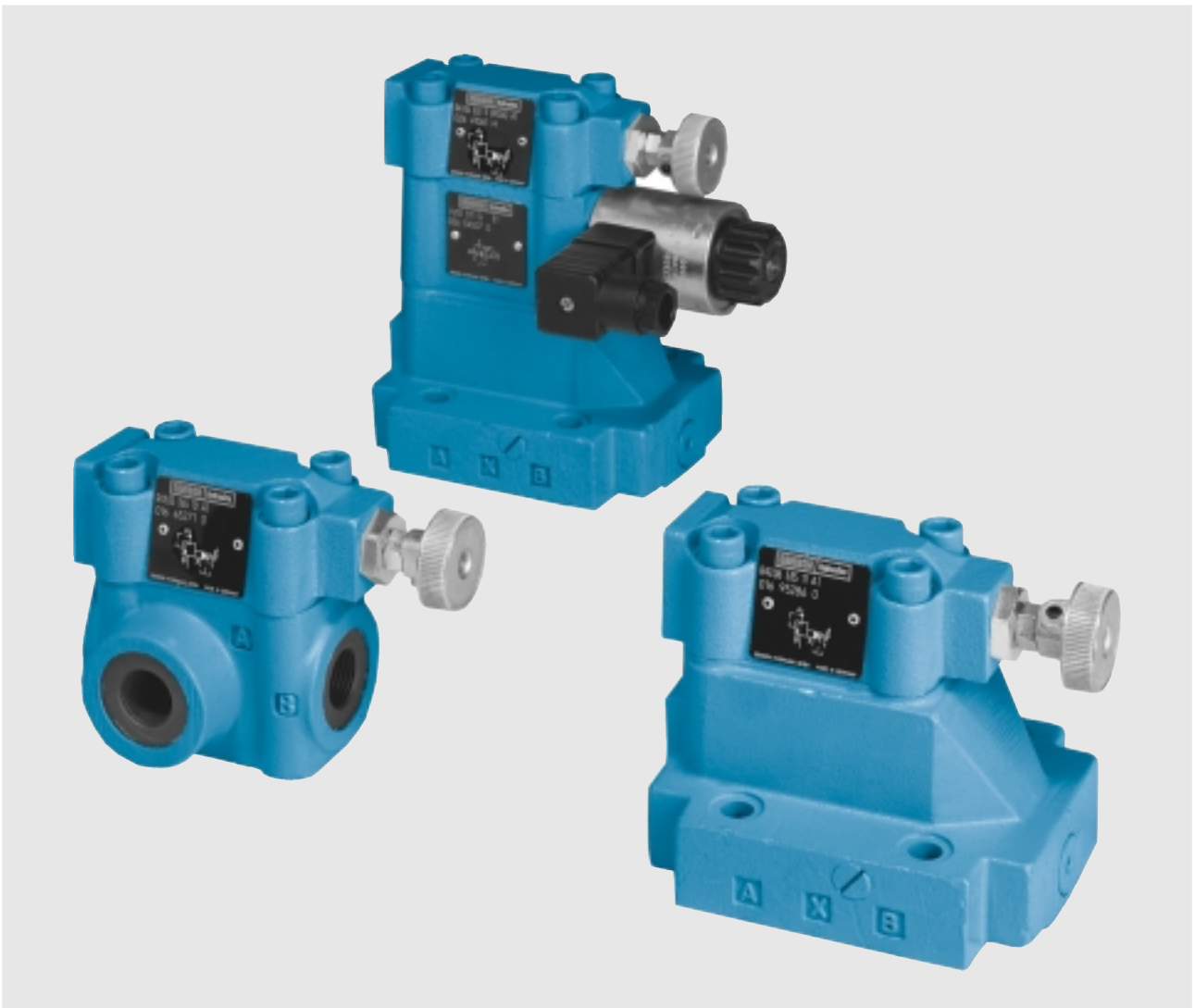


DENISON HYDRAULICS

Sequence Valves

Series R4S



Publ. 3-EN 2600-A, replaces 3-EN 260-C

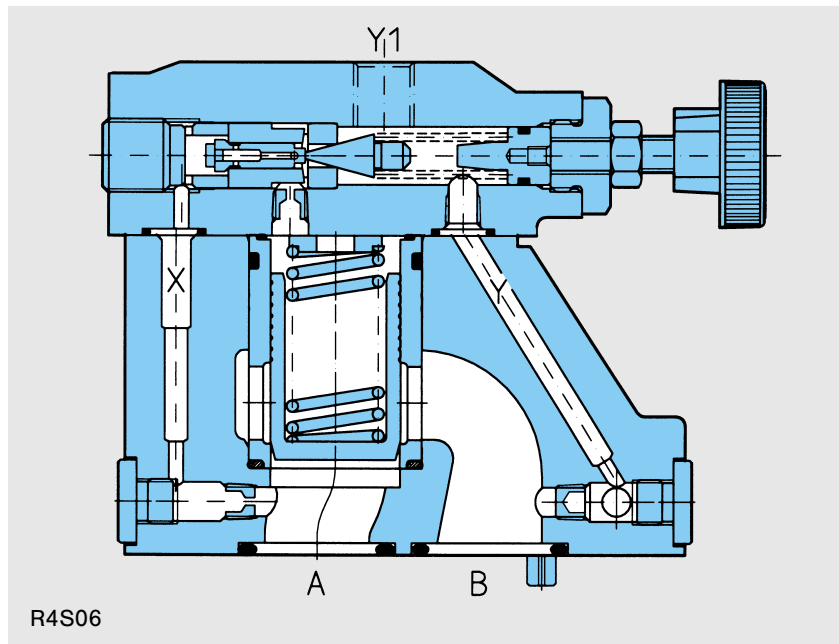
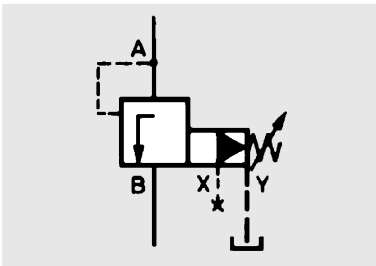
DENISON Hydraulics

FEATURES, SYMBOL

FEATURES

- **Outstanding Design:** DENISON Pressure Controls, Series R4, are exceptional – both in function and design – even under high flow conditions. Pacemaking in design, these valves offer improved features.
- **High Performance:** R4 valves are designed for a maximum adjustable pressure of 350 bars and a flow capacity ranging from 90 l/min ($\frac{3}{8}$ "") to 600 l/min ($1\frac{1}{4}$ ""). The pilot stage design reduces pressure overtravel and cracking flow to a minimum, thus reducing heating, power and production losses at high pressure operation.
- **Fast Response:** Due to the DENISON design, which combines a poppet type seat valve with the pilot control, precise adjustment and quick response eliminate pressure variation and system shocks. For sensitive control three spring settings are available.
- **Optional Versatility:** R4 valves can be used as threaded or subplate body type units or cartridges for manifold application. A solenoid vent valve is available. Integrally mounted, it requires no additional piping and can be vented in energized or de-energized condition.
- **Standardized Mounting:** Mounting configuration of Pressure Controls R4 are in accordance to international standards, such as CETOP-RP 121 H, ISO 6264. Subplate mounting, L-body or flow-through T-body are standard. Vent porting allows remote pressure control and adjustment.

SYMBOL



DESCRIPTION

GENERAL

DENISON Sequence Valves are pilot operated controls consisting of two valve sections: A high flow, poppet type seat valve section controlled by the low-flow, adjustable pilot section on top.

The R4S 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. Pressure setting can be achieved by means of a knurled knob or acorn nut with lead seal, if a tamperproof setting is required. The pilot flow can be drained externally from the pilot head or from the subplate. The R4S can be vented by means of an optional vent valve, VV01, this valve being sandwiched between the pilot valve and the main body.

CHARACTERISTICS

Due to the precise ratio between the main piston area and its mass, an exceptionally fast response can be obtained. The outstanding design features of the pilot allows for accurate and stable secondary pressure control. All the valve components are quality controlled based on international standards, thus obtaining worldwide interchangeability and replacement. Each valve is subject to an accurately monitored functional test before shipping.

OPERATION

Flow entering Port A is blocked by the poppet at low pressures. The pressure at A passes through orifices to the pilot cone and also to the top of the main poppet. There is no flow through these sections until pressure exceeds the spring setting of the pilot cone. The degree to which the spring is preloaded corresponds to the operating pressure of the valve.

If the pressure signal rises above the set pressure, the cone is lifted from its seat releasing a small pilot flow to the external drain, this results in a pressure drop across the main poppet. The main poppet opens, passing flow to B, maintaining the adjusted pressure at Port A until the pressure at B rises to the same value. As soon as the pressure is equal in both ports, the pilot control piston closes and prevents further pilot flow to the external drain. The main poppet now opens fully and allows the pressure at A and B to rise to higher values than the valve setting. In this condition, when the pressure is higher than the preset value, flow can pass through the R4S in either direction. The pilot spring cavity normally drains externally to tank.

TECHNICAL DATA

GENERAL

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Type of unit • Design • Type of mounting | Pilot operated sequence valve
Poppet type
Threaded body
Subplate mounting
Cartridge |
| <ul style="list-style-type: none"> • Port sizes • Mounting position • Direction of flow • Ambient temperature range • Suitability for special working conditions | $\frac{3}{8}$ " , $\frac{3}{4}$ " , $1\frac{1}{4}$ " nominal
optional
A→B
- 20 ... + 60 °C
Consult DENISON |

HYDRAULIC CHARACTERISTICS

- | | | | | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------|----------------------------|----------|-----------|-----------|----------|-----------|-----------|
| <ul style="list-style-type: none"> • Operating pressure range <ul style="list-style-type: none"> - inlet (port A) - outlet (port B) - port X - port Y, Y1 • Pressure setting range <ul style="list-style-type: none"> - min - max • Fluid | 0 ... 350 bar
0 ... 350 bar
0 ... 350 bar
without pressure to tank

depends on flow (see page 6)
up to 350 bar
Mineral oil according to DIN 51524/25
(other fluids on request) | | | | | | | | | |
| <ul style="list-style-type: none"> • Fluid temperature range • Viscosity range • Recommended operating viscosity • Contamination level | - 18 ... + 80 °C
10 ... 650 cSt
30 cSt
Max. permissible contamination level
according to NAS 1638 Class 8 (Class 9
for 15 micron and smaller) or ISO 17/14 | | | | | | | | | |
| <ul style="list-style-type: none"> • Nominal flow • Max. flow | <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">R4S06 ($\frac{3}{4}$")</td> <td style="width: 33%; text-align: center;">R4S10 ($1\frac{1}{4}$")</td> </tr> <tr> <td style="text-align: center;">60 l/min</td> <td style="text-align: center;">200 l/min</td> <td style="text-align: center;">450 l/min</td> </tr> <tr> <td style="text-align: center;">90 l/min</td> <td style="text-align: center;">300 l/min</td> <td style="text-align: center;">600 l/min</td> </tr> </table> | | R4S06 ($\frac{3}{4}$ ") | R4S10 ($1\frac{1}{4}$ ") | 60 l/min | 200 l/min | 450 l/min | 90 l/min | 300 l/min | 600 l/min |
| | R4S06 ($\frac{3}{4}$ ") | R4S10 ($1\frac{1}{4}$ ") | | | | | | | | |
| 60 l/min | 200 l/min | 450 l/min | | | | | | | | |
| 90 l/min | 300 l/min | 600 l/min | | | | | | | | |

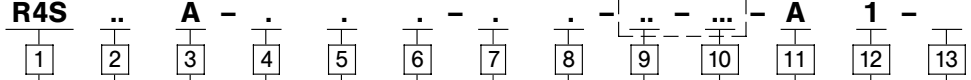
TYPE OF ADJUSTMENT

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Manual • Rotation • Operating torque • Electric (Vent valve VV01) • Nominal voltage • Permissible voltage difference • Max. coil temperature • Type of current | Handwheel
3.75 rev.
0.72 Nm
by solenoid
Refer to ordering code page 5
+ 5 ... - 10 %
+ 180 °C (temperature class H)
Alternating current (AC)
Direct current (DC) |
| <ul style="list-style-type: none"> • Input power • Holding • Inrush • Relative operating period • Type of protection | 31 W
78 VA
264 VA
100 %
IP 65 |

If the performance characteristics outlined above do not meet your requirements, please consult your local DENISON Office.

ORDERING CODE

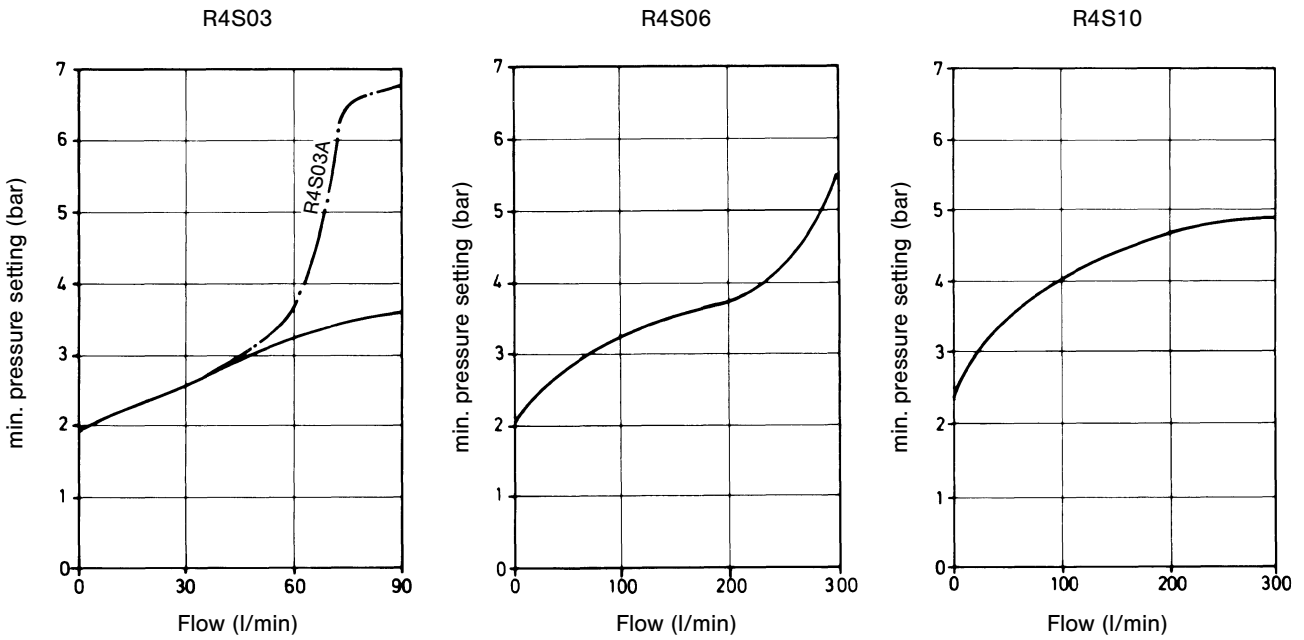
Model Number:



- 1 **Series**
R4S = Sequence Valve
- 2 **Size**
03 = 3/8"
06 = 3/4", 1"
10 = 1 1/4"
- 3 **A** = Shorter response time (R4S03)
- 4 **Max. Pressure**
0 = for cartridges only } 350 bar
5 = for body valves only }
- 5 **Body Mounting**
Cartridge with pilot valve:
0 = without Y1 port
E = Y1 port = SAE-4 (7/16"-20 UNF)
G = Y1 port = G 1/4"
Subplate mounting:
3 = without Y1 port
7 = Y1 port = SAE-4 (7/16"-20 UNF)
9 = Y1 port = G 1/4"
Threaded body:
6 = R4S03 = G 1/2" T-body }
= R4S06 = G 1" T-body } X, Y1 ports ¹⁾ = G 1/4"
D = R4S06 = G 3/4" L-body }
= R4S10 = G 1 1/4" L-body }
4 = R4S03 = SAE- 8 T-body }
= R4S06 = SAE-16 T-body } X, Y1 ports ¹⁾ = SAE-4
B = R4S06 = SAE-12 L-body } (7/16"-20 UNF)
= R4S10 = SAE-20 L-body }
¹⁾ Port Y1 is only available at **Drain line** (code 2) external from the pilot head
- 6 **Pressure Setting Range**
1 = 7...105 bar
3 = 7...210 bar
5 = 7...350 bar
- 7 **Type of Control**
1 = Hand knob 32 mm dia.
2 = Hand knob 50 mm dia. (not for version with vent valve VV01)
3 = Acorn nut with lead seal
4 = Adjusting device with key lock, key order no. 700-70619-8
- 8 **Drain Line (Ports Y, Y1)**
1 = external from the subplate/manifold (Y).
2 = external from the pilot head (Y1); (not for **Body mounting** codes 0 or 3)
- 9 **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
- 10 **Solenoid Voltage and Current**
W01 = 115 V / 60 Hz }
W02 = 230 V / 60 Hz } AC
W06 = 115 V / 50 Hz }
W07 = 230 V / 50 Hz }
G0R = 12 V }
G0Q = 24 V } DC
G0H = 48 V }
- 11 **Design Letter**
- 12 **Seal Class**
1 = N.B.R. (Buna N) Standard
4 = E.P.R.
5 = VITON®
- 13 **Modifications**

CURVES

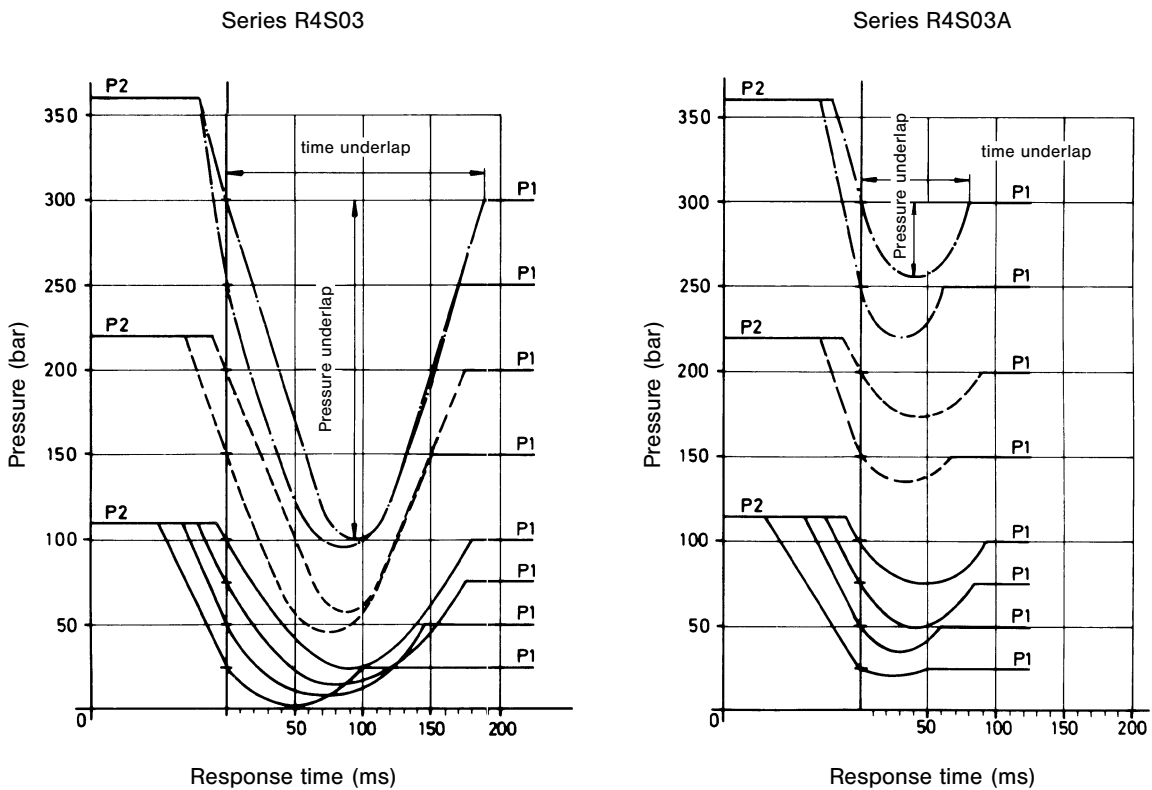
p_s min - q_v - Characteristics



Fluid 60 cSt at 40°C
Test temp. 50°C ± 10%

Pressure Characteristics at Closing Point

P1 = setting pressure
P2 = operating pressure



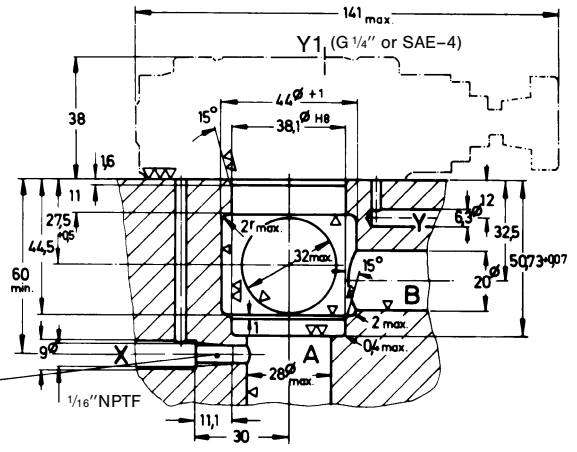
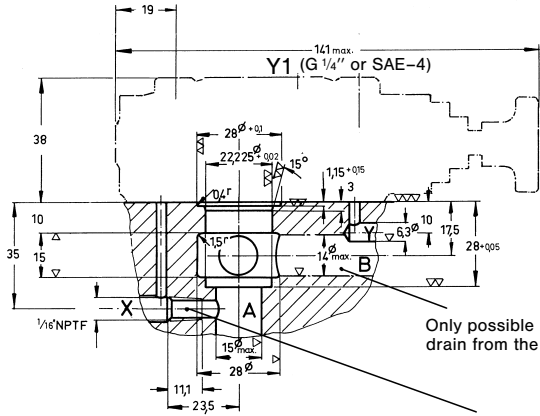
CARTRIDGES WITH PILOT VALVES

R4S03 – Cartridge

Weight: 0.6 kg

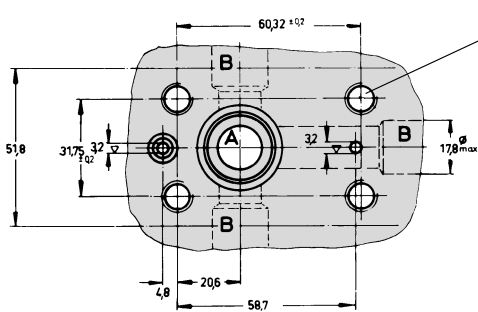
R4S06/10 – Cartridge

Weight: 1.2 kg

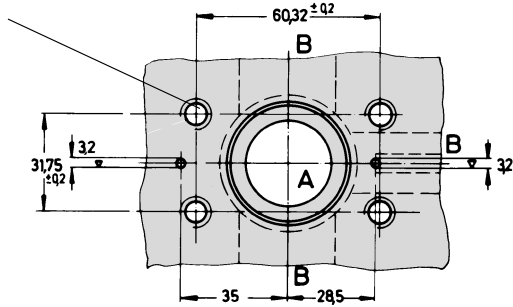


Only possible at external drain from the pilot head

Orifice position
(orifice is content
of delivery)



3/8"-24 UNF or
M10; 20 lg.



Ports	Function
A	Pressure (Inlet)
B*	Secondary Port (Outlet)
X	external control connection
Y, Y1 ¹⁾	external drain

4 Mounting screws	
Dimension	Order-No.
3/8"-24 UNF x 1 3/4" lg.	359-15220-0
or M10 x 45 mm, DIN 912-12.9	700-71602-8

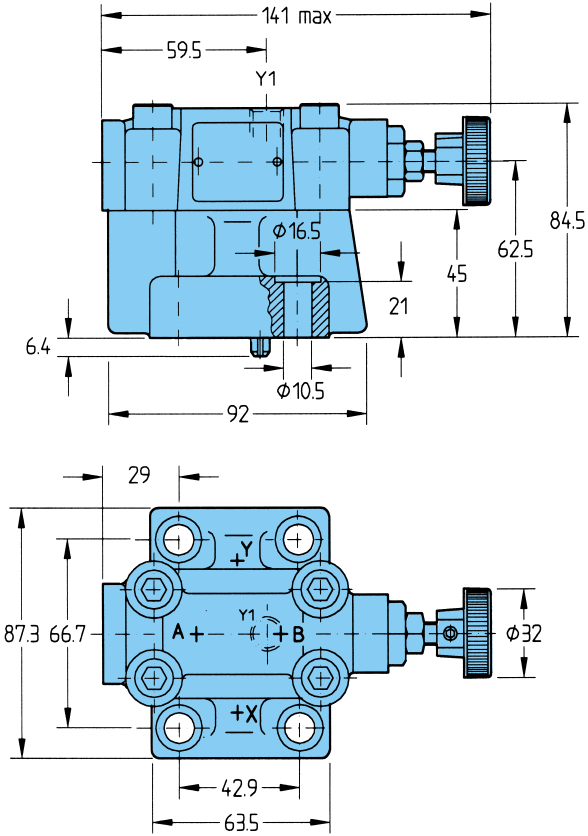
(mounting screws must be ordered separately)

* arrangement optional for R4S06 / R4S10

¹⁾ Port Y1 is only available at **Drain line** (code 2)
external from the pilot head.

R4S03 (3/8") SUBPLATE MOUNTING

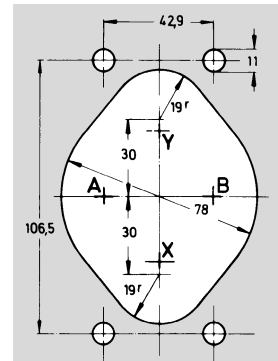
Weight: 2.7 kg



Ports	Function
A	Pressure (inlet)
B	Secondary (outlet)
X	Remote control or vent connection
Y (Y1)	external drain ¹⁾

¹⁾ optional from pilot head or subplate. Port Y1 is only available at **Drain line** (code 2) external from the pilot head.

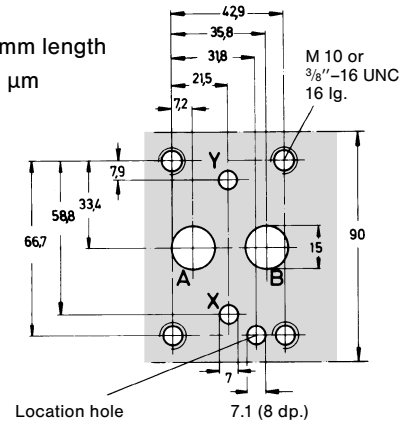
Panel opening



Block mounting face

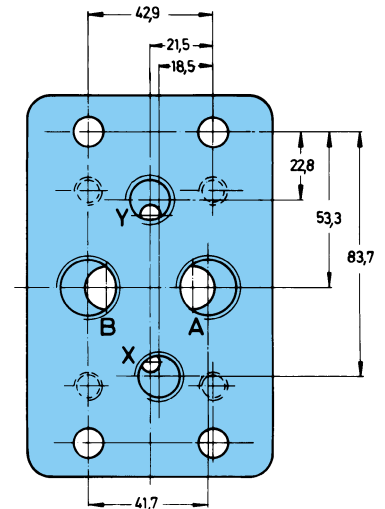
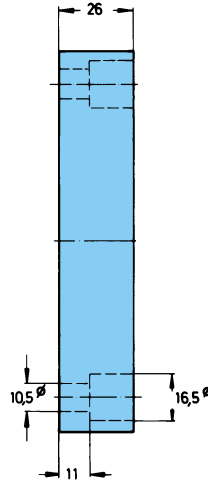
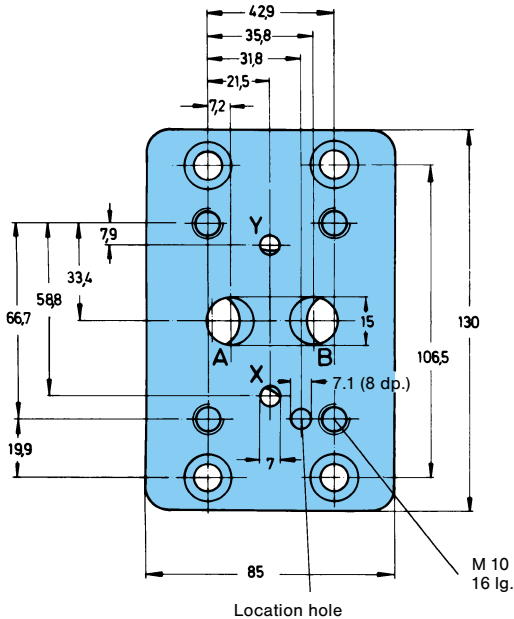
Flatness 0.01 mm / 100 mm length

Surface finish CLA 1.27 µm



SUBPLATES

Weight: 2 kg

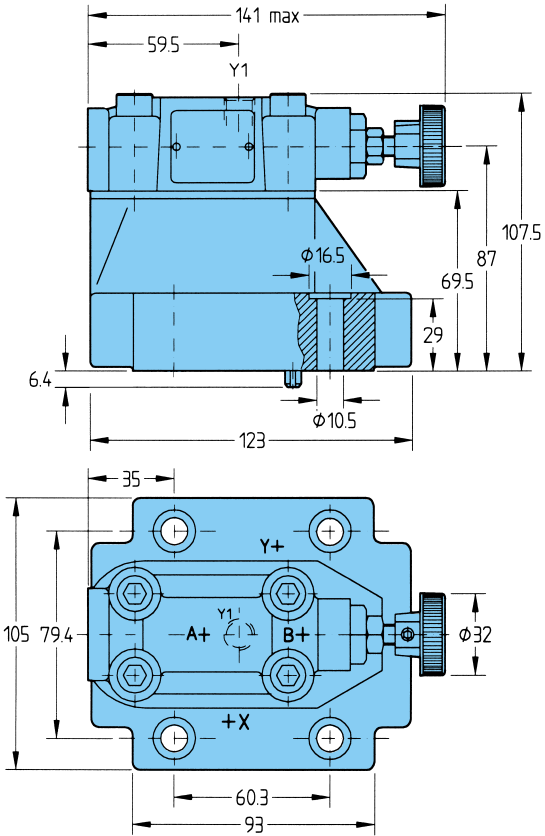


Model No.	Order No.	Port sizes		4 Mounting screws *		
		A + B	X + Y	Dimension	Order No.	min. tensile strength
SS-B-08-G 113	S16-63124-0	G 1/2"	G 1/4"	M 10 x 35 DIN 912-12.9	700-70039-8	at p ≤ 210 bar = 100 daN/mm ² at p > 210 bar = 120 daN/mm ²

* Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.

R4S06 (3/4") SUBPLATE MOUNTING

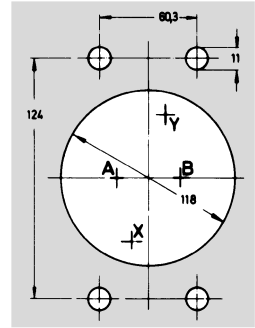
Weight: 4.5 kg



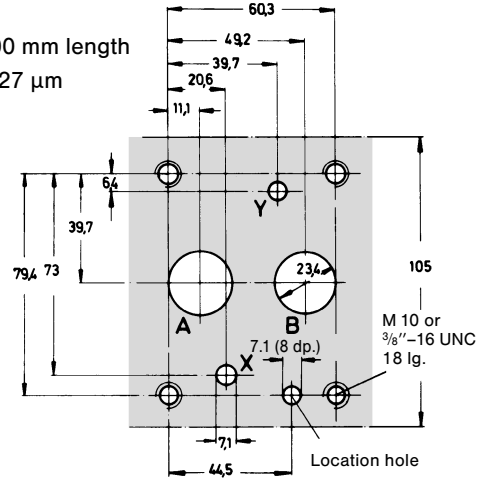
Ports	Function
A	Pressure (inlet)
B	Secondary (outlet)
X	Remote control or vent connection
Y (Y1)	external drain ¹⁾

¹⁾ optional from pilot head or subplate. Port Y1 is only available at **Drain line** (code 2) external from the pilot head.

Panel opening

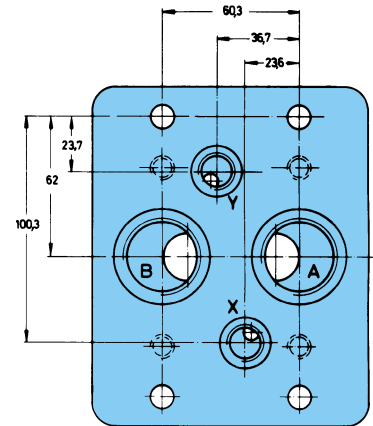
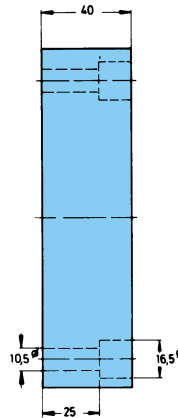
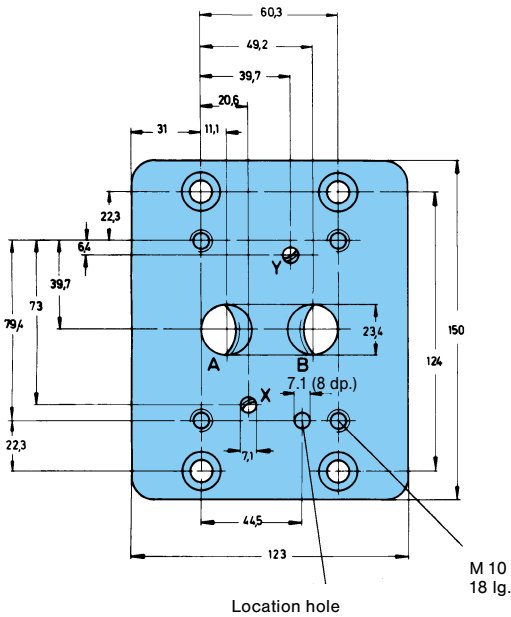


Block mounting face
 Flatness 0.01 mm / 100 mm length
 Surface finish CLA 1.27 µm



SUBPLATES

Weight: 4.8 kg

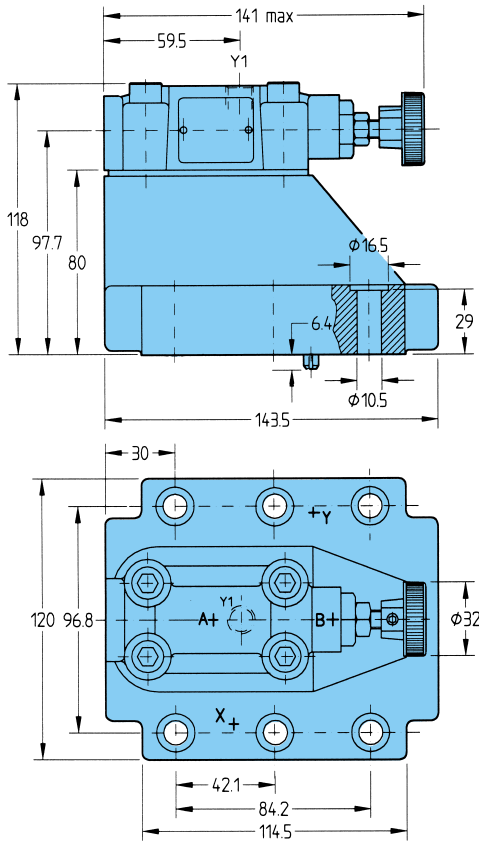


Model No.	Order No.	Port sizes		4 Mounting screws *		
		A + B	X + Y	Dimension	Order No.	min. tensile strength
SS-B-16-G 115	S16-39168-0	G 1"	G 1/4"	M 10 x 45 DIN 912-12.9	700-71602-8	at p ≤ 210 bar = 100 daN/mm ² at p > 210 bar = 120 daN/mm ²

* Mounting screws are included in subplate order.
 For valves ordered without subplate, mounting screws must be ordered separately.

R4S10 (1 1/4") SUBPLATE MOUNTING

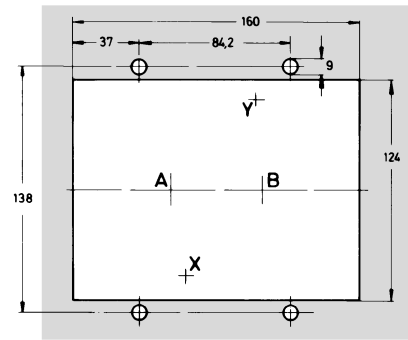
Weight: 6 kg



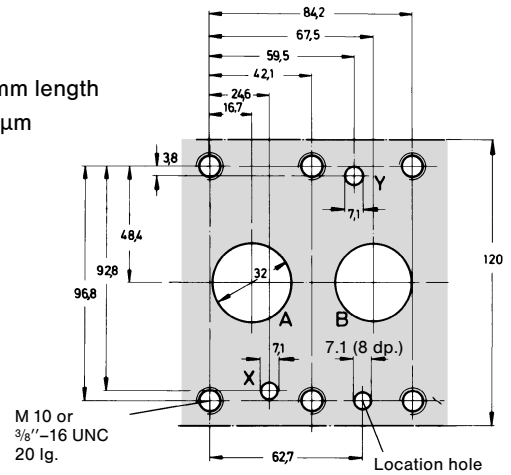
Ports	Function
A	Pressure (inlet)
B	Secondary (outlet)
X	Remote control or vent connection
Y (Y1)	external drain ¹⁾

¹⁾ optional from pilot head or subplate. Port Y1 is only available at **Drain line** (code 2) external from the pilot head.

Panel opening

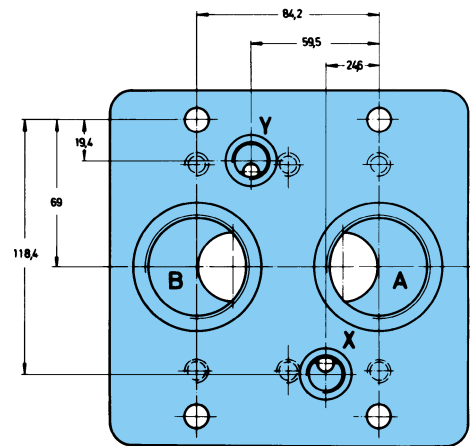
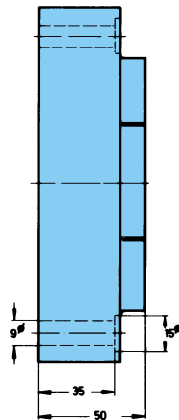
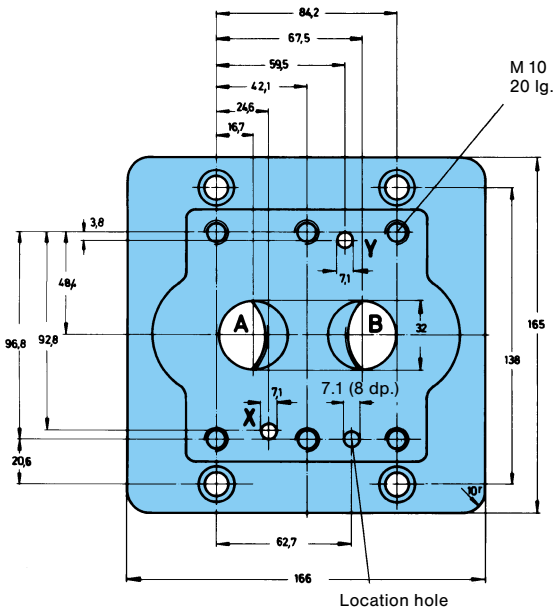


Block mounting face
Flatness 0.01 mm / 100 mm length
Surface finish CLA 1.27 µm



SUBPLATES

Weight: 8.5 kg



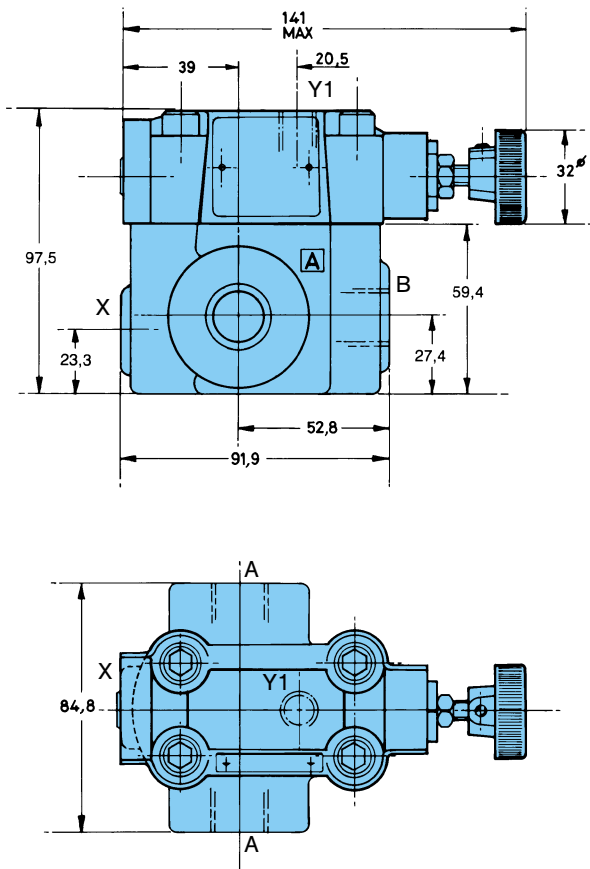
Model No.	Order No.	Port sizes		6 Mounting screws *		
		A + B	X + Y	Dimension	Order No.	min. tensile strength
SS-B-24-G 117	S16-39197-0	G 1 1/2"	G 1/4"	M 10 x 45 DIN 912-12.9	700-71602-8	at p ≤ 210 bar = 100 daN/mm ² at p > 210 bar = 120 daN/mm ²

* Mounting screws are included in subplate order.
For valves ordered without subplate, mounting screws must be ordered separately.

R4S03 (3/8") – R4S06 (3/4") THREADED BODY

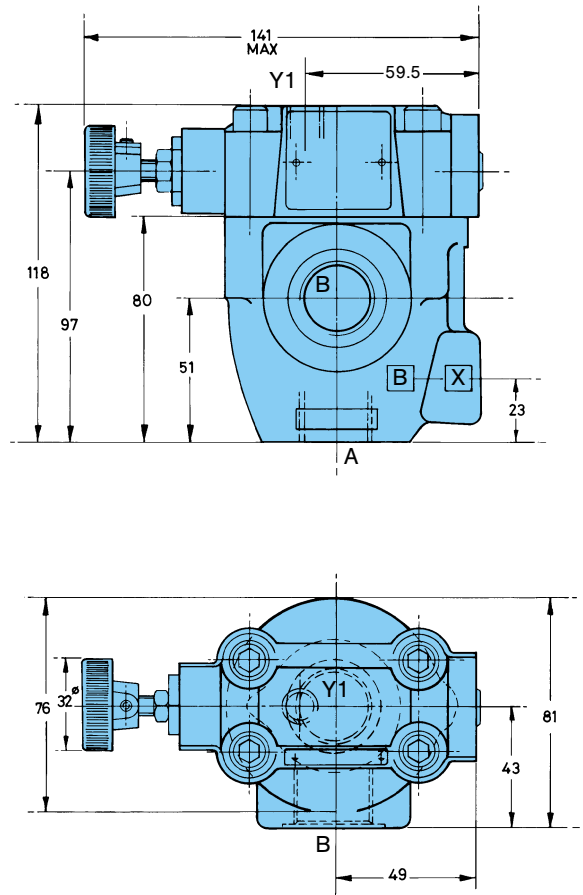
R4S03 (3/8")

Weight: 3.2 kg



R4S06 (3/4")

Weight: 3.3 kg



Ports	Function	Port Sizes
A (2)	Pressure (inlet)	G 1/2" or SAE-8 (3/4"-16 UNF)
B	Secondary port (outlet)	G 1/2" or SAE-8 (3/4"-16 UNF)
X ¹⁾	ext. remote control or vent connection	G 1/4" or SAE-4 (7/16"-20 UNF)
Y1	external drain	G 1/4" or SAE-4 (7/16"-20 UNF)

¹⁾ closed when supplied

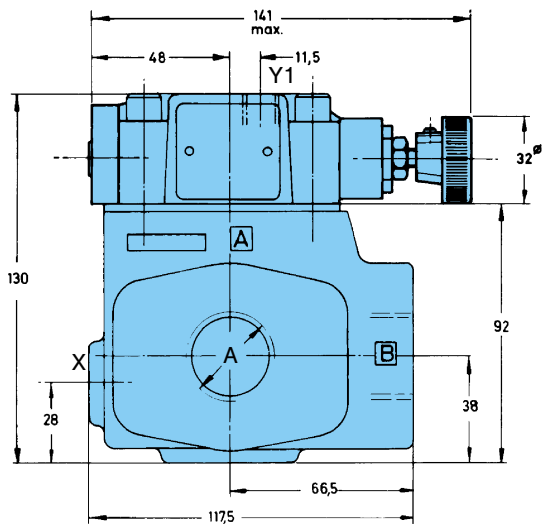
Ports	Function	Port Sizes
A	Pressure (inlet)	G 3/4" or SAE-12 (1 1/16"-12 UN)
B	Secondary port (outlet)	G 3/4" or SAE-12 (1 1/16"-12 UN)
X ¹⁾	ext. remote control or vent connection	G 1/4" or SAE-4 (7/16"-20 UNF)
Y1	external drain	G 1/4" or SAE-4 (7/16"-20 UNF)

¹⁾ closed when supplied

R4S06 (3/4") – R4S10 (1 1/4") THREADED BODY

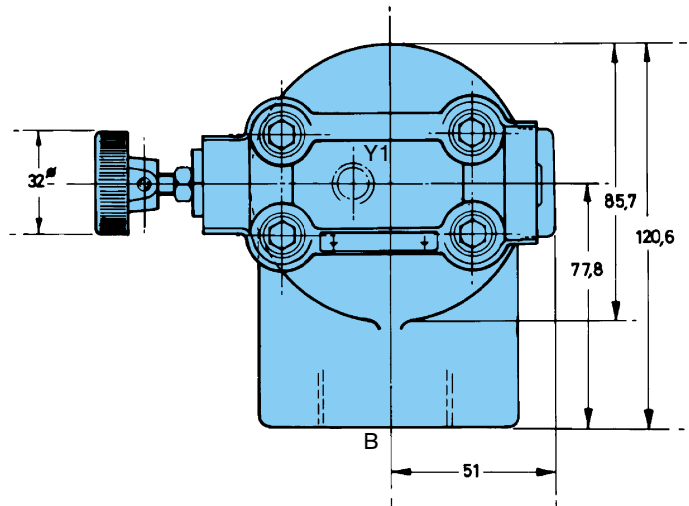
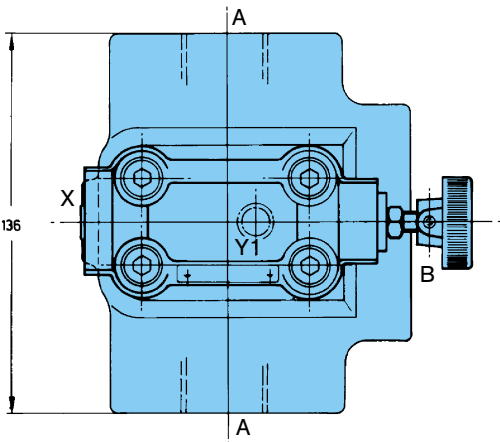
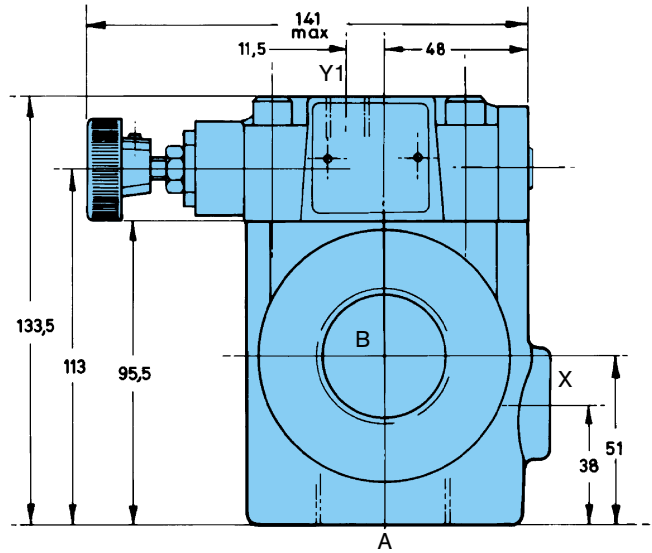
R4S06 (1")

Weight: 6.6 kg



R4S10 (1 1/4")

Weight: 5.6 kg



Ports	Function	Port Sizes
A (2)	Pressure (inlet)	G 1" or SAE-16 (1 5/16"-12 UN)
B	Secondary port (outlet)	G 1" or SAE-16 (1 5/16"-12 UN)
X ¹⁾	ext. remote control or vent connection	G 1/4" or SAE-4 (7/16"-20 UNF)
Y1	external drain	G 1/4" or SAE-4 (7/16"-20 UNF)

¹⁾ closed when supplied

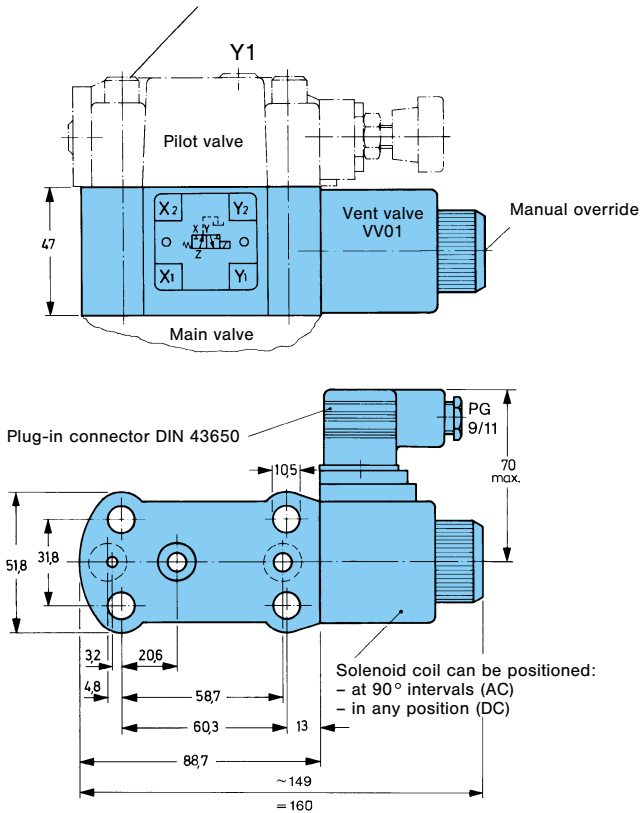
Ports	Function	Port Sizes
A	Pressure (inlet)	G 1 1/4" or SAE-20 (1 5/8"-12 UN)
B	Secondary port (outlet)	G 1 1/4" or SAE-20 (1 5/8"-12 UN)
X ¹⁾	ext. remote control or vent connection	G 1/4" or SAE-4 (7/16"-20 UNF)
Y1	external drain	G 1/4" or SAE-4 (7/16"-20 UNF)

¹⁾ closed when supplied

VERSION WITH VENT VALVE VV01

Weight (VV01): 1.7 kg

Screws for additional vent valve installation.
4 x 3/8"-24 UNF x 3 1/2" lg., order no. 359-15340-0.



Symbols:

R4S-Sequence Valve with Vent Valve VV01

Code	External drain
11 or 12	
09 or 10	

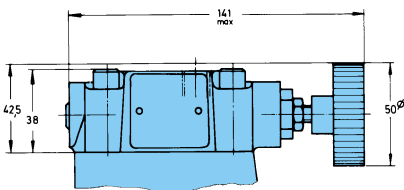
Note:

For full details of the vent valve VV01 refer to bulletin 3-EN 215.

ADDITIONAL TYPES OF CONTROL

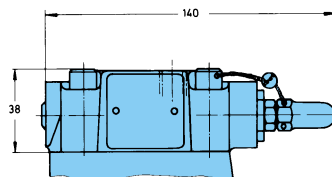
Type of Control-Code 2

Hand knob 50 mm dia.
(not for version with vent valve VV01)



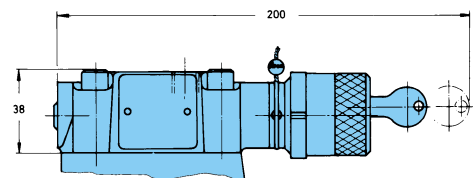
Type of Control-Code 3

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



The product described is subject to continual development and the manufacturer reserves the right to change the specifications without notice.