

Manual Actuator

MS / MC

Type Series Booklet



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Type Series Booklet MS / MC

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Manual Actuators

Manual Gearboxes

MS/MC



Main applications

- Water
- Waste water
- Energy
- Industry
- Shipbuilding

Operating data

Table 1: Operating properties

Characteristic	Value
MS	MS15
	MS30
	MS50
	MS100
	MS200
	MS450
	MS700
	MS1100
MC	MC15
	MC30
	MC50
	MC100
	MC200
	MC450
	MC700
	MC1100
	MC2600
	MC3200
	MC6300
MS:	
Min. permissible temperature [°C]	≥ -20
Max. permissible temperature [°C]	≤ +120
MC:	
Min. permissible temperature [°C]	≥ -20 (-60 optional)
Max. permissible temperature [°C]	≤ +120
Output torque [Nm] for MS	≤ 11000
Output torque [Nm] for MC	≤ 63000
Enclosure:	
MS	IP 67
MC	IP 66 and IP 68 (1 metre of water in 72 hours)

Design details

Design

- The MS manual gearboxes cover torques of up to 11,000 Nm.
- The MS and MC manual gearboxes cover torques of up to 63,000 Nm.
- The MS and MC manual gearboxes are irreversible in any position. They are suitable for all fields of application and all types of quarter-turn valves (centred-disc or offset-disc butterfly valves, ball valves, etc.).
- Exterior coating of MS and MC manual gearboxes:
 - MS: two-coat system with polyurethane top coat, nominal thickness 60 µm, colour: blue RAL 5002,
 - MC: two-coat system with polyurethane top coat, nominal thickness 80 µm, colour: blue RAL 5002,
- Actuator/valve connection flange to ISO 5211
- The force required for actuating the handwheel is defined in the EN 12570 standard.
- The standard manual gearbox is supplied with a handwheel and a position indicator.
- MS and MC manual gearboxes feature adjustable limit stops:
 - MS (± 2°) for opening and closing,
 - MC (± 5°) for opening and closing.

MS variants

- Handwheel extension

MC variants

- Actuation via universal-joint shaft, square for hydrant key or chain wheel after replacing the handwheel on site.
- AMTROBOX and AMTROBOX R limit switch boxes
- Position indication by flag
- Handwheel locking arrangement with stainless steel plate and padlock
- Special coatings for special ambient conditions
- Accessories for remote actuation
- Handwheel made of stainless steel
- Handwheel extension

Product benefits

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

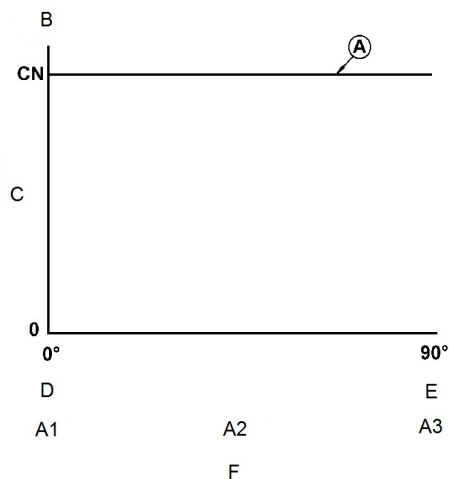
Technical data

Function

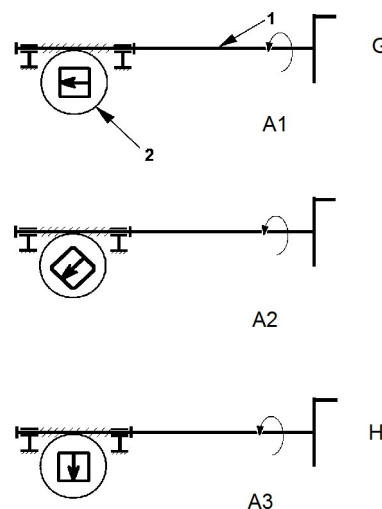
Standard MS and MC manual gearboxes are designed for valve closure in clockwise direction.

A worm gear provides a constant output torque over 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



Worm gear schematic

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
MS15	150	15	10,0
MS30	300	30	10,0
MS50	600	65	10,0
MS100	1200	120	10,0
MS200	2000	133	12,5
MS450	4500	136	27,0
MS700	7000	106	54,5
MS1100	11000	104	87,0
MC15	150	16	10,0
MC30	330	28,5	9,5
MC50	500	43	9,5
MC100	1000	83	8,5
MC200	2000	152	9,5
MC450	4500	136	27,0
MC700	7000	106	54,5
MC1100	11000	104	87,0
MC2600	26000	124	182,5
MC3200	32000	142	182,5
MC6300	63000	164	243,0

Table 3: Standardised interface and shaft dimensions

Type	Interface standardised to ISO*	Max. permissible shaft dimensions		
		Minimum depth	Shaft drive	
			Square	Bi-square
MS15	F05 - F07	35	-	T14
MS30	F07 - F10	40	-	T22
MS50	F07 - F10 - F12	50	-	T27
MS100	F10 - F12	50	-	T27
MS100	F14	65	-	T36
MS200	F14	65	-	T36
MS200	F16	70	L46	-
MS450	F14	65	-	T36
MS450	F16	70	L46	-
MS700	F16 - F25	90	L55	-
MS1100	F16 - F25	90	L55	-
MC15	F05 - F07	35	-	T14
MC30	F05 - F07 - F10	40	-	T22
MC50	F07 - F10	40	-	T22
MC100	F10 - F12	50	-	T27
	F14	65	-	T36
MC200	F14	65	-	T36
	F12 - F16	70	L46	-
MC450	F14	65	-	T36
	F12 - F16	70	L46	-
MC700	F16 - F25	90	L55	-
MC1100	F16 - F25	90	L55	-
MC2600	F25 - F30	130	L90	-
MC3200	F35	130	L90	-
MC3200	F40	140	L110	-
MC6300	F35 - F40	140	L110	-

Materials

MS manual gearbox

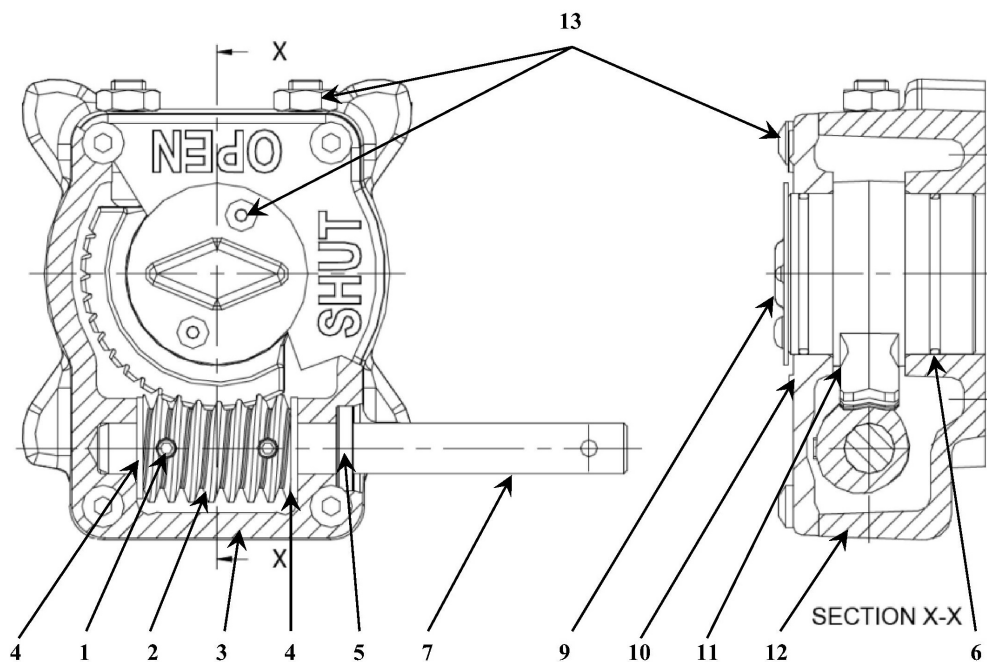


Fig. 1: Sectional drawing of MS

Table 4: List of components of MS manual gearbox

Part No.	Description	Materials
1	Grub screw	Steel
2	Worm shaft	Steel
3	Gasket	Sealing compound
4	Thrust bearing	Steel with PTFE coating
5	Joint ring	Composite material
6	O-ring	Nitrile
7	Actuating shaft	Steel with electrophoretic coating
Not shown	Lubricant	Grease
9	Position indicator	Stainless steel
10	Cover	Lamellar graphite cast iron
11	Worm wheel	Steel
12	Gear housing	Lamellar graphite cast iron
13	Bolt/screw	Galvanised steel
Not shown	Pin	Stainless steel AISI 304
Not shown	Handwheel	Coated steel
Not shown	Name plate	Adhesive label

MC manual gearbox

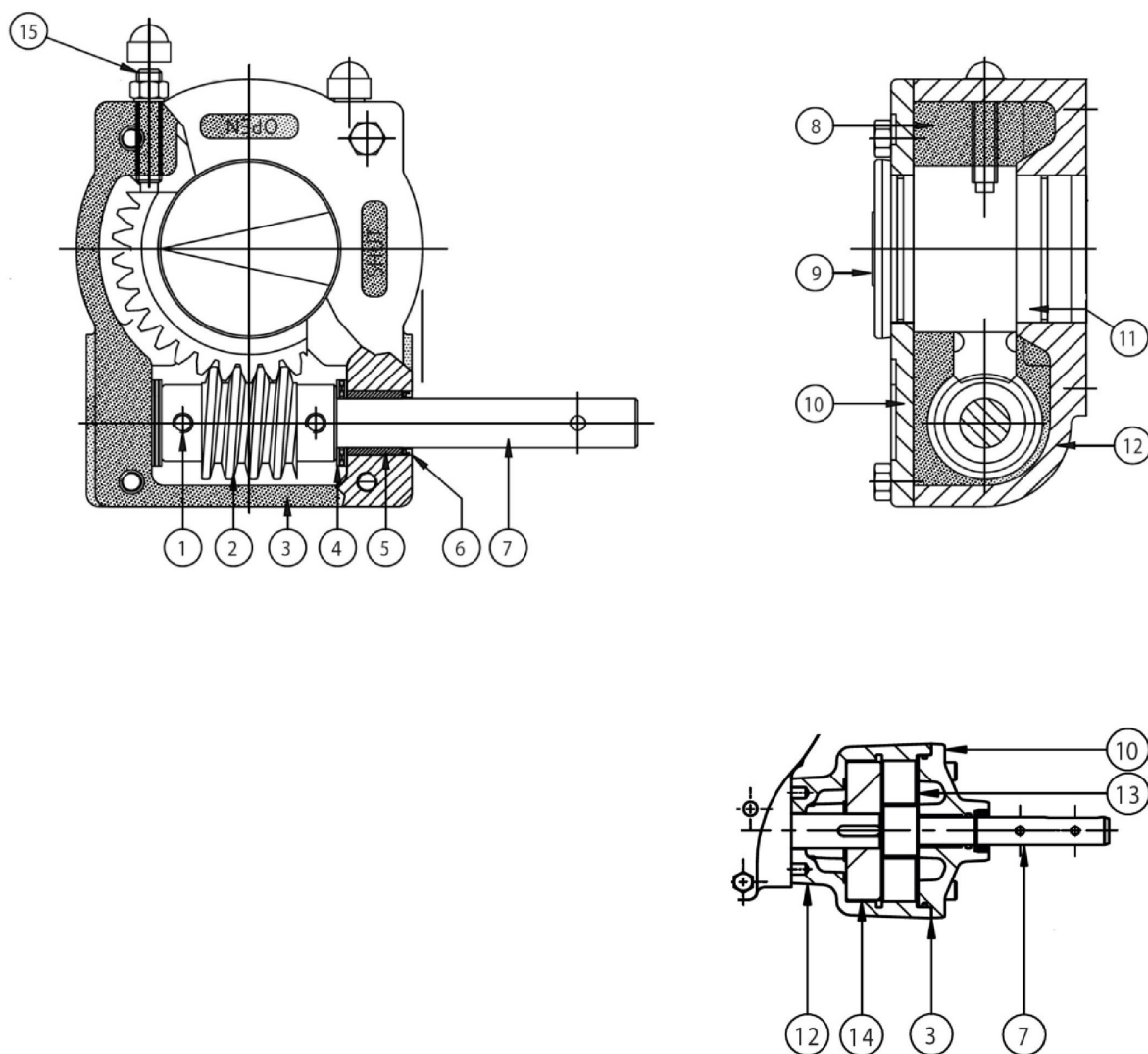


Fig. 2: Sectional drawing of MC

Table 5: List of components of MC manual gearbox

Part No.	Description	Materials
1	Grub screw	Steel
2	Worm shaft	Steel
3	Gasket	Sealing compound
4	Thrust bearing	Steel with PTFE coating
5	Joint ring	Composite material
6	O-ring	Nitrile
7	Actuating shaft	Stainless steel
8	Lubricant	Grease
9	Position indicator	Stainless steel
10	Cover	Lamellar graphite cast iron
11	Worm wheel	Steel
12	Gear housing	Lamellar graphite cast iron
13	Pinion	Steel
14	Guide support	Steel
15	Stop screw	Stainless steel
Not shown	Pin	Stainless steel AISI 304
Not shown	Handwheel	Coated steel
Not shown	Name plate	Adhesive label

Variants

Actuation via universal joint (tempered steel or stainless steel)

To enable actuation from a deck stand, the actuating shaft is fitted with a universal joint made of tempered steel and a 35-mm square drive.

The universal joint is galvanised.

The required length of transmission shaft (dia. 35 mm, max. length: 6 m) is included in the deck stand scope of supply.

A stainless steel variant of the universal joint can be supplied for the entire type series.

Actuation from a deck stand is described in the "Options - Actuation accessories - Actuation from a deck stand" section.

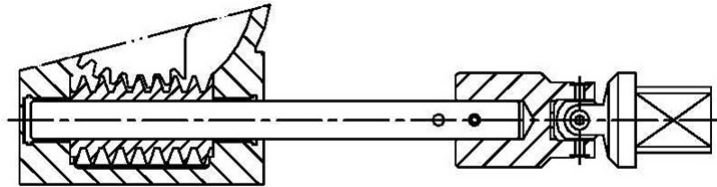


Fig. 3: Universal joint

Actuation via square for hydrant key

For valves installed in buried drinking water supply piping, the actuating shaft is fitted with a square for hydrant key operation (30 or 50 mm) made of nodular cast iron JS 1030.

Manual gearboxes with a square for hydrant key operation can be operated as follows:

30-mm square:

- Handwheel, diameter: 315, made of nodular cast iron
- Socket wrench
- Straight lever, length: 370 mm, made of nodular cast iron

50-mm square:

- Extension rod with square end, protecting tube and valve box

Accessories are described in the "Options - Actuation accessories - Accessories for actuation via square for hydrant key operation" section

Actuation via chain wheel

If piping is situated at a higher level and the actuating element is not accessible, the valve can be actuated via a chain wheel fitted on the shaft of the manual gearbox (remote actuation).

The total chain length must be indicated when ordering (pitch: 18.5, size: 5, to DIN 766).

The chain is made of tempered steel or stainless steel.

For horizontal piping the MC manual gearbox must be fitted below the pipe, to ensure that the chain hangs down vertically.

* Weight per metre of chain: 0.8 kg

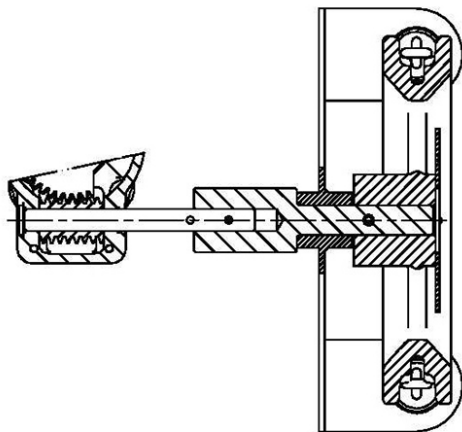


Fig. 4: Illustration with chain wheel

Actuation by handwheel, with extension

For some applications, the handwheel needs to be fitted at a distance from the manual gearbox. This is accomplished by fitting a handwheel extension:

- Actuating shaft made of stainless steel
- Handwheel (identical to standard handwheel of the manual gearbox)

The maximum extension length (dimension E) is 1.5 m. (Please contact the manufacturer for greater lengths.) Minimum length see table below.

Fitting an extra support is strongly recommended to safeguard the rigidity of the assembly. It must be supplied and fitted by the customer at the site.

Recommended set-up for this version:

- Valve fitted in a horizontal position
- MC fitted with the actuating shaft in the vertical position
- Extension fitted with the axis in the vertical position

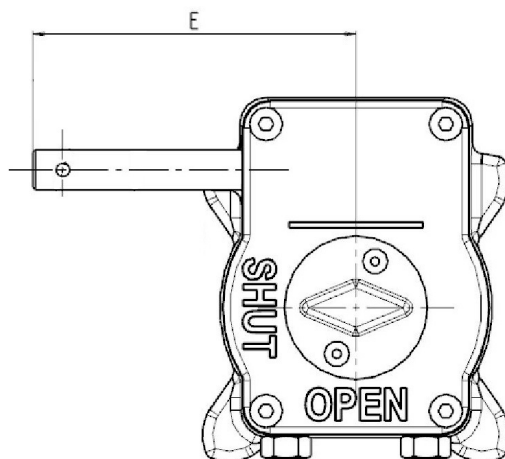


Fig. 5: MS with handwheel extension

Table 6: Dimensions [mm] of MS with handwheel extension

Type	E min.
MS	
15	200
30	275
50	285
100	335
200	315
450	385
700	485
1100	505

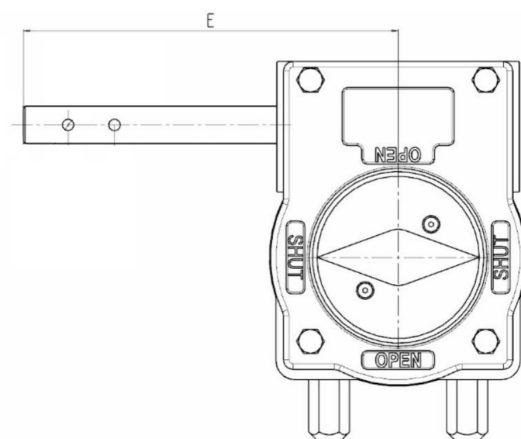


Fig. 6: MC with handwheel extension

Table 7: Dimensions [mm] of MS with handwheel extension

Type	E min.
MC	
15	165
30	225
50	225
100	335
200	345
450	385
700	485
1100	505
2600	525
3200	570
6300	On request

More basic solutions are available, provided that the actuating shaft is perfectly guided at the site. Please contact us.

Options - Actuation accessories

Actuation from a deck stand

Standard version: actuation by handwheel

Some installations require valves to be actuated from a different level.

In others, site conditions require the valve's actuating element to be installed at a distance from the valve for reasons of accessibility.

A deck stand enables valves installed at a lower level to be actuated from a higher-level location.

The actuation process is performed either manually or electrically.

In such cases, the valve will be equipped with an MC manual gearbox with an output-side universal joint and transmission shaft(s).

Universal joints are capable of accommodating some offset between the output shaft of the manual gearbox and the shaft of the deck stand.

The maximum offset angle between the transmission shaft axis and the output shaft of the deck stand (or the manual gearbox) must not exceed 30°.

The cast standard deck stands are dust and splash-proof (in accordance with IP 65).

- Deck stand made of nodular cast iron
- Handwheel made of nodular cast iron
- Transmission elements made of tempered steel
- Universal joint made of galvanised steel or stainless steel (optional)

Dimension L must equal at least 150 mm; it must not exceed 6 m.

The basic deck stand design is not equipped with a position indicator.

A design variant with position indicator can be supplied.

Protection by polyurethane coating, thickness 80 µm, colour: blue, RAL 5002.

This actuation method can only be implemented on MC manual gearboxes.

Variant: electric actuation

The valve is actuated by an electric multi-turn actuator which replaces the handwheel.

This actuation method can only be implemented on MC manual gearboxes that can be motorised and feature a universal-joint output.

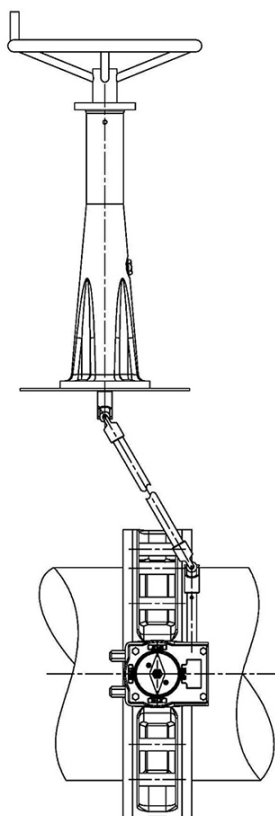


Fig. 7: Actuation from a deck stand

Remote actuation for buried MC

An extension can be fitted for buried service and for remote actuation.

The extension set-up consists of:

- MC, actuated via a square for hydrant key operation (WAF 50, mandatory) which functions as an extension socket
- Extension rod with square (WAF 22), a standard length of 0.6, 0.9, 1.5 or 2 metres + square for hydrant key operation (WAF 30)
- Valve box and PVC protecting tube

Note: The extension rod is cut to the required length on site.
The assembly can be extended further by adding another extension socket and extension rod.

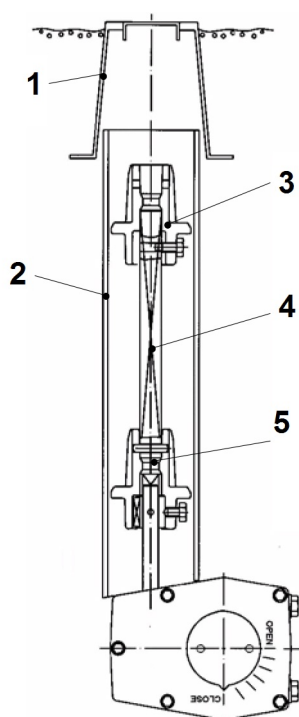


Illustration of MC, remote actuation

Key:

- | | |
|---|--|
| 1 : Valve box | 4 : Extension rod with square (WAF 22), max. straight length: 2 m |
| 2 : Protecting tube | 5 : Manual gearbox with square (WAF 50) for hydrant key operation / extension socket |
| 3 : Square (WAF 30) for hydrant key operation | |

Accessories for actuating the square for hydrant key operation

The following accessories are available for operating manual gearboxes with a WAF 30 square for hydrant key operation:

- Handwheel made of nodular cast iron, dia. 315
- Socket wrench
- Straight lever, length: 370 mm

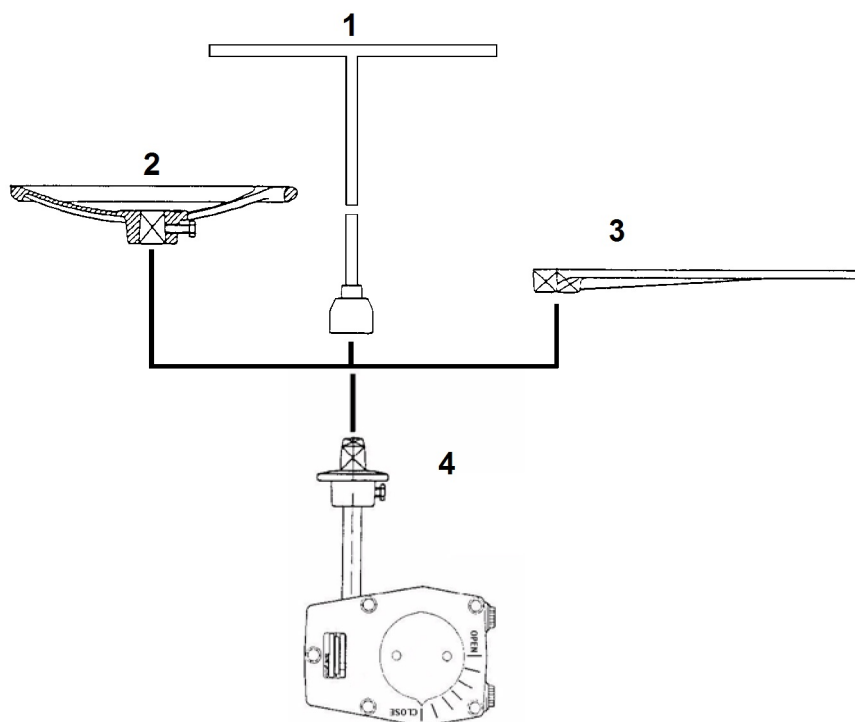


Illustration of MR 25 with square for hydrant key operation

Key:

- | | |
|-------------------------|---|
| 1 : Socket wrench | 3 : Straight lever, length: 370 mm |
| 2 : Handwheel, dia. 315 | 4 : Manual gearbox with WAF 30 square for hydrant key operation |

For operating manual gearboxes with WAF 50 square for hydrant key operation: request particulars

Limit switch box

MC manual gearboxes can be fitted with an AMTROBOX or AMTROBOX R limit switch box.

This limit switch box can be equipped with a maximum of three switches (1 for Open, 1 for Closed, and 1 for an adjustable intermediate position):

- Standard microswitch
- Standard or intrinsically safe proximity sensor

Connection is effected either by cable gland or connector.

The limit switch box has an IP 67 enclosure as standard.

The AMTROBOX and AMTROBOX R limit switch boxes are also available in an intrinsically safe or explosion-proof design.

Further limit switch boxes are available on request.

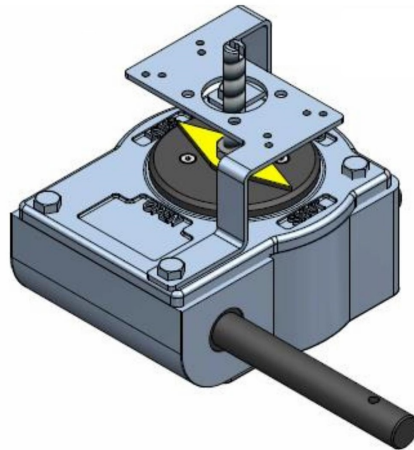


Fig. 8: VDI/VDE interface for open-loop and closed-loop control unit

Options

Flag indicator

MC

Flag measuring 150x250 mm, red on both sides, normally used in marine applications.

Flag can be designed to customer specification.

Handwheel locking arrangement

- Stainless steel plate and padlock

On request, MC manual gearboxes can be supplied with an arrangement for locking the handwheel using a stainless steel plate and padlock.

(The padlock is not included in KSB's scope of supply).

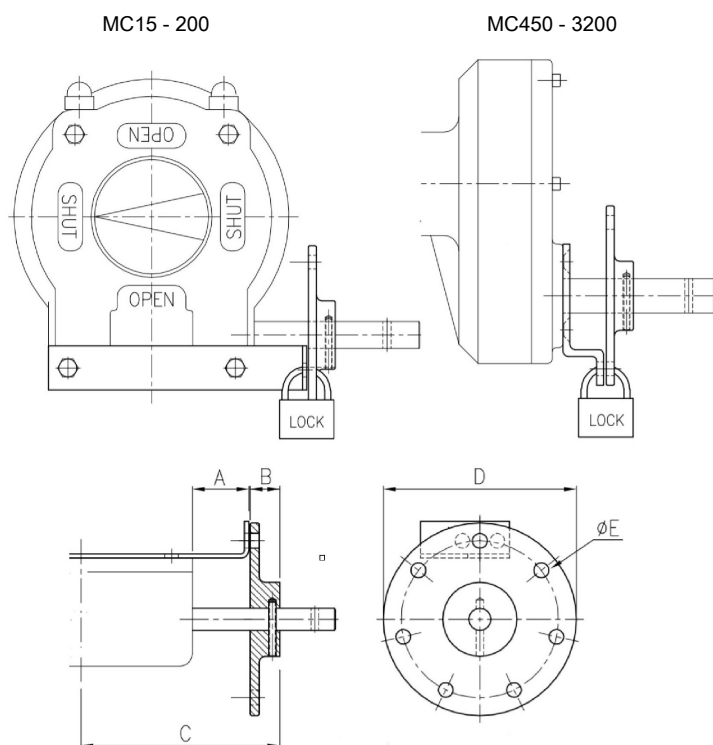


Fig. 9: MC with handwheel locking arrangement

Table 8: Dimensions [mm] for MC with handwheel locking arrangement

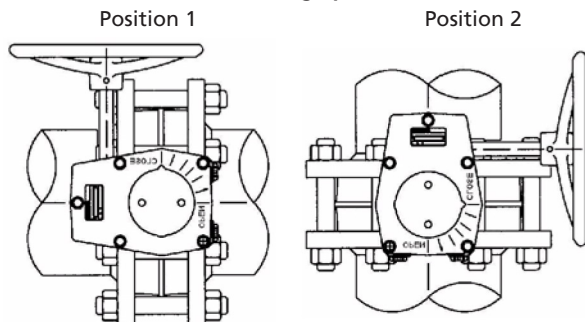
Type	A	B	C	D	E
MC15	20	18	70	50	10
MC30	30	20	102	63	8,5
MC50	30	20	102	63	8,5
MC100	75	20	163	90	8,5
MC200	53	20	151	90	8,5
MC450	5	20	183	90	8,5
MC700	4	20	263	130	10
MC1100	4	20	276	130	10
MC2600	3	20	336	125	10
MC3200	3	20	377	125	10
MC6300	-	-	-	125	11

Mounting onto the valve

MS

Mounts on the valve in two different positions.

Mounting option N

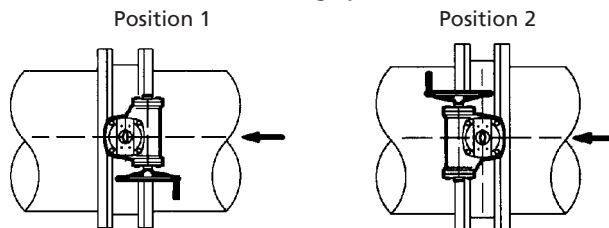


Mounted MS manual gearbox: mounting option N

MC

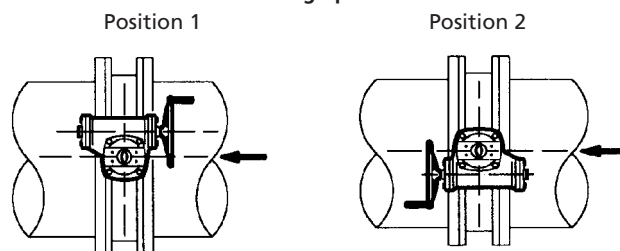
Mounts on the valve in 4 different positions, offset by 90° (normal mounting position = N / 1).

Mounting option N



Mounted MC manual gearbox: mounting option N

Mounting option M



Mounted MC manual gearbox: mounting option M

← Flow direction of fluid handled – Valve shown in closed position

Dimensions and weights

Dimensions and weights

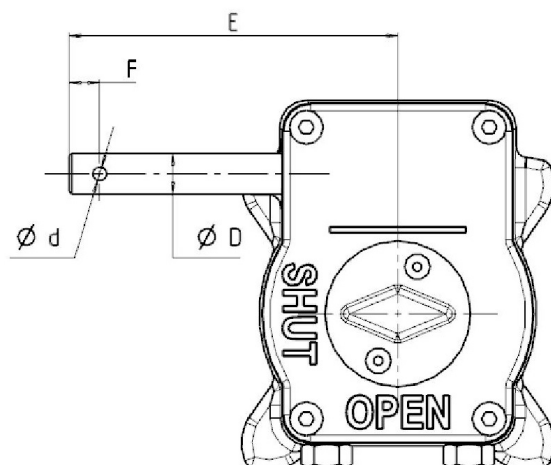


Fig. 10: MS type series with dimensions

Table 9: Dimensions [mm] and weights [kg]

Type	Actuation by handwheel				
	E	F	Diameter D	Diameter d	Weight
MS15	132	9	10	3,5	1
MS30	197	9	12	4	1,9
MS50	205	14	16	5	3,9
MS100	202	24	20	6	5,9
MS22	159	24	20	6	9
MS450	232	24	20	6	24
MS700	301	24	20	6	39
MS1100	314	24	20	6	51

MC dimensions and weights

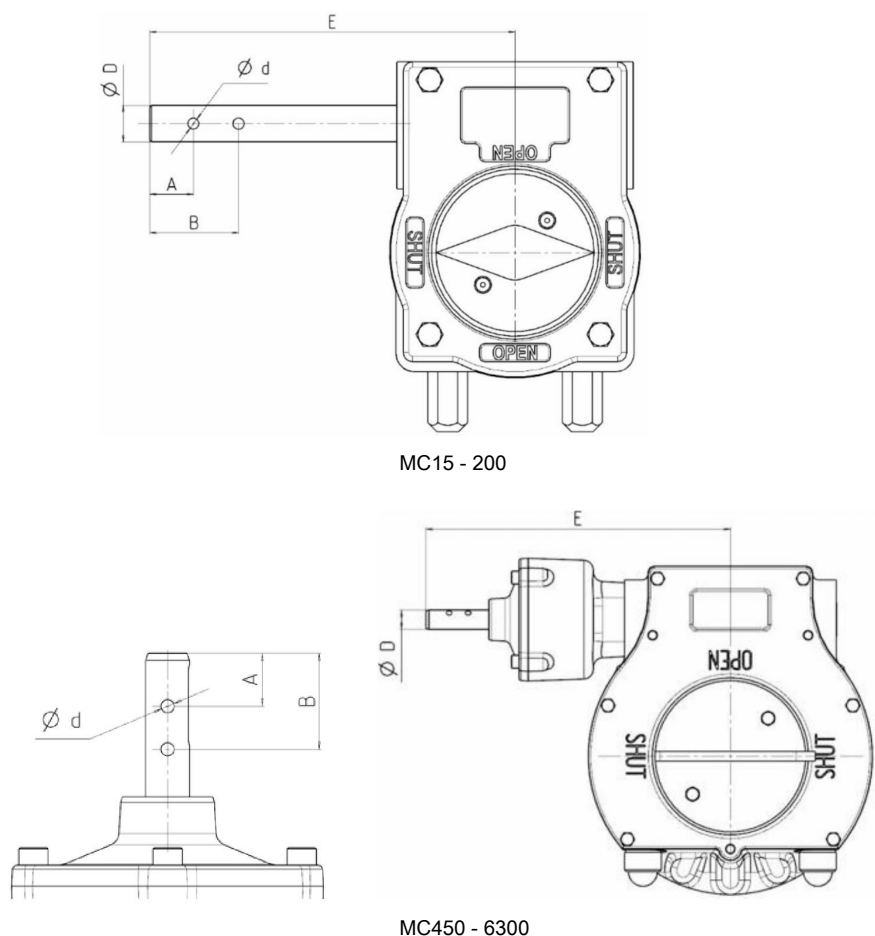


Fig. 11: MC type series with dimensions

Table 10: Dimensions [mm] and weights [kg]

Type	A	B	E	Diameter D	Diameter d	Weight
MC15	14	35	99,5	12	2 x 4	2,2
MC30	14	62	159	15	2 x 5	3,5
MC50	14	62	159	15	2 x 5	3,5
MC100	24	43	201	20	2 x 6	8,5
MC200	24	43	189	20	2 x 6	14
MC450	24	54	232	20	2 x 6	24
MC700	24	43,5	301	20	2 x 6	39
MC1100	24	43,5	314	20	2 x 6	51
MC2600	24	43,5	374,5	20	2 x 6	134,5
MC3200	24	43,5	414,5	20	2 x 6	219
MC6300	-	-	666	20	-	311



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