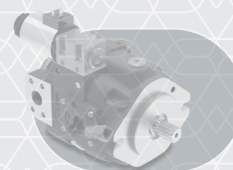
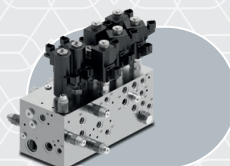
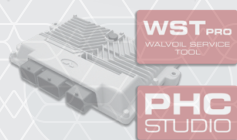


SAE Cavity cartridges



COMPACT HYDRAULICS

Additional information

This catalogue shows the product in the most standard configurations.
Please contact our Sales Dpt. for more detailed information or special requests.

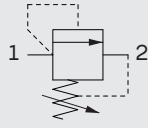
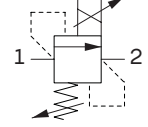
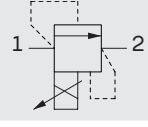
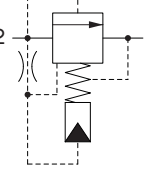
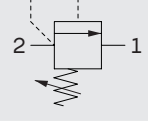
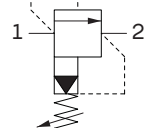
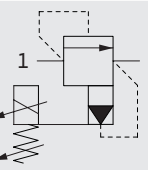
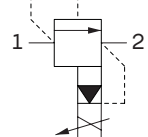
WARNING!

All specifications of this catalogue refer to the standard product at this date.
Walvoil, oriented to a continuous improvement, reserves the right to discontinue, modify or revise the specifications, without notice.

WALVOIL IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN
INCORRECT USE OF THE PRODUCT.

1st edition January 2025

Pressure control valves

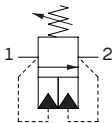
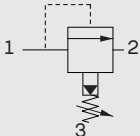
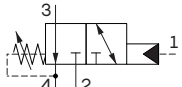
Pressure relief valves									
Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	
2 way									
	MC10MV	poppet	direct	mechanic	70	18.5	260	3770	11
	MC..R	poppet	direct	mechanic	60	15.8	350	5100	15
	MC10T	poppet	direct	proportional solenoid	10	2.6	350	5100	17
	MC10T HF type								
	MC10X MC10X HF type	poppet	direct	proportional solenoid	10	2.6	350	5100	21
	MD..M	poppet	direct	mechanic	120	31.7	350	5100	25
	MG..A	poppet	differential	mechanic	100	26.4	350	5100	31
	MP..M	spool	pilot	mechanic	400	105,7	350	5100	33
	MP..T	spool	pilot	proportional solenoid	200	52.8	350	5100	37
	MP..X	spool	pilot	proportional solenoid	200	52.8	350	5100	41

Pressure control valves

Pressure reducing valves

Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	
3 way									
	RD08L	spool	direct with relieving	mechanic	15	3.96	Port 2=350 Port 3=30	Port 2=5100 Port 3=435	45
	RD08LH	spool	direct with relieving	mechanic	30	7.9	Port 2=350 Port 3=30	Port 2=5100 Port 3=435	49
	RD08TX	spool	direct with relieving	proportional solenoid	12	3.17	Port 2=210 Port 3=30	Port 2=3045 Port 3=435	53
	RP..M	spool	pilot with relieving	mechanic	70	18.5	Port 2=350 Port 3=30	Port 2=5100 Port 3=435	57
	RP..X	spool	pilot with relieving	proportional solenoid	70	18.5	Port 2=350 Port 3=50	Port 2=5100 Port 3=725	61

Sequence valves

Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	
2 way									
	SW..A	spool	pilot	mechanic	180	48	350	5100	67
3 way									
	SP10A	spool	pilot	mechanic	50	13	350	5100	69
4 way									
	SN..L ⁽¹⁾	spool	direct	mechanic	50	13	350	5100	71

NOTE (1) the circuit shown are in normally open configuration; normally closed configuration is also available, see valves pages.

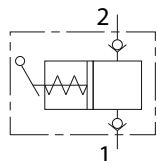
Motion control valves

Check valves

Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	

2 way

	UC..A	poppet	direct	mechanic	100	26	350	5100	75
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**UM08M**

-

direct

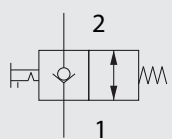
manual

1 in³/
stroke

-

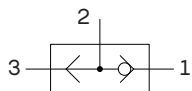
Port 1=50
Port 2=210Port 1=725
Port 2=3045

77

	UV10M	poppet	direct	manual	60	15.8	320	4650	79
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Shuttle valves

3 way

**UT..A**

ball

direct

mechanic

20

5.3

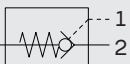
350

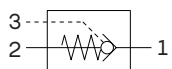
5100

81

Pilot operated check valves

3 way

	BC..A	poppet	direct	mechanic	100	26	350	5100	83
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**BC..B**

poppet

direct

mechanic

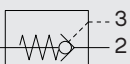
100

26

350

5100

83

	BC..C	poppet	direct	mechanic	60	16	350	5100	83
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Pressure control valves

Counterbalance valves

Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	

3 way

	CC..A	poppet	/	mechanic	150	40	350	5100	87
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Flow control valves

Needle valves

Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	

2 way

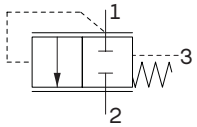
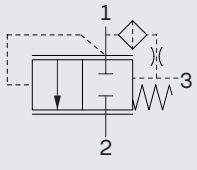
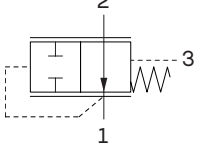
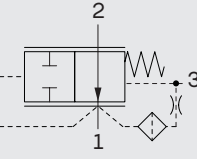
	NB..A	poppet	/	mechanic	100	26	350	5100	91
	NU..A	poppet	/	mechanic	100	26	350	5100	93
	NT..A	poppet	/	mechanic	100	26	350	5100	95
	EE..X	spool	direct	proportional solenoid	60	16	315	4600	97
	EC..T	poppet	pilot	proportional solenoid	97	25.6	350	5100	101

Flow control valves

Flow control pressure compensated valves

Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	
2 way									
	PW..A	spool	direct	mechanic	90	24	315	4600	105
	PU..A	spool	direct	mechanic	90	24	315	4600	109
	PU..X	spool	direct	proportional solenoid	90	24	315	4600	113
3 way									
	PP..A	spool	direct	mechanic	Port 1=150 Port 3=90	Port 1=39.6 Port 3=24	350	5100	117
	PP..X	spool	direct	proportional solenoid	Port 1=150 Port 3=90	Port 1=39.6 Port 3=24	315	4600	121
	PD	spool	direct	mechanic	150	40	210	3045	125
4 way									
	PL..M	spool	pilot	mechanic	Port 3=160 port 4=140	Port 3=42.2 Port 4=36.9	350	5100	127

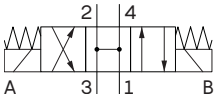
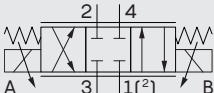
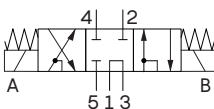
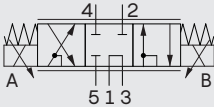
Logic valves

Logic element									
Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	
	LA..QA	spool	pilot to close	/	190	50.2	350	5100	131
	LB..QA	spool	venting to open	/	190	50.2	350	5100	133
	LC..QA	spool	venting to close	/	190	50.2	350	5100	135
	LD..QA	spool	pilot to open	/	190	50.2	350	5100	137

Directional control valves

Solenoid directional control valves									
Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	
2 way / 2 positions									
	EB08M	poppet	direct	on-off solenoid	2	0.53	350	5100	139
	EE..M ⁽¹⁾	spool	direct	on-off solenoid	40	10.5	250	3600	141
	EC..M ⁽¹⁾	poppet	pilot	on-off solenoid	150	40	380	5500	145
	EF..M ⁽¹⁾	poppet	pilot	on-off solenoid	150	40	380	5500	149
	EH..M ⁽¹⁾	poppet	pilot	on-off solenoid	150	40	380	5500	153
	EW..M ⁽¹⁾	poppet	direct	on-off solenoid	40	10.5	350	5100	157
3 way / 2 positions									
	EJ08MF ⁽²⁾	spool	direct	on-off solenoid	10	2.6	70	1050	161
	EJ08G	spool	direct	on-off solenoid	3	0.8	350	5100	165
	EJ..M ⁽²⁾	spool	direct	on-off solenoid	60	15.8	250	3600	167
	EL08B	poppet	direct	on-off solenoid	10	2.6	250	3600	173
	EL10C	poppet	direct	on-off solenoid	20	5.3	210	3050	175
4 way / 2 positions									
	ER..L ⁽²⁾	spool	direct	on-off solenoid	40	10.5	250	3600	177
	ER12M ⁽²⁾	spool	direct	on-off solenoid	60	15.8	Port 1=250 Port 2-3-4 =320	Port 1=3600 Port 2-3-4 =4600	181

Directional control valves

Solenoid directional control valves									
Hydraulic diagram	Valve	Execution	Operation	Control type	Max. flow up to		Max. press. up to		Page
					l/min	US gpm	bar	psi	
4 way / 3 positions									
	ET..L ⁽²⁾	spool	direct	on-off solenoid	40	10.5	250	3600	185
	ET..X ⁽²⁾	spool	direct	proportional solenoid	25	6.6	250	3600	189
5 way / 3 positions									
	EK10L ⁽²⁾	spool	direct	on-off solenoid	20	5.3	250	3600	193
	EK10X ⁽²⁾	spool	direct	proportional solenoid	23	6.1	250	3600	197

NOTE (1) the circuit shown are in normally open configuration; normally closed configuration is also available, see valves pages.

NOTE (2) the circuit shown are one type of available spools; for several types of spools see valves pages.

Accessories

Coils and connectors

Types and ordering codespage 201

Dimensional data and features page 203

Adjustments

Types and dimensions page 207

Valve bodies

2 way bodies page 208

3 way bodiespage 210

4 way bodiespage 212

5 way bodiespage 214

How to order valves with bodypage 215

Cavity tools and taps

2 way SAE cavitypage 216

3 way SAE cavitypage 217

4 way SAE cavitypage 218

5 way SAE cavitypage 219



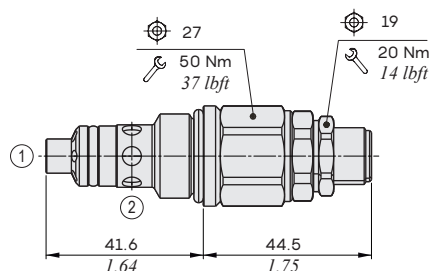
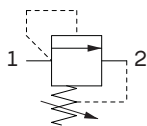
MC10MV type pressure relief valves – 2 way

- Direct acting
- Poppet type
- Mechanical control with screw adjustment
- Prepared for antitampering cap
- Different springs available to vary pressure range
- The backpressure values on line 2 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

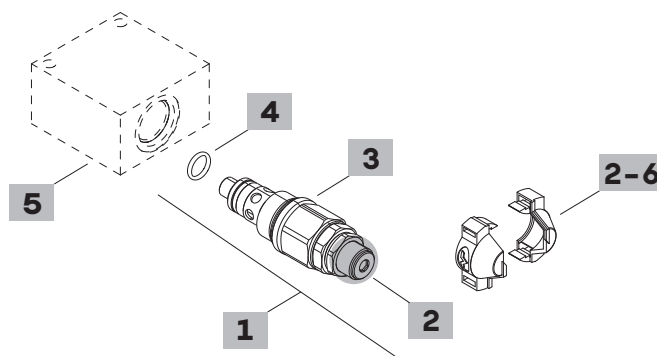
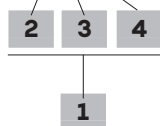
MC10MV		
Nominal flow		70 l/min (18.5 US gpm)
Max. pressure		260 bar (3770 psi)
Oil leakage	at 80% of max. pressure setting	0.25 cm ³ /min (0.015 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt
Max level of contamination		20/18/14 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 10/2 A
Weight		0.18 kg (0.396 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt.



Ordering codes and description composition

MC10MV/0Y2B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
MC10MV/0Y2B	OMC100020A04	Pressure range 2
MC10MV/0Y3B	OMC100020A05	Pressure range 3
MC10MV/0Y4B	OMC100020A06	Pressure range 4
MC10MV/0Y5B	OMC100020A02	Pressure range 5

2 Adjustments

TYPE	DESCRIPTION
Y	With screw
X	Valve set with antitampering cap (part code: see point 6)

3 Pressure range

Standard setting is referred to 5 l/min (1.32 Us gpm) flow

TYPE	DESCRIPTION
2	Pressure range 5÷75 bar (72.5÷1100 psi); Std. setting 50 bar (725 psi)
3	Pressure range 76÷125 bar (1100÷1800 psi); Std. setting 80 bar (1160 psi)
4	Pressure range 126÷220 bar (1800÷3190 psi); Std. setting 175 bar (2540 psi)
5	Pressure range 221÷260 bar (3190÷3770 psi); Std. setting 220 bar (3190 psi)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna) o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2 - SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread

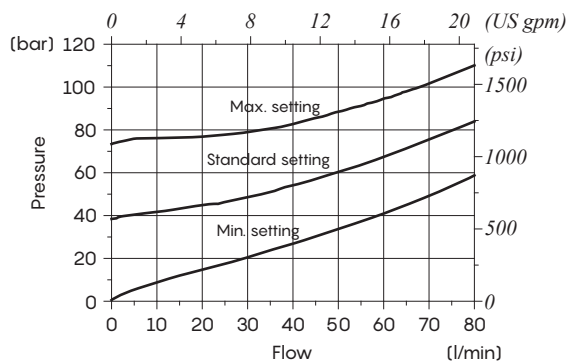
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

6 Accessories

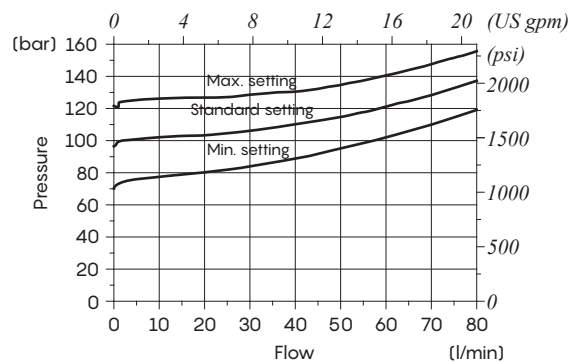
TYPE	CODE	DESCRIPTION
-	4COP126301	Antitampering cap (x2)

Rating diagrams

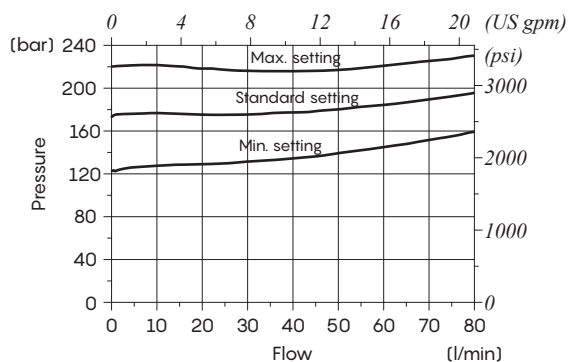
MC10MV pressure vs. flow
Pressure range 2



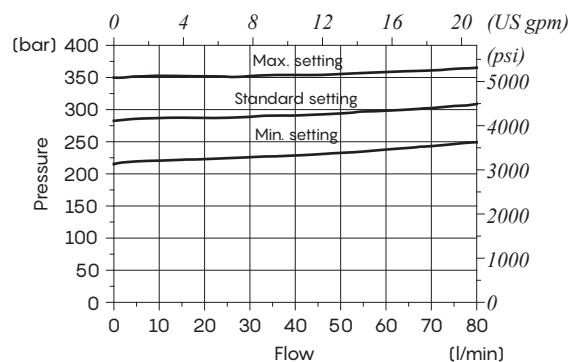
MC10MV pressure vs. flow
Pressure range 3



MC10MV pressure vs. flow
Pressure range 4



MC10MV pressure vs. flow
Pressure range 5





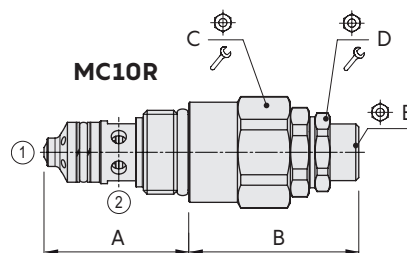
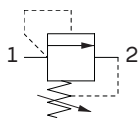
MC..R type pressure relief valves – 2 way

- Direct acting
- Poppet type
- Mechanical control with screw adjustment
- Prepared for antitampering cap
- Different springs available to vary pressure range
- The backpressure values on line 2 must be added to valve nominal setting
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	MC08R	MC09R	MC10R
Nominal flow	25 l/min (6.6 US gpm)	35 l/min (9.2 US gpm)	60 l/min (15.8 US gpm)
Max. pressure	350 bar (5100 psi)		
Oil leakage	at 80% of max. pressure setting 2 cm ³ /min (0.122 in ³ /min)		
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties		
Viscosity	10-200 cSt		
Max level of contamination	20/18/14 ISO4406		
Fluid temperature	with NBR seals+Polyurethane with FPM seals from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)		
Cavity	SAE 08/2 A	SAE 09/2 A	SAE 10/2 A
Weight	0.170 kg (0.37 lb)	0.230 kg (0.51 lb)	0.315 kg (0.69 lb)

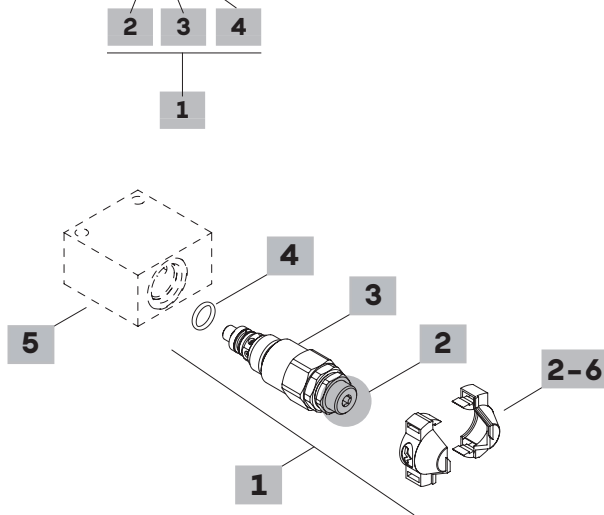
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C			D			E	
	mm	in	mm	in								
	mm	in	mm	in		Nm	lbft		Nm	lbft		
MC08R	34	1.34	46.6	1.83	24	30	22	19	20	15	5	
MC09R	33.8	1.33	46.6	1.83	24	42	31	19	20	15	5	
MC10R	38.3	1.50	44.4	1.75	27	50	37	19	20	15	5	

Ordering codes and description composition

MC08R/OY1B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2 A		
MC08R/OY1B	OMC08002050	Pressure range 1
MC08R/OY2B	OMC08002051	Pressure range 2
MC08R/OY3B	OMC08002052	Pressure range 3
SAE cavity 09/2 A		
MC09R/OY1B	OMC09002000	Pressure range 1
MC09R/OY2B	OMC09002001	Pressure range 2
MC09R/OY3B	OMC09002002	Pressure range 3
SAE cavity 10/2 A		
MC10R/OY1B	OMC10002023	Pressure range 1
MC10R/OY2B	OMC10002024	Pressure range 2
MC10R/OY3B	OMC10002025	Pressure range 3

2 Adjustments

TYPE	DESCRIPTION
Y	With screw
X	Valve set with antitampering cap (part code: see point 6)

3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

TYPE	DESCRIPTION
1	Pressure range 10÷120 bar (145÷1740 psi); Std. setting 80 bar (1160 psi)
2	Pressure range 40÷200 bar (580÷2900 psi); Std. setting 175 bar (2540 psi)
3	Pressure range 200÷350 bar (2900÷5100 psi); Std. setting 250 bar (3600 psi)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE09/2-G 3/8	3CC0920C11	Aluminium body for cavity 09 valve, G 3/8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

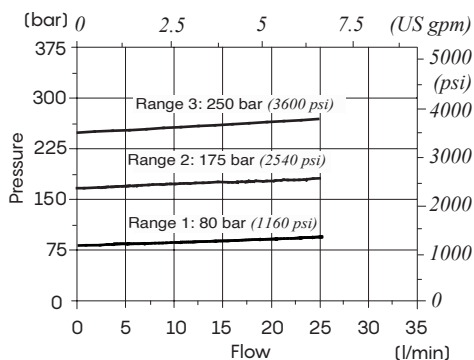
6 Accessories

TYPE	CODE	DESCRIPTION
-	4COP126301	Antitampering cap (x2)

Rating diagrams

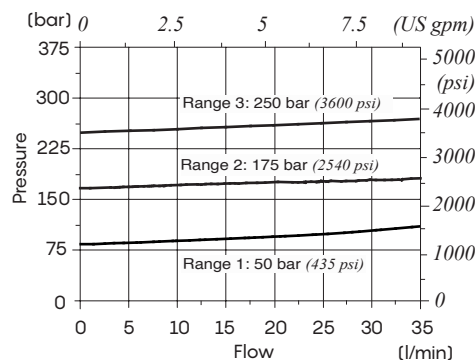
MC08R pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



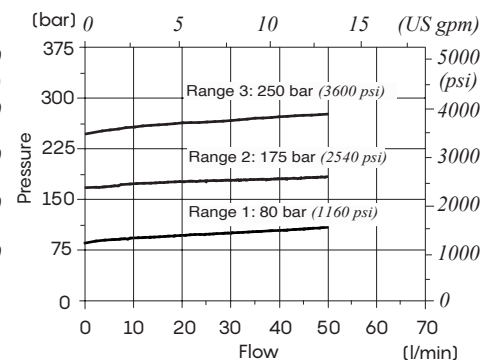
MC09R pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



MC10R pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)





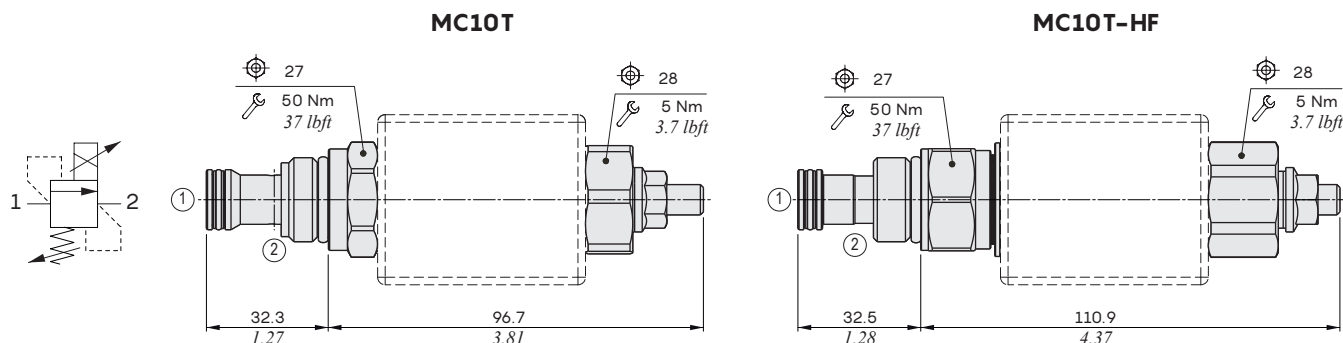
MC10T - MC10T-HF type pressure relief valves - 2 way

- Solenoid proportional type, direct acting
- Poppet type
- Decreasing pressure with increasing current (N.C)
- System of purging of air
- Applications for low flow rates (max. 10 l/min - 2.64 US gpm)

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		MC10T	MC10T-HF
Max. flow		3 l/min (0.79 US gpm)	10 l/min (2.64 US gpm)
Max. pressure		350 bar (5100 psi)	250 bar (3600 psi)
Oil leakage	at 80% of max. pressure setting	0.25 cm ³ /min (0.015 in ³ /min)	0.50 cm ³ /min (0.030 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt	
Max level of contamination		18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)	
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)	
Cavity		SAE 10/2	
Coil type*		BH or BQP19	BQP19
Nominal voltages		12VDC - 24VDC	
Power rating		33 W (BH) - 15 W (BQP19)	15 W
Max. control current		12V->1.70 A - 24V->0.85 (BH) 12V->1.25 A - 24V->0.63 A (BQP19)	12V->1.25 A - 24V->0.63 A
Dither frequency		150 Hz	
Hysteresis		<5%	
Weight		0.54 kg (1.19 lb)	0.87 kg (1.91 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

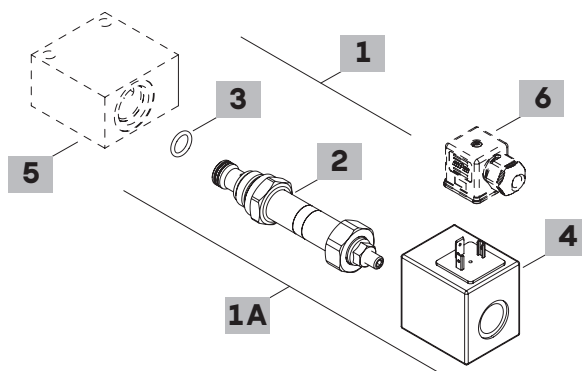


Ordering codes and description composition

MC10T/001B



MC10T/031B



1 Cartridges

TYPE	CODE	DESCRIPTION
MC10T/001B	OMC10002047	Pressure range 1
MC10T/002B	OMC10002048	Pressure range 2
MC10T/003B	OMC10002049	Pressure range 3

1A Complete cartridges with coil

TYPE	CODE	DESCRIPTION
MC10T/031B	OMC10002019	Pressure range 1 , 12VDC
MC10T/032B	OMC10002020	Pressure range 2 , 12VDC
MC10T/033B	OMC10002021	Pressure range 3 , 12VDC
MC10T-HF/033B	OMC10002070	Pressure range 3 , 12VDC

2 Pressure range

TYPE	DESCRIPTION
------	-------------

MC10T

1	Pressure range 15÷130 bar (217÷1885 psi);
2	Pressure range 15÷170 bar (217÷2465 psi);
3	Pressure range 15÷210 bar (217÷3045 psi);

MC10T-HF

3	Pressure range 20÷225 bar (290÷3260 psi);
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Note: for further pressure range contact Sales Dept

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Coils

TYPE	CODE	DESCRIPTION
2) BH 12VDC	4SLD001200A	12VDC-ISO4400 coil
3) BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil
4) BH 24VDC	4SLD002400A	24VDC-ISO4400 coil
5) BQP19 24VDC	4SL5000245A	24VDC-ISO4400 coil

Note: for HF version use only BQP19 coil

For complete coils list see from page 201

5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)

For steel bodies or different threading see from page 208

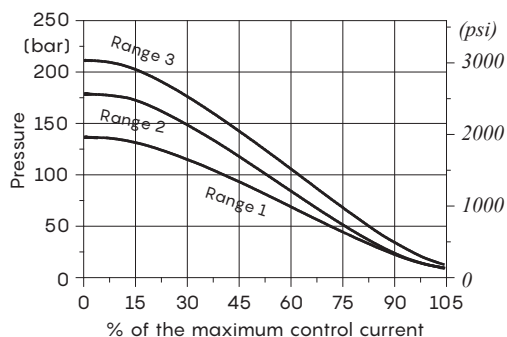
6 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

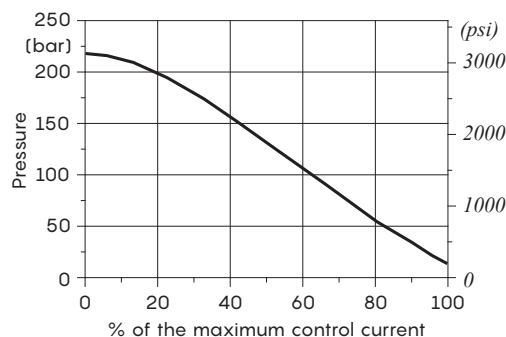
For complete connectors list see from page 201

Rating diagrams

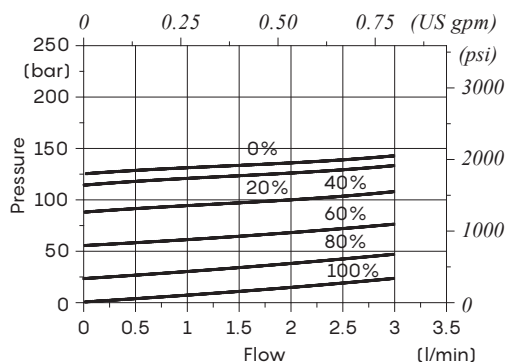
MC10T pressure setting vs. % max. control current
at 1 l/min (0.26 US gpm)



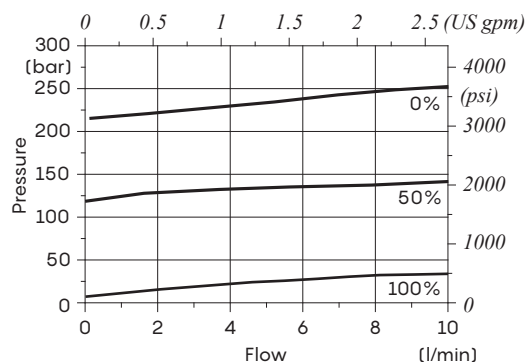
MC10T-HF pressure setting vs. % max. control current
at 2 l/min (0.53 US gpm)



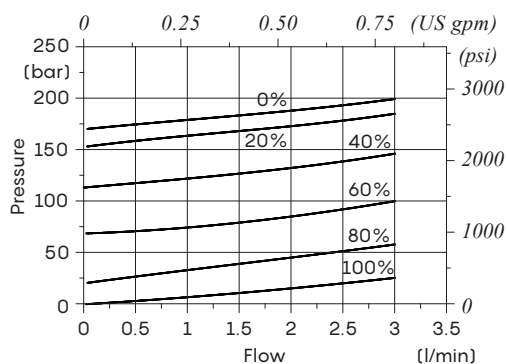
MC10T pressure vs. flow 1->2
for % of control current - Pressure range 1



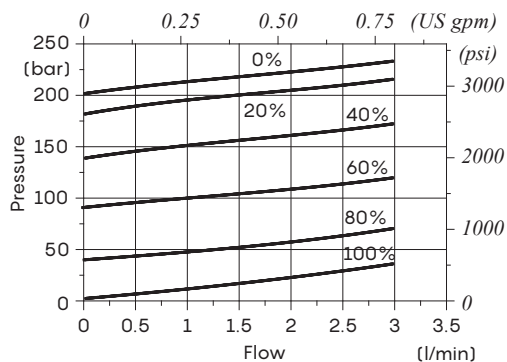
MC10T-HF pressure vs. flow 1->2
for % of control current



MC10T pressure vs. flow 1->2
for % of control current - Pressure range 2



MC10T pressure vs. flow 1->2
for % of control current - Pressure range 3





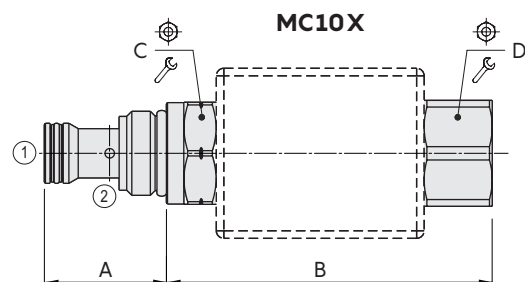
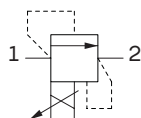
MC10X - MC10X-HF type pressure relief valves - 2 way

- Solenoid proportional type, direct acting
- Poppet type
- Decreasing pressure with increasing current (N.C)
- System of purging of air
- Applications for low flow rates (max. 10 l/min - 2.64 US gpm)

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		MC10X	MC10X-HF
Max. flow		3 l/min (0.79 US gpm)	10 l/min (2.64 US gpm)
Max. pressure		350 bar (5100 psi)	250 bar (3600 psi)
Oil leakage	at 80% of max. pressure setting	0.25 cm ³ /min (0.015 in ³ /min)	0.50 cm ³ /min (0.030 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt	
Max level of contamination		18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)	
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)	
Cavity		SAE 10/2	
Coil type*		BH or BQP19	BQP19
Nominal voltages		12VDC - 24VDC	
Power rating		33 W (BH) - 15 W (BQP19)	15 W
Max. control current		12V->1.70 A - 24V->0.85 (BH) 12V->1.25 A - 24V->0.63 A (BQP19)	12V->1.25 A - 24V->0.63 A
Dither frequency		150 Hz	
Hysteresis		<5%	
Weight		0.760 kg (1.67 lb)	0.863 kg (1.90 lb)

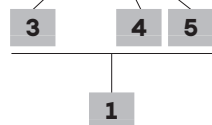
NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.



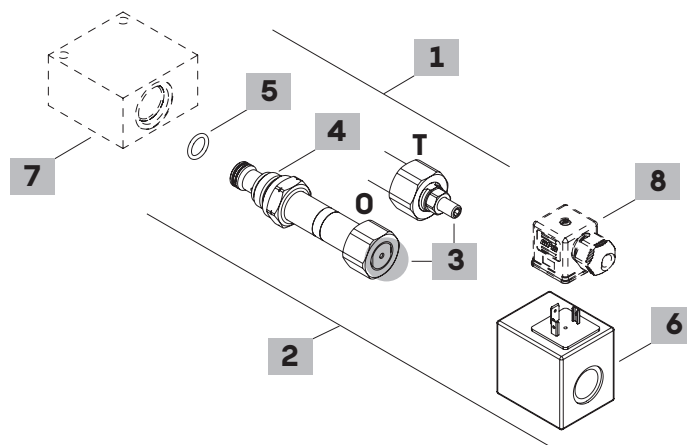
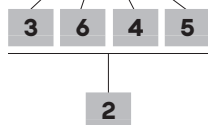
Valve type	A		B				C		D			
			N / O without emergency		T screw							
	mm	in	mm	in	mm	in	Nm	lbf·ft	Nm	lbf·ft	Nm	lbf·ft
MC10X	32.3	1.27	86.2	3.39	-	-	27	50	37	28	5	3.7
MC10X-HF	32.5	1.28	94.5	3.72	116.5	4.59	27	50	37	28	5	3.7

Ordering codes and description composition

MC10X/001B



MC10X/031B



1 Cartridges

TYPE	CODE	DESCRIPTION
MC10X/001B	OMC10002050	Pressure range 1
MC10X/002B	OMC10002051	Pressure range 2
MC10X/003B	OMC10002052	Pressure range 3

2 Complete cartridges with coil

TYPE	CODE	DESCRIPTION
MC10X/031B	OMC10002039	Pressure range 1 , 12VDC
MC10X/032B	OMC10002040	Pressure range 2 , 12VDC
MC10X/033B	OMC10002041	Pressure range 3 , 12VDC
MC10X-HF/033B	OMC10002064	Pressure range 3 , 12VDC
MC10X-HF/T33B	OMC10002089	Pressure range 3 , 12VDC

3 Emergency

TYPE	DESCRIPTION
0	Without override
T	With screw

4 Pressure range

TYPE	DESCRIPTION
MC10X	
1	Pressure range 7÷120 bar (102÷1740 psi);
2	Pressure range 7÷170 bar (102÷2450 psi);
3	Pressure range 7÷210 bar (102÷3050 psi);

MC10X-HF

3	Pressure range 3÷230 bar (43÷3330 psi);
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Note: for further pressure range contact Sales Dept

5 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

6 Coils

TYPE	CODE	DESCRIPTION
2) BH 12VDC	4SLD001200A	12VDC-ISO4400 coil
3) BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil
4) BH 24VDC	4SLD002400A	24VDC-ISO4400 coil
5) BQP19 24VDC	4SL5000245A	24VDC-ISO4400 coil

Note: for HF version use only BQP19 coil

For complete coils list see from page 201

7 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)

For steel bodies or different threading see from page 208

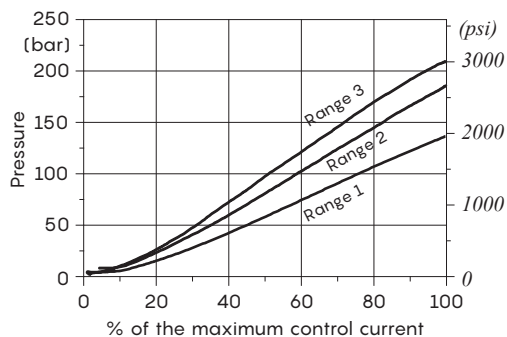
8 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

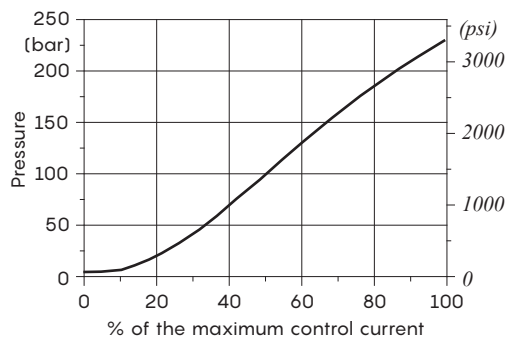
For complete connectors list see from page 201

Rating diagrams

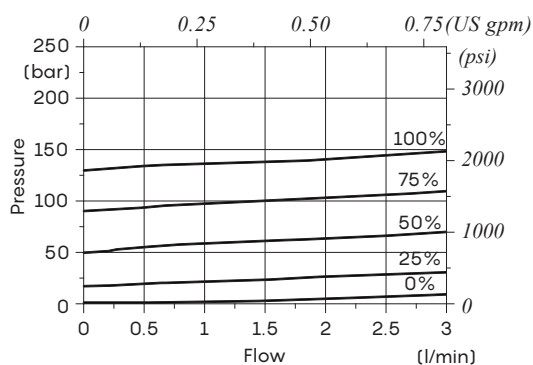
MC10X pressure setting vs. % max. control current
at 1 l/min (0.26 US gpm)



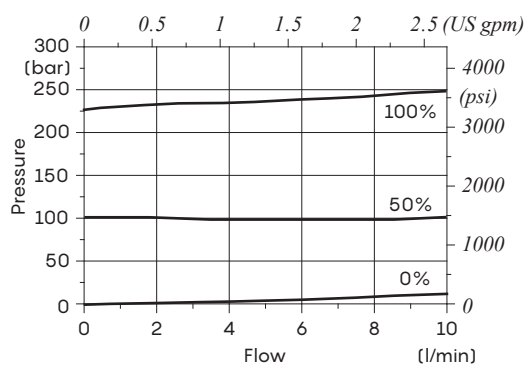
MC10X-HF pressure setting vs. % max. control current
at 2 l/min (0.53 US gpm)



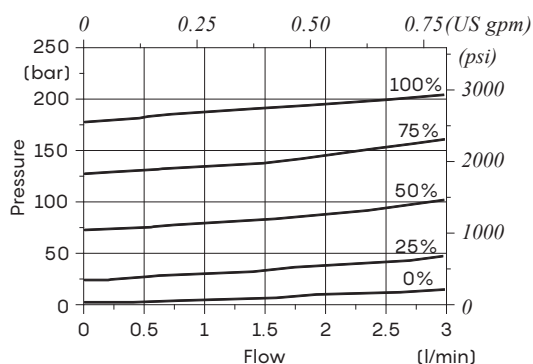
MC10X pressure vs. flow 1->2
for % of control current - Pressure range 1



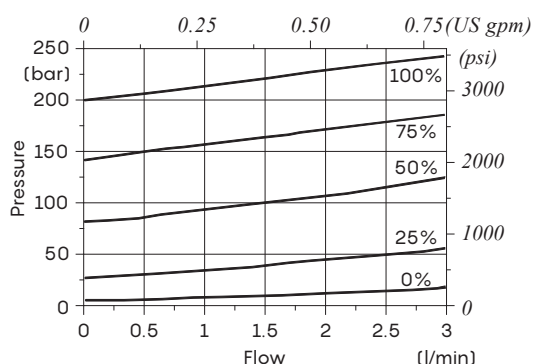
MC10X-HF pressure vs. flow 1->2
for % of control current



MC10X pressure vs. flow 1->2
for % of control current - Pressure range 2



MC10X pressure vs. flow 1->2
for % of control current - Pressure range 3





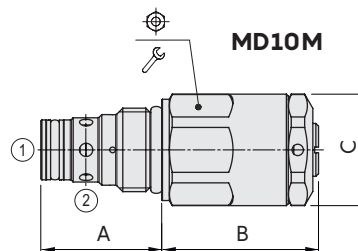
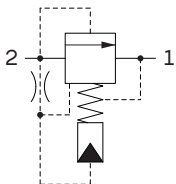
MD..M type shockless pressure relief valves – 2 way

- Direct acting
- Poppet type
- Damp valve
- Different reaction time available
- From SAE10 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		MD10M	MD12M
Nominal flow		60 l/min (15.8 US gpm)	120 l/min (31.7 US gpm)
Max. pressure		350 bar (5100 psi)	
Oil leakage	at 80% of max. pressure setting	5 cm ³ /min (0.30 in ³ /min)	5 cm ³ /min (0.30 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10–200 cSt	
Max level of contamination		20/18/14 ISO4406	
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)	
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)	
Cavity		SAE 10/2	SAE 12/2
Weight		0.200 kg (0.44 lb)	0.355 kg (0.78 lb)

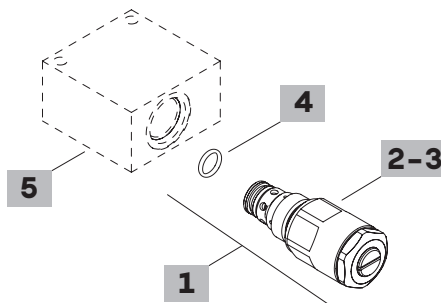
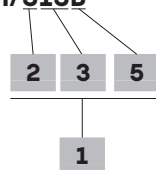
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C		 Nm lbft		
	mm	in	mm	in	mm	in			
MD10M	32	1.25	41.5	1.63	Ø29.5	Ø1.16	27	50	37
MD12M	46	1.81	46.5	1.83	Ø35	Ø1.38	32	85	62.7

Ordering codes and description composition

MD10M/313B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
MD10M/313B	OMD10002027	Pressure range 13
SAE cavity 12/2		
MD12M/513B	OMD12002004	Pressure range 13

2 Reaction time

TYPE	DESCRIPTION
2	Reaction time 0.2 sec. ($\pm$ 0.1 sec.)
3	Reaction time 0.3 sec. ($\pm$ 0.1 sec.)
4	Reaction time 0.4 sec. ($\pm$ 0.1 sec.)
5	Reaction time 0.5 sec. ($\pm$ 0.1 sec.)
6	Reaction time 0.6 sec. ($\pm$ 0.1 sec.)
7	Reaction time 0.7 sec. ($\pm$ 0.1 sec.)

3 Pressure range

TYPE	DESCRIPTION
SAE cavity 10/2	
11	Pressure range 130÷200 bar (1900÷2900 psi); Pressure ratio 1.9
12	Pressure range 180÷240 bar (2610÷3480 psi); Pressure ratio 2.2
13	Pressure range 220÷290 bar (3190÷4200 psi); Setting 250 bar (3625 psi) at 25 l/min (6.6 US gpm); Pressure ratio 2.4
21	Pressure range 170÷270 bar (2465÷3915 psi); Pressure ratio 2.5
22	Pressure range 220÷290 bar (3190÷4200 psi); Pressure ratio 2.8
SAE cavity 12/2	
11	Pressure range 125÷155 bar (1810÷2250 psi); Pressure ratio 1.7
12	Pressure range 160÷190 bar (2320÷2760 psi); Pressure ratio 1.9
13	Pressure range 180÷240 bar (2610÷3480 psi); Setting 220 bar (3190 psi) at 60 l/min (16 US gpm); Pressure ratio 2.2
21	Pressure range 150÷185 bar (1900÷2685 psi); Pressure ratio 2
22	Pressure range 190÷235 bar (2760÷3400 psi); Pressure ratio 2.35
23	Pressure range 230÷275 bar (3335÷3990 psi); Pressure ratio 2.55

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration

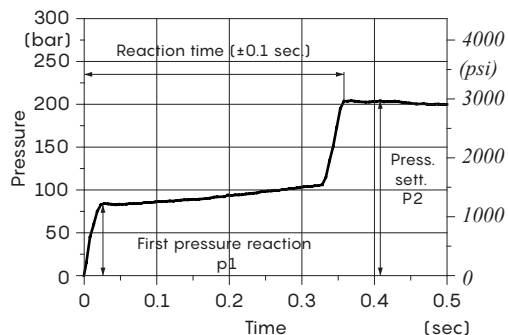
5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

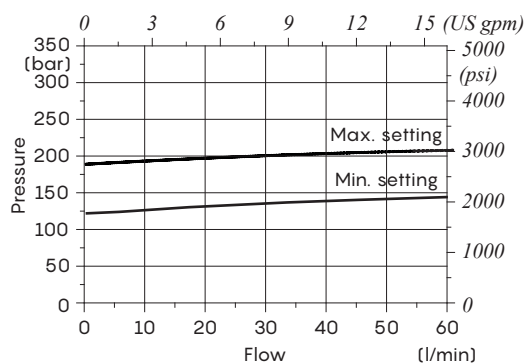
MD10M performance curve example with typical dimensions



Pressure ratio: $R_p = \frac{p_2}{p_1}$

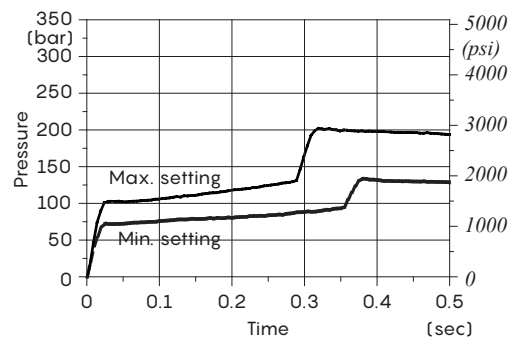
First pressure reaction: $p_1 = \frac{p_2}{R_p}$

MD10M pressure vs. flow at max. and min. setting

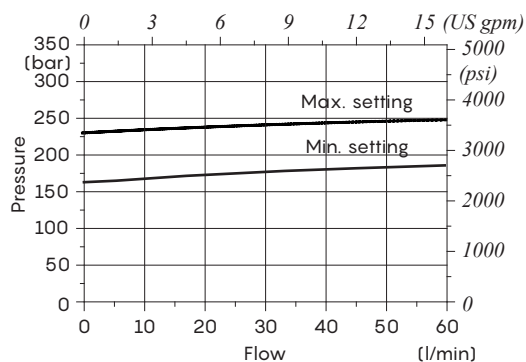


Pressure range 11
130÷200 bar
(1900÷2900 psi)
Pressure ratio 1.9
Q=60 l/min
(15.8 US gpm)

MD10M performance curve at max. and min. setting

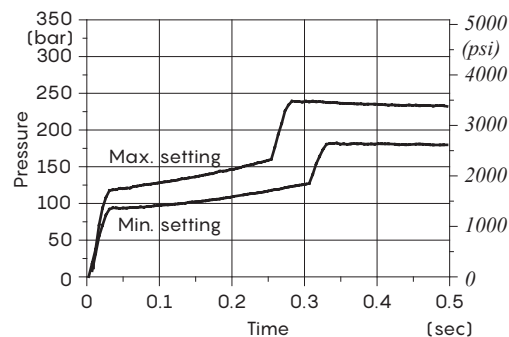


MD10M pressure vs. flow at max. and min. setting

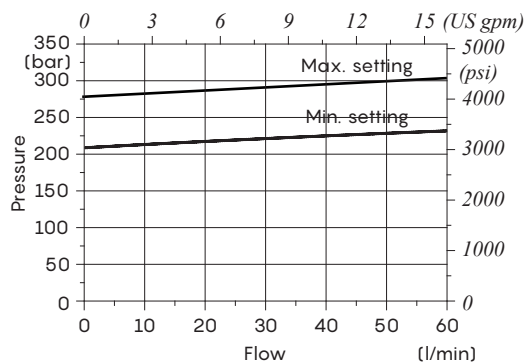


Pressure range 12
180÷240 bar
(2610÷3480 psi)
Pressure ratio 2.2
Q=60 l/min
(15.8 US gpm)

MD10M performance curve at max. and min. setting

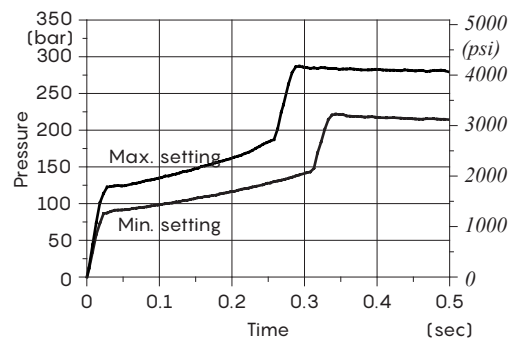


MD10M pressure vs. flow at max. and min. setting

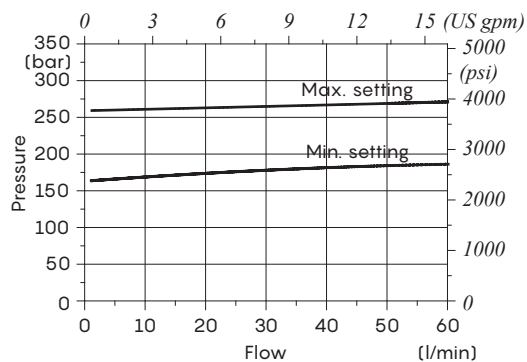
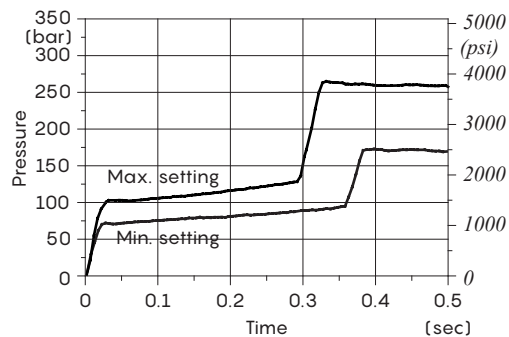
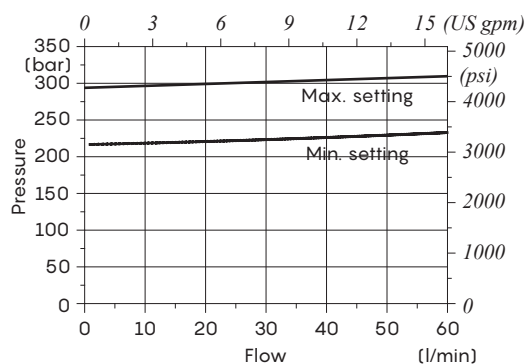
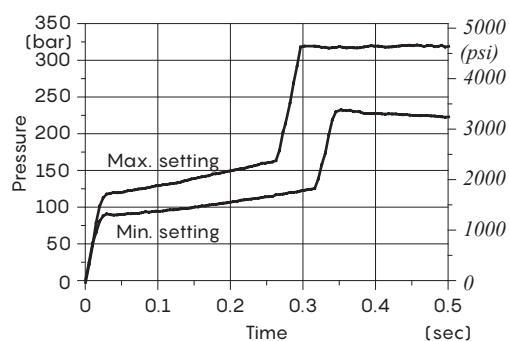


Pressure range 13
220÷290 bar
(3190÷4200 psi)
Setting 250 bar (3625 psi) at 25 l/min
(6.6 US gpm)
Pressure ratio 2.4
Q=60 l/min
(15.8 US gpm)

MD10M performance curve at max. and min. setting

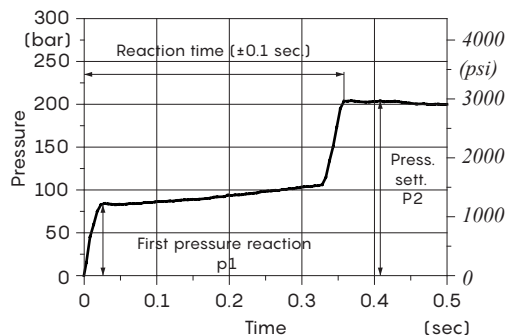


Rating diagrams

MD10M pressure vs. flow
at max. and min. settingMD10M performance curve
at max. and min. settingMD10M pressure vs. flow
at max. and min. settingMD10M performance curve
at max. and min. setting

Rating diagrams

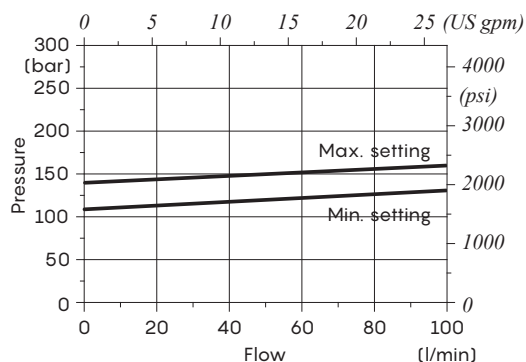
**MD12M performance curve example
with typical dimensions**



Pressure ratio: $R_p = \frac{p_2}{p_1}$

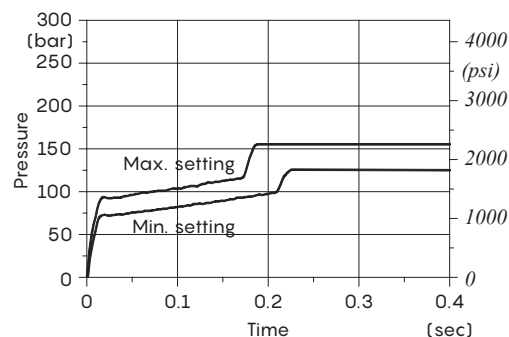
First pressure reaction: $p_1 = \frac{p_2}{R_p}$

**MD12M pressure vs. flow
at max. and min. setting**

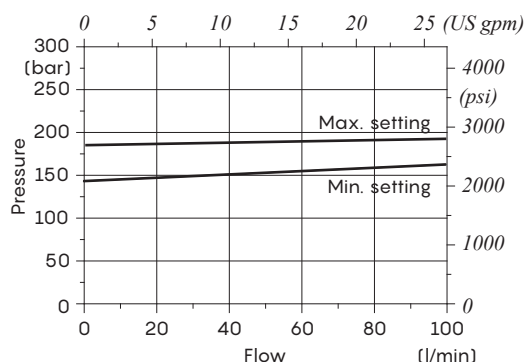


Pressure range 11
125÷155 bar
(1810÷2250 psi)
Pressure ratio 1.7
Q=100 l/min
(26.4 US gpm)

**MD12M performance curve
at max. and min. setting**

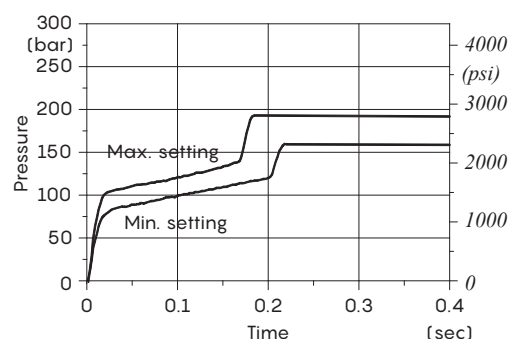


**MD12M pressure vs. flow
at max. and min. setting**

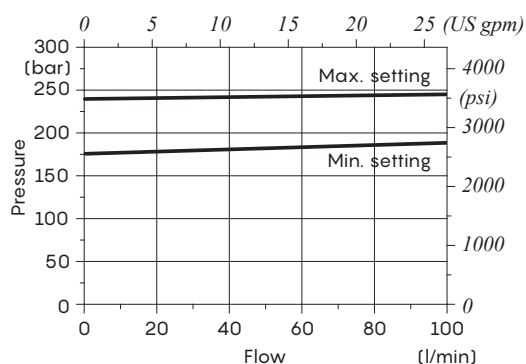


Pressure range 12
160÷190 bar
(2320÷2760 psi)
Pressure ratio 1.9
Q=100 l/min
(26.4 US gpm)

**MD12M performance curve
at max. and min. setting**

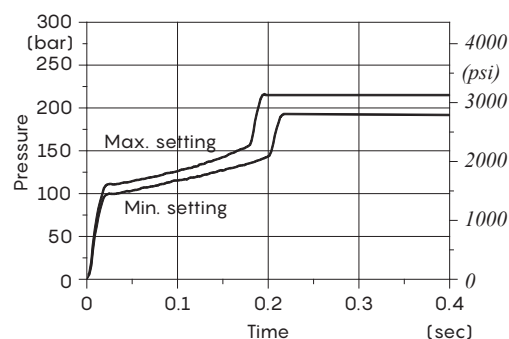


**MD12M pressure vs. flow
at max. and min. setting**

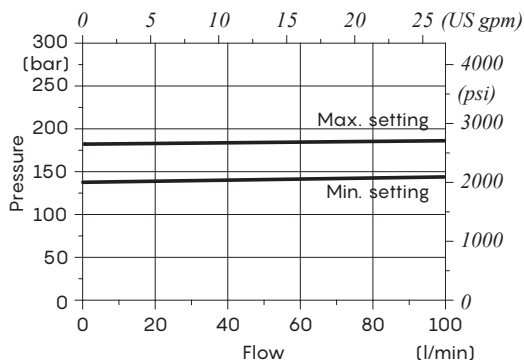


Pressure range 13
180÷220 bar
(2610÷3190 psi)
Setting 220 bar (3190 psi) at 60 l/min
(16 US gpm)
Pressure ratio 2.2
Q=100 l/min
(26.4 US gpm)

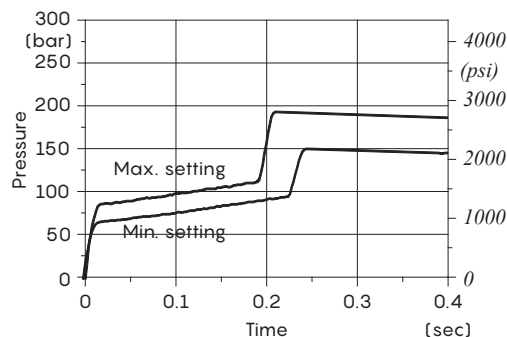
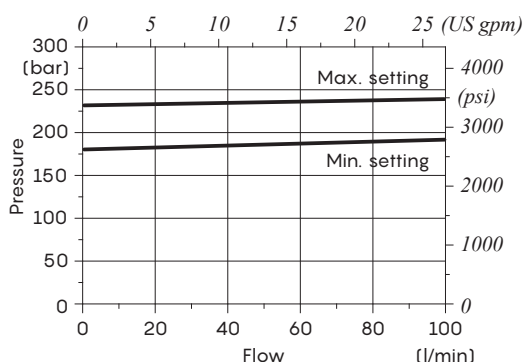
**MD12M performance curve
at max. and min. setting**



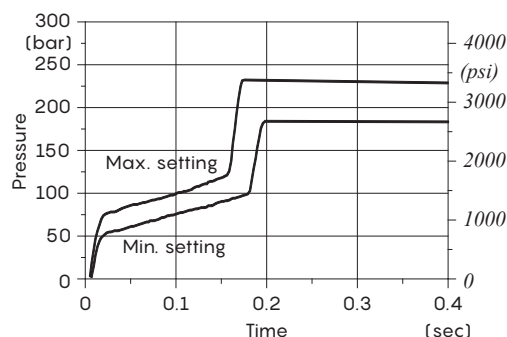
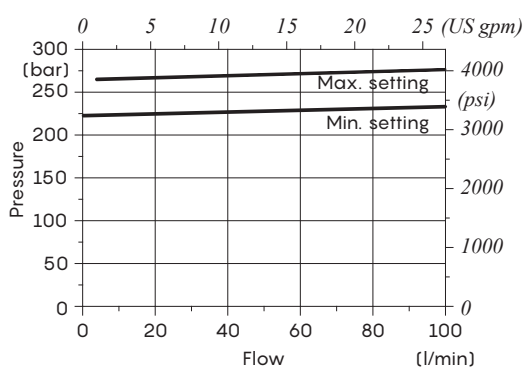
Rating diagrams

MD12M pressure vs. flow
at max. and min. setting

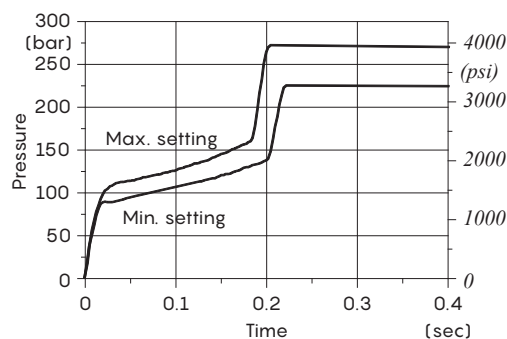
Pressure range 21
150÷185 bar
(1900÷2685 psi)
Pressure ratio 2
Q=100 l/min
(26.4 US gpm)

MD12M performance curve
at max. and min. settingMD12M pressure vs. flow
at max. and min. setting

Pressure range 22
190÷235 bar
(2760÷3400 psi)
Pressure ratio 2.35
Q=100 l/min
(26.4 US gpm)

MD12M performance curve
at max. and min. settingMD12M pressure vs. flow
at max. and min. setting

Pressure range 23
230÷275 bar
(3335÷3990 psi)
Pressure ratio 2.55
Q=100 l/min
(26.4 US gpm)

MD12M performance curve
at max. and min. setting



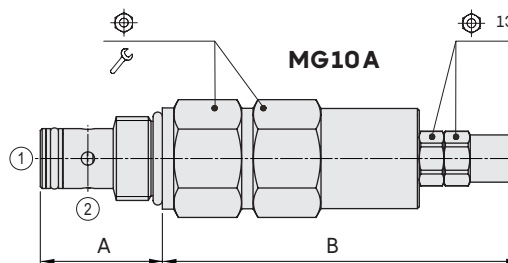
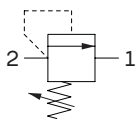
MG..A type pressure relief valves – 2 way

- Differential operated
- Poppet type
- Available with different types of adjustments
- The backpressure values on line 1 must be added to valve nominal setting
- Prepared for antitampering cap
- From SAE10 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		MG10A	MG12A
Nominal flow		60 l/min (15.8 US gpm)	100 l/min (26.4 US gpm)
Max. pressure		350 bar (5100 psi)	
Oil leakage	at 80% of max. pressure setting	2 cm ³ /min (0.122 in ³ /min)	
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10–200 cSt	
Max level of contamination		20/18/14 ISO4406	
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)	
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)	
Cavity		SAE 10/2	SAE 12/2
Weight		0.34 kg (0.75 lb)	0.87 kg (1.92 lb)

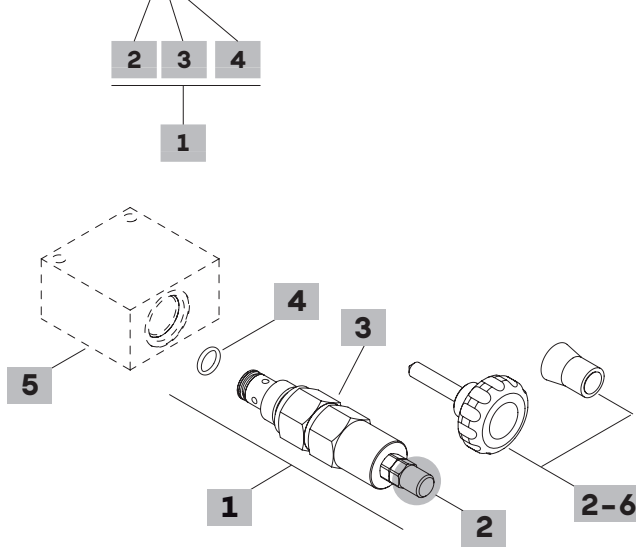
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		 Nm lbf·ft		
	mm	in	mm	in			
MG10A/0S	32.3	1.27	94.5	3.72	27	50	37
MG12A/0S	46	1.81	126.5	4.98	36	80	59

Ordering codes and description composition

MG10A/0S1B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
MG10A/0S1B	OMG10002009	Pressure range 1
MG10A/0S2B	OMG10002002	Pressure range 2
MG10A/0S3B	OMG10002003	Pressure range 3
MG10A/0S4B	OMG10002001	Pressure range 4
SAE cavity 12/2		
MG12A/0S1B	OMG12002000	Pressure range 1
MG12A/0S2B	OMG12002001	Pressure range 2
MG12A/0S3B	OMG12002002	Pressure range 3

2 Adjustments

TYPE	DESCRIPTION
S	Screw with cap
V	With handwheel (part code: see point 6)
X	Valve set with antitampering cap (part code: see point 6)

3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

TYPE	DESCRIPTION
1	For SAE cavity 10/2: pressure range 30÷100 bar (435÷1450 psi); Std. setting 80 bar (1160 psi) For SAE cavity 12/2: pressure range 20÷100 bar (290÷1450 psi); Std. setting 50 bar (725 psi)
2	Pressure range 50÷200 bar (725÷2900 psi); Std. setting 150 bar (2175 psi)
3	Pressure range 150÷350 bar (2175÷5100 psi); Std. setting 250 bar (3625 psi)
4	Pressure range 5÷60 bar (72.5÷870 psi); Std. setting 30 bar (435 psi); only for SAE cavity 10/2

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

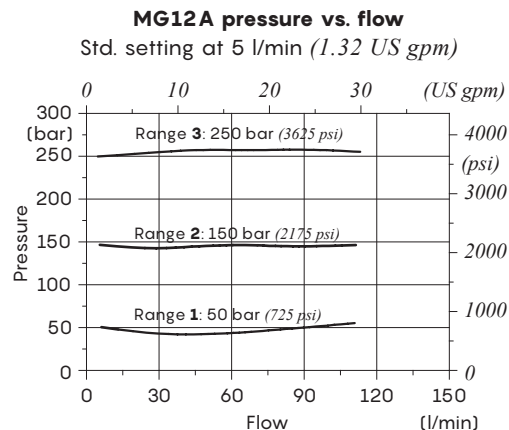
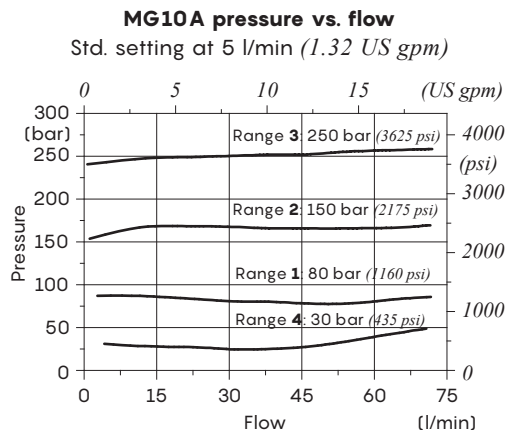
TYPE	CODE	DESCRIPTION
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

6 Accessories

TYPE	CODE	DESCRIPTION
-	4VL2407100	Handwheel
-	4COP120420	Antitampering cap

Rating diagrams





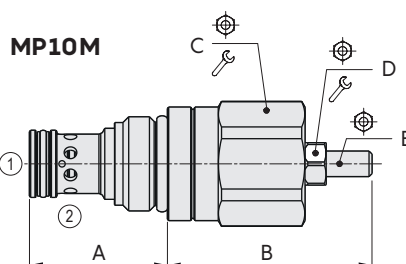
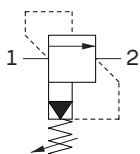
MP..M type pressure relief valves – 2 way

- Pilot operated
- Spool type
- Mechanical control with screw adjustments
- Different springs available to vary pressure range
- The backpressure values on line 2 must be added to valve nominal setting

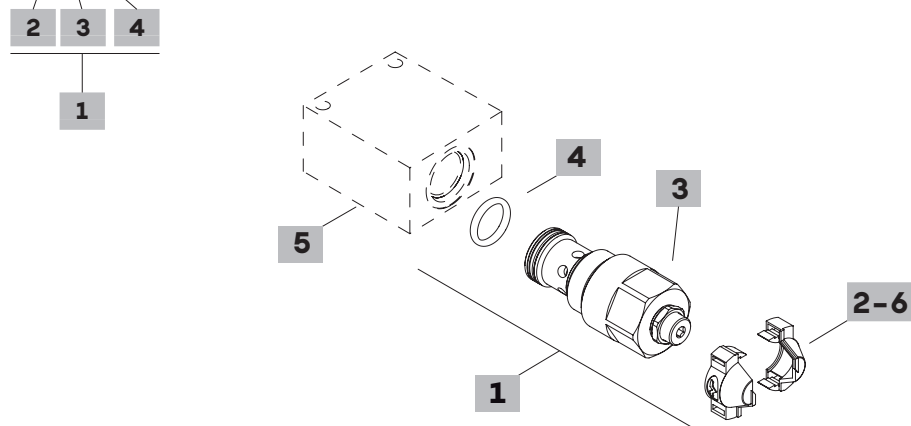
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		MP10M	MP12M	MP16M
Nominal flow		120 l/min (31.7 US gpm)	200 l/min (52.8 US gpm)	400 l/min (105.67 US gpm)
Max. pressure		Port 1= 350 bar (5100 psi) Port 2= 30 bar (435 psi)		350 bar (5100 psi)
Oil leakage	at 80% of max. pressure setting	25 cm³/min (1.525 in³/min)		100 cm³/min (6.102 in³/min)
Fluid		mineral based or sinthetic hydraulic fluid with lubricating properties		
Viscosity		10–200 cSt		12–400 cSt
Max level of contamination		18/16/13 ISO4406		20/18/14 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)		
Cavity		SAE 10/2	SAE 12/2	SAE 16/2
Weight		0.190 kg (0.42 lb)	0.300 kg (0.66 lb)	0.490 kg (1.080 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C			D			E
	mm	in	mm	in		Nm	lbft		Nm	lbft	
MP10M	32.6	1.28	48.3	1.90	27	50	37	10	6.6	4.9	3
MP12M	45	1.77	46.9	1.85	32	80	59	10	6.6	4.9	3
MP16M	45.2	1.78	49.8	1.96	36	100	74	19	20	15	5

Ordering codes and description composition
MP16M/0Y2B

1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
MP10M/0G1B	OMP10002091	Pressure range 1
MP10M/0G2B	OMP100020A00	Pressure range 2
MP10M/0G3B	OMP10002093	Pressure range 3
SAE cavity 12/2		
MP12M/0G1B	OMP12002046	Pressure range 1
MP12M/0G2B	OMP12002047	Pressure range 2
MP12M/0G3B	OMP12002048	Pressure range 3
SAE cavity 16/2		
MP16M/0Y1B	OMP16002017	Pressure range 1
MP16M/0Y2B	OMP16002013	Pressure range 2
MP16M/0Y3B	OMP16002014	Pressure range 3

2 Adjustments

TYPE	DESCRIPTION
G/Y	With screw
X	Valve set with antitampering cap (part code: see point 6)

3 Pressure range

TYPE	DESCRIPTION
1	Pressure range 5÷50 bar (72.5÷725 psi);
2	Pressure range 50÷220 bar (725÷3190 psi);
3	Pressure range 150÷350 bar (2175÷5100 psi);

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2 - SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2 - SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2 - SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
 For steel bodies or different threading see from page 208

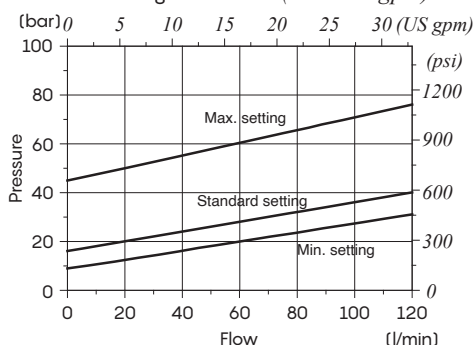
6 Accessories

TYPE	CODE	DESCRIPTION
-	4COP116420	Cap (for MP10M / MP12M)
-	4COP126300	Antitampering cap (x2) (for MP16M)

Rating diagrams

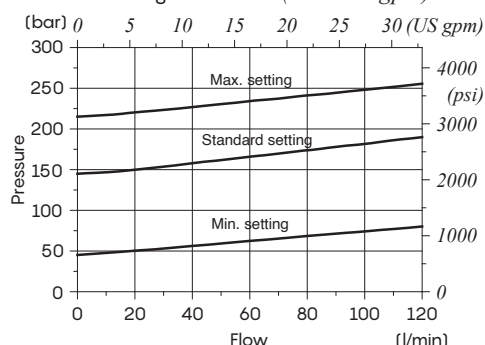
MP10M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



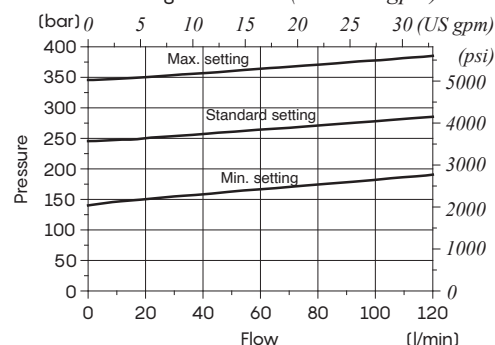
MP10M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



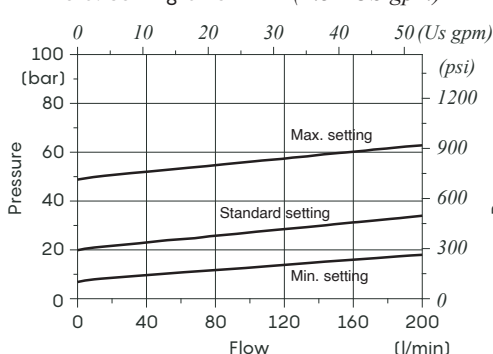
MP10M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



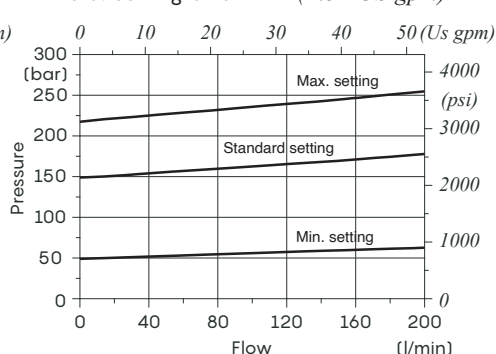
MP12M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



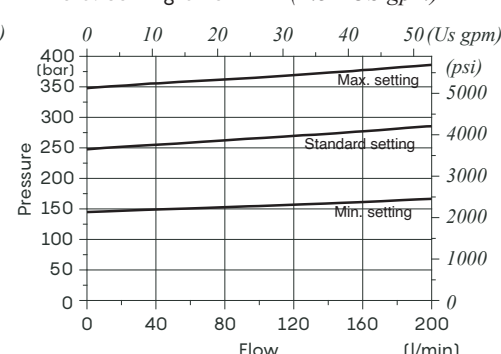
MP12M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



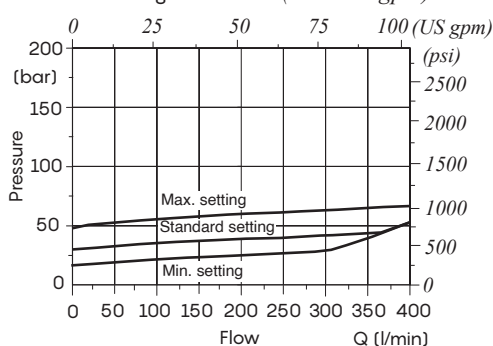
MP12M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



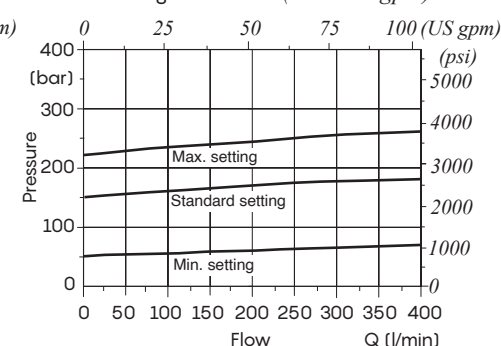
MP16M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



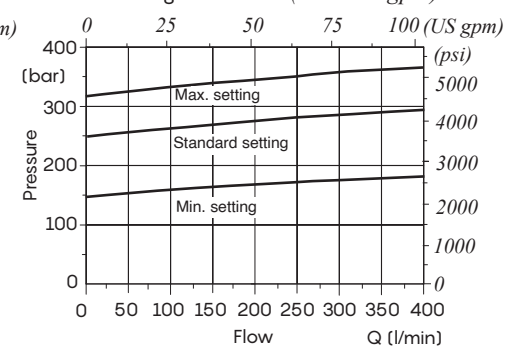
MP16M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)



MP16M pressure vs. flow

Std. setting at 5 l/min (1.32 US gpm)





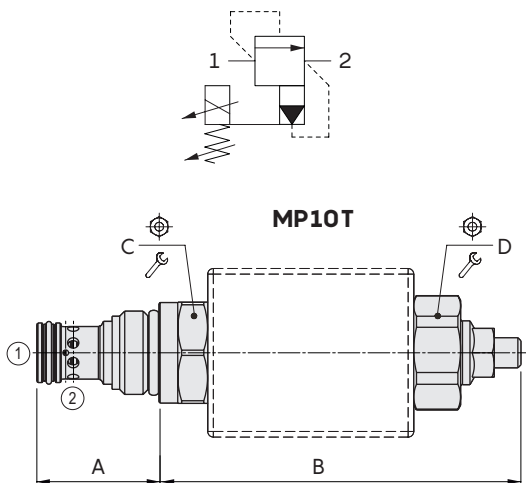
MP..T type pressure relief valves – 2 way

- Solenoid proportional type, direct acting
- Spool type
- Decreasing pressure with increasing current (N.C)
- Applications for high flow rates (max. 200 l/min – 52.8 US gpm)
- System of purging of air
- From SAE10 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		MP10T	MP12T
Nominal flow		120 l/min (16 US gpm)	200 l/min (52.8 US gpm)
Max. pressure		350 bar (5100 psi)	
Oil leakage	at 80% of max. pressure setting	<150 cm ³ /min (9.15 in ³ /min)	<200 cm ³ /min (<12.2 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10–200 cSt	
Max level of contamination		18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from –25°C (–13°F) to 90°C (194°F) from –20°C (–4°F) to 110°C (230°F)	
Environmental temp. for working conditions		from –20°C (–4°F) to 60°C (140°F)	
Cavity		SAE 10/2	SAE 12/2
Coil type*		BH or BQP19	
Nominal voltages		12VDC – 24VDC	
Power rating		33 W (BH) – 15 W (BQP19)	
Max. control current		12V->1.70 A – 24V->0.85 (BH) 12V->1.25 A – 24V->0.63 A (BQP19)	
Dither frequency		200 Hz	
Hysteresis		<5%	
Weight		0.77 kg (1.70 lb)	0.92 kg (2.03 lb)

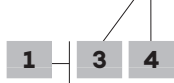
NOTE – For different conditions, please contact Walvoil Sales Dpt. – *For coils further features see from page 201.



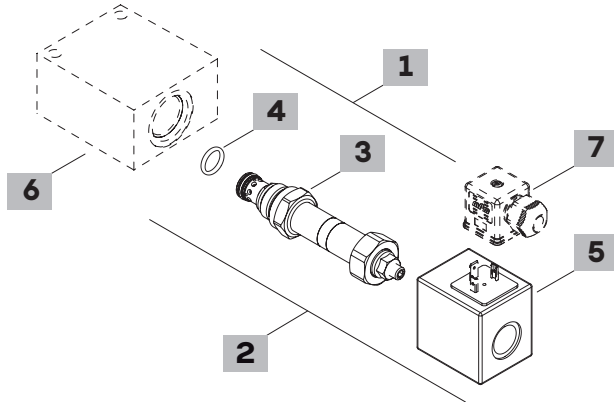
Valve type	A		B		C		D	
	mm	in	mm	in	Nm	lbf·ft	Nm	lbf·ft
MP10T	32.6	1.28	100	3.94	27	50	37	28
MP12T	45	1.81	115	4.53	32	85	62.7	28

Ordering codes and description composition

MP10T/001B



MP10T/031B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
MP10T/001B	OMP10002051	Pressure range 1
MP10T/002B	OMP10002052	Pressure range 2
MP10T/003B	OMP10002053	Pressure range 3
MP10T/004B	OMP100020A02	Pressure range 4
SAE cavity 12/2		
MP12T/001B	OMP12002028	Pressure range 1
MP12T/002B	OMP12002029	Pressure range 2
MP12T/003B	OMP12002030	Pressure range 3
MP12T/004B	OMP12002035	Pressure range 4

2 Complete cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
MP10T/031B	OMP10002035	Pressure range 1 , 12VDC
MP10T/032B	OMP10002036	Pressure range 2 , 12VDC
MP10T/033B	OMP10002037	Pressure range 3 , 12VDC
SAE cavity 12/2		
MP12T/031B	OMP12002020	Pressure range 1 , 12VDC
MP12T/032B	OMP12002021	Pressure range 2 , 12VDC
MP12T/033B	OMP12002022	Pressure range 3 , 12VDC
MP12T/034B	OMP12002027	Pressure range 4 , 12VDC

3 Pressure range

TYPE	DESCRIPTION
1	Pressure range 8+130 bar (<i>116÷1900 psi</i>)
2	Pressure range 8+180 bar (<i>116÷2600 psi</i>)
3	Pressure range 8+240 bar (<i>116÷3500 psi</i>)
4	Pressure range 8+300 bar (<i>116÷4350 psi</i>);

Note: for further pressure range contact Sales Dept

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
2) BH 12VDC	4SLD001200A	12VDC-ISO4400 coil
3) BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil
4) BH 24VDC	4SLD002400A	24VDC-ISO4400 coil
5) BQP19 24VDC	4SL5000245A	24VDC-ISO4400 coil

For complete coils list see from page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (*3050 psi*)

For steel bodies or different threading see from page 208

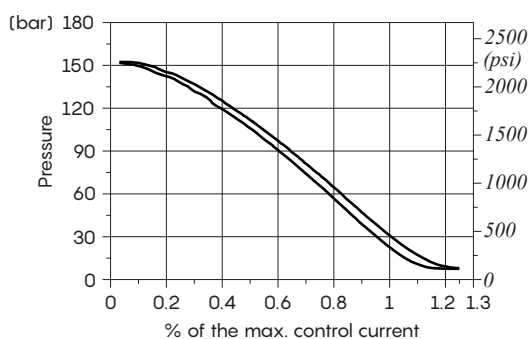
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

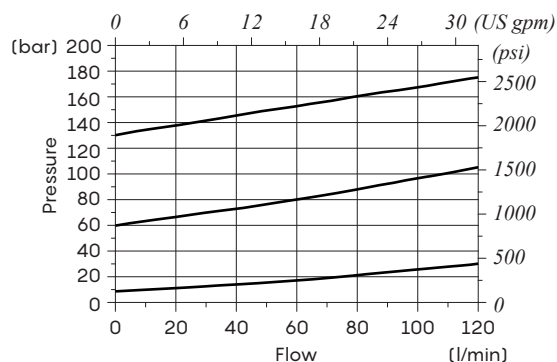
For complete connectors list see from page 201

Rating diagrams

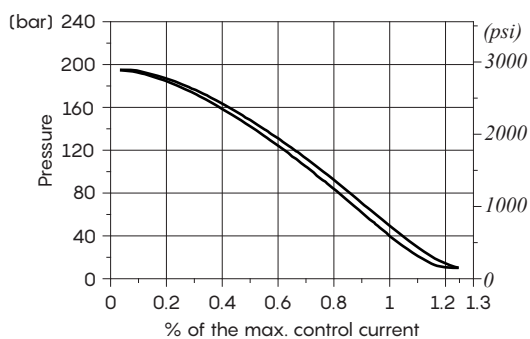
MP10T pressure setting vs. % max. control current
at 5 l/min (1.32 US gpm)



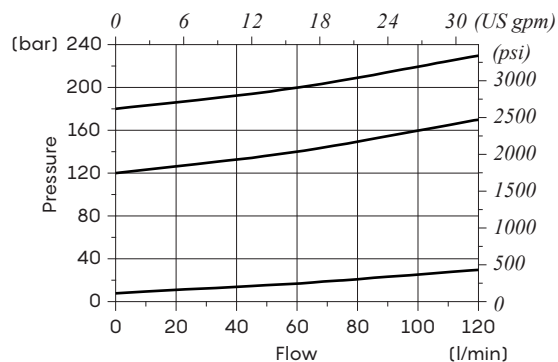
MP10T pressure vs. flow 1->2
for % of control current - Pressure range 1



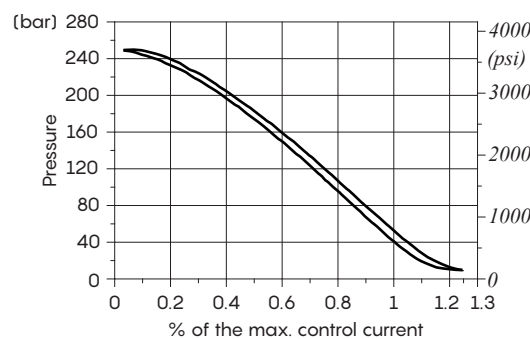
MP10T pressure setting vs. % max. control current
at 5 l/min (1.32 US gpm)



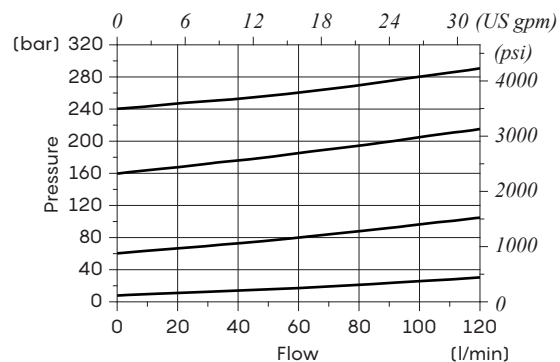
MP10T pressure vs. flow 1->2
for % of control current - Pressure range 2



MP10T pressure setting vs. % max. control current
at 5 l/min (1.32 US gpm)

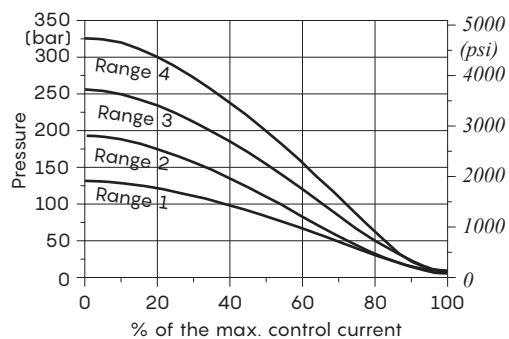


MP10T pressure vs. flow 1->2
for % of control current - Pressure range 3

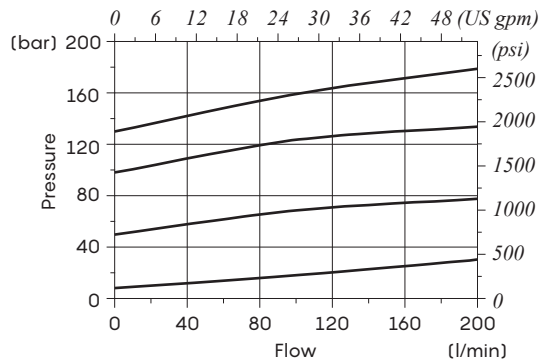


Rating diagrams

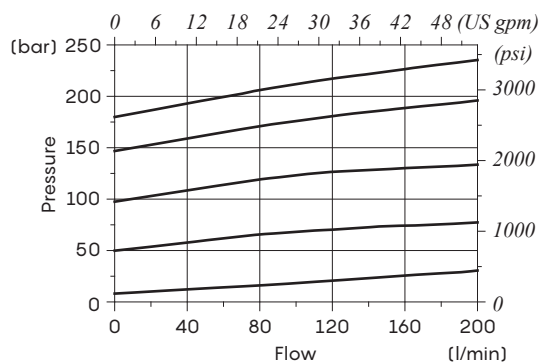
MP12T pressure setting vs. % max. control current
at 10 l/min (2.6 US gpm)



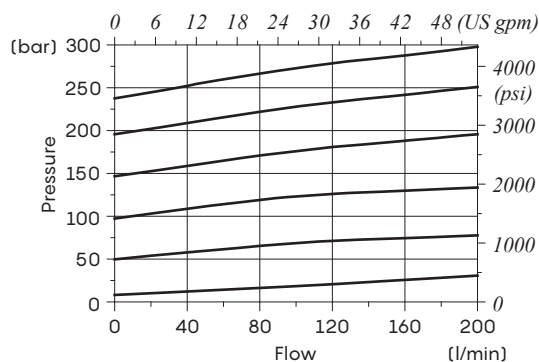
MP12T pressure vs. flow 1->2
for % of control current - Pressure range 1



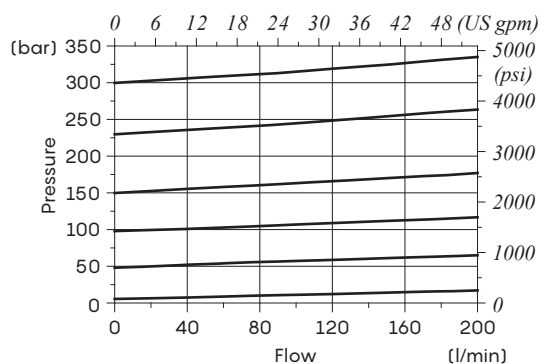
MP12T pressure vs. flow 1->2
for % of control current - Pressure range 2



MP12T pressure vs. flow 1->2
for % of control current - Pressure range 3



MP12T pressure vs. flow 1->2
for % of control current - Pressure range 4





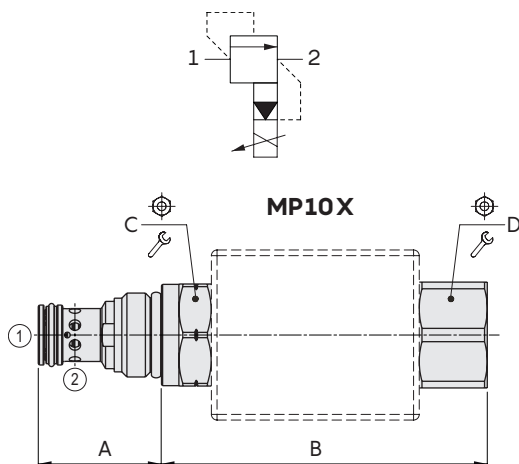
MP..X type pressure relief valves – 2 way

- Solenoid proportional type, pilot operated
- Spool type
- Increasing pressure with increasing current (N.O)
- Applications for high flow rates (max. 200 l/min – 52.8 US gpm)
- System of purging of air
- From SAE10 to SAE12 cavities

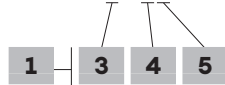
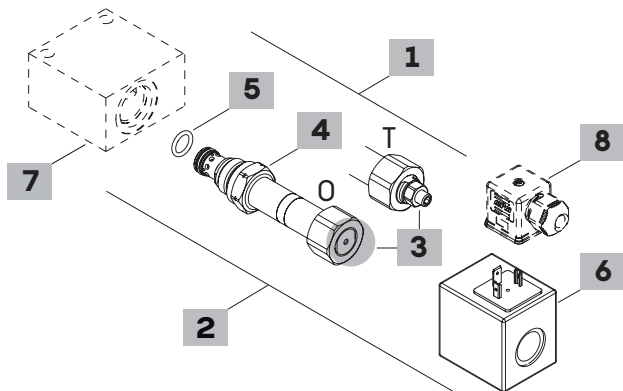
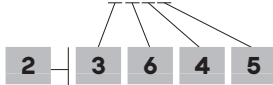
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		MP10X	MP12X
Max. flow		120 l/min (31.7 US gpm)	200 l/min (52.8 US gpm)
Max. pressure		350 bar (5100 psi)	
Oil leakage	at 80% of max. pressure setting	<150 cm ³ /min (9.15 in ³ /min)	<200 cm ³ /min (12.2 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10–200 cSt	
Max level of contamination		18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from –25°C (–13°F) to 90°C (194°F) from –20°C (–4°F) to 110°C (230°F)	
Environmental temp. for working conditions		from –20°C (–4°F) to 60°C (140°F)	
Cavity		SAE 10/2	SAE 12/2
Coil type*		BH or BQP19	
Nominal voltages		12VDC – 24VDC	
Power rating		33 W (BH) – 15 W (BQP19)	
Max. control current		12V->1.70 A – 24V->0.85 (BH) 12V->1.25 A – 24V->0.63 A (BQP19)	
Dither frequency		150–200 Hz	
Hysteresis		<5%	
Weight		0.76 kg (1.67 lb)	0.88 kg (1.94 lb)

NOTE – For different conditions, please contact Walvoil Sales Dpt. – *For coils further features see from page 201.



Valve type	A		B				C		D			
	mm	in	N / O without emergency		T screw							
	mm	in	mm	in	mm	in	Nm	lbf	Nm	lbf	Nm	lbf
MP10X	32.6	1.28	86	3.38	104.2	4.10	27	50	37	28	5	3.7
MP12X	45	1.77	103	4.05	118.3	4.66	32	85	62.7	28	5	3.7

Ordering codes and description composition
MP10X/001B

MP10X/031B

1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
MP10X/001B	OMP10002054	Pressure range 1
MP10X/002B	OMP10002055	Pressure range 2
MP10X/003B	OMP10002056	Pressure range 3
MP10X/004B	OMP10002057	Pressure range 4
SAE cavity 12/2		
MP12X/001B	OMP12002031	Pressure range 1
MP12X/002B	OMP12002032	Pressure range 2
MP12X/003B	OMP12002033	Pressure range 3
MP12X/004B	OMP12002034	Pressure range 4

2 Complete cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
MP10X/031B	OMP10002044	Pressure range 1 , 12VDC
MP10X/032B	OMP10002045	Pressure range 2 , 12VDC
MP10X/033B	OMP10002046	Pressure range 3 , 12VDC
MP10X/034B	OMP10002047	Pressure range 4 , 12VDC
SAE cavity 12/2		
MP12X/031B	OMP12002023	Pressure range 1 , 12VDC
MP12X/032B	OMP12002024	Pressure range 2 , 12VDC
MP12X/033B	OMP12002025	Pressure range 3 , 12VDC
MP12X/034B	OMP12002026	Pressure range 4 , 12VDC

3 Emergency

TYPE	DESCRIPTION
0	Without override
T	With screw

4 Pressure range

TYPE	DESCRIPTION
1	Pressure range 10÷120 bar (<i>145÷1740 psi</i>)
2	Pressure range 10÷160 bar (<i>145÷2320 psi</i>)
3	Pressure range 10÷230 bar (<i>145÷3335 psi</i>)
4	Pressure range 10÷350 bar (<i>145÷5100 psi</i>);

Note: for further pressure range contact Sales Dept

5 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

6 Coils

TYPE	CODE	DESCRIPTION
2) BH 12VDC	4SLD001200A	12VDC-ISO4400 coil
3) BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil
4) BH 24VDC	4SLD002400A	24VDC-ISO4400 coil
5) BQP19 24VDC	4SL5000245A	24VDC-ISO4400 coil

For complete coils list see from page 201

7 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (*3050 psi*)
 For steel bodies or different threading see from page 208

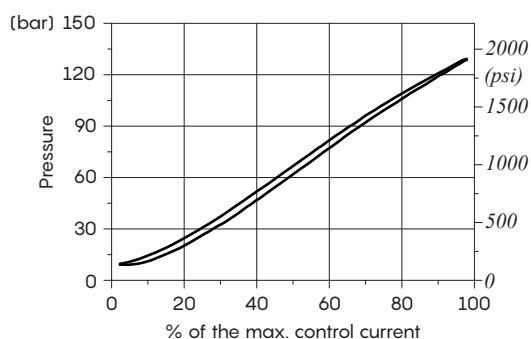
8 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

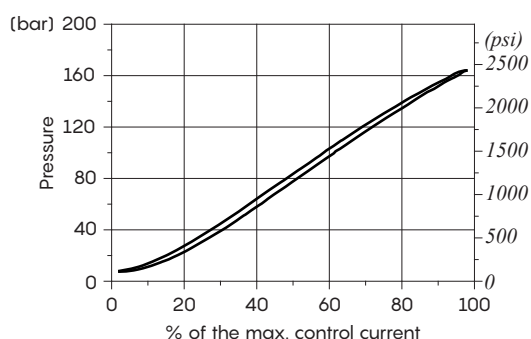
For complete connectors list see from page 201

Rating diagrams

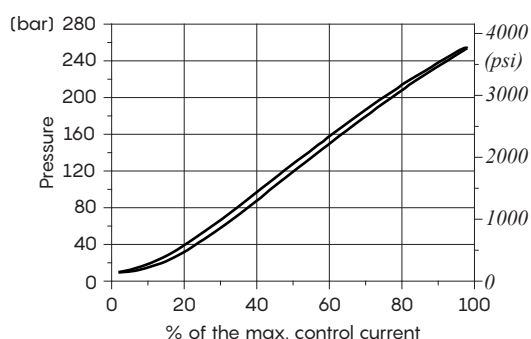
MP10X pressure setting vs. % max. control current
at 5 l/min (1.32 US gpm)



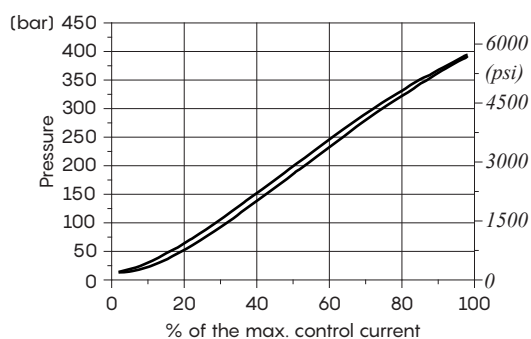
MP10X pressure setting vs. % max. control current
at 5 l/min (1.32 US gpm)



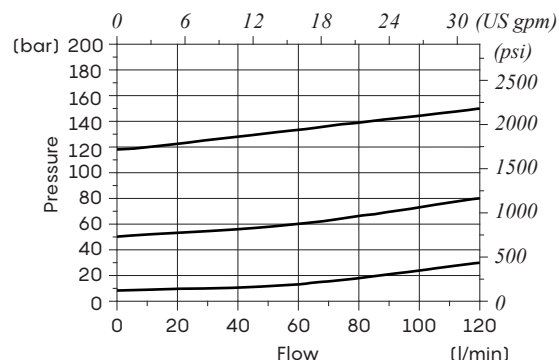
MP10X pressure setting vs. % max. control current
at 5 l/min (1.32 US gpm)



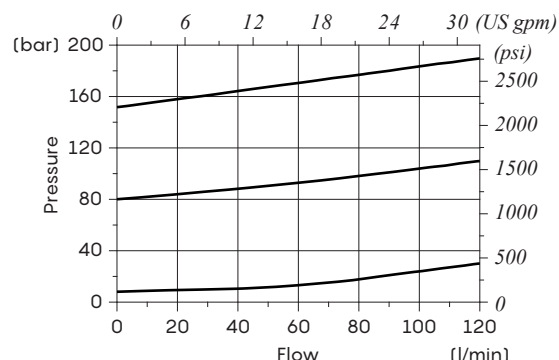
MP10X pressure setting vs. % max. control current
at 5 l/min (1.32 US gpm)



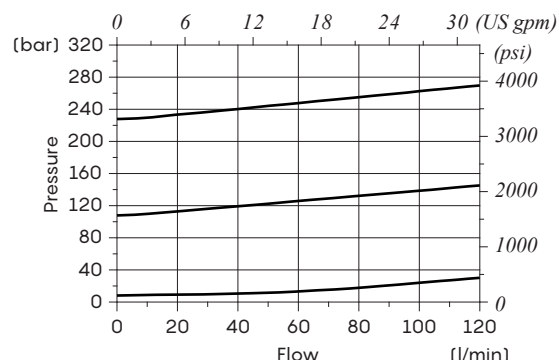
MP10X pressure vs. flow 1->2
for % of control current - Pressure range 1



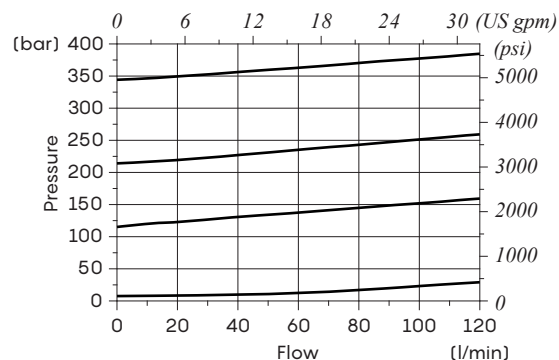
MP10X pressure vs. flow 1->2
for % of control current - Pressure range 2



MP10X pressure vs. flow 1->2
for % of control current - Pressure range 3

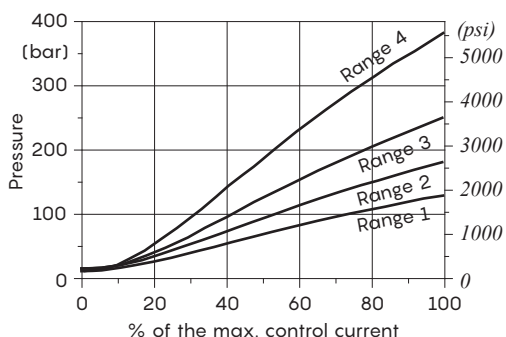


MP10X pressure vs. flow 1->2
for % of control current - Pressure range 4

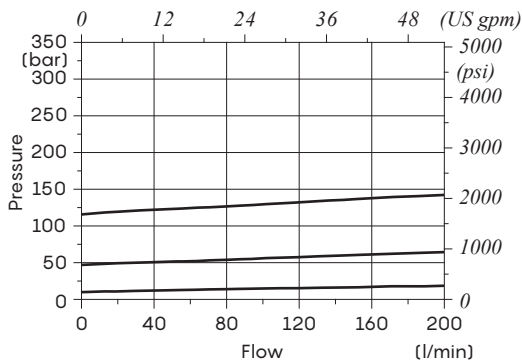


Rating diagrams

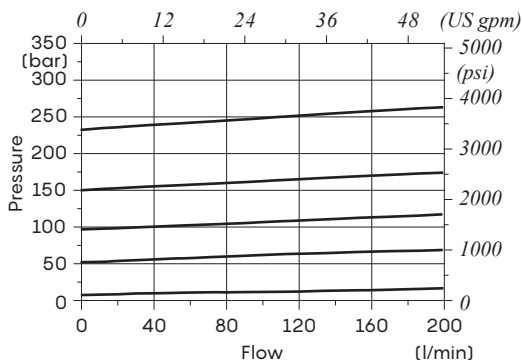
MP12X pressure setting vs. % max. control current
at 10 l/min (2.64 US gpm)



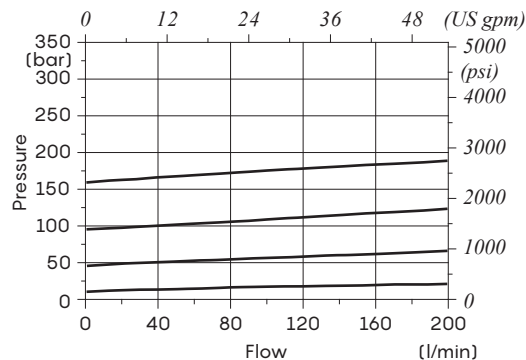
MP12X pressure vs. flow 1->2
for % of control current - Pressure range 1



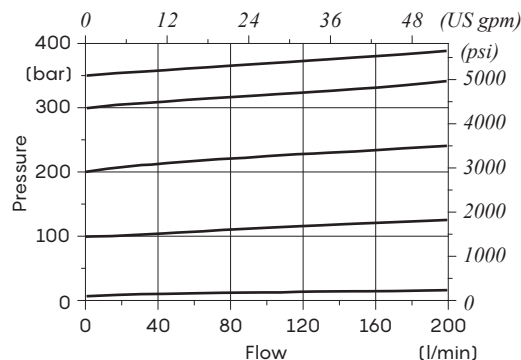
MP12X pressure vs. flow 1->2
for % of control current - Pressure range 3



MP12X pressure setting vs. flow 1->2
for % of control current - Pressure range 2



MP12X pressure vs. flow 1->2
for % of control current - Pressure range 4





RD08L type pressure reducing valves – 3 way

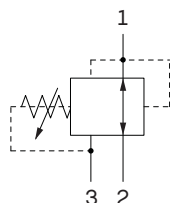
- Direct acting damped with relieving
- Spool type
- Mechanical control with screw adjustment
- Different springs available to vary pressure range (from 10 to 150 bar - 145 to 2175 psi)
- Applications for high flow rates (max. 350 bar - 5100 psi) and low flow rates (15 l/min - 4 US gpm)
- Available with or without filter (mesh-type 90 microns)
- The backpressure values on line 3 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

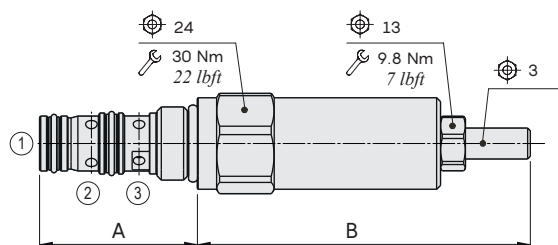
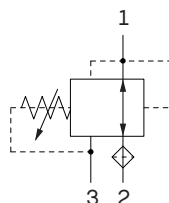
Nominal flow	15 l/min (4 US gpm)	
Max. pressure	Port 2 = 350 bar (5100 psi) Port 3 = 30 bar (435 psi)	
Oil leakage	-	
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	20/18/14 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/3	
Weight	0.250 kg (0.55 lb)	

NOTE - For different conditions, please contact Walvoil Sales Dpt.

**Configuration
without filter**



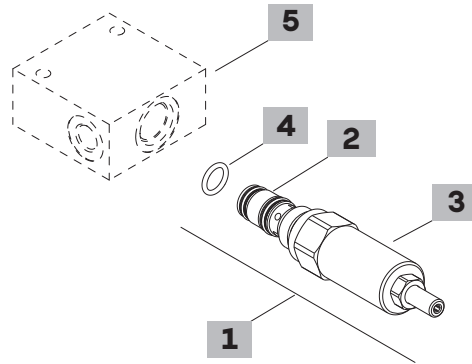
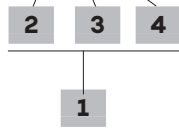
**Configuration
with filter**



Valve type		A		B	
		mm	in	mm	in
RD08L/	G1B	41.1	1.62	86.7	3.41
	G2B	41.1	1.62	86.7	3.41
	G3B	41.1	1.62	81.6	3.21

Ordering codes and description composition

RD08L/1G1B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
RD08L/0G1B	ORD08002038	Pressure range G1 , without filter
RD08L/1G1B	ORD08002037	Pressure range G1 , with filter
RD08L/0G2B	ORD08002033	Pressure range G2 , without filter
RD08L/1G2B	ORD08002039	Pressure range G2 , with filter
RD08L/0G3B	ORD08002034	Pressure range G3 , without filter
RD08L/1G3B	ORD08002040	Pressure range G3 , with filter

2 Filter

TYPE	DESCRIPTION
0	Without filter
1	Mesh filter: 90 micron

3 Pressure range

Standard setting is referred to 5 l/min (1.32 Us gpm) flow

TYPE	DESCRIPTION
G1	Pressure range 10÷50 bar (145÷725 psi); Std. setting 30 bar (435 psi)
G2	Pressure range 40÷100 bar (580÷1450 psi); Std. setting 50 bar (725 psi)
G3	Pressure range 70÷150 bar (1015÷2175 psi); Std. setting 100 bar (1450 psi)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

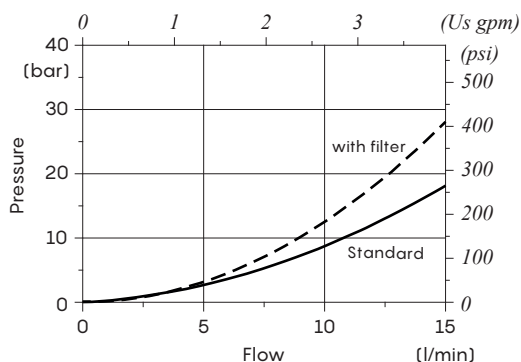
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread

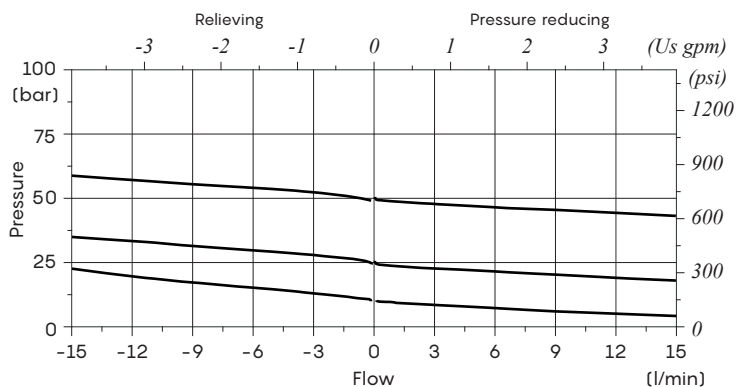
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

Rating diagrams

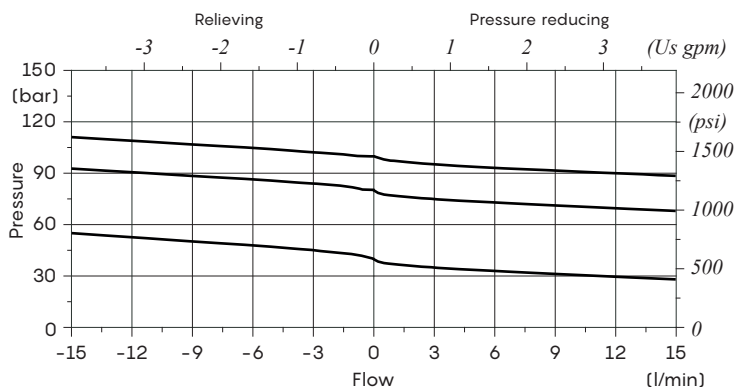
Pressure vs. flow 2-->1



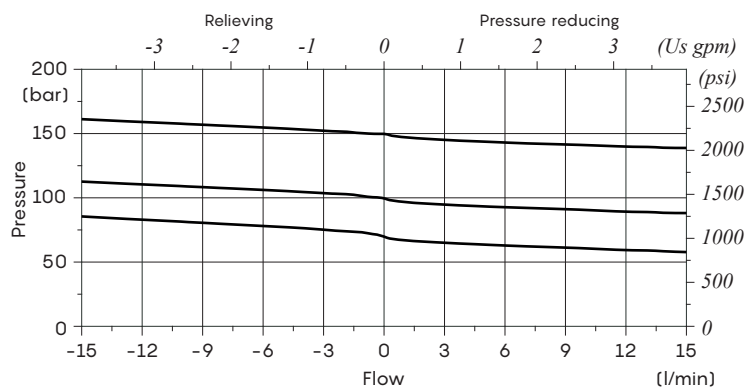
**G1 pressure range
reducing/relieving pressure vs. flow**



**G2 pressure range
reducing/relieving pressure vs. flow**



**G3 pressure range
reducing/relieving pressure vs. flow**





RD08LH type pressure reducing valves - 3 way

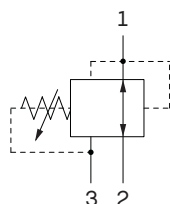
- Direct acting damped with relieving
- Spool type
- Mechanical control with screw adjustment
- Different springs available to vary pressure range (from 10 to 150 bar - 145 to 2175 psi)
- Applications for high flow rates (max. 350 bar - 5100 psi) and high flow rates (30 l/min - 7.9 US gpm)
- Available with or without filter (mesh-type 90 microns)
- The backpressure values on line 3 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

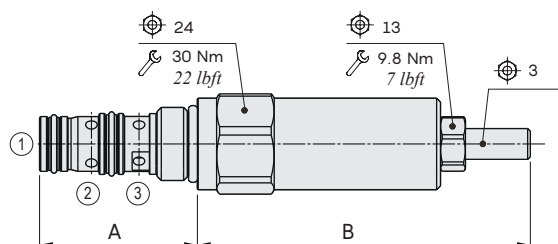
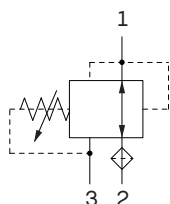
Nominal flow	30 l/min (7.9 US gpm)	
Max. pressure	Port 2 = 350 bar (5100 psi) Port 3 = 30 bar (435 psi)	
Oil leakage	-	
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	20/18/14 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/3	
Weight	0.250 kg (0.55 lb)	

NOTE - For different conditions, please contact Walvoil Sales Dpt.

**Configuration
without filter**



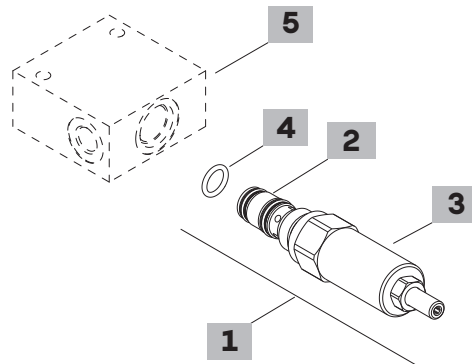
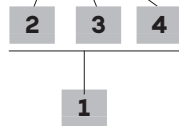
**Configuration
with filter**



Valve type		A		B	
		mm	in	mm	in
RD08LH/	G1B	41.1	1.62	86.7	3.41
	G1B	41.1	1.62	86.7	3.41
	G3B	41.1	1.62	81.6	3.21

Ordering codes and description composition

RD08LH/1G1B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
RD08LH/0G1B	ORD08002053	Pressure range G1 , without filter
RD08LH/1G1B	ORD08002054	Pressure range G1 , with filter
RD08LH/0G2B	ORD08002055	Pressure range G2 , without filter
RD08LH/1G2B	ORD08002056	Pressure range G2 , with filter
RD08LH/0G3B	ORD08002057	Pressure range G3 , without filter
RD08LH/1G3B	ORD08002058	Pressure range G3 , with filter

2 Filter

TYPE	DESCRIPTION
0	Without filter
1	Mesh filter: 90 micron

3 Pressure range

Standard setting is referred to 5 l/min (1.32 Us gpm) flow

TYPE	DESCRIPTION
G1	Pressure range 10÷50 bar (145÷725 psi); Std. setting 30 bar (435 psi)
G2	Pressure range 40÷100 bar (580÷1450 psi); Std. setting 50 bar (725 psi)
G3	Pressure range 70÷150 bar (1015÷2175 psi); Std. setting 100 bar (1450 psi)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

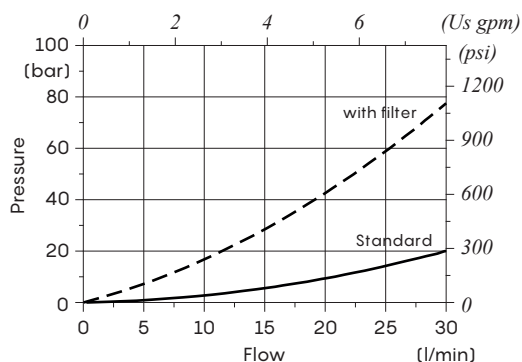
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread

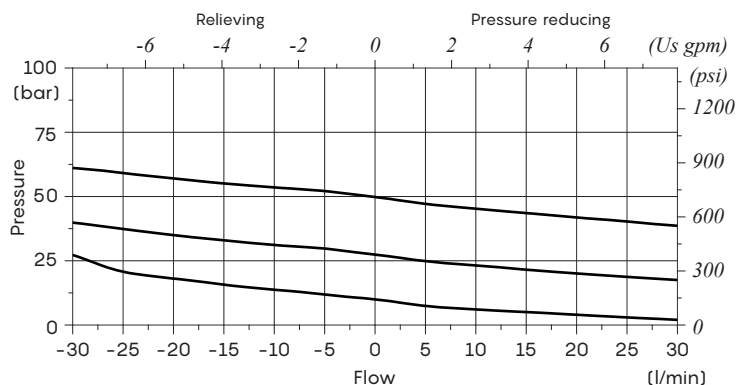
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

Rating diagrams

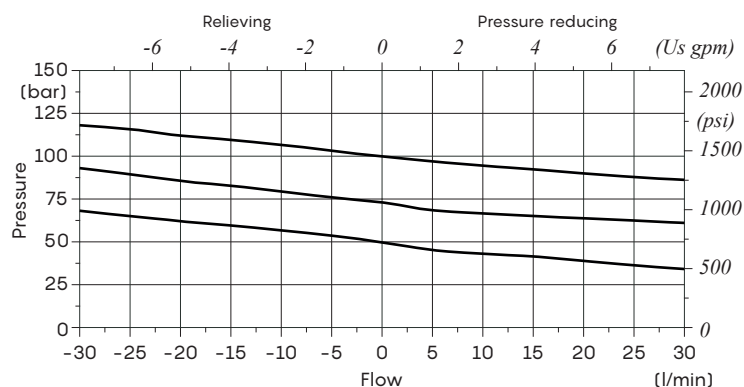
Pressure vs. flow 2-->1



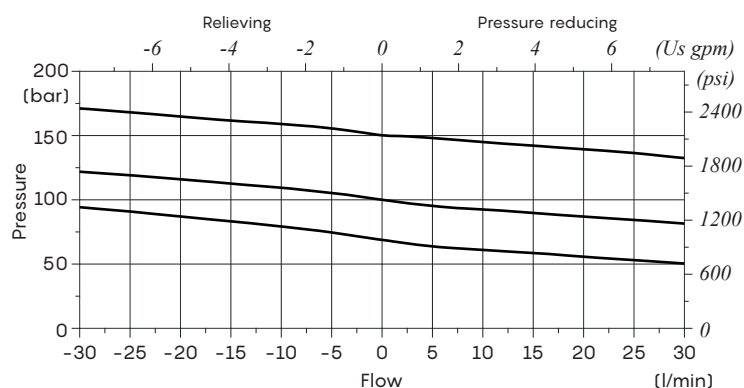
**G1 pressure range
reducing/relieving pressure vs. flow**



**G2 pressure range
reducing/relieving pressure vs. flow**



**G3 pressure range
reducing/relieving pressure vs. flow**





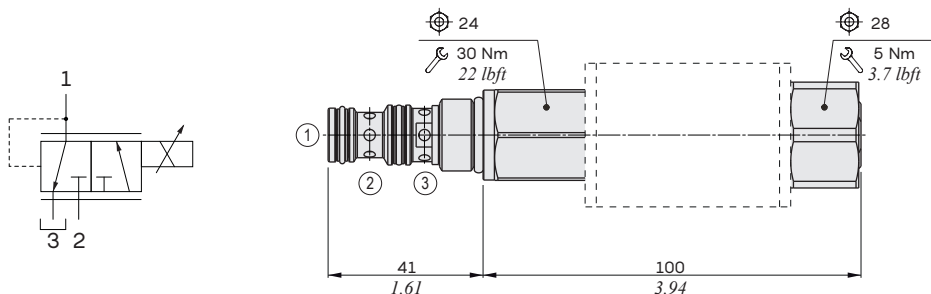
RD08TX type pressure reducing valves - 3 way

- Direct acting with relieving
- Spool type
- Control with proportional solenoid
- System of purging of air
- Applications for high flow rates (max. 210 bar - 3050 psi)
- The backpressure values on line 3 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

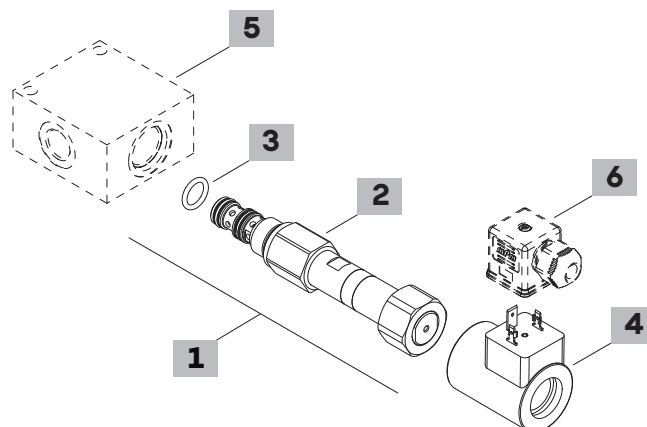
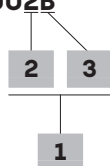
Nominal flow	12 l/min (3.17 US gpm)	
Max. pressure	Port 2 = 210 bar (3050 psi) Port 3 = 30 bar (435 psi)	
Oil leakage	-	
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	12-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/3	
Coil type*	BH	
Nominal voltages	12 VDC - 24 VDC	
Max. control current	12 V -> 1.7 A - 24 V -> 0.85 A	
Dither frequency	150-200 Hz	
Weight	0.350 kg (0.77 lb)	

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.



Ordering codes and description composition

RD08TX/002B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
RD08TX/001B	ORD08002041	Pressure range 1
RD08TX/002B	ORD08002042	Pressure range 2

2 Pressure range

TYPE	DESCRIPTION
1	Pressure range 0÷45 bar (0÷652.5 psi);
2	Pressure range 0÷35 bar (0÷507.5 psi);

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Coils

TYPE	CODE	DESCRIPTION
BH 24VDC	4SLD002400A	24VDC-ISO4400 coil

For complete coils list see from page 201

5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

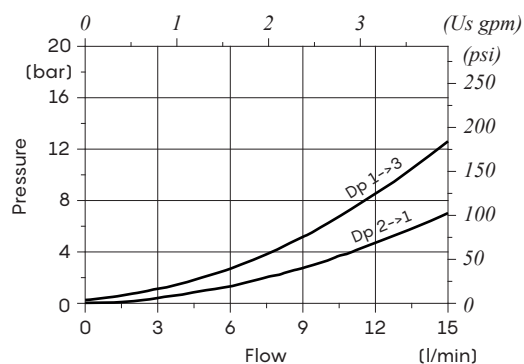
6 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

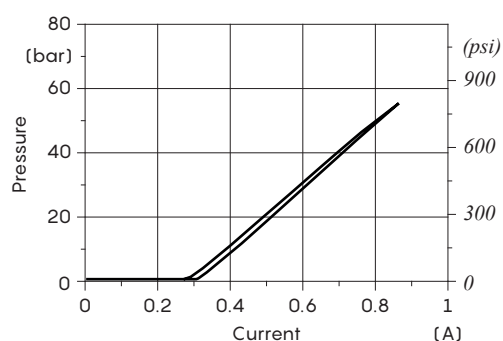
For complete connectors list see from page 201

Rating diagrams

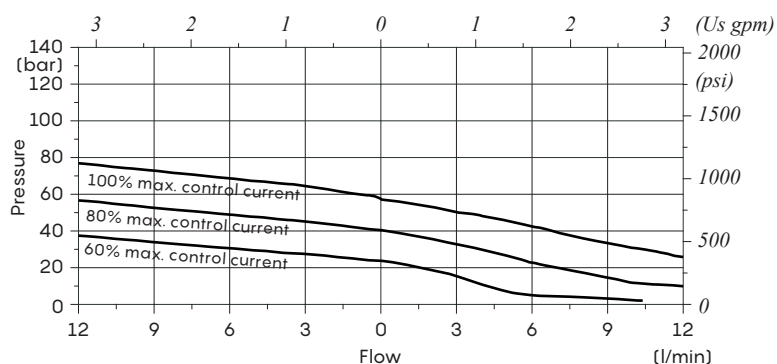
Pressure drop



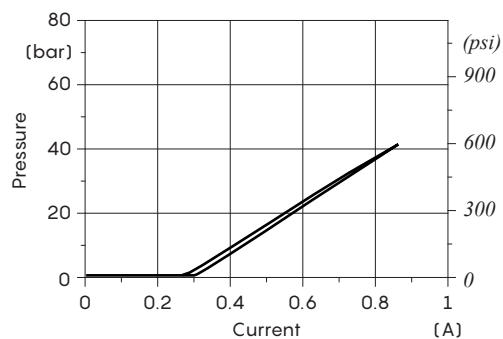
Pressure range 1
Reduced Pressure vs Control Current



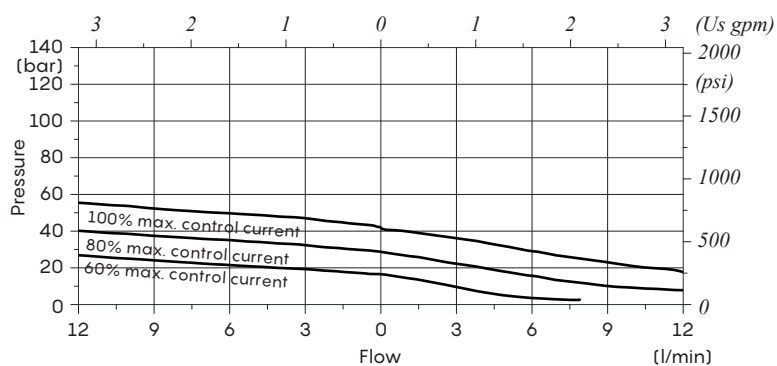
Pressure range 1
reducing/relieving pressure vs Flow rate



Pressure range 2
Reduced Pressure vs Control Current



Pressure range 2
reducing/relieving pressure vs Flow rate





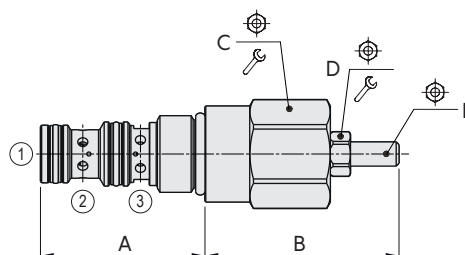
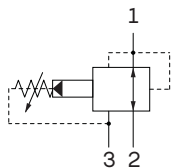
RP..M type pressure reducing valves - 3 way

- Piloted acting with relieving
- Spool type
- Mechanical control with screw adjustments
- Available in fixed or adjustable version (range from 5 to 350 bar - 72.5 to 5100 psi)
- Applications for high flow rates (max. 350 bar - 5100 psi)
- The backpressure values on line 3 must be added to valve nominal setting
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	RP08M	RP10M
Nominal flow	50 l/min (13 US gpm)	70 l/min (18.5 US gpm)
Max. pressure	Port 2= 350 bar (5100 psi) Port 3= 30 bar (435 psi)	
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	12-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)	
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/3	SAE 10/3
Weight	0.160 kg (0.35 lb)	0.200 kg (0.44 lb)

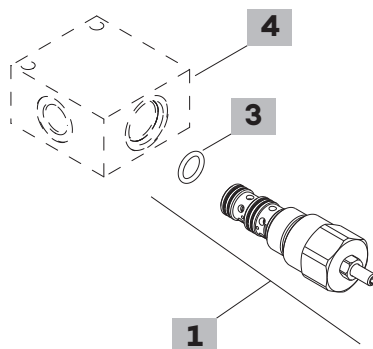
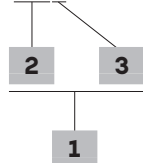
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C		D		E	
	mm	in	mm	in	Nm	lbft	Nm	lbft	Nm	lbft
RP08M	40.8	1.61	48.1	1.89	24	30	22	10	6.6	4.9
RP10M	47.2	1.86	46.3	1.82	27	50	37	10	6.6	4.9

Ordering codes and description composition

RP10M/1G1B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
RP08M/1G1B	ORP08002019	Pressure range 1
RP08M/1G2B	ORP08002020	Pressure range 2
RP08M/1G3B	ORP08002021	Pressure range 3
SAE cavity 10/3		
RP10M/1G1B	ORP10002038	Pressure range 1
RP10M/1G2B	ORP10002039	Pressure range 2
RP10M/1G3B	ORP10002034	Pressure range 3

2 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm)

TYPE	DESCRIPTION
G1	Pressure range 5÷80 bar (72.5÷1160 psi); Std. setting 50 bar (725 psi)
G2	Pressure range 20÷200 bar (290÷2900 psi); Std. setting 150 bar (2175 psi)
G3	Pressure range 90÷350 bar (1305÷5075 psi); Std. setting 250 bar (3625 psi)

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

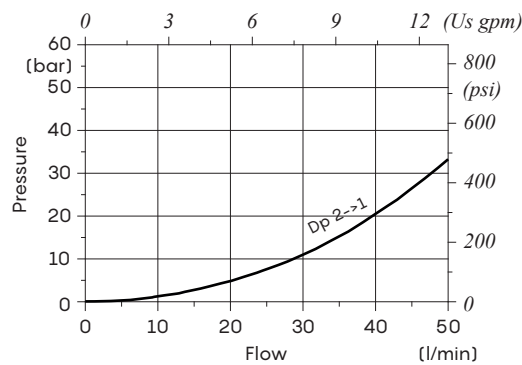
4 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread

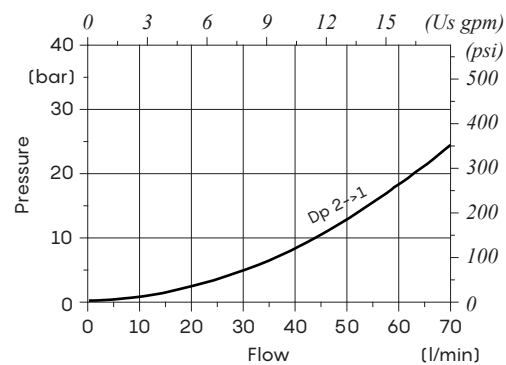
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

Rating diagrams

RP08M pressure drop



RP10M pressure drop





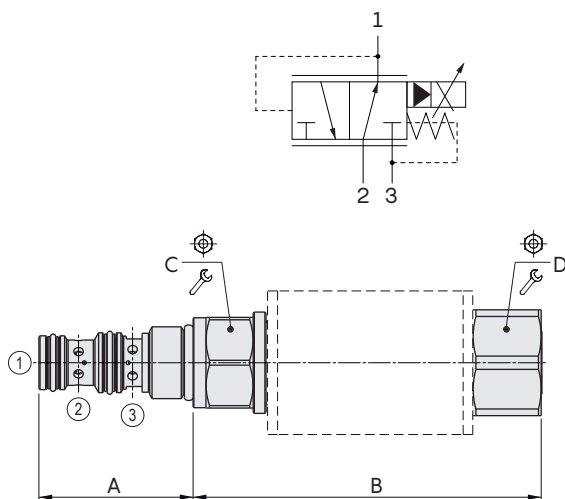
RP..X type pressure reducing valves – 3 way

- Piloted acting with relieving
- Spool type
- Control with proportional solenoid
- External zinc-plated and corrosion-proof components
- Excellent stability throughout the range
- Suitable for applications where high flow rates and low pressure drop are required
- From SAE08 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	RP08X	RP10X	RP12X
Nominal flow	50 l/min (13 US gpm)	70 l/min (18.5 US gpm)	70 l/min (18.5 US gpm)
Max. pressure	Port 2= 350 bar (5100 psi) Port 3= 30 bar (435 psi)	Port 2= 350 bar (5100 psi) Port 3= 50 bar (725 psi)	Port 2= 350 bar (5100 psi) Port 3= 50 bar (725 psi)
Oil leakage	-		
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties		
Viscosity	12-200 cSt		
Max level of contamination	18/16/13 ISO4406		
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)	
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)		
Cavity	SAE 08/3	SAE 10/3	SAE 12/2
Coil type*	BQP19/BH		
Nominal voltages	12 VDC - 24 VDC		
Power rating	15 W (BQP19) - 33 W (BH)		
Max. control current	12V->1.25 A - 24V->0.63 A (BQP19) 12V->1.7 A- 24V->0.85 A (BH)		
Dither frequency	150-200 Hz		
Hysteresis	-	-	-
Weight	0.44 kg (0.97 lb)	0.49 kg (1.08 lb)	0.61 kg (1.34 lb)

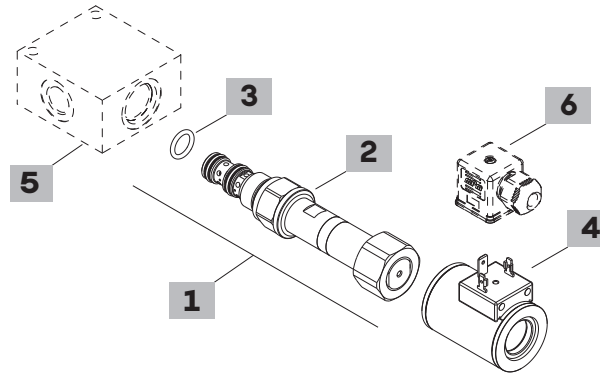
NOTE – For different conditions, please contact Walvoil Sales Dpt. – *For coils further features see from page 201.



Valve type	A		B		C		D	
	mm	in	mm	in	Nm	lbf·ft	Nm	lbf·ft
RP08X	40.8	1.61	92.3	3.63	24	30	22	5
RP10X	47.2	1.86	90.5	3.56	27	50	37	5
RP12X	73.5	2.89	93	3.66	32	80	59	5

Ordering codes and description composition

RP08X/001B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
RP08X/001B	ORP080002016	Pressure range 1
RP08X/002B	ORP080002015	Pressure range 2
RP08X/003B	ORP080002017	Pressure range 3
RP08X/004B	ORP080002018	Pressure range 4
SAE cavity 10/3		
RP10X/001B	ORP10002035	Pressure range 1
RP10X/002B	ORP10002033	Pressure range 2
RP10X/003B	ORP10002036	Pressure range 3
RP10X/004B	ORP10002037	Pressure range 4
SAE cavity 12/3		
RP12X/001B	ORP12002019	Pressure range 1
RP12X/002B	ORP12002020	Pressure range 2
RP12X/003B	ORP12002021	Pressure range 3
RP12X/004B	ORP12002022	Pressure range 4

2 Pressure range

TYPE	DESCRIPTION
1	Pressure range 10÷50 bar (145÷725 psi);
2	Pressure range 10÷170 bar (145÷2465 psi);
3	Pressure range 90÷350 bar (1300÷5075 psi);
4	Pressure range 10÷90 bar (145÷1300 psi);

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Coils

TYPE	CODE	DESCRIPTION
BH 12VDC	4SLD001200A	12VDC-ISO4400 coil
BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil

For complete coils list see from page 201

5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/3-SAE10	3CC1230L11	Aluminium body for cavity 12 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

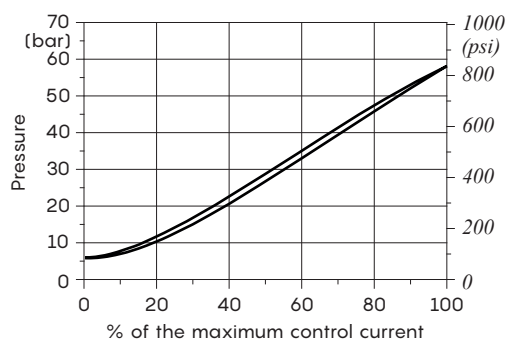
6 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

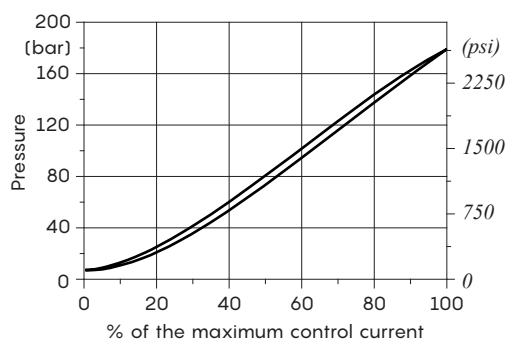
For complete connectors list see from page 201

Rating diagrams

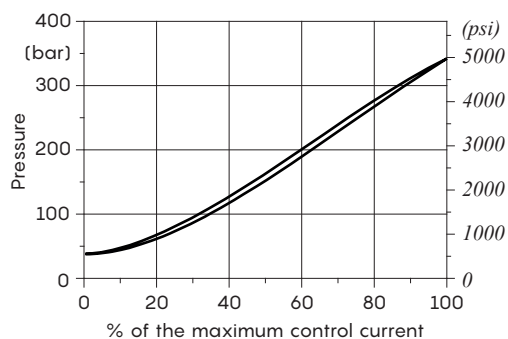
Pressure reducing vs. control current
RP08X/001B



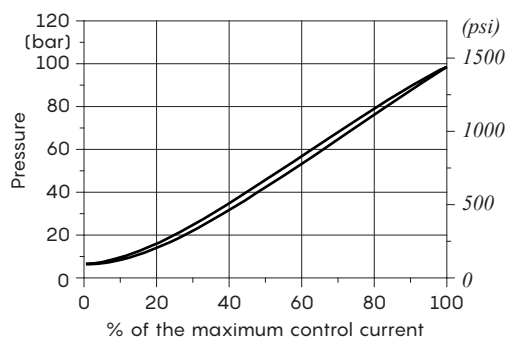
Pressure reducing vs. control current
RP08X/002B



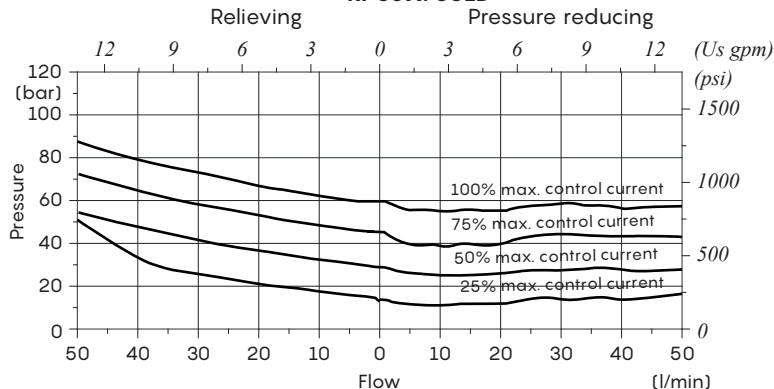
Pressure reducing vs. control current
RP08X/003B



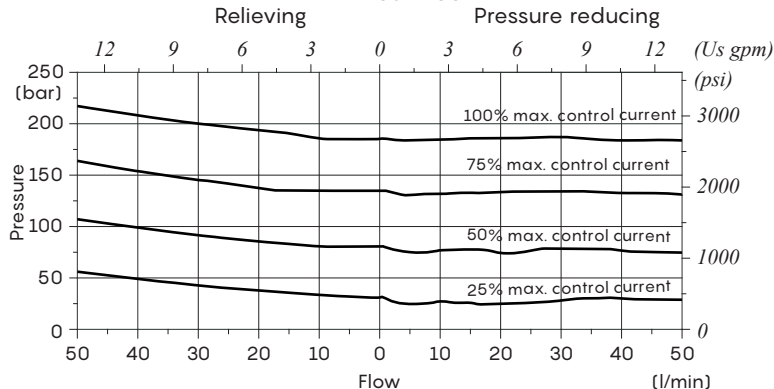
Pressure reducing vs. control current
RP08X/004B



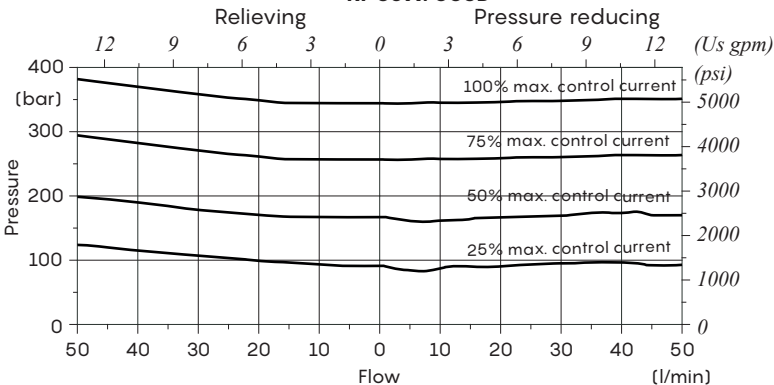
Reducing/relieving pressure vs. flow
RP08X/001B



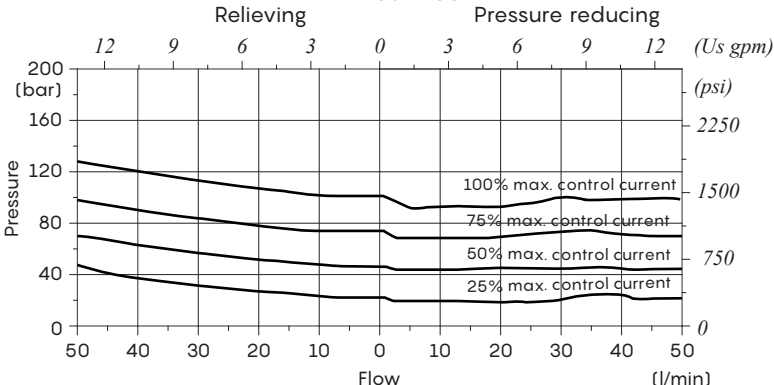
Reducing/relieving pressure vs. flow
RP08X/002B



Reducing/relieving pressure vs. flow
RP08X/003B

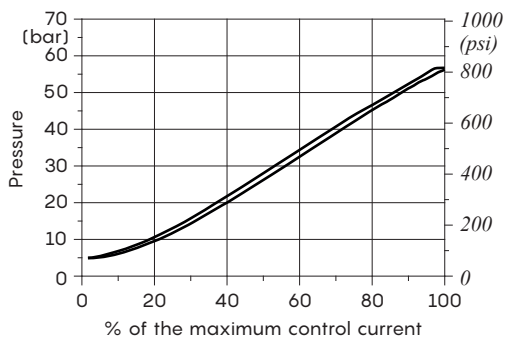


Reducing/relieving pressure vs. flow
RP08X/004B

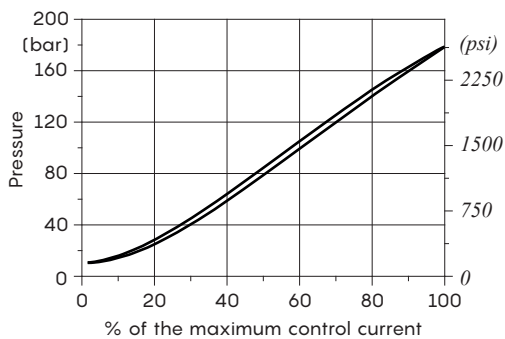


Rating diagrams

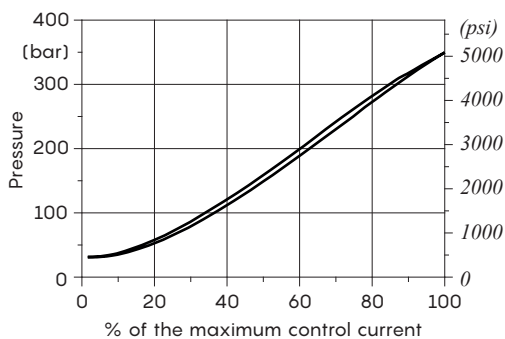
Pressure reducing vs. control current
RP10X/001B



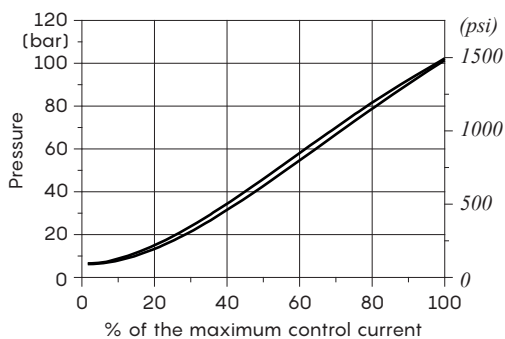
Pressure reducing vs. control current
RP10X/002B



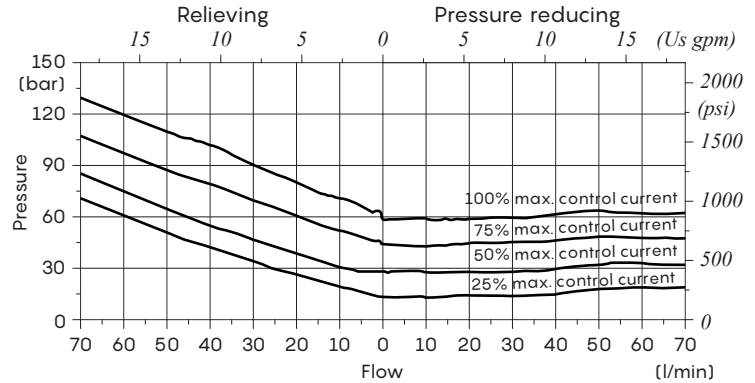
Pressure reducing vs. control current
RP10X/003B



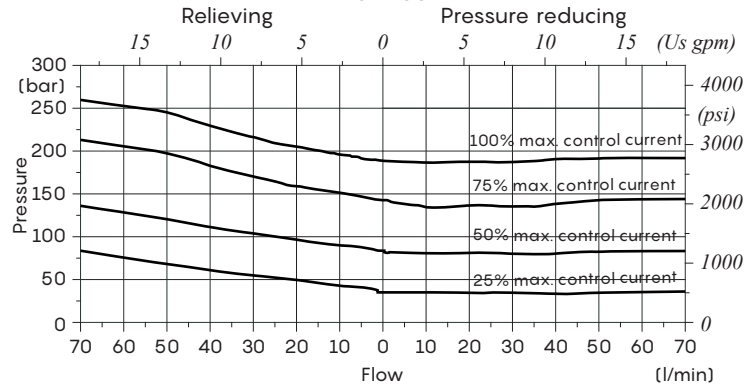
Pressure reducing vs. control current
RP10X/004B



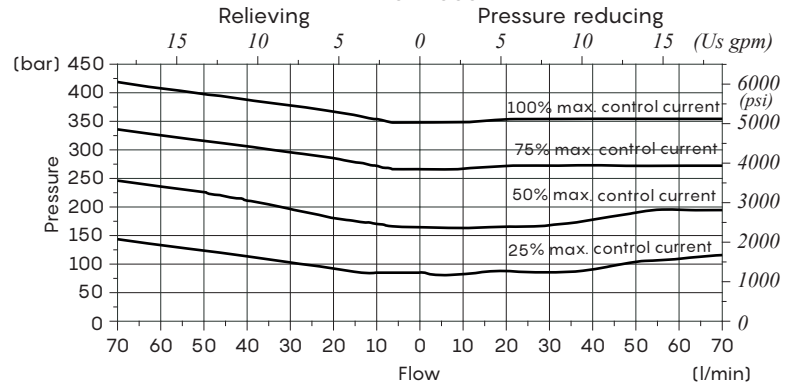
Reducing/relieving pressure vs. flow
RP10X/001B



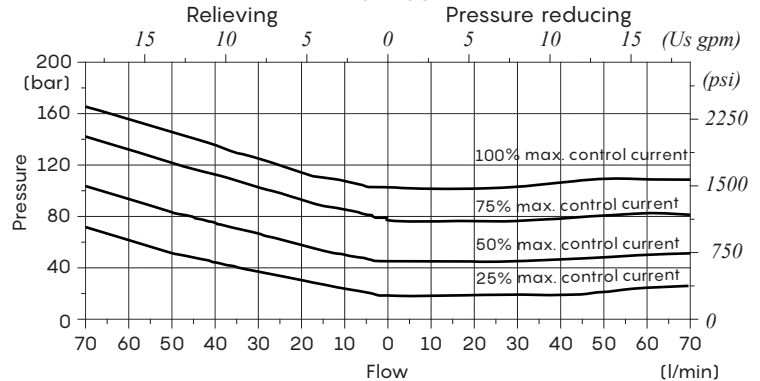
Reducing/relieving pressure vs. flow
RP10X/002B



Reducing/relieving pressure vs. flow
RP10X/003B

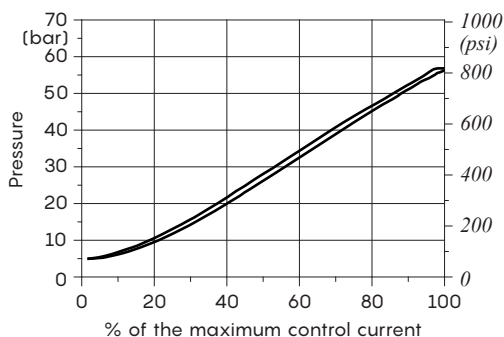


Reducing/relieving pressure vs. flow
RP10X/004B

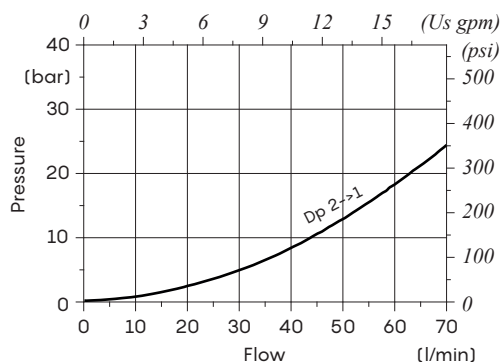


Rating diagrams

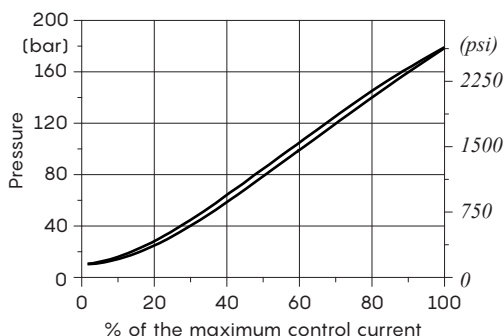
**Pressure reducing vs. control current
RP12X/001B**



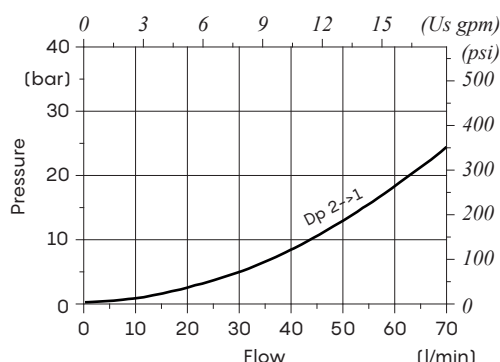
**Reducing/relieving pressure vs. flow
RP12X/001B**



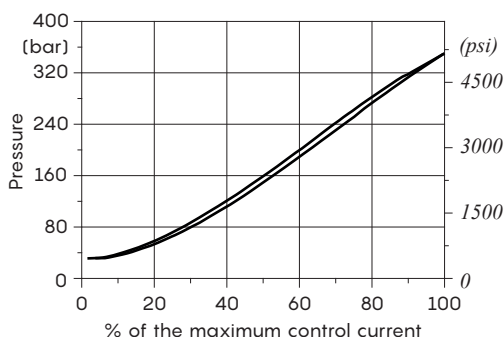
**Pressure reducing vs. control current
RP12X/002B**



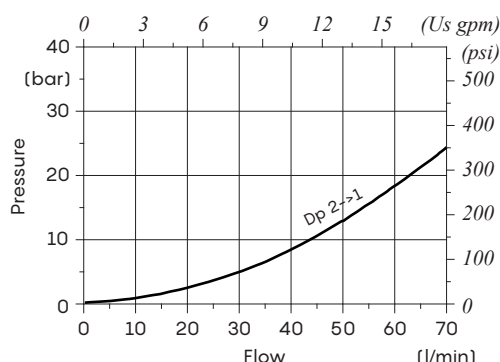
**Reducing/relieving pressure vs. flow
RP12X/002B**



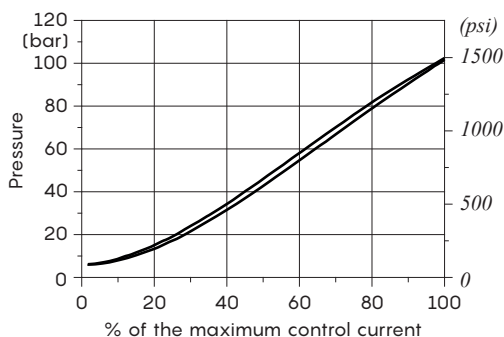
**Pressure reducing vs. control current
RP12X/003B**



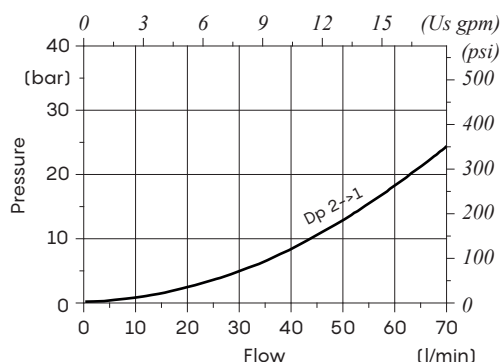
**Reducing/relieving pressure vs. flow
RP12X/003B**



**Pressure reducing vs. control current
RP12X/004B**



**Reducing/relieving pressure vs. flow
RP12X/004B**





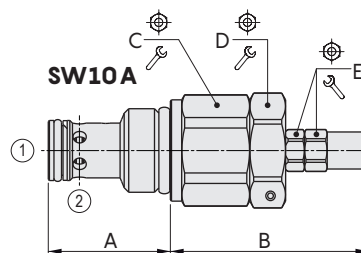
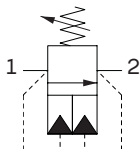
SW..A type sequence valves – 2 way

- Piloted acting
- Spool type
- Valves with kickdown operation
- Mechanical control with screw adjustment
- Different springs available to vary pressure range
- From SAE10 to SAE16 cavities

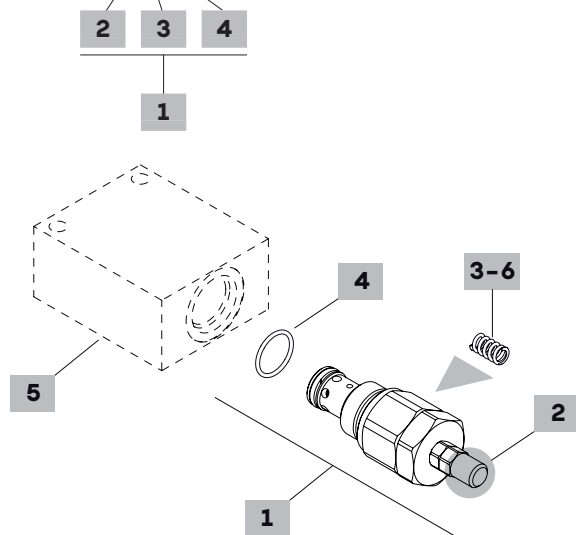
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		SW10A	SW12D	SW16A
Nominal flow		60 l/min (16 US gpm)	100 l/min (26 US gpm)	180 l/min (48 US gpm)
Max. pressure		350 bar (5100 psi)		
Oil leakage	at 80% of max. pressure setting	22 cm ³ /min (1.34 in ³ /min)	50 cm ³ /min (3.05 in ³ /min)	100 cm ³ /min (6.1 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties		
Viscosity		10-200 cSt		
Max level of contamination		20/18/14 ISO4406		
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)		
Cavity		SAE 10/2	SAE 12/2	SAE 16/2
Weight		0.20 kg (0.44 lb)	0.30 kg (0.66 lb)	0.44 kg (0.97 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C			D			E											
																						
	mm	in	mm	in		Nm	lbft		Nm	lbft		Nm	lbft		Nm	lbft						
SW10A	32.3	1.27	52.5	2.07	27	50	37	27	50	37	10	6.6	4.87									
SW12D	46	1.81	54.5	2.15	32	80	59	27	50	37	10	6.6	4.87									
SW16A	45.2	1.78	58	2.28	41	100	74	27	50	37	10	6.6	4.87									

Ordering codes and description composition
SW10A/OS2B

3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

TYPE DESCRIPTION

- 1** Pressure range 10÷80 bar (145÷1160 psi); Std. setting 30 bar (435 psi), pressure increase by steps of 10 bar (145 psi) for screw turn
- 2** Pressure range 50÷220 bar (725÷3200 psi); Std. setting 150 bar (2200 psi), pressure increase by steps of 36 bar (520 psi) for screw turn
- 3** Pressure range 150÷350 bar (2200÷5100 psi); Std. setting 250 bar (3600 psi), pressure increase by steps of 90 bar (1300 psi) for screw turn

4 Seals

TYPE DESCRIPTION

- B** **NBR (Buna)+Polyurethane** o-ring seals, std configuration
- V** **FPM (Viton)** o-ring seals, contact Sales Dept

5 Valve body

TYPE CODE DESCRIPTION

- SAE10/2-SAE8** 3CC1020K11 Aluminium body for cavity 10 valve, SAE8 std thread
- SAE12/2-SAE10** 3CC1220L11 Aluminium body for cavity 12 valve, SAE10 std thread
- SAE16/2-SAE12** 3CC1620M11 Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)

For steel bodies or different threading see from page 208

6 Springs

TYPE CODE DESCRIPTION

- 1** 3ML1081400 Pressure range **1** - white band
- 2** 3ML1081401 Pressure range **2** - no band
- 3** 3ML1081402 Pressure range **3** - red band

1 Cartridges

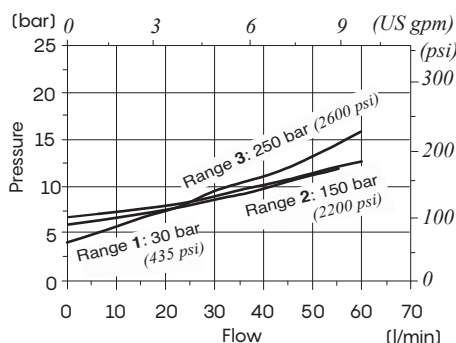
TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
SW10A/OS2B	OSW10002000	Pressure range 2
SAE cavity 12/2		
SW12D/OS2B	OSW12002005	Pressure range 2
SAE cavity 16/2		
SW16A/OS2B	OSW16002000	Pressure range 2

2 Adjustments

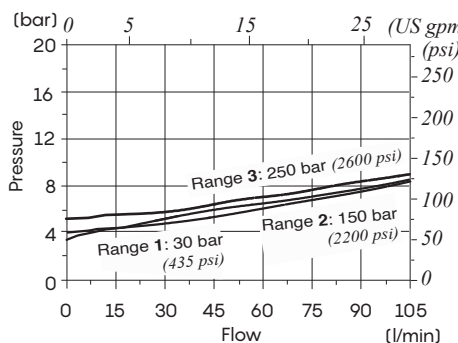
TYPE	DESCRIPTION
S	Screw

Rating diagrams
SW10A pressure vs. flow

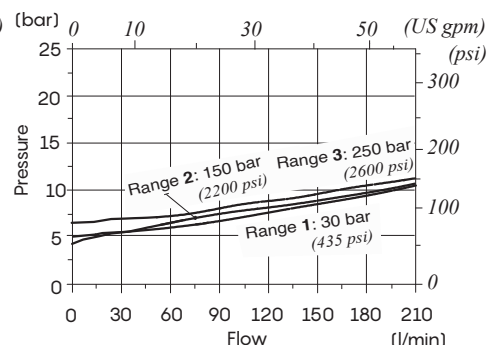
std. setting at 5 l/min (1.32 US gpm)


SW12A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)


SW16A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)





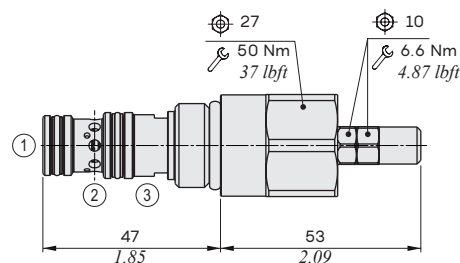
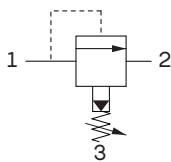
SP10A type sequence valves – 3 way

- Piloted acting
- Spool type
- Not affected by back pressure on port 2
- Mechanical control with screw adjustment
- Different springs available to vary pressure range

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

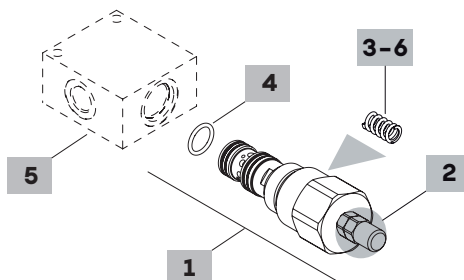
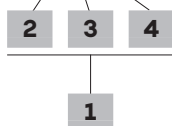
SP10A		
Nominal flow		50 l/min (13 US gpm)
Max. pressure		350 bar (5100 psi)
Oil leakage	at 210 bar (3050 psi)	25 cm ³ /min (1.52 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties
Viscosity		10-200 cSt
Max level of contamination		20/18/14 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 10/3
Weight		0.21 kg (0.46 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt.



Ordering codes and description composition

SP10A/1S3B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/3		
SP10A/1S1B	OSP10002002	Pressure range 1
SP10A/1S2B	OSP10002004	Pressure range 2
SP10A/1S3B	OSP10002003	Pressure range 3

2 Adjustments

TYPE	DESCRIPTION
S	Screw

3 Pressure range

Standard setting is referred to 5 l/min (1.32 US gpm) flow

TYPE	DESCRIPTION
1	Pressure range 10÷80 bar (145÷1160 psi); Std. setting 20 bar (290 psi), pressure increase by steps of 10 bar (145 psi) for screw turn
2	Pressure range 50÷220 bar (725÷3200 psi); Std. setting 150 bar (2200 psi), pressure increase by steps of 46 bar (660 psi) for screw turn
3	Pressure range 150÷350 bar (2200÷5100 psi); Std. setting 250 bar (3600 psi), pressure increase by steps of 110 bar (1600 psi) for screw turn

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

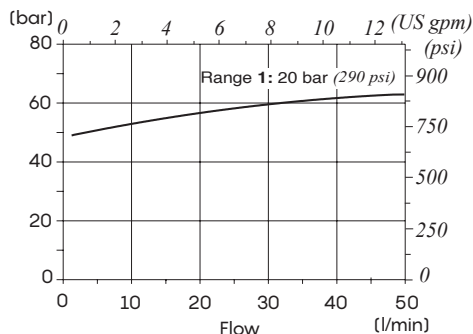
6 Springs

TYPE	CODE	DESCRIPTION
1	3ML1081400	Pressure range 1 - white band
2	3ML1081401	Pressure range 1 - no band
3	3ML1081402	Pressure range 1 - red band

Rating diagrams

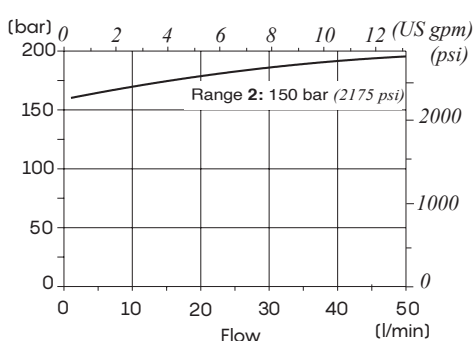
SP10A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)



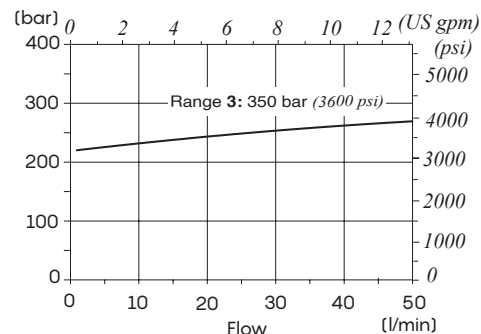
SP10A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)



SP10A pressure vs. flow

std. setting at 5 l/min (1.32 US gpm)





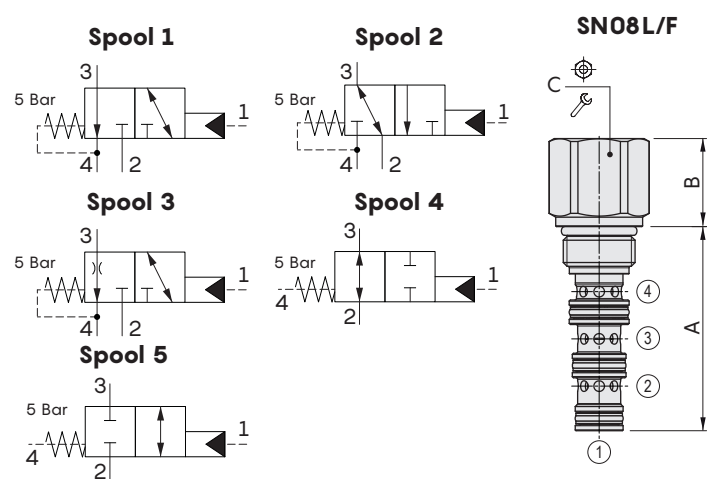
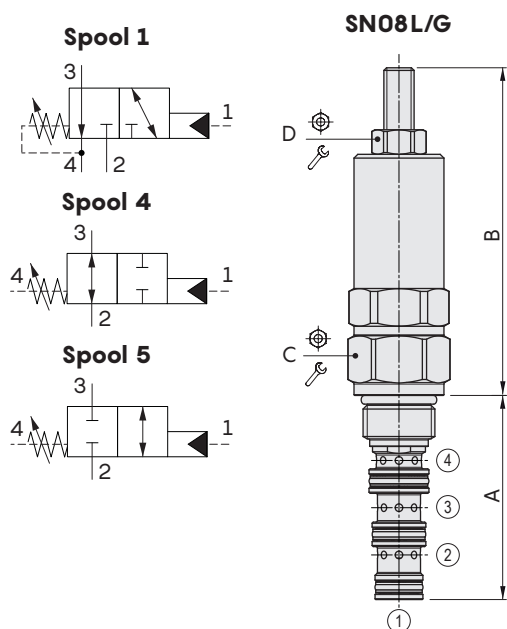
SN..L type sequence valves - 4 way

- Direct acting
- Spool type
- External pilot and drain
- Variable (G) and fixed (F) setting configurations
- The spring chamber is drained to the tank line (port 4)
- The backpressure values on line 4 must be added to valve nominal setting

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		SN08L/G	SN08L/F	SN10L/F
Nominal flow		20 l/min (5.3 US gpm)	20 l/min (5.3 US gpm)	50 l/min (13.2 US gpm)
Max. pressure		Port 4= 30 bar (435 psi) 350 bar (5100 psi)	350 bar (5100 psi)	350 bar (5100 psi)
Oil leakage	at 210 bar (3050 psi)		40 cm³/min (2.44 in³/min)	
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties		
Viscosity		10-200 cSt		
Max level of contamination		20/18/14 ISO4406		
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)		
Cavity		SAE 08/4	SAE 08/4	SAE 10/4
Weight		0.264 kg (0.582 lb)	0.131 kg (0.289 lb)	0.213 kg (0.470 lb)

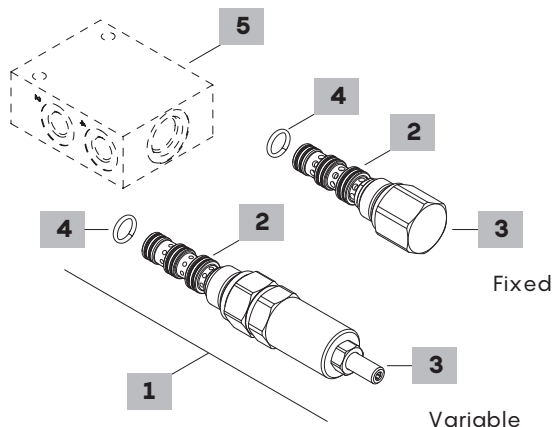
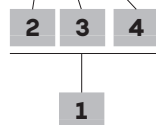
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C		D	
	mm	in	mm	in	Nm	lbft	Nm	lbft
SN08L/G	54	2.12	87.2	3.43	24	30	22	13
SN08L/F	54	2.12	23.3	0.92	24	30	22	-
SN10L/F	62.4	2.46	32.8	1.29	27	50	37	-

Ordering codes and description composition

SN08L/4G1B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/4		
<u>Variable pressure setting type</u>		
SN08L/1G1B	OSN08002015	From 30 to 90 bar (435 to 1300 psi), spool 1
SN08L/4G1B	OSN08002012	From 30 to 90 bar (435 to 1300 psi), spool 4
SN08L/5G1B	OSN08002013	From 30 to 90 bar (435 to 1300 psi), spool 5
<u>Fixed pressure setting type</u>		
SN08L/1F1B	OSN08002007	Setting 5 bar (72.5 psi), spool 1
SN08L/2F1B	OSN08002008	Setting 5 bar (72.5 psi), spool 2
SN08L/3F1B	OSN08002009	Setting 5 bar (72.5 psi), spool 3
SN08L/4F1B	OSN08002010	Setting 5 bar (72.5 psi), spool 4
SN08L/5F1B	OSN08002016	Setting 5 bar (72.5 psi), spool 5
SAE cavity 10/4		
<u>Fixed pressure setting type</u>		
SN10L/1F1B	OSN10002002	Setting 5 bar (72.5 psi), spool 1
SN10L/4F1B	OSN10002004	Setting 5 bar (72.5 psi), spool 4
SN10L/5F1B	OSN10002003	Setting 5 bar (72.5 psi), spool 5

2 Spools

TYPE	DESCRIPTION
1	Spool 1
2	Spool 2
3	Spool 3
4	Spool 4
5	Spool 5

3 Pressure setting

Setting is referred to 1 l/min (0.26 US gpm) flow

TYPE	DESCRIPTION
G1	Variable setting from 30 to 90 bar (435 to 1300 psi)
F1	Fixed setting 5 bar (72.5 psi)
F2	Fixed setting 10 bar (145 psi)
F3	Fixed setting 20 bar (290 psi)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

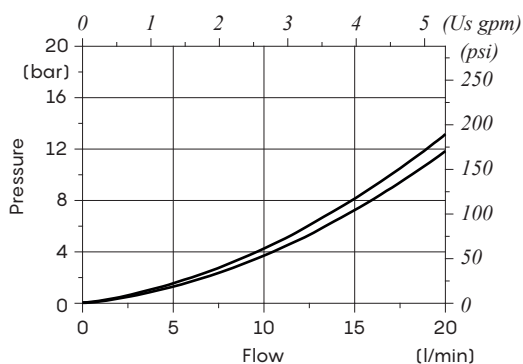
TYPE	CODE	DESCRIPTION
SAE08/4-SAE8	3CC0840K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/4-SAE8	3CC1040K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 212

Rating diagrams

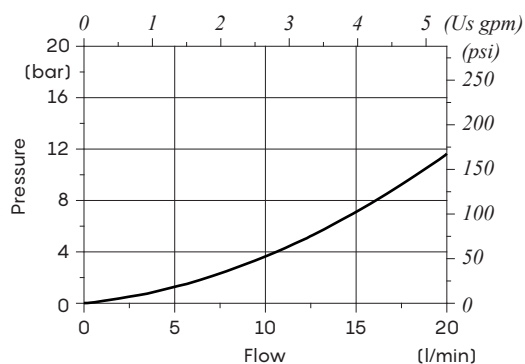
SN08L pressure drop vs. flow

- Spool 1 - Variable pressure -



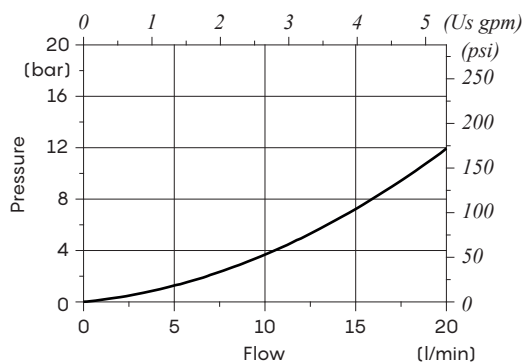
SN08L pressure drop vs. flow

- Spool 4 - Variable pressure -



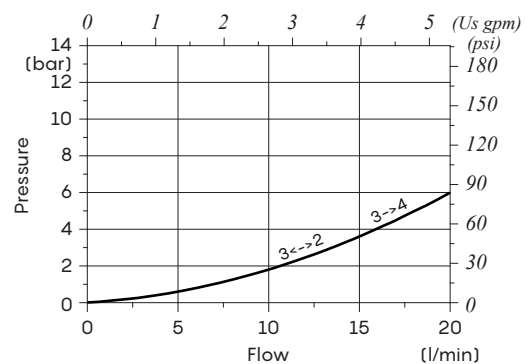
SN08L pressure drop vs. flow

- Spool 5 - Variable pressure -



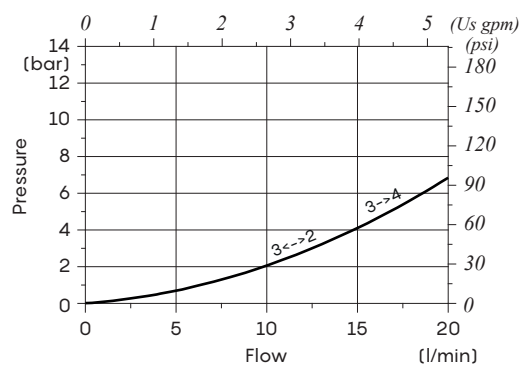
SN08L pressure drop vs. flow

- Spool 1 - Fixed pressure -



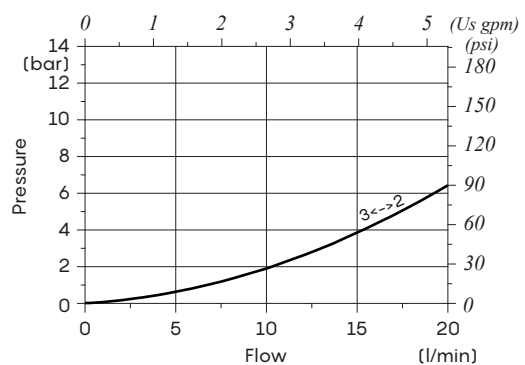
SN08L pressure drop vs. flow

- Spool 2 - Fixed pressure -



SN08L pressure drop vs. flow

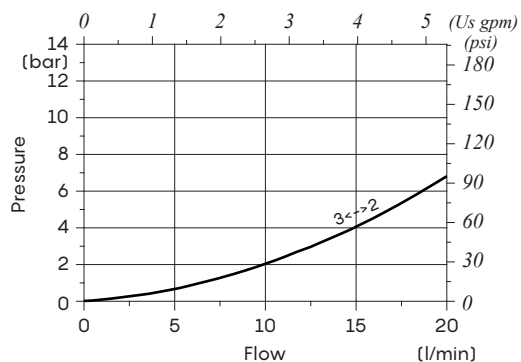
- Spool 3 - Fixed pressure -



Rating diagrams

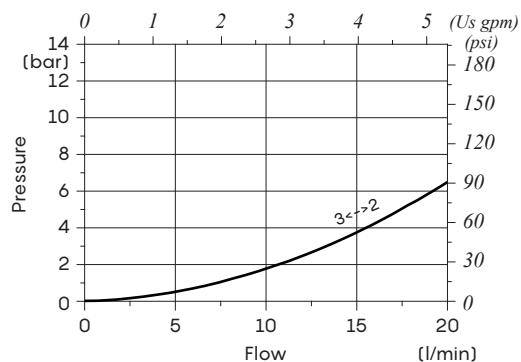
SN08L pressure drop vs. flow

- Spool 4 - Fixed pressure -



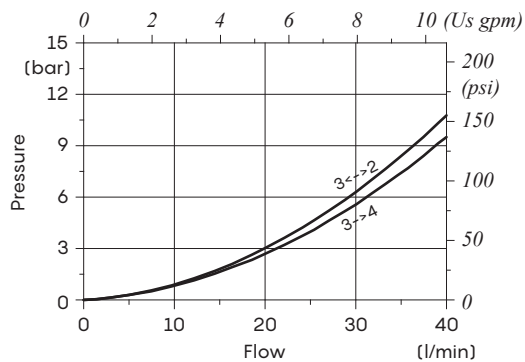
SN08L pressure drop vs. flow

- Spool 5 - Fixed pressure -



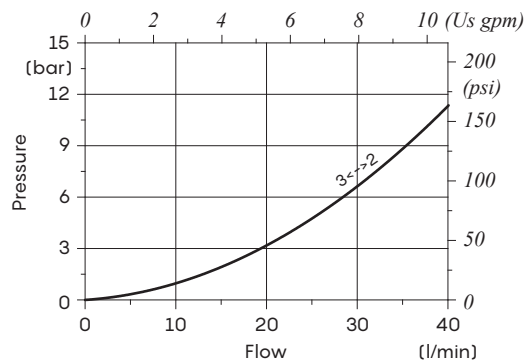
SN10L pressure drop vs. flow

- Spool 1 -



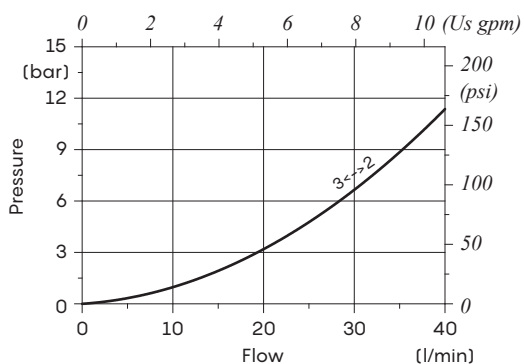
SN10L pressure drop vs. flow

- Spool 4 -



SN10L pressure drop vs. flow

- Spool 5 -





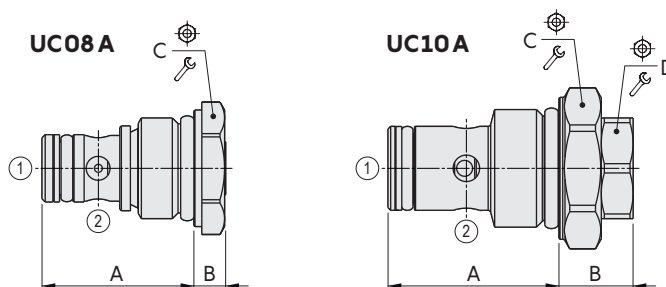
UC..A type check valves - 2 way

- Poppet type
- Direct acting
- Different opening pressures available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		UC08A	UC10A	UC12A	UC16A
Nominal flow		up to 20 l/min (5.3 US gpm)	up to 35 l/min (9.2 US gpm)	up to 50 l/min (13 US gpm)	up to 100 l/min (26 US gpm)
Max. pressure		350 bar (5100 psi)			
Oil leakage	at 100 bar (1450 psi)	0.25 cm ³ /min (0.015 in ³ /min)	0.25 cm ³ /min (0.015 in ³ /min)	0.25 cm ³ /min (0.015 in ³ /min)	0.25 cm ³ /min (0.015 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity		10-200 cSt			
Max level of contamination		20/18/14 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)			
Cavity		SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Weight		0.080 kg (0.18 lb)	0.090 kg (0.20 lb)	0.180 kg (0.40 lb)	0.370 kg (0.81 lb)

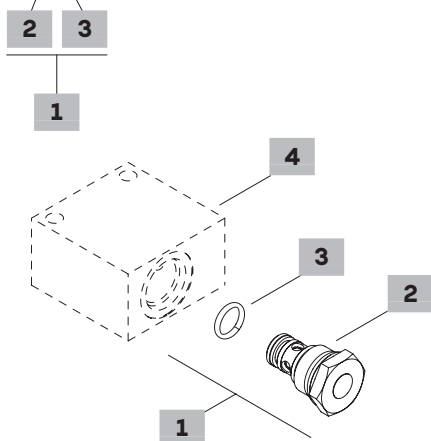
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C		D			
	mm	in	mm	in	Nm	lbft	Nm	lbft	Nm	lbft
UC08A	28.7	1.13	6	0.24	22	30	22	-	-	-
UC10A	32.3	1.27	14	0.55	27	50	37	19	30	22
UC12A	46	1.81	14	0.55	32	80	59	22	42	31
UC16A	45.2	1.78	25	0.98	41	100	73	30	65	48

Ordering codes and description composition

UC08 A/001B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
UC08 A/001B	OUC08002001	Opening pressure 0.5 bar (7.3 psi)
SAE cavity 10/2		
UC10 A/001B	OUC10002000	Opening pressure 0.5 bar (7.3 psi)
SAE cavity 12/2		
UC12 A/001B	OUC12002000	Opening pressure 0.5 bar (7.3 psi)
SAE cavity 16/2		
UC16 A/001B	OUC16002001	Opening pressure 0.5 bar (7.3 psi)

2 Opening pressure from 1 to 2

TYPE	DESCRIPTION
1	0.5 bar (7.3 psi)
2	2.5 bar (36.2 psi)
3	5 bar (72.5 psi)

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

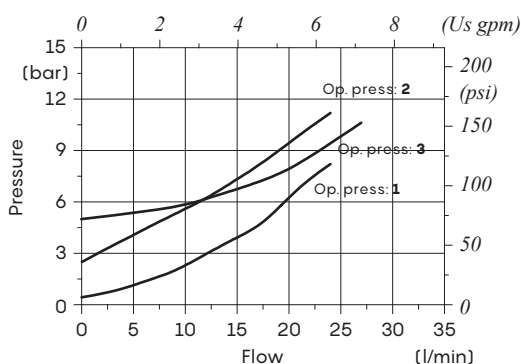
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

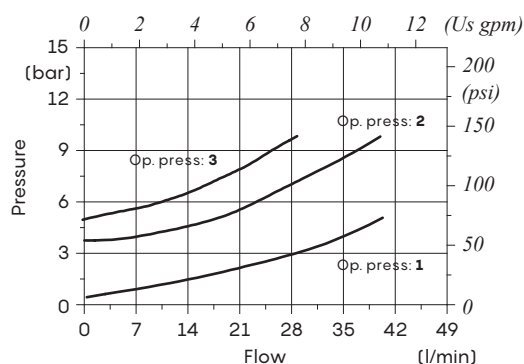
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

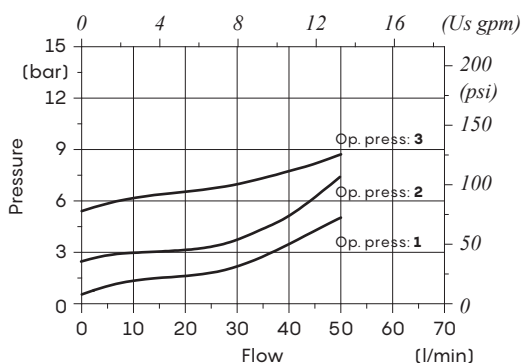
UC08A pressure drop vs. flow



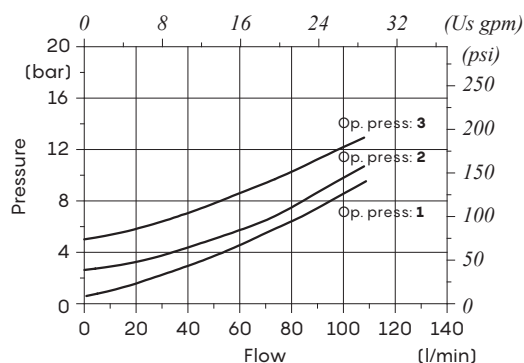
UC10A pressure drop vs. flow



UC12A pressure drop vs. flow



UC16A pressure drop vs. flow





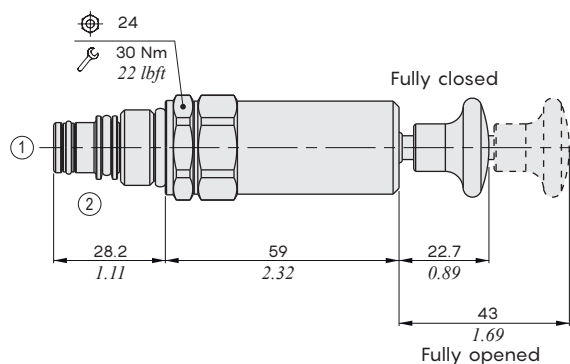
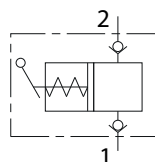
UM08M type check valves - 2 way

- Direct operation by knob
- Configuration with valve return in delivery position is available
- External zinc-plated and corrosion-proof components

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

UM08M		
Displacement		1 in ³ /stroke
Max. pressure		Port 1 = 50 bar (750 psi) Port 2 = 210 bar (3050 psi)
Oil leakage	at 200 bar (2900 psi)	0.25 cm ³ /min (0.015 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties
Viscosity		12-200 cSt
Max level of contamination		20/18/14 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 08/2
Weight		0.212 kg (0.47 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt.

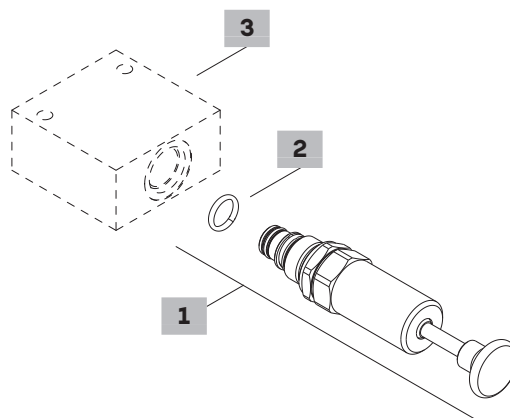


Ordering codes and description composition

UM08M/1A1B

2

1



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
UM08M/1A1B	0UM08002002	Valve assembly

2 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

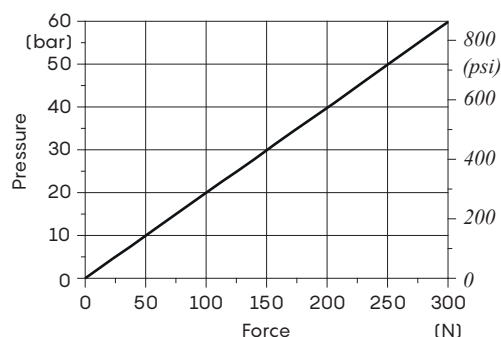
3 Valve body

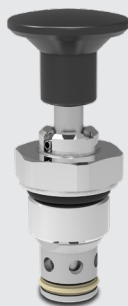
TYPE	CODE	DESCRIPTION
SAE08/2-SAE6	3CC0820J11	Aluminium body for cavity 08 valve, SAE6 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

Output Pressure vs. Input force





UV10M type check valves - 2 way

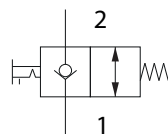
- Poppet type
- Direct operation by knob
- Available mechanical detent
- External zinc-plated and corrosion-proof components

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

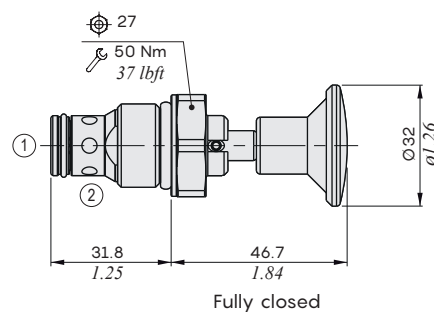
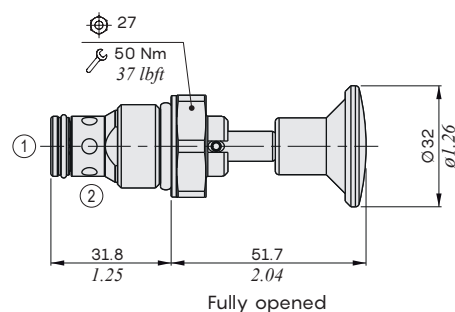
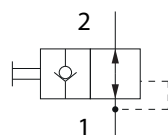
UV10M		
Nominal flow		60 l/min (16 US gpm)
Max. pressure		320 bar (4650 psi)
Oil leakage	at 210 bar (3050 psi)	0.25 cm ³ /min (0.015 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties
Viscosity		20-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 10/2
Weight		0.164 kg (0.36 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt.

Normally closed configuration

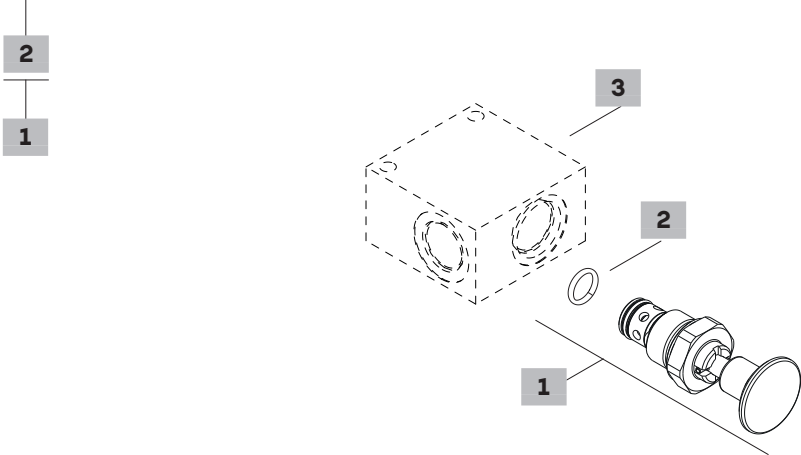


Normally open configuration



Ordering codes and description composition

UV10M/2A0B

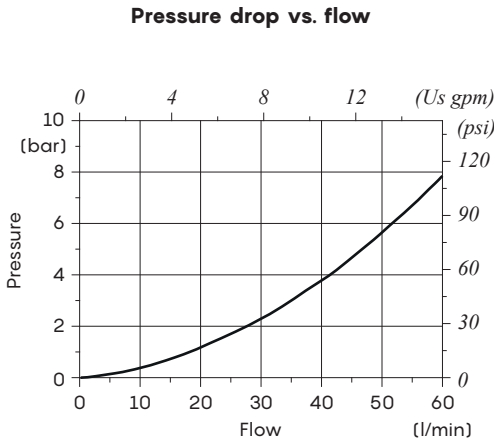


1 Cartridges		
TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
UV10M/2A0B	0UV10002000	Normally closed (N.C.) with detent, pull to operate; spring return
UV10M/2E0B	0UV10002002	Normally closed (N.C.) without detent

2 Seals	
TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

3 Valve body		
TYPE	CODE	DESCRIPTION
SAE10/2-SAE10	3CC1020L11	Aluminium body for cavity 10 valve, SAE10 std thread
Note: aluminium body can stand up to 210 bar (3050 psi) For steel bodies or different threading see from page 208		

Rating diagrams





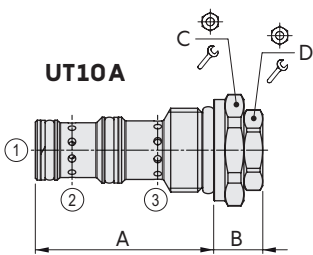
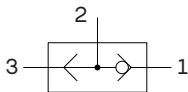
UT..A type
shuttle valves - 3 way

- Shuttle valve
- Direct acting
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

UT08 A		UT10 A
Nominal flow	15 l/min (4 US gpm)	up to 20 l/min (5.3 US gpm)
Max. pressure	350 bar (5100 psi)	
Oil leakage	at 210 bar (3050 psi)	0.50 cm³/min (0.030 in³/min)
Fluid	mineral based or sinthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	20/18/14 ISO4406	
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/3	SAE 10/3
Weight	0.80 kg (0.18 lb)	0.100 kg (0.22 lb)

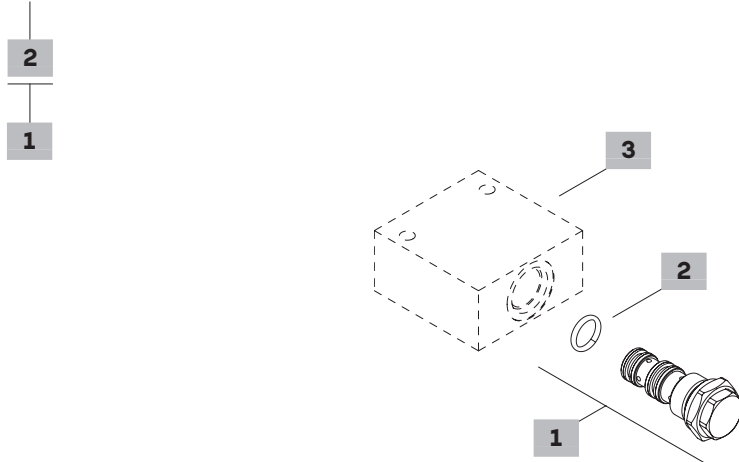
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C		D	
	mm	in	mm	in	Nm	lbft	Nm	lbft
UT08 A	40.8	1.60	12.5	0.49	24	30	22	19
UT10 A	47.2	1.86	13	0.51	27	50	37	19

Ordering codes and description composition

UT08A/000B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
UT08A/000B	OUT08002000	Valve assembly
SAE cavity 10/3		
UT10A/000B	OUT10002000	Valve assembly

2 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

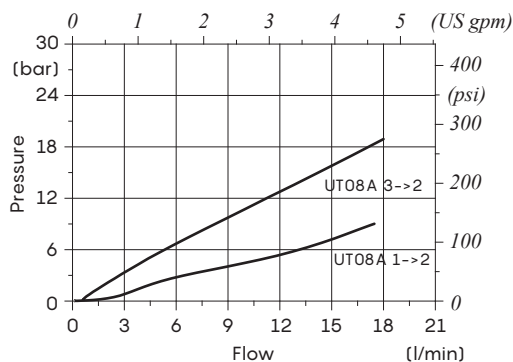
3 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE6	3CC0830J11	Aluminium body for cavity 08 valve, SAE6 std thread
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread

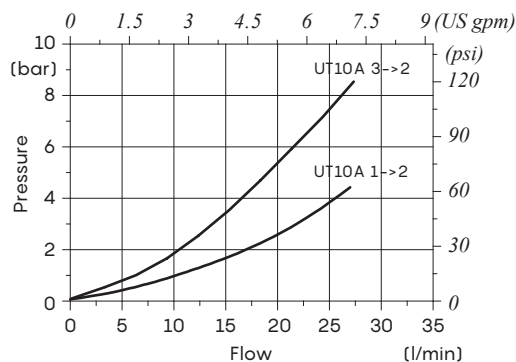
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

Rating diagrams

UT08A pressure drop vs flow



UT10A pressure drop vs flow





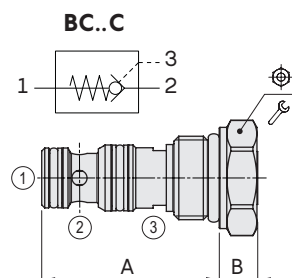
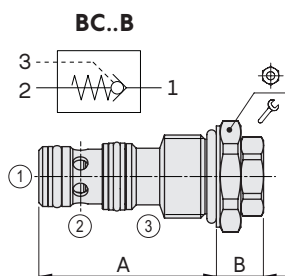
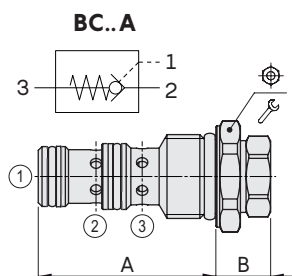
BC...type pilot operated check valves – 3 way

- Poppet type
- Direct acting
- From SAE08 to SAE16 cavities
- Different pilot ratio available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		BC08A	BC10A-B	BC10C	BC12A-B	BC16A-B
Nominal flow		15 l/min (4 US gpm)	30 l/min (8 US gpm)	60 l/min (16 US gpm)	50 l/min (13 US gpm)	100 l/min (26 US gpm)
Max. pressure		350 bar (5100 psi)				
Oil leakage	at 100 bar (1450 psi)	0.25 cm³/min (0.015 in³/min)	0.25 cm³/min (0.015 in³/min)	0.25 cm³/min (0.015 in³/min)	0.25 cm³/min (0.015 in³/min)	0.25 cm³/min (0.015 in³/min)
Fluid		mineral based or sinthetic hydraulic fluid with lubricating properties				
Viscosity		10-200 cSt				
Max level of contamination		20/18/14 ISO4406				
Fluid temperature	with NBR seals +Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)				
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)				
Cavity		SAE 08/3	SAE 10/3	SAE 10/3	SAE 12/3	SAE 16/3
Weight		0.080 kg (0.18 lb)	0.100 kg (0.22 lb)	0.111 kg (0.24 lb)	0.230 kg (0.51 lb)	0.440 kg (0.97 lb)

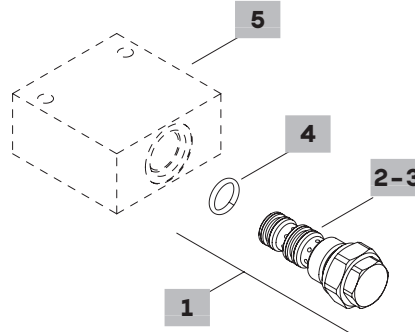
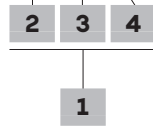
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B				
		mm	in	mm	in	Nm	lbft	
BC..A	SAE 08/3	40.8	1.61	17	0.67	24	30	22
	SAE 10/3	47	1.85	12.5	0.49	27	50	36
	SAE 12/3	73.5	2.89	14	0.55	32	80	59
	SAE 16/3	75	2.97	24	0.94	41	100	73
BC..B	SAE 10/3	47	1.85	12.5	0.49	27	50	36
	SAE 12/3	73.5	2.89	14	0.55	32	80	59
BC..C	SAE 16/3	75	2.95	24	0.94	41	100	73
	SAE 10/3	47	1.85	10.2	0.40	27	50	36

Ordering codes and description composition

BC08A/3 0 1 B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
BC08A/301B	OBC08002000	Pilot ratio 1:2.5 Opening press. 2 to 3=5 bar (72.5 psi)
SAE cavity 10/3		
BC10A/301B	OBC10002001	Pilot ratio 1:3 Opening press. 2 to 3=5 bar (72.5 psi)
BC10B/301B	OBC10002008	Pilot ratio 1:2 Opening press. 1 to 2=5 bar (72.5 psi)
BC10C/401B	OBC10002011	Pilot ratio 1:4 Opening press. 2 to 1=5 bar (72.5 psi)
SAE cavity 12/3		
BC12A/301B	OBC12002000	Pilot ratio 1:3 Opening press. 2 to 3=5 bar (72.5 psi)
BC12B/301B	OBC12002005	Pilot ratio 1:3 Opening press. 1 to 2=5 bar (72.5 psi)
SAE cavity 16/3		
BC16A/301B	OBC16002000	Pilot ratio 1:2.5 Opening press. 2 to 3=5 bar (72.5 psi)
BC16B/301B	OBC16002004	Pilot ratio 1:2.5 Opening press. 1 to 2=5 bar (72.5 psi)

2 Pilot ratio

TYPE	DESCRIPTION
For BC..A	
BC08A/3	1:2.5
BC10A/3	1:3
BC12A/3	1:3
BC16A/3	1:2.5
For BC..B	
BC10B/3	1:2
BC12B/3	1:3
BC16B/3	1:2.5
For BC..C	
BC10B/3	1:4

3 Opening pressure from 2 to 3

TYPE	DESCRIPTION
For BC..A from 2 to 3	
1	5 bar (72.5 psi) with sealed piston
2	2.5 bar (36.2 psi) without sealed piston
For BC..B from 1 to 2	
1	5 bar (72.5 psi) with sealed piston
For BC..C from 2 to 1	
1	5 bar (72.5 psi) with seal

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

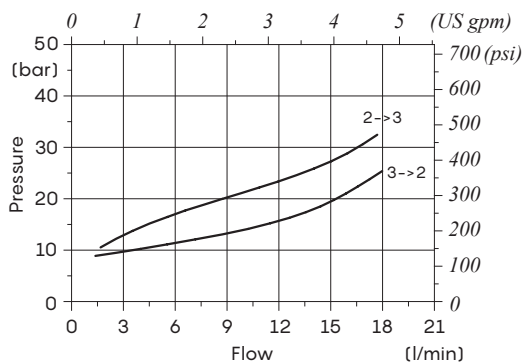
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/3-SAE10	3CC1230L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/3-SAE12	3CC1630M11	Aluminium body for cavity 16 valve, SAE12 std thread

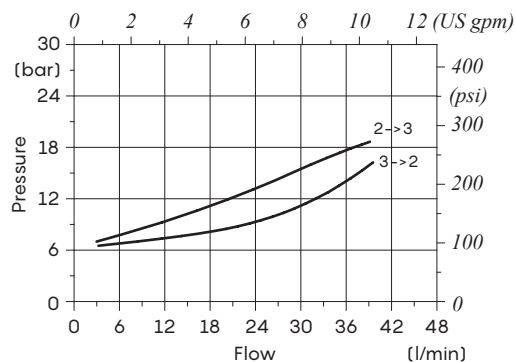
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

Rating diagrams

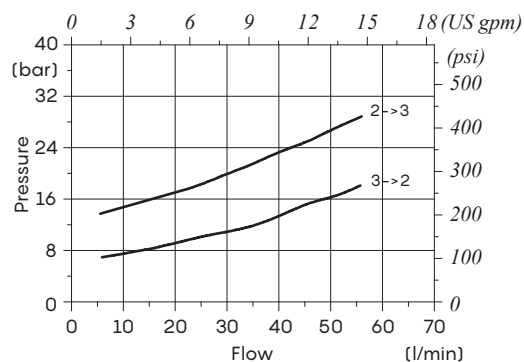
BC08A pressure drop vs flow



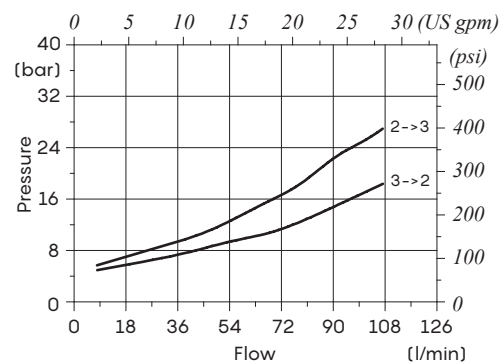
BC10A pressure drop vs flow



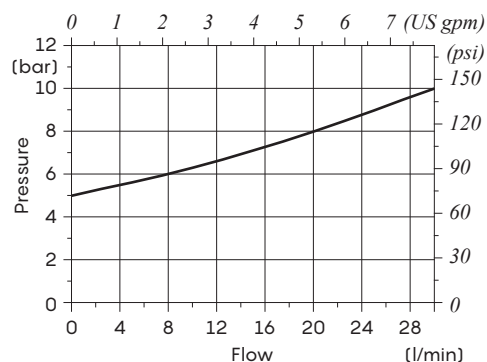
BC12A pressure drop vs flow



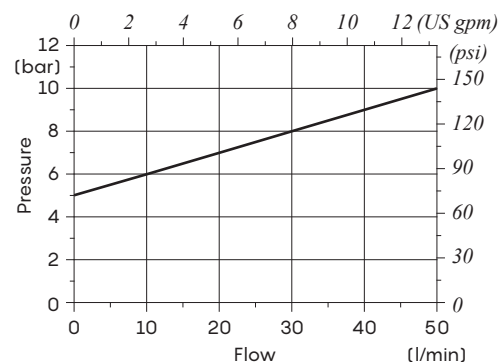
BC16A pressure drop vs flow



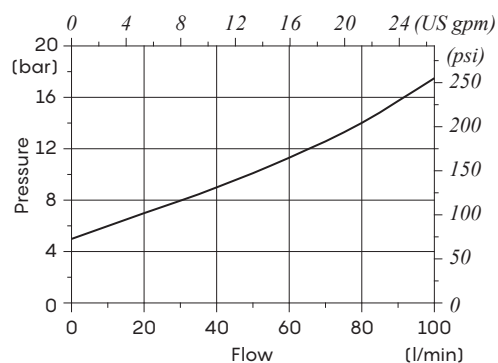
BC10B pressure drop vs flow



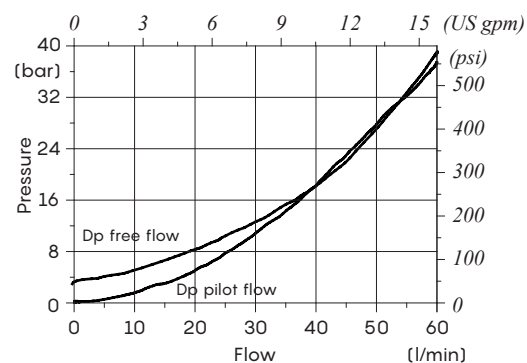
BC12B pressure drop vs flow



BC16B pressure drop vs flow



BC10C pressure drop vs flow





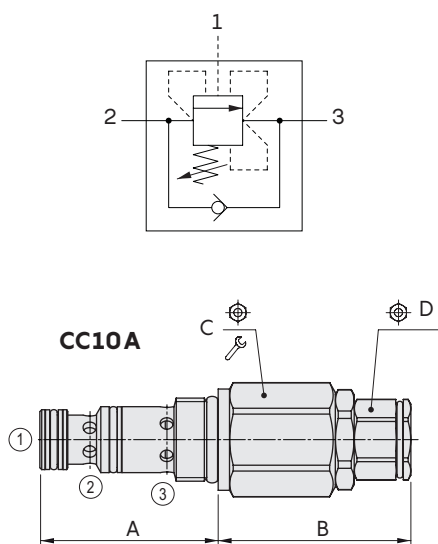
CC..A type counterbalance valves – 3 way

- For closed center
- Line mounting
- Not affected by back pressure
- From SAE10 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		CC10A	CC12A	CC16A
Nominal flow		30 l/min (7.9 US gpm)	60 l/min (16 US gpm)	90 l/min (24 US gpm)
Max. pressure		350 bar (5100 psi)		
Oil leakage	at 80% of max. pressure setting	0.25 cm ³ /min (0.015 in ³ /min)	0.25 cm ³ /min (0.015 in ³ /min)	0.25 cm ³ /min (0.015 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties		
Viscosity		10–200 cSt		
Max level of contamination		20/18/14 ISO4406		
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)		
Cavity		SAE 10/3	SAE 12/3	SAE 16/3
Weight		0.280 kg (0.62 lb)	0.380 kg (0.84 lb)	0.720 kg (1.59 lb)

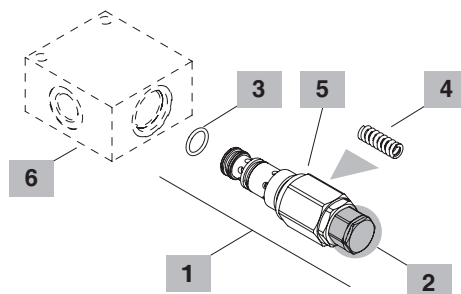
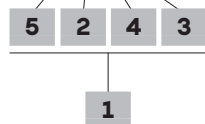
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C			D			
											
	mm	in	mm	in		Nm	lbft		Nm	lbft	
CC10A/	4S	47.2	1.86	51	2.01	27	50	37	19	30	22
	W	47.2	1.86	51	2.01	27	50	37	19	30	22
CC12A/	4S	73.5	2.89	58.5	2.30	32	80	59	24	35	26
	4W	73.5	2.89	58.5	2.30	32	80	59	24	35	26
CC16A/	4S	75	2.95	69	2.72	41	100	74	27	30	22
	4W	75	2.95	69	2.72	41	100	74	27	30	22

Ordering codes and description composition

CC10A/4S2B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/3		
CC10A/4S2B	OCC10002001	Screw type adjustment, pilot ratio 1:4 pressure range 2
SAE cavity 12/3		
CC12A/4S2B	OCC12002000	Screw type adjustment, pilot ratio 1:4 pressure range 2
SAE cavity 16/3		
CC16A/4S2B	OCC16002001	Screw type adjustment, pilot ratio 1:4 pressure range 2

2 Adjustments

TYPE	DESCRIPTION
S	Screw
W	Copped adjustment

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Pressure setting springs

Standard setting is referred to 5 l/min (1.32 Us gpm) flow

TYPE	CODE	DESCRIPTION
For CC10A valve		
1	3ML1092502	Setting range 50-220 bar (725-3200 psi) red band
2	3ML1092300	Setting range 180-350 bar (2600-5100 psi) red band
3	3ML1102800	Setting range 300-700 bar (4350-10150 psi) red band
For CC12A valve		
1	3ML1133201	Setting range 50-220 bar (725-3200 psi) blue band
2	3ML1133200	Setting range 180-350 bar (2600-5100 psi) red band
3	3ML1133500	Setting range 300-700 bar (4350-10150 psi) yellow band
For CC16A valve		
1	3ML1164000	Setting range 50-220 bar (725-3200 psi) blue band
2	3ML1164001	Setting range 180-350 bar (2600-5100 psi) red band
3	3ML1164002	Setting range 300-700 bar (4350-10150 psi) yellow band

5 Pilot ratio

TYPE	DESCRIPTION
4	1:4

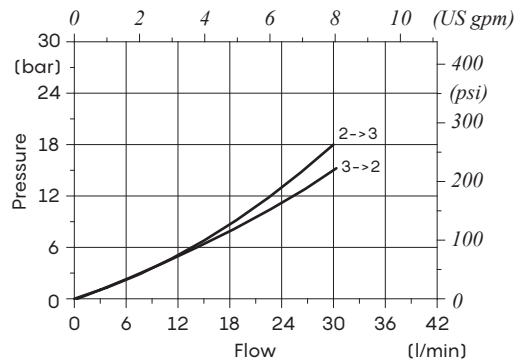
6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/3-SAE10	3CC1230L11	Aluminium body for cavity 12 valve, SAE12 std thread
SAE16/3-SAE12	3CC1630M11	Aluminium body for cavity 16 valve, SAE12 std thread

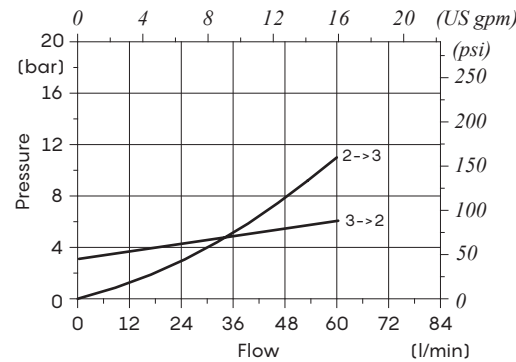
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

Rating diagrams

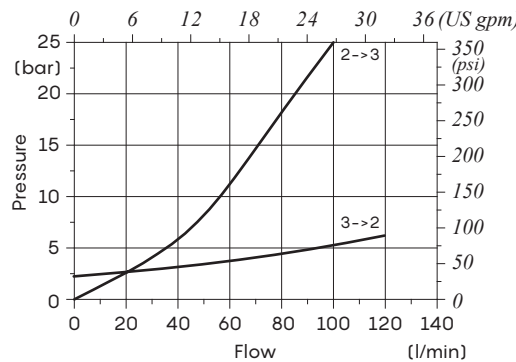
CC10A pressure drop vs. flow



CC12A pressure drop vs. flow



CC16A pressure drop vs. flow





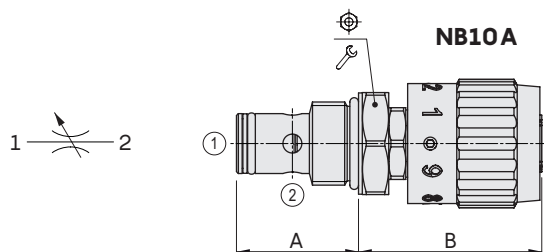
NB..A type needle valves - 2 way

- Poppet type
- Different types of manual adjustment
- Prepared for copped adjustment
- Ideal use in the circuit as bleed off
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	NB08A	NB10A	NB12A	NB16A
Nominal flow	15 l/min (3.9 US gpm)	30 l/min (7.9 US gpm)	60 l/min (16 US gpm)	100 l/min (26 US gpm)
Max. pressure	350 bar (5100 psi)			
Fluid	mineral based or sinthetic hydraulic fluid with lubricating properties			
Viscosity	10-200 cSt			
Max level of contamination	20/18/14 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)			
Cavity	SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Weight	0.180 kg (0.40 lb)	0.200 kg (0.44 lb)	0.280 kg (0.62 lb)	0.500 kg (1.10 lb)

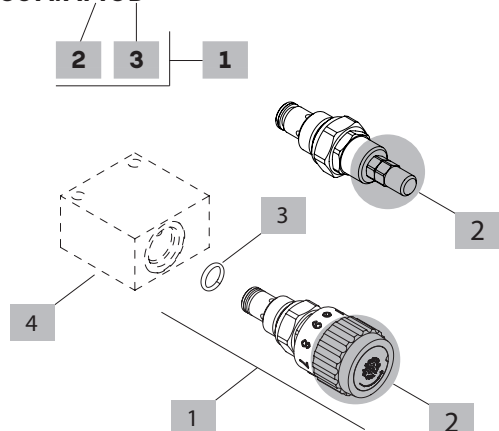
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B		Torque		
		mm	in	mm	in	Nm	lbft	
NB08A/A	M	27.6	1.09	55.5	2.19	24	30	22
	S	27.6	1.09	49.5	1.95	24	30	22
NB10A/A	M	32.5	1.28	47.5	1.87	27	50	37
	S	32.5	1.28	46.5	1.83	27	50	37
NB12A/A	M	46	1.81	53.4	2.10	32	80	59
	S	46	1.81	46.3	1.82	32	80	59
NB16A/A	M	45.2	1.78	71.6	2.82	41	100	74
	S	45.2	1.78	60.9	2.40	41	100	74

Ordering codes and description composition

NB08A/AMOB



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
NB08A/AMOB	ONB08002000	Handknob adjustment
NB08A/ASOB	ONB08002001	Screw type adjustment
SAE cavity 10/2		
NB10A/AMOB	ONB10002003	Handknob adjustment
NB10A/ASOB	ONB10002001	Screw type adjustment
SAE cavity 12/2		
NB12A/AMOB	ONB12002002	Handknob adjustment
NB12A/ASOB	ONB12002001	Screw type adjustment
SAE cavity 16/2		
NB16A/AMOB	ONB16002000	Handknob adjustment
NB16A/ASOB	ONB16002002	Screw type adjustment

2 Adjustments

TYPE	DESCRIPTION
S	Screw
M	Handknob calibrated
W	Copped adjustment

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

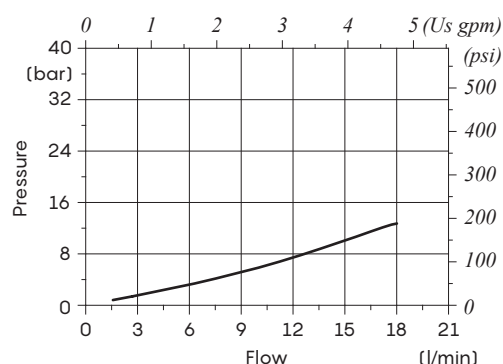
4 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

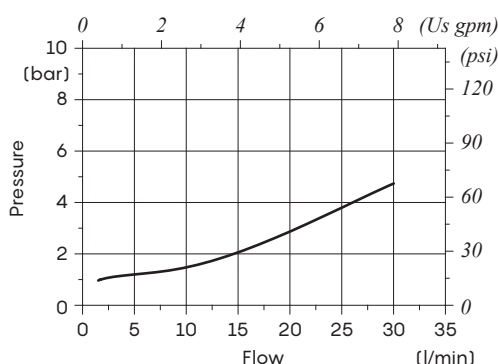
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

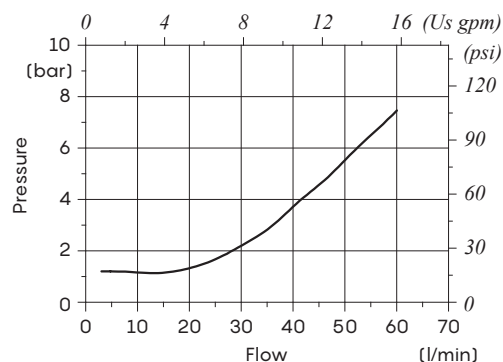
NB08A: pressure drop vs. flow 1->2 - 2->1, fully open



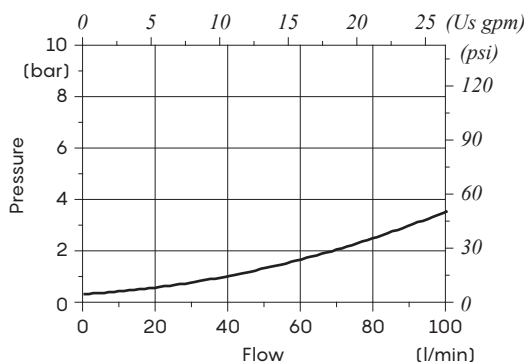
NB10A: pressure drop vs. flow 1->2 - 2->1, fully open



NB12A: pressure drop vs. flow 1->2 - 2->1, fully open



NB16A: pressure drop vs. flow 1->2 - 2->1, fully open





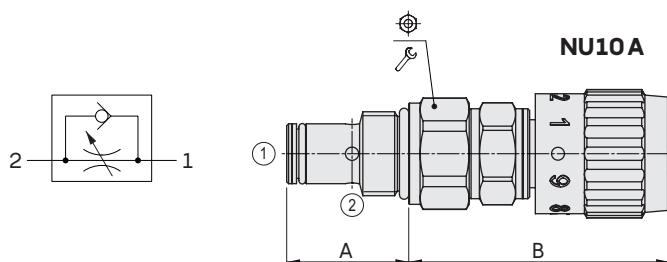
NU..A type needle valves - 2 way

- Poppet type
- Different types of manual adjustment
- Prepared for copped adjustment
- Free return line
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	NU08A	NU10A	NU12A	NU16A
Nominal flow	15 l/min (3.9 US gpm)	30 l/min (7.9 US gpm)	60 l/min (16 US gpm)	100 l/min (26 US gpm)
Max. pressure	350 bar (5100 psi)			
Fluid	mineral based or sinthetic hydraulic fluid with lubricating properties			
Viscosity	10-200 cSt			
Max level of contamination	20/18/14 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)			
Cavity	SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Weight	0.240 kg (0.53 lb)	0.290 kg (0.64 lb)	0.400 kg (0.88 lb)	0.550 kg (1.21 lb)

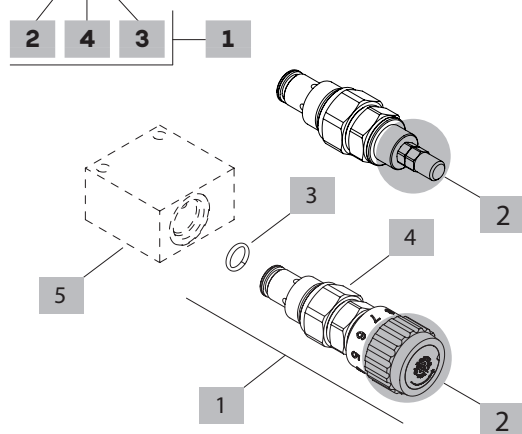
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B		Torque		
		mm	in	mm	in	Nm	lbft	
NU08A/A	M	27.6	1.09	70.7	2.78	24	30	22
	S	27.6	1.09	64.5	2.54	24	30	22
NU10A/A	M	32.3	1.27	70	2.76	27	50	37
	S	32.3	1.27	65	2.56	27	50	37
NU12A/A	M	46	1.81	71.2	2.80	32	80	59
	S	46	1.81	66	2.60	32	80	59
NU16A/A	M	45.2	1.78	72.9	2.87	41	100	74
	S	45.2	1.78	66	2.60	41	100	74

Ordering codes and description composition

NU08 A/AM1B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
NU08 A/AM1B	ONU08002000	Handknob adjustment
NU08 A/AS1B	ONU08002001	Screw type adjustment
SAE cavity 10/2		
NU10 A/AM1B	ONU10002000	Handknob adjustment
NU10 A/AS1B	ONU10002001	Screw type adjustment
SAE cavity 12/2		
NU12 A/AM1B	ONU12002000	Handknob adjustment
NU12 A/AS1B	ONU12002001	Screw type adjustment
SAE cavity 16/2		
NU16 A/AM1B	ONU16002000	Handknob adjustment
NU16 A/AS1B	ONU16002001	Screw type adjustment

2 Adjustments

TYPE	DESCRIPTION
S	Screw
M	Handknob calibrated
W	Copped adjustment

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Opening pressure check valve from 1 to 2

TYPE	DESCRIPTION
1	0.5 bar (7.3 psi)

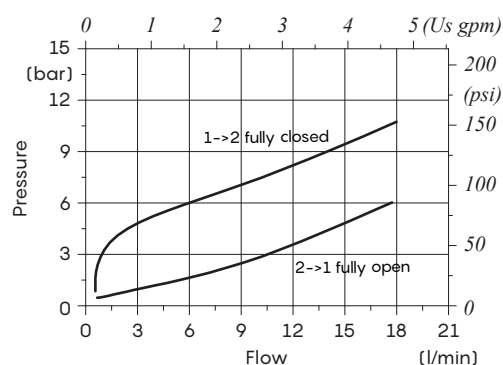
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

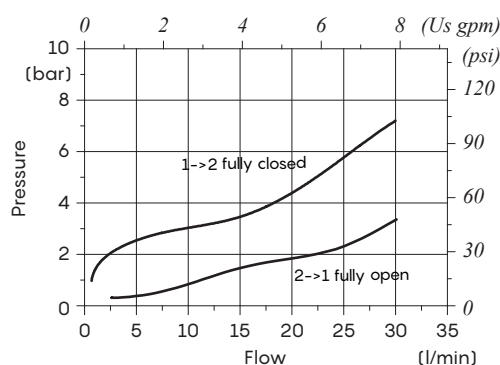
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

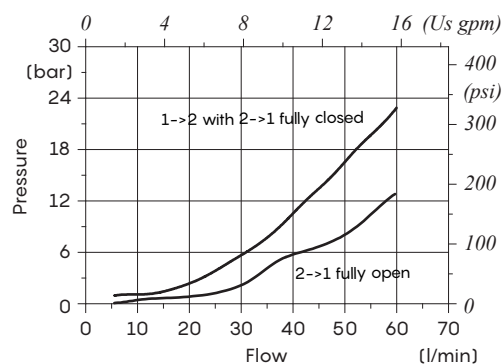
NU08A pressure drop vs. flow



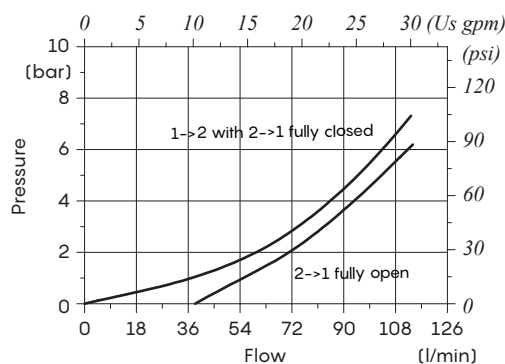
NU10A pressure drop vs. flow



NU12A pressure drop vs. flow



NU16A pressure drop vs. flow





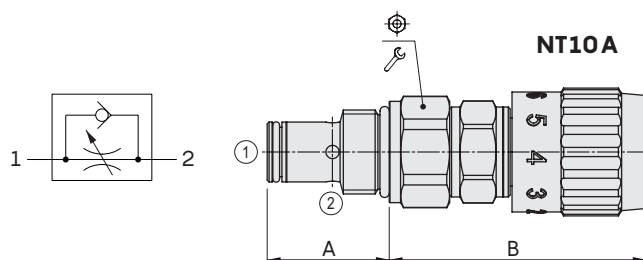
NT..A type needle valves - 2 way

- Poppet type
- Different types of manual adjustment
- Prepared for copped adjustment
- Free return line
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	NT08 A	NT10A	NT12A	NT16 A
Nominal flow	15 l/min (3.9 US gpm)	30 l/min (7.9 US gpm)	60 l/min (16 US gpm)	100 l/min (26 US gpm)
Max. pressure	350 bar (5100 psi)			
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity	10-200 cSt			
Max level of contamination	20/18/14 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)			
Cavity	SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Weight	0.240 kg (0.53 lb)	0.290 kg (0.64 lb)	0.400 kg (0.88 lb)	0.550 kg (1.21 lb)

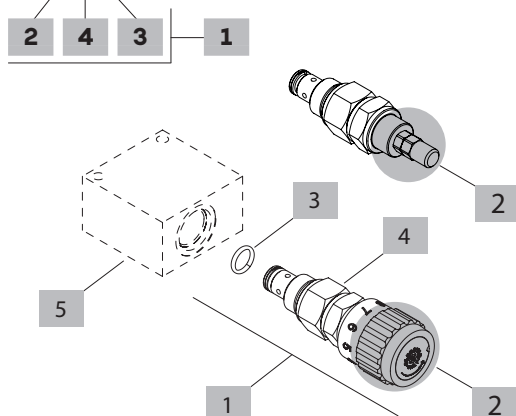
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B				
		mm	in	mm	in			
NT08 A/A	M	27.6	1.09	70.7	2.78	24	30	22
	S	27.6	1.09	64.5	2.54	24	30	22
NT10 A/A	M	32.3	1.27	70	2.76	27	50	37
	S	32.3	1.27	65	2.56	27	50	37
NT12 A/A	M	46	1.81	71.2	2.80	32	80	59
	S	46	1.81	66	2.60	32	80	59
NT16 A/A	M	45.2	1.78	72.9	2.87	41	100	74
	S	45.2	1.78	66	2.60	41	100	74

Ordering codes and description composition

NT08A/AM1B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
NT08A/AM1B	ONT08002000	Handknob adjustment
NT08A/AS1B	ONT08002001	Screw type adjustment
SAE cavity 10/2		
NT10A/AM1B	ONT10002000	Handknob adjustment
NT10A/AS1B	ONT10002001	Screw type adjustment
SAE cavity 12/2		
NT12A/AM1B	ONT12002000	Handknob adjustment
NT12A/AS1B	ONT12002001	Screw type adjustment
SAE cavity 16/2		
NT16A/AM1B	ONT16002000	Handknob adjustment
NT16A/AS1B	ONT16002001	Screw type adjustment

2 Adjustments

TYPE	DESCRIPTION
S	Screw
M	Handknob calibrated
W	Copped adjustment

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Opening pressure check valve from 1 to 2

TYPE	DESCRIPTION
1	0.5 bar (7.3 psi)

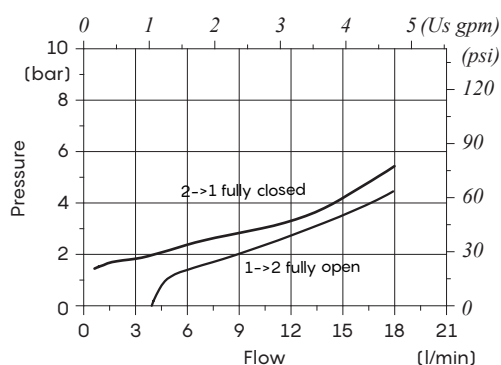
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

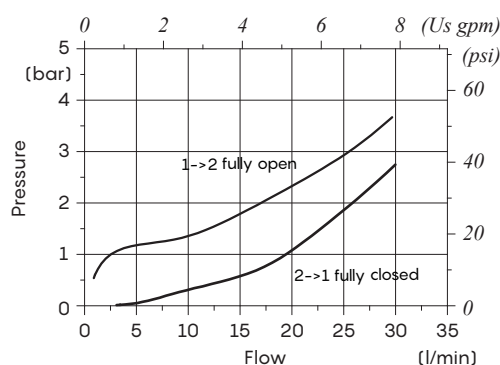
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

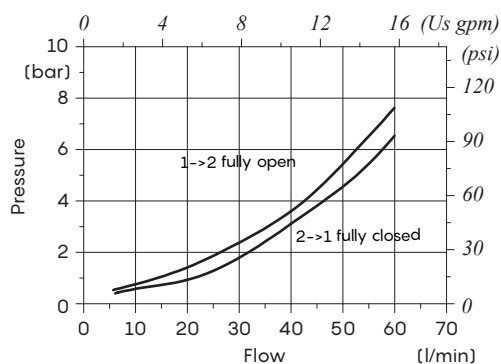
NT08A pressure drop vs. flow



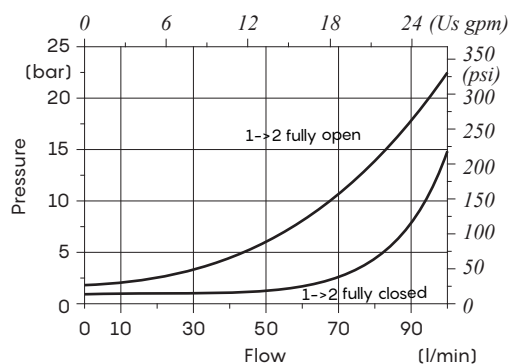
NT10A pressure drop vs. flow



NT12A pressure drop vs. flow



NT16A pressure drop vs. flow





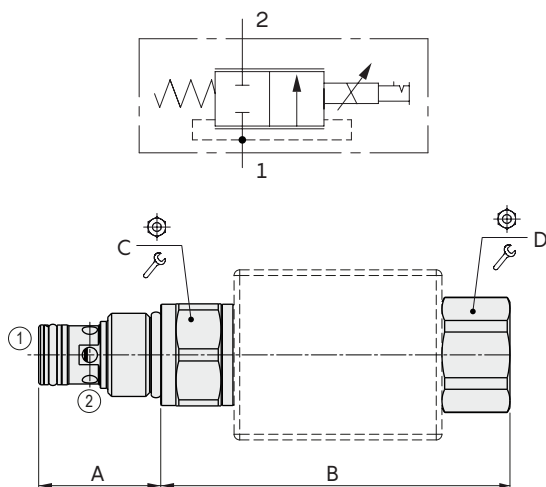
EE..X type needle valves - 2 way

- Spool type
- Direct acting through proportional solenoid
- Excellent low flow metering capability
- System of purging of air
- To be combined with an external compensator
- SAE10 and SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		EE10X	EE12X
Nominal flow ⁽¹⁾	with 10 bar (145 psi) stand-by	40 l/min (10.6 US gpm)	60 l/min (15.8 US gpm)
Max. pressure		300 bar (4350 psi)	315 bar (4600 psi)
Oil leakage	at 150 bar (2175 psi)	150 cm ³ /min (9.1 in ³ /min)	200 cm ³ /min (12.2 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		12-200 cSt	
Max level of contamination		18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)	
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)	
Cavity		SAE 10/2	SAE 12/2
Coil type ⁽²⁾		BQP19 or BH	
Nominal voltages		12VDC - 24VDC ± 10%	
Power rating		15 W (BQP19) - 33 W (BH)	
Max. control current		12V -> 1.25A - 24V -> 0.63A (BQP19) 12V -> 1.70A - 24V -> 0.85A (BH)	
Dither frequency		150 Hz	
Weight		0.30 kg (0.66 lb)	0.426 kg (0.94 lb)

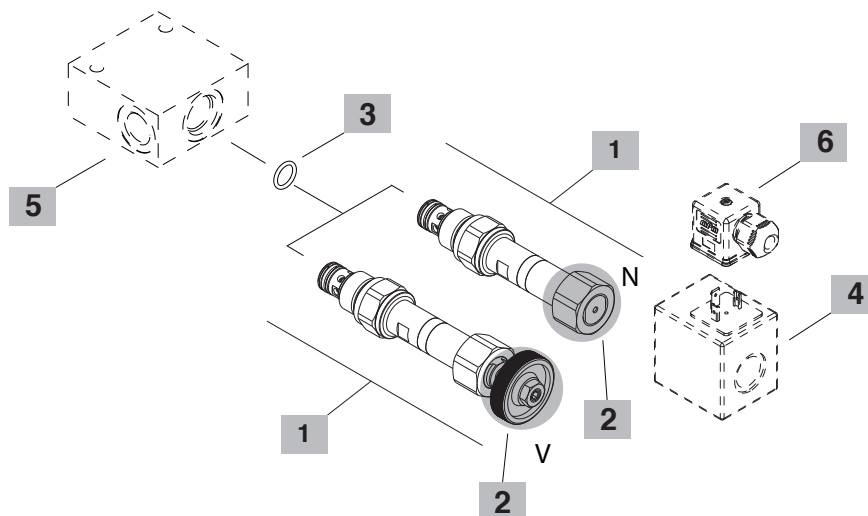
NOTE - For different conditions, please contact Walvoil Sales Dpt. - ⁽¹⁾ Values are checked with cartridge in parallel with compensator
- ⁽²⁾ For coils further features see from page 201.



Valve type	A		B				C		D			
	mm	in	N / O without emergency		V handknob		Nm		Nm		lbft	
EE10X	32.3	1.27	92.4	3.64	121.9	4.80	27	50	37	28	5	3.7
EE12X	45	1.77	94.9	3.74	124.3	4.89	32	80	59	28	5	3.7

Ordering codes and description composition

EE10X/22NB

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 10/2		
EE10X/22NB	OEE10002009	Without emergency
EE10X/22VB	OEE10002008	Handwheel emergency
SAE cavity 12/2		
EE12X/20NB	OEE12002007	Without emergency
EE12X/20VB	OEE12002009	Handwheel emergency

2 Emergency

TYPE	DESCRIPTION
N	Without emergency
V	Handknob emergency

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Coils

TYPE	CODE	DESCRIPTION
BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil

For complete coils list see from page 201
It is possible also combine coils BH

5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread

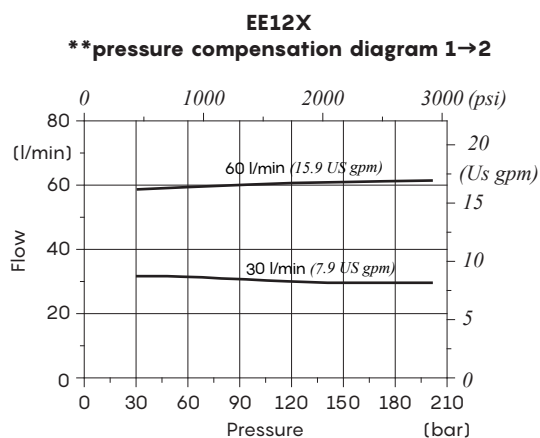
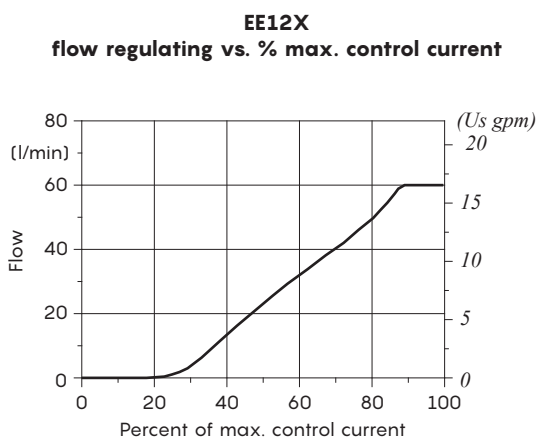
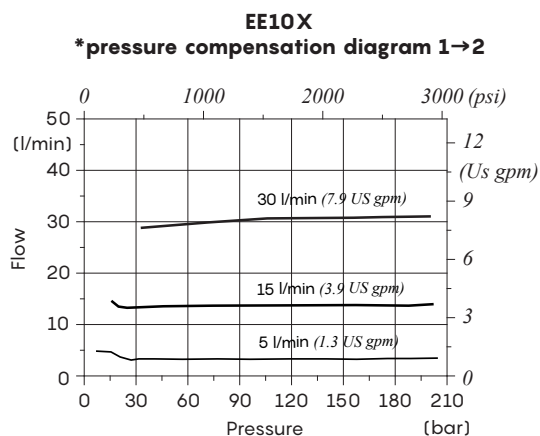
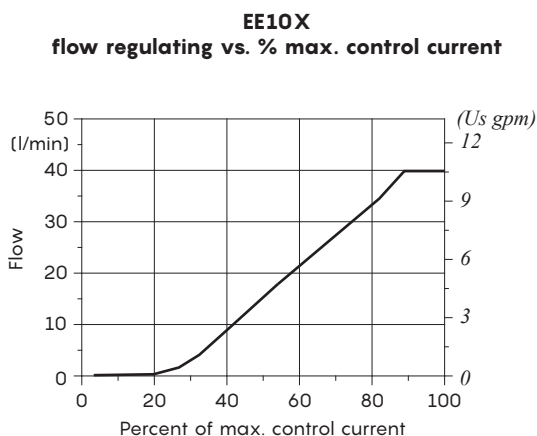
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

6 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams



*Compensation diagram were detected with the cartridge combined with a VPR/3/ET 38-12 compensator with 10 bar (145 psi) stand by

**Compensation diagram were detected with the cartridge combined with a VPR/3/ET 38-12 compensator with 7 bar (102 psi) stand by



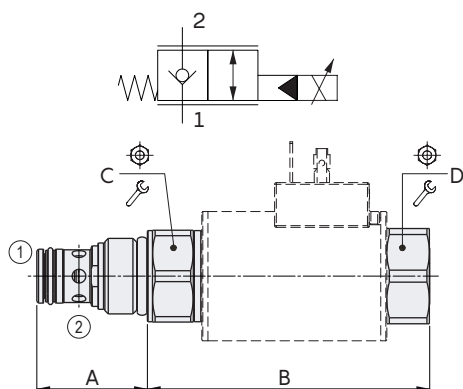
EC..T type needle valves - 2 way

- Poppet type
- Driven by proportional solenoid
- Excellent low flow metering capability
- To be combined with an external compensator
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		EC08T	EC10T	EC12T	EC16T
Nominal flow ⁽¹⁾	with 5 bar (72.5 psi) stand-by	35 l/min (9.2 US gpm)	44 l/min (11.6 US gpm)	55 l/min (15.5 US gpm)	70 l/min (18.5 US gpm)
	with 10 bar (145 psi) stand-by	44 l/min (11.6 US gpm)	58 l/min (15.3 US gpm)	70 l/min (18.5 US gpm)	97 l/min (25.6 US gpm)
Max. pressure		350 bar (5100 psi)			
Oil leakage	at 350 bar (5100 psi)	0.25 cm³/min (0.015 in³/min)	0.25 cm³/min (0.015 in³/min)	0.25 cm³/min (0.015 in³/min)	0.35 cm³/min (0.021 in³/min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity		12-200 cSt			
Max level of contamination		18/16/13 ISO4406			
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)			
Cavity		SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Coil type ⁽²⁾		BH			
Nominal voltages		12VDC - 24VDC ± 10%			
Power rating		33 W (BH)			
Max. control current		12V -> 1.70A - 24V -> 0.85A (BH)			
Dither frequency		from 100 Hz to 120 Hz			
Weight		0.275 kg (0.61 lb)	0.310 kg (0.68 lb)	0.390 kg (0.86 lb)	0.490 kg (1.08 lb)

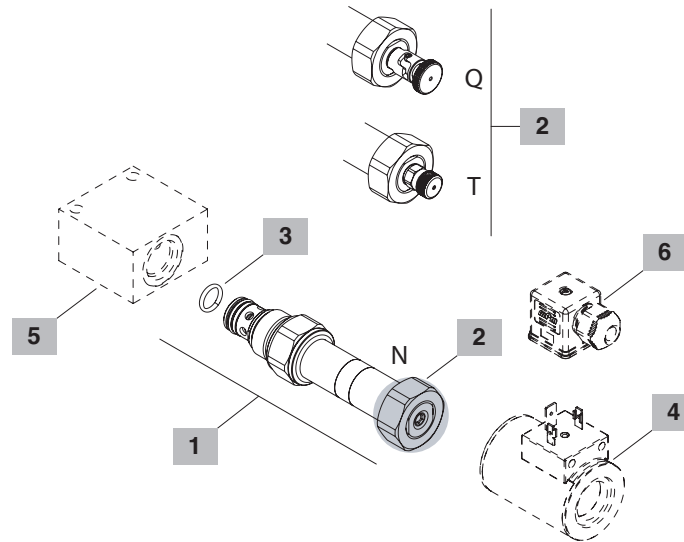
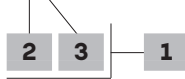
NOTE - For different conditions, please contact Walvoil Sales Dpt. - ⁽¹⁾ Values are checked with cartridge in parallel with compensator
- ⁽²⁾ For coils further features see from page 201.



Valve type	A		B						C			D		
	N / O without emergency		T screw		Q pull type with detent									
	mm	in	mm	in	mm	in	mm	in	Nm	lbft	Nm	lbft		
EC08T	28.1	1.11	83	3.27	97.5	3.84	105.6	4.16	27	50	37	28	5	3.7
EC10T	32.5	1.28	83	3.27	97.5	3.84	105.6	4.16	27	50	37	28	5	3.7
EC12T	45	1.77	82.5	3.25	97	3.82	105.1	4.14	32	85	63	28	5	3.7
EC16T	45.6	1.80	81	3.19	95.5	3.76	103.6	4.08	32	85	63	28	5	3.7

Ordering codes and description composition

EC10T/A0NB

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
EC08T/A0NB	OEC08002056	Without emergency
EC08T/A0TB	OEC08002058	Screw type emergency
EC08T/A0QB	OEC08002073	"Push&twist" emergency
SAE cavity 10/2		
EC10T/A0NB	OEC10002025	Without emergency
EC10T/A0TB	OEC10002027	Screw type emergency
EC10T/A0QB	OEC10002029	"Push&twist" emergency
SAE cavity 12/2		
EC12T/A0NB	OEC12002018	Without emergency
EC12T/A0TB	OEC12002019	Screw type emergency
EC12T/A0QB	OEC12002020	"Push&twist" emergency
SAE cavity 16/2		
EC16T/A0NB	OEC16002033	Without emergency
EC16T/A0TB	OEC16002035	Screw type emergency
EC16T/A0QB	OEC16002038	"Push&twist" emergency

2 Emergency

TYPE	DESCRIPTION
N	Without emergency
T	Screw type emergency
Q	"Push&twist" emergency

3 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

4 Coils

TYPE	CODE	DESCRIPTION
BH12VDC	4SLD001200A	12VDC-ISO4400 coil

For complete coils list see from page 201

5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

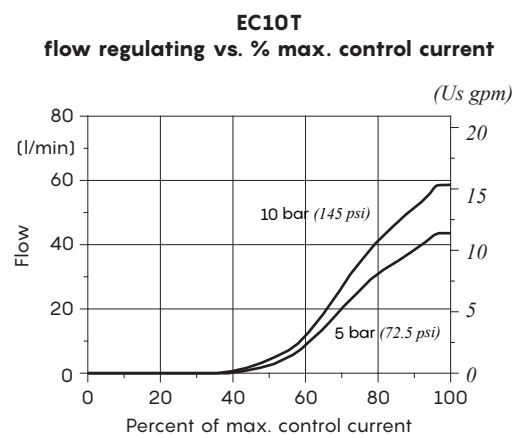
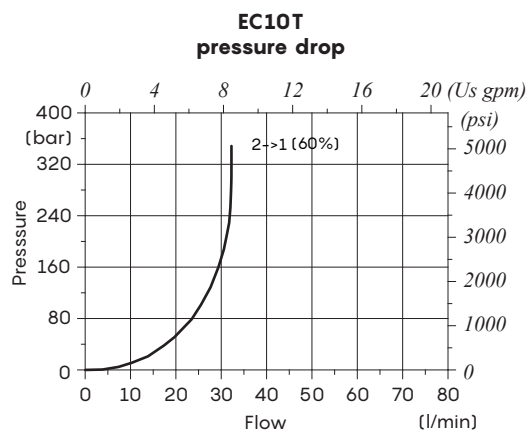
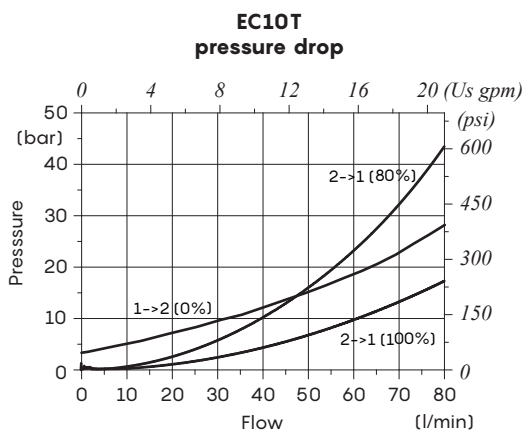
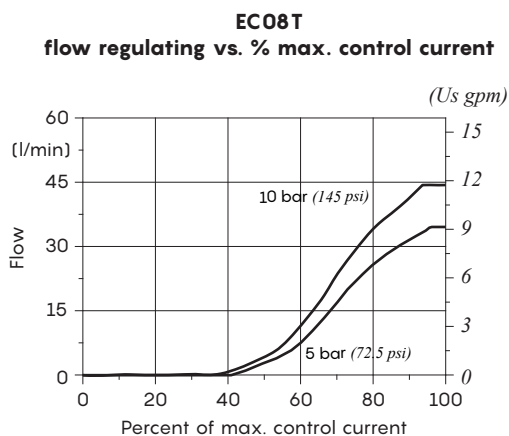
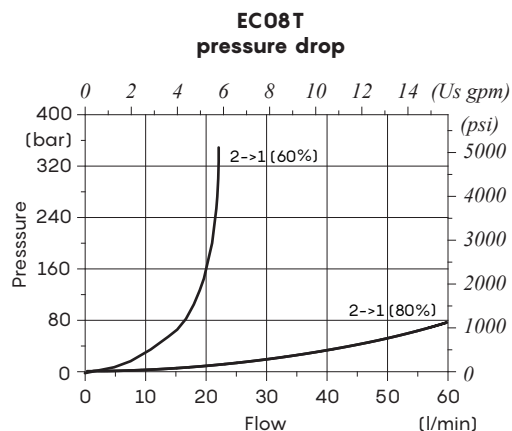
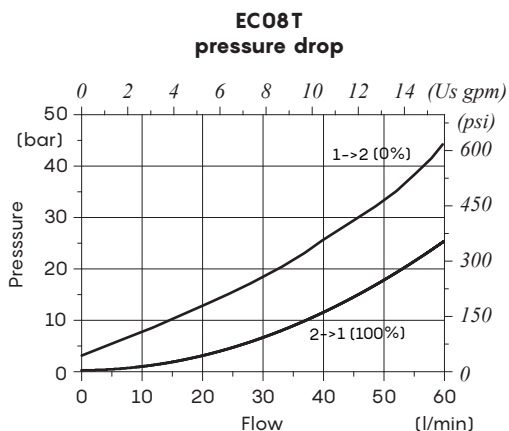
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

6 Connector

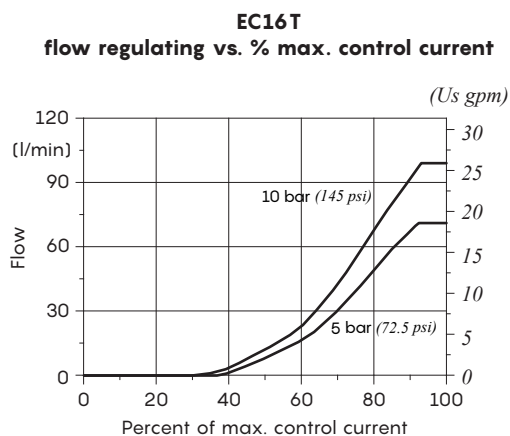
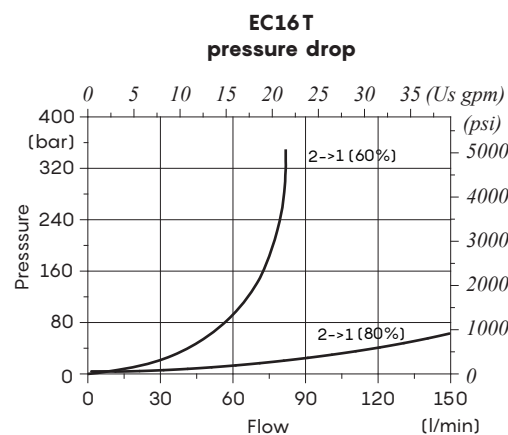
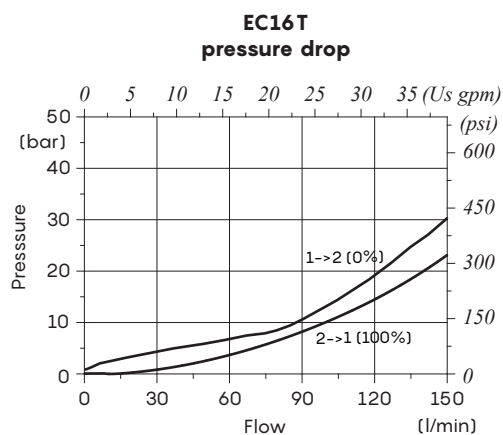
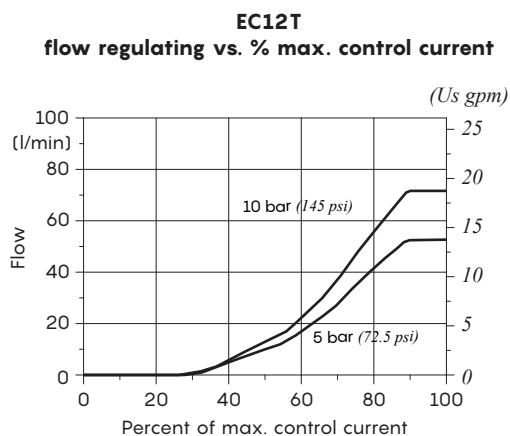
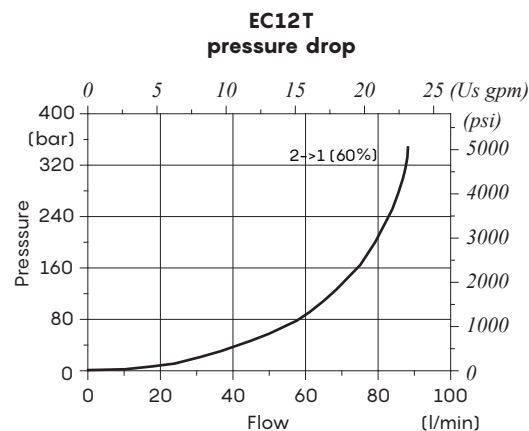
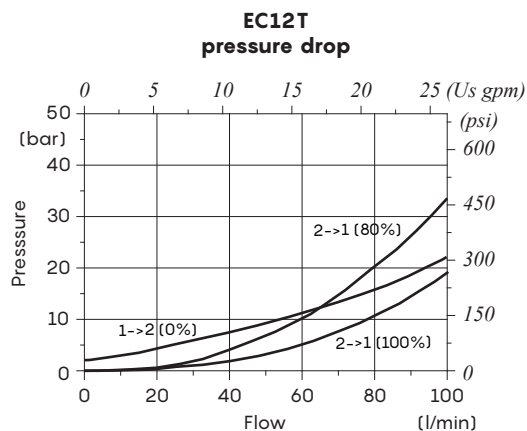
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams



Rating diagrams





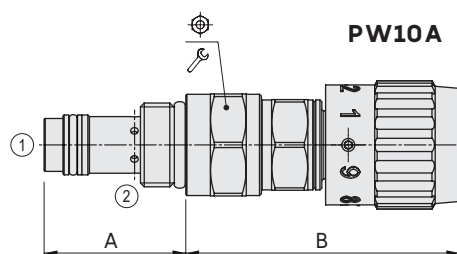
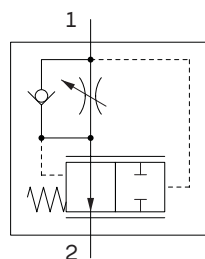
PW..A type flow control pressure compensated valves – 2 way

- Spool type
- Different types of manual adjustment
- Adjustment from port 1 to port 2
- With reverse free flow check
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	PW08A	PW10A	PW12A	PW16A
Nominal flow	10 l/min (2.6 US gpm)	30 l/min (7.9 US gpm)	50 l/min (13 US gpm)	90 l/min (24 US gpm)
Max. pressure	350 bar (5100 psi)			
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity	10-200 cSt			
Max level of contamination	20/18/14 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)			
Cavity	SAE 08/2 A	SAE 10/2 A	SAE 12/2 A	SAE 16/2 A
Weight	0.22 kg (0.48 lb)	0.30 kg (2.20 lb)	0.72 kg (1.58 lb)	0.98 kg (2.16 lb)

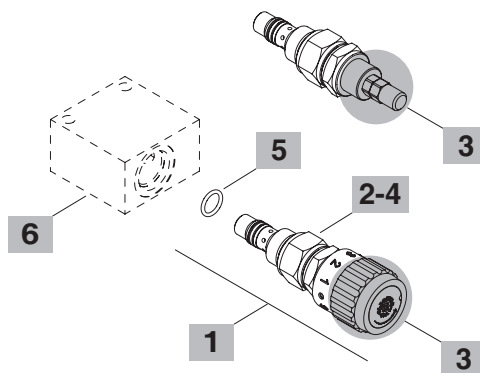
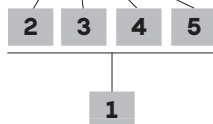
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B				
		mm	in	mm	in	 Nm lbf·ft		
PW08A/A	M	36.6	1.44	67.6	2.66	24	30	22
	S	36.6	1.44	62	2.44	24	30	22
PW10A/A	M	37.5	1.48	72.5	2.85	27	50	37
	S	37.5	1.48	69	2.72	27	50	37
PW12A/A	M	58.5	2.30	69.2	2.72	32	80	59
	S	58.5	2.30	61.5	2.42	32	80	59
PW16A/A	M	68	2.68	102	4.02	41	100	74
	S	68	2.68	96	3.78	41	100	74

Ordering codes and description composition

PW08A/AM1B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2 A		
PW08A/AM1B	OPW08002000	Handknob adjustment
PW08A/AS1B	OPW08002003	Screw type adjustment
SAE cavity 10/2 A		
PW10A/AM1B	OPW10002000	Handknob adjustment
PW10A/AS1B	OPW10002001	Screw type adjustment
SAE cavity 12/2 A		
PW12A/AM1B	OPW12002000	Handknob adjustment
PW12A/AS1B	OPW12002001	Screw type adjustment
SAE cavity 16/2 A		
PW16A/AM1B	OPW16002000	Handknob adjustment
PW16A/AS1B	OPW16002001	Screw type adjustment

2 Pressure drop from 1 to 2

TYPE	DESCRIPTION
A	12 bar (170 psi)

3 Adjustments

TYPE	DESCRIPTION
S	Screw
M	Handknob

4 Pressure drop from 2 to 1

TYPE	DESCRIPTION
1	0.5 bar (7.3 psi)

5 Seals

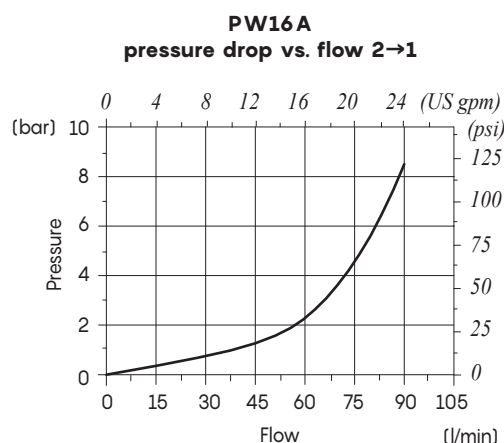
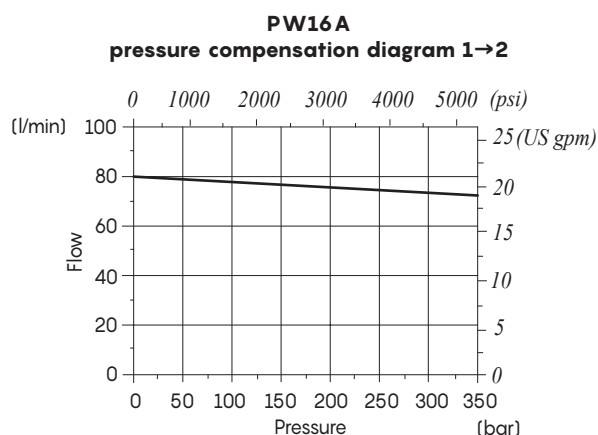
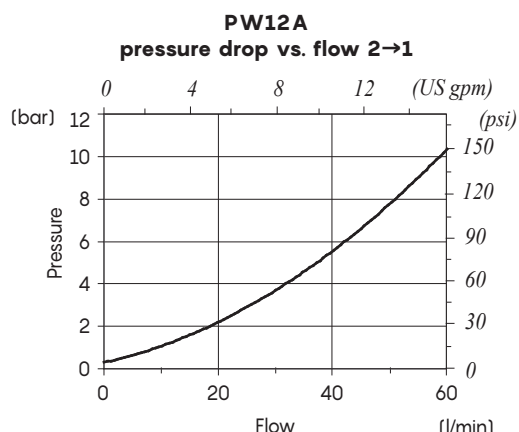
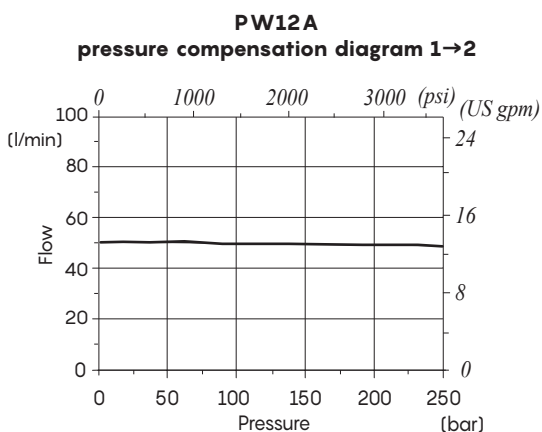
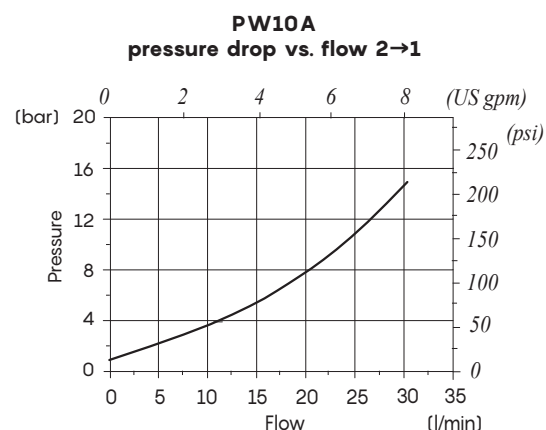
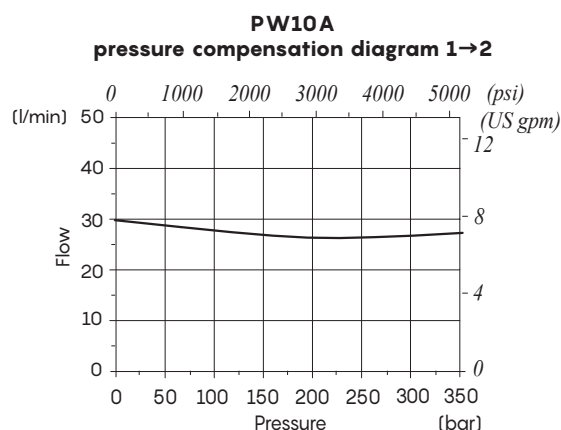
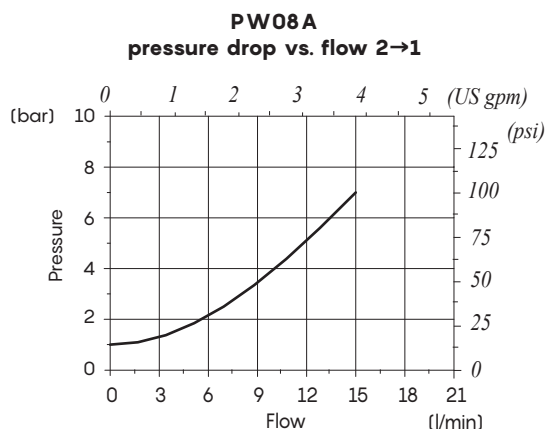
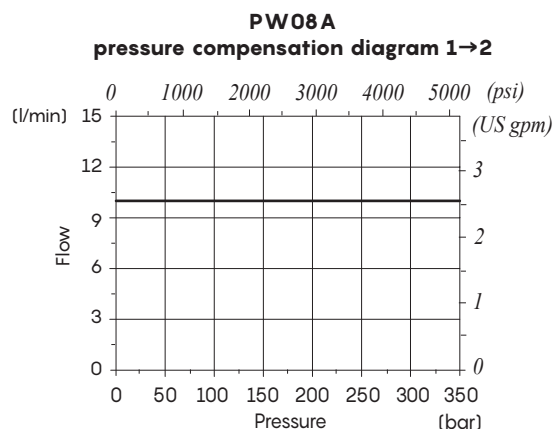
TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams





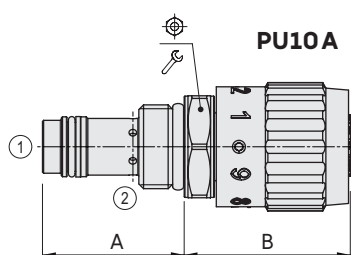
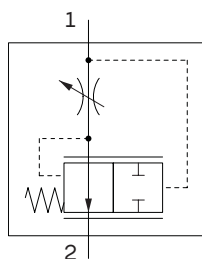
PU..A type flow control pressure compensated valves – 2 way

- Spool type
- Different types of manual adjustment
- Adjustment from port 1 to port 2
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	PU08A	PU10A	PU12A	PU16A
Nominal flow	15 l/min (3.9 US gpm)	30 l/min (7.9 US gpm)	50 l/min (13 US gpm)	90 l/min (24 US gpm)
Max. pressure	350 bar (5100 psi)			
Fluid	mineral based or sinthetic hydraulic fluid with lubricating properties			
Viscosity	10–200 cSt			
Max level of contamination	20/18/14 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)			
Cavity	SAE 08/2 A	SAE 10/2 A	SAE 12/2 A	SAE 16/2 A
Weight	0.18 kg (0.40 lb)	0.20 kg (0.44 lb)	0.30 kg (0.66 lb)	0.55 kg (1.21 lb)

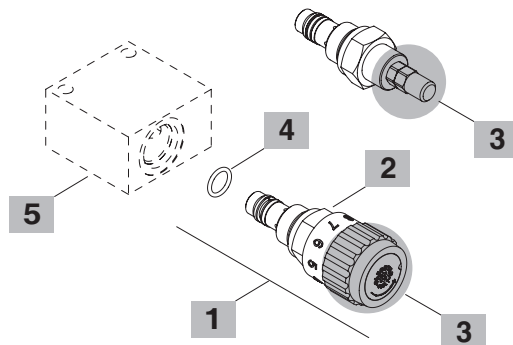
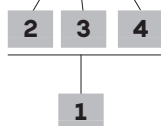
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B				
		mm	in	mm	in	 Nm lbft		
PU08 A/A	M	33.6	1.32	48	1.89	24	30	22
	S	33.6	1.32	46	1.81	24	30	22
PU10 A/A	M	37.5	1.48	44	1.73	27	50	37
	S	37.5	1.48	42	1.65	27	50	37
PU12 A/A	M	58.5	2.30	48	1.89	32	80	59
	S	58.5	2.30	42	1.65	32	80	59
PU16 A/A	M	68	2.68	53.5	2.11	41	100	74
	S	68	2.68	51	2.01	41	100	74

Ordering codes and description composition

PU08 A/AM0B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2 A		
PU08 A/AM0B	OPU08002000	Handknob adjustment
PU08 A/AS0B	OPU08002003	Screw type adjustment
SAE cavity 10/2 A		
PU10 A/AM0B	OPU10002001	Handknob adjustment
PU10 A/AS0B	OPU10002000	Screw type adjustment
SAE cavity 12/2 A		
PU12 A/AM0B	OPU12002000	Handknob adjustment
PU12 A/AS0B	OPU12002003	Screw type adjustment
SAE cavity 16/2 A		
PU16 A/AM0B	OPU16002000	Handknob adjustment
PU16 A/AS0B	OPU16002007	Screw type adjustment

2 Pressure drop from 1 to 2

TYPE	DESCRIPTION
A	12 bar (170 psi)

3 Adjustments

TYPE	DESCRIPTION
S	Screw
M	Handknob

4 Seals

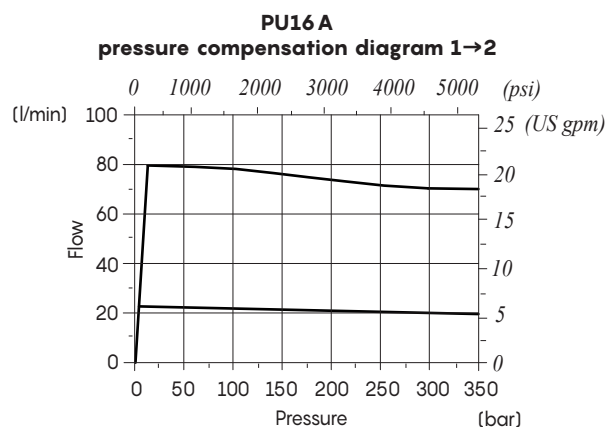
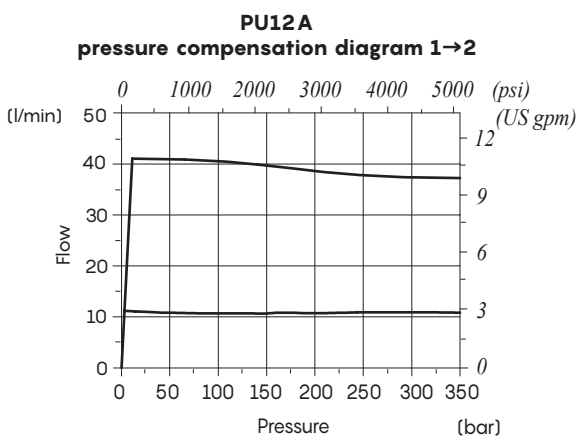
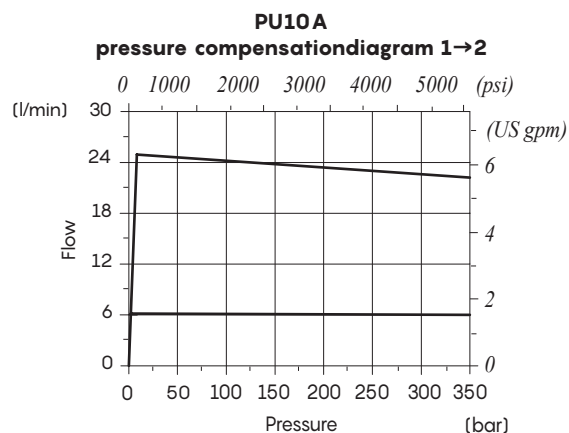
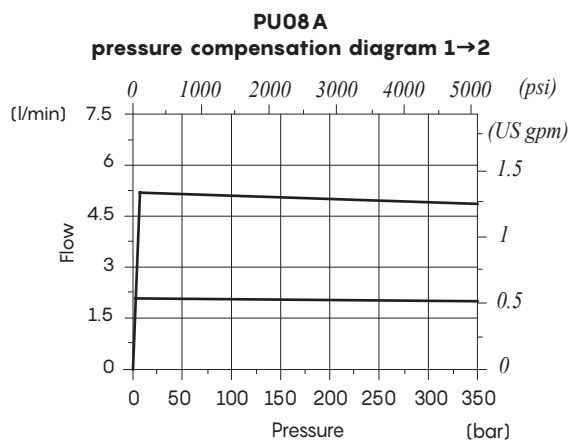
TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams





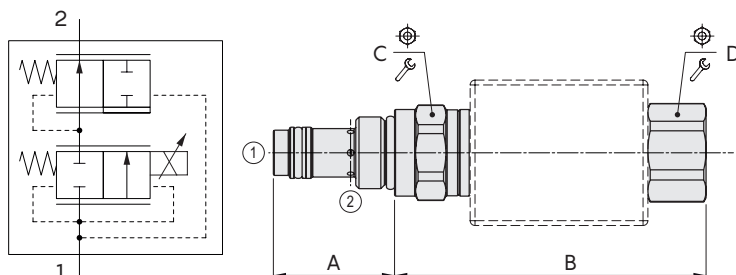
PU..X type flow control pressure compensated valves - 2 way

- Spool type
- Direct acting through proportional solenoid
- Different types of emergencies available
- Adjustment from port 1 to port 2
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		PU08X	PU10X	PU12X	PU16X
Nominal flow		10 l/min (2.6 US gpm)	30 l/min (7.9 US gpm)	50 l/min (13 US gpm)	90 l/min (24 US gpm)
Max. pressure		315 bar (4600 psi)			
Oil leakage	at 210 bar (3050 psi)	80 cm³/min (4.9 in³/min)	150 cm³/min (9.2 in³/min)	250 cm³/min (15.3 in³/min)	400 cm³/min (24.4 in³/min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity		10–200 cSt			
Max level of contamination		18/16/13 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)			
Cavity		SAE 08/2 A	SAE 10/2 A	SAE 12/2 A	SAE 16/2 A
Coil type*		BH or BQP19			
Nominal voltages		12VDC - 24VDC ± 10%			
Power rating		33 W (BH) - 15 W (BQP19)			
Max. control current		12V -> 1.70A - 24V -> 0.85A (BH) 12V -> 1.25A - 24V -> 0.63A (BQP19)			
Dither frequency		150Hz			
Hysteresis		8%			
Weight		0.34 kg (0.75 lb)	0.39 kg (0.86 lb)	0.51 kg (1.12 lb)	0.90 kg (1.98 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

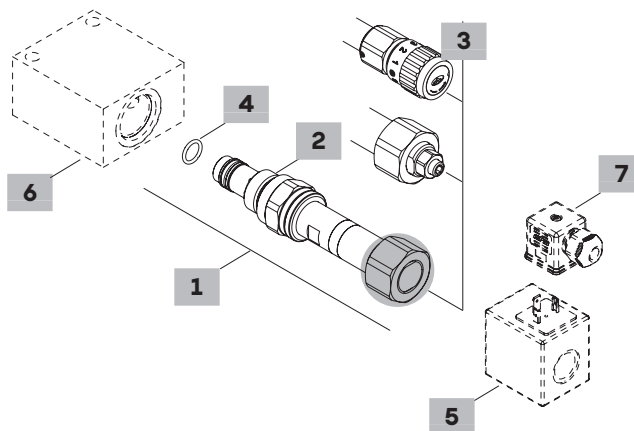
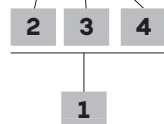


Valve type	A		B N without emergency		C			D		
										
	mm	in	mm	in	Nm	lbft		Nm	lbft	
PU10X	37.5	1.48	96.4	3.80	27	50	37	28	5	3.7

For dimensions with different type of emergency see list page 116

Ordering codes and description composition

PU08X/A0NB



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2 A		
PU08X/A0NB	OPU08002012	Without emergency
PU08X/A0TB	OPU08002013	Screw type emergency
PU08X/A0VB	OPU08002014	Handknob emergency
SAE cavity 10/2 A		
PU10X/A0NB	OPU10002020	Without emergency
PU10X/A0TB	OPU10002021	Screw type emergency
PU10X/A0VB	OPU10002022	Handknob emergency
SAE cavity 12/2 A		
PU12X/A0NB	OPU12002007	Without emergency
PU12X/A0TB	OPU12002008	Screw type emergency
PU12X/A0VB	OPU12002009	Handknob emergency
SAE cavity 16/2 A		
PU16X/A0NB	OPU16002010	Without emergency
PU16X/A0TB	OPU16002011	Screw type emergency
PU16X/A0VB	OPU16002012	Handknob emergency

2 Pressure drop from 1 to 2

TYPE	DESCRIPTION
A	12 bar (170 psi)

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
T	Screw type
V	Handknob

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BH 12VDC	4SLD001200A	12VDC-ISO4400 coil
BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil

For complete coils list see from page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

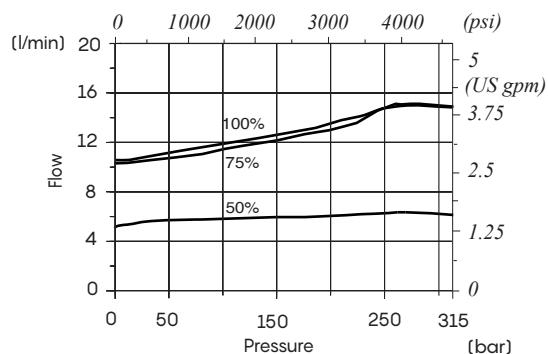
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

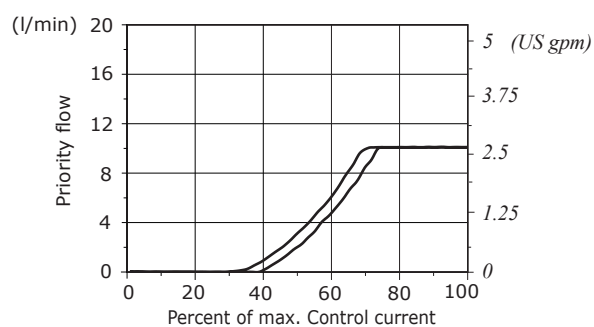
For complete connectors list see from page 201

Rating diagrams

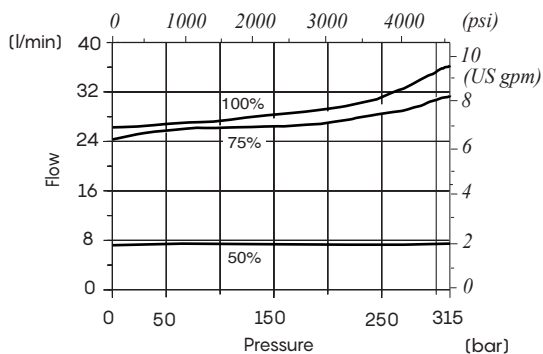
PU08X: pressure compensation diagram 1→2
for % of control current



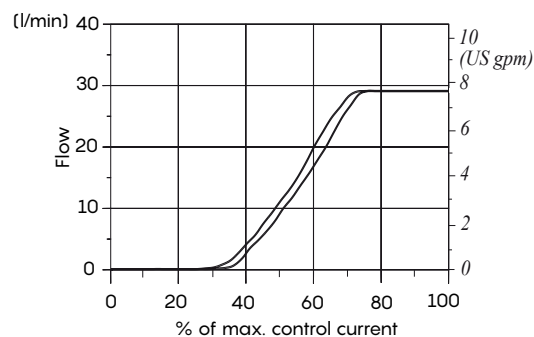
PU08X
flow regulating vs. % max. control current



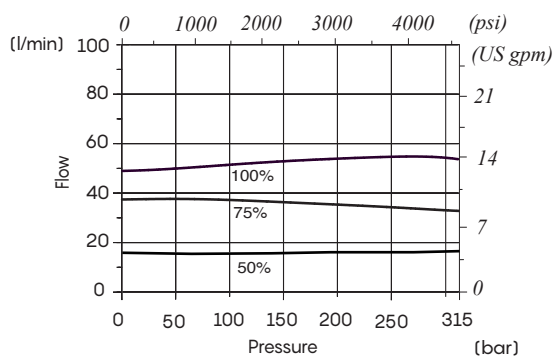
PU10X: pressure compensation diagram 1→2
for % of control current



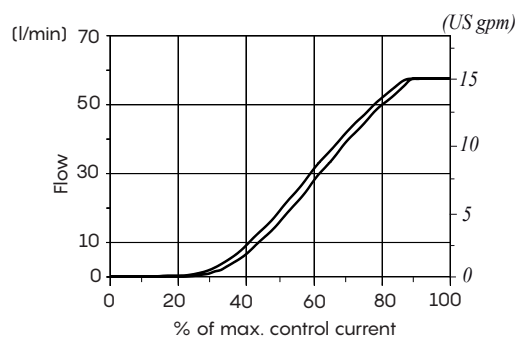
PU10X
flow regulating vs. % max. control current



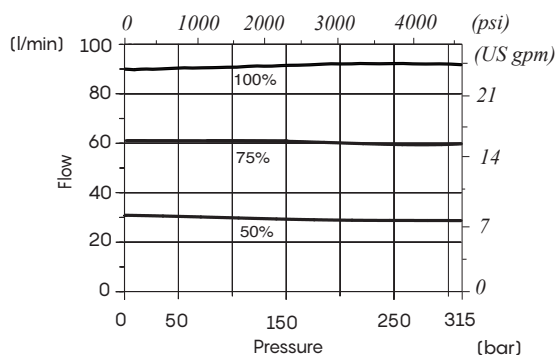
PU12X: pressure compensation diagram 1→2
for % of control current



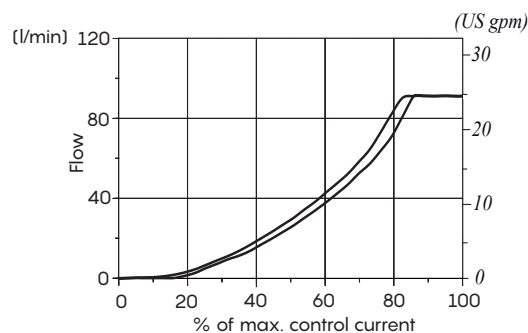
PU12X
flow regulating vs. % max. control current



PU16X: pressure compensation diagram 1→2
for % of control current



PU16X
flow regulating vs. % max. control current



Types and dimensions

Valve type	A		B						C		D			
			N without emergency		T screw		V handknob							
	mm	in	mm	in	mm	in	mm	in	Nm	lbft	Nm	lbft		
PU08X	36.6	1.44	93.9	3.70	107.9	4.25	139.9	5.51	24	30	22	28	5	3.7
PU10X	37.5	1.48	96.4	3.80	110.4	4.35	142.4	5.61	27	50	37	28	5	3.7
PU12X	58.5	2.30	97.4	3.83	111.4	4.39	145.4	5.72	32	75	55	28	5	3.7
PU16X	68	2.68	121.4	4.78	135.4	5.33	169.4	6.67	41	95	70	28	5	3.7



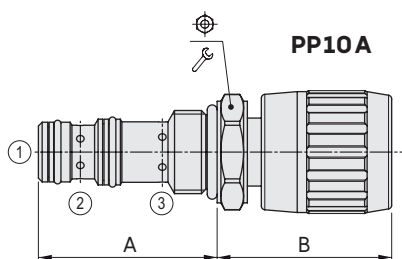
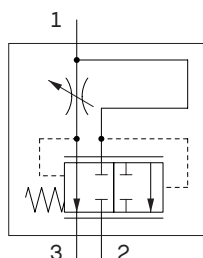
PP..A type flow control pressure compensated valves – 3 way

- Spool type
- Different types of manual adjustment
- With exceeding flow to pressure
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		PP08A	PP10A	PP12A	PP16A
Nominal flow	Q1max= Q3max=	20 l/min (5.2 US gpm) 15 l/min (4 US gpm)	50 l/min (13.2 US gpm) 30 l/min (7.9 US gpm)	90 l/min (23.8 US gpm) 50 l/min (13 US gpm)	150 l/min (39.6 US gpm) 90 l/min (24 US gpm)
Max. pressure		350 bar (5100 psi)			
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity		10–200 cSt			
Max level of contamination		20/18/14 ISO4406			
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)			
Cavity		SAE 08/3	SAE 10/3	SAE 12/3	SAE 16/3
Weight		0.15 kg (0.33 lb)	0.20 kg (0.44 lb)	0.42 kg (0.92 lb)	0.57 kg (1.26 lb)

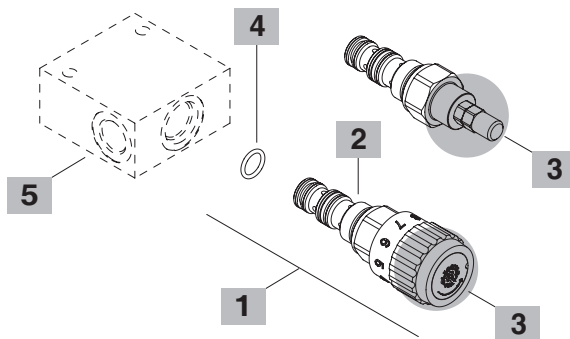
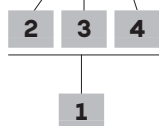
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B		Torque		
		mm	in	mm	in	Nm	lbf	ft
PP08A/A	M	41.1	1.62	54.1	2.13	24	30	22
	S	41.1	1.62	48	1.89	24	30	22
PP10A/A	M	47.2	1.86	47.2	1.86	27	50	37
	S	47.2	1.86	42	1.65	27	50	37
PP12A/A	M	73.5	2.89	47.5	1.87	32	80	59
	S	73.5	2.89	43	1.69	32	80	59
PP16A/A	M	75	2.95	51.5	2.03	41	100	74
	S	75	2.95	51	2.01	41	100	74

Ordering codes and description composition

PP08A/AM0B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
PP08A/AM0B	OPP08002000	Handknob adjustment
PP08A/AS0B	OPP08002004	Screw type adjustment
SAE cavity 10/3		
PP10A/AM0B	OPP10002000	Handknob adjustment
PP10A/AS0B	OPP10002005	Screw type adjustment
SAE cavity 12/3		
PP12A/AM0B	OPP12002000	Handknob adjustment
PP12A/AS0B	OPP12002004	Screw type adjustment
SAE cavity 16/3		
PP16A/AM0B	OPP16002001	Handknob adjustment
PP16A/AS0B	OPP16002006	Screw type adjustment

2 Pressure drop from 1 to 2

TYPE	DESCRIPTION
A	12 bar (170 psi)

3 Adjustments

TYPE	DESCRIPTION
S	Screw
M	Handknob

4 Seals

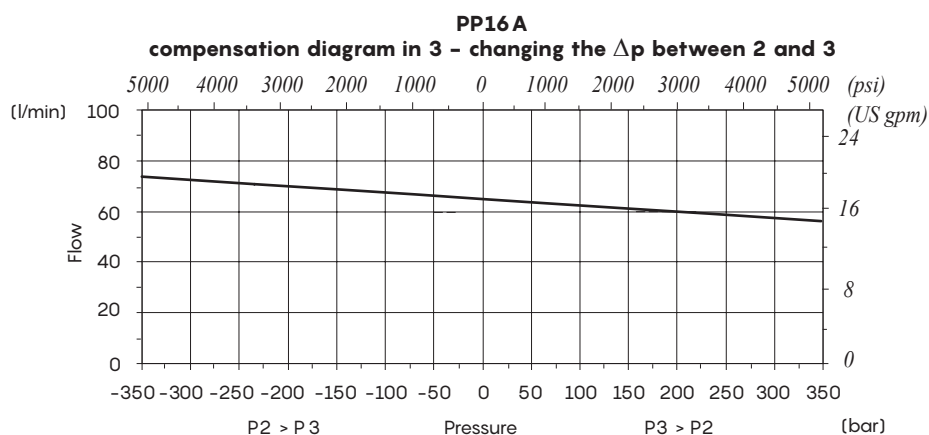
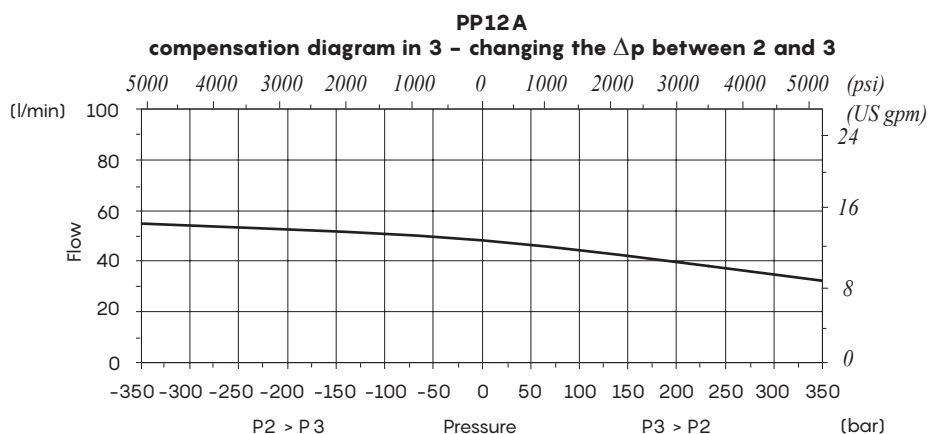
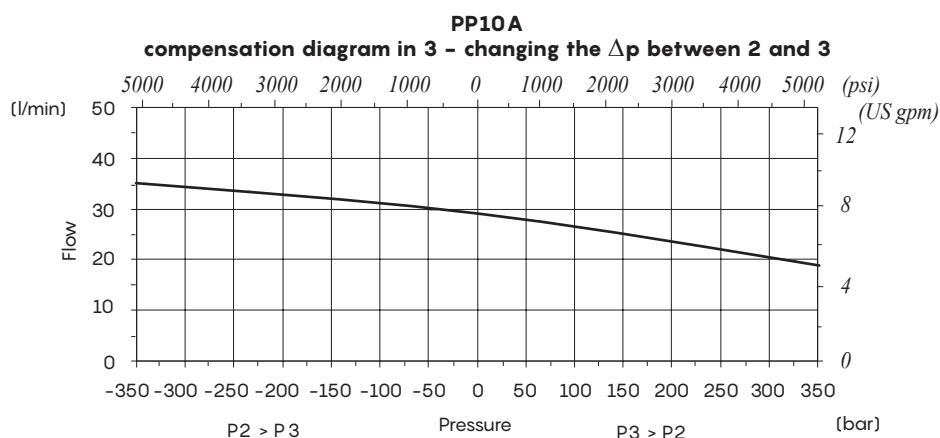
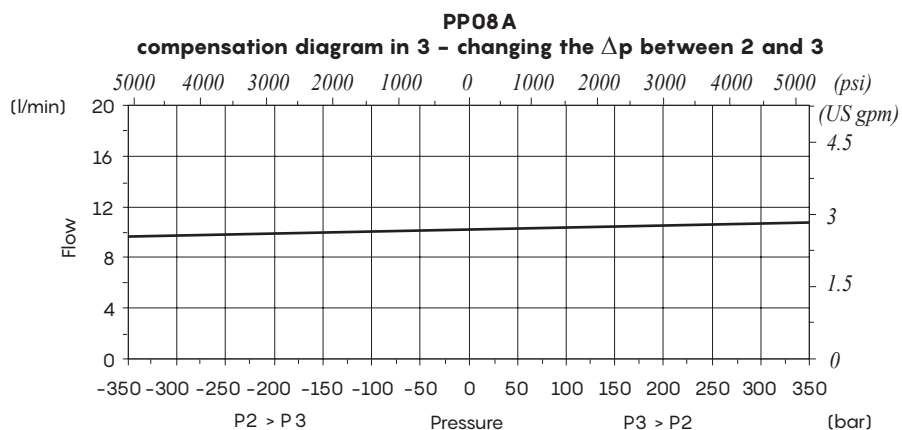
TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/3-SAE10	3CC1230L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/3-SAE12	3CC1630M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

Rating diagrams





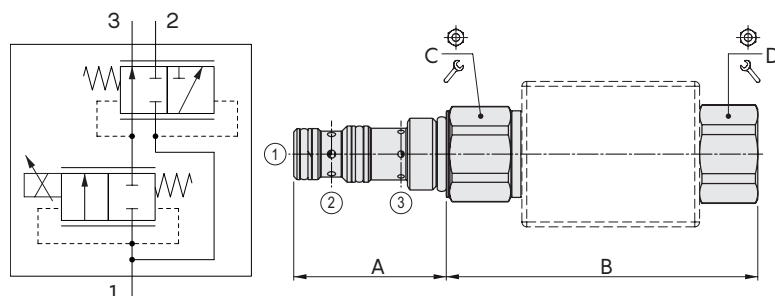
PP..X type flow control pressure compensated valves – 3 way

- Spool type
- Direct acting through proportional solenoid
- Different types of emergencies available
- With exceeding flow to pressure
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

		PP08X	PP10X	PP12X	PP16X
Nominal flow	Q1max= Q3max=	20 l/min (5.2 US gpm) 15 l/min (4 US gpm)	50 l/min (13.2 US gpm) 30 l/min (7.9 US gpm)	90 l/min (23.8 US gpm) 60 l/min (16 US gpm)	150 l/min (39.6 US gpm) 90 l/min (24 US gpm)
Max. pressure		315 bar (4600 psi)			
Oil leakage	at 210 bar (3050 psi)	80 cm³/min (4.9 in³/min)	150 cm³/min (9.2 in³/min)	250 cm³/min (15.3 in³/min)	400 cm³/min (24.4 in³/min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity		10-200 cSt			
Max level of contamination		18/16/13 ISO4406			
Fluid temperature	with NBR seals+ Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)			
Cavity		SAE 08/3	SAE 10/3	SAE 12/3	SAE 16/3
Coil type*		BQP19 or BH			
Nominal voltages		12VDC - 24VDC ± 10%			
Power rating		33 W (BH) - 15 W (BQP19)			
Max. control current		12V -> 1.70A - 24V -> 0.85A (BH) 12V -> 1.25A - 24V -> 0.63A (BQP19)			
Dither frequency		150Hz			
Hysteresis		8%			
Weight		0.44 kg (0.97 lb)	0.49 kg (1.08 lb)	0.61 kg (1.34 lb)	1 kg (2.20 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

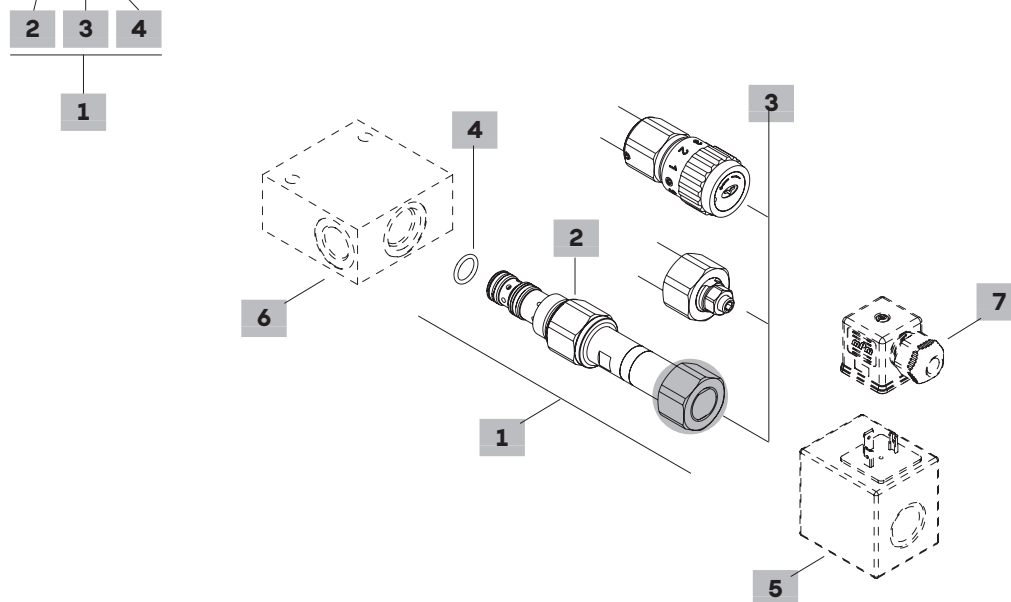


Valve type	A		B		C			D		
	N		without emergency							
	mm	in	mm	in	Nm	lbf	Nm	lbf		
PP10X	47.2	1.86	96.4	3.80	27	50	37	28	5	3.7

For dimensions with different type of emergency see list page 124

Ordering codes and description composition

PP08X/A0NB



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
PP08X/A0NB	OPP08002014	Without emergency
PP08X/A0TB	OPP08002015	Screw type emergency
PP08X/A0VB	OPP08002016	Handknob emergency
SAE cavity 10/3		
PP10X/A0NB	OPP10002031	Without emergency
PP10X/A0TB	OPP10002033	Screw type emergency
PP10X/A0VB	OPP10002035	Handknob emergency
SAE cavity 12/3		
PP12X/A0NB	OPP12002037	Without emergency
PP12X/A0TB	OPP12002039	Screw type emergency
PP12X/A0VB	OPP12002041	Handknob emergency
SAE cavity 16/3		
PP16X/A0NB	OPP16002013	Without emergency
PP16X/A0TB	OPP16002015	Screw type emergency
PP16X/A0VB	OPP16002014	Handknob emergency

2 Pressure drop from 1 to 3

TYPE	DESCRIPTION
A	12 bar (170 psi)

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
T	Screw type
V	Handknob

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BH 12VDC	4SLD001200A	12VDC-ISO4400 coil
BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil

For complete coils list see from page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/3-SAE10	3CC1230L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/3-SAE12	3CC1630M11	Aluminium body for cavity 16 valve, SAE12 std thread

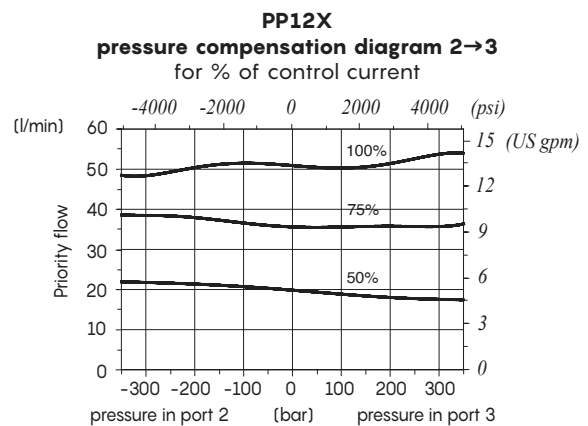
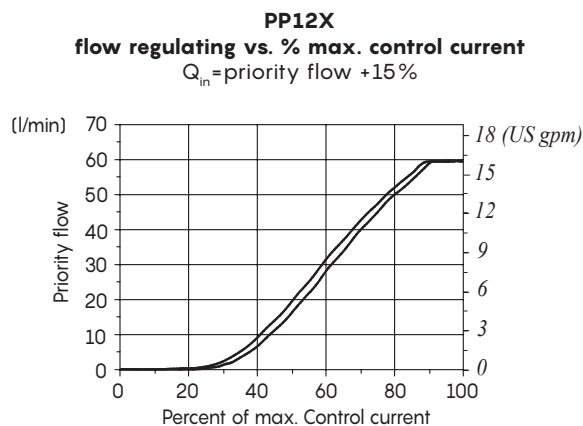
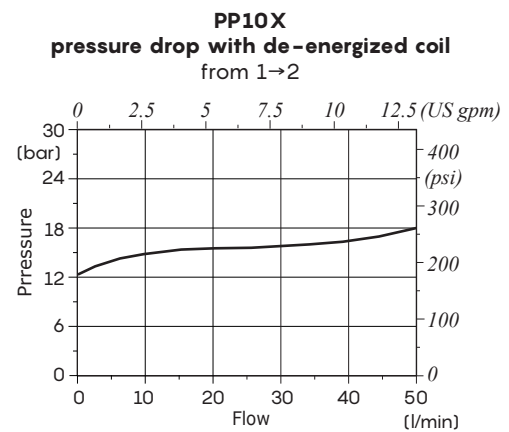
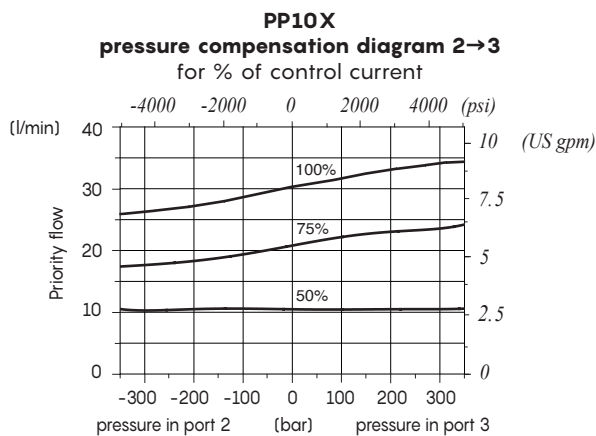
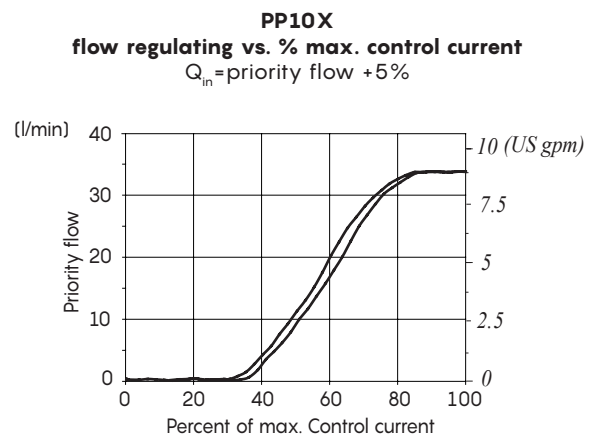
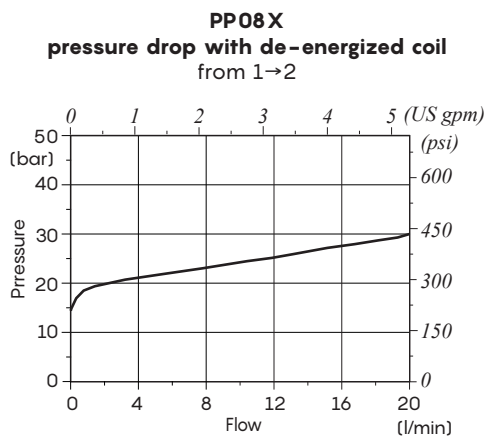
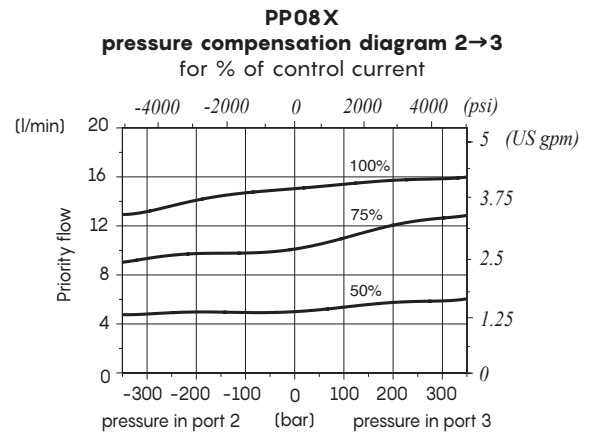
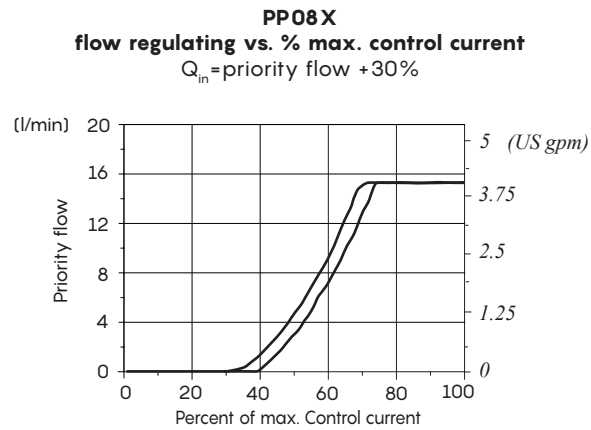
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

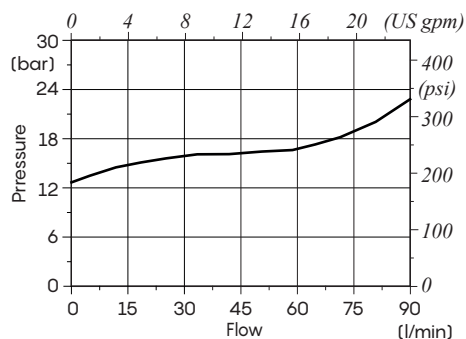
For complete connectors list see from page 201

Rating diagrams

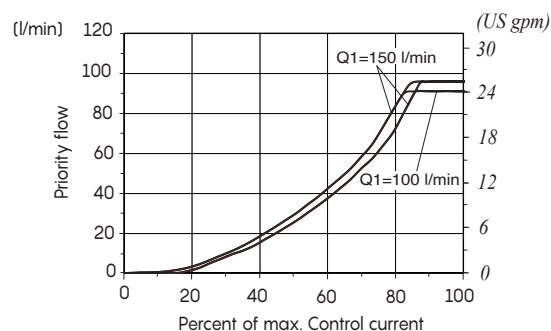


Rating diagrams

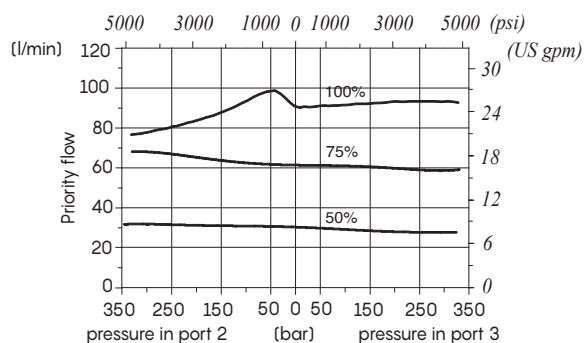
PP12X
pressure drop with de-energized coil
from 1→2



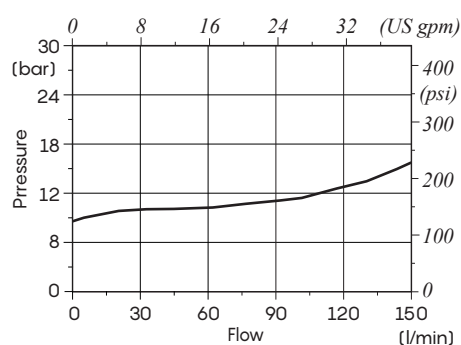
PP16X
flow regulating vs. % max. control current
 Q_{in} = priority flow +10%



PP16X
pressure compensation diagram 2→3
for % of control current - $Q_1=100$ l/min



PP16X
pressure drop with de-energized coil
from 1→2



Types and dimensions

Valve type	A		N		B		V		C		D	
	mm	in	without emergency		T screw		handknob		Nm	lbft	Nm	lbft
PP08X	40.8	1.60	93.9	3.70	107.9	4.25	141.9	5.59	24	30	22	28
PP10X	47.2	1.86	96.4	3.80	110.4	4.35	144.1	5.67	27	50	37	28
PP12X	73.5	2.89	97.4	3.83	111.4	4.39	145.4	5.72	32	80	59	28
PP16X	75	2.95	121.4	4.78	135.4	5.33	168.9	6.65	41	100	74	28



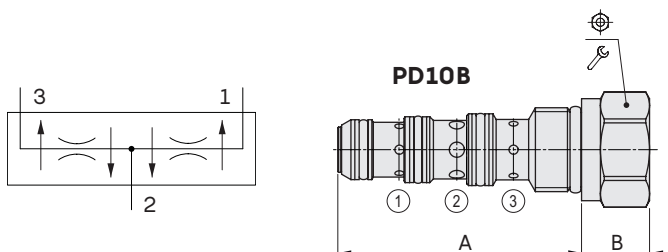
PD... type flow control pressure compensated valves – 3 way

- Spool type
- Direct mechanical control
- Flow divider in one direction and flow combiner in the opposite direction
- From SAE10 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	PD10B/110B	PD10B/120B	PD10B/130B	PD10B/140B	PD10B/150B	PD12B/100B	PD16C/110B
Flow range	4-12 l/min (1-3 US gpm)	12-20 l/min (3-5 US gpm)	20-28 l/min (5-7 US gpm)	28-36 l/min (7-9 US gpm)	36-44 l/min (9-12 US gpm)	40-75 l/min (10-20 US gpm)	75-150 l/min (20-40 US gpm)
Max. pressure	210 bar (3045 psi)						
Maximum division error	± 5% of the oil flow in 1 or 3 and 120 bar - 1750 psi - pressure difference between 1 and 3. (Division rate 50%+50%)						
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties						
Viscosity	10-200 cSt						
Max level of contamination	20/18/14 ISO4406						
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)					
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)						
Cavity	SAE 10/4	SAE 10/4	SAE 10/4	SAE 10/4	SAE 10/4	SAE 12/4	SAE 16/4
Weight	0.20 kg (0.44 lb)	0.20 kg (0.44 lb)	0.20 kg (0.44 lb)	0.20 kg (0.44 lb)	0.20 kg (0.44 lb)	0.30 kg (0.66 lb)	0.55 kg (1.214 lb)

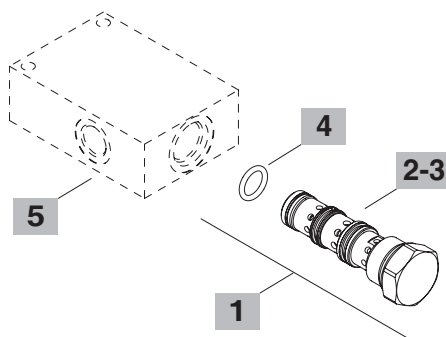
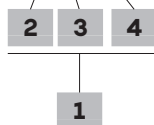
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		 Nm lbf·ft		
	mm	in	mm	in			
PD10B	64.5	2.54	18	0.71	27	50	37
PD12B	83	3.27	12	0.47	32	80	59
PD16C	104	4.09	17	0.69	41	100	74

Ordering codes and description composition

PD10B/110B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 10/4		
PD10B/110B	OPD10002004	Flow range 1
PD10B/120B	OPD10002005	Flow range 2
PD10B/130B	OPD10002006	Flow range 3
PD10B/140B	OPD10002007	Flow range 4
PD10B/150B	OPD10002008	Flow range 5
SAE cavity 12/4		
PD12B/100B	OPD12002001	Range 40+75 l/min (10-20 US gpm)
SAE cavity 16/4		
PD16C/100B	OPD16002003	Range 75+150 l/min (20-40 US gpm)

2 Dividing-Combining ratio

TYPE	DESCRIPTION
1	50+50

3 Flow range

TYPE	DESCRIPTION
1	4+12 l/min (1-3 US gpm)
2	12+20 l/min (3-5 US gpm)
3	20+28 l/min (5-7 US gpm)
4	28+36 l/min (7-9 US gpm)
5	36+44 l/min (9-12 US gpm)

4 Seals

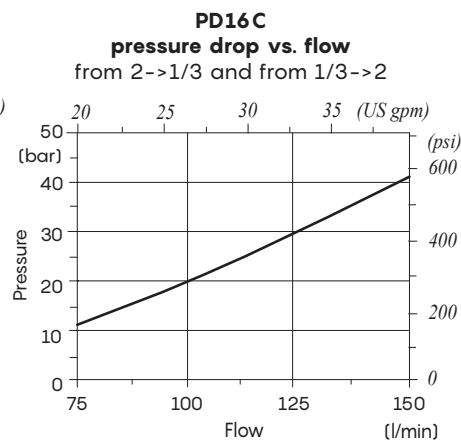
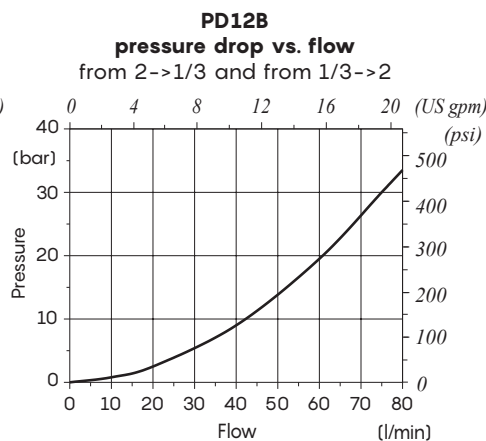
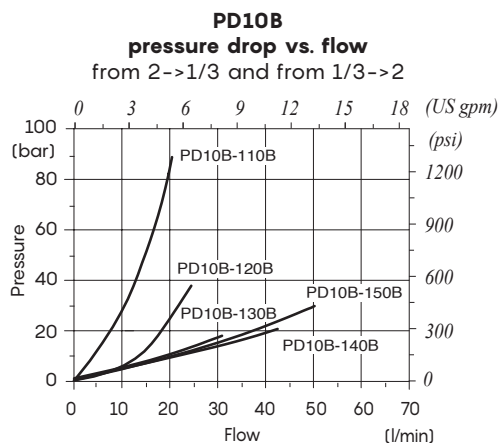
TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/4 - SAE8	3CC1040K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/4 - SAE10	3CC1240L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/4 - SAE16	3CC1640N11	Aluminium body for cavity 16 valve, SAE16 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 212

Rating diagrams





PL..M type flow control pressure compensated valves - 4 way

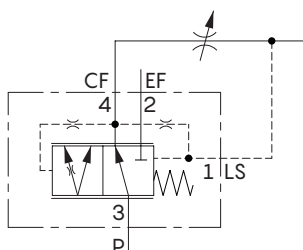
- Spool type
- Piloted acting by mechanical control
- Priority cartridges valves compensated with possibility of static and dynamic load sense
- External zinc-plated and corrosion-proof components
- Priority flow rate (port 4) not affected by changes in working conditions
- SAE10 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

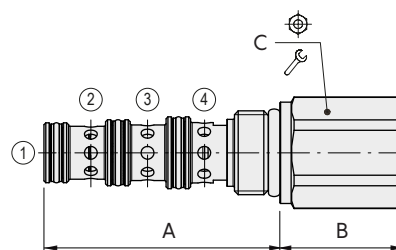
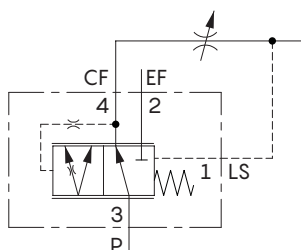
		PL10M	PL12M	PL16M
Nominal flow	on port 3	50 l/min (13.2 US gpm)	100 l/min (26.4 US gpm)	160 l/min (42.2 US gpm)
	max. on port 4	40 l/min (10.5 US gpm)	80 l/min (21.1 US gpm)	140 l/min (36.9 US gpm)
Max. pressure		350 bar (5100 psi)		
Stand-by	PL..M/..AB	5 bar (72.5 psi)	5 bar (72.5 psi)	5.5 bar (79.7 psi)
	PL..M/..BB	-	7.5 bar (108 psi)	-
	PL..M/..CB	10 bar (145 psi)	10.5 bar (152 psi)	11 bar (159 psi)
	PL..M/..DB	-	-	22 bar (319 psi)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties		
Viscosity		10-200 cSt		
Max level of contamination		18/16/13 ISO4406		
Fluid temperature	with NBR seals+Polyurethane	from -25°C (-13°F) to 90°C (194°F)		
	with FPM seals	from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)		
Cavity		SAE 10/4	SAE 12/4	SAE 16/4
Weight		0.224 kg (0.494 lb)	0.378 kg (0.833 lb)	0.800 kg (1.76 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt.

Dynamic circuit



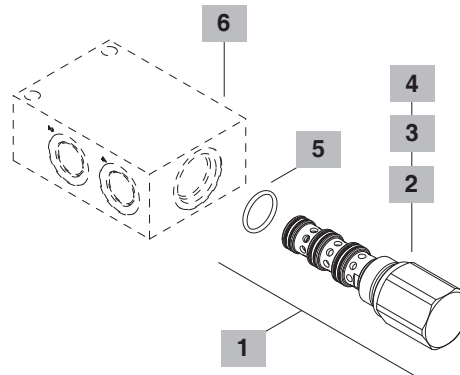
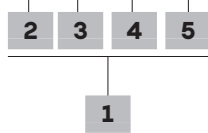
Static circuit



Valve type	A		B		C		
	mm	in	mm	in		Nm	lbft
PL10M	62.4	2.46	32.8	1.29		27	50
PL12M	81.9	3.22	35	1.38		32	80
PL16M	102.5	4.04	37.6	1.48		36	100

Ordering codes and description composition

PL10M/ D 1 C B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/4		
PL10M/S1AB	0PL10002000	Static circuit, 5 bar (72.5 psi) stand by
PL10M/S1CB	0PL10002002	Static circuit, 10 bar (145 psi) stand by
PL10M/D1AB	0PL10002003	Dynamic circuit, 5 bar (72.5 psi) stand by
PL10M/D1CB	0PL10002001	Dynamic circuit, 10 bar (145 psi) stand by
SAE cavity 12/4		
PL12M/S1AB	0PL12002004	Static circuit, 5 bar (72.5 psi) stand by
PL12M/S1BB	0PL12002005	Static circuit, 7.5 bar (109 psi) stand by
PL12M/S1CB	0PL12002003	Static circuit, 10.5 bar (152 psi) stand by
PL12M/D1AB	0PL12002000	Dynamic circuit, 5 bar (72.5 psi) stand by
PL12M/D1BB	0PL12002002	Dynamic circuit, 7.5 bar (109 psi) stand by
PL12M/D1CB	0PL12002001	Dynamic circuit, 10.5 bar (152 psi) stand by
SAE cavity 16/4		
PL16M/S1AB	0PL16002003	Static circuit, 5.5 bar (79.7 psi) stand by
PL16M/S1CB	0PL16002004	Static circuit, 11 bar (159 psi) stand by
PL16M/S1DB	0PL16002005	Static circuit, 22 bar (319 psi) stand by
PL16M/D1AB	0PL16002000	Dynamic circuit, 5.5 bar (79.7 psi) stand by
PL16M/D1CB	0PL16002001	Dynamic circuit, 11 bar (159 psi) stand by
PL16M/D1DB	0PL16002002	Dynamic circuit, 22 bar (319 psi) stand by

2 Circuit type

TYPE	DESCRIPTION
S	Static circuit
D	Dynamic circuit

3 Metering hole

TYPE	DESCRIPTION
1	Static circuit: Ø 0.5 mm (0.0197 in) Dynamic circuit: Ø 0.5 mm (0.0197 in)

4 Stand-by setting

TYPE	DESCRIPTION	PL10M	PL12M	PL16M
A	5 bar (72.5 psi)	5 bar (72.5 psi)	5.5 bar (79.7 psi)	
B	-	7.5 bar (109 psi)	-	
C	10 bar (145 psi)	10 bar (145 psi)	11 bar (159 psi)	
D	-	-	-	22 bar (319 psi)

5 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

6 Valve body

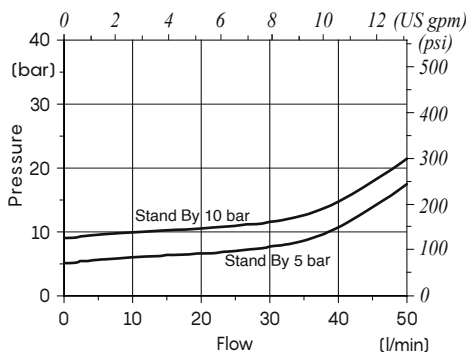
TYPE	CODE	DESCRIPTION
SAE10/4 - SAE10	3CC1040L11	Aluminium body for cavity 10 valve, SAE10 std thread
SAE12/4 - SAE10	3CC1240L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/4 - SAE16	3CC1640N11	Aluminium body for cavity 16 valve, SAE16 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 212

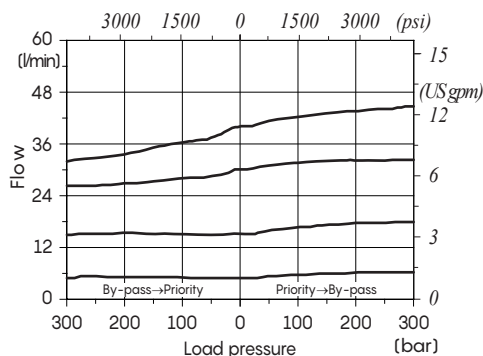
Rating diagrams

PL10M valve (valve body with G 1/2 ports)

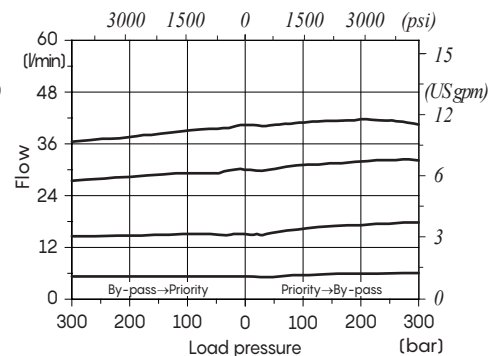
Pressure drop
from 3→2 [4 closed]



Priority flow vs. Load pressure
stand-by: 5 bar (72.5 psi)
inlet flow: 50 l/min (13.2 US gpm)

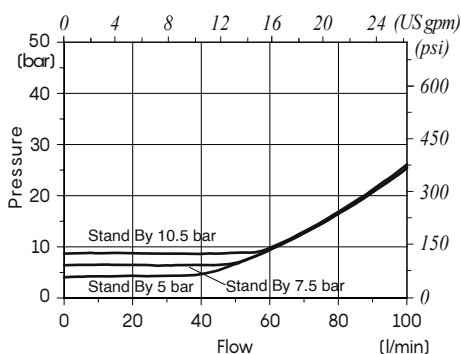


Priority flow vs. Load pressure
stand-by: 10 bar (145 psi)
inlet flow: 50 l/min (13.2 US gpm)

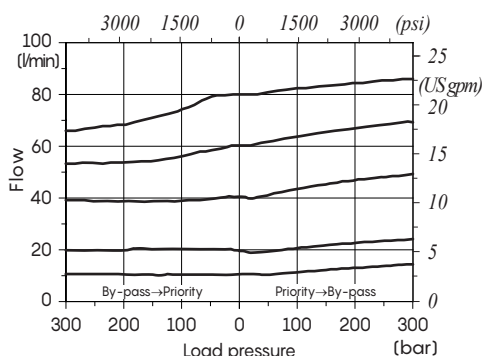


PL12M valve (valve body with G 1/2 ports)

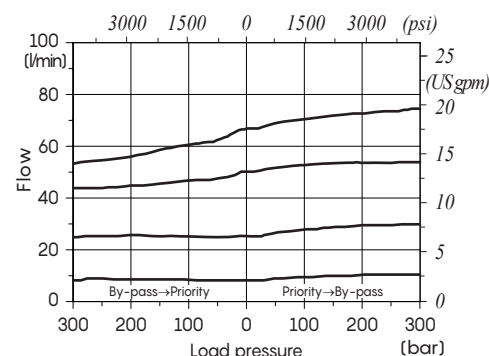
Pressure drop
from 3→2 [4 closed]



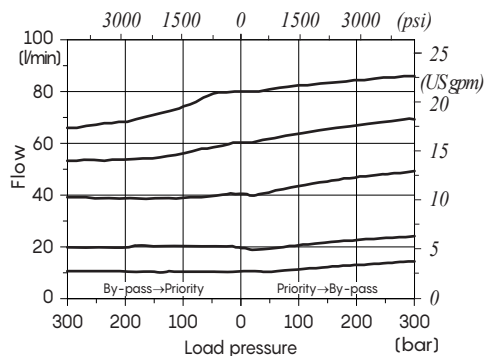
Priority flow vs. Load pressure
stand-by: 5 bar (72.5 psi)
inlet flow: 100 l/min (26.4 US gpm)



Priority flow vs. Load pressure
stand-by: 7.5 bar (108 psi)
inlet flow: 100 l/min (26.4 US gpm)



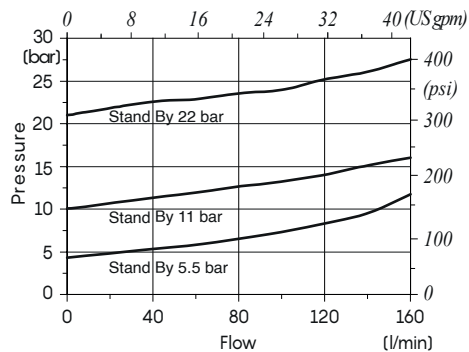
Priority flow vs. Load pressure
stand-by: 10.5 bar (152 psi)
inlet flow: 100 l/min (26.4 US gpm)



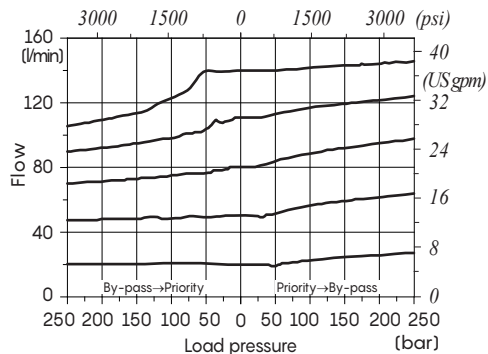
Rating diagrams

PL16M valve (valve body with G 3/4 ports)

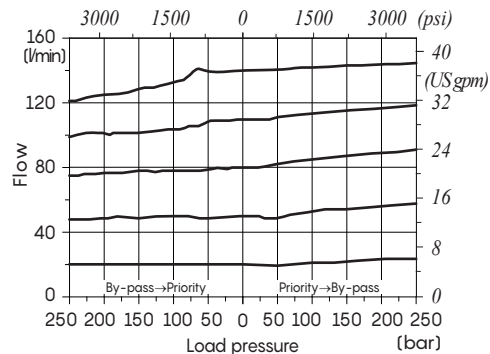
Pressure drop
from 3->2 (4 closed)



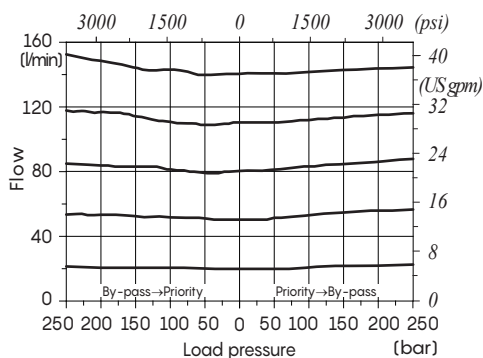
Priority flow vs. Load pressure
stand-by: 5.5 bar (79.7 psi)
inlet flow: 160 l/min (42.2 US gpm)



Priority flow vs. Load pressure
stand-by: 11 bar (159 psi)
inlet flow: 160 l/min (42.2 US gpm)



Priority flow vs. Load pressure
stand-by: 22 bar (319 psi)
inlet flow: 160 l/min (42.2 US gpm)





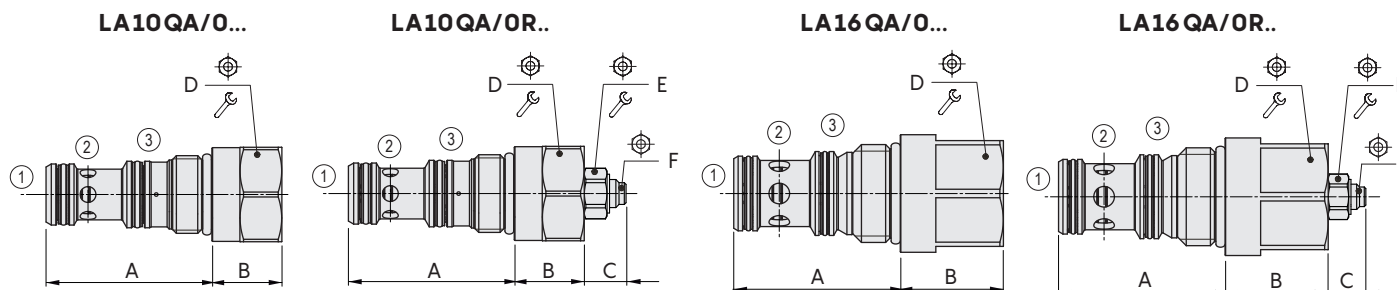
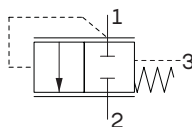
LA..QA type logic element - 3 way

- Pilot to close configuration
- Fixed or adjustable configuration with lead sealing option
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	LA10QA	LA16QA
Nominal flow	80 l/min (21 US gpm)	190 l/min (50 US gpm)
Max. pressure	350 bar (5100 psi)	
Opening pressure	fixed setting: 1, 5, 10 bar (14.5, 72.5, 145 psi) adjustable setting: from 8 to 15 bar (116 to 218 psi)	
Oil leakage	at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)	230 cm³/min (14.03 in³/min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	20/18/14 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 10/3Q	SAE 16/3Q
Weight	0.15 kg (0.33 lb)	0.45 kg (0.99 lb)

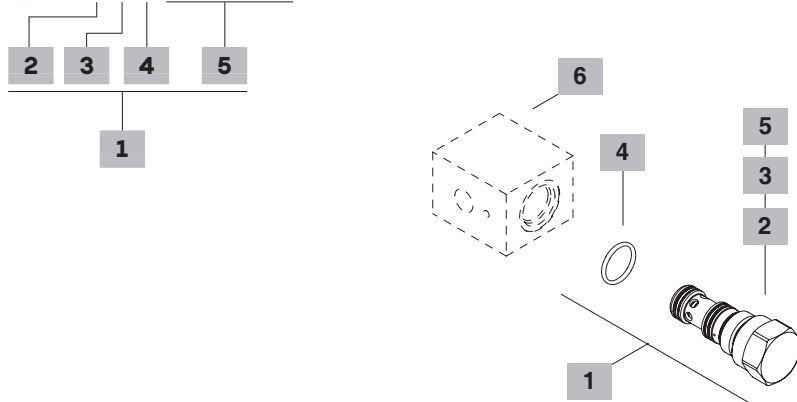
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C (max)		D		E		F	
	mm	in	mm	in	mm	in	Nm	lbft	Nm	lbft	Nm	lbft
LA10QA	47.4	1.87	42	1.65	11.9	0.47	27	70	52	13	9.8	7.2
LA16QA	56.9	2.24	35.1	1.38	24	0.94	36	100	74	13	9.8	7.2

Ordering codes and description composition

LA10QA/0 C 0 B SB=12bar

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 10/3Q		
LA10QA/0B0B	OLA10Q002003	Fixed setting, 5 bar (72.5 psi)
LA10QA/0C0B	OLA10Q002001	Fixed setting, 10 bar (145 psi)
LA10QA/0R0B SB=12bar	OLA10Q002002	Adjustable setting, std setting 12 bar (174 psi)
SAE cavity 16/3Q		
LA16QA/0C0B	OLA16Q002000	Fixed setting, 10 bar (145 psi)
LA16QA/0R0B SB=12bar	OLA16Q002001	Adjustable setting, std setting 12 bar (174 psi)

2 Stand by

Setting is referred to 1 l/min (0.26 US gpm) flow

TYPE	DESCRIPTION
A	Fixed setting: 1 bar (14.5 psi)
B	Fixed setting: 5 bar (72.5 psi)
C	Fixed setting: 10 bar (145 psi)
R	Adjustable setting: from 8 to 15 bar (116 to 218 psi)

3 Load sensing

TYPE	DESCRIPTION
0	Without sealing
X	With sealing: for valves with adjustable stand-by only

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Stand-by setting

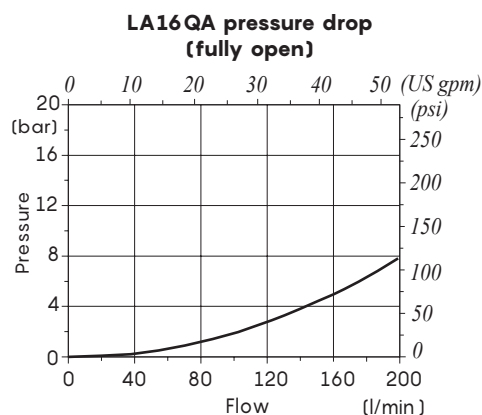
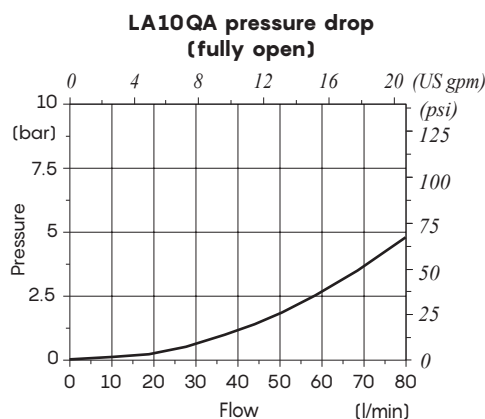
To be specified only with adjustable stand-by valve

6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/3Q-G 1/2	3CC1032D21	Steel body for cavity 08 valve, G 1/2 std thread
SAE16/3Q-G 3/4	3CC1632E21	Steel body for cavity 16 valve, G 3/4 std thread

For aluminium bodies or different threading see from page 210

Rating diagrams





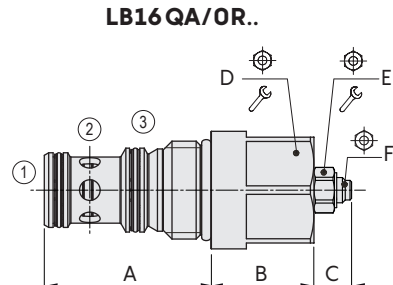
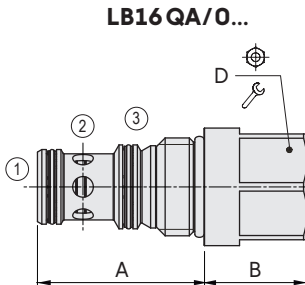
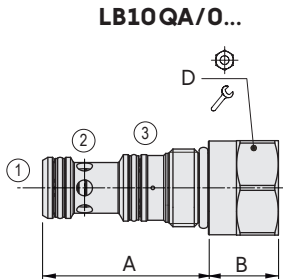
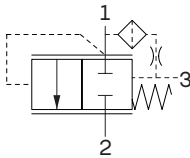
**LB..QA type
logic element - 3 way**

- Venting to open configuration
- Fixed or adjustable stand-by
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	LB10QA	LB16QA
Nominal flow	80 l/min (21 US gpm)	190 l/min (50 US gpm)
Max. pressure	350 bar (5100 psi)	
Opening pressure	fixed setting: 5, 10 bar (72.5, 145 psi) adjustable setting: from 8 to 15 bar (116 to 218 psi)	
Oil leakage	at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)	230 cm³/min (14.03 in³/min)
Fluid	mineral based or sinthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	20/18/14 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 10/3Q	SAE 16/3Q
Weight	0.15 kg (0.33 lb)	0.45 kg (0.99 lb)

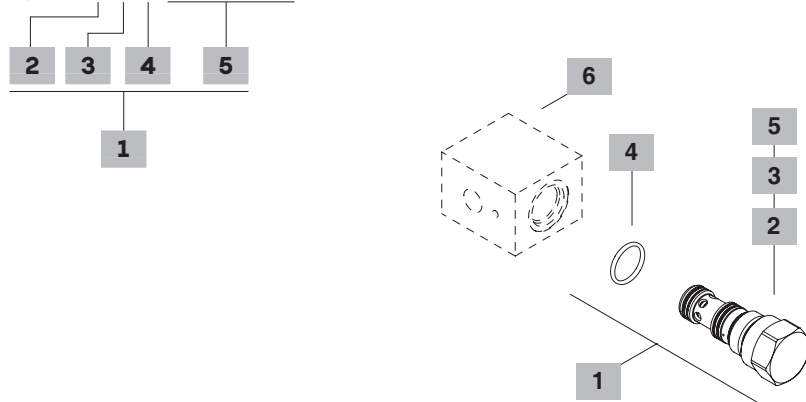
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C (max)		D		E		F	
	mm	in	mm	in	mm	in	Nm	lbft	Nm	lbft	Nm	lbft
LB10QA	47.4	1.87	20	0.79	-	-	27	70	52	-	-	-
LB16QA	56.9	2.24	35.1	1.38	24	0.94	36	100	74	13	9.8	7.2

Ordering codes and description composition

LB10QA/0 B 0 B SB=12bar

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 10/3Q		
LB10QA/0B0B	OLB10Q002000	Fixed setting, 5 bar (72.5 psi)
SAE cavity 16/3Q		
LB16QA/0B0B	OLB16Q002000	Fixed setting, 5 bar (72.5 psi)
LB16QA/0R0B	OLB16Q002001	Adjustable setting, stand-by 12 bar (174 psi)

2 Stand by

Setting is referred to 1 l/min (0.26 US gpm) flow

TYPE	DESCRIPTION
B	Fixed setting: 5 bar (72.5 psi)
C	Fixed setting: 10 bar (145 psi)
R	Adjustable setting: from 8 to 15 bar (116 to 218 psi)

3 Load sensing

TYPE	DESCRIPTION
0	Without sealing
X	With sealing: for valves with adjustable stand-by only

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Stand-by setting

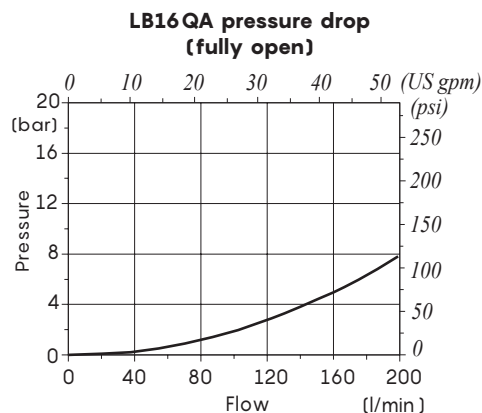
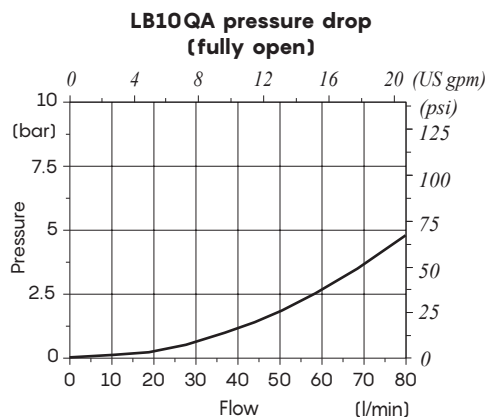
To be specified only with adjustable stand-by valve

6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/3Q-G 1/2	3CC1032D21	Steel body for cavity 08 valve, G 1/2 std thread
SAE16/3Q-G 3/4	3CC1632E21	Steel body for cavity 16 valve, G 3/4 std thread

For aluminium bodies or different threading see from page 210

Rating diagrams





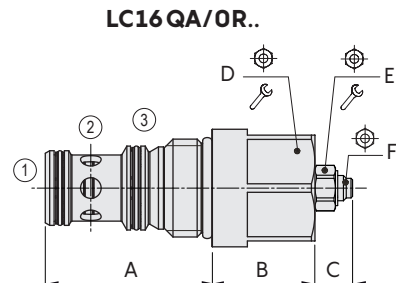
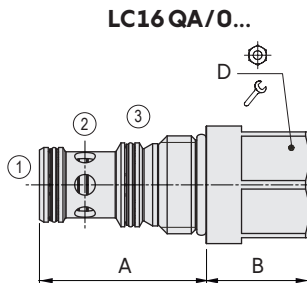
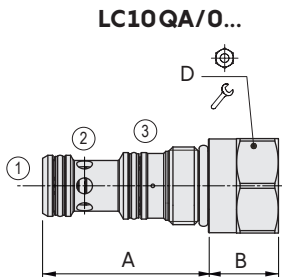
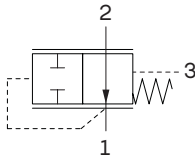
LC..QA type
logic element - 3 way

- Venting to close configuration
- Fixed or adjustable stand-by
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	LC10QA	LC16QA
Nominal flow	80 l/min (21 US gpm)	190 l/min (50 US gpm)
Max. pressure	350 bar (5100 psi)	
Opening pressure	fixed setting: 5, 10 bar (72.5, 145 psi) adjustable setting: from 8 to 15 bar (116 to 218 psi)	
Oil leakage	at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)	230 cm³/min (14.03 in³/min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	20/18/14 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 10/3Q	SAE 16/3Q
Weight	0.15 kg (0.33 lb)	0.45 kg (0.99 lb)

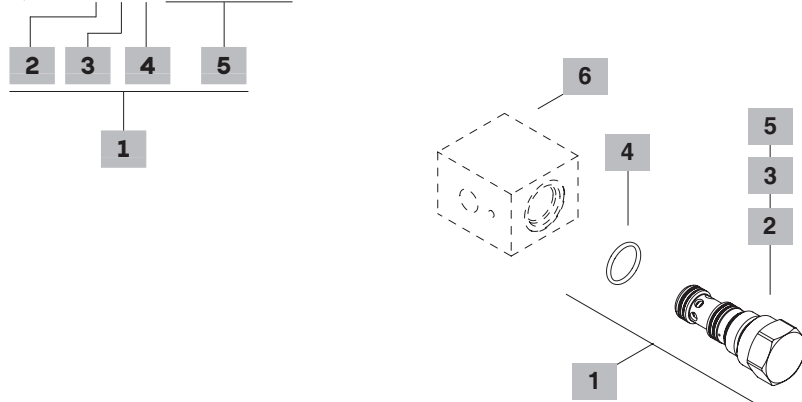
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		C (max)		D		E		F	
	mm	in	mm	in	mm	in	Nm	lbft	Nm	lbft	Nm	lbft
LC10QA	47.4	1.87	20	0.79	-	-	27	70	52	-	-	-
LC16QA	56.9	2.24	35.1	1.38	24	0.94	36	100	74	13	9.8	7.2

Ordering codes and description composition

LC10QA/0 B 0 B SB=12bar



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/3Q		
LC10QA/0B0B	OLC10Q002001	Fixed setting, 5 bar (72.5 psi)
LC10QA/0C0B	OLC10Q002002	Fixed setting, 10 bar (145 psi)
SAE cavity 16/3Q		
LC16QA/0B0B	OLC16Q002001	Fixed setting, 5 bar (72.5 psi)
LC16QA/0R0B	OLC16Q002003	Adjustable setting, 12 bar (174 psi)

2 Stand by

Setting is referred to 1 l/min (0.26 US gpm) flow

TYPE	DESCRIPTION
B	Fixed setting: 5 bar (72.5 psi)
C	Fixed setting: 10 bar (145 psi)
R	Adjustable setting: from 8 to 15 bar (116 to 218 psi)

3 Load sensing

TYPE	DESCRIPTION
0	Without sealing
X	With sealing: for valves with adjustable stand-by only

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Stand-by setting

To be specified only with adjustable stand-by valve

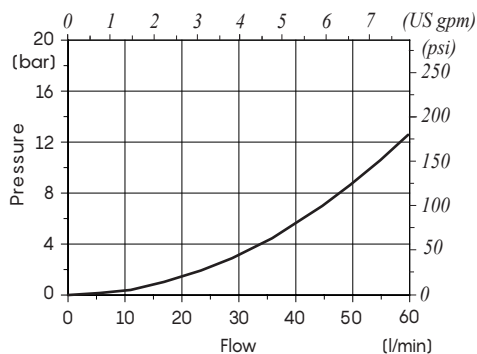
6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/3Q-G 1/2	3CC1032D21	Steel body for cavity 08 valve, G 1/2 std thread
SAE16/3Q-G 3/4	3CC1632E21	Steel body for cavity 16 valve, G 3/4 std thread

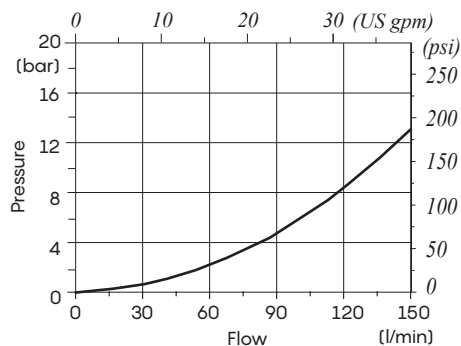
For aluminium bodies or different threading see from page 210

Rating diagrams

LC10QA pressure drop
(fully open)



LC16QA pressure drop
(fully open)





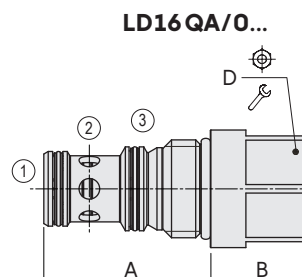
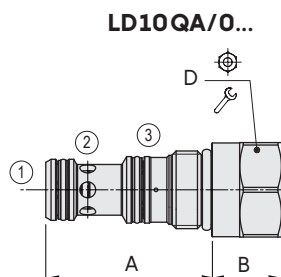
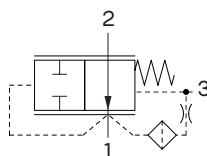
LD..QA type logic element - 3 way

- Pilot to open configuration
- Fixed or adjustable stand-by
- Screw type adjustable configuration with lead sealing option
- SAE10 and SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	LD10QA	LD16QA
Nominal flow	80 l/min (21 US gpm)	190 l/min (50 US gpm)
Max. pressure	350 bar (5100 psi)	
Opening pressure	fixed setting: 1, 5, 10 bar (14.5, 72.5, 145 psi) adjustable setting: from 8 to 15 bar (116 to 218 psi)	
Oil leakage	at 210 bar (3050 psi) 80 cm³/min (4.88 in³/min)	230 cm³/min (14.03 in³/min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	20/18/14 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 10/3Q	SAE 16/3Q
Weight	0.15 kg (0.33 lb)	0.45 kg (0.99 lb)

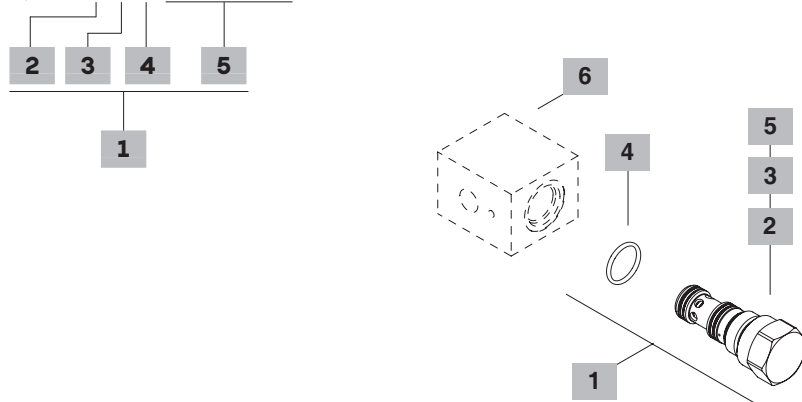
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type	A		B		D	
	mm	in	mm	in	Nm	lbft
LD10QA	47.4	1.87	20	0.79	27	70
LD16QA	56.9	2.24	35.1	1.38	36	100

Ordering codes and description composition

LD10QA/0 B 0 B SB=12bar

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 10/3Q		
LD10QA/0B0B	OLD10Q002000	Fixed setting, 5 bar (72.5 psi)
SAE cavity 16/3Q		
LD16QA/0B0B	OLD16Q002000	Fixed setting, 5 bar (72.5 psi)

2 Stand by

Setting is referred to 1 l/min (0.26 US gpm) flow

TYPE	DESCRIPTION
A	Fixed setting: 1 bar (14.5 psi)
B	Fixed setting: 5 bar (72.5 psi)
C	Fixed setting: 10 bar (145 psi);
R	Adjustable setting: from 8 to 15 bar (116 to 218 psi);

3 Load sensing

TYPE	DESCRIPTION
0	Without sealing
X	With sealing: for valves with adjustable stand-by only

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Stand-by setting

To be specified only with adjustable stand-by valve

6 Valve body

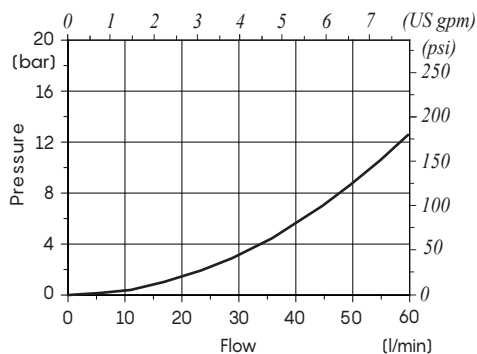
TYPE	CODE	DESCRIPTION
SAE10/3Q-G 1/2	3CC1032D21	Steel body for cavity 08 valve, G 1/2 std thread
SAE16/3Q-G 3/4	3CC1632E21	Steel body for cavity 16 valve, G 3/4 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)

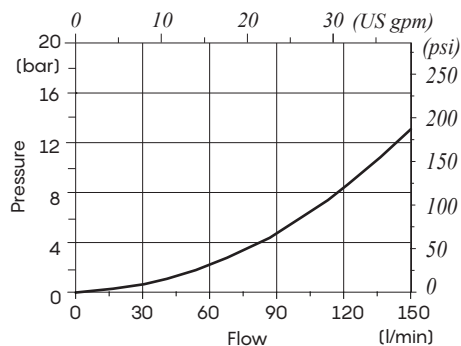
For aluminium bodies or different threading see from page 210

Rating diagrams

**LD10QA pressure drop
(fully open)**



**LD16QA pressure drop
(fully open)**





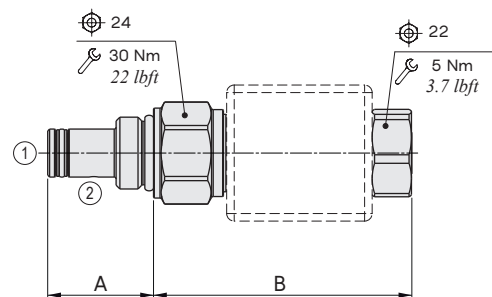
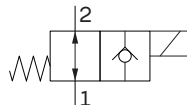
EB08M type directional solenoid valves – 2 way/2 positions

- Poppet type
- Direct acting with on-off solenoid
- Different types of emergencies available
- Configuration normally open

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

EB08M		
Nominal flow		2 l/min (0.53 US gpm)
Max. pressure		350 bar (5100 psi)
Oil leakage	at 210 bar (5100 psi)	0.25 cm ³ /min (0.015 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 8/2
Coil type*		BER
Nominal voltages		12VDC – 24VDC ± 10%
Power rating		19 W
Weight		0.399 kg (0.88 lb)

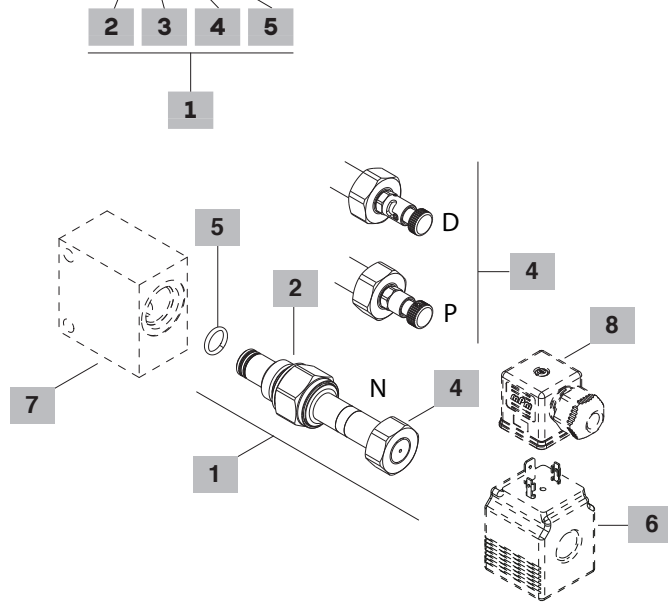
NOTE – For different conditions, please contact Walvoil Sales Dpt. – *For coils further features see from page 201.



Valve type	A		N without emergency		P push button		D push type with detent	
	mm	in	mm	in	mm	in	mm	in
EB08M	28	1.10	68.4	2.69	91.3	3.59	94	3.7

Ordering codes and description composition

EB08M/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
EB08M/10NB	0EB08002001	(N.O.) without emergency
EB08M/1HDB	0EB08002000	As previous one, push type with detent emergency
EB08M/10PB	0EB08002002	As previous one, push button emergency

2 Spool

TYPE	DESCRIPTION
1	Normally open configuration

3 Anti tampering arrangement

TYPE	DESCRIPTION
0	Without anti tampering arrangement
H	With anti tampering arrangement

4 Emergency

TYPE	DESCRIPTION
N	Without emergency
P	Push button emergency
D	Push type with detent

Note: for configurations with different emergency types contact Sales Dept.

5 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

6 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil

For complete coils list see page 201

7 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE6	3CC0820J11	Aluminium body for cavity 08 valve, SAE6 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

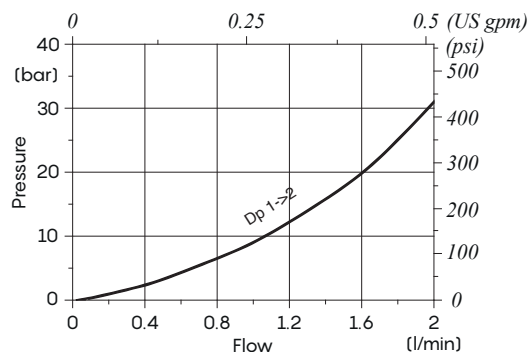
8 Connector

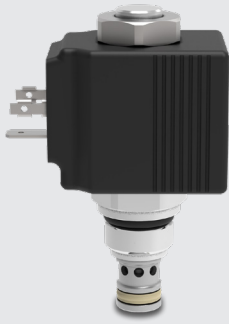
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams

Pressure drop vs. flow





EE..M type directional solenoid valves – 2 way/2 positions

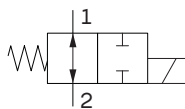
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- Normally open and closed configurations
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

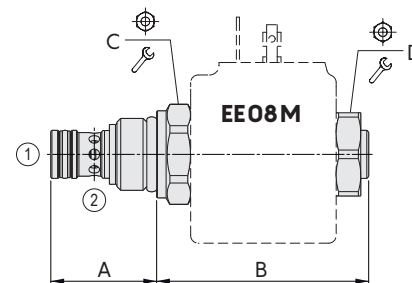
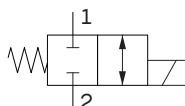
	EE08M	EE10M
Nominal flow	15 l/min (3.96 US gpm)	40 l/min (10.57 US gpm)
Max. pressure	250 bar (3600 psi)	
Oil leakage	at 210 bar (5100 psi)	20 cm ³ /min (1.22 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 8/2	SAE 10/2
Coil type*	BER	BC
Nominal voltages	12VDC – 24VDC ± 10%	
Power rating	19 W	26 W
Weight	0.122 kg (0.27 lb)	0.19 kg (0.42 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

Normally open configuration



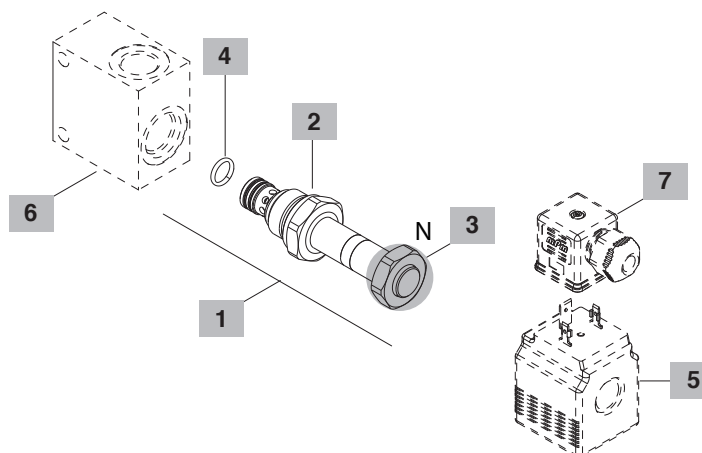
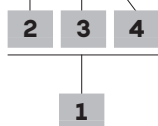
Normally closed configuration



Valve type	A		B N without emergency		C		D	
	mm	in	mm	in	Nm	lbft	Nm	lbft
EE08M	28	1.10	56.1	2.21	24	30	22	5±1 3.7
EE10M	32.3	1.27	68	2.68	27	50	37	23 5±1 3.7

Ordering codes and description composition

EE08M/ 1 0 N B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
EE08M/10NB	OEE08002006	Normally open configuration (N.O.) without emergency
EE08M/20NB	OEE08002007	Normally closed configuration (N.C.) without emergency
SAE cavity 10/2		
EE10M/10NB	OEE10002013	Normally open configuration (N.O.) without emergency
EE10M/20NB	OEE10002014	Normally closed configuration (N.C.) without emergency

2 Spool

TYPE	DESCRIPTION
1	Normally open configuration
2	Normally closed configuration

3 Emergency

TYPE	DESCRIPTION
N	Without emergency

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil
BC12VDC	4SL8000120	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE10	3CC1020L11	Aluminium body for cavity 10 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

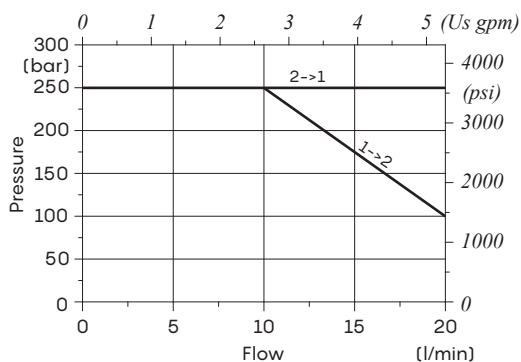
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

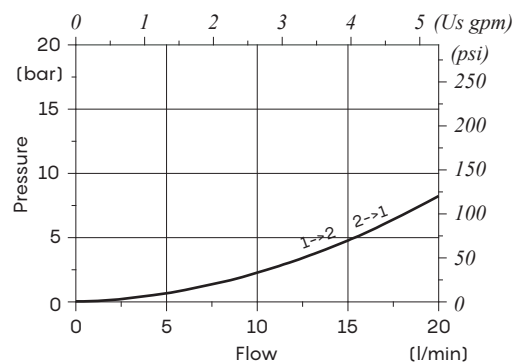
For complete connectors list see from page 201

Rating diagrams

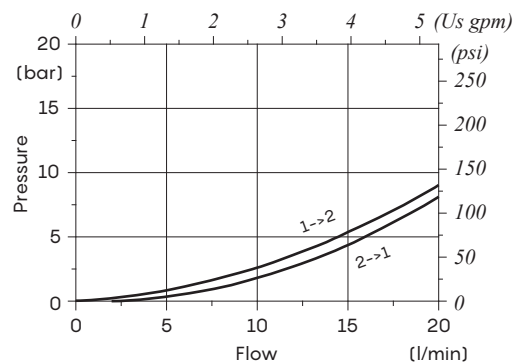
EE08M performance range
- Spool 1 / 2 -



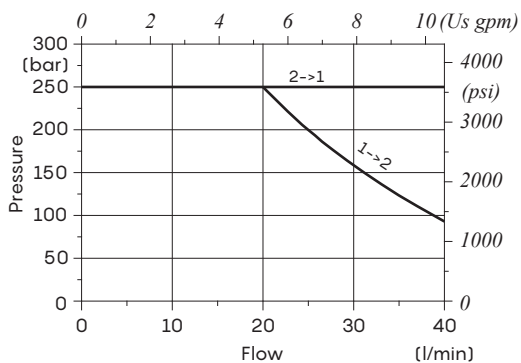
EE08M pressure drop vs. flow
- Spool 1 -



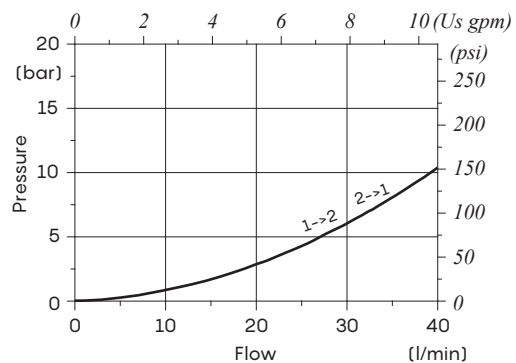
EE08M pressure drop vs. flow
- Spool 2 -



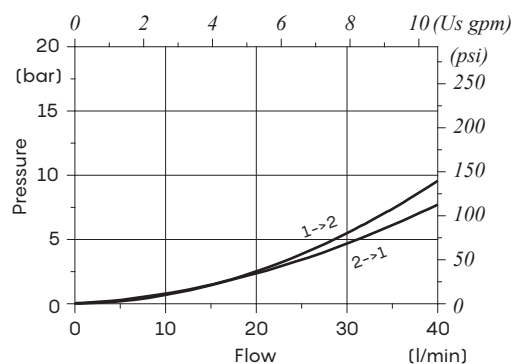
EE10M performance range
- Spool 1 / 2 -



EE10M pressure drop vs. flow
- Spool 1 -



EE10M pressure drop vs. flow
- Spool 2 -





EC..M type directional solenoid valves – 2 way / 2 positions

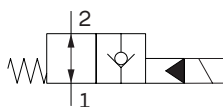
- Poppet type
- Piloted acting with on-off solenoid
- External zinc-plated and corrosion-proof components
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

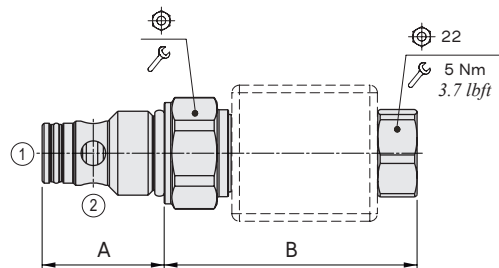
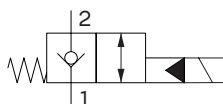
	EC08M	EC10M	EC12M	EC16M
Max. flow	40 l/min (10.5 US gpm)	70 l/min (18.5 US gpm)	150 l/min (40 US gpm)	150 l/min (40 US gpm)
Max. pressure	380 bar (5500 psi)			
Oil leakage	at 210 bar (3050 psi) 0.25 cm ³ /min (0.015 in ³ /min)			
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity	10-200 cSt			
Max level of contamination	18/16/13 ISO4406			
Fluid temperature	with NBR seals+Polyurethane with FPM seals			
Environmental temp. for working conditions	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Cavity	SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Coil type*	BER			
Nominal voltages	12VDC - 24VDC ±10%			
Power rating	19 W (12VDC - 24VDC)			
Weight	0.135 kg (0.30 lb)	0.170 kg (0.37 lb)	0.230 kg (0.51 lb)	0.315 kg (0.69 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

Normally open configuration



Normally closed configuration

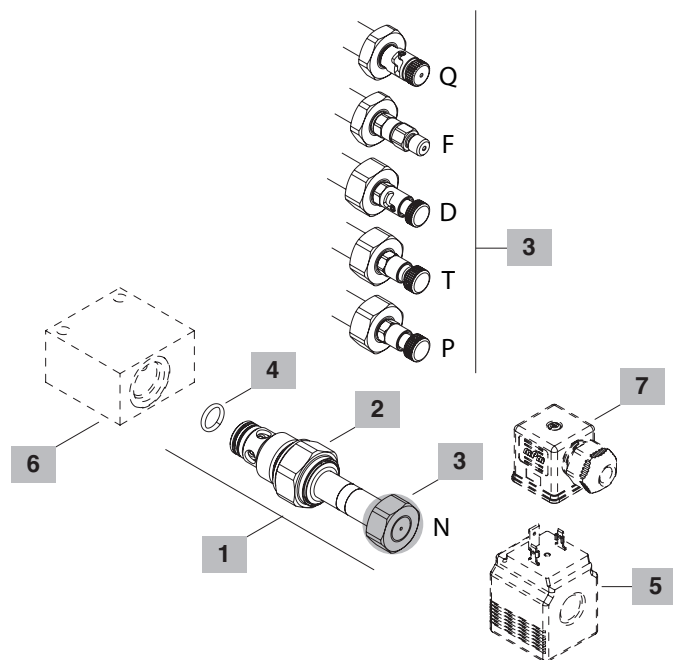
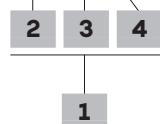


Valve type	A		B		N without emergency		Nm lbft
	mm	in	mm	in	mm	in	
EC10M/1	32.3	1.27	66.9	2.63	27	50	37

For dimensions with different type of emergency see list page 147

Ordering codes and description composition

EC08M/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
EC08M/10NB	OEC08002031	Normally open (N.O.) without emergency
EC08M/10PB	OEC08002033	(N.O.) push button emergency
EC08M/10TB	OEC08002034	(N.O.) screw type emergency
EC08M/10DB	OEC08002035	(N.O.) push type with detent emergency
EC08M/20NB	OEC08002032	Normally closed (N.C.) without emergency
EC08M/20FB	OEC08002036	(N.C.) pull button emergency
EC08M/20TB	OEC08002037	(N.C.) screw type emergency
EC08M/20QB	OEC08002038	(N.C.) pull type with detent emergency
SAE cavity 10/2		
EC10M/10NB	OEC10002012	Normally open (N.O.) without emergency
EC10M/10PB	OEC10002014	(N.O.) push button emergency
EC10M/10TB	OEC10002015	(N.O.) screw type emergency
EC10M/10DB	OEC10002016	(N.O.) push type with detent emergency
EC10M/20NB	OEC10002013	Normally closed (N.C.) without emergency
EC10M/20FB	OEC10002017	(N.C.) pull button emergency
EC10M/20TB	OEC10002018	(N.C.) screw type emergency
EC10M/20QB	OEC10002019	(N.C.) pull type with detent emergency
SAE cavity 12/2		
EC12M/10NB	OEC12002007	Normally open (N.O.) without emergency
EC12M/10PB	OEC12002009	(N.O.) push button emergency
EC12M/10TB	OEC12002010	(N.O.) screw type emergency
EC12M/10DB	OEC12002011	(N.O.) push type with detent emergency
EC12M/20NB	OEC12002008	Normally closed (N.C.) without emergency
EC12M/20FB	OEC12002012	(N.C.) pull button emergency
EC12M/20TB	OEC12002013	(N.C.) screw type emergency
EC12M/20QB	OEC12002014	(N.C.) pull type with detent emergency
SAE cavity 16/2		
EC16M/10NB	OEC16002020	Normally open (N.O.) without emergency
EC16M/10PB	OEC16002022	(N.O.) push button emergency
EC16M/10TB	OEC16002023	(N.O.) screw type emergency
EC16M/10DB	OEC16002024	(N.O.) push type with detent emergency
EC16M/20NB	OEC16002021	Normally closed (N.C.) without emergency
EC16M/20FB	OEC16002025	(N.C.) pull button emergency
EC16M/20TB	OEC16002026	(N.C.) screw type emergency
EC16M/20QB	OEC16002027	(N.C.) pull type with detent emergency

5 Coil

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

2 Spool

TYPE	DESCRIPTION
1	Normally open configuration
2	Normally closed configuration

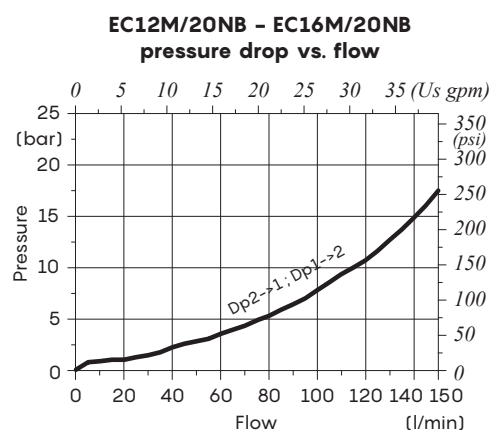
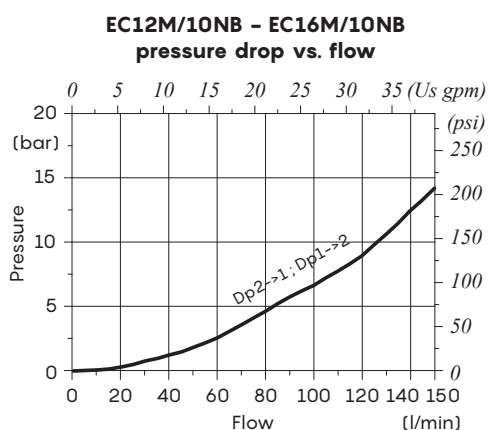
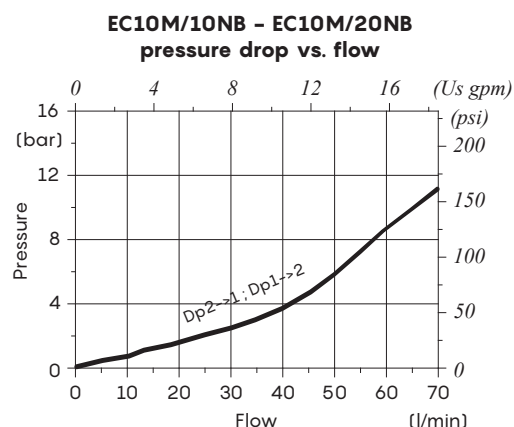
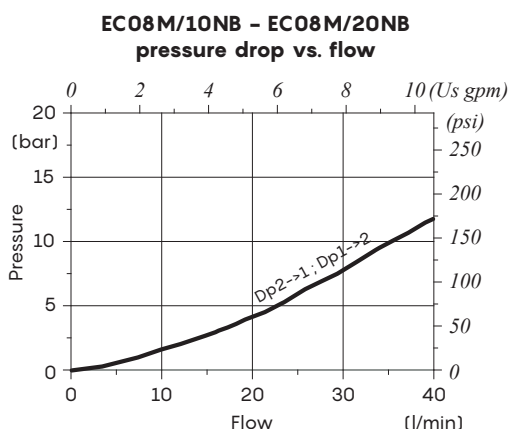
3 Emergency

TYPE	DESCRIPTION
N	Without emergency
P	Push button type (N.O.)
T	Screw type
D	Push type with detent (N.O.)
F	Pull button type (N.C.)
Q	Pull type with detent (N.C.)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

Rating diagrams



Types and dimensions

Valve type	A		B												 		
			N without emergency		T screw		P push button		D push type with detent		F pull button		Q pull type with detent				
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Nm	lbf·ft	
EC08M/1	28	1.10	67.2	2.64	90.1	3.55	90.1	3.55	92.8	3.65	-	-	-	-	24	30	22
EC08M/2	28	1.10	63.3	2.49	77.8	3.06	-	-	-	-	91.3	3.59	84.4	3.32	24	30	22
EC10M/1	32.3	1.27	66.9	2.63	89.8	3.54	89.8	3.54	92.5	3.64	-	-	-	-	27	50	37
EC10M/2	32.3	1.27	63	2.48	77.5	3.05	-	-	-	-	91	3.58	84.1	3.31	27	50	37
EC12M/1	45	1.77	61.2	2.40	84.2	3.31	84	3.31	86.8	3.42	-	-	-	-	32	80	59
EC12M/2	45	1.77	57.1	2.25	73.7	2.9	-	-	-	-	85.1	3.35	78	3.07	32	80	59
EC16M/1	46	1.81	61.2	2.40	84	3.31	84.1	3.31	86	3.39	-	-	-	-	38	80	59
EC16M/2	46	1.81	57	2.24	71.6	2.82	-	-	-	-	85	3.35	78.3	3.08	38	80	59



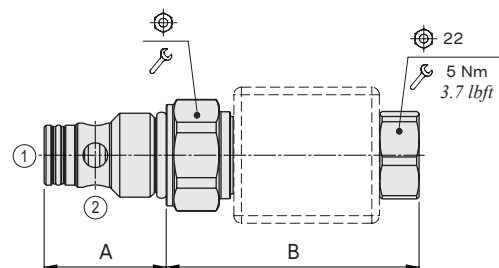
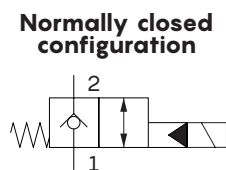
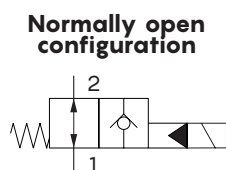
EF..M type directional solenoid valves – 2 way / 2 positions

- Poppet type
- Piloted acting with on-off solenoid
- External zinc-plated and corrosion-proof components
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	EF08M	EF10M	EF12M	EF16M
Max. flow	40 l/min (10.5 US gpm)	70 l/min (18.5 US gpm)	150 l/min (40 US gpm)	150 l/min (40 US gpm)
Max. pressure	380 bar (5500 psi)			
Oil leakage	at 210 bar (3050 psi) 0.50 cm ³ /min (0.030 in ³ /min)			
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity	10-200 cSt			
Max level of contamination	18/16/13 ISO4406			
Fluid temperature	with NBR seals+Polyurethane with FPM seals from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)			
Cavity	SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Coil type*	BER			
Nominal voltages	12VDC - 24VDC ±10%			
Power rating	19 W (12VDC - 24VDC)			
Weight	0.135 kg (0.30 lb)	0.170 kg (0.37 lb)	0.230 kg (0.51 lb)	0.315 kg (0.69 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

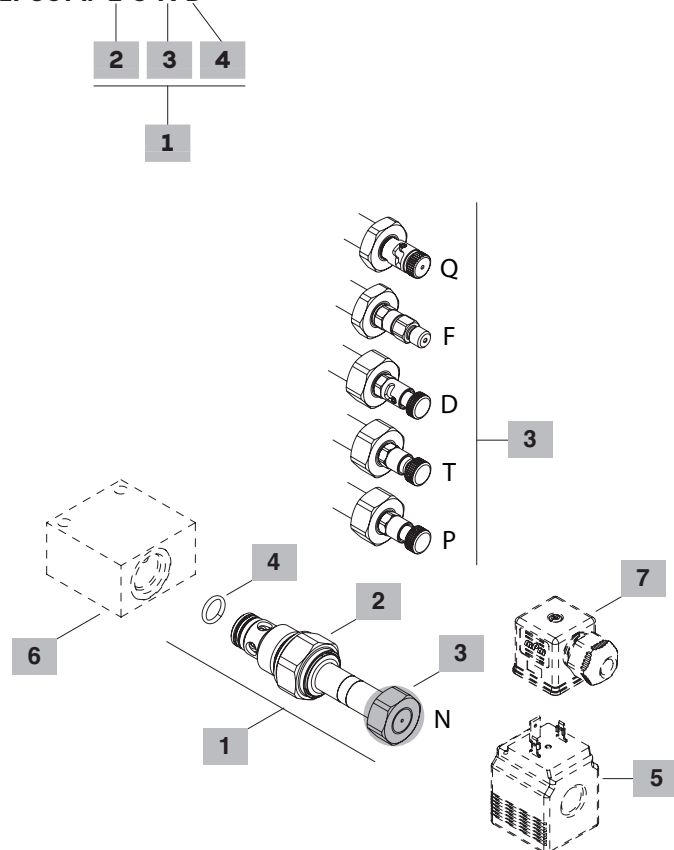


Valve type	A		B		 N without emergency		
	mm	in	mm	in	Nm	lbft	
EF10M/1	32.3	1.27	66.9	2.63	27	50	37

For dimensions with different type of emergency see list page 151

Ordering codes and description composition

EF08M/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
EF08M/10NB	0EF08002000	Normally open (N.O.) without emergency
EF08M/10PB	0EF08002002	(N.O.) push button emergency
EF08M/10TB	0EF08002003	(N.O.) screw type emergency
EF08M/10DB	0EF08002004	(N.O.) push type with detent emergency
EF08M/20NB	0EF08002001	Normally closed (N.C.) without emergency
EF08M/20FB	0EF08002005	(N.C.) pull button emergency
EF08M/20TB	0EF08002006	(N.C.) screw type emergency
EF08M/20QB	0EF08002007	(N.C.) pull type with detent emergency

SAE cavity 10/2

EF10M/10NB	0EF10002000	Normally open (N.O.) without emergency
EF10M/10PB	0EF10002002	(N.O.) push button emergency
EF10M/10TB	0EF10002003	(N.O.) screw type emergency
EF10M/10DB	0EF10002004	(N.O.) push type with detent emergency
EF10M/20NB	0EF10002001	Normally closed (N.C.) without emergency
EF10M/20FB	0EF10002005	(N.C.) pull button emergency
EF10M/20TB	0EF10002006	(N.C.) screw type emergency
EF10M/20QB	0EF10002007	(N.C.) pull type with detent emergency

SAE cavity 12/2

EF12M/10NB	0EF12002000	Normally open (N.O.) without emergency
EF12M/10PB	0EF12002002	(N.O.) push button emergency
EF12M/10TB	0EF12002003	(N.O.) screw type emergency
EF12M/10DB	0EF12002004	(N.O.) push type with detent emergency
EF12M/20NB	0EF12002001	Normally closed (N.C.) without emergency
EF12M/20FB	0EF12002005	(N.C.) pull button emergency
EF12M/20TB	0EF12002006	(N.C.) screw type emergency
EF12M/20QB	0EF12002007	(N.C.) pull type with detent emergency

SAE cavity 16/2

EF16M/10NB	0EF16002000	Normally open (N.O.) without emergency
EF16M/10PB	0EF16002002	(N.O.) push button emergency
EF16M/10TB	0EF16002003	(N.O.) screw type emergency
EF16M/10DB	0EF16002004	(N.O.) push type with detent emergency
EF16M/20NB	0EF16002001	Normally closed (N.C.) without emergency
EF16M/20FB	0EF16002005	(N.C.) pull button emergency
EF16M/20TB	0EF16002006	(N.C.) screw type emergency
EF16M/20QB	0EF16002007	(N.C.) pull type with detent emergency

5 Coil

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

2 Spool

TYPE	DESCRIPTION
1	Normally open configuration
2	Normally closed configuration

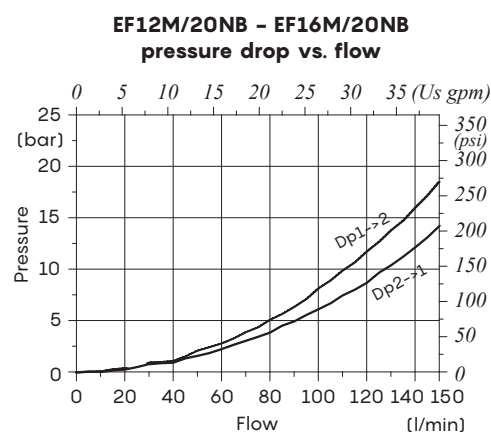
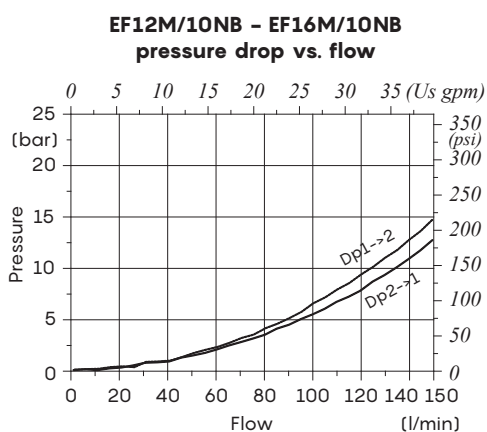
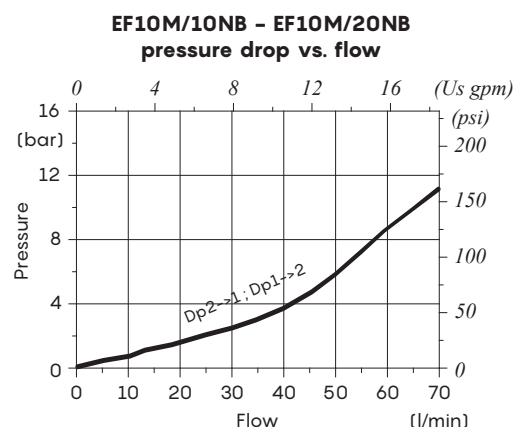
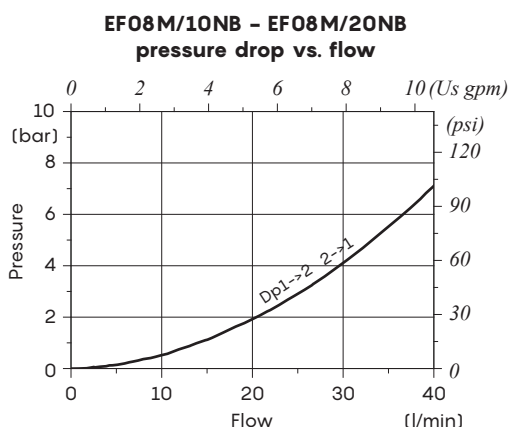
3 Emergency

TYPE	DESCRIPTION
N	Without emergency
P	Push button type (N.O.)
T	Screw type
D	Push type with detent (N.O.)
F	Pull button type (N.C.)
Q	Pull type with detent (N.C.)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

Rating diagrams



Types and dimensions

Valve type	A		B												 		
			N without emergency		T screw		P push button		D push type with detent		F pull button		Q pull type with detent				
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Nm	lbf·ft	
EF08M/1	28	1.10	67.2	2.64	90.1	3.55	90.1	3.55	92.8	3.65	-	-	-	-	24	30	22
EF08M/2	28	1.10	63.3	2.49	77.8	3.06	-	-	-	-	91.3	3.59	84.4	3.32	24	30	22
EF10M/1	32.3	1.27	66.9	2.63	89.8	3.54	89.8	3.54	92.5	3.64	-	-	-	-	27	50	37
EF10M/2	32.3	1.27	63	2.48	77.5	3.05	-	-	-	-	91	3.58	84.1	3.31	27	50	37
EF12M/1	45	1.77	61.1	2.40	84	3.31	84	3.31	86.7	3.41	-	-	-	-	32	80	59
EF12M/2	45	1.77	57.1	2.25	71.6	2.82	-	-	-	-	85.1	3.35	78.2	3.08	32	80	59
EF16M/1	46	1.81	61.2	2.40	84	3.31	84.1	3.31	86	3.39	-	-	-	-	38	80	59
EF16M/2	46	1.81	57.2	2.25	71.6	2.82	-	-	-	-	85	3.35	78.3	3.08	38	80	59



EH..M type directional solenoid valves – 2 way / 2 positions

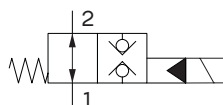
- Poppet type
- Piloted acting with on-off solenoid
- With check in both directions
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE16 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

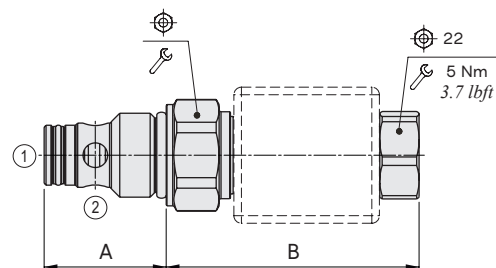
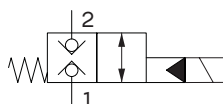
		EH08M	EH10M	EH12M	EH16M
Max. flow		40 l/min (10.5 US gpm)	70 l/min (18.5 US gpm)	150 l/min (40 US gpm)	150 l/min (40 US gpm)
Max. pressure		380 bar (5500 psi)			
Oil leakage	at 210 bar (3050 psi)	0.50 cm³/min (0.030 in³/min)		1 cm³/min (0.061 in³/min)	
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity		10–200 cSt			
Max level of contamination		18/16/13 ISO4406			
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)			
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)			
Cavity		SAE 08/2	SAE 10/2	SAE 12/2	SAE 16/2
Coil type*		BER			
Nominal voltages		12VDC - 24VDC ±10%			
Power rating		19 W (12VDC - 24VDC)			
Weight		0.135 kg (0.30 lb)	0.170 kg (0.37 lb)	0.230 kg (0.51 lb)	0.315 kg (0.69 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

Normally open configuration



Normally closed configuration

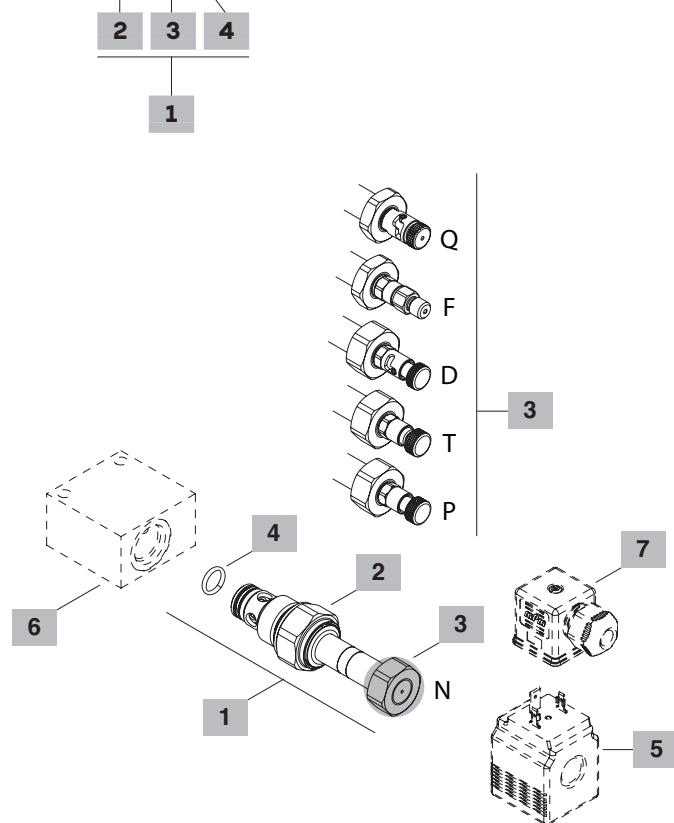


Valve type	A		B		 N without emergency		
	mm	in	mm	in	Nm	lbft	
EH10M/1	32.3	1.27	66.9	2.63	27	50	37

For dimensions with different type of emergency see list page 155

Ordering codes and description composition

EH08M/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
EH08M/10NB	0EH08002000	Normally open (N.O.) without emergency
EH08M/10PB	0EH08002002	(N.O.) push button emergency
EH08M/10TB	0EH08002003	(N.O.) screw type emergency
EH08M/10DB	0EH08002004	(N.O.) push type with detent emergency
EH08M/20NB	0EH08002001	Normally closed (N.C.) without emergency
EH08M/20FB	0EH08002005	(N.C.) pull button emergency
EH08M/20TB	0EH08002006	(N.C.) screw type emergency
EH08M/20QB	0EH08002007	(N.C.) pull type with detent emergency

SAE cavity 10/2

EH10M/10NB	0EH10002000	Normally open (N.O.) without emergency
EH10M/10PB	0EH10002002	(N.O.) push button emergency
EH10M/10TB	0EH10002003	(N.O.) screw type emergency
EH10M/10DB	0EH10002004	(N.O.) push type with detent emergency
EH10M/20NB	0EH10002001	Normally closed (N.C.) without emergency
EH10M/20FB	0EH10002005	(N.C.) pull button emergency
EH10M/20TB	0EH10002006	(N.C.) screw type emergency
EH10M/20QB	0EH10002007	(N.C.) pull type with detent emergency

SAE cavity 12/2

EH12M/10NB	0EH12002000	Normally open (N.O.) without emergency
EH12M/10PB	0EH12002002	(N.O.) push button emergency
EH12M/10TB	0EH12002003	(N.O.) screw type emergency
EH12M/10DB	0EH12002004	(N.O.) push type with detent emergency
EH12M/20NB	0EH12002001	Normally closed (N.C.) without emergency
EH12M/20FB	0EH12002005	(N.C.) pull button emergency
EH12M/20TB	0EH12002006	(N.C.) screw type emergency
EH12M/20QB	0EH12002007	(N.C.) pull type with detent emergency

SAE cavity 16/2

EH16M/10NB	0EH16002000	Normally open (N.O.) without emergency
EH16M/10PB	0EH16002002	(N.O.) push button emergency
EH16M/10TB	0EH16002003	(N.O.) screw type emergency
EH16M/10DB	0EH16002004	(N.O.) push type with detent emergency
EH16M/20NB	0EH16002001	Normally closed (N.C.) without emergency
EH16M/20FB	0EH16002005	(N.C.) pull button emergency
EH16M/20TB	0EH16002006	(N.C.) screw type emergency
EH16M/20QB	0EH16002007	(N.C.) pull type with detent emergency

5 Coil

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/2-SAE10	3CC1220L11	Aluminium body for cavity 12 valve, SAE10 std thread
SAE16/2-SAE12	3CC1620M11	Aluminium body for cavity 16 valve, SAE12 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

2 Spool

TYPE	DESCRIPTION
1	Normally open configuration
2	Normally closed configuration

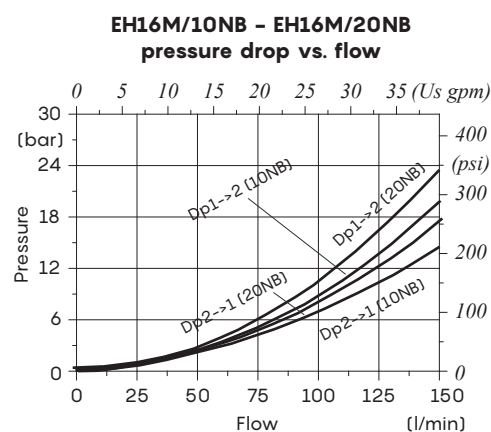
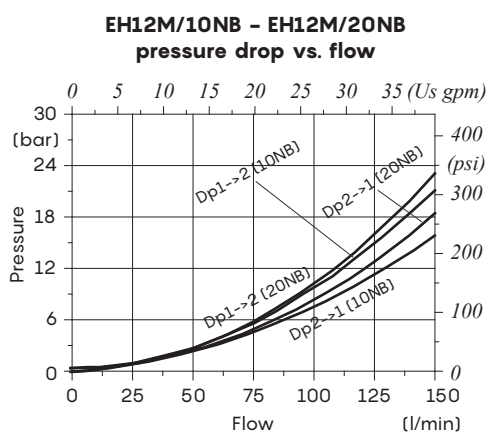
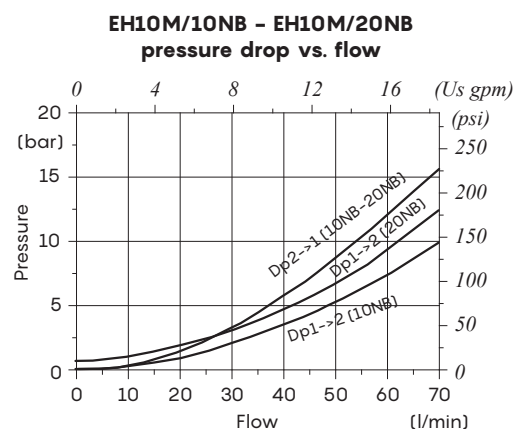
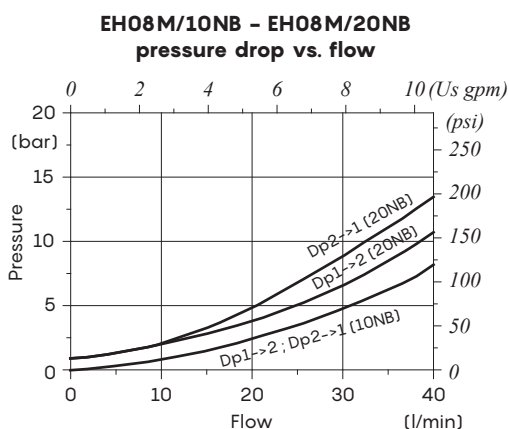
3 Emergency

TYPE	DESCRIPTION
N	Without emergency
P	Push button type (N.O.)
T	Screw type
D	Push type with detent (N.O.)
F	Pull button type (N.C.)
Q	Pull type with detent (N.C.)

4 Seals

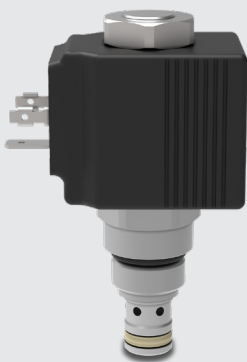
TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

Rating diagrams



Types and dimensions

Valve type	A		B												 		
			N without emergency		T screw		P push button		D push type with detent		F pull button		Q pull type with detent				
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Nm	lbf·ft	
EH08M/1	28	1.10	67.2	2.64	90.1	3.55	90.1	3.55	92.8	3.65	-	-	-	-	24	30	22
EH08M/2	28	1.10	63.1	2.48	77.8	3.06	-	-	-	-	91.3	3.59	84.4	3.32	24	30	22
EH10M/1	32.3	1.27	66.9	2.63	89.8	3.54	89.8	3.54	92.5	3.64	-	-	-	-	27	50	37
EH10M/2	32.3	1.27	63	2.48	77.5	3.05	-	-	-	-	90.8	3.57	84.1	3.31	27	50	37
EH12M/1	45	1.77	61.3	2.41	84.2	3.31	83.9	3.30	86.8	3.42	-	-	-	-	32	80	59
EH12M/2	45	1.77	57.1	2.25	73.7	2.9	-	-	-	-	85.1	3.35	78	3.07	32	80	59
EH16M/1	46	1.81	61.3	2.41	84	3.31	84.2	3.31	86	3.39	-	-	-	-	38	80	59
EH16M/2	46	1.81	57.1	2.25	71.6	2.82	-	-	-	-	85.3	3.36	78.3	3.08	38	80	59



EW..M type directional solenoid valves – 2 way/2 positions

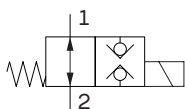
- Poppet type
- Direct acting with on-off solenoid
- With check in both directions
- Normally open and closed configurations
- Different types of emergencies available
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

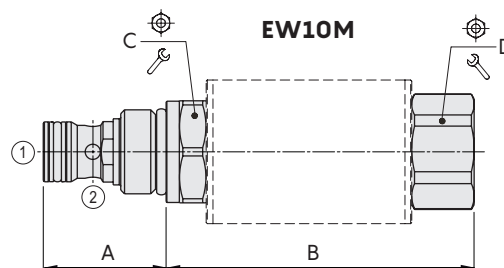
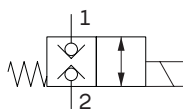
	EW08M	EW10M
Nominal flow	20 l/min (5.28 US gpm)	40 l/min (10.57 US gpm)
Max. pressure	250 bar (3600 psi)	350 bar (5100 psi)
Oil leakage	at 210 bar (5100 psi) 0.25 cm ³ /min (0.015 in ³ /min)	
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 8/2	SAE 10/2
Coil type*	BER	BH
Nominal voltages	12VDC – 24VDC ± 10%	
Power rating	19 W (12VDC – 24VDC)	33 W
Weight	0.15 kg (0.33 lb)	0.30 kg (0.66 lb)

NOTE – For different conditions, please contact Walvoil Sales Dpt. – *For coils further features see from page 201.

Normally open configuration



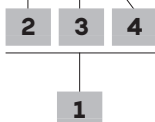
Normally closed configuration



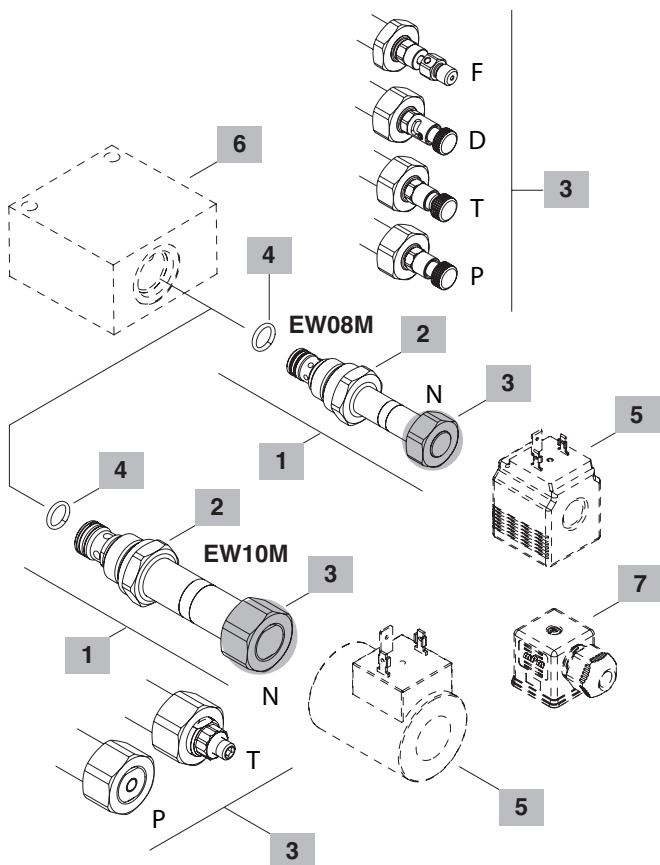
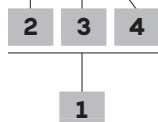
Valve type	A		N		T		P		D		F		C		D	
	mm	in	without emergency		mm	in	mm	in	mm	in	mm	in	Nm	lbft	Nm	lbft
EW08M/1	28	1.10	60.2	2.41	74.7	2.94	-	-	-	-	88.2	3.47	24	30	22	5
EW08M/2	28	1.10	62.5	2.46	85.4	3.36	85.4	3.36	88.1	3.47	-	-	24	30	22	5
EW10M	32.5	1.28	81.5	3.21	95.3	3.75	81.5	3.21	-	-	-	-	27	50	37	5

Ordering codes and description composition

EW08M/ 1 0 N B



EW10M/ 2 0 N B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
------	------	-------------

SAE cavity 08/2

EW08M/10NB	0EW08002014	Normally open (N.O.) without emergency
EW08M/10FB	0EW08002015	(N.O.) pull button emergency
EW08M/10TB	0EW08002016	(N.O.) screw type emergency
EW08M/20NB	0EW08002018	Normally closed (N.C.) without emergency
EW08M/20PB	0EW08002019	(N.C.) push button emergency
EW08M/20TB	0EW08002020	(N.C.) screw type emergency
EW08M/20DB	0EW08002021	(N.C.) push type with detent emergency

SAE cavity 10/2

EW10M/20NB	0EW10002008	Normally closed (N.C.) without emergency
EW10M/20TB	0EW10002009	(N.C.) screw type emergency
EW10M/20PB	0EW10002010	(N.C.) push button emergency

2 Spool

TYPE	DESCRIPTION
1	Normally open configuration
2	Normally closed configuration

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
P	Push button type (N.C.)
T	Screw type (N.C. - N.O. for EW08M / N.C. for EW10M)
D	Push type with detent (N.C.)
F	Pull button type (N.O.)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil for EW08M
BH12VDC	4SLD001200A	12VDC-ISO4400 coil for EW10M

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-SAE8	3CC0820K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/2-SAE8	3CC1020K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

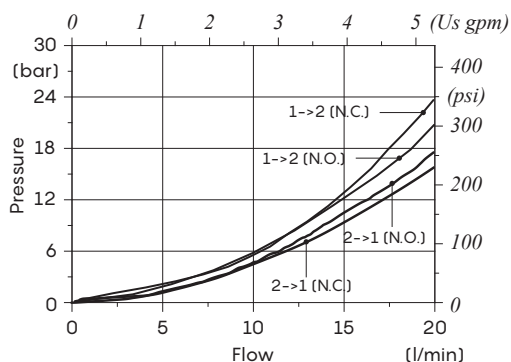
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

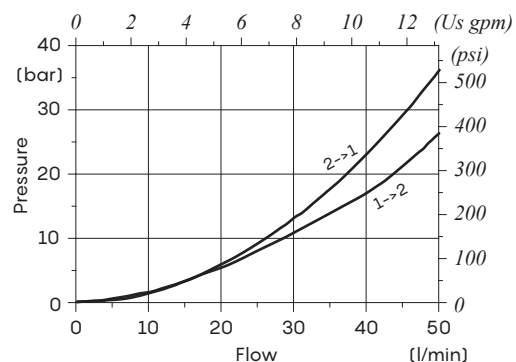
For complete connectors list see from page 201

Rating diagrams

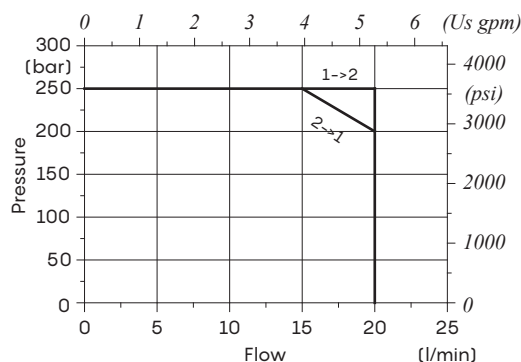
EW08M pressure drop vs. flow



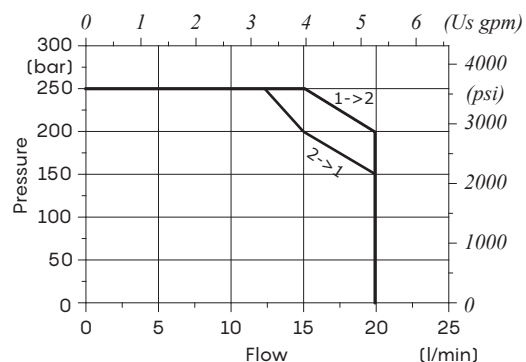
EW10M pressure drop vs. flow
(N.C.)



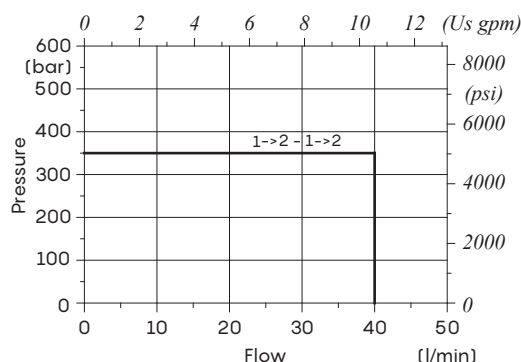
EW08M performance limit
(N.O.)

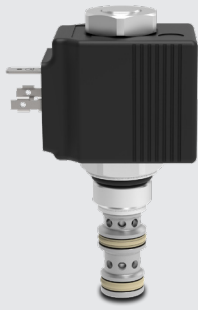


EW08M performance limit
(N.C.)



EW10M performance limit
(N.C.)





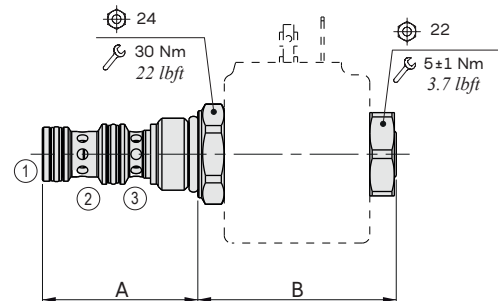
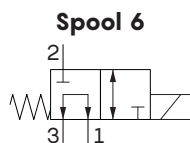
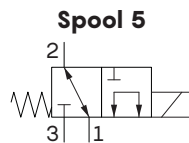
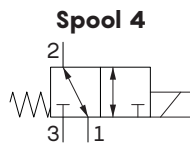
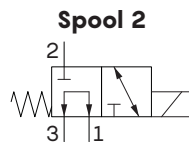
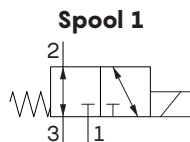
EJ08MF type directional solenoid valves – 3 way / 2 positions

- Spool type
- Direct acting with on-off solenoid
- Suitable for low pressure: 70 bar (1015 psi)
- Different types of emergencies available
- Different spool options and related schemes available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

EJ08MF		
Nominal flow		10 l/min (2.64 US gpm)
Max. pressure		70 bar (1015 psi)
Oil leakage	at 70 bar (1015 psi)	20 cm ³ /min (1.22 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties
Viscosity		10-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 8/3
Coil type*		BER
Nominal voltages		12VDC – 24VDC ± 10%
Power rating		19 W
Weight		0.358 kg (0.79 lb)

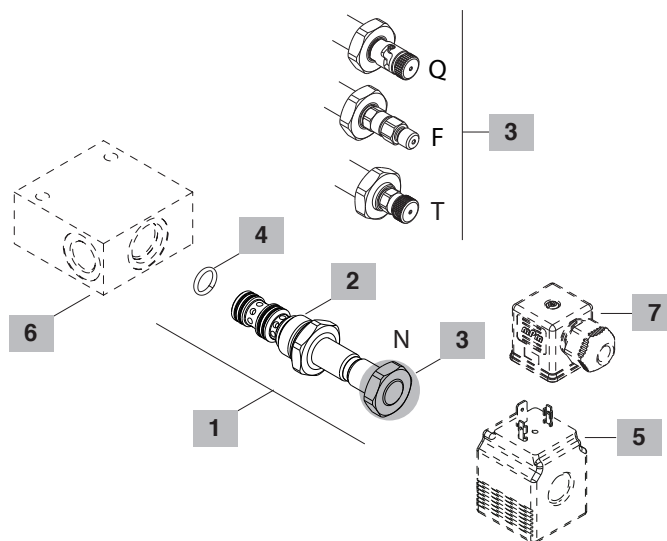
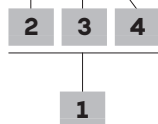
NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.



Valve type	A		B			
			N without emergency		T screw type	
	mm	in	mm	in	mm	in
EJ08MF	41.1	1.62	52.5	2.07	67.5	2.66

Ordering codes and description composition

EJ08MF/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
EJ08MF/10NB	0EJ08002070	Without emergency, spool 1
EJ08MF/20NB	0EJ08002072	Without emergency, spool 2
EJ08MF/40NB	0EJ08002074	Without emergency, spool 4
EJ08MF/50NB	0EJ08002075	Without emergency, spool 5
EJ08MF/60NB	0EJ08002076	Without emergency, spool 6
EJ08MF/20TB	0EJ08002079	Screw type emergency, spool 2

2 Spool

TYPE	DESCRIPTION
1	Spool 1
2	Spool 2
4	Spool 4
5	Spool 5
6	Spool 6

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
T	Screw type
F	Pull button type (N.C.)
Q	Pull type with detent (N.C.)

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

7 Connector

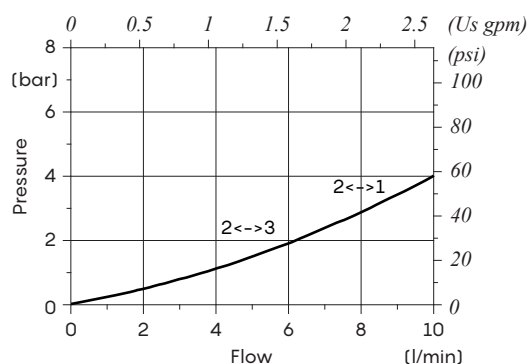
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams

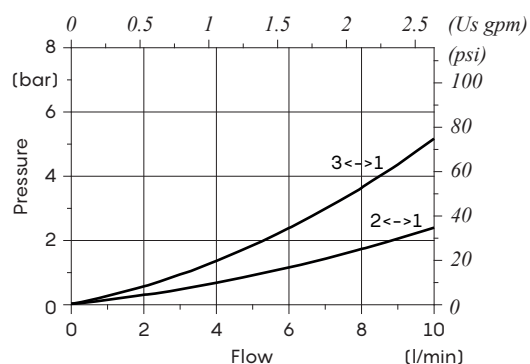
Pressure drop vs. flow

Spool 1



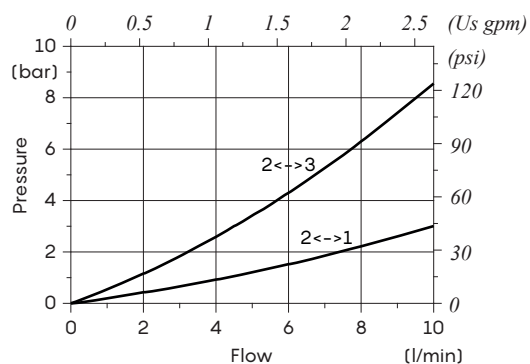
Pressure drop vs. flow

Spool 2



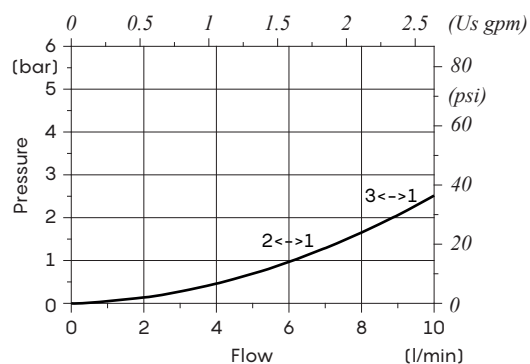
Pressure drop vs. flow

Spool 4



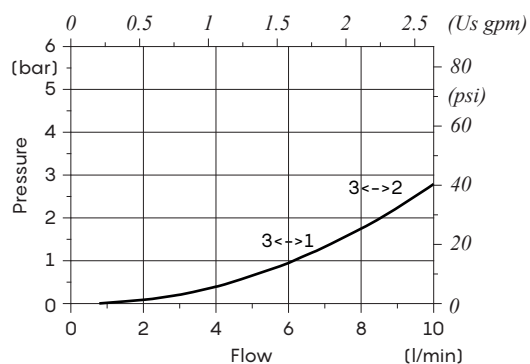
Pressure drop vs. flow

Spool 5



Pressure drop vs. flow

Spool 6





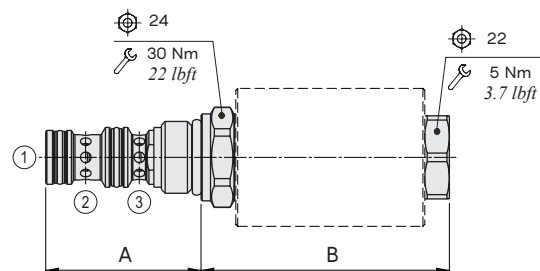
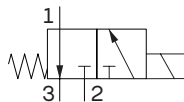
EJ08G type directional solenoid valves – 3 way / 2 positions

- Spool type
- Direct acting with on-off solenoid
- Suitable for high pressure: 350 bar (5100 psi)
- Different types of emergencies available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

EJ08G		
Nominal flow		3 l/min (0.80 US gpm)
Max. pressure		350 bar (5100 psi)
Oil leakage	at 210 bar (3050 psi)	10 cm ³ /min (0.61 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 8/3
Coil type*		BT
Nominal voltages		12VDC – 24VDC ± 10%
Power rating		21 W
Weight		0.134 kg (0.29 lb)

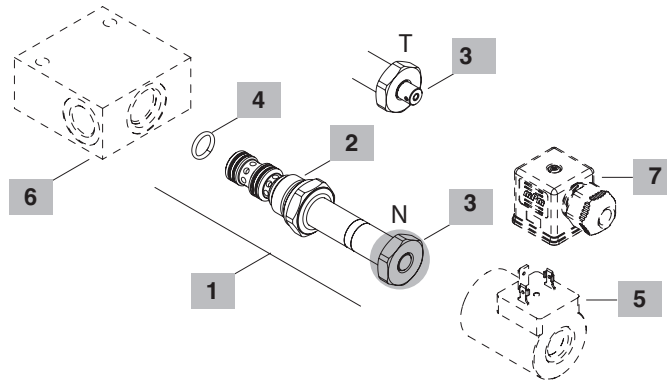
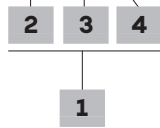
NOTE – For different conditions, please contact Walvoil Sales Dpt. – *For coils further features see from page 201.



Valve type	A		B			
			N without emergency		T screw type	
	mm	in	mm	in	mm	in
EJ08G	41.1	1.62	66	2.6	73.5	2.89

Ordering codes and description composition

EJ08G/ 2 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
EJ08G/20NB	OEJ08002035	Without emergency
EJ08G/20TB	OEJ08002042	Screw type emergency

2 Spool

TYPE	DESCRIPTION
2	Spool 2

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
T	Screw type

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BT12VDC	4SL3000120	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE6	3CC0830J11	Aluminium body for cavity 08 valve, SAE6 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

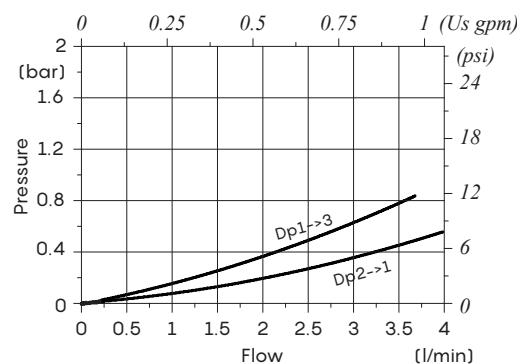
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams

Pressure drop vs. flow





EJ..M type directional solenoid valves – 3 way / 2 positions

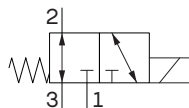
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- From SAE08 to SAE12 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

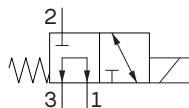
		EJ08M	EJ10M	EJ12M
Max. flow		25 l/min (6.6 US gpm)	40 l/min (10.5 US gpm)	60 l/min (15.8 US gpm)
Max. pressure		250 bar (3600 psi)		
Oil leakage	at 210 bar (3050 psi)	40 cm³/min (2.44 in³/min)	80 cm³/min (4.88 in³/min)	400 cm³/min (24.4 in³/min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties			
Viscosity	10-200 cSt			
Max level of contamination	18/16/13 ISO4406			
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)		
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)			
Cavity		SAE 08/3	SAE 10/3	SAE 12/3
Coil type*		BER	BC	BH
Nominal voltages	12VDC - 24VDC ±10%			
Power rating		19 W (12VDC - 24VDC)	26 W (12VDC - 24VDC)	33 W
Weight		0.125 kg (0.27 lb)	0.300 kg (0.661 lb)	0.434 kg (0.956 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

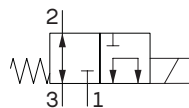
Spool 1



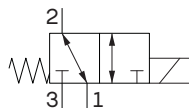
Spool 2



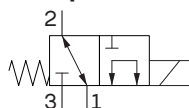
Spool 3 (only EJ08M)



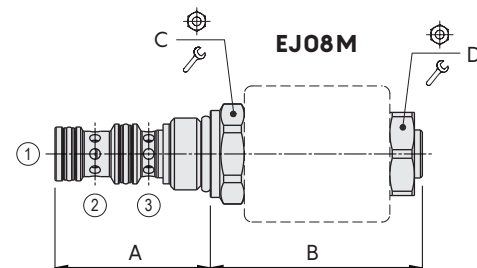
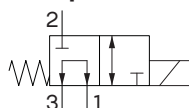
Spool 4



Spool 5



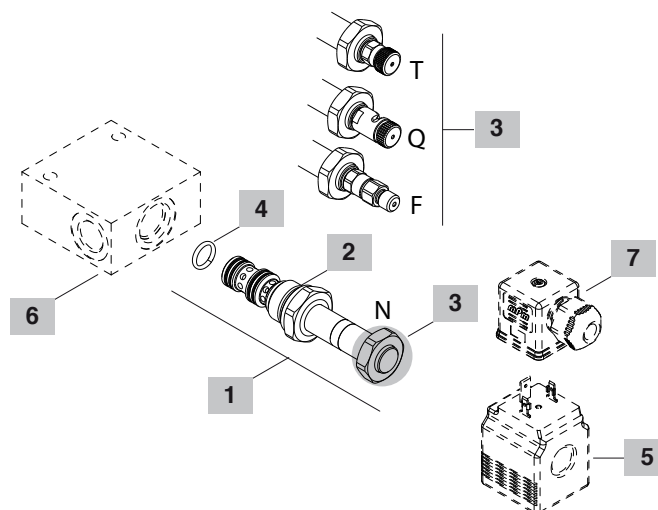
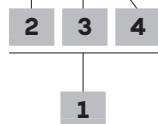
Spool 6



Valve type	A		B N without emergency		C		D	
	mm	in	mm	in	Nm	lbft	Nm	lbft
EJ08M	41.1	1.62	56.1	2.21	24	30	22	5
EJ10M	47	1.85	68	2.68	27	50	37	-
EJ12M	73.5	2.89	85.5	3.37	32	85	63	28

Ordering codes and description composition

EJ08M/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/3		
EJ08M/10NB	0EJ08002030	Without emergency, spool 1
EJ08M/20NB	0EJ08002031	Without emergency, spool 2
EJ08M/30NB	0EJ08002032	Without emergency, spool 3
EJ08M/40NB	0EJ08002033	Without emergency, spool 4
EJ08M/50NB	0EJ08002034	Without emergency, spool 5
SAE cavity 10/3		
EJ10M/10NB	0EJ10002018	Without emergency, spool 1
EJ10M/20NB	0EJ10002019	Without emergency, spool 2
EJ10M/40NB	0EJ10002021	Without emergency, spool 4
EJ10M/50NB	0EJ10002022	Without emergency, spool 5
EJ10M/60NB	0EJ10002023	Without emergency, spool 6
SAE cavity 12/3		
EJ12M/10NB	0EJ12002011	Without emergency, spool 1
EJ12M/20NB	0EJ12002012	Without emergency, spool 2
EJ12M/40NB	0EJ12002013	Without emergency, spool 4
EJ12M/50NB	0EJ12002014	Without emergency, spool 5

2 Spool

TYPE	DESCRIPTION
1	Spool 1
2	Spool 2
3	Spool 3
4	Spool 4
5	Spool 5
6	Spool 6

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
F	Pull button type
Q	Pull type with detent
T	Screw type

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil for EJ08M
BC12VDC	4SL8000120	12VDC-ISO4400 coil for EJ10M
BH12VDC	4SLD001200A	12VDC-ISO4400 coil for EJ12M

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE8	3CC0830K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread
SAE12/3-SAE10	3CC1230L11	Aluminium body for cavity 12 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

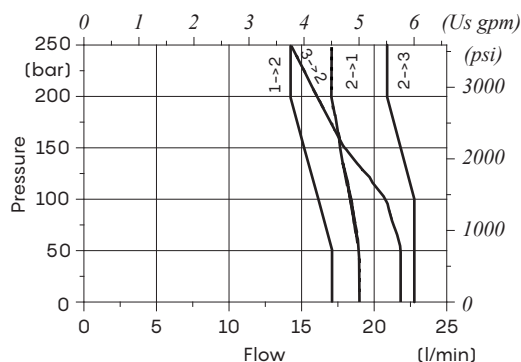
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

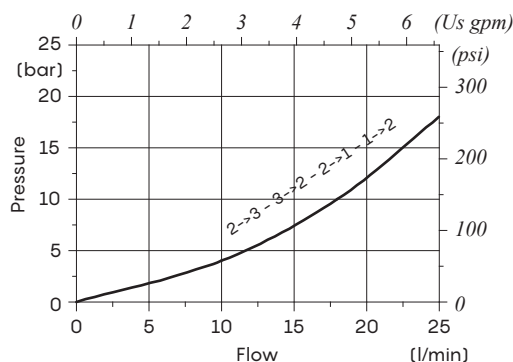
For complete connectors list see from page 201

Rating diagrams

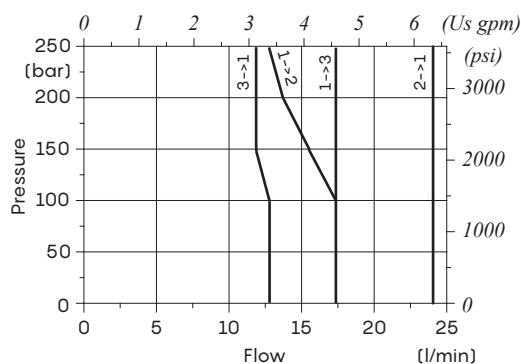
**EJ08M performance limit
spool 1**



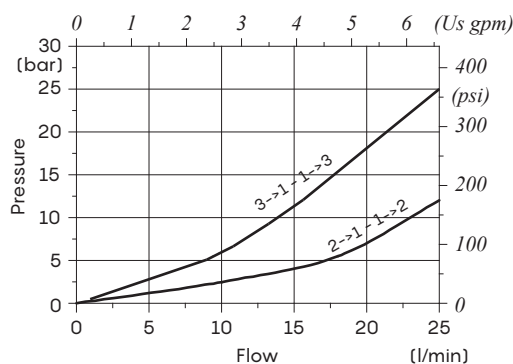
**EJ08M pressure drop vs. flow
spool 1**



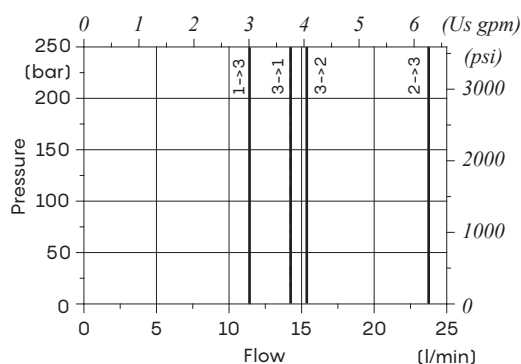
**EJ08M performance limit
spool 2**



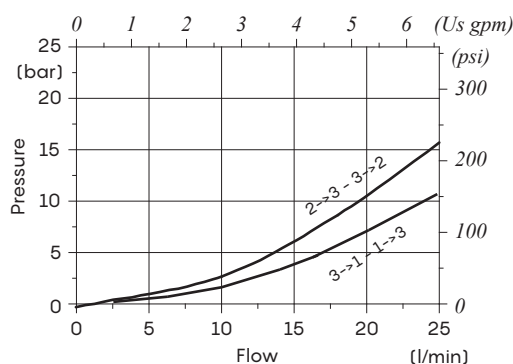
**EJ08M pressure drop vs. flow
spool 2**



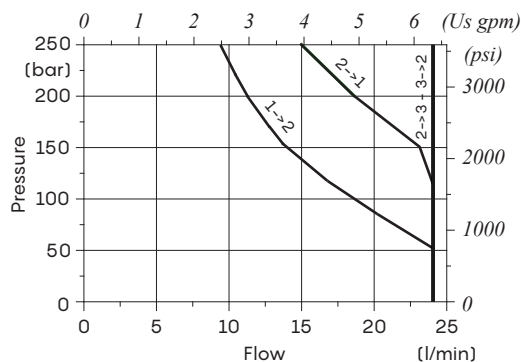
**EJ08M performance limit
spool 3**



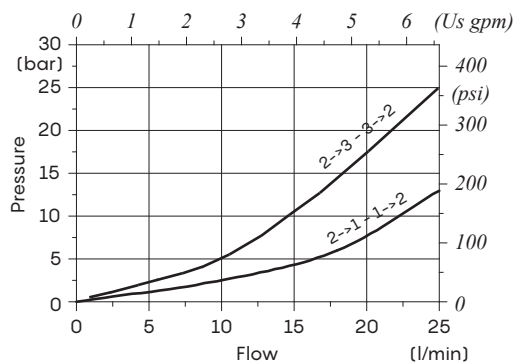
**EJ08M pressure drop vs. flow
spool 3**



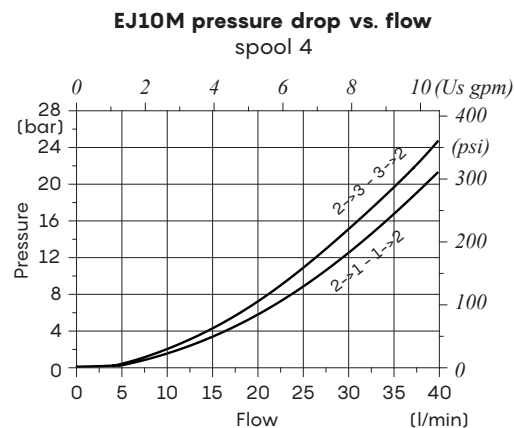
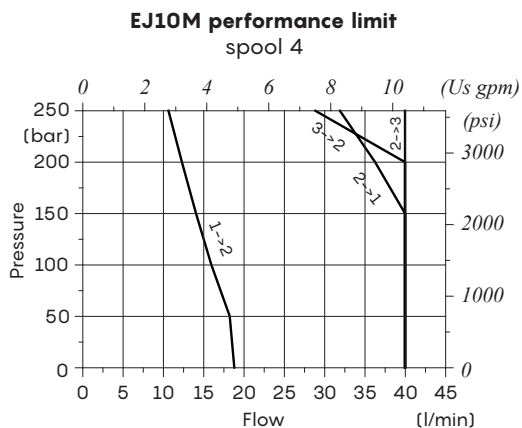
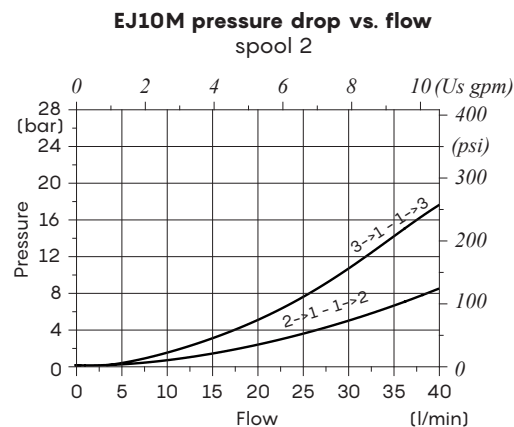
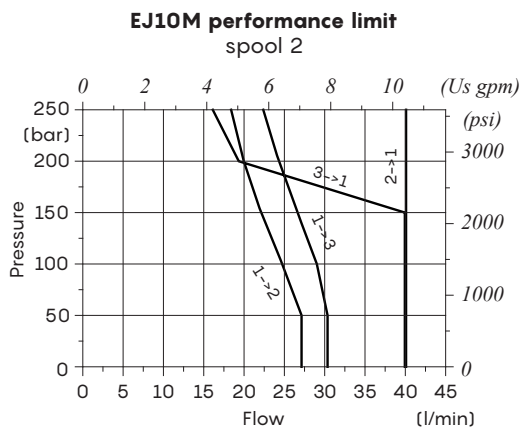
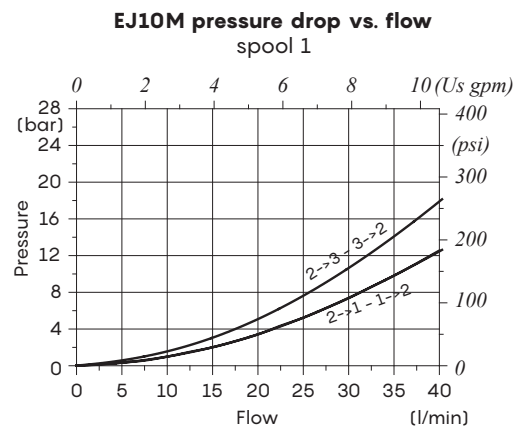
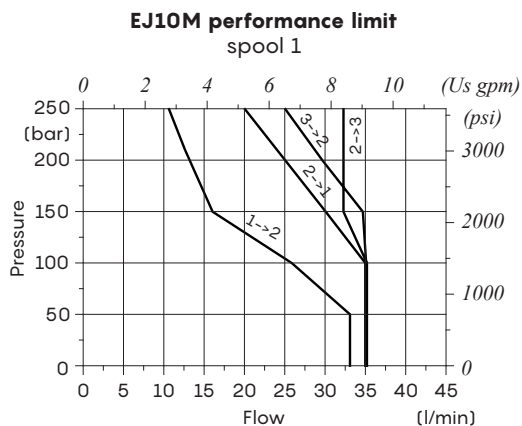
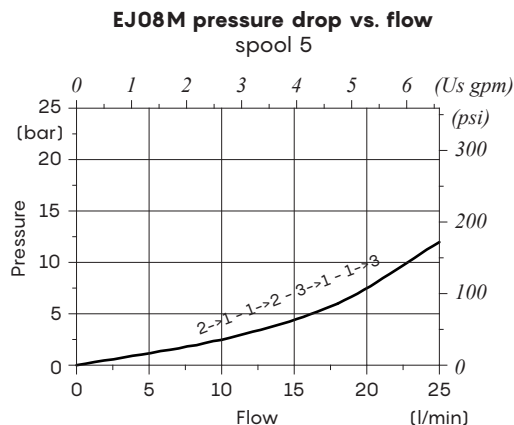
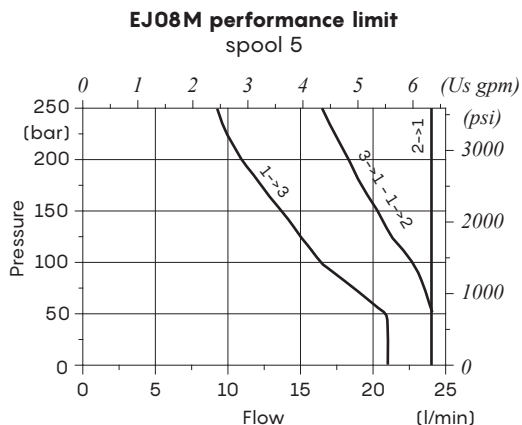
**EJ08M performance limit
spool 4**



**EJ08M pressure drop vs. flow
spool 4**

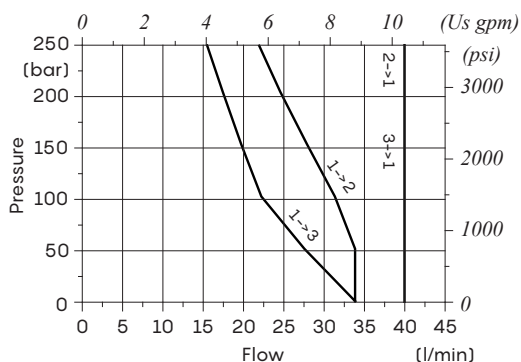


Rating diagrams

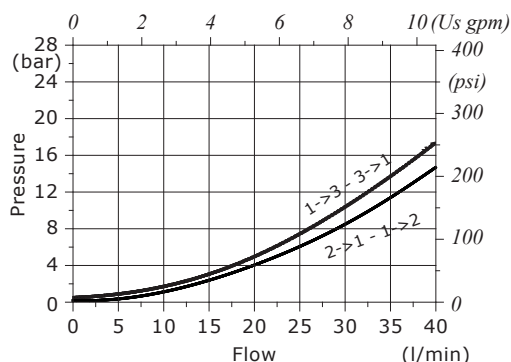


Rating diagrams

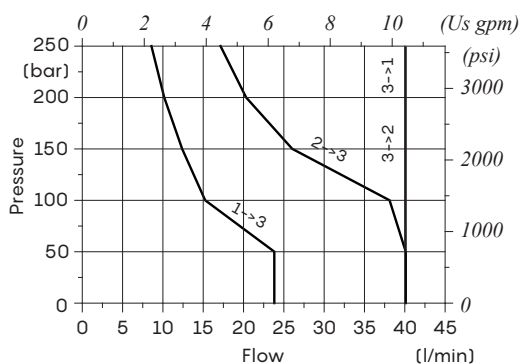
**EJ10M performance limit
spool 5**



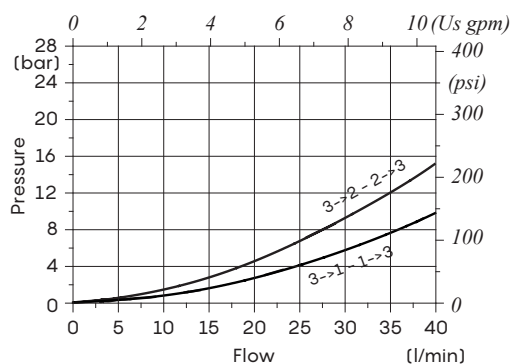
**EJ10M pressure drop vs. flow
spool 5**



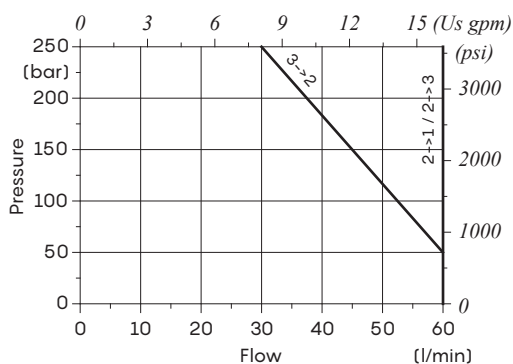
**EJ10M performance limit
spool 6**



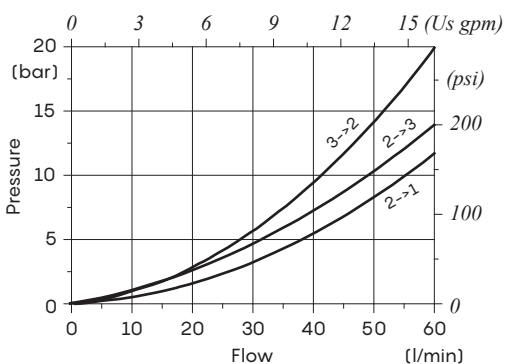
**EJ10M pressure drop vs. flow
spool 6**



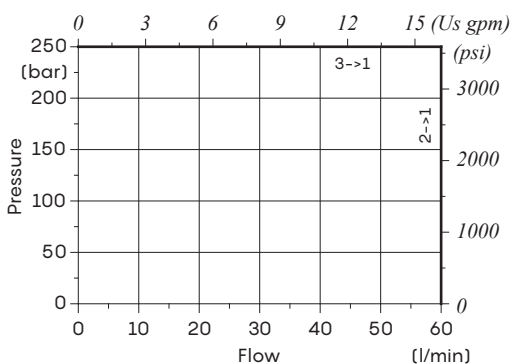
**EJ12M performance limit
spool 1**



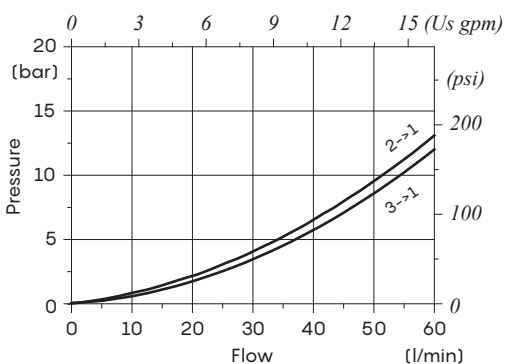
**EJ12M pressure drop vs. flow
spool 1**



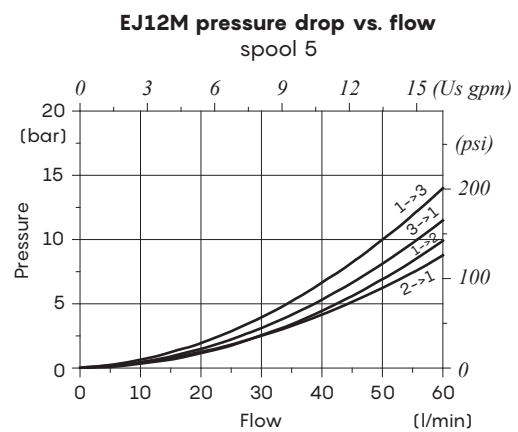
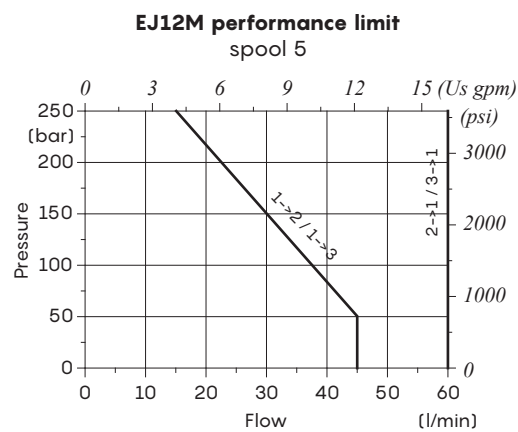
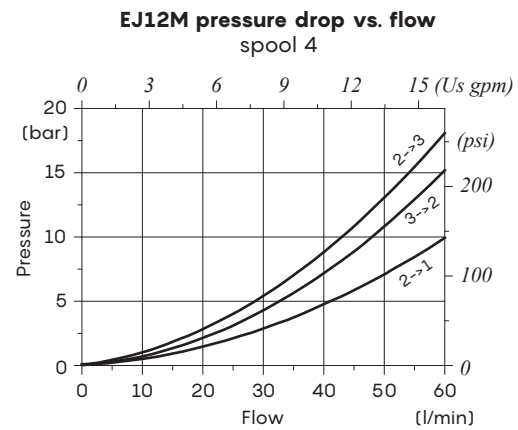
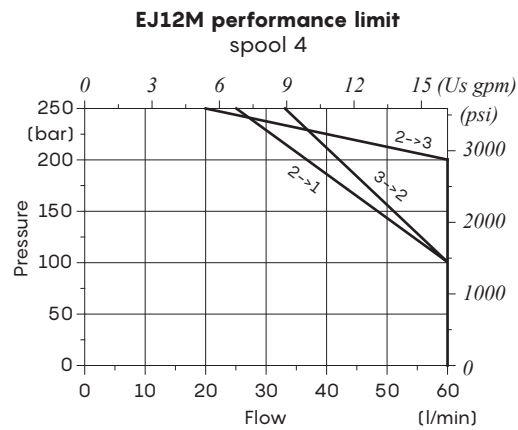
**EJ12M performance limit
spool 2**



**EJ12M pressure drop vs. flow
spool 2**



Rating diagrams





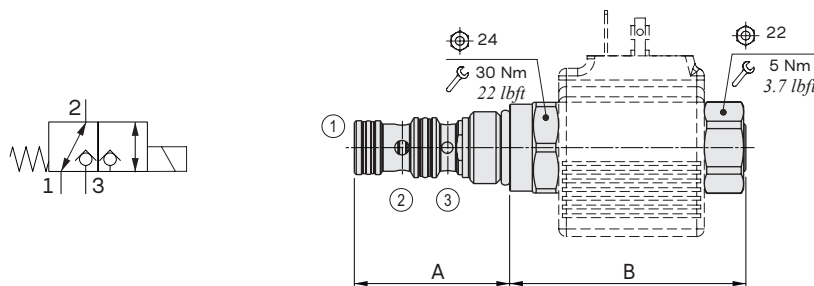
EL08B type directional solenoid valves – 3 way / 2 positions

- Poppet type
- Direct acting with on-off solenoid
- Different types of emergencies available
- Suitable for low pressure: 100 bar (1450 psi)

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

EL08B		
Nominal flow		10 l/min (2.64 US gpm)
Max. pressure		250 bar (3600 psi)
Oil leakage	at 210 bar (3050 psi)	0.25 cm ³ /min (0.015 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 08/3
Coil type*		BER
Nominal voltages		12VDC – 24VDC ± 10%
Power rating		19 W
Weight		0.16 kg (0.35 lb)

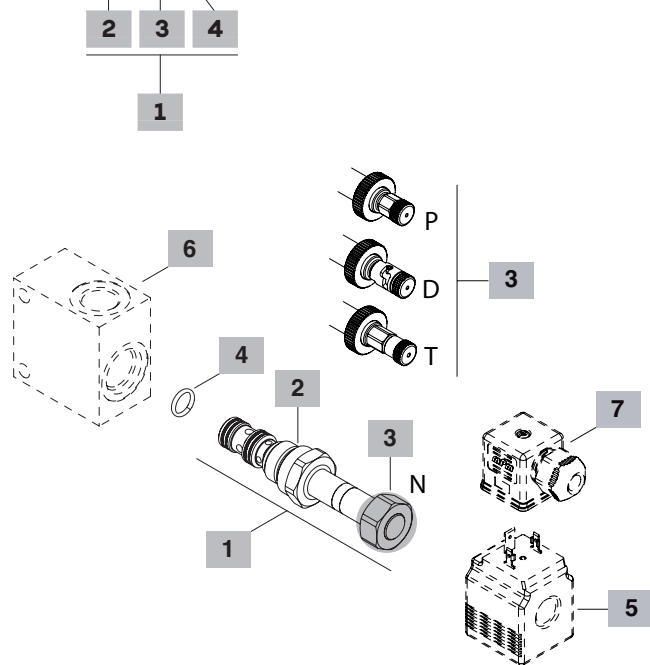
NOTE – For different conditions, please contact Walvoil Sales Dpt. – *For coils further features see from page 201.



Valve type	A		B							
			N without emergency		T screw		P push button		D push type with detent	
	mm	in	mm	in	mm	in	mm	in	mm	in
EL08B	41.1	1.62	62.5	2.46	85.4	3.36	85.4	3.36	88.1	3.47

Ordering codes and description composition

EL08B/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
EL08B/10NB	OEL08002009	Without emergency
EL08B/10PB	OEL08002006	With push-button emergency
EL08B/10TB	OEL08002007	Screw type emergency
EL08B/10DB	OEL08002008	Push type with detent emergency

2 Spool

TYPE	DESCRIPTION
1	Spool 1

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
P	Push-button emergency
T	Screw type emergency
D	Push type with detent emergency

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coil

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/3-SAE6	3CC0830J11	Aluminium body for cavity 08 valve, SAE6 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

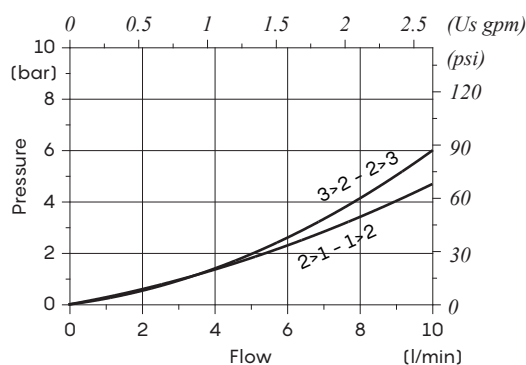
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

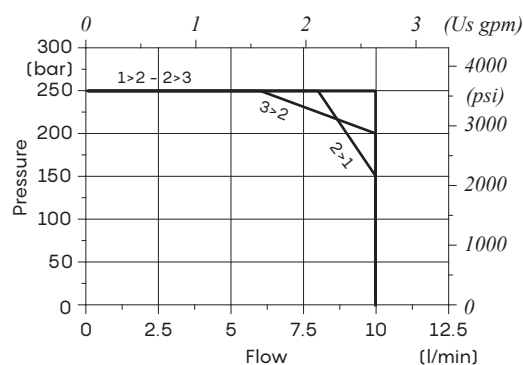
For complete connectors list see from page 201

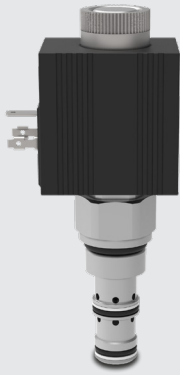
Rating diagrams

Pressure drop vs. flow



Performance limit





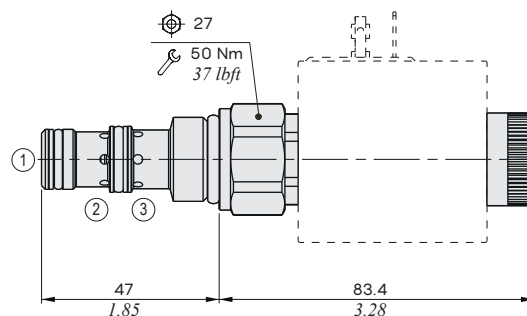
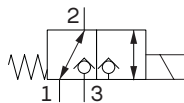
EL10C type directional solenoid valves – 3 way / 2 positions

- Poppet type
- Direct acting with on-off solenoid

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

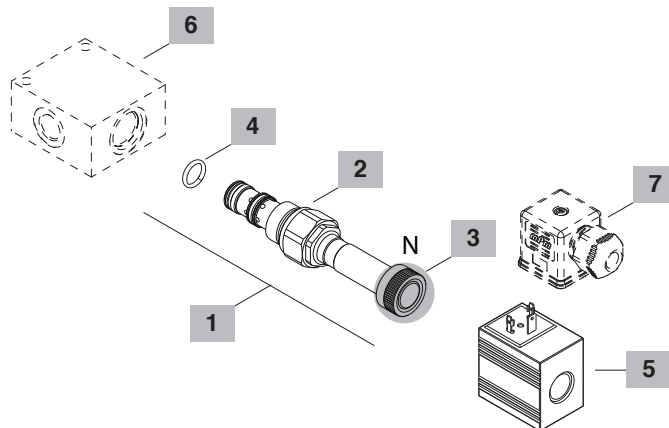
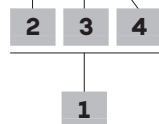
EL10C		
Nominal flow		20 l/min (5.28 US gpm)
Max. pressure		210 bar (3050 psi)
Oil leakage	at 210 bar (3050 psi)	0.25 cm ³ /min (0.015 in ³ /min)
Fluid		mineral based or synthetic hydraulic fluid with lubricating properties
Viscosity		10-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+PTFE with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 10/3
Coil type*		BQ16
Nominal voltages		12VDC ± 10%
Power rating		30 W
Weight		0.27 kg (0.59 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.



Ordering codes and description composition

EL10C/ 1 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/3		
EL10C/10NB	OEL10002008	Without emergency

2 Spool

TYPE	DESCRIPTION
1	Spool 1

3 Emergency

TYPE	DESCRIPTION
N	Without emergency

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BQ16 12VDC	4SL8000121	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/3-SAE8	3CC1030K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

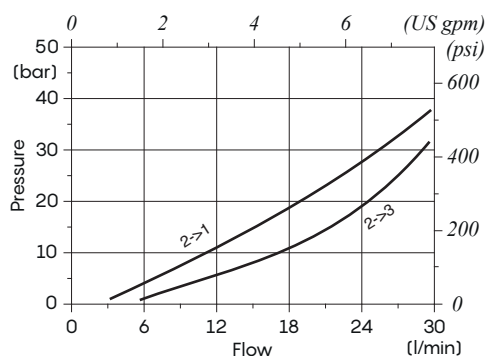
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams

Pressure drop vs. flow





ER..L type directional solenoid valves – 4 way/2 positions

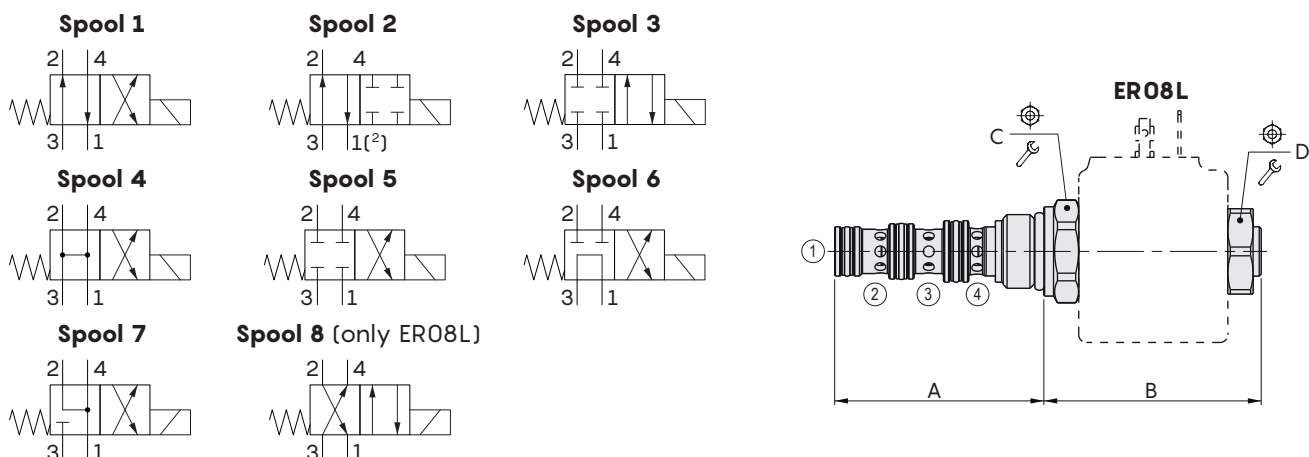
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- External zinc-plated and corrosion-proof components
- Low pressure drop
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	ER08L	ER10L
Nominal flow	20 l/min (5.3 US gpm)	40 l/min (10.6 US gpm)
Max. pressure	250 bar (3600 psi)	
Oil leakage	at 210 bar (5100 psi)	40 cm ³ /min (2.44 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/4	SAE 10/4
Coil type*	BER	BC
Nominal voltages	12VDC - 24VDC ± 10%	
Power rating	19 W (12VDC - 24VDC)	26 W (12VDC - 24VDC)
Weight	0.372 kg (0.82 lb)	0.432 kg (0.95 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

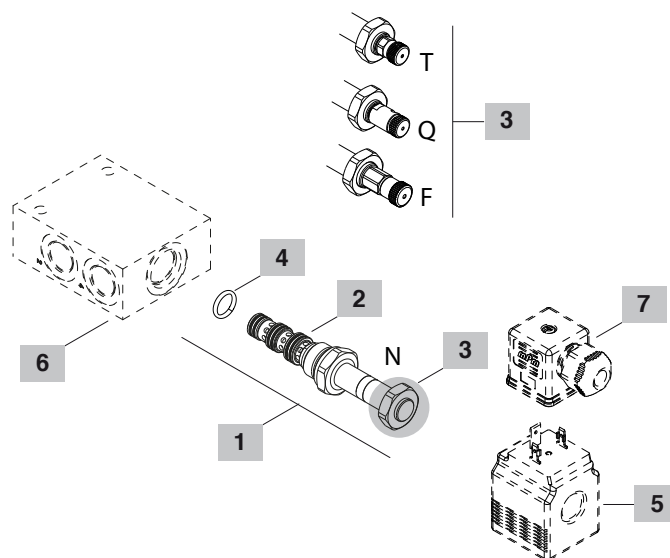
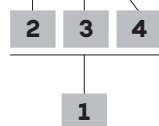
- (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.



Valve type	A		B								C		D	
	mm	in	N without emergency	T screw type	F pull button	Q pull type with detent								
ER08L	54	2.13	56.1	2.21	71.1	2.8	84	3.31	77.2	3.04	24	30	22	22
ER10L	62.4	2.46	68	2.68	82.5	3.25	95.2	3.75	88.5	3.48	27	50	37	23

Ordering codes and description composition

ER08L/ 1 0 N B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/4		
ER08L/10NB	OER08002036	Without emergency, spool 1
ER08L/20NB	OER08002042	Without emergency, spool 2
ER08L/30NB	OER08002043	Without emergency, spool 3
ER08L/40NB	OER08002044	Without emergency, spool 4
ER08L/50NB	OER08002039	Without emergency, spool 5
ER08L/60NB	OER08002045	Without emergency, spool 6
ER08L/70NB	OER08002046	Without emergency, spool 7
ER08L/80NB	OER08002047	Without emergency, spool 8
ER08L/70QB	OER08002041	Pull type with detent, spool 7
SAE cavity 10/4		
ER10L/10NB	OER10002040	Without emergency, spool 1
ER10L/20NB	OER10002047	Without emergency, spool 2
ER10L/30NB	OER10002048	Without emergency, spool 3
ER10L/40NB	OER10002044	Without emergency, spool 4
ER10L/50NB	OER10002045	Without emergency, spool 5
ER10L/60NB	OER10002042	Without emergency, spool 6
ER10L/70NB	OER10002046	Without emergency, spool 7

2 Spool

TYPE	DESCRIPTION
1	Spool 1
2	Spool 2
3	Spool 3
4	Spool 4
5	Spool 5
6	Spool 6
7	Spool 7
8	Spool 8

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
F	Pull screw button
Q	Pull type with detent
T	Screw type

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil for ER08L
BC12VDC	4SL8000120	12VDC-ISO4400 coil for ER10L

For complete coils list see page 201

6 Valve body

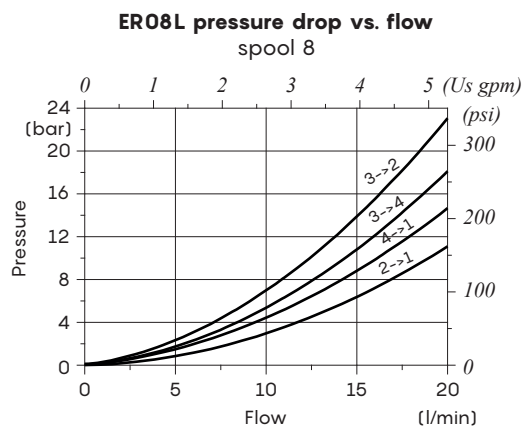
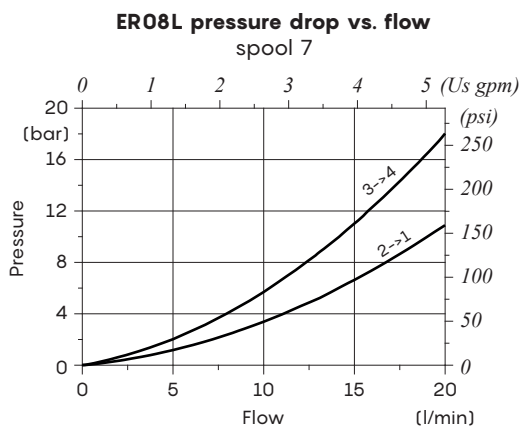
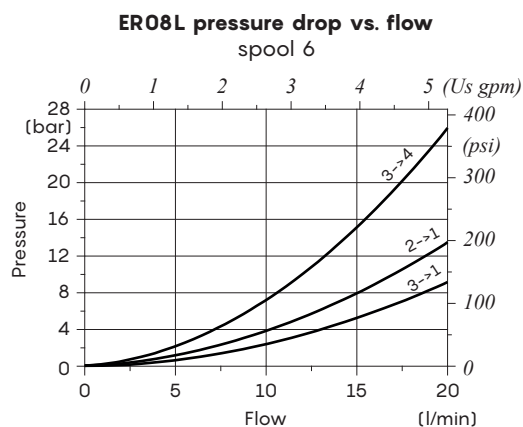
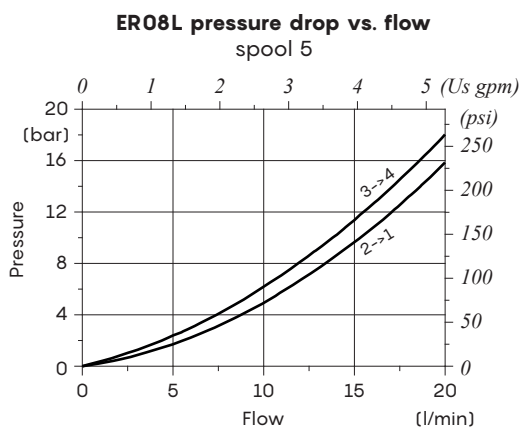
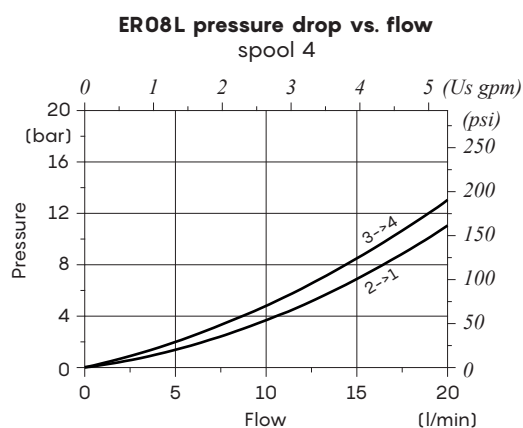
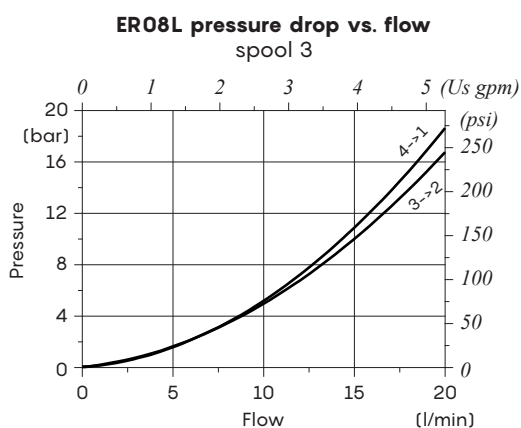
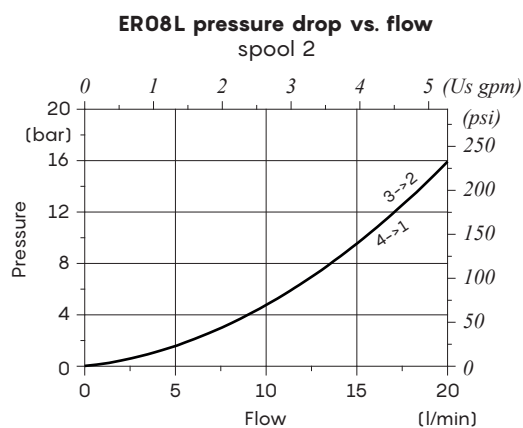
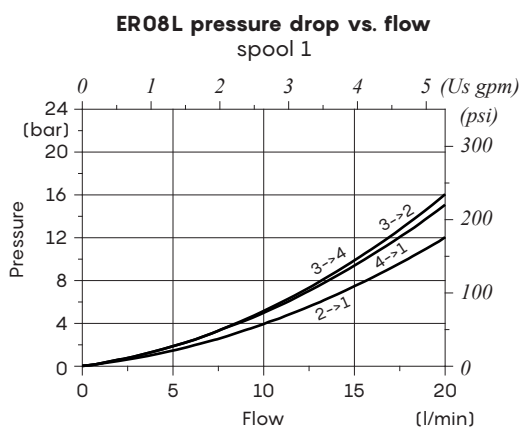
TYPE	CODE	DESCRIPTION
SAE08/4 - SAE8	3CC0840K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/4 - SAE10	3CC1040L11	Aluminium body for cavity 10 valve, SAE10 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 212**7 Connector**

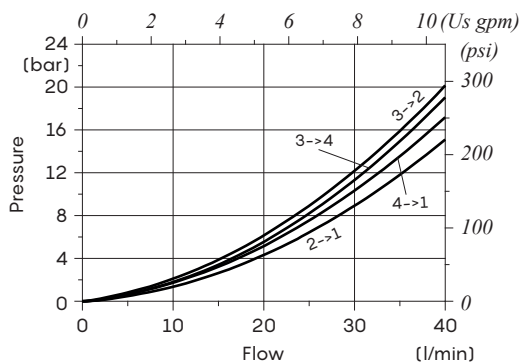
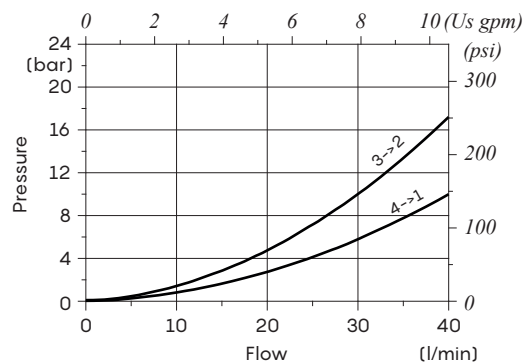
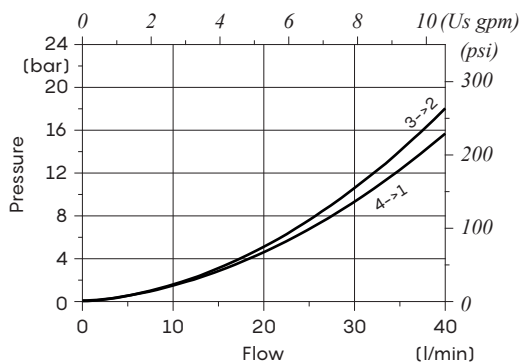
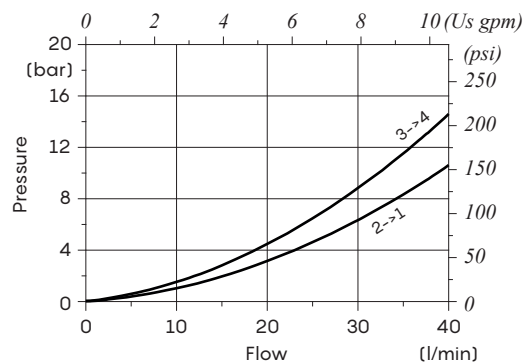
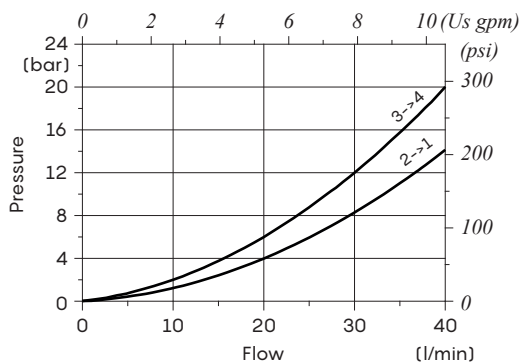
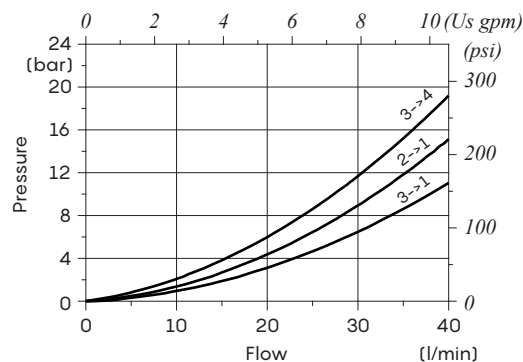
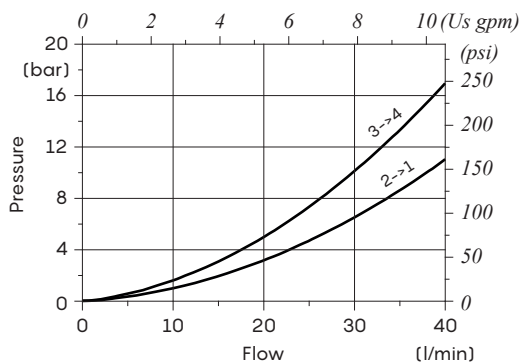
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams



Rating diagrams

ER10L pressure drop vs. flow
spool 1ER10L pressure drop vs. flow
spool 2ER10L pressure drop vs. flow
spool 3ER10L pressure drop vs. flow
spool 4ER10L pressure drop vs. flow
spool 5ER10L pressure drop vs. flow
spool 6ER10L pressure drop vs. flow
spool 7



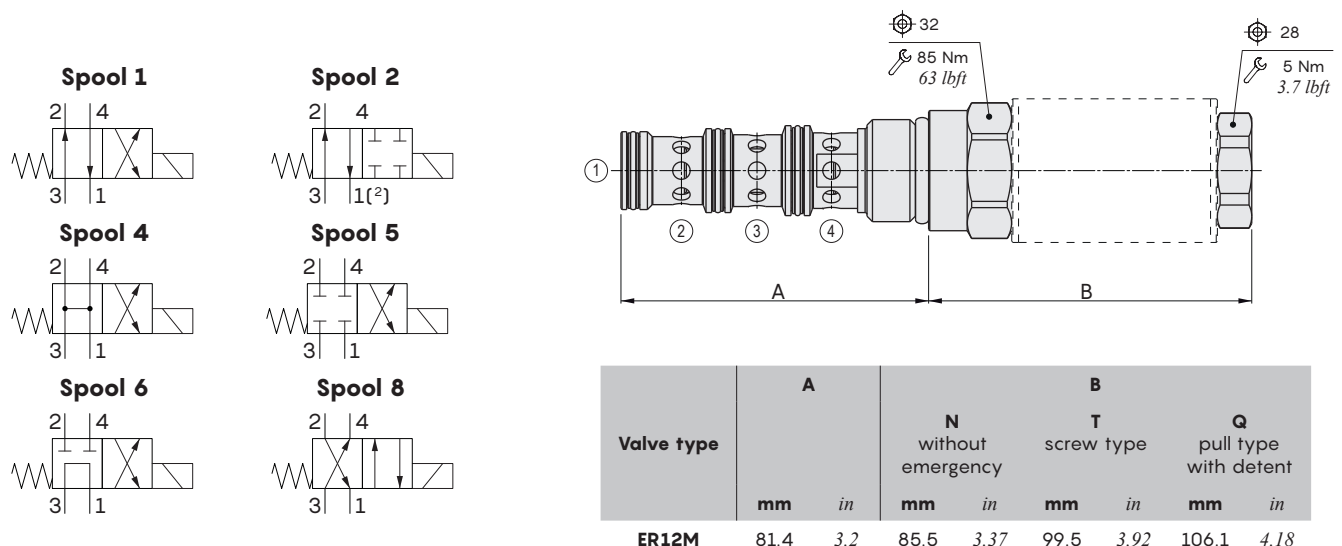
ER12M type directional solenoid valves – 4 way / 2 positions

- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

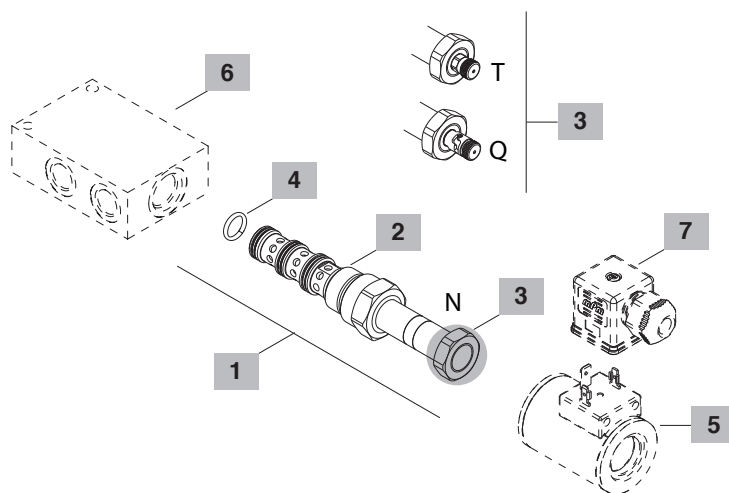
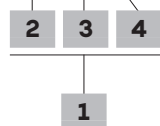
ER12M		
Nominal flow		60 l/min (15.8 US gpm)
Max. pressure	port 1 port 2, 3, 4	250 bar (3600 psi) 320 bar (4600 psi)
Oil leakage	at 210 bar (3050 psi)	200 cm ³ /min (12.20 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 12/4	
Coil type*	BH	
Nominal voltages	12VDC - 24 VDC ± 10%	
Power rating	33 W (12/24 VDC)	
Weight	0.73 kg (1.61 lb)	

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.



Ordering codes and description composition

ER12M/ 1 0 N B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 12/4		
ER12M/10NB	0ER12002021	Without emergency, spool 1
ER12M/20NB	0ER12002023	Without emergency, spool 2
ER12M/40NB	0ER12002031	Without emergency, spool 4
ER12M/50NB	0ER12002024	Without emergency, spool 5
ER12M/60NB	0ER12002028	Without emergency, spool 6
ER12M/80NB	0ER12002022	Without emergency, spool 8
ER12M/10QB	0ER12002033	Pull type emergency with detent, spool 1
ER12M/60TB	0ER12002030	Screw type, spool 6

2 Spool

TYPE	DESCRIPTION
1	Spool 1
2	Spool 2
4	Spool 4
5	Spool 5
6	Spool 6
8	Spool 8

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
Q	Pull type with detent
T	Screw type

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BH12VDC-ISO4400	4SLD001200A	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE12/4 - SAE10	3CC1240L11	Aluminium body for cavity 12 valve, SAE10 std thread

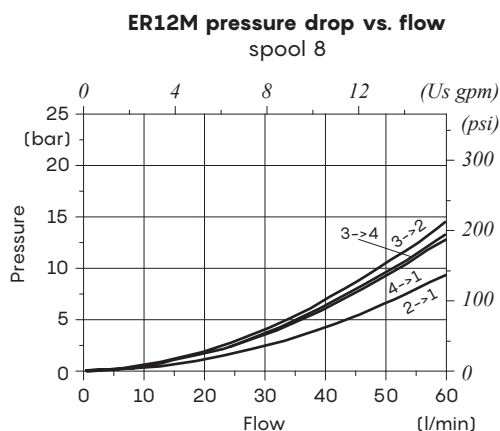
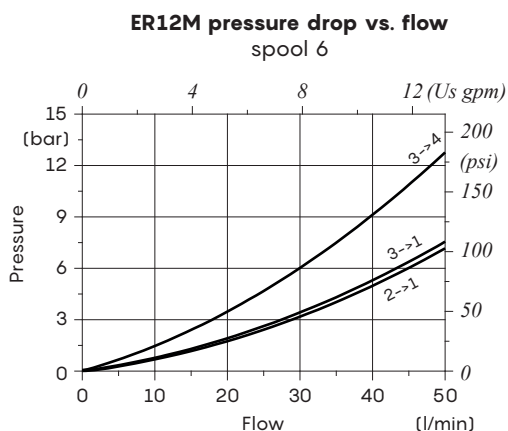
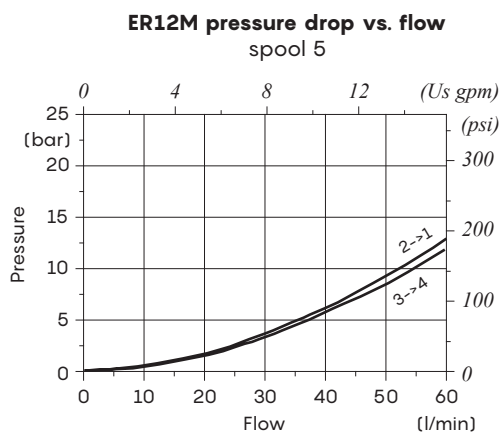
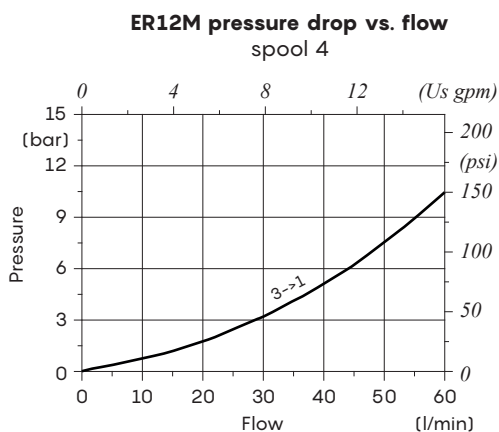
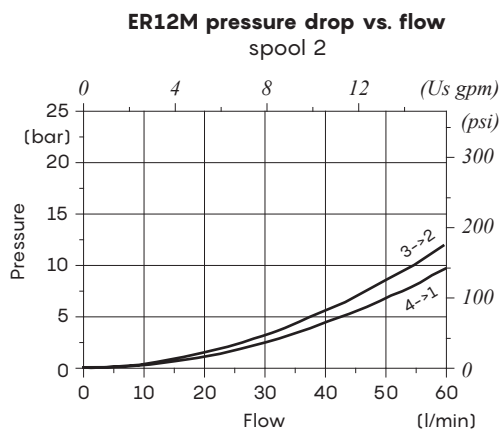
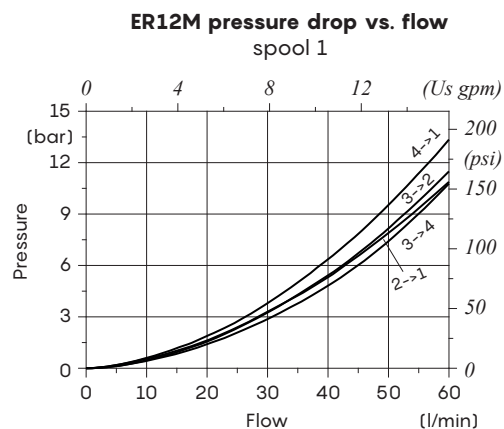
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 212

7 Connector

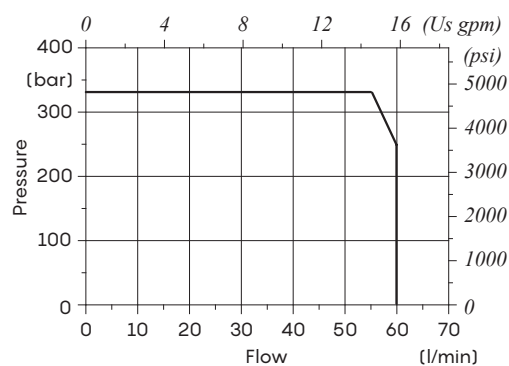
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams



ER12M performance limit





ET..L type directional solenoid valves – 4 way/3 positions

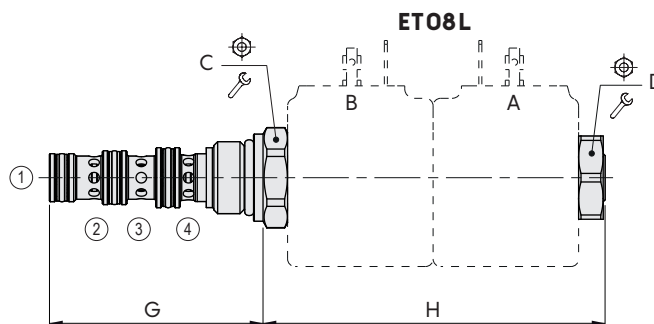
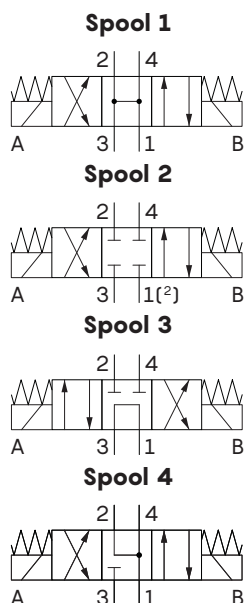
- Spool type
- Direct acting with on-off solenoid
- Different types of emergencies available
- External zinc-plated and corrosion-proof components
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

	ET08L	ET10L
Nominal flow	20 l/min (5.3 US gpm)	40 l/min (10.6 US gpm)
Max. pressure	250 bar (3600 psi)	
Oil leakage	at 210 bar (5100 psi)	40 cm ³ /min (2.44 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/4	SAE 10/4
Coil type*	BER	BC
Nominal voltages	12VDC - 24VDC ± 10%	
Power rating	19 W (12VDC - 24VDC)	26 W (12VDC - 24VDC)
Weight	0.635 kg (1.4 lb)	0.702 kg (1.55 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

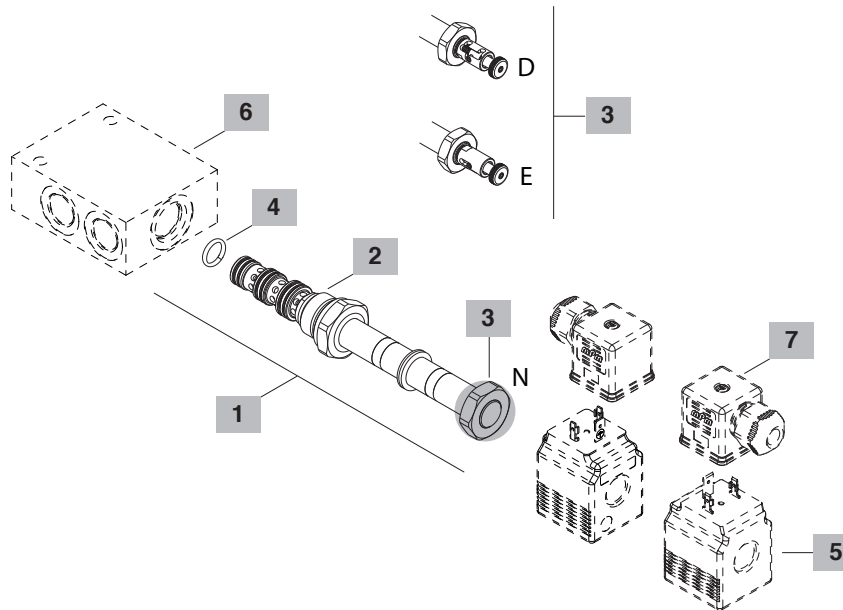
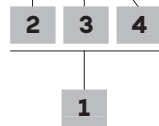
- (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.



Valve type	G		N		D		E		C		D	
	mm	in	mm	in	mm	in	mm	in	Nm	lbft	Nm	lbft
ET08L	54	2.13	93	3.66	122	4.8	122	4.8	24	30	22	5±1
ET10L	62.4	2.46	114	4.49	142.8	5.62	142.8	5.62	27	50	37	23

Ordering codes and description composition

ET08L/ 1 0 N B

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/4		
ET08L/10NB	OET08002026	Without emergency, spool 1
ET08L/20NB	OET08002027	Without emergency, spool 2
ET08L/30NB	OET08002025	Without emergency, spool 3
ET08L/40NB	OET08002028	Without emergency, spool 4
SAE cavity 10/4		
ET10L/10NB	OET10002041	Without emergency, spool 1
ET10L/20NB	OET10002043	Without emergency, spool 2
ET10L/30NB	OET10002040	Without emergency, spool 3
ET10L/40NB	OET10002042	Without emergency, spool 4

2 Spool

TYPE	DESCRIPTION
1	Spool 1
2	Spool 2
3	Spool 3
4	Spool 4

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
D	Push/pull type with detent
E	Push/pull type without detent

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil for ET08L
BC12VDC	4SL8000120	12VDC-ISO4400 coil for ET10L

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/4 - SAE8	3CC0840K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/4 - SAE10	3CC1040L11	Aluminium body for cavity 10 valve, SAE10 std thread

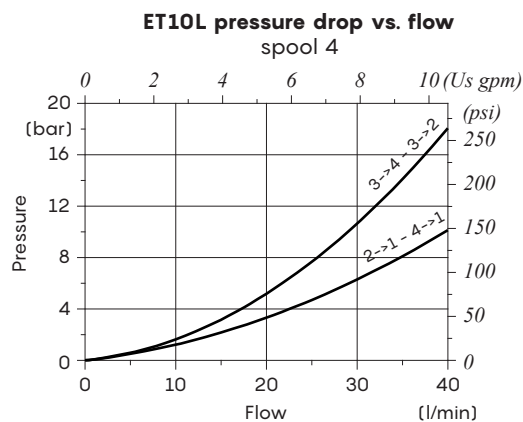
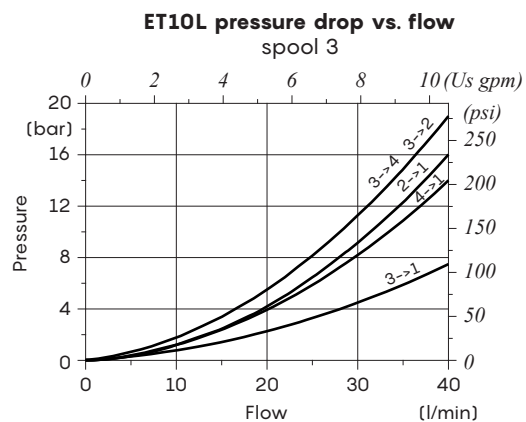
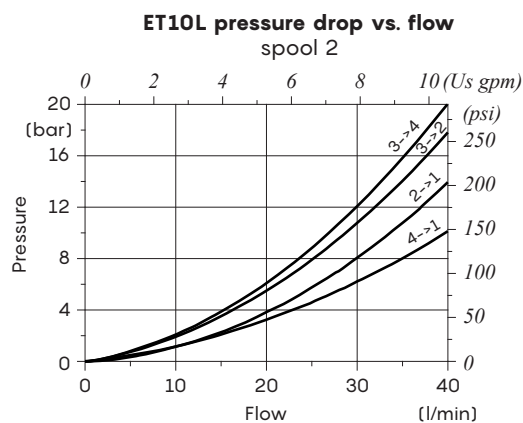
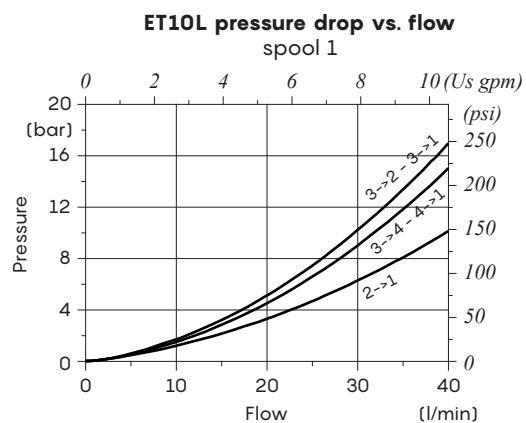
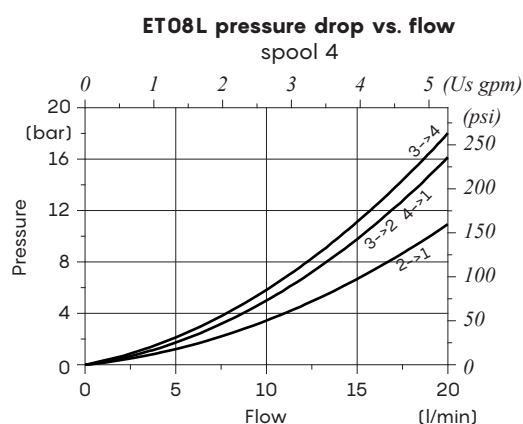
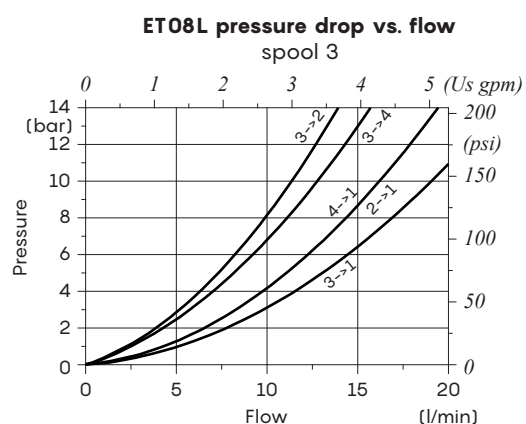
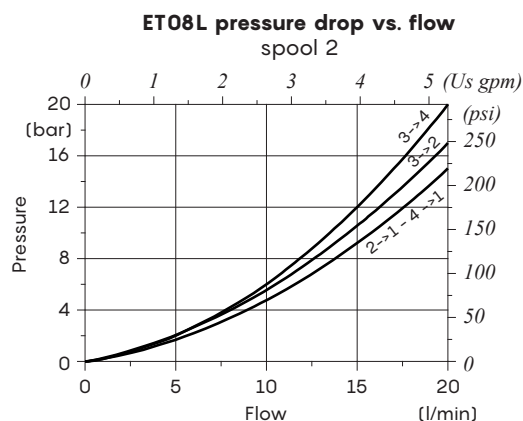
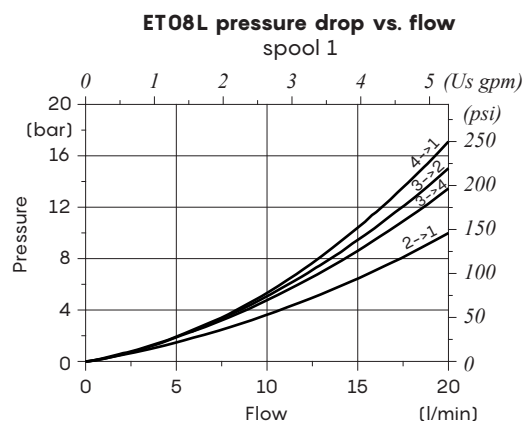
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 212

7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams





ET..X type directional solenoid valves – 4 way/3 positions

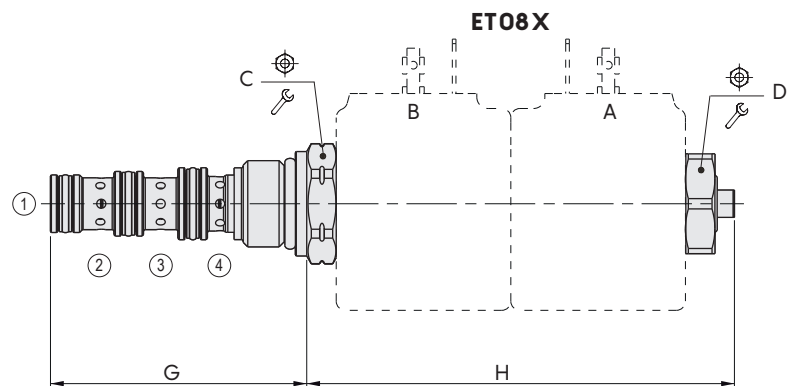
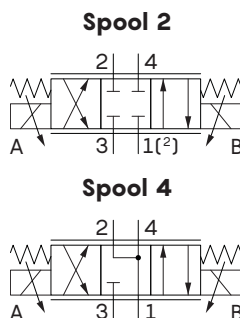
- Spool type
- Direct acting with proportional solenoid
- Different types of emergencies available
- Optimized linearity and hysteresis
- External zinc-plated and corrosion-proof components
- From SAE08 to SAE10 cavities

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

ET08X		ET10X
Nominal flow	12 l/min (3.17 US gpm)	25 l/min (6.6 US gpm)
Max. pressure	250 bar (3600 psi)	
Oil leakage	at 210 bar (5100 psi)	80 cm ³ /min (4.88 in ³ /min) 200 cm ³ /min (12.20 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity	10-200 cSt	
Max level of contamination	18/16/13 ISO4406	
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions	from -20°C (-4°F) to 60°C (140°F)	
Cavity	SAE 08/4	SAE 10/4
Coil type*	BER	BC
Nominal voltages	12VDC - 24VDC ± 10%	
Power rating	19 W (12VDC - 24VDC)	26 W (12VDC - 24VDC)
Weight	0.638 kg (1.41 lb)	0.720 kg (1.59 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

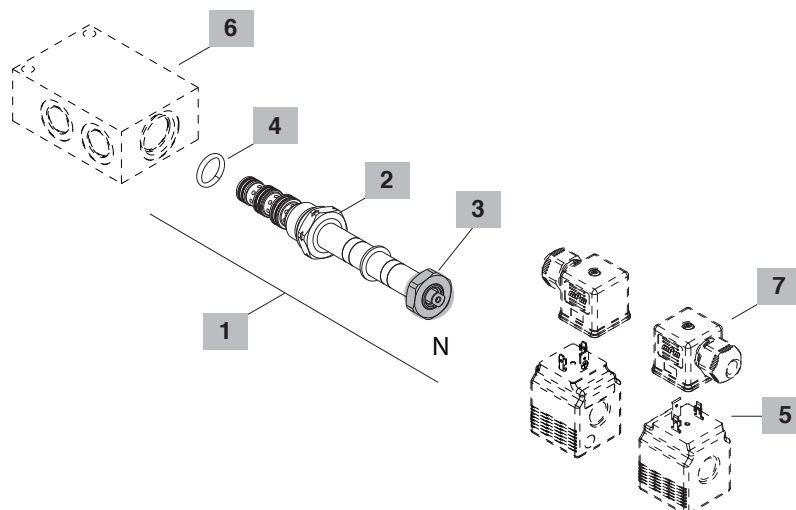
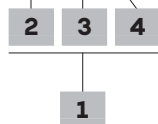
- (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.



Valve type	G		H N without emergency		C		D	
	mm	in	mm	in	Nm	lbft	Nm	lbft
ET08X	54	2.13	96.8	3.81	24	30	22	5±1 3.7
ET10X	62.4	2.46	117.8	4.64	27	50	37	23 5±1 3.7

Ordering codes and description composition

ET08X/ 2 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/4		
ET08X/20NB	OET08002035	Without emergency, spool 2
ET08X/40NB	OET08002036	Without emergency, spool 4
SAE cavity 10/4		
ET10X/20NB	OET10002058	Without emergency, spool 2
ET10X/40NB	OET10002059	Without emergency, spool 4

2 Spool

TYPE	DESCRIPTION
2	Spool 2
4	Spool 4

3 Emergency

TYPE	DESCRIPTION
N	Without emergency

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BER12VDC	4SLE001200A	12VDC-ISO4400 coil for ET08X
BC12VDC	4SL8000120	12VDC-ISO4400 coil for ET10X

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE08/4 - SAE8	3CC0840K11	Aluminium body for cavity 08 valve, SAE8 std thread
SAE10/4 - SAE8	3CC1040K11	Aluminium body for cavity 10 valve, SAE8 std thread

Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 212

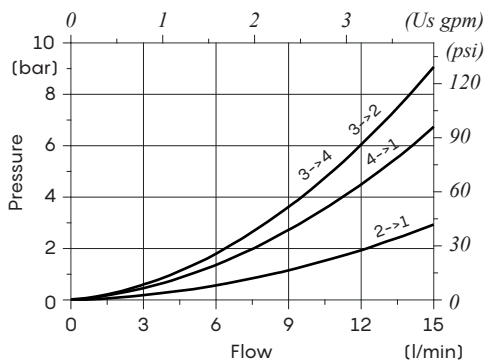
7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

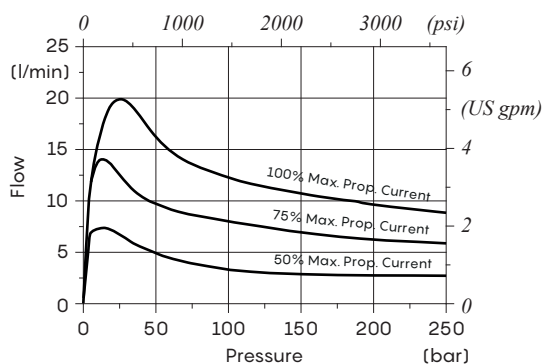
For complete connectors list see from page 201

Rating diagrams

ET08X pressure drop vs. flow
spool 2

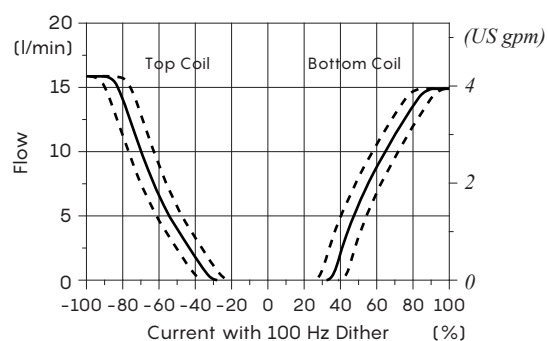


Pressure compensation
(inlet to work port - spool 2)

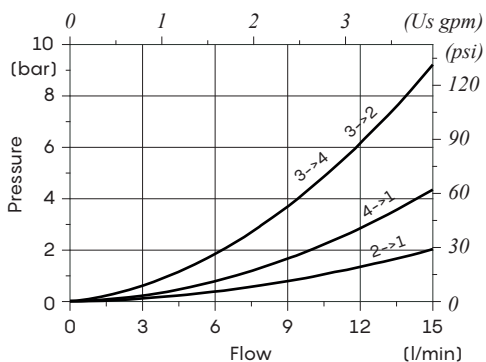


Flow vs. current

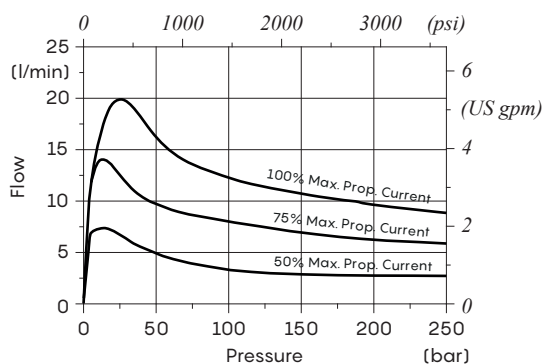
(with 10.5 bar/152 psi inline compensator- spool 2)



ET08X pressure drop vs. flow
spool 4

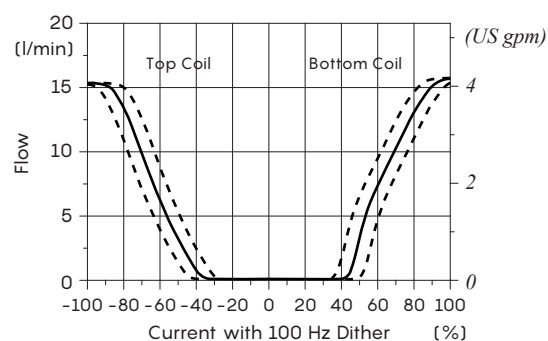


Pressure compensation
(inlet to work port - spool 4)



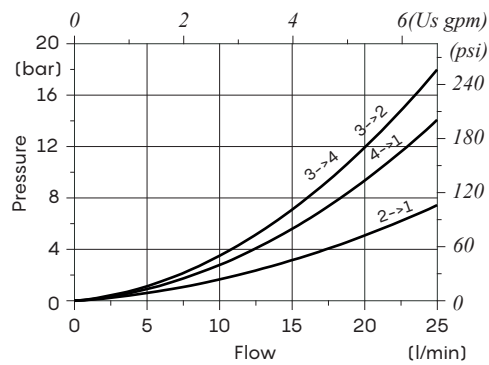
Flow vs. current

(with 10.5 bar/152 psi inline compensator- spool 4)

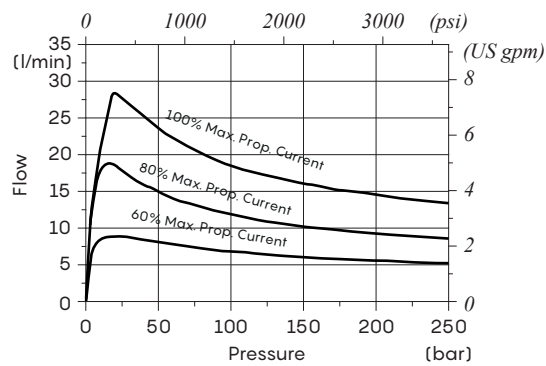


Rating diagrams

ET10X pressure drop vs. flow
spool 2/4 type

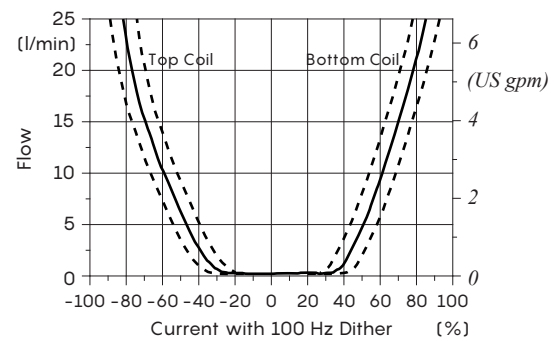


Pressure compensation
(inlet to work port - spool 2/4 type)



Flow vs. current

(with 10.5 bar/152 psi inline compensator- spool 2/4 type)





EK10L type directional solenoid valves – 5 way / 3 positions

- Spool type
- Direct acting with proportional solenoid
- Different types of emergencies available
- External zinc-plated and corrosion-proof components

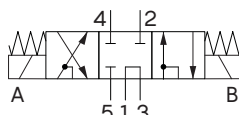
Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

EK10L		
Nominal flow		20 l/min (5.3 US gpm)
Max. pressure		250 bar (3600 psi)
Oil leakage	at 210 bar (3050 psi)	80 cm ³ /min (4.88 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 10/5
Coil type*		BC
Nominal voltages		12VDC - 24 VDC ± 10%
Power rating		26 W (12VDC - 24VDC)
Weight		0.720 kg (1.59 lb)

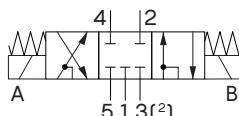
NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.

- (²) Port 1 may be fully pressurized, it's not intended for use as the valve's inlet.

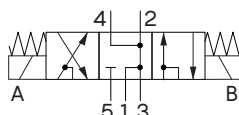
Spool 21



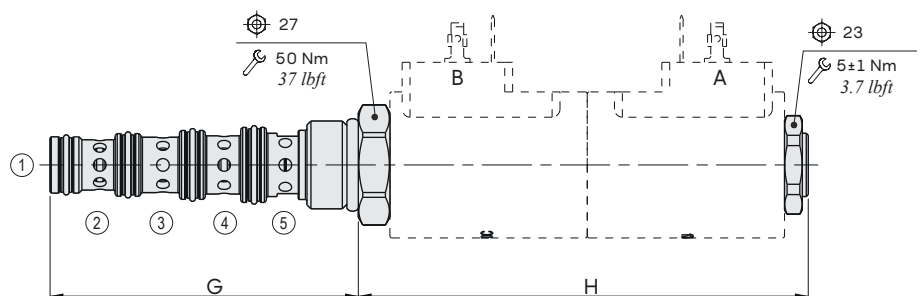
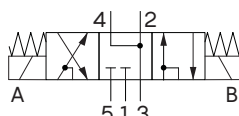
Spool 22



Spool 41



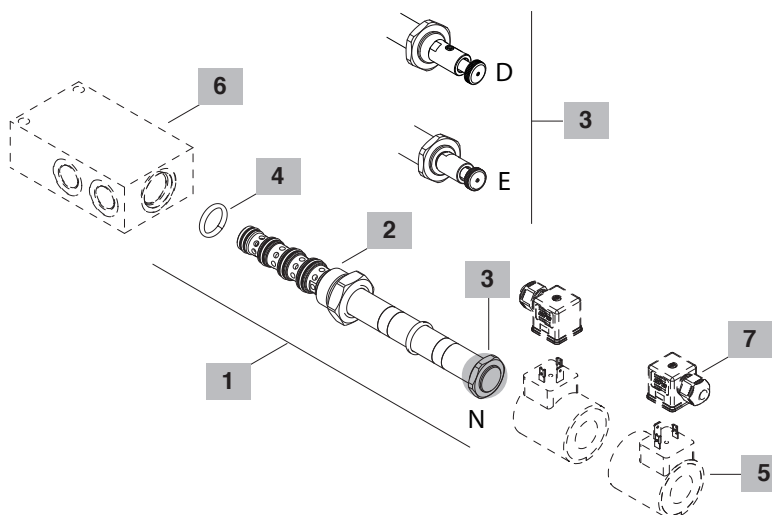
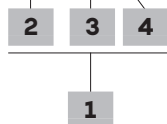
Spool 42



Valve type	A		N without emergency		B D push type with detent		E with pull/ push button	
	mm	in	mm	in	mm	in	mm	in
EK10L	78.1	3.07	114	4.49	142	5.59	142	5.59

Ordering codes and description composition

EK10L/22 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/5		
EK10L/210NB	OEK10002003	Without emergency, spool 21
EK10L/220NB	OEK10002000	Without emergency, spool 22
EK10L/410NB	OEK10002001	Without emergency, spool 41
EK10L/420NB	OEK10002004	Without emergency, spool 42

2 Spool

TYPE	DESCRIPTION
21	Spool 21
22	Spool 22
41	Spool 41
42	Spool 42

3 Emergency

TYPE	DESCRIPTION
N	Without emergency
D	Push/pull type with detent
E	Push/pull type without detent

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BC12VDC	4SL8000120	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/5-SAE6	3CC1050J11	Aluminium body for cavity 10 valve, SAE6 std thread

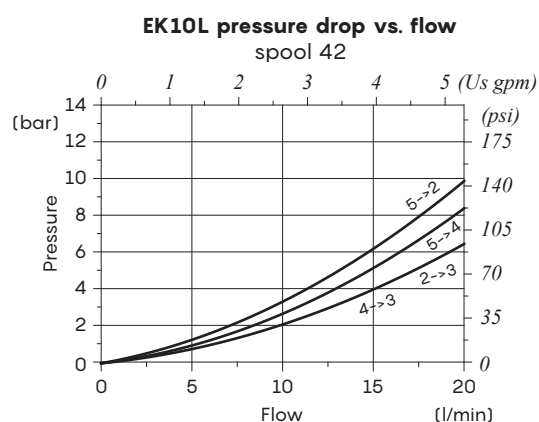
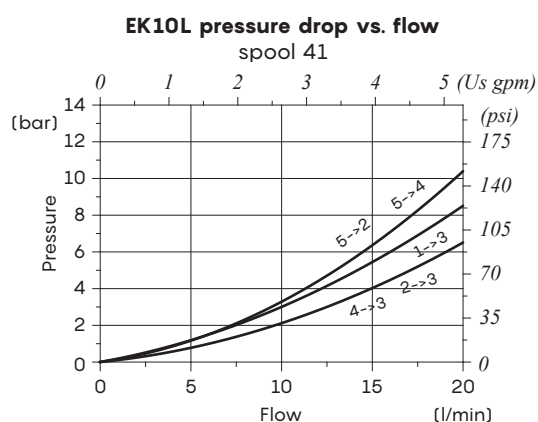
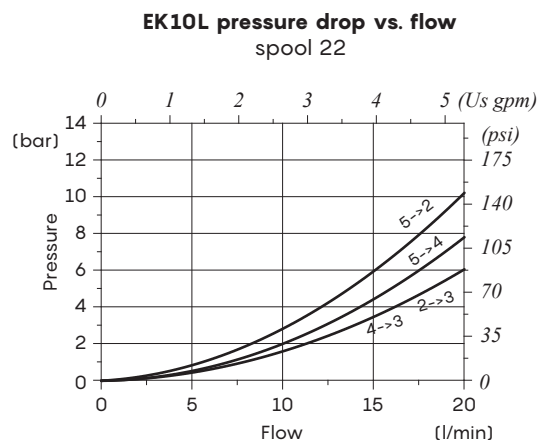
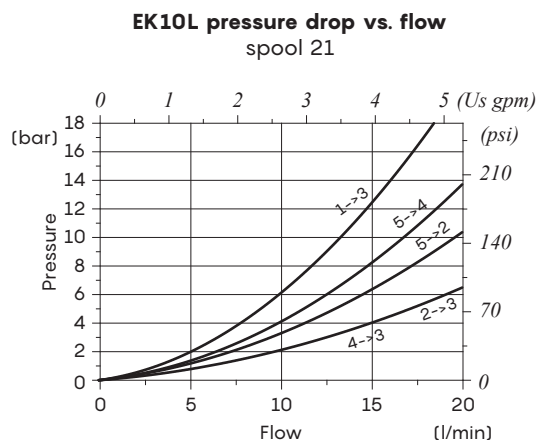
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 214

7 Connector

TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams





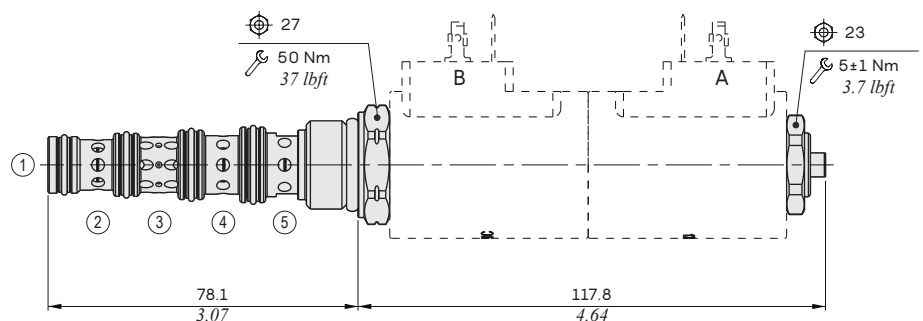
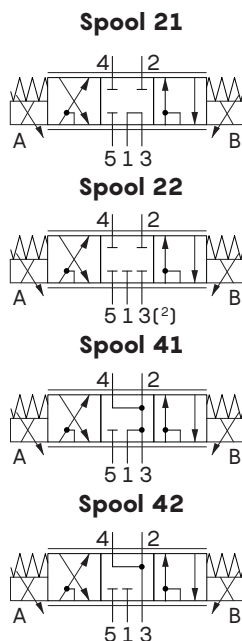
EK10X type directional solenoid valves – 5 way / 3 positions

- Spool type
- Direct acting with proportional solenoid
- Different types of emergencies available
- Optimized linearity and hysteresis
- External zinc-plated and corrosion-proof components

Technical specifications and diagrams are measured with mineral oil of 46 cSt viscosity at 40°C (104°F) temperature.

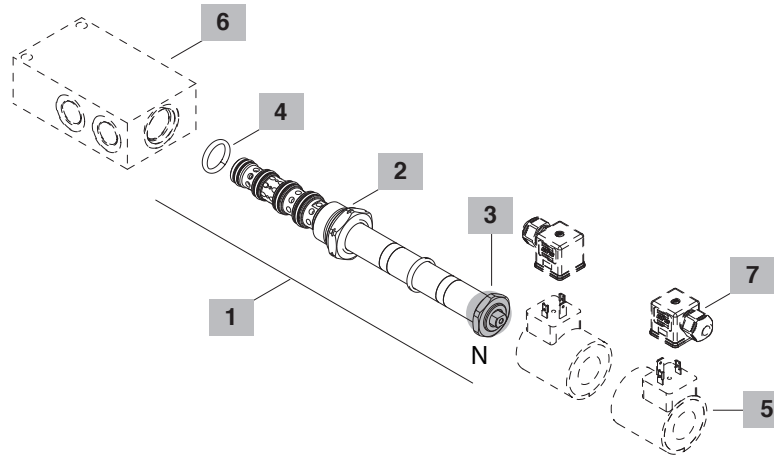
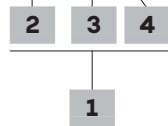
EK10X		
Nominal flow		23 l/min (6.1 US gpm)
Max. pressure		250 bar (3600 psi)
Oil leakage	at 210 bar (3050 psi)	200 cm ³ /min (12.2 in ³ /min)
Fluid	mineral based or synthetic hydraulic fluid with lubricating properties	
Viscosity		10-200 cSt
Max level of contamination		18/16/13 ISO4406
Fluid temperature	with NBR seals+Polyurethane with FPM seals	from -25°C (-13°F) to 90°C (194°F) from -20°C (-4°F) to 110°C (230°F)
Environmental temp. for working conditions		from -20°C (-4°F) to 60°C (140°F)
Cavity		SAE 10/5
Coil type*		BC
Nominal voltages		12VDC - 24 VDC ± 10%
Power rating		26 W (12VDC - 24VDC)
Weight		0.736 kg (1.62 lb)

NOTE - For different conditions, please contact Walvoil Sales Dpt. - *For coils further features see from page 201.



Ordering codes and description composition

EK10X/21 0 N B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/5		
EK10X/210NB	OEK10002017	Without emergency, spool 21
EK10X/220NB	OEK10002015	Without emergency, spool 22
EK10X/410NB	OEK10002014	Without emergency, spool 41
EK10X/420NB	OEK10002002	Without emergency, spool 42

2 Spool

TYPE	DESCRIPTION
21	Spool 21
22	Spool 22
41	Spool 41
42	Spool 42

3 Emergency

TYPE	DESCRIPTION
N	Without emergency

4 Seals

TYPE	DESCRIPTION
B	NBR (Buna)+Polyurethane o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Coils

TYPE	CODE	DESCRIPTION
BC12VDC	4SL8000120	12VDC-ISO4400 coil

For complete coils list see page 201

6 Valve body

TYPE	CODE	DESCRIPTION
SAE10/5-SAE6	3CC1050J11	Aluminium body for cavity 10 valve, SAE6 std thread

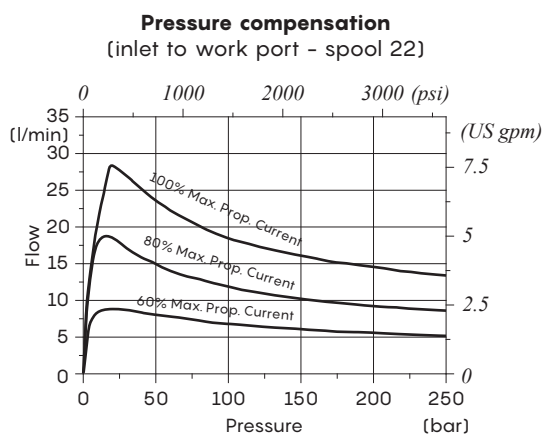
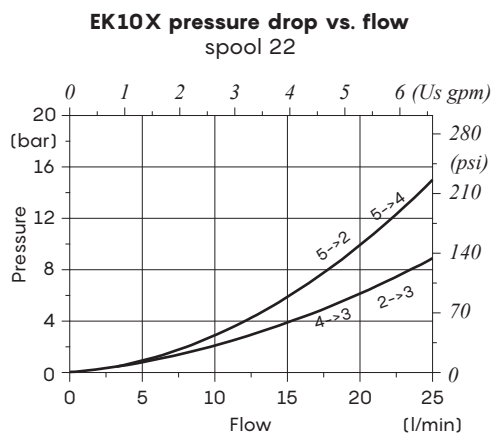
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 214

7 Connector

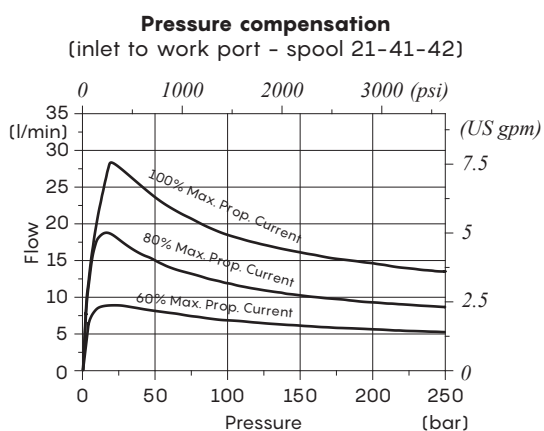
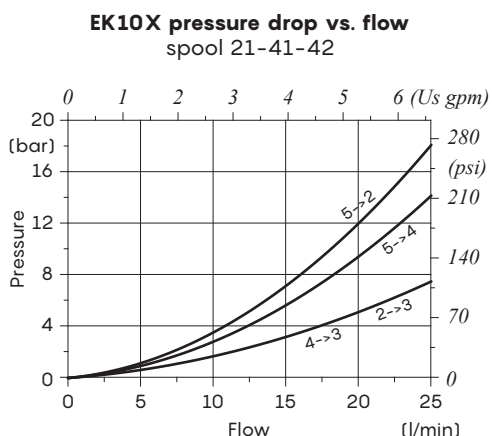
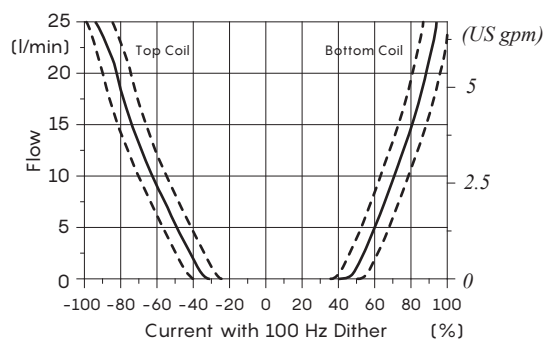
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

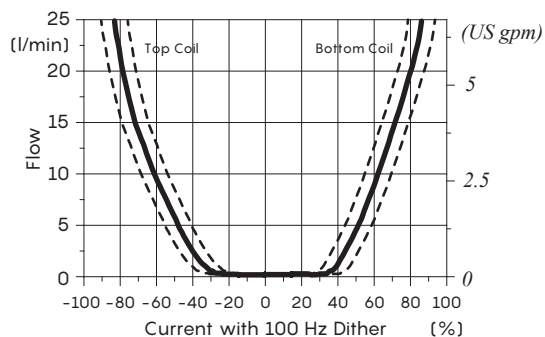
Rating diagrams



Flow vs. current
(with 10.5 bar/152 psi inline compensator- spool 22)



Flow vs. current
(with 10.5 bar/152 psi inline compensator- spool 21-41-42)



Types and ordering codes

Valve type	Coil	Voltage	Connector					
			ISO 4400	Deutsch DT	AMP JPT	Packard Weather-pack	Packard Metri-pack	Flying leads
Directional solenoid valves								
EJ08 G	BT	10 VDC	4SL3000100	-	-	-	-	-
		12 VDC	4SL3000120 4SL3000126 ⁽⁴⁾	4SL3000130 ⁽⁶⁾ 4SL3000134 ⁽³⁻⁶⁾ 4SL3000128 ⁽²⁾	4SL3000122 ⁽⁵⁾ 4SL3001200 ⁽³⁻⁵⁾	4SL3000124 ⁽²⁾	4SL3000127 ⁽²⁾	4SL300012C
		24 VDC	4SL3000240 4SL3030240 ⁽¹⁾	4SL3000249 ⁽⁶⁾ 4SL300024C ⁽³⁻⁶⁾	4SL3000248 ⁽⁵⁾	-	-	4SL3000246
		26 VDC	4SL3000260	-	-	-	-	-
		48 VDC	4SL3000480 4SL3030480 ⁽¹⁾	-	-	-	-	-
		110 VDC	4SL3001100 4SL3031100 ⁽¹⁾	-	-	-	-	-
		220 VDC	4SL3002200 4SL3032200 ⁽¹⁾	-	-	-	-	-
EC..T EW10M ER12M RD08TX EJ12M	BH	12 VDC	4SLD001200A	4SLD001201A ⁽⁶⁾	4SLD001207A ⁽⁶⁾	-	-	4SLD001203A
		24 VDC	4SLD002400A	4SLD002401A ⁽⁶⁾	4SLD002407A ⁽⁶⁾	-	-	4SLD002403A
		10 VDC	4SLE001000A	-	-	-	-	-
EE08 A EB08M EC..M EF..M EH..M EW08M EJ08MF EJ08M EL08B ER08L ET08L ET08X	BER	12 VDC	4SLE001200A 4SLE001217A ⁽³⁾	4SLE001201A ⁽⁵⁾ 4SLE001209A ⁽³⁻⁵⁾ 4SLE001202A ⁽⁶⁾ 4SLE001216A ⁽³⁻⁶⁾ 4SLE001206A ⁽²⁾	4SLE001203A ⁽⁵⁾ 4SLE001211A ⁽³⁻⁵⁾	4SLE001210A ⁽²⁾	4SLE001214 ⁽²⁾	4SLE001207A
		24 VDC	4SLE002400A 4SLE002408A ⁽³⁾ 4SLE302400A ⁽¹⁾	4SLE002401A ⁽⁵⁾ 4SLE002407A ⁽³⁻⁵⁾ 4SLE002402A ⁽⁶⁾	4SLE002403A ⁽⁵⁾	-	-	4SLE002404A
		48 VDC	4SLE004800A 4SLE304800A ⁽¹⁾	-	-	-	-	-
		110 VDC	4SLE011000A 4SLE311000A ⁽¹⁾	-	-	-	-	-
		220 VDC	4SLE022000A 4SLE322000A ⁽¹⁾	-	-	-	-	-
		10.5 VDC	4SL6000100	-	-	-	-	-
		12 VDC	4SL6000121	-	-	-	-	-
EE10A	BIN19	24 VDC	4SL6000240	-	-	-	-	-
		12 VDC	4SL6000128	-	-	-	-	-
EE12 A	BIN22	24 VDC	4SL6000245	-	-	-	-	-
		10.5 VDC	4SL8000110	-	-	-	-	-
EJ10M ER10L ET10L ET10X EK10L EK10X	BC	12 VDC	4SL8000120	4SL8000128A ⁽⁶⁾ 4SL8001201A ⁽⁶⁻³⁾	4SL8000127 ⁽⁵⁾ 4SL8000130 ⁽⁵⁻³⁾	-	-	4SL800012A
		24 VDC	4SL8000240 4SL8030240 ⁽¹⁾	4SL8000243 ⁽⁶⁾	4SL8000241 ⁽⁵⁾	-	-	4SL8000242
		26 VDC	4SL8000260	-	-	-	-	-
		48 VDC	4SL8030480 ⁽¹⁾	-	-	-	-	-
		110 VDC	4SL8031100 ⁽¹⁾	-	-	-	-	-
		220 VDC	4SL8032200A ⁽¹⁾	-	-	-	-	-
		12 VDC	4SL8000121	4SL8000128 ⁽⁵⁾	-	-	4SL8000124 ⁽²⁾	4SL8000125
EL10C	BQ16	24 VDC	4SL8002400	4SL8000245 ⁽⁵⁾	-	-	-	

Types and ordering codes

Valve type	Coil	Voltage	Connector					
			ISO4400	Deutsch DT	AMP JPT	Packard Weather-pack	Packard Metri-pack	Flying leads
Pressure relief valves – Pressure reducing valves – Flow control pressure compensated valves								
MC10T MC10X MP..T MP..X PP..X PU..X RP..X EE.X	BQP19	12 VDC	4SL5000126A	4SL5000125A ⁽⁶⁾	4SL5000129A ⁽⁵⁾	-	-	-
		24 VDC	4SL5000245A	4SL5000244A ⁽⁶⁾	4SL5000248 ^(A5)	-	-	-
	BH	12 VDC	4SLD001200A	4SLD001201A ⁽⁶⁾	4SLD001207A ⁽⁶⁾	-	-	4SLD001203A
		24 VDC	4SLD002400A	4SLD002401A ⁽⁶⁾	4SLD002407A ⁽⁶⁾	-	-	4SLD002403A
Mating connectors (For connector with rectifier see following table)			4CN1009995B	5CON140031	5CON003	5CON001	5CON017	-

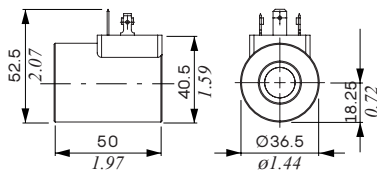
Notes: ⁽¹⁾ supply with AC and use only with rectifier connector – ⁽²⁾ with flying leads – ⁽³⁾ with bidirectional diode – ⁽⁴⁾ with unidirectional diode
⁽⁵⁾ integrated perpendicular type – ⁽⁶⁾ integrated parallel type

Voltage	ISO 4400 mating connector with rectifier			
	BT type coil	BE type coil	BER type coil	BC type coil
24 VDC	4CN3010240	4CN1010240	4CN1010240	4CN3010240
48 VDC	4CN3010480	4CN1010480	4CN1010480	4CN3010480
110 VDC	4CN3011100	4CN1011100	4CN1011100	4CN3011100
220 VDC	4CN3012200	4CN1012200	4CN1012200	4CN3012200

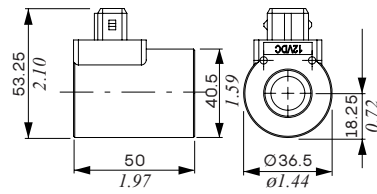
Dimensional data and features

BT type

ISO4400 connector



AMP JPT connector



Features

Nominal voltage tolerance : $\pm 10\%$

Power rating..... : 19 W - 10 VDC
 : 21 W - 12/24/26 VDC
 : 20.3 W - 48 VDC
 : 17.3 W - 110 VDC
 : 17.7 W - 220 VDC
 : 19.9 W - 24 RAC
 : 20.7 W - 48 RAC
 : 20 W - 110 / 220 RAC

Max. operating current : 1.9 A - 10 VDC

: 1.77 A - 12 VDC
 : 0.89 A - 24VDC
 : 0.84 A - 26 VDC
 : 0.43 A - 48 VDC
 : 0.16 A - 110 VDC
 : 0.08 A - 220 VDC
 : 0.93 A - 24 RAC
 : 0.47 A - 48 RAC
 : 0.18 A - 110 RAC
 : 0.09 A - 220 RAC

Coil insulation..... : Class F (155°C - 311°F)

Weather protection..... : IP65 - ISO4400

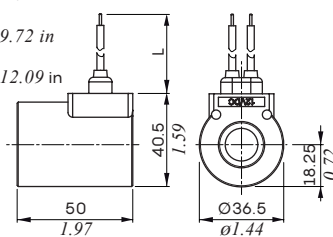
: IP69K - Deutsch DT
 : IP65 - AMP JPT
 : IP67 - Weatherpack
 : IP67 - Metri-pack

Insertion..... : 100%

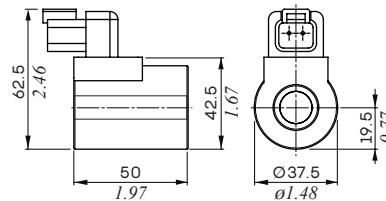
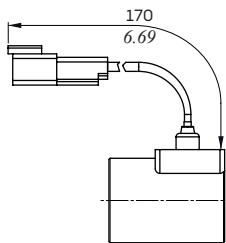
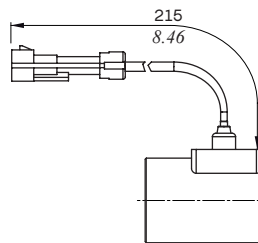
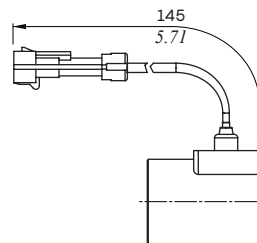
Dimension L:

12 VDC =
 247 mm / 9.72 in
 24 VDC =
 307 mm / 12.09 in

Flying leads

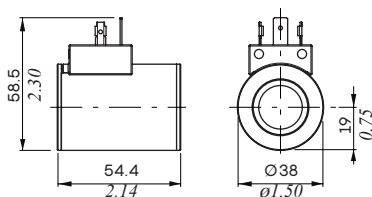


DEUTSCH DT04 connector

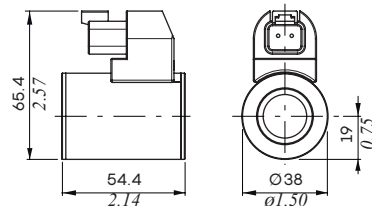
Flying leads with
DEUTSCH DT04
connectorFlying leads with
PACKARD WEATHER-PACK
connectorFlying leads with
PACKARD METRI-PACK
connector

BH type

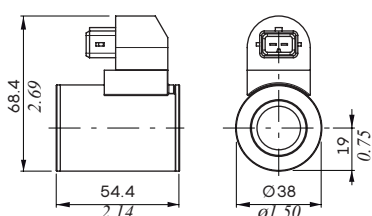
ISO4400 connector



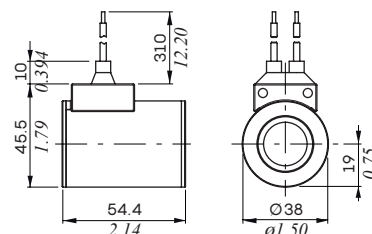
DEUTSCH DT04 connector



AMP JPT connector



Flying leads



Features

Nominal voltage tolerance : $\pm 10\%$

Power rating..... : 33 W - 12/24 VDC

Max. oper. current (on/off) : 2.75 A - 12 VDC
 : 1.38 A - 24 VDC

Max. prop. control current : 1.7 A - 12 VDC
 : 0.85 A - 24 VDC

Coil insulation..... : Class H
 (180°C - 356°F)

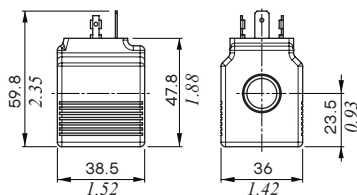
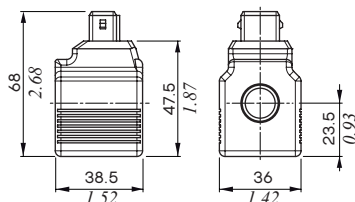
Weather protection..... : IP65 - ISO4400
 : IP69K - Deutsch DT
 : IP65 - AMP JPT

Insertion..... : 100%

Dimensional data and features

BER type

ISO4400 connector

DEUTSCH DT04 connector
(perpendicular type)

Features

Nominal voltage tolerance : $\pm 10\%$

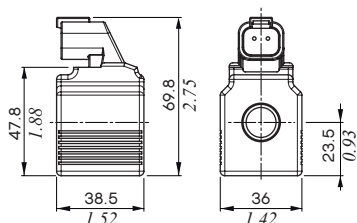
Power rating..... : 19 W - 10/12/24/48/
110/220 VDC
: 19 W - 24/110/220 RAC
: 19 W - 48 RAC

Max. operating current ... : 1.9 A - 10 VDC
: 1.61 A - 12 VDC
: 0.80 A - 24 VDC
: 0.40 A - 48 VDC
: 0.17 A - 110 VDC
: 0.09 A - 220 VDC
: 0.89 A - 24 RAC
: 0.45 A - 48 RAC
: 0.19 A - 110 RAC
: 0.09 A - 220 RAC

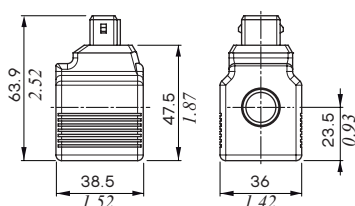
Coil insulation..... : Class H (180°C - 356°F)

Weather protection..... : IP65 - ISO4400
: IP69K - Deutsch DT
: IP65 - AMP JPT
: IP67 - Weatherpack
: IP67 - Metri-pack

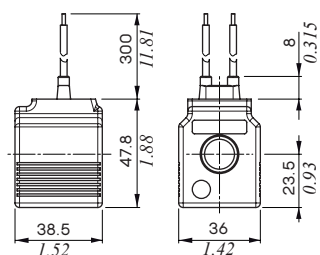
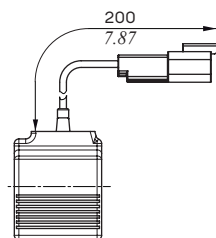
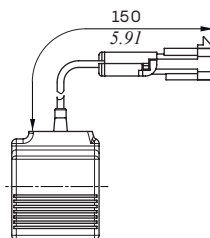
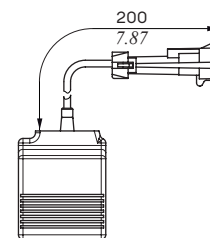
Insertion..... : 100%

DEUTSCH DT04 connector
(parallel type)

AMP JPT connector

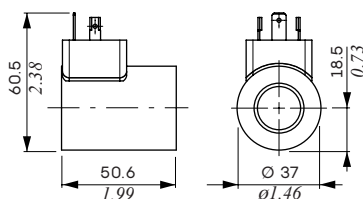


With flying leads

Flying leads with
DEUTSCH DT04 connectorFlying leads with
PACKARD WEATHER-PACK
connectorFlying leads with
PACKARD METRI-PACK
connector

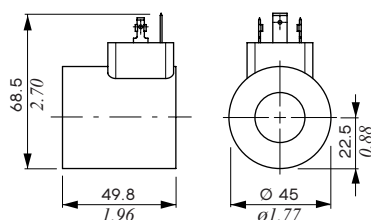
BIN19 type

ISO4400 connector



BIN22 type

ISO4400 connector



Features

Nominal voltage tolerance : $\pm 10\%$

Coil insulation..... : Class F (155°C - 311°F)

Weather protection..... : IP65 - ISO4400

Insertion..... : 100%

BIN19

Power rating..... : 26 W - 10.5 VDC
: 29 W - 12 VDC
: 31 W - 24 VDC

Max. operating current ... : 2.48 A - 10.5 VDC
: 2.41 A - 12 VDC
: 1.29 A - 24 VDC

BIN22

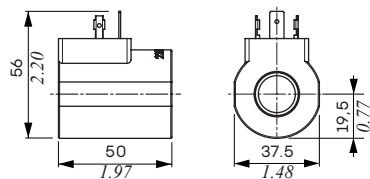
Power rating..... : 32.6 W - 12 VDC
: 31 W - 24 VDC

Max. operating current ... : 2.72 A - 12 VDC
: 1.29 A - 24 VDC

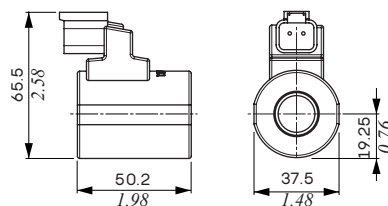
Dimensional data and features

BC type

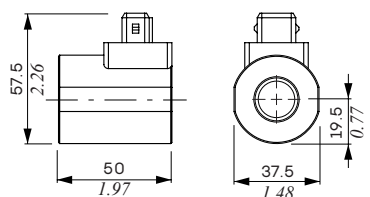
ISO4400 connector



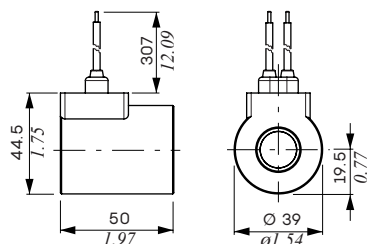
DEUTSCH DT04 connector



AMP JPT connector



Flying leads

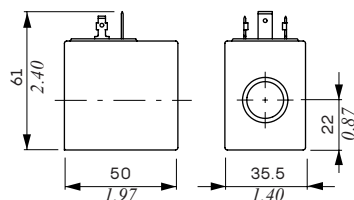


Features

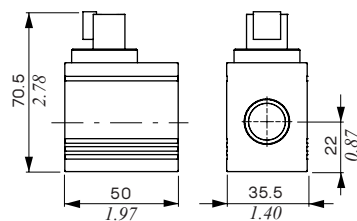
Nominal voltage tolerance	: ±10%
Power rating	: 26.9 W - 10.5 VDC
	: 26 W - 12 VDC
	: 26 W - 24 VDC
	: 24 W - 26 VDC
	: 26 W - 24/48/110/220 RAC
Max. operating current	: 2.6 A - 10.5 VDC
	: 2.19 A - 12 VDC
	: 1.08 A - 24 VDC
	: 0.92 A - 26 VDC
	: 1.2 A - 24 RAC
	: 0.6 A - 48 RAC
	: 0.3 A - 110 RAC
	: 0.15 A - 220 RAC
Coil insulation	: Class H (180°C - 356°F)
Weather protection	: IP65 - ISO4400
	: IP65 - AMP JPT
	: IP69K - Deutsch DT
Insertion	: 100%

BQ16 type

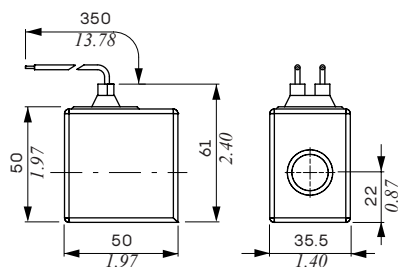
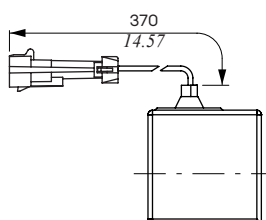
ISO4400 connector



DEUTSCH DT04 connector



Flying leads

Flying leads with
PACKARD METRI-PACK
connector

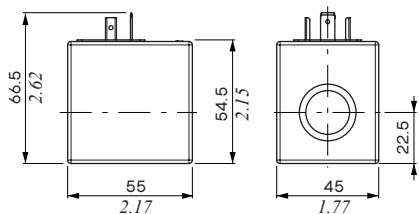
Features

Nominal voltage tolerance	: ±10%
Power rating	: 30 W - 12/24 VDC
Max. operating current	: 2.5 A - 12 VDC
	: 1.25 A - 24 VDC
Coil insulation	: Class H (180°C - 356°F)
Weather protection	: IP65 - ISO4400
	: IP69K - Deutsch DT
	: IP67 - Metri-pack
Insertion	: 100%

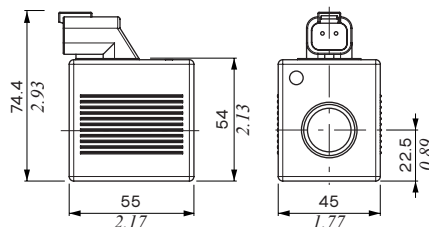
Dimensional data and features

BQP19 type

ISO4400 connector



DEUTSCH DT04 connector



Features

Nominal voltage tolerance : $\pm 10\%$

Power rating..... : 15 W - 12/24 VDC

Max. prop. control current : 1.25 A - 12 VDC

: 0.63 A - 24 VDC

Coil insulation..... : Class H (180°C - 356°F)

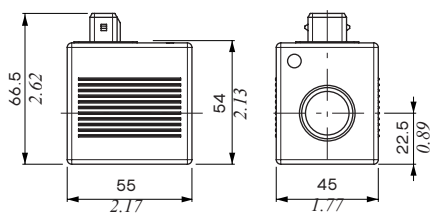
Weather protection..... : IP65 - ISO4400

: IP69K - Deutsch DT

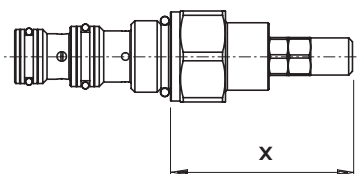
: IP65 - AMP JPT

Insertion..... : 100%

AMP JPT connector



Types and dimensions



Valve type	Cavity	Dimension "X"							
		M handknob		S (Y) screw		X Valve set with antitampering cap		W Copped adjustment	
		mm	in	mm	in	mm	in	mm	in
MC..MV	10/2	-	-	44.5	1.75	49.8	1.96	-	-
	08/2	-	-	46.6	1.83	54.9	2.16	-	-
MC..R	09/2	-	-	46.6	1.83	54.9	2.16	-	-
	10/2	-	-	44.4	1.75	52.7	2.07	-	-
MG..A	10/2	-	-	94.5	3.72	-	-	-	-
	12/2	-	-	126.5	4.98	-	-	-	-
MP..M	10/2	-	-	48.3	1.9	-	-	-	-
	12/2	-	-	46.9	1.85	-	-	-	-
	16/2	-	-	49.8	1.96	58.25	2.29	-	-
SW..A	10/2	-	-	52.5	2.07	-	-	-	-
	12/2	-	-	54.5	2.15	-	-	-	-
	16/2	-	-	58	2.28	-	-	-	-
SP..A	10/3	-	-	53	2.09	-	-	-	-
CC..A	10/3	-	-	51	2.01	-	-	51	2.01
	12/3	-	-	58.5	2.3	-	-	58.5	2.3
	16/3	-	-	69	2.72	-	-	69	2.72
NB..A	08/2	55.5	2.18	49.5	1.95	-	-	-	-
	10/2	47.5	1.87	46.5	1.83	-	-	-	-
	12/2	53.4	2.10	46.3	1.82	-	-	-	-
	16/2	71.6	2.82	60.9	2.40	-	-	-	-
NU..A	08/2	70.7	2.78	64.5	2.54	-	-	-	-
	10/2	70	2.75	65	2.56	-	-	-	-
	12/2	71.2	2.80	66	2.60	-	-	-	-
	16/2	72.9	2.87	66	2.60	-	-	-	-
NT..A	08/2	70.7	2.78	64.5	2.54	-	-	-	-
	10/2	70	2.76	65	2.56	-	-	-	-
	12/2	71.2	2.80	66	2.60	-	-	-	-
	16/2	72.9	2.87	66	2.60	-	-	-	-
PW..A	08/2	67.6	2.66	62	2.44	-	-	-	-
	10/2	72.5	2.85	69	2.72	-	-	-	-
	12/2	69.2	2.72	61.5	2.42	-	-	-	-
	16/2	102	4.02	96	3.78	-	-	-	-
PU..A	08/2	48	1.89	46	1.81	-	-	-	-
	10/2	44	1.73	42	1.65	-	-	-	-
	12/2	48	1.89	42	1.65	-	-	-	-
	16/2	53.5	2.11	51	2.01	-	-	-	-
PP..A	08/2	54.1	2.13	48	1.89	-	-	-	-
	10/2	47.2	1.86	42	1.65	-	-	-	-
	12/2	47.5	1.87	43	1.69	-	-	-	-
	16/2	51.5	2.03	51	2.01	-	-	-	-

Dimensional and ordering codes

Description composition

3/CC/-□□/20/□-□-1

Cavity

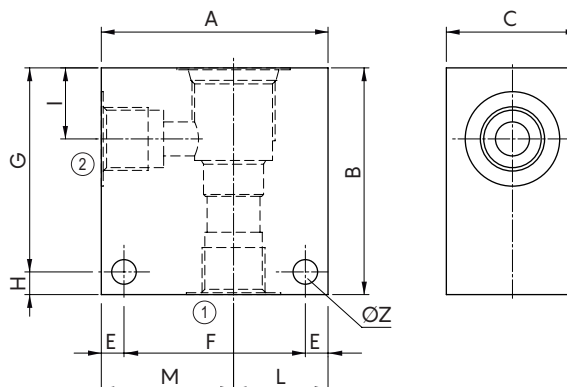
08
09
10
12
16

Ports

B) G 1/4
C) G 3/8
D) G 1/2
E) G 3/4
F) G 1
J) SAE6
K) SAE8
L) SAE10
M) SAE12
N) SAE16

Materials

1) Aluminium
2) Steel



Material	Max. pressure	
	bar	psi
Aluminium	210	3050
Steel	350	5100

Cavity	Ports	Dimensions												Ordering code	
		A	B	C	E	F	G	H	I	L	M	ØZ	Aluminium	Steel	
SAE 08/2	G 1/4	mm	50	50	30	6	38	44	6	14.8	20	30	6.5	3CC0820B11	3CC0820B21
		in	1.97	1.97	1.18	0.24	1.50	1.73	0.24	0.58	0.79	1.18	0.26		
	G 3/8	mm	50	50	30	6	38	44	6	14.8	20	30	6.5	3CC0820C11	3CC0820C21
		in	1.97	1.97	1.18	0.24	1.50	1.73	0.24	0.58	0.79	1.18	0.26		
	G 1/2	mm	60	60	35	6	48	54	6	18	25	35	6.5	3CC0820D11	/
		in	2.36	2.36	1.38	0.24	1.89	2.16	0.24	0.71	0.98	1.38	0.26		
	SAE6	mm	50	50	30	6	38	44	6	14.8	20	30	6.5	3CC0820J11	3CC0820J21
		in	1.97	1.97	1.18	0.24	1.50	1.73	0.24	0.58	0.79	1.18	0.25		
	SAE8	mm	60	60	30	6	48	54	6	14	25	35	6.5	3CC0820K11	3CC0820K21
		in	2.36	2.36	1.18	0.24	1.89	2.12	0.24	0.55	0.98	1.38	0.26		
SAE 09/2	G 3/8	mm	60	60	35	6	48	54	6	14	25	35	6.5	3CC0920C11	3CC0920C21
		in	2.36	2.36	1.38	0.24	1.89	2.12	0.24	0.55	0.98	1.38	0.26		
SAE 10/2	G 1/4	mm	60	60	35	6	48	54	6	18.8	25	35	6.5	3CC1020B11	3CC1020B21
		in	2.36	2.36	1.38	0.24	1.89	2.12	0.24	0.74	0.98	1.38	0.26		
	G 3/8	mm	60	60	35	6	48	54	6	18.8	25	35	6.5	3CC1020C11	3CC1020C21
		in	2.36	2.36	1.38	0.24	1.89	2.12	0.24	0.74	0.98	1.38	0.26		
	G 1/2	mm	60	60	35	6	48	54	6	18.8	25	35	6.5	3CC1020D11	3CC1020D21
		in	2.36	2.36	1.38	0.24	1.89	2.12	0.24	0.74	0.98	1.38	0.26		
	SAE6	mm	60	60	35	6	48	64	6	18.8	25	35	6.5	3CC1020J11	3CC1020J21
		in	2.36	2.36	1.38	0.24	1.89	2.52	0.24	0.74	0.98	1.38	0.26		
	SAE8	mm	70	70	35	6	58	64	6	18.5	35	35	6.5	3CC1020K11	3CC1020K21
		in	2.75	2.75	1.38	0.24	2.28	2.52	0.24	0.73	1.38	1.38	0.26		
	SAE10	mm	70	70	40	8	54	62	8	22	30	40	8.5	3CC1020L11	3CC1020L21
		in	2.75	2.75	1.57	0.31	2.12	2.44	0.31	0.87	1.18	1.57	0.33		

Dimensional and ordering codes

Cavity	Ports	Dimensions												Ordering code	
			A	B	C	E	F	G	H	I	L	M	ØZ	Aluminium	Steel
SAE 12/2	G 1/2	mm	70	80	40	8	54	72	8	25	30	40	8.5	3CC1220D11	3CC1220D21
		in	2.75	3.15	1.57	0.31	2.12	2.83	0.31	0.98	1.18	1.57	0.33		
	G 3/4	mm	70	90	40	8	54	82	8	25	30	40	8.5	3CC1220E11	3CC1220E21
		in	2.75	3.54	1.57	0.31	2.12	3.23	0.31	0.98	1.18	1.57	0.33		
	SAE10	mm	70	85	40	8	54	77	8	25	30	40	8.5	3CC1220L11	3CC1220L21
		in	2.75	3.35	1.57	0.31	2.12	3.03	0.31	0.98	1.18	1.57	0.33		
	SAE12	mm	70	85	40	8	54	77	8	25	30	40	8.5	3CC1220M11	3CC1220M21
		in	2.75	3.35	1.57	0.31	2.12	3.03	0.31	0.98	1.18	1.57	0.33		
SAE 16/2	G 1/2	mm	80	90	50	10	60	80	10	25	35	45	10.5	3CC1620D11	3CC1620D21
		in	3.15	3.54	1.97	0.39	2.36	3.15	0.39	0.98	1.38	1.77	0.41		
	G 3/4	mm	80	90	50	10	60	80	10	25	35	45	10.5	3CC1620E11	3CC1620E21
		in	3.15	3.54	1.97	0.39	2.36	3.15	0.39	0.98	1.38	1.77	0.41		
	G 1	mm	85	100	60	10	65	90	10	23.5	40	45	10.5	3CC1620F11	3CC1620F210
		in	3.35	3.94	2.36	0.39	2.56	3.54	0.39	0.92	1.57	1.77	0.41		
	SAE12	mm	80	90	50	10	60	80	10	25	35	45	10.5	3CC1620M11	3CC1620M21
		in	3.15	3.54	1.97	0.39	2.36	3.15	0.39	0.98	1.38	1.77	0.41		
	SAE16	mm	80	100	50	10	60	90	10	25	35	45	10.5	3CC1620N11	3CC1620N21
		in	3.15	3.94	1.97	0.39	2.36	3.54	0.39	0.98	1.38	1.77	0.41		

Dimensional and ordering codes

Description composition

3/CC/-□□/30/□□-□-1

Cavity

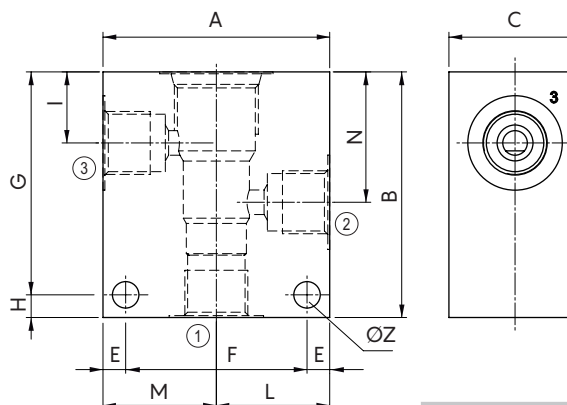
08
10
10Q
12
16
16Q

Ports

B) G 1/4
C) G 3/8
D) G 1/2
E) G 3/4
F) G 1
J) SAE6
K) SAE8
L) SAE10
M) SAE12
N) SAE16

Materials

1) Aluminium
2) Steel



Material	Max. pressure	
	bar	psi
Aluminium	210	3050
Steel	350	5100

Cavity	Ports	Dimensions													Ordering code	
		A	B	C	E	F	G	H	I	L	M	N	OZ	Aluminium	Steel	
SAE 08/3	G 1/4	mm	60	60	30	7	46	48	12	14.8	30	30	29.1	6.5	3CC0830B11	3CC0830B21
		in	2.36	2.36	1.18	0.27	1.81	1.89	0.47	0.58	1.18	1.18	1.14	0.25		
	G 3/8	mm	60	60	30	7	46	48	12	14.5	30	30	29.1	6.5	3CC0830C11	3CC0830C21
		in	2.36	2.36	1.18	0.27	1.81	1.89	0.47	0.57	1.18	1.18	1.14	0.25		
	G 1/2	mm	70	65	35	7	56	53	12	14.5	35	35	29.1	6.5	3CC0830D11	/
		in	2.75	2.56	1.38	0.27	2.20	2.09	0.47	0.57	1.38	1.38	1.14	0.25		
	SAE6	mm	60	60	30	7	46	48	12	14.5	30	30	29.1	6.5	3CC0830J11	3CC0830J21
		in	2.36	2.36	1.18	0.27	1.81	1.89	0.47	0.57	1.18	1.18	1.14	0.25		
SAE8	mm	60	60	30	7	46	48	12	15	30	30	29	6.5	3CC0830K11	3CC0830K21	
	in	2.36	2.36	1.18	0.27	1.81	1.89	0.47	0.59	1.18	1.18	1.14	0.25			
SAE 08/3C	G 3/8	mm	60	50	30	7	46	40	10	14.5	30	30	22	6.5	3CC0833C11	/
		in	2.36	1.97	1.18	0.27	1.81	1.57	0.39	0.57	1.18	1.18	0.87	0.25		
SAE 10/3	G 1/4	mm	60	65	35	6	48	59	6	18	30	30	34.5	7	3CC1030B11	3CC1030B21
		in	2.36	2.56	1.38	0.24	1.89	2.32	0.24	0.70	1.18	1.18	1.36	0.27		
	G 3/8	mm	60	65	35	6	48	59	6	18.8	30	30	34.5	7	3CC1030C11	3CC1030C21
		in	2.36	2.56	1.38	0.24	1.89	2.32	0.24	0.74	1.18	1.18	1.36	0.27		
	G 1/2	mm	65	70	35	6	53	64	6	18.8	32.5	32.5	34.5	7	3CC1030D11	3CC1030D21
		in	2.56	2.75	1.38	0.24	2.09	2.52	0.24	0.74	1.28	1.28	1.36	0.27		
	SAE6	mm	65	70	35	6	53	64	6	18.8	32.5	32.5	34.5	7	3CC1030J11	3CC1030J21
		in	2.56	2.75	1.38	0.24	2.09	2.52	0.24	0.74	1.28	1.28	1.36	0.27		
	SAE8	mm	65	70	35	6	53	64	6	18.8	32.5	32.5	34.5	7	3CC1030K11	3CC1030K21
		in	2.56	2.75	1.38	0.24	2.09	2.52	0.24	0.74	1.28	1.28	1.36	0.27		
SAE10	mm	65	70	35	6	53	64	6	18	31.5	33.5	34.5	7	3CC1030L11	3CC1030L21	
	in	2.56	2.75	1.38	0.24	2.09	2.52	0.24	0.70	1.24	1.32	1.36	0.27			

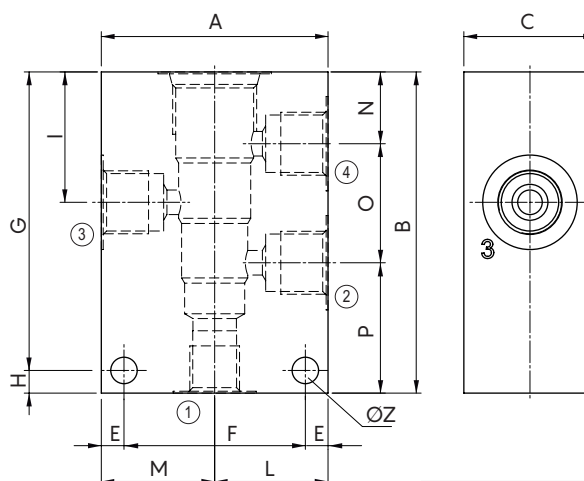
Dimensional and ordering codes

Cavity	Ports	Dimensions													Ordering code	
			A	B	C	E	F	G	H	I	L	M	N	ØZ	Aluminium	Steel
SAE 10/3Q	ports 1-2 = G 1/2 port 3 = G 1/4	mm	60	70	35	6	48	64	6	14.8	30	30	31.7	7	/	3CC1032D21
		in	2.36	2.75	1.38	0.24	1.89	2.52	0.24	0.58	1.18	1.18	1.25	0.27		
SAE 12/3	G 1/2	mm	70	100	40	8	54	92	8	25	35	35	53.5	8.5	3CC1230D11	3CC1230D21
		in	2.75	3.94	1.57	0.31	2.12	3.6	0.31	0.98	1.38	1.38	2.10	0.33		
	G 3/4	mm	90	100	50	10	70	90	10	25.1	45	45	53.5	10.5	3CC1230E11	3CC1230E21
		in	3.54	3.94	1.97	0.39	2.75	3.54	0.39	0.99	1.77	1.77	2.11	0.41		
	SAE10	mm	80	100	40	8	64	92	8	25	40	40	53.5	8.5	3CC1230L11	3CC1230L21
		in	3.15	3.94	1.57	0.31	2.52	3.6	0.31	0.98	1.57	1.57	2.11	0.33		
	SAE12	mm	80	100	45	8	64	92	8	25	40	40	53.5	8.5	3CC1230M11	3CC1230M21
		in	3.15	3.94	1.77	0.31	2.52	3.6	0.31	0.98	1.57	1.57	2.11	0.33		
	G 1/2	mm	90	100	50	10	70	90	10	25	45	45	53.5	10.5	3CC1630D11	3CC1630D21
		in	3.54	3.94	1.97	0.39	2.75	3.54	0.39	0.98	1.77	1.77	2.11	0.41		
	G 3/4	mm	90	100	50	10	70	90	10	25.1	45	45	53.5	10.5	3CC1630E11	3CC1630E21
		in	3.54	3.94	1.97	0.39	2.75	3.54	0.39	0.99	1.77	1.77	2.11	0.41		
SAE16/3	G 1	mm	90	105	50	10	70	95	10	25	46	44	53.5	10.5	3CC1630F11	3CC1630F21
		in	3.54	4.13	1.97	0.39	2.75	3.74	0.39	0.98	1.81	1.73	2.11	0.41		
	SAE12	mm	90	105	50	10	70	95	10	25.1	45	45	53.5	10.5	3CC1630M11	3CC1630M21
		in	3.54	4.13	1.97	0.39	2.75	3.74	0.39	0.99	1.77	1.77	2.11	0.41		
	SAE16	mm	90	105	50	10	70	95	10	25.1	45	45	53.5	10.5	3CC1630N11	3CC1630N21
		in	3.54	4.13	1.97	0.39	2.75	3.74	0.39	0.99	1.77	1.77	2.11	0.41		
SAE 16/3Q	ports 1-2 = G 3/4 port 3 = G 1/4	mm	80	85	50	10	60	75	10	17.2	40	40	38.1	10.5	/	3CC1632E21
		in	3.15	3.35	1.97	0.39	2.36	2.95	0.39	0.68	1.57	1.57	1.50	0.41		

Dimensional and ordering codes

Description composition

3/CC/-□□/40/□-□-1		
Cavity	Ports	Materials
08	B) G 1/4	1) Aluminium
10	C) G 3/8	2) Steel
12	D) G 1/2	
16	E) G 3/4	
	F) G 1	
	J) SAE6	
	K) SAE8	
	L) SAE10	
	M) SAE12	
	N) SAE16	



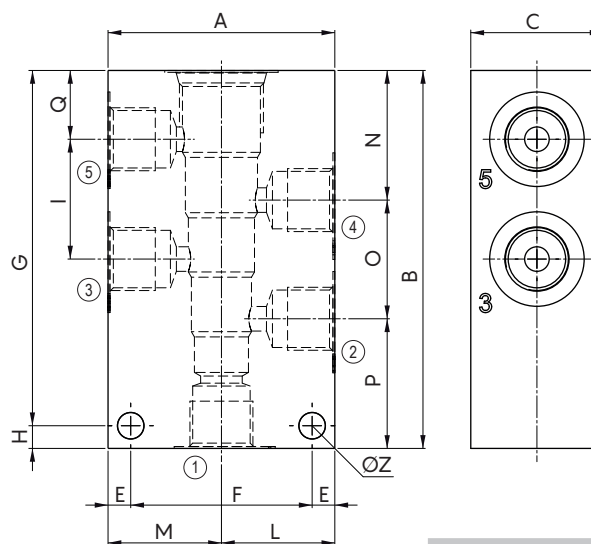
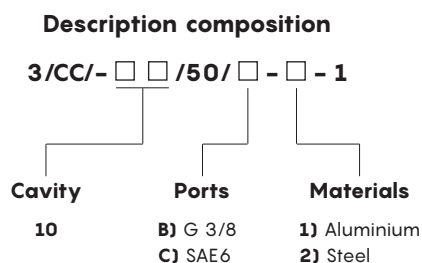
Material	Max. pressure	
	bar	psi
Aluminium	210	3050
Steel	350	5100

Cavity	Ports	Dimensions															Ordering code	
		A	B	C	E	F	G	H	I	L	M	N	O	P	ØZ	Aluminium	Steel	
SAE 08/4	G 1/4	mm	60	75	30	7	46	63	12	29.1	30	30	14.8	29.1	31.1	6.5	3CC0840B11	3CC0840B21
		in	2.36	2.95	1.18	0.27	1.81	2.48	0.47	1.14	1.18	1.18	0.58	1.14	1.22	0.25		
	G 3/8	mm	60	75	30	7	46	63	12	29.1	30	30	14.8	28.6	31.6	6.5	3CC0840C11	3CC0840C21
		in	2.36	2.95	1.18	0.27	1.81	2.48	0.47	1.14	1.18	1.18	0.58	1.13	1.24	0.25		
	SAE6	mm	60	75	30	7	46	63	12	29.1	30	30	14.8	29.1	31.1	6.5	3CC0840J11	3CC0840J21
		in	2.36	2.95	1.18	0.27	1.81	2.48	0.47	1.14	1.18	1.18	0.58	1.14	1.22	0.25		
	SAE8	mm	60	75	30	7	46	63	12	29	30	30	15	28.5	31.5	6.5	3CC0840K11	3CC0840K21
		in	2.36	2.95	1.18	0.27	1.81	2.48	0.47	1.14	1.18	1.18	0.59	1.12	1.24	0.25		
SAE 10/4	G 1/4	mm	60	85	35	6	48	79	6	34.5	30	30	19	31.5	34.5	7	3CC1040B11	3CC1040B21
		in	2.36	3.35	1.38	0.24	1.89	3.11	0.24	1.36	1.18	1.18	0.75	1.24	1.36	0.27		
	G 3/8	mm	60	85	35	6	48	79	6	34.5	30	30	18.8	31.7	34.5	7	3CC1040C11	3CC1040C21
		in	2.36	3.35	1.38	0.24	1.89	3.11	0.24	1.36	1.18	1.18	0.74	1.25	1.36	0.27		
	G 1/2	mm	70	85	35	6	58	79	6	34.5	35	35	18.8	31.7	34.5	7	3CC1040D11	3CC1040D21
		in	2.75	3.35	1.38	0.24	2.28	3.11	0.24	1.36	1.38	1.38	0.74	1.25	1.36	0.27		
	SAE6	mm	60	85	35	6	48	79	6	34.5	30	30	18.8	31.7	34.5	7	3CC1040J11	3CC1040J21
		in	2.36	3.35	1.38	0.24	1.89	3.11	0.24	1.36	1.18	1.18	0.74	1.25	1.36	0.27		
	SAE8	mm	70	85	35	6	58	79	6	34.5	35	35	18.8	31.7	34.5	7	3CC1040K11	3CC1040K21
		in	2.75	3.35	1.38	0.24	2.28	3.11	0.24	1.36	1.38	1.38	0.74	1.25	1.36	0.27		
	SAE10	mm	70	85	35	6	58	79	6	34.5	35	35	19	31.5	34.5	7	3CC1040L11	3CC1040L11
		in	2.75	3.35	1.38	0.24	2.28	3.11	0.24	1.36	1.38	1.38	0.75	1.24	1.36	0.27		

Dimensional and ordering codes

Cavity	Ports	Dimensions															Ordering code	
			A	B	C	E	F	G	H	I	L	M	N	O	P	ØZ	Aluminium	Steel
SAE 12/4	G 3/8	mm	80	115	40	8	64	107	8	44	40	40	22	44.5	48.5	8.5	3CC1240C11	3CC1240C21
		in	3.15	4.53	1.57	0.31	2.52	4.21	0.31	1.73	1.57	1.57	0.87	1.75	1.9	0.33		
	G 1/2	mm	80	115	40	8	64	107	8	44	40	40	22	44.5	48.5	8.5	3CC1240D11	3CC1240D21
		in	3.15	4.53	1.57	0.31	2.52	4.21	0.31	1.73	1.57	1.57	0.87	1.75	1.9	0.33		
	SAE10	mm	80	115	40	8	64	107	8	44	40	40	22	44.5	48.5	8.5	3CC1240L11	3CC1240L21
		in	3.15	4.53	1.57	0.31	2.52	4.21	0.31	1.73	1.57	1.57	0.87	1.75	1.9	0.33		
SAE 16/4	G 3/4	mm	100	130	50	10	80	120	10	53.5	50	50	25.1	56.9	48	10.5	3CC1640E11	3CC1640E21
		in	3.94	5.12	1.97	0.39	3.15	4.72	0.39	2.11	1.97	1.97	0.99	2.24	1.89	0.41		
	SAE16	mm	100	130	50	10	80	120	10	53.5	50	50	25.1	56.9	48	10.5	3CC1640N11	3CC1640N21
		in	3.94	5.12	1.97	0.39	3.15	4.72	0.39	2.11	1.97	1.97	0.99	2.24	1.89	0.41		

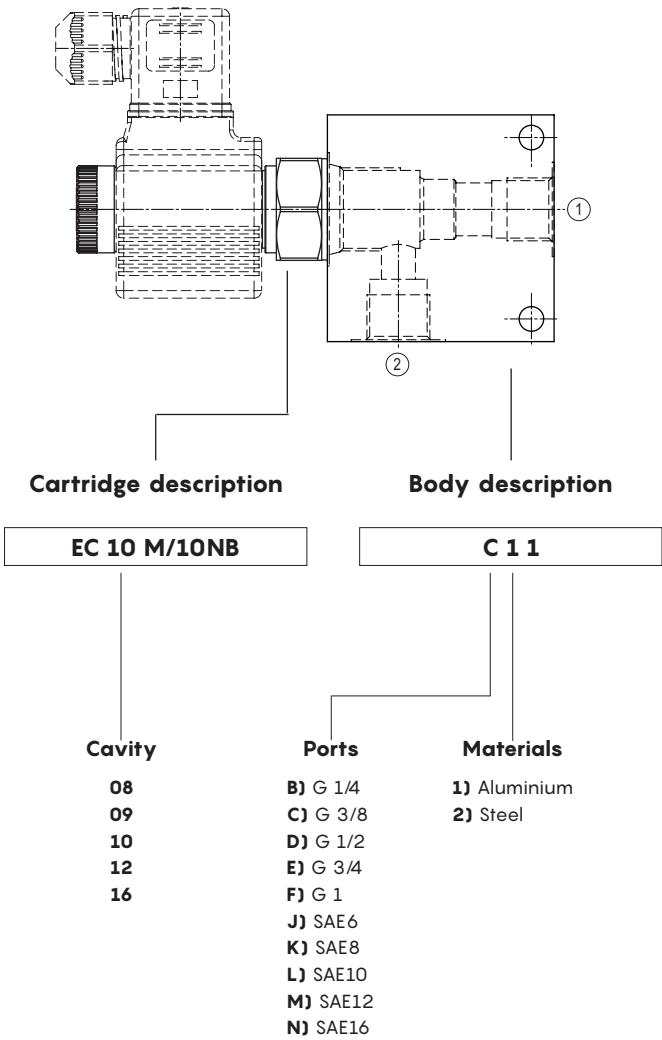
Dimensional and ordering codes



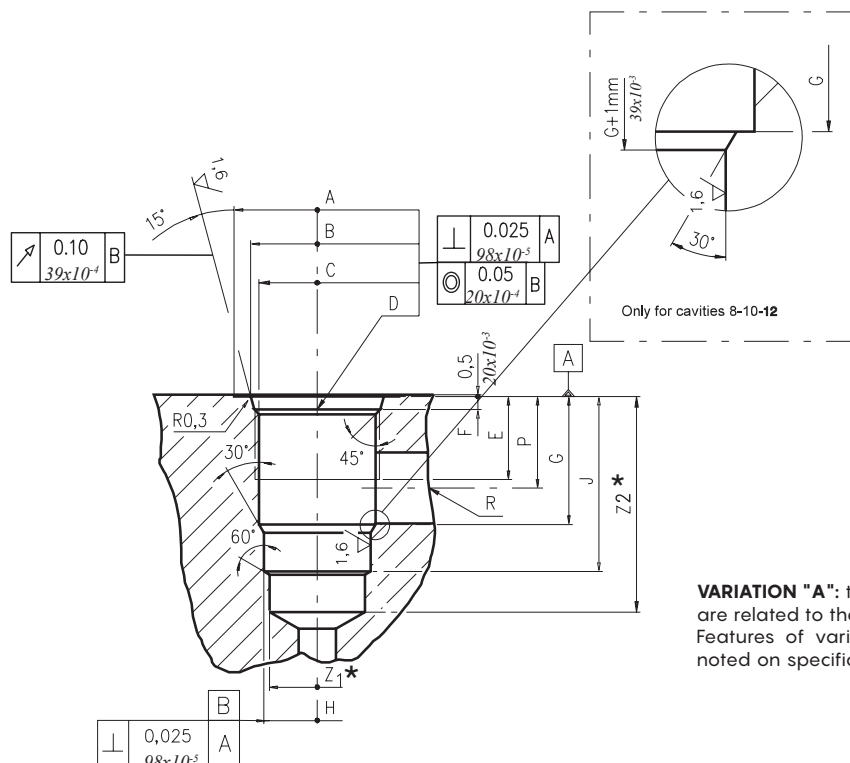
Material	Max. pressure	
	bar	psi
Aluminium	210	3050
Steel	350	5100

Cavity	Ports	Dimensions															Ordering code	
		A	B	C	E	F	G	H	I	L	M	N	O	P	Q	ØZ	Aluminium	Steel
SAE10/5	G 3/8	mm	60	100	35	6	48	94	6	31.7	30	34.3	31.4	34.3	18.2	7	3CC1050C11	3CC1050C21
		in	2.36	3.94	1.38	0.24	1.89	3.7	0.24	1.25	1.18	1.35	1.24	1.35	0.72	0.27		
	SAE6	mm	60	100	35	6	48	94	6	31.7	30	34.3	31.4	34.3	18.2	7	3CC1050J11	3CC1050J21
		in	2.36	3.94	1.38	0.24	1.89	3.7	0.24	1.25	1.18	1.35	1.24	1.35	0.72	0.27		

How to order valves with body



Dimensions



VARIATION "A": the dimension with "*" are related to the variation "A" of 2 way cavity. Features of variation "A" are required only if noted on specific product catalogue page.

Cavity		A	B ±0.05	C ±0.05	D	E	F	G	H ±0.02	J	K ±0.02	L	M ±0.02	N	P	R OMAX	S OMAX	T OMAX	U OMAX	V OMAX	X OMAX	Z1* OMIN	Z2* MIN
08/2	mm	27	20.66	17.42	3/4-16 UNF	12.5	2.5	18.2	12.72	29.5	-	-	-	-	14	8	-	-	-	-	-	12	39
08/2 A	in	1.06	0.81	0.68		0.49	0.10	0.72	0.50	1.16					0.55	0.31						0.47	1.53
09/2A	mm	27	20.66	17.42	3/4-16 UNF	13.5	2.5	18	15.9	29.5	-	-	-	-	14	8.5	-	-	-	-	-	14	35
	in	1.06	0.81	0.68		0.53	0.10	0.71	0.62	1.16					0.55	0.35						0.57	1.43
10/2	mm	30	24	20.62	7/8-14 UNF	16	2.8	24	15.9	33.5	-	-	-	-	18.3	11	-	-	-	-	-	14.5	40
10/2 A	in	1.18	0.94	0.81		0.63	0.11	0.94	0.62	1.32					0.72	0.43						0.57	1.57
12/2	mm	38	29.23	24.73	1 1/16-12 UNF	19	3.5	34.15	22.25	46.8	-	-	-	-	24.5	19	-	-	-	-	-	21.5	60
12/2 A	in	1.50	1.15	0.97		0.75	0.14	1.34	0.87	1.84					0.96	0.75						0.85	2.36
16/2	mm	45	35.6	31.34	1 5/16-12 UNF	22	3.50	34	28.62	47	-	-	-	-	24.5	19	-	-	-	-	-	25.5	70
16/2 A	in	1.77	1.40	1.23		0.87	0.14	1.34	1.13	1.85					0.96	0.75						1.00	2.75

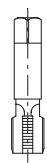
Rougher tool



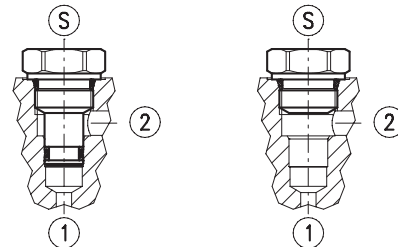
Finisher tool



Tap



Cavity plugs



Cavity	Ordering code
08/2	UDPF175030
08/2A	UDPF175030
09/2A	UDPF174230
10/2	UDPF20503F
10/2A	UDAS24003C
12/2	UDAS380031
12/2A	UDAS380031
16/2	UDPF313031
16/2A	UDPF313031

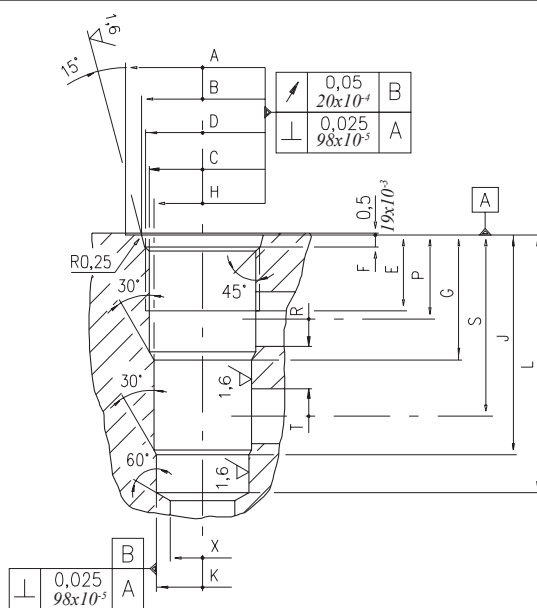
Cavity	Ordering code
08/2	UCAC127066
08/2A	UCAC127060
09/2A	UCAT159260
10/2	UCAC159080
10/2A	UCAC159080
12/2	UDAC222661
12/2A	UDAC222661
16/2	UDAC286261
16/2A	UDAC286261

Cavity	Ordering code
08/2	UCMS3/4161
08/2A	UCMS3/4161
09/2A	UCPL140020
10/2	UCMS7/8142
10/2A	UCMS7/8142
12/2	UCMS11/162
12/2A	UCMS11/162
16/2	UCMS15/160
16/2A	UCMS15/160

Cavity	Ordering code	①	②	③
08/2	3XTP3533700	X	X	X
08/2A	4TP5531500	0	0	X
09/2A	XTAP524340D	X	X	X
10/2	3XTP3544200	X	X	X
10/2A	3XTP1542300	0	0	X
12/2	3XTP3555400	X	X	X
12/2A	3XTP1552900	0	0	X
16/2	3XTP3575500	X	X	X
16/2A	3XTAP838200	0	0	X

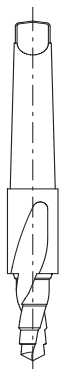
X=Close 0=Open

Dimensions



Cavity	A	B ±0.05	C ±0.05	D	E	F	G	H ±0.02	J	K ±0.02	L	M ±0.02	N	P	R oMAX	S	T oMAX	U	V oMAX	X oMAX
08/3	mm 27	20.66	17.42	3/4 -16 UNF	12.5	2.5	19.1	15.90	33.3	14.3	43.3	-	-	14.3	5.5	28.6	5.5	-	-	12.5
	in 1.06	0.81	0.68		0.49	0.10	0.75	0.62	1.31	0.56	1.70	-	-	0.56	0.22	1.12	0.22	-	-	0.49
08/3C	mm 27	20.66	17.42	3/4 -16 UNF	10	2.5	14.3	15.9	25.2	14.3	31.5	-	-	10.5	5	21.5	5	-	-	12.5
	in 1.06	0.81	0.68		0.39	0.10	0.56	0.62	1.31	0.56	1.70	-	-	0.41	0.20	0.85	0.20	-	-	0.49
10/3	mm 30	24	20.62	7/8 -14 UNF	16	2.8	23.1	17.5	39.6	15.9	47.6	-	-	18.3	6.5	34	6.5	-	-	14
	in 1.18	0.94	0.81		0.63	0.11	0.94	0.69	1.56	0.62	1.87	-	-	0.72	0.25	1.34	0.25	-	-	0.55
10/3Q	mm 30	24	20.62	7/8 -14 UNF	14.2	2.5	17.75	19.05	39.7	17.475	47.6	-	-	14.2	4.4	31.2	14	-	-	12.5
	in 1.18	0.94	0.81		0.56	0.10	0.7	0.75	1.56	0.69	1.87	-	-	0.56	0.17	1.23	0.55	-	-	0.49
12/3	mm 38	29.23	24.73	1 1/16 -12 UNF	19	3.56	36.6	23.82	63.5	22.25	75.4	-	-	24.5	16	53	16	-	-	19
	in 1.50	1.15	0.97		0.75	0.14	1.44	0.94	2.5	0.88	2.97	-	-	0.96	0.63	2.09	0.63	-	-	0.75
16/3	mm 45	35.6	28.62	1 5/16 -12 UNF	22	3.5	36.5	28.62	64.3	27.02	75.3	-	-	24.5	16	53	16	-	-	19
	in 1.77	1.40	1.13		0.87	0.14	1.44	1.13	2.53	1.06	2.96	-	-	0.96	0.63	2.09	0.63	-	-	0.75
16/3Q	mm 45	35.55	31.34	1 5/16 -12 UNF	17.5	3.5	22.1	28.6	47.6	25.425	56.85	-	-	16.5	6	37	15.5	-	-	19
	in 1.77	1.40	1.23		0.69	0.14	0.87	1.13	1.87	1	2.24	-	-	0.65	0.24	1.46	0.61	-	-	0.75
20/3	mm 58	43.6	36.55	1 5/8 -12 UNF	21	3.5	46	36.55	87.6	33.37	100	-	-	31	25.4	71.5	25.4	-	-	30
	in 2.28	1.71	1.44		0.83	0.14	1.81	1.04	3.45	1.31	3.93	-	-	1.22	1	2.81	1	-	-	1.18

Rougher tool



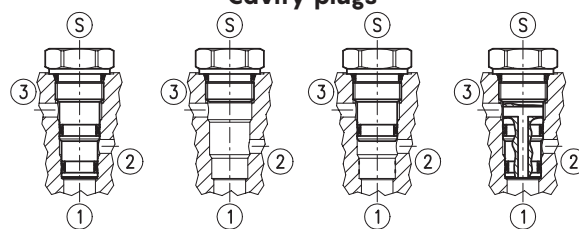
Finisher tool



Tap



Cavity plugs



Cavity	Ordering code
08/3	UDAS207021
08/3C	UDPF174021
10/3	UDPF205038
10/3Q	UDAS300031
12/3	UDAS380032
16/3	UDAS450032
16/3Q	UDAS450033
20/3	UT05X55380

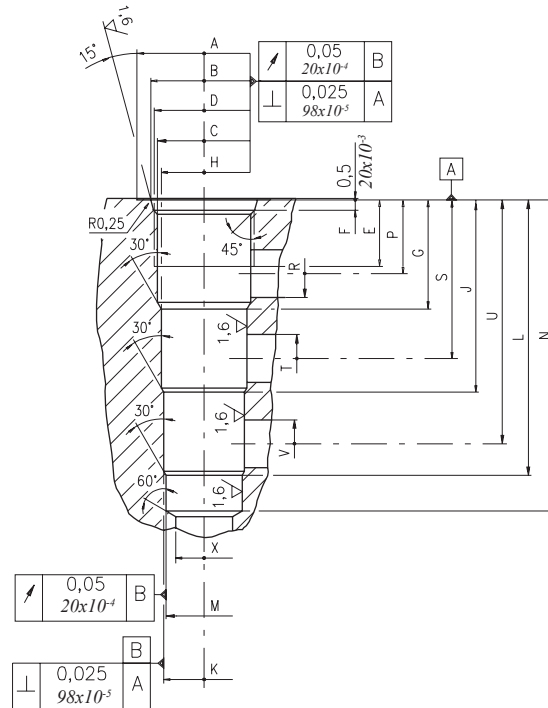
Cavity	Ordering code
08/3	UDAS159064
08/3C	UDAS159063
10/3	UDAC175080
10/3Q	UDAS190560
12/3	UDAS238060
16/3	UDAS286261
16/3Q	UDAS286060
20/3	UT05X55390

Cavity	Ordering code
08/3	UCMS34161
08/3C	UCMS34161
10/3	UCMS7/8142
10/3Q	UCMS7/8142
12/3	UCMS11/162
16/3	UCMS15/160
16/3Q	UCMS15/160
20/3	UCMS15/812

Cavity	Ordering code	①	②	③	④
08/3	XTAP324541	X	X	X	X
	3XTAP822150	0	0	0	X
	XTAP324400	0	0	X	X
08/3C	XTAP324540	0	X	0	X
	XTAP824370	X	X	X	X
	3XTAP822150	0	0	0	X
10/3	3XTP3545700	X	X	X	X
	3XTP1542300	0	0	0	X
	3XTP3545701	0	X	0	X
10/3Q	XTAP327350	0	0	X	X
	XTAP327573	X	X	X	X
	3XTP3558200	X	X	X	X
12/3	3XTP1552900	0	0	0	X
	3XTP3558201	0	X	0	X
	3XTP3578400	X	X	X	X
16/3	3XTAP838200	0	0	0	X
	XTAP341570	X	X	X	X
16/3Q	XTAP341570	X	X	X	X

X=Close 0=Open

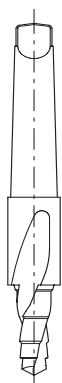
Dimensions



Cavity		A	B ±0.05	C ±0.05	D	E	F	G	H ±0.02	J	K ±0.02	L	M ±0.02	N	P	R oMAX	S	T oMAX	U	V oMAX	X oMAX
08/4	mm	28.00	20.66	17.42	3/4-16 UNF	12.5	2.5	19.1	15.9	33.3	14.3	47.6	12.72	57.6	14.3	5.5	28.6	5.5	42.9	5.5	11
	in	1.10	0.81	0.68		0.49	0.10	0.75	0.62	1.31	0.56	1.87	0.50	2.27	0.56	0.22	1.12	0.22	1.69	0.22	0.43
10/4	mm	30	24.00	20.62	7/8-14 UNF	16	2.8	23.6	19.08	39.6	17.5	55.4	15.9	63.5	18.3	6.5	34	6.5	50	6.5	14
	in	1.18	0.94	0.81		0.63	0.11	0.93	0.75	1.56	0.69	2.18	0.62	2.50	0.72	0.26	1.34	0.25	1.97	0.25	0.55
12/4	mm	38	29.23	24.73	1 1/16-12 UNF	19	3.56	29.5	23.82	51.5	22.25	73.6	20.65	83.33	21.5	11	43.5	11	66	11	19
	in	1.50	1.15	0.97		0.75	0.14	1.16	0.94	2.03	0.87	2.90	0.81	3.28	0.85	0.43	1.71	0.43	2.60	0.43	0.75
16/4	mm	45	35.60	31.34	1 5/16-12 UNF	22	3.5	36.5	28.62	64.3	27.02	92.07	25.45	104	24.6	16	53	16	81.5	16	19
	in	1.77	1.40	1.23		0.87	0.14	1.44	1.13	2.53	1.06	3.62	1.00	4.09	0.97	0.63	2.09	0.63	3.21	0.63	0.75

Cavity plugs

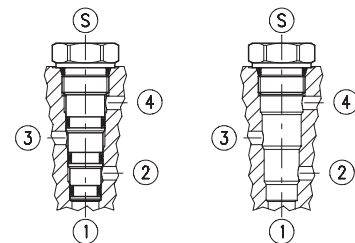
Rougher tool



Finisher tool



Tap



Cavity	Ordering code
08/4	UDAS207020
10/4	UDAS30003H
12/4	UDAS292020
16/4	UDAS356030

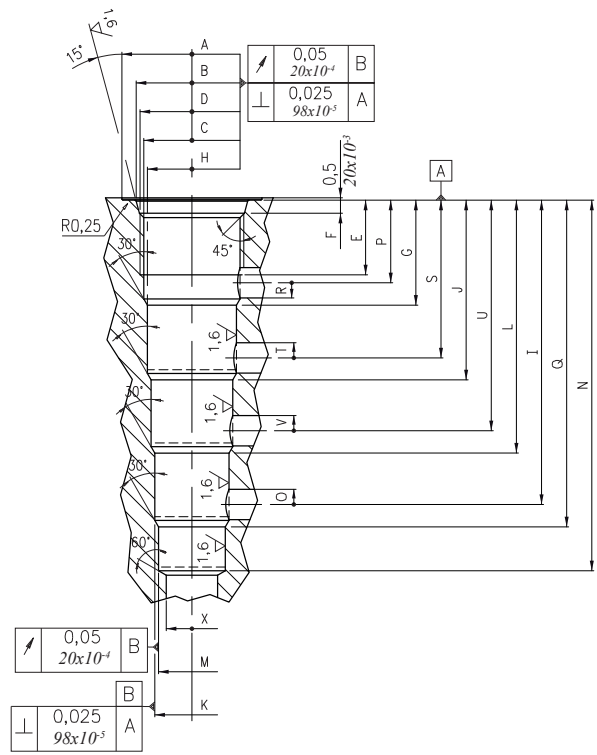
Cavity	Ordering code
08/4	UDAS170080
10/4	UDAS190861
12/4	UDAS238260
16/4	UDAS286262

Cavity	Ordering code
08/4	UCMS3/4161
10/4	UCMS7/8142
12/4	UCMS11/162
16/4	UCMS15/160

Cavity	Ordering code	①	②	③	④	⑤
08/4	3XTP3536500	X	X	X	X	X
	3XTAP822150	0	0	0	0	X
10/4	3XTP3548301	X	X	X	X	X
	3XTP1542300	0	0	0	0	X
12/4	3XTP3559300	X	X	X	X	X
	3XTP1552900	0	0	0	0	X
16/4	3XTP3578300	X	X	X	X	X
	3XTAP838200	0	0	0	0	X

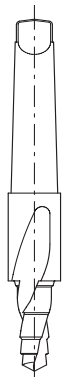
X=Close 0=Open

Dimensions



Cavity		A	B ±0.05	C ±0.05	D	E	F	G	H ±0.02	I	J	K ±0.02	L	M ±0.02	N	O øMAX	P	Q	R øMAX	S	T øMAX	U	V øMAX	X øMAX
10/5	mm	30	24.00	20.62	7/8-14 UNF	16	2.8	22.5	19.08	65.2	38.5	15.9	54.2	14.3	79.4	3.25	17.7	70	3.25	33.8	3.25	49.4	3.25	11
	in	1.18	0.94	0.81		0.63	0.11	0.89	0.75	2.57	1.51	0.63	2.13	0.56	3.13	0.13	0.70	2.75	0.13	1.33	0.13	1.94	0.13	0.43

Rougher tool



Cavity	Ordering code
10/5	UDPS188030

Finisher tool



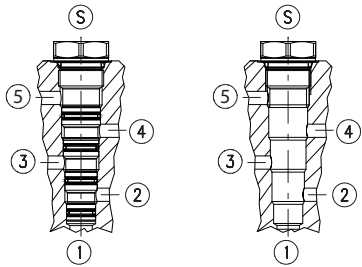
Cavity	Ordering code
10/5	UDPF204021

Tap



Cavity	Ordering code
10/5	UDAS190862

Cavity plugs



Cavity	Ordering code	①	②	③	④	⑤	⑥
10/5	XTAP327880	X	X	X	X	X	X
	3XTP1542300	0	0	0	0	0	0

X=Close 0=Open

This image shows a full page of blank, lined paper. It features approximately 28 horizontal blue or grey lines spaced evenly apart, typical of notebook paper. The lines extend across the entire width of the page, leaving small margins at the top and bottom. There are no vertical lines, text, or other markings on the page.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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