SEW EURODRIVE

Latest news

Explosion-Proof AC Motors
EDRN80 – 315
According to Class Division System (HazLoc-NA®)

Edition 04/2016

22741054/EN

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1 The new product line

1.1 Introduction and reasons

The topics environmental protection and efficiently conserving valuable resources gained importance in recent years. For this reason, numerous industrialized nations have passed laws and/or regulations that stipulate the limit values, especially for products with a considerable share in the total energy consumption. This has the aim, to decrease the consumption of primary energy and simultaneously reduce the CO2 emissions.

The stricter legal requirements also affect AC asynchronous motors including motors used in potentially explosive atmospheres.

When SEW-EURODRIVE introduced the modular concept for EDR.. AC asynchronous motors as well-known manufacturer in 2012, we were able to offer gearmotors to the European market that adhered to energy efficiency class IE1 and for 0.75 kW and higher IE2, in accordance to the EU directive 94/9 EC (ATEX).

With motors certified to IECEx, as well as country-specific approvals (e.g. KOSHA for South Korea), the product range has been extended.

North American countries have another classification than the countries that approve of IEC. In this case, classes and divisions are distinguished. The most important standard is the NEC (National Electrical Code), part 500 by the NFPA® (National Fire Protection Association), as well as the Canadian CSA22.2.

Since the introduction in 2013, motors are available for division 2 of class I (gas) and class II (dust).

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1.2 Global efficiency regulations

For asynchronous motors, standards of various institutions apply worldwide. This includes standards developed by the International Electrotechnical Commission (IEC), as well as standards developed by the National Electrical Manufacturers Association (NEMA).

The NEMA standards are important especially in North and Central America. Contents of single standards by the IEC and the NEMA are partially identical, but there also are significant differences that may directly affect the product design.

Standards and laws do not describe the same contents, but legal texts and regulations frequently refer to standards, as these reflect the current state-of-the-art technology.

No internationally consistent provisions exist for efficiency regulations, especially in regard of affected products or approved exceptions in single countries or regions.

The high dynamics and the varying international regulations require a documentation that can be quickly updated. For this reason, SEW-EURODRIVE provides the latest information on "efficiency regulations" via www.ie-guide.de.

The most important trigger for EDRN.. motors are the international markets, countries and changes to the efficiency requirements planned in Europe.

Motors with energy efficiency class IE3 and/or NEMA Premium are mandatory.

Date	Country	Ex standard	Extent
01.10.2015	Korea	IECEx	Motors ≥ 37 kW – ≤ 200 kW incl. explosion protection
01.06.2016	USA	HazLoc-NA®	As the first important market, the USA demand IE3 for motors of 0.75 kW and above, and also for Ex motors.
01.01.2018	Europe	ATEX	In Europe, the next stage of the expected follow-up regulation to the current VO640/2009 and 4/2014 will become valid in this year. The draft for the new regulation includes motors in the efficiency requirements according to directive 94/9/EC or the following directive 2014/34/EC. Exceptions according to article 1 paragraph 2 (e) are increased safety motors.
01.10.2018	Korea	IECEx	≥ 0.75 kW – ≤ 37 kW incl. explosion protection
2017/2018	Australia, New Zealand	IECEx	The MEPS revision affects motors ≥ 0.75 kW incl. explosion protection. The change is expected in the business year 2017/2018.

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1.3 Description of the new product line of EDRN.. motors

The new product line of EDRN.. motors is a variant of the already established DRN.. motors, with modifications for use in potentially explosive atmosphere.

Just as the existing asynchronous motor product lines from SEW-EURODRIVE, the new IE3 motor is suitable for operation at the supply system, as well as at a frequency inverter.

The new product line will initially contain AC motors with a power rating between 0.75 kW (1 HP) and 90 kW (125 HP) at 60 Hz and with 4 poles for the North American market. The series will be extended to 200 kW (275 HP) in August 2016.

The motors are certified according to standards valid in the USA and Canada by CSA. Thus, the motors are suited for use in environments categorized in division 2 class I and class II.

The motors adhere the limit values of energy efficiency class IE3 (IEC) and/or NEMA Premium at 60 Hz. The size/power assignment is based on IEC 60072 and/or EN 50347.

Only 4-pole variants will be introduced to the market.

The SEW-EURODRIVE product strategy has always pursued the aim to minimize the conversion effort for the customer. Thus, the new motor equals a EDRE.. motor with the same power rating in all relevant performance data.

The EDRN.. motors to HazLoc-NA® are structurally identical to the DRN.. motors. The same conversion scenarios as for the DRN.. motors apply.

In regard of existing certifications, approvals and registrations, nothing will change from the currently existing EDRE.. AC asynchronous motors. Additional, motor-dependent options will be available.

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2 Explosion protection in North America

2.1 The Class Division System

The following regulations apply to electrical operating resources and systems operated in premises with potentially explosive environment:

- **USA**: National Electrical Code (NEC), issues by the National Fire Protection Association (NFPA)
- **Canada**: Canadian Electrical Code (CEC), issued by the Canadian Standard Association (CSA)

These regulations are setup regulations for electrical systems in all ranges. The regulations refer to a series of standards from other institutions that contain regulations for installation and construction of suitable operating resources.

The regulations of National Electrical Code and Canadian Electrical Code define, which operating resources and protection types may be used in the single potentially explosive areas.

To define the requirements for operating resources, potentially explosive areas are distinguished in *classes*, *divisions*, and *groups* in North America.

This document uses the original designations.

Original	German	Note
Division	Division	Divisions define the probability of hazards being present in dependency of normal and exceptional conditions.
Class	Class	Classes define the type of hazard caused by gas or steam, inflammable or conductive dust, or ignitable fibers and dust of such fibers.
Group	Group	Groups define the exact type and properties of the potentially explosive substance.

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2.2 Certification and identification

In the USA and Canada, electrical equipment and operating resources in potentially explosive premises require a certification. An exception are electrical operating resources that cannot ignite the surrounding potentially explosive atmosphere due to their construction and properties. The responsible authority has to decide if an approval is required. In the USA and Canada, devices designed and manufactured for the use in potentially explosive areas are tested and approved by nationally renowned inspection authorities. In the USA, responsible authorities are for example Underwriters Laboratories (UL) or Factory Mutual (FM), in Canada the Canadian Standards Association (CSA).

In addition to data such as manufacturer, type, serial number and electrical data, data relevant for explosion protection must be included in the identification of the operating resources. The relevant specifications can be found in the NEC, the CEC and the corresponding design specifications of the inspection authorities.

Approved electric operating resources for class I, class II and class III, division 1 and division 2 should be marked with the following information:

1. Class(es), division(s) (optional except for division 2)
2. Gas/dust group(s)
3. Operating temperature or temperature class (optional for T5 and T6)

Example: Class I Division 2 Groups C D T4

2.2.1 Division

Potentially explosive areas are divided in division 1 and division 2 according to the frequency and duration that these substances occur in. The definition is based on NEC 500.5 and/or CSA 22.2, and is specified according to the classes.

Division 1

Areas with inflammable concentrations of inflammable or combustible substances that have contact to the motor.

Division 2

Areas with inflammable concentrations of inflammable or combustible substances that are stored in closed systems or containers and usually have no contact to the motor.

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2.2.2 Class

The class defines a general limit of the physical properties of the hazardous substances.

Class I

Gases, vapors, and liquids that can be present in sufficient quantities to be explosive or ignitable.

Class II

Dust or combustible dust that can be present in sufficient quantities to create potentially explosive mixtures or electrically conductive dust.

Assignment

Assignment of groups A – D in class I		Assignment of groups E – G in class II	
Gas and vapor		Dust	
Group A	Acetylene	Group E[1)]	Flammable metal dust, including aluminum, magnesia, or similar substances
Group B	Flammable gas, flammable vapor, or flammable vapor-air mixtures, including hydrogen, butadiene, ethylene oxide, propylene oxide	Group F	Flammable dust containing carbon, e.g. black coal, carbon dust, charcoal, and coke dust
Group C	Flammable gas, flammable vapor, or flammable vapor-air mixtures, including ethylene, acetaldehyde, cyclopropane, ether, hydrogen sulfide	Group G	Flammable dust not covered by group E or F, including flour, grain, wood, plastic, and chemicals
Group D	Flammable gas, flammable vapor, or flammable vapor-air mixtures, including propane, acetone, alcohol, ammonia, gasoline, solvents, natural gas, propylene	–	–

1) Group E is not available for EDR../EDRN.. motors.

The table is not complete. For a full description of the groups, refer to the standards CSA C22.1 and NFPA 70.

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2.2.3 Temperature classes

EDR.., EDRN.. motors in class I and class II for hazardous locations are additionally labeled with the respective temperature class. It is listed on the nameplate and specifies the maximum surface temperature.

The following table shows all possible temperature classes.

Temperature class	Maximum surface temperature
T1	450 °C
T2	300 °C
T2A	280 °C
T2B	260 °C
T2C	230 °C
T2D	215 °C
T3[1)]	**200 °C**
T3A	180 °C
T3B[1)]	**165 °C**
T3C[1)]	**160 °C**
T4	135 °C
T4A [1)]	**120 °C**
T5	100 °C
T6	85 °C

1) These temperature classes are available from SEW-EURODRIVE.

2.2.4 Degree of protection for housings

Just as the IP degree of protection for housings is specified according to IEC 60529, the NEMA (National Electrical Manufacturers Association) Standard Publication no. 250 applies in the USA. This describes the degree of protection for housings. The degrees of protection cannot be compared directly to the IEC degrees of protection.

The requirements to motors for the USA are defined according to NEMA MG 1, or ANSI/IEC 60529. In Canada the requirements are defined according to CSA 22.2 no. 60529.

The EDRN.. motors comply with NEMA TEFC (totally enclosed, fan-cooled) and IEC degree of protection IP55.

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3 Product description

According to CSA specifications, EDRN.. motors are marked with the following information on the nameplate and on additional labels.

The manufacturer is obliged to attach the following general identifications:

- Products are marked with the symbols specified in the relevant product standard.
- Products certified for Canada must be marked with warning and danger symbols in English and French.

The identification contains the following information:

- CSA mark or variant CSA/CSAus
- Name of sender (manufacturer) or CSA file no. 45341 or master agreement no. 170602
- Type designation
- Complete electrical rated values in Volt, operating mode, HP or kW, Ampere, phases, min^{-1}
- Serial number or encoded date
- Identification for potentially explosive areas
  - "CLASS I, DIVISION 2, GROUPS A, B, C & D" (temperature class T3C, T3 or T3B)
  - "CLASS II, DIVISION 2, GROUPS F & G" (temperature class T3C or T4A)
  - An additional, optional identification "Class I, Zone 2 Group IIC T3"
- Insulation class
- Power factor
- Degree of protection of the motor housing (totally enclosed, fan-cooled)
- Ambient temperature range
- Manufacturing location (M-L. + code)
- In case of motors for frequency inverter operation, the following information is marked: Inverter operation, speed range, CT and inverter type "VPWM"
- Electrical rated values of the brake rectifier (voltage, amperage or wattage)

INFORMATION

Based on CSA, the degree of protection of the motor housing is totally enclosed, fan-cooled (surface-cooled). Based on IEC 60529, this results in minimum IP55.

INFORMATION

Permitted abbreviations are CL (class), DIV (division) and GP (group).

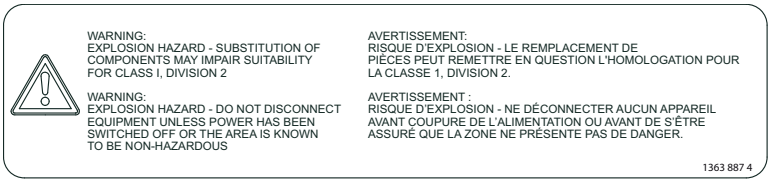
The following additional information is attached:

- Warning: Risk of explosion – do not disconnect the components before the power supply is disconnected, or the area is classified as harmless.
- "Notice: Only use supply wires suitable for 90 °C."
- “Warning: Risk of explosion – Substitution of components may impair suitability for class I, division 2."

- Warning – Reinstall the plastic caps or coating at the terminal studs after cabling.
- “Warning: More than one voltage-controlled circuit, see wiring diagram." (Applies if the brake rectifier is supplied by an external current source.)

At SEW-EURODRIVE identification is usually ensured by using additional labels attached to the terminal box cover. When a motor is used in Canada, this information must also be provided in French.

The following safety note is attached on motors for line operation:



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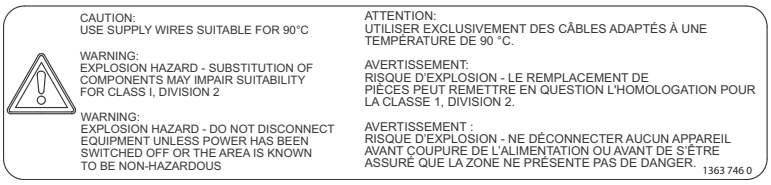
The following safety note is attached on motors for frequency inverter operation:



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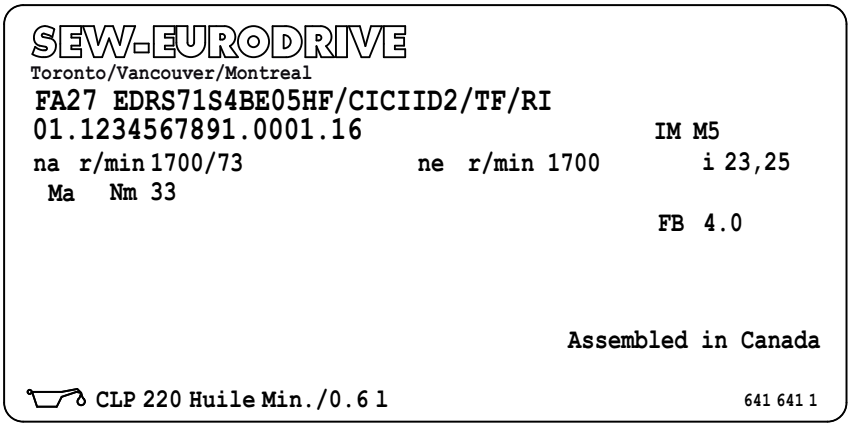
3.1 Type designations and nameplates

INFORMATION

In agreement with CSA, the motor nameplate contains all information requested by CSA above the separation line. Below the separation line, various information used by the IEC is listed.

3.1.1 Gear unit nameplate



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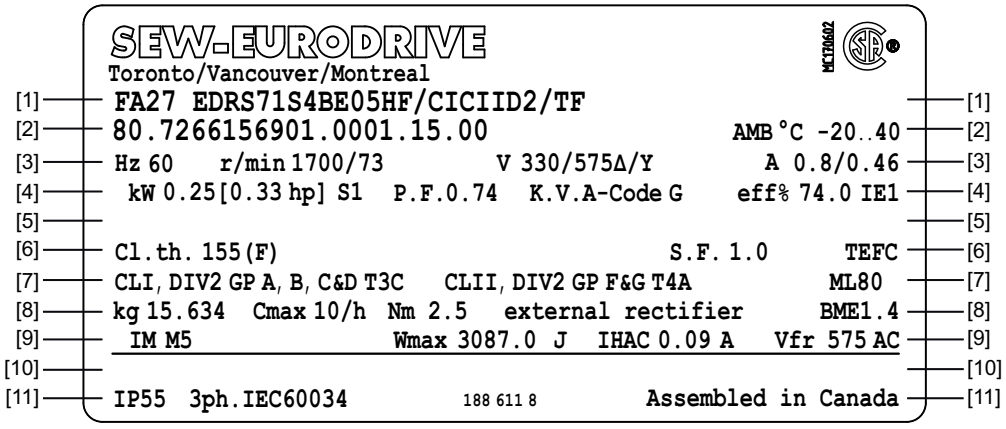
3.1.2 EDR../EDRN.. motors

The following figure shows a nameplate for line operation:



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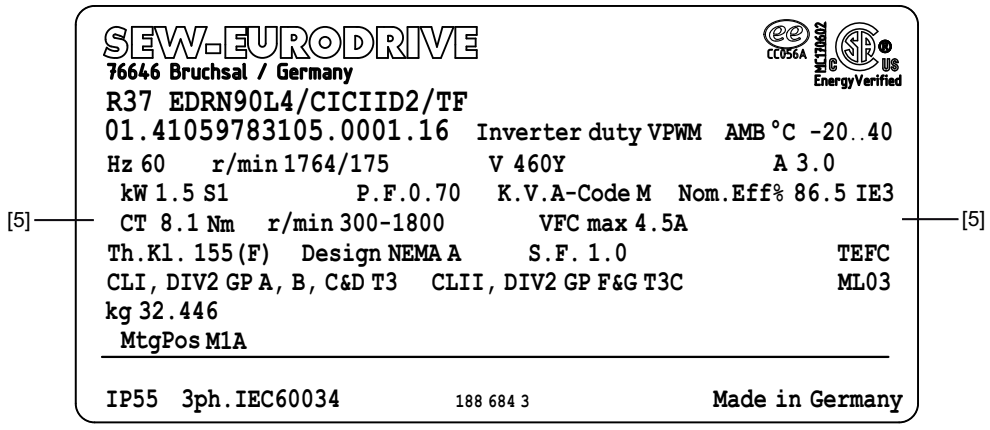
The following figure shows a nameplate for frequency inverter operation:



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Line	Information
[1]	• Type designation
[2]	• Serial number • Permitted ambient temperature range
[3]	• Nominal frequency • Nominal speed motor/gear unit output • Nominal voltage with connection type[1)] • Nominal current
[4]	• Nominal power in kW/hp and duty type • Power factor • KVA code according to NEMA MG1 • Efficiency information with nominal efficiency and IE class
[5]	• Continuous torque MCT in specified speed range[2)] • Speed range with constant torque (300 = continuous minimum speed n_{min}, 1800 = continuous maximum speed n_{max})[2)] • Maximum dynamic current in VFC mode I_{max} VFC[2)]
[6]	• Thermal class • Design letter according to NEMA MG1 • Service factor according to NEMA • Degree of protection and cooling
[7]	• Information on explosion protection • ML = Mounting Location
[8]	• Weight in kg/lb • Starting frequency of the brake • Braking torque • Installation location of brake control • Brake control type

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Line	Information
[9]	• Mounting position • Maximum braking work to adjustment • Nominal current of brake control • Nominal voltage of brake (connection to brake control)
[10]	• Customer-specific details
[11]	• Degree of protection according to IEC • Number of phases and underlying rating and performance standards (IEC 60034X and/or equivalent national standard)

1) Motors for frequency inverter operation are only available with one voltage.
2) Additional information for motors for inverter operation

Some specifications on the nameplate can be given either in SI units or imperial units.

	SI unit	Imperial unit
Power	kW	hp
Braking torque	Nm	lb-in
Weight	kg	lb
Gear unit torque	Nm	lb-in

3.1.3 EDR.., EDRN.. AC brakemotor type designation

The following diagram shows a type designation example:

EDRN132M4/BE11/HR/FI/TF	
E	Explosion-proof design
DR	Series
N	Type designation
132M	Size
4	Number of poles
/**BE11**	Brake
HR	Manual brake release
/FI	Output option
/TF	Thermal motor protection

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3.1.4 Mark on the nameplate

The marks on the upper edge of the nameplate are only present when the motor has been certified accordingly or when it includes the relevant components. The following table contains an explanation of all marks:

Mark	Meaning	Note
	The CSA mark indicates that a product complies with the applicable Canadian standards.	• Use with EDRS..
	The CSA/US mark indicates that a product complies with the applicable US and Canadian standards.	• Use with EDRS..
	The CSA/Energy Verification mark indicates that a product complies with the applicable Canadian standards as well as Canadian Federal and Provincial Energy Efficiency Regulations.	• Use with EDRE../EDRN.. • With the design specification Canada
	The CSA C/US combined Energy Verification mark indicates that the product meets applicable US and Canadian standards and complies with Canadian Federal and Provincial Energy Efficiency Regulations.	• Use with EDRE../EDRN.. • With the design specification USA (without UR)/Canada (CSA)
	The DoE mark indicates that a product complies with US limit values for efficiency levels of AC motors.	• Use with EDRE../EDRN..

3.1.5 Serial number

The following figure shows the example of a type serial number:

Example: 01. 12212343 01. 0001. 15. 89	
01.	Sales organization
12212343	Order number (8 digits)
01.	Order item (2 digits)
0001.	Quantity (4 digits)
15.	End digits of the year of manufacture (2 digits)
89	Additional country-specific information

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3.2 Designs and options

3.2.1 AC motor series

The following table shows the types of AC motors:

Designation	Available class and division	
EDRS..	/CID2, /CIID2, /CICIID2	Motor for hazardous locations, 60 Hz, Standard Efficiency IE1
EDRE..		Motor for hazardous locations, 60 Hz, Energy Efficiency IE2
EDRN..		Motor for hazardous locations, 60 Hz, Premium Efficiency IE3
71 – 315		Sizes 71, 80, 90, 100, 112, 132, 160, 180, 200, 225, 250, 280, 315
S, M, L, ME, H, LS, MC, LC		Sizes S, M, L, ME, H, LS MC= Medium, rotor with copper cage LC= Long, rotor with copper cage
4		Number of poles

3.2.2 Explosion-proof motors

The following table shows the option variants for hazardous locations:

Available class and division	Description
/CID2	Motors suitable for use in class I, division 2 Gas atmosphere
/CIID2	Motors suitable for use in class II, division 2 Dust atmosphere
/CICIID2	Motors suitable for use in class I or II, division 2 Gas or dust atmospheres

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3.2.3 Output variants

The following table shows possible output variants:

Designation	Available class and division	Description
/FI	/CID2,	IEC foot-mounted motor
/F.A, /F.B	/CIID2,	Universal foot-mounted motor
/FG	/CICIID2	7series integral motor, as stand-alone motor
/FF		IEC flange-mounted motor with bore
/FT		IEC flange-mounted motor with threads
/FL		General flange-mounted motor (other than IEC)
/FM		7-series integral motor with IEC feet
/FE		IEC flange-mounted motor with bore and IEC feet
/FY		IEC flange-mounted motor with threads and IEC feet
/FK		General flange-mounted motor (deviating from IEC) with feet
/FC		C-face flange-mounted motor, dimensions in inch

3.2.4 Mechanical attachments

The following table shows possible mechanical attachments:

Designation	Available class and division	Description
/BE..	/CID2,	Spring-loaded brake with specification of size
/HF	/CIID2,	Manual brake release, lockable
/HR	/CICIID2	Manual brake release of the brake, automatic re-engaging function
/RS		Backstop

3.2.5 Encoder

The following table shows possible encoder variants:

Designation	Available class and division	Description
/XV.A	/CID2,	Mounting adapter for third-party speed sensors (SI units)
/XC.A	/CIID2,	Mounting adapter for third-party speed sensors (Imperial units)
/XH.A	/CICIID2	Mounting adapter for non-SEW hollow-shaft encoders
/XVCC /XV1C		Mounting adapter with encoder mounted at factory

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3.2.6 Temperature sensor/temperature detection

The following table shows the thermal protection options:

Designation	Available class and division	Description
/TF	/CID2, /CIID2, /CICIID2	Temperature sensor (PTC thermistor or PTC resistor)
/KY		Sensor for temperature detection KTY84 – 130 (do not use any longer, phased out by the manufacturer)
/PT		1 or 3 PT100 sensor(s)
/PK		1 or 3 PT1000 sensor(s)[1)]

1) in preparation

3.2.7 Connection alternatives

Designation	Available class and division	Description
/KCC	/CID2, /CIID2, /CICIID2	6 or 10-pin terminal strip with cage clamp contacts

3.2.8 Ventilation

The following table shows possible ventilation variants:

Designation	Available class and division	Description
/AL	/CID2, /CIID2, /CICIID2	Metal fan
/C		Canopy for the fan guard
/LN		Low-noise fan guard

3.2.9 Bearing

Designation	Available class and division	Description
/NS	/CID2, /CIID2, /CICIID2	Relubrication device
/ERF		Reinforced bearings on A-side with rolling bearing
/NIB		Insulated bearing B-side

3.2.10 Other additional features

The following table shows an additional feature:

Designation	Available class and division	Description
/2W	/CID2, /CIID2, /CICIID2	2nd shaft end on the motor/brakemotor
/RI		Reinforced winding insulation

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4 Characteristics and features

4.1 Designs of EDRN.. motors

Designation	Area	Motor for hazardous locations
CID2	With potentially explosive gas-air/vapor-air mixtures	• Class I, division 2, groups A, B, C and D
CIID2	With explosive dust/air mixtures	• Class II, division 2, groups F and G
CICIID2	With potentially explosive gas-air/vapor-air mixtures or with potentially explosive dust-air mixtures	• Class I, division 2, groups A, B, C and D • Class II, division 2, groups F and G

4.1.1 Class I – Gas

EDR.., EDRN.. motors of class I are labeled with one of the following temperature classes depending on the operating mode:

Operating mode	Motors of class I, division 2		Temperature class	Maximum surface temperature
Line operation	Without brake		T3C (optionally T3)	160 °C (200 °C)
	Brakemotor	Rectifier in terminal box	T3B	165 °C
		Rectifier in control cabinet	T3C (optionally T3)	160 °C (200 °C)
Inverter operation	With/without brake		T3	200 °C

When selecting a motor, make sure that the temperature class specified on the motor is not higher than the ignition temperature of the hazardous substances (gas, steam and dust). This also applies, if the ambient conditions correspond with the class and group listed on the nameplate.

INFORMATION

EDR.., EDRN.. motors of temperature class T3 (max. 200 °C), T3B (max. 165 °C), and T3C (max. 160 °C) can be safely used with gases that have a higher ignition temperature (T1, T2).

4.1.2 Class II – Dust

EDR.., EDRN.. motors of class II are labeled with one of the following temperature classes depending on the operating mode:

Operating mode	Motors of class II, division 2	Temperature class	Maximum surface temperature
Line operation	With/without brake	T4A	120 °C
Inverter operation		T3C	160 °C

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4.2 Technical data for mains motor, 460 V, 60 Hz

Motor type	P_N		M_N	Speed	I_N	m	m_{Mot_BE}	Brake	Braking torque	NEMA design	IEC Design
	HP	kW	Nm	1/min	A	kg	kg		Nm		
EDRN80M4	1	0.75	4.1	1751	1.56	14	18	BE1	10	C	H
EDRN90S4	1.5	1.1	6	1762	2.3	20	24	BE2	14	C	H
EDRN90L4	2	1.5	8.1	1767	3	23	28	BE2	20	A	N
EDRN100L4	3	2.2	11.9	1765	4.15	34	40	BE5	28	A	H
EDRN100L4	4	3	16.2	1763	5.8	34	40	BE5	40	A	H
EDRN100L4	5	3.7	20	1758	7.2	34	40	BE5	40	A	H
EDRN112M4	5.4	4	21.5	1769	7.1	45	52	BE5	55	A	N
EDRN132S4	7.5	5.5	29.5	1768	9.2	57	71	BE11	80	A	H
EDRN132M4	10	7.5	40.5	1774	13.3	73	92	BE11	110	A	H
EDRN132L4	12.5	9.2	49.5	1775	16.5	82	100	BE11	110	A	H
EDRN160M4	15	11	59	1776	18.5	115	145	BE20	150	A	H
EDRN160L4	20	15	81	1777	25	130	165	BE20	200	A	H
EDRN180M4	25	18.5	99	1781	29.5	155	190	BE20	200	A	H
EDRN180L4	30	22	118	1781	34	175	215	BE30	300	A	H
EDRN200L4	40	30	161	1783	48.5	280	335	BE32	400	A	H
EDRN225S4	50	37	198	1785	56	310	365	BE32	400	A	H
EDRN225M4	60	45	240	1785	70	310	365	BE32	500	A	H
EDRN250ME4	75	55	295	1785	88	510	590	BE60	600	A	H
EDRN280S4	100	75	400	1785	125	520	600	BE62	800	A	H
EDRN280M4	125	90	480	1784	141	630	720	BE62	1000	A	H

P_N Rated power
M_N Rated torque
I_N Rated current
m Mass of the motor
m_{Mot_BE} Mass of the brakemotor

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4.3 Voltages

Adhere to the various voltage limits depending on the motor size. Motors with voltage outside of the minimum/maximum voltage range are not permitted.

Size	Minimum voltage	Maximum voltage
	V	V
80 – 132	100	690
160 – 180	154	690
200 – 315	200	690

Available voltages are based on the common line voltages and connection types.

Wiring diagram	Voltage	Standard
	V	
R13	330△/575人	Mains-powered motors
	575人	Motor at FU, R_{max} 1:6
R76[1)]	230人人/460人	Mains-powered motors
	230人人	Motor at FU, R_{max} 1:10
	460人	Motor at FU, R_{max} 1:6
R72[2)]	230△△/460△	Mains-powered motors
	230△△	Motor at FU, R_{max} 1:10
	460 △	Motor at FU, R_{max} 1:6

1) Size 80 – 132
2) Size 160M and higher

R_{max} Maximum setting range

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4.4 Special aspects compared to the standard

4.4.1 Terminal studs

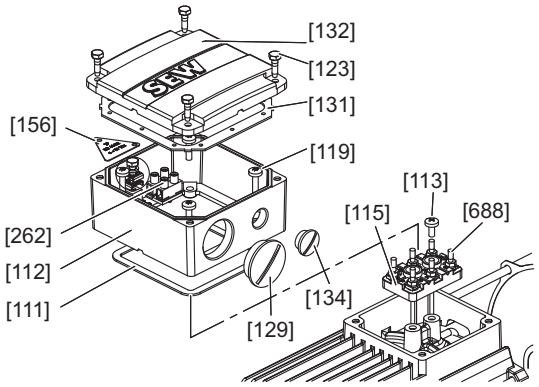
The terminal studs of the terminal board have maximum 80 % of the usual current carrying capacity, according to CSA specifications. Depending on voltage and connection type, using a different terminal board than for standard motors may be required. Eventually a larger terminal box may be required.

Terminal board	Number of connections	Maximum rated current	80 % of CSA
		A	A
KTM4	6	20	16
KTM5	6	31	24.8
K1M6	6	63	50.4
K1M8	6	100	50
K1M10	6	160	128
K1M12	6	250	200
K1M16	6	315	252

4.4.2 Design and structure

The structure of EDRN.. motors is almost identical to DRN.. motors. Differences for example are the plastic protection caps [688] for terminal studs, or the terminal box design.

Plastic protection caps



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[688] Protection caps

4.4.3 Terminal box

The terminal boxes have NPT tapped holes according to ANSI B1.20.1-1983. All bores are equipped with explosion-proof closing plugs upon delivery.

For a correct cable entry, replace the closing plugs by cable glands with strain relief that are certified for use in the respective hazardous location. Select the cable gland according to the outer diameter of the cable used. For the tightening torque of the cable entry, refer to the operating instructions.

The IP degree of protection of the cable entry must be at least as high as the IP degree of protection of the motor. Only use connection glands with screw heads that fit into the existing countersink. To meet the IP requirements, all unused cable entries must be sealed with a closing plug after the installation has been completed. A closing plug may only be replaced with another explosion-proof closing plug.

Unlike the standard, the terminal boxes of EDRN.. motors are additionally deburred.

Motor	Designation	Application	Number and size of cable glands	Material
EDRN80 – 90	DR71-90 NPT[1)]	Motor	2x NPT 1/2"	Aluminum
	DR71-90 BE NPT[1)]	Brakemotor	3x NPT 1/2"	Aluminum
	DR71-90 BE NPT	Optional	5x NPT 1/2"	Aluminum
	DR71-90 BE DUE/DUB NPT	Optional	3x NPT 1/2", 2x M12	Aluminum
	DR71-90 GG DUE/DUB NPT	Optional	3x NPT 1/2", 2x M12	Gray cast iron
	DR71-90 GG NPT	Optional	3x NPT 1/2"	Gray cast iron
	DR71-90 GG NPT SO	Optional	6x NPT 1/2"	Gray cast iron
EDRN100 – 132S	DR100-132 NPT[1)]	Motor	1x NPT 3/4", 1x NPT 1/2"	Aluminum
	DR100-132 BE NPT[1)]	Brakemotor	1x NPT 3/4", 2x NPT 1/2"	Aluminum
	DR100-132 NPT SO	Optional	2x NPT 3/4", 3x NPT 1/2"	Aluminum
	DR100-132 BE DUE/DUB NPT	Optional	1x NPT 3/4", 2x NPT 1/2", 2x M12	Aluminum
	DR100-132 GG DUE/DUB NPT	Optional	1x NPT 3/4", 2x NPT 1/2", 2x M12	Gray cast iron
	DR100-132 GG NPT SO	Optional	2x NPT 3/4", 4x NPT 1/2"	Gray cast iron
	DR100-132 GG NPT	Optional	1x NPT 3/4", 2x NPT 1/2"	Gray cast iron

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Motor	Designation	Application	Number and size of cable glands	Material
EDRN132M – 160M	DR160 NPT[1)]	Motor/ brakemotor	1x NPT 1 1/4", 2x NPT 1/2"	Aluminum
	DR160 NPT DUE/DUB	Optional	1x NPT 1 1/4", 2x NPT 1/2", 2x M12, 1x M50	Aluminum
	DR160 GG NPT	Optional	1x NPT 1 1/4", 2x NPT 1/2"	Gray cast iron
	DR160 NPT GG DUE/DUB	Optional	1x NPT 1 1/4", 2x NPT 1/2", 3x M12, 1x M50	Gray cast iron
EDRN160L – 225M	DR180-225 GG NPT[1)]	Motor/ brakemotor	2x NPT 1 1/2", 2x NPT 1/2"	Gray cast iron
	DR180-225 GG NPT DUE/DUB	Optional	2x NPT 1 1/2", 2x NPT 1/2", 3x M12, 1x M50	Gray cast iron
EDRN250 – 280	DR250-280 /+BE GG[1)]	Motor/ brakemotor	2x NPT 2 1/2", 2x NPT 1/2"	Gray cast iron
	DR250-280 BE DUE/DUB	Optional	2x NPT 2 1/2", 2x NPT 1/2", 2x M12	Gray cast iron
EDRN315	DR315 /+BE GG[1)]	Motor/ brakemotor	2x NPT 3", 2x NPT 1/2"	Gray cast iron

1) Standard

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4.4.4 Permitted rolling bearings

Rolling bearing types for motor sizes EDRN80 – 280

Motor type	A-side bearing		B-side bearing	
	IEC motor	Gearmotor	AC motor	Brakemotor
EDRN80	6205-2Z-J-C3 E2.6205-2Z-C3-K24	6304-2Z-J-C3	6304-2Z-J-C3 E2.6304-2Z-C3-K24	6304-2RS-J-C3
EDRN90	6305-2Z-J-C3		6205-2Z-J-C3	6205-2RS-J-C3
EDRN100	6306-2Z-J-C3		6205-2Z-J-C3	6205-2RS-J-C3
EDRN112	6308-2Z-J-C3		6207-2Z-J-C3	6207-2RS-J-C3
EDRN132S	6308-2Z-J-C3 E2.6308-2Z-C3-K24	6308-2Z-J-C3	6207-2Z-J-C3 E2.6207-2Z-C3-K24	6207-2RS-J-C3
EDRN132M/L	6308-2Z-J-C3	6309-2Z-J-C3	6209-2Z-J-C3	6209-2RS-J-C3
EDRN160	6310-2Z-J-C3	6312-2Z-J-C3	6212-2Z-J-C3	6212-2RS-J-C3
EDRN180	6311-2Z-J-C3	6312-2Z-J-C3	6212-2Z-J-C3	6212-2RS-J-C3
EDRN200	6312-2Z-J-C3	6314-2Z-J-C3	6314-2Z-J-C3	6314-2RS-J-C3
EDRN225	6314-2Z-J-C3		6314-2Z-J-C3	6314-2RS-J-C3
EDRN250 – 280	6317-2Z-J-C4		6315-2Z-J-C3	

Rolling bearing types for motor size EDRN315

Motor type	A-side bearing		B-side bearing	
	IEC motor	Gearmotor	IEC motor	Gearmotor
EDRN315S	6319-J-C3	6319-J-C3	6319-J-C3	6319-J-C3
EDRN315M/ME				
EDRN315L	6319-J-C3	6322-J-C3	6319-J-C3	6322-J-C3
EDRN315H				

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Motors with reinforced bearings /ERF for motor sizes EDRN250 – 315

Motor type	A-side bearing	B-side bearing	
		IEC motor	Gearmotor
EDRN250 – 280	NU317E-C3	6315-J-C3	
EDRN315S	NU319E	6319-J-C3	6319-J-C3
EDRN315M/ME			
EDRN315L			6322-J-C3
EDRN315H			

Current-insulated rolling bearings /NIB for motor sizes EDRE200 – 225, EDRN200 –315

Motor type	B-side bearing	
	IEC motor	Gearmotor
EDRE200 – 225, EDRN200 – 225	6314-J-C3-EI	6314-J-C3-EI
EDRN250 – 280	6315-Z-J-C3-EI	6315-Z-J-C3-EI
EDRN315S	6319-J-C3-EI	6319-J-C3-EI
EDRN315M/ME		
EDRN315L		6322-J-C3-EI
EDRN315H		

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4.5 /BE.. brake

In case of the brakemotors EDRS71 and EDRN.. for **line operation**, the standard brakes of the DRS.. or DRN.. are used. Thus, the same properties as of the standard brake are obtained in regard of:

- Motor/brake assignment
- Braking torques

But the maximum permitted values for braking work and switching work are reduced until the brake maintenance is performed.

INFORMATION

In non-ventilated state, the brake must not be permanently released to protect it from impermissible heat.

The brakes BE60 – 122 will be available as of 3rd quarter of 2016.

4.5.1 Notes on the brake

The type of application determines what the brake is used for. The decisive factor is the operating frequency of the brake.

- During line operation, the braking work in case of an emergency off is the same for continuous and switching operation.
- In frequency inverter operation, the emergency off braking work is speed-dependent, see chapter "Permitted work done by the BE brake in case of emergency off" (→ 🗎 34).

Continuous operation

In S1 continuous duty, the brake is applied when the drive is switched off or in an emergency. The braking work may not exceed the specified maximum braking work per braking operation. It is specified on the nameplate as C_{max} and shown in the figure in chapter "Permitted work done by the BE brake for AC motors" (→ 🗎 33).

A maximum of 10 emergency braking operations are permitted per hour. Between 2 emergency braking operations, a waiting time of minimum 6 minutes must be adhered to.

Switching operation

If the brakemotor is used in an application that requires a high starting frequency, both the motor and the brake are dimensioned accordingly. In this case, the motor must be equipped with the option temperature sensor /TF.

The braking work in case of an emergency off may not exceed the specified maximum braking work per emergency braking operation. It is also listed on the nameplate.

Frequency inverter operation

Due to the thermal load at low speeds, high braking torques cannot be realized within one size. Observe the permitted combinations in chapter "Braking torque assignment" (→ 🗎 29).

During project planning and startup, note the maximally permitted speed of the used brake.

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4.5.2 Braking torque assignment

Motor size EDR..71 – 100, EDRN80 – 100

Motor	Brake	Braking torque gradation in Nm										
EDR..71	BE05	1.8	2.5	3.5	5.0							
	BE1				5.0	7.0	10					
EDRE80 EDRN80	BE05	1.8	2.5	3.5	5.0							
	BE1				5.0	7.0	10					
	BE2				5.0	7.0	10	14	20			
EDRE90 EDRN90	BE1				5.0	7.0	10					
	BE2				5.0	7.0	10	14	20			
	BE5							14	20	28	40	55
EDRE100 EDRN100	BE1				5.0	7.0	10					
	BE2				5.0	7.0	10	14	20			
	BE5							14	20	28	40	55

Not for frequency inverter operation

Motor size EDR..112 – 225, EDRN112 – 225

Motor	Brake	Braking torque gradation in Nm												
EDRE112 EDRN112	BE5	14	20	28	40	55								
	BE11			20	40	55	80	110						
EDRE132 EDRN132S	BE5	14	20	28	40	55								
	BE11			20	40	55	80	110						
EDRE160 EDRN132M/L	BE11			20	40	55	80	110						
	BE20				40	55	80	110	150	200				
EDRE180 EDRN160/ 180	BE20				40	55	80	110	150	200				
	BE30						75	100	150	200	300			
	BE32							100	150	200	300	400	500	600

Not for frequency inverter operation

Motor size EDRE200 – 225, EDRN200 – 315

Motor	Brake	Braking torque gradation in Nm												
EDRE200 EDRE225 EDRN200 EDRN225	BE30	75	100	150	200	300								
	BE32		100	150	200	300	400	500	600					
	BE60				200	300	400	500	600					
	BE62						400		600	800	1000	1200		
EDRN250/280	BE60				200	300	400	500	600					
	BE62						400		600	800	1000	1200		
	BE120						400		600	800	1000			
	BE122									800		1200	1600	2000
EDRN315	BE120						400		600	800	1000			
	BE122									800		1200	1600	2000

Not for frequency inverter operation

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4.5.3 Brake control

Motor wiring space

The following tables list the technical data of brake control systems for installation in the motor wiring space. The different housings have different colors (= color code) to make them easier to distinguish.

The following table shows the technical data of the rectifiers:

Rectifier	Function	Voltage	Holding current I_{Hmax} in A	Type	Part number	Color code
BGE	Half-wave rectifier with electronic switching	AC 230 – 575 V	1.0	BGE 1.4	8278822	Red
		AC 150 – 500 V	1.5	BGE 1.5	8253854	Red
		AC 42 – 150 V	3.0	BGE 3	8253870	blue

INFORMATION

At a voltage > 500 V or frequency inverter operation, no rectifier must be used in the terminal box.

Control cabinet

The following tables list the technical data of brake control systems for installation in the control cabinet. The different housings have different colors (= color code) to make them easier to distinguish.

The following table shows the technical data of the rectifiers:

Rectifier	Function	Voltage	Holding current I_{Hmax} in A	Type	Part number	Color code
BME	Half-wave rectifier with electronic switching as BGE	AC 230 – 575 V	1.4	BME 1.4	8298319	Red
		AC 150 – 500 V	1.5	BME 1.5	8257221	Red
		AC 42 – 150 V	3.0	BME 3	825723X	Blue
BMP	Half-wave rectifier with electronic switching, integrated voltage relay for cut-off in the DC circuit.	AC 230 – 575 V	1.4	BMP 1.4	8298327	White
		AC 150 – 500 V	1.5	BMP 1.5	8256853	White
		AC 42 – 150 V	3.0	BMP 3	8265666	Light blue
		AC 230 – 575 V	2.8	BMP 3.1[1)]	8295077	–
BMK	Half-wave rectifier with electronic switch mode, 24 V_{DC} control input and separation in the DC circuit.	AC 230 – 575 V	1.4	BMK 1.4	8298335	Water blue
		AC 150 – 500 V	1.5	BMK 1.5	8264635	Water blue
		AC 42 – 150 V	3.0	BMK 3	8265674	Bright red

1) Only sizes 280M – 315

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4.5.4 Working air gap, braking torques

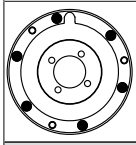
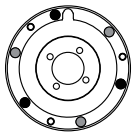
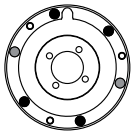
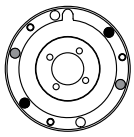
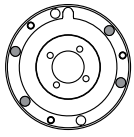
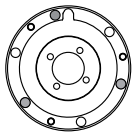
Brake	Braking work done until maintenance	Working air gap[1]		Brake disk	Part number damping plate/ pole sheet	Braking torque settings						
		mm		mm		Braking torque	Type/number of brake springs			Purchase order number for brake springs		
	10^6 J	Min.	Max.	Min.		Nm (lb-in)	Normal	Blue	White	Normal	Blue	White
BE05	60	0.25	0.6	9.0	13740563	5.0 (44.3)	3	–	–	0135017X	13741373	–
						3.5 (31)	–	6	–			
						2.5 (22.1)	–	4	–			
						1.8 (15.9)	–	3	–			
BE1	60	0.25	0.6	9.0	13740563	10 (88.5)	6	–	–	0135017X	13741373	–
						7.0 (62)	4	2	–			
						5.0 (44.3)	3	–	–			
BE2	90	0.25	0.6	9.0	13740199	20 (177)	6	–	–	13740245	13740520	–
						14 (123.9)	2	4	–			
						10 (88.5)	2	2	–			
						7.0 (62)	–	4	–			
						5.0 (44.3)	–	3	–			
BE5	190	0.25	0.6	9.0	13740695	55 (486.8)	6	–	–	13740709	13740717	–
						40 (354)	2	4	–			
						28 (247.8)	2	2	–			
						20 (177)	–	–	6			13747738
						14 (123.9)	–	–	4			
BE11	320	0.3	1.2	10.0	13741713	110 (976.6)	6	–	–	13741837	13741845	–
						80 (708)	2	4	–			
						55 (486.8)	2	2	–			
						40 (354)	–	4	–			
					13741713 + 13746995	28 (247.8)	–	3	–			13747789
						20 (177)	–	–	4			
BE20	500	0.3	0.9	10.0	–	200 (1770)	6	–	–	13743228	13742485	–
						150 (1328)	4	2	–			
						110 (976.6)	3	3	–			
						80 (708)	3	–	–			
						55 (486.8)	–	4	–			
					13746758	40 (354)	–	3	–			
BE30	750	0.3	0.9	10.0	–	300 (2655)	8	–	–	01874551	13744356	–
						200 (1770)	4	4	–			
						150 (1328)	4	–	–			
						100 (885)	–	8	–			
						75 (664)	–	6	–			
BE32	750	0.4	0.9	10.0	–	600 (5310)	8	–	–	01874551	13744356	–
						500 (4425)	6	2	–			
						400 (3540)	4	4	–			
						300 (2655)	4	–	–			
						200 (1770)	–	8	–			
						150 (1328)	–	6	–			
					13746731	100 (885)	–	4	–			–
BE60	2500	0.3	1.2	10.0	–	600 (5310)	8	–	–	01868381	13745204	–
						500 (4425)	6	2	–			
						400 (3540)	4	4	–			
						300 (2655)	4	–	–			
						200 (1770)	–	8	–			

Brake	Braking work done until maintenance	Working air gap[1]		Brake disk	Part number damping plate/ pole sheet	Braking torque settings						
		mm		mm		Braking torque	Type/number of brake springs			Purchase order number for brake springs		
	10^6 J	Min.	Max.	Min.		Nm (lb-in)	Normal	Blue	White	Normal	Blue	White
BE62	2500	0.4	1.2	10.0	–	1200 (10621)	8	–	–	01868381	13745204	–
						1000 (8851)	6	2	–			
						800 (7081)	4	4	–			
						600 (5310)	4	–	–			
						400 (3540)	–	8	–			
BE120	390	0.6	1.2	12.0	–	1000 (8851)	8	–	–	13608770	13608312	–
						800 (7081)	6	2	–			
						600 (5310)	4	4	–			
						400 (3540)	4	–	–			
BE122	300	0.8	1.2	12.0	–	2000 (17701)	8	–	–	13608770	13608312	–
						1600 (14161)	6	2	–			
						1200 (10621)	4	4	–			
						800 (7081)	4	–	–			

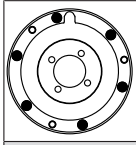
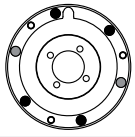
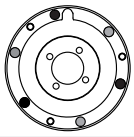
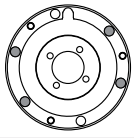
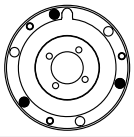
1) When checking the working air gap, note: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.15 mm after a test run.

The following table shows the brake spring requirements:

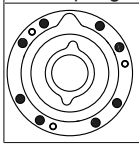
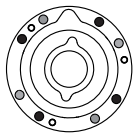
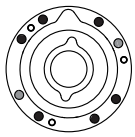
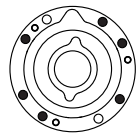
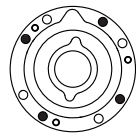
BE05 – 11:

6 springs	3 + 3 springs	4 + 2 springs	2 + 2 springs	4 springs	3 springs
					

BE20:

6 springs	4 + 2 springs	3 + 3 springs	4 springs	3 springs
				

BE30 – 122:

8 springs	6 + 2 springs	4 + 4 springs	6 springs	4 springs
				

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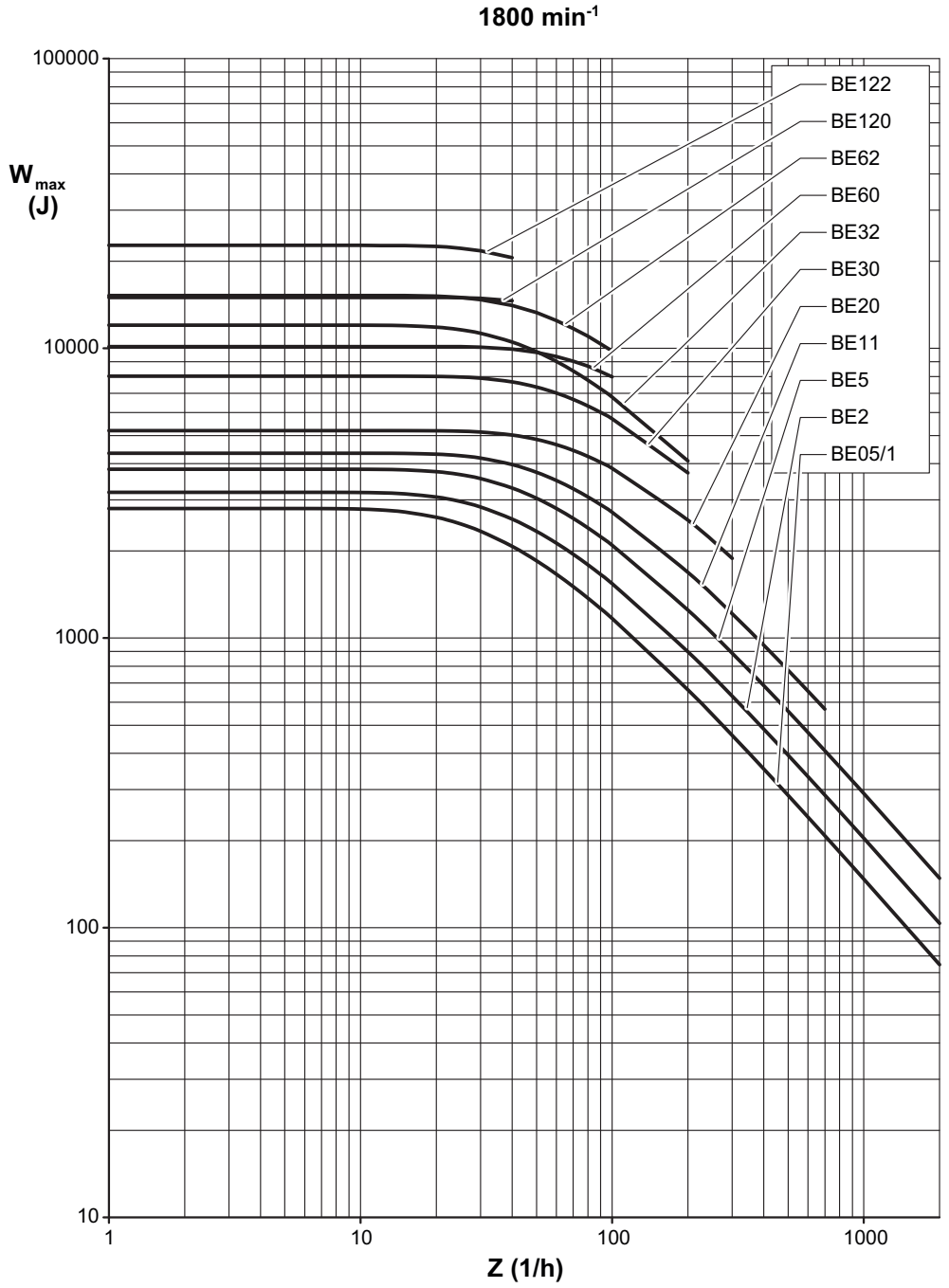
4.5.5 Permitted work done by the BE brake for AC motors

If you are using a brakemotor, you have to check whether the brake is approved for use with the required starting frequency Z. The following diagrams show the permitted braking work W_{max} per braking operation for different brakes and rated speeds. The values are given with reference to the required switching frequency Z in cycles/hour (1/h).



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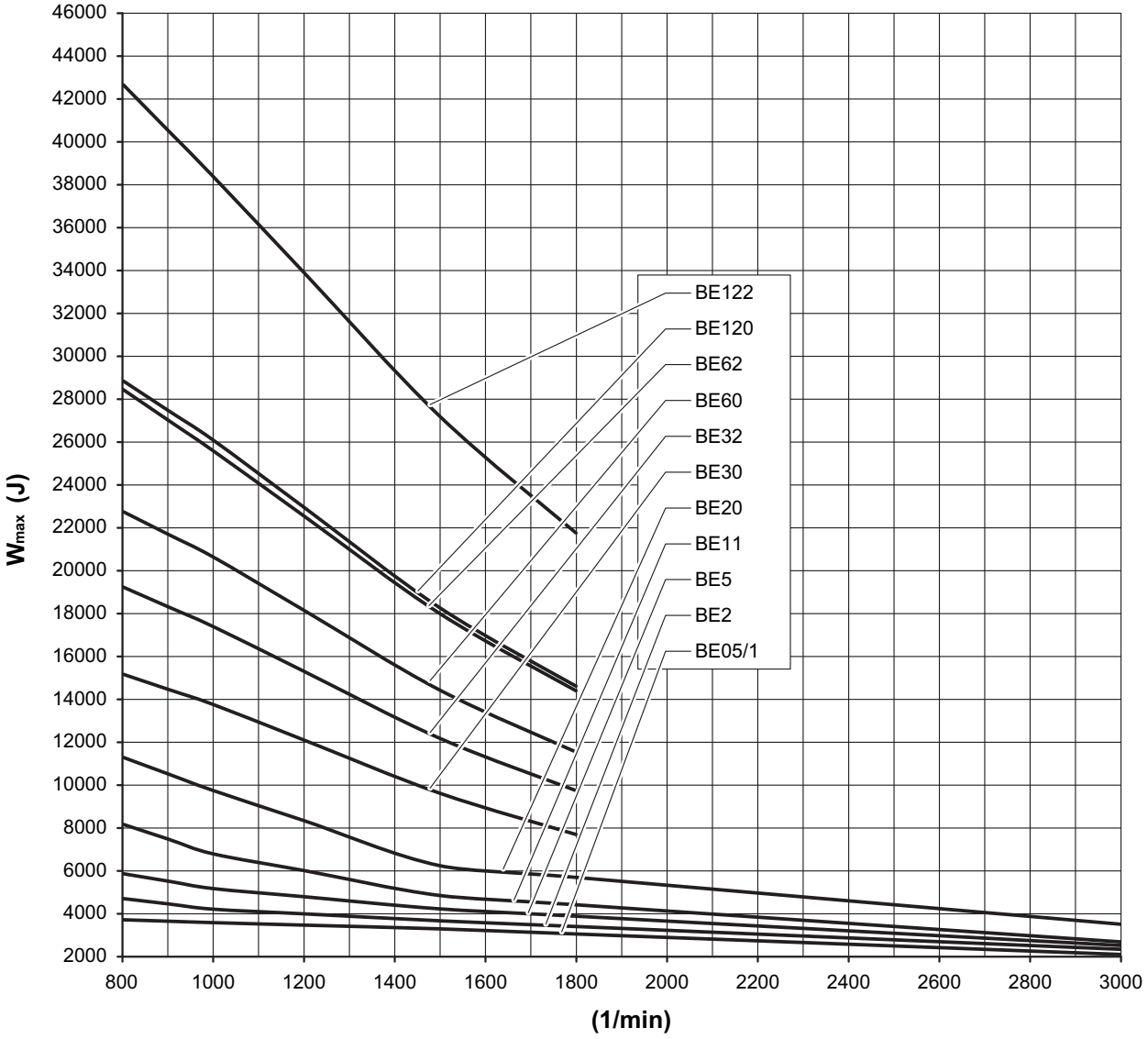
4.5.6 Permitted work done by the BE brake in case of emergency off

The permitted switching work of brakes from SEW-EURODRIVE is defined for the speed of 1800 1/min in the known W_{max} / Z diagrams.

Often, values for intermediate speeds are required for controlled drives (hoists, hoist-like drives, horizontal drives). The following diagram and the value tables apply for the operating frequency Z = 1/h. They list the maximally permitted braking work in the event of emergency off depending on the speed.



Maximally permitted braking work for vertical and horizontal drives in case of emergency off braking operations.

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INFORMATION

For brakes BE30 – BE122, braking operations above 1800 min^{-1} are not permitted.

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Table with values for maximally permitted braking work for vertical and horizontal drives in case of emergency switching off braking operations

n	W_{max} in J										
in 1/min	BE05/1	BE2	BE5	BE11	BE20	BE30	BE32	BE60	BE62	BE120	BE122
800	3718	4711	5873	8184	11310	15185	22777	19256	28884	28480	42720
900	3651	4462	5524	7489	10530	14474	21712	18328	27492	27040	40560
1000	3584	4212	5174	6794	9750	13764	20646	17400	26100	25600	38400
1100	3526	4103	4984	6405	9048	12935	19403	16356	24534	24080	36160
1200	3468	3995	4794	6016	8346	12106	18160	15312	22968	22560	33920
1300	3409	3886	4605	5627	7644	11278	16916	14268	21402	21040	31680
1400	3351	3778	4415	5238	6942	10449	15673	13224	19836	19520	29440
1500	3293	3669	4225	4849	6240	9620	14430	12180	18270	18000	27200
1600	3213	3580	4111	4705	6058	8979	13468	11368	17052	16800	25387
1700	3134	3492	3998	4561	5876	8337	12506	10556	15834	15600	23573
1800	3054	3403	3884	4416	5694	7696	11544	9744	14616	14400	21760
1900	2975	3315	3770	4272	5512						
2000	2895	3226	3657	4128	5330						
2100	2816	3137	3543	3984	5148						
2200	2736	3049	3429	3840	4966						
2300	2657	2960	3316	3695	4784						
2400	2577	2872	3202	3551	4602						
2500	2498	2783	3088	3407	4420						
2600	2418	2694	2975	3263	4238						
2700	2339	2606	2861	3119	4056						
2800	2259	2517	2747	2974	3874						
2900	2180	2429	2634	2830	3692						
3000	2100	2340	2520	2686	3510						

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4.6 Backstop/RS

The option mechanical backstop /RS can be used in order to prevent the rotor from running backwards on motors that have been switched off.

Motor size	Rated locking torque	Lift-off speed of sprags	Maximum speed
	Nm	1/min	1/min
80	130	860	5000
90/100	370	750	
112/132	490	730	4500
160	700	700	
180	1400	610	
200/225	2500	400	4000
250/280	2600	400	2600
315[1)]	6300	320	2500

1) in preparation

INFORMATION

In inverter operation, the speed range must only be used to reach lift-off speed as quick as possible. Permanent operation below the lift-off speed is not permitted.

For further information on the option /RS, refer to the "AC Motors" catalog.

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4.7 Encoder mounting

4.7.1 Encoder mounting at the factory

Type designation: /XVCC for EDRS.., EDRE.. or /XC1C for EDRN...

SEW-EURODRIVE offers the already installed "BEIsensors" encoder, type H25E.

Encoders		XC1C	XVCC
for motor size		EDRN80 – 280	EDR..71 – 225
Certification		Class I, division 2, groups A, B, C and D Class II, division 2, groups F and G	
Mounting type		XC1A mounting adapter	
Manufacturer		BEI sensors	
Encoders		H25	
Manufacturer's designation		H25E-F1-SS-1024-ABZC-28V/V-SM18-NI-S	
Supply voltage V_B	V	DC 5 to 28 ± 5 %	
Max. current consumption I_{in}	mA	250	
Signal output		HTL, TTL (V_{in} = V_{out})	
Output current per track I_{out}, RMS	mA	120	
Max. pulse frequency f_{max}	kHz	100	
Pulses per revolution	A, B	1024	
	Z	1	
Pulse duty factor		1:1	
Phase angle A: B		90°	
Vibration resistance at 5 Hz – 2 kHz	m/s^2	20 g	
Shock resistance	m/s^2	50 g for a duration of 11 ms	
Maximum speed nmax	1/min	3000	
Ambient temperature	°C	0 to 70 °C	
Degree of protection		NEMA 4 & 13 (IP66)	
Connection		M18 connector	
Manufacturer's designation mating connector		MS3106F18-1S	
Part number mating connector		19096550	
Part number encoder		16234332	
Additional weight	kg	0.5	

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4.7.2 Encoder mounting adapter – customer encoder

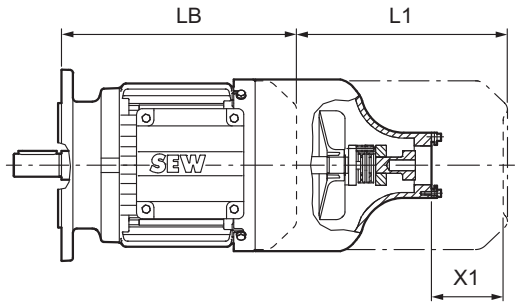
On request, EDR.. series motors can be equipped with various encoder mounting adapters for mounting customer-specific encoders from different manufacturers. These encoders are usually attached using 3 clamping jaws (bolts with eccentric disks). The encoder shaft is connected to the motor shaft via a coupling.

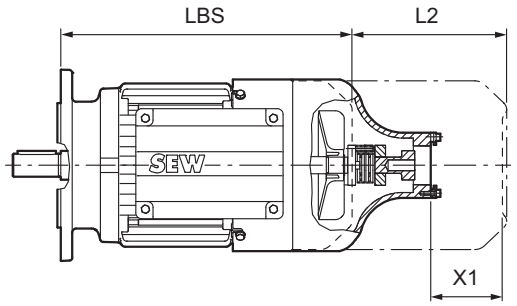
The encoder is not included in the delivery of SEW-EURODRIVE, but is purchased and installed by the customer.

4.7.3 Encoder mounting adapter with SI units

Mounting adapter		XV0A	XV1A	XV2A	XV3A	XV4A	XV7A
		mm	mm	mm	mm	mm	mm
For motors		EDR..71 – 225, EDRN80 – 280					
Mounting type of encoder		Flange centered with coupling					
Design	Encoder shaft	Any	6	10	12	11	10
	Centering	Any	50	50	80	85	50
Suitable for encoder		Provided by the customer or by SEW-EURODRIVE on behalf of the customer.					

XV0A mounting adapter





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Motor	Motor L1	Brakemotor L2	Max. encoder length X1		Protection cover
			Encoder shaft 6 mm	Encoder shaft 10 mm	
	mm	mm	Centering 36/50 mm	Centering 36 mm	
EDRS71	261	193	124	119	13616129
EDR..80	309	228	161	156	13620193
EDRE90 EDRE100	347	254	185	180	13616137
EDRE112 EDRE132S	279	167	99	94	13617036
EDRE132M EDRE132L	359	222	157	152	13634852
EDRE160 EDRE180	460	272	205	200	13634844
EDRE200 EDRE225	495	290	223	218	13622978

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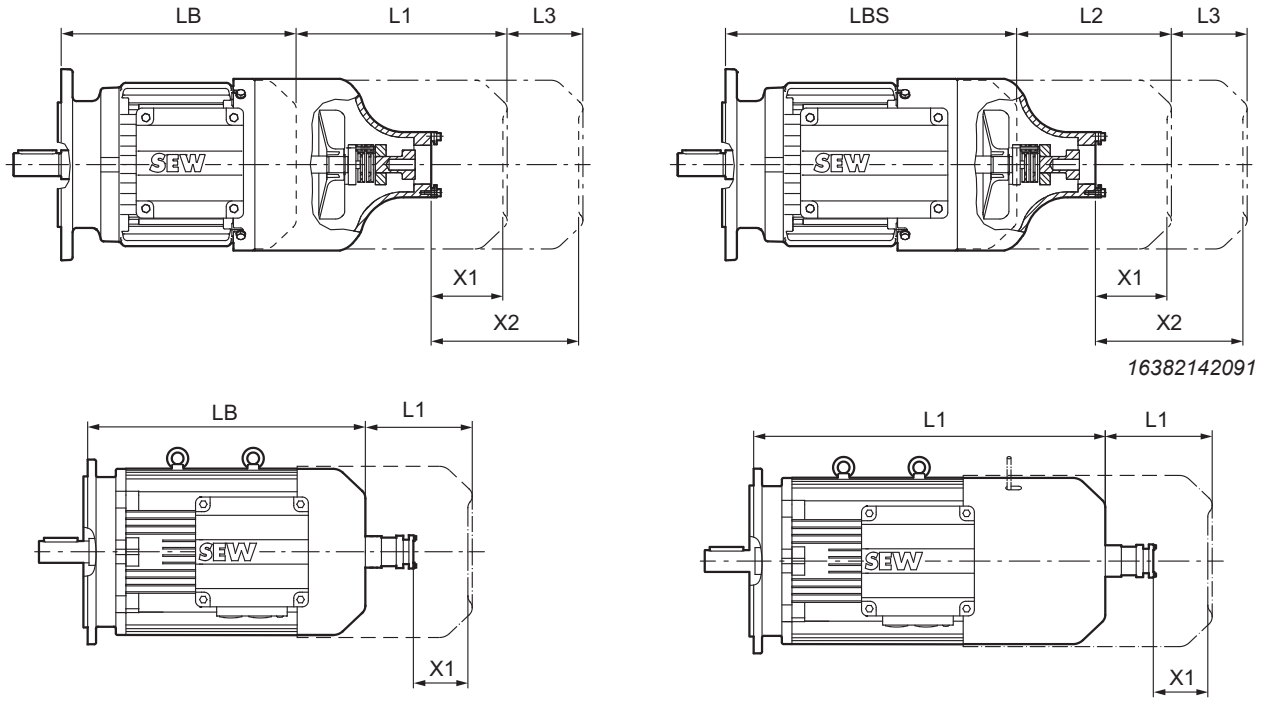
XV1A – XV4A, XV7A mounting adapter



Motor	Motor L1	Brake-motor L2	Addi-tional length L3	Max. encoder length X1			Short protec-tion cover	Max. encoder length X2			Long protec-tion cover
				XV1A	XV2A	XV3A		XV1A	XV2A	XV3A	
	mm	mm	mm	mm	mm	mm		mm	mm	mm	
EDRS71	183	115	78	54	43	36	13629840	132	121	114	13616129
EDR..80	202	121	107	62	51	44	13629859	169	158	151	13620193
EDRE90 EDRE100	210	117	137	56	45	38	13614541	193	182	175	13616137
EDRE112 EDRE132S	279	167	175	107	96	89	13617036	282	271	264	13620746
EDRE132M EDRE132L	359	222	–	165	154	147	13634852	–	–	–	–
EDRE160 EDRE180	460	271	–	213	202	195	13634844	–	–	–	–
EDRE200 EDRE225	495	290	–	231	220	213	13622978	–	–	–	–

Motor	Motor L1	Brakemotor L2	Additional length L3	Max. encoder length X1		Short pro-tection cover	Max. encoder length X2		Long pro-tection cover
				XV4A	XV7A		XV4A	XV7A	
	mm	mm	mm	mm	mm		mm	mm	
EDRS71	183	115	78	41	54	13629840	119	132	13616129
EDR..80	202	121	107	49	62	13629859	156	169	13620193
EDRE90 EDRE100	210	117	137	43	56	13614541	180	193	13616137
EDRE112 EDRE132S	279	167	175	94	107	13617036	269	282	13620746
EDRE132M EDRE132L	359	222	–	152	165	13634852	–	–	–
EDRE160 EDRE180	460	271	–	200	213	13634844	–	–	–
EDRE200 EDRE225	495	290	–	218	231	13622978	–	–	–

Motor	Motor L1	Brake-motor L2	Addi-tional length L3	Max. encoder length X1			Short protec-tion cover	Max. encoder length X2			Long protec-tion cover
				XV1A	XV2A	XV3A		XV1A	XV2A	XV3A	
	mm	mm	mm	mm	mm	mm		mm	mm	mm	
EDRN80	202	121	107	62	51	44	13629859	169	158	151	13620193
EDRN90 EDRN100	210	117	137	56	45	38	13614541	193	182	175	13616137
EDRN112 EDRN132S	279	167	175	107	96	89	13617036	282	271	264	13620746
EDRN132M EDRN132L	359	222	–	165	154	147	21004153	–	–	–	–
EDRN160 EDRN180	460	272	–	213	202	195	13634844	–	–	–	–
EDRN200 EDRN225	495	290	–	231	220	213	13622978	–	–	–	–
EDRN250 EDRN280	242		–	149	–	–	13629218	–	–	–	–
EDRN250 EDRN280	312		–	–	–	–	–	219	–	–	13636200

Motor	Motor L1	Brakemotor L2	Additional length L3	Max. encoder length X1		Short pro-tection cover	Max. encoder length X2		Long pro-tection cover
				XV4A	XV7A		XV4A	XV7A	
	mm	mm	mm	mm	mm		mm	mm	
EDRN80	202	121	107	49	62	13629859	156	169	13620193
EDRN90 EDRN100	210	117	137	43	56	13614541	180	193	13616137
EDRN112 EDRN132S	279	167	175	94	107	13617036	269	282	13620746
EDRN132M EDRN132L	359	222	–	152	165	21004153	–	–	–
EDRN160 EDRN180	460	272	–	200	213	13634844	–	–	–
EDRN200 EDRN225	495	290	–	218	231	13622978	–	–	–
EDRN250 EDRN280	242		–	–	122	13629218	–	–	–
EDRN250 EDRN280	312		–	–	–	–	–	192	13636200

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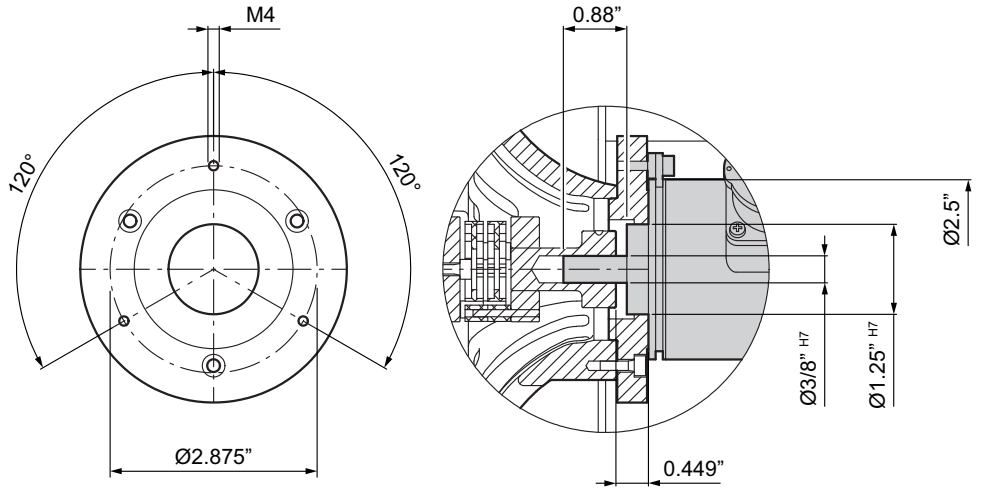
4.7.4 Encoder mounting adapter with imperial units

Mounting adapter		XVCA	XC1A
For motors		EDR..71 – 225	EDRN80 – 280
Mounting type of encoder		Flange centered with coupling	
Design	Encoder shaft	Any	3/8"
	Centering	Any	1.25"
	Flange	Any	2.5"
Suitable for encoder		Provided by the customer or by SEW-EURODRIVE on behalf of the customer.	



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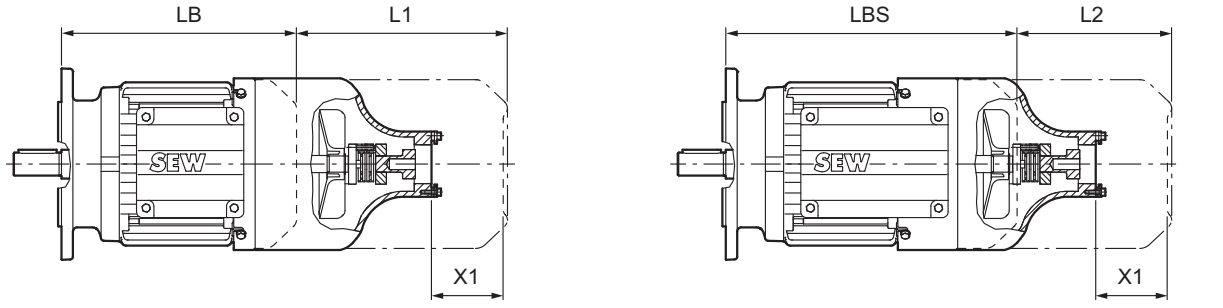
XVCA mounting adapter



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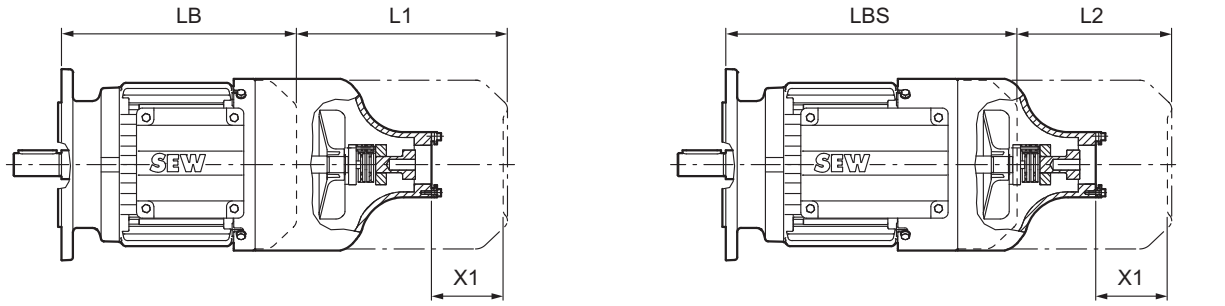
Motor	Motor L1	Brakemotor L2	Max. encoder length X1	Protection cover
	mm	mm	mm	
EDRS71	261	193	124	16236483
EDRE112 EDRE132S	304	192	121	16234375

XC1A mounting adapter



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Motor	Motor L1	Brakemotor L2	Max. encoder length X1	Protection cover
	mm	mm	mm	
EDRN80	309	228	163	16236599
EDRN112 EDRN132S	304	192	121	16234375

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4.8 Other additional features

The following table shows an additional feature:

Designation	Available class and division	Description
/2W	/CID2,	2nd shaft end on the motor/brakemotor
/RI	/CIID2,	Reinforced winding insulation
	/CICIID2	

4.8.1 2nd shaft end

SEW-EURODRIVE supplies the optional equipment "2nd shaft end" with inserted key (additional protection by means of adhesive tape). As standard, no cover is supplied. It can be ordered optionally for sizes EDR..71 – 225, EDRN80 – 280.

INFORMATION

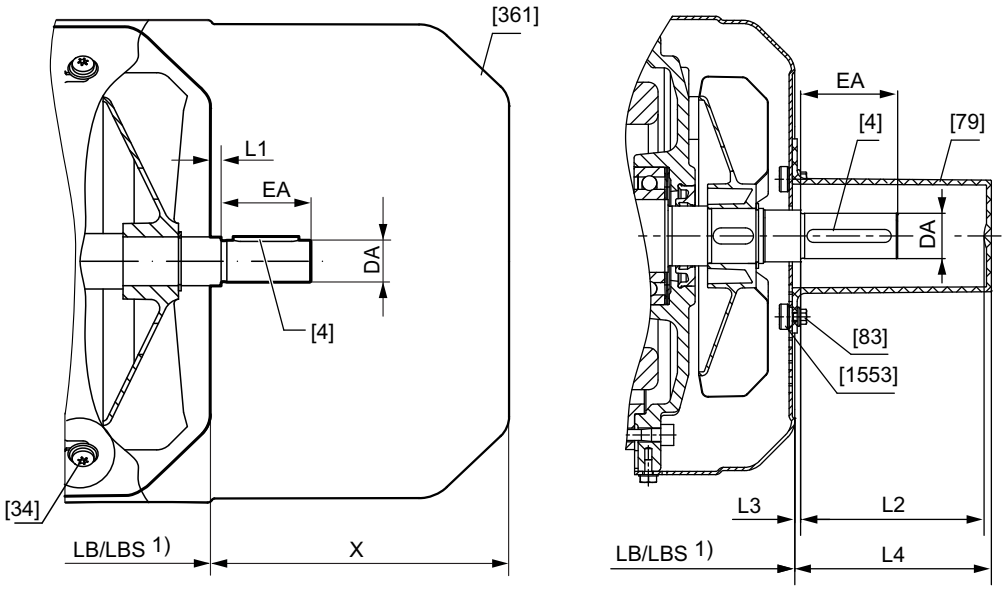
The motor must only be operated with a suitably secured key.

The following figure shows the dimensions of the covers:

Standard for EDR..71 – 132, EDRN80 – 132S, EDRN250/280

Optional for EDRE160 – 225, EDRN132M – 225

Standard for EDRE160 – 225, EDRN132M – 225M



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[4] Keyway
[34] Tapping screw
[79] Protective cap
[83] Hex head screw
[361] Extended fan guard
[1553] Cage nut
LB/LBS Length of the motor/brakemotor
1) Refer to the "AC Motors" catalog for dimensions

Dimensions second shaft end

Motor size		DA	EA	L1	L2	L3	L4	X
EDR..	EDRN..	mm	mm	mm	mm	mm	mm	mm
EDRS71	–	11	23	2	–	2	–	91.5
EDRS71 /BE	–				–		–	88
EDRE80	EDRN80	14	30	2	–	2	–	95.5
EDRE80 /BE	EDRN80 /BE				–		–	94.5
EDRE90	EDRN90	14	30	2	–	2	–	88.5
EDRE90 /BE	EDRN90 /BE				–		–	81
EDRE100	EDRN100	14	30	2	–	2	–	87.5
EDRE100 /BE	EDRN100 /BE				–		–	81
EDRE112 – 132	EDRN112 – 132S	19	40	3.5	–	3.5	–	125
EDRE112 – 132 /BE	EDRN112 – 132S /BE				–		–	120.5
EDRE160	EDRN132M/L	28	60	4	122	3.5	124	193
EDRE160 /BE	EDRN132M/L /BE							187
EDRE180	EDRN160 – 180	38	80	4	122	3.5	122	233
EDRE180 /BE	EDRN160 – 180 /BE							236
EDRE200 – 225	EDRN200 – 225	48	110	5	122	5	122	230
EDRE200 – 225 /BE	EDRN200 – 225 /BE							246
–	EDRN250/280	55	110	3	–	3	–	243.5
–	EDRN250/280 /BE							

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4.8.2 Reinforced winding insulation

/RI

For motors operated on frequency inverters at voltages > 500 V, SEW-EURODRIVE recommends to use the option reinforced insulation /RI.

For the permitted pulse voltages, refer to chapter Frequency inverter operation.

4.8.3 Metal fan /AL

An aluminum fan can be used, if higher requirements demand a more robust fan design. Using the aluminum fan allows for varying motor moment of inertia.

Technical data

Motor	J_{AL}	J_{PA}	J_{mot}	$J_{mot}+J_{AL}-J_{PA}$	Increase inertia	Mass m_{AL}
	10^{-4} kgm²	10^{-4} kgm²	10^{-4} kgm²	10^{-4} kgm²	%	kg
EDRN80M4	4.5	0.97	24.7	28.23	114	0.25
EDRN90S4	6.97	1.32	54	59.65	110	0.32
EDRN90L4	6.97	1.32	67.2	72.85	108	0.32
EDRN100L4	6.97	1.32	112	117.7	105	0.32
EDRN112M4	15.5	5.55	178	188.0	106	0.48
EDRN132S4	15.5	5.55	241	251.0	104	0.48
EDRN132M4	61.2	2.12	381	440.1	116	0.96
EDRN132L4	61.2	2.12	439	498.1	113	0.96
EDRN160M4	117	4.5	817	929.5	114	1.5
EDRN160L4	117	4.5	1040	1153	111	1.5
EDRN180M4	117	6.06	1630	1741	107	1.5
EDRN180L4	117	6.06	1950	2061	106	1.5
EDRN200L4	121	16.6	2660	2764	104	1.56
EDRN225S4	121	16.6	4350	4454	102	1.56
EDRN225M4	121	16.6	4350	4454	102	1.56
EDRN250ME4	157	23.8	8940	9073	101	1.77
EDRN280S4	157	23.8	8940	9073	101	1.77
EDRN280M4	157	23.8	12000	12133	101	1.77

J_{AL} Aluminum fan mass moment of inertia
J_{Mot} Motor mass moment of inertia (incl. J_{PA})
J_{PA} Plastic fan mass moment of inertia
m_{AL} Aluminum fan mass

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4.8.4 Canopy /C

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

The canopy can be retrofitted to the fan guard.

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

Motors in vertical mounting position (e.g. M4/V1) are equipped with the option canopy /C as standard. On request, the motor can be delivered without canopy. In this case, you have to install a cover when you install the drive in the plant/machine in order to prevent the ingression of objects into the ventilation openings. Adhere to the requirements of local standards. The cover must not obstruct the cooling air supply.

Technical data

For additional lengths due to the canopy, refer to the motor dimension sheets in the "AC Motors" catalog.

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5 Drive selection

5.1 Permitted duty types and protection concept for division 2 motors

Design	Duty type acc. to nameplate	Permitted duty types	Protection against excessive heating	Mark on the nameplate
CID2	S1	Line operation: S1	Motor circuit breaker[1)]	–
CIID2 CICIID2	S1	Line operation: • Switching operation • Soft starters • Heavy starting	PTC thermistor[2)]	Option /TF
	S1, inverter duty VPWM	FI operation: • Single drive • Group drive (only CIID2)	PTC thermistor[2)]	CT[3)], permitted speed range, nominal current, and maximum current
		Line operation: • Switching operation • Soft starters • Heavy starting	PTC thermistor[2)]	

1) Motor circuit breaker with approval according to cULus for USA/Canada.
2) Monitoring of the PTC thermistor via thermistor motor protection control unit with approval according to cULus for USA and Canada.
3) Constant torque in specified speed range

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5.2 Duty type definitions

5.2.1 Line operation

Line operation is given, if motors and/or brakemotors are directly supplied with voltage from the supply system and run-up uncontrolled. Further operating modes are distinguished based on the type of start-up (run-up to rated speed):

- Switching operation: Starting frequency > 10 c/h
- Soft start: Startup assisted by a soft starter or soft starting device.
- Heavy starting

5.2.2 Frequency inverter operation

Frequency inverter operation is given, if motors and/or brakemotors are operated frequency-controlled via a frequency inverter. The following cases are distinguished:

- Single drive: each motor is controlled by a separate frequency inverter
- Group drive: a frequency inverter controls a group of motors

5.3 Line operation

Explosion-proof motors of the EDR.. and EDRN.. series are marked with S1 duty type. For other duty types, the required starting frequency must be checked by way of calculation. For this calculation, use the formula for calculating the starting frequency (see chapter "Calculating the starting frequency" (→ 🗎 49)).

5.3.1 Operating mode S1 – continuous duty

S1 duty is operation at a constant load, with a duration long enough for the machine to reach a steady-state condition.

Notes on the brake

In **S1 continuous duty**, the brake is applied when the drive is switched off or in an emergency. The braking work may not exceed the specified maximum braking work per braking operation. It is specified on the nameplate as C_{max} and shown in the figure in chapter "Permitted work done by the BE brake for AC motors" (→ 🗎 33). A maximum of 10 emergency braking operations are permitted per hour. Between 2 braking operations, a waiting time of minimum 6 minutes must be adhered to.

If the brakemotor is used in an application that required **a high starting frequency**, both the motor and the brake are dimensioned accordingly. In this case, the motor must be equipped with a temperature sensor /TF.

The braking work in an emergency may not exceed the specified maximum braking work per emergency braking operation. It is listed on the nameplate.

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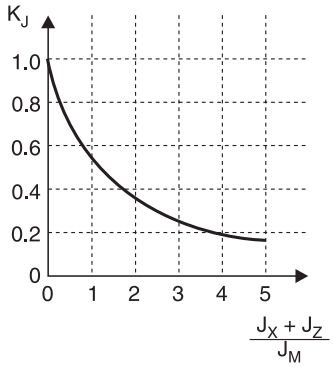
5.3.2 Calculating the starting frequency

You can determine the permitted starting frequency Z of the motor in cycles/hour using the following formula:

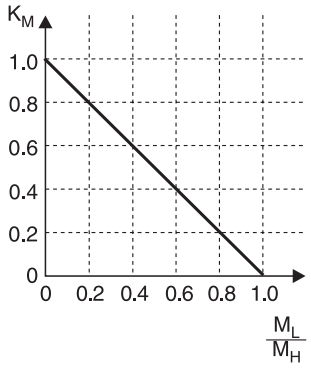
$$\mathbf{Z = Z_0 \times K_J \times K_M \times K_P}$$

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

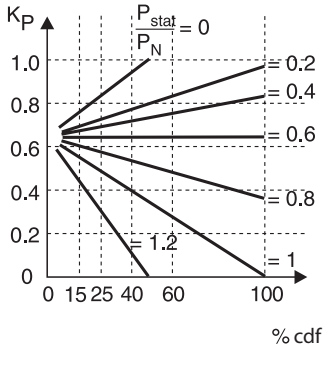
Depending on the additional moment of inertia



Depending on the counter-torque at startup



Depending on the static power and the cyclic duration factor (cdf)



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

Z_0 is the no-load starting frequency defined by the manufacturer.

The permitted starting frequency Z of a motor is calculated using the formula for calculating the starting frequency. Z_0 indicates the number of times per hour that the motor can accelerate the mass moment of inertia of its rotor up to nominal speed without counter-torque.

5.3.3 Soft starter/soft start units

Soft start units are permitted for motors of division 2 when the motors are equipped with the temperature sensor /TF option and meet the requirements of EN/IEC 60079-14. During startup, you must verify and document whether temperature monitoring is effective and whether the motor starts up correctly. The motor must be disconnected from the supply system when the protection device trips.

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5.4 Frequency inverter operation

Motors for frequency inverter operation are only available with one voltage. This defines the connection type and setting range.

The motors are CSA approved for operation at a frequency inverter with VPWM (Variable Puls With Modulation), with constant torque (CT) for 5 – 104 Hz (60 – max. 3120 1/min).

Depending on the voltage and system voltage (line voltage of the frequency inverter), as well as the wiring diagram, possible setting ranges are selected. The setting ranges are confirmed in the order documents and on the nameplate.

The minimum and maximum speed depend on motor size and selected options.

Wiring diagram	Voltage	System voltage	Maximum setting range in frequency inverter operation
	V	V	1/min
R13	575Y ⅄	575	300 – 1800
R76	230 ⅄⅄	230	300 – 1800
	230⅄⅄	460	300 – 3000
	460⅄	460	300 – 1800
R72	230 △△	230	300 – 1800
	230△△	460	300 – 3000
	460△	460	300 – 1800

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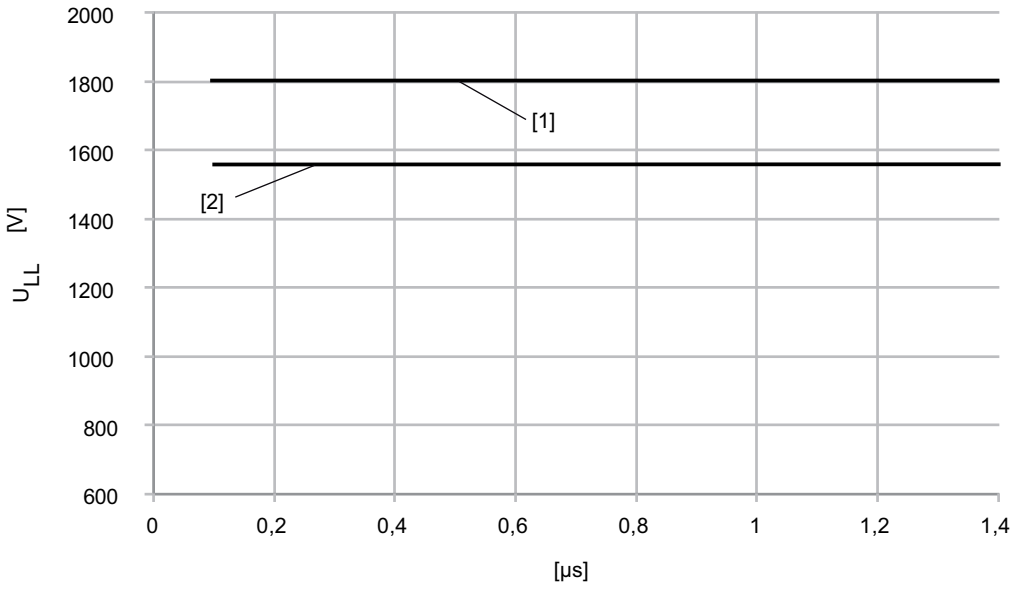
5.4.1 Frequency inverter operation

Permitted voltage load for frequency inverter operation

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



9007208404131083

[1] Permitted pulse voltage for EDR../EDRN.. motors with reinforced insulation (option /RI)

[2] Permitted pulse voltage for EDR../EDRN.. motors with standard insulation in double-star and star connection

U_{LL} Permitted pulse voltage

µs Voltage rise time

INFORMATION

The permitted maximum PE voltage of 1200 V must not be exceeded in IT system operation even in the event of an error.

INFORMATION

If the permitted pulse voltage is exceeded, you have to provide for according measures to limit it. Consult the manufacturer of the frequency inverter.

SEW-EURODRIVE frequency inverters

When using frequency inverters from SEW-EURODRIVE at line voltages of up to 500 V and in non-regenerative operation, the maximally permitted limit values of the motors are met.

The pulse voltage at the motor terminals (caused by reflections) depends among others on the level of the DC link voltage and the cable length between frequency inverter and motor.

If regenerative operation cannot be ruled out, a braking resistance must be configured and connected to the frequency inverter to avoid an increased DC link voltage.

Energy recovery

The regenerative power supply module of MOVIDRIVE® or MOVIAXIS® can be used with the necessary options without restrictions. The regenerative power supply unit prevents high DC link voltages and ensures that the limit values are not exceeded.

Frequency inverters from third party manufacturers

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

IT system

In an IT system, an insulation fault between a phase and ground is tolerated. The ground fault on the motor could mean that the maximum permitted limit value for phase/ground of 1200 V is exceeded in regenerative operation. To prevent this effectively, you have to install suitable protection elements between the frequency inverter and the motor. Usually, sine filters are installed between the frequency inverter and motor in this case. For detailed information about component selection and wiring, please contact the manufacturer of the frequency inverter.

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5.4.2 Notes for safe operation

General information

Install the frequency inverter outside the potentially explosive atmosphere.

Thermal motor protection

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

Motors that are suitable for frequency inverter operation have an "Inverter duty" label on the nameplate.

Overvoltage at the motor terminals

Observe the chapter Permitted voltage load for frequency inverter operation for motors operated with frequency inverter.

EMC measures

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

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

  If an output filter is used, the voltage drop at the filter must be taken into account.

Voltage drop

Always observe the voltage drop to avoid undervoltage.

Gear unit to Directive 2014/34/EC

When parameterizing FI-controlled gearmotors, you have to observe the n_{emax} and M_{amax} values of the gear unit.

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5.4.3 Assignment tables

Motor/inverter assignment, EDRN.. motor, 60 Hz

Canada/USA: 460 – 480 V

Inverter output voltage				Canada/USA: 460 – 480 V							
Rated motor voltage				460 V				230 V			
Connection type				⅄ (from 160M upwards: △)				⅄⅄ (from 160M upwards: △△)			
Motor	P_N	P_N	M_N	n_{min} – n_{max}	I_N	FI		n_{min} – n_{max}	I_N	FI	
	kW	HP	Nm	1/min	A	kW	HP	1/min	A	kW	HP
EDRN80M4	0.75	1	4.1	300 – 1800	1.56	0.75	1	300 – 3000	3.12	1.5	2.2
EDRN90S4	1.1	1.5	6	300 – 1800	2.3	1.1	1.5	300 – 3000	4.6	2.2	3
EDRN90L4	1.5	2	8.1	300 – 1800	3	1.5	2	300 – 3000	6	3	4
EDRN100L4	2.2	3	11.9	300 – 1800	4.15	2.2	3	300 – 3000	8.3	4	5.5
EDRN100L4	3	4	16.2	300 – 1800	5.8	3	4	300 – 3000	11.6	7.5	10
EDRN100L4	3.7	5	20	900 – 1800	7.2	4	5	900 – 3000	14.4	7.5	10
EDRN112M4	4	5.4	21.5	300 – 1800	7.1	4	5	300 – 3000	14.2	7.5	10
EDRN132S4	5.5	7.5	29.5	300 – 1800	9.2	5.5	7.5	300 – 3000	18.4	11	15
EDRN132M4	7.5	10	40.5	300 – 1800	13.3	7.5	10	300 – 3000	26.6	15	20
EDRN132L4	9.2	12.5	49.5	300 – 1800	16.5	11	15	300 – 3000	33	22	30
EDRN160M4	11	15	59	300 – 1800	18.5	11	15	300 – 3000	37	22	30
EDRN160L4	15	20	81	300 – 1800	25	15	20	300 – 3000	50	30	40
EDRN180M4	18.5	25	99	300 – 1800	29.5	22	30	300 – 2700	59	37	50
EDRN180L4	22	30	118	300 – 1800	34	22	30	300 – 2700	68	45	60
EDRN200L4	30	40	161	450 – 1800	48.5	30	40	Setting range not possible			
EDRN225S4	37	50	198	300 – 1800	56	37	50				
EDRN225M4	45	60	240	900 – 1800	70	45	60				
EDRN250ME4	55	75	295	300 – 1800	88	55	75				
EDRN280S4	75	100	400	900 – 1800	125	90	125				
EDRN280M4	90	125	480	300 – 1800	141	90	125				
EDRN315S4	110	150	590	300 – 1800	165	110	150				
EDRN315ME4	132	180	700	300 – 1800	200	132	180				
EDRN315L4	150	200	800	300 – 1800	225	160	215				
EDRN315L4	160	215	850	900 – 1800	235	160	215				
EDRN315H4	185	250	990	300 – 1800	290	200	275				
EDRN315H4	200	275	1070	450 – 1800	310	200	275				

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Canada: 575 V

Inverter output voltage				Canada: 575 V	
Rated motor voltage				575 V	
Connection type				⅄	
Motor	P_N	P_N	M_N	n_{min} – n_{max}	I_N
	kW	HP	Nm	1/min	A
EDRN80M4	0.75	1	4.1	300 – 1800	1.25
EDRN90S4	1.1	1.5	6	300 – 1800	1.85
EDRN90L4	1.5	2	8.1	300 – 1800	2.4
EDRN100L4	2.2	3	11.9	300 – 1800	3.35
EDRN100L4	3	4	16.2	300 – 1800	4.7
EDRN100L4	3.7	5	20	900 – 1800	5.7
EDRN112M4	4	5.4	21.5	300 – 1800	5.6
EDRN132S4	5.5	7.5	29.5	300 – 1800	7.4
EDRN132M4	7.5	10	40.5	300 – 1800	10.6
EDRN132L4	9.2	12.5	49.5	300 – 1800	13.2
EDRN160M4	11	15	59	300 – 1800	14.8
EDRN160L4	15	20	81	300 – 1800	20
EDRN180M4	18.5	25	99	300 – 1800	23.5
EDRN180L4	22	30	118	300 – 1800	27.5
EDRN200L4	30	40	161	450 – 1800	39.0
EDRN225S4	37	50	198	300 – 1800	44.5
EDRN225M4	45	60	240	900 – 1800	56.0
EDRN250ME4	55	75	295	300 – 1800	70.0
EDRN280S4	75	100	400	900 – 1800	100
EDRN280M4	90	125	480	300 – 1800	113
EDRN315S4	110	150	590	300 – 1800	130
EDRN315ME4	132	180	700	300 – 1800	159
EDRN315L4	150	200	800	300 – 1800	179
EDRN315L4	160	215	850	900 – 1800	189
EDRN315H4	185	250	990	300 – 1800	220
EDRN315H4	200	275	1070	450 – 1800	240

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6 Customer benefits

- EDRN.. motors are based on the DRN.. standard motors. This allows for short delivery times and uncomplicated service.
- Line operation, switching operation and inverter operation enable using the motors in almost every application.
- The use of standard brakes with the mains motor ensures a fast availability.
- Using the same brake also used for ATEX motors in inverter operation allows for especially low speeds.
- A unique size/power assignment supports the selection.
- The integrated series covers the power range already known from the standard series (0.25 – 0.75 HP/0.18 – 0.55 kW according to IE1 as EDRS.., and 1 – 125 HP/0.75 – 90 kW NEMA Premium and/or IE3 as EDRN, and soon up to 200 kW).
- The motors comply with NFPA/NEC 500 and CSA 22.2, and are CSA (Canadian Standard Association) certified for the USA and Canada (file number 45341). This facilitates the market access.
- The wide variety of options, including important options such as brakes or encoders, allows for using the motors almost everywhere.
- An optimal selection and configuration is facilitated by 2 or 3 brake sizes per motor size.
- Available with standard gear units or gear units according to the European Directive 2014/34/EC, that allow an extended protection.
- The certified locations ensure quick availability.
- In general, the new IE3 motor EDRN.. is not larger than a comparable EDRE.. motor with a similar power rating in efficiency class IE2.
- The size/power assignment is classified according to EN50347. In addition to power ratings, this means that the new product line is completely compatible with motors from other manufacturers of standardized IEC motors in terms of standardized foot and flange dimensions.
- In case of brakemotors or motors for inverter operation, the requirements from the standards are met by the option temperature sensor /TF in combination with an approved evaluation unit.
- Availability of the degrees of protection IP55, IP65, IP56 and IP66, and the surface protection up to OS4 facilitate the selection to fulfill application requirements.
- In case of low temperatures, an aluminum fan can be selected to meet possible technical requirements.
- Unlike the DRN.. motors, the EDRN80 and 90 are always equipped with a sheet metal fan guard, to meet the higher requirements of explosion protection.
- For mounting position M4, a canopy (/C) is used to prevent foreign particles to enter into the ventilation openings.

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7 Documentation and conversion guide

7.1 Documentation

Document	Edition	Part number DE	Part number EN
Operating instructions	02/2016	22501851	22501878
Internal product presentation EDRN..	03/2016	Product Information Lounge	
Customer presentation EDRN.. motors	03/2016	Product Information Lounge	
Launch package EDRN.. motors	03/2016	22518258	22518266
Latest news	03/2016	22741046	22741054
Product flyer EDRN.. motors	03/2016	2274 4258	22744266
Printed advertisement EDRN.. motors	Upon request from CC		
Gearmotor catalog 60 Hz	Scheduled for July 2016		

7.1.1 Certificates

The certification report for EDRS.., EDRE.. and EDRN.. motors with file number 45341 can be found on the CSA homepage via the following link:

http://www.csagroup.org/services/testing-and-certification/certified-product-listing/

7.2 SEW-EURODRIVE product tools

EDRN.. motors are integrated in the SEW-EURODRIVE product tools from release 2.20 on.

7.2.1 SEW-EURODRIVE homepage

Selection and configuration DriveConfigurator

Drives with EDRN.. can be configured via all tools where DriveConfigurator is used (in Online Support, in DriveGate and offline via SEW Workbench).

Start via the category "Explosion-proof Drives".

Drives with EDRN.. are listed in the drop-down list "Approval" of the section "HazLoc-NA®".

Data & documents

For CAD data and documentations, refer to the section "Data and Documents" of the Online Support.

7.2.2 Project planning with the SEW Workbench

Explosion-proof drives with EDRN.. motors can be configured using SEW-Workbench, for controlled as well as for uncontrolled applications.

The type of approval can be selected after clicking on the button with the Ex logo that is located next to the drop-down list "Motor type".

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7.3 Conversion aids

During the conversion from EDRS../EDRE.. motors to EDRN.. motors, note the changed temperature class for controlled motors in class II, division 2.

Motor	Operating mode	Temperature class	Maximum surface temperature
EDRS../EDRE..	Supply system operation and frequency inverter operation	T4A	120 °C
EDRN..	Line operation		
	Frequency inverter operation	**T3C**	**160 °C**

7.3.1 Key to the technical data

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	Mass of the motor
J_{Mot}	Mass moment of inertia of the motor
BE..	Brake used
Z_0 BG	Switching frequency for operation with BG.. brake control
Z_0 BGE	Switching frequency for operation with BGE.. brake control
M_B	Braking torque
m_B	Mass of the brakemotor
J_{Mot_BE}	Mass moment of inertia of the brakemotor

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7.3.2 Comparison of setting range for EDR../EDRN.. motors

P_N		Motor	M_N	Setting range n_{min} – n_{max}		Motor	M_N	Setting range n_{min} – n_{max}	
kW	HP		Nm	min^{-1}			Nm	min^{-1}	
0.18	0.25	EDRS71S4	1	300 – 1800	300 – 3000	Not specified	Not specified	Not specified	Not specified
0.25	0.34	EDRS71S4	1.4	300 – 1800	300 – 3000	Not specified	Not specified	Not specified	Not specified
0.37	0.5	EDRS71S4	2.1	450 – 1800	450 – 3000	Not specified	Not specified	Not specified	Not specified
0.55	0.75	EDRS71M4	3.1	450 – 1800	450 – 3000	Not specified	Not specified	Not specified	Not specified
0.75	1	EDRE80M4	4.1	300 – 1800	300 – 3000	EDRN80M4	4.1	300 – 1800	300 – 3000
1.1	1.5	EDRE90M4	6	300 – 1800	300 – 3000	EDRN90S4	6	300 – 1800	300 – 3000
1.5	2	EDRE90L4	8.2	300 – 1800	300 – 3000	EDRN90L4	8.1	300 – 1800	300 – 3000
2.2	3	EDRE100L4	12.1	300 – 1800	300 – 3000	EDRN100L4	11.9	300 – 1800	300 – 3000
3	4	Not specified	Not specified	Not specified	Not specified	EDRN100L4	16.2	300 – 1800	300 – 3000
3.7[1)]	5	EDRE112M4	20	300 – 1800	300 – 3000	EDRN100L4	20	900 – 1800	900 – 3000
4	5.4	EDRE132S4	21.5	300 – 1800	300 – 3000	EDRN112M4	21.5	300 – 1800	300 – 3000
5.5	7.5	EDRE132M4	30	300 – 1800	300 – 3000	EDRN132S4	29.5	300 – 1800	300 – 3000
7.5	10	EDRE160S4	40.5	300 – 1800	300 – 3000	EDRN132M4	40.5	300 – 1800	300 – 3000
9.2	12.5	EDRE160M4	49.5	300 – 1800	300 – 3000	EDRN132L4	49.5	300 – 1800	300 – 3000
11	15	EDRE180S4	59	300 – 1800	300 – 3000	EDRN160M 4	59	300 – 1800	300 – 3000
15	20	EDRE180M4	81	300 – 1800	300 – 2700	EDRN160L4	81	300 – 1800	300 – 3000
18.5	25	EDRE180L4	100	300 – 1800	300 – 2700	EDRN180M4	99	300 – 1800	300 – 2700
22	30	EDRE200L4	118	300 – 1800	Not specified	EDRN180L4	118	300 – 1800	300 – 2700
30	40	EDRE200L4	161	450 – 1800	Not specified	EDRN200L4	161	450 – 1800	Not specified
37	50	EDRE225S4	200	300 – 1800	Not specified	EDRN225S4	198	300 – 1800	Not specified
45	60	EDRE225M4	240	900 – 1800	Not specified	EDRN225M4	240	900 – 1800	Not specified
55	75	Not specified	Not specified	Not specified	Not specified	EDRN250ME4	295	300 – 1800	Not specified
75	100	Not specified	Not specified	Not specified	Not specified	EDRN280S4	400	900 – 1800	Not specified
90	125	Not specified	Not specified	Not specified	Not specified	EDRN280M4	480	300 – 1800	Not specified
110	150	Not specified	Not specified	Not specified	Not specified	EDRN315S4	590	300 – 1800	Not specified
132	180	Not specified	Not specified	Not specified	Not specified	EDRN315ME4	700	300 – 1800	Not specified
150	200	Not specified	Not specified	Not specified	Not specified	EDRN315L4	800	300 – 1800	Not specified
160	215	Not specified	Not specified	Not specified	Not specified	EDRN315L4	850	900 – 1800	Not specified
185	250	Not specified	Not specified	Not specified	Not specified	EDRN315H4	990	300 – 1800	Not specified
200	275	Not specified	Not specified	Not specified	Not specified	EDRN315H4	1070	450 – 1800	Not specified

1) For the conversion of the EDRE112M4, make sure not to convert based on performance, but based on size, to avoid limitations in regard of the setting range.

7.3.3 EDRS/EDRE 4-pole motors, 460 V, 60 Hz, S1, IE1 or IE2

Motor	P_N		M_N	Speed	I_N	cos φ	IE class	$\eta_{50\%}$	$\eta_{75\%}$	$\eta_{100\%}$	I_A/I_N	M_A/M_N M_H/M_N	m	J_{Mot}
	HP	kW	Nm	1/min	A			%	%	%			kg	10^{-4} kgm²
EDRS71S4	0.25	0.18	1	1715	0,435	0.69	IE1	70.2	74.6	75.7	4.8	2.5 2.2	8	5.13
EDRS71S4	0.34	0.25	1.4	1700	0.57	0.74	IE1	69.9	74.4	75.3	4.6	1.9 1.9	8	5.13
EDRS71S4	0.5	0.37	2.1	1700	0.92	0.69	IE1	66.6	71.3	72.3	4.2	1.9 1.9	8	5.13
EDRS71M4	0.75	0.55	3.1	1690	1.25	0.71	IE1	73.5	76	75.4	4.3	2.2 2.1	9.1	7.21
EDRE80M4	1	0.75	4.1	1740	1.44	0.78	IE2	80.8	83.3	83.5	7.1	3 2.1	15	22.3
EDRE90M4	1.5	1.1	6	1740	2.25	0.73	IE2	80.9	83.7	84.3	7.7	3.6 2.9	19	36.6
EDRE90L4	2	1.5	8.2	1740	2.85	0.77	IE2	85.2	86.5	86.4	7.5	3.4 3	22	44.9
EDRE100L4	3	2.2	12.1	1735	4	0.79	IE2	87.9	88.8	88.3	8.1	4 3.3	29	69.5
EDRE100LC4	5	3.7	20	1750	6.4	0.83	IE2	87.9	88.4	87.5	7.6	2.6 2.3	31	91
EDRE112M4	5	3.7	20	1750	6.3	0.84	IE2	89.4	89.6	88.1	7.1	2.1 1.8	42	148
EDRE132S4	5.4	4	21.5	1765	6.9	0.81	IE2	88.2	88.5	88.6	8.7	2.9 2.5	48	191
EDRE132M4	7.5	5.5	30	1755	9	0.85	IE2	90.7	90.6	89.6	8.1	2.5 1.7	61	258
EDRE132MC4	10	7.5	40.5	1775	12.7	0.82	IE2	90.3	90.7	90.1	8.8	2.3 1.5	64	347
EDRE160S4	10	7.5	40.5	1770	12.7	0.82	IE2	90.8	91.5	91	7.6	2.8 2	75	366
EDRE160M4	12.5	9.2	49.5	1770	15.4	0.82	IE2	91.2	91.6	91.1	8	3 2.2	84	442
EDRE160MC4	15	11	59	1780	18.3	0.82	IE2	91.7	92.2	91.8	8.2	2.9 2	89	600
EDRE180S4	15	11	59	1770	17.9	0.84	IE2	90.2	91.5	91.6	7.6	2.8 2.2	120	909
EDRE180M4	20	15	81	1775	24	0.86	IE2	91.5	92.4	92.3	7.4	2.6 1.9	140	1130
EDRE180L4	25	18.5	100	1775	30	0.84	IE2	91.8	92.9	93	8.1	2.9 2.2	150	1310
EDRE180LC4	30	22	118	1780	35.5	0.84	IE2	92.3	93.2	93	7.6	2.4 1.8	160	1700
EDRE200L4	30	22	118	1783	36.5	0.82	IE2	91	92.5	92.8	8.4	3.5 2.8	255	2390
EDRE200L4	40	30	161	1780	49.5	0.82	IE2	92.6	93.3	93.1	7.4	2.6 2.1	255	2390
EDRE225S4	50	37	200	1775	59	0.84	IE2	93.1	93.6	93.4	7.2	2.7 2	285	2970
EDRE225M4	60	45	240	1780	71	0.85	IE2	93.9	94.2	93.8	7.3	2.8 1.9	310	3470

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7.3.4 EDRS/EDRE 4-pole brakemotors, 460 V, 60 Hz, S1, IE1 or IE2

Motor	P_N		M_N	J_{Mot_BE}	m_{Mot_BE}	z_0 BGE	Standard brake	Standard braking torque
	HP	kW	Nm	$10^{-4}kgm^2$	kg	1/h		Nm
EDRS71S4	0.25	0.18	1	6.43	10	1500	BE05	2.5
EDRS71S4	0.34	0.25	1.4	6.43	10	1500	BE05	3.5
EDRS71S4	0.5	0.37	2.1	6.43	10	1500	BE05	5
EDRS71M4	0.75	0.55	3.1	8.51	12	1500	BE1	7
EDRE80M4	1	0.75	4.1	23.8	18	1440	BE1	10
EDRE90M4	1.5	1.1	6	41.3	23	1280	BE2	14
EDRE90L4	2	1.5	8.2	49.6	26	1280	BE2	20
EDRE100L4	3	2.2	12.1	75.5	35	610	BE5	28
EDRE100LC4	5	3.7	20	97	37	610	BE5	40
EDRE112M4	5	3.7	20	152	49	500	BE5	40
EDRE132S4	5.4	4	21.5	196	55	450	BE5	55
EDRE132M4	7.5	5.5	30	269	76	320	BE11	80
EDRE132MC4	10	7.5	40.5	357	79	220	BE11	80
EDRE160S4	10	7.5	40.5	388	94	180	BE11	80
EDRE160M4	12.5	9.2	49.5	464	105	160	BE11	110
EDRE160MC4	15	11	59	651	115	140	BE20	150
EDRE180S4	15	11	59	969	155	145	BE20	150
EDRE180M4	20	15	81	1190	170	130	BE20	200
EDRE180L4	25	18.5	100	1370	180	95	BE20	200
EDRE180LC4	30	22	118	1830	200	85	BE30	300
EDRE200L4	30	22	118	2520	305	90	BE30	300
EDRE200L4	40	30	161	2620	310	90	BE32	400
EDRE225S4	50	37	200	3200	340	50	BE32	400
EDRE225M4	60	45	240	3700	365	45	BE32	500

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7.3.5 EDRN 4-pole motors, 460 V, 60 Hz, S1, IE3

Motor	P_N		M_N	Speed	I_N	cos φ	IE class	$\eta_{50\%}$	$\eta_{75\%}$	$\eta_{100\%}$	I_A/I_N	M_A/M_N M_H/M_N	m	J_{Mot}
	HP	kW	Nm	1/min	A			%	%	%			kg	10^{-4} kgm²
EDRN80M4	1	0.75	4.1	1751	1.56	0.7	IE3	82	84.9	85.5	8.1	3.7 3	14	24.7
EDRN90S4	1.5	1.1	6	1762	2.3	0.69	IE3	83.5	86.1	86.5	8.2	3.3 2.3	20	54
EDRN90L4	2	1.5	8.1	1767	3	0.7	IE3	83.5	85.9	86.5	9.1	3.3 1.9	23	67.2
EDRN100L4	3	2.2	11.9	1765	4.15	0.74	IE3	87.5	89.2	89.5	9.4	3.7 2.2	34	112
EDRN100L4	4	3	16.2	1763	5.8	0.73	IE3	87.6	89.3	89.5	9.2	3.9 2.3	34	112
EDRN100L4	5	3.7	20	1758	7.2	0.72	IE3	87.8	89.4	89.5	9.1	4.1 2	34	112
EDRN112M4	5.4	4	21.5	1769	7.1	0.79	IE3	88.5	89.6	89.5	9.8	2.8 1.4	45	178
EDRN132S4	7.5	5.5	29.5	1768	9.2	0.82	IE3	90.9	91.8	91.7	9.8	3.5 2.8	57	241
EDRN132M4	10	7.5	40.5	1774	13.3	0.77	IE3	91.1	91.9	91.7	8.5	3.7 2.6	73	381
EDRN132L4	12.5	9.2	49.5	1775	16.5	0.76	IE3	91	91.9	91.7	8.4	4.3 1.7	82	439
EDRN160M4	15	11	59	1776	18.5	0.8	IE3	91.2	92.3	92.4	7	2.6 2.1	115	817
EDRN160L4	20	15	81	1777	25	0.8	IE3	92.3	93.3	93	9	3.4 2.1	130	1040
EDRN180M4	25	18.5	99	1781	29.5	0.84	IE3	92.7	93.6	93.6	9.5	4.1 3.4	155	1630
EDRN180L4	30	22	118	1781	34	0.86	IE3	93.2	93.8	93.6	9.8	4.2 2.7	175	1950
EDRN200L4	40	30	161	1783	48.5	0.82	IE3	93	94	94.1	8.5	3.5 2.5	280	2660
EDRN225S4	50	37	198	1785	56	0.88	IE3	94.2	94.7	94.5	9.2	3.4 2.6	310	4350
EDRN225M4	60	45	240	1785	70	0.85	IE3	94.5	95.1	95	8.9	3.6 2.2	310	4350
EDRN250ME4	75	55	295	1785	88	0.82	IE3	94.3	95.2	95.4	8.6	4.6 2.4	510	8940
EDRN280S4	100	75	400	1785	125	0.79	IE3	94.6	95.3	95.4	9.1	4.8 2.7	520	8940
EDRN280M4	125	90	480	1784	141	0.83	IE3	94.8	95.4	95.4	8	4.8 2.5	630	12000

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7.3.6 EDRN 4-pole brakemotors, 460 V, 60 Hz, S1, IE3

Motor	P_N		M_N	J_{Mot_BE}	m_{Mot_BE}	z_0 BGE	Standard brake	Standard braking torque
	HP	kW	Nm	$10^{-4}kgm^2$	kg	1/h		Nm
EDRN80M4	1	0.75	4.1	26.2	18	1060	BE1	10
EDRN90S4	1.5	1.1	6	58.7	24	770	BE2	14
EDRN90L4	2	1.5	8.1	71.9	28	750	BE2	20
EDRN100L4	3	2.2	11.9	118	40	590	BE5	28
EDRN100L4	4	3	16.2	118	40	460	BE5	40
EDRN100L4	5	3.7	20	118	40	460	BE5	40
EDRN112M4	5.4	4	21.5	183	52	370	BE5	55
EDRN132S4	7.5	5.5	29.5	251	71	270	BE11	80
EDRN132M4	10	7.5	40.5	403	92	140	BE11	110
EDRN132L4	12.5	9.2	49.5	461	100	120	BE11	110
EDRN160M4	15	11	59	877	145	120	BE20	150
EDRN160L4	20	15	81	1100	165	100	BE20	200
EDRN180M4	25	18.5	99	1690	190	60	BE20	200
EDRN180L4	30	22	118	2090	215	60	BE30	300
EDRN200L4	40	30	161	2890	335	60	BE32	400
EDRN225S4	50	37	198	4580	365	30	BE32	400
EDRN225M4	60	45	240	4580	365	25	BE32	500
EDRN250ME4	75	55	295	9280	590	20	BE60	600
EDRN280S4	100	75	400	9530	600	20	BE62	800
EDRN280M4	125	90	480	12600	720	10	BE62	1000

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7.3.7 Motor/inverter assignment, EDRS../EDRE.. motor, 60 Hz

Canada/USA: 460 – 480 V

Inverter output voltage				Canada/USA: 460 – 480 V							
Rated motor voltage				460 V				230 V			
Connection type				⅄				⅄⅄			
Motor	P_n	P_n	M_n	$n_{min} – n_{max}$	$I_{N\ Mot}$	FI	FI	$n_{min} – n_{max}$	$I_{N\ Mot}$	FI	FI
	kW	HP	Nm	1/min	A	kW	HP	1/min	A	kW	HP
EDRS71S4	0.18	0.25	1.01	300 – 1800	0.44	0.25	0.34	300 – 3000	0.87	0.37	0.5
EDRS71S4	0.25	0.34	1.4	300 – 1800	0.57	0.25	0.34	300 – 3000	1.14	0.37	0.5
EDRS71S4	0.37	0.5	2.1	450 – 1800	0.92	0.37	0.5	450 – 3000	1.84	0.75	1
EDRS71M4	0.55	0.75	3.1	450 – 1800	1.25	0.55	0.75	450 – 3000	2.5	1.1	1.5
EDRE80M4	0.75	1	4.1	300 – 1800	1.44	0.75	1	300 – 3000	2.88	1.5	2
EDRE90M4	1.1	1.5	6	300 – 1800	2.3	1.1	1.5	300 – 3000	4.5	2.2	3
EDRE90L4	1.5	2	8.2	300 – 1800	2.9	1.5	2	300 – 3000	5.7	3	4
EDRE100L4	2.2	3	12.1	300 – 1800	4	2.2	3	300 – 3000	8	4	5.4
EDRE112M4	3.7	5	20	300 – 1800	6.3	4	5.4	300 – 3000	12.6	7.5	10
EDRE132S4	4	5.4	21.5	300 – 1800	6.9	4	5.4	300 – 3000	13.8	7.5	10
EDRE132M4	5.5	7.5	30	300 – 1800	9	5.5	7.5	300 – 3000	18	11	15
EDRE160S4	7.5	10	40.5	300 – 1800	12.7	7.5	10	300 – 3000	25.4	15	20
EDRE160M4	9.2	12.5	49.5	300 – 1800	15.4	11	15	300 – 3000	30.8	22	30
EDRE180S4	11	15	59	300 – 1800	17.9	11	15	300 – 3000	35.8	22	30
EDRE180M4	15	20	81	300 – 1800	24	15	20	300 – 2700	48	30	40
EDRE180L4	18.5	25	100	300 – 1800	30	22	30	300 – 2700	60	37	50
EDRE200L4	22	30	118	300 – 1800	36.5	22	30	Setting range not possible			
EDRE200L4	30	40	161	450 – 1800	49.5	30	40				
EDRE225S4	37	50	200	300 – 1800	59	37	50				
EDRE225M4	45	60	240	900 – 1800	71	45	60				

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Canada: 575 V

Inverter output voltage				Canada: 575 V	
Rated motor voltage				575 V	
Connection type				⅄	
Motor	P_n	P_n	M_n	$n_{min} – n_{max}$	$I_{N\ Mot}$
	kW	HP	Nm	1/min	A
EDRS71S4	0.18	0.25	1.01	300 – 1800	0.35
EDRS71S4	0.25	0.34	1.4	300 – 1800	0.46
EDRS71S4	0.37	0.5	2.1	450 – 1800	0.74
EDRS71M4	0.55	0.75	3.1	450 – 1800	1
EDRE80M4	0.75	1	4.1	300 – 1800	1.2
EDRE90M4	1.1	1.5	6	300 – 1800	1.8
EDRE90L4	1.5	2	8.2	300 – 1800	2.3
EDRE100L4	2.2	3	12.1	300 – 1800	3.2
EDRE112M4	3.7	5	20	300 – 1800	5.0
EDRE132S4	4	5.4	21.5	300 – 1800	5.5
EDRE132M4	5.5	7.5	30	300 – 1800	7.2
EDRE160S4	7.5	10	40.5	300 – 1800	10.2
EDRE160M4	9.2	12.5	49.5	300 – 1800	12.3
EDRE180S4	11	15	59	300 – 1800	14.3
EDRE180M4	15	20	81	300 – 1800	19.2
EDRE180L4	18.5	25	100	300 – 1800	24.0
EDRE200L4	22	30	118	300 – 1800	29.2
EDRE200L4	30	40	161	450 – 1800	39.6
EDRE225S4	37	50	200	300 – 1800	47.2
EDRE225M4	45	60	240	900 – 1800	56.8

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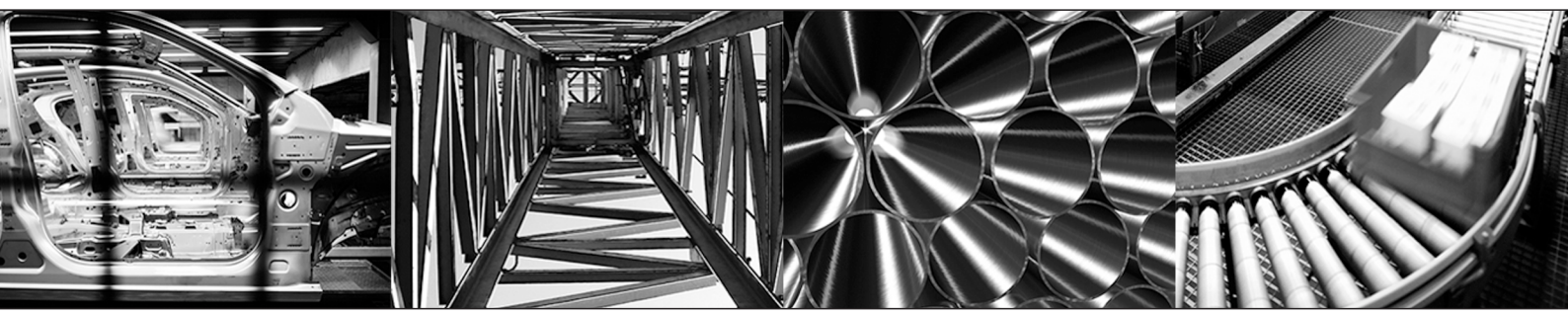

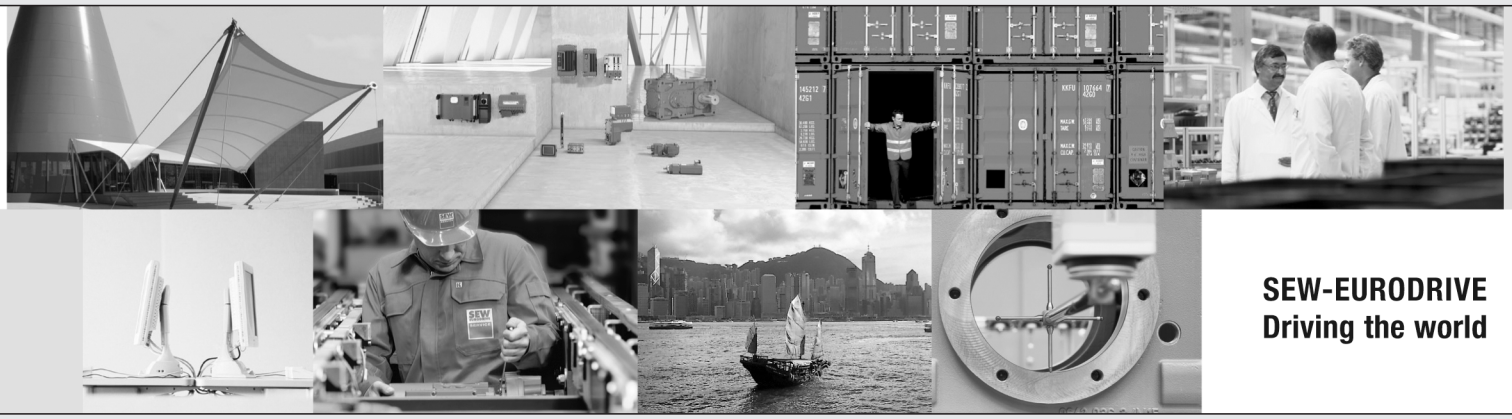

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