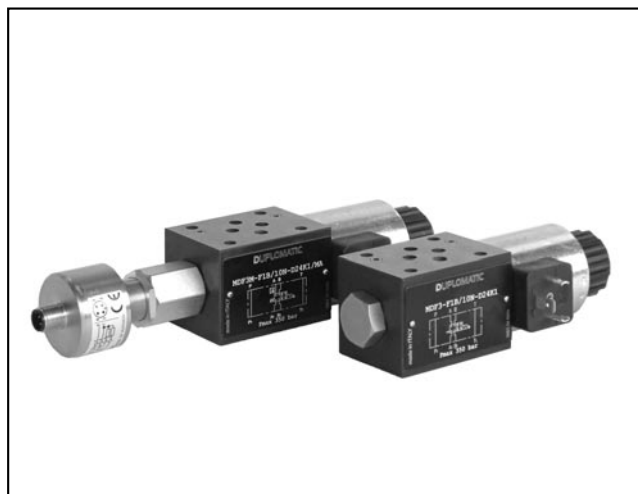




M*F3(M)

SHUT-OFF VALVES

SOLENOID OR HYDRAULICALLY ACTUATED, WITH OR WITHOUT POSITION MONITORING

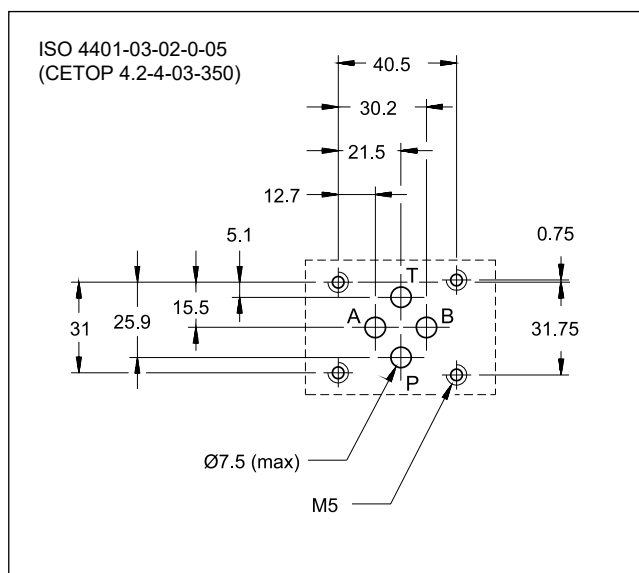
SERIES 10

MODULAR VERSION
ISO 4401-03

p max 350 bar

Q max 50 l/min

MOUNTING INTERFACE

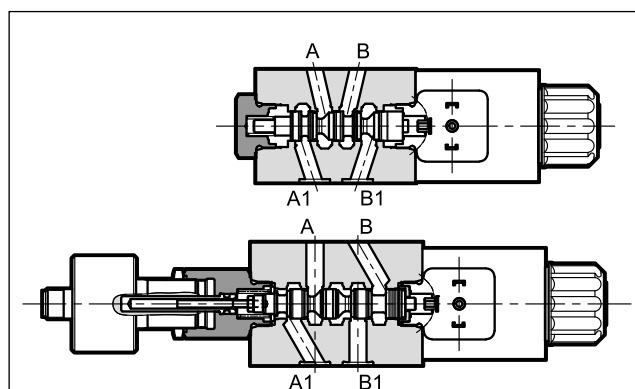


PERFORMANCE RATINGS

(working with mineral oil of viscosity of 36 cSt at 50°C)

		MDF3	MCF3
Maximum operating pressure: P - A - B ports T port	bar	350 210	350 25
Pilot pressure: min max	bar	-	15 (NOTE) 210
Maximum flow rate	l/min	50	40
Ambient temperature range	°C	-20 / +50	
Fluid temperature range	°C	-20 / +80	
Fluid viscosity range	cSt	10 ÷ 400	
Fluid contamination degree	According to ISO 4406:1999 class 20/18/15		
Recommended viscosity	cSt	25	
Mass	kg	1.5	1.3

OPERATING PRINCIPLE



- M*F3 are shut-off valves, solenoid or hydraulically actuated, with or without spool position monitoring, in modular version, with mounting interface according to ISO 4401-03 standard.
- M*F3 valves are placed under directional control servovalves in order to guarantee the safety of circuit when a power failure occurs.
- Spools with float, closed, parallel or cross position in de-energized condition are available.

— Versions with UL Recognized coils are available for the North American markets.

— Versions with spool monitoring do not have manual override and can not be disassembled, because of their characteristics and their possible use on machinery subject to safety requirements.

— The spool position monitoring is available either for initial position or for actuated position.

NOTE: The pilot pressure must be 10 to 20 bar higher than the return pressure to allow the fluid discharge from the pressure chamber.

1 - IDENTIFICATION CODES

1.1 - M*F3 valves

M		F	3	-			/	10	-			K1
----------	--	----------	----------	----------	--	--	----------	-----------	----------	--	--	-----------

Directional valve, modular version

Actuation: _____
D = solenoid **C** = hydraulically

Fail Safe feature _____

ISO 4401-03 size _____

Fail safe position: _____
F1 = closed (working ports closed)
F3 = float (working ports connected to a return line)
FP = parallel (P1→A1, B1→T1)
FC = cross (P→B1, A1→T)

Side of the control element: _____
A = side A (not available for FC fail safe position)
B = side B (not available for FP fail safe position)

AVAILABILITY

voltage	coil version	
	std	ULW
D12, D24	■	■
D48, D110, 220	-	■

Coil electrical connection (omit for MCF3 valves):
 plug for connector type EN 175301-803 (ex DIN 43650)

Coil version (see availability table):
 Omit for standard zinc-plated version
ULW = UL Recognized (points 7.2 and 9)

Power supply (omit for MCF3 valves):
D12 = 12 V **D110** = 110 V
D24 = 24 V **D220** = 220 V
D48 = 48 V
D00 = valve without coils, with locking rings and O-rings

Seals:
N = NBR seals for mineral oil (**standard**)
V = FPM seals for special fluids

Series:
 (the overall and mounting dimensions remain unchanged from 10 to 19)

1.2 - M*F3M valves with monitored spools

M		F	3	M	-			/	10	-		K1
----------	--	----------	----------	----------	----------	--	--	----------	-----------	----------	--	-----------

Directional valve, modular version

Actuation: _____
D = solenoid **C** = hydraulically

Fail Safe feature _____

ISO 4401-03 size _____

Spool position monitoring _____

Fail safe position: _____
F1 = closed (working ports closed). Not available for MCF3M valves.
FP = parallel (P1→A1, B1→T1)
FC = cross (P→B1, A1→T)

Side of the control element: _____
A = side A (not available for F1 and FC fail safe positions)
B = side B (not available for FP fail safe position)

Series:
 (the overall and mounting dimensions remain unchanged from 10 to 19)

AVAILABILITY

voltage	coil version	
	std	ULW
D12, D24	■	■
D48, D110, 220	-	■

Monitored position: (see p. 15 for switching logic)
MA = monitored position 'a'
MB = monitored position 'b'

Coil electrical connection (omit for MCF3M valves):
 plug for connector type EN 175301-803 (ex DIN 43650)

Coil version (see availability table):
 Omit for standard zinc-plated version
ULW = UL Recognized (points 7.2 and 9)

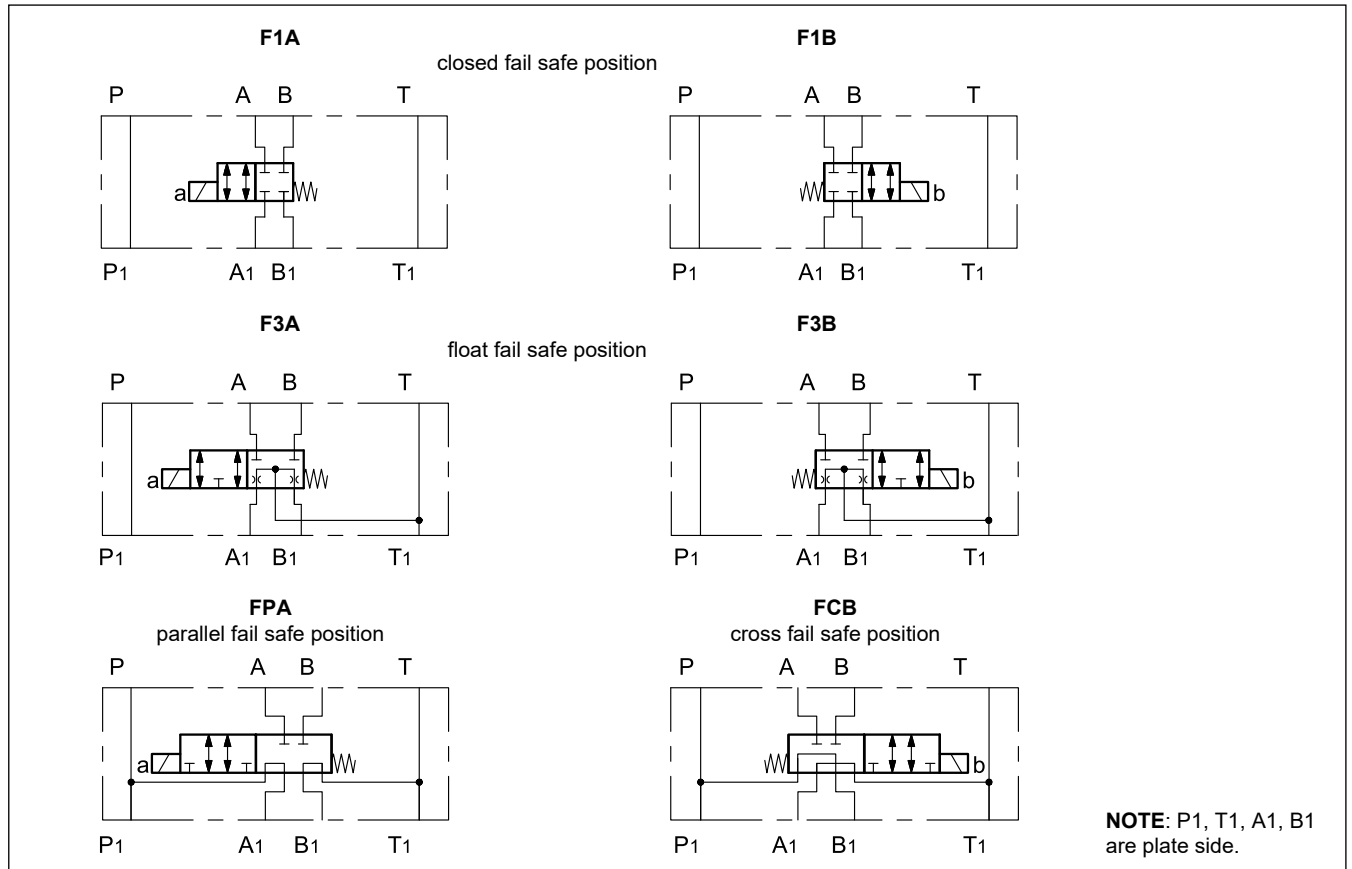
Power supply (omit for MCF3M valves):
D12 = 12 V **D110** = 110 V
D24 = 24 V **D220** = 220 V
D48 = 48 V
D00 = valve without coils, with locking rings and O-rings

Seals:
N = NBR seals for mineral oil (**standard**)
V = FPM seals for special fluids

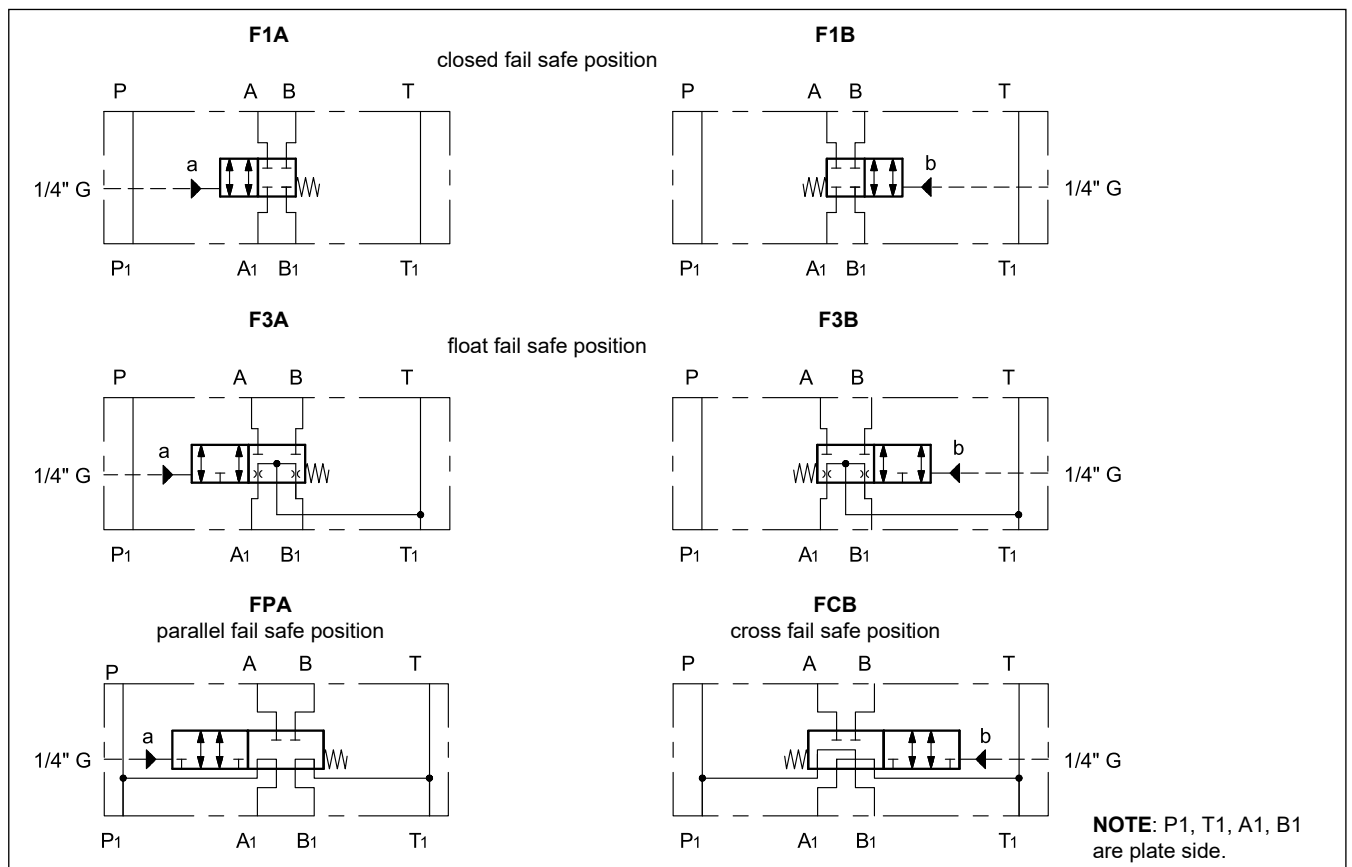
NOTE: The position sensor is not UL Recognized.

2 - HYDRAULIC SYMBOLS

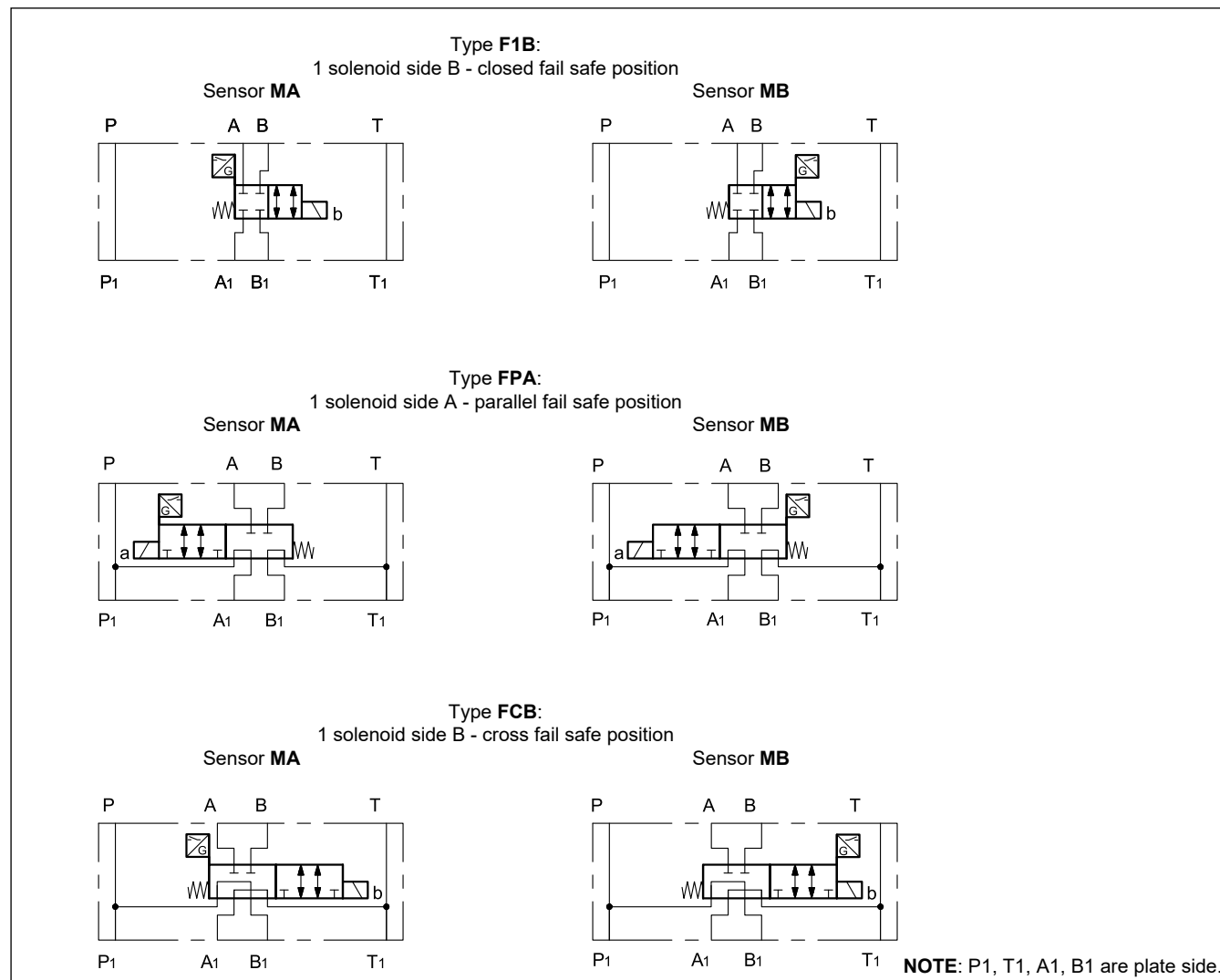
2.1 - MDF3 valves



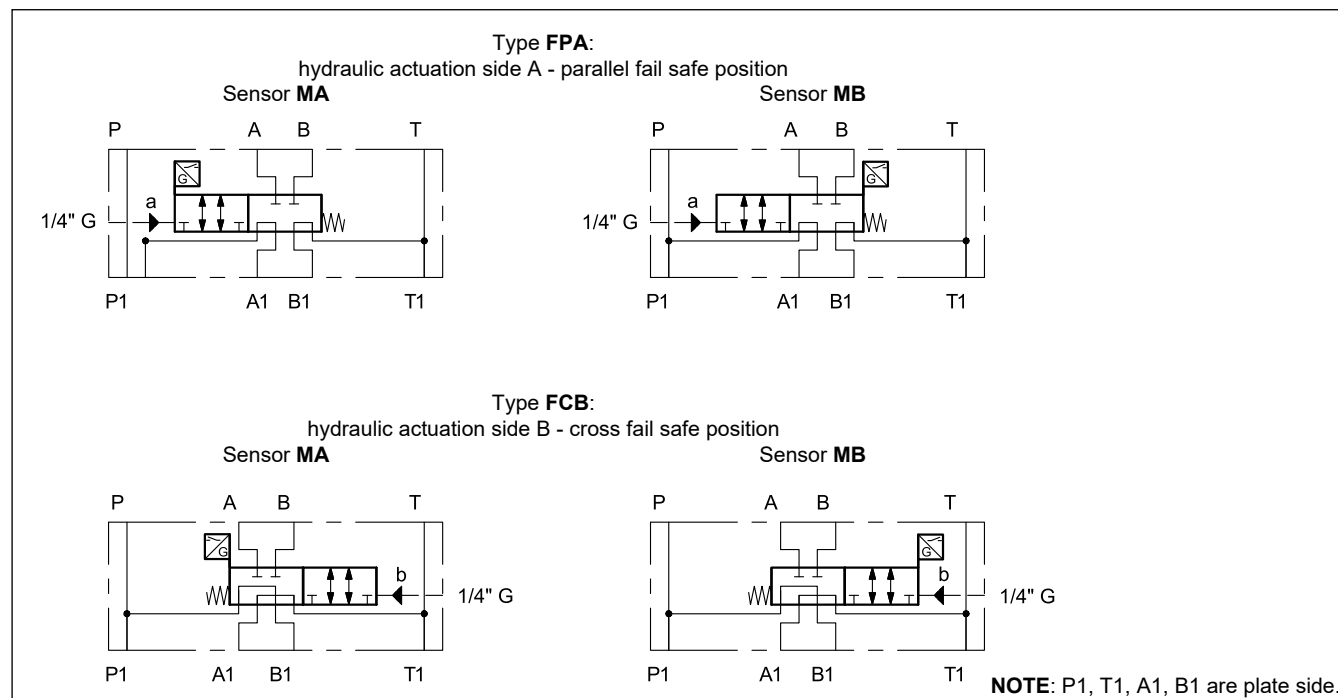
2.2 - MCF3 valves



2.3 - MDF3M valves with monitored spools



2.4 - MCF3M valves



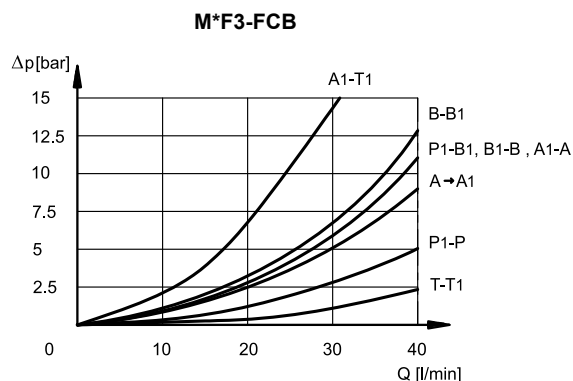
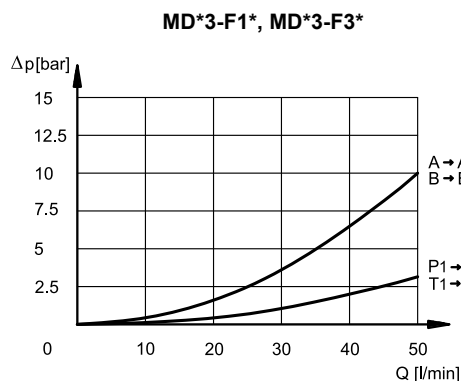
3 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other fluid types such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics. The fluid must be preserved in its physical and chemical characteristics.

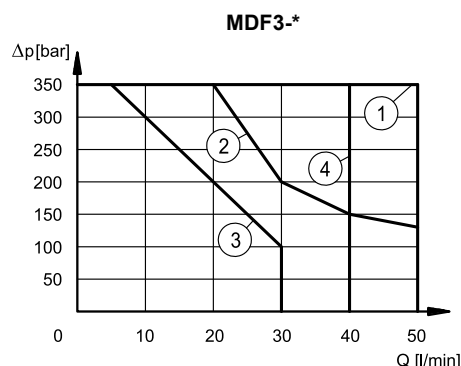
4 - PRESSURE DROPS Δp -Q

(obtained with viscosity 36 cSt at 50 °C)

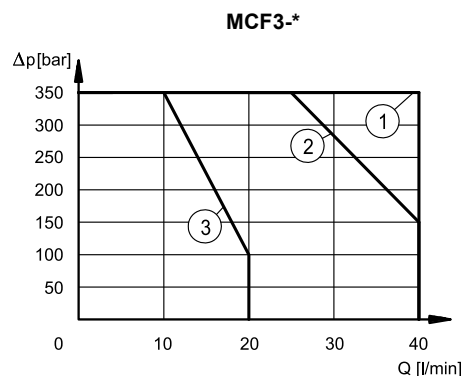


5 - OPERATING LIMITS

The values have been obtained according to ISO 6403 norm with solenoids at rated temperature and supplied with voltage equal to 90% of the nominal voltage. The values have been obtained with mineral oil, viscosity 36 cSt, temperature 50 °C and filtration according to ISO 4406:1999 class 18/16/13.



SPOOL TYPE	De-energizing	Energizing	
		with flow in A and B	without flow in A and B
CURVES ON GRAPH			
F1*, F3*	1	2	1
FCB	4	3	3



SPOOL TYPE	De-actuating	Actuating	
		pilot pressure tank +10 bar	pilot pressure tank +20 bar
CURVES ON GRAPH			
FCB	1	3	2

6 - SWITCHING TIMES

The values indicated are obtained according to ISO 6403 standard, with mineral oil viscosity 36 cSt at 50 °C.

TIMES [ms]	ENERGIZING	DE-ENERGIZING
MDF3 - F1	60 ÷ 90	20 ÷ 50 ms



7 - MDF3 - ELECTRICAL FEATURES

7.1 - Solenoids

These are essentially made up of two parts: tube and coil. The tube is threaded into the valve body and includes the armature that moves immersed in oil, without wear. The inner part, in contact with the oil in the return line, ensures heat dissipation.

The coil is fastened to the tube by a threaded ring, and can be rotated 360°, to suit the available space.

7.2 - UL Recognized coils

ULW type coils are UL Recognized Components (cUR@us marking) intended for installation within end-use equipment that is subject to evaluation in accordance with the applicable UL and CSA standards.

7.3 - Current and power consumption

The table shows current and power consumption values of the DC coils.

Using connectors type 'D' or 'D1'(see cat. 49 000) with embedded bridge rectifier it is possible to feed DC coils with alternating current (50 or 60 Hz), considering a reduction of the operating limits.

VOLTAGE SUPPLY FLUCTUATION	± 10% Vnom
MAX SWITCH ON FREQUENCY	18,000 ins/hr
DUTY CYCLE	100%
ELECTROMAGNETIC COMPATIBILITY (EMC) (NOTE)	In compliance with 2014/30/EU
LOW VOLTAGE	In compliance with 2014/35/EU
CLASS OF PROTECTION Coil insulation (VDE 0580) Impregnation	class H class F

NOTE: To further reduce emissions, when using a DC power supply, type H connectors are recommended. These prevent overvoltage peaks when the coil supply circuit is opened (see catalogue 49 000).

(values ± 10%)

	nominal voltage [V]	resistance at 20°C [Ω]	current consumpt [A]	power consumpt [W]
D12	12	4.5	2.68	32.2
D24 (std)	24	18.6	1.29	31
D24 (ULW)	24	16.6	1.45	34.7
D48	48	77.7	0.62	29.7
D110	110	419.8	0.26	28.8
D220	220	1670	0.13	29

8 - ELECTRICAL CONNECTORS

Solenoid operated valves are delivered without connectors. Connectors can be ordered separately. See catalogue 49 000.

9 - IP DEGREE OF PROTECTION

The IP degree of protection is defined according to IEC 60529 and indicates the level of protection against the ingress of solid objects and liquids.

The actual IP degree of protection of the valve depends on the type of electrical connection, the solenoid tube protection and the design solutions adopted. The stated IP degree of protection is guaranteed only when a connector with an equivalent degree of protection is correctly wired and installed.

coil version	IP rating	
	coil electrical conn.	valve
standard	IP65	IP65
ULW	IP66	IP65

IP Ratings: Selection Guide

The IP rating indicates protection against solid objects (first digit) and liquids (second digit). For solid objects, rating 6 is the highest level and provides complete dust protection. Our solenoid valves fall into this category.

For liquids, three types are distinguished:

- degree 1 to 6: protection against water jets;
- degree 7 and 8: protection against immersion;
- degree 9: protection against high-pressure, high-temperature water jets.

IP ratings are neither equivalent nor cumulative: IP66 covers lower ratings; IP68 covers IP67 only, not IP66, IP65 or lower ratings; IP69 does not cover any other rating.

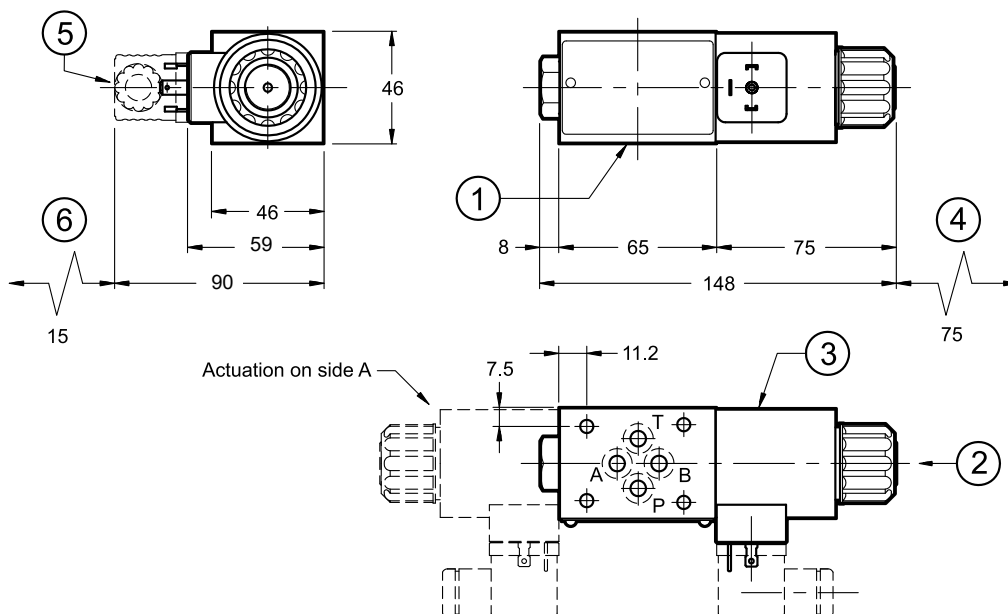
Where a component complies with more than one type of protection, all applicable IP ratings shall be stated.

Example: equipment protected against powerful water jets and continuous immersion is marked IP66/IP68.

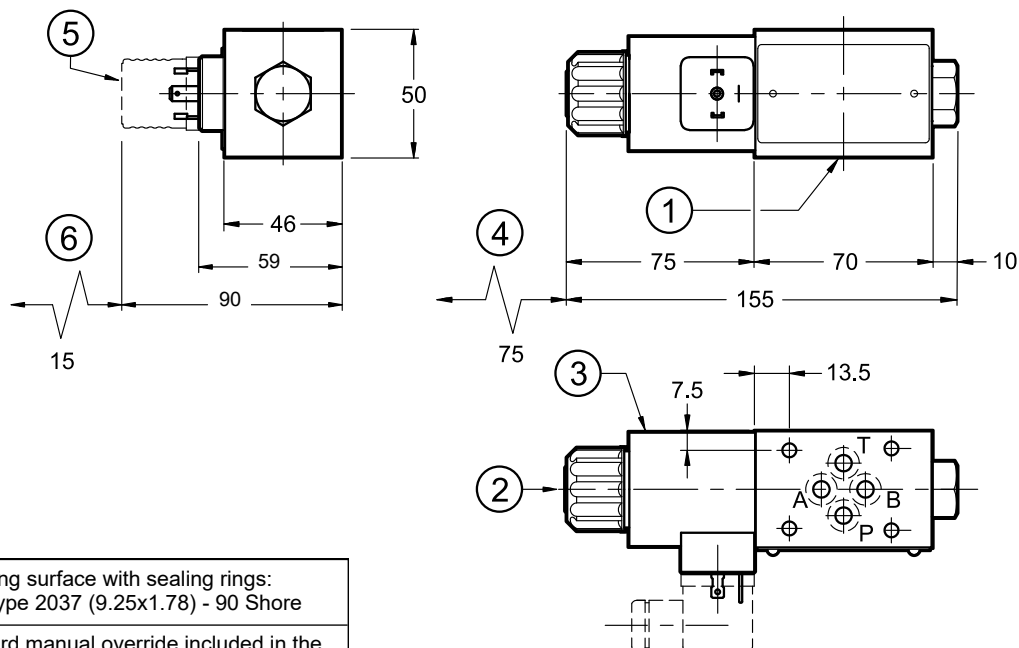
10 - MDF3 - OVERALL AND MOUNTING DIMENSIONS

MDF3-F1*
MDF3-F3*

dimensions in mm



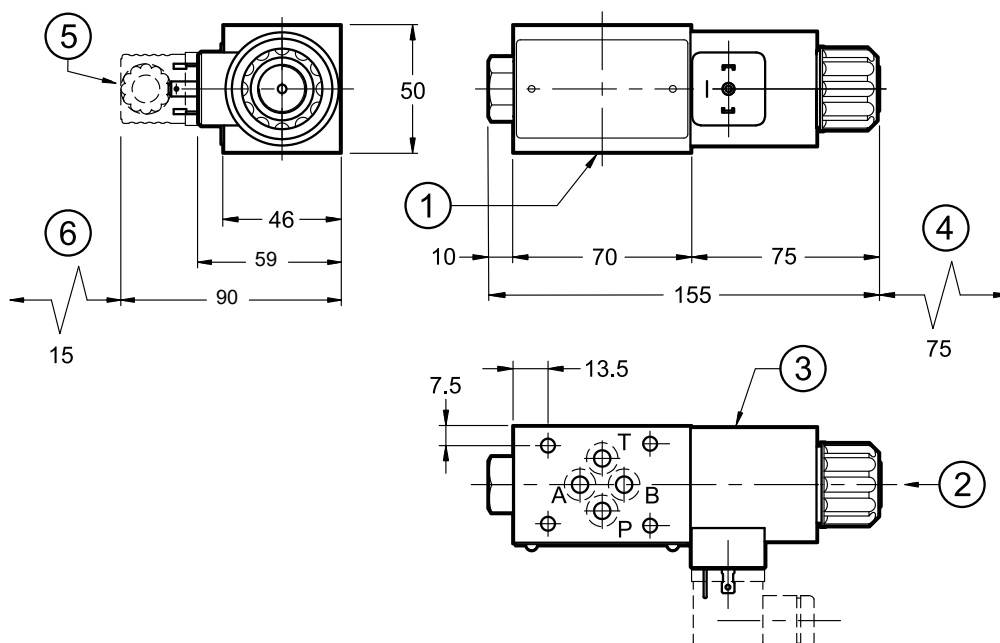
MDF3-FPA



1	Mounting surface with sealing rings: 4 OR type 2037 (9.25x1.78) - 90 Shore
2	Standard manual override included in the solenoid tube
3	Coil 360° revolving
4	Coil removal space
5	EN 175301-803 (ex DIN 43650) electrical connector to be ordered separately (see cat. 49 000)
6	Connector removal space

MDF3-FCB

dimensions in mm

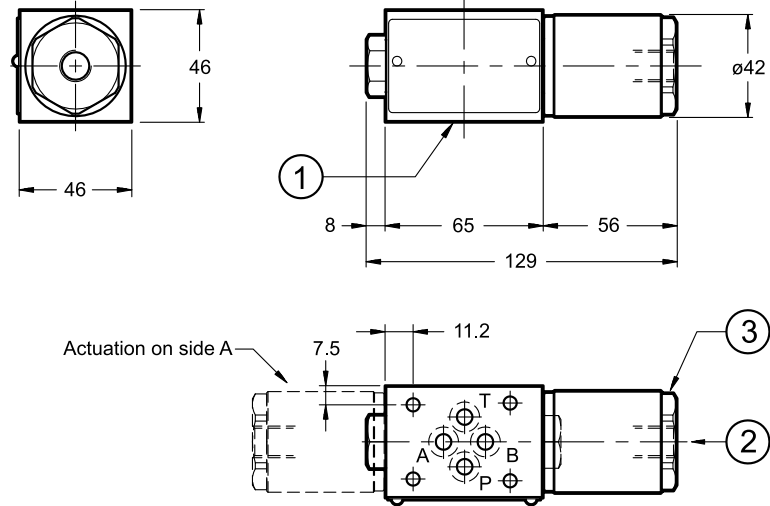


1	Mounting surface with sealing rings: 4 OR type 2037 (9.25x1.78) - 90 Shore
2	Standard manual override included in the solenoid tube
3	Coil 360° revolving
4	Coil removal space
5	EN 175301-803 (ex DIN 43650) electrical connector to be ordered separately (see cat. 49 000)
6	Connector removal space

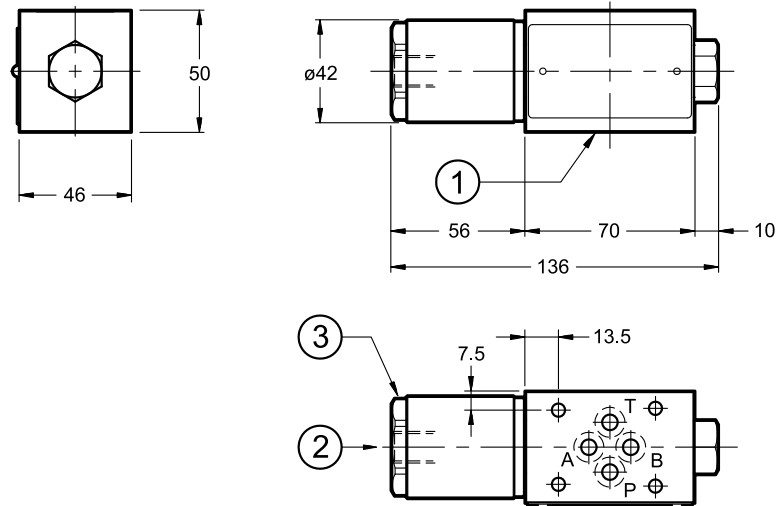
11 - MCF3 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm

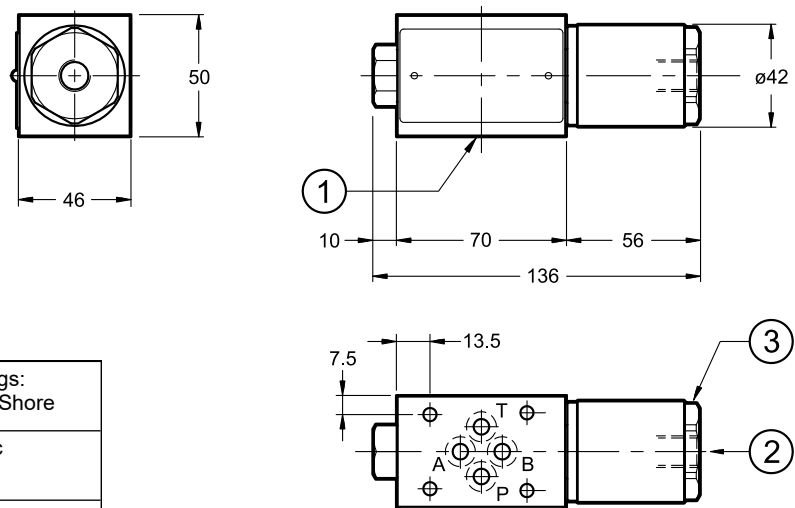
MCF3-F1*
MCF3-F3*



MCF3-FPA



MCF3-FCB

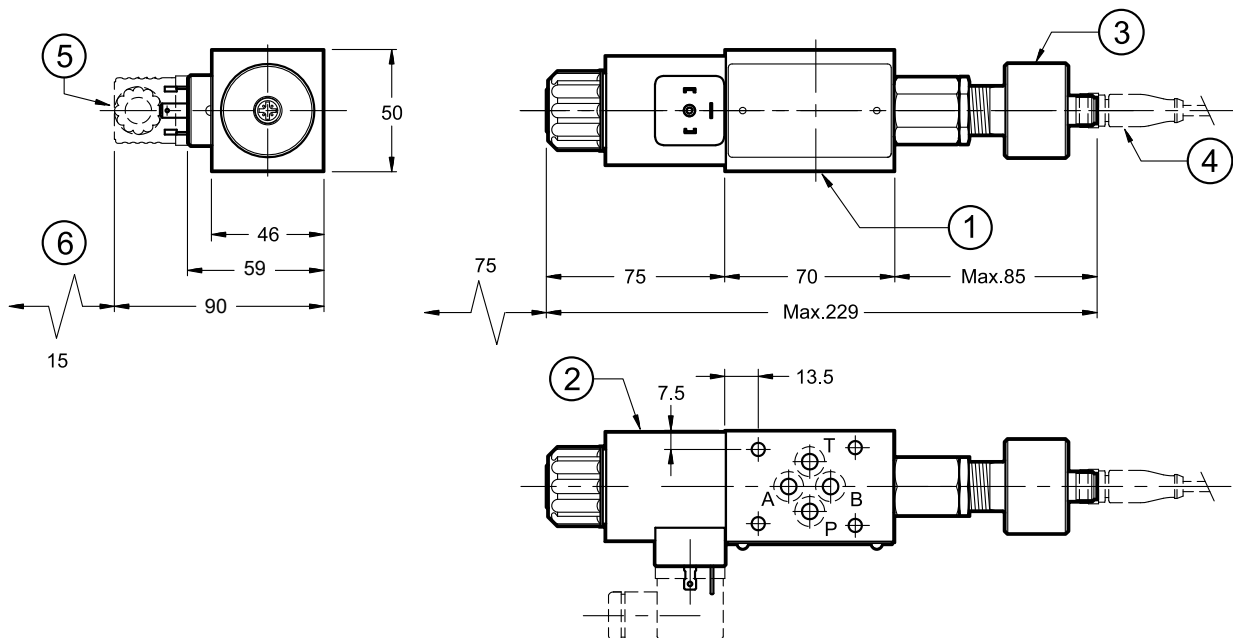


1	Mounting surface with sealing rings: 4 OR type 2037 (9.25x1.78) - 90 Shore
2	1/4" BSP connection for hydraulic actuation
3	Hexagon: spanner 38 Tightening torque 35 ÷ 40 Nm

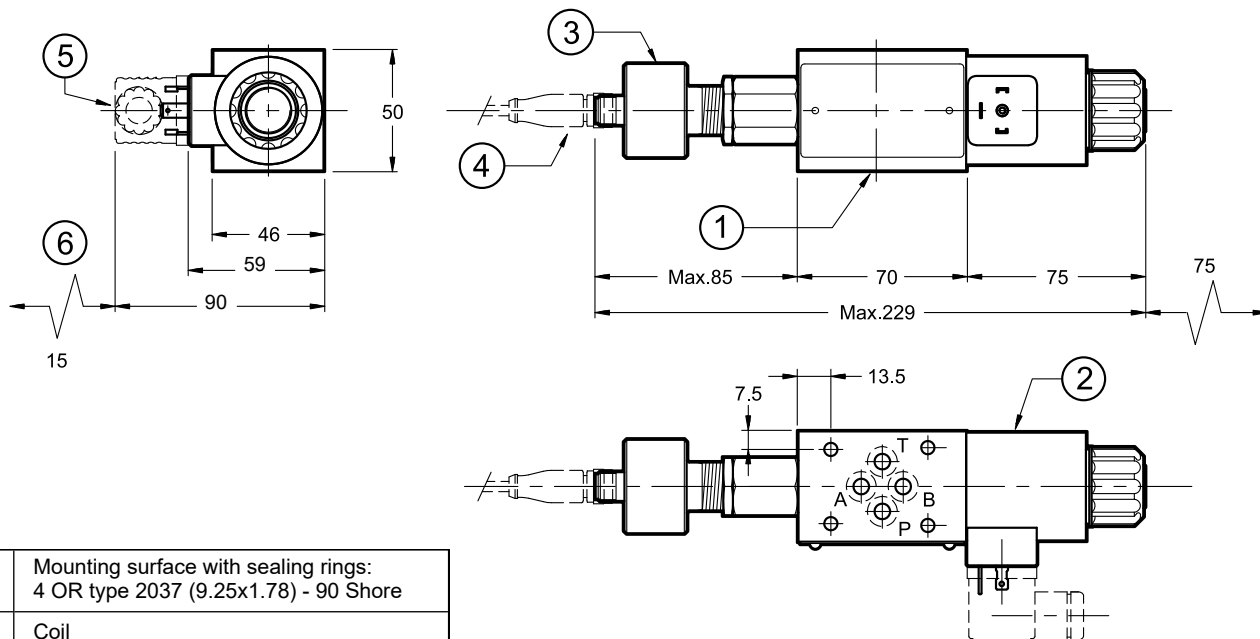
12 - MDF3M - OVERALL AND MOUNTING DIMENSIONS

MDF3M - FPA

dimensions in mm



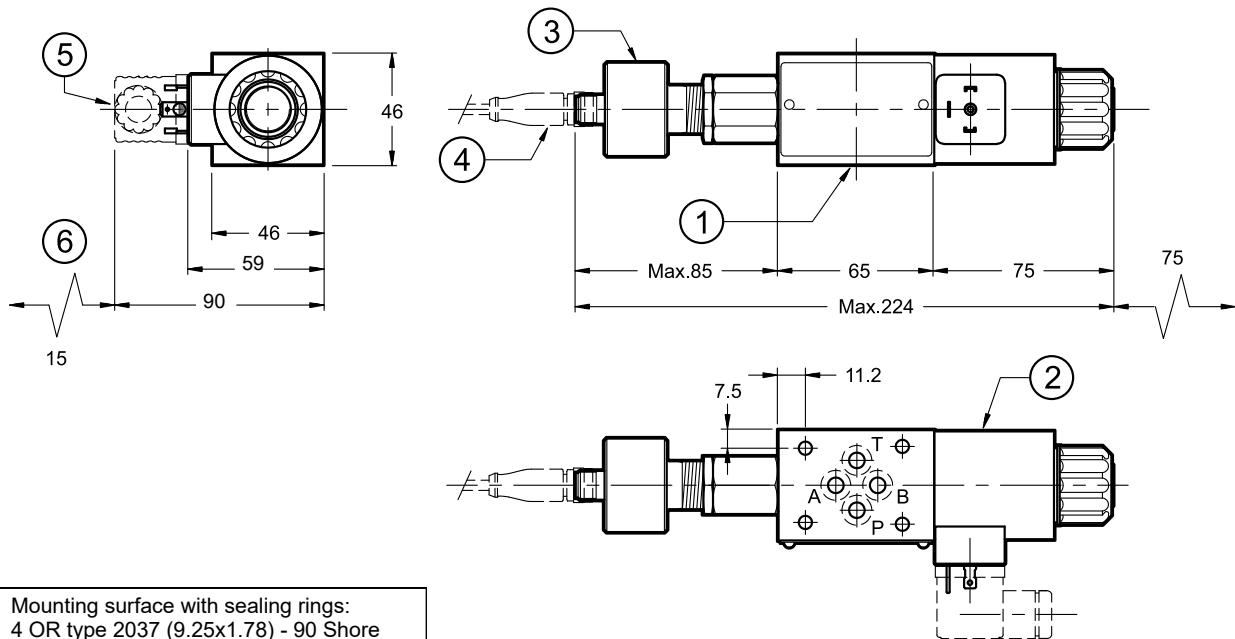
MDF3M - FCB



1	Mounting surface with sealing rings: 4 OR type 2037 (9.25x1.78) - 90 Shore
2	Coil
3	Position sensor: setting sealed at factory, do not tamper.
4	Connector for position sensor. To be ordered separately (see cat. 41 505)
5	EN 175301-803 (ex DIN 43650) electrical connector to be ordered separately (see cat. 49 000)
6	Connector removal space

MDF3M-F1B

dimensions in mm

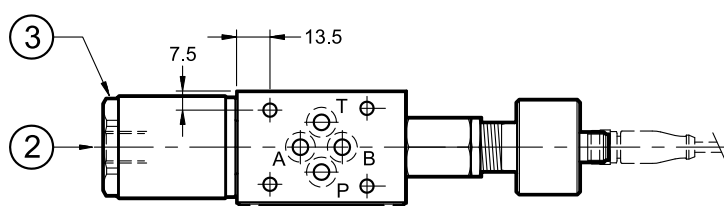
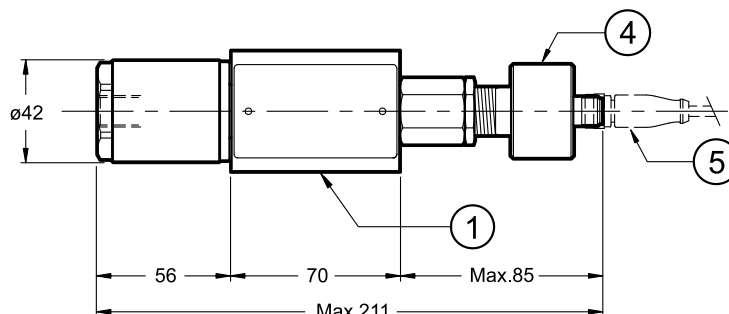
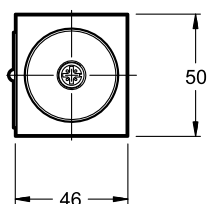


1	Mounting surface with sealing rings: 4 OR type 2037 (9.25x1.78) - 90 Shore
2	Coil
3	Position sensor: setting sealed at factory, do not tamper.
4	Connector for position sensor. To be ordered separately (see cat. 41 505)
5	EN 175301-803 (ex DIN 43650) electrical connector to be ordered separately (see cat. 49 000)
6	Connector removal space

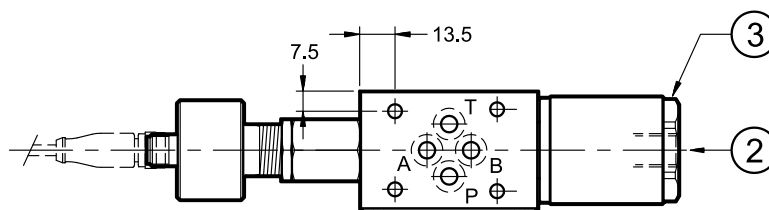
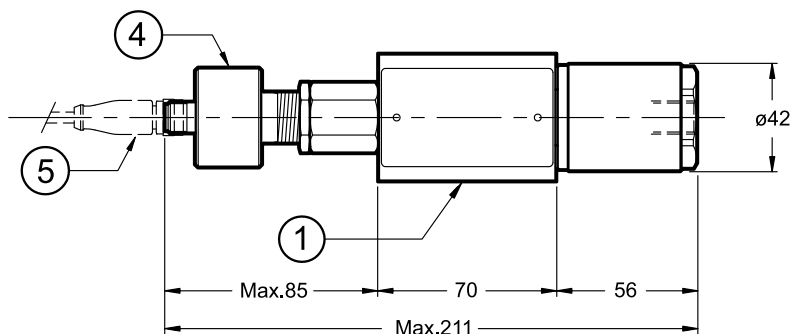
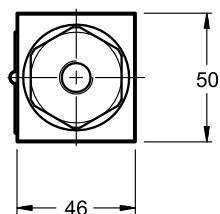
13 - MCF3M - OVERALL AND MOUNTING DIMENSIONS

MCF3M - FPA

dimensions in mm



MCF3M - FCB



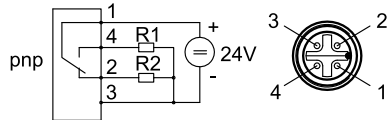
1	Mounting surface with sealing rings: 4 OR type 2037 (9.25x1.78) - 90 Shore
2	1/4" BSP connection for hydraulic actuation
3	Hexagon: spanner 38 Tightening torque 35 ± 40 Nm
4	Position sensor: setting sealed at factory, do not tamper.
5	Connector for position sensor. To be ordered separately (see cat. 41 505)

14 - M*F3M POSITION SENSOR



WARNING ! Valve disassembling is not allowed.
Sensors must not be unscrewed or tampered.

CONNECTION SCHEME



Pin	Values	Function
1	+24 V	Supply
2	NC	Normal Closed
3	0 V	-
4	NO	Normal Open

Operating voltage range	V DC	20 ÷ 32
Absorbed current	A	0.4
Max output load	mA	400
Output		2 PNP
Electric protections	polarity inversion short circuit	
Hysteresis	mm	≤ 0.1
Operating temperature range	°C	-25 / +80
Class of protection from atmospheric agents (IEC 60529)		IP65
EMC Electromagnetic compatibility	In compliance with 2014/30/EU	

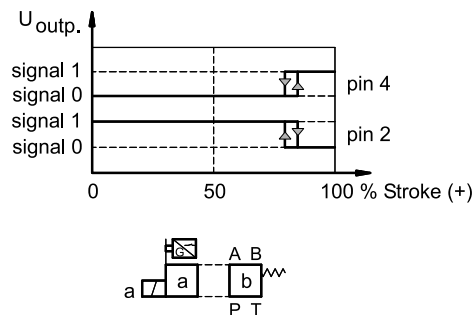
NOTE: The position sensor is not UL Recognized.

15 - SWITCHING LOGICS

15.1 - MA monitoring

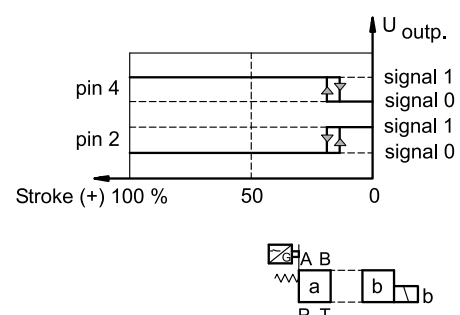
Energized position monitored.

for M*F3M-F*A valves



De-energized position monitored.

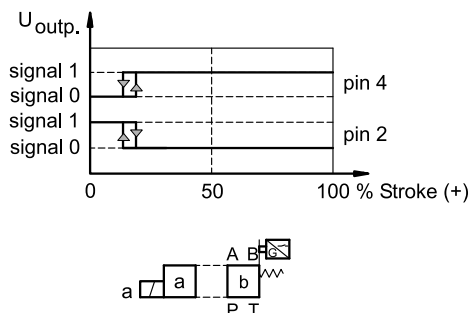
for M*F3M-F*B valves



15.2 - MB monitoring

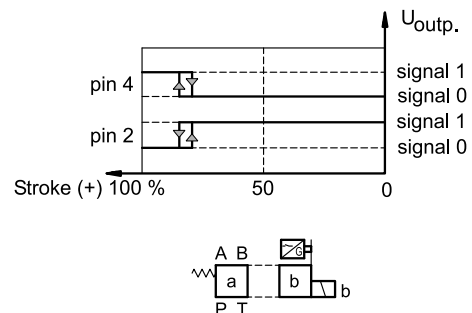
De-energized position monitored.

for M*F3M-A valves



Energized position monitored.

for M*F3M-B valves





M*F3
SERIES 10

DUPLOMATIC
MOTION SOLUTIONS
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