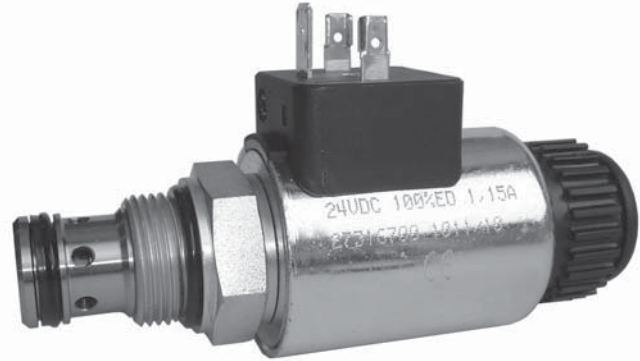
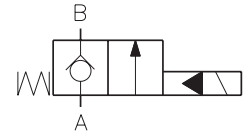


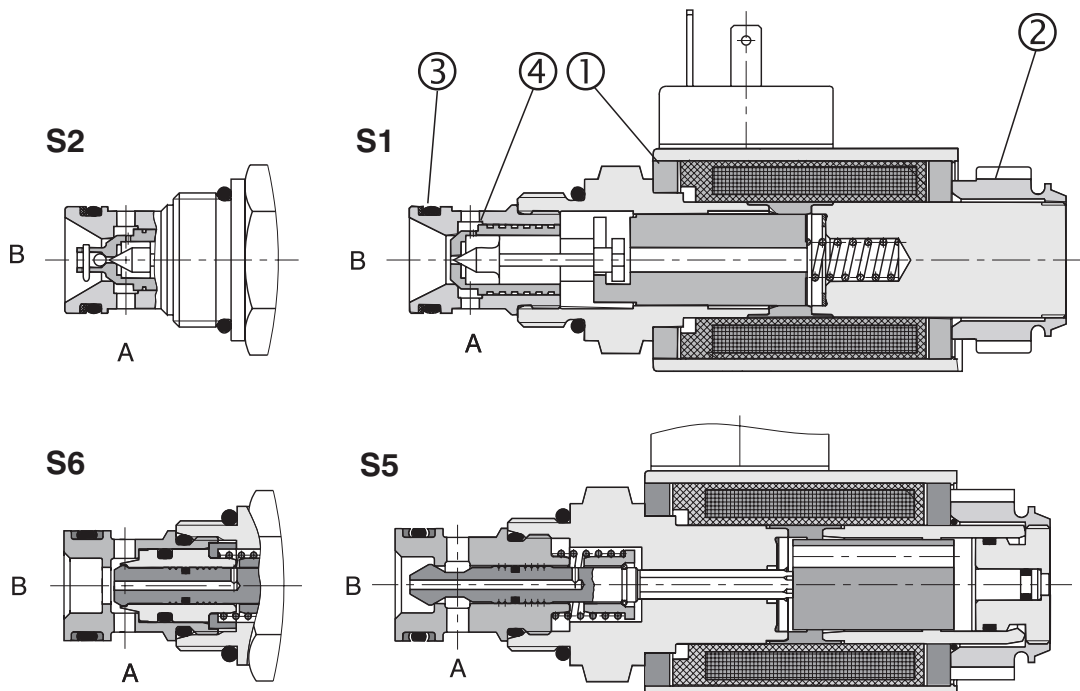
- Screw-in cartridge, sandwich size 04 (02), size 06 (03) and in-line design
- Poppet valve - leak-free shut-off
- High switching reliability after long idling time
- High transmitted power



Functional Description

2-way directional poppet valves with solenoid operation are designed to check and open the flow of the hydraulic fluid. The opening and closing of the valve is ensured by an electro-hydraulically controlled poppet (4) which sits on the seat (3) and guarantees in its closed position practically leak-free sealing. The operating solenoid (1) is a DC solenoid. For AC

supply the solenoid is provided with a rectifier which is integrated in the DIN connector socket as part of the solenoid. The electrical connector can be turned by 90°. By loosening the retaining nut (2), the solenoid (1) can be turned arbitrarily in the range of 360°, or replaced. The valve body is zinc coated, bodies M and R are phosphate coated.



Order Code

ROE3 - **2** /

2 Way Directional Poppet Valve with Solenoid Operation

Nominal size

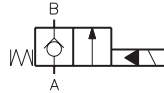
04 (D 02)
06 (D 03)

04
06

Number of operating positions

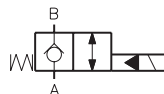
Model and functional symbols

screw-in cartridge



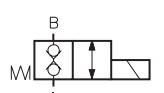
S1

screw-in cartridge



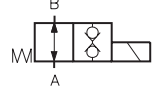
S2

screw-in cartridge



S5*

screw-in cartridge



S6*

* only for nominal size 04 (D 02)

Model

screw-in cartridge

no designation

modular valve, connection of A2 - A1	MA04
modular valve, connection of B2 - B1	MB04
modular valve, connection of A - B	MX04
modular valve, connection of A - T	MD04
modular valve, connection of B - T	ME04
modular valve, connection of B2 - B1, A2 - A1	MC04
modular valve, connection of B - T, A - T	MF04
modular valve, connection of P - T	MG04
modular valve, connection of A2 - A1	MA06
modular valve, connection of B2 - B1	MB06
modular valve, connection of A - B	MX06
modular valve, connection of A - T	MD06
modular valve, connection of B - T	ME06
modular valve, connection of B2 - B1, A2 - A1	MC06
modular valve, connection of B - T, A - T	MF06
modular valve, connection of P - T	MG06
modular valve, connection of P1 -P2	MP06
tube-mounting valve, thread G3/8	R1
tube-mounting valve, thread G1/2	R2
tube-mounting valve, thread SAE8, 3/4-16	R3
tube-mounting valve, thread SAE 10,7/8-14	R4

no designation
V

Seals
NBR
FPM (Viton)

****Electrical connector, EN 1745301-803**

no designation	without connector
K1	connector without rectifier
K2	connector without rectifier with LED and quenching diode
K3	connector with rectifier
K4	connector with rectifier with LED and quenching diode
K5	connector without rectifier

Type of solenoid coil

E1	with terminal for the connector, EN 1745301-803
E2	with terminal for the connector, EN 1745301-803 and quenching diode
E3	with AMP-Junior-Timer-connector
E4	with AMP-Junior-Timer-connector and quenching diode
E5	with integrated rectifier and with terminal for the connector, EN 1745301-803

Rated supply voltage of solenoids

01200	12 V DC / 2.41 A
01400	14 V DC / 1.66 A
02100	21 V DC / 1.14 A
02400	24 V DC / 1.16 A
04200	42 V DC / 0.59 A
04800	48 V DC / 0.56 A
06000	60 V DC / 0.41 A
10200	102 V DC / 0.24 A
20500	205 V DC / 0.12 A
02450	24 V AC / 1.44 A / 50 (60) Hz
11550	115 V AC / 0.26 A / 50 (60) Hz
23050	230 V AC / 0.14 A / 50 (60) Hz

**Note: Electrical connectors have to be ordered separately see page 13 and 15

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE, AND TABLE OF PREFERRED TYPES ON PAGE 15

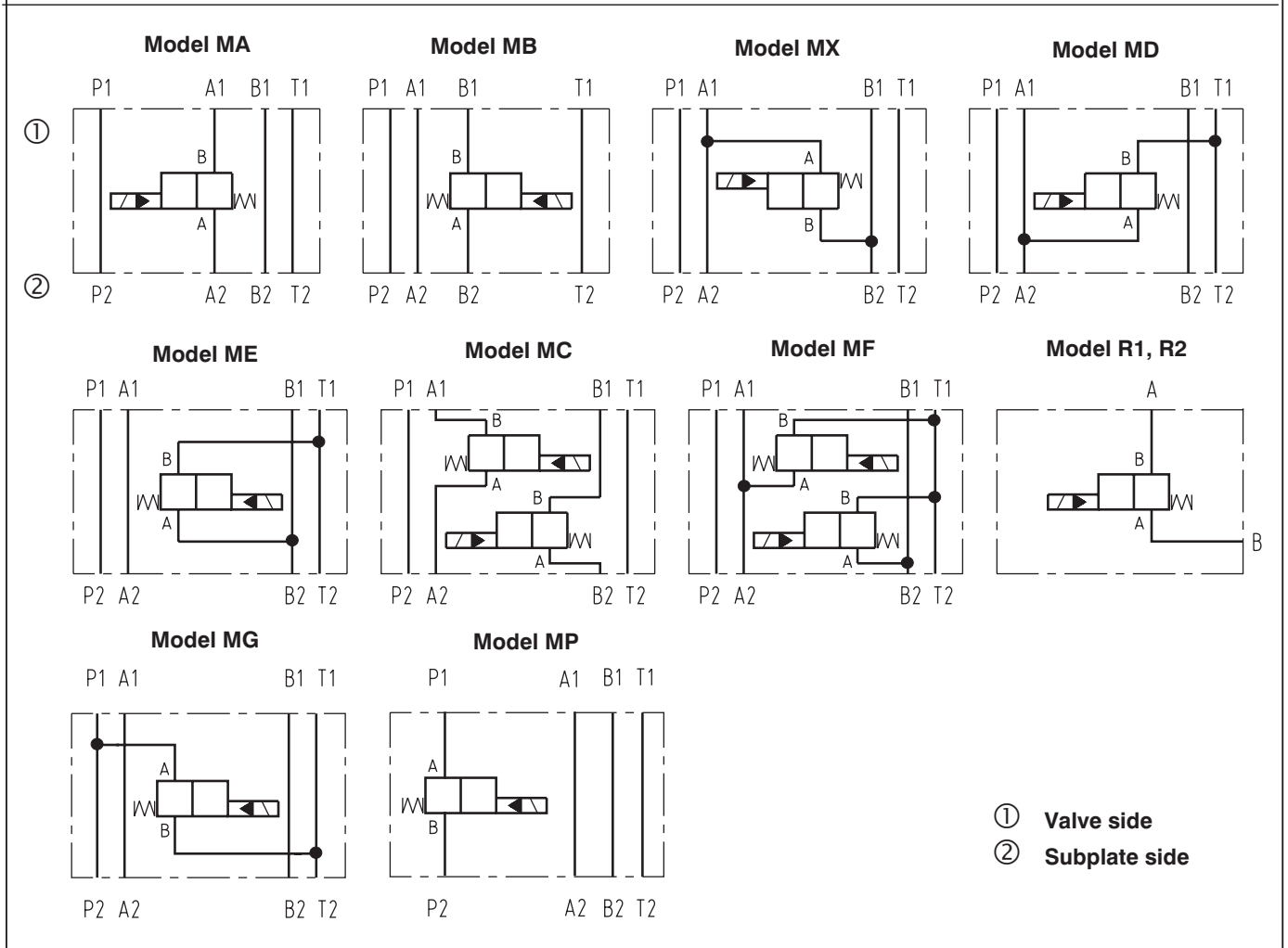
Recommended solenoid coils used with electrical connector with rectifiers - type designation K3, K4

Rated supply source voltage (permissible rated voltage variation ±10 %)	Type designation of the solenoid voltage
24 V AC / 1.44 A / 50 (60) Hz	02100
115 V AC / 0.26 A / 50 (60) Hz	10200
230 V AC / 0.14 A / 50 (60) Hz	20500

Ordering Numbers of Sandwich / Valve Bodies (without screw-in cartridge)

Modular valve - sealing NBR	Order number	Modular valve - sealing Viton	Order number
MA04-ROE3	15652600	MA04-ROE3/V	28592100
MB04-ROE3	15652800	MB04-ROE3/V	28592500
MX04-ROE3	15652900	MX04-ROE3/V	28592600
MD04-ROE3	15653000	MD04-ROE3/V	28592700
ME04-ROE3	15653100	ME04-ROE3/V	28593000
MC04-ROE3	15653200	MC04-ROE3/V	28593100
MF04-ROE3	15653300	MF04-ROE3/V	28593200
MG04-ROE3	15653800	MG04-ROE3/V	20717800
MA06-ROE3	15649200	MA06-ROE3/V	28593400
MB06-ROE3	15649300	MB06-ROE3/V	28593700
MX06-ROE3	15649400	MX06-ROE3/V	28594000
MD06-ROE3	16687400	MD06-ROE3/V	28594300
ME06-ROE3	15649600	ME06-ROE3/V	28594400
MC06-ROE3	15649700	MC06-ROE3/V	28594500
MF06-ROE3	15649800	MF06-ROE3/V	20690300
MG06-ROE3	15649900	MG06-ROE3/V	20690500
MP06-ROE3	16687500	MP06-ROE3/V	20690800
Tube-mounting valve	Order number	Tube-mounting valve	Order number
R1-ROE3	15653400	R3-ROE3	15653600
R2-ROE3	15653500	R4-ROE3	15653700

Functional Symbols



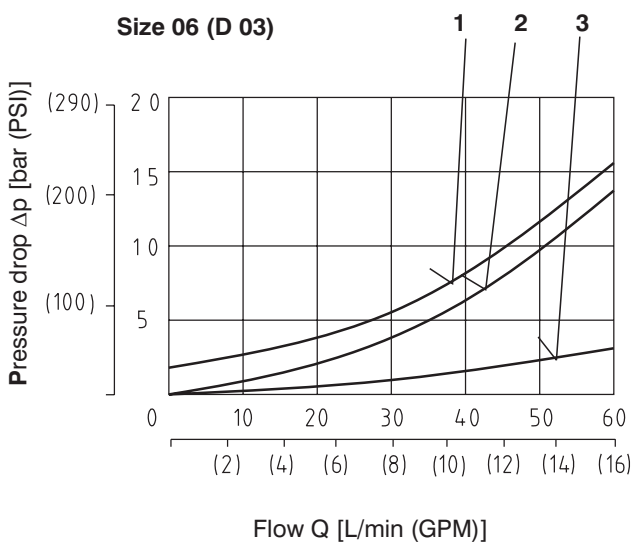
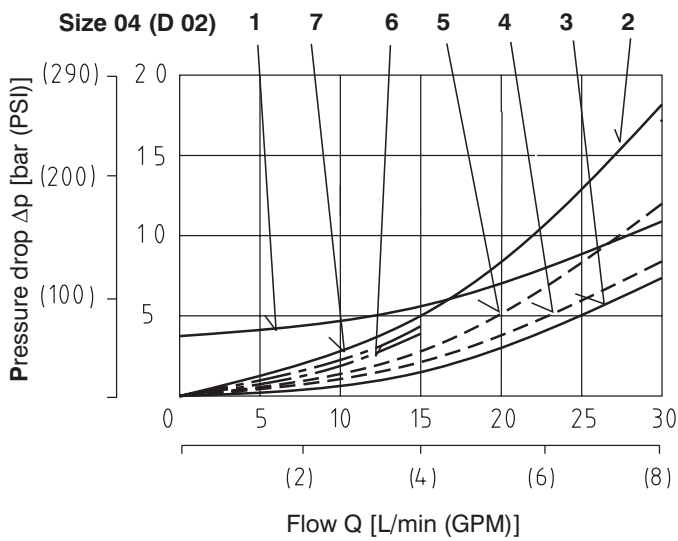
Technical Data

Valve size	mm (US)	04 (D 02)	06 (D 03)
Maximal flow	L/min (GPM)	25 (6.6)	63 (16.6)
Maximal operating pressure	bar (PSI)	250 (3600)	250 (3600)
Pressure drop	bar (PSI)	see Δp -Q characteristics	
Hydraulic fluid		Hydraulic oils of power classes (HL, HLP) to DIN 51524	
Fluid temperature range	°C (°F)	-30 ... +80 (-22 ... +176) for NBR seals -20 ... +80 (-4 ... +176) for FPM seals	
Ambient temperature, max.	°C (°F)	50 (+122)	
Viscosity range	mm ² /s (SUS)	20 ... 400 (98 ... 1840)	
Maximum degree of fluid contamination		Class 21/18/15 according to ISO 4406 (2006).	
Permissible rated voltage variation	%	DC: ± 10 AC: ± 10	
Maximal switching frequency	1/h	15 000	10 000
Switching time, ON; at rated voltage and $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)	ms	DC 25 ... 35 AC 25 ... 35	DC 30 ... 50 AC 30 ... 110
Switching time, OFF; at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)	ms	DC 15 ... 25 AC 50 ... 100	DC 80 ... 130 AC 100 ... 150
Duty cycle	%	100	
Service life		10^7	
Enclosure type to EN 60 529		IP 65	
Weight - screw-in cartridge - model MA, MB, MX, MD, ME, MG, MP - model MC, MF - model R1, R2, R3, R4	kg (lbs)	0.5 (1.1) 1.15 (2.5) 1.65 (3.6) 1.60 (3.5)	0.5 (1.1) 1.45 (3.2) 1.95 (4.3) 1.60 (3.5)
Mounting position		optional	

Δp -Q Characteristics

Measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

For the screw-in cartridge without valve body



- 1 - S1, S2 (B - A) Solenoid OFF
 - 2 - S1, S2 (A - B) Solenoid ON
 - 3 - S2 (B - A) Solenoid ON
 - 4 - S5 (A - B)
 - 5 - S5 (B - A)
 - 6 - S6 (A - B)
 - 7 - S6 (B - A)
- flow up to 15 L/min (4 GPM)

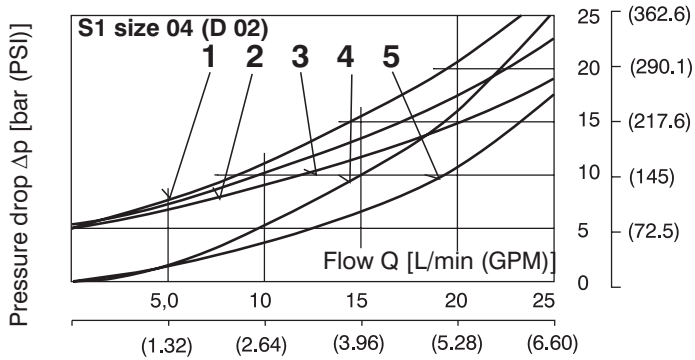
- 1 - S1, S2 (B - A) Solenoid OFF
- 2 - S1, S2 (A - B) Solenoid ON
- 3 - S2 (B - A) Solenoid ON

In connection with a valve body, the additional pressure loss of the valve body is to be considered.

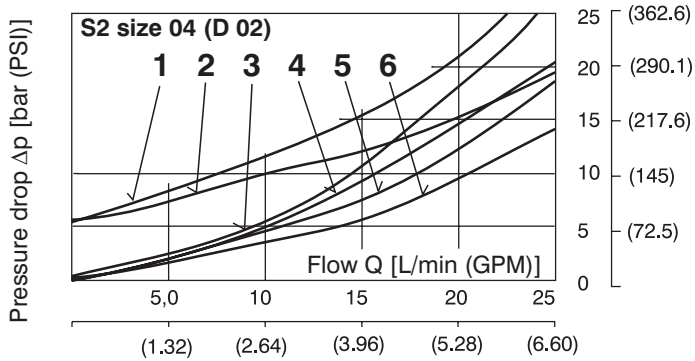
Δp-Q Characteristics

Measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

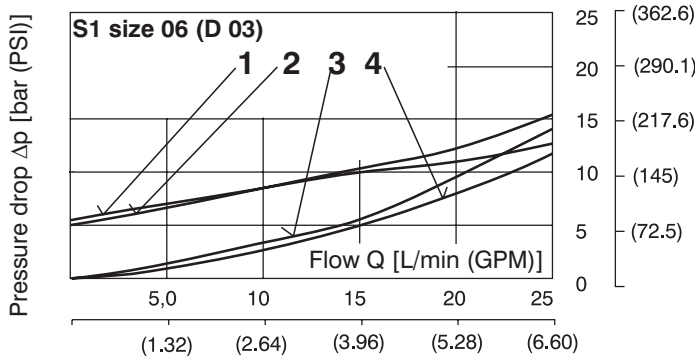
Pressure drops for valves S1, S2 in sandwich blocks Blocks R1, R2, R3, R4 for inline-mounting



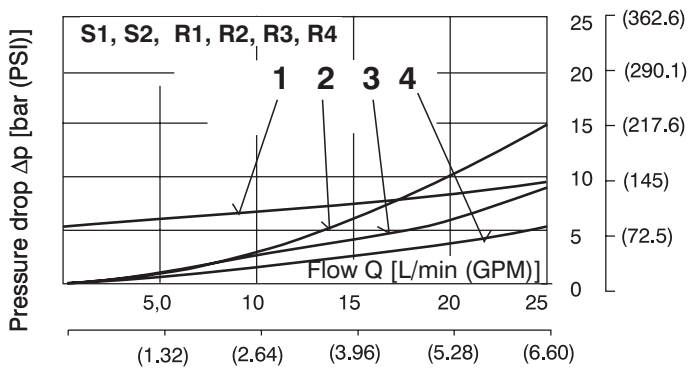
- 1 - MD 04 (T-A)
- 2 - MX 04 (B-A)
- 3 - MA 04 (A1-A2)
- 4 - MX 04 (A-B), MD 04 (A-T), MG 04 (P-T)
- 5 - MA 04 (A2-A1)



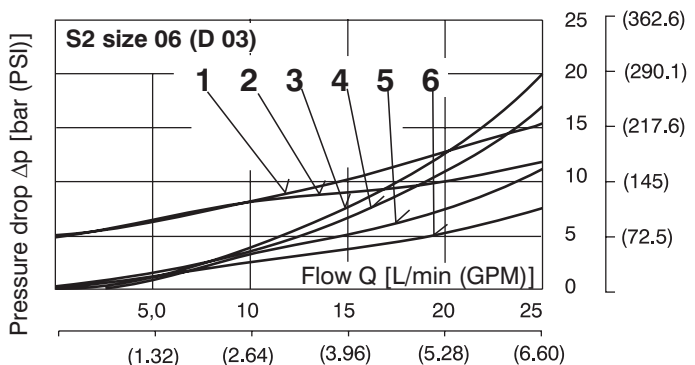
- 1 - MD 04 (T-A) Solenoid OFF
MX 04 (B-A) Solenoid OFF
- 2 - MA 04 (A1-A2) Solenoid OFF
- 3 - MD 04 (A-T)
- 4 - MA 04 (A2-A1)
MD 04 (T-A) Solenoid ON
- 5 - MX 04 (B-A) Solenoid ON
- 6 - MA 04 (A1-A2) Solenoid ON



- 1 - MA 06 (A1-A2), MX 06 (B-A)
- 2 - MD 06 (T-A)
- 3 - MD 06 (A-T), MG 06 (P-T)
- 4 - MA 06 (A2-A1), MX 06 (A-B)



- 1 - S2 R1 (R3), (A-B) Solenoid OFF
S2 R2 (R4), (A-B) Solenoid OFF
S1 R1 (R3), (A-B), S1 R4 (A-B)
- 2 - S2 R1 (R3), (B-A), S2 R4 (B-A)
- 3 - S1 R1 (R3), (B-A), S1 R4 (B-A)
- 4 - S2 R1 (R3), (A-B) Solenoid ON
S2 R2 (R4), (A-B) Solenoid ON

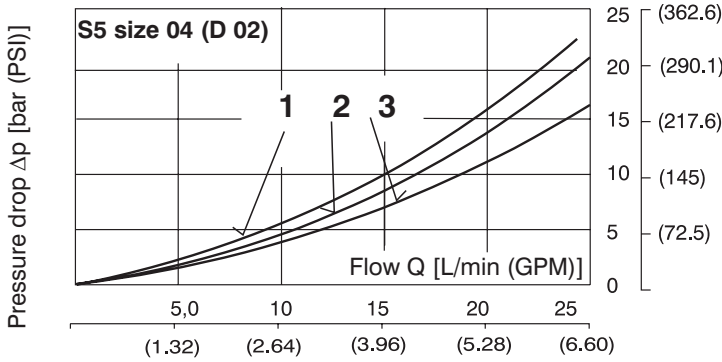


- 1 - MD 06 (T-A) Solenoid OFF
- 2 - MX 06 (B-A) Solenoid OFF
MA 06 (A1-A2) Solenoid OFF
- 3 - MD 06 (A-T)
- 4 - MA 06 (A2-A1), MX 06 (A-B)
- 5 - MD 06 (A-T)
- 6 - MA 06 (A1-A2) Solenoid ON
MX 06 (B-A) Solenoid ON

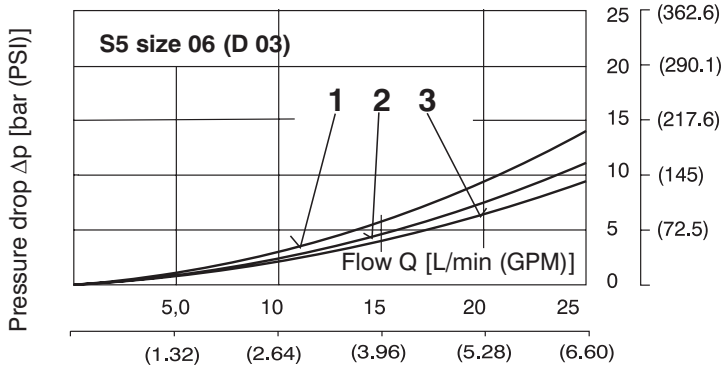
Δp-Q Characteristics

Measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

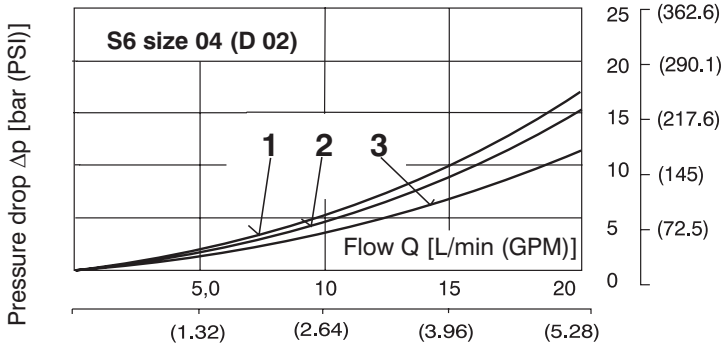
Pressure drops for valves S5, S6 in modular blocks Blocks R1, R2, R3, R4 for thread connection



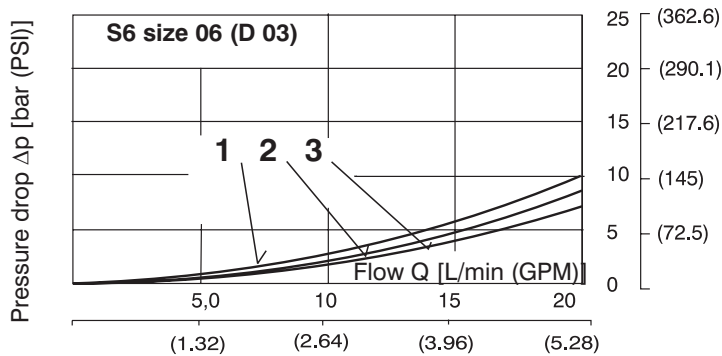
- 1** - MD 04 (A-T, T-A), ME 04 (B-T, T-B)
MF 04 (A-T, T-A)
- 2** - MX 04 (A-B, B-A)
- 3** - MA 04 (A1-A2, A2-A1), MB 04 (B1-B2, B2-B1)



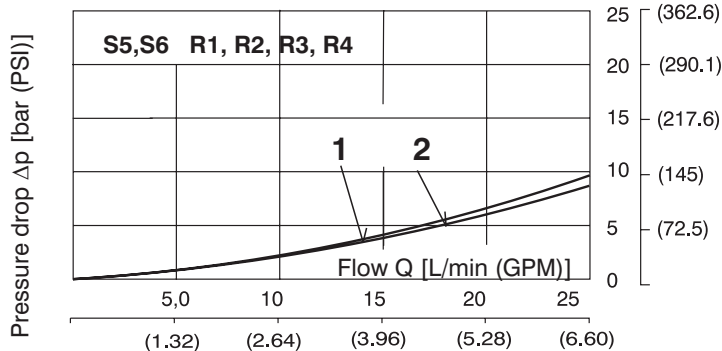
- 1** - MD 06 (A-T, T-A), ME 06 (B-T, T-B)
MF 06 v(A-T, B-T / T-A, T-B)
- 2** - MA 06 (A1-A2), MB 06 v(B1-B2),
MC 06 (A1-A2 / B1-B2), MX (B-A)
- 3** - MA 06 (A2-A1), MB 06 (B1-B2)
MC 06 (A2-A1/B2-B1), MX 06 (A-B)



- 1** - MD 04 (A-T, T-A), ME 04 (T-B, B-T)
MF 04 (A-T, B-T / T-A, T-B)
- 2** - MX 04 (A-B, B-A)
- 3** - MA 04 (A1-A2, A2-A1), MB (B1-B2, B2-B1)
MC 04 (A1-A2, A2-A1 / B1-B2, B2-B1)



- 1**- MD (T-A), ME (T-B), MF (T-A, T-B)
- 2** - MD (A-T), ME (B-T), MF (A-T, B-T)
- 3** - MA (A1-A2, A2-A1), MB (B1 -B2, B2-B1)
MC (A1-A2, A2-A1/ B1 -B2, B2-B1)

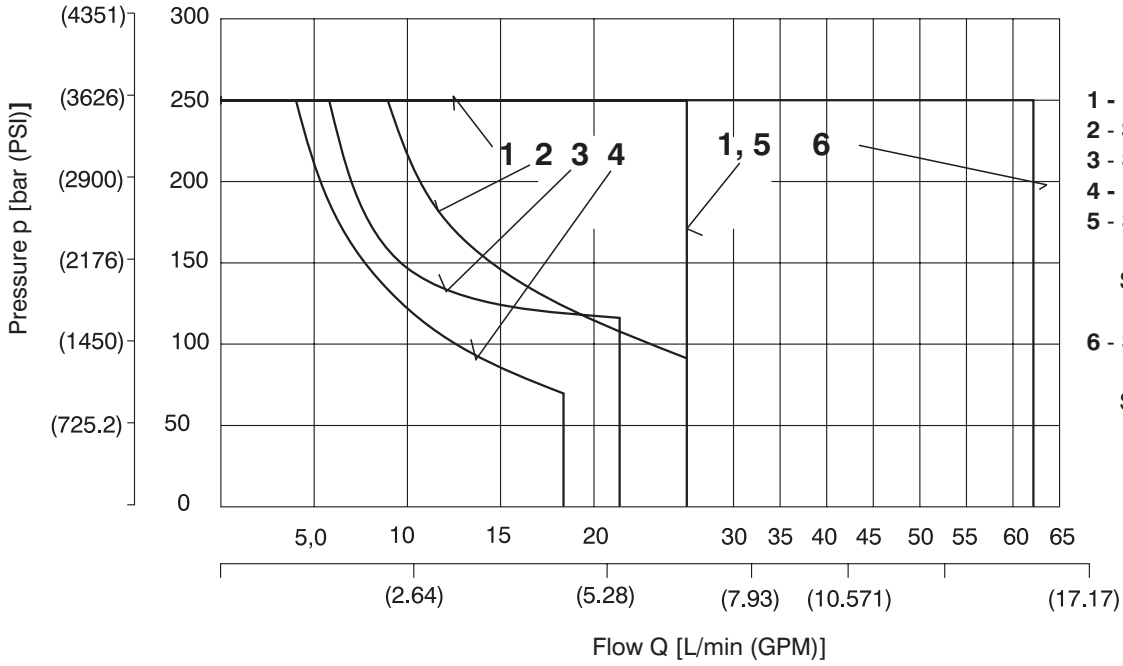


- S5** **1** - R1 (R3) A-B, B-A
- 2** - R2 (R4) A-B, B-A
- S6** **1** - R1(R3) A-B, B-A
- 2** - R2(R4) A-B, B-A

p-Q Characteristics

Measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Operating limits for maximum hydraulic power for valves S1, S2, S5, S6

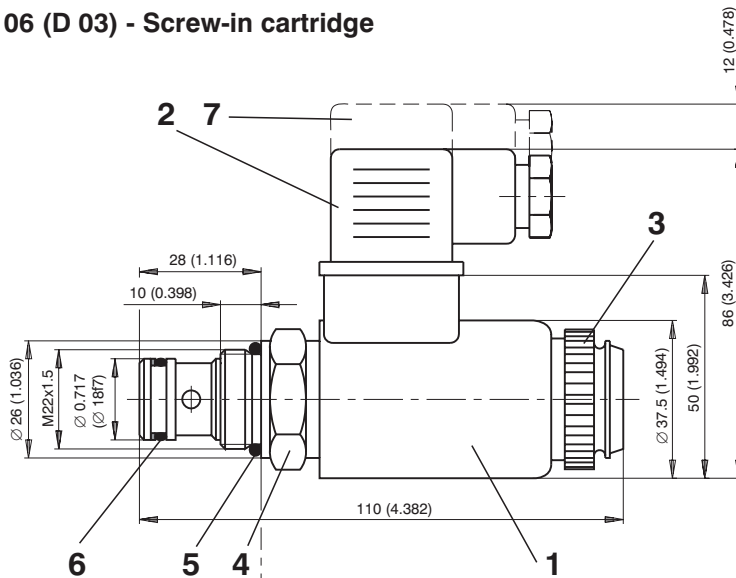


- 1 - S5 (A-B)
- 2 - S5 (B-A)
- 3 - S6 (A-B)
- 4 - S6 (B-A)
- 5 - S1 Size 04 (D 02) (A-B)
- 6 - S1 Size 06 (D 03) (A-B)

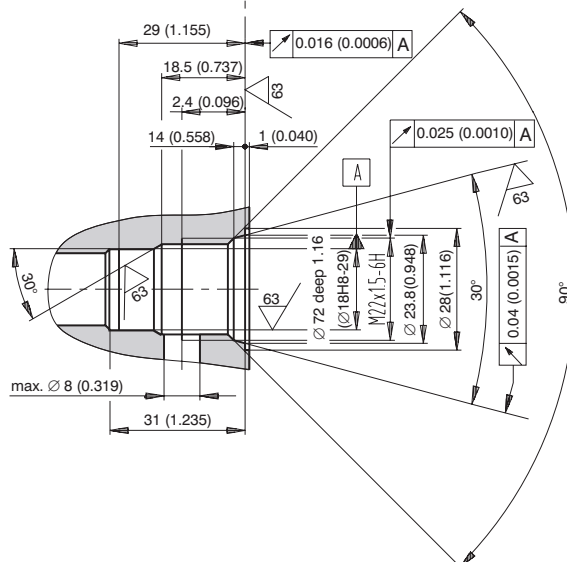
Valve Dimensions

Dimensions in millimeters (inches)

Size 04 (D 02), 06 (D 03) - Screw-in cartridge



Cavity



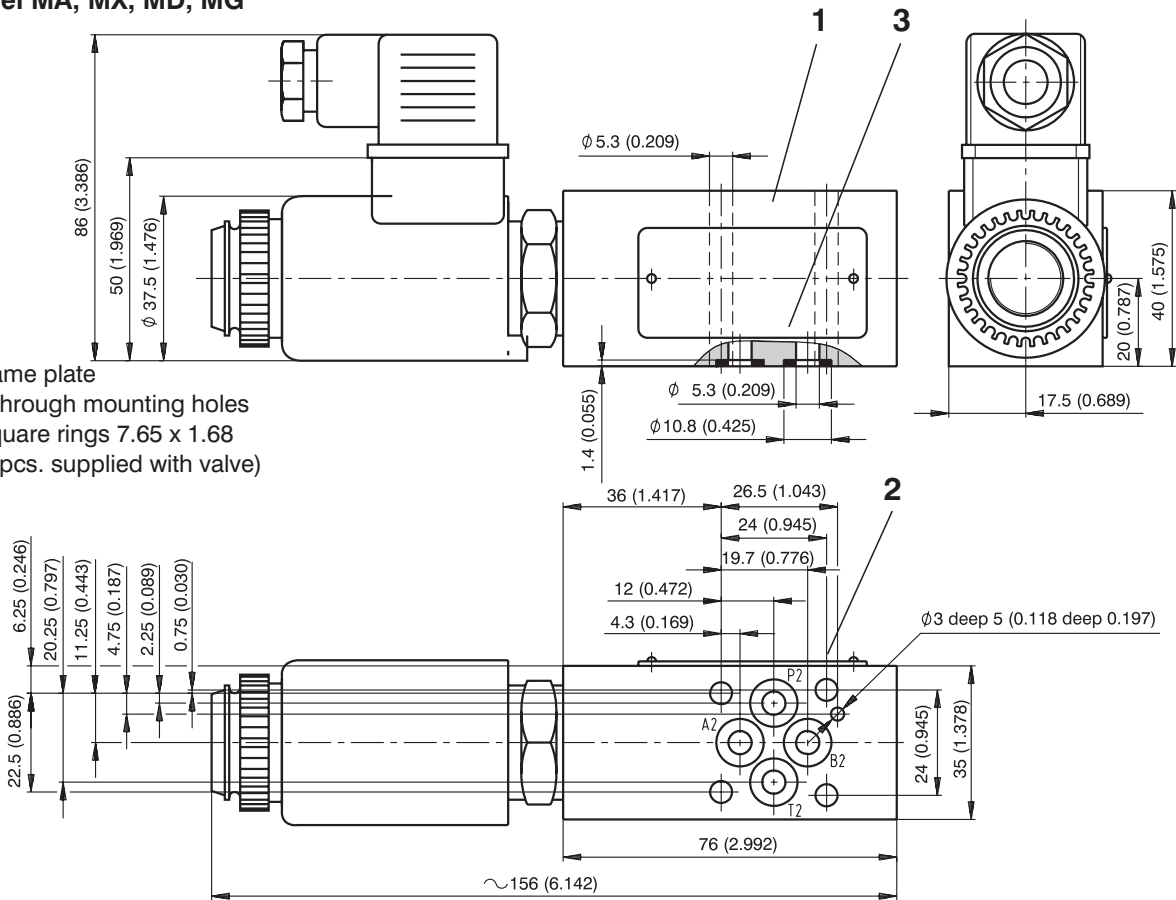
- 1 Solenoid turnable in the range of 360°
- 2 Electrical connector, EN 175301-803
- 3 Retaining nut of the solenoid [Nut torque 3 Nm (2.21 ft-lbs)]
- 4 Outside hexagon $s = 27 \text{ mm}$ (1.06 in.) Tightening torque 25 Nm (18.5 ft-lbs)
- 5 O-ring 19.4 x 2.1 NBR 80 (1 pc.) supplied with valve
- 6 Combined sealing:
O-ring 14 x 1.78 (1 pc.)
Back-up ring 14.73 x 17.43 x 1.14 (1 pc.) supplied with valve
- 7 Space required to remove connector

Valve Dimensions

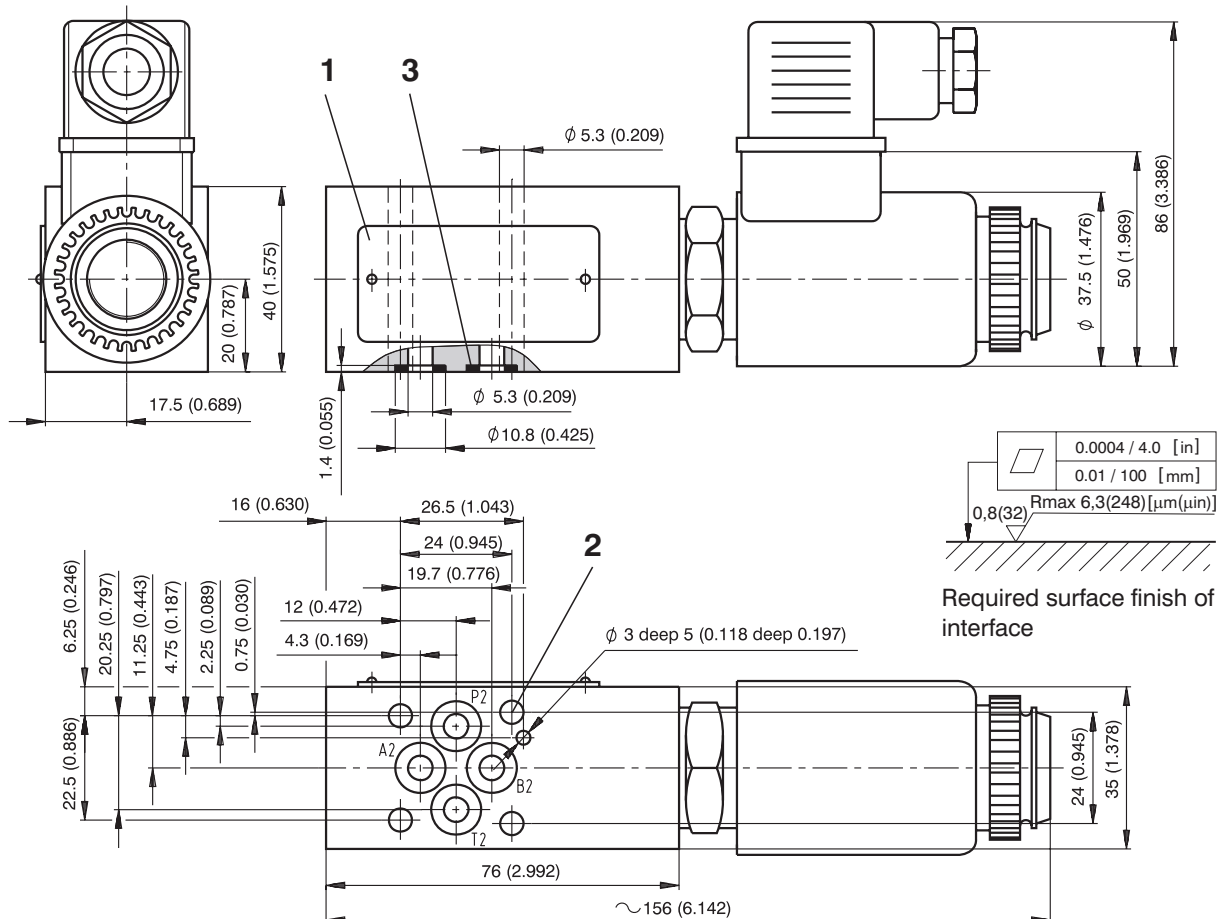
Dimensions in millimeters (inches)

Size 04 (D 02) - Connecting dimensions according to ISO 4401, CETOP - RP 121H

Model MA, MX, MD, MG



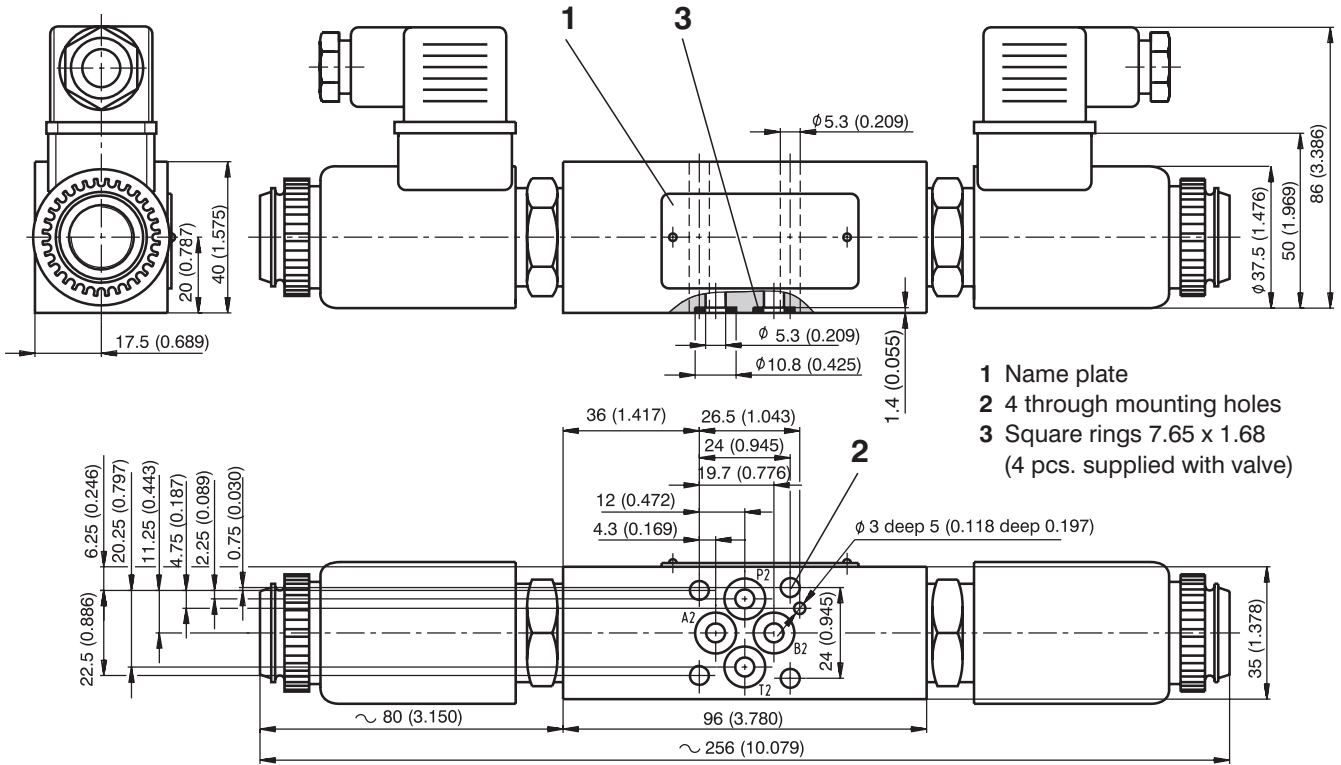
Model MB, ME



Valve Dimensions

Dimensions in millimeters (inches)

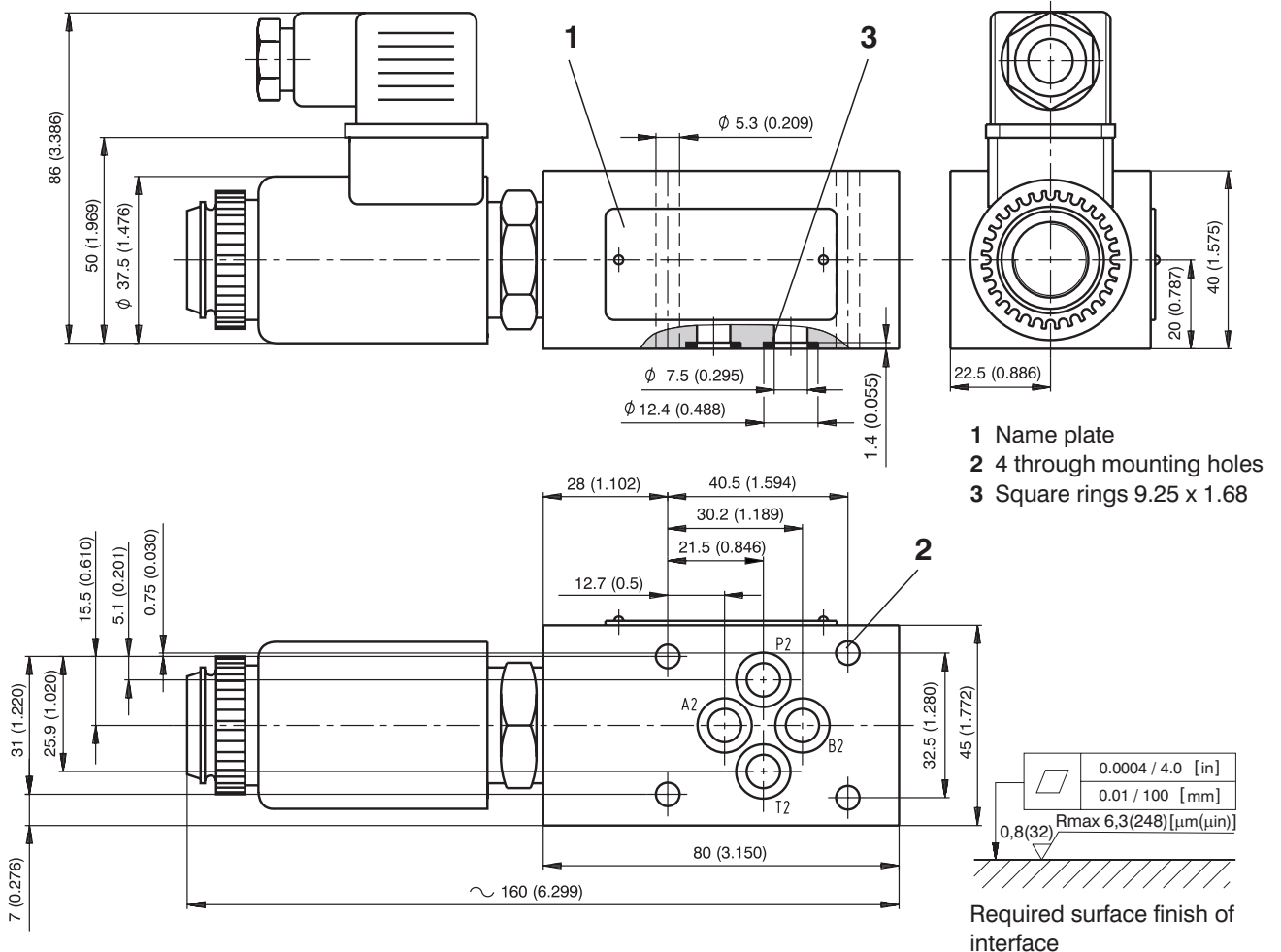
Model MC, MF



Valve Dimensions

Dimensions in millimeters (inches)

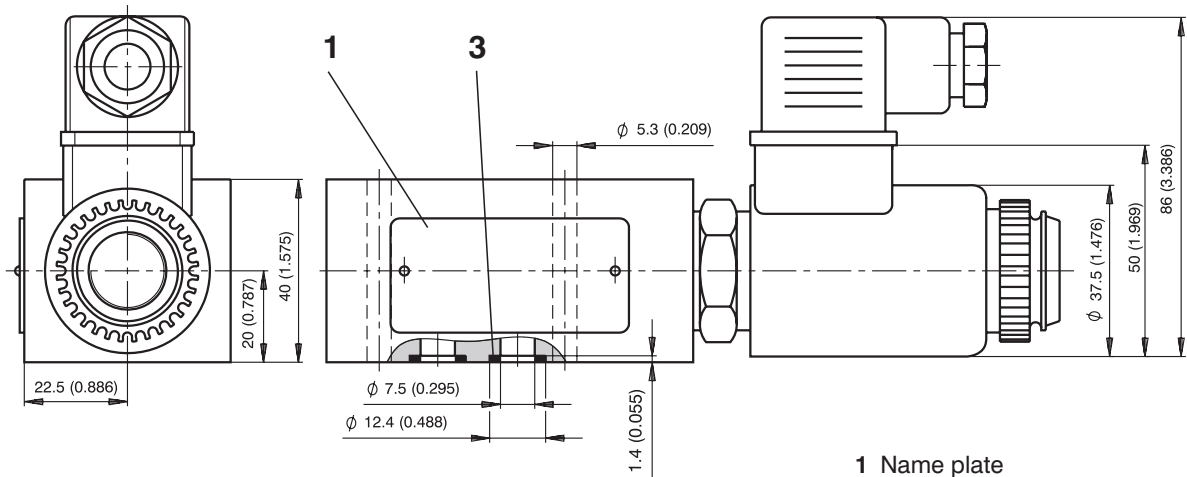
Size 06 (D 03) - Connecting dimensions according to ISO 4401, DIN 24 340 Model MA, MX, MD, MG, MP



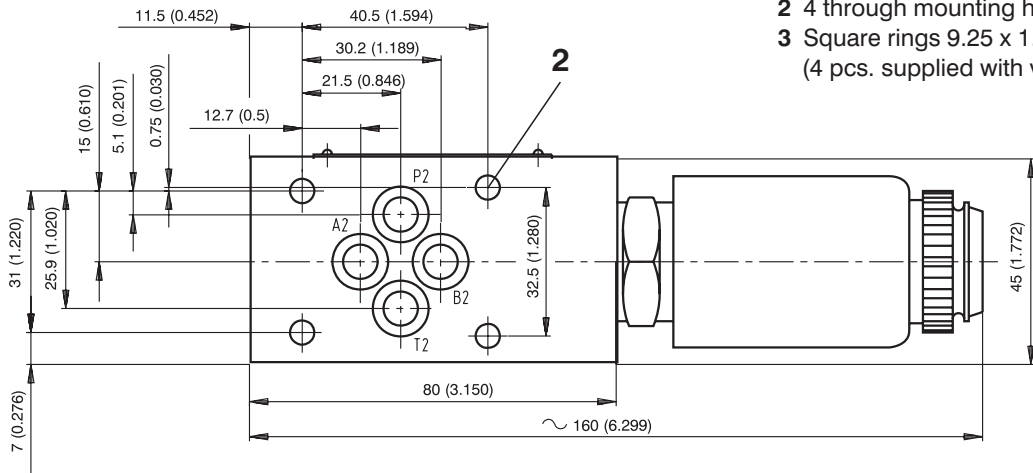
Valve Dimensions

Dimensions in millimeters (inches)

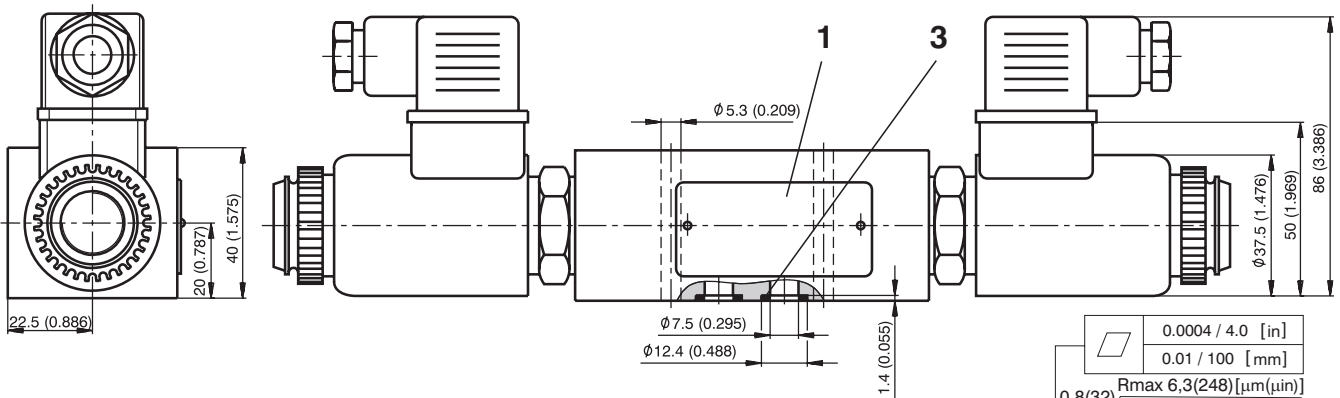
Model MB, ME



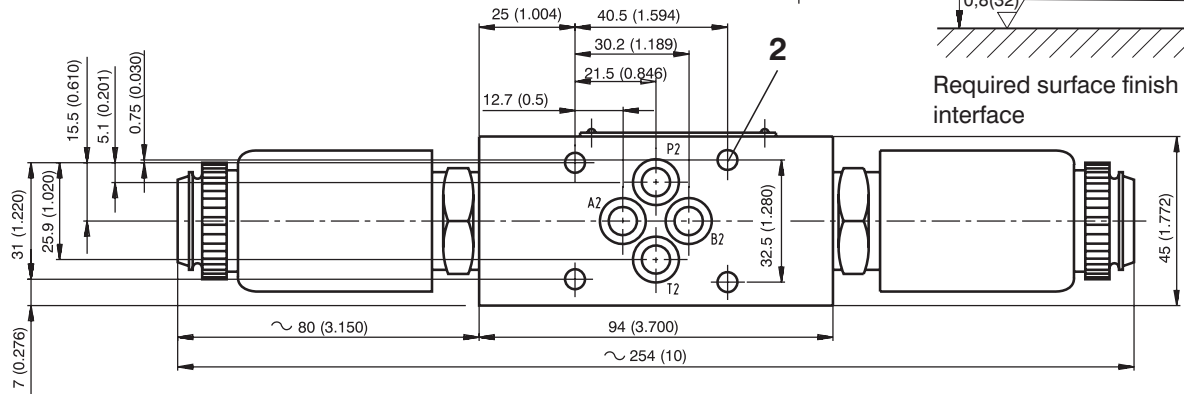
- 1 Name plate
- 2 4 through mounting holes
- 3 Square rings 9.25 x 1.68
(4 pcs. supplied with valve)



Model MC, MF



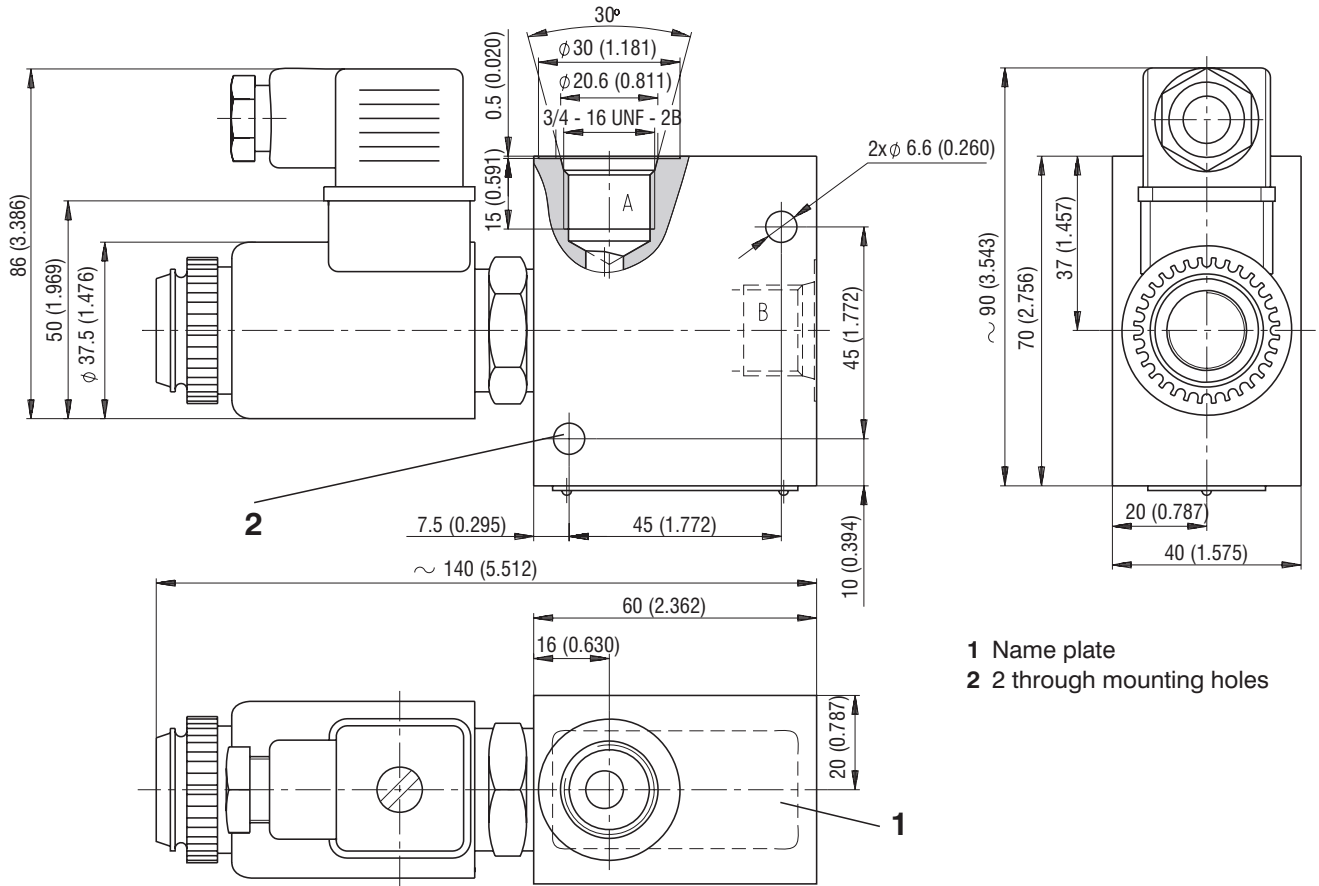
0.0004 / 4.0 [in]
0.01 / 100 [mm]
0,8(32) Rmax 6,3(248) [µm(µin)]
Required surface finish of interface



Valve Dimensions

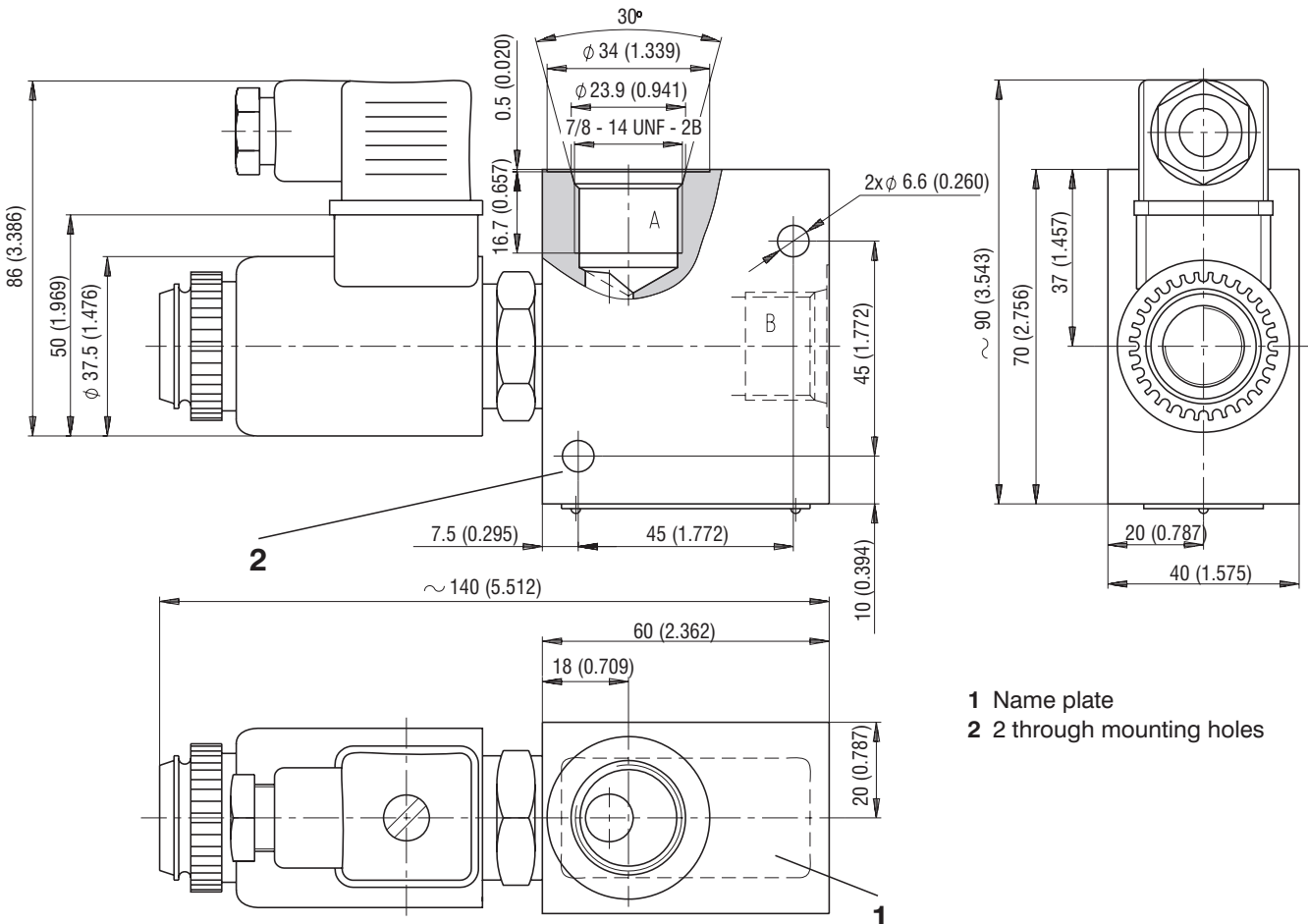
Dimensions in millimeters (inches)

Model R3 (Ports, SAE - 8)



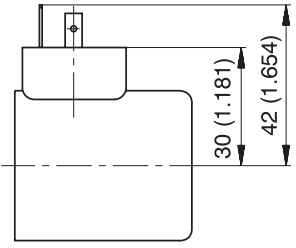
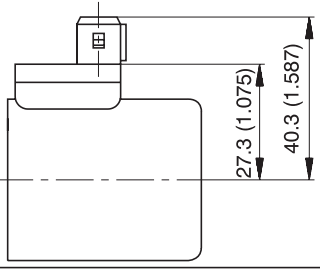
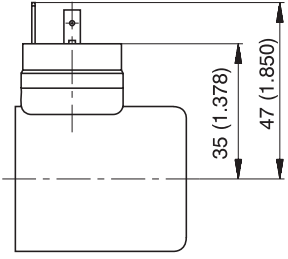
- 1 Name plate
- 2 2 through mounting holes

Model R4 (Ports, SAE - 10)

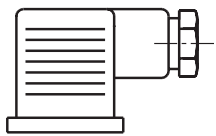


- 1 Name plate
- 2 2 through mounting holes

Type of the Solenoid Coil

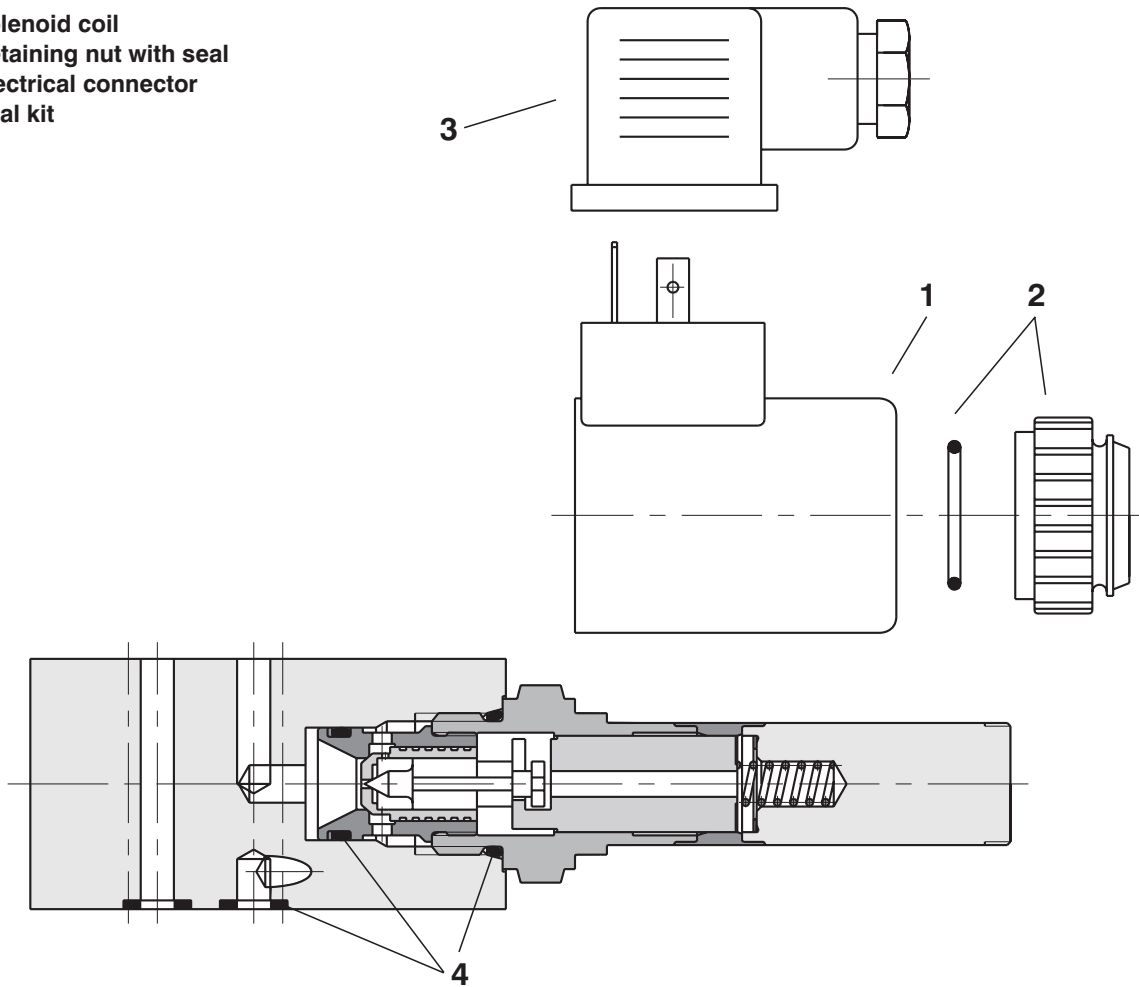
Designation	Dimensional sketch	Description
E1		Solenoid coil with terminal for the electrical connector, EN 175301-803
E2		Solenoid coil with integrated quenching diode (bipolar transistor diode) and terminal for the electrical connector, EN 175301-803
E3		Solenoid coil with terminal for AMP electrical connector.
E4		Solenoid coil with integrated quenching diode (bipolar transistor diode) and terminal for AMP electrical connector.
E5		Solenoid coil with integrated rectifier and terminal for the electrical connector, EN 175301-803

Electrical Connector, EN 175301-803

Designation	Type	Model	Max. input voltage	
K1	Connector B (black)	without rectifier - M16x1.5	230 V AC/DC	
	Connector A (grey)	bushing bore \varnothing 6-8 mm (0.236 - 0.315 in)		
K5	Connector B (black)	without rectifier - M16x1.5	230 V AC/DC	
	Connector A (grey)	bushing bore \varnothing 4-6 mm (0.158 - 0.236 in)		
K2	Connector B (black)	without rectifier with LED	12...24 V DC	
	Connector A (grey)	and quenching diode - M16x1.5 bushing bore \varnothing 6-8 mm (0.236 - 0.315 in)		
K3	Connector B (black)	with rectifier - M16x1.5	230 V AC	
	Connector A (grey)	bushing bore \varnothing 6-8 mm (0.236 - 0.315 in)		
K4	Connector B (black)	with rectifier with LED	230 V AC	
	Connector A (grey)	and quenching diode - M16x1.5 bushing bore \varnothing 6-8 mm (0.236 - 0.315 in)		

Spare Parts

- 1 Solenoid coil
- 2 Retaining nut with seal
- 3 Electrical connector
- 4 Seal kit



Solenoid coil

Type designation of the coil voltage	Type of the coil				
	E1	E2	E3	E4	E5
	Ordering number				
01200	16185500	16191600	16191100	16191300	
01400	16190700	23878400	23875300	23876700	
02100	16190800	23878600	23875500	23876900	
02400	16185700	16191700	16191200	16191400	
04200	23872800	23879200	23875900	23877500	
04800	16186000	23879400	23876100	23877700	
06000	23873000	-	-	-	
10200	16191000	-	-	-	
20500	16186300	-	-	-	
02450					
11550					16193100
23050					16193400

Solenoid retaining nut with seal			
Type of the nut	Seal ring	Order number	
Standard nut for S1, S2	18 x 1.5	17314100	
Standard nut for S5, S6	18 x 1,5	15874500	
Standard			
Electrical connector, EN 175301-803			
Type	Connector A gray	Connector B black	
	Order number		
K1	16202200	16202100	
K5	16202600	16202500	
K2	16202800	16202700	
K3	16202400	16202300	
K4	16203000	16202900	
Seal kit			
Type	Model	Dimensions, quantity	Order number
ROE3	O-ring - NBR 80	19.4 x 2.1 (1 pc.)	15650200
	O-ring - NBR 80	14 x 1.78 (1 pc.)	
	Back-up ring	14.73 x 17.43 x 1.14 (1 pc.)	
ROE3	O-ring - Viton	19.4 x 2.1 (1 pc.)	16954700
	O-ring - Viton	14 x 1.78 (1 pc.)	
	Back-up ring	14.73 x 17.43 x 1.14 (1 pc.)	
Subplate size 04 (D 02)	Square ring - NBR 70	7.65 x 1.68 (4 pcs.)	20718400
Subplate size 06 (D 03)	Square ring - NBR 70	9.25 x 1.68 (4 pcs.)	15650300
Subplate size 04 (D 02)	O-ring - Viton	7.65 x 1.68 (4 pcs.)	28618000
Subplate size 06 (D 03)	O-ring - Viton	9.25 x 1.68 (4 pcs.)	28608100
Preferred types of valves			
Type code	Order number	Type code	Order number
ROE3-042S2/01200E1	15651100	ROE3-042S5/01200E1	15655200
ROE3-042S2/02400E1	15650600	ROE3-042S5/02400E1	15655300
ROE3-042S2/23050E5	20705000	ROE3-042S5/23050E5	20731400
ROE3-062S2/01200E1	15646200	ROE3-042S6/01200E1	15655600
ROE3-062S2/02400E1	15646400	ROE3-042S6/02400E1	15655700
ROE3-062S2/23050E5	20679100	ROE3-042S6/23050E5	20743800
R2-ROE3	15653500		

Caution!

- The packing foil is recyclable.
- The protecting plate can be returned to the manufacturer.
- Mounting studs must be ordered separately. Tightening torques are 5 Nm (size 04) and 8.9 Nm (size 06).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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