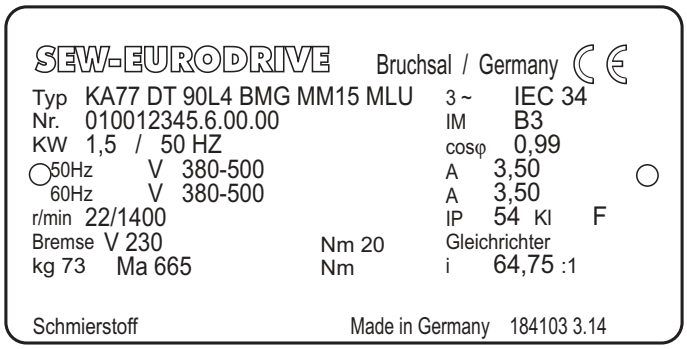
3 Technical Data and Dimension Drawings

3.1 MOVIMOT® Nameplates, Type Designation

Motor Nameplate
(Example)



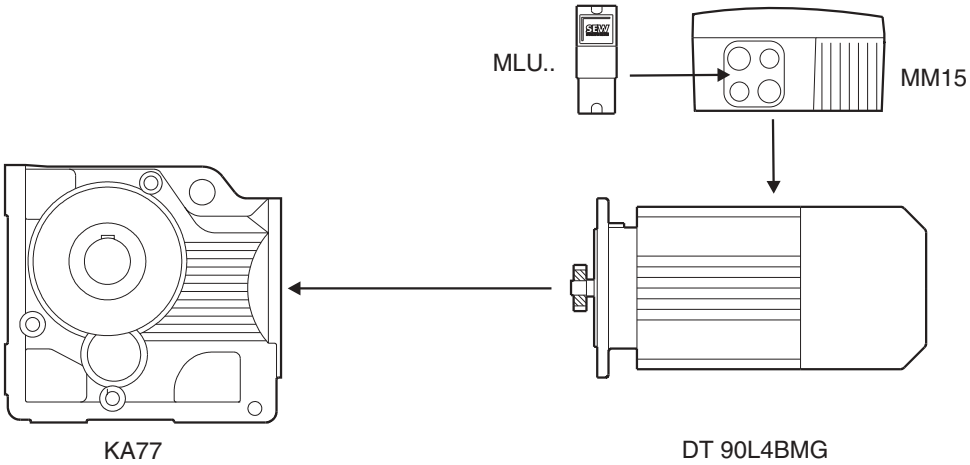
05113AXX

KA 77 DT 90L4 BMG/MM15/MLU

- Additional feature Inverter [1)]
- MOVITRAC® frequency inverter
- Additional feature Motor (brake)
- Motor size, number of poles
- Motor series
- Gear unit size[2)]
- Gear unit series[2)]

1) only factory-installed options are listed on the nameplate.

2) Detailed information about geared motor combinations can be found in the catalog "MOVIMOT Geared Motors"



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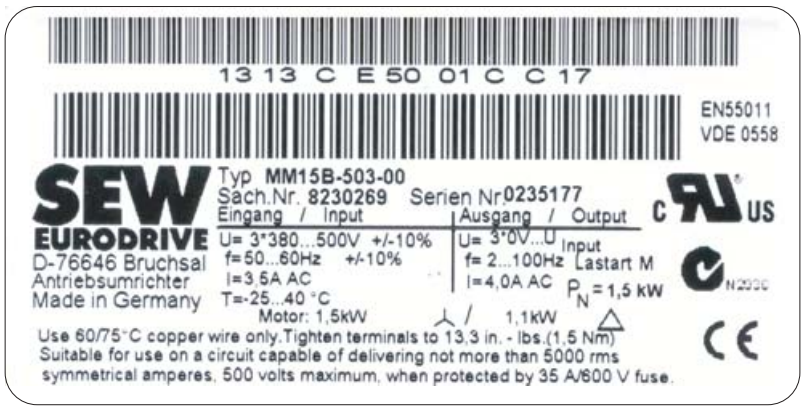
Inverter Nameplate (Example)

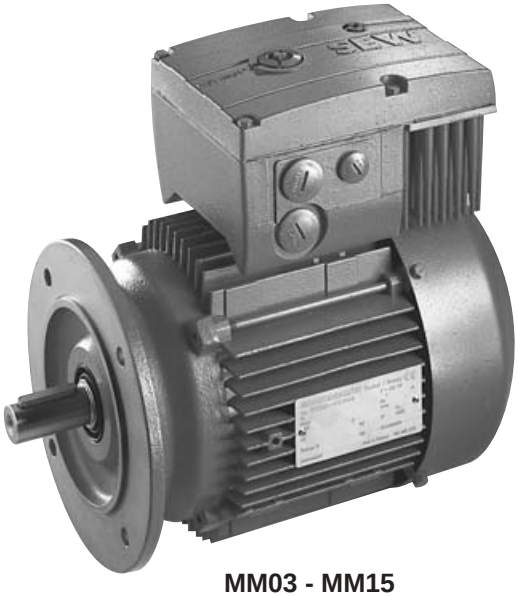


50457AXX

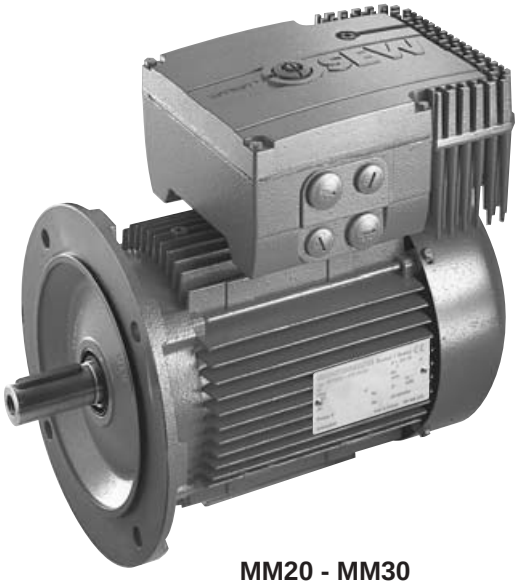
MM 15 B – 503 – 00

- 00 – Design (00 = Standard)
- 3 – Connection type (3 = 3-phase)
- 50 – Connection voltage (50 = 380...500 V_{AC}) (23 = 200...240 V_{AC})
- B – Version B
- 15 – Motor power (15 = 1.5 kW)
- MM – MOVIMOT® series

3.2 MOVIMOT® Motor Data for IEC Configuration



MM03 - MM15



MM20 - MM30

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280 – 1400 1/min ⅄ 3 x 380 – 500 V (400 V)

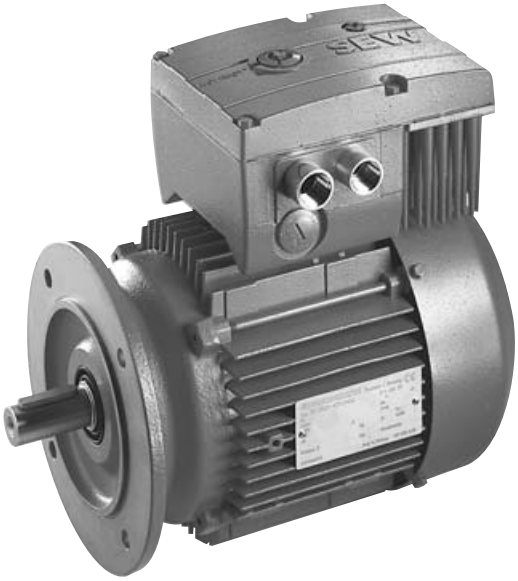
Type	P_n [kW]	M_n [Nm]	n_n [1/min]	I_{n1} [A]	cosφ	J_{mot} [10^{-4} kgm^2] without brake	J_{mot} [10^{-4} kgm^2] with brake	M_{Bmax} [Nm]	m [kg]	m [kg]
DT71D4/.../MM03	0.37	2.52	1400	1.3	0.99	4.61	5.51	5	8.6	11.4
DT80K4/.../MM05	0.55	3.75	1400	1.6	0.99	6.55	7.45	10	11.5	14.2
DT80N4/.../MM07	0.75	5.1	1400	1.9	0.99	8.7	9.6	10	13.1	15.8
DT90S4/.../MM11	1.1	7.5	1400	2.4	0.99	25	30.4	20	17.6	27.5
DT90L4/.../MM15	1.5	10.2	1400	3.5	0.99	34	39.4	20	19.6	29.5
DV100M4/.../MM22	2.2	15.0	1400	5.0	0.99	53	59	40	30.5	40.5
DV100L4/.../MM30	3.0	20.5	1400	6.7	0.99	65	71	40	33	43

290 – 2900 1/min △ 3 x 380 – 500 V (400 V)

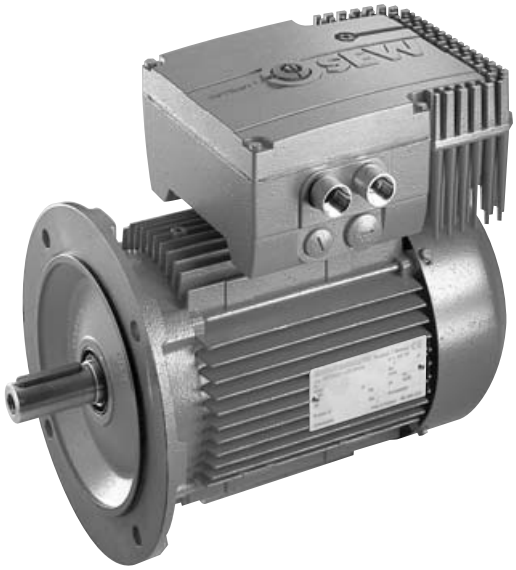
Type	P_n [kW]	M_n [Nm]	n_n [1/min]	I_{n1} [A]	cos φ	J_{mot} [10^{-4} kgm^2] without brake	J_{mot} [10^{-4} kgm^2] with brake	M_{Bmax} [Nm]	m [kg]	m [kg]
DT71D4/.../MM05	0.55	1.81	2900	1.6	0.99	4.61	5.51	5	8.6	11.4
DT80K4/.../MM07	0.75	2.47	2900	1.9	0.99	6.55	7.45	10	11.5	14.2
DT80N4/.../MM11	1.1	3.62	2900	2.4	0.99	8.7	9.6	10	13.1	15.8
DT90S4/.../MM15	1.5	4.95	2900	3.5	0.99	25	30.4	20	17.6	27.5
DT90L4/.../MM22	2.2	7.25	2900	5.0	0.99	34	39.4	20	21.0	31.0
DV100M4/.../MM30	3.0	9.9	2900	6.7	0.99	53	59	40	30.5	40.5

Thermal classification F standard for the drives

3.3 MOVIMOT® Motor Data for UL Configuration (Motor according to NEMA)



MM03 - MM15 (380 - 500 V)
MM03 - MM07 (200 - 240 V)



MM22 - MM30 (380 - 500 V)
MM11 - MM22 (200 - 240 V)

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280 – 1700 1/min ⅄ 3 x 380 – 500 V (460 V) c UL us

Type	P_n [HP]	P_n [kW]	M_n [Nm]	n_n [1/min]	I_{n1} [A]	cos φ	J_{mot} [10^{-4} kgm^2] without brake	J_{mot} [10^{-4} kgm^2] with brake	M_{Bmax} [Nm]	m [kg]	m [kg]
DT71D4/.../MM03	0.5	0.37	2.08	1700	1.1	0.99	4.61	5.51	5	8.6	11.4
DT80K4/.../MM05	0.75	0.55	3.09	1700	1.4	0.99	6.55	7.45	10	11.5	14.2
DT80N4/.../MM07	1	0.75	4.2	1700	1.7	0.99	8.7	9.6	10	13.1	15.8
DT90S4/.../MM11	1.5	1.1	6.2	1700	2.1	0.99	25	30.4	20	17.6	27.5
DT90L4/.../MM15	2	1.5	8.4	1700	3	0.99	34	39.4	20	19.6	29.5
DT100M4/.../MM22	3	2.2	12.4	1700	4.3	0.99	53	59	40	30.5	40.5
DT100L4/.../MM30	5	3.7	20.7	1700	5.8	0.99	65	71	40	33	43

280 – 1700 1/min ⅄⅄ 3 x 200 – 240 V (230 V) c UL us

Type	P_n [HP]	P_n [kW]	M_n [Nm]	n_n [1/min]	I_{n1} [A]	cos φ	J_{mot} [10^{-4} kgm^2] without brake	J_{mot} [10^{-4} kgm^2] with brake	M_{Bmax} [Nm]	m [kg]	m [kg]
DT71D4/.../MM03	0.5	0.37	2.08	1700	2.2	0.99	4.61	5.51	5	8.6	11.4
DT80K4/.../MM05	0.75	0.55	3.09	1700	2.9	0.99	6.55	7.45	10	11.5	14.2
DT80N4/.../MM07	1	0.75	4.2	1700	3.5	0.99	8.7	9.6	10	13.1	15.8
DT90S4/.../MM11	1.5	1.1	6.2	1700	4.7	0.99	25	30.4	20	19.0	29.0
DT90L4/.../MM15	2	1.5	8.4	1700	6.2	0.99	34	39.4	20	21.0	31.0
DT100M4/.../MM22	3	2.2	12.4	1700	8.2	0.99	53	59	40	30.5	40.5

Thermal classification F standard for the drives

3.4 MOVIMOT® Inverter Data

IEC configuration with connection voltages of 380...500 V_{AC}

MOVIMOT® Type		MM 03B-503-00	MM 05B-503-00	MM 07B-503-00	MM 11B-503-00	MM 15B-503-00	MM 22B-503-00	MM 30B-503-00
Part number		**823 022 6**	**823 023 4**	**823 024 2**	**823 025 0**	**823 026 9**	**822 953 8**	**822 954 6**
Apparent output power at V_{in} = 380...500 V_{AC}	S_N	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA
Connection voltages Permitted range	V_{in}	3 x 380 V_{AC} / **400 V_{AC}** /415 V_{AC} /460 V_{AC} /500 V_{AC} V_{in} = 380 V_{AC} -10 % ... 500 V_{AC} +10 %						
Supply frequency	f_{in}	50 Hz ... 60 Hz ± 10%						
Supply voltage rated current (at V_{in} =400 V_{AC})	I_{in}	1.3 A_{AC}	1.6 A_{AC}	1.9 A_{AC}	2.4 A_{AC}	3.5 A_{AC}	5.0 A_{AC}	6.7 A_{AC}
Output voltage	V_{outp}	0...V_{in}						
Output frequency Resolution Operating point	f_{outp}	2...100 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz						
Rated output current	I_N	1.6 A_{AC}	2.0 A_{AC}	2.5 A_{AC}	3.2 A_{AC}	4.0 A_{AC}	5.5 A_{AC}	7.3 A_{AC}
Motor power	P_{Mot}	**0.37 kW**	**0.55 kW**	**0.75 kW**	**1.1 kW**	**1.5 kW**	**2.2 kW**	**3.0 kW**
PWM frequency		**4**[1] / 8 / 12 / 16[2] kHz						
Current limit	I_{max}	**Motor operating mode:** 160 % at ⅄, 150 % at △ **regenerative mode:**160 % at ⅄, 150 % at △						
External braking resistor	R_{min}	200 Ω					100 Ω	
Interference immunity		Meets EN 61800-3						
Interference		Meets EN 61800–3 and class A limit to EN 55011 and EN 55014						
Ambient temperature Climatic category	ϑ_{amb}	**-25° C...40 °C** (P_N reduction: 3 % I_N per K up to max. 60 °C) 3 K3						
Enclosure (motor-dependent)		IP54, IP55, IP65 (optional, to be specified with order)						
Operating mode		DB (EN 60149-1-1 and 1-3)						
Type of cooling (DIN 41 751)		Convection cooling						
Altitude		h ≤ 1000 m (P_N reduction: 1 % per 100 m starting at an altitude of 1000 m, see also the section on "Electrical Installation – Installation Instructions")						
External electronics supply	TI. 24 V	V = +24 V ± 25 %, EN61131-2, residual ripple max. 13 % I_E ≤ 250 mA (typ. 180 mA at 24V) Starting current: 1 A						
3 binary inputs		Potential-free via opto-coupler, PLC-compatible (EN 61131-2) R_i ≈ 3.0 kW, I_E ≈ 10 mA, sampling time ≤ 5 ms						
Signal level		+13 V...+30 V = "1" = contact closed -3 V...+5 V = "0" = contact open						
Control functions	TI. R ↻ TI. L ↺ TI. f1/f2	CW/Stop CCW/Stop "0" = setpoint 1 / "1" = setpoint 2						
Output relays Contact data	TI. K1a TI. K1b	Response time ≤ 10 ms 24 V_{DC} / 0.6 A_{DC} / DC11 according to IEC 337-1						
Signaling function		Contactor for ready signal Contact closed: – with applied voltage (24 V + supply) – if no fault was detected – after self-test phase concluded (after switch-on)						
Serial interface	TI. RS + TI. RS -	RS-485 (see page 20)						

1) Factory setting

2) 16 kHz PWM frequency (low-noise): If DIP-SWITCH S1/7 = ON, the devices operate with 16 kHz PWM frequency (low-noise) and incrementally switch back to a lower clock frequency as a function of the heat sink temperature.

UL configuration with connection voltages of 380 – 500 V_{AC}

MOVIMOT® Type		MM 03B-503-00	MM 05B-503-00	MM 07B-503-00	MM 11B-503-00	MM 15B-503-00	MM 22B-503-00	MM 30B-503-00
Part number		**823 022 6**	**823 023 4**	**823 024 2**	**823 025 0**	**823 026 9**	**822 953 8**	**822 954 6**
Apparent output power at V_{in} = 380 – 500 V_{AC}	S_N	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA
Connection voltages Permitted range	V_{in}	3 x 380 V_{AC} / 400 V_{AC} / 415 V_{AC} / **460 V_{AC}** / 500 V_{AC} V_{in} = 380 V_{AC} -10 % ... 500 V_{AC} +10 %						
Supply frequency	f_{in}	50 Hz – 60 Hz ± 10 %						
Supply voltage rated current (at V_{in} = 460 V_{AC})	I_{in}	1.1 A_{AC}	1.4 A_{AC}	1.7 A_{AC}	2.1 A_{AC}	3.0 A_{AC}	4.3 A_{AC}	5.8 A_{AC}
Output voltage	V_{outp}	0...V_{in}						
Output frequency **Resolution** **Operating point**	f_{outp}	2...100 Hz 0.01 Hz 460 V at 60 Hz						
Rated output current	I_N	1.6 A_{AC}	2.0 A_{AC}	2.5 A_{AC}	3.2 A_{AC}	4.0 A_{AC}	5.5 A_{AC}	7.3 A_{AC}
Motor power	P_{Mot}	**0.37 kW 0.5 HP**	**0.55 kW 0.75 HP**	**0.75 kW 1.0 HP**	**1.1 kW 1.5 HP**	**1.5 kW 2 HP**	**2.2 kW 3.0 HP**	**3.7 kW 5 HP**
PWM frequency		**4**[1] / 8 / 12 / 16[2] kHz						
Current limit	I_{max}	**Motor operating mode:**160 % at ⅄ **Regenerative mode:**160 % at ⅄						
External braking resistor	R_{min}	200 Ω					100 Ω	
Interference immunity		Meets EN 61800-3						
Interference		Meets EN 61800–3 and class A limit to EN 55011 and EN 55014						
Ambient temperature Climatic category	ϑ_{amb}	**-25 °C...40 °C** (P_N reduction: 3 % I_N per K up to max. 60 °C) 3 K3						
Enclosure (motor-dependent)		IP54, IP55, IP65 (optional, to be specified with order)						
Operating mode		DB (EN 60149-1-1 and 1-3)						
Type of cooling (DIN 41 751)		Convection cooling						
Altitude		h ≤ 1000 m (P_N reduction: 1% per 100 m starting at an altitude of 1000 m, see also the section on "Electrical Installation – Installation Instructions")						
External electronics supply	Tl. 24 V	V = +24 V ± 25 %, EN 61131-2, residual ripple max. 13 % I_E ≤ 250 mA (typ. 180 mA at 24 V) Starting current: 1 A						
3 binary inputs		Potential-free via opto-coupler, PLC-compatible (EN 61131-2) R_i ≈ 3.0 kW, I_E ≈ 10 mA, sampling time ≤ 5 ms						
Signal level		+13 V...+30 V = "1" = contact closed -3 V...+5 V = "0" = contact open						
Control functions	Tl. R ↷ Tl. L ↶ Tl. f1/f2	CW/Stop CCW/Stop "0" = setpoint 1 / "1" = setpoint 2						
Output relays **Contact data**	Tl. K1a Tl. K1b	Response time ≤ 10 ms 24 V_{DC} / 0.6 A_{DC} / DC11 according to IEC 337-1						
Signaling function		Contactor for ready signal Contact closed: – with applied voltage (24 V + supply) – if no fault was detected – after self-test phase concluded (after switch-on)						
Serial interface	Tl. RS + Tl. RS -	RS-485 (see page 20)						

1) Factory setting

2) 16 kHz PWM frequency (low-noise): If DIP-SWITCH S1/7 = ON, the devices operate with 16 kHz PWM frequency (low-noise) and incrementally switch back to a lower clock frequency as a function of the heat sink temperature.

UL configuration with connection voltages of 200 – 240 V_{AC}

MOVIMOT® Type Part number		MM 03B-233-00 823 259 8	MM 05B-233-00 823 260 1	MM 07B-233-00 823 261 X	MM 11B-233-00 823 262 8	MM 15B-233-00 823 263 6	MM 22B-233-00 823 264 4
Apparent output power at V_{supply} = 200 – 240 V_{AC}	S_N	1.0 kVA	1.3 kVA	1.7 kVA	2.0 kVA	2.9 kVA	3.4 kVA
Connection voltages **Permitted range**	V_{in}	3 x 200 V_{AC} / **230 V_{AC}** / 240 V_{AC} V_{in} = 200 V_{AC} -10 % ... 240 V_{AC} +10 %					
Supply frequency	f_{in}	50 Hz – 60 Hz ± 10 %					
Supply voltage rated current (at V_{in} = 230 V_{AC})	I_{in}	2.2 A_{AC}	2.9 A_{AC}	3.5 A_{AC}	4.7 A_{AC}	6.2 A_{AC}	8.2 A_{AC}
Output voltage	V_{outp}	0...V_{in}					
Output frequency **Resolution** **Operating point**	f_{outp}	2...100 Hz 0.01Hz 230 V at 60 Hz					
Rated output current	I_N	2.5 A_{AC}	3.3 A_{AC}	4.2 A_{AC}	5.7 A_{AC}	6.9 A_{AC}	9.0 A_{AC}
Motor power	P_{Mot}	**0.37 kW** **0.5 HP**	**0.55 kW** **0.75 HP**	**0.75 kW** **1.0 HP**	**1.1 kW** **1.5 HP**	**1.5 kW** **2 HP**	**2.2 kW** **3.0 HP**
PWM frequency		**4**[1] / 8 / 12 / 16[2] kHz					
Current limit	I_{max}	**Motor operating mode:**160 % at **Regenerative mode:**160 % at					
External braking resistor	R_{min}	27 Ω					
Interference immunity		Meets EN 61800-3					
Interference		Meets EN 61800–3 and class A limit to EN 55011 and EN 55014					
Ambient temperature Climatic category	ϑ_{amb}	**-25 °C...40 °C** (P_N reduction: 3 % I_N per K up to max. 60 °C) 3 K3					
Enclosure (motor-dependent)		IP54, IP55, IP65 (optional, to be specified with order)					
Operating mode		DB (EN 60149-1-1 and 1-3)					
Type of cooling (DIN 41 751)		Convection cooling					
Altitude		h ≤ 1000 m (P_N reduction: 1 % per 100 m starting at an altitude of 1000 m, see also the section on "Electrical Installation – Installation Instructions")					
External electronics supply	Tl. 24 V	V = +24 V ± 25 %, EN61131-2, residual ripple max. 13 % I_E ≤ 250 mA (typ. 180 mA at 24 V) Starting current: 1 A					
3 binary inputs		Potential-free via opto-coupler, PLC-compatible (EN 61131-2) R_i ≈ 3.0 kW, I_E ≈ 10 mA, sampling time ≤ 5 ms					
Signal level		+13 V...+30 V = "1" = contact closed -3 V...+5 V = "0" = contact open					
Control functions	Tl. R Tl. L Tl. f1/f2	CW/Stop CCW/Stop "0" = setpoint 1 / "1" = setpoint 2					
Output relays **Contact data**	Tl. K1a Tl. K1b	Response time ≤ 10 ms 24 V_{DC} / 0.6 A_{DC} / DC11 according to IEC 337-1					
Signaling function		Contactor for ready signal Contact closed: – with applied voltage (24 V + supply) – if no fault was detected – after self-test phase concluded (after switch-on)					
Serial interface	Tl. RS + Tl. RS -	RS-485 (see page 20)					

1) Factory setting

2) 16 kHz PWM frequency (low-noise): If DIP-SWITCH S1/7 = ON, the devices operate with 16 kHz PWM frequency (low-noise) and incrementally switch back to a lower clock frequency as a function of the heat sink temperature.

3.5 Integrated RS-485 Interface

RS-485 interface	
Standard	RS-485 to EIA standard (with integrated dynamic terminating resistor)
Baud rate	9,600 baud 31,250 baud (in connection with fieldbus interfaces MF..)
Start bits	1 start bit
Stop bits	1 stop bit
Data bits	8 data bits
Parity	1 parity bit, supplementing to even parity
Data direction	Unidirectional
Operating mode	Asynchronous, half-duplex
Timeout interval	1 s
Cable length	max. 200 m at RS-485 operation with 9,600 baud max. 30 m with transmission rate: 31,250 baud [1)]
Number of stations	• Max. 32 stations (1 bus master[2)] + 31 MOVIMOT®) broadcast and group addresses are possible • 15 MOVIMOT® individually addressable

1) Transmission rate 31,250 baud is automatically detected when operating with fieldbus interface MF…

2) External controller or MBG11A, MWA21A or MLG..A option

3.6 4Q Operation in Motors with Mechanical Brake

- The brake coil is used as a braking resistor in 4Q operation.
- No external braking resistor may be connected.
- Braking voltage is generated inside the unit and, therefore, independently of supply voltage.

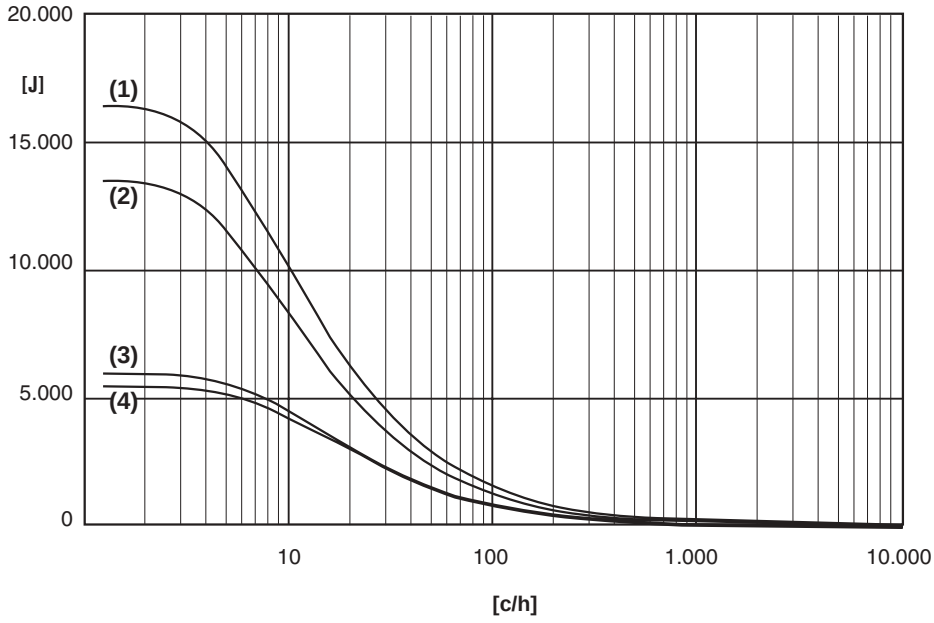
Resistance and Assignment of Brake Coil

Motor	Brake	Resistance of brake coil[1)]	
		MOVIMOT® with input voltage 380 – 500 V_{AC}	MOVIMOT® with input voltage 200 – 240 V_{AC}
DT71	**BMG05**	277 Ω (230 V)	69.6 Ω (110 V)
DT80	**BMG1**	248 Ω (230 V)	62.2 Ω (110 V)
DT90	**BMG2**	216 Ω (230 V) / 54.2 Ω (110 V)	54.2 Ω (110 V)
DV100/DT100	**BMG4**	43.5 Ω (110 V)	27.3 Ω (88 V)

1) Nominal value measured between red (terminal 13) and blue (terminal 15) connections at 20°C, temperature-dependent fluctuations in the range of -25% / +40 % are possible.

Regenerative Load Capacity of Brake Coil

MOVIMOT® with input voltage 380 – 500 V_{AC}



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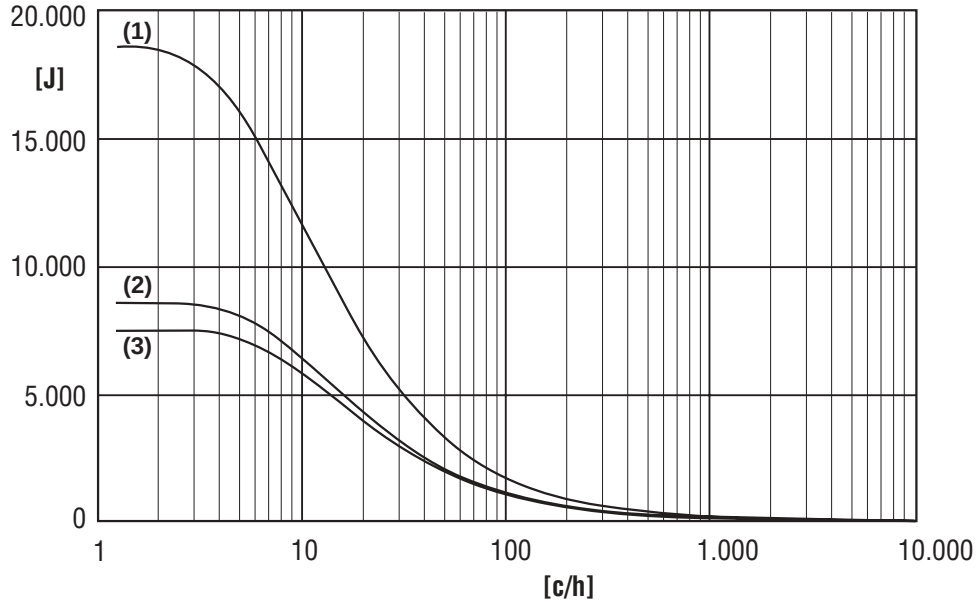
[c/h]	Cycles per hour	
(1)	BMG2/BMG4	(110 V)
(2)	BMG2	(230 V)
(3)	BMG1	(230 V)
(4)	BMG05	(230 V)

MOVIMOT® with input voltage 200 – 240 V_{AC}



03508BXX

[c/h] Cycles per hour
(1) BMG2 (110 V), BMG4 (88 V)
(2) BMG1 (110 V)
(3) BMG05 (110 V)

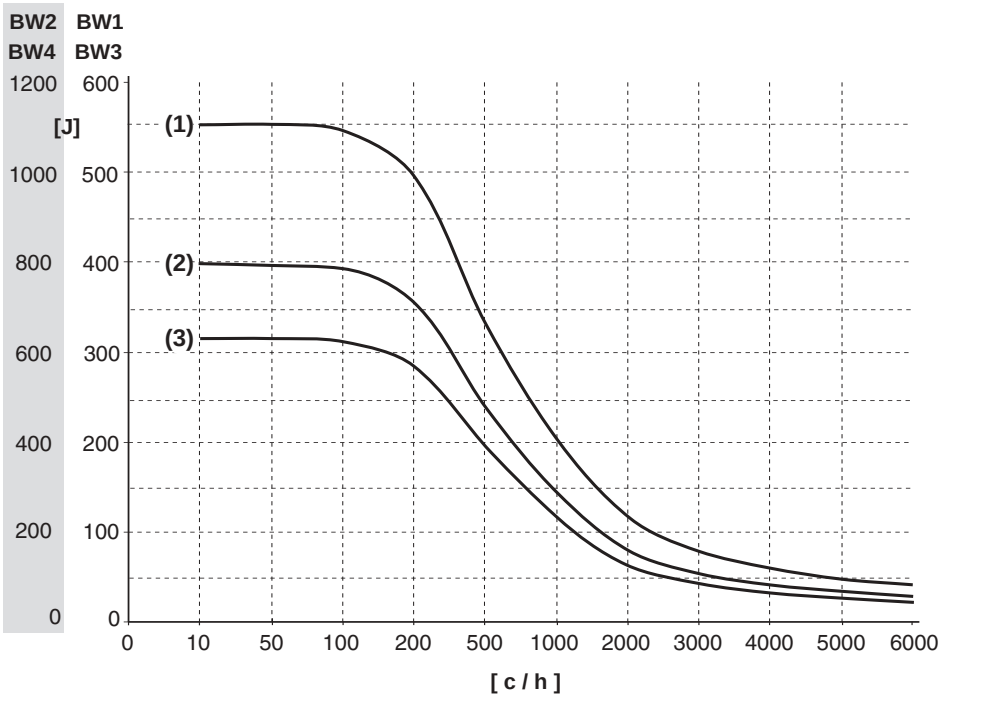
3.7 4Q Operation with Integrated BW.. Braking Resistor

- Braking resistor is integrated as standard in the terminal box of MOVIMOT® for motors without mechanical brake.
- 4Q operation is recommended for applications with low regenerative energy.
- The resistor is self-protecting (reversible) against regenerative overload by abruptly going to high resistance and no longer accepting any more energy.
- The inverter then switches off and signals an overvoltage fault (fault code 07).

Assignment of Internal Braking Resistors

MOVIMOT®	MOVIMOT® type	Braking resistor
with input voltage 380–500 V_{AC}	MM03..MM15	BW1
	MM22..MM30	BW2
with input voltage 200–240 V_{AC}	MM03..MM07	BW3
	MM11..MM22	BW4

Regenerative Load Capacity of Braking Resistors



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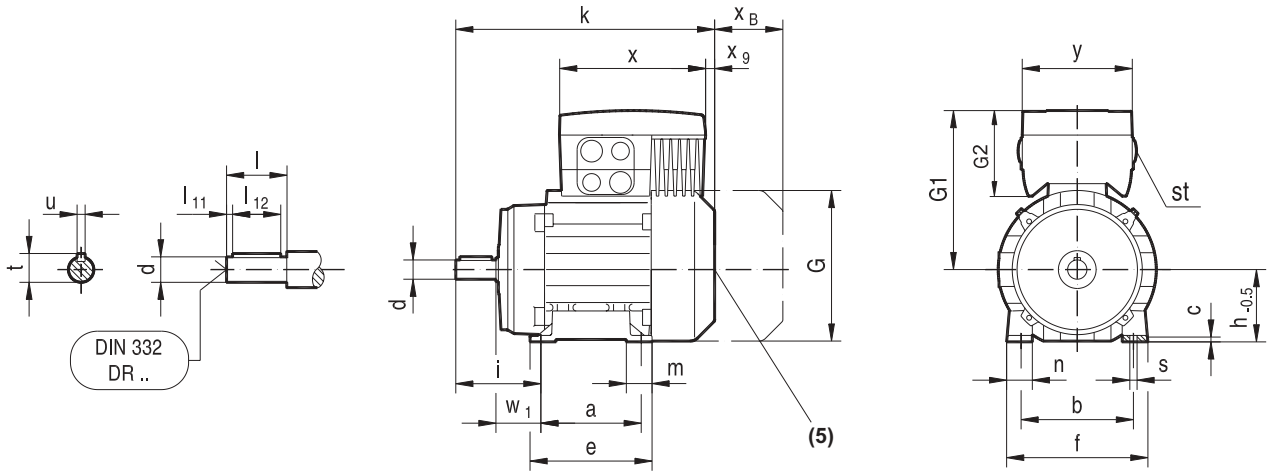
(1) Braking ramp 10 s
(2) Braking ramp 4 s
(3) Braking ramp 0.2 s

[c/h] Cycles per hour

3.8 Dimension Sheet Foot-Mounted MOVIMOT®



04828BXX

(1) 3 x 400 V_{AC}	DT71D	DT80..	DT90..MM1.	DT90L MM22	DV100M	DV100L
(2) 3 x 230 V_{AC}	DT71D	DT80..	–	DT90..	DV100M	–
a (B)	90	100	125 (4)	125 (4)	140	140
b (A)	112	125	140	140	160	160
c (HA)	5	10	8	8	12	12
e (BB)	115	125	152	152	170	170
f (AB	144	149	176	176	188	188
G (AC)	145 (3)	145	197 (3)	197 (3)	197	197
G1 (AD)	165	165	198	199	201	201
G2	110	110	110	117	117	117
h (H)	71	80	90	90	100	100
i (C+E)	75	90	106	106	123	123
k (L)	232	292	323	323	371	401
m (BA)	32	28	32	32	35	35
n (AA)	31	33	32	32	38	38
s (K)	7	9	9	9	12	12
st	4x M25x1.5 2x M16x1.5	4x M25x1.5 2x M16x1.5	4x M25x1.5 2x M16x1.5	4x M25x1.5 4x M16x1.5	4x M25x1.5 4x M16x1.5	4x M25x1.5 4x M16x1.5
w1 (C)	45	50	56	56	63	63
xB	64	64	85	85	85	85
x	182	182	182	230	230	230
y	140	140	140	175	175	175
x9	–3	–3	11.5	–2	–2	–2
d (D)	14	19	24	24	28	28
l (E)	30	40	50	50	60	60
l11 (E-EB-ED)	4	4	5	5	5	5
l12 (EB)	22	32	40	40	50	50
t (GA)	16	21.5	27	27	31	31
u (F)	5	6	8	8	8	8

(1) For drives with connection voltages of 380 – 500 V_{AC}
(2) For drives with connection voltages of 200 – 240 V_{AC}
(3) Fan cover flattened at bottom
(4) Deviates from IEC
(5) Keep air intake open

3.9 Dimension Sheet Flange-Mounted MOVIMOT®

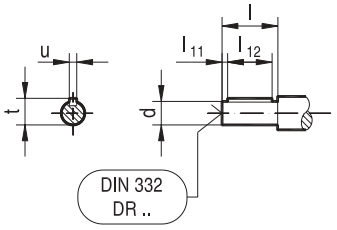


Fig.1

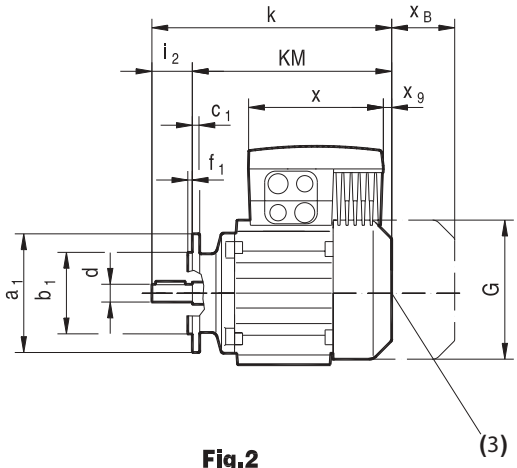
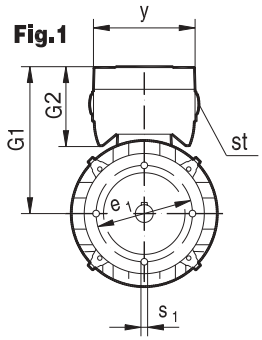
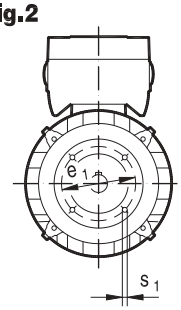


Fig.2





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(1) 3 x 400 V_{AC}	DFT71D	DFT80..		DFT90..MM1.		DFT90L MM22		DFV100M		DFV100L	
(2) 3 x 230 V_{AC}	DFT71D	DFT80..		–		DFT90..		DFV100M		–	
a1 (P)	160	160	200	200	250	200	250	200	250	200	250
b1 (N)	110	110	130	130	180	130	180	130	180	130	180
c1 (LA)	10	10	12	12	15	12	15	12	15	12	15
e1 (M)	130	130	165	165	215	165	215	165	215	165	215
f1 (T)	3.5	3.5		3.5	4	3.5	4	3.5	4	3.5	4
Fig.	2	2		2	1	2	1	2		2	
G (AC)	145	145		197		197		197		197	
G1 (AD)	165	165		198		199		201		201	
G2	110	110		110		117		117		117	
i2 (R+E)	30	40		50	66	50	66	60		60	
k (LB+R+E)	232	292		323		323		371		401	
KM (LB)	202	252		273	257	273	247	311		341	
s1 (S)	9	11		11	14	11	14	11	14	11	14
st	4x M25x1.5 2x M16x1.5	4x M25x1.5 2x M16x1.5		4x M25x1.5 2x M16x1.5		4x M25x1.5 4x M16x1.5		4x M25x1.5 4x M16x1.5		4x M25x1.5 4x M16x1.5	
xB	64	64		85		85		85		85	
x	182	182		182		230		230		230	
y	140	140		140		175		175		175	
x9	–3	–3		11.5		–2		–2		–2	
d (D)	14	19		24		24		28		28	
l (E)	30	40		50		50		60		60	
l11 (E-EB-ED)	4	4		5		5		5		5	
l12 (EB)	22	32		40		40		50		50	
t (GA)	16	21.5		27		27		31		31	
u (F)	5	6		8		8		8		8	

(1) For drives with connection voltages of 380 – 500 V_{AC}
(2) For drives with connection voltages of 200 – 240 V_{AC}
(3) Keep air intake open

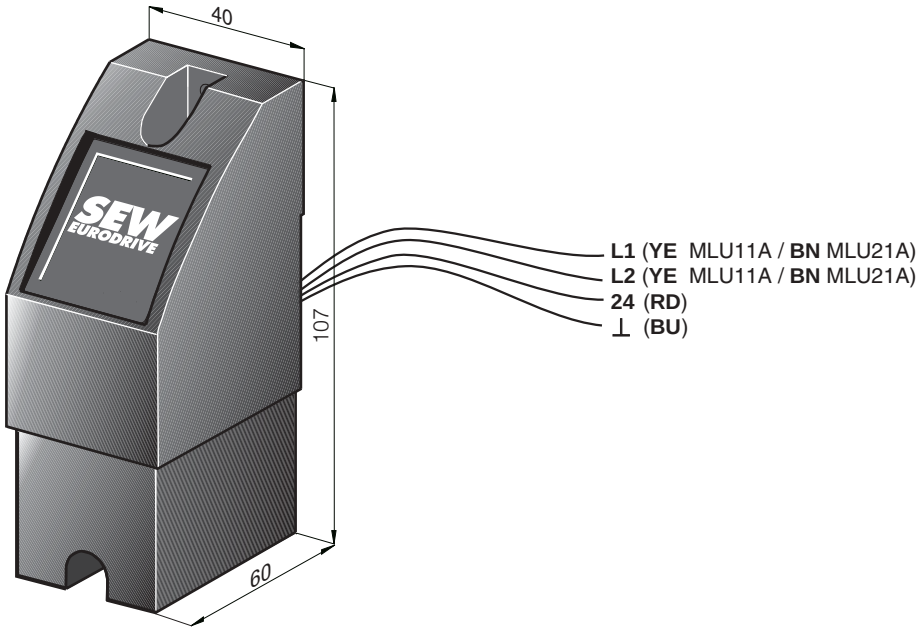
3.10 MOVIMOT® Options

24V_{DC} Power Supply MLU..A

The MLU..A option is mounted in a screwed cable gland of MOVIMOT® and allows for operating a MOVIMOT® including **one** option with a maximum current requirement of 70 mA (MBG11A, MWA21A) without external 24 V auxiliary supply.

Technical Data

	For MOVIMOT® with connection voltages of 380 – 500 V_{AC}	For MOVIMOT® with connection voltages of 200 – 240 V_{AC}
Option	**MLU11A**	**MLU21A**
Part number	823 383 7	823 387 X
Input voltage	380... 500 V_{AC} ± 10 %	200... 240 V_{AC} ± 10 %
Output voltage	24 V_{DC} ± 25 %	24 V_{DC} ± 25 %
Output power	max. 6 W	max. 6 W
Enclosure	IP 65	IP 65
Ambient temperature	-25...60 °C	-25...60 °C



03194BXX

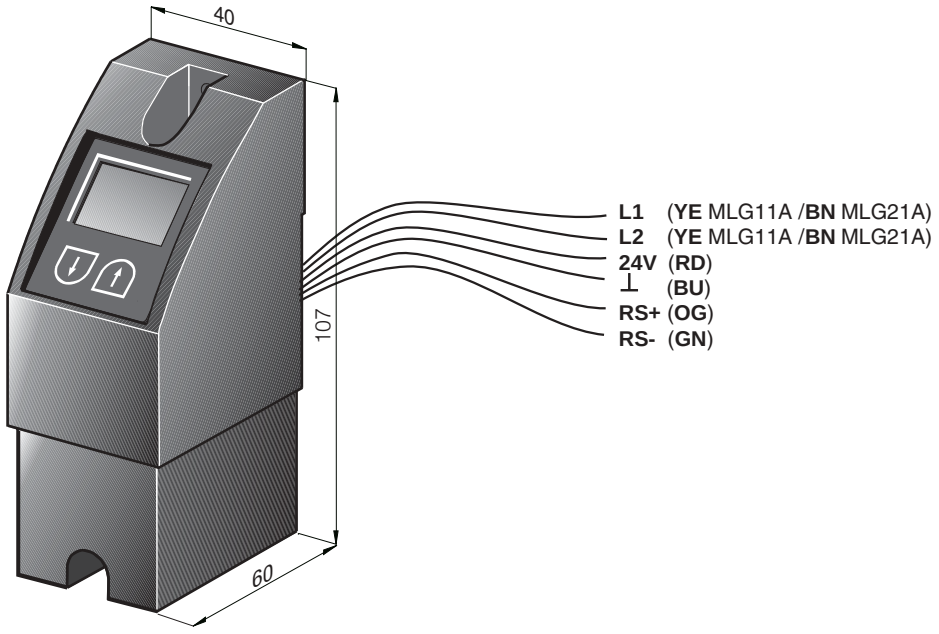
Setpoint Adjuster with 24 V_{DC} Power Supply MLG..A

The MLG..A option is mounted in a screwed cable gland of MOVIMOT® and allows for adjusting the drive speed in a range from -100 % ... +100 % $f_{a\,max}$ (potentiometer f1) and for supplying the inverter with 24 V_{DC} auxiliary voltage.

Technical Data

	For MOVIMOT® with connection voltages of 380 – 500 V_{AC}	For MOVIMOT® with connection voltages of 200 – 240 V_{AC}
Option	**MLG11A**	**MLG21A**
Part number	823 384 5	823 388 8
Input voltage	380... 500 V_{AC} ± 10 %	200... 240 V_{AC} ± 10 %
Output voltage	24 V_{DC} ± 25 %	24 V_{DC} ± 25 %
Output power	max. 6 W	max. 6 W
Setpoint resolution	1 %	1 %
Serial interface[1)]	RS-485 for connecting a MOVIMOT® inverter	
Enclosure	IP 65	IP 65
Ambient temperature	-25...60 °C	-25...60 °C

1) With integrated dynamic terminating resistor



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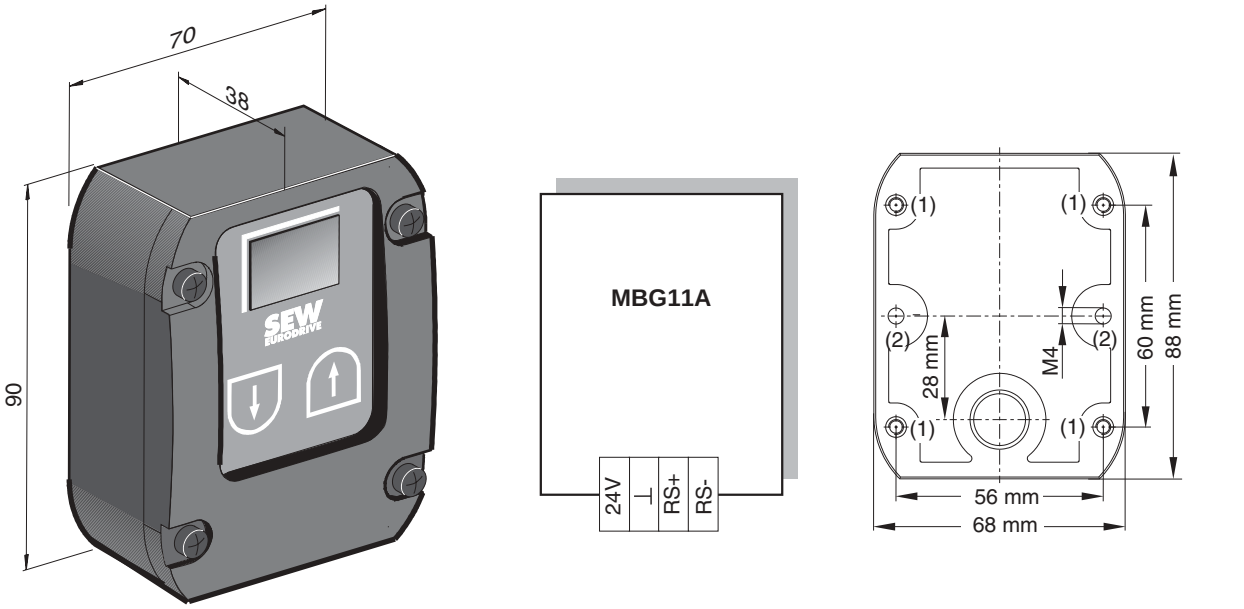
Setpoint Adjuster MBG11A

- Setpoint adjuster MBG11A has two buttons and a display. They allow remote speed adjustment in the range from -100 %… +100 % f_{max} (potentiometer f1).
- Up to 31 MOVIMOT® inverters can be controlled at the same time (broadcasting).

Technical Data

Option MBG11A	
Part number	822 547 8
Input voltage	24 V_{DC} ± 25 %
Current requirements	approx. 70 mA
Setpoint resolution	1 %
Serial interface[1)]	RS-485 for connection of up to 31 MOVIMOT® inverters (max. 200 m, 9,600 baud)
Enclosure	IP 65
Ambient temperature	-15...60 °C

1) with integrated dynamic terminating resistor



03196BXX

(1) drilled holes on the rear
(2) retaining openings for M4 screws

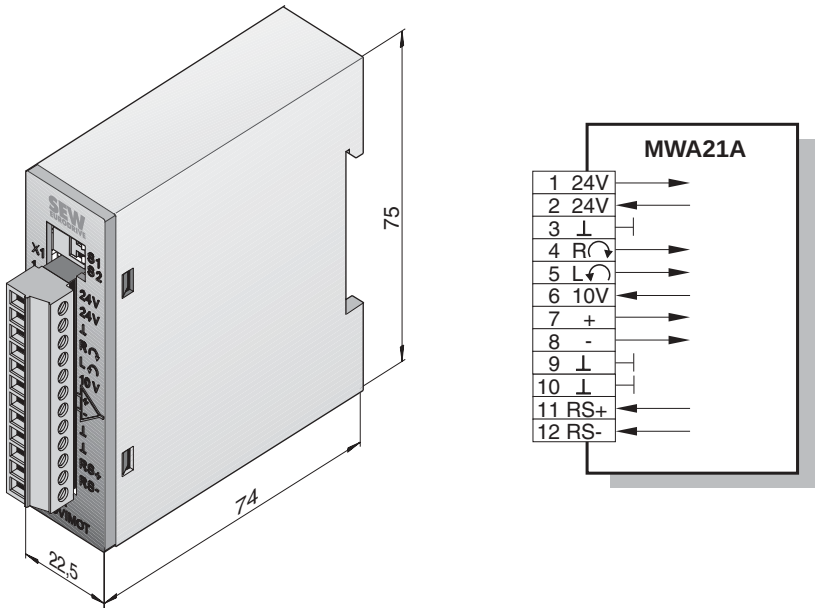
Setpoint Converter MWA21A

- Setpoint converter MWA21A converts an analog setpoint and control signals in an RS-485 protocol.
- This allows for remote control of MOVIMOT® from the switch cabinet.
- Up to 31 MOVIMOT® inverters can be controlled at the same time (broadcasting).

Technical Data

Option MWA21A	
Part number	823 006 4
Input voltage	24 V_{DC} ± 25 %
Current requirements	approx. 70 mA
Serial interface[1)]	RS-485 for connection of up to 31 MOVIMOT® inverters (max. 200 m, 9,600 baud) unidirectional communication Cycle time: 100 ms
Analog input	0...10 V / 2...10 V, $R_i \approx 12$ kΩ 0...20 mA / 4...20 mA, $R_i \approx 22$ Ω
Setpoint resolution of the analog input	8 bit (± 1 bit)
Signal level of binary inputs	+13 V ...+30 V = "1" - 3 V ...+5 V = "0"
Enclosure	IP 20
Ambient temperature	-15...60 °C

1) With integrated dynamic terminating resistor



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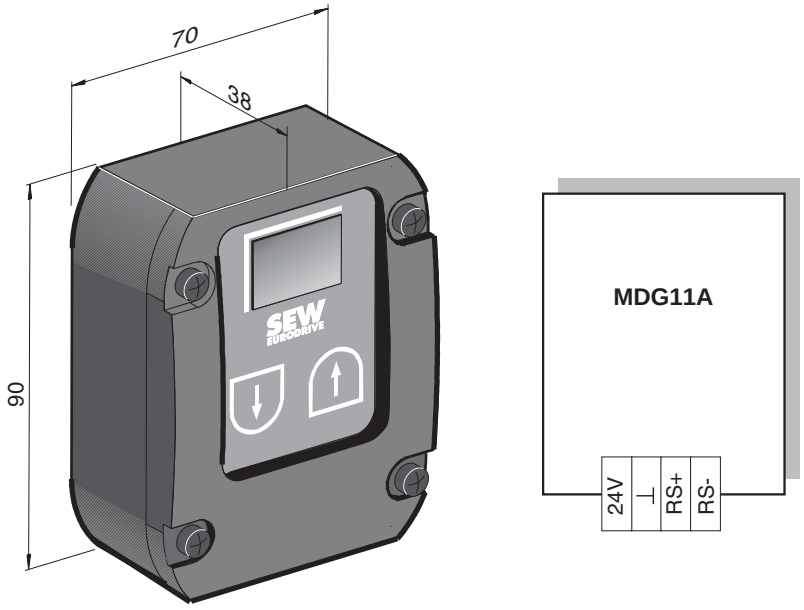
Diagnostic Unit MDG11A

The unit shows operating status, output current, terminal status and, in case of a fault condition, the fault code of a MOVIMOT®. The selection is performed using the ↑ button, the other arrow key has no function.

Technical Data

Option MDG11A	
Part number	822 941 4
Input voltage	24 V_{DC} ± 25 %
Current requirements	approx. 70 mA
Serial interface	RS-485 for connection of **one** MOVIMOT® inverter with control via terminals
Enclosure	IP 65
Ambient temperature	-15...60 °C



03607AXX

MOVIMOT® Plug Connectors

../AVT1

../ASA3

04149BXX

The following optional plug connectors are available for MOVIMOT®:

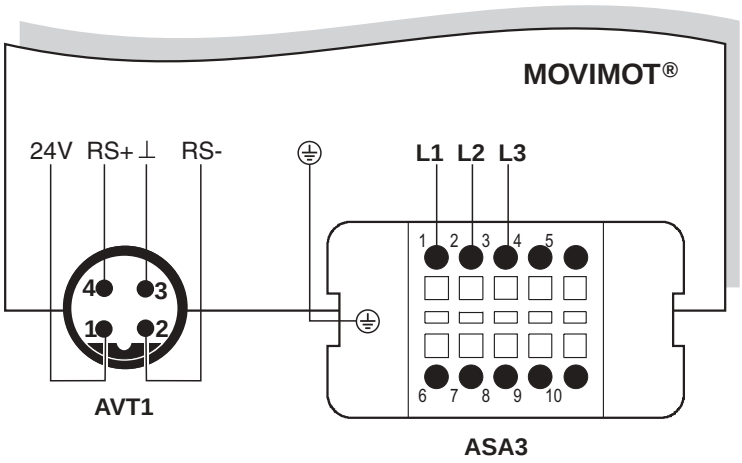
Plug connector	SEW order designation	Manufacturer designation Description
For power	ASA3	Harting Han® 10 ES pin insert (extension housing with 2 clips)
For RS-485	AVT1	Round plug connector M12 x 1 4-wire plug (male), B-coded

Please observe: The corresponding female connectors are not included in the shipment.

Possible Combinations

- MM.../ASA3
- MM.../AVT1
- MM.../ASA3/AVT1

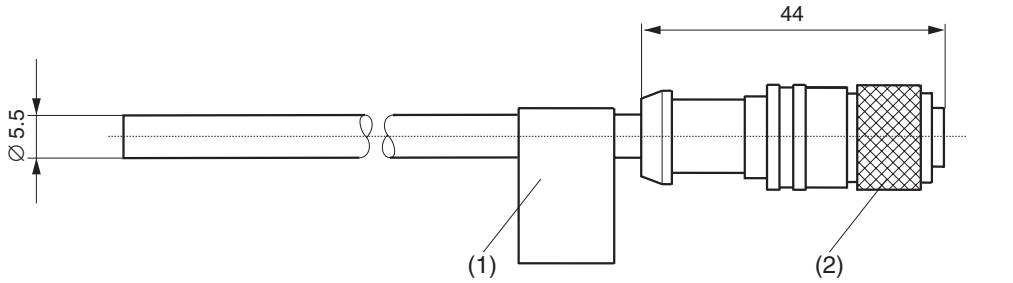
Connector Pin Assignment



05124AXX

Pre-fabricated Cables for AVT1 Plug Connector

The pre-fabricated cable with socket is used for connecting MOVIMOT® with AVT1 plug connector and MF.../Z.1. fieldbus interfaces or a commercially available controller (RS-485 master).



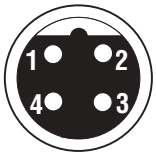
04073BXX

(1) Nameplate

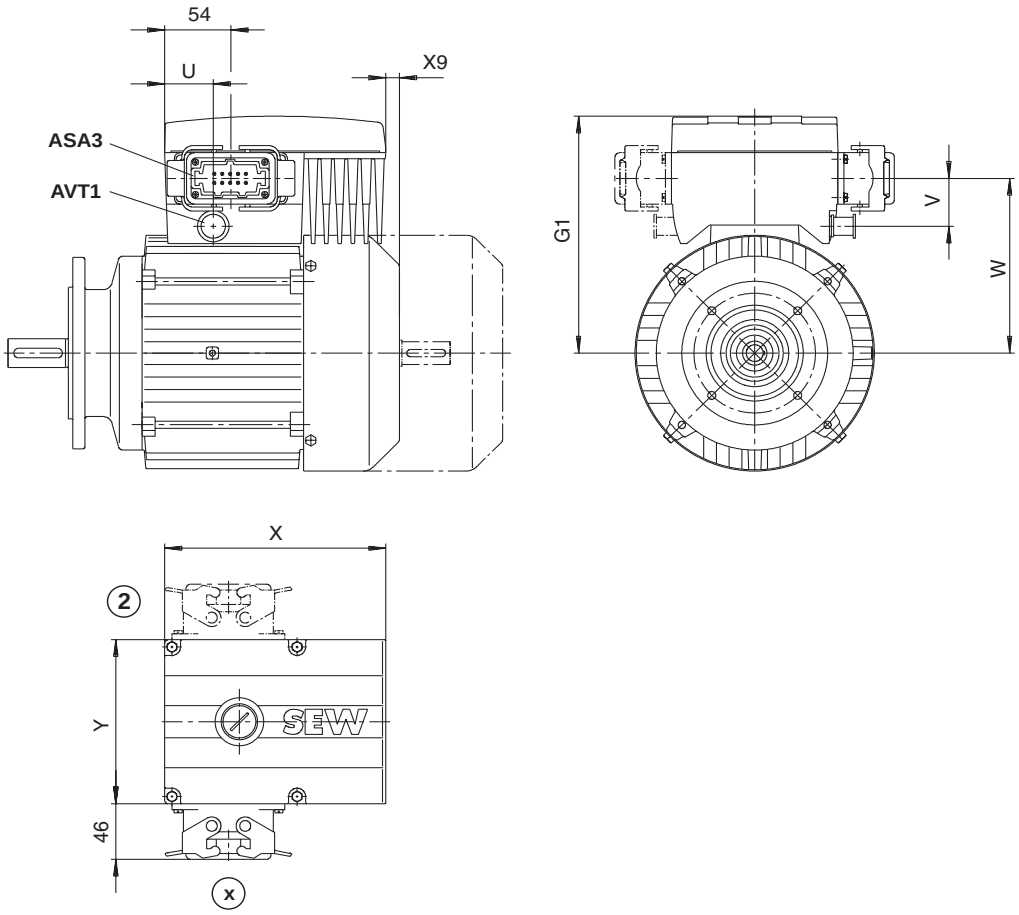
(2) Shielded cap nut with vibration resistance

Cable quality	Part number
Helu cable SUPER-PAAR-TRONIC-C-PUR	5 meters: 0815 592 5 10 meters: 0815 593 3

Socket Assignment

	PIN	Core color	Assignment
 04074AXX	1	brown	+24 V
	2	yellow	RS-
	3	white	GND
	4	green	RS+
	Shield on cap nut		

Dimension Sheet ASA3, AVT1 Plug Connector



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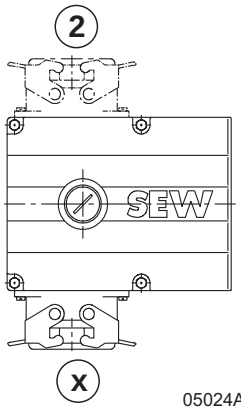
	G1	W	X9	X	Y	U	V
DFT71..BMG/MM..	165	113	-3	182	140	40	40
DFT80..BMG/MM..	165	113	-3	182	140	40	40
DFT90..BMG/MM..	198	146	11.5	182	140	40	40
DFV100..BMG/MM..	201	148	-2	230	175	56	38.5

Possible Plug Connector Positions

The following positions are possible for the ASA3 and AVT1 plug connectors:

Plug connector	ASA3	AVT1	ASA3 + AVT1
Possible positions	X (normal)	X (normal)	X (normal) + X (normal)
			2 + 2
	2	2	X (normal) + 2
			2 + X (normal)



05024AXX

3.11 MOVIMOT® with Factory-Installed Options

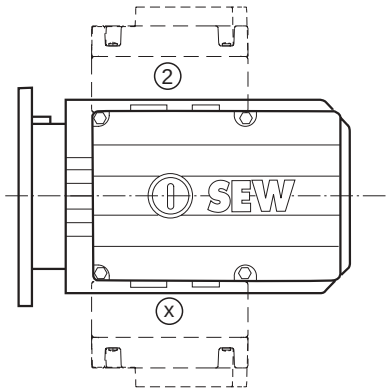
The following options can be installed upon request (assembled and wired for operation):

- Local 24 V_{DC} supply (MLU..A)
- Local setpoint adjuster with 24 V_{DC} supply (MLG..A)
- AS-i binary slave (MLK11A)
- Profibus (MFP..) fieldbus interface
- InterBus (MFI..) fieldbus interface
- DeviceNet (MFD..) fieldbus interface
- CANopen (MFO..) fieldbus interface
- Hybrid cable for connection between MF.../Z.3. or MF../.6. field distributor and MOVIMOT®
  - KPFA 1.5 m
  - KPFB 3 m

Important Ordering Information

The options can be installed in the following positions:

- Position "2"
- Position "X" (normal)



50377AXX

An ordering example can be found in the section "MOVIMOT® Nameplates, Type Designations" on page 13.

3.12 MOVIMOT® Retrofit Sets

In principle it is recommended to purchase factory pre-fabricated MOVIMOT® systems. In exceptional cases, a retrofitting may also be done by the customer.

Requirement: Only the following (brake) motors may be retrofitted:

- Motor nominal voltage 220 – 240/380 – 415 V_{AC}, 50 Hz
- Brake nominal voltage 230 V_{AC} with MM03 – 15
  110 V_{AC} with MM22/30

No retrofit sets are available for UL devices.

1400 1/min

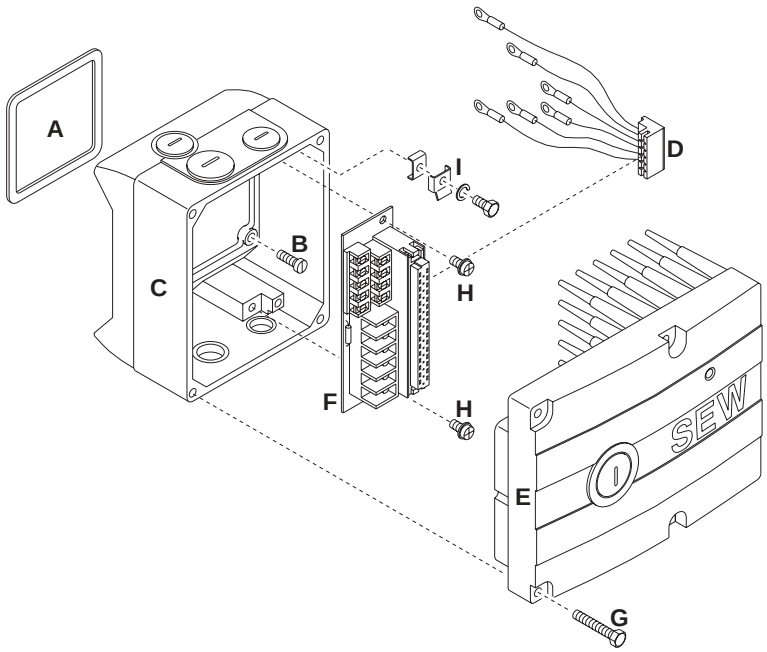
Power / kW	Motor	+ Retrofit set part number	= MOVIMOT®
0.37	DT71 D4	826 614 X (MM03, ⅄)	DT71 D4/.../MM03
0.55	DT80 K4	826 615 8 (MM05, ⅄)	DT80 K4/.../MM05
0.75	DT80 N4	826 616 6 (MM07, ⅄)	DT80 N4/.../MM07
1.1	DT90 S4	826 617 4 (MM11, ⅄)	DT90 S4/.../MM11
1.5	DT90 L4	826 618 2 (MM15, ⅄)	DT90 L4/.../MM15
2.2	DV100 M4	826 619 0 (MM22, ⅄)	DV100 M4/.../MM22
3.0	DV100 L4	826 620 4 (MM30, ⅄)	DV100 L4/.../MM30

2900 1/min

Power / kW	Motor	+ Retrofit set part number	= MOVIMOT®
0.37	–	–	–
0.55	DT71 D4	826 621 2 (MM05, △)	DT71 D4/.../MM05
0.75	DT80 K4	826 622 0 (MM07, △)	DT80 K4/.../MM07
1.1	DT80 N4	826 623 9 (MM11, △)	DT80 N4/.../MM11
1.5	DT90 S4	826 624 7 (MM15, △)	DT90 S4/.../MM15
2.2	DT90 L4	826 625 5 (MM22, △)	DT90 L4/.../MM22
3.0	DV100 M4	826 626 3 (MM30, △)	DV100 M4/.../MM30

Scope of Delivery MOVIMOT® Retrofit Sets

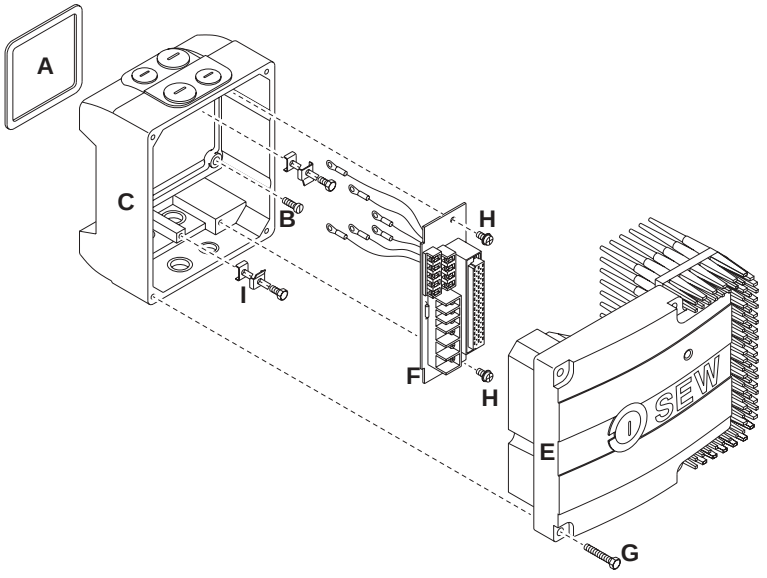
Scope of delivery of retrofit set MM03 – MM15 (Parts C – I are supplied assembled):



01082DXX

A	Terminal box gasket	D	Connection cable with right-angle plug	G	4 screws
B	4 screws	E	Cover with inverter	H	2 screws
C	Terminal box	F	Terminal board	I	PE screws

Scope of delivery of retrofit set MM22 – MM30 (Parts C – I are supplied assembled):



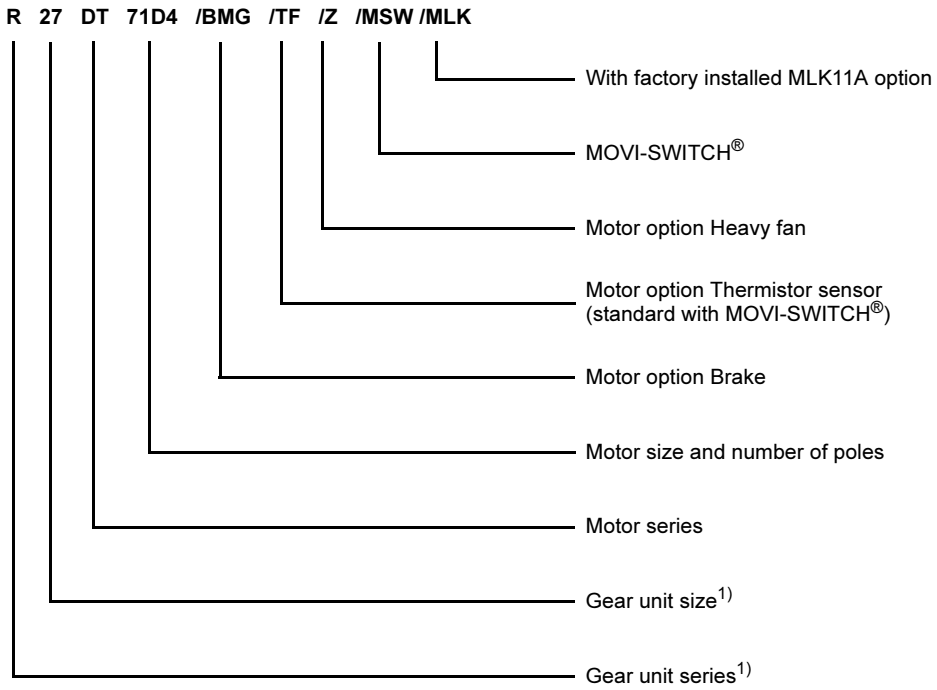
02661BXX

A	Terminal box gasket	E	Cover with inverter	G	4 screws
B	4 screws	F	Terminal board with connection cable	H	2 screws
C	Terminal box			I	PE screws

3.13 MOVI-SWITCH® Type Designation and Combination Options

03168AXX

Sample Type Designation



1) Detailed information about geared motor combinations can be found in the catalog "Geared Motors"

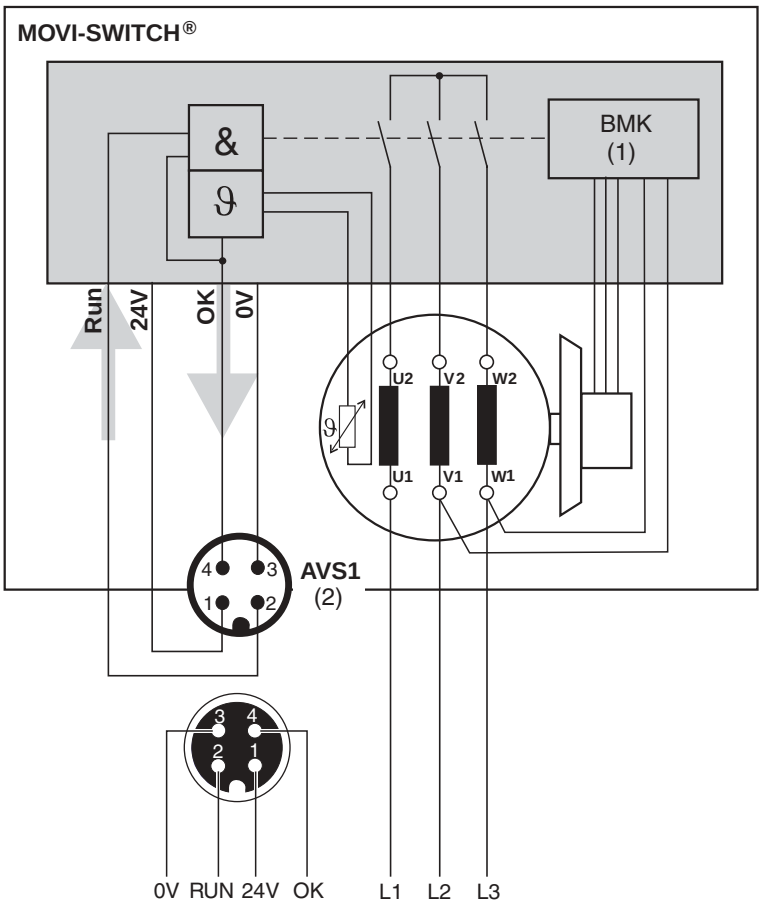
Possible Combinations

The following MOVI-SWITCH® AC motors and AC brake motors can be combined with all possible types of gear units, designs, and configurations in accordance with the selection tables in the "Geared Motors" catalog.

Size	Power [kW]			
	2-pole	4-pole	6-pole	8-pole
DT71D..(BMG)/TF/MSW	0.55	0.37	0.25	0.15
DT80K..(BMG)/TF/MSW	0.75	0.55	0.37	-
DT80N..(BMG)/TF/MSW	1.1	0.75	0.55	0.25
DT90S..(BMG)/TF/MSW	1.5	1.1	0.75	0.37
DT90L..(BMG)/TF/MSW	2.2	1.5	1.1	0.55
DV100M..(BMG)/TF/MSW	-	2.2	-	0.75
DV100L..(BMG)/TF/MSW	3.0	3.0	1.5	1.1

3.14 MOVI-SWITCH® Operating Principle

- MOVI-SWITCH® is a drive with integrated electronic On/Off switch for one direction of rotation and integrated full motor protection.
- Current flow in the motor is switched on or off by switching the star point with solid state power components.



03169BXX

(1) = Brake control system

(2) = M12 connector (standard coding)

3.15 MOVI-SWITCH® Features

Motor Voltage
- From 380 – 500 V, 50 / 60 Hz, motor winding only in ⅄ connection

Brake Voltage
- = Motor voltage / $\sqrt{3}$ or
- = Motor voltage

Control Supply Voltage
- 24 V_{DC} in accordance with EN 61 131-2

Control
- With control voltage 24 V_{DC} via M12 connector, identical for motors with and without brake

Switching Function
- On/Off with star bridge connection for one direction of rotation (CW or CCW, switchable via phase swapping)

Direction of Rotation
- CW or CCW (only externally switchable)

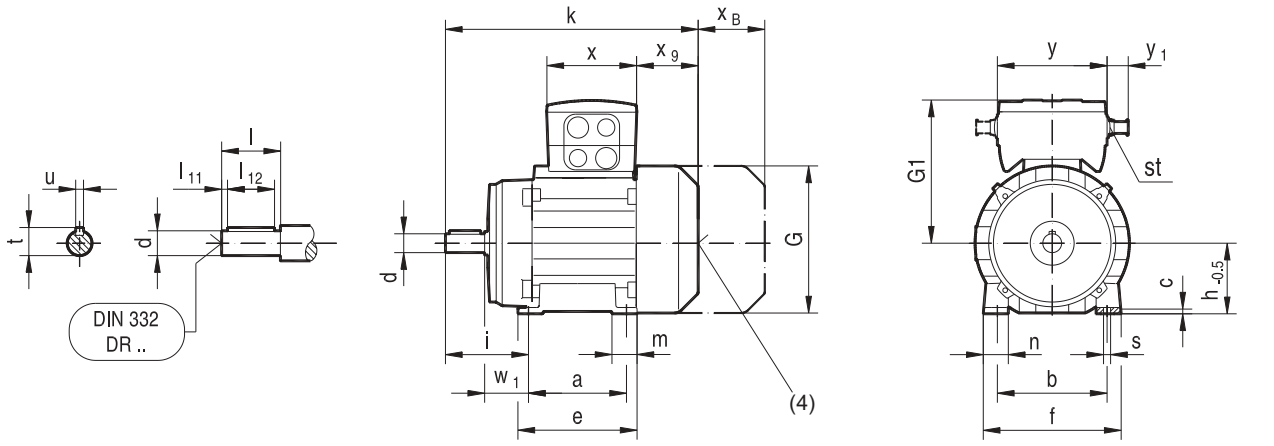
Thermal Motor Protection
- Integrated evaluation of PTC thermistor (TF), logically connected with enable signal

Brake Control System
- A special brake rectifier (BGW) is used in conjunction with brake motors that takes over brake control.
- The power supply of the brake coil consists of supply voltage, preferably by supplying the rectifier with power using one phase and the motor star point.
- The BGW rectifier implements quick release (BGE principle) of the brake and quick application (switch-off on the DC side) of the brake.

3.16 MOVI-SWITCH® Technical Data

MOVI-SWITCH®	
Power supply voltage (Signal: 24 V)	$V_{24\ V}$ 19 V...30 V $I_{24\ V}$ < (50 mA + I_{OK}) $I_{24\ V}$ < 2.5 A (at short-circuit output)
Control input (Signal: RUN) Circuit state RUN	 $V_{RUN(OFF)}$ 0...5 V, I_{RUN} < 2 mA $V_{RUN(ON)}$ 15...30 V, I_{RUN} < 15 mA
Temperature monitoring Circuit state PTC (TF) Module protection	 R_{OFF} > 3,990 Ohm R_{ON} < 1,650 Ohm Temperature shutdown 89 to 100 °C Temperature hysteresistyp. 5 K
Output (Signal OK) Checkback signal Ready for operation (high) Checkback signal Overtemperature(low) Current for checkback signal Short-circuit current	 V_{OK} > (V_{24V} - 3 V) high-resistance (I_{leak} < 2 mA) I_{OK} 0 to 0.65 A I_{OK} 0.7 to 2.4 A
Power connection Line current Line voltage range	 I_n motor 0.5 to 7 A V_n motor 380 V to 500 V (+/- 10 %), f = 48 to 62 Hz
Interference	meets EN 50081 Part 1 and EN 55011 limit B
Interference immunity	meets EN 50082 Part 2

3.17 Dimension Sheet Foot-Mounted MOVI-SWITCH®



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		DT71D	DT80..	DT90..	DV100M	DV100L
a	(B)	90	100	125 (2)	140	140
b	(A)	112	125	140	160	160
c	(HA)	5	10	8	12	12
e	(BB)	115	125	152	170	170
f	(AB)	144	149	176	188	188
G	(AC)	145 (1)	145	197 (1)	197	197
G1	(AD)	149	149	182	183	183
h	(H)	71	80	90	100	100
i	(C+E)	75	90	106	123	123
k	(L)	232	292	323	371	401
m	(BA)	32	28	32	35	35
n	(AA)	31	33	32	38	38
s	(K)	7	9	9	12	12
st		4x M25x1.5 1x M16x1.5 1x(3)	4x M25x1.5 1x M16x1.5 1x(3)	4x M25x1.5 1x M16x1.5 1x(3)	4x M25x1.5 3x M16x1.5 1x(3)	4x M25x1.5 3x M16x1.5 1x(3)
w1	(C)	45	50	56	63	63
xB		64	64	85	85	85
x		115	115	115	147	147
y		140	140	140	175	175
x9		64	64	98,5	79	79
y1		25	25	25	25	25
d	(D)	14	19	24	28	28
l	(E)	30	40	50	60	60
l11	(E-EB-ED)	4	4	5	5	5
l12	(EB)	22	32	40	50	50
t	(GA)	16	21.5	27	31	31
u	(F)	5	6	8	8	8

(1) Fan cover flattened at bottom
(2) Deviates from IEC
(3) Plug connector M12, 4-pole
(4) Keep air intake open!

3.18 Dimension Sheet Flange-Mounted MOVI-SWITCH®

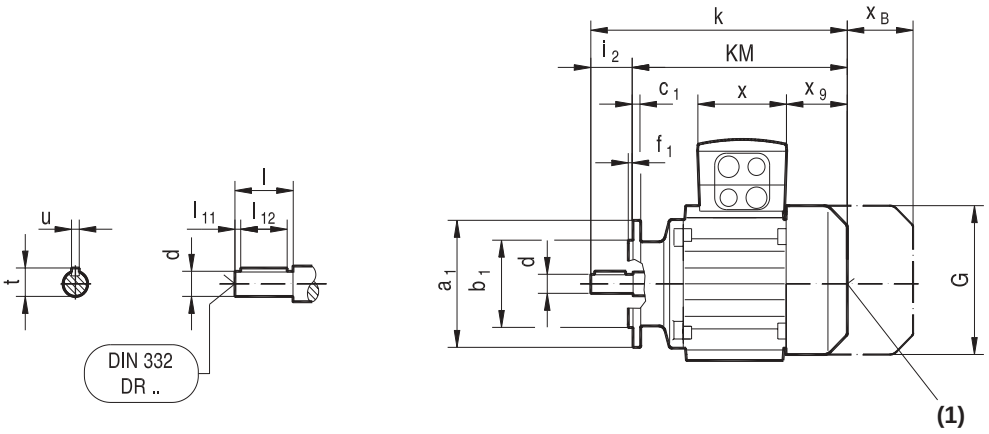


Fig.1

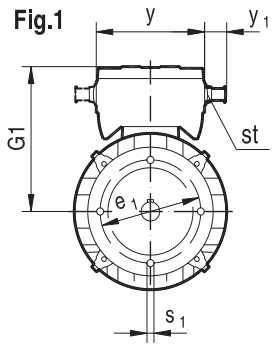
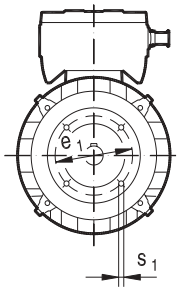


Fig.2



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	DFT71D	DFT80..		DFT90..		DFV100M		DFV100L	
a1 (P)	**160**	160	**200**	**200**	250	200	**250**	200	**250**
b1 (N)	110	110	130	130	180	130	180	130	180
c1 (LA)	10	10	12	12	15	12	15	12	15
e1 (M)	130	130	165	165	215	165	215	165	215
f 1 (T)	3.5	3.5		3.5	4	3.5	4	3.5	4
Fig.	2	2		2	1	2		2	
G (AC)	145	145		197		197		197	
G1 (AD)	149	149		182		183		183	
i2 (R+E)	30	40		50	66	60		60	
k (LB+R+E)	232	292		323		371		401	
KM (LB)	202	252		273	257	311		341	
s1 (S)	9	11		11	14	11	14	11	14
st	4x M25x1.5 1x M16x1.5 1x plug connector M12					4x M25x1.5 3x M16x1.5 1x plug connector M12			
xB	64	64		85		85		85	
x	115	115		115		147		147	
y	140	140		140		175		175	
x9	64	64		78.5		79		79	
y1	25	25		25		25		25	
d (D)	14	19		24		28		28	
l (E)	30	40		50		60		60	
l11 (E-EB-ED)	4	4		5		5		5	
l12 (EB)	22	32		40		50		50	
t (GA)	16	21.5		27		31		31	
u (F)	5	6		8		8		8	

(1) Keep air intake open!

3.19 MOVI-SWITCH® Plug Connector

../ASA3

04969AXX

The following plug connectors are available for MOVI-SWITCH®:

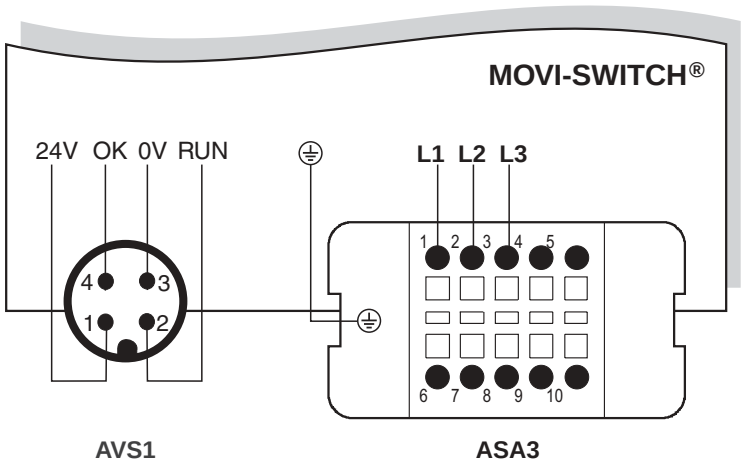
Plug connector	SEW designation	Manufacturer designation Description
For power	ASA3 (optional)	Harting Han® 10 ES pin insert (extension housing with 2 clips)
I/O communication	AVS1 (standard with MOVI-SWITCH®)	Standard round plug connector M12 x 1 4-wire plug (male), standard coded

Please observe: The corresponding female connectors are not included in the shipment.

Possible Combinations

- MSW.../AVS1 (standard)
- MSW.../ASA3
- MSW.../ASA3/AVS1

Connector Pin Assignment



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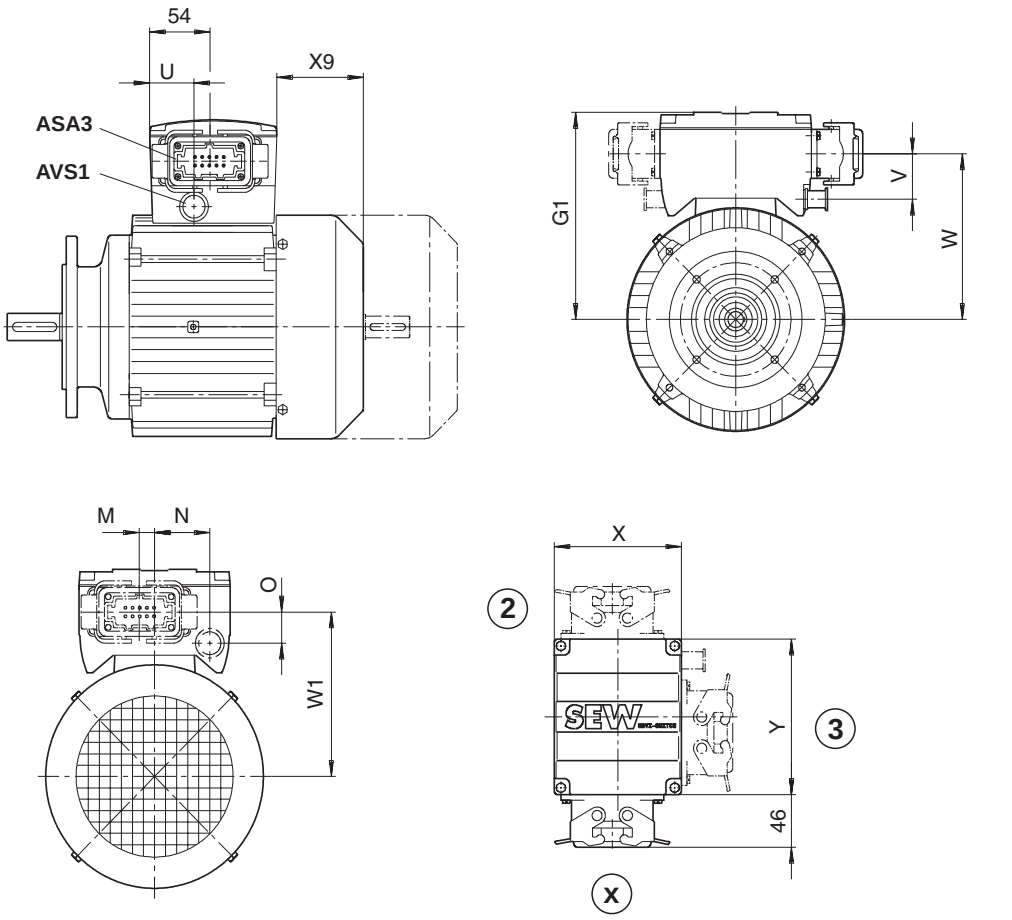
Dimension Sheet MOVI-SWITCH® with ASA3 and AVS1



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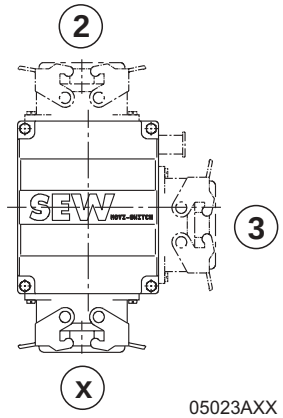
	G1	M	N	O	U	V	W	W1	X9	X	Y
DFT71..BMG/MSW	149	14	50	27.5	40	40	113	112	64	115	140
DFT80..BMG/MSW	149	14	50	27.5	40	40	113	112	64	115	140
DFT90..BMG/MSW	182	14	50	27.5	40	40	146	144	78.5	115	140
DFV100..BMG/MSW	183	30	80	11	56	38.5	148	147	79	147	175

Possible Plug Connector Positions

The following positions are possible for the ASA3 and AVS1 plug connectors:

Plug connector	ASA3	AVS1	ASA3 + AVS1
Possible positions	x (normal)	x (normal)	x (normal) + x (normal)
			2 + 2
	2	2	3 + 3
	3	3	x (normal) + 2
			2 + x (normal)



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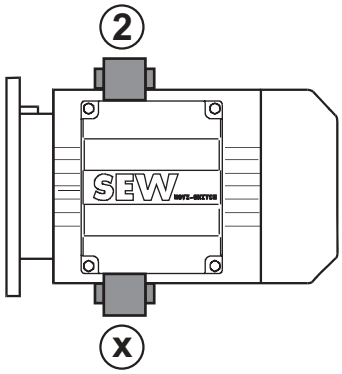
3.20 MOVI-SWITCH® with MLK11A Option Installed

AS-I binary slave MLK11A can be delivered installed upon request (assembled and wired for operation):

Important Ordering Information

The option can be installed in the following positions:

- Position "2"
- Position "x" (normal)



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An ordering example can be found in the section "MOVI-SWITCH® Type Designation and Combination Options" on page 37.

3.21 Fieldbus Interfaces

AS-i Binary Slave
MLK11A

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Function

Option MLK11A is mounted to a free cable gland and offers the possibility of connecting MOVIMOT® and MOVI-SWITCH® to the AS interface.

Functions in connection with MOVIMOT®

- Clockwise, counterclockwise
- Toggling between 2 setpoint values
- 24 V power supply for MOVIMOT®
- Ready for operation message to control
- LED display of inputs and outputs
- Input connections for one two-channel sensor or two one-channel sensors (via T connector)

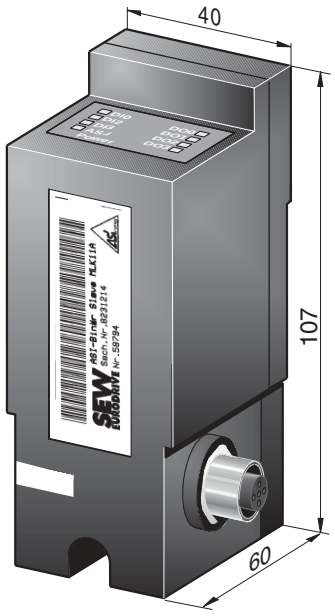
Functions in connection with MOVI-SWITCH®

- Start/Stop with one direction of rotation
- 24 V power supply for MOVI-SWITCH®
- Ready for operation message to control
- LED display of inputs and outputs
- Input connections for one two-channel sensor or two one-channel sensors (via T connector)

MLK11A Technical Data

AS-i Slaves with Special Functions

MLK11A Option	
Part number	823 121 4
AS-i profile	7.F (free profile)
I/O configuration	7_{hex}
ID code	F_{hex}
Address	1 to 31 (factory setting: address 0) max. number of address changes: 10
Watchdog	≥ 40 ms (all outputs de-energized)
Ambient temperature	-25 °C to +60 °C
Enclosure	IP65
Current consumption without external sensors	≤ 320 mA typically 250 mA (MLK11A with MOVIMOT®) typically 150 mA (MLK11A with MOVIMOT®)
Total current consumption	≤ 420 mA (including sensor power supply)
Sensor connection	
Power supply	18 V_{DC} to 30 V_{DC} from AS-i net, short-circuit proof I_{max} ≤ 100 mA
Binary inputs DI2 / DI3 Signal level Signal delay	PNP switching "1" : V ≥ 10 V, I ≥ 6 mA (max. 10 mA) "0" : V ≤ 5 V, I ≤ 2 mA < 5 ms



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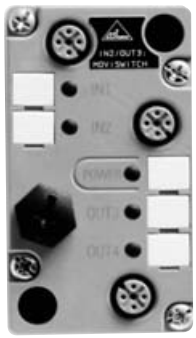
AS-i Slaves with Special Functions

Some manufacturers of AS-i products today offer specially adapted slaves for interfacing MOVIMOT® and MOVI-SWITCH®.

AS-i Slave with MOVI-SWITCH® Port

- Combined input, output for switching the drive on and off or checkback signal in case of overload
- 1 additional input
- 1 additional output
- Enclosure IP65

AS-i slave with MOVI-SWITCH® port	
Ordering designation	AC2054
Supply source	ifm electronic, 45127 Essen Phone (0)201 2422 - 0 Fax (0)201 - 2422200
AS-i profile	S 3.F



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AS-i Slave with RS-485 Interface

- Serial interface with SEW-MOVILINK® profile for MOVIMOT®
- Single control of fixed frequencies
- Setpoint selection via "AS-i Analog Protocol" (Profile 7.1)
- Enclosure IP65
- 2 additional inputs
- 24 V supply for MOVIMOT® via parallel black cable

AS-i slave with RS-485 interface		
Ordering designation	AC1150	Item number: 1164
Supply source	ifm electronic 45127 Essen Phone (0)201 2422 - 0 Fax (0)201 - 2422200	Bihl+Wiedemann 68199 Mannheim Phone (0)621 - 33996 - 0 Fax (0)621 - 3392239
AS-i profile	S 7.F	S 7.F

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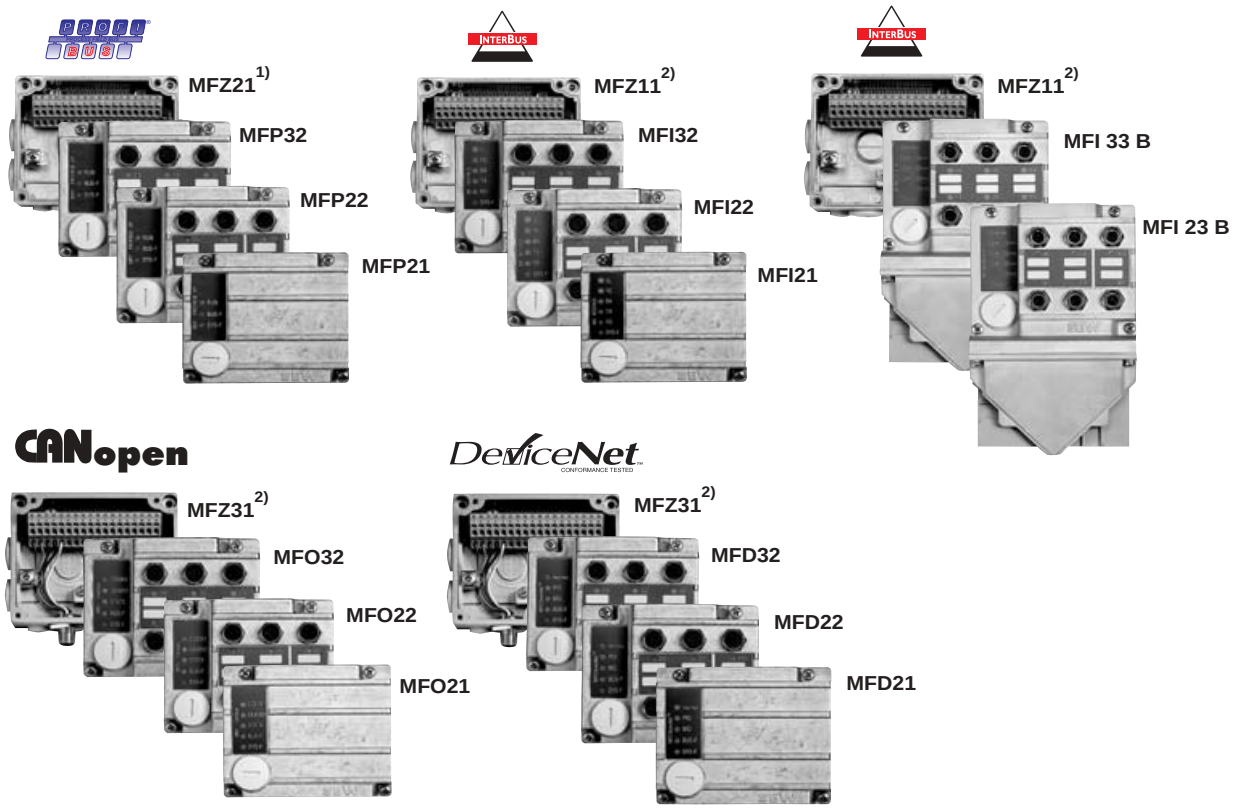
MF... Fieldbus Interfaces



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1 Red terminal label
2 Black terminal label

Designs

Module type	MFP21D	MFP22D	MFP32D
Part number	**823 624 0**	**823 625 9**	**823 626 7**
Corresponding module carrier Part number	MFZ 21D 823 627 5		
Module + Module carrier Part number	**MFP21D/Z21D 823 683 6**	**MFP22D/Z21D 823 684 4**	**MFP32D/Z21D 823 685 2**
Connection technology Bus Sensors / Actuators	Terminals Terminals	Terminals M12 and terminals	
Digital inputs	4		6
Digital outputs	2		0

Designs

Module type	MFI21A	MFI22A	MFI32A
Part number	**823 526 0**	**823 527 9**	**823 528 7**
Corresponding module carrier Part number	MFZ 11A 823 514 7		
Module + Module carrier Part number	**MFI21A/Z11A 823 451 5**	**MFI22A/Z11A 823 452 3**	**MFI32A/Z11A 823 453 1**
Connection technology Bus Sensors / Actuators	Terminals Terminals	Terminals M12 and terminals	
Digital inputs	4		6
Digital outputs	2		0

Designs

with Fiber Optic and Rugged-Line Plug Connector (Phoenix Contact)

Module type	**MFI23B**	**MFI33B**
Part number	**823 892 8**	**823 893 6**
Corresponding module carrier Part number	MFZ 11A 823 514 7	
Module + Module carrier Part number	**MFI23B/Z11A 823 966 5**	**MFI33B/Z11A 823 967 3**
Connection technology Bus Sensors / Actuators	Fiber optic (via rugged-line plug connector) M12 and terminals	
Digital inputs	4	6
Digital outputs	2	0

Designs

DeviceNet

Module type	**MFD21A**	**MFD22A**	**MFD32A**
Part number	**823 551 1**	**823 552 X**	**823 553 8**
Corresponding module carrier Part number	MFZ 31A 823 548 1		
Module + Module carrier Part number	**MFD21A/Z31A 823 554 6**	**MFD22A/Z31A 823 555 4**	**MFD32A/Z31A 823 556 2**
Connection technology Bus Sensors / Actuators	Micro-style connector Terminals	Micro-style connector M12 and terminals	
Digital inputs	4		6
Digital outputs	2		0

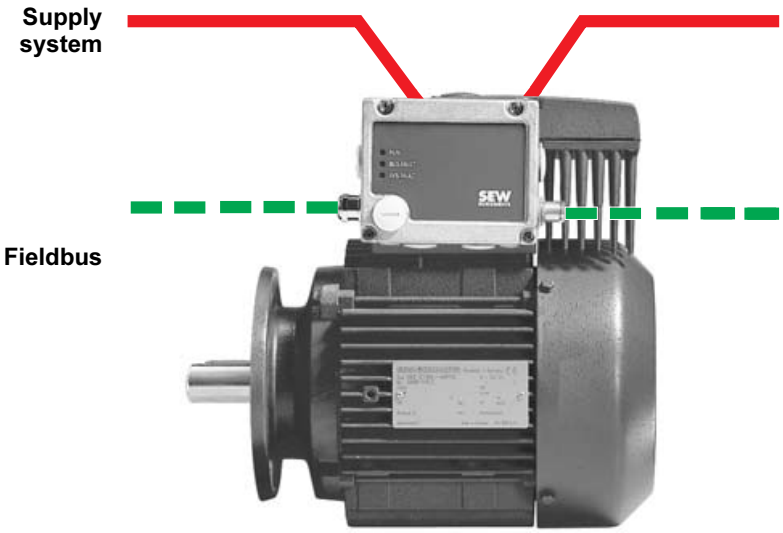
Designs

CANopen

Module type	**MFO21A**	**MFO22A**	**MFO32A**
Part number	**823 957 6**	**823 958 4**	**823 959 2**
Corresponding module carrier Part number	MFZ 31A 823 548 1		
Module + Module carrier Part number	**MFO21A/Z31A 823 978 9**	**MFO22A/Z31A 823 979 7**	**MFO32A/Z31A 823 980 0**
Connection technology Bus Sensors / Actuators	Micro-style connector Terminals	Micro-style connector M12 and terminals	
Digital inputs	4		6
Digital outputs	2		0

Installation types of MF.. Fieldbus Interfaces

On MOVIMOT®
Inverter:



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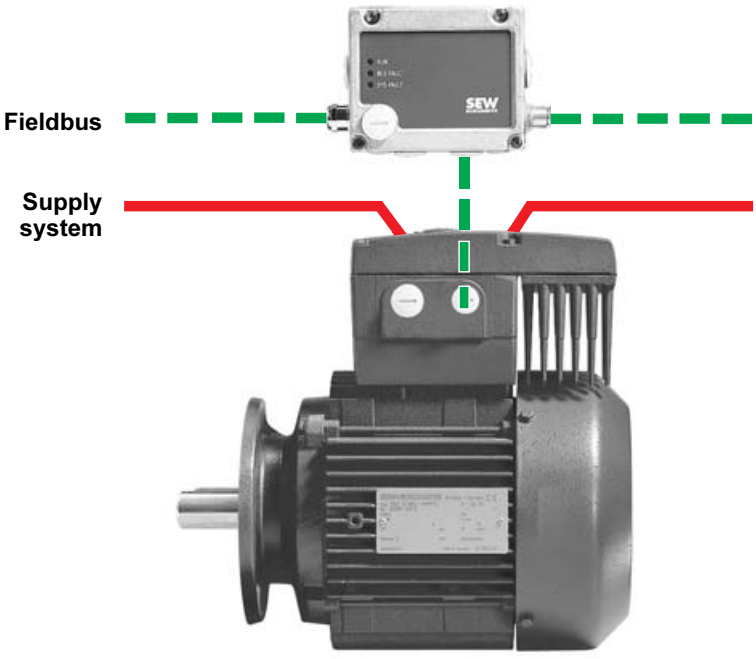
In the Field:



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Technical Data of MFP.. PROFIBUS Interface

MFP electrical specification	
MFP electronic power supply	V = +24 V +/- 25 %, $I_E \leq 150$ mA
Electrical isolation	• PROFIBUS DP connector potential-free • Between logic and 24 V power supply • Between logic and peripherals/MOVIMOT® via opto-coupler
Bus connection technology	2 cage clamp terminals each for incoming and outgoing bus cables (optional M12)
Shielding	**Using EMC metal cable glands**
Binary inputs (sensors) Signal form	PLC-compatible to EN 61131-2, Ri ≈ 3.0 kΩ, sampling time approx. 5 ms 13 V – +30 V "1" = Contact made / -3 V – +5 V "0" = Contact not made
Sensor power supply Rated current Internal voltage drop	24 V_{DC} to EN 61131-2 interference voltage proof and short-circuit proof Σ 500 mA max. 1 V
Binary outputs (actuators) Signal level Rated current Leakage current Internal voltage drop	PLC-compatible to EN 61131-2, interference voltage proof and short-circuit proof "0" = 0 V, "1" = 24 V 500 mA max. 0.2 mA max. 1 V
Inverter power supply (terminal 15/18) Rated current	24 V_{DC} **not short-circuit proof** 250 mA
Cable length RS-485	30 m between MFP and MOVIMOT® if installed separately
Ambient temperature	-25...60 °C
Enclosure	IP65 (assembled on MFZ.. connection module, all plug connections sealed)

Technical data PROFIBUS	
PROFIBUS protocol	PROFIBUS DP
Supported baud rates	9.6 kbps to 1.5 Mbps / 3 to 12 Mbps (with automatic recognition)
Bus termination	Integrated, can be enabled via DIP switch according to EN 50170 (V2)
Permitted line length for PROFIBUS	• 9.6 kbps: 1200 m • 19.2 kbps: 1200 m • 93.75 kbps: 1200 m • 187.5 kbps: 1000 m • 500 kbps: 400 m • 1.5 Mbps: 200 m • 12 Mbps: 100 m To increase the expansion, several segments can be coupled via repeater. The max. expansion/cascading depth can be found in the manuals to the DP Master or the repeater modules.
DP ident number	6001 hex (24577 dec)
DP configurations without DI/DO	2 PD, configuration: 113dez, 0dez 3 PD, configuration: 114dez, 0dez
DP configurations with DI/DO	2 PD + DI/DO, configuration: 113dez, 48dez 3 PD + DI/DO, configuration: 114dez, 48dez 0 PD + DI/DO, configuration: 0dez, 48dez,
DP configurations with DI	2 PD + DI, configuration: 113dez, 16dez 3 PD + DI, configuration: 114dez, 16dez 0 PD + DI, configuration: 0dez, 16dez, Universal configuration, for direct entry of configurations
Set Prm application data	Max. 10 byte, Hex parameterization: 00,00,00,00,00,00,00,00,00,00 diagnostic alarm active (default) 00,**01**,00,00,00,00,00,00,00,00 diagnostic alarm deactivated
Length of diagnostic data	Max. 8 byte, incl. 2 byte equipment-specific diagnosis
Address settings	Not supported, adjustable via DIP switch
Name of GSD file	SEW_6001.GSD
Name of bitmap file	SEW6001N.BMP SEW6001S.BMP

Technical Data of InterBus Interface MFI21A, MFI22A, MFI32A

Electrical specification MFI	
Electronic power supply MFI	V = +24 V +/- 25 %, $I_E \leq$ 150 mA
Electrical isolation	• InterBus connection potential free • Between logic and 24 V power supply • Between logic and peripherals/MOVIMOT® via opto-coupler
Bus connection technology	5 cage clamp terminals each for incoming and outgoing bus cables
Shielding	**Using EMC metal cable glands**
Binary inputs (sensors) Signal form	PLC-compatible to EN 61131-2, Ri ≈ 3.0 kΩ, sampling time approx. 5 ms 13 V – +30 V "1" = Contact made / -3 V – +5 V "0" = Contact not made
Sensor power supply Rated current Internal voltage drop	24 V_{DC} to EN 61131-2 interference voltage proof and short-circuit proof Σ 500 mA max. 1 V
Binary outputs (actuators) Signal level Rated current Leakage current Internal voltage drop	PLC-compatible to EN 61131-2, interference voltage proof and short-circuit proof "0" = 0 V, "1" = 24 V 500 mA max. 0.2 mA max. 1 V
Inverter power supply (terminal 15/18) Rated current	24 V_{DC} **not short-circuit proof** 250 mA
Cable length RS-485	30 m between MFI and MOVIMOT® if installed separately
Ambient temperature	-25...60 °C
Enclosure	IP65 (assembled on MFZ.. connection module, all plug connections sealed)

Programming Data	
InterBus interface	Remote bus and installation remote bus
Protocol mode	2 conductor asynchronous protocol 500 kbps
ID code	03_{hex} (03_{dez}) = digital module with input and output data
Length code	2_{hex} / 3_{hex} / 4_{hex} depending on the setting of the DIP switches
Register length on the bus	2, 3 or 4 words (depending on the DIP switch)
Parameter channel (PCP)	0 words

Data to remote bus interface	
Line length between two MFIs in the remote bus	InterBus-typical, max. 400 m
Maximum number of MFIs on remote bus	Depending on InterBus master 64 (configuration 3 PD + DI/DO) – 128 (configuration 2 PD)

Data to installation remote bus interface	
Line length between two MFIs in the installation remote bus	InterBus-typical, max. 50 m between first and last station
Maximum number of MFIs on installation remote bus	Limited by the total current consumption (max. 4.5 A) of the MFI in the installation remote bus radial line and voltage drop at the last MFI interface connection

Technical Data of InterBus Interface MFI23B, MFI33B with Fiber Optic and Rugged-Line Plug Connector

Electrical Specification MFI23B/33B	
Electronic power supply MFI	• Bus logic V_{S1} = 24 V_{DC} +/- 25%, $I_E \leq$ 200 mA (typ. 80 mA) plus supply current for sensors and MOVIMOT® inverter • Actuator voltage V_{S2} = 24 V_{DC} +/- 25% The two voltages V_{S1} and V_{S2} are connected through and can be picked off at the plug connection for the continuing remote bus. The maximum continuous current measures: – max. 16 A at 0–40 °C ambient temperature – max. 10 A at 0–55 °C ambient temperature
Electrical isolation	No isolation between bus logic and binary inputs or MOVIMOT® electrical isolation between bus logic and outputs via opto-coupler
Bus connection technology	Fiber optic rugged-line connector
Binary inputs (sensors) Signal form	PLC-compatible to EN 61131-2, Ri ≈ 3.0 kΩ, sampling time approx. 5 ms +13 V...+30 V = "1" / -3 V...+5 V = "0"
Sensor power supply Rated current Internal voltage drop	From VS1: 24 V_{DC} to EN 61131-2 interference voltage proof and short-circuit proof Σ 500 mA max. 1 V
Binary outputs (actuators) Signal level Rated current Leakage current Internal voltage drop	PLC-compatible to EN 61131-2 "0" = 0 V, "1" = 24 V 500 mA max. 0.2 mA max. 1 V
Inverter power supply (terminal 15/18) Rated current	From V_{S1}: 24 V_{DC} interference voltage proof and short-circuit proof 250 mA
Cable length RS-485	≤ 30 m between MFI and MOVIMOT®
Ambient temperature	0–55 °C [max. 10 A continuous current with 24 V voltage loop-through (VS1 and VS2)]
Enclosure	IP65 (assembled on MFZ.. connection module, all plug connections sealed)

Programming Data	
InterBus interface	Fiber optic remote bus
Transfer rate	500 kbps / 2 Mbps
ID code	$03_{hex}(03_{dec})$ = digital module with input and output data
Length code	2_{hex}/ 3_{hex}/ 4_{hex} depending on the setting of the DIP switch
Register length on the bus	2, 3 or 4 words (depending on the DIP switch)
Parameter channel (PCP)	0 words

Data on the INTERBUS interface	
incoming / outgoing remote bus	Fiber optic (polymer fiber 980/1,000 m)
Connection technology	Fiber optic rugged-line
Line length between two MFIs on the bus	Max. 50 m, depending on cable type[1)]
Maximum number of MFIs on fiber optic remote bus	Depending on InterBus master 64 (configuration 3 PD + DI/DO) – 128 (configuration 2 PD)

1) Line lengths < 1 m are only permitted using the specially pre-fabricated cable bridge CONNECTION-LK by Phoenix Contact

IBS RL

Technical Data of MFD DeviceNet Interface

Note: The DeviceNet Statement of Conformance is located in the appendix**.**

Electrical specification MFD	
Power supply to MFD control electronics via DeviceNet	V = 11 V…25 V according to DeviceNet specification I_E ≤ 200 mA
Input voltage for inverters and sensors (terminal 11/13)	V = +24 V +/- 25 %
Electrical isolation	DeviceNet potential and inputs/outputs DeviceNet potential and MOVIMOT®
Bus connection technology	Micro-style connector male (M12)
Binary inputs (sensors) Signal form	PLC-compatible to EN 61131-2, Ri ≈ 3.0 kΩ, sampling time approx. 5 ms 13 V – +30 V "1" = Contact made / -3 V – +5 V "0" = Contact not made
Sensor power supply Rated current Internal voltage drop	24 V_{DC} to EN 61131-2 interference voltage proof and short-circuit proof Σ 500 mA max. 1 V
Binary outputs (actuators) Signal level Rated current Leakage current Internal voltage drop	PLC-compatible to EN 61131-2, interference voltage proof and short-circuit proof "0" = 0 V, "1" = 24 V 500 mA max. 0.2 mA max. 1 V
Inverter power supply (terminal 15/18) Rated current	24 V_{DC} **not short-circuit proof** 250 mA
Cable length RS-485	30 m between MFD and MOVIMOT® if installed separately
Ambient temperature	-25...60 °C
Enclosure	IP65 (assembled on MFZ.. connection module, all plug connections sealed)

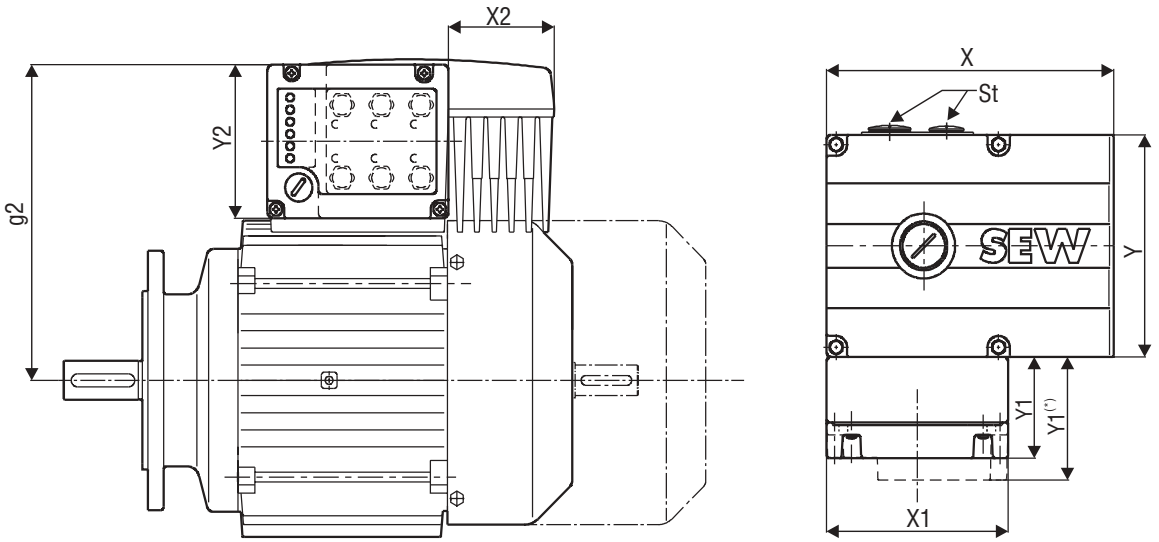
Specification DeviceNet	
Protocol type	Master-slave connection set with polled I/O and bit-strobe I/O
Supported baud rates	500 kbps 250 kbps 125 kbps
Cable length DeviceNet 500 kbps 250 kbps 125 kbps	See DeviceNet specification V. 2.0 100 m 200 m 400 m
Bus Termination	120 Ohm (requires external triggering)
Process data configuration without DI/DO	2 PD 3 PD
Process data configuration with DI/DO	2 PD + DI/DO 3 PD + DI/DO 0 PD + DI/DO
Process data configuration with DI	2 PD + DI 3 PD + DI 0 PD + DI
Address setting	DIP switch (0..63)
Process data length	DIP switches
I/O enable	DIP switches
Name of EDS file	MFD2x.eds MFD3x.eds
Name of bitmap file	MFD2x.bmp MFD3x.bmp

Technical Data of MFO.. CANopen Interface

Electrical specification MFO	
Electronic power supply MFO	V = +24 V +/- 25% I_E ≤ 150 mA
Electrical isolation	• CANopen potential and inputs/outputs • CANopen potential and MOVIMOT®
Input voltage for inverters and sensors (terminal 11/13)	V = +24 V +/- 25 %
Bus connection technology	Micro-style connector male (M12)
Binary inputs (sensors) Signal form	PLC-compatible to EN 61131-2, Ri ≈ 3.0 kΩ, sampling time approx. 5 ms 13 V – +30 V "1" = Contact made / -3 V – +5 V "0" = Contact not made
Sensor power supply Rated current Internal voltage drop	24 V_{DC} to EN 61131-2 interference voltage proof and short-circuit proof Σ 500 mA max. 1 V
Binary outputs (actuators) Signal level Rated current Leakage current Internal voltage drop	PLC-compatible to EN 61131-2, interference voltage proof and short-circuit proof "0" = 0 V, "1" = 24 V 500 mA max. 0.2 mA max. 1 V
Inverter power supply (terminal 15/18) Rated current	24 V_{DC} **not short-circuit proof** 250 mA
Cable length RS-485	30 m between MFO and MOVIMOT® if installed separately
Ambient temperature	-25...60 °C
Enclosure	IP65 (assembled on MFZ.. connection module, all plug connections sealed)

CANopen specification	
Protocol type	1 SDO, 1 PDO, Emergency, Lifetime
Supported baud rates	• 1 Mbps • 500 kbps • 250 kbps • 125 kbps
CANopen line length 1 Mbps 500 kbps 250 kbps 125 kbps	See CANopen specification DR303 40 m 100 m 200 m 400 m
Bus Termination	120 Ω (connect externally)
Process data configuration without DI/DO	2PD 3PD
Process data configuration with DI/DO	2 PD + DI/DO 3 PD + DI/DO 0 PD + DI/DO
Process data configuration with DI	2 PD + DI 3 PD + DI 0 PD + DI
Address setting	DIP switch (1..127)
Process data length	DIP switches
I/O enable	DIP switches

Dimension Sheet of MF... Fieldbus Interface (Mounted to MOVIMOT®)



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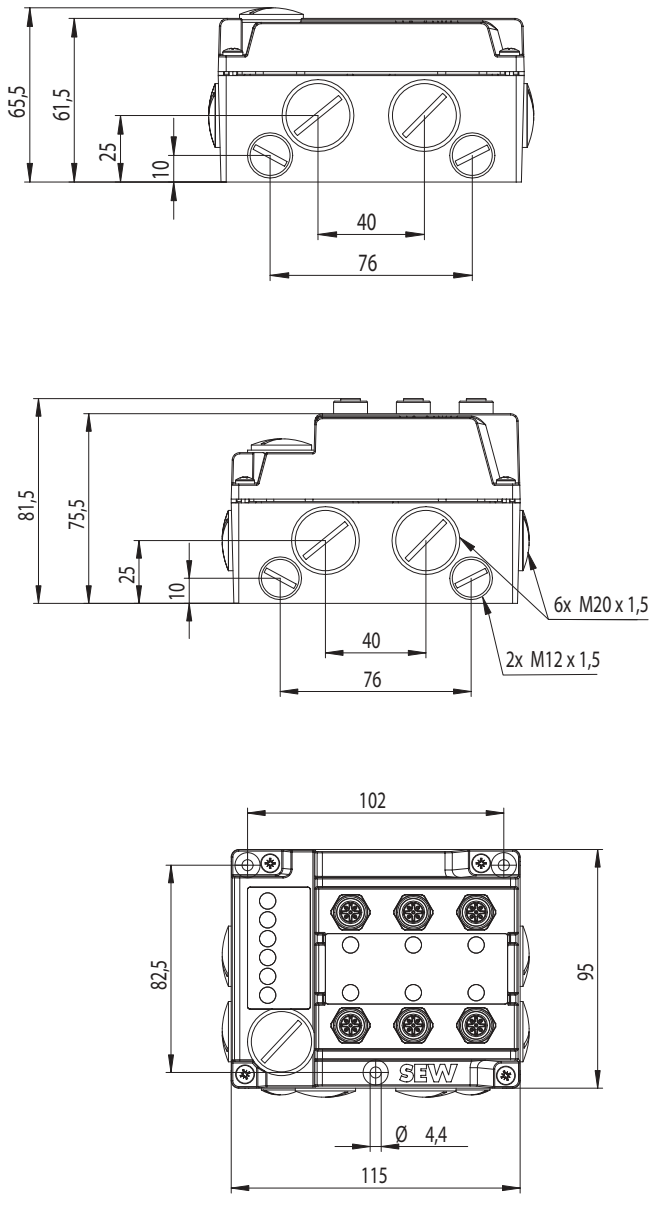
Type		g2	X1	X2	Y1	Y1(*)	Y2	X	Y	St
DT71..BMG/MM../MF. 21	(230/400 V)	162	115	67	65	–	95	182	140	2xM25/1xM16
DT71..BMG/MM../MF. 22	(230/400 V)	162	115	67	–	81	95	182	140	2xM25/1xM16
DT71..BMG/MM../MF. 32	(230/400 V)	162	115	67	–	81	95	182	140	2xM25/1xM16
DT80..BMG/MM../MF. 21	(230/400 V)	162	115	67	65	–	95	182	140	2xM25/1xM16
DT80..BMG/MM../MF. 22	(230/400 V)	162	115	67	–	81	95	182	140	2xM25/1xM16
DT80..BMG/MM../MF. 32	(230/400 V)	162	115	67	–	81	95	182	140	2xM25/1xM16
DT90..BMG/MM1./MF. 21	(400 V)	197	115	97	65	–	95	182	140	2xM25/1xM16
DT90..BMG/MM1./MF. 22	(400 V)	197	115	97	–	81	95	182	182	2xM25/1xM16
DT90..BMG/MM1./MF. 32	(400 V)	197	115	97	–	81	95	182	182	2xM25/1xM16
DT90..BMG/MM../MF. 21	(230 V)	197	115	97	65	–	95	230	175	2xM25/2xM16
DT90..BMG/MM../MF. 22	(230 V)	197	115	97	–	81	95	230	175	2xM25/2xM16
DT90..BMG/MM../MF. 32	(230 V)	197	115	97	–	81	95	230	175	2xM25/2xM16
DT90..BMG/MM22/MF. 21	(400 V)	197	115	97	65	–	95	230	175	2xM25/2xM16
DT90..BMG/MM22/MF. 22	(400 V)	197	115	97	–	81	95	230	175	2xM25/2xM16
DT90..BMG/MM22/MF. 32	(400 V)	197	115	97	–	81	95	230	175	2xM25/2xM16
DV100..BMG/MM../MF. 21	(230/400 V)	199	115	97	65	–	95	230	175	2xM25/2xM16
DV100..BMG/MM../MF. 22	(230/400 V)	199	115	97	–	81	95	230	175	2xM25/2xM16
DV100..BMG/MM../MF. 32	(230/400 V)	199	115	97	–	81	95	230	175	2xM25/2xM16

(400 V) = Dimensions only for equipment with connection voltages 380 – 500 V
(230 V) = Dimensions only for equipment with connection voltages 200 – 240 V
(230/400 V) = Dimensions for equipment with connection voltages 380 – 500 V and 200 – 240 V

Dimension Sheet of MF... Fieldbus Interface (without MOVIMOT®)



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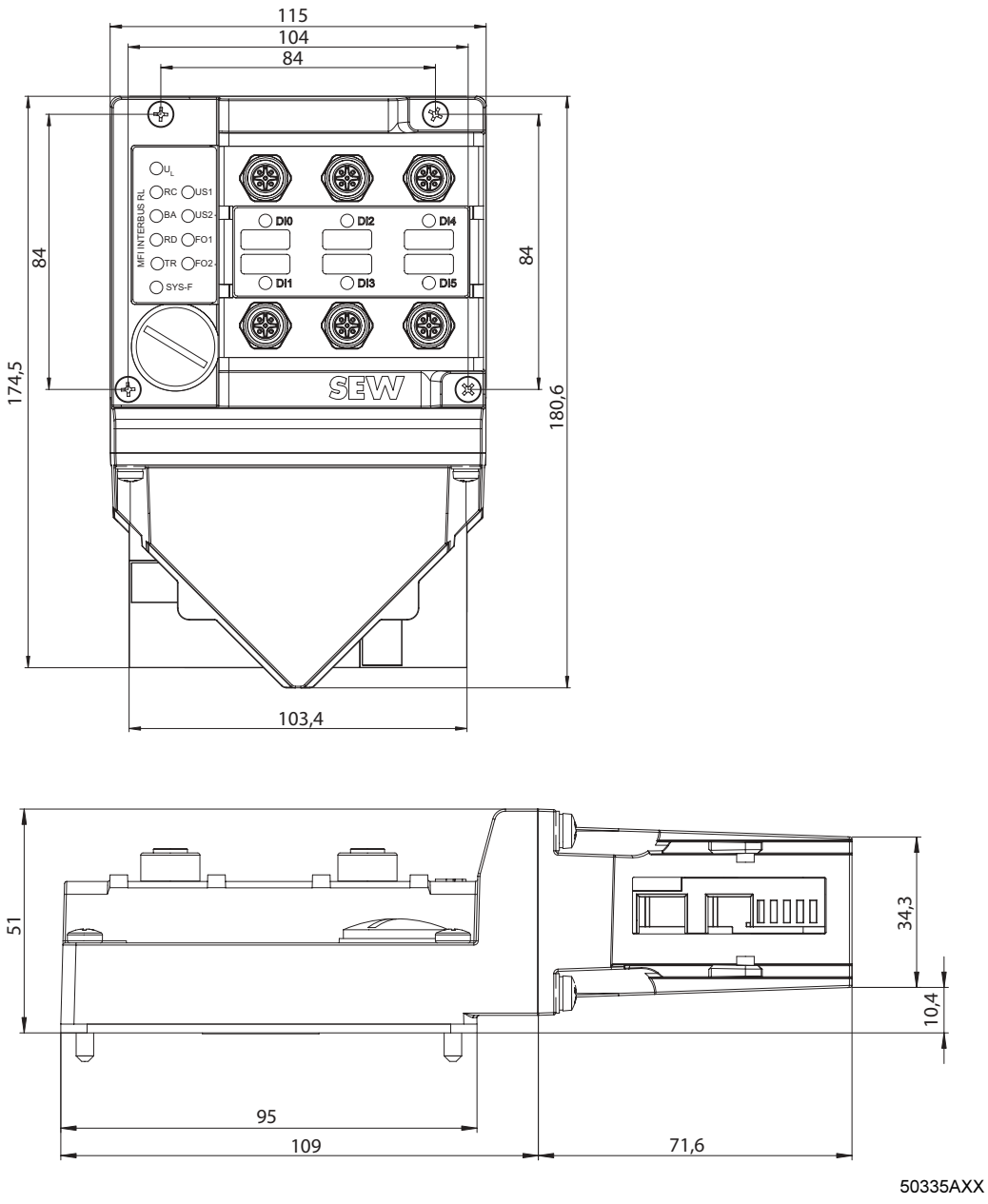
Dimension Sheet for Fieldbus Interface MFI23B/ MFI33B with Rugged-Line Connection (without MOVIMOT®)



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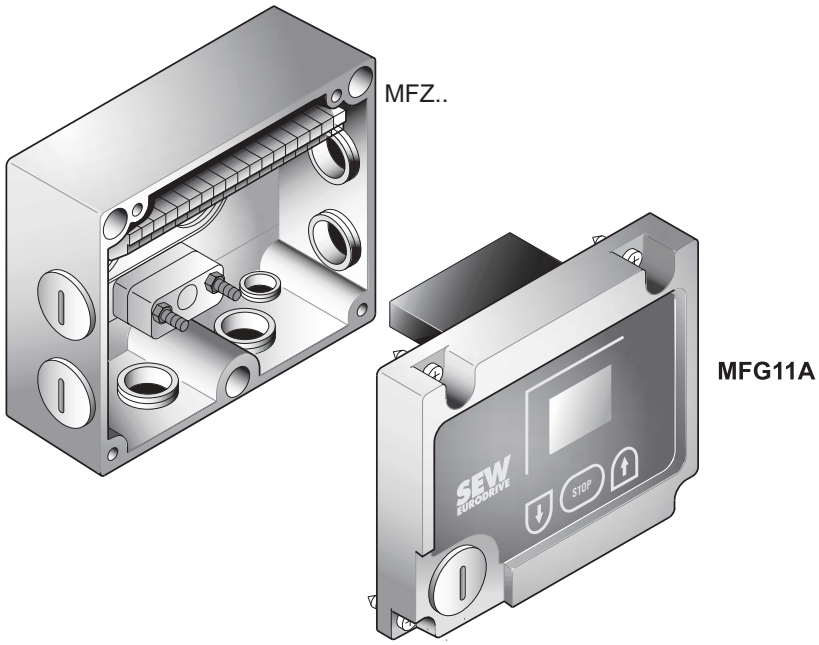
3.22 Options for MF.. Fieldbus Interfaces

MFG11A Keypad

The MFG11A keypad is plugged onto an MFZ.. connection module (not part of the scope of delivery) instead of a bus module and allows for manual control of a MOVIMOT® drive.



50030BXX

Technical Data

MFG11A Option	
Part number	823 559 7
Input voltage	24 V_{DC} ± 25 %
Current requirements	approx. 70 mA
Setpoint resolution	1 %
Serial interface	RS-485 for connection of up to 31 MOVIMOT® inverters (max. 200 m, 9,600 baud)
Enclosure	IP 54 (MFG11A mounted on MFZ.. connection module)
Ambient temperature	-15...60 °C

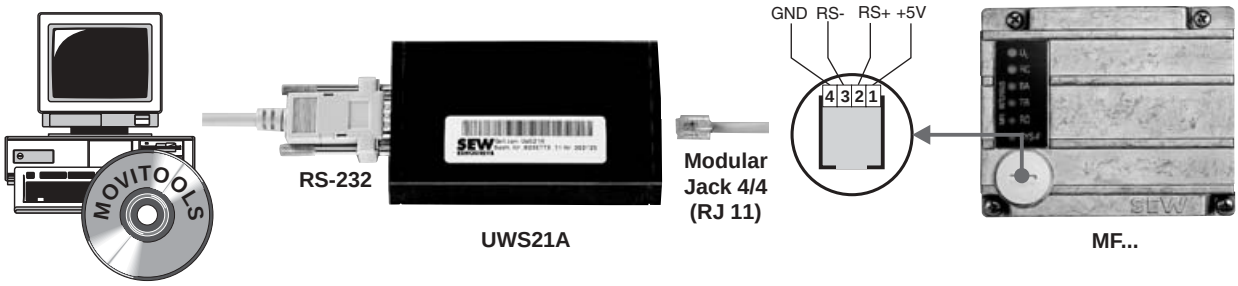
MWS Option for Bus Diagnostics (Part Number 823 180X)

MF.. fieldbus modules contain a diagnostics interface for startup and service. This allows for bus diagnostics using the SEW user software MOVITOOLS.

The diagnostics interface can be connected to a commercially available PC with a serial interface (RS-232) using MOVIMOT® MWS21A fieldbus diagnostics kit.

Scope of Delivery

- Interface adapter UWS21A
- Cable with modular jack 4/4 (RJ11) plug connector
- Interface cable RS-232
- SOFTWARE-ROM 4 (MOVITOOLS software)
- For additional information see the section "Operation and Service."



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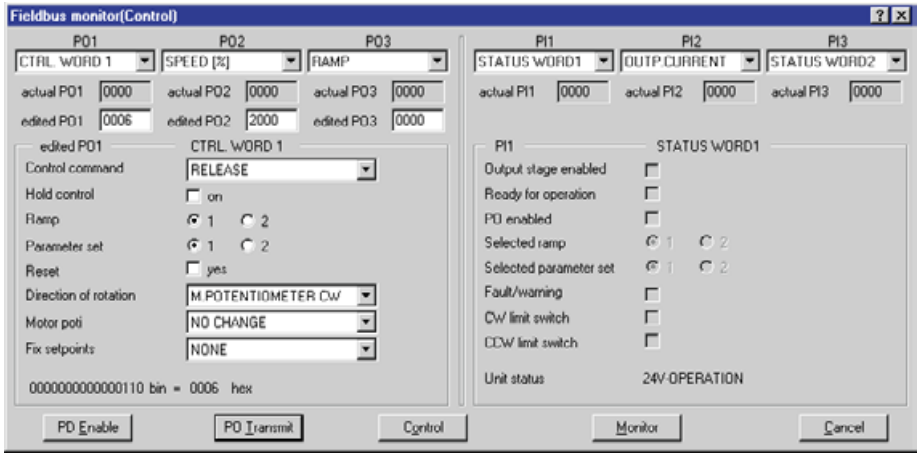
Bus Monitor in MOVITOOLS

The bus monitor in MOVITOOLS provides a friendly control and visualization of cyclical MOVIMOT® process data.



03565AEN

Features

- Simple operation
- User-friendly familiarization with control functions even without connection to the fieldbus (preparation for commissioning)
- Integrated into SEW user interface MOVITOOLS
- Simple and quick troubleshooting
- Shortest project planning phase

Function of Bus Monitor

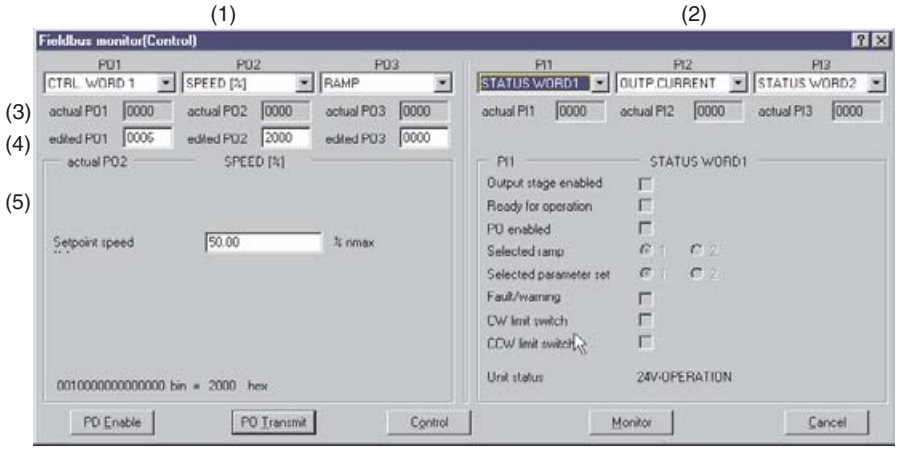
The bus monitor provides the user with a powerful tool for startup, and troubleshooting. It can be used to display and interpret cyclically exchanged process data between inverter and control unit.

In addition, the bus monitor allows not only monitoring bus operation as a passive station, but also allows for active control of the inverter.

This provides the user with the following possibilities:

- To interactively take over control of the inverter in an existing system and, thereby, check the functionality of the drive.
- To remotely simulate the operating principle of an individual drive (that is, without existing system and fieldbus master), so that the control functions can be tested prior to commissioning.

Bus Monitor in Controller Operating Mode



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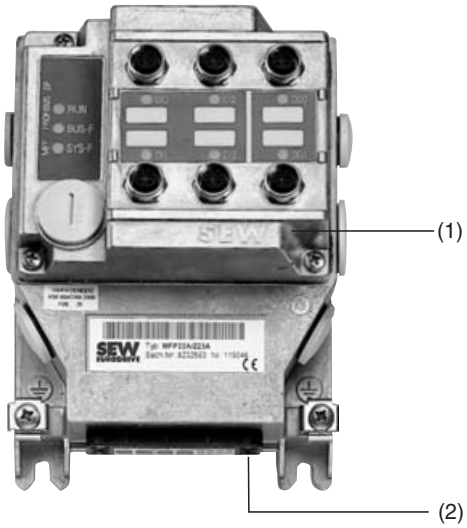
(1) PO data from controller
(2) PI data from inverter to controller
(3) Displays current data in hex code
(4) PO data can be edited here in control mode
  – "PD release" generally allows for sending data
  – "PO send" is used to send edited data to the inverter
(5) Displays current setting

3.23 MF.../Z.3. Field Distributors



04091BXX

(1) MF.. fieldbus interface
(2) Connection of pre-fabricated cable

Function

- Communications interface with I/Os (I/Os can only be used in combination with M12 plug connectors)
- Joint wiring space of bus and power terminals
- Pluggable motor circuit

Sample Designation Type

MFP21D/Z23D

Connection module
Z13A = for InterBus
Z23D = for PROFIBUS
Z33A = for DeviceNet and CANopen

Fieldbus interface
MFI... = InterBus
MFP... = PROFIBUS
MFD.. = DeviceNet
MFO.. = CANopen

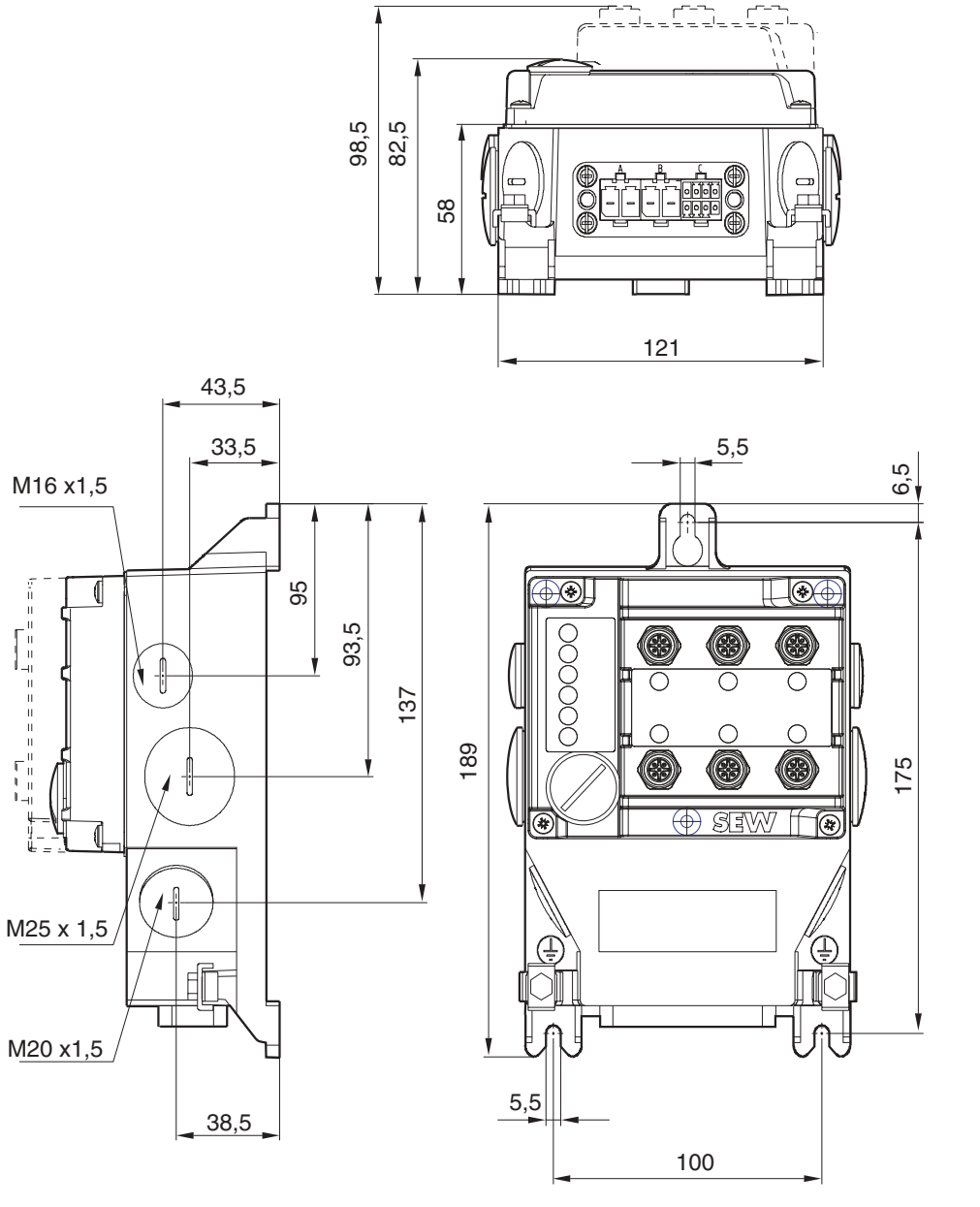
Possible Combinations

	**no I/O** 	**4 x I / 2 x O (M12)** 	**6 x I (M12)** 
InterBus	MFI21A/Z13A	MFI22A/Z13A	MFI32A/Z13A
InterBus with fiber optic and rugged line	–	MFI23B/Z13A	MFI33B/Z13A
PROFIBUS	MFP21D/Z23D	MFP22D/Z23D	MFP32D/Z23D
DeviceNet	MFD21A/Z33A	MFD22A/Z33A	MFD32A/Z33A
CANopen	MFO21A/Z33A	MFO22A/Z33A	MFO32A/Z33A

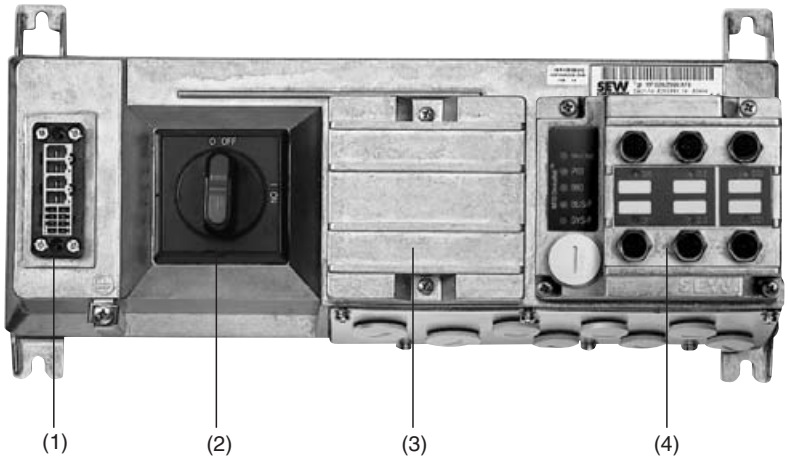
Technical Data of MF../Z.3.

MF../Z.3.	
Ambient temperature	-25...60 °C
Enclosure	IP65 (fieldbus interface and motor connection cable attached and screwed, all plug connections sealed)
Interface	PROFIBUS, InterBus, DeviceNet, CANopen (technical data starting on page 51)

Dimensions MF.../Z.3.



3.24 MF.../Z.6. Field Distributor

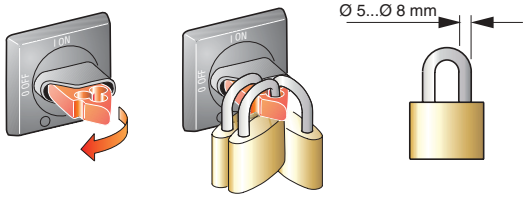


04092BXX

(1) Connection of pre-fabricated cable
(2) Maintenance switch
(3) Connection space for supply connection
(4) Fieldbus interface

Function

- Communications interface with I/Os
- Separate wiring space of bus and supply voltage
- Pluggable motor circuit
- Maintenance switch (triple lockable)
  - With line protection function
  - Manufactured by ABB
  - Type switch element MS 325 - 9
  - Type auxiliary contact HK 20
  - Color: black/red



Sample Type Designation

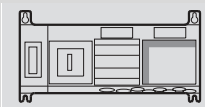
MFP21D/Z26D/AF0

Connection technology
AF0 = Metric cable entry
AF1 = With micro-style connector for DeviceNet and CANopen
AF2 = M12 plug connector for PROFIBUS
AF3 = M12 plug connector for PROFIBUS + M12 plug connector for 24 V supply

Connection module
Z16A = For InterBus
Z26D = For PROFIBUS
Z36A = For DeviceNet and CANopen

Fieldbus interface
MFI... = InterBus
MFP... = PROFIBUS
MFD.. = DeviceNet
MFO.. = CANopen

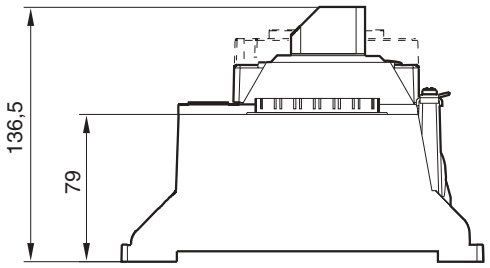
Possible Combinations MF.../Z.6.

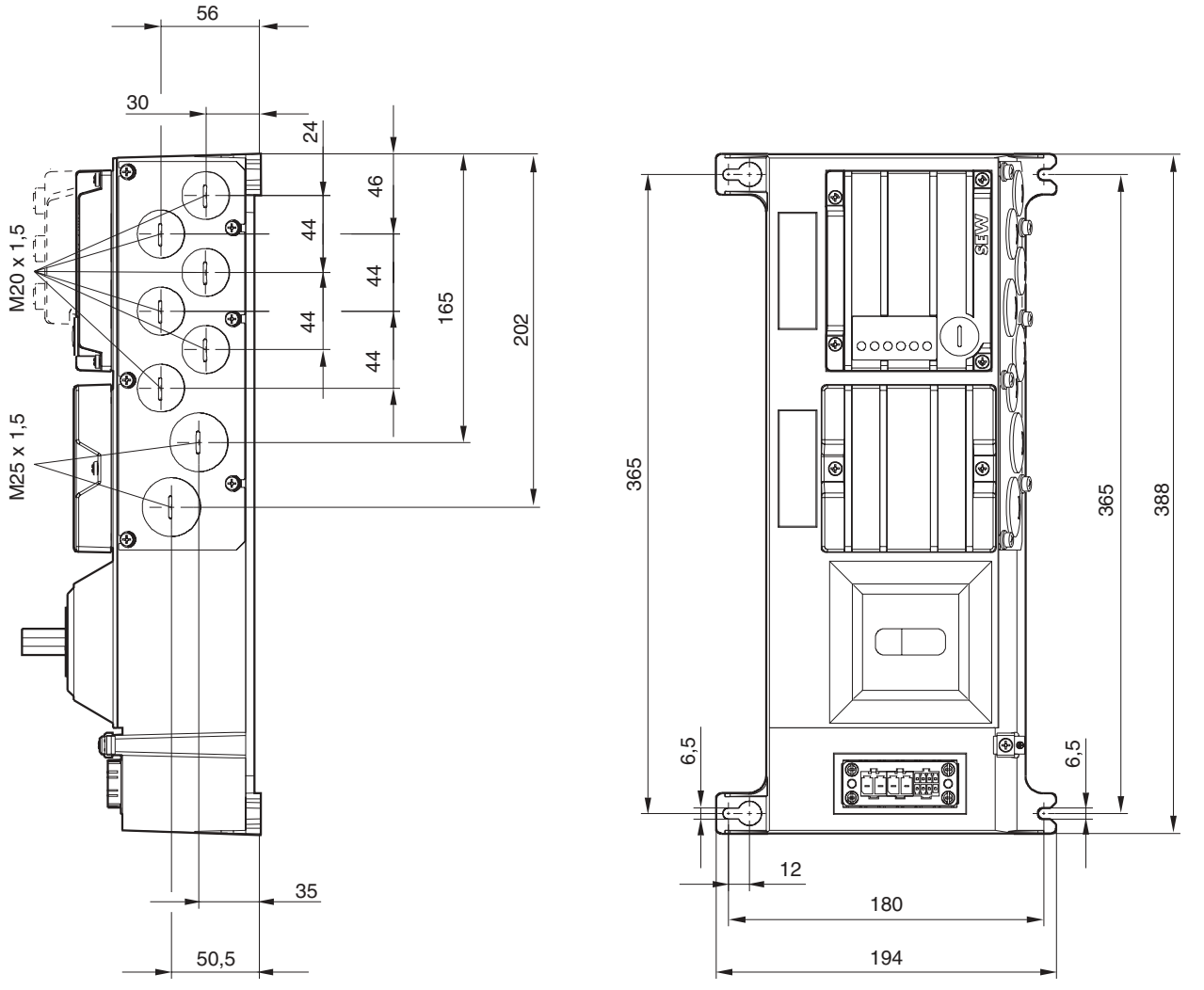
	**4 x I / 2 x O (terminals)** 	**4 x I / 2 x O (M12)** 	**6 x I (M12)** 
InterBus	MFI21A/Z16A/AF0	MFI22A/Z16A/AF0	MFI32A/Z16A/AF0
InterBus with fiber optic and rugged line	–	MFI23B/Z16A/AF0	MFI33B/Z16A/AF0
PROFIBUS	MFP21D/Z26D/AF**0**	MFP22D/Z26D/AF**0**	MFP32D/Z26D/AF**0**
	MFP21D/Z26D/AF**2**	MFP22D/Z26D/AF**2**	MFP32D/Z26D/AF**2**
	MFP21D/Z26D/AF**3**	MFP22D/Z26D/AF**3**	MFP32D/Z26D/AF**3**
DeviceNet	MFD21A/Z36A/AF1	MFD22A/Z36A/AF1	MFD32A/Z36A/AF1
CANopen	MFO21A/Z36A/AF1	MFO22A/Z36A/AF1	MFO32A/Z36A/AF1

Technical Data of MF.../Z.6.

MF../Z.6.	
Maintenance switch	Load disconnector and line protection Type: ABB MS 325 – 9 + HK20 Switch activation: black/red, triple lockable
Ambient temperature	-25...55 °C
Enclosure	IP65 (fieldbus interface, supply connection cover and motor connection cable attached and screwed, all plug connections sealed)
Interface	PROFIBUS, InterBus, DeviceNet, CANopen (technical data starting on page 51)

Dimension Sheet MF.../Z.6.





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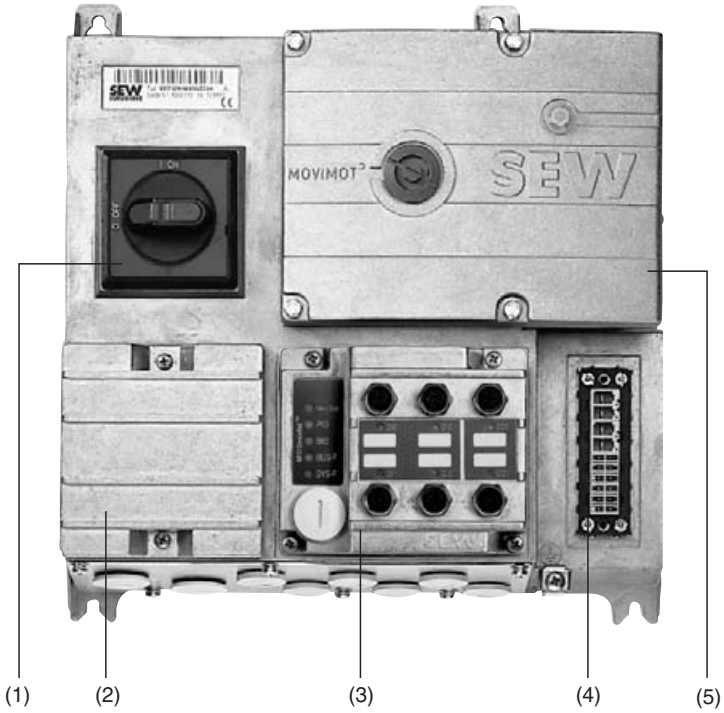
3.25 MF.../MM../Z.8. Field Distributor

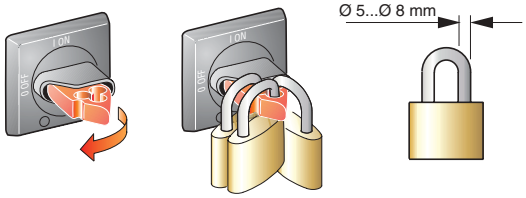


04093BXX

(1) Maintenance switch
(2) Connection space for supply connection
(3) MF.. fieldbus interface
(4) Connection of pre-fabricated cable
(5) MOVIMOT® inverter (here: size 1)

Function

- Communications interface with I/Os
- Separate wiring space of bus and power terminals
- Pluggable motor circuit
- Integrated MOVIMOT® inverter
- Maintenance switch (triple lockable)
  - Manufactured by ABB
  - Type OT16ET3HS3ST1
  - Color black/red



Sample Type Designation

MFP22D/MM22B/Z28D 0/AF0[1)]

Connection technology
AF0 = Metric cable entry
AF1 = With micro-style connector for DeviceNet and CANopen
AF2 = M12 plug connector for PROFIBUS
AF3 = M12 plug connector for PROFIBUS + M12 plug connector for 24 V supply

Method of connection
0 = ⅄ / 1= △

Connection module
Z18A = For InterBus
Z28D = For PROFIBUS
Z38A = For DeviceNet and CANopen

MOVIMOT® inverter

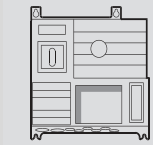
Fieldbus interface
MFI... = InterBus
MFP... = PROFIBUS
MFD.. = DeviceNet
MFO.. = CANopen

1) If the field distributor is used in combination with a drive without mechanical holding brake, the field distributor must be ordered with integrated braking resistor (according to the following example):

MF.../MM..B/**BW.**/Z.8./AF0

MM03 - MM15: **BW1**
MM22 - MM30: **BW2**

Possible Combinations

			**4 x I / 2 x O (terminals)** 	**4 x I / 2 x O (M12)** 	**6 x I (M12)** 
InterBus	⅄	MFI21A/MM..B/Z18A 0/AF0	MFI22A/MM..B/Z18A 0/AF0	MFI32A/MM..B/Z18A 0/AF0
	△	MFI21A/MM..B/Z18A 1/AF0	MFI22A/MM..B/Z18A 1/AF0	MFI32A/MM..B/Z18A 1/AF0
InterBus with fiber optic and rugged line	⅄	–	MFI23B/MM..B/Z18A 0/AF0	MFI33B/MM..B/Z18A 0/AF0
	△	–	MFI23B/MM..B/Z18A 1/AF0	MFI33B/MM..B/Z18A 1/AF0
PROFIBUS	⅄	MFP21D/MM..B/Z28D 0/AF**0**	MFP22D/MM..B/Z28D 0/AF**0**	MFP32D/MM..B/Z28D 0/AF**0**
	△	MFP21D/MM..B/Z28D 1/AF**0**	MFP22D/MM..B/Z28D 1/AF**0**	MFP32D/MM..B/Z28D 1/AF**0**
	⅄	MFP21D/MM..B/Z28D 0/AF**2**	MFP22D/MM..B/Z28D 0/AF**2**	MFP32D/MM..B/Z28D 0/AF**2**
	△	MFP21D/MM..B/Z28D 1/AF**2**	MFP22D/MM..B/Z28D 1/AF**2**	MFP32D/MM..B/Z28D 1/AF**2**
	⅄	MFP21D/MM..B/Z28D 0/AF**3**	MFP22D/MM..B/Z28D 0/AF**3**	MFP32D/MM..B/Z28D 0/AF**3**
	△	MFP21D/MM..B/Z28D 1/AF**3**	MFP22D/MM..B/Z28D 1/AF**3**	MFP32D/MM..B/Z28D 1/AF**3**
DeviceNet	⅄	MFD21A/MM..B/Z38A 0/AF1	MFD22A/MM..B/Z38A 0/AF1	MFD32A/MM..B/Z38A 0/AF1
	△	MFD21A/MM..B/Z38A 1/AF1	MFD22A/MM..B/Z38A 1/AF1	MFD32A/MM..B/Z38A 1/AF1
CANopen	⅄	MFO21A/MM..B/Z38A 0/AF1	MFO22A/MM..B/Z38A 0/AF1	MFO32A/MM..B/Z38A 0/AF1
	△	MFO21A/MM..B/Z38A 1/AF1	MFO22A/MM..B/Z38A 1/AF1	MFO32A/MM..B/Z38A 1/AF1

Assignment of Motors/ Field Distributors MF../ MM../Z.8.

1400 1/min:

Power [kW]	Motor ⅄	Field distributor with MOVIMOT®
0.37	DT71D4 / TH	MF/ **MM03B** / Z.8. 0 / **BW1** / AF..
	DT71D4 / **BMG** / TH .	MF/ **MM03B** / Z.8. 0 / AF..
0.55	DT80K4 / TH	MF/ **MM05B** / Z.8. 0 / **BW1** / AF..
	DT80K4 / **BMG** / TH .	MF/ **MM05B** / Z.8. 0 / AF..
0.75	DT80N4 / TH	MF/ **MM07B** / Z.8. 0 / **BW1** / AF..
	DT80N4 / **BMG** / TH .	MF/ **MM07B** / Z.8. 0 / AF..
1.1	DT90S4 / TH	MF/ **MM11B** / Z.8. 0 / **BW1** / AF..
	DT90S4 / **BMG** / TH .	MF/ **MM11B** / Z.8. 0 / AF..
1.5	DT90L4 / TH	MF/ **MM15B** / Z.8. 0 / **BW1** / AF..
	DT90L4 / **BMG** / TH .	MF/ **MM15B** / Z.8. 0 / AF..
2.2	DV100M4 / TH	MF/ **MM22B** / Z.8. 0 / **BW2** / AF..
	DV100M4 / **BMG** / TH .	MF/ **MM22B** / Z.8. 0 / AF..
3	DV100L4 / TH	MF/ **MM30B** / Z.8. 0 / **BW2** / AF..
	DV100L4 / **BMG** / TH .	MF/ **MM30B** / Z.8. 0 / AF..

2900 1/min:

Power [kW]	Motor △	Field distributor with MOVIMOT®
0.55	DT71D4 / TH	MF/ **MM05B** / Z.8. **1** / **BW1** / AF..
	DT71D4 / **BMG** / TH .	MF/ **MM05B** / Z.8. **1** / AF..
0,75	DT80K4 / TH	MF/ **MM07B** / Z.8. **1** / **BW1** / AF..
	DT80K4 / **BMG** / TH .	MF/ **MM07B** / Z.8. **1** / AF..
1.1	DT80N4 / TH	MF/ **MM11B** / Z.8. **1** / **BW1** / AF..
	DT80N4 / **BMG** / TH .	MF/ **MM11B** / Z.8. **1** / AF..
1.5	DT90S4 / TH	MF/ **MM15B** / Z.8. **1** / **BW1** / AF..
	DT90S4 / **BMG** / TH .	MF/ **MM15B** / Z.8. **1** / AF..
2.2	DT90L4 / TH	MF/ **MM22B** / Z.8. **1** / **BW2** / AF..
	DT90L4 / **BMG** / TH .	MF/ **MM22B** / Z.8. **1** / AF..
3	DV100M4 / TH	MF/ **MM30B** / Z.8. **1** / **BW2** / AF..
	DV100M4 / **BMG** / TH .	MF/ **MM30B** / Z.8. **1** / AF..

Technical Data of MF../MM../Z.8. Field Distributors:

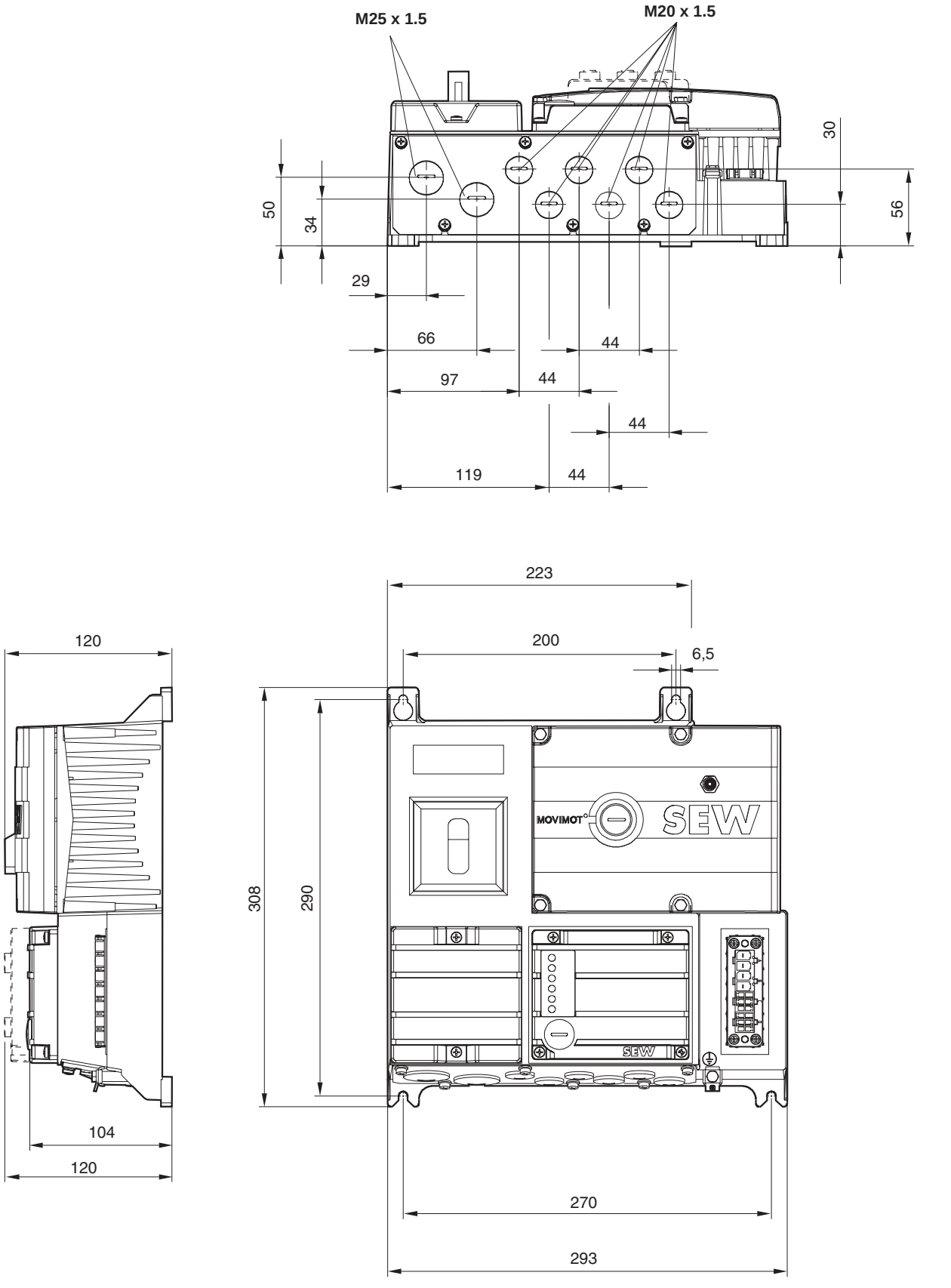
Field distributor type		MF../ MM03B/ Z.8...	MF../ MM05B/ Z.8...	MF../ MM07B/ Z.8...	MF../ MM11B/ Z.8...	MF../ MM15B/ Z.8...	MF../ MM22B/ Z.8...	MF../ MM30B/ Z.8...
Apparent output power with V_{in} = 380 – 500 V	S_N	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA
Connection voltages Permitted range	V_{in}	3 x 380 V_{AC} / **400 V_{AC}** / 415 V_{AC} / 460 V_{AC} / 500 V_{AC} V_{in} = 380 V_{AC} - 10%...500 V_{AC} + 10%						
Supply frequency	f_{in}	50 Hz – 60 Hz ± 10%						
Supply voltage rated current (at V_{in} =400 V_{AC})	I_{in}	1.3 A_{AC}	1.6 A_{AC}	1.9 A_{AC}	2.4 A_{AC}	3.5 A_{AC}	5.0 A_{AC}	6.7 A_{AC}
Output voltage	V_{outp}	0... V_{in}						
Output frequency Resolution Operating point	f_{outp}	2...100 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz						
Rated output current	I_N	1.6 A_{AC}	2.0 A_{AC}	2.5 A_{AC}	3.2 A_{AC}	4.0 A_{AC}	5.5 A_{AC}	7.3 A_{AC}
Motor power	P_{Mot}	**0.37 kW**	**0.55 kW**	**0.75 kW**	**1.1 kW**	**1.5 kW**	**2.2 kW**	**3.0 kW**
PWM frequency		4 / 8 / 12 / **16** [1] kHz						
Current limit	I_{max}	**Motor operating mode:** 160 % at ⅄, 150 % at △ **regenerative mode:**160 % at ⅄, 150 % at △						
External braking resistor	R_{min}	200 Ω					100 Ω	
Interference immunity		Meets EN 61800-3						
Interference		According to limit class A To EN 55011 and EN 55014, meets EN 61800-3						
Ambient temperature	ϑ_{amb}	-25...40 °C [2]						-25...35 °C [3]
Enclosure		IP65 (fieldbus interface, supply connection cover and motor connection cable attached and screwed, all plug connections sealed)						
Operating mode		DB (EN60149-1-1 and 1-3)						
Type of cooling (DIN 41 751)		Convection cooling						
Altitude		h ≤ 1000 m (P_N reduction: 1% per 100 m up to max. 2,000 m)						
External electronics supply	TI. 11 TI. 13	V = +24 V ± 25% I_E ≤ 250 mA (only MOVIMOT®),						
Maintenance switch		Load disconnector Type: ABB OT16ET3HS3ST1 Switch activation: black/red, triple lockable						
Interface		PROFIBUS, InterBus, DeviceNet, CANopen (technical data starting on page 51)						

1) 16 kHz-PWM frequency (low-noise) If DIP-SWITCH S1/7 = ON (factory setting), the equipment operates with 16 kHz PWM frequency (low-noise) and incrementally switches back to a lower takt frequency dependent upon the heat sink temperature.

2) P_N reduction: 3 % per K up to 55 °C

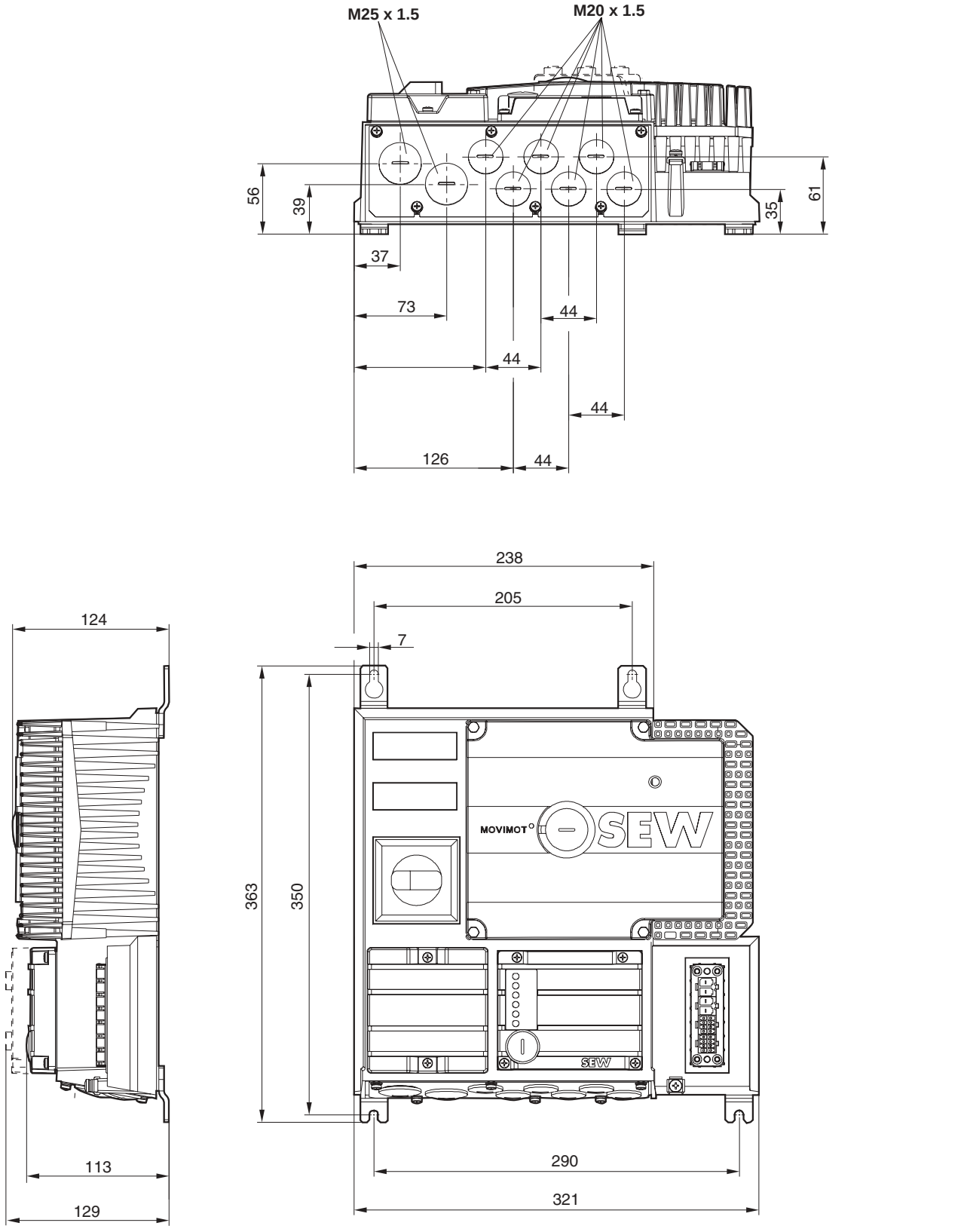
3) P_N reduction: 2.5 % per K up to 55 °C

MF.../MM03-MM15/Z.8. Dimension Sheet (Size 1)



50469AXX

MF.../MM22-MM30/Z.8. Dimension Sheet (Size 2)

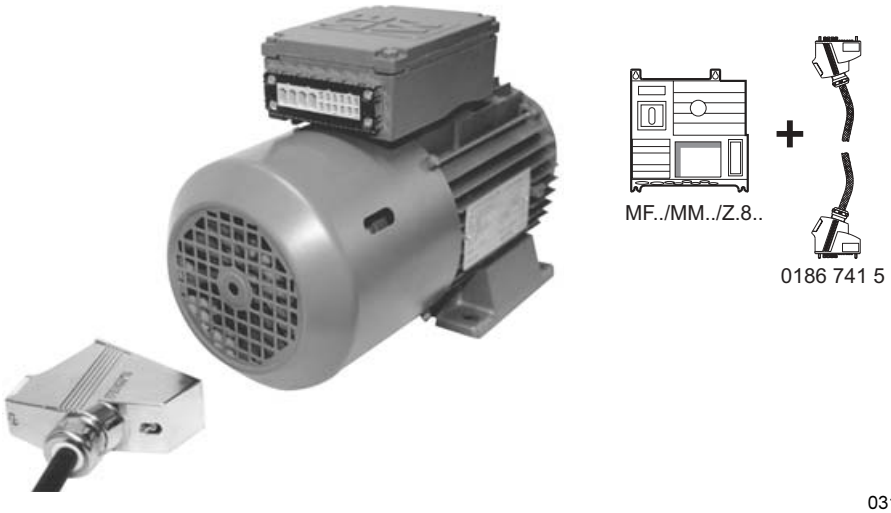


50470AXX

3.26 AC Motors with Plug Connector (for Z.8 Field Distributor)

- Additional Information about AC motors with plug connector can be found in the "Geared Motors" catalog.

AC Motors with APG4 Plug Connector



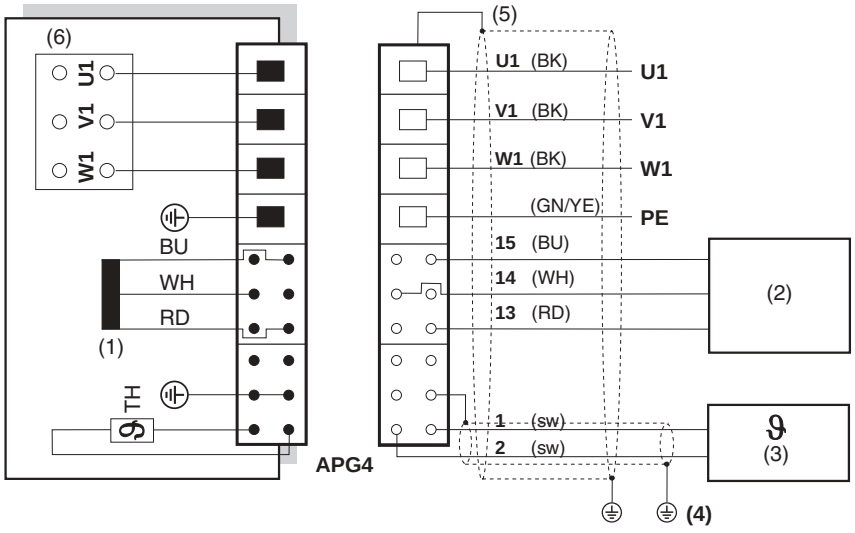
03198BXX

Function

AC motors DT..../APG4 have a plug connector manufactured by Phoenix Contact (Series PlusCon VC) for connecting power (phases), motor protection (TH), and brake.

Using plug connector APG4, the motor and an SEW field distributor with integrated MOVIMOT® MF../MM../Z.8... inverter or another suitable field control module (e.g. Drive Shuttle speed regulating rheostat by Phoenix Contact, Type IBS IP 400 VFD 1-3A...) are connected via a pre-fabricated hybrid cable.

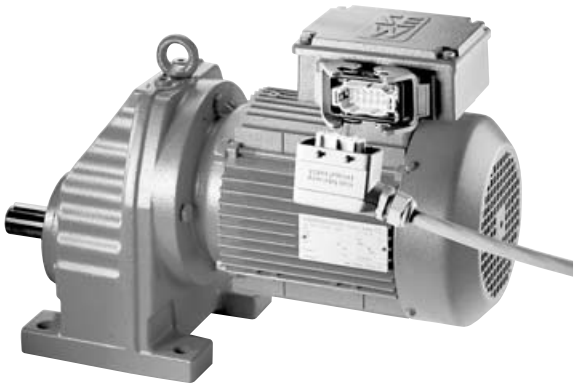
Connector Pin Assignment

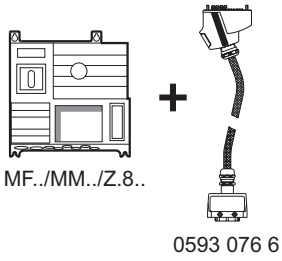


03205BXX

(1) Brake coil
(2) Brake control system
(3) Temperature evaluation
(4) EMC metal cable gland
(5) With wide-area contact of EMC metal cable gland with plug housing
(6) The method of connection at the motor terminal board must correspond to the intended method of connection of the field distributor. The jumpers at the motor terminal board must be placed accordingly.

AC Motors with ASA4 Plug Connector





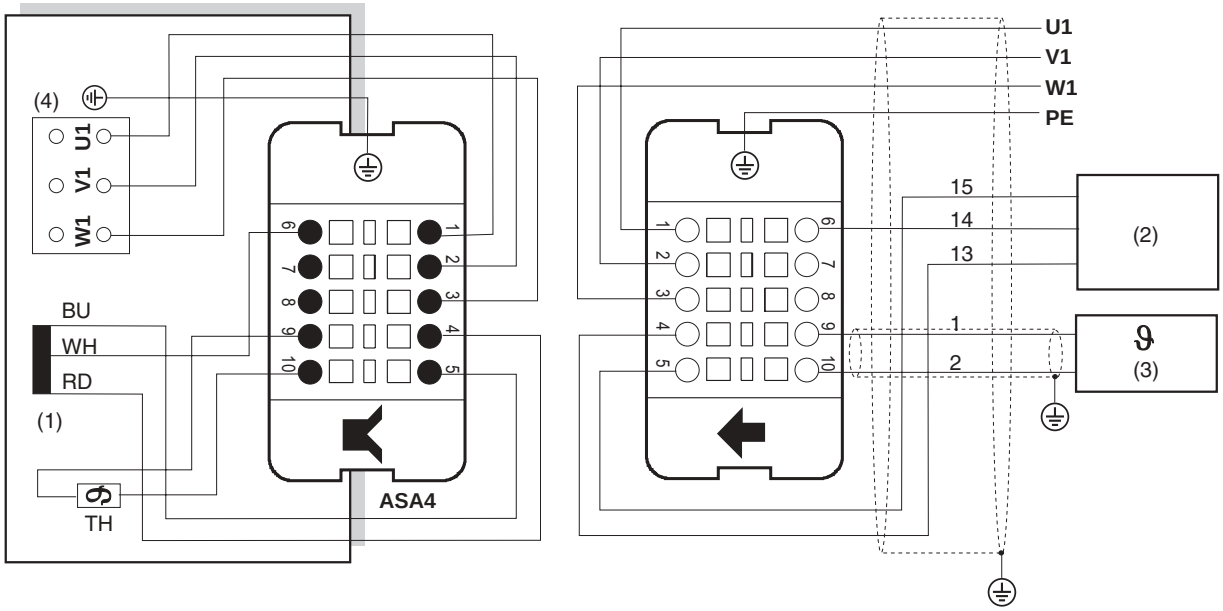
05018AXX

Function

AC motors DT..../ASA4 have a plug connector manufactured by Harting (Series HAN 10E) for connecting power (phases), motor protection (TH), and brake.

The ASA4 plug connector is used to connect the motor and an SEW field distributor with integrated MOVIMOT® MF../MM../Z.8... inverter via a pre-fabricated hybrid cable.

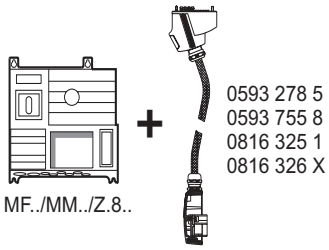
Connector Pin Assignment



05117AXX

(1) Brake coil
(2) Brake control system
(3) Temperature evaluation
(4) The method of connection at the motor terminal board must correspond to the intended method of connection of the field distributor. The jumpers at the motor terminal board must be placed accordingly.

AC Motors with IS(U) Plug Connector



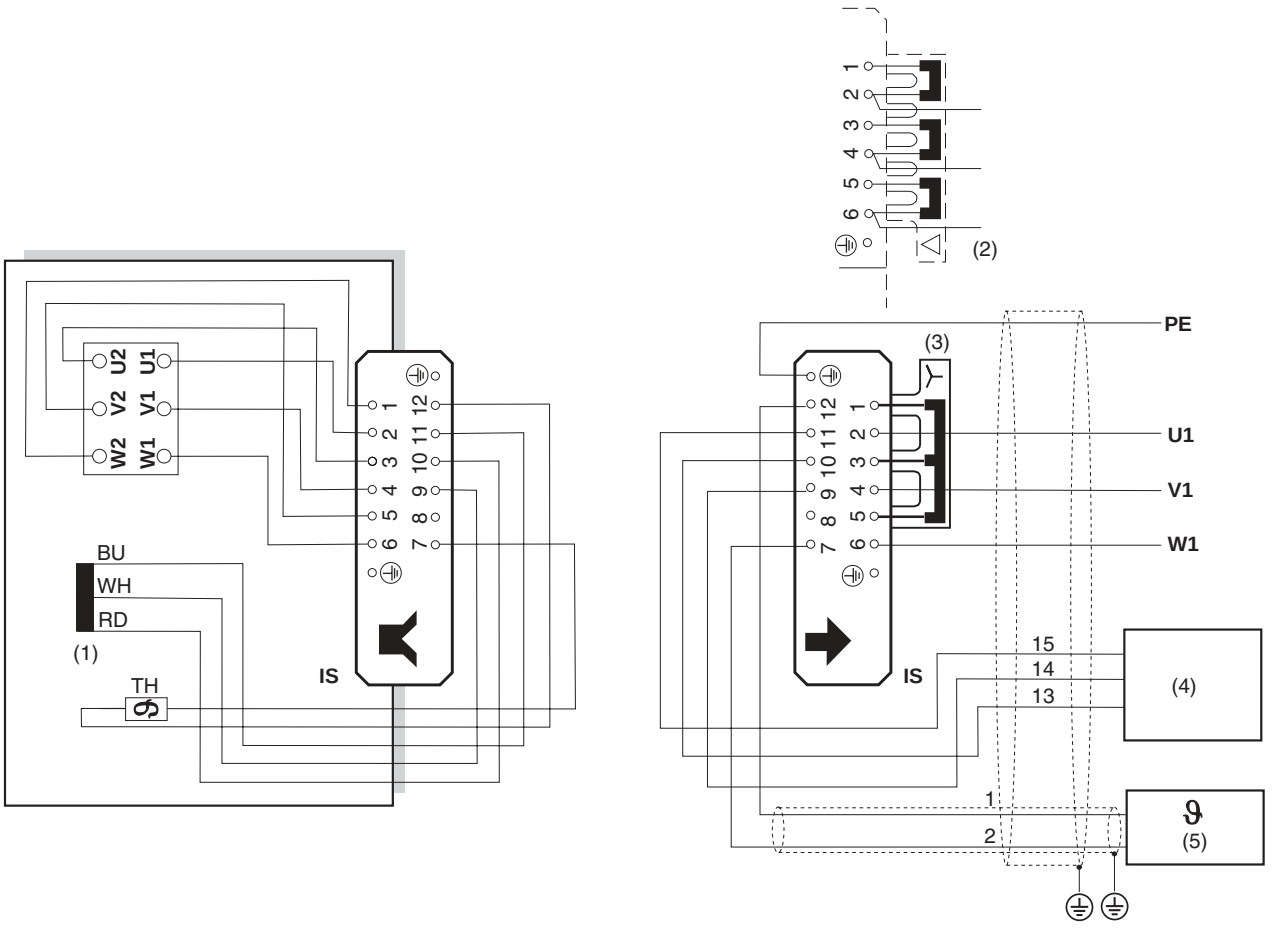
05019AXX

Function

AC motors DT..../IS have an integrated plug connector manufactured by SEW-EURODRIVE for connecting power (phases), motor protection (TH/TF) and brake.

The IS plug connector is used to connect the motor and an SEW field distributor with integrated MOVIMOT® MF../MM../Z.8... inverter via a pre-fabricated hybrid cable.

Connector Pin Assignment



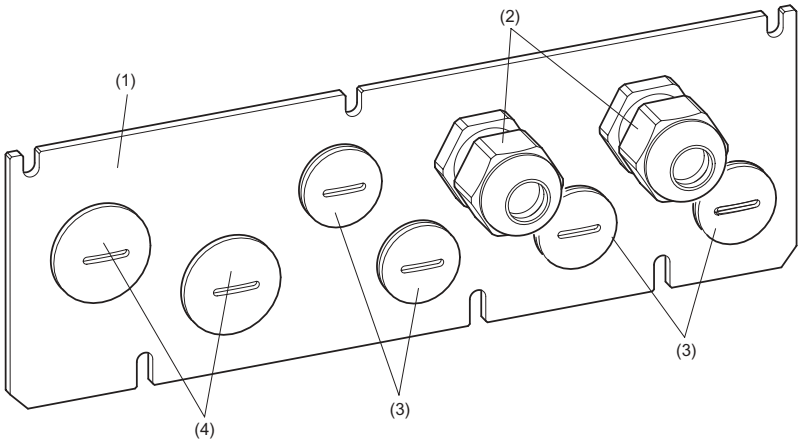
05121AXX

(1) Brake coil
(2) Variable terminal link for delta connection
(3) Variable terminal link for star connection
(4) Brake control system
(5) Temperature evaluation

3.27 Connection Technology for Field Distributors

With PROFIBUS, InterBus

Field distributors MF.../Z.6A and MF.../MM../Z.8. in combination with PROFIBUS and InterBus are equipped with AF0 mounting flange:

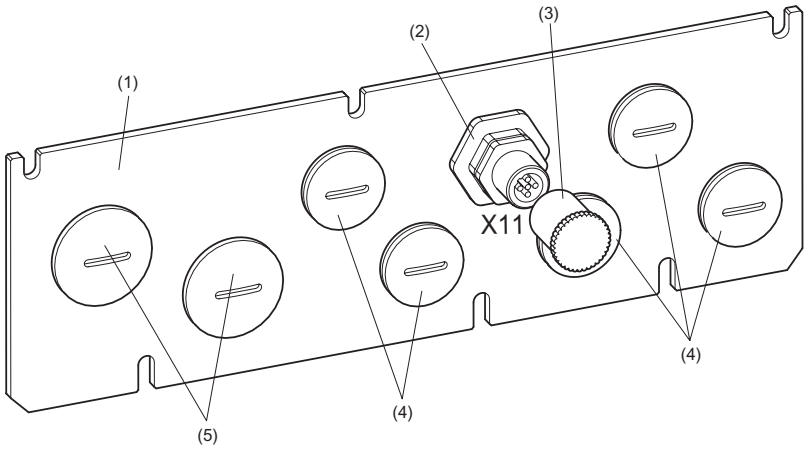


50362AXX

(1) Front panel
(2) M20 EMC cable gland
(3) M20 screw plug
(4) M25 screw plug

With DeviceNet, CANopen

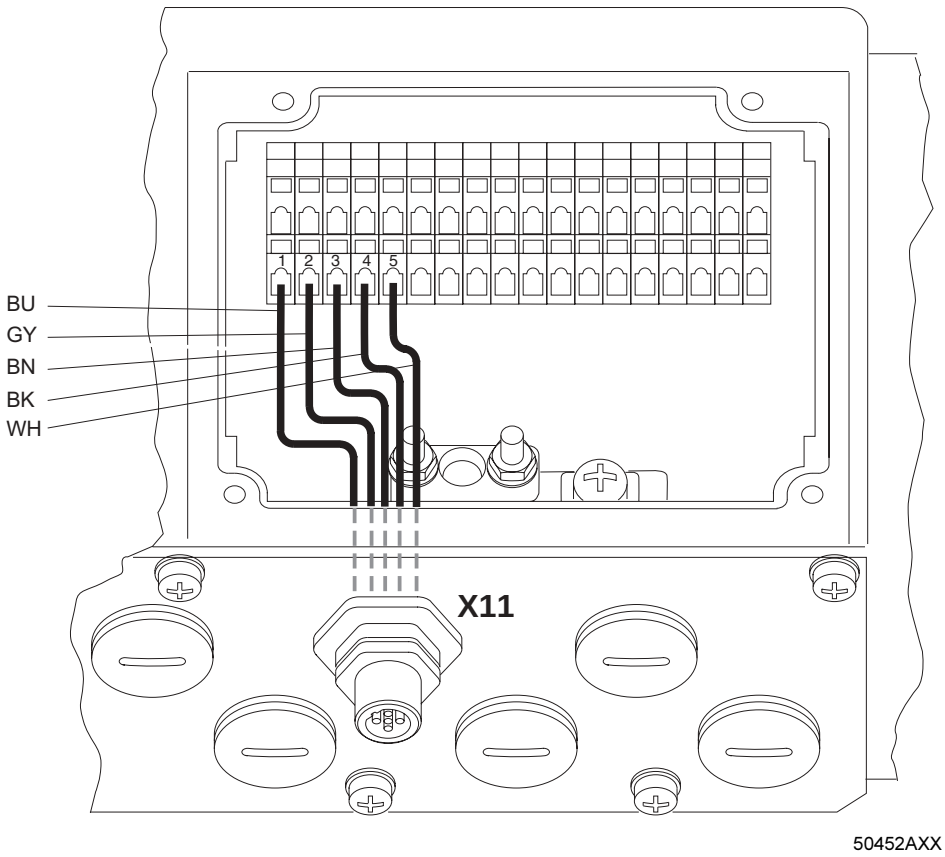
Field distributors MF.../Z.6A and MF.../MM../Z.8. in combination with DeviceNet and CANopen are equipped with AF1 mounting flange:



50361AXX

(1) Front panel
(2) Micro-style connector (X11)
(3) Protection cap
(4) M20 screw plug
(5) M25 screw plug

AF1 Cabling and Pin Assignment



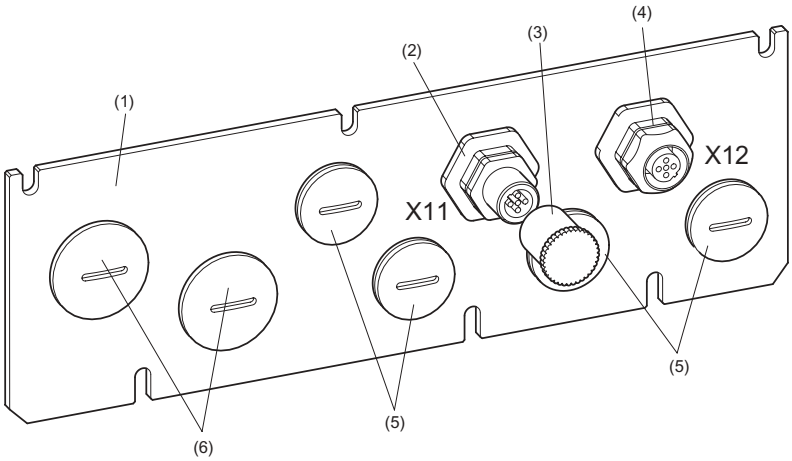
50452AXX

M12 connector X11		
	**Pin 1**	DRAIN
	Pin 2	V+
	Pin 3	V-
	Pin 4	CAN_H
	Pin 5	CAN_L

Optional Connection Technology

AF2 Mounting Flange

As an alternative to the AF0 standard design, the AF2 mounting flange can be combined with field distributors for Profibus MFZ26D and MFZ28D. The AF2 features an M12 connection system for Profibus connection. An X11 connector for the incoming and an X12 socket for the outgoing Profibus are mounted on the equipment. The M12 connectors are designed in "reverse-key coding" (often referred to as B or W coding).



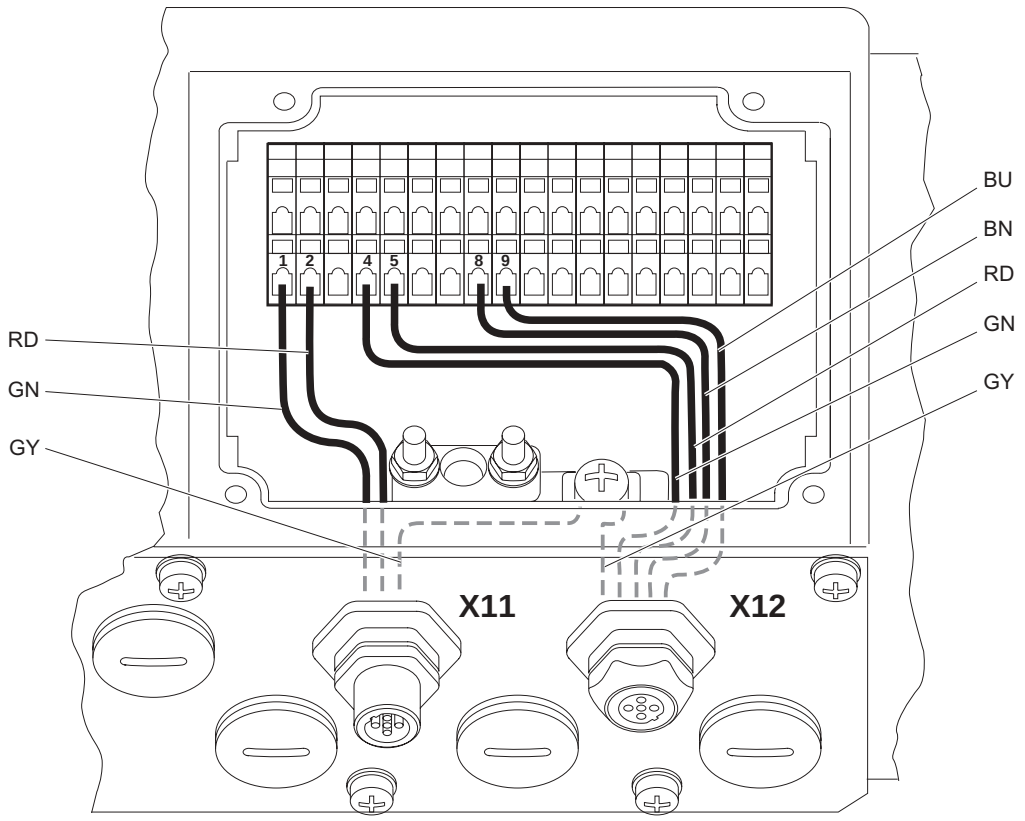
50360AXX

(1) Front panel
(2) M12 connector, incoming PROFIBUS (X11)
(3) Protection cap
(4) M12 socket, outgoing PROFIBUS (X12)
(5) M20 screw plug
(6) M25 screw plug

AF2 mounting flange corresponds to the recommendations from the Profibus guideline No. 2.141 "Connection Technology for Profibus"

In contrast to the standard design, the switchable bus termination at the MFP.. module may no longer be used if AF2 is used. Instead, a pluggable bus termination (M12) should be used in place of the outgoing X12 bus connection at the last station!

AF2 Cabling and Pin Assignment



50367AXX

M12 connector X11		
	**Pin 1**	Not assigned
	Pin 2	A-line PROFIBUS (incoming)
	Pin 3	Not assigned
	Pin 4	B-line PROFIBUS (incoming)
	Pin 5	Shield or protective ground
	Thread	Shield or protective ground

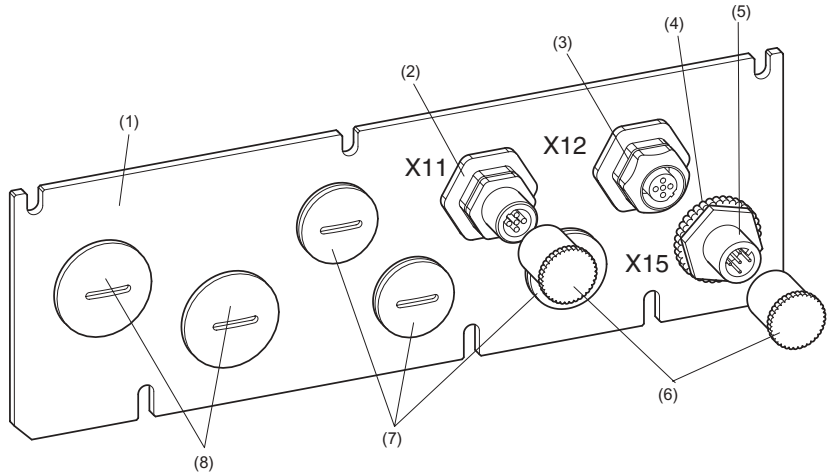
M12 socket X12		
	**Pin 1**	5 V VP supply voltage for terminating resistor
	Pin 2	A-line PROFIBUS (outgoing)
	Pin 3	DGND reference potential to VP (Pin1)
	Pin 4	B-line PROFIBUS (outgoing)
	Pin 5	Shield or protective ground
	Thread	Shield or protective ground

AF3 Mounting Flange

As an alternative to the AF0 standard design, the AF3 mounting flange can be combined with field distributors for Profibus MFZ26D and MFZ28D.

AF3 features an M12 connection system for Profibus connection. An X11 connector for the incoming and an X12 socket for the outgoing Profibus are mounted on the equipment. The M12 connectors are designed in "reverse-key coding" (often referred to as B or W coding).

In addition, AF3 features an M12 connecting plug X15 (4-pole, regular coding) for supplying the 24 V supply voltage(s).



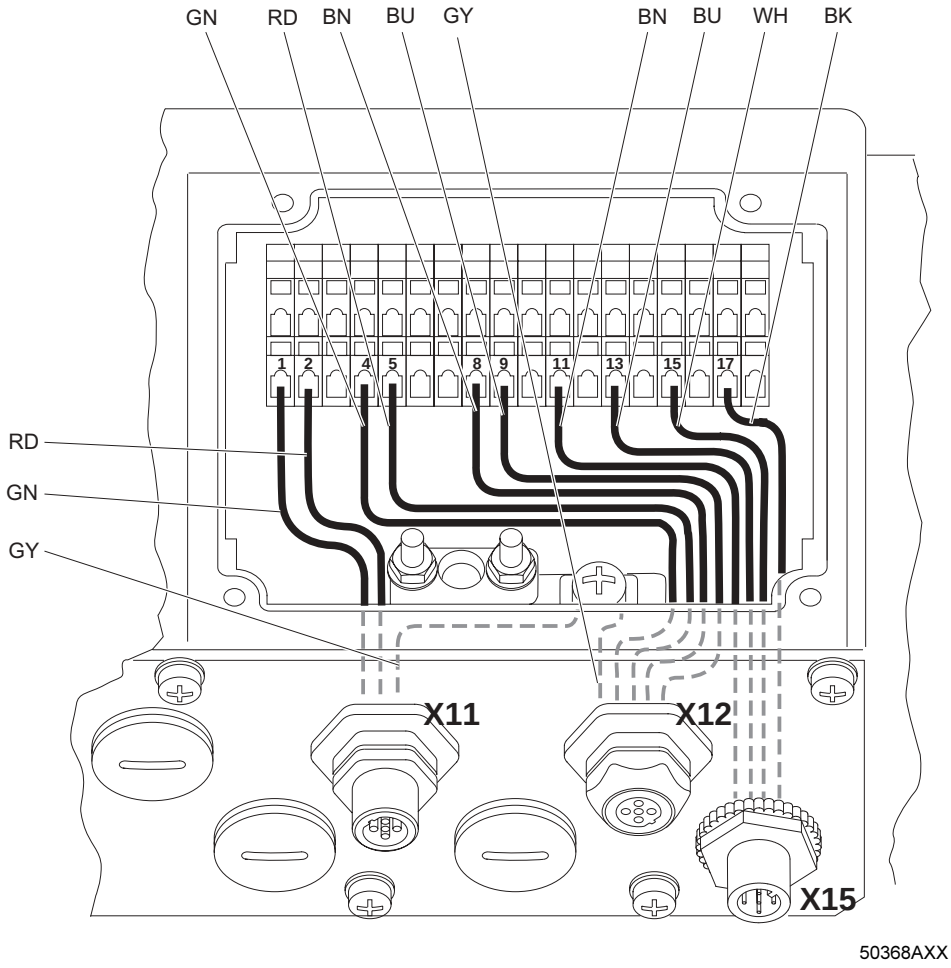
50359AXX

(1) Front panel
(2) M12 connector, incoming PROFIBUS (X11)
(3) M12 socket, outgoing PROFIBUS (X12)
(4) Reduction
(5) M12 connector, 24 V voltage supply (X15)
(6) Protection cap
(7) M20 screw plug
(8) M25 screw plug

AF3 mounting flange corresponds to the recommendations from the Profibus guideline No. 2.141 "Connection Technology for Profibus"

In contrast to the standard design, the switchable bus termination at the MFP.. module may no longer be used if AF3 is used. Instead, a pluggable bus termination (M12) should be used in place of the outgoing X12 bus connection at the last station!

AF3 Wiring and Pin Assignment



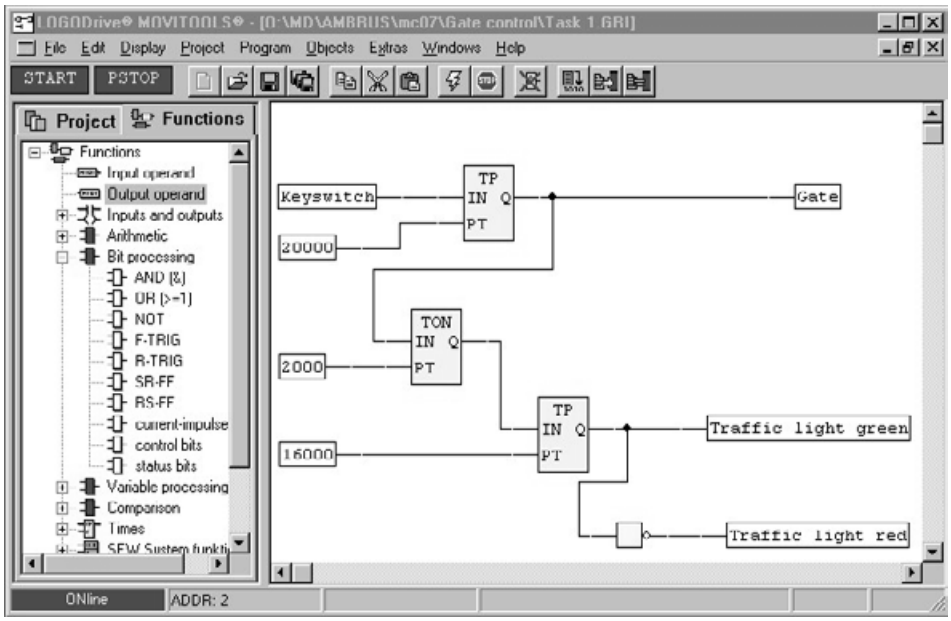
M12 connector X11		
	**Pin 1**	Not assigned
	Pin 2	A-line PROFIBUS (incoming)
	Pin 3	Not assigned
	Pin 4	B-line PROFIBUS (incoming)
	Pin 5	Shield or protective ground
	Thread	Shield or protective ground

M12 socket X12		
	**Pin 1**	5 V VP supply voltage for terminating resistor
	Pin 2	A-line PROFIBUS (outgoing)
	Pin 3	DGND reference potential to VP (Pin1)
	Pin 4	B-line PROFIBUS (outgoing)
	Pin 5	Shield or protective ground
	Thread	Shield or protective ground

M12 connector X15		
	**Pin 1**	24V - 24 V voltage supply for module electronics and sensors
	Pin 2	V2I24 – 24 V voltage supply for actuators
	Pin 3	GND - 0V24 - 24 V reference potential for module electronics and sensors
	Pin 4	GND2 - 0V24 reference potential for actuators

3.28 Fieldbus Interfaces and Field Distributors with Integrated MQ.. Control

Modules of type MQ... are based on the same housing and fieldbus technology as the MF.. modules; however, in addition they feature an integrated programmable controller.



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Technical Features

- Integrated fieldbus interface
- Programmable controller (IPOS, LOGODRIVE)
- Single positioning with NV26 proximity sensor
- Integrated I/O preprocessing and timers
- Protocol modification

Interface types *(in preparation)*

MQ.../Z.**1**.. Fieldbus Interface

- with integrated control

	4 x I / 2 x O (terminals) 	4 x I / 2 x O (M12) 	6 x I (M12) 
InterBus	MQI21A/Z11A	MQI22A/Z11A	MQI32A/Z11A
PROFIBUS	MQP21D/Z21D	MQP22D/Z21D	MQP32D/Z21D

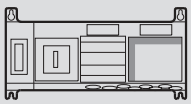
MQ.../Z.**3**.. Field Distributor

- with integrated control

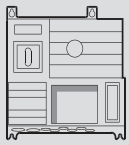
	no I/O 	4 x I / 2 x O (M12) 	6 x I (M12) 
InterBus	MQI21A/Z13A	MQI22A/Z13A	MQI32A/Z13A
PROFIBUS	MQP21D/Z23D	MQP22D/Z23D	MQP32D/Z23D

MQ.../Z.**6**../AF. Field Distributor

- with integrated control, line protection and maintenance switch

	4 x I / 2 x O (terminals) 	4 x I / 2 x O (M12) 	6 x I (M12) 
InterBus	MQI21A/Z16A/AF0	MQI22A/Z16A/AF0	MQI32A/Z16A/AF0
PROFIBUS	MQP21D/Z26D/AF**0**	MQP22D/Z26D/AF**0**	MQP32D/Z26D/AF**0**
	MQP21D/Z26D/AF**2**	MQP22D/Z26D/AF**2**	MQP32D/Z26D/AF**2**
	MQP21D/Z26D/AF**3**	MQP22D/Z26D/AF**3**	MQP32D/Z26D/AF**3**

MQ.../MM.../Z.**8**../AF. Field Distributorwith integrated control, maintenance switch, MOVIMOT® inverter

		4 x I / 2 x O (terminals) 	4 x I / 2 x O (M12) 	6 x I (M12) 
InterBus	⅄	MQI21A/MM..B/Z18A 0/AF0	MQI22A/MM..B/Z18A 0/AF0	MQI32A/MM..B/Z18A 0/AF0
	△	MQI21A/MM..B/Z18A 1/AF0	MQI22A/MM..B/Z18A 1/AF0	MQI32A/MM..B/Z18A 1/AF0
PROFIBUS	⅄	MQP21D/MM..B/Z28D 0/AF**0**	MQP22D/MM..B/Z28D 0/AF**0**	MQP32D/MM..B/Z28D 0/AF**0**
	△	MQP21D/MM..B/Z28D 1/AF**0**	MQP22D/MM..B/Z28D 1/AF**0**	MQP32D/MM..B/Z28D 1/AF**0**
	⅄	MQP21D/MM..B/Z28D 0/AF**2**	MQP22D/MM..B/Z28D 0/AF**2**	MQP32D/MM..B/Z28D 0/AF**2**
	△	MQP21D/MM..B/Z28D 1/AF**2**	MQP22D/MM..B/Z28D 1/AF**2**	MQP32D/MM..B/Z28D 1/AF**2**
	⅄	MQP21D/MM..B/Z28D 0/AF**3**	MQP22D/MM..B/Z28D 0/AF**3**	MQP32D/MM..B/Z28D 0/AF**3**
	△	MQP21D/MM..B/Z28D 1/AF**3**	MQP22D/MM..B/Z28D 1/AF**3**	MQP32D/MM..B/Z28D 1/AF**3**

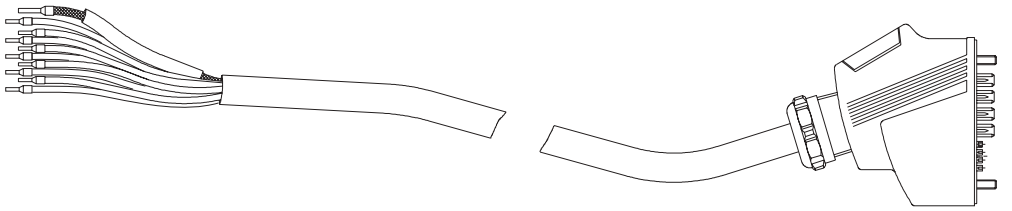
3.29 Hybrid Cables

Function

- Connecting field distributors with drives
- Combining power transmission, control voltage, and communication in one cable jacket
- Ensuring optimum EMC shielding and cable impedances
- Delivered with pre-fabricated plug connection

Hybrid cable for connection between MF.../Z.3. or MF../.6. field distributor and MOVIMOT®

- Part number: 0186 725 3
- Maximum cable length with MF.../Z.3. and cross-section reduction: 3 meter
- Maximum cable length with MF.../Z.3. without cross-section reduction: 30 meter
- Maximum cable length with MF.../Z.6.: 30 meter



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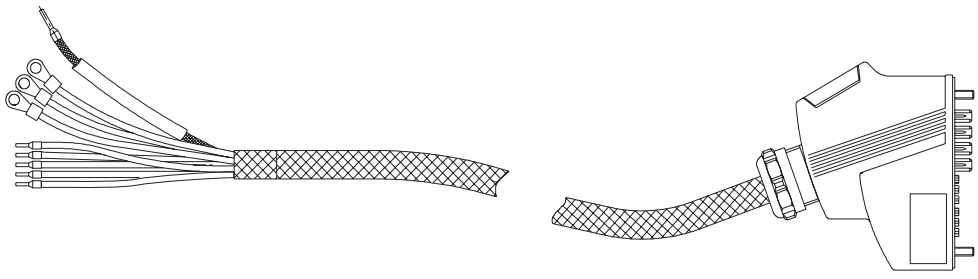
Connection between field distributors MF.../Z.8. and AC motors

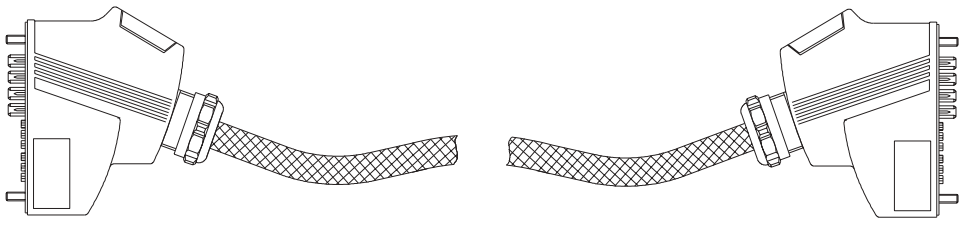
- Part number 0186 742 3
- Maximum cable length: 5 meter



50451AXX

Connection between field distributors MF…/Z.8. and AC motors with APG4 plug connector

- Part number: 0186 741 5
- Maximum cable length: 5 meter



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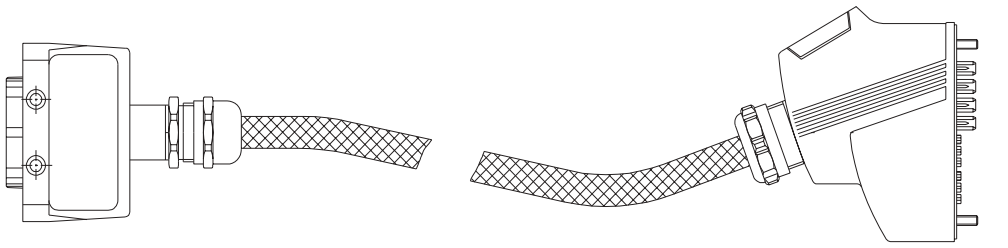
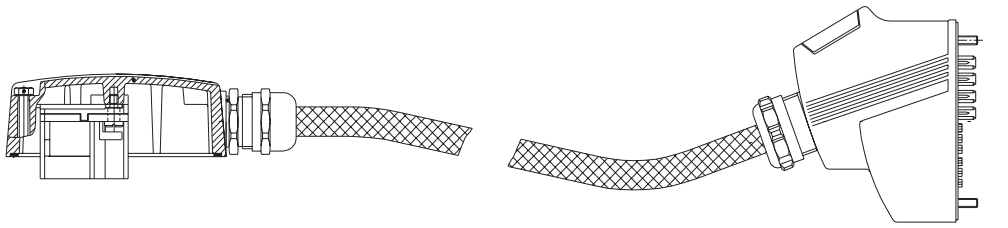
Connection between field distributors MF…/Z.8. and AC motors with ASA4 plug connector

- Part number: 0593 076 6
- Maximum cable length: 5 meter



05020AXX

Connection between field distributors MF…/Z.8. and AC motors with IS plug connector

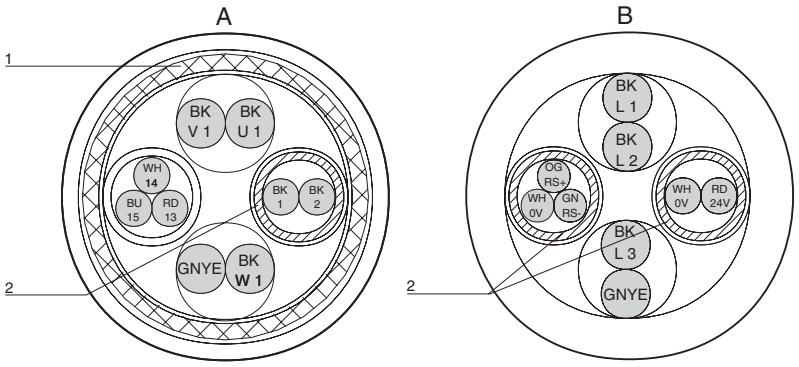


05030AXX

- Maximum cable length: 5 meter

	MF...../Z.8.. *0*/.... Field distributor in star connection	**MF...../Z.8.. *1*/.... Field distributor in delta connection**
Motor with IS lower part Size DT71 – DT90	Hybrid cable part number 0593 278 5	Hybrid cable part number 0816 325 1
Motor with IS lower part Size DV100	Hybrid cable part number 0593 755 8	Hybrid cable part number 0816 326 X

Mechanical Design



03520AXX

A Connection between field distributors MF…/Z.8A and AC motors (Part number 0186 742 3 + 0186 741 5)
B Connection between field distributor MF.../Z.3A or MF../.6A and MOVIMOT®
(Part number 0186 725 3)
1 Cumulative shield
2 Shield

- Supply core 4 x 1.5 mm^2
- Control core pair 2 x 0.75 mm^2
- Control core pair 3 x 0.75 mm^2
  - Insulation: TPE-E (polyester)
  - Conductor: E-CU extra finely stranded conductor, single wire ≤ 0.1 mm
  - Shield: made of tin-coated E-Cu wire.
- Overall diameter: ≤ 13 mm

Electrical Characteristics

- Conductor resistance for 1.5 mm^2 (20 °C):max. 13 Ω/km
- Conductor resistance for 0.75 mm^2 (20 °C):max. 26 Ω/km
- Operating voltage for 1.5 mm $core^2$: max. 750 V
- Operating voltage for 0.75 mm $core^2$: max. 350 V
- Insulation resistance at 20 °C: min. 20 MΩ x km

Mechanical Characteristics

- Can be used in cat-track routing
- Bending radius in cat-track 10 x diameter
  in fixed installation 5 x diameter

Thermal Characteristics

- Processing and operation -30 °C to +90 °C
- Transport and storage -40 °C to +90 °C

Chemical Characteristics

- Oil resistant to VDE 0472 Section 803 Testing method B
- General fuel resistance (e.g. diesel, gasoline) to DIN ISO 6722 Part 1 and 2
- General resistance to acids, caustic solutions, cleaning materials
- General resistance to dust (e.g. bauxite, magnesite)
- Insulating and sheathing material is halogen-free based on VDE 0472 Part 815 and silicon-free