



13 DT56, DR63, DV250/280 AC Motors

13.1 Technical data of DT56, DR63, DV250/280

3000 1/min - S1

Motor type	P_N M_N	n_N [rpm]	I_N 380-415 V (400 V) [A]	$\cos\varphi$	IE class	$\eta_{75\%}$ $\eta_{100\%}$ [%]	I_A/I_N	M_A/M_N M_H/M_N	J_{Mot}		Z_0 BG ⁴⁾ BGE ⁵⁾ [1/h]	M_{Bmax} [Nm]	$m^1)$	
	[kW] [Nm]								2)	3)			2)	3)
DR63S2	0.18 0.63	2720	0.46 (0.45)	0.88	-	-	4.2	2.4 2.2	3.6	4.8	5000 -	1.6	6.2	8.0
DR63M2	0.25 0.9	2660	0.66 (0.65)	0.86	-	-	3.5	2.2 1.9	3.6	4.8	4500 -	2.4	6.2	8.0
DR63L2	0.37 1.3	2650	1.0 (0.92)	0.87	-	-	3.5	2.1 1.9	4.4	5.6	4000 -	3.2	6.7	8.5

- 1) Applies to flange motor
- 2) Without brake
- 3) With brake
- 4) Operation with BG brake control system
- 5) Operation with BGE brake control system

1500 1/min - S1

Motor type	P_N M_N	n_N [rpm]	I_N 380-415 V (400 V) [A]	$\cos\varphi$	IE class	$\eta_{75\%}$ $\eta_{100\%}$ [%]	I_A/I_N	M_A/M_N M_H/M_N	J_{Mot}		Z_0 BG ⁴⁾ BGE ⁵⁾ [1/h]	M_{Bmax} [Nm]	$m^1)$	
	[kW] [Nm]								2)	3)			2)	3)
DT56M4	0.09 0.66	1300	0.31 (0.29)	0.68	-	-	2.6	2.1 1.8	1.1	1.2	10000 -	0.8	In combination with helical gear units R07, RF07, R07F or Spiroplan [®] gear units W10, WF10, WA10, WAF10 only	
DT56L4	0.12 0.88	1300	0.46 (0.42)	0.68	-	-	2.6	2.2 1.9	1.1	1.2	10000 -	1.2		
DR63S4	0.12 0.83	1380	0.39 (0.39)	0.69	-	-	3.3	2.4 2.2	3.6	4.8	10000 -	2.4	6.1	7.6
DR63M4	0.18 1.3	1320	0.55 (0.55)	0.78	-	-	2.9	1.8 1.7	3.6	4.8	10000 -	3.2	6.1	7.6
DR63L4	0.25 1.8	1300	0.73 (0.68)	0.81	-	-	2.8	1.8 1.7	4.4	5.6	10000 -	3.2	6.7	8.2
DV250M4	55 356	1475	106 (102)	0.83	IE1	92.7 92.5	6.0	2.7 2.0	6300	6600 6730 ⁶⁾	- 200	600 1200 ⁶⁾	448	528 538 ⁶⁾
DV280S4	75 484	1480	142 (138)	0.83	IE1	93.1 93.3	7.2	3.2 2.2	8925	9225 9355 ⁶⁾	- 150	600 1200	520	600 610 ⁶⁾
DV280M4	90 581	1480	173 (170)	0.81	IE1	93.4 93.5	7.1	3.3 2.2	8925	9225 9355 ⁶⁾	- 100	600 1200 ⁶⁾	520	600 610 ⁶⁾

- 1) Applies to flange motor
- 2) Without brake
- 3) With brake
- 4) Operation with BG brake control system
- 5) Operation with BGE brake control system
- 6) Double disk brake



DT56, DR63, DV250/280 AC Motors

Technical data of DT56, DR63, DV250/280

IE2 motors (energy-efficient motors): 1500 rpm - S1

Motor type	P _N M _N [kW] [Nm]	n _N [rpm]	I _N 380-415 V (400 V) [A]	cosφ	IE class	η		I _A /I _N	M _A /M _N M _H /M _N		J _{Mot} 2) 3) [10 ⁻⁴ kgm ²]		Z ₀ BG ⁴⁾ BGE ⁵⁾ [1/h]	M _{Bmax} [Nm]	m ¹⁾ 2) 3) [kg]	
						η _{75%} η _{100%} [%]										
DVE250M4	45 290	1480	88 (86)	0.81	IE2	93.2 93.4		7.1	3.3 2.5		6300	6600 6730 ⁶⁾	- -	300 600 ⁶⁾	448	528 538 ⁶⁾
DVE250M4	55 356	1475	106 (102)	0.83	IE2	94 93.7		6.0	2.7 2.0		6300	6600 6730 ⁶⁾	- -	600 1200 ⁶⁾	520	600 610 ⁶⁾
DVE280S4	75 484	1480	142 (137)	0.83	IE2	94.2 94.2		7.2	3.2 2.2		8925	9225 9355 ⁶⁾	- -	600 1200 ⁶⁾	520	600 610 ⁶⁾
DVE280M4	90 581	1480	171 (168)	0.81	IE2	94.6 94.5		7.1	3.3 2.2		8925	9225 9355 ⁶⁾	- -	600 1200 ⁶⁾	520	600 610 ⁶⁾

- 1) Applies to flange motor
- 2) Without brake
- 3) With brake
- 4) Operation with BG brake control system
- 5) Operation with BGE brake control system
- 6) Double disk brake

1000 1/min - S1

Motor type	P _N [kW]	M _N [Nm]	n _N [rpm]	I _N 380-415 V (400 V) [A]	cosφ	IE class	η		I _A /I _N	M _A /M _N M _H /M _N		J _{Mot} 2) 3) [10 ⁻⁴ kgm ²]		Z ₀ BG ⁴⁾ BGE ⁵⁾ [1/h]	M _{Bmax} [Nm]	m ¹⁾ 2) 3) [kg]	
							η _{75%} η _{100%} [%]										
DR63S6	0.09	0.95	900	0.42 (0.38)	0.64	-	-	2.2	1.8 1.6		5.4	6.6	20000 -	2.5	6.0	7.5	
DR63M6	0.12	1.2	900	0.62 (0.58)	0.65	-	-	2.1	1.8 1.7		5.4	6.6	20000 -	3.2	6.0	7.5	
DR63L6	0.18	2	870	0.81 (0.78)	0.70	-	-	2.2	1.6 1.5		6.8	8.0	20000 -	3.2	6.6	8.1	
DV250M6	37	360	980	85 (82)	0.71	IE1	91.5 91.3	4.5	2.4 1.6		6300	6600 6730 ⁶⁾	- 240	600 1200 ⁶⁾	448	528 538 ⁶⁾	
DV280S6	45	436	985	105 (103)	0.68	IE1	92 92	4.9	2.6 1.8		8925	9225 9355 ⁶⁾	- 180	600 1200 ⁶⁾	520	600 610 ⁶⁾	

- 1) Applies to flange motor
- 2) Without brake
- 3) With brake
- 4) Operation with BG brake control system
- 5) Operation with BGE brake control system
- 6) Double disk brake



13.2 General notes on the product description

Noise The noise levels of all motors from SEW-EURODRIVE are well within the maximum permitted noise levels set forth in IEC/EN60034-9.

Coating The motors from SEW-EURODRIVE are painted with "blue/gray" / RAL 7031 machine paint according to DIN 1843 as standard. Special paints are available on request.

Surface and corrosion protection

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

Air admission and accessibility

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

Brakemotors

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

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

International markets

On request, SEW-EURODRIVE supplies UL registered motors or CSA certified motors with connection conditions according to CSA and NEMA standard.

On request, SEW-EURODRIVE supplies UL registered MOVIMOT® drives with connection conditions according to NEMA standards.

For the Japanese market, SEW-EURODRIVE offers motors conforming to JIS standard. Contact your sales representative to assist you in such cases.



13.3 Energy-efficient motors

CEMEP, the association of European electric motor manufacturers, has reached an agreement with the European Commission's General Directorate for Energy that all 2 and 4-pole low-voltage AC motors from 1 to 100 kW will be classified on the basis of their efficiency, and that this classification will be identified on the nameplate and in catalogs. The classification distinguishes between EFF3, EFF2 and EFF1 classes. EFF3 refers to motors without any particular efficiency requirement. EFF2 indicates improved efficiency motors and EFF1 is for high-efficiency motors.



Type DV 4-pole AC motors of motor sizes 250M to 280M meet the requirements of efficiency class EFF2.



Type DVE 4-pole AC motors of motor sizes 250M to 280M meet the requirements of efficiency class EFF1. These motors are referred to as energy efficient motors.

International regulations

Type /DV and /DVE 4-pole AC motors comply with the energy efficiency standards and energy efficiency regulations of the following countries:

- Australia
- New Zealand
- Brazil
- Canada
- USA



13.4 Special markets

CSA/NEMA/UL-R SEW-EURODRIVE offers the NEMA MG1 version or the "CSA/UL-R" option for drives delivered to North America (see "Motors for the USA and Canada" on page 409). These versions have the following characteristic features:

- Terminal designation T1, T2, etc. in addition to U1, V1.
- In MOVIMOT[®] drives additional earth connection via an external terminal.
- Some terminal boxes are made of gray-cast iron and others of aluminum:

Motor size	Terminal box material
DT56/DR63	Aluminum (part of the motor housing)
DV250/DV280	Always gray cast iron

- Cable entry in the terminal box compliant with ANSI / ASME B1.20.1.-1983 with NPT threads (conical inch threads). The following table shows the number of cable entries and NPT sizes for the respective motor sizes.

Motor size	Number and type of threads
DT56	1 × 1/2" NPT + 1 × 3/8" NPT (with adapter)
DR63	2 × 1/2" NPT (with adapter)
DV250M ... DV280S	2 × 2 1/2' NPT + 2 × 1/2' NPT

The NPT openings are sealed with plugs for transportation and storage.

- For AC motors/AC brakemotors, there is a modified nameplate with the following information: TEFC, K.V.A. code and design. With CSA/UL-R option, also CSA and UR identification (UL registration no. E189357).

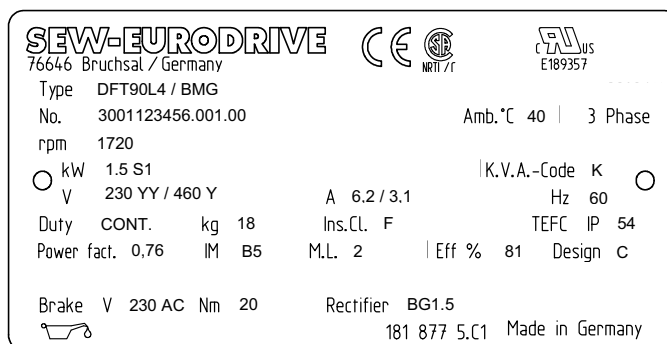


Figure 33: Example: Motor nameplate for CSA/UL-R variant

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**JIS / JEC**

The drives can be built according to JIS for delivery to Japan. SEW-EURODRIVE supplies special motor terminal boxes on request. These terminal boxes have cable entries with the PF threads (straight inch thread) customary in Japan.

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

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

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

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

Note

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

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

CCC

After joining the World Trade Organization (WTO), the People's Republic of China issued a certification system - CCC "China Compulsory Certification" - for products. CCC became effective on 1 May 2002 and replaced the marks "Great Wall" (CCEE China Commission for Conformity of Electric Equipment) for domestic products and "CCIB" (China Commodity Inspection Bureau) for imported products. The Chinese government is trying to improve the safety for household appliances by introducing the CCC certification. The certification requirement became effective on 1 August 2003 for many products in household applications.

That means machines and systems supplied by our customers with permanently installed motors and gearmotors are usually not subject to this mandatory certification. The only known exception are welding machines. That means CCC certification will only become an issue for machine and system supplier in case they are exporting individual products, such as spare parts.

This certification affects SEW-EURODRIVE products as well. The drive solutions from SEW-EURODRIVE received the necessary certification on 29 July 2003.



The SEW-EURODRIVE products affected by this certification are:

- 2-pole motors up to 2.2 kW
- 4-pole motors up to 1.1 kW
- 6-pole motors up to 0.75 kW
- 8-pole motors up to 0.55 kW

These motors may be identified with the CCC mark upon request and will be delivered with the certificate attached to the drive.

13.5 Corrosion and surface protection

See chapter "Corrosion and surface protection" on page 20.

13.6 Unit designations for AC motors and options

Standard AC motor of the series

DV..	Foot-mounted design
DR.., ..DT.., ..DV..	Attached motor for gear units
DFR.., DFT.., DFV..	Flange-mounted design
DV..F	Foot and flange-mounted design

Motor options

/BR, /BM(G)	Brake (noise-reduced)
../HF	.. with lock-type manual brake release
../HR	.. with self-reengaging manual brake release
/RI	Reinforced insulation for inverter operation > 500 V
/RS	Backstop
/TF	Thermistor (PTC resistor)
/TH	Thermostat (bimetallic switch)
/U	Non-ventilated
/V	Forced cooling fan, 3 × 380 – 415 V _{AC} , 50 Hz
/C	Protection canopy for the fan guard

Plug connector on AC motor options

/IS	Integrated plug connector
/AMD..	HAN modular 10B plug connector on the terminal box with one-clamp closure
/AME..	HAN modular 10B plug connector on terminal box with one-clamp closure and EMC housing
/ASD..	HAN 10ES plug connector on terminal box with one-clamp closure
/ASE..	HAN 10ES plug connector on terminal box with one-clamp closure and EMC housing


Encoder on AC motor options

/AV1Y	Multi-turn absolute encoder with solid shaft, MSI and sin/cos signals
/AV1H	Multi-turn absolute encoder with solid shaft, HIPERFACE™ and sin/cos signals
/EV1T	Encoder with solid shaft, TTL (RS-422), signals
/EV1S	Encoder with solid shaft, sin/cos signals
/EV1R	Encoder with solid shaft, TTL (RS-422), signals
/EV1H	Single-turn absolute encoder with solid shaft, HIPERFACE™ and sin/cos signals
/EH1T	Encoder with hollow shaft, TTL (RS-422), signals
/EH1S	Encoder with hollow shaft, sin/cos signals
/EH1R	Encoder with hollow shaft, TTL (RS-422), signals

Mounting device for encoders on AC motor options

EV1A .. with solid shaft

13.7 Important order information
Position of the motor terminal box and the cable entry

The position of the motor terminal box has so far been specified indicated with 0°, 90°, 180° or 270° as viewed onto the fan guard = B-end (see Figure 34). A change in the product standard EN 60034 specifies that the following designations will have to be used for terminal box positions for foot-mounted motors in the future:

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

This new designation applies to foot-mounted motors without a gear unit in mounting position B3 (= M1). The previous designation is retained for gearmotors. Figure 34 shows both designations. Where the mounting position of the motor changes, R, B, L and T are rotated accordingly. In motor mounting position B8 (= M3), T is at the bottom.

The position of the cable entry can be selected as well. The positions are "X" (= standard position), "1", "2" or "3" (see Figure 34).

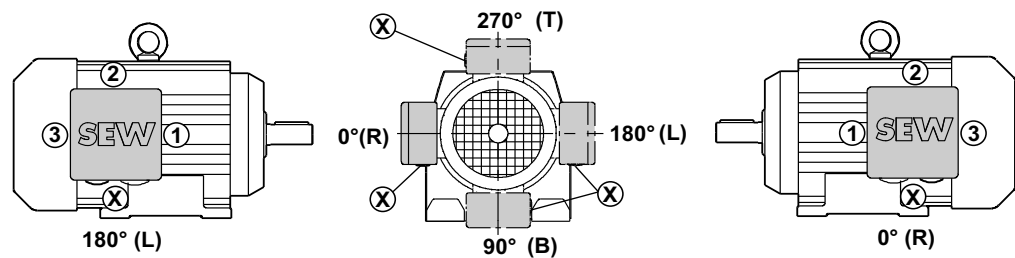



Figure 34: Position of terminal box and cable entry

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Unless indicated otherwise, you will receive the terminal box type 0° (R) with "X" cable entry. We recommend selecting cable entry "2" with mounting position M3.

	TIP
	<ul style="list-style-type: none"> • When the terminal box is in the 90° (B) position, check to see if the gearmotor has to be supported. • Only cable entries "X" and "2" are possible for DT56 and DR63 motors. Exception: For DR63 with IS plug connector, cable entry "3" is also possible.

Terminal box position	0° (R)	90° (B)	180° (L)	270° (T)
Possible cable entries	"X", "3"	"X", "1", "3"	"1", "2"	"X", "1", "3"

13.8 Mounting position designations of the motors

See chapter "Mounting position designation for motors" on page 42.

13.9 Available motor options

Overview

The following motor options are available in various combinations:

- Disk brakes BM(G)/BR (→ page 446)
- IS integrated plug connector (→ page 415)
- Plug connectors AS..., AC..., AM..., AB..(→ page 416)
- Encoders and pre-fabricated cables for encoder connection (→ page 419)
- Encoder mounting adapter (→ page 420)
- Forced cooling fan /V (→ page 428)
- Backstop RS (→ page 431)
- Protection canopy C (→ page 432)



13.10 Standards and regulations

Conformance to standards

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

- IEC 60034-1, EN 60034-1
Rotating electrical machinery, rating and performance.
- EN 60529
IP degrees of protection provided by enclosures of electrical equipment.
- IEC 60072
Dimensions and performance of rotating electrical machinery.
- EN 50262
Metric threads of cable glands.
- EN 50347
Standardized dimensions and power ranges.

Rated data

See section "Rated data" page 27.

Tolerances

See section "Tolerance" page 28.



13.11 Electrical characteristics

Suitability for use with an inverter

AC (brake) motors can be operated on inverters, for example SEW-EURODRIVE MOVIDRIVE[®], MOVITRAC[®] and MOVIMOT[®], thanks to the high quality of insulation (including phase separator) with which they are equipped as standard.

The winding option "reinforced insulation" is available for voltages higher than AC 500 V. The SEW unit designation for this option is "/RI".

Frequency

AC motors from SEW-EURODRIVE are designed for a system frequency of 50 Hz or 60 Hz on request. As standard, the technical data for AC motors refer to a 50 Hz supply frequency.

Motor voltage

AC motors are available for rated voltages from 220 – 690 V. Pole-changing motors of sizes 63 only from 220 – 500 V.

The standard variant for motor sizes 250/280 is AC 380 – 415 / 660 – 690 V, 50 Hz. The star or delta jumpers are mounted on the terminal board.

For 50 Hz power supply

The **standards voltages** are:

Motors	Motor size	
	56 (4-pole only)	63
	Motor voltage	
2, 4 and 6-pole motors, applies to the voltage range	AC 220-240 V ∟ AC 380-415 V ∟	AC 220-240 / 380-415 V Δ/∟
Single-speed	-	AC 230/400 V Δ/∟ AC 290/500 V Δ/∟
Multi-speed, Dahlander	-	AC 400 V Δ/∟∟
Multi-speed, separate winding	-	AC 400 V ∟ / ∟
	Brake voltage	
2, 4 and 6-pole motors, applies to the voltage range	AC 220-240 V AC 380-415 V	AC 220-240 V AC 380-415 V
Standard voltages	DC 24 V / AC 230 V / AC 400 V	
	Forced cooling fan voltage	
Standard voltage VR	-	DC 24 V ¹⁾
Voltage range VS	-	1 × AC 220-266 V ¹⁾

1) not applicable for motor size

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Motors	Motor size
	250, 280
	Motor voltage
4 and 6-pole motors, applies to the voltage range	AC 220-240 / 380-415 V Δ/∟ AC 380-415 / 660-690 V Δ/∟
Single-speed	AC 230/400 V Δ/∟ AC 290/500 V Δ/∟ AC 400/690 V Δ/∟ AC 500 V Δ
	Brake voltage
4 and 6-pole motors, applies to the voltage range	AC 220-240 V AC 380-415 V
Standard voltages	DC 24 V / AC 230 V / AC 400 V
	Forced cooling fan voltage
Voltage range V	AC 3 × 346-500 V

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



DT56, DR63, DV250/280 AC Motors

Electrical characteristics

Standard connections 50 Hz motors

Number of poles	Synchronous speed n_{syn} at 50 Hz [rpm]	Connection
2	3000	△ / △
4	1500	△ ; △ / △
6	1000	△ / △

50 Hz motor on 60 Hz supply system

The rated data of motors designed for 50 Hz supply systems are slightly different when the motors are operated on 60 Hz supply systems.

Motor voltage At 50 Hz	Motor connection	U [V] at 60 Hz	Modified rated data			
			n_N	P_N	M_N	M_A/M_N
AC 230/400 V △/△	△	230	+20%	0%	-17%	-17%
AC 230/400 V △/△	△	460	+20%	+20%	0%	0%
AC 400/690 V △/△	△					

For 60 Hz power supply

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

Motors	Motor size	
	56	63
	Motor voltage	
2, 4 and 6-pole motors, applies to the voltage range	AC 240-266 V △ AC 415-460 V △	AC 240-266 / 415-460 V △/△
Single-speed	-	AC 266/460 V △/△ AC 220/380 V △/△ AC 330/575 V △/△
Multi-speed, Dahlander	-	AC 460 V △/△△
Multi-speed, separate winding	-	-
	Brake voltage	
2, 4 and 6-pole motors, applies to the voltage range	AC 240-266 V AC 415-460 V	AC 240-266 V AC 415-460 V
Standard voltages	DC 24 V / AC 230 V / AC 266 V / AC 460 V	
	Forced cooling fan voltage	
Standard voltage VR	-	-
Voltage range VS	-	-

Motors	Motor size
	250...280
	Motor voltage
4 and 6-pole motors, applies to the voltage range	AC 240-266 / 415-460 V △/△ AC 415-460 V △
Single-speed	AC 266/460 V △/△ AC 220/380 V △/△ AC 330/575 V △/△ AC 200/400 V △△△△ AC 220/440 V △△△△ AC 230/460 V △△△△
	Brake voltage
4 and 6-pole motors, Applies to the voltage range	AC 240-266 V AC 415-460 V
Standard voltages	DC 24 V / AC 230 V / AC 266 V / AC 460 V
	Forced cooling fan voltage
Voltage range V	AC 3 × 346-500 V



Standard connections 60 Hz motors

Number of poles	Synchronous speed n_{syn} at 60 Hz [rpm]	Connection
2	3600	Δ/Y ; Y/Y / Y
4	1800	Δ/Y ; Y/Y / Y
6	1200	Δ/Y ; Y/Y / Y

60 Hz motor on 50 Hz supply system

The rated data of motors designed for 60 Hz supply systems are slightly different when these motors are operated on 50 Hz supply systems.

Example: NEMA C-motor, designed for the USA, operation on a 50 Hz supply system:

Motor voltage at 60 Hz (USA)	Motor connection	U [V] at 50 Hz	Modified rated data			
			n_N	P_N	M_N	M_A/M_N
AC 230/460 V $Y/Y/Y$	Y	400	-17%	-17%	0%	0%

Motors for USA and Canada

Motors for USA and Canada are designed according to NEMA or CSA regulations. Single-speed motors in NEMA or CSA design are registered by Underwriters Laboratories (UL). The following voltage assignments (60 Hz) are customary in the USA and Canada:

	Rated voltage of the supply power	Rated voltage of the motor
USA	208 V	200 V
	240 V	230 V
	480 V	460 V
Canada	600 V	575 V

The motor voltage may deviate up to $\pm 10\%$ from the rated voltage. This deviation roughly corresponds to tolerance B.

The standard in the USA are AC 230/460 V / 60 Hz motors (see section 'Special markets' on page 401).



13.12 Circuit breakers and protective equipment

See section "Circuit breaker and protective equipment" on page 29.

Secure switching of inductances

Note the following notes for switching of inductances:

- Switching of low-speed motor windings.
If the cable is installed unfavorably, switching of low-speed motor windings can generate voltage peaks. Voltage peaks can damage windings and contacts. Install varistors in the incoming cable to avoid such problems.
- Switching of brake coils.
Varistors must be used to avoid harmful switching overvoltages caused by switching operations in the DC circuit of disk brakes.
Brake control systems from SEW-EURODRIVE are equipped with varistors as standard. Use contactors with contacts in utilization category AC3 or better to EN 60947-4-1 for switching of brake coils.
- Suppressor circuit on the switching devices.
According to EN 60204 (Electrical Equipment of Machines), motor windings must be equipped with interference suppression to protect the numerical or programmable logic controllers. Because problems are primarily caused by switching operations, we recommend installing suppressor circuits on the switching devices.

13.13 Thermal characteristics

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

AC motors, AC brakemotors and MOVIMOT® drives are available in the following thermal classes:

- Single-speed AC motors/AC brakemotors and Dahlander motors are designed in thermal class 130 (B) as standard. Thermal classes 155 (F) or 180 (H) are available on request.
- The standard design for all multi-speed AC motors/AC brakemotors with separate winding is thermal class 155 (F). Thermal class 180 (H) is available on request.

The table below lists the overtemperatures to IEC 60034-1 (EN 60034-1).

Thermal class		Overtemperature limit [K]
Old	New	
B	130	80 K
F	155	105 K
H	180	125 K



Power reduction

The rated power P_N of an AC motor or the thermally permitted torque M_N of an asynchronous servomotor depends on the ambient temperature and the altitude. The rated power stated on the nameplate or the rated torque stated on the nameplate applies to an ambient temperature of 40 °C and a maximum altitude of 1,000 m above sea level. The rated power or the rated torque must be reduced according to the following formula in the case of higher ambient temperatures or altitudes:

$$P_{Nred} = P_N \cdot f_T \cdot f_H$$

$$M_{Nred} = M_N \cdot f_T \cdot f_H$$

AC motors and asynchronous servomotors

Refer to the following diagrams for factors f_T and f_H for AC motors and asynchronous servomotors:

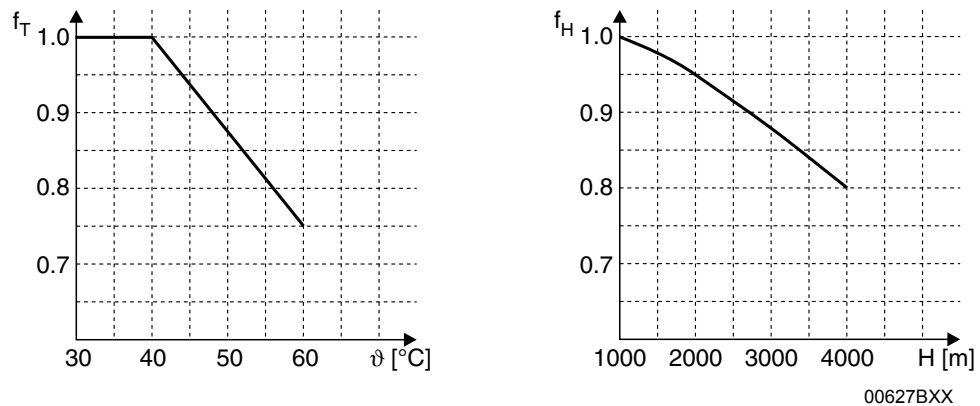


Figure 35: Power reduction dependent on ambient temperature and altitude

- ϑ = Ambient temperature
- H = Altitude above sea level

Duty types

See section "Operating modes" page 77.

13.14 Switching frequency

See chapter "Switching frequency" page 79.

Permitted switching frequency of the brake

If you are using a brakemotor, you have to check whether the brake is approved for use with the required switching frequency Z.

13.15 Mechanical characteristics

See chapter "Mechanical characteristics" page 81.



13.16 Overhung and axial loads

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

Mounting position	[rpm] Number of poles	Permitted overhung load F_R [N] Permitted axial force F_A [N]; $F_{A_Zug} = F_{A_Druck}$	
		Size	
		63	250 280
Foot mounted motor	1000 6	-	8000 2500
	1500 4	-	8000 2500
	3000 2	-	-
Flange-mounted motor	1000 6	600 150	11000 3000
	1500 4	500 110	9000 2600
	3000 2	400 70	-

Overhung load conversion for off-center force application

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

F_{xL} based on bearing life

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

F_{xW} from the shaft strength

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

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

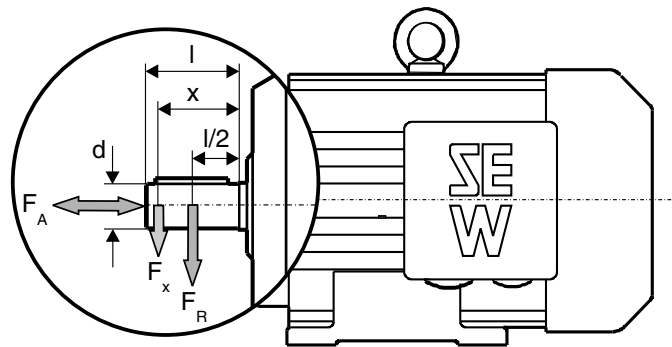


Figure 36: Overhung load FX for off-center force application

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Motor constants for overhung load conversion

Size	a [mm]	b [mm]	c			f [mm]	d [mm]	l [mm]
			2-pole [Nmm]	4-pole [Nmm]	6-pole [Nmm]			
63	161	146	$11.2 \cdot 10^3$	$16.8 \cdot 10^3$	$19 \cdot 10^3$	13	14	30
250	658	588	-	$630 \cdot 10^3$	-	0	65	140
280	658	588	-	$630 \cdot 10^3$	-	0	75	140

2nd motor shaft end

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

Motor bearings used

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

Motor type	A-side bearing			B-side bearing	
	Flange-mounted motor	Gearmotor	Foot mounted motor	Without brake	with brake
56	-	6302-Z	-	6001-2RS-J	
63	6203-2Z-J	6303-2Z-J	-	6202-2Z-J	6202-2RS-J-C3
250 / 280		6316-2Z-J-C3		6315-2Z-J-C3	



13.17 Project planning, technical data for plug connectors

Contact rating depending on the temperature

The "Technical data" tables for plug connectors list electrical current values for the maximum permitted contact load (= max. contact load) of the plug connectors. These current values are valid for ambient temperatures of up to 40 °C. Higher ambient temperatures apply for reduced current values. The following illustration shows the permitted contact load as a function of the ambient temperature.

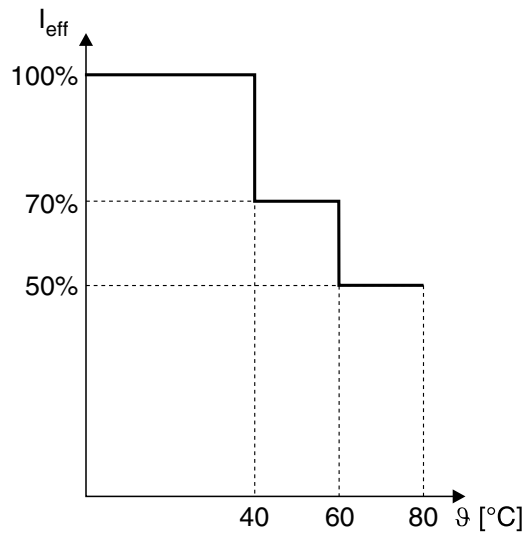


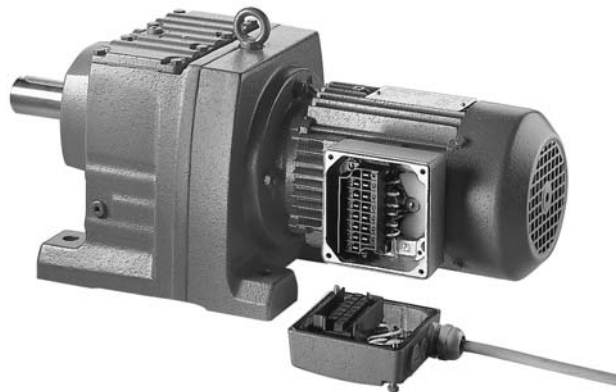
Figure 37: Permitted contact load as a function of the ambient temperature

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- I_{eff} = Current value of the maximum permitted contact load, 100% = value as listed in the "Technical data" table (see "Gearmotors" price catalog/catalog).
- θ = Ambient temperature



IS integrated plug connector



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Figure 38: AC gearmotor with IS integrated plug connector

AC (brake) motors in series DR63 can be supplied on request with the integrated 12-pole plug connector IS instead of the standard terminal box. The upper section of the IS plug connector (mating connector) is included in the scope of delivery. The IS plug connector is particularly compact and offers the following connection options:

- Motor, single-speed or two-speed pole-changing
- Brake
- Temperature monitoring (TF or TH)

As with the terminal box, the cable run with the integrated plug connector IS can be from four different directions offset at 90°.

	TIP
	<ul style="list-style-type: none">• IS requires a clearance of 30 mm for removing the connector.• For DR63 brakemotors with IS size 1 only: Only brake control systems BG1.2, BG2.4, BSR and BUR can be accommodated in the IS plug connector. Other brake control systems must be installed in the control cabinet.



Plug connectors AS.., AC.., AM.., AB..



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Figure 39: AC motor with ASE.. plug connector

The plug connector systems AS.., AC.., AM.., AB.. are based on the plug connector systems made by Harting.

- AS.., AC.. → Han 10E/10ES
- AM.., AB.. → Han Modular®

The plug connectors are located at the side of the terminal box. They are locked either using two clamps or one clamp on the terminal box.

UL approval has been granted for the plug connectors.

The mating connector (sleeve housing) with socket contacts is not included in the scope of delivery.

AS.., AC..

The ten contacts of the AC.. and AS.. plug connector systems connect the motor winding (6 contacts), the brake (2 contacts) and the thermal motor protection (2 contacts). You can connect both motors with single speed and two-speed pole-changing motors.

Types AS.. and AC.. differ as follows:

- AS = Spring cages
- AC = Crimp contacts and shortened contacts for thermal motor protection



TIP

Applies to AS.1 and AC.1:

For brakemotors, you can select the version with brake control in the terminal box only. In this case, the disconnection in the DC circuit has to take place electronically using BSR or BUR.



The ASD.. and ASE.. types with single clip longitudinal closure correspond to the DESINA regulation issued by the Association of German Machine Tool Manufacturers (VDW).

AM.., AB..

Plug connectors AM.., AB... can be used for connecting both single speed motors and double pole-changing motors.

With brakemotors, the brake control system can be either located in the terminal box or in the control cabinet. All versions of the brake control system are possible.



Pre-fabricated cable

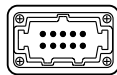
SEW-EURODRIVE offers a pre-fabricated cable for connecting the field distributor and the AC (brake) motor with option APG4. The cable is prefabricated up to a maximum length of 15 meters in increments of half a meter. The cable can be ordered from SEW-EURODRIVE. Specify the required length (max. 5 m).

IS integrated plug connector

IS size	1
For motors	DR63
Number of contacts	12 + 2 × PE
Contact connection	Screw connection
Contact type	Blade / bushing
Max. voltage/(CSA) [V_{AC}]	690 / (600)
Max. contact rating [A_{eff}]	16
Degree of protection	Corresponding to motor protection type (IP54, IP55, optionally IP56, IP65, IP66)
Ambient temperature [°C]	-40 to +40

Installed plug connectors AS.., AC.., AM.., AB..

Technical data
AS.., AC..

Plug connectors	ASD..
For motors	DR63
Locking of mating connector	Single clamp
Connector viewed from motor end	
Basic connector system	1)
Number of contacts	10
Max. contact rating [A_{eff}]	10 × 16
PE connection	2 contacts on insulator
Max. voltage/(CSA) [V_{AC}]	500 / (600)
Contact connection	AC = Crimp contacts AS = Spring cages
Contact type	Pin / (socket = from customer)
Degree of protection	Corresponding to motor protection type (IP54, IP55, optionally IP65)
Ambient temperature [°C]	-40 to +40

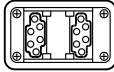
1) Harting, aluminum standard housing (painted) 10E / 10ES



DT56, DR63, DV250/280 AC Motors

Project planning, technical data for plug connectors

Technical data
AM.., AB..

Plug connectors	AMD..
For motors	DR63
Locking of mating connector	Single clamp
Connector viewed from motor end	
Basic connector system	1)
Number of contacts	2 × 6
Module type²⁾	2 × E-module
Max. contact rating [A_{eff}]	12 × 16
PE connection	2 contacts on articulated frame
Max. voltage/(CSA) [V_{AC}]	500 / (600)
Contact connection	Crimping contacts
Contact type	Pin / (socket = from customer)
Degree of protection	Corresponding to motor protection type (IP54, IP55, optionally IP65)
Ambient temperature [$^{\circ}C$]	-40 to +40

1) Harting, standard aluminum housing (painted) Han Modular 10B

2) The module type depends on the current. C-module for more than 16 A, E-module for less than or equal to 16 A.



13.18 Project planning, technical data for encoders

Tachometer

Various types of tachometers are available for installation on DR/DT/DV series AC motors as standard depending on the application and motor size. With rare exceptions, the encoders can be combined with other optional components installed in the motor, such as brakes and forced cooling fans.

Overview of encoders

Designation	For motor	Encoder type	Shaft	Specification	Power supply	Signal
EH1T	DR63	Encoder	Hollow shaft	1024 pulses/revolution	DC 5 V controlled	TTL/RS-422
EH1S					9 V _{DC} - 26 V _{DC}	1 V _{SS} sin/cos
EH1R						TTL/RS-422
EV1T	DV250/DV280		Solid shaft		DC 5 V controlled	TTL/RS-422
EV1S					10 V _{DC} - 30 V _{DC}	1 V _{SS} sin/cos
EV1R						TTL/RS-422
AV1Y	DV250/DV280	Multi-turn-absolute encoder	Solid shaft	-	10 V _{DC} - 30 V _{DC}	MSSI interface and 1 V _{SS} sin/cos
AV1H ¹⁾	DV250/DV280	Multi-turn HIPERFACE® encoder	Solid shaft	-	7 V _{DC} - 12 V _{DC}	RS-485 interface and 1 V _{SS} sin/cos

1) recommended encoder for operation with MOVIDRIVE™ MDX61B with option DEH11B

Encoder connection

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

- Maximum line length (inverter - encoder): 100 m with a cable capacitance per unit length ≤ 120 nF/km
- Core cross section: 0.25 - 0.5 mm²
- Use shielded cable with twisted pair conductors and apply shield over large area on both ends:
 - At the encoder in the cable gland or in the encoder plug
 - To the inverter on the electronics shield clamp or to the housing of the sub D plug
- Install the encoder cables separately from the power cables, maintaining a distance of at least 200 mm.
- Encoder with cable gland: Observe the permitted diameter of the encoder cable to ensure that the cable gland functions correctly.



Solid shaft encoder



Figure 40: AC motor with solid shaft encoder and forced cooling fan VR

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Encoder mounting adapter

The motors can be equipped with various encoder mounting adapters for installing encoders from different manufacturers.



Figure 41: AC motor with encoder mounting adapter EV1A and forced cooling fan VR

01949CXX

The encoder is attached to the EV1A (synchro flange) using 3 encoder mounting clamps (bolts with eccentric disks) for 3 mm flange thickness.



Absolute encoder The absolute encoders AV1Y from SEW-EURODRIVE are combination encoders. They contain a multi-turn absolute encoder and a high-resolution sinusoidal encoder.



Figure 42: AC motor with absolute encoder and forced cooling fan VR

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HIPERFACE® encoder

HIPERFACE® encoders are available as single-turn or multi-turn combination encoder. They contain an absolute encoder and a high-resolution sinusoidal encoder.



Figure 43: AC motor with HIPERFACE® encoder AS3H

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Prefabricated cables for encoder connection

SEW-EURODRIVE offers prefabricated cables for simple and reliable connection of encoder systems. It is necessary to differentiate between cables used for fixed installation or for use in cable carriers. The cables are pre-fabricated in 1 m steps to the required length.

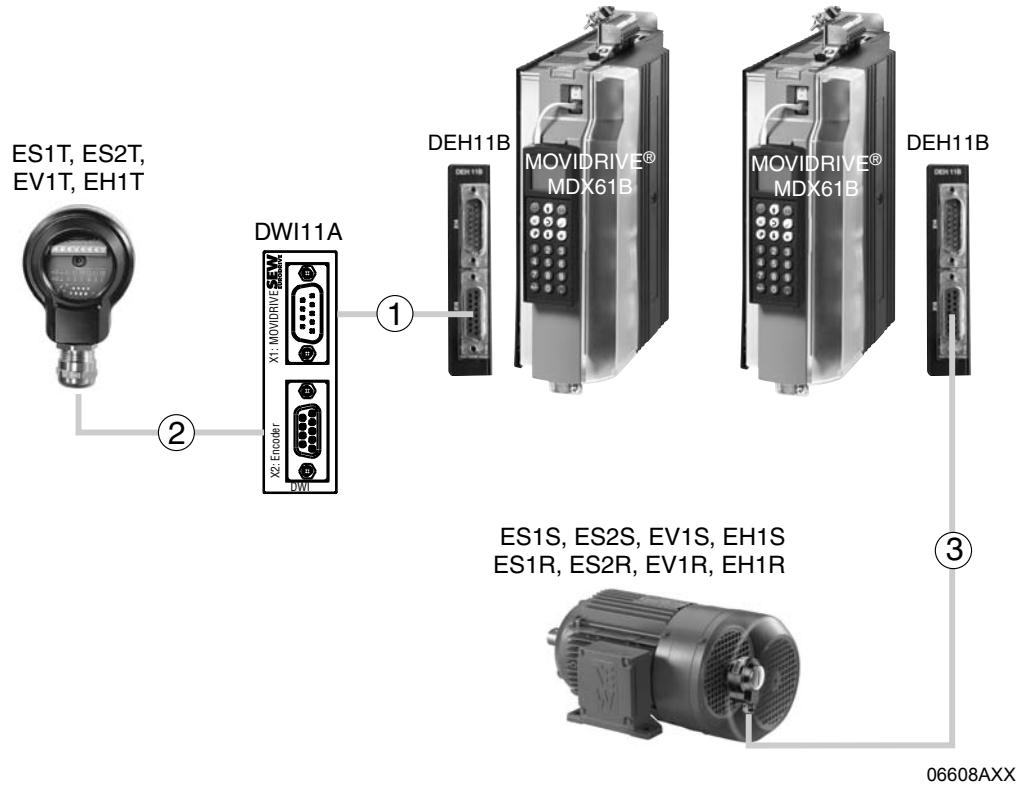


Figure 44: Pre-fabricated cables for encoder connection and encoders

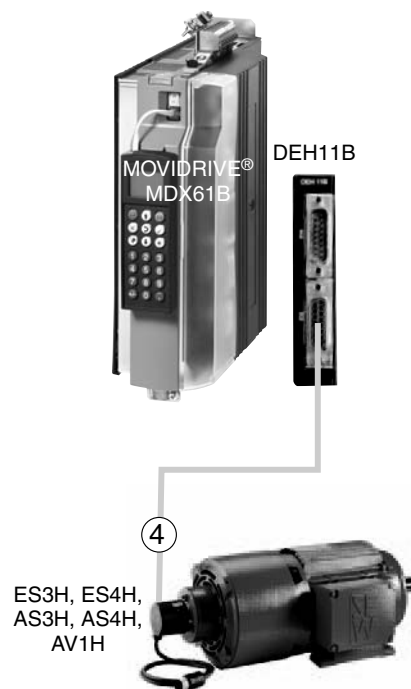


Figure 45: Pre-fabricated cables for HIPERFACE® encoders



①

Prefabricated cables for encoder connection:

Part number	817 957 3
Installation	Fixed installation
for encoders with 5 V voltage supply	EH1T
Cable cross section	4×2×0.25 mm ² (AWG23) + 1×0.25 mm ² (AWG23)
Conductor colors	A: Yellow (YE) A: Green (GN) B: Red (RD) B: Blue (BU) C : Pink (PK) C : Gray (GY) UB: White (WH) ┘: Brown (BN) Sensor cable: Violet (VT)
Manufacturer and type Lapp Helukabel	Unitronic Li2YCY (TP) Paar-Tronic-CY
For inverter	MOVIDRIVE [®] MDX61B with DEH11B option
Connection on the DWI11A on the inverter	with 9-pin sub D socket With 15-pin D-sub plug

②

Prefabricated cables for incremental TTL encoders with 5 V power supply:

Part number	198 829 8	198 828 X
Installation	Fixed installation	Cable carrier installation
For encoder	EH1T via DWI11A and cable 817 957 3	
Cable cross section	4×2×0.25 mm ² (AWG23) + 1×0.25 mm ² (AWG23)	
Conductor colors	A: Yellow (YE) A: Green (GN) B: Red (RD) B: Blue (BU) C : Pink (PK) C : Gray (GY) UB: White (WH) ┘: Brown (BN) Sensor cable: Violet (VT)	
Manufacturer and type Lapp Helukabel	Unitronic Li2YCY (TP) Paar-Tronic-CY	Unitronic LiYCY Super-Paar-Tronic-C-PUR
For inverter	MOVIDRIVE [®] MDX61B with DEH11B option	
Connection to encoder / motor	with conductor end sleeves Connect the violet conductor (VT) with the encoder at UB.	
DWI11A	With 9-pin D-sub plug	



DT56, DR63, DV250/280 AC Motors

Project planning, technical data for encoders

③

Pre-fabricated cables for incremental TTL sensors and sin/cos encoders with 24 V power supply:

Part number	1332 459 4	1332 458 6
Installation	Fixed installation	Cable carrier installation
For encoder	EH1S, EH1R	
Cable cross section	4×2×0.25 mm ² (AWG23) + 1×0.25 mm ² (AWG23)	
Conductor colors	A: Yellow (YE) A: Green (GN) B: Red (RD) B: Blue (BU) C : Pink (PK) C : Gray (GY) UB: White (WH) ⊥: Brown (BN) Sensor cable: Violet (VT)	
Manufacturer and type Lapp Helukabel	Unitronic Li2YCY (TP) Paar-Tronic-CY	Unitronic LiYCY Super-Paar-Tronic-C-PUR
For inverter	MOVIDRIVE [®] MDX61B with DEH11B option	
Connection to encoder / motor	with conductor end sleeves Cut off the violet conductor (VT) of the cable at the encoder end.	
Inverter	With 15-pin D-sub plug	

④

Pre-fabricated cables for HIPERFACE[®] encoders:

Part number	1332 453 5	1332 455 1
Installation	Fixed installation	Cable carrier installation
For encoder	AV1H	
Cable cross section	6 × 2 × 0.25 mm ² (AWG 23)	
Conductor colors	cos+: Red (RD) cos-: Blue (BU) sin+: Yellow (YE) sin-: Green (GN) D+: Black (BK) D-: Violet (VT) TF/TH/KTY+: brown (BN) TF/TH/KTY-: White (WH) GND: Gray/pink + pink (GY-PK + PK) U _S : Red/blue + gray (RD-BU + GY)	
Manufacturer and type	Lapp, PVC/C/PP 303 028 1	Nexans, 493 290 70
For inverter	MOVIDRIVE [®] MDX61B with DEH11B option	
Connection to encoder / motor	With 12-pin round connector plug (Intercontec, type ASTA021NN00 10 000 5 000)	
Inverter	With 15-pin D-sub plug	

Extension cables for HIPERFACE[®] cables

Part number	199 539 1	199 540 5
Installation	Fixed installation	Cable carrier installation
Cable cross section	6 × 2 × 0.25 mm ² (AWG 23)	
Conductor colors	→ HIPERFACE [®] cable	
Manufacturer and type	Lapp, PVC/C/PP 303 028 1	Nexans, 493 290 70
Connection to encoder / motor HIPERFACE [®] cable	With 12-pin round connector plug (Intercontec, type ASTA021NN00 10 000 5 000) with 12-pin round connector plug (Intercontec, type AKUA20)	



Incremental encoder

Hollow shaft encoder and spreadshaft encoder

Incremental encoder with 1024 pulses/revolution:

Hollow shaft encoders for AC motors DR63		EH1T	EH1S ¹⁾	EH1R
Supply voltage	U_B	DC 5 V \pm 5%	DC 9 V - DC 26 V	
Max. current consumption	I_{in}	180 mA	160 mA	180 mA
Output amplitude per track	U_{high} U_{low}	\geq DC 2.5 V \leq DC 0.5 V	1 V_{SS}	\geq DC 2.5 V \leq DC 0.5 V
Signal output		TTL/RS-422	Sin/cos	TTL/RS-422
Output current per track	I_{out}	20 mA	40 mA	20 mA
Max. pulse frequency	f_{max}	120 kHz		
Pulses (sine cycles) per revolution	A, B C	1024 1		
Mark space ratio		1 : 1 \pm 20%		
Phase angle A : B		90° \pm 20%		
Vibration resistance (10 Hz ... 2000 Hz)		\leq 100 m/s ² (EN 60068-2-6)		
Shock resistance		\leq 1000 m/s ² (EN 60068-2-27)		
Ambient temperature	ϑ_U	-30 °C to +60 °C (EN 60721-3-3, class 3K3)		
Degree of protection		IP66 (EN 60529)		
Connection		Terminal box on encoder		

1) recommended encoder for operation with MOVIDRIVE

Encoder mounting adapter

Type	EV1A
For motors	DV250/280
For	Solid shaft encoders (synchronous flange)
Flange diameter	58 mm
Center bore diameter	50 mm
Shaft end diameter	6 mm
Length of shaft end	10 mm


Absolute encoder

Absolute encoders for AC motors DT71 ... DV280		AV1Y
Supply voltage	U_B	DC 10 - 15 - 24 - 30 V, polarity reversal protected
Max. current consumption	I_{in}	250 mA
Cut-off frequency	f_{Grenz}	≥ 100 kHz
Pulses (sine cycles) per revolution	A, B	512
Output amplitude per track		$1 V_{SS} \sin/\cos$
Scanning code		Gray code
Single-turn resolution		4096 increments/revolution (12 bit)
Multi-turn resolution		4096 revolutions (12 bits)
Data transmission absolute values		synchronous, serial (SSI)
Serial data output		Driver to EIA RS-485
Serial clock input		Optocoupler, recommended driver to EIA RS-485
Clock frequency		Permitted range: 90 - 300 - 1100 kHz (max. 100m cable length with 300 kHz)
Clock-pulse space period		12 - 35 ms
Vibration resistance (10 Hz ... 2000 Hz)		≤ 100 m/s ² (EN 60068-2-6)
Maximum speed	n_{max}	6000 min ⁻¹
Mass	m	0.30 kg
Ambient temperature	ϑ_U	-40 °C to +60 °C (EN 60721-3-3, class 3K3)
Degree of protection		IP66 (EN 60529)
Connection		1 m cable with 17-pin round connector, matching encoder cable with SPUC 17B FRAN female connector



HIPERFACE®
encoder

HIPERFACE® solid shaft encoders for AC motors DT71 ... DV280		Multi-turn encoder AV1H ¹⁾
Supply voltage	U_B	DC 7 - 12 V, polarity reversal protected
Max. current consumption	I_{in}	80 mA
Cut-off frequency	f_{Grenz}	200 kHz
Pulses (sine cycles) per revolution	A, B	1024
Output amplitude per track		0.9 - 1.1 V_{SS} sin/cos
Scanning code		Binary code
Single-turn resolution		32768 increments/revolution (15 bit)
Multi-turn resolution		4096 revolutions (12 bits)
Data transmission absolute values		asynchronous, serial
Serial data output		Driver to EIA RS-485
Available memory in EEPROM (electronic nameplate)		1792 bytes
Vibration resistance (10 Hz ... 2000 Hz)		$\leq 200 \text{ m/s}^2$ (EN 60068-2-6)
Maximum speed	n_{max}	6000 min^{-1}
Mass	m	0.55 kg
Ambient temperature	ϑ_U	-20 °C to +60 °C (EN 60721-3-3, class 3K3)
Degree of protection		IP66 (EN 60529)
Connection		1 m cable with 12-pin round connector, suitable for Hiperface® cable with Intercontec female connector Type ASTA021NN00 10 000 5 000

1) Recommended encoder for operation with MOVIDRIVE® MDX61B with option DEH11B



13.19 Technical data for forced cooling fan

Forced cooling fan V

The motors can be equipped with a forced cooling fan if required. A forced cooling fan is usually not required for motors operated on the supply system in continuous duty. SEW-EURODRIVE recommends a forced cooling fan for the following applications:

- Drives with high switching frequency
- Inverter drives with a setting range $\geq 1:20$
- Inverter drives that have to produce rated torque at low speeds or even at standstill.

The following figure shows a typical speed-torque characteristic for a dynamic inverter drive, for example with MOVIDRIVE[®] MDX61B with DEH11B option in CFC operating mode.

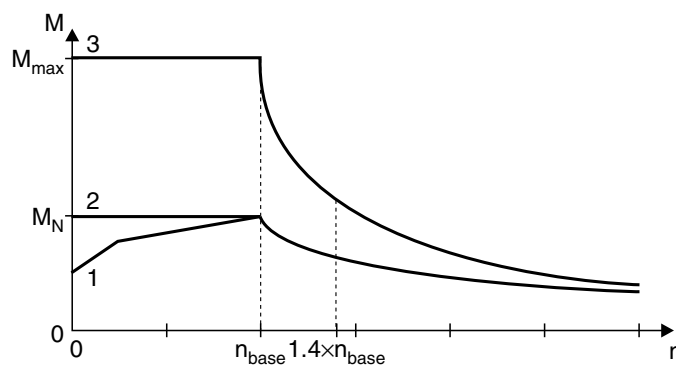


Figure 46: Speed/torque characteristic curve in CFC operating mode

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M_N	= Rated torque of the motor	1	= With self-cooling
M_{max}	= Maximum torque of the motor	2	= With forced cooling
n_{base}	= Rated speed (base speed) of the motor	3	= Maximum torque

A forced cooling fan must be used if the load torque in the 0 ... n_{base} is above curve 1. The motor becomes thermally overloaded without forced cooling.

Combination with encoders

Forced cooling fans can be combined with the following motor encoders:

Motor encoder	For motor size	Forced cooling fan V
EV1T, EV1R, EV1S	DV250/DV280	•
AV1Y, AV1H	DV250/DV280	•

In DV250M/DV280 motors, the motor encoder can only be installed in conjunction with a forced cooling fan.



V forced cooling fan

Forced cooling fan type		V	
For motor size		250 / 280	
Supply voltage ¹⁾ [V _{AC}]	△ ∩	3×200-290 3×346-500	3×200-330 3×346-575
Frequency	[Hz]	50	60
Current consumption [A _{AC}]	△ ∩	1.0 0.57	0.9 0.52
Power consumption	[W]	130 - 320	170 - 310
Air discharge rate	[m ³ /h]	750	
Ambient temperature	[°C]	-20 to +60	
Degree of protection		IP55	
Electrical connection		Terminal block in terminal box	
Max. cable cross section	[mm ²]	4 × 1.5	
Thread for cable gland		2 × M16 × 1.5	

1) Other supply voltages upon request.

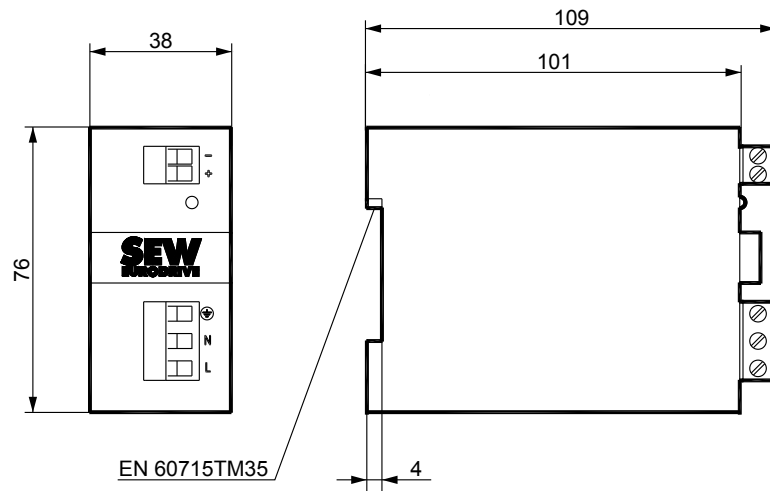
Technical data

Switched-mode power supply	UWU52A
Part number	188 181 7
for forced cooling fan	VR
Input voltage	1 × AC 110-240 V
Voltage range	AC 95-265 V, DC 110-300 V
Frequency	50/60 Hz
Max. no-load current	AC 40 mA
Rated input current at 1 × AC 110 V at 1 × AC 230 V	AC 1.04 A AC 0.63 A
Output voltage	DC 24 V (-1%/+3%)
Rated output current at 40 °C at 55 °C	DC 2.5 A DC 2.0 A
Residual ripple	< 50 mV _{eff}
Interference voltage	< 120 mV _{SS}
Power loss	< 5.5 W
Mass	0.23 kg
Working temperature	0 ... +55 °C (condensation not permitted)
Degree of protection	IP20 (EN 60529)
Protection class	I
Connection	Screw terminals for line cross section 0.20-2.5 mm ²

The power supply is short-circuit proof and protected against overload. Input and output are electrically isolated.



**Dimension
drawing**



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Leave a clearance of at least 50 mm at top and bottom of venting slots.



13.20 Project planning, technical data for backstop RS and canopy C

Backstop RS

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

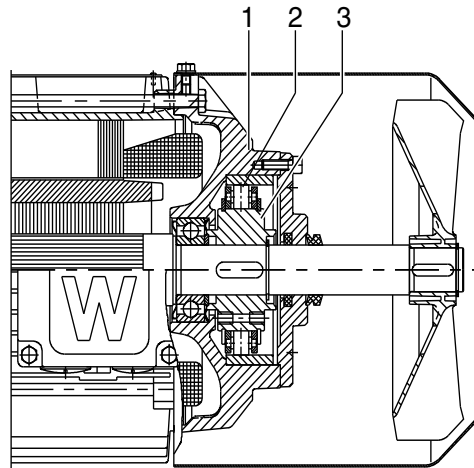


Figure 47: Design of the RS backstop

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

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

Technical data

Motor type	Rated locking torque [Nm]	Lift-off speed of sprags [rpm]	Ambient temperature
DV250, DV280../RS	2600	400	-40 °C to +60 °C

**Canopy C**

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

All explosion-proof AC motors and AC brakemotors in a vertical mounting position with their output shaft pointing downwards come equipped with protection canopy C. The same applies to motors in a vertical mounting position installed in the open.



Figure 48: AC motor with canopy C

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13.21 WPU smooth pole-change unit

See chapter "WPU smooth pole-change unit" on page 60.

13.22 Project planning for AC motors with inverter

See chapter "Project planning for AC motors with inverter" on page 100 ff.