



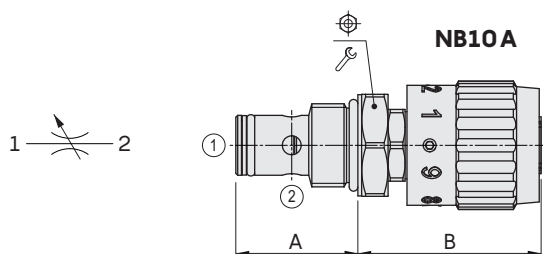
NB..A type needle valves - 2 way

- 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.

	NB08 A	NB10 A	NB12 A	NB16 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	0.180 kg (0.40 lb)	0.200 kg (0.44 lb)	0.280 kg (0.62 lb)	0.500 kg (1.10 lb)

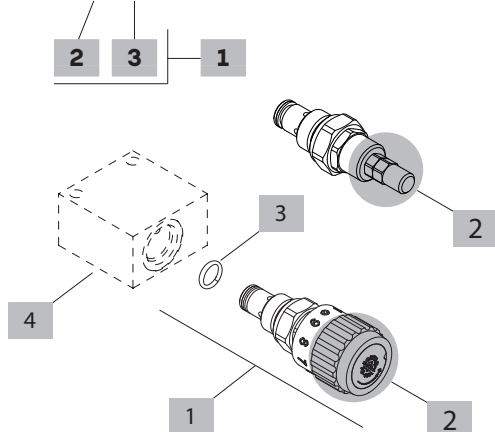
NOTE - For different conditions, please contact Walvoil Sales Dpt.



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

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

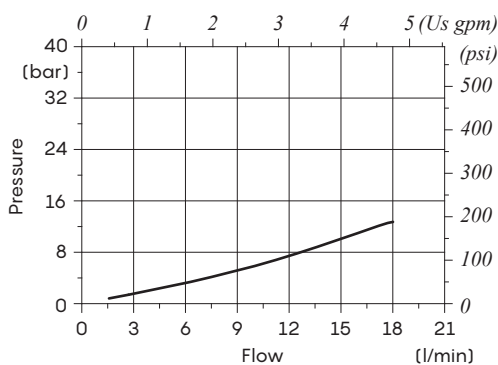
4 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-G 3/8	3CC0820C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/2-G 3/4	3CC1620E11	Aluminium body for cavity 16 valve, G 3/4 std thread

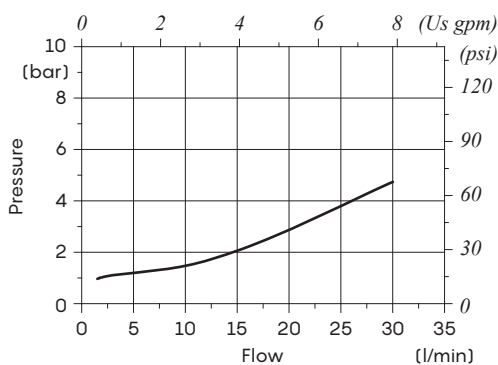
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

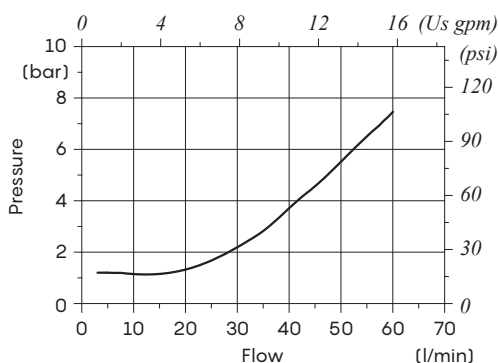
NB08A: pressure drop vs. flow 1->2 - 2->1, fully open



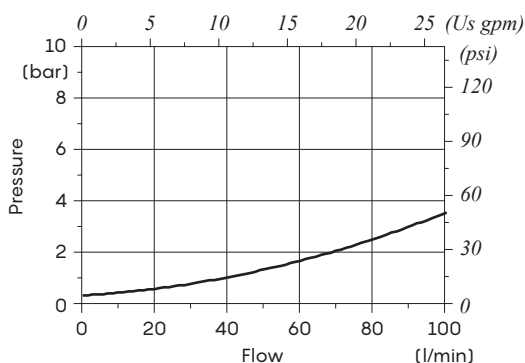
NB10A: pressure drop vs. flow 1->2 - 2->1, fully open



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



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





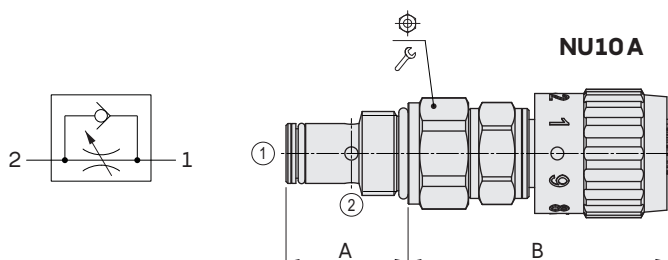
NU..A type needle valves - 2 way

- 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.

	NU08 A	NU10A	NU12 A	NU16 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)

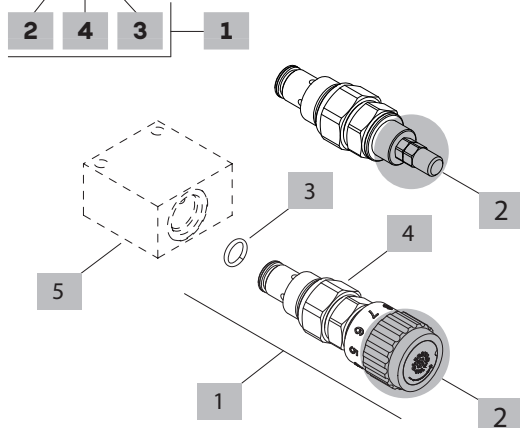
NOTE – For different conditions, please contact Walvoil Sales Dpt.



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

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)

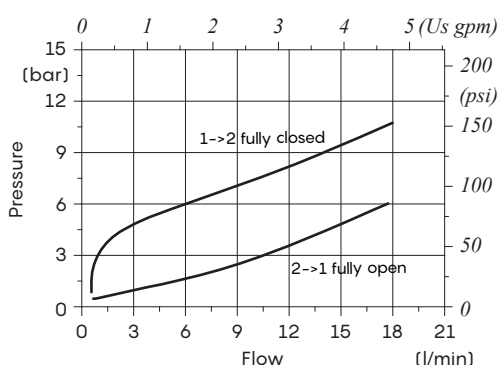
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-G 3/8	3CC0820C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/2-G 3/4	3CC1620E11	Aluminium body for cavity 16 valve, G 3/4 std thread

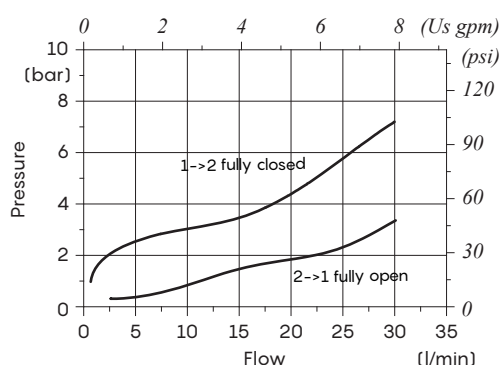
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

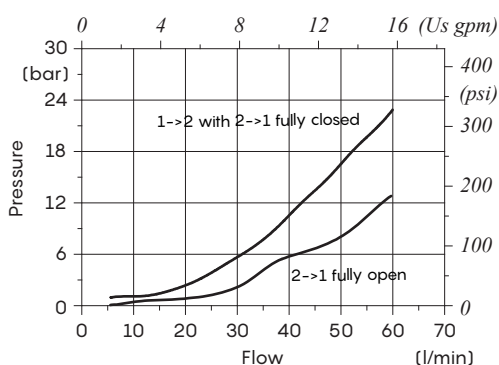
NU08 A pressure drop vs. flow



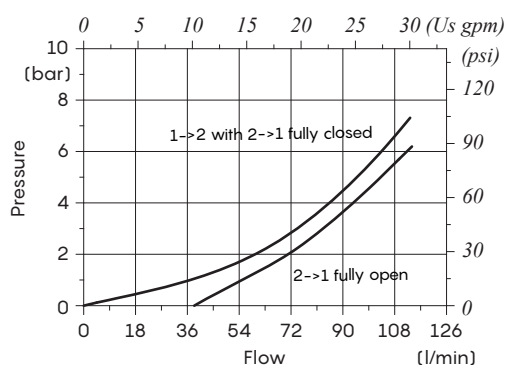
NU10 A pressure drop vs. flow



NU12 A pressure drop vs. flow



NU16 A pressure drop vs. flow





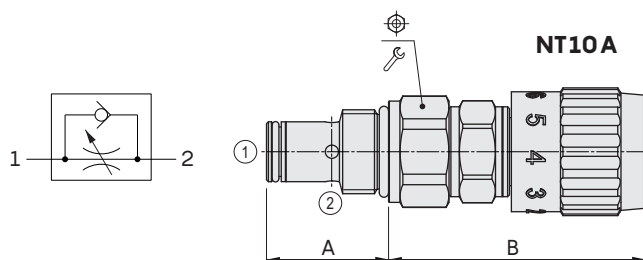
NT..A type needle valves – 2 way

- 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)

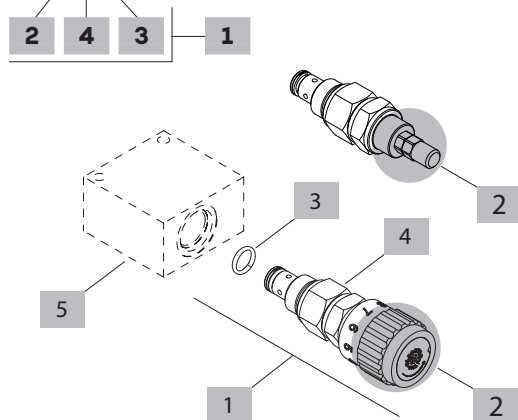
NOTE – For different conditions, please contact Walvoil Sales Dpt.



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

Ordering codes and description composition

NT08 A/AM1B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
NT08 A/AM1B	ONT08002000	Handknob adjustment
NT08 A/AS1B	ONT08002001	Screw type adjustment
SAE cavity 10/2		
NT10 A/AM1B	ONT10002000	Handknob adjustment
NT10 A/AS1B	ONT10002001	Screw type adjustment
SAE cavity 12/2		
NT12 A/AM1B	ONT12002000	Handknob adjustment
NT12 A/AS1B	ONT12002001	Screw type adjustment
SAE cavity 16/2		
NT16 A/AM1B	ONT16002000	Handknob adjustment
NT16 A/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)

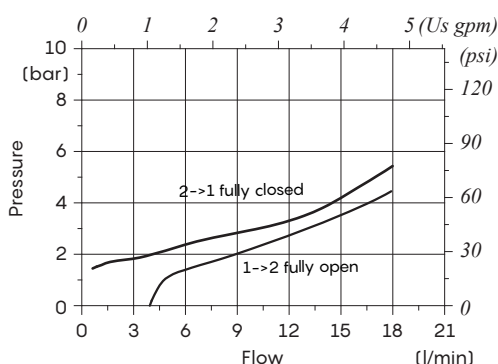
5 Valve body

TYPE	CODE	DESCRIPTION
SAE08/2-G 3/8	3CC0820C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/2-G 3/4	3CC1620E11	Aluminium body for cavity 16 valve, G 3/4 std thread

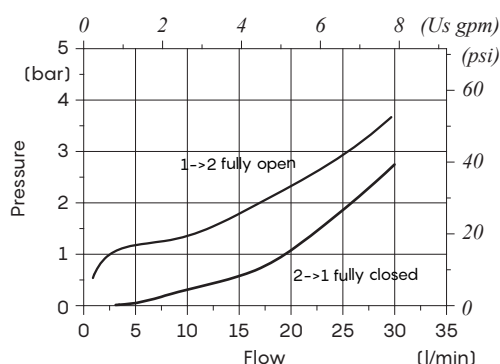
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

Rating diagrams

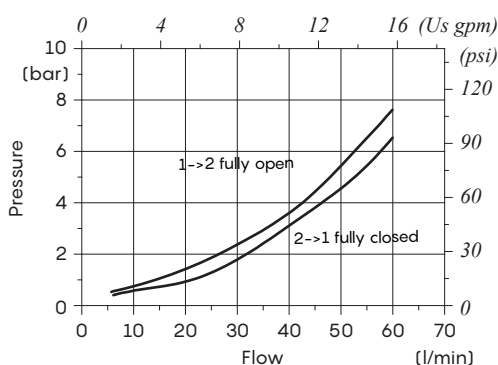
NT08A pressure drop vs. flow



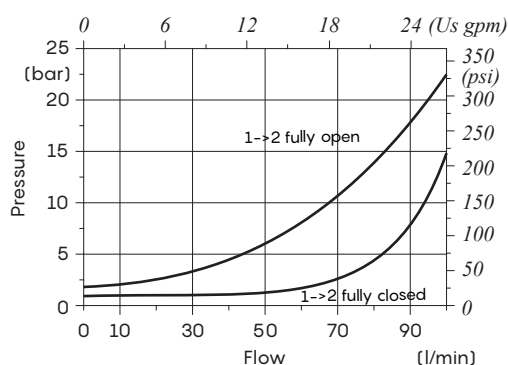
NT10A pressure drop vs. flow



NT12A pressure drop vs. flow



NT16A pressure drop vs. flow





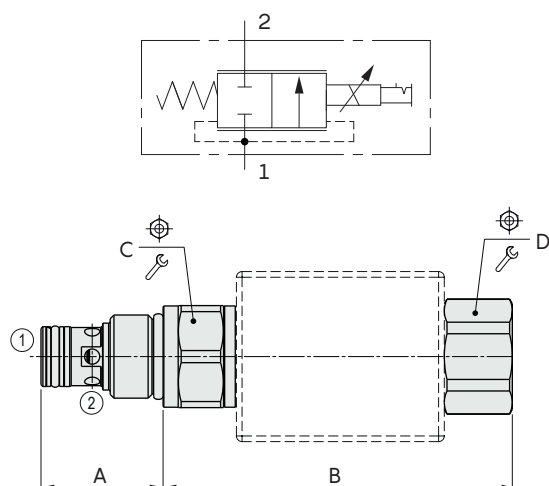
EE..X type needle valves - 2 way

- 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.

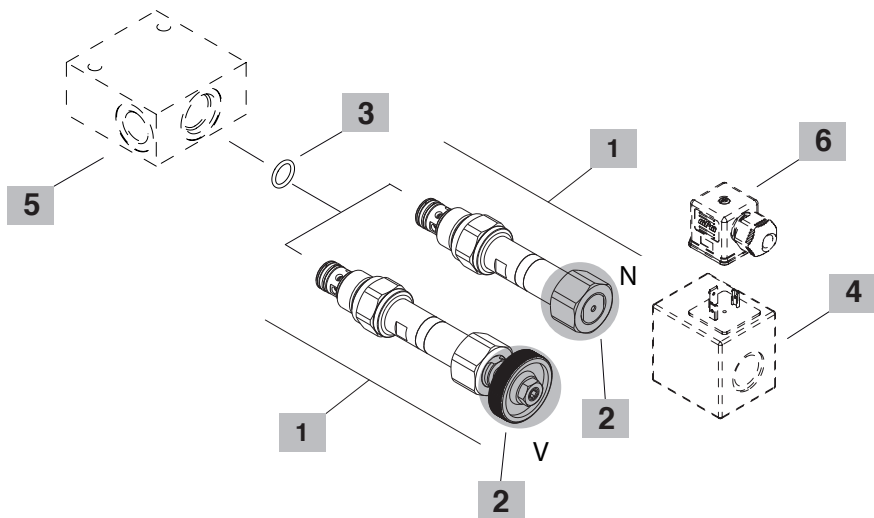
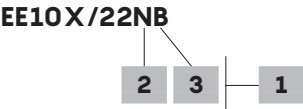
		EE10X	EE12X
Nominal flow ⁽¹⁾	with 10 bar (145 psi) stand-by	40 l/min (10.6 US gpm)	60 l/min (15.8 US gpm)
Max. pressure		300 bar (4350 psi)	315 bar (4600 psi)
Oil leakage	at 150 bar (2175 psi)	150 cm³/min (9.1 in³/min)	200 cm³/min (12.2 in³/min)
Fluid		mineral based or synthetic hydraulic fluid with 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 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		N / O without emergency		V handknob		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



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

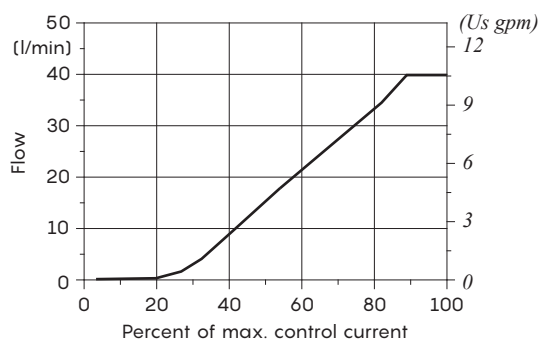
4 Coils		
TYPE	CODE	DESCRIPTION
BQP19 12VDC	4SL5000126A	12VDC-ISO4400 coil
For complete coils list see from page 201		
It is possible also combine coils BH		

5 Valve body		
TYPE	CODE	DESCRIPTION
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
Note: aluminium body can stand up to 210 bar (3050 psi)		
For steel bodies or different threading see from page 208		

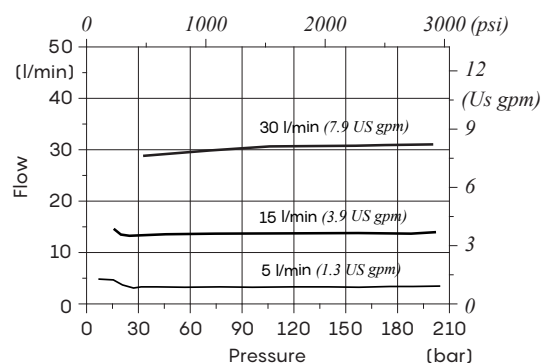
6 Connector		
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector
For complete connectors list see from page 201		

Rating diagrams

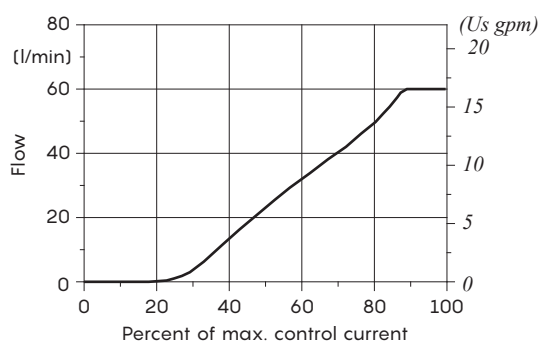
EE10X
flow regulating vs. % max. control current



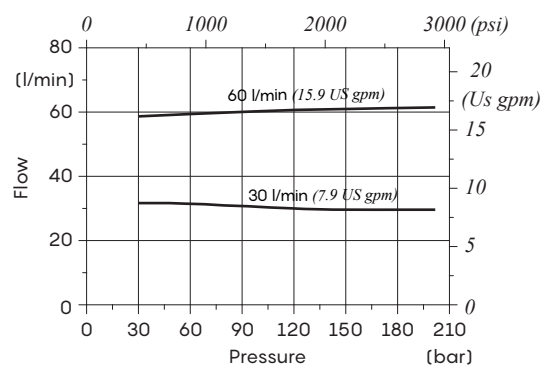
EE10X
*pressure compensation diagram 1→2



EE12X
flow regulating vs. % max. control current



EE12X
**pressure compensation diagram 1→2



*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



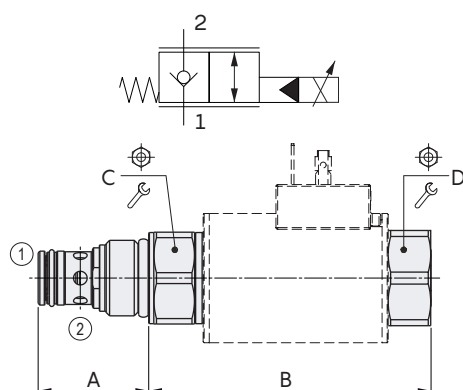
EC..T type needle valves - 2 way

- 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)

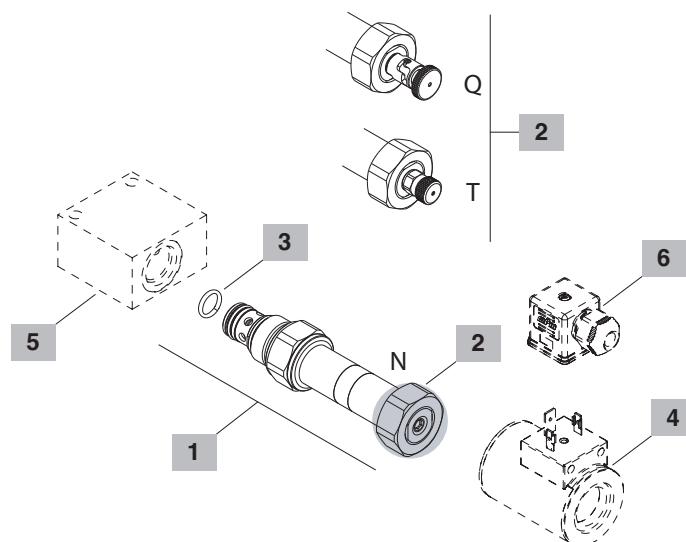
NOTE - For different conditions, please contact Walvoil Sales Dpt. - ⁽¹⁾ Values are checked with cartridge in parallel with compensator - ⁽²⁾ For coils further features see from page 201.



Valve type	A		B		C		D	
	mm	in	mm	in	mm	in	mm	in
EC08T	28.1	1.11	83	3.27	97.5	3.84	105.6	4.16
EC10T	32.5	1.28	83	3.27	97.5	3.84	105.6	4.16
EC12T	45	1.77	82.5	3.25	97	3.82	105.1	4.14
EC16T	45.6	1.80	81	3.19	95.5	3.76	103.6	4.08

Ordering codes and description composition

EC10T/AONB

**1 Cartridges**

TYPE	CODE	DESCRIPTION
SAE cavity 08/2		
EC08T/AONB	OEC08002056	Without emergency
EC08T/AOTB	OEC08002058	Screw type emergency
EC08T/AOQB	OEC08002073	"Push&twist" emergency
SAE cavity 10/2		
EC10T/AONB	OEC10002025	Without emergency
EC10T/AOTB	OEC10002027	Screw type emergency
EC10T/AOQB	OEC10002029	"Push&twist" emergency
SAE cavity 12/2		
EC12T/AONB	OEC12002018	Without emergency
EC12T/AOTB	OEC12002019	Screw type emergency
EC12T/AOQB	OEC12002020	"Push&twist" emergency
SAE cavity 16/2		
EC16T/AONB	OEC16002033	Without emergency
EC16T/AOTB	OEC16002035	Screw type emergency
EC16T/AOQB	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-G 3/8	3CC0820C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/2-G 3/4	3CC1620E11	Aluminium body for cavity 16 valve, G 3/4 std thread

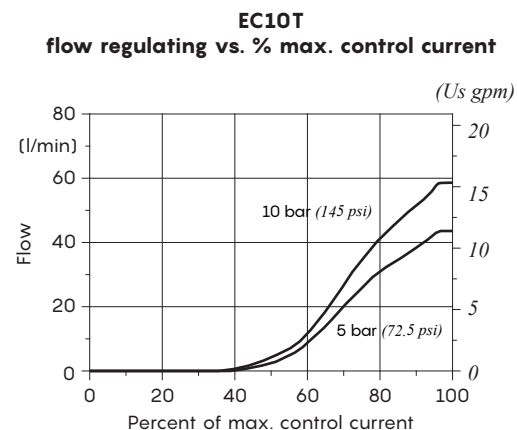
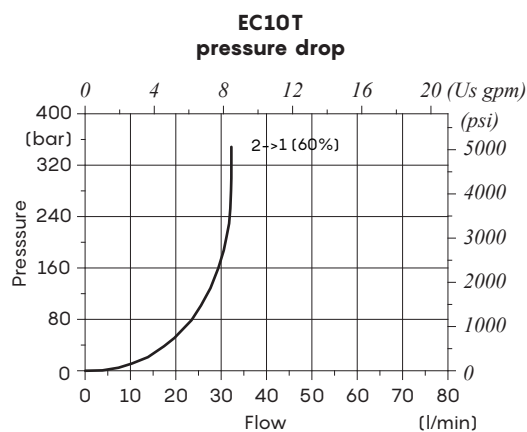
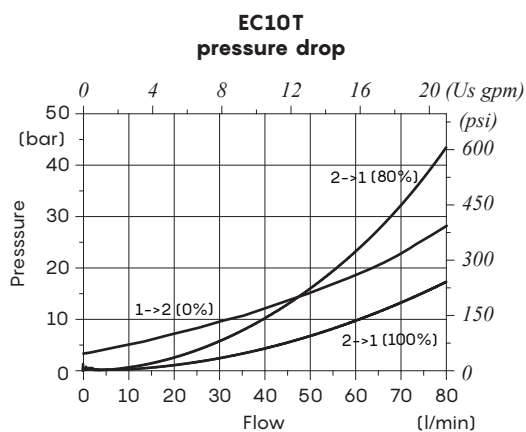
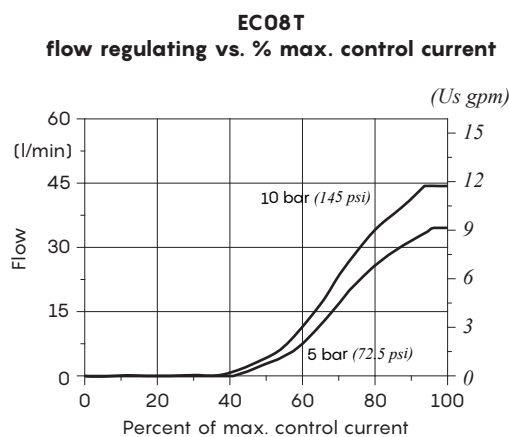
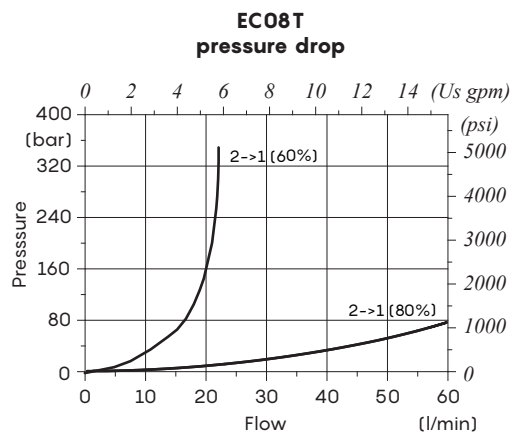
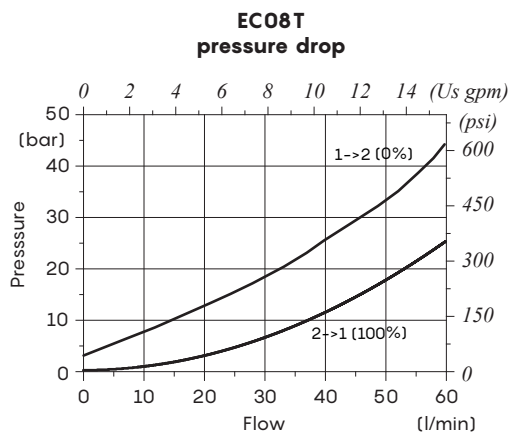
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

6 Connector

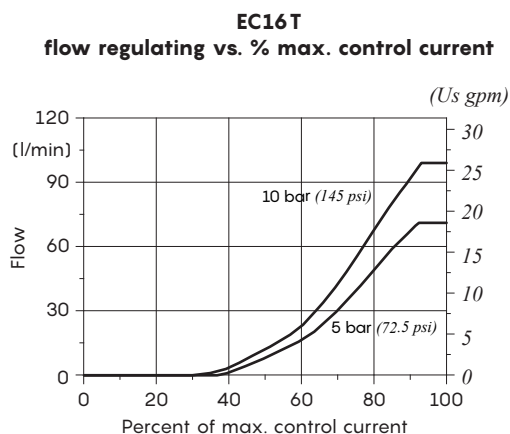
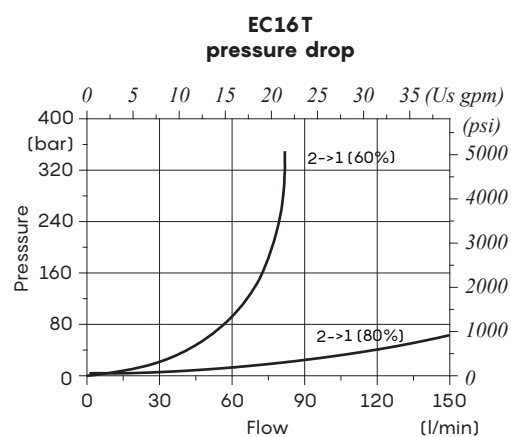
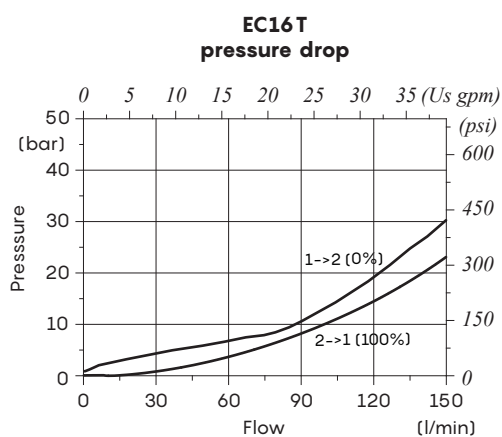
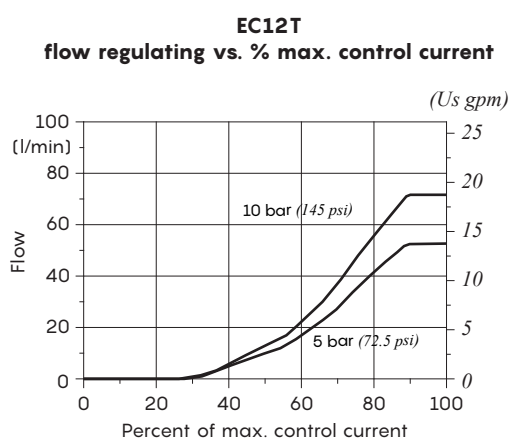
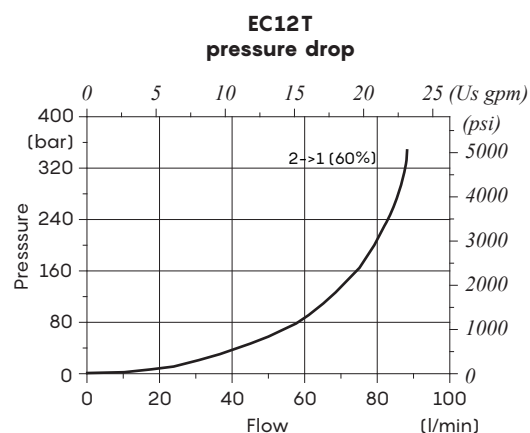
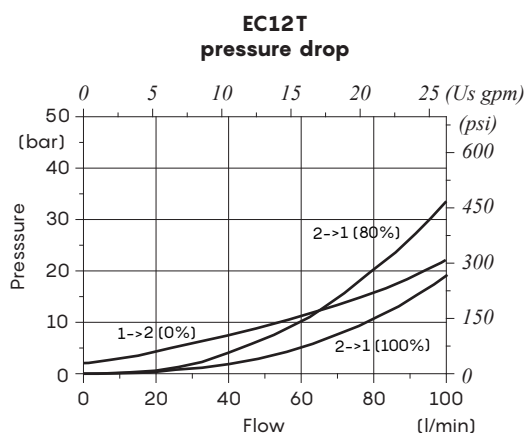
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

Rating diagrams



Rating diagrams





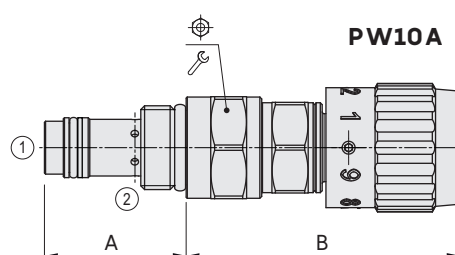
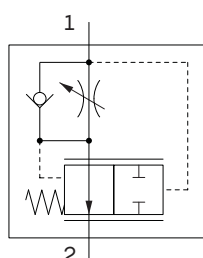
PW..A type flow control pressure compensated valves – 2 way

- 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)

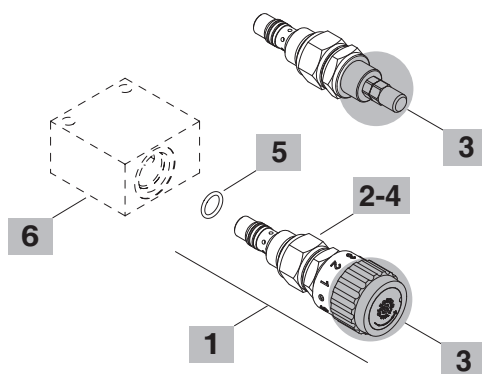
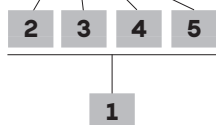
NOTE – For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B		 Nm lbft	
		mm	in	mm	in		
PW08 A/A	M	36.6	1.44	67.6	2.66	24	22
	S	36.6	1.44	62	2.44	24	22
PW10 A/A	M	37.5	1.48	72.5	2.85	27	37
	S	37.5	1.48	69	2.72	27	37
PW12 A/A	M	58.5	2.30	69.2	2.72	32	59
	S	58.5	2.30	61.5	2.42	32	59
PW16 A/A	M	68	2.68	102	4.02	41	74
	S	68	2.68	96	3.78	41	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)

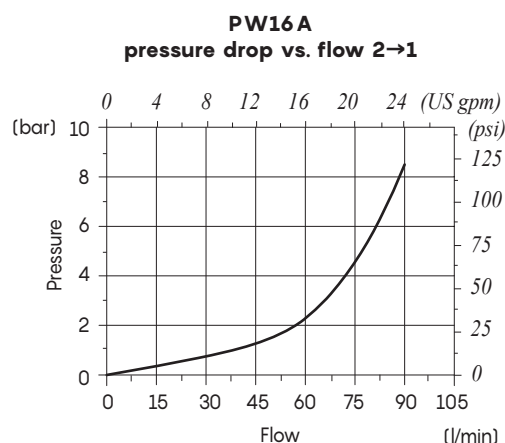
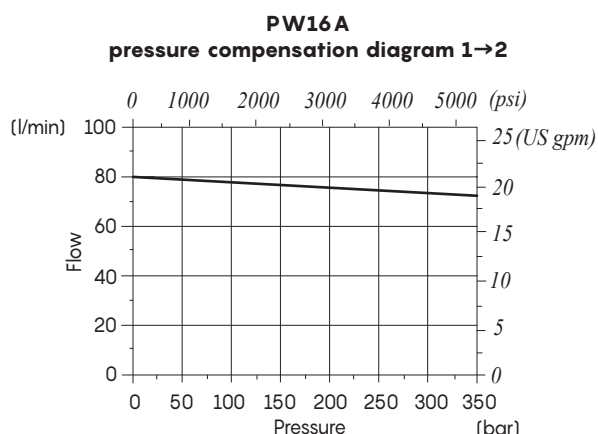
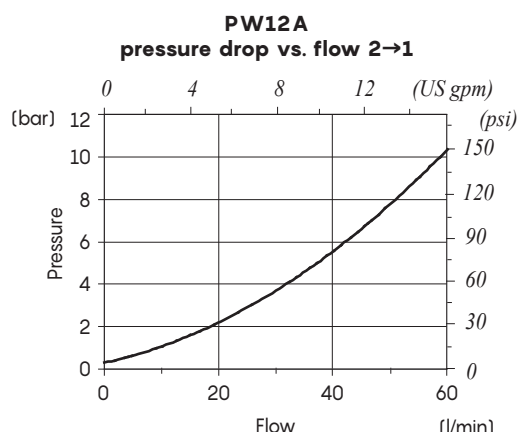
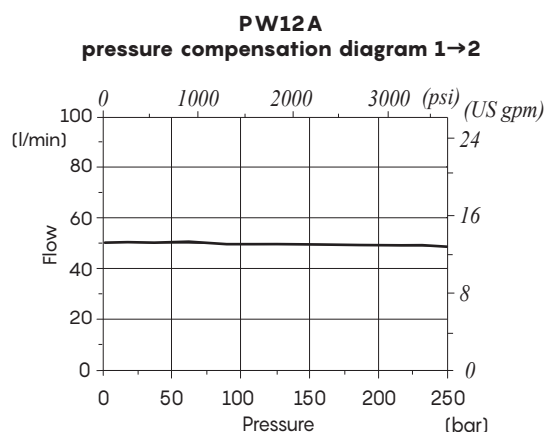
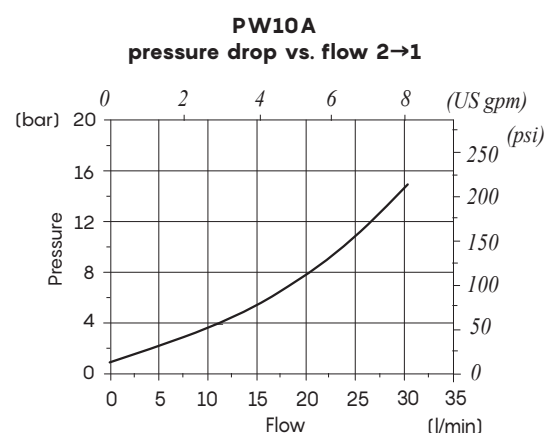
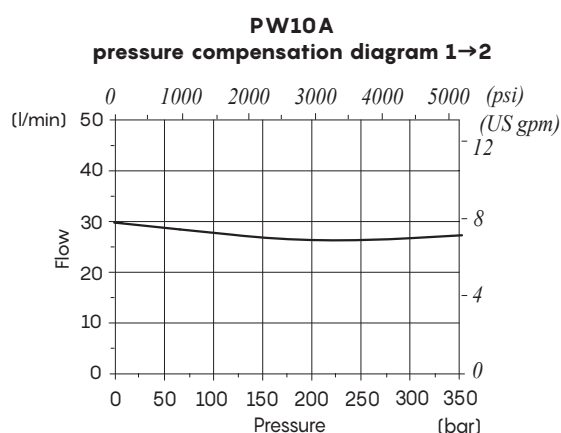
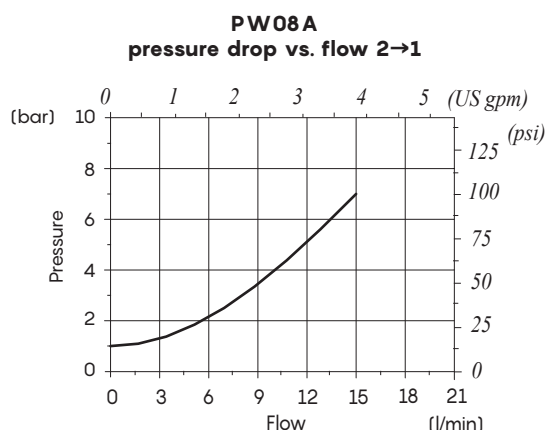
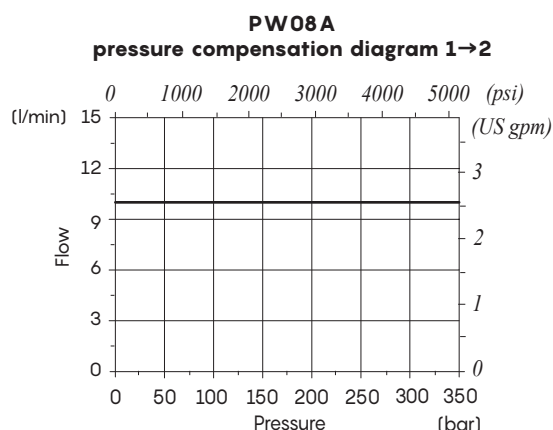
5 Seals

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-G 3/8	3CC0820C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/2-G 3/4	3CC1620E11	Aluminium body for cavity 16 valve, G 3/4 std thread

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





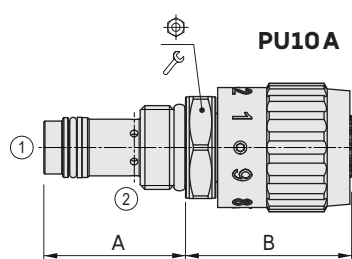
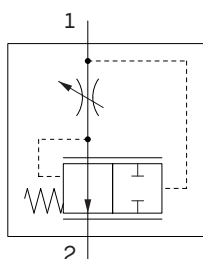
PU..A type flow control pressure compensated valves - 2 way

- 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 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	0.18 kg (0.40 lb)	0.20 kg (0.44 lb)	0.30 kg (0.66 lb)	0.55 kg (1.21 lb)

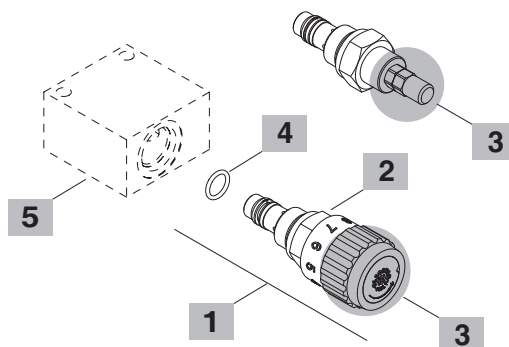
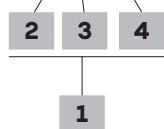
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B		 		
		mm	in	mm	in		Nm	lbft
PU08A/A	M	33.6	1.32	48	1.89	24	30	22
	S	33.6	1.32	46	1.81	24	30	22
PU10A/A	M	37.5	1.48	44	1.73	27	50	37
	S	37.5	1.48	42	1.65	27	50	37
PU12A/A	M	58.5	2.30	48	1.89	32	80	59
	S	58.5	2.30	42	1.65	32	80	59
PU16A/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

PU08A/AMOB



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 08/2 A		
PU08A/AMOB	OPU08002000	Handknob adjustment
PU08A/ASOB	OPU08002003	Screw type adjustment
SAE cavity 10/2 A		
PU10A/AMOB	OPU10002001	Handknob adjustment
PU10A/ASOB	OPU10002000	Screw type adjustment
SAE cavity 12/2 A		
PU12A/AMOB	OPU12002000	Handknob adjustment
PU12A/ASOB	OPU12002003	Screw type adjustment
SAE cavity 16/2 A		
PU16A/AMOB	OPU16002000	Handknob adjustment
PU16A/ASOB	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

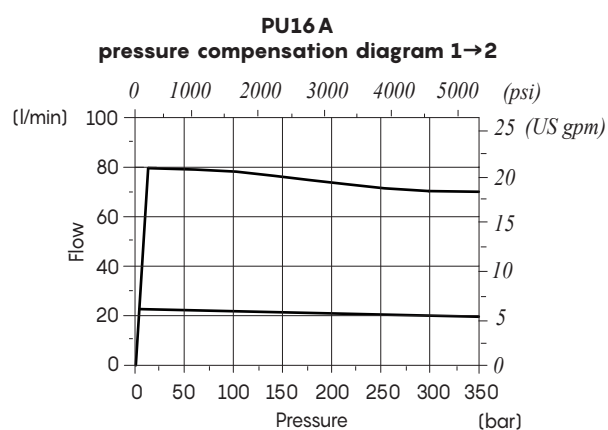
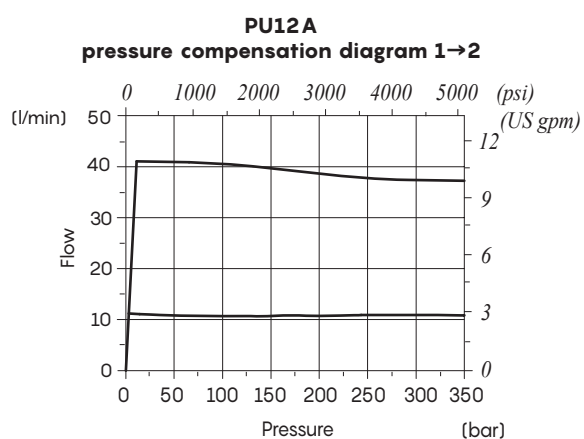
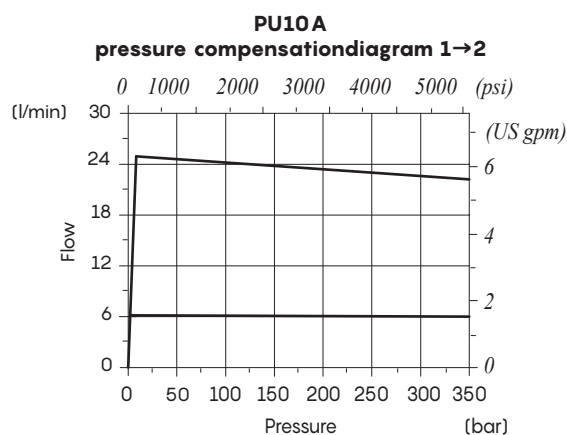
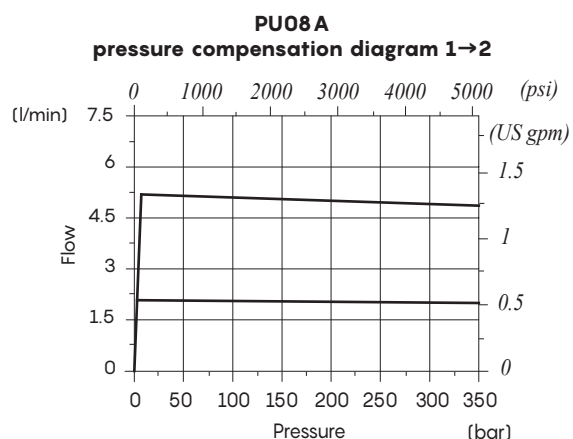
4 Seals

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-G 3/8	3CC0820C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/2-G 3/4	3CC1620E11	Aluminium body for cavity 16 valve, G 3/4 std thread

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





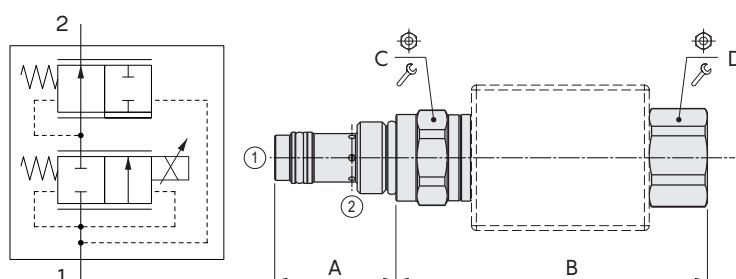
PU..X type flow control pressure compensated valves - 2 way

- 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.

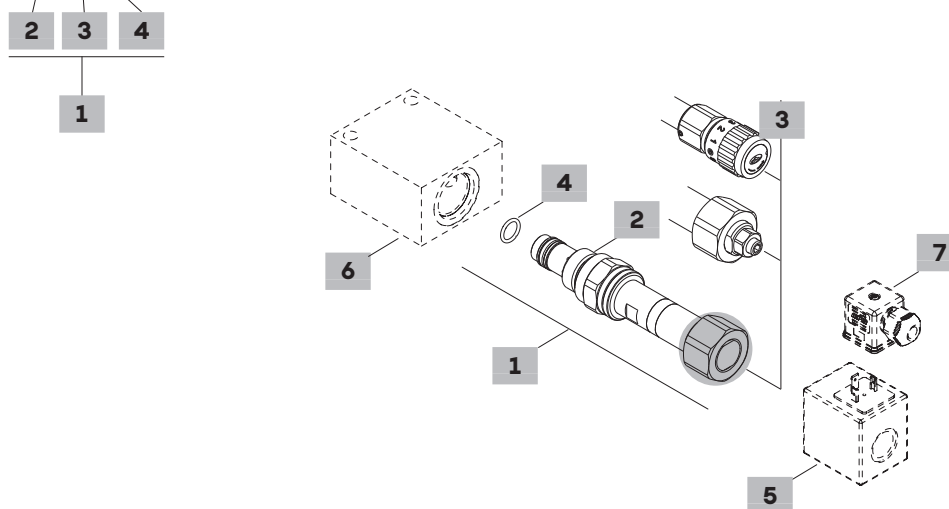


Valve type	A		B		C		D	
	mm	in	mm	in	Nm	lbf·ft	Nm	lbf·ft
PU10X	37.5	1.48	96.4	3.80	27	50	37	28
							5	3.7

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-G 3/8	3CC0820C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/2-G 3/8	3CC1020C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/2-G 1/2	3CC1220D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/2-G 3/4	3CC1620E11	Aluminium body for cavity 16 valve, G 3/4 std thread

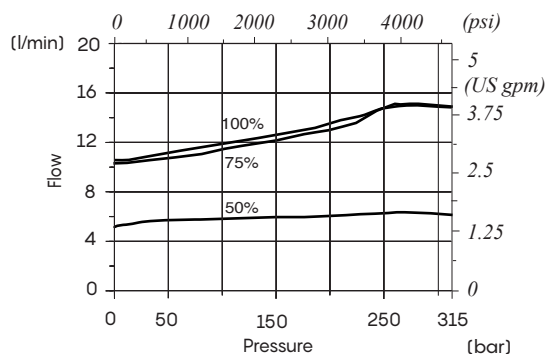
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 208

7 Connector

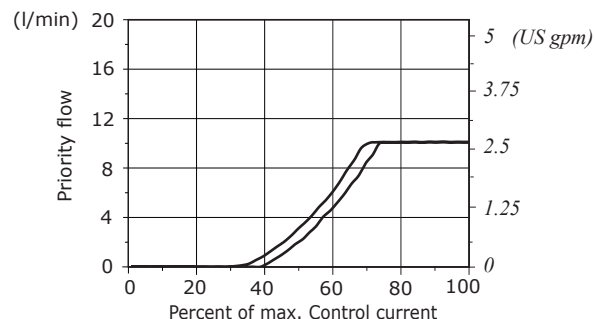
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

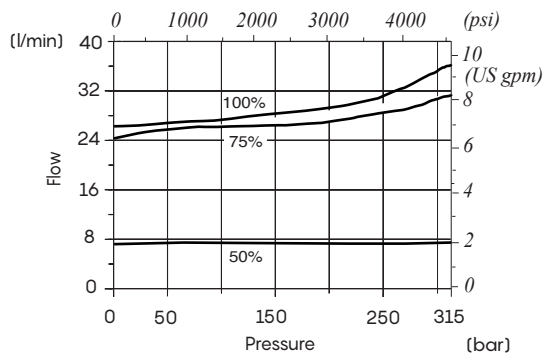
PU08X: pressure compensation diagram 1→2
for % of control current



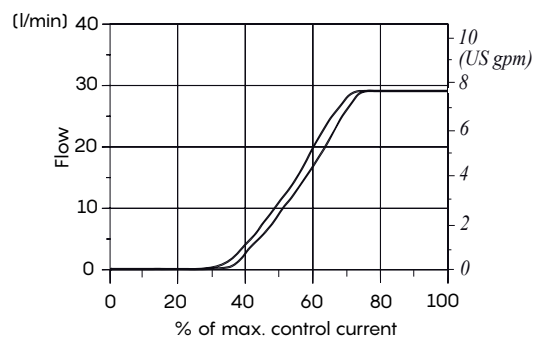
PU08X
flow regulating vs. % max. control current



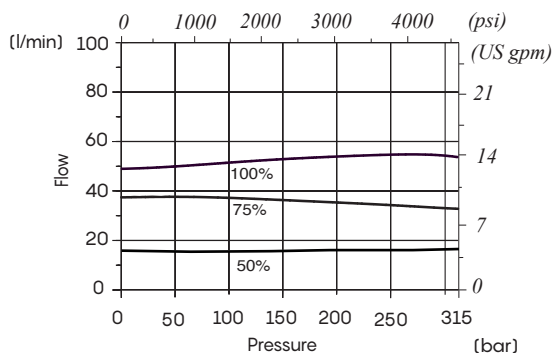
PU10X: pressure compensation diagram 1→2
for % of control current



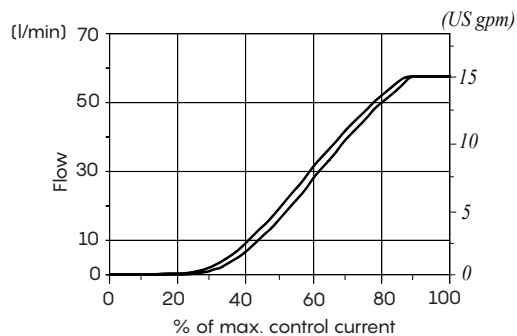
PU10X
flow regulating vs. % max. control current



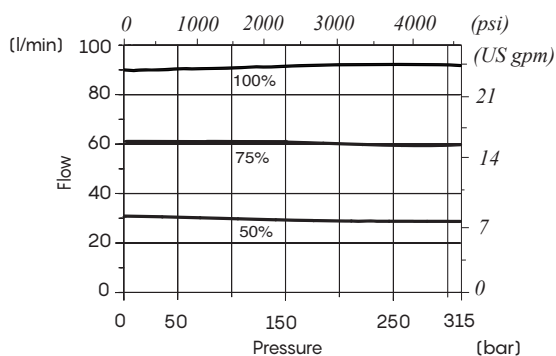
PU12X: pressure compensation diagram 1→2
for % of control current



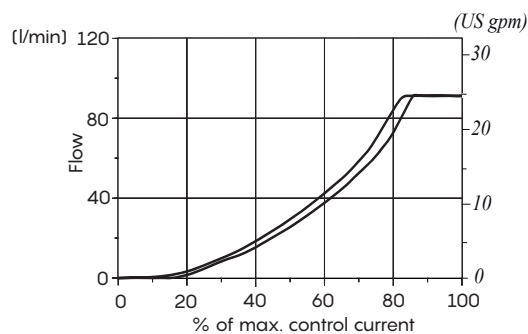
PU12X
flow regulating vs. % max. control current



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



PU16X
flow regulating vs. % max. control current



Types and dimensions

Valve type	A		N without emergency		B T screw		V handknob		C			D		
	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



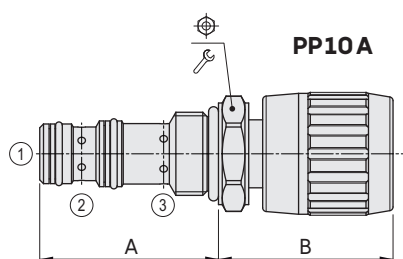
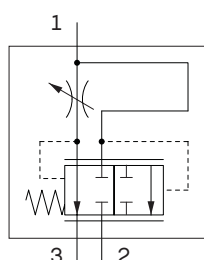
PP..A type flow control pressure compensated valves – 3 way

- 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=	20 l/min (5.2 US gpm)	50 l/min (13.2 US gpm)	90 l/min (23.8 US gpm)	150 l/min (39.6 US gpm)
	Q3max=	15 l/min (4 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 08/3	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)

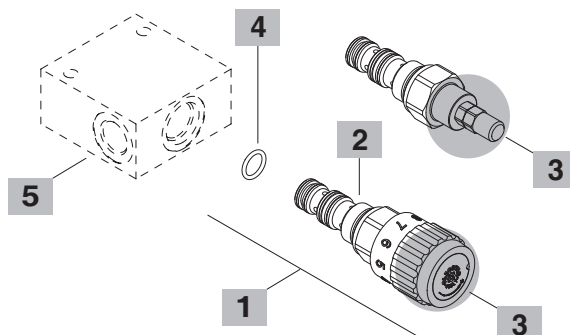
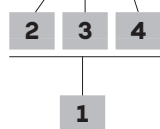
NOTE - For different conditions, please contact Walvoil Sales Dpt.



Valve type		A		B				
		mm	in	mm	in			
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/AMOB



1 Cartridges

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

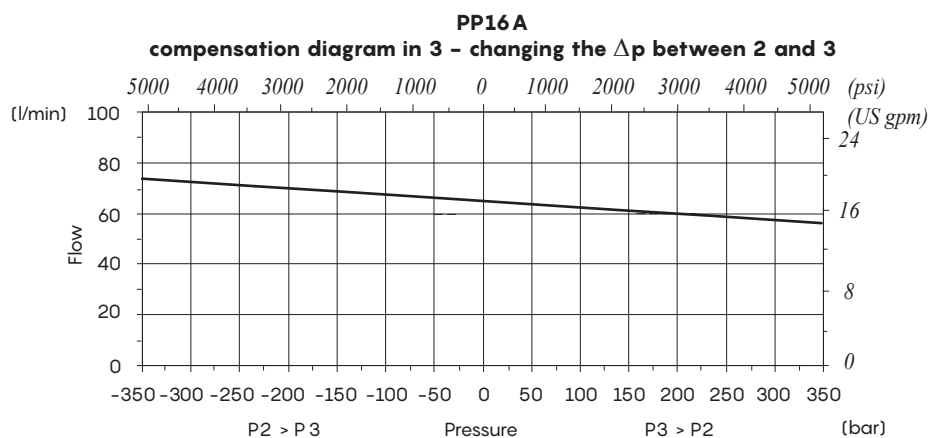
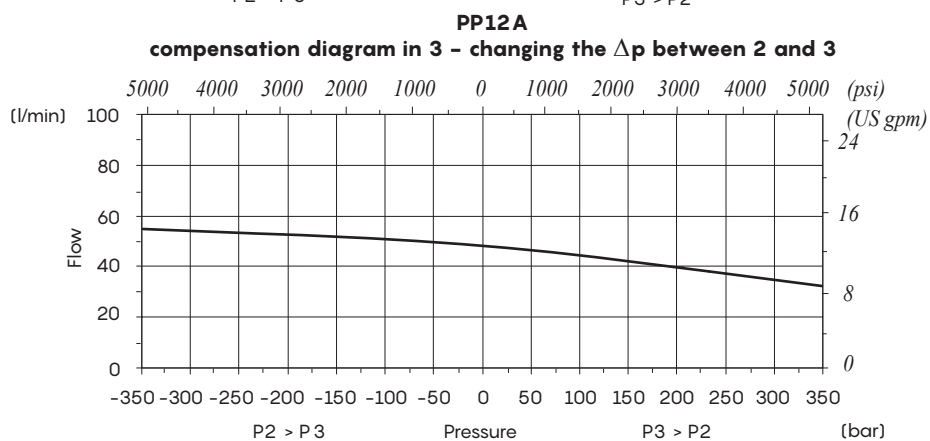
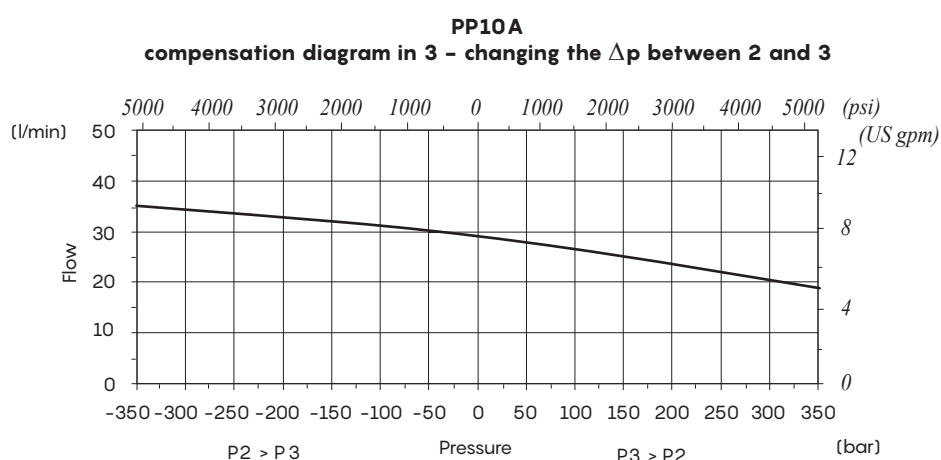
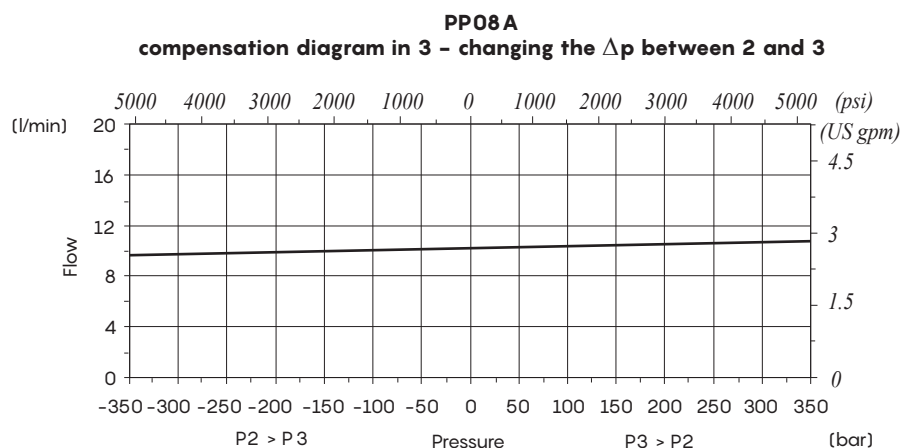
4 Seals

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-G 3/8	3CC0830C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/3-G 3/8	3CC1030C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/3-G 1/2	3CC1230D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/3-G 3/4	3CC1630E11	Aluminium body for cavity 16 valve, G 3/4 std thread

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





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.

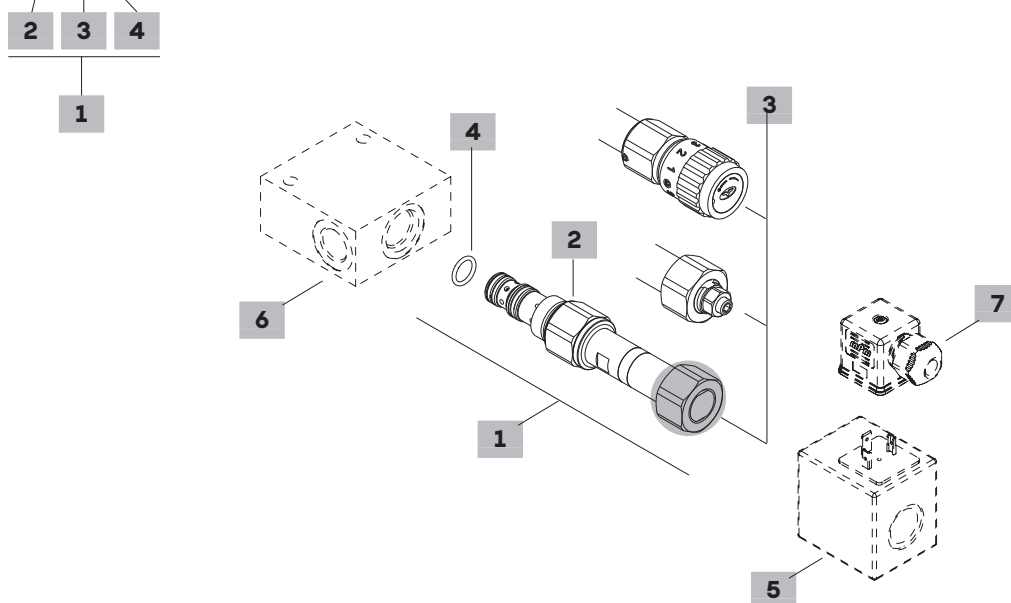
The diagram illustrates a 3/2-way solenoid valve. The schematic on the left shows the internal flow paths: port 1 is the inlet, port 2 is the outlet, and port 3 is the exhaust. The cross-section shows the valve body with dimensions A and B, and mounting points C and D. The table provides the following data for the PP10X model:

Valve type	A		B		C		D			
	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-G 3/8	3CC0830C11	Aluminium body for cavity 08 valve, G 3/8 std thread
SAE10/3-G 3/8	3CC1030C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/3-G 1/2	3CC1230D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/3-G 3/4	3CC1630E11	Aluminium body for cavity 16 valve, G 3/4 std thread

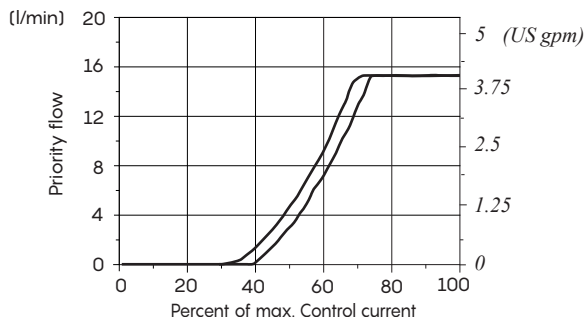
Note: aluminium body can stand up to 210 bar (3050 psi)
For steel bodies or different threading see from page 210

7 Connector

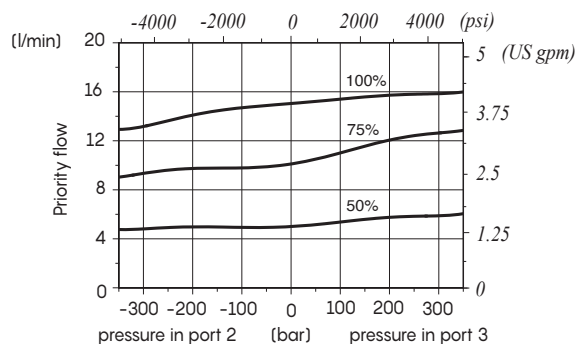
TYPE	CODE	DESCRIPTION
ISO4400	4CN1009995B	Connector

For complete connectors list see from page 201

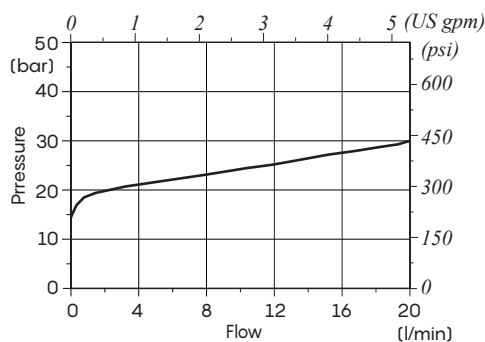
PP08X
flow regulating vs. % max. control current
 Q_{in} = priority flow +30%



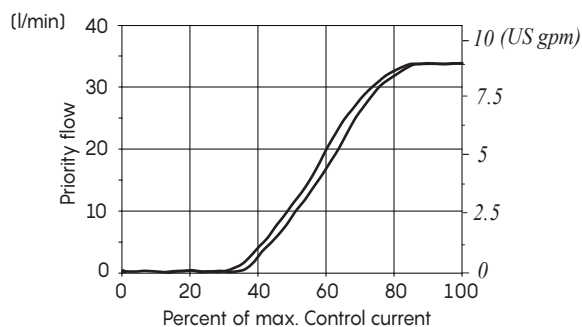
PP08X
pressure compensation diagram 2→3
for % of control current



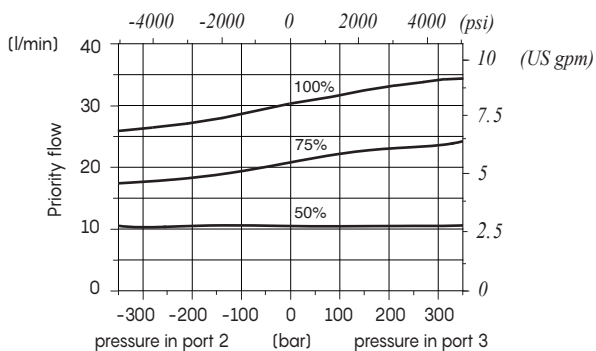
PP08X
pressure drop with de-energized coil
from 1→2



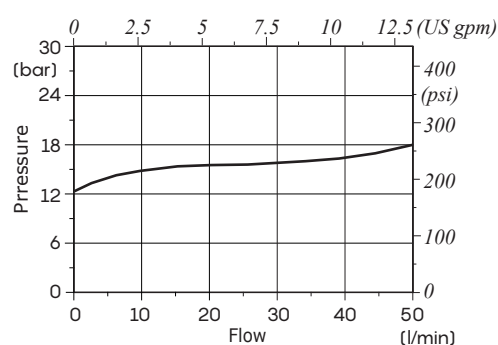
PP10X
flow regulating vs. % max. control current
 Q_{in} = priority flow +5%



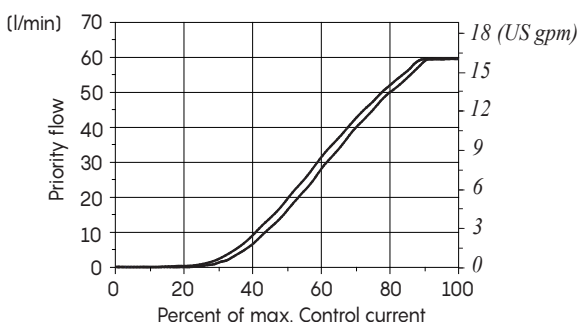
PP10X
pressure compensation diagram 2→3
for % of control current



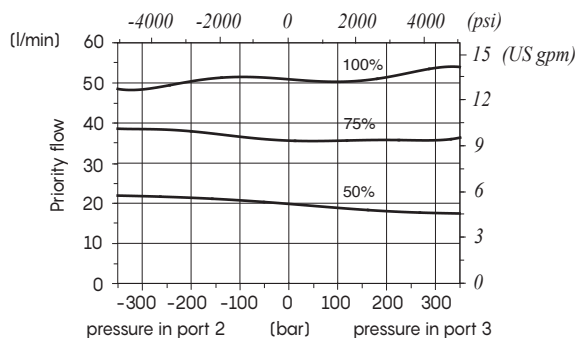
PP10X
pressure drop with de-energized coil
from 1→2



PP12X
flow regulating vs. % max. control current
 Q_{in} = priority flow +15%

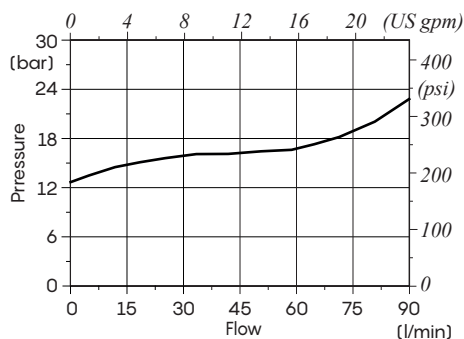


PP12X
pressure compensation diagram 2→3
for % of control current

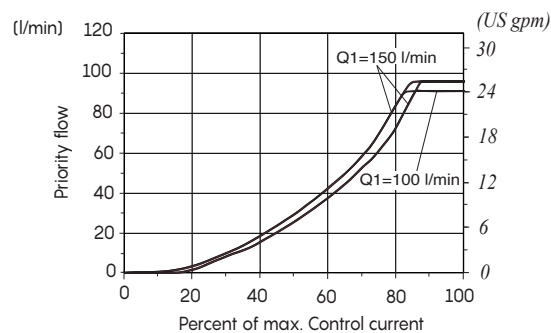


Rating diagrams

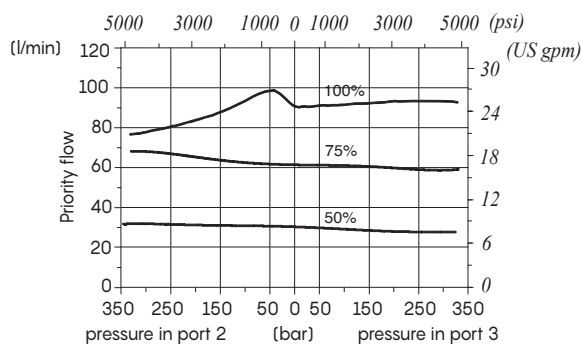
PP12X
pressure drop with de-energized coil
from 1→2



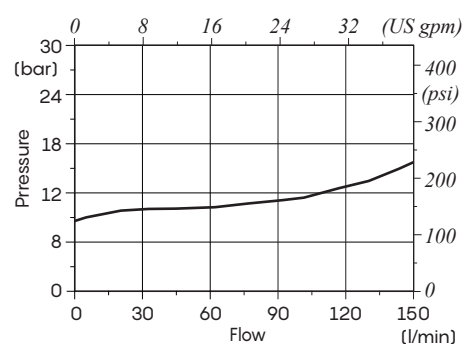
PP16X
flow regulating vs. % max. control current
 Q_{in} = priority flow +10%



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



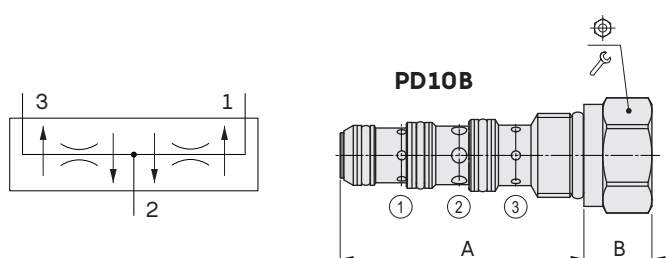
PD... type flow control pressure compensated valves - 3 way

- 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)

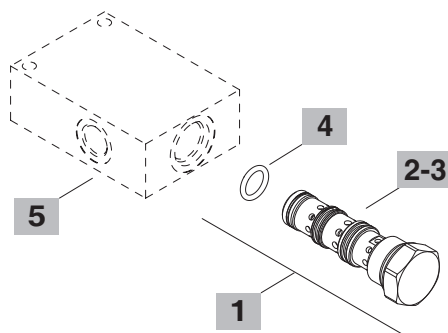
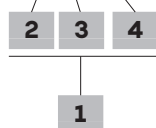
NOTE - For different conditions, please contact Walvoil Sales Dpt.



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

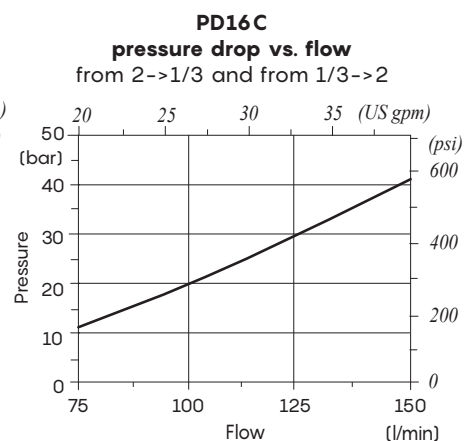
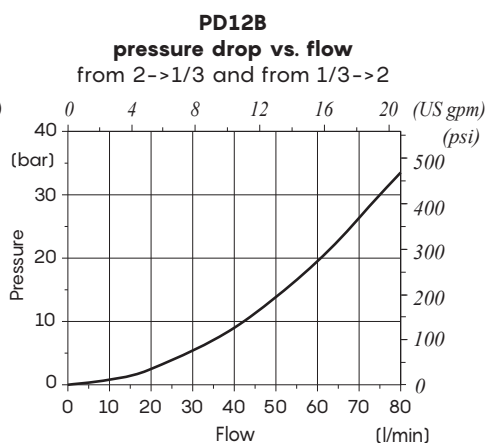
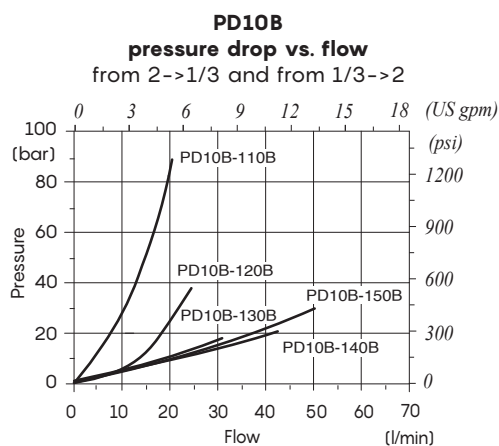
TYPE	DESCRIPTION
B	NBR (Buna)+PTFE o-ring seals, std configuration
V	FPM (Viton) o-ring seals, contact Sales Dept

5 Valve body

TYPE	CODE	DESCRIPTION
SAE10/4-G 3/8	3CC1040C11	Aluminium body for cavity 10 valve, G 3/8 std thread
SAE12/4-G 1/2	3CC1240D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/4-G 3/4	3CC1640E11	Aluminium body for cavity 16 valve, G 3/4 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





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

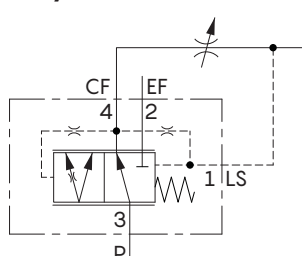
- Spool type
- Piloted acting by mechanical control
- Priority cartridges valves compensated with possibility of static and dynamic load sense
- External zinc-plated and corrosion-proof components
- Priority flow rate (port 4) not affected by changes in working conditions
- SAE10 to SAE16 cavities

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

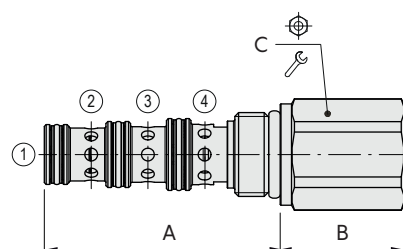
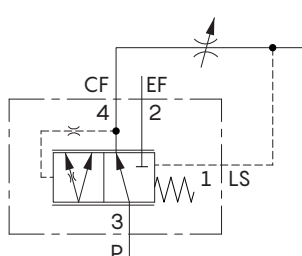
		PL10M	PL12M	PL16M
Nominal flow	on port 3	50 l/min (13.2 US gpm)	100 l/min (26.4 US gpm)	160 l/min (42.2 US gpm)
	max. on port 4	40 l/min (10.5 US gpm)	80 l/min (21.1 US gpm)	140 l/min (36.9 US gpm)
Max. pressure		350 bar (5100 psi)		
Stand-by	PL..M/..AB	5 bar (72.5 psi)	5 bar (72.5 psi)	5.5 bar (79.7 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 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 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)

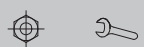
NOTE - For different conditions, please contact Walvoil Sales Dpt.

Dynamic circuit



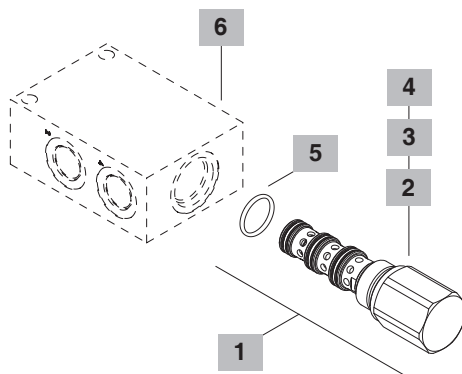
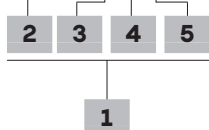
Static circuit



Valve type	A		B		C		
	mm	in	mm	in	 Nm lbft		
PL10M	62.4	2.46	32.8	1.29	27	50	37
PL12M	81.9	3.22	35	1.38	32	80	59
PL16M	102.5	4.04	37.6	1.48	36	100	74

Ordering codes and description composition

PL10M/ D 1 C B



1 Cartridges

TYPE	CODE	DESCRIPTION
SAE cavity 10/4		
PL10M/S1AB	OPL10002000	Static circuit, 5 bar (72.5 psi) stand by
PL10M/S1CB	OPL10002002	Static circuit, 10 bar (145 psi) stand by
PL10M/D1AB	OPL10002003	Dynamic circuit, 5 bar (72.5 psi) stand by
PL10M/D1CB	OPL10002001	Dynamic circuit, 10 bar (145 psi) stand by
SAE cavity 12/4		
PL12M/S1AB	OPL12002004	Static circuit, 5 bar (72.5 psi) stand by
PL12M/S1BB	OPL12002005	Static circuit, 7.5 bar (109 psi) stand by
PL12M/S1CB	OPL12002003	Static circuit, 10.5 bar (152 psi) stand by
PL12M/D1AB	OPL12002000	Dynamic circuit, 5 bar (72.5 psi) stand by
PL12M/D1BB	OPL12002002	Dynamic circuit, 7.5 bar (109 psi) stand by
PL12M/D1CB	OPL12002001	Dynamic circuit, 10.5 bar (152 psi) stand by
SAE cavity 16/4		
PL16M/S1AB	OPL16002003	Static circuit, 5.5 bar (79.7 psi) stand by
PL16M/S1CB	OPL16002004	Static circuit, 11 bar (159 psi) stand by
PL16M/S1DB	OPL16002005	Static circuit, 22 bar (319 psi) stand by
PL16M/D1AB	OPL16002000	Dynamic circuit, 5.5 bar (79.7 psi) stand by
PL16M/D1CB	OPL16002001	Dynamic circuit, 11 bar (159 psi) stand by
PL16M/D1DB	OPL16002002	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 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)	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-G 1/2	3CC1040D11	Aluminium body for cavity 10 valve, G 1/2 std thread
SAE12/4-G 1/2	3CC1240D11	Aluminium body for cavity 12 valve, G 1/2 std thread
SAE16/4-G 3/4	3CC1640E11	Aluminium body for cavity 16 valve, G 3/4 std thread

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

Flow control valves

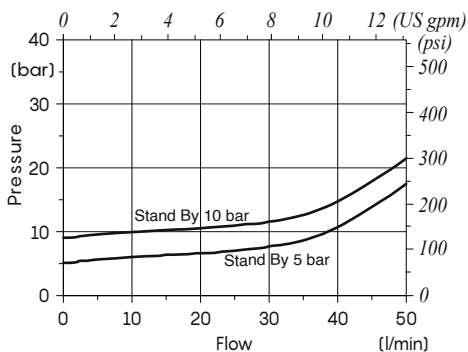
Flow control pressure compensated valves - 4 way

PL..M type

Rating diagrams

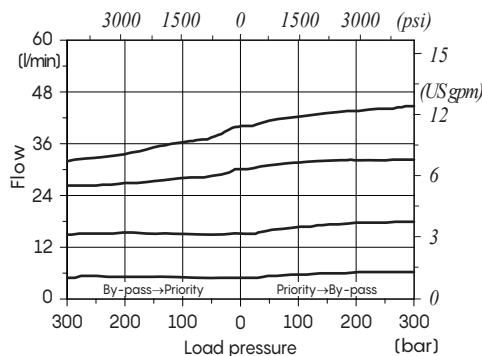
PL10M valve (valve body with G 1/2 ports)

Pressure drop
from 3→2 (4 closed)



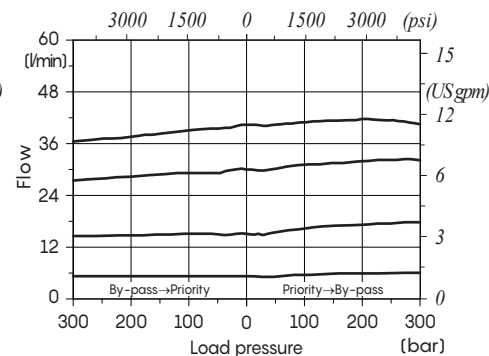
Priority flow vs. Load pressure

stand-by: 5 bar (72.5 psi)
inlet flow: 50 l/min (13.2 US gpm)



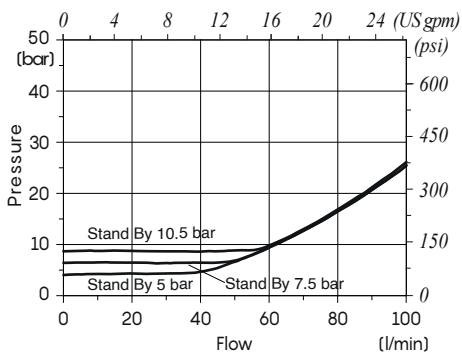
Priority flow vs. Load pressure

stand-by: 10 bar (145 psi)
inlet flow: 50 l/min (13.2 US gpm)



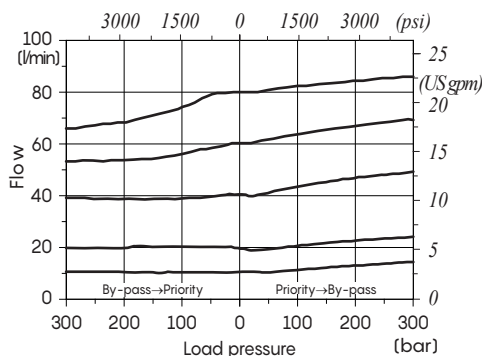
PL12M valve (valve body with G 1/2 ports)

Pressure drop
from 3→2 (4 closed)



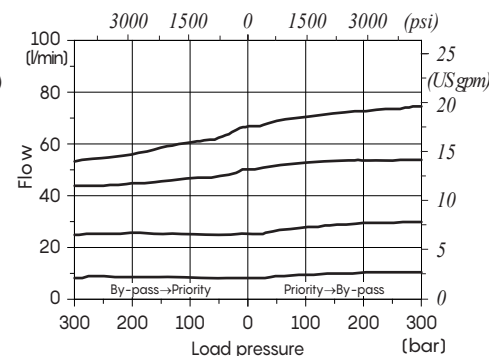
Priority flow vs. Load pressure

stand-by: 5 bar (72.5 psi)
inlet flow: 100 l/min (26.4 US gpm)



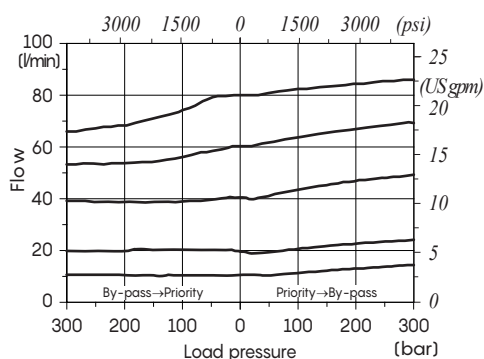
Priority flow vs. Load pressure

stand-by: 7.5 bar (108 psi)
inlet flow: 100 l/min (26.4 US gpm)



Priority flow vs. Load pressure

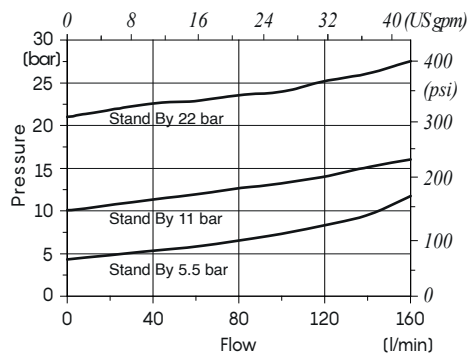
stand-by: 10.5 bar (152 psi)
inlet flow: 100 l/min (26.4 US gpm)



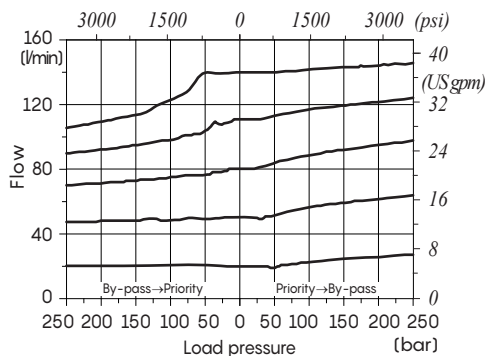
Rating diagrams

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

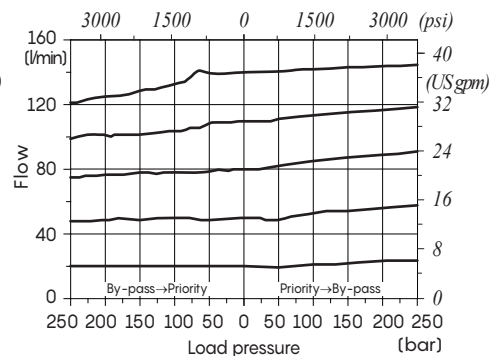
Pressure drop
from 3->2 (4 closed)



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)

