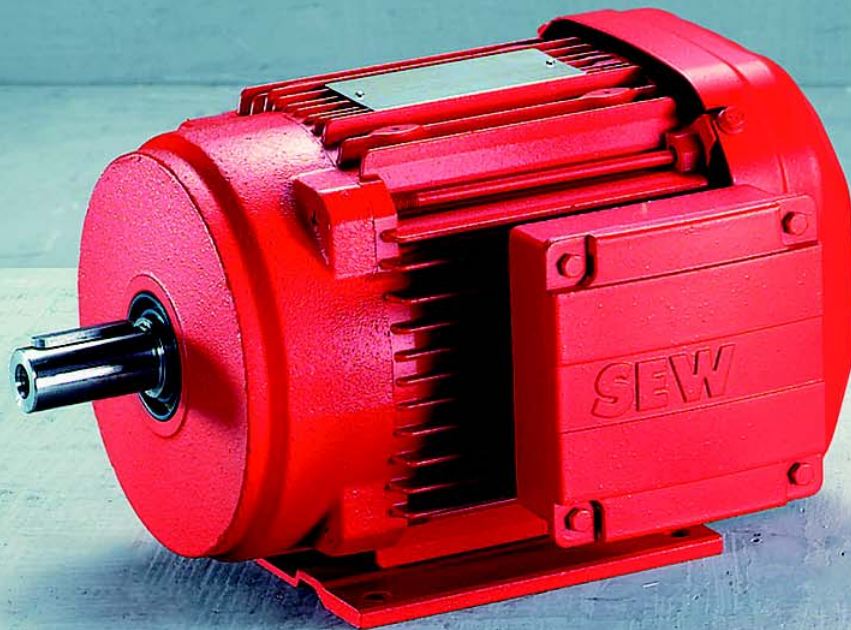


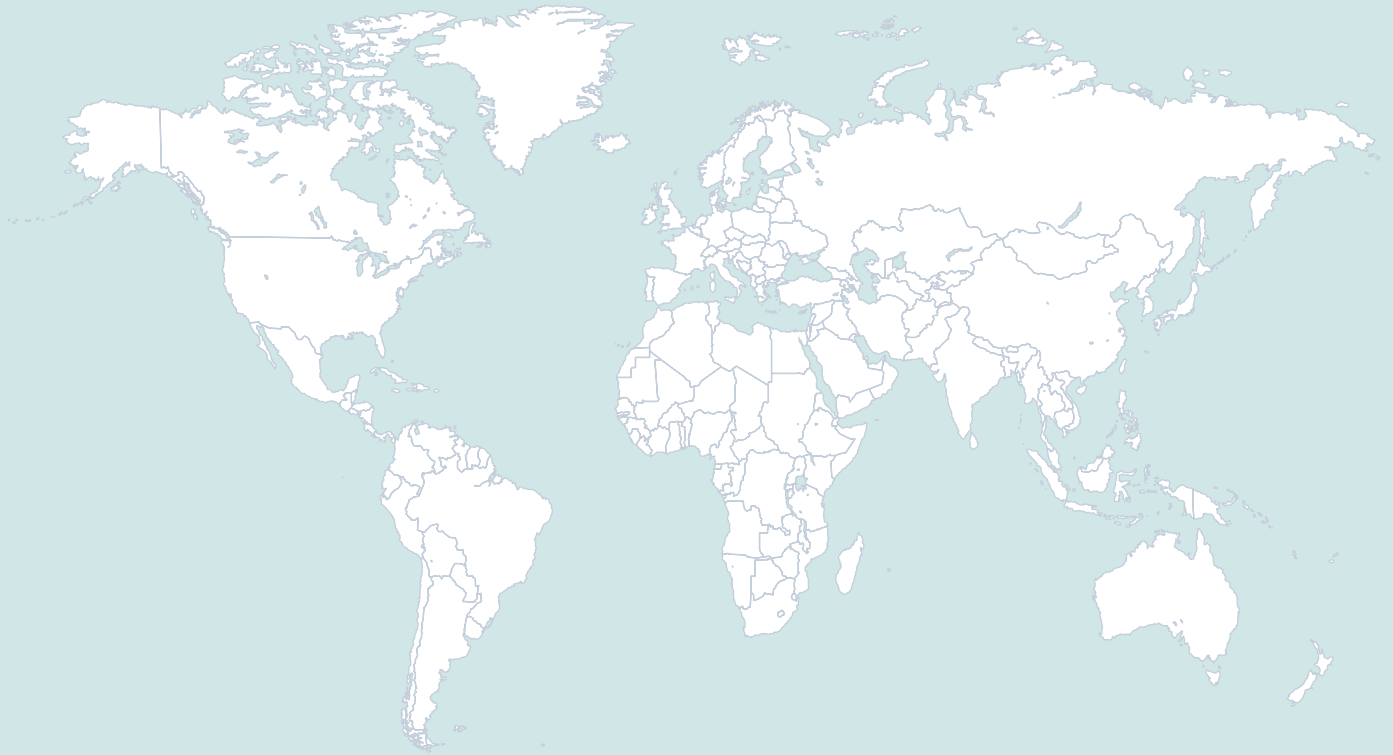


**SEW**  
**EURODRIVE**

# Catalog



**Explosion-Proof AC Motors**  
EDRS71 – 80, EDRE80 – 225  
DR63, DV250, DV280





<b>1</b>	<b>Introduction .....</b>	<b>5</b>
1.1	The SEW-EURODRIVE Group of Companies .....	5
1.2	Products and systems from SEW-EURODRIVE .....	6
1.3	Additional documentation .....	8
1.4	Product names and trademarks .....	9
1.5	Copyright .....	9
<b>2</b>	<b>General Product Description .....</b>	<b>10</b>
2.1	Explosion protection designation .....	10
2.2	Drive technology in accordance with EU Directive 94/9/EC .....	12
2.3	Regulations .....	13
2.4	Categories and protection types .....	15
2.5	Designation code in accordance with EU Directive 94/9/EC .....	19
2.6	EDR. AC motors .....	20
2.7	Energy-efficient motors of the EDR motor series .....	21
2.8	Corrosion and surface protection .....	23
2.9	Operating temperatures .....	24
2.10	Motors at a glance .....	25
<b>3</b>	<b>General Project Planning Notes .....</b>	<b>26</b>
3.1	Standards and regulations .....	26
3.2	Switching and protective equipment .....	29
<b>4</b>	<b>Type Designations .....</b>	<b>32</b>
4.1	Unit designations for the EDR. motor series .....	32
4.2	Serial number .....	37
4.3	Examples for the type designation of DR series AC motors .....	38
4.4	Mounting position designations of the motors .....	40
<b>5</b>	<b>EDR. AC Motors .....</b>	<b>41</b>
5.1	Notes on the data of explosion-proof energy efficiency motors .....	41
5.2	Technical data of 4-pole explosion-proof energy efficiency motors .....	42
<b>6</b>	<b>Project Planning .....</b>	<b>44</b>
6.1	Electrical characteristics .....	44
6.2	Thermal characteristics .....	45
6.3	Switching frequency .....	45
6.4	Mechanical characteristics .....	47
6.5	Overhung loads .....	48
6.6	Center of gravity of the motors/brakemotors .....	56
6.7	Project planning procedure for EDR. – supply system operation .....	57
6.8	Project planning procedure for EDR. – inverter operation .....	58
6.9	Operation on the inverter .....	59
6.10	Safe operation of motors in category 2 and 3 .....	60
6.11	Typical application .....	61
6.12	Motor terminal voltage .....	61
6.13	Torque limit curves of EDRS and EDRE motors for inverter operation .....	61
6.14	Permitted maximum and minimum frequencies .....	63
6.15	Frequency inverter selection .....	64
6.16	Notes for safe operation .....	67
6.17	Permitted voltage load for frequency inverter operation .....	69



<b>7</b>	<b>Dimension Sheets of EDR. AC Motors/Brakemotors</b>	<b>71</b>
7.1	Notes on the dimension sheets	71
7.2	Dimension sheets of EDR. AC motors	73
<b>8</b>	<b>Encoder</b>	<b>91</b>
8.1	Product description	91
8.2	Project planning, technical data	93
<b>9</b>	<b>Additional Features</b>	<b>101</b>
9.1	Motor protection	101
9.2	Other connection options	105
9.3	Ventilation	106
9.4	Other additional features	109
<b>10</b>	<b>AC Motors eDR63, DV.250 / 280</b>	<b>111</b>
10.1	Technical data for protection type nA, category II3GD (zone 2 and 22)	111
10.2	Technical data for protection type e, category II2G (zone 1)	111
10.3	Motors for frequency inverter operation	112
10.4	Type designation of AC (brake)motors	116
10.5	Available motor options	116
10.6	Backstop RS and canopy C	117
10.7	Motor protection	118
10.8	Standards and regulations	120
10.9	EMC measures	122
10.10	Electrical characteristics	123
10.11	Thermal characteristics	124
10.12	Permitted operating modes	124
10.13	Starting frequency	124
10.14	Mechanical characteristics	126
10.15	Overhung loads	126
10.16	Special markets	128
<b>11</b>	<b>Dimension Sheets DR63, DV250 / 280</b>	<b>129</b>
11.1	Notes on the dimension sheets for AC motors	129
11.2	Dimension sheets	130
<b>12</b>	<b>Appendix</b>	<b>132</b>
12.1	Check List and Inquiry Form for Explosion-Proof Drives	132
12.2	Cable dimension units according to AWG	136
<b>13</b>	<b>Address Directory</b>	<b>140</b>



## 1 Introduction

### 1.1 The SEW-EURODRIVE Group of Companies

#### *Global presence*

Driving the world – with innovative drive solutions for all branches and every application. Products and systems from SEW-EURODRIVE are used in a multitude of applications – worldwide. Be it in the automotive, building materials, food and beverage or metal-processing industry – the decision to use drive technology 'made by SEW-EURODRIVE' stands for reliability for both functionality and investment.

We are represented in the most important branches of industry all over the world: with 13 manufacturing plants, 67 assembly plants in 44 countries and our comprehensive range of services, which we consider an integrative service that continues our commitment to outstanding quality.

#### *Always the right drive*

The SEW-EURODRIVE modular concept offers millions of combinations. This wide selection enables you to choose the correct drive for all applications, each based on the required speed and torque range, space available and the ambient conditions. Gear units and gearmotors offering a unique and finely tuned performance range and the best economic prerequisites to face your drive challenges.

The gearmotors are powered by MOVITRAC<sup>®</sup> frequency inverters, MOVIDRIVE<sup>®</sup> inverters and MOVIAXIS<sup>®</sup> multi-axis servo inverters, a combination that blends perfectly with the existing SEW-EURODRIVE program. As in the case for mechanical systems, the development, production and assembly is also carried out completely by SEW-EURODRIVE. In combination with our drive electronics, these drives provide the utmost in flexibility.

Products of the servo drive system, such as low backlash servo gear units, compact servomotors or MOVIAXIS<sup>®</sup> multi-axis servo inverters provide precision and dynamics. From single-axis or multi-axis applications all the way to synchronized process sequences, servo drive systems by SEW-EURODRIVE offer a flexible and customized implementation of your application.

For economical, decentralized installations, SEW-EURODRIVE offers components from its decentralized drive system, such as MOVIMOT<sup>®</sup>, the gearmotor with integrated frequency inverter or MOVI-SWITCH<sup>®</sup>, the gearmotor with integrated switching and protection function. SEW-EURODRIVE hybrid cables have been designed specifically to ensure cost-effective solutions, independent of the philosophy behind or the size of the system. The latest developments from SEW-EURODRIVE: MOVITRANS<sup>®</sup> system components for contactless energy transfer, MOVIPRO<sup>®</sup>, the decentralized drive control and MOVIFIT<sup>®</sup>, the new decentralized intelligence.

Power, quality and sturdy design combined in one standard product: With high torque levels, industrial gear units from SEW-EURODRIVE realize major movements. The modular concept will once again provide optimum adaptation of industrial gear units to meet a wide range of different applications.

#### *Your ideal partner*

Its global presence, extensive product range and broad spectrum of services make SEW-EURODRIVE the ideal partner for the machinery and plant construction industry when it comes to providing drive systems for demanding applications in all branches of industries and applications.



## 1.2 Products and systems from SEW-EURODRIVE

The products and systems from SEW-EURODRIVE are divided into the following 4 product groups:

1. Gearmotors and frequency inverters
2. Servo drive systems
3. Decentralized drive systems
4. Industrial gear units

Products and systems used in several group applications are listed in a separate group "Products and systems covering several product groups". Consult the following tables to locate the products and systems included in the respective product group:

1. Gearmotors and frequency inverters		
Gear units/gearmotors	Motors	Frequency inverters
<ul style="list-style-type: none"> <li>• Helical gear units/helical gearmotors</li> <li>• Parallel-shaft helical gear units/parallel-shaft helical gearmotors</li> <li>• Helical-bevel gear units/helical-bevel gearmotors</li> <li>• Helical-worm gear units/helical-worm gearmotors</li> <li>• SPIROPLAN® right-angle gearmotors</li> <li>• EMS drives</li> <li>• Geared torque motors</li> <li>• Pole-changing gearmotors</li> <li>• Variable speed gear units/variable speed gearmotors</li> <li>• Aseptic gearmotors</li> <li>• Gear units/gearmotors to ATEX standard</li> <li>• Variable speed gear units/variable speed gearmotors to ATEX standard</li> </ul>	<ul style="list-style-type: none"> <li>• Asynchronous AC motors/AC brakemotors</li> <li>• Pole-changing AC motors/AC brakemotors</li> <li>• Energy-efficient motors</li> <li>• Explosion-proof AC motors/AC brakemotors</li> <li>• Torque motors</li> <li>• Single-phase motors/single-phase brakemotors</li> <li>• Asynchronous linear motors</li> </ul>	<ul style="list-style-type: none"> <li>• MOVITRAC® frequency inverters</li> <li>• MOVIDRIVE® inverters</li> <li>• Control, technology and communication options for inverters</li> </ul>

2. Servo drive systems		
Servo gear units and servo gearmotors	Servomotors	Servo drive inverters/servo inverters
<ul style="list-style-type: none"> <li>• Low backlash planetary gear units/planetary gearmotors</li> <li>• Low backlash helical-bevel gear units / helical-bevel gearmotors</li> <li>• Explosion-proof servo gear units and servo gearmotors</li> </ul>	<ul style="list-style-type: none"> <li>• Asynchronous servomotors/servo brakemotors</li> <li>• Synchronous servomotors/servo brakemotors</li> <li>• Explosion-proof servomotors/servo brakemotors</li> <li>• Synchronous linear motors</li> </ul>	<ul style="list-style-type: none"> <li>• MOVIDRIVE® servo inverters</li> <li>• MOVIAxis® multi-axis servo inverters</li> <li>• Control, technology and communication options for servo drive inverters and servo inverters</li> </ul>



3. Decentralized drive systems		
Decentralized drives	Communication and installation	Contactless energy transfer
<ul style="list-style-type: none"> <li>• MOVIMOT<sup>®</sup> gearmotors with integrated frequency inverter</li> <li>• MOVIMOT<sup>®</sup> motors/brakemotors with integrated frequency inverter</li> <li>• MOVI-SWITCH<sup>®</sup> gearmotors with integrated switching and protection function</li> <li>• MOVI-SWITCH<sup>®</sup> motors/brakemotors with integrated switching and protection function</li> <li>• Explosion-proof MOVIMOT<sup>®</sup> and MOVI-SWITCH<sup>®</sup> gearmotors</li> </ul>	<ul style="list-style-type: none"> <li>• Fieldbus interfaces</li> <li>• Field distributors for decentralized installation</li> <li>• MOVIFIT<sup>®</sup> product range                             <ul style="list-style-type: none"> <li>– MOVIFIT<sup>®</sup> MC for controlling MOVIMOT<sup>®</sup> drives</li> <li>– MOVIFIT<sup>®</sup> SC with integrated electronic motor switch</li> <li>– MOVIFIT<sup>®</sup> FC with integrated frequency inverter</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• MOVITRANS<sup>®</sup> system                             <ul style="list-style-type: none"> <li>– Stationary components for energy supply</li> <li>– Mobile components for energy consumption</li> <li>– Line cables and installation material</li> </ul> </li> </ul>

4. Industrial gear units
<ul style="list-style-type: none"> <li>• Helical gear units</li> <li>• Helical-bevel gear units</li> <li>• Planetary gear units</li> </ul>

Products and systems covering several product groups
<ul style="list-style-type: none"> <li>• Operator terminals</li> <li>• MOVI-PLC<sup>®</sup> drive-based control system</li> </ul>

In addition to products and systems, SEW-EURODRIVE offers a comprehensive range of services. These include:

- Technical consulting
- Application software
- Seminars and training
- Extensive technical documentation
- International customer service

Visit our homepage at

→ [www.sew-eurodrive.com](http://www.sew-eurodrive.com)

The website provides comprehensive information and services.



### 1.3 Additional documentation

#### **Contents of this publication**

The 'Explosion-Proof AC Motors' catalog/price catalog provides a detailed description of the following product groups from SEW-EURODRIVE:

- Explosion-proof AC motors EDR. of category 2G, temperature class T3.
- Explosion-proof AC motors EDR. of category 2GD, temperature class T3, maximum surface temperature 120 °C or 140 °C.
- Explosion-proof AC motors EDR. of category 2GD, temperature class T3, maximum surface temperature 120 °C or 140 °C.

This catalog/price catalog contains the following information:

- Type designations
- Product descriptions
- Project planning information
- Technical data
- Technical data of options and additional features
- Information about the dimension sheets
- Dimension sheets
- Price catalog – Prices and option pricing of options and accessories

#### **Additional documentation**

The "Explosion-Proof Drives" catalog/price catalog is available from SEW-EURODRIVE in addition to this "Explosion-Proof AC Motors" catalog/price catalog.

This catalog/price catalog contains the following information:

- Type designations
- Product descriptions
- Project planning instructions for drives and gear units
- Description of mounting positions
- Explanation on the order information
- Design and operating notes
- Important information about tables and dimension sheets
- Description of the different types
- Overview of all permitted combinations
- Selection tables for explosion-proof drives
- Dimension sheets for explosion-proof drives
- Technical data
- Price catalog – Prices and option pricing of options and accessories





### **Additional documentation**

The following price catalogs/catalogs are available from SEW-EURODRIVE in addition to this motor catalog:

- DR AC motors
- DR gearmotors
- Synchronous servomotors
- Synchronous servo gearmotors
- Asynchronous servo gearmotors

The price catalogs and catalogs offer the following information:

- Product descriptions
- Type designations
- Project planning instructions for drives and gear units
- Visual representation of mounting positions
- Explanation on the order information
- Design and operating notes
- Important information about tables and dimension sheets
- Description of the different types
- Overview of all permitted combinations
- Selection tables for gearmotors
- Gearmotor dimension sheets
- Technical data
- Price catalog – Prices and option pricing of options and accessories

Please note that the complete range of technical documentation is available on our home page:

[www.sew-eurodrive.com](http://www.sew-eurodrive.com)

## **1.4 Product names and trademarks**

The brands and product names in this catalog are trademarks or registered trademarks of the titleholders.

## **1.5 Copyright**

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## 2 General Product Description

### 2.1 Explosion protection designation

#### Revision of the standards

With the revision of the explosion protection standards, new designations have been implemented internationally (IEC), the so-called **E**quipment **P**rotection **L**evels (EPL). Parallel to the explosion protection categories, the EPL specifies the applicability of a unit according to the zone categorization for potentially explosive atmospheres.

With the revision of EN 60079-0, from 2010, the EPL have also been adopted to European standards. The following table shows the assignment of the EPL to the explosion protection zones.

Gas (G)			Dust (D)		
EPL	Category	Use in zone	EPL	Category	Use in zone
<b>Ga</b>	1G	0	<b>Da</b>	1D	20
<b>Gb</b>	2G	1	<b>Db</b>	2D	21
<b>Gc</b>	3G	2	<b>Dc</b>	3D	22

With the revision of the IEC 60079 'Electrical apparatus for potentially explosive atmospheres', dust explosion protection has been integrated in this set of standards as part 31. The separate dust standard IEC 61241-1 has become invalid with the release of IEC 60079-31 in November 2008.

The international standard IEC 60079 will be harmonized as EN standard with the same number and the same content in the foreseeable future.

The equipment group III for dust has also been implemented as part of this integration. As a result, there are 3 equipment groups in international standards. The following table shows the three equipment groups.

Equipment group	Description
<b>I</b>	Equipment for use in mine openings with a risk of firedamp (underground mining)
<b>II</b>	Equipment for use in areas with potentially explosive gas/air mixtures
<b>III</b>	Equipment for use in areas with potentially explosive dust/air mixtures

In addition, the new equipment group III has been split up into three subgroups 'A', 'B' and 'C' depending on the type of dust. The following table shows this division.

Equipment group	Suitable for atmospheres with	Required minimum IP rating
<b>IIIA</b>	Flammable lint	IP5x
<b>IIIB</b>	Non-conducting dust	IP5x
<b>IIIC</b>	Conducting dust	IP6x

The specific values of equipment groups IIIA to IIIC for the dust/air mixture correspond to the previous designation IIA to IIC for gas/air mixtures.

Previously, the designation IIA to IIC has only be used for motors in EX-d design (flame-proof). Now, the designation of motors of a protection type with increased safety 'e' is changed from II (without letter) to IIA, IIB, or IIC. This includes requirements for the prevention of electrostatic charge of plastic surfaces (e.g. fans) and coated, metal surfaces.



**EX labeling of motors**

The standard changes described above also cause a change of the EX designation of motors that must also be specified on the motor nameplate. The following table shows this change (example).

Previous designation	New designation (ATEX)	New designation (IECEx)
II2G Ex e II T3	II2G Ex e IIc T3 Gb	Ex e IIC T3 Gb
II3G Ex nA II T3	II3G Ex nA IIC T3 Gc	Ex nA IIC T3 Gc
II2D Ex tD A21 IP65 T120°C	II2D Ex tb IIIC T120°C Db	Ex tb IIIC T120°C Db
II3D Ex tD A22 IP54 T120°C	II3D Ex tc IIIB T120°C Dc	Ex tc IIIB T120°C Dc
II3D Ex tD A22 IP65 T120°C	II3D Ex tc IIIC T120°C Dc	Ex tc IIIC T120°C Dc

With the designation of the explosion protection, you have to distinguish between the designation according to directive (e.g. II3D) and the designation according to standard (e.g. Ex tc IIIC T120°C Dc).

Designation according to directive	Designation according to standard
II3D	Ex tc IIIC T120°C Dc

Equipment sold within the scope of the European Directive 94/9/EC must be labeled according to Directive 94/9/EC in addition to the standard designation. It is important to note that the Directive designation (e.g. with II) and the standard designation (e.g. with III) are two different designations.

As the directive contains both gas and dust atmospheres in category II, a motor can be designated with II3D according to the directive and with IIIC according to the standard, for example.

**Motor protection**

Motor protection must be in accordance with the respective approvals. Two basic protection variants are distinguished:

1. Motor current circuit breaker
2. Temperature sensor (PTC resistor, SEW designation: TF)

The following additional features can be selected as well, if available:

For 1: TF, KY or PT

For 2: KY or PT

For detailed information about motor protection, refer to page 101 ff.

The following table shows the type of motor protection required according to the respective approval.

Category	2 (2GD / Gb Db)			3 (3GD / Gc Dc)		
	Supply system	Frequency inverter	pulsed	Supply system	Frequency inverter	pulsed
Label (see nameplate)	T <sub>e</sub> time	T <sub>a</sub> time				
Motor protection according to	1.	2.	2.	1.	2.	2.



## 2.2 Drive technology in accordance with EU Directive 94/9/EC

### Why explosion protection?

Special measures are required for the operation of systems and machinery in areas with potentially explosive air/gas or air/dust mixtures. If mixture formation cannot be prevented, specially protected drives must be used. Applicable standards and regulations govern the use of equipment within existing hazard zones. They also stipulate the quality requirements that must be met by drive manufacturers.

### Harmonized European design provisions

EU Directive 94/9/EC provides binding minimum requirements to be applied within the European Union to equipment intended for use in potentially explosive atmospheres. The minimum requirements are defined in the European standards. These standards are identical with the international EX standards on the IEC level. This means motors in accordance with 94/9/EC also meet the requirements of the respective international laws. In relation to drives, the directive covers motors as well as all other electrical and mechanical components such as gear units, mechanical variable speed gear units, brakes, forced cooling fans, integrated frequency inverters, sensors, and actuators.

Directive 94/9/EC defines the minimum requirements for units and divides the units into categories.

The requirements for production plants, division into zones and the assignment of equipment categories to zones are defined in EU Directive 1999/92/EC.



Naturally, EU Directive 94/9/EC also applies to all products which are manufactured outside the EU and imported into the EU. To indicate compliance with EU Directive 94/9/EC, explosion-proof units also bear the CE mark on their nameplates.

### Explosion-proof drives from SEW-EURODRIVE

Drives from SEW-EURODRIVE for potentially explosive atmospheres have the following characteristics:

- Included are all product areas from mains operated AC gearmotors and MOVIMOT® gearmotors with integrated frequency inverters through to controlled drives for particularly exacting applications.
- All components can be combined with one another according to the rules of the SEW-EURODRIVE modular concept.
- All drives satisfy typical market requirements in terms of their power range and functions.



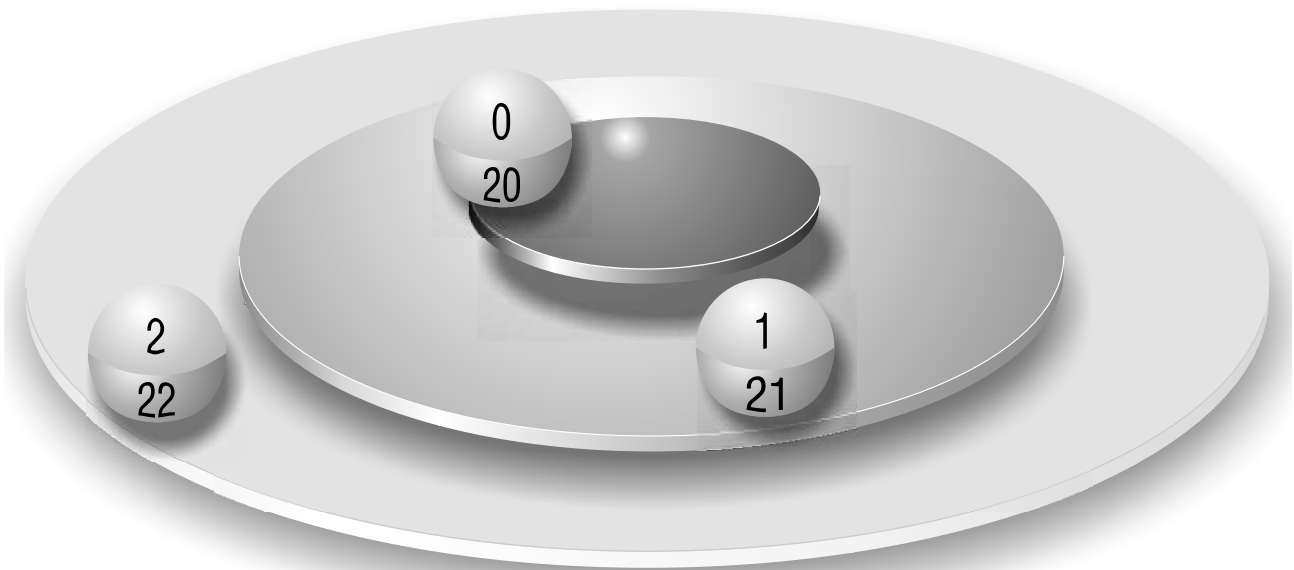
## 2.3 Regulations

### Zone in potentially explosive atmospheres

According to EU Directive 99/92/EC, the operator of the equipment must divide potentially explosive atmospheres into zones.

2

Zone		Probability of a potentially explosive atmosphere occurring	SEW-relevant
Gas	Dust		
0	20	Continuous, long-term, frequent, predominant in time	
1	21	Occasional, in normal operation	x
2	22	Seldom, short-term	x



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### Dividing explosion-proof equipment into categories

According to EU Directive 94/9/EC, explosion-proof equipment is divided into categories. The category specifies the protection level of the equipment, describes the operating conditions and makes it easier to assign permitted equipment to a zone. In addition to the degree of protection (normal, high, very high), the directive distinguishes between explosive G (gas) and D (dust) atmospheres.

Category	Protection level	Guaranteed protection	Operating conditions	SEW-relevant
M1	Very high	With two independent preventive measures; two faults are allowed to occur independently of one another	Equipment continues to operate in the presence of a potentially explosive atmosphere	
1	Very high	With two independent preventive measures; two faults are allowed to occur independently of one another	Equipment continues to operate in the presence of a potentially explosive atmosphere	
M2	High	Suitable for normal operation and harsh operating conditions	Equipment is switched off in the presence of a potentially explosive atmosphere	
2	High	One preventive measure; suitable for normal operation with the likelihood of frequent malfunctions, one fault is allowed to occur	Equipment continues to operate in the presence of a potentially explosive atmosphere	x
3	Standard	Suitable for standard operation	Equipment continues to operate in the presence of a potentially explosive atmosphere	x

### Overview of explosion-proof equipment

The following table describes the division of explosion-proof equipment into equipment groups I and II:

Category	Equipment group I Mines, firedamp		Equipment group II Other areas with potentially explosive atmospheres due to gas or dust					
	M1	M2	1		2		3	
Ex atmosphere <sup>1)</sup>			G	D	G	D	G	D
Zone			0	20	1	21	2	22
Protection type Motor Gear unit					d, e, i, p ... (c, k ...)	t (c, k ...)	nA (c, k ...)	t (c, k ...)

1) G = Gas atmosphere, D = Dust atmosphere



#### INFORMATION

All gear units and motors offered by SEW-EURODRIVE for potentially explosive atmospheres are equipment group II units. SEW-EURODRIVE does not supply any drives for use in equipment group I (mining).

### Potentially explosive atmospheres

Potentially explosive atmospheres are divided into gas and dust. The atmosphere is indicated by the letters G (Gas) and D (Dust) in the designation of the variant.



**Protection types**

Unit type	Protection type	Standard	Description	SEW-relevant
Motors (electrical units)	d	EN 60079-0 and -1	Flameproof enclosure	x
	e	EN 60079-0 and -7	Increased safety	x
	i	EN 60079-0 and -11	Intrinsic safety	
	n/nA	EN 60079-0 and -15	Non-sparking	x
	m	EN 60079-0 and -18	Casting compound enclosure	
	p	EN 60079-0 and -2	Excess pressure enclosure	
	t	EN 60079-0 and -31	Dust explosion protection	x
Gear units (mechanical units)	b	EN 13463-1 and -6	Protection by monitoring sources of ignition	
	c	EN 13463-1 and -5	Constructional safety	x
	d	EN 13463-1 and -3	Flameproof enclosure	
	fr	EN 13463-1 and -2	Restricted breathing	
	k	EN 13463-1 and -8	Liquid immersion	x

**Validity of the Declaration of Conformity**



The declaration of conformity is a statement that a device complies with Directive 94/9/EC. The validity of this statement of conformance is bindingly linked to compliance with the operating instructions supplied with the explosion-proof unit (in particular maintenance and servicing measures and permitted ambient conditions, e.g. ambient temperature, unit heating from other customer's equipment). This is necessary for adequate risk minimization. The validity of the declaration of conformity becomes void if the specifications for designated use made in the operating instructions no longer apply.

The validity of the statement of conformance exclusively refers to the gear unit and motor types listed in the catalog or in the order confirmation. For customer-specific types, it is essential that you contact SEW-EURODRIVE.

**2.4 Categories and protection types**

**Category 1 – Particularly high safety**

SEW-EURODRIVE does not provide category 1 gear units and electric motors. Consequently, drives from SEW-EURODRIVE cannot be used in zones 0 and 20, where potentially explosive atmospheres are to be expected on a continuous and long-term basis.

**Category 2 – High safety**

Units in category 2 are safe in terms of the expected unit malfunctions and are predominantly intended for use in zones 1 and 21. Of course, these units can also be used in zones 2 and 22.

**Category 3 – Normal safety**

Equipment in category 3 is safe when it is used as intended and overload is predictable. These units are designed for zones 2 and 22.



#### Motors

Typical electrical drives of type II2G for zone 1 are motors with the following protection types:

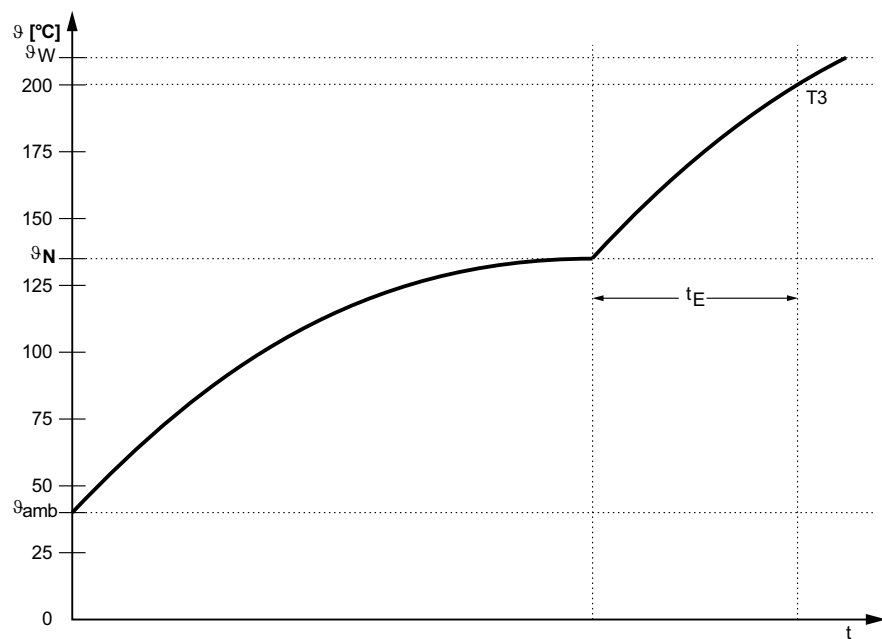
*Protection type d  
flameproof enclosure*

The housing is able to withstand the pressure even if an explosion occurs inside the motor. Gas which may escape is sufficiently cooled so it will not ignite a potentially explosive atmosphere outside the motor. This is achieved by ignition gaps, which also reduce the pressure that builds up in the event of an explosion.

*Protection type e  
increased safety*

No source of ignition is present in normal operation and in the event of a foreseeable malfunction. This is achieved by design measures such as higher quality insulation systems or larger clearances. Normal operation is operation including the usual equipment malfunctions.

The following graph shows a sample temperature profile on a motor with a blocked shaft. The temperature rises from the rated temperature  $\vartheta_N$  to the maximum permitted surface temperature  $T_3 = 200\text{ °C}$  during the heating time  $t_E$ .



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$\vartheta_W$  = maximum permitted winding temperature

$\vartheta_N$  = steady-state temperature of the motor in operation without malfunctions

$\vartheta_{amb}$  = ambient temperature

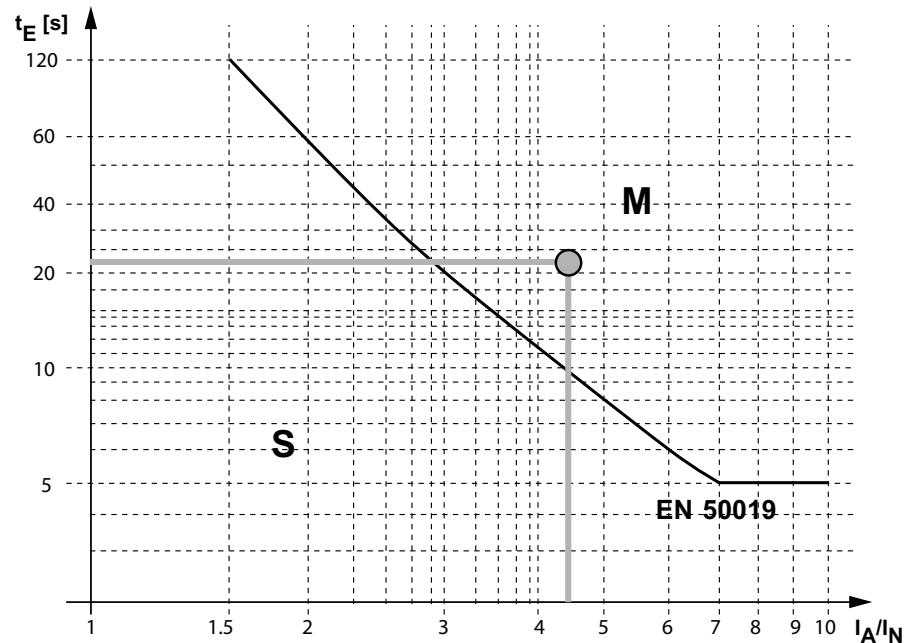




A special protective circuit breaker switches off the motor within the motor's heating time  $t_E$  if a malfunction occurs. This ensures that the critical temperature (here: temperature class T3) is not reached.

To ensure that the protective circuit breaker (S) reacts reliably according to EN 60079, motors (M) with protection type 'e' must at least maintain the heating time  $t_E$  ratio and the ratio between starting and rated current ( $I_A/I_N$ ) as shown in the following graph (area above the characteristic curve). The protective circuit breakers (S) must trip first (area below the characteristic curve) to protect the motors against excessive temperature.

2



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S = Area of the protection device  
M = Area of the motors

**Gear unit**

*Protection type c  
constructional  
safety*

The following protection types apply to gear units:

Protection type c (constructional safety c) is achieved through constructional measures that provide adequate protection against the possibility of ignition due to hot surfaces, sparks and adiabatic compression caused by moving parts (DIN EN 13463-5).

*Protection type k  
liquid immersion*

Protection type k (liquid immersion k) is the protection type in which partial or complete immersion in a non-flammable, insulating liquid or constant wetting of a potentially combustible surface with such a liquid is used to deactivate the potential source of ignition or to provide separation from the potentially explosive atmosphere (DIN EN 13463-8).



#### **Category 3 – normal safety**

Category 3 equipment is only intended for zones 2 and 22 where there is a low probability of potentially explosive atmospheres occurring.

#### *Protection type n*

Typical electrical drives of the II3G type for zone 2 (gas) are motors with protection type nA – non-sparking. The requirements of protection type n largely correspond to the requirements of protection type e, but for operation without malfunctions.

#### *Protection type t*

Protection type t is for motors that are to be used in areas with ignitable dusts. The units are designated with tb (suitable for zone 21) or tc (suitable for zone 22) according to the unit category.

Explosion protection is in this case realized by safely preventing the ingress of ignitable dust and the occurrence of impermissibly high temperatures on the surface.

For category 3 units with protection type t, a difference is made between:

- Non-conducting dust
- Conducting dust

Depending on the classification of the dust, the units must have a minimum IP rating of

- IP5x
- IP6x

.

#### *Gear units*

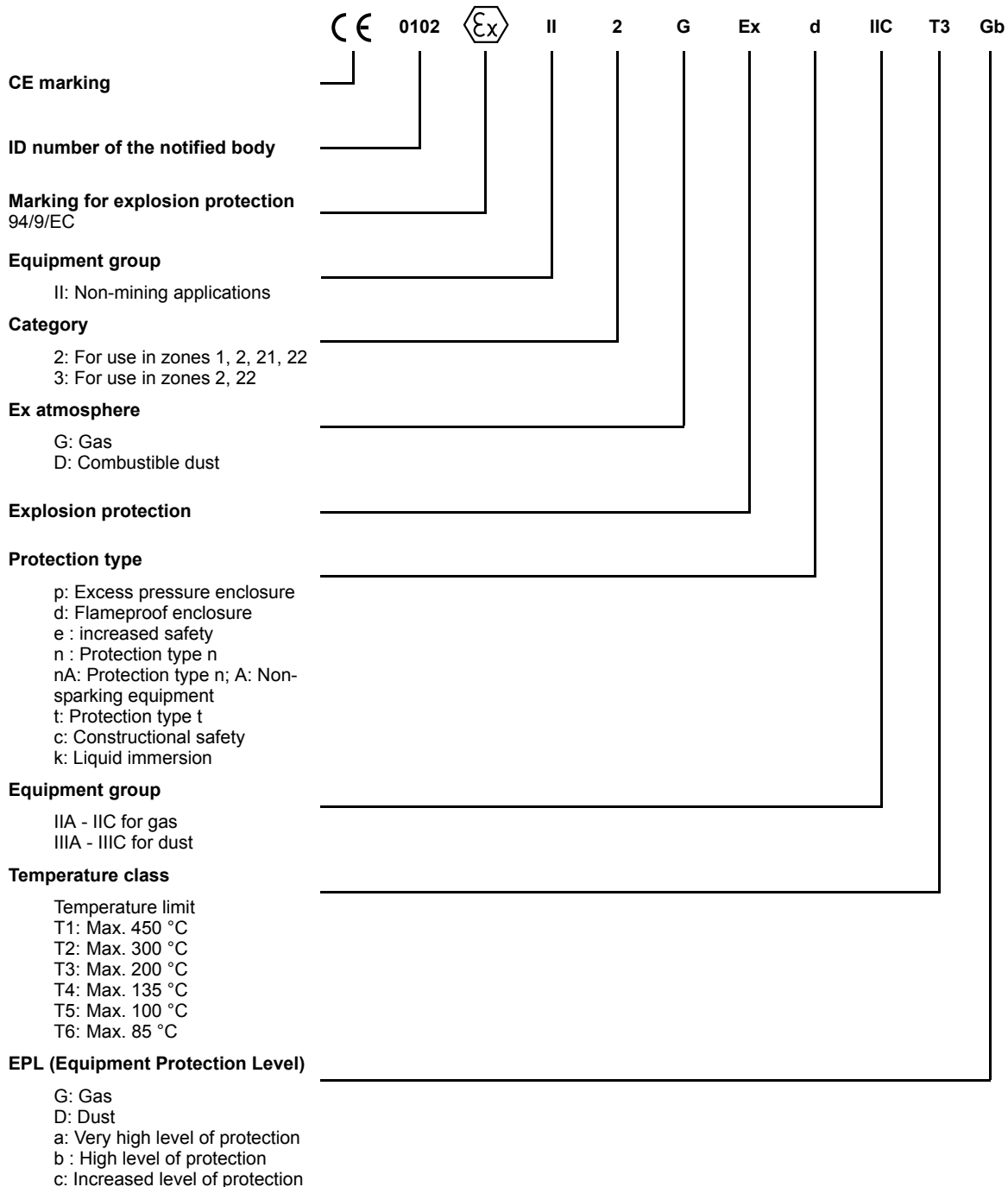
Compliance with DIN EN 13463-1 must be guaranteed for gear units. In this category, no particular type of protection is required for gear units.



## 2.5 Designation code in accordance with EU Directive 94/9/EC

EU Directive 94/9/EC links the protection types to equipment groups, categories, ex-atmospheres, minimum protection types and temperature classes.

Example: Equipment with type of protection "flameproof enclosure".





#### 2.6 EDR. AC motors

**Noise** The noise levels of all motors from SEW-EURODRIVE are well within the maximum permitted noise levels set forth in IEC/EN 60034-9.

**Paint** The EDR. motors are painted with 'blue/gray' machine paint (RAL 7031 according DIN 1843) as standard. Special coatings and other colors are available on request. SEW-EURODRIVE delivers the drives with a coating that complies with the requirements regarding the prevention of electrostatic charge according to EN/IEC 60079-0 and EN 13463-1. If you recoat the motors or gearmotors, you have to observe the requirements regarding the prevention of electrostatic charge according to EN/IEC 60079-0 and EN 13463-1.

#### **Surface and corrosion protection**

If required, all motors from SEW-EURODRIVE can be supplied with special surface protection for applications in extremely humid and chemically aggressive environments.

#### **Air admission and accessibility**

The motors/brakemotors must be mounted on the driven machine in such a way that both axially and radially there is enough space left for unimpeded air admission and for maintenance of the brake. Please also refer to the notes in the motor dimension sheets.

#### **Brakemotors<sup>1)</sup>**

On request, the motors can be supplied with an integrated mechanical brake. The SEW-EURODRIVE brake is an electromagnetic disk brake with a DC coil that releases electrically and brakes using spring force. Due to its operating principle, the brake is applied if the power fails. It meets the basic safety requirements. The brake can also be released mechanically if equipped with manual brake release. For this purpose, the brake is supplied with either a hand lever with automatic reset or an adjustable setscrew. The brake is controlled by a brake controller that is either installed in the motor wiring space or the control cabinet.

A characteristic feature of the brakes is their extremely short design. The brake bearing end shield is a part of both the motor and the brake. The integrated construction of the SEW-EURODRIVE brakemotor permits particularly compact and sturdy solutions.

**Inverter operation** EDRE and EDRS motors can be used together with the reliable SEW-EURODRIVE frequency inverter of the series MOVIDRIVE<sup>®</sup> and MOVITRAC<sup>®</sup>.

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1) Brake in preparation



## 2.7 Energy-efficient motors of the EDR motor series

### **SEW energy-efficient motors tap the full potential**

Since 2002, SEW-EURODRIVE has been using rotors with a cast copper cage for the production of energy-efficient motors. The advantages of this innovative copper die-cast technology used for the DR motor series is beneficial to the entire motor spectrum.

The design, which is optimized in size and material, allows for combining standard motors, energy-efficient motors and premium motors in one series. This means that SEW-EURODRIVE customers no longer have to use different motor types or series and that there are no differing additional features and options.

In view of existing and foreseeable national and international legislation and regulations, the DR motors have been developed and designed as a modular energy saving system. They apply all the advantages of a modular system with re-usage and multiple usage of parts to achieve the required efficiency levels safely and easily.

### **EU Europe - ErP Directive 2009/125/EC (previously: EuP2005/32/EC)**

The European Commission enacted a directive in 2005 which contains regulations concerning the permitted energy consumption of products. Directive 2005/32/EC was revised in 2009 Directive ErP 2009/125/EC – Energy-related products – also covers the asynchronous AC motors.

The corresponding implementing regulation (VO640/2009) prohibits the sale of standard efficiency motors within the European Community and prescribes a minimum efficiency of IE2 as of June 16, 2011.

Two more stages for increasing the minimum efficiency levels of asynchronous AC motors to the Premium level were determined as well. As of January 1, 2015, motors with a power rating of 7.5 kW and higher will have to meet level IE3, and as of January 1, 2017, motors with a power rating of 0.75 kW and higher must meet level IE3 in supply system operation. Class IE2 motors in frequency inverter operation are excepted from the IE3 regulation as of 2015/2017.

This implementing regulation regarding the ErP directive refers to the new sections of the IEC 60034. Section T 30 (see below) describes the classification and the minimum values of the efficiency classes on international level. Section T 2-1 (also below) regulates the method for determining the numerical value of the efficiency.

The DRE and DRP energy-efficiency motors from SEW-EURODRIVE comply with the specifications and values derived from IEC 60034 2-1 and -30.

### **IEC 60034 T2-1 (2007)**

Part 2-1 of IEC 60034 describes the measuring method for determining the efficiency of an asynchronous AC motor. What is new in part 2-1 is how additional losses are determined.

The generalized Approach from the IEC 60034-2 with 0.5% no longer applies. The additional losses must be measured indirectly and taken into account during calculation. This mathematical approach results in a smaller value.

This seems to indicate that the motor performance has worsened, even though only the across-the-board proportion was changed. No motor component was modified and the energy consumption is still the same.



## General Product Description

### Energy-efficient motors of the EDR motor series

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#### **IEC 60034 T30**

After different standards have coexisted for years, part 30 of IEC 60034 now constitutes an internationally uniform efficiency classification.

Similar to the IP designation for the degree of protection, this classification is based on a designation with IE. The abbreviation IE stands for "International Efficiency". Currently, there are three classes:

- IE1= Standard Efficiency
- IE2= High Efficiency
- IE3= Premium Efficiency

Minimum efficiency levels are defined for classes IE1, IE2 and IE3 at 50 Hz and at 60 Hz, 2-, 4- and 6-pole, in the power range 0.75 kW to 375 kW. The result is a standard for consumers, manufacturers and legislation.

The values for the efficiency levels in accordance with IEC 60034-30 are listed in the technical data overview for DRS, DRE or DRP motors (see page 24 ff).



## 2.8 Corrosion and surface protection

### General information


SEW-EURODRIVE offers various optional protective measures for operating motors under special environmental conditions.

The protective measures comprise two groups:

- KS corrosion protection
- OS surface protection

For motors, optimum protection is offered by a combination of KS corrosion protection and OS surface protection.

Special optional protective measures for the output shafts are also available.

	<b>INFORMATION</b>
	<p>The EDR. motors are painted with 'blue/gray' machine paint (RAL 7031 according DIN 1843) as standard. Special coatings and other colors are available on request.</p> <p>SEW-EURODRIVE delivers the drives with a coating that complies with the requirements regarding the prevention of electrostatic charge according to EN/IEC 60079-0 and EN 13463-1. If you recoat the motors or gearmotors, you have to observe the requirements regarding the prevention of electrostatic charge according to EN/IEC 60079-0 and EN 13463-1.</p>

### KS corrosion protection

KS corrosion protection for motors comprises the following measures:



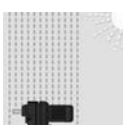

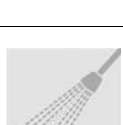
- All retaining screws that are loosened during operation are made of stainless steel.
- The nameplates are made of stainless steel.
- A top coating is applied to various motor parts.
- The flange contact surfaces and shaft ends are treated with a temporary anti-corrosion agent.
- Additional measures for brakemotors.

A sticker labeled "KORROSIONSSCHUTZ" (corrosion protection) on the fan guard indicates special treatment has been applied.



#### OS surface protection

In addition to standard surface protection, motors and gear units are available with surface protection OS1 to OS4. The special procedure "Z" is also available. Special procedure "Z" means that large surface recesses are sprayed with a rubber filling prior to painting.

Surface protection <sup>1)</sup>	Ambient conditions	Sample applications
<b>Standard</b> 	Suitable for machines and systems in buildings and rooms indoors with neutral atmospheres. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C1 (negligible)</li> </ul>	<ul style="list-style-type: none"> <li>• Machines and systems in the automobile industry</li> <li>• Transport systems in logistics</li> <li>• Conveyor belts at airports</li> </ul>
<b>OS1</b> 	Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C2 (low)</li> </ul>	<ul style="list-style-type: none"> <li>• Systems in saw mills</li> <li>• Hall gates</li> <li>• Agitators and mixers</li> </ul>
<b>OS2</b> 	Suited for environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C3 (moderate)</li> </ul>	<ul style="list-style-type: none"> <li>• Applications in amusement parks</li> <li>• Funiculars and chair-lifts</li> <li>• Applications in gravel plants</li> <li>• Systems in nuclear power plants</li> </ul>
<b>OS3</b> 	Suited for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C4 (high)</li> </ul>	<ul style="list-style-type: none"> <li>• Sewage treatment plants</li> <li>• Port cranes</li> <li>• Mining applications</li> </ul>
<b>OS4</b> 	Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning also with chemical cleaning agents. According to corrosivity category <sup>2)</sup> : <ul style="list-style-type: none"> <li>• C5-1 (very high)</li> </ul>	<ul style="list-style-type: none"> <li>• Drives in malting plants</li> <li>• Wet areas in the beverage industry</li> <li>• Conveyor belts in the food industry</li> </ul>

1) Motors/brakemotors in degree of protection IP56 or IP66 are only available with OS2, OS3, or OS4 surface protection

2) To DIN EN ISO 12944-2 classification of ambient conditions

## 2.9 Operating temperatures

Motors of the EDR. series are designed for use in a temperature range between 20 °C and +40 °C.

Contact SEW-EURODRIVE if the motors are operated outside the specified temperature range down to 40 °C or up to + 60 °C.





## 2.10 Motors at a glance

EDR. motors, 50 Hz, 4-pole

2

Motor type	EDRS			EDRE		
	P <sub>N</sub> in kW M <sub>N</sub> in Nm	n <sub>N</sub> rpm	IE class	P <sub>N</sub> in kW M <sub>N</sub> in Nm	n <sub>N</sub> rpm	IE class
DR63S4	See technical data of DR/eDR63S4			-	-	-
DR63M4	See technical data of DR/eDR63M4			-	-	-
DR63L4	See technical data of DR/eDR63L4			-	-	-
EDR.71S4	0.25 1.7	1405	-	-	-	-
EDR.71M4	0.37 2.57	1375	-	-	-	-
EDR.80S4	0.55 3.71	1415	-	-	-	-
EDR.80M4	-	-	-	0.75 5	1435	IE2
EDR.90M4	-	-	-	1.1 7.4	1420	IE2
EDR.90L4	-	-	-	1.5 10	1430	IE2
EDR.100M4	-	-	-	2.2 14.7	1425	IE2
EDR.100LC4	-	-	-	3 19.7	1455	IE2
EDR.112M4	-	-	-	3 19.7	1455	IE2
EDR.132S4	-	-	-	4.0 26.2	1460	IE2
EDR.132M4	-	-	-	5.5 36.1	1455	IE2
EDR.160S4	-	-	-	7.5 48.9	1465	IE2
EDR.160M4	-	-	-	9.2 59.8	1470	IE2
EDR.180S4	-	-	-	11 71.5	1470	IE2
EDR.180M4	-	-	-	15 97.4	1470	IE2
EDR.180L4	-	-	-	18.5 120	1470	IE2
EDR.200L4	-	-	-	22 142	1480	IE2
EDR.225S4	-	-	-	30 194	1480	IE2
EDR.225M4	-	-	-	37 239	1480	IE2
EDRE225M4	-	-	-	45 291	1480	IE2
DV/DVE250M4	-	-	-	See technical data of DV/DVE250M4		
DV/DVE280S4	-	-	-	See technical data of DV/DVE280S4		
DV/DVE280M4	-	-	-	See technical data of DV/DVE280M4		



### 3 General Project Planning Notes

#### 3.1 Standards and regulations

##### **Conformity with standards**

AC (brake)motors and servo (brake)motors from SEW-EURODRIVE conform to the relevant standards and regulations, in particular:

- IEC 60034-1, EN 60034-1  
Rotating electrical machines, rating and performance.
- IEC 60034-2-1, EN 60034-2-1  
Rotating electrical machines, determining losses and efficiency.
- IEC 60034-9, EN 60034-9  
Rotating electrical machines, noise limits.
- IEC 60034-14, EN 60034-14  
Rotating electrical machines, vibration levels.
- IEC 60034-30  
Rotating electrical machines, classification of efficiency levels IE1, IE2, IE3.
- EN 60529, IEC60034-5, EN60034-5  
IP degrees of protection for enclosures.
- IEC 60072  
Dimensions and performance of rotating electrical machines.
- EN 50262  
Metric threads of cable glands.
- EN 50347  
Standardized dimensions and power ranges.
- EN 60079-0  
Electrical equipment for potentially explosive atmospheres, general provisions
- EN 60079-7  
Increased safety "e"
- EN 60079-15  
Protection "n"
- EN 60079-31  
Equipment dust ignition protection by enclosure "t"

##### **Rated data**

The specific data of an asynchronous AC motor (AC squirrel cage motor) are:

- Size
- Rated power
- Cyclic duration factor
- Rated speed
- Rated current
- Rated voltage
- Power factor  $\cos \varphi$
- Degree of protection
- Thermal class
- Efficiency class



This data is given on the nameplate of the motor. In accordance with IEC 60034 (EN 60034), the nameplate data applies to a maximum ambient temperature of 40 °C and a maximum altitude of 1000 m above sea level.

**Example: Nameplate of EDRE AC motor in category 2GD:**

3

<b>SEW-EURODRIVE</b>		6306-2Z-J-C3		<b>VIK</b>		<b>Ex</b>		<b>CE</b>	
76646 Bruchsal / Germany		6205-2Z-J-C3							
EDRE90M4/2GD								0102	
01.1151928301.0001.09		PTB 10 ATEX 1234 / 01		eff %		82,5			
Hz	50	r/min	1430	V	220-240 Δ / 380-420Y	IA/IN	6,9		
kW	1,5	A	3,48	cosφ	0,77	tEs	16		
<input type="radio"/>	kW	<input type="radio"/>	A	<input type="radio"/>	cosφ	<input type="radio"/>	tEs	<input type="radio"/>	
Hz	<input type="text"/>	r/min	<input type="text"/>	V	<input type="text"/>	IA/IN	<input type="text"/>		
Vbr	<input type="text"/>	I <sub>HAC</sub>	<input type="text"/>			eff %	<input type="text"/>		
Nm	<input type="text"/>	II2G Ex e IICT3 Gb		II2D Ex tb IIIC T120°C Db					
<input type="text"/>	Kundenartikel-Nr.		13A47B911						
IM	B3	IP	65	Iso.Kl.	155 (F)	3~IEC60034-1 Zone A			
kg	19	Ta	-20..+40 °C	UTIL	130 (B)	Jahr	2010	Made in Germany	

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**Example: Nameplate of EDRE AC brakemotor in category 3GD:<sup>1)</sup>**

<b>SEW-EURODRIVE</b>		6306-2Z-J-C3		<b>VIK</b>		<b>Ex</b>		<b>CE</b>	
76646 Bruchsal / Germany		6205-2RS-J-C3							
EDRE90M4BE2/3GD									
01.1151928301.0001.09				eff %		82,5			
Hz	50	r/min	1430	V	220-240 Δ / 380-420Y	IA/IN	<input type="text"/>		
kW	1,5	A	3,48	cosφ	0,77	tEs	<input type="text"/>		
<input type="radio"/>	kW	<input type="radio"/>	A	<input type="radio"/>	cosφ	<input type="radio"/>	tEs	<input type="radio"/>	
Hz	<input type="text"/>	r/min	<input type="text"/>	V	<input type="text"/>	IA/IN	<input type="text"/>		
Vbr	230	I <sub>HAC</sub>	0,3			eff %	<input type="text"/>		
Nm	20	II3G Ex nA IICT3 Gc		II3D Ex tc IIIB T120°C Dc					
<input type="text"/>	BME1.5	Kundenartikel-Nr.		13A47B911					
IM	B3	IP	54	Iso.Kl.	155 (F)	3~IEC60034-1 Zone A			
kg	23,5	Ta	-20..+40 °C	UTIL	130 (B)	Jahr	2010	Made in Germany	

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1) Brake in preparation



Example: Nameplate of EDRE AC motor with frequency inverter:

SEW-EURODRIVE									
76646 Bruchsal/Germany									
R77/II2GD EDRE90L4/3GD/KCC/TF/AL 0188 592 8.12									
01.1700099511.0001.11									
△					Y				
Hz	r/min	V	A	Nm	Hz	r/min	V	A	Nm
5	120	35	4.50	6.2	5	120	60	2.60	6.2
10	225	55	4.85	7.2	10	225	95	2.80	7.2
25	675	116	6.1	10	25	675	200	3.50	10
53	1435	247	6.1	10	53	716	400	3.50	4.7

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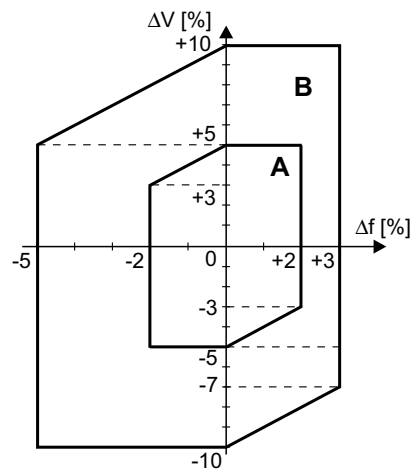
### Tolerances

According to IEC 60034 (EN 60034), the following tolerances are permitted for electric motors with rated voltage (also applies to the rated voltage range):

Voltage and frequency	Tolerance A or tolerance B
Efficiency $\eta$	$P_N \leq 50 \text{ kW}$ $P_N > 50 \text{ kW}$
Power factor $\cos \varphi$	$-\frac{1 - \cos \varphi}{6}$
Slip	$P_N < 1 \text{ kW}$ $P_N \geq 1 \text{ kW}$
Starting current	+ 20 %
Tightening torque	- 15 % - + 25 %
Breakdown torque	- 10 %
Mass moment of inertia	$\pm 10 \%$

Tolerance A,  
tolerance B

Tolerances A and B describe the permitted range within which the frequency and voltage are allowed to deviate from their respective rated points. The origin identified with "0" indicates the respective rated points for frequency and voltage.



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In the tolerance range A, the motor must be able to deliver the rated torque in continuous duty (S1). The other characteristic values and the heat development may deviate slightly from the rated voltage and rated frequency values.

In the tolerance range B, the motor must be able to deliver the rated torque but not in continuous duty. The increase in temperature and deviations from the rated data are higher than in tolerance range A. Avoid frequent operation of the motor at the limits of tolerance range B.

*Undervoltage*

It is not possible to achieve the values in the catalog such as power, torque and speed in the event of undervoltage due to weak supply systems or an underdimensioned motor cable. This is particularly true for motor startup where the starting current amounts to a multiple of the rated current.

Operation with undervoltage is not permitted.

### 3.2 Switching and protective equipment

**EMC measures**

AC motors, AC brakemotors and MOVIMOT® drives from SEW-EURODRIVE are components for installation in machinery and systems. The designer of the machine or system is responsible for complying with the EMC Directive 2004/108/EC. Please refer to the publication 'Drive Engineering - Practical Implementation, EMC in Drive Engineering' for detailed information about this topic. For specific information on MOVIMOT® drives, refer to the "Drive System for Decentralized Installation" system manual.

*Supply system operation*

SEW-EURODRIVE AC (brake) motors satisfy the EMC generic standards EN 50081 and EN 50082 when used in accordance with their designated use in continuous supply system operation.

*Switching operation*

For switching operation of the motor, take suitable measures for suppressing interference from the switchgear.

**Inverter operation**

For inverter operation, refer to the installation and EMC instructions provided by the inverter manufacturer.

Please also note the information in section "Operation on inverters" on page 59 ff and the following project planning guidelines:

*Brakemotors on the inverter*

Install the brake cables of brakemotors separately from the other power cables, maintaining a distance of at least 200 mm. Joint installation is only permitted if either the brake cable or the power cable is shielded.

*Connecting tachometers to inverters*

Observe the following instructions when connecting the tachometer:

- Use a shielded cable with twisted pair conductors only.
- Connect the shield to the PE potential on both ends over a large surface area.
- Install signal cables separately from power cables or brake cables (min. distance 200 mm).

Please also note the information in section "Operation on inverters" on page 59 ff .



## General Project Planning Notes

### Switching and protective equipment

*Connecting the positive temperature coefficient thermistor (TF) to the inverter*

Install the connecting lead of the positive temperature coefficient (PTC) thermistor TF separately from other power cables, maintaining a distance of at least 200 mm. Collective installation is only permitted if either the TF cable or the power cable is shielded.

#### **Motor protection**

Selecting the correct protection device is a significant factor in determining the operational reliability of the motor. A distinction is made between protection devices that are current-dependent and those that depend on the motor temperature. Current-dependent protection devices are motor circuit breakers.

Temperature-dependent protection devices are PTC thermistors in the winding. PTC sensors will trip when the maximally permitted winding temperature is reached. Their advantage is that temperatures are measured where they actually occur.

*Motor circuit breakers*

Motor circuit breakers offer adequate protection against overload in standard operation with a low switching frequency, brief start-ups and starting currents that are not excessive. The motor circuit breaker is set to the rated motor current.

*TF PTC thermistor*

Three positive temperature coefficient (PTC) thermistors **TF** (PTC, characteristic curve according to DIN 44080) are connected in series in the motor and connected to a trip switch in the control cabinet. Motor protection with positive temperature coefficient (PTC) thermistors TF provide comprehensive protection against thermal overload. Motors protected in this way can be used for high inertia starting, switching and braking operation as well as with fluctuating power supply systems. A motor circuit breaker is usually installed in addition to the TF.

SEW-EURODRIVE recommends always using motors equipped with TF for inverter operation or switching operation.

*Trigger temperature*

Thermal motor protection through temperature sensor TF is implemented by elements installed in the motor's winding overhang. The trigger temperature is slightly lower than the limit value of the thermal classification to achieve maximum motor protection. TF temperature sensors are available with the following trigger temperatures:

Thermal class	Trip temperature (nominal response temperature of TF)	
	Category 2	Category 3
155 (F)	130 °C	130 °C or 150 °C

*Various protection equipment*

The following tables show the qualification of the various protection devices for different causes of tripping.

<ul style="list-style-type: none"> <li>○ = No thermal protection</li> <li>◐ = Limited motor protection (requires verification)</li> <li>● = Thermal protection is given</li> </ul>	Temperature sensor (TF)	Motor protection switch
Continuous operation at the load limit, slight overload permanently present (max. 200 % I <sub>N</sub> )	●	●
Heavy start	●	◐
Blocked motor	◐	◐
Switching operation (number of cycles too high)	●	○
Phase failure	●	●
Voltage and frequency deviation	●	●
Forced cooling fan failure	●	○



**Secure switching of inductances**

Note the following notes for switching of inductances:

*Switching of motor windings with a high number of poles*

If the cable is installed unfavorably, switching of motor windings with a high number of poles can generate voltage peaks. Voltage peaks can damage windings and contacts. Install varistors in the incoming cable to avoid such problems.

*Switching of brake coils*

Varistors must be used to avoid harmful switching overvoltages caused by switching operations in the DC circuit of disk brakes.

Brake control systems from SEW-EURODRIVE are equipped with varistors as standard. Use contactors with contacts in utilization category AC3 or better to EN 60947-4-1 for switching of brake coils.

*Suppressor circuit on the switching devices*

According to EN 60204 (Electrical Equipment of Machines), motor windings must be equipped with interference suppression to protect the numerical or programmable logic controllers. Because problems are primarily caused by switching operations, we recommend installing suppressor circuits on the switching devices.



## Type Designations

Unit designations for the EDR. motor series

### 4 Type Designations

#### 4.1 Unit designations for the EDR. motor series

##### AC motor series

Designation	
EDRS..	ATEX motor, 50 Hz
EDRE..	ATEX energy-efficient motor, High Efficiency IE2, 50 Hz
71 - 225	Sizes: 71 / 80 / 90 / 100 / 112 / 132 / 160 / 180 / 200 / 225
S - L	Lengths: S = short / M = medium / L = long LC = Rotors with copper cage
4	Number of poles

##### Output types

Designation	Category	Option
/FI	/2G, /2GD, /3GD	IEC foot-mounted motor with specification of shaft height
/FG		7 Series integral motor, as stand-alone motor
/FF		IEC flange-mounted motor with bore holes
/FT		IEC flange-mounted motor with threads
/FL		General flange-mounted motor (other than IEC)
/FM		7 series integral gearmotor with IEC feet, with specification of shaft height if required
/FE		IEC flange-mounted motor with bore holes and IEC feet, with specification of shaft height
/FY		IEC flange-mounted motor with thread and IEC feet, with specification of shaft height
/FK		General flange-mounted motor (other than IEC) with feet, with specification of shaft height if required



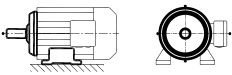


*Output types of the motors*

*Foot-mounted motor*

*Unit designation*

/FI



SEW motor with IEC feet and A endshield

*Description*

The /FI foot-mounted motor is a motor variant with shaft end and feet to IEC specifications. The shaft and feet dimensions for 4-pole motors are based on the power rating of the EDRS motor.

Different feet and shaft dimensions are available for motors with efficiency rating requirements (EDRE).

According to EN 50347, each power rating is assigned the corresponding shaft height. Certain frame sizes of the EDR motors are implemented with smaller power ratings.

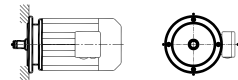
If an application requires the EN-compliant shaft height, the motor can be equipped with another foot height instead.

If the power assigned to the motor differs from EN 50347, the shaft height will be indicated in the type designation.

*7 series gearmotor*

*Unit designation*

/FG



Motors for gear unit mounting

*Description*

Motors sold as stand-alone motor prepared for mounting to a gear unit are assigned the designation /FG. This designation is eliminated if the motor is mounted together with the gear unit (as conventional gearmotor).

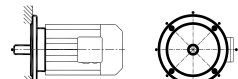
The /FG flange-mounted motor is the gear unit mounting version of the motor. The flange dimensions are implemented according to the SEW work standards for gear unit mounting.

The pinion shaft end is dimensioned according to the motor power rating. It is therefore possible that EDRS and EDRE motors have different pinion shaft ends within one motor size and length.

*IEC flange-mounted motor with boreholes*

*Unit designation*

/FF



IEC flange-mounted motor with bores

*Description*

The design /FF is a variant with through bores in the flange, comparable to IEC type of construction B5.

The flange dimensions for 4-pole motors with Standard Efficiency (DRS) and High Efficiency (DRE) are based on the power rating according to the standard.

Flange combinations deviating from the standard are given the type designation /FL (see below).

If the motor size differs from the standard, the flange size is specified accordingly.



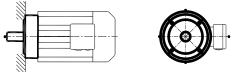
## Type Designations

Unit designations for the EDR. motor series

### IEC flange-mounted motor with threads

Unit designation

/FT



IEC flange-mounted motor with threads

Description

This type is for example comparable with the IEC type B14.

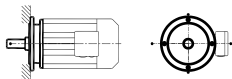
The flange dimensions are designed for shaft dimensions of 4-pole motors with standard efficiency level (EDRS) according to the standard EN 50 347 2001.

Other shaft dimensions are available for energy-efficient motors or for power enhanced motors with copper rotor.

### Flange-mounted motor (deviating from IEC)

Unit designation

/FL



Flange-mounted motor with dimensions deviating from IEC

Description

This flange-mounted motor is a motor variant deviating from IEC.

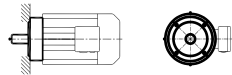
The /FL option enables the customer to choose an IEC flange that does not correspond to the power assigned to the motor (see IEC standard flange assignment /FF).

The shaft collar is not necessarily at the same level as the flange bolt surface.

### 'C-face' flange-mounted motor

Unit designation

/FC



Description

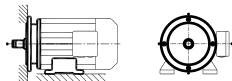
The "C-face" flange-mounted motor is a motor type with tapped holes in the flanged end shield similar to an FT type (B14).

The flange and shaft dimensions for 4-pole EDRS motors with standard efficiency level are designed in compliance with the NEMA standard (in inches).

### 7-series gearmotor with feet

Unit designation

/FM



Integral motor on 7-series with feet

Only motors sold as stand-alone motors prepared for mounting to a gear unit are assigned the designation /FM. This designation is eliminated if the motor is mounted together with the gear unit.

Description

/FM is the gear unit mounting variant of the motor with feet. It is a combination of the options /FG and /FI.

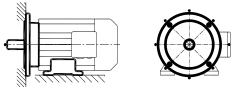
The flange dimensions are implemented according to the SEW work standards for gear unit mounting.

The pinion shaft end is dimensioned according to the motor power rating. It is therefore possible that EDRS and EDRE motors have different pinion shaft ends within one motor size and length.



**Foot-/flange-mounted motor**

**Unit designation**     /FE



Motor with flange, bores and feet according to IEC

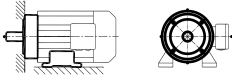
**Description**

The foot- and flange-mounted motor is an IEC variant of the motor and is comparable with the IEC type B35, for example.

The foot and flange dimensions for 4-pole motors with Standard Efficiency (EDRS) and High Efficiency (EDRE) are based on the power rating according to the standard.

**IEC flange-mounted motor with threads and feet**

**Unit designation**     /FY



Motor with flange, threads and feet according to IEC

**Description**

The foot- and flange-mounted motor is an IEC variant of the motor and is comparable with the IEC type B34, for example.

The foot and flange dimensions for 4-pole motors with Standard Efficiency (EDRS) and High Efficiency (EDRE) are based on the power rating according to the standard.

**Mechanical attachments**

Designation	Category	Option
/RS	/3GD	Backstop

**Temperature sensor/detection**

Designation	Category	Option
/TF	/2G, /2GD, /3GD	Temperature sensor (positive coefficient thermistor or PTC resistor)
/TH	/3D	Thermostat (bimetallic switch)
/KY	/2G, /2GD, /3GD	One KTY84 - 130 sensor
/PT	/2G, /2GD, /3GD	One / three PT100 sensor(s)

For detailed information about motor protection, refer to page 101 ff.



## Type Designations

Unit designations for the EDR. motor series

### Encoder

Designation	Category	Option
/ES7S, /EG7S, /EV7S	/3GD	Mounted speed sensor with sin/cos interface
/ES7R, /EG7R, /EV7R		Mounted speed sensor with TTL (RS-422) interface, U = 9 - 26 V
/ES7C, /EG7C, /EV7C		Mounted speed sensor with HTL interface
/AS7W, /AG7W, /AV7W		Mounted absolute encoder, RS-485 interface (multi-turn)
/AS7Y, /AG7Y, /AV7Y		Mounted absolute encoder, SSI interface (multi-turn)
/ES7A, /EG7A		Mounting adapter for encoders from the SEW portfolio
/XV.A		Mounting adapter for non-SEW encoders
/XV..		Mounted non-SEW encoders

For detailed information, refer to page 91 ff.

### Connection variants

Designation	Category	Included in the scope of delivery
/KCC	/2G, /2GD, /3GD	Terminal strip with cage clamps (for DR.71 - DR.132)

For detailed information, refer to page 105 ff.

### Ventilation

Designation	Category	Option
/VE	/3GD	Forced-cooling fan for motors according to 94/9/EC, category 3 (gas/dust)
/AL	/2G, /2GD, /3GD	Metal fan
/C	/2G, /2GD, /3GD	Protection canopy for the fan guard

For detailed information, refer to page 106 ff.

### Explosion-proof motors

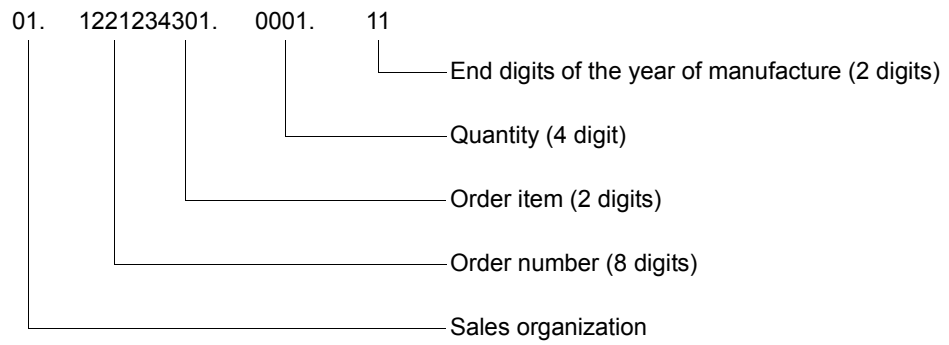
Designation	Option
/2G, /2GD	Motors according to 94/9/EC, category 2 (gas/dust)
/3GD	Motors according to 94/9/EC, category 3 (gas/dust)

### Other additional features

Designation	Category	Option
/2W	/2G, /2GD, /3GD	2nd shaft end on the motor/brakemotor



## 4.2 Serial number





## Type Designations

Examples for the type designation of DR series AC motors

### 4.3 Examples for the type designation of DR series AC motors

The motor variants in **bold** are available for explosion-proof EDR. motors.

Motor variant	Type designation of the motor variant											
<b>Ventilation</b>												
Fan guard	-	/C	/LF									
Fan	-	/Z	/AL	/U	/OL							
Forced cooling fan	-	/VE										
<b>Connection options</b>												
Connection options	-	/AB..	/AC..	/AD..	/AK..	/AM..	/AS..	<b>/KCC</b>	<b>/KC1</b>			
<b>Encoder</b>												
Encoder	-	<b>/ES7.</b>	<b>/EG7.</b>	<b>/EH7.</b>	<b>/EV7.</b>	<b>/AS7.</b>	<b>/AG7.</b>	<b>/AH7.</b>	<b>/XV..</b>			
<b>Temperature sensor/temperature detection</b>												
Thermal motor protection	-	<b>/TF</b>	<b>/TH</b>									
Temperature detection	-	<b>/KT</b>	<b>/PT</b>									
<b>Mechanical attachments</b>												
Decentralized installation	-	/MI	/MO	/MSW	/MM03	/MM05	/MM07	/MM11	/MM15	/MM22	/MM30	/MM40
Backstop	-	<b>/RS</b>										
Manual brake release	-	HF	HR									
Brake	-	BE05	BE1	BE2	BE5	BE11	BE20	BE30	BE32	BE120	BE122	
<b>Output variants</b>												
Output variant	<b>/FF</b>	<b>/FG</b>	<b>/FM</b>	<b>/FI*</b>	<b>/FT</b>	<b>/FC</b>	<b>/FE*</b>	<b>/FY*</b>	<b>/FL</b>	<b>/FK*</b>	**= Shaft height	
<b>AC motor series</b>												
Number of poles	<b>4</b>	2	6	12	8/2	8/4						
Length	<b>S</b>	<b>M</b>	<b>L</b>	<b>MC</b>	<b>LC</b>							
Size	<b>71</b>	<b>80</b>	<b>90</b>	<b>100</b>	<b>112</b>	<b>132</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	315	
Type designation	<b>S</b>	<b>E</b>	<b>P</b>	<b>K</b>	<b>M</b>	<b>L</b>						
Series	<b>EDR</b>	<b>EDR</b>										



Motor variant	Type designation of the motor variant				
<b>Other additional features</b>					
2. Shaft end	-	/2W			
Reinforced winding insulation	-	/RI			
<b>Explosion-proof motors</b>					
Explosion protection	-	/2G	/2GD	/3GD	/3D
<b>Condition monitoring</b>					
Brake monitoring		/DUB			

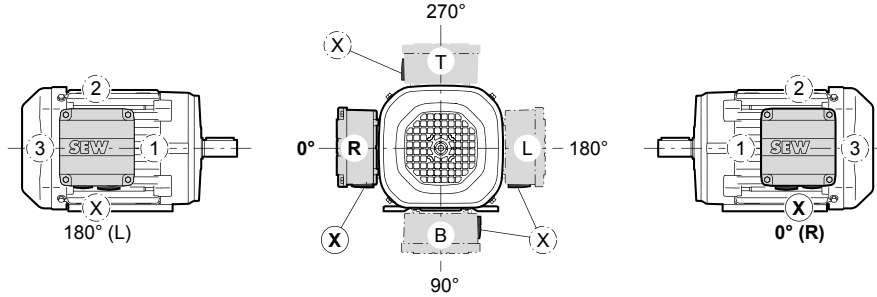


## Type Designations

Mounting position designations of the motors

### 4.4 Mounting position designations of the motors

Position of motor terminal box and cable entry



60500AXX

### Mounting positions

Mounting positions for AC motors

<p><b>B3</b></p>	<p><b>B6</b></p>	<p><b>B7</b></p>
<p><b>B8</b></p>	<p><b>V5</b></p>	<p><b>V6</b></p>
<p><b>B5</b></p> <p><b>B35</b></p>	<p><b>V1</b></p> <p><b>V15</b></p>	<p><b>V3</b></p> <p><b>V36</b></p>
<p><b>B14</b></p> <p><b>B34</b></p>	<p><b>V18</b></p> <p><b>V17</b></p>	<p><b>V19</b></p> <p><b>V37</b></p>
<p><b>B65</b></p>	<p><b>B75</b></p>	<p><b>B85</b></p>

62592AXX





## 5 EDR. AC Motors

### 5.1 Notes on the data of explosion-proof energy efficiency motors

The following table lists the short symbols used in the "Technical Data" tables.

$P_N$	Rated power
$M_N$	Rated torque
$n_N$	Rated speed
$I_N$	Rated current
$\cos\varphi$	Power factor
$h_{50\%}$	Efficiency at 50% of the rated power
$h_{75\%}$	Efficiency at 75% of the rated power
$h_{100\%}$	Efficiency at 100% of the rated power
$I_A/I_N$	Starting current ratio
$M_A/M_N$	Starting torque ratio
$M_H/M_N$	Ramp-up torque ratio
$m$	Weight of the motor
$J_{Mot}$	Mass moment of inertia of the motor
BE..	Brake used <sup>1)</sup>
$Z_0$ BG	Switching frequency for operation with BG brake controller
$Z_0$ BGE	Switching frequency for operation with BGE brake controller
$M_B$	Braking torque
$m_B$	Weight of the brakemotor
$J_{MOT\_BE}$	Mass moment of inertia of the brakemotor
$t_E$	Heating time

1) Brake in preparation



## 5.2 Technical data of 4-pole explosion-proof energy efficiency motors

Category: ATEX 2G, 2GD, 400 V, temperature class: T3, max. surface temperature: 120 °C

Motor type	P <sub>N</sub>	M <sub>N</sub>	n <sub>N</sub>	I <sub>N</sub> Voltage range ±5%	cosφ	IE class	η <sub>50%</sub> η <sub>75%</sub> η <sub>100%</sub>	I <sub>A</sub> /I <sub>N</sub>	M <sub>A</sub> /M <sub>N</sub> M <sub>H</sub> /M <sub>N</sub>	m	t <sub>E</sub>
	kW	Nm	1/min	A	%		kg		s		
EDRS 71S 4	0.25	1.7	1405	0.86	0.67	-	-	3.9	2.2 2.1	7.8	50
EDRS 71M 4	0.37	2.55	1375	1.05	0.76	-	-	3.9	2.6 2.5	9.1	60
EDRS 80S 4	0.55	3.7	1415	1.36	0.81	-	-	5.1	2.1 1.8	11.5	30
EDRE 80M 4	0.75	5	1435	1.76	0.79	IE2	79.2 81.3 81.0	6.1	2.8 2.1	14.3	30
EDRE 90M 4	1.1	7.4	1420	2.6	0.79	IE2	82.5 83.5 82.4	6.1	2.8 2.3	18.4	23
EDRE 90L 4	1.5	10	1430	3.5	0.77	IE2	83.5 84.7 84.0	6.9	3.2 2.8	21.4	16
EDRE 100LC 4	3	19.7	1455	6.5	0.81	IE2	86.3 87.1 86.3	7.7	2.7 2.4	31.2	6
EDRE 112M 4	3	19.7	1455	6.4	0.83	IE2	87.7 87.4 86.5	6.5	2.4 2.0	41.3	20
EDRE 132S 4	4	26	1460	8.4	0.82	IE2	87.6 88.2 87.4	8.1	2.7 2.4	46.3	15
EDRE 132M 4	5.5	36	1455	11.3	0.85	IE2	89.8 89.6 88.3	7.0	2.6 1.9	60	15
EDRE 160S 4	7.5	49	1460	15.4	0.82	IE2	90.3 90.3 89.3	6.6	2.4 1.8	79.5	12
EDRE 160M 4	9.2	60	1470	19.1	0.80	IE2	90.4 90.7 90.0	8.0	2.9 2.2	88.5	11
EDRE 180S 4	11	71	1470	22	0.83	IE2	89.5 90.4 90.2	7.8	2.6 2.2	121.9	14
EDRE 180M 4	15	97	1470	29.5	0.85	IE2	90.9 91.5 91.0	7.6	2.4 2.0	138.3	10
EDRE 200L 4	22	142	1480	43.5	0.82	IE2	- 92.8 92.6	7.5	2.5 2.0	258	11



Category: ATEX 3GD, 400 V, temperature class: T3, max. surface temperature: 120 °C or 140 °C

Motor type	P <sub>N</sub> kW	M <sub>N</sub> Nm	n <sub>N</sub> 1/min	I <sub>N</sub> A	I <sub>N</sub> Voltage range ±5% A	cosφ	IE	η <sub>50%</sub> η <sub>75%</sub> η <sub>100%</sub> %	I <sub>A</sub> /I <sub>N</sub>	M <sub>A</sub> /M <sub>N</sub> M <sub>H</sub> /M <sub>N</sub>	m kg
EDRS 71S 4	0.25	1.7	1405	0.8	0.86	0.67	-	-	3.8	2.2 2.1	7.8
EDRS 71M 4	0.37	2.55	1375	1	1	0.76	-	-	4.0	2.6 2.5	9.1
EDRS 80S 4	0.55	3.7	1415	1.35	1.38	0.81	-	-	5.1	2.1 1.8	11.5
EDRE 80M 4	0.75	5	1435	1.73	1.73	0.79	IE2	79.2 81.3 81.0	6.2	2.8 2.1	14.3
EDRE 90M 4	1.1	7.4	1420	2.5	2.55	0.79	IE2	82.5 83.5 82.4	5.9	2.8 2.3	18.4
EDRE 90L 4	1.5	10	1430	3.45	3.5	0.77	IE2	83.5 84.7 84.0	6.6	3.2 2.8	21.4
EDRE 100M 4	2.2	14.7	1425	4.8	4.9	0.80	IE2	86.3 86.7 85.4	6.4	3.3 2.7	26
EDRE 100LC 4	3	19.7	1455	6.3	6.4	0.81	IE2	86.3 87.1 86.3	7.5	2.7 2.4	31.2
EDRE 112M 4	3	19.7	1455	6.2	6.4	0.83	IE2	87.7 87.4 86.5	7.3	2.4 2.0	41.3
EDRE 132S 4	4	26	1460	8.1	8.4	0.82	IE2	87.6 88.2 87.4	8.0	2.7 2.4	46.3
EDRE 132M 4	5.5	36	1455	10.7	11.3	0.85	IE2	89.8 89.6 88.3	7.7	2.6 1.9	60
EDRE 160S 4	7.5	49	1465	14.9	15.4	0.82	IE2	90.3 90.3 89.3	6.5	2.4 1.8	79.5
EDRE 160M 4	9.2	60	1470	18.9	19.1	0.80	IE2	90.4 90.7 90.0	7.7	2.9 2.2	88.5
EDRE 180S 4	11	71	1470	21	22	0.83	IE2	89.5 90.4 90.2	7.2	2.6 2.2	121.9
EDRE 180M 4	15	97	1470	28.5	29.5	0.85	IE2	90.9 91.5 91.0	7.1	2.4 2.0	138.3
EDRE 180L 4	18.5	120	1470	34.5	36	0.85	IE2	91.4 92.0 91.6	7.1	2.5 2.1	152.1
EDRE 200L 4	22	142	1480	41.5	43	0.82	IE2	- 92.8 92.6	7.8	2.5 2.0	258
EDRE 225S 4	30	194	1480	55	59	0.83	IE2	- 93.5 93.1	7.5	2.4 2.0	287.7
EDRE 225M 4	37	240	1480	69	71	0.84	IE2	- 93.5 93.0	9.0	2.5 2.0	315.5
EDRE 225M 4	45	290	1480	86	89	0.81	IE2	- 93.3 92.9	7.3	2.6 2.1	315.5

5



## 6 Project Planning

### 6.1 Electrical characteristics

#### Suitable for inverter operation

EDR series AC (brake) motors can be operated on inverters thanks to the high quality winding with which they are equipped as standard. Operation on a frequency inverter is only permitted if this is certified accordingly in the EC prototype test certificate for motors of category 2, or if an additional nameplate with the permitted motor data is attached to motors of category 3.

#### Frequency

On request, AC motors from SEW-EURODRIVE are designed for a supply frequency of 50 Hz or 60 Hz. As standard, the technical data in this motor catalog is based on a supply frequency of 50 Hz.

#### Motor voltage

AC motors in standard and energy efficient design are available for rated voltages of 220 - 690 V.

#### 4-pole motors

Motors with power ratings up to 5.5 kW are usually available in the following designs:

- For voltage ranges 219 - 241 V  $\Delta$  / 380 - 420 V  $\Delta$ , 50 Hz
- Or for rated voltage 230 V  $\Delta$  / 400 V  $\Delta$ , 50 Hz.

Motors with power ratings from 7.5 kW are usually available in the following designs:

- For voltage ranges 380 - 420 V  $\Delta$  / 656 - 724 V  $\Delta$ , 50 Hz
- Or for rated voltage 400 V  $\Delta$  / 690 V  $\Delta$ , 50 Hz.

If not specified in the order, the motors are designed for the above mentioned voltages for 50 Hz.

The other optional motor voltages available as standard are listed in the following table.

For 50 Hz power supply

The **standards voltages** are:

Motors Standard High		Motor size up to 5.5 kW EDRS71S4 - 80S4 EDRE80M4 - 132M4	Motor size as of 7.5 kW EDRE160S4 - 225M4
Voltage range	$\Delta$ / $\Delta$	AC 219 - 241 / 380 - 420 V	AC 380 - 420 / 656 - 724 V
Rated voltage	$\Delta$ / $\Delta$ $\Delta$ / $\Delta$ $\Delta$ / $\Delta$ $\Delta$ / $\Delta$		AC 230 / 400 V AC 290 / 500 V AC 400 / 690 V AC 500 / -

Motors and brakes for AC 230/400 V and motors for AC 690 V may also be operated on supply systems with a rated voltage of AC 220/380 V or AC 660 V respectively. The voltage-dependent data changes only slightly.

#### Forced cooling fan voltage

Motors	Forced cooling fan voltage EDR.71 - 225
Voltage range	1 × AC 230 - 277 V $\Delta$ (with capacitor) 3 × AC 220 - 303 V $\Delta$ 3 × AC 346 - 525 V $\Delta$



**Standard connections 50 Hz motors**

Number of poles	Synchronous speed $n_{syn}$ at 50 Hz in rpm	Connection
4-pole	1500	$\lambda / \Delta$

**60 Hz motors**

This motor catalog contains the technical data of EDR motors for supply systems with a frequency of 50 Hz.

The EDR motors can also be supplied for supply systems with a frequency of 60 Hz. They are also available as standard and energy-efficient variants.

The power assignment of the 60 Hz variants is different for some sizes from that of 50 Hz.

**6.2 Thermal characteristics**

**Thermal classification according to IEC 60034-1 (EN 60034-1)**

Single-speed AC motors / AC brakemotors are designed in thermal class 130 (B) as standard. Thermal class 155 (F) is available on request.

The following table shows the overtemperatures.

Thermal class	Category	Standard	Limit overtemperature in K
130	Category 3	EN 60034-1	80 K
	Category 2	EN 60079-7	60 K
155	Category 3	EN 60034-1	105 K
	Category 2	EN 60079-7	80 K

**Operating modes**

EDR. motors are designed for continuous duty according to IEC 60034-1 (EN 60034-1), i.e. operation with constant load conditions, the motor reaches a steady thermal state.

**6.3 Switching frequency**

A motor is usually rated according to its thermal loading. In many applications the motor is started only once (S1 = continuous duty = 100 % cdf). The power demand calculated from the load torque of the driven machine is the same as the rated motor power.

**High switching frequency**

Many applications call for a high switching frequency at low counter-torque, such as in travel drives. In this case, it is not the power demand that is the decisive factor in determining the size of the motor, but rather the number of times the motor has to start up. Frequent starting means the high starting current flows every time, leading to disproportionate heating of the motor. The windings become overheated if the heat absorbed is greater than the heat dissipated by the motor ventilation system.



#### No-load switching frequency $Z_0$ <sup>1)</sup>

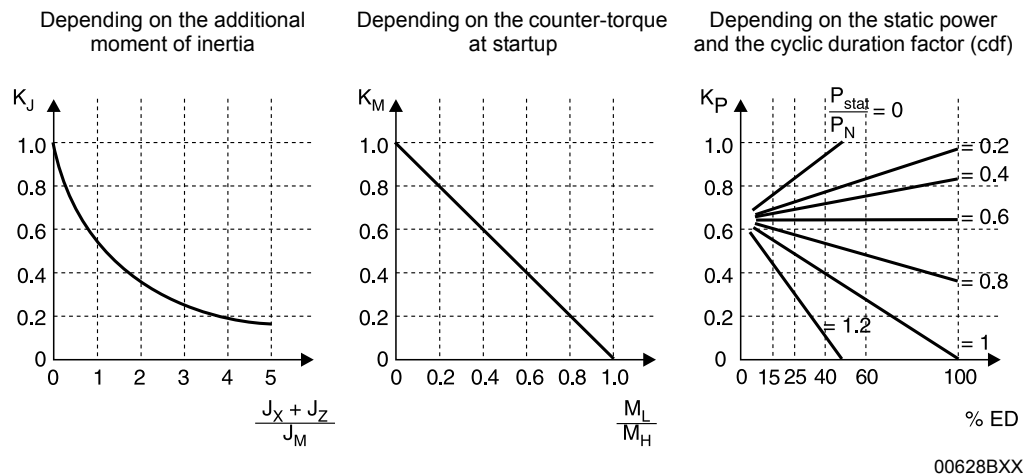
SEW-EURODRIVE specifies the permitted switching frequency of a brakemotor as the no-load switching frequency  $Z_0$  at 50 % cdf. This value indicates the number of times per hour that the brakemotor can accelerate the mass moment of inertia of its rotor up to speed without counter-torque at 50 % cdf. If an additional mass moment of inertia has to be accelerated or if an additional load torque occurs, the starting time of the brakemotor will increase. Increased current flows during this acceleration time. This means the brakemotor is subjected to increased thermal load and the permitted switching frequency is reduced.

#### Permitted brakemotor switching frequency<sup>1)</sup>

You can determine the permitted starting frequency  $Z$  of the motor in cycles/hour [1/h] using the following formula:

$$Z = Z_0 \times K_J \times K_M \times K_P$$

You can determine the factors  $K_J$ ,  $K_M$  and  $K_P$  using the following diagrams:



$J_X$  = Total of all external mass moments of inertia in relation to the motor axis

$J_Z$  = Mass moment of inertia flywheel fan

$J_M$  = Mass moment of inertia of the motor

$M_L$  = Counter-torque during startup

$M_H$  = Acceleration torque of the motor

$P_{stat}$  = Power requirement after start-up (static power)

$P_N$  = Rated motor power

%cdf = cyclic duration factor

#### Example

Brakemotor<sup>1)</sup>: EDRS71M4 BE1

No-load starting frequency  $Z_0 = 11000$  1/h

1.  $(J_X + J_Z) / J_M = 3.5$  :  $K_J = 0.2$
2.  $M_L / M_H = 0.6$  :  $K_M = 0.4$
3.  $P_{stat} / P_N = 0.6$  and 60% cdf :  $K_P = 0.65$

$$Z = Z_0 \times K_J \times K_M \times K_P = 11000 \text{ 1/h} \times 0.2 \times 0.4 \times 0.65 = 572 \text{ 1/h}$$

The cycle duration is 6.3 s, the operating time 3.8 s.

1) Brake in preparation



## 6.4 Mechanical characteristics

### Degree of protection to EN 60034 (IEC 60034-5)

AC motors and AC brakemotors are available with degree of protection IP54 as standard. Enclosures IP55, IP56, IP65 or IP66 are available upon request.

IP	1. digit		2. digit
	Touch guard	Protection against foreign objects	Protection against water
0	No protection	No protection	No protection
1	Protected against access to hazardous parts with the back of your hand	Protection against solid foreign objects $\varnothing$ 50 mm and larger	Protection against dripping water
2	Protected against access to hazardous parts with a finger	Protection against solid foreign objects $\varnothing$ 12 mm and larger	Protection against dripping water if the housing is tilted by up to 15°
3	Protected against access to hazardous parts with a tool	Protection against solid foreign objects $\varnothing$ 2,5 mm and larger	Protection against spraying water
4	Protected against access to hazardous parts with a wire	Protection against solid foreign objects $\varnothing$ 1 mm and larger	Protection against splashing water
5		Dust-proof	Protection against water jets
6		Dust-proof	Protection against powerful water jets
7	-	-	Protection against temporary immersion in water
8	-	-	Protection against permanent immersion in water

### Vibration class of motors

The rotors of AC motors are dynamically balanced with a half key. The motors meet vibration class "A" according to IEC 60034-14:2008. For special requirements on the mechanical running smoothness, single-speed motors without options installed (without brake, forced cooling fan, encoder, etc.) are available in a low-vibration design, vibration class "B" according to IEC 60034-14:2008.

### KS corrosion protection

If the motors are exposed to the weather, e.g. outdoor use without roof, the KS corrosion protection variant must be used.

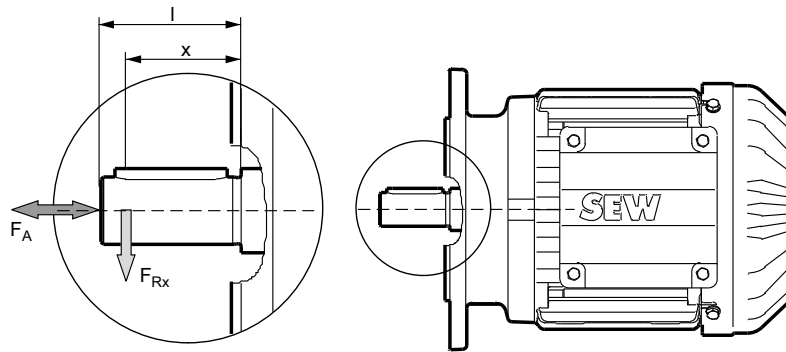


#### 6.5 Overhung loads

##### Permitted overhung load for EDR motors

Refer to the following diagrams for the permitted overhung load  $F_{Rx}$  for EDR. AC (brake) motors. In order to read the permitted overhung load from the diagram, you must know what the distance  $x$  is between the force application point of the overhung load  $F_R$  and the shaft shoulder.

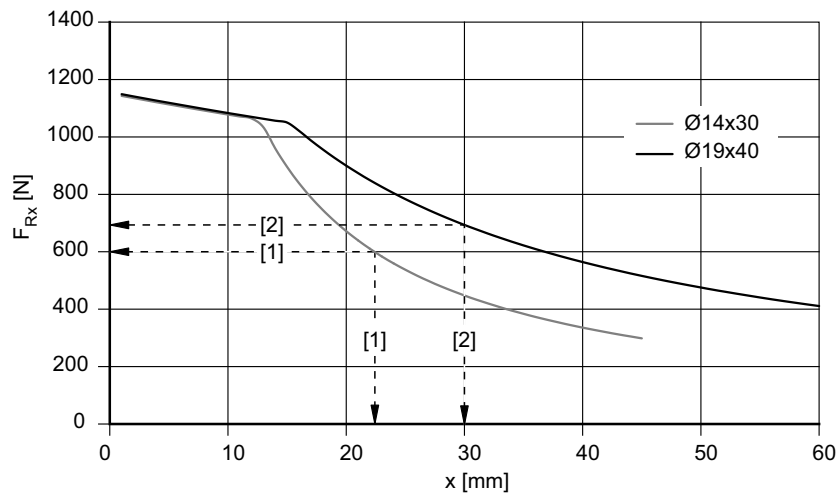
The following figure shows the application point of the overhung load.



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- $l$  = Length of the shaft end
- $x$  = Distance between overhung load application point and shaft shoulder
- $F_{Rx}$  = Overhung load at force application point
- $F_A$  = Axial force

The following diagram shows an example of how you can read the overhung load from the diagram:



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- [1] Motor with shaft diameter 14 mm, force application  $x$  at 22 mm, permitted overhung load  $F_{Rx} = 600$  N
- [2] Motor with shaft diameter 19 mm, force application  $x$  at 30 mm, permitted overhung load  $F_{Rx} = 700$  N

##### Permitted axial load for EDR motors

You can then determine the permitted axial load  $F_A$  by means of the previously determined overhung load  $F_{Rx}$ :

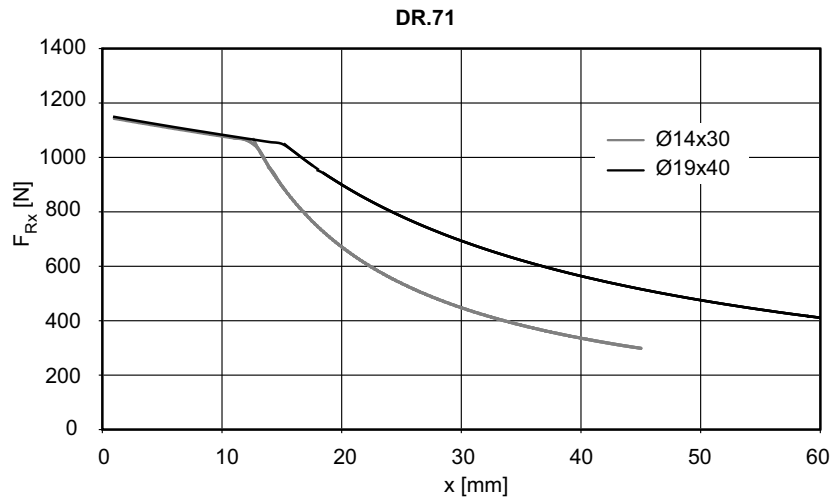
$$F_A = 0.2 \times F_{Rx}$$





**Overhung load diagrams of 4-pole EDR motors**

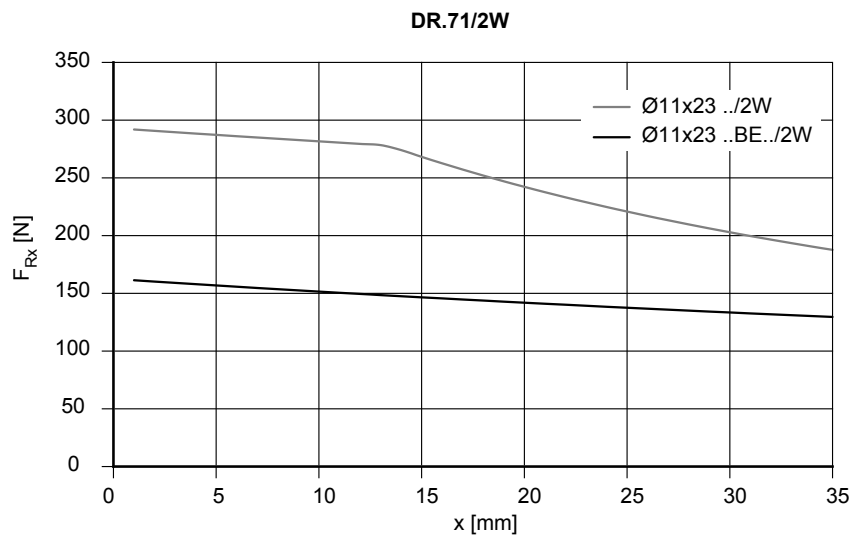
Overhung load diagram EDR.71 Overhung load diagram for 4-pole EDR.71 motors:



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Overhung load diagram EDR.71 on the 2. shaft end

Overhung load diagram for 4-pole EDR.71 motors at 2. shaft end:

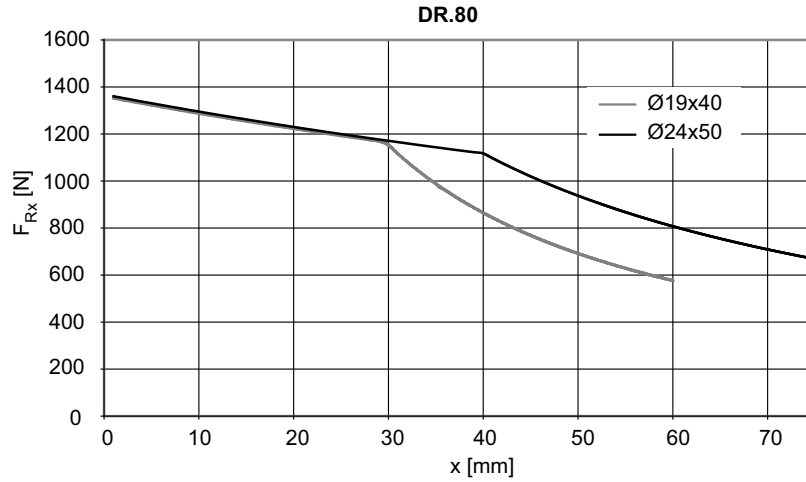


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Overhung load diagram EDR.80

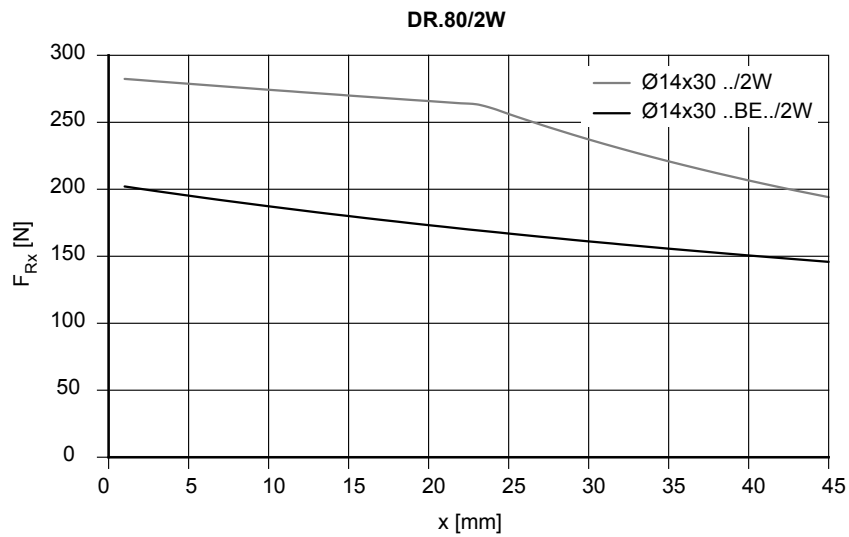
Overhung load diagram for 4-pole EDR.80 motors:



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Overhung load diagram EDR.80 on the 2. shaft end

Overhung load diagram for 4-pole EDR.80 motors at 2. shaft end:

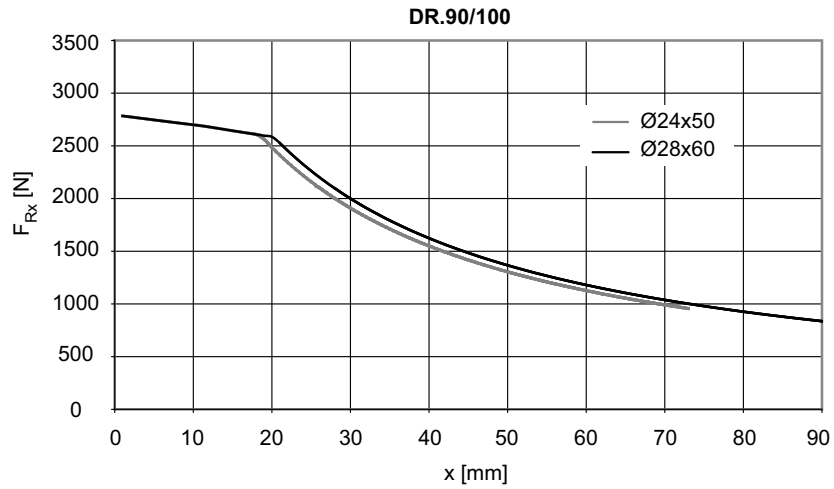


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Overhung load diagram EDR.90 and EDR.100

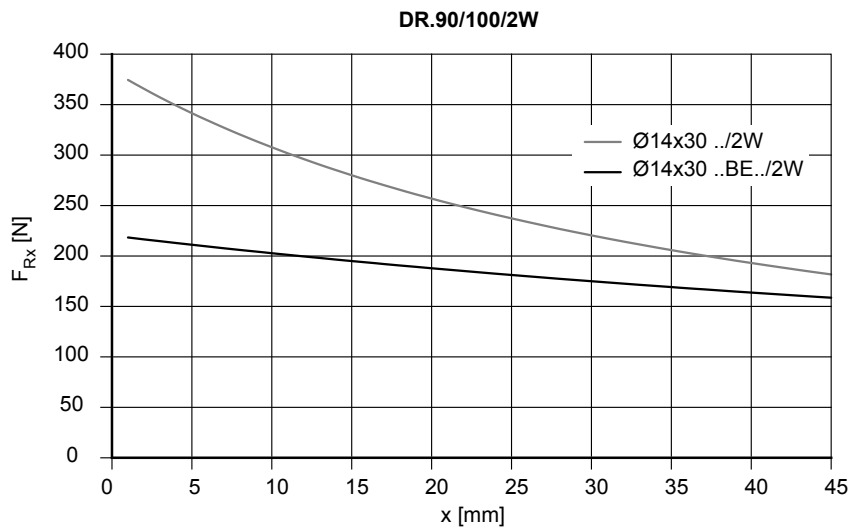
Overhung load diagram for 4-pole EDR.90 and EDR.100 motors:



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Overhung load diagram for EDR.90 and EDR.100 at 2. shaft end

Overhung load diagram for 4-pole EDR.90 and EDR.100 motors at 2. shaft end:

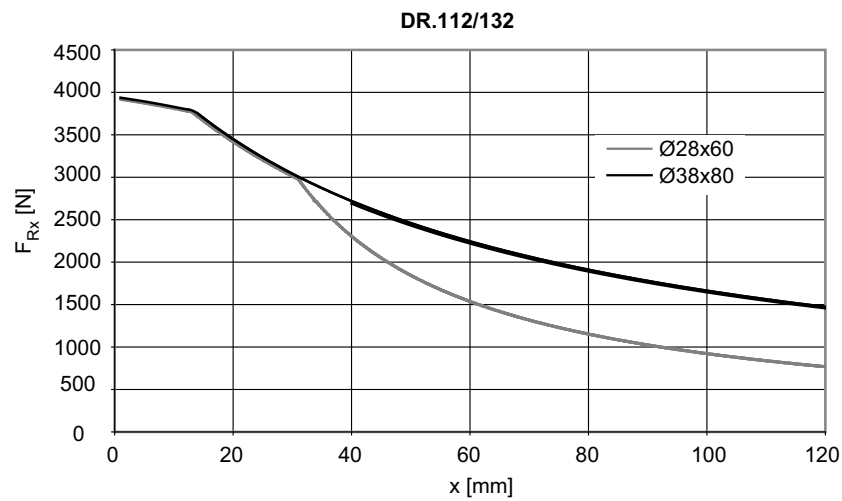


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Overhung load diagram EDR.112 and EDR.132

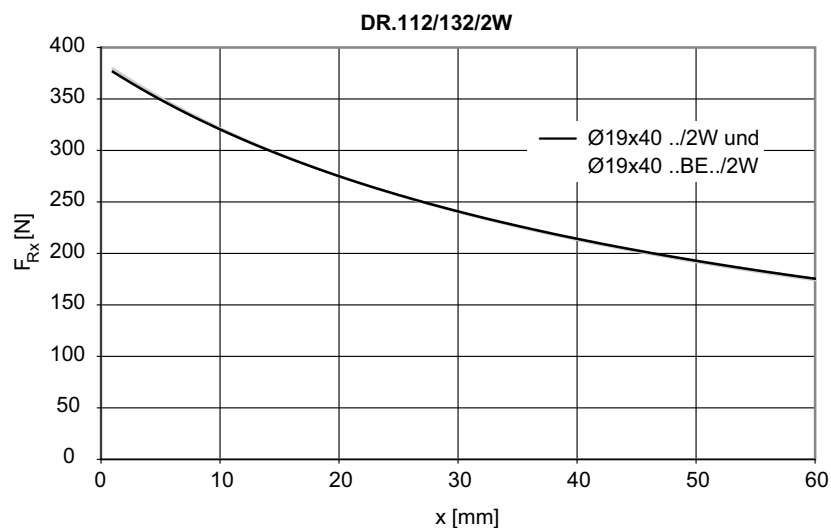
Overhung load diagram for 4-pole EDR.112 and EDR.132 motors:



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Overhung load diagram EDR.112 and EDR.132 at 2. shaft end

Overhung load diagram for 4-pole EDR.112 and EDR.132 motors at 2. shaft end:

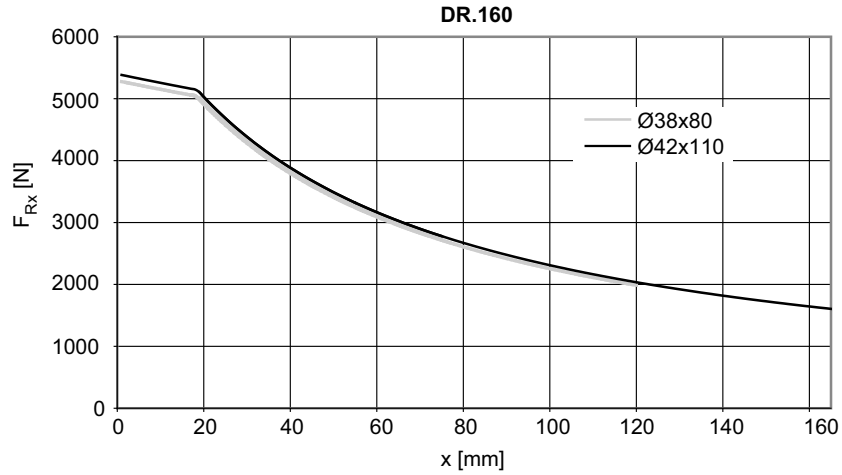


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Overhung load diagram EDR.160

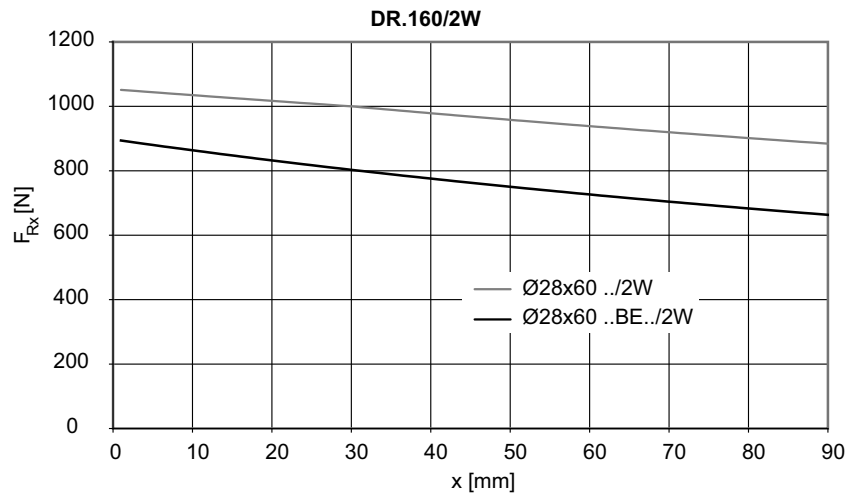
Overhung load diagram for 4-pole EDR.160 motors:



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Overhung load diagram EDR.160 on the 2. shaft end

Overhung load diagram for 4-pole EDR.160 motors at 2. shaft end:

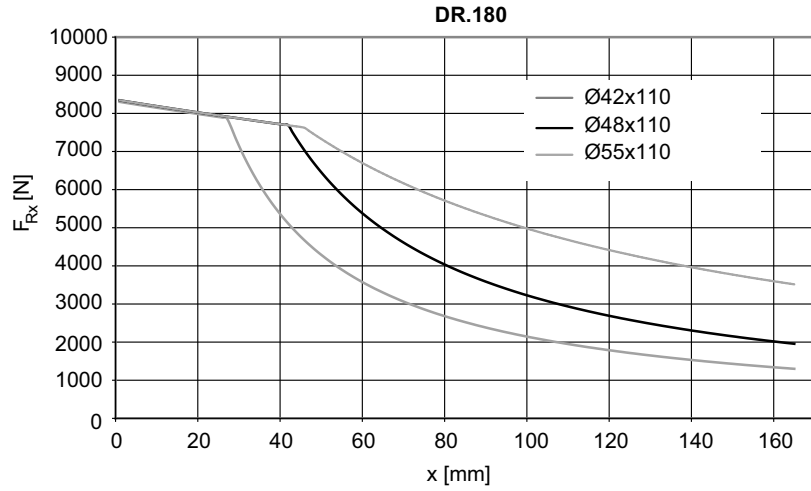


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Overhung load diagram EDR.180

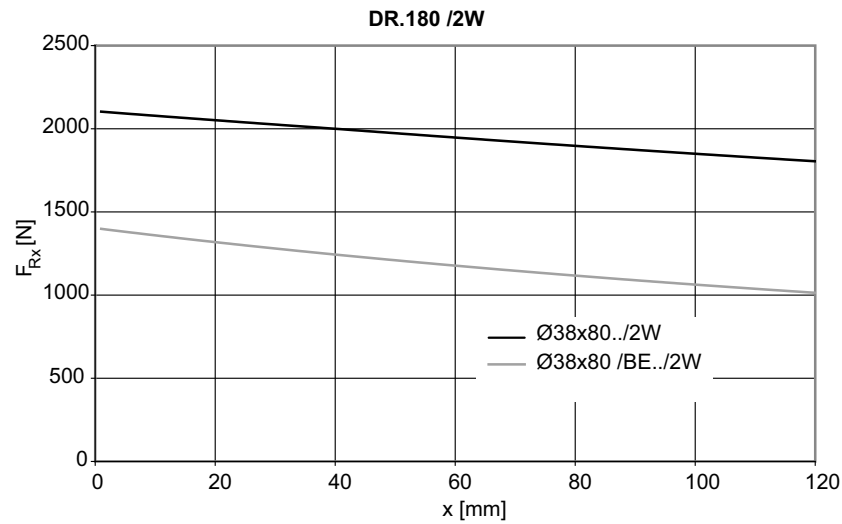
Overhung load diagram for 4-pole EDR.180 motors:



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Overhung load diagram EDR.180 on the 2. shaft end

Overhung load diagram for 4-pole EDR.180 motors at 2. shaft end:

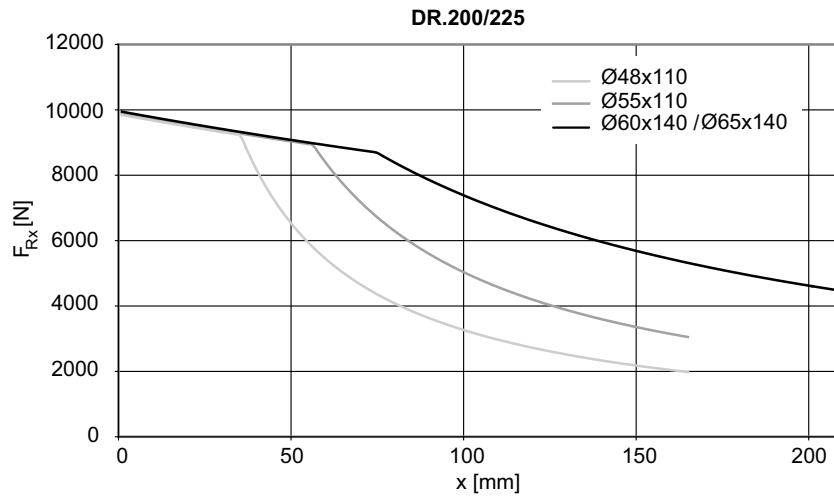


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Overhung load diagram EDR.200 and EDR.225

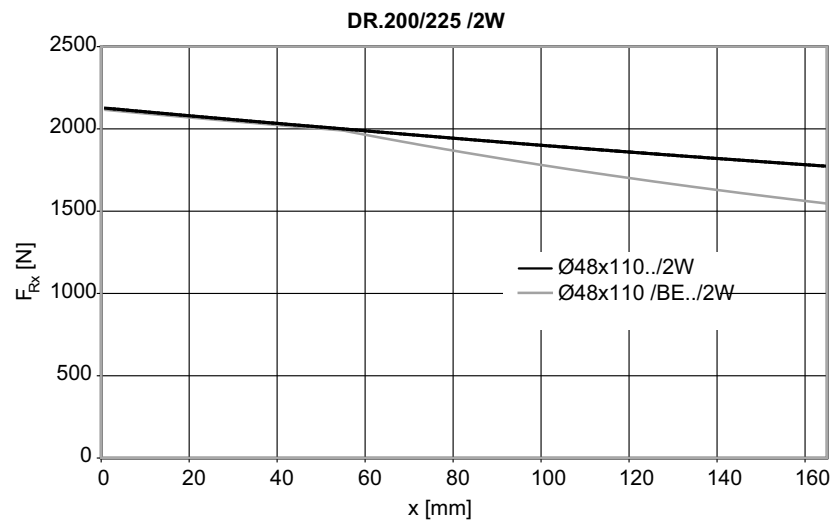
Overhung load diagram for 4-pole EDR.200 and EDR.225 motors:



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Overhung load diagram EDR.200 and EDR.225 at 2. shaft end

Overhung load diagram for 4-pole EDR.200 and EDR.225 motors at 2. shaft end:



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**Permitted ball bearing types**

The following table shows the permitted ball bearing types:

Motor type	A-side bearing		B-side bearing	
	IEC motor	Gearmotor	AC motor	Brakemotor
EDR.71	6204-2Z-J-C3	6303-2Z-J-C3	6203-2Z-J-C3	6203-2RS-J-C3
EDR.80	6205-2Z-J-C3	6304-2Z-J-C3	6304-2Z-J-C3	6304-2RS-J-C3
EDR.90 - EDR.100	6306-2Z-J-C3		6205-2Z-J-C3	6205-2RS-J-C3
EDR.112 - EDR.132	6308-2Z-J-C3		6207-2Z-J-C3	6207-2RS-J-C3
EDR.160	6309-2Z-J-C3		6209-2Z-J-C3	6209-2RS-J-C3
EDR.180	6312-2Z-J-C3		6213-2Z-J-C3	6213-2RS-J-C3
EDR.200 - EDR.225	6314-2Z-J-C3		6314-2Z-J-C3	6314-2RS-J-C3

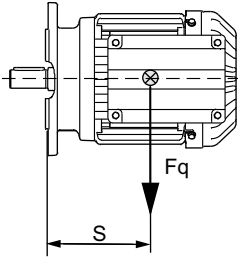
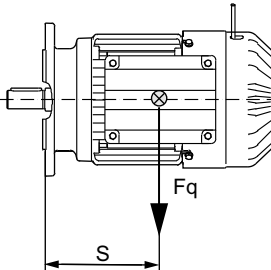


### 6.6 Center of gravity of the motors/brakemotors

The center of gravity of a motor is a theoretical variable which assumes that the entire mass of the motor/brakemotor (see technical data page 42) is concentrated in one point and acts on this point with the weight  $F_q$ .

Please take this into account when combining IEC motors with gear units that are mounted using adapters.

The brakemotors are in preparation.

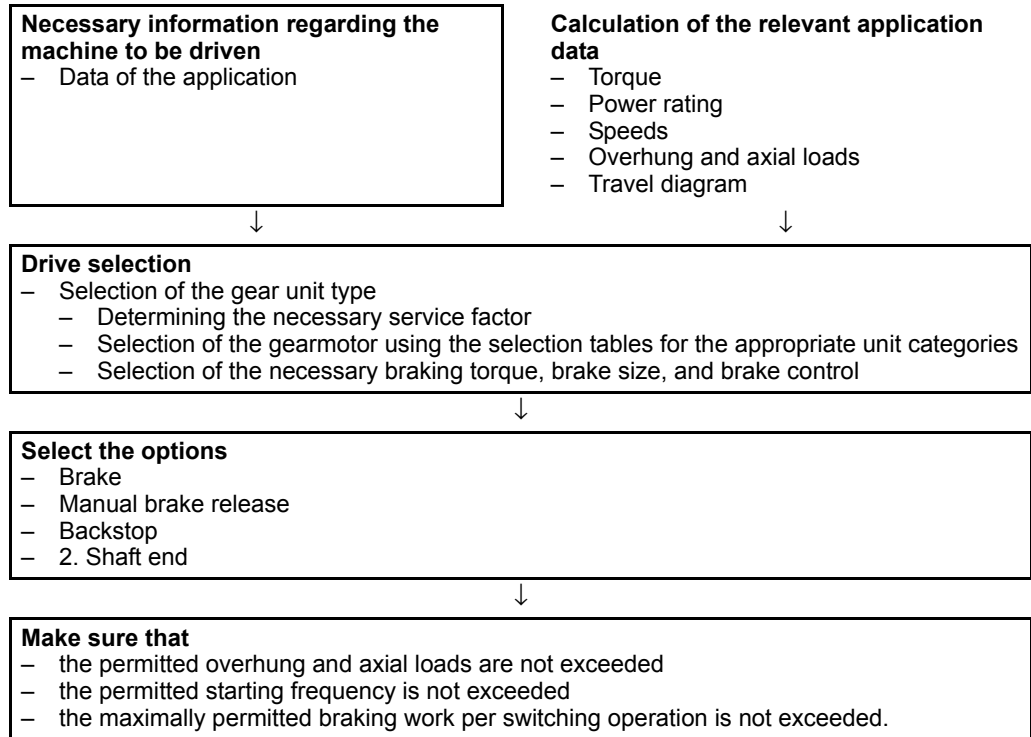
Motor type	Center of gravity S in mm	Brakemotor type	Brake	Center of gravity S in mm
				
EDR.71S	86	EDR.71S	BE05	108
EDR.71M	92	EDR.71M	BE1	112
EDR.80S	106	EDR.80S	BE1	148
EDR.80M	119	EDR.80M	BE2	150
EDR.90M	118	EDR.90M	BE2	142
EDR.90L	124	EDR.90L	BE5	151
EDR.100M	137	EDR.100M	BE5	165
EDR.100L / LC	153	EDR.100L / LC	BE5	180
EDR.112M	153	EDR.112M	BE5	179
EDR.132S	167	EDR.132S	BE11	202
EDR.132M	193	EDR.132M	BE11	226
EDR.160S / M	205	EDR.160S	BE20	265
EDR.180S / M	224	EDR.160M	BE20	255
EDR.180L	237	EDR.180S	BE20	287
EDR.200L	228	EDR.180M / L	BE30	302
EDR.225S	250	EDR.200L	BE32	340
EDR.225M	264	EDR.225S	BE32	340
		EDR.225M	BE32	363





### 6.7 Project planning procedure for EDR. – supply system operation

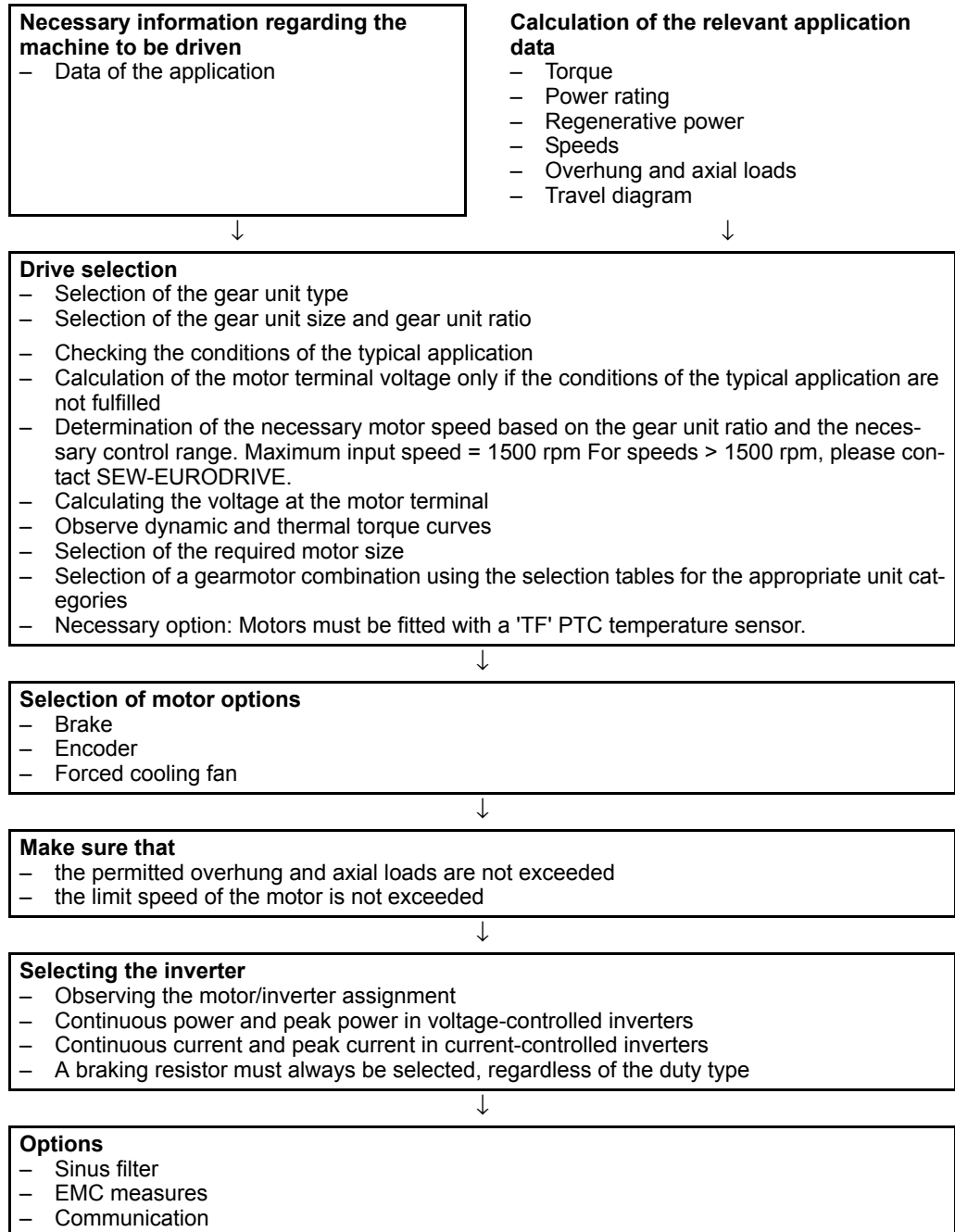
The following flow diagram illustrates the project planning procedure for a mains-powered drive.





#### 6.8 Project planning procedure for EDR. – inverter operation

The following flow diagram illustrates the project planning procedure for a drive. The drive consists of a gearmotor that is powered by an inverter.





## 6.9 Operation on the inverter

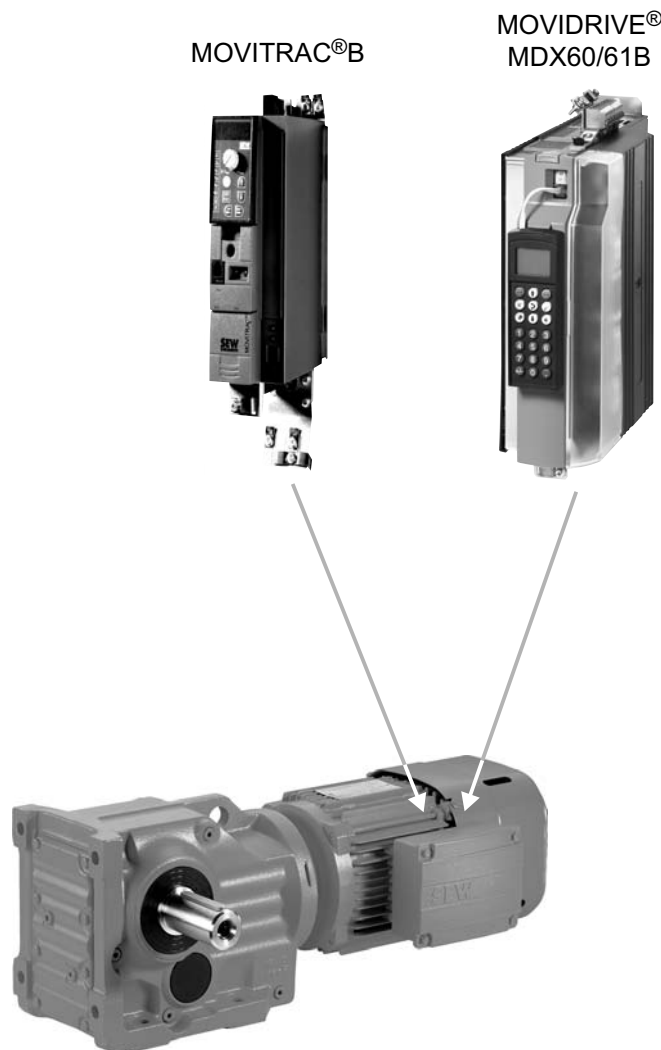
### Range of products

The extensive product range of SEW-EURODRIVE inverters is available for designing electronically controlled drives.

SEW-EURODRIVE offers the following inverter series:

- **MOVITRAC® B:** Compact and inexpensive frequency inverter for the power range 0.25 – 75 kW. 3-phase supply system connection for AC 380 – 500 V.
- **MOVIDRIVE® MDX60/61B:** High-performance drive inverter for dynamic drives in the 0.55 – 250 kW power range. Great diversity of applications due to extensive expansion options with technology and communication options. 3-phase supply system connection for AC 380 – 500 V.

Range of inverters for EDRS and EDRE series AC motors:



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### Product characteristics

The following table lists the most important product characteristics for the various inverter series. You can choose the inverter series matching your application based on these product features.

Product features	MOVITRAC® B	MOVIDRIVE® MDX60/61B
Voltage range	3 × AC 380 - 500 V	3 × AC 380 - 500 V
Power range	0.25 – 75 kW	0.55 – 250 kW
Overload capacity	150% $I_N$ <sup>1)</sup> briefly and 125% $I_N$ permanently during operation without overload	
4Q capable	Yes, with integrated brake chopper as standard.	
Integrated line filter	3 × AC 380 - 500 V: sizes 0, 1 and 2 according to limit value class A	For sizes 0, 1 and 2 according to limit class A
TF input	Yes	
Control modes	U/f or voltage-controlled flux vector control (VFC)	U/f or voltage-controlled flux vector control (VFC and VFCn control)
Speed feedback	No	Option
Integrated positioning and sequence control system	No	Standard
Serial interfaces	System bus (SBus) and RS-485	
Fieldbus interfaces	Optional via gateway PROFIBUS, INTERBUS, CANopen, DeviceNet, Ethernet	Optional PROFIBUS-DP, INTERBUS, INTERBUS LWL, CANopen, DeviceNet, Ethernet
Application options	IEC-61131 control	Input/output card Synchronous operation Absolute encoder card IEC-61131 control
Safe stop	Yes	Yes
Certifications	UL and cUL approval, C-tick	

1) Only for MOVIDRIVE® MDX60/61B: The temporary overload capacity of size 0 units (0005 & 0014) is 200%  $I_N$ .

### 6.10 Safe operation of motors in category 2 and 3

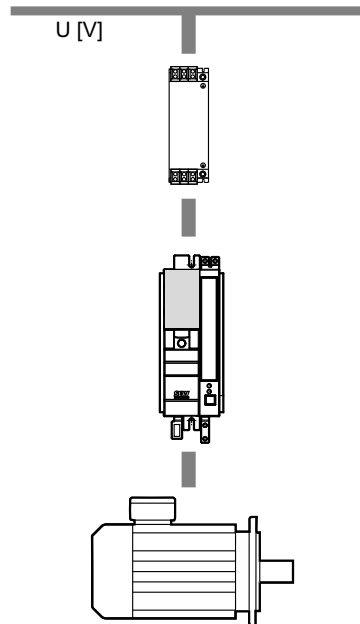
The project planning is the basic requirement for the safe operation of explosion-proof motors. It is necessary to consider the following points:

- Checking the conditions of the typical application.
- Adherence to the thermal torque limit characteristic curve.
- Adherence to the dynamic limit torque.
- Adherence to the motor limit frequency.
- Selection of a suitable frequency inverter.
- Braking resistor must be used irrespective of the duty type.
- Check of the overhung and axial loads on the shaft of stand-alone motors.
- Adherence to the maximum gear unit input speed, see 'Explosion-Proof Drives' catalog.
- Adherence to the maximum gear unit output torque, see 'Explosion-Proof Drives' catalog.



### 6.11 Typical application

The following conditions must be met:



- $V_{\text{mains}}$ : 400 V, line tolerance:  $\pm 5\%$
- Installation with and without external NF line filter
- Frequency inverter:
  - MOVITRAC® B
  - MOVIDRIVE® B
- Installation without line choke and without sine filter
- Max. motor cable length 100 m  
Max. permitted voltage drop: 10 V
- Rated motor voltage: 219 - 241 V / 380 - 420 V or 230 / 400 V, 50 Hz

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### 6.12 Motor terminal voltage

The thermal torque limit curves are based on the assumption that all conditions of a typical application are fulfilled.

The motor terminal voltage must only be dimensioned if the conditions of a typical application are not met. Contact SEW-EURODRIVE in this case.

### 6.13 Torque limit curves of EDRS and EDRE motors for inverter operation

The thermal torque limit characteristic curves show the permitted maximum torque ratings for continuous operation.

The values may be exceeded for brief periods if the effective operating point lies below the thermal limit characteristic curve.

#### Category 2

The permitted maximum dynamic limit torque of category 2 motors is determined by the short-term current limitation ( $150\% I_{c \text{ motor}}$ ).

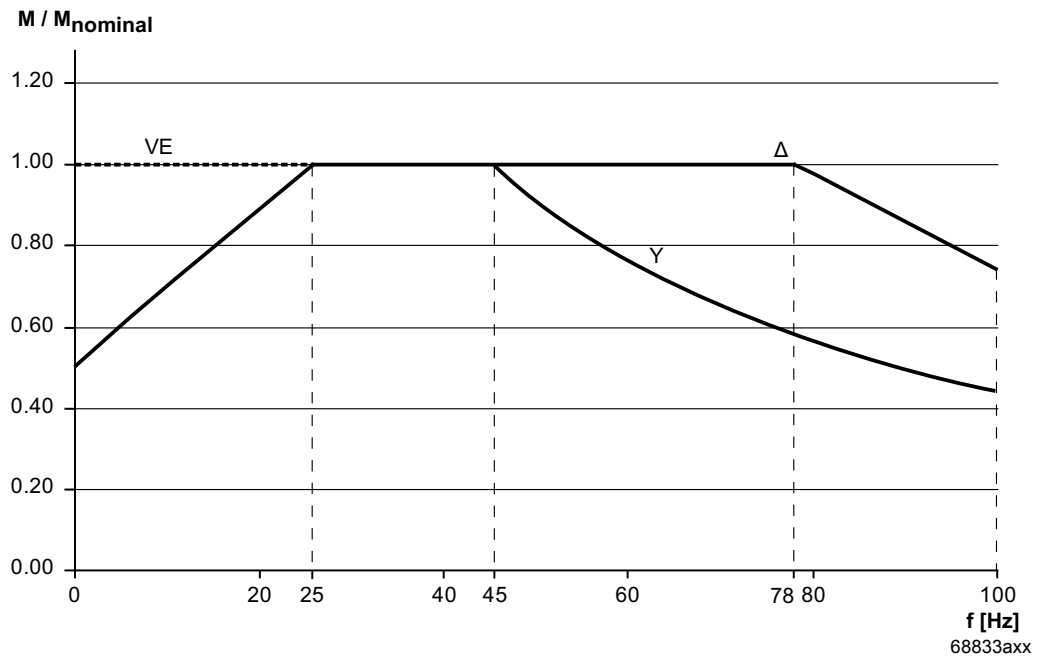
#### Category 3

The values for category 3 motors are listed in the technical data table, see page 43.

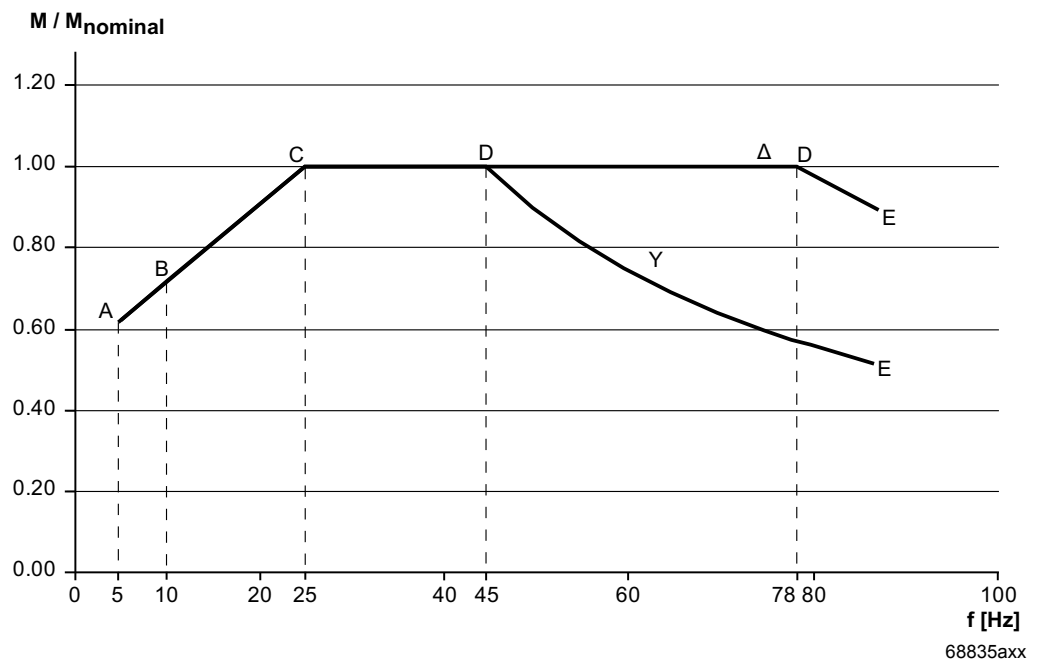


**Limit curves**

Category 3



Category 2





**Points A, B and C**

These 3 points limit the torque in the lower speed range in order to protect the from overheating due to the reduced cooling. They do not have to be projected. The variables are included in the startup software and are automatically assigned the permitted values during startup.

**Points D, E**

Field weakening begins at point D. Point E is the permitted limit speed. The startup software calculates both values for the typical application and sets the respective parameters.

***Mechanical limit – axial and overhung loads***

For electric machines operated on a frequency inverter, the maximum torque and the maximum speed must be regarded as the mechanical limit.

Additional loads caused by the customer system, such as overhung or axial loads due to belt drives, must be taken into account for all motors.

**6.14 Permitted maximum and minimum frequencies**

**Category 2**

Observe the maximum frequencies listed in the assignment tables for the motor/frequency inverter combinations. The minimum frequency is 5 Hz.

**Category 3**

Observe the maximum frequencies listed in the assignment tables for the motor/frequency inverter combinations. Exceedance is not permitted.



#### 6.15 Frequency inverter selection

##### Motor/inverter assignment for category 2 motors

MOVITRAC® B can be used for the basic control range as well as for the field weakening range as of firmware version 1822 563 2.11.<sup>1)</sup>

MOVIDRIVE® B is only suitable for the basic control range. This means that the parameter *Maximum speed* must be limited to the start of the field weakening range.

You must only use frequency inverters that comply with the requirements specified in the EC prototype test certificate.

$$I_{N \text{ Frequenzumrichter}} \leq 2 \times I_{N \text{ Motor}}$$

Motor in  $\Delta$  connection at 230/400 V motor voltage

Motor type 2G / 2GD	P <sub>N</sub> [kW]	n <sub>max</sub> [rpm]	Inverter power kW																				
			0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	22	30	37	45	55	75	90	110
EDRS71S 4	0.25	2415	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS71M 4	0.37	2110	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS80S 4	0.55	2410	-	-	x	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE80M 4	0.75	2465	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE90M 4	1.1	2455	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE90L 4	1.5	2395	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE100M 4	2.2	2455	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-
EDRE100LC 4	3	2480	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-
EDRE112M 4	3	1695	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-
EDRE132S 4	4	1730	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-
EDRE132M 4	5.5	1685	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-
DRE160S 4	7.5	1730	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-
EDRE160M 4	9.2	1755	-	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-
EDRE180S 4	11	2325	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-
EDRE180M 4	15	2325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-
EDRE180L 4	18.5	2055	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-
EDRE200L 4	22	2375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	-
EDRE225S 4	30	2365	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o
EDRE 225M 4	37	2065	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o

x = recommended      o = optionally permitted      - = not permitted

1) Parameter P076 contains information about the firmware version.





Motor in  $\Delta$  connection at 230/400 V motor voltage:

Motor type 2G / 2GD	P <sub>N</sub> [kW]	n <sub>max</sub> [rpm]	Inverter power kW																				
			0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	22	30	37	45	55	75	90	110
EDRS71S 4	0.25	2510	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS71M 4	0.37	2465	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS80S 4	0.55	2525	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE80M 4	0.75	2535	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE90M 4	1.1	2530	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE90L 4	1.5	2535	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-	-	-
EDRE100M 4	2.2	2530	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-
EDRE100LC 4	3	2556	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-
EDRE112M 4	3	1740	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-	-
EDRE132S 4	4	1760	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-	-
EDRE132M 4	5.5	1730	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-	-
EDRE160S 4	7.5	1750	-	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-	-
EDRE160M 4	9.2	1750	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	-	-	-	-	-	-
EDRE180S 4	11	2340	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-
EDRE180M 4	15	2330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-
EDRE180L 4	18.5	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-
EDRE200L 4	22	2370	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-
EDRE225S 4	30	2380	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o
EDRE225M 4	37	2080	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o

x = recommended      o = optionally permitted      - = not permitted

MOVITRAC<sup>®</sup> B can be used for the basic control range. As of version 18225632.11<sup>1)</sup> MOVITRAC<sup>®</sup> B can be used for the field weakening range. MOVIDRIVE<sup>®</sup> B is only suitable for the basic control range. This means that the parameter *Maximum speed* must be limited to the start of the field weakening range.

1) Parameter P076 contains information about the firmware version.



#### Motor/inverter assignment for category 3 motors

The listed motor/frequency inverter combinations are recommended for motors in the following categories:

- **Category 3G:** However, frequency inverters that have similar values with respect to output current and output voltage (EN 60079-15) can be used as well.
- **Category 3D:** If you want to operate category 3D motors on other frequency inverters, the maximum frequencies and the thermal torque limit curves must also be observed. In addition, we strongly recommend you use a frequency inverter matching the respective power rating.

Motor in  $\Delta$  connection at 230/400 V motor voltage

Motor type 3GD	P <sub>N</sub> [kW]	n <sub>max</sub> [rpm]	Inverter power kW																				
			0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	22	30	37	45	55	75	90	110
EDRS71S 4	0.25	2415	x	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS71M 4	0.37	2110	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS80S 4	0.55	2750	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE80M 4	0.75	2820	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE90M 4	1.1	2790	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE90L 4	1.5	2780	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE100M 4	2.2	2805	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-
EDRE100LC 4	3	2850	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-
EDRE112M 4	3	2460	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-
EDRE132S 4	4	2510	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-
EDRE132M 4	5.5	2445	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-
DRE160S 4	7.5	2500	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-
EDRE160M 4	9.2	2540	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-
EDRE180S 4	11	2545	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-
EDRE180M 4	15	2530	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	-	-	-	-
EDRE180L 4	18.5	2535	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	-	-	-
EDRE200L 4	22	2565	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	o	-
EDRE225S 4	30	2565	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	o
EDRE 225M 4	37	2560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o

x = recommended

o = optionally permitted

- = not permitted



Motor in  $\Delta$  connection at 230/400 V motor voltage

Motor type 3GD	P <sub>N</sub> [kW]	n <sub>max</sub> [rpm]	Inverter power kW																			
			0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	22	30	37	45	55	75	90
EDRS71S 4	0.25	2900	-	x	o	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS71M 4	0.37	2850	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRS80S 4	0.55	2900	-	-	-	x	o	o	o	-	-	-	-	-	-	-	-	-	-	-	-	-
EDRE80M 4	0.75	2910	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-	-
EDRE90M 4	1.1	2860	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-	-
EDRE90L 4	1.5	2920	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-	-
EDRE100M 4	2.2	2905	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-	-
EDRE100LC 4	3	2935	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-
EDRE112M 4	3	2545	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-	-
EDRE132S 4	4	2565	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-	-
EDRE132M 4	5.5	2535	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-	-
EDRE160S 4	7.5	2560	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-	-
EDRE160M 4	9.2	2570	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	-	-	-	-
EDRE180S 4	11	2580	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	-	-	-
EDRE180M 4	15	2565	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	-	-
EDRE180L 4	18.5	2575	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o	-
EDRE200L 4	22	2585	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o	o
EDRE225S 4	30	2575	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o	o
EDRE225M 4	37	2585	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	x	o

x = recommended      o = optionally permitted      - = not permitted

**Braking resistor – category 2 and 3**

You must always use a braking resistor, regardless of the duty type.

**6.16 Notes for safe operation**

**General information**      Install the frequency inverter outside the potentially explosive atmosphere.

**Thermal motor protection category 2**

Thermal motor protection is ensured by the following measures:

- Winding temperature monitoring through PTC thermistors (TF) built into the winding. The TF is monitored via an evaluation unit that complies with directive 94/9/EC and is labeled with Ex identification (2)G.
- Motor current monitoring according to the specifications of the EC prototype test certificate.
- Motor current limit according to the specifications of the EC prototype test certificate.

**Thermal motor protection category 3**

Only motors that are equipped with a positive temperature coefficient thermistor (TF) are permitted for operation on a frequency inverter to ensure that the permitted limit temperature is not exceeded. The positive temperature coefficient thermistor has to be evaluated using an appropriate device.

**Overvoltage at the motor terminals**

For FI-operated motors, observe chapter 'Permitted voltage load in FI operation' page 69.



#### **EMC measures**

The following components are permitted for the MOVIDRIVE® and MOVITRAC® frequency inverters:

- Line filters of the NF...-... series
- Output chokes of the HD... series
- Output filter (sine filter) HF..

If an output filter is used, the voltage drop has to be compensated via the filter. Contact SEW-EURODRIVE in this case.

#### **Gear unit**

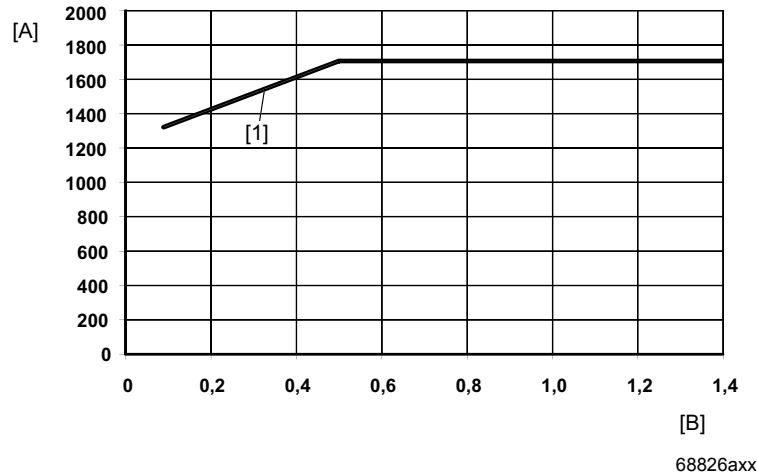
From the perspective of the gear unit, restrictions apply to the maximum speed when using controlled gearmotors. For input speeds greater than 1500 rpm contact SEW-EURODRIVE.

When parameterizing FI-controlled gearmotors, you have to observe the  $n_{e\max}$  and  $M_{a\max}$  values of the gear unit.



### 6.17 Permitted voltage load for frequency inverter operation

Operating SEW motors on frequency inverters is permitted if the pulse voltages at the motor terminals indicated in the following figure are not exceeded.



- [1] Permitted pulse voltage for EDR standard
- [A] Permitted pulse  $U_{LL}$  in V
- [B] Rise time in  $\mu$ s



- If the permitted pulse voltage is exceeded, you have to provide for according measures to limit it. Consult the manufacturer of the frequency inverter.
- The permitted maximum PE voltage of 1200 V must not be exceeded in IT system operation even in the event of an error.

#### Frequency inverter from SEW-EURODRIVE

When using frequency inverters from SEW-EURODRIVE on supply systems of up to 500 V, the maximally permitted limit values of the EDR. motors are met.

The maximum permitted motor cable length is 100 m.

A braking resistor and a 4Q startup are mandatory. This prevents that in case of a fault in 1Q operation, the DC link voltage increases to an unacceptable level. External components, e.g. output choke, must not be used.

#### Frequency inverters from third party manufacturers

If the maximum permitted limit values cannot be met with frequency inverters from other manufacturers, you must take limiting measures. Consult the manufacturer of the frequency inverter.



## Project Planning

### Permitted voltage load for frequency inverter operation

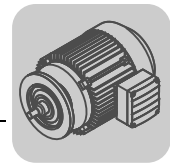
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#### ***IT system***

In an IT system, an insulation fault between a phase and ground is tolerated. The ground connection of the motor could mean that the maximum permitted limit value for phase-to-ground of 1200 V is exceeded in regenerative operation. This limit value can be met by using a sine filter with DC link connection. The DC link connection also achieves the necessary filter effect against ground.

#### ***Regeneration***

The use of regenerative power supply units with block-shaped (MDR type) or sinusoidal (MXR type) current along with corresponding options is possible without restrictions. The regenerative power supply unit prevents high DC link voltages and ensures that the limit values are not exceeded.




## 7 Dimension Sheets of EDR. AC Motors/Brakemotors

### 7.1 Notes on the dimension sheets

Observe the following notes regarding dimension sheets for 4-pole DR AC (brake)motors:

- Leave a clearance of at least half the fan guard diameter to provide unhindered air access.
- For brakemotors, do not forget to add the space required for removing the fan guard (= fan guard diameter).

	<b>INFORMATION</b>
	<p>The standard variant of EDR.71 - 132 motors up to a voltage of AC 500 V is the variant with 'cage clamp' (type and catalog designation: /KCC).</p> <p>The 'terminal board with anti-rotation protection' variant is available as an option.</p> <p>The dimensions of the terminal box are identical for both variants. As of size EDR.160, the 'terminal board with anti-rotation protection' variant is compulsory.</p>

#### Software support

Not any cable entry position [X, 1, 2, 3] and terminal box position [0°(R), 90°(B), 180°(L), 270°(T)] can be chosen. Some additional features for the motor require a connection inside the terminal box, which means this terminal box is larger than the standard terminal box due to the normative air gaps and creepage distances. The dimension sheets only depict the standard terminal box.

For a thorough check of the possible positions of your drive, you can use the DRIVECAD software in DriveGate on the SEW-EURODRIVE website.

- If you are already a registered DriveGate user: <https://portal.drivegate.biz/drivecad>.
- If you are not registered: [www.sew-eurodrive.de](http://www.sew-eurodrive.de) → DriveGate login.

#### Tolerances

##### Shaft heights

The following tolerances apply to the indicated dimensions:

h	≤ 250 mm	→ -0.5 mm
h	> 250 mm	→ -1 mm

##### Shaft ends

Diameter tolerance:

∅	≤ 28 mm	→ ISO j6
∅	≤ 50 mm	→ ISO k6
∅	> 50 mm	→ ISO m6

Center bores according to DIN 332, shape DR:

∅ = 7 - 10 mm	→ M3	∅ > 30 - 38 mm	→ M12
∅ > 10 - 13 mm	→ M4	∅ > 38 - 50 mm	→ M16
∅ > 13 - 16 mm	→ M5	∅ > 50 - 85 mm	→ M20
∅ > 16 - 21 mm	→ M6	∅ > 85 - 130 mm	→ M24
∅ > 21 - 24 mm	→ M8	∅ > 130 mm	→ M30
∅ > 24 - 30 mm	→ M10		

Keys: according to DIN 6885 (domed type)



#### *Flanges*

Centering shoulder tolerance:

- ∅ ≤ 230 mm (flange sizes A120 - A300) → ISO j6
- ∅ > 230 mm (flange sizes A350 - A660) → ISO h6

Different flange dimensions are available for each AC (brake) motor size. The dimension sheets show the possible flanges for the respective sizes.

#### *Eyebolts, lifting eyes*

Motors up to EDR.100M are delivered without special transportation fixtures.

Motors ≥ EDR.100L are equipped with removable lifting eye bolts.

#### **Motor dimensions**

##### *Additional motor features*

The motor dimensions may change due to motor options. Refer to the dimension drawings of the motor options.

##### *Special designs*

In case of special designs or comprehensive additional features connected in the terminal box, the terminal box dimensions might deviate from the standard.

Observe the notes in the order confirmation from SEW-EURODRIVE.

##### *EN 50347*

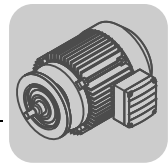
European standard EN 50347 became effective in August 2001. This standard adopts the dimension designations for three-phase AC motors of size 56 to 315M and flange size 65 to 740 from the IEC 72-1 standard.

The new dimension designations given in EN 50347 / IEC 72-1 are used for the relevant dimensions in the dimension sheet tables.



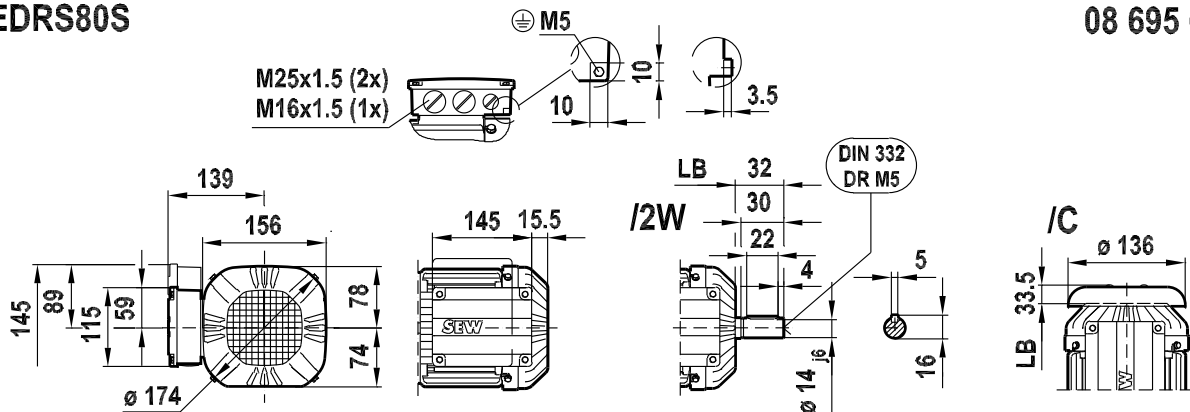






**EDRS80S**

08 695 00 10

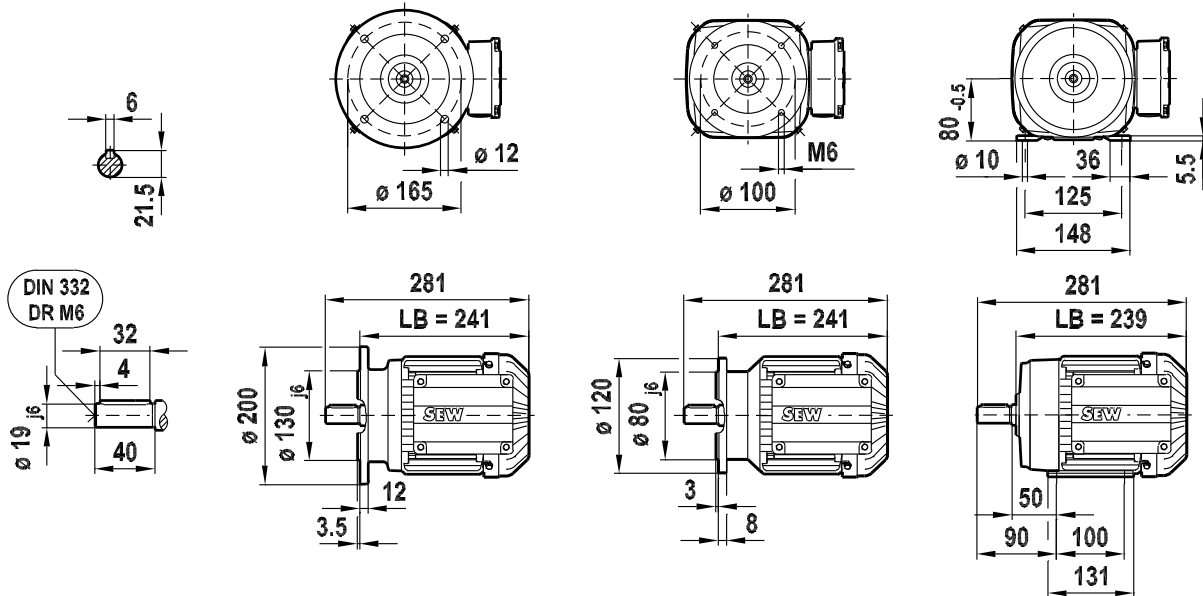


**/FF (B5) FF165D200**

**/FT (B14) FT100D120**

**/FI.. (B3)**

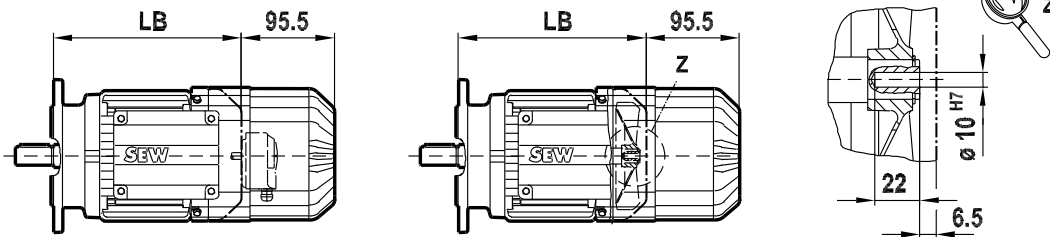
7



**/ES7.**

**/AS7.**

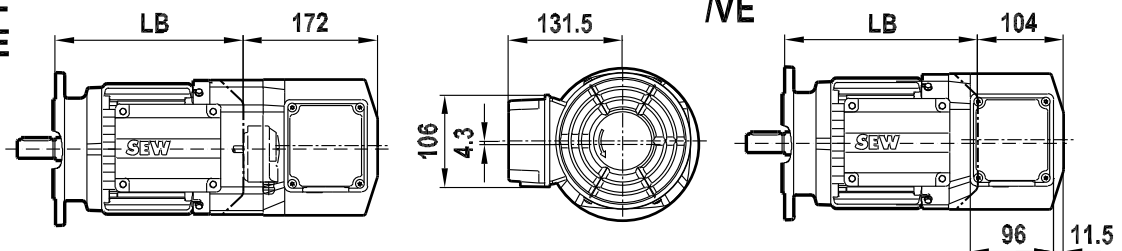
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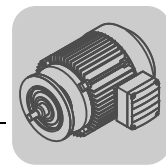
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**/AS7./VE**

**/VE**

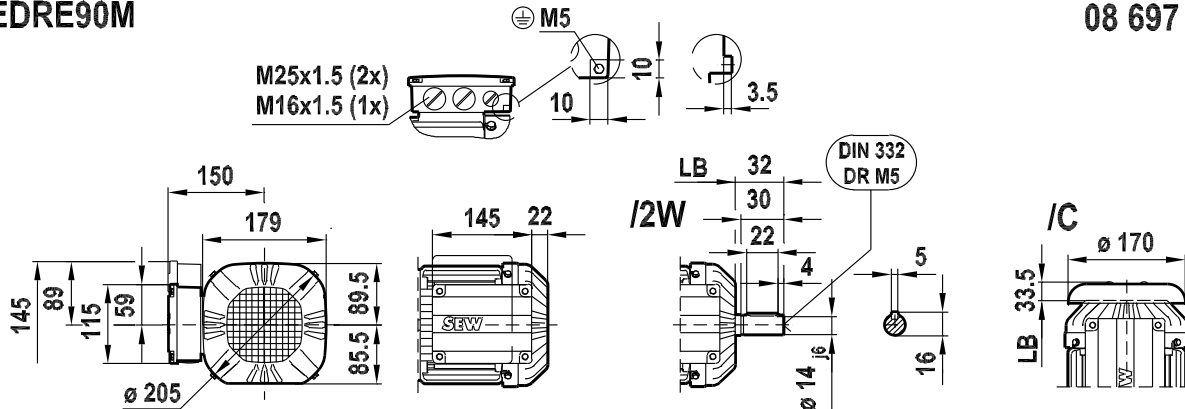






EDRE90M

08 697 00 10

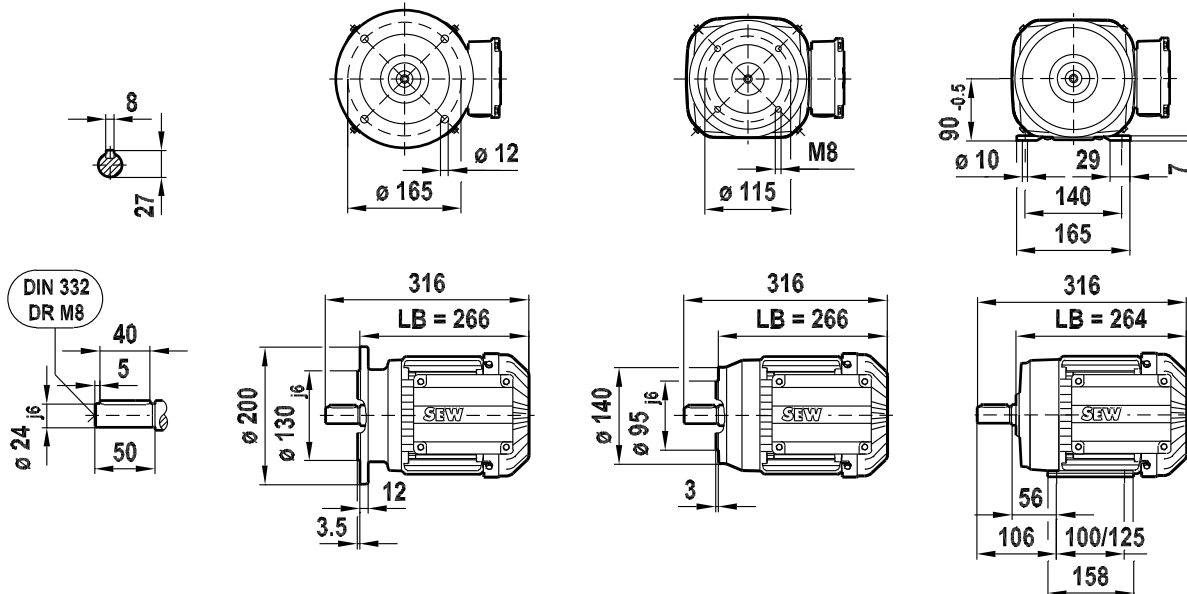


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/FT (B14) FT115D140

/FI.. (B3)

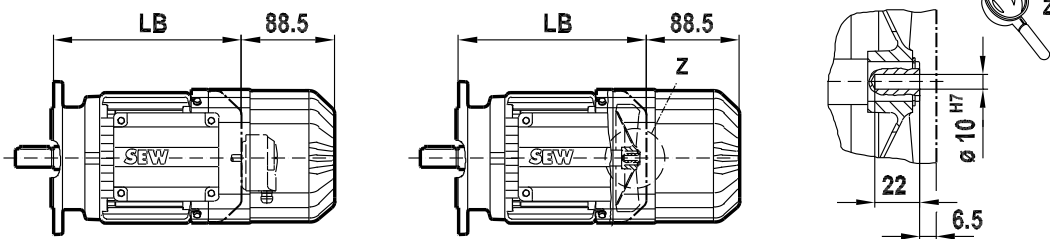
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/AS7.

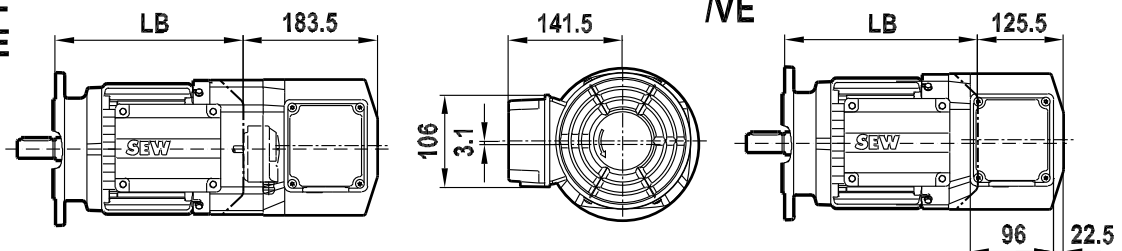
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/ES7./VE

/AS7./VE

/VE

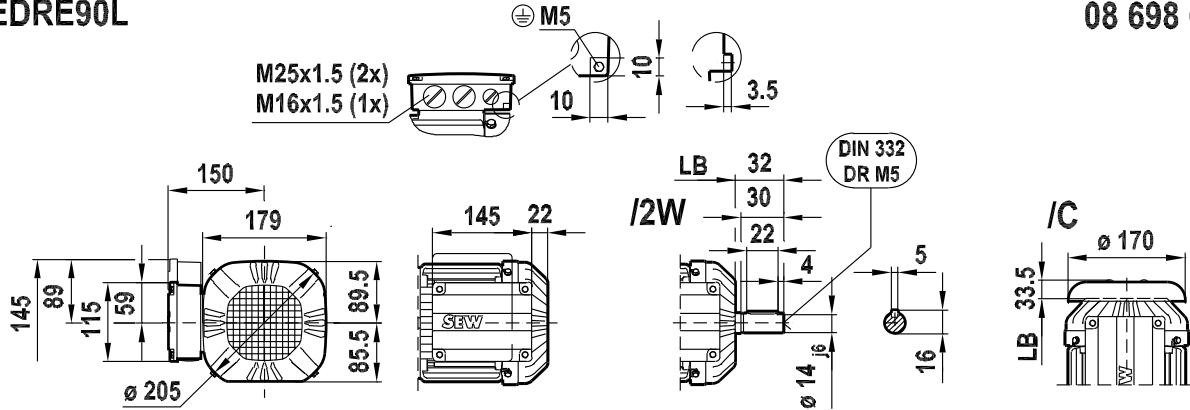




**Dimension Sheets of EDR. AC Motors/Brakemotors**  
Dimension sheets of EDR. AC motors

**EDRE90L**

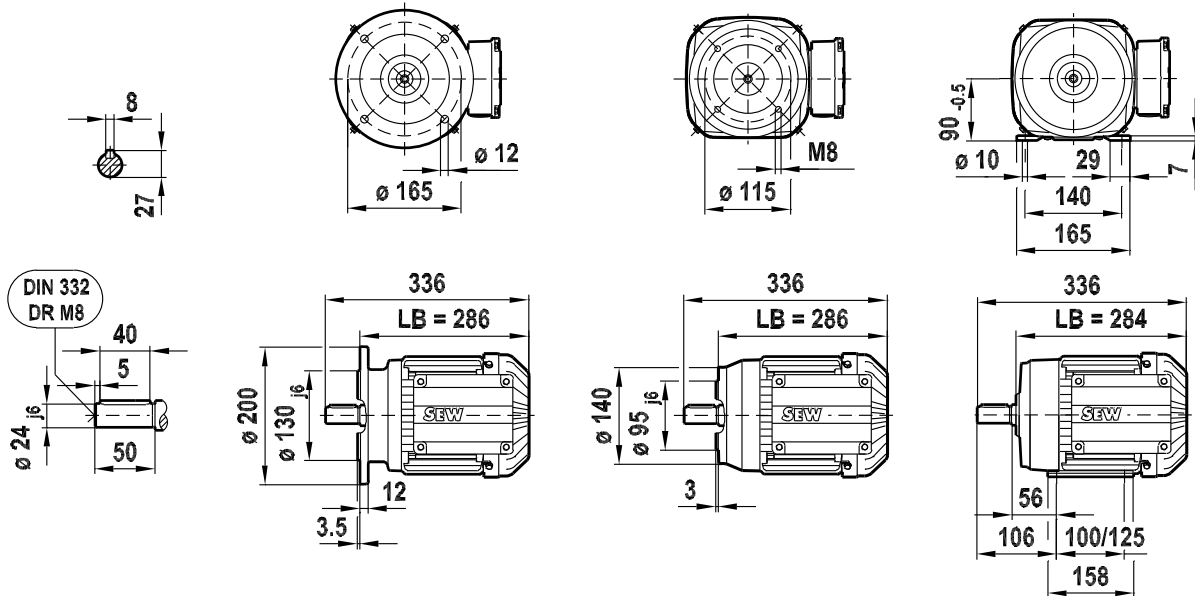
08 698 00 10



**/FF (B5) FF165D200**

**/FT (B14) FT115D140**

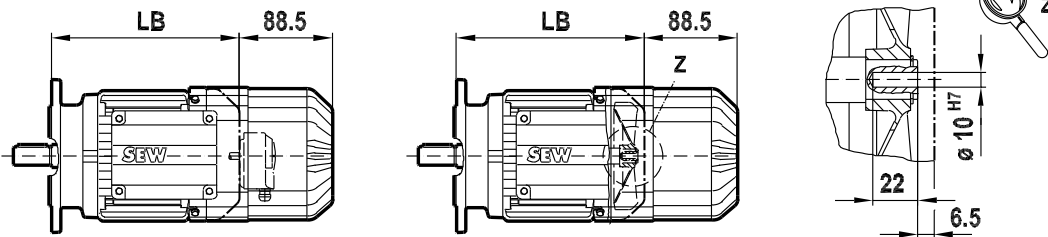
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**/ES7.**

**/AS7.**

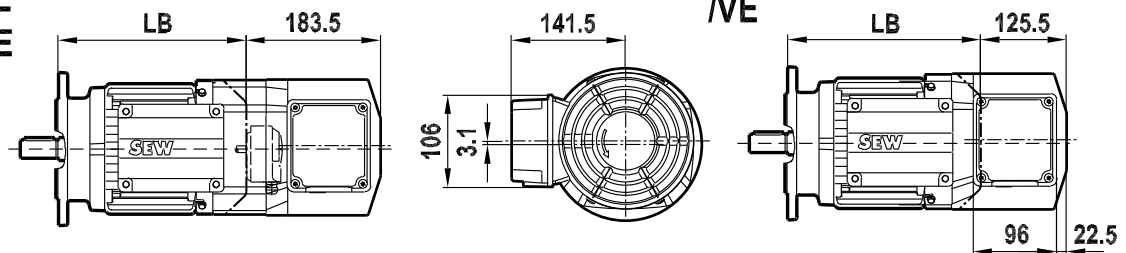
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**/ES7./VE**

**/AS7./VE**

**/VE**



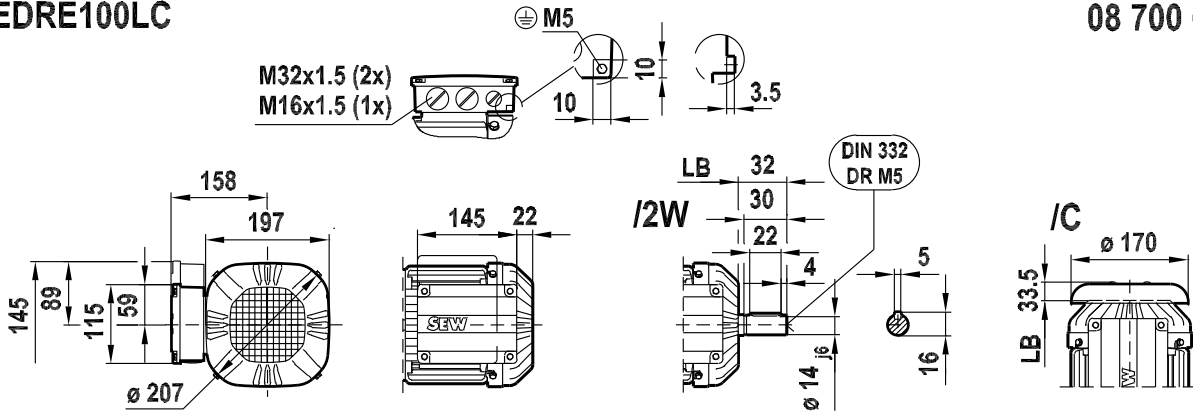




**Dimension Sheets of EDR. AC Motors/Brakemotors**  
Dimension sheets of EDR. AC motors

**EDRE100LC**

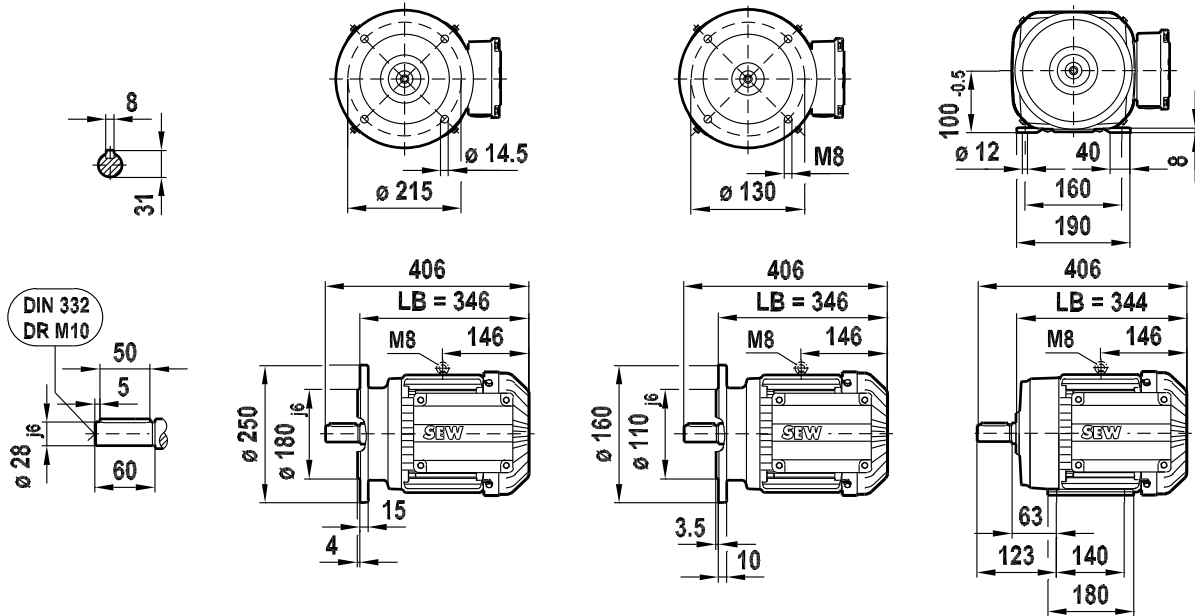
08 700 00 10



**/FF (B5) FF215D250**

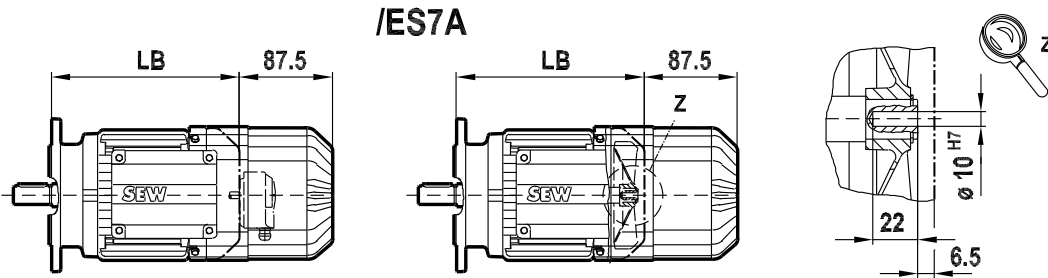
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**/FI.. (B3)**



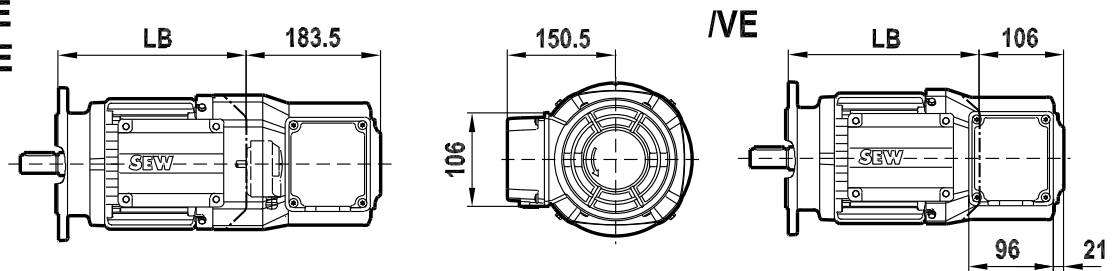
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**/ES7A**

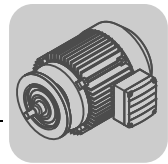


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**/VE**

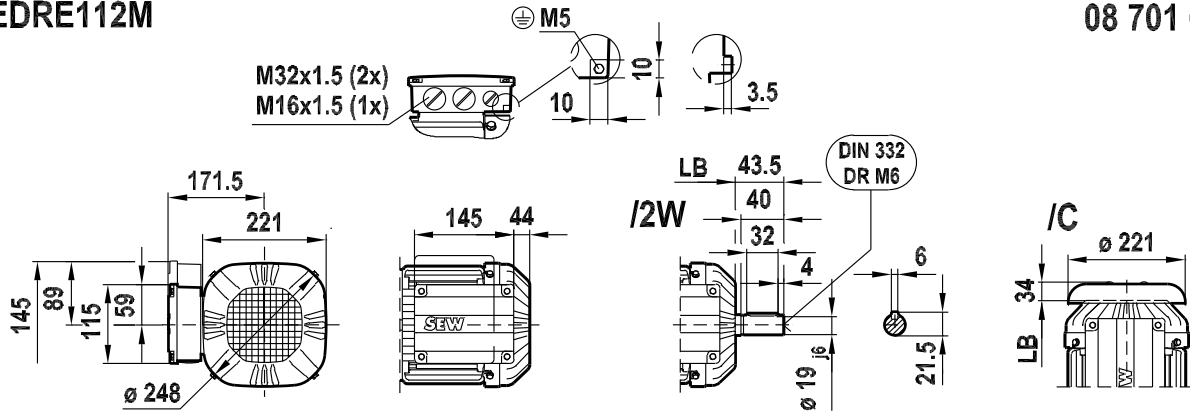






EDRE112M

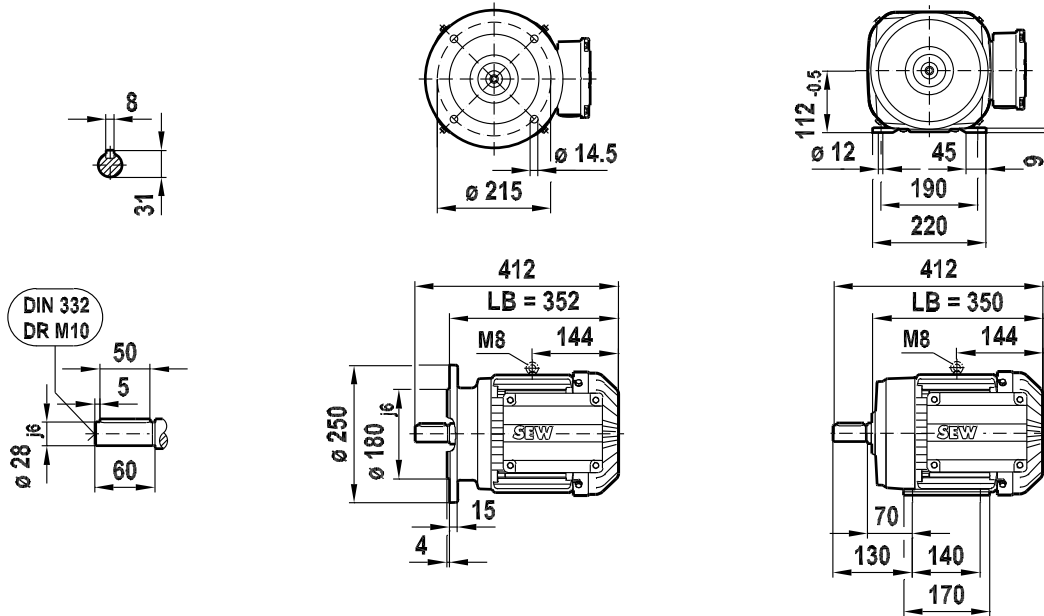
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/FF (B5) FF215D250

/Fl. (B3)

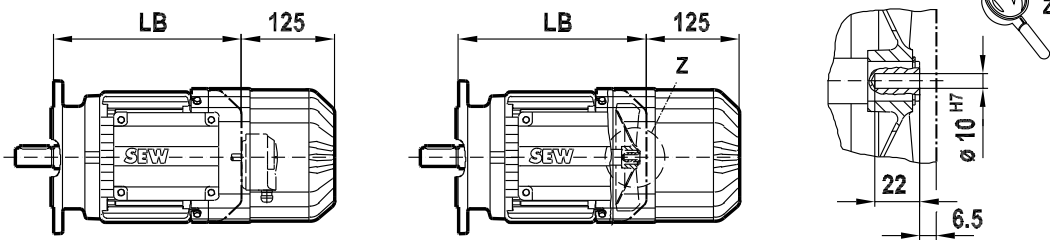
7



/ES7.

/ES7A

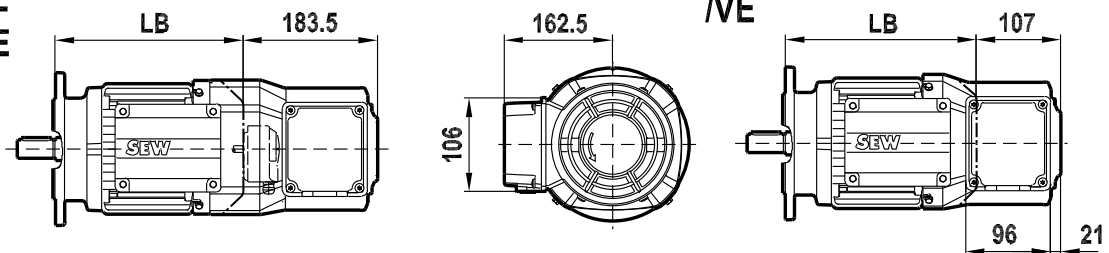
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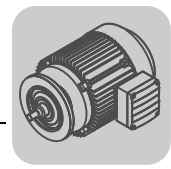
/ES7./VE

/AS7./VE

/VE

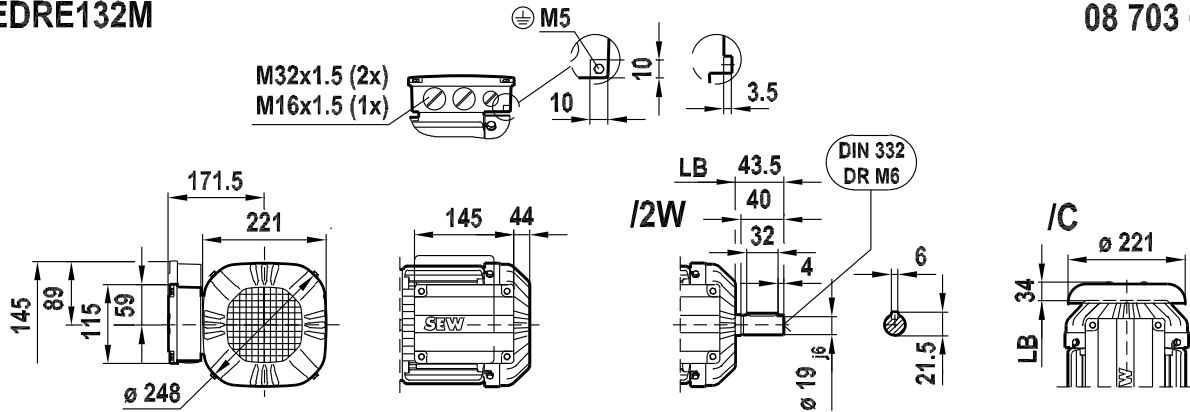






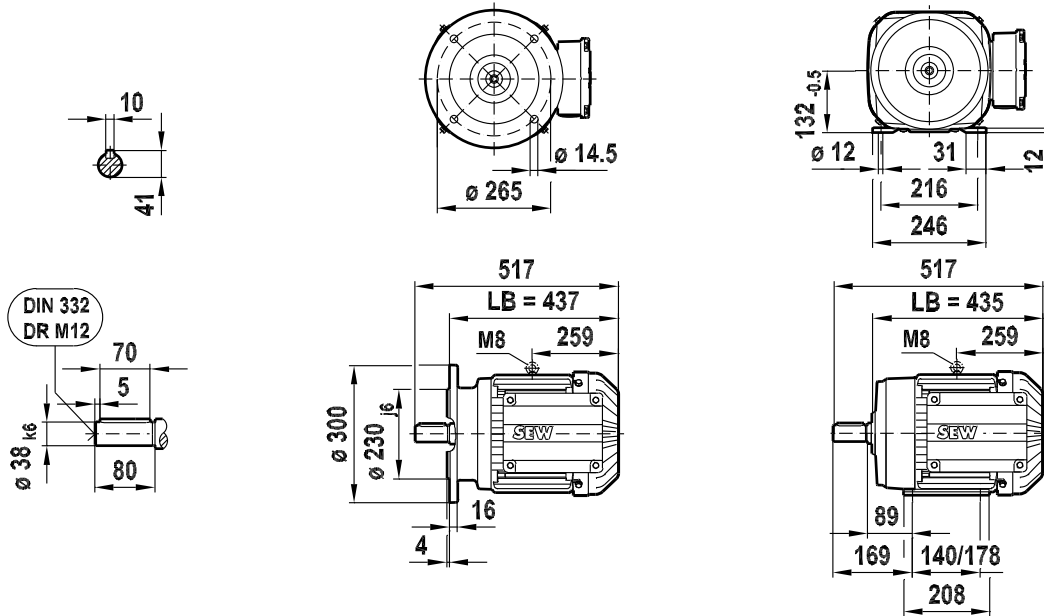
EDRE132M

08 703 00 10



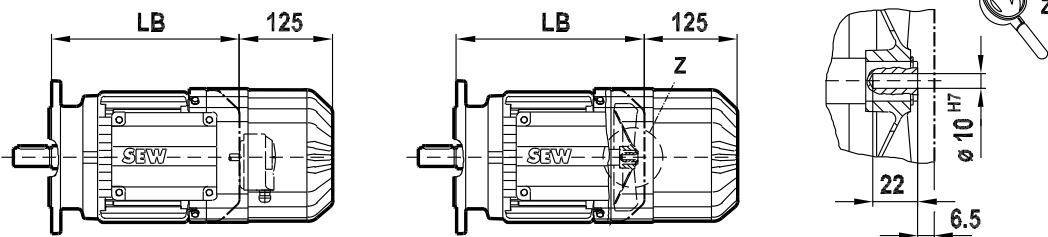
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/Fl. (B3)



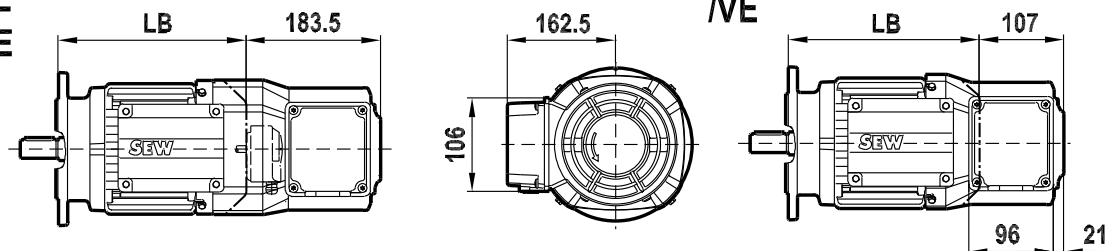
/ES7.  
/AS7.

/ES7A



/ES7./VE  
/AS7./VE

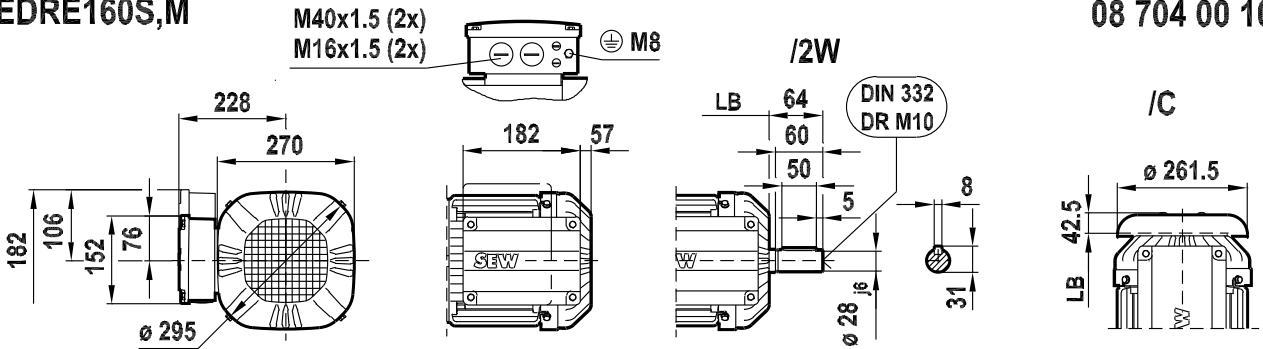
/VE





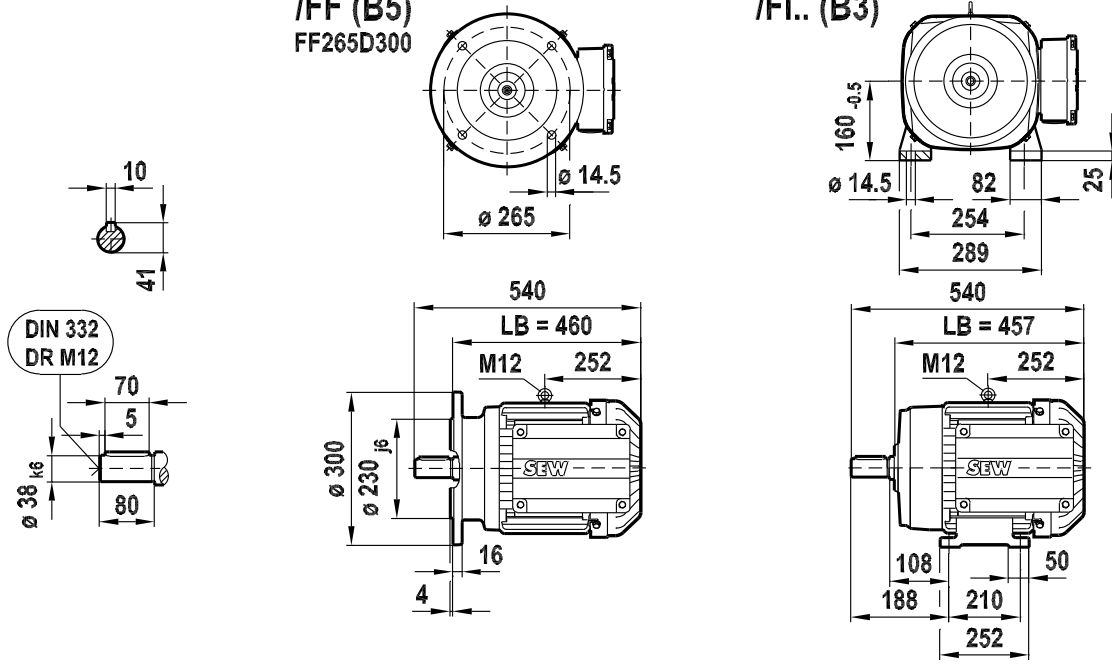
EDRE160S,M

08 704 00 10



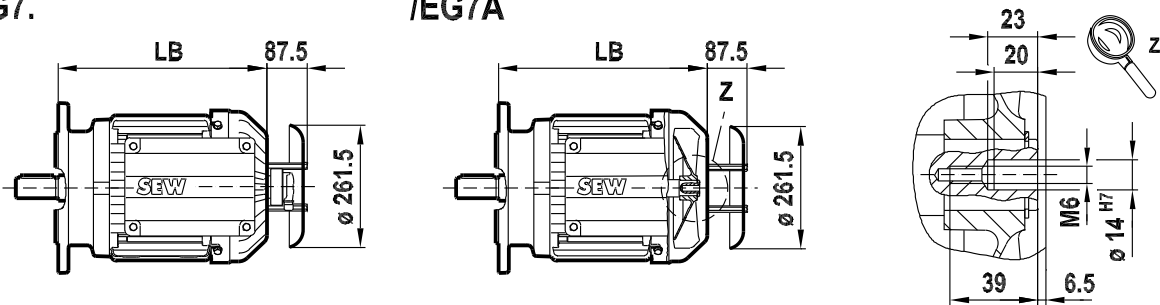
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FF265D300

/FI.. (B3)



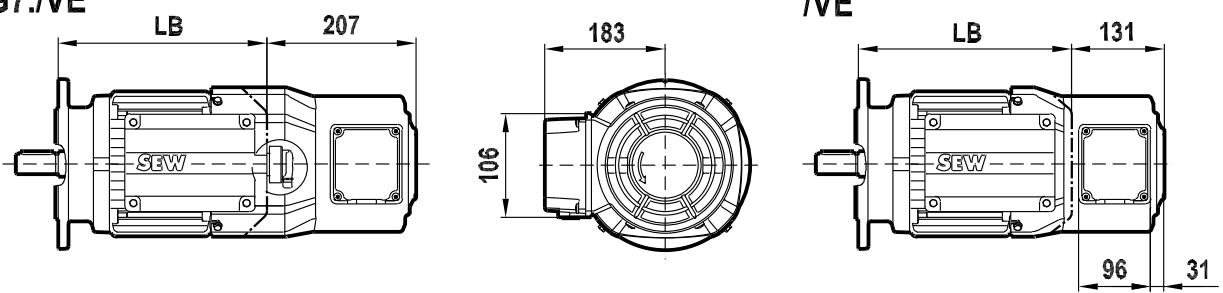
/EG7.

/EG7A



/EG7./VE

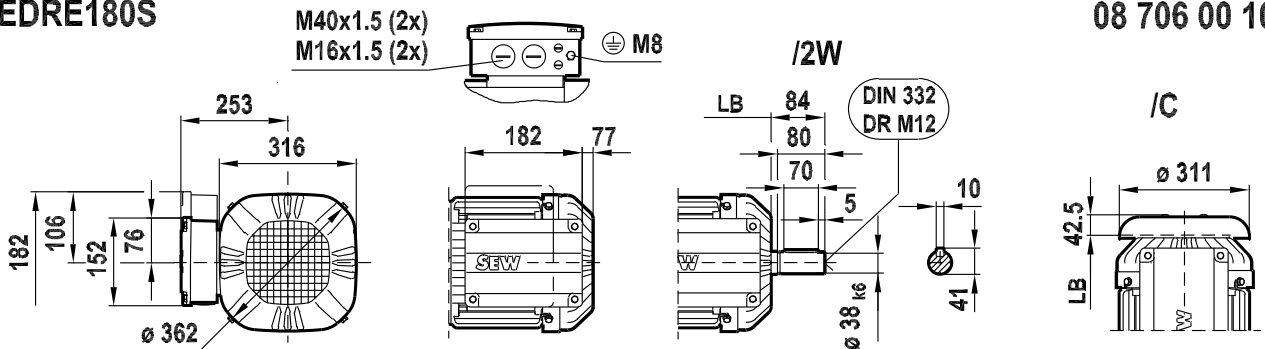
/VE





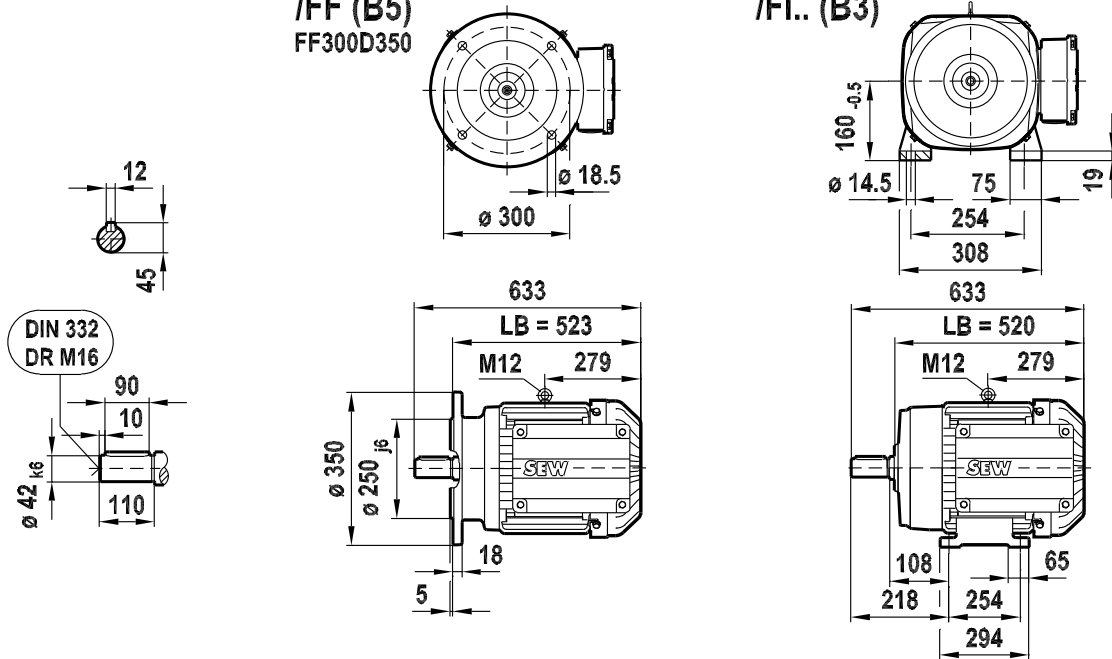
**EDRE180S**

08 706 00 10



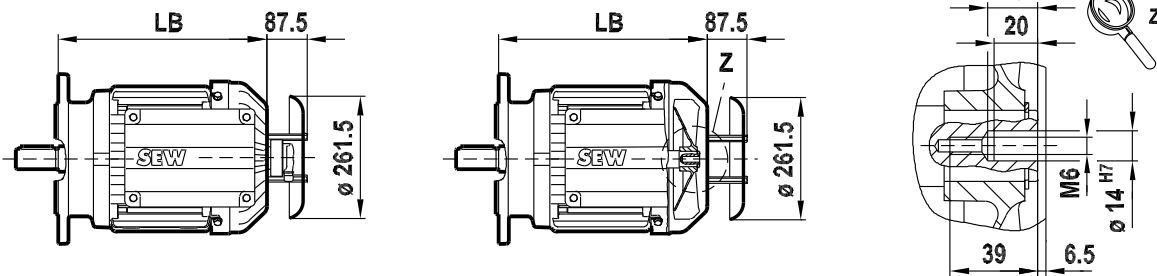
**/FF (B5)**  
FF300D350

**/FI.. (B3)**



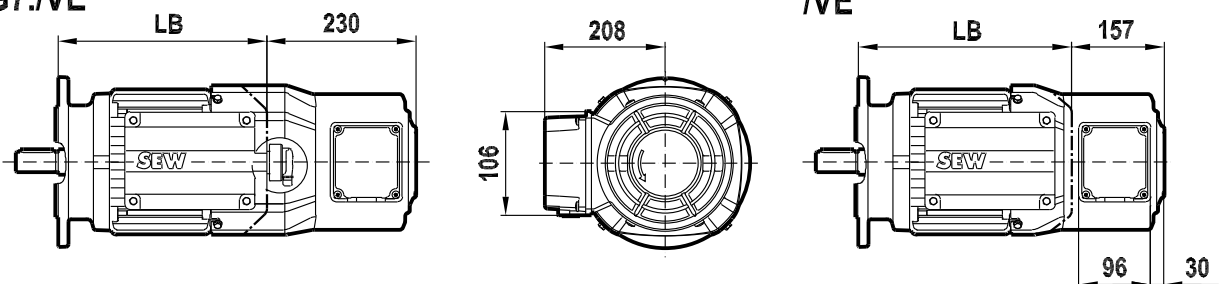
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**/EG7A**



**/EG7./VE**

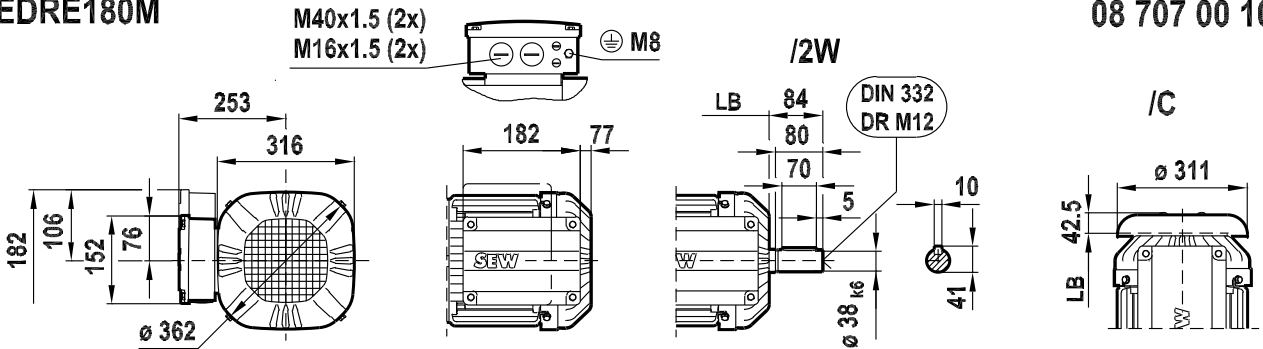
**/VE**





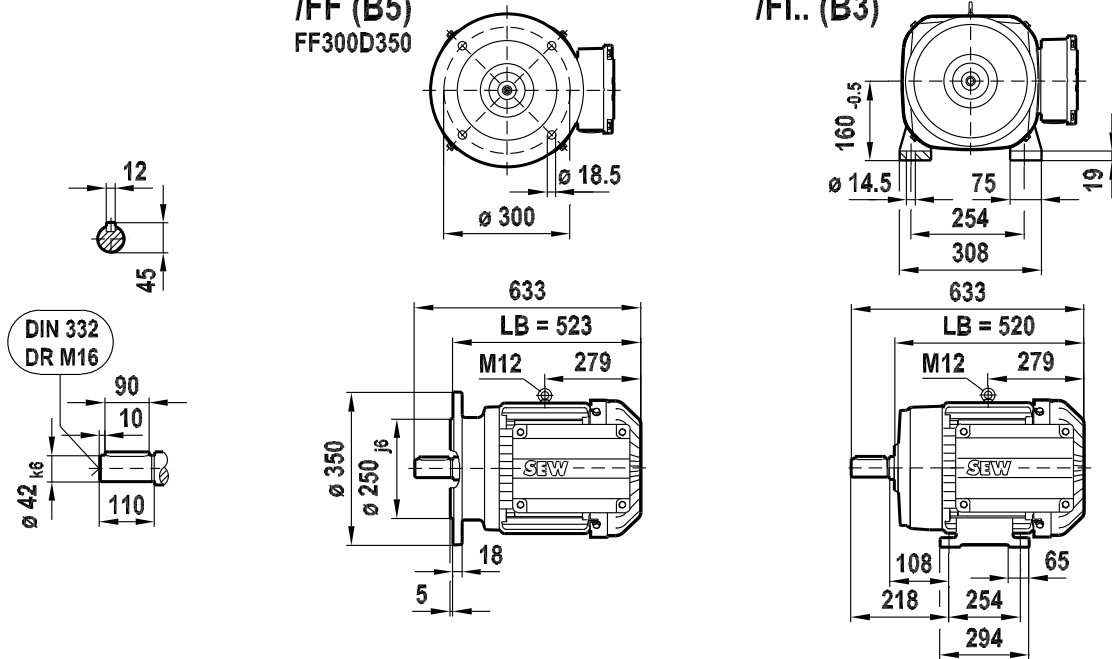
**EDRE180M**

08 707 00 10



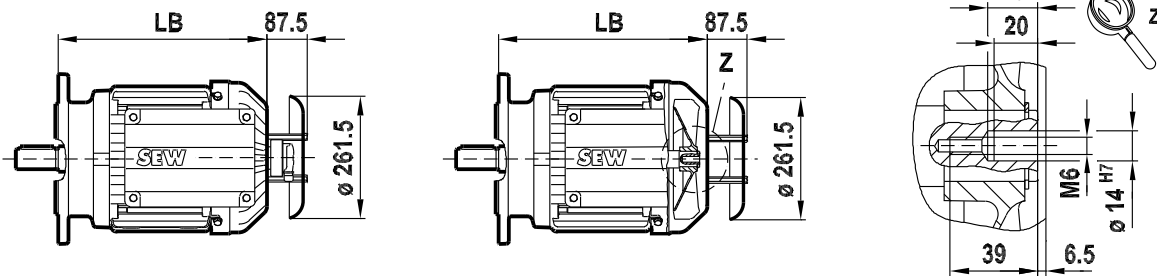
**/FF (B5)**  
FF300D350

**/FI.. (B3)**



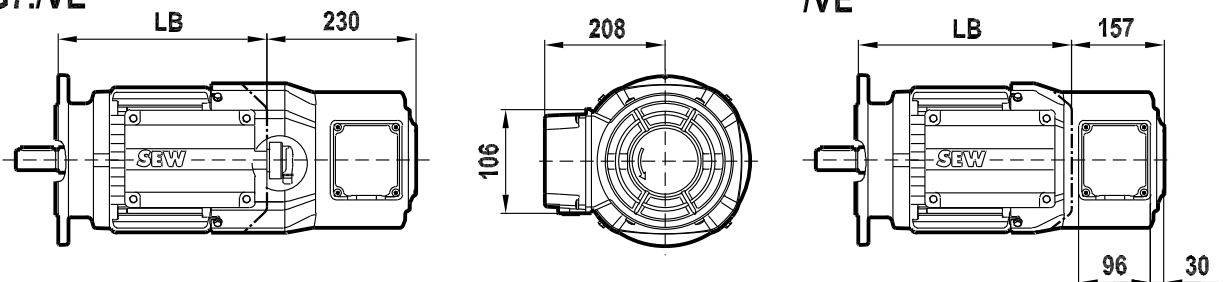
**/EG7.**

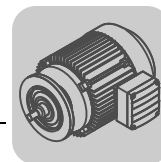
**/EG7A**



**/EG7./VE**

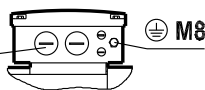
**/VE**



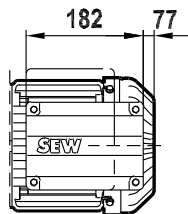
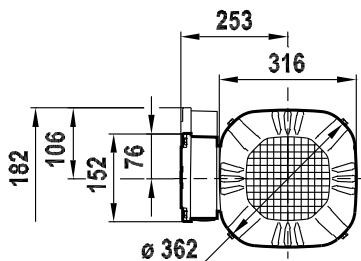


**EDRE180L**

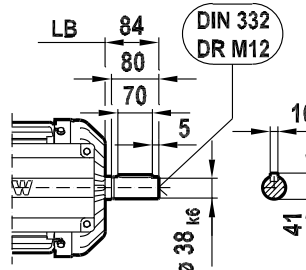
M40x1.5 (2x)  
M16x1.5 (2x)



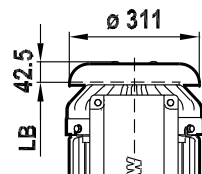
08 708 00 10



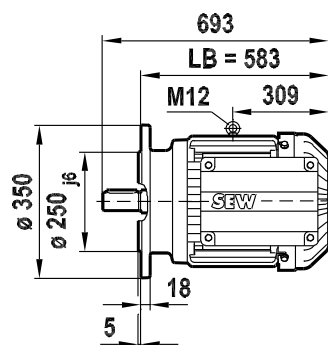
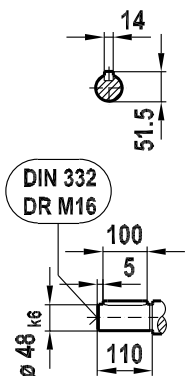
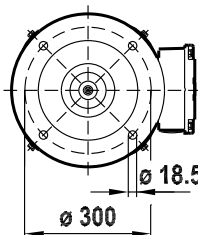
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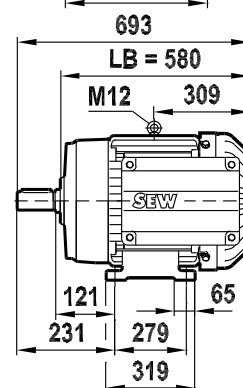
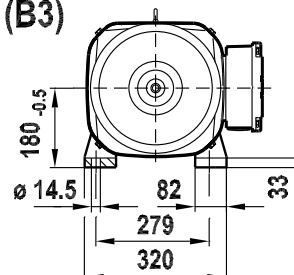
/C



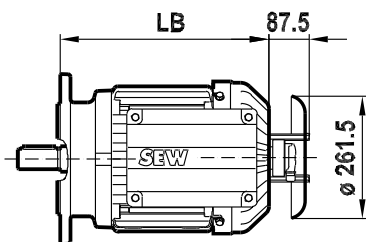
/FF (B5)  
FF300D350



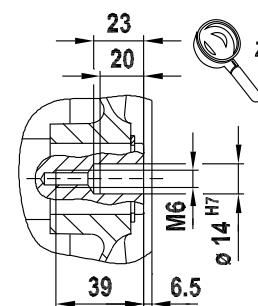
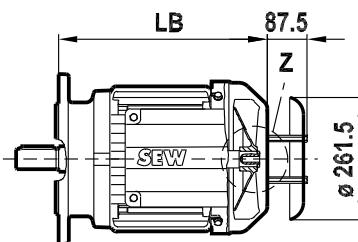
/FI.. (B3)



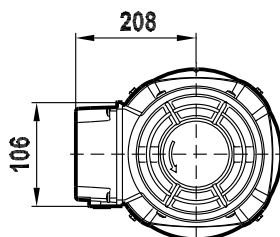
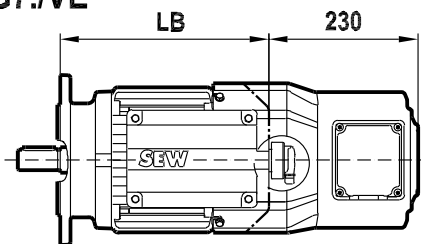
**/EG7.**



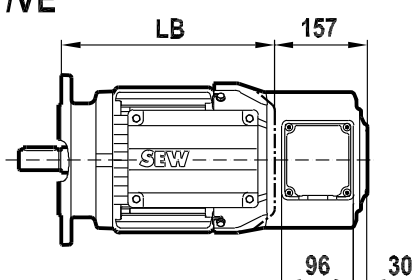
**/EG7A**



**/EG7./VE**

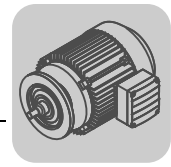


**/VE**

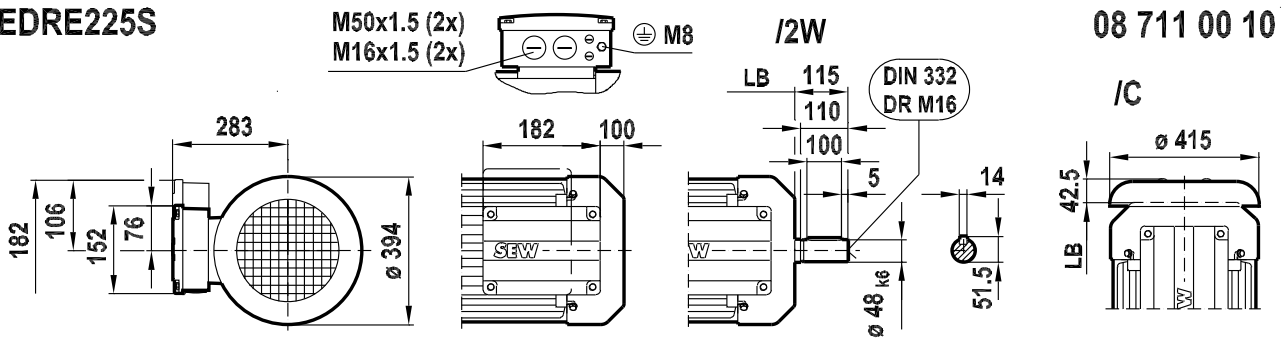




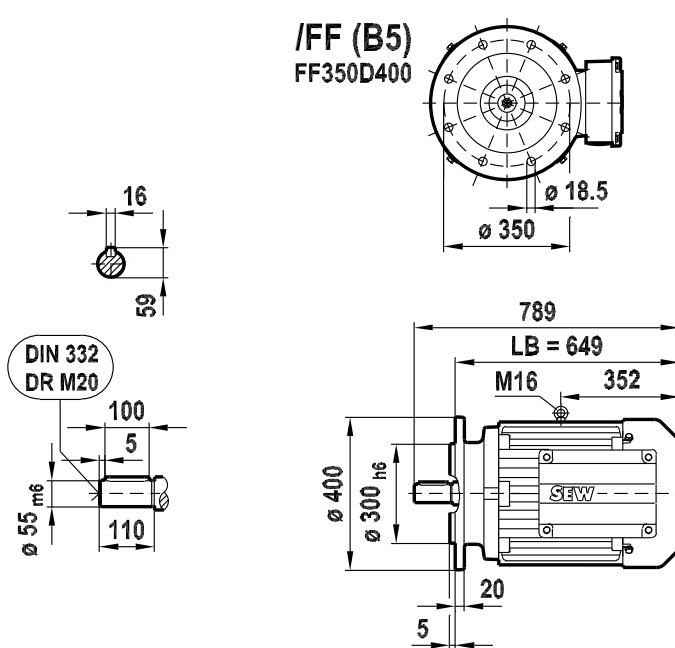




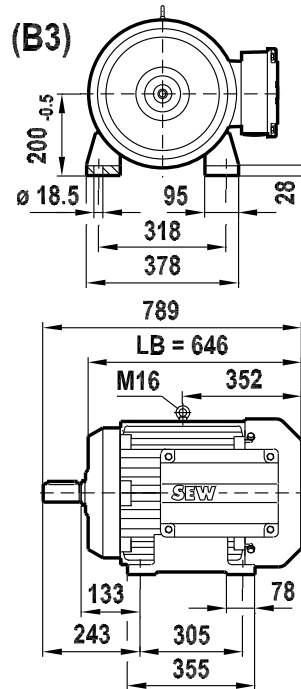
**EDRE225S**



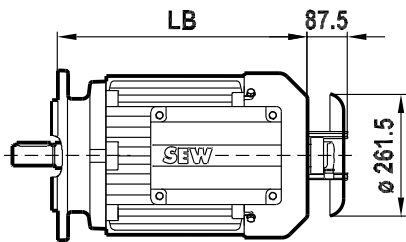
**/FF (B5)**  
FF350D400



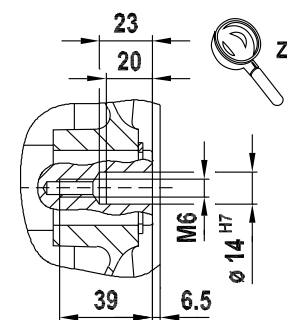
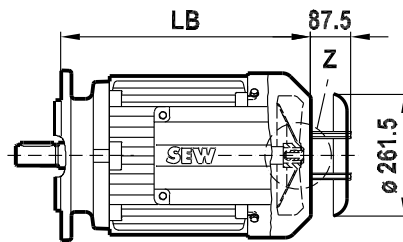
**/Fl.. (B3)**



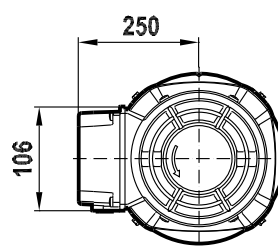
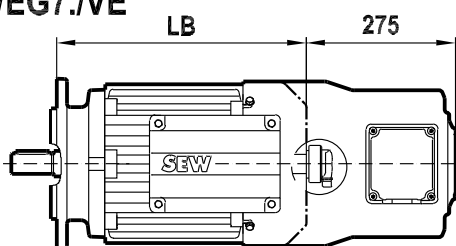
**/EG7.**



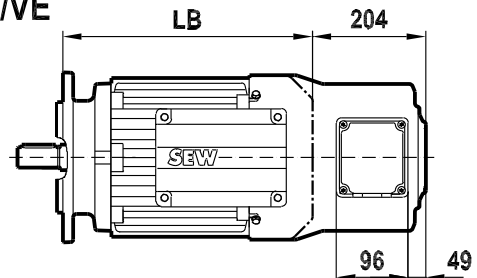
**/EG7A**



**/EG7./VE**

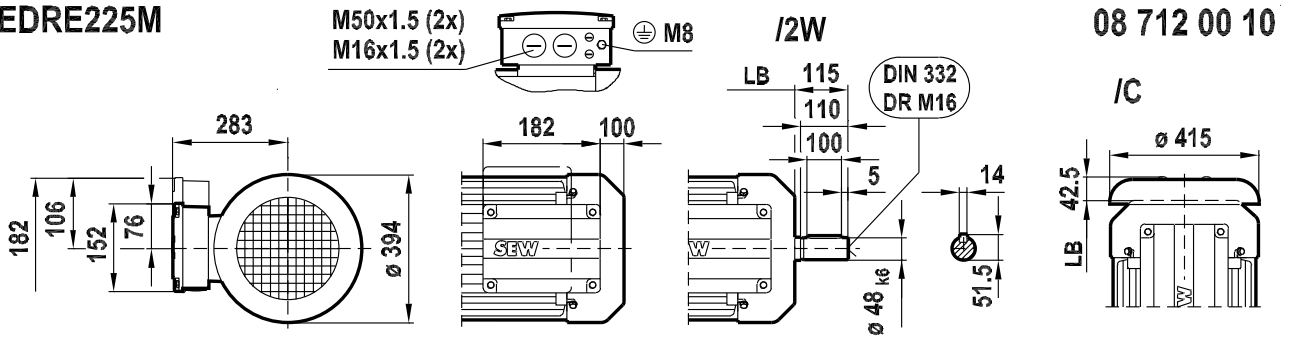


**/VE**

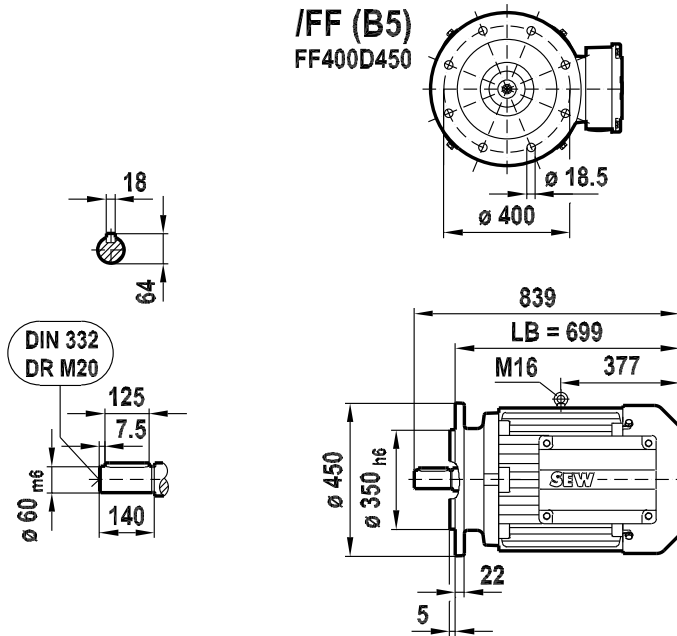




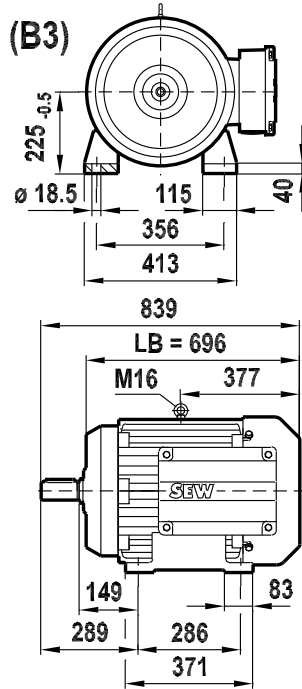
**EDRE225M**



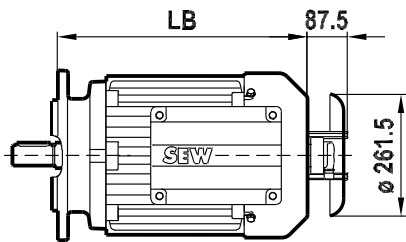
**/FF (B5)**  
FF400D450



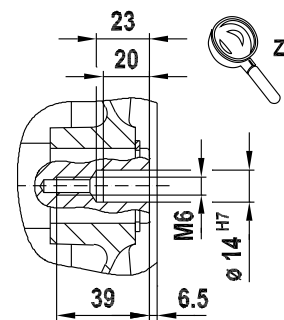
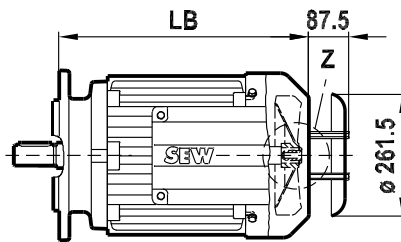
**/Fl.. (B3)**



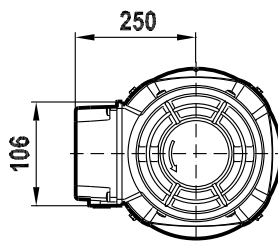
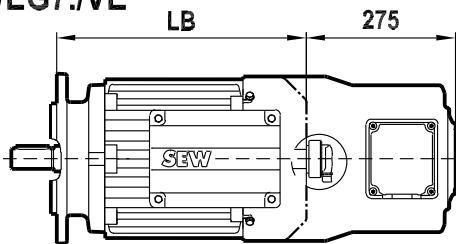
**/EG7.**



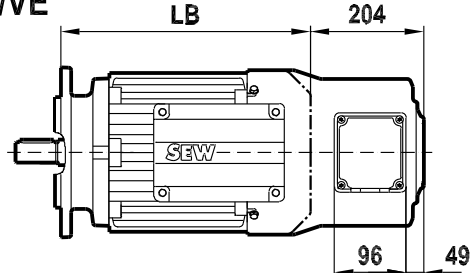
**/EG7A**



**/EG7./VE**



**/VE**





## 8 Encoder

### 8.1 Product description

#### Type designation

/ES7 + letter for the electrical interface

/EG7 + letter for the electrical interface

/EV7 + letter for the electrical interface

/AS7 + letter for the electrical interface

/AG7 + letter for the electrical interface

/AV7 + letter for the electrical interface

#### Description

These encoder types are mounted on the B end of the motor or brakemotor (shaft-centered). The encoder housings are supported by the fan guard.

- Encoders ES7. and AS7. are **shaft-centered with spread shaft**.
- Encoders EG7. and AG7. are **shaft-centered with plug-in shaft and end thread**. They are available a reinforced design compared to ES7./AS7.
- The variants ES7./AS7. can also be mounted to the DR motors **via coupling and flange hood**. The type designation then changes to EV7./AV7.

For project planning notes and technical data, see page 93 ff.

#### Pin assignment

For the pin assignment of the respective encoder, refer to chapter "Prefabricated cables" in the "AC Motors" catalog.

#### Standardized encoder mounting adapter

Type designation /ES7A or /EG7A

#### Description

The encoder from SEW is not included in the scope of delivery. Only prepared for installation of an encoder. The shaft is predrilled and an additional protective canopy is mounted.

#### Principle of installation:

DR.71 - 132 .../ES7A

The encoder is connected as non-positive connection with the shaft bore using a spread shaft. The torque arm is attached to the fan guard from outside.

Bore with  $\varnothing$  10 mm, H7 fit.

DR.160 - 225 .../EG7A

The encoder with outer thread on the encoder shaft is fastened in the shaft bore (with internal thread). The torque arm is attached to the fan guard from inside.

Bore with  $\varnothing$  14 mm, H7 fit, and additional end thread in M6.

For project planning notes and technical data, see page 99 ff.



#### **Non-SEW encoder mounting**

*Type designation* /XV..

*Description* The non-SEW mounting option enables SEW to mount non-SEW encoders to the motor. The non-standard encoder requested by the customer is installed by SEW.

The encoder can be fixed to the motor shaft via the flange hood. The encoder shaft is connected to the motor shaft via spread shaft coupling.

If the customer wants to mount a non-SEW encoder, the /X\*A mounting attachment must be ordered. The non-SEW encoder must be designed in accordance with the zone definition. Mount and connect the non-SEW encoder according to the operating instructions of the encoder manufacturer.

For project planning notes and technical data, see page 100 ff.

#### **Standardized mechanical interface for the mounting of non-SEW encoders by the customer**

*Type designation* Mounting devices for non-SEW encoders

- /XV0A Any shaft diameter and centering
- /XV1A Shaft diameter 6 mm; centering 50 mm
- /XV2A Shaft diameter 10 mm; centering 50 mm
- /XV3A Shaft diameter 12 mm; centering 80 mm
- /XV4A Shaft diameter 11 mm; centering 85 mm

*Description* The non-SEW mounting option allows non-SEW encoders to be mounted to the motor via a shaft coupling.

The non-SEW encoder itself is not installed yet, only the mechanical interface is installed for mounting the encoder.

The encoder shaft is connected to the motor shaft via a coupling.

For project planning notes and technical data, see page 99 ff.



## 8.2 Project planning, technical data

**Speed sensor** Various encoder types are available as standard for installation in DR. series AC motors. The encoders can be combined with other optional additional features, such as brake and forced cooling fan.

For questions, please contact your contact partner for drives at SEW-EURODRIVE.

**Delivery** The encoder types ES7./EG7./EV7. and AS7./AG7./AV7 can be delivered in two connection variants:

- With connection cover
- Without connection cover

SEW-EURODRIVE recommends the use of prefabricated cables (see chapter 'Prefabricated cables' in the 'AC Motors' catalog). When purchasing the cables from SEW-EURODRIVES, you can order the encoders without a connection cover because this cover is already part of the prefabricated cable.

**Encoder connection** When connecting the encoders to the inverters, always follow the operating instructions for the relevant inverter and the wiring diagrams supplied with the encoders!

- Maximum cable length (inverter - encoder): 100 m for a cable capacitance:
  - < 83 nF/km (core/core) according to DIN VDE 0472 part 504
  - < 110 nF/km (core/shield)
- Core cross section: 0.20 - 0.5 mm<sup>2</sup>
- Use shielded cables with twisted pair conductors and apply the shield over large area on both ends:
  - At the encoder in the cable gland or in the encoder plug
  - To the inverter on the electronics shield clamp or to the housing of the sub D plug
- Install the encoder cables separately from the power cables, maintaining a distance of at least 200 mm.
- Encoder with cable gland: Observe the permitted diameter of the encoder cable to ensure that the cable gland functions correctly.

For the pin assignment of the respective encoder, refer to chapter "Prefabricated cables" in the "AC Motors" catalog.



### Absolute encoder overview

Electrical interface

RS-485 + 1 V<sub>SS</sub>

Sin/Cos

Designation	for motor size	Encoder type	Mounting type	Specification [Periods/revolution]	Supply voltage [V]
AS7W	71 - 132	Absolute encoder (multi-turn)	Shaft centered	2048	DC 7 - 30
AG7W	160 - 225		Coupling		
AV7W	71 - 225				

Electrical interface

MSSI + 1 V<sub>SS</sub>

Sin/Cos

Designation	for motor size	Encoder type	Mounting type	Specification [Periods/revolution]	Supply voltage [V]
AS7Y	71 - 132	Absolute encoder SSI® (multi-turn)	Shaft centered	2048	DC 7 - 30
AG7Y	160 - 225		Coupling		
AV7Y	71 - 225				

### Speed sensor overview

Electrical interface

1 V<sub>SS</sub> Sin/Cos

Designation	for motor size	Encoder type	Mounting type	Specification [Periods/revolution]	Supply voltage [V]
ES7S	71 - 132	Speed sensor	Shaft centered	1024	DC 7 - 30
EG7S	160 - 225		Coupling		
EV7S	71 - 225				DC 7 - 30

Electrical interface

TTL (RS-422)

Designation	for motor size	Encoder type	Mounting type	Specification [Periods/revolution]	Supply voltage [V]
ES7R	71 - 132	Speed sensor	Shaft centered	1024	DC 7 - 30
EG7R	160 - 225		Coupling		
EV7R	71 - 225				

Electrical interface

HTL

Designation	for motor size	Encoder type	Mounting type	Specification [Periods/revolution]	Supply voltage [V]
ES7C	71 - 132	Speed sensor	Shaft centered	1024	DC 4.75 - 30
EG7C	160 - 225		Coupling		
EV7C	71 - 225				



### Technical data of absolute encoders

M-SSI + sin/cos



60602AXX

Encoder For motor size DR.	AS7Y 71 - 132	AG7Y 160 - 225
Mounting type	Shaft centered	
Supply voltage $V_B$ [V]	DC 7 - 30	
Max. current consumption $I_{in}$ [mA]	140	
Output amplitude [V]	1	
Signal output	Sine / cosine	
Output current per track $I_{out}$ [mA]	10	
Max. pulse frequency $f_{max}$ [kHz]	200	
Periods per revolution A, B C	2048 - -	
Phase angle A: B	$90^\circ \pm 3^\circ$	
Absolute encoder scanning code	Gray code	
Resolution Single-turn Multi-turn	8196 increments / revolution 4096 revolutions	
Data transfer of absolute value	Synchronous, serial (SSI)	
Serial data output	Driver according to EIA RS-485	
Serial clock input	Optocoupler, recommended driver to EIA RS-485	
Clock rate [kHz]	Permitted range: 100 - 2000 (max. 100 m cable length with 300 kHz)	
Clock-pulse space period [ms]	12 - 30	
Vibration resistance [10 Hz - 2 kHz] [ $m/s^2$ ]	$\leq 100$ (EN 60088-2-6)	$\leq 200$ (EN 60088-2-6)
Shock resistance [ $m/s^2$ ]	$\leq 1000$ (EN 60088-2-27)	$\leq 2000$ (EN 60088-2-27)
Maximum speed $n_{max}$ [rpm]	6000	
Ambient temperature [ $^\circ C$ ]	-20 to +60 (EN 60721-3-3, class 3K3)	
Degree of protection	IP66 (EN 60529)	
Connection	Terminal strip in pluggable connection cover	
Clamping range of the cable gland [mm]	$\varnothing$ 5 - 10	
Additional weight [kg]	1.15	1.45
Category	/3GD IIIC	

For a product description, see page 91.



RS-485 + sin/cos



60602AXX

Encoder	AS7W	AG7W
For motor size DR.	71 - 132	160 - 225
Mounting type	Shaft centered	
Supply voltage $V_B$ [V]	DC 7 - 30	
Max. current consumption $I_{in}$ [mA]	150	
Output amplitude [V]	1	
Signal output	Sine / cosine	
Output current per track $I_{out}$ [mA]	10	
Max. pulse frequency $f_{max}$ [kHz]	200	
Periods per revolution	A, B	2048
	C	-
Phase angle A: B	$90^\circ \pm 3^\circ$	
Absolute encoder scanning code	Binary code	
Resolution	8192 increments / revolution	
Single-turn	4096 revolutions	
Multi-turn		
Data transfer of absolute value	Asynchronous, serial (RS-485)	
Serial data output	Driver according to EIA RS-485	
Serial clock input	Optocoupler, recommended driver to EIA RS-485	
Data memory	1792 bytes	
Vibration resistance [10 Hz - 2 kHz] [ $m/s^2$ ]	$\leq 100$ (EN 60088-2-6)	$\leq 200$ (EN 60088-2-6)
Shock resistance [ $m/s^2$ ]	$\leq 1000$ (EN 60088-2-27)	$\leq 2000$ (EN 60088-2-27)
Maximum speed $n_{max}$ [rpm]	6000	
Ambient temperature [ $^\circ C$ ]	-20 to +60 (EN 60721-3-3, class 3K3)	
Degree of protection	IP66 (EN 60529)	
Connection	Terminal strip in pluggable connection cover	
Clamping range of the cable gland[mm]	$\varnothing$ 5 - 10	
Additional weight [kg]	1.15	1.45
Category	/3GD IIIC	

For a product description, see page 91.





**Technical data of incremental encoders**

Sin/cos



60602AXX

Encoder For motor size DR.	ES7S 71 - 132	EG7S 160 - 225
Mounting type	Shaft centered	
Supply voltage $V_B$ [V]	DC 7- 30	
Max. current consumption $I_{in}$ [mA]	140	
Output amplitude per track $V_{high}$ [V <sub>SS</sub> ] $V_{low}$ [V <sub>SS</sub> ]	1	
Signal output	Sine / cosine	
Output current per track $I_{out}$ [mA]	10	
Max. pulse frequency $f_{max}$ [kHz]	150	
Pulses (sine cycles) per revolution A, B C	1024 1	
Phase angle A: B	90° ±3°	
Data memory	1920	
Vibration resistance [m/s <sup>2</sup> ] (10 Hz - 2000 Hz)	≤ 100 (EN 60068-2-6)	
Shock resistance [m/s <sup>2</sup> ]	≤ 1000 (EN 60068-2-27)	≤ 2000 (EN 60068-2-27)
Maximum speed $n_{max}$ [min <sup>-1</sup> ]	6000	
Ambient temperature [°C]	-30 to +60 (EN 60721-3-3, class 3K3)	
Degree of protection	IP66 (EN 60529)	
Connection	Terminal strip in pluggable connection cover	
Clamping range of the cable gland [mm]	Ø 5 - 10	
Additional weight [kg]	1.1	1.4
Category	/3GD IIIC	

For a product description, see page 91.



TTL (RS-422)



60602AXX

Encoder For motor size DR.	ES7R 71 - 132	EG7R 160 - 225
Mounting type	Shaft centered	
Supply voltage $V_B$ [V]	DC 7 - 30	
Max. current consumption $I_{in}$ [mA]	160	
Output amplitude $V_{high}$ [V] $V_{low}$ [V]	$\geq 2.5$ $\leq 0.5$	
Signal output	TTL (RS-422)	
Output current per track $I_{out}$ [mA]	25	
Max. pulse frequency $f_{max}$ [kHz]	150	
Periods per revolution A, B C	1024 1	
Mark space ratio	1 : 1 $\pm$ 10 %	
Phase angle A: B	90° $\pm$ 20°	
Vibration resistance [10 Hz - 2 kHz] [m/s <sup>2</sup> ]	$\leq 100$ (EN 60088-2-6)	$\leq 200$ (EN 60088-2-6)
Shock resistance [m/s <sup>2</sup> ]	$\leq 1000$ (EN 60088-2-27)	$\leq 2000$ (EN 60088-2-27)
Maximum speed $n_{max}$ [rpm]	6000	
Ambient temperature [°C]	-20 to +60 (EN 60721-3-3, class 3K3)	
Degree of protection	IP66 (EN 60529)	
Connection	Terminal strip in pluggable connection cover	
Clamping range of the cable gland [mm]	$\varnothing$ 5 - 10	
Additional weight [kg]	1.1	1.4
Category	/3GD III C	

For a product description, see page 91.



**Encoder mounting adapter**

On request, DR motors can be equipped with various encoder mounting adapters for mounting customer-specific encoders from different manufacturers.

These encoders are usually attached to the synchro flange using 3 encoder mounting clamps (bolts with eccentric disks).

**The encoder is not included in the scope of delivery of SEW-EURODRIVE** but is purchased and installed by the customer itself.

For a product description, see page 91.

**Technical data of encoder mounting adapters**

For encoders from  
SEW-EURO-  
DRIVE

Encoder mounting adapter For motor size DR.	ES7A 71 - 132	EG7A 160 - 225
Mounting type of encoder	Shaft centered	
Motor shaft type	10 mm bore	14 mm bore with M6 end thread
Suitable for encoder	ES7S ES7R AS7Y AS7W	EG7S EG7R AG7Y AG7W

For a product description, see page 91.

For the motor dimension sheets, refer to page 73 ff.

For encoders pro-  
vided by customer

AC motor with encoder mounting adapter and forced cooling fan:



60599AXX

Encoder mounting adapter For motor size DR.	XV0A	XV1A	XV2A	XV3A	XV4A
	71 - 225				
Mounting type of encoder	Flange centered with coupling				
Variant shaft	Encoder	6 mm	10 mm	12 mm	11 mm
	Centering	Any	50 mm	50 mm	80 mm
Suitable for encoder	Provided by the customer or by SEW-EURODRIVE on behalf of the customer.				

For a product description, see page 92.

Please request the necessary dimension sheets, if required.

***Mounting of non-SEW encoders***

All mounting adapters described above are available if the customer wants SEW-EURODRIVE to install a customer-specific encoder.

The encoder is usually provided by the customer. The non-SEW encoder must be designed in accordance with the zone definition.

SEW-EURODRIVE can also provide the encoder if the customer submits an exact specification.

For questions, please contact your contact partner for drives at SEW-EURODRIVE.

For a product description, see page 92.



## 9 Additional Features

### 9.1 Motor protection

For general project planning notes on switching and protection devices for DR motors, see page 29.

Take the information of that chapter into account for your selection.

#### **Thermal motor protection with PTC resistor – 2G, 2GD, 3GD**

Type designation /TF

**Description** Thermal motor protection prevents the motor from overheating and consequently from being damaged. The TF is a triplet thermistor. There is one TF in each motor phase. The TF is designed for thermal class 130 (B) or 155 (F). It consists of a resistor whose resistance increases with rising temperature.


/TF

The PTC thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with  $V \geq 2.5 \text{ V}$  or  $I < 1 \text{ mA}$ ):

- Standard measured values: 20 - 500  $\Omega$
- Hot resistance: > 4000  $\Omega$

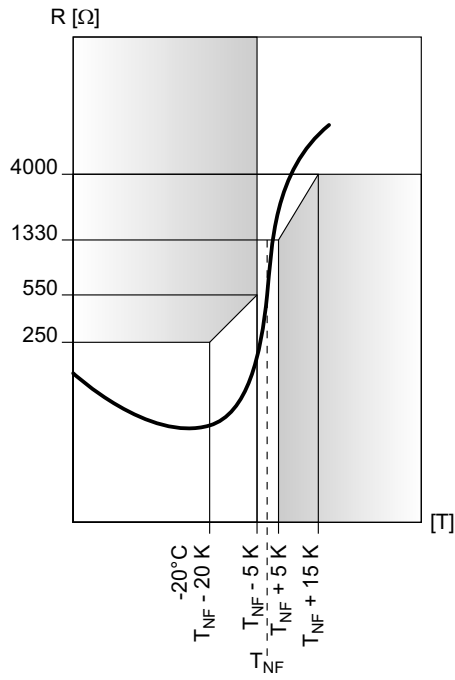
When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, a thermal protection function must be triggered immediately.

	<b>INFORMATION</b>
	The temperature sensor TF may not be subjected to voltages > 30 V.



**Additional Features**  
Motor protection

Below figure shows the characteristic curve of the TF with reference to the rated response temperature (referred to as  $T_{NF}$ ).



62590axx



**Thermal motor information with KTY84 - 130 – 2G, 2GD, 3GD**

Type designation /KY

Description This type detects the motor temperature continuously using a semi-conductor sensor for further processing in the inverter / controller.

The option with a KTY does not replace the standard motor protection using TF and TH.

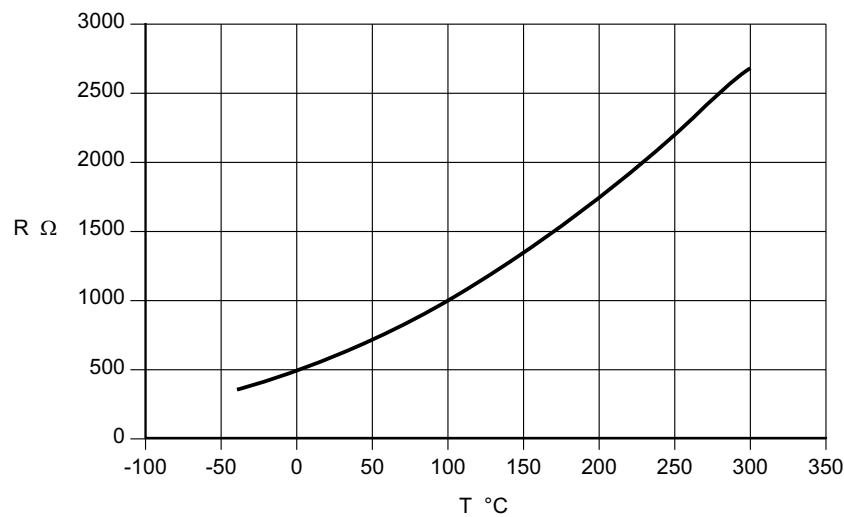
The inverter + /KY option can only take on the function of motor protection when it is used in combination with an inverter containing the thermal motor model.

/KY

The temperature sensor KTY84 - 130 continuously detects the motor temperature.

Technical data	KTY84 - 130
Connection	Red (+) Blue (-)
Total resistance at 20 - 25 °C	540 Ω < R < 640 Ω
Test current	< 3 mA

Typical characteristic curve of KTY:



63578axx



#### Thermal motor information with PT100 – 2GD, 3GD

Type designation /PT

#### Description

This type detects the motor temperature continuously using a linear platinum sensor for further processing in the inverter / controller.

Unlike the KTY semiconductor sensor, the platinum sensor has an almost linear characteristic curve and is more accurate.

The variant with a /PT does not replace the standard motor protection using /TF and /TH.

The inverter + /PT option can only take on the function of motor protection when it is used in combination with an inverter containing the thermal motor model.

The following is installed:

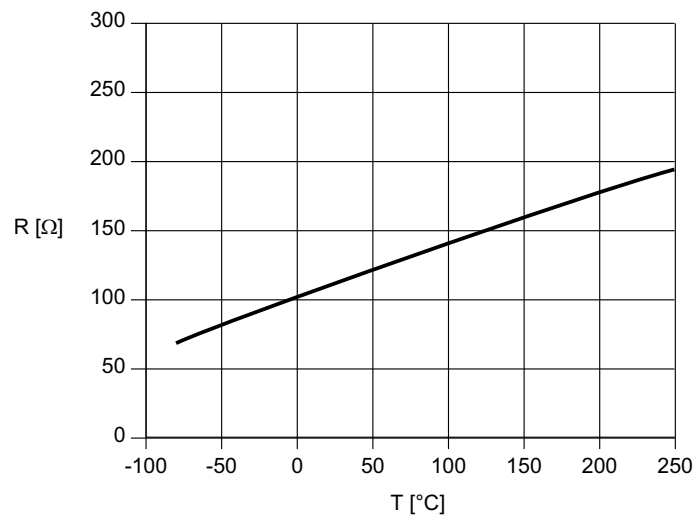
- 1 sensor per stator stack
- 3 sensors per stator stack (one per phase)

#### /PT

The temperature sensor PT100 continuously detects the motor temperature. One or three PT100 sensors are used depending on the requirements.

Technical data	PT100
Connection	Red/white
Resistance at 20 - 25 °C per PT100	107 Ω < R < 110 Ω
Test current	< 3 mA

Characteristic curve of PT100:



63692axx





## 9.2 Other connection options

### Terminal strip with cage clamp (standard)

Type designation /KCC

Description In this additional feature, the conventional way of connection to the bolts of the terminal board is replaced by a terminal strip.

Star or delta connection is implemented by one jumper for star connection and three jumpers for delta connection in the middle of the terminal strip. The 4 jumpers are included in the scope of delivery.

In a brakemotor<sup>1)</sup>, additional terminal strips can be used optionally to connect the brake.

/KCC

In addition to the only connection option of the motor, 6 times winding + 1 PE, two options are available when connecting brakemotors.

1. Seven terminal strips, 6 times winding + 1 PE. The brake is connected directly, not via the terminal strip.
2. Ten terminal strips, 6 times winding + 1 PE and additionally three terminals for the brake, prewired in the terminal box to the SEW rectifier, or only the terminal strip for supplying the BE brake by a rectifier in the control cabinet.

The auxiliary terminals, for example for thermal motor protection, are basically connected separately and not via the terminal strip.

### Technical data for terminal strip with cage clamps

/KCC

The KCC terminal strip is included in the standard scope of delivery. Terminal boards are available with anti-rotation protection as option.

Terminal strip	KCC
For motor sizes	71 - 132
Number of terminals	6 + PE (motor)
Contact connection	Cage clamp
Core cross section (max.)	4 mm <sup>2</sup> rigid 4 mm <sup>2</sup> flexible 2.5 mm <sup>2</sup> with conductor end sleeve
Connection	1 × star jumper or 3 × delta jumper in the middle of the terminal strip
Max. voltage [V]	AC 500
Max. load [A <sub>eff</sub> ]	Terminal: 17 Jumper: 17
Power range [kW]	Up to 9.2
Degree of protection	According to motor IP54 Optional IP55 – IP66
Ambient temperature °C	-40 to +60

1) Brake in preparation



### 9.3 Ventilation

#### Forced cooling fan – 3GD

Type designation /VE

#### Description

A forced cooling fan is installed in order to ensure motor cooling independent of the motor speed. This means the motor can permanently deliver the full rated torque at small speeds without the risk that the motor will overheat.

The cooling effect is at least equivalent with self-ventilation.

The metal cover of the forced cooling fan has the DR typical octagonal shape instead of the cylindrical shape. The length of the forced cooling fan guard varies depending on the motor options, such as brake or encoder. This also applies to the punched grooves, for example in the case of manual brake release.

#### Combination with encoders

The forced cooling fan VE can be combined with all encoders described in chapter 'Additional feature – Encoder' on page 91.

Please take into account that the overall drive might become longer.

#### Forced cooling fan – technical data

/VE AC motor 3 ~ 230 V / 400 V

Voltage operating range, IL series								
AC motor 3 ~ 230V / 400V								
Operating mode	Size	Motor type	Fan diameter	Voltage range		Max. permitted current (A)	Max. power consumption (W)	Max. permitted ambient temperature
				50 Hz	60 Hz			
1 ~ Δ (Δ)	63	B202-2	118	230 - 277	230 - 277	0,12	32	60
	71	B202-2	132	230 - 277	230 - 277	0,12	33	60
	80	B202-2	150	230 - 277	230 - 277	0,14	37	60
	90	B312-2	169	230 - 277	230 - 277	0,29	65	60
	100	B312-2	187	230 - 277	230 - 277	0,30	75	60
	112	B312-2	210	230 - 277	230 - 277	0,37	94	60
	132	C352-2	250	230 - 277	230 - 277	0,57	149	60
	132	C354-2	250	230 - 277	230 - 277	0,28	67	60
	160 - 200	C604-2	300	230 - 277	230 - 277	0,45	112	60
3 ~ Δ	63	B202-2	118	346 - 525	380 - 575	0,06	28	60
	71	B202-2	132	346 - 525	380 - 575	0,06	31	60
	80	B202-2	156	346 - 525	380 - 575	0,06	34	60
	90	B312-2	169	346 - 525	380 - 575	0,20	91	60
	100	B312-2	187	346 - 525	380 - 575	0,19	91	60
	112	B312-2	210	346 - 525	380 - 575	0,19	103	60
	132	C352-2	250	346 - 525	380 - 575	0,29	148	60

Table continued on next page.



Voltage operating range, IL series								
AC motor 3 ~ 230V / 400V								
3 ~ Δ	132	C354-2	250	346 - 525	380 - 575	0,20	81	60
	160 - 200	C604-2	300	346 - 525	380 - 575	0,32	118	60
	204-249	D48 4-2	375	346 - 525	380 - 575	0,41	262	60
	250-450	F504-2	470	346 - 525	380 - 575	0,80	505	60
3 ~ Δ	63	B202-2	118	220 - 303	220 - 332	0,11	28	60
	71	B202-2	132	220 - 303	220 - 332	0,11	31	60
	80	B202-2	156	220 - 303	220 - 332	0,10	34	60
	90	B312-2	169	220 - 303	220 - 332	0,37	91	60
	100	B312-2	187	220 - 303	220 - 332	0,35	91	60
	112	B312-2	210	220 - 303	220 - 332	0,34	103	60
	132	C352-2	250	220 - 303	220 - 332	0,50	148	60
	132	C354-2	250	220 - 303	220 - 332	0,35	81	60
	160 - 200	C604-2	300	220 - 303	220 - 332	0,56	118	60
	204-249	D48 4-2	375	220 - 400	220 - 400	0,96	285	50
	250-450	F504-2	470	220 - 400	220 - 400	1,64	540	60

With reference endshield on B-side

### Metal fan – GD

Type designation /AL

Description The metal fan is used instead of the PVC fan if the expected ambient temperature exceeds +40 °C or drops below -20 °C.

It is set as standard for explosion-proof motors of category 3 (/3GD).

For motors of category 2 (/2G), the metal fan can be selected as an option.

### Technical data for metal fan

/AL Mass moments of inertia of the metal fan:

Motor	J <sub>AL</sub> [10 <sup>-4</sup> kgm <sup>2</sup> ]	J <sub>mot</sub> [10 <sup>-4</sup> kgm <sup>2</sup> ]	J <sub>PA</sub> [10 <sup>-4</sup> kgm <sup>2</sup> ]	J <sub>Mot</sub> + J <sub>AL</sub> [10 <sup>-4</sup> kgm <sup>2</sup> ]	Ratio [%]	Mass m <sub>AL</sub> [kg]
EDR.71S	2.69	4.9	0.33	7.26	148	0.18
EDR.71M		7.1		9.46	133	
EDR.80S	4.50	14.9	0.97	18.4	124	0.25
EDR.80M		21.4		24.9	117	
EDR.90M	6.97	35.4	1.32	41	116	0.32
EDR.90L		43.7		49.3	113	
EDR.100M		56		61.6	110	
EDR.100LC		89.8		95.4	106	
EDR.112M	15.5	146	5.55	161.5	110	0.48
EDR.132S		190		205.5	108	
EDR.132M		255		270.5	106	
EDR.160S	61.2	370	5.97	431	116	0.96
EDR.160M		450		511.2	114	

Table continued on next page.



Motor	$J_{AL}$ [ $10^{-4}$ kgm <sup>2</sup> ]	$J_{mot}$ [ $10^{-4}$ kgm <sup>2</sup> ]	$J_{PA}$ [ $10^{-4}$ kgm <sup>2</sup> ]	$J_{Mot} + J_{AL}$ [ $10^{-4}$ kgm <sup>2</sup> ]	Ratio [%]	Mass $m_{AL}$ [kg]
EDR.180M	117	1110	16.27	1227	111	1.5
EDR.180L		1300		1417	109	
EDR.200L	121	2360	16.85	2481	105	1.56
EDR.225S		2930		3051	104	
EDR.225M		3430		3551	104	

The bigger the motor size, the less influencing the aluminum fan becomes.

### Canopy – 2G, 2GD, 3GD

Type designation /C

#### Description

The canopy is used to prevent the ingress of foreign particles into the fan guard. It is particularly used for vertical mounting positions.

The protection canopy can be retrofitted to the fan guards.

The PVC elements are made of conductive PVC. This means they are also permitted for use in explosion-proof drives because they do not cause static charge in the protection canopy.

/C

Liquids and/or solid foreign objects can penetrate the air outlet openings of motors in a vertical mounting position with their input shaft pointing downwards. SEW-EURODRIVE offers the motor option protection canopy C for this purpose.

Motors in vertical mounting position (e.g. M4/V1) are equipped with a canopy /C as standard.

On request, the motor can be delivered without canopy. In this case, you have to install a cover when you install the drive in the plant/machine in order to prevent objects from falling into the drive. Observe the requirements according to EN / IEC 60079-0 and EN / IEC 60079-7. This cover must not obstruct the cooling air supply.

#### Technical data for protection canopy

/C

For additional lengths due to the canopy, refer to the motor dimension sheets on page 73 ff.



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## 9.4 Other additional features

### Backstop – 3 GD

Type designation /RS

Description A backstop is used to block/preclude a direction of rotation of the motor. The blocking direction is defined as looking onto the fan guard.

*Specification of blocking direction:*

CW (Clockwise)

CCW (Counterclockwise)

The backstop is installed instead of the brake.

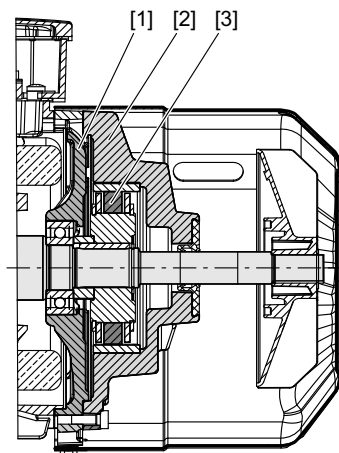
The locking torque reaches at least double the maximum motor torque,

Similar to the installation principle of the brake (integrated or premounted on a friction disk), the backstop can also be installed in different ways:

/RS

The mechanical backstop is used for protecting equipment against reverse movement when the motor is switched off.

The figure below shows the design of the RS backstop.



- 1 Brake endshield
- 2 RS housing
- 3 Sprag ring

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**Note:** Specify the direction of rotation for the motor or gearmotor in your order.



## Additional Features

### Other additional features

#### Technical data for backstop

/RS

The RS backstop operates maintenance-free above the lift-off speed. Please consult SEW-EURODRIVE for operation below lift-off speed.

Motor sizes	Rated locking torque [Nm]	Lift-off speed of sprags [rpm]	Ambient temperature
71	95	890	-40 °C to +60 °C
80	130	860	
90 / 100	370	750	
112 / 132	490	730	
160	700	700	
180	1400	610	
200 / 225	2500	400	



## 10 AC Motors eDR63, DV.250 / 280

### 10.1 Technical data for protection type nA, category II3GD (zone 2 and 22)

1500 rpm II3GD Ex nA IIT3/T120 °C (for types with thermal class F: T 140 °C)

Motor type	P <sub>N</sub> kW	n <sub>N</sub> 1/min	M <sub>N</sub> Nm	I <sub>N</sub> 400 V A	cosφ	η <sub>75%</sub> η <sub>100%</sub> %	I <sub>A</sub> /I <sub>N</sub>	M <sub>A</sub> /M <sub>N</sub> M <sub>H</sub> /M <sub>N</sub>	J <sub>mot</sub> 10 <sup>-4</sup> kgm <sup>2</sup>	m kg
DR63S4 <sup>1)</sup>	0.12	1380	0.83	0.39	0.69	-	3.3	2.4 2.2	3.6	6.1
DR63M4	0.18	1320	1.30	0.55	0.78	-	2.9	1.8 1.7	3.6	6.1
DR63L4	0.25	1300	1.83	0.68	0.81	-	2.8	1.8 1.7	4.4	6.7
DVE250M4	55	1475	356	102	0.83	94.0 93.8	6.0	2.7 2.0	6300	448
DVE280S4	75	1480	483	142	0.81	94.2 94.4	7.2	3.2 2.2	8925	520

1) Motors with lower rated power available on request

1000 rpm - S1 II3GD Ex nA IIT3/T120 °C (for types in thermal class F: T 140 °C)

Motor type	P <sub>N</sub> kW	n <sub>N</sub> 1/min	I <sub>N</sub> 400 V A	cosφ	I <sub>A</sub> /I <sub>N</sub>	M <sub>A</sub> /M <sub>N</sub> M <sub>H</sub> /M <sub>N</sub>	J <sub>mot</sub> 10 <sup>-4</sup> kgm <sup>2</sup>	m kg
DR63S6 <sup>1)</sup>	0.09	900	0.38	0.64	2.2	1.8 1.6	5.4	6.0
DR63M6	0.12	900	0.58	0.65	2.1	1.8 1.7	5.4	6.0
DR63L6	0.18	870	0.78	0.70	2.2	1.6 1.5	5.4	6.6

1) Motors with lower rated power available on request

### 10.2 Technical data for protection type e, category II2G (zone 1)

1500 rpm - S1 II2G Ex e IIT3/T120 °C (for types in thermal class F: T 140 °C)

Motor type	P <sub>N</sub> kW	n <sub>N</sub> 1/min	I <sub>N</sub> 219-241 V A	I <sub>N</sub> 380-420 V A	cosφ	I <sub>A</sub> /I <sub>N</sub>	M <sub>A</sub> /M <sub>N</sub> M <sub>H</sub> /M <sub>N</sub>	J <sub>mot</sub> 10 <sup>-4</sup> kgm <sup>2</sup>	m kg	t <sub>E</sub> 2
eDR63S4 <sup>1)</sup>	0.12	1380	0.71	0.71	0.7	3.4	2.4 2.1	3.6	6.1	60
eDR63M4	0.18	1335	1.03	1.03	0.75	3.1	2 1.7	3.6	6.1	40
eDR63L4	0.25	1315	1.3	1.3	0.8	3.2	1.9 1.6	4.4	6.7	30

1) Motors with lower rated power available on request



### 10.3 Motors for frequency inverter operation

Inverter drives with variable speeds can also be operated in potentially explosive atmospheres. There are basically two different variants:

- Motor in the potentially explosive atmosphere – frequency inverter outside the potentially explosive atmosphere in the control cabinet
- Motor in the potentially explosive atmosphere – frequency inverter in the potentially explosive atmosphere in the motor terminal box

#### **Permitted motor/frequency inverter combinations**

Drives with inverters outside the potentially explosive atmosphere are available in the following categories:

- II2G for use in zone 1:  
Flameproof motors in Ex d design in connection with MOVITRAC® or MOVIDRIVE® inverters.
- II3GD for use in zone 2:  
Non-sparking motors in Ex nA design in connection with MOVITRAC® or MOVIDRIVE® inverters. Use of this frequency inverter type is mandatory. Observe the assignment tables and the restrictions listed below.
- II3GD for use in zone 22:  
Dust-proof motors in connection with MOVITRAC® or MOVIDRIVE® inverters. Use of this frequency inverter type is recommended. Observe the restrictions listed below when using other frequency inverter types.

#### **Category II2GD drives**

Technical data and additional information about these drives are available on request.

#### **Category II3G and II3D drives**

##### *Motor/inverter combination*

- The listed motor/inverter combinations are mandatory for category II3GD motors for use in zone 2 (see EN 60079-15).
- The listed motor/frequency inverter combinations are recommended for category II3GD motors for use in zone 22. If you want to operate category II3GD motors in zone 22 on other frequency inverters, the maximum speeds/frequencies and the thermal torque limiting characteristic curves must also be observed. In addition, we strongly recommend to use a frequency inverter matching the respective power.





<i>Winding type</i>	<p>Two voltage types are permitted for operation on a frequency inverter:</p> <ul style="list-style-type: none"><li>• Nominal motor voltage 230 V / 400 V</li><li>• Nominal motor voltage 230 V / 400 V, inverter supply 400 V: For operation with a base frequency of 50 Hz, the motor must be in star connection; for a base frequency of 87 Hz, it must be in delta connection.</li><li>• Nominal motor voltage 400 V / 690 V, inverter supply 400 V: Operation only possible with a base frequency of 50 Hz. The motor must be in delta connection.</li></ul> <p>Due to the higher thermal load, only motors with temperature class F winding must be used in frequency inverter operation.</p>
<i>Temperature class and surface temperature</i>	<p>II3GD motors are labeled for temperature class T3 and a maximum surface temperature of 140 °C (other surface temperatures on request).</p>
<i>Protection against excessive temperature</i>	<p>Only motors that are equipped with a positive temperature coefficient thermistor (TF) are permitted for operation on a frequency inverter to ensure that the permitted limit temperature is not exceeded. The positive temperature coefficient thermistor has to be evaluated using an appropriate PTC thermistor trip switch.</p> <p>The temperature sensor must be evaluated with a suitable evaluation unit.</p>
<i>Supply voltage of the frequency inverter</i>	<p>The supply voltage of the frequency inverter must be within the range specified by the manufacturer without dropping below the minimum rated motor voltage.</p> <p>The supply voltage at the frequency inverter input must not exceed 500 V.</p>
<i>EMC measures</i>	<p>The following options are permitted:</p> <ul style="list-style-type: none"><li>• Line filters of the NF type for frequency inverters of the MOVITRAC® series</li><li>• Line filters of the NF... type for frequency inverters of the MOVIDRIVE® series</li><li>• Output chokes of the HD.. type for frequency inverters of the MOVITRAC® and MOVIDRIVE® series.</li></ul>
<i>Maximum permitted torques</i>	<p>Motors operated with a frequency inverter must not exceed the maximum torques (thermal torque limiting characteristic curves) specified in this section. The values may be exceeded for brief periods if the effective operating point lies below the characteristic curve.</p>



## AC Motors eDR63, DV.250 / 280

### Motors for frequency inverter operation

#### Maximum permitted speeds/frequencies

Observe the maximum speeds/frequencies listed in the assignment tables for the motor/frequency inverter combinations. These values must not be exceeded.

#### Group drives

Group drive means that several motors are connected to one frequency inverter output. Motors of the DR/DT/DV series in category II3GD for operation in zone 2 may generally not be operated as group drive!

The following restrictions apply to operation in zone 22:

- The line lengths specified by the frequency inverter manufacturer must not be exceeded
- The motors in a group must not be more than two power ratings apart.

#### Gear unit

From the perspective of the gear unit, restrictions apply to the maximum input speed when using controlled gearmotors. Consult SEW-EURODRIVE for gear unit speeds above 50 Hz (4-pole).

#### Motor/inverter assignment: **MOVIDRIVE®** and **MOVITRAC®**

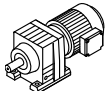
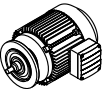
Motor type II3GD	Motor connection $\lambda$		Motor connection $\Delta$	
	P <sub>FI</sub> [kW]	n <sub>max</sub> [rpm]	P <sub>FI</sub> [kW]	n <sub>max</sub> [rpm]
DR63S4	0,25 <sup>1)</sup>	2100	0,25 <sup>1)</sup>	3600
DR63M4	0,25 <sup>1)</sup>	2100	0,25 <sup>1)</sup>	3600
DR63L4	0,25 <sup>1)</sup>	2100	0,37 <sup>1)</sup>	3600
DVE250M4	55	2100	110	2500
DVE280S4	75	2100	132	2500

1) MOVITRAC® B only

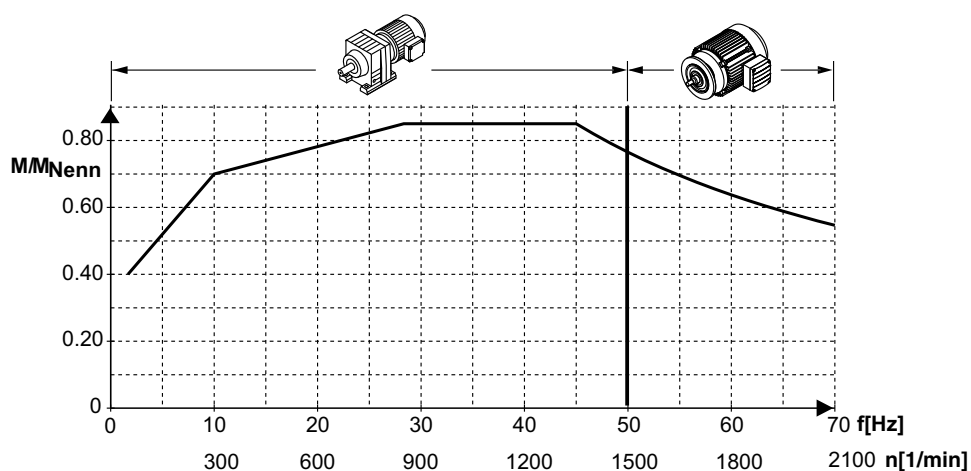


**Thermal torque limit curves**

The following table shows the symbols used in the torque limit characteristic curves and what they mean:

Symbol	Meaning
	0 ≤ n ≤ 1500 rpm: Characteristic curve for gearmotors Gearmotor selection from the selection tables categories II3D and II3G
	When n > 1500 rpm: Characteristic curve only applies to motors without gear unit. <b>Contact SEW-EURODRIVE regarding gearmotors!</b>

Thermal torque limit curve for inverter operation of 4-pole AC motors and AC brakemotors with a base frequency of 50 Hz (duty type S1, 100 % cdf):

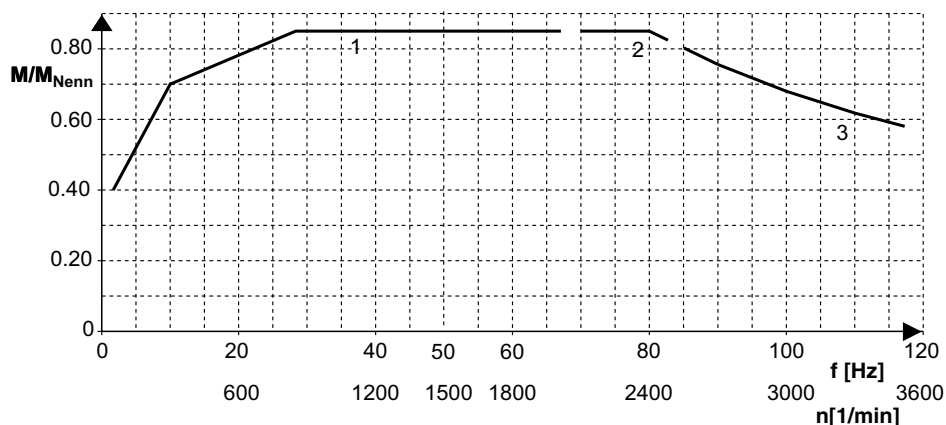


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Figure 1: Thermal torque limit curve for frequency inverter operation

Thermal torque limit characteristic curve in inverter operation for 4-pole AC motors and AC brake motors with a base frequency of 87 Hz:

- 1 = duty type S1, 100 % cdf up to size 280
- 2 = duty type S1, 100 % cdf up to size 225
- 3 = duty type S1, 100 % cdf up to size 180

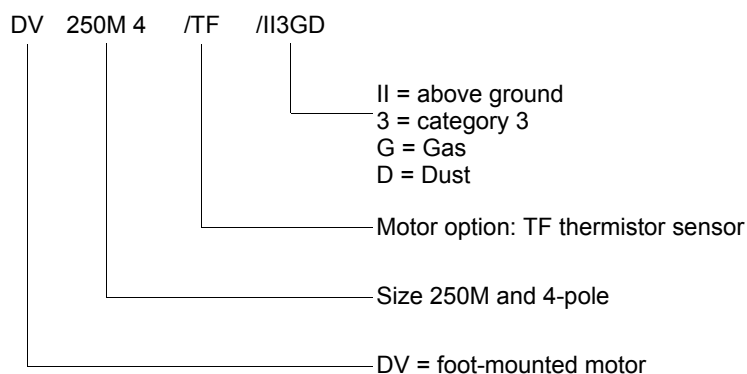


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### 10.4 Type designation of AC (brake)motors

#### Examples



### 10.5 Available motor options

#### Overview

The following motor options are available in various combinations:

- Backstop RS
- Protection canopy C
- Encoder on request
- Encoder mounting adapters on request
- TF temperature sensor



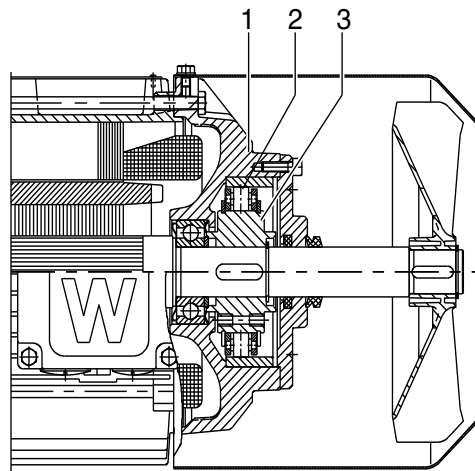
Not all options are always available for a specific equipment category!



## 10.6 Backstop RS and canopy C

### Backstop RS

The mechanical backstop RS is used for protecting equipment against reverse movement when the motor is switched off.



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Figure 2: Design of the RS backstop

- 1 B-side endshield
- 2 Wedge element train
- 3 Driver



Specify the direction of rotation for the motor or gearmotor when placing your order. CW rotation means the output shaft rotates clockwise as viewed onto its face end and is blocked to prevent it from turning counterclockwise. CCW vice versa accordingly.

### Technical data RS backstop

#### Backstop RS

Motor type	Rated locking torque [Nm]	Lift-off speed of sprags [rpm]	Ambient temperature
DV/DVE250 - DV/DVE280../RS	2600	400	-20 °C to +40 °C


**Canopy C**

All explosion-proof AC motors and AC brake motors in a vertical mounting position with their output shaft pointing downwards come equipped with protection cowl C.



Figure 3: AC brakemotor with protection cowl C

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## 10.7 Motor protection

Selecting the correct protection device is a significant factor in determining the operational reliability of the motor. A distinction is made between protection devices that are current-dependent and those that depend on the motor temperature. Current-dependent protection devices include fuses or motor circuit breakers. Temperature dependent protection devices are PTC thermistors or bimetallic switches (thermostats) in the winding. PTC thermistors or bimetallic switches respond when the maximum permitted winding temperature is reached. Their advantage is that temperatures are measured where they actually occur.

**Motor circuit breakers**

Motor circuit breakers offer adequate protection against overload in standard operation with a low switching frequency, brief start-ups and starting currents that are not excessive. The motor circuit breaker is set to the rated motor current.

**PTC thermistor**

Three positive temperature coefficient (PTC) thermistors **TF** (PTC, characteristic curve according to DIN 44080) are connected in series in the motor and connected from the terminal box to a trip switch in the control cabinet. Motor protection with positive temperature coefficient (PTC) thermistors TF provide comprehensive protection against thermal overload. Motors protected in this way can be used for high inertia starting, switching and braking operation (note the certificate/approval for the corresponding operating mode!). A motor circuit breaker is usually installed in addition to the TF. SEW-EURODRIVE recommends always using motors equipped with TF for frequency inverter operation.

**Bimetallic switch**

Three bimetallic switches **TH**, connected in series in the motor, are looped directly into the motor monitoring circuit from the terminal box.



**Fuses**

Fuses do not protect the motor from overload. Their only purpose is short-circuit protection.

The following tables show the qualification of the various protection devices for different causes of tripping.

○ = No thermal protection ◐ = Limited motor protection (requires verification) ● = Thermal protection is given	Temperature sensor (TF)	Motor protection switch
Continuous operation at the load limit, slight overload permanently present (max. 200 % I <sub>N</sub> )	●	●
Heavy start	●	◐
Blocked motor	◐	◐
Switching operation (number of cycles too high)	●	○
Phase failure	●	●
Voltage and frequency deviation	●	●
Forced cooling fan failure	●	○

**Safe switching of inductances**

- Switching of low-speed motor windings.  
If the cable is installed unfavorably, switching of motor windings with a high number of poles can generate voltage peaks. Voltage peaks can damage windings and contacts. To avoid this, connect the cables using varistors outside the potentially explosive atmosphere.
- Switching of brake coils.  
Varistors must be used to avoid harmful switching overvoltages caused by switching operations in the DC circuit of disk brakes.  
Brake control systems from SEW-EURODRIVE are equipped with varistors as standard. Only use contactors with contacts in **utilization category AC3 to EN 60947-4-1** for switching brake coils.
- Suppressor circuit on the switching devices.  
According to EN 60204 (Electrical Equipment of Machines), motor windings must be equipped with interference suppression to protect the numerical or programmable logic controllers. Because problems are primarily caused by switching operations, we recommend installing suppressor circuits on the switching devices.
- Always adhere to the information given in the "Explosion-Proof AC Motors" operating instructions.



#### 10.8 Standards and regulations

##### **Conformance to standards**

AC motors and AC brakemotors from SEW-EURODRIVE conform to the relevant standards and regulations, in particular:

- IEC 60034-1, EN 60034-1  
Rotating electrical machines, rating and performance.
- EN 60529  
IP degrees of protection provided by enclosures of electrical equipment.
- IEC 60072  
Dimensions and performance of rotating electrical machines.
- EN 50262  
Metric threads of cable glands.
- EN 50347  
Standardized dimensions and power ranges.
- DIN 42925  
Terminal box cable entries for AC motors.
- DIN 44080  
Thermistors; PTC, technical terms and tests.
- EN 60079-0  
Electrical equipment for potentially explosive atmospheres, general provisions.
- EN 60079-7  
Increased safety "e"
- EN 60079-15  
Protection type "n"
- EN 61241-1  
Electrical equipment for use in atmospheres containing combustible dust.

##### **Energy-efficient motors only available in category 3**

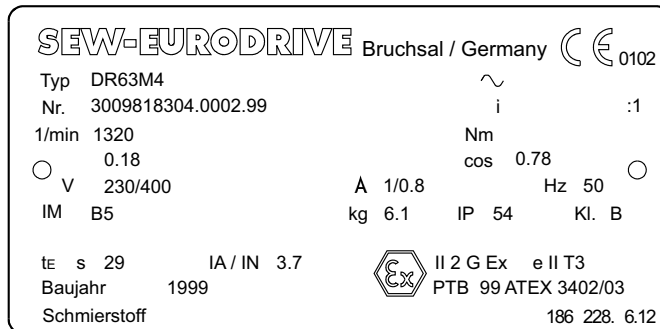
CEMEP, the association of European electric motor manufacturers, has reached an agreement with the European Commission's General Directorate for Energy that all 2 and 4-pole low-voltage AC motors from 1 to 100 kW will be classified on the basis of their efficiency, and that this classification will be identified on the nameplate and in catalogs. The classification distinguishes between EFF3, EFF2 and EFF1 classes. EFF2 indicates improved efficiency motors and EFF1 is for high efficiency motors.





**Rated data**

The specific data of an asynchronous AC motor (AC squirrel-cage motor) are its size, rated power, cyclic duration factor, rated speed, rated current, rated voltage, power factor  $\cos\phi$ , degree of protection, thermal classification and efficiency category. This data is given on the nameplate of the motor. In accordance with IEC 60034 (EN 60034), the nameplate data apply to a maximum ambient temperature of 40°C and a maximum altitude of 1000 m above sea level.



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Figure 4: Motor nameplate

**Tolerances**

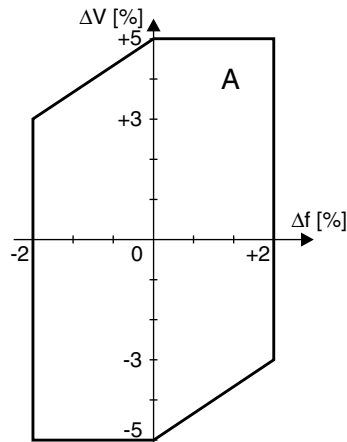
According to IEC 60034 (EN 60034), the following tolerances are permitted for electric motors (also applies to the rated voltage range):

Voltage and frequency		Tolerance A
Efficiency $\eta$	$P_N \leq 50 \text{ kW}$ $P_N > 50 \text{ kW}$	$-0,15 \cdot (1-\eta)$ $-0,1 \cdot (1-\eta)$
Power factor $\cos \phi$		$-\frac{1 - \cos\phi}{6}$
Slip	$P_N < 1 \text{ kW}$ $P_N \geq 1 \text{ kW}$	$\pm 30 \%$ $\pm 20 \%$
Starting current		+20 %
Tightening torque		-15 % to +25 %
Breakdown torque		-10 %
Mass moment of inertia		$\pm 10 \%$


**Tolerance A**

Tolerance A describes the permitted range within which the frequency and voltage are allowed to deviate from their respective rated points. The origin identified with "0" indicates the respective rated points for frequency and voltage.

Motors for operation in systems with higher voltage fluctuations are available on request.



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Figure 5: Range of tolerance A

**Undervoltage**

It is not possible to achieve the values in the catalog such as power, torque and speed in the event of undervoltage due to weak supply systems or an underdimensioned motor cable. This is particularly true for motor startup where the starting current amounts to a multiple of the rated current.

## 10.9 EMC measures

**EMC measures**

SEW-EURODRIVE AC motors and AC brake motors are components for installation in machinery and systems. The designer of the machine or system is responsible for complying with the EMC Directive 89/336/EEC. Please refer to the publication 'Drive Engineering - Practical Implementation, EMC in Drive Engineering' for detailed information about this topic.

**Supply system operation**

SEW-EURODRIVE AC (brake) motors satisfy the EMC generic standards EN 50081 and EN 50082 when used in accordance with their designated use in continuous supply system operation.

**Switching operation**

For switching operation of the motor, take suitable measures for suppressing interference from the switchgear.

**Frequency inverter operation**

Please refer to the installation and EMC instructions provided by the inverter manufacturer regarding frequency inverter operation. Also note the following points:

**Brakemotors on the frequency inverter**

Install the brake cables of brakemotors separately from the other power cables, maintaining a distance of at least 200 mm. Joint installation is only permitted if either the brake cable or the power cable is shielded.



*Tachometer connection on the frequency inverter*

Observe the following instructions when connecting the tachometer:

- Use a shielded cable with twisted pair conductors only.
- Connect the shield to the PE potential on both ends over a large surface area.
- Install signal cables separately from power cables or brake cables (min. distance 200 mm).

*Positive temperature coefficient (PTC) thermistor TF connection on the frequency inverter*

Install the connecting lead of the positive temperature coefficient (PTC) thermistor TF separately from other power cables, maintaining a distance of at least 200 mm. Collective installation is only permitted if either the TF cable or the power cable is shielded.

### 10.10 Electrical characteristics

**Suitable for frequency inverter operation**

AC (brake)motors in category 3 can be operated on the frequency inverter because of the high-quality insulation installed as standard (using phase separators, amongst other features). Observe the permitted motor/frequency inverter combinations.

**Frequency**

SEW-EURODRIVE AC motors are designed for a line frequency of 50 Hz or 60 Hz on request. As standard, the technical data for AC motors refer to a line frequency of 50 Hz. 60 Hz variants in category 2 are not continuously available.

**Motor voltage**

AC motors are available for rated voltages from 220 – 690 V. Pole-changing motors of sizes 71 – 90 only from 220 to 500 V.

*For 50 Hz power supply*

The **standards voltages** are:

Motors	Motor size	
	63	250, 280
	<b>Motor voltage</b>	
Single-speed	230/400 V <sub>AC</sub> Δ/W 290/500 V <sub>AC</sub> Δ/λ	230/400 V <sub>AC</sub> Δ/λ 290/500 V <sub>AC</sub> Δ/λ 400/690 V <sub>AC</sub> Δ/λ 500 V <sub>AC</sub> Δ
	<b>Brake voltage</b>	
Standard voltages	24 V <sub>DC</sub> / 230 V <sub>AC</sub> / 400 V <sub>AC</sub>	

Motors and brakes for 230/400 V<sub>AC</sub> and motors for 690 V<sub>AC</sub> may also be operated on supply systems with a rated voltage of 220/380 V<sub>AC</sub> or 660 V<sub>AC</sub> respectively. In this case, the voltage-dependent data will change slightly.

*Standard connections 50 Hz motors*

Number of poles		Synchronous speed n <sub>syn</sub> at 50 Hz [rpm]	Connection
4	Single-speed	1500	λ / Δ



For 60 Hz power supply

The **standard voltages** are indicated in **bold**:

Motors	Motor size	
	63	250, 280
	<b>Motor voltage</b>	
Single-speed	<b>266/460 V<sub>AC</sub></b> Δ/λ 220/380 V <sub>AC</sub> Δ/λ 330/575 V <sub>AC</sub> Δ/λ	<b>266/460 V<sub>AC</sub></b> Δ/λ 220/380 V <sub>AC</sub> Δ/λ 330/575 V <sub>AC</sub> Δ/λ
	<b>Brake voltage</b>	
Standard voltages	<b>24 V<sub>DC</sub> / 266 V<sub>AC</sub> / 460 V<sub>AC</sub></b>	

Standard connections 60 Hz motors

Number of poles	Synchronous speed $n_{syn}$ at 60 Hz [1/min]	Connection
4	1800	Δ/λ

### 10.11 Thermal characteristics

Thermal classification according to EN 60034-1

For detailed information, refer to page 45.

### 10.12 Permitted operating modes

Motor type and unit category	Protection against impermissibly high temperatures exclusively by	Permitted operating mode
DV.. II3G/II3D	Motor protection switch	<ul style="list-style-type: none"> <li>S1</li> <li>No heavy start</li> </ul>
DV.. DV..BM.. II3G/II3D	Positive temperature coefficient thermistor (TF)	<ul style="list-style-type: none"> <li>S1</li> <li>S4, no-load starting frequency according to catalog data, starting frequency is to be calculated under load</li> <li>Heavy start</li> <li>Frequency inverter operation according to the information in section 5</li> </ul>

### 10.13 Starting frequency

A motor is usually rated according to its thermal loading. In many applications the motor is started only once (S1 = continuous duty = 100 % cdf). The power demand calculated from the load torque of the driven machine is the same as the rated motor power.

**Increased starting frequency**

The maximum permitted starting frequency must be calculated if the operating mode is not continuous duty. This is because the decisive factor for the motor size in this case is not the power demand but the number of motor starts. Frequent starting means the high starting current flows every time, leading to disproportionate heating of the motor. The windings become overheated if the heat absorbed is greater than the heat dissipated by the motor ventilation system. A motor protection switch does not provide adequate protection for the motor against overtemperature if there are more than 30 cycles per hour. The motor then needs to be protected using positive temperature coefficient thermistors (TF).



**No-load starting frequency  $Z_0$**

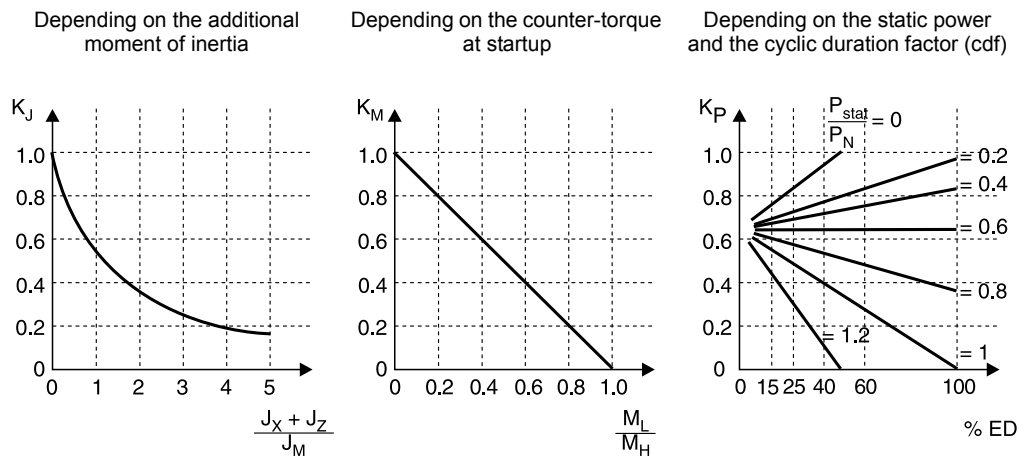
The manufacturer specifies the permitted starting frequency of a motor as the no-load starting frequency  $Z_0$  at 50 % cdf. This value indicates the number of times per hour that the motor can accelerate the mass moment of inertia of its rotor up to speed without counter-torque at 50 % cdf. If an additional mass moment of inertia has to be accelerated or if an additional load torque occurs, the starting time of the motor will increase. Increased current flows during this acceleration time. This means the motor is subjected to increased thermal load and the permitted switching frequency is reduced.

**Permitted starting frequency of the motor**

You can determine the permitted starting frequency  $Z$  of the motor in cycles/hour [1/h] using the following formula:

$$Z = Z_0 \cdot K_J \cdot K_M \cdot K_P$$

You can determine the factors  $K_J$ ,  $K_M$  and  $K_P$  using the following diagrams:



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Figure 6: Dependency of the starting frequency

- |   |  |
|---|--|
| $J_X$ = Total of all external mass moments of inertia in relation to the motor axis | $M_H$ = Acceleration torque of the motor                     |
| $J_Z$ = Mass moment of inertia flywheel fan   | $P_{stat}$ = Power requirement after start-up (static power) |
| $J_M$ = Mass moment of inertia of the motor   | $P_N$ = Rated motor power                                    |
| $M_L$ = Counter-torque during startup   | %cdf = cyclic duration factor                                |

**Example**

Motor: eDT80N4/BC05  
No-load starting frequency  $Z_0 = 3600$  1/h

1.  $(J_X + J_Z) / J_M = 3.5 \rightarrow K_J = 0.2$
2.  $M_L / M_H = 0.6 \rightarrow K_M = 0.4$
3.  $P_{stat} / P_N = 0.6$  and 60 % cdf  $\rightarrow K_P = 0.65$

$$Z = Z_0 \cdot K_J \cdot K_M \cdot K_P = 3600 \text{ c/h} \cdot 0.2 \cdot 0.4 \cdot 0.65 = 187 \text{ c/h}$$

The cycle duration is 20 s, the operating time 11 s.



### 10.14 Mechanical characteristics

For detailed information, refer to page 47.

### 10.15 Overhung loads

The following table lists the permitted overhung loads (top value) and axial forces (bottom value) of AC motors:

Mounting position	n in rpm Number of poles	Permitted overhung load $F_R$ in N Permitted axial load $F_A$ in N; $F_{A\_tension} = F_{A\_compr.}$	
		Size	
		63	250 280
Foot-mounted motor	750 8	-	-
	1000 6	-	-
	1500 4	-	8000 2500
	3000 2	-	-
Flange-mounted motor	750 8	-	-
	1000 6	600 150	-
	1500 4	500 110	9000 2600
	3000 2	400 70	-

#### Overhung load conversion for off-center force application

The permitted overhung loads must be calculated using the following formulae in the event that force is not applied at the center of the shaft end. The smaller of the two values  $F_{xL}$  (according to bearing life) and  $F_{xW}$  (according to shaft strength) is the permitted value for the overhung load at point x. Note that the calculations apply to  $M_{a\ max}$ .

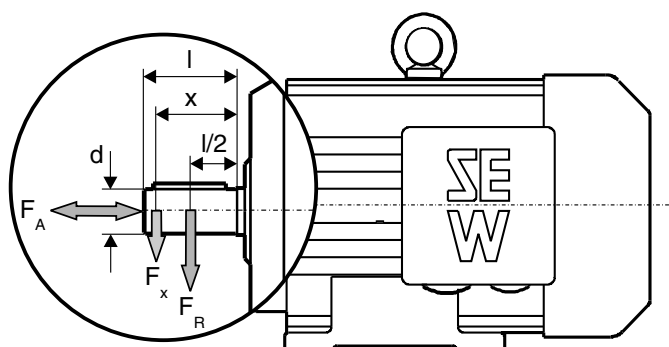
$F_{xL}$  according to bearing service life

$$F_{xL} = F_R \cdot \frac{a}{b + x} \text{ [N]}$$

$F_{xW}$  from the shaft strength

$$F_{xW} = \frac{c}{f + x} \text{ [N]}$$

- $F_R$  = Permitted overhung load ( $x = l/2$ ) [N]
- $x$  = Distance from the shaft shoulder to the force application point [mm]
- $a, b, f$  = Motor constant for overhung load conversion [mm]
- $c$  = Motor constant for overhung load conversion [mm]



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Figure 7: Overhung load  $F_x$  for off-center force application

Motor constants for overhung load conversion

Size	a [mm]	b [mm]	c				f [mm]	d [mm]	l [mm]
			2-pole [Nmm]	4-pole [Nmm]	6-pole [Nmm]	8-pole [Nmm]			
DFR63	161	146	$11.2 \cdot 10^3$	$16.8 \cdot 10^3$	$19 \cdot 10^3$	-	13	14	30
DV250	658	588	-	$630 \cdot 10^3$	-	-	0	65	140
DV280	658	588	-	$630 \cdot 10^3$	-	-	0	75	140

2nd motor shaft end

Contact SEW-EURODRIVE regarding permitted load for 2nd motor shaft end.

Motor bearings used

The following table shows which bearings are used in SEW-EURODRIVE AC (brake) motors:

Motor type	A-side bearing (AC motor, brakemotor)		B-side bearing (Foot- and flange-mounted motors and gearmotors)	
	Gearmotor	Flange- and foot-mounted motors	AC motor	Brakemotor
DR63	6303 2RS J C3	6203 2RS J C3	6202 2RS J C3	-
DV250 - DV280S	6316 2RS J C3		6315 2RS J C3	

Bearing lubrication: Asonic GHY72



### 10.16 Special markets

**V.I.K. (German Association of the Energy and Power Generation Industry)**

The German association of the Energy and Power Generation Industry V.I.K. has published for its members a recommendation for the implementation of technical requirements for AC asynchronous motors.

The drives from SEW-EURODRIVE can be supplied in compliance with these requirements. The following deviations from the standard are taken into account:

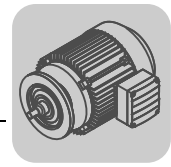
- Motor with enclosure of at least IP55.
- Motor of thermal class F, permitted overtemperature only as in thermal class B.
- Corrosion protection of motor parts.
- Terminal box made of gray cast iron.
- Protection canopy for vertical motor mounting positions with fan guard on top.
- Additional ground connection via external terminal.
- Nameplate with V.I.K. information. A second nameplate on the inside of the terminal box cover.

*Information*

Technical requirements issued by the V.I.K. must be applied analogously to gearmotors, pole-changing motors and motors for high inertia starting, switching operation and speed control. The requirements result in the following necessary deviations:

- Design: The position of the breather valves and the lubricant fill quantities, which depend on the mounting position, means that gearmotors cannot be used in either horizontal or vertical mounting positions.
- Sign: No bores are provided for attaching an additional identification sign.





## **11 Dimension Sheets – DR63, DV250 / 280**

### **11.1 Notes on the dimension sheets for AC motors**

Please observe the following notes regarding the dimension sheets for the AC motors (DT/DV):

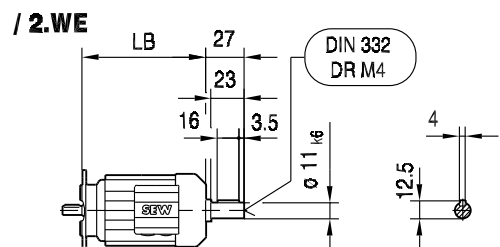
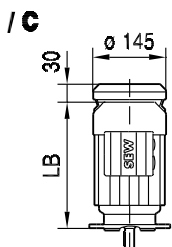
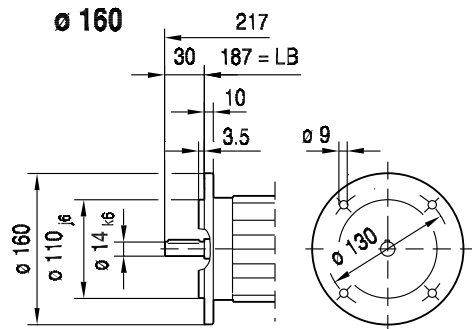
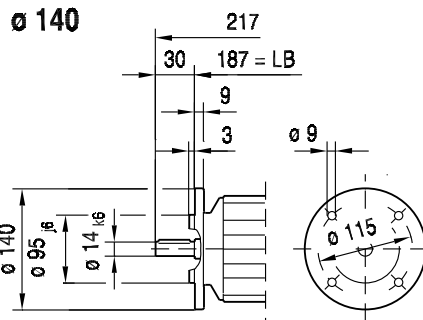
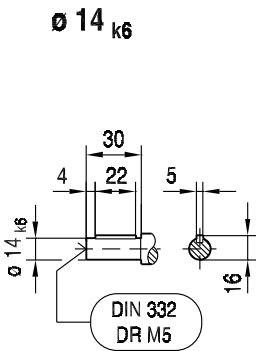
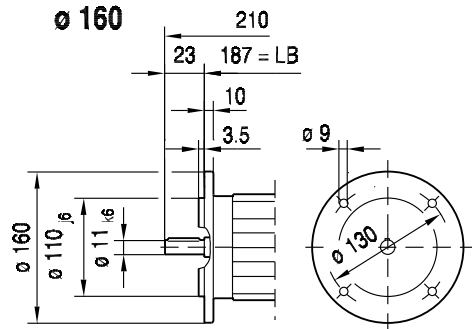
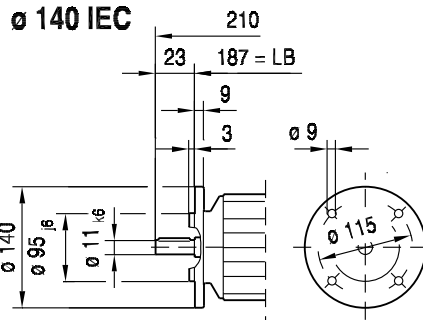
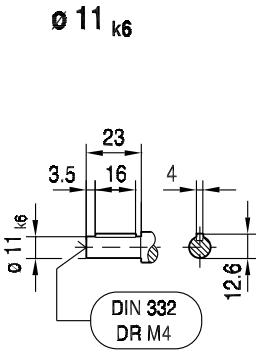
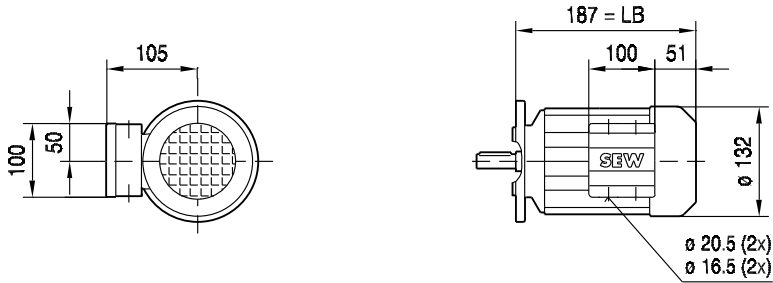
- For brakemotors, do not forget to add the space required for removing the fan guard (= fan guard diameter).
- Motors of size DV250 and DV280 are equipped with lifting eyebolts. The lifting eyebolts can be unscrewed.
- Leave a clearance of at least half the fan guard diameter to provide unhindered air access.

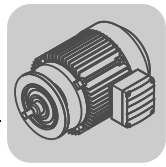


11.2 Dimension sheets

**DFR63**

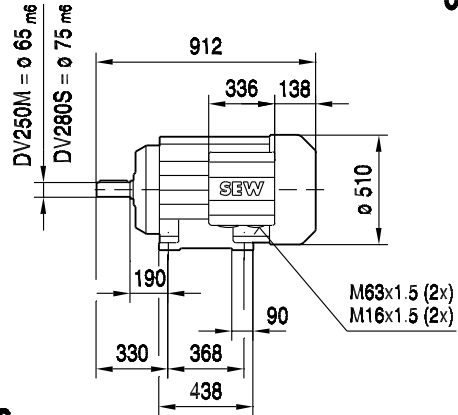
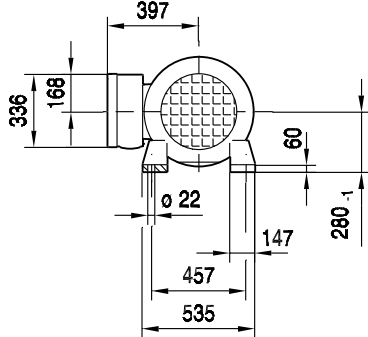
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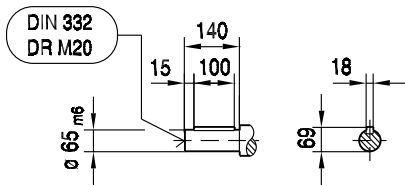


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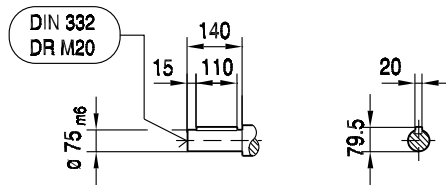
**DV250M  
DV280S**



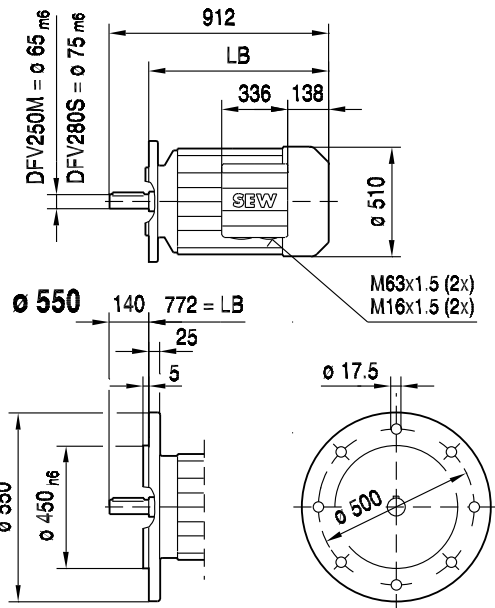
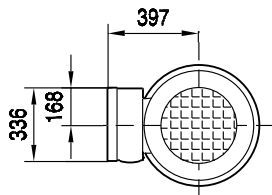
**D..250M**



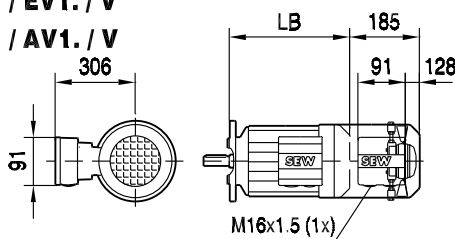
**D..280S**



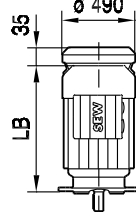
**DFV250M  
DFV280S**



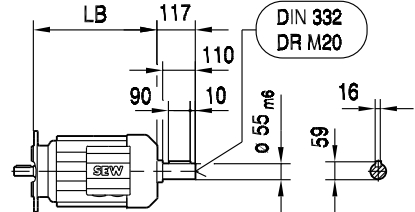
**/ V  
/ EV1. / V  
/ AV1. / V**



**/ C**



**/ 2.WE**





## 12 Appendix

### 12.1 Check List and Inquiry Form for Explosion-Proof Drives

The following check list will help you to determine the necessary information for specifying the unit properties and unit categories of drives that are used in potentially explosive atmospheres.

#### Check list for explosion-proof drives

Step	Criterion	Condition	Decision	Continue with step
1	Potentially explosive mixture of air and	Gas		2
		Dust		7
<b>For gas</b>				
2	Drive will be installed in	Zone 1		3
		Zone 2		5
3	In the case of zone 1, the protection type of the motor is prescribed by the customer as	Flameproof enclosure (d)		4
		Increased safety (e)		5
4	In the case of motors with flameproof enclosure, design of the terminal box (TB)	TB with flameproof enclosure (d)		5
		TB with increased safety (e)		
5	Group specification	IIA		6
		IIB		
		IIC		
6	Temperature class (for gas/air mixtures)	T3		9
		T4		
		T5 (only with flameproof enclosure)		
		T6 (only with flameproof enclosure)		
<b>For dust</b>				
7	Drive will be installed in	Zone 21		8
		Zone 22 (flammable lint)		
		Zone 22 (non-conducting dust)		
		Zone 22 (conducting dust)		
8	Maximum permitted surface temperature (for dust/air mixtures)	T120 °C		9
		T140 °C		
		T150 °C (only for synchronous servo gearmotors)		
<b>Company address</b>				
9	Ms. / Mr.			Place, date
	Company			
	Department			



### Notes on the individual items:

#### Step 1

Categorization of the potentially explosive atmosphere into gas or dust.

#### Step 2

Zone categorization according to the installation location of the drive. The owner is responsible for the zone categorization according to directive 99/92/EC. Assistance can be obtained from the TÜV (German Technical Control Board), German Institutions for Statutory Accident Insurance and Prevention or expert offices:

- Zone 1: Potentially explosive gas mixtures are to be expected in normal operation.
- Zone 2: Potentially explosive gas mixtures are not to be expected in normal operation and if they occur at all, then only briefly.

#### Step 3

Protection types of the motor for use in zone 1.

- Flameproof enclosure (d)  
Potentially explosive mixtures can penetrate the equipment, the mixture inside the housing can be ignited → Design measures prevent ignition of the external atmosphere
- Increased safety (e)  
Potentially explosive mixtures can penetrate the equipment, no sources of combustion in or on the equipment → No ignition of the gas mixture.

#### Step 4

Design of the terminal box in the case of motors with flameproof enclosure with protection type

- Flameproof enclosure (d)  
When this terminal box version is selected, it is essential to take account of the permitted cable bushings (conduit system, cable glands, etc.). In addition, the thread type of the screw fitting (ISO or NPT) must be specified.
- Increased safety (e)  
When this terminal box version is selected, the cable entry design can be simpler. It is merely necessary to use an Ex-certified screw fitting.

#### Step 5

Group II is divided into 3 subgroups according to substance.

- All protection types  
Electrostatic requirements for plastic surfaces (including paint). As a consequence, the EX designation of protection types "e" and "nA" (previously II) is changed to IIA, IIB or IIC, depending on the plastic surfaces or paint used.
- Additionally for flameproof enclosure (d)  
Here, the subgroup determines the parameters of the ignition gap.

Refer to the relevant published tables, e.g. Nabert/Schön, 'Kennzahlen brennbarer Gase und Dämpfe' ('Classifications of flammable gases and vapors'), Deutscher Eichverlag GmbH, D-38102 Braunschweig, Germany.

**Step 6**

Each of the temperature classes represents the assured maximum surface temperatures of the drive. For information about the temperature classes of the hazardous materials, refer to step 5:

- T3: Max. permitted surface temperature: 200 °C
- T4: Max. permitted surface temperature: 135 °C
- T5: Max. permitted surface temperature: 100 °C
- T6: Max. permitted surface temperature: 85 °C

**Step 7**

Zone categorization according to location where the drive is used. According to Directive 99/92/EC, the owner is responsible for the zone categorization. Assistance can be obtained from the TÜV (German Technical Control Board), German Institutions for Statutory Accident Insurance and Prevention or expert offices:

- Zone 21: Potentially explosive dust/air mixtures are to be expected in normal operation.
- Zone 22: Potentially explosive dust/air mixtures are not to be expected in normal operation and if they occur at all, then only briefly.

Group III is divided into 3 subgroups according to substance.

Group	Suitable for atmospheres with	Minimum degree of protection IP
IIIA	Flammable lint	5x
IIIB	Non-conducting dust	5x
IIIC	Conducting dust	6x

**Step 8**

The maximum surface temperature of a drive in dust/air mixtures. The value is specified in °C. The maximum surface temperature of synchronous servo gearmotors is 150 °C.

For information about this, refer for example to: BIA-Report 'Brenn- und Explosionskenngrößen von Stäuben' (Report no. 3051 of BG Institute for Occupational Safety, 'Combustion and explosion characteristics of dusts'), Hauptverband der gewerbl. Berufsgenossenschaften, D-53757 St. Augustin, Germany.



**Inquiry form for explosion-proof drives**

<b>Customer data</b>	
Company:	Customer no.:
Department	
Name	Phone:
Street / P.O. Box:	Fax:
Zip code/city:	E-mail:
<b>Your contact person at SEW-EURODRIVE</b>	
Name:	Phone:
Technical office:	Fax:
<b>Technical data</b>	
Quantity:	Desired delivery date:
Catalog designation:	
<b>Gear unit type</b>	
<input type="checkbox"/> Helical gear unit	<input type="checkbox"/> Parallel-shaft helical gear unit
<input type="checkbox"/> Helical-bevel gear unit	<input type="checkbox"/> Helical-worm gear unit
<input type="checkbox"/> SPIROPLAN®	
<input type="checkbox"/> Multi-stage gear unit	
<b>Power:</b> kW	<b>Output speed:</b> rpm
<b>Output torque:</b> Nm	
<b>Cycles/hour:</b> c/h	
<input type="checkbox"/> 1-shift operation	<input type="checkbox"/> 2-shift operation
<input type="checkbox"/> 3-shift operation	
<input type="checkbox"/> Regular	<input type="checkbox"/> Irregular
<input type="checkbox"/> Very irregular	
<b>Mounting position</b>	
M1	M2
M3	M4
M5	M6
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<b>Housing type</b>	
<input type="checkbox"/> Foot-mounted	<input type="checkbox"/> Flange (bore)
<input type="checkbox"/> Flange (thread)	
<input type="checkbox"/> Torque arm	
Other:	
<b>Shaft design</b>	
<input type="checkbox"/> Solid shaft with key	<input type="checkbox"/> Shrink disk
Shaft/hollow shaft Ø	mm
<input type="checkbox"/> Hollow shaft with key	<input type="checkbox"/> TorqLoc®
Flange Ø	mm
<b>Shaft position (angular gear unit)</b>	
<input type="checkbox"/> A	<input type="checkbox"/> B
<input type="checkbox"/> AB	<input type="checkbox"/> 0° (R)
<input type="checkbox"/> 90° (B)	<input type="checkbox"/> 180° (L)
<input type="checkbox"/> 270° (T)	<input type="checkbox"/> X
<input type="checkbox"/> 1	<input type="checkbox"/> 2
<input type="checkbox"/> 3	
<b>Terminal box position</b>	
<b>Cable entry</b>	
<b>Degree of protection</b>	
<input type="checkbox"/> IP54	<input type="checkbox"/> IP55
<input type="checkbox"/> IP65	<input type="checkbox"/> 130 (B)
<input type="checkbox"/> 155 (F)	<input type="checkbox"/> KS
<input type="checkbox"/> OS1	<input type="checkbox"/> OS2
<input type="checkbox"/> OS3	<input type="checkbox"/> OS4
<b>Thermal class</b>	
<b>Surface/corrosion protection</b>	
<b>Line voltage:</b> V	
Line frequency:	<input type="checkbox"/> 50 Hz
<input type="checkbox"/> 60 Hz	Connection type:
<input type="checkbox"/> Δ	<input type="checkbox"/> Y
<input type="checkbox"/> For inverter operation	Max. frequency: Hz
Motor cable length: m	
<b>Control range:</b>	
<b>Required options</b>	
<input type="checkbox"/> Brake	Voltage: V
Braking torque: Nm	
<input type="checkbox"/> Manual brake release	<input type="checkbox"/> HR
<input type="checkbox"/> HF	
<input type="checkbox"/> Forced cooling fan	Forced cooling fan voltage: V
<input type="checkbox"/> Motor protection: TF	
<input type="checkbox"/> Encoder	
<b>Other options:</b>	
<input type="checkbox"/> Inverter	
<input type="checkbox"/> RAL 7031	<input type="checkbox"/> RAL
<b>Special ambient conditions</b>	
Temperature from °C to °C	<input type="checkbox"/> Operation outdoors
<input type="checkbox"/> Installation altitude > 1000 m above msl	
Other ambient conditions:	
Miscellaneous:	



### 12.2 Cable dimension units according to AWG

AWG stands for **American Wire Gauge** and refers to the size of the wires. This number specifies the diameter or cross section of a wire in code. This type of cable designation is usually only used in the USA. However, the designations can also be seen in catalogs or data sheets in Europe.

AWG designation	Cross section in mm <sup>2</sup>
000000 (6/0)	185
00000 (5/0)	150
0000 (4/0)	120
000 (3/0)	90
00 (2/0)	70
0 (1/0)	50
1	50
2	35
3	25
4	25
5	16
6	16
7	10
8	10
9	6
10	6
11	4
12	4
13	2.5
14	2.5
15	2.5
16	1.5
16	1
18	1
19	0.75
20	0.5
21	0.5
22	0.34
23	0.25
24	0.2





## Numerics

7-series gearmotor with feet .....34

## A

### AC motors

*Backstop RS* .....117

*Canopy C* .....118

*Electrical characteristics* ..... 44, 123

*EMC measures* .....29

*Mechanical characteristics* .....47

*Motor options, overview* .....116

*Motor protection* .....30

*Mounting position designations* .....40

*Overhung loads* ..... 48, 126

*Standards and regulations* .....120

*Starting frequency* .....124

*Switching and protective equipment* .....122

*Switching frequency* .....45

*Thermal characteristics* .....45

*Thermal classes* .....124

*Thermal classification* .....45

*Unit designation, examples* ..... 38, 116

*V.I.K.* .....128

AC motors eDR63, DV.250 / 280 .....111

Adapter for mounting non-SEW encoders .....92

Additional documentation .....8

Additional features ..... 36, 101

Axial load .....48

## B

Backstop .....109

Ball bearing types .....55

Brakemotors .....20

Braking resistor category 2 and 3 .....67

## C

C-face flange-mounted motor .....34

Cage clamps .....105

Canopy .....108

Categories, division .....14

Center of gravity of the motors .....56

Conformity with standards .....26

Connection options .....105

Connection variants .....36

Copyright .....9

Corrosion protection .....23

## D

Declaration of conformity .....15

Degree of protection to EN 60034 .....47

Description of EDR. AC motors .....20

Designation code in accordance with EU

Directive 94/9/EC .....19

Dimension sheets

*DR series AC motors* .....73

Dimension sheets of EDR. AC motors .....71

Distinguishing potentially explosive

atmospheres .....14

Division into categories ..... 14

Documentation, additional ..... 8

Drive technology in accordance with EU

Directive 94/9/EC ..... 12

## E

EC 60034 T2-1 (2007) ..... 21

Electrical characteristics ..... 44

EMC ..... 68

EMC measures ..... 113

Encoder ..... 36, 91

*Encoder connection* ..... 93

*Encoder mounting adapter* ..... 99

*Mounting non-SEW encoders* ..... 100

*Non-SEW encoder mounting* ..... 92

*Project planning notes*

*Speed sensor* ..... 93

*Project planning, technical data* ..... 93

*Technical data for absolute encoders* ..... 95

*Technical data for encoder mounting*

*adapters* ..... 99

*Technical data for incremental encoders* ..... 97

*Type designation* ..... 91

Encoder connection ..... 93

Encoder mounting adapter ..... 99

Encoder overview

*Absolute encoder* ..... 94

*Speed sensor* ..... 94

Encoders

*Pin assignment* ..... 91

Energy-efficient motors ..... 21, 120

Equipment groups, classification ..... 14

ErP Directive 2009/125/EC ..... 21

EX labeling of motors ..... 11

Explosion protection designation ..... 10

Explosion-proof motors ..... 36

## F

Flange-mounted motor (deviating from IEC) ..... 34

Foot-/flange-mounted motor ..... 35

Foot-mounted motor ..... 33

Forced cooling fan ..... 106

Forced cooling fan in combination with

encoders ..... 106

Frequency and voltage ..... 44

Frequency inverter operation ..... 112

Frequency inverter selection ..... 64

## G

Gearmotor ..... 33

## H

Harmonized European design provisions ..... 12

High switching frequency ..... 45

## I

IEC ..... 35

IEC 60034 T30 ..... 22



IEC flange-mounted motor with boreholes .....	33
IEC flange-mounted motor with threads .....	34
Inverter operation .....	59
Inverter operation, suitable for .....	44
<b>K</b>	
KS corrosion protection .....	23
<b>L</b>	
Labeling of motors .....	11
<b>M</b>	
Mechanical attachments .....	35
Mechanical characteristics .....	47
Metal fan .....	107
Motor dimensions .....	72
Motor protection .....	11, 118
Motor terminal voltage .....	61
Motor voltage .....	44
Motor/inverter assignment DT/DV motors .....	114
Motor/inverter assignment for category 2 motors .....	64
Motor/inverter assignment for category 3 motors .....	66
Motors at a glance .....	25
Motors for frequency inverter operation .....	112
Mounting positions .....	40
<b>N</b>	
Nameplate EDRE AC motor in category 2GD .....	27
Nameplate of EDRE AC brakemotor in category 3GD .....	27
Nameplate of EDRE AC motor with frequency inverter .....	28
No-load switching frequency .....	46
Notes for safe operation .....	67
Notes on the dimension sheets .....	71
Notes on the dimensions sheets for EDR brakemotors .....	41
<b>O</b>	
Operating modes .....	45
Operating temperatures of the motor .....	24
Operation with undervoltage .....	29
Other additional features .....	36
Output types .....	32
Overhung load diagrams .....	49
Overhung loads .....	48
Overview of absolute encoders .....	94
Overview of speed sensors .....	94
<b>P</b>	
Permitted brakemotor switching frequency .....	46
Permitted frequencies .....	63
Permitted voltage load for frequency inverter operation .....	69
Potentially explosive atmospheres .....	14
Potentially explosive atmospheres, zones .....	13
Product characteristics of the inverters .....	60
Product description	
7 series gearmotor .....	33
C-face flange-mounted motor .....	34
Energy-efficient motors .....	21
Flange-mounted motor (deviating from IEC) .....	34
Foot-/flange-mounted motor .....	35
Foot-mounted motor .....	33
IEC flange-mounted motor with boreholes .....	33
IEC flange-mounted motor with threads .....	34
Inverter operation .....	20
Product description DR	
Mounting positions .....	40
Product description, energy-efficient motors .....	21
Product description, general .....	10
Product groups .....	6
Product names and trademarks .....	9
Project planning .....	44
Tolerances .....	28
Project planning for AC motors	
EMC measures .....	122
Frequency and voltage .....	123
Overhung load conversion .....	126
Rated data .....	26, 121
Starting frequency .....	124
Tolerances .....	121
Project planning notes	
Backstop .....	109
DR. torque limit curves for inverter operation .....	61
Overhung loads .....	48
Product characteristics of the inverters .....	60
Vibration class .....	47
Project planning notes DR	
Ball bearing types .....	55
Canopy .....	108
Center of gravity of the motors .....	56
Encoder mounting adapter .....	99
Forced cooling fan in combination with encoders .....	106
Frequency and voltage .....	44
Inverter operation, suitable for .....	44
Motor voltage .....	44
Non-SEW encoder mounting .....	100
Project planning notes EDR	
Axial load .....	48
Project planning notes, general .....	26
Project planning procedure for inverter operation .....	58
Project planning procedure for supply system operation .....	57
Protection type c constructional safety .....	17
Protection type d flameproof enclosure .....	16
Protection type e increased safety .....	16
Protection type k liquid immersion .....	17
Protection type n .....	18
Protection type t .....	18
Protection types .....	15



Protection types .....	15	Type designation of EDR AC motors .....	38
<b>R</b>		Typical application .....	61
Rated data .....	26	<b>U</b>	
<b>S</b>		Undervoltage .....	29
Safe operation of motors in category 2 and 3 .....	60	Unit designation	
Secure switching of inductances .....	31	<i>Temperature detection</i> .....	35
Serial number .....	37	<i>Temperature sensor</i> .....	35
SEW-EURODRIVE		Unit designation DR	
<i>Group of companies</i> .....	5	<i>Connection variants</i> .....	36
<i>Products</i> .....	6	<i>Encoder</i> .....	36
<i>Systems</i> .....	6	<i>Examples</i> .....	38
Standardized encoder mounting adapter .....	91	<i>Mechanical attachments</i> .....	35
Standards		Unit designation EDR	
<i>Conformity</i> .....	26	<i>AC motors and options</i> .....	32
Standards and regulations .....	26	<i>Motor series</i> .....	32
Surface protection .....	23	<b>V</b>	
Surface protection OS .....	24	Variants, possible	
Surface temperature .....	113	<i>Brakemotors</i> .....	20
Switching and protective equipment		Ventilation .....	36, 106
<i>AC motors</i> .....	29	<i>Canopy</i> .....	108
<b>T</b>		<i>Forced cooling fan</i> .....	106
Technical data		<i>Metal fan</i> .....	107
<i>Absolute encoder</i> .....	95	Vibration class .....	47
<i>AC motors eDR63, DV.250 / protection</i>		<b>W</b>	
<i>type e, category II2G</i> .....	111	Winding type .....	113
<i>AC motors eDR63, DV.250 / protection</i>		<b>Z</b>	
<i>type nA, category II3GD</i> .....	111	Zones in potentially explosive atmospheres .....	13
<i>Backstop</i> .....	110		
<i>Encoder mounting adapter</i> .....	99		
<i>Incremental encoder</i> .....	97		
<i>Metal fan</i> .....	107		
<i>Protection canopy</i> .....	108		
<i>Terminal strip with cage clamps</i> .....	105		
<i>Thermal motor information with</i>			
<i>KTY84 - 130</i> .....	103		
<i>Thermal motor information with PT100</i> .....	104		
<i>Thermal motor protection with</i>			
<i>PTC resistor</i> .....	101		
Technical data category			
<i>ATEX 2G, 2GD</i> .....	42		
<i>ATEX 3GD</i> .....	43		
Technical data of EDR. AC motors/brakemotors	41		
Temperature sensor/detection .....	35		
Terminal strip with cage clamps .....	105		
Thermal characteristics .....	45		
Thermal motor information with KTY84 - 130 ...	103		
Thermal motor information with PT100 .....	104		
Thermal motor protection category 2 .....	67		
Thermal motor protection category 3 .....	67		
Thermal motor protection with PTC resistor .....	101		
Torque limit curves .....	115		
Torque limit curves of motors operated			
on an inverter .....	61		
Type designation			
<i>Examples for an AC motor</i> .....	116		



## 13 Address Directory

Germany				
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	<b>Drive Service Hotline / 24 Hour Service</b>		+49 180 5 SEWHELP +49 180 5 7394357 14 euro cents/min on the German landline network. Max 42 euro cents/ min from a German mobile network. Prices for mobile and international calls may differ.	
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	<b>Rovaniemi</b>	SEW-EURODRIVE OY Valtakatu 4 A FIN-96100 Rovaniemi	Tel. +358 201 589-300 Fax +358 201 589-239 <a href="mailto:sew@sew.fi">sew@sew.fi</a>
Production Assembly	<b>Karkkila</b>	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 <a href="mailto:sew@sew.fi">sew@sew.fi</a> <a href="http://www.sew-eurodrive.fi">http://www.sew-eurodrive.fi</a>
Gabon			
Sales	<b>Libreville</b>	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 <a href="mailto:esg_services@yahoo.fr">esg_services@yahoo.fr</a>



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		<b>Drive Service Hotline / 24 Hour Service</b>	Tel. 01924 896911
<b>Service Competence Center</b>	<b>Southern England</b>	SEW-EURODRIVE Ltd. Unit 41 Easter Park Benyon Road Silchester Reading Berkshire RG7 2PQ	Tel. +44 1189 701-699 Fax +44 1189 701-021
<b>Technical Offices</b>	<b>Midlands</b>	SEW-EURODRIVE Ltd. 5 Sugar Brook court Aston Road Bromsgrove Worcs. B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245
	<b>Scotland</b>	SEW-EURODRIVE Ltd. No 37 Enterprise House Springkerse Business Park Stirling FK7 7UF	Tel. +44 17 8647-8730 Fax +44 17 8645-0223
Greece			
<b>Sales</b>	<b>Athens</b>	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 <a href="http://www.boznos.gr">http://www.boznos.gr</a> <a href="mailto:info@boznos.gr">info@boznos.gr</a>
<b>Technical Office</b>	<b>Thessaloniki</b>	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 <a href="mailto:info@boznos.gr">info@boznos.gr</a>
Hong Kong			
<b>Assembly Sales Service</b>	<b>Hong Kong</b>	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 <a href="mailto:contact@sew-eurodrive.hk">contact@sew-eurodrive.hk</a>
Hungary			
<b>Sales Service</b>	<b>Budapest</b>	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 <a href="mailto:office@sew-eurodrive.hu">office@sew-eurodrive.hu</a>
Iceland			
<b>Sales</b>	<b>Reykjavik</b>	VARMA & VELAVERK EHF Dalshrauni 5 IS-220 Hafnarjördur	Tel. +354 585 1070 Fax +354 585)1071 <a href="mailto:varmaverk@varmaverk.is">varmaverk@varmaverk.is</a> <a href="http://www.varmaverk.is">http://www.varmaverk.is</a>



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<b>Assembly Sales Service</b>	<b>Chennai</b>	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 <a href="mailto:saleschennai@seweurodriveindia.com">saleschennai@seweurodriveindia.com</a>
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	<b>Bengaluru</b>	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bengaluru - 560052 - Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 <a href="mailto:salesbangalore@seweurodriveindia.com">salesbangalore@seweurodriveindia.com</a>
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		PT. Agrindo Putra Lestari Jl.Prof.DR.Latumenten no27/A Jakarta 11330	Tel: +62 21 63855588 Fax: +62 21 63853789 aplindo@indosat.net.id
		PT. Sentratek Adiprestasi Jl. Industri Raya I, Komp. Gunung Sahari 8 Block B-3 Gunung Sahari Utara, Sawah B Jakarta 10720	Tel: +62 21 6398122 Fax: +62 21 6499264 adm_samit@yahoo.co.id roberto_samit@yahoo.co.id
	<b>Medan</b>	PT. Serumpun Indah Lestari Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com
	<b>Surabaya</b>	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60122	Tel: +62 31 5990128 Fax: +62 31 5962666 triagri@indosat.net.id
		CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel: +62 31 5458589 / +62 31 5317224 Fax: +62 31 5317220 / +62 31 5994629 sianhwa@sby.centrin.net.id

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Israel			
<b>Sales</b>	<b>Tel-Aviv</b>	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
<b>Assembly Sales Service</b>	<b>Solaro</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini, 14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
<b>Technical Offices</b>	<b>Bologna</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 I-40064 Ozzano dell'Emilia (Bo)	Tel. +39 051 65-23-801 Fax +39 051 796-595
	<b>Caserta</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 I-81020 S. Nicola la Strada (Caserta)	Tel. +39 0823 219011 Fax +39 0823 421414
	<b>Milan</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini, 14 I-20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 799781
	<b>Pescara</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa, 132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 085 41-59-643
	<b>Torino</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C I-10135 Torino	Tel. +39 011 3473780 Fax +39 011 3473783
	<b>Verona</b>	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via P. Sgulmero, 27/A I-37132 Verona	Tel. +39 045 89-239-11 Fax +39 045 97-6079
Ivory Coast			
<b>Sales</b>	<b>Abidjan</b>	SICA Société industrielle & commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1115 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci
Japan			
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<b>Technical Offices</b>	<b>Fukuoka</b>	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	<b>Osaka</b>	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th flor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp



Japan			
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Kazakhstan			
<b>Sales</b>	<b>Almaty</b>	TOO "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
Latvia			
<b>Sales</b>	<b>Riga</b>	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com
Lebanon			
<b>Sales</b>	<b>Beirut</b>	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Jordan Kuwait Saudi Arabia Syria	<b>Beirut</b>	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
Lithuania			
<b>Sales</b>	<b>Alytus</b>	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
<b>Assembly Sales Service</b>	<b>Brussels</b>	<b>SEW Caron-Vector</b> Research park Haasrode Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Malaysia			
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Mexico			
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New Zealand			
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Norway			
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	<b>All Areas</b>	P.T. Cerna Corporation 2166 Primo Rivera St., Brgy. La Paz, Makati City	Tel: +63 2 890 2862 / +63 2 890 2813 Fax: +63 2 890 2802 <a href="mailto:electrical_controls@ptcerna.com">electrical_controls@ptcerna.com</a>
Poland			
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	<b>24 Hour Service</b>		Tel. +48 602 739 739 (+48 602 SEW SEW) <a href="mailto:serwis@sew-eurodrive.pl">serwis@sew-eurodrive.pl</a>
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	<b>Cape Town</b>	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
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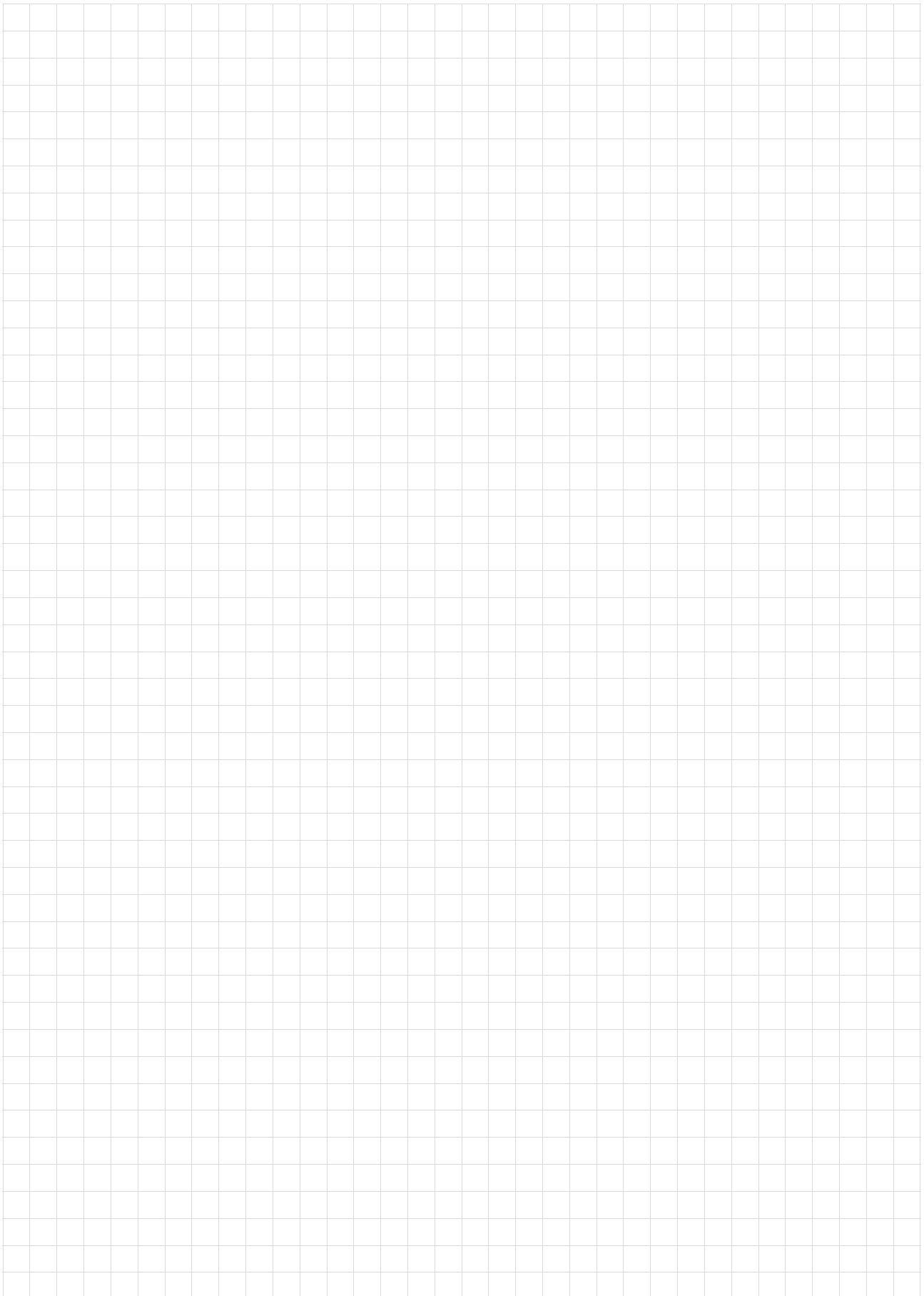
Switzerland			
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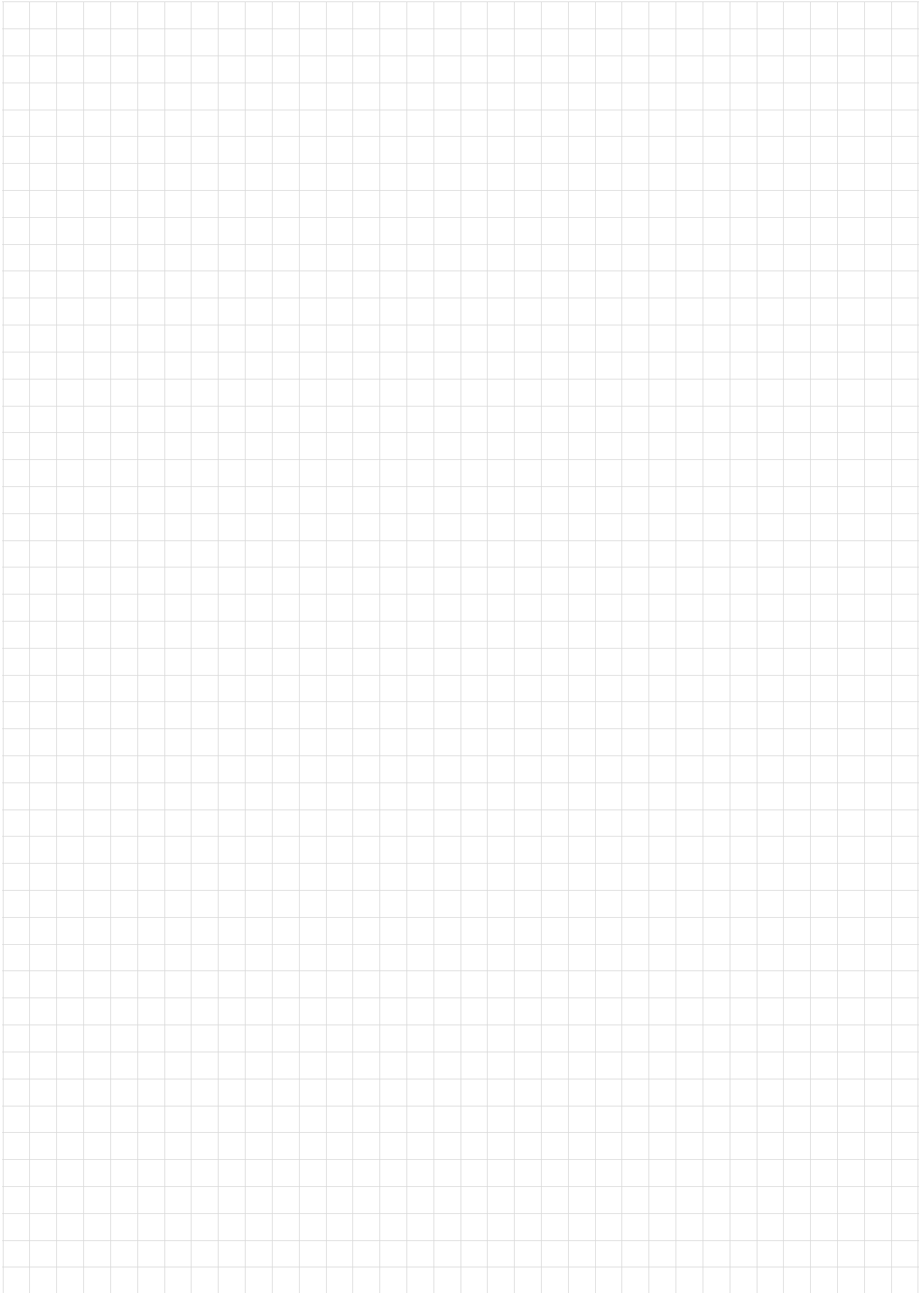
Turkey			
Technical Offices	<b>Adana</b>	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Kizilay Caddesi 8 Sokak No 6 Daötekin Is Merkezi Kat 4 Daire 2 TR-01170 SEYHAN / ADANA	Tel. +90 322 359 94 15 Fax +90 322 359 94 16
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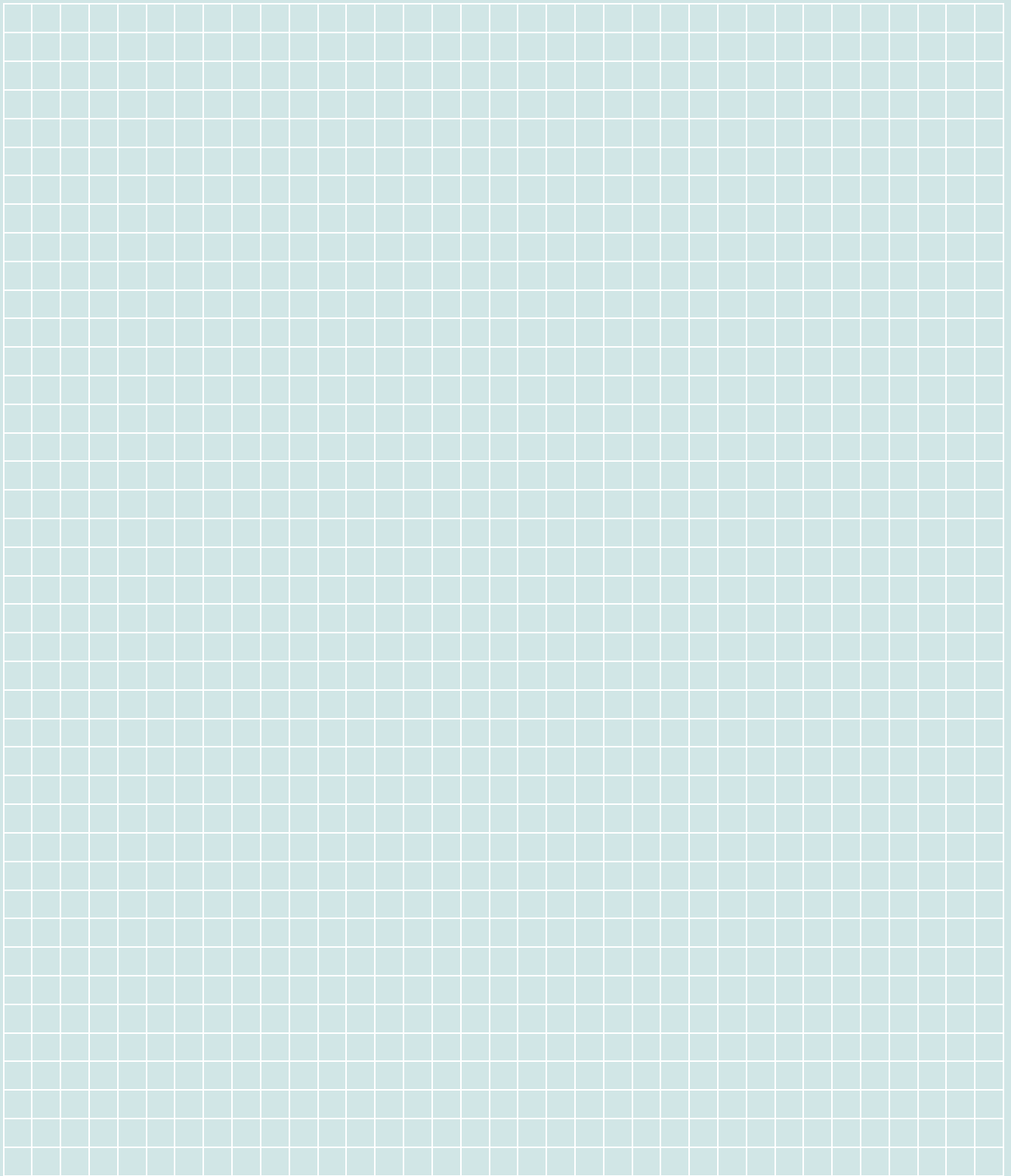


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