SEW EURODRIVE

Catalog

AC Motors
DRN355

Edition 01/2021

26862174/EN

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1 Introduction

1.1 The SEW-EURODRIVE group of companies

1.1.1 Global presence

Driving the world – with innovative drive solutions for all industries and for every application. Products and systems from SEW-EURODRIVE are used all over the world. 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 reliable products with regard to functionality and investment.

Products and services from SEW-EURODRIVE are represented in all important industries of our time. We also show this presence with subsidiaries and production plants all over the world, as well as with our service, which we see as an integrative part of our portfolio that extends SEW-EURODRIVE's high quality standards.

1.1.2 Always the right drive solution

With the broad product range of SEW-EURODRIVE, which also includes mechatronic drive units, frequency inverters, controllers, software and communication in addition to the tried-and-tested modular system for gearmotors, it is possible to implement the perfect drive solution for every application.

Gear units and motors

Thanks to the modular system, gearmotors can be combined individually according to the required speed and torque ranges, the space requirements and the ambient conditions. Gear units and gearmotors offering a unique and finely tuned power range and the best economic prerequisites to face any drive challenge.

Motors by SEW-EURODRIVE can be mounted directly or via adapter to SEW-EURODRIVE gear units. They meet all worldwide requirements regarding energy efficiency and technical regulations. A wide range of options and accessories ensures high flexibility for adjusting the motor to the requirements of the user and the application.

Inverter

The proven inverter series MOVITRAC®, MOVIDRIVE® and MOVIAXIS® enhance the gearmotors, forming a combination that blends in perfectly with the existing range of SEW-EURODRIVE systems.

Modular automation system

With its brand MOVI-C®, SEW-EURODRIVE launches a new generation of drive and automation technology. MOVI-C® is the modular automation system that allows for the highest level of system and machine automation. It comprises drive technology, motion control, control technology and visualization.

MOVIDRIVE® modular is the modular application inverter for all types of applications, ranging from simple open-loop speed control to servo drives with kinematic model. MOVIDRIVE® modular can be supplemented by connecting MOVIDRIVE® system single-axis units. These possess functionalities comparable to those of axis modules, but have their own line connection. Especially in the upper power range, MOVIDRIVE® system complements the modular application inverter.

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MOVIDRIVE® modular and MOVIDRIVE® system are intended for operation at the MOVI-C® CONTROLLER, the controller from SEW-EURODRIVE. They offer a powerful clock-synchronous connection via the integrated EtherCAT®/SBus^{PLUS} communication interface. Other EtherCAT® stations from SEW-EURODRIVE or other manufacturers can be controlled and diagnosed by the MOVI-C® CONTROLLER.

The MOVISUITE® engineering software with its unique operating philosophy is above all MOVI-C® hardware and software components. MOVISUITE® was developed with a focus on systematically shortening the startup time and covers the entire engineering process, from planning to diagnostics.

Decentralized drive technology

For economical, decentralized installations, SEW-EURODRIVE offers components from decentralized drive technology, such as MOVIMOT®, the gearmotor with integrated frequency inverter, or MOVI-SWITCH®, 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 decentralized drive technology portfolio is complemented by the DRC.. electronic motor, MOVIGEAR® mechatronic drive system, MOVIFIT® decentralized drive controller, MOVIPRO® decentralized drive, positioning, and application controller, as well as MOVITRANS® system components for contactless energy transfer.

The smart energy management system MOVI-DPS® enhances the modular product range of SEW-EURODRIVE. With MOVI-DPS®, SEW-EURODRIVE offers the perfect combination: Conserving resources. Reducing costs.

MOVI-DPS® allows for stable power grids, no power failures, and consequently reliable system availability. MOVI-DPS® is convincing in both, mobile and stationary applications. In addition, MOVI-DPS® can be combined with other systems, such as the contactless energy transfer system MOVITRANS®, resulting in further important synergy effects.

Industrial gear units

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.

Individual system solutions with MAXOLUTION®

MAXOLUTION® from SEW-EURODRIVE provides individual application solutions in all areas of system and machine automation. From electromechanical drives, controllers and communication to visualization and the contactless energy transfer system MOVITRANS® up to a comprehensive service portfolio, MAXOLUTION® offers all modules required to design customer-specific solutions for machines and systems.

MAXOLUTION® combines individual products of the proven modular system with innovative system components to form individual solutions that perfectly match the requirements of the specific application – "powered by SEW-EURODRIVE".

Safe – flexible – effective: safetyDRIVE

Guaranteeing the safety of all employees and preventing work accidents while ensuring trouble-free production processes are demands placed on all production areas. safetyDRIVE, the comprehensive safety concept, allows you to implement your machines "safely," in accordance with the currently valid guidelines. With controllers that meet the respective requirement of the safety categories or performance levels and that monitor instead of shut down.

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All of our drive and frequency inverters provide the function that safely stops the electrical power to the motor (STO). The MOVISAFE® components complete the portfolio – integrated into the inverter as option cards DFS..B or DCS..B or modular as safety monitors UCS..B. The decentralized MOVIFIT® and MOVIPRO® drive controllers with integrated safety functions are ready for use in decentralized installations.

The functionally safe motor options allow for implementing safety functions in safety-related applications. Safety encoders are used to implement safety functions with respect to speed, direction of rotation, standstill, and relative position. Safety brakes can implement safety functions with respect to decelerating and stopping.

1.1.3 Your ideal partner

Its global presence, extensive product portfolio 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 drive tasks in all industries and applications.

For detailed information on the entire SEW-EURODRIVE range of products, refer to our website www.sew-eurodrive.com where you can find out about components, system solutions, services and industries. Via the Online Support, you can access a large selection of documents and tools such as the product configurator and different selection guides as well as all documentation in different languages for download.

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1.2 Product names and trademarks

All product names included in this documentation are trademarks or registered trademarks of the respective titleholders.

1.3 Copyright notice

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2 Product description

2.1 DRN.. AC motors

The topics of environmental protection and efficient, careful use of existing resources have become important in recent years. For this reason, numerous industrial nations have passed and will pass laws and regulations to stipulate binding minimum efficiency values. This especially applies to products with a considerable share in total energy consumption. The goal is to decrease the consumption of primary energy and simultaneously reduce CO_2 emissions.

The stricter legal requirements also affect AC asynchronous motors. We assume that the use of motors in accordance with the limit values of the international efficiency class IE3 will become mandatory in the largest target markets in the future.

There are no internationally consistent provisions for efficiency regulations with regard to affected products or approved exceptions in single countries or regions.

The highly dynamic nature and the varying international regulations require documentation that can be quickly updated. For this reason, SEW-EURODRIVE provides the latest information on "efficiency regulations" online via "http://www.ie-guide.com" as well as via Online Support under "Engineering & selection – Energy efficiency tools".

DRN.. motors are suited for a variety of drive tasks in industrial environments. They are characterized by the reliability and quality SEW-EURODRIVE is known for and can be used worldwide. Regardless of being used in horizontal materials handling technology, lifting gears or other applications, DR.. motors certainly also meet your requirements even under harsh ambient conditions. In general, DRN.. motors are suited for operation at the supply system and in connection with an inverter.

A broad range of approvals and certifications enables you to use DRN.. motors all over the world. In this context, the DRN.. global motors are particularly noteworthy as they can be used in almost any country in the world in the same design due to the wide voltage range and the numerous approvals. These characteristics reduce the effort regarding material management and storage and in this way save you a lot of money.

This catalog focuses on the DRN355.. stand-alone motors of SEW-EURODRIVE.

This catalog describes how the motor can be ideally adapted to your requirements by choosing the required design or by enhancing it with various options.

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2.1.1 Product characteristics

DRN.. motors are AC asynchronous motors with an aluminum squirrel cage. They are designed for continuous duty (S1 duty type). Just as the existing asynchronous motor series from SEW-EURODRIVE, the new DRN355 motors are suitable for operation at the supply system as well as on an inverter.

The size includes IE3 AC motors in 50, 60 and 50/60 Hz that are available for the following power ratings, depending on the length:

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW

DRN.. motors adhere to the limit values of energy efficiency class IE1 or NEMA Standard/Premium at 50 Hz and 60 Hz.

2.1.2 Encoders

SEW-EURODRIVE offers compact mounting of incremental encoders and multi-turn absolute encoders in conjunction with the motors.

Various electrical interfaces are available.

For more information, refer to chapter "Encoders" (→ 🗎 77).

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2.2 Standards and regulations

SEW-EURODRIVE's AC motors comply with the IEC 60034/EN 60034 international series of product standards and also comply with other standards for special topics.

- **IEC 60034-1, EN 60034-1**

  Rotating electrical machines, rating and performance

- **IEC 60034-2-1, EN 60034-2-1**

  Rotating electrical machines, standard methods for determining losses and efficiency from tests

- **IEC 60034-5, EN 60034-5**

  Rotating electrical machines, degrees of protection provided by integral design of rotating electrical machines (IP code)

- **IEC 60034-7, EN 60034-7**

  Rotating electrical machines: Classification of types of construction, mounting arrangements and terminal box position (IM code)

- **IEC 60034-8, EN 60034-8**

  Rotating electrical machines: Terminal markings and direction of rotation

- **IEC 60034-9, EN 60034-9**

  Rotating electrical machines, noise limits

- **IEC 60034-11, EN 60034-11**

  Rotating electrical machines: Thermal protection

- **IEC 60034-12, EN 60034-12**

  Rotating electrical machines: Starting performance of single-speed three-phase cage induction motors

- **IEC 60034-14, EN 60034-14**

  Rotating electrical machines, mechanical vibrations

- **IEC 60034-18-41, EN 60034-18-41**

  Rotating electrical machines: Partial discharge free electrical insulation systems (Type I) used in rotating electrical machines fed from voltage converters - Qualification and quality control tests

- **IEC 60034-30-1, EN 60034-30-1**

  Rotating electrical machines, efficiency classes of line operated AC motors (IE code)

- **IEC 60072**

  Dimensions and output series for rotating electrical machines

In connection with terminal box:

- EN 62444:2013

  Cable glands for electrical installations (IEC 62444:2010, modified)

For international use, further standards are considered as well:

- NEMA MG1

  Motors and generators

- UL 1004-1

  Standard for rotating electrical machines – General requirements

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- CSA-C22.2 No. 100
  Motors and generators
- ABNT NBR 17094-1
  Rotating electrical machines – Inductance motors

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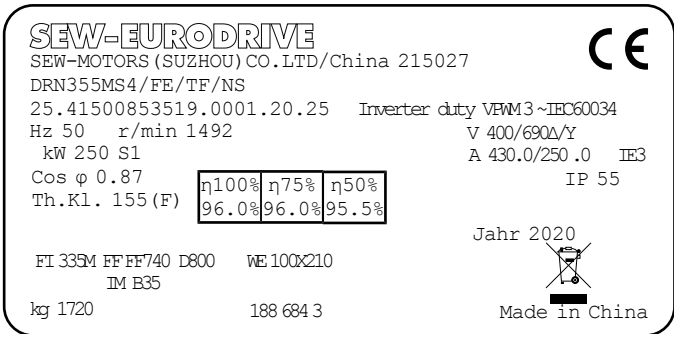
2.3 Rated data

Important data of an AC asynchronous motor:

- Size
- Number of poles
- Rated power
- Cyclic duration factor
- Rated speed
- Rated current
- Nominal voltage
- Rated frequency
- Power factor cosφ
- Degree of protection
- Thermal class
- Efficiency, energy efficiency class

This data is found on the nameplate of the motor, see the figure below. In accordance with IEC 60034-1, the nameplate data applies to a maximum ambient temperature of 40 °C and a maximum installation altitude of 1000 m above sea level.



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2.4 Worldwide usability

The motors can be used in every country in the world.

Market access is contingent to approvals in many countries. Local laws, regulations and other market-specific requirements must be adhered to. SEW-EURODRIVE provides the latest information on efficiency regulations online via "www.ie-guide.com" as well as via the Online Support under "Engineering & selection – Energy efficiency tools" on the website "www.sew-eurodrive.com".

In many cases, an identification on the motor is required along with the certification. This identification is documented with one or several logos on the nameplate or additional labels on the motor.

2.4.1 Approvals and certifications for asynchronous motors

The requirements on the condition of asynchronous motors are different all around the world to guarantee safe and efficient operation. A distinction has to be made between statutory provisions (e.g. efficiency regulations) and voluntary measures (e.g. specific certifications for selected markets).

2.4.2 Approvals

Proof of compliance with normative and statutory requirements is required for evaluation of the conformity. In many countries, adherence to statutory minimum efficiency levels are mandatory.

In some regions, such as Europe, the conformity can be evaluated directly by the manufacturer. It assesses the suitability of the product and confirms compliance with specifications under its own responsibility. In some countries, this assessment has to be performed by an accredited conformity assessment body. The manufacturer has to request the approval from an independent third party.

Independent of the type of conformity assessment, SEW-EURODRIVE fulfills the approval requirements for asynchronous motors worldwide.

In most cases, the product approval or conformity has to be indicated on the product itself. The following chapters provide a selection of frequently used labels on the nameplates.

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Market access

Country	Law/standard/regulation	Description	Identification on the nameplate
Brazil	ABNT 17094-1	Conformity requires, among others: • Number of standard • Starting current ratio • Wiring diagram(s) • Direction(s) of rotation • Bearing sizes	Information on nameplate
Europe (EU)	2014/35/EU	Low Voltage Directive	CE mark
Canada	CSA	Conformity with inspection	CSA mark
Morocco	Law no. 24.09	Conformity: • Low Voltage Directive • Electrical Safety	CMIM mark
Russia, Kazakhstan, Belarus and Armenia	Technical Regulation	TR CU 004/2011 Low Voltage Directive	EAC mark

Local business customs

Country	Law/standard/regulation	Description	Identification on the nameplate
Canada	CSA 22.2	Motor standard requires, among others: • Permitted temperature range • Design letter	Information on nameplate
USA	NEMA MG1 UL 1004-1	Proof of fire endurance based on recognized components	UR mark
		Number of assembly plant	ML + 2 numbers
		Motor standard requires, among others: • KVA letter • Design letter • Overload factor S.F TEFC, TENC or TEBC (similar to IP degree of protection)	e.g. design and ventilation type

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Subsidies

There are various subsidies available in the different markets to promote the use of energy-efficient motors. For more information, contact SEW-EURODRIVE.

Europe, Switzerland, Turkey

CE

By printing the CE marking on the nameplate, the manufacturer declares the conformity of the product with harmonized standards and applicable directives in the EU. Although the countries Switzerland and Turkey are not members of the EU, the EU specifications have been adopted for local laws. This means that the EU regulations are also applicable in these countries.

The declaration of conformity can be obtained from the manufacturer. It does not have to be included with the product upon delivery, i.e., when passing through customs.

Three directives are relevant for the motors:

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- Ecodesign Directive 2009/125/EC and VO 2019/1781

Motors whose CE conformity was declared in accordance with the Low Voltage Directive do not have to be declared in accordance with the Machinery Directive as well.

Directive 2009/125/EC

The Ecodesign Directive 2009/125/EC establishes a framework to set mandatory ecological requirements for energy-using and energy-related products. It covers the following topics:

- AC asynchronous motors in Regulation (EC) No. 640/2009 and Regulation (EU) No. 4/2014
- Fans/ventilators in Regulation (EC) No. 327/2011
- Water pumps in Regulation (EC) No. 547/2012
- Wet rotor circulation pumps in Regulation (EC) No. 641/2009

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Regulation 640/2009 and 2019/1718

The implementing directives (VO 640/2009 and VO 2019/1781) define the placing of motors on the market within the European Community. A minimum efficiency has been specified since June 16, 2011 that corresponds to IE2 from IEC 60034-30:2008.

As of January 1, 2017, motors in grid operation with a power rating ≥ 0.75 kW must meet the higher IE3 level as per IEC 60034-30:2008.

As of 1 July 2021, the new implementing regulation VO 2019/1781 will apply. In this regulation, motors that can be operated in grid operation must achieve the minimum efficiency IE2 from a power of 0.12 kW and the minimum efficiency IE3 from a power of 0.75 kW according to IEC 60034-30-1:2014.

The following are exempt from Reg 2019/1781 within the ErP Regulation:

- Motors not on continuous duty
- Non-ventilated motors in accordance with IC Code 410 or TENV
- Motors that are exclusively intended for operation under the following conditions:
  - Where ambient temperatures exceed 60 °C
  - Where ambient temperatures are less than -30 °C
  - More than 4000 meters above sea level

Motors for use in Europe, Switzerland, Turkey

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW

Switzerland

Switzerland adopts the energy-related Products Directive and its implementation regulations in Energy Ordinance EnEV 730.02 (2020). For motors, this is valid from July 2021.

This means that the EU rules must be directly applied in Switzerland.

Turkey

Turkey has released rules pertaining to motors in various communiqués (SMG 2012/2), along with Gazette No. 28197 in February 2012.

This is when the Energy-related Products Directive and its implementation regulation no. 640/2009 were adopted. Likewise, regulation no. 4/2014 was adopted per SMG 2015/15.

Regarding the new European Regulation 2019/1781, there are no adjustments in Turkey yet.

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Australia, New Zealand

The minimum efficiency (MEPS or GEMS 2019) stipulated by law both in Australia and New Zealand took effect on April 1, 2006 in Australia and on June 1, 2006 in New Zealand. It regulates numerical values and methods for measuring the efficiency of 2-, 4-, 6- and 8-pole motors from 0.73 kW to 185 kW.

Since the regulation only applies up to a power of 185 kW, DRN.. motors of size 355 can be used without restriction in Australia/New Zealand.

Information

In Australia and New Zealand, the IE2 motors are considered the standard design. The advanced IE3 motors (premium efficiency) are just "high-efficiency".

The voltage level 3 × 415 V, 50 Hz has already been adapted to 3 × 400 V, -6%/ +10%, 50 Hz throughout the most parts of these countries.

Applicable motors

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW

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USA

Market access in the United States requires three primary features for use or export.

- UL (UR) certificate (UL = Underwriters Laboratories)
- EISA 2007 conformity (EISA = Energy Independence and Security Act)
- Code of Federal Regulations title 10, chapter II, sub-chapter D, part 431 B motors

Registering AC motors with UL (Underwriters Laboratories) offers advantages for US users due to lower fire insurance premiums. The mark includes the registration number.

E189357

UL approvals for SEW-EURODRIVE can be accessed under no. E189357. All DRN.. motors can be ordered with the appropriate mark on the nameplate.

EISA compliance

The US legal requirements for minimum efficiency from 1992 were modified and renewed in 2007 and 2014. In a decision of the American authorities on May 29, 2014 taking effect on June 1, 2016, the requirements specified for the Premium NEMA energy efficiency class in the United States were extended to cover a larger power range and 8-pole motors, and numerous exceptions were eliminated. The requirements are specified in the Code of Federal Regulations of the Department of Energy (DoE).

EISA applies to the following motors:

- 2-pole and 4-pole motors from 1 hp (0.75 kW) to 500 hp (373 kW). These must meet the Premium Efficiency level.
- 6-pole motors from 1 hp (0.75 kW) to 350 hp (261 kW). These must meet the Premium Efficiency level.
- 8-pole motors from 1 hp (0.75 kW) to 250 hp (186 kW). These must meet the Premium Efficiency level.

ee CC056A

Upon registration with the Department of Energy (DoE), the motors are marked with "ee" and the registration number, which is CC056A for SEW-EURODRIVE.

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Applicable motors

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW/350 – 500 hp

Not for use in the USA

One special feature is the requirement for identifying non-usability for the US market. Motors sold in the United States that cannot be used there because they do not comply with EISA 2007 must be labeled accordingly. SEW-EURODRIVE labels motors with the "NOT FOR USE IN THE USA" label.

Canada

Market access in Canada requires two primary features for use or export.

- CSA approval (CSA = Canadian Standard Association)
- EER2016 (EER = Energy Efficiency Regulations)

CSA approval

EnergyVerified

Manufacturers of AC motors must obtain approval and certification from the CSA.

The designs of the motor series can be ordered certified with the CSA mark on the nameplate.

CSA approval for motors is limited to a maximum ambient temperature of 40 °C. Use above 40 °C is only possible with the configured output reduction. However, in these instances, the nameplate only shows the maximum temperature of 40 °C at full power.

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Energy Efficiency Regulations (EER)

The Canadian legal requirements (EER = Energy Efficiency Regulations) for minimum efficiency from 1997 were modified and renewed in 2016. They were published in the Canada Gazette in April 2016.

As of June 2016, the minimum efficiency level for AC motors was increased to premium level (IE3). This applies to the following motors:

- 2-, 4-, 6- and 8-pole motors from 0.75 kW (1 hp) to 375 kW (500 hp)

The motor can only pass through Canadian customs with the CSA or CSA Energy Verified mark on the nameplate.

The CSA or CSA Energy Verified certificate is not included with the drive, since Canadian customs can view the certificate on the CSA website by entering the registration number MC170602. The MC number can be found on the nameplate next to the CSA mark.

The overview of permitted motors can be found online by selecting "SEW-EURODRIVE" under the following link:

"www.csagroup.org/services-industries/product-listing/"

Applicable motors

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW/350 – 500 hp

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Brazil

Market access in Brazil requires two primary features for use or export.

- ABNT NBR 17094-1

  Associação Brasileira de Normas/Técnicas Máquinas Eléctricas Girantes – Motores de Indução – Parte 1: Trifásicos

- INMETRO certification (Instituto Nacional de Metrologia, Qualidade e Tecnologia)

  With the passing of Law Nº 10.295 in 2001, the Brazilian government established the legal basis for Decree Nº 4.508, Nº 533 and Nº 1.

Decree Nº 1 is an addendum to Decree Nº 4.508 and stipulates that as of July 1, 2019, only motors with efficiency class IR3 Premium may be produced in Brazil or may be imported into Brazil.

Decree Nº 4.508 requires the use of the ENCE label and describes the certification process. ENCE stands for the national energy conservation label (Etiqueta Nacional de Conservação de Energia).

ABNT NBR 17094-1

Brazil's motor standard ABNT NBR 17094-1 requires information on the nameplate in addition to the information required by motor standard IEC 60034:

- Starting current ratio I_a/I_n
- Bearing sizes on drive end and non-drive end.
- Directions of rotation upon delivery with backstop.
- Wiring diagrams

SEW-EURODRIVE may place this information on a second motor nameplate.

Since September 2019, the minimum efficiency for AC motors has been increased to IR3 Premium (nearly IE3, premium efficiency level).

This applies to the following motors:

- 2-, 4-, 6- and 8-pole motors from 0.12 kW (0.15 hp) to 370 kW (500 hp)

The motors are given the ENCE mark together with the INMETRO registration number of the production plant after certification.

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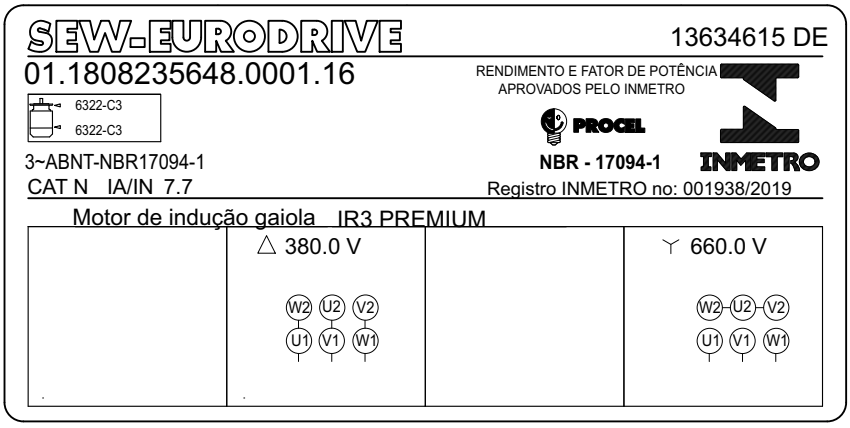
INMETRO certification

Motor certification is carried out by INMETRO. INMETRO (Instituto Nacional de Metrologia, Qualidade e Tecnologia) is the National Institute of Metrology, Quality and Technology of Brazil.

The certification does not issue a certificate. This is only the permission to use the ENCE label and to assign a registration number to each motor series.



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The motor can only pass through Brazilian customs with the ENCE mark on the nameplate.

Applicable motors

The following table shows the DRN355 motors certified by INMETRO (NBR 17094-1) (IR3):

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW

People's Republic of China

Market access in the People's Republic of China requires two primary features for use or export.

- GB 12350 (2009) – CCC
- GB 18613 (2012) – CEL

GB stands for Gan Biao, a local standard.

GB 12350 (2009) – CCC

Chinese standard GB 12350 (2009) requires small devices to be certified and labeled, and documentation indicating the plant that produced the motor.

This affects motors with the following power ratings:

- 2-pole ≤ 2.2 kW
- 4-pole ≤ 1.1 kW
- 6-pole ≤ 0.75 kW
- 8-pole ≤ 0.55 kW

If one of the rated power values in pole-changing motors exceeds the limit values mentioned above, the entire motor is CCC-exempt. This means the DRN355. motor is exempt from CCC marking.

GB 18613 (2012) – CEL

Chinese standard GB 18613 (2012) contains the legal requirements on minimum efficiencies.

Since July 2007/September 2012, the minimum efficiency for AC motors has been increased to the High Efficiency level, which approximates class IE2 of IEC 60034-30-1.

The motors are labeled by China using a grade system. The following table shows the corresponding international motor standard in February 2013.

IEC 60034-30-1	GB 18613 (2012)
IE1	–
IE2	Grade 3
IE3	Grade 2
IE4	Grade 1

This applies to the following motors:

- 2-, 4- and 6-pole motors from 0.75 kW (1 hp) to 375 kW (500 hp)
- Motors with 9.2 kW
- Explosion-protected motors

A number of exceptions allow for the requirements to be reduced. The following motors are exempt from the requirements or have reduced requirements:

- Pole-changing motors with 2 nominal speeds
- Fully integrated motors that cannot be tested separately, e.g. pumps, fans, compressors and gearmotors
- Motors that are not designed for continuous duty
- Motors only stamped for operation with frequency inverters (asynchronous servomotors)

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- DRK.. single-phase motors with running capacitor
- Non-ventilated motors

The design and the contents of the CEL label were redefined in the implementation regulation CEL 007-2016. By using the QR code, you can access an online website with additional information about the respective motor.

For logistical reasons, SEW-EURODRIVE has added the following information to the Grade label:

- Barcode
- Color ID field corresponding to the CEL color code
- Item number from SEW-EURODRIVE

The motor can only pass through Chinese customs with the CEL label on the product.

The CEL certificate is not included with the drive, since Chinese customs can view the certificate on the CQC website (Chinese approval authority) using the type and catalog designation or the QR code on the motor nameplate.

Since this database only contains Chinese characters, the link is not included here. SEW-EURODRIVE will give interested customers the link to the CQC database upon request.

Applicable motors

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW

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GB 18613 (2020) – CEL

INFORMATION

The new Chinese standard GB 18613 (2020) will be valid as of 1 June, 2021. This increases the minimum efficiency for the motors concerned and introduces a new grade classification.

The corresponding implementing regulation CEL 007 has not yet been finally adopted.

The new minimum efficiency is grade 3, which is close to the IE3 class of IEC60034-30-1, and the motors are marked according to the Chinese grade classification. The following table shows the corresponding international motor standard in February 2013 and June 2021

IEC 60034-30-1	GB 18613 (2020)	GB 18613 (2012)
IE1	–	–
IE2	–	Grade 3
IE3	Grade 3	Grade 2
IE4	Grade 2	Grade 1
[1]	Grade 1	

1) Not defined in accordance with IEC 60034-30-1. In GB18613-2020, the losses in Grade 1 have been reduced by approx. 20% compared to Grade 2 (IE4).

From 2021, the following motors are affected:

- 50 Hz, three-phase AC voltage
- Nominal voltage of up to 1000 V
- Nominal power of 0.12 kW to 1000 kW
- 2-, 4- , 6 -and **8-pole** motors
- Fan-cooled
- Design N
- Continuous duty
- Standard motors and motors with explosion protection
- Single-phase motors from 0.12 kW

Mexico

Mexican standard NOM-016-ENER-2010 has been required since December 2010. Minimum efficiency IE3 applies to the following motors:

- AC motors with squirrel-cage motor rotor
- At nominal power from 0,746 kW to 373 kW
- With a nominal voltage of up to 600 V
- 2, 4, 6 and 8-pole motors
- Continuous duty: S1 duty type

The nameplate must be in Spanish. Mexico's exemptions are the same as those of the United States.

Compliance with the standard is confirmed by the NOM marking on the nameplate.

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Applicable motors

Series	Number of poles	Sizes	Power range
DRN..	4	355MS – 355ML	250 – 375 kW/350 – 500 hp

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Russia, Kazakhstan, Belarus, Armenia, Kyrgyzstan

The following must be observed to access the market in the Eurasian Economic Union, the customs union between Russia, Belarus, Kazakhstan, Armenia, and Kyrgyzstan:

Motors marketed in countries of the Eurasian Economic Union after March 15, 2015 must bear the EAC logo (Eurasian Conformity), similar to the European CE mark.

With the EAC mark, manufacturers and suppliers confirm that a product has undergone a conformity process and meets the specified technical requirements. Conformity is issued by an authorized certifying body.

The requirements for the conformity evaluation procedure are set forth in the technical regulations of the Customs Union (TR CU). These regulations refer to standards that must be applied for a manufacturer to meet the requirements.

All of the motors listed in this catalog meet the technical regulations TR CU 004/2011 of the Customs Union for low-voltage systems.

INFORMATION

From 1 September, 2021, the new technical regulation EAEU 048/2019 will apply, which includes an obligation of efficiency from IE2 and from 2023 IE3.

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2.4.3 Certifications

In addition to mandatory approvals mentioned above, there are numerous optional certifications.

Example

A UL certification is often required for electronic and electromechanical products used in the United States. It includes requirements on the condition of products to minimize risks during operation of electrical systems. In many cases, presentation of an UL approval reduces insurance rates in the USA.

During the conformity assessment, the product characteristics are checked for compliance with the requirements and the certification is issued in case of positive results. Depending on the product category, the proof of conformity is documented with different labels.

For example, "UL-Recognized" label for a motor without integrated inverter.

For example, "UL-Listed" logo for a motor with an integrated MOVIMOT® inverter.

In addition to the shown labels for approvals and certifications, there are also numerous combinations that are not described in the catalog. If you have further questions relating to approvals and certifications, do not hesitate to contact us.

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2.5 Global motors from SEW-EURODRIVE

A global motor has approvals and certifications for several markets and can be used almost anywhere due to its wide voltage range. For this reason, global motors from SEW-EURODRIVE are the ideal solution for supplying as many countries as possible with as little effort as possible.

The motor's part number in the system's parts list does not depend on the country of use which means that only one design is required for the application. When configuring the motor, make sure to observe the dependency of voltage and frequency for different speeds. The required approvals and certifications can be selected for the requested target countries.

The table below shows the voltage range at 50 Hz and 60 Hz.

		Voltage range at 50 Hz	Voltage range at 60 Hz
Variant 1	△	380 – 415 V	440 – 480 V
	人	660 – 725 V	–

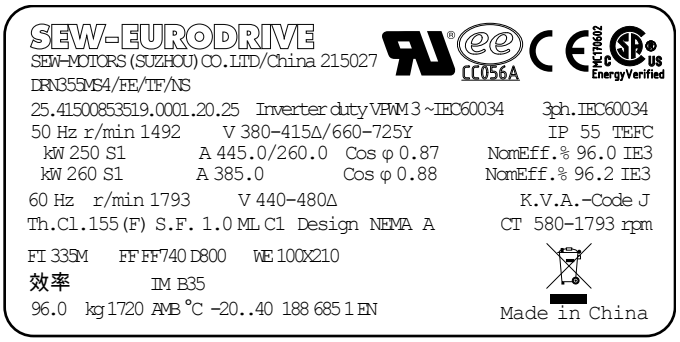
Depending on the number of requested approvals and certificates, additional nameplates or small parts for attaching a label to the motor can be added due to the amount of required information.

The example shows global nameplates for a design that can be used in the following markets. Labels that are required additionally are not shown.

- Europe, Switzerland, Turkey
- Russia, Kazakhstan, Belarus
- South Africa
- Australia, New Zealand
- China
- USA
- Canada
- Brazil

2.5.1 Example of a nameplate for the global motor

The following illustration shows an example nameplate of a "global motor".



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2.6 Overview of materials used for the motors

The following table shows an overview of the materials used.

As standard, the motors are painted with "blue/gray"/RAL 7031 machine paint in accordance with DIN 1843. Special coatings and other colors are available on request.

Component	Material	Motor size
		355
Shaft	Steel	Plain steel, quenched and tempered steel
Bearings	Deep groove ball bearing	6322-C3
	Cylindrical roller bearing	NU322
Laminated core rotor/stator	Sheet metal	Electrical steel
Rotor cage	Aluminum	Aluminum die casting (EN-AB)
Seals	Oil seals	NBR
		FKM
Drive-end endshield/flange	Gray cast iron	Gray cast iron (EN-GJL)
Stator housing	Gray cast iron	EN-GJL
Rear endshield	Gray cast iron	EN-GJL
Terminal boxes	Gray cast iron	EN-GJL
Insulation	Surfaces	NMN compound
Winding	Copper + paint	Cu-enameled wire
Terminal board	Base	Polyester resin
	Terminal stud	Nickel-plated steel/brass
Fan	Plastic	FPP
	Aluminum	EN-AC
Fan guard	Steel	Zinc-plated sheet steel

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3 Overview of types and type designation

3.1 Designs, options, and accessories

3.1.1 Output

Code in the type designation	Description
/FI	IEC foot-mounted motor
/FF	IEC flange-mounted motor with through bores
/FE	IEC flange-mounted motor with through bores and IEC feet
/2W	Second shaft end at motor
Without	FKM oil seal

3.1.2 Thermal monitoring

Code in the type designation	Description
/TF	Temperature sensor (PTC thermistor or PTC resistor)
/TH	Thermostat (bimetallic switch)
/PK	PT1000 sensor
/PT	PT100 sensor

3.1.3 Ventilation

Code in the type designation	Description
Without	Steel fan guard
/C	Canopy for fan guard
/V	Forced cooling fan
/AL	Aluminum fan

3.1.4 IP degree of protection

Code in the type designation	Description
Without	Degree of protection IP44 – IP66 according to EN 60034-5

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3.1.5 Bearings

Code in the type designation	Description
/NIB	Current-insulated rolling bearings B-side
/ERF	Reinforced bearing on A-side with roller bearing
/NS	Relubrication device
Without	Preparation for accommodating SPM measuring nipples

3.1.6 Winding

Code in the type designation	Description
Without	Thermal class F
Without	Thermal class H
/RI	Reinforced winding insulation
/RI2	Reinforced winding insulation with increased resistance against partial discharge
Without	Humidity and acid protection
Without	Tropicalized

3.1.7 Terminal box and stator

Code in the type designation	Description
Without	Gray cast iron terminal box with connection piece
Without	Anti-condensation heating
/DH	Condensation drain hole

3.1.8 Surface and corrosion protection

Code in the type designation	Description
Without	Base coat OSG
Without	Painting OS1 to OS4
Without	Corrosion protection

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3.1.9 Add-on encoders

Code in the type designation	Description
/EK8S	Add-on encoder with sin/cos interface
/EK8R	Add-on encoder with TTL(RS422) interface
/EK8C	Add-on encoder with HTL interface
/AK8W	Add-on absolute encoder with sin/cos and RS485 interface (multi-turn)
/AK8Y	Add-on absolute encoder with sin/cos and SSI interface (multi-turn)
/AK8H	Add-on absolute encoder with sin/cos and RS485 interface and HIPERFACE® protocol

3.1.10 Encoder mounting adapters

Code in the type designation	Description
/EK8A	Mounting adapter for encoders from the product range of SEW-EURODRIVE

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3.2 Type designation

The following table shows the structure of a motor type designation:

DRN355M4/FI/TF/NS	
DR	Product family
N	Code for product line identification
355M	Size
4	Number of poles
/FI	Output option
/TF	Thermal motor protection
/NS	Relubrication device

3.2.1 Designation of the motors

Designation	
DRN..	Energy-efficient motor, Premium Efficiency IE3
355	Nominal sizes: 355
MS, M, ML	Lengths
R	Power designation (identification of motors with the same size but with different power)
4	Number of poles

3.3 Serial number

The following table lists the structure of a serial number:

Example: 01. 12212343 01. 0001. 18	
01.	Sales organization
12212343	Order number (8 digits)
01.	Order item (2 digits)
0001	Quantity (4 digits)
18	End digits of the year of manufacture (2 digits)

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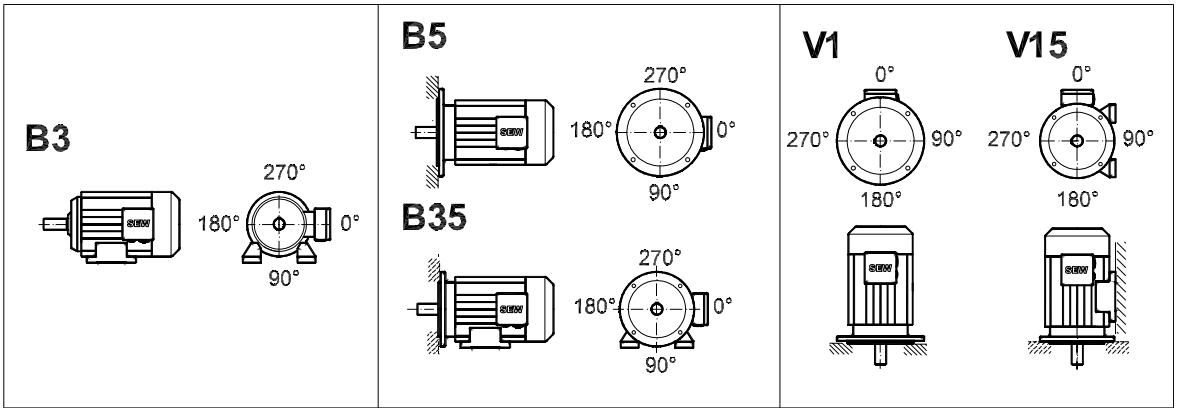
3.4 Mounting position designation of motors

3.4.1 Designs of AC motors according to DIN EN 60034-7



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3.4.2 Size/power assignment

In countries that accept the requirements of the IEC, AC motors with squirrel-cage rotor are usually classified according to the European standard EN 50347. This standard defines a unique size assignment depending on the shaft height between 63 mm and 315 mm for motors with the following data:

IEC 50347 cannot be applied because the motors listed here with power ratings of 250 kW and above are not included in it. IEC 60072 describes the geometrical dimensions of size 355 but without direct power assignment.

At different rated frequencies of 50 Hz and 60 Hz, motors of the same length have different power ratings. This can be explained by the preferred series of the corresponding rated frequencies.

INFORMATION

There are no specifications on the geometrical length of a motor, which means that motors from different manufacturers but with the same designated size can have varying lengths. For a definite statement on the adherence of the normative specifications, the geometrical dimensions of foot or flange must be compared to the relevant rated power.

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3.4.3 Position of motor terminal box and cable entry

The standard EN 60034 specifies the following designations for motor terminal box positions:

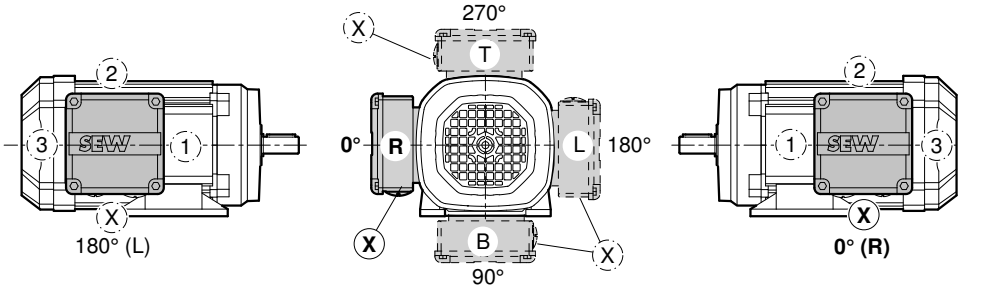
- As viewed onto the output shaft = A-side.
- Designation as R (right), B (bottom), L (left) and T (top).

Deviating from this standard, the position of the motor terminal box is specified as 0°, 90°, 180° or 270° as viewed onto the fan guard = B-side.

The selection 90° is not available in the version with foot (/FI and /FE).

The following figure shows both designations. Where the mounting position of the motor changes, R, B, L and T are rotated accordingly.

The cable entry position is specified with x, 1, 2, 3.



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INFORMATION

Without specific information regarding the terminal box, the design 0° with cable entry "x" (designation "normal" in quotation and order confirmation) is delivered.

INFORMATION

The position of the terminal box is not given on the nameplate.

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4 Technical data of the motors

4.1 Operating temperatures

The motors are designed for use in a temperature range between -20 °C and +40 °C in the standard version. According to IEC 60034, the standard temperature range is lower with -15 °C to +40 °C.

If the motors are operated outside of the standard temperature range, modifications may be necessary. Contact SEW-EURODRIVE in such a case.

4.2 Key to the data tables

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
cosφ	Power factor
$\eta_{50\%}$	Efficiency at 50 % of the rated power
$\eta_{75\%}$	Efficiency at 75 % of the rated power
$\eta_{100\%}$	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_K/M_N	Breakdown torque ratio
m_{Mot}	Mass of the motor
J_{mot}	Mass moment of inertia of the motor

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4.3 DRN355 motors, 380/660 V, 50 Hz, 4-pole

Information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	$\eta_{50\%}$ %	$\eta_{75\%}$ %	$\eta_{100\%}$ %	I_A/I_N	M_A/M_N M_H/M_N	M_K/M_N
DRN 355MS 4	250	1 600	1491	445	0.88	95.5	96.0	96.0	6.2	2.0 1.4	2.6
DRN 355M 4	315	2 000	1491	560	0.89	95.6	96.0	96.0	6.8	2.2 1.5	2.8
DRN 355ML 4	355	2250	1491	630	0.89	95.5	96.0	96.0	6.8	2.1 1.5	2.7

Further information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	m_{Mot} kg	J_{mot} 10^{-4} kgm^2
DRN 355MS 4	250	1 600	1491	1720	73100
DRN 355M 4	315	2 000	1491	1930	90600
DRN 355ML 4	355	2250	1491	2070	102 000

4.4 DRN355 motors, 400/690 V, 50 Hz, 4-pole

Information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	$\eta_{50\%}$ %	$\eta_{75\%}$ %	$\eta_{100\%}$ %	I_A/I_N	M_A/M_N M_H/M_N	M_K/M_N
DRN 355MS 4	250	1 600	1492	430	0.87	95.5	96.0	96.0	6.7	2.2 1.6	3.0
DRN 355M 4	315	2 000	1492	540	0.88	95.6	96.1	96.0	7.4	2.4 1.6	3.1
DRN 355ML 4	355	2250	1492	610	0.87	95.6	96.0	96.0	7.4	2.4 1.6	3.0

Further information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	m_{Mot} kg	J_{mot} 10^{-4} kgm^2
DRN 355MS 4	250	1 600	1492	1720	73100
DRN 355M 4	315	2 000	1492	1930	90600
DRN 355ML 4	355	2250	1492	2070	102 000

4.5 DRN355 motors, 380/660 V, 60 Hz, 4-pole

Information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	$\eta_{50\%}$ %	$\eta_{75\%}$ %	$\eta_{100\%}$ %	I_A/I_N	M_A/M_N M_H/M_N	M_K/M_N
DRN 355MS 4	260	1380	1793	465	0.86	95.3	96.0	96.2	7.7	2.4 1.7	3.2
DRN 355MR 4	300	1 600	1792	560	0.89	95.2	96.0	96.2	8.6	2.6 2.0	3.2
DRN 355M 4	335	1790	1791	630	0.89	95.5	96.1	96.2	7.7	2.3 1.8	2.9
DRN 355ML 4	375	2 000	1792	660	0.89	95.5	96.1	96.2	7.6	2.1 1.4	2.6

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Further information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	m_{Mot} kg	J_{mot} 10^{-4} kgm^2
DRN 355MS 4	260	1380	1793	1720	73100
DRN 355MR 4	300	1 600	1792	1930	90600
DRN 355M 4	335	1790	1791	1930	90600
DRN 355ML 4	375	2 000	1792	2070	102 000

4.6 DRN355 motors, 440/– V, 60 Hz, 4-pole

Information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	$\eta_{50\%}$ %	$\eta_{75\%}$ %	$\eta_{100\%}$ %	I_A/I_N	M_A/M_N M_H/M_N	M_K/M_N
DRN 355MS 4	260	1390	1792	400	0.89	95.3	96.0	96.2	6.9	2.0 1.4	2.7
DRN 355MR 4	300	1 600	1792	460	0.88	95.2	96.0	96.2	8.4	2.7 2.1	3.3
DRN 355M 4	335	1790	1791	510	0.89	95.4	96.1	96.2	7.6	2.4 1.9	3.0
DRN 355ML 4	375	2 000	1792	580	0.89	95.5	96.1	96.2	7.6	2.1 1.4	2.6

Further information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	m_{Mot} kg	J_{mot} 10^{-4} kgm^2
DRN 355MS 4	260	1390	1792	1720	73100
DRN 355MR 4	300	1 600	1792	1930	90600
DRN 355M 4	335	1790	1791	1930	90600
DRN 355ML 4	375	2 000	1792	2070	102 000

4.7 DRN355 motors, 460/– V, 60 Hz, 4-pole

Information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	$\eta_{50\%}$ %	$\eta_{75\%}$ %	$\eta_{100\%}$ %	I_A/I_N	M_A/M_N M_H/M_N	M_K/M_N
DRN 355MS 4	260	1380	1793	385	0.87	95.4	96.1	96.2	7.4	2.2 1.6	3.0
DRN 355MR 4	300	1 600	1793	445	0.87	95.2	96.0	96.2	9.1	2.9 2.3	3.7
DRN 355M 4	335	1790	1792	495	0.88	95.5	96.1	96.2	8.2	2.6 2.1	3.3
DRN 355ML 4	375	2 000	1793	550	0.88	95.5	96.1	96.2	8.3	2.3 1.6	2.9

Further information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	m_{Mot} kg	J_{mot} 10^{-4} kgm^2
DRN 355MS 4	260	1380	1793	1720	73100
DRN 355MR 4	300	1 600	1793	1930	90600
DRN 355M 4	335	1790	1792	1930	90600
DRN 355ML 4	375	2 000	1793	2070	102 000

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4.8 DRN355 motors, 575/– V, 60 Hz, 4-pole

Information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	$\eta_{50\%}$ %	$\eta_{75\%}$ %	$\eta_{100\%}$ %	I_A/I_N	M_A/M_N M_H/M_N	M_K/M_N
DRN 355MS 4	260	1380	1794	310	0.86	95.3	96.0	96.2	7.7	2.4 1.7	3.2
DRN 355MR 4	300	1 600	1793	355	0.87	95.2	96.0	96.2	9.1	2.9 2.3	3.7
DRN 355M 4	335	1790	1792	395	0.88	95.5	96.1	96.2	8.2	2.6 2.1	3.3
DRN 355ML 4	375	2 000	1793	450	0.89	95.5	96.1	96.2	8.0	2.2 1.5	2.7

Further information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	m_{Mot} kg	J_{mot} 10^{-4} kgm^2
DRN 355MS 4	260	1380	1794	1720	73100
DRN 355MR 4	300	1 600	1793	1930	90600
DRN 355M 4	335	1790	1792	1930	90600
DRN 355ML 4	375	2 000	1793	2070	102 000

4.9 DRN355 global motors, 50 Hz/60 Hz, 4-pole

Information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	I_N A	cosφ	$\eta_{50\%}$ %	$\eta_{75\%}$ %	$\eta_{100\%}$ %	I_A/I_N	M_A/M_N	M_H/M_N	M_K/M_N
DRN 355MS 4	250 260	1 600 1380	1492 1793	445 385	0.87 0.87	95.5 95.4	96.0 95.4	96.0 96.2	6.7 7.4	2.2 2.2	1.6 1.6	3.0 3.0
DRN 355M 4	315 335	2 000 1790	1492 1792	560 495	0.88 0.88	95.6 95.5	96.1 95.5	96.0 96.2	7.4 8.2	2.4 2.6	1.6 2.1	3.1 3.3
DRN 355ML 4	355 355	2250 1890	1492 1793	630 550	0.87 0.88	95.6 95.5	96.0 95.5	96.0 96.2	7.4 8.3	2.4 2.3	1.6 1.6	3.0 2.9

Further information on motors

Motor	P_N kW	M_N Nm	n_N min^{-1}	m_{Mot} kg	J_{mot} 10^{-4} kgm^2
DRN 355MS 4	250 260	1 600 1380	1492 1793	1720	73100
DRN 355M 4	315 335	2 000 1790	1492 1792	1930	90600
DRN 355ML 4	355 355	2250 1890	1492 1793	2070	102 000

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5 Drive selection

Observe the explanations and notes in this chapter during drive selection.

5.1 Notes on electromagnetic compatibility – EMC

5.1.1 EMC Directive 2014/30/EU

AC motors are designed for use as components for installation in machinery and systems. The manufacturer of the machine or system is responsible for complying with the EMC Directive 2014/30/EU.

5.1.2 EMC measures

The motor can be equipped with grounding terminals, depending on size and design.

- External grounding terminals **LF** (low frequency grounding)
- External grounding terminals **HF** (high frequency grounding)

Metallic cable glands and shielded cables increase the electromagnetic compatibility.

5.1.3 Line operation

AC (brake) motors by SEW-EURODRIVE adhere to the EMC requirements of EN 60034-1 when used in accordance with their designated use in continuous duty. No interference prevention measures are required.

5.1.4 Switching operation

Switching operation of the motor requires suitable measures for interference suppression from the switching device.

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5.1.5 Safe switching of motor and brakes

Note the information in the following sections for switching of inductances.

Switching of motor windings

Switching of motor windings can create voltage peaks. Voltage peaks can damage windings and contacts. To avoid this, install the incoming cables with varistors.

Suppressor circuit on the switching devices

According to standard 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.

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5.2 Drive selection – non-controlled motor

5.2.1 Flow diagram

The following flow diagram shows the project planning procedure for a non-controlled motor without gear unit that is operated on the grid.

Necessary information regarding the machine to be driven

- Technical data
- Required duty type
- Travel cycle and switching frequency
- Other specifications (such as minimum and maximum acceleration, run-up time, etc.)
- Ambient conditions
- Country of use, voltage and frequency
- Required approvals and certifications
- Installation situation, available space

↓

Calculation of the relevant application data

- Travel diagram (acceleration, maximum speed, deceleration, pauses)
- Speeds on 50 Hz or 60 Hz supply system
- Static and dynamic torques
- Static and dynamic overhung loads
- Static and dynamic power requirements

↓

Motor selection

- Specify motor voltage and motor frequency
- Identify the efficiency class demanded in the country of use, and required approvals and certifications
- Static and maximum torque
- Consider derating due to installation altitude or ambient temperature
- Permitted overhung loads
- Permitted switching frequency
- Maximum speed
- Number of poles
- Duty type
- Mounting position selection
- Motor options (brake, ventilation, plug connectors, motor protection, degree of protection, painting, etc.)

↓

Ensure that all requirements have been met.

Also refer to chapter "Rated data" (→ 🗎 13).

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5.3 Drive selection – controlled motor

5.3.1 Inverter operation

Suitability for inverter operation

AC motors by SEW-EURODRIVE can be operated with inverters.

If the motors are operated at the frequency inverter at more than 1800 min^{-1}, SEW-EURODRIVE recommends using shaft seals made of FKM (fluorocarbon rubber) on the A and B sides of the motor.

Installation note

For operating AC motors with an inverter, refer to the installation and EMC instructions provided by the inverter manufacturer.

Connecting an encoder to the inverter

Observe the following instructions when connecting an encoder:

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

Connection of a PTC thermistor /TF to the inverter

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

INFORMATION

Motor protection device at ambient temperatures of < 0 °C

Operating motors in CFC and VFC mode at ambient temperatures of less than 0 °C makes using a Pt1000 temperature sensor mandatory to reach the optimum motor torque.

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5.3.2 Flow diagram

The following flow diagram shows how to determine a controlled drive. The drive consists of a motor that is powered by an inverter.

For the flow diagram on project planning for a gearmotor, refer to the gearmotor catalogs.

Necessary information regarding the machine to be driven

- Technical data
- Travel cycle
- Speed setting range
- Positioning accuracy
- Ambient conditions
- Country of use, voltage and frequency
- Required approvals and certifications
- Installation condition

↓

Calculation of the relevant application data

- Travel diagram (acceleration, maximum speed, deceleration, pauses)
- Motor speeds
- Static and dynamic torques
- Static and dynamic overhung loads
- Static and dynamic power requirements
- Regenerative power and cyclic duration factor
- Thermal rms torque
- Thermal rms power

↓

Motor selection

- Specify motor voltage and motor frequency
- Identify the efficiency class required in the country of use, required approvals and certifications
- Static and maximum torque
- Consider derating due to installation altitude or ambient temperature
- Observe dynamic and thermal torque curves
- Permitted overhung loads
- Maximum speed
- Number of poles
- Duty type
- Mounting position selection
- Encoder selection based on requirements
- Motor options (brake, ventilation, plug connectors, thermal motor protection, degree of protection, painting, oil seal, etc.)

↓

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Selecting the inverter

- Motor/inverter assignment
- Continuous current and peak current for current-controlled inverters/axes
- Selection of additional inverter options according to functional requirements

↓

Ensure that all requirements have been met.

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5.3.3 Product range of inverters by SEW-EURODRIVE

The control cabinet mounting of MOVIDRIVE® B is available for motor size 355 for implementing electronically controlled drives.

Control cabinet installation

- MOVIDRIVE® B

  The application inverter MOVIDRIVE® B in degree of protection IP10/IP20 and a power range of 0.55 to 315 kW is designed for torque control, speed control, and positioning control of asynchronous motors and synchronous motors. The large number of basic functionalities, the broad spectrum of options, and the excessive accessories make MOVIDRIVE® B a universal application inverter for all types of applications. In combination with control technology of SEW-EURODRIVE, it is the ideal device, both technically and economically, for demanding tasks in conveying, handling technology, processing technology, and kinematics applications.

Product characteristics of MOVIDRIVE® B

The most important product characteristics are listed below.

Control cabinet installation

MOVIDRIVE® B

Product characteristics	MOVIDRIVE® B
Voltage range	3 × AC 380 – 500 V (0.55 – 315 kW)
Performance/current range	0.55 – 250 kW
Overload capacity	150% I_N for 60 seconds
	125% I_N continuously in operation without overload
4Q capable	Yes, with integrated brake chopper as standard
Control mode	V/f
	VFC voltage-controlled vector control
	CFC current-controlled vector control
Encoder input	Option
Torque control	Yes
Speed control	Yes
Positioning control	Yes
Serial interfaces	System bus (SBus) and RS485
Fieldbus interfaces	Optionally PROFIBUS DP, CANopen, DeviceNet™, PROFINET IO, EtherNet/IP™, EtherCAT®
Maximum output frequency	599 Hz
STO – Safe Torque Off	Yes
Approvals and certifications	CE, UL, cUL, RCM, EAC

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5.3.4 Non-SEW inverters

The motors can be operated with third-party inverters. Observe the information on use with third-party inverters, see chapter "AC motors on third-party inverters" (→ 🗎 50).

5.3.5 Reinforced insulation for inverter operation

When asynchronous motors are operated at an inverter, the winding is subject to higher loads than would be the case in line operation without inverter.

An inverter pulses the DC voltage of the DC link (U_z) to the supply cables to the motor. This pulsing takes place in the kHz range, which means several thousand ON and OFF switchings per second – at SEW-EURODRIVE usually 2.5 or 4 kHz for higher power ratings.

The standard winding can resist voltage peaks up to:

- Line-to-line voltages U_{LL} = 1560 V
- Line-to-ground voltages U_{LG} = 1100 V

As a result, using SEW-EURODRIVE AC motors with standard winding at an inverter is permitted up to 500 V.

If a motor is operated at an inverter under the following conditions, the double voltage pulse can exceed the maximum permissible value of the standard winding of 1560 V:

- The inverter supplies the motor with a voltage of 550 V or higher.
- The DC link voltage is increased to DC 742.5 V.

Additional measures are required to protect the motor winding. The options reinforced winding insulation /RI (chapter "Reinforced winding insulation" (→ 🗎 100)) and reinforced winding insulation with increased resistance against partial discharge /RI2, see chapter "Reinforced winding insulation with increased resistance against partial discharge" (→ 🗎 100) are available.

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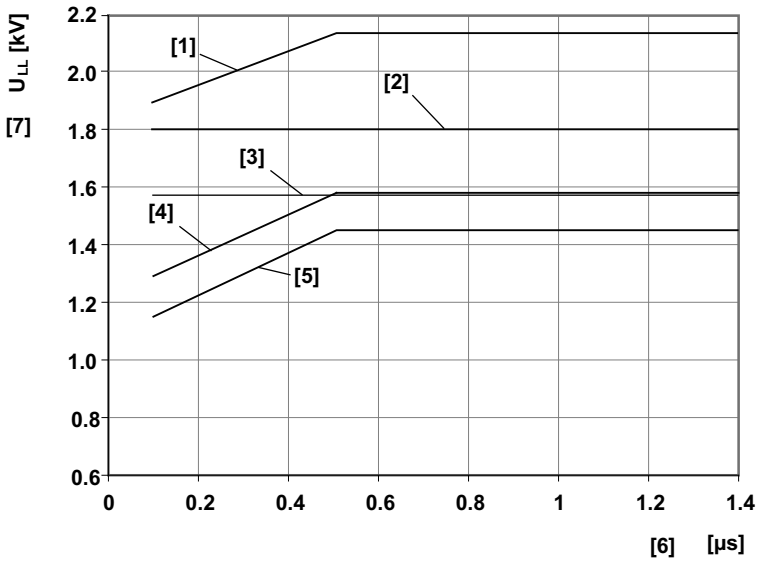
5.3.6 AC motors on third-party inverters

When motors are powered from inverters, observe the wiring instructions issued by the inverter manufacturer. It is essential that you observe the operating instructions for the inverter.

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



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[1] Permitted pulse voltage for motors with reinforced insulation and increased resistance against partial discharge (/RI2)
[2] Permitted pulse voltage for motors with reinforced insulation (/RI)
[3] Permitted pulse voltage according to NEMA MG1 part 31, $V_N \leq 500$ V
[4] Permitted pulse voltage for nominal voltages $V_N \leq 500$ V, star connection
[5] Permitted pulse voltage for nominal voltages $V_N \leq 500$ V, delta connection
[6] Duration of voltage increase
[7] Permitted pulse voltage

INFORMATION

Compliance with the limit values must be checked and taken into account as follows:

- The supply voltage level at the third-party inverter
- The threshold of the brake chopper voltage
- The operating mode of the motor (motor mode/generator mode)

→ If the permitted pulse voltage is exceeded, you must install limiting measures, such as filters, chokes or special motor cables. Consult the manufacturer of the inverter.

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5.3.7 IVIC class for motors

The standard IEC 60034-18-41:2014 defines the stress categories for motors with the following characteristics:

- Nominal voltages over 300 V
- With electrical insulation system that is free of partial discharge
- Operation at a frequency inverter with intermediate voltage circuit

The stress categories, or impulse voltage insulation classes (IVIC), are divided into classes A to D.

Contact SEW-EURODRIVE if you need confirmation of the IVIC class.

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5.3.8 Limit characteristic curves of the motors in inverter operation

If the motors are operated with inverter, the thermally permitted torque must be observed during drive project planning. The thermally permitted torque depends on the following factors:

- Motor size
- Duty type
- Type of cooling: Self-cooling or forced cooling fan
- Base frequency:
  - f_{base} = 50 Hz (400/690 V △/人)
  - f_{base} = 60 Hz (460 V △)

The effective operating point derived from the travel cycle must be below the limit curve. It comprises the effective torque and the mean speed.

The following conditions apply to the shown limit curves:

- Motor in S1 duty type on 50 Hz supply system
- Motor in corresponding voltage range
- Motor in thermal class 155 (F)

INFORMATION

Observe the maximum limit speeds in chapter "Rated data" (→ 🗎 13) as well as the project planning notes for motors and mounted options.

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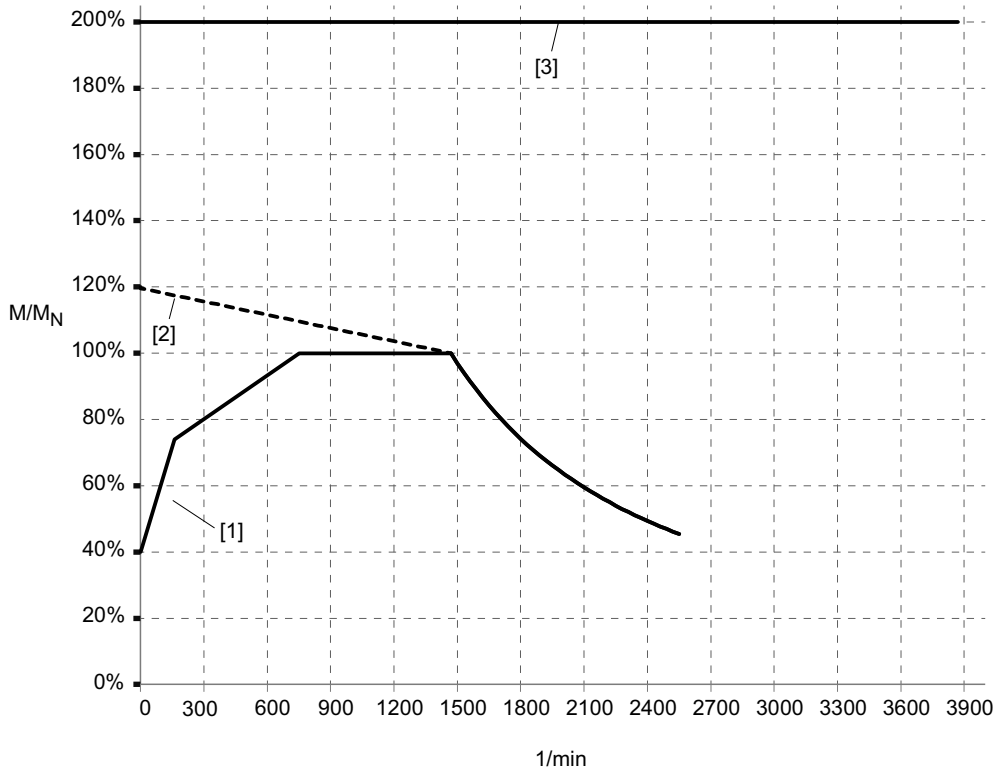
f_{base} = 50 Hz (400/690 V Δ/人, 50 Hz) DRN355 motor, 4-pole (self-cooling and forced air cooling)

The following figure shows the thermal limit characteristic curve of a DRN.. motor at a base frequency f_{base} of 50 Hz. A distinction is made between motors with self-cooling and forced air cooling (option forced cooling fan /V).



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[1] S1 duty type with self-cooling DRN355
[2] S1 duty type with forced air cooling DRN355
[3] Mechanical limit for gearmotors

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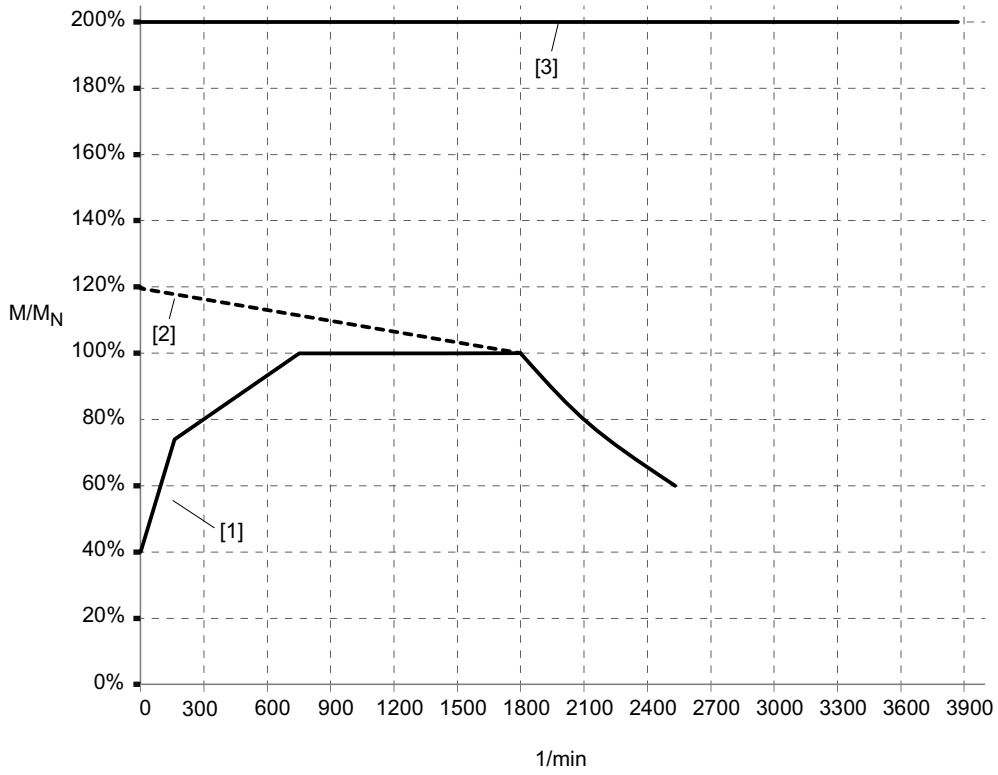
f_{base} = 60 Hz (460 V Δ, 60 Hz) DRN355 motor, 4-pole (self-cooling and forced air cooling)

The following figure shows the thermal limit characteristic curve of a DRN.. motor at a base frequency f_{base} of 60 Hz. A distinction is made between motors with self-cooling and forced air cooling (option forced cooling fan /V).



33841771915

[1] S1 duty type with self-cooling DRN355
[2] S1 duty type with forced air cooling DRN355
[3] Mechanical limit for gearmotors

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5.4 Electrical properties

5.4.1 Frequencies and voltages

Frequencies

The AC motors from SEW-EURODRIVE are delivered suitable for line frequency operation of 50 Hz or 60 Hz, depending on the configuration. The nameplates of the relevant motors list data referring to the configuration, see chapter "Type designation" (→ 🗎 35).

The global motor design is an exception to that. The global motor is designed both for operation on a 50 Hz and on a 60 Hz supply system. The nameplates of global motors list information for operation on a 50 Hz supply system, as well as information for operation on a 60 Hz supply system.

Unless specified otherwise, the technical specifications in this catalog refer to motors operated at a line frequency of 50 Hz.

Voltages

Depending on the configuration, AC motors from SEW-EURODRIVE are designed for operation at a fixed voltage (e.g. 400 V △/690 V ⅄) or for operation in a voltage range (e.g. 380 V – 415 V △/660 V – 725 V ⅄), see chapter "Type designation" (→ 🗎 35).

The following combinations of rated frequency and rated voltage are possible:

- 50 Hz fixed voltage
- 60 Hz fixed voltage
- 50 Hz voltage range
- 50/60 Hz voltage range

The tolerances A and B as specified in standard IEC 60034 apply to rated frequencies as well as to nominal voltages, see chapter "Tolerances according to IEC 60034-1" (→ 🗎 57).

The AC motors from SEW-EURODRIVE are available in a variety of nominal voltages. Should you require a nominal voltage deviating from the local standard, contact SEW-EURODRIVE.

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5.4.2 Standard nominal voltages at 50 Hz or 50/60 Hz, depending on the motor size

As standard, motors in the variants 50 Hz or 50/60 Hz are operated in the wiring diagram R13, i.e. in star or delta connection.

The nominal voltage assigned to the motors by SEW-EURODRIVE as standard varies depending on the motor size and motor power.

The following table lists the nominal voltages for motors designed for operation at a 50 Hz or 50/60 Hz supply system depending on the rated power.

Motor	Power	50 Hz fixed voltage	50 Hz voltage range	50/60 Hz voltage range
	kW	V	V	V
DRN355MS – DRN355ML	250 – 355	400△/690⅄	380 – 415△/660 – 725⅄	380 – 415△/660 – 725⅄
				440 – 480△/–

Due to the tolerances A and B as specified in standard IEC 60034, motors and brakes for motors for AC 400/690 V can also be operated at AC 380/660 V supply systems.

5.4.3 Motor properties for operation on a 60 Hz or 50/60 Hz supply system

The motors are also available for operation at a line frequency of 60 Hz and 50/60 Hz.

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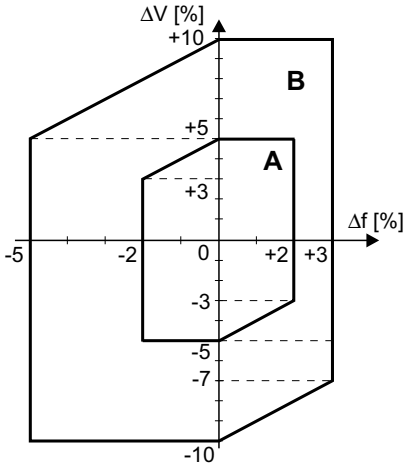
5.5 Tolerances according to IEC 60034-1

In accordance with IEC 60034-1, the following tolerances are permitted for electric motors with rated voltage (also applies to the rated voltage range):

Voltage and frequency	Tolerance A and tolerance B
Efficiency η P_N ≤ 150 kW P_N > 150 kW	-0.15 × (1-η) -0.1 × (1-η)
Power factor cosφ	$-\frac{1 - \cos\varphi}{6}$
Slip P_N < 1 kW P_N ≥ 1 kW	± 30% ± 20%
Starting current	+ 20%
Tightening torque	-15% to +25%
Breakdown torque	-10%
Pull-up torque	-15%
Mass moment of inertia	±10%

5.5.1 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 marked "0" in the following figure identifies the respective ratings for frequency as well as 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 heating may deviate slightly from the rated voltage and rated frequency.

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 outer limits of tolerance range B.

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5.5.2 Undervoltage

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

5.5.3 Overvoltage

Overvoltage results in a higher torque development, but also in more intense heating of the motor winding.

Overvoltages exceeding the tolerances permitted in the standards may cause damage at the motor winding.

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5.6 Thermal classes according to IEC 60034-1

The motor standards of the IEC 60034-1 series describe the designs and identification of thermal classes. This defines the limit overtemperatures for the winding subject to the rated torque at a maximum ambient temperature of +40 °C. A thermal reserve of 10 – 15 Kelvin for eventual voltage tolerances is also provided.

SEW-EURODRIVE indicated the thermal class of the motor with the numerical value as required in the standards and with a letter.

As standard, DRN355 size asynchronous motors are designed in thermal class 155 (F). A higher thermal class with 180 (H) can be selected on request.

Thermal classification/ thermal class	Maximum winding temperature
155 (F)	155 °C
180 (H)	+180° C

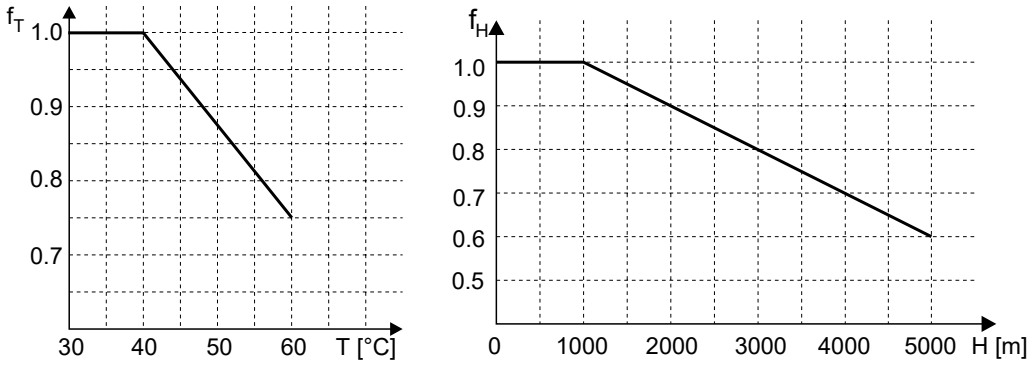
5.6.1 Power reduction

The rated power P_N of a motor depends on the ambient temperature and the altitude. The rated power stated on the nameplate applies to an ambient temperature of 40 °C and a maximum installation altitude of 1000 m above sea level. The power must be reduced according to the following formula in the case of higher ambient temperatures or altitudes:

$$\mathbf{P_{Nred} = P_N \times f_T \times f_H}$$

The following diagrams show the power reduction depending on the ambient temperature and installation altitude.

The factors f_T and f_H apply to the motors:



T Ambient temperature
H Installation altitude above sea level

Contact SEW-EURODRIVE for ambient temperatures over 60 °C or installation altitudes above 5000 m.

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5.7 Thermal monitoring

In accordance with the standard IEC 60034-11, two fundamental states are taken into account when monitoring a motor against thermal overload:

- Thermal overload with gradual temperature change
- Thermal overload with rapid temperature change

5.7.1 Thermal overload with gradual temperature change

If the motor is subject to thermal overload with a gradual temperature rise, the thermal protection system must limit the winding temperature from critical rising.

Possible causes for heating:

- Failure of the cooling system, e.g. due to residue in the cooling channels or at the cooling fins on the motor housing.
- Reduced flow of cooling air, e.g. due to completely or partially covered fan grille.
- Renewed drawing in of already heated cooling air.
- Excessive rise in the ambient temperature or the coolant temperature.
- Rising mechanical overload.
- Voltage drop, overvoltage or asymmetry in the motor supply over an extended period.
- A cyclic duration factor deviating from the initial specifications at a motor dimensioned for intermittent duty.
- Deviations from the rated frequency.

5.7.2 Thermal overload with rapid temperature change

If the motor is subject to thermal overload with a rapid temperature rise, then the thermal protection system must limit the winding temperature from rising further.

Possible causes for rapid heating:

- Rotor blockage.
- Phase failure.
- Start-up under special, non-designated conditions, e.g. with excess mass moment of inertia, insufficient voltage, or extremely high load torque.
- Rapid load increase.
- Repeated start-up over short time intervals.

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5.7.3 Selecting the correct motor protection device

Selecting the correct motor protection device significantly influences the operational safety of the motor. There are 2 kinds of protection devices: current-controlled and motor temperature-dependent.

Current-controlled protection devices are usually installed in the control cabinet.

Examples of current-controlled protection devices:

- Fuses
- Motor circuit breaker

Temperature-dependent protection devices are usually installed directly in the motor winding.

PTC thermistors, bimetallic switches, or temperature sensors respond when the maximum permitted winding temperature is reached. The advantage is that temperatures are detected where they actually occur and where they reach the highest values.

SEW-EURODRIVE provides 4 fundamental types of thermal motor protection for the motors:

- PTC thermistor /TF, chapter "PTC thermistor /TF (PTC)" (→ 🗎 88)
- Bimetallic temperature switch /TH, chapter "Temperature switch /TH" (→ 🗎 90)
- Temperature sensor /PT, chapter "Temperature sensor /PT" (→ 🗎 92)
- Temperature sensor /PK, chapter "Temperature sensor /PK" (→ 🗎 93)

INFORMATION

Motor protection device at ambient temperatures of < 0 °C

Operating motors in CFC and VFC mode at ambient temperatures of less than 0 °C makes using a Pt1000 temperature sensor mandatory to reach the optimum motor torque.

Fuses

Fuses do not protect the motor from overload, but are used to protect supply cables. They are exclusively used as short-circuit protection and may detect a rotor blockage, as this condition is similar to a short-circuit on the terminals.

Motor circuit breakers

Motor circuit breakers offer adequate protection against overload in operation with low switching frequencies and brief start-ups. The motor circuit breaker is set to the rated motor current. In combination with DRN.. motors, ensure that the motor circuit breakers used are suitable for IE3 motors.

Motor circuit breakers are not adequate as the sole means of protection given switching operation with a high switching frequency (> 60 per h) and for high inertia starting. In these cases, we recommend using PTC thermistors in addition, see chapter "PTC thermistor /TF (PTC)" (→ 🗎 88).

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PTC thermistors

Three PTC thermistors (PTC, characteristic curve according to DIN 44082) are integrated into the winding overhang of the motor and connected in series. The terminals are in the terminal box.

Evaluation takes place at a respective input of the inverter or at a trip switch in the control cabinet.

Motor protection with PTC thermistor /TF (see chapter "PTC thermistor /TF (PTC)" (→ 🗎 88)) provides comprehensive protection against thermal overload. Motors protected in this way can be used for heavy starting, switching and braking operation and in case of unstable supply systems. A motor circuit breaker is usually installed as well.

SEW-EURODRIVE recommends using motors equipped with PTC thermistor for inverter operation.

Bimetallic switches

In contrast to the PTC thermistors, bimetallic switches do not require specific evaluation electronics. They can be directly included into the monitoring circuit of the motor.

Three bimetallic switches are integrated into the winding overhang of the motor and connected in series, see chapter "Temperature switch /TH" (→ 🗎 90). The terminals are located in the terminal box.

To achieve maximum motor protection, the trigger temperature is slightly lower than the limit value of the thermal class selected for the motor.

Temperature sensor

A temperature sensor is integrated into the winding of the motor. The winding temperature of the motor can be constantly determined with an evaluation unit by means of the characteristic curve of the sensor.

The sensor has a nearly linear characteristic curve and a high level of accuracy.

The sensors do not bear any relation to the selected thermal class of the motor and can be integrated into the winding in addition to a PTC thermistor or a bimetallic switch.

For detailed information, refer to chapters "Temperature sensor /PT" (→ 🗎 92) and "Temperature sensor /PK" (→ 🗎 93).

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5.7.4 Comparison of the safety mechanisms

The following table shows the suitability of the various protection devices and temperature sensors for different causes of tripping.

Cause of the increased thermal load	Current-dependent protection device		Temperature-dependent protection device			
	Fuse	Motor circuit breaker	PTC thermistor /TF	Bimetallic switch /TH	Temperature sensor /PT[1)]	Temperature sensor /PK[1)]
Overcurrents up to 200% I_N	–	x	x	x	x	x
Heavy start	–	•	x	•	•	•
Direct switching of the direction of rotation	–	•	x	•	–	–
Switching operation up to Z = 30 1/h	–	•	x	x	–	–
Stalling	•	•	•	•	•	•
Phase failure	–	•	x	x	–	–
Voltage deviation (> tolerance B)	–	x	x	x	x	x
Frequency deviation (> tolerance B)	–	x	x	x	x	x
Insufficient motor cooling	–	–	x	x	x	x

1) With adapted evaluation unit

x Comprehensive protection
• Limited protection
– No protection

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5.8 Output designs

Asynchronous motors from SEW-EURODRIVE are available in different flange and foot-mounted designs. This chapter provides a list of the available designs.

In the standard version, the output shaft is designed as IEC shaft end with full key or half key.

AC motors from SEW-EURODRIVE are equipped with a pinion shaft end for direct mounting to gear units.

5.8.1 /FI – IEC foot-mounted motor

The /FI foot-mounted motor is a motor design with drive-end endshield (closed flange), shaft end and feet pursuant to IEC 60072-1/EN 50347 (comparable to IEC basic mounting position IM B3). The dimension of the feet and the shaft end are shown on the nameplate. This ensures a reference to the geometrical dimensions given in EN 50347.

5.8.2 /FF – IEC flange-mounted motor with through bores

Flanges of the type /FF are designed with through bores according to IEC 60072-1 (comparable with IEC basic mounting position IM B5). Both the flange diameter and the diameter where the bores are located and the shaft end comply with the specifications of the standard.

5.8.3 /FE – IEC flange-mounted motor with through bores and IEC feet

Combination of /FI and /FF (comparable with IEC basic mounting position IM B35).

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5.9 Input side shaft end

In the standard design, the input side shaft end (A-side) of an AC motor from SEW-EURODRIVE is designed with keyway according to EN 50347 and full key according to DIN 6885. On request, the shaft ends can also be delivered as smooth shaft ends and without a key and keyway.

A special form of input side shaft end for direct mounting to gear units from SEW-EURODRIVE is the pinion shaft end that represents the input element for the gear unit.

Rotors are balanced with a half key as standard, see chapter "Vibration class and increased vibration stress" (→ 🗎 72) class.

Contact SEW-EURODRIVE if you need the motors to be delivered with rotors with full-key balancing (deviating from the standard). Rotors balanced in this manner are labeled with a "V" on the front shaft end face in line with the standard regulations.

5.9.1 Shaft ends

DRN355 motors

The following table lists the shaft ends for DRN.. motors.

Size	Shaft end
355	100 × 210 (standard)
355	95 × 170

5.9.2 Center of gravity of motors

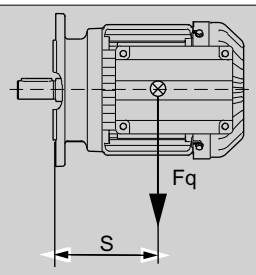
The center of gravity of a motor is a theoretical variable. This theoretical value is determined under the assumption that the entire mass of the motor is concentrated in one point and acts on this point with the weight F_q. The mass of the motor can be found in the chapter "Technical data of the motors" (→ 🗎 38).

The center of gravity is relative to the flange position and stated with regard to the standard IEC flange (B5).

Also consider the center of gravity for the combination of motors that are mounted to a gear unit with an adapter.

Changed designs or additional options influence the center of gravity. Consult SEW-EURODRIVE in case of deviating motor designs or changed options.

DRN.. motors



Motor	Center of gravity S
	mm
DRN355MS	672

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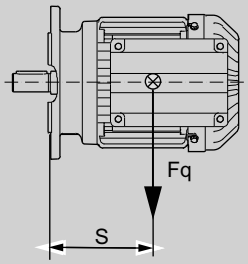

Motor	Center of gravity S
	mm
DRN355M	676
DRN355ML	686

5.9.3 Overhung and axial loads for motor shaft ends

Permitted axial load

The maximum permitted axial load F_A is determined by multiplying the maximum permitted overhung load F_{RX} with the factor 0.2.

$F_A = 0.2 \times F_{Rx}$

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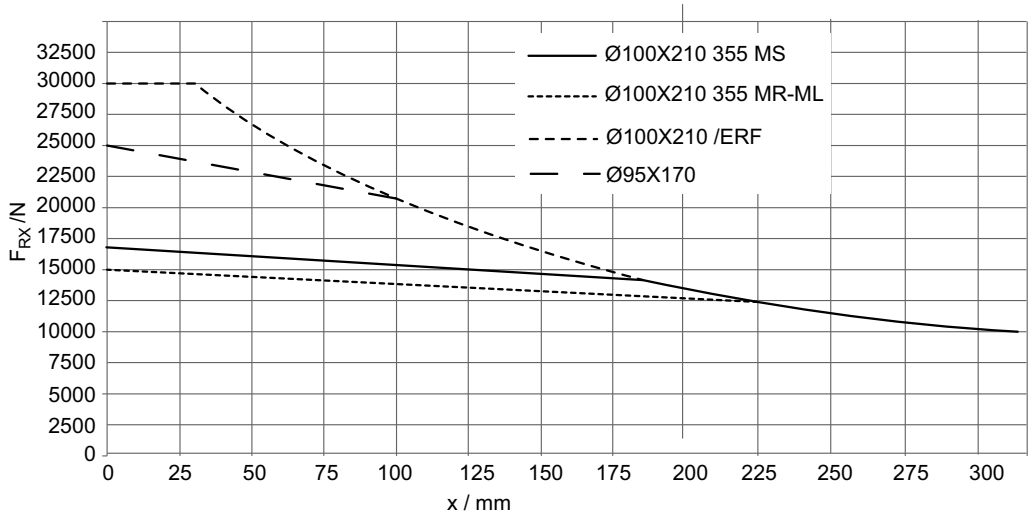
Overhung load diagrams

Key

4	Number of poles
Ø100x210	Shaft end

For overhung load diagrams of the second shaft end, refer to chapter "Output" (→ 🗎 87).

Overhung load diagram for DRN355



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5.10 Bearings

5.10.1 Bearing types used

Asynchronous motors are delivered with deep groove ball bearings of the 63.. series with cover plate and bearing clearance C3 as standard.

Depending on the selected options, the bearing selection can deviate from the standard.

Motor size	IEC motor	
	A-side bearing	B-side bearing
DRN355	6322-C3	6322-C3

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5.11 Maximum speeds

The mechanical limit speeds of the motors depend on the size and are binding for operation on inverters. For limit speeds that have been configured differently, larger limit speeds may be possible depending on the options. Contact SEW-EURODRIVE in such cases. The guide values for limit speeds are listed in the following table:

Motors	Mechanical limit speed n_{max} in min^{-1}
	Motor
DRN355	2500

Other motor options

Additional motor options influence these speeds. Contact SEW-EURODRIVE in such cases.

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5.12 Ventilation

Asynchronous motors from SEW-EURODRIVE are fan-cooled (IC code 411) as standard. The fan is attached to the rotor shaft at the B-side of the motor. The impellers of the fan wheels generate the same air flow, irrespective of the direction of rotation. The intensity of the air flow depends on the motor speed. This means that the cooling capacity of the motor fan decreases with lower motor speeds (e.g. FI-controlled drives). For this reason, the rated motor torque can be decreased at low speeds only with additional measures during continuous duty.

The forced cooling fan option is available as another ventilation option, see chapter "Forced cooling fan" (→ 🗎 95). For this option, the fan wheel is removed from the rotor shaft and replaced by a cover with an integrated active fan. The forced cooling fan has to be supplied externally, which means it is operated irrespective of the motor speed.

To fulfill different application-related requirements, the fan wheels can have different geometries and can be made of different materials. In the standard version, the motors are delivered with a plastic fan. They can be used in a temperature range of -20 °C to +60 °C. The technical data of the motors, e.g. the switching frequency or the inertia refer to the use of a plastic fan, see chapter "Technical data of the motors" (→ 🗎 38).

As an alternative, the fan wheels can also be made of aluminum. When using other fan wheel materials, the properties of the drive will change. Observe the relevant conditions during drive selection and project planning. For detailed information on the different fan options, refer to chapter "Aluminum fan" (→ 🗎 96).

5.12.1 Geometry of the fan wheel

The impellers of the fan wheels are designed to create the same air flow independently of the direction of rotation.

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5.13 Degrees of protection according to IEC 60034-5

In the standard version, the DRN355 AC motors are designed in degree of protection IP55 according to IEC 60034-5. Degrees of protection up to IP66 are available on request.

Instead, the motors can also be delivered in a basic design in IP44 degree of protection.

Drive selection

The required degree of protection must be selected with care. Otherwise, there is a risk of damage due to dirt particles or water entering the motor. In addition, there is the option to specifically protect the drive against corrosion as well as aggressive ambient conditions, see chapter "Surface and corrosion protection" (→ 🗎 105).

Definition of degrees of protection according to IEC 60034-5

First characteristic numeral		Second characteristic numeral	
	Brief description		**Brief description**
0	Unprotected machine	0	Unprotected machine
1	Machine protected against solid foreign objects > 50 mm	1	Machine protected against dripping water
2	Machine protected against solid foreign objects > 12 mm	2	Machine protected against dripping water at inclination of 15°
3	Machine protected against solid foreign objects > 2.5 mm	3	Machine protected against spraying water
4	Machine protected against solid foreign objects > 1 mm	4	Machine protected against splashing water
5	Machine protected against dust	5	Machine protected against water jets
6	Machine dust-tight	6	Machine protected against effects of rough seas
–	–	7	Machine protected when immersing
–	–	8	Machine protected when fully immersed

5.13.1 Labeling of degree of protection for global motors

SEW-EURODRIVE classifies the motor degrees of protection according to the international standard IEC 60034-5.

In North America, on the other hand, identification of a different degree of protection is used.

The degree of protection and the type of cooling are represented with an abbreviation made up of 4 letters. In the case of the global motor, SEW-EURODRIVE employs the following identifications and includes this information on the nameplate.

Abbreviation	English designation	German translation
TEFC	Totally Enclosed Fan Cooled	völlig geschlossen, lüftergekühlt
TEBC	Totally Enclosed Blower Cooled	völlig geschlossen, fremdlüftergekühlt
TENV	Totally Enclosed Non-Ventilated	völlig geschlossen, unbelüftet

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5.14 Vibration class and increased vibration stress

Irrespective of the mount-on components on the B-side, AC motors from SEW-EURODRIVE fulfill the requirements for achieving vibration class A according to DIN EN 60034-14. If special requirements for the mechanical running smoothness exist, motors without mount-on components (no brake, forced cooling fan, encoder, etc.) can be delivered in a low-vibration design in vibration class B. For this design, special measures for balancing the rotors are carried out.

For vibration classes A or B, the motor rotors are always dynamically balanced with a half key.

5.14.1 Design for increased vibration stress

When installing the motors, make sure that the supports are even, the foot or flange mounting is solid and if there is direct coupling, align with precision. Avoid resonances between the rotational frequency and the double line frequency caused by the structure or the positioning of the motor.

If the installation of the drive cannot be ensured in accordance with the standard requirements by SEW-EURODRIVE, the motors can be delivered in a design for increased vibration stress.

Motors that are designed for increased vibration stress achieve vibration stress level 1 (Vibration Level 1 = VL1). The values from the following table can be applied. The values are based on standardized information pursuant to DIN ISO 10816-1.

DRN.. motors

Motors	Periodic vibrations	Shock stress 1g = 9.81 m/s²
DRN132M – 355ML	Effective vibration speed ≤ 7.1 mm/s	Maximum acceleration = 15 g

If you require a drive for which the required values exceed the information for VL1, contact SEW-EURODRIVE.

The following design types and options for motors with increased vibration stress cannot be delivered:

Designation	Designation
Thermal class 180 (H)	–

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6 Dimension sheets of the motors

6.1 Notes on the dimension sheets

Observe the following information regarding the dimension sheets:

- Not all cable entry positions X, 1, 2, 3 and terminal box positions 0°(R), 90°(B), 180°(L), 270°(T) are possible in any case. Some designs and options 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 depict only the standard terminal box.

Due to the selection of specific designs and options, the dimensions of the motor can differ from the standard design. Observe the associated dimension sheets.

Observe the information in the order confirmation from SEW-EURODRIVE for special designs.

6.1.1 Geometric tolerances

Shaft heights

The following tolerances apply to the indicated dimensions:

h	> 250 mm	→ -1 mm

Shaft ends

Diameter tolerance:

Ø	> 50 mm	→ ISO m6

Center holes according to DIN 332, shape DR:

Ø	> 50 – 85 mm	→ M20
Ø	> 85 – 130 mm	→ M24

Keys: according to DIN 6885 (domed type)

Flanges

Centering shoulder tolerance:

Ø	> 250 mm (flange sizes FF300 – FF740)	→ ISO h6

6.1.2 Lifting eyebolts, lifting eyes

Size 355 motors are equipped with eyebolts (M36) that can be unscrewed.

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6.1.3 Motor dimensions

Safety covers

EK8./AK8. encoders are equipped with a protection device as standard to prevent damage.

This protection is implemented in the form of a safety cover. The encoder cover of DRN355 motor sizes have the same diameter as the fan guard of DRN160M motors.

Second shaft end

For DRN355 motors, the standard design of the second shaft end is shown.

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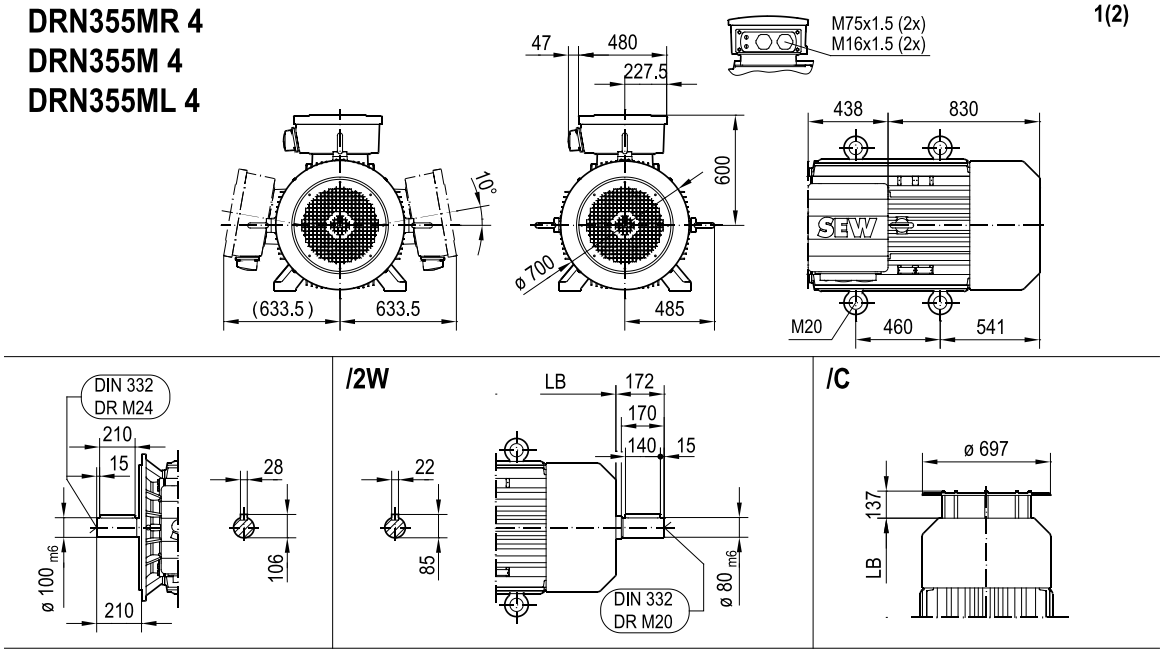
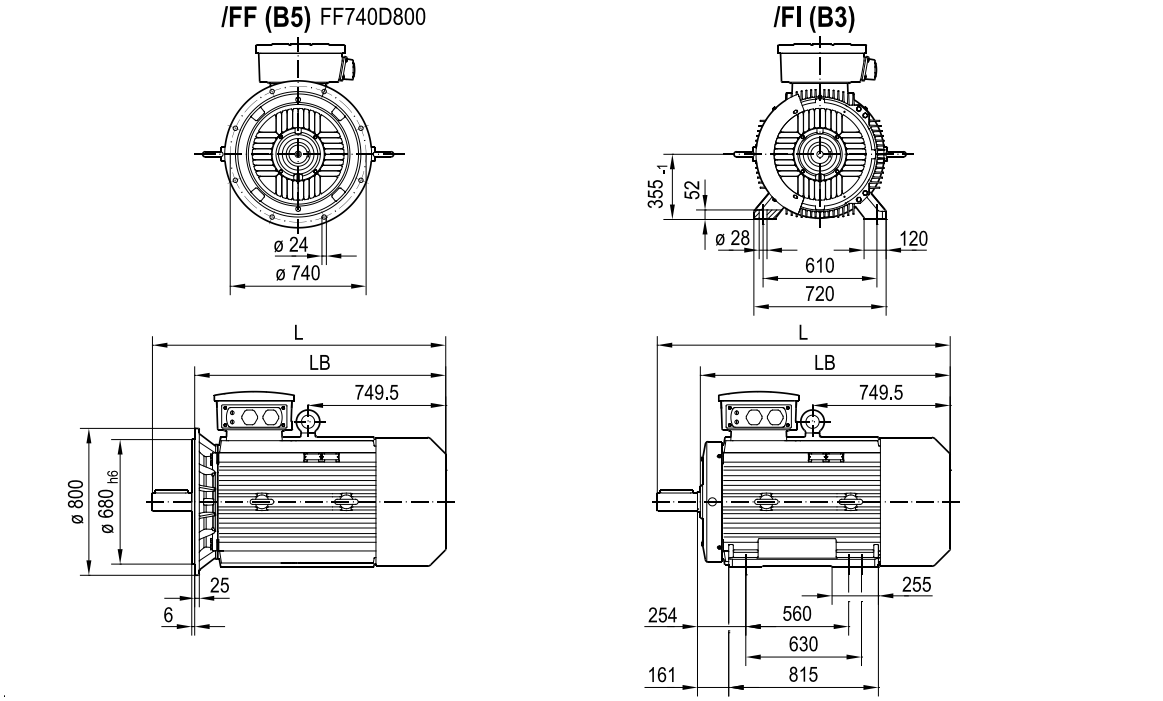
6.2 Dimension sheets for DRN355

DRN355MS 4
DRN355MR 4
DRN355M 4
DRN355ML 4

08 189 01 19
1(2)





(→ 📖)	355M	355ML	355MS					
L	1577	1577	1577					
LB (B5)	1367	1367	1367					
LB (B3)	1352	1352	1352					

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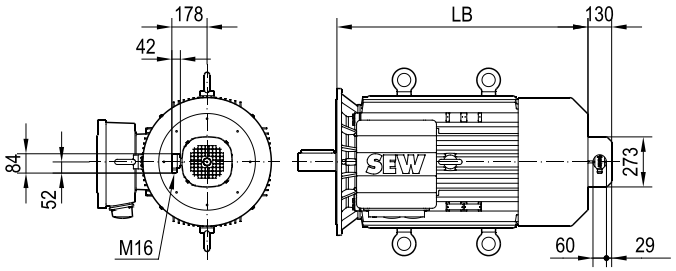
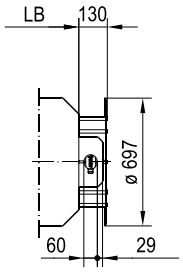
08 189 01 19
2(2)

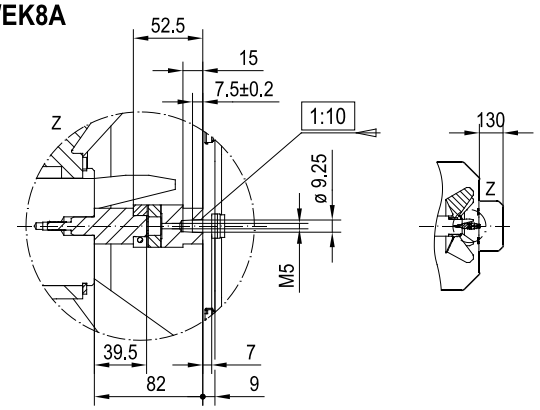
/EK8.
/AK8.



/EK8./C
/AK8./C

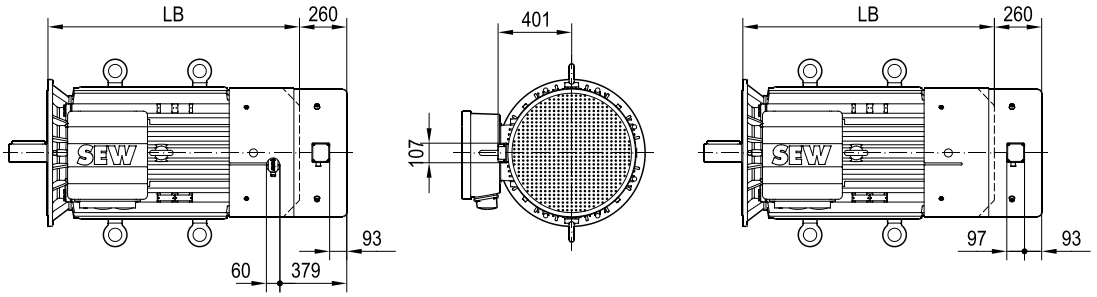


/EK8A



/EK8./V
/AK8./V

/V



(→ 📖)	355M	355ML	355MS					
L	1577	1577	1577					
LB (B5)	1367	1367	1367					
LB (B3)	1352	1352	1352					

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7 Encoders

7.1 Description

The task of an encoder is to detect the angular position of the motor shaft or the change of the angular position, and to pass on this information to a unit that evaluates this data, such as a PLC or frequency inverter.

This information is used to determine the rotational speed and angular acceleration. The evaluating unit (inverter, encoder card) can then monitor or control the speed and position the drive system accordingly.

Encoders are connected to the inverter and allow for further improved motor control.

- The motor can be operated in position control.
- The quality of torque control can be improved significantly.
- The quality of speed control can be improved significantly.

Encodes are available in various designs:

- Incremental encoders, single-turn absolute encoders, multi-turn absolute encoders.
- Built-in encoders integrated in the motor and add-on encoders mounted to the motor.
- Different mechanical connections of the motor shaft with the encoder.
- Different electrical connection options, such as terminal strip or plug connector.
- Different output signals: sin/cos, HTL, TTL, SSI + sin/cos, RS485 + sin/cos, HIPERFACE®.
- With or without electronic nameplate for startup on SEW-EURODRIVE inverters.
- Different resolutions and number of counted revolutions.
- Can be ordered ex factory or can be retrofit.

SEW-EURODRIVE offers a wide range of encoders for different applications and different inverters. Before selecting the encoder, check the encoder interface of the inverter.

Cone shaft (.K8.)

- Encoders with cone shaft .K8.
  - This encoder type can be used for all motors of size 71 – 355.
  - The cone shaft connection is particularly robust and accurate.

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7.2 Type designation for encoders from SEW-EURODRIVE

The type designation of SEW-EURODRIVE encoders consists of 4 characters, e.g. EK8C, and is included in the type designation of the motor.

1st character: Encoder design

Identifier	Description
E	Incremental encoder
A	Multi-turn absolute encoder

2nd character: Mechanical interface to the motor

Identifier	Description
K	Cone shaft (shaft centered)

3rd character: Code to identify the geometry of the encoder/encoder mounting adapter

Identifier	Description
8	Standard motor geometry, encoder of the new generation

4th character: Electrical interface of the encoder

Identifier	Description
S	sin/cos
R	TTL (RS422) at typically U_B = 9 – 30 V
C	HTL
W	Sin/cos + RS485 (multi-turn)
H	Sin/cos + RS485 HIPERFACE® (multi-turn)
Y	Sin/cos or TTL(RS422) + SSI (multi-turn)
A	Design of the mounting adapter (see chapter "Encoder mounting adapter" (→ 🗎 85))

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7.3 Add-on encoder

The add-on encoder is mounted to the motor on the B-side by means of a mechanical interface.

Electronic nameplate

For EK8S und AK8W encoders, important startup data is stored in an electronic nameplate. This facilitates starting up the drive and ensures that motor parameters are set correctly in the inverter.

During startup, the engineering software checks whether an electronic nameplate is present in the encoder and suggests the use of this data.

Advantages of auto identification of the drive:

- Complete and correct identification of motor and gear unit.
- No manual entry of data is necessary, which saves time during startup.
- Easy startup of drives that are installed in locations that are difficult to access.

7.3.1 Incremental encoders

Technical details

Technical data

Designation	Value
Storage temperature	-15 °C to +70 °C
Maximum angular acceleration	10^4 rad/s^2

Incremental encoder E.8.

Encoder		EK8S [1]	EK8R [2]	EK8C
Supply voltage	U_B	DC 7 V – 30 V		DC 4.75 V – 30 V
Supply voltage for functional safety applications	U_{B_FS}	DC 7 V – 30 V	–	
Maximum current consumption, free of load	I_{in}	100 mA (at U_B = 7 V)		
Max. pulse frequency	f_{pulse_max}	150 kHz	120 kHz	
Direction of rotation		A (cosine) before B (sine) when looking at the motor output shaft in clockwise rotation B (sine) before A (cos) when looking at the fan guard and clockwise direction of rotation.		
Incremental tracks, periods per revolution	A, B	1024 (10 bits)		
	C	1		
Position resolution, increments per revolution	A, B	4096 (12 bits)		
Voltage output signal differential (peak-to-peak) (A' = A – $\overline{A}$; B' = B – $\overline{B}$)	U_{t_diff}	1 V ± 10%	–	
Voltage output signal non-differential (peak-to-peak)	U_t	0.5 V ± 10%	U_{Low} ≤ 0.5 V U_{High} ≥ 2.5 V	U_B ≤ 6 V: U_{Low} ≤ 0.5 V U_{High} ≥ 2.5 V U_B > 6 V: U_{Low} ≤ 3 V U_{High} ≥ U_B - 2.5 V
Signal level output, offset nominal against 0 V (A, B, C, $\overline{A}$, $\overline{B}$, $\overline{C}$)V	U_{t_o}	2.5 V ± 0.3 V	–	
Signal output		sin/cos	TTL (RS422)	HTL

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Encoder		EK8S [1]	EK8R [2]	EK8C
Total harmonic distortion (THD)		40 dB (1%), 60 dB (0.1%) from 7th harmonic		–
Load resistance/load current differential	R_L/I_L	120 Ω ± 10%		U_B 6 V: 120 Ω ± 10% UB > 6 V: 1 – 3 kΩ
Resistance between tracks and reference ground	R_{gnd}	≥ 1 kΩ	–	
Load capacitance, output	C_o	≤ 20 nF	–	–
Voltage output signal, differential (C' = C – $\overline{C}$) (peak-to-peak)	U_{t_diff} e	0.3 to 1.4 V	–	–
C track offset	g	192 mV ± 5 mV	–	–
Voltage output signal, non-differential (C,$\overline{C}$) (peak-to-peak)	U_{t_C}	–	U_{Low} ≤ 0.5 V U_{High} ≥ 2.5 V	U_B ≤ 6 V: U_{Low} ≤ 0.5 V U_{High} ≥ 2.5 V U_B > 6 V: U_{Low} ≤ 3 V U_{High} ≥ U_B - 2.5 V
Phase angle track C', n = constant	k, l	k = 180° ± 90° l = 180° ± 90°	–	–
Signal width track C	W_C	see figure	90° electrical	
Signal logic track C		see figure	C = log 1, when A = B = log 1	
Pulse duty factor according to IEC 60469-1, n = constant		–	50% ± 10%	
Phase offset A: B, $\overline{A}$: $\overline{B}$ n = constant	d	90° ± 2°	90° ± 20°	
Accuracy of the incremental section[3]		0.0194° (70")	0.033° (120")	
Vibration resistance according to EN 60068-2-6		≤ 10 g (f > 18.5 Hz)		
Shock resistance according to EN 60068-2-27		≤ 100 g (t = 6 ms, 18 pulses)		
Maximum speed	n_{max}	6000 min^{-1}		
Maximum line length		100 m	300 m	100 m
Duration until fault message (disabled outputs)[4]		≤ 25 ms	–	
Activation time of rotary encoder internal diagnostics after switching on		≤ 200 ms	–	
Degree of protection in accordance with EN 60529		IP66		
Installation altitude	h	≤ 4000 m above sea level		
		In explosion-protected areas: Permitted external pressure 0.8 – 1.1 bar (at typical height ≤ 1800 m above sea level)		
Corrosion protection, surface protection		KS, OS1 – OS4, OSG		
Connection		Integrated encoder plug connector on the fan guard (can be pre-assembled and plugged in the field)		
Ambient temperature of motor	T_{amb}	-30 to +60 °C		
Electronic nameplate		RS485 (serial, asynchronous), 1920 bytes	–	–
Maximum degree of pollution during installation work		Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)		

1) See figure "Sin/cos signals and phase relationship".
2) See figure "HTL/TTL signals and phase relationship".
3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting ±0.6° twist (depending of the direction of rotation) of the encoder housing compared to the encoder shaft.
4) Sin/cos encoders have a self-diagnostics function. If a fault is detected, the sensor reports it by deactivating the output signals to the encoder evaluation unit.

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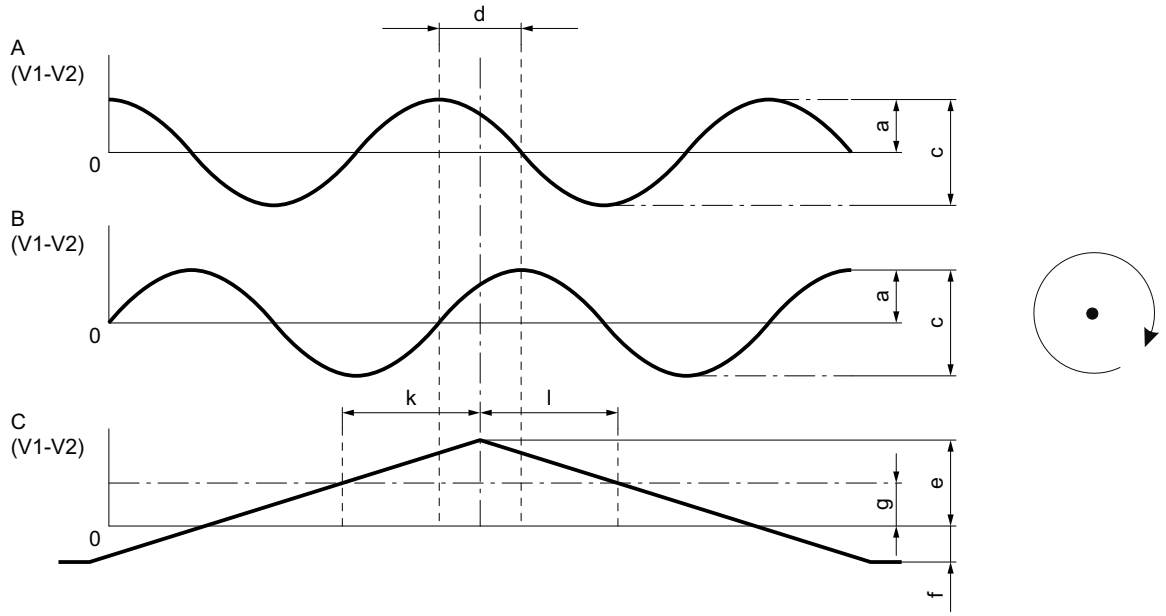
Sin/cos signals and phase relationship



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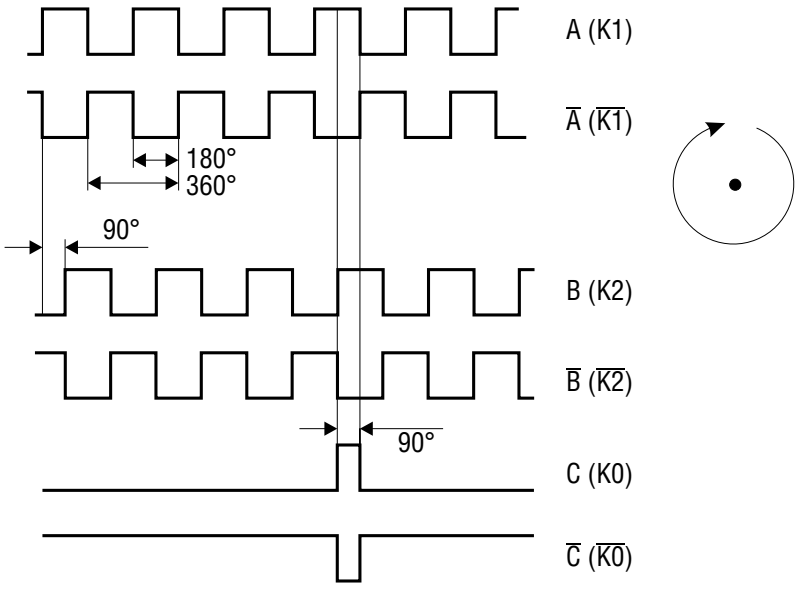
HTL/TTL signals and phase relationship



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7.3.2 Multi-turn absolute encoders

Technical details

Technical data

Multi-turn absolute encoder A.8.

Encoder		AK8Y [1]	AK8W [1]	AK8H [1][2]
Supply voltage	U_B	DC 7 V – 30 V		DC 7 V – 12 V
Supply voltage for FS applications	U_{B_FS}	DC 7 V – 30 V		–

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Encoder		AK8Y [1]	AK8W [1]	AK8H [1][2]
Max. current consumption, free of load	I_{in}	100 mA (at U_B = 7 V)		80 mA
Max. pulse frequency	f_{pulse_max}	200 kHz		
Direction of rotation		A (cosine) before B (sine) when looking at the motor output shaft in clockwise rotation B (sine) before A (cos) when looking at the fan guard and clockwise direction of rotation.		
Incremental tracks, periods per revolution	A, B	2048 (11 bits)		1024 (10 bits)
	C	–		
Position resolution, increments per revolution	A, B	4096 (12 bits) (SSI, RS422)	65536 (16 bits) (RS485)	32768 (15 bits) HIPERFACE®
Voltage output signal differential (peak-to-peak) (A' = A – $\overline{A}$; B' = B – $\overline{B}$	U_{t_diff}	1 V ± 10%		HIPERFACE®
Voltage output signal non-differential (peak-to-peak)	U_t	0.5 V ± 10%		
Signal level output, offset nominal against 0 V (A, B, C, $\overline{A}$, $\overline{B}$, $\overline{C}$)V	U_{t_o}	2.5 V ± 0.3 V		
Signal output		sin/cos + SSI, RS422	sin/cos + RS485	
Total harmonic distortion (THD)		40 dB (1%), 60 dB (0.1%) from 7th harmonic		
Load resistance/load current differential	R_L/I_L	120 Ω ± 10%		
Resistance between track and reference ground	R_{gnd}	≥ 1 kΩ		
Load capacitance, output		≤ 20 nF		
Voltage output signal, differential (C' = C – $\overline{C}$) (peak-to-peak)	U_{t_diff} e	–	–	
C track offset	g	–	–	
Voltage output signal, non-differential (C,$\overline{C}$) (peak-to-peak)	U_{t_C}	–	–	
Phase angle track C', n = constant	k, l	–	–	
Signal width track C	W_C	–	–	–
Signal logic track C		–	–	–
Pulse duty factor according to IEC 60469-1, n = constant		–		–
Phase offset A: B, $\overline{A}$: $\overline{B}$ n = constant		90° ± 2°		HIPERFACE®
Accuracy of the incremental section[3]		0.0194° (70 ")		± 0.0144° (± 52 ")
Accuracy of the absolute section		± 1 LSB (Least Significant Bit)		
Scanning code/counting direction		Gray code, ascending with the direction of rotation specified above	Binary code, ascending with the direction of rotation specified above	–
Multi-turn resolution		4096 revolutions (12 bits)	65536 revolutions (16 bits)	4096 revolutions (12 bits)
Communication, interface		SSI (synchronous, serial)	RS485 (asynchronous, serial)	HIPERFACE®
Communication, modules		Driver to EIA RS422	Driver to EIA RS485	
Clock frequency/bandwidth		100 – 800 kHz (100 m cable length with maximum 300 kHz)	9600 baud	HIPERFACE®
Clock-pulse space period		12 – 30 µs	–	
Vibration resistance according to EN 60068-2-6		≤ 10 g (f > 18.5 Hz)		
Shock resistance according to EN 60068-2-27		≤ 100 g (t = 6 ms, 18 pulses)		
Maximum speed	n_{max}	6000 min^{-1}		

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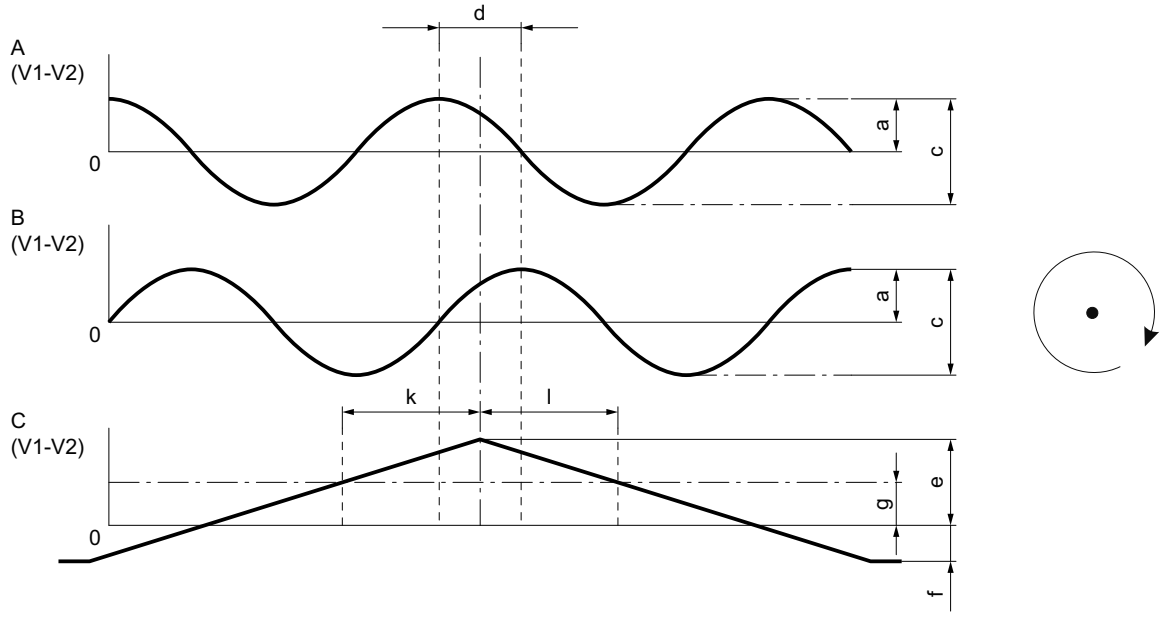
Encoder		AK8Y [1]	AK8W [1]	AK8H [1][2]
Maximum line length		100 m		
Duration until fault message (disabled outputs)[4]		≤ 25 ms + 3/4 revolution		HIPERFACE®
Activation time of rotary encoder internal diagnostics after switching on		200 ms		HIPERFACE®
Degree of protection in accordance with EN 60529		IP66		
Installation altitude	h	≤ 4000 m above sea level		≤ 2000 m above sea level
		In explosion-protected areas: Permitted external pressure 0.8 – 1.1 bar (at typical height ≤ 1800 m above sea level)		
Corrosion protection, surface protection		KS, OS1 – OS4, OSG		
Connection		Integrated encoder plug connector on the fan guard (can be pre-assembled and plugged in the field)		
Ambient temperature of motor	T_{amb}	-30 to +60 °C		
Electronic nameplate		–	RS485 (serial, asynchronous); 1920 bytes	HIPERFACE®; 1792 bytes
Maximum degree of pollution during installation work		Degree of pollution 1 (IEC 61010-1, EN 60664-1, VDE 0110-1)		
Other technical data		On request		

1) See figure "Sin/cos signals and phase relationship".
2) Observe the specification for the HIPERFACE® interface, Sick AG.
3) Due to the stiffness of the torque bracket, you have to take into account an automatically resetting ±0.6° twist (depending of the direction of rotation) of the encoder housing compared to the encoder shaft.
4) Absolute encoders A.8. have a self-diagnostics function. If a fault is detected, the sensor reports it by deactivating the output signals to the encoder evaluation unit.

Sin/cos signals and phase relationship



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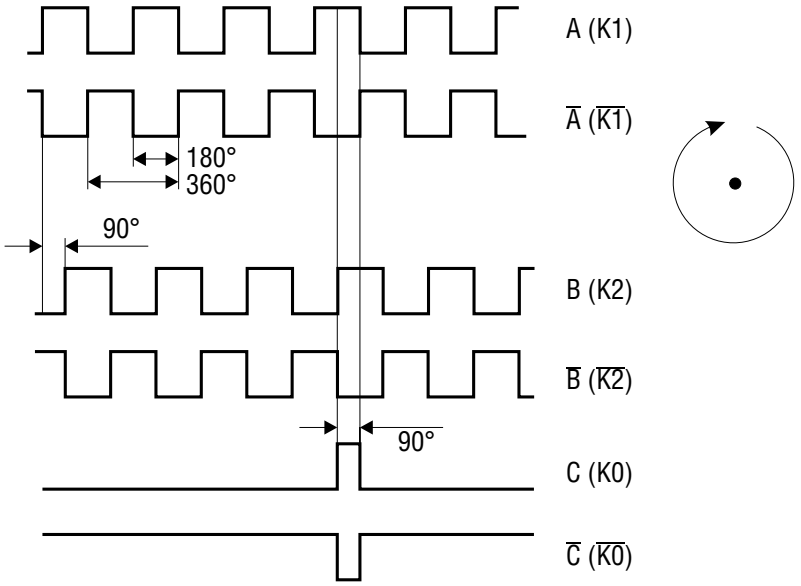
HTL/TTL signals and phase relationship



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7.4 Encoder mounting adapter

An encoder mounting adapter allows for mounting an encoder, which is not part of the standard delivery, at a later time.

7.4.1 Encoder mounting adapters for encoders from SEW-EURODRIVE

For the mechanical interface depending on the size for an encoder mounting adapter for encoders from SEW-EURODRIVE, refer to chapter "Add-on encoder" (→ 🗎 79).

This encoder mounting adapter is available for all standard encoders from SEW-EURODRIVE:

Identifier	Description
EK8A	For cone-shaft encoders from SEW-EURODRIVE on sizes 355.

Notes on selection

For dimensions of mounting adapters of SEW-EURODRIVE encoders, refer to chapter Dimension sheets for motors/brakemotors.

Order information

Type designation EK8A

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7.5 General information on drive selection

7.5.1 Encoders

Sensors that are mountable on the motors in series can be combined with a range of motor designs and options, such as brakes and forced cooling fans.

If you have any questions, please contact SEW-EURODRIVE.

7.5.2 Encoder connection

When connecting the encoders to the inverters, follow the operating instructions for the inverter and the wiring diagrams supplied with the encoders.

- Maximum cable length (inverter – encoder):
  - 100 m with a capacitance from core to shield ≤ 110 nF/km
  - 100 m with a capacitance from core to core ≤ 70 nF/km

    Capacitances according to DIN VDE 0472 part 504.
- Core cross-section:
  - Supply cores 0.25 mm^2 for cable lengths up to 50 m
  - Supply cores 0.5 mm^2 for cable lengths up to 100 m
  - Signal cores ≥ 0.25 mm^2
- Use shielded cable with twisted pair cores. Connect the shield over a wide area at both ends:
  - Encoder end: in the cable gland of the encoder connection cover, or in the terminal box, or in the encoder connector.
  - Inverter end or evaluation unit end: to the electronics shield clamp and to the housing of the D-sub connector or another connector.
- Install the encoder cables separately from the power cables, maintaining a distance of at least 200 mm.
- When selecting the cabling, observe the technical data of the encoder, in particular regarding operating voltage and operating current.

7.5.3 Connection alternatives

The encoders are available with the following connection options:

/EK8., /AK8.
- With integrated encoder plug connector with connection cover
- With integrated encoder plug connector without connection cover

SEW-EURODRIVE recommends using prefabricated cables.

When using prefabricated cables from SEW-EURODRIVE, you can order the encoders without a connection cover because this cover is part of the cable.

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8 Other options and design types

8.1 Output

8.1.1 Second shaft end (B-side)

The output end of the motor is optionally available with another shaft end. This so-called second shaft end is designed with a conventional keyway and key in accordance with DIN 6885 Sheet 1 (ISO 773).

A cover can be ordered for configurations that are prone to damage during transport.

For sizes and dimensions, refer to the relevant dimension sheets in chapter "Dimension sheets of the motors" (→ 🗎 73).

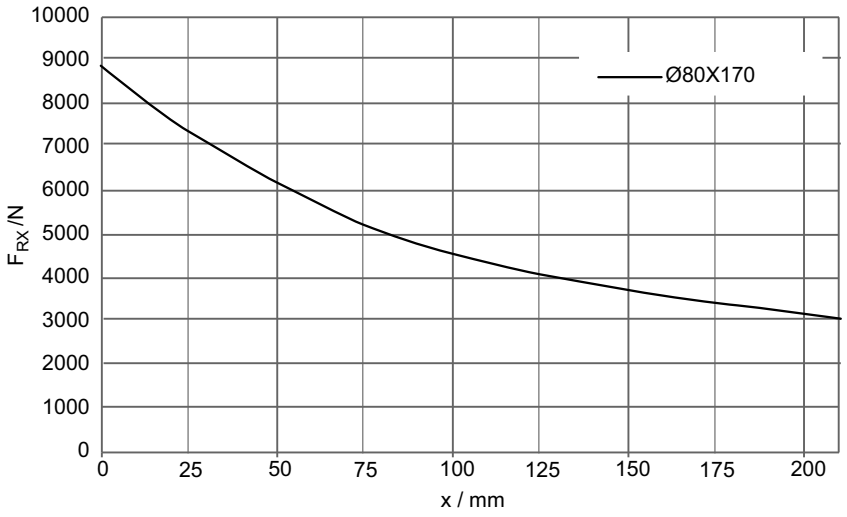
Technical details

DRN.. motors

Motor	Second shaft end:
DRN355	80 × 170

Overhung load diagrams for second shaft end option DRN../DR2S..

Overhung load diagram for DRN355 – second shaft end



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Order information

Type designation /2W

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8.2 Thermal motor monitoring

8.2.1 PTC thermistor /TF (PTC)

Thermal motor protection averts overheating and therefore prevents irreparable damage from being caused to the motor.

A PTC thermistor is a resistor with a resistance value that increases when the temperature rises. The resistance value grows significantly when the nominal response temperature is reached.

An evaluation unit is required for interpreting the resistance value of the PTC thermistor. When the nominal response temperature is exceeded, the controller switches off the motor. Frequency inverters of SEW-EURODRIVE are suitable for evaluating PTC thermistors.

Technical details

The thermal monitoring with /TF temperature sensor is performed via PTC thermistors installed in the winding overhang of the motor and connected in series. To achieve maximum motor protection, the trigger temperature is slightly lower than the limit value of the thermal class. Temperature sensors /TF are available for the following nominal response temperatures:

Thermal class	Nominal response temperature /TF
130 (B)	130 °C
155 (F)	150 °C
180 (H)	170 °C

Double design

PTC thermistors /TF are also available in double design, for example for warning 130 (B) and shutdown 155 (F). Contact SEW-EURODRIVE if you select such a design.

The PTC thermistors comply with the specifications described in DIN VDE V 0898-1-401.

Resistance measurement (measuring device with U ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20 – 500 Ω
- Hot resistance: > 4000 Ω

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. The thermal protection function must become active in case of overtemperature.

INFORMATION

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

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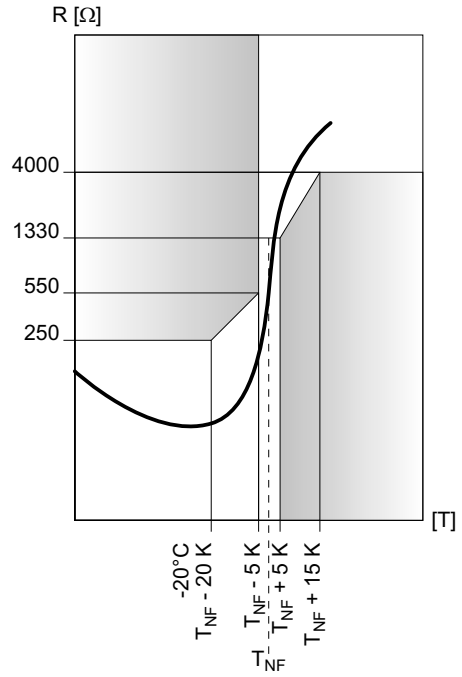
The below figure shows the characteristic curve of a temperature sensor /TF with reference to the nominal response temperature (referred to as T_{NF}).



4151365003

Order information

Type designation	/TF

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8.2.2 Temperature switch /TH

Thermal motor protection prevents overheating, therefore preventing irreparable damage to the motor.

A bimetallic switch is a switching element with contact, which opens the contact when the switching temperature is reached. A higher-level controller or a switching device then disconnects the motor from the voltage supply.

The bimetallic switch does not reengage immediately after tripping, e.g. when the nominal switching temperature is reached. The switch is only closed again after a minimum temperature difference of approximately 40 K to the nominal switching temperature is reached (reset temperature RST); only then can the AC motor be operated again.

The time it takes for the reset temperature to be reached is usually in the high double-digit minute range.

Technical details

The thermal motor protection with bimetallic switch /TH is performed via bimetallic elements installed in the winding overhang of the motor and connected in series. To achieve maximum motor protection, the trigger temperature is slightly lower than the limit value of the thermal class. Bimetallic switches /TH are available for the following nominal response temperatures:

Thermal class	Nominal switching temperature /TH
130 (B)	130 °C
155 (F)	150 °C
180 (H)	170 °C

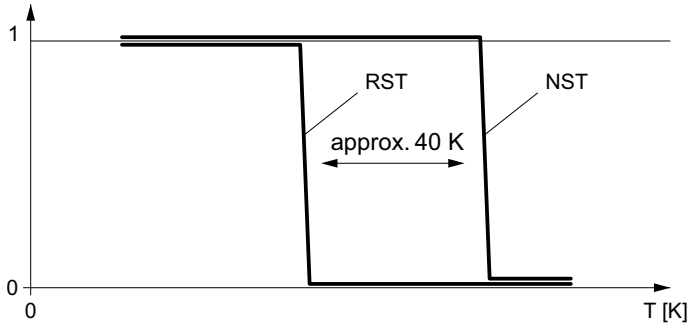
Double design

Bimetallic switches /TH are also available in double design, e.g. for warning 130 (B) and shutdown 155 (F). Contact SEW-EURODRIVE if you select such a design.

Information about drive selection

The thermostats are connected in series and open when the permitted winding temperature is exceeded. They can be connected in the drive monitoring loop.

Type	AC values	DC values	
Voltage in V	250	60	24
Current in A (cosφ = 1.0)	2.5	1.0	1.6
Current in A (cosφ = 0.6)	1.6	–	–



Switching condition of a bimetallic switch "NC contact": *4151368331*

RST Reset temperature
NST Rated switching temperature

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Order information

Type designation	/TH

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8.2.3 Temperature sensor /PT

If the option /PT is selected, a Pt1000 platinum sensor is installed in one of the 3 motor windings. With the option 3 x Pt100, 3 sensors are distributed onto the 3 winding phases, and each connected to separate terminals.

The platinum sensor has a linear characteristic curve and a high level of accuracy. The platinum sensor can take on the function of motor protection when it is used in combination with a control unit or a frequency inverter with the thermal protection model of the motor.

The temperature sensor can also be added to a PTC thermistor or bimetallic switch.

Technical details

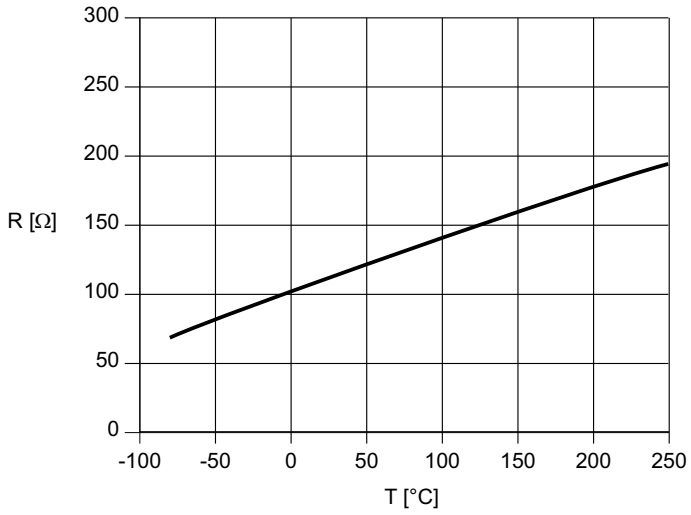
Type	PT100
Connection	Red/white
Total resistance at 20 °C – 25 °C	107 Ω < R < 110 Ω
Test current	< 3 mA

Temperature sensor /PT (Pt100) meets the requirements of IEC 60751.

INFORMATION

Temperature sensors /PT are not polarized; for this reason, swapping the supply cables does not affect the measuring result.

Characteristic curve of a Pt100:



4151378315

Order information

Type designation /PT

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8.2.4 Temperature sensor /PK

If the option /PK is selected, a Pt1000 platinum sensor is installed in one of the 3 motor windings.

The platinum sensor has a linear characteristic curve and a high level of accuracy. The platinum sensor can take on the function of motor protection when it is used in combination with a control unit or a frequency inverter with the thermal protection model of the motor.

A temperature sensor can also be added to a PTC thermistor or bimetallic switch.

The temperature sensor PK (Pt1000) has 10 times the resistance value of a Pt100.

Technical details

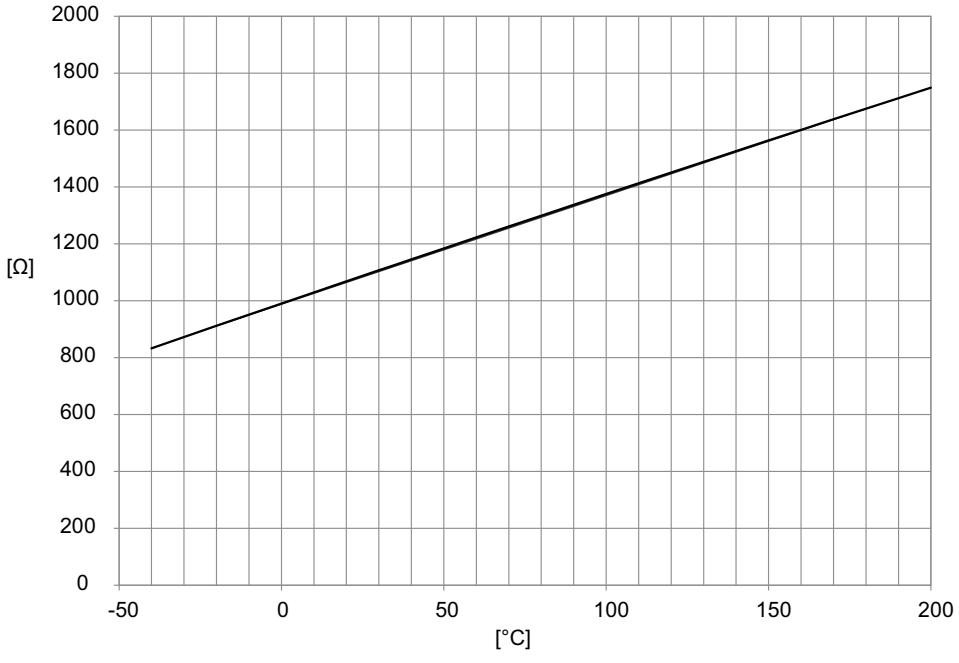
	PT1000
Connection	Red – black
Total resistance at 20 – 25 °C	1050 Ω < R < 1150 Ω
Test current	< 3 mA

Temperature sensors /PK (PT1000) meet the requirements of EN 60751.

INFORMATION

The /PK temperature sensors are not polarized; for this reason, swapping the supply cables does not affect the measuring result.

Characteristic curve of a Pt1000:



17510446987

Order information

Type designation /PK

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8.3 Ventilation

8.3.1 Fan guards

As standard, the motors are delivered as fan-cooled design with a plastic fan wheel. The design of the fan guard leads the air flow over the cooling fins of the stator housing.

Axial space required to disassemble the fan guard

The fan-cooled motors require adequate space behind the fan guard in order to draw in the air required for cooling. The distance of half the diameter of the fan guard in the axial direction is usually sufficient.

The space required for removing the fan guard depends on the motor configuration.

Order information

Type designation
- Option designation of the sheet steel: None

8.3.2 Canopy for fan guard

If a motor in vertical design with fan guard facing up is installed in the system or machine, ensure that foreign bodies cannot penetrate through the fan grille into the fan wheel. This can be avoided either by constructional measures taken by the customer, or by using a canopy above the fan guard.

Technical details

The canopy extends the motor or brakemotor. For dimensions, refer to chapter Dimension sheets for motors/brakemotors.

Information about drive selection

If there is still a risk of foreign objects or liquids entering the motor even though a canopy is installed, please contact SEW-EURODRIVE.

Order information

Type designation /C

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8.3.3 Forced cooling fan

A forced cooling fan can be installed upon request to ensure motor cooling independent of the motor speed. The cooling effect for forced air cooling is at least equivalent to the cooling effect of a fan-cooled motor at rated speed.

This means the motor can permanently deliver the full or up to 1.2 times the rated torque at low speeds without the risk that the motor will overheat.

SEW-EURODRIVE recommends a forced cooling fan in the following applications:

- Inverter drives with a setting range ≥ 1:2
- Inverter drives that have to produce the rated torque at low speeds or even at an idle state.

Technical details

Motor and forced cooling fan are connected via a fan guard dimensioned for this purpose. The length of the forced cooling fan guard varies depending on the desired motor configuration, such as configurations with an encoder.

Observe the resulting additional length of the overall drive when using a forced cooling fan.

Technical data

DRN355 motors

Overview of possible operating voltages of the forced cooling fan:

Motor	Operating mode/connection	Frequency Hz	Voltage V
DRN355	3 ~ AC ⅄	50	346 to 690
DRN355	3 ~ AC △	50	200 to 400

Motor	Operating mode/connection	Frequency Hz	Voltage V
DRN355	3 ~ AC ⅄	60	380 to 690
DRN355	3 ~ AC △	60	220 to 400

Order information

Type designation /V

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8.3.4 Aluminum fan

An aluminum fan is used instead of the standard PVC fan if the expected ambient temperature exceeds +50 °C or drops below -20 °C.

The permitted temperature range for using an aluminum fan is -40 °C to +100 °C.

Information about drive selection

Observe the following notes:

- The aluminum fan decreasingly influences the inertia of the rotor the higher the motor size is selected, see the following table.
- Note the aluminum fan inertia when determining the permitted switching frequency Z.
- The no-load starting frequency Z_0 does not need to be reduced.

Motor	J_{AL}	J_{Mot_AL}	Increase in inertia compared to standard design
	10^{-4} kgm²	10^{-4} kgm²	%
DRN355MS	850	73900	1
DRN355M	850	91300	1
DRN355ML	850	102700	1

Order information

Type designation /AL

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8.4 Bearings

8.4.1 Current-insulated rolling bearings

AC motors in size 200 and larger can be equipped with a current-insulated bearing on the B-side to prevent damage to the bearing caused by indulatory currents during inverter operation.

Technical details

Bearing assignment for version /NIB

Motor	A-side bearing	B-side bearing
DRN355	6322-C3	6322-C3-EI

Order information

Type designation /NIB

8.4.2 Reinforced bearings

If the expected statistical service life of the bearings cannot be achieved due to excessive loads, SEW-EURODRIVE offers a version with reinforced bearing. In this case, A-side cylindrical roller bearings are installed (/ERF design). This option is only available in combination with a relubrication device (/NS design).

Technical details

Bearing assignment in /ERF design

Motor	A-side bearing	B-side bearing
DRN355	NU322E	6322-C3

Order information

Type designation /ERF

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8.4.3 Relubrication device

A relubrication device is included as standard for DRN355 motors. Externally accessible grease nipples can be used to relubricate the A-side and B-side bearings.

Technical details

The following greases are used on-site, depending on the ambient temperature.

Ambient temperature	Manufacturer	Type	DIN designation
-20 °C to +80 °C	Mobile	Polyrex EM	K2P-20
-40 °C to +60 °C	SKF	GXN	K2N-40

The greases can also be purchased separately from SEW-EURODRIVE in 400 g packaging units.

Information about drive selection

The relubrication intervals must be individually adapted to the conditions of the application. The motor generally has to be inspected and the used grease removed after 6 to 8 relubrications.

Order information

Type designation /NS

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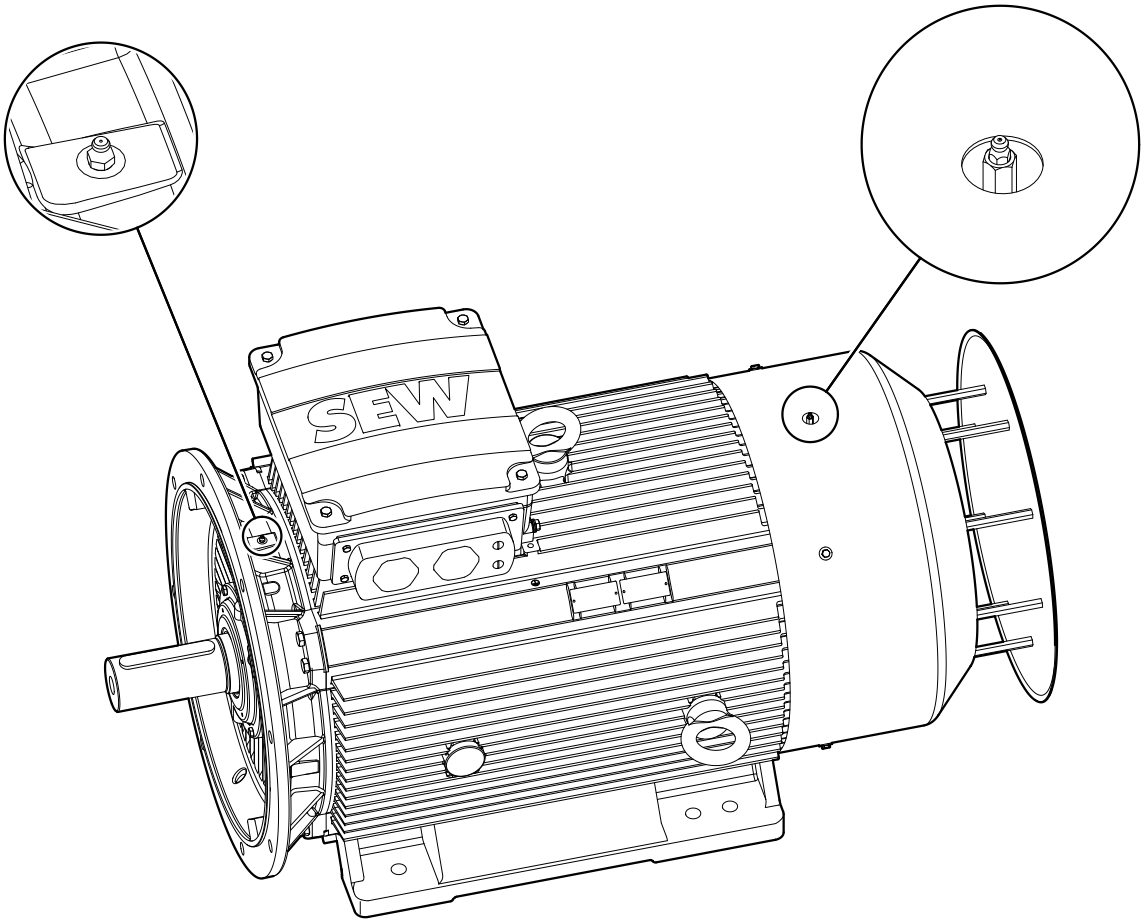
8.4.4 Preparation for accommodating SPM measuring nipples

Increased strain, e.g. caused by vibrations, can gradually lead to the failure of important motor functions, such as defects in the bearings. Using a vibration monitoring device is a possible measure for early detection of when the wear limit is reached.

SEW-EURODRIVE offers a vibration transducer mounting adapter for size 355 motors. These are threaded holes for accommodating measuring nipples from SPM.



9007232650795787

[1] Tapped hole for vibration transducer

The components of the mounting adapter are loosely included in the delivery. Vibration transducers are not included in the delivery.

Technical details

The A-side and B-side bores feature metrical threads (M8) in the flanges or covers and are closed with a closing plug. The closing plug is pregreased at the factory for easy disassembly.

Order information

Type designation	None

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8.5 Winding

8.5.1 Reinforced winding insulation

A reinforced insulation of the copper wires provides a higher electric strength of the winding insulation.

Technical details

The motor winding with reinforced insulation can withstand the following voltage peaks:

- Line-to-line voltages U_{LL} = 1800 V
- Line-to-ground voltages U_{LG} = 1250 V

Also refer to chapter "AC motors on third-party inverters" (→ 🗎 50).

Order information

Type designation	/RI

8.5.2 Reinforced winding insulation with increased resistance against partial discharge

If the voltage peaks exceed the 1800 V threshold, windings with higher resistance against partial discharge must be used.

To protect against these very high voltages, thicker surface insulating materials and enhanced impregnation must be used.

Technical details

The motor winding with reinforced insulation with increased resistance against partial discharge can withstand the following voltage peaks:

- Line-to-line voltages U_{LL} = 2150 V
- Line-to-ground voltages U_{LG} = 1800 V

Order information

Type designation	/RI2

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8.5.3 Humidity and acid protection

This option uses stators that have a resin-impregnated winding. The resins allow the motors to be used in high humidity conditions. The impregnation leads to an increased resistance to solvents and solvent vapors.

Order information

Type designation	None

8.5.4 Tropicalization

This option uses stators that are impregnated with highly hydrolysis-resistant resins. This allows the motors to be used in areas with increased air humidity, such as in tropical climate conditions.

The utilized wiring insulation materials and the impregnating resin protect the motor against termite-related damage.

Order information

Type designation	None

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8.6 Terminal box

The terminal box of the motor is attached to the stator housing. The terminal box contains the terminals used to connect the motor and options via separate power cables and control cables. The terminal box protects the motor from potential damage and persons from injury caused by current-carrying components.

The terminal boxes are made of gray cast iron only.

8.6.1 Technical details

The terminal box is only available with connector. Various types are available.

- China standard
- Europe standard
- USA standard

AC motors from SEW-EURODRIVE have threads in metric dimensions as standard. With motors intended for operation in North America, terminal boxes with Anglo-American threads (NPT, geometric dimensions in inch) are assigned to the order as standard.

In case the motor is ordered with additional features or options connected in the terminal box, a larger terminal box may be required in some cases. The individual standard designs of the terminal boxes for motors are depicted on the dimension sheets.

Metric plastic cable glands (PA) from SEW-EURODRIVE can be preinstalled on request.

8.6.2 Order information

Type designation None

When the order is created, a suitable terminal box is automatically assigned to the motor depending on the selected option.

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8.6.3 Gray cast iron terminal box with connection piece

For size 355, only the terminal box made of gray cast iron with connection piece is available.

The connection piece can be removed from the terminal box to enable the initial fitting of the supply cables. This facilitates the motor connection especially if there is little space available.

Technical details

Combinations

The following connection pieces are available depending on the motor size:

- 2 × M72; 2 × M16
- 2 × M750; 2 × M16
- 2 × NPT3"; 2 × NPT3/4

Order information

Type designation None

Please specify the required thread size for the cable glands with your order. In the case of restricted installation space, please request the terminal box dimensions separately.

8.6.4 Anti-condensation heating

Asynchronous motors from SEW-EURODRIVE can also be equipped with an anti-condensation heating.

The anti-condensation heating consist of strip heaters installed in the winding overhang(s). It serves for heating the switched-off motor in case of low ambient temperatures, so that condensation in the winding is avoided.

Technical details

The anti-condensation heating connection voltage is AC 400 V or AC 230 V.

The following differences arise depending on the motor size:

They are connected to an auxiliary terminal strip in the terminal box.

Voltage	Total heating capacity
230 V	300 W
400 V	226 W

Information about drive selection

Depending on the ambient conditions, using an anti-condensation heating is recommended or mandatory.

- The use of an anti-condensation heating is recommended at ambient temperatures below 0 °C.
- The use of an anti-condensation heating is mandatory at ambient temperatures below -20 °C, and if the motor is exposed to possible condensation.

The anti-condensation heating must be activated as long as the motor is switched off.

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Order information

Type designation None

8.6.5 Condensation drain hole

Depending on ambient conditions, condensation can form in the motor or water infiltration cannot always be prevented despite a high degree of protection. In order to ensure that ingressing water can drain safely, one or more condensation drain holes can be installed upon request.

Technical details

The number and position of required condensation drain holes is based on the relevant mounting position.

The condensation drain holes are sealed at the factory with a closing plug made of NBR. The plug has a labyrinth seal from which condensation can drain off. If contaminated, the condensation drain holes must be checked for proper functioning on a regular basis and cleaned if required.

Closed screw plugs can be selected instead. This type of screw plug must be removed on a regular basis so that the condensation can drain off.

The interval for doing so must be determined by the customer depending on the application and environmental conditions. Observe that condensation must not remain inside the motor over an extended period of time.

The closing plug must not be removed permanently; otherwise, the IP degree of protection for the motor cannot be guaranteed.

Condensation drain holes on the fan guard

With inclined or moving mounting positions, humidity can accumulate in the fan guard. SEW-EURODRIVE offers an optional fan guard with condensation drain hole as an option.

Order information

Type designation /DH

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8.7 Surface and corrosion protection

To optimally protect motors that are subject to severe environmental influences, SEW-EURODRIVE offers measures to increase the resistance of highly stressed surfaces.

- Surface protection
- Corrosion protection

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

8.7.1 Surface protection

As an option for standard surface protection, motors and gear units are also available with surface protection.

The special measure "Z" is also available. During this procedure, large contour recesses are filled with rubber before the coat is applied.

Technical details

Surface protection		Ambient conditions	Sample applications
Standard		Suitable for machines and systems in buildings and rooms indoors with neutral atmospheres. Based on corrosivity category: • C1 (negligible)	• Machines and systems in the automotive industry • Transport systems in logistics • Conveyor belts at airports
OS1		Suitable for environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection device. Based on corrosivity category: • C2 (low)	• Systems in saw mills • Hall gates • Agitators and mixers
OS2		Suitable for environments with high humidity or moderate atmospheric contamination, such as applications outdoors subject to direct weathering. Based on corrosivity category: • C3 (moderate)	• Applications in amusement parks • Cable cars and chairlifts • Applications in gravel plants • Systems in nuclear power plants
OS3		Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasional acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. Based on corrosivity category: • C4 (high)	• Sewage treatment plants • Port cranes • Mining applications

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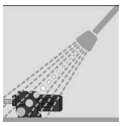
Surface protection		Ambient conditions	Sample applications
OS4		Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning, also with chemical cleaning agents. Based on corrosivity category: • C5-1 (very high)	• Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry

- Drives with surface protection OS2 – OS4 are always equipped with /KS corrosion protection.
- Drives in degree of protection IPX6 are always equipped with /KS corrosion protection.
- Drives with surface protection OS4 are always additionally equipped with preventive measure "Z". "Z" = All surface recesses are sprayed with elastic rubber compound.
- Corrosivity category: To ISO 12944-2 classification of ambient conditions

Order information

Type designation None

8.7.2 Corrosion protection

The option description "Corrosion protection" lists all measures to increase the corrosion resistance that refer to treatment of outer surfaces.

A label with the word "KORROSIONSSCHUTZ" (corrosion protection) on the fan guard indicates that special treatment has been applied.

Technical details

The corrosion protection measures are described in the brochure "We have the very thing against corrosion: Surface and corrosion protection". If you have any questions, contact SEW-EURODRIVE.

Order information

Type designation None

8.7.3 Paint

As standard, the motors are painted with "blue/gray"/RAL 7031. Special coatings and other colors are available on request.

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9 Prefabricated cables

SEW-EURODRIVE offers prefabricated cables with plugs for straightforward and reliable motor connection.

Prefabricated cables are divided as follows:

- Power cables such as motor cables, brakemotor cables, extension cables.
- Encoder cables and their extension cables.

Cable and contact are connected using the crimp technique. Cables are available by the meter.

9.1 Preselection of cables

Prefabricated cables were preselected by SEW-EURODRIVE according to the standard EN 60204. The routing types "fixed installation" and "cable carrier installation" were considered.

Using other standards for the machine construction can result in diverging cross sections.

9.2 Project planning

9.2.1 Cable dimensioning to EN 60204

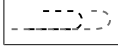
Cable load table

Cable load through current I according to EN 60204-1:2006 table 6, ambient temperature 40 °C.

Cable cross section	Three-core sheathed cable in pipe or cable	Triple-core, plastic-sheathed cable on top of each other on wall	Three-core sheathed cable lined up horizontally
mm²	A	A	A
35	86	104	110
50	103	125	133
70	130	160	171
95	156	194	207
120	179	225	240

These data are merely recommended values and are no substitute for the detailed project planning of the incoming cables depending on the concrete application considering the applicable regulations.

9.3 Key

Symbol	
	Cables also suitable for cable carriers

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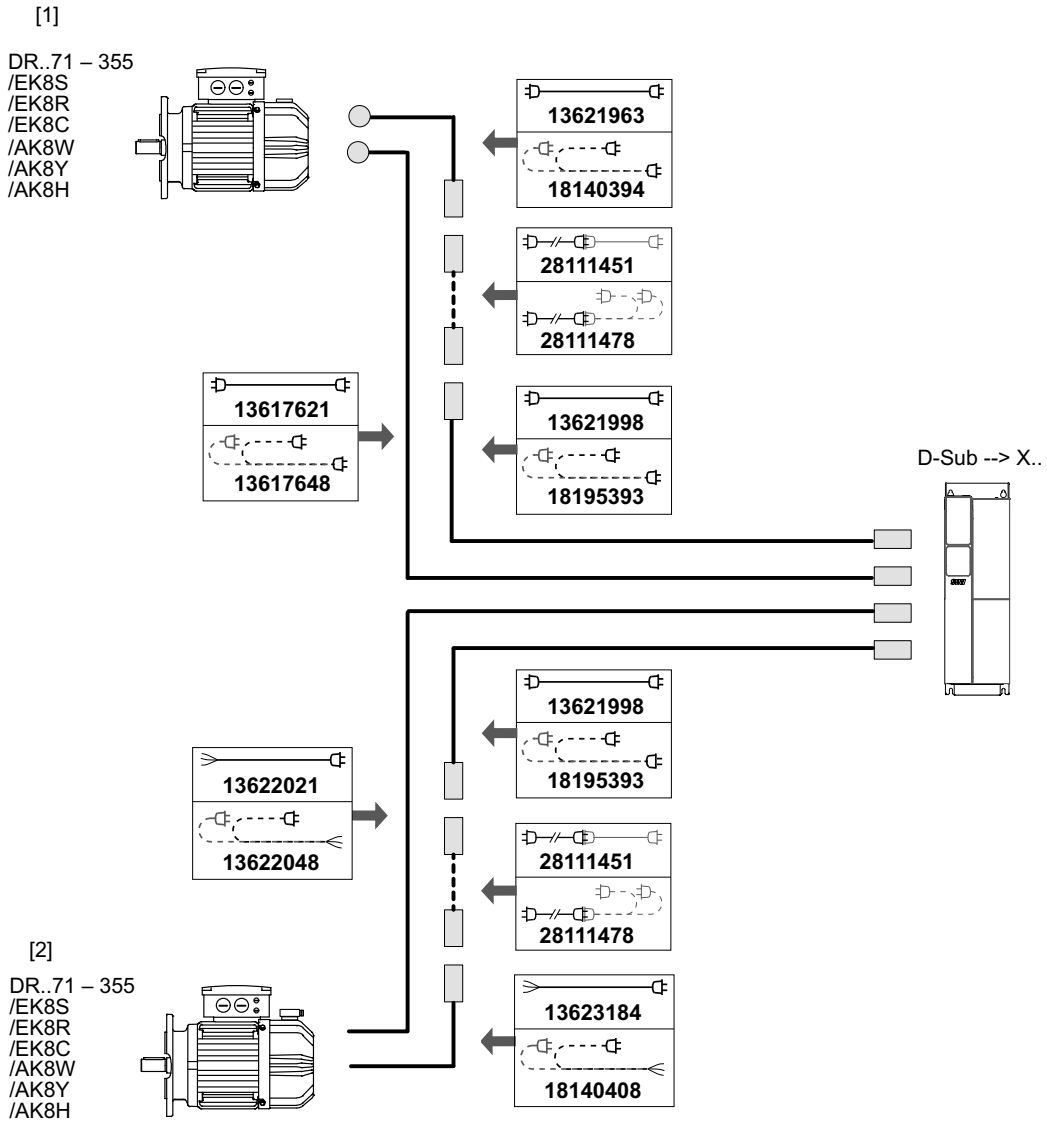
9.4 Encoder cables for DR.. motors

9.4.1 Overview



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D-Sub --> X.. MOVIDRIVE® B
Multi-encoder cards: DEH11B, DEU21B
For more detailed information, refer to the "MOVIDRIVE® MDX60B/61B" system manual.

[1] Motors with an integrated plug connector for encoder signals without connection cover, connection type A2GA.
The signals for thermal monitoring of the motor are not located in the encoder cable.

[2] Motors with integrated plug connector for encoder signals with connection cover, connection type A1GA.
The signals for thermal monitoring of the motor are not located in the encoder cable.

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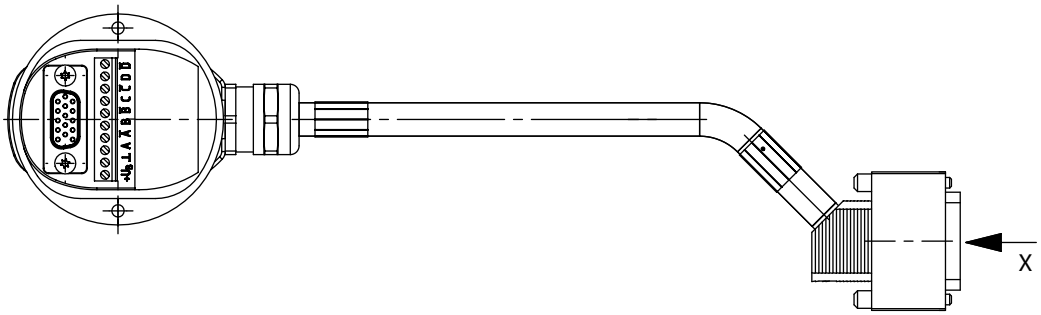
9.4.2 Encoder cable with connection cover and D-sub

Illustration of encoder cable



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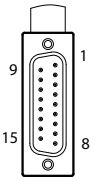
Types of encoder cables

Number of cores and cable cross section	Part number	Installation type
6 × 2 × 0.25 mm^2	13617621	Fixed installation
6 × 2 × 0.25 mm^2	13617648	Cable carrier installation

Pin assignment of encoder cables

Motor connection side					X15 terminal
Contact	**Signal**	**Cable/core color**	**Signal**	**Contact**	**Plug connector view X**
A	cos+	Red (RD)	A	1	
$\overline{A}$	cos-	Blue (BU)	$\overline{A}$	9	
B	sin+	Yellow (YE)	B	2	
$\overline{B}$	sin-	Green (GN)	$\overline{B}$	10	
C	C+	Brown (BN)	C	3	
$\overline{C}$	C-	White (WH)	$\overline{C}$	11	
D	Data+	Black (BK)	D	4	
$\overline{D}$	Data-	Violet (VT)	$\overline{D}$	12	
+UB	UB	Red/blue + gray (RD-BU + GY) optionally: Gray (GY)	UB	15	
GND	DGND	Gray-pink+pink (GY-PK +PK) optionally: Pink (PK)	DGND	8	

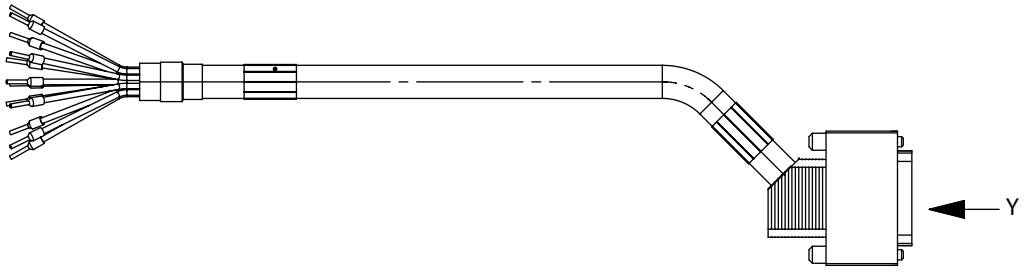
D-sub



15-pin

9.4.3 Encoder cable with conductor end sleeves and D-sub

Illustration of encoder cable



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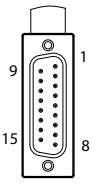
Types of encoder cables

Number of cores and cable cross section	Part number	Installation type
6 × 2 × 0.25 mm²	13622021	Fixed installation
6 × 2 × 0.25 mm²	13622048	Cable carrier installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111508	Fixed installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111516	Cable carrier installation

Pin assignment of encoder cables

Motor connection side				X15 terminal
	Contact	Description	Conductor color	Plug connector View Y
	1	A (cos+)	Red (RD)	
	9	$\overline{A}$ (cos-)	Blue (BU)	
	2	B (sin+)	Yellow (YE)	
	10	$\overline{B}$ (sin-)	Green (GN)	
	3	C+	Brown (BN)	
	11	C-	White (WH)	
	4	Data+	Black (BK)	
	12	Data-	Violet (VT)	
	15	UB	Red/blue + gray (RDBU + GY) optionally: Gray (GY)	
	8	GND	Gray/pink + pink (GYPK + PK) optionally: Pink (PK)	
	14	TF+	Gray/pink (GYPK)	
	6	TF-	Red/blue (RDBU)	

TF+ and TF-: assigned, if present

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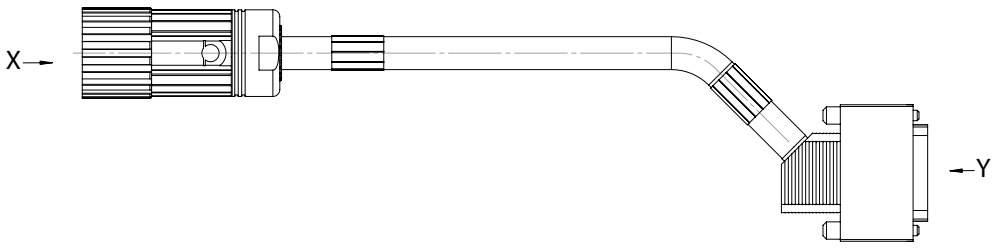
9.4.4 Encoder cable with M23 and D-sub

Illustration of encoder cable

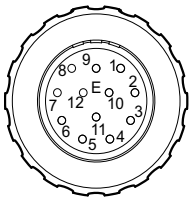
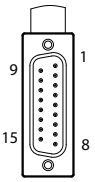


14818370059

Types of encoder cables

Number of cores and cable cross section	Part number	Installation type
5 × 2 × 0.25 mm²	13602659	Fixed installation
5 × 2 × 0.25 mm²	13623206	Cable carrier installation

Pin assignment of encoder cables

Motor connection side					X15 terminal	
Plug connector View X	Contact	Signal	Cable/core color	Signal	Contact	Plug connector View Y
	5	A cos+	Red (RD)	A cos+	1	 D-sub 15-pin
	6	$\overline{A}$ cos-	Blue (BU)	$\overline{A}$ cos-	9	
	8	B sin+	Yellow (YE)	B sin+	2	
	1	$\overline{B}$ sin-	Green (GN)	$\overline{B}$ sin-	10	
	3	C+	Brown (BN)	C	3	
	4	C-	White (WH)	$\overline{C}$	11	
	-	Data+	-	D	4	
	-	Data-	-	$\overline{D}$	12	
	12	UB	Black + gray (BK +GY)	UB	15	
	10	GND	Pink + violet (PK+VT)	GND	8	

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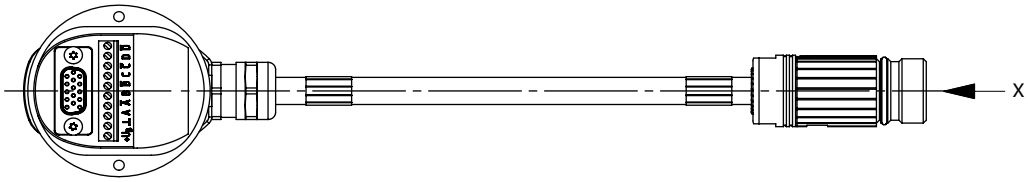
9.4.5 Encoder extension cable with connection cover and M23

Illustration of encoder extension cable



14818380043

Types of encoder extension cables

Number of cores and cable cross section	Part number	Installation type
6 × 2 × 0.25 mm²	13621963	Fixed installation
6 × 2 × 0.25 mm²	18139183	Cable carrier installation
6 × 2 × 0.25 mm²	18140394	Cable carrier installation

Pin assignment of encoder extension cables

Motor connection side					X15 terminal
Contact	Signal	Cable/core color	Signal	Contact	Plug connector View X
A	A cos+	Red (RD)	A cos+	3	
$\overline{A}$	$\overline{A}$ cos-	Blue (BU)	$\overline{A}$ cos-	4	
B	B sin+	Yellow (YE)	B sin+	5	
$\overline{B}$	$\overline{B}$ sin-	Green (GN)	$\overline{B}$ sin-	6	**AKUA 020**
C	C+	Brown (BN)	C+	1	
$\overline{C}$	C-	White (WH)	C-	2	
D	Data+	Black (BK)	Data+	8	
$\overline{D}$	Data-	Violet (VT)	Data-	7	
+UB	UB	Red/blue + gray (RD-BU + GY)	UB	12	
GND	GND	Gray-pink+pink (GY-PK+PK)	GND	11	

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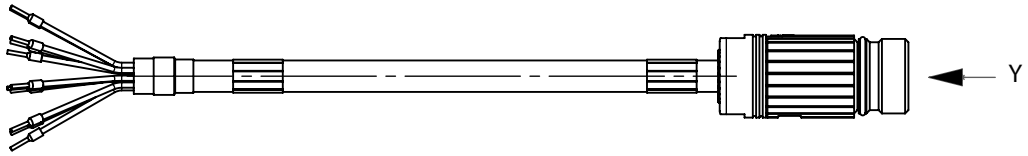
9.4.6 Encoder extension cable with conductor end sleeves and M23

Illustration of encoder extension cable



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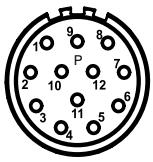
Types of encoder extension cables

Number of cores and cable cross section	Part number	Installation type
6 × 2 × 0.25 mm²	13623184	Fixed installation
6 × 2 × 0.25 mm²	18140408	Cable carrier installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111486	Fixed installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111494	Cable carrier installation

Pin assignment of encoder extension cables

Motor connection side				X15 terminal
	Contact	Description	Conductor color	Plug connector View Y
	3	A cos+	Red (RD)	
	4	$\overline{A}$ cos-	Blue (BU)	
	5	B sin+	Yellow (YE)	
	6	$\overline{B}$ sin-	Green (GN)	
	1	C+	Brown (BN)	
	2	C-	White (WH)	
	8	Data+	Black (BK)	
	7	Data-	Violet (VT)	
	12	UB	Red/blue + gray (RDBU + GY) optionally: Gray (GY)	
	11	GND	Gray/pink + pink (GYPK + PK) optionally: Pink (PK)	
	9	TF+	Gray/pink (GYPK)	
	10	TF-	Red/blue (RDBU)	

TF+ and TF-: assigned, if present

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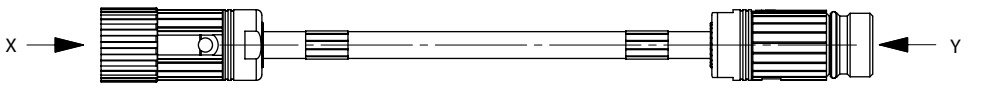
9.4.7 Encoder extension cable with two M23

Illustration of encoder extension cable



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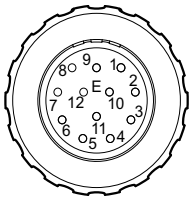
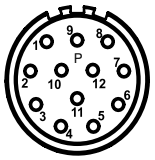
Types of encoder extension cables

Number of cores and cable cross section	Part number	Installation type
6 × 2 × 0.25 mm²	13623192	Fixed installation
6 × 2 × 0.25 mm²	13621971	Cable carrier installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111451	Fixed installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111478	Cable carrier installation

Pin assignment of encoder extension cables

Motor connection side					X15 terminal	
Plug connector View X	Contact	Signal	Cable/core color	Signal	Contact	Plug connector View Y
ASTA 021FR 	3	A cos+	Red (RD)	A cos+	3	AKUA 020 
	4	$\overline{A}$ cos-	Blue (BU)	$\overline{A}$ cos-	4	
	5	B sin+	Yellow (YE)	B sin+	5	
	6	$\overline{B}$ sin-	Green (GN)	$\overline{B}$ sin-	6	
	1	C+	Brown (BN)	C+	1	
	2	C-	White (WH)	C-	2	
	8	Data+	Black (BK)	Data+	8	
	7	Data-	Violet (VT)	Data-	7	
	12	UB	Red/blue + gray (RD-BU + GY) optionally: Gray (GY)	UB	12	
	11	GND	Gray-pink+pink (GY-PK+PK) optionally: Pink (PK)	GND	11	
	9	TF+	Gray/pink (GYPK)	TF+	9	
	10	TF-	Red/blue (RDBU)	TF-	10	

TF+ and TF-: assigned, if present

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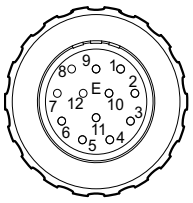
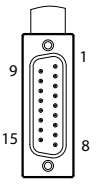
9.4.8 Encoder extension cable with M23 and D-sub

Illustration of encoder extension cable

Types of encoder extension cables

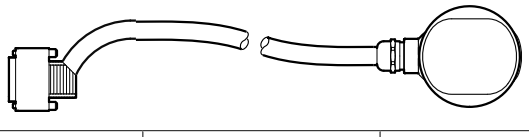
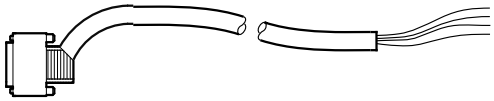
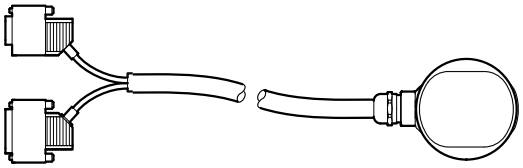
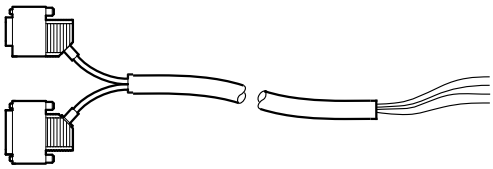
Number of cores and cable cross section	Part number	Installation type
6 × 2 × 0.25 mm²	13621998	Fixed installation
4 × 2 × 0.25 mm² + 2 × 0.5 mm²	18195393	Cable carrier installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111435	Fixed installation
5 × 2 × 0.25 mm² + 2 × 0.5 mm²	28111443	Cable carrier installation

Pin assignment of encoder extension cables

Motor connection side					X15 terminal	
Plug connector View X	Contact	Signal	Cable/core color	Signal	Contact	Plug connector View Y
ASTA 021FR 	3	A cos+	Red (RD)	A cos+	1	
	4	$\overline{A}$ cos-	Blue (BU)	$\overline{A}$ cos-	9	
	5	B sin+	Yellow (YE)	B sin+	2	
	6	$\overline{B}$ sin-	Green (GN)	$\overline{B}$ sin-	10	
	1	C+	Brown (BN)	C+	3	
	2	C-	White (WH)	C-	11	
	8	Data+	Black (BK)	Data+	4	
	7	Data-	Violet (VT)	Data-	12	
	12	UB	Red/blue + gray (RD-BU + GY) optionally: Gray (GY)	UB	15	
	11	GND	Gray-pink+pink (GY-PK +PK) optionally: Pink (PK)	GND	8	
	9	TF+	Gray/pink (GYPK)	TF+	14	
	10	TF-	Red/blue (RDBU)	TF-	6	

TF+ and TF-: assigned, if present

9.5 Overview of add-on encoder cables for DRN.. motors – MOVIDRIVE® B

Connection cables			Length/installation type	Specification
Motor side				
			Fixed length Variable length	If the encoder on the motor is ordered and delivered without an encoder connection cover, the prefabricated cable can be fitted with an encoder connection cover on the encoder end. Encoder cable with connection cover and D-sub
D-Sub (15-pin)		Encoder connection cover		
			Fixed length Variable length	The customer is responsible for connecting the terminal strip in the encoder connection cover. The cable gland in the encoder connection cover is included in the encoder scope of delivery. Connection to MOVIDRIVE®: A 15-pin connector is available that matches the interface on the inverter. Encoder cable with conductor end sleeves and D-sub
D-Sub (15-pin)		Open (conductor end sleeve and ring cable lug)		
			Fixed length Variable length	If the encoder on the motor is ordered and delivered without an encoder connection cover, the prefabricated cable can be fitted with an encoder connection cover on the encoder end. Encoder cable with connection cover and 2 D-sub
D-sub (1 × 9-pin and 1 × 15-pin)		Encoder connection cover		
			Fixed length Variable length	The customer is responsible for connecting the terminal strip in the encoder connection cover. The cable gland in the encoder connection cover is included in the encoder scope of delivery. Connection to MOVIDRIVE®: A 9-pin or 15-pin connector is available to match the inverter in the interface. Encoder cable with conductor end sleeve and 2 D-sub
D-sub (1 × 9-pin and 1 × 15-pin)		Open (conductor end sleeve and ring cable lug)		

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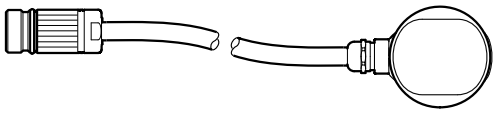
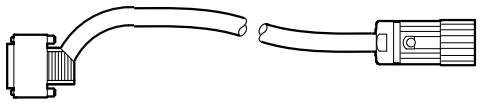
9.6 Overview of extensions for add-on encoder cables for asynchronous motors

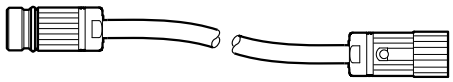
9.6.1 Intermediate sockets and extensions

Intermediate sockets are used whenever part of the wiring is routed in a cable carrier, or if connecting several cable sections is easier for very long distances. The encoder cables are available with intermediate sockets for this purpose.

The cable types used for fixed and cable carrier installation are listed in chapter "Cable specifications".

Connection cable			Length/installation type	Specification
Motor side				
			Fixed length Variable length	Encoder extension cable with connection cover and M23
M23 connector		Connection cover		
			Fixed length Variable length	The customer is responsible for connecting the terminal strip in the connection cover. The cable gland in the connection cover is included in the delivery of the encoder. Encoder extension cable with conductor end sleeves and M23
M23 connector		Open (conductor end sleeve and ring cable lug)		
			Fixed length Variable length	Connection to MOVIDRIVE®: A 15-pin plug is available that matches the interface on the inverter. Encoder extension cable with D-sub – M23 connector
D-Sub (15-pin)		M23 connector		

Extension

Connection cable			Length/ Installation type	Specification
Motor side				
			Fixed length Variable length	Encoder extension cable with M23 connector – M23 connector
M23 connector		M23 connector		

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9.7 Cable specification of encoder cables

9.7.1 Fixed installation

Accessory designation		**.K8.**
Cable cross sections		**6 × 2 × 0.25 mm²** **4 × 2 × 0.25 + 2 × 0.5 mm²** **5 × 2 × 0.25 + 2 × 0.5 mm²**
Manufacturer		**HELUKABEL/Leoni**
Manufacturer's designation		LI9YCY
Operating voltage U_0/U AC	V	230 / 350
Temperature range	°C	Fixed installation -40 to +80
Maximum temperature	°C	+ 80
Minimum bending radius	mm	43
Outer diameter D	mm	8.6 ± 0.2 8.8 ± 0.2
Core identification		DIN 47100
Sheath color		Green, similar to RAL 6018
Approval(s)		DESINA/VDE/UL/CSA/CE
Capacitance core/shield	nF/km	110
Capacitance core/core	nF/km	70
Halogen-free		No
Silicone-free		Yes
CFC-free		Yes
Inner insulation (core)		PP
Outer insulation (sheath)		PVC
Flame-retardant/self-extinguishing		No
Conductor material		Cu blank
Shielding		Braided tinned Cu
Weight (cable)	kg/km	107

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9.7.2 Cable carrier installation

Accessory designation		**.K8.**
Cable cross sections		**6 × 2 × 0.25 mm²** **4 × 2 × 0.25 + 2 × 0.5 mm²** **5 × 2 x 0.25 + 2 × 0.5 mm²**
Manufacturer		**Nexans**
Manufacturer's designation		SSL18YC11Y 6 x 2 x 0.25 SSL18YC11Y 5 x 2 x 0.25
Operating voltage U_0/U AC	V	300
Temperature range	°C	-20 to +60
Maximum temperature	°C	+90 (on conductor)
Minimum bending radius	mm	100
Outer diameter D	mm	9.8 ± 0.2 8.8 ± 0.2
Maximum acceleration	m/s^2	20
Maximum speed	m/min	200
Core identification		DIN 47100
Sheath color		Green, similar to RAL 6018
Approval(s)		DESINA/VDE
Capacitance core/shield	nF/km	100
Capacitance core/core	nF/km	58
Halogen-free		Yes
Silicone-free		Yes
CFC-free		Yes
Inner insulation (core)		PP
Outer insulation (sheath)		PUR
Flame-retardant/self-extinguishing		Yes
Conductor material		E-Cu blank
Shielding		Braided tinned Cu
Weight	kg/km	130
Minimum bending cycles		≥ 5 million

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10 Address Directory

Germany			
Headquarters Production plant Sales	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 42 76646 Bruchsal, Germany P.O. box address Postfach 3023 • D-76642 Bruchsal, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.seweurodrive.com sew@sew-eurodrive.de
Production Plant / Industrial Gear Units	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 76646 Bruchsal, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production plant	**Graben**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 1 76676 Graben-Neudorf, Germany P.O. box address Postfach 1220 • 76671 Graben-Neudorf, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Oestringen Plant Franz-Gurk-Strasse 2 76684 Oestringen, Germany	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oestringen@sew-eurodrive.de
Service Competence Centers	**Mechanical/ Mechatronic Components**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 1 76676 Graben-Neudorf, Germany	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 42 76646 Bruchsal, Germany	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
Drive Technology Center	**North**	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Strasse 40-42 30823 Garbsen (near Hanover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Daenkritzer Weg 1 08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstrasse 5 85551 Kirchheim (near Munich)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstrasse 1 40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
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	Berlin	SEW-EURODRIVE GmbH & Co KG Lilienthalstrasse 3a 12529 Schoenefeld, Germany	Tel. +49 306331131-30 Fax +49 306331131-36 tb-berlin@sew-eurodrive.de
	Lake Constance	SEW-EURODRIVE GmbH & Co KG Dornierstraße 4 88677 Markdorf, Germany	Tel. +49 7544 96590-90 Fax +49 7544 96590-99 tb-bodensee@sew-eurodrive.de
	Bremen	SEW-EURODRIVE GmbH & Co KG Bornstr.19 ... 22 28195 Bremen, Germany	Tel. +49 421 33918-10 Fax +49 421 33918-22 tb-bremen@sew-eurodrive.de
	Dortmund	SEW-EURODRIVE GmbH & Co KG Hildastraße 8 44145 Dortmund, Germany	Tel. +49 231 229028-10 Fax +49 231 229028-20 tb-dortmund@sew-eurodrive.de
	Dresden	SEW-EURODRIVE GmbH & Co KG Hauptstrasse 32 01445 Radebeul, Germany	Tel. +49 351 26338-0 Fax +49 351 26338-38 tb-dresden@sew-eurodrive.de
	Erfurt	SEW-EURODRIVE GmbH & Co KG Dubliner Strasse 12 99091 Erfurt, Germany	Tel. +49 361 21709-70 Fax +49 361 21709-79 tb-erfurt@sew-eurodrive.de
	Guestrow	SEW-EURODRIVE GmbH & Co KG Glasewitzer Chaussee 33 B 18273 Guestrow, Germany P.O. box address Postfach 1216 • 18262 Güstrow, Germany	Tel. +49 3843 8557-80 Fax +49 3843 8557-88 tb-guestrow@sew-eurodrive.de

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	Hanover/Garbsen	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Str.40-42 30823 Garbsen, Germany P.O. box address Postfach 1104 53 • 30804 Garbsen, Germany	Tel. +49 5137 8798-10 Fax +49 5137 8798-50 tb-hannover@sew-eurodrive.de
	Heilbronn	SEW-EURODRIVE GmbH & Co KG Zeppelinstrasse 7 74357 Boennigheim, Germany	Tel. +49 7143 8738-0 Fax +49 7143 8738-25 tb-heilbronn@sew-eurodrive.de
	Herford	SEW-EURODRIVE GmbH & Co KG Göbenstraße 3 – 7 32052 Herford	Tel. +49 5221 9141-0 Fax +49 5221 9141-20 tb-herford@sew-eurodrive.de
	Karlsruhe	SEW-EURODRIVE GmbH & Co KG Ettlinger Weg 2 76467 Bietigheim, Germany P.O. box address Postfach 43 • 76463 Bietigheim, Germany	Tel. +49 7245 9190-10 Fax +49 7245 9190-20 tb-karlsruhe@sew-eurodrive.de
	Kassel	SEW-EURODRIVE GmbH & Co KG Lange Strasse 14 34253 Lohfelden, Germany	Tel. +49 561 95144-80 Fax +49 561 95144-90 tb-kassel@sew-eurodrive.de
	Koblenz	SEW-EURODRIVE GmbH & Co KG Bahnstrasse 17a 56743 Mendig, Germany	Tel. +49 2652 9713-30 Fax +49 2652 9713-40 tb-koblenz@sew-eurodrive.de
	Lahr	SEWEURODRIVE GmbH & Co KG Europastrasse 3/1 77933 Lahr/Schwarzwald, Germany	Tel. +49 7821 90999-60 Fax +49 7821 90999-79 tb-lahr@sew-eurodrive.de
	Langenfeld	SEW-EURODRIVE GmbH & Co KG Siemensstrasse 1 40764 Langenfeld, Germany	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 tb-langenfeld@sew-eurodrive.de
	Magdeburg	SEW-EURODRIVE GmbH & Co KG Breiteweg 53 39179 Barleben, Germany	Tel. +49 39203 7577-1 Fax +49 39203 7577-9 tb-magdeburg@sew-eurodrive.de
	Mannheim	SEW-EURODRIVE GmbH & Co KG Besselstrasse 26 68219 Mannheim, Germany	Tel. +49 621 71683-10 Fax +49 621 71683-22 tb-mannheim@sew-eurodrive.de
	Munich	SEW-EURODRIVE GmbH & Co KG Domagkstrasse 5 85551 Kirchheim, Germany	Tel. +49 89 90955-110 Fax +49 89 90955-150 tb-muenchen@sew-eurodrive.de
	Muenster	SEW-EURODRIVE GmbH & Co KG Hafenplatz 4 48155 Muenster, Germany	Tel. +49 251 41475-11 Fax +49 251 41475-50 tb-muenster@sew-eurodrive.de
	Nuremberg	SEW-EURODRIVE GmbH & Co KG Plattenaeckerweg 6 90455 Nuremberg, Germany	Tel. +49 911 98884-50 Fax +49 911 98884-60 tb-nuernberg@sew-eurodrive.de
	Regensburg	SEW-EURODRIVE GmbH & Co KG Im Gewerbepark A15 93059 Regensburg, Germany	Tel. +49 941 46668-68 Fax +49 941 46668-66 tb-regensburg@sew-eurodrive.de
	Rhine-Main	SEW-EURODRIVE GmbH & Co KG Niederstedter Weg 5 61348 Bad Homburg, Germany	Tel. +49 6172 9617-0 Fax +49 6172 9617-50 tb-rheinmain@sew-eurodrive.de
	Stuttgart	SEW-EURODRIVE GmbH & Co KG Friedrich-List-Strasse 46 70771 Leinfelden-Echterdingen, Germany	Tel. +49 711 16072-0 Fax +49 711 16072-72 tb-stuttgart@sew-eurodrive.de
	Ulm	SEWEURODRIVE GmbH & Co KG Dieselstrasse 14 89160 Dornstadt, Germany	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 tb-ulm@sew-eurodrive.de
	Drive Center Wuerzburg	SEW-EURODRIVE GmbH & Co KG Nuernbergerstrasse 118 97076 Wuerzburg-Lengfeld, Germany	Tel. +49 931 27886-60 Fax +49 931 27886-66 tb-wuerzburg@sew-eurodrive.de
	Zwickau / Meerane	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane, Germany	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 tb-zwickau@sew-eurodrive.de

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France			
Production plant **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 67506 Haguenau Cedex, France	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production plant	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex, France	Tel. +33 3 87 29 38 00
Assembly plant **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 33607 Pessac Cedex, France	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Etang, France	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Technical offices	**Alsace**	SEW-USOCOME 1 rue Auguste Gasser 68360 Soultz, France	Tel. +33 3 89 74 51 62 Fax +33 3 89 76 58 71
	Aquitaine/Charente	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B.P.182 33607 Pessac Cedex, France	Tel. +33 5 57 26 39 08 Fax +33 5 57 26 39 09
	Auvergne/Limousin	SEW-USOCOME Farges 19600 Chasteaux, France	Tel. +33 5 55 20 12 10 Fax +33 5 55 20 12 11
	Lower Normandy	SEW-USOCOME 5 rue de la Limare 14250 Brouay, France	Tel. +33 2 31 37 92 86 Fax +33 2 31 74 68 15
	Burgundy	SEW-USOCOME 10 rue de la poste 71350 Saint Loup Géanges, France	Tel. +33 3 85 49 92 18 Fax +33 3 85 49 92 19
	Brittany	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 04 Fax +33 2 40 78 42 20
	Centre/Poitou	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 11 Fax +33 2 40 78 42 20
	Champagne-Ardenne	SEW-USOCOME 25 bis rue Victor Hugo Appartement 7 10120 Saint André les Vergers, France	Tel. +33 3 25 79 63 24 Fax +33 3 25 79 63 25
	Franche-Comté	SEW-USOCOME 24 avenue Charles Boby 70000 Quincey, France	Tel. +33 3 81 60 20 47 Fax +33 3 81 87 75 93
	Île-de-France East/Aisne	SEW-USOCOME 20 rue Félix Faure 02100 Saint Quentin, France	Tel. +33 3 23 62 81 24 Fax +33 3 23 62 81 44
	Île-de-France North/Picardy	SEW-USOCOME 25bis rue Kléber 92300 Levallois Perret, France	Tel. +33 1 41 05 92 74 Fax +33 1 41 05 92 75
	Île-de-France South	SEW-USOCOME 6 chemin des bergers Lieu-dit Marchais 91410 Roinville sous Dourdan, France	Tel. +33 1 60 81 10 56 Fax +33 1 60 81 10 57

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France			
	Lothringen/Northern Alsace	SEW-USOCOME 1 rue de la forêt 54250 Champigneulles, France	Tel. +33 3 83 96 28 04 Fax +33 3 83 96 28 07
	Midi-Pyrénées/ Roussillon	SEW-USOCOME 179 route de Grazac 31190 Caujac, France	Tel. +33 5 61 08 15 85 Fax +33 5 61 08 16 44
	Nord-Pas-de-Calais	SEW-USOCOME 209, route d'Hesdigneul 62360 Hesdin l'Abbé, France	Tel. +33 3 21 10 86 86 Fax +33 3 21 10 86 87
	Paris/Île-de-France West	SEW-USOCOME 42 avenue Jean Jaurès 78580 Maule, France	Tel. +33 1 30 90 89 86 Fax +33 1 30 90 93 15
	Pays de la Loire	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 03 Fax +33 2 40 78 42 20
	Provence-Alpes-Côte d'Azur	SEW-USOCOME Le Clos Montolivet 9 impasse Bounin – Bât. A 13012 Marseille, France	Tel. +33 4 91 18 00 11 Fax +33 4 91 18 00 12
	Rhône-Alpes East	SEW-USOCOME Montée de la Garenne 26750 Génissieux, France	Tel. +33 4 75 05 65 95 Fax +33 4 75 05 65 96
	Rhône-Alpes North	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 03 Fax +33 4 72 15 37 15
	Rhône-Alpes West	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 04 Fax +33 4 72 15 37 15
Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com
Argentina			
Assembly plant **Sales**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Córdoba	SEW EURODRIVE ARGENTINA S.A. Ruta Nacional 19, Manzana 97, Lote 5 (X5125) Malvinas Argentinas Prov. de Córdoba	Tel. +54 351-490-0010 sewcor@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Santa Fe	SEW EURODRIVE ARGENTINA S.A. Ruta Prov. 21 Km 7, Lote 41 Parque Industrial Alvear (2126) Gral. Alvear Prov. de Santa Fe	Tel. +54 341-317-7277 sewsfe@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Service	**Mendoza**	SEW EURODRIVE ARGENTINA S.A.	Tel. +54 261-430-0060 sewmen@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Technical offices	**Tucumán**	SEW EURODRIVE ARGENTINA S.A. Balcarce 609 (T4000IAM) S.M. de Tucumán Prov. de Tucumán	Tel. +54 381-400-4569 sewtuc@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Bahía Blanca	SEW EURODRIVE ARGENTINA S.A. O'Higgins 95, 1er Piso A (B8000IVA) Bahía Blanca Prov. de Buenos Aires	Tel. +54 291-451-7345 sewbb@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Comahue	SEW EURODRIVE ARGENTINA S.A. Puerto Rico 1885 (R8324IOE) Cipolletti Prov. de Río Negro	Tel. +54 299-478-1290 sewcomahue@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

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Argentina			
Mining	**Mendoza**	SEW EURODRIVE ARGENTINA S.A.	Tel. +54 261-430-0060 mineria@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Australia			
Assembly plants **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043, Australia	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164, Australia	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Sales **Service**	**Adelaide**	SEW-EURODRIVE PTY. LTD. 9C Park Way Mawson Lakes, SA 5095, Australia	Tel. +61 8 8161 4000 Fax +61 8 8161 4002 enquires@sew-eurodrive.com.au
	Brisbane	SEW-EURODRIVE PTY.LTD. 1 /34 Collinsvale St Rocklea, Queensland, 4106, Australia	Tel. +61 7 3276 5100 Fax +61 7 3276 5102 enquires@sew-eurodrive.com.au
	Perth	SEW-EURODRIVE PTY. LTD. 10 Colin Jamieson Drive Welshpool, WA 6106, Australia	Tel. +61 8 9251-4900 Fax +61 8 9251-4903 enquires@sew-eurodrive.com.au
Sales	**Townsville**	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814, Australia	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au
Austria			
Assembly plant **Sales** **Service**	**Vienna**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 1230 Wien, Austria	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Technical offices	**Linz**	SEW-EURODRIVE Ges.m.b.H. Reuchlinstr. 6/3 4020 Linz, Austria	Tel. +43 732 655 109-0 Fax +43 732 655 109-20 tb-linz@sew-eurodrive.at
	Graz	SEW-EURODRIVE Ges.m.b.H. Grabenstraße 231 8045 Graz, Austria	Tel. +43 316 685 756-0 Fax +43 316 685 755 tb-graz@sew-eurodrive.at
	Dornbirn	SEW-EURODRIVE Ges.m.b.H. Lustenauerstraße 27/1 6850 Dornbirn, Austria	Tel. +43 5572 3725 99-0 Fax +43 5572 3725 99-20 tb-dornbirn@sew-eurodrive.at
Bangladesh			
Sales	**Bangladesh**	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Mobile +88 01729 097309 salesdhaka@seweurodrive-bangladesh.com
Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 220033 Minsk, Belarus	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by
Belgium			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Centers	**Industrial gear units**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 6900 Marche-en-Famenne, Belgium	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
Brazil			
Production plant **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP, Brazil SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

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Brazil			
Assembly plants **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 – Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br
Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia, Bulgaria	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg
Cameroon			
Sales	**Douala, Cameroon**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala, Cameroon	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr
Canada			
Assembly plants **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Please contact us for more addresses of service centers in Canada.		
Chile			
Assembly plant **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. box address Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production plant **Assembly plant** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly plant **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 51262581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530, China	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141, China	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan, China	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn

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China			
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
Colombia			
Assembly plant **Sales** **Service**	**Bogota**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá, Colombia	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
Côte d'Ivoire			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci
Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb, Croatia	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Sales **Assembly plant** **Service**	**Hostivice**	SEW-EURODRIVE CZ S.R.O. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline/24-hour availability	HOTLINE: +420 800 739 739 (800 SEW SEW)	**Service:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Assembly plant **Service**	**Plzeň**	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradni 173/2 326 00 Plzeň	Tel. +420 378 775 320 Fax +420 377 970 710 sew@sew-eurodrive.cz
Technical offices	**Brno**	SEW-EURODRIVE CZ S.R.O. Křenová 52 60200 Brno	Tel. +420 543 254 174 Fax +420 543 256 845 radek.chmela@sew-eurodrive.cz
	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 50202 Hradec Králové	Tel. +420 495 510 141 Fax +420 495 521 313 miroslav.moravec@sew-eurodrive.cz
	Ostrava	SEW-EURODRIVE CZ S.R.O. Studentská 6202/17 708 00 Ostrava-Poruba	Tel. +420 597 329 044 david.kenkus@sew-eurodrive.cz
	Klatovy	SEW-EURODRIVE CZ S.R.O. Vídeňská 841 33901 Klatovy	Tel. +420 376 331 634 Fax +420 376 331 634 viktor.kubernat@sew-eurodrive.cz
Service	**Horní Moštěnice**	SEW-EURODRIVE CZ S.R.O. Nám.Dr.M.Tyrše 14/64 751 17 Horní Moštěnice	Tel. +420 581 224 374 Fax +420 581 224 374 servis@sew-eurodrive.cz
Denmark			
Assembly plant **Sales** **Service**	**Copenhagen**	SEW-EURODRIVE A/S Geminivej 28-30 2670 Greve, Denmark	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo, Egypt	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg
Estonia			
Sales	**Tallinn**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa, Estonia	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

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Finland			
Assembly plant **Sales** **Service**	**Hollola**	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola 2, Finland	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	**Hollola**	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Technical offices	**Helsinki**	SEW-EURODRIVE OY Luutnantintie 5 00410 Helsinki, Finland	Tel. +358 201 589-300 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Asemakatu 7 65100 Vaasa, Finland	Tel. +358 201 589-300 sew@sew.fi
	Kuopio	SEW-EURODRIVE OY Viestikatu 3 70600 Kuopio, Finland	Tel. +358 201 589-300 sew@sew.fi
Production plant **Assembly plant**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi
Gabon			
Sales	**Libreville, Gabon**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabon	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr
Greece			
Sales	**Athens**	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 http://www.boznos.gr info@boznos.gr
Technical office	**Thessaloniki**	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki, Greece	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr
Great Britain			
Assembly plant **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline/24-hour availability		Tel. +44 1924 896911
Service Competence Centers	**Southern England**	SEW-EURODRIVE Ltd. Unit 41 Easter Park Benyon Road Silchester Reading Berkshire RG7 2PQ	Tel. +44 1189 701-699 Fax +44 1189 701-021
Technical offices	**Midlands**	SEW-EURODRIVE Ltd. 5 Sugar Brook Court Aston Road Bromsgrove Worcs. B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245
	Scotland	SEW-EURODRIVE Ltd. No 37 Enterprise House Springkerse Business Park Stirling FK7 7UF	Tel. +44 17 8647-8730 Fax +44 17 8645-0223

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Hong Kong			
Assembly plant **Sales** **Service**	**Hong Kong**	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 contact@sew-eurodrive.hk
Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. 1037 Budapest, Hungary Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
India			
Company office **Assembly plant** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243, India Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly plant **Sales** **Service**	**Chennai**	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 saleschennai@seweurodriveindia.com
Technical offices	**Ahmedabad**	SEW-EURODRIVE India Private Limited 306, Shaan office complex, Behind Sakar-IV, Ellisebridge, Ashram Road Ahmedabad – Gujarat, India	Tel. +91 79 40072067/68 Fax +91 79 40072069 salesahmedabad@seweurodrivein-dia.com
	Aurangabad	SEW-EURODRIVE INDIA PRIVATE LIMITED	Tel. +91 86000 12333 salesaurangabad@seweurodrivein-dia.com
	Bangalore	SEW-EURODRIVE India Private Limited Sy.no:41-P3, Peenya1, Phase 1A, Peenya Village, Yeswanthapura Hobli, Bangalore North Taluk, Bangalore Dist, Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbangalore@seweurodriveindia.com
		SEW-EURODRIVE India Private Limited # C-104, 3rd Block, KSSIDC Complex, Electronic City. Bangalore – 560100, Karnataka	Tel. +91 80 28522662 / 28522663 salesbangalore@seweurodriveindia.com
	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED Genetic Udayanchal, House-96 (6th Floor), Road-23/A, Block-B, Banani, Dhaka-1213, Bangladesh	Mobile +88 01729 097309 salesdhaka@seweurodrive-bangladesh.com
	Bellary	SEW-EURODRIVE India Private Limited Door no-56/279 Ward No-16, Sindhigi compound, Near Raghavendra talkies, Bellary-583101 Karnataka	Tel. +91 77609 88668 salesbellary@seweurodriveindia.com
	Chandigarh	SEW-EURODRIVE India Private Limited # 72, Type- 4, Power Colony, Chandigarh - Rupnagar Highway Rupnagar- 140001, Punjab	Tel. +91 81462 67606 saleschandigarh@seweurodrivein-dia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu, India	Tel. +91 44 42849813 Fax +91 44 42849816 saleschennai@seweurodriveindia.com
	Kochi	SEW-EURODRIVE India Private Limited CF7-(2), Block No 1, Vasanth Nagar, Opposite Jawahar Lal Nehru Stadium, Palarivattom – Cochin 682025	Tel. +91 98951 30375 salescochin@seweurodriveindia.com
	Coimbatore	SEW-EURODRIVE INDIA PRIVATE LIMITED 687/2, SRI SAKTHIVEL TOWERS (NEAR DEEPAM HOSPITAL) TRICHY ROAD, RAMANATHAPURAM COIMBATORE - 641 045.Tamilnadu, India	Tel. +91 422 2322420 Fax +91 422 2323988 salescoimbatore@seweurodrivein-dia.com

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India			
	Cuttack	SEW-EURODRIVE India Private Limited Plot No. 1764, Nuasahi, Nayapalli Bhubaneswar-12 Orissa	Tel. +91 9937446333 salescuttack@seweurodriveindia.com
	Gandhidham	SEW-EURODRIVE India Private Limited TCX-S-28, FF, Ward 12/A, Gandhidham - Kutch - 370201	Tel. +91 81282 36850 salesgandhidham@seweurodrivein-dia.com
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpeet Hyderabad - 500016 - Andhra Pradesh, India	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyderabad@seweurodriveindia.com
	Jamshedpur	SEW-EURODRIVE India Private Limited Flat no.: S1 " Kashi Kunj",h. No. 60, New Rani Kudar Road No - 3 P.o. + P.s. - Kadma Jamshedpur - Pin - 831005 Jharkhand	Tel. +91 9934123671 salesjamshedpur@seweurodrivein-dia.com
	Kolhapur	SEW EURODRIVE India Private Limited	Tel. +91 86000 20846 saleskolhapur@seweurodriveindia.com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal, India	Tel. +91 33 22827457 Fax +91 33 22894204 saleskolkata@seweurodriveindia.com
	Lucknow	SEW-EURODRIVE India Private Limited 69, Shiv Vihar Colony Vikas Nagar-5 Lucknow 226022 - Uttar Pradesh	Tel. +91 9793627333 saleslucknow@seweurodriveindia.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra, India	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com
	Nagpur	SEW-EURODRIVE India Private Limited Plot No 49, New Kailash Nager, Samta colony, Nagpur-440027	Tel. +91 95610 89525 salesnagpur@seweurodriveindia.com
	Nashik	SEW-EURODRIVE India Private Limited 107, "YOG" Bunglow, Mahatama Nagar, Trimbak Road, Nashik, Maharashtra – 422 007	Tel. +91 9665752978 salesnashik@seweurodriveindia.com
	New Delhi	SEW-EURODRIVE India Private Limited 1008, 10th Floor, 12th Level "Westend Mall" Tower Plot, District Centre Adjacent Hotel Hilton Janak Puri, New Delhi – 110058	Tel. +91 11 25544111 Fax +91 11 25544113 salesdelhi@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Jai Tulajabhavani Complex. Office No: 15 First Floor, Opp. Century Enka Company, MIDC Bhosari, Pune 411 026	Tel. +91 20-65118890 / 91 Fax +91 20 25380721 salespune@seweurodriveindia.com
		SEW-EURODRIVE India Private Limited LUNAWAT PRISM 4th Floor, S.No. 148 Opposite Wanaz Company, Besides Mega Mart At Neena Co-Operative Housing Society, Paud Road, Pune 411038 - Maharashtra, India	Tel. +91 20 25380730/735 Fax +91 20 25380721 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited A-42, Ashoka Millenium Complex, Ring Road-1, Raipur 492 001 - Chhattisgarh, India	Tel. +91 771 4090765 Fax +91 771 4090765 salesraipur@seweurodriveindia.com
	Ranchi	SEW-EURODRIVE India Private Limited Flat No.: A - 101, Krishna Shree Apartment, Anantpur, P.O. Doranda – Ranchi 834002	Tel. +91 8294630772 salesranchi@seweurodriveindia.com

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India			
	Tiruchirappalli	SEW-EURODRIVE India Private Limited A-106,Trichy Towers, Chandrasekarapuram, Salai Road, Trichy – 620018.	Mobile +91 95009 88081 salestrichy@seweurodriveindia.com
	Vadodara	SEW-EURODRIVE India Private Limited Unit No. 301, Savorite Bldg, Plot No. 143, Vinayak Society, off old Padra Road, Vadodara - 390 007. Gujarat	Tel. +91 265 2325258 Fax +91 265 2325259 salesvadodara@seweurodriveindia.com
	Vijayawada	SEW-EURODRIVE India Private Limited Door No:40-5/3-10A, Syam Nagar, NGO's Colony, Tikkle Road, Vijayawada-520010	Tel. +91 99895 01748 Fax +91 8662475157 Mobile +91 9989501748 salesvijayawada@seweurodrivein-dia.com
Indonesia			
Sales	**Jakarta**	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350, Indonesia	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
		PT. Agrindo Putra Lestari Jl.Prof.DR.Latumenten no27/A Jakarta 11330	Tel. +62 21 63855588 Fax +62 21 63853789 aplindo@indosat.net.id
	Medan	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
	Surabaya	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
Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11, Ireland	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie
Iceland			
Sales	**Reykjavik**	VARMA & VELAVERK EHF Dalshrauni 5 IS-220 Hafnarjördur	Tel. +354 585 1070 Fax +354 585 1071 varmaverk@varmaverk.is http://www.varmaverk.is
Israel			
Sales	**Tel Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon, Israel	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly plant **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano), Italy	Tel. +39 02 96 9801 Fax +39 02 96 980 999 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical offices	**Bologna**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 40064 Ozzano dell'Emilia (Bo), Italy	Tel. +39 051 65-23-801 Fax +39 02 96 980 499
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 81020 S. Nicola la Strada (Caserta), Italy	Tel. +39 0823 219011 Fax +39 02 96 980 599
	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano), Italy	Tel. +39 02 96 980229 Fax +39 02 96 980 999

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Italy			
	Pescara	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 02 96 980 699
	Turin	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C 10135 Torino, Italy	Tel. +39 011 3473780 Fax +39 02 96 980 799
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Antonio Meucci 5, I-37042 - Caldiero (VR)	Tel. +39 045 89-239-11 Fax +39 02 96 980 814
Japan			
Assembly plant **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical offices	**Fukuoka**	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022, Japan	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th floor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001, Japan	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Omarimon Yusen Bldg. 13th floor 3-23-5 Nishinbashi, Minato-ku Tokyo 105-0003, Japan	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp
Kazakhstan			
Sales	**Almaty**	ТОО "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
Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke
Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C 1073 Riga, Latvia	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com
Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut, Lebanon	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	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
		After Sales Service	service@medrives.com
Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be

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Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg
Malaysia			
Assembly plant **Sales** **Service**	**Johor**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical offices	**Kuala Lumpur**	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 51229633 Fax +60 3 51229622 sewsa@sew-eurodrive.com.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTLD Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 sewpg@sew-eurodrive.com.my
Morocco			
Sales **Service**	**Mohammedia**	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma
Mauritania			
Sales	**Zouérat**	AFRICOM - SARL En Face Marché Dumez P.B. 88 Zouérate	Tel. +222 45 44 50 19 Fax +222 45 44 03 14 contact@africom-sarl.com
Macedonia			
Sales	**Skopje**	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Mexico			
Assembly plant **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Sales	**Ulan Bator**	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253	Tel. +976-70009997 Fax +976-70009997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn
Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 sales@dbmining.in.na
New Zealand			
Assembly plants **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount Drive East Tamaki Auckland, New Zealand	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch, New Zealand	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch, New Zealand	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

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New Zealand			
Technical offices	**Palmerston North**	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz
Netherlands			
Assembly plant **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam, Netherlands Postbus 10085 3004 AB Rotterdam, Netherlands	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl
Nigeria			
Sales	**Lagos**	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria	Tel. +234 1 217 4332 team.sew@eisnl.com http://www.eisnl.com
Norway			
Assembly plant **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss, Norway	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	**Karatschi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
Sales	**Fernando de la Mora**	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sew-py@sew-eurodrive.com.py
Peru			
Assembly plant **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima, Peru	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
Sales	**Luzon**	Totaltech Corporation 5081-B C&L Mansion Filmore Ave. Cor. Fahrenheit St. 1235 Makati City	Tel. +63 2 551-9265 / +63 2 551-9271 / +63 2 551-9378 Fax +63 2 551-9273 totaltech89@gmail.com
	All Areas	P.T. Cerna Corporation 4137 Ponte St., Brgy. Santa Cruz, Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com
Poland			
Assembly plant **Sales** **Service**	**Łódź**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź, Poland	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa 24 hour hotline Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Technical office	**Tychy**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Strzelecka 66 PL-43-109 Tychy	Tel. +48 32 32 32 610 Fax +48 32 32 32 648
	Bydgoszcz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fordońska 246 PL-85-959 Bydgoszcz	Tel. +48 52 3606590 Fax +48 52 3606591
	Gdansk	SEW-EURODRIVE Polska Sp.z.o.o. ul. Galaktyczna 30A PL-80-299 Gdańsk	Tel. +48 58 762 70 00 Fax +48 58 762 70 09

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Poland			
	Poznan	SEW-EURODRIVE Polska Sp.z.o.o. ul. Romana Maya 1 61-371 Poznań, Poland	Tel. +48 61 6465500 Fax +48 61 6465519
	Radom	SEW-EURODRIVE Polska Sp.z.o.o. ul. Słowackiego 84 26-600 Radom, Poland	Tel. +48 48 365 40 50 Fax +48 48 365 40 52
Portugal			
Assembly plant **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 3050-901 Mealhada, Portugal	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Service Competence Centers	**Lisbon**	SEW-EURODRIVE, LDA. Núcleo Empresarial I de São Julião do Tojal Rua de Entremuros, 54 Fracção I 2660-533 São Julião do Tojal, Portugal	Tel. +351 21 958-0198 Fax +351 21 958-0245 esc.lisboa@sew-eurodrive.pt
Technical office	**Porto**	SEW-EURODRIVE, LDA. Av. 25 de Abril, 68 4440-502 Valongo, Portugal	Tel. +351 229 350 383 Fax +351 229 350 384 Tel. +351 9 32559110 esc.porto@sew-eurodrive.pt
Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti, Romania	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly plant **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Technical office	**Ekaterinburg**	ZAO SEW-EURODRIVE Kominterna Str. 16 Office 614 620078 Ekaterinburg, Russia	Tel. +7 343 310 3977 Fax +7 343 310 3978 eso@sew-eurodrive.ru
	Irkutsk	ZAO SEW-EURODRIVE 5-Armii Str., 31 664011 Irkutsk, Russia	Tel. +7 3952 25 5880 Fax +7 3952 25 5881 iso@sew-eurodrive.ru
	Moscow	ZAO SEW-EURODRIVE Malaja Semjonowskaja Str. д. 9, корпус 2 107023 Moscow	Tel. +7 495 9337090 Fax +7 495 9337094 mso@sew-eurodrive.ru
	Novosibirsk	ZAO SEW-EURODRIVE pr. K Marksa 30 630087 Novosibirsk, Russia	Tel. +7 383 3350200 Fax +7 383 3462544 nso@sew-eurodrive.ru
	Perm	ZAO SEW-EURODRIVE Stakhanovskaya str., 45 Office 512 RUS-614066 Perm	Tel. +7 342 2219494 Fax +7 342 2219444 pso@sew-eurodrive.ru
	Togliatti	ZAO SEW-EURODRIVE Sportivnaya Str. 4B, office 2 Samarskaya obl. 445057 Togliatti, Russia	Tel. +7 8482 710529 Fax +7 8482 810590
Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com
Serbia			
Sales	**Belgrade**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd, Serbia	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly plant **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

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Slovakia			
Sales	**Bratislava**	SEW-EURODRIVE SK s.r.o. Rybničná 40 831 06 Bratislava, Slovakia	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-EURODRIVE SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 010 01 Žilina, Slovakia	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banska Bystrica	SEW-EURODRIVE SK s.r.o. Rudlovská cesta 85 974 11 Banská Bystrica, Slovakia	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-EURODRIVE SK s.r.o. Slovenská ulica 26 040 01 Košice, Slovakia	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk
Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 3000 Celje, Slovenia	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
Spain			
Assembly plant **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya), Spain	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Technical offices	**Barcelona**	Delegación Barcelona Avda. Francesc Macià, 60 – Planta 16, porta 1 Eix Macià – "Torre Milenium" 08208 Sabadell (Barcelona), Spain	Tel. +34 93 7162200 Fax +34 93 7233007
	Madrid	Delegación Madrid Gran Via. 48-2° A-D 28220 Majadahonda (Madrid), Spain	Tel. +34 91 6342250 Fax +34 91 6340899
	Sevilla	MEB Pólogono Calonge, C/A Nave 2 - C E-41.077 Sevilla, Spain	Tel. +34 954 356 361 Fax +34 954 356 274 mebsa.sevilla@mebsa.com
	Valencia	MEB Músico Andreu i Piqueres, 4 E-46.900 Torrente (Valencia)	Tel. +34 961 565 493 Fax +34 961 566 688 mebsa.valencia@mebsa.com
Sri Lanka			
Sales	**Colombo**	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
South Africa			
Assembly plants **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013, South Africa P.O.Box 90004 Bertsham 2013, South Africa	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town, South Africa P.O. Box 36556 Chempet 7442 Cape Town, South Africa	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban, South Africa	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban, South Africa P.O. Box 10433, Ashwood 3605, South Africa	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O. Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

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South Africa			
Technical offices	**Port Elizabeth**	SEW-EURODRIVE PTY LTD. 8 Ruan Access Park Old Cape Road Greenbushes 6000 Port Elizabeth	Tel. +27 41 3722246 Fax +27 41 3722247 dtait@sew.co.za
South Korea			
Assembly plant **Sales** **Service**	**Ansan**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270, Korea	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Technical offices	**Daegu**	SEW-EURODRIVE KOREA Co., Ltd. No.1108 Sungan officetel 87-36, Duryu 2-dong, Dalseo-ku Daegu 704-712	Tel. +82 53 650-7111 Fax +82 53 650-7112
	Daejeon	SEW-EURODRIVE KOREA Co., Ltd. No. 1502, Hongin officetel 536-9, Bongmyung-dong, Yusung-ku Daejeon 305-301	Tel. +82 42 828-6461 Fax +82 42 828-6463
	Gwangju	SEW-EURODRIVE KOREA Co., Ltd. 4fl., Dae-Myeong B/D 96-16 Unam-dong, Buk-ku Kwangju 500-170	Tel. +82 62 511-9172 Fax +82 62 511-9174
	Seoul	SEW-EURODRIVE KOREA Co., Ltd. No.504 Sunkyung officetel 106-4 Kuro 6-dong, Kuro-ku Seoul 152-054, Korea	Tel. +82 2 862-8051 Fax +82 2 862-8199
Swaziland			
Sales	**Manzini**	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz
Sweden			
Assembly plant **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 55303 Jönköping, Sweden Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se
Sales	**Göteborg**	SEW-EURODRIVE AB Gustaf Werners gata 8 42132 Västra Frölunda, Sweden	Tel. +46 31 70968 80 Fax +46 31 70968 93 goteborg@sew.se
	Stockholm	SEW-EURODRIVE AB Björkholmsvägen 10 14146 Huddinge, Sweden	Tel. +46 8 44986 80 Fax +46 8 44986 93 stockholm@sew.se
	Malmö	SEW-EURODRIVE AB Borrgatan 5 21124 Malmö, Sweden	Tel. +46 40 68064 80 Fax +46 40 68064 93 malmo@sew.se
	Skellefteå	SEW-EURODRIVE AB Trädgårdsgatan 8 93131 Skellefteå, Sweden	Tel. +46 910 7153 80 Fax +46 910 7153 93 skelleftea@sew.se
Switzerland			
Assembly plant **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Technical offices	**Romandy**	André Gerber Es Perreyres 1436 Chamblon, Switzerland	Tel. +41 24 445 3850 Fax +41 24 445 4887
	Bern / Solothurn	Rudolf Bühler Muntersweg 5 2540 Grenchen, Switzerland	Tel. +41 32 652 2339 Fax +41 32 652 2331
	Central Switzerland, Aargau	Armin Pfister Stierenweid 4950 Huttwill, BE, Switzerland	Tel. +41 62 962 54 55 Fax +41 62 962 54 56

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Switzerland			
	Zurich, Tessin	Gian-Michele Muletta Fischerstrasse 61 8132 Egg bei Zürich, Switzerland	Tel. +41 44 994 81 15 Fax +41 44 994 81 16
	Lake Constance and Eastern Switzerland	Markus Künzle Eichweg 4 9403 Goldach, Switzerland	Tel. +41 71 845 2808 Fax +41 71 845 2809
Taiwan (R.O.C.)			
Sales	**Nan Tou**	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878
	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Hwa South Road, Taipei, Taiwan	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net
Tanzania			
Sales	**Dar es Salaam**	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 uroos@sew.co.tz
Thailand			
Assembly plant **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000, Thailand	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Technical offices	**Bangkok**	SEW-EURODRIVE (Thailand) Ltd. 6th floor, TPS Building 1023, Phattanakarn Road Suanluang Bangkok,10250	Tel. +66 2 7178149 Fax +66 2 7178152 sewthailand@sew-eurodrive.com
	Hat Yai	SEW-EURODRIVE (Thailand) Ltd. Hadyai Country Home Condominium 59/101 Soi.17/1 Rachas-Utid Road. Hadyai, Songkhla 90110, Thailand	Tel. +66 74 359441 Fax +66 74 359442 sewthailand@sew-eurodrive.com
	Khon Kaen	SEW-EURODRIVE (Thailand) Ltd. 4th Floor, Kaow-U-HA MOTOR Bldg, 359/2, Mitraphab Road. Muang District Khonkaen 40000, Thailand	Tel. +66 43 225745 Fax +66 43 324871 sew-thailand@sew-eurodrive.com
Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn
Turkey			
Assembly plant **Sales** **Service**	**Kocaeli-Gebze**	SEW-EURODRİVE Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90-262-9991000-04 Fax +90-262-9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Technical offices	**Adana**	SEW-EURODRİVE Cevat Yurdakul Cad.No:52 Akdoğan İş Merkezi K:5 D.18 Seyhan / Adana	Tel. +90 322 359 94 15 Fax +90 322 359 94 16
	Ankara	SEW-EURODRİVE 1368.Cadde Eminel İşmerkezi No: 18/68 İvogsan / Ankara	Tel. +90 312 385 33 90 Fax +90 312 385 32 58
	Bursa	SEW-EURODRİVE Üçevler Mah. Bayraktepe Sok. Akay İş Merkezi Kat:3 No: 7/6 Nilüfer / Bursa	Tel. +90 224 443 45 60 Fax +90 224 443 45 58
	Istanbul	SEW-EURODRİVE Tekstilkent Ticaret Merkezi B-13 Blok No:70 Esenler / İstanbul	Tel. +90-262-9991000-04 Fax +90-262-9991009

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Turkey			
	Izmir	SEW-EURODRİVE 1203/11 Sok. No. 4/614 Kara Hasan Atlı İş Merkezi Kat :6 Yenişehir / İzmir	Tel. +90 232 469 62 64 Fax +90 232 433 61 05
Ukraine			
Assembly plant **Sales** **Service**	**Dnipropetrowsk**	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск	Тел. +380 56 370 3211 Факс. +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
Sales	**Kiev**	ООО «СЕВ-Евродрайв» ул.С.Олейника, 21 02068 Киев	Тел. +380 44 503 95 77 Факс. +380 44 503 95 78 kso@sew-eurodrive.ua
	Donetsk	ООО «СЕВ-Евродрайв» ул.25-летия РККА, 1-В, оф. 805 83000 Донецк	Тел. +380 62 38 80 545 Факс. +380 62 38 80 533 dso@sew-eurodrive.ua
	Ivano-Frankivsk	ООО «СЕВ-Евродрайв» ул.Независимости, 4, оф.303 83000 Ивано-Франковск	Тел. +380 342 725 190 Факс. +380 342 725 191 ifso@sew-eurodrive.ua
Uruguay			
Assembly plant **Sales**	**Montevideo**	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esqina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-89 sewuy@sew-eurodrive.com.uy
USA			
Production plant **Assembly plant** **Sales** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly plants **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014, USA	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373, USA	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237, USA	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544, USA	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Please contact us for other service center addresses in the USA.		
Venezuela			
Assembly plant **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo, Venezuela	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net
United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae
Vietnam			
Sales	**Ho-Chi-Minh-Stadt**	**All sectors except for ports and offshore:** Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn truongtantam@namtrung.com.vn khanh-nguyen@namtrung.com.vn

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Vietnam			
		Ports and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn
Zambia			
Sales	**Kitwe**	EC Mining Limited Plots No. 5293 & 5294,Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe	Tel. +260 212 210 642 Fax +260 212 210 645 sales@ecmining.com http://www.ecmining.com

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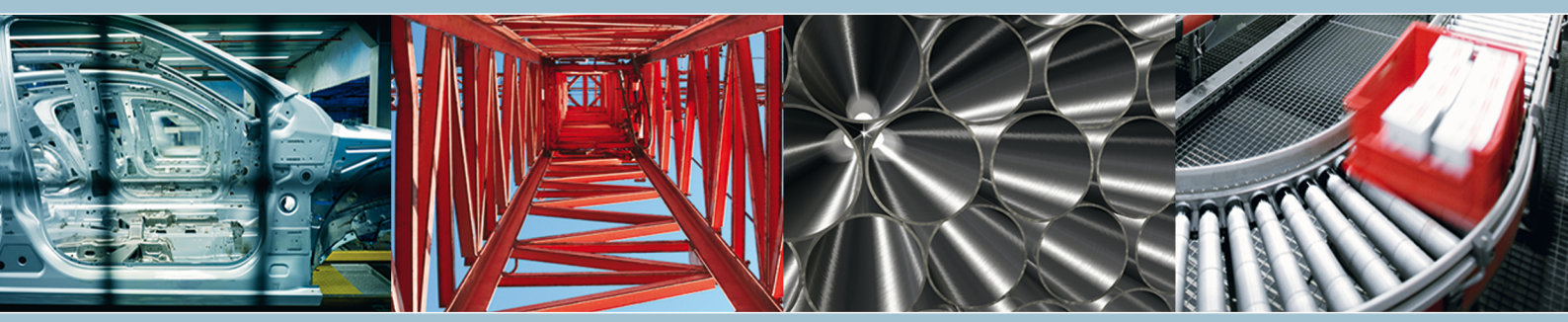

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Driving the world

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