LC

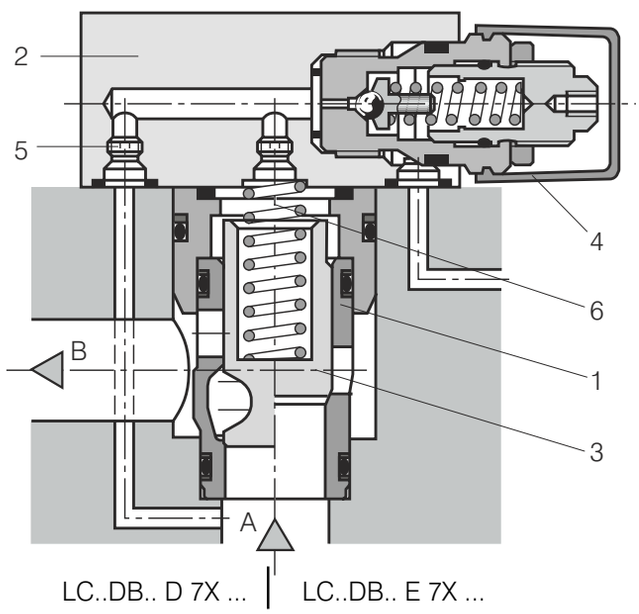
2-way cartridge valves - Pressure function
Size 16 to 100
Max. pressure up to 420 bar
Max. flow up to 7000L/min

Index

Function Description

- **General**

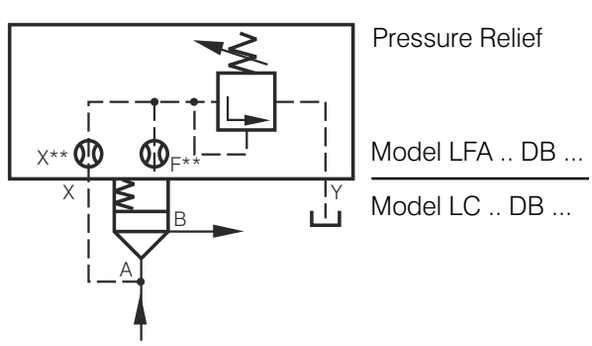
2-way cartridge valves for pressure control are pilot operated poppet or spool valves. The main component designed as a cartridge valve (1) is inserted in a cavity bore corresponding to DIN 24 342 and sealed by control cover (2).
The pilot valve (4) for either manual or electrical proportional pressure control, is integrated into the control cover (2) or mounted onto the control cover as a pilot valve with interface connections to DIN 24 340[D03, D05] (2).
By combining the cartridge valve with the control covers, various pressure functions can be achieved.



LC..DB.. D 7X ... | LC..DB.. E 7X ...

Pressure relief function
Control cover: LFA..DB...
Cartridge valve: LC..DB...
The cartridge valve (1) for the pressure relief function (model LC.. DB..) is a poppet valve with no area differential (no effective area at port B). The pilot signal at port A is fed via pilot oil orifice (5) to the spring side (6) of the element. At pressures below the setting of pilot valve (4) forces on cartridge element (3) are balanced and the spool remains closed, due to the biasing spring force. Upon reaching the set pressure, cartridge element (3) opens and limits the pressure at port A to the corresponding valve pressure/ flow characteristics.

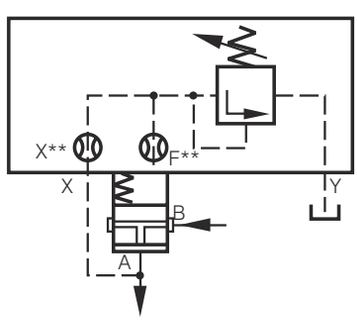
Pressure reducing function
a) Normally open: Control cover: LFA..DB...
Cartrdige valve: LC..DR...
The cartridge valve for the pressure reducing function is a spool valve with no area differential (no effective area at port B). The same cover models are used as above for the pressure relief functions (model LFA.. DB..). The pilot signal at port A is fed to the spring side of the cartridge element via the pilot oil supply orifice. Below the performance limit and pressure set at the pilot valve, the cartridge element is pressure balanced and is held open by the spring force, so that oil is free to flow from port B to port A.
Upon reaching the set pressure, the cartridge element close and limits the pressure at port A to the corresponding valve pressure/flow characteristics.



Pressure Relief

Model LFA .. DB ...

Model LC .. DB ...



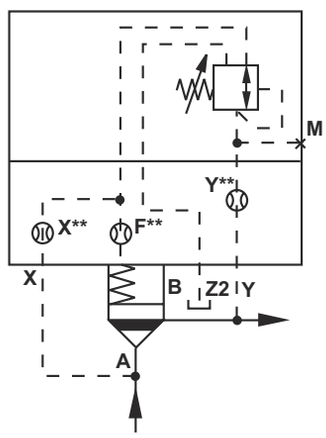
Pressure Reducing:
– Normally Open

e.g.
Model LFA .. DB ...

Model LC .. DR 40 ...

Function Description

b) Normally closed:
Control cover: LFA.. DR...
Cartridge valve: LC...DB40D...
For the normally closed pressure reducing function, a pressure relief valve cartridge (model LC.. DB40D...) and a control cover with a pressure reducing valve (model LFA.. DR..) as the pilot valve are used. Pilot oil is fed from port A to the top of the control element via orifices (X) and (F). The pilot signal passes through the normally open reducing valve pilot into port B via orifice (Y). The main spool opens and allows free flow form port A to port B. Upon reaching set pressure, the cartridge element closes and limits the pressure at port B to the corresponding valve pressure/flow characteristics. Possible pressure spikes on the secondary side (B) are led away to tank via the third port of the pilot valve. By fitting a directional valve, an additional isolating function can also be attained (model LFA ...DRW...).



Pressure reducing:
– Normally Closed

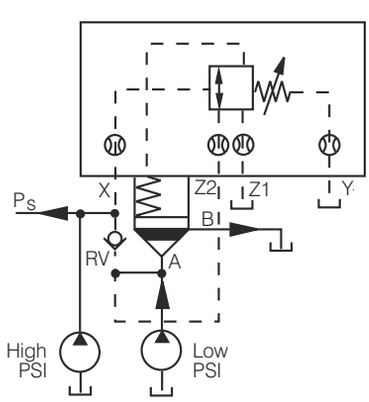
e.g.
Model LFA.. DR...
Model LC.. DB40D...

Pressure sequencing function
Control cover: LFA..DZ...
Cartridge valve: LC..DB...
This function enables a pressure-dependent sequencing of a branch circuit. The required sequencing pressure is set by the pilot valve, integrated into the control cover. The pilot oil supply may be either external (pilot oil port X) or internal (from port A via pilot oil port X or Z2). The spring chamber of the pilot control is drained to tank via ports Y or Z1.
When the pressure setting of the pilot spring is reached, the pilot valve switches and unloads the spring chamber of the main valve to tank. The main cartridge element opens connecting ports A to B. In model LFA.. DZW..., the required cartridge element position may be controlled by means of an electrically operated pilot valve (additionally ordered with control cover LFA..DZW..).

Typical Circuits

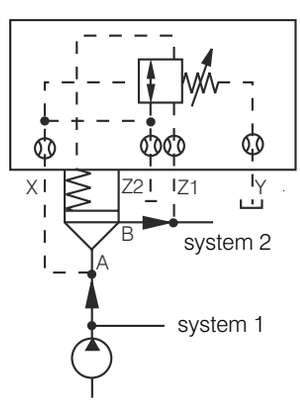
Example 1:
In the circuit shown, the system is fed by a high pressure pump and a low pressure pump. The system pressure ps acts externally from the high pressure side via pilot oil port X on the pilot valve. Upon reaching set pressure, the low pressure pump is unloaded to provide low pressure circulation. The check valve RV (not included within the scope of supply) prevents the high pressure system from flowing into the low pressure system.

Example 2:
With this circuit, oil is allowed to flow into system 2 when the pressure in system 1 has reached a pre-set value. The pilot oil supply is internal from connection A of the main valve.



Example 1:
Circuit for pressure dependent unloading of a low pressure system

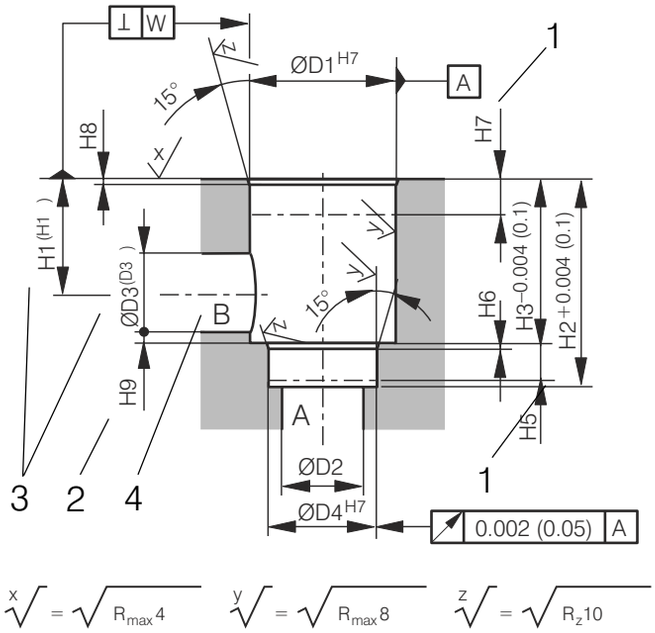
e.g.
Model LFA..DZ../..XY
Model LC..DB20D...



Example 2:
Pressure dependent sequencing of a second system

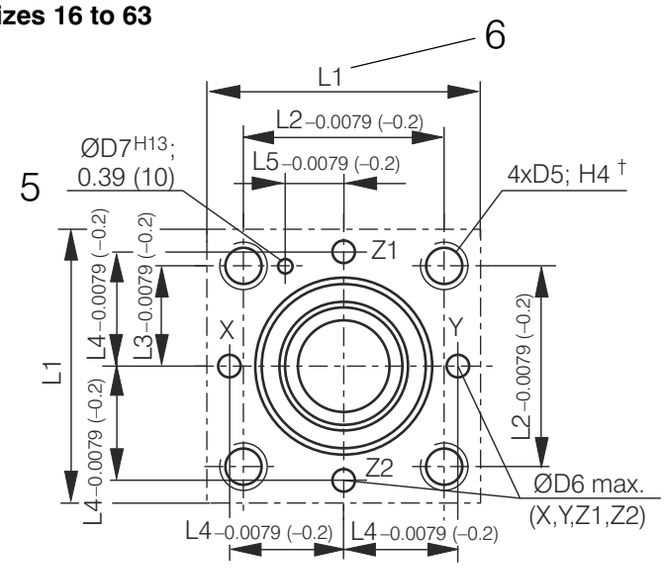
LFA.DZ.../...Y
LC..DB20D...

Installation cavity and porting to DIN 24 342 (DIN ISO 73568) (Dimensions in mm)

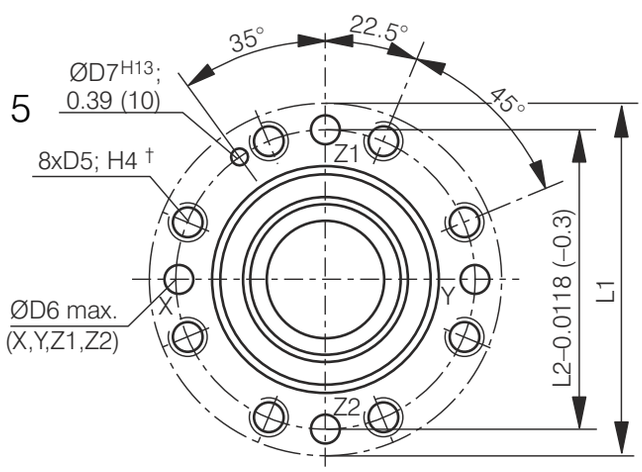


$\sqrt{}^{x} = \sqrt{R_{max}4}$ $\sqrt{}^{y} = \sqrt{R_{max}8}$ $\sqrt{}^{z} = \sqrt{R_z10}$

Sizes 16 to 63



Sizes 80, 100



Size	16	25	32	40	50	63	80	180
ØD1 H7	32	45	60	75	90	120	145	180
ØD2	16	25	32	40	50	63	80	100
ØD3	16	25	32	40	50	63	80	100
(ØD3*)	25	32	40	50	63	80	100	125
ØD4 H7	25	34	45	55	68	90	110	135
ØD5	M8	M12	M16	M20	M20	M30	M24	M30
ØD6 1)	4	6	8	10	10	12	16	20
ØD7 H13	4	6	6	6	8	8	10	10
H1	34	44	52	64	72	95	130	155
(H1*)	29.5	40.5	48	59	65.5	86.5	120	142
H2	56	72	85	105	122	155	205	245
H3	43	58	70	87	100	130	$175^{-0.2}$	$210^{-0.2}$
H4	20	25	35	45	45	65	50	63
H5	11	12	13	15	17	20	25	29
H6	2	2.5	2.5	3	3	4	5	5
H7	20	30	30	30	35	40	40	50
H8	2	2.5	2.5	3	4	4	5	5
H9	0.5	1	1.5	2.5	2.5	3	4.5	4.5
L1	65/80	85	102	125	140	180	250	300
L2	46	58	70	85	100	125	200	245
L3	23	29	35	42.5	50	62.5	-	-
L4	25	33	41	50	58	75	-	-
L5	10.5	16	17	23	30	38	-	-
W	0.05	0.05	0.1	0.1	0.1	0.2	0.2	0.2

1) max. dimensions

† For applications with UNC thread bolts, use inch value.

Size	ØD1 H7	ØD4 H7	ØD7 H13
16	$1.26^{+0.0010}$	$0.98^{+0.008}$	$0.158^{+0.0071}$
25	$1.77^{+0.0010}$	$1.34^{+0.0010}$	$0.236^{+0.0071}$
32	$2.36^{+0.0012}$	$1.77^{+0.0010}$	$0.236^{+0.0071}$
40	$2.95^{+0.0012}$	$2.17^{+0.0012}$	$0.236^{+0.0071}$
50	$3.54^{+0.0014}$	$2.68^{+0.0012}$	$0.315^{+0.0087}$
63	$4.72^{+0.0016}$	$3.54^{+0.0014}$	$0.315^{+0.0087}$
80	$5.71^{+0.0016}$	$4.33^{+0.0014}$	$0.39^{+0.0087}$
100	$7.09^{+0.0018}$	$5.32^{+0.0016}$	$0.39^{+0.0087}$

1. Depth of fit
2. Reference dimension
3. For other diameters of port B ØD3 or (ØD3*) the distance from the cover surface to the center line of this hole must be calculated.
4. Port B may be moved about the central axis of port A. Care must be taken to ensure that the mounting holes and control holes are not damaged.
5. Drilling for location pin
6. Note on size 16 porting pattern: Length L1 (axis x–y drilling) is 80 mm.

Ordering code

LC		DB				

Series 7X
size 16 = 16
Size 25 = 25
size 32 = 32
size 40 = 40
size 50 = 50
size 63 = 63
Series 6X
size 80 = 80
size 100 = 100

Cracking pressure
Cracking pressure 0 PSI (0 bar) (without spring) = 00
Cracking pressure 29 PSI (2.0 bar) = 20[1])
Cracking pressure 58 PSI (4.0 bar) = 40
Cracking pressure 72.5 PSI (5.0 bar) = 50
Cracking pressure 116 PSI (8.0 bar) = 80

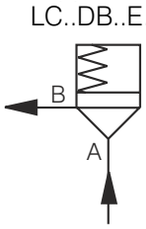
No code = NBR seals
V = FPM seals
(other seals on request)
⚠Attention!
The compatibility of the seals and pressure fluid has to be taken into account!

6X = **Sizes 80 to 100** Series 60 to 69
(60 to 69: unchanged installation and connection dimensions)
7X = **Sizes 16 to 63** Series 70 to 79
(70 to 79: unchanged installation and connection dimensions)

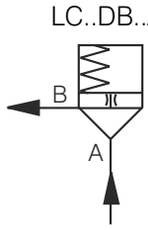
E = Poppet valve
D = Poppet spool valve
A = Poppet valve with orifice
B = Poppet spool valve with orifice

Symbols

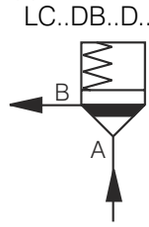
Poppet valve
LC..DB..E...



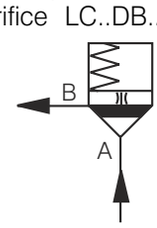
Poppet valve with orifice
LC..DB..A...



Poppet spool valve
LC..DB..D...



Poppet spool valve with orifice LC..DB.. B...



Technical data

Pressure fluid 1) suitable for NBR and FPM seals suitable for FPM seals		Mineral oil (HL, HLP) to DIN 51 524 [1]; Fast bio-degradable pressure fluids to VDMA 24 568 HETG (rape seed oil)[1];only HEPG (polyglycol) [2]; HEES (synthetic ester) [2]; other fluids on request						
Pressure fluid - temperature range	°C	– 30 to + 80 NBR seals						
		– 20 to + 80 FPM seals						
Viscosity range	mm²/s	2.8 to 380						
Degree of fluid contamination		Maximum permissible degree of contamination of the fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of ß 10 ‡ 75.						
2-way cartridge valve								
Max. operating pressure at ports A and B	bar	up to 420						
Nominal size		16	25	32	40	50	63	80	100
Max. flow (recommendation) Poppet valve insert LC..DB..E../.. LC..DB..A..	l/min	300	450	600	1000	1600	2500	4500	7000
Spool valve insert LC..DB..D../.. LC..DB..B..	l/min	175	300	450	700	1400	1750	3200	4900

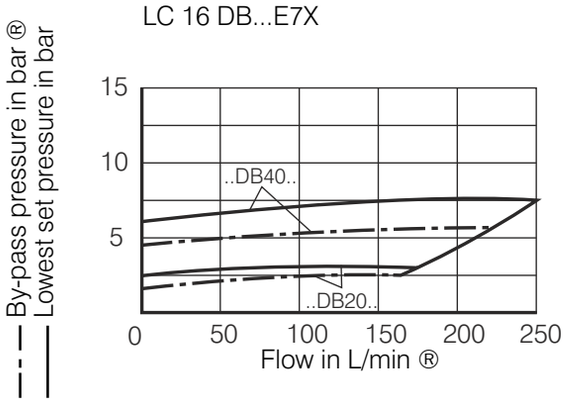
Operating curves, measured at n = 41 mm²/s and t = 50°C

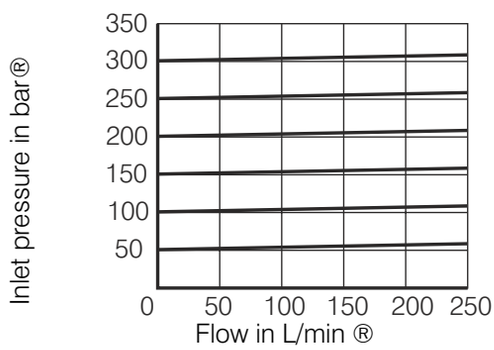
- **Size 16**

The curves were measured with an external pilot oil drain line at zero pressure. With an internal pilot oil drain the curves will increase additive to the pressure existing at port B.

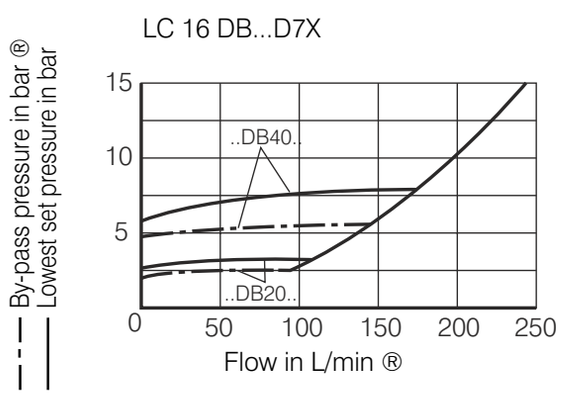
Manual pressure adjustment LFA 16 DB/DBW ...7X/...

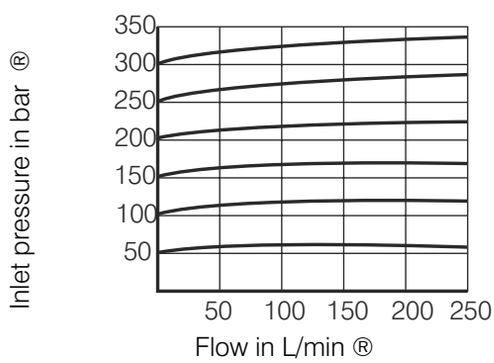
LC 16 DB...E7X





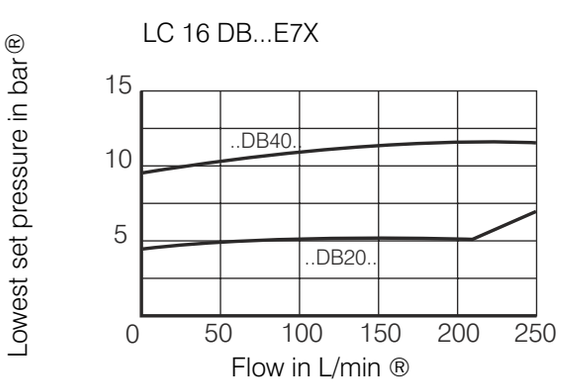
LC 16 DB...D7X

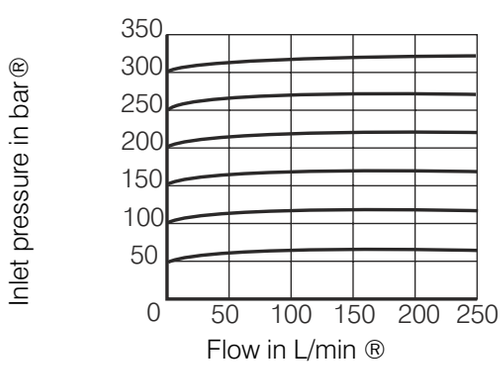




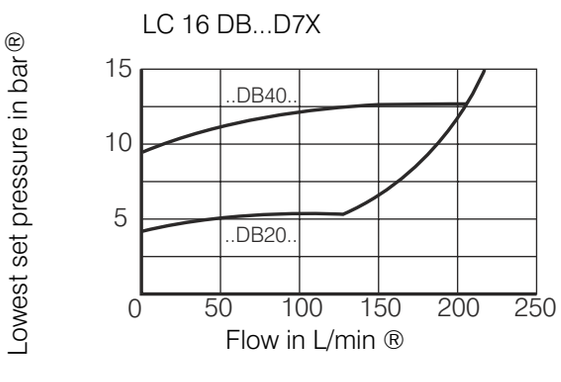
Electrical proportional pressure adjustment LFA 16 DBE ...7X/...

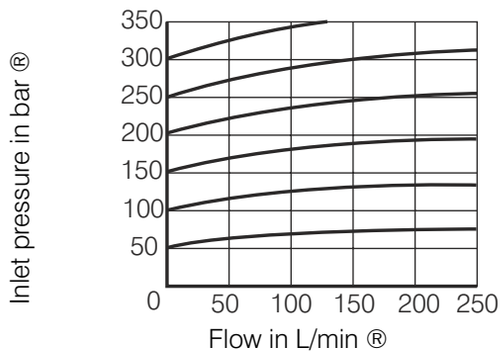
LC 16 DB...E7X





LC 16 DB...D7X

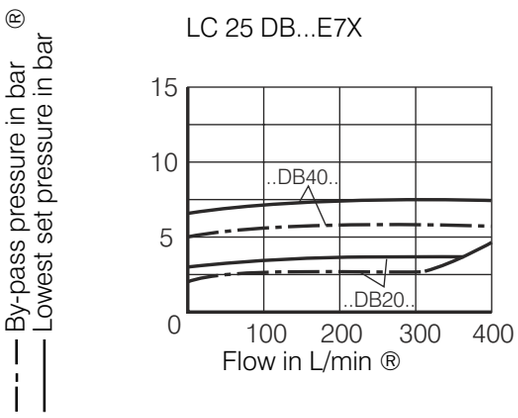


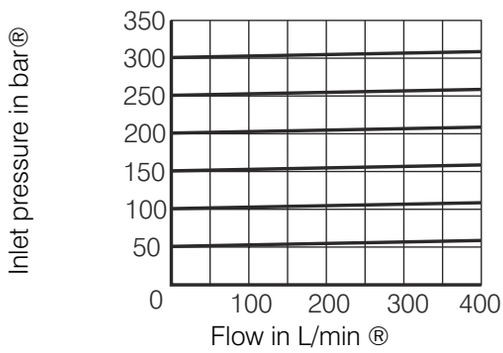


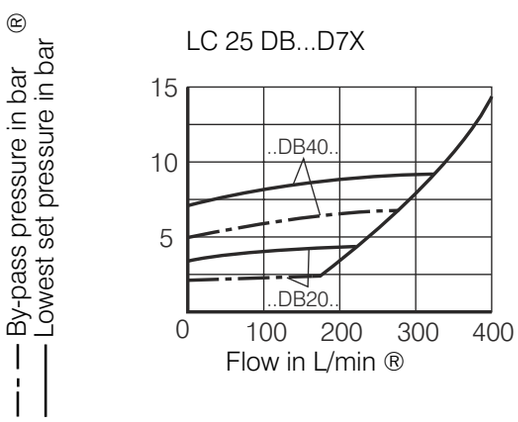
Operating curves, measured at n = 41 mm²/s and t = 50°C

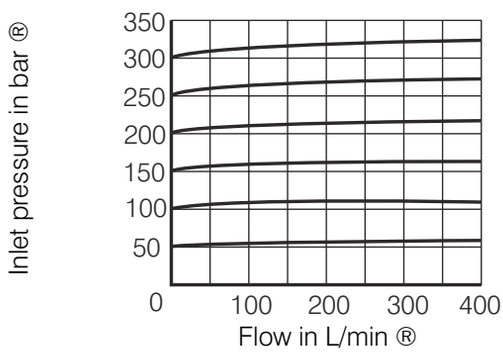
Size 25 The curves were measured with an external pilot oil drain line at zero pressure. With an internal pilot oil drain the curves will increase additive to the pressure existing at port B.

Manual pressure adjustment LFA 25 DB DBW ...7X/...

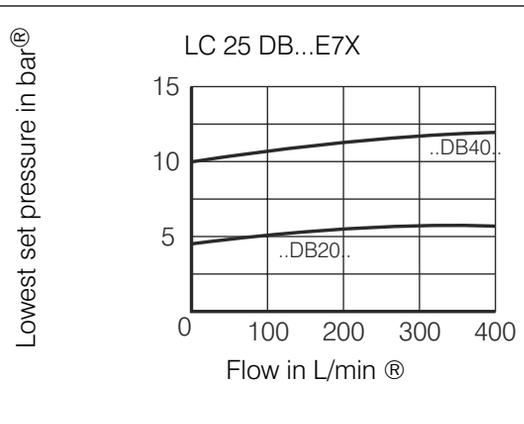


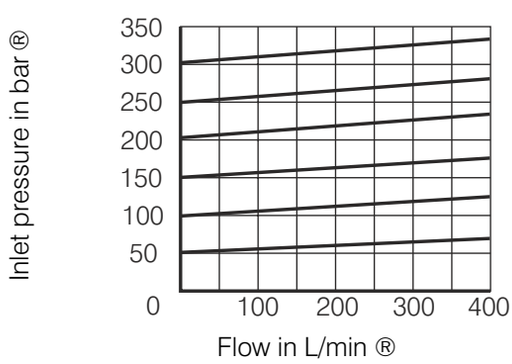


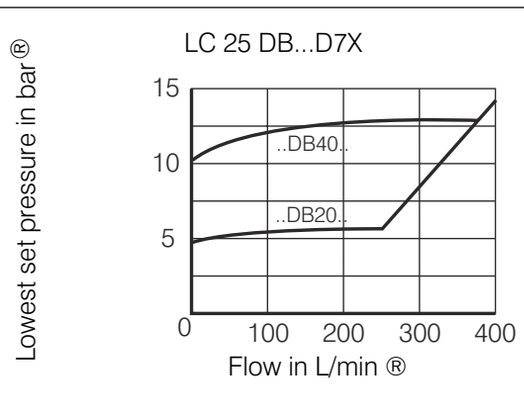


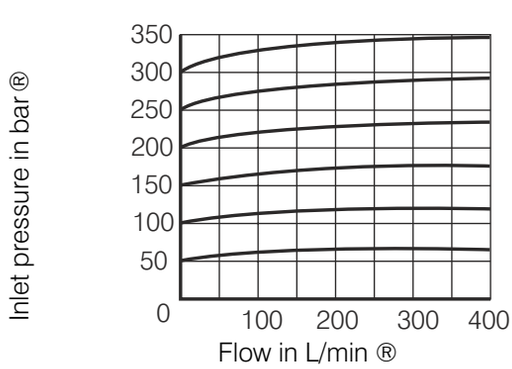


Electrical proportional pressure adjustment LFA 25 DBE ...7X/...







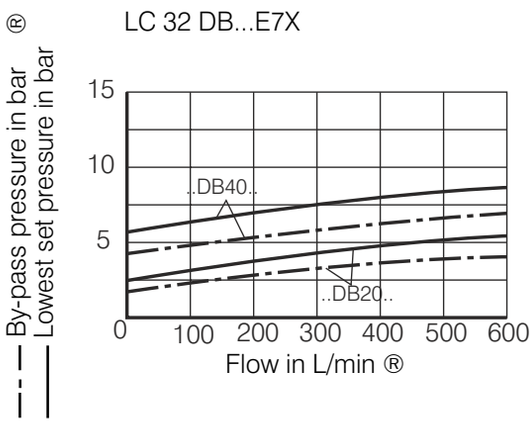


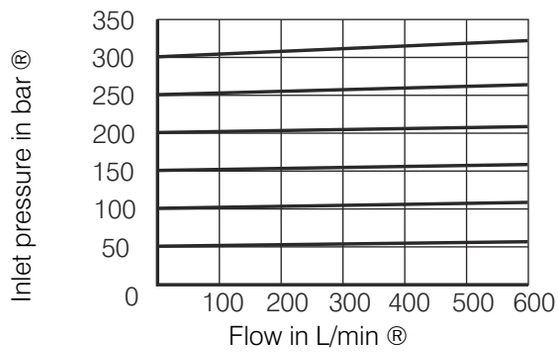
Operating curves, measured at n = 41 mm²/s and t = 50°C

Size 32 The curves were measured with an external pilot oil drain line at zero pressure. With an internal pilot oil drain the curves will increase additive to the pressure existing at port B.

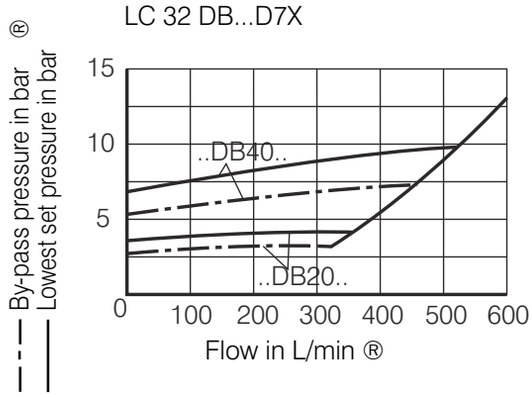
Manualpressure adjustment LFA 32 DB DBW...7X/...

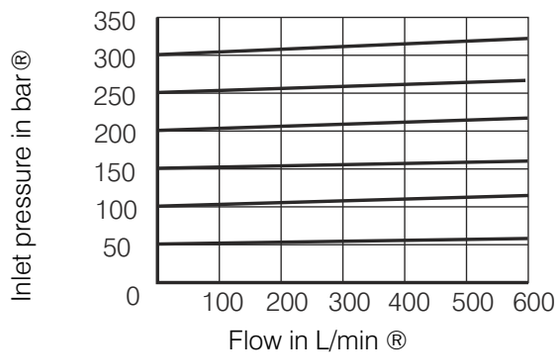
LC 32 DB...E7X





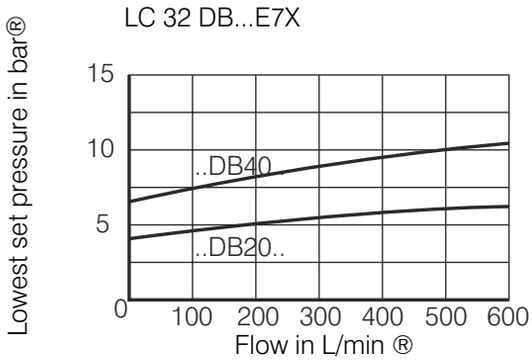
LC 32 DB...D7X

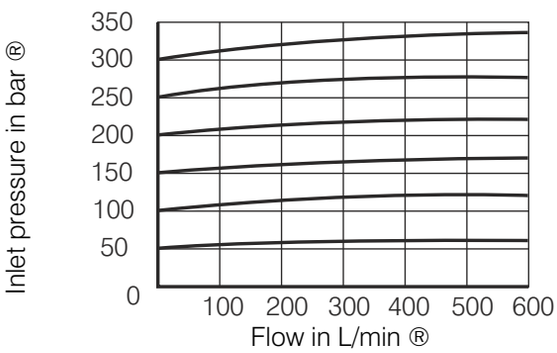




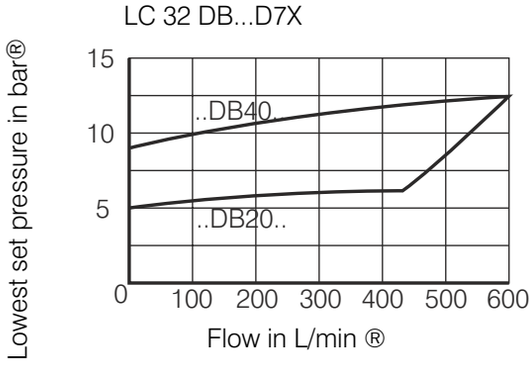
Electrical proportional pressure adjustment LFA 32 DBE ...7X/...

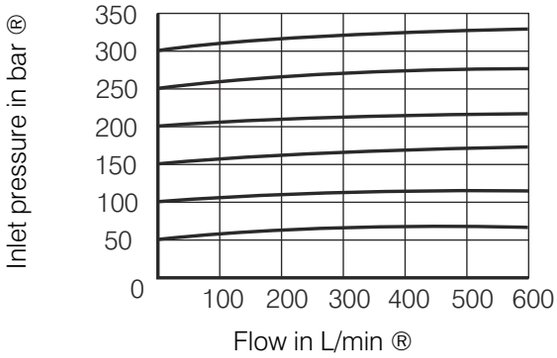
LC 32 DB...E7X





LC 32 DB...D7X



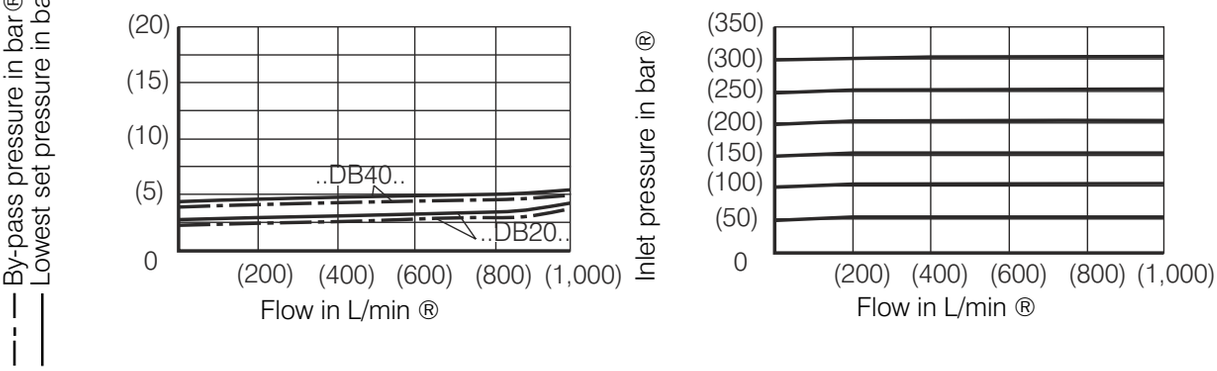


Operating curves, measured at n = 41 mm²/s and t = 50°C

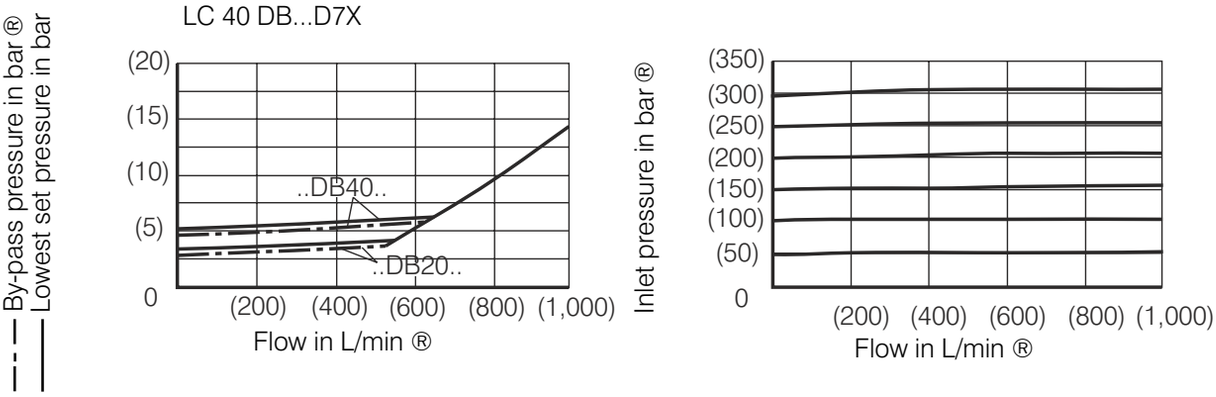
- **Size 40** The curves were measured with an external pilot oil drain line at zero pressure. With an internal pilot oil drain the curves will increase additive to the pressure existing at port B.

Manual pressure adjustment LFA 40 DB DBW ...7X/...

LC 40 DB...E7X

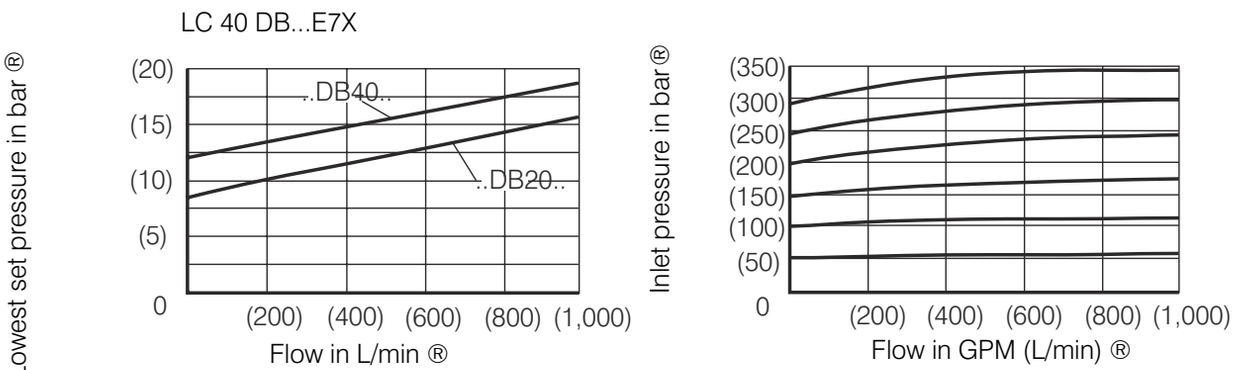


LC 40 DB...D7X

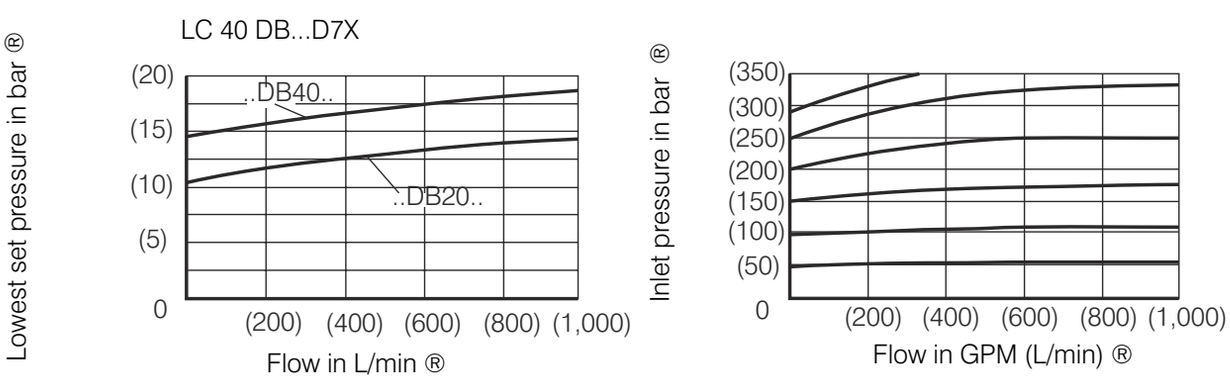


Electrical proportional pressure adjustment LFA 40 DBE ...7X/...

LC 40 DB...E7X



LC 40 DB...D7X

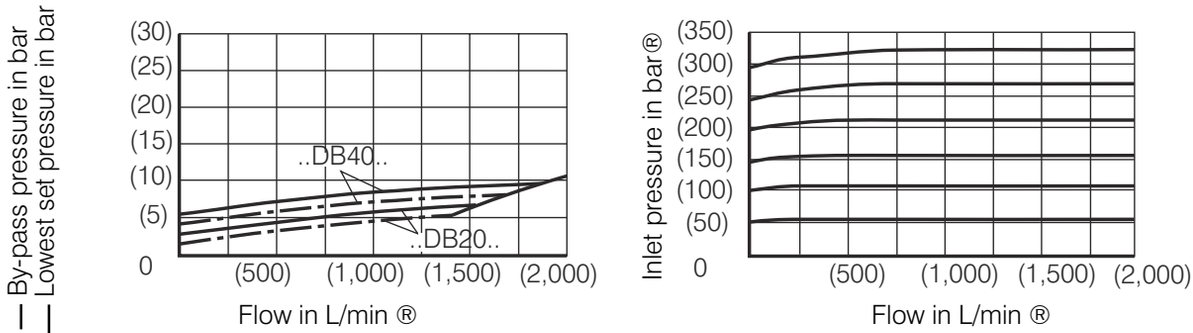


Operating curves, measured at n = 41 mm²/s and t = 50°C

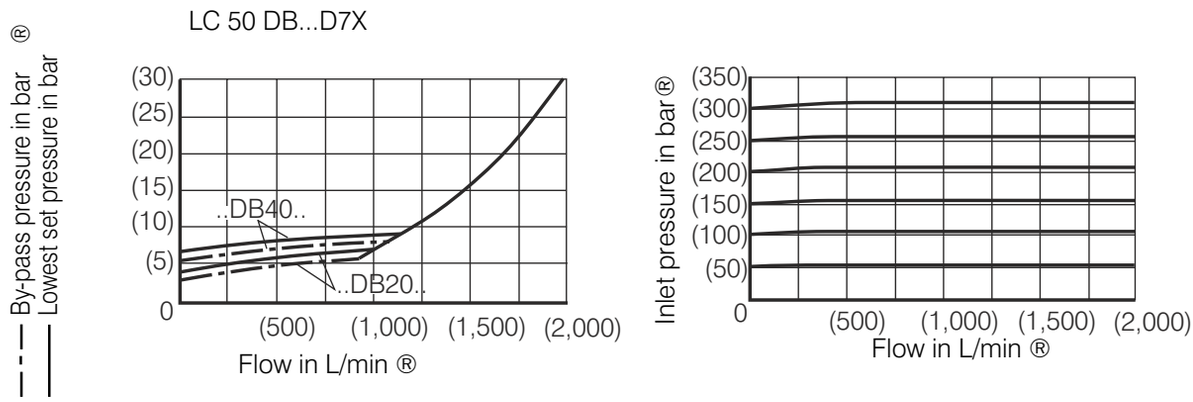
- **Size 50** The curves were measured with an external pilot oil drain line at zero pressure. With an internal pilot oil drain the curves will increase additive to the pressure existing at port B.

Manual pressure adjustment LFA 50 DB DBW...7X/...

LC 50 DB...E7X

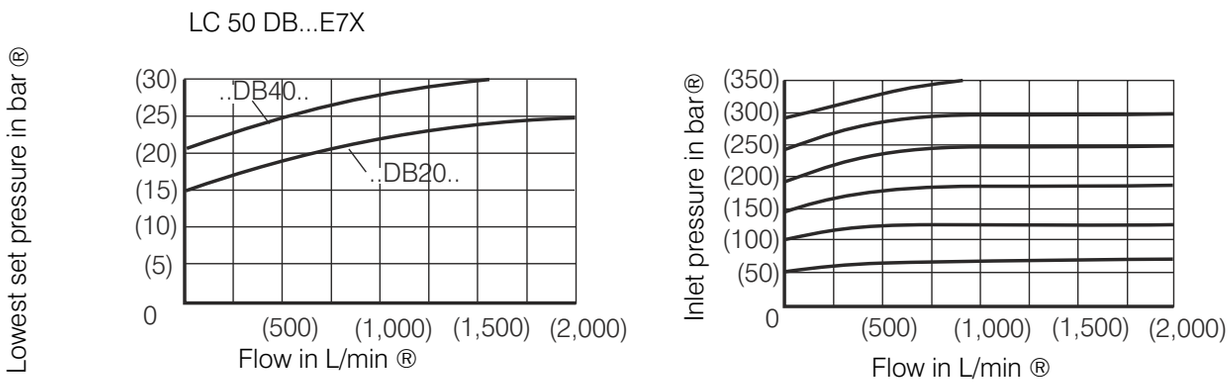


LC 50 DB...D7X

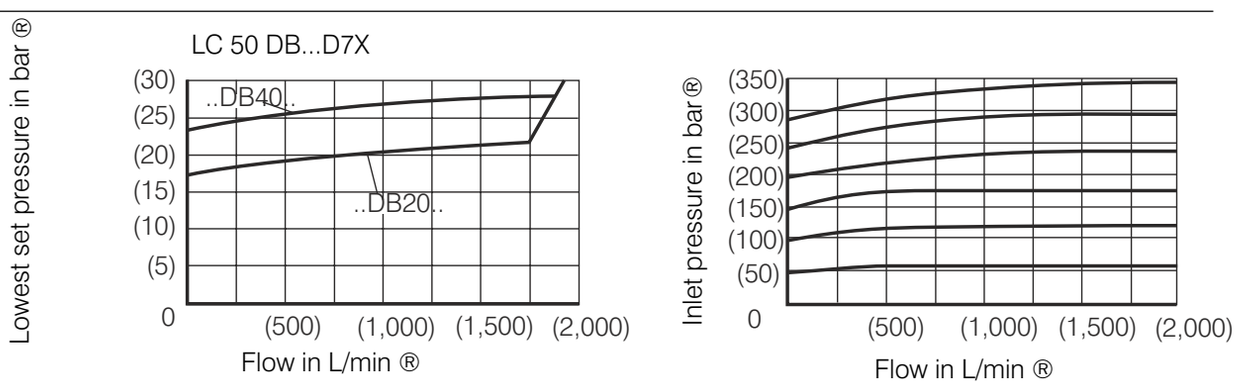


Electrical proportional pressure adjustment LFA 50 DBE ...7X/...

LC 50 DB...E7X



LC 50 DB...D7X

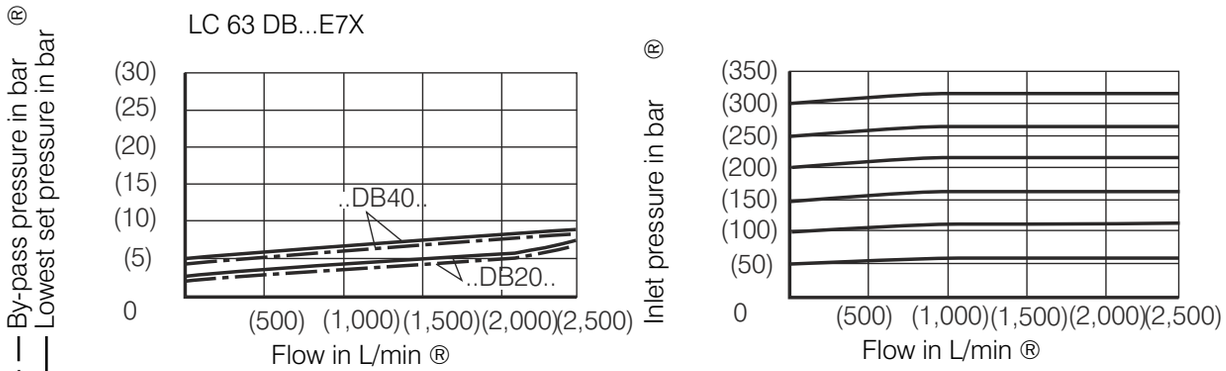


Operating curves, measured at n = 41 mm²/s and t = 50°C

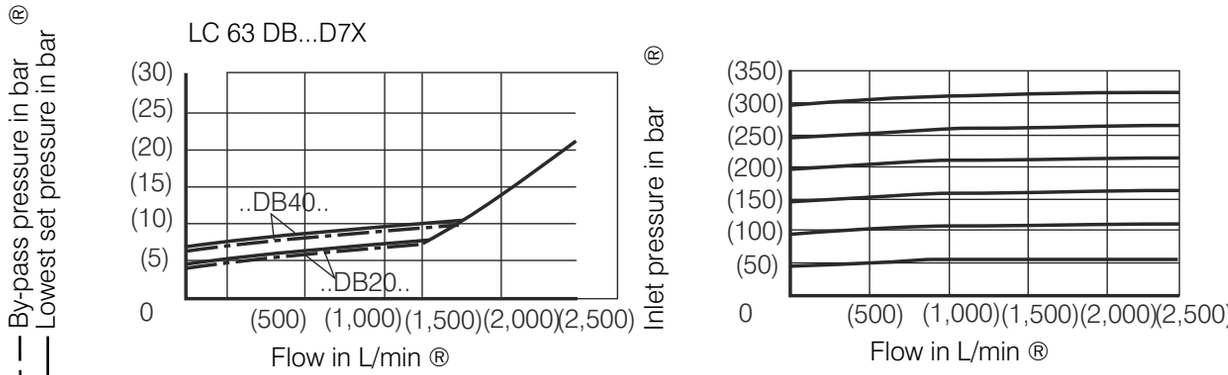
Size 63 The curves were measured with an external pilot oil drain line at zero pressure. With an internal pilot oil drain the curves will increase additive to the pressure existing at port B.

Manual pressure adjustment LFA 63 DB DBW ...7X/...

LC 63 DB...E7X

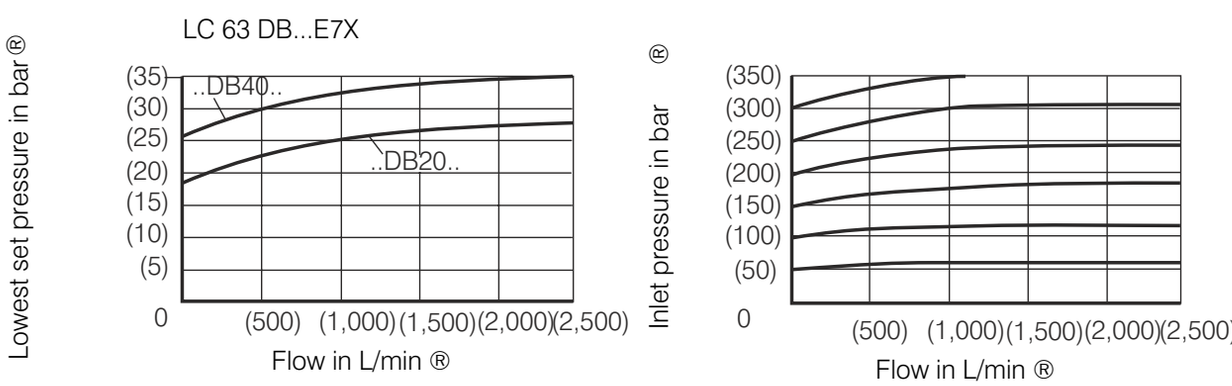


LC 63 DB...D7X

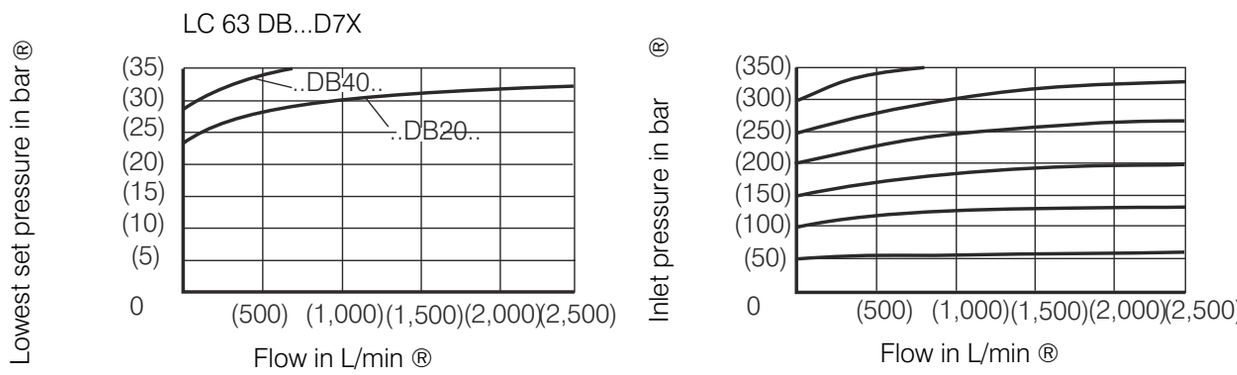


Electrical proportional pressure adjustment LFA 63 DBE ...7X/...

LC 63 DB...E7X



LC 63 DB...D7X



Compression springs (DB and DR) for sizes 16...100

Size	UID	Dimensions in inches	(Dimensions in mm)	Model code
16	T100062747	0.402/0.051 x 1.6/0.315	(10.2/1.3 x 40.5/8.0)	20
	T100062753	0.394/0.063 x 1.504/0.354	(10.0/1.6 x 38.2/9.0)	30
	T100062754	0.386/0.067 x 1.496/0.354	(9.8/1.7 x 38.0/9.0)	40
	T100062757	0.382/0.075 x 1.406/0.335	(9.7/1.9 x 35.7/8.5)	50
	T100082073	0.362/0.095 x 2.382/0.571	(9.2/2.4 x 60.5/14.5)	80 1)
25	T100062762	0.602/0.089 x 2.165/0.315	(15.3/2.25 x 55.0/8.0)	20
	T100062764	0.587/0.106 x 2.102/0.335	(14.9/2.7 x 53.4/8.5)	30
	T100062820	0.579/0.11 x 2.106/0.335	(14.7/2.8 x 53.5/8.5)	40
	T100062819	0.575/0.118 x 2.067/0.335	(14.6/3.0 x 52.5/8.5)	50
	T100082072	0.555/0.138 x 3.091/0.472	(14.1/3.5 x 78.5/12.0)	80 1)
32	T100062813	0.772/0.11 x 2.736/0.295	(19.6/2.8 x 69.5/7.5)	20
	T100062783	0.756/0.126 x 2.795/0.335	(19.2/3.2 x 71.0/8.5)	30
	T100062810	0.752/0.134 x 2.835/0.375	(19.1/3.4 x 72.0/9.5)	40
	T100062805	0.752/0.138 x 2.866/0.354	(19.1/3.5 x 72.8/9.0)	50
	T100082071	0.728/0.158 x 4.291/0.571	(18.5/4.0 x 109/14.5)	80 1)
40	T100014032	0.953/0.158 x 2.461/0.256	(24.2/4 x 62.5/6.5)	20
	T100014033	0.949/0.167 x 2.677/0.295	(24.1/4.25 x 68/7.5)	40
	T100011119	0.898/0.221 x 5.512/0.61	(22.8/5.6 x 140/15.5)	50
	T100011119	0.898/0.221 x 5.512/0.61 (with washer 0.295)	(22.8/5.6 x 140/15.5) (with washer 7.5)	80 1)
50	T100014034	1.15/0.197 x 3.012/0.295	(29.2/5 x 76.5/7.5)	20
	T100014035	1.15/0.197 x 3.406/0.295	(29.2/5 x 86.5/7.5)	40
	T100015962	1.102/0.248 x 7.874/0.65	(28/6.3 x 200/16.5)	50 1)
	T100015962	1.102/0.248 x 7.874/0.65 (with washer 0.551)	(28/6.3 x 200/16.5) (with washer 14)	80 1)
63	T100014036	1.48/0.256 x 4.035/0.315	(37.6/6.5 x 102.5/8)	20
	T100014037	1.48/0.256 x 4.528/0.315	(37.6/6.5 x 115/8)	40
	T100011778	1.398/0.335 x 10.12/0.768	(35.5/8.5 x 257/19.5)	50 1)
	T100011778	1.398/0.335 x 10.12/0.768 (with washer 0.551)	(35.5/8.5 x 257/19.5) (with washer 14)	80 1)
80	T100012353	1.91/0.315 x 5.433/0.295	(48.5/8 x 138/7.5)	20
100	T100012385	2.059/0.374 x 6.929/0.374	(52.3/9.5 x 176/9.5)	20

1) These springs require an additional installation length.
When using standard control covers, an additional sandwich plate LFA..D22-.. must be used.

Exception:
Control cover model "D" can be replaced by LFA..D8-../F (no sandwich plate required).

Seal kits for cartridge valves

Seal kits for cartridge valves models LC..DB../.. (sizes 16 ... 100)

Seal kit for	UID NBR	UID FPM
LC 16 DB..7X/...	T200313104	T300313107
LC 25 DB..7X/...	T200313105	T300313108
LC 32 DB..7X/...	T200313106	T300313109
LC 40 DB..7X/...	T200314055	T300314064
LC 50 DB..7X/...	T200314056	T300314065
LC 63 DB..7X/...	T200314057	T300314066
LC 80 DB..6X/...	T200314058	T300314067
LC 100 DB..6X/...	T200314059	T300314068

The specified data is for product description purposes only and may not be deemed to be guaranteed unless expressly confirmed in the contract.

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