MF201 Emergency Actuator

with two-way/three-way valves of the RD/RGD/RWG/RGDE.. series

Application

For 3-point control with mains voltage of AC 230 V with two-way and three-way valves.

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Important Information Regarding Product Safety

Safety Instructions

This data sheet contains information on installing and commissioning the product "MF201". Each person who carries out work on this product must have read and understood this data sheet. If you have any questions that are not resolved by this data sheet, you can obtain further information from the supplier or manufacturer.

If the product is not used in accordance with this data sheet, the protection provided will be impaired.

Applicable regulations must be observed when installing and using the device. Within the EU, these include regulations regarding occupational safety and accident prevention as well as those from the VDE (Association for Electrical, Electronic & Information Technologies). If the device is used in other countries, it is the responsibility of the system installer or operator to comply with local regulations.

Mounting, installation and commissioning work on the devices may only be carried out by qualified technicians. Qualified technicians are persons who are familiar with the described product and who can assess given tasks and recognize possible dangers due to technical training, knowledge and experience as well as knowledge of the appropriate regulations.

Legend

WARNING

Indicates a hazard of medium risk which can result in death or severe bodily injury if it is not avoided.

CAUTION

Indicates a hazard of low risk which can result in minor or medium bodily injury if it is not avoided.

CAUTION

Indicates a hazard of medium risk which can result in material damage or malfunctions if it is not avoided.

NOTE

Indicates additional information that can simplify the work with the product for you.

Notes on Disposal

For disposal, the product is considered waste from electrical and electronic equipment (electronic waste) and must not be disposed of as household waste. Special treatment for specific components may be legally binding or ecologically sensible. The local and currently applicable legislation must be observed.

MF201 Emergency Actuator

Application

With a positioning force of 1000 N, the MF201 emergency actuator with automatic coupling and safety function is used for fine stroke adjustment of RD65 and RGD50..RGD80 two-way valves, as well as RWG50..80 three-way valves.

The emergency actuator is controlled with a 3-point signal (open/stop/closed). The actuator includes an emergency function, which uses spring force to open or close valves (depending on the type of valve used) when the power supply is interrupted.

Item

MF201	AC 230 V emergency actuator with 3-point control Emergency function: **Emergency actuator extends with no power**

Technical Data

Nominal voltage	AC 230 V ± 15%, 50/60 Hz; 30 VA
Control	3-point signal (open/stop/closed), optionally via - 230 V energized control or - contact inputs
Actuator	Brushless DC motor
Priority switching	Direct control via voltage-free contact inputs “Z2”/”Z3” as - 3-point control (open/stop/closed) or - 2-point control (open/closed), e.g. frost protection, limitation (Connection parallel to energized control from the loop controller)
Nominal stroke	Max. 30 mm, automatic stroke adjustment though initialization
Travel time	9 s/mm nominal stroke
Emergency positioning time	1.2 s/mm
Positioning force	1,000 N
Position indicator	Stroke range scale
Positioning feedback	DC 0 V to 10 V, 5 mA for 0% to 100% nominal stroke
Valve monitoring	Automatic valve blocking monitoring with fault signal greater than approx. 12.5 V or 0 mA
Manual adjustment	Socket for hexagon socket key beneath the drive cover, key socket 4 mm, locking using knob
Ambient temp.	0 °C to 50 °C
Degree of protection	IP54
Protection class	I in acc. with EN 60730
Installation position	Anywhere from vertical above the valve to a horizontal position
Maintenance	Maintenance-free
Weight	3.52 kg

NOTE

For a positioning time over the entire valve stroke of 108 s, 126 s, 180 s or 135 s, the positioning movement is performed step-by-step with periods of inactivity of approx. 5 s. This operating characteristic corresponds to normal state.

Accessories

Accessories are delivered as complete units that can be inserted into the actuator later.

You may chose from among the following accessories which are **not included in delivery**.

E/MF Upgradable switch module

with two electrically isolated switches (relay outputs), max. load AC 250 V, 3 A.

Application The E/MF switch module provides the actuator with
- feedback about both valve end positions (open/closed).

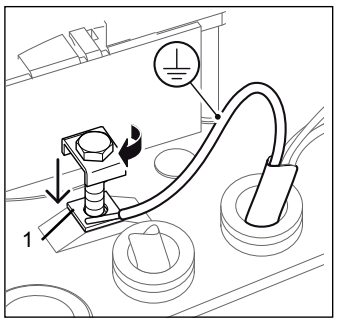
Installation note 3.10-09.900-99-oo contains further information, including the connection and installation (included with accessory E/MF).

WARNING

If low voltage (AC 230 V is applied, the device must be installed to meet the requirements of protection class I.

The contacts on the end switches must only be used with voltages of the same installation category.

The wiring of the PE terminal must be connected between the terminal clip and the square washer (Cupal washer), with the copper-coated side of the washer facing the terminal clip.

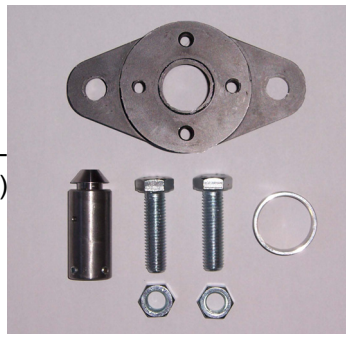


Copper-coated side (1) of the square washer (Cupal washer)

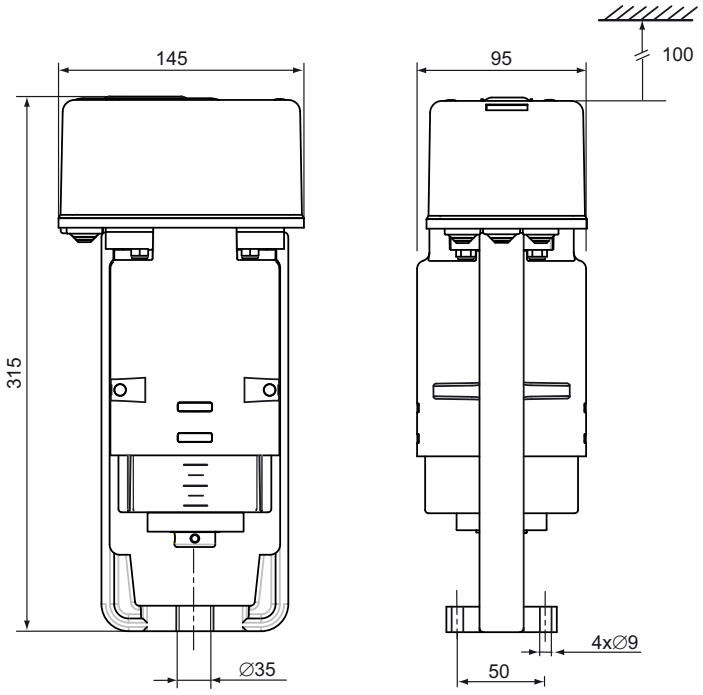
Z190 Mounting set for RGDE.. from DN65

The actuator, Z190 mounting set and valve are pre-assembled as supplied by the factory.

Installation note 3.10-40.299-99-oo contains further information on the installation (included with accessory Z190)

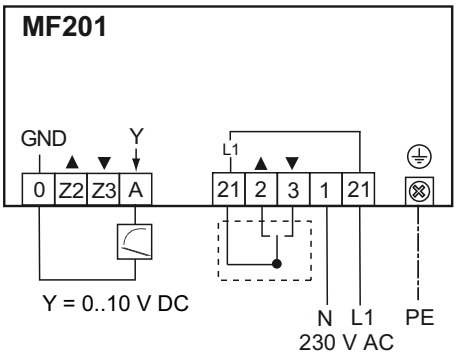


Dimensions

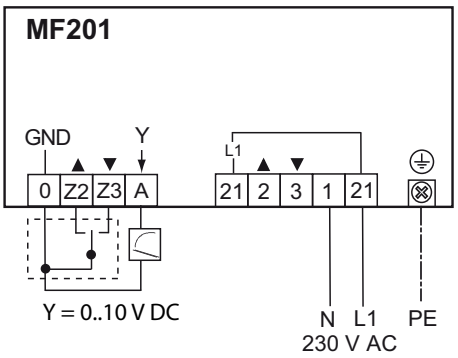


Connection

3-point control AC 230 V energized



Voltage-free 3-point control



NOTE

When accessories are installed, the device connection changes or is augmented.

Follow the connection instructions in the datasheet of the accessory that is being used.

Actuator Functions

Automatic mode/testing the emergency function

(1) Switch
(2) Indicator slide

Automatic mode or testing the emergency function can be selected directly on the actuator using the switch on the drive hood.

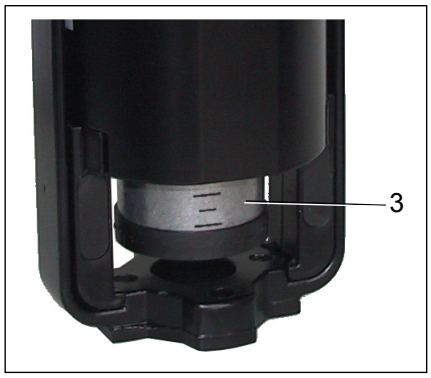
Automatic mode: Slide the switch to position .

Testing the emergency function: Slide the switch to position .

When the “emergency function test” feature is activated, the extended indicator slide allows this status to be recognized even in poorly lit areas.
After the “emergency function test” has been switched off, the emergency actuator automatically returns to automatic mode.

Position indicator on the actuator

The current stroke position of the valve is indicated by the position of the stroke range scale (3).



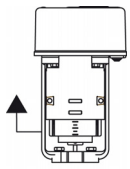
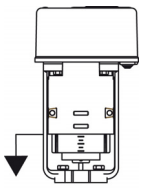
Automatic malfunction message

If the pipeline becomes blocked by foreign objects during a valve stroke, the drive reports this malfunction with a feedback signal, approx > DC 12.5 V (connection terminal A). The LED below the drive hood also flashes (short flashes).

The actuator then automatically tries to correct the valve block using a remedy algorithm, which repeatedly lifts the valve ball for a short time.

A manual activation of the emergency function or manual adjustment is also signaled by a feedback signal of approx. > DC 12.5 V.

Actuating directions

Actuator retracting		Two-way valves RD.. and RGD..: open Three-way valves RWG.. Gate A: closes Gate B: opens
Actuator: extending **Emergency function with no power: extending**		Two-way valves RD.. and RGD..: closing Three-way valves RWG.. Gate A: opens Gate B: closes

Installation

CAUTION

Electrical installation and unit connection may only be carried out by qualified technicians.

The mains supply may only be connected after commissioning.
Be sure to comply with VDE guidelines and local wiring regulations.
The device is connected according to the obligatory wiring diagram.

CAUTION

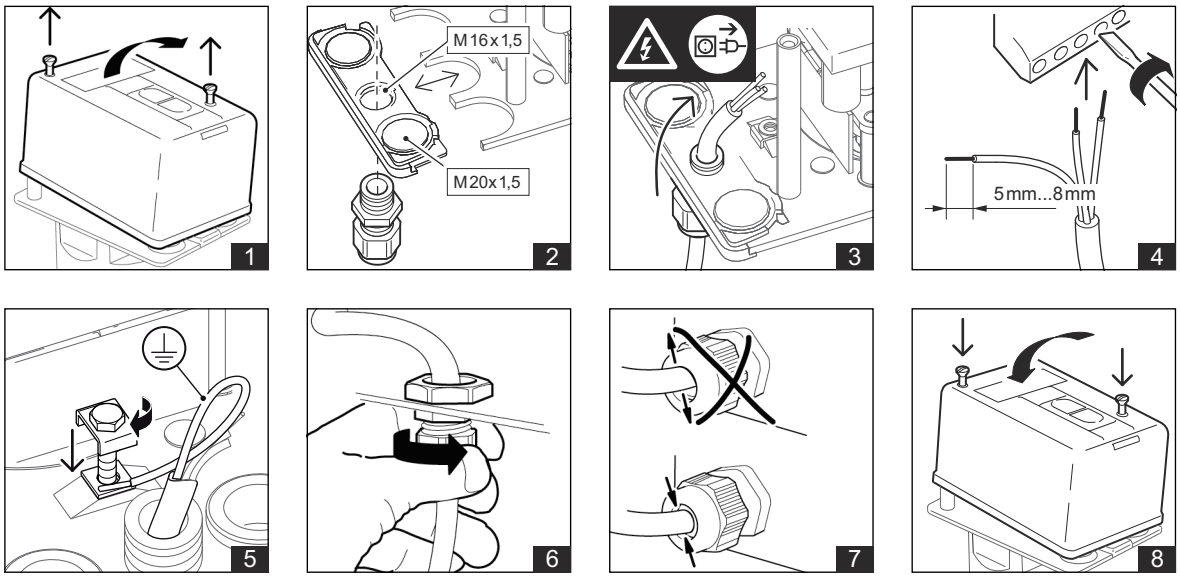
The electrical connection of the actuator must be carried out as a fixed installation.

An M16x1.5 screw fitting is enclosed in the scope of delivery of the actuator to be used as a strain relief device. The electrical connection is to be made using plug-in screw terminals (connection diameter 0.3–2.3 mm).

CAUTION

There is a risk of getting crushed between the cross member and the spring pan.

If the power supply is interrupted, the emergency function of the actuator automatically moves the valve into the lower end position using high spring force.



Direct control/priority switching

Priority switching can be used parallel to the energized 3-point control by wiring the Z2 and Z3 terminals. Control of the actuator replaces regular control from the loop controller via terminals 2 and 3.

Note the following priorities for priority switching:

Priority	Terminal Z2	Terminal Z3	Actuator
None	Open	Open	Priority switching not functioning. Control is evaluated via terminals 2 and 3.
Medium	Closed Open	Open Closed	Actuator moves into lower end position. Actuator moves into upper end position.
High	Closed	Closed	Actuator moves into upper end position.

RD65MF201 Two-Way Valve

Application

The RD65 nodular iron two-way valve with MF201 emergency actuator is used for fine quantity control of liquid and vapor.
A 3-point signal is used for control (open/stop/closed; AC 230 V or voltage-free contacts). The MF201 actuator has an emergency function that automatically closes the valve with spring force when the power supply is interrupted.

Types

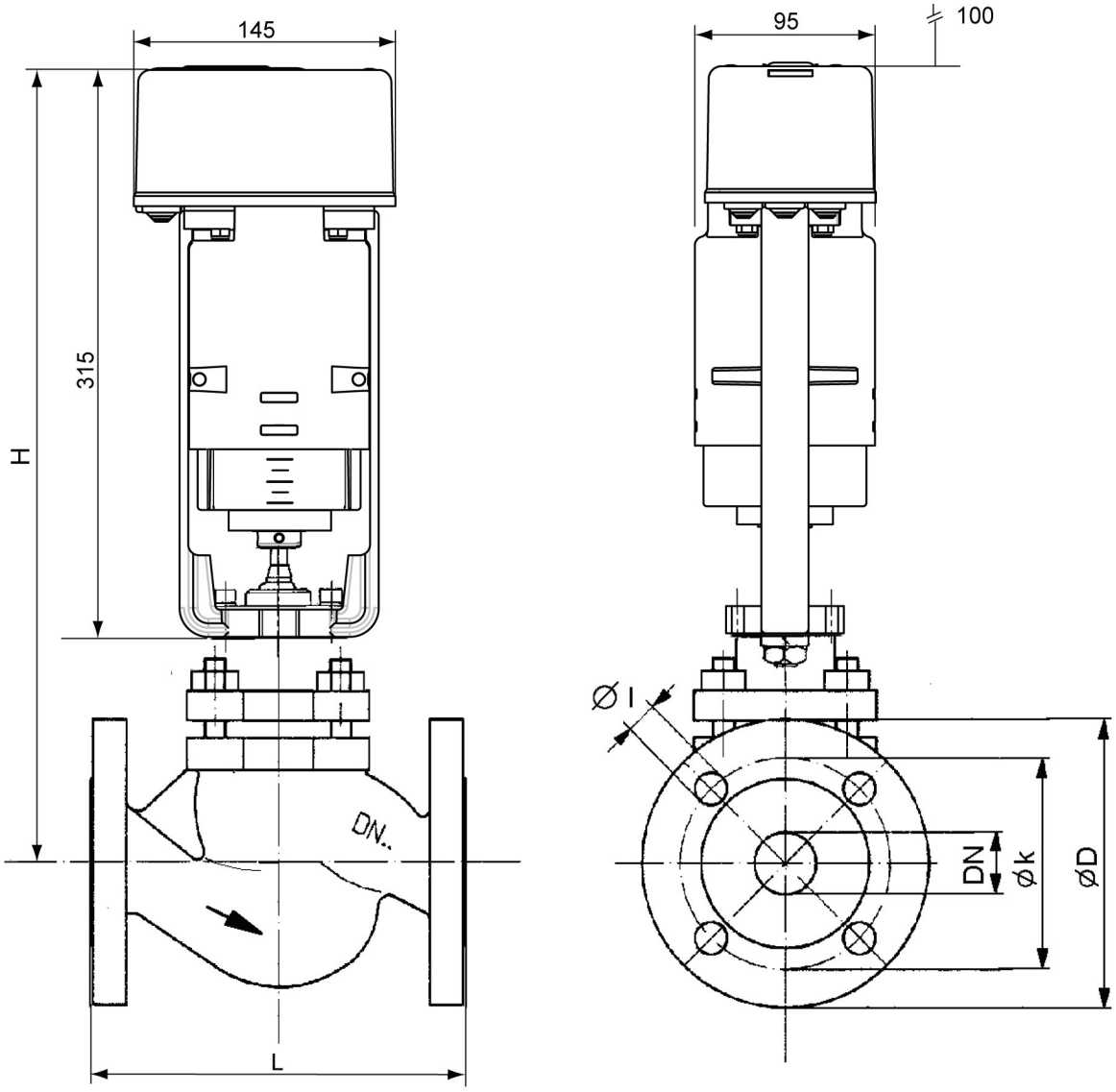
RD65 nodular iron two-way valve with MF201 emergency actuator for water up to 120 °C, 16 bar, as well as for hot water and steam up to 200 °C, 13 bar

	DN	PN	Kvs	Δp (bar)	Travel time (s)	Weight (kg)	Emergency function
RD65MF201	65	16	63	1.7	60	20.72	Valve closed

Technical Data: RD65 Valves

Nominal diameter	DN65
Pressure rating	PN 16
CE marking	CE marking, notified body: 025
Connection	Flange according to DIN, PN16
Characteristic curve	Equal percentage
Nominal stroke	30 mm
Leak rate	In accordance with EN 1349, leakage class VI
Medium temperature	0 °C to 200 °C
Housing	Nodular iron GGG-40.3
Seat ring	Stainless steel 1.4021
Cone	Stainless steel 1.4021
Valve spindle	Stainless steel 1.4571
Spindle seal	Univerdit gaskets with PTFE sleeve (maintenance-free)

Dimensions



DN	H	L	Ø I	Ø K	Ø K	D
65	437.5	290	160	4x Ø 11	145	185
	Dimensions H to D in mm					

RGD50..80MF201 Two-Way Valves With Emergency Actuator

Application

The RGD50..80 nodular iron two-way valves with MF201 emergency actuator are used for precise regulation of liquid and vapor flow rates.
A 3-point signal is used for control (open/stop/closed; AC 230 V or voltage-free contacts). The MF201 actuator features an emergency function that automatically closes the valve with spring force when the power supply is interrupted.

Types

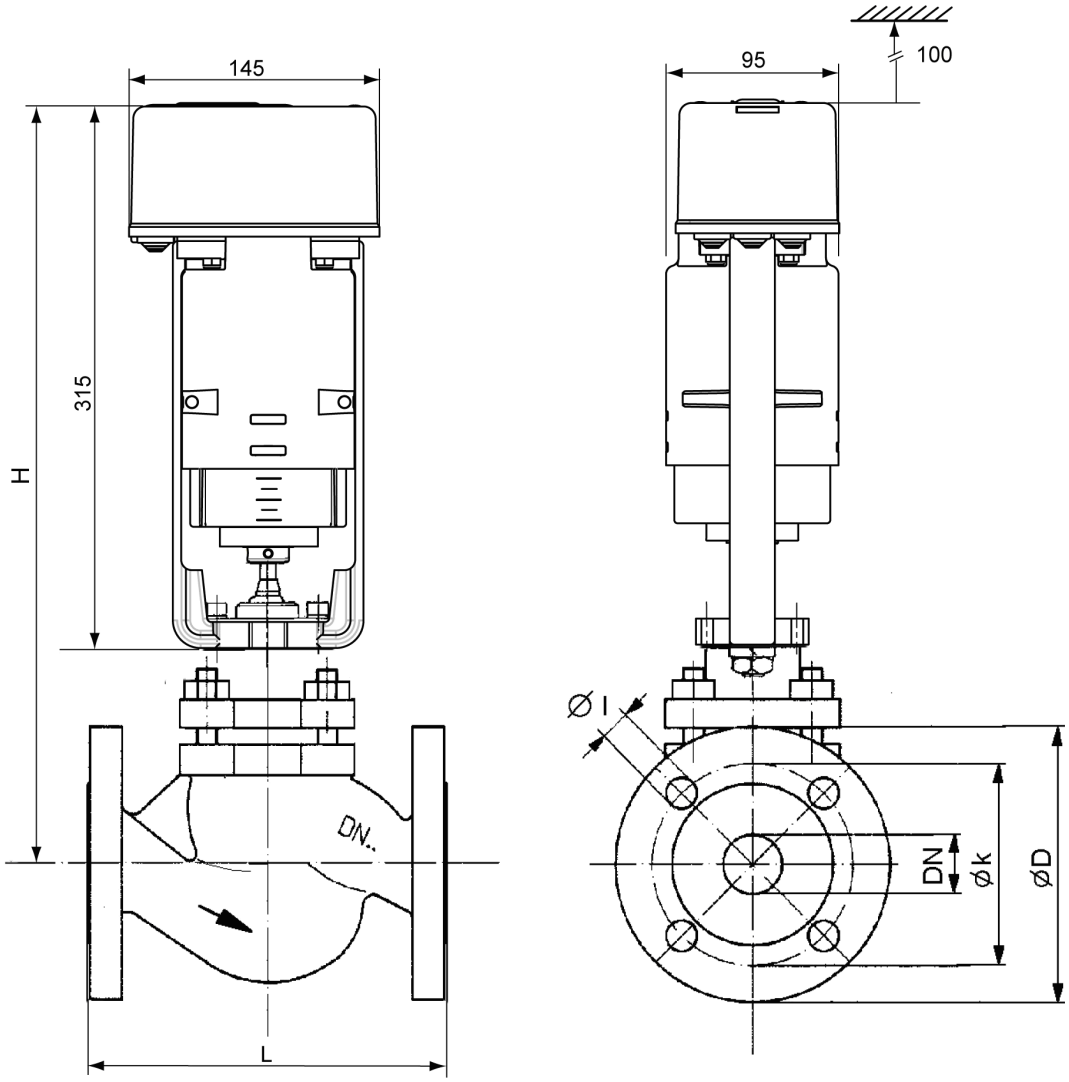
RGD50..80 nodular iron two-way valves with MF201 emergency actuator for water up to 120 °C, 25 bar, as well as for hot water and steam up to 200 °C, 20 bar.

	DN	PN	Kvs	Δp (bar)	Travel time (s)	Weight (kg)	Emergency function
RGD50MF201	50	25	40	2.5	60	15.4	Valve: Closed
RGD65MF201	65	25	63	1.7	60	20.7	Valve: Closed
RGD80MF201	80	25	100	1.1	60	25.5	Valve: Closed

Technical Data: RGD50..80 Two-Way Valves

Nominal diameter	DN50 to DN80
Pressure rating	PN 25
CE marking	CE marking, notified body: 025
Connection	Flange according to DIN, PN25
Characteristic curve	Equal percentage
Nominal stroke	30 mm
Leak rate	In accordance with EN 1349, leakage class VI
Medium temperature	0 °C to 200 °C
Housing	Pressure rating
Seat ring	Stainless steel 1.4021
Cone	Stainless steel 1.4021
Valve spindle	Stainless steel 1.4571
Spindle seal	Univerdit gaskets with PTFE sleeve (maintenance-free)

Dimensions



DN	H	L	Ø l	Ø k	Ø D
50	422.0	230	4x Ø 18	125	165
65	437.5	230	8x Ø 18	145	185
80	453.5	310	8x Ø 18	160	200
	Dimensions H to D in mm				

RWG50..80MF201 Three-Way Valves With Emergency Actuator

Application

The RWG50..80 nodular iron three-way valves with MF201 emergency actuator are used for precise regulation of liquid and vapor flow rates.
A 3-point signal is used for control (open/stop/closed; AC 230 V or voltage-free contacts). The MF201 actuator includes an emergency function that automatically closes the valve with spring force when the power supply is interrupted = straight throughput A → AB open without power).

Types

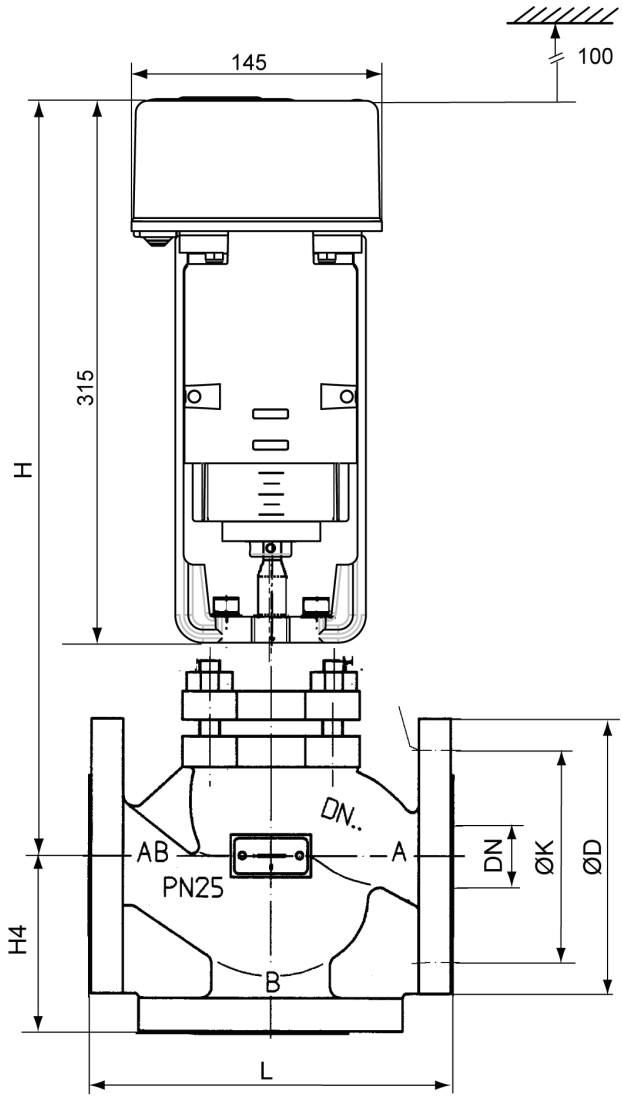
RWG.. nodular iron three-way valves with MF201 emergency actuator for water up to 120 °C, 25 bar, as well as for hot water up to 200 °C, 20 bar.

	DN	PN	Kvs	Δp (bar)	Travel time (s)	Weight (kg)	Emergency function
RWG50MF201	50	25	40	2.5	60	20.32	Gate A: Open
RWG65MF201	65	25	63	1.7	60	27.02	Gate A: Open
RWG80MF201	80	25	100	1.1	60	34.02	Gate A: Open

Technical Data: RWG50..80 Valves

Nominal diameter	DN50 to DN80
Pressure rating	PN 25
CE marking	CE marking, notified body: 0525
Connection	Flange in accordance with DIN, PN25
Characteristic curve	Gates A → AB = same percentage Gates B → AB = linear
Nominal stroke	30 mm
Leak rate	In accordance with EN 1349, leakage class VI
Medium temperature	0 °C to 200 °C
Housing	Nodular iron GGG-40.3
Seat ring	Stainless steel 1.4021
Cone	Stainless steel 1.4021
Valve spindle	Stainless steel 1.4571
Spindle seal	Univerdit gaskets with PTFE sleeve

Dimensions



DN	L	H	H4	Ø D	Ø K	Ø l
50	230	442.5	100	165	125	4 x Ø18
65	290	481	120	185	145	4 x Ø18
80	310	497	130	200	160	4 x Ø18
	Dimensions L to l in mm, flanges according to DIN, PN25					

RGDE65..80MF201 Two-Way Valves with Emergency Actuator

Application

The RGDE65..80 nodular iron two-way valves with pressure-relieved cone and the MF201 emergency actuator are used for precise regulation of liquid and vapor flow rates.
A 3-point signal is used for control (open/stop/closed; AC 230 V or voltage-free contacts). The MF201 actuator features an emergency function that automatically closes the valve with spring force when the power supply is interrupted.

Types

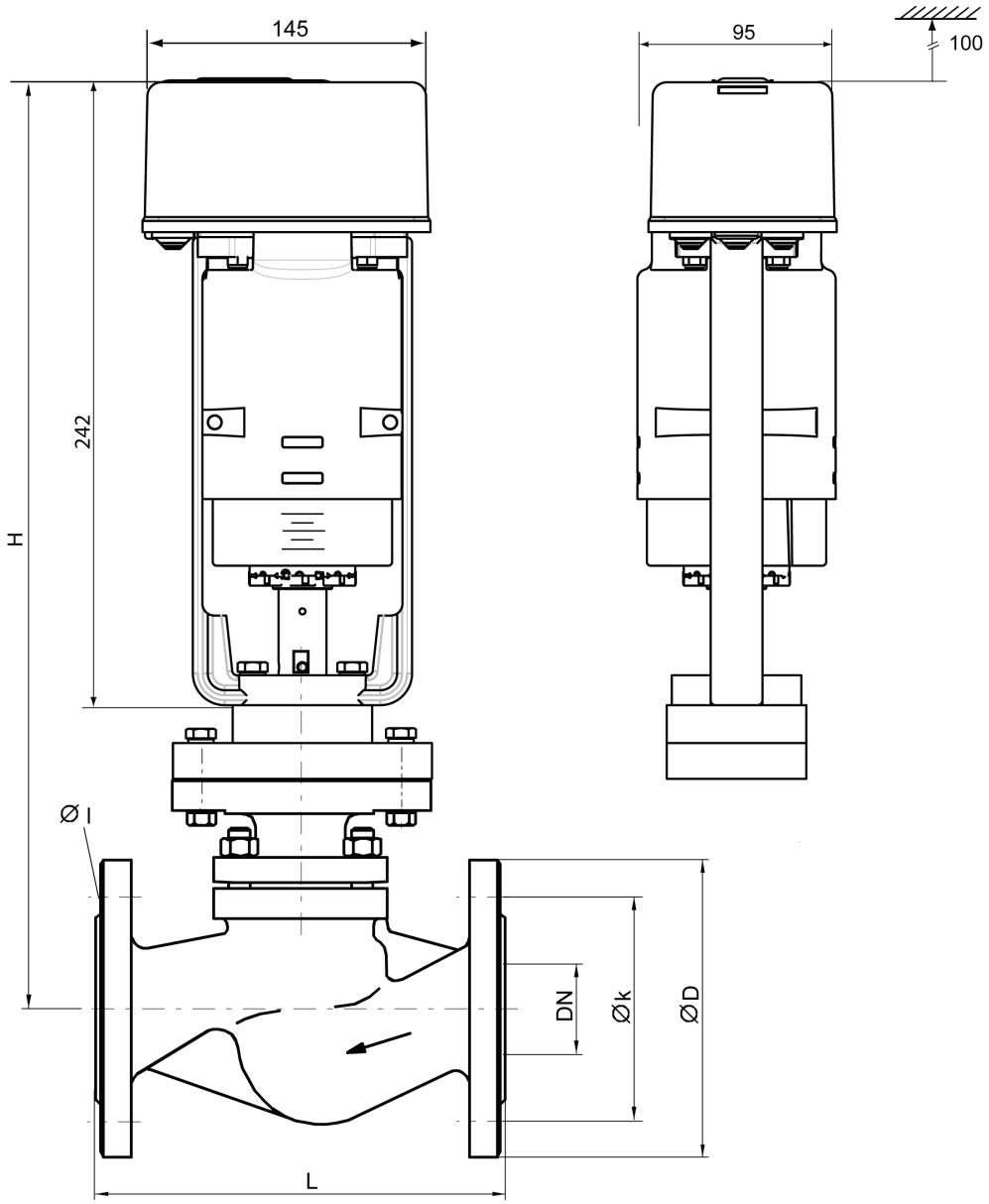
RGDE65..80 pressure-relieved, nodular iron two-way valves with MF201 emergency actuator for water up to 120 °C, 25 bar, as well as for hot water and steam up to 200 °C, 20 bar.

	DN	PN	Kvs	∆p (bar)	Travel time (s)	Weight (kg)	Emergency function
RGDE65MF201	65	25	63	13	60	21	Valve closed
RGDE80MF201	80	25	100	6	60	29.7	Valve closed

Technical Data: RGDE65..80 Valves

Nominal diameter	DN65 to DN80
Pressure rating	PN 25
CE marking	CE marking, notified body: 0525
Connection	Flange according to DIN 2501-1, PN 25
Characteristic curve	Equal percentage
Nominal stroke	30 mm
Leak rate	In accordance with EN 1349, leakage class VI
Medium temperature	0 °C to 200 °C
Housing	Nodular iron GGG-40.3
Seat ring	CrNi steel 1.4021
Cone	CrNi steel 1.4021, metallically sealed, pressure-relieved cone sealing made from PTFE with stainless steel insert (max. 200 °C)
Valve spindle	CrMo steel 1.4571
Spindle seal	PTFE gaskets, maintenance-free

Dimensions



DN	L	Ø D	Ø k	Ø I	H
65	290	185	145	8x Ø 18	444.5
80	310	200	160	8x Ø 18	452.0
	Dimensions L to H in mm				

Valve Installation

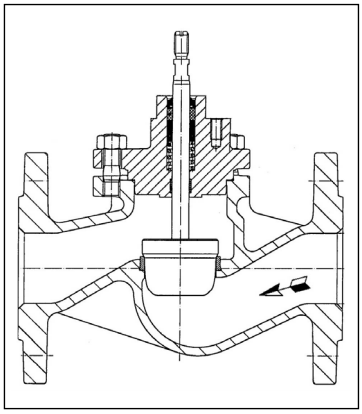
CAUTION

The valve may only be installed by qualified technicians. In addition to the generally valid installation guidelines, the following points are to be observed:

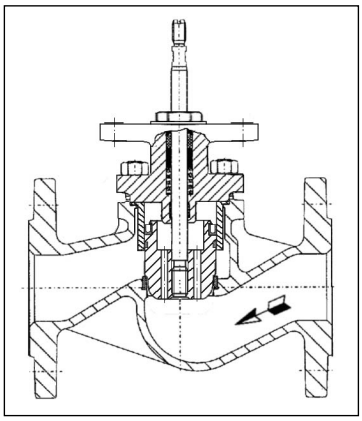
- The valve ports come with protective caps to protect against contamination. They are to be removed before installing the valves.
- The pipeline system and the interior of the fitting must be free of foreign objects. In the event of contaminated media, dirt collectors are to be inserted upstream of the valves.
- There must be no tension between the valve and the pipeline connection.
- Use only perfectly fitting flange seals, inserted centrally in the valve flanges.
- To avoid eddy formations in the valve body, the valve should be installed in a straight section of the pipe. A distance of 10 times the nominal diameter is recommended between the valve flange and manifold or other similar parts.
- The installation location is to be selected so that the ambient temperature at the actuator is kept between 0 °C and 50 °C.
- When mounting, the permissible max. pressure difference Δp and the specified direction of flow must be taken into account (see table in “Types” section, as well as the “Valve Principle”).
- The three-way valves are to be used as mixing valves. Pay attention to the direction of flow (see fig. “Valve Principle”).
- The actuator can be installed vertically above the fixture, or in any position as far as a horizontal position. When installed horizontally, the drive pillars must be one upon the other. Where applicable, turn the cross member after loosening the retaining nut.
- To remove the actuator hood, approx. 100 mm of free space is required above the drive.
- The actuator is delivered with a protective box. Up until commissioning, this cover protects the drive during the installation phase and pipeline work.
- Observe the direction of flow arrow on the valve body. Inverting the direction of flow impairs control behavior.

Valve Cross-Sections with Flow Directions

Two-way valves

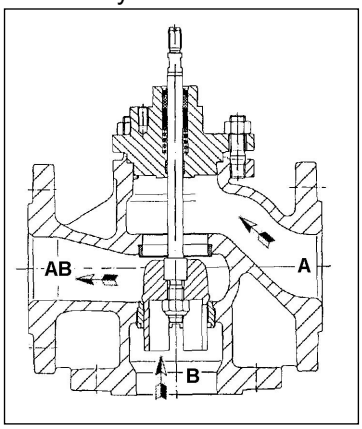


RD/RGD..



RGDE..

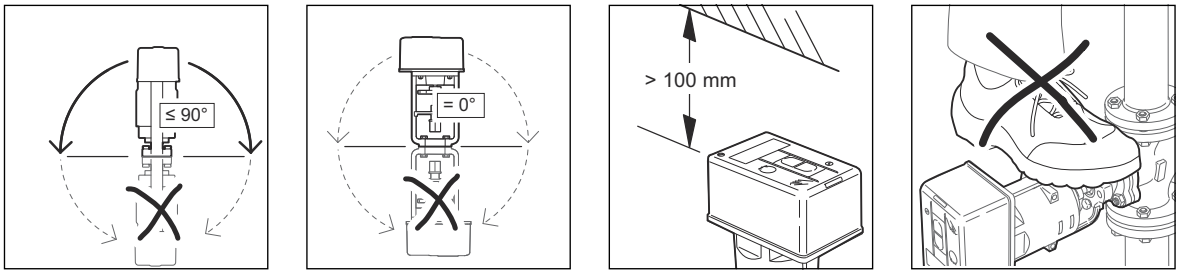
Three-way valve



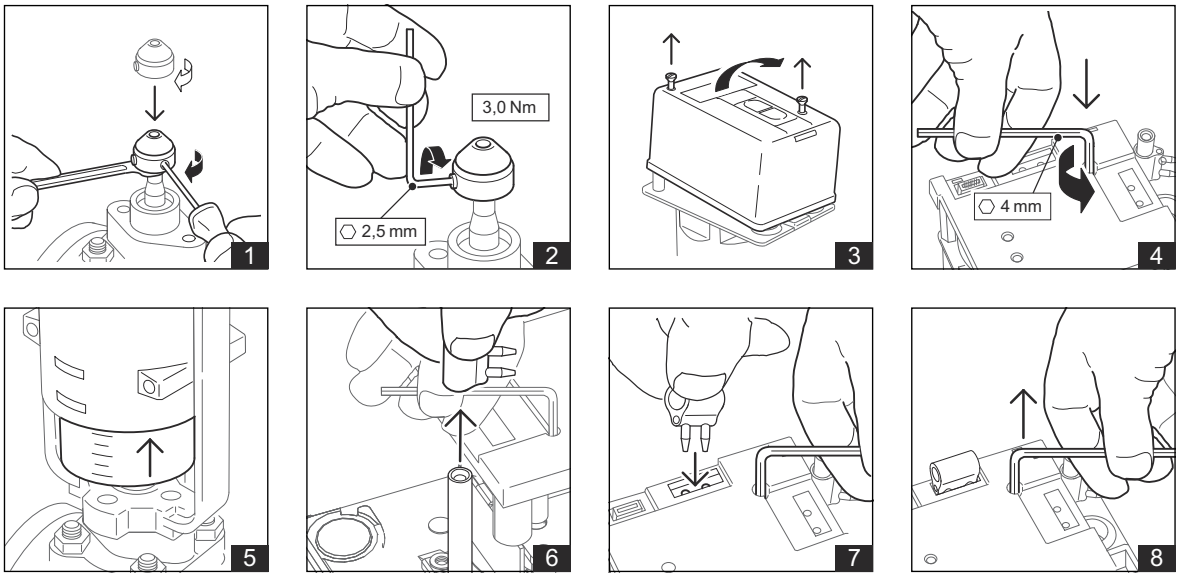
RWG..

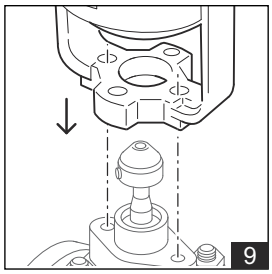
Mounting the MF201 Emergency Actuator

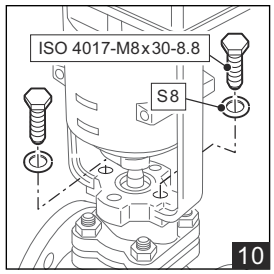
Installation instructions

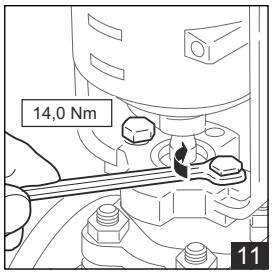


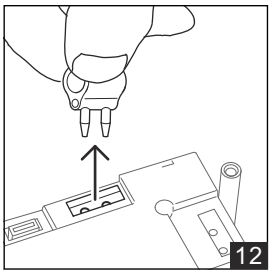
Mounting and installation

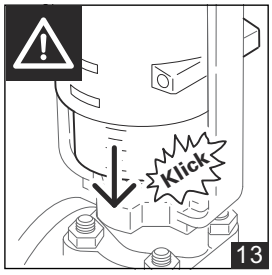


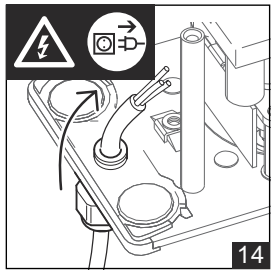


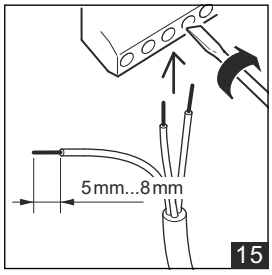


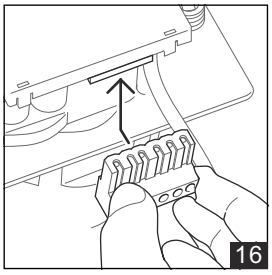


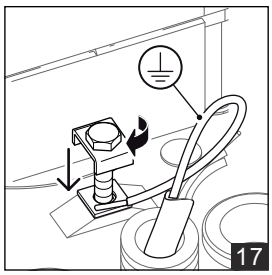


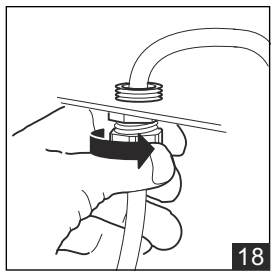


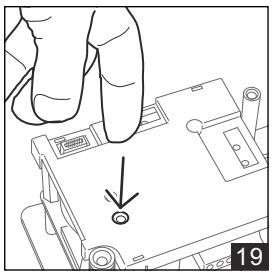


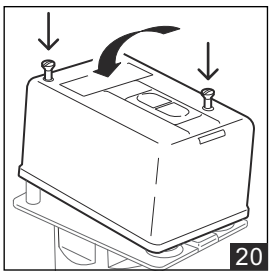










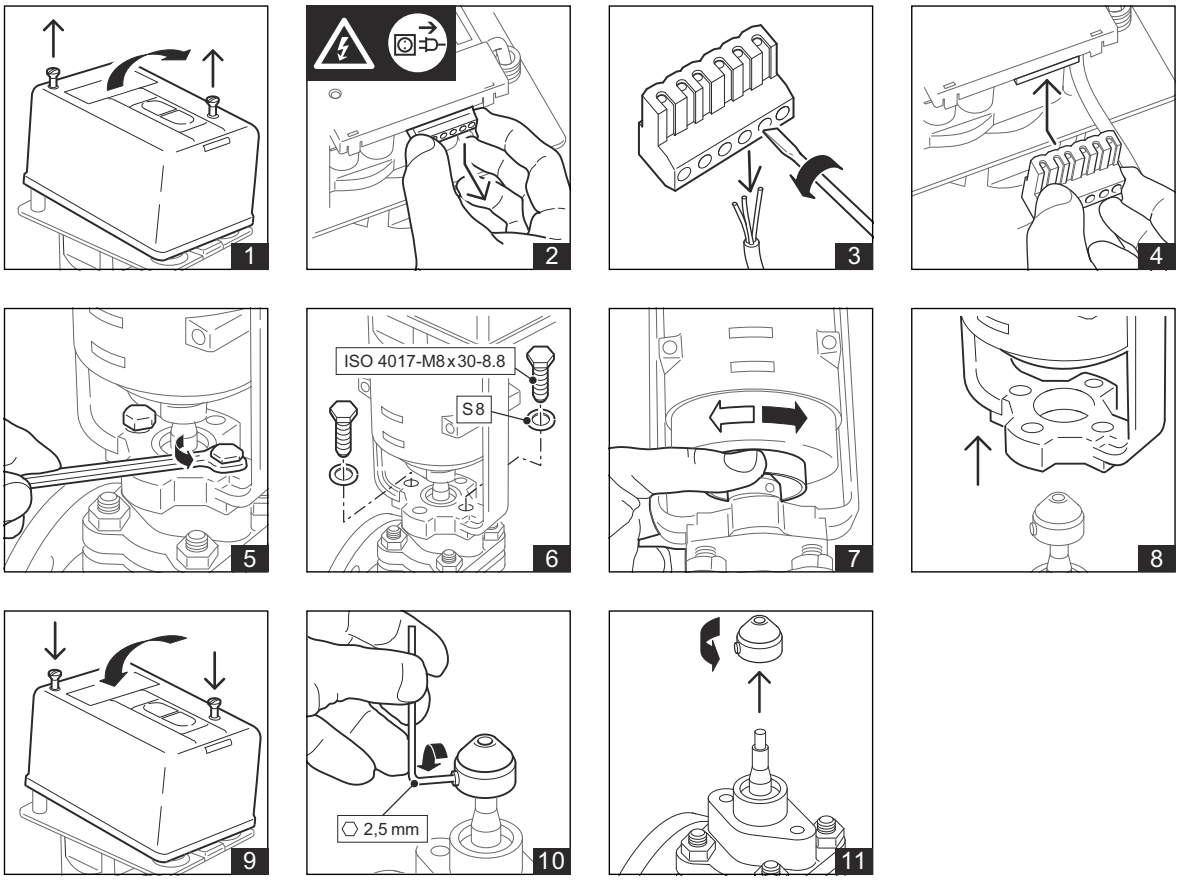


- After the pipeline has cooled off, you can begin mounting the emergency actuator.
- Once the emergency actuator has been mounted and installed, you must trigger an automatic initialization run, see “Commissioning Steps”.

CAUTION

Both hexagon socket screws must be tightened equally with the hexagon socket key (see Fig. 2).

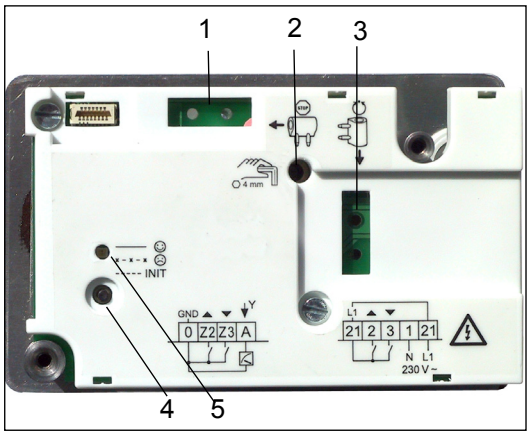
Removing the MF201 Emergency Actuator



- Before beginning to remove the unit, make sure that no differential pressure builds up in the valve body before beginning work. If necessary, close the gate valve and turn off pumps. After the pipeline has cooled off, you can begin removal of the emergency actuator.
- Disconnect the emergency actuator from the mains power supply. Then disconnect all electrical connections.

Commissioning

Operating and functional components beneath the emergency actuator cover



(1) Receptacle for the knob during manual adjustment
(2) Socket for hexagon socket key
(3) Receptacle for the knob during automatic mode without cover during commissioning
(4) Status LED display
(5) INIT button

General information

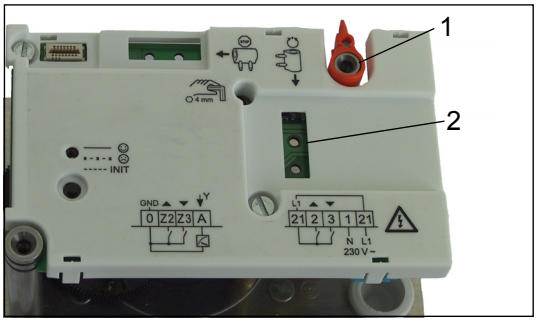
The commissioning process may change if accessories are installed. In such cases, commissioning is described in the data sheet of the accessory that is being used.

WARNING

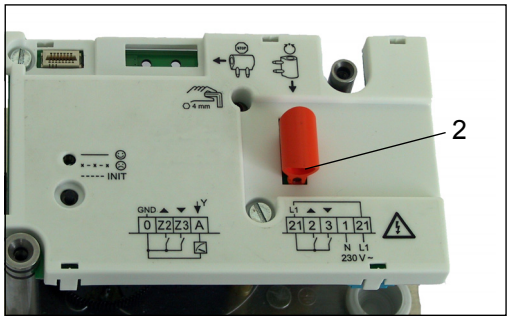
Caution: 230 V mains voltage may be present at the connection terminals of the switch module when the E/MF switch module is used.

CAUTION

Automatic mode without the cover must only be used by the technician during commissioning.



Knob not inserted = emergency function triggered



Knob inserted = automatic mode

When the cover is removed, the emergency actuator automatically tests the emergency function and moves into its safety position to maintain safe operation. To allow the commissioning technician to test for proper function, the emergency actuator can be switched to automatic mode by inserting the knob (1).

Remove the actuator cover and then insert the knob (1) into the PCB (2).

CAUTION

Observe after installing the emergency actuator

If the emergency actuator was installed on-site, the nominal stroke must be adjusted to the valve stroke using initialization (INIT).

Status of the LED displays

LED beneath the emergency actuator cover	**Meaning**
Constantly lit	Normal operation
Short flashes	Disabled state / voltage polarity incorrect
Long flashes	Installation run

Commissioning Steps

1. Testing for proper actuating device installation and testing the electrical connection

2. Switching on the power supply

LED (2) flashes.

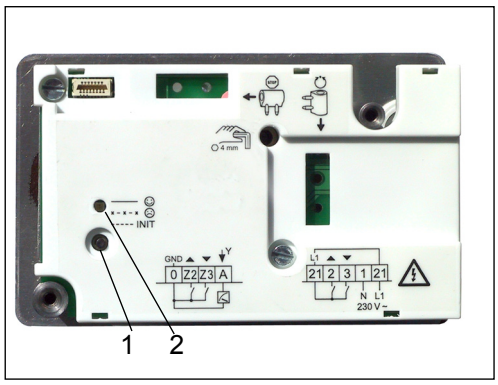
NOTE

In the first 10 min after switching on the supply voltage, positioning movements are carried out separately from the normal operating characteristics with idle periods of approx. 2 s.

3. Initialization and adjustment to the valve stroke

The initialization run is switched on by pressing the INIT button (1). The valve is completely opened and closed once during initialization. LED (2) flashes during initialization. The emergency actuator always moves first to the upper end position and then to the lower end position.

The LED remains constantly lit to signal that initialization is completed. The INIT button (1) and the LED (2) are located beneath the drive cover (see illustration).



4. Positioning feedback

At terminal “A”, a constant DC 0 V to 10 V signal can be picked up for

- position feedback (=display of current position of the emergency actuator) or
- reporting an error status/manual mode (approx. > DC 12.5 V).

5. Manual adjustment

Remove the emergency actuator cover for manual operation. Using a hex key (key socket 4 mm), the valve can be moved into any position. The knob is then used to lock the emergency actuator. See “Installing the Emergency Actuator”.

6. Accessories

If additional components are installed on the emergency actuator (see accessories), their functionality must be tested and adjusted as necessary.

You must follow the accessories’ descriptions with connection instructions when doing so.

7. Function test

Replace and tighten the screws of the emergency actuator cover after the drive settings have been made with any accessories.

Then test the complete functionality of the actuator in the control system, including the emergency function.