

Manual Actuator

EMO

Type Series Booklet



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Type Series Booklet EMO

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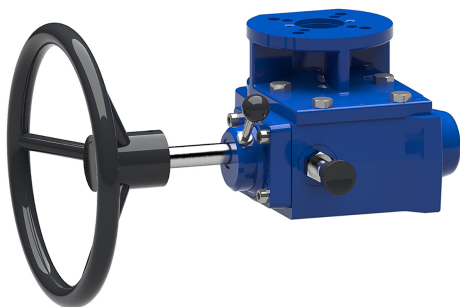
Contents

Manual Actuators	4
Declutchable Manual Override	4
EMO	4
Main applications.....	4
Operating data.....	4
Design details.....	4
Product benefits.....	4
Technical data	5
Materials.....	7
Dimensions and weights.....	9

Manual Actuators

Declutchable Manual Override

EMO



Main applications

- Water
- Waste water
- Energy
- Industry
- Oil and gas
- Shipbuilding

Operating data

Table 1: Characteristics

Characteristic	Value
EMO	EMO 0
	EMO 1
	EMO 2
	EMO 3
	EMO 4
	EMO 5
	EMO 6
	EMO 7
Min. permissible temperature [°C]	≥ -20
Max. permissible temperature [°C]	≤ +120
Output torque [Nm]	≤ 17000
Enclosure:	
Standard design	IP 66
Variant	IP 68 (30 metres of water)

Design details

Design

- The manual overrides of the EMO type series (Emergency Manual Override) cover torques of up to 17,000 Nm.
- This manual override is mounted between the valve and the actuator.
- The EMO manual overrides are designed to perform safety functions and are suitable for use with all types of quarter-turn valves (with centred or offset discs, with ball,...).
- The pneumatic actuators of the ACTAIR EVO and DYNACTAIR EVO type series and the hydraulic actuators of the HQ EVO type series can be equipped with a declutchable EMO emergency manual override (except EMO 7).
- Engaging the gear locks the handwheel and the actuator, allowing the valve to be actuated manually.
- Emergency handwheel
- Worm gear mechanism
- Valve closure in clockwise direction
- The manual overrides of the EMO type series feature travel stops which can be adjusted from -4° (± 1°) to +94° (± 1°).
- Number of guaranteed cycles of EMO:
 - In engaged position = 100 cycles at nominal torque
 - In disengaged position = in accordance with EN 15714-3 standard
- Exterior coating of the EMO manual override:
 - EMO 0 to 4: Two-coat system with polyurethane top coat, nominal thickness: 60 µm, colour: blue RAL 5002
 - EMO 5 to 7: Two-coat system with polyurethane top coat, nominal thickness: 80 µm, colour: blue RAL 5002
- Coating of handwheel, colour: black (RAL 9005)
- The force required for actuating the handwheel is defined in the EN 12570 standard.
- Impact resistance: at least IK08 to EN 62262

Variants

- The handwheels are available in two different materials:
 - Stainless steel
 - Non-coated steel

Product benefits

- Worm gear mechanism irreversible in any position
- Grease-packed for life (silicone-free grease) at the factory, therefore maintenance-free.

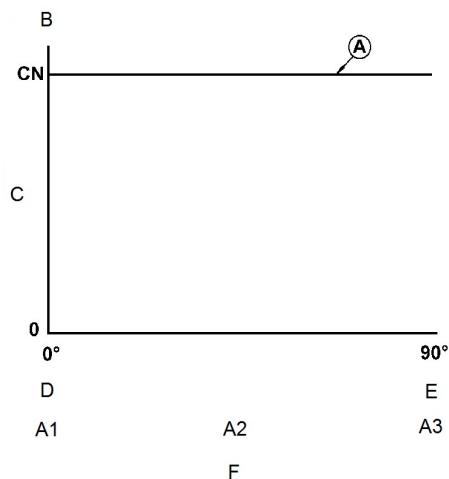
Technical data

Function

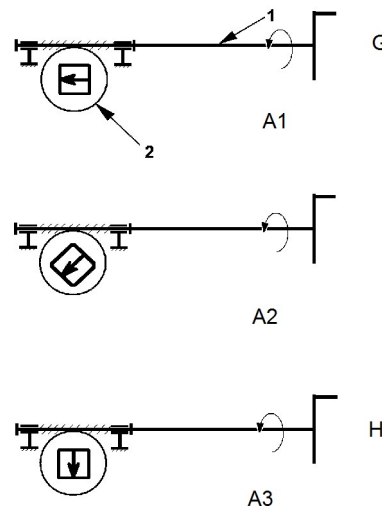
Standard EMO manual overrides are designed for valve closure in clockwise direction.

The worm gear mechanism provides a constant output torque throughout the entire worm shaft travel.

When the actuating element (handwheel, universal-joint shaft, square for hydrant key, chain wheel) connected to the worm shaft ① is actuated, the worm wheel ② connected to the valve shaft rotates.



Curve A: constant output torque



Curve of worm gear mechanism

Key:

A1 Fig. 1

A2 Fig. 2

A3 Fig. 3

B: Output torque

C: Multiplication coefficient

D: Close

E: Open

F: Opening angle in degrees

G: Closed

H: Open

Type series

Table 2: Torques [Nm] and number of handwheel turns

Type	Nominal output torque	Nominal input torque	Number of handwheel turns
EMO 0	150	13	10
EMO 1	250	26	9
EMO 2	750	60	12
EMO 3	1450	125	11
EMO 4	2485	160	15
EMO 5	3390	188	17
EMO 6	8135	120	78
EMO 7	17000	140	117

Table 3: Standardised interface and dimensions for shaft and actuating bush

Type	Interface standardised to ISO		Max. permissible dimensions for shaft and actuating bush				
			Actuating bush			Shaft	
	Actuator	Valve	Depth	Drive		Height	Drive Square
				Square	Bi-square		
EMO 0	F05 - F07	F05 - F07	41	-	T17	19	L17
EMO 1	F05 - F07	F05 - F07 - F10	45	-	T22	24	L22
EMO 2	F07 - F10 - F12	F07 - F10 - F12	58	-	T27	29	L27
EMO 3	F10 - F12	F10 - F12	66	-	T36	38	L36
EMO 4	F14	F14	71	L46	-	48	L46
EMO 5	F16	F12 - F16	92	L46	-	48	L46
EMO 6	F16 - F25	F16 - F25	113	L55	-	57	L55
EMO 7	F25 - F30	F25 - F30	90	L90	-	92	L90

Functioning of declutchable manual override:

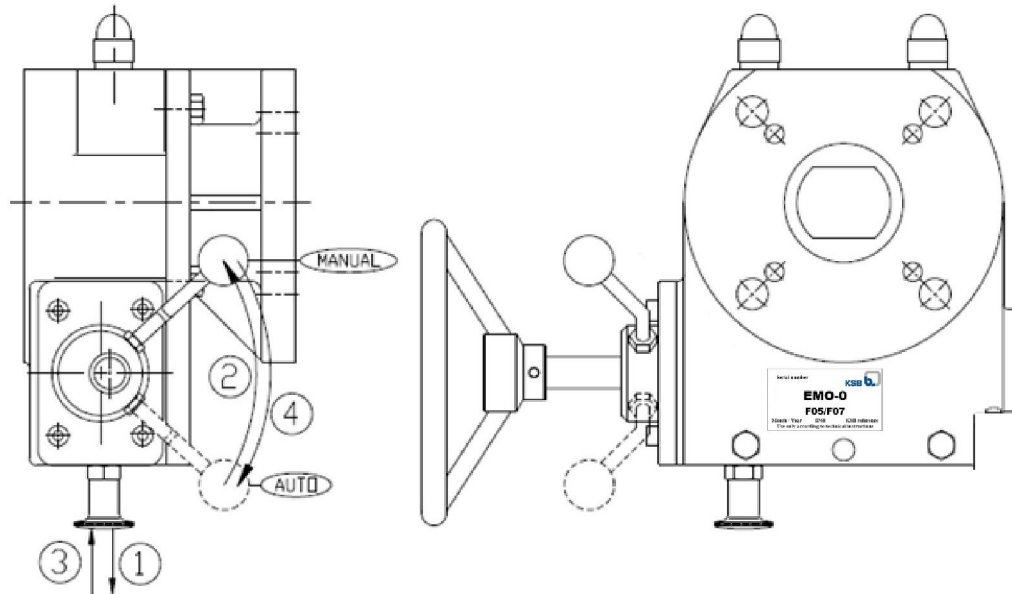


Fig. 1: Functioning of EMO declutchable manual override

Engaging the manual override (manual operation)

To engage the manual override, pull out the locking device (in direction 1) and move the lever into position 2 (engaged). Now release the locking device to let it return into position 3 and to lock the position. The manual override can now be used for manually opening and closing the valve.

Close the valve by turning the handwheel clockwise.

Open the valve by turning the handwheel anti-clockwise.

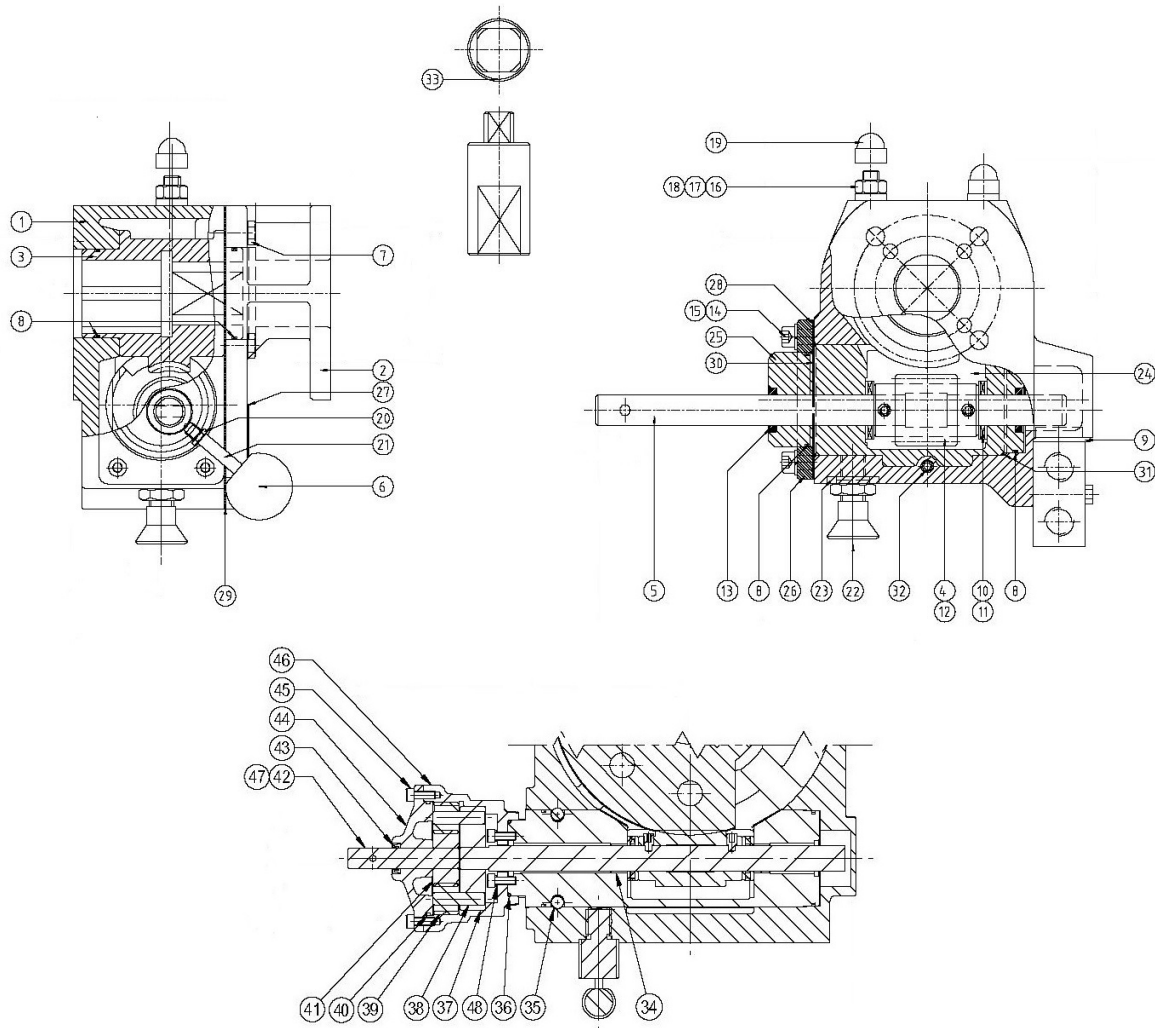
Disengaging the manual override (automatic operation)

To disengage the emergency manual override, pull out the locking device (in direction 1) and move the lever into position 4 (disengaged). Now release the locking device to let it return into position 3 and to lock the position. The manual override is now disengaged and the valve can be operated by the pneumatic or hydraulic actuator.

Note: If the lever is not exactly in one of the two 90° positions, turn the handwheel slightly until the lever is in the correct position. (The locking device is back in its original position).

Note: Automatic operation (hydraulic or pneumatic actuation) and manual operation are not possible at the same time.

Materials



Sectional drawings of EMO 6 and 7

Fig. 2: Sectional drawing of EMO

Table 4: List of components

Part No.	Description	Materials
1	Gear housing	Lamellar graphite cast iron
2	Cover	Lamellar graphite cast iron
3	Worm wheel	Nodular cast iron
4	Worm shaft	Steel
5	Input shaft	Stainless steel
6	Knob	Plastic
7	Hexagon head bolt	Stainless steel
8	O-ring	Nitrile
10	Needle bearing	Steel, hardened
11	Bearing disc	Steel, hardened
12	Adjusting screw	Steel
13	Joint ring	Nitrile
14	Hexagon socket head cap screw	Stainless steel
16	Adjusting screw	Steel
17	Hexagon nut	Stainless steel
18	Circlip	Copper
20	Hexagon nut	Stainless steel
21	Stud	Stainless steel
22	Nut + latch bolt	Stainless steel + plastic
23	Ring	Copper
24	Lubricant	Grease
25	Rack, off-centre	Lamellar graphite cast iron
26	Support plate for rack	Lamellar graphite cast iron
27	Sticker	Polyester
28	Support ring for rack	Nitrile
29	Sealing element for gear housing	Sealing compound
30	Front fixed bearing	PTFE
31	Rear fixed bearing	PTFE
32	Pin	Steel
33	Shaft coupling	Steel
34	Bush	Steel with PTFE coating
35	Stud	Steel
36	O-ring	Nitrile
37	Guide element, input shaft	Steel
38	Stud	Steel
39	Planet wheel	Steel, hardened
40	O-ring	Nitrile
41	Sun wheel	Steel, hardened
42	Input shaft	Stainless steel
43	Lip seal	Nitrile
44	Cover	Lamellar graphite cast iron
45	Hexagon socket head cap screw	Stainless steel
46	Gear housing, manual gearbox	Nodular cast iron
48	Washer	Steel
Not shown	Pin	Steel
Not shown	Handwheel	Steel
Not shown	Name plate	Stainless steel

Dimensions and weights

Dimensions and weights of EMO

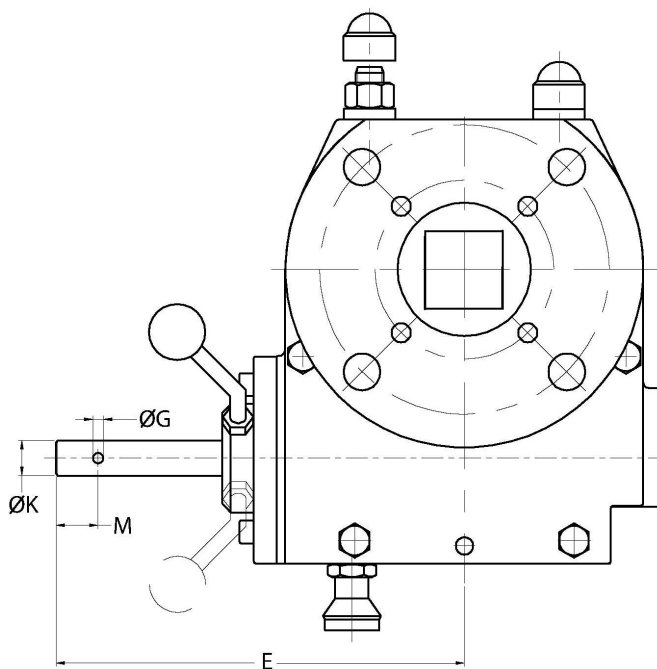


Fig. 3: EMO with dimensions

Table 5: Dimensions [mm] and weights [kg]

Type	E	M	Diameter G	Diameter K	Weight
EMO 0	137,5	14	4	12	4,7
EMO 1	158	14	5	15	7,3
EMO 2	189,5	14	5	15	17,0
EMO 3	190	24	6	20	21,0
EMO 4	233	24	6	20	34,0
EMO 5	304	28	6	25	54,0
EMO 6	328	24	6	20	90,0
EMO 7 ¹⁾	345	24	6	20	90,0

¹ Version for HQ EVO hydraulic actuators and previous-generation pneumatic actuators (AG) only

Dimensions and weights of EMO handwheel

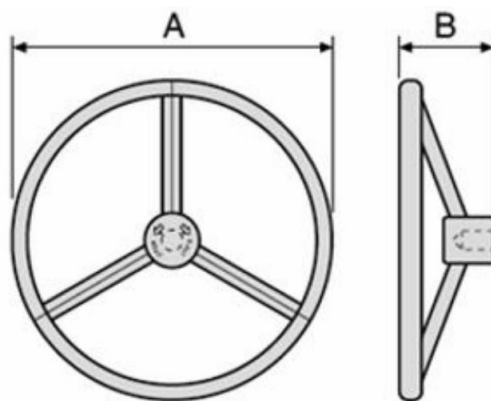


Fig. 4: EMO handwheel with dimensions

Table 6: Dimensions [mm] and weights [kg]

Type	Steel handwheel and non-coated steel handwheel		Stainless steel handwheel		Weight
	Diameter A	B	Diameter A	B	
EMO 0	150	80	160	48	1,0
EMO 1	250	110	250	63	1,5
EMO 2	250	110	250	63	1,5
EMO 3	400	130	400	130	2,0
EMO 4	400	130	400	130	2,5
EMO 5	600	150	600	150	3,0
EMO 6	600	150	600	150	2,5
EMO 7 ¹⁾	600	150	-	-	4,0

Dimensions and weights of EMO coupling sleeve

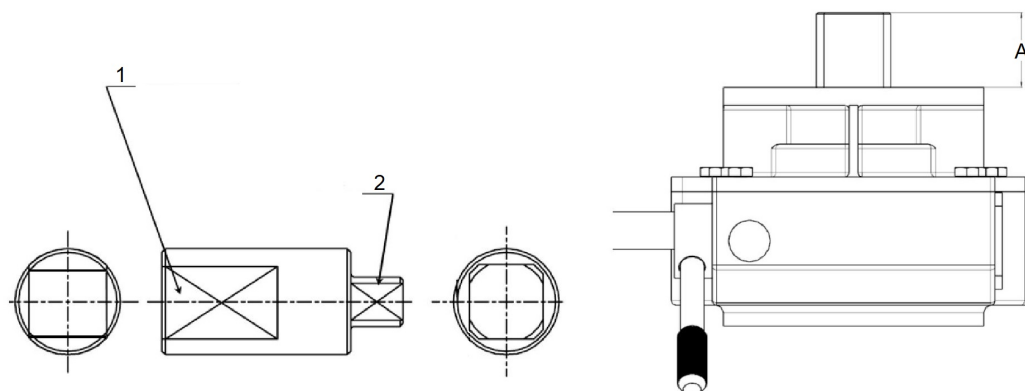


Fig. 5: EMO coupling sleeve

- 1: Manual override end
- 2: Actuator end

Table 7: Dimensions [mm] and weights [kg]

Type	Sleeve height	Weight
	A	
EMO 0	19	0,2
EMO 1	24	0,4
EMO 2	29	0,5
EMO 3	38	1,1
EMO 4	48	2,1
EMO 5	48	2,3
EMO 6	57	2,4
EMO 7 ¹⁾	92	22,2



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