

## LOHER Low-Voltage Motors

Type series 1MD5, 1PS0, 1PS1, 1PS4 and 1PS5

Frame sizes 71 to 500

Power range 0.25 to 1400 kW

Motors

Catalog  
D 83.1

Edition  
2014

Answers for industry.

## Related catalogs

<p><b>SINAMICS G180</b> D 18.1 Converters – Compact Units, Cabinet Systems, Cabinet Units Air-Cooled and Liquid-Cooled</p> <p>E86060-K5518-A111-A2-7600</p>	
<p><b>MOTOX Geared Motors</b> D 87.1</p> <p>E86060-K5287-A111-A4-7600</p>	
<p><b>Motion Control Drives</b> D 31 SINAMICS Inverters for Single-Axis Drives and SIMOTICS Motors</p> <p>E86060-K5531-A101-A1-7600 E86060-E5531-A101-A1-7600 (News)</p>	
<p><b>SINAMICS Drives</b> D 11 SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units E86060-K5511-A101-A5-7600</p>	
<p><b>Industrial Communication</b> IK PI SIMATIC NET</p> <p>E86060-K6710-A101-B7-7600</p>	
<p><b>AC NEMA &amp; IEC Motors</b> D 81.2 Further details available on the Internet at: U.S./Canada</p> <p><a href="http://www.sea.siemens.com/motors">www.sea.siemens.com/motors</a></p>	
<p><b>Products for Automation and Drives</b> CA 01 Interactive Catalog, DVD</p> <p>E86060-D4001-A510-D3-7600</p>	
<p><b>Industry Mall</b> Information and Ordering Platform in the Internet:</p> <p><a href="http://www.siemens.com/industrymall">www.siemens.com/industrymall</a></p>	

All information material, such as brochures, catalogs, manuals and operating instructions for standard drive systems are available up-to-date on the Internet at the following address:

[www.siemens.com/motors/printmaterial](http://www.siemens.com/motors/printmaterial)

The listed documentation can be ordered here or it is available in commonly used file formats (PDF, ZIP) for downloading.

**Energy saving/Energy-saving program SinaSave**

Further information on the subject of energy saving and the energy-saving program SinaSave is available at the following address:

[www.siemens.com/energysaving](http://www.siemens.com/energysaving)

**Interactive Catalog CA 01 – Drive Technology Configurator**

The **Drive Technology Configurator** is available in conjunction with the electronic catalog CA 01 on DVD.



In addition, the Drive Technology Configurator (DT Configurator) can be used on the Internet without requiring any installation. The DT Configurator can be found in the Siemens Mall under the following address:

[www.siemens.com/dt-configurator](http://www.siemens.com/dt-configurator)

The DT Configurator for motors, mechanical components, converters, connection systems, control and licenses and system configuration can be found in the CA 01 main menu, under drive systems, selection and engineering tools.

- 2D/3D model generator for motors and drives
- Data sheet generator
- Start-up calculation
- Comprehensive product-specific documentationn

#### Hardware and software requirements

- PC with 1.5 GHz CPU or faster
- Operating systems
  - Windows XP
  - Windows NT 4.0 (SP6 and higher)
  - Windows Vista
  - Windows 7
- At least 1 GB RAM (2 GB recommended)
- Screen resolution 1024 x 768, graphics with more than 256 colors, small fonts
- DVD drive for offline version (CA 01)
- Windows-compatible sound card
- Windows-compatible mouse

#### Installation

The CA01 catalog can be directly installed on the hard disk or in the network from the DVD as a partial or full version.

# LOHER Low-Voltage Motors

## Type series 1MD5, 1PS0, 1PS1, 1PS4 and 1PS5

### Motors



### Catalog D 83.1 · 2014

Refer to the Industry Mall for current updates of this catalog:

[www.siemens.com/industrymall](http://www.siemens.com/industrymall)

The products contained in this catalog can also be found in the Interactive Catalog CA 01.

Article No.: E86060-D4001-A510-D3-7600

Please contact your local Siemens branch.

© Siemens AG 2014

### Introduction

LOHER motors

General information regarding efficiency in accordance with International Efficiency Guide to selecting and ordering the motors  
 General technical specifications

1

### Motors with Explosion Protection

Orientation

SIMOTICS XP 1MD5 motor series

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

LOHER CHEMSTAR and VARIO 1PS1 motor series

2

### Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

3

### Tools and Engineering

4

### Appendix

5



Printed on paper from sustainably managed forests and controlled sources.

[www.pefc.org](http://www.pefc.org)



The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 002241 QM08). The certificate is recognized by all IQNet countries.



آتور صنعت  
ATOORSANAT



## Answers for industry.

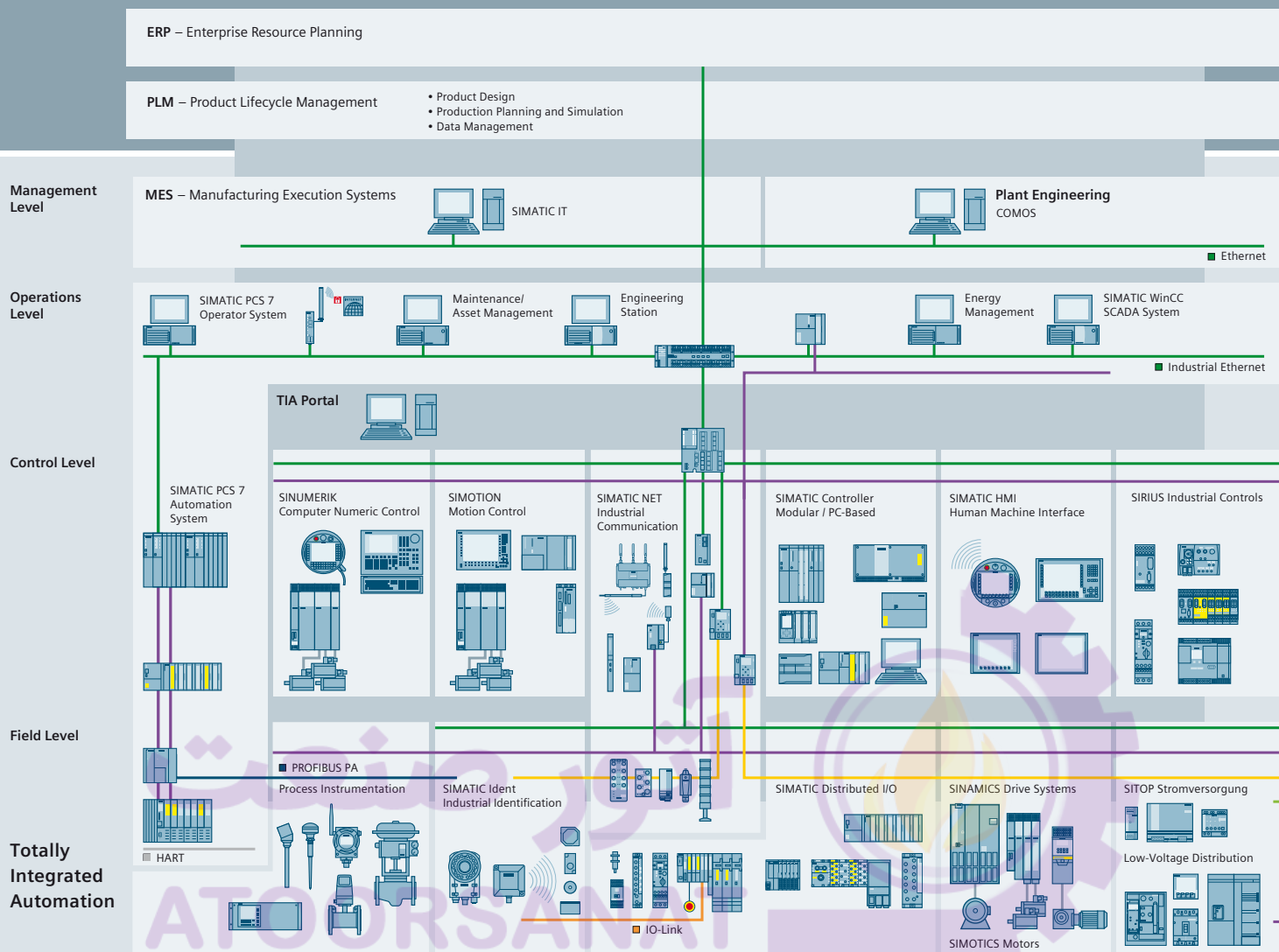
Integrated technologies, vertical market expertise and services for greater productivity, energy efficiency, and flexibility.



The Siemens Industry Sector is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility. With a global workforce of more than 100 000 employees, the Industry Sector comprises the Industry Automation, Drive Technologies, and Customer Services divisions, as well as the Metals Technologies Business Unit.

We consistently rely on integrated technologies and, thanks to our bundled portfolio, we can respond more quickly and flexibly to our customers' wishes. With our globally unmatched range of automation technology, industrial control and drive technology as well as industrial software, we equip companies with exactly what they need over their entire value chain – from product design and development to production, sales and service. Our industrial customers benefit from our comprehensive portfolio, which is tailored to their market and their needs.

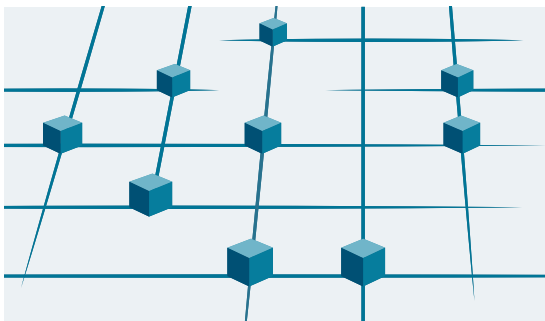
Market launch times can be reduced by up to 50 % due to the combination of powerful automation technology and industrial software from Siemens Industry. At the same time, the costs for energy or waste water for a manufacturing company can be reduced significantly. In this way, we increase our customers' competitive strength and make an important contribution to environmental protection with our energy-efficient products and solutions.



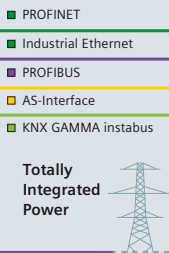
## Efficient automation starts with efficient engineering.

**Totally Integrated Automation: Efficiency driving productivity.**

Efficient engineering is the first step toward better production that is faster, more flexible, and more intelligent. With all components interacting efficiently, Totally Integrated Automation (TIA) delivers enormous time savings right from the engineering phase. The result is lower costs, faster time-to-market, and greater flexibility.



Totally Integrated Automation  
Efficient interoperability of all automation components



## A unique complete approach for all industries

As one of the world's leading automation suppliers, Siemens provides an integrated, comprehensive portfolio for all requirements in process and manufacturing industries. All components are mutually compatible and system-tested. This ensures that they reliably perform their tasks in industrial use and interact efficiently, and that each automation solution can be implemented with little time and effort based on standard products. The integration of many separate individual engineering tasks into a single engineering environment, for example, provides enormous time and cost savings.

With its comprehensive technology and industry-specific expertise, Siemens is continuously driving progress in manufacturing industries – and Totally Integrated Automation plays a key role.

Totally Integrated Automation creates real value added in all automation tasks, especially for:

- **Integrated engineering**  
Consistent, comprehensive engineering throughout the entire product development and production process
- **Industrial data management**  
Access to all important data occurring in productive operation – along the entire value chain and across all levels
- **Industrial communication**  
Integrated communication based on international cross-vendor standards that are mutually compatible
- **Industrial security**  
Systematic minimization of the risk of an internal or external attack on plants and networks
- **Safety Integrated**  
Reliable protection of personnel, machinery, and the environment thanks to seamless integration of safety technologies into the standard automation

## Making things right with Totally Integrated Automation

Totally Integrated Automation, industrial automation from Siemens, stands for the efficient interoperability of all automation components. The open system architecture covers the entire production process and is based on end-to-end shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces.

Totally Integrated Automation lays the foundation for comprehensive optimization of the production process:

- Time and cost savings due to efficient engineering
- Minimized downtime due to integrated diagnostic functions
- Simplified implementation of automation solutions due to global standards
- Better performance due to interoperability of system-tested components



## Totally Integrated Power

We bring power to the point – safely and reliably.



Comprehensive answers for power distribution in complex energy systems – from Siemens

Efficient, reliable, safe: These are the demands placed on electrification and especially power distribution. And our answer – for all application areas of the energy system – is Totally Integrated Power (TIP). It's based on our comprehensive range of products, systems, and solutions for low and medium voltage, rounded out by our support throughout the entire lifecycle – from planning with our own software tools to installation, operation, and services.

Smart interfaces allow linking to industrial or building automation, making it possible to fully exploit all the optimization potential of an integrated solution. This is how we provide our customers around the world with answers to their challenges. With highly efficient, reliable, and safe power distribution, we lay the foundation for sustainable infrastructure and cities, buildings, and industrial plants. We bring power to the point – wherever and whenever it is needed.

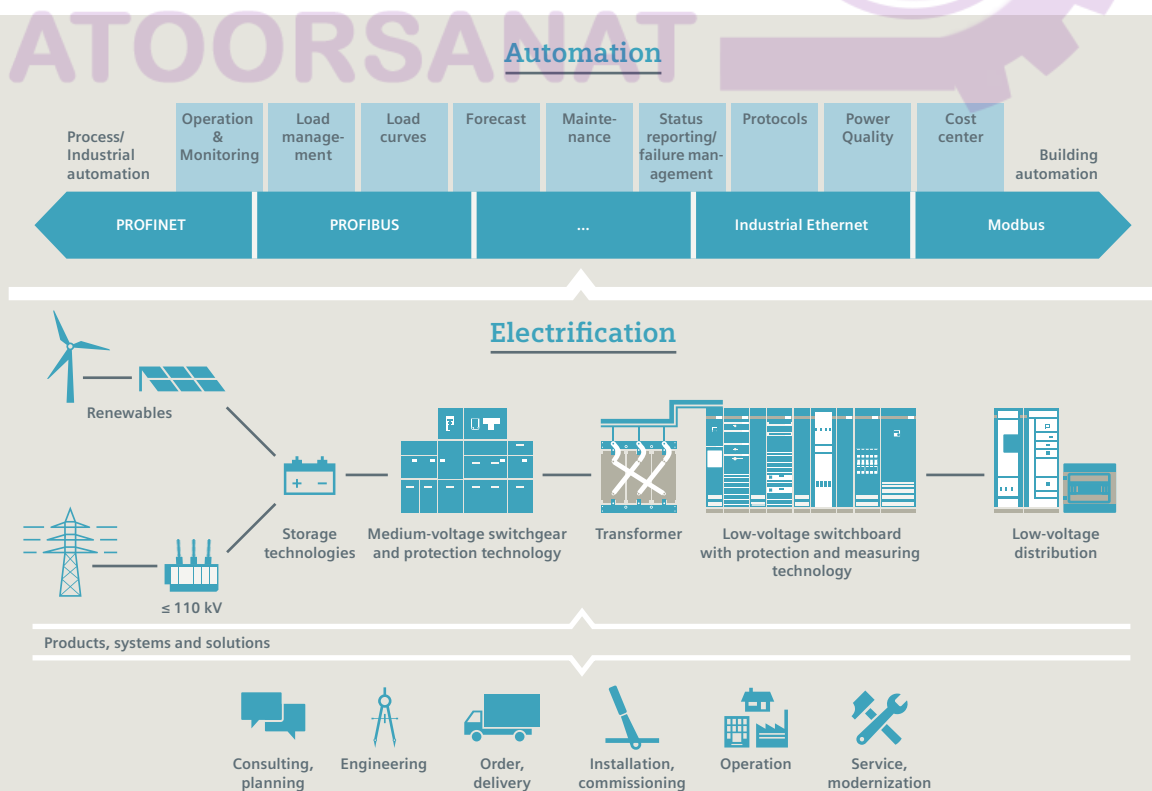
More information: [www.siemens.com/tip](http://www.siemens.com/tip)



# Totally Integrated Power offers more:

- **Consistency:**  
For simplified plant engineering and commissioning as well as smooth integration into automation solutions for building or production processes
- **One-stop-shop:**  
A reliable partner with a complete portfolio for the entire process and lifecycle – from the initial idea to after-sales service
- **Safety:**  
A comprehensive range of protection components for personnel safety and line and fire protection, safety by means of type testing
- **Reliability:**  
A reliable partner who works with customers to develop long-lasting solutions that meet the highest quality standards
- **Efficiency:**  
Bringing power to the point means greater plant availability and maximum energy efficiency in power distribution
- **Flexibility:**  
End-to-end consistency and modular design of Totally Integrated Power for any desired expansions and adaptation to future requirements
- **Advanced technology:**  
Reliable power distribution especially for applications in which supply is critical, continuous refinement of the technology

## Challenges are our speciality





## Introduction



1/2	<b>LOHER motors</b>	1/16	<b>General technical specifications</b>
1/2	<u>Customized and industry-specific drive solutions in the process industry</u>	1/16	Cut-away diagram of a LOHER CHEMSTAR low-voltage motor
1/2	Overview	1/17	Paint finishes
1/2	• Motors in all applicable types of protection – from 0.1 kW through to the Megawatt range	1/19	Packaging, safety notes, documentation and test certificates
1/2	• Double protection for maximum safety	1/20	Designs in accordance with standards and specifications
1/3	Application	1/22	Motor protection
1/3	• LOHER CHEMSTAR and LOHER VARIO	1/23	Voltages, currents and frequencies
1/3	• Special solutions exclusively for special cases	1/24	Outputs and operating modes
1/4	Design	1/25	Rating plates and extra rating plates
1/5	<b>General information regarding efficiency in accordance with International Efficiency with International Efficiency</b>	1/26	Efficiency, power factor, rated torque, rated speed
1/5	<u>Efficiency classes and efficiencies according to IEC 60034-30:2008</u>	1/26	Insulation and windings
1/5	Overview	1/27	Heating and ventilation
1/5	• Standardization of the efficiency classes	1/28	Types of construction
1/5	• IE efficiency classes	1/30	Motor connection and terminal box
1/5	• Measuring method according to IEC 60034-2-1:2007 for determining the efficiency	1/31	Degrees of protection and mechanical design
1/5	• Background information	1/33	Bearings
1/6	• Dates on which the changes will come into effect	1/46	Grease lifetime, relubrication intervals, grease quantities
1/6	• Explosion-proof motors also with high efficiency	1/48	Position and design of the grounding terminals
1/6	• Abbreviations	1/49	Measuring-surface sound pressure level
1/7	<b>Guide to selecting and ordering the motors</b>	1/50	Information about electric motor dimensioning
1/7	<u>Drive selection and catalog orientation</u>	1/51	Coolant temperature and site altitudes
1/7	Overview	1/58	VIK design
1/7	• Steps for drive selection	1/59	Brakes and brake motors
1/8	• Range of motors with explosion protection	1/68	<u>Converter-fed operation</u>
1/9	• Range of motors without explosion protection	1/68	Special mechanical characteristics
1/10	<u>Article number code</u>	1/88	Technical definitions for pole-changing motors
1/11	<u>Special tests in the test bay</u>		
1/11	Overview		
1/11	• Tests, test bay		

## Introduction

### LOHER motors

#### Customized and industry-specific drive solutions in the process industry

#### Overview

With the LOHER CHEMSTAR, LOHER VARIO and SIMOTICS XP motor series, Siemens has a range of drive solutions that are specifically tailored to customized or industry-specific requirements.

Building on well-proven standard platforms, the motors and converters are adapted to a specific project with considerable versatility in terms of mechanical and electrical design, as well as special monitoring systems and cooling methods. Totally individual drive systems are generated as a consequence which are tailor made for the respective plant, application or customer specification, thus enabling even highly sophisticated drives to be achieved over the complete output range.

#### *Motors in all applicable types of protection – from 0.1 kW through to the Megawatt range*

LOHER CHEMSTAR and LOHER VARIO motors are available depending on their classification from 0.1 to around 3000 kW in all applicable types of protection. The motors ensure reliable operation even in explosive atmospheres and provide maximum safety for persons, machines and the environment.

The motors are available with the following types of protection:

- Dust explosion protection in hazardous zones 21 and 22
- "Non-sparking" **Ex nA** for Zone 2
- "Pressurized enclosure" **Ex p** for Zone 1
- "Increased safety" **Ex e** for Zone 1
- "Explosion-proof enclosure" **Ex d** for Zone 1

The portfolio comprises motors of Group II (EU directive 94/9/EC) for use in environments containing explosive gases in the chemical, petrochemical and oil and gas industries, as well as motors of Group I for firedamp protection in mining.

The motors are ATEX certified and also have country-specific certificates such as EAC (Eurasian Customs Union), CCOE (India) and NEPSI (China). The range of explosion-proof low-voltage motors has been expanded with motors of the SIMOTICS XP series. It represents the future standard product series. The SIMOTICS XP motors are available in the type of protection "Explosion-proof enclosure" **Ex d** for an output range from 0.25 to 500 kW and supplement the LOHER CHEMSTAR series. In comparison to the LOHER CHEMSTAR series, the smaller range of products and fixed product characteristics ensure significantly shorter delivery times and a considerably easier ordering process.

#### *Double protection for maximum safety*

LOHER CHEMSTAR and LOHER VARIO motors can also be used for drive solutions with double protection. This involves, on the one hand, a combination of gas and dust explosion protection for locations in which both fine dust and explosive gases can occur, e.g. in the process industry or in mining. On the other hand, this can be the double protection of the Ex d and Ex e types of protection. This double protection is, for example, appropriate onboard liquid gas tankers whereby electrical equipment must be totally excluded as a possible ignition source due to the hazardous load. For this purpose, the explosion-proof motors are mechanically designed with the type of protection "Explosion-proof enclosure". At the same time, the temperatures of the active parts correspond to the type of protection "Increased safety".

#### Further products

This catalog contains explosion-proof motors in fin-cooled designs. In the case of high outputs up to 13.5 MW, tube-cooled motors are available (normally in the type of protection "Explosion-proof enclosure" Ex d) as well as LOHER VARIO PLUS motors with built-on heat exchangers (air-to-air or air-to-water). The normal types of protection here are "Non-sparking" Ex n and "Pressurized enclosure" Ex p. Specially designed motors are also available in the larger frame sizes for converter-fed operation. They are characterized by subcritical operation, i.e. the critical bending speed is higher than the rated speed. The full control range can be utilized. The motors are designed with sleeve bearings or roller bearings in accordance with their output and number of poles.

## Application

The drive solutions with LOHER motors are matched to application-specific requirements – whatever extreme the actual location of use. The range comprises, in particular:

- Explosion-proof drives of all common types of protection
- Winch drives that stand unprotected on the deck of a ship
- Subsea components for transporting mineral resources from the deep sea
- Drill drives for drilling tunnels or for underground coal mining
- Smoke extraction motors that ensure fault-free fan operation even under conditions of smoke at extremely high temperatures
- Vibration-proof, shock-resistant and earthquake-resistant motors
- Motors for deserts – specially designed for heat, dust and sand storms
- Low-temperature drives for drive tasks in polar climates



### LOHER CHEMSTAR and LOHER VARIO

LOHER CHEMSTAR and LOHER VARIO motors cover all common types of protection with outputs ranging from 0.25 to 1400 kW. The standard degree of protection is IP55. The range of degrees of protection, however, extends as far as IP66. The housing is made of rugged cast-iron or steel. Possible options include reinforced bearings and integrated PTC thermistors. LOHER CHEMSTAR and LOHER VARIO motors are supplied with industry-specific documentation, including ATEX certificates for the chemical and petrochemical industries.

With motors of the LOHER CHEMSTAR series, there is often no need for an anti-condensation heater even under conditions of extremely high humidity. The motors operate reliably in a temperature range from -55 to +70 °C, even in zones with dust and gas. The motors can therefore also be used in desert and polar regions. Versions with corrosion-resistant stainless steel screws are available. Shaft seals in IP55 degree of protection are available as standard and provide protection against water and dust to ensure problem-free outdoor installation.

Versions in industry-specific design are possible, for example with a high-quality, particularly chemical-resistant finish or galvanized fan covers for corrosion protection in aggressive atmospheres.



### Special solutions exclusively for special cases

#### Subsea components

The subsea motors are developed especially for operation on the seabed. They operate smoothly at depths of 1000 m. They are used as drives for pumps, multi-phase pumps and compressors and therefore play an important role in the optimum exploitation of oil and gas fields.

#### Platform drives

Compliance with extremely stringent standards is necessary here with regard to the requirements for the operation of drive systems on drilling platforms. The platform motors satisfy the requirements of these standards, both in general terms of reliability, monitoring equipment and integration in platform-wide monitoring systems, as well as in specific applications for example with requirements such as ice protection for polar regions. The platform motors generally feature a special offshore paint finish for protection against salty sea air. Bolts and other exposed parts are made of stainless steel.

## Introduction

LOHER motors

### Customized and industry-specific drive solutions in the process industry

#### Application (continued)

##### Integrated pump drives

In the chemical industry, special motors are used that are integrated into pumps. They operate reliably even under extreme conditions of temperature and pressure. In this industry, temperatures can range from -50 to +400 °C and system pressures can be as high as 1200 bar.



#### Design

The motors described in this catalog are surface-cooled, low-voltage motors designed for the highest demands on availability and reliability. The motors are extremely rugged and reliable and are available as standard versions without explosion protection, as well as in the Ex nA, Ex d(e), Ex p and Ex e types of protection. For extreme requirements, motors are available with double protection against gas and dust.

The highly efficient motors cover the output range of 0.25 to 1400 kW in 2 to 16-pole versions (higher outputs are possible on request) and, in compliance with IEC 60034-30, they achieve efficiency class IE2 in the output range 0.75 to 375 kW in 2-, 4- and 6-pole versions, and they are available for 50 Hz and 60 Hz.

The LOHER CHEMSTAR and SIMOTICS XP motor series are self-ventilated, surface-cooled finned motors for mains-fed and converter-fed operation.

The LOHER VARIO series, which is also surface-cooled, is characterized by its special internal air circulation / hollow fin technology for an extremely high power density with a very high degree of efficiency.

## Overview

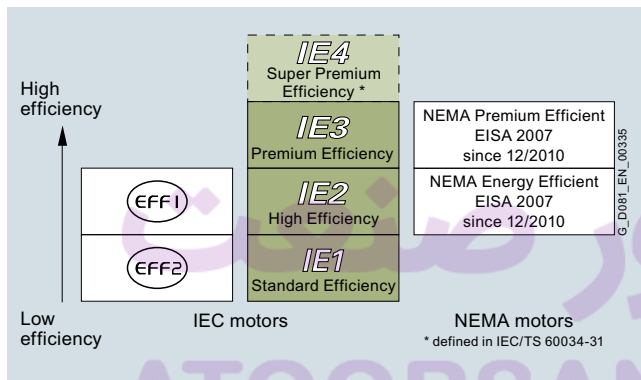
### Standardization of the efficiency classes

Different energy efficiency standards exist worldwide for induction motors. To promote international standardization, the international standard IEC 60034-30:2008 (Rotating electrical machines – Part 30: Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)) was created. This groups low-voltage induction motors into new efficiency classes (valid since October 2008). The efficiencies of IEC 60034-30:2008 are based on losses determined in accordance with the IEC 60034-2-1:2007 standard. This has been valid since November 2007 and replaces standard IEC 60034-2:1996 as of November 2010. The supplementary losses are now measured and no longer added as a percentage.

### IE efficiency classes

The efficiency classes are grouped according to the following nomenclature:

- IE1 (Standard Efficiency)
- IE2 (High Efficiency)
- IE3 (Premium Efficiency)
- IE4 (Super Premium Efficiency)



IE efficiency classes depending on the output

Note: All efficiency classes are stated with reference to 50 Hz data (unless specified otherwise).

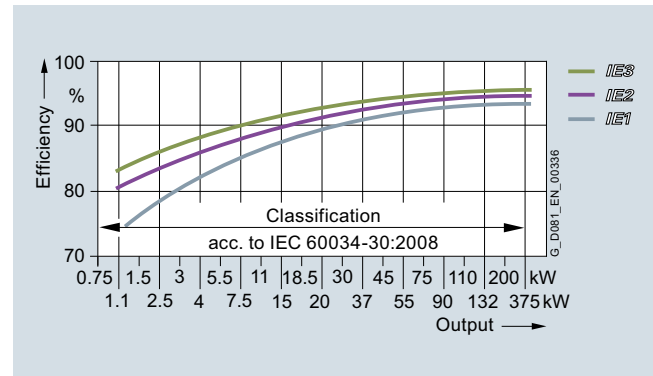
### Measuring method according to IEC 60034-2-1:2007 for determining the efficiency

With the measuring method, the supplementary losses are no longer applied as a percentage, but instead they are determined with measurements (IEC 60034-2-1: 2007). The nominal efficiencies are therefore normally reduced from EFF1 to IE2 and from EFF2 to IE1 for technically and physically identical motors.

Previously:  $P_{LL} = 0.5 \% \text{ of } P_{\text{added}}$

Now:  $P_{LL} = \text{Individual measurement}$

$P_{LL} = \text{Load dependent supplementary losses}$



IE1 to IE3 efficiencies 4-pole 50 Hz

The following table shows examples of the efficiency values according to the current and previous loss calculating methods.

	EFF measuring method (incl. percentage losses) EN/IEC 60034-2:1996 50 Hz	Losses determined according to IEC 60034-2-1:2007 50 Hz
5.5 kW 4-pole	89.2 %	87.7 %
45 kW 4-pole	93.9 %	93.1 %

### Background information

Comprehensive laws have been introduced in the European Union with the objective of reducing energy consumption and therefore CO<sub>2</sub> emissions. EU Directive 640/2009 concerns the energy consumption or efficiency of induction motors in the industrial environment. This Directive is now in force in every country of the European economic area.

For further details on internationally applicable standards and legal requirements, visit:

[www.siemens.com/international-efficiency](http://www.siemens.com/international-efficiency)

The EuP directive (Energy using Products) is implemented in the domestic laws of EU countries. The framework conditions for the European directives have already been agreed. The EU directive 2005/32/EC (=EuP directive) is based, regarding minimum efficiencies, on IEC 60034-30:2008. This directive has been implemented in Germany by means of the so-called "Energiebetriebene-Produkte-Gesetz (EBPG)" [Energy-using products law]. Low-voltage motors and high-voltage motors are affected by changes to the standard – but only the version for mains-fed operation.

## Introduction

General information regarding efficiency in accordance with International Efficiency

### Efficiency classes and efficiencies according to IEC 60034-30:2008

#### Overview (continued)

	CEMEP voluntary EU agreement	NEMA	EuP directive based on standard IEC 60034-30:2008
Description	Voluntary agreement between the EU commission and the European sector committee of manufacturers of electrical machines (CEMEP)	The current legislature in USA/CAN/MX also governs efficiencies	The EuP directive must be implemented in national law in all EU countries. Losses are determined and therefore the efficiency is determined in accordance with IEC 60034-2-1:2007
Number of poles	2, 4	2, 4, 6	2, 4, 6
Output range	1.1 ... 90 kW	0.75 ... 150 kW	0.75 ... 375 kW
Level	Standard – EFF3 Improved efficiency – EFF2 Highly efficient – EFF1	NEMA Energy Efficient NEMA Premium Efficient	Standard Efficiency – IE1 High Efficiency – IE2 Premium Efficiency – IE3
Voltage	400 V, 50 Hz	230/460 V, 60 Hz	<1000 V, 50/60 Hz
Degree of protection	IP5x	Open + closed motors	All
Motors with brake	NO	YES	In agreement
Geared motors	NO	NO	YES
Ex motors	NO	YES	EuP directive – NO IEC 60034-30 – YES (but explosion protection always has a higher priority)
Validity	Voluntary agreement; will be replaced on implementation of the national measures	Before November 2010 EPACT (IE2) From December 2010 EISA 2007 Premium (IE3) minimum efficiency	IEC 60034-30 standard, valid since October 2008, EuP

#### Dates on which the changes will come into effect

##### January 1, 2015

Compliance with the legally required minimum efficiency class IE3 for outputs from 7.5 to 375 kW or, as an alternative, IE2 motor plus frequency converter

##### January 1, 2017

Compliance with the legally required minimum efficiency class IE3 for outputs from 0.75 to 375 kW or, as an alternative, IE2 motor plus frequency converter

#### Abbreviations

**CEMEP:** Comité Européen de Constructeurs de Machines Électriques et d'Électronique de Puissance (European sector committee of manufacturers of electrical machines)

**NEMA:** National Electrical Manufacturers Association

**IEC:** International Electrotechnical Commission

**IE:** International Efficiency

**EuP:** Energy using Products

#### Explosion-proof motors also with high efficiency

International standard IEC 60034-30, which has been issued in response to the increasing importance of the subject of energy efficiency, also concerns explosion-proof motors. LOHER has developed some series of explosion-proof motors especially for this purpose in the Ex nA, Ex e and Ex de types of protection in class "IE2". The rating plate is stamped with efficiency class "IE2" and the efficiency values. On expiry of the transition phase, details of the voltage ranges are omitted. Only the rated voltage is specified with the admissible line supply tolerances of  $\pm 10\%$ .



## Overview

## Steps for drive selection

Step 1	Orientation and general technical information	
<b>Technical requirements for the motor</b>	Rated frequency and rated voltage	50/60 Hz 3 AC 400/500/690 V
	Operating mode	Standard duty (continuous duty S1 according to EN 60034-1)
	Degree of protection or type of explosion protection required	IP..
	Rated speed (No. of poles)	$n = \dots$ rpm
	Rated output	$P = \dots$ kW
	Rated torque	$T = P \cdot 9550/n = \dots$ Nm
	Type of construction	IM..
Step 2	Preselection in accordance with the application	
<b>Determination of the installation conditions and definition of the application, if necessary</b>	Ambient temperature	$\leq 40$ °C $> 40$ °C
	Site altitude	$\leq 1000$ m $> 1000$ m
	Factors for derating	None      Determine the factor for derating (for reduction factor, see "Information about electric motor dimensioning")
<b>Cross-reference to other motors</b>	These can be SIMOTICS motors for special requirements and applications or motors to the NEMA standard	
Step 3	Preliminary selection of the motor	
<b>Determination of the range of possible motors</b>	Select the frame size and therefore the possible motors on the basis of the following parameters: cooling method, degree of protection, rated output, rated speed and rated torque range. Note: The standard temperature range of the motors is from -20 to +40 °C.	

## Structure of the selection and ordering tables

Output, frame size, temperature class		Operating values at rated output														Article No., add. data		
Table header – Meaning																		
$P_{\text{rated}}$ 50 Hz	$P_{\text{rated}}$ 60 Hz	$P_{\text{rated}}$ 60 Hz	Frame size	$n_{\text{rated}}$ 50 Hz	$T_{\text{rated}}$ 50 Hz	IE class	$\eta_{\text{rated}}$ 50 Hz, 4/4	$\eta_{\text{rated}}$ 50 Hz, 3/4	$\eta_{\text{rated}}$ 50 Hz, 2/4	COS- $\varphi_{\text{rated}}$ 50 Hz, 4/4	$I_{\text{rated}}$ 50 Hz, 400 V	$I_{\text{rated}}$ 50 Hz, 690 V	$T_{\text{LR}}/T_{\text{rated}}$	$I_{\text{LR}}/I_{\text{rated}}$	$T_{\text{B}}/T_{\text{rated}}$	Article No.	$m_{\text{IM B3}}$	$J$
kW	kW	hp	FS	rpm	Nm		%	%	%		A	A					kg	kgm <sup>2</sup>
Rated output at 50 Hz	Rated output at 60 Hz	Rated output at 60 Hz	Frame size	Rated speed at 50 Hz	Rated torque at 50 Hz	Efficiency Class according to IEC 60034-30 standard	Efficiency at 50 Hz 4/4 load	Efficiency at 50 Hz 3/4 load	Efficiency at 50 Hz 2/4 load	Power factor at 50 Hz 4/4 load	Rated current at 50 Hz	Rated current at 690 V, 50 Hz	Locked-rotor torque on direct switch-on as a multiple of the rated torque	Locked-rotor current on direct switch-on as a multiple of the rated current	Breakdown torque on direct switch-on as a multiple of the rated torque	Article number	Weight for IM B3 type of construction, approx.	Moment of inertia

## Legend:

Primary key
Standard values for all motors
Specially for versions for converter-fed operation

## Note on pole-changing motors:

The operating values are specified here for the rated output for the 2 or 3 different pole numbers.

Step 4	Detailed selection of the motors in the selection and ordering data tables
<b>Determination of the basic Article No. of the motor</b>	Determine the motor Article No. according to the following parameters: rated output, rated speed, rated torque and rated current from the "Selection and ordering data" for the motors that have already been identified as possibilities.
Step 5	Selection of the special versions or options
<b>Completing the motor Article No.</b>	Determine special versions and the associated order codes (e.g. special voltages and types of construction, motor protection and degrees of protection, windings and insulation, colors and paint finish, mountings and mounting technology, etc.).
Step 6	Additional information for motor selection
<b>Checking the required measurements</b>	The dimensions are specified in each catalog section under the paragraph of "Dimensions".
<b>Selection of the frequency converter, if required</b>	Article No. of the converter as well as its selection, see Catalogs D 11, D 11.1, D 18.1, D 21.3, D 31 and DA 51.2.

## Introduction

Guide to selecting and ordering the motors

### Drive selection and catalog orientation

1

#### Overview (continued)

##### Range of motors with explosion protection

Cata- log section	Motor version	Motor type	No. of poles	Fre- quency	Frame size – rated output at 50 or 60 Hz																
					71	80	90	100	112	132	160	180	200	225	250	280	315	355	400	450	500
<b>2</b>	<b>Motors with explosion protection 1PS1, 1PS4, 1PS5, 1MD5</b>																				
High Efficiency IE2	1MD5	2-pole	50 Hz	0.75 ... 360 kW																	
				4-pole	50 Hz	0.75 ... 360 kW															
						6-pole	50 Hz	0.75 ... 360 kW													
High Efficiency	2-pole	50 Hz	0.37 ... 0.55 kW												460 kW						
			4-pole	50 Hz	0.25 ... 0.55 kW												460 kW				
					6-pole	50 Hz	0.25 ... 0.55 kW														
High Efficiency IE2	1PS4	2-pole	50 Hz	315 ... 355 kW												460 kW					
			60 Hz	355 kW																	
		4-pole	50 Hz	280 ... 355 kW																	
			60 Hz	315/355 kW																	
		6-pole	50 Hz	225 ... 355 kW																	
High Efficiency <sup>2)</sup>	2-pole	50 Hz	400 ... 1200 kW																		
			60 Hz	400 ... 900 kW																	
		4-pole		50 Hz	400 ... 1400 kW																
			60 Hz	400 ... 1000 kW																	
		6-pole	50 Hz	400 ... 1120 kW																	
		8-pole	50 Hz	200 ... 950 kW																	
10-pole	50 Hz	160 ... 750 kW																			
12-pole	50 Hz	140 ... 600 kW																			
14-pole	50 Hz	110 ... 500 kW																			
16-pole	50 Hz	90 ... 400 kW																			
High Efficiency IE2	1PS5	2-pole	50 Hz	0.75 ... 355 kW																	
			60 Hz	0.9 ... 355 kW																	
		4-pole	50 Hz	0.75 ... 355 kW																	
			60 Hz	0.9 ... 355 kW																	
		6-pole	50 Hz	0.75 ... 355 kW, FS90 and above																	
			60 Hz	0.75 ... 200 kW; FS90 ... 315																	
High Efficiency <sup>2)</sup>	2-pole	50 Hz	0.37 ... 0.55 kW												400 ... 1200 kW						
			60 Hz	0.44/0.66 kW												400 ... 900 kW					
		4-pole		50 Hz	0.25 ... 0.55 kW												400 ... 1400 kW				
			60 Hz	0.3 ... 0.66 kW												400 ... 1000 kW					
		6-pole	50 Hz	0.25 ... 0.55 kW												400 ... 1120 kW					
			60 Hz	0.3 ... 0.66 kW																	
		8-pole	50 Hz	0.12 ... 950 kW																	
10-pole	50 Hz													160 ... 750 kW							
12-pole	50 Hz													140 ... 600 kW							
14-pole	50 Hz													110 ... 500 kW							
16-pole	50 Hz													90 ... 400 kW							
Pole- changing (50 Hz)	4-/2-pole	50 Hz	Constant load torque: 0.65/0.85 ... 150/200 kW																		
			Square-law load torque for fan drive: 0.22/1.1 ... 50/200 kW																		
	8-/4-pole	50 Hz	Constant load torque: 0.5/0.8 ... 145/220 kW																		
			Fan output: 0.12/0.7 ... 45/180 kW																		
	6-/4-pole	50 Hz	Constant load torque: 0.6/0.9 ... 125/180 kW																		
			Square-law load torque for fan drive: 0.4/1.3 ... 75/200 kW																		
8-/6-pole	50 Hz	Constant load torque: 0.45/0.6 ... 115/150 kW																			
		Square-law load torque for fan drive: 0.32/0.75 ... 70/150 kW																			
Brake motors with High Efficiency IE2	4-pole	50 Hz	0.75 ... 30 kW																		
			6-pole	50 Hz	0.6 ... 22 kW																

<sup>1)</sup> Frame sizes 560 to 630 on request.

<sup>2)</sup> Outside the IE code classification according to IEC 60034-30.

Overview (continued)

Range of motors with explosion protection (continued)

Cata-log section	Motor version	Motor type	No. of poles	Fre-quency	Frame size – rated output at 50 or 60 Hz															
					71	80	90	100	112	132	160	180	200	225	250	280	315	355	400	450
<b>2 Motors with explosion protection 1PS1, 1PS4, 1PS5, 1MD5 (continued)</b>																				
High Efficiency IE2	1PS1	2-pole	50 Hz	1.5 ... 355 kW																
			60 Hz	1.5 ... 315 kW																
		4-pole	50 Hz	1.1 ... 355 kW																
			60 Hz	1.3 ... 315 kW																
		6-pole	50 Hz	0.75 ... 355 kW																
			60 Hz	0.75 ... 250 kW																
	High Efficiency <sup>2)</sup>	2-pole	50 Hz	On request																
			60 Hz	400 ... 1200 kW																
		4-pole	50 Hz	400 ... 900 kW																
			60 Hz	400 ... 1400 kW																
		6-pole	50 Hz	400 ... 1000 kW																
			60 Hz	400 ... 1120 kW																
8-pole	50 Hz	0.37 ... 1350 kW																		
	50 Hz	180 ... 1100 kW																		
	50 Hz	160 ... 800 kW																		
	50 Hz	125 ... 710 kW																		
14-pole	50 Hz	100 ... 560 kW																		
	50 Hz																			

Range of motors without explosion protection

Cata-log section	Motor ver-sion	Motor type	No. of poles	Fre-quency	Frame size – rated output at 50 or 60 Hz															
					71	80	90	100	112	132	160	180	200	225	250	280	315	355	400	450
<b>3 1PS0 motors without explosion protection</b>																				
High Efficiency IE2	1PS0	2-pole	50 Hz	1.5 ... 355 kW																
			60 Hz	1.5 ... 315 kW																
		4-pole	50 Hz	1.1 ... 355 kW																
			60 Hz	1.3 ... 315 kW																
		6-pole	50 Hz	0.75 ... 355 kW																
			60 Hz	0.75 ... 250 kW																
	High Efficiency <sup>2)</sup>	2-pole	50 Hz	On request																
			60 Hz	400 ... 1200 kW																
		4-pole	50 Hz	400 ... 900 kW																
			60 Hz	400 ... 1400 kW																
		6-pole	50 Hz	400 ... 1000 kW																
			60 Hz	400 ... 1250 kW																
8-pole	50 Hz	0.37 ... 1350 kW																		
	50 Hz	0.55 ... 1100 kW																		
	50 Hz	0.37 ... 800 kW																		
	50 Hz	125 ... 710 kW																		
14-pole	50 Hz	100 ... 560 kW																		
	50 Hz																			
Pole-changing	4-/2-pole	50 Hz	0.5/2 ... 65/250 kW																	
		50 Hz	0.35/1.3 ... 60/275 kW																	
	6-/4-pole	50 Hz	0.4/1.3 ... 90/250 kW																	
		50 Hz	0.32/0.75 ... 85/190 kW																	
	8-/6-/4-pole	50 Hz	0.5/0.6/0.8 ... 70/90/110 kW																	
		50 Hz																		
Brake motors with High Efficiency IE2	2-pole	50 Hz	5.5 ... 11 kW																	
		50 Hz	5.5 ... 55 kW																	
		50 Hz	3 ... 37 kW																	

<sup>1)</sup> Frame sizes 560 to 630 on request.

<sup>2)</sup> Outside the IE code classification according to IEC 60034-30.

## Introduction

### Guide to selecting and ordering the motors

#### Article number code

#### Overview

The Article No. consists of a combination of digits and letters and is divided into three hyphenated blocks to provide a better overview, e.g.:

**1PS5070-0BD10-4AA0-Z**  
**A15**

The first block (positions 1 to 7) identifies the motor type complete with shaft height and overall length; the second block (positions 8 to 12) defines the insulation, machine type, stator frame and voltage/connection/frequency; and in the third block (positions 13 to 16) the temperature class, number of poles, bearing type and product version are encoded.

For deviations in the second and third block from the catalog codes, either **-Z** or **9** should be used as appropriate.

#### Ordering data:

- Complete Article No. and order code(s) or plain text
- If a quotation is available, please specify the quotation number in addition to the Article No.
- When ordering a complete motor as a spare part, please specify the factors No. for the previously supplied motor as well as the Article No.

Structure of the Article No.:		Position: 1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16																		
<b>Motors with explosion protection 1PS1, 1PS4, 1PS5, 1MD5 and motors without explosion protection 1PS0</b>																				
Positions 1 to 3: Digit, letter, letter, digit	<b>Motor series</b> LOHER CHEMSTAR, LOHER VARIO	<b>1</b>	<b>P</b>	<b>S</b>																
Position 4 Digit	<b>Type of protection</b> • Without explosion protection • "Non-sparking" Ex nA version • "Explosion-proof enclosure" Ex de IIB/Ex d IIB • "Explosion-proof enclosure" Ex de IIC/Ex d IIC				<b>0</b>	<b>1</b>	<b>4</b>	<b>5</b>												
Positions 1 to 3: Digit, letter, letter, digit	<b>Motor series</b> SIMOTICS XP	<b>1</b>	<b>M</b>	<b>D</b>																
Position 4 Digit	<b>Type of protection</b> "Explosion-proof enclosure" Ex de IIC/Ex d IIC				<b>5</b>															
Positions 5 and 6 Digits	<b>Frame size (FS)</b> <b>07:</b> FS 71; <b>08:</b> FS 80; <b>09:</b> FS 90; <b>10:</b> FS 100; <b>11:</b> FS 112; <b>13:</b> FS 132; <b>20:</b> FS 200; <b>22:</b> FS 225; <b>25:</b> FS 250; <b>28:</b> FS 280; <b>16:</b> FS 160; <b>18:</b> FS 180; <b>31:</b> FS 315; <b>35:</b> FS 355; <b>40:</b> FS 400; <b>45:</b> FS 450; <b>56:</b> FS 560				<b>0</b>	<b>7</b>	<b>...</b>	<b>5</b>	<b>6</b>											
Position 7 Digit	<b>Output identifier (encoded)</b> Length + output levels					<b>0</b>	<b>...</b>	<b>9</b>												
Position 8 Digit	<b>Insulation</b> <b>0:</b> Low-voltage, mains-fed operation; <b>1:</b> Low-voltage, converter-fed operation, standard insulation; <b>0</b> <b>2:</b> Low-voltage, converter-fed operation, special insulation; <b>...</b> <b>3:</b> Low-voltage, mains-fed operation, pre-formed coil; <b>4</b> <b>4:</b> Low-voltage, converter-fed operation, pre-formed coil									<b>0</b>	<b>...</b>	<b>4</b>								
Position 9 Letter	<b>Type of machine</b> <b>B:</b> Induction motor, squirrel-cage rotor, enclosed machine; <b>F:</b> Asynchronous generator, squirrel-cage rotor, enclosed machine; <b>N:</b> Induction motor, pole-changing, fan design; <b>R:</b> Induction motor with built-on brake											<b>B</b>	<b>...</b>	<b>R</b>						
Position 10 Letter	<b>Housing and cooling</b> <b>D:</b> Cast-iron, TEFC (self-ventilated); <b>F:</b> Cast-iron, TEFV (forced-air cooled) <b>F:</b> Steel, TEFC (self-ventilated); <b>J:</b> Steel, TEFV (forced-air cooled)												<b>D</b>	<b>...</b>	<b>J</b>					
Position 11 Digit	<b>Voltage, circuit and frequency</b> <b>0:</b> 690 VΔ, 50 Hz; <b>1:</b> 230/400 VΔ/Y, 50 Hz; <b>3:</b> 500 VY, 50 Hz; <b>4:</b> 400 VΔ, 50 Hz; <b>5:</b> 500 VΔ, 50 Hz; <b>6:</b> 400/690 VΔ/Y, 50 Hz; <b>8:</b> 690 VY, 50 Hz; <b>9:</b> Other voltages														<b>0</b>	<b>...</b>	<b>9</b>			
Position 12 Digit	<b>Type of construction</b> <b>0:</b> IM B3; <b>1:</b> IM B5; <b>2:</b> IM B34; <b>3:</b> IM B14; <b>4:</b> IM V1 with protective cover; <b>6:</b> IM B35; <b>8:</b> IM V1 without protective cover (without explosion protection); <b>9:</b> Other types of construction														<b>0</b>	<b>...</b>	<b>9</b>			
Position 13 Digit	<b>Temperature class</b> <b>0:</b> Without temperature class; <b>3:</b> Temperature class T3; <b>4:</b> Temperature class T4															<b>0</b>	<b>...</b>	<b>4</b>		
Position 14 Letter	<b>No. of poles</b> <b>A:</b> 2-pole; <b>B:</b> 4-pole; <b>C:</b> 6-pole; <b>D:</b> 8-pole; <b>E:</b> 10-pole; <b>F:</b> 12-pole; <b>G:</b> 14-pole; <b>H:</b> 16-pole; <b>N:</b> 4-/2-pole; <b>P:</b> 6-/4-pole; <b>Q:</b> 8-/4-pole; <b>R:</b> 8-/6-pole; <b>S:</b> 8-/6-/4-pole																<b>A</b>	<b>...</b>	<b>S</b>	
Position 15 Letter	<b>Bearing type/rotor type</b> <b>A:</b> Roller bearing/standard rotor; <b>B:</b> Roller bearing/special rotor																	<b>A</b>	<b>B</b>	
Position 16 Digit	<b>Product version</b> <b>0:</b> Finned housing; <b>1:</b> Cast-ingot housing (1MD5...1); <b>2:</b> Finned housing IE2 design <b>3:</b> Cast-ingot housing (1PS5...3)																	<b>0</b>	<b>...</b>	<b>3</b>

#### Ordering example

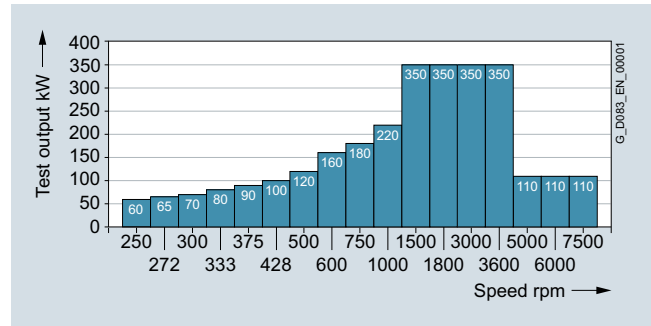
Selection criteria	Requirement	Structure of the Article No.
Motor type 1PS	Industry motor LOHER CHEMSTAR with type of protection "Explosion-proof enclosure"	<b>1PS5</b> ■■■ - ■■■■■ - ■■■■
Frame size	071	<b>1PS507</b> ■ - ■■■■■ - ■■■■
Output identifier	S	<b>1PS5070</b> - ■■■■■ - ■■■■
Mains-fed operation, induction motor with squirrel-cage rotor, cast-iron (self-ventilated)		<b>1PS5070 - 0BD</b> ■■ - ■■■■
Voltage/delta connection/frequency	690 VΔ, 50 Hz	<b>1PS5070 - 0BD1</b> ■ - ■■■■
Type of construction	IM B3	<b>1PS5070 - 0BD10</b> - ■■■■
Temperature class	T4	<b>1PS5070 - 0BD10 - 4</b> ■■■■
No. of poles	2-pole	<b>1PS5070 - 0BD10 - 4A</b> ■■■■
Bearing type/rotor	Roller bearing/standard rotor	<b>1PS5070 - 0BD10 - 4AA</b> ■■■■
Product version	Cast-ingot housing	<b>1PS5070 - 0BD10 - 4AA3</b>

**Overview****Tests, test bay**

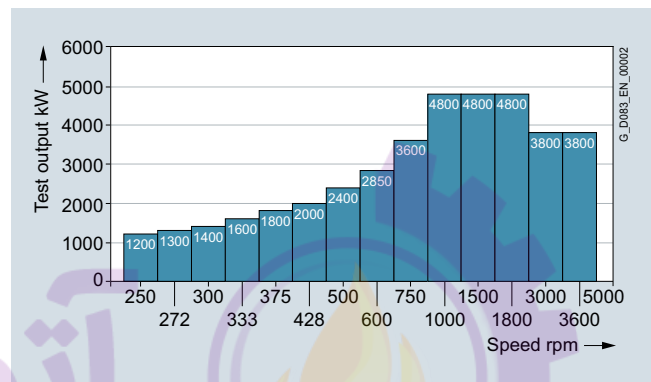
The Siemens Ruhstorf site is equipped with an ultra-modern test bay to enable it to fulfill the stringent requirements of the chemical industry and the oil and gas sector. The quality and reliability of the tests is also confirmed, for example, by the certification authorities for Ex motors. The in-house motor test bays are equipped for testing the complete range of options of the 1PS and 1MD5 motor series in accordance with the latest standards and regulations. Each motor is subjected to a short routine test prior to delivery. Type testing, warm-up runs and special tests are possible. The testing capacities are subdivided into two test units according to motor output. The output classification is shown in the following diagrams.

Tests are organized on the site ranging from acceptance tests in the presence of the customer through to system acceptance tests with supply equipment such as transformers and converters. Special tests are possible on request in accordance with customer specifications or standard tests such as API compliance. In our submersion tanks, motors to IP68 can be submerged in water and tested under load conditions.

Noise measurements are performed on request in a soundproof room. Under normal circumstances, noise measurements are performed under no-load conditions. On request, the measurements can also be taken under load conditions. So-called "hold points" can be agreed in addition to the possibilities offered by the test environments. These "hold points" are time points in which semi-finished/finished motor parts are tested in accordance with requirements. These tests are performed at the installed test sections of the production facility or, if necessary, in the test bays.



Overview of the range of tests available in the test bay for industrial motors



Overview of the range of tests available in the test bay for non-standard motors

## Introduction

### Guide to selecting and ordering the motors

#### Special tests in the test bay

##### Overview (continued)

##### Tests and acceptance tests for 1PS0, 1PS1, 1PS4 and 1PS5 motors

Additional identification code -Z with order code		Documen- tation	Test description	Available for	
For internal tests	For acceptance test with customer or inspector			Frame size	LOHER type series
<b>Standard</b>	<b>F01</b>	U51	Routine test to IEC (sine-wave voltage)	71 ... 500	CHEMSTAR, VARIO
–	<b>F03</b>	1)	Visual inspection with test report review	71 ... 500	CHEMSTAR, VARIO
<b>F14</b>	<b>F15</b>	2)	Recording of no-load characteristic	71 ... 500	CHEMSTAR, VARIO
<b>F16</b>	<b>F17</b>	2)	Recording of short-circuit characteristic	71 ... 500	CHEMSTAR, VARIO
<b>F28</b>	<b>F29</b>	U55	No load noise measurement, without noise analysis	71 ... 500	CHEMSTAR, VARIO
<b>F46</b>	<b>F47</b>	U73	Partial discharge measurement on completed stator winding	Pre-formed coil	VARIO
<b>F52</b>	<b>F53</b>	1) 2)	Locked-rotor torque and current measurement	71 ... 500	CHEMSTAR, VARIO
<b>F54</b>	<b>F55</b>	1) 2)	Polarization index measurement	Pre-formed coil	VARIO
<b>F56</b>	<b>F57</b>	1) 2)	Measurement of shaft vibration (for sleeve bearings only)	355 ... 500	VARIO
<b>F58</b>	<b>F59</b>	U56 <sup>1) 2)</sup>	Vibration modal analysis (2-pole and V1 fixed mounted)	71 ... 500	CHEMSTAR, VARIO
<b>F62</b>	<b>F63</b>	U55	Noise level analysis – octave-band analysis in combination with <b>F28/29</b> or <b>F74/75</b>	71 ... 500	CHEMSTAR, VARIO
<b>F70</b>	–	U79	Ultrasonic test on motor shaft with certificate	71 ... 500	CHEMSTAR, VARIO
<b>Standard</b>	<b>F71</b>	U50	Rotor balancing	355 ... 500	VARIO
<b>F74</b>	<b>F75</b>	U55	Noise test under load, without noise analysis, in combination with type test <b>F82/83</b> or <b>F92/93</b>	71 ... 500	CHEMSTAR, VARIO
<b>F76</b>	–	U76	Magnetic particle test on motor shaft	315 ... 500	CHEMSTAR, VARIO
–	<b>F77</b>	U81	Painting inspection (order sample paint sheets separately with V90)	71 ... 500	CHEMSTAR, VARIO
<b>F78</b>	–	U77	Magnetic particle test on motor lifting lugs	355 ... 500	VARIO
–	<b>F79</b>	–	Packaging inspections	71 ... 500	CHEMSTAR, VARIO
<b>F82</b>	<b>F83</b>	U53	Type test with heat run for horizontal motors according to IEC (sine wave voltage)	71 ... 500	CHEMSTAR, VARIO
<b>F92</b>	<b>F93</b>	U53	Type test with heat run for vertical motors according to IEC (sine wave voltage)	71 ... 500	CHEMSTAR, VARIO
–	<b>F95</b>	U53	Type test, motor together with SINAMICS G180 converter	71 ... 500	CHEMSTAR, VARIO
–	<b>F97</b>	U53	Type test, motor together with SINAMICS G/S or PERFECT HARMONY (max. 3 days service technician for converter adjustment not included)	71 ... 500	CHEMSTAR, VARIO
–	<b>F99</b>	U53	Type test, motor together with non-Siemens converter (max. 3 days service technician for converter adjustment not included)	71 ... 500	CHEMSTAR, VARIO
–	–		Special test on request	71 ... 500	CHEMSTAR, VARIO
–	–		Special tests in combination with manufacturing of test equipment; special shafts and special mouning types on request	71 ... 500	CHEMSTAR, VARIO

1) Only in combination with a type test **F82/F83** or **F92/F93**: document U53.

2) Only in combination with a routine test, at acceptance **F01**: document U51.

3) Protocols according to separate order.

**Overview** (continued)

## Documentation for 1PS0, 1PS1, 1PS4 and 1PS5 motors

Additional identification code <b>-Z</b> with order code	Documentation	Available for Languages	Frame size	LOHER type series
<b>U90</b>	Document package NM1 (=U06+U15+U18+U58) consisting of installation and operating instructions, EC type-examination certificate, dimensional drawing, wiring diagram(s)	De, En	71 ... 355	CHEMSTAR
<b>U91</b>	Document package NM2 (=U01+U04+U06+U15+U18+U40+U58) consisting of installation and operating instructions, wiring diagram(s), EC type-examination certificate, LOHER data sheet, manufacturer's declaration, dimensional drawing, current-torque characteristic	De, En	71 ... 355	CHEMSTAR
<b>U92</b>	Document package TM1 (=U01+U04+U06+U08+U15+U17+U24+U25+U36+U43+U51+U56+U57+U58) consisting of data sheet, current-torque characteristic, detail dimensional drawing, terminal box drawing, wiring diagrams, installation and operating instructions, set values	De, En	355 ... 500	VARIO
<b>U01</b>	Standard data sheet	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
<b>U02</b>	Customer data sheet		71 ... 500	CHEMSTAR, VARIO
<b>U03</b>	Current-starting time characteristic	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U04</b>	Current-torque characteristic (with load torque characteristic)	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
<b>U05</b>	Transient air-gap torques	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U06</b>	Circuit diagram	De, En, Fr	71 ... 500	CHEMSTAR, VARIO
<b>U07</b>	Equivalent circuit diagram	De, En, Fr, It, Es	71 ... 500	CHEMSTAR, VARIO
<b>U08</b>	Terminal box drawing	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U09</b>	Wöhler curve	De, En	355 ... 500	VARIO
<b>U10</b>	Indication of shock resistance	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U11</b>	Shock resistance calculation	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U12</b>	Foundation load	De, En, Fr, It, Es	280 ... 500	CHEMSTAR, VARIO
<b>U13</b>	Calculation of axial magnetic pull	De, En	355 ... 500	VARIO
<b>U14</b>	Lateral critical speed analysis	De, En	200 ... 500	CHEMSTAR, VARIO
<b>U15</b>	Dimensional drawing	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U16</b>	Speed-starting time characteristic	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U17</b>	Bearing and lubrication data sheet	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
<b>U18</b>	Operating instructions	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
<b>U19</b>	Shaft dimensional drawing with torsional stiffness values	De, En	200 ... 500	CHEMSTAR, VARIO
<b>U20</b>	Shaft dimensional drawing (without torsional stiffness values)	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U21</b>	Instrument data sheet (all instruments combined)	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U22</b>	Rating plate drawing	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U23</b>	Noise characteristics report (standard)	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U24</b>	Setpoint values (e.g. Pt100)	De, En	200 ... 500	CHEMSTAR, VARIO
<b>U26</b>	Spare parts list, order-specific (without prices)	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U28</b>	Drawing of motor thermal growth	De, En	200 ... 500	CHEMSTAR, VARIO
<b>U29</b>	Winding data	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U30</b>	Winding diagram	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U31</b>	Shell record card	En	71 ... 500	CHEMSTAR, VARIO
<b>U32</b>	Test certificate 2.2 (EN 10204)	De, En, Fr, It, Es, Ru	71 ... 500	CHEMSTAR, VARIO
<b>U33</b>	SASO certificate	En	71 ... 500	CHEMSTAR, VARIO
<b>U34</b>	Calculation of the REED frequency	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U35</b>	Lifting transport recommendation	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U36</b>	Coating description	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U37</b>	P & ID diagram	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U38</b>	Power factor-efficiency characteristic	De, En	71 ... 500	CHEMSTAR, VARIO

## Introduction

### Guide to selecting and ordering the motors

#### Special tests in the test bay

#### Overview (continued)

##### Documentation for 1PS0, 1PS1, 1PS4 and 1PS5 motors (continued)

Additional identification code <b>-Z</b> with order code	Documentation	Available for Languages	Frame size	LOHER type series
<b>U39</b>	Power factor-speed characteristic	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U40</b>	EC Declaration of Conformity	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U41</b>	Certificate of conformity for mounting parts	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U42</b>	Certificate of conformity for terminal box	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U43</b>	Declaration of Incorporation	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U44</b>	Certificate of conformity for IP degree of protection	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U45</b>	Lifting lug calculation	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U46</b>	Bearing life time calculation	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U50</b>	Balance certificate (multi)	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U51</b>	Inspection certificate 3.1 EN 10204 (multi)	De, En, Fr, Ru	71 ... 500	CHEMSTAR, VARIO
<b>U52</b>	Type test report (original motor)	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U53</b>	Type test report (order-specific) – only in combination with <b>F82/F83</b> or <b>F92/93</b>	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U54</b>	Load characteristics	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U55</b>	Order-specific noise measurement report according to F option selected	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U56</b>	Vibration test report 3.1 (EN 10204) – at no load	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U57</b>	Data information – for converter-fed operation	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U58</b>	EC type-examination certificate	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U59</b>	Acceptance test certificate	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U60</b>	Shaft material certificate 3.1	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U62</b>	Calibration certificates	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U63</b>	Quality plan	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U64</b>	Thermal limit curve	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U65</b>	Temperature-rise curve	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U66</b>	External certificate according to design option	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U67</b>	Certificate flame path 3.1	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U68</b>	Certificate of Compliance	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U69</b>	Manufacturing Record Book	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U70</b>	Tangent-delta measuring protocol (complete winding) 3.1	De, En	Pre-formed coil	VARIO
<b>U71</b>	Tangent-delta measuring protocol (10 % of the coils) 3.1	De, En	Pre-formed coil	VARIO
<b>U72</b>	Sample coil test protocol 3.1	De, En	Pre-formed coil	VARIO
<b>U73</b>	Partial discharge measurement report 3.1	De, En	Pre-formed coil	VARIO
<b>U74</b>	Material certificate for lamination 2.2	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U75</b>	Material certificate for copper 2.2	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U76</b>	Magnetic particle test report for motor shaft (frame size 315 and above)	De, En	315 ... 500	CHEMSTAR, VARIO
<b>U77</b>	Magnetic particle test report for lifting lugs 3.1	De, En	355 ... 500	VARIO
<b>U78</b>	Liquid-penetrant test report for motor shaft 3.1 (frame size 315 and above)	De, En	315 ... 500	CHEMSTAR, VARIO
<b>U79</b>	Ultrasonic test report for motor shaft 3.1 (only in combination with <b>F70</b> )	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U80</b>	Air gap measurement report 3.1 (frame size 315 and above)	De, En	315 ... 500	CHEMSTAR, VARIO
<b>U81</b>	Layer thickness protocol 3.1 (total layer thickness only)	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U82</b>	Protection level certificate	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U83</b>	Shaft vibration and run out protocol	De, En		
<b>U84</b>	Customer-specific dimension protocol	De, En	71 ... 500	CHEMSTAR, VARIO
<b>U86</b>	Standard test procedure	De, En	71 ... 500	CHEMSTAR, VARIO

Note: The delivery time for the factory test certificates may differ from the delivery time for the motors.



**Overview** (continued)

## Documentation for 1PS0, 1PS1, 1PS4 and 1PS5 motors (continued)

Additional identification code <b>-Z</b> with order code	Documentation	Available for Languages	Frame size	LOHER type series
<b>D00</b>	Documentation in German <sup>1)</sup>		71 ... 500	CHEMSTAR, VARIO
<b>D54</b>	Documentation in Czech (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D55</b>	Documentation in Polish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D56</b>	Documentation in Russian (operating instructions, data sheet, dimension sheet)		71 ... 500	CHEMSTAR, VARIO
<b>D57</b>	Documentation in Japanese (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D62</b>	Documentation in Danish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D71</b>	Documentation in Rumanian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D72</b>	Documentation in Italian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D73</b>	Documentation in Finnish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D74</b>	Documentation in Dutch (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D75</b>	Documentation in Turkish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D76</b>	Documentation in English <sup>1)</sup>		71 ... 500	CHEMSTAR, VARIO
<b>D77</b>	Documentation in French (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D78</b>	Documentation in Spanish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D79</b>	Documentation in Portuguese (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D80</b>	Documentation in Bulgarian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D81</b>	Documentation in Norwegian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D82</b>	Documentation in Hungarian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D83</b>	Documentation in Swedish (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D84</b>	Documentation in Chinese, simplified (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>D91</b>	Documentation in Serbian (operating instructions)		71 ... 500	CHEMSTAR, VARIO
<b>B00</b>	No documentation		71 ... 500	CHEMSTAR, VARIO
<b>B16</b>	Photos for approval before shipment (rating plates + 2 views of motor, delivery after approval by customer)		71 ... 500	CHEMSTAR, VARIO
<b>B17</b>	Expediting during production (per order position)		71 ... 500	CHEMSTAR, VARIO
<b>B21</b>	Documentation on CD		71 ... 500	CHEMSTAR, VARIO
<b>B22</b>	Documentation as Email (standard)		71 ... 500	CHEMSTAR, VARIO
<b>B23</b>	Documentation on paper, 1 set		71 ... 500	CHEMSTAR, VARIO
<b>B24</b>	Preliminary documentation only		71 ... 500	CHEMSTAR, VARIO
<b>B29</b>	Final documentation only		71 ... 500	CHEMSTAR, VARIO
On request	Customer entry in drawing: <ul style="list-style-type: none"> <li>• Adding of additional title blocks in all drawings (title block has to made available by the customer in the form of a DXF file)</li> <li>• Approval documentation</li> <li>• Motor sectional drawing</li> <li>• Special documentation</li> <li>• Plant-specific or order-specific creation of operating instructions</li> <li>• Compilation of final documentation in a folder</li> </ul>			

Languages for the main components (e.g. operating and maintenance instructions):  
Official EU languages (English/Spanish/French/Italian and German) available to download!  
Please consult the factory about availability/delivery time/feasibility.

<sup>1)</sup> All documents available.

## Introduction

### General technical specifications

#### Cut-away diagram of a LOHER CHEMSTAR low-voltage motor

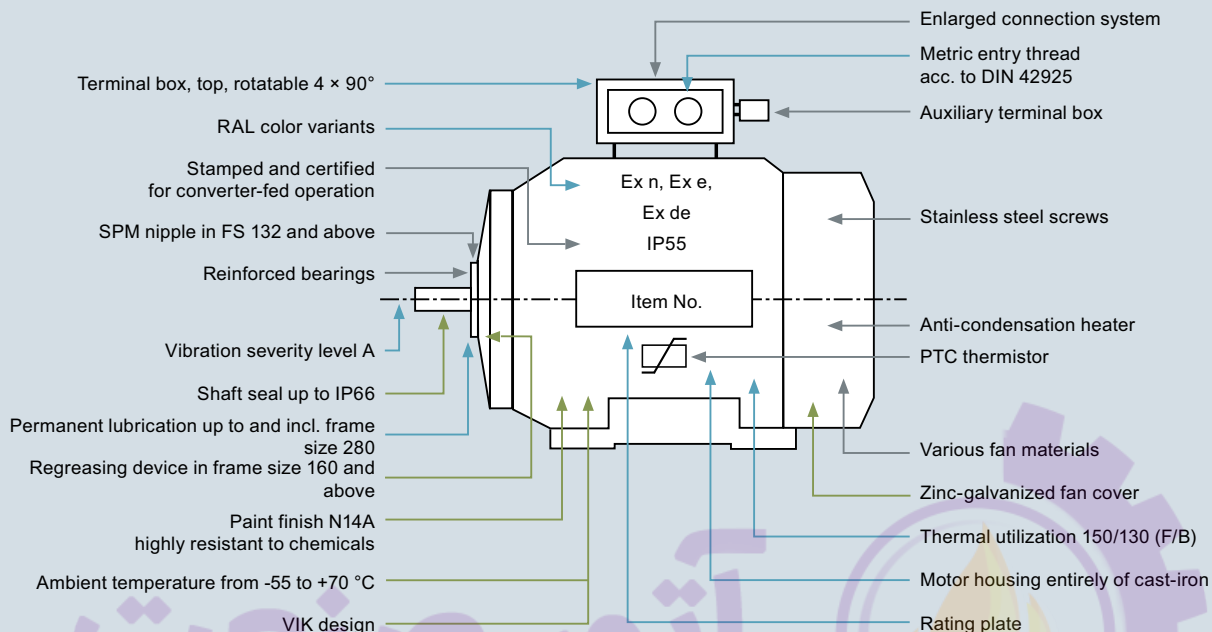
1

#### Overview

##### LOHER CHEMSTAR motors, standard version

##### LOHER CHEMSTAR motors with option W09

##### Additional options



##### LOHER CHEMSTAR motors, standard version

- Vibration severity level A
- Permanent lubrication up to and incl. frame size 280
- Terminal box, top, rotatable 4 × 90°
- Metric entry thread according to DIN 42925
- Thermal utilization 155/130 (F/B)
- Motor housing entirely of cast-iron
- RAL color variants
- Rating plate

##### LOHER CHEMSTAR motors with W09 option package for applications in the chemical and petrochemical industry

- VIK design
- Vibration severity values such as level B
- IP56 degree of protection for motor
- IP66 for shaft seal
- Zinc-galvanized fan cover
- Paint finish N14A highly resistant to chemicals

##### Other options (with and without W09)

- Stamped and certified for converter-fed operation with standard and special insulation
- SPM measuring nipple
- Reinforced bearings
- Regreasing device for frame size 160 and above
- Stainless steel screws
- Anti-condensation heater
- Various fan materials
- Ambient temperatures from -55 to +70 °C
- PTC thermistor as additional protection or sole protection
- Auxiliary terminal box
- Special paint finishes
- Special paint colors
- Cable glands also for shielded or armored cables
- Enlarged connection system
- And much more

G\_D083\_EN\_00081

## Overview

	Additional identification code <b>-Z</b> with order code						
	<b>Standard</b>	<b>V09</b>	<b>V10 (W14)</b>	<b>V11</b>	<b>W15</b>	<b>-</b>	<b>K24</b>
<b>LOHER paint finish</b>	System N04	System N08	System N14/J08 (paint finish System N14A)	System Z21/J08	Special prime coat system Z05 with internal corrosion protection system J08	System S10 – ETO option (Engineer To Order) without order code	System G04
<b>Use</b>							
Use:	Standard paint finish, indoor installation, <b>standard for 1PS0, 1PS1</b>	Outdoor climate, tropical climate, humid indoor climate, <b>standard for 1PS4, 1PS5</b>	Tropical climate, humid indoor climate, VIK standard paint finish, incl. J08 (N14A without J08) highly aggressive chemicals, decontamination capability, ships, onshore	Offshore, drilling platforms, customer request, incl. J08/optional ( <b>V19</b> ) with layer thickness 275 µm complies with C5-M <sub>high</sub>	Customer request (top coat from customer), incl. J08	Underwater paint (submersible pumps), incl. J08	Customer request (top coat from customer)
<b>Max. corrosiveness category</b>							
Internal	–	C3 <sub>high</sub>	C5-M <sub>low</sub>	C5-M <sub>mid</sub>	–	–	Im 1h
External	C3 <sub>mid</sub>		C5-I <sub>mid</sub>	C5-M <sub>low</sub>	–	–	Im 1h
<b>Layer thickness</b>							
µm	> 40	> 80	> 140	> 210	> 50	> 210	> 40
<b>Resistance</b>							
Climate groups acc. to EN 60721-3	Moderate	Worldwide					
Condensation climate acc. to KFW DIN 50017	+	+	++	++	+		+
Sulfur dioxide acc. to DIN EN ISO 6988	0	+	+ / ++	++	+		0
Saltwater according to DIN 53167	0	+	+ / ++	++	+	+ / ++	0
<b>Resistance according to DIN EN ISO 2812-1</b>							
Ammonia ~10 %	+	++	++	++	+	++	+
Mineral oil, grease, solvent, benzene/benzol, alcohol	+	++	++	++	++	++	+
Sulfuric acid 10 %	0	+	++	++	+		0
Sulfuric acid 50 %	–	0	+	+	0		–
Bicarbonate of soda 10 %	0	+	++	++	+		–
Bicarbonate of soda 40 %	–	0	++	++	+		–
Hydrochloric acid 37 %	0	0	+	+	–		–
<b>Temperature range</b>	–40 ... +130 °C (temporarily –60 ... +150 °C, at +180 °C possible slight discoloration)						
<b>Humidity</b>							
	90 %		100 %		90 %	100 %	90 %
<b>Ability to be painted</b>							
	Good within 1 week, afterwards sanding down is necessary				Very good		Very good
<b>Adhesion acc. to DIN EN ISO 2409</b>	Characteristic value Gt 1						
<b>Pre-treatment of parts</b>	All parts cleaned and degreased, steel and cast-iron parts sandblasted.						
<b>Drying</b>	All layers oven dried.						
<b>Colors</b>							
Standard	Standard RAL 7030 (stone gray)				Gray <sup>1)</sup>	Gray <sup>1)</sup>	RAL 7032 (pebble gray)
Available colors <sup>2)</sup>	RAL 1004, 1018, 2004, 5009, 5010, 5012, 5015, 5018, 6002, 6003, 6011, 7000, 7011, 7031, 7032, 7036, 7038, 9010, other colors are available on request				–	–	
<b>Surface treatment of unpainted parts, shaft extension and flange</b>	Coated with special rust-protection oil that repels water and palm sweat						
<b>Miscellaneous</b>	Abrasion-resistant, elastic, scratch-resistant, shock-proof, totally light resistant, physiologically harmless						

- ++ Long-term resistance
- + Good resistance
- 0 Limited resistance
- Temporary resistance
- – No resistance

<sup>1)</sup> Color non-compliant with RAL.

Order code **W10** can be used to order an internal coating in the color RAL 7032 (pebble gray). This internal coating is included in the case of paint systems N14 (not N14A), Z21, Z05 and S10. The maximum corrosiveness category of this paint finish is C3<sub>mid</sub>.

<sup>2)</sup> Colors with poor coverage, e.g. white or yellow, are not implemented in N04, but instead with a greater layer thickness (e.g. N08).

## Introduction

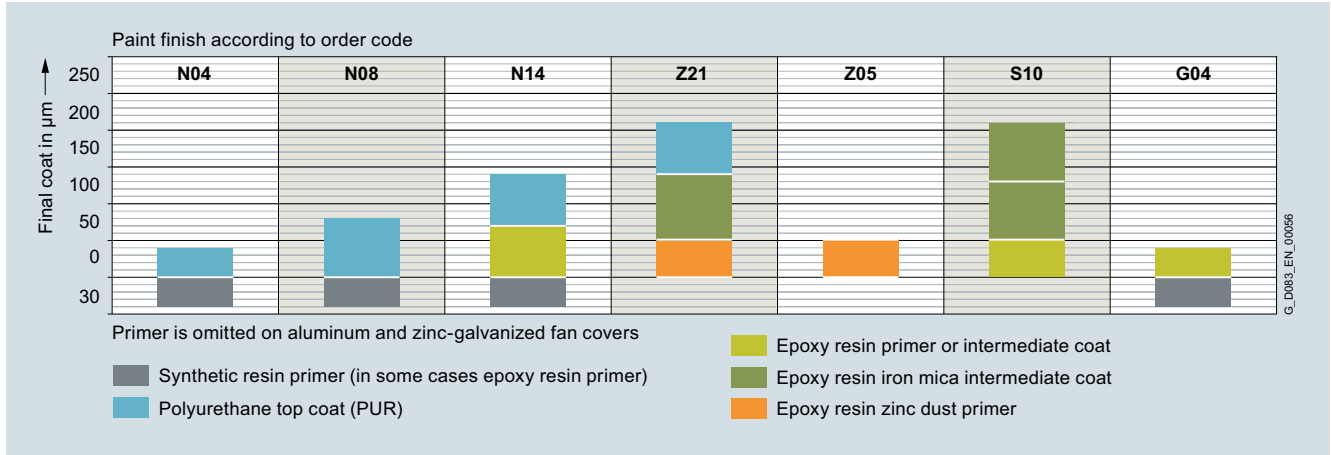
General technical specifications

1

### Paint finishes

#### Overview (continued)

##### Paint system



**Overview****Packing weights**

For 1PS0, 1PS1, 1PS4, 1PS5, 1MD5 motors

Frame size	For land transport		Air freight		Sea freight				
	Packaging	Foot-mounted type Tare kg	Flange-mounted type Tare kg	Packaging	Foot-mounted type Tare kg	Flange-mounted type Tare kg	Packaging	Foot-mounted type Tare kg	Flange-mounted type Tare kg
71	Box	5 <sup>1)</sup>	5 <sup>1)</sup>	Box	5 <sup>1)</sup>	5 <sup>1)</sup>	Box	5 <sup>1)</sup>	5 <sup>1)</sup>
80		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>
90		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>
100		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>
112		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>		5 <sup>1)</sup>	5 <sup>1)</sup>
132	Crate	8 <sup>2)</sup>	8 <sup>2)</sup>	Crate	9 <sup>2)</sup>	9 <sup>2)</sup>	Plywood crate	35 <sup>3)</sup>	45 <sup>3)</sup>
160		8 <sup>2)</sup>	8 <sup>2)</sup>		9 <sup>2)</sup>	9 <sup>2)</sup>		40 <sup>3)</sup>	50 <sup>3)</sup>
180		10 <sup>2)</sup>	10 <sup>2)</sup>		11 <sup>2)</sup>	11 <sup>2)</sup>		45 <sup>3)</sup>	60 <sup>3)</sup>
200	Planks	5 <sup>2)</sup>	8 <sup>2)</sup>	Planks	5 <sup>2)</sup>	8 <sup>2)</sup>		60 <sup>3)</sup>	60 <sup>3)</sup>
225		6 <sup>2)</sup>	9 <sup>2)</sup>		6 <sup>2)</sup>	9 <sup>2)</sup>		65 <sup>3)</sup>	65 <sup>3)</sup>
250		7 <sup>2)</sup>	10 <sup>2)</sup>		7 <sup>2)</sup>	10 <sup>2)</sup>		70 <sup>3)</sup>	80 <sup>3)</sup>
280		8 <sup>2)</sup>	11 <sup>2)</sup>		8 <sup>2)</sup>	11 <sup>2)</sup>		80 <sup>3)</sup>	95 <sup>3)</sup>
315		15 <sup>2)</sup>	30 <sup>3)</sup>		15 <sup>2)</sup>	30 <sup>3)</sup>	Wooden crate	O.R. <sup>3)</sup>	O.R. <sup>3)</sup>
355		35 <sup>3)</sup>	40 <sup>3)</sup>		35 <sup>3)</sup>	40 <sup>3)</sup>		O.R. <sup>3)</sup>	O.R. <sup>3)</sup>
400		50 <sup>3)</sup>	60 <sup>3)</sup>		50 <sup>3)</sup>	60 <sup>3)</sup>		O.R. <sup>3)</sup>	O.R. <sup>3)</sup>
450		70 <sup>3)</sup>	80 <sup>3)</sup>		70 <sup>3)</sup>	80 <sup>3)</sup>		O.R. <sup>3)</sup>	O.R. <sup>3)</sup>
500		80 <sup>3)</sup>	90 <sup>3)</sup>		80 <sup>3)</sup>	90 <sup>3)</sup>		O.R. <sup>3)</sup>	O.R. <sup>3)</sup>

The packing weights for standard motors are not binding. Weights may vary for special versions and components specially built onto the motor.

Special packaging is possible, e.g. wooden crate for outdoor storage or long-term storage.

Special packaging materials are possible on request, e.g. IPPC heat-treated wood with certificate for China, or with Sirex certificate.

Pallets for Germany are EURO pallets.

Pallets for export are non-returnable pallets.

<sup>1)</sup> On pallet (more than one motor is possible on one pallet).

<sup>2)</sup> Attached to pallet (more than one motor is possible on one pallet).

<sup>3)</sup> Packaging can be transported with forklift trucks, in plywood crate for sea freight several motors may be possible per packing unit.

## Introduction

### General technical specifications

#### Designs in accordance with standards and specifications

#### Overview

##### Quality assurance

Orders for electrical machines are processed throughout, from the quotation through to delivery, on the basis of a recognized quality assurance system that fulfills the requirements of the following quality standards:

- DIN EN ISO 9001
- EN 29001

LOHER is certified in accordance with Directive 94/9/EC:  
PTB 99 ATEX Q 003

For this certificate, an application for an extension of 3 years is submitted before the validity of the current certificate expires.

##### CE marking

The motors bear the CE mark in accordance with the following guidelines:

- Guideline 2006/95/EC (Low-Voltage Directive) supersedes 93/68/EEC and 73/23/EEC
- Directive 94/9/EC

##### Applicable standards and specifications

The motors comply with the appropriate standards and regulations, especially those listed in the table below.

Title	EN	IEC
Rotating electrical machines – Rating and performance	EN 60034-1	IEC 60034-1 IEC 60085
Rotating electrical machines – Standard methods for determining losses and efficiency from tests	EN 60034-2-1	IEC 60034-2-1
Rotating electrical machines – Degrees of protection provided by integral design of rotating electrical machines (IP code)	EN 60034-5	IEC 60034-5
Rotating electrical machines – Methods of cooling (IC code)	EN 60034-6	IEC 60034-6
Rotating electrical machines – Classification of types of construction, mounting arrangements and terminal box position (IM code)	EN 60034-7	IEC 60034-7
Rotating electrical machines – Terminal markings and direction of rotation	EN 60034-8	IEC 60034-8
Rotating electrical machines – Noise limits	EN 60034-9	IEC 60034-9
Acoustics: Test code for the measurement of airborne noise emitted by rotating electrical machines	EN ISO 1680	–
Thermal protection	–	IEC 60034-11
Starting performance of single-speed three-phase cage induction motors	EN 60034-12	IEC 60034-12
Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibrations severity	EN 60034-14	IEC 60034-14
CENELEC standard voltages	–	IEC 60038
General purpose three-phase induction motors having standard dimensions and outputs – Frame numbers 56 to 315 and flange numbers 65 to 740	EN 50347	IEC 60072-1 <sup>1)</sup>
Center holes with thread	EN 332	–
Drive type fastenings without taper action; parallel keys, keyways, deep pattern	EN 6885-1	–
<b>In addition, the following applies to Ex motors:</b>		
Explosive atmospheres – Electrical installations design, selection and erection	EN 60079-14	IEC 60079-14
Explosive atmospheres – Equipment protection by type of protection "n"	EN 60079-15	IEC 60079-15
Explosive atmospheres – Equipment protection by explosion-proof enclosures "d"	EN 60079-1	IEC 60079-1
Explosive atmospheres – Equipment dust ignition protection by enclosure "t"	EN 60079-31	IEC 60079-31
Explosive atmospheres – Equipment – General requirements	EN 60079-0	IEC 60079-0
Explosive atmospheres – Equipment protection by increased safety "e"	EN 60079-7	IEC 60079-7
Explosive atmospheres – Equipment protection by intrinsic safety "i"	EN 60079-11	IEC 60079-11

<sup>1)</sup> IEC 60072-1 specifies dimensions only, there is no assignment of outputs.  
More than one motor is possible per packing unit.

**Overview** (continued)***The following applies to explosion-proof motors:***

Since the requirements of explosion-proof motors comply with the European standards EN 60079-0, EN 60079-15, EN 60079-31 and Directive 94/9/EC (ATEX 95), the certificates issued by authorized testing agencies (PTB, DEKRA EXAM, etc.) are accepted by all member states of the EU. The remaining members of CENELEC, Switzerland in particular, also accept the certificates.

***Certifications***

Product certifications are to be differentiated in terms of safety-related certificates and efficiency certificates. Since 2011, it has been obligatory for low-voltage motors with outputs in the range of 0.75 to 375 kW (2, 4 and 6-pole) to be classified in accordance with the IEC 60034-30 efficiency standard and to be marked with the corresponding IE code (International Efficiency IE1, IE2 or IE3). The efficiency is determined using the summed losses method in accordance with IEC 60034-2-1.

**Energy-saving motors for the European Economic Area in accordance with EU Directive 640/2009**

Since June 2011, all low-voltage motors that fall within the scope of the EU directive must fulfill the specifications of international efficiency class IE2.

- Line voltage  $\leq 1000$  V
- Line frequency 50 or 50/60 Hz
- Output range 0.75 to 375 kW
- Pole number 2, 4 and 6-pole
- Continuous duty S1

In January 2015, the efficiency requirements for motors within the 7.5 to 375 kW range increased to IE3, otherwise IE2 motors must be converter-fed.

This will also apply from January 2017 for 0.75 to < 7.5 kW motors.

آتور صنعت  
 ATOORSANAT



## Introduction

### General technical specifications

#### Motor protection

1

#### Overview

In the standard version, the motor is designed without motor protection. The order variants for motor protection are coded by means of the selected options.

A distinction is made between current dependent and motor temperature dependent protection devices.

#### Current dependent protection devices

Fuses are only used to protect mains cables in the event of a short-circuit. They are not suitable for overload protection of the motor.

The motors are usually protected by thermally delayed overload protection devices (circuit breakers for motor protection or overload relays). This protection is current dependent and is particularly effective in the case of a locked rotor.

For standard duty with short start-up times and starting currents not too excessive and for low numbers of switching operations, motor protection switches provide adequate protection.

Motor protection switches are not suitable for heavy starting duty or large numbers of switching operations. Differences in the thermal time constants for the protection equipment and the motor result in unnecessary early tripping when the protection switch is set to rated current.

#### Motor temperature dependent protection devices

Temperature detectors installed in the motor winding are suitable protection devices in the case of slowly rising motor temperature.

The most comprehensive protection against thermal overloading of the motor is provided by PTC thermistors (thermistor motor protection) installed in the motor winding. The temperature of the winding can be accurately monitored thanks to its low heating capacity and the excellent heat contact with the winding. When a limit temperature is reached (rated tripping temperature), the PTC thermistors undergo a step change in resistance. This is evaluated by a tripping unit and can be used to open auxiliary circuits. The PTC thermistors themselves cannot be subjected to high currents and voltages. This would result in destruction of the semiconductor. The switching hysteresis of the PTC thermistor and tripping unit is low, which supports fast restarting of the drive. Motors with this type of protection are recommended for heavy duty starting, switching duty, extreme changes in load, high ambient temperatures or fluctuating supply systems.

#### Option A11

Motor protection with PTC thermistors with 3 embedded temperature sensors for tripping. In the terminal box, 2 auxiliary terminals are required.

Two sets of three temperature sensors are used if a warning is required before the motor is shut down (tripped). The warning is normally set to 10 K below the tripping temperature.

#### Option A12

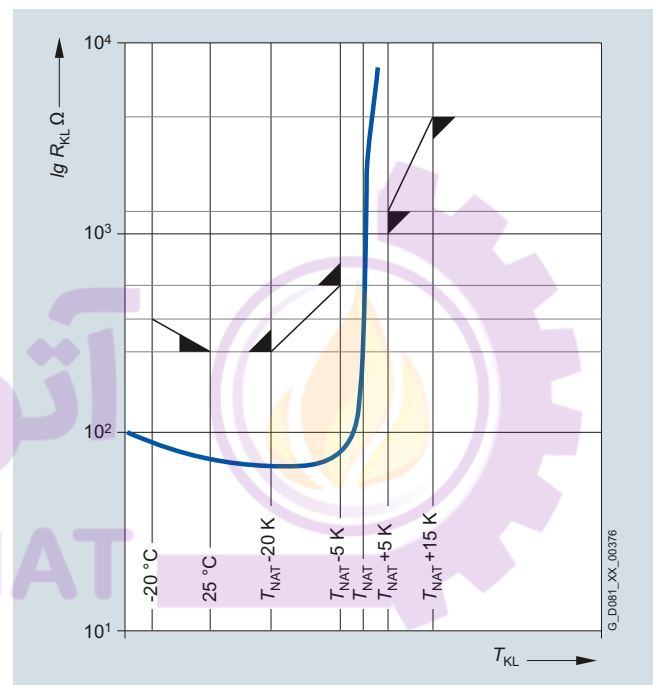
Motor protection through PTC thermistor with 6 embedded temperature sensors for warning and tripping. In the terminal box, 4 auxiliary terminals are required.

In order to achieve full thermal protection it is necessary to combine a thermally delayed overcurrent release and a PTC thermistor. For full motor protection implemented only with PTC thermistors, please inquire.

#### Motor temperature detection with converter operation

##### PTC sensor

The PTC thermistor is a temperature dependent component. In the region of the rated response temperature, the resistance of the PTC increases very steeply.



PTC sensor characteristic

#### Option A15 or A16

For motors designed with explosion protection, the PTC sensors must be tested in the installed state for correct operation (TMS tests). For this test, the stator winding is heated to the tripping temperature. The option of a PTC sensor including TMS test can be ordered using Option **A15** (3 PTCs for trip) and **A16** (6 PTCs for alarm and trip).



## Overview

### Standard voltages and tolerances

The motors listed in this catalog are supplied with a fixed voltage (e.g. 400 V). The tolerance band for rated voltage is  $\pm 10\%$ . This tolerance is in compliance with the standard and is not stamped on the rating plate. The tolerance band for frequency is  $\pm 2\%$ .

The motors of the LOHER CHEMSTAR and LOHER VARIO series can be designed without explosion protection and for Ex zones with a non-standard winding for almost any frequency and any required line voltage up to 1000 V. The operating data listed in the output tables applies to the rated voltages specified with tolerance bands according to EN 60034-1.

EN 60034-1 differentiates between Category A (sum of voltage deviation and frequency deviation  $\pm 5\%$ ) and Category B (sum of voltage deviation and frequency deviation  $\pm 10\%$ ) for voltage and frequency fluctuations.

The motors can supply their rated torque in both Category A and Category B.

#### Tolerance range A (voltage $\pm 5\%$ ):

Motor must be functionally stable in continuous duty. The temperature rise is permitted to be 10 K higher than the limit value.

#### Tolerance range B (voltage $\pm 10\%$ ):

The motor must be functionally stable and is permitted to exhibit wide variations in characteristic data; operation over long periods close to the limits of Category B is not recommended.

Standard	Range	Range
EN 60034-1	A	B
Voltage deviation	$\pm 5\%$	$\pm 10\%$
Frequency deviation	$\pm 2\%$	$+3\%/-5\%$
Rating plate data stamped with rated voltage a (e.g. 230 V)	a $\pm 5\%$ (e.g. 230 V $\pm 5\%$ )	a $\pm 10\%$ (e.g. 230 V $\pm 10\%$ )

### Rated current

In some output tables, the rated currents are only specified at a rated voltage of 400 V. At other voltages, the rated currents vary in accordance with the inverse of the voltage:

$$\frac{U}{U'} = \frac{I'}{I}$$

This means:

$$I' = \frac{U \cdot I}{U'}$$

Example:

According to the output table, the pole-changing motor ANGA-180MB-42 has a rated current of 31/37 A at 400 V. The rated current at 230 V is therefore:

$$I' = \frac{400 \cdot 31 \text{ or } 37}{230} = 54/64 \text{ A}$$

Tolerances for electrical values in the output tables

The following tolerances apply to the electrical values listed in the output tables according to EN 60034-1:

Efficiency	$\leq 150 \text{ kW}$ : $-0.15 (1 - \eta)$ $> 150 \text{ kW}$ : $-0.1 (1 - \eta)$
Power factor	$-\frac{1 - \cos \varphi}{6}$ (minimum 0.02, maximum 0.07)
Tightening torque	-15 % and +25 %
Breakdown torque	-10 %
Locked-rotor current	+20 % (no lower limit)
Slip at rated load and operating temperature	$\geq 1 \text{ kW}$ $\pm 20\%$ of the guaranteed slip $< 1 \text{ kW}$ $\pm 30\%$ of the guaranteed slip

## Introduction

### General technical specifications

#### Outputs and operating modes

1

##### Overview

The outputs specified in the output tables are valid for duty type S1 (continuous duty at constant load) in accordance with EN 60034-1. For duty types S4, S5, S7 and S8 in addition to the values for cyclic duration factor and switching frequency, the moment of inertia of the motor ( $J_M$ ) and driven machine ( $J_{ext}$ ) must also be stamped. All moments of inertia must be referred to the motor speed. EN 60034-1 categorizes the groups of duty types as follows:

1. Duty types in which starting and electrical braking do not affect the overtemperature of the stator winding of the motor:
  - S2: Short-time duty  
Operating times of 10, 30, 60, and 90 minutes are recommended. After each period of duty the motor remains at zero current until the winding has cooled down to the coolant temperature.
  - S3: Intermittent duty without the influence of starting on the temperature.  
Unless specified otherwise, the duty cycle time is 10 minutes. Values of 15, 25, 40, and 60 % are recommended for the cyclic duration factor.
  - S6: Continuous duty with intermittent load.  
Unless specified otherwise, the duty cycle time is 10 minutes. Values of 15, 25, 40, and 60 % are recommended for the cyclic duration factor.
2. Duty types in which starting and braking have a corresponding effect on the overtemperature of the stator winding and the rotor cage:
  - S4: Intermittent duty with the influence of starting on the temperature – switching cycles per hour ( $c/h$ ) refers to starting cycles.
  - S5: Intermittent duty with the influence of starting and braking on the temperature – switching cycles per hour ( $c/h$ ) refers to starting and braking cycles.
  - S7: Continuous duty with starting and braking – the load during the operating period must be known.
  - S8: Continuous duty with pole changing – the load during the operating period must be known.
  - S9: Continuous duty with non-periodic load and speed changes (converter-fed operation)
  - S10: Duty with discrete constant loads.

Most of the intermittent operating conditions occurring in practice are a combination of the duty types listed under 1. and 2. All of the operating conditions must be known in order to precisely determine a suitable motor.



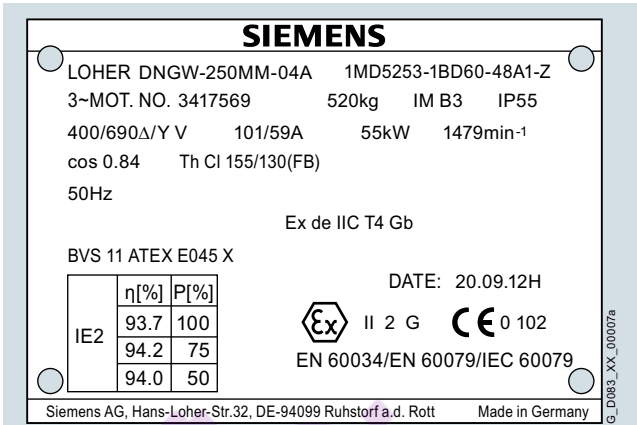
Overview

Due to IE changeover, the affected motors will be equipped with new rating plates complete with modified technical data. There is no requirement to specify a voltage range. Only the rated voltages are specified. Unless specified otherwise, a voltage tolerance of up to ±10 % acc. to EN 60034-1 Range B applies.

**Note:** The transition phase for harmonization of line voltages with increased tolerance within the EU expired on January 1, 2008. Since then the admissible mains tolerances are 230/400 V ±10 %, 50 Hz and 400/690 V ±10 %, 50 Hz. In general, the country of manufacture only is specified. The designation "D-94099 Ruhstorf" is omitted with the exception of explosion-proof motors.

New, according to EuP:

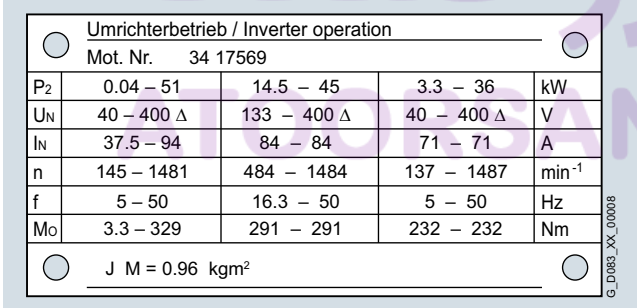
- Efficiency classes IE1, IE2, IE3 according to IEC 60034-30
- Specification of the nominal efficiencies according to IEC 60034-30:2008 and the rated current with the rating plate values or list values of power factor and efficiency (IEC 60034-30:2008 does not include any details regarding current)
- No separate specification of the rated voltage range



**SIEMENS**  
 LOHER DNGW-250MM-04A 1MD5253-1BD60-48A1-Z  
 3-MOT. NO. 3417569 520kg IM B3 IP55  
 400/690Δ/Y V 101/59A 55kW 1479min<sup>-1</sup>  
 cos 0.84 Th CI 155/130(FB)  
 50Hz  
 Ex de IIC T4 Gb  
 BVS 11 ATEX E045 X  
 DATE: 20.09.12H  
 II 2 G CE 0 102  
 EN 60034/EN 60079/IEC 60079  
 Siemens AG, Hans-Loher-Str.32, DE-94099 Ruhstorf a.d. Rott Made in Germany

IE2	η[%]	P[%]
	93.7	100
	94.2	75
	94.0	50

Main rating plate: Mains-fed operation

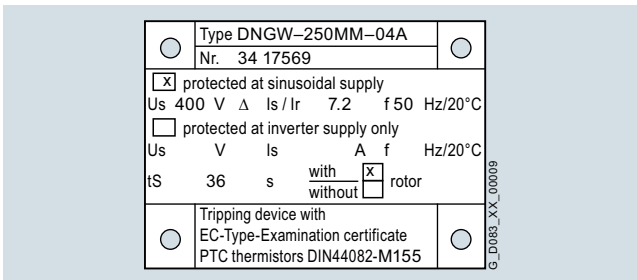


Umrichterbetrieb / Inverter operation  
 Mot. Nr. 34 17569

P <sub>2</sub>	0.04 – 51	14.5 – 45	3.3 – 36	kW
U <sub>N</sub>	40 – 400 Δ	133 – 400 Δ	40 – 400 Δ	V
I <sub>N</sub>	37.5 – 94	84 – 84	71 – 71	A
n	145 – 1481	484 – 1484	137 – 1487	min <sup>-1</sup>
f	5 – 50	16.3 – 50	5 – 50	Hz
M <sub>0</sub>	3.3 – 329	291 – 291	232 – 232	Nm

J M = 0.96 kgm<sup>2</sup>

Rating plate: Converter-fed operation



Type DNGW-250MM-04A  
 Nr. 34 17569

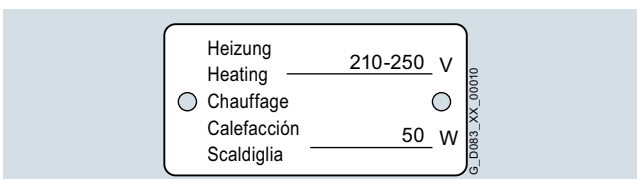
protected at sinusoidal supply  
 U<sub>s</sub> 400 V Δ I<sub>s</sub>/I<sub>r</sub> 7.2 f 50 Hz/20°C

protected at inverter supply only  
 U<sub>s</sub> V I<sub>s</sub> A f Hz/20°C

t<sub>S</sub> 36 s with  rotor without

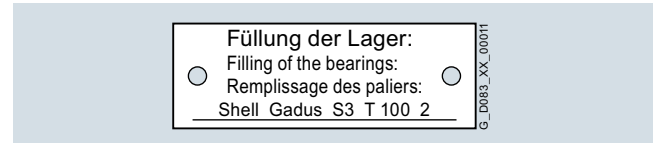
Tripping device with EC-Type-Examination certificate PTC thermistors DIN44082-M155

Extra rating plate: PTC thermistor for sole protection, mains or converter-fed operation



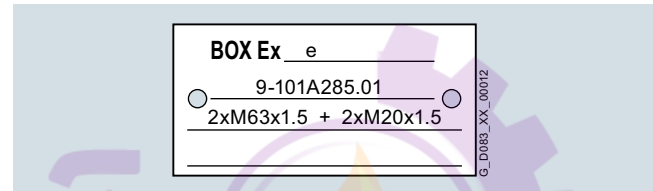
Heizung Heating 210-250 V  
 Chauffage Calefacción Scaldiglia 50 W

Extra rating plate: Anti-condensation heater



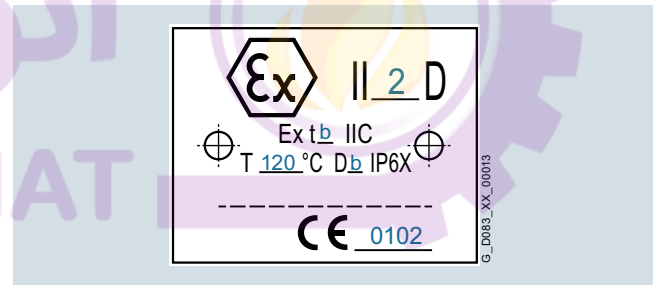
Füllung der Lager: Filling of the bearings: Remplissage des paliers: Shell Gadus S3 T 100 2

Extra rating plate: Bearing grease



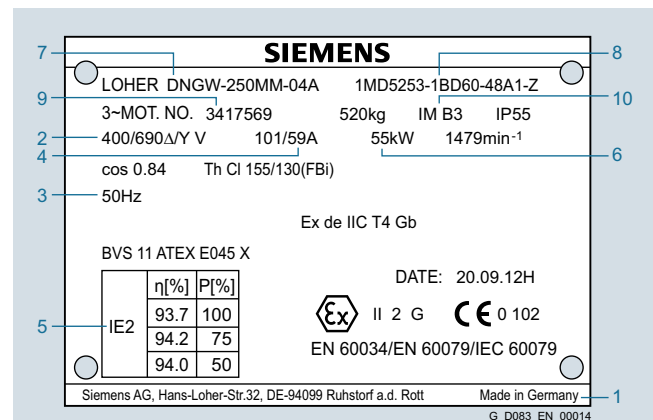
BOX Ex e  
 9-101A285.01  
 2xM63x1.5 + 2xM20x1.5

Extra rating plate: Ex marking for terminal box



Ex II 2 D  
 Ex t<sub>b</sub> IIC  
 T 120°C D<sub>b</sub> IP6X  
 CE 0102

Extra rating plate: Dust Ex protection



**SIEMENS**  
 LOHER DNGW-250MM-04A 1MD5253-1BD60-48A1-Z  
 3-MOT. NO. 3417569 520kg IM B3 IP55  
 400/690Δ/Y V 101/59A 55kW 1479min<sup>-1</sup>  
 cos 0.84 Th CI 155/130(FB)  
 50Hz  
 Ex de IIC T4 Gb  
 BVS 11 ATEX E045 X  
 DATE: 20.09.12H  
 II 2 G CE 0 102  
 EN 60034/EN 60079/IEC 60079  
 Siemens AG, Hans-Loher-Str.32, DE-94099 Ruhstorf a.d. Rott Made in Germany

IE2	η[%]	P[%]
	93.7	100
	94.2	75
	94.0	50

- 1 Country of origin
- 2 Rated voltage
- 3 Frequency
- 4 Rated current
- 5 IE efficiency class and standard rated efficiency at 1/2, 3/4 and 4/4 load
- 6 Output
- 7 LOHER type
- 8 Article No.
- 9 Workshop ID/Serial number
- 10 Type of construction

Main rating plate: Mains-fed operation with legend

## Introduction

### General technical specifications

#### Efficiency, power factor, rated torque, rated speed / insulation and winding

1

##### Overview

###### Efficiency and power factor

The efficiency  $\eta$  and power factor  $\cos\phi$  for each rated output are listed in the selection tables in the individual sections of this catalog.

###### Rated speed and direction of rotation

The rated speeds are applicable for the rated data. The synchronous speed changes proportionally with the line frequency. The motors are suitable for clockwise and counter-clockwise rotation.

If U1, V1, W1 are connected to L1, L2, L3, clockwise rotation results as viewed onto the drive-end shaft extension. Counter-clockwise rotation is achieved by swapping two phases (see also "Heating and ventilation" on Page 1/27).

###### Rated torque

The rated torque in Nm delivered at the motor shaft is

$$T = \frac{9.55 \cdot P \cdot 1000}{n}$$

$P$  Rated output in kW  
 $n$  Speed in rpm

If the voltage deviates from its rated value within the admissible limits, the locked-rotor torque, the pull-up torque and the breakdown torque vary with the approximate square of the value, but the locked-rotor current varies approximately linearly.

In the case of squirrel-cage motors, the locked-rotor torque and breakdown torque are listed in the selection tables as multiples of the rated torque.

##### Overview

High-grade enameled wires, suitable insulating sheet materials, and the type of impregnation (current UV or vacuum method) form insulation systems for the motor windings that ensure a high level of mechanical and electrical strength as well as good serviceability and a long service life. The insulation system is suitable for rated voltages up to 1000 V. These insulation systems protect the winding to a large degree against the effects of aggressive gases, vapors, dust and oil. They resist the stress of normal climates in accordance with EN 60721-3 and are suitable for use in tropical climates. In the case of a damp alternation climate, which also occurs in various tropical zones, the special version for increased humidity protection is required.

###### Silicone rubber encapsulation

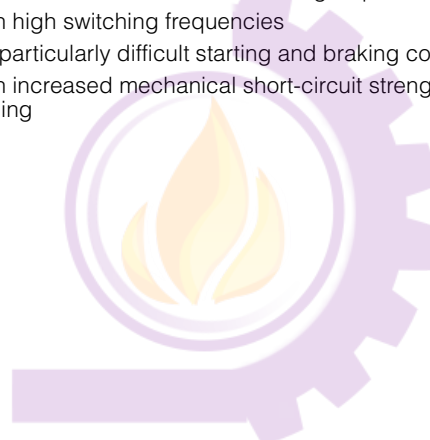
Silicone rubber encapsulation is recommended in the following cases irrespective of the temperature class of the winding:

- When there is a heightened risk of condensation forming due to the type of drive or application of the motor.
- If deposits of highly conductive dust on the winding heads need to be prevented.

Encapsulation offers particular advantages in combination with temperature classes F and H for the following requirements:

- Motors with high switching frequencies
- Motors for particularly difficult starting and braking conditions
- Motors with increased mechanical short-circuit strength of the winding

آتور صنعت  
ATOORSANAT



**Overview****Anti-condensation heater**

The motors can be equipped with anti-condensation heaters to protect them against internal condensation. The standard supply voltages are listed in the table below. Other supply voltages are possible on request. Anti-condensation heaters must not be switched on during operation.

Anti-condensation heaters for 1PS1 motors in the type of protection "Non-sparking" are supplied with a self-limiter. The heater output is listed in the adjacent table.

Alternatively, a voltage of between 5 and 10 % of the rated motor voltage can be connected to terminals U1 and V1 (1-phase) which will heat the stator winding sufficiently.

Frame size	Supply voltage V	Heater output per motor	
		1PS0, 1PS4, 1PS5 W	1PS1 W
<b>LOHER CHEMSTAR motors</b>			
71 ... 100	110 ... 120	12	12
112 ... 132	or 210 ... 250	25	24
160 ... 250		50	48
280 ... 315 S/M		100	100
315 L ... 355		200	200
<b>LOHER VARIO motors</b>			
355 ... 400	110 ... 120	250	250
450	or 210 ... 250	280	280
500		350	350

**Cooling air flow and admissible back pressure**

Frame size	3000 rpm		1500 rpm		1000 rpm		750 rpm	
	Cooling air flow m <sup>3</sup> /s	Admissible back pressure Pa	Cooling air flow m <sup>3</sup> /s	Admissible back pressure Pa	Cooling air flow m <sup>3</sup> /s	Admissible back pressure Pa	Cooling air flow m <sup>3</sup> /s	Admissible back pressure Pa
<b>LOHER CHEMSTAR motors</b>								
71	0.03	1						
80	0.04	2	0.02	1				
90	0.06	40	0.03	10	0.02	6		
100	0.08	50	0.04	12	0.03	8		
112	0.10	50	0.05	12	0.03	8	0.02	
132	0.15	70	0.1	18	0.07	10	0.05	5
160	0.25	90	0.15	30	0.1	15	0.08	8
180	0.35	100	0.2	40	0.15	20	0.1	10
200	0.4	120	0.3	50	0.2	25	0.15	12
225	0.5	120	0.45	50	0.3	30	0.23	15
250	0.6	140	0.55	60	0.33	35	0.28	20
280	0.8	160	0.7	80	0.45	45	0.33	25
315	1.0	160	0.9	80	0.6	45	0.45	25
355	1.5	160	1.5	80	1.0	45	0.8	25
<b>LOHER VARIO motors</b>								
400	1.8	200	1.8	100	1.4	60	1.1	30
450	2.2	200	2	150	1.8	80	1.4	40
500	2.9	200	3	150	2.5	100	2.4	50

If motors are equipped with forced ventilation, pipes for infeed or extraction of air, silencers, or similar, the values listed above must be complied with depending on frame size. They must also be used to calculate the static back pressure of piping.

The values for static back pressure in Pa (1 Pascal = 0.102 mm WS) are maximum values that must not be exceeded on self-ventilation and with the specified cooling air flow in pipes, silencers, or similar.

## Introduction

### General technical specifications

#### Types of construction













##### Overview

##### Installation of rotating electrical machines according to EN 60034-7



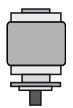








The most common types of construction are shown in the table. It can be seen from the option lists for which frame size range the individual types of construction are supplied. Other types of construction are available on request. The type of construction is specified on the rating plate in accordance with Code I, EN 60034-7, according to the type of construction ordered and also appears as code letters in the type designation. This is not the case with motor versions whose type of construction has not been standardized according to Code I. In such cases, the type of construction is specified in accordance with Code II. Standard motors, that is frame sizes 90 to 315 M, that are ordered in the basic (universal) types of construction IM B3, IM B5 or IM B14, can also be operated in other mounting positions as follows:

**IM B3** in IM B6, IM B7, IM B8, IM V5 or IM V6,  
**IM B5** in IM V1 or IM V3,  
**IM B14** in IM V18 or IM V19.

For motors up to frame size 180 (standard version without condensation drain), this applies without constraints. With frame size 200 and above, it is important that the motors are installed with the condensation drainage holes at the lowest point. The mains connection of the motors is suitable for all types of construction due to the ability to rotate the terminal box by 90°. The motors in the version "without explosion protection" for vertical installation with the shaft extension pointing downwards are supplied without a protective cover over the fan cover, unless specified otherwise.

Type of construction acc. to EN 60034-7	Bearings		Motor type	Type of construction code 12th position of the Article No.	Additional identification code with order code
<b>Horizontal installation with bearing plates</b>					
<b>Without flange</b>					
IM B3/IM 1001	2 bearing plates		A	0	
IM B6/IM 1051	2 bearing plates		B	9	+M1A
IM B7/IM 1061	2 bearing plates		B	9	+M1B
IM B8/IM 1071	2 bearing plates		B	9	+M1C
IM B15/IM 1201	1 bearing plate – IM B3 no bearing plate (also no roller bearing) at DE		J	9	+M2K or +M2L
IM B20/IM 1101	2 bearing plates		L	9	+M1Q
<b>With flange</b>					
IM B35/IM 2001	2 bearing plates		D	6	
IM B34/IM 2101	2 bearing plates		F	2	
IM B5/IM 3001	2 bearing plates		C	1	
IM B9/IM 9101	1 bearing plate – as for IM B5 or IM B14, but no bearing plate and no roller bearing at DE		G	9	
IM B14/IM 3601	2 bearing plates		E	3	
<b>Special type of construction</b>					
–/IM 5210 without shaft, rotor sits on external shaft	Without bearing		Y	9	

**Overview** (continued)

Type of construction acc. to EN 60034-7	Bearings		Motor type	Type of construction code 12th position of the Article No.	Additional identification code with order code
<b>Vertical installation with bearing plates</b>					
<b>Without flange</b>					
IM V5/IM 1011	2 bearing plates		<i>R</i>	<b>9</b>	<b>+M1D or +M1F</b>
IM V6/IM 1031	2 bearing plates		<i>R</i>	<b>9</b>	<b>M1E</b>
<b>With flange</b>					
IM V1/IM 3011	2 bearing plates		<i>M</i>	<b>8 or 4</b>	
IM V15/IM 2011	2 bearing plates		<i>T</i>	<b>9</b>	<b>+M2K or +M2L</b>
IM V2/IM 3231	2 bearing plates		<i>N</i>	<b>9</b>	
IM V3/IM 3031	2 bearing plates		<i>P</i>	<b>9</b>	<b>+M1G</b>
IM V36/IM 2031	2 bearing plates		<i>U</i>	<b>9</b>	<b>+M1J</b>
IM V8/IM 9111 type of construction IM V 1 or IM V 18	1 bearing plate – IM V1 or IM V18 without bearing plate and without roller bearing at DE		<i>G</i>	<b>9</b>	<b>+M1L or +M1M</b>
IM V9/IM 9131 type of construction IM V 3 or IM V 19	1 bearing plate – IM V3 or IM V19 without bearing plate and without roller bearing at DE		<i>Z</i>	<b>9</b>	
IM V18/IM 3611	2 bearing plates		<i>S</i>	<b>9</b>	<b>+M2M or +M2N</b>
IM V19/IM 3631	2 bearing plates		<i>S</i>	<b>9</b>	

**Flange designations**

In accordance with EN 50347 or IEC 60072-1, the mounting flanges are designated according to the nominal dimension of the hole diameter. Their assignment to frame sizes can be obtained from the dimensional drawings.

Flange with through holes, e.g. IM B5 EN 50347:  
 FF100, FF115, FF130, FF165, FF215, FF265, FF300, FF350,  
 FF400, FF500, FF600, FF740

Flange with tapped holes, e.g. IM B14 EN 50347:  
 FT65, FT75, FT85, FT100, FT115, FT130, FT165

## Introduction

### General technical specifications

#### Motor connection and terminal box

1

#### Overview

The terminal box housings are made of cast-iron and designed to IP55 degree of protection (to IP56 in the case of LOHER VARIO) in accordance with EN 60034-5. The terminals are therefore protected from touch, dust deposits and water jets from any direction. The terminal boxes for explosion-proof motors correspond to the respective standards.

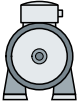

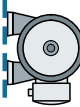
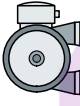



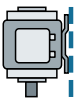
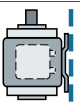

Explosion-proof motors are equipped as standard with terminal boxes in type of protection Ex e in accordance with EN 60079-0 and EN 60079-7. For motors in type of protection "Non-sparking", the terminal boxes are stamped with "Ex nA" in accordance with EN 60079-15. The "Ex nA" terminal box design is identical to that for "Ex e".

The position of the terminal box and cable entries can be obtained from the table below. The terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides. For motors in type of protection "explosion-proof enclosure", subsequent rotation of the terminal box for frame sizes 71 and 80 is only permitted to be performed in an authorized specialist workshop.

Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box that is mounted on the side of the terminal box corresponding to the type of protection of the motor.

#### Position of the terminal box

Assignment of terminal box position to type of construction

Types of construction	Terminal box position
IM B3/IM B5, IM B3/IM B14 – terminal box on top	
IM B3/IM B5, IM B3/IM B14 – terminal box on side	
IM B6 <sup>1)</sup>	
IM B7 <sup>1)</sup>	
IM B8 <sup>1)</sup>	
IM V1, IM V18	
IM V3, IM V19	
IM V5 <sup>1)</sup>	
IM V6 <sup>1)</sup>	
IM V15, IM V17 <sup>1)</sup>	

<sup>1)</sup> For terminal box position on top, the design is as for IM B3/IM B5, IM B3/IM B14 – terminal box on top.



## Overview

### Degrees of protection acc. to EN 60034-5

Degree of protection	Scope of protection	Protection against water (2nd digit)
	Shock hazard protection and protection against the ingress of foreign bodies (1st digit)	
IP54	Total protection against touching of live parts and against getting near such parts as well as touching of moving parts inside the housing.	Water sprayed from all directions onto the machine must not have a harmful effect.
IP55	Protection against harmful dust deposits: Ingress of dust is not totally prevented, but dust will not penetrate in sufficient quantities for satisfactory operation of the machine to be affected.	A jet of water from a nozzle that is aimed at the machine from all directions does not have a harmful effect.
IP56		Water due to heavy seas, or water in a powerful jet, will not penetrate the housing in any quantities that may cause damage.
IP65	Total protection against touching of live parts and against getting near such parts as well as touching of moving parts inside the housing. Protection against ingress of dust (dust tight).	A jet of water from a nozzle that is aimed at the machine from all directions does not have a harmful effect.

All motors in the standard version correspond to **IP55 degree of protection**. Other degrees of protection are available as an option.

For all types of construction with the shaft extension pointing downwards, a suitable cover that prevents small parts from falling into the fan cover is essential. Exceptions to this rule are cases in which the motor is mounted such that the machine performs the function of the cover. This type of cover must, however, not adversely affect the cooling air flow. Motors that are installed outdoors must be protected against intensive exposure to the sun.

### Motors to IP67 degree of protection

Special motor versions can be supplied for installation in plants which can be flooded occasionally, such as pumping stations. They are suitable for temporary submersion at standstill for up to 72 hours in a maximum depth of water of 8 m. During the entire period of submersion, the motor must not be in operation. To ensure that the built-in fan of the motor or the external ventilation is not destroyed, the motor must be switched off before the water level reaches the fan.

Special measures, such as special sealing around the shaft and static joints in accordance with IP67 ensure that no water can enter the motor for the duration of submersion. After connecting the motor, the terminal box must be tightly sealed using the supplied casting resin in accordance with the installation instructions supplied with the motor.

Available types in IP67 degree of protection in frame size 160 and above:

- 1PS0 without explosion protection
- 1PS1 with type of protection Ex nA IIC
- 1PS5 with type of protection Ex de IIC

The technical specifications of the motors can be obtained from the type descriptions.

Additional options that are appropriate for IP67 degree of protection:

- PTC thermistor for winding monitoring
- Paint finish N14
- Stainless steel screws
- Anti-condensation heater
- Built-on level switch  
(not included in the scope of supply of the motor)

## Introduction

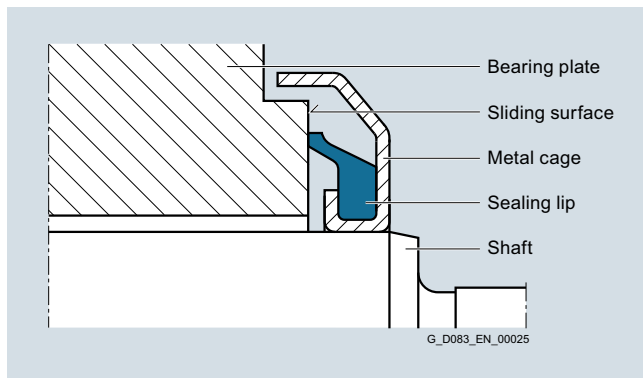
### General technical specifications

#### Degrees of protection and mechanical design

#### Overview (continued)

##### *IP66 shaft seal (optional)*

A shaft seal to IP66 is available as an option for motors of the LOHER CHEMSTAR 1PS series. It comprises an axial ring seal (Gammaring 9RB). The sealing lip slides over a carefully prepared metal surface. The contact pressure reduces as the speed increases. This reduces wear. The metal cage in combination with the housing forms a labyrinth gap which protects the sealing lip from water jets, dust and mechanical damage. This mechanical design prevents deposits of water in the vicinity of the sealing lip.



The shaft seal is suitable for horizontal and vertical motor types of construction. It is particularly suited to outdoor installations, especially V3.

IP66/65 degree of protection has been verified for the seal by DEKRA EXAM. The shaft seal has been successfully implemented under extreme conditions for 30 years.

LOHER VARIO motors are equipped as standard with a contactless, maintenance-free labyrinth sealing system. Degree of protection up to IP66 can be achieved by means of the special version with integrated seals. This sealing system is certified in accordance with the strict requirements for dust explosion-proof motors (Ex t).

##### *Condensation drainage holes*

For motors of frame size 180 and below, condensation drainage holes are not provided due to the minimal empty internal space and consequently minimal build-up of condensation. They will only be implemented in response to a special request. Such a request must be clearly stated when placing an order. Motors of frame size 160 and above feature condensation drainage holes as standard.

The location of the condensation drainage holes depends on the type of construction. They are located at the lowest point of the bearing plates. If the drainage holes are not at the lowest point following installation and commissioning of the motor, new holes must be drilled accordingly and the existing holes must be sealed with plugs. For IP55 and IP56 degrees of protection, the condensation drainage holes are sealed. For motors of the 1PS0 type series, the condensation drainage holes are sealed with a plug that is compliant with the degree of protection and which ensures condensation drainage. For motors of the 1PS1 type series, condensation drainage holes are tightly sealed with a bolt. The drilled hole must be opened regularly to allow the accumulated condensation water to drain away.

For the 1PS4, 1PS5 and 1MD5 motor series, condensation drainage holes cannot be implemented, as this would not comply with the type of protection "Explosion-proof enclosure".

In the case of vertical types of construction, the hole in the top bearing plate is sealed with a plug.

**Overview**

The motors are equipped with deep groove ball bearings at the drive end (DE) and the non-drive end (NDE). For special versions with reinforced bearings, a cylindrical roller bearing is fitted at the DE in some cases.

To fix the rotor in the axial direction, a bearing must be designed as a so-called located bearing. To prevent expansion of the shaft in a warm motor in the direction of the driven machine, the located bearing is installed at the drive end. This does not apply to motors with reinforced bearings (roller bearings). In accordance with the type of construction, the located bearing must be mounted on the NDE fan end. In LOHER VARIO motors of the 1PS0 and 1PS1 type series for vertical installation, the located bearing is also mounted at NDE.

The assignment and designation of bearings are shown in the tables under the heading "Selection of roller bearings".

**Bearing shipping brace**

Cylindrical roller bearings are sensitive to shock at standstill. This can occur during transportation, or it can be caused after installation by adjacent machines. This results in longitudinal grooves on the inner ring of the roller bearing. To prevent this, all motors with roller bearings are equipped with a special shipping brace. The rotor shaft is totally blocked by tightening several hexagon bolts. This prevents vibration on the moving surface of the bearing from being transferred.

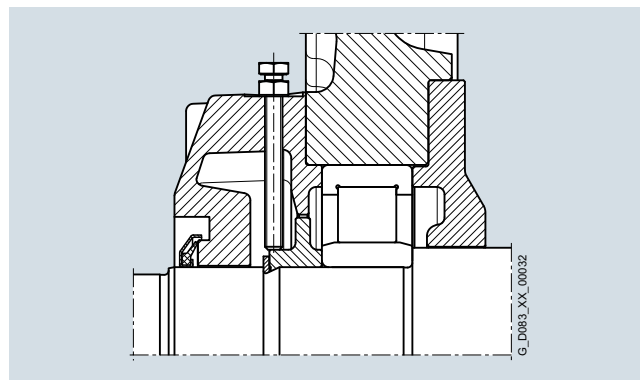
**Standard bearings****Selection of roller bearings**

Frame size	No. of poles	Drive end (DE) bearing		Non-drive end (NDE) bearing	
		Type of construction IM B3, IM B5	V types of construction	Type of construction IM B3, IM B5	V types of construction
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>					
90	All	6205-2Z C3	6205-2Z C3	6205-2Z C3	6205-2Z C3
100	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
112	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
132	All	6308-2Z C3	6308-2Z C3	6308-2Z C3	6308-2Z C3
160	All	6310-2Z C3	6310-2Z C3	6310-2Z C3	6310-2Z C3
180	All	6311-2Z C3	6311-2Z C3	6311-2Z C3	6311-2Z C3
200	All	6312-Z C3	6312-Z C3	6312-Z C3	6312-Z C3
225	All	6313-Z C3	6313-Z C3	6313-Z C3	6313-Z C3
250	All	6314-Z C3	6314-Z C3	6314-Z C3	6314-Z C3
280	2	6314-Z C3	6314-Z C3	6314-Z C3	6314-Z C3
280	≥ 4	6316-Z C3	6316-Z C3	6316-Z C3	6316-Z C3
315	2	6316 C3	6316 C3 <sup>1)</sup>	6316 C3	6316 C3
315	≥ 4	6219 C3	6219 C3	6219 C3	6219 C3
355	2	6316 C3	6316 C3 <sup>1)</sup>	6316 C3	6316 C3
355	≥ 4	6320 C3	6320 C3	6320 C3	6320 C3
<b>LOHER VARIO 1PS0 and 1PS1 motors</b>					
355	2	6316 C3	6316 C3	6316 C3	7316 B <sup>1)</sup>
355	≥ 4	6320 C3	6320 C3	6320 C3	7320 B
400	2	6317 C3	6317 C3 <sup>1)</sup>	6317 C3	7317 B <sup>1)</sup>
400	≥ 4	6322 C3	6322 C3	6322 C3	7322 B
450	2	6318 C3 <sup>1)</sup>	2)	6318 C3 <sup>1)</sup>	2)
450	≥ 4	6324 C3	6324 C3	6324 C3	7324 B
500	2	2)	2)	2)	2)
500	≥ 4	6326 C3	6326 C3	6326 C3	7326 B

Continued on next page.

<sup>1)</sup> For 50 Hz operation only, for 60 Hz with C4 bearings.

<sup>2)</sup> On request, sleeve bearings may be necessary.



Example illustration

## Introduction

### General technical specifications

#### Bearings

#### Overview (continued)

##### Selection of roller bearings (continued)

Frame size	No. of poles	Drive end (DE) bearing		Non-drive end (NDE) bearing	
		Type of construction IM B3, IM B5	V types of construction	Type of construction IM B3, IM B5	V types of construction
<b>LOHER CHEMSTAR 1PS5 and SIMOTICS XP 1MD5 motors</b>					
71	All	6203-2Z	6203-2Z	6203-2Z	6203-2Z
80	All	6204-2Z	6204-2Z	6204-2Z	6204-2Z
90	All	6205-2Z C3	6205-2Z C3	6205-2Z C3	6205-2Z C3
100	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
112	All	6306-2Z C3	6306-2Z C3	6306-2Z C3	6306-2Z C3
132	All	6308-2Z C3	6308-2Z C3	6308-2Z C3	6308-2Z C3
160	All	6310-2Z C3	6310-2Z C3	6310-2Z C3	6310-2Z C3
180	All	6311 C3	6311 C3	6311 C3	6311 C3
200	All	6312 C3	6312 C3	6312 C3	6312 C3
225	All	6313 C3	6313 C3	6313 C3	6313 C3
250	All	6314 C3	6314 C3	6314 C3	6314 C3
280	2	6314 C3	6314 C3	6314 C3	6314 C3
280	≥ 4	6316 C3	6316 C3	6316 C3	6316 C3
315	2	6316 C3	6316 C3 <sup>1)</sup>	6316 C3	6316 C3
315	≥ 4	6219 C3	6219 C3	6219 C3	6219 C3
355	2 <sup>2)</sup>	6316 C3	6316 C3	6316 C3	6316 C3
355	≥ 4	6320 C3	6320 C3	6320 C3	6320 C3
<b>LOHER VARIO 1PS4 and 1PS5 motors</b>					
355	2	6316 C4	6318 C4	6316 C4	6316 C4
355	≥ 4	6320 C3	6320 C3	6320 C3	6320 C3
400	2	6317 C4	6320 C4	6317 C4	6320 C4
400	≥ 4	6322 C3	6322 C3	6322 C3	6322 C3
450	2	NU1022M C3+6022 C3 <sup>1)</sup>	7218+6218 C4 <sup>1)</sup>	NU1022M C3	NU1022M C3
450	≥ 4	6324 C3	7224+6324 C3	6324 C3	NU1022M
500	2	NU1022M C3+6022 C3 <sup>1)</sup>	<sup>3)</sup>	NU1022M C3	<sup>3)</sup>
500	≥ 4	6326M C3	7226+6226 C3	6326M C3	NU1022M

<sup>1)</sup> For 50 Hz operation only, for 60 Hz with C4 bearings.

<sup>2)</sup> Only applies for 1PS5.

<sup>3)</sup> On request, sleeve bearings may be necessary.

**Overview** (continued)Admissible forces on shaft extension

The values apply to the bearings and drive end shaft extensions that are assigned in the following tables based on a calculated service life of  $L_{10h} = 20000$  h.

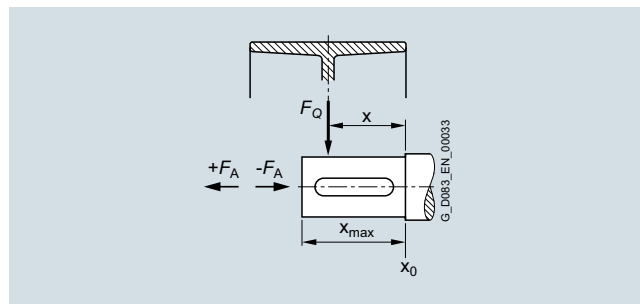
They are applicable for horizontal and vertical shafts.

$F_Q$  = Cantilever force in N

$F_A$  = Axial force in N

$x$  = Distance between point of application of force and shoulder of shaft in mm

$l$  = Length of shaft extension in mm



Admissible cantilever force

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Valid are:  $x_0$  values for  $x = 0$ ,  $x_{0,5}$  values for  $x = 0.5 \cdot l$  and  $x_{max}$  values for  $x = l$  ( $l$  = shaft extension)

Frame size **Admissible cantilever force  $F_Q$**

Frame size	at $x_0$				at $x_{0,5}$				at $x_{max}$			
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>												
90	0.75	0.94	0.93	0.93	0.69	0.64	0.60	0.60	0.63	0.47	0.44	0.44
100	1.39	0.57	2.00	2.00	1.27	0.38	1.48	1.48	1.11	0.29	1.11	1.11
112	1.36	1.72	1.96	1.96	1.24	1.48	1.48	1.48	1.11	1.11	1.11	1.11
132	2.14	2.70	3.08	3.08	1.93	2.43	2.77	2.77	1.23	1.91	2.26	2.26
160	3.42	4.33	4.99	4.99	3.11	3.93	4.56	4.56	2.87	3.31	3.31	3.31
180	4.21	5.30	6.08	6.08	3.84	4.84	5.55	5.55	3.53	4.21	4.21	4.21
200	4.46	5.60	6.42	6.42	4.08	5.14	5.90	5.90	3.78	4.75	5.36	5.36
225	5.10	6.37	7.21	7.21	4.73	5.79	6.57	6.57	4.41	5.32	5.74	5.74
250	5.53	7.00	8.01	8.91	5.03	6.36	7.28	8.10	4.61	5.83	6.68	7.43
280	5.32	7.96	9.09	10.23	4.89	7.31	8.35	9.41	4.52	6.77	7.73	8.70
315 S/M	6.20	6.80	7.70	8.70	5.70	6.30	7.20	8.00	5.40	5.80	6.70	7.50
315 L	5.90	6.20	7.00	8.00	5.60	6.00	6.30	7.50	5.30	5.70	6.30	7.20
355 LB	5.60	10.20	11.80	13.20	5.20	9.45	10.80	12.00	4.80	8.50	9.60	10.60

**LOHER VARIO 1PS0 and 1PS1 motors**

355 ... 500 Values on request

The specified cantilever forces must not be exceeded to ensure compliance with the maximum admissible shaft flexing in the ignition gap.

## Introduction

### General technical specifications

#### Bearings

#### Overview (continued)

##### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Valid are:  $x_0$  values for  $x = 0$ ,  $x_{0,5}$  values for  $x = 0.5 \cdot l$  and  $x_{max}$  values for  $x = l$  ( $l$  = shaft extension)

Frame size **Admissible cantilever force  $F_Q$**

Frame size	at $x_0$				at $x_{0,5}$				at $x_{max}$			
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>LOHER CHEMSTAR 1PS5 motors</b>												
71	0.52	0.57	0.57	0.57	0.41	0.41	0.41	0.41	0.32	0.32	0.32	0.32
80	0.69	0.75	0.89	0.89	0.59	0.49	0.59	0.59	0.44	0.37	0.44	0.44
90	0.75	0.94	0.93	0.93	0.69	0.64	0.60	0.60	0.63	0.47	0.44	0.44
100	1.39	0.57	1.84	1.84	1.11	0.38	1.23	1.23	0.83	0.29	0.92	0.92
112	1.36	1.72	1.96	1.96	1.24	1.33	1.33	1.33	1.00	1.00	1.00	1.00
132	2.14	2.70	3.08	3.08	1.73	1.88	2.77	2.77	1.23	1.34	2.01	2.01
160	3.42	4.33	4.99	4.99	3.11	3.93	4.23	4.23	2.82	2.90	2.87	2.87
180	4.21	5.30	6.08	6.08	3.84	4.84	5.55	5.55	3.53	4.21	4.21	4.21
200	4.46	5.60	6.42	6.42	4.08	5.14	5.90	5.90	3.78	4.75	5.36	5.36
225	5.10	6.37	7.21	7.21	4.73	5.79	6.57	6.57	4.41	5.32	5.74	5.74
250	5.53	7.00	8.01	8.91	5.03	6.36	7.28	8.10	4.61	5.83	6.68	6.81
280	5.32	7.96	9.09	10.23	4.89	7.31	8.35	9.41	4.52	6.77	7.73	8.70
315 S/M	6.20	6.80	7.70	8.70	5.70	6.30	7.20	8.00	5.40	5.80	6.70	7.50
315 L	5.90	6.20	7.00	8.00	5.60	6.00	6.30	6.30	5.30	4.90	4.20	4.20
355	Values on request											

##### LOHER VARIO 1PS4 and 1PS5 motors

355 ... 500 Values on request

##### SIMOTICS XP 1MD5 motors

71	0.52	0.57	0.57	–	0.41	0.41	0.41	–	0.32	0.32	0.32	–
80	0.69	0.86	0.89	–	0.59	0.59	0.59	–	0.44	0.44	0.44	–
90	0.75	0.94	1.08	–	0.69	0.87	0.92	–	0.64	0.67	0.67	–
100	1.40	1.26	1.17	–	1.22	0.84	0.78	–	0.91	0.63	0.58	–
112	1.38	1.73	1.37	–	1.25	1.17	0.91	–	0.95	0.87	0.68	–
132	2.17	2.73	3.04	–	1.95	1.88	1.81	–	1.39	1.34	1.29	–
160	3.46	4.37	4.38	–	2.51	2.37	2.34	–	1.72	1.61	1.60	–
180	4.29	5.36	6.16	–	3.92	4.51	3.57	–	3.06	3.09	3.12	–
200	4.49	5.68	6.49	–	4.13	5.21	5.95	–	3.81	4.56	4.35	–
225	5.14	6.38	7.38	–	4.77	5.81	6.72	–	4.45	5.33	5.74	–
250	5.64	6.98	8.12	–	5.13	6.35	7.39	–	4.71	5.82	6.77	–
280	5.53	8.19	9.59	–	5.08	7.53	8.82	–	4.70	6.97	8.16	–
315 S/M	6.20	6.75	7.59	–	5.75	6.16	6.94	–	5.36	5.67	6.38	–
315 L	6.16	6.01	6.89	–	5.79	5.57	6.38	–	5.45	5.20	5.95	–
355	Values on request											

The specified cantilever forces must not be exceeded to ensure compliance with the maximum admissible shaft flexing in the ignition gap.

**Overview** (continued)**Admissible axial force**

In the case of exclusively axial loading, the values in the following tables are admissible. The values apply exclusively to the bearings listed below. The data is based on a fatigue life of  $L_{10h} = 20000$  h.

The specified values apply to operation at 50 Hz. For a 60 Hz supply, the values must be reduced by 6 % to achieve the same service life.

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Frame size	Admissible axial force $+F_A$ Horizontal shaft				Vertical shaft – force acting upwards Type of construction IM V3, IM V6, IM V14, IM V19, IM V36				Vertical shaft – force acting downwards Type of construction IM V3, IM V6, IM V14, IM V19, IM V36			
	at speed											
	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>												
90	0.38	0.59	0.75	0.75	0.43	0.67	0.82	0.82	0.85	1.05	1.21	1.21
100	0.96	1.38	1.66	1.66	1.04	1.48	1.78	1.78	1.40	1.80	2.07	2.07
112	0.95	1.35	1.64	1.64	1.05	1.48	1.80	1.80	1.39	1.77	2.05	2.05
132	1.29	1.89	2.32	2.32	1.48	2.12	2.60	2.60	2.18	2.76	3.16	3.16
160	2.06	2.97	3.64	3.64	2.42	3.37	4.03	4.03	3.10	3.98	4.66	4.66
180	2.76	3.86	4.67	4.67	3.34	4.52	5.46	5.46	3.48	4.52	5.29	5.29
200	3.10	4.26	5.12	5.12	3.79	5.20	6.12	6.12	3.38	4.42	5.21	5.21
225	3.43	4.71	5.63	5.63	4.30	5.86	7.22	7.22	3.87	4.94	5.63	5.63
250 <sup>1)</sup>	3.20	4.67	5.75	6.66	4.27	6.01	7.29	8.21	4.89	6.19	7.15	8.07
280 <sup>1)</sup>	3.09	5.32	6.51	7.62	4.66	7.54	8.96	9.83	4.34	6.32	7.26	8.79
315 S/M	6.10	6.80	7.80	8.70	8.70	9.90	11.40	12.30	2.10	2.30	3.00	3.90
315 L	6.00	6.70	7.50	8.40	9.50	10.80	12.80	13.70	1.20	1.50	1.50	2.50
355 LB	5.40	9.40	10.90	12.30	10.20	15.90	18.90	20.40	0.45	2.90	3.70	5.20

**LOHER VARIO 1PS0 and 1PS1 motors**

355 ... 500 Values on request

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Frame size	Admissible axial force $-F_A$ Horizontal shaft				Vertical shaft – force acting upwards Type of construction IM V1, IM V5, IM V15, IM V18				Vertical shaft – force acting downwards Type of construction IM V1, IM V5, IM V15, IM V18			
	at speed											
	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>												
90	0.89	1.10	1.26	1.26	0.94	1.17	1.33	1.33	0.35	0.54	0.70	0.70
100	1.46	1.87	2.15	2.15	1.54	1.97	2.27	2.27	0.91	1.31	1.58	1.58
112	1.46	1.86	2.15	2.15	1.56	1.99	2.30	2.30	0.88	1.27	1.54	1.54
132	2.31	2.91	3.33	3.33	2.49	3.13	3.61	3.61	1.17	1.74	2.14	2.14
160	3.38	4.29	4.96	4.96	3.74	4.69	5.35	5.35	1.78	2.66	3.34	3.34
180	3.90	5.00	5.81	5.81	4.48	5.66	6.60	6.60	2.34	3.38	4.15	4.15
200	3.90	5.06	5.92	5.92	4.59	6.00	6.92	6.92	2.58	3.62	4.41	4.41
225	4.49	5.77	6.69	6.69	5.36	6.92	8.28	8.28	2.81	3.88	4.57	4.57
250 <sup>2)</sup>	5.60	7.07	8.15	9.06	6.67	8.41	9.69	10.61	2.49	3.79	4.75	5.67
280 <sup>2)</sup>	5.49	7.92	9.11	10.22	7.06	10.14	11.56	12.43	1.94	3.72	4.66	6.19
315 S/M	3.70	4.40	5.40	6.30	6.30	7.50	9.00	9.90	4.50	4.70	5.40	6.30
315 L	3.60	4.30	5.10	6.00	7.10	8.40	10.40	11.30	3.60	3.90	3.90	4.90
355 LB	3.80	7.60	9.10	10.50	8.60	14.10	17.10	18.60	2.05	4.70	5.50	7.00

**LOHER VARIO 1PS0 and 1PS1 motors**

355 ... 500 Values on request

<sup>1)</sup> For relubrication, see values for IMV1, IMV5, IMV15, IMV18.

<sup>2)</sup> For relubrication, see values for IMV3, IMV6, IMV14, IMV19, IMV36.

## Introduction

### General technical specifications

#### Bearings

#### Overview (continued)

##### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Frame size	Admissible axial force $+F_A$				Vertical shaft – force acting upwards				Vertical shaft – force acting downwards			
	Horizontal shaft											
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>LOHER CHEMSTAR 1PS5 motors</b>												
71	0.25	0.39	0.49	0.49	0.28	0.43	0.53	0.53	0.53	0.66	0.76	0.76
80	0.37	0.55	0.68	0.68	0.40	0.61	0.74	0.74	0.67	0.84	0.97	0.97
90	0.38	0.59	0.75	0.75	0.43	0.67	0.82	0.82	0.85	1.05	1.21	1.21
100	0.96	1.38	1.66	1.66	1.04	1.48	1.78	1.78	1.40	1.80	2.07	2.07
112	0.95	1.35	1.64	1.64	1.05	1.48	1.80	1.80	1.39	1.77	2.05	2.05
132	1.29	1.89	2.32	2.32	1.48	2.12	2.60	2.60	2.18	2.76	3.16	3.16
160	2.06	2.97	3.64	3.64	2.42	3.37	4.03	4.03	3.10	3.98	4.66	4.66
180	2.76	3.86	4.67	4.67	3.34	4.52	5.46	5.46	3.48	4.52	5.29	5.29
200	3.10	4.26	5.12	5.12	3.79	5.20	6.12	6.12	3.38	4.42	5.21	5.21
225	3.43	4.71	5.63	5.63	4.30	5.86	7.22	7.22	3.87	4.94	5.63	5.63
250	5.60	7.07	8.15	9.06	6.67	8.41	9.69	10.61	2.49	3.79	4.75	5.67
280	5.49	7.92	9.11	10.22	7.06	10.14	11.56	12.43	1.94	3.72	4.66	6.19
315 S/M	6.10	6.80	7.80	8.70	8.70	9.90	11.40	12.30	2.10	2.30	3.00	3.90
315 L	6.00	6.70	7.50	8.40	9.50	10.80	12.80	13.70	1.20	1.50	1.50	2.50

##### LOHER VARIO 1PS4 and 1PS5 motors

355 ... 500 Values on request

##### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Frame size	Admissible axial force $-F_A$				Vertical shaft – force acting upwards				Vertical shaft – force acting downwards			
	Horizontal shaft											
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>LOHER CHEMSTAR 1PS5 motors</b>												
71	0.55	0.68	0.79	0.79	0.57	0.72	0.82	0.82	0.24	0.36	0.47	0.47
80	0.69	0.87	1.00	1.00	0.72	0.93	1.06	1.06	0.35	0.52	0.65	0.65
90	0.89	1.10	1.26	1.26	0.94	1.17	1.33	1.33	0.35	0.54	0.70	0.70
100	1.46	1.87	2.15	2.15	1.54	1.97	2.27	2.27	0.91	1.31	1.58	1.58
112	1.46	1.86	2.15	2.15	1.56	1.99	2.30	2.30	0.88	1.27	1.54	1.54
132	2.31	2.91	3.33	3.33	2.49	3.13	3.61	3.61	1.17	1.74	2.14	2.14
160	3.38	4.29	4.96	4.96	3.74	4.69	5.35	5.35	1.78	2.66	3.34	3.34
180	3.90	5.00	5.81	5.81	4.48	5.66	6.60	6.60	2.34	3.38	4.15	4.15
200	3.90	5.06	5.92	5.92	4.59	6.00	6.92	6.92	2.58	3.62	4.41	4.41
225	4.49	5.77	6.69	6.69	5.36	6.92	8.28	8.28	2.81	3.88	4.57	4.57
250	3.20	4.67	5.75	6.66	4.27	6.01	7.29	8.21	4.89	6.19	7.15	8.07
280	3.09	5.32	6.51	7.62	4.66	7.54	8.96	9.83	4.34	6.32	7.26	8.79
315 S/M	3.70	4.40	5.40	6.30	6.30	7.50	9.00	9.90	4.50	4.70	5.40	6.30
315 L	3.60	4.30	5.10	6.00	7.10	8.40	10.40	11.30	3.60	3.90	3.90	4.90

##### LOHER VARIO 1PS4 and 1PS5 motors

355 ... 500 Values on request



## Overview (continued)

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Frame size	Admissible axial force $+F_A$				Vertical shaft – force acting upwards				Vertical shaft – force acting downwards			
	Horizontal shaft											
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>SIMOTICS XP 1MD5 motors</b>												
71	0.25	0.39	0.49	–	0.28	0.43	0.53	–	0.53	0.66	0.76	–
80	0.37	0.55	0.69	–	0.40	0.59	0.72	–	0.67	0.84	0.98	–
90	0.38	0.59	0.75	–	0.43	0.64	0.80	–	0.85	1.06	1.21	–
100	0.97	1.37	1.66	–	1.03	1.46	1.77	–	1.41	1.78	2.08	–
112	0.96	1.36	1.65	–	1.04	1.45	1.78	–	1.41	1.80	2.08	–
132	1.31	1.90	2.34	–	1.44	2.06	2.52	–	2.21	2.79	3.19	–
160	2.07	2.98	3.64	–	2.34	3.31	4.04	–	3.16	4.04	4.64	–
180	2.79	3.89	4.71	–	3.20	4.46	5.36	–	3.64	4.62	5.40	–
200	3.12	4.30	5.15	–	3.70	5.05	5.96	–	3.47	4.58	5.34	–
225	3.44	4.73	5.72	–	4.27	5.82	6.97	–	3.90	4.93	5.91	–
250	5.65	7.06	8.19	–	6.67	8.62	9.66	–	2.49	3.58	4.77	–
280	5.58	8.02	9.34	–	6.99	10.03	11.06	–	2.04	3.93	5.35	–
315 S/M	6.09	6.80	7.77	–	8.22	9.53	10.56	–	1.89	2.14	2.77	–
315 L	5.90	6.44	7.40	–	9.16	10.77	12.44	–	0.95	0.37	0.99	–
355	Values on request											

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Frame size	Admissible axial force $-F_A$				Vertical shaft – force acting upwards				Vertical shaft – force acting downwards			
	Horizontal shaft											
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>SIMOTICS XP 1MD5 motors</b>												
71	0.55	0.68	0.79	–	0.57	0.72	0.82	–	0.24	0.36	0.47	–
80	0.69	0.87	1.01	–	0.72	0.91	1.04	–	0.35	0.53	0.66	–
90	0.89	1.10	1.25	–	0.93	1.15	1.31	–	0.34	0.55	0.70	–
100	1.46	1.86	2.15	–	1.52	1.95	2.27	–	0.92	1.29	1.58	–
112	1.46	1.87	2.16	–	1.54	1.96	2.28	–	0.90	1.30	1.57	–
132	2.32	2.92	3.35	–	2.45	3.08	3.53	–	1.20	1.78	2.18	–
160	3.39	4.30	4.96	–	3.66	4.63	5.36	–	1.84	2.72	3.32	–
180	3.93	5.03	5.85	–	4.34	5.60	6.50	–	2.50	3.48	4.26	–
200	3.92	5.10	5.95	–	4.50	5.85	6.76	–	2.67	3.78	4.54	–
225	4.50	5.79	6.78	–	5.33	6.88	8.03	–	2.84	3.87	4.85	–
250	3.25	4.66	5.79	–	4.27	6.22	7.26	–	4.89	5.98	7.17	–
280	3.18	5.42	6.74	–	4.59	7.43	8.46	–	4.44	6.53	7.95	–
315 S/M	3.69	4.40	5.37	–	5.82	7.13	8.16	–	4.29	4.54	5.17	–
315 L	3.50	4.04	5.00	–	6.76	8.37	10.04	–	3.35	2.77	3.39	–
355	Values on request											

## Introduction

### General technical specifications

#### Bearings

#### Overview (continued)

#### Additional axial force with cantilever force on shaft extension

If the shaft extensions are loaded at  $x = l$  ( $l$  = shaft extension) with the respective admissible cantilever force  $F_Q$ , the following additional forces are permitted to occur in the axial direction.

If the admissible cantilever forces are not exploited to the full, higher loads are possible in the axial direction (values on request).

#### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Frame size	Additional axial force $+F_A$ Horizontal shaft				Vertical shaft – force acting upwards Shaft extension at top Type of construction IM V3, IM V6, IM V14, IM V19, IM V36				Vertical shaft – force acting downwards Shaft extension at top Type of construction IM V3, IM V6, IM V14, IM V19, IM V36											
	at speed				3000 rpm				1500 rpm				1000 rpm				750 rpm			
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN		
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>																				
90	0.04	0.26	0.41	0.41	0.09	0.33	0.48	0.48	0.51	0.72	0.87	0.87								
100	0.47	1.10	0.91	0.91	0.45	1.20	0.90	0.90	0.75	1.52	1.23	1.23								
112	0.38	0.67	0.99	0.99	0.48	0.70	1.01	1.01	0.75	1.00	1.28	1.28								
132	0.59	1.00	1.07	1.07	0.64	0.83	1.35	1.35	1.20	1.46	1.75	1.75								
160	0.46	1.30	1.85	1.85	0.85	1.74	2.07	2.07	1.49	2.11	2.56	2.56								
180	1.08	1.58	2.26	2.26	1.58	2.24	3.03	3.03	1.71	2.23	2.86	2.86								
200	1.34	1.85	2.26	2.26	1.92	2.66	3.17	3.17	1.52	1.88	2.20	2.20								
225	1.45	2.07	2.48	2.48	2.21	3.06	4.03	4.03	1.78	2.16	2.45	2.45								
250 <sup>1)</sup>	1.00	1.66	2.06	2.42	1.94	2.84	3.57	3.86	2.57	3.01	3.44	3.85								
280 <sup>1)</sup>	1.02	1.99	2.62	2.96	2.44	4.00	4.77	4.87	2.14	2.82	3.13	3.87								
315 S/M	3.80	4.10	4.70	5.10	6.20	7.10	8.10	8.50	–	–	–	0.10								
315 L	3.80	4.10	4.60	5.00	7.10	8.20	9.80	10.20	–	–	–	–								
355 LB	3.30	5.40	6.40	6.90	8.00	11.90	13.90	14.40	Values on request											

#### LOHER VARIO 1PS0 and 1PS1 motors

355 ... 500 Values on request

#### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Frame size	Additional axial force $-F_A$ Horizontal shaft				Vertical shaft – force acting upwards Shaft extension at bottom Type of construction IM V1, IM V5, IM V10, IM V15, IM V18				Vertical shaft – force acting downwards Shaft extension at bottom Type of construction IM V1, IM V5, IM V10, IM V15, IM V18											
	at speed				3000 rpm				1500 rpm				1000 rpm				750 rpm			
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>																				
90	0.55	0.77	0.92	0.92	0.60	0.84	0.99	0.99	0.01	0.21	0.36	0.36								
100	0.97	1.59	1.41	1.41	0.95	1.69	1.40	1.40	0.25	1.03	0.73	0.73								
112	0.88	1.18	1.50	1.50	0.98	1.20	1.51	1.51	0.25	0.50	0.78	0.78								
132	1.61	2.01	2.09	2.09	1.66	1.85	2.36	2.36	0.18	0.44	0.73	0.73								
160	1.78	2.62	3.17	3.17	2.17	3.06	3.39	3.39	0.17	0.79	1.24	1.24								
180	2.22	2.72	3.40	3.40	2.72	3.38	4.17	4.17	0.57	1.09	1.72	1.72								
200	2.14	2.65	3.06	3.06	2.72	3.46	3.97	3.97	0.72	1.08	1.40	1.40								
225	2.51	3.13	3.54	3.54	3.27	4.12	5.09	5.09	0.72	1.10	1.39	1.39								
250 <sup>2)</sup>	3.40	4.06	4.46	4.82	4.34	5.24	5.97	6.26	0.17	0.61	1.04	1.45								
280 <sup>2)</sup>	3.42	4.59	5.22	5.56	4.84	6.60	7.37	7.47	–	0.22	0.53	1.27								
315 S/M	1.40	1.70	2.30	2.70	3.80	4.70	5.70	6.10	2.00	1.90	2.10	2.50								
315 L	1.40	1.70	2.20	2.60	4.70	5.80	7.40	7.80	1.30	1.30	1.30	1.40								
355 LB	1.70	3.60	4.60	5.10	6.40	10.10	12.10	12.60	Values on request											

#### LOHER VARIO 1PS0 and 1PS1 motors

355 ... 500 Values on request

<sup>1)</sup> For relubrication, see values for IMV1, IMV5, IMV15, IMV18.

<sup>2)</sup> For relubrication, see values for IMV3, IMV6, IMV14, IMV19, IMV36.

## Overview (continued)

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Frame size	<b>Additional axial force +F<sub>A</sub></b> <b>Horizontal shaft</b>				<b>Vertical shaft – force acting upwards</b>				<b>Vertical shaft – force acting downwards</b>			
					<b>Shaft extension at top</b>				<b>Shaft extension at top</b>			
					Type of construction IM V3, IM V6, IM V14, IM V19, IM V36				Type of construction IM V3, IM V6, IM V14, IM V19, IM V36			
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>LOHER CHEMSTAR 1PS5 motors</b>												
71	0.07	0.18	0.27	0.27	0.09	0.22	0.31	0.31	0.34	0.45	0.54	0.54
80	0.09	0.26	0.37	0.37	0.12	0.31	0.42	0.42	0.39	0.54	0.65	0.65
90	0.04	0.26	0.41	0.41	0.09	0.33	0.48	0.48	0.51	0.72	0.87	0.87
100	0.47	1.10	1.02	1.02	0.55	1.20	1.13	1.13	0.91	1.52	1.43	1.43
112	0.38	0.67	0.99	0.99	0.48	0.80	1.15	1.15	0.81	1.09	1.65	1.65
132	0.59	1.00	1.07	1.07	0.78	1.22	1.35	1.35	1.48	1.86	1.91	1.91
160	0.46	1.30	1.85	1.85	0.85	1.74	2.28	2.28	1.49	2.31	2.85	2.85
180	1.08	1.58	2.26	2.26	1.58	2.24	3.03	3.03	1.71	2.23	2.86	2.86
200	1.34	1.85	2.26	2.26	1.92	2.66	3.17	3.17	1.52	1.88	2.20	2.20
225	1.45	2.07	2.48	2.48	2.21	3.06	4.03	4.03	1.78	2.16	2.45	2.45
250	3.40	4.06	4.46	4.97	4.34	5.24	5.97	6.49	0.17	0.61	1.04	1.55
280	3.42	4.59	5.22	5.56	4.84	6.60	7.37	7.47	–	0.22	0.53	1.27
315 S/M	3.80	4.10	4.70	5.10	6.20	7.10	8.10	8.50	–	–	–	0.10
315 L	3.80	4.10	4.60	5.00	7.10	8.20	9.80	10.20	–	–	–	–

**LOHER VARIO 1PS4 and 1PS5 motors**

355 ... 500 Values on request

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Frame size	<b>Additional axial force –F<sub>A</sub></b> <b>Horizontal shaft</b>				<b>Vertical shaft – force acting upwards</b>				<b>Vertical shaft – force acting downwards</b>			
					<b>Shaft extension at bottom</b>				<b>Shaft extension at bottom</b>			
					Type of construction IM V1, IM V5, IM V10, IM V15, IM V18				Type of construction IM V1, IM V5, IM V10, IM V15, IM V18			
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>LOHER CHEMSTAR 1PS5 motors</b>												
71	0.36	0.47	0.57	0.57	0.38	0.51	0.60	0.60	0.05	0.16	0.25	0.25
80	0.41	0.57	0.69	0.69	0.44	0.63	0.74	0.74	0.07	0.22	0.33	0.33
90	0.55	0.77	0.92	0.92	0.60	0.84	0.99	0.99	0.01	0.21	0.36	0.36
100	0.97	1.59	1.51	1.51	1.04	1.69	1.63	1.63	0.42	1.03	0.94	0.94
112	0.88	1.18	1.50	1.50	0.98	1.31	1.65	1.65	0.30	0.58	0.89	0.89
132	1.61	2.01	2.09	2.09	1.79	2.23	2.36	2.36	0.47	0.84	0.89	0.89
160	1.78	2.62	3.17	3.17	2.17	3.06	3.60	3.60	0.17	0.99	1.53	1.53
180	2.22	2.72	3.40	3.40	2.72	3.38	4.17	4.17	0.57	1.09	1.72	1.72
200	2.14	2.65	3.06	3.06	2.72	3.46	3.97	3.97	0.72	1.08	1.40	1.40
225	2.51	3.13	3.54	3.54	3.27	4.12	5.09	5.09	0.72	1.10	1.39	1.39
250	1.00	1.66	2.06	2.57	1.94	2.84	3.57	4.09	2.57	3.01	3.44	3.95
280	1.02	1.99	2.62	2.96	2.44	4.00	4.77	4.87	2.14	2.82	3.13	3.87
315 S/M	1.40	1.70	2.30	2.70	3.80	4.70	5.70	6.10	2.00	1.90	2.10	2.50
315 L	1.40	1.70	2.20	2.60	4.70	5.80	7.40	7.80	1.30	1.30	1.30	1.40

**LOHER VARIO 1PS4 and 1PS5 motors**

355 ... 500 Values on request

## Introduction

### General technical specifications

#### Bearings

#### Overview (continued)

##### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Frame size	Additional axial force $+F_A$ Horizontal shaft				Vertical shaft – force acting upwards				Vertical shaft – force acting downwards			
					Shaft extension at top				Shaft extension at top			
					Type of construction IM V3, IM V6, IM V14, IM V19, IM V36				Type of construction IM V3, IM V6, IM V14, IM V19, IM V36			
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>SIMOTICS XP 1MD5 motors</b>												
71	0.07	0.18	0.27	–	0.09	0.22	0.31	–	0.34	0.45	0.54	–
80	0.10	0.25	0.36	–	0.13	0.29	0.40	–	0.40	0.54	0.65	–
90	0.05	0.17	0.30	–	0.10	0.23	0.36	–	0.52	0.63	0.76	–
100	0.45	0.94	1.25	–	0.51	1.03	1.36	–	0.89	1.36	1.66	–
112	0.41	0.78	1.16	–	0.49	0.87	1.28	–	0.86	1.22	1.58	–
132	0.53	1.08	1.48	–	0.66	1.24	1.66	–	1.44	1.96	2.34	–
160	1.09	1.93	2.45	–	1.40	2.30	2.93	–	2.18	2.98	3.45	–
180	1.24	2.01	2.86	–	1.64	2.59	3.50	–	2.07	2.73	3.54	–
200	1.34	1.84	2.49	–	1.81	2.58	3.38	–	1.59	2.10	2.66	–
225	1.45	1.99	2.48	–	2.17	2.93	3.71	–	1.79	2.04	2.65	–
250	3.42	4.07	4.56	–	4.32	5.46	5.83	–	0.14	0.42	0.95	–
280	3.42	4.61	5.18	–	4.82	6.41	6.66	–	–	0.34	0.97	–
315 S/M	3.77	4.08	4.62	–	5.61	6.49	6.87	–	–	–	–	–
315 L	3.76	4.10	4.61	–	6.70	7.93	9.02	–	–	–	–	–
355	Values on request											

##### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Frame size	Additional axial force $-F_A$ Horizontal shaft				Vertical shaft – force acting upwards				Vertical shaft – force acting downwards			
					Shaft extension at bottom				Shaft extension at bottom			
					Type of construction IM V1, IM V5, IM V10, IM V15, IM V18				Type of construction IM V1, IM V5, IM V10, IM V15, IM V18			
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>SIMOTICS XP 1MD5 motors</b>												
71	0.36	0.47	0.57	–	0.38	0.51	0.60	–	0.05	0.16	0.25	–
80	0.42	0.57	0.68	–	0.45	0.60	0.72	–	0.08	0.22	0.33	–
90	0.56	0.68	0.80	–	0.60	0.74	0.87	–	0.02	0.13	0.25	–
100	0.94	1.43	1.74	–	1.00	1.53	1.85	–	0.40	0.87	1.17	–
112	0.92	1.28	1.67	–	0.99	1.38	1.79	–	0.35	0.71	1.08	–
132	1.55	2.09	2.50	–	1.68	2.25	2.68	–	0.43	0.95	1.32	–
160	2.41	3.25	3.77	–	2.72	3.62	4.25	–	0.86	1.66	2.13	–
180	2.38	3.15	4.00	–	2.78	3.73	4.64	–	0.93	1.59	2.40	–
200	2.14	2.64	3.29	–	2.61	3.38	4.18	–	0.79	1.30	1.86	–
225	2.51	3.05	3.54	–	3.23	3.99	4.77	–	0.73	0.98	1.59	–
250	1.02	1.67	2.16	–	1.92	3.06	3.43	–	2.54	2.82	3.35	–
280	1.02	2.01	2.58	–	2.42	3.81	4.06	–	2.15	2.94	3.57	–
315 S/M	1.37	1.68	2.22	–	3.21	4.09	4.47	–	1.79	1.66	1.80	–
315 L	1.36	1.70	2.21	–	4.30	5.53	6.62	–	1.01	0.21	0.36	–
355	Values on request											

**Overview** (continued)**Reinforced bearings**

Motors of the 1PS0, 1PS1 1PS5 and 1MD5 type series can be designed with cylindrical roller bearings at DE for higher cantilever forces, e.g. for belt drives. For frame size 160 and above, the motors are equipped with a regreasing device at DE and NDE.

**Selection of roller bearings**

Frame size	No. of poles	Drive end (DE) bearing		Non-drive end (NDE) bearing	
		Type of construction IM B3, IM B5	V types of construction	Type of construction IM B3, IM B5	V types of construction
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>					
160	All	NU310E C3	NU310E C3	6310 C3	6310 C3
180	All	NU311E C3	NU311E C3	6311 C3	6311 C3
200	2	NU312E C3	NU312E C3	6312 C3	6312 C3
200	≥ 4	NU312E	NU312E	6312 C3	6312 C3
225	2	NU313E C3	NU313E C3	6313 C3	6313 C3
225	≥ 4	NU313E	NU313E	6313 C3	6313 C3
250	2	NU314E C3	NU314E C3	6314 C3	6314 C3
250	≥ 4	NU314E	NU314E	6314 C3	6314 C3
280	2	NU314E C3	NU314E C3	6314 C3	6314 C3
280	≥ 4	NU316E	NU316E	6316 C3	6316 C3
315	2	NU316E C3	NU316E C3	6316 C3	6316 C3 <sup>1)</sup>
315	≥ 4	NU219E	NU219E	6219 C3	6219 C3
355	2	NU316E C3 <sup>2)</sup>	NU316E C3 <sup>2)</sup>	6316 C3	6316 C3 <sup>1)</sup>
355	4	NU320E C3	NU320E	6320 C3	6320 C3
355	≥ 6	NU320E	NU320E	6320 C3	6320 C3
<b>LOHER VARIO 1PS0 and 1PS1 motors</b>					
355 ... 500	All	Bearing types on request			
<b>LOHER CHEMSTAR 1PS5 and SIMOTICS XP 1MD5 motors</b>					
160	All	NU310E C3	NU310E C3	6310 C3	6310 C3
180	All	NU311E C3	NU311E C3	6311 C3	6311 C3
200	2	NU312E C3	NU312E C3	6312 C3	6312 C3
200	≥ 4	NU312E	NU312E	6312 C3	6312 C3
225	2	NU313E C3	NU313E C3	6313 C3	6313 C3
225	≥ 4	NU313E	NU313E	6313 C3	6313 C3
250	2	NU314E C3	NU314E C3	6314 C3	6314 C3
250	≥ 4	NU314E	NU314E	6314 C3	6314 C3
280	2	NU314E C3	NU314E C3	6314 C3	6314 C3
280	≥ 4	NU316E	NU316E	6316 C3	6316 C3
315	2	NU316E C3	NU316E C3	6316 C3	6316 C3 <sup>1)</sup>
315	≥ 4	NU219E	NU219E	6219 C3	6219 C3
<b>LOHER VARIO 1PS4 and 1PS5 motors</b>					
355	All	Bearing sizes on request			

For SIMOTICS XP motors, the version with cylindrical roller bearings at DE and regreasing device at DE and NDE is an alternative to the standard version.

The located bearing is at NDE. A regreasing device for DE and NDE is standard.

<sup>1)</sup> For operation at 60 Hz, C4 bearing.

<sup>2)</sup> For operation at 50 Hz only, please inquire regarding operation at 60 Hz.

## Introduction

### General technical specifications

#### Bearings

#### Overview (continued)

##### Admissible forces on shaft extension

The following values are based on a calculated service life of  $L_{10h} = 20000$  h. They are applicable for horizontal and vertical shafts.

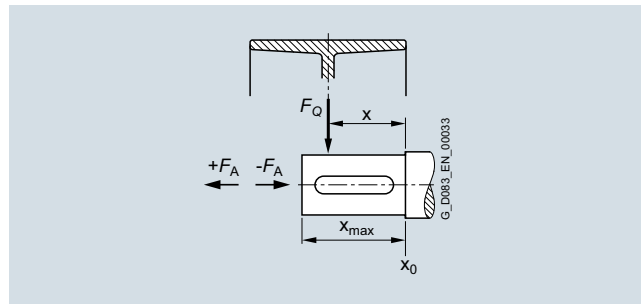
The cantilever forces specified in the tables must not be exceeded to ensure compliance with the maximum admissible shaft flexing in the ignition gap. Where values are not specified in the tables, an increase in admissible force cannot be achieved by using a roller bearing in place of a normal bearing, due to flexing of the shaft.

$F_Q$  = Cantilever force in N

$F_A$  = Axial force in N

$x$  = Distance between point of application of force and shoulder of shaft in mm

$l$  = Length of shaft extension in mm



Admissible cantilever force

#### Admissible cantilever forces

##### 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors

Valid are:  $x_0$  values for  $x = 0$ ,  $x_{0,5}$  values for  $x = 0.5 \cdot l$  and  $x_{max}$  values for  $x = l$  ( $l$  = shaft extension)

Frame size	Admissible cantilever force $F_Q$											
	at $x_0$ at speed				at $x_{0,5}$				at $x_{max}$			
	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN	3000 rpm kN	1500 rpm kN	1000 rpm kN	750 rpm kN
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>												
160	9.67	9.74	9.74	9.74	5.21	5.21	5.21	5.21	3.31	3.31	3.31	3.31
180	11.85	12.66	12.66	–	6.85	6.85	6.85	–	4.68	4.68	4.68	4.21
200	13.19	15.59	15.59	–	8.63	8.63	8.63	–	5.96	5.96	5.96	5.36
225	16.24	18.85	18.85	–	10.67	9.53	9.53	–	7.42	6.37	6.37	5.74
250	17.40	20.41	20.41	20.41	11.04	11.04	11.04	11.04	7.57	7.57	7.57	7.57
280	17.29	26.58	28.72	28.72	10.69	15.96	15.96	15.96	7.40	11.05	11.05	11.05
315 S/M	18.90	19.60	22.10	24.30	15.90	18.00	20.30	22.30	9.60	14.80	14.80	14.80
315 L	18.70	19.50	21.90	24.10	15.90	18.20	20.50	22.60	9.60	18.80	18.80	14.80
355 LB	18.00	34.50	39.00	44.00	17.00	28.00	28.50	29.00	11.00	18.50	19.00	19.50
<b>LOHER VARIO 1PS0 and 1PS1 motors</b>												
355 ... 500	Values on request											
<b>LOHER CHEMSTAR 1PS5 motors</b>												
160	4.98	5.12	5.45	5.45	–	–	–	–	–	–	–	–
180	11.39	11.39	11.39	11.39	6.15	6.15	6.15	6.15	4.21	4.21	4.21	4.21
200	13.19	14.03	14.03	14.03	7.55	7.77	7.77	7.77	5.21	5.36	5.36	5.36
225	16.24	16.97	16.97	16.97	9.16	8.57	8.57	8.57	6.40	5.74	5.74	5.74
250	11.39	18.37	18.37	18.37	6.16	9.94	9.94	9.94	–	6.81	6.81	6.81
280	13.40	25.85	25.85	25.85	7.44	14.36	14.36	14.36	5.15	9.94	9.94	9.94
315 S/M	13.10	19.60	22.10	22.10	7.30	16.80	16.80	16.80	–	11.20	11.20	11.20
315 L	10.60	19.40	21.90	21.90	5.90	13.00	12.50	12.50	–	8.60	8.50	8.50
355	Values on request											
<b>LOHER VARIO 1PS4 and 1PS5 motors</b>												
355 ... 500	Values on request											
<b>SIMOTICS XP 1MD5 motors</b>												
160	–	–	–	–	–	–	–	–	–	–	–	–
180	5.65	5.65	5.69	–	–	–	–	–	–	–	–	–
200	9.38	12.57	12.00	–	5.19	6.98	6.65	–	–	4.80	4.59	–
225	15.83	16.97	16.97	–	8.95	8.57	8.57	–	6.24	5.74	5.74	–
250	10.89	18.37	18.37	–	5.95	9.94	9.94	–	–	6.81	6.81	–
280	10.95	25.85	24.08	–	6.08	14.36	13.38	–	–	9.94	9.26	–
315 S/M	9.49	19.90	18.94	–	5.30	9.96	9.48	–	–	6.63	–	–
315 L	6.35	23.06	23.32	–	3.55	12.19	11.67	–	–	8.12	7.77	–

**Overview** (continued)**Additional axial force with cantilever force on shaft extension**

If the shaft extensions are loaded at  $x = l$  with the respective admissible cantilever force  $F_Q$ , the following additional forces are permitted to occur in the axial direction. If the admissible cantilever forces are not exploited to the full, higher loads are possible in the axial direction (values on request).

**1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors**

Frame size	Additional axial force $+F_A$ or $-F_A$											
	Horizontal shaft				Vertical shaft – force acting upwards				Vertical shaft – force acting downwards			
	at speed											
	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm	3000 rpm	1500 rpm	1000 rpm	750 rpm
	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN	kN
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>												
160	1.25	1.71	2.10	2.10	1.43	1.93	2.32	2.32	1.14	1.67	2.11	2.11
180	2.72	3.74	4.46	4.46	3.33	4.41	5.25	5.25	2.33	3.26	3.95	3.95
200	2.77	3.79	4.55	4.55	3.06	4.75	5.62	5.62	1.98	3.17	3.86	3.86
225	3.21	4.38	5.17	5.17	3.54	5.55	6.78	6.78	2.26	3.57	4.14	4.14
250	3.35	4.63	5.51	6.34	4.39	5.96	7.03	7.79	2.61	3.73	4.49	5.38
280	3.39	5.04	6.16	7.26	4.94	7.23	8.62	9.29	2.22	3.43	4.30	5.81
315 S/M	4.20	4.70	5.60	6.40	6.70	7.80	9.20	10.00	2.50	2.60	3.20	4.00
315 L	4.20	4.70	5.50	6.20	7.60	8.80	10.70	11.50	–	1.90	1.90	2.60
355	3.45	5.60	6.90	7.70	8.30	12.40	15.00	15.60	–	0.90	1.50	2.30
<b>LOHER VARIO 1PS0 and 1PS1 motors</b>												
355 ... 500	Values on request											
<b>LOHER CHEMSTAR 1PS5 motors</b>												
160	2.42	3.25	3.76	3.76	–	–	–	–	–	–	–	–
180	2.72	3.74	4.46	4.46	3.33	4.41	5.25	5.25	2.33	3.26	3.95	3.95
200	2.77	3.79	4.55	4.55	3.50	4.75	5.62	5.62	2.27	3.17	3.86	3.86
225	3.21	4.38	5.17	5.17	4.11	5.55	6.78	6.78	2.62	3.57	4.14	4.14
250	3.82	4.76	5.65	6.49	4.86	6.06	7.17	7.94	–	3.86	4.63	5.53
280	3.65	5.20	6.32	7.34	5.22	7.38	8.77	9.46	2.48	3.59	4.46	5.81
315 S/M	4.40	4.70	5.60	6.40	6.90	7.80	9.20	10.00	–	2.60	3.20	4.00
315 L	4.40	4.70	5.50	6.20	7.90	8.80	10.70	11.50	–	1.90	1.90	2.60
355	Values on request											
<b>LOHER VARIO 1PS4 and 1PS5 motors</b>												
355 ... 500	Values on request											
<b>SIMOTICS XP 1MD5 motors</b>												
160	–	–	–	–	–	–	–	–	–	–	–	–
180	3.03	3.98	4.81	–	–	–	–	–	–	–	–	–
200	2.99	3.85	4.60	–	3.62	4.63	5.49	–	–	3.35	4.01	–
225	3.21	4.23	5.09	–	4.08	5.38	6.39	–	2.65	3.41	4.27	–
250	3.80	4.65	5.65	–	4.89	6.25	7.18	–	–	3.62	4.69	–
280	3.70	5.11	6.26	–	5.23	7.21	8.20	–	–	3.72	5.00	–
315 S/M	4.34	4.41	5.12	–	6.59	7.35	8.36	–	–	2.20	–	–
315 L	3.70	4.20	5.07	–	6.81	8.53	10.08	–	–	0.59	1.07	–
355	Values on request											

## Introduction

### General technical specifications

#### Grease lifetime, relubrication intervals, grease quantities

1

#### Overview

Motors of the 1PS and 1MD5 type series up to frame size 280 have permanent lubrication. The grease reservoir is sufficient for several years. Motors of frame size 315 and above are equipped with a regreasing device and grease dosing control. A regreasing system is available for roller bearings as an option (**K40**) for series 1PS and 1MD5 in frame sizes 160 ... 280.

#### Standard bearings

Frame size	Grease lifetime/regreasing interval for optional relubrication, see values in brackets in operating hours at rated speed					
	Horizontal type of construction (B) 3000 rpm			Vertical type of construction (V) 3000 rpm		
	1500 rpm	≤ 1000 rpm	1500 rpm	≤ 1000 rpm	≤ 1000 rpm	
<b>LOHER CHEMSTAR 1PS0, 1PS1, 1PS5 and SIMOTICS XP 1MD5 motors</b>						
71	33000	40000	40000	24000	33000	40000
80		(8000)	(8000)			(8000)
90						
100						
112						
132	24000			16000	26000	
160	(4000)			(2800)	(5600)	
180						
200						
225						
250						
280						
315	4000	8000	11000	2800	5600	8000
355					4000	5600
<b>LOHER VARIO 1PS0, 1PS1, 1PS4 and 1PS5 motors</b>						
355	4000	8000	11000	2800	4000	5600
400		5600	8000	2000		
450	2000			1400	2800	4000
500	2000	4000	5600	-	2000	



**Overview** (continued)**Reinforced bearings**

Frame size	Regreasing interval in operating hours at rated speed			Vertical type of construction (V)		
	Horizontal type of construction (B)			Vertical type of construction (V)		
	3000 rpm	1500 rpm	≤ 1000 rpm	3000 rpm	1500 rpm	≤ 1000 rpm
<b>LOHER CHEMSTAR 1PS0, 1PS1, 1PS5 and SIMOTICS XP 1MD5 motors</b>						
160	2800	5600	8000	2000	4000	5600
180						
200						
225						
250	2000			1400	2800	4000
280		4000	5600			
315						
355		2800				
<b>LOHER VARIO 1PS0, 1PS1, 1PS4 and 1PS5 motors</b>						
355 ... 500	Values on request					

The specified regreasing intervals are valid for an ambient temperature of max. 40 °C.

For every 10 °C increase in temperature, the greasing interval is reduced by a factor of 0.7 of the value in the table (max. 20 °C = factor 0.5). Intervals for operation on 60 Hz systems on request.

**Special aspects of grease lifetime**

For VARIO types in vertical types of construction, angular-contact ball bearings or combined bearings are sometimes installed at NDE. This reduces the grease lifetime for the NDE bearings.

At an ambient temperature of ≤ 25 °C, the grease lifetime can be expected to be doubled. Due to the durability of the grease in years, it is limited to a maximum of 40000 h.

The grease lifetime or regreasing interval must be regarded independently of the mechanical service life of the bearing. In coupling operation with an elastic coupling, for example, the calculated mechanical service life of the bearing is  $L_{10h} = 50000$  h. The grease lifetime for permanently lubricated bearings is, however, limited to 40000 h. Regreasing must be performed within the specified intervals.

The intervals for operation on 60 Hz systems are available on request. They can be estimated for higher speeds by means of the following rule.

At speeds above the rated speed on 50 Hz systems, the grease lifetime and regreasing intervals are reduced. With reference to the time  $t_{50}$  at 50 Hz, the reductions are as shown in the table below.

**Reduction in grease lifetime of regreasing interval**

The specified regreasing intervals are valid for an ambient temperature of max. 40 °C. For every 15 °C increase in temperature, the lubrication interval must be reduced to half of the value in the table.

	Rated frequency				
	60 Hz	70 Hz	80 Hz	90 Hz	100 Hz
$t/t_{50}$	0.75	0.65	0.55	0.50	0.45

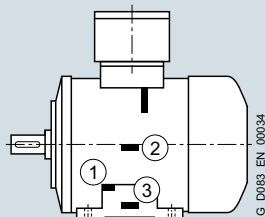
## Introduction

### General technical specifications

#### Position and design of the grounding terminals

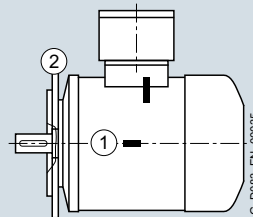
1

#### Overview



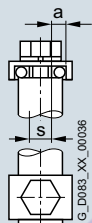
- ① Frame sizes 71
- ② Frame sizes 80 to 280
- ③ Frame sizes 315 to 500

Motors with feet, frame sizes 71 to 500

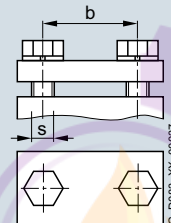


- ① LOHER CHEMSTAR Frame sizes 71 to 355
- ② LOHER VARIO Frame sizes 355 to 500

Flange-mounting motors, frame sizes 71 to 500



Clamping bracket for frame sizes 71 to 112



Flat terminal for frame sizes 132 to 500

Frame size	a mm	b mm	s	Conductor cross-section mm <sup>2</sup>
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>				
71 ... 112	5.75	–	M5	2.5 ... 10
132	7.25	–	M6	6 ... 25
160 ... 180	–	23	M8	1.5 ... 35
200 ... 225	–	23	M8	1.5 ... 70
250 ... 280	–	35	M8	1.5 ... 70
315 ... 355	–	40	M10	1.5 ... 150
<b>LOHER VARIO 1PS0 and 1PS1 motors</b>				
355 ... 500	–	40	M10	1.5 ... 120
<b>LOHER CHEMSTAR 1PS5 and SIMOTICS XP 1MD5 motors</b>				
71 ... 112	5.75	–	M5	2.5 ... 10
132	–	18	M6	1.5 ... 35
160	–	18	M6	1.5 ... 35
180 ... 225	–	26	M6	1.5 ... 35
250 ... 280	–	35	M8	1.5 ... 70
315	–	40	M10	1.5 ... 150

## Overview

The table below lists the measuring-surface sound pressure level  $L_{pFA}$  as well as the sound power level  $L_{WA}$  for motors of the 1PS0 type series without explosion protection and the 1PS4, 1PS5 and 1MD5 type series with the type of protection "Explosion-proof enclosure". The noise values apply to no-load operation at a rated frequency of 50 Hz. The noise measurements are performed according to DIN EN ISO 1680 in a noise measuring chamber under no-load conditions. The tolerance is +3 dB(A). Noise values in converter-fed operation may differ from these values, because the speed can vary and an increase in the noise level can be expected due to the non-sinusoidal voltages and currents.

At 60 Hz, the values for 2-pole motors increase by approximately 5 dB(A), and for 4-pole motors or higher pole numbers by approximately 4 dB(A).

For a rated frequency of 50 Hz and operation on the SINAMICS G180 converter, the sound pressure level will increase by approximately 3 dB(A). Noise data is not available for operation on other SINAMICS types. Noise values in converter-fed operation are also dependent on the operating point of the application and the parameter settings (e.g. clock frequency) of the converter. Noise values can therefore only be given provisionally for a system controlled by a PWM converter (pulse width modulation).

As the frequency/speed decreases, the noise level is reduced. Experience has shown that, with high-quality converters, many motors under real operating conditions that frequently involve lower speeds and lower output, generate less noise than a comparable motor in mains-fed operation.

### Measuring-surface sound pressure level $L_{pFA}$ and sound power level $L_{WA}$ in no-load operation at fixed voltage for 1PS0, 1PS4, 1PS5 and 1MD5 motors

Frame size	Motors in standard design – noise class 1								Low-noise motors with fans for one direction of rotation – noise class 3 <sup>1)</sup>			
	2-pole 3000 rpm		4-pole 1500 rpm		6-pole 1000 rpm		8-pole 750 rpm		2-pole 3000 rpm		4-pole 1500 rpm	
	$L_{pFA}$ dB	$L_{WA}$ dB	$L_{pFA}$ dB	$L_{WA}$ dB	$L_{pFA}$ dB	$L_{WA}$ dB	$L_{pFA}$ dB	$L_{WA}$ dB	$L_{pFA}$ dB	$L_{WA}$ dB	$L_{pFA}$ dB	$L_{WA}$ dB
<b>LOHER CHEMSTAR 1PS0, 1PS5 and SIMOTICS XP 1MD5 motors</b>												
71	54	65	46	57	48	59	45	56	–	–	–	–
80	57	68	49	60	48	59	50	61	–	–	–	–
90	62	74	50	61	52	63	52	63	–	–	–	–
100	64	76	54	66	52	64	52	64	–	–	–	–
112	65	77	54	66	55	67	55	67	–	–	–	–
132	68	80	62	74	57	69	57	69	56	68	–	–
160	70	82	65	77	60	72	60	72	61	73	–	–
180	71	84	66	79	61	74	63	76	62	75	–	–
200	75	88	66	79	61	74	63	76	66	79	–	–
225	76	89	69	82	62	75	64	77	67	80	–	–
250	76	90	71	85	62	76	64	78	67	81	–	–
280	78	92	73	87	66	80	66	80	68	82	–	–
315	80	94	73	87	68	82	71	85	70	84	–	–
355	82	97	76	91	74	89	72	87	77	92	–	–
<b>LOHER VARIO<sup>2)</sup> 1PS0, 1PS4 and 1PS5 motors</b>												
355	78	93	76	91	74	89	75	90	74	89.5	–	–
400	80	95.5	78	93.5	77	92.5	77	92.5	77	93	75	91
450	82	98	80	96	79	95	79	95	79	95	77	93
500	–	–	82	98.5	80	96.5	79	95.5	81	97.5	79	95.5

<sup>1)</sup> The motor length (dimension L or LC) increases for noise class 3.

<sup>2)</sup> LOHER VARIO 2-pole and 4-pole motors are equipped as standard with unidirectional fans.

## Introduction

### General technical specifications

#### Information about electric motor dimensioning

1

#### Overview

##### Output

The rated outputs and operating values specified in the selection tables apply to duty type S1 in accordance with EN 60034-1 at a rated frequency of 50 Hz at rated voltage, a coolant temperature (CT) of up to 40 °C and a site altitude of up to 1000 m above sea level.

The motors can also be used at a coolant temperature of between 40 °C and 60 °C or a site altitude of between 1000 m and 4000 m above sea level. In these cases, the rated output specified in the selection tables must be reduced in accordance with the diagram, or a sufficiently larger motor type or higher temperature class should be selected. If the coolant temperature is reduced at site altitudes of over 1000 m above sea level, there is no need for a reduction in the rating data.

##### Occasional current overload

In accordance with EN 60034-1, the motors with rated outputs up to 315 kW are designed to withstand 1.5 times the rated current for 2 minutes at operating temperature without adversely affecting the service life. No specifications have been defined for larger motors.

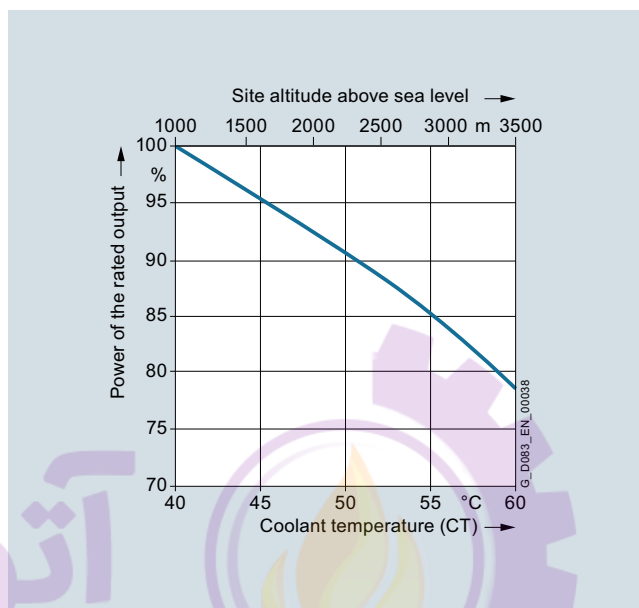
##### Conversion of output from kW to hp

The output can be converted from kW to hp as follows:

$$1 \text{ kW} = 1.341 \text{ hp}$$

Reduction factors for increased ambient temperature and site altitude:

- The motor output can be approximated in accordance with the following characteristic curve.



- The following derating tables are superordinately applicable for the 1PS motor series in mains-fed operation.
- In converter-fed operation, the derating factor applies in accordance with the curve.

أثور صنعت  
 ATOORSANAT

**Overview****SIMOTICS XP 1MD5 motors**

The rated output specified in the selection tables is applicable for continuous duty in accordance with EN 60034-1 at the frequency of 50 Hz, a coolant temperature (CT) or ambient temperature of 40 °C and a site altitude (SA) up to 1000 m above sea level.

For higher coolant temperatures and/or site altitudes greater than 1000 m above sea level, the specified motor output must be reduced using the factor  $k_{HT}$ .

This results in an admissible output of the motor of:

$$P_{adm} = P_{rated} \cdot k_{HT}$$

$P_{adm}$  Admissible motor output in kW

$P_{rated}$  Rated output in kW

$k_{HT}$  Factor for abnormal coolant temperature and/or site altitude

If the admissible motor output is no longer adequate for the drive, it should be checked whether the motor with the next higher rated output fulfills the requirements.

The motors are designed for temperature class 155 (F) and utilized in temperature class 130 (B). Under non-standard operating conditions, if they are to be used in this class, the admissible output must be determined from the tables below.

If the coolant temperature differs from the standard +40 °C, for compliance with explosion protection standards the option **C22** for +45 °C or **C23** for +50 °C must be selected for the applicable coolant temperature. The maximum coolant temperature as well as the reduced output are stamped on the rating plate.

**Reduction factor  $k_{HT}$  for different site altitudes and/or coolant temperatures**

Site altitude above sea level	Coolant temperature		
	40 °C	45 °C	50 °C
1000 m	1.00	0.96	0.92

The coolant temperature is rounded up to the next 5 °C.

**LOHER CHEMSTAR**

For motors of the LOHER CHEMSTAR series, the outputs or reduced outputs listed in the following tables apply for the specified coolant temperatures and site altitudes for a winding utilization of 130 °C (B). The options specified here must be explicitly ordered. The coolant temperature and output are stamped on the rating plate.

آتور صنعت  
**ATOORSANAT**



## Introduction

### General technical specifications

#### Coolant temperature and site altitudes

#### Overview (continued)

##### 1PS0 and 1PS1 motors

##### Derating tables for increased ambient temperatures and site altitudes

Type	Motor type	IE class	Rated output for standard version $\leq +40\text{ °C}, \leq 1000\text{ m}$	Rated output for ambient temperature and site altitude Additional identification code <b>-Z</b> with appropriate order codes			
				+45 °C, 1000 m <b>D11</b> +40 °C, 1500 m <b>D06</b>	+50 °C, 1000 m <b>D12</b> +45 °C, 1500 m <b>D11+D06</b> +40 °C, 2000 m <b>D07</b>	+55 °C, 1000 m <b>D13</b> +50 °C, 1500 m <b>D12+D06</b> +45 °C, 2000 m <b>D11+D07</b> +40 °C, 2500 m <b>D08</b>	
				Winding utilization 130 °C (B)			
				$P_{\text{rated}}$ kW	$P_{\text{adm}}$ kW	$P_{\text{adm}}$ kW	$P_{\text{adm}}$ kW
<b>1PS0 and 1PS1 motors – 2-pole</b>							
1PS.095-BD...AA3	ANG.-090LR-02	IE2	1.5	1.5	1.5	1.5	
1PS.096-BD...AA3	ANG.-090LS-02	IE2	2.2	2.2	2.2	2.2	
1PS.106-BD...AA3	ANG.-100LS-02	IE2	3	3	3	3	
1PS.113-BD...AA3	ANG.-112MS-02	IE2	4	4	4	4	
1PS.130-BD...AA3	ANG.-132SR-02	IE2	5.5	5.5	5.5	5.5	
1PS.132-BD...AA3	ANG.-132SS-02	IE2	7.5	7.5	7.5	7.5	
1PS.163-BD...AA3	ANG.-160MR-02	IE2	11	11	11	11	
1PS.165-BD...AA3	ANG.-160MS-02	IE2	15	15	15	15	
1PS.166-BD...AA3	ANG.-160LS-02	IE2	18.5	18.5	18.5	18.5	
1PS.183-BD...AA3	ANG.-180MS-02	IE2	22	22	22	22	
1PS.206-BD...AA3	ANG.-200LR-02	IE2	30	30	30	30	
1PS.208-BD...AA3	ANG.-200LS-02	IE2	37	37	37	37	
1PS.223-BD...AA3	ANG.-225MS-02	IE2	45	45	45	45	
1PS.253-BD...AA3	ANG.-250MM-02	IE2	55	55	55	50	
1PS.280-BD...AA3	ANG.-280SL-02	IE2	75	75	75	75	
1PS.283-BD...AA3	ANG.-280MM-02	IE2	90	90	90	90	
1PS.311-BD...AA3	ANG.-315SL-02	IE2	110	110	110	110	
1PS.313-BD...AA3	ANG.-315ML-02	IE2	132	132	120 <sup>1)</sup>	110 <sup>1)</sup>	
1PS.315-BD...AA3	ANG.-315MN-02	IE2	160	160	145 <sup>1)</sup>	135 <sup>1)</sup>	
1PS.316-BD...AA3	ANG.-315LL-02	IE2	200	190 <sup>1)</sup>	180 <sup>1)</sup>	170 <sup>1)</sup>	
1PS.318-BD...AA3	ANG.-315LN-02	IE2	250	240 <sup>1)</sup>	230 <sup>1)</sup>	210 <sup>1)</sup>	
1PS.356-BD...AA0	ANG.-355LB-02	IE2	315	300	290	275	
1PS.357-BH...AA0	ANS.-355LC-02	IE2	355	340	325	310	
1PS.358-BH...AA0	ANS.-355LD-02	2)	400	380	365	350	
1PS.358-BJ...AA2	ANS.-355LX-02	2)	450	430	410	395	
1PS.404-BJ...AA0	ANS.-400LL-02	2)	450	430	410	395	
1PS.405-BJ...AA0	ANS.-400LN-02	2)	500	480	460	440	
1PS.407-BJ...AA0	ANS.-400LN-02	2)	560	535	515	490	
1PS.408-BJ...AA0	ANS.-400LX-02	2)	630	605	580	550	
1PS.453-BJ...AA0	ANS.-450LL-02	2)	630	605	580	550	
1PS.455-BJ...AA0	ANS.-450LL-02	2)	710	680	650	625	
1PS.457-BJ...AA0	ANS.-450LN-02	2)	800	765	735	700	
1PS.458-BJ...AA0	ANS.-450LN-02	2)	900	860	825	790	
1PS.505-BJ...AA0	ANS.-500LL-02	2)	1000	960	920	880	
1PS.508-BJ...AA0	ANS.-500LN-02	2)	1200	1150	1100	1055	

For footnotes, see Page 1/54.

## Overview (continued)

Type	Motor type	IE class	Rated output for standard version	Rated output for ambient temperature and site altitude Additional identification code <b>-Z</b> with appropriate order codes		
			≤ +40 °C, ≤ 1000 m	+45 °C, 1000 m <b>D11</b>	+50 °C, 1000 m <b>D12</b>	+55 °C, 1000 m <b>D13</b>
				+40 °C, 1500 m <b>D06</b>	+45 °C, 1500 m <b>D11+D06</b>	+50 °C, 1500 m <b>D12+D06</b>
					+40 °C, 2000 m <b>D07</b>	+45 °C, 2000 m <b>D11+D07</b>
						+40 °C, 2500 m <b>D08</b>
			Winding utilization 130 °C (B)			
			$P_{rated}$ kW	$P_{adm}$ kW	$P_{adm}$ kW	$P_{adm}$ kW
<b>1PS0 and 1PS1 motors – 4-pole</b>						
1PS.095-BD...BA3	ANG.-090LR-04	IE2	1.1	1.1	1.1	1.1
1PS.096-BD...BA3	ANG.-090LS-04	IE2	1.5	1.5	1.5	1.5
1PS.106-BD...BA3	ANG.-100LR-04	IE2	2.2	2.2	2.2	2.2
1PS.108-BD...BA3	ANG.-100LS-04	IE2	3	3	3	3
1PS.113-BD...BA3	ANG.-112MS-04	IE2	4	4	4	4
1PS.130-BD...BA3	ANG.-132SR-04	IE2	5.5	5.5	5.5	5.5
1PS.133-BD...BA3	ANG.-132MS-04	IE2	7.5	7.5	7.5	7.5
1PS.163-BD...BA3	ANG.-160MR-04	IE2	11	11	11	11
1PS.166-BD...BA3	ANG.-160LS-04	IE2	15	15	15	15
1PS.183-BD...BA3	ANG.-180MR-04	IE2	18.5	18.5	18.5	18.5
1PS.186-BD...BA3	ANG.-180LS-04	IE2	22	22	22	22
1PS.206-BD...BA3	ANG.-200LS-04	IE2	30	30	30	30
1PS.220-BD...BA3	ANG.-225SR-04	IE2	37	37	37	37
1PS.223-BD...BA3	ANG.-225MS-04	IE2	45	45	45	45
1PS.253-BD...BA3	ANG.-250MM-04	IE2	55	55	55	50
1PS.280-BD...BA3	ANG.-280SL-04	IE2	75	75	75	75
1PS.283-BD...BA3	ANG.-280MM-04	IE2	90	90	90	90
1PS.311-BD...BA3	ANG.-315SL-04	IE2	110	110	110	100 <sup>1)</sup>
1PS.313-BD...BA3	ANG.-315ML-04	IE2	132	132	132	120 <sup>1)</sup>
1PS.315-BD...BA3	ANG.-315MN-04	IE2	160	160	145 <sup>1)</sup>	135 <sup>1)</sup>
1PS.316-BD...BA3	ANG.-315LL-04	IE2	200	190 <sup>1)</sup>	180 <sup>1)</sup>	170 <sup>1)</sup>
1PS.317-BD...BA3	ANG.-315LM-04	IE2	250	240 <sup>1)</sup>	230 <sup>1)</sup>	210 <sup>1)</sup>
1PS.356-BD...BA2	ANG.-355LB-04	IE2	280	265 <sup>1)</sup>	255 <sup>1)</sup>	240 <sup>1)</sup>
1PS.356-BD...BB2	ANG.-355LB-04	IE2	315	300 <sup>1)</sup>	290 <sup>1)</sup>	275 <sup>1)</sup>
1PS.358-BH...BA0	ANS.-355LC-04	IE2	355	340 <sup>1)</sup>	325 <sup>1)</sup>	310 <sup>1)</sup>
1PS.350-BH...BA0	ANS.-355LD-04	2)	400	380 <sup>1)</sup>	365 <sup>1)</sup>	350 <sup>1)</sup>
1PS.357-BJ...BA0	ANS.-355LN-04	2)	450	430 <sup>1)</sup>	410 <sup>1)</sup>	395 <sup>1)</sup>
1PS.358-BJ...BA0	ANS.-355LX-04	2)	500	480 <sup>1)</sup>	460 <sup>1)</sup>	440 <sup>1)</sup>
1PS.404-BJ...BA0	ANS.-400LL-04	2)	500	480 <sup>1)</sup>	460 <sup>1)</sup>	440 <sup>1)</sup>
1PS.405-BJ...BA0	ANS.-400LN-04	2)	560	535 <sup>1)</sup>	515 <sup>1)</sup>	490 <sup>1)</sup>
1PS.407-BJ...BA0	ANS.-400LN-04	2)	630	600 <sup>1)</sup>	580 <sup>1)</sup>	550 <sup>1)</sup>
1PS.408-BJ...BA0	ANS.-400LX-04	2)	710	680 <sup>1)</sup>	650 <sup>1)</sup>	620 <sup>1)</sup>
1PS.455-BJ...BA0	ANS.-450LL-04	2)	800	765 <sup>1)</sup>	735 <sup>1)</sup>	700 <sup>1)</sup>
1PS.457-BJ...BA0	ANS.-450LN-04	2)	900	860 <sup>1)</sup>	825 <sup>1)</sup>	790 <sup>1)</sup>
1PS.458-BJ...BA0	ANS.-450LN-04	2)	950	910 <sup>1)</sup>	870 <sup>1)</sup>	835 <sup>1)</sup>
1PS.504-BJ...BA0	ANS.-500LL-04	2)	1000	690 <sup>1)</sup>	920 <sup>1)</sup>	880 <sup>1)</sup>
1PS.505-BJ...BA0	ANS.-500LL-04	2)	1120	1075 <sup>1)</sup>	1030 <sup>1)</sup>	985 <sup>1)</sup>
1PS.507-BJ...BA0	ANS.-500LN-04	2)	1250	1200 <sup>1)</sup>	1150 <sup>1)</sup>	1100 <sup>1)</sup>
1PS.508-BJ...BA0	ANS.-500LN-04	2)	1400	1340 <sup>1)</sup>	1280 <sup>1)</sup>	1230 <sup>1)</sup>

For footnotes, see Page 1/54.

## Introduction

### General technical specifications

#### Coolant temperature and site altitudes

#### Overview (continued)

Type	Motor type	IE class	Rated output for standard version	Rated output for ambient temperature and site altitude Additional identification code <b>-Z</b> with appropriate order codes		
			≤ +40 °C, ≤ 1000 m	+45 °C, 1000 m <b>D11</b>	+50 °C, 1000 m <b>D12</b>	+55 °C, 1000 m <b>D13</b>
				+40 °C, 1500 m <b>D06</b>	+45 °C, 1500 m <b>D11+D06</b>	+50 °C, 1500 m <b>D12+D06</b>
					+40 °C, 2000 m <b>D07</b>	+45 °C, 2000 m <b>D11+D07</b>
				Winding utilization 130 °C (B)		
			$P_{rated}$ kW	$P_{adm}$ kW	$P_{adm}$ kW	$P_{adm}$ kW
<b>1PS0 and 1PS1 motors – 6-pole</b>						
1PS.095-BD...CA3	ANG.-090LR-06	IE2	0.75	0.75	0.75	0.75
1PS.096-BD...CA3	ANG.-090LS-06	IE2	1.1	1.1	1.1	1.1
1PS.106-BD...CA3	ANG.-100LS-06	IE2	1.5	1.5	1.5	1.5
1PS.113-BD...CA3	ANG.-112MS-06	IE2	2.2	2.2	2.2	2.2
1PS.130-BD...CA3	ANG.-132SR-06	IE2	3	3	3	3
1PS.133-BD...CA3	ANG.-132MR-06	IE2	4	4	4	4
1PS.135-BD...CA3	ANG.-132MS-06	IE2	5.5	5.5	5.5	5 <sup>1)</sup>
1PS.163-BD...CA3	ANG.-160MR-06	IE2	7.5	7.5	7.5	7.5
1PS.166-BD...CA3	ANG.-160LS-06	IE2	11	11	11	11
1PS.186-BD...CA3	ANG.-180LS-06	IE2	15	15	15	15
1PS.206-BD...CA3	ANG.-200LR-06	IE2	18.5	18.5	18.5	18.5
1PS.208-BD...CA3	ANG.-200LS-06	IE2	22	22	22	22
1PS.223-BD...CA3	ANG.-225MS-06	IE2	30	30	30	30
1PS.253-BD...CA3	ANG.-250MM-06	IE2	37	37	37	37
1PS.280-BD...CA3	ANG.-280SL-06	IE2	45	45	45	45
1PS.283-BD...CA3	ANG.-280MM-06	IE2	55	55	55	55
1PS.311-BD...CA3	ANG.-315SL-06	IE2	75	75	75	75
1PS.313-BD...CA3	ANG.-315ML-06	IE2	90	90	90	90
1PS.314-BD...CA3	ANG.-315MM-06	IE2	110	110	110	110
1PS.315-BD...CA3	ANG.-315MN-06	IE2	132	132	132	120 <sup>1)</sup>
1PS.316-BD...CA3	ANG.-315LL-06	IE2	160	160	145 <sup>1)</sup>	135 <sup>1)</sup>
1PS.317-BD...CA3	ANG.-315LM-06	IE2	200	180 <sup>1)</sup>	170 <sup>1)</sup>	160 <sup>1)</sup>
1PS.317-BD...CB3	ANG.-315LM-06 <sup>3)</sup>	IE2	200	190 <sup>1)</sup>	180 <sup>1)</sup>	170 <sup>1)</sup>
1PS.356-BD...CB0	ANG.-355LB-06	IE2	250	240 <sup>1)</sup>	230 <sup>1)</sup>	220 <sup>1)</sup>
1PS.357-BH...CB0	ANS.-355LC-06	IE2	280	265 <sup>1)</sup>	255 <sup>1)</sup>	245 <sup>1)</sup>
1PS.358-BH...CB0	ANS.-355LD-06	IE2	315	300 <sup>1)</sup>	290 <sup>1)</sup>	275 <sup>1)</sup>
1PS.357-BJ...CB0	ANS.-355LN-06	IE2	355	340 <sup>1)</sup>	325 <sup>1)</sup>	310 <sup>1)</sup>
1PS.358-BJ...CB0	ANS.-355LN-06	2)	400	380 <sup>1)</sup>	365 <sup>1)</sup>	350 <sup>1)</sup>
1PS.404-BJ...CB0	ANS.-400LL-06	2)	400	380 <sup>1)</sup>	365 <sup>1)</sup>	350 <sup>1)</sup>
1PS.405-BJ...CB0	ANS.-400LN-06	2)	450	430 <sup>1)</sup>	410 <sup>1)</sup>	395 <sup>1)</sup>
1PS.407-BJ...CB0	ANS.-400LN-06	2)	500	480 <sup>1)</sup>	460 <sup>1)</sup>	440 <sup>1)</sup>
1PS.453-BJ...CB0	ANS.-450LL-06	2)	560	535 <sup>1)</sup>	515 <sup>1)</sup>	490 <sup>1)</sup>
1PS.455-BJ...CB0	ANS.-450LL-06	2)	630	600 <sup>1)</sup>	580 <sup>1)</sup>	550 <sup>1)</sup>
1PS.457-BJ...CB0	ANS.-450LN-06	2)	710	680 <sup>1)</sup>	650 <sup>1)</sup>	620 <sup>1)</sup>
1PS.458-BJ...CB0	ANS.-450LN-06	2)	800	765 <sup>1)</sup>	735 <sup>1)</sup>	700 <sup>1)</sup>
1PS.505-BJ...CB0	ANS.-500LL-06	2)	900	860 <sup>1)</sup>	825 <sup>1)</sup>	790 <sup>1)</sup>
1PS.507-BJ...CB0	ANS.-500LN-06	2)	1000	960 <sup>1)</sup>	920 <sup>1)</sup>	880 <sup>1)</sup>
1PS.508-BJ...CB0	ANS.-500LN-06	2)	1120	1075 <sup>1)</sup>	1030 <sup>1)</sup>	985 <sup>1)</sup>

<sup>1)</sup> Alternative combination with Option **C29** "Rated output of the lower output level". Please inquire regarding higher ambient temperatures and other combinations.

<sup>2)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>3)</sup> Special rotors with copper bars.



## Overview (continued)

## 1PS4 and 1PS5 motors – type of protection "Explosion-proof enclosure"

## Derating tables for increased ambient temperatures and site altitudes

Type	Motor type	IE class	Rated output for standard version ≤ +40 °C, ≤ 1000 m	Rated output for ambient temperature and site altitude Additional identification code <b>-Z</b> with appropriate order codes			
				≤ +45 °C, ≤ 1000 m <b>D11</b>	≤ +50 °C, ≤ 1000 m <b>D12</b>	≤ +55 °C, ≤ 1000 m <b>D13</b>	
				≤ +40 °C, ≤ 1500 m <b>D06</b>	≤ +45 °C, ≤ 1500 m <b>D11+D06</b>	≤ +50 °C, ≤ 1500 m <b>D12+D06</b>	
				≤ +40 °C, ≤ 2000 m <b>D07</b>			
				≤ +45 °C, ≤ 2000 m <b>D11+D07</b>			
				≤ +40 °C, ≤ 2500 m <b>D08</b>			
				Winding utilization 130 °C (B)			
				$P_{rated}$ kW	$P_{adm}$ kW	$P_{adm}$ kW	$P_{adm}$ kW
<b>1PS4 and 1PS5 motors – 2-pole</b>							
1PS5070-.BD..-4AA3	<i>DNGW-071BR-02</i>	1)	0.37	0.37	0.37	0.37	
1PS5071-.BD..-4AA3	<i>DNGW-071BS-02</i>	1)	0.55	0.55	0.55	0.55	
1PS5081-.BD..-4AA3	<i>DNGW-080BR-02</i>	IE2	0.75	0.75	0.75	0.75	
1PS5081-.BD..-4AA3	<i>DNGW-080BS-02</i>	IE2	1.1	1.1	1.1	1.1	
1PS5095-.BD..-4AA3	<i>DNGW-090LR-02</i>	IE2	1.5	1.5	1.5	1.5	
1PS5098-.BD..-4AA3	<i>DNGW-090LS-02</i>	IE2	2.2	2.2	2.2	2.2	
1PS5106-.BD..-4AA3	<i>DNGW-100LS-02</i>	IE2	3	3	3	3	
1PS5113-.BD..-4AA3	<i>DNGW-112MS-02</i>	IE2	4	4	4	4	
1PS5131-.BD..-4AA3	<i>DNGW-132SR-02</i>	IE2	5.5	5.5	5.5	5.5	
1PS5132-.BD..-4AA3	<i>DNGW-132SS-02</i>	IE2	7.5	7.5	7.5	7.5	
1PS5163-.BD..-4AA3	<i>DNGW-160MR-02</i>	IE2	11	11	11	11	
1PS5165-.BD..-4AA3	<i>DNGW-160MS-02</i>	IE2	15	15	15	15	
1PS5166-.BD..-4AA3	<i>DNGW-160LS-02</i>	IE2	18.5	18.5	18.5	18.5	
1PS5183-.BD..-4AA3	<i>DNGW-180MS-02</i>	IE2	22	22	22	22	
1PS5206-.BD..-4AA3	<i>DNGW-200LR-02</i>	IE2	30	30	30	30	
1PS5208-.BD..-4AA3	<i>DNGW-200LS-02</i>	IE2	37	37	37	37	
1PS5223-.BD..-4AA3	<i>DNGW-225MS-02</i>	IE2	45	45	45	45	
1PS5253-.BD..-4AA3	<i>DNGW-250MM-02</i>	IE2	55	55	55	50	
1PS5280-.BD..-4AA3	<i>DNGW-280SL-02</i>	IE2	75	75	75	75	
1PS5283-.BD..-4AA3	<i>DNGW-280MM-02</i>	IE2	90	90	90	90	
1PS5311-.BD..-4AA3	<i>DNGW-315SL-02</i>	IE2	110	110	110	110	
1PS5313-.BD..-4AA3	<i>DNGW-315ML-02</i>	IE2	132	132	120 <sup>2)</sup>	110 <sup>2)</sup>	
1PS5315-.BD..-4AA3	<i>DNGW-315MN-02</i>	IE2	160	160	145 <sup>2)</sup>	135 <sup>2)</sup>	
1PS5316-.BD..-4AA3	<i>DNGW-315LL-02</i>	IE2	200	190 <sup>2)</sup>	180 <sup>2)</sup>	170 <sup>2)</sup>	
1PS5318-.BD..-4AA3	<i>DNGW-315LN-02</i>	IE2	250	240 <sup>2)</sup>	230 <sup>2)</sup>	210 <sup>2)</sup>	
1PS5353-.BD..-4AA3	<i>DNGW-355MR-02</i>	IE2	315	300 <sup>2)</sup>	290 <sup>2)</sup>	275 <sup>2)</sup>	
1PS5355-.BD..-4AA3	<i>DNGW-355MS-02</i>	IE2	360	340	330	315	
1PS5357-.BD..-4AA3	<i>DNGW-355MT-02</i>	1)	460	440	430	405	
1PS.358-.BH..-4AA0	<i>DNS.-355LD-02</i>	1)	400	380 <sup>2)</sup>	365 <sup>2)</sup>	350 <sup>2)</sup>	
1PS.358-.BJ..-4AA0	<i>DNS.-355X-02</i>	1)	450	430 <sup>2)</sup>	410 <sup>2)</sup>	395 <sup>2)</sup>	
1PS.404-.BJ..-4AA0	<i>DNS.-400LL-02</i>	1)	450	430 <sup>2)</sup>	410 <sup>2)</sup>	395 <sup>2)</sup>	
1PS.405-.BJ..-4AA0	<i>DNS.-400LN-02</i>	1)	500	480 <sup>2)</sup>	460 <sup>2)</sup>	440 <sup>2)</sup>	
1PS.407-.BJ..-4AA0	<i>DNS.-400LN-02</i>	1)	560	535 <sup>2)</sup>	515 <sup>2)</sup>	490 <sup>2)</sup>	
1PS.408-.BJ..-4AA0	<i>DNS.-400X-02</i>	1)	630	605 <sup>2)</sup>	580 <sup>2)</sup>	550 <sup>2)</sup>	
1PS.453-.BJ..-4AA0	<i>DNS.-450LL-02</i>	1)	630	605 <sup>2)</sup>	580 <sup>2)</sup>	550 <sup>2)</sup>	
1PS.455-.BJ..-4AA0	<i>DNS.-450LL-02</i>	1)	710	680 <sup>2)</sup>	650 <sup>2)</sup>	625 <sup>2)</sup>	
1PS.457-.BJ..-4AA0	<i>DNS.-450LN-02</i>	1)	800	765 <sup>2)</sup>	735 <sup>2)</sup>	700 <sup>2)</sup>	
1PS.458-.BJ..-4AA0	<i>DNS.-450LN-02</i>	1)	900	860 <sup>2)</sup>	825 <sup>2)</sup>	790 <sup>2)</sup>	
1PS.505-.BJ..-4AA0	<i>DNS.-500LL-02</i>	1)	1000	960 <sup>2)</sup>	920 <sup>2)</sup>	880 <sup>2)</sup>	
1PS.508-.BJ..-4AA0	<i>DNS.-500LN-02</i>	1)	1200	1150 <sup>2)</sup>	1100 <sup>2)</sup>	1055 <sup>2)</sup>	

For footnotes, see Page 1/57.

## Introduction

### General technical specifications

#### Coolant temperature and site altitudes

#### Overview (continued)

Type	Motor type	IE class	Rated output for standard version	Rated output for ambient temperature and site altitude Additional identification code <b>-Z</b> with appropriate order codes			
			≤ +40 °C, ≤ 1000 m	≤ +45 °C, ≤ 1000 m <b>D11</b>	≤ +50 °C, ≤ 1000 m <b>D12</b>	≤ +55 °C, ≤ 1000 m <b>D13</b>	
				≤ +40 °C, ≤ 1500 m <b>D06</b>	≤ +45 °C, ≤ 1500 m <b>D11+D06</b>	≤ +50 °C, ≤ 1500 m <b>D12+D06</b>	
				≤ +40 °C, ≤ 2000 m <b>D07</b>			
				≤ +45 °C, ≤ 2000 m <b>D11+D07</b>			
				≤ +40 °C, ≤ 2500 m <b>D08</b>			
				Winding utilization 130 °C (B)			
				$P_{rated}$ kW	$P_{adm}$ kW	$P_{adm}$ kW	$P_{adm}$ kW
<b>1PS4 and 1PS5 motors – 4-pole</b>							
1PS5070-.BD..-4BA3	<i>DNGW-071BR-04</i>	<sup>1)</sup>	0.25	0.25	0.25	0.25	0.25
1PS5071-.BD..-4BA3	<i>DNGW-071BS-04</i>	<sup>1)</sup>	0.37	0.37	0.37	0.37	0.37
1PS5080-.BD..-4BA3	<i>DNGW-080BR-04</i>	<sup>1)</sup>	0.55	0.55	0.55	0.55	0.55
1PS5081-.BD..-4BA3	<i>DNGW-080BS-04</i>	IE2	0.75	0.75	0.75	0.75	0.75
1PS5095-.BD..-4BA3	<i>DNGW-090LR-04</i>	IE2	1.1	1.1	1.1	1.1	1.1
1PS5098-.BD..-4BA3	<i>DNGW-090LS-04</i>	IE2	1.5	1.5	1.5	1.5	1.5
1PS5106-.BD..-4BA3	<i>DNGW-100LR-04</i>	IE2	2.2	2.2	2.2	2.2	2.2
1PS5108-.BD..-4BA3	<i>DNGW-100LS-04</i>	IE2	3	3	3	3	3
1PS5113-.BD..-4BA3	<i>DNGW-112MS-04</i>	IE2	4	4	4	4	4
1PS5131-.BD..-4BA3	<i>DNGW-132SR-04</i>	IE2	5.5	5.5	5.5	5.5	5.5
1PS5133-.BD..-4BA3	<i>DNGW-132MS-04</i>	IE2	7.5	7.5	7.5	7.5	7.5
1PS5163-.BD..-4BA3	<i>DNGW-160MR-04</i>	IE2	11	11	11	11	11
1PS5166-.BD..-4BA3	<i>DNGW-160LS-04</i>	IE2	15	15	15	15	15
1PS5183-.BD..-4BA3	<i>DNGW-180MR-04</i>	IE2	18.5	18.5	18.5	18.5	18.5
1PS5186-.BD..-4BA3	<i>DNGW-180LS-04</i>	IE2	22	22	22	22	22
1PS5206-.BD..-4BA3	<i>DNGW-200LS-04</i>	IE2	30	30	30	30	30
1PS5220-.BD..-4BA3	<i>DNGW-225SR-04</i>	IE2	37	37	37	37	37
1PS5223-.BD..-4BA3	<i>DNGW-225MS-04</i>	IE2	45	45	45	45	45
1PS5253-.BD..-4BA3	<i>DNGW-250MM-04</i>	IE2	55	55	55	55	50
1PS5280-.BD..-4BA3	<i>DNGW-280SL-04</i>	IE2	75	75	75	75	75
1PS5283-.BD..-4BA3	<i>DNGW-280MM-04</i>	IE2	90	90	90	90	90
1PS5311-.BD..-4BA3	<i>DNGW-315SL-04</i>	IE2	110	110	110	110	100 <sup>2)</sup>
1PS5313-.BD..-4BA3	<i>DNGW-315ML-04</i>	IE2	132	132	132	132	120 <sup>2)</sup>
1PS5315-.BD..-4BA3	<i>DNGW-315MN-04</i>	IE2	160	160	145 <sup>2)</sup>	145 <sup>2)</sup>	135 <sup>2)</sup>
1PS5316-.BD..-4BA3	<i>DNGW-315LL-04</i>	IE2	200	190 <sup>2)</sup>	180 <sup>2)</sup>	180 <sup>2)</sup>	170 <sup>2)</sup>
1PS5317-.BD..-4BA3	<i>DNGW-315LM-04</i>	IE2	250	240 <sup>2)</sup>	230 <sup>2)</sup>	230 <sup>2)</sup>	210 <sup>2)</sup>
1PS5353-.BD..-4BA3	<i>DNGW-355MR-04</i>	IE2	315	300 <sup>2)</sup>	290 <sup>2)</sup>	290 <sup>2)</sup>	275 <sup>2)</sup>
1PS5355-.BD..-4BA3	<i>DNGW-355MS-04</i>	IE2	360	340	330	330	315
1PS5357-.BD..-4BA3	<i>DNGW-355MT-04</i>	<sup>1)</sup>	450	440	430	430	405
1PS.350-.BH..-4BA0	<i>DNS.-355LD-04</i>	<sup>1)</sup>	400	380 <sup>2)</sup>	365 <sup>2)</sup>	365 <sup>2)</sup>	350 <sup>2)</sup>
1PS.357-.BJ..-4BA0	<i>DNS.-355LN-04</i>	<sup>1)</sup>	450	430 <sup>2)</sup>	410 <sup>2)</sup>	410 <sup>2)</sup>	395 <sup>2)</sup>
1PS.358-.BJ..-4BA0	<i>DNS.-355LX-04</i>	<sup>1)</sup>	500	480 <sup>2)</sup>	460 <sup>2)</sup>	460 <sup>2)</sup>	440 <sup>2)</sup>
1PS.404-.BJ..-4BA0	<i>DNS.-400LL-04</i>	<sup>1)</sup>	500	480 <sup>2)</sup>	460 <sup>2)</sup>	460 <sup>2)</sup>	440 <sup>2)</sup>
1PS.405-.BJ..-4BA0	<i>DNS.-400LN-04</i>	<sup>1)</sup>	560	535 <sup>2)</sup>	515 <sup>2)</sup>	515 <sup>2)</sup>	490 <sup>2)</sup>
1PS.407-.BJ..-4BA0	<i>DNS.-400LN-04</i>	<sup>1)</sup>	630	600 <sup>2)</sup>	580 <sup>2)</sup>	580 <sup>2)</sup>	550 <sup>2)</sup>
1PS.408-.BJ..-4BA0	<i>DNS.-400LX-04</i>	<sup>1)</sup>	710	680 <sup>2)</sup>	650 <sup>2)</sup>	650 <sup>2)</sup>	620 <sup>2)</sup>
1PS.455-.BJ..-4BA0	<i>DNS.-450LL-04</i>	<sup>1)</sup>	800	765 <sup>2)</sup>	735 <sup>2)</sup>	735 <sup>2)</sup>	700 <sup>2)</sup>
1PS.457-.BJ..-4BA0	<i>DNS.-450LN-04</i>	<sup>1)</sup>	900	860 <sup>2)</sup>	825 <sup>2)</sup>	825 <sup>2)</sup>	790 <sup>2)</sup>
1PS.458-.BJ..-4BA0	<i>DNS.-450LN-04</i>	<sup>1)</sup>	950	910 <sup>2)</sup>	870 <sup>2)</sup>	870 <sup>2)</sup>	835 <sup>2)</sup>
1PS.504-.BJ..-4BA0	<i>DNS.-500LL-04</i>	<sup>1)</sup>	1000	960 <sup>2)</sup>	920 <sup>2)</sup>	920 <sup>2)</sup>	880 <sup>2)</sup>
1PS.505-.BJ..-4BA0	<i>DNS.-500LL-04</i>	<sup>1)</sup>	1120	1075 <sup>2)</sup>	1030 <sup>2)</sup>	1030 <sup>2)</sup>	985 <sup>2)</sup>
1PS.507-.BJ..-4BA0	<i>DNS.-500LN-04</i>	<sup>1)</sup>	1250	1200 <sup>2)</sup>	1150 <sup>2)</sup>	1150 <sup>2)</sup>	1100 <sup>2)</sup>
1PS.508-.BJ..-4BA0	<i>DNS.-500LN-04</i>	<sup>1)</sup>	1400	1340 <sup>2)</sup>	1280 <sup>2)</sup>	1280 <sup>2)</sup>	1230 <sup>2)</sup>

For footnotes, see Page 1/57.

## Overview (continued)

Type	Motor type	IE class	Rated output for standard version ≤ +40 °C, ≤ 1000 m	Rated output for ambient temperature and site altitude Additional identification code <b>-Z</b> with appropriate order codes			
				≤ +45 °C, ≤ 1000 m <b>D11</b> ≤ +40 °C, ≤ 1500 m <b>D06</b>	≤ +50 °C, ≤ 1000 m <b>D12</b> ≤ +45 °C, ≤ 1500 m <b>D11+D06</b> ≤ +40 °C, ≤ 2000 m <b>D07</b>	≤ +55 °C, ≤ 1000 m <b>D13</b> ≤ +50 °C, ≤ 1500 m <b>D12+D06</b> ≤ +45 °C, ≤ 2000 m <b>D11+D07</b> ≤ +40 °C, ≤ 2500 m <b>D08</b>	
				Winding utilization 130 °C (B)			
				$P_{rated}$ kW	$P_{adm}$ kW	$P_{adm}$ kW	$P_{adm}$ kW
<b>1PS4 and 1PS5 motors – 6-pole</b>							
1PS5071-.BD..-4CA3	<i>DNGW-071BS-06</i>	1 <sup>1)</sup>	0.25	0.25	0.25	0.25	
1PS5080-.BD..-4CA3	<i>DNGW-080BR-06</i>	1 <sup>1)</sup>	0.37	0.37	0.37	0.37	
1PS5081-.BD..-4CA3	<i>DNGW-080BS-06</i>	1 <sup>1)</sup>	0.55	0.55	0.55	0.55	
1PS5095-.BD..-4CA3	<i>DNGW-090LR-06</i>	IE2	0.75	0.75	0.75	0.75	
1PS5098-.BD..-4CA3	<i>DNGW-090LS-06</i>	IE2	1.1	1.1	1.1	1.1	
1PS5106-.BD..-4CA3	<i>DNGW-100LS-06</i>	IE2	1.5	1.5	1.5	1.5	
1PS5113-.BD..-4CA3	<i>DNGW-112MS-06</i>	IE2	2.2	2.2	2.2	2.2	
1PS5131-.BD..-4CA3	<i>DNGW-132SR-06</i>	IE2	3	3	3	3	
1PS5133-.BD..-4CA3	<i>DNGW-132MR-06</i>	IE2	4	4	4	4	
1PS5135-.BD..-4CA3	<i>DNGW-132MS-06</i>	IE2	5.5	5.5	5.5	5 <sup>2)</sup>	
1PS5163-.BD..-4CA3	<i>DNGW-160MR-06</i>	IE2	7.5	7.5	7.5	7.5	
1PS5166-.BD..-4CA3	<i>DNGW-160LS-06</i>	IE2	11	11	11	11	
1PS5186-.BD..-4CA3	<i>DNGW-180LS-06</i>	IE2	15	15	15	15	
1PS5206-.BD..-4CA3	<i>DNGW-200LR-06</i>	IE2	18.5	18.5	18.5	18.5	
1PS5208-.BD..-4CA3	<i>DNGW-200LS-06</i>	IE2	22	22	22	22	
1PS5223-.BD..-4CA3	<i>DNGW-225MS-06</i>	IE2	30	30	30	30	
1PS5253-.BD..-4CA3	<i>DNGW-250MM-06</i>	IE2	37	37	37	37	
1PS5280-.BD..-4CA3	<i>DNGW-280SL-06</i>	IE2	45	45	45	45	
1PS5283-.BD..-4CA3	<i>DNGW-280MM-06</i>	IE2	55	55	55	55	
1PS5311-.BD..-4CA3	<i>DNGW-315SL-06</i>	IE2	75	75	75	75	
1PS5313-.BD..-4CA3	<i>DNGW-315ML-06</i>	IE2	90	90	90	90	
1PS5314-.BD..-4CA3	<i>DNGW-315MM-06</i>	IE2	110	110	110	110	
1PS5315-.BD..-4CA3	<i>DNGW-315MN-06</i>	IE2	132	132	132	120 <sup>2)</sup>	
1PS5316-.BD..-4CA3	<i>DNGW-315LL-06</i>	IE2	160	160	145 <sup>2)</sup>	135 <sup>2)</sup>	
1PS5317-.BD..-4CA3	<i>DNGW-315LM-06<sup>3)</sup></i>	IE2	200	180 <sup>2)</sup>	170 <sup>2)</sup>	160 <sup>2)</sup>	
1PS5353-.BD..-4CA3	<i>DNGW-355MR-06</i>	IE2	280	260 <sup>2)</sup>	250 <sup>2)</sup>	240 <sup>2)</sup>	
1PS5355-.BD..-4CA3	<i>DNGW-355MS-06</i>	IE2	315	300	280	270	
1PS5357-.BD..-4CA3	<i>DNGW-355MT-06</i>	IE2	360	340	330	305	
1PS.357-.BJ..-4CA0	<i>DNS.-355LN-06</i>	IE2	355	340 <sup>2)</sup>	325 <sup>2)</sup>	310 <sup>2)</sup>	
1PS.358-.BJ..-4CA0	<i>DNS.-355LN-06</i>	1 <sup>1)</sup>	400	380 <sup>2)</sup>	365 <sup>2)</sup>	350 <sup>2)</sup>	
1PS.404-.BJ..-4CA0	<i>DNS.-400LL-06</i>	1 <sup>1)</sup>	400	380 <sup>2)</sup>	365 <sup>2)</sup>	350 <sup>2)</sup>	
1PS.405-.BJ..-4CA0	<i>DNS.-400LN-06</i>	1 <sup>1)</sup>	450	430 <sup>2)</sup>	410 <sup>2)</sup>	395 <sup>2)</sup>	
1PS.407-.BJ..-4CA0	<i>DNS.-400LN-06</i>	1 <sup>1)</sup>	500	480 <sup>2)</sup>	460 <sup>2)</sup>	440 <sup>2)</sup>	
1PS.453-.BJ..-4CA0	<i>DNS.-450LL-06</i>	1 <sup>1)</sup>	560	535 <sup>2)</sup>	515 <sup>2)</sup>	490 <sup>2)</sup>	
1PS.455-.BJ..-4CA0	<i>DNS.-450LL-06</i>	1 <sup>1)</sup>	630	600 <sup>2)</sup>	580 <sup>2)</sup>	550 <sup>2)</sup>	
1PS.457-.BJ..-4CA0	<i>DNS.-450LN-06</i>	1 <sup>1)</sup>	710	680 <sup>2)</sup>	650 <sup>2)</sup>	620 <sup>2)</sup>	
1PS.458-.BJ..-4CA0	<i>DNS.-450LN-06</i>	1 <sup>1)</sup>	800	765 <sup>2)</sup>	735 <sup>2)</sup>	700 <sup>2)</sup>	
1PS.505-.BJ..-4CA0	<i>DNS.-500LL-06</i>	1 <sup>1)</sup>	900	860 <sup>2)</sup>	825 <sup>2)</sup>	790 <sup>2)</sup>	
1PS.507-.BJ..-4CA0	<i>DNS.-500LN-06</i>	1 <sup>1)</sup>	1000	960 <sup>2)</sup>	920 <sup>2)</sup>	880 <sup>2)</sup>	
1PS.508-.BJ..-4CA0	<i>DNS.-500LN-06</i>	1 <sup>1)</sup>	1120	1075 <sup>2)</sup>	1030 <sup>2)</sup>	985 <sup>2)</sup>	

1) Outside the IE code classification according to IEC 60034-30.

3) For +40 °C/+1000 m utilization F.

2) Alternative combination with Option **C29** "Rated output of the lower output level". Please inquire regarding higher ambient temperatures and other combinations.

## Introduction

### General technical specifications

#### VIK design

#### Overview

On request, three-phase motors of the LOHER CHEMSTAR 1PS and SIMOTICS XP 1MD5 series can be designed in accordance with VIK guidelines ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry). VIK motors have the same output as the motors of this list, but also satisfy the VIK recommendation both mechanically and electrically. The most important points of the minimum design to the VIK recommendation of March 2011 are outlined in the table below.

VIK recommendation	1PS or 1MD5 design
Motor housing and terminal box in cast-iron, steel is permitted for frame size 355 and above	LOHER CHEMSTAR in cast-iron as standard LOHER VARIO in steel as standard
Standard temperature range -20 to +40 °C	Standard
Paint finish suitable for industrial climates with corrosive gases and vapors	Paint system N14A or higher quality
Fan covers must be designed with corrosion protection	Fan cover of zinc-plated sheet steel or increased wall thickness
The motor compartment must be protected to prevent any small parts entering through the terminal box	Flexible implementation for 1PS0 and 1PS1. For 1PS5 and 1MD5 this separation is standard due to the Ex type of protection.
Terminal box of minimum size and rotatable 4 × 90°, observe derating factors regarding the load on cables and wires	The required size and conductor cross-sections as well as rotation capability correspond to the standard design of 1PS and 1MD5, wire cross-sections are adapted
Nominal bearing lifetime 40000 h for coupling drive, the grease lifetime can be different or use of regreasing device	Standard for 1PS and 1MD5 Flat grease nipples are used with regreasing device
Efficiency at least IE2 also for explosion-proof motors	Standard
Defined noise emission limits	Standard
Motors in explosion-proof enclosures and optionally selected PTC thermistors must be designed for sole protection	1PS5 and 1MD5 with PTC thermistors ( <b>A11</b> ) are designed for VIK ( <b>K30</b> ) with sole protection (no converter rating plates). In larger industrial motors, sole protection is only provided and stamped as such for converter-fed operation.
For converter-fed operation, the bearing at NDE must be insulated in frame size 315 and above	Options for converter-fed operation are not included in the VIK options and must be ordered separately. If mains-operated motors with explosion-proof enclosures and PTC thermistors are subsequently used for converter-fed operation, insulated bearings must be retrofitted by the customer.
Motors in type of protection Ex d must be constructed with Ex e terminal boxes and must fulfill IIC type of protection in frame size 315 and below	Standard
Minimum requirements for the documentation	Documentation is not included with the VIK design ( <b>K30</b> or <b>W09</b> ) and must be ordered separately

**Overview****Three-phase brake motors with cage rotor**

Due to the demands of modern manufacturing systems, the brake motor has become a special drive component in machine construction. In the rationalization of machines, in addition to the requirement for higher working speeds in switching operation, there is a demand for shortening the non-productive intervals. The brake motor ensures short braking times for the rotating masses, even with a high switching frequency. Another important application of brake motors is in stopping loads and reversing torques. The 1PS0 brake motor comprises a three-phase induction motor that is combined with a brake in a single unit.

**Benefits**

Thanks to its compact design, the brake motor is a useful component in drive technology wherever minimum braking time is a priority. The familiar advantages of the three-phase induction motor with a squirrel-cage rotor are also retained. This brake motor is suitable for multi-faceted customer-specific application cases. It can be used both for switching operation at a high switching frequency, a high follow-on accuracy and longer service life and as a high-power brake motor with a large operating capacity. The right brake size must be selected for the application. The brake motor is also particularly suitable for driving hoists and traversing gear.

The brake motors have the following properties:

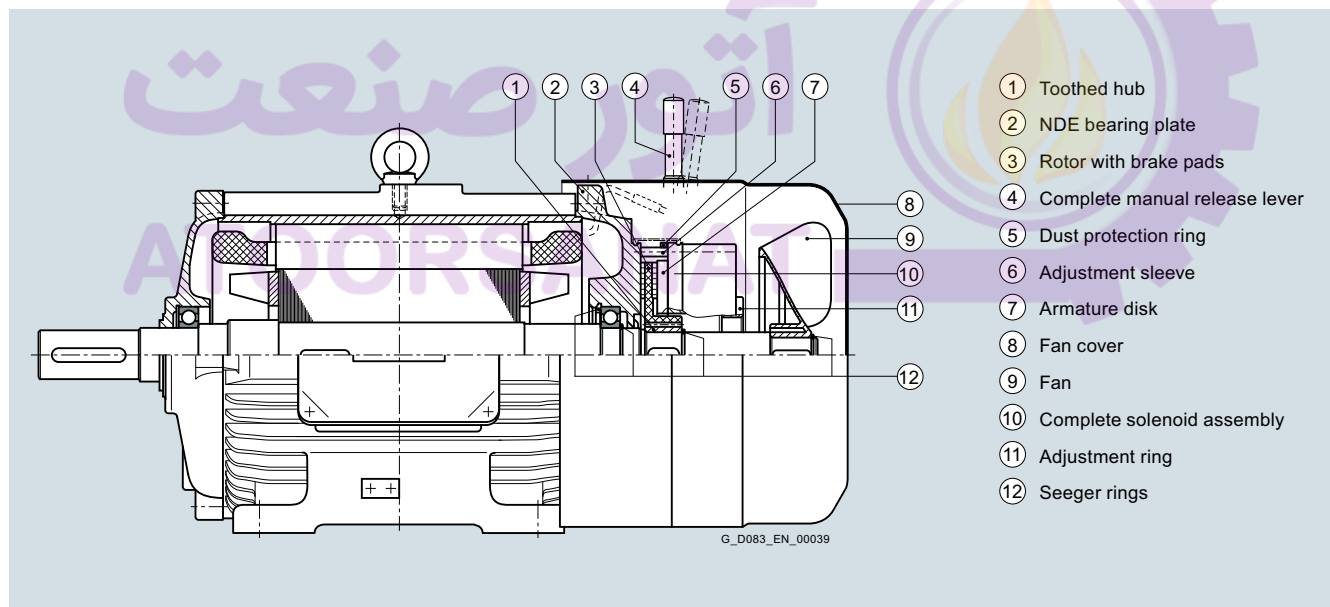
- Short switching times
- High operational reliability
- A low motor flywheel effect
- Favorable dimensions
- Low space requirements

**Application**

The main application areas are as follows:

- Braking of loads and centrifugal masses
- Braking in the event of danger
- Shortening of follow-on times
- Increased setting accuracy

Brake motors are available as shown in the selection tables, but also with higher outputs, different voltages, frequencies and numbers of poles as well as in pole-changing versions.

**Design**

Sectional drawing of brake motor type 1PS020 frame size 200 with single-disk spring-operated brake

## Introduction

### General technical specifications

#### Brakes and brake motors

1

#### Overview (continued)

The surface-cooled brake motors are equipped with a quiescent current-operated (fail-safe) single-disk spring-operated brake with two asbestos-free brake pads. The bearing plate at the non-drive end is specially shaped and it is made of cast-iron in every motor. Refer to the table for the size of the bearings. Otherwise, in terms of their mechanical design, the brake motors correspond to the surface-cooled three-phase motors.

The brakes and fans of the brake motors are suitable for both directions of rotation. The degree of protection for the brake motors is IP55. Other degrees of protection are possible on request.

If it is necessary to rotate the shaft in the zero current state, the brake can be specially ordered with a manual release. All brakes feature torque adjustment.

#### Single-disk spring-operated brake

##### Design

Single-disk spring-operated brakes are fail-safe brakes with 2 frictional surfaces in which an electromagnetic field is used to release the brake which is applied using spring force. The spring-operated brake brakes in the zero current state and releases when current is flowing.

Special characteristics of the single-disk spring-operated brake:

- Braking in accordance with DIN VDE 0580 "Electromagnetic devices and components – General specifications"
- Holding brake with spring-loaded operation
- Microswitch for air gap monitoring as an option (brake size 12 and above)
- Braking torque is active in zero current state (fail-safe brake)
- Rugged and simple design
- High level of operational reliability due to long service life
- Brakes are designed for temperature class F
- Large operating air gap makes automatic readjustment superfluous
- Under conditions of extremely high wear, the operating air gap is easily adjusted
- Braking torque can be adjusted between 100 % and approximately 60 %
- Manual release with automatic return
- Brakes are corrosion-protected, asbestos-free friction pads
- The brakes are designed for 100 % duty ratio
- The brakes will operate in any position

The standard voltages for the brake coils are: 24 V, 103 V, 180 V, 205 V +5 to 10 %. For the relationship between brake control voltage, rectifier type and brake coil voltage, see the section "Circuit diagrams".

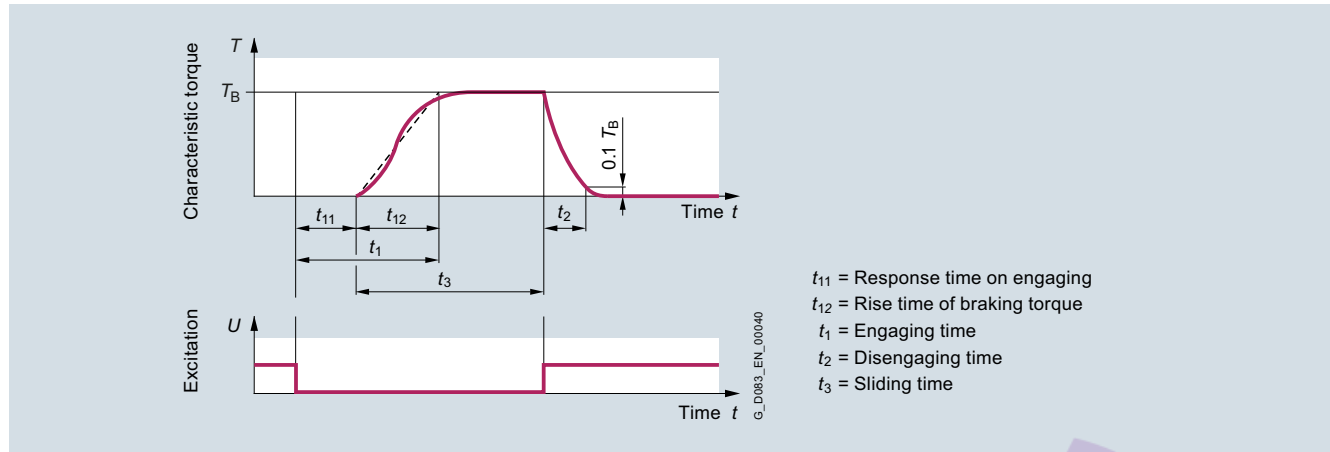
#### Electrical connection

In the terminal box, apart from the motor connection terminals, there is also a bridge rectifier for the standard 230 V brake control voltage. For higher brake control voltages, either a half-wave rectifier with zero diodes can be installed or connection can be performed via an intermediate transformer that is, however, not included in the scope of supply. For cases in which the motor operating voltage does not comply with the brake control voltage, a separate brake control voltage must be supplied via an additional contact.



**Overview** (continued)Switching times

The switching times are given in the table below. The times are shown in the diagram.



Torque/time curve as a function of excitation voltage

- AC-side switching – extended engaging time (delayed response of the brake). The disengaging time is the same as for DC-side switching.
- DC-side switching – short activation time, short engaging time (quick response of the brake).

The switching times for DC-side switching are as follows:

Brake size	Brake characteristic torque $T_B^{1)}$ Nm	Maximum admissible switching energy for single switching $Q_E$ J	Transitional switching frequency $S_{ft}$ $h^{-1}$	Switching times for $s_{GapRated}$			
				DC engage $t_{11}$ ms	$t_{12}$ ms	$t_1$ ms	Disengage $t_2$ ms
12	32	24000	30	28	25	53	115
14	60	30000	28	17	25	42	210
16	80	36000	27	27	30	57	220
18	150	36000	20	33	45	78	270
20	260	80000	19	65	100	165	340
25	400	120000	15	110	120	230	390

With AC-side switching, the  $t_1$  values increase for the brakes to about 6 times the values.

<sup>1)</sup> Minimum braking torque for run-in frictional surfaces.

## Introduction

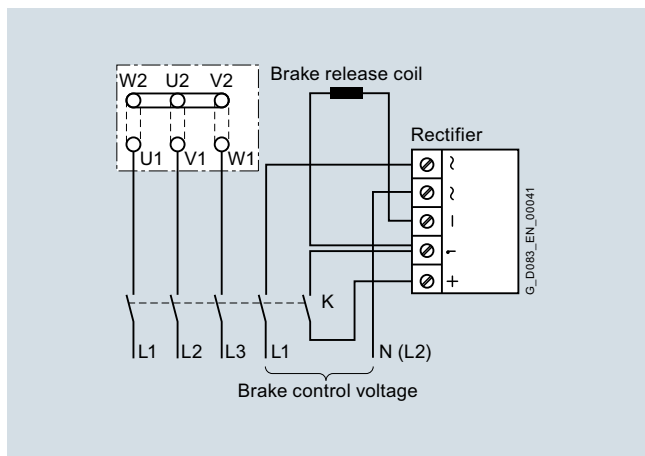
### General technical specifications

#### Brakes and brake motors

1

#### Overview (continued)

#### Circuit diagrams for brake motor with single-disk spring-operated brake



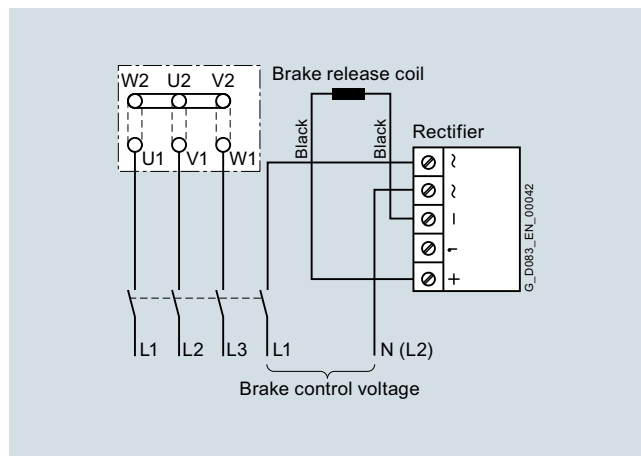
Brake switched at AC side (as delivered).  
Note control voltage on rating plate of the brake.

The control voltage of the brake on the rating plate must be observed

Alternating voltage (brake control voltage) V	Rectifier type	DC brake coil voltage V
230	Bridge	205
400	Half-wave	180

**Pole-changing brake motors and brake motors with higher switching frequency:** On request.

**The ambient temperature range for brake motors is:**  
-20 to +40 °C.



Brake switched at DC side and AC side (additional switching contact K required; reconnect brake connection cable from + to 1).

آتور صنعت  
 ATOORSANAT





**Overview** (continued)

## Technical specifications

<b>Brake size</b>			<b>10</b>	<b>12</b>	<b>14</b>	<b>16</b>	<b>18</b>	<b>20</b>	<b>25</b>
Characteristic torque	$T_B^{1)}$	Nm	16	32	60	80	150	260	400
Braking torque in %									
• at 1500 rpm		%	83	81	80	79	77	75	73
• at 3000 rpm		%	76	74	73	72	70	68	68
Speed, max.		rpm	3000	3000	3000	3000	3000	1500	1500
Input power	$P_{20\text{ °C}}$	W	30	40	50	55	85	100	110
Weight, approx.		kg	2.5	3.5	5.2	7.9	12	19.3	29.1
Moment of inertia	$J^{2)}$	kg m <sup>2</sup>	0.0002	0.00045	0.00063	0.0015	0.0029	0.0073	0.02
Air gap adjustment, max.		mm	1.5	2.0	2.5	3.5	3.0	4.0	4.5
Brake rotor thickness, min.		mm	7.5	8.0	7.5	8.0	10.0	12.0	15.5
Operating energy, max. adm. (per switching operation)	$W_E$	kJ	12	24	30	36	60	80	120
Operating energy (up to 0.1 mm abrasion)	$W_{R\ 0.1}$	Nm	On request						
Operating air gap									
• min.		mm	0.3	0.3	0.3	0.3	0.4	0.4	0.5
• max.		mm	0.75	0.75	0.75	0.75	1.0	1.0	1.25

The brake coil has a supply voltage of 205 V. Other standard voltages for the coil are 24 V, 103 V and 180 V. Supply voltages other than those specified here are available at an additional charge. Voltage tolerance 10 % according to DIN IEC 60038.

Torque adjustment

The rotor with brake pads is connected to the motor shaft via the toothed hub. The armature disk is pressed firmly against the rotor in the zero-current state by means of springs. The braking torque is applied by means of this pressure.

The braking torque that can be transferred can be altered by adjusting the spring force. The brake is equipped with an adjustment ring. The spring force, and therefore the braking torque, can be adjusted by rotating the adjustment ring.

<sup>1)</sup> For possible assignment to motor frame sizes, see the output tables.

<sup>2)</sup> Rotating parts of the brake

## Introduction

### General technical specifications

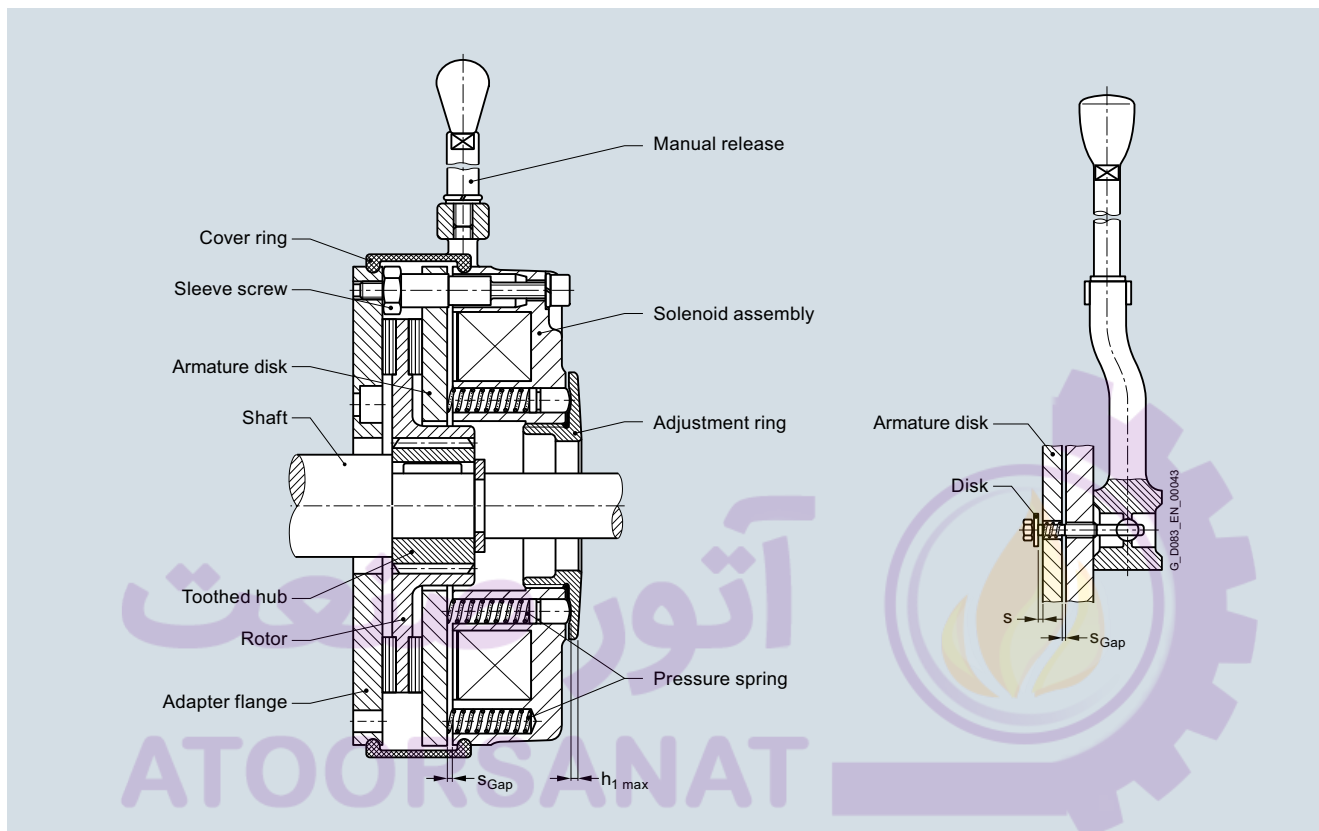
#### Brakes and brake motors

#### Overview (continued)

##### Brake with manual release

The brake can also be supplied with manual release as an option. When the manual release lever is pulled under zero current conditions, the armature disk is pulled by means of the tension bolts against the pressure springs in the solenoid assembly. An air gap is created between the rotor and the armature disk.

The brake is mechanically released and the shaft can rotate easily. The pressure spring on the tension bolts holds the manual release lever in its normal position during operation.



The air gap "s" is the distance between the armature disk and the disk. The dimension "s" must be taken into consideration when the manual release is installed.

Brake size	Air gap		
	$s_{Gap}$ mm	$s^{+0.1}$ mm	
12	0.3	1.5	Operating brake ( $s_{Gap \max}$ ca. $2.5 \times s_{Gap}$ )
14			
16			
18	0.4	2	Holding brake with emergency stop function ( $s_{Gap \max}$ approx. $1.5 \times s_{Gap}$ )
20			
25	0.5	2.5	

#### Important:

Even with reduced characteristic torque, the release distance must be adjusted when the maximum air gap  $s_{Gap \max}$  is reached.

#### Noise behavior

During operation, the noise response of the brake motor is hardly affected by the brake. The measuring-surface sound pressure level can therefore be obtained from the noise value tables for 1PS0, 1PS4, 1PS5 and 1MD5 motors (without brakes) in the section "Measuring-surface sound pressure level".

When the brake is released or engaged, however, sudden noises arise. These are recorded by means of the A-weighted emission sound pressure level (impulse sound pressure level) according to DIN EN ISO 1680 – see Table.

Frame size	A-weighted emission sound pressure level (guide values)
	$L_{pAF}$ dB (A)
132	76
160	80
180 ... 250	83

**Overview** (continued)**Basis for the calculation**

A brake is designed mainly in accordance with the required braking torque  $T_{\text{req}}$ .

The masses to be braked (moments of inertia), relative speeds, braking times and the switching frequencies must be included in the calculations. The boundary conditions, such as ambient temperature, air humidity, dust accumulation and mounting position must be known. In the case of extreme/critical operating conditions, the manufacturer should be consulted. Dimensioning must be in accordance with VDI guideline 2241.

The friction surfaces must be kept free of grease and oil at all times.

**Safety factor**

In order to ensure that mechanical transmission is reliable even under extreme operating conditions, the calculated braking torque should include the safety factor  $K$  which must be selected in accordance with the operating conditions.

**Load types**

In practice, the following main types of load occur:

$$T_{\text{req}} = T_a \cdot K + T_B$$

**Dynamic and static loading**

Most application cases involve a mixture of loads, because a dynamic load is added to a static load torque.

$$T_{\text{req}} = (T_a \pm T_L) \cdot K + T_B$$

$+T_L$  is used, for example, when lowering a load  
 $-T_L$  is used for normal braking

**Rough determination of the required braking torque or frame size**

If only the drive power to be transferred is known, the required torque or braking torque can be determined as follows:

$$T_{\text{req}} = 9550 \frac{P}{\Delta n_0} \times K \leq T_B$$

**Thermal load capacity**

If high switching frequencies and increased friction energy per switching cycle are expected, thermal recalculation of the brake is recommended.

The friction energy per switching cycle is calculated as follows:

$$Q = \frac{J_L + \Delta n^2}{182.5} \times \frac{T_B}{T_B + T_L}$$

$-T_L$  is used, for example, when lowering a load  
 $+T_L$  is used for normal braking

The admissible friction energy per switching cycle for a known switching frequency can be obtained from the following diagram. For a known friction energy per switching cycle, the admissible switching frequency can similarly be obtained from this diagram.

**Abbreviations and definitions used**

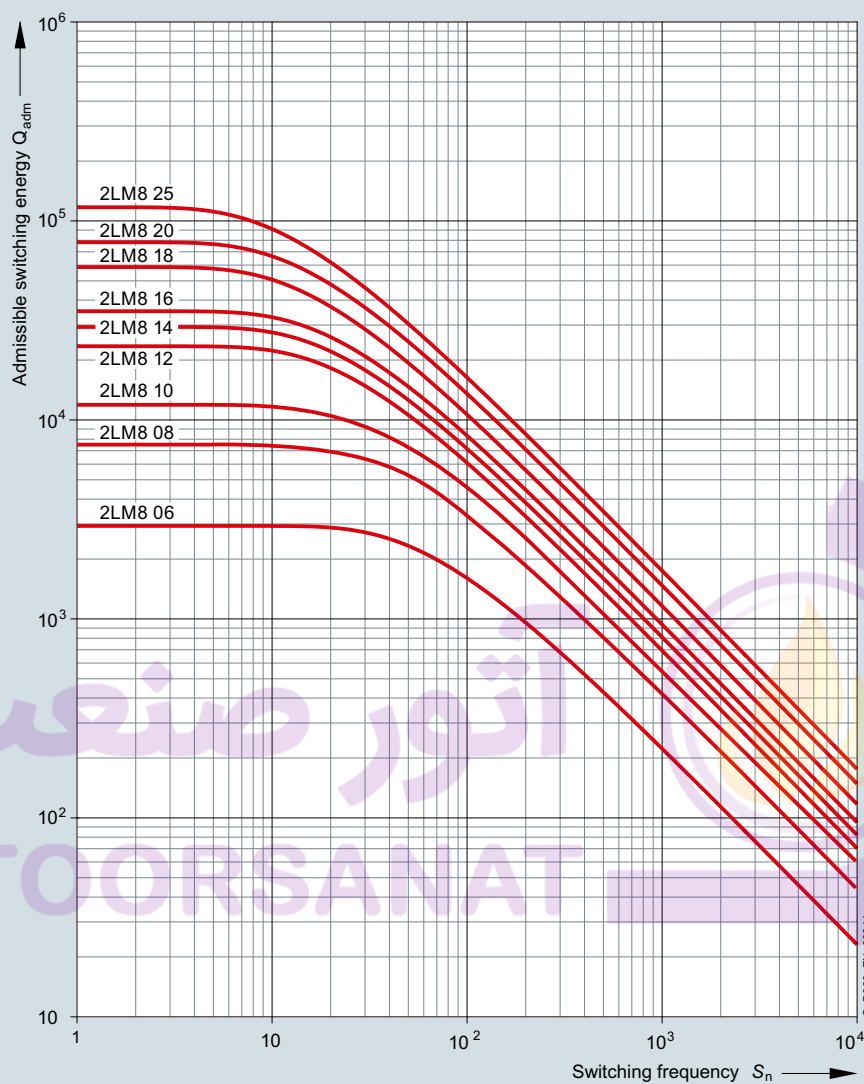
$P$	Drive power in kW
$T_B$	Characteristic torque for the brake in Nm
$T_L$	Load torque in Nm
$T_{\text{req}}$	Required braking torque in Nm
$T_a$	Deceleration torque in Nm
$\Delta n_0$	Initial relative speed of the brake in rpm
$J_L$	Moment of inertia of all drive components referred to the shaft to be braked in $\text{kgm}^2$
$t_1$	Engaging time, $t_1 = t_{11} + t_{12}$ in s
$t_2$	Disengaging time (time from the start of torque removal until the value $0.1 T_B$ is reached) in s
$t_3$	Sliding time (time during which a relative movement occurs between the input and the output with the brake engaged) in s. This time depends on the delay required by the application case e.g. switching frequency
$t_{11}$	Responding delay on engaging (time from voltage switch-off up to the moment when the torque begins to rise) in s
$t_{12}$	Time taken for the braking torque to rise in s
$K$	Safety factor
$Q$	Calculated switching energy per switching cycle in J
$Q_{\text{adm}}$	Max. admissible switching energy per switching cycle in J
$S_n$	Switching frequency, i.e. the number of braking operations distributed evenly over the time unit in $\text{h}^{-1}$

## Introduction

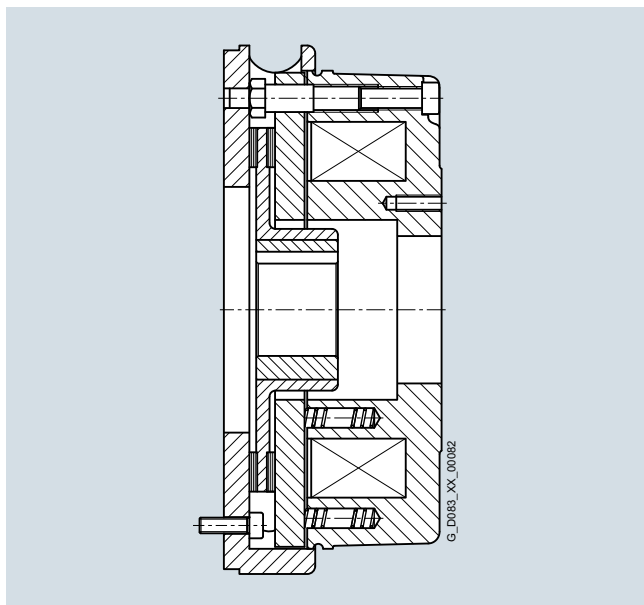
### General technical specifications

#### Brakes and brake motors

#### Overview (continued)



Admissible switching energy  $Q_{adm}$  as a function of the switching frequency  $S_n$

**Overview** (continued)**Seawater-protected spring-operated brake IP67**

The solenoid double-disk spring-operated brake of type 4BZFM (Stromag) brakes the motor if the supply is disconnected or in the event of power failure. Motors with built-on brakes are mainly used in cranes to drive traversing, trolley and hoisting gear, but also in marine winch drives. The size of the brake depends on the external moment of inertia, brake speed and the required braking time.

**Further characteristics of the solenoid double-disk spring-operated brake of type 4BZFM**

- Seawater-protected solenoid double-disk spring-operated brake
- Torque range: 100 to 1600 Nm (static torque)
- For use in cranes and offshore
- A cast-iron cover ensures IP67 degree of protection, so it can be used under the most difficult climatic conditions
- All surfaces finished
- When the cover is removed, the braking function is maintained
- Minimal wear, brake pads are easy to replace
- Emergency release
- IEC – mounting flange
- As an option: switching status indication, terminal box, anti-condensation heater, prepared for tachometer mounting
- Type approval: Germanisch Lloyd, Lloyds Register of Shipping, American Bureau of Shipping

**Solenoid double-disk spring-operated brake of type 4BZFM**

			Brake size						
			10	16	25	40	63	100	160
Switchable torque	$T_{SN}$	Nm	100	160	250	400	630	1000	1600
Transmittable torque	$T_{trans}$	Nm	110	176	275	440	690	1100	1750
Air gap, normal	$s_{Gap}$	mm	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Air gap, max.	$s_{Gap\ max.}$	mm	1.2	1.2	1.2	1.5	1.8	2.1	2.4
Speed, max.	$n$	rpm	6000	6000	5500	4700	4000	3600	3200
Moment of inertia	$J$	kg m <sup>2</sup>	0.0019	0.0026	0.0050	0.0133	0.0271	0.0366	
Weight, approx.	$m$	kg	32	40	56	73	107	138	
Rated DC voltage	$U$	V	110	110	110	110	110	110	110
Rated output	$P$	W	122	142	164	214	249	332	
Rated current	$I$	A	1.11	1.29	1.49	1.95	2.27	3.02	

**Brakes for explosion-proof motors**

Special information for brakes for explosion-proof motors, see catalog section 2.

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview

###### Basics

Due to optimized design and manufacturing, most 1PS0 motors (without explosion protection) and 1PS1, 1PS4, 1PS5, 1MD5 motors (with explosion protection) can also be used for converter-fed operation without the need to modify the electrical and mechanical design. The maximum limits and parameters for converter-fed operation are summarized in this catalog. The special mechanical characteristics which must be taken into account that result from the higher speeds are listed below.

###### Bearing currents

It is known that in motors supplied from the mains, a voltage can form along the mechanical shaft due to magnetic unbalance. If this shaft voltage exceeds a threshold value of approximately 500 mV, bearing currents that can damage the bearings start to flow. This phenomenon only occurs with larger motors. Therefore, to prevent bearing currents, the non-drive end bearing is insulated as of frame size 315. However, we recommend that motors of frame size 225 and above be equipped with insulated bearings on the non-drive end. The bearing insulation is performed by insulating the bearing seat on the motor shaft or through the use of current-insulated rolling-contact bearings. The minimum requirement for the ordering options is described in detail under "Output tables for converter-fed operation".

Converter-fed operation can increase these shaft voltages and bearing currents (typically by approximately 30 to 50 %). Additional high-frequency bearing voltages and currents can occur during operation with pulse converters (common mode bearing currents and circulating currents). The bearing currents depend on the motor size and the converter version (clock frequency, pulse modulation, output filter).

Previous experience shows that drives with SINAMICS G180 pulse converters (clock frequency 3 to 7.5 kHz, pulse modulation through voltage vector control, standard dv/dt output filter) and 1PS0, 1PS1, 1PS4, 1PS5 and 1MD5 motors are not damaged by the bearing currents that occur.

آتور صنعت  
 ATOORSANAT



**Overview** (continued)Mechanical limit speeds

When the motor is operated above its rated frequency, it is important to note that the maximum speeds are limited by the limits for the roller bearings, the critical rotor speed and the rigidity of the rotating parts. In the case of motors for use in potentially explosive areas of Zone 1 or 2, in accordance with EN 60079-0, the peripheral speed and therefore the speed of plastic fans is also limited.

For the limit speeds listed in the tables below, further special measures may be required.

**Mechanical limit speeds for standard version:  
 1PS0 and 1PS1 motors without explosion protection and with  
 type of protection "Non-sparking"**

Frame size	No. of poles							
	2		4		6		8	
	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>
	rpm	Hz	rpm	Hz	rpm	Hz	rpm	Hz
<b>LOHER CHEMSTAR 1PS0 and 1PS1 motors</b>								
90	9200	153	8500	273	8500	425	8500	567
100	6900	115	8500	273	9000	450	9000	600
112	6300	105	9200	306	6800	340	6800	453
132	6500	108	5900	197	7500	375	7500	500
160	5900	98	6200	207	6200	310	6200	413
180	4800	80	5600	187	4750	238	4750	317
200	5000	83	3600	120	4300	215	4300	287
225	5300	88	4200	140	4200	210	4200	420
250	4200	70	3600	120	4000	200	4000	267
280	4800	80	3550	118	3800	190	3800	253
315	4000	67	3450	115	3700	185	3700	247
355	3800	63	3200	106	3200	160	3000	200
<b>LOHER VARIO 1PS0 and 1PS1 motors</b>								
355	3600	60	2700	90	2400	120	2400	160
400	3000	50	2250	75	2200	110	2100	140
450	3000	50	2100	70	2000	100	1900	127
500	3000	50	1800	60	1600	80	1500	100

**Mechanical limit speeds for standard version:  
 1PS5 motors with  
 type of protection "Ex d"**

Frame size	No. of poles							
	2		4		6		8	
	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>	<i>n</i>	<i>f</i>
	rpm	Hz	rpm	Hz	rpm	Hz	rpm	Hz
<b>LOHER CHEMSTAR 1PS5 motors</b>								
71	9300	155	9300	310	9100	455	9100	606
80	9300	155	9300	310	9100	455	9100	606
90	9200	153	8500	273	8500	425	8500	567
100	6900	115	8500	273	9000	450	9000	600
112	6300	105	9200	306	6800	340	6800	453
132	6500	108	5900	197	7500	375	7500	500
160	5900	98	6200	207	6200	310	6200	413
180	4800	80	5600	187	4750	238	4750	317
200	5000	83	3600	120	4300	215	4300	287
225	5300	88	4200	140	4200	210	4200	280
250	4200	70	3600	120	4000	200	4000	267
280	4800	80	3550	118	3800	190	3800	253
315	4000	67	3450	115	3700	185	3700	247
<b>LOHER VARIO 1PS5 motors</b>								
355	3600	60	2700	90	2400	120	2400	160
400	3000	50	2250	75	2200	110	2100	140
450	3000	50	2100	70	2000	100	1900	127
500	3000	50	1800	60	1600	80	1500	100
<b>SIMOTICS XP 1MD5 motors</b>								
71	6000	100	4500	150	4000	200	3000	200
80	6000	100	4500	150	4000	200	3000	200
90	6000	100	4500	150	4000	200	3000	200
100	6000	100	4200	140	3600	180	3000	200
112	6000	100	4200	140	3600	180	3000	200
132	5400	90	4200	140	3600	180	3000	200
160	4800	80	4200	140	3600	180	3000	200
180	4600	76	4200	140	3600	180	3000	200
200	4500	75	4200	140	3600	180	3000	200
225	4500	75	4500	150	4400	220	4400	293
250	3900	65	3700	123	3700	185	3700	247
280	3600	60	3000	100	3000	150	3000	200
315	3600	60	2600	87	2600	130	2600	173
355	3600	60	2600	87	2600	130	2600	173

Fans made of special plastic or metal are used for explosion-proof motors.

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

###### *Operating explosion-proof motors on a converter*

For the safe operation of explosion-proof motors on a converter, some basic rules must be observed. These rules are summarized in the R20000 guideline. The current version of R20000 is stamped on the rating plate.

The guideline must be complied with regardless of the type and manufacturer of the converter.

If explosion-proof motors are to be operated at frequencies above 60 Hz or 10 % above the cutoff frequency, it may be necessary to perform a system test of the motor with the converter.

The minimum requirement for the ordering options is described in detail under "Output tables for converter-fed operation". The customer is responsible for fulfillment of the regulations which may be affected by the use of sine-wave filters, long cables, etc.

###### *Operating dust explosion-proof motors on a converter*

Dust explosion-proof motors can be operated on a converter if suitable monitoring equipment is used (e.g. PTC thermistor for sole protection and certified evaluation units). The boundary conditions described above also apply in this case and compliance with the R20000 guideline, in particular, is essential. For motors in the admissible type of protection for Zone 21, the limits of the control range between 5 and 50 (60 Hz) also apply. The maximum possible output in converter-fed operation must not exceed the output for mains-fed operation even in the case of higher thermal utilization on the converter. In special cases, it may be necessary to test the original system comprising the motor with the converter, or a system comprising the same types.

If the motor is operated on SINAMICS G180 or on a different SINAMICS converter with a suitable filter (e.g. dv/dt filter), operation on line supplies from 500 V to 690 V is possible. Operation on converters with vector control is admissible. Compliance with the boundary conditions described in the guideline No. 20000h must be ensured by the operating company.

###### *Siemens R20000 guideline for converter-fed operation of explosion-proof, low-voltage, three-phase motors*

Converter-fed operation of explosion-proof, low-voltage, three-phase motors with type of protection "Explosion-proof enclosure" and "Non-sparking" for temperature classes T1 – T4

Explosion-proof three-phase motors may be operated on a converter if the following conditions are satisfied:

- The output voltage of the converter shall be controlled such that within the frequency range below the rated frequency of the motor, an approximately linear relationship is maintained between the voltage (fundamental component) and the frequency (fundamental component), i.e. practically constant machine flux in accordance with the rated data. Operation above 1.1 times the rated frequency is only admissible when the motor has an appropriate rating plate for converter-fed operation.
- $I_{\text{continuous}}$  is the value to which the current is restricted by converter control in continuous duty. The maximum value which can be set for  $I_{\text{continuous}}$  is the continuously admissible rated motor current in accordance with the rating plate on the motor or the value specified in the documents that describe converter-fed operation (R No.).
- $I_{\text{temp}}$  is the value to which the current is limited by converter control in the case of temporary overloads of a maximum duration of  $t_{\text{temp}}$ . The maximum value which can be set for  $I_{\text{temp}}$  is  $1.5 \times I_{\text{continuous}}$ .
- The time  $t_{\text{temp}}$  is the maximum time for which the converter permits  $I_{\text{continuous}}$  to be exceeded.  $t_{\text{temp}}$  is to be set for a maximum of 60 seconds.
- The installed thermistors (e.g. PTC thermistors), which must be suitable as sole protection, are to be connected to a tripping device conforming to guideline 94/9/EC with a prototype test certificate such as CK140: PTB 04 ATEX 3038 or CK144/145: PTB 02 ATEX 3059.
- Voltage peaks (especially for pulse inverters with long motor cable)
  - The assessment of the terminal box in relation to clearances and creepage distances allows for converter-fed operation with voltage peaks ( $\hat{U}_{LL}$  and  $\hat{U}_{LE}$ ) of up to  $\hat{U} = 1866$  V. This may not be exceeded in the interests of explosion protection.
  - To prevent partial discharges arising, with Ex nA machines the voltage at the motor terminals must also be limited in relation to the rise time to values which fall below the characteristic curve of the "withstand voltage curve" diagram (see picture below). With Ex d motors, this is recommended so as not to limit the service life.

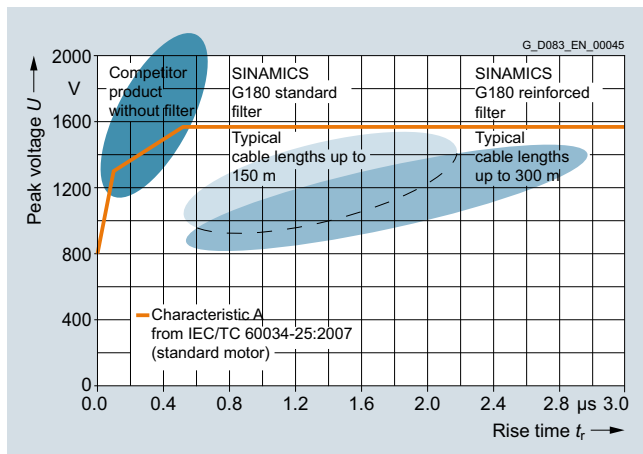
Ruhstorf, 2012-09-10  
Siemens Aktiengesellschaft



Overview (continued)

Typical voltage stress of motors for operation on the SINAMICS G180 converter at 690 V

Motors of the 1PS or 1MD5 series with standard insulation are designed for peak voltage in accordance with IEC/TS 60034-25:2007 Curve A (1560 V), see the diagram below.



As an option, 1PS motors are also available with special insulation for peak voltages of 2.25 kV. In this case, the winding is suitable for peak voltages in accordance with IEC/TS 60034-25:2007 Curve B. Due to the space required by the special winding insulation, this option can only be ordered for frame size 160 and above. The possible output of the motor is then 5 % lower than a motor with standard insulation. The limits for peak voltage with regard to explosion protection, especially for the terminal box, are applicable as specified in the R20000 regulation.

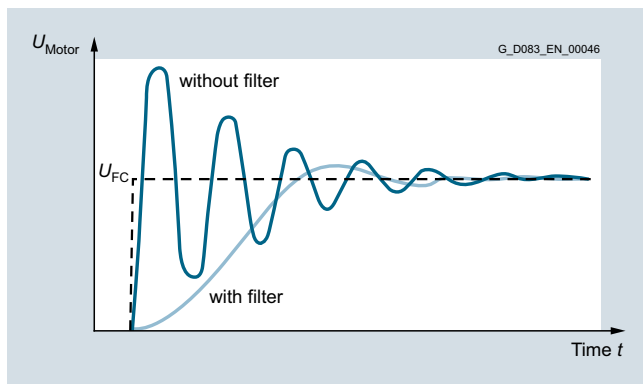
Engineering information for converter-fed operation

Admissible voltage stress

More stress is placed on the insulation of the motor winding with converter-fed operation than with mains-fed operation. The voltage stress also depends on the type of converter used.

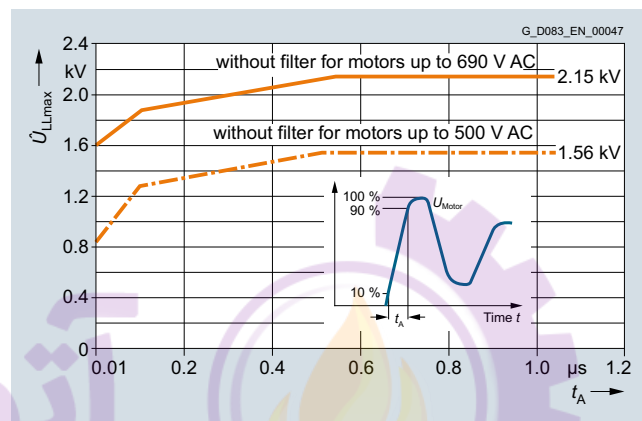
Voltage stress on a converter with pulse width modulation (PWM)

The PWM converter subjects the motor windings to wear and tear mainly by quickly applying voltage pulses. Each switching process of the converter releases a voltage wave onto the motor supply cable that can result in excessive motor voltages due to reflection (see diagram).



Typical progression of converter voltage  $U_{FC}$  and motor voltage  $U_{Motor}$  on the PWM converter (converter with and without output filter, length of motor cable 100 m)

The maximum voltage is influenced by the rise time of the pulses and by the length of cable used between motor and converter. A  $dv/dt$  output filter at the converter can reduce the maximum motor voltage to uncritical values. With the SINAMICS G180 converters, a high-quality  $dv/dt$  output filter is included as standard. With converters without  $dv/dt$  output filters, inadmissible voltage peaks can occur even with a relatively short motor cable (approx. 10 m). With the  $dv/dt$  output filters of the SINAMICS G180 converter, depending on the supply voltage, cable lengths of 150 m (at 690 V) to 300 m (at 400 to 500 V) are possible. The admissible voltage stress for the motor depends on the rise time  $t_r$  of the converter output voltage. The admissible voltage stress for our motors with standard insulation (1.56 kV curve) is shown in the diagram below. Special insulation is necessary for higher voltage stress (2.15 kV curve; on request, additional charge).



Admissible voltage stress for motors with standard insulation ( $\hat{U}_{LLmax}$  = Maximum value of phase-to-phase voltage)

Motor operation on converter with sine-wave filter

In special applications, e.g. with extremely long motor cables, so-called sine-wave filters are used which result in a smoother converter voltage than  $dv/dt$  filters. When a sine-wave filter is used, it is important to note that a significant drop in motor voltage of up to 15 % occurs. Under these operating conditions, derating is necessary to prevent the motors from overheating. For operation with sine-wave filters and the consequent reduction of 10 to 15 % in motor voltage, the admissible outputs for converter-fed operation must be similarly reduced by 10 to 15 %.

For the LOHER CHEMSTAR and LOHER VARIO series, it is possible to dimension the motors for the reduced voltage at the motor terminals that results from the converter, which can prevent a reduction in output due to reduced voltage.

## Introduction

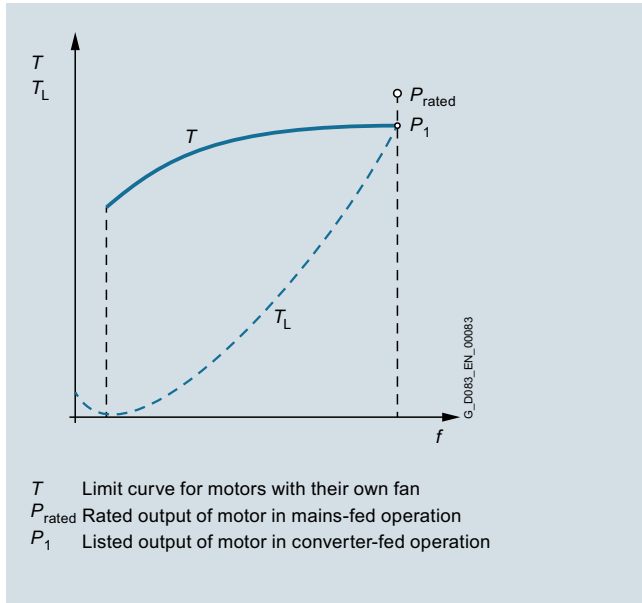
General technical specifications

1

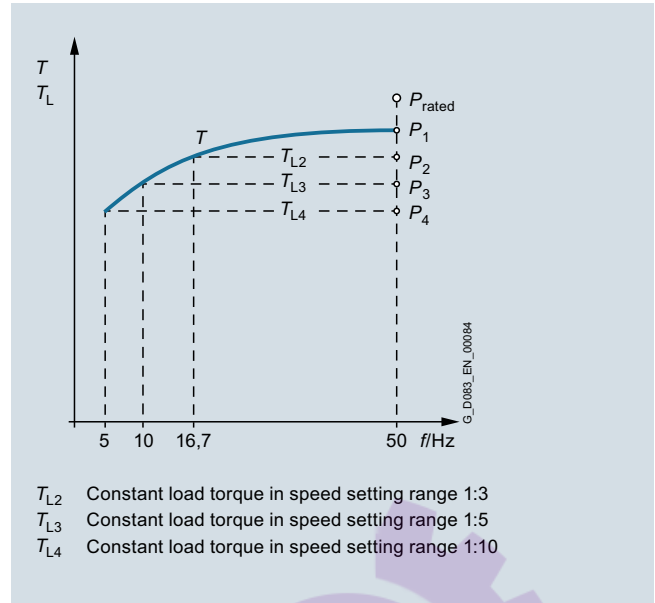
### Converter-fed operation – Special mechanical characteristics

#### Overview (continued)

Output tables for converter-fed operation

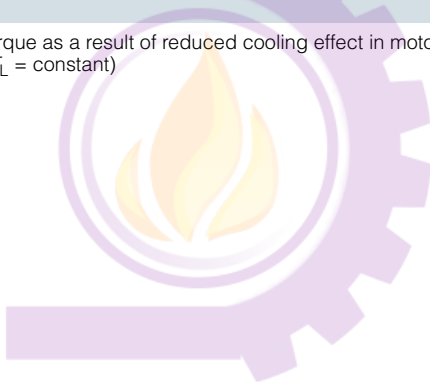


Motors with their own fan for pump and fan operation ( $T_L \sim n^2$ )



Reduction in torque as a result of reduced cooling effect in motors with their own fan ( $T_L = \text{constant}$ )

اتور صنعت  
ATOORSANAT



## Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
Mains	Mains		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A	kW	Nm	A

## LOHER CHEMSTAR/VARIO 1PS4 and 1PS5 motors (Ex de)

## Utilization of the winding according to B (130 °C)

Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)

Valid, for example, for SINAMICS G180

2-pole: 3000 rpm at 50 Hz

## LOHER CHEMSTAR 1PS5 motors

0.37	2780	1PS5070-1BD...4AA3	0.41	1.4	0.87	0.25	0.9	0.61	0.30	1.0	0.69	0.35	1.2	0.76
0.55	2780	1PS5071-1BD...4AA3	0.60	2.1	1.32	0.38	1.3	0.89	0.45	1.6	1.02	0.50	1.8	1.15
0.75	2810	1PS5080-1BD...4AA3	0.80	2.9	1.68	0.50	1.8	1.15	0.60	2.1	1.32	0.70	2.4	1.47
1.1	2810	1PS5081-1BD...4AA3	1.2	4.2	2.55	0.75	2.6	1.74	0.90	3.1	1.99	1.05	3.6	2.25
1.5	2865	1PS5095-1BD...4AA3	1.6	5.7	3.25	1.05	3.5	2.20	1.2	4.2	2.50	1.4	4.8	2.80
2.2	2845	1PS5098-1BD...4AA3	2.4	8.3	4.80	1.5	5.2	3.35	1.8	6.2	3.80	2.1	7.1	4.25
3	2900	1PS5106-1BD...4AA3	3.3	11.2	6.4	2.1	7.1	4.55	2.5	8.5	5.1	2.9	9.6	5.7
4	2890	1PS5113-1BD...4AA3	4.4	14.9	8.1	2.8	9.5	5.3	3.4	11.3	6.2	3.8	12.8	7.0
5.5	2910	1PS5131-1BD...4AA3	6.0	20.4	11.2	4.0	13.0	7.5	4.7	15.5	8.7	5.3	17.6	9.8
7.5	2910	1PS5132-1BD...4AA3	8.0	28	14.9	5.4	18	10.0	6.0	21	11.6	7.0	24	13.0
11	2955	1PS5163-1BD...4AA3	12.0	40	22.0	8.0	26	14.8	9.5	31	17.1	10.5	35	19.1
15	2955	1PS5165-1BD...4AA3	16.5	55	30.0	11.0	36	20.0	13.0	42	23.0	14.5	48	26.0
18.5	2955	1PS5166-1BD...4AA3	20	67	36.5	13.5	44.1	24.5	16.0	52	28.5	18.0	59	32.0
22	2960	1PS5183-1BD...4AA3	24	80	42.5	16.0	52	29.0	19.0	62	33.5	21	70	37.5
30	2955	1PS5206-1BD...4AA3	33	109	58	22	72	39.5	26	84	46.0	29	95	51
37	2960	1PS5208-1BD...4AA3	39	127	68	26	83	46.0	30	98	53	34	110	60
45	2965	1PS5223-1BD...4AA3	47	154	84	34	109	61	38	124	69	42	136	75
55	2975	1PS5253-1BD...4AA3	55	178	99	39	126	74	44	143	82	49	157	89
75	2980	1PS5280-1BD...4AA3	84	272	143	60	193	104	68	218	116	74	240	127
90	2980	1PS5283-1BD...4AA3	100	326	171	72	231	124	80	262	139	90	289	152
110	2980	1PS5311-1BD...4AA3	116	376	200	82	267	148	94	302	165	102	332	180
132	2980	1PS5313-1BD...4AA3	126	408	220	90	290	161	102	329	179	112	362	195
160	2980	1PS5315-1BD...4AA3	154	495	260	108	352	192	124	398	215	136	438	235
200	2980	1PS5316-1BD...4AA3	184	594	315	132	422	230	148	478	260	164	526	285
250	2985	1PS5318-1BD...4AA3	230	741	390	164	528	285	186	597	320	205	657	350
315	2984	1PS5353-1BD...4AA3	290	934	500	205	665	375	235	752	415	255	828	450
360	2984	1PS5355-1BD...4AA3	330	1069	570	235	760	420	265	860	465	295	947	510
460	2985	1PS5357-1BD...4AA3	425	1365	710	300	971	520	340	1099	580	375	1209	630

## LOHER VARIO 1PS4 and 1PS5 motors

400	2984	1PS . 358-1BH...4AA0	380	1220	630	281	894	470	316	1006	530	346	1100	570
450	2977	1PS . 358-1BJ...4AA0	430	1370	710	301	959	510	346	1102	580	384	1221	630
500	2981	1PS . 405-1BJ...4AA0	475	1520	780	348	1107	580	394	1253	650	432	1374	710
560	2982	1PS . 407-1BJ...4AA0	530	1700	870	385	1226	650	439	1396	730	482	1534	790
630	2983	1PS . 408-1BJ...4AA0	600	1920	575 <sup>1)</sup>	435	1385	423 <sup>1)</sup>	496	1578	475 <sup>1)</sup>	545	1735	522 <sup>1)</sup>
710	2985	1PS . 455-1BJ...4AA0	670	2150	645 <sup>1)</sup>	493	1571	481 <sup>1)</sup>	560	1782	539 <sup>1)</sup>	614	1953	586 <sup>1)</sup>
800	2985	1PS . 457-1BJ...4AA0	760	2450	730 <sup>1)</sup>	560	1782	545 <sup>1)</sup>	637	2028	614 <sup>1)</sup>	699	2225	667 <sup>1)</sup>
900	2984	1PS . 458-1BJ...4AA0	860	2750	817 <sup>1)</sup>	637	2028	614 <sup>1)</sup>	721	2295	690 <sup>1)</sup>	788	2510	748 <sup>1)</sup>

For LOHER CHEMSTAR type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** or **A16** and with frame size 315 and above Option **L27** (insulated bearing, fan side).

The current values specified in the lists are calculated for 400 V.

<sup>1)</sup> Not possible with 400 V, current values apply to 690 V.

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
Mains	Mains		Output	Torque	Current	Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A	kW	Nm	A

##### LOHER CHEMSTAR/VARIO 1PS4 and 1PS5 motors (Ex de)

##### Utilization of the winding according to B (130 °C)

Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)

Valid, for example, for SINAMICS G180

4-pole: 1500 rpm at 50 Hz

##### LOHER CHEMSTAR 1PS5 motors

0.25	1350	1PS5070-1BD...4BA3	0.27	1.9	0.73	0.17	1.2	0.54	0.20	1.4	0.60	0.23	1.6	0.65
0.37	1360	1PS5071-1BD...4BA3	0.41	2.9	1.01	0.25	1.7	0.78	0.31	2.1	0.85	0.35	2.4	0.92
0.55	1400	1PS5080-1BD...4BA3	0.60	4.2	1.49	0.38	2.6	1.10	0.46	3.1	1.22	0.50	3.6	1.33
0.75	1455	1PS5081-1BD...4BA3	0.80	5.5	1.82	0.50	3.6	1.40	0.60	4.2	1.53	0.70	4.8	1.65
1.1	1460	1PS5095-1BD...4BA3	1.2	8.1	2.35	0.80	5.2	1.71	0.95	6.2	1.92	1.05	7.0	2.10
1.5	1460	1PS5098-1BD...4BA3	1.6	11.1	3.35	1.05	7.1	2.55	1.2	8.4	2.80	1.4	9.6	3.05
2.2	1450	1PS5106-1BD...4BA3	2.4	16.3	4.85	1.6	10.4	3.45	1.8	12.4	3.90	2.1	14.1	4.30
3	1455	1PS5108-1BD...4BA3	3.3	22.3	6.8	2.1	14	5.2	2.5	17	5.7	2.9	19.2	6.2
4	1460	1PS5113-1BD...4BA3	4.5	29.6	8.6	2.9	19	6.1	3.4	23	6.9	3.9	25.5	7.6
5.5	1455	1PS5131-1BD...4BA3	6.0	40.8	11.7	4.0	26	8.1	4.7	31	9.3	5.3	35.2	10.3
7.5	1470	1PS5133-1BD...4BA3	8.0	55	15.8	5.5	36	11.3	6.5	42	12.8	7.0	48	14.0
11	1460	1PS5163-1BD...4BA3	12.0	81	23.5	8.0	52	16.3	9.5	62	18.6	10.5	70	20.5
15	1460	1PS5166-1BD...4BA3	16.5	110	31.0	11.0	71	22.0	13.0	84	25.0	14.5	95	27.5
18.5	1470	1PS5183-1BD...4BA3	20	135	38.0	13.5	88	26.0	16.0	104	30.0	18.0	117	33.5
22	1470	1PS5186-1BD...4BA3	24	161	45.0	16.0	105	31.5	19.0	124	36.0	21	139	40.0
30	1470	1PS5206-1BD...4BA3	33	219	61	22	143	43.5	26	168	49	29	190	54
37	1480	1PS5220-1BD...4BA3	41	270	72	29	190	54	33	216	60	36	238	65
45	1480	1PS5223-1BD...4BA3	50	328	91	35	231	68	40	263	75	44	290	82
55	1480	1PS5253-1BD...4BA3	55	358	99	39	252	74	44	286	82	49	316	89
75	1480	1PS5280-1BD...4BA3	84	545	151	60	385	113	68	437	125	74	482	136
90	1480	1PS5283-1BD...4BA3	94	617	170	68	436	127	76	495	141	84	545	153
110	1485	1PS5311-1BD...4BA3	110	713	205	78	504	156	88	572	172	98	630	186
132	1485	1PS5313-1BD...4BA3	132	855	240	94	605	180	106	686	200	116	756	215
160	1485	1PS5315-1BD...4BA3	154	994	275	108	703	205	124	798	230	136	879	250
200	1488	1PS5316-1BD...4BA3	184	1191	330	130	844	250	148	957	275	164	1054	300
250	1488	1PS5317-1BD...4BA3	230	1488	415	164	1055	320	186	1196	350	205	1317	375
315	1488	1PS5353-1BD...4BA3	290	1872	530	205	1330	405	253	1506	445	255	1657	480
360	1488	1PS5355-1BD...4BA3	330	2141	600	235	1520	455	265	1721	500	295	1895	540
460	1488	1PS5357-1BD...4BA3	425	2737	760	300	1942	570	340	2200	630	375	2422	680

##### LOHER VARIO 1PS4 and 1PS5 motors

400	1491	1PS...350-1BH...4BA0	380	2450	670	288	1831	520	323	2059	570	352	2243	620
450	1491	1PS...357-1BJ...4BA0	430	2750	760	322	2052	590	363	2311	650	396	2519	700
500	1492	1PS...358-1BJ...4BA0	475	3050	840	359	2283	660	403	2569	730	439	2797	780
560	1492	1PS...405-1BJ...4BA0	530	3400	910	401	2556	700	451	2872	780	491	3124	840
630	1492	1PS...407-1BJ...4BA0	600	3850	1030	454	2890	800	511	3250	880	556	3537	950
710	1492	1PS...408-1BJ...4BA0	670	4300	1140	510	3248	890	572	3644	990	622	3960	1060
800	1493	1PS...455-1BJ...4BA0	760	4850	1290	576	3666	1010	646	4114	1110	702	4468	1200
900	1493	1PS...457-1BJ...4BA0	860	5500	1460 <sup>1)</sup>	651	4145	1130 <sup>1)</sup>	732	4659	1250 <sup>1)</sup>	796	5065	1350 <sup>1)</sup>
950	1493	1PS...458-1BJ...4BA0	900	5800	1540 <sup>1)</sup>	687	4376	1210 <sup>1)</sup>	772	4916	1340 <sup>1)</sup>	839	5343	1420 <sup>1)</sup>
1000	1494	1PS...504-1BJ...4BA0	950	6100	1620 <sup>1)</sup>	720	4582	1290 <sup>1)</sup>	810	5158	1430 <sup>1)</sup>	882	5613	1500 <sup>1)</sup>
1120	1493	1PS...505-1BJ...4BA0	1060	6800	1810 <sup>1)</sup>	805	5128	1430 <sup>1)</sup>	905	5764	1580 <sup>1)</sup>	984	6266	1680 <sup>1)</sup>

<sup>1)</sup> Not possible with 400 V, current values apply to 690 V.

## Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A	Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A	Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A	Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A
<b>LOHER CHEMSTAR/VARIO 1PS4 and 1PS5 motors (Ex de)</b>														
<b>Utilization of the winding according to B (130 °C)</b>														
<b>Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)</b>														
<b>Valid, for example, for SINAMICS G180</b>														
<b>6-pole: 1000 rpm at 50 Hz</b>														
<b>LOHER CHEMSTAR 1PS5 motors</b>														
0.25	895	1PS5071-1BD...4CA3	0.27	3.0	0.74	0.16	1.7	0.75	0.20	2.1	0.74	0.23	2.5	0.74
0.37	895	1PS5080-1BD...4CA3	0.41	4.5	1.18	0.24	2.5	0.91	0.30	3.2	0.99	0.34	3.7	1.06
0.55	900	1PS5081-1BD...4CA3	0.60	6.6	1.65	0.37	3.8	1.31	0.45	4.7	1.41	0.50	5.5	1.51
0.75	960	1PS5095-1BD...4CA3	0.80	8.4	2.00	0.50	5.3	1.62	0.60	6.3	1.74	0.70	7.2	1.85
1.1	950	1PS5098-1BD...4CA3	1.1	11.8	2.90	0.70	7.3	2.40	0.85	8.8	2.55	1.00	10.1	2.70
1.5	955	1PS5106-1BD...4CA3	1.6	17	4.15	1.05	10.6	3.55	1.2	12.7	3.75	1.4	14.5	3.90
2.2	950	1PS5113-1BD...4CA3	2.4	25	5.6	1.5	16	4.30	1.8	19	4.70	2.1	21	5.1
3	955	1PS5131-1BD...4CA3	3.3	34	7.0	2.1	21	5.1	2.5	25	5.7	2.9	29	6.2
4	955	1PS5133-1BD...4CA3	4.4	45	9.0	2.8	28	6.5	3.4	34	7.3	3.8	39	8.0
5.5	955	1PS5135-1BD...4CA3	5.5	55	12.1	3.5	35	9.3	4.2	42	10.1	4.7	48	10.9
7.5	965	1PS5163-1BD...4CA3	8.0	84	16.8	5.4	53	12.2	6.0	63	13.6	7.0	72	15.0
11	970	1PS5166-1BD...4CA3	12.0	122	25.5	8.0	78	18.4	9.0	93	20.5	10.5	106	22.5
15	980	1PS5186-1BD...4CA3	16.5	165	32.0	11.0	107	23.0	13.0	126	26.0	14.5	143	28.5
18.5	980	1PS5206-1BD...4CA3	20	204	40.5	13.5	132	29.0	16.0	156	32.5	18.0	176	36.0
22	980	1PS5208-1BD...4CA3	23	228	46.5	15.0	148	35.0	18.0	175	38.5	20	198	42.0
30	985	1PS5223-1BD...4CA3	33	329	63	23	231	47.5	27	263	53	29	290	57
37	985	1PS5253-1BD...4CA3	39	382	75	27	269	58	31	306	63	34	337	68
45	985	1PS5280-1BD...4CA3	50	493	93	35	347	71	40	394	78	44	435	84
55	990	1PS5283-1BD...4CA3	62	600	112	44	424	84	49	481	93	54	530	101
75	990	1PS5311-1BD...4CA3	84	818	148	60	578	110	68	656	122	74	723	133
90	990	1PS5313-1BD...4CA3	100	981	180	72	694	133	80	787	148	88	868	161
110	990	1PS5314-1BD...4CA3	124	1199	220	88	848	160	98	962	178	108	1061	195
132	990	1PS5315-1BD...4CA3	132	1283	235	94	908	176	106	1030	195	116	1135	210
160	990	1PS5316-1BD...4CA3	154	1490	270	108	1055	200	124	1196	225	136	1318	245
200	990	1PS5317-1BD...4CA3	184	1788	340	130	1267	260	148	1436	285	164	1582	305
280	994	1PS5353-1BD...4CA3	255	2496	485	184	1773	370	205	2008	410	230	2210	410
315	994	1PS5355-1BD...4CA3	290	2808	530	205	1994	405	235	2258	445	255	2485	445
360	994	1PS5357-1BD...4CA3	360	3206	610	235	2279	470	265	2580	510	295	2839	550
<b>LOHER VARIO 1PS4 and 1PS5 motors</b>														
315	994	1PS5354-1BD...4CA3	300	2900	540	226	2156	430	255	2432	470	278	2654	500
355	993	1PS .357-1BJ ...4CA0	335	3250	600	257	2453	470	288	2751	520	313	2989	560
400	992	1PS .358-1BJ ...4CA0	380	3650	690	272	2602	520	313	2994	580	346	3306	630
450	994	1PS .405-1BJ ...4CA0	425	4100	770	325	3102	600	364	3478	660	396	3777	710
500	994	1PS .407-1BJ ...4CA0	475	4550	850	360	3436	670	404	3857	740	439	4191	790
560	995	1PS .453-1BJ ...4CA0	530	5100	940	404	3854	740	453	4326	810	492	4699	870
630	995	1PS .455-1BJ ...4CA0	600	5700	1050	452	4315	830	507	4841	910	550	5256	980
710	995	1PS .457-1BJ ...4CA0	670	6500	1190	515	4921	940	578	5522	1030	628	5996	1110
800	995	1PS .458-1BJ ...4CA0	740	7100	765 <sup>1)</sup>	569	5430	614 <sup>1)</sup>	635	6067	672 <sup>1)</sup>	688	6570	719 <sup>1)</sup>
900	995	1PS .505-1BJ ...4CA0	860	8200	875 <sup>1)</sup>	651	6219	684 <sup>1)</sup>	730	6976	754 <sup>1)</sup>	793	7572	812 <sup>1)</sup>
1000	995	1PS .507-1BJ ...4CA0	950	9100	968 <sup>1)</sup>	721	6887	759 <sup>1)</sup>	810	7733	835 <sup>1)</sup>	880	8399	899 <sup>1)</sup>

For LOHER CHEMSTAR type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** or **A16** and with frame size 315 and above Option **L27** (insulated bearing, fan side).

The current values specified in the lists are calculated for 400 V.

<sup>1)</sup> Not possible with 400 V, current values apply to 690 V.

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A	kW	Nm	A

##### LOHER CHEMSTAR/VARIO 1PS4/5 motors (Ex de)

##### Utilization of the winding according to F (155 °C)

Converter infeed with extremely motor-friendly output signal and slightly reduced rated voltage at the motor terminal (modulation depth < 1)

Valid, for example, for SINAMICS G120 PM230, SINAMICS G120 PM240, SINAMICS G130, SINAMICS S120

2-pole: 3000 rpm at 50 Hz

##### LOHER CHEMSTAR 1PS5 motors

0.37	2780	1PS5070-1BD...4AA3	0.43	1.52	0.96	0.26	0.903	0.65	0.32	1.1	0.74	0.37	1.28	0.83
0.55	2780	1PS5071-1BD...4AA3	0.6	2.25	1.46	0.39	1.34	0.95	0.48	1.64	1.11	0.55	1.9	1.26
0.75	2810	1PS5080-1BD...4AA3	0.85	3.04	1.88	0.55	1.84	1.24	0.65	2.23	1.44	0.75	2.58	1.63
1.1	2810	1PS5081-1BD...4AA3	1.2	4.46	2.8	0.8	2.7	1.85	0.95	3.27	2.15	1.1	3.78	2.4
1.5	2865	1PS5095-1BD...4AA3	1.7	6	3.6	1.1	3.72	2.35	1.3	4.46	2.75	1.5	5.1	3.1
2.2	2845	1PS5098-1BD...4AA3	2.5	8.8	5.3	1.6	5.4	3.65	1.9	6.5	4.2	2.2	7.5	4.65
3	2900	1PS5106-1BD...4AA3	3.5	11.8	7.1	2.2	7.5	4.9	2.7	8.9	5.6	3	10.1	6.2
4	2890	1PS5113-1BD...4AA3	4.7	15.8	9	3	10	5.8	3.6	11.9	6.9	4	13.5	7.8
5.5	2910	1PS5131-1BD...4AA3	6.5	21.5	12.4	4.2	13.7	8.2	4.9	16.3	9.6	5.5	18.5	10.8
7.5	2910	1PS5132-1BD...4AA3	8.5	29.3	16.5	5.5	18.7	11	6.5	22.3	12.8	7.5	25.3	14.4
11	2955	1PS5163-1BD...4AA3	13	42.4	24.5	8.5	27.7	16.2	10	32.6	18.9	11	36.8	21
15	2955	1PS5165-1BD...4AA3	17.5	58	33	11.5	37.7	22	13.5	44.4	26	15.5	50	29
18.5	2955	1PS5166-1BD...4AA3	22	71	41	14	46.5	27.5	16.5	55	32	19	62	35.5
22	2960	1PS5183-1BD...4AA3	26	85	47.5	17	55	32	20	65	37	22	73	41.5
30	2955	1PS5206-1BD...4AA3	35	115	65	23	76	44	27	89	51	31	100	57
37	2960	1PS5208-1BD...4AA3	41	134	76	27	88	51	32	103	59	36	116	67
45	2965	1PS5223-1BD...4AA3	50	163	93	35	115	67	40	131	75	44	144	83
55	2975	1PS5253-1BD...4AA3	58	188	110	41	133	81	47	151	90	51	166	98
75	2980	1PS5280-1BD...4AA3	88	287	157	63	203	114	71	230	128	78	254	140
90	2980	1PS5283-1BD...4AA3	106	344	189	76	244	137	86	277	154	94	305	169
110	2980	1PS5311-1BD...4AA3	122	396	225	86	281	163	98	319	182	108	351	199
132	2980	1PS5313-1BD...4AA3	134	431	240	94	306	175	108	347	195	118	382	215
160	2980	1PS5315-1BD...4AA3	162	523	290	116	371	210	130	420	235	144	463	260
200	2980	1PS5316-1BD...4AA3	194	627	350	138	445	255	156	504	285	172	555	310
250	2985	1PS5318-1BD...4AA3	240	783	430	174	557	315	196	630	350	215	693	385
315	2987	1PS5353-1BD...4AA3	245	799	440	178	569	330	200	643	365	220	708	395
360	2987	1PS5355-1BD...4AA3	285	913	495	200	650	365	230	735	405	250	809	440
460	2988	1PS5357-1BD...4AA3	365	1167	620	260	831	465	290	940	510	320	1034	560

##### LOHER VARIO 1PS4 and 1PS5 motors

315	2981	1PS . 356-1BH...4AA0	Values on request											
355	2982	1PS . 357-1BH...4AA0												
400	2984	1PS . 358-1BH...4AA0												
450	2977	1PS . 358-1BJ ...4AA0												
500	2981	1PS . 405-1BJ ...4AA0												
560	2982	1PS . 407-1BJ ...4AA0												
630	2983	1PS . 408-1BJ ...4AA0												
710	2985	1PS . 455-1BJ ...4AA0												
800	2985	1PS . 457-1BJ ...4AA0												
900	2984	1PS . 458-1BJ ...4AA0												

For LOHER CHEMSTAR type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** or **A16** and with frame size 315 and above Option **L27** (insulated bearing, fan side).

The current values specified in the lists are calculated for 400 V.

## Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A	kW	Nm	A

**LOHER CHEMSTAR/VARIO 1PS4/5 motors (Ex de)****Utilization of the winding according to F (155 °C)**

Converter infeed with extremely motor-friendly output signal and slightly reduced rated voltage at the motor terminal (modulation depth < 1)

Valid, for example, for SINAMICS G120 PM230, SINAMICS G120 PM240, SINAMICS G130, SINAMICS S120

4-pole: 1500 rpm at 50 Hz

**LOHER CHEMSTAR 1PS5 motors**

0.25	1350	1PS5070-1BD...4BA3	0.29	2.06	0.8	0.18	1.22	0.56	0.21	1.49	0.63	0.25	1.73	0.7
0.37	1360	1PS5071-1BD...4BA3	0.43	3.01	1.12	0.27	1.81	0.81	0.32	2.2	0.91	0.37	2.55	1
0.55	1400	1PS5080-1BD...4BA3	0.6	4.48	1.65	0.4	2.69	1.16	0.48	3.28	1.31	0.55	3.79	1.45
0.75	1455	1PS5081-1BD...4BA3	0.85	5.9	2	0.55	3.75	1.48	0.65	4.45	1.65	0.75	5	1.8
1.1	1460	1PS5095-1BD...4BA3	1.3	8.6	2.65	0.8	5.5	1.86	1	6.5	2.1	1.1	7.4	2.35
1.5	1460	1PS5098-1BD...4BA3	1.7	11.7	3.7	1.1	7.5	2.7	1.3	8.9	3.05	1.5	10.1	3.3
2.2	1450	1PS5106-1BD...4BA3	2.6	17.2	5.3	1.6	11	3.7	1.9	13.1	4.25	2.2	14.8	4.7
3	1455	1PS5108-1BD...4BA3	3.5	23.5	7.5	2.2	15	5.5	2.7	17.8	6.2	3	20.2	6.7
4	1460	1PS5113-1BD...4BA3	4.7	31.2	9.6	3	20	6.6	3.6	23.7	7.6	4.1	26.9	8.4
5.5	1455	1PS5131-1BD...4BA3	6.5	43.1	12.9	4.2	27.5	8.8	4.9	32.6	10.1	5.5	37.1	11.3
7.5	1470	1PS5133-1BD...4BA3	8.5	58	17.5	5.5	37.6	12.2	6.5	44.5	13.9	7.5	50	15.4
11	1460	1PS5163-1BD...4BA3	13	86	26	8	55	17.6	10	65	20.5	11	74	22.5
15	1460	1PS5166-1BD...4BA3	17.5	116	34.5	11.5	75	23.5	13.5	89	27.5	15	101	30.5
18.5	1470	1PS5183-1BD...4BA3	22	143	42	14	93	28.5	16.5	110	33	19	124	36.5
22	1470	1PS5186-1BD...4BA3	26	170	50	17	111	34	20	130	39.5	22	147	44
30	1470	1PS5206-1BD...4BA3	35	231	68	23	151	47	27	178	54	31	201	60
37	1480	1PS5220-1BD...4BA3	44	285	83	31	200	61	35	228	68	38	252	74
45	1480	1PS5223-1BD...4BA3	53	346	101	37	244	74	42	277	82	47	306	90
55	1480	1PS5253-1BD...4BA3	58	377	109	41	266	80	46	302	89	51	333	97
75	1480	1PS5280-1BD...4BA3	88	576	168	63	407	123	71	461	137	78	509	150
90	1480	1PS5283-1BD...4BA3	100	651	188	71	460	138	80	522	154	88	576	168
110	1485	1PS5311-1BD...4BA3	116	751	225	82	532	171	94	603	188	102	664	205
132	1485	1PS5313-1BD...4BA3	140	901	265	98	639	197	112	724	220	124	797	235
160	1485	1PS5315-1BD...4BA3	162	1047	305	114	742	225	130	841	250	144	926	275
200	1488	1PS5316-1BD...4BA3	194	1257	370	138	891	275	156	1010	305	172	1112	330
250	1487	1PS5317-1BD...4BA3	240	1570	455	172	1114	340	196	1262	380	215	1389	410
315	1490	1PS5353-1BD...4BA3	250	1603	460	178	1138	350	200	1289	385	220	1419	415
360	1490	1PS5355-1BD...4BA3	285	1831	520	200	1301	400	230	1473	440	250	1622	470
460	1490	1PS5357-1BD...4BA3	365	2340	650	255	1662	495	290	1882	550	320	2072	590

**LOHER VARIO 1PS4, 1PS5 motors**

280	1484	1PS .356-1BH...4BA0	Values on request											
315	1489	1PS .357-1BH...4BA0												
355	1490	1PS .358-1BH...4BA0												
400	1491	1PS .350-1BH...4BA0												
450	1491	1PS .357-1BJ...4BA0												
500	1492	1PS .358-1BJ...4BA0												
560	1492	1PS .405-1BJ...4BA0												
630	1492	1PS .407-1BJ...4BA0												
710	1492	1PS .408-1BJ...4BA0												
800	1493	1PS .455-1BJ...4BA0												
900	1493	1PS .457-1BJ...4BA0												
950	1493	1PS .458-1BJ...4BA0												
1000	1494	1PS .504-1BJ...4BA0												
1120	1493	1PS .505-1BJ...4BA0												

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A	Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A	Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A	Output 50 Hz kW	Torque 50 Hz Nm	Current 400 V A

##### LOHER CHEMSTAR/VARIO 1PS4/5 motors (Ex de)

##### Utilization of the winding according to F (155 °C)

Converter infeed with extremely motor-friendly output signal and slightly reduced rated voltage at the motor terminal (modulation depth < 1)

Valid, for example, for SINAMICS G120 PM230, SINAMICS G120 PM240, SINAMICS G130, SINAMICS S120

6-pole: 1000 rpm at 50 Hz

##### LOHER CHEMSTAR 1PS5 motors

0.25	895	1PS5071-1BD...4CA3	0.29	3.13	0.88	0.17	1.81	0.64	0.21	2.23	0.71	0.24	2.61	0.78
0.37	895	1PS5080-1BD...4CA3	0.43	4.63	1.22	0.26	2.68	0.91	0.31	3.31	1	0.36	3.87	1.09
0.55	900	1PS5081-1BD...4CA3	0.6	6.9	1.77	0.39	3.98	1.33	0.47	4.92	1.46	0.5	5.8	1.59
0.75	960	1PS5095-1BD...4CA3	0.85	8.9	2.2	0.55	5.6	1.69	0.65	6.7	1.86	0.75	7.6	2
1.1	950	1PS5098-1BD...4CA3	1.2	12.4	3.15	0.75	7.7	2.45	0.9	9.3	2.7	1.05	10.6	2.9
1.5	955	1PS5106-1BD...4CA3	1.7	17.9	4.55	1.1	11.2	3.65	1.3	13.4	3.95	1.5	15.3	4.2
2.2	950	1PS5113-1BD...4CA3	2.5	26.4	6.3	1.6	16.3	4.55	1.9	19.6	5.1	2.2	22.5	5.6
3	955	1PS5131-1BD...4CA3	3.5	36	7.8	2.2	22.2	5.5	2.6	26.8	6.2	3	30.7	6.9
4	955	1PS5135-1BD...4CA3	4.7	47.7	10	3	29.7	6.8	3.5	35.7	7.8	4	40.8	8.7
5.5	955	1PS5135-1BD...4CA3	5.5	58	13.2	3.7	36.7	9.7	4.4	43.9	10.8	5	50	11.8
7.5	965	1PS5163-1BD...4CA3	8.5	89	18.6	5.5	56	13	6.5	67	14.8	7.5	76	16.4
11	970	1PS5166-1BD...4CA3	13	129	26.5	8	82	18.9	9.5	98	21.5	11	111	23.5
15	980	1PS5186-1BD...4CA3	17.5	174	35.5	11.5	113	24.5	13.5	133	28	15	151	31.5
18.5	980	1PS5206-1BD...4CA3	21	216	45	14	139	31	16.5	165	35.5	19	186	39.5
22	980	1PS5208-1BD...4CA3	24	242	51	16	156	35.5	18.5	185	40.5	21	209	45
30	985	1PS5223-1BD...4CA3	35	347	70	25	244	52	28	277	58	31	306	63
37	985	1PS5253-1BD...4CA3	41	403	83	29	284	63	33	322	69	36	356	75
45	985	1PS5280-1BD...4CA3	53	518	102	37	366	75	43	415	84	47	458	91
55	990	1PS5283-1BD...4CA3	65	634	124	46	447	91	52	508	102	57	560	111
75	990	1PS5311-1BD...4CA3	88	863	165	63	610	120	71	692	135	78	763	147
90	990	1PS5313-1BD...4CA3	106	1036	200	74	732	146	86	830	163	94	916	179
110	990	1PS5314-1BD...4CA3	130	1266	240	92	894	175	104	1015	197	114	1119	215
132	990	1PS5315-1BD...4CA3	140	1354	260	98	958	191	112	1086	215	124	1198	230
160	990	1PS5316-1BD...4CA3	162	1573	300	114	1113	220	130	1262	245	144	1391	270
200	990	1PS5317-1BD...4CA3	194	1888	375	138	1336	280	156	1515	310	172	1670	335
280	994	1PS5353-1BD...4CA3	220	2134	430	158	1517	335	178	1718	365	196	1890	390
315	994	1PS5355-1BD...4CA3	250	2401	470	178	1707	365	300	1932	400	220	2126	425
360	994	1PS5357-1BD...4CA3	285	2741	540	200	2950	420	230	2207	455	250	2428	490

##### LOHER VARIO 1PS4 and 1PS5 motors

225	993	1PS .353 1BH...4CA0	Values on request										
250	994	1PS .356-1BH...4CA0											
280	993	1PS .357-1BH...4CA0											
315	994	1PS .358-1BH...4CA0											
355	993	1PS .357-1BJ...4CA0											
400	992	1PS .358-1BJ...4CA0											
450	994	1PS .405-1BJ...4CA0											
500	994	1PS .407-1BJ...4CA0											
560	995	1PS .453-1BJ...4CA0											
630	995	1PS .455-1BJ...4CA0											
710	995	1PS .457-1BJ...4CA0											
800	995	1PS .458-1BJ...4CA0											
900	995	1PS .505-1BJ...4CA0											
1000	995	1PS .507-1BJ...4CA0											
1120	995	1PS .508-1BJ...4CA0											

For LOHER CHEMSTAR type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** or **A16** and with frame size 315 and above Option **L27** (insulated bearing, fan side).

For LOHER VARIO type series and welded steel types *355LC*, *355LD*, without further options, sole winding protection is implemented with 3 PTC thermistors for winding and bearing insulation at the fan side.

The current values specified in the lists are calculated for 400 V.



## Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A
<b>SIMOTICS XP 1MD5 motors (Ex de)</b>											
<b>Utilization of the winding according to B (130 °C)</b>											
<b>Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)</b>											
<b>Valid, for example, for SINAMICS G180</b>											
<b>2-pole: 3000 rpm at 50 Hz</b>											
0.37	2840	1MD5070-.BD...-4AA1	0.34	1.15	0.95	0.21	0.720	0.76	0.29	0.985	0.87
0.55	2835	1MD5071-.BD...-4AA1	0.50	1.71	1.35	0.32	1.07	1.01	0.44	1.47	1.21
0.75	2805	1MD5080-.BD...-4AA1	0.65	2.36	1.58	0.44	1.46	1.18	0.60	2.02	1.42
1.1	2835	1MD5081-.BD...-4AA1	1.00	3.44	2.25	0.65	2.15	1.72	0.85	2.94	2.05
1.5	2885	1MD5095-.BD...-4AA1	1.3	4.60	3.00	0.90	2.93	2.40	1.2	3.96	2.75
2.2	2890	1MD5098-.BD...-4AA1	2.0	6.8	4.30	1.3	4.32	3.45	1.7	5.8	3.95
3	2905	1MD5106-.BD...-4AA1	2.7	9.2	5.8	1.8	5.9	4.25	2.4	7.9	5.2
4	2950	1MD5113-.BD...-4AA1	3.6	12.0	7.3	2.4	7.8	5.3	3.2	10.4	6.6
5.5	2950	1MD5131-.BD...-4AA1	5.1	16.5	9.9	3.3	10.8	7.2	4.4	14.3	8.8
7.5	2950	1MD5132-.BD...-4AA1	6.5	22.5	13.2	4.5	14.7	9.7	6.0	19.5	11.8
11	2955	1MD5163-.BD...-4AA1	10.0	32.9	19.2	6.5	21.6	14.1	8.5	28.6	17.2
15	2955	1MD5165-.BD...-4AA1	13.5	45.0	25.5	9.0	29.4	18.3	12.0	39.0	22.5
18.5	2955	1MD5166-.BD...-4AA1	17.0	56	31.5	11.0	36.4	22.5	14.5	48.3	28.0
22	2940	1MD5183-.BD...-4AA1	20	66	37.5	13.0	42.9	26.5	17.5	57	33.0
30	2955	1MD5206-.BD...-4AA1	27	90	51	18.0	59	36.0	24	78	44.5
37	2960	1MD5208-.BD...-4AA1	34	110	62	22	72	43.0	29	96	55
45	2965	1MD5223-.BD...-4AA1	41	134	74	29	95	55	36	119	67
55	2970	1MD5253-.BD...-4AA1	51	164	90	36	116	67	45	145	81
75	2978	1MD5280-.BD...-4AA1	69	222	124	49	158	95	61	197	113
90	2975	1MD5283-.BD...-4AA1	82	268	147	59	190	109	73	237	131
110	2982	1MD5311-.BD...-4AA1	100	326	174	72	232	128	90	289	156
132	2982	1MD5313-.BD...-4AA1	122	392	205	86	279	149	108	347	182
160	2982	1MD5315-.BD...-4AA1	148	475	245	104	337	178	130	420	220
200	2982	1MD5316-.BD...-4AA1	184	593	305	130	422	220	164	525	275
250	2985	1MD5318-.BD...-4AA1	230	742	385	164	528	280	205	657	345
315	2984	1MD5353-.BD...-4AA1	290	934	500	205	665	375	255	828	450
360	2984	1MD5355-.BD...-4AA1	330	1068	570	235	760	420	295	946	510
460	2985	1MD5357-.BD...-4AA1	425	1365	720	300	971	530	375	1209	640

For SIMOTICS XP type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** and with frame size 315 and above Option **L27** (insulated bearing, fan side). Infeed via the converter with peak voltage in accordance with IEC 60034-25:2007 Curve A (1560 V).

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A
<b>SIMOTICS XP 1MD5 motors (Ex de)</b>											
<b>Utilization of the winding according to B (130 °C)</b>											
<b>Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)</b>											
<b>Valid, for example, for SINAMICS G180</b>											
<b>4-pole: 1500 rpm at 50 Hz</b>											
0.25	1410	1MD5070-.BD...-4BA1	0.23	1.57	0.80	0.14	0.974	0.71	0.20	1.34	0.76
0.37	1385	1MD5071-.BD...-4BA1	0.34	2.36	0.98	0.21	1.44	0.87	0.29	2.01	0.94
0.55	1440	1MD5080-.BD...-4BA1	0.50	3.38	1.32	0.33	2.15	1.13	0.44	2.91	1.24
0.75	1440	1MD5081-.BD...-4BA1	0.65	4.61	1.72	0.44	2.93	1.41	0.60	3.97	1.59
1.1	1425	1MD5095-.BD...-4BA1	1.00	6.9	2.40	0.65	4.32	1.95	0.85	5.9	2.20
1.5	1435	1MD5098-.BD...-4BA1	1.3	9.3	3.15	0.85	5.9	2.55	1.2	8.0	2.90
2.2	1455	1MD5106-.BD...-4BA1	2.0	13.3	4.40	1.3	8.6	3.35	1.7	11.5	3.95
3	1455	1MD5108-.BD...-4BA1	2.7	18.3	5.9	1.8	11.8	4.40	2.4	15.8	5.3
4	1460	1MD5113-.BD...-4BA1	3.7	24.3	7.8	2.4	15.7	6.2	3.2	21.0	7.1
5.5	1465	1MD5131-.BD...-4BA1	5.1	33.3	10.7	3.3	21.6	8.1	4.4	28.8	9.6
7.5	1465	1MD5133-.BD...-4BA1	6.5	45.3	13.8	4.5	29.4	10.1	6.0	39.2	12.3
11	1470	1MD5163-.BD...-4BA1	10.0	66	19.8	6.5	42.9	14.7	8.5	57	17.8
15	1475	1MD5166-.BD...-4BA1	13.5	90	26.5	9.0	59	19.5	12.0	78	23.5
18.5	1465	1MD5183-.BD...-4BA1	17.0	112	33.0	11.0	73	24.0	14.5	97	29.0
22	1465	1MD5186-.BD...-4BA1	20	133	39.0	13.0	86	28.5	17.5	115	35.0
30	1470	1MD5206-.BD...-4BA1	27	181	53	18.0	118	38.0	24	157	47.0
37	1470	1MD5220-.BD...-4BA1	34	222	61	24	156	45.0	30	196	54
45	1475	1MD5223-.BD...-4BA1	41	270	75	29	190	56	36	238	67
55	1480	1MD5253-.BD...-4BA1	51	329	94	36	232	71	45	291	84
75	1485	1MD5280-.BD...-4BA1	69	447	123	49	316	91	61	395	110
90	1486	1MD5283-.BD...-4BA1	82	536	149	59	380	113	73	474	134
110	1490	1MD5311-.BD...-4BA1	102	654	183	72	464	138	90	579	165
132	1490	1MD5313-.BD...-4BA1	122	784	215	86	557	160	108	694	193
160	1490	1MD5315-.BD...-4BA1	148	950	260	104	675	196	130	841	235
200	1490	1MD5316-.BD...-4BA1	184	1188	325	132	844	245	164	1052	295
250	1487	1MD5317-.BD...-4BA1	230	1488	410	164	1055	310	205	1317	370
315	1488	1MD5353-.BD...-4BA1	290	1874	520	205	1330	395	255	1659	470
360	1488	1MD5355-.BD...-4BA1	330	2141	600	235	1520	450	295	1895	540
460	1488	1MD5357-.BD...-4BA1	425	2737	750	300	1942	560	375	2422	670

For SIMOTICS XP type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** and with frame size 315 and above Option **L27** (insulated bearing, fan side). Infeed via the converter with peak voltage in accordance with IEC 60034-25:2007 Curve A (1560 V).

## Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 $T = \text{constant}$			Setting range 1:3 $T = \text{constant}$		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A
<b>SIMOTICS XP 1MD5 motors (Ex de)</b>											
<b>Utilization of the winding according to B (130 °C)</b>											
<b>Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)</b>											
<b>Valid, for example, for SINAMICS G180</b>											
<b>6-pole: 1000 rpm at 50 Hz</b>											
0.25	860	1MD5070-.BD...-4CA1	0.23	2.58	0.77	0.13	1.44	0.76	0.19	2.13	0.76
0.37	925	1MD5080-.BD...-4CA1	0.34	3.54	1.04	0.21	2.16	0.90	0.29	3.01	0.98
0.55	930	1MD5081-.BD...-4CA1	0.50	5.2	1.58	0.32	3.19	1.35	0.43	4.42	1.48
0.75	935	1MD5095-.BD...-4CA1	0.70	7.1	1.97	0.44	4.41	1.64	0.60	6.1	1.84
1.1	935	1MD5098-.BD...-4CA1	1.00	10.4	2.80	0.60	6.4	2.30	0.85	8.9	2.60
1.5	970	1MD5106-.BD...-4CA1	1.3	13.7	3.50	0.90	8.8	2.80	1.2	11.9	3.25
2.2	965	1MD5113-.BD...-4CA1	2.0	20.2	4.95	1.3	12.9	3.90	1.7	17.4	4.55
3	970	1MD5131-.BD...-4CA1	2.7	27.3	6.7	1.8	17.6	5.4	2.4	23.6	6.1
4	970	1MD5133-.BD...-4CA1	3.7	36.5	8.2	2.4	23.5	6.3	3.2	31.5	7.5
5.5	970	1MD5135-.BD...-4CA1	5.0	50	11.4	3.3	32.2	8.8	4.4	43.2	10.3
7.5	975	1MD5163-.BD...-4CA1	6.5	68	15.3	4.5	43.8	11.6	6.0	59	13.9
11	975	1MD5166-.BD...-4CA1	10.0	100	21.0	6.5	65	15.7	8.5	87	19.1
15	975	1MD5186-.BD...-4CA1	13.5	136	29.5	9.0	88	23.5	12.0	118	27.0
18.5	978	1MD5206-.BD...-4CA1	17.0	168	34.0	11.0	109	25.0	14.5	145	30.5
22	978	1MD5208-.BD...-4CA1	20	199	40.0	13.0	130	31.5	17.5	173	36.5
30	980	1MD5223-.BD...-4CA1	27	271	54	19.5	190	40.5	24	239	48.5
37	982	1MD5253-.BD...-4CA1	34	334	65	24	235	49.0	30	295	59
45	985	1MD5280-.BD...-4CA1	41	404	78	29	285	59	36	357	70
55	985	1MD5283-.BD...-4CA1	51	494	92	36	348	69	45	436	83
75	988	1MD5311-.BD...-4CA1	69	672	130	49	475	99	61	594	117
90	988	1MD5313-.BD...-4CA1	82	806	154	59	570	116	73	713	139
110	988	1MD5314-.BD...-4CA1	102	985	183	72	697	136	90	871	164
132	988	1MD5315-.BD...-4CA1	122	1183	220	86	836	164	108	1046	197
160	988	1MD5316-.BD...-4CA1	148	1433	265	104	1013	200	130	1267	240
200	990	1MD5317-.BD...-4CA1	184	1788	345	130	1267	270	164	1582	315
280	993	1MD5353-.BD...-4CA1	255	2496	485	184	1773	370	230	2210	440
315	993	1MD5355-.BD...-4CA1	290	2808	530	205	1994	405	255	2486	485
360	994	1MD5357-.BD...-4CA1	330	3206	610	235	2279	470	295	2839	550

For SIMOTICS XP type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** and with frame size 315 and above Option **L27** (insulated bearing, fan side). Infeed via the converter with peak voltage in accordance with IEC 60034-25:2007 Curve A (1560 V).

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A
<b>SIMOTICS XP 1MD5 motors (Ex de)</b>											
<b>Utilization of the winding according to F (155 °C)</b>											
<b>Converter infeed with extremely motor-friendly output signal and slightly reduced rated voltage at the motor terminal (modulation depth &lt; 1)</b>											
<b>Valid, for example, for SINAMICS G120 PM230, SINAMICS G120 PM240, SINAMICS G130, SINAMICS S120</b>											
<b>2-pole: 3000 rpm at 50 Hz</b>											
0.37	2840	1MD5070-.BD...-4AA1	0.36	1.21	0.98	0.23	0.758	0.77	0.31	1.04	0.90
0.55	2835	1MD5071-.BD...-4AA1	0.50	1.81	1.41	0.34	1.13	1.03	0.46	1.55	1.26
0.75	2805	1MD5080-.BD...-4AA1	0.70	2.50	1.65	0.46	1.53	1.21	0.60	2.13	1.47
1.1	2835	1MD5081-.BD...-4AA1	1.05	3.63	2.35	0.65	2.26	1.77	0.90	3.10	2.10
1.5	2885	1MD5095-.BD...-4AA1	1.4	4.85	3.10	0.90	3.09	2.45	1.2	4.18	2.85
2.2	2890	1MD5098-.BD...-4AA1	2.1	7.1	4.40	1.3	4.55	3.50	1.8	6.2	4.10
3	2905	1MD5106-.BD...-4AA1	2.9	9.7	6.0	1.9	6.2	4.40	2.5	8.4	5.4
4	2950	1MD5113-.BD...-4AA1	3.9	12.6	7.6	2.5	8.2	5.5	3.3	10.9	6.8
5.5	2950	1MD5131-.BD...-4AA1	5.3	17.4	10.3	3.5	11.4	7.5	4.6	15.1	9.2
7.5	2950	1MD5132-.BD...-4AA1	7.0	23.8	13.9	4.8	15.5	10.0	6.0	20.6	12.3
11	2955	1MD5163-.BD...-4AA1	10.5	34.7	20.0	7.0	22.7	14.5	9.0	30.1	17.9
15	2955	1MD5165-.BD...-4AA1	14.5	47.5	26.5	9.5	31.1	19.0	12.5	41.2	23.5
18.5	2955	1MD5166-.BD...-4AA1	18.0	59	33.0	11.5	38.4	23.0	15.5	51	29.0
22	2940	1MD5183-.BD...-4AA1	21	69	39.0	14.0	45.2	27.5	18.5	60	34.5
30	2955	1MD5206-.BD...-4AA1	29	95	53	19.0	62	37.0	25	82	46.5
37	2960	1MD5208-.BD...-4AA1	36	116	64	23	76	45.0	31	101	57
45	2965	1MD5223-.BD...-4AA1	44	142	78	31	100	58	39	125	69
55	2970	1MD5253-.BD...-4AA1	53	173	94	38	123	70	47	153	84
75	2978	1MD5280-.BD...-4AA1	73	235	131	52	167	99	64	208	118
90	2975	1MD5283-.BD...-4AA1	88	283	154	62	201	114	78	250	138
110	2982	1MD5311-.BD...-4AA1	106	344	183	76	245	134	94	305	164
132	2982	1MD5313-.BD...-4AA1	128	414	215	92	294	156	114	367	192
160	2982	1MD5315-.BD...-4AA1	156	501	260	110	356	188	138	444	230
200	2982	1MD5316-.BD...-4AA1	194	626	325	138	445	235	172	555	290
250	2985	1MD5318-.BD...-4AA1	240	783	405	174	557	295	215	693	360
315	2984	1MD5353-.BD...-4AA1	245	799	440	178	569	330	220	708	395
360	2984	1MD5355-.BD...-4AA1	285	913	495	200	650	365	250	809	440
460	2985	1MD5357-.BD...-4AA1	365	1167	620	260	831	465	320	1034	560

For SIMOTICS XP type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** and with frame size 315 and above Option **L27** (insulated bearing, fan side). Infeed via the converter with peak voltage in accordance with IEC 60034-25:2007 Curve A (1560 V).

## Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 $T = \text{constant}$			Setting range 1:3 $T = \text{constant}$		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A
<b>SIMOTICS XP 1MD5 motors (Ex de)</b>											
<b>Utilization of the winding according to F (155 °C)</b>											
<b>Converter infeed with extremely motor-friendly output signal and slightly reduced rated voltage at the motor terminal (modulation depth &lt; 1)</b>											
<b>Valid, for example, for SINAMICS G120 PM230, SINAMICS G120 PM240, SINAMICS G130, SINAMICS S120</b>											
<b>4-pole: 1500 rpm at 50 Hz</b>											
0.25	1410	1MD5070-.BD...-4BA1	0.24	1.65	0.81	0.15	1.02	0.72	0.21	1.41	0.77
0.37	1385	1MD5071-.BD...-4BA1	0.36	2.50	1.00	0.22	1.51	0.88	0.31	2.12	0.95
0.55	1440	1MD5080-.BD...-4BA1	0.50	3.57	1.36	0.34	2.27	1.14	0.46	3.07	1.27
0.75	1440	1MD5081-.BD...-4BA1	0.70	4.86	1.77	0.47	3.09	1.43	0.60	4.18	1.63
1.1	1425	1MD5095-.BD...-4BA1	1.05	7.2	2.45	0.65	4.54	1.99	0.90	6.2	2.25
1.5	1435	1MD5098-.BD...-4BA1	1.4	9.8	3.25	0.90	6.2	2.60	1.2	8.4	3.00
2.2	1455	1MD5106-.BD...-4BA1	2.1	14.1	4.60	1.3	9.1	3.45	1.8	12.2	4.10
3	1455	1MD5108-.BD...-4BA1	2.9	19.3	6.1	1.9	12.4	4.50	2.5	16.6	5.5
4	1460	1MD5113-.BD...-4BA1	3.9	25.6	8.1	2.5	16.5	6.3	3.4	22.2	7.4
5.5	1465	1MD5131-.BD...-4BA1	5.3	35.1	11.1	3.5	22.8	8.3	4.6	30.4	10.0
7.5	1465	1MD5133-.BD...-4BA1	7.0	47.8	14.4	4.7	31.0	10.4	6.0	41.4	12.9
11	1470	1MD5163-.BD...-4BA1	10.5	69	20.5	7.0	45.2	15.2	9.0	60	18.4
15	1475	1MD5166-.BD...-4BA1	14.5	95	27.5	9.5	62	20.0	12.5	82	24.5
18.5	1465	1MD5183-.BD...-4BA1	18.0	118	34.5	11.5	77	24.5	15.5	102	30.5
22	1465	1MD5186-.BD...-4BA1	21	140	41.0	14.0	91	30.0	18.5	121	36.5
30	1470	1MD5206-.BD...-4BA1	29	191	55	19.0	124	39.5	25	165	49.0
37	1470	1MD5220-.BD...-4BA1	36	235	64	25	165	47.0	31	207	57
45	1475	1MD5223-.BD...-4BA1	43	285	79	31	200	58	38	251	70
55	1480	1MD5253-.BD...-4BA1	53	347	98	38	245	74	47	307	88
75	1485	1MD5280-.BD...-4BA1	73	472	129	52	334	96	64	417	116
90	1486	1MD5283-.BD...-4BA1	88	566	156	62	401	117	76	500	140
110	1490	1MD5311-.BD...-4BA1	106	690	191	76	490	144	94	611	172
132	1490	1MD5313-.BD...-4BA1	128	828	225	90	588	168	114	733	200
160	1490	1MD5315-.BD...-4BA1	156	1003	275	110	712	205	138	888	245
200	1490	1MD5316-.BD...-4BA1	194	1254	345	138	891	255	172	1111	310
250	1487	1MD5317-.BD...-4BA1	240	1570	425	172	1113	325	215	1390	385
315	1488	1MD5353-.BD...-4BA1	250	1603	455	178	1138	350	220	1419	415
360	1488	1MD5355-.BD...-4BA1	285	1831	520	200	1301	400	250	1621	470
460	1488	1MD5357-.BD...-4BA1	365	2340	650	255	1662	495	320	2072	590

For SIMOTICS XP type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** and with frame size 315 and above Option **L27** (insulated bearing, fan side). Infeed via the converter with peak voltage in accordance with IEC 60034-25:2007 Curve A (1560 V).

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A
<b>SIMOTICS XP 1MD5 motors (Ex de)</b>											
<b>Utilization of the winding according to F (155 °C)</b>											
<b>Converter infeed with extremely motor-friendly output signal and slightly reduced rated voltage at the motor terminal (modulation depth &lt; 1)</b>											
<b>Valid, for example, for SINAMICS G120 PM230, SINAMICS G120 PM240, SINAMICS G130, SINAMICS S120</b>											
<b>6-pole: 1000 rpm at 50 Hz</b>											
0.25	860	1MD5070-.BD...-4CA1	0.24	2.72	0.77	0.14	1.50	0.76	0.20	2.24	0.76
0.37	925	1MD5080-.BD...-4CA1	0.36	3.74	1.06	0.22	2.27	0.91	0.31	3.17	1.00
0.55	930	1MD5081-.BD...-4CA1	0.50	5.5	1.62	0.33	3.35	1.37	0.45	4.66	1.51
0.75	935	1MD5095-.BD...-4CA1	0.70	7.5	2.00	0.46	4.63	1.66	0.60	6.4	1.87
1.1	935	1MD5098-.BD...-4CA1	1.05	11.0	2.85	0.65	6.7	2.30	0.90	9.3	2.65
1.5	970	1MD5106-.BD...-4CA1	1.4	14.5	3.65	0.95	9.3	2.90	1.2	12.5	3.35
2.2	965	1MD5113-.BD...-4CA1	2.1	21.3	5.1	1.3	13.6	4.00	1.8	18.4	4.65
3	970	1MD5131-.BD...-4CA1	2.9	28.9	6.9	1.9	18.6	5.5	2.5	24.9	6.3
4	970	1MD5133-.BD...-4CA1	3.9	38.6	8.6	2.5	24.8	6.5	3.3	33.3	7.7
5.5	970	1MD5135-.BD...-4CA1	5.3	53	11.8	3.4	34.0	9.0	4.6	45.6	10.7
7.5	975	1MD5163-.BD...-4CA1	7.0	71	15.8	4.7	46.2	12.0	6.0	62	14.3
11	975	1MD5166-.BD...-4CA1	10.5	106	22.0	7.0	68	16.2	9.0	91	19.7
15	975	1MD5186-.BD...-4CA1	14.5	144	30.5	9.5	93	24.0	12.5	124	28.0
18.5	978	1MD5206-.BD...-4CA1	18.0	177	35.5	11.5	115	26.0	15.5	153	31.5
22	978	1MD5208-.BD...-4CA1	21	210	42.0	14.0	137	32.0	18.5	182	38.0
30	980	1MD5223-.BD...-4CA1	29	286	56	20	200	42.0	25	252	50
37	982	1MD5253-.BD...-4CA1	36	352	69	25	247	51	32	311	62
45	985	1MD5280-.BD...-4CA1	44	427	82	31	301	61	38	377	73
55	985	1MD5283-.BD...-4CA1	53	522	97	38	367	72	47	461	87
75	988	1MD5311-.BD...-4CA1	73	709	135	52	501	103	64	627	122
90	988	1MD5313-.BD...-4CA1	88	851	162	62	601	121	76	753	146
110	988	1MD5314-.BD...-4CA1	106	1040	192	76	735	142	94	920	172
132	988	1MD5315-.BD...-4CA1	128	1249	230	90	882	171	114	1104	205
160	988	1MD5316-.BD...-4CA1	156	1513	280	110	1069	210	138	1337	250
200	990	1MD5317-.BD...-4CA1	194	1888	360	138	1336	280	172	1670	325
280	993	1MD5353-.BD...-4CA1	220	2134	430	158	1517	335	196	1890	390
315	993	1MD5355-.BD...-4CA1	250	2401	470	178	1707	365	220	2126	425
360	994	1MD5357-.BD...-4CA1	285	2741	540	200	1950	420	250	2428	490

For SIMOTICS XP type series, PTC thermistor must be selected for sole protection of the winding with Option **A15** and with frame size 315 and above Option **L27** (insulated bearing, fan side). Infeed via the converter with peak voltage in accordance with IEC 60034-25:2007 Curve A (1560 V).

**Overview (continued)**

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
Mains	Mains		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A	kW	Nm	A

**LOHER CHEMSTAR/VARIO 1PS0 motors (non Ex)****Utilization of the winding according to B (130 °C)****Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)****Valid, for example, for SINAMICS G180**

2-pole: 3000 rpm at 50 Hz

**LOHER CHEMSTAR 1PS0 motors**

1.5	2865	1PS 0 095-1BD...-4AA3	1.6	5.7	3.30	1.05	3.53	2.20	1.2	4.24	2.55	1.4	4.85	2.85
2.2	2845	1PS 0 098-1BD...-4AA3	2.4	8.3	4.80	1.5	5.2	3.35	1.8	6.2	3.80	2.1	7.1	4.25
3	2900	1PS 0 106-1BD...-4AA3	3.3	11.2	6.4	2.1	7.1	4.55	2.5	8.5	5.1	2.9	9.6	5.7
4	2890	1PS 0 113-1BD...-4AA3	4.4	14.9	8.1	2.8	9.5	5.3	3.4	11.3	6.2	3.8	12.8	7.0
5.5	2910	1PS 0 131-1BD...-4AA3	6.0	20.4	11.2	4.0	13.0	7.5	4.7	15.5	8.7	5.3	17.6	9.8
7.5	2910	1PS 0 132-1BD...-4AA3	8.0	27.8	14.9	5.4	17.8	9.9	6.0	21.1	11.5	7.0	24.0	13.0
11	2955	1PS 0 163-1BD...-4AA3	12.0	40.2	22.0	8.0	26.2	14.8	9.5	30.9	17.1	10.5	34.8	19.1
15	2955	1PS 0 165-1BD...-4AA3	16.5	55	30.0	11.0	35.8	20.0	13.0	42.1	23.0	14.5	47.5	26.0
18.5	2955	1PS 0 166-1BD...-4AA3	20	67	36.5	13.5	44.1	24.5	16.0	52	28.5	18.0	59	32.0
22	2960	1PS 0 183-1BD...-4AA3	24	80	42.5	16.0	52	29.0	19.0	62	33.5	21	70	37.5
30	2955	1PS 0 206-1BD...-4AA3	33	109	58	22	72	39.5	26	84	46.0	29	95	51
37	2960	1PS 0 208-1BD...-4AA3	39	127	68	26	83	46.0	30	98	53	34	110	60
45	2965	1PS 0 223-1BD...-4AA3	47	154	84	34	109	61	38	124	69	42	136	75
55	2975	1PS 0 253-1BD...-4AA3	55	178	99	39	126	74	44	143	82	49	157	89
75	2980	1PS 0 280-1BD...-4AA3	84	272	143	60	193	104	68	218	116	74	240	127
90	2980	1PS 0 283-1BD...-4AA3	100	326	171	72	231	124	80	262	139	90	289	152
110	2980	1PS 0 311-1BD...-4AA3	116	376	200	82	267	148	94	302	165	102	332	180
132	2980	1PS 0 313-1BD...-4AA3	126	408	220	90	290	160	102	329	179	112	362	195
160	2980	1PS 0 315-1BD...-4AA3	154	495	260	108	352	192	124	398	215	136	438	235
200	2980	1PS 0 316-1BD...-4AA3	184	594	315	132	422	230	148	478	260	164	526	285
250	2985	1PS 0 318-1BD...-4AA3	230	741	390	164	528	285	186	597	320	205	657	350

**LOHER VARIO 1PS0 motors**

315	2981	1PS 0 356-1BH...-4AA0	300	960	510	218	695	390	245	781	430	269	855	460
355	2982	1PS 0 357-1BH...-4AA0	335	1080	550	238	758	400	272	866	450	301	957	490
400	2984	1PS 0 358-1BH...-4AA0	380	1220	630	281	894	470	316	1006	530	346	1100	570
450	2977	1PS 0 358-1BJ...-4AA0	430	1370	710	301	959	510	346	1102	580	384	1221	630
500	2981	1PS 0 405-1BJ...-4AA0	475	1520	780	348	1107	580	394	1253	650	432	1374	710
560	2982	1PS 0 407-1BJ...-4AA0	530	1700	870	385	1226	650	439	1396	730	482	1534	790
630	2983	1PS 0 408-1BJ...-4AA0	600	1920	990	435	1385	730	496	1578	820	545	1735	900
710	2985	1PS 0 455-1BJ...-4AA0	670	2150	1110	493	1571	830	560	1782	930	614	1953	1010
800	2985	1PS 0 457-1BJ...-4AA0	760	2450	1260	560	1782	940	637	2028	1060	699	2225	1150
900	2984	1PS 0 458-1BJ...-4AA0	860	2750	1410	637	2028	1060	721	2295	1190	788	2510	1290

## Introduction

### General technical specifications

#### Converter-fed operation – Special mechanical characteristics

##### Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A	kW	Nm	A

##### LOHER CHEMSTAR/VARIO 1PS0 motors (non Ex)

##### Utilization of the winding according to B (130 °C)

Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)

Valid, for example, for SINAMICS G180

4-pole: 1500 rpm at 50 Hz

##### LOHER CHEMSTAR 1PS0 motors

1.1	1460	1PS 0 095-1BD...-4BA3	1.2	8.1	2.35	0.80	5.2	1.71	0.95	6.2	1.92	1.05	7.0	2.10
1.5	1460	1PS 0 098-1BD...-4BA3	1.6	11.1	3.35	1.05	7.1	2.55	1.2	8.4	2.80	1.4	9.6	3.05
2.2	1450	1PS 0 106-1BD...-4BA3	2.4	16.3	4.85	1.6	10.4	3.45	1.8	12.4	3.90	2.1	14.1	4.30
3	1455	1PS 0 108-1BD...-4BA3	3.3	22.3	6.8	2.1	14.2	5.2	2.5	16.9	5.7	2.9	19.2	6.2
4	1460	1PS 0 113-1BD...-4BA3	4.5	29.6	8.5	2.9	19.0	6.1	3.4	22.5	6.8	3.9	25.5	7.5
5.5	1455	1PS 0 131-1BD...-4BA3	6.0	40.8	11.7	4.0	26.1	8.1	4.7	31.0	9.3	5.3	35.2	10.3
7.5	1470	1PS 0 133-1BD...-4BA3	8.0	55	15.7	5.5	35.7	11.5	6.5	42.2	12.9	7.0	47.7	14.1
11	1460	1PS 0 163-1BD...-4BA3	12.0	81	23.5	8.0	52	16.3	9.5	62	18.6	10.5	70	20.5
15	1460	1PS 0 166-1BD...-4BA3	16.5	110	31.0	11.0	71	22.0	13.0	84	25.0	14.5	95	27.5
18.5	1470	1PS 0 183-1BD...-4BA3	20	135	38.0	13.5	88	26.0	16.0	104	30.0	18.0	117	33.5
22	1470	1PS 0 186-1BD...-4BA3	24	161	44.5	16.0	105	31.0	19.0	124	35.5	21	139	39.5
30	1470	1PS 0 206-1BD...-4BA3	33	219	61	22	143	43.5	26	168	49.0	29	190	54
37	1480	1PS 0 220-1BD...-4BA3	41	270	74	29	190	56	33	216	62	36	238	67
45	1480	1PS 0 223-1BD...-4BA3	50	328	90	35	231	67	40	263	74	44	290	81
55	1480	1PS 0 253-1BD...-4BA3	55	358	99	39	252	74	44	286	82	49	316	89
75	1480	1PS 0 280-1BD...-4BA3	84	545	151	60	385	113	68	437	125	74	482	136
90	1480	1PS 0 283-1BD...-4BA3	94	617	170	68	436	127	76	495	141	84	545	153
110	1485	1PS 0 311-1BD...-4BA3	110	711	205	78	504	158	88	572	173	98	630	187
132	1485	1PS 0 313-1BD...-4BA3	132	854	240	94	605	183	106	686	200	116	755	220
160	1485	1PS 0 315-1BD...-4BA3	154	992	275	108	703	210	124	797	230	136	878	250
200	1488	1PS 0 316-1BD...-4BA3	184	1191	335	130	844	255	148	957	280	164	1054	300
250	1487	1PS 0 317-1BD...-4BA3	230	1487	415	164	1055	315	186	1196	350	205	1316	375

##### LOHER VARIO 1PS0 motors

280	1484	1PS 0 356-1BH...-4BA0	265	1710	470	200	1275	370	225	1432	410	245	1560	440
315	1489	1PS 0 357-1BH...-4BA0	300	1920	530	225	1434	410	253	1610	450	275	1754	490
355	1490	1PS 0 358-1BH...-4BA0	335	2150	590	254	1615	460	284	1811	510	309	1969	540
400	1491	1PS 0 350-1BH...-4BA0	380	2450	670	288	1831	520	323	2059	570	352	2243	620
450	1491	1PS 0 357-1BJ...-4BA0	430	2750	760	322	2052	590	363	2311	650	396	2519	700
500	1492	1PS 0 358-1BJ...-4BA0	475	3050	840	359	2283	660	403	2569	730	439	2797	780
560	1492	1PS 0 405-1BJ...-4BA0	530	3400	910	401	2556	700	451	2872	780	491	3124	840
630	1492	1PS 0 407-1BJ...-4BA0	600	3850	1030	454	2890	800	511	3250	880	556	3537	950
710	1492	1PS 0 408-1BJ...-4BA0	670	4300	1140	510	3248	890	572	3644	990	622	3960	1060
800	1493	1PS 0 455-1BJ...-4BA0	760	4850	1290	576	3666	1010	646	4114	1110	702	4468	1200
900	1493	1PS 0 457-1BJ...-4BA0	860	5500	1460	651	4145	1130	732	4659	1250	796	5065	1350
950	1493	1PS 0 458-1BJ...-4BA0	900	5800	1540	687	4376	1200	772	4916	1320	839	5343	1430
1000	1494	1PS 0 504-1BJ...-4BA0	950	6100	1620	720	4582	1260	810	5158	1400	882	5613	1510
1120	1493	1PS 0 505-1BJ...-4BA0	1060	6800	1810	805	5128	1400	905	5764	1550	984	6266	1680



## Overview (continued)

$P_{rated}$	$n_{rated}$	Type	Setting range 1:10 $T \sim n^2$			Setting range 1:10 T = constant			Setting range 1:5 T = constant			Setting range 1:3 T = constant		
			Output	Torque	Current	Output	Torque	Current	Output	Torque	Current	Output	Torque	Current
50 Hz	50 Hz		50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V	50 Hz	50 Hz	400 V
kW	rpm		kW	Nm	A	kW	Nm	A	kW	Nm	A	kW	Nm	A
<b>LOHER CHEMSTAR/VARIO 1PS0 motors (non Ex)</b>														
<b>Utilization of the winding according to B (130 °C)</b>														
<b>Converter infeed with extremely motor-friendly output signal and full rated voltage at the motor terminal (modulation depth = 1)</b>														
<b>Valid, for example, for SINAMICS G180</b>														
6-pole: 1000 rpm at 50 Hz														
<b>LOHER CHEMSTAR 1PS0 motors</b>														
0.75	960	1PS 0 095-1BD...-4CA0	0.80	8.4	2.00	0.50	5.3	1.62	0.60	6.3	1.74	0.70	7.2	1.85
1.1	950	1PS 0 098-1BD...-4CA0	1.2	12.5	3.00	0.75	7.8	2.45	0.90	9.3	2.60	1.05	10.7	2.75
1.5	955	1PS 0 106-1BD...-4CA0	1.6	17.0	4.20	1.05	10.6	3.60	1.2	12.7	3.75	1.4	14.5	3.95
2.2	950	1PS 0 113-1BD...-4CA0	2.4	25.0	5.6	1.5	15.5	4.30	1.8	18.6	4.70	2.1	21.4	5.1
3	955	1PS 0 131-1BD...-4CA0	3.3	34.1	7.0	2.1	21.2	5.1	2.5	25.4	5.7	2.9	29.1	6.2
4	955	1PS 0 133-1BD...-4CA0	4.4	45.2	9.1	2.8	28.3	6.4	3.4	33.9	7.2	3.8	38.7	8.0
5.5	955	1PS 0 135-1BD...-4CA0	5.5	55	12.1	3.5	34.9	9.3	4.2	41.7	10.1	4.7	47.5	10.9
7.5	965	1PS 0 163-1BD...-4CA3	8.0	84	16.8	5.4	53	12.2	6.0	63	13.6	7.0	72	15.0
11	970	1PS 0 166-1BD...-4CA3	12.0	122	24.0	8.0	78	17.7	9.0	93	19.8	10.5	106	21.5
15	980	1PS 0 186-1BD...-4CA3	16.5	165	32.0	11.0	107	23.0	13.0	126	26.0	14.5	143	28.5
18.5	980	1PS 0 206-1BD...-4CA3	20	204	40.5	13.5	132	28.5	16.0	156	32.5	18.0	177	36.0
22	980	1PS 0 208-1BD...-4CA3	23	229	46.0	15.0	148	33.0	17.5	175	37.0	20	198	41.0
30	985	1PS 0 223-1BD...-4CA3	33	329	63	23	231	47.5	27	263	53	29	290	57
37	985	1PS 0 253-1BD...-4CA3	39	382	75	27	269	58	31	306	63	34	337	68
45	985	1PS 0 280-1BD...-4CA3	50	491	92	36	347	70	40	394	77	44	434	83
55	990	1PS 0 283-1BD...-4CA3	62	601	112	43	424	84	49	481	93	54	531	101
75	990	1PS 0 311-1BD...-4CA3	84	818	148	60	578	110	68	656	122	74	723	133
90	990	1PS 0 313-1BD...-4CA3	100	981	180	72	694	133	80	787	148	88	868	161
110	990	1PS 0 314-1BD...-4CA3	124	1199	215	88	848	158	98	962	177	108	1061	193
132	990	1PS 0 315-1BD...-4CA3	132	1283	235	94	908	176	106	1030	195	116	1135	210
160	990	1PS 0 316-1BD...-4CA3	154	1490	270	108	1055	200	124	1196	225	136	1318	245
200	990	1PS 0 317-1BD...-4CA3	184	1788	340	130	1267	260	148	1436	285	164	1582	305
<b>LOHER VARIO 1PS0 motors</b>														
225	993	1PS 0 353-1BH...-4CA0	215	2050	390	161	1540	310	181	1726	330	197	1877	360
250	994	1PS 0 356-1BH...-4CA0	235	2300	430	180	1718	340	202	1932	370	220	2104	400
280	993	1PS 0 357-1BH...-4CA0	265	2550	470	200	1907	370	225	2145	410	245	2336	440
315	994	1PS 0 358-1BH...-4CA0	300	2900	540	226	2156	430	255	2432	470	278	2654	500
355	993	1PS 0 357-1BJ...-4CA0	335	3250	600	257	2453	470	288	2751	520	313	2989	560
400	992	1PS 0 358-1BJ...-4CA0	380	3650	690	272	2602	520	313	2994	580	346	3306	630
450	994	1PS 0 405-1BJ...-4CA0	425	4100	770	325	3102	600	364	3478	660	396	3777	710
500	994	1PS 0 407-1BJ...-4CA0	475	4550	850	360	3436	670	404	3857	740	439	4191	790
560	995	1PS 0 453-1BJ...-4CA0	530	5100	940	404	3854	740	453	4326	810	492	4699	870
630	995	1PS 0 455-1BJ...-4CA0	600	5700	1050	452	4315	830	507	4841	910	550	5256	980
710	995	1PS 0 457-1BJ...-4CA0	670	6500	1190	515	4921	940	578	5522	1030	628	5996	1110
800	995	1PS 0 458-1BJ...-4CA0	740	7100	1320	569	5430	1060	635	6067	1160	688	6570	1240
900	995	1PS 0 505-1BJ...-4CA0	860	8200	1510	651	6219	1180	730	6976	1300	793	7572	1400
1000	995	1PS 0 507-1BJ...-4CA0	950	9100	1670	721	6887	1310	810	7733	1440	880	8399	1550

For LOHER CHEMSTAR 1PS0 type series, PTC thermistor must be selected for protection of the winding with Option **A11** or **A12** and with frame size 315 and above Option **L27** (insulated bearing, fan side).

For LOHER VARIO type series and welded steel *types 355LC, 355LD*, without further options, sole winding protection is implemented with 3 PTC thermistors for winding and bearing insulation at the fan side.

The current values specified in the lists are calculated for 400 V.

# Introduction

## General technical specifications

### Technical definitions for pole-changing motors

1

#### Overview

##### General information

Mechanically, all pole-changing motors correspond to the single-speed motors. Pole-changing motors in frame size 225 and above of the 2-pole level have the same bearings and the same shaft extensions as the corresponding frame sizes of the single-speed 2-pole motors.

##### Voltage and frequency

The pole-changing motors in this catalog are supplied for the following voltages in 50 Hz supply systems: 400 V, 500 V or 690 V.

Within the range of these voltages, motors can be supplied with abnormal windings for any rated voltage required. For rated voltages below 400 V as well as different frequencies, it is essential to inquire.

##### Output

The outputs specified in the selection tables apply to duty type S1 according to EN 60034-1.

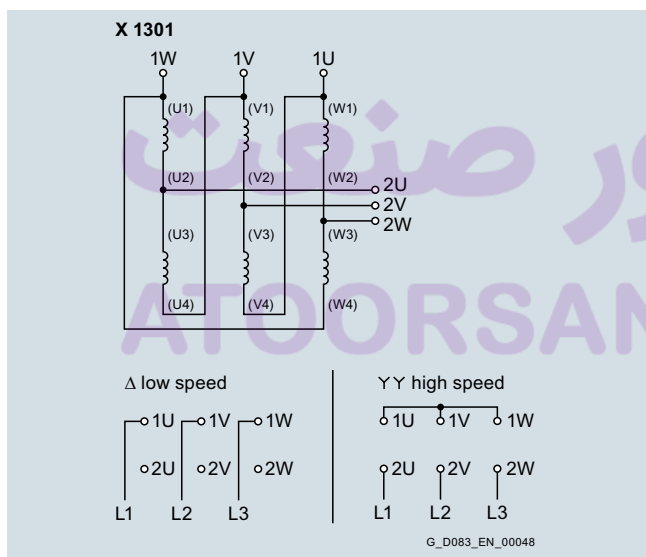
With regard to coolant temperatures above 40 °C and site altitudes above 1000 m above sea level, the same points apply as for single-speed motors.

##### Circuit diagrams for two speeds

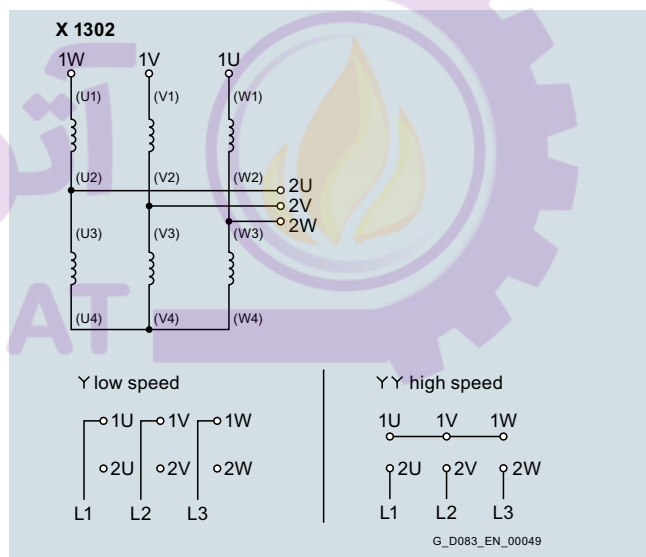
##### Torque

The pole-changing motors can be started up from standstill whatever the number of poles. In the output tables, the starting torques are specified for direct switch-on and the rotor classes. The high speed levels can have pull-up torques; so where possible start-up must be performed at the lower speed levels. Starting is improved as a result, and with heavy starting the temperature rise is reduced.

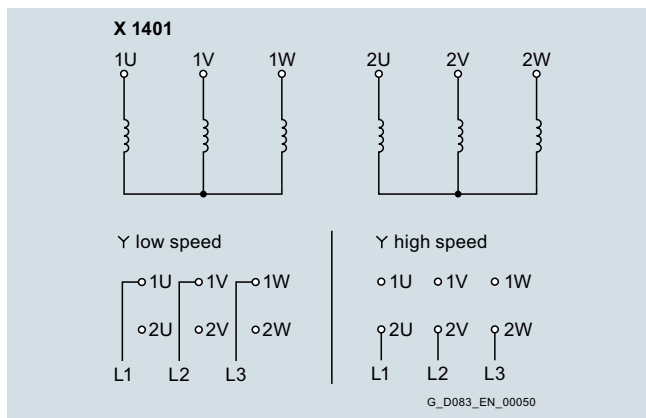
The pole-changing motors included in the output tables are supplied for 2 or 3 fixed speed levels. If output levels are required other than those listed in the catalog, the motors in Dahlander circuits can also be supplied with 2 separate windings. The output will, however, be considerably lower than for a motor with a Dahlander circuit. The following variants are available:



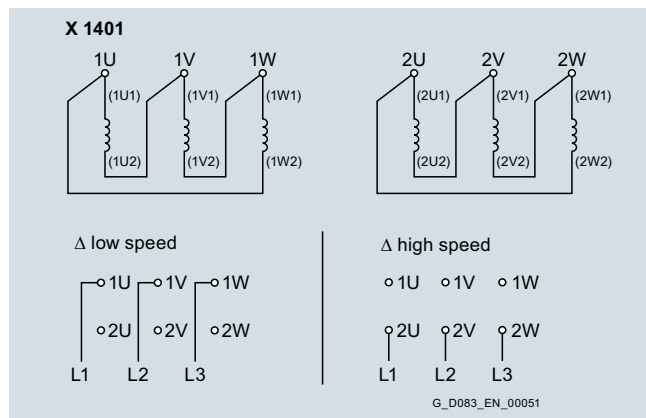
Speed ratio 1:2; 1 winding (Dahlander) circuit Δ/YY for constant torque 4-/2-, 8-/4- and 12-/6-pole



Speed ratio 1:2; 1 winding (Dahlander) circuit Y/YY for torque that reduces in accordance with the square law (fan drive) 4-/2-pole, 8-/4-pole and 12-/6-pole



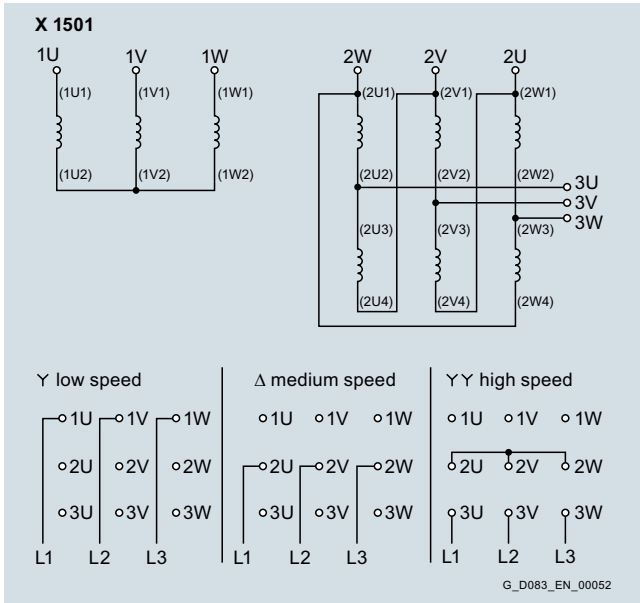
Speed ratio 1:1.5 and 1:1.33; 2 separate windings in Y/Y or Y/Δ or Δ/Y circuit for constant torque 6-/4-pole and 8-/6-pole, for torque that reduces in accordance with the square law 6-/4-pole and 8-/6-pole



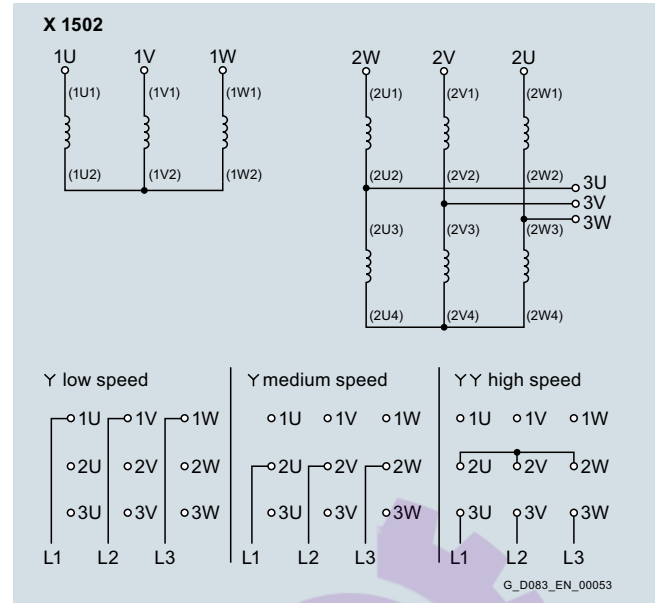
Speed ratio 1:1.5 and 1:1.33; 2 separate windings in Δ/Δ or Y/Δ or Δ/Y circuit for constant torque 6-/4-pole and 8-/6-pole, for torque that reduces in accordance with the square law 6-/4-pole and 8-/6-pole

Overview (continued)

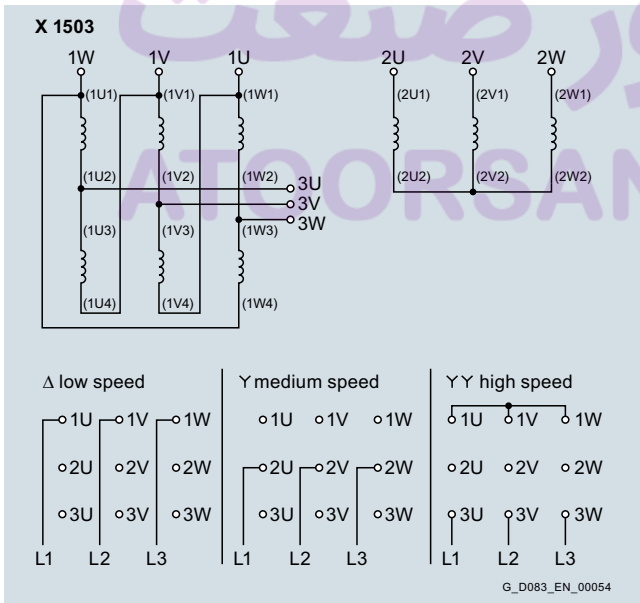
Circuit diagrams for three speeds



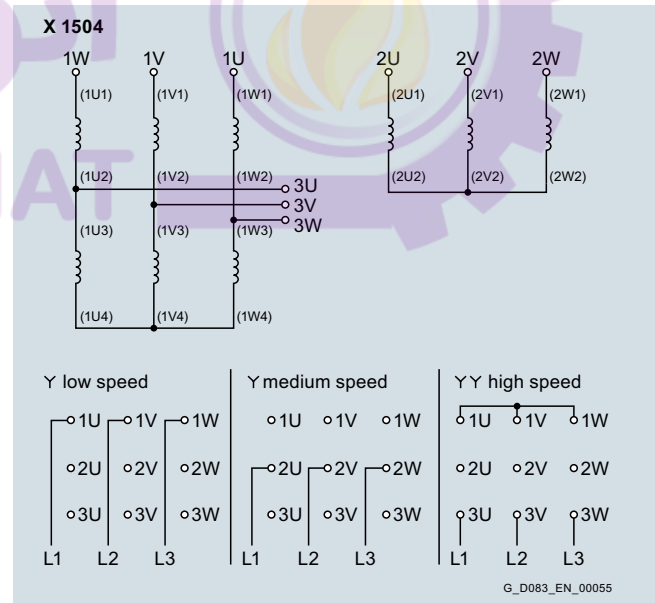
Speed ratio 1:2:4; Dahlander circuit, 4-/2-pole, separate winding 8-pole, Y/Δ/YY circuit – 2 separate windings also possible in Δ circuit for constant torque 8-/4-/2-pole



Speed ratio 1:2:4; Dahlander circuit, 4-/2-pole, separate winding 8-pole, Y/Y/YY circuit – 2 separate windings also possible in Δ circuit for torque that reduces in accordance with the square law (fan drive) 8-/4-/2-pole



Speed ratio 1:1.33:2; Dahlander circuit, 8-/4-pole, separate winding 6-pole, Y/Δ/YY circuit – 2 separate windings also possible in Δ circuit for constant torque 8-/6-/4-pole



Speed ratio 1:1.33:2; Dahlander circuit, 8-/4-pole, separate winding 6-pole, Y/Y/YY circuit – 2 separate windings also possible in Δ circuit for torque that reduces in accordance with the square law (fan drive) 8-/6-/4-pole

## Introduction

General technical specifications

Notes



## Motors with Explosion Protection

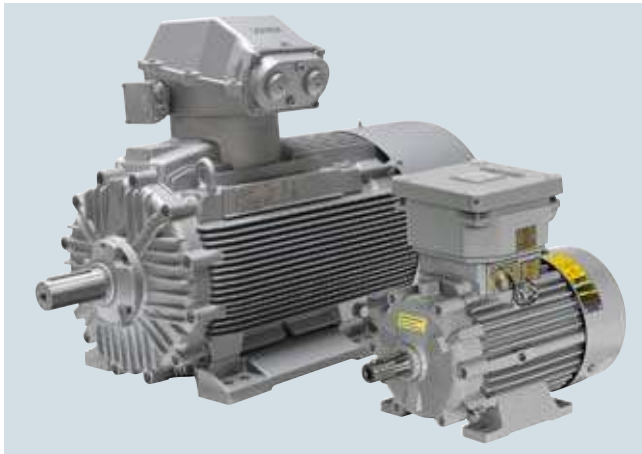


<a href="#">2/2</a>	<b>Orientation</b>	<a href="#">2/36</a>	<a href="#">Motors in cast-iron and steel versions</a>
<a href="#">2/2</a>	Overview	<a href="#">2/36</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/2</a>	• Classification of zones	<a href="#">2/42</a>	<a href="#">Motors with High Efficiency IE2 in cast-iron and steel versions</a>
<a href="#">2/3</a>	• Hazardous areas	<a href="#">2/42</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/4</a>	• Types of protection	<a href="#">2/45</a>	<a href="#">Pole-changing motors in cast-iron and steel versions</a>
<a href="#">2/5</a>	• Overview of standards for explosion protection	<a href="#">2/45</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/5</a>	• Device marking	<a href="#">2/53</a>	<a href="#">Brake motors with High Efficiency IE2 in cast-iron and steel versions</a>
<a href="#">2/6</a>	• Temperature classes and groups	<a href="#">2/53</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/7</a>	• Operation of motors with type of protection "Dust explosion protection"	<a href="#">2/54</a>	<a href="#">Article No. supplements</a>
<a href="#">2/7</a>	• Maintaining explosion protection during normal operation	<a href="#">2/54</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/9</a>	<b>SIMOTICS XP 1MD5 motor series</b>	<a href="#">2/55</a>	<a href="#">Special versions</a>
<a href="#">2/9</a>	<a href="#">General information</a>	<a href="#">2/55</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/9</a>	<a href="#">Technical specifications</a>	<a href="#">2/69</a>	<a href="#">Dimensions for frame sizes 71 B to 250 M</a>
<a href="#">2/9</a>	• SIMOTICS XP 1MD5 motor series, type of protection "Explosion-proof enclosure"	<a href="#">2/69</a>	<a href="#">Dimensional drawings</a>
<a href="#">2/10</a>	• Mechanical design	<a href="#">2/71</a>	<a href="#">Dimensions for frame sizes 280 S to 355 M</a>
<a href="#">2/14</a>	• Electrical design	<a href="#">2/71</a>	<a href="#">Dimensional drawings</a>
<a href="#">2/15</a>	<a href="#">Motors in cast-iron version</a>	<a href="#">2/73</a>	<a href="#">Dimensions for frame sizes 355 L to 500 L</a>
<a href="#">2/15</a>	<a href="#">Selection and ordering data</a>	<a href="#">2/73</a>	<a href="#">Dimensional drawings</a>
<a href="#">2/18</a>	<a href="#">Article No. supplements</a>	<a href="#">2/75</a>	<a href="#">Flange dimensions</a>
<a href="#">2/18</a>	<a href="#">Selection and ordering data</a>	<a href="#">2/75</a>	<a href="#">Dimensional drawings</a>
<a href="#">2/19</a>	<a href="#">Special versions</a>	<a href="#">2/77</a>	<b>LOHER CHEMSTAR and VARIO 1PS1 motor series</b>
<a href="#">2/19</a>	<a href="#">Selection and ordering data</a>	<a href="#">2/77</a>	<a href="#">General information</a>
<a href="#">2/22</a>	<a href="#">Dimensions for frame sizes 71 B to 250 M</a>	<a href="#">2/77</a>	<a href="#">Technical specifications</a>
<a href="#">2/22</a>	<a href="#">Dimensional drawings</a>	<a href="#">2/77</a>	• LOHER CHEMSTAR and VARIO 1PS1 motor series, type of protection "Non-sparking"
<a href="#">2/24</a>	<a href="#">Dimensions for frame sizes 280 S to 355 M</a>	<a href="#">2/78</a>	• Mechanical design
<a href="#">2/24</a>	<a href="#">Dimensional drawings</a>	<a href="#">2/81</a>	• Electrical design
<a href="#">2/26</a>	<a href="#">Flange dimensions</a>	<a href="#">2/82</a>	<a href="#">Motors with High Efficiency IE2 in cast-iron and steel versions</a>
<a href="#">2/26</a>	<a href="#">Dimensional drawings</a>	<a href="#">2/82</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/27</a>	<b>LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series</b>	<a href="#">2/82</a>	<a href="#">Article No. supplements</a>
<a href="#">2/27</a>	<a href="#">General information</a>	<a href="#">2/91</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/27</a>	<a href="#">Technical specifications</a>	<a href="#">2/91</a>	<a href="#">Special versions</a>
<a href="#">2/27</a>	• LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series, type of protection "Explosion-proof enclosure"	<a href="#">2/92</a>	<a href="#">Selection and ordering data</a>
<a href="#">2/28</a>	• Mechanical design	<a href="#">2/104</a>	<a href="#">Dimensions for frame sizes 90 L to 250 M</a>
<a href="#">2/33</a>	• Electrical design	<a href="#">2/104</a>	<a href="#">Dimensional drawings</a>
<a href="#">2/33</a>	• Three-phase motors with external cables	<a href="#">2/106</a>	<a href="#">Dimensions for frame sizes 280 S to 355 L</a>
<a href="#">2/34</a>	• Motors with built-on backstop	<a href="#">2/106</a>	<a href="#">Dimensional drawings</a>
<a href="#">2/34</a>	• Axially-mounted forced ventilation	<a href="#">2/108</a>	<a href="#">Dimensions for frame sizes 355 L to 500 L</a>
<a href="#">2/35</a>	• Built-on single-disk spring-operated brake	<a href="#">2/108</a>	<a href="#">Dimensional drawings</a>
		<a href="#">2/110</a>	<a href="#">Flange dimensions</a>
		<a href="#">2/110</a>	<a href="#">Dimensional drawings</a>

## Motors with Explosion Protection

### Orientation

#### Overview



In many industrial and public sectors, explosion protection or explosion hazards are ever-present, e.g. in the chemicals industry, in refineries, on drilling platforms, at gas stations, in feed manufacturing and in sewage treatment plants.

The risk of explosion is always present when gases, fumes, mist or dust are mixed with oxygen in the air in an explosive ratio close to sources of ignition that are able to release the so-called minimum ignition energy.

In the chemical and petrochemical industries in particular, when crude oil and natural gas are transported, or in mining, milling (e.g. grain and granular solids), this can result in serious injury to persons and damage to equipment.

To ensure maximum safety in these areas, legislators in most countries have implemented appropriate stipulations in the form of laws and regulations based on national and international standards.

Explosion-protected equipment is designed such that an explosion can be prevented when it is used properly.

The explosion-protected equipment can be designed in accordance with various types of protection.

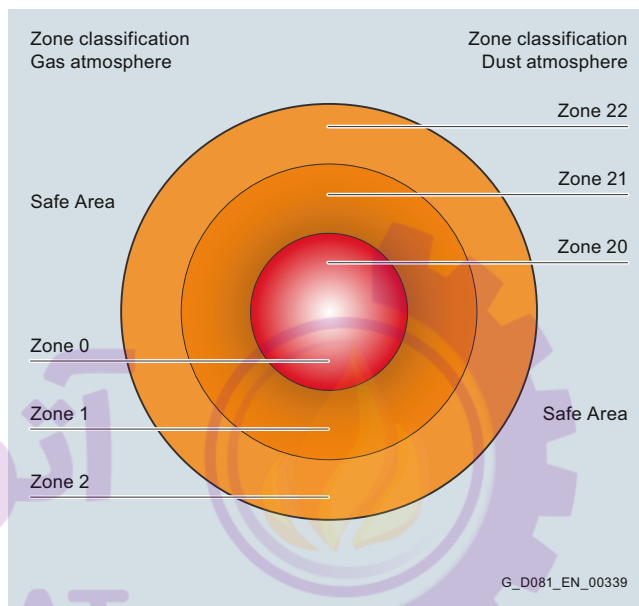
The local conditions must be subdivided into specified zones by the user with the assistance of the responsible authorities in accordance with the frequency of occurrence of an explosion hazard. Device (equipment) categories are assigned to these zones. The zones are then subdivided into possible types of protection and therefore into possible equipment (product) types.

#### Classification of zones

Areas subject to explosion hazard are divided into zones. Division into zones depends on the chronological and geographical probability of the presence of a hazardous, potentially explosive atmosphere. Information and specifications for classification of the zones are laid down in the following standards:

- IEC/EN 60079-10-1 for gas atmospheres
- IEC/EN 60079-10-2 for dust atmospheres

Further, a distinction is made between various explosion groups as well as temperature classes and these are included in the hazard assessment.



Depending on the particular zone and therefore the associated hazard, operating equipment must comply with defined minimum requirements regarding the type of protection. The different types of protection require corresponding measures to prevent ignition that should be implemented at the motor in order to prevent that a surrounding explosive atmosphere is ignited.

Zone	Zone definition acc. to		Assigned types of protection	Category according to 94/9/EC	Equipment protection level acc. to IEC/EN 60079-0
Gas 1) 2)	Dust 1) 2)	IEC/EN 60079-10-1 for gas atmospheres IEC/EN 60079-10-2 for dust atmospheres			
0	-	An area in which there is an explosive gas atmosphere <b>constantly, over a long period or frequently.</b>	Low voltage motors not permitted	1	Ga
1	-	An area in which it is expected that an explosive gas atmosphere will occur <b>occasionally</b> during normal operation.	Ex e Ex de Ex d	2	Gb
2	-	An area in which in normal operation it is expected that an explosive gas atmosphere will occur only <b>rarely</b> and then only <b>briefly.</b>	Ex nA	3	Gc
-	20	An area in which there is an explosive gas atmosphere comprising a dust-air mixture <b>constantly, over a long period or frequently.</b>	Low voltage motors not permitted	1	Da
-	21	An area in which it is expected that an explosive gas atmosphere comprising a dust-air mixture will occur <b>occasionally</b> during normal operation.	Ex tb	2	Db
-	22	An area in which in normal operation it is expected that an explosive gas atmosphere in the form of a cloud of flammable dust in air will occur only <b>rarely</b> and then only <b>briefly.</b>	Ex tc <sup>3)</sup>	3	Dc

1) Motors of  
- Zone 1 can also be used in Zone 2  
- Zone 21 can also be used in Zone 22

2) Motors which are certified for gas or dust protection must not be used in hybrid mixtures! Hybrid mixtures:  
When explosive gas and dust atmospheres occur simultaneously.

3) Motors are not approved for operation in environments containing conductive dust.

### Overview (continued)

#### Hazardous areas

Zone acc. to EN 60079-14	Explanations	Examples	Permissible electrical equipment	
			General	Motors
<b>Gases, vapors and mist</b>				
Zone 0	Areas in which there is an explosive gas atmosphere <u>constantly or over a long period</u> .	This normally only applies to the internal space of containers or apparatus.	Electrical equipment is only permitted to be used in Zone 0 which is explicitly certified for use in this zone.	Explosion-proof motors are not permitted to be used here whatever their type of protection. Exceptions can only be applied by the monitoring authorities.
Zone 1	Areas in which it is to be expected that a hazardous, potentially explosive atmosphere will only occur <u>occasionally</u> .	These include, for example: Close proximity to Zone 0, the internal space of equipment, close proximity to <ul style="list-style-type: none"> <li>• Feed openings</li> <li>• Filling and draining facilities</li> <li>• Fragile apparatus or pipes made of glass or ceramics, etc.</li> </ul>	Electrical equipment must be explosion-proof in accordance with one of the EN 60079-0 types of protection.	In Zone 1, explosion-proof motors must be used that have type of protection "Explosion-proof enclosure", "Increased safety" or "Pressurized enclosure".
Zone 2	Areas in which it is to be expected that a hazardous, potentially explosive atmosphere will occur <u>only rarely and then only for a short period</u> .	This may also include: Areas surrounding Zones 0 and 1. Areas surrounding flange connections with flat seals for pipes in closed rooms.		Explosion-proof motors in the type of protection "Non-sparking" Ex nA can be used in Zone 2.
<b>Dust</b>				
Zone 20	Areas in which a potentially explosive gaseous atmosphere in the form of a cloud of combustible dust is present <u>constantly over long periods, or frequently</u> .	This normally only applies to the internal space of apparatus (mills, dryers, mixers, pipelines, silos, etc.)	Electrical equipment is only permitted to be used in Zone 20 which is explicitly certified for use in this zone.	Explosion-proof motors are not permitted to be used here. Exceptions can only be applied by the monitoring authorities.
Zone 21	Areas in which a potentially explosive atmosphere in the form of a cloud of combustible dust is <u>occasionally present in normal operation</u> .	This zone may also include: Areas in the immediate vicinity of filling and draining stations and areas in which dust deposits build up that could occasionally result in an explosive mixture of combustible dust and air during normal operation		Motors with type of protection "Explosion-proof enclosure", "Increased safety" or "Non-sparking" can be used in Zone 21 provided that they comply with IP6x degree of protection and fulfill the requirements of EN 60079-0 and EN 60079-31.
Zone 22	Areas in which a dangerous explosive atmosphere in the form of a cloud in the air containing flammable dust <u>does not usually occur or occurs only briefly during normal operation</u> .	These may also include: Areas in the vicinity of apparatus when dust may be expelled from unsealed areas (e.g. mill rooms).		Motors without EC type-examination certificate (with EC Declaration of Conformity of the manufacturer) are also permitted to be used in Zone 22. For non-conductive dust, IP5x degree of protection must be implemented as a minimum and the requirements of EN 60079-0 and EN 60079-31 must be fulfilled. In the case of conductive dust, the requirements for Zone 21 apply.

#### Note:

The installation regulations of VDE 0118 apply to firedamp protection equipment. In mining, the areas are not subdivided into Zones.

#### Note I:

Layers, deposits and accumulations of combustible dust must be taken into consideration like any other possible cause of an explosive atmosphere.

#### Note II:

Normal operation refers to the state in which the equipment is used within its design parameters.

## Motors with Explosion Protection

### Orientation

#### Overview (continued)

##### Types of protection

###### Type of protection "Non-sparking" Ex nA acc. to IEC/EN 60079-15

For motors with type of protection "Non-sparking", the type of construction prevents the occurrence of arcing, sparks or hot surfaces during normal operation. Motors of this type of protection are occasionally located in a potentially explosive atmosphere whereby the atmosphere can achieve a level that poses a risk. These motors are assigned to device group II – category 3G (corresponding to Zone 2).

The LOHER CHEMSTAR and LOHER VARIO Ex nA series are generally certified for the highest class "IIC". They are marked in accordance with the EC directive (94/9/EC) with II 3G Ex nA IIC T3 Gc. Compliance with the regulations is documented with an EC Declaration of Conformity.

The motor terminal boxes are also marked and certified as "Non-sparking". The terminal boxes of the LOHER CHEMSTAR and LOHER VARIO Ex nA series are identical in construction to the Ex e "Increased safety" connection system. In accordance with the current, harmonized edition, EN 60079-0 Edition 2009, the gas for the type of protection test must be specified in the case of type of protection "Non-sparking".

###### Type of protection "Explosion-proof enclosure" Ex d acc. to IEC/EN 60079-1

For motors in type of protection "Explosion-proof enclosure", it is ensured that any explosion will be restricted to within the motor. The housing must resist the pressure of the explosion and also prevent ignition from the internal to the external atmospheres. Motors in type of protection "Explosion-proof enclosure Ex d" are used in a potentially explosive atmosphere whereby this atmosphere can achieve a level that poses a risk. These motors are assigned to device group II – category 2G (corresponding to Zone 1). They ensure a high degree of safety.

To define the risk posed by a potentially explosive gas, the minimum ignition temperature of a dust cloud is required as well as details of the possibility of a flame exiting through a narrow slit in the motor housing. This is achieved by classification in explosion groups IIA, IIB and IIC, whereby IIC represents the highest requirements (see the table "Assignment of combustible gases and vapors").

##### LOHER CHEMSTAR Ex d(e) motors

The LOHER CHEMSTAR 1PS5 motor series in type of protection Ex d(e) are approved for use in potentially explosive atmospheres of Zone 1 according to EN 60079-0, EN 60079-1 and EN 60079-7. They are marked in accordance with the EC directive (94/9/EC) with II 2G Ex d IIB T3-T6 Gb and II 2G Ex d IIC T3-T6 Gb. If the terminal box is in type of protection "Increased safety", they are marked with II 2G Ex de IIB T3-T6 Gb and II 2G Ex de IIC T3-T6 Gb.

Compliance with the regulations is ensured in every case with an EC type-examination certificate.

##### SIMOTICS XP motors

The SIMOTICS XP 1MD5 motor series are positioned in the range of explosion-proof motors alongside the LOHER motor series and represent the future standard product series. SIMOTICS XP motors are characterized by significantly shorter delivery times, as well as by a considerable simplification of order processing, but in comparison to the 1PS5 motor series the variety of products is limited and the product characteristics are fixed. The components with relevance for the type of protection, such as housing, bearing plate and terminal box, are identical in design in the 1MD5 and 1PS5 motor series. These two series are therefore mechanically interchangeable and offer a well-rounded portfolio ranging from 1MD5 standard applications to 1PS5 special applications.

The SIMOTICS XP 1MD5 motors are explosion-proof, 3-phase induction motors with squirrel-cage rotors. They are suitable for use under ambient conditions in which there is a high risk of an explosive atmosphere being generated as a result of gas, vapor or mist (Zone 1). The motors comply with directive ATEX 94/9/EC and are marked with II 2G Ex de IIC T3-T6 Gb.

###### Type of protection "Dust explosion protection" Ex t acc. to IEC/EN 60079-31

The motor series in types of protection "Non-sparking" and "Explosion-proof enclosure" already described can also be designed for dust explosion protection. Atmospheres with potentially explosive dust are classified as frequently occurring (Zone 21) and rarely occurring (Zone 22). Further classification differentiates between conductive and non-conductive dust. In general, motors of the 1PS and 1MD5 series can be used in Zone 21 for non-conductive and conductive dust and in Zone 22 for non-conductive dust. The motors are marked in accordance with EN 60079-0 and EN 60079-31 with II 3D Ex tc IIIB T130 °C Dc (Zone 22, non-conductive dust) or II 2D Ex tb IIIC T130 °C (Zone 21, conductive dust). The installed terminal boxes are marked and certified in accordance with the dust and gas explosion protection class.

Suitability of the motors is confirmed for Zone 21 with an EC type-examination certificate and for Zone 22 with an EC Declaration of Conformity.

Motors with dual labeling for gas and dust may only be used in applications in which gas and dust occur simultaneously after prior examination of the properties of the hybrid mixtures by the user.

For further information, see Chapter "Operation of motors with type of protection "Dust explosion protection"



### Overview (continued)

#### Overview of standards for explosion protection

The explosion-proof three-phase motors comply with the European standards. The European standards are recognized by all member states of CENELEC (European Committee for Electrotechnical Standardization). The national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, Portugal, and United Kingdom (UK) are affiliated to CENELEC.

Equipment	European standard
General provisions	EN 60079-0
Flameproof enclosures	EN 60079-1
Increased safety	EN 60079-7
Classification of areas (gases, vapors and mist)	EN 60079-10-1
Classification of areas (dust)	EN 60079-10-2
Intrinsic safety	EN 60079-11
Electrical equipment in potentially explosive atmospheres (gases, vapors, mist)	EN 60079-14
Type of protection "n" (Zone 2)	EN 60079-15
Maintenance of Ex equipment	EN 60079-17
Intrinsically safe electrical systems	EN 60079-25
Equipment "Dust" (dust ignition protection by enclosure)	EN 60079-31
Equipment "Dust"	EN 50281-2-1
Equipment "Dust"	EN 61241-2-2
Basic concepts and methodology	EN 1127-1

#### Explosion protection directive 94/9/EC – ATEX 100a

Explosion protection has been fully harmonized by directive 94/9/EC in Germany and in the other member states of the European Union. The requirements of the new law came into force on July 1, 2003 and since then only those devices and protection systems that comply with directive 94/9/EC are permitted to be marketed.

Directive 94/9/EC and directive 1999/92/EC specify that only specific electrical equipment and devices are permitted to be used in the zones.

The devices are assigned to device groups and categories.

#### Certifications

With the exception of the dust explosion proof motors certified by EXAM (BVS), the motors in this catalog are certified by the

#### Example "Non-sparking":

CE marking

Number of the certifying "notified" body (0158 = EXAM)

Explosion protection marking

Device group: **I** = Underground  
**II** = All other areas

Category: **2** (Zone 1/21)  
**3** (Zone 2/22)

Ex atmosphere **G** = Gas  
**D** = Dust

Explosion-proof equipment – Explosion protection (protection method) in accordance with European standards

Type of protection **nA**, **d**, **de**, **e**, **tb** or **tc** (de = Motor enclosure Ex d with terminal box Ex e) – see types of protection

Explosion group and explosion subgroup **II** = Gas (IIA, IIB or IIC)  
**III** = Dust (IIIA, IIIB or IIIC)

see Table "Examples of the assignment of combustible gases and vapors"

Temperature class with max. surface temperature (see the following section)  
"Temperature classes and groups"

**T1** = 450 °C      **T4** = 135 °C  
**T2** = 300 °C      **T5** = 100 °C  
**T3** = 200 °C      **T6** = 85 °C

Equipment protection level:

**G** = Gas      **D** = Dust  
**Ga** = Very high protection,      **Da** = Very high protection,  
**Gb** = High protection,      **Db** = High protection,  
**Gc** = Increased protection,      **Dc** = Increased protection

Additional information on the subject of explosion protection, types of protection and zones is provided in the Siemens brochure "Explosion Protection".

German Federal Testing Laboratory. EC type-examination certificates from the German Federal Testing Laboratory for explosion-proof electrical equipment in accordance with EN standards are valid in all EU member states. Any deviations from the certified electrical and mechanical design specified in this list require a supplement to be issued, or re-certification.

#### Use of electrical equipment in accordance with EN 60079-14


Electrical equipment used in potentially explosive workshops and storage areas must comply with EN 60079-14/ VDE 0165-1 "Explosive atmospheres - Part 14: Electrical installations design, selection and erection". All other general regulations issued by the responsible supervisory authorities and the Employer's Liability Insurance Association or any specifically issued for individual case are also applicable.

A plant subject to inspection is not permitted to be commissioned initially or following a significant modification until the plant has been inspected by an approved testing agency for correctness of assembly, installation, site conditions and safe operation taking into account the intended mode of operation. Devices compliant with directive 94/9/EC are permitted to be commissioned in accordance with the responsible supervisory authority. (see BetrSichV, Section 3, § 14)

#### Device marking


The device group and category are specified in the device marking.

The device marking is specified as follows:

e.g. CE 0102  II 2G Ex d IIC T4 Gb

- CE conformity mark, CE stands for "Communauté Européenne" (French for "European Community")

The manufacturer declares by means of CE marking that the relevant product has been manufactured in accordance with all applicable regulations and requirements of directive 94/9/EC and the product has been subjected to the relevant conformity evaluation process.

-0102 Identification number for the supervisory authority, in the case of the products 1PS and 1MD5 this is the German Federal Testing Laboratory (PTB)

- Marking for prevention of explosions in accordance with directive 94/9/EC

CE 0158  II 3 G Ex nA IIC T3 Gc

## Motors with Explosion Protection

### Orientation

#### Overview (continued)

##### Temperature classes and groups

Combustible gases and vapors are divided into temperature classes according to their ignitability and into groups according to their spark ignition capacity. The marking of a three-phase motor with the codes for the type of protection, group and temperature class specifies that it can be used without danger in hazardous areas depending on the zone classification. The numerical sequence of the codes for the group and temperature class has been selected so that motors that satisfy the requirements for a certain group and temperature class also satisfy the requirements for lower groups and classes.

##### Temperature classes

Temperature class of electrical equipment	Maximum surface temperature of electrical equipment	Ignition temperature of gases or vapors
T1	450 °C	> 450 °C
T2	300 °C	> 300 °C
T3	200 °C	> 200 °C
T4	135 °C	> 135 °C
T5	100 °C	> 100 °C
T6	85 °C	> 85 °C

##### Examples of the assignment of combustible gases and vapors

Group	Temperature classes											
	T1		T2		T3		T4		T5		T6	
	Material designation	Minimum ignition temperature °C	Material designation	Minimum ignition temperature °C	Material designation	Minimum ignition temperature °C	Material designation	Minimum ignition temperature °C	Material designation	Minimum ignition temperature °C	Material designation	Minimum ignition temperature °C
IIA <sup>1)</sup>	Acetone	540	i-amyl acetate	380	Benzine		Acetaldehyde	140				
	Ethane	515	n-butane	365	Gasoline <sup>2)</sup>							
	Ethyl acetate	460	n-butyl alcohol	340	Special benzine <sup>2)</sup>							
	Ethyl chloride	510	Cyclohexanone	430	Diesel fuel <sup>2)</sup>							
	Ammonia	630	1,2-dichloroethane	440	Heating oils <sup>2)</sup>							
	Benzene	555	Acetic acid anhydride	330	n-hexane	240						
	Acetic acid	485										
	Carbon monoxide	605										
	Methane	595										
	Methanol	455										
	Methyl chloride	625										
	Naphthalene	520										
	Phenol	595										
	Propane	470										
Toluene	535											
IIB <sup>1)</sup>	Town gas (illuminating gas)	560	Ethyl alcohol	425	Hydrogen sulfide	270	Ethyl ether	180				
			Ethylene	425								
			Ethylene oxide	440								
IIC <sup>1)</sup>	Hydrogen	560	Acetylene	305							Carbon disulfide	95

<sup>1)</sup> Subgroups IIA, IIB and IIC must be specified for the Ex nA and Ex de types of protection described in this list in accordance with EN 60079-0 (2009).

<sup>2)</sup> The minimum ignition temperature depends on the composition and lies between 220 and 300 °C, over 300 °C in special cases.

**Overview** (continued)

**Operation of motors with type of protection**  
**"Dust explosion protection"**

Potentially explosive atmospheres with dust can arise in industry and in agriculture. For a specific environment (Zone), a product (device or motor) is permitted to be used only if it is assigned to the appropriate device group and category (see the following table).

An important feature of dust protection is the IP degree of protection. Depending on the environmental conditions, differing requirements are placed on the dust-tightness of the enclosure.

For dust explosion protection, it is important to ensure that the surface temperature of the motors is limited to a value below the minimum ignition temperature of the combustible dust or a dust layer.

**Dust explosion protection EN 50281-1-1/EN 50281-1-2**

Equipment group	II		
Category	2D	3D	
Zone	21	22	
Dust group	IIIC	IIIB	IIIC
	Conductive dust	Non-conductive dust	Conductive dust
IP degree of protection	IP6x	IP5x	IP6x
Max. surface temperature	T130 °C		
Marking	II 2D Ex tb IIIC T130 °C Db	II 3D Ex tc IIIB T130 °C Dc	II 3D Ex tc IIIC T130 °C Dc
ATEX certification	EC type-examination certificate		EC Declaration of Conformity of the manufacturer
IECEx certification	IECEx Certificate of Conformity		No IECEx certificate available

Zone 22 non-conductive dust:

Can be ordered as an option (Zone 22 options) with LOHER CHEMSTAR 1PS0, 1PS1, 1PS5 and SIMOTICS XP 1MD5 motor series.

Zone 22 conductive dust:

Implemented and certified normally as Zone 21, the option for Zone 21 must be selected in this case.

Zone 21 non-conductive dust:

Handled and certified as for Zone 21 conductive dust.

Zone 21 conductive dust:

Can be ordered as an option (Zone 21 options) with LOHER CHEMSTAR 1PS1, 1PS5 and SIMOTICS XP 1MD5 motor series.

**Hybrid mixtures**

When dust explosion protection is combined with gas explosion protection, it is important to consider the possibility that hybrid mixtures can occur: hybrid mixtures are mixtures of flammable dusts with explosive gas/air atmospheres which can together create a dangerous explosive atmosphere if they occur at the same time. Changes can arise in the safety characteristics here, such as a change in the zone classification, increase in the explosion pressure, reduction in the minimum ignition energy and a reduction in the maximum temperatures to be observed.

For this reason, the relative characteristics must be considered both for gas (Zones 0, 1 and 2) and for dust (Zones 20, 21 and 22) where hybrid mixtures arise. It is necessary for a competent assessor to determine in the individual case whether the parameters determining ignition are unfavorably affected in a particular hybrid mixture. Motors with dual labeling for gas (G) and dust (D) may only be used in applications in which gas and dust occur simultaneously after prior examination of the properties of the hybrid mixtures by the user.

- Surface temperature of motors  $< \frac{2}{3}$  the minimum ignition temperature of the dust/air mixture.
- Surface temperature of the motors  $<$  minimum ignition temperature of dust layer (of 5 mm depth) -75 K.

The user determines the category and maximum permissible surface temperature based on the hazardous area and the type of dust.

**Note:**

Conductive or non-conductive dust changes the device category (see table below).

The motors are designed for ambient temperatures between -20 and +40 °C.

**Maintaining explosion protection during normal operation**

Electrical machines must be protected against overheating as a result of overload. The protection devices that can be considered depend on the operating mode, but also on the design and suitability of the electrical machine.

Overcurrent protection devices with inverse-time delayed tripping in accordance with EN 60947, e.g. motor circuit breakers in all phase conductors, must be set to the rated current of the motor. Furthermore, they should be selected such that the motor is thermally protected even under short-circuit conditions (i.e. with a blocked rotor). This requirement is regarded as fulfilled when the tripping time obtained from the tripping characteristic (starting temperature 20 °C) for the ratio  $I_A/I_N$  does not exceed the warm-up time  $t_E$  for the relevant ignition group.

Windings in a  $\Delta$  connection should preferably be protected in such a way that the trip unit or relay is connected in series with the winding phases. When selecting and configuring the trip unit, the rated value of the phase current (i.e. 0.58 times the rated motor current) is to be taken as a basis. If, however, the trip unit is connected in the mains supply conductor, protective measures must be taken to ensure that sufficient motor protection is afforded when only one phase fails.

For pole-changing motors, inverse-time delayed trip units or relays must be provided for each speed level that must be mutually interlocked.

Thermal motor protection for direct temperature monitoring, e.g. with PTC thermistors, in combination with a certified monitoring device alone or in addition to overcurrent protection. Motors with thermal motor protection as sole protection are available on request.

The motors are only permitted to be used for continuous duty and not for normal, infrequently repeated start-ups in which no significant start-up temperature rise occurs. The values for temperature rise time  $t_E$  for the individual ignition groups and for the inrush current ratio  $I_A/I_N$  are specified on the rating plate of the respective motor and are stated in the test certificate from the German Federal Testing Laboratory.

## Motors with Explosion Protection

### Orientation

#### Overview (continued)

##### Overview of explosion-proof motors

	Type of protection "d"		Type of protection "n"
Motor series	1MD5	1PS5	1PS1
<i>Motor type</i>	<i>DNGW</i>	<i>D..L/D..W</i>	<i>A..K</i>
Frame size	71 ... 355	71 ... 500	90 ... 500
Outputs	0.25 ... 460 kW	0.25 ... 1120 kW	0.25 ... 1120 kW
Temperature class	T4	T1 ... T6	T3
Type of protection	II 2G Ex d(e) IIC Gb IEC/EN 60079-0 IEC/EN 60079-1	II 2G Ex d(e) IIC Gb IEC/EN 60079-0 IEC/EN 60079-1	II 3G Ex nA IIC Gc IEC/EN 60079-15
Ex zones	Gas Zone 1 optional Dust Zone 22/21	Gas Zone 1 optional Dust Zone 22/21	Gas Zone 2 optional Dust Zone 22/21
Guidelines	94/9/EC (ATEX 95)		
Cooling	Surface-cooled IC 411	Surface-cooled, water-jacket-cooled on request	
No. of poles	2- ... 6-pole	2- ... 12-pole, multi-pole + pole-changing on request	
Voltage/frequency	400, 500, 690 V/50 Hz	All common voltages in 50 Hz; 60 Hz special designs on request	
Degree of protection	IP55, IP56, IP65	IP55 to IP68	
Type of construction	All common types of construction	All common types of construction + special types of construction	
Housing	Cast-iron	Cast-iron or steel	
Insulation	Class F utilized according to B		
Special versions	For outdoor temperature -20 to +50 °C	For outdoor temperature -55 to +60 °C (other temperatures on request)	
	Site altitude 1000 m above sea level	Site altitude up to 3000 m (> 3000 m on request)	
		Modified windings, for example, for increased ambient temperatures, site altitude for optimum electrical values	
	Permanent load S1	Permanent load S1 as well as partial load operation, e.g. S2/S3/S6	
	Version for mains-fed and/or converter-fed operation	Version for mains-fed and/or converter-fed operation	
	IE2 efficiency class ( $\geq 0.75$ kW)	IE2 efficiency class ( $\geq 0.75$ ... 375 kW), IE3 on request	
	Drive-end located bearing	Drive-end located bearing; special bearing for increased axial/radial forces	
		Large electrical variance, such as reduced starting current, modified torque curve, star-delta start-up, etc.	
		LOHER CHEMSTAR copper rotor as an option LOHER VARIO copper rotor as standard	
		Metal fan in aluminum, steel or brass	
		Monitoring devices such as Pt100, PTC, KTY winding/bearing, vibration monitoring, etc.	
	Country-specific certificate according to EAC (Eurasian Customs Union) PESO (CCOE India)	Country-specific certificates such as EAC (Eurasian Customs Union), NEPSI (China), China Energy Label, CCOE (India), IECEX (international)	
		Version for offshore, on-deck and/or marine classifications	
		Combination with brakes + rotary encoder + forced ventilation	
		Enlarged connection system and/or larger terminal box for large cable cross-sections	
	Designs true to the specification, excellent project capability		
	Customized documentation, excellent project capability		

## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

#### General information

#### Technical specifications

##### *SIMOTICS XP 1MD5 motor series, type of protection "Explosion-proof enclosure"*

SIMOTICS XP motors of the 1MD5 series are surface-cooled, fully enclosed motors in type of protection "Explosion-proof enclosure" Ex d. They can be designed in accordance with the current VIK recommendation ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry).

The motors are marked in accordance with EN 60079-0 Ed. 2009 and EN 60079-1 with II 2G Ex de IIC T4 Gb for operation in Zone 1.

#### General technical specifications

##### SIMOTICS XP 1MD5 motors

Motor type	DNGW
Frame size	71 ... 355
Outputs	0.25 ... 460 kW
Temperature class	T4
Type of protection	II 2G Ex d(e) IIC Gb, IEC/EN 60079-0, IEC/EN 60079-1
Ex zones	Gas Zone 1 optional Dust Zone 22/21
Guidelines	94/9/EC (ATEX 95)
Cooling	Surface-cooled IC 411
No. of poles	2-, 4-, 6-pole
Voltage/frequency	400, 500, 690 V/50 Hz
Degree of protection	IP55, IP56, IP65
Type of construction	All common types of construction
Housing	Cast-iron
Insulation	Class F utilized according to B

##### Special versions

- For outdoor temperatures -20 to +50 °C
- Permanent load S1
- Drive-end located bearing
- Country-specific certificates such as EAC (Eurasian Customs Union), China Energy Label, PESO (CCOE India)

أثور صنعت  
 ATOORSANAT

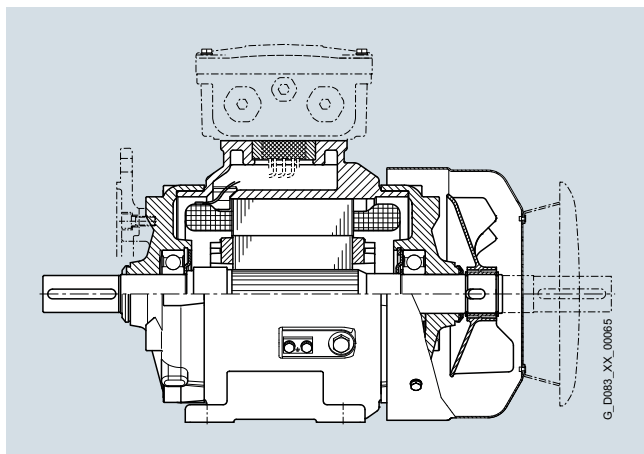
## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

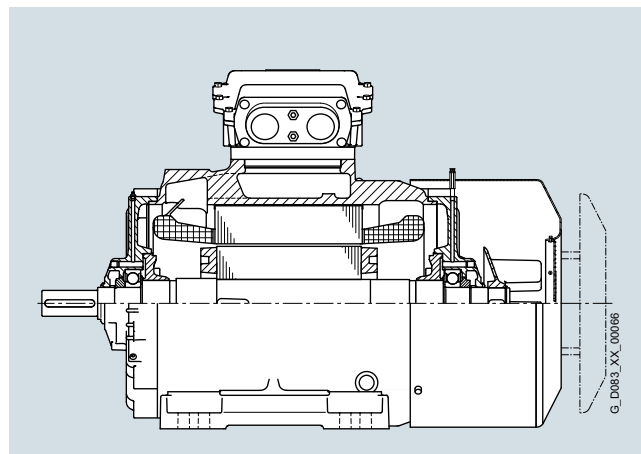
#### General information

#### Technical specifications (continued)

##### Mechanical design



Sectional view of 1MD5 three-phase motor, frame sizes 71 to 132  
Example: 1MD5131-0BD60-4AA1 (motor type: DNGW-132SR-02)  
7.5 kW, 2-pole



Sectional view of 1MD5 three-phase motor, frame sizes 160 to 355  
Example: 1MD5315-0BD60-4AA1 (motor type: DNGW-315LL-02)  
200 kW, 2-pole

#### Housing and ventilation

##### Housing and fan for motors of the SIMOTICS XP 1MD5 series

Frame size	Housing		Surface	Bearing plates		Fan cover	Fan		Suitable for
	Material	Design of housing feet <sup>1)</sup>		Material	Flange ring on bearing plate		Material		
71 ... 90	Cast-iron	Cast	With cooling fins	Cast-iron	Screwed on	Sheet steel	Plastic <sup>3)</sup>	Both directions of rotation	
100					Cast				
112					Screwed on <sup>2)</sup>				
132 ... 160		Cast							
180 ... 280		Screwed on							
315							Aluminum <sup>3)</sup>		
355							Steel <sup>4)</sup>		

<sup>1)</sup> For designs with feet only.

<sup>2)</sup> Special version for frame size 132.

<sup>3)</sup> For specific operating conditions, the external fans can be constructed in aluminum for frame sizes 71 to 225 and in sheet steel for frame sizes 250 to 315. This applies in the case of increased coolant temperature in particular. The cooling air flow from NDE to DE must not be obstructed. The intake area in front of the fan cover must not be obstructed.

<sup>4)</sup> Only one direction of rotation for 2-pole and 4-pole version.

**Technical specifications** (continued)

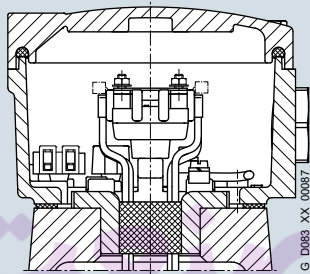
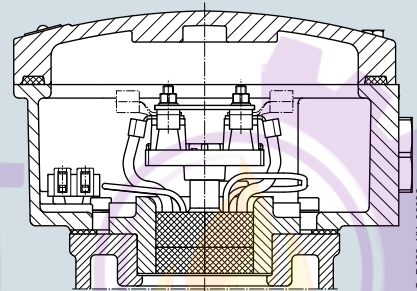
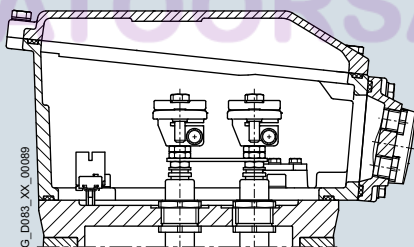
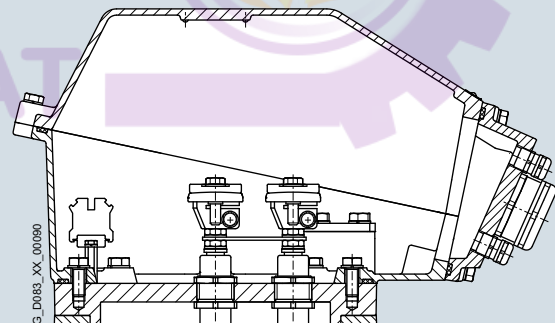
Protection against ingress of condensation

Condensation drainage holes must not be drilled into encapsulated explosion-proof motors, otherwise the type of protection can no longer be ensured. In frame size 250 and above, the explosion-proof encapsulated motors have separate chambers at the drive end (DE) and non-drive end (NDE) for collection of any condensation that may arise. This prevents possible damage to the winding as a result of condensation in the winding overhang spaces. In the case of smaller motors (frame sizes 71 to 225), the risk of adverse effects from condensation is countered by applying increased humidity protection to the winding insulation.

In the standard version, the motor can be used in environments with up to 80 % relative humidity without the need for further measures. With an appropriate coating of internal corrosion protection (e.g. order code **V10**), anti-condensation heater and stainless steel screws and plates (order codes **M13** and **W71**), the motor can be upgraded for a relative humidity of up to 100 %.

Terminal boxes

The design of the terminal boxes can be seen in the following figures. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below. Terminal boxes in type of protection "Explosion-proof enclosure" Ex d IIC according to EN 60079-0 and EN 60079-1 can be supplied on request. Separate terminal boxes for main connections and accessories are available in type of protection "Explosion-proof enclosures" for auxiliary terminals for frame sizes 200 to 355 only.

**Figure 1** Terminal box for frame sizes 71 to 112

**Figure 2** Terminal box for frame sizes 132 to 225

**Figure 3** Terminal box for frame sizes 250 to 280

**Figure 4** Terminal box for frame sizes 315 to 355


## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

#### General information

#### Technical specifications (continued)

##### Terminal box for 1MD5...1 motor

Degree of protection: IP55

Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7

Housing material: Cast-iron

Frame size	Standard terminal box		Auxiliary terminals in main terminal box		PE/ground connection		Fig. No. on Page 2/11	
	Terminal studs	Conductor cross-section	Number × max. cross-section <sup>1)</sup>		max.			
		min. mm <sup>2</sup>	max. mm <sup>2</sup>	mm <sup>2</sup>		mm <sup>2</sup>		
71	6 × M4	1	4 (6) <sup>2)</sup>	4 × 2.5		4	6 <sup>2)</sup>	<b>Fig. 1</b>
80								
90								
100								
112								
132	6 × M5	1	10 (25) <sup>2)</sup>			25		<b>Fig. 2</b>
160								
180	6 × M6	2.5	35 (50) <sup>2)</sup>	12 × 4		70		<b>Fig. 2</b>
200								
225								
250	6 × M10	6 ... 70				95		<b>Fig. 3</b>
280								
315 S/M	6 × M12	16 ... 150		16 × 4		150		<b>Fig. 4</b>
315 L	6 × M16/M20 <sup>3)</sup>	16 ... 300						
355								

Number and size of entry threads and cable glands (to be ordered specially), see table "Cable glands for 1MD5 motors".

The terminals are designed for the connection of 1 conductor per terminal. For connection of 2 conductors per terminal, please inquire at Siemens Ruhstorf specifying the conductor cross-sections.

##### Cable glands for 1MD5 motors

Frame size	Standard cable glands		Removable gland plate (for Ex e terminal box only)	
	Entry thread <sup>4)</sup>	Cable diameter <sup>5)</sup>	Type HSK-M-Ex <sup>6)</sup> for Ex e	Type ADE 1F <sup>7)</sup> for Ex d
		mm	mm	mm
71	1 × M25 × 1.5	10 ... 16	10 ... 16	None
80				
90				
100	1 × M32 × 1.5	13 ... 20	18 ... 27.5	
112	2 × M32 × 1.5			
132				
160	2 × M40 × 1.5	22 ... 32	23 ... 34	
180				None
200	2 × M50 × 1.5	32 ... 38	29 ... 41	
225				
250	2 × M63 × 1.5	37 ... 44	42 ... 56	With
280				
315				
355				

Auxiliary entry threads, e.g. for PTC thermistor and heating:

- Ex e II: M20 × 1.5/D = 6 up to 12 mm
- Ex d IIC: M20 × 1.5/D = 6 up to 12 mm

Entry threads are sealed on delivery with certified plugs, cable glands can be ordered separately.

<sup>1)</sup> Rated voltage / max. working voltage 400 V / 440 V.

<sup>2)</sup> Maximum conductor cross-section with cable lug.

<sup>3)</sup> Alternatively, larger studs for higher rated current.

<sup>4)</sup> Number and size of entry threads according to DIN 42925.

<sup>5)</sup> Cable glands suitable for unshielded/non-reinforced cables and leads. Option **K54** (Ex e), **W91** (Ex d).

<sup>6)</sup> Cable glands from the company Hummel.

<sup>7)</sup> Cable gland from the company RST.



**Technical specifications** (continued)

**Auxiliary terminal box**

Degree of protection: IP55

Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7

Housing material: Cast-iron

Frame size	Standard terminal box		Auxiliary terminal box	
	Main terminal box	Fig. No. on Page 2/11	Design	Max. connections <sup>1)</sup> (number × max. cross-section) mm
71	2	<b>Fig. 1</b>	–	–
80				
90				
100				
112				
132	6	<b>Fig. 2</b>	Cast	6 × 2.5
160				
180	12	<b>Fig. 2</b>	Screwed on	12 × 4
200				
225				
250	20	<b>Fig. 3</b>	Screwed on	36 × 4
280				
315 L	36	<b>Fig. 4</b>	Screwed on	42 × 4
355				

Explosion-proof terminal boxes with a cast auxiliary terminal box only (max. 12 × 4 mm<sup>2</sup>), for number and size of entry threads, see "Cable glands" table.

 آتور صنعت  
 ATOORSANAT

<sup>1)</sup> Rated voltage/max. working voltage 400/440V

## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

#### General information

#### Technical specifications (continued)

##### Electrical design

The SIMOTICS XP 1MD5 explosion-proof motors are equipped with 6 terminals. They can be operated in star or delta. The standard connection for all 400 V motors is delta connection. They are therefore suitable for 400 V $\Delta$ /690 VY. The 500 V motors are available both for 500 VY and for 500 V $\Delta$ , provided that one of the two variants is not preferred for winding reasons.

SIMOTICS XP motors are wound in accordance with temperature class F (155 °C). Normally, they are only utilized according to class B (130 °C). In accordance with EN 60034-1, in addition to the temperature class, the thermal utilization is also stamped on the rating plate if this value lies below that of the temperature class. The fixed-voltage motors of this series are stamped with "F – B". Temperature class F is only used by a few exceptions. They are indicated in the output tables and are stamped with "F".

The standard also requires that even with an unfavorable constellation, the temperature on the outer surface of the explosion-proof enclosure must not exceed the maximum permissible temperature for the respective temperature class. The 1MD5 motors are certified for T4. The maximum permissible surface temperature is therefore 120 °C.

##### Operation on a frequency converter

SIMOTICS XP motors can also be operated on frequency converters without any modifications to the electrical design because of the used type of winding with insulation system and impregnation. The maximum limits and parameters for converter-fed operation are summarized in this catalog.

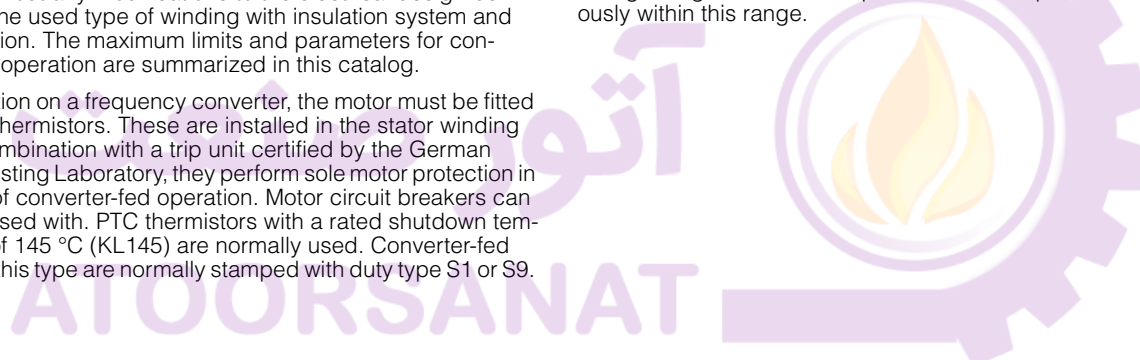
For operation on a frequency converter, the motor must be fitted with PTC thermistors. These are installed in the stator winding and, in combination with a trip unit certified by the German Federal Testing Laboratory, they perform sole motor protection in the case of converter-fed operation. Motor circuit breakers can be dispensed with. PTC thermistors with a rated shutdown temperature of 145 °C (KL145) are normally used. Converter-fed motors of this type are normally stamped with duty type S1 or S9.

##### Mains-fed operation

Selection of the PTC thermistor for full motor protection (sole protection) in mains-fed operation is more complex because the load case "blocked shaft, motor draws full starting current" also has to be monitored. To protect the rotor, it may be necessary here to use only PTC thermistors with low tripping temperatures. The advantage is that all line duty types (S1 to S7) and converter-fed operation (S9) are covered. These motors are therefore stamped with S1 to S7 and S9. The larger the motor and the smaller the number of poles, the more difficult it is to achieve sole protection using PTC thermistors in mains-fed operation: due to the laws of increasing size, larger machines become ever more "rotor-critical". The sole protection limit for 4-pole motors typically lies in the region of frame size 280.

##### Voltage tolerances

The motors are tested at -10 % of rated voltage and 100 % of rated torque, as well as at +10 % of rated voltage and 100 % of rated torque which is determined at rated output and mean voltage. It is assumed that the voltage can vary within the range of specified tolerance, but during operation the mean voltage is mainly applied to the motor (e.g. 400 V). The rated current is therefore stamped as the current that flows at rated output and mean voltage. It is sufficient to verify during testing that all temperature limits are complied with at rated torque throughout the voltage range. The motor is permitted to be operated continuously within this range.



## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

Motors in cast-iron version

#### Selection and ordering data

P <sub>ra-</sub> ted, 50 Hz	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J			
		$\eta_{ra-}$ ted,	$T_{ra-}$ ted,	IE class	$\eta_{ra-}$ ted,	$\eta_{ra-}$ ted,	$\eta_{ra-}$ ted,	cos $\varphi$ rated,	$I_{ra-}$ ted,	$I_{ra-}$ ted,	$I_{ra-}$ ted,					$T_{LR}/$ $T_{ra-}$	$I_{LR}/$ $I_{ra-}$	$T_B/$ $T_{ra-}$
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	kg	kgm <sup>2</sup>		
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>																		
2-pole: 3000 rpm at 50 Hz																		
0.37	071 B	2840	1.24	<sup>1)</sup>	69.5	69.5	68.0	0.77	1.00	0.8	0.58	3.6	6.5	3.1	DNGW-071BR-02	1MD5070- <b>BD</b> - <b>4AA1</b>	24	0.0004
0.55	071 B	2835	1.85	<sup>1)</sup>	74.1	74.1	70.0	0.75	1.43	1.14	0.83	3.6	6.3	2.9	DNGW-071BS-02	1MD5071- <b>BD</b> - <b>4AA1</b>	25	0.0005
0.75	080 B	2805	2.55	IE2	77.4	79.5	78.8	0.84	1.67	1.34	0.97	1.9	4.9	2.3	DNGW-080BR-02	1MD5080- <b>BD</b> - <b>4AA1</b>	26	0.0008
1.1	080 B	2835	3.71	IE2	79.6	81.3	80.8	0.83	2.40	1.92	1.39	2.4	6.0	2.7	DNGW-080BS-02	1MD5081- <b>BD</b> - <b>4AA1</b>	28	0.0011
1.5	090 L	2885	4.96	IE2	81.3	82.3	80.8	0.84	3.15	2.52	1.83	2.7	6.9	3.6	DNGW-090LR-02	1MD5095- <b>BD</b> - <b>4AA1</b>	36	0.0017
2.2	090 L	2890	7.3	IE2	83.2	83.9	82.3	0.85	4.50	3.6	2.61	2.5	7.1	3.7	DNGW-090LS-02	1MD5098- <b>BD</b> - <b>4AA1</b>	36	0.0021
3	100 L	2905	9.9	IE2	84.6	85.2	84.7	0.84	6.1	4.9	3.54	2.3	7.0	3.3	DNGW-100LS-02	1MD5106- <b>BD</b> - <b>4AA1</b>	51	0.0044
4	112 M	2950	12.9	IE2	85.8	86.7	86.1	0.86	7.8	6.2	4.5	2.4	7.4	3.3	DNGW-112MS-02	1MD5113- <b>BD</b> - <b>4AA1</b>	66	0.0092
5.5	132 S	2950	17.8	IE2	87.0	88.0	87.4	0.87	10.5	8.4	6.1	1.8	6.6	2.9	DNGW-132SR-02	1MD5131- <b>BD</b> - <b>4AA1</b>	83	0.020
7.5	132 S	2950	24.3	IE2	88.1	88.7	88.6	0.87	14.1	11.3	8.2	2.2	7.5	3.1	DNGW-132SS-02	1MD5132- <b>BD</b> - <b>4AA1</b>	95	0.024
11	160 M	2955	35.5	IE2	89.4	90.0	89.1	0.87	20.5	16.4	11.9	2.1	7.4	3.2	DNGW-160MR-02	1MD5163- <b>BD</b> - <b>4AA1</b>	168	0.045
15	160 M	2955	48.5	IE2	90.3	90.9	90.3	0.88	27.0	21.6	15.7	2.4	7.6	3.4	DNGW-160MS-02	1MD5165- <b>BD</b> - <b>4AA1</b>	177	0.045
18.5	160 L	2955	59.8	IE2	90.9	91.2	90.4	0.88	33.5	26.8	19.4	2.9	7.9	3.6	DNGW-160LS-02	1MD5166- <b>BD</b> - <b>4AA1</b>	185	0.057
22	180 M	2940	71.5	IE2	91.3	91.8	91.4	0.87	40.0	32.0	23.2	2.7	7.4	3.6	DNGW-180MS-02	1MD5183- <b>BD</b> - <b>4AA1</b>	231	0.094
30	200 L	2955	96.9	IE2	92.0	92.3	91.7	0.87	54.0	43.2	31.3	2.5	6.9	3.3	DNGW-200LR-02	1MD5206- <b>BD</b> - <b>4AA1</b>	311	0.18
37	200 L	2960	119	IE2	92.5	92.8	92.3	0.88	66.0	52.8	38.3	2.7	7.4	3.5	DNGW-200LS-02	1MD5208- <b>BD</b> - <b>4AA1</b>	311	0.20
45	225 M	2965	145	IE2	92.9	93.1	92.5	0.88	79.0	63.2	45.8	2.7	7.8	3.7	DNGW-225MS-02	1MD5223- <b>BD</b> - <b>4AA1</b>	390	0.23
55	250 M	2970	177	IE2	93.2	93.3	92.4	0.89	96.0	76.8	55.7	2.3	6.8	3.1	DNGW-250MM-02	1MD5253- <b>BD</b> - <b>4AA1</b>	469	0.40
75	280 S	2978	240	IE2	93.8	93.6	92.4	0.87	133	106	77.1	2.5	7.2	3.2	DNGW-280SL-02	1MD5280- <b>BD</b> - <b>4AA1</b>	672	0.71
90	280 M	2975	289	IE2	94.1	94.2	93.5	0.88	157	126	91.0	2.5	7.1	3.1	DNGW-280MM-02	1MD5283- <b>BD</b> - <b>4AA1</b>	732	0.83
110	315 S	2982	352	IE2	94.3	94.2	93.3	0.90	187	150	108	2.4	7.3	3.0	DNGW-315SL-02	1MD5311- <b>BD</b> - <b>4AA1</b>	1004	1.3
132	315 M	2982	423	IE2	94.6	94.7	94.1	0.91	220	176	128	2.4	7.2	3.1	DNGW-315ML-02	1MD5313- <b>BD</b> - <b>4AA1</b>	1088	1.6
160	315 M	2982	512	IE2	94.8	94.9	94.3	0.92	265	212	154	2.3	7.0	3.1	DNGW-315MN-02	1MD5315- <b>BD</b> - <b>4AA1</b>	1132	1.8
200	315 L	2982	640	IE2	95.0	95.2	94.8	0.92	330	264	191	2.4	7.1	3.0	DNGW-315LL-02	1MD5316- <b>BD</b> - <b>4AA1</b>	1367	2.2
250	315 L	2985	800	IE2	95.0	95.5	95.2	0.92	415	332	241	3.2	8.6	3.5	DNGW-315LN-02	1MD5318- <b>BD</b> - <b>4AA1</b>	1561	3.5
315	355 M	2984	1008	IE2	95.6	95.4	94.5	0.88	540	432	313	1.6	6.8	2.3	DNGW-355MR-02 <sup>2)</sup>	1MD5353- <b>BD</b> - <b>4AA1</b>	2520	4.8
360	355 M	2984	1152	IE2	95.9	95.6	95.0	0.89	610	488	354	1.7	6.8	2.4	DNGW-355MS-02 <sup>2)</sup>	1MD5355- <b>BD</b> - <b>4AA1</b>	2660	5.3
460	355 M	2985	1472	<sup>1)</sup>	96.3	96.3	95.7	0.90	770	616	446	1.9	6.8	2.6	DNGW-355MT-02 <sup>2)</sup>	1MD5357- <b>BD</b> - <b>4AA1</b>	2800	6.4
<b>Operating modes</b>		Frame size												Order code				
Mains-fed operation		71 ... 355											0	–				
Converter-fed operation, standard insulation		71 ... 355											1	–				
<b>Voltages</b>		Frame size												Order code				
690 VΔ, 50 Hz		355											0	–				
230 V/400 V, 50 Hz		71 ... 200											1	–				
500 VY, 50 Hz		71 ... 315											3	–				
500 VΔ, 50 Hz		71 ... 355											5	–				
400 V/690 V, 50 Hz		71 ... 355											6	–				
For other voltages see Page 2/18		71 ... 355											9	...				
<b>Types of construction</b>		Frame size												Order code				
IM B3		71 ... 355											0	–				
IM B5		71 ... 315											1	–				
IM B34		71 ... 112											2	–				
IM B14		71 ... 112											3	–				
IM V1/cover		71 ... 355											4	–				
IM B35		71 ... 355											6	–				
Other types of construction see Page 1/28 and 2/18		71 ... 355											9	...				

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.<sup>2)</sup> Direction of rotation must be specified (order code **K97** or **K98**).

# Motors with Explosion Protection

## SIMOTICS XP 1MD5 motor series

### Motors in cast-iron version

#### Selection and ordering data (continued)

P <sub>ra-</sub> ted	Frame size	Operating values at rated output											Motor type	Article No.	m IM B3	J		
		$\eta_{ra-}$ ted	$T_{ra-}$ ted	IE class	$\eta_{ra-}$ ted	$\eta_{ra-}$ ted	$\eta_{ra-}$ ted	$\cos\phi$ rated	$I_{ra-}$ ted	$I_{ra-}$ ted	$I_{ra-}$ ted	$T_{LR}/T_{ra-}$					$I_{LR}/I_{ra-}$	$T_B/T_{ra-}$
50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	ted	ted	ted	ted	ted	ted	
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	–	–	–	
• Cooling: self-ventilated (IC 411) • Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30 • Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 % • Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb																		
<b>4-pole: 1500 rpm at 50 Hz</b>																		
0.25	071 B	1410	1.69	<sup>1)</sup>	68.5	68.5	60.0	0.64	0.68	0.54	0.39	3.6	4.3	3.1	DNGW-071BR-04	1MD5070- <b>BD</b> -4BA1	24	0.0007
0.37	071 B	1385	2.55	<sup>1)</sup>	72.7	72.7	63.0	0.73	0.85	0.68	0.49	3.3	4.2	3.0	DNGW-071BS-04	1MD5071- <b>BD</b> -4BA1	24	0.0009
0.55	080 B	1440	3.65	<sup>1)</sup>	78.1	78.9	76.1	0.74	1.14	0.91	0.66	2.2	5.3	3.1	DNGW-080BR-04	1MD5080- <b>BD</b> -4BA1	27	0.0017
0.75	080 B	1440	4.97	IE2	79.6	80.2	78.0	0.76	1.49	1.19	0.86	2.2	5.6	3.1	DNGW-080BS-04	1MD5081- <b>BD</b> -4BA1	28	0.0021
1.1	090 L	1425	7.4	IE2	81.4	81.7	79.9	0.78	2.15	1.72	1.25	2.3	5.6	2.9	DNGW-090LR-04	1MD5095- <b>BD</b> -4BA1	34	0.0028
1.5	090 L	1435	10.0	IE2	82.8	83.5	82.0	0.79	2.80	2.24	1.62	2.6	6.4	3.4	DNGW-090LS-04	1MD5098- <b>BD</b> -4BA1	37	0.0036
2.2	100 L	1455	14.4	IE2	84.3	85.1	84.3	0.81	3.75	3.0	2.17	2.1	6.9	3.3	DNGW-100LR-04	1MD5106- <b>BD</b> -4BA1	53	0.0086
3	100 L	1455	19.7	IE2	85.5	86.7	86.0	0.82	4.8	3.84	2.78	2.0	6.9	3.1	DNGW-100LS-04	1MD5108- <b>BD</b> -4BA1	55	0.011
4	112 M	1460	26.2	IE2	86.6	87.3	86.5	0.81	6.8	5.4	3.94	2.5	7.1	3.2	DNGW-112MS-04	1MD5113- <b>BD</b> -4BA1	66	0.014
5.5	132 S	1465	35.9	IE2	87.7	89.0	87.7	0.80	8.9	7.1	5.2	2.3	6.9	2.9	DNGW-132SR-04	1MD5131- <b>BD</b> -4BA1	93	0.027
7.5	132 M	1465	48.9	IE2	88.7	90.3	88.8	0.83	11.4	9.1	6.2	2.3	6.9	2.9	DNGW-132MS-04	1MD5133- <b>BD</b> -4BA1	102	0.034
11	160 M	1470	71	IE2	89.8	90.9	90.8	0.85	21.0	16.8	12.2	2.1	6.7	2.8	DNGW-160MR-04	1MD5163- <b>BD</b> -4BA1	168	0.077
15	160 L	1475	97	IE2	90.6	91.3	91.0	0.85	28.0	22.4	16.2	2.3	7.3	3.0	DNGW-160LS-04	1MD5166- <b>BD</b> -4BA1	185	0.098
18.5	180 M	1465	121	IE2	91.2	92.0	91.9	0.84	35.0	28.0	20.3	2.5	7.2	3.4	DNGW-180MR-04	1MD5183- <b>BD</b> -4BA1	231	0.16
22	180 L	1465	143	IE2	91.6	92.2	91.9	0.84	41.5	33.2	24.1	2.6	7.3	3.5	DNGW-180LS-04	1MD5186- <b>BD</b> -4BA1	242	0.16
30	200 L	1470	195	IE2	92.3	92.8	92.6	0.84	56.0	44.8	32.5	2.5	6.7	3.3	DNGW-200LS-04	1MD5206- <b>BD</b> -4BA1	311	0.27
37	225 S	1470	240	IE2	92.7	93.5	93.5	0.88	65.0	52.0	37.7	2.3	6.6	2.9	DNGW-225SR-04	1MD5220- <b>BD</b> -4BA1	390	0.42
45	225 M	1475	291	IE2	93.1	93.8	93.7	0.87	80.0	64.0	46.4	2.5	6.9	3.1	DNGW-225MS-04	1MD5223- <b>BD</b> -4BA1	420	0.46
55	250 M	1480	355	IE2	93.5	93.9	93.5	0.85	100	80.0	57.0	2.7	6.8	3.0	DNGW-250MM-04	1MD5253- <b>BD</b> -4BA1	518	0.75
75	280 S	1485	482	IE2	94.0	94.2	93.8	0.87	132	106	76.5	2.5	6.8	3.0	DNGW-280SL-04	1MD5280- <b>BD</b> -4BA1	752	1.3
90	280 M	1486	578	IE2	94.2	94.3	93.6	0.87	159	127	92.2	2.6	7.3	3.1	DNGW-280MM-04	1MD5283- <b>BD</b> -4BA1	785	1.4
110	315 S	1490	705	IE2	94.5	94.6	94.0	0.86	195	156	113	2.7	7.4	3.0	DNGW-315SL-04	1MD5311- <b>BD</b> -4BA1	1001	2.0
132	315 M	1490	846	IE2	94.7	94.9	94.6	0.87	230	184	133	2.7	7.1	2.9	DNGW-315ML-04	1MD5313- <b>BD</b> -4BA1	1033	2.3
160	315 M	1490	1025	IE2	94.9	95.0	94.5	0.87	280	224	162	2.8	7.2	3.1	DNGW-315MN-04	1MD5315- <b>BD</b> -4BA1	1126	2.8
200	315 L	1490	1282	IE2	95.1	95.3	94.7	0.87	350	280	203	3.1	7.5	3.2	DNGW-315LL-04	1MD5316- <b>BD</b> -4BA1	1341	3.5
250	315 L	1487	1605	IE2	95.1	95.4	95.0	0.87	435	348	252	2.6	7.5	2.6	DNGW-315LM-04	1MD5317- <b>BD</b> -4BA1	1449	4.2
315	355 M	1488	2022	IE2	95.5	95.6	95.0	0.85	560	448	325	2.0	6.8	2.2	DNGW-355MR-04 <sup>2)</sup>	1MD5353- <b>BD</b> -4BA1	2480	6.1
360	355 M	1488	2310	IE2	95.7	95.8	95.2	0.85	640	512	371	2.2	6.9	2.2	DNGW-355MS-04 <sup>2)</sup>	1MD5355- <b>BD</b> -4BA1	2610	6.8
460	355 M	1488	2952	<sup>1)</sup>	96.0	96.1	95.8	0.86	800	640	464	2.2	7.1	2.2	DNGW-355MT-04 <sup>2)</sup>	1MD5357- <b>BD</b> -4BA1	2750	8.5
<b>Operating modes</b>		Frame size													Order code			
Mains-fed operation		71 ... 355											0		–			
Converter-fed operation, standard insulation		71 ... 355											1		–			
<b>Voltages</b>		Frame size													Order code			
690 VΔ, 50 Hz		355											0		–			
230 V/400 V, 50 Hz		71 ... 200											1		–			
500 VY, 50 Hz		71 ... 315											3		–			
500 VΔ, 50 Hz		71 ... 355											5		–			
400 V/690 V, 50 Hz		71 ... 355											6		–			
For other voltages see Page 2/18		71 ... 315											9		...			
<b>Types of construction</b>		Frame size													Order code			
IM B3		71 ... 355											0		–			
IM B5		71 ... 315											1		–			
IM B34		71 ... 112											2		–			
IM B14		71 ... 112											3		–			
IM V1/cover		71 ... 355											4		–			
IM B35		71 ... 355											6		–			
Other types of construction see Page 1/28 and 2/18		71 ... 355											9		...			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Direction of rotation must be specified (order code **K97** or **K98**).

# Motors with Explosion Protection

## SIMOTICS XP 1MD5 motor series

Motors in cast-iron version

### Selection and ordering data (continued)

P <sub>ra</sub> ted, 50 Hz	Frame size	Operating values at rated output											Motor type	Article No.	m IM B3	J		
		n <sub>ra</sub> ted, 50 Hz	T <sub>ra</sub> ted, 50 Hz	IE class	η <sub>ra</sub> ted, 50 Hz, 4/4	η <sub>ra</sub> ted, 50 Hz, 3/4	η <sub>ra</sub> ted, 50 Hz, 2/4	cos φ rated, 4/4	I <sub>ra</sub> ted, 400 V	I <sub>ra</sub> ted, 500 V	I <sub>ra</sub> ted, 690 V	T <sub>LR</sub> / T <sub>ra</sub> ted					I <sub>LR</sub> / I <sub>ra</sub> ted	T <sub>B</sub> / T <sub>ra</sub> ted
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–		kg	kgm <sup>2</sup>	
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>																		
6-pole: 1000 rpm at 50 Hz																		
0.25	071 B	860	2.78	<sup>1)</sup>	61.6	60.0	55.0	0.76	0.77	0.62	0.45	2.2	3.0	2.0	DNGW-071BS-06	1MD5070- <b>BD</b> -4CA1	24	0.0008
0.37	080 B	925	3.82	<sup>1)</sup>	71.4	71.0	67.5	0.70	1.07	0.86	0.62	2.1	4.0	2.4	DNGW-080BR-06	1MD5080- <b>BD</b> -4CA1	27	0.0020
0.55	080 B	930	5.6	<sup>1)</sup>	74.0	74.2	71.0	0.66	1.63	1.30	0.94	2.5	4.4	2.9	DNGW-080BS-06	1MD5081- <b>BD</b> -4CA1	30	0.0030
0.75	090 L	935	7.7	IE2	75.9	76.1	74.0	0.70	2.05	1.64	1.19	2.0	4.1	2.5	DNGW-090LR-06	1MD5095- <b>BD</b> -4CA1	36	0.0038
1.1	090 L	935	11.2	IE2	78.1	78.0	76.5	0.70	2.90	2.32	1.68	2.2	4.4	2.6	DNGW-090LS-06	1MD5098- <b>BD</b> -4CA1	42	0.0054
1.5	100 L	970	14.8	IE2	79.8	80.2	79.0	0.73	3.70	2.96	2.14	2.0	6.2	2.9	DNGW-100LS-06	1MD5106- <b>BD</b> -4CA1	55	0.011
2.2	112 M	965	21.8	IE2	81.8	82.5	81.3	0.75	5.2	4.2	3.01	2.1	6.0	3.1	DNGW-112MS-06	1MD5113- <b>BD</b> -4CA1	66	0.014
3	132 S	970	29.5	IE2	83.3	84.0	82.8	0.74	7.0	5.6	4.1	1.6	5.6	2.6	DNGW-132SR-06	1MD5131- <b>BD</b> -4CA1	92	0.024
4	132 M	970	39.4	IE2	84.6	85.8	85.0	0.78	8.7	7.0	5.0	1.6	5.6	2.5	DNGW-132MR-06	1MD5133- <b>BD</b> -4CA1	96	0.029
5.5	132 M	970	54	IE2	86.0	87.4	87.0	0.77	12.0	9.6	7.0	1.9	6.1	2.8	DNGW-132MS-06	1MD5135- <b>BD</b> -4CA1	104	0.037
7.5	160 M	975	73	IE2	87.2	88.0	87.3	0.74	16.8	12.9	9.33	1.9	4.7	2.2	DNGW-160MR-06	1MD5163- <b>BD</b> -4CA1	168	0.125
11	160 L	975	108	IE2	88.7	89.6	89.2	0.76	23.5	18.0	13.0	1.9	4.8	2.2	DNGW-160LS-06	1MD5166- <b>BD</b> -4CA1	177	0.144
15	180 L	975	147	IE2	89.7	90.1	90.2	0.78	31.0	24.8	18.0	2.5	6.0	3.1	DNGW-180LS-06	1MD5186- <b>BD</b> -4CA1	242	0.138
18.5	200 L	978	181	IE2	90.4	91.3	91.2	0.82	36.0	28.8	20.9	2.4	5.8	2.6	DNGW-200LR-06	1MD5206- <b>BD</b> -4CA1	311	0.33
22	200 L	978	215	IE2	90.9	91.6	91.2	0.82	42.5	34.0	24.6	2.5	6.2	2.6	DNGW-200LS-06	1MD5208- <b>BD</b> -4CA1	311	0.33
30	225 M	980	292	IE2	91.7	92.5	92.3	0.83	57.0	45.6	33.0	2.5	6.1	2.8	DNGW-225MS-06	1MD5223- <b>BD</b> -4CA1	395	0.58
37	250 M	982	360	IE2	92.2	93.1	93.1	0.83	70.0	56.0	40.6	2.8	6.0	2.5	DNGW-250MM-06	1MD5253- <b>BD</b> -4CA1	524	0.86
45	280 S	985	436	IE2	92.7	93.4	93.2	0.84	83.0	66.4	48.1	2.7	6.3	2.6	DNGW-280SL-06	1MD5280- <b>BD</b> -4CA1	638	1.1
55	280 M	985	533	IE2	93.1	93.9	94.0	0.86	99.0	79.2	57.4	2.5	6.4	2.6	DNGW-280MM-06	1MD5283- <b>BD</b> -4CA1	704	1.4
75	315 S	988	725	IE2	93.7	94.0	93.6	0.84	138	110	80.0	2.5	6.7	2.8	DNGW-315SL-06	1MD5311- <b>BD</b> -4CA1	905	2.1
90	315 M	988	870	IE2	94.0	94.3	93.6	0.84	165	132	95.7	2.6	6.9	2.8	DNGW-315ML-06	1MD5313- <b>BD</b> -4CA1	952	2.5
110	315 M	988	1063	IE2	94.3	94.6	94.5	0.86	196	157	114	2.7	7.0	2.8	DNGW-315MM-06	1MD5314- <b>BD</b> -4CA1	1111	3.6
132	315 M	988	1276	IE2	94.6	94.9	94.7	0.86	235	188	136	3.0	7.5	2.9	DNGW-315MN-06	1MD5315- <b>BD</b> -4CA1	1165	4.0
160	315 L	988	1546	IE2	94.8	94.7	94.4	0.86	285	228	165	3.1	7.7	3.3	DNGW-315LL-06	1MD5316- <b>BD</b> -4CA1	1319	4.7
200	315 L	990	1929	IE2	95.0	95.3	94.9	0.83	365	292	212	2.8	7.5	3.3	DNGW-315LM-06	1MD5317- <b>BD</b> -4CA1	1671	7.6
280	355 M	993	2693	IE2	95.7	95.7	95.2	0.82	520	416	301	2.1	7.1	2.8	DNGW-355MR-06	1MD5353- <b>BD</b> -4CA1	2460	13
315	355 M	993	3029	IE2	95.9	95.9	95.5	0.83	570	456	330	2.1	7.1	2.8	DNGW-355MS-06	1MD5355- <b>BD</b> -4CA1	2590	15
360	355 M	994	3458	IE2	96.0	96.1	95.7	0.83	650	520	377	2.2	7.2	2.9	DNGW-355MT-06	1MD5357- <b>BD</b> -4CA1	2730	16
<b>Operating modes</b>		Frame size														Order code		
Mains-fed operation		71 ... 355											0			–		
Converter-fed operation, standard insulation		71 ... 355											1			–		
<b>Voltages</b>		Frame size														Order code		
690 VΔ, 50 Hz		355											0			–		
230 V/400 V, 50 Hz		71 ... 200											1			–		
500 VY, 50 Hz		71 ... 315											3			–		
500 VΔ, 50 Hz		71 ... 355											5			–		
400 V/690 V, 50 Hz		71 ... 355											6			–		
For other voltages see Page 2/18		71 ... 315											9			...		
<b>Types of construction</b>		Frame size														Order code		
IM B3		71 ... 355											0			–		
IM B5		71 ... 315											1			–		
IM B34		71 ... 112											2			–		
IM B14		71 ... 112											3			–		
IM V1/cover		71 ... 355											4			–		
IM B35		71 ... 355											6			–		
Other types of construction see Page 1/28 and 2/18		71 ... 355											9			...		

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.





## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

Special versions

#### Selection and ordering data

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series													
		<b>SIMOTICS XP</b>													
<b>1MD5.....-Z</b>		Frame size													
		71	80	90	100	112	132	160	180	200	225	250	280	315	355
<b>Special electrical designs/winding protection</b>															
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	<b>A11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	<b>A12</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Motor protection with 3 PTC thermistors for tripping as sole protection on converter (TMS)	<b>A15</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping as sole protection on converter (TMS)	<b>A16</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
2 Pt100 double resistance thermometers for 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	<b>A42</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	<b>A64</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Ambient temperature +45 °C, insulation class F, utilization B, derating 4 %	<b>C22</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ambient temperature +50 °C, insulation class F, utilization B, derating 8 %	<b>C23</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Colors and paint finish</b>															
Coating system N08 – 110 µm (C3 medium) – standard finish with corrosion resistance acc. to EN/ISO 12944-5 = C3		□	□	□	□	□	□	□	□	□	□	□	□	□	□
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>V10</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system (chemical industry + onshore, C5 industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>W14</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) – sea climate	<b>V11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted, only primed	<b>K24</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted	<b>K23</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Special finish in RAL 1004, 1018, 2000, 2004, 5009, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002 – specify special coating system in addition, e.g. <b>V10, V11, W14</b> , etc.	<b>Y54 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RAL colors, other than those offered above	<b>Y51 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

2

## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series													
		<b>SIMOTICS XP</b>													
		Frame size													
<b>1MD5.....-Z</b>		71	80	90	100	112	132	160	180	200	225	250	280	315	355
<b>Design for Zones according to ATEX</b>															
Design in double protection additionally for dust, Zone 22 for mains-fed operation, no hybrid certification – non-conductive dust	<b>W20</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design in double protection additionally for dust, Zone 21 for mains-fed operation, no hybrid certification – design and certification for conductive dust (incl. non-conductive dust)	<b>W21</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Individual certifications</b>															
China Energy Efficiency Label – relevant for outputs from 0.75 to 375 kW	<b>D34</b>	–	○	○	○	○	○	○	○	○	○	○	○	○	○
Certificate EAC for Eurasian Customs Union	<b>D35</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IECEX certificate	<b>D37</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Ex certification for India (PESO – CCOE)	<b>D38</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Special mechanical designs</b>															
Terminal box on right-hand side (view onto DE)	<b>K09</b>	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–
Terminal box on left-hand side (view onto DE)	<b>K10</b>	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–
Terminal box on top		□	□	□	□	□	□	□	□	□	□	□	□	□	□
1 × cable gland for non-armored cable – one cable gland for supply cable in main terminal box, non-armored cable	<b>K54</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cable gland, standard thread size for auxiliary connection, 1 unit – for connection cable of accessories in main or auxiliary terminal box	<b>W33</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Explosion-proof main terminal box, Ex d IIC	<b>K53</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auxiliary terminal box Ex d IIC of cast-iron – only in combination with <b>K53</b>	<b>V43</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
Cable gland, standard Ex d (non-armored cable) 1 unit – only in combination with <b>K53</b> , specify exact cable data	<b>W91</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auxiliary terminal box Ex e version/cast-iron – not in combination with order code <b>K53</b> (Ex d terminal box)	<b>W72</b>	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
Separate auxiliary terminal box for anti-condensation heater – only in combination with <b>M13</b>	<b>M52</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	✓
Cable entry from DE	<b>K83</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Cable entry from NDE	<b>K84</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Rotation of the terminal box by 180°	<b>K85</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vibration quantity level A – IEC 60034-14		□	□	□	□	□	□	□	□	□	□	□	□	□	□
Vibration quantity level B – IEC 60034-14 – for converter-fed operation only at lowest and highest speed of speed range	<b>K02</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bearing for increased cantilever forces (roller bearing DE) with regreasing device – comprising <b>K40</b>	<b>K20</b>	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓
Metal external fan	<b>K35</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□
Regreasing device DE/NDE	<b>K40</b>							✓	✓	✓	✓	✓	✓	□	□
Bearing insulation NDE for roller bearing – binding for frame sizes 315 to 355 and converter-fed operation	<b>L27</b>	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓



**Motors with Explosion Protection**  
**SIMOTICS XP 1MD5 motor series**
**Special versions**

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series													
		<b>SIMOTICS XP</b>													
		Frame size													
<b>1MD5.....-Z</b>		71	80	90	100	112	132	160	180	200	225	250	280	315	355
<b>Special mechanical designs (continued)</b>															
Located bearing DE		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
VIK design	<b>K30</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Second rating plate, supplied loose	<b>K31</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second rating plate installed in terminal box	<b>W47</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate with rated data for converter-fed operation - data for quadratic load torque in speed range 1:10 and constant load torque in speed range 1:3 and 1:10	<b>Y80 •</b> and identification code	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Extra rating plate for customer data (each plate) – data must be specified as text in the order	<b>Y82 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Supplementary data on the rating plate and on the packaging label – max. 20 characters possible	<b>Y84</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 210 to 250 V (min. 200 V, max. 264 V)	<b>M13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP56 degree of protection	<b>K51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP65 degree of protection	<b>K50</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Operation in both directions of rotation		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	-
Clockwise – direction of rotation must be specified for motors of FS 355 and above 2-/4-pole	<b>K97</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	○
Counter-clockwise – direction of rotation must be specified for motors of FS 355 and above 2-/4-pole	<b>K98</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	○
Noise reduction: silencer for air inlet (DW, NMA) – only in combination with <b>K97</b> or <b>K98</b>	<b>L20</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	○
Stainless steel screws and plates	<b>W71</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SPM bearing monitoring: measuring nipple system 32 - thread M8, DE and NDE	<b>G50</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
Version for gas – Group IIC, but stamped IIB	<b>M99</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
<b>Documentation</b>															
Terminal box drawing	<b>U08</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Inspection certificate 3.1 EN10204 (multi)	<b>U51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Type test report (original motor)	<b>U52</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Documentation package NM2	<b>U91</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Documentation in English	<b>D76</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Documentation in German	<b>D00</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
<b>Test options</b>															
Routine test to IEC (sine-wave voltage)	<b>F00</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○
<b>Extension of the liability for defects</b>															
Extension of the liability for defects by 12 months to a total of 24 months from delivery	<b>Q80</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 18 months to a total of 30 months from delivery	<b>Q81</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 24 months to a total of 36 months from delivery	<b>Q82</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- ☐ Standard version  
 ○ Without additional charge  
 • This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge  
 - Not possible

# Motors with Explosion Protection

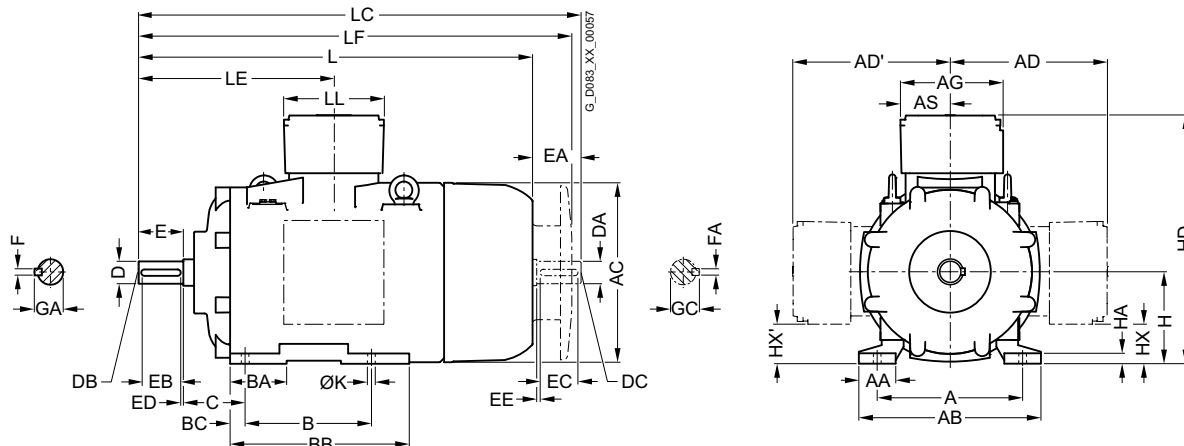
## SIMOTICS XP 1MD5 motor series

### Dimensions for frame sizes 71 B to 250 M

#### Dimensional drawings

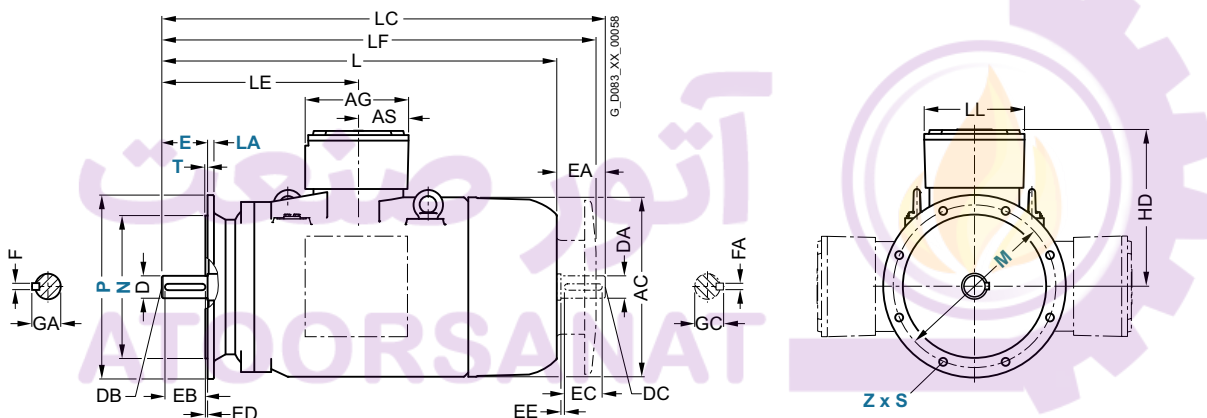
##### Type of construction IM B3

For flange dimensions, see Page 2/26.



##### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/26.

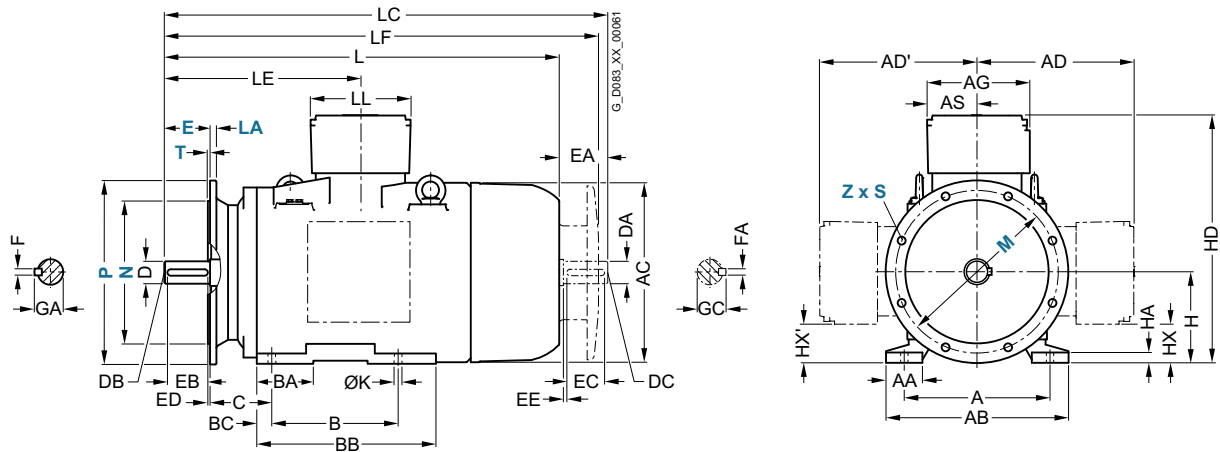


Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>SIMOTICS XP</b>																		
71 B	2, 4, 6	112	30	140	148	-	138	69	90	30	125	10	45	71	10	271	7	345
80 B	2, 4, 6	125	35	160	168	-	138	69	100	35	130	13	50	80	10	289	10	358
90 L	2, 4, 6	140	40	180	186	-	138	69	125	40	155	15	56	90	13	303	10	426
100 L	2, 4, 6	160	45	205	213	-	138	69	140	45	170	15	63	100	18	327	12	482
112 M	2, 4, 6	190	50	240	237	-	138	69	140	60	170	15	70	112	18	352	12	465
132 S	2, 4, 6	216	50	260	278	274	186	92	140	88	228	25	89	132	18	406	12	574
132 M	2, 4, 6	216	50	260	278	274	186	92	178	88	228	25	89	132	18	406	12	574
160 M	2, 4, 6	254	60	310	331	304	186	92	210	61	307	21	108	160	27	465	15	786
160 L	2, 4, 6	254	60	310	331	304	186	92	254	61	307	21	108	160	27	465	15	786
180 M	2, 4, 6	279	70	349	363	349	254	123	241	99	359	24	121	180	19	529	15	822
180 L	2, 4, 6	279	70	349	363	349	254	123	279	99	359	24	121	180	19	529	15	822
200 L	2, 4, 6	318	80	400	402	367	254	123	305	120	425	32	133	200	25	569	19	884
225 S	2 4, 6	356	90	446	451	384	254	123	286	136	438	34	149	225	26	609	19	966 996
225 M	2 4, 6	356	90	446	451	384	254	123	311	136	438	34	149	225	26	609	19	966 996
250 M	2 4, 6	406	100	505	490	522	382	176	349	110	420	36	168	250	35	772	25	1028

Dimensional drawings (continued)

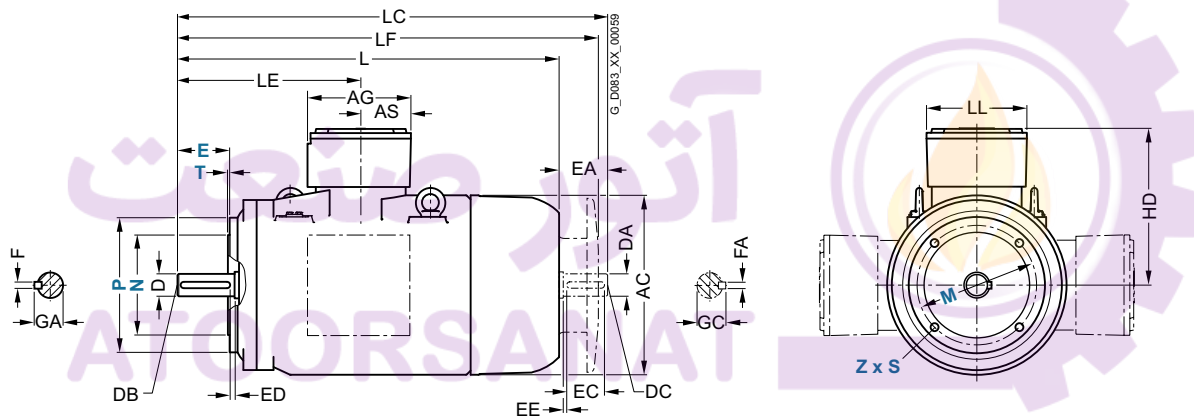
Type of construction IM B35

For flange dimensions, see Page 2/26.



Type of construction IM B14

For flange dimensions, see Page 2/26.



Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension								NDE shaft extension							
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC								
<b>SIMOTICS XP</b>																											
71 B	2, 4, 6	385	135	377	138	14	M5	30	22	4	5	16	14	M5	30	22	4	5	16								
80 B	2, 4, 6	408	158	391	138	19	M6	40	32	4	6	21.5	19	M6	40	32	4	6	22								
90 L	2, 4, 6	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27								
100 L	2, 4, 6	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31								
112 M	2, 4, 6	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31								
132 S	2, 4, 6	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41								
132 M	2, 4, 6	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41								
160 M	2, 4, 6	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45								
160 L	2, 4, 6	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45								
180 M	2, 4, 6	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	52								
180 L	2, 4, 6	942	415	912	246	48	M16	110	100	5	14	51.6	48	M16	110	100	5	14	52								
200 L	2, 4, 6	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59								
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59								
	4, 6	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64									
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59								
	4, 6	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64									
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64								
	4, 6				65							69	65							69							

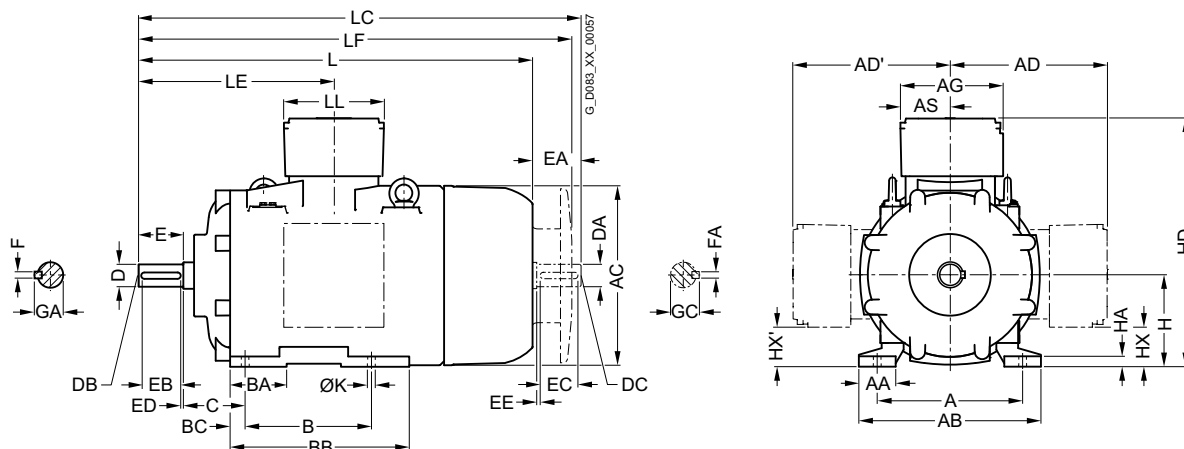
# Motors with Explosion Protection

## SIMOTICS XP 1MD5 motor series

Dimensions for frame sizes 280 S to 355 M

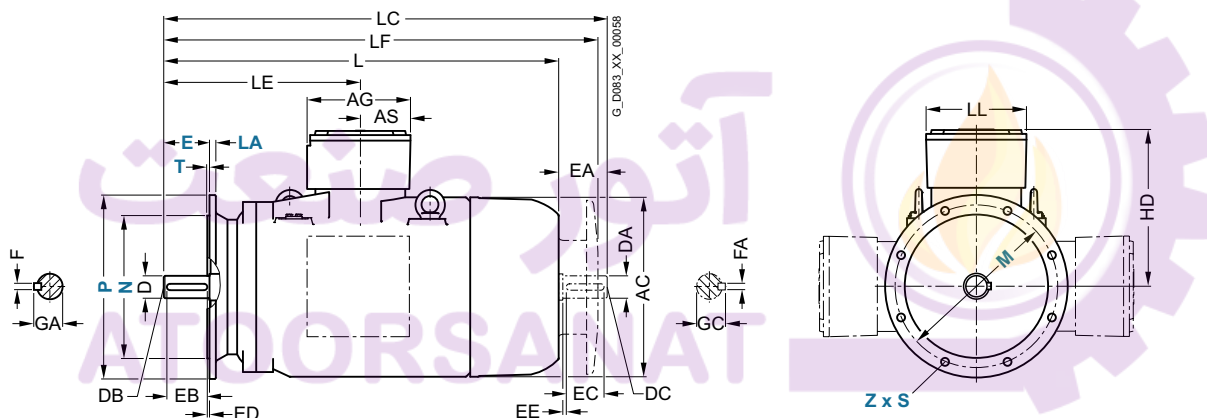
### Dimensional drawings (continued)

#### Type of construction IM B3



#### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/26.



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>SIMOTICS XP</b>																		
280 S	2 4, 6	457	110	570	550	552	382	176	368	150	520	51	190	280	40	832	25	1119
280 M	2 4, 6	457	110	570	550	552	382	176	419	150	520	51	190	280	40	832	25	1119
315 S	2 4, 6	508	125	630	622	660	509	196	406	165	575	59	216	315	40	975	28	1304 1334
315 M	2 4, 6	508	125	630	622	660	509	196	457	165	575	59	216	315	40	975	28	1304 1334
315 LL	2 4, 6	508	125	630	622	676	509	196	508	165	575	59	216	315	40	991	28	1491 1521
315 L	2 4, 6	508	125	630	622	676	509	196	560	165	575	59	216	315	40	991	28	1491 1521
355 M	2 4, 6	630	150	780	734	-	509	196	800	220	980	90	254	355	35	1182	35	1781 1840

# Motors with Explosion Protection

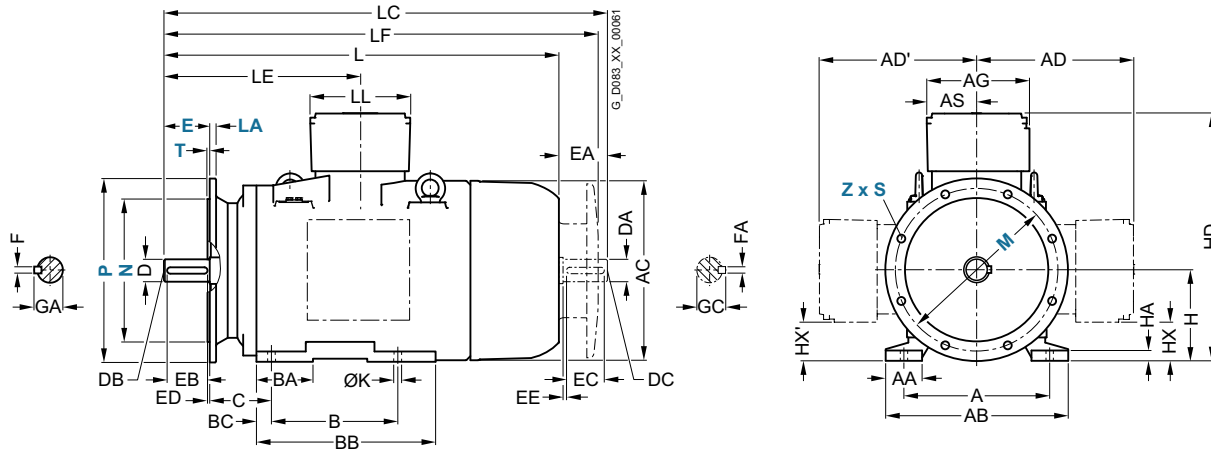
## SIMOTICS XP 1MD5 motor series

Dimensions for frame sizes 280 S to 355 M

### Dimensional drawings (continued)

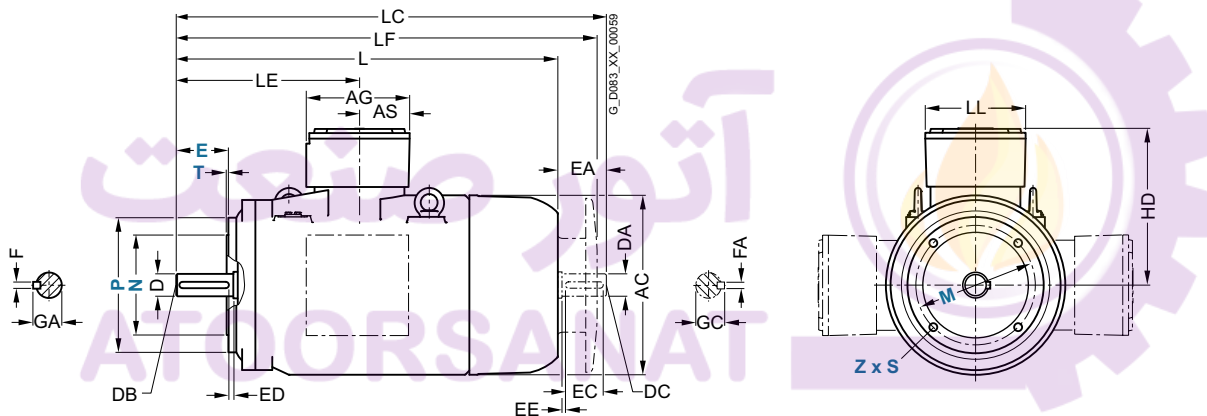
#### Type of construction IM B35

For flange dimensions, see Page 2/26.



#### Type of construction IM B14

For flange dimensions, see Page 2/26.



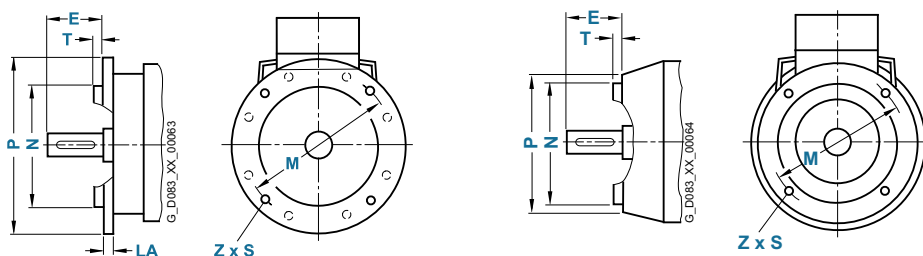
Frame size	No. of poles	Dimension designation acc. to IEC										NDE shaft extension							
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>SIMOTICS XP</b>																			
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6					75					20	79.5	75					20	79.5
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6					75					20	79.5	75					20	79.5
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6					80		170	140	15	22	79.5	80		170	140	15	22	80
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6					80		170	140	15	22	85	80		170	140	15	22	85
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6					80		170	140	15	22	85	80		170	140	15	22	85
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4, 6					80		170	140	15	22	85	80		170	140	15	22	85
355 M	2	1986	793	1947	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4, 6					100	M24	210	180	15	28	106	75		140		7.5	20	79.5

## Motors with Explosion Protection

### SIMOTICS XP 1MD5 motor series

#### Flange dimensions

#### Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes. (Z = the number of retaining holes)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
<b>SIMOTICS XP</b>										
<b>71 B</b>	2, 4	<b>FF130</b>	10	30	130	110	160	9.5	3.5	4
		<b>FT85</b>	15	30	85	70	105	M6	2.5	4
<b>80 B</b>	2, 4	<b>FF165</b>	10	40	165	130	200	11.5	3.5	4
		<b>FT100</b>	15	40	100	80	120	M6	3	4
<b>90 L</b>	2, 4	<b>FF165</b>	10	50	165	130	200	11.5	3.5	4
		<b>FT115</b>	10	50	115	95	140	M8	3	4
<b>100 L</b>	2, 4	<b>FF215</b>	11	60	215	180	250	14	4	4
		<b>FT130</b>	10	60	130	110	160	M8	3.5	4
<b>112 M</b>	2, 4	<b>FF215</b>	11	60	215	180	250	14	4	4
		<b>FT130</b>	10	60	130	110	160	M8	3.5	4
<b>132 S</b>	2, 4	<b>FF265</b>	12	80	265	230	300	14	4	4
<b>132 M</b>	2, 4	<b>FF265</b>	12	80	265	230	300	14	4	4
<b>160 M</b>	2, 4, 6	<b>FF300</b>	20	110	300	250	350	18	5	4
<b>160 L</b>	2, 4, 6	<b>FF300</b>	20	110	300	250	350	18	5	4
<b>180 M</b>	2, 4, 6	<b>FF300</b>	16	110	300	250	350	18	5	4
<b>180 L</b>	2, 4, 6	<b>FF300</b>	16	110	300	250	350	18	5	4
<b>200 L</b>	2, 4, 6	<b>FF350</b>	20	110	350	300	400	18	5	8
<b>225 S</b>	2	<b>FF400</b>	16	110	400	350	450	18	5	8
	4, 6			140						
<b>225 M</b>	2	<b>FF400</b>	16	110	400	350	450	18	5	8
	4, 6			140						
<b>250 M</b>	2, 4, 6	<b>FF500</b>	18	140	500	450	550	18	5	8
<b>280 S</b>	2, 4, 6	<b>FF500</b>	18	140	500	450	550	18	5	8
<b>280 M</b>	2, 4, 6	<b>FF500</b>	18	140	500	450	550	18	5	8
<b>315 S</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
	4, 6			170						
<b>315 M</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
	4, 6			170						
<b>315 LL</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
	4, 6			170						
<b>315 L</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
	4, 6			170						
<b>355 M</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4, 6			210						

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### General information

#### Technical specifications

##### **LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series, type of protection "Explosion-proof enclosure"**

LOHER CHEMSTAR and VARIO motors of the 1PS4 and 1PS5 series are surface-cooled motors in type of protection "Explosion-proof enclosure" Ex d. The CHEMSTAR motors can be designed in accordance with the current VIK recommendation ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry).

The motors are marked in accordance with EN 60079-0 Ed.2009 and EN 60079-1 with II 2G Ex de IIB T3-6 Gb or II 2G Ex de IIC T3-6 Gb for operation in Zone 1.

#### General technical specifications

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motors	
Motor type	D..L/D..W
Frame size	71 ... 500
Outputs	0.25 ... 1120 kW
Temperature class	T1 ... T6
Type of protection	II 2G Ex d(e) IIC Gb, IEC/EN 60079-0, IEC/EN 60079-1
Ex Zones	Gas Zone 1 optional, Dust Zone 22/21
Guidelines	94/9/EC (ATEX 95)
Cooling	Surface-cooled, water-jacket-cooled on request
No. of poles	2- ... 12-pole, multi-pole + pole-changing versions on request
Voltage/frequency	All common voltages, and in 50 Hz and 60 Hz special designs on request
Degree of protection	IP55 to IP68
Type of construction	All common types of construction + special types of construction
Housing	Cast-iron or steel
Insulation	Class F utilized according to B
Special versions	
<ul style="list-style-type: none"> <li>• For outdoor temperatures -55 to +60 °C (other temperatures on request)</li> <li>• Site altitude up to 3000 m (&gt; 3000 m on request)</li> <li>• Modified windings, for example, for increased ambient temperatures, site altitude for optimum electrical values</li> <li>• Permanent load S1 as well as partial load operation, e.g. S2/S3/S6</li> <li>• Drive-end located bearing; special bearing for increased axial/radial forces</li> <li>• Large electrical variance, such as reduced starting current, modified torque curve, star-delta start-up, etc.</li> <li>• CHEMSTAR: copper rotor as an option</li> <li>• Metal fan in aluminum, steel or brass</li> <li>• Monitoring devices such as Pt100, PTC, KTY winding/bearing, vibration monitoring, etc.</li> <li>• Country-specific certificates such as EAC (Eurasian Customs Union), NEPSI (China), China Energy Label, CCOE (India), IECEX (international)</li> <li>• Version for offshore, on-deck and/or marine classifications</li> <li>• Combination with brakes + rotary encoder + forced ventilation</li> <li>• Enlarged connection system and/or larger terminal box for large cable cross-sections</li> </ul>	

آتور صنعت  
 ATOORSANAT

## Motors with Explosion Protection

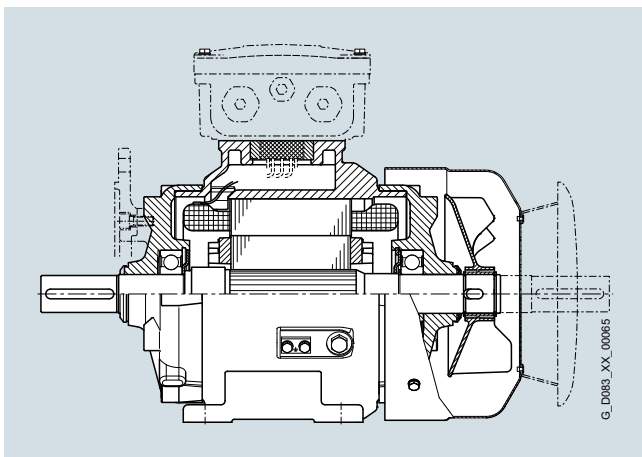
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### General information

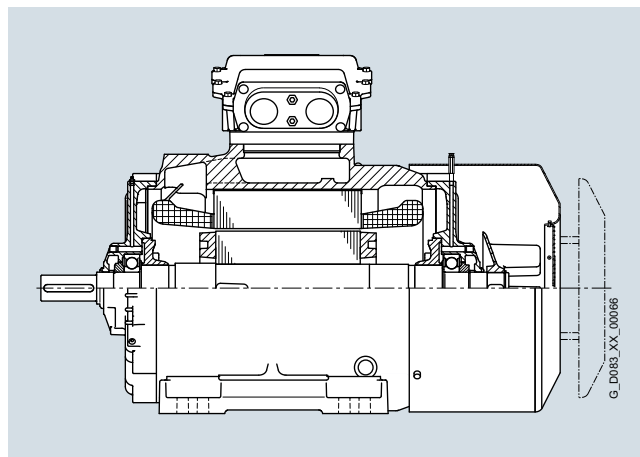
#### Technical specifications (continued)

##### Mechanical design

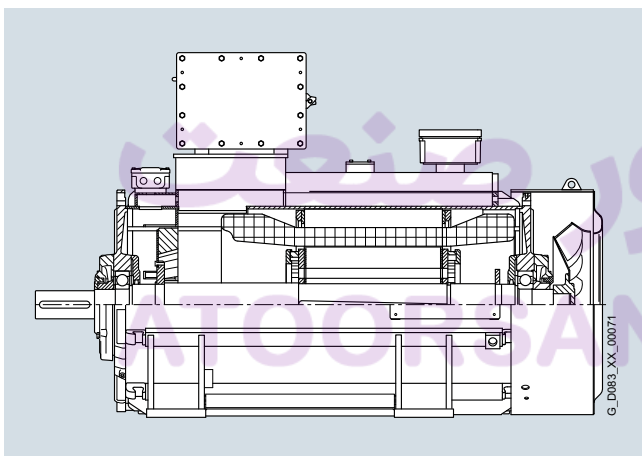
2



Sectional view of CHEMSTAR 1PS5 three-phase motor, frame sizes 71 to 132  
 Example: 1PS5131-0BD6.-4AA3 (motor type: DNGW-132SR-02)  
 7.5 kW, 2-pole



Sectional view of CHEMSTAR 1PS5 three-phase motor, frame sizes 160 to 315  
 Example: 1PS5316-0BD6.-4AA3 (motor type: DNGW-315LL-02)  
 200 kW, 2-pole



Sectional view of VARIO 1PS4/5 three-phase motor, frame sizes 355 to 500  
 Example: 1PS4356-0BH6.-4AA0 (motor type: DNGL-355LB-02)  
 315 kW, 2-pole

#### Housing, ventilation

##### Housing and fan for motors of the LOHER CHEMSTAR and VARIO 1PS5/1PS5 series

Frame size	Housing Material	Design of housing feet <sup>1)</sup>	Surface	Bearing plates Material	Fan cover Material	Fan <sup>2)</sup> Material
<b>LOHER CHEMSTAR</b>						
71 ... 160	Cast-iron	Cast	With cooling fins	Cast-iron	Sheet steel	Plastic
180 ... 315		Screwed on				Aluminum
355		Cast				Steel
<b>LOHER VARIO</b>						
355 ... 450	Steel	Welded	With cooling fins	Cast-iron	Sheet steel	Steel
500 <sup>3)</sup>				Steel, bearing hub in cast-iron		

<sup>1)</sup> For designs with feet only.

<sup>2)</sup> For specific operating conditions, the external fans can be constructed in aluminum for frame sizes 71 to 225 and in sheet steel for frame sizes 250 to 315. This applies in the case of increased coolant temperature in particular. The cooling air flow from NDE to DE must not be obstructed. The intake area in front of the fan cover must not be obstructed.

<sup>3)</sup> Suitable for both directions of rotation, but LOHER VARIO 2- and 4-pole are only suitable for one direction of rotation.



## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### General information

#### Technical specifications (continued)

##### Protection against ingress of condensation

Condensation drainage holes must not be drilled into encapsulated explosion-proof motors, otherwise the type of protection can no longer be ensured. In frame size 250 and above, the explosion-proof encapsulated motors have separate chambers at the drive end (DE) and non-drive end (NDE) for collection of any condensation that may arise. This prevents possible damage to the winding as a result of condensation in the winding overhang spaces. In the case of smaller motors (frame size range 71 to 225), the risk of adverse effects from condensation is countered by applying increased humidity protection to the winding insulation.

In the standard version, the motor can be used in environments with up to 80 % relative humidity without the need for further measures. For operation at higher humidity levels, the hollow spaces and internal parts can be finished with special paint, which enables operation at up to 100 % humidity to be achieved as an option. In the CHEMSTAR motor series, an anti-condensation heater is not necessary in most cases. This is known as a "tropical insulation version".

##### Explosion-proof three-phase motors in type of protection Ex d for ambient temperatures down to -55 °C

Motors of the 1PS4/1PS5 series can also be designed for hazardous areas with ambient temperatures down to -55 °C.

Advantages	The motors can be used in hazardous areas at ambient temperatures down to -55 °C without the need for expensive additional heating. This saves on expensive switching and monitoring devices, the associated cables and leads, as well as heating energy.
Explosion protection	In accordance with European standards EN 60079-0, EN 60079-1, EN 60079-7
Marking	II 2G Ex de IIB T3-6 Gb or II 2G Ex de IIC T3-6 Gb
Certifications	EC type-examination certificate
Ambient temperature range	-55 to +60 °C
Type series	CHEMSTAR and VARIO 1PS4/1PS5 motors
Rated voltage $U_{rated}$	Up to 690 V
Design	Selection of materials for temperatures down to -55 °C Group IIC or IIB Optional version possible Motors with built-on components, such as brakes and speed encoders, cannot be supplied for ambient temperatures down to -55 °C.
Note	The fan must not be blocked by ice or snow.

آتور صنعت  
 ATOORSANAT

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### General information

#### Technical specifications (continued)

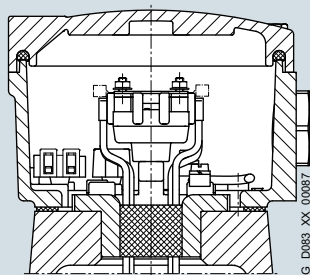
##### Terminal boxes

The terminal boxes comply with the type of protection "Increased safety" Ex e in accordance with EN 60079-0 and EN 60079-7. The housings are made of cast-iron and designed to IP55 degree of protection in accordance with EN 60034-5. The terminals are therefore protected from touch, dust deposits and water jets from any direction.

The position of the terminal box and cable entries can be obtained from the tables below. In frame size 90 and above, the terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides. In frame sizes 71 and 80, the terminal box can only be rotated subsequently in an authorized specialist workshop (due to opening the explosion-proof enclosure).

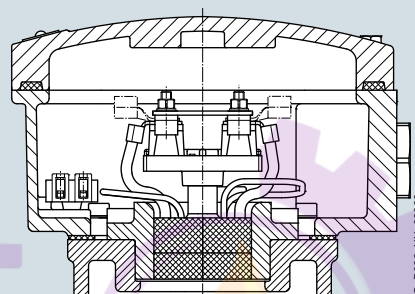
Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box in type of protection Ex e II mounted on the side of the terminal box. The design of the terminal boxes can be seen in the schematic diagrams. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below. Terminal boxes in type of protection "Explosion-proof enclosure" Ex d IIC according to EN 60079-0 and EN 60079-1 can be supplied on request. Separate terminal boxes for main connections and accessories are available in type of protection "Explosion-proof enclosure" for auxiliary terminals for frame sizes 200 to 500 only.

**Figure 1** Terminal box for LOHER CHEMSTAR frame sizes 71 to 112



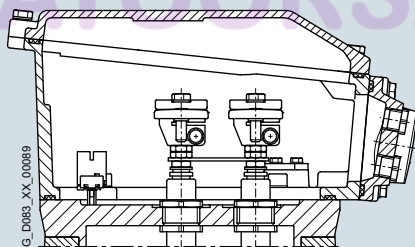
Auxiliary terminal box is not possible.

**Figure 2** Terminal box for LOHER CHEMSTAR frame sizes 132 to 225



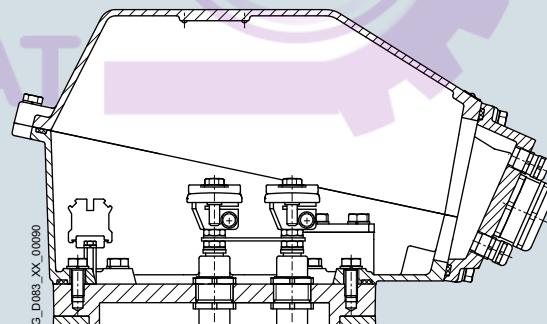
Frame sizes 132 to 160, 1 auxiliary terminal box Ex e (**W72**, **M52**) is possible, frame sizes 180 to 225, 2 auxiliary terminal boxes Ex e (**W72**, **M52**) are possible.

**Figure 3** Terminal box for LOHER CHEMSTAR frame sizes 250 to 280



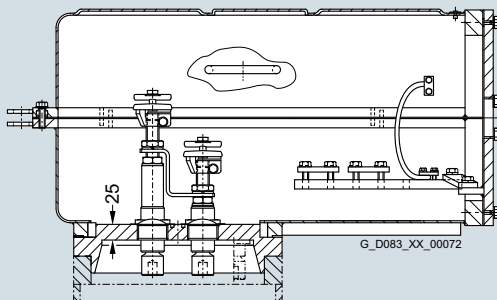
3 auxiliary terminal boxes Ex e (**W72**, **M52**) are possible.

**Figure 4** Terminal box for LOHER CHEMSTAR frame sizes 315 to 355



3 auxiliary terminal boxes Ex e (**W72**, **M52**) are possible.

**Figure 5** Terminal box for LOHER VARIO frame sizes 355 to 500



With the VARIO connection system, the auxiliary terminal boxes (max. 3) are mounted on the housing.

For versions with terminal box Ex d, no auxiliary terminal boxes are possible for frame sizes 71 to 112 and 1 auxiliary terminal box Ex d (**V43**) is possible for frame sizes 132 to 355.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### General information

#### Technical specifications (continued)

##### Terminal boxes for 1PS4 and 1PS5 motors

Degree of protection: IP55

Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7

Housing material: Cast-iron

Frame size	Standard terminal box				PE/ground connection	Fig. No. on Page 2/30	Enlarged terminal box – Option <b>L00</b>				
	Terminal studs	Conductor cross-section		Auxiliary terminals in main terminal box			Terminal studs	Conductor cross-section		Fig. No. on Page 2/30	
		min.	max.	Number × max. cross-section <sup>1)</sup>	max.		min.	max.			
		mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>		mm <sup>2</sup>	mm <sup>2</sup>			
<b>LOHER CHEMSTAR</b>											
71	6 × M4	1	2.5 (6) <sup>2)</sup>	4 × 2.5	4	6 <sup>2)</sup>	<b>Fig. 1</b>	6 × M5	1	10 (25) <sup>2)</sup>	<b>Fig. 2</b>
80											
90											
100											
112											
132	6 × M5	1	10 (25) <sup>2)</sup>		25		<b>Fig. 2</b>	6 × M6	2.5	35 (50) <sup>2)</sup>	<b>Fig. 2</b>
160											
180	6 × M6	2.5	35 (50) <sup>2)</sup>	12 × 4	70		<b>Fig. 2</b>	6 × M10	6	70	<b>Fig. 3</b>
200											
225											
250	6 × M10	6 ... 70			95		<b>Fig. 3</b>	6 × M12	16	150	<b>Fig. 4</b>
280											
315 S/M	6 × M12	16 ... 150		16 × 4	150		<b>Fig. 4</b>	6 × M16	16	300	<b>Fig. 4</b>
315 L	6 × M16/M20 <sup>3)</sup>	16 ... 300						Special connection system on request			
<b>LOHER VARIO</b>											
355 ... 500							<b>Fig. 5</b>				

Number and size of entry threads and cable glands (to be ordered specially), see table "Cable glands for 1PS4 and 1PS5 motors".

##### Cable glands for 1PS4 and 1PS5 motors

Frame size	Standard cable glands		Removable gland plate (for Ex e terminal box only)	Max. entry threads <sup>6)</sup>				
	Entry thread <sup>4)</sup>	Cable diameter <sup>5)</sup>		Ex e terminal box		Ex d terminal box		
	Type HSK-M-Ex for Ex e	Type ADE 1F for Ex d		Metric	NPT	Metric	NPT	
	mm	mm						
<b>LOHER CHEMSTAR</b>								
71	1 × M25 × 1.5	10 ... 16	8.5 ... 16	None	1 × M32 × 1.5	2 × 1"	2 × M40 × 1.5	2 × 1 <sup>1</sup> / <sub>4</sub> "
80								
90								
100	1 × M32 × 1.5	13 ... 20	18 ... 27.5					
112	2 × M32 × 1.5							
132					2 × M50 × 1.5	2 × 2"	2 × M63 × 1.5	2 × 2"
160	2 × M40 × 1.5	22 ... 32	23 ... 34					
180				None	2 × M63 × 1.5			
200	2 × M50 × 1.5	32 ... 38	29 ... 41					
225								
250	2 × M63 × 1.5	37 ... 44	42 ... 56	With				
280								
315					2 × M100 × 2	2 × 4"	2 × M100 × 2	2 × 4"

Additional entry threads, e.g. for PTC thermistor, heating:

- Ex e II: M20 × 1.5/D = 6 up to 12 mm
- Ex d IIC: M20 × 1.5/D = 6 up to 12 mm

Entry threads are sealed on delivery with certified plugs, cable glands can be ordered separately.

1) Rated voltage / max. working voltage 400 V / 440 V.  
 2) Maximum conductor cross-section with cable lug.  
 3) Alternatively, larger studs for higher rated current.

4) Number and size of entry threads according to DIN 42925.  
 5) Cable glands suitable for unshielded/non-reinforced cables and leads. Option **K54** (Ex e), **W91** (Ex d).  
 6) Other threads, number and size on request.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### General information

#### Technical specifications (continued)

##### Auxiliary terminal box

Degree of protection: IP55

Type of protection: Ex e II, alternatively Ex d IIC acc. to EN 60079-0/EN 60079-1/EN 60079-7

Housing material: Cast-iron

Frame size	Standard terminal box		Max. configuration of auxiliary terminal boxes <sup>2)</sup>					
	Main terminal box		Auxiliary terminal box		Max. auxiliary connections	Fig. No. on Page 2/30	Auxiliary terminal box	
	Max. auxiliary connections	Fig. No. on Page 2/30	Design	Max. connections <sup>1)</sup> (number × max. cross-section) mm			Design	Max. connections <sup>1)</sup> (number × max. cross-section) mm
<b>LOHER CHEMSTAR</b>								
71	2	<b>Fig. 1</b>	–	–	6	<b>Fig. 2</b>	Cast	6 × 2.5
80								
90								
100								
112								
132	6	<b>Fig. 2</b>	Cast	6 × 2.5	12	<b>Fig. 2</b>	Screwed on	12 × 4
160								
180	12	<b>Fig. 2</b>	Screwed on	12 × 4	20	<b>Fig. 3</b>	Screwed on	36 × 4
200								
225								
250	20	<b>Fig. 3</b>	Screwed on	36 × 4	36	<b>Fig. 4</b>	Screwed on	42 × 4
280								
315 L	36	<b>Fig. 4</b>	Screwed on	42 × 4	Special solution on request			

Explosion-proof terminal boxes with a cast auxiliary terminal box only (max. 12 × 4 mm<sup>2</sup>), for number and size of entry threads, see table "Cable glands for 1PS5 motors".

<sup>1)</sup> Rated voltage / max. working voltage 400 V / 440 V.

<sup>2)</sup> Only in conjunction with enlarged terminal box.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### General information

#### Technical specifications (continued)

##### Electrical design

The outputs and electrical values listed in the selection tables can be changed by modifying the configuration. For example, if a copper cage rotor is used in place of a die-cast aluminum rotor, an even higher degree of efficiency can be achieved.

The insulation system of this motor series is suitable for line voltages up to 1000 V. The connection system (terminal box, terminals) is designed for rated voltages up to 1000 V.

The explosion-proof motors are equipped with 6 terminals. They can be operated in star or delta. The standard connection for all 400 V motors is delta connection. They are therefore suitable for 400 V $\Delta$ /690 VY. The 500 V motors are available both for 500 VY and for 500 V $\Delta$ , provided that one of the two variants is not preferred for winding reasons.

Motors of the 1PS5 series are wound in accordance with temperature class F (155 °C). Normally, they are only utilized according to class B (130 °C). In accordance with EN 60034-1, in addition to the temperature class, the thermal utilization is also stamped on the rating plate if this value lies below that of the temperature class. The fixed-voltage motors of this series are therefore stamped with "F – B". Temperature class F is only used by a few exceptions. They are indicated in the selection and ordering data and are stamped with "F".

The standard also requires that even with an unfavorable constellation, the temperature on the outer surface of the explosion-proof enclosure must not exceed the maximum permissible temperature for the respective temperature class. The motors in this list are certified for T4. The maximum permissible surface temperature is therefore 135 °C.

##### Operation on a frequency converter

General use of "Overcoat" double-layer enameled wire, optimized impregnation techniques and partial use of pre-formed coils with VARIO motors ensures that most motors can be converter-fed without modification of the electrical design. The maximum limits and parameters for converter-fed operation are summarized in this catalog.

For operation on a frequency converter, the motor must be fitted with PTC thermistors. These are installed in the stator winding and, in combination with a trip unit certified by the German Federal Testing Laboratory, they perform sole motor protection in the case of converter-fed operation. Motor circuit breakers can be dispensed with. PTC thermistors with a rated shutdown temperature of 145 °C ("KL145") are normally used. Converter-fed motors of this type are normally stamped with duty type S1 or S9.

##### Mains-fed operation

Selection of the PTC thermistor for full motor protection (sole protection) in mains-fed operation is more complex because the load case "blocked shaft, motor draws full starting current" also has to be monitored.

To protect the rotor, it may be necessary here to use only PTC thermistors with low tripping temperatures. The advantage is that all line duty types (S1 to S7) and converter-fed operation (S9) are covered. These motors are therefore stamped with S1 to S7 and S9. The larger the motor and the smaller the number of poles, the more difficult it is to achieve sole protection using PTC thermistors in mains-fed operation: due to the laws of increasing size, larger machines become ever more "rotor-critical". The sole protection limit for 4-pole motors typically lies in the region of frame size 280.

##### Voltage tolerances

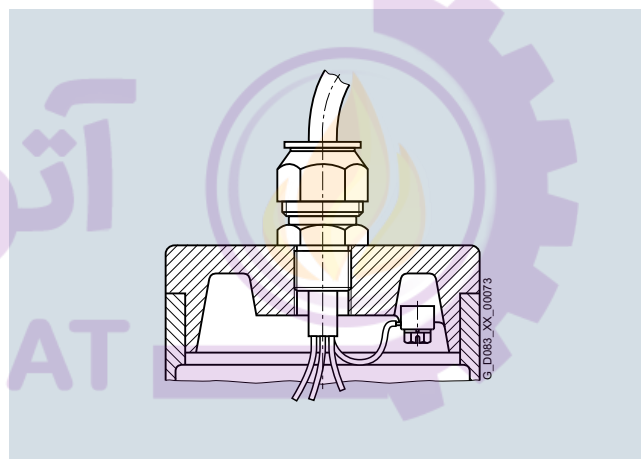
The motors are tested at -10 % of rated voltage and 100 % of rated torque, as well as at +10 % of rated voltage and 100 % of rated torque which is determined at rated output and mean voltage. It is assumed that the voltage can vary within the range of specified tolerance, but during operation the mean voltage is mainly applied to the motor (e.g. 400 V). The rated current is therefore stamped as the current that flows at rated output and mean voltage. It is sufficient to verify during testing that all temperature limits are complied with at rated torque throughout the voltage range. The motor is permitted to be operated continuously within this range.

##### Three-phase motors with external cables

Three-phase motors with externally routed connecting cables are used in machines or ventilation systems in which the electrical connections are routed via a separately mounted terminal box due to the space constraints.

##### Design

The motors correspond to the surface-cooled versions in this catalog. A gland plate is mounted in place of the terminal box (Options **G48/G49**).



**Explosion protection:** II 2G Ex d IIC T4 Gb

**Frame sizes and types of construction:** see dimensional drawings

**Permissible coolant temperature:** -20 to +50 °C

**Connection cable** (standard design): NSSH $\acute{o}$ u-J

The free length of connection cable must be specified when ordering. The standard length is 1.5 m. Two or more cable entries are used in the case of pole-changing or single-speed motors with rated current > 70 A.

**Rated voltage:** 1000 V

**Max. operating temperature at conductor:** -20 to +80 °C

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### General information

#### Technical specifications (continued)

##### Motors with built-on backstop

If reverse motion of the drive has to be prevented following switch-off, three-phase motors with mechanical backstop can be used. Backstops are maintenance-free and have individual spring-loaded clamping elements. The backstops of the type CSK are supplied with permanent lubrication. The clamping elements have a tendency to lift. In backstops of the FXM type series, the clamping elements lift automatically after approach due to the centrifugal force. Wear therefore does not occur at rated speed of the motor.

The backstop is not permitted to be used as protection against rotation in the wrong direction caused by switching despite the interlock. The direction of rotation must be specified on ordering.

The motor outputs are as specified in the selection tables in this catalog. The assignment of backstops to frame sizes is specified in the table below. Frame sizes 90 to 112 have the same dimensions as standard motors. Dimensional drawings are available for the larger types on request.

##### Backstops for motors of frame sizes 132 to 355

Motor Frame size	No. of poles	Backstop	
		Type	$M_t$ Nm
132	2, 4, 6	FXM 51-25 DX	On request
160	2, 4, 6	FXM 66-25 DX	400
180	2, 4, 6	FXM 66-25 DX	400
200	2, 4, 6, 8	FXM 86-25 DX	430
225	2, 4, 6, 8	FXM 86-25 DX	430
250	2, 4, 6, 8	FXM 100-50 DX	860
280	2, 4, 6, 8	FXM 120-50 SX	860
315	2, 4, 6, 8	FXM 120-50 SX	On request
355	2	FXM 120-50 SX	On request
355	4, 6	FXM 140-50 SX	On request

With the backstops listed in the table above, motors of frame sizes 90 to 355 can be supplied in IP55 or IP56 degree of protection. Higher degrees of protection on request.

##### Axially-mounted forced ventilation

Forced ventilation with axially-mounted fans is mainly used with converter-fed operation. It serves to increase the motor utilization while lowering the sound level in accordance with the synchronous speed. Motors with forced ventilation are designed for rated voltage ranges in accordance with the following table. The data is shown on the rating plate on the external fan or on the motor with forced ventilation.

Special versions for higher ambient temperatures, increased vibration loading on request.  
Retrofitting of forced ventilation is only possible following the prior consent of Siemens Ruhstorf.

**Degree of protection:** IP55, available as a special version up to IP66.

##### Rated voltage ranges for forced ventilation on motors of the 1PS4 and 1PS5 series

Motor Frame size	Motor type	Mains/ connection	Rated voltage range V	Frequency Hz	Rated output kW	Rated current max. A
<b>LOHER CHEMSTAR</b>						
132 ... 225	<i>DN.W-071BG-04</i>	Y	400	50	0.25	0.70
	<i>DN.W-071BH-04</i>		440	60	0.44	1.05
250	<i>DN.W-071BG-04</i>	Y	400	50	0.25	0.70
	<i>DN.W-080BH-04</i>		440	60	0.90	1.90
280 ... 315	<i>DN.W-080BG-04</i>	Y	400	50	0.75	1.70
	<i>DN.W-080BH-04</i>		440	60	0.90	1.90
355	<i>DN.W-090LX-04</i>	D	400	50	1.1	2.60
			60 Hz on request			
<b>LOHER VARIO</b>						
355 ... 500	<i>DN.W100LD04</i>	D	400	50	3	6.60
			60 Hz on request			

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

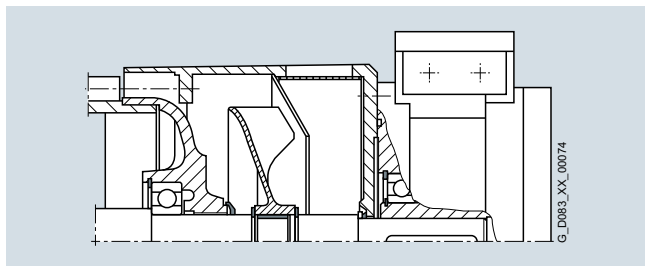
#### General information

#### Technical specifications (continued)

##### Built-on single-disk spring-operated brake

##### Design

The explosion-proof single-disk spring-operated brake is attached to the reinforced fan cover and the extended motor shaft. Otherwise, in terms of their mechanical design, the motors are identical to the surface-cooled motors in this catalog.



**Voltage and frequency:** Motors with a built-on brake are supplied for the voltages and frequencies specified in the output tables.

**Output:** The outputs specified in the selection tables are applicable to S4 duty type in accordance with EN 60034-1.

**Thermal motor protection:** The motors have 3 embedded PTC thermistors and are designed for sole protection in combination with a trip unit.

**Possible brake size:** See table of outputs

**Connection:** The brake is connected in the terminal box mounted on the brake.

**Brake:** Type 76...-B

**Degree of protection acc. to EN 60034-5:** IP67

**Permissible ambient temperatures:** -20 to +40 °C

**Type of protection** acc. to EN 60079-0, EN 60079-1 and EN 60079-7: II 2G Ex de IIC T5 Gb  
 Terminal box: II 2G Ex e II Gb  
 In special version with dust protection II 2D T100\_C,  
 DMT02 ATEX E 122 approval

##### AC connection:

Preferred voltage 230 V 1 AC, frequency 40 to 60 Hz or

##### DC connection:

Preferred voltages 24 V DC, 205 V DC

The single-disk spring-operated brake is an electromagnetic unit for dry-running operation. An electromagnetic field is used to release the brake which is applied using spring force.

The spring-operated brake brakes at zero current and releases when an AC or DC voltage is applied. The brake can be operated on the AC or DC side when alternating current is flowing.

The brake is equipped with a microswitch and 2 thermostatic switches. These switching elements are dimensioned for 250 V AC, 2.5 A inductive. In the control line of the motor contactor, the microswitch prevents the motor starting in opposition to the unreleased brake. The microswitch is not permitted to be used in lifting gear and elevators. The thermostatic switches (NC) connected in series with the microswitch (NO) interrupt the control circuit as soon as an impermissible temperature rise occurs in the brake. The motor is only permitted to be controlled via the microswitch of the spring-operated brake to ensure that it can never start in opposition to the unreleased brake. The brake can be equipped with a manual release on request, which allows the brake to be released manually.

If the motor is only ordered and used for S1 duty type and the built-on brake is only required as a holding brake, the motor can be protected with a motor circuit breaker in accordance with DIN VDE 0165.

##### Mechanical design with brake

Dust and explosion protection II for DC or single-phase AC

##### General technical specifications

		Brake designs	
		76 24E..B00 – DC (direct current)	76 24G..B00 – AC (alternating current)
Standard rated voltage	V	205 V DC	230 V AC
Degree of protection	–	IP67	
Temperature class	–	T5 (according to EN 60079)	
Rated torque	Nm	10 ... 270	

##### Technical specifications

		Brake size					
		10	11	13	16	19	24
Braking torque $T_2$	Nm	10	20	50	100	150	270
Max. speed $n_{max}$	rpm	6000	6000	3000	3000	3000	3000
Maximum switching power $P_{max}$	kJ/h	270	270	400	400	570	570
Maximum operating energy $(Z = 1) W_{max}$	kJ	41	41	55	55	80	80
Rated power $P_{rated}$	W	56	56	82	82	91	91
Apparent power $P_S$	VA	62	62	88	88	95	95
Application time $t_1$	ms	80	70	110	90	180	140
Release time $t_2$	ms	80	110	170	230	240	350
Moment of inertia of brake (driver and friction disk)	kg m <sup>2</sup>	0.0025	0.0025	0.0215	0.0215	0.125	0.125
Weight $m$	kg	14.5	14.5	29	29	57	57

# Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Motors in cast-iron and steel versions

## Selection and ordering data

P <sub>ra</sub> ted, 50 Hz kW	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kgm <sup>2</sup>			
		n <sub>ra</sub> ted, 50 Hz	T <sub>ra</sub> ted, 50 Hz	IE class	η <sub>ra</sub> ted, 50 Hz	η <sub>ra</sub> ted, 50 Hz	η <sub>ra</sub> ted, 50 Hz	cos φ rated	I <sub>ra</sub> ted, 50 Hz	I <sub>ra</sub> ted, 50 Hz	I <sub>ra</sub> ted, 50 Hz					T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>	T <sub>B</sub> / T <sub>ra</sub>
		rpm	Nm	%	%	%	%	A	A	A	-	-	-					
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>																		
2-pole: 3000 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
0.37	071 B	2780	1.27	1)	77.5	78.5	78.3	0.87	0.79	0.63	0.46	2.5	5.0	2.5	DNGW-071BR-02 <sup>2)</sup>	1PS 5070-BD-4AA3	24	0.0006
0.55	071 B	2780	1.89	1)	77.5	78.5	78.3	0.86	1.19	0.95	0.69	2.5	5.0	2.5	DNGW-071BS-02 <sup>2)</sup>	1PS 5071-BD-4AA3	25	0.0006
0.75	080 B	2810	2.55	IE2	81.6	83.0	82.0	0.87	1.52	1.22	0.88	2.7	5.8	2.9	DNGW-080BR-02 <sup>2)</sup>	1PS 5080-BD-4AA3	26	0.0008
1.1	080 B	2810	3.74	IE2	81.5	82.8	82.7	0.86	2.30	1.84	1.33	2.8	5.5	2.9	DNGW-080BS-02 <sup>2)</sup>	1PS 5081-BD-4AA3	28	0.0008
1.5	090 L	2865	5.00	IE2	84.0	85.1	84.3	0.88	2.90	2.32	1.68	3.0	6.8	2.8	DNGW-090LR-02	1PS 5095-BD-4AA3	36	0.0020
2.2	090 L	2850	7.4	IE2	84.6	85.6	85.1	0.86	4.4	3.52	2.55	3.0	6.5	3.0	DNGW-090LS-02	1PS 5098-BD-4AA3	36	0.002
3	100 L	2900	9.9	IE2	86.0	86.3	85.8	0.87	5.8	4.6	3.36	2.7	7.5	3.0	DNGW-100LS-02	1PS 5106-BD-4AA3	51	0.0041
4	112 M	2890	13.2	IE2	86.5	86.8	86.8	0.93	7.2	5.8	4.2	2.7	7.0	3.1	DNGW-112MS-02	1PS 5113-BD-4AA3	66	0.0075
5.5	132 S	2910	18.0	IE2	88.5	89.9	89.2	0.90	10.0	8.0	5.8	2.6	6.7	3.1	DNGW-132SR-02	1PS 5131-BD-4AA3	83	0.014
7.5	132 S	2915	24.6	IE2	89.5	90.1	89.5	0.91	13.3	10.6	7.7	2.7	6.8	3.0	DNGW-132SS-02	1PS 5132-BD-4AA3	95	0.020
11	160 M	2955	36	IE2	90.7	91.0	90.0	0.90	19.5	15.6	11.3	2.1	7.5	2.8	DNGW-160MR-02	1PS 5163-BD-4AA3	176	0.045
15	160 M	2955	48	IE2	91.3	92.1	91.9	0.89	26.5	21.5	15.4	2.1	7.0	2.8	DNGW-160MS-02	1PS 5165-BD-4AA3	176	0.092
18.5	160 L	2955	60	IE2	91.4	92.2	91.9	0.89	33.0	26.5	19.0	2.1	7.0	2.8	DNGW-160LS-02	1PS 5166-BD-4AA3	192	0.092
22	180 M	2960	71	IE2	92.5	93.0	92.8	0.90	38.0	30.5	22.0	2.2	6.8	2.9	DNGW-180MS-02	1PS 5183-BD-4AA3	246	0.16
30	200 L	2955	97	IE2	92.0	92.3	91.7	0.87	54.0	43.5	31.5	2.5	6.9	3.3	DNGW-200LR-02	1PS 5206-BD-4AA3	333	0.20
37	200 L	2960	119	IE2	92.5	92.8	92.3	0.88	66.0	52.0	38.0	2.7	7.4	3.5	DNGW-200LS-02	1PS 5208-BD-4AA3	349	0.23
45	225 M	2965	145	IE2	92.9	93.1	92.5	0.88	79.0	64.0	46.0	2.3	7.8	2.6	DNGW-225MS-02	1PS 5223-BD-4AA3	420	0.34
55	250 M	2975	177	IE2	93.8	93.9	93.2	0.86	98.0	79.0	57.0	2.1	8.0	2.9	DNGW-250MM-02	1PS 5253-BD-4AA3	540	0.45
75	280 S	2980	240	IE2	94.4	93.9	92.4	0.89	129	103	75.0	2.1	7.3	3.0	DNGW-280SL-02	1PS 5280-BD-4AA3	775	0.88
90	280 M	2980	288	IE2	94.4	94.1	92.6	0.90	153	122	89.0	2.0	6.3	2.5	DNGW-280MM-02	1PS 5283-BD-4AA3	830	1.03
110	315 S	2980	352	IE2	94.8	94.3	92.9	0.88	190	152	110	2.2	6.7	2.5	DNGW-315SL-02	1PS 5311-BD-4AA3	1030	1.55
132	315 M	2980	423	IE2	95.1	95.0	94.2	0.89	225	180	130	2.0	6.3	2.4	DNGW-315ML-02	1PS 5313-BD-4AA3	1080	1.85
160	315 M	2980	513	IE2	95.6	95.6	95.0	0.89	270	215	157	2.3	6.8	2.6	DNGW-315MN-02	1PS 5315-BD-4AA3	1160	2.2
200	315 L	2980	641	IE2	95.8	95.8	95.2	0.89	340	270	196	2.6	7.3	2.7	DNGW-315LL-02	1PS 5316-BD-4AA3	1390	2.8
250	315 L	2985	800	IE2	95.8	95.8	95.8	0.90	420	335	245	2.6	7.3	2.7	DNGW-315LN-02	1PS 5318-BD-4AA3	1570	3.5
315	355 M	2984	1008	IE2	95.6	95.4	94.5	0.88	540	432	313	1.6	6.8	2.3	DNGW-355MR-02 <sup>3)</sup>	1PS 5353-BD-4AA3	2520	4.8
360	355 M	2984	1152	IE2	95.9	95.6	95.0	0.89	610	488	354	1.7	6.8	2.4	DNGW-355MS-02 <sup>3)</sup>	1PS 5355-BD-4AA3	2660	5.3
460	355 M	2985	1472	1)	96.3	96.3	95.7	0.90	770	616	446	1.9	6.8	2.6	DNGW-355MT-02 <sup>3)</sup>	1PS 5357-BD-4AA3	2800	6.4
<b>LOHER VARIO</b>																		
400	355 L	2985	1279	1)	96.7	96.7	96.1	0.91	655	525	380	1.4	7.9	3.2	DNS-355LD-02	1PS 358-BH-4AA0	2250	4.0
450	355 L	2978	1443	1)	96.4	96.5	96.0	0.91	740	590	430	0.95	6.2	2.55	DNS-355LX-02	1PS 358-BJ-4AA0	2600	5.0
450	400 L	2984	1440	1)	96.5	96.5	95.9	0.90	745	595	430	0.80	6.2	2.8	DNS-400LL-02	1PS 404-BJ-4AA0	3000	6.0
500	400 L	2982	1601	1)	96.6	96.7	96.2	0.91	820	655	475	0.80	5.9	2.55	DNS-400LN-02	1PS 405-BJ-4AA0	3200	7.0
560	400 L	2983	1792	1)	96.8	96.8	96.3	0.91	915	730	530	0.85	6.2	2.7	DNS-400LN-02	1PS 407-BJ-4AA0	3200	7.0
630	400 L	2984	2016	1)	96.8	96.8	96.3	0.91	-	825	595	0.85	6.2	2.6	DNS-400LX-02	1PS 408-BJ-4AA0	3500	8.5
630	450 L	2986	2014	1)	96.7	96.6	96.0	0.91	-	830	600	0.75	6.2	2.7	DNS-450LL-02	1PS 453-BJ-4AA0	4200	11
710	450 L	2986	2270	1)	96.8	96.8	96.2	0.91	-	925	670	0.80	6.3	2.8	DNS-450LL-02	1PS 455-BJ-4AA0	4200	11
800	450 L	2986	2557	1)	96.9	96.9	96.3	0.91	-	1050	760	0.80	6.3	2.8	DNS-450LN-02	1PS 457-BJ-4AA0	4500	13
900	450 L	2985	2879	1)	97.0	97.0	96.5	0.91	-	1170	850	0.85	6.4	2.7	DNS-450LN-02	1PS 458-BJ-4AA0	4500	13
1000	500 L	2986	3198	1)	96.6	96.5	95.6	0.90	-	960	850	0.85	6.4	2.8	DNS-500LL-02	1PS 505-BJ-4AA0	6400	24
1200	500 L	2990	3831	1)	96.9	96.8	96.1	0.91	-	1135	960	0.75	6.6	2.8	DNS-500LN-02	1PS 508-BJ-4AA0	6400	35
<b>Enclosures</b>												Frame size	L	4	5	Order code		
Ex de IIB/Ex d IIB												355 ... 500	L	4	5	-		
Ex de IIC/Ex d IIC												71 ... 500	W	4	5	-		
<b>Operating modes</b>												Frame size				Order code		
Mains-fed operation												71 ... 450 (≤ 800 kW)		0		-		
Converter-fed operation, standard insulation												71 ... 400		1		-		
Converter-fed operation with special insulation (derating approx. 5 %)												160 ... 500		2		-		
Mains-fed operation, pre-formed coil												450 (> 800 kW) ... 500		3		-		
Converter-fed operation, pre-formed coil												450 ... 500		4		-		
<b>Voltages</b>												Frame size				Order code		
690 VΔ, 50 Hz												355 ... 500		0		-		
230 V/400 V, 50 Hz												71 ... 112		1		-		
500 VY, 50 Hz												71 ... 315		3		-		
500 VΔ, 50 Hz												355 ... 450		5		-		
400 V/690 V, 50 Hz												71 ... 400		6		-		
690 VY, 50 Hz												71 ... 400		8		-		
For other voltages see Page 2/54												71 ... 500		9		...		
<b>Types of construction</b>												Frame size				Order code		
IM B3												71 ... 500		0		-		
IM B5												71 ... 315		1		-		
IM B34												71 ... 112		2		-		
IM B14												71 ... 112		3		-		
IM V1/cover												71 ... 400		4		-		
IM B35												71 ... 500		6		-		
For other types of construction see from Page 1/28												71 ... 500		9		...		

1) Outside the IE code classification according to IEC 60034-30.

3) Direction of rotation must be specified (order code **K97** or **K98**).

2) Variant can be supplied as Ex nA, Loher type changes to **ANGK...**





# Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Motors in cast-iron and steel versions

## Selection and ordering data (continued)

P <sub>ra</sub> ted, 50 Hz kW	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kgm <sup>2</sup>			
		n <sub>ra</sub> ted, 50 Hz	T <sub>ra</sub> ted, 50 Hz	IE class	η <sub>ra</sub> ted, 50 Hz	η <sub>ra</sub> ted, 50 Hz	η <sub>ra</sub> ted, 50 Hz	cos φ rated	I <sub>ra</sub> ted, 50 Hz	I <sub>ra</sub> ted, 50 Hz	I <sub>ra</sub> ted, 50 Hz					T <sub>L</sub> /T <sub>ra</sub>	L <sub>R</sub> /I <sub>ra</sub>	T <sub>B</sub> /T <sub>ra</sub>
		rpm	Nm	%	%	%	%	A	A	A	-	-	-					
		FS																
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>																		
6-pole: 1000 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
0.25	071 B	910	2.62	1)	65.0	67.0	63.5	0.75	0.74	0.59	0.43	1.7	3.2	2.0	DNGW-071BS-06 2)	1PS 5071-BD-4CA3	24	0.0015
0.37	080 B	910	3.88	1)	69.5	70.0	68.0	0.74	1.04	0.83	0.60	1.9	3.5	2.1	DNGW-080BR-06 2)	1PS 5080-BD-4CA3	27	0.0020
0.55	080 B	910	5.8	1)	73.5	73.8	71.0	0.70	1.51	1.21	0.88	2.0	3.3	2.1	DNGW-080BS-06 2)	1PS 5081-BD-4CA3	30	0.0030
0.75	090 L	960	7.5	IE2	80.0	80.4	78.0	0.72	1.88	1.50	1.09	1.5	4.5	2.2	DNGW-090LR-06	1PS 5095-BD-4CA3	36	0.0044
1.1	090 L	950	11.1	IE2	78.1	77.9	75.4	0.72	2.80	2.24	1.62	1.4	4.1	2.0	DNGW-090LS-06	1PS 5098-BD-4CA3	42	0.0044
1.5	100 L	955	15.0	IE2	80.0	79.0	75.0	0.68	3.95	3.16	2.29	2.5	4.5	2.7	DNGW-100LS-06	1PS 5106-BD-4CA3	55	0.010
2.2	112 M	950	22.1	IE2	82.7	83.7	82.3	0.74	5.2	4.2	3.01	2.0	5.0	2.2	DNGW-112MS-06	1PS 5113-BD-4CA3	66	0.019
3	132 S	950	30.2	IE2	85.4	86.1	85.1	0.79	6.4	5.1	3.71	2.5	5.7	2.5	DNGW-132SR-06	1PS 5131-BD-4CA3	92	0.033
4	132 M	955	40.0	IE2	85.7	86.7	86.1	0.82	8.2	6.6	4.8	2.3	6.0	2.5	DNGW-132MR-06	1PS 5133-BD-4CA3	96	0.045
5.5	132 M	955	55	IE2	86.1	86.1	85.5	0.77	12.0	9.6	7.0	2.4	6.0	2.6	DNGW-132MS-06	1PS 5135-BD-4CA3	104	0.045
7.5	160 M	955	74	IE2	88.2	88.5	88.0	0.80	15.3	12.3	8.9	1.5	6.0	2.4	DNGW-160MR-06	1PS 5163-BD-4CA3	176	0.088
11	160 L	970	108	IE2	88.9	89.4	88.7	0.78	23.0	18.3	13.3	1.6	6.0	2.6	DNGW-160LS-06	1PS 5166-BD-4CA3	192	0.11
15	180 L	980	146	IE2	90.5	91.2	90.7	0.82	29.0	23.5	16.9	2.1	6.5	2.5	DNGW-180LS-06	1PS 5186-BD-4CA3	255	0.28
18.5	200 L	980	180	IE2	91.2	91.5	90.9	0.80	36.5	29.5	21.0	2.5	7.0	2.6	DNGW-200LR-06	1PS 5206-BD-4CA3	333	0.45
22	200 L	980	214	IE2	91.5	92.0	91.4	0.78	44.5	35.5	26.0	2.5	7.0	2.6	DNGW-200LS-06	1PS 5208-BD-4CA3	349	0.49
30	225 M	985	291	IE2	91.7	92.5	92.0	0.81	58.0	46.5	34.0	2.0	7.0	2.8	DNGW-225MS-06	1PS 5223-BD-4CA3	430	0.92
37	250 M	985	359	IE2	92.8	92.8	91.9	0.79	73.0	58.0	42.0	1.5	6.6	2.5	DNGW-250MM-06	1PS 5253-BD-4CA3	560	1.0
45	280 S	985	436	IE2	93.2	93.4	93.1	0.83	84.0	67.0	48.5	2.5	7.0	2.8	DNGW-280SL-06	1PS 5280-BD-4CA3	780	2.5
55	280 M	990	531	IE2	93.5	93.6	93.2	0.84	101	81.0	59.0	2.6	7.0	2.8	DNGW-280MM-06	1PS 5283-BD-4CA3	850	2.9
75	315 S	990	723	IE2	94.5	94.8	94.5	0.86	133	107	77.0	2.0	7.2	2.1	DNGW-315SL-06	1PS 5311-BD-4CA3	1030	3.3
90	315 M	990	868	IE2	94.8	95.2	95.1	0.85	161	129	93.0	2.1	6.9	2.3	DNGW-315ML-06	1PS 5313-BD-4CA3	1100	4.0
110	315 M	990	1061	IE2	94.5	94.8	94.4	0.86	195	156	113	2.0	7.1	2.2	DNGW-315MM-06	1PS 5314-BD-4CA3	1190	4.9
132	315 M	990	1273	IE2	94.7	95.0	94.7	0.86	235	187	136	2.2	7.0	2.2	DNGW-315MN-06	1PS 5315-BD-4CA3	1180	4.9
160	315 L	990	1543	IE2	94.8	95.0	95.0	0.87	280	225	162	2.1	7.0	2.3	DNGW-315LL-06	1PS 5316-BD-4CA3	1400	6.0
200	315 L	990	1929	IE2	95.0	95.2	95.0	0.84	360	290	210	2.3	7.0	2.5	DNGW-315LM-06	1PS 5317-BD-4CA3	1600	6.8
280	355M	993	2693	IE2	95.7	95.7	95.2	0.82	520	416	301	2.1	7.1	2.8	DNGW-355MR-06	1PS 5353-BD-4CA3	2460	13
315	355M	993	3029	IE2	95.9	95.9	95.5	0.83	570	456	330	2.1	7.1	2.8	DNGW-355MS-06	1PS 5355-BD-4CA3	2590	15
360	355M	994	3458	IE2	96.0	96.1	95.7	0.83	650	520	377	2.2	7.2	2.9	DNGW-355MT-06	1PS 5357-BD-4CA3	2730	16
<b>LOHER VARIO</b>																		
315	355 L	994	3027	IE2	96.2	96.2	95.5	0.84	560	450	325	1.35	6.6	2.5	DNS -355LD-06	1PS 358-BH-4CA0	2600	11.5
355	355 L	993	3415	IE2	96.3	96.3	95.8	0.85	630	505	360	1.0	5.6	2.3	DNS -355LN-06	1PS 357-BJ-4CA0	2700	12.5
400	355 L	992	3849	1)	96.3	96.4	95.9	0.84	715	575	415	1.0	5.6	2.25	DNS -355LN-06	1PS 358-BJ-4CA0	2700	12.5
400	400 L	994	3844	1)	96.3	96.4	95.8	0.84	715	575	415	1.0	5.6	2.3	DNS -400LL-06	1PS 404-BJ-4CA0	3400	18.0
450	400 L	994	4323	1)	96.4	96.4	95.9	0.84	800	640	465	1.0	5.5	2.25	DNS -400LN-06	1PS 405-BJ-4CA0	3700	21.5
500	400 L	994	4805	1)	96.5	96.5	96.0	0.84	890	710	515	1.05	5.7	2.3	DNS -400LN-06	1PS 407-BJ-4CA0	3700	21.5
560	450 L	995	5374	1)	96.7	96.7	96.2	0.85	980	785	570	0.95	5.8	2.3	DNS -450LL-06	1PS 453-BJ-4CA0	4700	34.0
630	450 L	995	6046	1)	96.8	96.8	96.3	0.85	1105	885	640	0.95	5.7	2.3	DNS -450LL-06	1PS 455-BJ-4CA0	4700	34.0
710	450 L	995	6813	1)	96.9	97.0	96.5	0.85	1240	995	720	0.95	5.7	2.25	DNS -450LN-06	1PS 457-BJ-4CA0	5000	40.0
800	450 L	995	7676	1)	97.0	97.0	96.5	0.85	-	1125	815	1.0	5.9	2.35	DNS -450LN-06	1PS 458-BJ-4CA0	5000	40.0
900	500 L	995	8635	1)	96.8	96.8	96.2	0.85	-	-	915	1.0	5.8	2.25	DNS -500LL-06	1PS 505-BJ-4CA0	6200	60.0
1000	500 L	995	9592	1)	96.9	96.8	96.2	0.85	-	-	1015	1.0	6.0	2.25	DNS -500LN-06	1PS 507-BJ-4CA0	6900	72.0
1120	500 L	995	10746	1)	96.9	96.9	96.4	0.86	-	-	1120	1.0	5.7	2.15	DNS -500LN-06	1PS 508-BJ-4CA0	6900	72.0
<b>Enclosures</b>																		
Ex de IIB/Ex d IIB												Frame size		Order code				
Ex de IIC/Ex d IIC												355 ... 500		L 4				
												71 ... 500		W 5				
<b>Operating modes</b>																		
Mains-fed operation												Frame size		Order code				
Converter-fed operation, standard insulation												71 ... 450		0				
Converter-fed operation with special insulation (derating approx. 5 %)												71 ... 450		1				
Mains-fed operation, pre-formed coil												160 ... 500		2				
Converter-fed operation, pre-formed coil												500		3				
												450 ... 500		4				
<b>Voltages</b>																		
690 VΔ, 50 Hz												Frame size		Order code				
230 V/400 V, 50 Hz												355 ... 500		0				
500 VY, 50 Hz												71 ... 112		1				
500 VΔ, 50 Hz												71 ... 315		3				
400 V/690 V, 50 Hz												355 ... 450		5				
690 VY, 50 Hz												71 ... 400		6				
For other voltages see Page 2/54												71 ... 400		8				
												71 ... 500		9				
														...				
<b>Types of construction</b>																		
IM B3												Frame size		Order code				
IM B5												71 ... 500		0				
IM B34												71 ... 315		1				
IM B14												71 ... 112		2				
IM V1/cover												71 ... 112		3				
IM B35												71 ... 450		4				
For other types of construction see from Page 1/28												71 ... 500		6				
												71 ... 500		9				

1) Outside the IE code classification according to IEC 60034-30.

2) Variant can be supplied as Ex nA, Loher type changes to AN GK....

## Motors with Explosion Protection LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Motors in cast-iron and steel versions

### Selection and ordering data (continued)

P <sub>ra</sub> ted, 50 Hz	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kgm <sup>2</sup>			
		n <sub>ra</sub> ted, 50 Hz	T <sub>ra</sub> ted, 50 Hz	IE class	η <sub>ra</sub> ted, 50 Hz	η <sub>ra</sub> ted, 50 Hz	η <sub>ra</sub> ted, 50 Hz	cos φ rated,	I <sub>ra</sub> ted, 400 V	I <sub>ra</sub> ted, 500 V	I <sub>ra</sub> ted, 690 V					T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>	T <sub>B</sub> / T <sub>ra</sub>
<b>kW</b>	<b>FS</b>	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	kg	kgm <sup>2</sup>		
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>																		
8-pole: 750 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
0.12	071 B	680	1.69	1)	51.0	51.5	45.0	0.66	0.51	0.41	0.30	1.9	2.4	2.0	DNGW-071BS-08 <sup>2)</sup>	1PS 5071-BD-4DA3	20	0.0015
0.25	080 B	680	3.51	1)	56.0	55.4	50.0	0.66	0.98	0.78	0.57	1.7	2.3	2.0	DNGW-080BS-08 <sup>2)</sup>	1PS 5081-BD-4DA3	27	0.0020
0.37	090 L	700	5.0	1)	67.0	67.5	64.0	0.60	1.33	1.06	0.77	1.7	2.5	2.0	DNGW-090LR-08	1PS 5095-BD-4DA3	35	0.0036
0.55	090 L	700	7.5	1)	69.5	69.5	65.0	0.60	1.90	1.52	1.10	1.7	2.8	2.0	DNGW-090LS-08	1PS 5098-BD-4DA3	35	0.0044
0.75	100 L	700	10.2	1)	71.9	70.2	66.0	0.70	2.15	1.72	1.25	2.0	3.7	2.1	DNGW-100LR-08	1PS 5106-BD-4DA3	55	0.010
1.1	100 L	710	14.8	1)	74.7	72.2	68.5	0.70	3.05	2.44	1.77	1.5	4.0	2.0	DNGW-100LS-08	1PS 5108-BD-4DA3	55	0.010
1.5	112 M	710	20.2	1)	78.0	78.5	76.5	0.73	3.80	3.04	2.20	1.8	4.0	2.0	DNGW-112MS-08	1PS 5113-BD-4DA3	65	0.016
2.2	132 S	715	29.4	1)	82.5	83.2	81.5	0.73	5.3	4.2	3.07	1.7	4.5	2.1	DNGW-132SR-08	1PS 5131-BD-4DA3	90	0.033
3	132 M	715	40.1	1)	83.8	84.5	82.9	0.74	7.0	5.6	4.1	1.8	4.5	2.2	DNGW-132MR-08	1PS 5133-BD-4DA3	90	0.045
4	160 M	720	53	1)	87.3	88.0	87.5	0.80	8.3	6.6	4.8	1.8	5.5	2.2	DNGW-160MR-08	1PS 5163-BD-4DA3	176	0.12
5.5	160 M	720	73	1)	87.3	88.0	87.5	0.80	11.4	9.1	6.6	1.7	5.6	2.2	DNGW-160MS-08	1PS 5165-BD-4DA3	176	0.12
7.5	160 L	720	99	1)	87.6	88.7	88.5	0.80	15.4	12.4	9.0	1.7	5.6	2.2	DNGW-160LS-08	1PS 5166-BD-4DA3	192	0.16
11	180 L	720	146	1)	87.6	88.5	88.0	0.80	22.5	18.1	13.1	1.8	5.0	2.0	DNGW-180LS-08	1PS 5186-BD-4DA3	255	0.28
15	200 L	725	198	1)	89.8	90.0	89.5	0.78	31.0	24.5	17.9	2.4	5.2	2.2	DNGW-200LR-08	1PS 5206-BD-4DA3	333	0.49
18.5	225 S	735	240	1)	90.0	90.5	89.8	0.78	38.0	30.5	22.0	2.3	5.5	2.5	DNGW-225SR-08	1PS 5220-BD-4DA3	395	0.82
22	225 M	735	286	1)	91.0	91.2	90.5	0.78	44.5	36.0	26.0	2.3	5.8	2.5	DNGW-225MS-08	1PS 5223-BD-4DA3	430	0.92
30	250 M	735	390	1)	91.3	91.5	90.4	0.80	59.0	47.5	34.5	1.9	5.3	2.2	DNGW-250MM-08	1PS 5253-BD-4DA3	560	1.1
37	280 S	740	477	1)	92.0	92.1	91.0	0.80	73.0	58.0	42.0	2.0	5.3	2.1	DNGW-280SL-08	1PS 5280-BD-4DA3	780	1.9
45	280 M	740	581	1)	92.4	92.5	91.5	0.80	88.0	70.0	51.0	2.0	5.2	2.1	DNGW-280MM-08	1PS 5283-BD-4DA3	850	2.2
55	315 S	743	707	1)	94.0	94.4	94.3	0.78	108	87.0	63.0	1.6	6.2	2.1	DNGW-315SL-08	1PS 5311-BD-4DA3	1000	3.4
75	315 M	742	965	1)	93.8	94.3	94.2	0.79	146	117	85.0	1.6	6.2	2.0	DNGW-315ML-08	1PS 5313-BD-4DA3	1170	4.1
90	315 M	742	1158	1)	94.0	94.2	94.0	0.79	175	140	101	1.7	6.3	2.0	DNGW-315MM-08	1PS 5314-BD-4DA3	1240	4.8
110	315 M	742	1416	1)	94.2	94.3	94.0	0.80	210	169	122	1.6	6.0	2.0	DNGW-315MN-08 <sup>3)</sup>	1PS 5315-BD-4DA3	1240	5.2
132	315 L	742	1699	1)	94.4	94.7	94.6	0.79	255	205	148	1.6	6.5	2.0	DNGW-315LL-08	1PS 5316-BD-4DA3	1390	6.8
160	315 L	742	2059	1)	94.6	94.6	94.0	0.79	310	245	179	1.5	6.5	2.5	DNGW-315LM-08 <sup>3)</sup>	1PS 5317-BD-4DA3	1530	7.2
<b>LOHER VARIO</b>																		
200	355 L	744	2566	1)	95.2	95.4	94.8	0.82	370	295	214	1.15	5.8	2.35	DNS -355LB-08	1PS 356-BH-4DA0	2250	14.7
225	355 L	744	2886	1)	95.3	95.4	94.8	0.81	420	335	243	1.15	5.8	2.4	DNS -355LC-08	1PS 357-BH-4DA0	2500	15.7
250	355 L	744	3206	1)	95.3	95.4	94.8	0.81	466	373	270	1.2	5.8	2.45	DNS -355LD-08	1PS 358-BH-4DA0	2600	17.0
280	355 L	743	3597	1)	95.8	96.0	95.6	0.81	520	415	300	1.15	5.2	2.3	DNS -355LN-08	1PS 357-BJ-4DA0	2700	12.5
315	355 L	743	4049	1)	95.8	96.0	95.6	0.81	580	465	335	1.05	5.1	2.2	DNS -355LX-08	1PS 358-BJ-4DA0	2850	13.5
355	400 L	743	4559	1)	96.0	96.1	95.6	0.81	655	525	380	1.0	5.1	2.3	DNS -400LL-08	1PS 404-BJ-4DA0	3400	17.5
400	400 L	744	5136	1)	96.1	96.2	95.8	0.82	735	585	425	0.95	5.2	2.25	DNS -400LN-08	1PS 407-BJ-4DA0	3700	21.0
450	400 L	743	5779	1)	96.1	96.3	95.9	0.81	830	665	480	0.95	5.0	2.25	DNS -400LX-08	1PS 408-BJ-4DA0	3900	23.0
500	450 L	745	6411	1)	96.5	96.6	96.1	0.83	900	720	520	0.85	5.2	2.2	DNS -450LL-08	1PS 455-BJ-4DA0	4700	35.5
560	450 L	745	7178	1)	96.5	96.6	96.1	0.84	1000	800	580	0.85	5.4	2.25	DNS -450LN-08	1PS 457-BJ-4DA0	5100	42.0
630	450 L	745	8075	1)	96.6	96.7	96.2	0.83	1130	905	655	0.90	5.3	2.25	DNS -450LN-08	1PS 458-BJ-4DA0	5100	42.0
670	450 L	746	8579	1)	96.7	96.7	96.3	0.83	1210	965	700	0.85	5.2	2.3	DNS -450LX-08	1PS 450-BJ-4DA0	5300	46.0
710	500 L	746	9086	1)	96.7	96.8	96.2	0.85	1240	995	720	0.85	5.8	2.55	DNS -500LL-08	1PS 504-BJ-4DA0	6200	73.0
800	500 L	746	10242	1)	96.7	96.8	96.4	0.85	–	1120	810	0.85	5.6	2.45	DNS -500LL-08	1PS 505-BJ-4DA0	6200	73.0
900	500 L	745	11530	1)	96.5	96.6	96.1	0.84	–	1285	930	1.0	5.5	2.2	DNS -500LN-08	1PS 507-BJ-4DA0	6900	88.0
950	500 L	746	12152	1)	96.7	96.7	96.1	0.83	–	–	990	0.95	5.9	2.4	DNS -500LX-08	1PS 508-BJ-4DA0	7100	96.0
<b>Enclosures</b>												Frame size	L	4	5	Order code		
Ex de IIB/Ex d IIB												355 ... 500	W			–		
Ex de IIC/Ex d IIC												71 ... 500				–		
<b>Operating modes</b>												Frame size				Order code		
Mains-fed operation												71 ... 450		0	1	–		
Converter-fed operation, standard insulation												71 ... 450				–		
Converter-fed operation with special insulation (derating approx. 5 %)												160 ... 500		2	3	–		
Mains-fed operation, pre-formed coil												500				–		
Converter-fed operation, pre-formed coil												500				–		
<b>Voltages</b>												Frame size				Order code		
690 VΔ, 50 Hz												355 ... 500				0		
230 V/400 V, 50 Hz												71 ... 112				1		
500 VY, 50 Hz												71 ... 315				3		
500 VΔ, 50 Hz												355 ... 450				5		
400 V/690 V, 50 Hz												71 ... 400				6		
690 VY, 50 Hz												71 ... 400				8		
For other voltages see Page 2/54												71 ... 500				9		
<b>Types of construction</b>												Frame size				Order code		
IM B3												71 ... 500				0		
IM B5												71 ... 315				1		
IM B34												71 ... 112				2		
IM B14												71 ... 112				3		
IM V1/cover												71 ... 450				4		
IM B35												71 ... 500				6		
For other types of construction see from Page 1/28												71 ... 500				9		

1) Outside the IE code classification according to IEC 60034-30.

3) Rated output, partial utilization up to 155 °C (F).

2) Variant can be supplied as Ex nA, Loher type changes to ANGK....

2

# Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

## Motors in cast-iron and steel versions

### Selection and ordering data (continued)

P <sub>rated</sub> 50 Hz	Frame size	Operating values at rated output											Motor type	Article No.	m IM B3	J kgm <sup>2</sup>				
		$\eta_{ra}$ ted,	$T_{ra}$ ted,	IE class	$\eta_{ra}$ ted,	$\eta_{ra}$ ted,	$\eta_{ra}$ ted,	$\cos\phi$ rated,	$I_{ra}$ ted,	$I_{ra}$ ted,	$I_{ra}$ ted,	$T_{LR}/T_{ra}$ ted					$I_{LR}/I_{ra}$ ted	$T_{\beta}/T_{ra}$ ted		
		50 Hz	50 Hz		50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	ted	ted	ted							
					4/4	3/4	2/4	4/4	400 V	500 V	690 V									
<b>KW</b>	<b>FS</b>	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–						

- Cooling: self-ventilated (IC 411)
- Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %
- Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb

10-pole: 600 rpm at 50 Hz

LOHER CHEMSTAR on request

LOHER VARIO

160	355 L	594	2570	<sup>1)</sup>	94.4	94.5	94.0	0.82	298	238	172	1.0	5.0	2.0	DNS-355LB-10	1PS-356-BH-4EA0	2250	15.0
180	355 L	594	2889	<sup>1)</sup>	94.6	94.7	94.0	0.81	338	271	196	1.05	5.3	2.15	DNS-355LC-10	1PS-357-BH-4EA0	2500	16.5
200	355 L	594	3211	<sup>1)</sup>	94.6	94.8	94.1	0.81	376	300	218	1.05	5.1	2.05	DNS-355LD-10	1PS-358-BH-4EA0	2600	18.0
225	355 L	593	3620	<sup>1)</sup>	95.2	95.5	95.1	0.80	425	340	245	1.1	4.8	2.15	DNS-355LX-10	1PS-358-BJ-4EA0	2850	19.0
250	400 L	594	4014	<sup>1)</sup>	95.4	95.7	95.2	0.80	475	380	275	0.95	4.7	2.05	DNS-400LL-10	1PS-404-BJ-4EA0	3400	27.0
280	400 L	595	4495	<sup>1)</sup>	95.6	95.8	95.3	0.81	520	415	300	0.95	4.7	2.05	DNS-400LN-10	1PS-405-BJ-4EA0	3700	32.0
315	400 L	595	5058	<sup>1)</sup>	95.6	95.8	95.4	0.80	595	475	345	0.95	4.7	2.05	DNS-400LN-10	1PS-407-BJ-4EA0	3700	32.0
355	400 L	595	5700	<sup>1)</sup>	95.8	96.0	95.6	0.80	665	530	385	0.95	4.8	2.1	DNS-400LX-10	1PS-408-BJ-4EA0	3900	35.0
400	450 L	595	6418	<sup>1)</sup>	96.0	96.1	95.5	0.80	750	600	435	1.0	4.9	2.1	DNS-450LL-10	1PS-454-BJ-4EA0	4700	42.0
450	450 L	595	7221	<sup>1)</sup>	96.1	96.2	95.6	0.81	835	670	485	0.95	4.8	2.05	DNS-450LN-10	1PS-455-BJ-4EA0	5100	50.0
500	450 L	595	8020	<sup>1)</sup>	96.2	96.3	95.7	0.80	940	750	545	0.95	5.0	2.15	DNS-450LN-10	1PS-457-BJ-4EA0	5100	50.0
520	450 L	595	8336	<sup>1)</sup>	96.2	96.2	95.6	0.79	985	785	570	1.0	5.1	2.2	DNS-450LX-10	1PS-458-BJ-4EA0	5300	55.0
560	500 L	596	8965	<sup>1)</sup>	96.1	96.1	95.3	0.80	1050	840	610	0.85	5.3	2.35	DNS-500LL-10	1PS-504-BJ-4EA0	6200	82.0
630	500 L	596	10082	<sup>1)</sup>	96.2	96.2	95.4	0.80	1180	945	685	0.90	5.3	2.4	DNS-500LN-10	1PS-505-BJ-4EA0	7000	98.0
670	500 L	597	10719	<sup>1)</sup>	96.3	96.2	95.4	0.80	1260	1005	730	0.95	5.5	2.45	DNS-500LN-10	1PS-507-BJ-4EA0	7000	98.0
750	500 L	597	11998	<sup>1)</sup>	96.4	96.3	95.5	0.79	–	–	820	0.95	5.5	2.45	DNS-500LX-10	1PS-508-BJ-4EA0	7200	108

12-pole: 500 rpm at 50 Hz

LOHER CHEMSTAR on request

LOHER VARIO

140	355 L	492	2713	<sup>1)</sup>	93.8	94.0	93.2	0.74	292	235	170	0.90	4.4	1.95	DNS-355LB-12	1PS-356-BH-4FA0	2250	15.0
160	355 L	493	3097	<sup>1)</sup>	94.1	94.3	93.8	0.78	313	250	181	0.95	4.6	2.1	DNS-355LC-12	1PS-357-BH-4FA0	2500	17.0
180	355 L	494	3481	<sup>1)</sup>	94.3	94.5	93.9	0.77	355	285	205	1.0	4.7	2.15	DNS-355LD-12	1PS-358-BH-4FA0	2600	19.0
190	355 L	494	3672	<sup>1)</sup>	94.5	94.7	94.3	0.77	375	300	218	0.95	4.6	2.2	DNS-355LX-12	1PS-358-BJ-4FA0	2850	18.5
200	400 L	494	3861	<sup>1)</sup>	94.9	95.1	94.7	0.78	390	310	225	0.95	4.6	2.05	DNS-400LL-12	1PS-404-BJ-4FA0	3400	26.5
225	400 L	495	4341	<sup>1)</sup>	95.1	95.3	94.9	0.79	430	345	250	1.0	4.7	2.15	DNS-400LN-12	1PS-405-BJ-4FA0	3700	32.0
250	400 L	495	4824	<sup>1)</sup>	95.2	95.4	95.0	0.78	485	390	282	1.0	4.6	2.1	DNS-400LN-12	1PS-407-BJ-4FA0	3700	32.0
280	400 L	495	5402	<sup>1)</sup>	95.2	95.4	95.0	0.78	545	435	315	1.0	4.8	2.15	DNS-400LX-12	1PS-408-BJ-4FA0	3900	35.0
315	450 L	495	6075	<sup>1)</sup>	95.5	95.7	95.3	0.78	610	490	355	0.90	4.5	1.95	DNS-450LL-12	1PS-454-BJ-4FA0	4700	42.0
355	450 L	495	6842	<sup>1)</sup>	95.6	95.8	95.4	0.78	690	550	400	0.90	4.6	2.0	DNS-450LN-12	1PS-455-BJ-4FA0	5100	50.0
400	450 L	495	7709	<sup>1)</sup>	95.7	95.9	95.4	0.78	785	630	455	0.95	4.6	2.0	DNS-450LN-12	1PS-457-BJ-4FA0	5100	50.0
420	450 L	495	8095	<sup>1)</sup>	95.7	95.9	95.4	0.78	810	650	470	0.95	4.7	2.05	DNS-450LX-12	1PS-458-BJ-4FA0	5300	55.0
450	500 L	496	8662	<sup>1)</sup>	95.8	95.8	95.2	0.80	845	675	490	0.90	4.8	2.05	DNS-500LL-12	1PS-504-BJ-4FA0	6200	82.0
500	500 L	496	9617	<sup>1)</sup>	95.8	95.8	95.1	0.79	950	760	550	0.95	5.1	2.2	DNS-500LN-12	1PS-505-BJ-4FA0	7000	98.0
560	500 L	496	10779	<sup>1)</sup>	95.9	96.0	95.3	0.80	1055	840	610	0.90	4.9	2.1	DNS-500LN-12	1PS-507-BJ-4FA0	7000	98.0
600	500 L	496	11546	<sup>1)</sup>	96.0	96.1	95.5	0.80	–	905	655	0.90	5.1	2.15	DNS-500LX-12	1PS-508-BJ-4FA0	7200	108

<b>Enclosures</b>	Frame size																		Order code
Ex de IIB/Ex d IIB	355 ... 500																		–
Ex de IIC/Ex d IIC	355 ... 500																		–
<b>Operating modes</b>	Frame size																		Order code
Mains-fed operation	355 ... 450																		0
Converter-fed operation, standard insulation	355 ... 450																		1
Converter-fed operation with special insulation (derating approx. 5 %)	355 ... 500																		2
Mains-fed operation, pre-formed coil	500																		3
Converter-fed operation, pre-formed coil	500																		4
<b>Voltages</b>	Frame size																		Order code
690 VΔ, 50 Hz	355 ... 500																		0
500 VΔ, 50 Hz	355 ... 450																		5
400 V/690 V, 50 Hz	355 ... 400																		6
690 VY, 50 Hz	355 ... 400																		8
For other voltages see Page 2/54	355 ... 500																		9
																			...
<b>Types of construction</b>	Frame size																		Order code
IM B3	355 ... 500																		0
IM V1/cover	355 ... 450																		4
IM B35	355 ... 500																		6
For other types of construction see from Page 1/28	355 ... 500																		9
																			...

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Motors in cast-iron and steel versions

## Selection and ordering data (continued)

$P_{ra}$ - ted, 50 Hz	Frame size	Motor type	Article No.	J
				kgm <sup>2</sup>
<ul style="list-style-type: none"> <li>Cooling: self-ventilated (IC 411)</li> <li>Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
14-pole: 430 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
110	355 L	DNS -355LB-14	1PS 356-BH-4GA0	2250
125	355 L	DNS -355LC-14	1PS 357-BH-4GA0	2500
140	355 L	DNS -355LD-14	1PS 358-BH-4GA0	2600
160	400 L	DNS -400LL-14	1PS 404-BJ-4GA0	3400
180	400 L	DNS -400LN-14	1PS 405-BJ-4GA0	3700
200	400 L	DNS -400LN-14	1PS 407-BJ-4GA0	3700
225	400 L	DNS -400LX-14	1PS 408-BJ-4GA0	3900
250	450 L	DNS -450LL-14	1PS 454-BJ-4GA0	4700
280	450 L	DNS -450LN-14	1PS 455-BJ-4GA0	5100
315	450 L	DNS -450LN-14	1PS 457-BJ-4GA0	5100
340	450 L	DNS -450LX-14	1PS 458-BJ-4GA0	5300
355	500 L	DNS -500LL-14	1PS 504-BJ-4GA0	6200
400	500 L	DNS -500LN-14	1PS 505-BJ-4GA0	7000
450	500 L	DNS -500LN-14	1PS 507-BJ-4GA0	7000
500	500 L	DNS -500LX-14	1PS 508-BJ-4GA0	7200
16-pole: 375 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
90	355 L	DNS -355LB-16	1PS 356-BH-4HA0	2250
100	355 L	DNS -355LC-16	1PS 357-BH-4HA0	2500
110	355 L	DNS -355LD-16	1PS 358-BH-4HA0	2600
132	400 L	DNS -400LL-16	1PS 405-BJ-4HA0	3400
160	400 L	DNS -400LN-16	1PS 407-BJ-4HA0	3700
180	400 L	DNS -400LX-16	1PS 408-BJ-4HA0	3900
200	450 L	DNS -450LL-16	1PS 454-BJ-4HA0	4700
225	450 L	DNS -450LN-16	1PS 455-BJ-4HA0	5100
250	450 L	DNS -450LN-16	1PS 457-BJ-4HA0	5100
265	450 L	DNS -450LX-16	1PS 458-BJ-4HA0	5300
280	500 L	DNS -500LL-16	1PS 504-BJ-4HA0	6200
315	500 L	DNS -500LN-16	1PS 505-BJ-4HA0	7000
355	500 L	DNS -500LN-16	1PS 507-BJ-4HA0	7000
400	500 L	DNS -500LX-16	1PS 508-BJ-4HA0	7200
<b>Enclosures</b>				
Ex de IIB/Ex d IIB	355 ... 500	L	4	Order code
Ex de IIC/Ex d IIC	355 ... 500	W	5	-
<b>Operating modes</b>				
Mains-fed operation	355 ... 450		0	Order code
Converter-fed operation, standard insulation	355 ... 450		1	-
Converter-fed operation with special insulation (derating approx. 5 %)	355 ... 500		2	-
Mains-fed operation, pre-formed coil	500		3	-
Converter-fed operation, pre-formed coil	500		4	-
<b>Voltages</b>				
690 VΔ, 50 Hz	355 ... 500		0	Order code
500 VΔ, 50 Hz	355 ... 450		5	-
400 V/690 V, 50 Hz	355 ... 400		6	-
690 VY, 50 Hz	355 ... 400		8	-
For other voltages see Page 2/54	355 ... 500		9	...
<b>Types of construction</b>				
IM B3	355 ... 500		0	Order code
IM V1/cover	355 ... 450		4	-
IM B35	355 ... 500		6	-
For other types of construction see from Page 1/28	355 ... 500		9	...

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted, 60 Hz kW	Frame size FS	Operating values at rated output							Motor type			Article No.	m IM B3	J kg kgm <sup>2</sup>		
		n <sub>ra</sub> ted, 60 Hz rpm	T <sub>ra</sub> ted, 60 Hz Nm	IE class	η <sub>ra</sub> ted, 60 Hz %	η <sub>ra</sub> ted, 60 Hz %	η <sub>ra</sub> ted, 60 Hz %	cos φ <sub>rated</sub> 60 Hz, 480 V %	T <sub>LR</sub> / T <sub>ra</sub> ted	I <sub>LR</sub> / I <sub>ra</sub> ted	T <sub>B</sub> / T <sub>ra</sub> ted					
<ul style="list-style-type: none"> <li>Cooling: self-ventilated (IC 411)</li> <li>Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>																
2-pole: 3600 rpm at 60 Hz																
<b>LOHER CHEMSTAR</b>																
0.44	071 B	3360	1.25	1)	76.5	77.5	75.6	0.88	0.79	2.7	5.5	2.9	DNGW-071BR-02 <sup>2)</sup>	1PS 5070-BD-4AA3	24	0.0006
0.66	071 B	3360	1.88	1)	76.5	77.5	75.6	0.88	1.18	2.7	5.5	2.9	DNGW-071BS-02 <sup>2)</sup>	1PS 5071-BD-4AA3	25	0.0006
0.9	080 B	3370	2.55	IE2	80.1	80.8	79.2	0.89	1.52	2.7	6.0	2.9	DNGW-080BR-02 <sup>2)</sup>	1PS 5080-BD-4AA3	26	0.0008
1.2	080 B	3400	3.37	IE2	82.5	82.7	81.5	0.82	2.15	2.9	6.0	2.7	DNGW-080BS-02 <sup>2)</sup>	1PS 5081-BD-4AA3	28	0.0008
1.8	090 L	3460	4.97	IE2	85.4	85.6	84.5	0.88	2.85	3.0	7.0	2.8	DNGW-090LR-02	1PS 5095-BD-4AA3	36	0.0020
2.6	090 L	3460	7.2	IE2	85.5	85.8	84.7	0.84	4.4	3.0	7.0	2.6	DNGW-090LS-02	1PS 5098-BD-4AA3	36	0.0020
3.6	100 L	3510	9.8	IE2	87.5	87.1	85.2	0.85	5.8	2.9	8.0	3.0	DNGW-100LS-02	1PS 5106-BD-4AA3	51	0.0041
4.5	112 M	3490	12.3	IE2	87.5	87.7	87.2	0.94	6.6	2.7	7.8	3.0	DNGW-112MS-02	1PS 5113-BD-4AA3	66	0.0075
6.6	132 S	3510	18.0	IE2	89.5	88.7	87.2	0.89	10.0	3.0	7.8	3.0	DNGW-132SR-02	1PS 5131-BD-4AA3	83	0.014
9	132 S	3510	24.5	IE2	90.1	91.0	90.1	0.91	13.1	2.7	7.0	3.0	DNGW-132SS-02	1PS 5132-BD-4AA3	95	0.020
13.2	160 M	3550	36	IE2	90.8	91.2	91.0	0.88	19.9	2.0	7.5	2.6	DNGW-160MR-02	1PS 5163-BD-4AA3	176	0.045
18	160 M	3550	48	IE2	91.5	91.8	91.2	0.89	26.5	1.9	7.0	2.6	DNGW-160MS-02	1PS 5165-BD-4AA3	176	0.092
22	160 L	3550	59	IE2	91.5	91.8	91.2	0.89	32.5	2.0	7.0	2.7	DNGW-160LS-02	1PS 5166-BD-4AA3	192	0.092
26	180 M	3560	70	IE2	92.5	93.0	92.4	0.89	38.0	2.6	7.0	2.6	DNGW-180MS-02	1PS 5183-BD-4AA3	246	0.16
36	200 L	3565	96	IE2	92.6	92.8	92.0	0.89	53.0	2.0	7.2	2.6	DNGW-200LR-02	1PS 5206-BD-4AA3	333	0.20
44	200 L	3565	118	IE2	93.0	93.1	92.4	0.89	64.0	2.0	7.2	2.6	DNGW-200LS-02	1PS 5208-BD-4AA3	349	0.23
54	225 M	3565	145	IE2	93.2	93.4	92.8	0.88	79.0	2.2	7.6	2.6	DNGW-225MS-02	1PS 5223-BD-4AA3	420	0.34
66	250 M	3575	176	IE2	93.8	93.7	92.6	0.88	96.0	1.9	7.5	2.6	DNGW-250MM-02	1PS 5253-BD-4AA3	540	0.45
90	280 S	3575	240	IE2	94.5	94.5	93.0	0.90	127	1.7	7.0	2.4	DNGW-280SL-02	1PS 5280-BD-4AA3	775	0.88
110	280 M	3580	293	IE2	95.1	95.0	93.9	0.89	156	2.4	7.7	2.7	DNGW-280MM-02	1PS 5283-BD-4AA3	830	1.03
125	315 S	3580	333	IE2	94.6	94.4	93.2	0.87	183	1.9	7.0	2.5	DNGW-315SL-02	1PS 5311-BD-4AA3	1030	1.55
145	315 M	3580	387	IE2	95.1	95.0	93.8	0.89	205	2.0	7.7	2.6	DNGW-315ML-02	1PS 5313-BD-4AA3	1080	1.85
180	315 M	3581	480	IE2	95.4	95.4	94.4	0.88	260	2.2	7.5	2.7	DNGW-315MN-02	1PS 5315-BD-4AA3	1160	2.2
220	315 L	3580	587	IE2	95.8	95.9	95.4	0.90	305	2.5	7.3	2.7	DNGW-315LL-02	1PS 5316-BD-4AA3	1390	2.8
270	315 L	3580	720	IE2	95.8	95.9	95.4	0.90	375	2.6	7.7	2.7	DNGW-315LN-02	1PS 5318-BD-4AA3	1570	3.5
<b>LOHER VARIO</b>																
355	355 L	3581	947	IE2	96.1	95.9	94.9	0.89	500	2.2	6.8	2.6	DNS-355LB-02	1PS 5356-BH-4AA0	2000	3.6
400	355 L	3583	1066	1)	96.4	96.3	95.6	0.92	541	1.15	6.7	2.75	DNS-355LC-02	1PS 357-BH-4AA0	2150	3.6
450	355 L	3585	1198	1)	96.6	96.5	95.7	0.92	610	1.2	7.4	3.0	DNS-355LD-02	1PS 358-BH-4AA0	2250	4.0
500	355 L	3579	1334	1)	96.3	96.2	95.5	0.91	683	0.90	6.3	2.65	DNS-355LX-02	1PS 358-BJ-4AA0	2600	5.0
500	400 L	3581	1333	1)	96.4	96.3	95.5	0.90	688	0.65	5.7	2.45	DNS-400LL-02	1PS 404-BJ-4AA0	3000	6.0
560	400 L	3584	1492	1)	96.6	96.5	95.7	0.91	765	0.80	6.5	2.8	DNS-400LN-02	1PS 405-BJ-4AA0	3200	7.0
630	400 L	3583	1679	1)	96.7	96.6	96.0	0.91	862	0.75	6.1	2.65	DNS-400LN-02	1PS 407-BJ-4AA0	3200	7.0
710	400 L	3585	1891	1)	96.7	96.6	95.9	0.91	675 <sup>3)</sup>	0.80	6.5	2.75	DNS-400LX-02	1PS 408-BJ-4AA0	3500	8.3
710	450 L	3586	1890	1)	96.3	96.1	95.1	0.90	685 <sup>3)</sup>	0.70	6.2	2.7	DNS-450LL-02	1PS 455-BJ-4AA0	4200	12
800	450 L	3586	2130	1)	96.5	96.3	95.3	0.91	762 <sup>3)</sup>	0.80	6.4	2.85	DNS-450LN-02	1PS 457-BJ-4AA0	4500	14
900	450 L	3586	2396	1)	96.6	96.4	95.6	0.90	865 <sup>3)</sup>	0.80	6.4	2.8	DNS-450LN-02	1PS 458-BJ-4AA0	4500	14
<b>Enclosures</b>																
Ex de IIB/Ex d IIB		Frame size		355 ... 450		L		4						Order code		
Ex de IIC/Ex d IIC		Frame size		71 ... 450		W		5						-		
<b>Operating modes</b>																
Mains-fed operation		Frame size		71 ... 450 (≤ 900 kW)				0						Order code		
Converter-fed operation, standard insulation		Frame size		71 ... 400				1						-		
Converter-fed operation with special insulation (derating approx. 5 %)		Frame size		160 ... 450				2						-		
Mains-fed operation, pre-formed coil		Frame size		450 (> 900 kW)				3						-		
Converter-fed operation, pre-formed coil		Frame size		450				4						-		
<b>Voltages</b>																
For other voltages see Page 2/54		Frame size		71 ... 450				9						Order code		
		Frame size		71 ... 450										...		
<b>Types of construction</b>																
IM B3		Frame size		71 ... 450				0						Order code		
IM B5		Frame size		71 ... 315				1						-		
IM B34		Frame size		71 ... 112				2						-		
IM B14		Frame size		71 ... 112				3						-		
IM V1/cover		Frame size		71 ... 400				4						-		
IM B35		Frame size		71 ... 450				6						-		
For other types of construction see from Page 1/28		Frame size		71 ... 450				9						...		

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>3)</sup> Only possible with 690 V, 60 Hz (values apply to 690 V).

<sup>2)</sup> Variant can be supplied as Ex nA, Loher type changes to **ANGK...**

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>rated</sub> kW	Frame size	Operating values at rated output							Motor type			Article No.	m IM B3	J kgm <sup>2</sup>			
		n <sub>rated</sub> rpm	T <sub>rated</sub> Nm	IE class	η <sub>rated</sub> %	η <sub>rated</sub> %	η <sub>rated</sub> %	cos φ <sub>rated</sub> %	T <sub>LR</sub> ted	I <sub>LR</sub> ted	T <sub>B</sub> ted						
60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	60 Hz	480 V	4/4	3/4	2/4	4/4						
<ul style="list-style-type: none"> <li>Cooling: self-ventilated (IC 411)</li> <li>Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>																	
4-pole: 1800 rpm at 60 Hz																	
<b>LOHER CHEMSTAR</b>																	
0.3	071 B	1700	1.69	1)	75.0	76.5	74.0	0.73	0.66	2.2	4.3	2.3	DNGW-071BR-04 <sup>2)</sup>	1PS 5070-BD-4BA3	24	0.0015	
0.44	071 B	1700	2.47	1)	78.0	78.5	76.8	0.73	0.93	2.5	4.8	2.5	DNGW-071BS-04 <sup>2)</sup>	1PS 5071-BD-4BA3	24	0.0020	
0.66	080 B	1700	3.71	1)	79.0	80.0	78.8	0.75	1.34	2.5	5.0	2.5	DNGW-080BR-04 <sup>2)</sup>	1PS 5080-BD-4BA3	27	0.0030	
0.9	080 B	1760	4.88	IE2	86.2	86.0	83.5	0.74	1.71	2.1	7.0	2.5	DNGW-080BS-04 <sup>2)</sup>	1PS 5081-BD-4BA3	28	0.0030	
1.3	090 L	1760	7.1	IE2	85.6	85.2	82.0	0.82	2.25	2.2	7.2	2.7	DNGW-090LR-04	1PS 5095-BD-4BA3	34	0.0044	
1.8	090 L	1760	9.8	IE2	87.8	88.0	86.6	0.80	3.10	2.2	7.4	2.7	DNGW-090LS-04	1PS 5098-BD-4BA3	37	0.0044	
2.6	100 L	1755	14.1	IE2	88.0	88.3	87.2	0.83	4.3	1.9	7.0	2.5	DNGW-100LR-04	1PS 5106-BD-4BA3	53	0.0060	
3.6	100 L	1760	19.5	IE2	87.5	87.0	85.2	0.79	6.3	1.8	7.0	2.4	DNGW-100LS-04	1PS 5108-BD-4BA3	55	0.0071	
4.8	112 M	1760	26.0	IE2	89.9	90.3	89.5	0.83	7.8	1.9	7.0	2.5	DNGW-112MS-04	1PS 5113-BD-4BA3	66	0.0126	
6.6	132 S	1750	36.0	IE2	89.8	90.4	89.9	0.86	10.3	2.4	7.5	2.7	DNGW-132SR-04	1PS 5131-BD-4BA3	93	0.03	
9	132 M	1765	48.7	IE2	90.1	90.5	89.7	0.86	14.0	2.0	7.5	2.2	DNGW-132MS-04	1PS 5133-BD-4BA3	102	0.03	
13	160 M	1765	70.0	IE2	91.1	91.5	91.0	0.85	20.0	3.0	7.5	2.6	DNGW-160MR-04	1PS 5163-BD-4BA3	176	0.10	
18	160 L	1770	97.0	IE2	92.4	92.1	91.8	0.85	27.5	3.0	7.5	2.6	DNGW-160LS-04	1PS 5166-BD-4BA3	192	0.13	
22	180 M	1775	118	IE2	92.5	93.0	92.2	0.84	34.0	1.8	7.5	2.8	DNGW-180MR-04	1PS 5183-BD-4BA3	246	0.20	
26	180 L	1775	140	IE2	93.7	94.0	93.5	0.85	39.5	1.8	7.5	2.6	DNGW-180LS-04	1PS 5186-BD-4BA3	255	0.23	
36	200 L	1780	193	IE2	94.2	94.4	93.9	0.83	55.0	3.0	7.5	2.9	DNGW-200LS-04	1PS 5206-BD-4BA3	333	0.37	
44	225 S	1780	236	IE2	93.7	94.0	93.5	0.85	66.0	2.0	7.0	2.6	DNGW-225SR-04	1PS 5220-BD-4BA3	415	0.64	
54	225 M	1780	290	IE2	94.2	94.7	94.6	0.85	81.0	2.0	7.0	2.6	DNGW-225MS-04	1PS 5223-BD-4BA3	445	0.72	
66	250 M	1780	354	IE2	94.5	94.4	94.2	0.86	98.0	2.1	7.7	2.7	DNGW-250MM-04	1PS 5253-BD-4BA3	560	0.79	
90	280 S	1785	481	IE2	94.6	94.8	94.5	0.84	136	2.2	7.0	2.5	DNGW-280SL-04	1PS 5280-BD-4BA3	820	1.44	
110	280 M	1785	588	IE2	95.2	95.2	94.8	0.84	165	2.5	7.0	2.7	DNGW-280MM-04	1PS 5283-BD-4BA3	870	1.66	
125	315 S	1787	668	IE2	95.0	95.0	94.0	0.82	193	2.2	7.0	2.5	DNGW-315SL-04	1PS 5311-BD-4BA3	1020	2.2	
145	315 M	1787	775	IE2	95.1	95.2	94.7	0.84	220	2.0	7.0	2.2	DNGW-315ML-04	1PS 5313-BD-4BA3	1110	2.9	
180	315 M	1787	962	IE2	95.4	95.4	94.8	0.83	275	2.4	7.5	2.5	DNGW-315MN-04	1PS 5315-BD-4BA3	1190	3.4	
220	315 L	1787	1176	IE2	95.4	95.6	95.0	0.84	330	2.3	7.5	2.5	DNGW-315LL-04	1PS 5316-BD-4BA3	1400	3.9	
270	315 L	1787	1443	IE2	95.8	95.8	95.5	0.85	400	2.3	7.5	2.4	DNGW-315LM-04	1PS 5317-BD-4BA3	1520	4.2	
<b>LOHER VARIO</b>																	
315	355 L	1789	1681	IE2	95.9	95.6	94.4	0.85	463	2.1	6.7	2.4	DNS-355LB-04	1PS 356-BH-4BA0	2200	6.5	
355	355 L	1791	1891	IE2	96.4	96.3	95.5	0.85	518	1.2	6.8	2.5	DNS-355LB-04	1PS 357-BH-4BA0	2200	7.0	
400	355 L	1791	2133	1)	96.4	96.3	95.5	0.86	578	1.1	6.5	2.3	DNS-355LB-04	1PS 358-BH-4BA0	2350	7.7	
450	355 L	1791	2399	1)	96.5	96.4	95.6	0.86	651	1.1	6.5	2.3	DNS-355LB-04	1PS 350-BH-4BA0	2500	8.5	
500	355 L	1791	2664	1)	96.6	96.5	95.9	0.86	724	1.05	6.3	2.45	DNS-355LB-04	1PS 357-BJ-4BA0	2900	9.0	
560	355 L	1792	2984	1)	96.7	96.6	95.9	0.85	820	1.0	6.5	2.5	DNS-355LB-04	1PS 358-BJ-4BA0	3000	9.5	
560	400 L	1791	2984	1)	96.5	96.4	95.6	0.88	793	1.0	6.2	2.55	DNS-400LL-04	1PS 404-BJ-4BA0	3500	13	
630	400 L	1791	3357	1)	96.6	96.5	95.8	0.89	885	1.0	6.0	2.45	DNS-400LN-04	1PS 405-BJ-4BA0	3700	15	
710	400 L	1791	3784	1)	96.7	96.6	96.0	0.89	995	0.95	5.7	2.3	DNS-400LN-04	1PS 407-BJ-4BA0	3700	15	
800	400 L	1792	4263	1)	96.8	96.8	96.1	0.88	1123	0.95	6.1	2.31	DNS-400LX-04	1PS 408-BJ-4BA0	3900	17	
900	450 L	1793	4792	1)	96.9	96.8	96.1	0.88	1265	0.90	6.4	2.32	DNS-450LL-04	1PS 455-BJ-4BA0	4500	24.5	
1000	450 L	1793	5324	1)	96.9	96.8	96.2	0.88	980 <sup>3)</sup>	0.85	6.0	2.33	DNS-450LN-04	1PS 457-BJ-4BA0	5000	29	
<b>Enclosures</b>																	
Ex de IIB/Ex d IIB										Frame size		L		4		Order code	
Ex de IIC/Ex d IIC										Frame size		W		5		-	
<b>Operating modes</b>																	
Mains-fed operation										Frame size		0		Order code			
Converter-fed operation, standard insulation										Frame size		1		-			
Converter-fed operation with special insulation (derating approx. 5 %)										Frame size		2		-			
Mains-fed operation, pre-formed coil										Frame size		3		-			
Converter-fed operation, pre-formed coil										Frame size		4		-			
<b>Voltages</b>																	
For other voltages see Page 2/54										Frame size		9		Order code			
										Frame size		...		...			
<b>Types of construction</b>																	
IM B3										Frame size		0		Order code			
IM B5										Frame size		1		-			
IM B34										Frame size		2		-			
IM B14										Frame size		3		-			
IM V1/cover										Frame size		4		-			
IM B35										Frame size		6		-			
For other types of construction see from Page 1/28										Frame size		9		...			

1) Outside the IE code classification according to IEC 60034-30.

3) Only possible with 690 V, 60 Hz (values apply to 690 V).

2) Variant can be supplied as Ex nA, Loher type changes to **ANGK**...

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>rated</sub> 60 Hz	Frame size	Operating values at rated output							Motor type			Article No.	m IM B3	J kg	kgm <sup>2</sup>	
		$\eta_{ra-}$ ted, 60 Hz	$T_{ra-}$ ted, 60 Hz	IE class	$\eta_{ra-}$ ted, 60 Hz	$\eta_{ra-}$ ted, 60 Hz	$\eta_{ra-}$ ted, 60 Hz	$\cos\phi$ rated, 60 Hz, 480 V	$T_{LR}/$ $T_{ra-}$ ted	$I_{LR}/$ $I_{ra-}$ ted	$T_B/$ $T_{ra-}$ ted					
kW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–				

- Cooling: self-ventilated (IC 411)
- Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30
- Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %
- Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb

6-pole: 1200 rpm at 60 Hz

#### LOHER CHEMSTAR

0.3	071 B	1110	2.58	<sup>1)</sup>	69.0	69.5	65.5	0.69	0.76	2.2	4.0	2.1	DNGW-071BS-06 <sup>2)</sup>	1PS5071- <b>BD</b> -4CA3	24	0.0015
0.44	080 B	1110	3.79	<sup>1)</sup>	70.0	71.0	70.0	0.70	1.08	2	4.0	2.2	DNGW-080BR-06 <sup>2)</sup>	1PS5080- <b>BD</b> -4CA3	27	0.0020
0.66	080 B	1130	5.6	<sup>1)</sup>	75.0	75.0	72.0	0.66	1.64	2.3	4.5	2.4	DNGW-080BS-06 <sup>2)</sup>	1PS5081- <b>BD</b> -4CA3	30	0.0030
0.75	090 L	1160	6.2	IE2	81.8	82.0	80.1	0.72	1.53	1.5	5.0	2.5	DNGW-090LR-06	1PS5095- <b>BD</b> -4CA3	36	0.0044
0.9	090 L	1160	7.4	IE2	82.0	82.0	80.2	0.72	1.83	1.4	5.1	2.4	DNGW-090LS-06	1PS5098- <b>BD</b> -4CA3	42	0.0044
1.25	100 L	1175	10.2	IE2	85.5	85.2	82.3	0.73	2.4	1.5	5.6	2.4	DNGW-100LS-06	1PS5106- <b>BD</b> -4CA3	55	0.010
1.8	112 M	1180	14.6	IE2	86.6	86.5	83.0	0.73	3.4	1.3	5.8	2.5	DNGW-112MS-06	1PS5113- <b>BD</b> -4CA3	66	0.019
3	132 S	1170	24.5	IE2	87.9	87.6	85.3	0.74	5.5	2.4	6.6	3.0	DNGW-132SR-06	1PS5131- <b>BD</b> -4CA3	92	0.033
4	132 M	1160	32.9	IE2	88.3	88.9	88.1	0.79	6.9	2.1	6.6	2.7	DNGW-132MR-06	1PS5133- <b>BD</b> -4CA3	96	0.045
5.5	132 M	1180	44.5	IE2	90.0	90.2	89.0	0.80	9.2	1.5	6.5	2.3	DNGW-132MS-06	1PS5135- <b>BD</b> -4CA3	104	0.045
7.5	160 M	1170	61	IE2	89.6	89.7	88.0	0.80	12.6	1.3	6.2	2.4	DNGW-160MR-06	1PS5163- <b>BD</b> -4CA3	176	0.088
11	160 L	1170	90	IE2	90.2	90.4	89.0	0.80	18.3	1.3	6.5	2.4	DNGW-160LS-06	1PS5166- <b>BD</b> -4CA3	192	0.11
15	180 L	1180	121	IE2	91.0	91.4	90.7	0.81	24.5	2.4	7.0	2.5	DNGW-180LS-06	1PS5186- <b>BD</b> -4CA3	255	0.28
18.5	200 L	1180	150	IE2	91.7	91.7	90.8	0.80	30.5	2.5	7.0	2.6	DNGW-200LR-06	1PS5206- <b>BD</b> -4CA3	333	0.45
22	200 L	1180	178	IE2	91.8	91.8	91.0	0.80	36.0	2.5	7.0	2.6	DNGW-200LS-06	1PS5208- <b>BD</b> -4CA3	349	0.49
30	225 M	1180	243	IE2	93.0	93.0	92.0	0.82	47.5	2.0	7.0	2.8	DNGW-225MS-06	1PS5223- <b>BD</b> -4CA3	430	0.92
37	250 M	1185	298	IE2	93.2	93.2	92.3	0.80	60.0	1.4	7.0	2.6	DNGW-250MM-06	1PS5253- <b>BD</b> -4CA3	560	1.0
45	280 S	1189	361	IE2	93.6	93.6	93.2	0.85	68.0	2.3	6.5	2.5	DNGW-280SL-06	1PS5280- <b>BD</b> -4CA3	780	2.5
55	280 M	1190	441	IE2	93.8	93.8	93.0	0.84	84.0	2.5	7.2	2.8	DNGW-280MM-06	1PS5283- <b>BD</b> -4CA3	850	2.9
75	315 S	1190	602	IE2	94.8	94.9	94.3	0.86	111	2.2	7.2	2.4	DNGW-315SL-06	1PS5311- <b>BD</b> -4CA3	1030	3.3
90	315 M	1190	722	IE2	94.3	94.4	94.0	0.86	133	2.0	7.2	2.2	DNGW-315ML-06	1PS5313- <b>BD</b> -4CA3	1100	4.0
110	315 M	1190	883	IE2	95.0	95.2	95.0	0.87	160	1.8	7.1	2.2	DNGW-315MM-06	1PS5314- <b>BD</b> -4CA3	1190	4.9
132	315 M	1190	1059	IE2	95.2	95.2	95.0	0.86	194	2.0	7.2	2.3	DNGW-315MN-06	1PS5315- <b>BD</b> -4CA3	1180	4.9
160	315 L	1190	1284	IE2	95.2	95.3	95.0	0.86	235	2.2	7.5	2.5	DNGW-315LL-06	1PS5316- <b>BD</b> -4CA3	1400	6.0
200	315 L	1190	1605	IE2	95.2	95.2	95.0	0.84	300	2.4	7.6	2.6	DNGW-315LM-06	1PS5317- <b>BD</b> -4CA3	1600	6.8

#### LOHER VARIO on request

<b>Enclosures</b>	Frame size			Order code
Ex de IIB/Ex d IIB	71 ... 315			–
Ex de IIC/Ex d IIC	71 ... 315			–
<b>Operating modes</b>	Frame size			Order code
Mains-fed operation	71 ... 315	0		–
Converter-fed operation, standard insulation	71 ... 315	1		–
Converter-fed operation with special insulation (derating approx. 5 %)	160 ... 315	2		–
<b>Voltages</b>	Frame size			Order code
For other voltages see Page 2/54	71 ... 315	9		...
<b>Types of construction</b>	Frame size			Order code
IM B3	71 ... 315	0		–
IM B5	71 ... 315	1		–
IM B34	71 ... 112	2		–
IM B14	71 ... 112	3		–
IM V1/cover	71 ... 315	4		–
IM B35	71 ... 315	6		–
For other types of construction see from Page 1/28	71 ... 315	9		...

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Variant can be supplied as Ex nA, Loher type changes to **ANGK...**



## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$ kg
<b>kW</b>	<b>FS</b>			
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for constant load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
4-/2-pole: 1500/3000 rpm at 50 Hz with one winding connected in Dahlander circuit				
<b>LOHER CHEMSTAR</b>				
0.65/0.85	80 B	DNGW-080BS-42	1PS5081-■BD■-4NA3	28
1.45/1.9	90 L	DNGW-090LS-42	1PS5098-■BD■-4NA3	37
2/2.4	100 L	DNGW-100LR-42	1PS5106-■BD■-4NA3	53
2.6/3.2	100 L	DNGW-100LS-42	1PS5108-■BD■-4NA3	55
3.6/4.3	112 M	DNGW-112MS-42 <sup>1)</sup>	1PS5113-■BD■-4NA3	66
4.9/6	132 S	DNGW-132SR-42 <sup>1)</sup>	1PS5131-■BD■-4NA3	93
6.5/9	132 M	DNGW-132MR-42	1PS5133-■BD■-4NA3	102
9/11	160 M	DNGW-160MR-42	1PS5163-■BD■-4NA3	176
13/16	160 L	DNGW-160LS-42	1PS5166-■BD■-4NA3	192
16.5/20	180 M	DNGW-180MR-42	1PS5183-■BD■-4NA3	246
18.5/25	180 L	DNGW-180LS-42	1PS5186-■BD■-4NA3	255
26/31	200 L	DNGW-200LS-42	1PS5206-■BD■-4NA3	333
32/38	225 S	DNGW-225SR-42	1PS5220-■BD■-4NA3	415
38/46	225 M	DNGW-225MS-42	1PS5223-■BD■-4NA3	420
45/55	250 M	DNGW-250MM-42	1PS5253-■BD■-4NA3	540
60/75	280 S	DNGW-280SL-42	1PS5280-■BD■-4NA3	775
73/90	280 M	DNGW-280MM-42	1PS5283-■BD■-4NA3	830
82/96	315 S	DNGW-315SL-42	1PS5311-■BD■-4NA3	1020
100/124	315 M	DNGW-315ML-42	1PS5313-■BD■-4NA3	1120
120/145	315 M	DNGW-315MN-42	1PS5315-■BD■-4NA3	1190
142/172	315 L	DNGW-315LL-42	1PS5316-■BD■-4NA3	1430
150/200	315 L	DNGW-315LM-42	1PS5317-■BD■-4NA3	1520
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		80 ... 315	0	–
Converter-fed operation, standard insulation		80 ... 315	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		80 ... 312	1	–
500 VY, 50 Hz		80 ... 315	3	–
400 V, 50 Hz		80 ... 315	6	–
690 VY, 50 Hz		80 ... 315	8	–
For other voltages see Page 2/54		80 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		80 ... 315	0	–
IM B5		80 ... 315	1	–
IM B34		80 ... 312	2	–
IM B14		80 ... 312	3	–
IM V1/cover		80 ... 315	4	–
IM B35		80 ... 315	6	–
For other types of construction see from Page 1/28		80 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$
kW	FS			kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for constant load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
8-/4-pole: 750/1500 rpm at 50 Hz with one winding connected in Dahlander circuit				
<b>LOHER CHEMSTAR</b>				
0.5/0.8	90 L	DNGW-090LS-84	1PS5098- <b>BD</b> -4QA3	37
0.9/1.3	100 L	DNGW-100LR-84	1PS5106- <b>BD</b> -4QA3	53
1/1.6	100 L	DNGW-100LS-84	1PS5108- <b>BD</b> -4QA3	55
1.4/2.2	112 M	DNGW-112MS-84	1PS5113- <b>BD</b> -4QA3	66
2.3/3.4	132 S	DNGW-132SR-84	1PS5131- <b>BD</b> -4QA3	93
3/5	132 M	DNGW-132MR-84	1PS5133- <b>BD</b> -4QA3	102
4/5.5	160 M	DNGW-160MR-84	1PS5163- <b>BD</b> -4QA3	176
5/7.5	160 M	DNGW-160MS-84	1PS5165- <b>BD</b> -4QA3	176
7/11	160 L	DNGW-160LS-84	1PS5166- <b>BD</b> -4QA3	192
11/18	180 L	DNGW-180LS-84 <sup>1)</sup>	1PS5186- <b>BD</b> -4QA3	255
17/25	200 L	DNGW-200LR-84	1PS5206- <b>BD</b> -4QA3	333
22/31	225 S	DNGW-225SR-84 <sup>1)</sup>	1PS5220- <b>BD</b> -4QA3	405
26/38	225 M	DNGW-225MS-84 <sup>1)</sup>	1PS5223- <b>BD</b> -4QA3	445
32/46	250 M	DNGW-250MM-84	1PS5253- <b>BD</b> -4QA3	560
42/60	280 S	DNGW-280SL-84	1PS5280- <b>BD</b> -4QA3	780
50/72	280 M	DNGW-280MM-84 <sup>1)</sup>	1PS5283- <b>BD</b> -4QA3	850
60/83	315 S	DNGW-315SL-84	1PS5311- <b>BD</b> -4QA3	1020
72/110	315 M	DNGW-315ML-84	1PS5313- <b>BD</b> -4QA3	1170
90/132	315 M	DNGW-315MN-84	1PS5315- <b>BD</b> -4QA3	1240
115/160	315 L	DNGW-315LL-84 <sup>1)</sup>	1PS5316- <b>BD</b> -4QA3	1430
145/220	315 L	DNGW-315LM-84 <sup>1)</sup>	1PS5317- <b>BD</b> -4QA3	1530
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 315	0	–
Converter-fed operation, standard insulation		90 ... 315	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	–
500 VY, 50 Hz		90 ... 315	3	–
400 V, 50 Hz		90 ... 315	6	–
690 VY, 50 Hz		90 ... 315	8	–
For other voltages see Page 2/54		90 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 315	0	–
IM B5		90 ... 315	1	–
IM B34		90 ... 112	2	–
IM B14		90 ... 112	3	–
IM V1/cover		90 ... 315	4	–
IM B35		90 ... 315	6	–
For other types of construction see from Page 1/28		90 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$ kg
<b>kW</b>	<b>FS</b>			
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for constant load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
6-/4-pole: 1000/1500 rpm at 50 Hz with two separate windings				
<b>LOHER CHEMSTAR</b>				
0.6/0.9	90 L	DNGW-090LS-64	1PS5098- <b>BD</b> -4PA3	37
0.9/1.3	100 L	DNGW-100LR-64	1PS5106- <b>BD</b> -4PA3	53
1.1/1.5	100 L	DNGW-100LS-64	1PS5108- <b>BD</b> -4PA3	55
1.5/2.2	112 M	DNGW-112MS-64	1PS5113- <b>BD</b> -4PA3	66
2.2/3.3	132 S	DNGW-132SR-64	1PS5131- <b>BD</b> -4PA3	93
3/4.5	132 M	DNGW-132MR-64	1PS5133- <b>BD</b> -4PA3	102
4.5/6.5	160 M	DNGW-160MR-64	1PS5163- <b>BD</b> -4PA3	176
6.5/9.5	160 M	DNGW-160LS-64	1PS5166- <b>BD</b> -4PA3	192
11/16	160 L	DNGW-180LS-64	1PS5186- <b>BD</b> -4PA3	255
13/19	180 L	DNGW-200LR-64	1PS5206- <b>BD</b> -4PA3	333
15/23	200 L	DNGW-200LS-64	1PS5208- <b>BD</b> -4PA3	349
18/27	225 S	DNGW-225SR-64	1PS5220- <b>BD</b> -4PA3	395
21/31	225 M	DNGW-225MS-64	1PS5223- <b>BD</b> -4PA3	445
28/40	250 M	DNGW-250MM-64	1PS5253- <b>BD</b> -4PA3	560
43/65	280 S	DNGW-280SL-64	1PS5280- <b>BD</b> -4PA3	820
52/78	280 M	DNGW-280MM-64	1PS5283- <b>BD</b> -4PA3	870
60/90	315 S	DNGW-315SL-64	1PS5311- <b>BD</b> -4PA3	1020
70/100	315 M	DNGW-315ML-64 <sup>1)</sup>	1PS5313- <b>BD</b> -4PA3	1020
80/115	315 M	DNGW-315MN-64	1PS5315- <b>BD</b> -4PA3	1190
100/140	315 L	DNGW-315LL-64 <sup>1)</sup>	1PS5316- <b>BD</b> -4PA3	1430
125/180	315 L	DNGW-315LM-64 <sup>1)</sup>	1PS5317- <b>BD</b> -4PA3	1550
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 315	0	–
Converter-fed operation, standard insulation		90 ... 315	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	–
500 VY, 50 Hz		90 ... 315	3	–
400 V, 50 Hz		90 ... 315	6	–
690 VY, 50 Hz		90 ... 315	8	–
For other voltages see Page 2/54		90 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 315	0	–
IM B5		90 ... 315	1	–
IM B34		90 ... 112	2	–
IM B14		90 ... 112	3	–
IM V1/cover		90 ... 315	4	–
IM B35		90 ... 315	6	–
For other types of construction see from Page 1/28		90 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$
kW	FS			kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for constant load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
8-/6-pole: 750/1000 min at 50 Hz with two separate windings				
<b>LOHER CHEMSTAR</b>				
0.45/0.6	90 L	DNGW-090LS-86	1PS5098- <b>BD</b> -4RA3	37
0.6/0.8	100 L	DNGW-100LR-86	1PS5106- <b>BD</b> -4RA3	53
0.7/0.9	100 L	DNGW-100LS-86	1PS5108- <b>BD</b> -4RA3	55
0.9/1.4	112 M	DNGW-112MS-86	1PS5113- <b>BD</b> -4RA3	66
1.5/2	132 S	DNGW-132SR-86	1PS5131- <b>BD</b> -4RA3	93
2.2/3	132 M	DNGW-132MR-86	1PS5133- <b>BD</b> -4RA3	102
4/5.5	160 M	DNGW-160MR-86	1PS5163- <b>BD</b> -4RA3	176
5.5/7.5	160 L	DNGW-160LS-86	1PS5166- <b>BD</b> -4RA3	192
8.5/11	180 L	DNGW-180LS-86	1PS5186- <b>BD</b> -4RA3	255
14.5/19	200 L	DNGW-200LR-86 <sup>1)</sup>	1PS5206- <b>BD</b> -4RA3	333
16/21	225 S	DNGW-225SR-86	1PS5220- <b>BD</b> -4RA3	395
19/25	225 M	DNGW-225MS-86	1PS5223- <b>BD</b> -4RA3	445
24/32	250 M	DNGW-250MM-86	1PS5253- <b>BD</b> -4RA3	560
33/44	280 S	DNGW-280SL-86	1PS5280- <b>BD</b> -4RA3	780
40/53	280 M	DNGW-280MM-86	1PS5283- <b>BD</b> -4RA3	850
50/65	315 S	DNGW-315SL-86 <sup>1)</sup>	1PS5311- <b>BD</b> -4RA3	1010
60/80	315 M	DNGW-315ML-86 <sup>1)</sup>	1PS5313- <b>BD</b> -4RA3	1170
70/95	315 M	DNGW-315MN-86 <sup>1)</sup>	1PS5315- <b>BD</b> -4RA3	1240
80/110	315 L	DNGW-315LL-86 <sup>1)</sup>	1PS5316- <b>BD</b> -4RA3	1400
115/150	315 L	DNGW-315LM-86 <sup>1)</sup>	1PS5317- <b>BD</b> -4RA3	1550
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 315	0	-
Converter-fed operation, standard insulation		90 ... 315	1	-
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	-
500 VY, 50 Hz		90 ... 315	3	-
400 V, 50 Hz		90 ... 315	6	-
690 VY, 50 Hz		90 ... 315	8	-
For other voltages <a href="#">see Page 2/54</a>		90 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 315	0	-
IM B5		90 ... 315	1	-
IM B34		90 ... 112	2	-
IM B14		90 ... 112	3	-
IM V1/cover		90 ... 315	4	-
IM B35		90 ... 315	6	-
For other types of construction <a href="#">see from Page 1/28</a>		90 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$ kg
<b>kW</b>	<b>FS</b>			
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
4-/2-pole: 1500/3000 rpm at 50 Hz with one winding connected in Dahlander circuit for fan drive				
<b>LOHER CHEMSTAR</b>				
0.22/1.1	80 B	DVGW-080BS-42	1PS5081-ND-4NA3	28
0.5/2	90 L	DVGW-090LS-42	1PS5098-ND-4NA3	37
0.65/2.4	100 L	DVGW-100LR-42	1PS5106-ND-4NA3	53
0.8/3	100 L	DVGW-100LS-42	1PS5108-ND-4NA3	55
1.1/4.1	112 M	DVGW-112MS-42	1PS5113-ND-4NA3	66
1.6/6	132 S	DVGW-132SR-42	1PS5131-ND-4NA3	93
2.2/9	132 M	DVGW-132MR-42	1PS5133-ND-4NA3	102
3/12	160 M	DVGW-160MR-42	1PS5163-ND-4NA3	176
4/16	160 L	DVGW-160LS-42	1PS5166-ND-4NA3	192
5.5/20	180 M	DVGW-180MR-42	1PS5183-ND-4NA3	246
6.3/25	180 L	DVGW-180LS-42 <sup>1)</sup>	1PS5186-ND-4NA3	255
8.5/33	200 L	DVGW-200LS-42	1PS5206-ND-4NA3	333
10.5/38	225 S	DVGW-225SR-42	1PS5220-ND-4NA3	415
13/46	225 M	DVGW-225MS-42	1PS5223-ND-4NA3	420
15/55	250 M	DVGW-250MM-42	1PS5253-ND-4NA3	540
20/75	280 S	DVGW-280SL-42	1PS5280-ND-4NA3	775
24/90	280 M	DVGW-280MM-42	1PS5283-ND-4NA3	830
27/110	315 S	DVGW-315SL-42	1PS5311-ND-4NA3	1020
33/132	315 M	DVGW-315ML-42	1PS5313-ND-4NA3	1120
37/145	315 M	DVGW-315MN-42	1PS5315-ND-4NA3	1190
44/172	315 L	DVGW-315LL-42	1PS5316-ND-4NA3	1430
50/200	315 L	DVGW-315LM-42	1PS5317-ND-4NA3	1520
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		80 ... 315	0	-
Converter-fed operation, standard insulation		80 ... 315	1	-
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		80 ... 112	1	-
500 VY, 50 Hz		80 ... 315	3	-
400 V, 50 Hz		80 ... 315	6	-
690 VY, 50 Hz		80 ... 315	8	-
For other voltages see Page 2/54		80 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		80 ... 315	0	-
IM B5		80 ... 315	1	-
IM B34		80 ... 112	2	-
IM B14		80 ... 112	3	-
IM V1/cover		80 ... 315	4	-
IM B35		80 ... 315	6	-
For other types of construction see from Page 1/28		80 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$
kW	FS			kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
8-/4-pole: 750/1500 rpm at 50 Hz with one winding connected in Dahlander circuit for fan drive				
<b>LOHER CHEMSTAR</b>				
0.12/0.7	80 B	DVGW-080BS-84 <sup>1)</sup>	1PS5081-ND-4QA3	28
0.35/1.3	90 L	DVGW-090LS-84	1PS5098-ND-4QA3	37
0.45/2	100 L	DVGW-100LR-84	1PS5106-ND-4QA3	53
0.55/2.5	100 L	DVGW-100LS-84	1PS5108-ND-4QA3	55
0.9/3.7	112 M	DVGW-112MS-84	1PS5113-ND-4QA3	66
1.3/5	132 S	DVGW-132SR-84	1PS5131-ND-4QA3	93
1.7/6.8	132 M	DVGW-132MR-84	1PS5133-ND-4QA3	102
3/10	160 M	DVGW-160MR-84	1PS5163-ND-4QA3	176
3.5/13	160 L	DVGW-160LS-84	1PS5166-ND-4QA3	192
4/16	180 M	DVGW-180MR-84	1PS5183-ND-4QA3	246
5/20	180 L	DVGW-180LS-84	1PS5186-ND-4QA3	255
7/28	200 L	DVGW-200LR-84	1PS5206-ND-4QA3	333
8/33	225 S	DVGW-225SR-84	1PS5220-ND-4QA3	405
9.5/39	225 M	DVGW-225MS-84 <sup>1)</sup>	1PS5223-ND-4QA3	445
11/49	250 M	DVGW-250MM-84	1PS5253-ND-4QA3	560
17/68	280 S	DVGW-280SL-84	1PS5280-ND-4QA3	780
20/80	280 M	DVGW-280MM-84	1PS5283-ND-4QA3	850
22/95	315 S	DVGW-315SL-84	1PS5311-ND-4QA3	1030
26/110	315 M	DVGW-315ML-84	1PS5313-ND-4QA3	1120
30/130	315 M	DVGW-315MN-84	1PS5315-ND-4QA3	1190
38/160	315 L	DVGW-315LL-84	1PS5316-ND-4QA3	1450
45/180	315 L	DVGW-315LM-84	1PS5317-ND-4QA3	1520
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		80 ... 315	0	-
Converter-fed operation, standard insulation		80 ... 315	1	-
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		80 ... 112	1	-
500 VY, 50 Hz		80 ... 315	3	-
400 V, 50 Hz		80 ... 315	6	-
690 VY, 50 Hz		80 ... 315	8	-
For other voltages see Page 2/54		80 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		80 ... 315	0	-
IM B5		80 ... 315	1	-
IM B34		80 ... 112	2	-
IM B14		80 ... 112	3	-
IM V1/cover		80 ... 315	4	-
IM B35		80 ... 315	6	-
For other types of construction see from Page 1/28		80 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$ kg
<b>kW</b>	<b>FS</b>			
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
6-/4-pole: 1000/1500 rpm at 50 Hz with two separate windings for fan drive				
<b>LOHER CHEMSTAR</b>				
0.4/1.3	90 L	DVGW-090LS-64	1PS5098-ND-4PA3	37
0.6/1.8	100 L	DVGW-100LR-64	1PS5106-ND-4PA3	53
0.75/2.4	100 L	DVGW-100LS-64	1PS5108-ND-4PA3	55
0.9/3	112 M	DVGW-112MS-64	1PS5113-ND-4PA3	66
1.25/4.2	132 S	DVGW-132SR-64	1PS5131-ND-4PA3	93
1.65/5.5	132 M	DVGW-132MR-64	1PS5133-ND-4PA3	102
2.2/7.5	160 M	DVGW-160MR-64	1PS5163-ND-4PA3	176
3/9	160 M	DVGW-160MS-64	1PS5165-ND-4PA3	176
3.5/12	160 L	DVGW-160LS-64	1PS5166-ND-4PA3	192
4.5/14	180 M	DVGW-180MR-64	1PS5183-ND-4PA3	246
5.5/16.5	180 L	DVGW-180LS-64	1PS5186-ND-4PA3	255
7/20	200 L	DVGW-200LR-64	1PS5206-ND-4PA3	333
9/26	200 L	DVGW-200LS-64	1PS5208-ND-4PA3	349
10/31	225 S	DVGW-225SR-64	1PS5220-ND-4PA3	395
13/38	225 M	DVGW-225MS-64	1PS5223-ND-4PA3	445
17/48	250 M	DVGW-250MM-64	1PS5253-ND-4PA3	560
25/70	280 S	DVGW-280SL-64	1PS5280-ND-4PA3	820
30/82	280 M	DVGW-280MM-64	1PS5283-ND-4PA3	870
32/95	315 S	DVGW-315SL-64	1PS5311-ND-4PA3	1030
37/115	315 M	DVGW-315ML-64	1PS5313-ND-4PA3	1120
47/135	315 M	DVGW-315MN-64	1PS5315-ND-4PA3	1190
55/160	315 L	DVGW-315LL-64 <sup>1)</sup>	1PS5316-ND-4PA3	1430
75/200	315 L	DVGW-315LM-64 <sup>1)</sup>	1PS5317-ND-4PA3	1520
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 315	0	–
Converter-fed operation, standard insulation		90 ... 315	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	–
500 VY, 50 Hz		90 ... 315	3	–
400 V, 50 Hz		90 ... 315	6	–
690 VY, 50 Hz		90 ... 315	8	–
For other voltages see Page 2/54		90 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 315	0	–
IM B5		90 ... 315	1	–
IM B34		90 ... 112	2	–
IM B14		90 ... 112	3	–
IM V1/cover		90 ... 315	4	–
IM B35		90 ... 315	6	–
For other types of construction see from Page 1/28		90 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{\text{rated}}$ , 50 Hz	Frame size	Motor type	Article No.	$m_{\text{IM B3}}$
kW	FS			kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb</li> </ul>				
8-/6-pole: 750/1000 rpm at 50 Hz with two separate windings for fan drive				
<b>LOHER CHEMSTAR</b>				
0.32/0.75	90 L	DVGW-090LS-86	1PS5098-ND-4RA3	37
0.45/1	100 L	DVGW-100LR-86	1PS5106-ND-4RA3	53
0.55/1.3	100 L	DVGW-100LS-86	1PS5108-ND-4RA3	55
0.8/1.9	112 M	DVGW-112MS-86	1PS5113-ND-4RA3	66
1.1/2.6	132 S	DVGW-132SR-86	1PS5131-ND-4RA3	93
1.6/3.8	132 M	DVGW-132MR-86	1PS5133-ND-4RA3	102
2.5/6	160 M	DVGW-160MR-86	1PS5163-ND-4RA3	176
3.5/8	160 L	DVGW-160LR-86	1PS5166-ND-4RA3	192
5.5/12.5	180 L	DVGW-180LS-86	1PS5186-ND-4RA3	255
9.5/20	200 L	DVGW-200LS-86	1PS5206-ND-4RA3	333
11/24	225 S	DVGW-225SS-86	1PS5220-ND-4RA3	395
13/28	225 M	DVGW-225MS-86	1PS5223-ND-4RA3	445
16/34	250 M	DVGW-250MM-86	1PS5253-ND-4RA3	560
25/50	280 S	DVGW-280SL-86	1PS5280-ND-4RA3	780
30/60	280 M	DVGW-280MM-86	1PS5283-ND-4RA3	850
33/70	315 S	DVGW-315SL-86	1PS5311-ND-4RA3	1010
40/85	315 M	DVGW-315ML-86	1PS5313-ND-4RA3	1090
47/100	315 M	DVGW-315MN-86	1PS5315-ND-4RA3	1180
55/120	315 L	DVGW-315LL-86	1PS5316-ND-4RA3	1390
70/150	315 L	DVGW-315LM-86 <sup>1)</sup>	1PS5317-ND-4RA3	1550
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 315	0	–
Converter-fed operation, standard insulation		90 ... 315	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	–
500 VY, 50 Hz		90 ... 315	3	–
400 V, 50 Hz		90 ... 315	6	–
690 VY, 50 Hz		90 ... 315	8	–
For other voltages see Page 2/54		90 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 315	0	–
IM B5		90 ... 315	1	–
IM B34		90 ... 112	2	–
IM B14		90 ... 112	3	–
IM V1/cover		90 ... 315	4	–
IM B35		90 ... 315	6	–
For other types of construction see from Page 1/28		90 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).



## Motors with Explosion Protection LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Brake motors with High Efficiency IE2 in cast-iron and steel versions

### Selection and ordering data (continued)

P <sub>ra</sub> ted, 50 Hz	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J	
		n <sub>ra</sub> ted, 50 Hz	T <sub>ra</sub> ted, 50 Hz	T <sub>B</sub>	c/h · J S4- class	IE	η <sub>ra</sub> ted, 50 Hz	η <sub>ra</sub> rated, 50 Hz	cos φ ted, 50 Hz	I <sub>ra</sub> ted, 400 V	I <sub>ra</sub> ted, 500 V					I <sub>ra</sub> ted, 690 V
		rpm	Nm	Nm	1)	%	%	%	A	A	A	-	-	-	kg	kgm <sup>2</sup>

- Cooling: self-ventilated (IC 411)
- Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30
- Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %
- Type of protection: "Explosion-proof enclosure" according to EN 60079-1; 2007: CE 0102 II 2G Ex d(e) IIC T4 Gb

4-pole: 1500 rpm at 50 Hz

#### LOHER CHEMSTAR

0.75	80 B	1455	4.9	10	2.2	IE2	81.3	81.5	0.77	1.73	1.34	0.97	1.7	6.0	2.5	DBGW-080BS-04	1PS5081- RD -4BA3	33	0.0030
1.1	90 L	1460	7.2	10	2.0	IE2	86.4	87.1	0.83	2.20	1.73	1.25	2.0	6.8	2.8	DBGW-090LR-04	1PS5095- RD -4BA3	42	0.0044
1.5	90 L	1460	9.8	20	3.0	IE2	85.6	85.7	0.79	3.20	2.50	1.80	2.0	6.7	2.8	DBGW-090LS-04	1PS5098- RD -4BA3	45	0.0044
2.2	100 L	1450	14.4	20	6.25	IE2	86.9	87.9	0.85	4.30	3.50	2.55	1.6	6.4	2.5	DBGW-100LR-04	1PS5106- RD -4BA3	64	0.0060
3.0	100 L	1455	19.7	50	7.5	IE2	85.6	85.8	0.79	6.40	5.00	3.65	2.0	6.3	2.7	DBGW-100LS-04	1PS5108- RD -4BA3	66	0.0071
4.0	112 M	1460	26	50	7.5	IE2	88.3	89.1	0.83	7.90	6.20	4.50	1.9	6.8	2.5	DBGW-112MS-04	1PS5113- RD -4BA3	80	0.0126
5.5	132 S	1455	36.2	50	10.0	IE2	89.5	89.9	0.85	10.4	8.40	6.10	2.6	7.9	2.7	DBGW-132SR-04	1PS5131- RD -4BA3	110	0.030
7.5	132 M	1470	48.7	100	12.5	IE2	90.2	90.7	0.84	14.5	11.4	8.30	2.0	7.6	2.8	DBGW-132MS-04	1PS5133- RD -4BA3	115	0.030
11	160 M	1465	72	100	15.0	IE2	90.5	91.4	0.84	21.0	16.7	12.1	2.8	6.5	2.7	DBGW-160MR-04	1PS5163- RD -4BA3	176	0.10
15	160 L	1470	97	150	12.5	IE2	91.4	92.3	0.84	28.0	22.5	16.3	3.0	6.5	2.7	DBGW-160LS-04	1PS5166- RD -4BA3	192	0.13
18.5	180 M	1475	120	150	20.0	IE2	92.3	92.8	0.84	34.5	27.5	20.0	1.8	7.5	2.5	DBGW-180MR-04	1PS5183- RD -4BA3	246	0.20
22	180 L	1477	142	270	22.5	IE2	92.5	93.0	0.85	40.5	32.5	23.5	1.8	7.5	2.5	DBGW-180LS-04	1PS5186- RD -4BA3	255	0.23
30	200 L	1470	195	270	24.0	IE2	92.3	93.2	0.83	57.0	45.0	33.0	3.0	7.0	2.8	DBGW-200LS-04	1PS5206- RD -4BA3	333	0.37

6-pole: 1000 rpm at 50 Hz

#### LOHER CHEMSTAR

0.55	80 B	900	5.8	10	3.5	1)	73.2	73.4	0.70	1.55	1.24	0.90	2.0	3.5	2.1	DBGW-080BS-06	1PS5081- RD -4CA3	33	0.0030
0.75	90 L	960	7.5	10	3.75	IE2	80	80.4	0.72	1.88	1.50	1.09	1.5	4.5	2.2	DBGW-090LR-06	1PS5095- RD -4CA3	42	0.0044
1.1	90 L	950	11.1	20	6.25	IE2	78.1	77.9	0.72	2.80	2.25	1.64	1.4	4.1	2.0	DBGW-090LS-06	1PS5098- RD -4CA3	45	0.0044
1.5	100 L	955	15	20	8.75	IE2	80.4	79.5	0.68	3.95	3.15	2.30	2.5	5.0	2.7	DBGW-100LS-06	1PS5106- RD -4CA3	64	0.010
2.2	112 M	950	22	50	10.0	IE2	82.7	83.7	0.74	5.20	4.15	3.00	2.0	5.0	2.2	DBGW-112MS-06	1PS5113- RD -4CA3	80	0.019
3	132 S	950	30	50	13.75	IE2	85.4	86.1	0.79	6.40	5.10	3.70	2.3	6.0	2.5	DBGW-132SR-06	1PS5131- RD -4CA3	110	0.033
4	132 M	955	40	50	17.5	IE2	85.7	86.7	0.82	8.20	6.60	4.75	2.3	6.0	2.5	DBGW-132MR-06	1PS5133- RD -4CA3	115	0.045
5.5	132 M	955	55	100	20.0	IE2	86.1	86.3	0.77	12.0	9.60	6.90	2.4	6.0	2.6	DBGW-132MS-06	1PS5135- RD -4CA3	115	0.045
7.5	160 M	965	74	100	27.5	IE2	88.2	88.5	0.80	15.3	12.3	8.90	1.5	6.0	2.4	DBGW-160MR-06	1PS5163- RD -4CA3	176	0.088
11	160 L	970	108	150	42.5	IE2	88.9	89.4	0.78	23.0	18.3	13.3	1.6	6.0	2.6	DBGW-160LS-06	1PS5166- RD -4CA3	192	0.11
15	180 L	980	146	270	35.0	IE2	90.5	91.2	0.82	29.0	23.5	16.9	2.1	6.5	2.5	DBGW-180LS-06	1PS5186- RD -4CA3	255	0.28
18.5	200 L	980	180	270	65.0	IE2	91.2	91.5	0.80	36.5	29.5	21.0	2.5	7.0	2.6	DBGW-200LR-06	1PS5206- RD -4CA3	333	0.45
22	200 L	980	214	270	65.0	IE2	91.5	92.0	0.78	44.5	35.5	26.0	2.5	7.0	2.6	DBGW-200LS-06	1PS5208- RD -4CA3	349	0.49

Operating modes		Frame size	Order code
Mains-fed operation		80 ... 200	0
Converter-fed operation, standard insulation		80 ... 200	1
Converter-fed operation with special insulation (derating approx. 5 %)		160 ... 200	2
Voltages		Frame size	Order code
230 V/400 V, 50 Hz		80 ... 112	1
500 VY, 50 Hz		80 ... 200	3
400 V/690 V, 50 Hz		Standard	6
690 VY, 50 Hz		80 ... 200	8
For other voltages see Page 2/54		80 ... 500	9
			...
Types of construction		Frame size	Order code
IM B3		Standard	0
IM B5		80 ... 200	1
IM B34		80 ... 200	2
IM B14		80 ... 200	3
IM V1/cover		80 ... 200	4
IM B35		80 ... 200	6
For other types of construction see from Page 1/28		80 ... 200	9
			...

T<sub>B</sub> = Braking torque in Nm

The maximum permissible number of starts is limited for all motors to 20 c/h. For conditions for a higher number of starts, please inquire.

In the case of a number of starts of > 1 per hour, the brake dimensioning must be checked.

Conversion factor "c/h · J" depending on the duty cycle.

Standard brake supply: 230 V, 1-phase AC

#### Example 1

Motor: 1PS5113-. RB.-4BA0  
(motor type: DBGW-112MB-04), S4, 40 %, 120 c/h  
Required: ΣJ  
Solution: c/h · J = 7.5 from table  
ΣJ = 7.5/120 = 0.0625 kgm<sup>2</sup>

#### Example 2

Motor: 1PS5113-. RB.-4BA0  
(motor type: DBGW-112MB-04), S4, 40 %  
Required: c/h  
Solution: ΣJ = 0.05 kgm<sup>2</sup>  
c/h · J = 7.5  
c/h = 7.5/0.05 = 150

1) Outside the IE code classification according to IEC 60034-30.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Article No. supplements

#### Selection and ordering data

Voltages	Voltage code	Additional identification code with order code and plain text if required	Motor series																	
			LOHER CHEMSTAR												LOHER VARIO					
			Frame size																	
			71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
690 VΔ, 50 Hz	0		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
230 VΔ/400 VY, 50 Hz	1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-
500 VY, 50 Hz	3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-
400 VΔ, 50 Hz	4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
500 VΔ, 50 Hz	5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
400 VΔ/690 VY, 50 Hz	6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
690 VY, 50 Hz	8		0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-
415 VY, 50 Hz	9	L1C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
415 VΔ, 50 Hz	9	L1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
380 VΔ/660 VY, 50 Hz	9	L1L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
220 VΔ/380 VY, 50 Hz	9	L1R	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	
1000 VΔ, 50 Hz	9	L1V	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	
Other voltages	9	L1Y • and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
220 VΔ/380 VY, 60 Hz (50 Hz output)	9	L2A	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	
220 VΔ/380 VY, 60 Hz (60 Hz output)	9	L2B	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	
380 VΔ/660 VY, 60 Hz (50 Hz output)	9	L2C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
380 VΔ/660 VY, 60 Hz (60 Hz output)	9	L2D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	
460 VY, 60 Hz (60 Hz output)	9	L2E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	
460 VΔ, 60 Hz (60 Hz output)	9	L2F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
575 VY, 60 Hz (60 Hz output)	9	L2L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	
575 VΔ, 60 Hz (60 Hz output)	9	L2M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
440 VY, 60 Hz (50 Hz output)	9	L2Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	
440 VΔ, 60 Hz (50 Hz output)	9	L2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
460 VY, 60 Hz (50 Hz output)	9	L2S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	
460 VΔ, 60 Hz (50 Hz output)	9	L2T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	
575 VY, 60 Hz (50 Hz output)	9	L2U	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	
575 VΔ, 60 Hz (50 Hz output)	9	L2V	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
440 VY, 60 Hz (60 Hz output)	9	L2W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	-	
440 VΔ, 60 Hz (60 Hz output)	9	L2X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	

- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. On request
- Not possible

For dual voltages 230 V/400 V, 220 V/380 V, 400 V/690 V or 380 V/660 V:

- For motors for converter-fed operation, the converter rating plate is stamped with 380 V or 400 V.
- For motors with a Dahlander circuit, the lower voltage is generally specified.

Voltages not listed in the catalog are only available on request.  
 Standard brake supply voltage: 230 V, 1-phase AC

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Special versions

## Selection and ordering data

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS4 . . . . . -Z	1PS5 . . . . . -Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection</b>																			
Design with reduced starting current – factory clarification required and maybe type test needed, ETO option (Engineer To Order) without order code	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Special design according to load curve of driven machine or customer requirements – factory clarification required and maybe type test needed, ETO option without order code	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Adjustment of rating in response to customer requirements – factory clarification required and maybe type test needed, ETO option without order code	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	<b>A11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	<b>A12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 3 PTC thermistors for tripping as sole protection on converter (TMS)	<b>A15</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping as sole protection on converter (TMS)	<b>A16</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of embedded KTY84-130 temperature sensor	<b>A23</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of 2 × embedded KTY84-130 temperature sensors	<b>A25</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monitoring of winding temperature using 3 Pt100 resistance thermometers – in 2-wire design	<b>A60</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Monitoring of winding temperature using 2 × 3 Pt100 resistance thermometers – 2-wire design, for round-wire winding only	<b>A61</b>	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓
3 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	<b>A63</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	<b>A64</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6 Pt100 slot resistance thermometers without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A65</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6 Pt100 slot resistance thermometers with surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A66</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6 Pt100 slot resistance thermometers in shielded design without surge arresters for 4-wire connection – for pre-formed coil winding only	<b>A67</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

2

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection (continued)</b>																			
6 Pt100 slot resistance thermometers in shielded design to Ex i with surge arresters for 3- and 4-wire connection from terminal box – for pre-formed coil winding only	<b>Q40</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 Pt100 double resistance thermometers in shielded design (Ex i) for roller bearing or sleeve bearings – 2-wire from element, 4-wire from terminal box	<b>V80</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Winding Pt100 in 3- or 4-wire type from sensor instead of from terminal (not Ex i Pt100!) – Optionally possible for <b>A60, A61, A65, A66</b>	<b>Q43</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing Pt100 in 3- or 4-wire type from sensor instead of from terminal – optionally possible for <b>V80, A40, A42</b>	<b>Q44</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
One thermocouple per bearing	<b>Q49</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for housing vibration monitoring (preferred brand), with loose cable – for each sensor	<b>V14</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for housing vibration monitoring (preferred brand), without terminal box – for each sensor	<b>V15</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
3 transmitters, 4 to 20 mA for Pt100 winding	<b>P20</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
1 transmitter with digital display with Ex d or Ex i approval	<b>V88</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pt100 winding in tolerance class A with calibration certificate	<b>V78</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Site altitude max. 1500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D06</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 2000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D07</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 2500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D08</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

2

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
		Frame size																	
<b>1PS4.....-Z</b>		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection (continued)</b>																			
Site altitude max. 3000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 45 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 50 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 55 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 60 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D14</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coolant temperature below +40 °C with increased output – factory clarification required, not applicable for IE2.	<b>D18</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Utilization to temperature class 155 (F) with higher output – higher output on request, not applicable for IE2. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>C12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Rated output of the lower output level – IEC output levels are maintained, only in combination with <b>D06</b> to <b>D18</b> . No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>C29</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Temperature class F	<b>W00</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Temperature class H	<b>W01</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR												LOHER VARIO						
		Frame size																		
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
<b>Special electrical designs/winding protection (continued)</b>																				
Special insulation for increased voltage load in converter-fed operation (phase/phase 2250 V <sub>Peak</sub> /derating) – for LOHER CHEMSTAR at 8th position of the Article No. = 2	<b>1)</b>	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Sealing of winding overhangs with silicone rubber	<b>W03</b>	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	O.R.	O.R.	O.R.	O.R.
Sealing of cable duct with silicone rubber	<b>W04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Efficiency according to efficiency class IE3 (Premium Efficiency) – factory clarification required	<b>D25</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Non-standard voltage and/or frequency for separate fan motor	<b>Y81 •</b> and identification code	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Other special electrical designs/configurations		O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	
<b>Colors and paint finish</b>																				
Internal corrosion protection system J08	<b>W10</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Coating system N08 – 110 µm (C3 medium) – corrosion resistance acc. to EN/ISO 12944-5 = C3	<b>V09</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○	
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>V10</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Coating system N14A (chemical industry + onshore, C5 industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>W14</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Special prime coat system Z05 with internal corrosion protection system J08	<b>W15</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) – sea climate	<b>V11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Increased layer thickness 275 µm for coating system Z21 (C5M-high) – only in combination with <b>V11</b> – corrosion resistance acc. to EN/ISO 12944-5 = C5 high (> 15 years) – sea climate	<b>V19</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special offshore paint finish S13 with reference to NORSOK M501 (C5M-high) with comments and deviations – corrosion resistance acc. to EN/ISO 12944-5 = C5 high (> 15 years) – sea climate	<b>V12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special coating system S11/J08 (e.g. submerged motors)	<b>V13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Unpainted, only primed	<b>K24</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Unpainted	<b>K23</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	
Outer coating 110 µm for zinc-galvanized noise cabinet	<b>V98</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Special colors according to Munsell or British Standard	<b>Y50 •</b> and identification code	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
		Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Colors and paint finish (continued)</b>																			
Standard paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002	<b>Y53 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002 (specify special coating system in addition, e.g. <b>V10</b> , <b>V11</b> , <b>W14</b> , etc.)	<b>Y54 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RAL colors, other than those offered above	<b>Y51 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special non-RAL colors	<b>Y71 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Other paint combinations/systems or RAL colors to customer specification		O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
<b>Design for Zones according to ATEX</b>																			
Design for Zone 21 (conductive dust) for mains-fed operation	<b>M34</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design for Zone 22 (non-conductive dust) for mains-fed operation	<b>M35</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design for Zone 21 (conductive dust) for converter-fed operation	<b>M38</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design for Zone 22 (non-conductive dust) for converter-fed operation	<b>M39</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 22 for mains-fed operation, no hybrid certification – non-conductive dust	<b>W20</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 21 for mains-fed operation, no hybrid certification – version and certification for conductive dust (incl. non-conductive dust)	<b>W21</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 22 for converter-fed operation, no hybrid certification – non-conductive dust, select options for converter-fed operation separately	<b>W22</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 21 for converter-fed operation, no hybrid certification – version and certification for conductive dust (incl. non-conductive dust), select options for converter-fed operation separately	<b>W23</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
<b>Ship design "Operation below deck"</b>																			
Design acc. to GL (Germanischer Lloyd), CT 45 °C with manufacturer's declaration – non essential	<b>W24</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration – non essential	<b>W25</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration – non essential	<b>W26</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR														LOHER VARIO			
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Ship design "Operation below deck" (continued)</b>																			
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration – non essential	<b>W27</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration – non essential	<b>W28</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Navale), CT 50 °C with manufacturer's declaration – non essential	<b>W29</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Other certifications, motors for upper deck mounting and acceptance tests to classification – factory clarification required	<b>W99</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–
Design acc. to GL (Germanischer Lloyd), CT 45 °C, essential drive <sup>2)</sup>	<b>Q60</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q61</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q62</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q63</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q64</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Navale), CT 50 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q65</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to CCS (China) CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q66</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to USSR (Russia) CT xx °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q67</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to PR (Poland) CT xx °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q68</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design acc. to NKK (Japan) CT xx °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q69</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
<b>Individual certifications</b>																			
Coolant temperature in temperature range -50 to +40 °C – roller bearing design	<b>D02</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Coolant temperature in temperature range -40 to +40 °C – roller bearing design	<b>D03</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Coolant temperature in temperature range -30 to +40 °C – roller bearing design	<b>D04</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Electrical design according to NEMA MG1-12	<b>D30</b>	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Certification acc. to NEPSI – design may differ (different cover size)	<b>D32</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
China Energy Efficiency Label	<b>D34</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
Certificate EAC for Eurasian Customs Union	<b>D35</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.



## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																					
		LOHER CHEMSTAR												LOHER VARIO									
		Frame size																					
	<b>1PS4.....-Z</b> <b>1PS5.....-Z</b>	71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500				
<b>Individual certifications (continued)</b>																							
Ex certification for India (PESO – CCOE)	<b>D38</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
IEC Ex certificate	<b>D37</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	O.R.	O.R.	O.R.	O.R.
<b>Special mechanical designs</b>																							
Terminal box on right-hand side (view onto DE)	<b>K09</b>	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□	
Terminal box on left-hand side (view onto DE)	<b>K10</b>	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○	
Terminal box on top	<b>K11</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○	
Terminal box to IP65	<b>Q71</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Cable entry thread metrically different from standard – thread dimension must be specified	<b>W30</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Enlarged connection system for main terminal box – not in combination with <b>K53</b> (Ex d terminal box)	<b>L00</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Undrilled cable gland plate – for main terminal box	<b>L01</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	
Main terminal box in Ex d version with standard terminals	<b>Q31</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	
1 × NPT thread – specify size in plain text, cable gland not in our supply	<b>W32</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	
1 × cable gland for non-armored cable – for main terminal box	<b>K54</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
1 × cable gland, standard thread size, for non-armored cable – for additional connection	<b>W33</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Saddle terminal for connection without cable lug	<b>W35</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	□	□	□	□	
Special cable gland – one cable gland for supply cable in the main terminal box, non-armored cable	<b>Y97 •</b> and identification code	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	
Cable gland, standard Ex d (non-armored cable) 1 unit – only in combination with <b>K53</b>	<b>W91</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Cable gland for accessories Ex d – 1 unit (non-armored cable) –	<b>W92</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Explosion-proof main terminal box Ex d IIC – for connection cable of accessories in main or auxiliary terminal box	<b>K53</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Auxiliary terminal box Ex d IIC, cast-iron – with standard thread according to catalog; specify size if different ( <b>W30</b> ), because cable glands with reduction are only permitted in certain cases	<b>V43</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs</b> (continued)																			
Auxiliary terminal box Ex e, cast-iron – not in combination with <b>K53</b> (Ex d terminal box)	<b>W72</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.
Material of auxiliary terminal box: Stainless steel – not in combination with <b>K53</b> (Ex d terminal box)	<b>M51</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Separate auxiliary terminal box for anti-condensation heater	<b>M52</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	✓
Auxiliary terminal box in cast-iron design with "undrilled" removable cable gland plate – not in combination with <b>K53</b> (Ex d terminal box)	<b>Q75</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Auxiliary terminal box in cast-iron design with removable cable gland plate "drilled with metric thread and sealed with metal plug" – not in combination with <b>K53</b> (Ex d terminal box)	<b>Q76</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Cable outlet radially without terminal box with 1 m free cable length (4- or 7-core)	<b>W38</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Additional price for each additional meter of cable – only in combination with <b>W38</b>	<b>W39</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Connection cable for accessories – only in combination with <b>W38</b> , length as power cable	<b>W40</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Additional separately supplied terminal box made of cast-iron with baseplate – main terminal box certified acc. to Ex e	<b>W41</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Cable entry from DE	<b>K83</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Cable entry from NDE	<b>K84</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Rotation of the terminal box by 180°	<b>K85</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vibration quantity level A – IEC 60034-14	<b>K01</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Vibration quantity level B – IEC 60034-14 – for converter-fed operation only at lowest and highest speed of speed range	<b>K02</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft and flange with increased accuracy according to DIN 42955-R	<b>K04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Radial sealing ring at DE for horizontal flange-mounting types (oil-tight)	<b>K17</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	
Radial sealing ring at DE for vertical flange-mounting types (oil-tight)	<b>W43</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	
Labyrinth sealing for external bearing seal	<b>W44</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	□	
Bearing for increased cantilever forces (roller bearing DE) with regreasing device – comprising <b>K40</b>	<b>K20</b>	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.R.
Bearings for increased axial forces	<b>V20</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.
Regreasing device DE/NDE	<b>K40</b>	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	□	□	□

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR	LOHER VARIO																
<b>1PS4.....-Z</b>		Frame size																	
<b>1PS5.....-Z</b>		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs</b> (continued)																			
Bearing insulation NDE for roller bearings – binding for frame sizes 315 to 500 for converter-fed operation	<b>L27</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft grounding device – up to -20 °C only	<b>V36</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Located bearing DE	<b>K94</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Located bearing NDE	<b>L04</b>	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-	-
Pt100 bearing in tolerance class A with calibration certificate – only in combination with <b>Q44</b>	<b>V76</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing ventilation at DE for lower bearing temperature for roller bearing design grease-lubricated	<b>V17</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing insulation at both ends for roller bearing design motors (DE linked to ground) – for horizontal mounting only (vertical mounting on request)	<b>V18</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Grease extractors for DE and NDE	<b>V21</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Automatic grease lubricator at DE and NDE (permissible temperature range from -15 to +50 °C)	<b>V22</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Enlarged spent grease chamber at DE and NDE	<b>V25</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
External grounding (additionally)	<b>W46</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
VIK design – including <b>W14, W69</b>	<b>K30</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
LOHER CHEMSTAR Plus design, including VIK design – including <b>K30, K51, W14, W69</b> and IP66 bearing seal, vibration quantity level as grade B	<b>W09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Second rating plate, supplied loose	<b>K31</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second rating plate installed in terminal box	<b>W47</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate stamped with data for converter-fed operation – data for quadratic torque in speed range 1:10 and constant torque in speed ranges 1:3 and 1:10	<b>Y80 •</b> and identification code	○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
Extra rating plate for customer data (each plate) – data must be specified as text in the order	<b>Y82 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rating plates made of stainless steel	<b>W48</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates in languages other than English or German – main rating plate or extra rating plates O.R. factory clarification required	<b>W49</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional measures for 2 to 4 years storage in accordance with storage regulations	<b>W50</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 230 V	<b>K45</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Anti-condensation heater 115 V	<b>K46</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Anti-condensation heater, 110 to 120 V (min. 100 V, max. 132 V) – preferred	<b>M12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater, 210 to 250 V (min. 200 V, max. 264 V) – preferred	<b>M13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater rated voltage range 110 to 120 V (min. 100 V, max. 132 V) Ex e II T3	<b>M14</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
		Frame size																	
<b>1PS4</b> .....-Z		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs</b> (continued)																			
Anti-condensation heater rated voltage range 220 to 240 V (min. 200 V, max. 264 V) Ex e II T3	<b>M15</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Heater in main terminal box	<b>P84</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Second standard shaft extension – for 100 % torque; VARIO 50 % torque	<b>K16</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second shaft extension for IM B3 up to 100 % torque; cylindrical with feather key	<b>Q21</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Non-standard cylindrical shaft extension (standard diameter or smaller) – in case of significantly different diameters, especially high-pole motors due to the maximum permissible torque stress, factory clarification required	<b>Y55 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft of material 1.7225	<b>W51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Shaft of material 1.4021	<b>W52</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft end of stainless steel butt-welded (material 1.4571)	<b>W53</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft made of special steel – for increased torque loading, e.g. 1.7225-42CrMo4	<b>L72</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Welded standard stator housing for surface-cooled motors – factory clarification required because of possible dimension deviations	<b>W54</b>	-	-	-	-	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Welded copper bar rotors	<b>W55</b>	-	-	-	-	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Special rotors for heavy duty starting (e.g. double-cage rotor or brass rotor) – testing needed	<b>Q22</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Generator design (asynchronous) with 1.8 times runaway speed – only 4-pole and higher	<b>W56</b>	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	-	-	-
IP56 degree of protection	<b>K51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
IP65 degree of protection	<b>K50</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP66 degree of protection	<b>L94</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Increased tropicalization, humidity ≥ 80 % – LOHER CHEMSTAR incl. <b>V10</b> and <b>W71</b> , LOHER VARIO incl. <b>V10</b> and <b>P45</b>	<b>W61</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tropical design for outdoor onshore installation	<b>L28</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design without fan and fan cover – motor mounted in air stream. Without external air stream cooling, factory clarification required due to derating	<b>W62</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan with plastic coating in case of metal fan	<b>W63</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan of aluminum	<b>W64</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	□	-	-	-	-	-
Fan of steel	<b>W65</b>	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
External fan of brass	<b>W66</b>	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External fan of stainless steel	<b>V94</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																				
		LOHER CHEMSTAR												LOHER VARIO								
		Frame size																				
	<b>1PS4.....-Z</b> <b>1PS5.....-Z</b>	71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500			
<b>Special mechanical designs (continued)</b>																						
Special ventilation for on-deck motors	<b>W67</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan cover of steel sheet (3 mm thick)	<b>W68</b>	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Galvanized fan cover – included in <b>K30</b> and <b>W09</b>	<b>W69</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.
Noise class 3 for clockwise direction of rotation viewed onto DE – for 2-pole motors only	<b>K37</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Noise class 3 for counter-clockwise direction of rotation viewed onto DE – for 2-pole motors only	<b>K38</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Clockwise – direction of rotation must be specified for motors of FS 355 and above 2-/4-pole	<b>K97</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
Counter-clockwise – direction of rotation must be specified for motors of FS 355 and above 2-/4-pole	<b>K98</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
Noise reduction: Silencer for air inlet (DW, NMA) – only in combination with <b>K97</b> or <b>K98</b>	<b>L20</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Stainless steel grid for air inlet silencer – only in combination with <b>L20</b>	<b>L25</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Noise cabinet with inspection door – zinc-galvanized, unpainted – noise reduction approx. 15 dB(A) for GG1	<b>V32</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Noise cabinet with inspection door – V4A unpainted – noise reduction approx. 15 dB(A) for GG1	<b>V35</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Operation in both directions of rotation – FS 355 and above 2-/4-pole on request, increased noise values and derating	<b>K99</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○	○
Higher number of starts (up to 3000 starts per year)	<b>Q23</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Full-key balancing	<b>L68</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Support ring for coupling guard	<b>L15</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Fitting of coupling halves (customer-supplied, finish-machined and balanced) – supplied 4 weeks ahead of testing date	<b>L17</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓
Motor mounting material: bolts for mounting on steel foundation with shims (V2A), taper pins	<b>L31</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Motor mounting material: T-head bolts, anchor sleeves and soleplates for mounting on concrete foundation	<b>L33</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Half-key balancing	<b>L69</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
Stainless steel screws and plates	<b>W71</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stainless steel external bolts	<b>P45</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓
Ambient temperatures down to -40 °C; preheating before operation necessary – factory clarification required regarding the heating power required, heating via the winding may be necessary. Installed heating elements in motor at additional charge.	<b>W73</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																		
		LOHER CHEMSTAR												LOHER VARIO						
1PS4.....-Z	1PS5.....-Z	Frame size																		
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
<b>Special mechanical designs (continued)</b>																				
Ambient temperatures down to -40 °C; no preheating before operation	<b>W97</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Ambient temperatures down to -55 °C; no preheating before operation	<b>W98</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Mounting of rotary pulse encoder, 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version	<b>W96</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Mounting of rotary pulse encoder Ex version (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version	<b>V72</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mounting of rotary pulse encoder Ex version with integrated shaft grounding (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version; up to 20 °C; select bearing insulation separately	<b>V77</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mechanical protection for rotary pulse encoder – in combination with <b>V72, V77</b>	<b>M68</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Mounted axial forced ventilation – forced ventilation should preferably be specified in the 10th position of the Article No.	<b>G17</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Mounted radial forced ventilation	<b>W81</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Forced ventilation at NDE – for Ex motors – axial forced ventilation	<b>V28</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Backstop for clockwise direction of rotation viewed onto DE (counter-clockwise blocked) – dimensions may differ	<b>G48</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Backstop for counter-clockwise direction of rotation viewed onto DE (clockwise blocked)	<b>G49</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Manual mechanical release for standard brake	<b>K82</b>	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Brake supply voltage 400 V AC/50 Hz	<b>C01</b>	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Brake supply voltage 24 V DC	<b>C00</b>	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Tapered shaft extension with shaft nut	<b>T36</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Microswitch for brake – optionally deselectable if monitoring is implemented differently	<b>W83</b>	-	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Sun protection shield – fixing parts of mild steel, cover unpainted stainless steel for vertical motors	<b>V87</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sun protection shield – fixing parts of mild steel, cover of unpainted stainless steel for horizontal motors	<b>V99</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Preparation for SPM bearing monitoring, only M8 drilled hole for measuring nipple	<b>W84</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
1PS4.....-Z	1PS5.....-Z	Frame size																	
		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																			
Condensation drain valve (drain and breather) for auxiliary terminal box to IP55 – not in combination with <b>V43</b> (Ex d terminal box)	<b>Q77</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Condensation drain valve (drain and breather) for main terminal box – not in combination with <b>K53</b> (Ex d terminal box)	<b>Q78</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Machined surface on motor foot with dowel pin holes	<b>Q94</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Base frame for height adaptation of max. 2 frame sizes difference	<b>Q96</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of foot and shaft dimensions to next higher frame size (no adaptation of terminal box!)	<b>Q97</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Adaptation of flange dimensions and drilled holes in flange	<b>Q98</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Preparation for later installation of sun protection shield	<b>Q99</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: Measuring nipple system 32 – thread M8, DE and NDE	<b>G50</b>	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shock pulse measurement (SPM), fixed sensor and distribution box	<b>H05</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
SPM bearing monitoring: Fixed sensor system 40 – thread M8	<b>W85</b>	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	-	-	-	-
Bearing temperature monitoring with PTC thermistors at DE/NDE	<b>W86</b>	-	-	-	-	-	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Speed monitoring by inductive proximity switches, Pepperl + Fuchs	<b>A03</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 Pt100 resistance thermometers for 3- or 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	<b>A40</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	✓
2 Pt100 double resistance thermometers for 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	<b>A42</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers without contacts, capillary principle	<b>A70</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers with 2 NO contacts, capillary principle	<b>A71</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing temperature monitoring with 1 × Pt100 per bearing in 2-wire connection – 2-wire from terminal box	<b>A72</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-
One dial-type thermometer with 2 contacts, capillary principle – Ex i design without supply unit!	<b>V89</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Engraved tag plate fixed on terminal box	<b>V96</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
4 mm shims, stainless-steel base (V4A/AISI 316) – not laminated	<b>Q92</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
4 mm shims, brass base – not laminated	<b>V31</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																	
		LOHER CHEMSTAR												LOHER VARIO					
		Frame size																	
<b>1PS4</b> . . . . . <b>-Z</b>		71	80	90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																			
Slotted feet holes	<b>Q95</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pre-formed coil for LV motors	<b>V01</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
2 metal test sheets (100 × 150 mm) with paint layer for special acceptance test	<b>V08</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Impact protection – for built-on devices, per device	<b>M81</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
"High-speed motors" for speed range 3600 < n ≤ 6000 rpm – only on request; torque curve and cutoff frequency affect the design; test with original converter may be required	<b>W87</b>	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
"High-speed motors" for speed range > 6000 rpm – only on request; torque curve and cutoff frequency affect the design; test with original converter may be required, ETO option (Engineer To Order) without order code	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Retrofit (description of special design separately) – adaptation to an existing motor	<b>B15</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
<b>Extension of the liability for defects</b>																			
Extension of the liability for defects by 12 months to a total of 24 months from delivery	<b>Q80</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 18 months to a total of 30 months from delivery	<b>Q81</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 24 months to a total of 36 months from delivery	<b>Q82</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 30 months to a total of 42 months from delivery	<b>Q83</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 36 months to a total of 48 months from delivery	<b>Q84</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 48 months to a total of 60 months from delivery	<b>Q85</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. Possible on request
- Not possible

<sup>1)</sup> Coding in 8th position of the article number, for LOHER CHEMSTAR = 2.

<sup>2)</sup> Acceptance tests must be selected additionally. For example, for the first motor select **F83** or **F93**, and for each additional motor **F01**. Inclusive of costs for certification authority and inspector, and shaft test if specified by certification authority. LOHER CHEMSTAR for essential drive is possible on request as an ETO option (Engineer To Order) without an option code.



# Motors with Explosion Protection

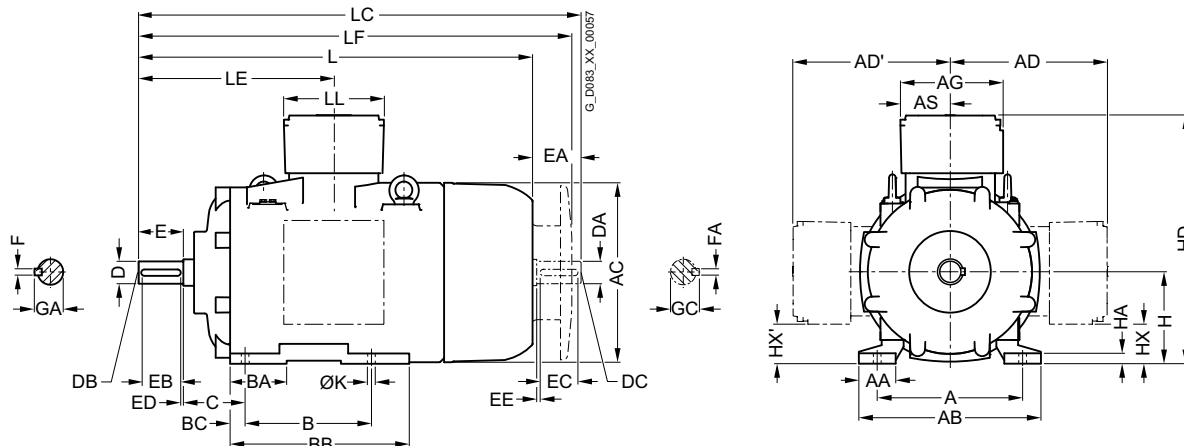
## LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 71 B to 250 M

### Dimensional drawings

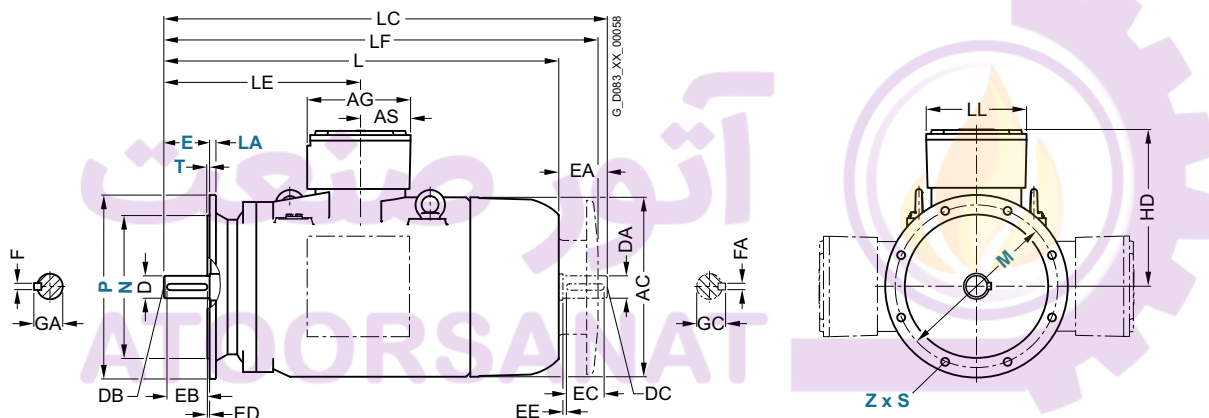
#### Type of construction IM B3

For flange dimensions, see Page 2/75.



#### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/75.



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER CHEMSTAR</b>																		
71 B	2 ... 16	112	30	140	148	-	138	69	90	30	125	10	45	71	10	271	7	345
80 B	2 ... 16	125	35	160	168	-	138	69	100	35	130	13	50	80	10	289	10	358
90 L	2 ... 16	140	40	180	186	-	138	69	125	40	155	15	56	90	13	303	10	426
100 L	2 ... 16	160	45	205	213	-	138	69	140	45	170	15	63	100	18	327	12	482
112 M	2 ... 16	190	50	240	237	-	138	69	140	60	170	15	70	112	18	352	12	465
132 S	2 ... 16	216	50	260	278	274	186	92	140	88	228	25	89	132	18	406	12	574
132 M	2 ... 16	216	50	260	278	274	186	92	178	88	228	25	89	132	18	406	12	574
160 M	2 ... 16	254	60	310	331	304	186	92	210	61	307	21	108	160	27	465	15	786
160 L	2 ... 16	254	60	310	331	304	186	92	254	61	307	21	108	160	27	465	15	786
180 M	2 ... 16	279	70	349	363	349	254	123	241	99	359	24	121	180	19	529	15	822
180 L	2 ... 16	279	70	349	363	349	254	123	279	99	359	24	121	180	19	529	15	822
200 L	2 ... 16	318	80	400	402	367	254	123	305	120	425	32	133	200	25	569	19	884
225 S	2	356	90	446	451	384	254	123	286	136	438	34	149	225	26	609	19	966
	4 ... 16																	996
225 M	2	356	90	446	451	384	254	123	311	136	438	34	149	225	26	609	19	966
	4 ... 16																	996
250 M	2	406	100	505	490	522	382	176	349	110	420	36	168	250	35	772	25	1028
	4 ... 16																	

2

# Motors with Explosion Protection

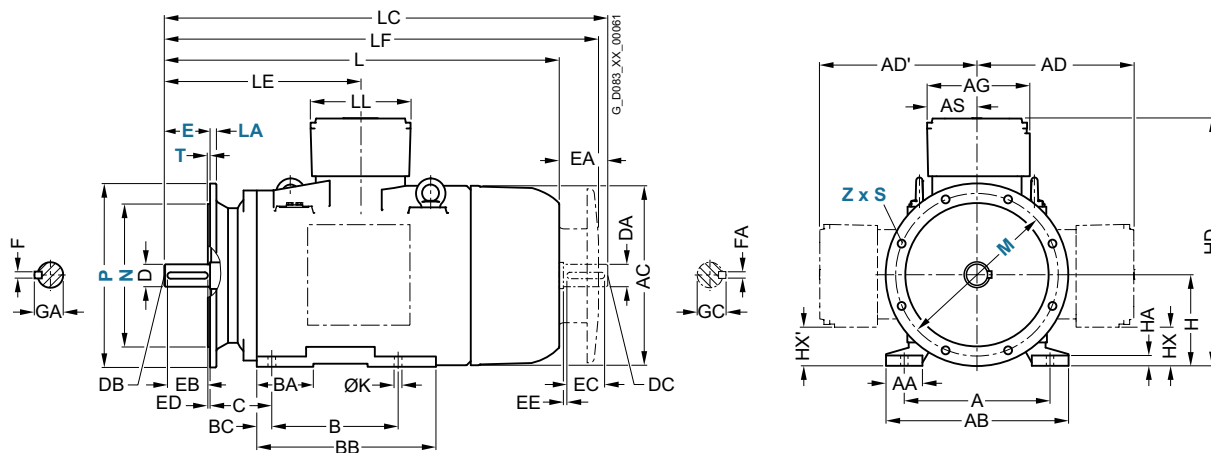
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 71 B to 250 M

## Dimensional drawings (continued)

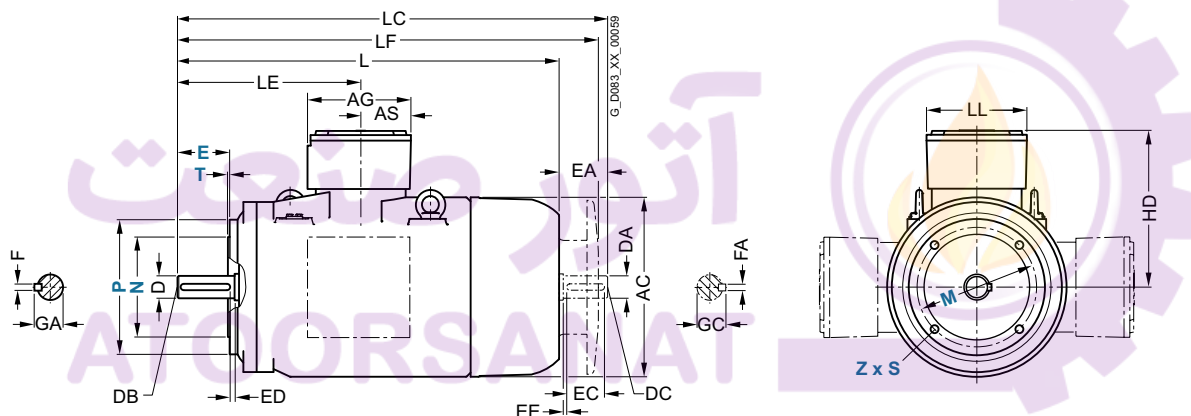
### Type of construction IM B35

For flange dimensions, see Page 2/75.



### Type of construction IM B14

For flange dimensions, see Page 2/75.



Frame size	No. of poles	Dimension designation acc. to IEC							DE shaft extension				NDE shaft extension						
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER CHEMSTAR</b>																			
71 B	2 ... 16	385	135	377	138	14	M5	30	22	4	5	16	14	M5	30	22	4	5	16
80 B	2 ... 16	408	158	391	138	19	M6	40	32	4	6	21.5	19	M6	40	32	4	6	22
90 L	2 ... 16	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27
100 L	2 ... 16	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
112 M	2 ... 16	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
132 S	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132 M	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160 M	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
160 L	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
180 M	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	52
180 L	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.6	48	M16	110	100	5	14	52
200 L	2 ... 16	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64
	4 ... 16				65							69	65						

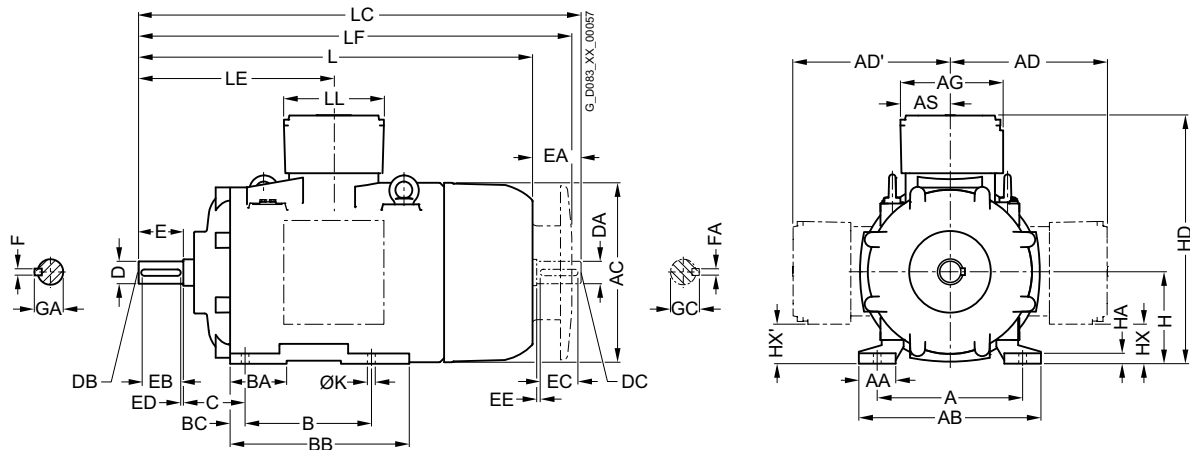
# Motors with Explosion Protection

## LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 280 S to 355 M

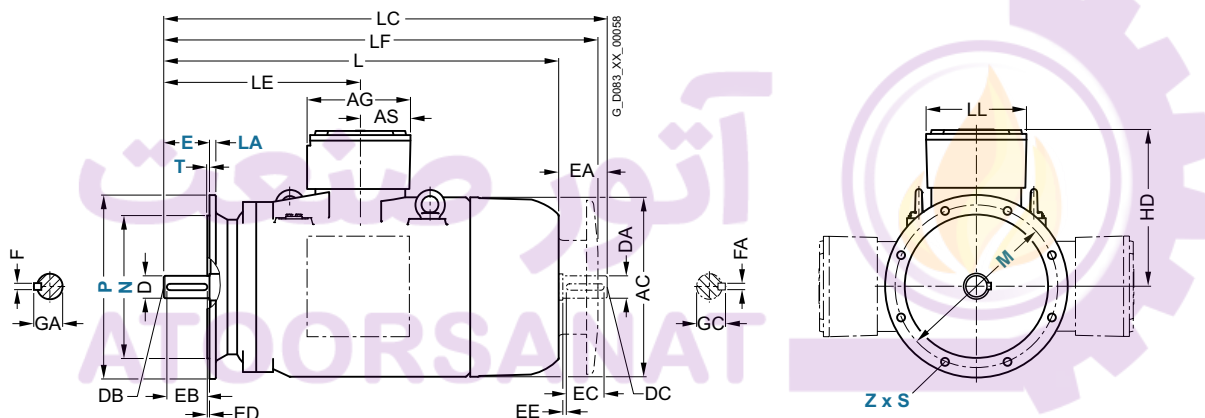
### Dimensional drawings (continued)

#### Type of construction IM B3



#### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/75.



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER CHEMSTAR</b>																		
280 S	2	457	110	570	550	552	382	176	368	150	520	51	190	280	40	832	25	1119
	4 ... 16																	
280 M	2	457	110	570	550	552	382	176	419	150	520	51	190	280	40	832	25	1119
	4 ... 16																	
315 S	2	508	125	630	622	660	509	196	406	165	575	59	216	315	40	975	28	1304
	4 ... 16																	1334
315 M	2	508	125	630	622	660	509	196	457	165	575	59	216	315	40	975	28	1304
	4 ... 16																	1334
315 LL	2	508	125	630	622	676	509	196	508	165	575	59	216	315	40	991	28	1491
	4 ... 16																	1521
315 L	2	508	125	630	622	676	509	196	560	165	575	59	216	315	40	991	28	1491
	4 ... 16																	1521
355 M	2	630	150	780	734	-	509	196	800	220	980	90	254	355	35	1182	35	1781
	4, 6																	1840

## Motors with Explosion Protection

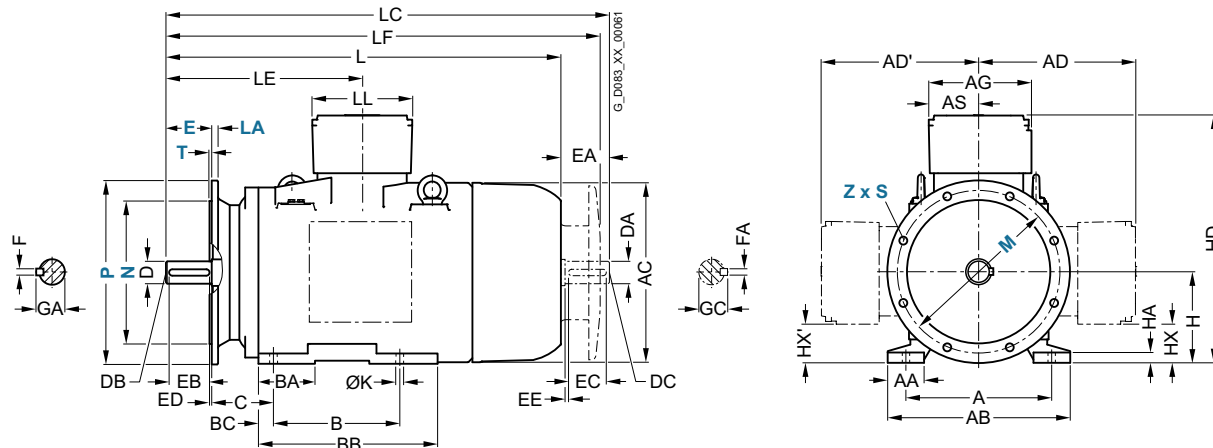
LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 280 S to 355 M

### Dimensional drawings (continued)

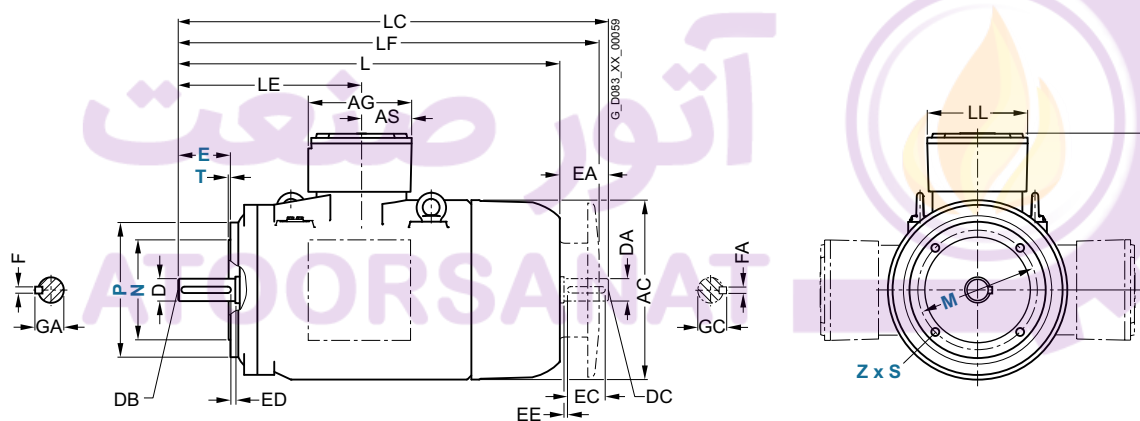
#### Type of construction IM B35

For flange dimensions, see Page 2/75.



#### Type of construction IM B14

For flange dimensions, see Page 2/75.



Frame size	No. of poles	Dimension designation acc. to IEC							DE shaft extension				NDE shaft extension						
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER CHEMSTAR</b>																			
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	79.5	80		170	140	15	22	80
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	85	80		170	140	15	22	85
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
355 M	2	1986	793	1947	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	80
	4 ... 16	2115	863	2006	401	100	M24	210	180	15	28	106	75	M20	140	125	7.5	20	79.5

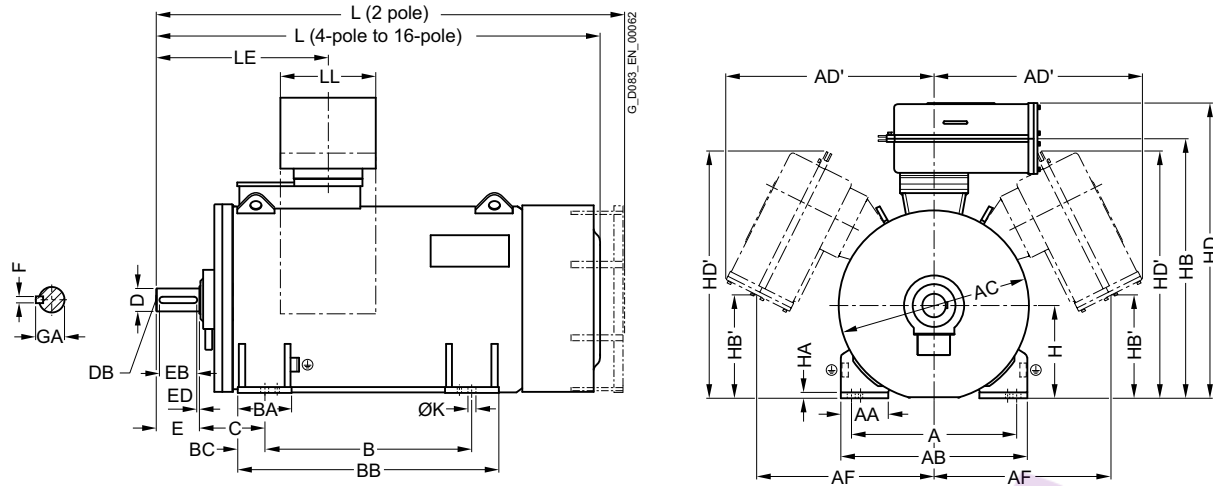
## Motors with Explosion Protection LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

Dimensions for frame sizes 355 L to 500 L

### Dimensional drawings (continued)

#### Type of construction IM B3

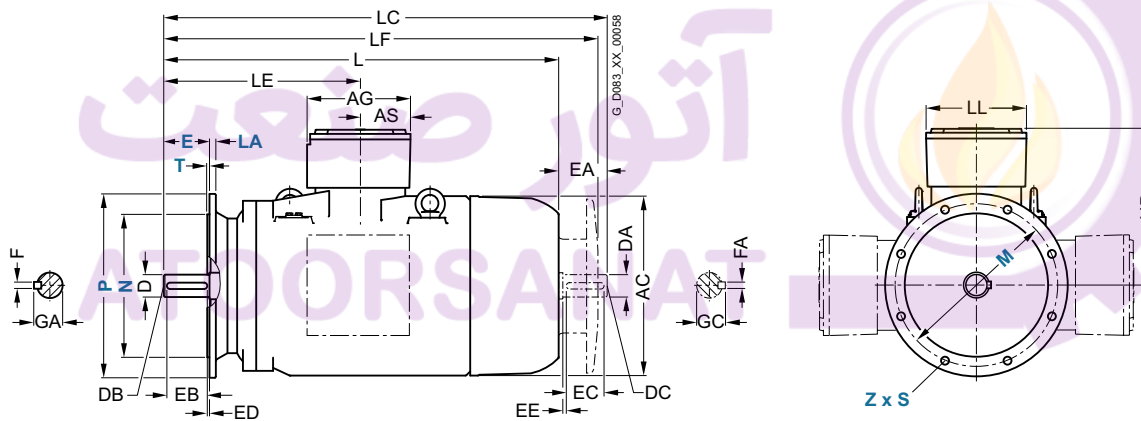
Design of terminal box and position for LOHER VARIO



#### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/75.

Design of terminal box and position for LOHER VARIO



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AF	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER VARIO</b>																		
355 LB	2	610	120	700	698				630	150	720		254	355	30	1062	28	1870
	4 ... 16																	1775
355 LC/LD	2	610	120	700	698				800	150	890		254	355	30	1062	28	1950
	4 ... 16																	1855
355 L	2	630	140	780	740		511		800	210	950		254	355	35	1240	33	2016
	4 ... 16																	1900
400 L	2	710	185	860	820		511		900	210	1090		280	400	30	1305	33	2131
	4 ... 16																	2025
450 L	2	800	230	900	920		511		1000	260	1260		315	450	30	1430	39	2251
	4 ... 16																	2180
500 L	2	900	220	1030	1015		511		1120	280	1400		335	500	40	1530	39	2421
	4 ... 16																	2375

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

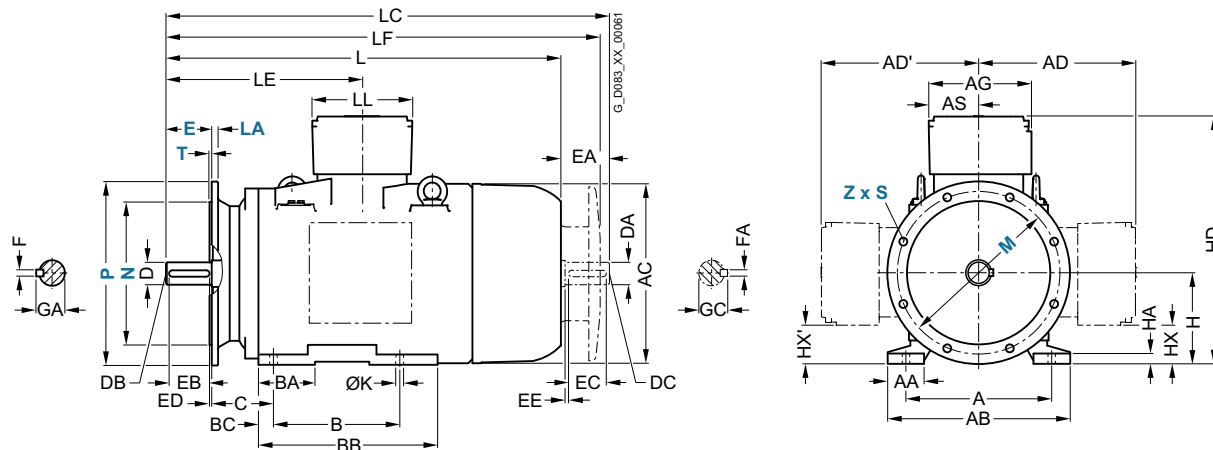
Dimensions for frame sizes 355 L to 500 L

### Dimensional drawings (continued)

#### Type of construction IM B35

For flange dimensions, see Page 2/75.

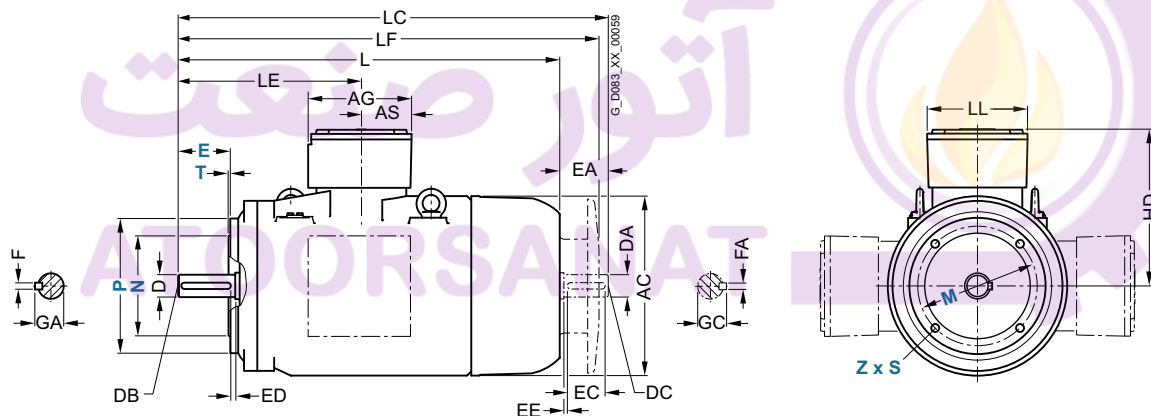
Design of terminal box and position for LOHER VARIO



#### Type of construction IM B14

For flange dimensions, see Page 2/75.

Design of terminal box and position for LOHER VARIO



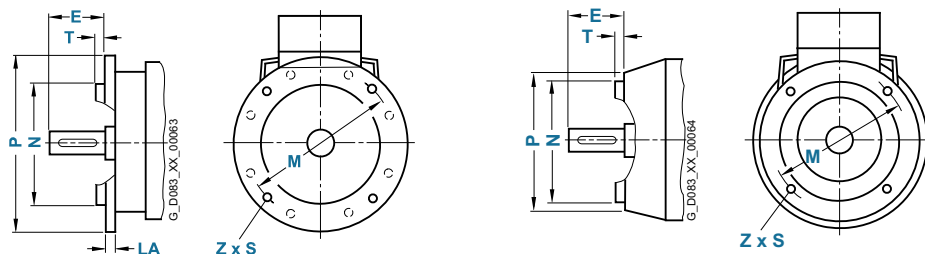
Frame size	No. of poles	Dimension designation acc. to IEC				DE shaft extension				NDE shaft extension									
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER VARIO</b>																			
355 LB	2	779	1870		75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	80	
	4 ... 16	809	1935		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95	
355 LC/LD	2	779	1950		75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	80	
	4 ... 16	809	2015		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95	
355 L	2	750	2016		75	M20	170	125	7.5	20	79.5	75	M20	170	125	7.5	20	80	
	4 ... 16	780	2066		90	M24	210	140	15	25	95	90	M24	210	140	15	25	95	
400 L	2	780	2131		80	M20	170	140	15	22	85	80	M20	170	140	15	22	85	
	4 ... 16	820	2191		100	M24	210	180		28	106	100	M24	210	180		28	106	
450 L	2	780	2251		85	M20	170	140	15	22	90	85	M20	170	140	15	22	90	
	4 ... 16	820	2346		110	M24	210	180		28	116	110	M24	210	180		28	116	
500 L	2	780	2421		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95	
	4 ... 16	820	2541		120		210	180		32	127	120		210	180		32	127	

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

#### Flange dimensions

#### Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes.  
(Z = the number of retaining holes)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
<b>LOHER CHEMSTAR</b>										
71 B	2 ... 16	FF130	10	30	130	110	160	9.5	3.5	4
		FT85	15	30	85	70	105	M6	2.5	4
		FT115 <sup>1)</sup>	15	–	115	95	140	M8	3	4
		FT100 <sup>1)</sup>	15	–	100	80	120	M6	3	4
		FT130 <sup>1)</sup>	15	–	130	110	160	M8	3.5	4
80 B	2 ... 16	FF165	10	40	165	130	200	11.5	3.5	4
		FT100	15	40	100	80	120	M6	3	4
		FT130 <sup>1)</sup>	10	–	130	110	160	M8	3.5	4
		FT85 <sup>1)</sup>	15	–	85	70	105	M6	2.5	4
		FT115 <sup>1)</sup>	15	–	115	95	140	M8	3	4
90 L	2 ... 16	FF165	10	50	165	130	200	11.5	3.5	4
		FT115	10	50	115	95	140	M8	3	4
		FT130 <sup>1)</sup>	13.5	–	130	110	160	M8	3.5	4
		FT110 <sup>1)</sup>	13.5	–	110	80	140	M6	3	4
100 L	2 ... 16	FF215	11	60	215	180	250	14	4	4
		FT130	10	60	130	110	160	M8	3.5	4
		FT115 <sup>1)</sup>	10	–	115	95	140	M8	3	4
		FT165 <sup>1)</sup>	12	–	165	130	200	M10	3.5	4
112 M	2 ... 16	FF215	11	60	215	180	250	14	4	4
		FT130	10	60	130	110	160	M8	3.5	4
		FT165 <sup>1)</sup>	12	–	165	130	200	M10	3.5	4
132 S	2 ... 16	FF265	12	80	265	230	300	14	4	4
132 M	2 ... 16	FF265	12	80	265	230	300	14	4	4
160 M	2 ... 16	FF300	20	110	300	250	350	18	5	4
160 L	2 ... 16	FF300	20	110	300	250	350	18	5	4
180 M	2 ... 16	FF300	16	110	300	250	350	18	5	4
180 L	2 ... 16	FF300	16	110	300	250	350	18	5	4
200 L	2 ... 16	FF350	20	110	350	300	400	18	5	8
225 S	2	FF400	16	110	400	350	450	18	5	8
	4 ... 16			140						
225 M	2	FF400	16	110	400	350	450	18	5	8
	4 ... 16			140						
250 M	2 ... 16	FF500	22	–	500	450	550	18	5	8
		FF400 <sup>1)</sup>	16	–	400	350	450	18	5	8
		FF600 <sup>1)</sup>	22	–	600	550	660	22	6	8

<sup>1)</sup> Flange is selectable at no additional cost.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS4 and 1PS5 motor series

### Flange dimensions

#### Dimensional drawings (continued)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
<b>LOHER CHEMSTAR (continued)</b>										
<b>280 S</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400</i> <sup>1)</sup>	16	–	400	350	450	18	5	8
		<i>FF600</i> <sup>1)</sup>	22	–	600	550	660	22	6	8
<b>280 M</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400</i> <sup>1)</sup>	16	–	400	350	450	18	5	8
		<i>FF600</i> <sup>1)</sup>	22	–	600	550	660	22	6	8
<b>315 S</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF500</i> <sup>1)</sup>	22	–	500	450	550	18.5	5	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF500</i> <sup>1)</sup>		22	–	500	450	550	18.5	5	8	
<b>315 M</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF500</i> <sup>1)</sup>	22	–	500	450	550	18.5	5	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF500</i> <sup>1)</sup>		22	–	500	450	550	18.5	5	8	
<b>315 LL</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF740</i> <sup>1)</sup>	25	–	740	680	800	24	6	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF740</i> <sup>1)</sup>		25	–	740	680	800	24	6	8	
<b>315 L</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF740</i> <sup>1)</sup>	25	–	740	680	800	24	6	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF740</i> <sup>1)</sup>		25	–	740	680	800	24	6	8	
<b>355 M</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			210						
<b>LOHER VARIO</b>										
<b>355 LB</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			170						
<b>355 LC/LD</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			170						
<b>355 L</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			170						
<b>400 L</b>	2	<b>FF940</b>	28	170	940	880	1000	24	6	8
	4 ... 16			210						
<b>450 L</b>	2	<b>FF1080</b>	30	170	1080	1000	1150	28	6	8
	4 ... 16			210						
<b>500 L</b>	2	<b>FF1180</b>	30	170	1180	1120	1250	28	7	8
	4 ... 16			210						

<sup>1)</sup> Flange is selectable at no additional cost.



## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### General information

#### Technical specifications

##### **LOHER CHEMSTAR and VARIO 1PS1 motor series, type of protection "Non-sparking"**

The LOHER CHEMSTAR and VARIO motors of the 1PS1 series are fully-enclosed, surface-cooled motors in the "Non-sparking" type of protection Ex nA II. In these motors, the type of construction prevents the occurrence of arcing, sparks or hot surfaces during normal operation, ensuring that the required level of safety is maintained. The CHEMSTAR motors can be designed in accordance with the applicable VIK specifications ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry).

The motors are assigned to device group II – category 3G (corresponding to Zone 2) and are approved and optimized for use in hazardous areas of Zone 2 in accordance with EN 60079-0 and EN 60079-15. The motors are marked according to EN 60079-15 with II 3G Ex nA IIC Gc for use in Zone 2.

#### General technical specifications

LOHER CHEMSTAR and VARIO 1PS1 motors	
Motor type	A..K
Frame size	90 ... 500
Outputs	0.25 ... 1120 kW
Temperature class	T3
Type of protection	II 3G Ex nA IIC Gc IEC/EN 60079-15
Ex Zones	Gas Zone 2 optional, Dust Zone 22/21
Guidelines	94/9/EC (ATEX 95)
Cooling	Surface-cooled, water-jacket-cooled on request
No. of poles	2 ... 12-pole, multi-pole + pole-changing versions on request
Voltage/frequency	All common voltages, and in 50 Hz and 60 Hz special designs on request
Degree of protection	IP55 to IP68
Type of construction	All common types of construction + special types of construction
Housing	Cast-iron or steel
Insulation	Class F utilized according to B
Special versions	
<ul style="list-style-type: none"> <li>• For outdoor temperatures -55 to +60 °C (other temperatures on request)</li> <li>• Site altitude up to 3000 m (&gt; 3000 m on request)</li> <li>• Modified windings, for example, for increased ambient temperatures, site altitude for optimum electrical values</li> <li>• Permanent load S1 as well as partial load operation, e.g. S2/S3/S6</li> <li>• Drive-end located bearing; special bearing for increased axial/radial forces</li> <li>• Large electrical variance, such as reduced starting current, modified torque curve, star-delta start-up, etc.</li> <li>• CHEMSTAR: copper rotor as an option</li> <li>• Metal fan in aluminum, steel or brass</li> <li>• Monitoring devices such as Pt100, PTC, KTY winding/bearing, vibration monitoring, etc.</li> <li>• Country-specific certificates such as EAC (Eurasian Customs Union), NEPSI (China), China Energy Label, CCOE (India), IECEX (international)</li> <li>• Version for offshore, on-deck and/or marine classifications</li> <li>• Combination with brakes + encoder + forced ventilation</li> <li>• Enlarged connection system and/or larger terminal box for large cable cross-sections</li> </ul>	

أثور صنعت  
ATOORSANAT

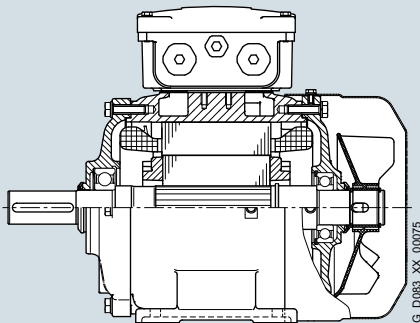
## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

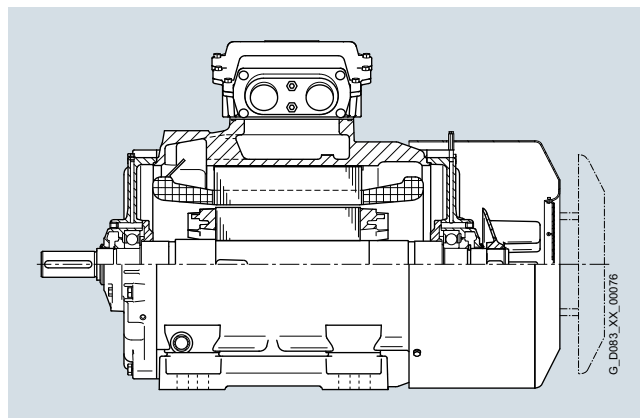
### General information

#### Technical specifications (continued)

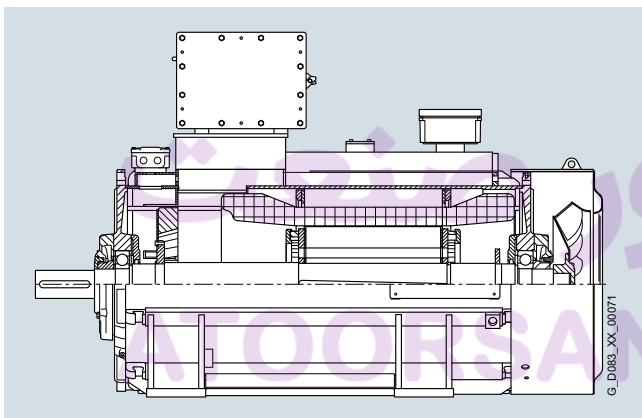
##### Mechanical design



Sectional view of CHEMSTAR 1PS1 three-phase motor, frame sizes 90 to 200 LB  
 Example: 1PS1131-0BD0.-0AA3 (motor type: ANGK-132SR-02)  
 7.5 kW, 2-pole



Sectional view of CHEMSTAR 1PS1 three-phase motor, frame sizes 225 to 355 with regreasing device (frame size 315 and above)  
 Example: 1PS1316-0BD0.-0AA3 (motor type: ANGK-315LL-02)  
 200 kW, 2-pole



Sectional view of VARIO three-phase motor, frame sizes 355 to 500, with regreasing device  
 Example: 1PS1357-0BH0.-0AA2 (motor type: ANSK-355LC-02)  
 355 kW, 2-pole

#### Housing, ventilation

##### Housing and fan for motors of the LOHER CHEMSTAR and VARIO 1PS1 series

Frame size	Housing Material	Design of housing feet <sup>1)</sup>	Surface	Bearing plates Material	Fan cover Material	Fan <sup>2)</sup> Material
<b>LOHER CHEMSTAR</b>						
90 ... 160	Cast-iron	Cast	With cooling fins	Cast-iron	Sheet steel	Plastic
180 ... 280		Screwed on				
315		Cast	Steel			
355						
<b>LOHER VARIO</b>						
355 ... 450	Steel	Welded	With cooling fins	Cast-iron	Sheet steel	Steel
500 <sup>3)</sup>				Steel, bearing hub in cast-iron		

<sup>1)</sup> For designs with feet only.

<sup>2)</sup> For specific operating conditions, the external fans can be constructed in aluminum for frame sizes 71 to 225 and in sheet steel for frame sizes 250 to 315. This applies in the case of increased coolant temperature in particular. The cooling air flow from NDE to DE must not be obstructed. The intake area in front of the fan cover must not be obstructed.

<sup>3)</sup> Suitable for both directions of rotation, but LOHER VARIO 2- and 4-pole are only suitable for one direction of rotation.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### General information

#### Technical specifications (continued)

##### Terminal boxes

The installed terminal boxes are also marked and certified as "Non-sparking". Ex nA terminal boxes of the CHEMSTAR and VARIO series are identical in construction to the Ex e "Increased safety" connection system. In accordance with the current, harmonized edition, EN 60079-0 Edition 2009, the gas for the type of protection Ex test must be specified in the case of type of protection "Non-sparking". The CHEMSTAR and VARIO series are generally certified for the highest class as per "IIC". They are marked in accordance with the EC directive (94/9/EC) with II 3G Ex nA IIC T3 Gc. Compliance with the regulations is documented here with an EC Declaration of Conformity.

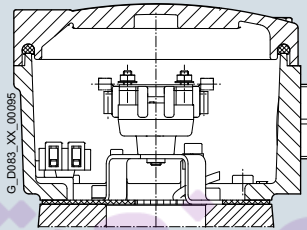
The terminal boxes comply with type of protection "Increased safety" Ex e II. The housings are made of cast-iron and designed to IP55 degree of protection in accordance with EN 60034-5. The terminals are therefore protected from touch, dust deposits and water jets from any direction.

The position of the terminal box and cable entries can be obtained from the tables below. Terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides.

Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box that is mounted on the side of the terminal box corresponding to the type of protection of the motor. The design of the terminal boxes can be seen in the schematic diagrams. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below.

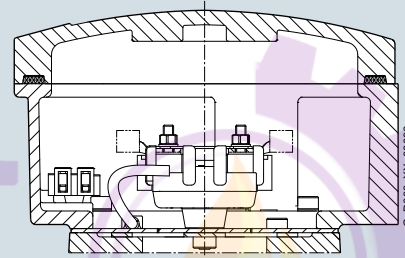
2

**Figure 1** Terminal box for LOHER CHEMSTAR frame sizes 90 to 112



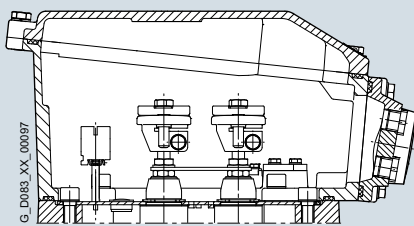
No auxiliary terminal boxes Ex e (**W72, M52**) are possible.

**Figure 2** Terminal box for LOHER CHEMSTAR frame sizes 132 to 225



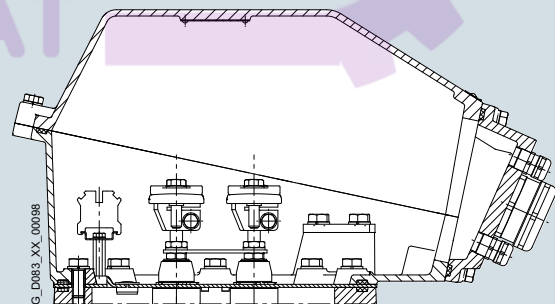
Frame sizes 132 to 160, 1 auxiliary terminal box Ex e (**W72, M52**) is possible, frame sizes 180 to 225, 2 auxiliary terminal boxes Ex e (**W72, M52**) are possible.

**Figure 3** Terminal box for LOHER CHEMSTAR frame sizes 250 to 280



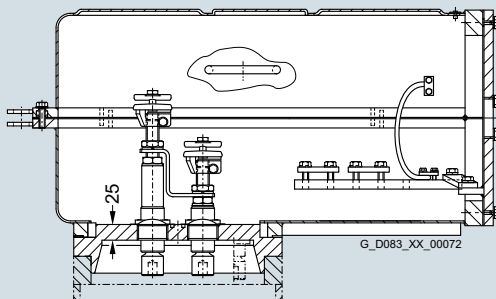
3 auxiliary terminal boxes Ex e (**W72, M52**) are possible.

**Figure 4** Terminal box for LOHER CHEMSTAR frame sizes 315 to 355



3 auxiliary terminal boxes Ex e (**W72, M52**) are possible.

**Figure 5** Terminal box for LOHER VARIO frame sizes 355 to 500



With the VARIO connection system, the auxiliary terminal boxes (max. 3) are mounted on the housing.

For motors of type series 1PS1 CHEMSTAR and VARIO, the terminal pins are fitted with round terminals in accordance with DIN 46223.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### General information

#### Technical specifications (continued)

##### Terminal box for 1PS1 motors

Degree of protection: IP55

Type of protection: Ex e II, acc. to EN 60079-7

Housing material: Cast-iron

Frame size	Standard terminal box				PE/ground connection max.	Fig. No. on Page 2/79	Enlarged terminal box – Option <b>L00</b>				
	Terminal studs	Conductor cross-section min. max. mm <sup>2</sup> mm <sup>2</sup>		Auxiliary terminals in main terminal box Number × max. cross-section <sup>1)</sup> mm <sup>2</sup>			Terminal studs	Conductor cross-section min. max. mm <sup>2</sup> mm <sup>2</sup>		Fig. No. on Page 2/79	
<b>LOHER CHEMSTAR</b>											
90	6 × M4	1	2.5 (6) <sup>2)</sup>	4 × 2.5	4	6 <sup>2)</sup>	<b>Fig. 1</b>	6 × M5	1	10 (25) <sup>2)</sup>	<b>Fig. 2</b>
100											
112											
132	6 × M5	1	10 (25) <sup>2)</sup>		25		<b>Fig. 2</b>	6 × M6	2.5	35 (50) <sup>2)</sup>	<b>Fig. 2</b>
160											
180	6 × M6	2.5	35 (50) <sup>2)</sup>	12 × 4	70		<b>Fig. 2</b>	6 × M10	6	70	<b>Fig. 3</b>
200											
225											
250	6 × M10	6 ... 70			95		<b>Fig. 3</b>	6 × M12	16	150	<b>Fig. 4</b>
280											
315 S/M	6 × M12	16 ... 150		16 × 4	150		<b>Fig. 4</b>	6 × M16	16	300	<b>Fig. 4</b>
315 L	6 × M16/M20 <sup>3)</sup>	16 ... 300						Special connection system on request			
<b>LOHER VARIO</b>											
355 ... 500							<b>Fig. 5</b>				

Number and size of entry thread and cable glands (to be ordered specially), see table "Cable glands for 1PS1 motors".

##### Cable glands for 1PS1 motors

Frame size	Standard cable glands <sup>4)</sup>		Cable diameter, type HSK-K <sup>7)</sup> mm	Max. entry thread <sup>5)</sup>	
	Entry thread <sup>6)</sup>			Metric	NPT <sup>8)</sup>
<b>LOHER CHEMSTAR</b>					
90	1 × M25 × 1.5		9 ... 16	1 × M25 × 1.5	1 × 1"
100	1 × M32 × 1.5		13 ... 20	1 × M32 × 1.5	2 × 1"
112	2 × M32 × 1.5			2 × M32 × 1.5	
132				2 × M40 × 1.5	2 × 1 1/2"
160	2 × M40 × 1.5		22 ... 32		
180				2 × M63 × 1.5	2 × 2"
200	2 × M50 × 1.5		32 ... 38		
225					
250	2 × M63 × 1.5		37 ... 44		
280					
315 S/M				2 × M100 × 1.5	2 × 3 1/2"
315 L					
355					
<b>LOHER VARIO</b>					
355 ... 500	<sup>9)</sup>		<sup>9)</sup>	<sup>9)</sup>	<sup>9)</sup>

Entry thread for PTC thermistor, heating: M20 × 1.5/D = 6 up to 12 mm

The entry threads are sealed on delivery with certified plugs.

The terminal boxes will only be supplied with cable glands in accordance with the table if specially ordered.

Special cable glands can be fitted on request.

<sup>1)</sup> Rated voltage / max. working voltage 400 V/440 V

<sup>2)</sup> Maximum conductor cross-section with cable lug.

<sup>3)</sup> Alternatively, larger studs for higher rated current.

<sup>4)</sup> Materials used for standard gland: polyamide

<sup>5)</sup> Other threads, number and size on request.

<sup>6)</sup> Number and size of entry threads according to DIN 42925.

<sup>7)</sup> Cable glands suitable for the infeed of unshielded/non-reinforced cables and leads.

<sup>8)</sup> Cable glands for NPT thread on request.

<sup>9)</sup> Undrilled gland plate.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### General information

#### Technical specifications (continued)

##### Electrical design

The outputs and electrical values listed in the selection tables can be changed by modifying the configurations. For example, if a copper cage rotor is used in place of a die-cast aluminum rotor, an even higher degree of efficiency can be achieved.

The insulation system of this motor series is suitable for line voltages up to 1000 V. The connection system (terminal boxes, terminals) is designed for rated voltages up to 1000 V, including frame size 355 for CHEMSTAR motors.

The motors are equipped with 6 terminals. They can be operated in star or delta. The standard connection for all 400 V motors is delta connection. They are therefore suitable for 400 V $\Delta$ /690 VY and for Y- $\Delta$  starting at 400 V. The 500 V motors are available both for 500 VY and for 500 V $\Delta$ , provided that one of the two variants is not preferred for winding reasons.

Motors of the 1PS1 series are wound in accordance with temperature class F (155 °C). Normally, they are only utilized according to Class B (130 °C). Exceptions are indicated in the selection and ordering data. In accordance with EN 60034-1, in addition to the temperature class, the thermal utilization is also stamped on the rating plate if this value lies below that of the temperature class. The motors of this series are therefore stamped with "F – B", and those indicated are stamped with "F".

##### Operation on a frequency converter

General use of "Overcoat" double-layer enameled wires and optimized impregnation techniques ensures that most motors in this series can be converter-fed without modification of the electrical design. The standard requires that the motor manufacturer conducts an initial type test using the original converter. Converter-fed motors of the 1PS1 series are fitted with PTC thermistors (CHEMSTAR) or Pt100 (VARIO). These temperature sensors in combination with a trip unit certified by the German Federal Testing Laboratory perform sole temperature monitoring in the case of converter-fed operation. Motor circuit breakers can be dispensed with. PTC thermistors with a rated shutdown temperature of 145 °C ("KL145") are normally used. Other PTC thermistors can also be installed in the motor, e.g. prewarning sensors.

##### Acceptance testing of explosion-proof motors of type of protection Ex nA II T

For dimensioning and for acceptance testing, with regard to the heat rise of all parts of the machine, the most unfavorable value is used. Motors of the 1PS1 series are certified for temperature class T3. None of the components, even those inside the housing (e.g. rotor cage winding), are permitted to exceed a temperature of 200 °C. The winding temperature is limited by the temperature class (e.g. "F": 145 °C). The reason for the above-mentioned initial test on the original converter is normally to establish compliance with the temperature limits for the motor with type of protection Ex nA II T.

##### Special cases "blocked shaft" and "starting":

Type of protection Ex nA II T excludes these two special cases. Limit temperatures are permitted here that do not take into account the temperature class. Even though "blocked shaft" and "starting" are excluded, a motor of the type of protection Ex nA II T is not permitted to be implemented for heavy starting. These motors are only permitted to be operated on soft-starting devices under the following conditions:

- The soft-starting device has been function-tested by the German Federal Testing Laboratory
- A motor circuit breaker must be provided as a minimum of protection
- The duty type does not give rise to expectations of a significant increase in temperature as a result of the starting procedure (e.g. pump drives with a low moment of inertia)

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{ra}$ ted,	Frame size	Operating values at rated output											Motor type	Article No.	m IM B3	J kgm <sup>2</sup>		
		$n_{ra}$ ted,	$T_{ra}$ ted,	IE class	$\eta_{ra}$ ted,	$\eta_{ra}$ ted,	$\eta_{ra}$ ted,	$\cos\varphi$ rated,	$I_{ra}$ ted,	$I_{ra}$ ted,	$I_{ra}$ ted,	$T_{LR}/T_{ra}$					$I_{LR}/I_{ra}$	$T_B/T_{ra}$
50 Hz	50 Hz	50 Hz	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	ted	ted	ted					
kW	FS	rpm	Nm	%	%	%	–	A	A	A	–	–	–					
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>																		
2-pole: 3000 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
1.5	090 L	2865	5.00	IE2	84.0	85.1	84.3	0.88	2.90	2.32	1.68	3.0	6.8	2.8	ANGK-090LR-02	1PS1095-BD-3AA3	36	0.0020
2.2	090 L	2850	7.4	IE2	84.6	85.6	85.1	0.86	4.4	3.52	2.55	3.0	6.5	3.0	ANGK-090LS-02	1PS1098-BD-3AA3	36	0.0020
3	100 L	2900	9.9	IE2	86.0	86.3	85.8	0.87	5.8	4.6	3.36	2.7	7.5	3.0	ANGK-100LS-02	1PS1106-BD-3AA3	51	0.0041
4	112 M	2890	13.2	IE2	86.5	86.8	86.8	0.93	7.2	5.8	4.2	2.7	7.0	3.1	ANGK-112MS-02	1PS1113-BD-3AA3	66	0.0075
5.5	132 S	2910	18.0	IE2	88.5	89.9	89.2	0.90	10.0	8.0	5.8	2.6	6.7	3.1	ANGK-132SR-02	1PS1131-BD-3AA3	83	0.014
7.5	132 S	2915	24.6	IE2	89.5	90.1	89.5	0.91	13.3	10.6	7.7	2.7	6.8	3.0	ANGK-132SS-02	1PS1132-BD-3AA3	95	0.020
11	160 M	2930	36	IE2	90.7	91.0	90.0	0.90	19.5	15.6	11.3	2.1	7.5	2.8	ANGK-160MR-02	1PS1163-BD-3AA3	176	0.045
15	160 M	2925	48	IE2	91.3	92.1	91.9	0.89	26.5	21.5	15.4	2.1	7.0	2.8	ANGK-160MS-02	1PS1165-BD-3AA3	176	0.092
18.5	160 L	2925	60	IE2	91.4	92.2	91.9	0.89	33.0	26.5	19.0	2.1	7.0	2.8	ANGK-160LS-02	1PS1166-BD-3AA3	192	0.092
22	180 M	2960	71	IE2	92.5	93.0	92.8	0.90	38.0	30.5	22.0	2.2	6.8	2.9	ANGK-180MS-02	1PS1183-BD-3AA3	246	0.16
30	200 L	2960	97	IE2	92.0	92.3	91.7	0.87	54.0	43.5	31.5	2.5	6.9	3.3	ANGK-200LR-02	1PS1206-BD-3AA3	333	0.20
37	200 L	2960	119	IE2	92.5	92.8	92.3	0.88	66.0	52.0	38.0	2.7	7.4	3.5	ANGK-200LS-02	1PS1208-BD-3AA3	349	0.23
45	225 M	2965	145	IE2	92.9	93.1	92.5	0.88	79.0	64.0	46.0	2.3	7.8	2.6	ANGK-225MS-02	1PS1223-BD-3AA3	420	0.34
55	250 M	2975	177	IE2	93.8	93.9	93.2	0.86	98.0	79.0	57	2.1	8	2.9	ANGK-250MM-02	1PS1253-BD-3AA3	540	0.45
75	280 S	2980	240	IE2	94.4	93.9	92.4	0.89	129	103	75	2.1	7.3	3.0	ANGK-280SL-02	1PS1280-BD-3AA3	775	0.88
90	280 M	2980	288	IE2	94.4	94.1	92.6	0.90	153	122	89	2.0	6.3	2.5	ANGK-280MM-02	1PS1283-BD-3AA3	830	1.03
110	315 S	2980	352	IE2	94.8	94.3	92.9	0.88	190	152	110	2.2	6.7	2.5	ANGK-315SL-02	1PS1311-BD-3AA3	960	1.55
132	315 M	2980	423	IE2	95.1	95.0	94.2	0.89	225	180	130	2.0	6.3	2.4	ANGK-315ML-02	1PS1313-BD-3AA3	1020	1.85
160	315 M	2980	513	IE2	95.6	95.6	95.0	0.89	270	215	157	2.3	6.8	2.6	ANGK-315MN-02	1PS1315-BD-3AA3	1100	2.2
200	315 L	2980	641	IE2	95.8	95.8	95.2	0.89	340	270	196	2.6	7.3	2.7	ANGK-315LL-02	1PS1316-BD-3AA3	1310	2.8
250	315 L	2985	800	IE2	95.8	96.1	95.8	0.90	420	335	245	2.6	7.3	2.7	ANGK-315LN-02	1PS1318-BD-3AA3	1450	3.5
315	355 L	2985	1008	IE2	96.1	96.3	96.0	0.89	530	425	310	2.3	7	2.7	ANGK-355LB-02	1PS1356-BD-3AA3	1580	4.7
<b>LOHER VARIO</b>																		
355	355 L	2983	1136	IE2	96.5	96.5	96.0	0.92	575	460	333	1.20	6.80	2.80	ANSK-355LC-02	1PS1357-BH-3AA0	2100	3.6
400	355 L	2985	1279	<sup>1)</sup>	96.7	96.7	96.1	0.91	655	525	380	1.40	7.90	3.20	ANSK-355LD-02	1PS1358-BH-3AA0	2200	4.0
450	355 L	2978	1443	<sup>1)</sup>	96.4	96.5	96.0	0.91	740	590	430	0.95	6.20	2.55	ANSK-355LX-02	1PS1358-BJ-3AA0	2300	5.0
450	400 L	2984	1440	<sup>1)</sup>	96.5	96.5	95.9	0.90	745	595	430	0.80	6.20	2.80	ANSK-400LL-02	1PS1404-BJ-3AA0	2400	6.0
500	400 L	2982	1601	<sup>1)</sup>	96.6	96.7	96.2	0.91	820	655	475	0.80	5.9	2.55	ANSK-400LN-02	1PS1405-BJ-3AA0	2600	7.0
560	400 L	2983	1792	<sup>1)</sup>	96.8	96.8	96.3	0.91	915	730	530	0.85	6.2	2.7	ANSK-400LN-02	1PS1407-BJ-3AA0	2600	7.0
630	400 L	2984	2016	<sup>1)</sup>	96.8	96.8	96.3	0.91	–	825	595	0.85	6.2	2.6	ANSK-400LX-02	1PS1408-BJ-3AA0	2900	8.5
630	450 L	2986	2014	<sup>1)</sup>	96.7	96.6	96.0	0.91	–	830	600	0.75	6.2	2.7	ANSK-450LL-02	1PS1453-BJ-3AA0	3500	11.0
710	450 L	2986	2270	<sup>1)</sup>	96.8	96.8	96.2	0.91	–	925	670	0.80	6.3	2.8	ANSK-450LL-02	1PS1455-BJ-3AA0	3500	11.0
800	450 L	2986	2557	<sup>1)</sup>	96.9	96.9	96.3	0.91	–	1050	760	0.80	6.3	2.8	ANSK-450LN-02	1PS1457-BJ-3AA0	3700	13.0
900	450 L	2985	2879	<sup>1)</sup>	97.0	97.0	96.5	0.91	–	1170	850	0.85	6.4	2.7	ANSK-450LN-02	1PS1458-BJ-3AA0	3700	13.0
1000	500 L	2986	3198	<sup>1)</sup>	96.6	96.5	95.6	0.90	–	960	0.85	6.4	2.8	ANSK-500LL-02	1PS1507-BJ-3AA0	6300	24.0	
1200	500 L	2990	3831	<sup>1)</sup>	96.9	96.8	96.1	0.91	–	1135	0.75	6.6	2.8	ANSK-500LN-02	1PS1508-BJ-3AA0	6300	35.0	
<b>Operating modes</b>																		
Mains-fed operation												Frame size			Order code			
Mains-fed operation												90 ... 450 (≤ 800 kW)	0		–			
Converter-fed operation, standard insulation <sup>2)</sup>												90 ... 400	1		–			
Converter-fed operation with special insulation (derating approx. 5 % <sup>2)</sup> )												160 ... 500	2		–			
Mains-fed operation, pre-formed coil												450 (> 800 kW)... 500	3		–			
Converter-fed operation, pre-formed coil												450 ... 500	4		–			
<b>Voltages</b>																		
690 VΔ, 50 Hz												Frame size			Order code			
230 V/400 V, 50 Hz												355 ... 500	0		–			
500 VY, 50 Hz												90 ... 112	1		–			
500 VΔ, 50 Hz												90 ... 315	3		–			
400 V/690 V, 50 Hz												355 ... 450	5		–			
690 VY, 50 Hz												90 ... 400	6		–			
For other voltages see Page 2/91												90 ... 400	8		–			
												90 ... 500	9		...			
<b>Types of construction</b>																		
IM B3												Frame size			Order code			
IM B5												90 ... 500	0		–			
IM B34												90 ... 315	1		–			
IM B14												90 ... 112	2		–			
IM V1/cover												90 ... 112	3		–			
IM B35												90 ... 400	4		–			
For other types of construction see from Page 1/28												90 ... 500	6		–			
												90 ... 500	9		...			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Can only be ordered with additional identification code -Z and order code M73.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>rated</sub>	Frame size	Operating values at rated output											Motor type	Article No.	m	J		
		$\eta_{ra}$	$T_{ra}$	IE class	$\eta_{ra}$	$\eta_{ra}$	$\eta_{ra}$	rated	$\cos\phi$	$I_{ra}$	$I_{ra}$	$I_{ra}$					$T_{LR}/T_{ra}$	$I_{LR}/I_{ra}$
50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	ted	ted	ted		IM B3		
kW	FS	rpm	Nm	%	%	%	—	A	A	A	—	—	—	—	kg	kgm <sup>2</sup>		
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>																		
4-pole: 1500 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
1.1	090 L	1460	7.2	IE2	86.4	87.2	86.3	0.85	2.15	1.72	1.25	1.9	6.8	2.8	ANGK-090LR-04	1PS1095-BD-3BA3	34	0.0044
1.5	090 L	1455	9.8	IE2	86.1	86.5	85.2	0.81	3.10	2.48	1.80	1.9	6.7	2.8	ANGK-090LS-04	1PS1098-BD-3BA3	37	0.0044
2.2	100 L	1455	14.4	IE2	87.1	87.8	86.8	0.83	4.4	3.52	2.55	1.7	6.4	2.4	ANGK-100LR-04	1PS1106-BD-3BA3	53	0.0060
3	100 L	1455	19.7	IE2	86.0	86.3	84.7	0.80	6.3	5.0	3.65	2.0	6.3	2.6	ANGK-100LS-04	1PS1108-BD-3BA3	55	0.0071
4	112 M	1460	26.2	IE2	88.8	89.4	88.8	0.84	7.8	6.2	4.5	1.9	6.8	2.5	ANGK-112MS-04	1PS1113-BD-3BA3	66	0.0126
5.5	132 S	1455	36.1	IE2	89.0	89.7	89.2	0.85	10.5	8.4	6.1	2.6	7.6	2.7	ANGK-132SR-04	1PS1131-BD-3BA3	93	0.030
7.5	132 S	1470	48.7	IE2	90.2	90.7	90.1	0.84	14.3	11.4	8.3	2.0	7.6	2.8	ANGK-132MS-04	1PS1133-BD-3BA3	102	0.030
11	160 M	1460	71	IE2	90.5	91.4	91.6	0.81	21.7	16.7	12.1	2.1	6.8	2.6	ANGK-160MR-04	1PS1163-BD-3BA3	176	0.077
15	160 L	1460	98	IE2	90.9	92.0	92.2	0.81	29.4	22.5	16.3	2.1	6.5	2.7	ANGK-160LS-04	1PS1166-BD-3BA3	192	0.098
18.5	180 M	1470	120	IE2	92.3	92.8	92.4	0.83	34.9	27.5	20.0	3.3	7.6	3.0	ANGK-180MR-04	1PS1183-BD-3BA3	246	0.16
22	180 L	1470	143	IE2	91.8	92.3	92.0	0.83	41.7	32.5	23.5	3.0	7.0	2.6	ANGK-180LS-04	1PS1186-BD-3BA3	255	0.16
30	200 L	1470	195	IE2	92.3	93.2	93.4	0.83	56.5	45.0	33.0	1.5	6.0	2.5	ANGK-200LS-04	1PS1206-BD-3BA3	333	0.27
37	225 S	1480	239	IE2	93.5	93.9	93.4	0.81	71.0	52.0	38.0	3.0	7.3	2.9	ANGK-225SR-04	1PS1220-BD-3BA3	415	0.37
45	225 S	1475	291	IE2	93.5	93.9	93.4	0.81	71.0	65.0	47.5	3.0	7.3	2.9	ANGK-225MS-04	1PS1223-BD-3BA3	445	0.37
55	250 M	1480	355	IE2	93.7	94.4	94.4	0.87	97.0	78.0	56.0	2.5	7.7	2.9	ANGK-250MM-04	1PS1253-BD-3BA3	560	0.75
75	280 S	1480	484	IE2	94.4	94.8	95.0	0.84	137	109	79.0	2.4	7.0	2.6	ANGK-280SL-04	1PS1280-BD-3BA3	820	1.3
90	280 M	1480	581	IE2	94.5	94.4	93.5	0.85	162	129	94.0	2.5	7.2	2.7	ANGK-280MM-04	1PS1283-BD-3BA3	870	1.4
110	315 S	1485	707	IE2	94.6	94.6	93.5	0.82	205	164	119	2.0	6.6	2.5	ANGK-315SL-04	1PS1311-BD-3BA3	960	2.2
132	315 M	1485	849	IE2	95.0	95.1	94.5	0.84	240	191	138	2.0	6.4	2.5	ANGK-315ML-04	1PS1313-BD-3BA3	1040	2.9
160	315 M	1485	1029	IE2	95.1	95.3	95.0	0.85	285	230	166	2.1	6.9	2.5	ANGK-315MN-04	1PS1315-BD-3BA3	1120	3.4
200	315 L	1488	1284	IE2	95.2	95.4	95.3	0.85	355	285	205	2.3	6.9	2.5	ANGK-315LL-04	1PS1316-BD-3BA3	1340	3.9
250	315 L	1487	1605	IE2	95.2	95.4	95.2	0.83	455	365	265	2.6	7.5	2.6	ANGK-315LM-04	1PS1317-BD-3BA3	1420	4.2
315	355 L	1488	2022	IE2	95.1	95.2	95.0	0.85	560	450	340	2.0	7.7	2.5	ANGK-355LB-04	1PS1356-BD-3BA2	1730	6.8
315	355 L	1493	2015	IE2	96.3	96.3	96.0	0.85	560	445	320	1.3	7.7	2.6	ANGK-355LB-04 <sup>2)</sup>	1PS1356-BD-3BB2	1730	6.8
<b>LOHER VARIO</b>																		
355	355 L	1491	2273	IE2	96.6	96.6	96.0	0.86	615	492	357	1.25	6.7	2.4	ANSK-355LC-04	1PS1358-BH-3BA0	2300	7.7
400	355 L	1491	2561	<sup>1)</sup>	96.7	96.7	96.1	0.86	690	552	400	1.25	6.7	2.4	ANSK-355LD-04	1PS1350-BH-3BA0	2350	8.5
450	355 L	1491	2880	<sup>1)</sup>	96.6	96.7	96.1	0.86	785	630	457	1.1	6.2	2.4	ANSK-355LN-04	1PS1357-BJ-3BA0	2400	9.0
500	355 L	1492	3200	<sup>1)</sup>	96.7	96.7	96.2	0.85	875	700	505	1.0	6.2	2.4	ANSK-355LX-04	1PS1358-BJ-3BA0	2500	9.5
500	400 L	1492	3200	<sup>1)</sup>	96.6	96.6	96.0	0.87	855	685	495	1.1	6.2	2.6	ANSK-400LL-04	1PS1404-BJ-3BA0	2700	13
560	400 L	1492	3583	<sup>1)</sup>	96.7	96.7	96.1	0.88	950	760	550	1.1	6.2	2.55	ANSK-400LN-04	1PS1405-BJ-3BA0	2900	15
630	400 L	1492	4031	<sup>1)</sup>	96.8	96.8	96.2	0.88	1070	855	620	1.1	6.3	2.6	ANSK-400LN-04	1PS1407-BJ-3BA0	2900	15
710	400 L	1492	4544	<sup>1)</sup>	96.9	96.9	96.4	0.88	1200	960	695	1.05	6.3	2.5	ANSK-400LX-04	1PS1408-BJ-3BA0	3500	17
800	450 L	1493	5114	<sup>1)</sup>	96.9	96.9	96.3	0.88	1355	1085	785	1.0	6.6	2.6	ANSK-450LL-04	1PS1455-BJ-3BA0	3800	24.5
900	450 L	1493	5755	<sup>1)</sup>	97.0	97.0	96.4	0.88	—	1215	880	1.05	6.6	2.5	ANSK-450LN-04	1PS1457-BJ-3BA0	4300	29.0
950	450 L	1493	6076	<sup>1)</sup>	97.0	97.0	96.5	0.88	—	1285	930	1.05	6.6	2.5	ANSK-450LN-04	1PS1458-BJ-3BA0	4800	29.0
1000	500 L	1494	6390	<sup>1)</sup>	96.9	96.9	96.2	0.88	—	—	980	0.85	6.2	2.55	ANSK-500LL-04	1PS1504-BJ-3BA0	5200	43.0
1120	500 L	1493	7160	<sup>1)</sup>	97.0	97.0	96.4	0.88	—	—	1095	0.80	6.0	2.4	ANSK-500LL-04	1PS1505-BJ-3BA0	5200	43.0
1250	500 L	1494	7990	<sup>1)</sup>	97.0	96.9	96.3	0.88	—	—	—	0.80	6.5	2.4	ANSK-500LN-04	1PS1507-BJ-3BA0	6600	54.0
1400	500 L	1494	8940	<sup>1)</sup>	97.1	97.0	96.3	0.87	—	—	1385	0.90	7.2	2.7	ANSK-500LN-04	1PS1508-BJ-3BA0	6600	54.0
<b>Operating modes</b>																		
Mains-fed operation												Frame size			Order code			
Converter-fed operation, standard insulation <sup>3)</sup>												90 ... 450 (≤ 800 kW)	0		—			
Converter-fed operation with special insulation (derating approx. 5 %) <sup>3)</sup>												90 ... 400	1		—			
Mains-fed operation, pre-formed coil												160 ... 500	2		—			
Converter-fed operation, pre-formed coil												450 (> 800 kW)... 500	3		—			
												450 ... 500	4		—			
<b>Voltages</b>																		
690 VΔ, 50 Hz												Frame size			Order code			
230 V/400 V, 50 Hz												355 ... 500	0		—			
500 VY, 50 Hz												90 ... 112	1		—			
500 VΔ, 50 Hz												90 ... 315	3		—			
400 V/690 V, 50 Hz												355 ... 450	5		—			
690 VY, 50 Hz												90 ... 400	6		—			
For other voltages see Page 2/91												90 ... 400	8		—			
												90 ... 500	9		...			
<b>Types of construction</b>																		
IM B3												Frame size			Order code			
IM B5												90 ... 500	0		—			
IM B34												90 ... 315	1		—			
IM B14												90 ... 112	2		—			
IM V1/cover												90 ... 112	3		—			
IM B35												90 ... 400	4		—			
For other types of construction see from Page 1/28												90 ... 500	6		—			
												90 ... 500	9		...			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Motor with special rotor (Cu).

<sup>3)</sup> Can only be ordered with additional identification code **-Z** and order code **M73**.

# Motors with Explosion Protection

## LOHER CHEMSTAR and VARIO 1PS1 motor series

### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted,	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kgm <sup>2</sup>			
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	cosφ rated,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,					T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>	T <sub>B</sub> / T <sub>ra</sub>
50 Hz	50 Hz	50 Hz	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	ted	ted	ted					
kW	FS	rpm	Nm	%	%	%	–	A	A	A	–	–	–					
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>																		
6-pole: 1000 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
0.75	090 L	960	7.5	IE2	80.0	80.4	78.0	0.72	1.88	1.5	1.09	1.5	4.5	2.2	ANGK-090LR-06	1PS1095-BD-3CA3	36	0.0044
1.1	090 L	950	11.1	IE2	78.1	77.9	75.4	0.72	2.80	2.24	1.62	1.4	4.1	2.0	ANGK-090LS-06	1PS1098-BD-3CA3	42	0.0044
1.5	100 L	955	15.0	IE2	80.0	79.0	75.0	0.68	3.95	3.16	2.29	2.5	4.5	2.7	ANGK-100LS-06	1PS1106-BD-3CA3	55	0.010
2.2	112 M	950	22.1	IE2	82.7	83.7	82.3	0.74	5.2	4.2	3.01	2.0	5.0	2.2	ANGK-112MS-06	1PS1113-BD-3CA3	66	0.019
3	132 S	950	30.2	IE2	85.4	86.1	85.1	0.79	6.4	5.1	3.71	2.5	5.7	2.5	ANGK-132SR-06	1PS1131-BD-3CA3	92	0.033
4	132 M	955	40.0	IE2	85.7	86.7	86.1	0.82	8.2	6.6	4.8	2.3	6.0	2.5	ANGK-132MR-06	1PS1133-BD-3CA3	96	0.045
5.5	132 M	955	55	IE2	86.1	86.1	85.5	0.77	12.0	9.6	7.0	2.4	6.0	2.6	ANGK-132MS-06	1PS1135-BD-3CA3	104	0.045
7.5	160 M	965	74	IE2	88.2	88.5	88.0	0.80	15.3	12.3	8.90	1.5	6.0	2.4	ANGK-160MR-06	1PS1163-BD-3CA3	176	0.088
11	160 L	970	108	IE2	88.9	89.4	88.7	0.78	23.0	18.3	13.3	1.6	6.0	2.6	ANGK-160LS-06	1PS1166-BD-3CA3	192	0.11
15	180 L	980	148	IE2	90.5	91.2	90.7	0.82	29.0	23.5	16.9	2.1	6.5	2.5	ANGK-180LS-06	1PS1186-BD-3CA3	255	0.28
18.5	200 L	980	180	IE2	91.2	91.5	90.9	0.80	36.5	29.5	21.0	2.5	7.0	2.6	ANGK-200LR-06	1PS1206-BD-3CA3	333	0.45
22	200 L	980	214	IE2	91.5	92.0	91.4	0.78	44.5	35.5	26.0	2.5	7.0	2.6	ANGK-200LS-06	1PS1208-BD-3CA3	349	0.49
30	225 M	980	292	IE2	91.7	92.5	92.0	0.81	58.0	46.5	34.0	2.0	7.0	2.8	ANGK-225MS-06	1PS1223-BD-3CA3	430	0.92
37	250 M	985	359	IE2	92.2	92.3	91.1	0.77	75.0	60.0	43.5	2.1	6.0	2.1	ANGK-250MM-06	1PS1253-BD-3CA3	560	1.0
45	280 S	985	436	IE2	92.9	93.0	93.1	0.85	82.0	66.0	47.5	2.0	6.0	2.3	ANGK-280SL-06	1PS1280-BD-3CA3	780	2.5
55	280 M	985	533	IE2	93.4	93.6	93.0	0.88	97.0	77.0	56.0	2.4	7.0	2.8	ANGK-280MM-06	1PS1283-BD-3CA3	850	2.9
75	315 S	990	723	IE2	94.0	94.1	93.5	0.86	134	107	78.0	2.0	6.7	2.1	ANGK-315SL-06	1PS1311-BD-3CA3	960	3.3
90	315 M	990	868	IE2	94.8	95.2	95.1	0.85	161	129	93.0	2.1	6.9	2.3	ANGK-315ML-06	1PS1313-BD-3CA3	1030	4.0
110	315 M	990	1061	IE2	94.5	94.6	94.3	0.86	195	156	113	2.0	7.1	2.2	ANGK-315MM-06	1PS1314-BD-3CA3	1110	4.9
132	315 M	990	1273	IE2	94.7	94.8	94.5	0.86	235	187	136	2.0	7.0	2.1	ANGK-315MN-06	1PS1315-BD-3CA3	1110	4.9
160	315 L	990	1543	IE2	94.8	95.0	94.6	0.87	280	225	162	2.0	6.8	2.1	ANGK-315LL-06	1PS1316-BD-3CA3	1300	6.0
200	315 L	990	1929	IE2	95.0	95.0	94.6	0.84	360	290	210	2.1	7.0	2.3	ANGK-315LM-06	1PS1317-BD-3CA3	1410	6.8
200	315 L	992	1925	IE2	95.4	95.6	95.3	0.88	345	275	199	1.5	6.9	2.3	ANGK-315LM-06 <sup>3)</sup>	1PS1317-BD-3CB3	1420	6.8
250	355 L	995	2399	IE2	95.9	96.1	95.8	0.86	440	350	255	1.5	7.3	2.3	ANGK-355LB-06	1PS1356-BD-3CB2	1730	9.1
<b>LOHER VARIO</b>																		
280	355 L	993	2691	IE2	96.1	96.1	95.5	0.85	495	395	286	1.2	6.4	2.35	ANSK-355LC-06	1PS1357-BH-3CA0	2350	10.5
315	355 L	994	3027	IE2	96.2	96.2	95.5	0.84	560	450	325	1.35	6.6	2.5	ANSK-355LD-06	1PS1358-BH-3CA0	2400	11.5
355	355 L	993	3415	IE2	96.3	96.3	95.8	0.85	630	505	360	1.0	5.6	2.3	ANSK-355LN-06	1PS1357-BJ-3CA0	2400	12.5
400	355 L	992	3849 <sup>1)</sup>		96.3	96.4	95.9	0.84	715	575	415	1.0	5.6	2.25	ANSK-355LN-06	1PS1358-BJ-3CA0	2400	12.5
400	400 L	994	3844 <sup>1)</sup>		96.3	96.4	95.8	0.84	715	575	415	1.0	5.6	2.3	ANSK-400LL-06	1PS1404-BJ-3CA0	2800	18.0
450	400 L	994	4323 <sup>1)</sup>		96.4	96.4	95.9	0.84	800	640	465	1.0	5.5	2.25	ANSK-400LN-06	1PS1405-BJ-3CA0	3100	21.5
500	400 L	994	4805 <sup>1)</sup>		96.5	96.5	96.0	0.84	890	710	515	1.05	5.7	2.3	ANSK-400LN-06	1PS1407-BJ-3CA0	3100	21.5
560	450 L	995	5374 <sup>1)</sup>		96.7	96.7	96.2	0.85	980	785	570	0.95	5.8	2.3	ANSK-450LL-06	1PS1453-BJ-3CA0	4100	34.0
630	450 L	995	6046 <sup>1)</sup>		96.8	96.8	96.3	0.85	1105	885	640	0.95	5.7	2.3	ANSK-450LL-06	1PS1455-BJ-3CA0	4100	34.0
710	450 L	995	6813 <sup>1)</sup>		96.9	97.0	96.5	0.85	1240	995	720	0.95	5.7	2.25	ANSK-450LN-06	1PS1457-BJ-3CA0	4400	40.0
800	450 L	995	7676 <sup>1)</sup>		97.0	97.0	96.5	0.85	–	1125	815	1.0	5.9	2.35	ANSK-450LN-06	1PS1458-BJ-3CA0	4400	40.0
900	500 L	995	8635 <sup>1)</sup>		96.8	96.8	96.2	0.85	–	–	915	1.0	5.8	2.25	ANSK-500LL-06	1PS1505-BJ-3CA0	5400	60.0
1000	500 L	995	9592 <sup>1)</sup>		96.9	96.8	96.2	0.85	–	–	1015	1.0	6.0	2.25	ANSK-500LN-06	1PS1507-BJ-3CA0	6100	72.0
1120	500 L	995	10746 <sup>1)</sup>		96.9	96.9	96.4	0.86	–	–	1120	1.0	5.7	2.15	ANSK-500LN-06	1PS1508-BJ-3CA0	6100	72.0
<b>Operating modes</b>																		
Mains-fed operation												Frame size		Order code				
Converter-fed operation, standard insulation <sup>3)</sup>												90 ... 450	0	–				
Converter-fed operation with special insulation (derating approx. 5 %) <sup>3)</sup>												90 ... 450	1	–				
Mains-fed operation, pre-formed coil												160 ... 500	2	–				
Converter-fed operation, pre-formed coil												500	3	–				
												450 ... 500	4	–				
<b>Voltages</b>																		
690 VΔ, 50 Hz												Frame size		Order code				
230 V/400 V, 50 Hz												355 ... 500	0	–				
500 VY, 50 Hz												90 ... 112	1	–				
500 VΔ, 50 Hz												90 ... 315	3	–				
400 V/690 V, 50 Hz												355 ... 450	5	–				
690 VY, 50 Hz												90 ... 400	6	–				
For other voltages see Page 2/91												90 ... 400	8	–				
												90 ... 500	9	...				
<b>Types of construction</b>																		
IM B3												Frame size		Order code				
IM B5												90 ... 500	0	–				
IM B34												90 ... 315	1	–				
IM B14												90 ... 112	2	–				
IM V1/cover												90 ... 112	3	–				
IM B35												90 ... 450	4	–				
												90 ... 500	6	–				
For other types of construction see from Page 1/28												90 ... 500	9	...				

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Motor with special rotor (Cu).

<sup>3)</sup> Can only be ordered with additional identification code **-Z** and order code **M73**.



# Motors with Explosion Protection

## LOHER CHEMSTAR and VARIO 1PS1 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

### Selection and ordering data (continued)

P <sub>ra</sub> ted,	Frame size	Operating values at rated output												Motor type	Article No.	m IM B3	J
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	cosφ rated,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>				

- Cooling: self-ventilated (IC 411)
- Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %
- Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc

8-pole: 750 rpm at 50 Hz

LOHER CHEMSTAR																		
<b>0.37</b>	<b>090 L</b>	700	5.0	1)	67.0	67.5	64.0	0.60	1.33	1.06	0.77	1.7	2.5	2.0	ANGK-090LR-08	<b>1PS1095-BD-3DA3</b>	36	0.0036
<b>0.55</b>	<b>090 L</b>	700	7.5	1)	69.5	69.5	65.0	0.60	1.90	1.52	1.10	1.7	2.8	2.0	ANGK-090LS-08	<b>1PS1098-BD-3DA3</b>	42	0.0044
<b>0.75</b>	<b>100 L</b>	700	10.2	1)	71.9	70.2	66.0	0.70	2.15	1.72	1.25	2.0	3.7	2.1	ANGK-100LR-08	<b>1PS1106-BD-3DA3</b>	55	0.010
<b>1.1</b>	<b>100 L</b>	710	14.8	1)	74.7	72.2	68.5	0.70	3.05	2.44	1.77	1.5	4.0	2.0	ANGK-100LS-08	<b>1PS1108-BD-3DA3</b>	56	0.010
<b>1.5</b>	<b>112 M</b>	710	20.2	1)	78.0	78.5	76.5	0.73	3.80	3.04	2.20	1.8	4.0	2.0	ANGK-112MS-08	<b>1PS1113-BD-3DA3</b>	66	0.016
<b>2.2</b>	<b>132 S</b>	715	29.4	1)	82.5	83.2	81.5	0.73	5.3	4.2	3.07	1.7	4.5	2.1	ANGK-132SR-08	<b>1PS1131-BD-3DA3</b>	96	0.033
<b>3</b>	<b>132 M</b>	715	40.1	1)	83.8	84.5	82.9	0.74	7.0	5.6	4.1	1.8	4.5	2.2	ANGK-132MR-08	<b>1PS1133-BD-3DA3</b>	104	0.045
<b>4</b>	<b>160 M</b>	715	53	1)	85.9	86.0	83.9	0.74	9.10	7.3	5.3	1.8	5.0	2.2	ANGK-160MR-08	<b>1PS1163-BD-3DA3</b>	176	0.12
<b>5.5</b>	<b>160 M</b>	720	73	1)	86.0	86.3	84.4	0.74	12.5	10.0	7.2	1.8	5.3	2.3	ANGK-160MS-08	<b>1PS1165-BD-3DA3</b>	176	0.12
<b>7.5</b>	<b>160 L</b>	720	99	1)	86.0	86.4	84.5	0.74	17.0	13.6	9.9	2.0	5.4	2.3	ANGK-160LS-08	<b>1PS1166-BD-3DA3</b>	192	0.16
<b>11</b>	<b>180 L</b>	720	146	1)	87.1	87.9	87.0	0.81	22.5	18.0	13.0	1.8	5.0	2.6	ANGK-180LS-08	<b>1PS1186-BD-3DA3</b>	255	0.28
<b>15</b>	<b>200 L</b>	720	199	1)	88.5	88.9	88.7	0.76	32.0	26.0	18.7	1.8	4.0	2.1	ANGK-200LS-08	<b>1PS1206-BD-3DA3</b>	333	0.49
<b>18.5</b>	<b>225 S</b>	725	244	1)	88.7	89.5	88.8	0.77	39.0	31.5	22.5	2.4	5.0	2.4	ANGK-225SR-08	<b>1PS1220-BD-3DA3</b>	395	0.82
<b>22</b>	<b>225 M</b>	730	288	1)	89.3	89.8	88.8	0.76	47.0	37.5	27.0	2.5	5.1	2.5	ANGK-225MS-08	<b>1PS1223-BD-3DA3</b>	430	0.92
<b>30</b>	<b>250 M</b>	735	390	1)	90.8	91.2	90.4	0.80	60.0	47.5	34.5	1.9	5.3	2.2	ANGK-250MM-08	<b>1PS1253-BD-3DA3</b>	560	1.0
<b>37</b>	<b>280 S</b>	735	481	1)	90.9	91.9	91.7	0.80	73.0	59.0	42.5	1.8	5.0	2.2	ANGK-280SL-08	<b>1PS1280-BD-3DA3</b>	780	1.9
<b>45</b>	<b>280 M</b>	740	581	1)	91.0	91.2	90.1	0.78	92.0	73.0	53.0	2.2	5.0	2.1	ANGK-280MM-08	<b>1PS1283-BD-3DA3</b>	850	2.2
<b>55</b>	<b>315 S</b>	740	710	1)	93.7	94.0	93.6	0.78	109	87.0	63.0	1.6	6.0	2.1	ANGK-315SL-08	<b>1PS1311-BD-3DA3</b>	950	3.4
<b>75</b>	<b>315 M</b>	740	968	1)	93.8	94.3	94.2	0.79	146	117	85.0	1.6	5.8	2.0	ANGK-315ML-08	<b>1PS1313-BD-3DA3</b>	1030	4.1
<b>90</b>	<b>315 M</b>	740	1161	1)	93.8	94.4	94.3	0.79	175	140	102	1.7	5.8	2.5	ANGK-315MM-08	<b>1PS1314-BD-3DA3</b>	1110	4.8
<b>110</b>	<b>315 M</b>	740	1419	1)	93.9	94.5	94.5	0.79	215	171	124	1.7	5.8	2.0	ANGK-315MN-08 <sup>2)</sup>	<b>1PS1315-BD-3DA3</b>	1110	4.8
<b>132</b>	<b>315 L</b>	740	1703	1)	94.1	94.7	94.7	0.79	255	205	149	1.6	5.8	2.0	ANGK-315LL-08	<b>1PS1316-BD-3DA3</b>	1300	6.0
<b>160</b>	<b>315 L</b>	742	2059	1)	94.4	94.4	93.6	0.79	310	250	180	1.5	6.0	2.5	ANGK-315LM-08 <sup>3)</sup>	<b>1PS1317-BD-3DA3</b>	1410	7.2
<b>200</b>	<b>355 L</b>	740	2580	1)	95.2	95.5	95.2	0.80	355	280	205	1.5	6.4	2.7	ANGK-355LB-08 <sup>3)</sup>	<b>1PS1356-BD-3DB0</b>	1420	14.7

LOHER VARIO																		
<b>225</b>	<b>355 L</b>	744	2886	1)	95.3	95.4	94.8	0.81	420	335	243	1.15	5.8	2.4	ANSK-355L-08	<b>1PS1357-BH-3DA0</b>	2350	15.7
<b>250</b>	<b>355 L</b>	744	3206	1)	95.3	95.4	94.8	0.81	466	373	270	1.2	5.8	2.45	ANSK-355LD-08	<b>1PS1358-BH-3DA0</b>	2400	17.0
<b>280</b>	<b>355 L</b>	743	3597	1)	95.8	96.0	95.6	0.81	520	415	300	1.15	5.2	2.3	ANSK-355LN-08	<b>1PS1357-BJ-3DA0</b>	2400	12.5
<b>315</b>	<b>355 L</b>	743	4049	1)	95.8	96.0	95.6	0.81	580	465	335	1.05	5.1	2.2	ANSK-355LX-08	<b>1PS1358-BJ-3DA0</b>	2550	13.5
<b>355</b>	<b>400 L</b>	743	4559	1)	96.0	96.1	95.6	0.81	655	525	380	1.0	5.1	2.3	ANSK-400LL-08	<b>1PS1404-BJ-3DA0</b>	2800	17.5
<b>400</b>	<b>400 L</b>	744	5136	1)	96.1	96.2	95.8	0.82	735	585	425	0.95	5.2	2.25	ANSK-400LN-08	<b>1PS1407-BJ-3DA0</b>	3100	21.0
<b>450</b>	<b>400 L</b>	743	5779	1)	96.1	96.3	95.9	0.81	830	665	480	0.95	5.0	2.25	ANSK-400LX-08	<b>1PS1408-BJ-3DA0</b>	3250	23.0
<b>500</b>	<b>450 L</b>	745	6411	1)	96.5	96.6	96.1	0.83	900	720	520	0.85	5.2	2.2	ANSK-450LL-08	<b>1PS1455-BJ-3DA0</b>	4100	35.5
<b>560</b>	<b>450 L</b>	745	7178	1)	96.5	96.6	96.1	0.84	1000	800	580	0.85	5.4	2.25	ANSK-450LN-08	<b>1PS1457-BJ-3DA0</b>	4400	42.0
<b>630</b>	<b>450 L</b>	745	8075	1)	96.6	96.7	96.2	0.83	1130	905	655	0.90	5.3	2.25	ANSK-450LN-08	<b>1PS1458-BJ-3DA0</b>	4400	42.0
<b>670</b>	<b>450 L</b>	746	8579	1)	96.7	96.7	96.3	0.83	1210	965	700	0.85	5.2	2.3	ANSK-450LX-08	<b>1PS1450-BJ-3DA0</b>	4600	46.0
<b>710</b>	<b>500 L</b>	746	9086	1)	96.7	96.8	96.2	0.85	1240	995	720	0.85	5.8	2.55	ANSK-500LL-08	<b>1PS1504-BJ-3DA0</b>	5400	73.0
<b>800</b>	<b>500 L</b>	746	10242	1)	96.7	96.8	96.4	0.85	-	1120	810	0.85	5.6	2.45	ANSK-500LL-08	<b>1PS1505-BJ-3DA0</b>	5400	73.0
<b>900</b>	<b>500 L</b>	745	11530	1)	96.5	96.6	96.1	0.84	-	1285	930	1.0	5.5	2.2	ANSK-500LN-08	<b>1PS1507-BJ-3DA0</b>	6100	88.0
<b>950</b>	<b>500 L</b>	746	12152	1)	96.7	96.7	96.1	0.83	-	-	990	0.95	5.9	2.4	ANSK-500LX-08	<b>1PS1508-BJ-3DA0</b>	6400	96.0

Operating modes		Frame size	Order code
Mains-fed operation		90 ... 450	0
Converter-fed operation, standard insulation <sup>4)</sup>		90 ... 450	1
Converter-fed operation with special insulation (derating approx. 5 % <sup>4)</sup> )		160 ... 500	2
Mains-fed operation, pre-formed coil		500	3
Converter-fed operation, pre-formed coil		500	4
Voltages		Frame size	Order code
690 VΔ, 50 Hz		355 ... 500	0
230 V/400 V, 50 Hz		90 ... 112	1
500 VY, 50 Hz		90 ... 315	3
500 VΔ, 50 Hz		355 ... 450	5
400 V/690 V, 50 Hz		90 ... 400	6
690 VY, 50 Hz		90 ... 400	8
For other voltages see Page 2/91		90 ... 500	9
Types of construction		Frame size	Order code
IM B3		90 ... 500	0
IM B5		90 ... 315	1
IM B34		90 ... 112	2
IM B14		90 ... 112	3
IM V1/cover		90 ... 450	4
IM B35		90 ... 500	6
For other types of construction see from Page 1/28		90 ... 500	9

1) Outside the IE code classification according to IEC 60034-30.  
 2) Rated output, partial utilization up to 155 °C (F).

3) Motor with special rotor (Cu).  
 4) Can only be ordered with additional identification code **-Z** and order code **M73**.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

### Selection and ordering data (continued)

P <sub>ra</sub> - ted, 50 Hz	Frame size	Operating values at rated output											Motor type	Article No.	m IM B3	J kgm <sup>2</sup>	
		n <sub>ra</sub> - ted, 50 Hz	T <sub>ra</sub> - ted, 50 Hz	IE class	η <sub>ra</sub> - ted, 50 Hz, 4/4	η <sub>ra</sub> - ted, 50 Hz, 3/4	η <sub>ra</sub> - ted, 50 Hz, 2/4	cos φ rated, 4/4	I <sub>ra</sub> - ted, 400 V	I <sub>ra</sub> - ted, 500 V	I <sub>ra</sub> - ted, 690 V	T <sub>LR</sub> / T <sub>ra</sub>					I <sub>LR</sub> / I <sub>ra</sub>
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–		kg	kgm <sup>2</sup>
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>																	
10-pole: 600 rpm at 50 Hz																	
LOHER CHEMSTAR on request																	
LOHER VARIO																	
180	355 L	594	2889	1)	94.6	94.7	94.0	0.81	338	271	196	1.05	5.3	2.15	ANSK-355LC-10	1PS1357-BH-3EA0	2350 16.5
200	355 L	594	3211	1)	94.6	94.8	94.1	0.81	376	300	218	1.05	5.1	2.05	ANSK-355LD-10	1PS1358-BH-3EA0	2400 18.0
225	355 L	593	3620	1)	95.2	95.5	95.1	0.80	425	340	245	1.1	4.8	2.15	ANSK-355LX-10	1PS1358-BJ-3EA0	2550 19.0
250	400 L	594	4014	1)	95.4	95.7	95.2	0.80	475	380	275	0.95	4.7	2.05	ANSK-400LL-10	1PS1404-BJ-3EA0	2800 27.0
280	400 L	595	4495	1)	95.6	95.8	95.3	0.81	520	415	300	0.95	4.7	2.05	ANSK-400LN-10	1PS1405-BJ-3EA0	3100 32.0
315	400 L	595	5058	1)	95.6	95.8	95.4	0.80	595	475	345	0.95	4.7	2.05	ANSK-400LN-10	1PS1407-BJ-3EA0	3100 32.0
355	400 L	595	5700	1)	95.8	96.0	95.6	0.80	665	530	385	0.95	4.8	2.15	ANSK-400LX-10	1PS1408-BJ-3EA0	3300 35.0
400	450 L	595	6418	1)	96.0	96.1	95.5	0.80	750	600	435	1.0	4.9	2.1	ANSK-450LL-10	1PS1454-BJ-3EA0	4100 42.0
450	450 L	595	7221	1)	96.1	96.2	95.6	0.81	835	670	485	0.95	4.8	2.05	ANSK-450LN-10	1PS1455-BJ-3EA0	4400 50.0
500	450 L	595	8020	1)	96.2	96.3	95.7	0.80	940	750	545	0.95	5.0	2.15	ANSK-450LN-10	1PS1457-BJ-3EA0	4400 50.0
520	450 L	595	8336	1)	96.2	96.2	95.6	0.79	985	785	570	1.0	5.1	2.2	ANSK-450LX-10	1PS1458-BJ-3EA0	4700 55.0
560	500 L	596	8965	1)	96.1	96.1	95.3	0.80	1050	840	610	0.85	5.3	2.35	ANSK-500LL-10	1PS1504-BJ-3EA0	5400 82.0
630	500 L	596	10082	1)	96.2	96.2	95.4	0.80	1180	945	685	0.90	5.3	2.4	ANSK-500LN-10	1PS1505-BJ-3EA0	6100 98.0
670	500 L	597	10719	1)	96.3	96.2	95.4	0.80	1260	1005	730	0.95	5.5	2.45	ANSK-500LN-10	1PS1507-BJ-3EA0	6100 98.0
750	500 L	597	11998	1)	96.4	96.3	95.5	0.79	–	–	820	0.95	5.5	2.45	ANSK-500LX-10	1PS1508-BJ-3EA0	6500 108
12-pole: 500 rpm at 50 Hz																	
LOHER CHEMSTAR on request																	
LOHER VARIO																	
160	355 L	493	3097	1)	94.1	94.3	93.8	0.78	313	250	181	0.95	4.6	2.1	ANSK-355LC-12	1PS1357-BH-3FA0	2350 17.0
180	355 L	494	3481	1)	94.3	94.5	93.9	0.77	355	285	205	1.0	4.7	2.15	ANSK-355LD-12	1PS1358-BH-3FA0	2400 19.0
190	355 L	494	3672	1)	94.5	94.7	94.3	0.77	375	300	218	0.95	4.6	2.2	ANSK-355LX-12	1PS1358-BJ-3FA0	2550 18.5
200	400 L	494	3861	1)	94.9	95.1	94.7	0.78	390	310	225	0.95	4.6	2.05	ANSK-400LL-12	1PS1404-BJ-3FA0	2800 26.5
225	400 L	495	4341	1)	95.1	95.3	94.9	0.79	430	345	250	1.0	4.7	2.15	ANSK-400LN-12	1PS1405-BJ-3FA0	3100 32.0
250	400 L	495	4824	1)	95.2	95.4	95.0	0.78	485	390	282	1.0	4.6	2.1	ANSK-400LN-12	1PS1407-BJ-3FA0	3100 32.0
280	400 L	495	5402	1)	95.2	95.4	95.0	0.78	545	435	315	0.95	4.8	2.2	ANSK-400LX-12	1PS1408-BJ-3FA0	3300 35.0
315	450 L	495	6075	1)	95.5	95.7	95.3	0.78	610	490	355	0.90	4.5	1.95	ANSK-450LL-12	1PS1454-BJ-3FA0	4100 42.0
355	450 L	495	6842	1)	95.6	95.8	95.4	0.78	690	550	400	0.90	4.6	2.0	ANSK-450LN-12	1PS1455-BJ-3FA0	4400 50.0
400	450 L	495	7709	1)	95.7	95.9	95.4	0.78	785	630	455	0.95	4.6	2.0	ANSK-450LN-12	1PS1457-BJ-3FA0	4400 50.0
420	450 L	495	8095	1)	95.7	95.9	95.4	0.78	810	650	470	0.95	4.7	2.05	ANSK-450LX-12	1PS1458-BJ-3FA0	4600 55.0
450	500 L	496	8662	1)	95.8	95.8	95.2	0.80	845	675	490	0.90	4.8	2.05	ANSK-500LL-12	1PS1504-BJ-3FA0	5400 82.0
500	500 L	496	9617	1)	95.8	95.8	95.1	0.79	950	760	550	0.95	5.1	2.2	ANSK-500LN-12	1PS1505-BJ-3FA0	6100 98.0
560	500 L	496	10779	1)	95.9	96.0	95.3	0.80	1055	840	610	0.90	4.9	2.1	ANSK-500LN-12	1PS1507-BJ-3FA0	6100 98.0
600	500 L	496	11546	1)	96.0	96.1	95.5	0.80	–	905	655	0.90	5.1	2.15	ANSK-500LX-12	1PS1508-BJ-3FA0	6350 108
<b>Operating modes</b>																	
Mains-fed operation											Frame size			Order code			
Mains-fed operation											355 ... 400			0			
Converter-fed operation, standard insulation <sup>2)</sup>											355 ... 400			1			
Converter-fed operation with special insulation (derating approx. 5 %) <sup>2)</sup>											355 ... 500			2			
Mains-fed operation, pre-formed coil											450 ... 500			3			
Converter-fed operation, pre-formed coil											450 ... 500			4			
<b>Voltages</b>																	
690 VΔ, 50 Hz											Frame size			Order code			
690 VΔ, 50 Hz											355 ... 500			0			
500 VY, 50 Hz											355 ... 500			3			
500 VΔ, 50 Hz											355 ... 450			5			
400 V/690 V, 50 Hz											355 ... 500			6			
690 VY, 50 Hz											355 ... 500			8			
For other voltages see Page 2/91											355 ... 500			9			
<b>Types of construction</b>																	
IM B3											Frame size			Order code			
IM B3											355 ... 500			0			
IM V1/cover											355 ... 450			4			
IM B35											355... 500			6			
For other types of construction see from Page 1/28											355 ... 500			9			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Can only be ordered with additional identification code -Z and order code M73.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> - ted, 50 Hz	Frame size	Motor type	Article No.	m IM B3	kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>					
14-pole: 430 rpm at 50 Hz					
LOHER CHEMSTAR on request					
LOHER VARIO					
125	355 L	ANSK-355LC-14	1PS1357-BH-3GA0	2350	
140	355 L	ANSK-355LD-14	1PS1358-BH-3GA0	2400	
160	400 L	ANSK-400LL-14	1PS1404-BJ-3GA0	2800	
180	400 L	ANSK-400LN-14	1PS1405-BJ-3GA0	3100	
200	400 L	ANSK-400LN-14	1PS1407-BJ-3GA0	3100	
225	400 L	ANSK-400LX-14	1PS1408-BJ-3GA0	3250	
250	450 L	ANSK-450LL-14	1PS1454-BJ-3GA0	4100	
280	450 L	ANSK-450LN-14	1PS1455-BJ-3GA0	4400	
315	450 L	ANSK-450LN-14	1PS1457-BJ-3GA0	4400	
340	450 L	ANSK-450LX-14	1PS1458-BJ-3GA0	4600	
355	500 L	ANSK-500LL-14	1PS1504-BJ-3GA0	5400	
400	500 L	ANSK-500LN-14	1PS1505-BJ-3GA0	6100	
450	500 L	ANSK-500LN-14	1PS1507-BJ-3GA0	6100	
500	500 L	ANSK-500LX-14	1PS1508-BJ-3GA0	6500	
16-pole: 375 rpm at 50 Hz					
LOHER CHEMSTAR on request					
LOHER VARIO					
100	355 L	ANSK-355LC-16	1PS1357-BH-3HA0	2350	
110	355 L	ANSK-355LD-16	1PS1358-BH-3HA0	2400	
132	400 L	ANSK-400LL-16	1PS1405-BJ-3HA0	2800	
160	400 L	ANSK-400LN-16	1PS1407-BJ-3HA0	3100	
180	400 L	ANSK-400LX-16	1PS1408-BJ-3HA0	3250	
200	450 L	ANSK-450LL-16	1PS1454-BJ-3HA0	4100	
225	450 L	ANSK-450LN-16	1PS1455-BJ-3HA0	4400	
250	450 L	ANSK-450LN-16	1PS1457-BJ-3HA0	4400	
265	450 L	ANSK-450LX-16	1PS1458-BJ-3HA0	4650	
280	500 L	ANSK-500LL-16	1PS1504-BJ-3HA0	5400	
315	500 L	ANSK-500LN-16	1PS1505-BJ-3HA0	6100	
355	500 L	ANSK-500LN-16	1PS1507-BJ-3HA0	6100	
400	500 L	ANSK-500LX-16	1PS1508-BJ-3HA0	6650	
<b>Operating modes</b>					
Mains-fed operation	Frame size				Order code
	355 ... 500		0		-
Converter-fed operation, standard insulation <sup>1)</sup>	355 ... 500		1		-
Converter-fed operation with special insulation (derating approx. 5 % <sup>1)</sup> )	355 ... 500		2		-
Mains-fed operation, pre-formed coil	450 ... 500		3		-
Converter-fed operation, pre-formed coil	450 ... 500		4		-
<b>Voltages</b>					
690 VΔ, 50 Hz	Frame size				Order code
	355 ... 500		0		-
500 VY, 50 Hz	355 ... 500		3		-
500 VΔ, 50 Hz	355 ... 450		5		-
400 V/690 V, 50 Hz	355 ... 500		6		-
690 VY, 50 Hz	355 ... 500		8		-
For other voltages see Page 2/91	355 ... 500		9		...
<b>Types of construction</b>					
IM B3	Frame size				Order code
	355 ... 500		0		-
IM V1/cover	355 ... 500		4		-
IM B35	355 ... 500		6		-
For other types of construction see from Page 1/28	355 ... 500		9		...

<sup>1)</sup> Can only be ordered with additional identification code **-Z** and order code **M73**.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Motors with High Efficiency IE2 in cast-iron and steel versions

### Selection and ordering data (continued)

P <sub>ra</sub> ted, 60 Hz	Frame size	Operating values at rated output								Motor type			Article No.	m J		
		n <sub>ra</sub> ted, 60 Hz	T <sub>ra</sub> ted, 60 Hz	IE class	η <sub>ra</sub> ted, 60 Hz, 4/4	η <sub>ra</sub> ted, 60 Hz, 3/4	η <sub>ra</sub> ted, 60 Hz, 2/4	cos φ rated, 4/4	I <sub>rated</sub> , 60 Hz, A	T <sub>LR</sub> / T <sub>ra</sub> ted	I <sub>LR</sub> / I <sub>ra</sub> ted	T <sub>B</sub> / T <sub>ra</sub> ted		IM B3	kg	kgm <sup>2</sup>
<ul style="list-style-type: none"> <li>Cooling: self-ventilated (IC 411)</li> <li>Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>																
2-pole: 3000 rpm at 60 Hz																
<b>LOHER CHEMSTAR</b>																
1.8	090 L	3460	4.97	IE2	85.4	85.6	84.5	0.88	2.85	3.0	7.0	2.8	ANGK-090LR-02	1PS1095-BD-3AA3	36	0.0020
2.6	090 L	3460	7.2	IE2	85.5	85.8	84.7	0.84	4.4	3.0	7.0	3.0	ANGK-090LS-02	1PS1098-BD-3AA3	36	0.0020
3.6	100 L	3510	9.8	IE2	87.5	87.1	85.2	0.85	5.8	2.9	8.0	3.0	ANGK-100LS-02	1PS1106-BD-3AA3	51	0.0041
4.5	112 M	3490	12.3	IE2	87.5	87.7	87.2	0.94	6.6	2.7	7.8	3.0	ANGK-112MS-02	1PS1113-BD-3AA3	66	0.0075
6.6	132 S	3510	18.0	IE2	89.5	88.7	87.2	0.89	10.0	3.0	7.8	3.0	ANGK-132SR-02	1PS1131-BD-3AA3	83	0.014
9	132 S	3510	24.5	IE2	90.1	91.0	90.1	0.91	13.1	2.7	7.0	3.0	ANGK-132SS-02	1PS1132-BD-3AA3	95	0.020
13.2	160 M	3550	36	IE2	90.8	91.2	91.0	0.88	19.9	2.0	7.5	2.6	ANGK-160MR-02	1PS1163-BD-3AA3	176	0.045
18	160 M	3550	46	IE2	91.5	91.8	91.2	0.89	26.5	1.9	7.0	2.6	ANGK-160MS-02	1PS1165-BD-3AA3	176	0.092
22	160 L	3550	59	IE2	91.5	91.8	91.2	0.89	32.5	2.0	7.0	2.7	ANGK-160LS-02	1PS1166-BD-3AA3	192	0.092
26	180 M	3560	70	IE2	92.5	93.0	92.4	0.89	38.0	2.6	7.0	2.6	ANGK-180MS-02	1PS1183-BD-3AA3	246	0.16
36	200 L	3560	96	IE2	92.6	92.8	92.0	0.89	53.0	2.0	7.2	2.6	ANGK-200LR-02	1PS1206-BD-3AA3	333	0.20
44	200 L	3560	118	IE2	93.0	93.1	92.4	0.89	64.0	2.0	7.2	2.6	ANGK-200LS-02	1PS1208-BD-3AA3	349	0.23
54	225 M	3565	145	IE2	93.2	93.4	92.8	0.88	79.0	2.2	7.6	2.6	ANGK-225MS-02	1PS1223-BD-3AA3	420	0.34
66	250 M	3575	176	IE2	93.8	93.7	92.6	0.88	96.0	1.9	7.5	2.6	ANGK-250MM-02	1PS1253-BD-3AA3	540	0.45
90	280 S	3575	240	IE2	94.5	94.5	93.0	0.90	127	1.7	7.0	2.4	ANGK-280SL-02	1PS1280-BD-3AA3	775	0.88
110	280 M	3580	293	IE2	95.1	95.0	93.9	0.89	156	2.4	7.7	2.7	ANGK-280MM-02	1PS1283-BD-3AA3	830	1.03
125	315 S	3580	333	IE2	94.6	94.4	93.2	0.87	183	1.9	7.0	2.5	ANGK-315SL-02	1PS1311-BD-3AA3	960	1.55
145	315 M	3580	387	IE2	95.1	95.0	93.8	0.89	205	2.0	7.7	2.6	ANGK-315ML-02	1PS1313-BD-3AA3	1020	1.85
180	315 M	3581	480	IE2	95.4	95.4	94.4	0.88	260	2.2	7.5	2.7	ANGK-315MN-02	1PS1315-BD-3AA3	1100	2.2
220	315 L	3580	587	IE2	95.8	95.9	95.4	0.90	305	2.5	7.3	2.7	ANGK-315LL-02	1PS1316-BD-3AA3	1310	2.8
270	315 L	3580	720	IE2	95.8	95.9	95.4	0.90	375	2.6	7.7	2.7	ANGK-315LN-02	1PS1318-BD-3AA3	1450	3.5
315	355 L	3580	840	IE2	95.5	95.3	94.6	0.90	440	2.0	7.2	2.7	ANGK-355LB-02	1PS1356-BD-3AA2	1580	4.7
<b>LOHER VARIO</b>																
400	355 L	3583	1066	<sup>1)</sup>	96.4	96.3	95.6	0.92	540	1.15	6.7	2.75	ANSK-355LC-02	1PS1357-BH-3AA0	2100	3.6
450	355 L	3585	1198	<sup>1)</sup>	96.6	96.5	95.7	0.92	610	1.2	7.4	3.0	ANSK-355LD-02	1PS1358-BH-3AA0	2200	4.0
500	355 L	3579	1334	<sup>1)</sup>	96.3	96.2	95.5	0.91	680	0.90	6.3	2.65	ANSK-355LX-02	1PS1358-BJ-3AA0	2300	5.0
500	400 L	3581	1333	<sup>1)</sup>	96.4	96.3	95.5	0.90	690	0.65	5.7	2.45	ANSK-400LL-02	1PS1404-BJ-3AA0	2400	6.0
560	400 L	3584	1492	<sup>1)</sup>	96.6	96.5	95.7	0.91	770	0.80	6.5	2.8	ANSK-400LN-02	1PS1405-BJ-3AA0	2600	7.0
630	400 L	3583	1679	<sup>1)</sup>	96.7	96.6	96.0	0.91	860	0.75	6.1	2.65	ANSK-400LN-02	1PS1407-BJ-3AA0	2600	7.0
710	400 L	2585	1891	<sup>1)</sup>	96.7	96.6	95.9	0.91	675 <sup>2)</sup>	0.80	6.5	2.75	ANSK-400LX-02	1PS1408-BJ-3AA0	2900	8.3
710	450 L	3586	1890	<sup>1)</sup>	96.3	96.1	95.1	0.90	685 <sup>2)</sup>	0.70	6.2	2.7	ANSK-450LL-02	1PS1455-BJ-3AA0	3500	12
800	450 L	3586	2130	<sup>1)</sup>	96.5	96.3	95.3	0.91	762 <sup>2)</sup>	0.80	6.4	2.85	ANSK-450LN-02	1PS1457-BJ-3AA0	3900	14
900	450 L	3586	2396	<sup>1)</sup>	96.6	96.4	95.6	0.90	865 <sup>2)</sup>	0.80	6.4	2.8	ANSK-450LN-02	1PS1458-BJ-3AA0	3900	14
<b>Operating modes</b>										Frame size			Order code			
Mains-fed operation										90 ... 450			0			
Converter-fed operation, standard insulation <sup>3)</sup>										90 ... 450			1			
Converter-fed operation with special insulation (derating approx. 5 %) <sup>3)</sup>										160 ... 450			2			
Mains-fed operation, pre-formed coil										450			3			
Converter-fed operation, pre-formed coil										450			4			
<b>Voltages</b>										Frame size			Order code			
230 V/400 V, 60 Hz										90 ... 112			1			
500 VY, 60 Hz										90 ... 450			3			
400 V/690 V, 60 Hz										90 ... 450			6			
690 VY, 60 Hz										90 ... 450			8			
For other voltages see Page 2/91										90 ... 450			9			
<b>Types of construction</b>										Frame size			Order code			
IM B3										90 ... 450			0			
IM B5										90 ... 315			1			
IM B34										90 ... 112			2			
IM B14										90 ... 112			3			
IM V1/cover										90 ... 450			4			
IM B35										90 ... 450			6			
For other types of construction see from Page 1/28										90 ... 450			9			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Only possible with 690 V (values apply to 690 V).

<sup>3)</sup> Can only be ordered with additional identification code **-Z** and order code **M73**.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted, 60 Hz	Frame size	Operating values at rated output							Motor type			Article No.	m IM B3	J		
		n <sub>ra</sub> ted, 60 Hz	T <sub>ra</sub> ted, 60 Hz	IE class	η <sub>ra</sub> ted, 60 Hz, 4/4	η <sub>ra</sub> ted, 60 Hz, 3/4	η <sub>ra</sub> ted, 60 Hz, 2/4	cos φ <sub>rated</sub> 60 Hz, 4/4	I <sub>rated</sub> 60 Hz, 480 V	T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>				T <sub>B</sub> / T <sub>ra</sub>	
KW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–	–	kg	kgm <sup>2</sup>	
<ul style="list-style-type: none"> <li>Cooling: self-ventilated (IC 411)</li> <li>Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>																
4-pole: 1800 rpm at 60 Hz																
<b>LOHER CHEMSTAR</b>																
1.3	090 L	1760	7.1	IE2	85.6	85.2	82.0	0.82	2.25	2.2	7.2	2.7	ANGK-090LR-04	1PS1095-■BD■-3BA3	34	0.0044
1.8	090 L	1760	9.8	IE2	87.8	88.0	86.6	0.80	3.1	2.2	7.4	2.7	ANGK-090LS-04	1PS1098-■BD■-3BA3	37	0.0044
2.6	100 L	1755	14.1	IE2	88.0	88.3	87.2	0.83	4.3	1.9	7.0	2.5	ANGK-100LR-04	1PS1106-■BD■-3BA3	53	0.0060
3.6	100 L	1760	19.5	IE2	87.5	87.0	85.2	0.79	6.3	1.8	7.0	2.4	ANGK-100LS-04	1PS1108-■BD■-3BA3	55	0.0071
4.8	112 M	1760	26.0	IE2	89.9	90.3	89.5	0.83	7.8	1.9	7.0	2.5	ANGK-112MS-04	1PS1113-■BD■-3BA3	66	0.0126
6.6	132 S	1750	36.0	IE2	89.8	90.4	89.9	0.86	10.3	2.4	7.5	2.7	ANGK-132SR-04	1PS1131-■BD■-3BA3	93	0.03
9	132 M	1765	48.7	IE2	90.1	90.5	89.7	0.86	14.0	2.0	7.5	2.2	ANGK-132MS-04	1PS1133-■BD■-3BA3	102	0.03
13	160 M	1765	70.0	IE2	91.1	91.5	91.0	0.85	20.0	3.0	7.5	2.6	ANGK-160MR-04	1PS1163-■BD■-3BA3	176	0.10
18	160 L	1770	97.0	IE2	92.4	92.1	91.8	0.85	27.5	3.0	7.5	2.6	ANGK-160LS-04	1PS1166-■BD■-3BA3	192	0.13
22	180 M	1775	118	IE2	92.5	93.0	92.2	0.84	34.0	1.8	7.5	2.8	ANGK-180MR-04	1PS1183-■BD■-3BA3	246	0.20
16	180 L	1775	140	IE2	93.7	94.0	93.5	0.85	39.5	1.8	7.5	2.6	ANGK-180LS-04	1PS1186-■BD■-3BA3	255	0.23
26	200 L	1780	193	IE2	94.2	94.4	93.9	0.83	55.0	3.0	7.5	2.9	ANGK-200LS-04	1PS1206-■BD■-3BA3	333	0.37
44	225 S	1780	236	IE2	93.7	94.0	93.5	0.85	66.0	2.0	7.0	2.6	ANGK-225SR-04	1PS1220-■BD■-3BA3	415	0.64
54	225 M	1780	290	IE2	94.2	94.7	94.6	0.85	81.0	2.0	7.0	2.6	ANGK-225MS-04	1PS1223-■BD■-3BA3	445	0.72
66	250 M	1780	354	IE2	94.5	94.4	94.2	0.86	98.0	2.1	7.7	2.7	ANGK-250MM-04	1PS1253-■BD■-3BA3	560	0.79
90	280 S	1785	481	IE2	94.6	94.8	94.5	0.84	136	2.2	7.0	2.5	ANGK-280SL-04	1PS1280-■BD■-3BA3	820	1.44
110	280 M	1785	588	IE2	95.2	95.2	94.8	0.84	165	2.5	7.0	2.7	ANGK-280MM-04	1PS1283-■BD■-3BA3	870	1.66
125	315 S	1787	668	IE2	95.0	95.0	94.0	0.82	193	2.2	7.0	2.5	ANGK-315SL-04	1PS1311-■BD■-3BA3	960	2.2
145	315 M	1787	775	IE2	95.1	95.2	94.7	0.84	220	2.0	7.0	2.2	ANGK-315ML-04	1PS1313-■BD■-3BA3	1040	2.9
180	315 M	1787	962	IE2	95.4	95.4	94.8	0.83	275	2.4	7.5	2.5	ANGK-315MN-04	1PS1315-■BD■-3BA3	1120	3.4
220	315 L	1787	1176	IE2	95.4	95.6	95.0	0.84	330	2.3	7.5	2.5	ANGK-315LL-04	1PS1316-■BD■-3BA3	1340	3.9
270	315 L	1787	1443	IE2	95.8	95.8	95.5	0.85	400	2.3	7.5	2.4	ANGK-315LM-04	1PS1317-■BD■-3BA3	1420	4.2
315	355 L	1790	1680	IE2	95.4	95.5	95.2	0.85	465	1.8	7.0	2.5	ANGK-355LB-04	1PS1356-■BD■-3BA2	1730	6.8
315	355 L	1791	1680	IE2	95.6	96	95.5	0.86	460	1.1	7.0	2.4	ANGK-355LB-04 <sup>3)</sup>	1PS1357-■BD■-3BB2	1730	6.8
<b>LOHER VARIO</b>																
400	355 L	1791	2133 <sup>1)</sup>		96.4	96.3	95.5	0.86	–	1.1	6.5	2.30	ANSK-355LC-04	1PS1358-■BH■-3BA0	2300	7.7
450	355 L	1791	2399 <sup>1)</sup>		96.5	96.4	95.6	0.86	–	1.1	6.5	2.30	ANSK-355LD-04	1PS1350-■BH■-3BA0	2350	8.5
500	355 L	1791	2664 <sup>1)</sup>		96.6	96.5	95.9	0.86	–	1.05	6.3	2.45	ANSK-355LN-04	1PS1357-■BJ■-3BA0	2400	9.0
560	355 L	1792	2984 <sup>1)</sup>		96.7	96.6	95.9	0.85	–	1.0	6.5	2.50	ANSK-355LX-04	1PS1358-■BJ■-3BA0	2500	9.5
560	400 L	1791	2984 <sup>1)</sup>		96.5	96.4	95.6	0.88	–	1.0	6.2	2.55	ANSK-400LL-04	1PS1404-■BJ■-3BA0	2700	13
630	400 L	1791	3357 <sup>1)</sup>		96.6	96.5	95.8	0.89	–	1.0	6.0	2.45	ANSK-400LN-04	1PS1405-■BJ■-3BA0	2900	15
710	400 L	1791	3784 <sup>1)</sup>		96.7	96.6	96.0	0.89	–	0.95	5.7	2.30	ANSK-400LN-04	1PS1407-■BJ■-3BA0	2900	15
800	400 L	1792	4263 <sup>1)</sup>		96.8	96.8	96.1	0.88	–	0.95	6.1	2.45	ANSK-400LX-04	1PS1408-■BJ■-3BA0	3100	17
900	450 L	1793	4792 <sup>1)</sup>		96.9	96.8	96.1	0.88	–	0.90	6.4	2.55	ANSK-450LL-04	1PS1455-■BJ■-3BA0	3800	24.5
1000	450 L	1793	5324 <sup>1)</sup>		96.9	96.8	96.2	0.88	980 <sup>2)</sup>	0.85	6.0	2.40	ANSK-450LN-04	1PS1457-■BJ■-3BA0	4300	29
<b>Operating modes</b>										Frame size					Order code	
Mains-fed operation										90 ... 500			0		–	
Converter-fed operation, standard insulation <sup>4)</sup>										90 ... 500			1		–	
Converter-fed operation with special insulation (derating approx. 5 %) <sup>4)</sup>										160 ... 500			2		–	
Mains-fed operation, pre-formed coil										450 ... 500			3		–	
Converter-fed operation, pre-formed coil										450 ... 500			4		–	
<b>Voltages</b>										Frame size					Order code	
230 V/400 V, 60 Hz										90 ... 112			1		–	
500 VY, 60 Hz										90 ... 500			3		–	
400 V/690 V, 60 Hz										90 ... 500			6		–	
690 VY, 60 Hz										90 ... 500			8		–	
For other voltages see Page 2/91										90 ... 500			9		...	
<b>Types of construction</b>										Frame size					Order code	
IM B3										90 ... 500			0		–	
IM B5										90 ... 315			1		–	
IM B34										90 ... 112			2		–	
IM B14										90 ... 112			3		–	
IM V1/cover										90 ... 500			4		–	
IM B35										90 ... 500			6		–	
For other types of construction see from Page 1/28										90 ... 500			9		...	

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Only possible with 690 V (values apply to 690 V).

<sup>3)</sup> Motor with special rotor (Cu).

<sup>4)</sup> Can only be ordered with additional identification code **-Z** and order code

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted, 60 Hz	Frame size	Operating values at rated output								Motor type			Article No.	m IM B3	J kgm <sup>2</sup>	
		n <sub>ra</sub> ted, 60 Hz	T <sub>ra</sub> ted, 60 Hz	IE class	η <sub>ra</sub> ted, 60 Hz, 4/4	η <sub>ra</sub> ted, 60 Hz, 3/4	η <sub>ra</sub> ted, 60 Hz, 2/4	cos φ rated, 60 Hz, 4/4	I <sub>rated</sub> 60 Hz, A	T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>	T <sub>B</sub> / T <sub>ra</sub>				
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> <li>• Type of protection: "Non-sparking" in accordance with EN 60079-15; 2010: CE 0102 II 3G Ex nA IIC T3 Gc</li> </ul>																
6-pole: 1200 rpm at 60 Hz																
<b>LOHER CHEMSTAR</b>																
0.75	090 L	1160	6.2	IE2	81.8	82.0	80.1	0.72	1.53	1.5	5.0	2.5	ANGK-090LR-06	1PS1095-BD-3CA3	36	0.0044
0.9	090 L	1160	7.4	IE2	82.0	82.0	80.2	0.72	1.83	1.4	5.1	2.4	ANGK-090LS-06	1PS1098-BD-3CA3	42	0.0044
1.25	100 L	1175	10.2	IE2	85.5	85.2	82.3	0.73	2.4	1.5	5.6	2.4	ANGK-100LS-06	1PS1106-BD-3CA3	55	0.010
1.8	112 M	1180	14.6	IE2	86.6	86.5	83.0	0.73	3.4	1.3	5.8	2.5	ANGK-112MS-06	1PS1113-BD-3CA3	66	0.019
3	132 S	1170	24.5	IE2	87.9	87.6	85.3	0.74	5.5	2.4	6.6	3.0	ANGK-132SR-06	1PS1131-BD-3CA3	92	0.033
4	132 M	1160	32.9	IE2	88.3	88.9	88.1	0.79	6.9	2.1	6.6	2.7	ANGK-132MR-06	1PS1133-BD-3CA3	96	0.045
5.5	132 M	1180	44.5	IE2	90.0	90.2	89.0	0.80	9.2	1.5	6.5	2.3	ANGK-132MS-06	1PS1135-BD-3CA3	104	0.045
7.5	160 M	1180	61	IE2	89.6	89.7	88.0	0.80	12.6	1.3	6.2	2.4	ANGK-160MR-06	1PS1163-BD-3CA3	176	0.088
11	160 L	1175	89	IE2	90.2	90.4	89.0	0.80	18.3	1.3	6.5	2.4	ANGK-160LS-06	1PS1166-BD-3CA3	192	0.11
15	180 L	1170	122	IE2	91.0	91.4	90.7	0.81	24.5	2.4	7.0	2.5	ANGK-180LS-06	1PS1186-BD-3CA3	255	0.28
18.5	200 L	1180	150	IE2	91.7	91.7	90.8	0.80	30.5	2.5	7.0	2.6	ANGK-200LR-06	1PS1206-BD-3CA3	333	0.45
22	200 L	1180	178	IE2	91.8	91.8	91.0	0.80	36.0	2.5	7.0	2.6	ANGK-200LS-06	1PS1208-BD-3CA3	349	0.49
30	225 M	1180	243	IE2	93.0	93.0	92.0	0.82	47.5	2.0	7.0	2.8	ANGK-225MS-06	1PS1223-BD-3CA3	430	0.92
37	250 M	1185	298	IE2	93.2	93.2	92.3	0.80	60.0	1.4	7.0	2.6	ANGK-250MM-06	1PS1253-BD-3CA3	560	1.0
45	280 S	1185	363	IE2	93.6	93.6	92.5	0.80	37.5	2.3	6.5	2.5	ANGK-280SL-06	1PS1280-BD-3CA3	780	2.5
55	280 M	1188	442	IE2	93.8	93.6	93.0	0.90	45.5	2.4	7.0	2.8	ANGK-280MM-06	1PS1283-BD-3CA3	850	2.9
75	315 S	1190	602	IE2	94.5	94.6	94.3	0.90	62	2.3	7.2	2.4	ANGK-315SL-06	1PS1311-BD-3CA3	1030	3.3
90	315 M	1190	722	IE2	94.5	94.6	94.3	0.90	75	2.2	7.2	2.3	ANGK-315ML-06	1PS1313-BD-3CA3	1100	4.0
110	315 M	1190	883	IE2	95.0	95.0	94.3	0.90	90	1.8	7.1	2.2	ANGK-315MM-06	1PS1314-BD-3CA3	1190	4.9
132	315 M	1190	1059	IE2	95.2	95.2	94.3	0.90	108	1.8	7.2	2.2	ANGK-315MN-06	1PS1315-BD-3CA3	1180	4.9
160	315 L	1190	1284	IE2	95.2	95.2	94.6	0.90	134	2.0	7.5	2.3	ANGK-315LL-06	1PS1316-BD-3CA3	1400	6.0
200	315 L	1192	1602	IE2	95.1	95.2	94.6	0.80	172	2.4	7.4	2.6	ANGK-315LM-06	1PS1317-BD-3CA3	1600	6.8
250	355 L	1194	1999	IE2	95.4	95.5	94.7	0.90	210	1.1	7.1	2.4	ANGK-355LB-06	1PS1356-BD-3CB2	1730	9.1
<b>LOHER VARIO on request</b>																
<b>Operating modes</b>		Frame size										Order code				
Mains-fed operation		90 ... 355										0				
Converter-fed operation, standard insulation <sup>2)</sup>		90 ... 355										1				
Converter-fed operation with special insulation (derating approx. 5 %) <sup>2)</sup>		160 ... 355										2				
<b>Voltages</b>		Frame size										Order code				
230 V/400 V, 60 Hz		90 ... 112										1				
500 VY, 60 Hz		90 ... 355										3				
400 V/690 V, 60 Hz		90 ... 355										6				
690 VY, 60 Hz		90 ... 355										8				
For other voltages see Page 2/91		90 ... 355										9				
<b>Types of construction</b>		Frame size										Order code				
IM B3		90 ... 355										0				
IM B5		90 ... 315										1				
IM B34		90 ... 112										2				
IM B14		90 ... 112										3				
IM V1/cover		90 ... 355										4				
IM B35		90 ... 355										6				
For other types of construction see from Page 1/28		90 ... 355										9				

<sup>1)</sup> Motor with special rotor (Cu).

<sup>2)</sup> Can only be ordered with additional identification code **-Z** and order code **M73**.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

Article No. supplements

#### Selection and ordering data

Voltages	Voltage code 11. position of the Article No.	Additional identification code with order code and plain text if required	Motor series															
			LOHER CHEMSTAR												LOHER VARIO			
			Frame size															
1PS1.....			90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Optional voltages</b>																		
690 VΔ, 50 Hz	0		-	-	-	-	-	-	-	-	-	-	-	○	○	○	○	○
230 VΔ/400 VY, 50 Hz	1		○	○	○	○	○	○	○	○	○	○	-	-	-	-	-	-
500 VY, 50 Hz	3		○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-
400 VΔ, 50 Hz	4		○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-
500 VΔ, 50 Hz	5		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
400 VΔ/690 VY, 50 Hz	6		○	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-
690 VY, 50 Hz	8		○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-
415 VY, 50 Hz	9	L1C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
415 VΔ, 50 Hz	9	L1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
380 VΔ/660 VY, 50 Hz	9	L1L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
220 VΔ/380 VY, 50 Hz	9	L1R	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-	-
1000 VΔ, 50 Hz	9	L1V	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Other voltages	9	L1Y • and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
220 VΔ/380 VY, 60 Hz (50 Hz output)	9	L2A	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-	-
220 VΔ/380 VY, 60 Hz (60 Hz output)	9	L2B	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-	-	-
380 VΔ/660 VY, 60 Hz (50 Hz output)	9	L2C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
380 VΔ/660 VY, 60 Hz (60 Hz output)	9	L2D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-
460 VY, 60 Hz (60 Hz output)	9	L2E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-
460 VΔ, 60 Hz (60 Hz output)	9	L2F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
575 VY, 60 Hz (60 Hz output)	9	L2L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-
575 VΔ, 60 Hz (60 Hz output)	9	L2M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
440 VY, 60 Hz (50 Hz output)	9	L2Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-
440 VΔ, 60 Hz (50 Hz output)	9	L2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
460 VY, 60 Hz (50 Hz output)	9	L2S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-
460 VΔ, 60 Hz (50 Hz output)	9	L2T	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
575 VY, 60 Hz (50 Hz output)	9	L2U	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-
575 VΔ, 60 Hz (50 Hz output)	9	L2V	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
440 VY, 60 Hz (60 Hz output)	9	L2W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	-	-
440 VΔ, 60 Hz (60 Hz output)	9	L2X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.

- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. On request
- Not possible

For dual voltages 230 V/400 V, 220 V/380 V, 400 V/690 V or 380 V/660 V:

- For motors for converter-fed operation, the converter rating plate is stamped with 380 V or 400 V.
- For motors with a Dahlander circuit, the lower voltage is generally specified.

Voltages not listed in the catalog are only available on request.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Special versions

#### Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
1PS1.....-Z		Frame size															
		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection</b>																	
Design with reduced starting current – factory clarification required (type test may be necessary), ETO option (Engineer To Order) without order code	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Special design according to load curve of driven machine or customer requirements – factory clarification required and maybe type test needed, ETO option without order code	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Adjustment of rating in response to customer requirements – factory clarification required and maybe type test needed, ETO option without order code	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	<b>A11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	<b>A12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 3 PTC thermistors for tripping as sole protection on converter (TMS)	<b>A15</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping as sole protection on converter (TMS)	<b>A16</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of embedded KTY84-130 temperature sensor	<b>A23</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of 2 × embedded KTY84-130 temperature sensors	<b>A25</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monitoring of winding temperature using 3 Pt100 resistance thermometers – 2-wire from element and terminal box; for round-wire windings only	<b>A60</b>	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Monitoring of winding temperature using 2 × 3 Pt100 resistance thermometers – 2-wire from element and terminal box; for round-wire windings only	<b>A61</b>	–	–	–	–	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓
3 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	<b>A63</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	<b>A64</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A65</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers with surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A66</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design without surge arrester for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A67</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design to Ex i with surge arresters for 3- and 4-wire connection from terminal box – for pre-formed coil winding only	<b>Q40</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓



## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
<b>1PS1.....-Z</b>		Frame size															
		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection (continued)</b>																	
2 Pt100 double resistance thermometers in shielded design (Ex i) for roller bearing or sleeve bearing	<b>V80</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Winding Pt100 in 3- or 4-wire type from sensor instead of from terminal (not Ex i Pt100!)	<b>Q43</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing Pt100 in 3- or 4-wire type from sensor instead of from terminal – optionally possible for <b>V80, A40, A42</b>	<b>Q44</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
One thermocouple per bearing	<b>Q49</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for housing vibration monitoring (preferred brand), with loose cable – for each sensor	<b>V14</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for housing vibration monitoring (preferred brand), without terminal box – for each sensor	<b>V15</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
3 transmitters, 4 to 20 mA for Pt100 winding	<b>P20</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
1 transmitter with digital display with Ex d or Ex i approval	<b>V88</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pt100 winding in tolerance class A with calibration certificate	<b>V78</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Site altitude max. 1500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D06</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 2000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D07</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 2500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D08</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 3000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 45 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 50 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
<b>1PS1.....-Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection (continued)</b>																	
Cooling air temperature max. 55 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 60 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D14</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coolant temperature below +40 °C with increased output – factory clarification required, not applicable for IE2.	<b>D18</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Utilization to temperature class 155 (F) with higher output – higher output on request, not applicable for IE2. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>C12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Rated output of the lower output level – IEC output levels are maintained, only in combination with <b>D06</b> to <b>D18</b> . No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>C29</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Temperature class F	<b>W00</b>	–	–	–	–	–	–	–	–	–	–	–	–	○	○	○	○
Temperature class H	<b>W01</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–
Special insulation for increased voltage load in converter-fed operation (phase/phase 2250 V <sub>Peak</sub> /derating) – for LOHER CHEMSTAR at 8th position of the Article No. = 2	<sup>1)</sup>	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sealing of winding overhangs with silicone rubber	<b>W03</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Sealing of cable duct with silicone rubber	<b>W04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Efficiency according to efficiency class IE3 (Premium Efficiency) – factory clarification required	<b>D25</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–
Non-standard voltage and/or frequency for separate fan motor	<b>Y81 •</b> and identification code	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Other special electrical designs/configurations		O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
<b>Colors and paint finish</b>																	
Internal corrosion protection system J08	<b>W10</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Coating system N08 – 110 µm (C3 medium) – corrosion resistance acc. to EN/ISO 12944-5 = C3	<b>V09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>V10</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14A (chemical industry + onshore, C5 industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>W14</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–

2

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
		Frame size															
<b>1PS1.....-Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Colors and paint finish (continued)</b>																	
Special prime coat system Z05 with internal corrosion protection system J08	<b>W15</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) – sea climate	<b>V11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Increased layer thickness 275 µm for coating system Z21 (C5M-high) – only in combination with <b>V11</b> – corrosion resistance acc. to EN/ISO 12944-5 = C5 high (> 15 years) – sea climate	<b>V19</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special offshore paint finish S13 with reference to NORSOK M501 (C5M-high) with comments and deviations – corrosion resistance acc. to EN/ISO 12944-5 = C5 high (> 15 years) – sea climate	<b>V12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special coating system S11/J08 (e.g. submerged motors)	<b>V13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted, only primed	<b>K24</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Unpainted	<b>K23</b>	○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
Outer coating 110 µm for zinc-galvanized noise cabinet – <b>V98</b> = Outer coating 110 µm for zinc-galvanized noise cabinet	<b>V98</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Special colors according to Munsell or British Standard	<b>Y50 •</b> and identification code	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Standard paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002	<b>Y53 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002 – (specify special coating system in addition, e.g. <b>V10</b> , <b>V11</b> , <b>W14</b> , etc.)	<b>Y54 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RAL colors, other than those offered above	<b>Y51 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special non-RAL colors	<b>Y71 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Other paint combinations/systems or RAL colors to customer specification		O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
<b>Design for Zones according to ATEX</b>																	
Ex nA II T3 (Zone 2) design according to IEC 60079-15 for converter-fed operation – system test on original converter	<b>M73</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Design for Zone 21 (conductive dust) for mains-fed operation	<b>M34</b>	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design for Zone 21 (conductive dust) for converter-fed operation	<b>M38</b>	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 22 for mains-fed operation, no hybrid certification – non-conductive dust	<b>W20</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 21 for converter-fed operation, no hybrid certification – non-conductive and conductive dust	<b>W21</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design in double protection additionally for dust, Zone 22 for converter-fed operation, no hybrid certification – non-conductive dust, select options for converter-fed operation separately	<b>W22</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Special versions

Special versions	Additional identification code -Z with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
1PS1.....-Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Design for Zones according to ATEX (continued)</b>																	
Design in double protection additionally for dust; Zone 21 for converter-fed operation; no hybrid certification – select options for converter-fed operation separately	<b>W23</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
<b>Ship design "Operation below deck"</b>																	
Design acc. to GL (Germanischer Lloyd), CT 45 °C with manufacturer's declaration – non essential	<b>W24</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration – non essential	<b>W25</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 50 °C with manufacturer's declaration – non essential	<b>W26</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration – non essential	<b>W27</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration – non essential	<b>W28</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Novale), CT 50 °C with manufacturer's declaration – non essential	<b>W29</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Other certifications, motors for upper deck mounting and acceptance tests to classification – factory clarification required	<b>W99</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Design acc. to GL (Germanischer Lloyd), CT 45 °C, essential drive <sup>1)</sup>	<b>Q60</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q61</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q62</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q63</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q64</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to RINa (Registro Italiano Novale), CT 50 °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q65</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to CCS (China) CT 45 °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q66</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to USSR (Russia) CT xx °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q67</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to PR (Poland) CT xx °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q68</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Design acc. to NKK (Japan) CT xx °C with manufacturer's declaration, essential drive <sup>1)</sup>	<b>Q69</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
<b>Individual certifications</b>																	
Coolant temperature in temperature range -50 to +40 °C – roller bearing design	<b>D02</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Coolant temperature in temperature range -40 to +40 °C – roller bearing design	<b>D03</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Coolant temperature in temperature range -30 to +40 °C – roller bearing design	<b>D04</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Electrical design according to NEMA MG1-12	<b>D30</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
<b>1PS1.....-Z</b>		Frame size															
		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Individual certifications (continued)</b>																	
China Energy Efficiency Label	<b>D34</b>	○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
Certification acc. to NEPSI – design may differ (different cover size)	<b>D32</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Certificate EAC for Eurasian Customs Union	<b>D35</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC Ex certificate	<b>D37</b>	○	○	○	○	○	○	○	○	○	○	○	○	✓	✓	✓	✓
<b>Special mechanical designs</b>																	
Terminal box on right-hand side (view onto DE)	<b>K09</b>	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Terminal box on left-hand side (view onto DE)	<b>K10</b>	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○
Terminal box on top	<b>K11</b>	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○
Terminal box to IP65	<b>Q71</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Cable entry thread metrically different from standard – thread dimension must be specified	<b>W30</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Enlarged connection system for main terminal box – not in combination with <b>K53</b> (Ex d terminal box)	<b>L00</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Undrilled cable gland plate – for main terminal box	<b>L01</b>	–	–	–	–	–	–	–	–	–	–	–	–	□	□	□	□
Split terminal box	<b>W31</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
NPT thread – specify size in plain text, gland cannot be supplied	<b>W32</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Cable gland, standard – one cable gland for supply cable in the main terminal box, non-armored cable	<b>K54</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Cable gland, standard thread size for auxiliary connection (1 unit) – for connection cable of accessories in main or auxiliary terminal box	<b>W33</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Main terminal with tinned cable lug for copper cable	<b>W34</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Saddle terminal for connection without cable lug	<b>W35</b>	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Special cable gland – special sizes or armored cable, exact cable data needed	<b>Y97 •</b> and identification code	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Material of auxiliary terminal box: Stainless steel – not in combination with <b>K53</b> (Ex d terminal box)	<b>M51</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Separate auxiliary terminal box for anti-condensation heater	<b>M52</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Heater in main terminal box	<b>P84</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Auxiliary terminal box in cast-iron design with "undrilled" removable cable gland plate – not in combination with <b>K53</b> (Ex d terminal box)	<b>Q75</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Auxiliary terminal box in cast-iron design with removable cable gland plate "drilled with metric thread and sealed with metal plug" – not in combination with <b>K53</b> (Ex d terminal box)	<b>Q76</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
<b>1PS1.....-Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Auxiliary terminal box Ex e/cast-iron – not in combination with <b>K53</b> (Ex d terminal box)	<b>W72</b>	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cable outlet radially without terminal box with 1 m free cable length (4- or 7-core)	<b>W38</b>	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Additional price for each additional meter of cable – only in combination with <b>W38</b>	<b>W39</b>	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Connection cable for accessories – only in combination with <b>W38</b> , length as power cable	<b>W40</b>	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Additional separately supplied terminal box made of cast-iron with baseplate – main terminal box certified acc. to Ex e	<b>W41</b>	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Cable entry from DE	<b>K83</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Cable entry from NDE	<b>K84</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Rotation of the terminal box by 180°	<b>K85</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vibration quantity level A – IEC 60034-14	<b>K01</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Vibration quantity level B – IEC 60034-14 – for converter-fed operation only at lowest and highest speed of speed range	<b>K02</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft and flange with increased accuracy according to DIN 42955-R	<b>K04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Radial sealing ring at DE for horizontal flange-mounting types (DE oil-tight)	<b>K17</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Radial sealing ring at DE for vertical flange-mounting types (DE oil-tight)	<b>W43</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Labyrinth sealing for external bearing seal	<b>W44</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	□	□	□	□
Bearing for increased cantilever forces (roller bearing DE) with regreasing device – comprising <b>K40</b>	<b>K20</b>	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Bearings for increased axial forces	<b>V20</b>	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Regreasing device DE/NDE	<b>K40</b>	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Grease-collecting chamber if regreasing is applied	<b>W45</b>	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bearing insulation NDE for roller bearings – binding for frame sizes 315 to 500 for converter-fed operation	<b>L27</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓
Shaft grounding device – up to -20 °C only	<b>V36</b>	–	–	–	–	–	–	–	–	–	–	–	–	O.R.	O.R.	O.R.	O.R.
Located bearing DE	<b>K94</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Located bearing NDE	<b>L04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special grease Klüber Staburags NBU8EP – ETO option (Engineer To Order) without order code	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special grease Klüber Isoflex SL2 – ETO option (Engineer To Order) without order code	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special grease Barierta L55/2 – ETO option (Engineer To Order) without order code	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other special grease – ETO option (Engineer To Order) without order code	–	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Pt100 bearing in tolerance class A with calibration certificate – only in combination with <b>Q44</b>	<b>V76</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Sensor for housing vibration monitoring Bently Nevada Accelerometers plus separate terminal box – for each sensor	<b>V16</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
<b>1PS1.....-Z</b>		Frame size															
		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Bearing ventilation at DE for lower bearing temperature for roller bearing design grease-lubricated	<b>V17</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing insulation at both ends for roller bearing design motors (DE linked to ground) – for horizontal mounting only (vertical mounting on request)	<b>V18</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Grease extractors for DE and NDE	<b>V21</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓
Automatic grease lubricator at DE and NDE (permissible temperature range from -15 to +50 °C)	<b>V22</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Enlarged spent grease chamber at DE and NDE	<b>V25</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
External grounding (additionally)	<b>W46</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
VIK design – including <b>W14, W69</b>	<b>K30</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
LOHER CHEMSTAR Plus design, including VIK design – including <b>K30, K51, W14, W69</b> and IP66 bearing seal, vibration quantity level as grade B	<b>W09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Second rating plate, supplied loose	<b>K31</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second rating plate installed in terminal box	<b>W47</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate for customer data (each plate) – data must be specified as text in the order	<b>Y82 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rating plates made of stainless steel	<b>W48</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rating plates in languages other than English or German – main rating plate or extra rating plates O.R. factory clarification required	<b>W49</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional measures for 2 to 4 years storage in accordance with storage regulations	<b>W50</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 230 V	<b>K45</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater 115 V	<b>K46</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater rated voltage range 110 to 120 V (min. 100 V, max. 132 V) Ex e II T3	<b>M14</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater rated voltage range 220 to 240 V (min. 200 V, max. 264 V) Ex e II T3	<b>M15</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Anti-condensation heater 208 to 254 V – 1-phase (self-limiting for Ex e, Ex n)	<b>W88</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Heater with thermostat (e.g. Elmess)	<b>V75</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
Second standard shaft extension – for 100 % torque	<b>K16</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Non-standard cylindrical shaft extension (standard diameter or smaller) – in case of significantly different diameters, especially high-pole motors due to the maximum permissible torque stress, factory clarification required	<b>Y55 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft of material 1.7225	<b>W51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Shaft of material 1.4021	<b>W52</b>	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
		Frame size															
<b>1PS1.....-Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Shaft end of stainless steel butt-welded (material 1.4571)	<b>W53</b>	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-	-
Shaft made of special steel – for increased torque loading, e.g. 1.7225-42CrMo4	<b>L72</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Welded standard stator housing for surface-cooled motors – factory clarification required because of possible dimension deviations	<b>W54</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	□	□	□	□
Welded copper bar rotors	<b>W55</b>	-	-	-	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
Second shaft extension for IM B3 up to 100 % $T_{rated}$ ; cylindrical with feather key	<b>Q21</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Special rotor for heavy duty starting (e.g. double-cage rotor or brass rotor) – testing needed	<b>Q22</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Generator design (asynchronous) with 1.8 times runaway speed	<b>W56</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IP56 degree of protection	<b>K51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
IP65 degree of protection	<b>K50</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP66 degree of protection	<b>L94</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
IP67 degree of protection	<b>K93</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
IP67 degree of protection without level switch (resin material for terminal box protection will be shipped as extra package, 8 m submerged, 72 h max.)	<b>W58</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Condensation drainage holes sealed with screw	<b>W60</b>	-	-	-	-	□	□	□	□	□	□	□	□	✓	✓	✓	✓
Increased tropicalization, humidity ≥ 80 % – LOHER CHEMSTAR incl. <b>V10</b> and <b>W71</b> , LOHER VARIO incl. <b>V10</b> and <b>P45</b>	<b>W61</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tropical design for outdoor onshore installation	<b>L28</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design without fan and fan cover – motor mounted in air stream of driven fan; without external air stream cooling, due to derating	<b>W62</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
Fan with plastic coating in case of metal fan	<b>W63</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan of aluminum	<b>W64</b>	✓	✓	✓	✓	✓	✓	✓	✓	-	-	□	-	-	-	-	-
Fan of steel	<b>W65</b>	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
External fan of brass	<b>W66</b>	O.R.	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External fan of stainless steel	<b>V94</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Special ventilation for on-deck motors	<b>W67</b>	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan cover of steel sheet (3 mm thick)	<b>W68</b>	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Galvanized fan cover – included in <b>K30</b> and <b>W09</b>	<b>W69</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Noise class 3 for clockwise direction of rotation viewed onto DE – for 2-pole motors only	<b>K37</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Noise class 3 for counter-clockwise direction of rotation viewed onto DE – for 2-pole motors only	<b>K38</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Clockwise – direction of rotation must be specified for LOHER VARIO 2-/4-pole motors	<b>K97</b>	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○
Counter-clockwise – direction of rotation must be specified for LOHER VARIO 2-/4-pole motors	<b>K98</b>	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○
Noise reduction: Silencer for air inlet (DW, NMA) – only in combination with <b>K97</b> or <b>K98</b>	<b>L20</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Stainless steel grid for air inlet silencer – only in combination with <b>L20</b>	<b>L25</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓



## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																
		LOHER CHEMSTAR												LOHER VARIO				
<b>1PS1.....-Z</b>		Frame size																
		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
<b>Special mechanical designs (continued)</b>																		
Noise cabinet with inspection door – zinc-galvanized, unpainted – noise reduction approx. 15 dB(A) based on GG1	<b>V32</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Operation in both directions of rotation – for LOHER VARIO (frame sizes 355 to 500) 2-/4-pole increased noise values and possible derating	<b>K99</b>	□	□	□	□	□	□	□	□	□	□	□	○	✓	✓	✓	O.R.	
Higher number of starts (up to 3000 starts per year) – factory testing is necessary	<b>Q23</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	
Full-key balancing	<b>L68</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Support ring for coupling guard	<b>L15</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Fitting of coupling halves (customer-supplied, finish-machined and balanced) – supplied 4 weeks ahead of testing date	<b>L17</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓	
Motor mounting material: bolts for mounting on steel foundation with shims (V2A), taper pins	<b>L31</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Motor mounting material: T-head bolts, anchor sleeves and soleplates for mounting on concrete foundation	<b>L33</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Half-key balancing	<b>L69</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	
Heavy duty bearing design for extreme cantilever forces	<b>L96</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Stainless steel screws and plates	<b>W71</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Stainless steel external bolts	<b>P45</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Ambient temperatures down to -40 °C; preheating before operation necessary	<b>W73</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Ambient temperatures down to -40 °C; preheating before operation necessary (factory clarification required)	<b>W77</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	
Ambient temperatures down to -60 °C; preheating before operation necessary – factory clarification required	<b>W78</b>	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	
Ambient temperatures down to -40 °C Ex nA II and Ex e II; no preheating before operation	<b>W79</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Mounting of rotary pulse encoder, 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version	<b>W96</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Ambient temperatures down to -55 °C; no preheating before operation	<b>W98</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Mounting of rotary pulse encoder Ex version (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version	<b>V72</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Mounting of rotary pulse encoder Ex version with integrated shaft grounding (preferred brand) – 1024 pulses per revolution -10 to 30 V, HTL level – explosion-proof version; up to 20 °C; select bearing insulation separately	<b>V77</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	
Mechanical protection for rotary pulse encoder	<b>M68</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Mounted axial forced ventilation – forced ventilation should preferably be specified in the 10th position of the Article No.	<b>G17</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
<b>1PS1.....-Z</b>		Frame size															
		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Mounted radial forced ventilation	<b>W81</b>	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	-	-	-
Forced ventilation at NDE	<b>V28</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Backstop for clockwise direction of rotation viewed onto DE (counter-clockwise blocked)	<b>G48</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Backstop for counter-clockwise direction of rotation viewed onto DE (clockwise blocked)	<b>G49</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tapered shaft extension with shaft nut	<b>T36</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.
Sun canopy mounting in normal steel, cover in unpainted stainless steel for vertical motors	<b>V87</b>	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Sun canopy mounting in normal steel, cover in unpainted stainless steel for horizontal motors	<b>V99</b>	-	-	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Preparation for SPM bearing monitoring, only M8 drilled hole for measuring nipple	<b>W84</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Machined surface on motor foot with dowel pin holes	<b>Q94</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Base frame for height adaptation of max. 2 frame sizes difference	<b>Q96</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Adaptation of foot and shaft dimensions to next higher frame size (no adaptation of terminal box!)	<b>Q97</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Adaptation of flange dimensions and drilled holes in flange	<b>Q98</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
Preparation for later installation of sun protection shield	<b>Q99</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
SPM bearing monitoring: Measuring nipple system 32 - thread M8, DE and NDE	<b>G50</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shock pulse measurement (SPM), fixed sensor and distribution box	<b>H05</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
SPM bearing monitoring: Fixed sensor system 40 thread M8	<b>W85</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Bearing temperature monitoring with PTC thermistors at DE/NDE	<b>W86</b>	-	-	-	-	O.R.	O.R.	✓	✓	✓	✓	✓	✓	✓	-	-	-
Speed monitoring by inductive proximity switches, Pepperl + Fuchs	<b>A03</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
2 Pt100 resistance thermometers for 3- or 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	<b>A40</b>	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
2 Pt100 double resistance thermometers for 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	<b>A42</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers for roller bearings and sleeve bearings with meter unit without contacts	<b>A70</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers for roller bearings and sleeve bearings with meter unit on stator housing and 2 NO contacts	<b>A71</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR												LOHER VARIO			
		Frame size															
<b>1PS1.....-Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Bearing temperature monitoring with 1 × Pt100 per bearing in 2-wire connection	<b>A72</b>	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-
One dial-type thermometer with 2 contacts, capillary principle – Ex i design without supply unit!	<b>V89</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Engraved tag plate fixed on terminal box	<b>V96</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
4 mm shims, stainless-steel base (V4A/AISI 316) – not laminated	<b>Q92</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
4 mm shims, brass base – not laminated	<b>V31</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Slotted feet holes	<b>Q95</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pre-formed coil for LV motors	<b>V01</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.R.	O.R.	O.R.	O.R.
2 metal test sheets (100 × 150 mm) with paint layer for special acceptance test	<b>V08</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Impact protection – for built-on devices, per device	<b>M81</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
"High-speed motors" for speed range 3600 < n ≤ 6000 rpm – factory clarification required; torque characteristic and cutoff frequency affect the design	<b>W87</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	✓	✓	✓	✓
"High-speed motors" for speed range > 6000 rpm – factory clarification required; torque characteristic and cutoff frequency affect the design; ETO option (Engineer To Order) without order code	-	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Retrofit (description of special design separately) – adaptation to an existing motor	<b>B15</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
<b>Extension of the liability for defects</b>																	
Extension of the liability for defects by 12 months to a total of 24 months from delivery	<b>Q80</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 18 months to a total of 30 months from delivery	<b>Q81</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 24 months to a total of 36 months from delivery	<b>Q82</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 30 months to a total of 42 months from delivery	<b>Q83</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 36 months to a total of 48 months from delivery	<b>Q84</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extension of the liability for defects by 48 months to a total of 60 months from delivery	<b>Q85</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. Possible on request
- Not possible

1) Coding in 8th position of the article number, for LOHER CHEMSTAR = 2.

# Motors with Explosion Protection

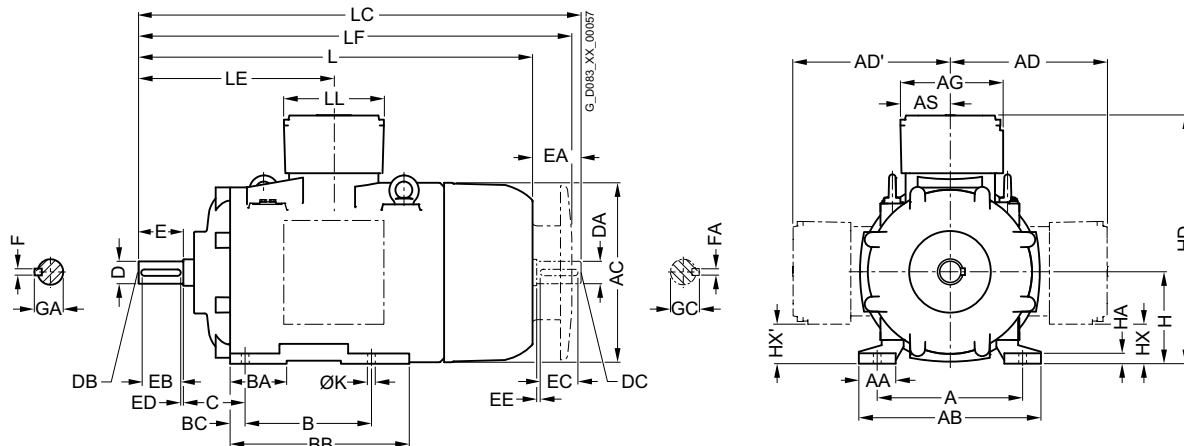
LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 90 L to 250 M

## Dimensional drawings

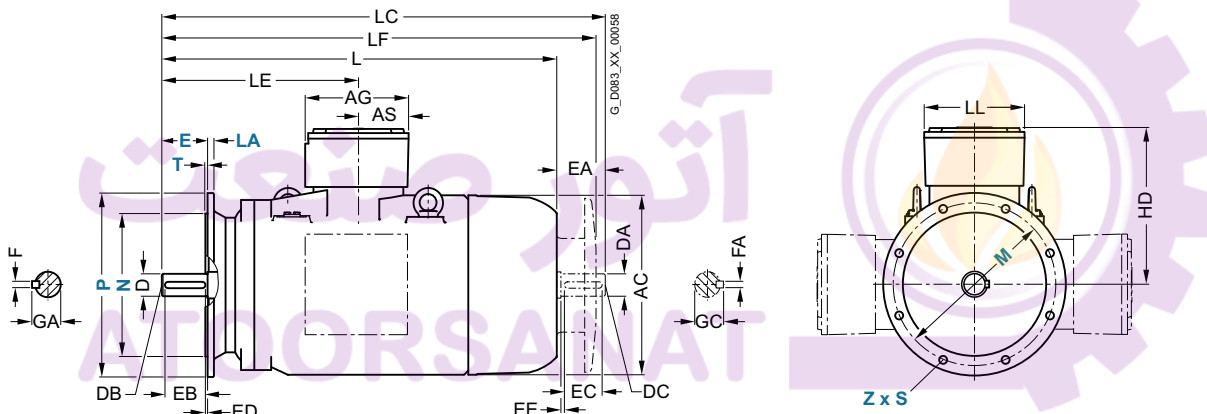
### Type of construction IM B3

For flange dimensions, see Page 2/110.



### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/110.



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER CHEMSTAR</b>																		
90 L	2 ... 16	140	40	180	186	-	138	69	125	62	155	15	56	90	13	303	10	426
100 L	2 ... 16	160	40	205	213	-	138	69	140	45	170	15	63	100	18	327	12	482
112 M	2 ... 16	190	45	240	237	-	138	69	140	45	170	18	70	112	18	352	12	465
132 S	2 ... 16	216	50	260	278	274	186	92	140	92	228	25	89	132	18	406	12	574
132 M	2 ... 16	216	50	260	278	274	186	92	178	92	228	25	89	132	18	406	12	574
160 M	2 ... 16	254	60	310	331	305	186	92	210	60	307	21	108	160	27	465	15	786
160 L	2 ... 16	254	60	310	331	305	186	92	254	60	307	21	108	160	27	465	15	786
180 M	2 ... 16	279	70	349	364	349	254	123	241	99	359	24	121	180	19	529	15	822
180 L	2 ... 16	279	70	349	364	349	254	123	279	99	359	24	121	180	19	529	15	822
200 L	2 ... 16	318	80	400	404	367	254	123	305	120	425	32	133	200	25	569	19	884
225 S	2	356	90	446	451	384	254	123	286	136	438	34	149	225	26	609	19	966
	4 ... 16																	996
225 M	2	356	90	446	451	384	254	123	311	136	438	34	149	225	26	609	19	966
	4 ... 16																	996
250 M	2	406	100	505	489	522	382	176	349	110	420	35.5	168	250	35	772	25	1028
	4 ... 16					522												

# Motors with Explosion Protection

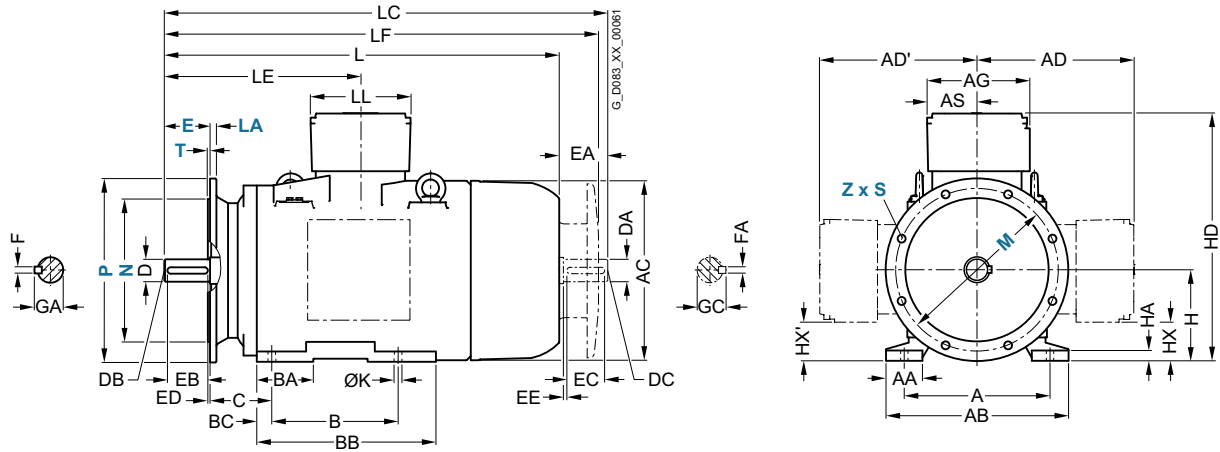
## LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 90 L to 250 M

### Dimensional drawings (continued)

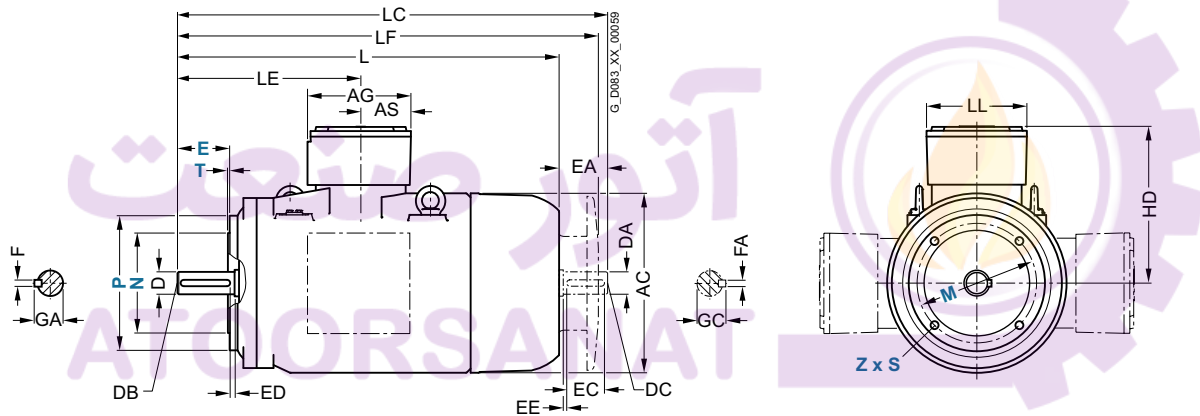
#### Type of construction IM B35

For flange dimensions, see Page 2/110.



#### Type of construction IM B14

For flange dimensions, see Page 2/110.



Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER CHEMSTAR</b>																			
90 L	2 ... 16	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27
100 L	2 ... 16	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
112 M	2 ... 16	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
132 S	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132 M	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160 M	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
160 L	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
180 M	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
180 L	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
200 L	2 ... 16	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	140		125	7.5	18	64	60	140		125	7.5	18	64	
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64
	4 ... 16				65							69	65						

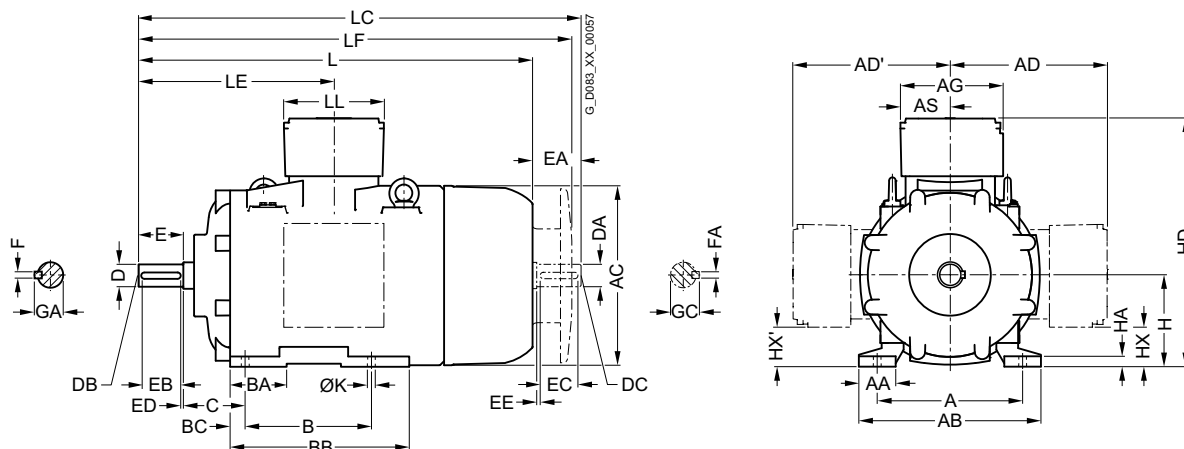
# Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 280 S to 355 L

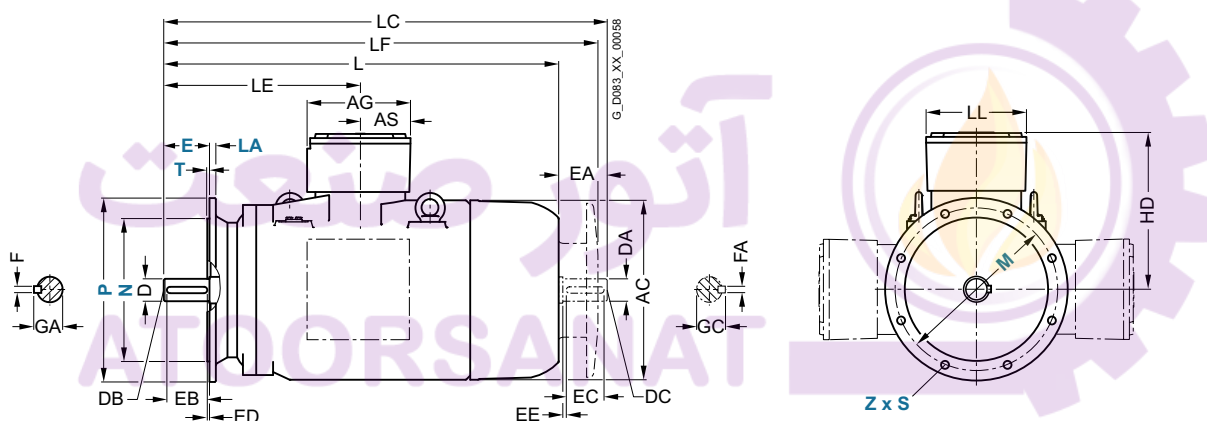
## Dimensional drawings (continued)

### Type of construction IM B3



### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/110.



Frame size	No. of poles	Dimension designation acc. to IEC																
		A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER CHEMSTAR</b>																		
280 S	2	457	110	570	550	552	382	176	368	120	520	51	190	280	40	768	26	1119
	4 ... 16																	
280 M	2	457	110	570	550	552	382	196	419	120	520	51	190	280	40	768	26	1119
	4 ... 16																	
315 S	2	508	125	630	622	660	509	196	406	165	575	59	216	315	40	955	28	1304
	4 ... 16																	1334
315 M	2	508	125	630	622	660	509	196	457	165	575	59	216	315	40	955	28	1304
	4 ... 16																	1334
315 LL	2	508	125	630	622	676	509	196	508	165	575	59	216	315	40	971	28	1491
	4 ... 16																	1521
315 L	2	508	125	630	622	676	509	196	560	165	575	59	216	315	40	971	28	1491
	4 ... 16																	1521
355 M	2	610	120	730	700	729			560	150	650	45	254	355	50	1084	30	1400
	4 ... 16																	1430
355 L	2	610	120	730	700	729			630	150	720	45	254	355	50	1084	30	1470
	4 ... 16																	1500

# Motors with Explosion Protection

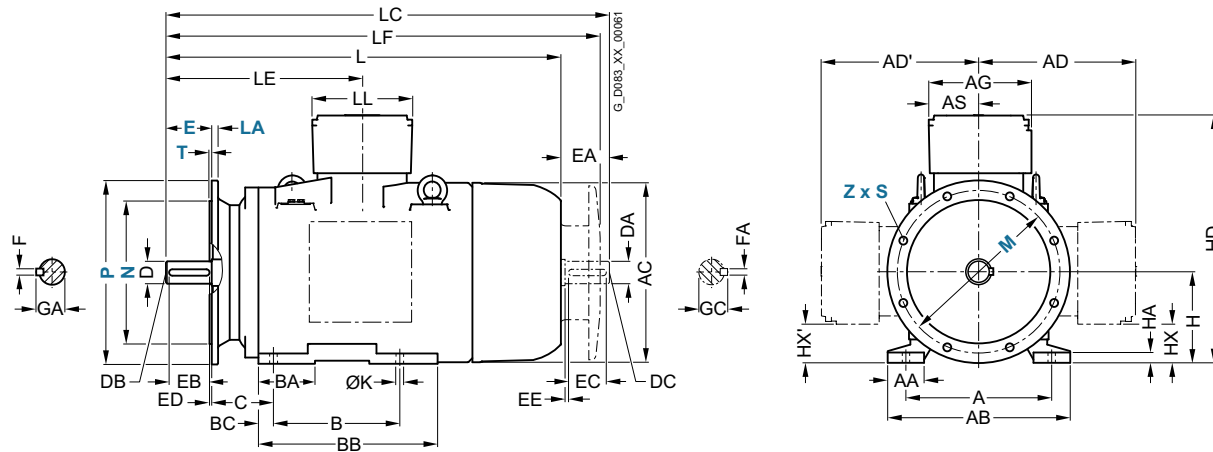
## LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 280 S to 355 L

### Dimensional drawings (continued)

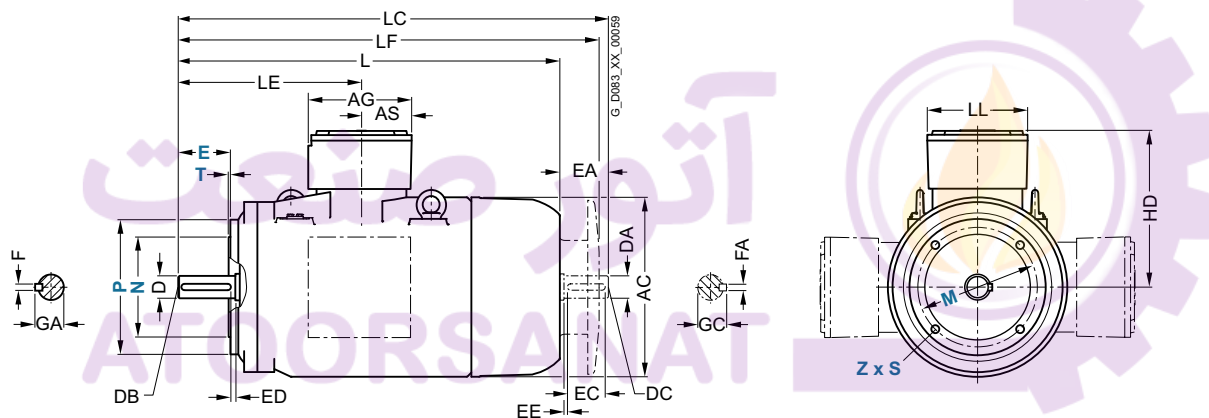
#### Type of construction IM B35

For flange dimensions, see Page 2/110.



#### Type of construction IM B14

For flange dimensions, see Page 2/110.



Frame size	No. of poles	Dimension designation acc. to IEC							DE shaft extension				NDE shaft extension						
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER CHEMSTAR</b>																			
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	79.5	80		170	140	15	22	79.5
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	85	80		170	140	15	22	85
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
355 M	2	1550	674	1563	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4 ... 16	1610	704	1593		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95
355 L	2	1620	709	1633	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4 ... 16	1680	739	1663		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95

## Motors with Explosion Protection

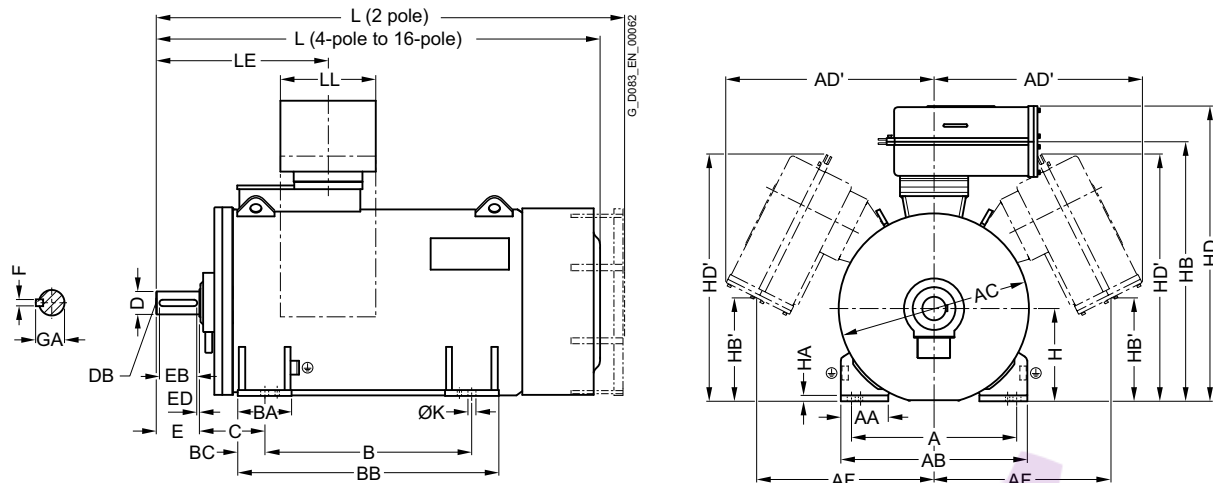
LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 355 L to 500 L

### Dimensional drawings (continued)

#### Type of construction IM B3

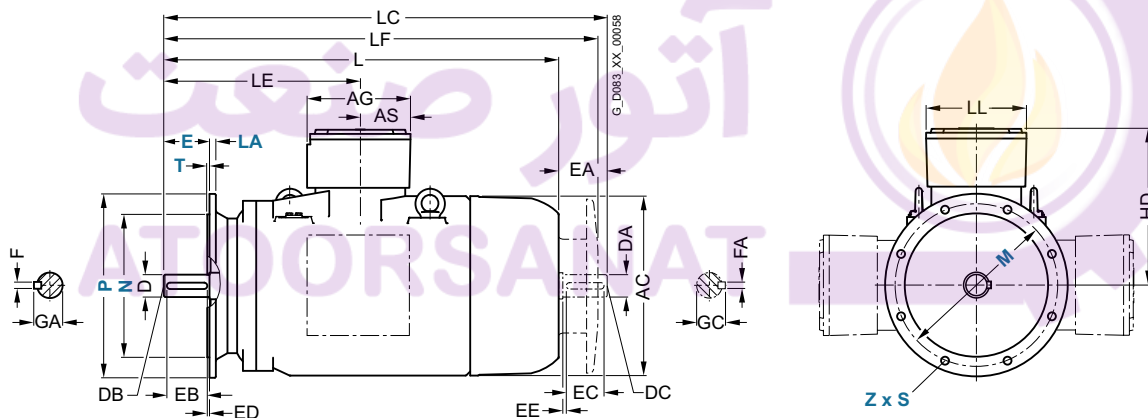
Design of terminal box and position for LOHER VARIO



#### Types of construction IM B5 and IM V1

For flange dimensions, see Page 2/110.

Design of terminal box and position for LOHER VARIO



Frame size	No. of poles	Dimension designation acc. to IEC																	
		A	AA	AB	AC	AD/AD'	AF	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER VARIO</b>																			
355 L	2	630	140	780	740	500			800	210	950		254	355	35	1190	33	1860	
	4 ... 16																	1890	
400 L	2	710	185	860	820	500			900	210	1090		280	400	30	1297	33	1975	
	4 ... 16																	2015	
450 L	2	800	230	900	920	500			1000	260	1260		315	450	30	1375	39	2095	
	4 ... 16																	2135	
500 L	2	900	220	1030	1015	500			1120	280	1400		335	500	40	1479	39	-	
	4 ... 16																	2305	



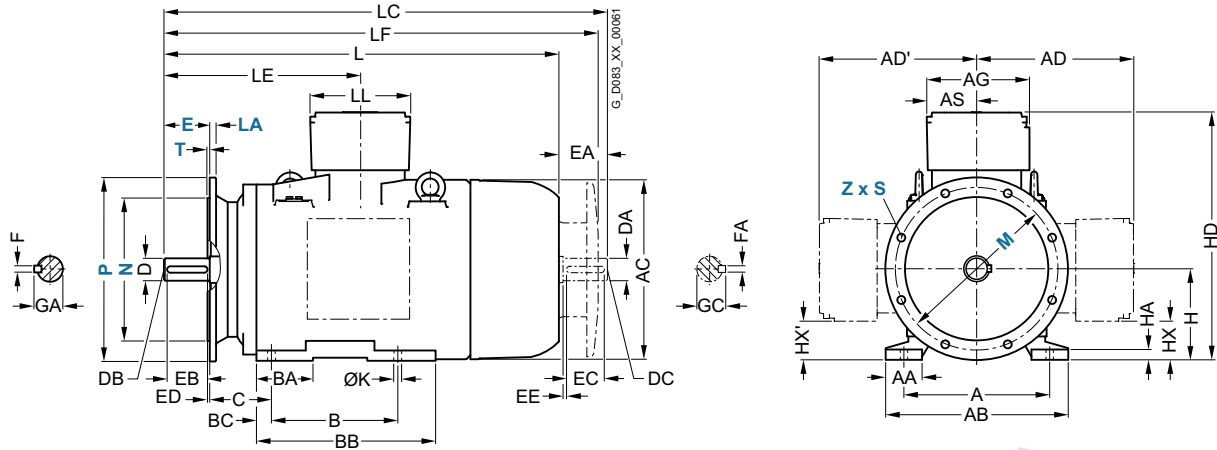
**Motors with Explosion Protection**  
LOHER CHEMSTAR and VARIO 1PS1 motor series

Dimensions for frame sizes 355 L to 500 L

**Dimensional drawings** (continued)

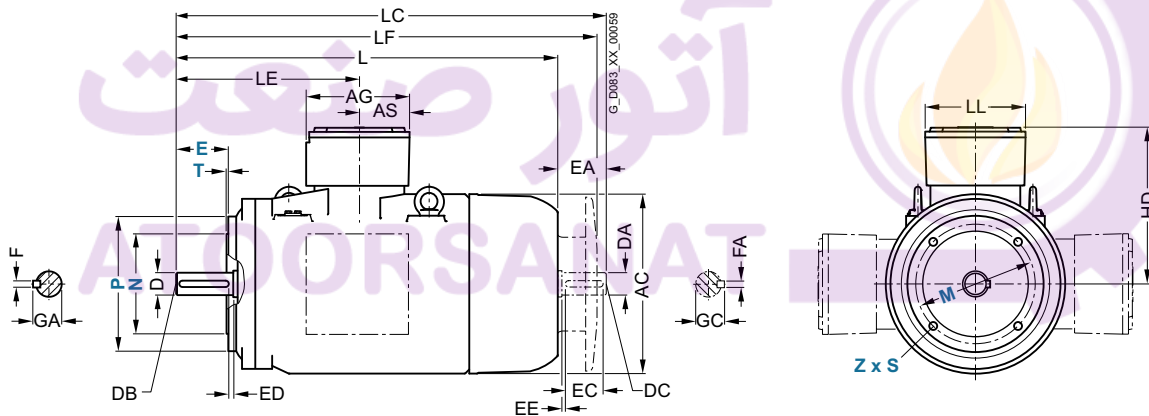
**Type of construction IM B35**

For flange dimensions, see Page 2/110.  
Design of terminal box and position for LOHER VARIO



**Type of construction IM B14**

For flange dimensions, see Page 2/110.  
Design of terminal box and position for LOHER VARIO



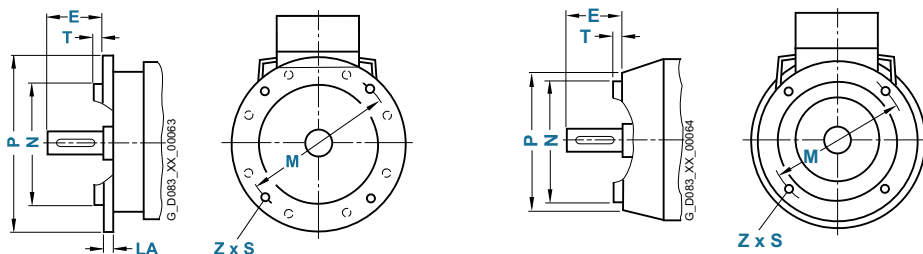
Frame size	No. of poles	Dimension designation acc. to IEC					DE shaft extension					NDE shaft extension							
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER VARIO</b>																			
355 L	2		657			75	M20	140			20	79.5	75	M20	140			20	79.5
	4 ... 16		687			90	M24	170			25	95	90	M24	170			25	95
400 L	2		695			80	M20	170			22	85	80	M20	170			22	85
	4 ... 16		732			100	M24	210			28	106	100	M24	210			28	106
450 L	2		707			85	M20	170			22	90	85	M20	170			22	90
	4 ... 16		747			110	M24	210			28	116	110	M24	210			28	116
500 L	2		-			-	-	-			-	-	-	-	-			-	-
	4 ... 16		747			120	M24	210			32	127	120	M24	210			32	127

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

### Flange dimensions

#### Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes.  
(Z = the number of retaining holes)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
<b>LOHER CHEMSTAR</b>										
<b>90 L</b>	2 ... 16	<b>FF165</b>	10	50	165	130	200	11.5	3.5	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<b>FT115</b>	15	50	115	95	140	M8	3	4
		<i>FT100<sup>1)</sup></i>	8	–	100	80	120	M6	3	4
<b>100 L</b>	2 ... 16	<i>FT130<sup>1)</sup></i>	10	–	130	110	160	M8	3.5	4
		<b>FF215</b>	11	60	215	180	250	14	4	4
		<b>FT130</b>	11	60	130	110	160	M8	3.5	4
		<i>FT115<sup>1)</sup></i>	10	–	115	95	140	M8	3	4
<b>112 M</b>	2 ... 16	<i>FT130<sup>1)</sup></i>	12	–	165	130	200	M10	3.5	4
		<b>FF215</b>	11	60	215	180	250	14	4	4
		<i>FT165<sup>1)</sup></i>	13	–	265	230	300	14	4	4
		<b>FT130</b>	11	60	130	110	160	M8	3.5	4
<b>132 S</b>	2 ... 16	<i>FT165<sup>1)</sup></i>	12	–	165	130	200	M10	3.5	4
		<b>FF265</b>	12	80	265	230	300	14	4	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<b>FF265</b>	12	80	265	230	300	14	4	4
<b>132 M</b>	2 ... 16	<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<b>FF300</b>	20	110	300	250	350	18	5	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
<b>160 M</b>	2 ... 16	<b>FF300</b>	20	110	300	250	350	18	5	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<b>FF300</b>	20	110	300	250	350	18	5	4
<b>160 L</b>	2 ... 16	<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<b>FF300</b>	13	110	300	250	350	18	5	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
<b>180 M</b>	2 ... 16	<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
		<b>FF300</b>	13	110	300	250	350	18	5	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
<b>180 L</b>	2 ... 16	<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
		<b>FF350</b>	15	110	350	300	400	18	5	8
		<i>FF300<sup>1)</sup></i>	15	–	300	250	350	18	5	4
<b>200 L</b>	2 ... 16	<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
		<b>FF400</b>	17	140	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
<b>225 S</b>	2	<b>FF400</b>	16	110	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
	4 ... 16	<b>FF400</b>	17	140	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8

<sup>1)</sup> Flange is selectable at no additional cost.

## Motors with Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS1 motor series

#### Flange dimensions

#### Dimensional drawings (continued)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
<b>LOHER CHEMSTAR (continued)</b>										
<b>225 M</b>	2	<b>FF400</b>	16	110	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
	4 ... 16	<b>FF400</b>	16	140	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
<b>250 M</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
<b>280 S</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400<sup>1)</sup></i>	22	–	400	350	450	18	5	8
<b>280 M</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400<sup>1)</sup></i>	22	–	400	350	450	18	5	8
<b>315 S</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF500<sup>1)</sup></i>	22	–	500	450	550	18.5	5	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
		<i>FF500<sup>1)</sup></i>	22	–	500	450	550	18.5	5	8
<b>315 M</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF500<sup>1)</sup></i>	22	–	500	450	550	18.5	5	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
		<i>FF500<sup>1)</sup></i>	22	–	500	450	550	18.5	5	8
<b>315 LL</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF740<sup>1)</sup></i>	25	–	740	680	800	24	6	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
		<i>FF740<sup>1)</sup></i>	25	–	740	680	800	24	6	8
<b>315 L</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF740<sup>1)</sup></i>	25	–	740	680	800	24	6	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
		<i>FF740<sup>1)</sup></i>	25	–	740	680	800	24	6	8
<b>355 M</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			170						
<b>355 L</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			170						
<b>LOHER VARIO</b>										
<b>355 L</b>	2	<b>FF740</b>	25	140	740	680	800	22	6	8
	4 ... 16			170						
<b>400 L</b>	2	<b>FF940</b>	28	170	940	880	1000	22	6	8
	4 ... 16			210						
<b>450 L</b>	2	<b>FF1080</b>	30	170	1080	1000	1150	26	6	8
	4 ... 16			210						
<b>500 L</b>	2	<b>FF1180</b>	30	–	1180	1120	1250	26	7	8
	4 ... 16			210						

<sup>1)</sup> Flange is selectable at no additional cost.

## Motors with Explosion Protection

LOHER CHEMSTAR and VARIO 1PS1 motor series

Notes

2





آتور صنعت  
ATOORSANAT

3/2

**LOHER CHEMSTAR  
and VARIO 1PS0 motor series**

3/2 General information

3/2 Technical specifications

3/2 • LOHER CHEMSTAR and VARIO 1PS0  
motor series without explosion protection

3/3 • Mechanical design

3/6 • Electrical design

3/6 • Operation on a frequency converter

3/6 • Three-phase motors with external cables

3/6 • Motors with built-on backstop

3/7 Motors in cast-iron and steel

versions

3/7 Selection and ordering data

3/17 Pole-changing motors in cast-iron and  
steel versions

3/17 Selection and ordering data

3/22 Brake motors with High Efficiency IE2  
in cast-iron and steel versions

3/22 Selection and ordering data

3/23 Article No. supplements

3/23 Selection and ordering data

3/24 Special versions

3/24 Selection and ordering data

3/37 Dimensions for frame sizes 90 L to 250 M

3/37 Dimensional drawings

3/39 Dimensions for frame sizes 280 S to 355 L

3/39 Dimensional drawings

3/41 Dimensions for frame sizes 355 L to 500 L

3/41 Dimensional drawings

3/43 Flange dimensions

3/43 Dimensional drawings

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### General information

#### Technical specifications

##### *LOHER CHEMSTAR and VARIO 1PS0 motor series without explosion protection*

The motors of series 1PS0 without explosion protection are available as LOHER CHEMSTAR and VARIO motors. Motors that operate in a "safe" or "non-explosive" environment do not require any special mechanical and electrical protection against explosive gas, vapor or dust. There is no risk of explosion in this case. The CHEMSTAR motors can be mechanically designed in accordance with VIK specifications ("Verband der Industriellen Energie- und Kraftwirtschaft e. V.", the Association of the Industrial Energy and Power Industry). These motors therefore correspond mechanically to the VIK recommendation, they have no Ex marking and are not permitted to be used in potentially explosive atmospheres of Zone 2. VIK motors with Ex certification are available for selection in series 1PS1.

In general, these motors are suitable for applications in production plants or process engineering equipment in factories (conveyor belts, elevators and cranes, escalators and water pumps).

#### General technical specifications

LOHER CHEMSTAR and VARIO 1PS0 motors	
Motor type	A...A
Frame size	90 ... 500
Output range (50 Hz types)	0.37 ... 1400 kW (thermal utilization in accordance with temperature class B at ambient temperature = 40 °C)
Number of poles	2 to 12-pole, also higher number of poles for special versions Pole-changing: <ul style="list-style-type: none"> <li>• 2 speeds, e.g. 4-/2-pole, 8-/4-pole, 12-/6-pole</li> <li>• 3 speeds, e.g. 8-/4-/2-pole, 8-/6-/4-pole Dahlander or separate windings for square-law or constant torques</li> </ul>
Voltage range	Up to 1000 V
Rated voltage	Normal low voltage Non-standard voltage and/or frequency as required by the customer
Operating mode	S1 and others
Degree of protection	IP55, IP56 and IP65 to IP68
Cooling method	IC 411, IC 416, special cooling methods such as non-ventilated IC 410, IC 71W water-jacket-cooled
Type of construction	All common types of construction + special types of construction
Housing	Cast-iron or steel
Bearings	Roller bearings (standard) and special bearings for high axial and radial forces
Types of protection	None
Noise level	All motors are noise-optimized (noise values in accordance with EN 60034-9) low-noise version for 2-pole motors (GG3) is possible as an option

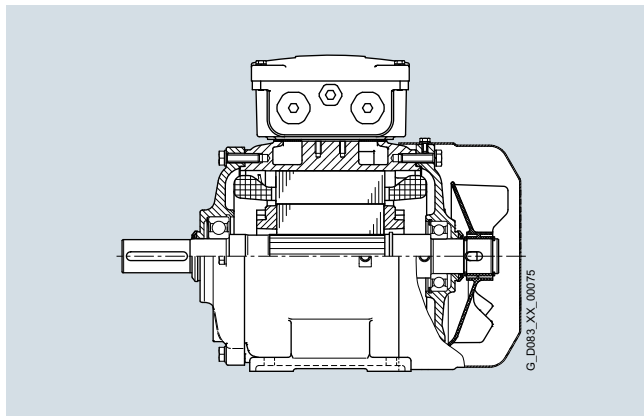
## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

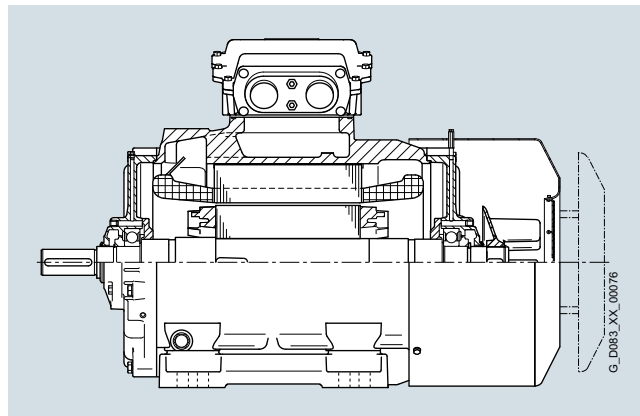
#### General information

#### Technical specifications (continued)

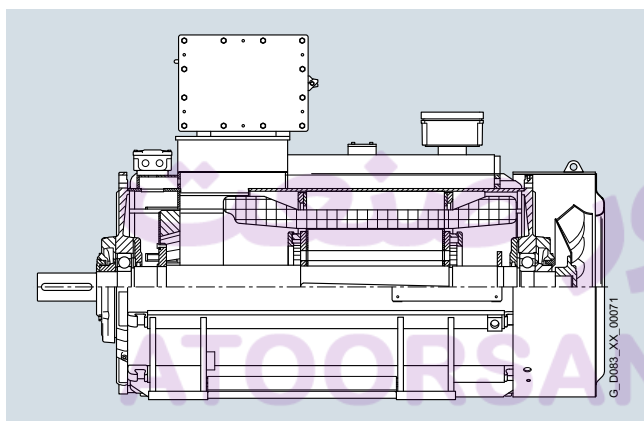
##### Mechanical design



Sectional view of CHEMSTAR 1PS0 three-phase motor, frame sizes 90 to 200 LB  
 Example: 1PS0132-0BD60-0AA3 (*motor type: ANGA-132SR-02*)  
 7.5 kW, 2-pole



Sectional view of CHEMSTAR 1PS0 three-phase motor, frame sizes 225 to 355  
 Example: 1PS0316-0BD60-0AA3 (*motor type: ANGA-315LL-02*)  
 200 kW, 2-pole



Sectional view of VARIO 1PS0 three-phase motor, frame sizes 355 to 500, with regreasing device  
 Example: 1PS0357-0BH0.-0AA2 (*motor type: ANSA-355LC-02*)  
 355 kW, 2-pole

#### Housing, ventilation

##### Housing and fan for motors of the LOHER CHEMSTAR and VARIO 1PS0 series

Frame size	Housing		Surface	Bearing plates	Fan cover	Fan <sup>2)</sup>
	Material	Design of housing feet <sup>1)</sup>				
<b>LOHER CHEMSTAR</b>						
90 ... 280	Cast-iron	Cast	With cooling fins	Cast-iron	Sheet steel	Plastic <sup>3)</sup>
315		Screwed on				Aluminum <sup>3)</sup>
355		Cast	Steel			
<b>LOHER VARIO</b>						
355 ... 450	Steel	Welded	With cooling fins	Cast-iron	Sheet steel	Steel
500 <sup>2)</sup>				Steel, bearing hub in cast-iron		

<sup>1)</sup> For designs with feet only.

<sup>2)</sup> Suitable for both directions of rotation, but LOHER VARIO 2- and 4-pole are only suitable for one direction of rotation.

<sup>3)</sup> For specific operating conditions, the external fans can be constructed in aluminum for frame sizes 90 to 225 and in sheet steel for frame sizes 250 to 315. This applies in the case of increased coolant temperature in particular and a high number of starts. The cooling air flow from NDE to DE must not be obstructed. The intake area in front of the fan cover must not be obstructed.

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### General information

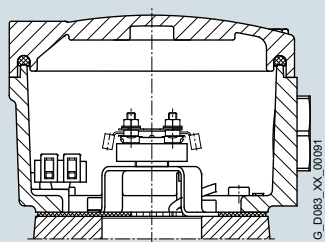
#### Technical specifications (continued)

##### Terminal boxes

The position of the terminal box and cable entries can be obtained from the tables below. The terminal boxes can be rotated by 90° which allows the incoming supply cable to be fed in from different sides.

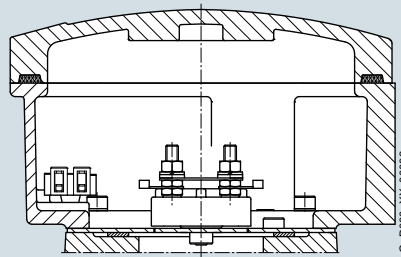
Monitoring devices or anti-condensation heaters are connected via auxiliary terminals in the terminal box. In frame size 132 and above, the auxiliary terminals can be installed in an auxiliary terminal box that is mounted on the side of the terminal box corresponding to the type of protection of the motor. The design of the terminal boxes can be seen in the schematic diagrams. The number and size of the main and auxiliary terminals as well as their characteristic data can be obtained from the tables below.

**Figure 1** Terminal box for LOHER CHEMSTAR frame sizes 90 to 112



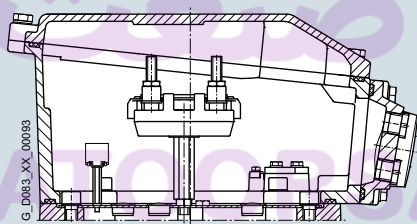
Auxiliary terminal box is not possible

**Figure 2** Terminal box for LOHER CHEMSTAR frame sizes 132 to 225



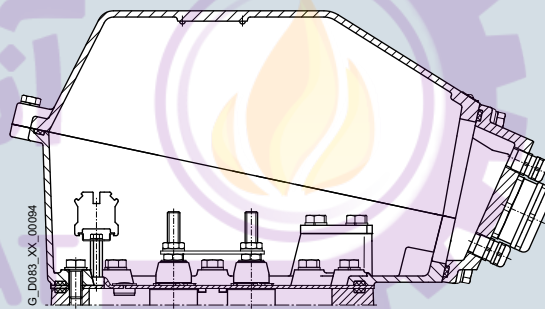
Frame sizes 132 to 160, 1 auxiliary terminal box (**M50**) is possible,  
 Frame sizes 180 to 225, 2 auxiliary terminal boxes (**M50**) are possible

**Figure 3** Terminal box for LOHER CHEMSTAR frame sizes 250 to 280



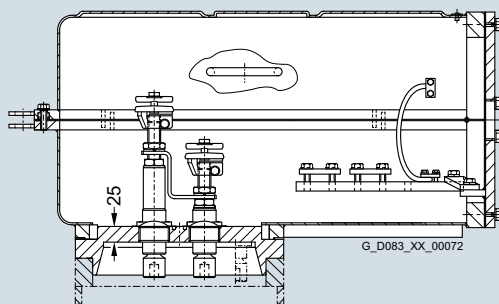
3 auxiliary terminal boxes (**M50**) are possible

**Figure 4** Terminal box for LOHER CHEMSTAR frame sizes 315 to 355



3 auxiliary terminal boxes (**M52**) are possible

**Figure 5** Terminal box for LOHER VARIO frame sizes 355 to 500



With the VARIO connection system, the auxiliary terminal boxes (max. 3) are mounted on the housing



## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### General information

#### Technical specifications (continued)

##### Terminal box for 1PS0 motors

Degree of protection: IP55

Type of protection: –

Housing material: Cast-iron

Frame size	Standard terminal box					Enlarged terminal box – Option <b>L00</b>					
	Terminal studs	Conductor cross-section		Auxiliary terminals in main terminal box	PE/ground connection	Fig. No. on Page 3/4	Terminal studs	Conductor cross-section		Fig. No. on Page 3/4	
		min.	max.	Number × max. cross-section <sup>1)</sup>	max.			min.	max.		
		mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>			mm <sup>2</sup>	mm <sup>2</sup>		
<b>LOHER CHEMSTAR</b>											
90	6 × M4	1	2.5 (6) <sup>2)</sup>	4 × 2.5	4	6 <sup>2)</sup>	<b>Fig. 1</b>	6 × M5	1	10 (25) <sup>2)</sup>	<b>Fig. 2</b>
100											
112											
132	6 × M5	1	10 (25) <sup>2)</sup>				<b>Fig. 2</b>	6 × M6	2.5	35 (50) <sup>2)</sup>	<b>Fig. 2</b>
160											
180	6 × M6	2.5	35 (50) <sup>2)</sup>	12 × 4	70		<b>Fig. 2</b>	6 × M10	6	70	<b>Fig. 3</b>
200											
225											
250	6 × M10	6 ... 70			95		<b>Fig. 3</b>	6 × M12	16	150	<b>Fig. 4</b>
280											
315 S/M	6 × M12	16 ... 150		16 × 4	150		<b>Fig. 4</b>	6 × M16	16	300	<b>Fig. 4</b>
315 L	6 × M16/M20 <sup>3)</sup>	16 ... 300						Special connection system on request			
<b>LOHER VARIO</b>											
355 ... 500							<b>Fig. 5</b>				

Number and size of entry thread and cable glands (to be ordered specially), see table "Cable glands for 1PS0 motors".

##### Cable glands for 1PS0 motors

Frame size	Standard cable glands <sup>4)</sup>		Cable diameter, type HSK-K <sup>7)</sup> mm	Max. entry thread <sup>5)</sup>	
	Entry thread <sup>6)</sup>			Metric	NPT <sup>8)</sup>
<b>LOHER CHEMSTAR</b>					
90	1 × M25 × 1.5		9 ... 16	1 × M25 × 1.5	2 × 1"
100	1 × M32 × 1.5		13 ... 20	1 × M32 × 1.5	
112	2 × M32 × 1.5			2 × M32 × 1.5	
132				2 × M40 × 1.5	2 × 1½"
160	2 × M40 × 1.5		22 ... 32		
180				2 × M63 × 1.5	2 × 2"
200	2 × M50 × 1.5		32 ... 38		
225					
250	2 × M63 × 1.5		37 ... 44		
280					
315 S/M					
315 L				2 × M100 × 1.5	2 × 3½"
355					
<b>LOHER VARIO</b>					
355 ... 500			9)		9)

Entry thread for PTC thermistor, heating:  
 $M20 \times 1.5/D = 6$  up to 12 mm

The entry threads are sealed on delivery with certified plugs. The terminal boxes will only be supplied with cable glands in accordance with the table if specially ordered. Special cable glands can be fitted on request.

- 1) Rated voltage/max. working voltage 400 V/440 V.
- 2) Maximum conductor cross-section with cable lug.
- 3) Alternatively, larger studs for higher rated current.
- 4) Materials used for standard gland: polyamide
- 5) Other threads, number and size on request.
- 6) Number and size of entry threads according to DIN 42925.
- 7) Cable glands suitable for the infeed of unshielded/non-reinforced cables and leads.
- 8) Cable glands for NPT thread on request.
- 9) Undrilled gland plate.

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### General information

#### Technical specifications (continued)

##### Electrical design

The outputs and electrical values listed in the selection tables can be changed by modifying the configurations. For example, if a copper cage rotor is used in place of a die-cast aluminum rotor, an even higher degree of efficiency can be achieved.

The insulation system (stator winding) and the connection system (terminal boxes, terminals) of this motor series are designed for rated voltages up to 1000 V.

The motors are equipped with 6 terminals. They can be operated in star or delta. The standard connection for all 400 V motors is delta connection. They are therefore suitable for 400 V $\Delta$ /690 VY and for Y- $\Delta$  starting at 400 V. The 500 V motors are available both for 500 VY and for 500 V $\Delta$ , provided that one of the two variants is not preferred for winding reasons.

Motors of the 1PS0 series are wound in accordance with temperature class F (155 °C). Thermal utilization is only according to class B (130 °C). For a fixed voltage motor, therefore, increased output of 12 % on average is possible for continuous duty at a coolant temperature of 40 °C without the need for prior consultation. To maintain the IE2 efficiency class, the rating plate will be stamped with temperature class B (130 °C) only. An increase in coolant temperature from 40 °C to 60 °C for rated output and full utilization of temperature class F (155 °C) is permissible. Exceptions, such as utilization of temperature class F at rated output and 40 °C coolant temperature, are indicated in the selection tables.

##### Operation on a frequency converter

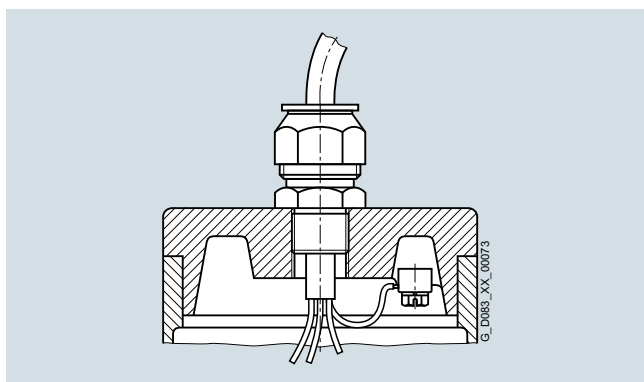
Most motors in this series can also be operated on frequency converters without any modifications to the electrical design, due to the use of "Overcoat" double-layer enameled wires and optimized impregnation techniques. On ordering, if it is known that the motor will be converter-fed, the motors will be equipped with 3 PTC thermistors with a rated shutdown temperature of 145 °C (KL145). The temperature sensors, in combination with specific parameter settings on the converter, perform sole thermal monitoring of the motor. Motor circuit breakers can be dispensed with. The PTC thermistors can be connected to the thermistor connections provided in the converter or to a trip unit.

##### Three-phase motors with external cables

Three-phase motors with externally routed connecting cables are used in machines or ventilation systems in which the electrical connections are routed via a separately mounted terminal box due to the space constraints.

##### Design

The motors correspond to the surface-cooled versions in this catalog. A gland plate is mounted in place of the terminal box (Options **G48/G49**).



**Frame sizes and types of construction:** See dimensional drawings

**Connection cables:** The free length of connection cable must be specified when ordering. The standard length is 1.5 m. Two or more cable entries are used in the case of pole-changing motors or single-speed motors with rated current > 70 A. The permissible coolant temperature is dependent on the connection cables used.

##### Cable types (standard version)

Temperature class of the motor	Cable Type	Max. rated voltage	Max. temperature at conductor
		$U_{rated}$ V	°C
F	Ölflex	500	-40 ... +80
F	NSSHöu-J	1000	-20 ... +80
F	EWKF/SIHF	500	-50 ... +180

##### Motors with built-on backstop

If reverse motion of the drive has to be prevented following switch-off, three-phase motors with mechanical backstop can be used. Backstops are maintenance-free and have individual spring-loaded clamping elements. The backstops of the type CSK are supplied with permanent lubrication. The clamping elements have a tendency to lift. In backstops of the FXM type series, the clamping elements lift automatically after approach due to the centrifugal force. Wear therefore does not occur at rated speed of the motor.

The backstop is not permitted to be used as protection against rotation in the wrong direction caused by switching despite the interlock. The direction of rotation must be specified on ordering.

The motor outputs are as specified in the selection tables in this catalog. The assignment of backstops to frame sizes is specified in the table below. Frame sizes 90 to 112 have the same dimensions as standard motors. Dimensional drawings are available for the larger types on request.

##### Backstops for motors of frame sizes 132 to 355

Motor Frame size	No. of poles	Backstop	
		Type	$M_t$ Nm
132	2, 4, 6	FXM 51-25 DX	680
160	2, 4, 6	FXM 66-25 DX	1480
180	2, 4, 6	FXM 66-25 DX	1480
200	2, 4, 6, 8	FXM 86-25 DX	2410
225	2, 4, 6, 8	FXM 86-25 DX	2410
250	2, 4, 6, 8	FXM 100-50 DX	6000
280	2, 4, 6, 8	FXM 120-50 SX	10400
315	2, 4, 6, 8	FXM 120-50 SX	10400
355	2	FXM 120-50 SX	10400
355	4, 6	FXM 140-50 SX	15200

With the backstops listed in the table above, motors of frame sizes 132 to 355 can be supplied in IP55 or IP56 degree of protection. Higher degrees of protection on request.

## Motors without Explosion Protection LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors in cast-iron and steel versions

### Selection and ordering data

P <sub>ra</sub> ted,	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kg kgm <sup>2</sup>			
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	cos φ rated,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,					T <sub>LR</sub> /T <sub>ra</sub> ted	T <sub>LR</sub> /T <sub>ra</sub> ted	T <sub>B</sub> /T <sub>ra</sub> ted
50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	
kW	FS	rpm	Nm	–	%	%	%	–	A	A	A	–	–	–	–	–	–	
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																		
2-pole: 3000 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
1.5	090 L	2865	5.00	IE2	84.0	85.1	84.3	0.88	2.90	2.32	1.68	3.0	6.8	2.8	ANGA-090LR-02	1PS0095-BD-0AA3	36	0.0020
2.2	090 L	2850	7.4	IE2	84.6	85.6	85.1	0.86	4.4	3.52	2.55	3.0	6.5	3.0	ANGA-090LS-02	1PS0098-BD-0AA3	36	0.0020
3	100 L	2900	9.9	IE2	86.0	86.3	85.8	0.87	5.8	4.6	3.36	2.7	7.5	3.0	ANGA-100LS-02	1PS0106-BD-0AA3	51	0.0041
4	112 M	2890	13.2	IE2	86.5	86.8	86.8	0.93	7.2	5.8	4.2	2.7	7.0	3.1	ANGA-112MS-02	1PS0113-BD-0AA3	66	0.0075
5.5	132 S	2910	18.0	IE2	88.5	89.9	89.2	0.90	10.0	8.0	5.8	2.6	6.7	3.1	ANGA-132SR-02	1PS0131-BD-0AA3	83	0.014
7.5	132 S	2915	24.6	IE2	89.5	90.1	89.5	0.91	13.3	10.6	7.7	2.7	6.8	3.0	ANGA-132SS-02	1PS0132-BD-0AA3	95	0.020
11	160 M	2955	35.5	IE2	90.7	91.0	90.0	0.90	19.5	15.6	11.3	2.1	7.5	2.8	ANGA-160MR-02	1PS0163-BD-0AA3	176	0.075
15	160 M	2955	48.5	IE2	91.3	92.1	91.9	0.89	26.5	21.2	15.4	2.1	7.0	2.8	ANGA-160MS-02	1PS0165-BD-0AA3	176	0.092
18.5	160 L	2960	60	IE2	92.0	92.5	92.0	0.89	32.5	26.0	18.8	2.1	7.0	2.6	ANGA-160LS-02	1PS0166-BD-0AA3	192	0.092
22	180 M	2960	71	IE2	92.5	93.0	92.8	0.90	38.0	30.4	22.0	2.2	6.8	2.9	ANGA-180MS-02	1PS0183-BD-0AA3	246	0.16
30	200 L	2970	96	IE2	93.2	93.6	93.2	0.89	52.0	41.6	30.1	2.2	6.9	2.6	ANGA-200LR-02	1PS0206-BD-0AA3	333	0.20
37	200 L	2970	119	IE2	93.5	94.2	94.1	0.89	64.0	51.0	37.1	2.0	7.2	2.6	ANGA-200LS-02	1PS0208-BD-0AA3	349	0.23
45	225 M	2970	145	IE2	93.6	93.7	93.0	0.88	79.0	63.0	45.8	2.3	7.5	2.6	ANGA-225MS-02	1PS0223-BD-0AA3	420	0.34
55	250 M	2975	177	IE2	93.8	93.9	93.2	0.86	98.0	79.0	57.0	2.1	8.0	2.9	ANGA-250MM-02	1PS0253-BD-0AA3	540	0.45
75	280 S	2980	240	IE2	94.4	93.9	92.4	0.89	129	103	75.0	2.1	7.3	3.0	ANGA-280SL-02	1PS0280-BD-0AA3	775	0.88
90	280 S	2980	288	IE2	94.4	94.1	92.6	0.90	153	122	89.0	2.0	6.3	2.5	ANGA-280MM-02	1PS0283-BD-0AA3	830	1.03
110	315 S	2980	352	IE2	94.8	94.3	92.9	0.88	190	152	110	2.2	6.7	2.5	ANGA-315SL-02	1PS0311-BD-0AA3	960	1.55
132	315 M	2980	423	IE2	95.1	95.0	94.2	0.89	225	180	130	2.0	6.3	2.4	ANGA-315ML-02	1PS0313-BD-0AA3	1020	1.85
160	315 M	2980	513	IE2	95.6	95.6	95.0	0.89	270	215	157	2.3	6.8	2.6	ANGA-315MN-02	1PS0315-BD-0AA3	1100	2.2
200	315 L	2980	641	IE2	95.8	95.8	95.2	0.89	340	270	196	2.6	7.3	2.7	ANGA-315LL-02	1PS0316-BD-0AA3	1310	2.8
250	315 L	2985	800	IE2	95.8	96.1	95.8	0.90	420	335	245	2.6	7.3	2.7	ANGA-315LN-02	1PS0318-BD-0AA3	1450	3.5
315	355 L	2985	1008	IE2	96.1	96.3	96.0	0.89	530	425	310	2.3	7.0	2.7	ANGA-355LB-02	1PS0356-BD-0AA2	1580	4.7
<b>LOHER VARIO</b>																		
355	355 L	2983	1136	IE2	96.5	96.5	96.0	0.92	575	460	333	1.2	6.8	2.8	ANSA-355LC-02	1PS0357-BH-0AA0	2100	3.6
400	355 L	2985	1279	<sup>1)</sup>	96.7	96.7	96.1	0.91	655	525	380	1.4	7.9	3.2	ANSA-355LD-02	1PS0358-BH-0AA0	2200	4.0
450	355 L	2978	1443	<sup>1)</sup>	96.4	96.5	96.0	0.91	740	590	430	0.95	6.2	2.55	ANSA-355LX-02	1PS0358-BJ-0AA0	2300	5.0
450	400 L	2984	1440	<sup>1)</sup>	96.5	96.5	95.9	0.90	745	595	430	0.8	6.2	2.8	ANSA-400LL-02	1PS0404-BJ-0AA0	2400	6.0
500	400 L	2982	1601	<sup>1)</sup>	96.6	96.7	96.2	0.91	820	655	475	0.8	5.9	2.55	ANSA-400LN-02	1PS0405-BJ-0AA0	2600	7.0
560	400 L	2983	1792	<sup>1)</sup>	96.8	96.8	96.3	0.91	915	730	530	0.85	6.2	2.7	ANSA-400LN-02	1PS0407-BJ-0AA0	2600	7.0
630	400 L	2984	2016	<sup>1)</sup>	96.8	96.8	96.3	0.91	–	825	595	0.85	6.2	2.6	ANSA-400LX-02	1PS0408-BJ-0AA0	2900	8.5
630	450 L	2986	2014	<sup>1)</sup>	96.7	96.6	96.0	0.91	–	830	600	0.75	6.2	2.7	ANSA-450LL-02	1PS0453-BJ-0AA0	3500	11
710	450 L	2986	2270	<sup>1)</sup>	96.8	96.8	96.2	0.91	–	925	670	0.8	6.3	2.8	ANSA-450LL-02	1PS0455-BJ-0AA0	3500	11
800	450 L	2986	2557	<sup>1)</sup>	96.9	96.9	96.3	0.91	–	1050	760	0.8	6.3	2.8	ANSA-450LN-02	1PS0457-BJ-0AA0	3700	13
900	450 L	2985	2879	<sup>1)</sup>	97.0	97.0	96.5	0.91	–	1170	850	0.85	6.4	2.7	ANSA-450LN-02	1PS0458-BJ-0AA0	3700	13
1000	500 L	2986	3198	<sup>1)</sup>	96.6	96.5	95.6	0.90	–	–	960	0.85	6.4	2.8	ANSA-500LL-02	1PS0507-BJ-0AA0	6300	24
1200	500 L	2990	3831	<sup>1)</sup>	96.9	96.8	96.1	0.91	–	–	1135	0.75	6.6	2.8	ANSA-500LN-02	1PS0508-BJ-0AA0	6300	35
<b>Operating modes</b>																		
Mains-fed operation												Frame size			Order code			
Mains-fed operation												90 ... 450 (≤ 800 kW)	0		–			
Converter-fed operation, standard insulation												90 ... 400	1		–			
Converter-fed operation with special insulation (derating approx. 5 %)												160 ... 500	2		–			
Mains-fed operation, pre-formed coil												450 (> 800 kW)... 500	3		–			
Converter-fed operation, pre-formed coil												450 ... 500	4		–			
<b>Voltages</b>																		
690 VΔ, 50 Hz												Frame size			Order code			
230 V/400 V, 50 Hz												355 ... 500	0		–			
500 VY, 50 Hz												90 ... 112	1		–			
500 VΔ, 50 Hz												90 ... 315	3		–			
400 V/690 V, 50 Hz												355 ... 450	5		–			
690 VY, 50 Hz												90 ... 400	6		–			
For other voltages see Page 3/23												90 ... 400	8		–			
												90 ... 500	9		...			
<b>Types of construction</b>																		
IM B3												Frame size			Order code			
IM B5												90 ... 500	0		–			
IM B34												90 ... 315	1		–			
IM B14												90 ... 112	2		–			
IM V1/cover												90 ... 112	3		–			
IM B35												90 ... 400	4		–			
For other types of construction see from Page 1/28												90 ... 500	6		–			
												90 ... 500	9		...			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Motors in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted,	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kgm <sup>2</sup>			
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> rated,	cos φ	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,					T <sub>LR</sub> /T <sub>ra</sub>	I <sub>LR</sub> /I <sub>ra</sub>	T <sub>B</sub> /T <sub>ra</sub>
50 Hz	50 Hz	50 Hz	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	ted	ted	ted					
kW	FS	rpm	Nm	–	4/4 %	3/4 %	2/4 %	4/4 %	–	400 V A	500 V A	690 V A	–	–	–	kg	kgm <sup>2</sup>	
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																		
4-pole: 1500 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
1.1	090 L	1460	7.2	IE2	86.4	87.2	86.3	0.85	2.15	1.72	1.25	1.9	6.8	2.8	ANGA-090LR-04	1PS0095-BD-0BA3	34	0.0044
1.5	090 L	1455	9.8	IE2	86.1	86.5	85.2	0.81	3.10	2.48	1.8	1.9	6.7	2.8	ANGA-090LS-04	1PS0098-BD-0BA3	37	0.0044
2.2	100 L	1455	14.4	IE2	87.1	87.8	86.8	0.83	4.4	3.52	2.55	1.7	6.4	2.4	ANGA-100LR-04	1PS0106-BD-0BA3	53	0.0060
3	100 L	1455	19.7	IE2	86.0	86.3	84.7	0.80	6.3	5.0	3.65	2.0	6.3	2.6	ANGA-100LS-04	1PS0108-BD-0BA3	55	0.0071
4	112 M	1460	26.2	IE2	88.8	89.4	88.8	0.84	7.8	6.2	4.5	1.9	6.8	2.5	ANGA-112MS-04	1PS0113-BD-0BA3	66	0.0126
5.5	132 S	1455	36.1	IE2	89.0	89.7	89.2	0.85	10.5	8.4	6.1	2.6	7.6	2.7	ANGA-132SR-04	1PS0131-BD-0BA3	93	0.03
7.5	132 M	1470	48.7	IE2	90.2	90.7	90.1	0.84	14.3	11.4	8.3	2.0	7.6	2.8	ANGA-132MS-04	1PS0133-BD-0BA3	102	0.03
11	160 M	1465	72	IE2	90.5	91.4	91.1	0.84	21.0	16.8	12.2	2.8	6.5	2.7	ANGA-160MR-04	1PS0163-BD-0BA3	176	0.10
15	160 L	1470	97	IE2	91.4	92.3	91.8	0.85	28.0	22.4	16.2	3.0	6.5	2.7	ANGA-160LS-04	1PS0166-BD-0BA3	192	0.13
18.5	180 M	1475	120	IE2	92.9	93.4	93.2	0.85	34.0	27.2	19.7	1.8	7.0	2.5	ANGA-180MR-04	1PS0183-BD-0BA3	246	0.20
22	180 L	1477	142	IE2	93.0	93.5	93.3	0.85	40.0	32	23.2	1.8	7.3	2.5	ANGA-180LS-04	1PS0186-BD-0BA3	255	0.23
30	200 L	1477	194	IE2	93.6	94.0	93.5	0.84	55.0	44.0	31.9	2.8	6.8	2.6	ANGA-200LS-04	1PS0206-BD-0BA3	333	0.37
37	225 S	1480	239	IE2	92.7	93.5	93.5	0.86	67.0	54.0	38.8	2.1	6.6	2.5	ANGA-225SR-04	1PS0220-BD-0BA3	415	0.64
45	225 M	1480	290	IE2	93.8	94.5	94.5	0.85	81.0	65.0	47.0	2.1	6.9	2.5	ANGA-225MS-04	1PS0223-BD-0BA3	445	0.72
55	250 M	1480	355	IE2	93.7	94.4	94.4	0.87	97.0	78.0	56.0	2.5	7.7	2.9	ANGA-250MM-04	1PS0253-BD-0BA3	560	0.75
75	280 S	1480	484	IE2	94.4	94.8	95.0	0.84	137	109	79.0	2.4	7.0	2.6	ANGA-280SL-04	1PS0280-BD-0BA3	820	1.3
90	280 M	1480	581	IE2	94.5	94.4	93.5	0.85	162	129	94.0	2.5	7.2	2.7	ANGA-280MM-04	1PS0283-BD-0BA3	870	1.4
110	315 S	1485	707	IE2	94.6	94.6	93.5	0.82	205	164	119	2.0	6.6	2.5	ANGA-315SL-04	1PS0311-BD-0BA3	960	2.2
132	315 M	1485	849	IE2	95.0	95.1	94.5	0.84	240	191	138	2.0	6.4	2.5	ANGA-315ML-04	1PS0313-BD-0BA3	1040	2.9
160	315 M	1485	1029	IE2	95.1	95.3	95.0	0.85	285	230	166	2.1	6.9	2.5	ANGA-315MN-04	1PS0315-BD-0BA3	1120	3.4
200	315 L	1488	1284	IE2	95.2	95.4	95.3	0.85	355	285	205	2.3	6.9	2.5	ANGA-315LL-04	1PS0316-BD-0BA3	1340	3.9
250	315 L	1487	1605	IE2	95.2	95.4	95.2	0.83	455	365	265	2.6	7.5	2.6	ANGA-315LM-04	1PS0317-BD-0BA3	1420	4.2
315	355 L	1488	2022	IE2	95.1	95.2	95.0	0.85	560	450	340	2.0	7.7	2.5	ANGA-355LB-04	1PS0356-BD-0BA2	1730	6.8
315	355 L	1493	2015	IE2	96.3	96.3	96.0	0.85	560	445	320	1.3	7.7	2.6	ANGA-355LB-04 <sup>2)</sup>	1PS0356-BD-0BB2	1730	6.8
<b>LOHER VARIO</b>																		
355	355 L	1491	2273	IE2	96.6	96.6	96.0	0.86	615	492	357	1.25	6.7	2.4	ANSA-355LC-04	1PS0358-BH-0BA0	2300	7.7
400	355 L	1491	2561	<sup>1)</sup>	96.7	96.7	96.1	0.86	690	552	400	1.25	6.7	2.4	ANSA-355LD-04	1PS0350-BH-0BA0	2350	8.5
450	355 L	1491	2880	<sup>1)</sup>	96.6	96.7	96.1	0.86	785	630	457	1.1	6.2	2.4	ANSA-355LN-04	1PS0357-BJ-0BA0	2400	9.0
500	355 L	1492	3200	<sup>1)</sup>	96.7	96.7	96.2	0.85	875	700	505	1.0	6.2	2.4	ANSA-355LX-04	1PS0358-BJ-0BA0	2500	9.5
500	400 L	1492	3200	<sup>1)</sup>	96.6	96.6	96.0	0.87	855	685	495	1.1	6.2	2.6	ANSA-400LL-04	1PS0404-BJ-0BA0	2700	13
560	400 L	1492	3583	<sup>1)</sup>	96.7	96.7	96.1	0.88	950	760	550	1.1	6.2	2.55	ANSA-400LN-04	1PS0405-BJ-0BA0	2900	15
630	400 L	1492	4031	<sup>1)</sup>	96.8	96.8	96.2	0.88	1070	855	620	1.1	6.3	2.6	ANSA-400LN-04	1PS0407-BJ-0BA0	2900	15
710	400 L	1492	4544	<sup>1)</sup>	96.9	96.9	96.4	0.88	1200	960	695	1.05	6.3	2.5	ANSA-400LX-04	1PS0408-BJ-0BA0	3500	17
800	450 L	1493	5114	<sup>1)</sup>	96.9	96.9	96.3	0.88	1355	1085	785	1.0	6.6	2.6	ANSA-450LL-04	1PS0455-BJ-0BA0	3800	24.5
900	450 L	1493	5755	<sup>1)</sup>	97.0	97.0	96.4	0.88	–	1215	880	1.05	6.6	2.5	ANSA-450LN-04	1PS0457-BJ-0BA0	4300	29
950	450 L	1493	6076	<sup>1)</sup>	97.0	97.0	96.5	0.88	–	1285	930	1.05	6.6	2.5	ANSA-450LN-04	1PS0458-BJ-0BA0	4800	29
1000	500 L	1494	6390	<sup>1)</sup>	96.9	96.9	96.2	0.88	–	–	980	0.85	6.2	2.55	ANSA-500LL-04	1PS0504-BJ-0BA0	5200	43
1120	500 L	1493	7160	<sup>1)</sup>	97.0	97.0	96.4	0.88	–	–	1095	0.8	6.0	2.4	ANSA-500LL-04	1PS0505-BJ-0BA0	5200	43
1250	500 L	1494	7990	<sup>1)</sup>	97.0	96.9	96.3	0.88	–	–	<sup>3)</sup>	0.8	6.5	2.4	ANSA-500LN-04	1PS0507-BJ-0BA0	6600	54
1400	500 L	1494	8940	<sup>1)</sup>	97.1	97.0	96.3	0.87	–	–	1385	0.9	7.2	2.7	ANSA-500LN-04	1PS0508-BJ-0BA0	6600	54
<b>Operating modes</b>																		
Mains-fed operation												Frame size			Order code			
Converter-fed operation, standard insulation												90 ... 450 (≤ 800 kW)	0		–			
Converter-fed operation with special insulation (derating approx. 5 %)												90 ... 400	1		–			
Mains-fed operation, pre-formed coil												160 ... 500	2		–			
Converter-fed operation, pre-formed coil												450 (> 800 kW)... 500	3		–			
												450 ... 500	4		–			
<b>Voltages</b>																		
690 VΔ, 50 Hz												Frame size			Order code			
230 V/400 V, 50 Hz												355 ... 500	0		–			
500 VY, 50 Hz												90 ... 112	1		–			
500 VΔ, 50 Hz												90 ... 315	3		–			
400 V/690 V, 50 Hz												355 ... 450	5		–			
690 VY, 50 Hz												90 ... 400	6		–			
For other voltages see Page 3/23												90 ... 400	8		–			
												90 ... 500	9		...			
<b>Types of construction</b>																		
IM B3												Frame size			Order code			
IM B5												90 ... 500	0		–			
IM B34												90 ... 315	1		–			
IM B14												90 ... 112	2		–			
IM V1/cover												90 ... 112	3		–			
IM B35												90 ... 400	4		–			
For other types of construction see from Page 1/28												90 ... 500	6		–			
												90 ... 500	9		...			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Motor with special rotor (Cu).

<sup>3)</sup> Only implementable as 6-phase motor with 2 × 690 V (I = 2 × 610 A) or 2 × 950 V (I = 2 × 445 A)

# Motors without Explosion Protection

## LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors in cast-iron and steel versions

### Selection and ordering data (continued)

		Operating values at rated output										Motor type			Article No.		m J	
$P_{ra}$	Frame size	$n_{ra}$	$T_{ra}$	IE class	$\eta_{ra}$	$\eta_{ra}$	$\eta_{ra}$	$\cos\phi$	$I_{ra}$	$I_{ra}$	$I_{ra}$	$T_{LR}$	$I_{LR}$	$T_B$				
ted,	ted,	ted,	ted,	ted,	ted,	ted,	rated,	ted,	ted,	ted,	ted	ted	ted					
50 Hz	50 Hz	50 Hz	50 Hz	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	ted	ted	ted				
kW	FS	rpm	Nm	–	4/4	3/4	2/4	4/4	400 V	500 V	690 V	–	–	–			kg	kgm <sup>2</sup>
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																		
<b>6-pole: 1000 rpm at 50 Hz</b>																		
<b>LOHER CHEMSTAR</b>																		
0.75	090 L	960	7.5	IE2	80.0	80.4	78.0	0.72	1.88	1.5	1.09	1.5	4.5	2.2	ANGA-090LR-06	1PS0095-BD-0CA3	36	0.0044
1.1	090 L	950	11.1	IE2	78.1	77.9	75.4	0.72	2.80	2.24	1.62	1.4	4.1	2.0	ANGA-090LS-06	1PS0098-BD-0CA3	42	0.0044
1.5	100 L	955	15.0	IE2	80.0	79.0	75.0	0.68	3.95	3.16	2.29	2.5	4.5	2.7	ANGA-100LS-06	1PS0106-BD-0CA3	55	0.010
2.2	112 M	950	22.1	IE2	82.7	83.7	82.3	0.74	5.2	4.2	3.01	2.0	5.0	2.2	ANGA-112MS-06	1PS0113-BD-0CA3	66	0.019
3	132 S	950	30.2	IE2	85.4	86.1	85.1	0.79	6.4	5.1	3.71	2.5	5.7	2.5	ANGA-132SR-06	1PS0131-BD-0CA3	92	0.033
4	132 M	955	40.0	IE2	85.7	86.7	86.1	0.82	8.2	6.6	4.8	2.3	6.0	2.5	ANGA-132MR-06	1PS0133-BD-0CA3	96	0.045
5.5	132 M	955	55	IE2	86.1	86.1	85.5	0.77	12.0	9.6	7.0	2.4	6.0	2.6	ANGA-132MS-06	1PS0135-BD-0CA3	104	0.045
7.5	160 M	965	74	IE2	88.2	88.5	88.0	0.80	15.3	12.2	8.9	1.5	6.0	2.4	ANGA-160MR-06	1PS0163-BD-0CA3	176	0.088
11	160 L	970	108	IE2	89.5	90.4	90.0	0.81	22.0	17.6	12.8	1.6	5.2	2.6	ANGA-160LS-06	1PS0166-BD-0CA3	192	0.11
15	180 L	980	146	IE2	90.5	91.2	90.7	0.82	29.0	23.2	16.8	2.1	6.2	2.5	ANGA-180LS-06	1PS0186-BD-0CA3	255	0.28
18.5	200 L	977	181	IE2	91.4	92.4	92.6	0.80	36.5	29.2	21.2	2.3	5.5	2.3	ANGA-200LR-06	1PS0206-BD-0CA3	333	0.45
22	200 L	977	215	IE2	91.0	92.0	92.1	0.80	43.5	34.8	25.2	2.5	5.5	2.4	ANGA-200LS-06	1PS0208-BD-0CA3	349	0.49
30	225 M	985	291	IE2	92.5	92.8	92.4	0.82	57.0	45.6	33.0	1.7	7.0	2.8	ANGA-225MS-06	1PS0223-BD-0CA3	430	0.92
37	250 M	985	359	IE2	92.2	92.3	91.1	0.77	75.0	60.0	43.5	2.1	6.0	2.1	ANGA-250MM-06	1PS0253-BD-0CA3	560	1.0
45	280 S	985	436	IE2	92.9	93.0	93.1	0.85	82.0	66.0	47.5	2.0	6.0	2.3	ANGA-280SL-06	1PS0280-BD-0CA3	780	2.5
55	280 M	985	533	IE2	93.4	93.6	93.0	0.88	97.0	77.0	56.0	2.4	7.0	2.8	ANGA-280MM-06	1PS0283-BD-0CA3	850	2.9
75	315 S	990	723	IE2	94.0	94.1	93.5	0.86	134	107	78.0	2.0	6.7	2.1	ANGA-315SL-06	1PS0311-BD-0CA3	960	3.3
90	315 M	990	868	IE2	94.8	95.2	95.1	0.85	161	129	93.0	2.1	6.9	2.3	ANGA-315ML-06	1PS0313-BD-0CA3	1030	4.0
110	315 M	990	1061	IE2	94.5	94.6	94.3	0.86	195	156	113	2.0	7.1	2.2	ANGA-315MM-06	1PS0314-BD-0CA3	1110	4.9
132	315 M	990	1273	IE2	94.7	94.8	94.5	0.86	235	187	136	2.0	7.0	2.1	ANGA-315MN-06	1PS0315-BD-0CA3	1110	4.9
160	315 L	990	1543	IE2	94.8	95.0	94.6	0.87	280	225	162	2.0	6.8	2.1	ANGA-315LL-06	1PS0316-BD-0CA3	1300	6.0
200	315 L	990	1929	IE2	95.0	95.0	94.6	0.84	360	290	210	2.1	7.0	2.3	ANGA-315LM-06	1PS0317-BD-0CA3	1410	6.8
200	315 L	992	1925	IE2	95.4	95.6	95.3	0.88	345	275	199	1.5	6.9	2.3	ANGA-315LM-06 <sup>2)</sup>	1PS0317-BD-0CB3	1420	6.8
250	355 L	995	2399	IE2	95.9	96.1	95.8	0.86	440	350	255	1.5	7.3	2.3	ANGA-355LB-06	1PS0356-BD-0CB2	1730	9.1
<b>LOHER VARIO</b>																		
280	355 L	993	2691	IE2	96.1	96.1	95.5	0.85	495	395	286	1.2	6.4	2.35	ANSA-355LC-06	1PS0357-BH-0CA0	2350	10.5
315	355 L	994	3027	IE2	96.2	96.2	95.5	0.84	560	450	325	1.35	6.6	2.5	ANSA-355LD-06	1PS0358-BH-0CA0	2400	11.5
355	355 L	993	3415	IE2	96.3	96.3	95.8	0.85	630	505	360	1.0	5.6	2.3	ANSA-355LN-06	1PS0357-BJ-0CA0	2400	12.5
400	355 L	992	3849	<sup>1)</sup>	96.3	96.4	95.9	0.84	715	575	415	1.0	5.6	2.25	ANSA-355LN-06	1PS0358-BJ-0CA0	2400	12.5
400	400 L	994	3844	<sup>1)</sup>	96.3	96.4	95.8	0.84	715	575	415	1.0	5.6	2.3	ANSA-400LL-06	1PS0404-BJ-0CA0	2800	18
450	400 L	994	4323	<sup>1)</sup>	96.4	96.4	95.9	0.84	800	640	465	1.0	5.5	2.25	ANSA-400LN-06	1PS0405-BJ-0CA0	3100	21.5
500	400 L	994	4805	<sup>1)</sup>	96.5	96.5	96.0	0.84	890	710	515	1.05	5.7	2.3	ANSA-400LN-06	1PS0407-BJ-0CA0	3100	21.5
560	450 L	995	5374	<sup>1)</sup>	96.7	96.7	96.2	0.85	980	785	570	0.95	5.8	2.3	ANSA-450LL-06	1PS0453-BJ-0CA0	4100	34
630	450 L	995	6046	<sup>1)</sup>	96.8	96.8	96.3	0.85	1105	885	640	0.95	5.7	2.3	ANSA-450LL-06	1PS0455-BJ-0CA0	4100	34
710	450 L	995	6813	<sup>1)</sup>	96.9	97.0	96.5	0.85	1240	995	720	0.95	5.7	2.25	ANSA-450LN-06	1PS0457-BJ-0CA0	4400	40
800	450 L	995	7676	<sup>1)</sup>	97.0	97.0	96.5	0.85	–	1125	815	1.0	5.9	2.35	ANSA-450LN-06	1PS0458-BJ-0CA0	4400	40
900	500 L	995	8635	<sup>1)</sup>	96.8	96.8	96.2	0.85	–	–	915	1.0	5.8	2.25	ANSA-500LL-06	1PS0505-BJ-0CA0	5400	60
1000	500 L	995	9592	<sup>1)</sup>	96.9	96.8	96.2	0.85	–	–	1015	1.0	6.0	2.25	ANSA-500LN-06	1PS0507-BJ-0CA0	6100	72
1120	500 L	995	10746	<sup>1)</sup>	96.9	96.9	96.4	0.86	–	–	1120	1.0	5.7	2.15	ANSA-500LN-06	1PS0508-BJ-0CA0	6100	72
1250	560 L	996	11980	<sup>1)</sup>	97.0	97.0	96.5	0.87	–	–	1230	0.75	5.9	2.3	ANSA-560LL-06	1PS0564-BJ-0CA0	8300	120
<b>Operating modes</b>																		
															Frame size		Order code	
Mains-fed operation															90 ... 450	0	–	
Converter-fed operation, standard insulation															90 ... 450	1	–	
Converter-fed operation with special insulation (derating approx. 5 %)															160 ... 500	2	–	
Mains-fed operation, pre-formed coil															500	3	–	
Converter-fed operation, pre-formed coil															450 ... 500	4	–	
<b>Voltages</b>																		
															Frame size		Order code	
690 VΔ, 50 Hz															355 ... 500	0	–	
230 V/400 V, 50 Hz															90 ... 112	1	–	
500 VY, 50 Hz															90 ... 315	3	–	
500 VΔ, 50 Hz															355 ... 450	5	–	
400 V/690 V, 50 Hz															90 ... 400	6	–	
690 VY, 50 Hz															90 ... 400	8	–	
For other voltages see Page 3/23															90 ... 500	9	...	
<b>Types of construction</b>																		
															Frame size		Order code	
IM B3															90 ... 500	0	–	
IM B5															90 ... 315	1	–	
IM B34															90 ... 112	2	–	
IM B14															90 ... 112	3	–	
IM V1/cover															90 ... 450	4	–	
IM B35															90 ... 500	6	–	
For other types of construction see from Page 1/28															90 ... 500	9	...	

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Motor with special rotor (Cu).

3

# Motors without Explosion Protection

## LOHER CHEMSTAR and VARIO 1PS0 motor series

### Motors in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted,	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kgm <sup>2</sup>			
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	cos φ rated,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,					T <sub>LR</sub> I <sub>ra</sub> /I <sub>ra</sub>	T <sub>B</sub> I <sub>ra</sub> /I <sub>ra</sub>	
50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz	ted	ted	ted				
kW	FS	rpm	Nm	–	4/4 %	3/4 %	2/4 %	4/4 %	–	400 V A	500 V A	690 V A	–	–	–		kg	kgm <sup>2</sup>
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																		
8-pole: 750 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
0.37	090 L	700	5.0	1)	67.0	67.5	64.0	0.60	1.33	1.06	0.77	1.7	2.5	2.0	ANGA-090LR-08	1PS0095-BD-0DA3	35	0.0036
0.55	090 L	700	7.5	1)	69.5	69.5	65.0	0.60	1.90	1.52	1.10	1.7	2.8	2.0	ANGA-090LS-08	1PS0098-BD-0DA3	35	0.0044
0.75	100 L	700	10.2	1)	71.9	70.2	66.0	0.70	2.15	1.72	1.25	2.0	3.7	2.1	ANGA-100LR-08	1PS0106-BD-0DA3	55	0.010
1.1	100 L	710	14.8	1)	74.7	72.2	68.5	0.70	3.05	2.44	1.77	1.5	4.0	2.0	ANGA-100LS-08	1PS0108-BD-0DA3	55	0.010
1.5	112 M	710	20.2	1)	78.0	78.5	76.5	0.73	3.80	3.04	2.20	1.8	4.0	2.0	ANGA-112MS-08	1PS0113-BD-0DA3	65	0.016
2.2	132 S	715	29.4	1)	82.5	83.2	81.5	0.73	5.3	4.2	3.07	1.7	4.5	2.1	ANGA-132SR-08	1PS0131-BD-0DA3	90	0.033
3	132 M	715	40.1	1)	83.8	84.5	82.9	0.74	7.0	5.6	4.1	1.8	4.5	2.2	ANGA-132MR-08	1PS0133-BD-0DA3	90	0.045
4	160 M	720	53	1)	87.3	88.0	87.5	0.80	8.3	6.6	4.8	1.8	5.5	2.2	ANGA-160MR-08	1PS0163-BD-0DA3	176	0.12
5.5	160 M	720	73	1)	87.3	88.0	87.5	0.80	11.4	9.1	6.6	1.7	5.6	2.2	ANGA-160MS-08	1PS0165-BD-0DA3	176	0.12
7.5	160 L	720	99	1)	87.6	88.7	88.5	0.80	15.4	12.3	8.9	1.7	5.6	2.2	ANGA-160LS-08	1PS0166-BD-0DA3	192	0.16
11	180 L	720	146	1)	87.8	88.5	88.0	0.80	22.5	18	13	1.8	5.0	2.0	ANGA-180LS-08	1PS0186-BD-0DA3	255	0.28
15	200 L	725	198	1)	89.8	90.0	89.5	0.78	31.0	24.8	18	2.4	5.2	2.2	ANGA-200LS-08	1PS0206-BD-0DA3	333	0.49
18.5	225 S	735	240	1)	90.0	90.5	89.8	0.78	38.0	30.4	22	2.3	5.5	2.5	ANGA-225SR-08	1PS0220-BD-0DA3	395	0.82
22	225 M	735	286	1)	91.0	91.2	90.5	0.78	44.5	35.6	25.8	2.3	5.8	2.5	ANGA-225MS-08	1PS0223-BD-0DA3	430	0.92
30	250 M	735	390	1)	90.8	91.2	90.4	0.80	60.0	47.5	34.5	1.9	5.3	2.2	ANGA-250MM-08	1PS0253-BD-0DA3	560	1.0
37	280 S	735	481	1)	90.9	91.9	91.7	0.80	73.0	59.0	42.5	1.8	5.0	2.2	ANGA-280SL-08	1PS0280-BD-0DA3	780	1.9
45	280 M	740	581	1)	91.0	91.2	90.1	0.78	92.0	73.0	53.0	2.2	5.0	2.1	ANGA-280MM-08	1PS0283-BD-0DA3	850	2.2
55	315 S	740	710	1)	93.7	94.0	93.6	0.78	109	87.0	63.0	1.6	6.0	2.1	ANGA-315SL-08	1PS0311-BD-0DA3	950	3.4
75	315 M	740	968	1)	93.8	94.3	94.2	0.79	146	117	85.0	1.6	5.8	2.0	ANGA-315ML-08	1PS0313-BD-0DA3	1030	4.1
90	315 M	740	1161	1)	93.8	94.4	94.3	0.79	175	140	102	1.7	5.8	2.5	ANGA-315MM-08	1PS0314-BD-0DA3	1110	4.8
110	315 M	740	1419	1)	93.9	94.5	94.5	0.79	215	171	124	1.7	5.8	2.0	ANGA-315MN-08 <sup>2)</sup>	1PS0315-BD-0DA3	1110	4.8
132	315 L	740	1703	1)	94.1	94.7	94.7	0.79	255	205	149	1.6	5.8	2.0	ANGA-315LL-08	1PS0316-BD-0DA3	1300	6.0
160	315 L	742	2059	1)	94.4	94.4	93.6	0.79	310	250	180	1.5	6.0	2.5	ANGA-315LM-08 <sup>3)</sup>	1PS0317-BD-0DB3	1410	7.2
200	355 L			1)											ANGA-355LB-08 <sup>3)</sup>	1PS0356-BD-0DB0	1420	
<b>LOHER VARIO</b>																		
225	355 L	744	2886	1)	95.3	95.4	94.8	0.81	420	335	243	1.15	5.8	2.4	ANSA-355LC-08	1PS0357-BH-0DA0	2350	15.7
250	355 L	744	3206	1)	95.3	95.4	94.8	0.81	466	373	270	1.2	5.8	2.45	ANSA-355LD-08	1PS0358-BH-0DA0	2400	17
280	355 L	743	3597	1)	95.8	96.0	95.6	0.81	520	415	300	1.15	5.2	2.3	ANSA-355LN-08	1PS0357-BJ-0DA0	2400	12.5
315	355 L	743	4049	1)	95.8	96.0	95.6	0.81	580	465	335	1.05	5.1	2.2	ANSA-355LX-08	1PS0358-BJ-0DA0	2550	13.5
355	400 L	743	4559	1)	96.0	96.1	95.6	0.81	655	525	380	1.0	5.1	2.3	ANSA-400LL-08	1PS0404-BJ-0DA0	2800	17.5
400	400 L	744	5136	1)	96.1	96.2	95.8	0.82	735	585	425	0.95	5.2	2.25	ANSA-400LN-08	1PS0407-BJ-0DA0	3100	21
450	400 L	743	5779	1)	96.1	96.3	95.9	0.81	830	665	480	0.95	5.0	2.25	ANSA-400LX-08	1PS0408-BJ-0DA0	3250	23
500	450 L	745	6411	1)	96.5	96.6	96.1	0.83	900	720	520	0.85	5.2	2.2	ANSA-450LL-08	1PS0455-BJ-0DA0	4100	35.5
560	450 L	745	7178	1)	96.5	96.6	96.1	0.84	1000	800	580	0.85	5.4	2.25	ANSA-450LN-08	1PS0457-BJ-0DA0	4400	42
630	450 L	745	8075	1)	96.6	96.7	96.2	0.83	1130	905	655	0.9	5.3	2.25	ANSA-450LX-08	1PS0458-BJ-0DA0	4400	42
670	450 L	746	8579	1)	96.7	96.7	96.3	0.83	1210	965	700	0.85	5.2	2.3	ANSA-450LX-08	1PS0450-BJ-0DA0	4600	46
710	500 L	746	9086	1)	96.7	96.8	96.2	0.85	1240	995	720	0.85	5.8	2.55	ANSA-500LL-08	1PS0504-BJ-0DA0	5400	73
800	500 L	746	10242	1)	96.7	96.8	96.4	0.85	–	1120	810	0.85	5.6	2.45	ANSA-500LL-08	1PS0505-BJ-0DA0	5400	73
900	500 L	745	11530	1)	96.5	96.6	96.1	0.84	–	1285	930	1.0	5.5	2.2	ANSA-500LN-08	1PS0507-BJ-0DA0	6100	88
950	500 L	746	12152	1)	96.7	96.7	96.1	0.83	–	–	990	0.95	5.9	2.4	ANSA-500LX-08	1PS0508-BJ-0DA0	6400	96
<b>Operating modes</b>												Frame size		Order code				
Mains-fed operation												90 ... 450	0	–				
Converter-fed operation, standard insulation												90 ... 450	1	–				
Converter-fed operation with special insulation (derating approx. 5 %)												160 ... 500	2	–				
Mains-fed operation, pre-formed coil												500	3	–				
Converter-fed operation, pre-formed coil												500	4	–				
<b>Voltages</b>												Frame size		Order code				
690 VΔ, 50 Hz												355 ... 500	0	–				
230 V/400 V, 50 Hz												90 ... 112	1	–				
500 VY, 50 Hz												90 ... 315	3	–				
500 VΔ, 50 Hz												355 ... 450	5	–				
400 V/690 V, 50 Hz												90 ... 400	6	–				
690 VY, 50 Hz												90 ... 400	8	–				
For other voltages see Page 3/23												90 ... 500	9	...				
<b>Types of construction</b>												Frame size		Order code				
IM B3												90 ... 500	0	–				
IM B5												90 ... 315	1	–				
IM B34												90 ... 112	2	–				
IM B14												90 ... 112	3	–				
IM V1/cover												90 ... 450	4	–				
IM B35												90 ... 500	6	–				
For other types of construction see from Page 1/28												90 ... 500	9	...				

1) Outside the IE code classification according to IEC 60034-30.

3) Motor with special rotor (Cu).

2) Rated output, partial utilization up to 155 °C (F).

## Motors without Explosion Protection LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors in cast-iron and steel versions

### Selection and ordering data (continued)

P <sub>ra</sub> ted,	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J kgm <sup>2</sup>		
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	cos φ rated,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,					T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>
50 Hz	50 Hz	50 Hz	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	ted	ted	ted				
kW	FS	rpm	Nm	–	4/4 %	3/4 %	2/4 %	4/4 %	–	400 V A	500 V A	690 V A	–	–	–	kg	kgm <sup>2</sup>
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																	
10-pole: 600 rpm at 50 Hz																	
<b>LOHER CHEMSTAR</b>																	
0.55	100 L		1)										ANGA-100LR-10	1PS0106- <b>BD</b> - <b>0EA3</b>	53	–	
0.75	100 L		1)										ANGA-100LS-10	1PS0108- <b>BD</b> - <b>0EA3</b>	55	–	
1.1	112 M		1)										ANGA-112MS-10	1PS0113- <b>BD</b> - <b>0EA3</b>	66	–	
1.5	132 S		1)										ANGA-132SR-10	1PS0131- <b>BD</b> - <b>0EA3</b>	93	–	
2.2	132 M		1)										ANGA-132MS-10	1PS0133- <b>BD</b> - <b>0EA3</b>	102	–	
3	160 M		1)										ANGA-160MR-10	1PS0163- <b>BD</b> - <b>0EA3</b>	176	–	
4	160 M		1)										ANGA-160MS-10	1PS0165- <b>BD</b> - <b>0EA3</b>	192	–	
5.5	160 L		1)										ANGA-160LR-10	1PS0166- <b>BD</b> - <b>0EA3</b>	192	–	
7.5	180 L		1)										ANGA-180LR-10	1PS0186- <b>BD</b> - <b>0EA3</b>	255	–	
11	200 L		1)										ANGA-200LS-10	1PS0206- <b>BD</b> - <b>0EA3</b>	333	–	
15	225 S		1)										ANGA-225SS-10	1PS0220- <b>BD</b> - <b>0EA3</b>	415	–	
18.5	225 M		1)										ANGA-225MR-10	1PS0223- <b>BD</b> - <b>0EA3</b>	445	–	
22	250 M		1)										ANGA-250MM-10	1PS0253- <b>BD</b> - <b>0EA3</b>	560	–	
30	280 S		1)										ANGA-280SL-10	1PS0280- <b>BD</b> - <b>0EA3</b>	780	–	
37	280 M		1)										ANGA-280MM-10	1PS0283- <b>BD</b> - <b>0EA3</b>	850	–	
45	315 S		1)										ANGA-315SL-10	1PS0311- <b>BD</b> - <b>0EA3</b>	950	–	
55	315 M		1)										ANGA-315ML-10	1PS0313- <b>BD</b> - <b>0EA3</b>	1030	–	
75	315 M		1)										ANGA-315MN-10	1PS0315- <b>BD</b> - <b>0EA3</b>	1110	–	
90	315 L		1)										ANGA-315LL-10	1PS0316- <b>BD</b> - <b>0EA3</b>	1300	–	
110	315 L		1)										ANGA-315LM-10	1PS0317- <b>BD</b> - <b>0EA3</b>	1410	–	
132	355 M		1)										ANGA-355MD-10	1PS0355- <b>BD</b> - <b>0EA0</b>	1670	–	
160	355 L		1)										ANGA-355LB-10	1PS0356- <b>BD</b> - <b>0EA0</b>	1900	–	
<b>LOHER VARIO</b>																	
180	355 L	594	2889	1)	94.6	94.7	94.0	0.81	338	271	196	1.05	5.3	2.15	ANSA-355LC-10	1PS0357- <b>BH</b> - <b>0EA0</b>	2350 16.5
200	355 L	594	3211	1)	94.6	94.8	94.1	0.81	376	300	218	1.05	5.1	2.05	ANSA-355LD-10	1PS0358- <b>BH</b> - <b>0EA0</b>	2400 18
225	355 L	593	3620	1)	95.2	95.5	95.1	0.80	425	340	245	1.1	4.8	2.15	ANSA-355LX-10	1PS0358- <b>BJ</b> - <b>0EA0</b>	2550 19
250	400 L	594	4014	1)	95.4	95.7	95.2	0.80	475	380	275	0.95	4.7	2.05	ANSA-400LL-10	1PS0404- <b>BJ</b> - <b>0EA0</b>	2800 27
280	400 L	595	4495	1)	95.6	95.8	95.3	0.81	520	415	300	0.95	4.7	2.05	ANSA-400LN-10	1PS0405- <b>BJ</b> - <b>0EA0</b>	3100 32
315	400 L	595	5058	1)	95.6	95.8	95.4	0.80	595	475	345	0.95	4.7	2.05	ANSA-400LN-10	1PS0407- <b>BJ</b> - <b>0EA0</b>	3100 32
355	400 L	595	5700	1)	95.8	96.0	95.6	0.80	665	530	385	0.95	4.8	2.1	ANSA-400LX-10	1PS0408- <b>BJ</b> - <b>0EA0</b>	3300 35
400	450 L	595	6418	1)	96.0	96.1	95.5	0.80	750	600	435	1.0	4.9	2.1	ANSA-450LL-10	1PS0454- <b>BJ</b> - <b>0EA0</b>	4100 42
450	450 L	595	7221	1)	96.1	96.2	95.6	0.81	835	670	485	0.95	4.8	2.05	ANSA-450LN-10	1PS0455- <b>BJ</b> - <b>0EA0</b>	4400 50
500	450 L	595	8020	1)	96.2	96.3	95.7	0.80	940	750	545	0.95	5.0	2.15	ANSA-450LN-10	1PS0457- <b>BJ</b> - <b>0EA0</b>	4400 50
520	450 L	595	8336	1)	96.2	96.2	95.6	0.79	985	785	570	1.0	5.1	2.2	ANSA-450LX-10	1PS0458- <b>BJ</b> - <b>0EA0</b>	4700 55
560	500 L	596	8965	1)	96.1	96.1	95.3	0.80	1050	840	610	0.85	5.3	2.35	ANSA-500LL-10	1PS0504- <b>BJ</b> - <b>0EA0</b>	5400 82
630	500 L	596	10082	1)	96.2	96.2	95.4	0.80	1180	945	685	0.9	5.3	2.4	ANSA-500LN-10	1PS0505- <b>BJ</b> - <b>0EA0</b>	6100 98
670	500 L	597	10719	1)	96.3	96.2	95.4	0.80	1260	1005	730	0.95	5.5	2.45	ANSA-500LN-10	1PS0507- <b>BJ</b> - <b>0EA0</b>	6100 98
750	500 L	597	11998	1)	96.4	96.3	95.5	0.79	–	–	820	0.95	5.5	2.45	ANSA-500LX-10	1PS0508- <b>BJ</b> - <b>0EA0</b>	6500 108
<b>Operating modes</b>																	
												Frame size			Order code		
Mains-fed operation												100 ... 450	0		–		
Converter-fed operation, standard insulation												100 ... 450	1		–		
Converter-fed operation with special insulation (derating approx. 5 %)												100 ... 500	2		–		
Mains-fed operation, pre-formed coil												500	3		–		
Converter-fed operation, pre-formed coil												500	4		–		
<b>Voltages</b>																	
												Frame size			Order code		
690 VΔ, 50 Hz												355 ... 500	0		–		
500 VΔ, 50 Hz												355 ... 450	5		–		
400 V/690 V, 50 Hz												100 ... 400	6		–		
690 VY, 50 Hz												100 ... 400	8		–		
For other voltages see Page 3/23												100 ... 500	9		...		
<b>Types of construction</b>																	
												Frame size			Order code		
IM B3												100 ... 500	0		–		
IM V1/cover												100 ... 450	4		–		
IM B35												100 ... 500	6		–		
For other types of construction see from Page 1/28												100 ... 500	9		...		

1) Outside the IE code classification according to IEC 60034-30.

# Motors without Explosion Protection

## LOHER CHEMSTAR and VARIO 1PS0 motor series

### Motors in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted,	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J			
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	cos φ rated,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,	I <sub>ra</sub> ted,					T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>	T <sub>B</sub> / T <sub>ra</sub>
50 Hz	50 Hz	50 Hz	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	50 Hz,	ted	ted	ted					
kW	FS	rpm	Nm	–	4/4	3/4	2/4	4/4	400 V	500 V	690 V	–	–	–	kg	kgm <sup>2</sup>		
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																		
12-pole: 500 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
0.37	100 L												ANGA-100LR-12	1PS0106-BD-0FA3	53	–		
0.55	100 L												ANGA-100LS-12	1PS0108-BD-0FA3	55	–		
0.75	112 M												ANGA-112MS-12 <sup>2)</sup>	1PS0113-BD-0FA3	66	–		
1.1	132 S												ANGA-132SS-12	1PS0131-BD-0FA3	93	–		
1.5	132 M												ANGA-132MR-12	1PS0133-BD-0FA3	102	–		
2.2	160 M												ANGA-160MR-12	1PS0163-BD-0FA3	176	–		
3	160 M												ANGA-160MS-12	1PS0165-BD-0FA3	192	–		
4	160 L												ANGA-160LS-12	1PS0166-BD-0FA3	192	–		
5.5	180 L												ANGA-180LS-12	1PS0186-BD-0FA3	255	–		
7.5	200 L												ANGA-200LS-12	1PS0206-BD-0FA3	333	–		
11	225 S												ANGA-225SR-12	1PS0220-BD-0FA3	415	–		
15	225 M												ANGA-225MS-12	1PS0223-BD-0FA3	445	–		
18.5	250 M												ANGA-250MM-12	1PS0253-BD-0FA3	560	–		
22	280 S												ANGA-280SL-12	1PS0280-BD-0FA3	780	–		
30	280 M												ANGA-280MM-12	1PS0283-BD-0FA3	850	–		
37	315 S												ANGA-315SL-12	1PS0311-BD-0FA3	950	–		
45	315 M												ANGA-315ML-12	1PS0313-BD-0FA3	1030	–		
55	315 M												ANGA-315MN-12	1PS0315-BD-0FA3	1110	–		
75	315 L												ANGA-315LL-12	1PS0316-BD-0FA3	1300	–		
90	315 L												ANGA-315LM-12	1PS0317-BD-0FA3	1410	–		
110	355 M												ANGA-355MD-12	1PS0355-BD-0FA0	1670	–		
140	355 L												ANGA-355LB-12	1PS0356-BD-0FA0	1900	–		
<b>LOHER VARIO</b>																		
160	355 L	493	3097	<sup>1)</sup>	94.1	94.3	93.8	0.78	313	250	181	0.95	4.6	2.1	ANSA-355LC-12	1PS0357-BH-0FA0	2350	17
180	355 L	494	3481	<sup>1)</sup>	94.3	94.5	93.9	0.77	355	285	205	1.0	4.7	2.15	ANSA-355LD-12	1PS0358-BH-0FA0	2400	19
190	355 L	494	3672	<sup>1)</sup>	94.5	94.7	94.3	0.77	375	300	218	0.95	4.6	2.2	ANSA-355LX-12	1PS0358-BJ-0FA0	2550	18.5
200	400 L	494	3861	<sup>1)</sup>	94.9	95.1	94.7	0.78	390	310	225	0.95	4.6	2.05	ANSA-400LL-12	1PS0404-BJ-0FA0	2800	26.5
225	400 L	495	4341	<sup>1)</sup>	95.1	95.3	94.9	0.79	430	345	250	1.0	4.7	2.15	ANSA-400LN-12	1PS0405-BJ-0FA0	3100	32
250	400 L	495	4824	<sup>1)</sup>	95.2	95.4	95.0	0.78	485	390	282	1.0	4.6	2.1	ANSA-400LN-12	1PS0407-BJ-0FA0	3100	32
280	400 L	495	5402	<sup>1)</sup>	95.2	95.4	95.0	0.78	545	435	315	0.95	4.8	2.2	ANSA-400LX-12	1PS0408-BJ-0FA0	3300	35
315	450 L	495	6075	<sup>1)</sup>	95.5	95.7	95.3	0.78	610	490	355	0.9	4.5	1.95	ANSA-450LL-12	1PS0454-BJ-0FA0	4100	42
355	450 L	495	6842	<sup>1)</sup>	95.6	95.8	95.4	0.78	690	550	400	0.9	4.6	2.0	ANSA-450LN-12	1PS0455-BJ-0FA0	4400	50
400	450 L	495	7709	<sup>1)</sup>	95.7	95.9	95.4	0.78	785	630	455	0.95	4.6	2.0	ANSA-450LN-12	1PS0457-BJ-0FA0	4400	50
420	450 L	495	8095	<sup>1)</sup>	95.7	95.9	95.4	0.78	810	650	470	0.95	4.7	2.05	ANSA-450LX-12	1PS0458-BJ-0FA0	4600	55
450	500 L	496	8662	<sup>1)</sup>	95.8	95.8	95.2	0.80	845	675	490	0.9	4.8	2.05	ANSA-500LL-12	1PS0504-BJ-0FA0	5400	82
500	500 L	496	9617	<sup>1)</sup>	95.8	95.8	95.1	0.79	950	760	550	0.95	5.1	2.2	ANSA-500LN-12	1PS0505-BJ-0FA0	6100	98
560	500 L	496	10779	<sup>1)</sup>	95.9	96.0	95.3	0.80	1055	840	610	0.9	4.9	2.1	ANSA-500LN-12	1PS0507-BJ-0FA0	6100	98
600	500 L	496	11546	<sup>1)</sup>	96.0	96.1	95.5	0.80	–	905	655	0.9	5.1	2.15	ANSA-500LX-12	1PS0508-BJ-0FA0	6350	108
<b>Operating modes</b>																		
Mains-fed operation											Frame size				Order code			
Converter-fed operation, standard insulation											100 ... 450	0			–			
Converter-fed operation with special insulation (derating approx. 5 %)											100 ... 450	1			–			
Mains-fed operation, pre-formed coil											160 ... 500	2			–			
Converter-fed operation, pre-formed coil											450 ... 500	3			–			
											450 ... 500	4			–			
<b>Voltages</b>																		
690 VΔ, 50 Hz											Frame size				Order code			
230 V/400 V, 50 Hz											355 ... 500	0			–			
500 VY, 50 Hz											100 ... 112	1			–			
500 VΔ, 50 Hz											100 ... 315	3			–			
400 V/690 V, 50 Hz											355 ... 450	5			–			
690 VY, 50 Hz											100 ... 400	6			–			
For other voltages see Page 3/23											100 ... 400	8			–			
											100 ... 500	9			–			
											100 ... 500	9			...			
<b>Types of construction</b>																		
IM B3											Frame size				Order code			
IM B5											100 ... 500	0			–			
IM B34											100 ... 315	1			–			
IM B14											100 ... 112	2			–			
IM V1/cover											100 ... 112	3			–			
IM B35											100 ... 450	4			–			
For other types of construction see from Page 1/28											100 ... 500	6			–			
											100 ... 500	9			–			

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Rated output, partial utilization up to 155 °C (F).



## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors in cast-iron and steel versions

## Selection and ordering data (continued)

$P_{ra}$ rated, 50 Hz	Frame size	Motor type	Article No.	$m$ IM B3
<b>kW</b>	<b>FS</b>			<b>kg</b>
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>				
14-pole: 430 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
125	355 L	ANSA-355LC-14	1PS0357-BH-0GA0	2350
140	355 L	ANSA-355LD-14	1PS0358-BH-0GA0	2400
160	400 L	ANSA-400LL-14	1PS0404-BJ-0GA0	2800
180	400 L	ANSA-400LN-14	1PS0405-BJ-0GA0	3100
200	400 L	ANSA-400LN-14	1PS0407-BJ-0GA0	3100
225	400 L	ANSA-400LX-14	1PS0408-BJ-0GA0	3250
250	450 L	ANSA-450LL-14	1PS0454-BJ-0GA0	4100
280	450 L	ANSA-450LN-14	1PS0455-BJ-0GA0	4400
315	450 L	ANSA-450LN-14	1PS0457-BJ-0GA0	4400
340	450 L	ANSA-450LX-14	1PS0458-BJ-0GA0	4600
355	500 L	ANSA-500LL-14	1PS0504-BJ-0GA0	5400
400	500 L	ANSA-500LN-14	1PS0505-BJ-0GA0	6100
450	500 L	ANSA-500LN-14	1PS0507-BJ-0GA0	6100
500	500 L	ANSA-500LX-14	1PS0508-BJ-0GA0	6500
16-pole: 375 rpm at 50 Hz				
LOHER CHEMSTAR on request				
LOHER VARIO				
100	355 L	ANSA-355LC-16	1PS0357-BH-0HA0	2350
110	355 L	ANSA-355LD-16	1PS0358-BH-0HA0	2400
132	400 L	ANSA-400LL-16	1PS0405-BJ-0HA0	2800
160	400 L	ANSA-400LN-16	1PS0407-BJ-0HA0	3100
180	400 L	ANSA-400LX-16	1PS0408-BJ-0HA0	3250
200	450 L	ANSA-450LL-16	1PS0454-BJ-0HA0	4100
225	450 L	ANSA-450LN-16	1PS0455-BJ-0HA0	4400
250	450 L	ANSA-450LN-16	1PS0457-BJ-0HA0	4400
265	450 L	ANSA-450LX-16	1PS0458-BJ-0HA0	4650
280	500 L	ANSA-500LL-16	1PS0504-BJ-0HA0	5400
315	500 L	ANSA-500LN-16	1PS0505-BJ-0HA0	6100
355	500 L	ANSA-500LN-16	1PS0507-BJ-0HA0	6100
400	500 L	ANSA-500LX-16	1PS0508-BJ-0HA0	6650
<b>Operating modes</b>	Frame size			Order code
Mains-fed operation	355 ... 450	0		–
Converter-fed operation, standard insulation	355 ... 450	1		–
Converter-fed operation with special insulation (derating approx. 5 %)	355 ... 500	2		–
Mains-fed operation, pre-formed coil	355 ... 500	3		–
Converter-fed operation, pre-formed coil	355 ... 500	4		–
<b>Voltages</b>	Frame size			Order code
690 VΔ, 50 Hz	355 ... 500	0		–
500 VΔ, 50 Hz	355 ... 450	5		–
400 V/690 V, 50 Hz	355 ... 400	6		–
690 VY, 50 Hz	355 ... 400	8		–
For other voltages <a href="#">see Page 3/23</a>	355 ... 500	9		...
<b>Types of construction</b>	Frame size			Order code
IM B3	355 ... 500	0		–
IM V1/cover	355 ... 450	4		–
IM B35	355 ... 500	6		–
For other types of construction <a href="#">see from Page 1/28</a>	355 ... 500	9		...

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Motors in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> - ted, 60 Hz	Frame size	Operating values at rated output							Motor type			Article No.	m IM B3	J kgm <sup>2</sup>		
		n <sub>ra</sub> - ted, 60 Hz	T <sub>ra</sub> - ted, 60 Hz	IE class	η <sub>ra</sub> - ted, 60 Hz, 4/4	η <sub>ra</sub> - ted, 60 Hz, 3/4	η <sub>ra</sub> - ted, 60 Hz, 2/4	cos φ rated, 4/4	I <sub>ra</sub> - ted, 480 V	T <sub>LR</sub> / T <sub>ra</sub> - ted	I <sub>LR</sub> / I <sub>ra</sub> - ted				T <sub>B</sub> / T <sub>ra</sub> - ted	
KW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–	–	–	–	
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																
2-pole: 3600 rpm at 60 Hz																
<b>LOHER CHEMSTAR</b>																
1.8	090 L	3460	4.97	IE2	85.4	85.6	84.5	0.88	2.85	3.0	7.0	2.8	ANGA-090LR-02	1PS0095-BD-0AA3	36	0.0020
2.6	090 L	3460	7.2	IE2	85.5	85.8	84.7	0.84	4.4	3.0	7.0	3.0	ANGA-090LS-02	1PS0098-BD-0AA3	36	0.0020
3.6	100 L	3510	9.8	IE2	87.5	87.1	85.2	0.85	5.8	2.9	8.0	3.0	ANGA-100LS-02	1PS0106-BD-0AA3	51	0.0041
4.5	112 M	3490	12.3	IE2	87.5	87.7	87.2	0.94	6.6	2.7	7.8	3.0	ANGA-112MS-02	1PS0113-BD-0AA3	66	0.0075
6.6	132 S	3510	18.0	IE2	89.5	88.7	87.2	0.89	10.0	3.0	7.8	3.0	ANGA-132SR-02	1PS0131-BD-0AA3	83	0.014
9	132 S	3510	24.5	IE2	90.1	91.0	90.1	0.91	13.1	2.7	7.0	3.0	ANGA-132SS-02	1PS0132-BD-0AA3	95	0.020
13.2	160 M	3550	35.5	IE2	90.8	91.2	91.0	0.88	19.9	2.0	7.5	2.6	ANGA-160MR-02	1PS0163-BD-0AA3	176	0.075
18	160 M	3550	48.4	IE2	91.5	91.8	91.2	0.89	26.5	1.9	7.0	2.6	ANGA-160MS-02	1PS0165-BD-0AA3	176	0.092
22	160 L	3560	59	IE2	92.0	92.5	91.5	0.89	32.5	2.0	7.0	2.5	ANGA-160LS-02	1PS0166-BD-0AA3	192	0.092
26	180 M	3560	70	IE2	92.5	93.0	92.4	0.89	38.0	2.6	7.0	2.6	ANGA-180MS-02	1PS0183-BD-0AA3	246	0.16
36	200 L	3570	96	IE2	92.9	93.0	92.3	0.89	52.0	2.0	7.0	2.6	ANGA-200LR-02	1PS0206-BD-0AA3	333	0.20
44	200 L	3570	118	IE2	93.5	93.8	93.4	0.89	64.0	2.0	7.2	2.6	ANGA-200LS-02	1PS0208-BD-0AA3	349	0.23
54	225 M	3575	144	IE2	93.4	93.3	92.2	0.88	79.0	2.2	7.6	2.6	ANGA-225MS-02	1PS0223-BD-0AA3	420	0.34
66	250 M	3575	147	IE2	93.6	93.3	92.3	0.86	82.0	1.9	7.3	2.8	ANGA-250MM-02	1PS0253-BD-0AA3	540	0.45
90	280 S	3575	240	IE2	94.5	94.5	93.0	0.90	127	1.7	7.0	2.4	ANGA-280SL-02	1PS0280-BD-0AA3	775	0.88
110	280 M	3580	293	IE2	95.1	95.0	93.9	0.89	156	2.4	7.7	2.7	ANGA-280MM-02	1PS0283-BD-0AA3	830	1.03
125	315 S	3580	333	IE2	94.6	94.4	93.2	0.87	183	1.9	7.0	2.5	ANGA-315SL-02	1PS0311-BD-0AA3	960	1.55
145	315 M	3580	387	IE2	95.1	95.0	93.8	0.89	205	2.0	7.7	2.6	ANGA-315ML-02	1PS0313-BD-0AA3	1020	1.85
180	315 M	3581	480	IE2	95.4	95.4	94.4	0.88	260	2.2	7.5	2.7	ANGA-315MN-02	1PS0315-BD-0AA3	1100	2.2
220	315 L	3580	587	IE2	95.8	95.9	95.4	0.90	305	2.5	7.3	2.7	ANGA-315LL-02	1PS0316-BD-0AA3	1310	2.8
270	315 L	3580	720	IE2	95.8	95.9	95.4	0.90	375	2.6	7.7	2.7	ANGA-315LN-02	1PS0318-BD-0AA3	1450	3.5
315	355 L	3580	840	IE2	95.5	95.3	94.6	0.90	440	2.0	7.2	2.7	ANGA-355LB-02	1PS0356-BD-0AA0	1580	4.7
<b>LOHER VARIO</b>																
400	355 L	3583	1066	1)	96.4	96.3	95.6	0.92	540	1.15	6.7	2.75	ANSA-355LC-02	1PS0357-BH-0AA0	2100	3.6
450	355 L	3585	1198	1)	96.6	96.5	95.7	0.92	610	1.2	7.4	3.0	ANSA-355LD-02	1PS0358-BH-0AA0	2200	4
500	355 L	3579	1334	1)	96.3	96.2	95.5	0.91	680	0.9	6.3	2.65	ANSA-355LX-02	1PS0358-BJ-0AA0	2300	5
500	400 L	3581	1333	1)	96.4	96.3	95.5	0.90	690	0.65	5.7	2.45	ANSA-400LL-02	1PS0404-BJ-0AA0	2400	6
560	400 L	3584	1492	1)	96.6	96.5	95.7	0.91	770	0.8	6.5	2.8	ANSA-400LN-02	1PS0405-BJ-0AA0	2600	7
630	400 L	3583	1679	1)	96.7	96.6	96.0	0.91	860	0.75	6.1	2.65	ANSA-400LN-02	1PS0407-BJ-0AA0	2600	7
710	400 L	2585	1891	1)	96.7	96.6	95.9	0.91	675 <sup>2)</sup>	0.8	6.5	2.75	ANSA-400LX-02	1PS0408-BJ-0AA0	2900	8.3
710	450 L	3586	1890	1)	96.3	96.1	95.1	0.90	685 <sup>2)</sup>	0.7	6.2	2.7	ANSA-450LL-02	1PS0455-BJ-0AA0	3500	12
800	450 L	3586	2130	1)	96.5	96.3	95.3	0.91	762 <sup>2)</sup>	0.8	6.4	2.85	ANSA-450LN-02	1PS0457-BJ-0AA0	3900	14
900	450 L	3586	2396	1)	96.6	96.4	95.6	0.90	865 <sup>2)</sup>	0.8	6.4	2.8	ANSA-450LN-02	1PS0458-BJ-0AA0	3900	14
<b>Operating modes</b>										Frame size				Order code		
Mains-fed operation										90 ... 450 (≤ 800 kW)			0	–		
Converter-fed operation, standard insulation										90 ... 400			1	–		
Converter-fed operation with special insulation (derating approx. 5 %)										160 ... 450			2	–		
Mains-fed operation, pre-formed coil										450 (> 800 kW)... 450			3	–		
Converter-fed operation, pre-formed coil										450			4	–		
<b>Voltages</b>										Frame size				Order code		
For other voltages see Page 3/23										90 ... 450			9	...		
<b>Types of construction</b>										Frame size				Order code		
IM B3										90 ... 450			0	–		
IM B5										90 ... 315			1	–		
IM B34										90 ... 112			2	–		
IM B14										90 ... 112			3	–		
IM V1/cover										90 ... 400			4	–		
IM B35										90 ... 450			6	–		
For other types of construction see from Page 1/28										90 ... 450			9	...		

<sup>1)</sup> Outside the IE code classification according to IEC 60034-30.

<sup>2)</sup> Only possible with 690 V, 60 Hz (values apply to 690 V).

**Motors without Explosion Protection**  
 LOHER CHEMSTAR and VARIO 1PS0 motor series

Motors in cast-iron and steel versions

**Selection and ordering data** (continued)

P <sub>ra</sub> ted,	Frame size	Operating values at rated output							Motor type			Article No.	m IM B3	J kgm <sup>2</sup>		
		n <sub>ra</sub> ted,	T <sub>ra</sub> ted,	IE class	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	η <sub>ra</sub> ted,	cos φ rated,	I <sub>ra</sub> ted,	T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>				T <sub>B</sub> / T <sub>ra</sub>	
60 Hz		60 Hz	60 Hz		60 Hz,	60 Hz,	60 Hz,	60 Hz,	60 Hz,							
KW	FS	rpm	Nm	–	%	%	%	–	A	–	–	–		kg	kgm <sup>2</sup>	
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																
4-pole: 1800 rpm at 60 Hz																
<b>LOHER CHEMSTAR</b>																
1.3	090 L	1760	7.1	IE2	85.6	85.2	82.0	0.82	2.25	2.2	7.2	2.7	ANGA-090LR-04	1PS0095-BD-BD-OBA3	34	0.0044
1.8	090 L	1760	9.8	IE2	87.8	88.0	86.6	0.80	3.10	2.2	7.4	2.7	ANGA-090LS-04	1PS0098-BD-BD-OBA3	37	0.0044
2.6	100 L	1755	14.1	IE2	88.0	88.3	87.2	0.83	4.3	1.9	7.0	2.5	ANGA-100LR-04	1PS0106-BD-BD-OBA3	53	0.0060
3.6	100 L	1760	19.5	IE2	87.5	87.0	85.2	0.79	6.3	1.8	7.0	2.4	ANGA-100LS-04	1PS0108-BD-BD-OBA3	55	0.0071
4.8	112 M	1760	26.0	IE2	89.9	90.3	89.5	0.83	7.8	1.9	7.0	2.5	ANGA-112MS-04	1PS0113-BD-BD-OBA3	66	0.0126
6.6	132 S	1750	36.0	IE2	89.8	90.4	89.9	0.86	10.3	2.4	7.5	2.7	ANGA-132SR-04	1PS0131-BD-BD-OBA3	93	0.03
9	132 M	1765	48.7	IE2	90.1	90.5	89.7	0.86	14.0	2.0	7.5	2.2	ANGA-132MS-04	1PS0133-BD-BD-OBA3	102	0.03
13	160 M	1765	70	IE2	91.1	91.5	91.0	0.85	20.0	3.0	7.5	2.6	ANGA-160MR-04	1PS0163-BD-BD-OBA3	176	0.10
18	160 L	1770	97	IE2	92.5	92.8	92.5	0.85	27.5	3.0	7.5	2.6	ANGA-160LS-04	1PS0166-BD-BD-OBA3	192	0.13
22	180 M	1775	118	IE2	93.0	93.3	93.0	0.85	33.5	1.8	7.5	2.8	ANGA-180MR-04	1PS0183-BD-BD-OBA3	246	0.20
26	180 L	1775	140	IE2	93.7	94.0	93.5	0.85	39.5	1.8	7.5	2.6	ANGA-180LS-04	1PS0186-BD-BD-OBA3	255	0.23
36	200 L	1775	194	IE2	93.8	94.0	93.2	0.83	56.0	3.0	7.5	2.9	ANGA-200LS-04	1PS0206-BD-BD-OBA3	333	0.37
44	225 S	1780	236	IE2	93.7	94.0	93.5	0.85	66.0	2.0	7.0	2.6	ANGA-225SR-04	1PS0220-BD-BD-OBA3	415	0.64
54	225 M	1780	290	IE2	94.2	94.7	94.6	0.85	81.0	2.0	7.0	2.6	ANGA-225MS-04	1PS0223-BD-BD-OBA3	445	0.72
66	250 M	1780	295	IE2	94.1	94.1	93.5	0.86	82.0	2.3	7.7	2.7	ANGA-250MM-04	1PS0253-BD-BD-OBA3	540	0.79
90	280 S	1785	481	IE2	94.6	94.8	94.5	0.84	136	2.2	7.0	2.5	ANGA-280SL-04	1PS0280-BD-BD-OBA3	820	1.44
110	280 M	1785	588	IE2	95.2	95.2	94.8	0.84	165	2.5	7.0	2.7	ANGA-280MM-04	1PS0283-BD-BD-OBA3	870	1.66
125	315 S	1787	668	IE2	95.0	95.0	94.0	0.82	193	2.2	7.0	2.5	ANGA-315SL-04	1PS0311-BD-BD-OBA3	960	2.2
145	315 M	1787	775	IE2	95.1	95.2	94.7	0.84	220	2	7.0	2.2	ANGA-315ML-04	1PS0313-BD-BD-OBA3	1040	2.9
180	315 M	1787	962	IE2	95.4	95.4	94.8	0.83	275	2.4	7.5	2.5	ANGA-315MN-04	1PS0315-BD-BD-OBA3	1120	3.4
220	315 L	1787	1176	IE2	95.4	95.6	95.0	0.84	330	2.3	7.5	2.5	ANGA-315LL-04	1PS0316-BD-BD-OBA3	1340	3.9
270	315 L	1787	1443	IE2	95.8	95.8	95.5	0.85	400	2.3	7.5	2.4	ANGA-315LM-04	1PS0317-BD-BD-OBA3	1420	4.2
315	355 L	1790	1680	IE2	95.4	95.5	95.2	0.85	465	1.8	7.0	2.5	ANGA-355LB-04	1PS0356-BD-BD-OBA2	1730	6.8
315	355 L	1791	1680	IE2	95.6	96.0	95.5	0.86	460	1.1	7.0	2.4	ANGA-355LB-04 <sup>2)</sup>	1PS0357-BD-BD-OBB2	1730	6.8
<b>LOHER VARIO</b>																
400	355 L	1791	2133	1)	96.4	96.3	95.5	0.86	0	1.1	6.5	2.3	ANSA-355LC-04	1PS0358-BH-BH-OBA0	2300	7.7
450	355 L	1791	2399	1)	96.5	96.4	95.6	0.86	0	1.1	6.5	2.3	ANSA-355LD-04	1PS0350-BH-BH-OBA0	2350	8.5
500	355 L	1791	2664	1)	96.6	96.5	95.9	0.86	0	1.05	6.3	2.45	ANSA-355LN-04	1PS0357-BJ-BJ-OBA0	2400	9.0
560	355 L	1792	2984	1)	96.7	96.6	95.9	0.85	0	1.0	6.5	2.5	ANSA-355LX-04	1PS0358-BJ-BJ-OBA0	2500	9.5
560	400 L	1791	2984	1)	96.5	96.4	95.6	0.88	0	1.0	6.2	2.55	ANSA-400LL-04	1PS0404-BJ-BJ-OBA0	2700	13
630	450 L	1791	3357	1)	96.6	96.5	95.8	0.89	0	1.0	6.0	2.45	ANSA-400LN-04	1PS0405-BJ-BJ-OBA0	2900	15
710	500 L	1791	3784	1)	96.7	96.6	96.0	0.89	0	0.95	5.7	2.3	ANSA-400LN-04	1PS0407-BJ-BJ-OBA0	2900	15
800	500 L	1792	4263	1)	96.8	96.8	96.1	0.88	0	0.95	6.1	2.45	ANSA-400LX-04	1PS0408-BJ-BJ-OBA0	3100	17
900	500 L	1793	4792	1)	96.9	96.8	96.1	0.88	0	0.9	6.4	2.55	ANSA-450LL-04	1PS0455-BJ-BJ-OBA0	3800	24.5
1000	500 L	1793	5324	1)	96.9	96.8	96.2	0.88	980 <sup>3)</sup>	0.85	6.0	2.4	ANSA-450LN-04	1PS0457-BJ-BJ-OBA0	4300	29
<b>Operating modes</b>										Frame size					Order code	
Mains-fed operation										90 ... 450 (≤ 800 kW)			0		–	
Converter-fed operation, standard insulation										90 ... 400			1		–	
Converter-fed operation with special insulation (derating approx. 5 %)										160 ... 500			2		–	
Mains-fed operation, pre-formed coil										450 (> 800 kW)... 500			3		–	
Converter-fed operation, pre-formed coil										450 ... 500			4		–	
<b>Voltages</b>										Frame size					Order code	
For other voltages see Page 3/23										90 ... 500			9		...	
<b>Types of construction</b>										Frame size					Order code	
IM B3										90 ... 500			0		–	
IM B5										90 ... 315			1		–	
IM B34										90 ... 112			2		–	
IM B14										90 ... 112			3		–	
IM V1/cover										90 ... 400			4		–	
IM B35										90 ... 500			6		–	
For other types of construction see from Page 1/28										90 ... 500			9		...	

1) Outside the IE code classification according to IEC 60034-30.

3) Only possible with 690 V, 60 Hz (values apply to 690 V).

2) Motor with special rotor (Cu).

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Motors in cast-iron and steel versions

#### Selection and ordering data (continued)

P <sub>ra</sub> ted, 60 Hz	Frame size	Operating values at rated output							Motor type			Article No.	m IM B3	J kgm <sup>2</sup>	
		n <sub>ra</sub> ted, 60 Hz	T <sub>ra</sub> ted, 60 Hz	IE class	η <sub>ra</sub> ted, 60 Hz, 4/4	η <sub>ra</sub> ted, 60 Hz, 3/4	η <sub>ra</sub> ted, 60 Hz, 2/4	cos φ rated, 4/4	I <sub>ra</sub> ted, 480 V	T <sub>LR</sub> / T <sub>ra</sub>	I <sub>LR</sub> / I <sub>ra</sub>				T <sub>B</sub> / T <sub>ra</sub>
<b>KW</b>	<b>FS</b>	rpm	Nm	–	%	%	%	–	A	–	–	–		kg	kgm <sup>2</sup>

- Cooling: self-ventilated (IC 411)
- Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30
- Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %

6-pole: 1200 rpm at 60 Hz

#### LOHER CHEMSTAR

<b>0.75</b>	<b>090 L</b>	1160	6.2	IE2	81.8	82.0	80.1	0.72	1.53	1.5	5.0	2.5	ANGA-090LR-06	<b>1PS0095-BD-0CA3</b>	36	0.0044
<b>0.9</b>	<b>090 L</b>	1160	7.4	IE2	82.0	82.0	80.2	0.72	1.83	1.4	5.1	2.4	ANGA-090LS-06	<b>1PS0098-BD-0CA3</b>	42	0.0044
<b>1.25</b>	<b>100 L</b>	1175	10.2	IE2	85.5	85.2	82.3	0.73	2.40	1.5	5.6	2.4	ANGA-100LS-06	<b>1PS0106-BD-0CA3</b>	55	0.010
<b>1.8</b>	<b>112 M</b>	1180	14.6	IE2	86.6	86.5	83.0	0.73	3.40	1.3	5.8	2.5	ANGA-112MS-06	<b>1PS0113-BD-0CA3</b>	66	0.019
<b>3</b>	<b>132 S</b>	1170	24.5	IE2	87.9	87.6	85.3	0.74	5.5	2.4	6.6	3.0	ANGA-132SR-06	<b>1PS0131-BD-0CA3</b>	92	0.033
<b>4</b>	<b>132 M</b>	1160	32.9	IE2	88.3	88.9	88.1	0.79	6.9	2.1	6.6	2.7	ANGA-132MR-06	<b>1PS0133-BD-0CA3</b>	96	0.045
<b>5.5</b>	<b>132 M</b>	1180	44.5	IE2	90.0	90.2	89.0	0.80	9.2	1.5	6.5	2.3	ANGA-132MS-06	<b>1PS0135-BD-0CA3</b>	104	0.045
<b>7.5</b>	<b>160 M</b>	1170	61	IE2	89.6	89.7	88.0	0.80	12.6	1.3	6.2	2.4	ANGA-160MR-06	<b>1PS0163-BD-0CA3</b>	176	0.088
<b>11</b>	<b>160 L</b>	1170	90	IE2	90.2	90.4	89.0	0.80	18.3	1.3	6.5	2.4	ANGA-160LS-06	<b>1PS0166-BD-0CA3</b>	192	0.11
<b>15</b>	<b>180 L</b>	1180	121	IE2	91.0	91.4	90.7	0.81	24.5	2.4	7.0	2.5	ANGA-180LS-06	<b>1PS0186-BD-0CA3</b>	255	0.28
<b>18.5</b>	<b>200 L</b>	1180	150	IE2	91.7	91.7	90.8	0.80	30.5	2.5	6.8	2.6	ANGA-200LR-06	<b>1PS0206-BD-0CA3</b>	333	0.45
<b>22</b>	<b>200 L</b>	1180	178	IE2	91.8	91.8	91.0	0.80	36.0	2.5	7.0	2.6	ANGA-200LS-06	<b>1PS0208-BD-0CA3</b>	349	0.49
<b>30</b>	<b>225 M</b>	1185	242	IE2	93.0	93.0	92.0	0.83	46.5	1.6	7.0	2.8	ANGA-225MS-06	<b>1PS0223-BD-0CA3</b>	430	0.92
<b>37</b>	<b>250 M</b>	1185	298	IE2	93.0	93.0	91.1	0.80	37.0	2.2	7.0	2.2	ANGA-250MM-06	<b>1PS0253-BD-0CA3</b>	560	1.0
<b>45</b>	<b>280 S</b>	1185	363	IE2	93.6	93.6	92.5	0.80	37.5	2.3	6.5	2.5	ANGA-280SL-06	<b>1PS0280-BD-0CA3</b>	780	2.5
<b>55</b>	<b>280 M</b>	1188	442	IE2	93.8	93.6	93.0	0.90	45.5	2.4	7.0	2.8	ANGA-280MM-06	<b>1PS0283-BD-0CA3</b>	850	2.9
<b>75</b>	<b>315 S</b>	1190	602	IE2	94.5	94.6	94.3	0.90	62.0	2.3	7.2	2.4	ANGA-315SL-06	<b>1PS0311-BD-0CA3</b>	1030	3.3
<b>90</b>	<b>315 M</b>	1190	722	IE2	94.5	94.6	94.3	0.90	75.0	2.2	7.2	2.3	ANGA-315ML-06	<b>1PS0313-BD-0CA3</b>	1100	4.0
<b>110</b>	<b>315 M</b>	1190	883	IE2	95.0	95.0	94.3	0.90	90.0	1.8	7.1	2.2	ANGA-315MM-06	<b>1PS0314-BD-0CA3</b>	1190	4.9
<b>132</b>	<b>315 M</b>	1190	1059	IE2	95.2	95.2	94.3	0.90	108	1.8	7.2	2.2	ANGA-315MN-06	<b>1PS0315-BD-0CA3</b>	1180	4.9
<b>160</b>	<b>315 L</b>	1190	1284	IE2	95.2	95.2	94.6	0.90	134	2.0	7.5	2.3	ANGA-315LL-06	<b>1PS0316-BD-0CA3</b>	1400	6.0
<b>200</b>	<b>315 L</b>	1192	1602	IE2	95.1	95.2	94.6	0.80	172	2.4	7.4	2.6	ANGA-315LM-06	<b>1PS0317-BD-0CA3</b>	1600	6.8
<b>250</b>	<b>355 L</b>	1194	1999	IE2	95.4	95.5	94.7	0.90	210	1.1	7.1	2.4	ANGA-355LB-06	<b>1PS0356-BD-0CB2</b>	1730	9.1

#### LOHER VARIO on request

Operating modes	Frame size		Order code
Mains-fed operation	90 ... 355	0	–
Converter-fed operation, standard insulation	90 ... 355	1	–
Converter-fed operation with special insulation (derating approx. 5 %)	160 ... 355	2	–
Voltages	Frame size		Order code
For other voltages <a href="#">see Page 3/23</a>	90 ... 355	9	...
Types of construction	Frame size		Order code
IM B3	90 ... 355	0	–
IM B5	90 ... 355	1	–
IM B34	90 ... 112	2	–
IM B14	90 ... 112	3	–
IM V1/cover	90 ... 355	4	–
IM B35	90 ... 355	6	–
For other types of construction <a href="#">see from Page 1/28</a>	90 ... 355	9	...

<sup>1)</sup> Motor with special rotor (Cu).

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{rated}$ , 50 Hz	Frame size	Motor type	Article No.	m IM B3
kW	FS			kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>				
4-/2-pole: 1500/3000 rpm at 50 Hz with one winding connected in Dahlander circuit for fan drive				
<b>LOHER CHEMSTAR</b>				
0.5/2	90 L	AVGA-090LS-42	1PS0098-ND-0NA3	37
0.65/2.4	100 L	AVGA-100LR-42	1PS0106-ND-0NA3	53
0.8/3	100 L	AVGA-100LS-42	1PS0108-ND-0NA3	55
1.1/4.1	112 M	AVGA-112MS-42	1PS0113-ND-0NA3	66
1.6/6	132 S	AVGA-132SR-42	1PS0131-ND-0NA3	93
2.2/9	132 M	AVGA-132MR-42	1PS0133-ND-0NA3	102
3/12	160 M	AVGA-160MR-42	1PS0163-ND-0NA3	176
4/16	160 L	AVGA-160LS-42	1PS0166-ND-0NA3	192
5.5/20	180 M	AVGA-180MR-42	1PS0183-ND-0NA3	246
6.3/25	180 L	AVGA-180LS-42 <sup>1)</sup>	1PS0186-ND-0NA3	255
8.5/33	200 L	AVGA-200LS-42	1PS0206-ND-0NA3	333
10.5/38	225 S	AVGA-225SR-42	1PS0220-ND-0NA3	415
13/46	225 M	AVGA-225MS-42	1PS0223-ND-0NA3	455
15/55	250 M	AVGA-250MM-42	1PS0253-ND-0NA3	560
20/75	280 S	AVGA-280SL-42	1PS0280-ND-0NA3	780
24/90	280 M	AVGA-280MM-42	1PS0283-ND-0NA3	850
27/110	315 S	AVGA-315SL-42 <sup>2)</sup>	1PS0311-ND-0NA3	970
33/132	315 M	AVGA-315ML-42 <sup>2)</sup>	1PS0313-ND-0NA3	1040
37/145	315 M	AVGA-315MN-42 <sup>2)</sup>	1PS0315-ND-0NA3	1120
44/172	315 L	AVGA-315LL-42 <sup>2)</sup>	1PS0316-ND-0NA3	1340
50/200	315 L	AVGA-315LM-42 <sup>2)</sup>	1PS0317-ND-0NA3	1420
65/250	355 L	AVGA-355LB-42 <sup>2)</sup>	1PS0356-ND-0NA0	1730
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 355	0	-
Converter-fed operation, standard insulation		90 ... 355	1	-
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	-
500 VY, 50 Hz		90 ... 315	3	-
400 V, 50 Hz		90 ... 355	6	-
690 VY, 50 Hz		90 ... 355	8	-
For other voltages see Page 3/23		90 ... 355	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 355	0	-
IM B5		90 ... 315	1	-
IM B34		90 ... 112	2	-
IM B14		90 ... 112	3	-
IM V1/cover		90 ... 355	4	-
IM B35		90 ... 355	6	-
For other types of construction see from Page 1/28		90 ... 355	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

<sup>2)</sup> Motor with special rotor (Cu).

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Pole-changing motors in cast-iron and steel versions

### Selection and ordering data (continued)

$P_{rated}$ , 50 Hz kW	Frame size FS	Motor type	Article No.	<i>m</i> IM B3 kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>				
8-/4-pole: 750/1500 rpm at 50 Hz with one winding connected in Dahlander circuit for fan drive				
<b>LOHER CHEMSTAR</b>				
0.35/1.3	90 L	AVGA-090LS-84	1PS0098-ND-0QA3	37
0.45/2	100 L	AVGA-100LR-84	1PS0106-ND-0QA3	53
0.55/2.5	100 L	AVGA-100LS-84	1PS0108-ND-0QA3	55
0.9/3.7	112 M	AVGA-112MS-84	1PS0113-ND-0QA3	66
1.3/5	132 S	AVGA-132SR-84	1PS0131-ND-0QA3	93
1.7/6.8	132 M	AVGA-132MR-84	1PS0133-ND-0QA3	102
3/10	160 M	AVGA-160MR-84	1PS0163-ND-0QA3	176
3.5/13	160 L	AVGA-160LS-84	1PS0166-ND-0QA3	192
4/16	180 M	AVGA-180MR-84	1PS0183-ND-0QA3	246
5/20	180 L	AVGA-180LR-84	1PS0186-ND-0QA3	255
7/28	200 L	AVGA-200LR-84	1PS0206-ND-0QA3	333
8/33	225 S	AVGA-225SR-84	1PS0220-ND-0QA3	415
9.2/37	225 S	AVGA-225SS-84 <sup>1)</sup>	1PS0221-ND-0QA3	425
9.5/39	225 M	AVGA-225MR-84 <sup>1)</sup>	1PS0223-ND-0QA3	445
11/44	225 M	AVGA-225MS-84 <sup>1)</sup>	1PS0224-ND-0QA3	335
11/49	250 M	AVGA-250MM-84	1PS0253-ND-0QA3	560
17/68	280 S	AVGA-280SL-84	1PS0280-ND-0QA3	780
20/80	280 M	AVGA-280MM-84	1PS0283-ND-0QA3	850
22/95	315 S	AVGA-315SL-84	1PS0311-ND-0QA3	950
26/110	315 M	AVGA-315ML-84	1PS0313-ND-0QA3	1030
30/130	315 M	AVGA-315MN-84	1PS0315-ND-0QA3	1110
38/160	315 L	AVGA-315LL-84	1PS0316-ND-0QA3	1300
45/180	315 L	AVGA-315LM-84	1PS0317-ND-0QA3	1410
50/220	355 M	AVGA-355MB-84 <sup>2)</sup>	1PS0353-ND-0QB0	1560
60/275	355 L	AVGA-355LB-84 <sup>2)</sup>	1PS0356-ND-0QB0	1730
<b>LOHER VARIO</b> on request				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 355	0	–
Converter-fed operation, standard insulation		90 ... 355	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	–
500 VY, 50 Hz		90 ... 315	3	–
400 V, 50 Hz		90 ... 355	6	–
690 VY, 50 Hz		90 ... 355	8	–
For other voltages see Page 3/23		90 ... 355	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 355	0	–
IM B5		90 ... 315	1	–
IM B34		90 ... 112	2	–
IM B14		90 ... 112	3	–
IM V1/cover		90 ... 355	4	–
IM B35		90 ... 355	6	–
For other types of construction see from Page 1/28		90 ... 355	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

<sup>2)</sup> Motor with special rotor (Cu).

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{rated}$ , 50 Hz kW	Frame size FS	Motor type	Article No.	$m$ IM B3 kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>				
6-/4-pole: 1000/1500 rpm at 50 Hz with two separate windings for fan drive				
<b>LOHER CHEMSTAR</b>				
0.4/1.3	90 L	AVGA-090LS-64	1PS0098-ND-0PA3	37
0.6/1.8	100 L	AVGA-100LR-64	1PS0106-ND-0PA3	53
0.75/2.4	100 L	AVGA-100LS-64	1PS0108-ND-0PA3	55
0.9/3	112 M	AVGA-112MS-64	1PS0113-ND-0PA3	66
1.25/4.2	132 S	AVGA-132SR-64	1PS0131-ND-0PA3	93
1.65/5.5	132 M	AVGA-132MR-64	1PS0133-ND-0PA3	102
2.2/7.5	160 M	AVGA-160MR-64	1PS0163-ND-0PA3	176
3/9	160 M	AVGA-160MS-64	1PS0165-ND-0PA3	182
3.5/12	160 L	AVGA-160LS-64	1PS0166-ND-0PA3	192
4.5/14	180 M	AVGA-180MR-64	1PS0183-ND-0PA3	246
5.5/16.5	180 L	AVGA-180LS-64	1PS0186-ND-0PA3	255
7/20	200 L	AVGA-200LR-64	1PS0206-ND-0PA3	333
9/26	200 L	AVGA-200LS-64	1PS0208-ND-0PA3	341
10/31	225 S	AVGA-225SR-64	1PS0220-ND-0PA3	415
13/38	225 M	AVGA-225MS-64	1PS0223-ND-0PA3	445
17/48	250 M	AVGA-250MM-64	1PS0253-ND-0PA3	560
25/70	280 S	AVGA-280SL-64	1PS0280-ND-0PA3	780
30/82	280 M	AVGA-280MM-64	1PS0283-ND-0PA3	850
32/95	315 S	AVGA-315SL-64	1PS0311-ND-0PA3	980
37/115	315 M	AVGA-315ML-64	1PS0313-ND-0PA3	1040
47/135	315 M	AVGA-315MN-64	1PS0315-ND-0PA3	1120
55/160	315 L	AVGA-315LL-64 <sup>1)</sup>	1PS0316-ND-0PA3	1340
75/200	315 L	AVGA-315LM-64 <sup>1) 2)</sup>	1PS0317-ND-0PA3	1430
90/250	355 L	AVGA-355LB-64	1PS0356-ND-0PA0	1730
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 355	0	–
Converter-fed operation, standard insulation		90 ... 355	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	–
500 VY, 50 Hz		90 ... 315	3	–
400 V, 50 Hz		90 ... 355	6	–
690 VY, 50 Hz		90 ... 355	8	–
For other voltages see Page 3/23		90 ... 355	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 355	0	–
IM B5		90 ... 315	1	–
IM B34		90 ... 112	2	–
IM B14		90 ... 112	3	–
IM V1/cover		90 ... 355	4	–
IM B35		90 ... 355	6	–
For other types of construction see from Page 1/28		90 ... 355	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

<sup>2)</sup> Motor with special rotor (Cu).

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

Pole-changing motors in cast-iron and steel versions

### Selection and ordering data (continued)

$P_{rated}$ , 50 Hz kW	Frame size FS	Motor type	Article No.	$m$ IM B3 kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: double pole-changing for square-law load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>				
8-/6-pole: 750/1000 rpm at 50 Hz with two separate windings for fan drive				
<b>LOHER CHEMSTAR</b>				
0.32/0.75	90 L	AVGA-090LR-86	1PS0098-ND-ORA3	37
0.45/1	100 L	AVGA-100LR-86	1PS0106-ND-ORA3	53
0.55/1.3	100 L	AVGA-100LS-86	1PS0108-ND-ORA3	55
0.8/1.9	112 M	AVGA-112MS-86	1PS0113-ND-ORA3	66
1.1/2.6	132 S	AVGA-132SR-86	1PS0131-ND-ORA3	93
1.6/3.8	132 M	AVGA-132MR-86	1PS0133-ND-ORA3	102
2.5/6	160 M	AVGA-160MR-86	1PS0163-ND-ORA3	176
3.5/8	160 L	AVGA-160LS-86	1PS0166-ND-ORA3	192
5.5/12.5	180 L	AVGA-180LS-86	1PS0186-ND-ORA3	246
9.5/20	200 L	AVGA-200LR-86	1PS0206-ND-ORA3	333
11/24	225 S	AVGA-225SR-86	1PS0220-ND-ORA3	415
13/28	225 M	AVGA-225MS-86	1PS0223-ND-ORA3	445
16/34	250 M	AVGA-250MM-86	1PS0253-ND-ORA3	560
25/50	280 S	AVGA-280SL-86	1PS0280-ND-ORA3	780
30/60	280 M	AVGA-280MM-86	1PS0283-ND-ORA3	850
33/70	315 S	AVGA-315SL-86	1PS0311-ND-ORA3	960
40/85	315 M	AVGA-315ML-86	1PS0313-ND-ORA3	1030
47/100	315 M	AVGA-315MN-86	1PS0315-ND-ORA3	1110
55/120	315 L	AVGA-315LL-86	1PS0316-ND-ORA3	1300
70/150	315 L	AVGA-315LM-86 <sup>1) 2)</sup>	1PS0317-ND-ORA3	1420
85/190	355 L	AVGA-355LB-86	1PS0356-ND-ORA0	1730
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		90 ... 355	0	–
Converter-fed operation, standard insulation		90 ... 355	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		90 ... 112	1	–
500 VY, 50 Hz		90 ... 315	3	–
400 V, 50 Hz		90 ... 355	6	–
690 VY, 50 Hz		90 ... 355	8	–
For other voltages <a href="#">see Page 3/23</a>		90 ... 355	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		90 ... 355	0	–
IM B5		90 ... 315	1	–
IM B34		90 ... 112	2	–
IM B14		90 ... 112	3	–
IM V1/cover		90 ... 355	4	–
IM B35		90 ... 355	6	–
For other types of construction <a href="#">see from Page 1/28</a>		90 ... 355	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

<sup>2)</sup> Motor with special rotor (Cu).



## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

Pole-changing motors in cast-iron and steel versions

#### Selection and ordering data (continued)

$P_{rated}$ , 50 Hz kW	Frame size FS	Motor type	Article No.	$m$ IM B3 kg
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Mains-fed operation: triple pole-changing for constant load torque</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>				
8-/6-pole: 750/1000 rpm at 50 Hz with two separate windings for fan drive				
<b>LOHER CHEMSTAR</b>				
0.5/0.6/0.8	100 L	ANGA-100LR-33	1PS0106-■BD■-0SA3	53
0.7/0.8/1.1	100 L	ANGA-100LS-33	1PS0108-■BD■-0SA3	55
0.9/1.1/1.5	112 M	ANGA-112MR-33	1PS0113-■BD■-0SA3	66
1.3/1.6/2.2	132 S	ANGA-132SR-33	1PS0131-■BD■-0SA3	93
2.2/2.5/3.6	132 M	ANGA-132MR-33	1PS0133-■BD■-0SA3	102
3.3/4/5.5	160 M	ANGA-160MR-33	1PS0163-■BD■-0SA3	176
4.5/6/8	160 L	ANGA-160LR-33	1PS0166-■BD■-0SA3	192
6/8/11	180 M	ANGA-180MR-33	1PS0183-■BD■-0SA3	246
7/9/14	180 L	ANGA-180LR-33	1PS0186-■BD■-0SA3	255
12/15/18.5	200 L	ANGA-200LS-33	1PS0206-■BD■-0SA3	333
16/20/26	225 S	ANGA-225SS-33	1PS0220-■BD■-0SA3	415
19/22/30	225 M	ANGA-225MS-33 <sup>1)</sup>	1PS0223-■BD■-0SA3	445
24/28/36	250 M	ANGA-250MM-33	1PS0253-■BD■-0SA3	560
31/37/50	280 S	ANGA-280SL-33	1PS0280-■BD■-0SA3	780
37/45/60	280 M	ANGA-280MM-33	1PS0283-■BD■-0SA3	850
43/55/68	315 S	ANGA-315SL-33 <sup>2)</sup>	1PS0311-■BD■-0SA3	960
50/65/80	315 M	ANGA-315ML-33 <sup>2)</sup>	1PS0313-■BD■-0SA3	1040
60/75/95	315 M	ANGA-315MN-33 <sup>2)</sup>	1PS0315-■BD■-0SA3	1120
70/90/110	315 L	ANGA-315LL-33 <sup>2)</sup>	1PS0316-■BD■-0SA3	1350
<b>LOHER VARIO on request</b>				
<b>Operating modes</b>		Frame size		Order code
Mains-fed operation		100 ... 315	0	–
Converter-fed operation, standard insulation		100 ... 315	1	–
<b>Voltages</b>		Frame size		Order code
230 V, 50 Hz		100 ... 112	1	–
500 VY, 50 Hz		100 ... 315	3	–
400 V, 50 Hz		100 ... 315	6	–
690 VY, 50 Hz		100 ... 315	8	–
For other voltages see Page 3/23		100 ... 315	9	...
<b>Types of construction</b>		Frame size		Order code
IM B3		100 ... 315	0	–
IM B5		100 ... 315	1	–
IM B34		100 ... 112	2	–
IM B14		100 ... 112	3	–
IM V1/cover		100 ... 315	4	–
IM B35		100 ... 315	6	–
For other types of construction see from Page 1/28		100 ... 315	9	...

<sup>1)</sup> Rated output, partial utilization up to 155 °C (F).

<sup>2)</sup> Motor with special rotor (Cu).

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Brake motors with High Efficiency IE2 in cast-iron and steel versions

#### Selection and ordering data

P <sub>ra-</sub> ted, 50 Hz	Frame size	Operating values at rated output										Motor type	Article No.	m IM B3	J			
		n <sub>ra-</sub> ted, 50 Hz	T <sub>ra-</sub> ted, 50 Hz	T <sub>B</sub>	c/h · J S4- class 40 % 1)	IE	η <sub>ra-</sub> ted, 50 Hz, 4/4	η <sub>ra-</sub> ted, 50 Hz, 3/4	cos φ rated, 4/4	I <sub>ra-</sub> ted, 50 Hz, 400 V	I <sub>ra-</sub> ted, 50 Hz, 500 V					I <sub>ra-</sub> ted, 50 Hz, 690 V	T <sub>LR</sub> /T <sub>ra-</sub>	I <sub>LR</sub> /I <sub>ra-</sub>
KW	FS	rpm	Nm	Nm	–	–	%	%	–	A	A	A	–	–	–	kg	kgm <sup>2</sup>	
<ul style="list-style-type: none"> <li>• Cooling: self-ventilated (IC 411)</li> <li>• Efficiency: High Efficiency IE2, 0.75 kW and above in accordance with IEC 60034-30</li> <li>• Insulation: thermal class 155 (temperature class F), IP55 degree of protection, utilization in accordance with thermal class 130 (temperature class B), S1-100 %</li> </ul>																		
2-pole: 3000 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
5.5	132 S	2910	18	80	IE2	88.9	89.9	0.9	9.90	7.90	5.80	2.6	6.7	3.1	ABGA-132SR-02	1PS0131- <b>RD</b> - <b>0AA3</b>	103	0.014
7.5	132 S	2910	25	80	IE2	89.5	90.1	0.91	13.3	10.6	7.70	3.0	7.6	3.3	ABGA-132SS-02	1PS0132- <b>RD</b> - <b>0AA3</b>	112	0.020
11	160 M	2930	36	150	IE2	89.6	90.0	0.88	20.0	16.1	11.7	2.5	6.7	3.0	ABGA-160MR-02	1PS0163- <b>RD</b> - <b>0AA3</b>	193	0.045
4-pole: 1500 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
5.5	132 S	1455	36	80	IE2	89.5	89.9	0.85	10.4	8.30	6.00	2.6	7.9	2.7	ABGA-132SR-04	1PS0131- <b>RD</b> - <b>0BA3</b>	103	0.030
7.5	132 M	1470	49	150	IE2	90.2	90.7	0.84	14.3	11.4	8.30	2.0	7.6	2.8	ABGA-132MS-04	1PS0133- <b>RD</b> - <b>0BA3</b>	112	0.030
11	160 M	1460	72	150	IE2	90.5	91.4	0.81	21.5	17.3	12.6	2.1	6.8	2.6	ABGA-160MR-04	1PS0163- <b>RD</b> - <b>0BA3</b>	193	0.077
15	160 L	1460	98	260	IE2	90.9	92.0	0.81	29.5	23.5	17.0	2.1	6.5	2.7	ABGA-160LS-04	1PS0166- <b>RD</b> - <b>0BA3</b>	210	0.098
18.5	180 M	1470	120	260	IE2	92.3	92.8	0.83	35.0	28.0	20.0	3.3	7.6	3.0	ABGA-180MR-04	1PS0183- <b>RD</b> - <b>0BA3</b>	270	0.16
22	180 L	1470	143	260	IE2	91.8	92.3	0.83	41.5	33.5	24.0	3.0	7.0	2.6	ABGA-180LS-04	1PS0186- <b>RD</b> - <b>0BA3</b>	280	0.16
30	200 L	1470	195	400	IE2	92.3	93.2	0.83	57.0	45.0	33.0	1.5	6.0	2.5	ABGA-200LR-04	1PS0206- <b>RD</b> - <b>0BA3</b>	366	0.27
37	225 S	1480	239	400	IE2	93.5	93.9	0.81	71.0	56.0	41.0	3.0	7.3	2.9	ABGA-225SR-04	1PS0220- <b>RD</b> - <b>0BA3</b>	456	0.37
45	225 M	1475	291	400	IE2	93.1	93.7	0.84	83.0	66.0	48.0	2.6	6.7	2.6	ABGA-225MS-04	1PS0223- <b>RD</b> - <b>0BA3</b>	490	0.41
55	250 M	1480	355	400	IE2	93.7	94.4	0.87	97.0	78.0	56.0	2.5	7.7	2.9	ABGA-250MM-04	1PS0253- <b>RD</b> - <b>0BA3</b>	616	0.79
6-pole: 1000 rpm at 50 Hz																		
<b>LOHER CHEMSTAR</b>																		
3	132 S	955	30	80	IE2	84.1	85.0	0.79	6.50	5.20	3.80	2.3	6.5	2.5	ABGA-132SR-06	1PS0131- <b>RD</b> - <b>0CA3</b>	103	0.033
4	132 M	955	40	80	IE2	86.0	86.3	0.81	8.30	6.60	4.80	2.3	6.5	2.5	ABGA-132MR-06	1PS0133- <b>RD</b> - <b>0CA3</b>	112	0.045
5.5	132 M	955	55	150	IE2	86.1	86.8	0.77	12.0	9.60	6.90	2.4	6.1	2.6	ABGA-132MS-06	1PS0135- <b>RD</b> - <b>0CA3</b>	118	0.045
7.5	160 M	965	74	150	IE2	87.4	88.1	0.82	15.1	12.1	8.80	2.5	6.5	2.9	ABGA-160MR-06	1PS0163- <b>RD</b> - <b>0CA3</b>	193	0.125
11	160 L	970	108	260	IE2	89.0	89.2	0.74	24.0	19.3	14.0	3.0	6.7	3.0	ABGA-160LS-06	1PS0166- <b>RD</b> - <b>0CA3</b>	210	0.144
15	180 L	970	148	260	IE2	89.7	90.2	0.78	31.0	25.0	17.9	1.7	5.6	2.5	ABGA-180LS-06	1PS0186- <b>RD</b> - <b>0CA3</b>	270	0.138
18.5	200 L	980	180	400	IE2	91.2	91.5	0.80	36.5	29.5	21.0	2.5	7.0	2.6	ABGA-200LR-06	1PS0206- <b>RD</b> - <b>0CA3</b>	366	0.33
22	200 L	980	214	400	IE2	91.5	92.0	0.78	44.5	35.5	26.0	2.5	7.0	2.6	ABGA-200LS-06	1PS0208- <b>RD</b> - <b>0CA3</b>	375	0.33
30	225 M	980	292	400	IE2	91.8	92.5	0.80	59.0	47.0	34.0	2.8	6.0	2.3	ABGA-225MS-06	1PS0223- <b>RD</b> - <b>0CA3</b>	380	0.55
37	250 M	985	359	400	IE2	92.2	92.3	0.77	75.0	60.0	43.5	2.1	6.0	2.1	ABGA-250MM-06	1PS0253- <b>RD</b> - <b>0CA3</b>	560	1.0
<b>Operating modes</b>																		
Mains-fed operation												Frame size	132 ... 250	0	–	Order code		
Converter-fed operation, standard insulation												Frame size	132 ... 250	1	–	Order code		
Converter-fed operation with special insulation (derating approx. 5 %)												Frame size	160 ... 250	2	–	Order code		
<b>Voltages</b>																		
230 V/400 V, 50 Hz												Frame size	132 ... 250	1	–	Order code		
500 VY, 50 Hz												Frame size	132 ... 250	3	–	Order code		
400 V/690 V, 50 Hz												Frame size	132 ... 250	6	–	Order code		
690 VY, 50 Hz												Frame size	132 ... 250	8	–	Order code		
For other voltages see Page 3/23												Frame size	132 ... 250	9	...	Order code		
<b>Types of construction</b>																		
IM B3												Frame size	132 ... 250	0	–	Order code		
IM B5												Frame size	132 ... 250	1	–	Order code		
IM B34												Frame size	132 ... 250	2	–	Order code		
IM B14												Frame size	132 ... 250	3	–	Order code		
IM V1/cover												Frame size	132 ... 250	4	–	Order code		
IM B35												Frame size	132 ... 250	6	–	Order code		
For other types of construction see from Page 1/28												Frame size	132 ... 250	9	...	Order code		

T<sub>B</sub> = Braking torque in Nm

Standard brake supply: 230 V, 1-phase AC

<sup>1)</sup> Conversion factor "c/h · J" depending on the duty cycle.

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

Article No. supplements

#### Selection and ordering data

Voltages	Voltage code	Additional identification code with order code and plain text if required	Motor series															
			LOHER CHEMSTAR											LOHER VARIO				
			Frame size															
	<b>1PS0.....</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Optional voltages</b>																		
690 VΔ, 50 Hz	<b>0</b>		–	–	–	–	–	–	–	–	–	–	–	○	○	○	○	○
230 VΔ/400 VY, 50 Hz	<b>1</b>		○	○	○	○	○	○	○	○	○	○	○	–	–	–	–	–
500 VY, 50 Hz	<b>3</b>		○	○	○	○	○	○	○	○	○	○	○	–	–	–	–	–
400 VΔ, 50 Hz	<b>4</b>		○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–
500 VΔ, 50 Hz	<b>5</b>		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
400 VΔ/690 VY, 50 Hz	<b>6</b>		○	○	○	○	○	○	○	○	○	○	○	○	○	○	–	–
690 VY, 50 Hz	<b>8</b>		○	○	○	○	○	○	○	○	○	○	○	○	–	–	–	–
415 VY, 50 Hz	<b>9</b>	<b>L1C</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
415 VΔ, 50 Hz	<b>9</b>	<b>L1D</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
380 VΔ/660 VY, 50 Hz	<b>9</b>	<b>L1L</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–
220 VΔ/380 VY, 50 Hz	<b>9</b>	<b>L1R</b>	✓	✓	✓	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–	–
1000 VΔ, 50 Hz	<b>9</b>	<b>L1V</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.
Other voltages	<b>9</b>	<b>L1Y •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
220 VΔ/380 VY, 60 Hz (50 Hz output)	<b>9</b>	<b>L2A</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–	–
220 VΔ/380 VY, 60 Hz (60 Hz output)	<b>9</b>	<b>L2B</b>	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	O.R.	–	–	–	–	–
380 VΔ/660 VY, 60 Hz (50 Hz output)	<b>9</b>	<b>L2C</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–
380 VΔ/660 VY, 60 Hz (60 Hz output)	<b>9</b>	<b>L2D</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–
460 VY, 60 Hz (60 Hz output)	<b>9</b>	<b>L2E</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–
460 VΔ, 60 Hz (60 Hz output)	<b>9</b>	<b>L2F</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
575 VY, 60 Hz (60 Hz output)	<b>9</b>	<b>L2L</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–
575 VΔ, 60 Hz (60 Hz output)	<b>9</b>	<b>L2M</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
440 VY, 60 Hz (50 Hz output)	<b>9</b>	<b>L2Q</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–
440 VΔ, 60 Hz (50 Hz output)	<b>9</b>	<b>L2R</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
460 VY, 60 Hz (50 Hz output)	<b>9</b>	<b>L2S</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–
460 VΔ, 60 Hz (50 Hz output)	<b>9</b>	<b>L2T</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
575 VY, 60 Hz (50 Hz output)	<b>9</b>	<b>L2U</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–
575 VΔ, 60 Hz (50 Hz output)	<b>9</b>	<b>L2V</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.
440 VY, 60 Hz (60 Hz output)	<b>9</b>	<b>L2W</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	–	–
440 VΔ, 60 Hz (60 Hz output)	<b>9</b>	<b>L2X</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O.R.	O.R.	O.R.	O.R.

- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. Possible on request
- Not possible

For dual voltages 230 V/400 V, 220 V/380 V, 400 V/690 V or 380 V/660 V:

- For motors for converter-fed operation, the converter rating plate is stamped with 380 V or 400 V.
- For motors with a Dahlander circuit, the lower voltage is generally specified.

Voltages not listed in the catalog are only available on request.

Standard brake supply voltage: 230 V, 1-phase

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Special versions

#### Selection and ordering data

Special versions	Additional identification code -Z with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
1PS0.....-Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection</b>																	
Design with reduced starting current – factory clarification required and maybe type test needed, ETO option (Engineer To Order) without order code	–	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Special design according to load curve of driven machine or customer requirements – factory clarification required and maybe type test needed, ETO option without order code	–	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Adjustment of rating in response to customer requirements – factory clarification required and maybe type test needed, ETO option without order code	–	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Motor protection with 3 PTC thermistors for tripping – without surge arresters, sole protection not included	<b>A11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–
Motor protection with 2 × 3 PTC thermistors for prewarning/tripping – without surge arresters, sole protection not included	<b>A12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of embedded KTY84-130 temperature sensor	<b>A23</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Measuring of winding temperature by means of 2 × embedded KTY84-130 temperature sensors	<b>A25</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monitoring of winding temperature using 3 Pt100 resistance thermometers – 2-wire from element and terminal box; for round-wire windings only	<b>A60</b>	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Monitoring of winding temperature using 2 × 3 Pt100 resistance thermometers – 2-wire from element and terminal box; for round-wire windings only	<b>A61</b>	–	–	–	–	O	R	O	R	O	R	O	R	✓	✓	✓	✓
3 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	<b>A63</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 resistance thermometers in stator winding, 3-wire connection from auxiliary terminal box	<b>A64</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers without surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A65</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers with surge arresters for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A66</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers without surge arresters in Ex i for 4-wire connection from terminal box – for pre-formed coil winding only	<b>A67</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
6 Pt100 slot resistance thermometers in shielded design to Ex i with surge arresters for 3- and 4-wire connection from terminal box – for pre-formed coil winding only	<b>Q40</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
<b>1PS0. .... -Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection (continued)</b>																	
2 Pt100 double resistance thermometers in shielded design (Ex i) for roller bearing or sleeve bearing	<b>V80</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Winding Pt100 in 3- or 4-wire type from sensor instead of from terminal (not Ex i Pt100!)	<b>Q43</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing Pt100 in 3- or 4-wire type from sensor instead of from terminal – optionally possible for <b>V80, A40, A42</b>	<b>Q44</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
One thermocouple per bearing	<b>Q49</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for housing vibration monitoring (preferred brand), with loose cable – for each sensor	<b>V14</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Sensor for housing vibration monitoring (preferred brand), without terminal box – for each sensor	<b>V15</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
3 transmitters, 4 to 20 mA for Pt100 winding	<b>P20</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
1 transmitter with digital display with Ex d or Ex i approval	<b>V88</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pt100 winding in tolerance class A with calibration certificate	<b>V78</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Site altitude max. 1500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D06</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 2000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D07</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 2500 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D08</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site altitude max. 3000 m (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 45 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
1PS0. .... -Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special electrical designs/winding protection (continued)</b>																	
Cooling air temperature max. 50 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 55 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cooling air temperature max. 60 °C (observe derating) – derating in accordance with reduction table, efficiency class of motor is maintained. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>D14</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coolant temperature below +40 °C with increased output – factory clarification required, not applicable for IE2.	<b>D18</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Utilization to temperature class 155 (F) with higher output – higher output on request, not applicable for IE2. No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>C12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Rated output of the lower output level – IEC output levels are maintained, only in combination with <b>D06</b> to <b>D18</b> . No additional charge when special voltage is selected (11th position of Article No. = 9).	<b>C29</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Moderately extended speed range for converter-fed operation	<b>V82</b>	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Temperature class F	<b>W00</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Temperature class H	<b>W01</b>	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Special insulation for increased voltage load in converter-fed operation (phase-to-phase 2250 V <sub>Peak</sub> /derating)	<b>1)</b>	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sealing of winding overhangs with silicone rubber	<b>W03</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sealing of cable duct with silicone rubber	<b>W04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Efficiency according to efficiency class IE3 (Premium Efficiency) – factory clarification required	<b>D25</b>	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Non-standard voltage and/or frequency for separate fan motor	<b>Y81 •</b> and identification code	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Other special electrical designs/configurations		O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																
		LOHER CHEMSTAR												LOHER VARIO				
1PS0. .... -Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
<b>Colors and paint finish</b>																		
Internal corrosion protection system J08	<b>W10</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Coating system N08 – 110 µm (C3 medium) – corrosion resistance acc. to EN/ISO 12944-5 = C3	<b>V09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14/J08 – 170 µm (chemical industry + onshore, C5 – industrial climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>V10</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coating system N14A (chemical industry + onshore, C5 – industry) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) for industrial climate	<b>W14</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Special prime coat system Z05 with internal corrosion protection system J08	<b>W15</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Coating system Z21/J08 – 210 µm (offshore, C5M-M) – corrosion resistance acc. to EN/ISO 12944-5 = C5 (5 to 15 years) – sea climate	<b>V11</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Increased layer thickness 275 µm for coating system Z21 (C5M-high) – only in combination with <b>V11</b> – corrosion resistance acc. to EN/ISO 12944-5 = C5 high (> 15 years) – sea climate	<b>V19</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special offshore paint finish to Norsok M501 (C5-high – sea climate) – corrosion resistance acc. to EN/ISO 12944-5 = C5 high (> 15 years) – sea climate	<b>V12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special coating system S11/J08 (e.g. submerged motors)	<b>V13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unpainted, only primed	<b>K24</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	
Unpainted	<b>K23</b>	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	
Outer coating 110 µm for zinc-galvanized noise cabinet – <b>V98</b> = outer coating 110 µm for zinc-galvanized noise cabinet	<b>V98</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Special colors according to Munsell or British Standard	<b>Y50 •</b> and identification code	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Standard paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002	<b>Y53 •</b> and standard finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special paint finish in RAL 1004, 1018, 2000, 2004, 5009, 5012, 5015, 6003, 6011, 7000, 7011, 7031, 7038, 9002 – (specify special coating system in addition, e.g. <b>V10</b> , <b>V11</b> , <b>W14</b> , etc.)	<b>Y54 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RAL colors, other than those offered above	<b>Y51 •</b> and special finish RAL....	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special non-RAL colors	<b>Y71 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other paint combinations/systems or RAL colors to customer specification		O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
1PS0. .... -Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Design for Zones according to ATEX</b>																	
Design for Zone 21 (conductive dust) for mains-fed operation	<b>M34</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O. R.	O. R.	O. R.
Design for Zone 22 (non-conductive dust) for mains-fed operation	<b>M35</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design for Zone 21 (conductive dust) for converter-fed operation	<b>M38</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O. R.	O. R.	O. R.
Design for Zone 22 (non-conductive dust) for converter-fed operation	<b>M39</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Ship design "Operation below deck"</b>																	
Design acc. to GL (Germanischer Lloyd), CT 45 °C with manufacturer's declaration – non essential	<b>W24</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration – non essential	<b>W25</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design acc. to BV (Bureau Veritas), CT 50 °C with manufacturer's declaration – non essential	<b>W26</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration – non essential	<b>W27</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration – non essential	<b>W28</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Design acc. to RINA (Registro Italiano Navale), CT 50 °C with manufacturer's declaration – non essential	<b>W29</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other certifications, motors for upper deck mounting and acceptance tests to classification – factory clarification required	<b>W99</b>	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.
Design acc. to GL (Germanischer Lloyd), CT 45 °C, essential drive <sup>2)</sup>	<b>Q60</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to LRoS (Lloyds Register of Shipping), CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q61</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to BV (Bureau Veritas), CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q62</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to DNV (Det Norske Veritas), CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q63</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to ABS (American Bureau of Shipping), CT 50 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q64</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to RINA (Registro Italiano Navale), CT 50 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q65</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to CCS (China) CT 45 °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q66</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to USSR (Russia) CT xx °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q67</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to PR (Poland) CT xx °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q68</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.
Design acc. to NKK (Japan) CT xx °C with manufacturer's declaration, essential drive <sup>2)</sup>	<b>Q69</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.



## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																							
		LOHER CHEMSTAR											LOHER VARIO												
1PS0.....-Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500								
<b>Individual certifications</b>																									
Coolant temperature in temperature range -50 to +40 °C – roller bearing design	<b>D02</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O	R	O	R	O	R	O	R	O	R	
Coolant temperature in temperature range -40 to +40 °C – roller bearing design	<b>D03</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Coolant temperature in temperature range -30 to +40 °C – roller bearing design	<b>D04</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Electrical design according to NEMA MG1-12	<b>D30</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	O	R	O	R	O	R	O	R	O	R	
China Energy Efficiency Label	<b>D34</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	
<b>Special mechanical designs</b>																									
Terminal box on right-hand side (view onto DE)	<b>K09</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□	□	□	□	□	□	□	
Terminal box on left-hand side (view onto DE)	<b>K10</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	○	○	○	○	○	○	○	○	○	○	
Terminal box on top	<b>K11</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	○	○	○	○	○	○	○	○	○	○	
Mounting of rotary pulse encoder Loher preferred brand	<b>Q70</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Terminal box to IP65	<b>Q71</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cable entry thread metrically different from standard – thread dimension must be specified	<b>W30</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	
Enlarged connection system for main terminal box – not in combination with <b>K53</b> (Ex d terminal box)	<b>L00</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	
Undrilled cable gland plate – for main terminal box	<b>L01</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	□	□	□	□	□	□	□	□	□	□	
Split terminal box	<b>W31</b>	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
NPT thread – specify thread size in plain text, cable gland not in our supply	<b>W32</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Cable gland, standard – one cable gland for supply cable in the main terminal box, non-armored cable	<b>K54</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	
Cable gland, standard thread size for auxiliary connection (1 unit) – for connection cable of accessories in main or auxiliary terminal box	<b>W33</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	
Main terminal with tinned cable lug for copper cable	<b>W34</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Saddle terminal for connection without cable lug	<b>W35</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Special cable gland – special sizes or armored cable, exact cable data needed	<b>Y97 •</b> and identification code	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Auxiliary terminal box, non-Ex, cast-iron design – without removable cable gland plate, with metric cable entry thread	<b>M50</b>	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Material of auxiliary terminal box: stainless steel – not in combination with <b>K53</b> (Ex d terminal box)	<b>M51</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Separate auxiliary terminal box for anti-condensation heater	<b>M52</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Heater in main terminal box	<b>P84</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
1PS0.....-Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Auxiliary terminal box in cast-iron design with "undrilled" removable cable gland plate – not in combination with <b>K53</b> (Ex d terminal box)	<b>Q75</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Auxiliary terminal box in cast-iron design with removable cable gland plate "drilled with metric thread and sealed with metal plug" – not in combination with <b>K53</b> (Ex d terminal box)	<b>Q76</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Cable outlet radially without terminal box with 1 m free cable length (4- or 7-core)	<b>W38</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Additional price for each additional meter of cable – only in combination with <b>W38</b>	<b>W39</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Connection cable for accessories – only in combination with <b>W38</b> , length as power cable	<b>W40</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Additional separately supplied terminal box made of cast-iron with baseplate – main terminal box certified acc. to Ex e	<b>W41</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Cable entry from DE	<b>K83</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Cable entry from NDE	<b>K84</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Rotation of the terminal box by 180°	<b>K85</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Vibration quantity level A – IEC 60034-14	<b>K01</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Vibration quantity level B – IEC 60034-14 – for converter-fed operation only at lowest and highest speed of speed range	<b>K02</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft and flange with increased accuracy according to DIN 42955	<b>K04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Radial sealing ring at DE for horizontal flange-mounting types (DE oil-tight)	<b>K17</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Radial sealing ring at DE for vertical flange-mounting types (DE oil-tight)	<b>W43</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Labyrinth sealing for external bearing seal	<b>W44</b>	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	✓	✓	✓	✓	✓	✓
Bearing for increased cantilever forces (roller bearing DE with regreasing) – comprising <b>K40</b>	<b>K20</b>	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	O.	R.	O.	R.
Bearings for increased axial forces	<b>V20</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.	R.	O.	R.
Regreasing device DE/NDE	<b>K40</b>	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	□	□	□	□	□
Grease-collecting chamber if regreasing is applied	<b>W45</b>	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bearing insulation NDE for roller bearings – binding for frame sizes 315 to 500 for converter-fed operation	<b>L27</b>	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	✓	✓	✓	✓
Shaft grounding device – up to -20 °C only	<b>V36</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.	R.	O.	R.
Located bearing DE	<b>K94</b>	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
Located bearing NDE	<b>L04</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special grease Klüber Staburags NBU8EP – ETO option (Engineer To Order) without order code	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special grease Klüber Isoflex SL2 – ETO option (Engineer To Order) without order code	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
<b>1PS0. .... -Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs</b> (continued)																	
Special grease Barierta L55/2 – ETO option (Engineer To Order) without order code	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other special grease – ETO option (Engineer To Order) without order code	–	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.
Pt100 bearing in tolerance class A with calibration certificate – only in combination with <b>Q44</b>	<b>V76</b>	–	–	–	–	–	–	–	–	–	–	–	–	O.	R.	O.	R.
One transmitter each (2 in total) 4 to 20 mA for Pt100 bearing DE and NDE	<b>V83</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Sensor for housing vibration monitoring Bently Nevada Accelerometers without separate terminal box – for each sensor	<b>V16</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Bearing ventilation at DE for lower bearing temperature for roller bearing design grease-lubricated	<b>V17</b>	–	–	–	–	–	–	–	–	–	–	–	–	O.	R.	O.	R.
Bearing insulation at both ends for roller bearing design motors (DE linked to ground) – for horizontal mounting only (vertical mounting on request)	<b>V18</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Grease extractors for DE and NDE	<b>V21</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Automatic grease lubricator at DE and NDE (permissible temperature range from -15 to +50 °C)	<b>V22</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
Enlarged spent grease chamber at DE and NDE	<b>V25</b>	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓	✓
External grounding (additionally)	<b>W46</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
VIK design – including <b>W14, W69</b>	<b>K30</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–
LOHER CHEMSTAR Plus design, including VIK design – including <b>K30, K51, W14, W69</b> and IP66 bearing seal, vibrations as grade B	<b>W09</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Second rating plate, supplied loose	<b>K31</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second rating plate installed in terminal box	<b>W47</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Extra rating plate stamped with data for converter-fed operation – data for quadratic torque in speed range 1:10 and constant torque in speed ranges 1:3 and 1:10	<b>Y80 •</b> and identification code	○	○	○	○	○	○	○	○	○	○	○	○	✓	✓	✓	✓
Extra rating plate for customer data (each plate) – data must be specified as text in the order	<b>Y82 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rating plates made of stainless steel	<b>W48</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
Rating plates in languages other than English and German – main rating plate or extra rating plates O.R., factory clarification required	<b>W49</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Additional measures for 2 to 4 years storage in accordance with storage regulations	<b>W50</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 230 V	<b>K45</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater 115 V	<b>K46</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater, 110 to 120 V (min. 100 V, max. 132 V) – preferred	<b>M12</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-condensation heater, 210 to 250 V (min. 200 V, max. 264 V) – preferred	<b>M13</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
1PS0.....-Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Anti-condensation heater with other voltages	<b>Y83 •</b> and identification code	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.
Heater with thermostat (e.g. Elmess)	<b>V75</b>	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.
Second standard shaft extension – for 100 % torque	<b>K16</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O. R.	O. R.	O. R.	O. R.
Non-standard cylindrical shaft extension (standard diameter or smaller) – in case of significantly different diameters, especially high-pole motors due to the maximum permissible torque stress, factory clarification required	<b>Y55 •</b> and identification code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shaft of material 1.7225	<b>W51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Shaft of material 1.4021	<b>W52</b>	✓	✓	✓	✓	✓	✓	✓	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.
Shaft end of stainless steel butt-welded (material 1.4571)	<b>W53</b>	✓	✓	✓	✓	✓	✓	✓	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.
Shaft made of special steel – for increased torque loading, e.g. 1.7225 – 42CrMo4	<b>L72</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Welded standard stator housing for surface-cooled motors – factory clarification required because of possible dimension deviations	<b>W54</b>	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.
Welded copper bar rotors	<b>W55</b>	-	-	-	O. R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Second shaft extension for IM B3 up to 100 % $T_{rated}$ ; cylindrical with feather key	<b>Q21</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Special rotor for heavy duty starting (e.g. double-cage rotor or brass rotor) – testing needed	<b>Q22</b>	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.
Generator design (asynchronous) with 1.8 fold runaway speed	<b>W56</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
IP56 degree of protection	<b>K51</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	□	□	□	□
IP65 degree of protection	<b>K50</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IP66 degree of protection	<b>L94</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O. R.	O. R.	O. R.	O. R.
IP67 degree of protection	<b>K93</b>	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.
IP67 degree of protection without level switch (resin material for terminal box protection will be shipped as extra package; 8 m submerged, 72 h max.)	<b>W58</b>	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	✓	✓	✓	✓	✓	✓	✓	✓
Condensation drainage holes sealed with plug	<b>W59</b>	-	-	-	-	□	□	□	□	□	□	□	□	○	○	○	○
Condensation drainage holes sealed with screw	<b>W60</b>	-	-	-	-	□	□	□	□	□	□	□	□	✓	✓	✓	✓
Increased tropicalization, humidity $\geq 80\%$ – LOHER CHEMSTAR incl. <b>V10</b> and <b>W71</b> , LOHER VARIO incl. <b>V10</b> and <b>P45</b>	<b>W61</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tropical design for outdoor onshore installation	<b>L28</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Design without fan and fan cover – motor mounted in air stream of driven fan; without external air stream cooling, due to derating	<b>W62</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	O. R.	O. R.	O. R.	O. R.
Fan with plastic coating in case of metal fan	<b>W63</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan of aluminum	<b>W64</b>	✓	✓	✓	✓	✓	✓	✓	✓	-	-	□	-	-	-	-	-

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
<b>1PS0.....-Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Fan of steel	<b>W65</b>	O.	R.	O.	R.	O.	R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External fan of brass	<b>W66</b>	O.	R.	O.	R.	O.	R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External fan of stainless steel	<b>V94</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Special ventilation for on-deck motors	<b>W67</b>	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fan cover of steel sheet (3 mm thick)	<b>W68</b>	O.	R.	O.	R.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Galvanized fan cover – included in <b>K30</b> and <b>W09</b>	<b>W69</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Noise class 3 for clockwise direction of rotation viewed onto DE – for 2-pole motors only	<b>K37</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Noise class 3 for counter-clockwise direction of rotation viewed onto DE – for 2-pole motors only	<b>K38</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Clockwise – direction of rotation must be specified for motors of FS 355 and above 2-/4-pole	<b>K97</b>	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○
Counter-clockwise – direction of rotation must be specified for motors of FS 355 and above 2-/4-pole	<b>K98</b>	-	-	-	-	-	-	-	-	-	-	-	-	○	○	○	○
Noise reduction: silencer for air inlet (DW, NMA) – only in combination with <b>K97</b> or <b>K98</b>	<b>L20</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Stainless steel grid for air inlet silencer – only in combination with <b>L20</b>	<b>L25</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Noise cabinet with inspection door – zinc-galvanized, unpainted – noise reduction approx. 15 dB(A) based on GG1	<b>V32</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Operation in both directions of rotation – for 2-/4-pole motors of frame size 355 and above, increased noise values and possible derating	<b>K99</b>	○	○	○	○	○	○	○	○	○	○	○	○	✓	✓	✓	✓
Higher number of starts (up to 3000 starts per year) – factory testing is necessary	<b>Q23</b>	-	-	-	-	-	-	-	-	-	-	-	-	O.	R.	O.	R.
Full-key balancing	<b>L68</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Support ring for coupling guard	<b>L15</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Fitting of coupling halves (customer-supplied, finish-machined and balanced) – supplied 4 weeks ahead of testing date	<b>L17</b>	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.	O.	R.
Motor mounting material: bolts for mounting on steel foundation with shims (V2A), taper pins	<b>L31</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Motor mounting material: T-head bolts, anchor sleeves and soleplates for mounting on concrete foundation	<b>L33</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Half-key balancing	<b>L69</b>	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Heavy duty bearing design for extreme cantilever forces	<b>L96</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Stainless steel screws and plates	<b>W71</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Stainless steel external bolts	<b>P45</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Ambient temperatures down to -40 °C; preheating before operation necessary	<b>W73</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Ambient temperatures down to -40 °C no preheating before operation necessary; without Ex protection	<b>W75</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series																
		LOHER CHEMSTAR											LOHER VARIO					
1PS0. .... -Z		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500	
<b>Special mechanical designs (continued)</b>																		
Ambient temperatures down to -60 °C no preheating before operation necessary; without Ex protection	<b>W76</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Ambient temperatures down to -40 °C; preheating before operation necessary (factory clarification required)	<b>W77</b>	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R	
Ambient temperatures down to -60 °C; preheating before operation necessary – factory clarification required	<b>W78</b>	-	-	-	-	-	-	-	-	-	-	O	R	O	R	O	R	
Mounted pulse transmitter 10 to 30 V, HTL level – signals A, B, N + inverted signals	<b>W80</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Hollow-shaft encoder (special brand) e.g. Baumer Hübner	<b>Q93</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Mechanical protection for rotary pulse encoder	<b>M68</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Mounted axial forced ventilation – forced ventilation should preferably be specified in the 10th position of the Article No.	<b>G17</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	O	R	O	R	
Mounted radial forced ventilation	<b>W81</b>	-	-	-	-	-	-	-	O	R	O	R	O	R	O	R	O	R
Backstop for clockwise direction of rotation viewed onto DE (counter-clockwise blocked)	<b>G48</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Backstop for counter-clockwise direction of rotation viewed onto DE (clockwise blocked)	<b>G49</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Mounted brake, standard design	<b>G40</b>	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	-	
Mechanical manual release for standard brake – in combination with <b>G40</b>	<b>K82</b>	-	-	✓	✓	✓	✓	✓	✓	O	R	O	R	O	R	O	R	
Brake supply voltage 400 V AC/50 Hz	<b>C01</b>	-	-	✓	✓	✓	✓	✓	✓	O	R	O	R	O	R	O	R	
Brake supply voltage 24 V DC	<b>C00</b>	-	-	✓	✓	✓	✓	✓	✓	O	R	O	R	O	R	O	R	
Tapered shaft extension with shaft nut	<b>T36</b>	-	-	-	-	-	-	-	-	-	-	-	-	O	R	O	R	
Microswitch for brake – in combination with <b>G40</b>	<b>W83</b>	-	-	✓	✓	✓	✓	✓	✓	O	R	O	R	O	R	O	R	
Sun protection shield – fixing parts of mild steel, cover unpainted stainless steel for vertical motors	<b>V87</b>	-	-	-	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Sun protection shield – fixing parts of mild steel, cover of unpainted stainless steel for horizontal motors	<b>V99</b>	-	-	-	O	R	O	R	O	R	O	R	O	R	O	R	O	R
Preparation for SPM bearing monitoring, only M8 drilled hole for measuring nipple	<b>W84</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Machined surface on motor foot with dowel pin holes	<b>Q94</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Base frame for height adaptation of max. 2 frame sizes difference	<b>Q96</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Adaptation of foot and shaft dimensions to next higher frame size (no adaptation of terminal box!)	<b>Q97</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Adaptation of flange dimensions and drilled holes in flange	<b>Q98</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
Preparation for later installation of sun protection shield	<b>Q99</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	
SPM bearing monitoring: measuring nipple system 32 – thread M8, DE and NDE	<b>G50</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Shock pulse measurement (SPM), fixed sensor and distribution box	<b>H05</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR											LOHER VARIO				
<b>1PS0.....-Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
SPM bearing monitoring: Fixed sensor system 40 – thread M8	<b>W85</b>	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-
Bearing temperature monitoring with PTC thermistors at DE/NDE	<b>W86</b>	-	-	-	-	O. R.	O. R.	✓	✓	✓	✓	✓	✓	-	-	-	-
Speed monitoring by inductive proximity switches, Pepperl + Fuchs	<b>A03</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 Pt100 resistance thermometers for 3- or 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	<b>A40</b>	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.	✓	✓	✓	✓
2 Pt100 double resistance thermometers for 4-wire connection from terminal box for roller bearings – 1 × DE and 1 × NDE	<b>A42</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers for roller bearings and sleeve bearings with meter unit without contacts	<b>A70</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
2 dial-type thermometers for roller bearings and sleeve bearings with meter unit on stator housing and 2 NO contacts	<b>A71</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Bearing temperature monitoring with 1 × Pt100 per bearing in 2-wire connection	<b>A72</b>	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-
2 Pt100 double resistance thermometers for three-wire connection for roller bearing	<b>A80</b>	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
One dial-type thermometer with 2 contacts, capillary principle – Ex i design without supply unit!	<b>V89</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Engraved tag plate fixed on terminal box	<b>V96</b>	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.
4 mm shims, stainless-steel base (V4A/AISI 316) – not laminated	<b>Q92</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
4 mm shims, brass base – not laminated	<b>V31</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Slotted feet holes	<b>Q95</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pre-formed coil for LV motors	<b>V01</b>	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.
2 metal test sheets (100 × 150 mm) with paint layer for special acceptance test	<b>V08</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Impact protection – for built-on devices, per device	<b>M81</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Brackets for lifting and shifting	<b>P42</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Provision for housing vibration probe, one flat surface with thread M8 × 1	<b>P63</b>	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓
Pressure oil connection with cylindrical or stepped shaft extension instead of feather key connection	<b>Y85 •</b> and identification code	-	-	-	-	-	-	-	-	-	-	-	-	O. R.	O. R.	O. R.	O. R.
"High-speed motors" for speed range 3600 < n ≤ 6000 rpm – factory clarification required; torque characteristic and cutoff frequency affect the design	<b>W87</b>	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	-	-	-	-
"High-speed motors" for speed range > 6000 rpm – factory clarification required; torque characteristic and cutoff frequency affect the design; ETO option (Engineer To Order) without order code	-	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.	O. R.

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

### Special versions

Special versions	Additional identification code <b>-Z</b> with order code and plain text if required	Motor series															
		LOHER CHEMSTAR							LOHER VARIO								
<b>1PS0. .... -Z</b>		90	100	112	132	160	180	200	225	250	280	315	355	355	400	450	500
<b>Special mechanical designs (continued)</b>																	
Retrofit (description of special design separately) – adaptation to an existing motor	<b>B15</b>	O	R	O	R	O	R	O	R	O	R	O	R	O	R	O	R
<b>Extension of the liability for defects</b>																	
Extension of the liability for defects by 12 months to a total of 24 months from delivery	<b>Q80</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Extension of the liability for defects by 18 months to a total of 30 months from delivery	<b>Q81</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Extension of the liability for defects by 24 months to a total of 36 months from delivery	<b>Q82</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Extension of the liability for defects by 30 months to a total of 42 months from delivery	<b>Q83</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Extension of the liability for defects by 36 months to a total of 48 months from delivery	<b>Q84</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Extension of the liability for defects by 48 months to a total of 60 months from delivery	<b>Q85</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

- Standard version
- Without additional charge
- This order code only determines the price of the version – Additional plain text is required.
- ✓ With additional charge
- O.R. Possible on request
- Not possible

<sup>1)</sup> Coding in 8th position of the article number, for LOHER CHEMSTAR = 2.

<sup>2)</sup> Acceptance tests must be selected additionally. For example, for the first motor select **F83** or **F93**, and for each additional motor **F01**. Inclusive of costs for certification authority and inspector, and shaft test if specified by certification authority. LOHER CHEMSTAR for essential drive is possible on request as an ETO option (Engineer To Order) without an option code.



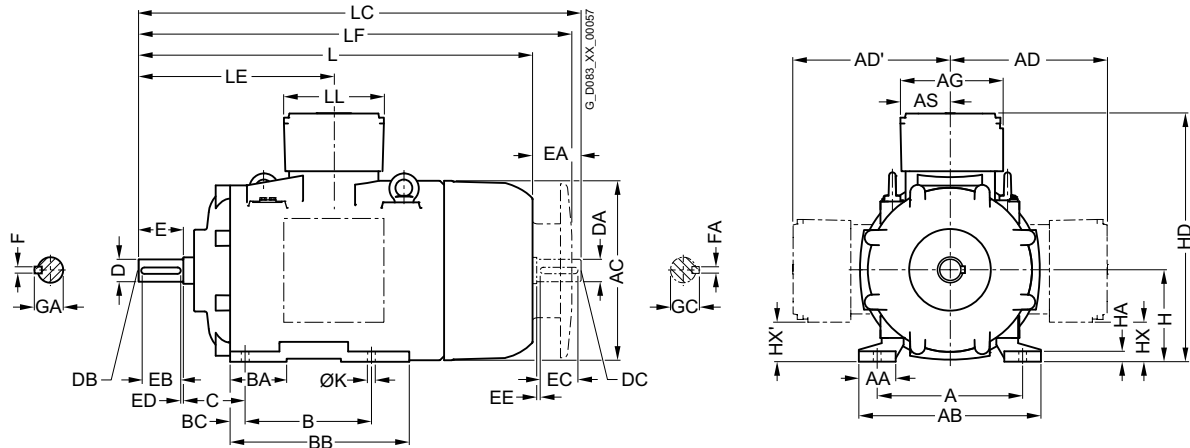
## Motors without Explosion Protection LOHER CHEMSTAR and VARIO 1PS0 motor series

### Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 90 L to 250 M

#### Dimensional drawings

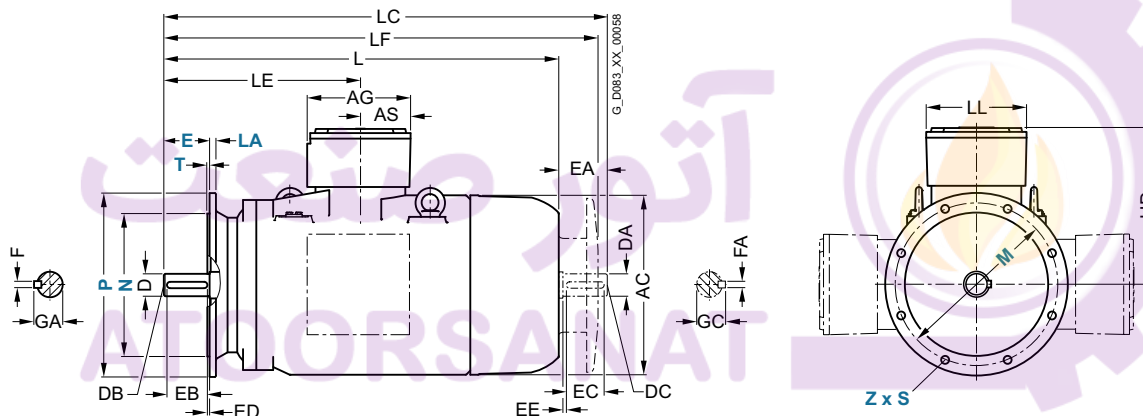
##### Type of construction IM B3

For flange dimensions, see Page 3/43.



##### Types of construction IM B5 and IM V1

For flange dimensions, see Page 3/43.



Dimension designation acc. to IEC

Frame size	No. of poles	A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER CHEMSTAR</b>																		
90 L	2 ... 16	140	40	180	186	–	138	69	125	40	155	15	56	90	13	303	10	426
100 L	2 ... 16	160	40	205	213	–	138	69	140	50	170	15	63	100	18	327	12	482
112 M	2 ... 16	190	45	240	237	–	138	69	140	50	170	18	70	112	18	352	12	465
132 S	2 ... 16	216	50	260	278	274	186	92	140	50	228	25	89	132	18	406	12	574
132 M	2 ... 16	216	50	260	278	274	186	92	178	50	228	25	89	132	18	406	12	574
160 M	2 ... 16	254	60	310	331	305	186	92	210	83	307	21	108	160	23	465	14.5	786
160 L	2 ... 16	254	60	310	331	305	186	92	254	83	307	21	108	160	23	465	14.5	786
180 M	2 ... 16	279	70	349	364	349	254	123	241	99	359	24	121	180	18.5	529	14.5	822
180 L	2 ... 16	279	70	349	364	349	254	123	279	99	359	24	121	180	18.5	529	14.5	822
200 L	2 ... 16	318	80	400	404	367	254	123	305	120	425	32	133	200	25	569	18.5	884
225 S	2	356	90	450	451	384	254	123	286	136	438	34	149	225	26	609	19	966
	4 ... 16																	996
225 M	2	356	90	450	451	384	254	123	311	136	438	34	149	225	26	609	19	966
	4 ... 16																	996
250 M	2	406	100	505	490	522	382	176	349	110	420	36	168	250	35	772	25	1028
	4 ... 16																	

## Motors without Explosion Protection

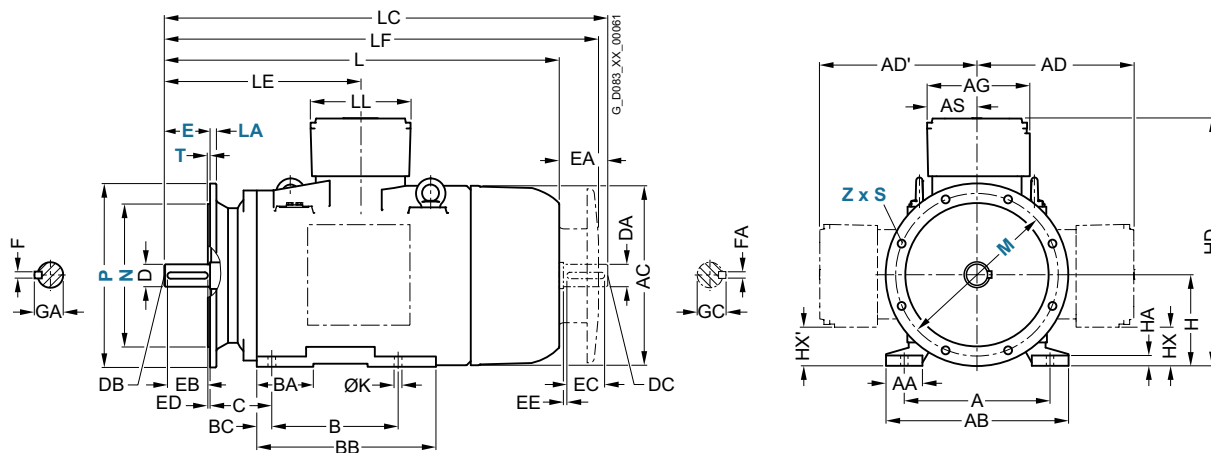
LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 90 L to 250 M

### Dimensional drawings (continued)

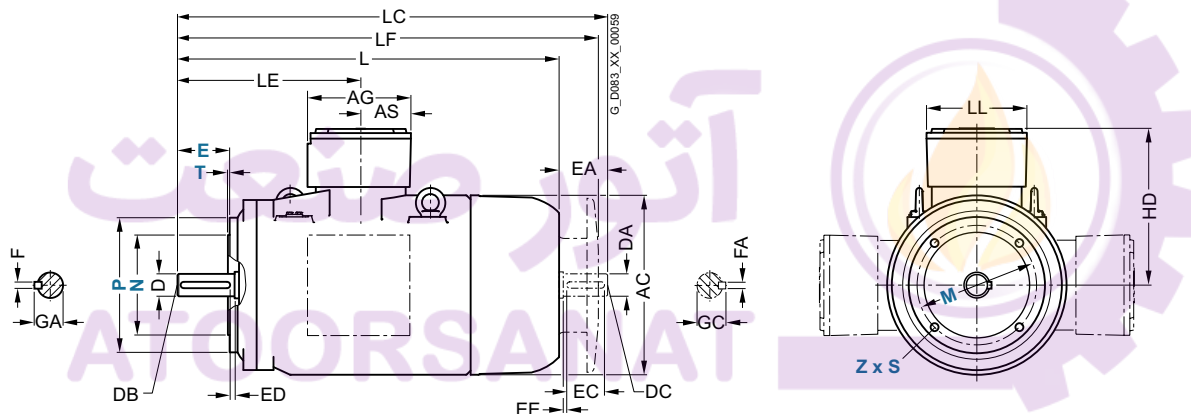
#### Type of construction IM B35

For flange dimensions, see Page 3/43.



#### Type of construction IM B14

For flange dimensions, see Page 3/43.



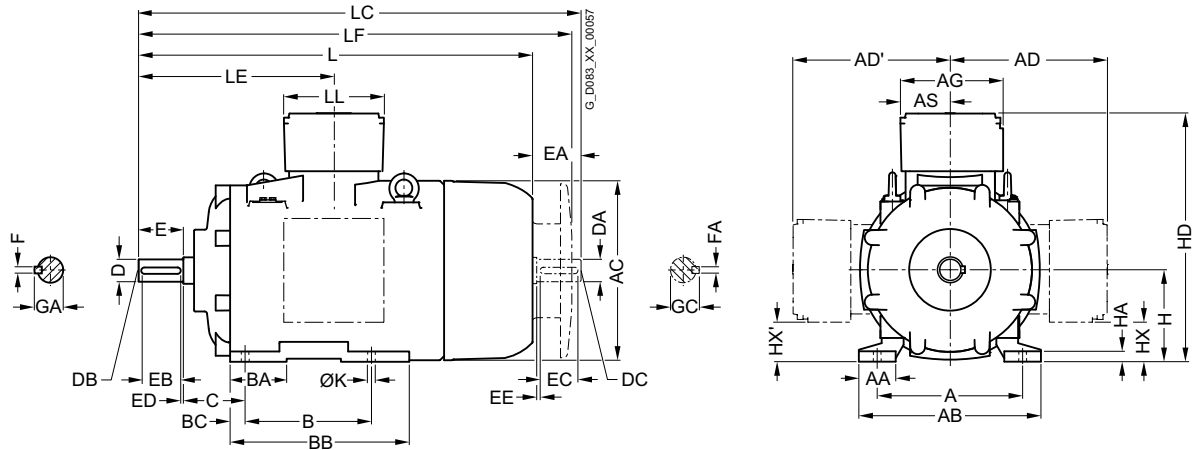
Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension			NDE shaft extension				
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER CHEMSTAR</b>																			
90 L	2 ... 16	486	173	459	138	24	M8	50	40	5	8	27	24	M8	50	40	5	8	27
100 L	2 ... 16	552	205	520	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
112 M	2 ... 16	535	210	505	138	28	M10	60	50	5	8	31	28	M10	60	50	5	8	31
132 S	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
132 M	2 ... 16	664	270	638	184	38	M12	80	70	5	10	41	38	M12	80	70	5	10	41
160 M	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
160 L	2 ... 16	906	381	850	184	42	M16	110	100	5	12	45	42	M16	110	100	5	12	45
180 M	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
180 L	2 ... 16	942	415	912	246	48	M16	110	100	5	14	51.5	48	M16	110	100	5	14	51.5
200 L	2 ... 16	1004	460	974	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
225 S	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	60		140	125	7.5	18	64	60		140	125	7.5	18	64
225 M	2	1086	480	1062	246	55	M20	110	100	5	16	59	55	M20	110	100	5	16	59
	4 ... 16	1146	510	1092	60	60		140	125	7.5	18	64	60		140	125	7.5	18	64
250 M	2	1178	496	1140	354	60	M20	140	125	7.5	18	64	60	M20	140	125	7.5	18	64
	4 ... 16				65	65						69	65						69

Motors without Explosion Protection  
LOHER CHEMSTAR and VARIO 1PS0 motor series

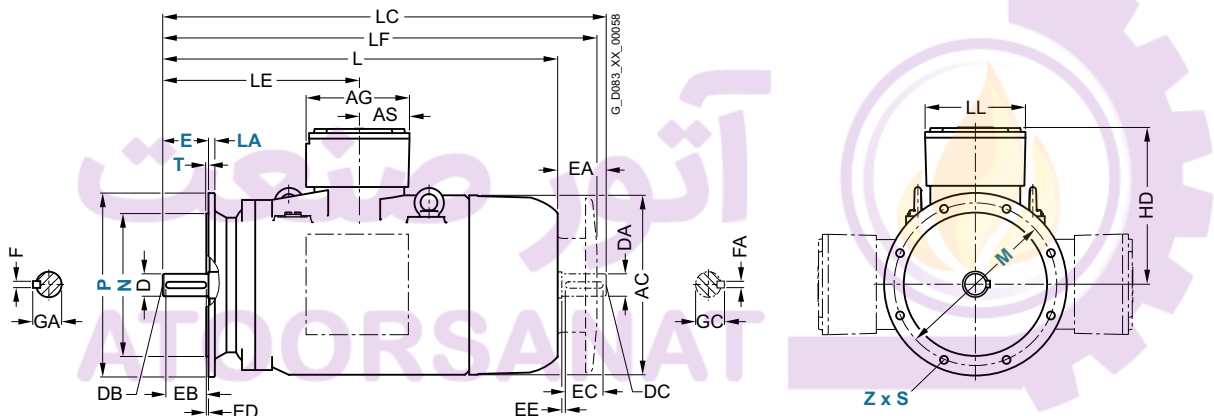
Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 280 S to 355 L

Dimensional drawings (continued)

Type of construction IM B3



Types of construction IM B5 and IM V1  
For flange dimensions, see Page 3/43.



Dimension designation acc. to IEC

Frame size	No. of poles	A	AA	AB	AC	AD/AD'	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER CHEMSTAR</b>																		
280 S	2 4 ... 16	457	110	570	550	552	382	176	368	150	520	51	190	280	40	768	25	1119
280 M	2 4 ... 16	457	110	570	550	552	382	176	419	120	520	51	190	280	40	768	25	1119
315 S	2 4 ... 16	508	125	630	622	660	509	196	406	165	575	59	216	315	40	955	28	1304 1334
315 M	2 4 ... 16	508	125	630	622	660	509	196	457	165	575	59	216	315	40	955	28	1304 1334
315 LL	2 4 ... 16	508	125	630	622	676	509	196	508	165	575	59	216	315	40	971	28	1491 1521
315 L	2 4 ... 16	508	125	630	622	676	509	196	560	165	575	59	216	315	40	971	28	1491 1521
355 M	2 4 ... 16	610	120	730	700	729	509	196	560	150	650	45	254	355	50	1084	30	1400 1430
355 L	2 4 ... 16	610	120	730	700	729	509	196	630	150	720	45	254	355	50	1084	30	1470 1500

## Motors without Explosion Protection

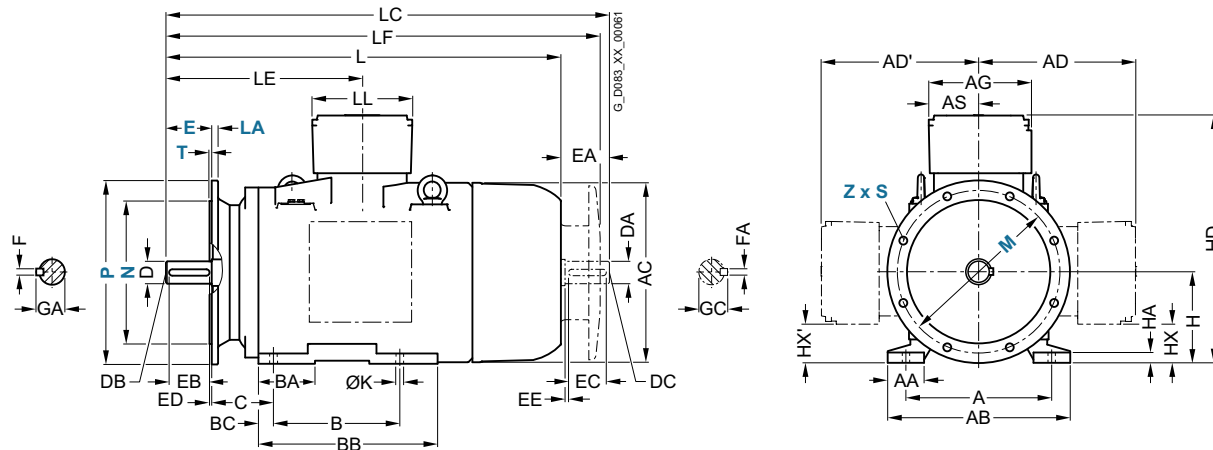
LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER CHEMSTAR 1PS0 motors, frame sizes 280 S to 355 L

### Dimensional drawings (continued)

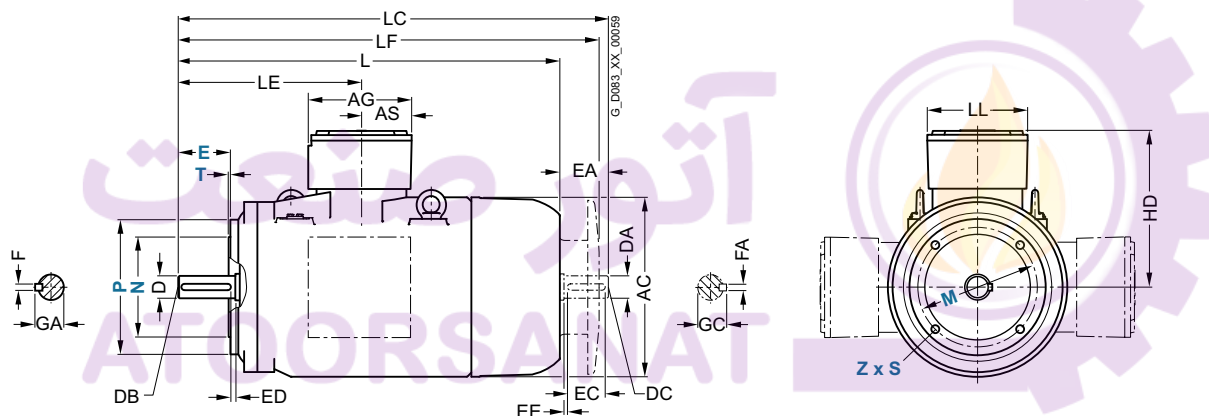
#### Type of construction IM B35

For flange dimensions, see Page 3/43.



#### Type of construction IM B14

For flange dimensions, see Page 3/43.



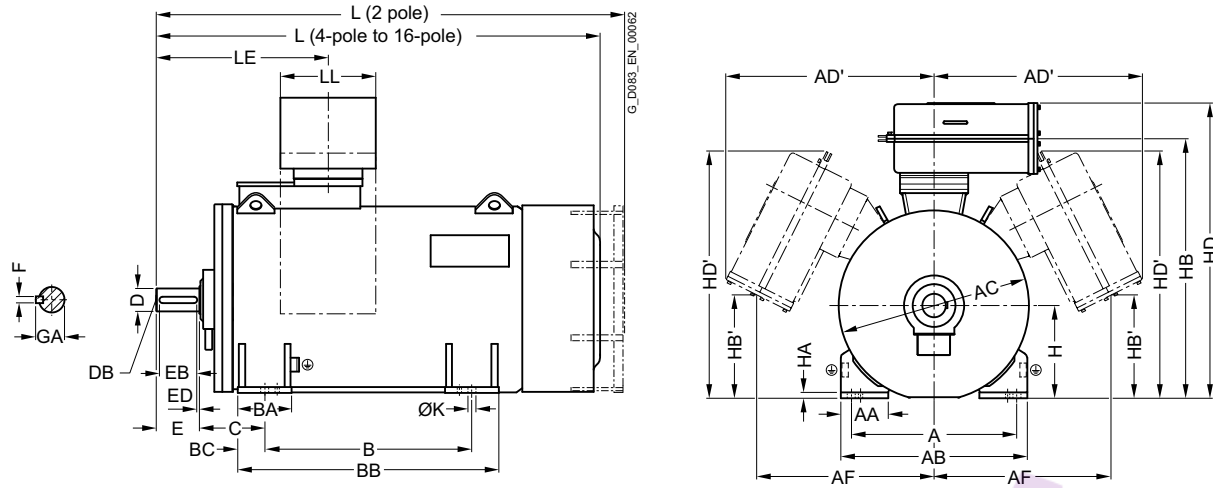
Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER CHEMSTAR</b>																			
280 S	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75					20	79.5	75					20	79.5
280 M	2	1269	582	1231	354	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16					75				20	79.5	75						20	79.5
315 S	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	79.5	80		170	140	15	22	79.5
315 M	2	1494	630	1422	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1554	660	1452		80		170	140	15	22	85	80		170	140	15	22	85
315 LL	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
315 L	2	1694	630	1609	401	65	M20	140	125	7.5	18	69	65	M20	140	125	7.5	18	69
	4 ... 16	1741	660	1639		80		170	140	15	22	85	80		170	140	15	22	85
355 M	2	1550	674	1563	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4 ... 16	1610	704	1593		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95
355 L	2	1620	709	1633	401	75	M20	140	125	7.5	20	79.5	75	M20	140	125	7.5	20	79.5
	4 ... 16	1680	739	1663		90	M24	170	140	15	25	95	90	M24	170	140	15	25	95

**Motors without Explosion Protection**  
LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER VARIO 1PS0 motors, frame sizes 355 L to 500 L

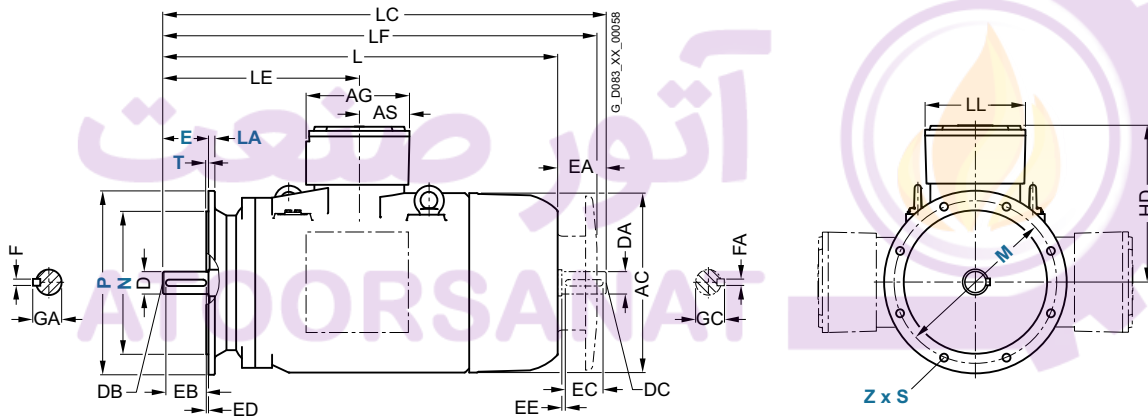
**Dimensional drawings** (continued)

**Type of construction IM B3**



**Types of construction IM B5 and IM V1**

For flange dimensions, see Page 3/43.



Dimension designation acc. to IEC

Frame size	No. of poles	A	AA	AB	AC	AD/AD'	AF	AG	AS	B	BA	BB	BC	C	H	HA	HD	øK	L
<b>LOHER VARIO</b>																			
355 L	2	630	140	780	740	500	500	800	210	950	254	355	35	1190	33	1860	1890		
	4 ... 16																		
400 L	2	710	185	860	820	500	500	900	210	1090	280	400	30	1297	33	1975	2015		
	4 ... 16																		
450 L	2	800	230	900	920	500	500	1000	260	1260	315	450	30	1375	39	2095	2135		
	4 ... 16																		
500 L	2	900	220	1030	1015	500	500	1120	280	1400	335	500	40	1479	39	-	2305		
	4 ... 16																		

# Motors without Explosion Protection

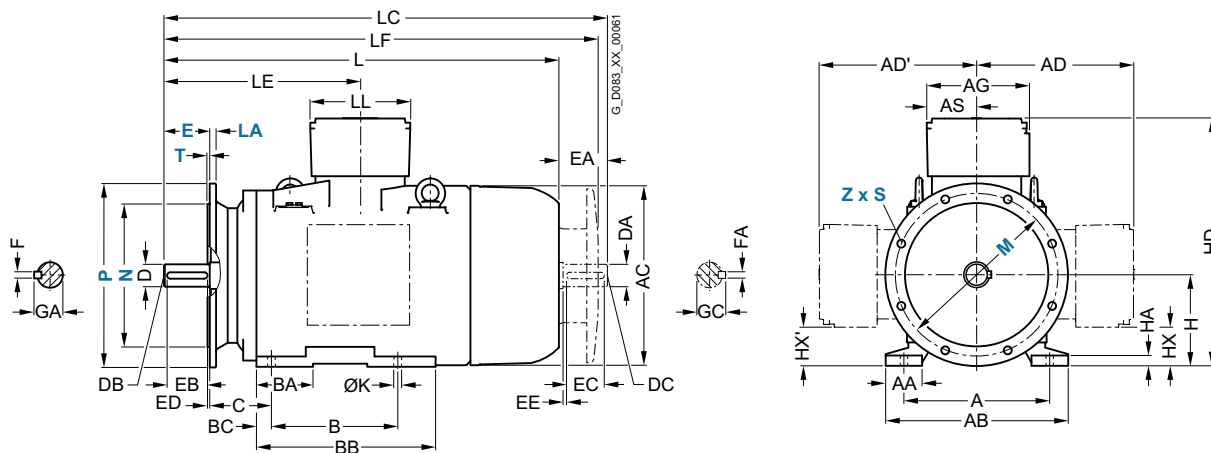
## LOHER CHEMSTAR and VARIO 1PS0 motor series

Dimensions for LOHER VARIO 1PS0 motors, frame sizes 355 L to 500 L

### Dimensional drawings (continued)

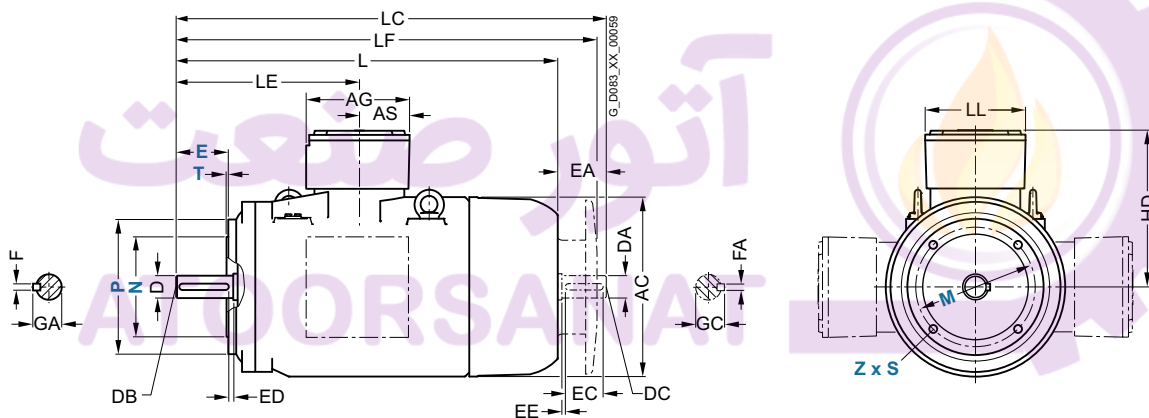
#### Type of construction IM B35

For flange dimensions, see Page 3/43.



#### Type of construction IM B14

For flange dimensions, see Page 3/43.



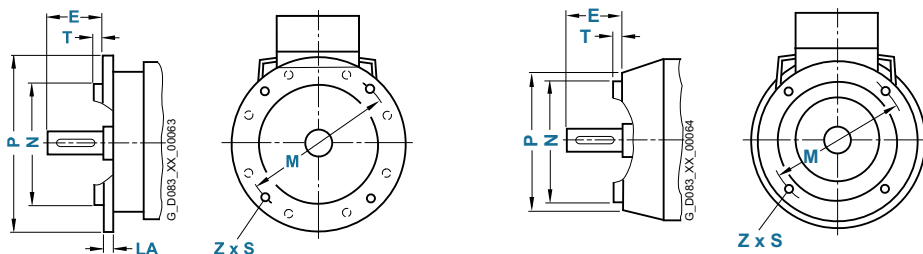
Frame size	No. of poles	Dimension designation acc. to IEC										DE shaft extension		NDE shaft extension					
		LC	LE	LF	LL	D	DB	E	EB	ED	F	GA	DA	DC	EA	EC	EE	FA	GC
<b>LOHER VARIO</b>																			
355 L	2		657			75	M20	140			20	79.5	75	M20	140			20	79.5
	4 ... 16		687			90	M24	170			25	95	90	M24	170			25	95
400 L	2		695			80	M20	170			22	85	80	M20	170			22	85
	4 ... 16		732			100	M24	210			28	106	100	M24	210			28	106
450 L	2		707			85	M20	170			22	90	85	M20	170			22	90
	4 ... 16		747			110	M24	210			28	116	110	M24	210			28	116
500 L	2		-			-	-	-			-	-	-	-	-			-	-
	4 ... 16		747			120	M24	210			32	127	120	M24	210			32	127

## Motors without Explosion Protection

### LOHER CHEMSTAR and VARIO 1PS0 motor series

#### Flange dimensions

#### Dimensional drawings



In EN 50347, the frame sizes are allocated flange FF with through holes and flange FT with tapped holes.  
 (Z = the number of retaining holes)

Frame size	No. of poles	Flange with through hole (FF)/tapped hole (FT) acc. to EN 50347 <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
<b>LOHER CHEMSTAR</b>										
<b>90 L</b>	2 ... 16	<b>FF165</b>	10	50	165	130	200	11.5	3.5	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<b>FT115</b>	15	50	115	95	140	M8	3	4
		<i>FT100<sup>1)</sup></i>	8	–	100	80	120	M6	3	4
<b>100 L</b>	2 ... 16	<i>FT130<sup>1)</sup></i>	10	–	130	110	160	M8	3.5	4
		<b>FF215</b>	11	60	215	180	250	14	4	4
		<b>FT130</b>	11	60	130	110	160	M8	3.5	4
		<i>FT115<sup>1)</sup></i>	10	–	115	95	140	M8	3	4
<b>112 M</b>	2 ... 16	<i>FT130<sup>1)</sup></i>	12	–	165	130	200	M10	3.5	4
		<b>FF215</b>	11	60	215	180	250	14	4	4
		<i>FT165<sup>1)</sup></i>	13	–	265	230	300	14	4	4
		<b>FT130</b>	11	60	130	110	160	M8	3.5	4
<b>132 S</b>	2 ... 16	<i>FT165<sup>1)</sup></i>	12	–	165	130	200	M10	3.5	4
		<b>FF265</b>	12	80	265	230	300	14	4	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<b>FF265</b>	12	80	265	230	300	14	4	4
<b>132 M</b>	2 ... 16	<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<b>FF300</b>	20	110	300	250	350	18	5	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
<b>160 M</b>	2 ... 16	<b>FF300</b>	20	110	300	250	350	18	5	4
		<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<b>FF300</b>	20	110	300	250	350	18	5	4
<b>160 L</b>	2 ... 16	<i>FF215<sup>1)</sup></i>	11	–	215	180	250	14	4	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<b>FF300</b>	13	110	300	250	350	18	5	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
<b>180 M</b>	2 ... 16	<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
		<b>FF300</b>	13	110	300	250	350	18	5	4
		<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
<b>180 L</b>	2 ... 16	<i>FF265<sup>1)</sup></i>	12	–	265	230	300	14	4	4
		<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
		<b>FF350</b>	15	110	350	300	400	18	5	8
		<i>FF300<sup>1)</sup></i>	15	–	300	250	350	18	5	4
<b>200 L</b>	2 ... 16	<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
		<b>FF400</b>	17	140	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
<b>225 S</b>	2	<b>FF400</b>	16	110	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
	4 ... 16	<b>FF400</b>	17	140	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8

<sup>1)</sup> Flange is selectable at no additional cost.

## Motors without Explosion Protection

LOHER CHEMSTAR and VARIO 1PS0 motor series

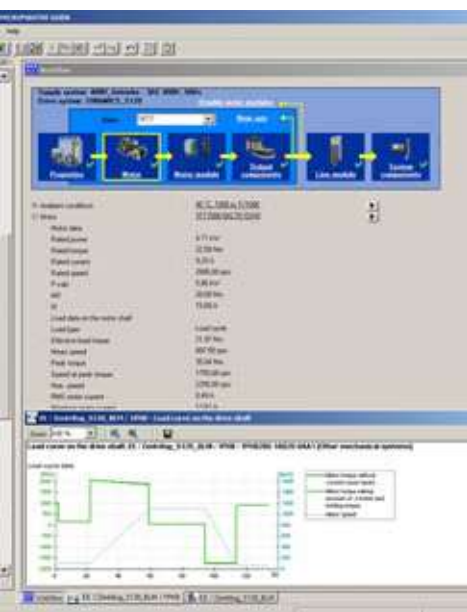
### Flange dimensions

#### Dimensional drawings (continued)

Frame size	No. of poles	Flange with through hole (FF)/ tapped hole (FT) acc. to EN 50347  <i>Selectable flange</i>	Dimension designation acc. to IEC							
			LA	E	M	N	P	S	T	Z
<b>LOHER CHEMSTAR (continued)</b>										
<b>225 M</b>	2	<b>FF400</b>	16	110	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
	4 ... 16	<b>FF400</b>	16	140	400	350	450	18	5	8
		<i>FF350<sup>1)</sup></i>	15	–	350	300	400	18	5	8
<b>250 M</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400<sup>1)</sup></i>	16	–	400	350	450	18	5	8
<b>280 S</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400<sup>1)</sup></i>	22	–	400	350	450	18	5	8
<b>280 M</b>	2 ... 16	<b>FF500</b>	18	140	500	450	550	18	5	8
		<i>FF400<sup>1)</sup></i>	22	–	400	350	450	18	5	8
<b>315 S</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF500<sup>1)</sup></i>	22	–	500	450	550	18.5	5	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF500<sup>1)</sup></i>		22	–	500	450	550	18.5	5	8	
<b>315 M</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF500<sup>1)</sup></i>	22	–	500	450	550	18.5	5	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF500<sup>1)</sup></i>		22	–	500	450	550	18.5	5	8	
<b>315 LL</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF740<sup>1)</sup></i>	25	–	740	680	800	24	6	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF740<sup>1)</sup></i>		25	–	740	680	800	24	6	8	
<b>315 L</b>	2	<b>FF600</b>	22	140	600	550	660	24	6	8
		<i>FF740<sup>1)</sup></i>	25	–	740	680	800	24	6	8
	4 ... 16	<b>FF600</b>	22	170	600	550	660	24	6	8
<i>FF740<sup>1)</sup></i>		25	–	740	680	800	24	6	8	
<b>355 M</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			170						
<b>355 L</b>	2	<b>FF740</b>	25	140	740	680	800	24	6	8
	4 ... 16			170						
<b>LOHER VARIO</b>										
<b>355 L</b>	2	<b>FF740</b>	25	140	740	680	800	22	6	8
	4 ... 16			170						
<b>400 L</b>	2	<b>FF940</b>	28	170	940	880	1000	22	6	8
	4 ... 16			210						
<b>450 L</b>	2	<b>FF1080</b>	30	170	1080	1000	1150	26	6	8
	4 ... 16			210						
<b>500 L</b>	2	<b>FF1180</b>	30	–	1180	1120	1250	26	7	8
	4 ... 16			210						

<sup>1)</sup> Flange is selectable at no additional cost.





### Security notes

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, solutions, machines, devices, and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered.

For more information about industrial security, visit

[www.siemens.com/industrialsecurity](http://www.siemens.com/industrialsecurity)

To receive information about product updates on a regular basis, register for our product newsletter.

For more information, visit

<http://support.automation.siemens.com>

4/2	<b>SinaSave energy efficiency tool</b>
4/3	<b>Drive Technology Configurator</b>
4/4	<b>SIZER for Siemens Drives configuration tool</b>
4/5	<b>SIZER WEB ENGINEERING engineering tool</b>

آتور صنعت  
ATOORSANAT



## Tools and Engineering

### SinaSave energy efficiency tool

#### Overview

Payback calculator for energy-efficient drive systems



SinaSave calculates the extent of the potential savings that are possible in a specific drive application, based on the plant characteristics. Potential savings of up to 70 % can be achieved. SinaSave also works as a payback calculator, stating how quickly investing in an energy-efficient motor will pay off in mains operation or with a frequency converter for variable-speed operation. The payback period will frequently be just a few months.

For mains operation, SinaSave calculates the cost savings and payback period of Siemens energy-saving motors of efficiency class IE3 (IEC) or Premium Efficiency (NEMA) compared to motors of the standard efficiency classes IE2 and IE1 (IEC) or High Efficiency (NEMA), individually selected or familiar motors as part of a complete plant assessment.

For converter operation, SinaSave takes all necessary plant-specific parameters and values required for the process into account. Other basic data for the program include the number of working days and work shifts, as well as the load curve that decides the extent of the energy-saving effect throughout the day and the year. From the entered plant-specific data, SinaSave first obtains the drive system with the appropriate output and the price of the corresponding frequency converter. In a further step, the program determines the energy requirements of the variable-speed drive system and compares it to the calculated values for all alternative concepts that could be considered.

#### More information

SinaSave is available on the Internet free of charge at [www.siemens.com/sinasave](http://www.siemens.com/sinasave)

More information about services for energy saving is available on the Internet at [www.siemens.com/energy-saving](http://www.siemens.com/energy-saving)

## Overview

### Configuration of drive technology products

The Drive Technology Configurator (DT Configurator) helps you to select the optimum products for your application – starting with gear units, motors, converters and the associated options and components and ending with controllers, software licenses and connection technology. With or without detailed knowledge of products: preselected product groups, deliberate navigation through selection menus and direct product selection through entry of the product number support quick, efficient and convenient configuration.



Also, comprehensive documentation comprising technical data sheets, operating instructions, certificates and 2D/3D dimensional drawings can be selected in the DT Configurator. Immediate ordering is possible by simply transferring a parts list to the shopping cart of the Industry Mall.

### DT Configurator – Efficient drive configuration:

- Quick and easy configuration of drive components
- Configuration of drive systems for pumps, fans and compressor applications from 1 kW to 2.6 MW
- Selection from a wide range of products
- Comprehensive documentation
- Support with retrofitting
- Direct ordering via the Industry Mall

### System requirements:

- Internet access as well as a standard browser (e.g. Internet Explorer V7.0 and higher, Firefox V5.0 and higher)
- Documentation (data sheets, dimensional drawings, etc.) is output in PDF or RTF format
- The DT Configurator can be used without the need for registration

## Selection and ordering data

Description	Article No.
<b>Interactive Catalog CA 01</b> DVD-ROM including Drive Technology Configurator, German	<b>E86060-D4001-A510-D3-7600</b>

## More information

### Online access to Drive Technology Configurator

More information about the Drive Technology Configurator is available on the Internet at:

[www.siemens.com/dt-configurator](http://www.siemens.com/dt-configurator)

### Offline access to the Drive Technology Configurator in the Interactive Catalog CA 01

In addition, the Drive Technology Configurator is also included on the DVD of the Interactive Catalog CA 01 – the offline version of Siemens Industry Mall.

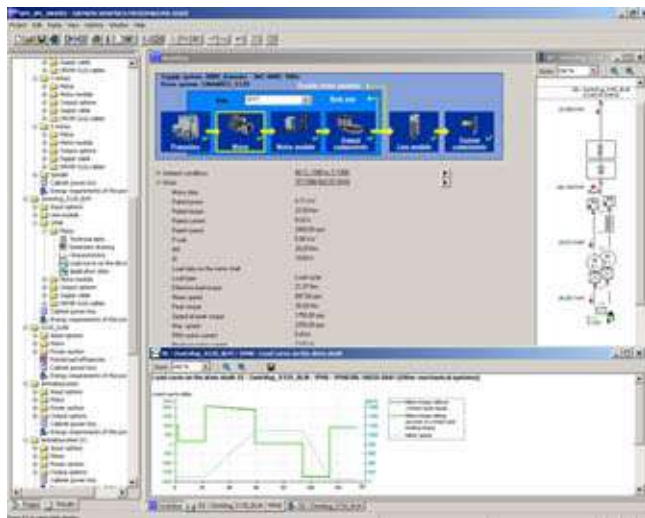
The Interactive Catalog CA 01 can be ordered from the relevant Siemens sales office or via the Internet:

[www.siemens.com/automation/CA01](http://www.siemens.com/automation/CA01)

## Tools and Engineering

### SIZER for Siemens Drives configuration tool

#### Overview



The following drives and controls can be engineered in a user-friendly way using the SIZER for Siemens Drives configuration tool:

- SINAMICS Low Voltage and MICROMASTER 4 drive systems
- Motor starters
- SINUMERIK CNC system
- SIMOTION Motion Control System
- SIMATIC Technology

It provides support when setting up the technologies involved in the hardware and firmware components required for a drive task. SIZER for Siemens Drives covers the full range of operations required to configure a complete drive system, from basic single drives to complex multi-axis applications.

SIZER for Siemens Drives supports all of the engineering steps in a workflow:

- Configuring the power supply
- Designing the motor and gearbox, including calculation of mechanical transmission elements
- Configuring the drive components
- Selecting the required accessories
- Selecting the line-side and motor-side power options, e.g. cables, filters, and reactors

When SIZER for Siemens Drives was being designed, particular importance was placed on a high degree of usability and a universal, function-based approach to the drive application. The extensive user guidance makes it easy to use the tool. Status information keeps you continually informed about the progress of the configuration process.

The SIZER for Siemens Drives user interface is available in English, French, German and Italian.

The drive configuration is saved in a project. In the project, the components and functions used are displayed in a hierarchical tree structure.

The project view permits the configuration of drive systems and the copying/inserting/modifying of drives already configured.

The configuration process produces the following results:

- A parts list of the required components (export to Excel, use of the Excel data sheet for import to SAP)
- Technical specifications of the system
- Characteristic curves
- Comments on system reactions
- Mounting arrangement of drive and control components and dimensional drawings of motors
- Energy requirements of the configured application

These results are displayed in a results tree and can be reused for documentation purposes.

Support is provided by the technological online help menu:

- Detailed technical specifications
- Information about the drive systems and their components
- Decision-making criteria for the selection of components
- Online help in English, French, German, Italian, Chinese and Japanese

#### System requirements

- PG or PC with Pentium III min. 800 MHz (recommended > 1 GHz)
- 512 MB RAM (1 GB RAM recommended)
- At least 4.1 GB of free hard disk space
- An additional 100 MB of free hard disk space on the Windows system drive
- Screen resolution 1024 × 768 pixels (1280 × 1024 pixels recommended)
- Operating system:
  - Windows XP Home Edition SP2
  - Windows XP Professional 32 bit SP2
  - Windows XP Professional 64 bit SP2
  - Windows Vista Business
  - Windows 7 Ultimate 32 bit
  - Windows 7 Professional 32 bit
- Microsoft Internet Explorer V5.5 SP2

#### Selection and ordering data

Description	Article No.
<b>SIZER for Siemens Drives configuration tool</b> DVD-ROM	<b>6SL3070-0AA00-0AG0</b>
English, French, German, Italian	

#### More information

The SIZER for Siemens Drives configuration tool is available free on the Internet at

[www.siemens.com/sizer](http://www.siemens.com/sizer)

## Overview

### *Drive engineering – flexible, tailored and user-friendly*

You can quickly find a solution for your drive task with the web-based tool: menu-prompted workflows navigate you through the technical selection and dimensioning of products and drive systems, including the accessories.

Based on an integrated inquiry functionality, SIZER WEB ENGINEERING also offers you special customized solutions for applications which cannot be addressed using "Standard Products", i.e. the focus is on flexibility and customized solutions.

The following product groups are presently supported:

- High-voltage motors
- Low-voltage motors
- Medium-voltage converters
- Low-voltage converters
- DC converters

The tool can also be used to design the following drive systems:

- Medium-voltage systems
- Low-voltage systems
  - Basic single-axis applications for pumps, fans, and compressors
  - More complex applications (on condition that SIZER for Siemens Drives is installed)

Comprehensive documentation, such as data sheets, startup calculations, dimensional drawings, offer documentation and a lot more are integrated in the tool.

The result: customized solutions for your drive tasks.



Example of startup calculation

Internet access as well as a standard browser (e.g. Internet Explorer from V7.0, Firefox from V3.0) are required. After successful registration and release, SIZER WEB ENGINEERING is available 24/7.

## More information

More information on the SIZER WEB ENGINEERING engineering tool is available on the Internet at [www.siemens.com/sizer-we](http://www.siemens.com/sizer-we)



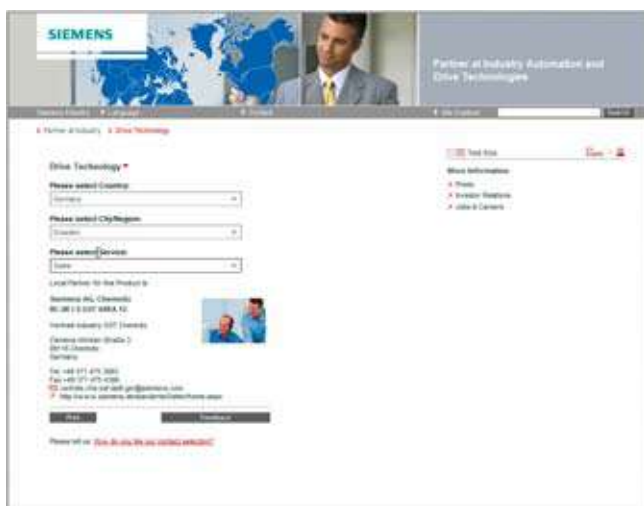


# آتور صنعت ATOORSANAT

5/2	<b>Partners at Industry</b>
5/3	<b>Online Services</b>
	<u>Information and Ordering in the Internet and on DVD</u>
5/3	Siemens Industry Automation and Drive Technologies in the WWW
5/3	Product Selection using the Interactive Catalog CA 01 of Industry
5/3	Easy shopping with the Industry Mall <u>Information and Download Center</u>
	<u>Social Media, Mobile Media</u>
5/4	Downloading Catalogs
5/4	Social Media
5/4	Mobile Media
5/5	<b>Industry Services</b>
5/5	Your machines and plant can do more – with Industry Services. <u>Industry Services for the entire life cycle</u>
5/6	Online Support
5/6	Technical Support
5/7	Spare Parts
5/7	Repair Services
5/7	Field Services
5/8	Training
5/8	Technical Consulting & Engineering Support
5/8	Energy & Environmental Services
5/9	Modernization & Optimization Services
5/9	Plant Maintenance & Condition Monitoring
5/9	Service Contracts
5/10	<b>Metal surcharges</b>
5/13	<b>Conditions of sale and delivery</b>

# Appendix

## Partners at Industry



5





### Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

[www.siemens.com/industry](http://www.siemens.com/industry)

you will find everything you need to know about products, systems and services.

### Product Selection Using the Interactive Catalog CA 01 of Industry



Detailed information together with convenient interactive functions:

The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

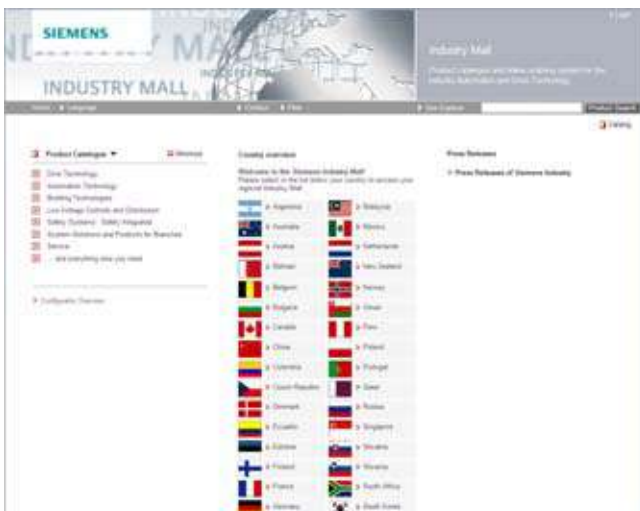
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

[www.siemens.com/automation/ca01](http://www.siemens.com/automation/ca01)

or on DVD.

### Easy Shopping with the Industry Mall



The Industry Mall is the electronic ordering platform of Siemens AG on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking and tracing of the order to be carried out. Availability checks, customer-specific discounts and preparation of quotes are also possible.

Numerous additional functions are available to support you.

For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

Please visit the Industry Mall on the Internet under:

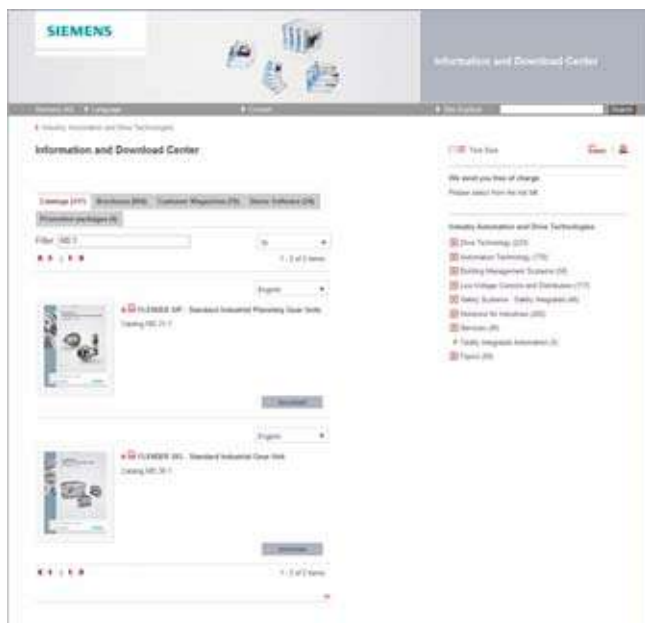
[www.siemens.com/industrymall](http://www.siemens.com/industrymall)

## Appendix

### Online Services

#### Information and Download Center, Social Media, Mobile Media

##### Downloading Catalogs



In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "ST 70" both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

[www.siemens.com/industry/infocenter](http://www.siemens.com/industry/infocenter)

##### Social Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

[www.siemens.com/industry/socialmedia](http://www.siemens.com/industry/socialmedia)

Or via our product pages at:

[www.siemens.com/automation](http://www.siemens.com/automation)

or

[www.siemens.com/drives](http://www.siemens.com/drives)

To find out more about Siemens' current social media activities visit us at:

[www.siemens.com/socialmedia](http://www.siemens.com/socialmedia)

##### Mobile Media



Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

**Your machines and plant can do more – with Industry Services.**

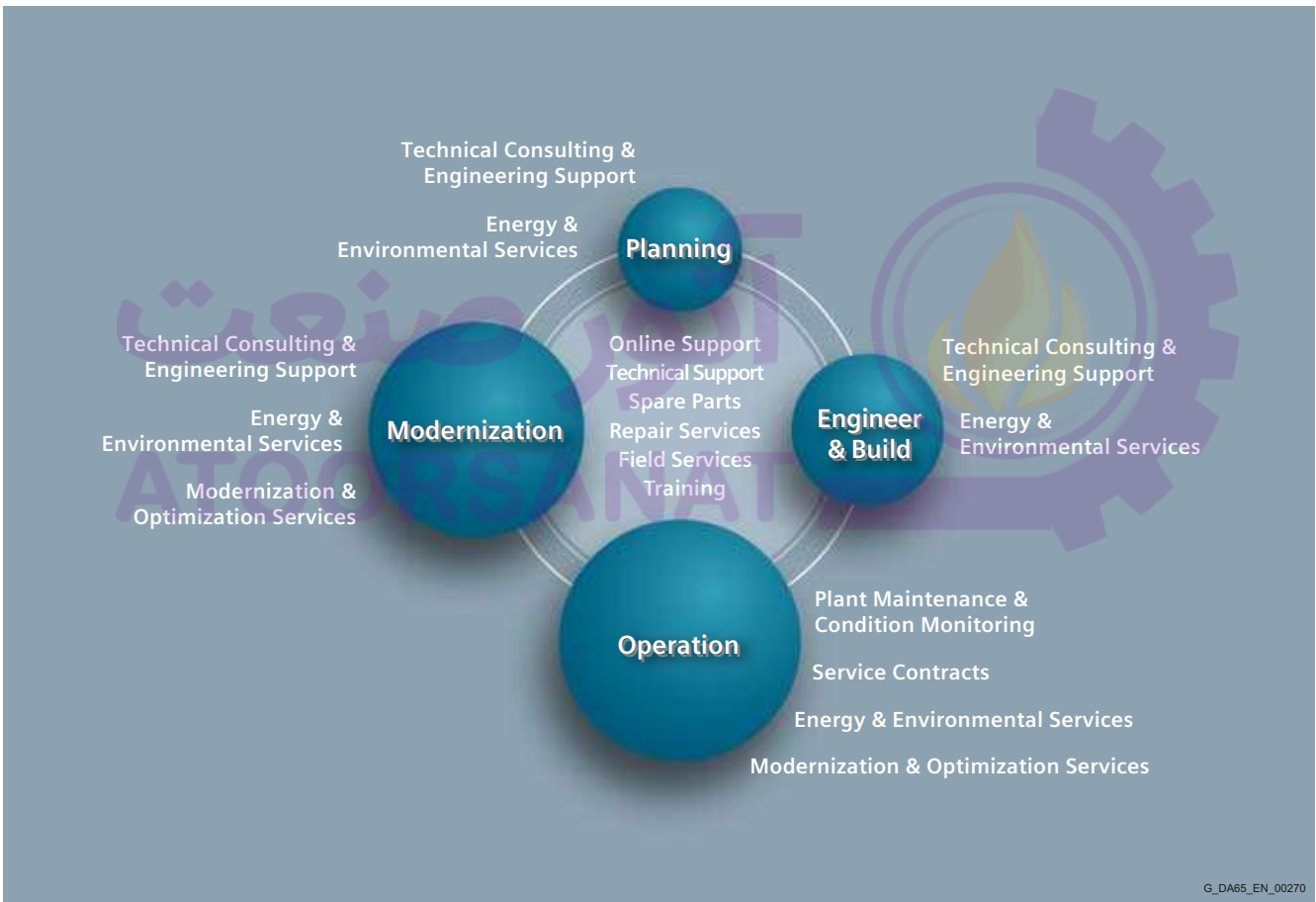


Whether it is production or process industry – in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries.

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio:  
[www.siemens.com/industry-services](http://www.siemens.com/industry-services)



G\_DA65\_EN\_00270

Siemens supports its clients with technology based Services across a plants entire life cycle.

## Appendix

### Industry Services

#### Industry Services for the entire life cycle

##### Online Support

Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediated – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.



[www.siemens.com/industry/onlinesupport](http://www.siemens.com/industry/onlinesupport)

##### Online Support App



Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products – anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical Cx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code  
for information on  
our Online Support  
app.



The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

[www.siemens.com/industry/onlinesupportapp](http://www.siemens.com/industry/onlinesupportapp)

##### Technical Support

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by e-mail, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.



<http://support.automation.siemens.com/WWW/view/en/16605032>

### Spare Parts

Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill – and result in substantial financial losses for the operator. The spare parts services from Siemens protects against such losses – with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts services is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.



<http://support.automation.siemens.com/WW/view/en/43502238>

### Repair Services

Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.



<http://support.automation.siemens.com/WW/view/en/43512848>

### Field Services

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.



<http://support.automation.siemens.com/WW/view/en/66012486>

## Appendix

### Industry Services

#### Industry Services for the entire life cycle

##### Training

Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN – Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.



<http://support.automation.siemens.com/WW/view/en/43514324>

##### Technical Consulting & Engineering Support

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.



<http://support.automation.siemens.com/WW/view/en/16605680>

##### Energy & Environmental Services

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.



<http://support.automation.siemens.com/WW/view/en/42350774>

### Modernization & Optimization Services

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation.



<http://support.automation.siemens.com/WW/view/en/66005532>

### Plant Maintenance & Condition Monitoring

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.



<http://support.automation.siemens.com/WW/view/en/59456862>

### Service Contracts

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.



<http://support.automation.siemens.com/WW/view/en/65961857>

## Appendix

### Metal surcharges

#### Explanation of the raw material/metal surcharges<sup>1)</sup>

##### Surcharge calculation

To compensate for variations in the price of the raw materials silver, copper, aluminum, lead, gold, dysprosium<sup>2)</sup> and/or neodym<sup>2)</sup>, surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The surcharges are calculated in accordance with the following criteria:

- Basic official price of the raw material  
Basic official price from the day prior to receipt of the order or prior to release order (daily price) for<sup>3)</sup>
  - Silver (sales price, processed)
  - Gold (sales price, processed)
- and for<sup>4)</sup>
  - Copper (lower DEL notation + 1 %)
  - Aluminum (aluminum in cables)
  - Lead (lead in cables)
- Metal factor of the products  
Certain products are displayed with a metal factor. The metal factor determines the official price (for those raw materials concerned) as of which the metal surcharges are applied and the calculation method used (weight or percentage method). An exact explanation is given below.

##### Structure of the metal factor

The metal factor consists of several digits; the first digit indicates whether the percentage method of calculation refers to the list price or a possible discounted price (customer net price) (L = list price / N = customer net price).

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG)
3rd digit	for copper (CU)
4th digit	for aluminum (AL)
5th digit	for lead (PB)
6th digit	for gold (AU)
7th digit	for dysprosium (Dy) <sup>2)</sup>
8th digit	for neodym (Nd) <sup>2)</sup>

##### Weight method

The weight method uses the basic official price, the daily price and the raw material weight. In order to calculate the surcharge, the basic official price must be subtracted from the daily price. The difference is then multiplied by the raw material weight.

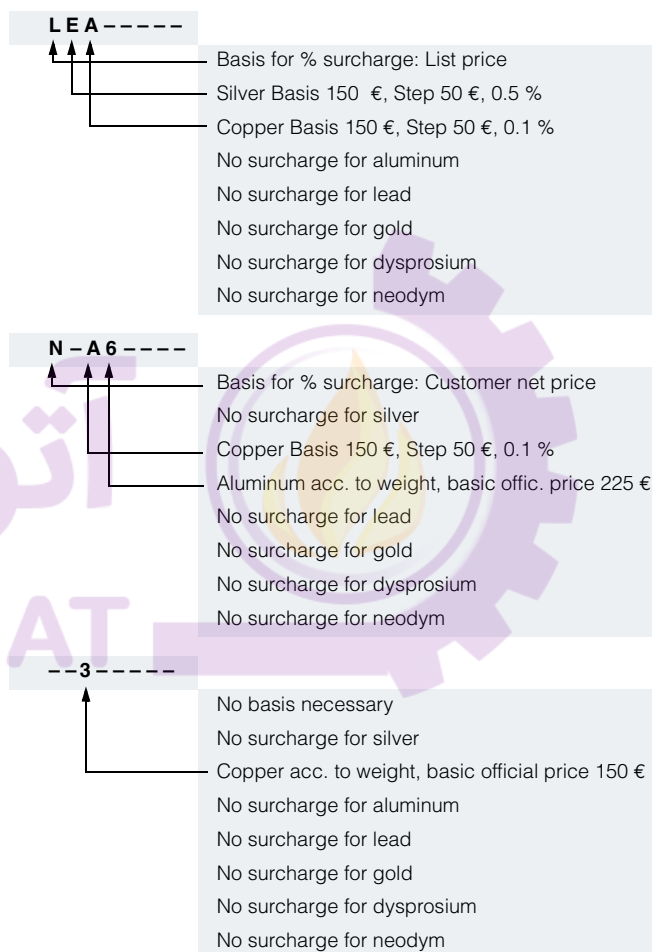
The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. The raw material weight can be found in the respective product descriptions.

##### Percentage method

Use of the percentage method is indicated by the letters A-Z at the respective digit of the metal factor.

The surcharge is increased – dependent on the deviation of the daily price compared with the basic official price – using the percentage method in "steps" and consequently offers surcharges that remain constant within the framework of this "step range". A higher percentage rate is charged for each new step. The respective percentage level can be found in the table below.

##### Metal factor examples



<sup>1)</sup> Refer to the separate explanation on the next page regarding the raw materials dysprosium and neodym (= rare earths).

<sup>2)</sup> For a different method of calculation, refer to the separate explanation for these raw materials on the next page.

<sup>3)</sup> Source: Umicore, Hanau ([www.metalsmanagement.umicore.com](http://www.metalsmanagement.umicore.com)).

<sup>4)</sup> Source: German Trade Association for Cables and Conductors ([www.kabelverband.org](http://www.kabelverband.org)).



## Explanation of the raw material/metal surcharges for dysprosium and neodym (rare earths)

### Surcharge calculation

To compensate for variations in the price of the raw materials silver<sup>1)</sup>, copper<sup>1)</sup>, aluminum<sup>1)</sup>, lead<sup>1)</sup>, gold<sup>1)</sup>, dysprosium and/or neodym, surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. The surcharge for dysprosium and neodym is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The surcharge is calculated in accordance with the following criteria:

- Basic official price of the raw material<sup>2)</sup>  
 Three-month basic average price (see below) in the period before the quarter in which the order was received or the release order took place (= average official price) for
  - dysprosium (Dy metal, 99 % min. FOB China; USD/kg)
  - neodym (Nd metal, 99 % min. FOB China; USD/kg)
- Metal factor of the products  
 Certain products are displayed with a metal factor. The metal factor indicates (for those raw materials concerned) the basic official price as of which the surcharges for dysprosium and neodym are calculated using the weight method. An exact explanation of the metal factor is given below.

### Three-month average price

The prices of rare earths vary according to the foreign currency, and there is no freely accessible stock exchange listing. This makes it more difficult for all parties involved to monitor changes in price. In order to avoid continuous adjustment of the surcharges, but to still ensure fair, transparent pricing, an average price is calculated over a three-month period using the average monthly foreign exchange rate from USD to EUR (source: European Central Bank). Since not all facts are immediately available at the start of each month, a one-month buffer is allowed before the new average price applies.

Examples of calculation of the average official price:

Period for calculation of the average price:	Period during which the order/release order is effected and the average price applies:
Sep 2012 – Nov 2012	Q1 in 2013 (Jan – Mar)
Dec 2012 – Feb 2013	Q2 in 2013 (Apr – Jun)
Mar 2013 – May 2013	Q3 in 2013 (Jul – Sep)
Jun 2013 – Aug 2013	Q4 in 2013 (Oct – Dec)

### Structure of the metal factor

The metal factor consists of several digits; the first digit is not relevant to the calculation of dysprosium and neodym.

The remaining digits indicate the method of calculation used for the respective raw material. If no surcharge is added for a raw material, a "-" is used.

1st digit	List or customer net price using the percentage method
2nd digit	for silver (AG) <sup>1)</sup>
3rd digit	for copper (CU) <sup>1)</sup>
4th digit	for aluminum (AL) <sup>1)</sup>
5th digit	for lead (PB) <sup>1)</sup>
6th digit	for gold (AU) <sup>1)</sup>
7th digit	for dysprosium (Dy)
8th digit	for neodym (Nd)

### Weight method

The weight method uses the basic official price, the average price and the raw material weight. In order to calculate the surcharge, the basic official price must be subtracted from the average price. The difference is then multiplied by the raw material weight.

The basic official price can be found in the table below using the number (1 to 9) of the respective digit of the metal factor. Your Sales contact can inform you of the raw material weight.

### Metal factor examples

----- 7 1	No basis necessary
↑	No surcharge for silver
↑	No surcharge for copper
↑	No surcharge for aluminum
↑	No surcharge for lead
↑	No surcharge for gold
↑	Dysprosium acc. to weight, basic official price 300 €
↑	Neodym acc. to weight, basic official price 50 €

<sup>1)</sup> For a different method of calculation, refer to the separate explanation for these raw materials on the previous page.

<sup>2)</sup> Source: Asian Metal Ltd ([www.asianmetal.com](http://www.asianmetal.com))

## Appendix

### Metal surcharges

#### Values of the metal factor

Percentage method	Basic official price in €	Step range in €	% surcharge 1st step	% surcharge 2nd step	% surcharge 3rd step	% surcharge 4th step	% surcharge per additional step	
			Price in € 150.01 – 200.00	Price in € 200.01 – 250.00	Price in € 250.01 – 300.00	Price in € 300.01 – 350.00		
A	150	50	0.1	0.2	0.3	0.4	0.1	
B	150	50	0.2	0.4	0.6	0.8	0.2	
C	150	50	0.3	0.6	0.9	1.2	0.3	
D	150	50	0.4	0.8	1.2	1.6	0.4	
E	150	50	0.5	1.0	1.5	2.0	0.5	
F	150	50	0.6	1.2	1.8	2.4	0.6	
G	150	50	1.0	2.0	3.0	4.0	1.0	
H	150	50	1.2	2.4	3.6	4.8	1.2	
I	150	50	1.6	3.2	4.8	6.4	1.6	
J	150	50	1.8	3.6	5.4	7.2	1.8	
			175.01 – 225.00	225.01 – 275.00	275.01 – 325.00	325.01 – 375.00		
O	175	50	0.1	0.2	0.3	0.4	0.1	
P	175	50	0.2	0.4	0.6	0.8	0.2	
R	175	50	0.5	1.0	1.5	2.0	0.5	
			225.01 – 275.00	275.01 – 325.00	325.01 – 375.00	375.01 – 425.00		
S	225	50	0.2	0.4	0.6	0.8	0.2	
U	225	50	1.0	2.0	3.0	4.0	1.0	
V	225	50	1.0	1.5	2.0	3.0	1.0	
W	225	50	1.2	2.5	3.5	4.5	1.0	
			150.01 – 175.00	175.01 – 200.00	200.01 – 225.00	225.01 – 250.00		
Y	150	25	0.3	0.6	0.9	1.2	0.3	
			400.01 – 425.00	425.01 – 450.00	450.01 – 475.00	475.01 – 500.00		
Z	400	25	0.1	0.2	0.3	0.4	0.1	
<b>Price basis (1st digit)</b>								
L	Calculation based on the list price							
N	Calculation based on the customer net price (discounted list price)							
<b>Weight method</b>	<b>Basic official price in €</b>							
1	50	Calculation based on raw material weight						
2	100							
3	150							
4	175							
5	200							
6	225							
7	300							
8	400							
9	555							
<b>Miscellaneous</b>								
-	No metal surcharge							

## 1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

### 1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"<sup>1)</sup> and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"<sup>1)</sup> and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"<sup>1)</sup>.

### 1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"<sup>1)</sup> and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"<sup>1)</sup> and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"<sup>1)</sup>.

## 2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

You will find a detailed explanation of the metal factor on the page headed "Metal surcharges".

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

## 3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

## 4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i.a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

1) The text of the Terms and Conditions of Siemens AG can be downloaded at [www.siemens.com/automation/salesmaterial-as/catalog/en/terms\\_of\\_trade\\_en.pdf](http://www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf)

## Appendix

### Notes





## Appendix

### Notes



## Industry Automation, Drive Technologies and Low-Voltage Power Distribution

Further information can be obtained from our branch offices listed at [www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

<b>System Solutions for Industry</b> <b>Interactive Catalog on DVD</b>	<i>Catalog</i>		
Products for Automation and Drives, Low-Voltage Power Distribution and Electrical Installation Technology	<b>CA 01</b>		
<b>Building Control</b>			
GAMMA Building Control	ET G1		
<b>Drive Systems</b>			
SINAMICS G130 Drive Converter Chassis Units	D 11		
SINAMICS G150 Drive Converter Cabinet Units			
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12		
SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives Germany Edition	D 15.1		
SINAMICS G180 Converters – Compact Units, Cabinet Systems, Cabinet Units Air-Cooled and Liquid-Cooled	D 18.1		
SINAMICS S120 Chassis Format Units and Cabinet Modules	D 21.3		
SINAMICS S150 Converter Cabinet Units			
SINAMICS DCM DC Converter, Control Module	D 23.1		
SINAMICS DCM Cabinet	D 23.2		
SINAMICS and Motors for Single-Axis Drives	D 31		
SINAMICS G120P and SINAMICS G120P Cabinet pump, fan, compressor converters	D 35		
Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN	D 84.1		
• Series H-compact			
• Series H-compact PLUS			
Asynchronous Motors Standardline	D 86.1		
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2		
DC Motors	DA 12		
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1		
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2		
<i>Digital: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i>	DA 22		
SIMOVERT PM Modular Converter Systems	DA 45		
SIEMOSYN Motors	DA 48		
MICROMASTER 420/430/440 Inverters	DA 51.2		
MICROMASTER 411/COMBIMASTER 411	DA 51.3		
SIMODRIVE 611 universal and POSMO	DA 65.4		
<i>Note: Additional catalogs on SIMODRIVE or SINAMICS drive systems and SIMOTICS motors with SINUMERIK and SIMOTION can be found under Motion Control</i>			
<u>Low-Voltage Three-Phase-Motors</u>			
SIMOTICS Low-Voltage Motors	D 81.1		
SIMOTICS FD Flexible Duty Motors	D 81.8		
MOTOX Geared Motors	D 87.1		
SIMOGEAR Geared Motors	MD 50.1		
SIMOGEAR Gearboxes with adapter	MD 50.11		
<u>Mechanical Driving Machines</u>			
FLENDER Standard Couplings	MD 10.1		
FLENDER High Performance Couplings	MD 10.2		
FLENDER SIG Standard industrial gear unit	MD 30.1		
FLENDER SIP Standard industrial planetary gear units	MD 31.1		
<b>Process Instrumentation and Analytics</b>			
Field Instruments for Process Automation	FI 01		
<i>Digital: SIPART Controllers and Software</i>	MP 31		
Products for Weighing Technology	WT 10		
<i>Digital: Process Analytical Instruments</i>	PA 01		
<i>Digital: Process Analytics, Components for the System Integration</i>	PA 11		
<b>Low-Voltage Power Distribution and Electrical Installation Technology</b>	<i>Catalog</i>		
SENTRON · SIVACON · ALPHA Protection, Switching, Measuring and Monitoring Devices, Switchboards and Distribution Systems	LV 10		
Standards-Compliant Components for Photovoltaic Plants	LV 11		
3WT Air Circuit Breakers up to 4000 A	LV 35		
3VT Molded Case Circuit Breakers up to 1600 A	LV 36		
<i>Digital: SIVACON System Cubicles, System Lighting and System Air-Conditioning</i>	LV 50		
<i>Digital: ALPHA Distribution Systems</i>	LV 51		
ALPHA FIX Terminal Blocks	LV 52		
SIVACON S4 Power Distribution Boards	LV 56		
<i>Digital: SIVACON 8PS Busbar Trunking Systems</i>	LV 70		
<i>Digital: DELTA Switches and Socket Outlets</i>	ET D1		
<b>Motion Control</b>			
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60		
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61		
SINUMERIK 840D sl Type 1B Equipment for Machine Tools	NC 62		
SINUMERIK 808 Equipment for Machine Tools	NC 81.1		
SINUMERIK 828 Equipment for Machine Tools	NC 82		
SIMOTION, SINAMICS S120 & SIMOTICS Equipment for Production Machines	PM 21		
Drive and Control Components for Cranes	CR 1		
<b>Power Supply</b>			
Power supply SITOP	KT 10.1		
<b>Safety Integrated</b>			
Safety Technology for Factory Automation	SI 10		
<b>SIMATIC HMI/PC-based Automation</b>			
Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC		
<b>SIMATIC Ident</b>			
Industrial Identification Systems	ID 10		
<b>SIMATIC Industrial Automation Systems</b>			
Products for Totally Integrated Automation	ST 70		
SIMATIC PCS 7 Process Control System System components	ST PCS 7		
SIMATIC PCS 7 Process Control System Technology components	ST PCS 7 T		
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7 AO		
<b>SIMATIC NET</b>			
Industrial Communication	IK PI		
<b>SIRIUS Industrial Controls</b>			
SIRIUS Industrial Controls	IC 10		
<b>Information and Download Center</b>			
Digital versions of the catalogs are available on the Internet at: <a href="http://www.siemens.com/industry/infocenter">www.siemens.com/industry/infocenter</a>			
There you'll find additional catalogs in other languages.			
Please note the section "Downloading catalogs" on page "Online services" in the appendix of this catalog.			

*Digital: These catalogs are only available as a PDF.*

آتور صنعت  
ATOORSANAT



## Get more information

Siemens Motors:  
[www.siemens.com/motors](http://www.siemens.com/motors)

Siemens Low-Voltage Motors:  
[www.siemens.com/low-voltage-motors](http://www.siemens.com/low-voltage-motors)

Local partners worldwide:  
[www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

Please scan the  
QR code for more  
information on  
Siemens Motors.



Siemens AG  
Industry Sector  
Drive Technologies Division  
Large Drives  
Hans-Loher-Str. 32  
94099 RUHSTORF A. D. ROTT  
GERMANY

Subject to change without prior notice  
Article No. E86060-K5583-A111-A2-7600  
E.9115.27.LDT / Dispo 18402  
KG 0914 4.0 HOF/AUM 276 En  
Printed in Germany  
© Siemens AG 2014

The information provided in this catalog contains merely general descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.  
All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.

[www.siemens.com/drives](http://www.siemens.com/drives)

Token fee: 5.00 €