Pressure reducing valve, pilot operated

Type 3DR

Size 16
Component series 5X
Maximum operating pressure 250 bar
Maximum flow 220 l/min

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Features

- Valve for reducing (P to A) and limiting (A to T) a system pressure
- For subplate mounting
- Porting pattern to ISO 4401-07-07-0-05
- Subplates (separate order)
- 4 pressure ratings
- 4 adjustment elements, optional:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale

Ordering code

3DR	16	P	–5X/	Y/00		*

3-way pressure reducing valve

Size 16 = 16

Subplate mounting = P

Adjustment elements

Rotary knob = 4
Sleeve with hexagon and protective cap = 5
Lockable rotary knob with scale = 6 [1)]
Rotary knob with scale = 7

Component series 50 to 59 = 5X
(50 to 59: unchanged installation and connection dimensions)

Pressure setting up to 50 bar = 50
Pressure setting up to 100 bar = 100
Pressure setting up to 200 bar = 200
Pressure setting up to 250 bar = 250

Further details in clear text

Seal material

M = NBR seals
V = FKM seals
(other seals on request)

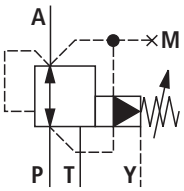
⚠ **Attention!**
Observe compatibility of seals with hydraulic fluid used!

00 = Without stroke limiter

Pilot oil supply

Y = Internal pilot oil supply, external pilot oil drain

Symbol



Function, section

Pressure control valves of type 3DR are pilot operated 3-way pressure reducing valves with pressure relief function for the secondary circuit. They are used to reduce a system pressure.

The pressure reducing valve basically consists of main valve (1) with control spool (2) and pilot control valve (3) with pressure adjustment element (10).

In the starting position, the valve is open. Hydraulic fluid can flow from channel P to channel A without any restrictions. The pressure in channel A is applied via bore (4) to the spool area opposite to compression spring (9). At the same time, pressure is applied via orifice (6) to the spring-loaded side of control spool (2) and via channel (5) to ball (7) in pilot control valve (3).

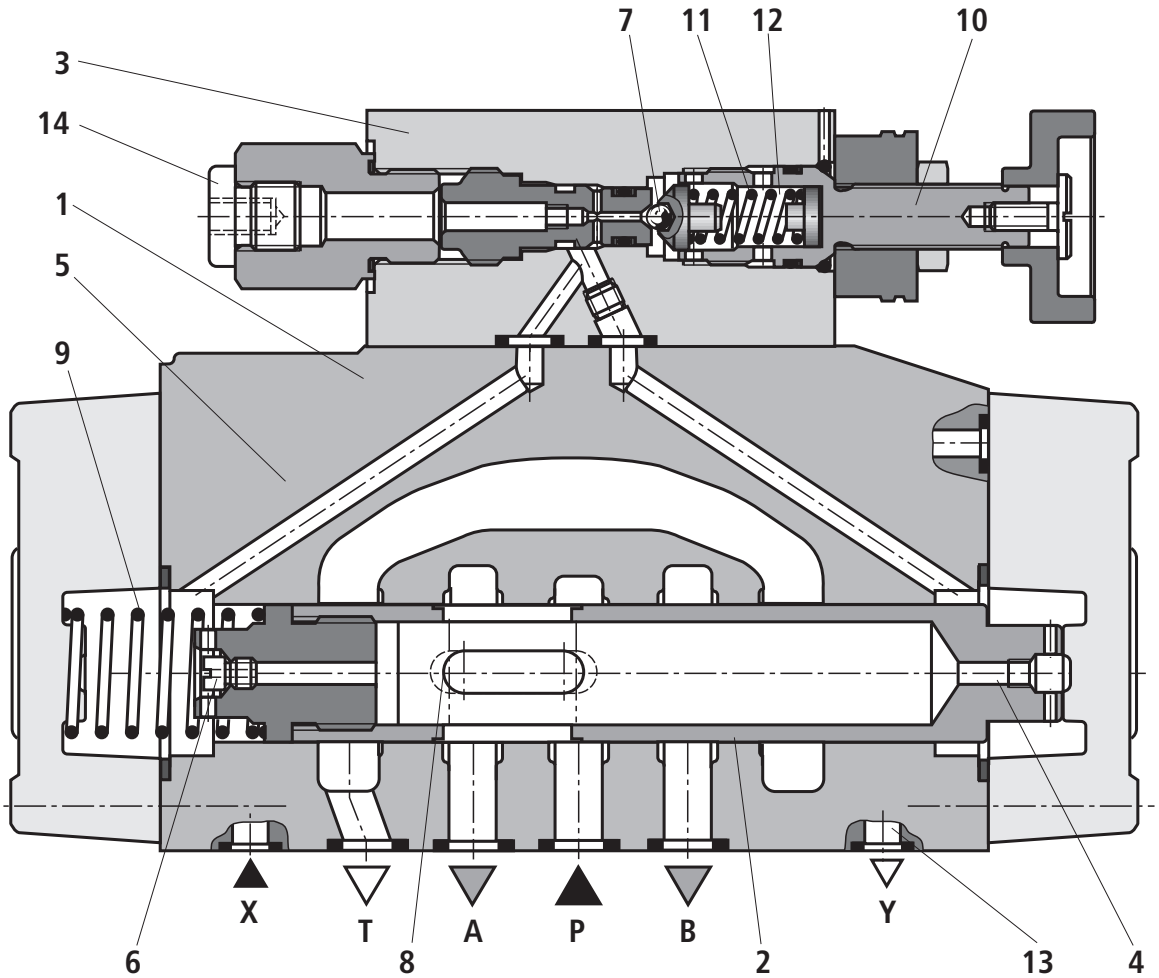
Depending on the setting of compression spring (11) pressure builds up upstream of ball (7) and in channel (5) and holds control spool (2) in the open position. Hydraulic fluid flows from channel P via control spool (2) to channel A until pressure builds up in channel A, which reaches a higher value than the pressure value set on compression spring (11) and lifts off ball (7).

Control spool (2) moves to the closed position. The required reduced pressure is reached when the pressure in channel A and the pressure value set on compression spring (11) are in balance.

When the pressure in channel A increases further due to external forces acting on the actuator, control spool (2) is pushed further against compression spring (9). This opens a connection between channel T and channel A via control land (8) on control spool (2). The amount of hydraulic fluid discharged to tank ensures that the pressure will no longer increase.

The pilot oil is always drained externally from spring chamber (12) via pilot line (13) at port Y. It must always be returned at zero pressure to tank.

Pressure gauge port (14) allows the reduced pressure in channel A to be checked.



Type 3DR 16 P4-5X/…

Technical data (for applications outside these parameters, please consult us!)

General

Weight		kg	8.0
Installation position			Optional
Ambient temperature range		°C	–30 to +50

Hydraulic

Nominal pressure		bar	315
Maximum operating pressure	– Port P	bar	315
	– Port A	bar	250
	– Port Y	bar	Separately and pressureless to tank
Pressure setting	– Minimum	bar	Depending on flow (see characteristic curves on page 5)
	– Maximum	bar	50; 100; 200; 250
Maximum flow		l/min	220
Hydraulic fluid			Mineral oil (HL, HLP) to DIN 51524 [1]; fast bio-degradable hydraulic fluids to VDMA 24568 (see also RE 90221); HETG (rape seed oil) [1]; HEPG (polyglycols) [2]; HEES (synthetic esters) [2]; other hydraulic fluids on request
Hydraulic fluid temperature range		°C	–30 to +80 (NBR seals) –20 to +80 (FKM seals)
Viscosity range		mm^2/s	10 to 800
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)			Class 20/18/15 [3]

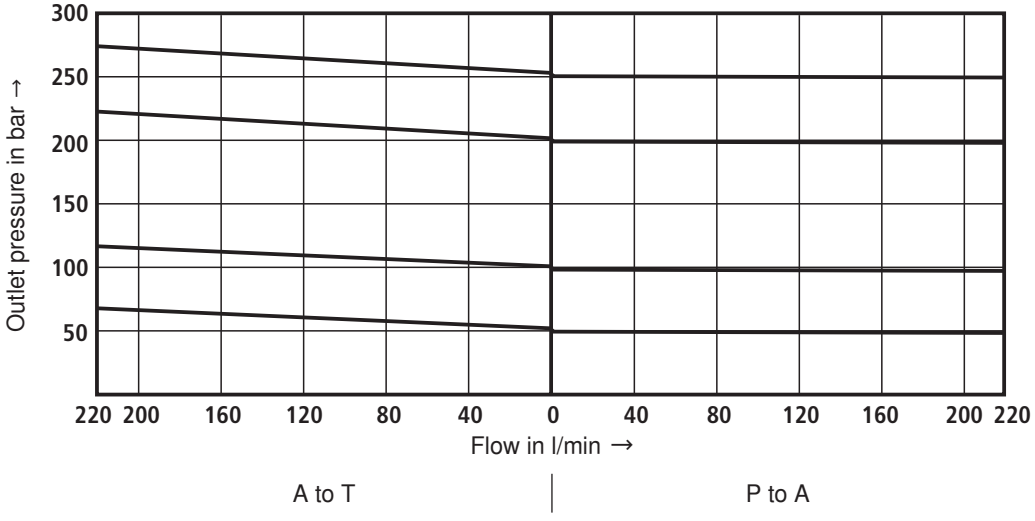
[1] Suitable for NBR and FKM seals

[2] Suitable only for FKM seals

[3] The cleanliness classes specified for components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, prolongs the service life of components.

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$)

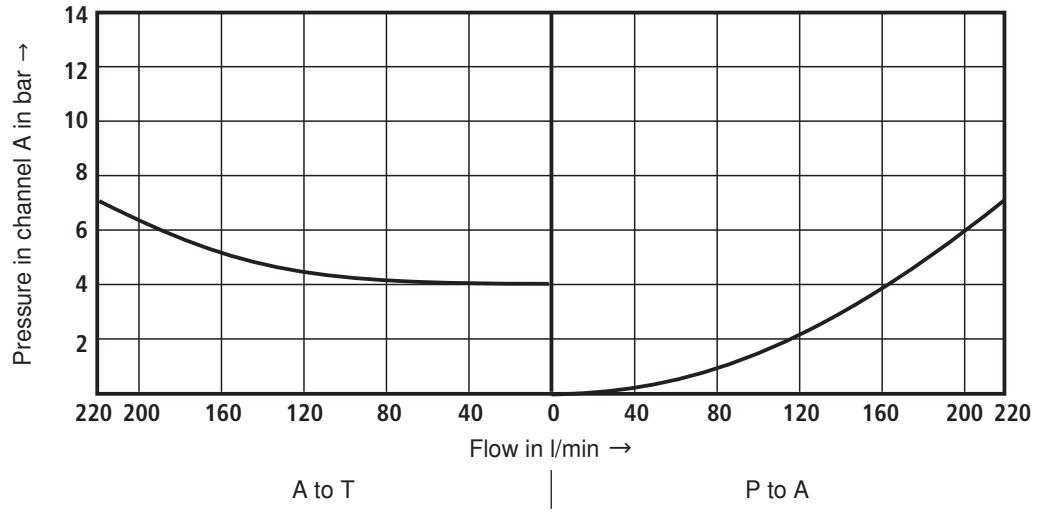
Outlet pressure p_A in dependence on flow q_V



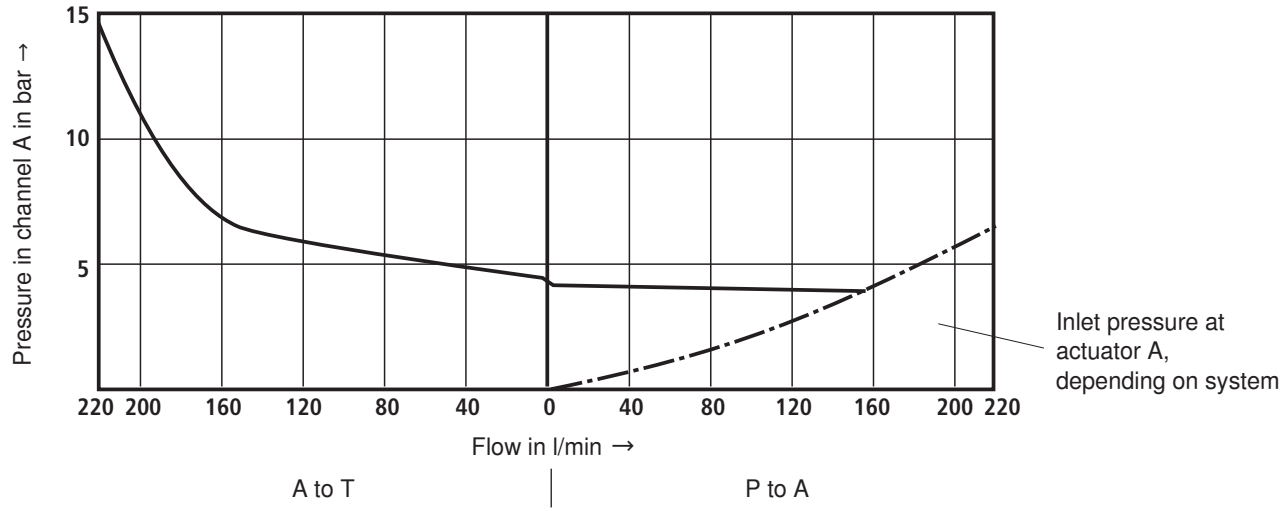
The characteristic curves are valid for outlet pressure p_T = zero over the entire flow range.

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$)

Flow resistance

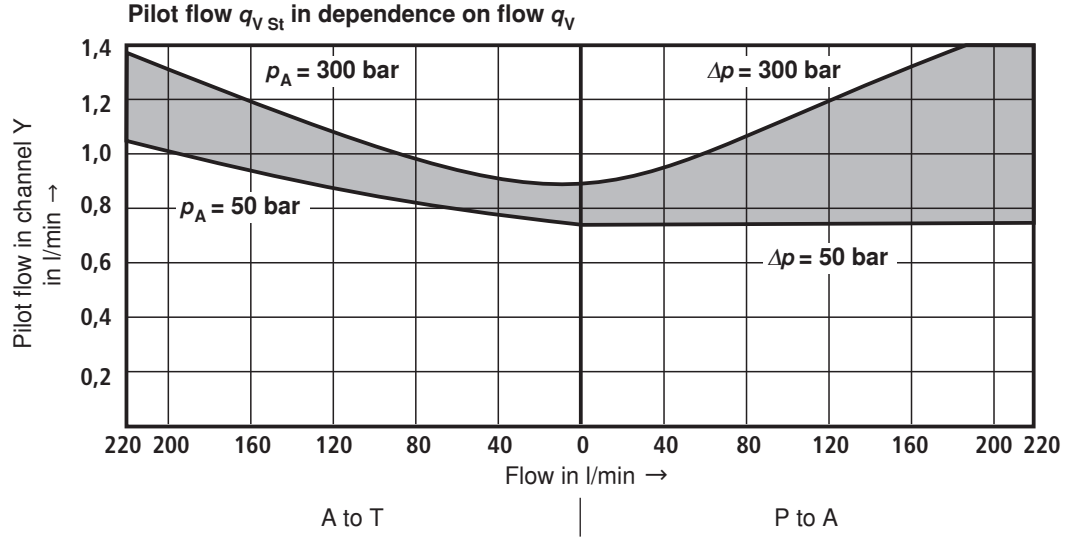


Minimum pressure setting p_{min} in dependence on flow q_V

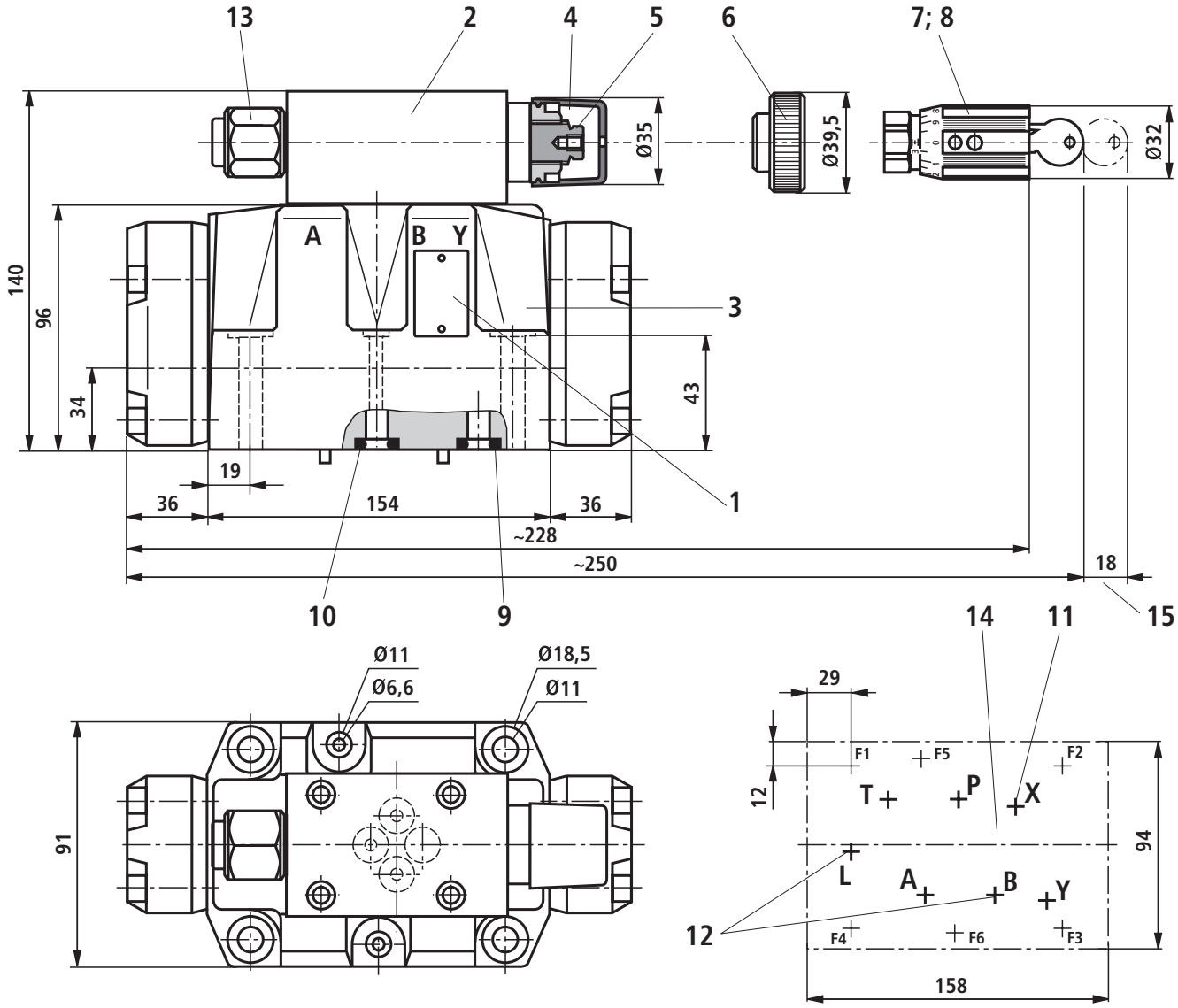


The characteristic curves are valid for outlet pressure p_T = zero over the entire flow range.

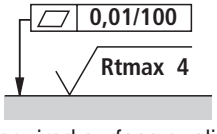
Pilot flow $q_{V\,St}$ in dependence on flow q_V



Unit dimensions (dimensions in mm)



For explanations of items and valve mounting screws, see page 7.



Required surface quality of valve mounting face

Unit dimensions

1 Nameplate
2 Pilot control valve
3 Main valve
4 Adjustment element “5”
5 Hexagon 10 A/F
6 Adjustment element “4”
7 Adjustment element “6”
8 Adjustment element “7”
9 Seal rings for ports X, Y and L
10 Seal rings for ports A, B, P and T
11 Port X must be plugged in the subplate
12 Ports B and L must be plugged in the subplate
13 Pressure gauge port
14 Valve mounting face – porting pattern to ISO 4401-07-07-0-05
15 Space required to remove key

Suplates
(separate order)
G172/01 (G3/4)
G174/01 (G1)

Valve mounting screws (separate order)

- **4 hexagon socket head cap screws ISO 4762 - M10 x 60 - 10.9-flZn-240h-L**
  Friction coefficient $\mu_{total} = 0.09$ to 0.14,
  tightening torque $M_T = 73$ Nm ± 10%,
- **2 hexagon socket head cap screws ISO 4762 - M6 x 60 - 10.9-flZn-240h-L**
  Friction coefficient $\mu_{total} = 0.09$ to 0.14,
  tightening torque $M_T = 15.5$ Nm ± 10%,

☞ **Note!**
The specified tightening torques are recommended values when screws of the given friction coefficients and a torque wrench are used (tolerance ±10%).