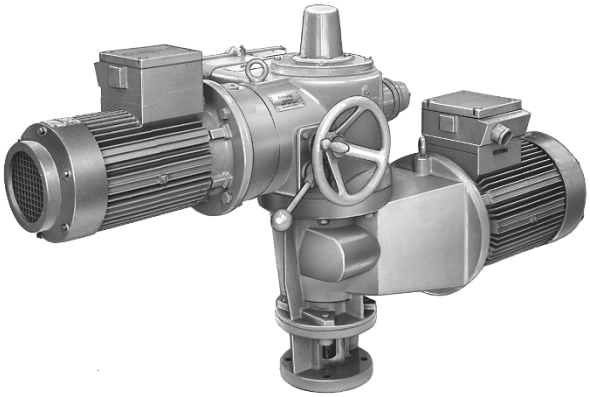
SIPOS AKTORIK

M76348

Technical Data
Electric double-motor-actuators



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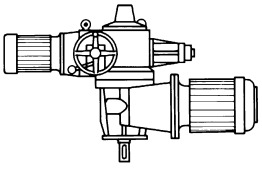
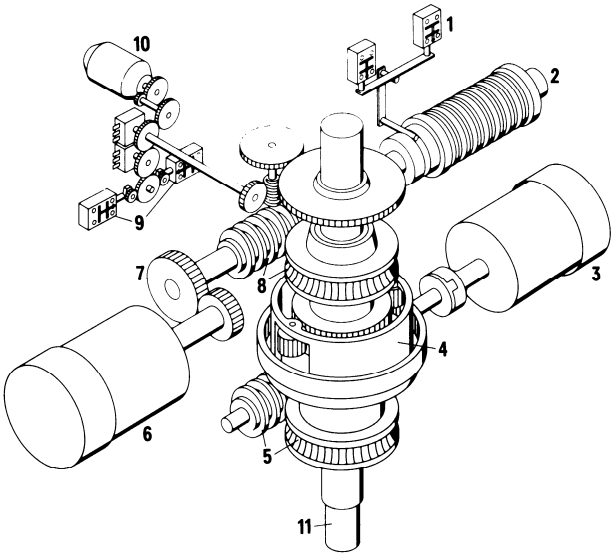
Technical Data

General data

Overview

Electric double-motor actuators for closed-loop control equipment				
R series	Type	M76348-D	M76348-E	M76348-F
Cut-off torque, not adjustable Size to DIN 3210		**750 Nm** 3	**1500Nm** 4	**3000 Nm** 5
Output speed - for closed-loop control operation - for high-speed operation		5 or 10 rpm 20, 40 or 80 rpm		
Motors		Three-phase motors with 3 PTC thermistors		
- Control motor Operating mode to DIN EN 600 34		without or with brake S4/S5 intermittent duty - 10% cdf - - 1200c/h with < 3kW - 600 c/h with > 3 kW		
- High-speed motor Betriebsart nach DIN EN 600 34		without brake S 2 - 5 min min short-time duty		



1 Torque-dependent switches
2 Torque spring (plate springs)
3 High-speed motor
4 Planetary gear
5 Worm gear II
6 Control motor
7 Transmission gear
8 Worm gear I
9 Travel-dependent switches
10 Electronic position transmitter
11 Drive shaft

Application

Double-motor actuators are special actuators which are used for open-loop control functions in addition to the closed-loop control operation.

The positioning time reached by the control motor with the gear unit lies well within the range normally used for closed-loop control circuits. The positioning time reached by the high-speed motor is required for particular operating conditions in view of safety considerations. When the safe position is reached with the high-speed motor the control motor once again takes over the control function of the actuator in the control circuit via an appropriate switching unit.

Corresponding to the specific tasks in a power station, three actuators with a cut-off torque of 750 Nm, 1500 Nm and 3000 Nm can be supplied; the ratio of the output speeds is specified in the ordering data.

Double-motor actuators are normally mounted directly on the valve, for instance on a steam reduction valve.

Design and mode of operation

The gear unit is a combination of a primary spur gear, two self-locking worm gears and a planetary gear.
(cf. Fig. 1).

In low-speed operation the power flow goes from the closed-loop control motor (6) via the primary spur gear and the worm gear I (8) to the sun wheel of the planetary gear (4). The annulus of the planetary gear (4) is held in position by the self-locking worm gear II (5) via a hollow shaft. As a result the sun wheel transmits its rotary motion via the planetary gear (4) carrier onto the drive shaft (shaft end) (11).

In high-speed operation the power of the high-speed motor (3) is transmitted to the annulus via worm gear II (5). In this case the sun wheel of the planetary gear (4) is held in position by the self-locking of worm gear I (8) and the annulus rotation is transmitted to the carrier of the planetary gear (4) and in this way to the securely coupled drive shaft (11).

The torque-dependent cut-off is actuated by the traveling worm of planetary gear I.
The high-speed motor can only be switched off by travel-dependent switches.

The switching and signaling unit is driven by the drive shaft through an intermediate gear.

The handwheel acts on the worm gear of planetary gear I through a link. By using a changeover lever during standstill of both motors manual operation can be switched on. Switching back takes place automatically when the control motor Starts.

Mounting position

The actuators can operate in any mounting position. However, since the gear runs in grease and it is not possible to keep the seals completely oil-tight over an extended period of operation it is advisable to mount the actuator on the final control element in such a way that the two motors are not hanging downward. In the case of horizontal mounting the actuator must be supported.

Technical details

General	
Electric double-motor actuators, R series, type series	M76348
Cut-off torques	750, 1500 and 3000 Nm
Speeds of drive shaft for closed-loop control operation/high-speed operation	5/20, 5/40, 10/40 or 10/80 rpm
Temperature range (perm. ambient temperature)	-20 to +60 °C
Degree of protection to EN 60 529	
- Gear enclosure	IP65
- Motors	IP54
- Motor terminal box	IP55
- Signaling and terminal box	IP65
- Individual plug	IP55
- Compact plug	IP67
Operating mode to DIN EN 600 34	
- for control operation	S 4/S 5 intermittent duty - 10% cdf- - 1200 c/h with < 3 kW - 600 c/h with > 3 kW (power of control motor)
- for high-speed operation	Short-time duty S2 - 5 min
Electric connection	
- Control motor	- via terminals in motor terminal box - via individual plug or - via compact plug
- High-speed motor	via terminals in motor terminal box
- Switching and signaling unit	- via terminal strip (48-pole) in terminal box, - via individual plug or - compact plug (2 x 24-pole)
Painting	(Moderate) RAL 7030
Thread for cable glands	see dimensional drawings
Weights	- M76348-D 240 kg - M76348-E /-F 400 kg

Motors	
Type and mains connection	Three-phase asynchronous motors 3/PEN AC 50 Hz 230/400 V or 500 V with or without brake (high-speed motor only without brake)
Thermal protection	3 PTC thermistor temperature detectors
Insulation class	- H for motors without brake - F for control motor with brake
Electric data	see table page 4

Switching and signaling unit		
Torque-dependent and travel-dependent switches (DE and WE)		
- Versions	Microswitches with silver contacts or with gold-plated contacts	
- Connection types	as NC, NO or changeover contacts, switchable with the same voltage potential	
Mechanical lifetime	approx. 10^7 switching cycles	
- Switches		
· with silver contacts permissible current loading	5 A for AC 250 V 8 A for AC 125 V 10 A for AC 30 V	0,4 A for DC 250 V 0,6 A for DC 125 V 5 A for DC 30 V
· with gold-plated contacts permissible voltage	max. DC 60 V	
rated utilization voltage	DC 24 V; 3 to 15 mA	
Note: Operation with a voltage higher than 60 V is not permissible since it damages the contact properties. Contact assignment of the microswitch is only possible with the same potential.		
Electronic position transmitter (ESR)		
- Version	2SX9000-1WR00 (C73451-A383-A1 / R410134) without restoring spring, turning through	
- Measuring range	0 to 340°	
· smallest measuring span	80°	
· largest measuring span	340°	
- Torque at drive shaft	approx 0.1 Ncm	
- Electric connection	3- or 4-wire connection	2- wire connection
· Supply voltage UH	DC 18 to 30 V	DC 12 to 30 V
· Maximum load RL	50 • (UH -2,5) Ω	50 • (UH -12) Ω
· Output signal	load-independent direct current	
	0 to 20 mA1)	4 to 20 mA
· Current consumption	max. 30 mA	max. 30 mA
- Linearity error (tolerance band setting) for a measuring span of 270°	≤ 1%	
- Influence with a measuring span of 270° for		
· supply voltage · load	} ≤ 0,1% over the whole range	
· ambient temperature	≤ 0,3%/10K	
Space heater (Hz)		
- Supply voltage	AC 24 V, 110 V or 230 V depending on order	
- Power consumption	7 to 8 W	

[1] 4 to 20 mA setting possible

Technical Data

Electrical Data of motors

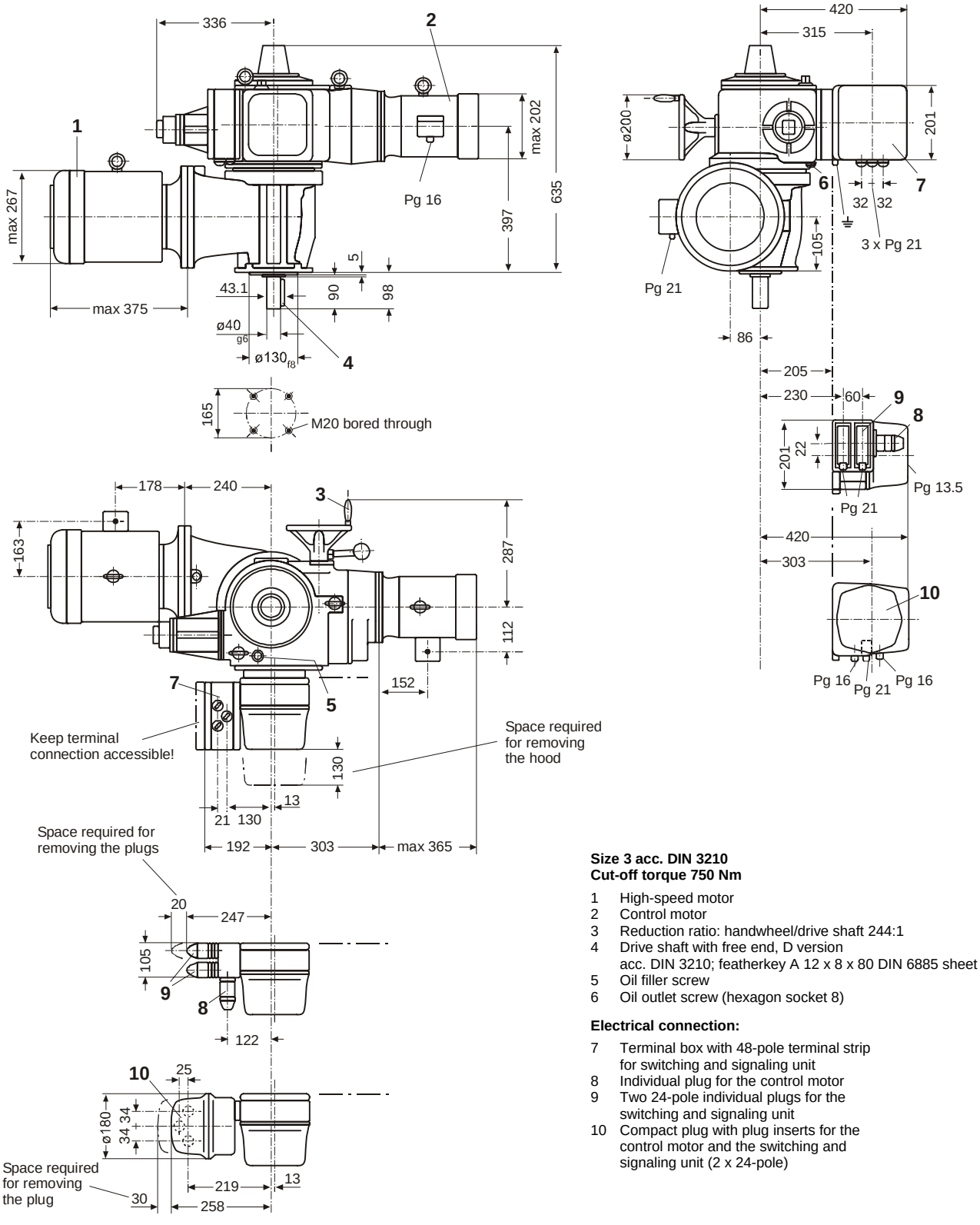
Complete thermal protection with 3 PTC thermistor temperature detectors possible for every motor

Double-motor actuators, R series			Data of used motors											
Motor	M76348-	Cut-off torque Nm	Rated power to VDE 0530 kW	No. of poles	Rated speed rpm	Effi-ciency η %	Power factor cos φ	Rated current at 400 V [1] A	Locked-rotor current factor	Rated torque Nm	Locked-rotor torque factor	Size to DIN 42673	Form to DIN 42950	Flange size to DIN 42948
Closed-loop control motor without brake	-D52 -D53	750	0.75	4	1220	61	0.84	2.2	3.3	5.9	2.7	80	B 5	A 200
	-D54 -D55		1.5		1260	65	0.85	4.1	3.8	11.4	2.5	90 L		
	-E52 -E53	1500												
	-E54 -E55		3.0		1320	69	0.84	7.4	4.6	21.7	3.2	100 L		A 250
	-F52 -F53	3000												
	-F54 -F55		5.5		1360	80	0.84	12.5	4.8	38	2.5	132 S		A 300
Closed-loop control motor with brake	-D52 -D53	750	0.75	4	1220	61	0.84	2.2	3.3	5.9	2.7	80	B 5	A 200
	-D54 -D55		1.5		1260	65	0.85	4.1	3.8	11.4	2.7	90 L		
	-E52 -E53	1500												
	-E54 -E55		3.0		1320	69	0.84	7.4	4.6	21.7	3.2	100 L		A 250
	-F52 -F53	3000												
	-F54 -F55		5.5		1425	80	0.84	12.5	4.8	38	2.5	132 S		A 300
High-speed motor	-D52	750	3	8	700	77	0.74	8	4.1	41	2.1	132 M	B 5	A 300
	-D53 -D54		5.5	4	1455	86	0.81	12	6.3	36	2.5	132 S		
	-D55		7.5	2	2930	88	0.89	14.5	6.9	24	2.3			
	-E52	1500	4	8	715	80	0.72	10.5	4.5	53	2.2	160 M		A 350
	-E53 -E54		11	4	1460	88	0.84	22.6	6.2	72				
	-E55		15	2	2940	90	0.9	27.8	6.6	49				
	-F52	3000	7.5	8	715	85	0.72	18.6	5.3	100	2.7	160 L		
	-F53 -F54		15	4	1460	90	0.84	30	6.5	98	2.6			
	-F55		27.5	2	2850	82	0.86	60	4.8	92	2.1	160 M		

[1] For other voltages convert the values to the inverse proportional voltage, e.g.: $I_{500\ V} = I_{400V} \cdot \frac{400\ V}{500\ V}$ (A)

Technical Data

Dimensional drawing **M76348-D**



Size 3 acc. DIN 3210
Cut-off torque 750 Nm

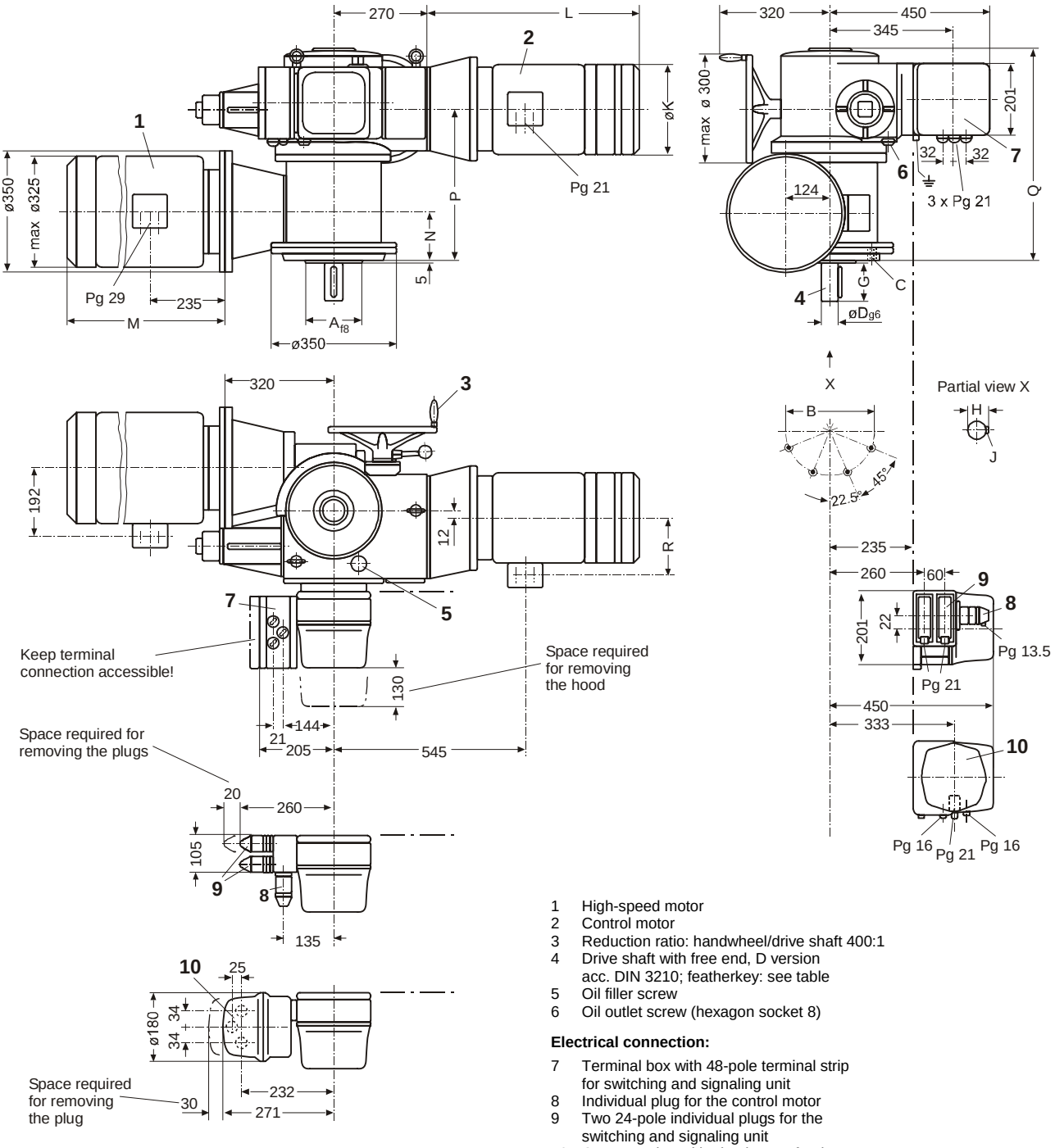
1 High-speed motor
2 Control motor
3 Reduction ratio: handwheel/drive shaft 244:1
4 Drive shaft with free end, D version acc. DIN 3210; featherkey A 12 x 8 x 80 DIN 6885 sheet 1
5 Oil filler screw
6 Oil outlet screw (hexagon socket 8)

Electrical connection:

7 Terminal box with 48-pole terminal strip for switching and signaling unit
8 Individual plug for the control motor
9 Two 24-pole individual plugs for the switching and signaling unit
10 Compact plug with plug inserts for the control motor and the switching and signaling unit (2 x 24-pole)

Technical Data

Dimensional drawing **M76348-E, M76348-F**



1 High-speed motor
2 Control motor
3 Reduction ratio: handwheel/drive shaft 400:1
4 Drive shaft with free end, D version acc. DIN 3210; featherkey: see table
5 Oil filler screw
6 Oil outlet screw (hexagon socket 8)

Electrical connection:

7 Terminal box with 48-pole terminal strip for switching and signaling unit
8 Individual plug for the control motor
9 Two 24-pole individual plugs for the switching and signaling unit
10 Compact plug with plug inserts for the control motor and the switching and signaling unit (2 x 24-pole)

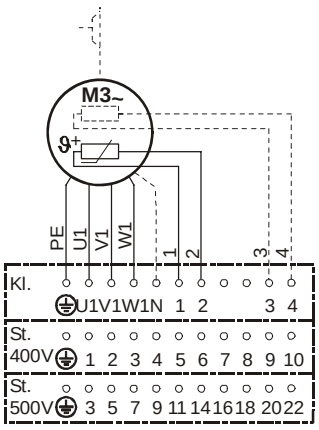
Double-motor actuator	Size acc. DIN 3210	Cut-off torque	A	B	C Threaded bores	D	G	H	J Featherkey acc. DIN 6885, sheet 1	K max	L max	M max	N	P	Q	R
M76348-E	**4**	**1500 Nm**	160	254	8 x M 16, 20 deep	50	110	53.5	A 14 x 9 x 100	207	500	525	158	430	605	135
M76348-F	**5**	**3000 Nm**	180	300	8 x M 20, 28 deep	60	120	64	A 18 x 11 x 110	272	610	525	148	420	595	177

Technical Data

Wiring diagram **M76348**

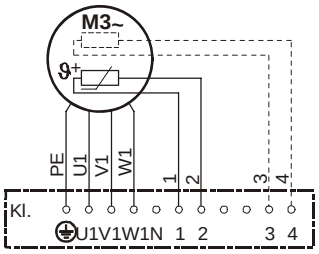
Motor connections

Three-phase motor for **closed-loop control**, with PTC thermistors, with or without mechanical brake, with or without anti-condensation heater



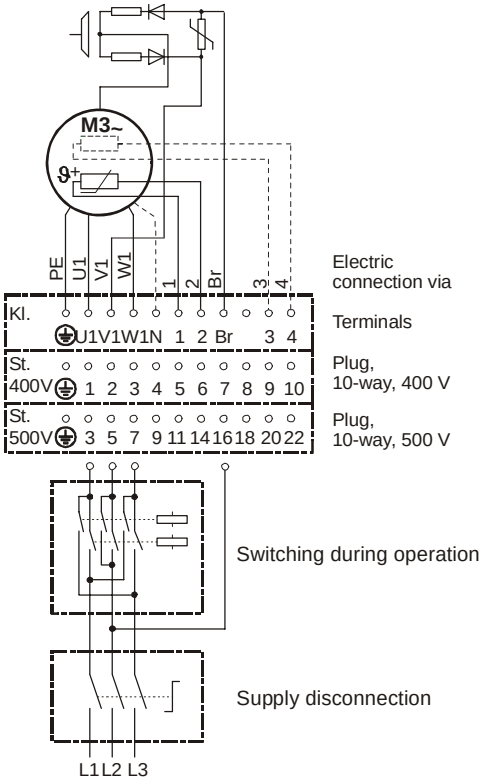
Electric connection via
Terminals
Plug, 10-way, 400 V
Plug, 10-way, 500 V

Three-phase motor for **high-speed operation**, with PTC thermistors, without brake, with or, without anti-condensation heater



Electric connection via terminals

Three-phase motor for **closed-loop control**, with PTC thermistors and with mechanical DC-operated brake for high-speed cut-off,, with or without anti-condensation heater



Electric connection via
Terminals
Plug, 10-way, 400 V
Plug, 10-way, 500 V

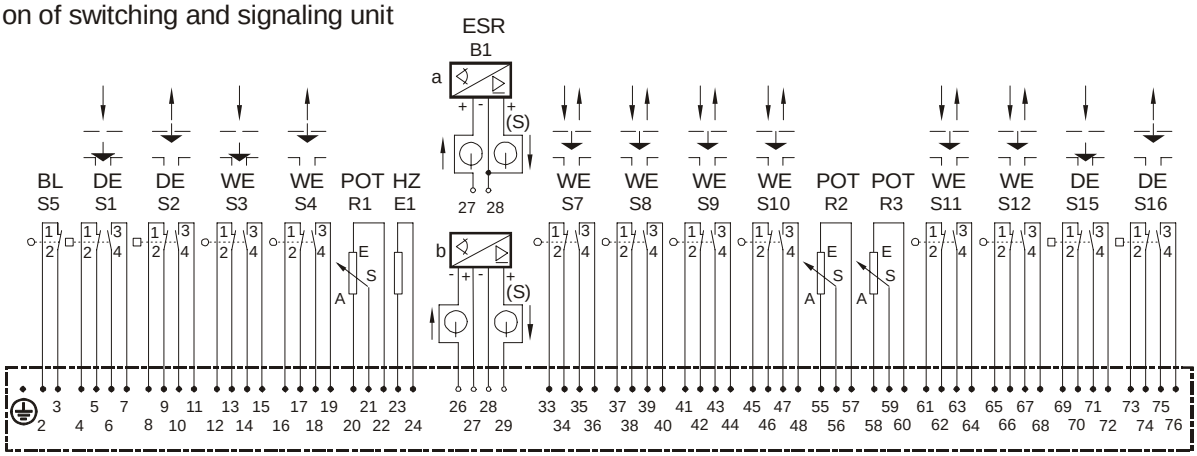
Circuit for the version with brake motor

The eventually mounted brake motor is designed for quick stopping. For that the brake connection (Br) has to be connected to the phase conductor L2 before the reversing contactor module (see terminal connection diagram in the terminal compartment).

Danger

Voltage disconnection in case of quick stopping is only possible over the main switch, because voltage can be present via the tapped “Br” line even when the contactor is switched off.
Change of direction of rotation is only possible in interverting the phases L1 and L3!
With normal cut-off, connect Br to V1.

Connection of switching and signaling unit



The connection diagram is valid for terminal and plug connection.

BL	Blinker contact
DE	Torque-dependent switch
WE	Travel-dependent switch
	The DE and WE switches are shown not activated
POT	Potentiometer for position indication
ESR	Electronic position transmitter
	a with 2-wire connection
	b with 3-/4-wire connection
HZ	Space heater