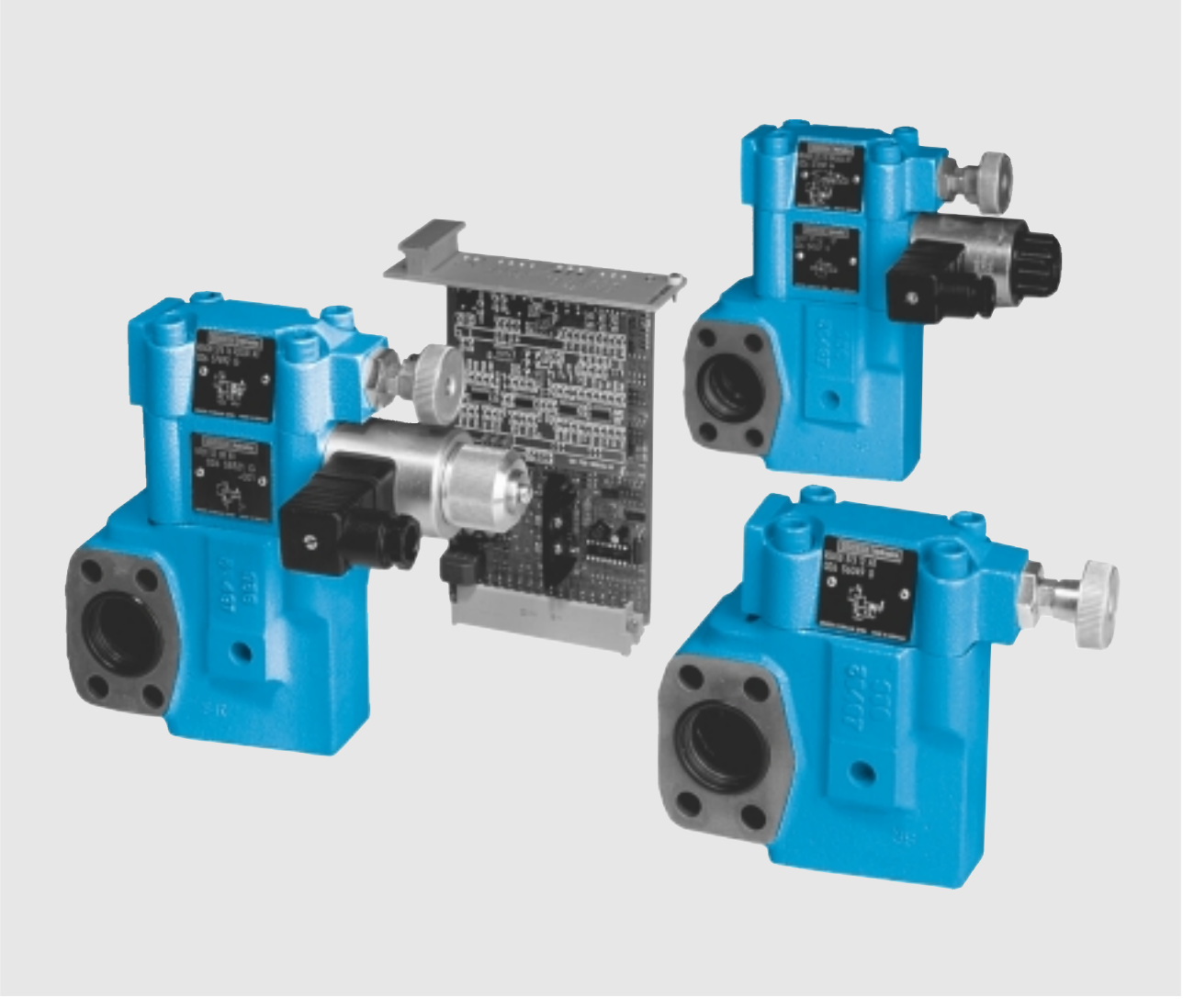
DENISON HYDRAULICS
Pressure Controls – Flanged Type
Series R5 with 2 ports



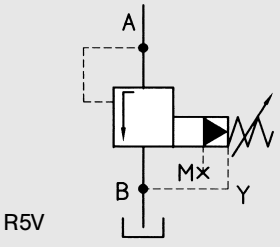
Publ. 3–EN 2850–B, replaces 3–EN 2850-A

DENISON Hydraulics

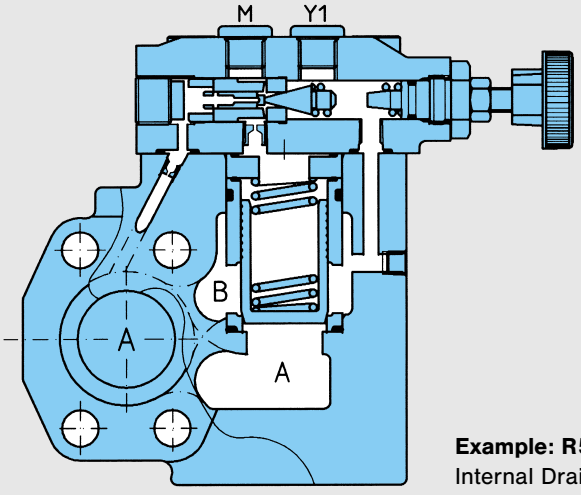
FEATURES

- **Increase Operating Satefy:** Flange mounted valves as illustrated in this bulletin increase operating safety and reduce mounting costs. The R5 range of flange bodied pressure controls enable the valves to be mounted directly on an SAE pump outlet flange, ensuring maximum pump protection against peak pressure and eliminating costly piping.
- **High Performance:** R5 valves are designed for a maximum adjustable pressure of 210/280/350 bar and a flow capacity ranging from 90 l/min (3/4'') to 600 l/min (1 1/4''). The pilot stage design reduces pressure overshoot and cracking flow to a minimum, thus reducing power and production losses during high pressure operation.
- **Precise Control:** With the DENISON combined Seat Valve and Pilot design, and the range of springs available, it is possible to achieve extremely precise pressure setting.
- **Fast Response:** The favourable poppet mass to area ratio is especially advantageous, as it enables such features as fast response, high accuracy and quiet, flutter free control.
- **Wide Selection:** In addition to the two port flange mount valve, the ordering code offers a wide range of control options for valves and accessories.

SYMBOL

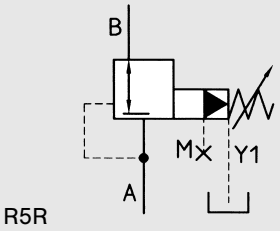


R5V

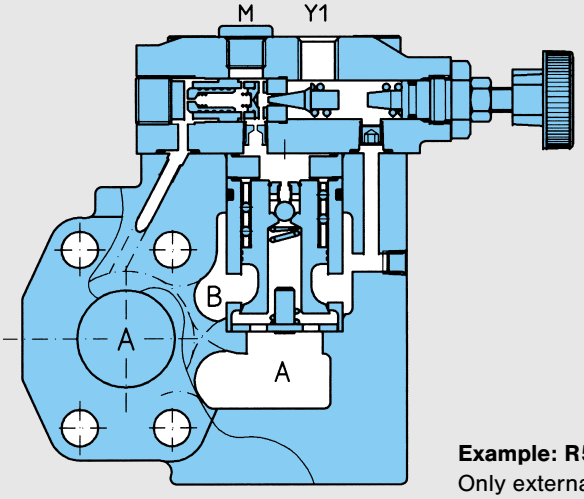


Example: R5V10
Internal Drain

SYMBOL



R5R



Example: R5R10
Only external Drain

GENERAL DESCRIPTION

DENISON Pressure Valves are pilot operated controls consisting of two or three valve sections, either a high flow, poppet type seat valve section controlled by the low flow, adjustable pilot mounted on top or in the case of the Proportional Pressure Valve, the proportional section P2 sandwiched between the pilot valve and the main body.

Pressure setting is achieved by means of a knurled knob or, if a tamperproof setting is required, by an acorn nut with lead seal. A proportional pressure setting is achieved according to the current input by R5V...P2 or R5R...P2.

PRESSURE RELIEF VALVE

R5V pressure relief valves are used to limit the system pressure of a hydraulic system, in order to control the force exerted by a hydraulic actuator. The R5V valve may also be used to generate a pressure drop in a hydraulic circuit. Normally the pump is connected to Port A and the tank line to Port B.

PRESSURE REDUCING VALVE

R5R reducing valves are used to control pressures in a secondary part of a hydraulic circuit and to maintain this pressure as set by the control knob on the pilot, or according to the current input at R5R...P2. The small check valve prevents intensification in the secondary port by allowing excess flow to drain.
The max. flow through this valve should not exceed 5 l/min.

SEQUENCE VALVE

The R5S valve enables a hydraulic system to operate in a pressure sequence. After system pressure connected to Port A has reached a preadjusted value, fluid is allowed to pass through Port B to a secondary system.

NOTE

DENISON flange valves enable the realisation of complete control systems. In addition to the valves discussed in this publication, the following flange valves are also available:

	Publication
– R5 pressure valves with 3 ports	3–EN 2900
– F5C flow controls & R5A, R5P compensators	5–EN 4200
– C5V check valves, direct operated	6–EN 4660
– C5P check valves, direct & pilot operated	6–EN 4700
– D5S seat valves with 2 ports	7–EN 520
– D5S seat valves with 3 ports	7–EN 530

TECHNICAL DATA

GENERAL

• Design	Poppet type
• Type of mounting	Flanged according to SAE 61 e.g. directly on a pump
• Port sizes	3/4″, 1″, 1 1/4″
• Mounting position	Optional
• Direction of flow	A→B for R5V, R5S B→A for R5R
• Ambient temperature range	– 20 . . . + 60 °C
• Suitability for special working conditions	Consult DENISON

HYDRAULIC CHARACTERISTICS

• Operating pressure range	
– Inlet (R5V, R5S port A), (R5R port B)	0 . . . 350 bar R5* 06/08 0 . . . 280 bar R5* 10 0 . . . 210 bar R5* **C
– Outlet (R5V, R5S port B), (R5R port A)	0 . . . 30 bar R5V 0 . . . 350 bar R5S, R5R 06/08 0 . . . 280 bar R5S, R5R 10 0 . . . 210 bar R5* **C
– Port M	0 . . . 350 bar R5* 06/08 0 . . . 280 bar R5* 10 0 . . . 210 bar R5* **C
– Port Y1	0 . . . 30 bar
• Pressure setting range	7 . . . 350 bar R5* 06/08 7 . . . 280 bar R5* 10 7 . . . 210 bar R5* **C

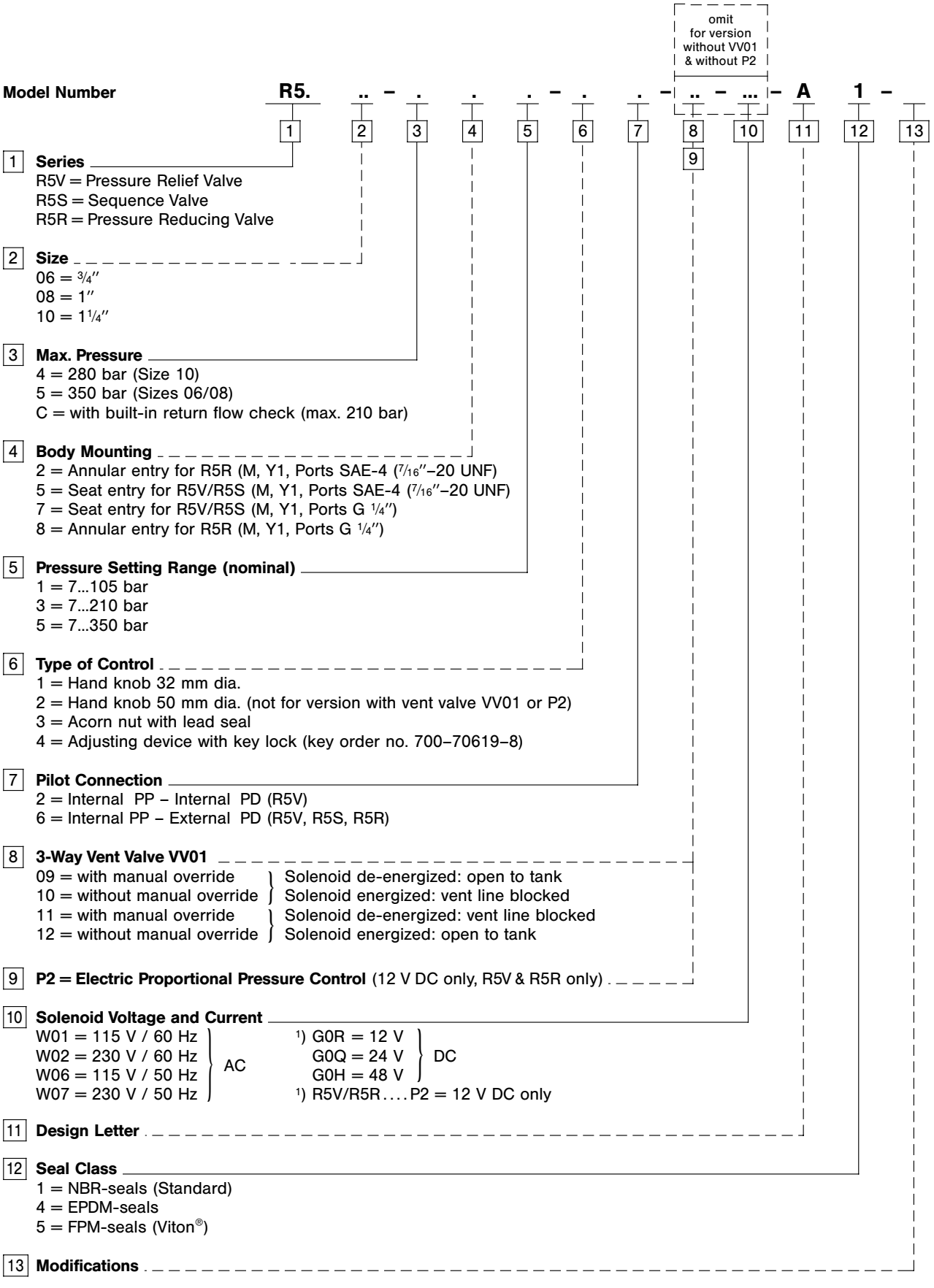
	R5*06 3/4″	R5*08 1″	R5*10 1 1/4″
• Max. flow	90 l/min	300 l/min	600 l/min
• Nominal flow	60 l/min	200 l/min	450 l/min

• Pilot flow	0.5 l/min at Δ p 10 bar 1.0 l/min at Δ p 350 bar
• Fluid	Mineral oil according to DIN 51524/25 (other fluids on request)
• Contamination level	Max. permissible contamination level according to NAS 1638 Class 8 (Class 9 for 15 Micron and smaller) or ISO 17/14
• Fluid temperature range	– 18 . . . + 80 °C
• Viscosity range	10 . . . 650 cSt; optimal 30 cSt

TYPE OF ACTUATOR

• **Manual**	
• Rotation	3.75 x 360 °
• Operation torque	72 Ncm
• **Electric**	By solenoid
• Nominal voltage	Refer to ordering code page 5
• Permissible voltage difference	+ 5 % . . . – 10 %
• Max. coil temperature	+ 180 °C (temperature class H)
• Type of current	Alternating current (AC) or direct current (DC)
• Input power	31 W
• Holding	78 VA } AC
• Inrush	264 VA } AC
• Relative operating period	100 %
• Type of protection	IP 65
• **Electric proportional** (Pilot stage P2)	0 . . . 2.5 A (refer to publication 3–EN 2200)

ORDERING CODE



1 **Series**
R5V = Pressure Relief Valve
R5S = Sequence Valve
R5R = Pressure Reducing Valve

2 **Size**
06 = 3/4″
08 = 1″
10 = 1 1/4″

3 **Max. Pressure**
4 = 280 bar (Size 10)
5 = 350 bar (Sizes 06/08)
C = with built-in return flow check (max. 210 bar)

4 **Body Mounting**
2 = Annular entry for R5R (M, Y1, Ports SAE-4 (7/16″–20 UNF)
5 = Seat entry for R5V/R5S (M, Y1, Ports SAE-4 (7/16″–20 UNF)
7 = Seat entry for R5V/R5S (M, Y1, Ports G 1/4″)
8 = Annular entry for R5R (M, Y1, Ports G 1/4″)

5 **Pressure Setting Range (nominal)**
1 = 7...105 bar
3 = 7...210 bar
5 = 7...350 bar

6 **Type of Control**
1 = Hand knob 32 mm dia.
2 = Hand knob 50 mm dia. (not for version with vent valve VV01 or P2)
3 = Acorn nut with lead seal
4 = Adjusting device with key lock (key order no. 700–70619–8)

7 **Pilot Connection**
2 = Internal PP – Internal PD (R5V)
6 = Internal PP – External PD (R5V, R5S, R5R)

8 **3-Way Vent Valve VV01**
09 = with manual override } Solenoid de-energized: open to tank
10 = without manual override } Solenoid energized: vent line blocked
11 = with manual override } Solenoid de-energized: vent line blocked
12 = without manual override } Solenoid energized: open to tank

9 **P2 = Electric Proportional Pressure Control** (12 V DC only, R5V & R5R only)

10 **Solenoid Voltage and Current**
W01 = 115 V / 60 Hz } AC
W02 = 230 V / 60 Hz } AC
W06 = 115 V / 50 Hz } AC
W07 = 230 V / 50 Hz } AC
[1]) G0R = 12 V } DC
G0Q = 24 V } DC
G0H = 48 V } DC
[1]) R5V/R5R.... P2 = 12 V DC only

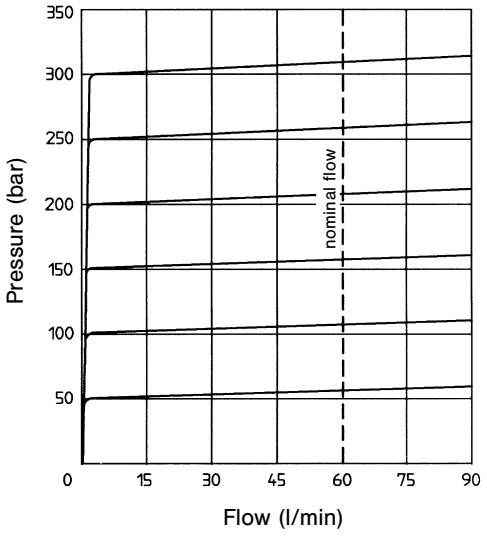
11 **Design Letter**

12 **Seal Class**
1 = NBR-seals (Standard)
4 = EPDM-seals
5 = FPM-seals (Viton®)

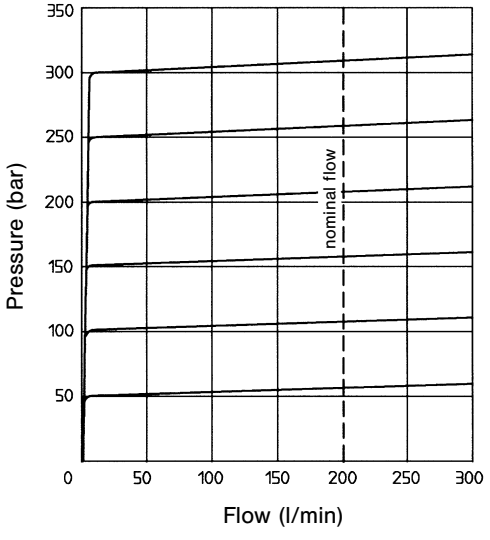
13 **Modifications**

p-Q-Curves

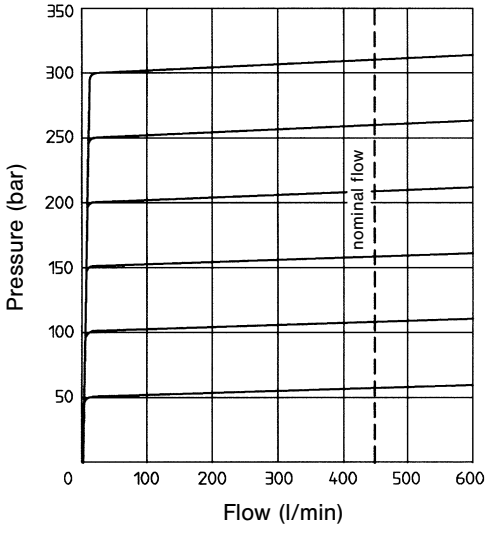
R5V06



R5V08



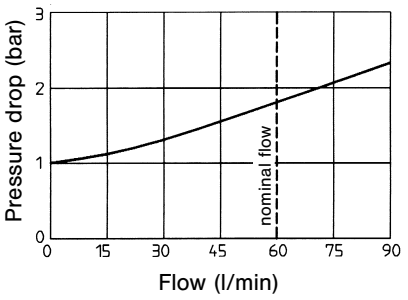
R5V10



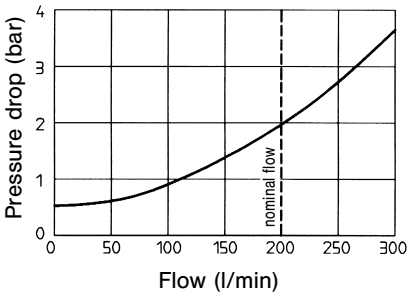
Min. pressure setting ≧ 3 bar
(depending on flow and viscosity).
Fluid 40 cSt and 50 °C ± 0.5 °C.

Pressure Drop of the Return Flow Check Valve

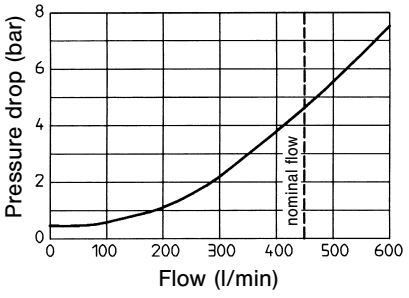
R5.06C



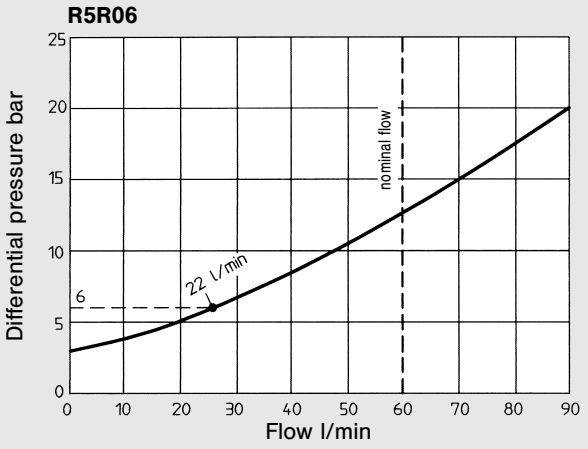
R5.08C

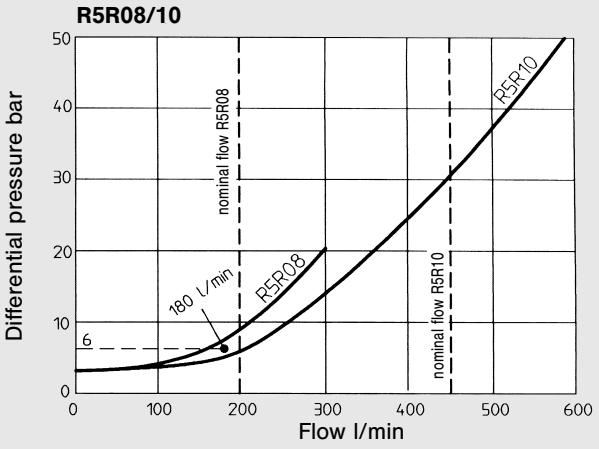


R5.10C

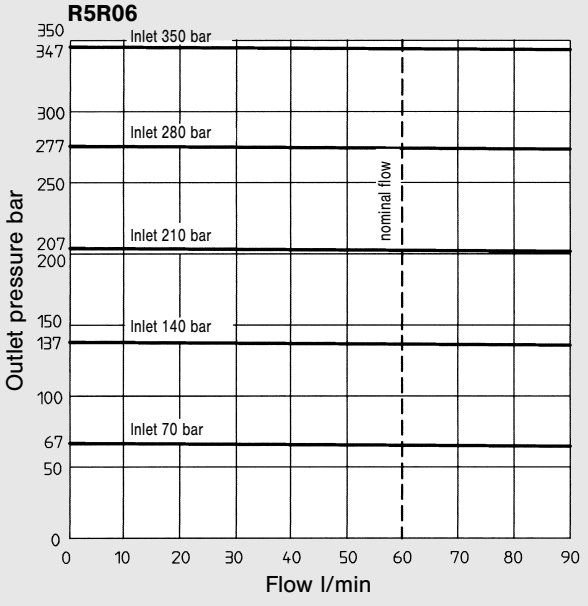


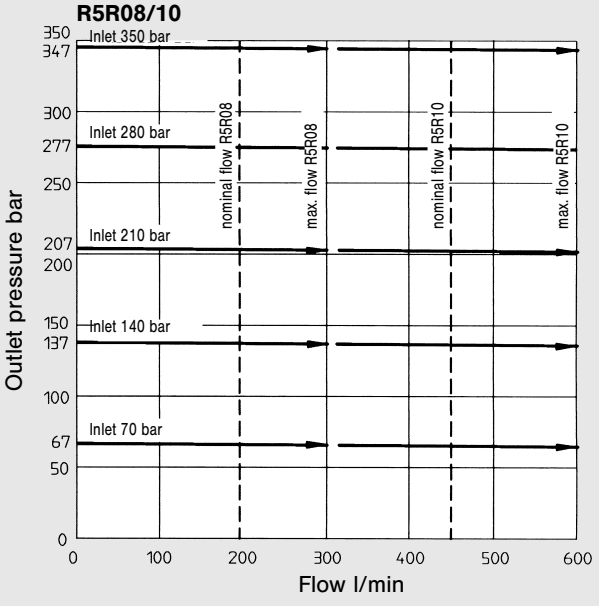
Minimum differential pressure between inlet & outlet pressure at various flow rates



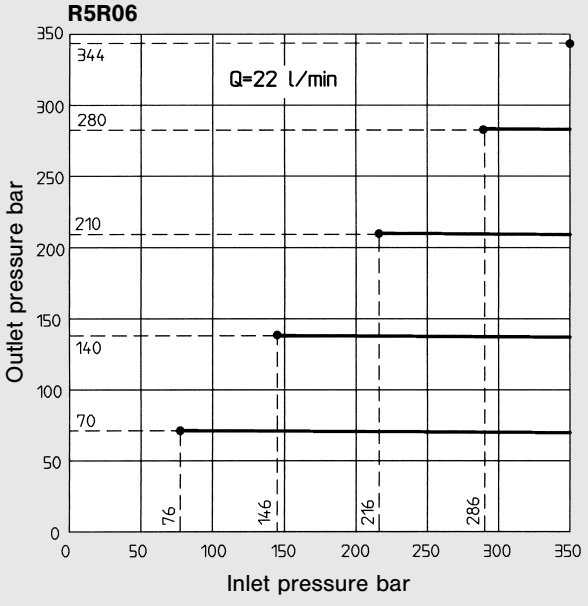


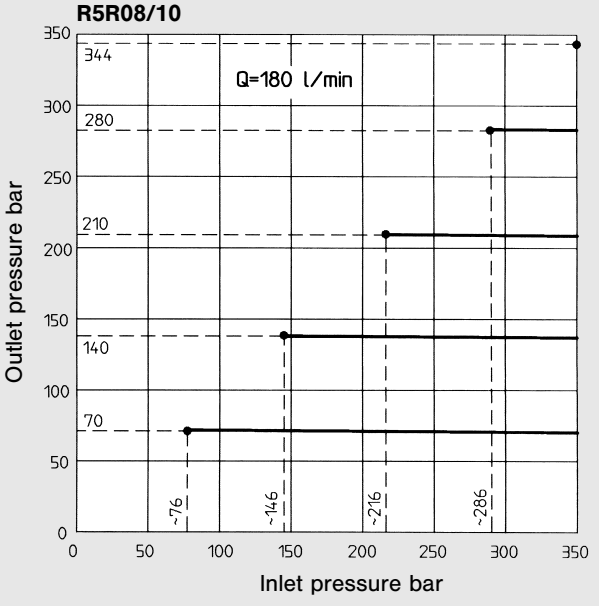
Variation in outlet pressure for variation in flow rate



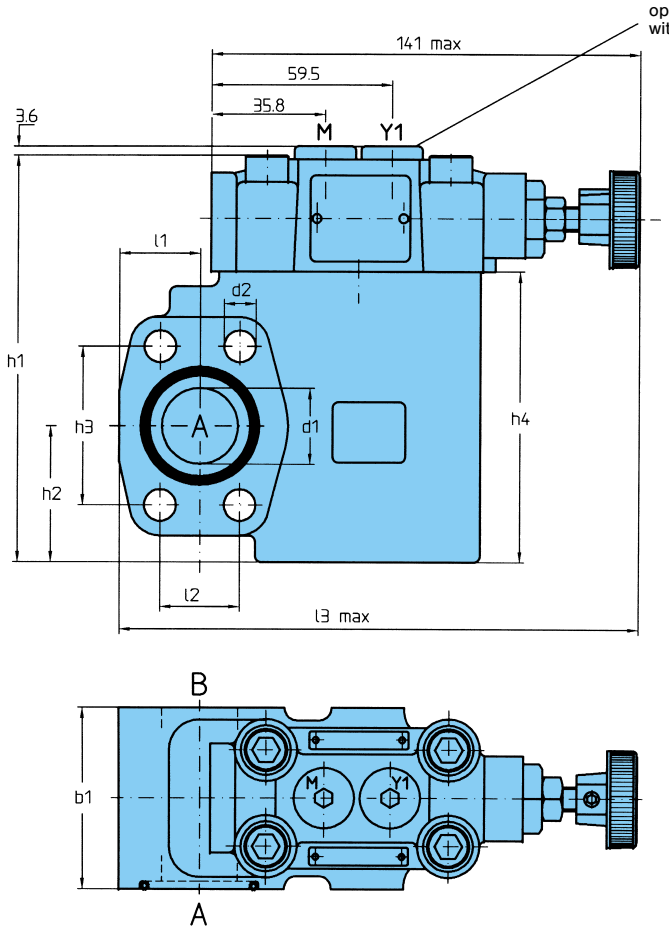


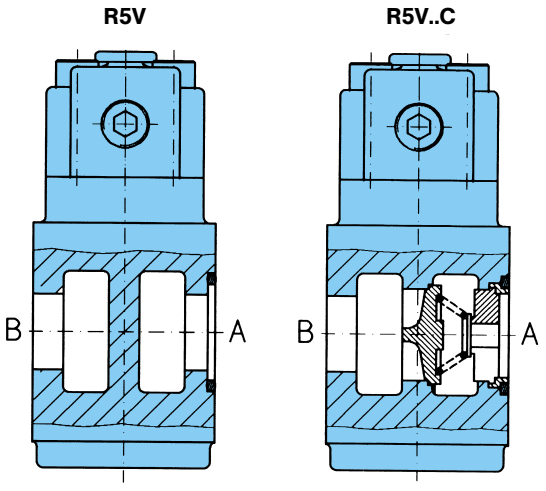
The effect of inlet pressure variation on outlet pressure setting

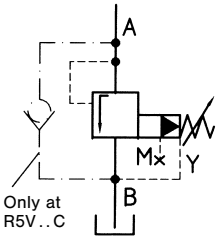
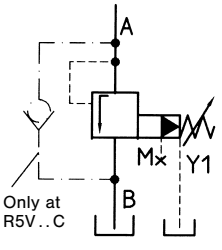




Seat Entry





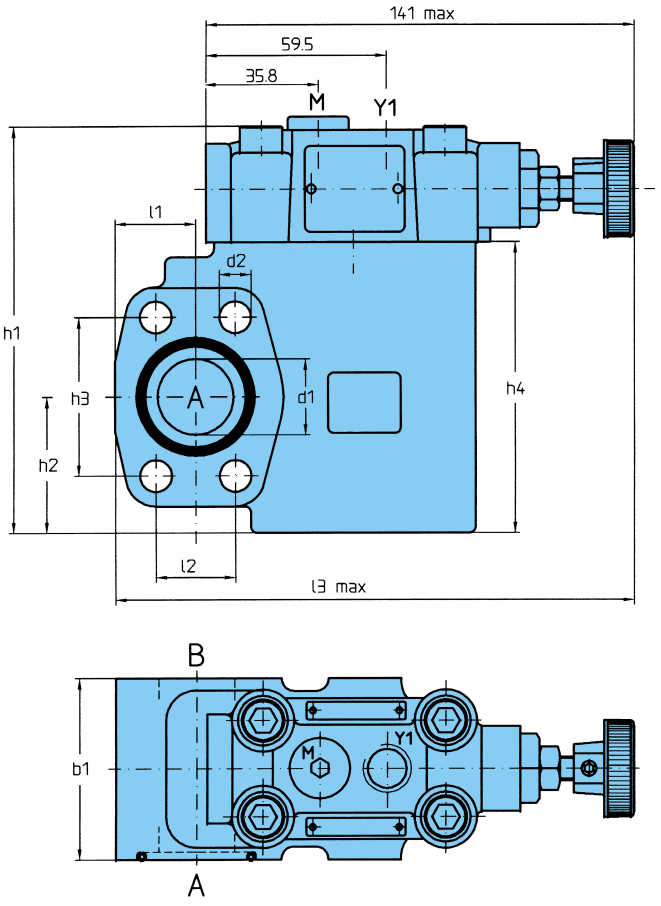
Internal Drain	External Drain
	

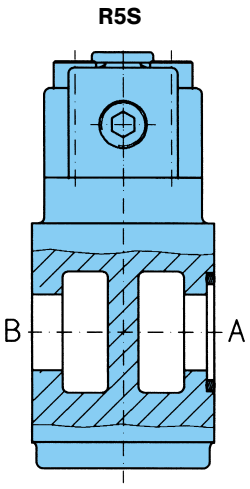
Ports	Function	Port Sizes		
		R5V06	R5V08	R5V10
A	Pressure	3/4″ SAE-61	1″ SAE-61	1 1/4″ SAE-61
B	Tank	3/4″ SAE-61	1″ SAE-61	1 1/4″ SAE-61
Y1	external drain	G1/4″ or SAE-4		
M	Pressure gauge			

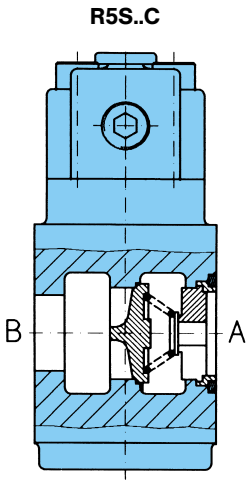
Dimensions

	Size	l_1	l_2	l_3	b_1	h_1	h_2	h_3	h_4	d_1	d_2	Weight
R5V06	3/4″	24.6	22.2	152	60	128	37	47.6	90	19	10.5	4.0 kg
R5V08	1″	26.5	26.2	171	60	134	45	52.4	96	25	10.5	4.6 kg
R5V10	1 1/4″	34.0	30.2	179	75	147	48	58.7	109	32	12.5	5.9 kg

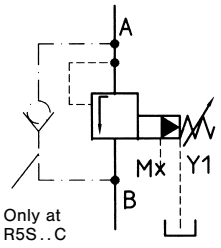
Seat Entry







External Drain

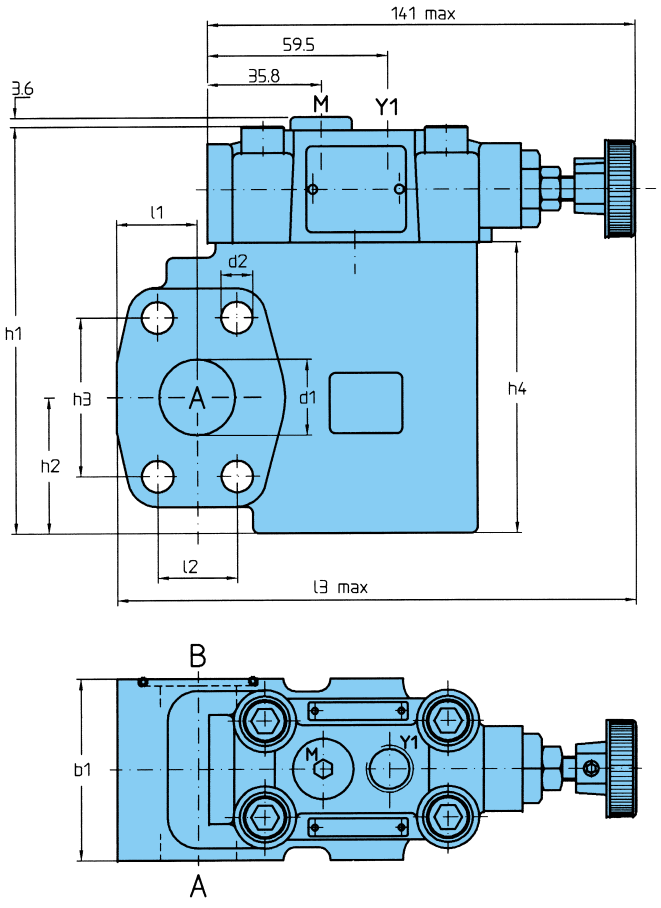


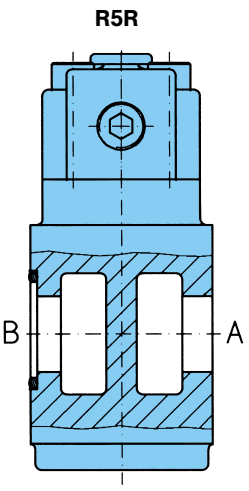
Ports	Function	Port Sizes		
		R5S06	R5S08	R5S10
A	Pressure port (inlet)	¾″ SAE-61	1″ SAE-61	1¼″ SAE-61
B	Secondary port (outlet)	¾″ SAE-61	1″ SAE-61	1¼″ SAE-61
Y1	external drain	G¼″ or SAE-4		
M	Pressure gauge			

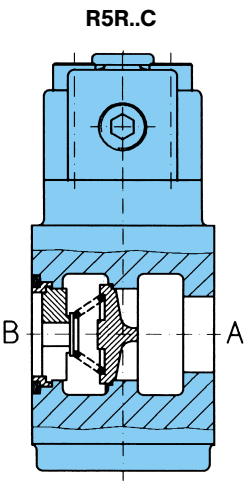
Dimensions

	Size	l_1	l_2	l_3	b_1	h_1	h_2	h_3	h_4	d_1	d_2	Weight
R5S06	¾″	24.6	22.2	152	60	128	37	47.6	90	19	10.5	4.0 kg
R5S08	1″	26.5	26.2	171	60	134	45	52.4	96	25	10.5	4.6 kg
R5S10	1¼″	34.0	30.2	179	75	147	48	58.7	109	32	12.5	5.9 kg

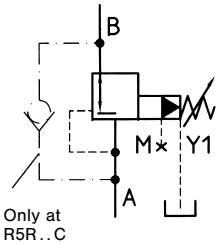
Annular Entry







External Drain



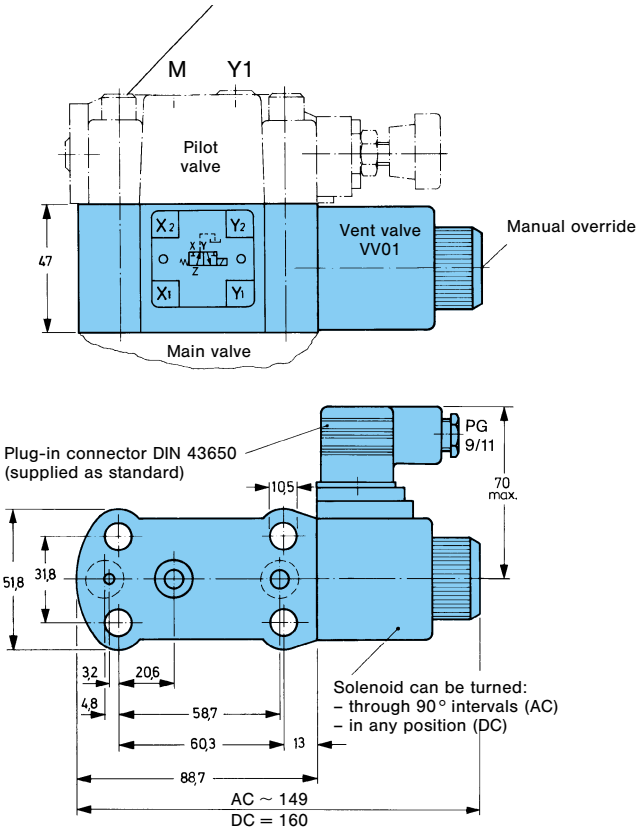
Ports	Function	Port Sizes		
		R5R06	R5R08	R5R10
B	Inlet pressure	¾″ SAE-61	1″ SAE-61	1¼″ SAE-61
A	Reduced outlet pressure	¾″ SAE-61	1″ SAE-61	1¼″ SAE-61
Y1	external drain	G¼″ or SAE-4		
M	Pressure gauge			

Dimensions

	Size	l_1	l_2	l_3	b_1	h_1	h_2	h_3	h_4	d_1	d_2	Weight
R5R06	¾″	24.6	22.2	152	60	128	37	47.6	90	19	10.5	4.0 kg
R5R08	1″	26.5	26.2	171	60	134	45	52.4	96	25	10.5	4.6 kg
R5R10	1¼″	34.0	30.2	179	75	147	48	58.7	109	32	12.5	5.9 kg

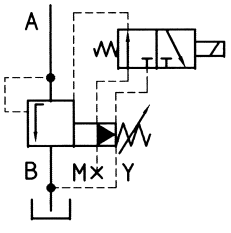
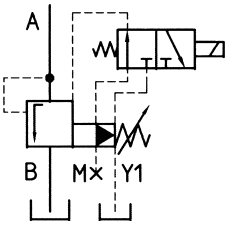
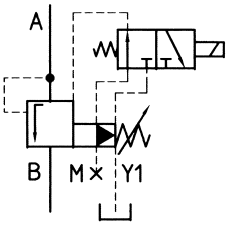
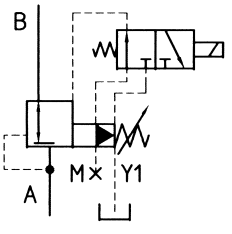
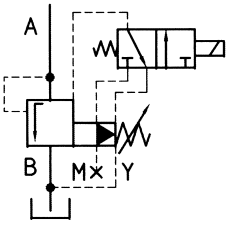
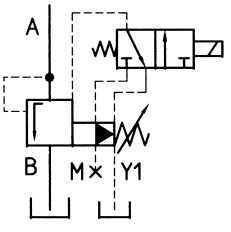
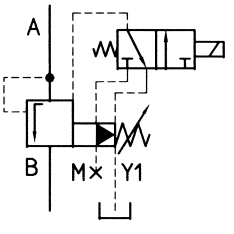
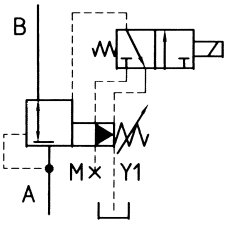
Weight (VV01): 1.7 kg

Screws for additional vent valve installation.
4 x 3/8″–24 UNF x 3½″ lg., order no. 359–15340–0.

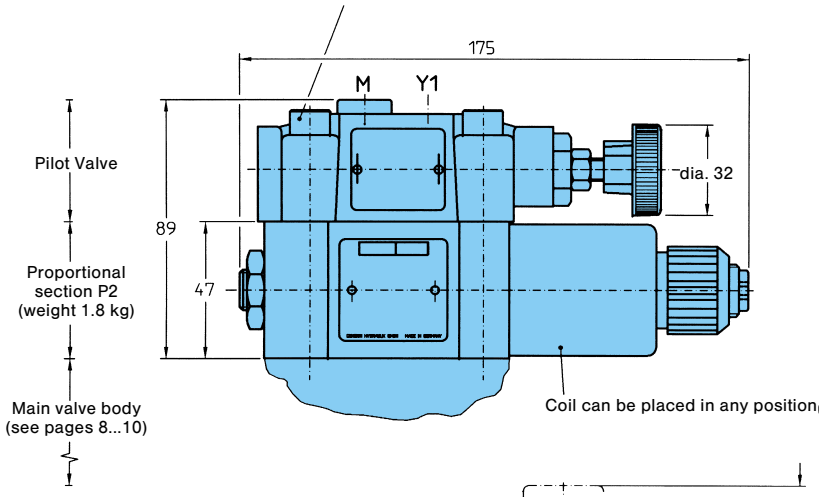


Note:
Details for vent valve VV01 see publication 3–EN 215.

Symbols:
R5* – Pressure Controls with Vent Valve VV01

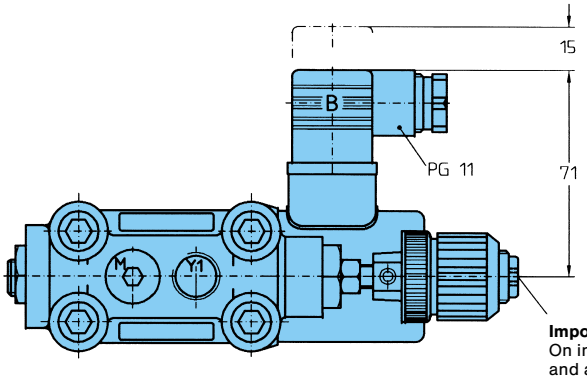
Code	Pressure Relief Valve R5V		Sequence Valve R5S	Pressure Reducing Valve R5R
	Internal Drain	External Drain	External Drain	External Drain
11 or 12				
09 or 10				

Screws for additional proportional section installation
4 x 3/8"–24 UNF x 3 1/2" lg., Order No. 359–15340.



The pilot drain port must be connected to a stable low pressure tank line. Pressure variations in the drain port should be avoided.

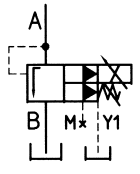
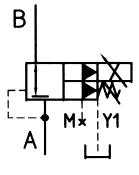
Drain line
external from the pilot head (Y1), no return line pressure permissible



Distance required to remove plug-in connector.
Plug-in connector supplied as standard.

Important:
On initial start up
and after long shut down periods
bleed air from this plug.

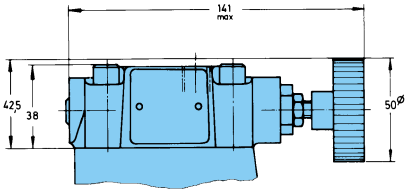
Symbol

R5V..P2	R5R..P2
External drain	
	

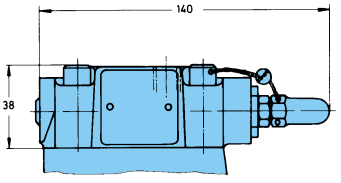
Note:
See publication 3–EN 2200 for information on Electrical Proportional Control Valve.
For additional installation with pilot operated control valves please consult DENISON.

ADDITIONAL TYPES OF CONTROLS

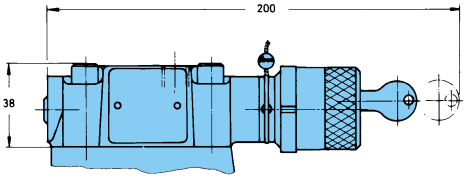
Type of Control-Code 2
Hand knob 50 mm dia.
(not for version with
vent valve VV01 or P2)



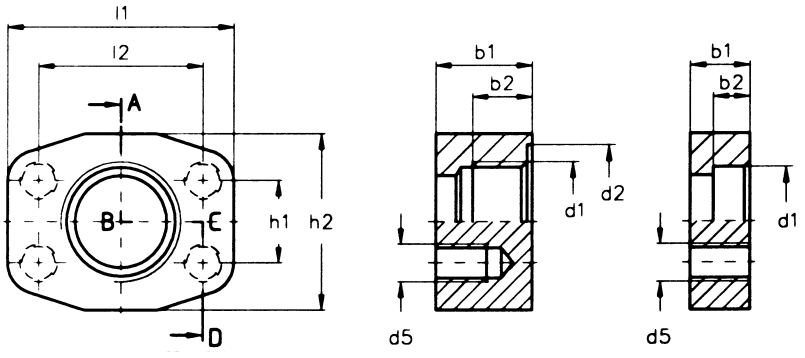
Type of Control-code 3
Acorn nut with lead seal



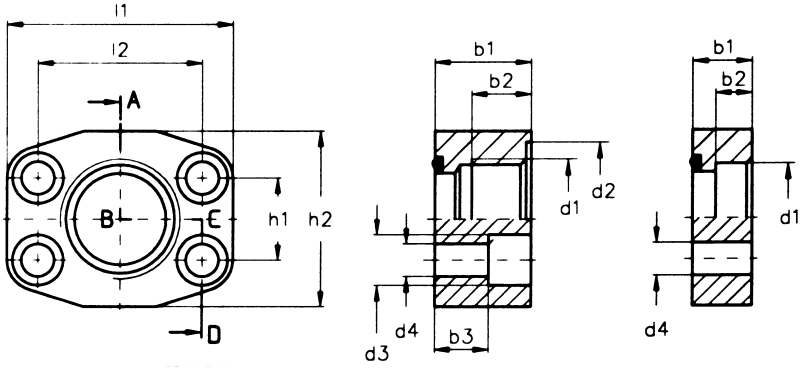
Type of Control-Code 4
Adjusting device with key lock.
Key must be ordered separately
order-no. 700–70619–8



Inlet flange
(only for
pipe mounting)
available with
UNC-threads only



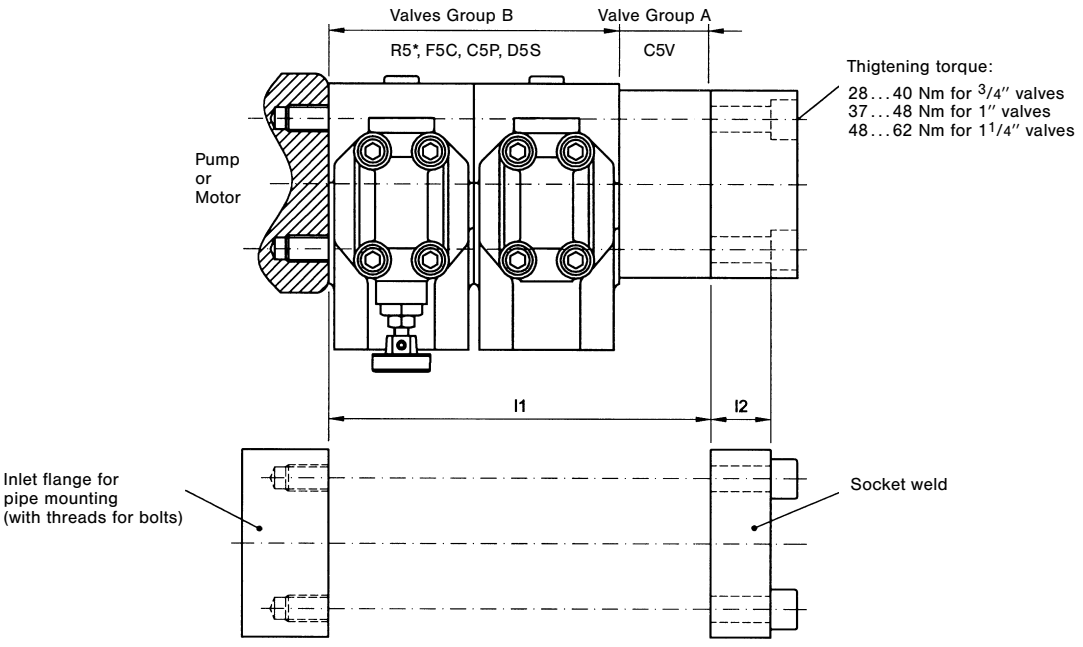
**Outlet and
tank port
flange**



Port sizes d_1	**Inlet flange** (without screws*) only for pipe mounting	**Outlet flange** (without screws*)	**Tank port flange** (with screws)												
	Order No.	Order No.	Order No.	l_1	l_2	b_1	b_2	b_3	h_1	h_2	$d_2\varnothing$	$d_3\varnothing$	$d_4\varnothing$	d_5
G 3/4″	S16-86520-0	S16-86529-0	S14-66933-0	67	47.6	34	15.9	22	22.2	52	40	16.5	10.5	3/8″ UNC
3/4″ socket weld	S16-86519-0	S16-86528-0	S14-66941-0			19	12	–			–	–		
G 1″	S16-86523-0	S16-86532-0	S14-66934-0	72	52.4	34	20	22	26.2	58	46	16.5		
1″ socket weld	S16-86522-0	S16-86531-0	S14-66942-0			24	14	–			–	–		
G 1 1/4″	S16-86526-0	S16-86535-0	S14-66935-0	80	58.7	39	22	24	30.2	73	54	17.5	12.5	7/16″ UNC
1 1/4″ socket weld	S16-86525-0	S16-86534-0	S14-66943-0			24	14	–			–	–		

* see page 15 for screws

Example



	Qty. of valves and group for each stack	l1	l2	UNC-Screws (12.9)		Metric Screws (12.9)	
				Dimension	Order No.	Dimension	Order No.
3/4" SAE 61	1 x A	45	16...22	3/8"–16 x 3 1/4"	358–16330–0	M10 x 80	361–11324–8
	1 x B	60		3/8"–16 x 3 3/4"	358–16350–0	M10 x 95	361–11354–8
	(1 x A) + (1 x B)	105		3/8"–16 x 5 1/2"	358–16420–0	M10 x 140	361–11424–8
	2 x B	120		3/8"–16 x 6"	358–16440–0	M10 x 160	700–70836–8
	(1 x A) + (2 x B)	165		3/8"–16 x 8"	358–16520–0	M10 x 200	700–70821–8
	3 x B	180		3/8"–16 x 8 1/2"	358–16540–0	M10 x 220	361–11494–8
1" SAE 61	1 x A	45	18...24	3/8"–16 x 3 1/4"	358–16330–0	M10 x 80	361–11324–8
	1 x B	60		3/8"–16 x 3 3/4"	358–16350–0	M10 x 95	361–11354–8
	(1 x A) + (1 x B)	105		3/8"–16 x 5 3/4"	358–16430–0	M10 x 140	361–11424–8
	2 x B	120		3/8"–16 x 6 1/4"	358–16450–0	M10 x 160	700–70836–8
	(1 x A) + (2 x B)	165		3/8"–16 x 8"	358–16520–0	M10 x 200	700–70821–8
	3 x B	180		3/8"–16 x 8 1/2"	358–16540–0	M10 x 220	361–11494–8
1 1/4" SAE 61	1 x A	50	21...25	7/16"–14 x 3 1/2"	358–18340–0	M12 x 90	361–12344–8
	1 x B	75		7/16"–14 x 4 1/2"	358–18380–0	M12 x 120	361–12404–8
	(1 x A) + (1 x B)	125		7/16"–14 x 6 1/2"	358–18460–0	M12 x 170	361–12454–8
	2 x B	150		7/16"–14 x 7 1/2"	358–18500–0	M12 x 190	361–12474–8
	(1 x A) + (2 x B)	200		7/16"–14 x 9 1/2"	358–18580–0	M12 x 240	361–12504–8
	3 x B	225		7/16"–14 x 10 1/2"	358–18590–0	M12 x 270	361–12664–8