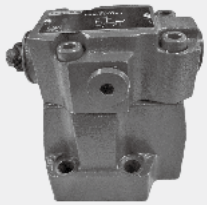
3.13

Pilot operated pressure reducing valves

Type DR...L5X

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



Contents

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
  · Lockable rotary knob with scale
  · Rotary knob with scale
- Check valve ,optional (only for sub-plate mounting)

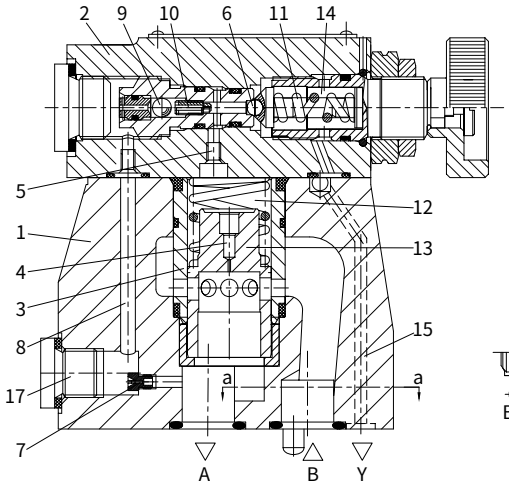
Function and configurations

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.

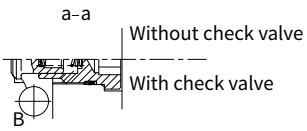
At static state, the valves are normally open, fluid flows free from port B to port A via the main spool (3). Pressure at port A acts on the underside of main spool(3) and its spring-loaded side via throttle orifice(4). Fluid also acts on the ball valve(6) of the pilot valve(2) via the channel (5). Meanwhile,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

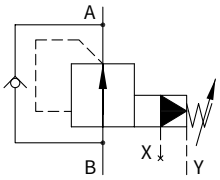


Type DR...-4-L5X/...Y

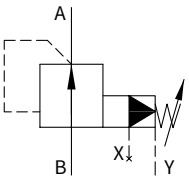


Symbols

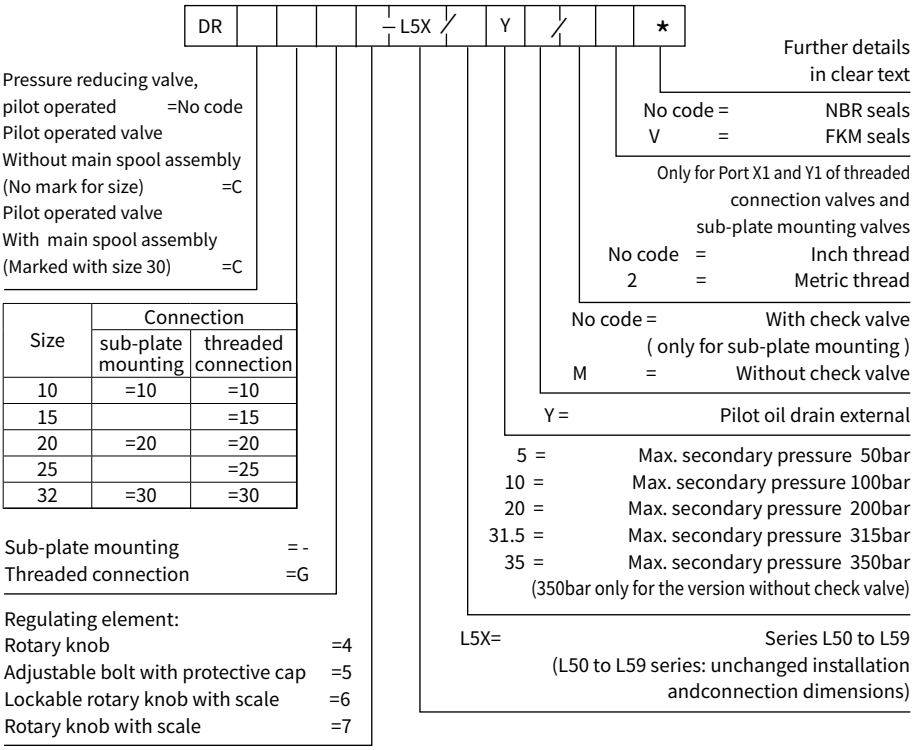
DR...L5X/...Y



DR...L5X/...YM



Ordering code



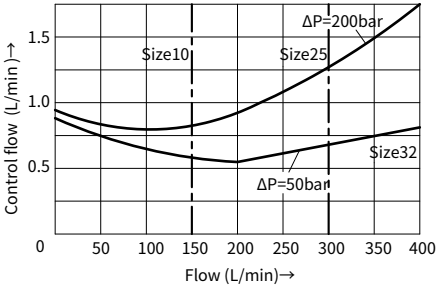
Size	Connection	
	sub-plate mounting	threaded connection
10	=10	=10
15		=15
20	=20	=20
25		=25
32	=30	=30

Technical data

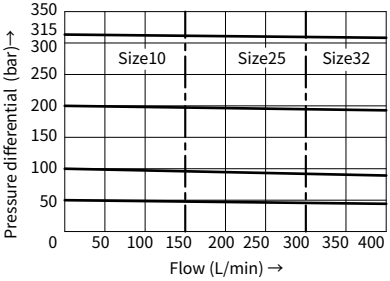
Fluid				Mineral oil suitable for NBR and FKM seal				
				Phosphate ester for FKM seal				
Fluid temperature range			℃	-30 to +80 (NBR seal)				
				-20 to +80 (FKM seal)				
Viscosity range			mm^2/s	10 to 800				
Degree of contamination				Maximum permissible degree of fluid contamination: Class 9. 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); 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
	Threaded connection	DR...G	kg	Approx.5.3	Approx.5.5	Approx.5.1	Approx.5.0	Approx.5.0
		DRC	kg	Approx.1.2				
		DRC30	kg	Approx.1.5				

Characteristic curves (Measured at ϑ_{oil} =40°C ±5°C , using HLP46)

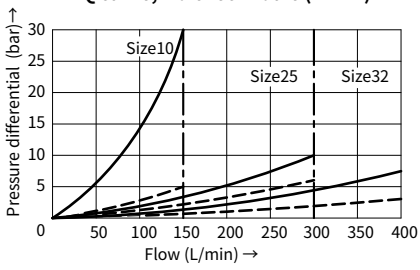
Control oil flow related with flow (B → A) and pressure differential



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



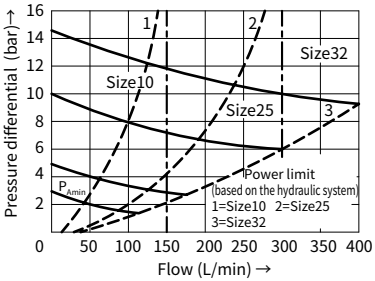
ΔP-Q curve, via check valve (A → B)



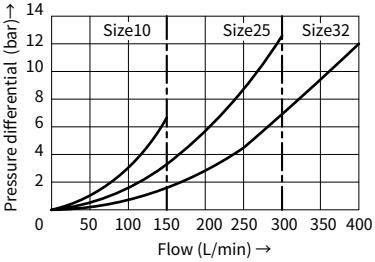
——— Main valve close

– – – Main valve open

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



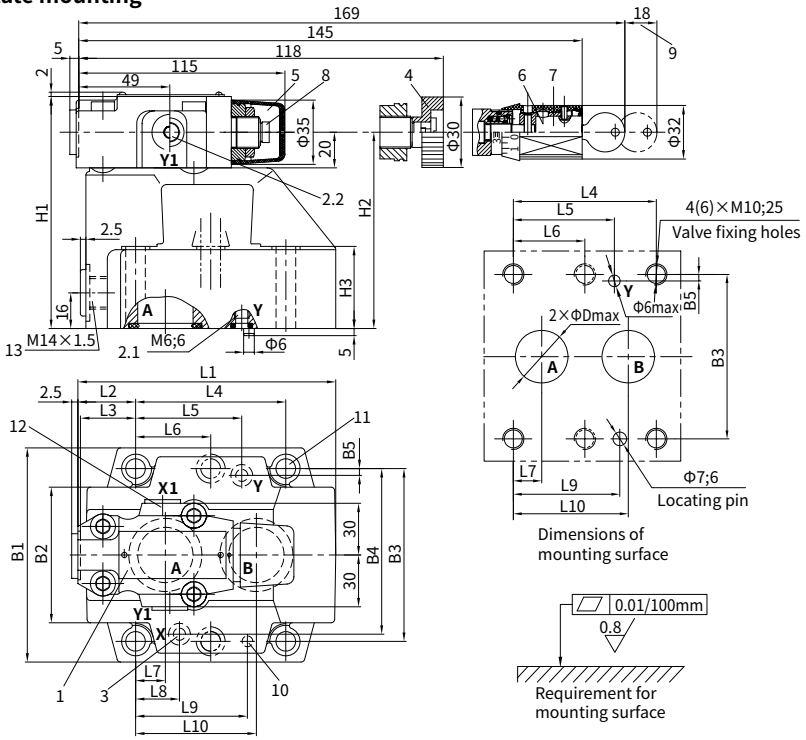
P-Q curve(B → A)
(Min. setting pressure differential)



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 orM14×1.5)
3 Port X no function
4 Adjustment element "4"
5 Adjustment element "5"
6 Adjustment element "6"
7 Adjustment element" 7"
8 Internal hexagon screw S=10
9 Space required to remove the key
10 Locating pin
11 Valve fixing holes 4pcs(DR10,DR20) , 6pcs(DR30)
12 Port X1 for control external(G1/4or M14×1.5)
13 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)

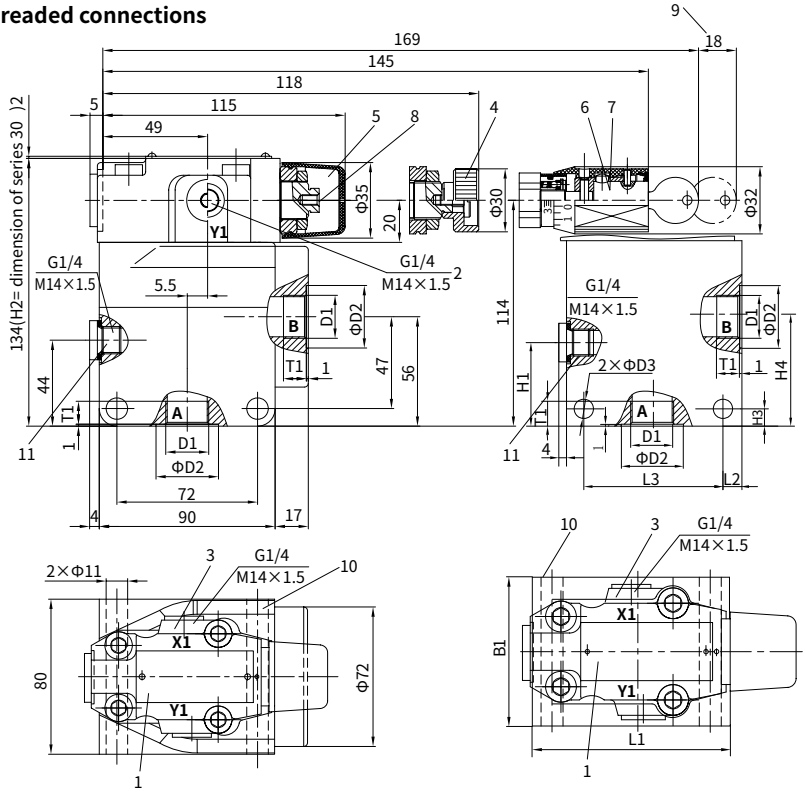
Valve fixing screws:
Internal hexagon screw
DR10: GB/T 70.1-M10×50 -10.9 **DR20:** GB/T 70.1-M10×60-10.9
DR30: GB/T 70.1-M10×70-10.9 Tightening torque M_A =75 Nm

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)

Threaded connections



DR..G..L5X outline and installation dimension

DR..G..30 outline and installation dimension

Note:
For threaded connection valve, there is different installation dimension between series L5X and series 30.
If series 30 valve need to be changed to series L5X, the pitch of installation holes and the position of external tapping will be changed.

1 Nameplate
2 Port Y1 for control oil external drain
3 Port X1 for control oil external supply
4 Adjustment element "4"
5 Adjustment element "5"
6 Adjustment element "6"
7 Adjustment element "7"
8 Internal hexagon screw S=10
9 Space required to remove the key
10 Valve mounting holes
11 Pressure gauge connection

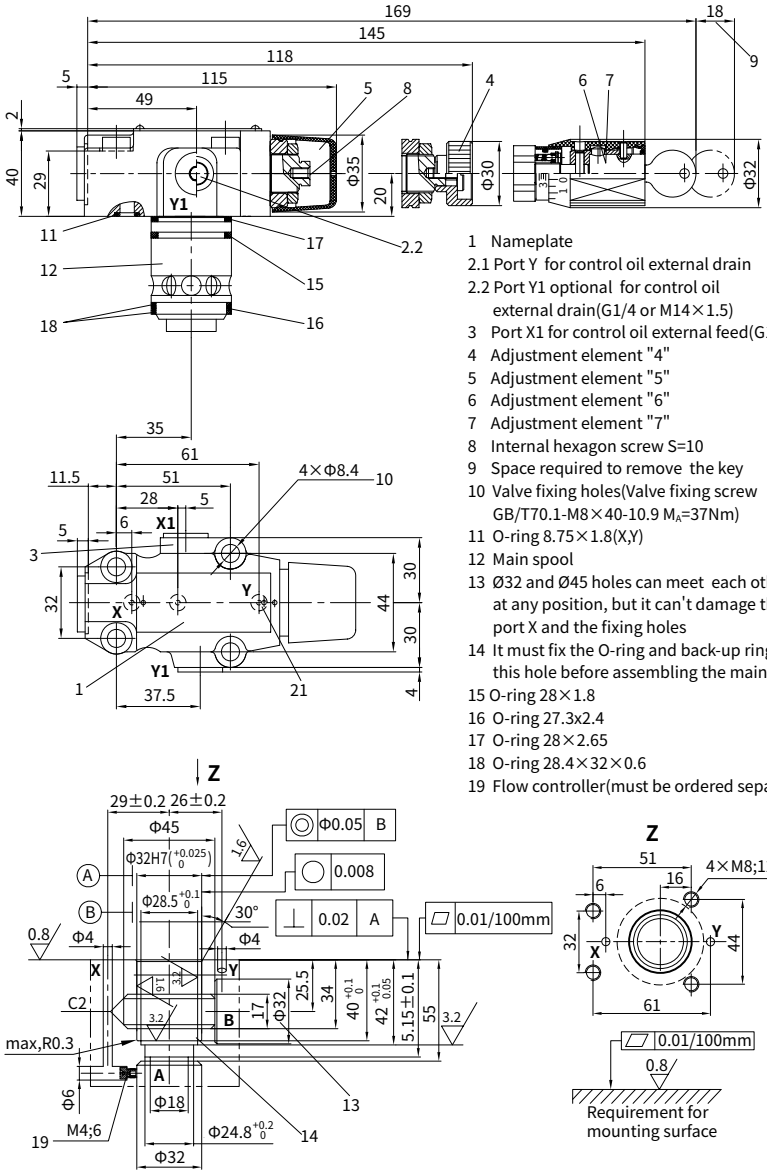
Outline and installation dimension of Series 30 threaded connection valve:

Type	B1	D3	H1	H2	H3	H4	L1	L2	L3	D1	D2	T1
DR10G	63	9	27	125	10	62	85	11.5	62	G1/2;M22×1.5	34	14
DR15G										G3/4;M27×2	42	16
DR20G						57				G1 ;M33×2	47	18
DR25G	70	11	42	138	13	64	100	14	72	G1 1/4;M42×2	58	20
DR30G										G1 1/2;M48×2	65	22

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 Adjustment element "6"
7 Adjustment element "7"
8 Internal hexagon screw S=10
9 Space required to remove the key
10 Valve fixing holes(Valve fixing screw GB/T70.1-M8×40-10.9 M_A=37Nm)
11 O-ring 8.75×1.8(X,Y)
12 Main spool
13 Ø32 and Ø45 holes can meet each other at any position, but it can't damage the port X and the fixing holes
14 It must fix the O-ring and back-up ring into this hole before assembling the main spool
15 O-ring 28×1.8
16 O-ring 27.3x2.4
17 O-ring 28×2.65
18 O-ring 28.4×32×0.6
19 Flow controller(must be ordered separately)