

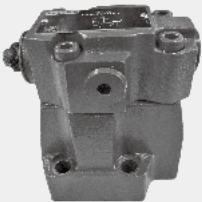


3.12

# Pilot operated pressure reducing valves

## Type DR...L5X

Sizes 10 to 32  
up to 350 bar  
up to 400L/min



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### Features

- Sub-plate mounting
- Porting pattern conforms to DIN 24 340, form D and ISO 5781
- Threaded connections
- Installation in manifolds
- 5 pressure ratings
- 4 adjustment elements
  - Rotary knob
  - Adjustable bolt with protective cap
- Check valve ,optional (only for sub-plate mounting)

## Function and configurations

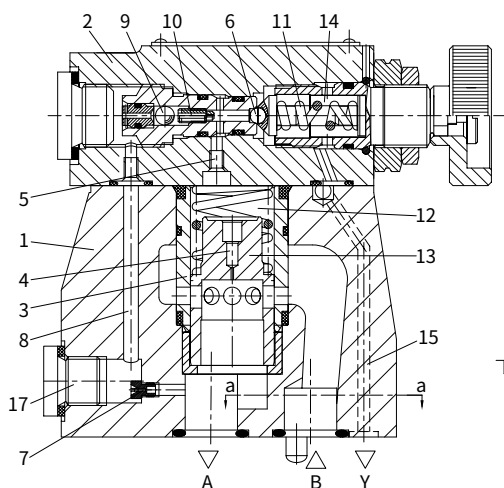
Pressure control valves type DR series L5X are pilot operated pressure reducing valves. They are used to control secondary circuit in a system. They consist mainly of the main valve (1) with main spool assembly (3) and pilot valve (2) with pressure adjustment element.

At static state, the valves are normally open, fluid flows free from port B to port A via the main spool (3). Pressure at port A acts on the underside of main spool (3) and its spring-loaded side via throttle orifice (4). Fluid also acts on the ball valve (6) of the pilot valve (2) via the channel (5). Meanwhile, pressure fluid flows via throttle orifice (7), control line (8), check valve (9) and throttle orifice (10) to the ball valve (6). Based on the

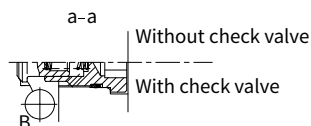
setting value of the spring (11), control piston (13) keeps open, then fluid can flow free from port B to port A, until pressure at port A exceed the setting value of spring (11), and then ball valve (6) is opened. Control piston (13) moves to close position. When pressure at port A is balanced with setting value at spring, pressure reducing is achieved as expected. Control oil returns from spring chamber (14) to tank via channel (15).

A check valve (16) can be fitted optionally to give free return flow from line A to B.

Pressure gauge connection (17), used for monitoring the reduced pressure at the port A.

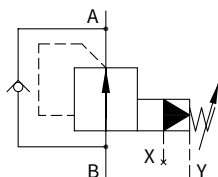


Type DR...-4-L5X/...Y

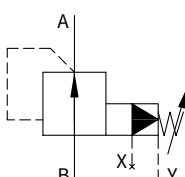


## Symbols

DR...L5X/...Y



DR...L5X/...YM



**Ordering code**

Pressure reducing valve,  
pilot operated =No code  
Pilot operated valve  
Without main spool assembly  
(No mark for size) =C  
Pilot operated valve  
With main spool assembly  
(Marked with size 30)=C

| Size | Connection         |                     |
|------|--------------------|---------------------|
|      | sub-plate mounting | threaded connection |
| 10   | =10                | =10                 |
| 15   |                    | =15                 |
| 20   | =20                | =20                 |
| 25   |                    | =25                 |
| 32   | =30                | =30                 |

Sub-plate mounting = -  
Threaded connection =G

Regulating element:  
Rotary knob =4  
Adjustable bolt with protective cap =5

Further details in clear text

No code = NBR seals  
V = FKM seals

Only for Port X1 and Y1 of threaded connection valves and sub-plate mounting valves

No code = Inch thread  
2 = Metric thread

No code = With check valve  
( only for sub-plate mounting )  
M = Without check valve

Y = Pilot oil drain external

5 = Max. secondary pressure 50bar  
10 = Max. secondary pressure 100bar  
20 = Max. secondary pressure 200bar  
31.5 = Max. secondary pressure 315bar  
35 = Max. secondary pressure 350bar  
(350bar only for the version without check valve)

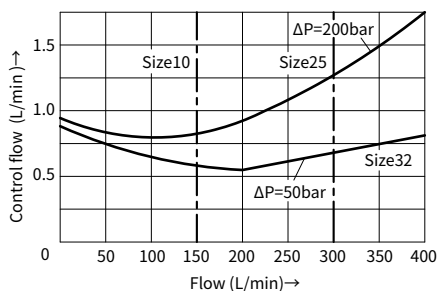
L5X= Series L50 to L59  
(L50 to L59 series: unchanged installation and connection dimensions)

Technical data

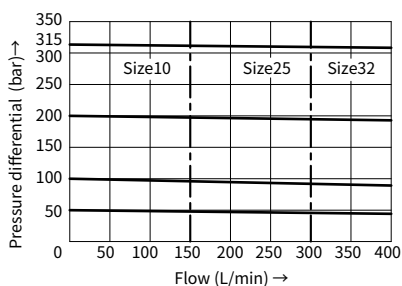
|                          |                     |        |    |                                                                                              |            |            |            |            |
|--------------------------|---------------------|--------|----|----------------------------------------------------------------------------------------------|------------|------------|------------|------------|
| Fluid                    |                     |        |    | Mineral oil suitable for NBR and FKM seal                                                    |            |            |            |            |
|                          |                     |        |    |                                                                                              |            |            |            |            |
| Fluid temperature range  |                     |        |    | °C                                                                                           |            |            |            |            |
|                          |                     |        |    |                                                                                              |            |            |            |            |
| Viscosity range          |                     |        |    | mm²/s                                                                                        |            |            |            |            |
|                          |                     |        |    |                                                                                              |            |            |            |            |
| Degree of contamination  |                     |        |    | Maximum permissible degree of fluid contamination:<br>Class 9. NAS 1638 or 20/18/15, ISO4406 |            |            |            |            |
| Max.operating pressure   | Port B              | bar    |    | 350                                                                                          |            |            |            |            |
| Operating pressure range | Port A              | bar    |    | 10 to 350                                                                                    |            |            |            |            |
| Max.backing pressure     | Port Y              | bar    |    | 350 (only for without check valve);<br>315 (with check valve)                                |            |            |            |            |
| Adjustable pressure      | Max.                | bar    |    | 50; 100; 200; 315; 350                                                                       |            |            |            |            |
|                          | Min.                | bar    |    | Related with flow-rate ( refer to the curves)                                                |            |            |            |            |
| Size                     |                     |        |    | DR10                                                                                         | DR15       | DR20       | DR25       | DR30       |
| Max. flow-rate           | Sub-plate mounting  | L/min  |    | 150                                                                                          | -          | 300        | -          | 400        |
|                          | Threaded connection | L/min  |    | 150                                                                                          | 300        | 300        | 400        | 400        |
| Fixing position          |                     |        |    | Optional                                                                                     |            |            |            |            |
| Size                     |                     |        |    | DR10                                                                                         | DR15       | DR20       | DR25       | DR30       |
| Weight                   | Sub-plate mounting  | DR     | kg | Approx.3.6                                                                                   | -          | Approx.5.3 | -          | Approx.8.2 |
|                          |                     | DR...G | kg | Approx.5.3                                                                                   | Approx.5.5 | Approx.5.1 | Approx.5.0 | Approx.5.0 |
|                          | Threaded connection | DRC    | kg | Approx.1.2                                                                                   |            |            |            |            |
|                          |                     | DRC30  | kg | Approx.1.5                                                                                   |            |            |            |            |

## Characteristic curves (Measured at $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , using HLP46)

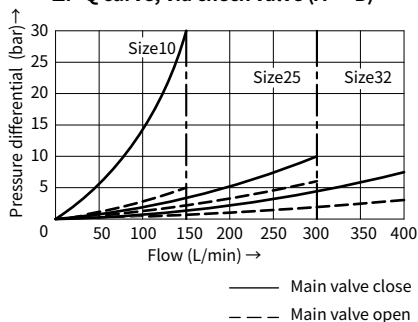
**Control oil flow related with flow (B → A)  
and pressure differential**



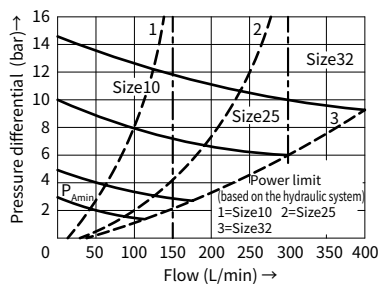
**Outlet pressure PA and  
in relation to (B → A)**



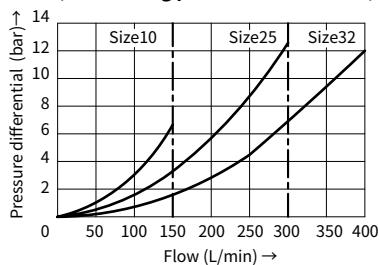
**$\Delta P$ -Q curve, via check valve (A → B)**



**Min. setting pressure PA min  
in relation to flow (B → A)**



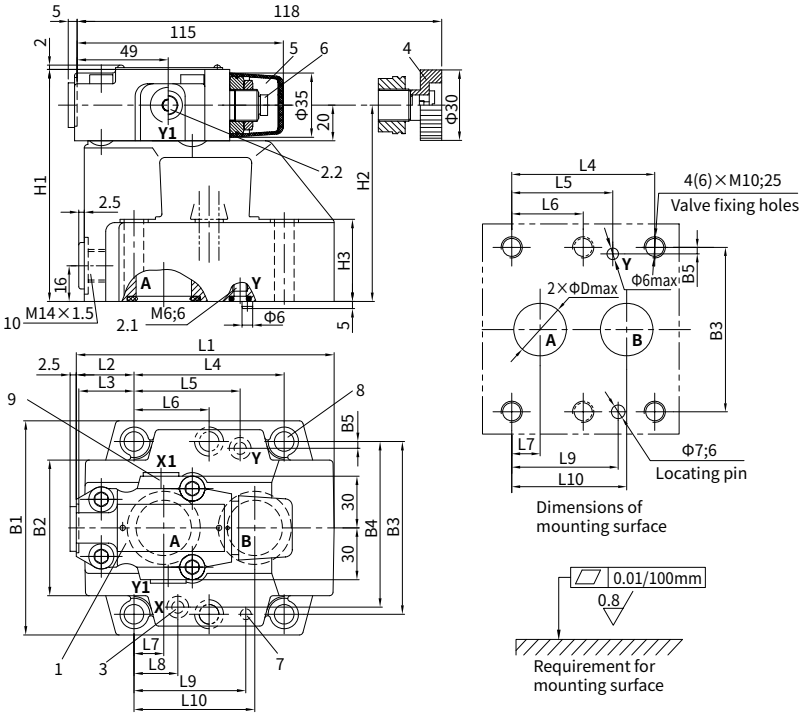
**P-Q curve(B → A)  
(Min. setting pressure differential )**



Unit dimensions

(Dimensions in mm)

Sub-plate mounting



- 1 Nameplate
- 2.1 Port Y used for control oil external drain
- 2.2 Port Y1 optional for control oil external drain (G1/4 or M14×1.5)
- 3 Port X no function
- 4 Adjustment element "4"
- 5 Adjustment element "5"
- 6 Internal hexagon screw S=10
- 7 Locating pin
- 8 Valve fixing holes 4pcs(DR10,DR20) , 6pcs(DR30)
- 9 Port X1 for control external (G1/4or M14×1.5)
- 10 Pressure gauge connection

The sub-plate must be ordered separately.

Type:

- Dr10: G460/01 (G3/8) G460/02 (M18×1.5)  
G461/01 (G1/2) G461/02 (M22×1.5)
- Dr20: G412/01 (G3/4) G412/02 (M27×2)  
G413/01 (G1) G413/02 (M33×2)
- DR30: G414/01 (G1 1/4) G414/02 (M42×2)  
G415/01 (G1 1/2) G415/02 (M48×2)

Valve fixing screws:

Internal hexagon screw

- DR10: GB/T 70.1-M10×50 -10.9 DR20: GB/T 70.1-M10×60-10.9
- DR30: GB/T 70.1-M10×70-10.9 Tightening torque M<sub>A</sub> =75 Nm

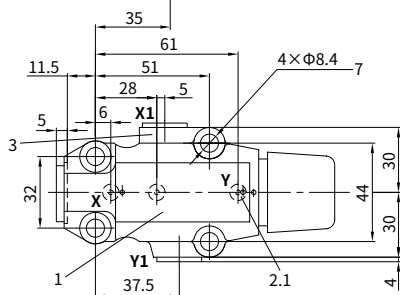
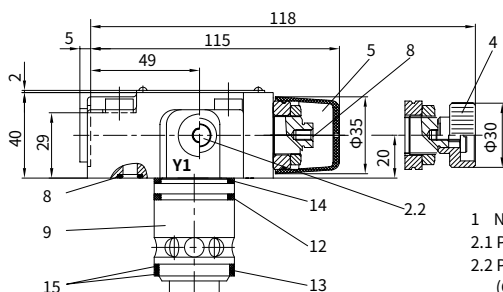
| Type | B1  | B2   | B3   | B4   | B5   | O-ring (PortA,B) |      |      |      |      | O-ring (PortX,Y) |     |    | D  |
|------|-----|------|------|------|------|------------------|------|------|------|------|------------------|-----|----|----|
| DR10 | 85  | 50   | 66.7 | 58.8 | 7.9  | 17.12×2.62       |      |      |      |      | 9.25×1.78        |     |    | 13 |
| DR20 | 102 | 59.5 | 79.4 | 73   | 6.4  | 28.17×3.53       |      |      |      |      | 9.25×1.78        |     |    | 22 |
| DR30 | 120 | 76   | 96.8 | 92.8 | 3.8  | 34.52×3.53       |      |      |      |      | 9.25×1.78        |     |    | 30 |
| Type | L1  | L2   | L3   | L4   | L5   | L6               | L7   | L8   | L9   | L10  | H1               | H2  | H3 |    |
| DR10 | 96  | 35.5 | 33   | 42.9 | 21.5 | -                | 7.2  | 21.5 | 31.8 | 35.8 | 112              | 92  | 28 |    |
| DR20 | 116 | 37.5 | 35.4 | 60.3 | 39.7 | -                | 11.1 | 20.6 | 44.5 | 49.2 | 122              | 102 | 38 |    |
| DR30 | 145 | 33   | 29.8 | 84.2 | 59.5 | 42.1             | 16.7 | 24.6 | 62.7 | 67.5 | 130              | 110 | 46 |    |



## Unit dimensions

(Dimensions in mm)

### (DRC30) pilot valve with or (DRC30) without main spool assembly



- 1 Nameplate
- 2.1 Port Y for control oil external drain
- 2.2 Port Y1 optional for control oil external drain (G1/4 or M14×1.5)
- 3 Port X1 for control oil external feed (G1/4 or M14×1.5)
- 4 Adjustment element "4"
- 5 Adjustment element "5"
- 6 Internal hexagon screw S=10
- 7 Valve fixing holes  
(Valve fixing screw GB/T70.1-M8×40-10.9  $M_s=37\text{Nm}$ )
- 8 O-ring 8.75×1.8(X, Y)
- 9 Main spool
- 10 Ø32 and Ø45 holes can meet each other at any position, but it can't damage the port X and the fixing holes
- 11 It must fix the O-ring and back-up ring into this hole before assembling the main spool
- 12 O-ring 28×1.8
- 13 O-ring 27.3×2.4
- 14 O-ring 28×2.65
- 15 O-ring 28.4×32×0.6
- 16 Flow controller (must be ordered separately)

