LOWFLOW
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I & M Mark 708ME

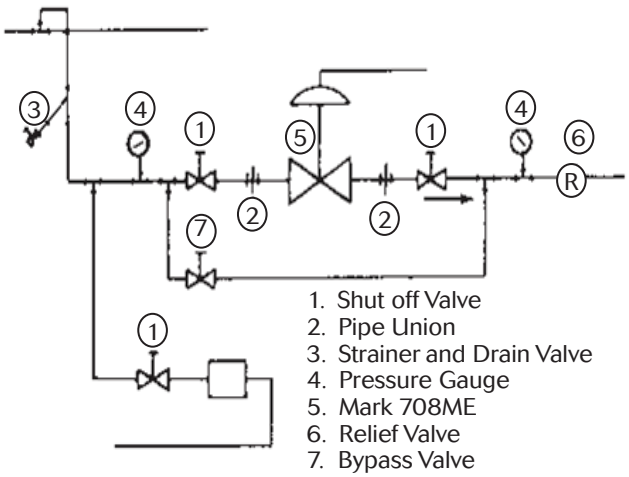
Installation & Maintenance Instructions for
Mark 708 & Motor Actuator

Warning: Jordan LowFlow Control Valves must only be used, installed and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard. Before servicing any valve, disconnect, shut off, or bypass all pressurized fluid. Before disassembling a valve, be sure to release all spring tension.

Please read these instructions carefully!

Your Jordan LowFlow Valve product will provide you with long, trouble-free service if it is correctly installed and maintained. Spending a few minutes now reading these instructions can save hours of trouble and downtime later. When making repairs, use only genuine Jordan LowFlow Valve parts, available for immediate shipment from the factory.

Ideal Installation



1. To control very low flow rates, Mark 708 control valves are often provided with trims having very small clearances. To keep this trim functioning properly, it is essential that the fluid flowing through the valve be clean.
2. To protect the valve from grit, scale, thread chips and other foreign matter, ALL pipelines and piping components should be blown out and thoroughly cleaned before the installation process begins.
3. Shutoff valves, pressure gauges, and by-pass piping should be installed as indicated in the Installation Schematic to provide easier adjustment, operation and testing.
4. A line strainer should be installed on the inlet side of the valve to protect it from grit, scale, and other foreign matter. A 0.033 perforated screen is usually suitable for this purpose. Line strainers are available from Jordan Valve.
5. For best control, 3′ 0″ straight sections of pipe should be installed on either side of the valve.
6. In preparing threaded pipe connections, care should be exercised to prevent pipe-sealing compound from getting into pipelines. Pipe sealing compound should be used sparingly, leaving the two end threads clean. Jordan uses, and recommends, thread sealer Teflon ribbon.
7. The flow arrow on the valve body must be pointed in the direction of the flow. Ideally the valve should be installed in the highest horizontal line of piping to provide drainage for inlet and outlet piping, to prevent water hammer, and to obtain faster response.
8. If possible, install a relief valve downstream from the valve. Set at 15 psi above the control point of the valve.
9. In hot vapor lines, upstream and downstream piping near the valve should be insulated to minimize condensation.
10. Evaluate inlet and outlet pipe friction losses and velocities to decide when smaller outlet piping might cause excessive back pressure. When required, a standard tapered expander connected to the outlet of the valve is recommended.
11. Where surges are severe, a piping accumulator is recommended.
12. On steam control applications, install a steam trap with sufficient capacity to drain the coil or condenser. Be sure to have a good fall to the trap, and no backpressure. Best control is maintained if the coil or condenser is kept dry.

Start-Up Procedure

1. Be sure that the action of the control valve and of the controller are such that you achieve the desired results. The action can be changed if needed using the instructions shown in “Reversing Action”.

Increase in pressure or temperature must:	And the action of the valve is:	Then the action of the controller must be:
Close Valve	Air to Close (direct)	Direct
Close Valve	Air to Open (reverse)	Reverse
Open Valve	Air to Close (direct)	Reverse
Open Valve	Air to Open (reverse)	Direct

2. The control valve has been pre-set by Jordan Valve, however, finer adjustment may be required to compensate for the system conditions of your application.
3. With inlet, outlet and bypass shutoff valves closed, and no pressure in the down stream line, fully open the outlet valve. Slowly open the inlet valve just enough to start flow through the control valve. Increase the flow gradually by slowly opening the inlet shutoff valve. Do not fully open the inlet valve until you are sure that the controller and control valve have control of the system. Usually, the handwheel on the inlet valve will turn freely when this point is reached.
4. To shut off the line fluid, close the inlet shutoff valve first, and then close the outlet shutoff valve.

Maintenance

Caution: Make certain that there is no pressure in the valve before loosening any fittings or joints. The following steps are recommended:

1. Close the inlet shutoff valve.
2. Allow pressure to bleed off through the downstream piping. Do not attempt to reverse the flow through the valve by bleeding pressure from the upstream side of the valve.
3. When the pressure gauges indicate that all pressure has been removed from the system, close the outlet shutoff valve, and the valve may be serviced.

Note: refer to the drawing at the end of this document for description and proper orientation of parts.

To reduce maintenance time, refer to proper figure and follow steps indicated below for applicable maintenance operation.

Proposed Maintenance Procedure	Follow Steps...
Renewing Stem Packing	Packing Replacement
Valve Disassembly, Inspecting Parts, Replacing Plug or Seat Ring	Valve Disassembly
Valve Reassembly	Valve Reassembly
Motor Valve Seat Spring Preload	Motor Valve Seat Spring Preload

Packing Replacement

Renew valve plug stem packing if control valve has been in service beyond normal maintenance, and packing shows signs of wear. Wear will be indicated by leakage, which cannot be corrected by minor tightening of the packing flange. An additional packing ring can be installed to overcome minor leakage without dismantling the control valve or breaking valve plug connection.

1. Remove the actuator from the bonnet. (See Removing Actuator from Valve.)
2. Remove all of the packing and discard. Clean valve stem and packing box thoroughly. The valve stem may be dressed with a very fine crocus cloth, but generally it is best not to as the stem has a fine machined finish. Use approved non-residue-forming solvent for cleaning. Wipe dry with clean cloth.
3. Insert a new set of packing in packing box. Press each ring down in place with a tube as it is installed.
4. After packing is installed, assemble packing adapter, gland, and gland nuts. Tighten the nuts hand tight.
5. The final packing adjustment should be made with the valve pressurized and the packing tightened just enough to stop any leakage, while stroking the valve. **Excessive tightening could cause the stem to stick and result in improper valve operation due to high friction forces.**

Removing Actuator from Valve

1. Position the valve to full open and disconnect all electrical connections.
2. Remove the actuator from the valve as follows: loosen the two stem connector nuts and move them down the stem. Lock these nuts together. Remove the two nuts that secure the packing flange, then the then the two hex bolts that secure the yoke to the bonnet. Remove the gland nuts (11) that secure the packing gland (9) and the packing adaptor (7). Using a wrench on the nuts and on the flats of the actuator stem, turn the stem connector (while holding the actuator stem in place) until the stems disengage. The actuator will be free of the valve.

Body & Bonnet Disassembly

1. For actuator removal, refer to section on “Removing Actuator”.
2. Remove the body/bonnet bolts and carefully separate the body from the bonnet so as not to damage delicate trim components.
3. Remove stem nuts and indicator. Withdraw the stem and plug out of the bonnet. (The smaller trims have a one-piece stem and plug, which can be withdrawn through the packing.)
4. With a socket wrench, remove the seat from the body. Remove and discard the body/bonnet gasket.
5. Soft seats are disassembled by removing the seat cap from the seat and then the soft seat can be removed.
6. Clean all parts with an approved non-residue-forming solvent. Remove encrusted material with a very fine Crocus or aluminum oxide cloth. However, do not use these abrasives on the seating surface or the trim surface (the portion of the plug that enters the seat bore.) The machining tolerances on these surfaces are so closely controlled that you might change the valves flow characteristic.
7. Inspect all parts and replace and worn or damaged parts. It is always advisable to replace seals and

gaskets. DO NOT attempt to resurface seating surfaces of the plug or seat. Seats and plugs are only sold in factory-matched sets.

Valve Reassembly

1. Soft seated valves: insert soft seat into the seat cavity, install the seat cap and tighten.
2. Lubricate the seat threads with a lubricant such as NO-LOK and thread the seat into the body. Torque to values shown.

Valve Size	Seat Torque	
	ft. - lbs.	in. - lbs.
3/4″	26	310
1/2″	20	240

3. Guided trim: Assemble plug to stem.
4. Insert the stem into the bonnet. Set the gasket around the boss on the bonnet. Carefully assemble the bonnet to the body and allow the plug to center into the seat. Push down on the stem to be sure that the plug has fully engaged the seat. Hand-tighten the body bolts.

Valve Size	Gasket Material	Quantity Required
All	Teflon	1
1/2″ & 3/4″	Grafoil	2

5. Remove and replace the packing as described in "Packing Replacement".
6. While holding the plug firmly in position in the seat, secure the body to the bonnet with the bolts. Torque bolts evenly to the values shown.

Torque Values (in. - lbs.)			
Material	Bolt Diameter		Limitation
	5/16″	3/8″	
Gr. BD*	125	200	650 deg. (also SAE GR. 8)
Gr. B7	125	200	1000 deg. F
Gr. B6	125	200	900 deg. F (410 SST)

* Standard Bolting

7. Reassemble the two stem nuts and indicator all the way onto the stem threads. Lock the two nuts together.
8. Position to full open.
9. Mount the motor actuator support legs to the bonnet flange and secure with the hex nuts. Thread the stem into the motor actuator stem. Hold the actuator stem with a wrench to prevent it from turning.

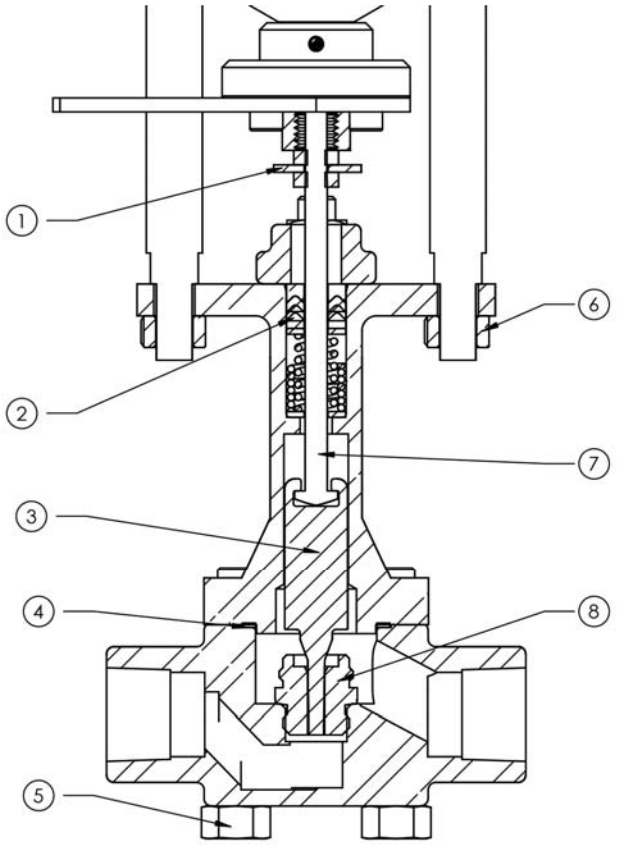
Motor Valve Seat Spring Preload

1. Position the valve to be full open.
2. The two stem nuts should be loosened and threaded down the stem and then locked together.
3. Slowly stroke the motor to closed position, while rotating valve stem and stem nuts back and forth (approximately ¼ turn). Caution: valve stem should rotate freely. When it no longer rotates freely, the plug is in contact with the seat, and the motor must be stopped or damage may occur. If required, the valve stem may be threaded into the actuator stem to allow motor to complete stroke.
4. With motor in full closed position and stopped by limit switch, rotate the stem down until the plug is in contact with the seat, and turn and additional ¼ - ½ turn to preload the seat.
5. Position motor to open position, and confirm that the motor is stopped by the limit switch prior to the plug reaching the upper stop. Without rotating the stem, thread the stem nuts up and lock them against the actuator stem.
   Note: limit switches and high/low set points are factory-set. If command signal range will not fully stroke the valve, refer to electrical connection diagram for the motor actuator that was shipped with the valve. With seat spring preload set, if plug hits upper stop prior to limit switch, the limit switch will require adjustment; consult factory for procedure.

Trim Removal Instructions

Referring to drawing below:

1. Position valve stem at mid-stroke.
2. Unthread the four bolts (5) and remove body.
3. Loosen hex nuts and indicator washer (1). Unthread stem from motor shaft and remove nuts and washer (1).
4. Remove the hex nuts (6) and lift motor from valve.
5. Push stem (7) through body. (DO NOT push stem threads through packing unless stem is being replaced).
6. Slide plug (3) off stem.
7. Remove and install new seat (8) – optional.
8. Install new gasket (4). Install new packing (2) if stem is removed.
9. Assemble in reverse order. Note: stem must be threaded into connector until bottomed out to maintain stroke adjustment.



Item	Description
1	Lock Nuts/ Indicator
2	Packing
3	Plug
4	Gasket
5	Bolts
6	Hex Nuts
7	Stem
8	Seat

Ordering Spare Parts

Use only genuine Jordan Valve parts to keep your valve in good working order. So that we can supply the parts, which were designed for your valve, we must know exactly which product you are using. The only guarantee to getting the correct replacement parts is to provide your Jordan Representative with the valve serial number. This number is located on the valve identification tag. If the serial number is not available, the parts needed for your valve might be determined using the following information: Model Number, Valve Body Size, Seat Material and Cv Rating, Spring Range and Set Point, Trim Material, Part Name - Number and Quantity.

NOTE: Any parts ordered without a valve serial number that are found to be incorrect are subject to up to a minimum 25% restock charge when returned.

Trouble Shooting

If You Experience Erratic Control:

- Oversizing can cause cycling or hunting (recalculate the size required).
- Undersizing can cause the control point to drop off under peak loads (increase the trim size).
- Inlet pressure to the valve maybe varying significantly and the controller may not be following it (adjust the controller).
- Control loop may require equal percentage trim if high rangabilities are being utilized.
- Steam traps may need reconditioning.
- Safety relief valves may be leaking.
- Valve stroke may be out of adjustment or there may be foreign matter in the valve preventing full movement.

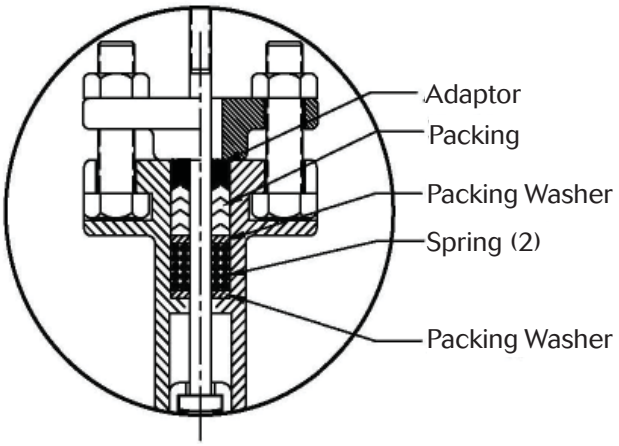
If You Experience Insufficient Flow:

- Check shutoff valves to be sure they are fully open.
- Inlet pressure to valve may be insufficient to provide the needed flow (check the inlet pressure with a pressure gauge).
- Strainers should be checked for clogging and blown down if needed.
- Steam traps may need reconditioning.
- Dirt in the trim may prevent the valve from passing its full capacity.
- Diaphragm failure or insufficient air pressure to reverse acting (air-to-open) actuators would prevent the valve from properly stroking open. Incorrect actuator spring adjustment in reverse acting actuators would prevent the valve properly stroking open.

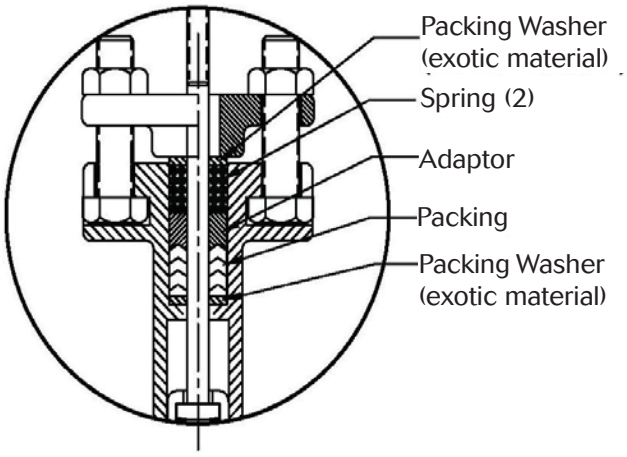
If You Experience Overpressure (outlet):

- Dirt in the trim may prevent valve from shutting off.
- Diaphragm failure, incorrect actuator spring adjustment, or insufficient air pressure to direct acting (air-to-close) actuators would prevent the valve from properly stroking closed.

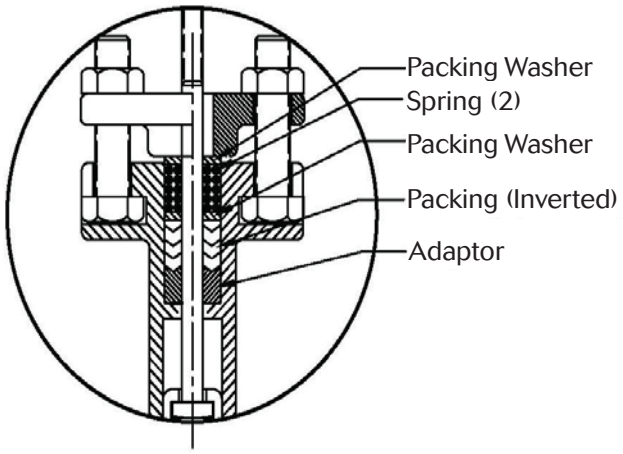
Mark 708ME Packing Assembly



Standard Packing

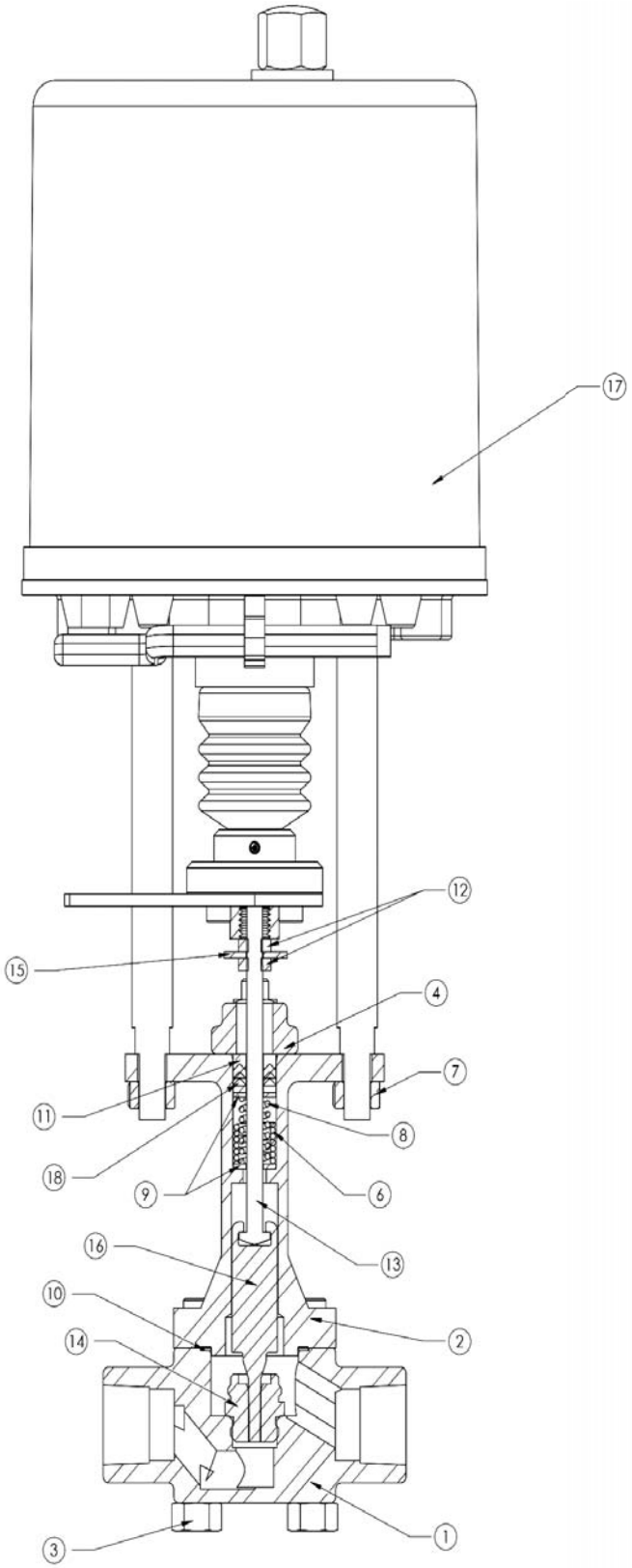


Inverted Packing - for Exotic Body Material
(Put spring on top of packing.)
(JV P/N 92065)



Packing for Vacuum
(Invert packing rings and put spring on top)
(JV P/N 96071)

Illustration and Parts List



Item	Description	Qty.
1	Body	1
2	Bonnet	1
3	HHCS 5/16- 18 x 2″	4
4	Gland	1
5	HHCS 5/16-18 x 1″(Not Shown)	2
6	Packing Spring	1
7	Hex Nut 5/16-18	2
8	Spring	1
9	Retainer Washer	2
10	Body Gasket	1
11	Adapter	1
12	Hex Nut 10-24	2
13	Stem	1
14	Seat	1
15	Washer	1
16	Plug	1
17	Motor	1
18	Packing	1

1 Position regulator PEL 100 (option)

1.1 Functionality and functions of the position regulator

The electronic positioner serves to control, regulate and position final controlling elements, such as linear, part-turn and turn actuators. The position regulator operates the actuator into the position defined by a continuous input signal. The controlled variable (actual value) is compared to the reference variable (setpoint), and, in case of deviation, a manipulated variable is generated to trigger the control element. The triggering is kept until the setpoint and the actual value are equal.

The actual value requires a potentiometer within the actuator to record the movement of the actuator.

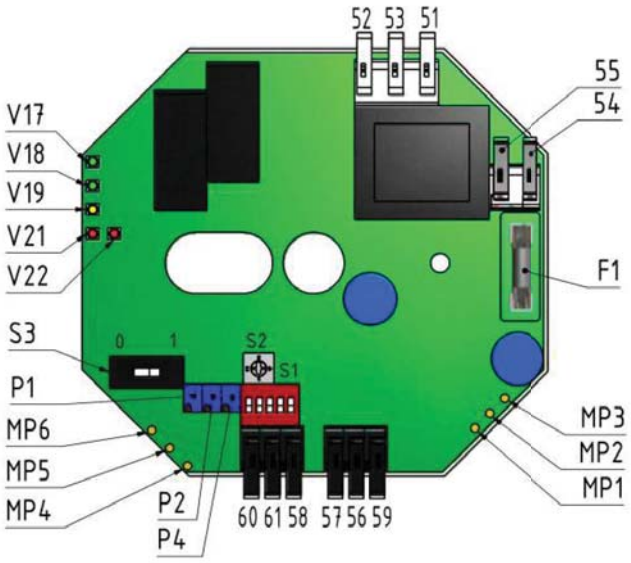


Fig. 1.1: Position regulator board PEL 100

The light emitting diodes on the position regulator board indicate the status of the electronic positioner.

LED	Meaning	Indication
V17	Supply voltage ok	Green
V18	Operation “Ingoing actuator stem” (OPEN)	Green
V19	Operation “Outgoing actuator stem” (CLOSED)	Yellow
V21	Dead time active	Red
V22	E1 < 4 mA	Red

Table: Meaning of the LEDs on the position regulator board

Settings such as stroke adjustment, split range, reversing and dead zone are made via the trimmers P1, P2, P4.

The DIP switches at S1 define additional functions such as zero point presetting, spreading of the potentiometer signal and the behaviour on loss of signal.

A minimum dead time of 200 ms is set as default in the position regulator to avoid sudden changes of direction or very short switching on and off procedures.

As standard, the feedback signal is available on the position regulator and indicates the current position of the control element. The range corresponds to the input signal range.

The feedback signal is not galvanically isolated from the input.

The positioning signal type (voltage or current) is defined by the configuration of the terminals. Switching over or re-soldering is not required.

1.2 Assembly of the position regulator

The mechanical set-up is performed in the factory. Subsequent fitting of the position regulator is not always possible. If the actuator is designed for retrofitting of the position regulator, a PEL kit can be used for retrofitting.

The actuator has to be equipped with a potentiometer required for operation (and, if necessary, the switching and signalling device) before installling the position regulator.

Once the actuator is mounted on the valve and the switching and signalling device is set, the zero point of the potentiometer has to be set. The procedure is described the “Adjustment of the potentiometer” chapter.

1.3 Electrical connection

Mains connection and commissioning of the linear actuator requires expert knowledge on the erection of power installations (DIN VDE 0100), knowledge on the prevention of accidents and the special conditions for commissioning the linear actuator.
These tasks may only be carried out by qualified personnel. ***Failure to observe this warning can result in death, serious injury or considerable property damage!***

- Perform mains connection with switched off power supply only! Safeguard against accidental switching on!
- When installing electric lines and the mains connection, the DIN/VDE regulations for the erection of power installations as well as the provisions of the local electricity board must be observed!
- Check whether the mains connection voltage and the mains frequency comply with the data on the name plate of both the linear actuator and the actuator motor.
- The conductor cross section must always be sized according to the power consumption of the linear actuator and the required cable length. The permissible cable cross section is 0.8…2.5 mm² (AWG 28…12).

- Mains disconnection with regard to the installation: For the disconnection and voltage release from the power line to the actuator for maintenance and adjustment work, a suitable breaker unit must be used ensuring an all-pole disconnection (except the earth wire). This breaker unit must be lockable in the state of breaking and be safeguarded against accidental switching on.
- Mains fuse protection with regard to the installation: max. 6 A.

1.3.1 Configuration of terminals

To avoid interference pulses on the signal cables, they have to be laid separately from the supply voltage cables. We recommend using a shielded cable with voltage signals and placing the shield on the protective earth (PE) of the actuator housing.

Terminal X4:

Terminal	Function	
60	mA output	0 (4)…20 mA
61	Volt output	0 (2)…10 V
58	GND	Ground
57	GND	Ground
56	Volt input	0 (2)…10 V
59	mA input	0 (4)…20 mA

The impedance of the mA input is 50 Ω. When using the volt input, the impedance is 20 kΩ.

Terminal X2:

Terminal	Function		
54	L	Mains input phase	50/60 Hz
55	N	Mains input, protective earth	

Terminal X3:

Terminal	Function		
51	L⇧	Phase, direction “Ingoing stem”	50/60 Hz
52	N	Mains input, protective earth	
53	L⇩	Phase, direction “Outgoing stem”	50/60 Hz

Plug X4:

A plug is used to connect the potentiometer to the position regulator board.

Pin	Function	
1	Maximum value	Blue
2	Measured at the slider	Green
3	Zero point	Red

Colour assignment depends on the actuator type

1.3.2 Determining the input and output signal

The actuator is either preconfigured to 0…10 V, 0…20 mA or 2…10 V, 4…20 mA. Depending on the configuration, the cables of the input and output signals are connected to terminal X4. The configuration of the position regulator can be modified. The procedure is described in chapter 1.4.6 “Modification of the preset setpoint signal range”.

1.4 Commissioning and settings

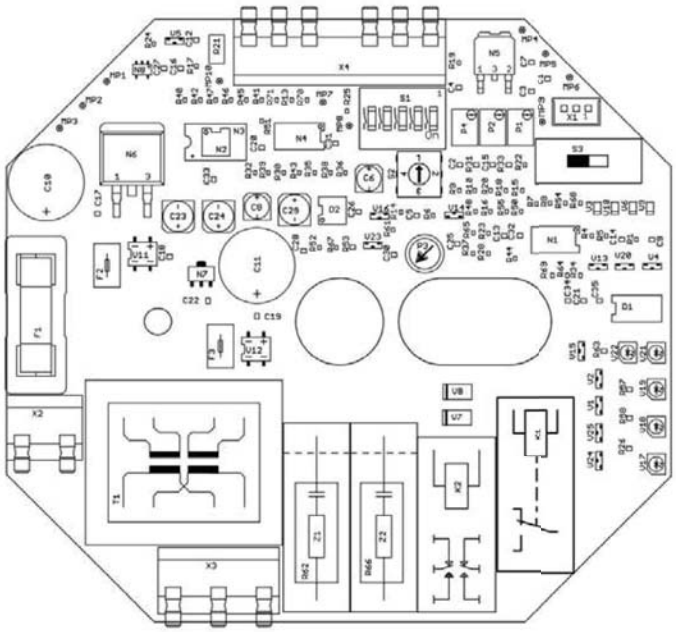


Fig. 1.4: Electronic positioner PEL 100, parameters

Trimmer

P1	Adjustment of lower limit value	Clockwise rotation reduces the value
P2	Adjustment of upper limit value	Clockwise rotation reduces the value
P4	Span adjustment	Counterclockwise rotation results in electronic spreading of the potentiometer signal

Switches

	Description	**ON**	**OFF**
S1.1	Zero point preselection	0 mA	4 mA
S1.2	Spread	Off	On
S1.3	FAIL CLOSE	On	Off
S1.4	FAIL OPEN	On	Off
S1.5	FAIL function	On	Off

	Description	Position	
S2	Dead zone	1 2 3 4	1.5 % 1.0 % 0.5 % 0.25 %
S3	Inverse operation / reversing	0 1	Off On

Measuring points

	Description		**Signal**
Mp1	Supply voltage +15 V		+15 V
Mp2	Supply voltage –5 V		–5 V
Mp3	Ground		
Mp4	Voltage at max. value (actual value)	At 0…10 V, or 0…20 mA	10.1 V
Mp5	Voltage from the potentiometer slider		
Mp6	Voltage at min. value (actual value)	At 0…10 V, or 0…20 mA At 2…10 V, or 4…20 mA	0 V 2 V

F1	Fuse	250 mA / 230V 1 A / 24 V
V1 + V2	Quenching element	Possibly required spark quenching elements for relay contacts

1.4.1 Electric adjustment to the positioning travel

The electronic positioner is configured for the indicated travel in the factory. Only minor adjustments should therefore be required.

Prerequisite for further actions:

- Proper mounting of the actuator on the valve
- Correct adjustment of the switching and signalling unit to the valve stroke
  Zero positon of the potentiomenter has to match the lower end position of the stroke
- Adjustment of the end positon switches to the valve stroke is completed

The electronic positioner can be set so that the actuator is switched off in the end positions either via the switches (DE, WE) or via the electronic positioner itself.

If the actuator is switched off via the switches, the trimmers on the electronic positioner have to be set as to ensure that the LEDs are only just illuminated when reaching the end position.

The lower setpoint (0 or 4 mA, 0 V) is defined as the lower end position for the input.

Trimmer P1 is turned counterclockwise until the actuator is switched off via the respective switch and LED V19 is only just illuminated. This can be checked by turning back the trimmer.

Trimmer P2 in combination with LED V18 is used in the upper end position.

The setpoint for the upper end position is predefined.

By turning trimmer P2 clockwise, the switch-off point is increased. In case of tripping via switches, the position of the trimmer has to be changed until the LED is only just illuminated.

If the swing angle of the potentiometer cannot be fully used as the travel is very small, the input range can be adapted using the spread function. The function is activated if switch S1.2 is set to OFF.

By turning trimmer P4 counterclockwise, the upper switch-off point is reduced.

1.4.2 Setting the dead zone

The set dead zone of the actuator depends on the actuator type. The parameter is preset in the factory and should not be changed. If the dead zone is set too narrow, the actuator oscillates at the setpoint, which results in premature wear of both the position regulator and the actuator.

If an oscillation is detected, this can be avoided by increasing the dead zone.

When replacing the electronic positioner, accept the preset values.

1.4.3 Reversing

If the running direction of the actuator is to be reversed with regard to the setpoint, this can be achieved by changing over at switch S3.

The end position or the travel possibly has to be readjusted (refer to chapter 1.4.1 “Electric adjustment to the positioning travel”).

1.4.4 Wire break detection

The wire break detection determines whether the input signal is incorrect. The function can be activated or deactivated using switch S1.5. The input signal has to be set to 4…20 mA or
2…10 V as a prerequisite for this function.

If the wire detection function is used for an input signal of 0…20 mA or 0…10 V, the position regulator fails.

As soon as the input signal falls below 3.5 mA, the FAIL function is tripped. Switches S1.3 and S1.4 can be used to define the actuator behaviour on loss of signal.

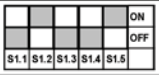
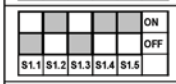
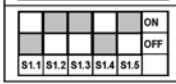
Position of the DIP switches	Function
	FAIL AS IS
	FAIL OPEN
	FAIL CLOSE

Fig. 1.4.4: Switch positions of S1.1, S1.3, S1.4, S1.5 for behaviour on loss of signal

1.4.5 Split range operation

To set the split-range operation, the actuator is controlled with the setpoint for the upper end position (e.g. 12 mA).

Adjust trimmer P2, until the stroke corresponds to the upper end position. Counterclockwise rotation makes the actuator stem retract.

The lowest settable value for the upper switch-off point is ~8 mA or ~4.0 V.

The setpoint is now set to the lower end position (e.g. 6 mA). Counterclockwise rotation of trimmer P1 changes the position of the actuator stem to outgoing actuator stem.

The top settable value for the lower switch-off point is ~13.2 mA or ~6.6 V.

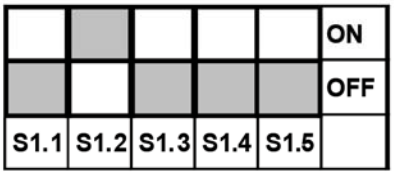
Check the end positions by approaching the upper and lower end position again.

1.4.6 Modification of the preset setpoint signal range

The electronic position can be preset without input signal by means of measuring points. The adjustment to the actuator is made according to the “Electric adjustment to the positioning travel” chapter.

Set signal 4…20 mA or 2…10 V:

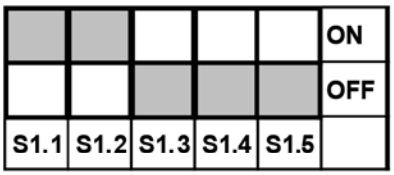
Configuration of the DIP switches S1:



- Connect voltage to the electronic positioner on terminals 54 and 55
- Measure the voltage between measuring point 3 and measuring point 6
- Use trimmer P1 to set voltage to 2.0 V
- Measure the voltage between measuring point 3 and measuring point 4
- Use trimmer P2 to set voltage to 10.0 V

Set signal 0…20 mA or 0…10 V:

Configuration of the DIP switches S1:



- Connect voltage to the electronic positioner on terminals 54 and 55
- Measure the voltage between measuring point 3 and measuring point 6
- Use trimmer P1 to set voltage to 0.0 V
- Measure the voltage between measuring point 3 and measuring point 4
- Use trimmer P2 to set voltage to 10.0 V

1.5 Technical data

Control signal	0(4)…20 mA, Ri approx. 50 Ω 0(2)…10 V, Ri > 100 kΩ
Feedback signal	0(4)…20 mA, load 500 Ω 0(2)…10 V corresponds to the control signal
Indication	LED's
Potentiometer	1000 Ω to 10 kΩ
Switching stage	Relay contacts max. 250 V / 50/60 Hz, 2 A
Power supply	24VAC /110V AC / 230 VAC
Power consumption	
Connection terminals	Snap-type terminal for 1.5 mm² solid wire or cords with wire end sleeves
Ambient temperature	–10 °C…+50 °C

1.5.1 Wiring examples

The wiring diagrams are just examples and serve as orientation. The terminal plan attached to the actuator is binding.

The connection of the load-dependent DE and the travel-dependent WE switches depends on the application (valve type, tripping in end position, ...) and has to be determined by the operator.

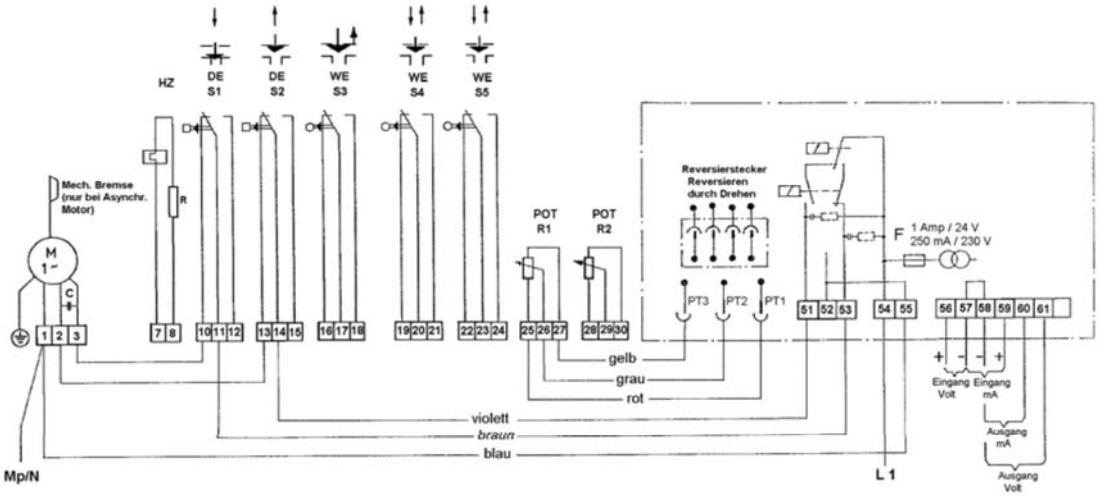


Fig. 1.5.1-1: Wiring diagram with 2 DE switches S1 and S2

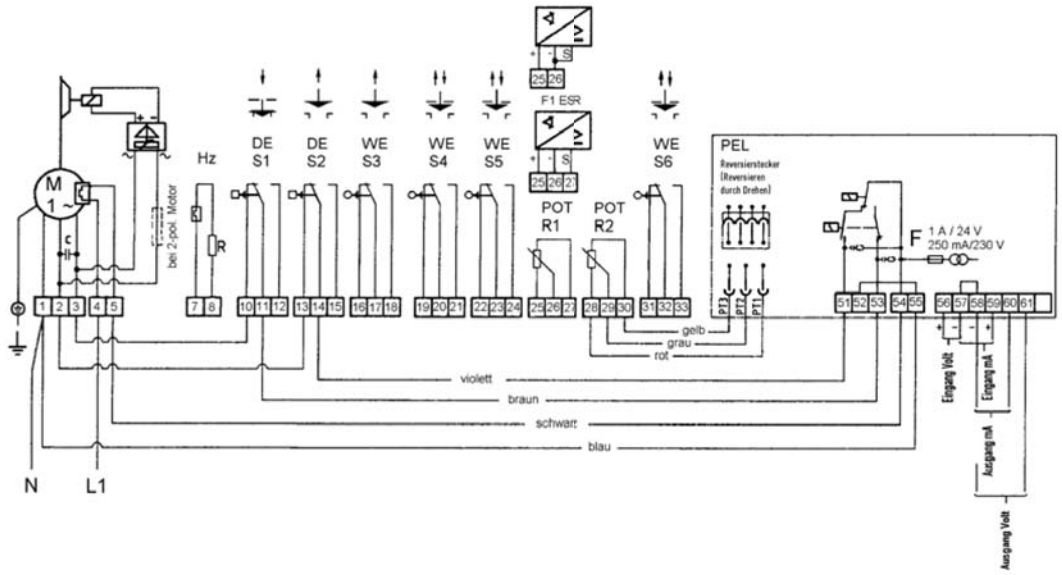


Fig. 1.5.1-2: Wiring diagram with 2 DE switches S1 and S2, 1-phase AC motor with thermoswitches

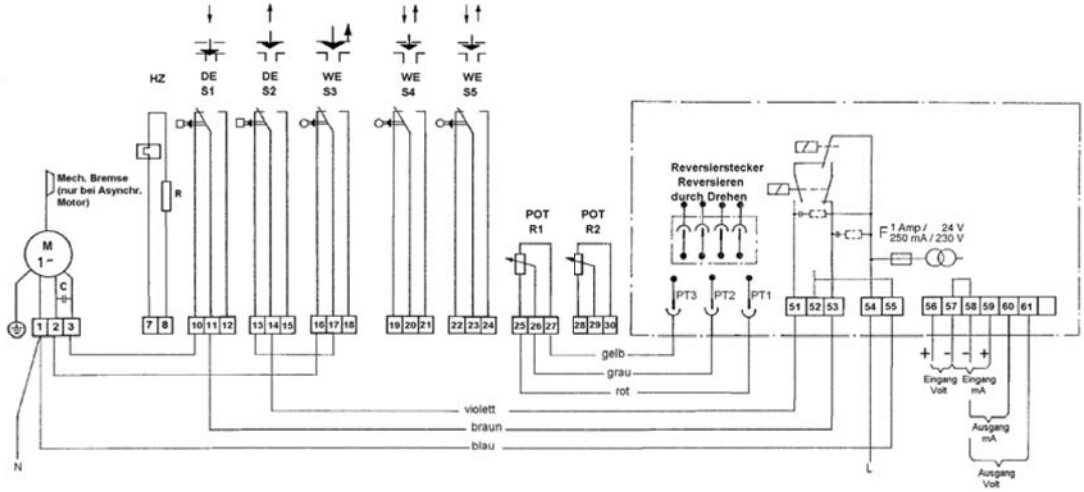


Fig. 1.5.1-3: Wiring diagram with 2 DE switches S1 and S2 and WE switch S3

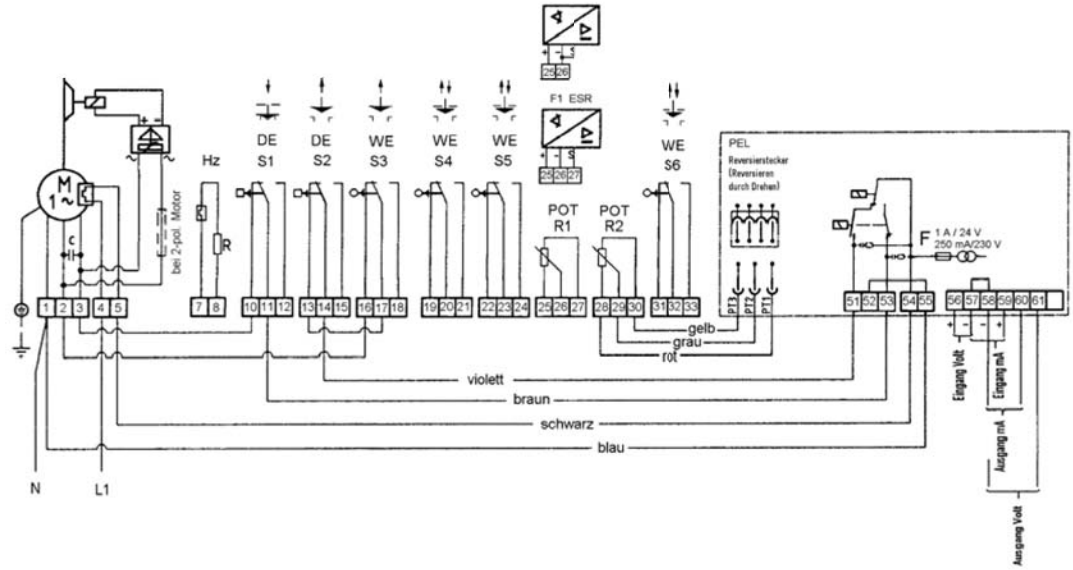


Fig. 1.5.1-4: Wiring diagram with 2 DE switches S1 and S2 and WE switch S3, 1-phase AC motor with thermoswitches

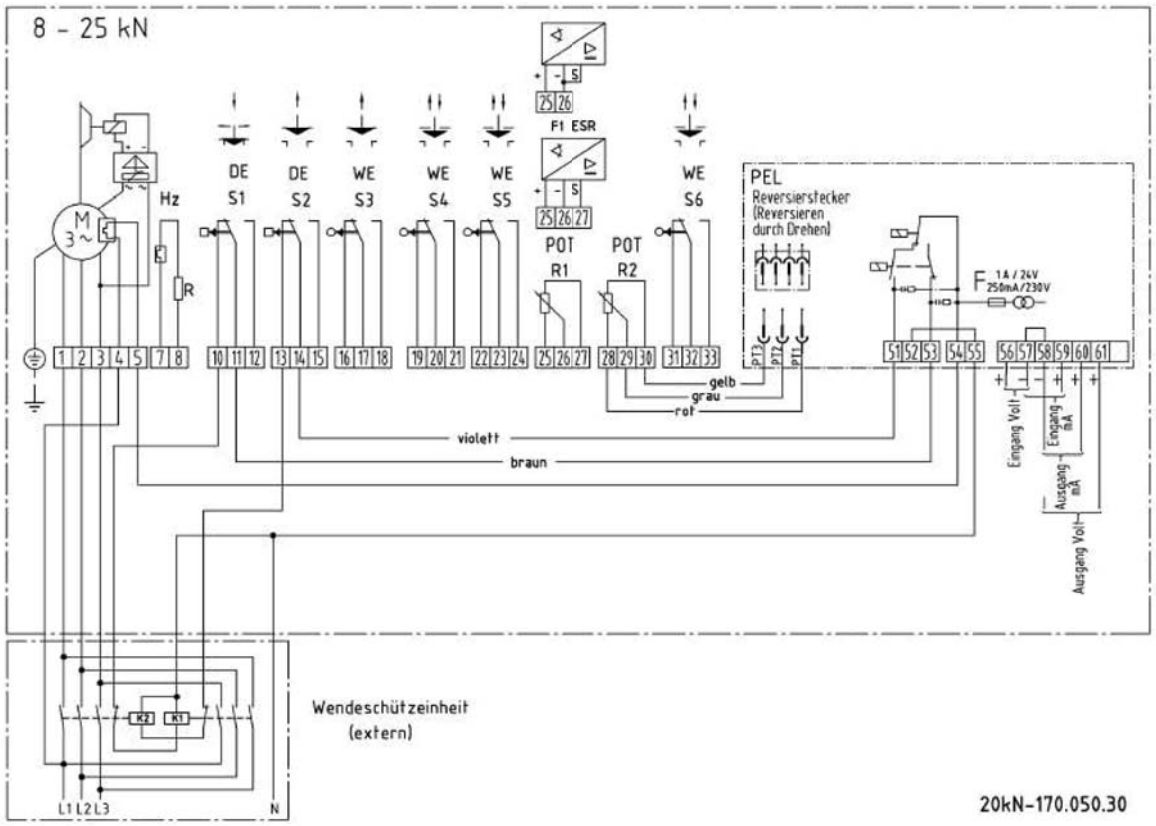


Fig. 1.5.1-5: Wiring diagram with 2 DE switches S1 and S2 and WE switch S3, 3-phase AC motor, separate reversing contactor unit

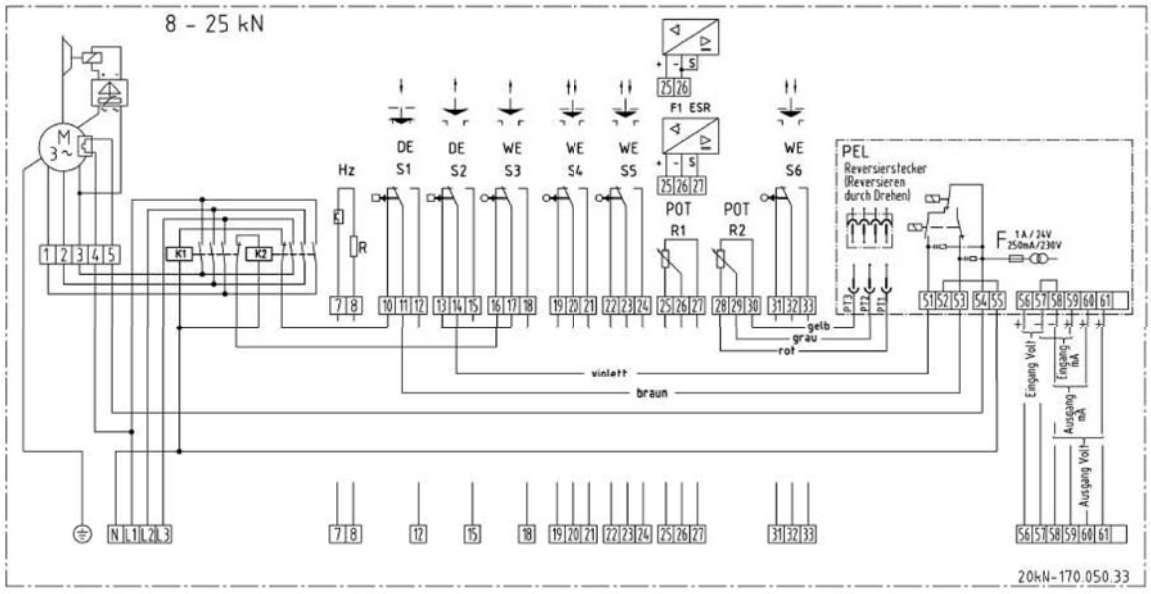


Fig. 1.5.1-6: Wiring diagram with 2 DE switches S1 and S2 and WE switch S3, 3-phase AC motor with thermoswitches, integral reversing contactor unit

Legend to the wiring diagrams

Mech. Bremse (nur bei Asynchr. Motor)	mech. brake (async. motor only)
Reversierstecker	reversing plug
Reversieren durch Drehen	reversing by turning
gelb	yellow
grau	grey
rot	red
violett	violet
braun	brown
blau	blue
Eingang Volt	Volt input
Eingang mA	mA input
Ausgang Volt	Volt output
mA Ausgang	mA output
Wendeschützeinheit (extern)	reversing contactor unit (external)

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