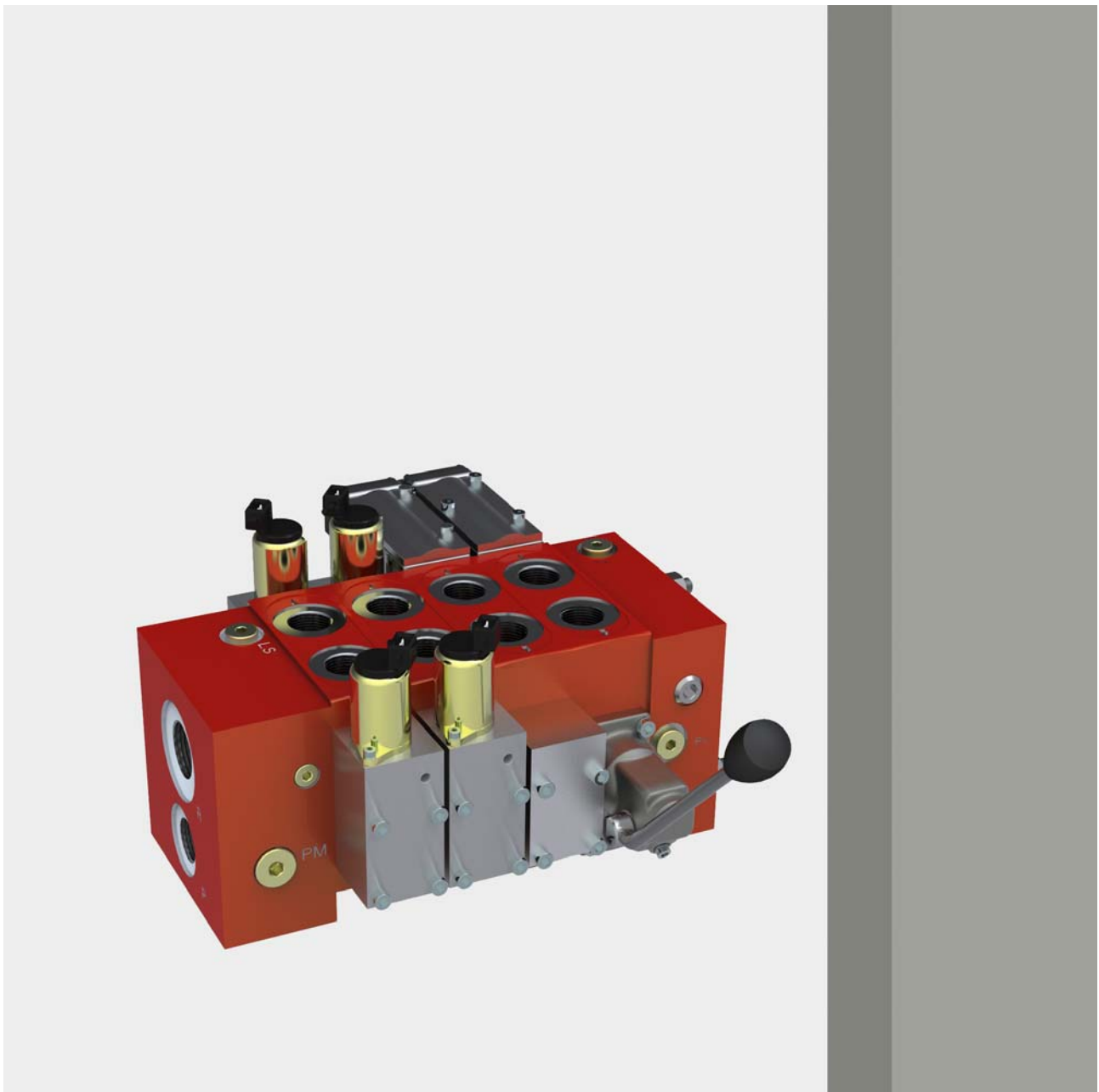


Proportional Directional Valve System

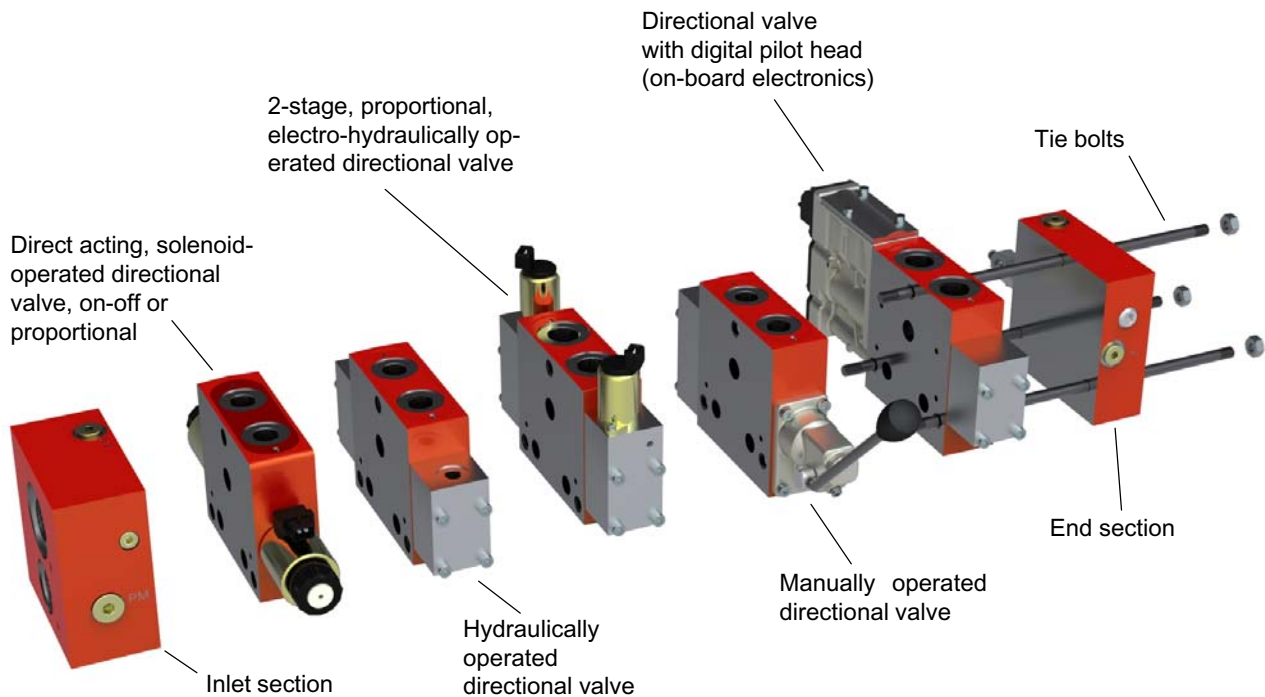
Series LVS



motion and progress

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1 General description



With the LVS hydraulic valve, designers can easily create mobile-machine control systems that, are normally difficult to master. Its systematic design as a family of valve modules offers exceptional adaptability.

All directional sections are designed as load-sensing directional valves with one main bore. The pressure-compensated models are designed as hollow spools with flow-force compensation. The associated, independent individual-section pressure compensators for service ports A and B operate on the principle of proportional flow-sharing. The integral auxiliary functions and high power density make the LVS not only a highly adaptable modular valve, but also a very compact unit.

LVS valve blocks can be configured for both fixed- and variable-displacement pumps.

The basic LVS valve block has 6 control options: hand lever, on/off solenoid, proportional solenoid, hydraulic, proportional electro-hydraulic, and with digital pilot head. With the proportional flow-sharing principle of the LVS directional valves, and in contrast to conventional load-sensing valves, the load signal is fed directly to the variable-displacement pump or system pressure-control valve i.e. without using a series of shuttle valves.

1.1 Pump systems

1.1.1 Fixed-displacement pump

The valve block includes a 3-way pressure compensator, directional sections and block termination components. In the neutral position, the 3-way pressure compensator is unloaded to tank and the entire flow being supplied to the valve passes through the 3-way compensator to tank with minimal off-load pressure drop.

When a directional section is operated, the actuator pressure is signalled to the 3-way pressure compensator. The 3-way compensator maintains the Δp at a constant level, so that the flow rate is independent of the load and proportional to the open flow area of the metering orifice in the directional valve.

1.1.2 Variable-displacement pump

In systems with a variable-displacement pump (load-sensing control), as well as the normal p-line, the control line is also connected to the pump control. When all directional valves are in the neutral position, the control line is connected to tank and the pump de-strokes. When a directional section is operated, the actuator pressure is signalled to the pump control and the pump goes on-stroke until the defined control Δp is reached.

1.2 General technical data

Oil temperature	-25 °C to 80 °C
Oil viscosity	for reliable operation, 380 to 10 mm ² /s (cSt); for rated performance, 80 to 20 mm ² /s (cSt)
Oil cleanliness	at least 19/16/14 to ISO 4406 or class 9 to NAS 1638
Pressure	LVS08: pump port 250 bar, actuator ports 280 bar, tank port 200 bar static. LVS12: pump port 350 bar, actuator ports 400 bar, tank port 50 bar static (optional: 200 bar)
Flow rate	Q _{max.} from 6 l/min to 180 l/min at max. 12 bar pressure drop from P port of valve block to LS (maximum allowable pressure drop: 20 bar, theoretical Q _{max.} = 232 l/min)
Energy consumption	LVS08: on/off solenoid 6.8 Ω, 30 W; proportional solenoid 12 VDC / 2.5 A, 24 VDC / 1.25 A at maximum stroke. LVS12 electro-hydraulic: 12 VDC / 1.5 A, 24 VDC / 0.75 A at maximum stroke. Digital pilot head: 0.6 A at 12 Volt, 0,3 A at 24 Volt, on/off operation 8 W
On-board voltage	minimum required for on/off solenoids: 10.8 VDC / 21.6 VDC at the coil contact pins
Pressure medium (hydraulic fluid)	recommendation: high-quality fluids with a mineral-oil base, such as HLP oils to DIN 51524 Part 2. For other fluids (e.g. phosphate esters), please consult Bucher
Sections	maximum 10 directional sections per valve block

2 Inlet sections



2.1 Technical data

	Unit	Value
Inlet pressure	bar	max. 350
Nominal flow rate / open-centre systems	l/min	max. 200
Nominal flow rate / closed-centre systems	l/min	max. 260
Nominal flow rate, A and B to T	l/min	max. 300

For other values consult Bucher Hydraulics

2.2 Functions

2.2.1 LS Unloading

The higher loaded directional valve signals its load pressure to the LS gallery when it is in a working position. In the neutral position, no load is signalled. In the proportional flow-sharing system, all control valves are connected to the same load-sensing pressure. This means that pressure unloading in the neutral position is ensured by a controlled connection to tank (Q_{LSmax} approx. 0.7 l/min).

2.2.2 LS_{max} pressure relief

The LS_{max} pressure (pressure relief) at the valve block must be set below the pressure cut-off setting of the pump. Without this pressure-relief function, all activated actuators stop when any actuator reaches its end-stop. If this is not a disadvantage in a system, the LS_{max} pressure-relief function in the valve block is not required.



IMPORTANT: the pressure setting at the LS pump must be higher than LS_{max} pressure relief by at least the LS-Δp of the pump (see also 3.2.5)

2.2.3 3-way pressure compensator

The 3-way pressure compensator keeps the pressure difference between the pressure and control galleries inside the block at a constant level. The surplus flow passes to tank or to the surplus-flow port.

2.2.4 2-way pressure compensator

The 2-way compensator is a differential-pressure valve. It is situated inside the block, before the pressure gallery. By reducing the inlet pressure to this valve, the control pressure between the pressure and control galleries inside the block is kept at a constant level. If the pressure in the control line reaches the setting of an upstream pressure-relief valve, the valve shuts off the supply to the block.

2.2.5 2-stage pressure relief (only in conjunction with 3-way pressure compensator)

If the pressure in the control line reaches the setting of an upstream pressure-relief valve, the 3-way compensator opens to tank, thus limiting the pressure in the pressure gallery inside the block.

2.2.6 External priority function, with "Dynamic Flow" in the LS line

An external actuator always has priority when receiving supply. Only when the external actuator is already being supplied with the required flow is any surplus flow then fed to the valve block. A defined oil flow runs through the LS line

to the priority actuator. This has the effect of shortening the priority function's reaction time.

2.2.7 LS pressure relief in the priority flow

If the pressure in the control line reaches the LS pressure-relief setting, the flow to the priority actuator is reduced until the pressure in the LS line equals the setting of the pressure-relief valve. The flow that is no longer required is now available to other actuators.

2.2.8 Pressure control in P

Direct-acting pressure-relief function in the inlet flow in P.

2.3 Ordering code

Inlet section		Pressure setting in bar	
L₁ V₁ S - E - C₁ F₁ * - G₁ 1 1 0 J₁ 1 2 A 0 0 /		P = P1 = P2 = P3 =	
Functions		Options (see 2.7)	
No control function, no ports	= CA*	Design stage	
No control function / P, R and LS ports	= CAP		
LS unloading / P, R and LS ports	= CB*	Solenoid voltage + sol. connector AMP Junior Timer, 12 V = J12 AMP Junior Timer, 24 V = J24	
LS _{max} pressure relief ¹⁾ (P1=) / P, R and LS ports	= CC*		
LS _{max} pressure relief ¹⁾ (P1=) / electrical LS-disable via 2/2 seat valve / de-energised open / P, R and LS ports	= CCL	Not required for models without electrical connections	
LS _{max} pressure relief ¹⁾ (P1=) / LS unloading / P, R and LS ports	= CE*		
LS _{max} pressure relief ²⁾ (P1=) / LS unloading / pressure relief in P (P=) / P, R and LS ports	= CD*	Port threads to DIN 3852 - Part 2 P and R G1" LS G1/4" Priority flow G1/2" = G110 Without threaded ports = ****	
3-way compensator / LS unloading / two-stage pressure relief (P1=) / P and R ports	= CF*		
3-way compensator / LS unloading / two-stage pressure relief (P1=) / reduced off-load pressure (control Δp = 9 bar) / P and R ports	= CFE	Dyn. LS _{max} pr. relief in prio. flow ²⁾ (P2=) / LS _{max} pr. relief in surplus flow (P3=) / external prio. function / LS unloading / P, PL, R, LS and LSL ports = CG*	
3-way compensator / LS unloading / two-stage pressure relief (P1=) / electrical LS-disable via 2/2 seat valve / de-energised open / P and R ports	= CFL		
2-way compensator / flow cut-off (P1=) / LS unloading / P, R and LS ports	= CF2	3-way compensator / 2-stage pressure relief (P1=) / mechanical switchover, OC - CC / LS unloading / P, R and LS ports = CH*	
.			
		3-way compensator / 2-stage pressure relief (P1=) / mechanical switchover, OC - CC / LS unloading / reduced off-load pressure (control Δp = 9 bar) / P, R and LS ports = CHE	

P = pressure setting for the pressure relief in the P inlet

P1 = pressure setting for the LS max pressure relief (inlet pressure = P1+Δp)

1) fixed pressure settings in bar available for the pressure-relief function (measured at 10 l/min test flow) 25, 32, 40, 50, 63, 80, 100, 125, 140, 160, 175, 190, 210, 230, 250, 280, 300, 330, 350 (for other pressures, consult Bucher Hydraulics) 2) adjustable pressure

P2 = pressure setting for the pressure relief in the priority flow

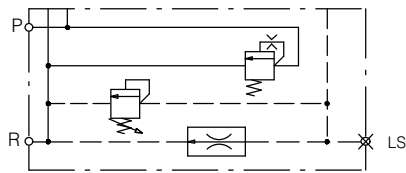
P3 = pressure setting for the pressure relief in the surplus flow

2.4 Inlet sections for systems with fixed-displacement pump (open centre)

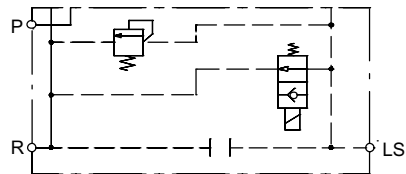
Model code and symbol	Description
<p>LVS-E-CF*-G110A00</p>	<ul style="list-style-type: none"> - 3-way compensator - two-stage pressure relief (P1 = ...) - LS unloading - control $\Delta p = 12$ bar - threaded ports for P (G1") and R (G1") <p>Specify pressure setting in bar at the end of the ordering code (P1 = inlet pressure + Δp)</p>
<p>LVS-E-CFE-G110A00</p>	<ul style="list-style-type: none"> - 3-way compensator - two-stage pressure relief (P1 = ...) - LS unloading - reduced off-load pressure (control $\Delta p = 9$ bar) - threaded ports for P (G1") and R (G1") <p>Specify pressure setting in bar at the end of the ordering code (P1 = inlet pressure + Δp)</p>
<p>LVS-E-CFL-G110J..A00</p>	<ul style="list-style-type: none"> - 3-way compensator - two-stage pressure relief (P1 = ...) - LS unloading - control $\Delta p = 12$ bar - electrical LS-disable via 2/2 seat valve, de-energised open - threaded ports for P (G1") and R (G1") <p>Specify pressure setting in bar at the end of the ordering code</p>

2.5 Inlet sections for systems with load-sensing pump (closed centre) and block combinations

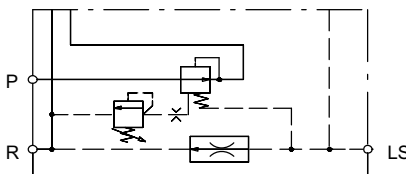
Model code and symbol	Description
<p>LVS-E-CA*-****A00</p>	<ul style="list-style-type: none"> - no control function - no ports
<p>LVS-E-CAP-G110A00</p>	<ul style="list-style-type: none"> - no control function - threaded ports for P (G1"), R (G1") and LS (G1/4")
<p>LVS-E-CB*-G110A00</p>	<ul style="list-style-type: none"> - LS unloading - threaded ports for P (G1"), R (G1") and LS (G1/4")
<p>LVS-E-CC*-G110A00</p>	<ul style="list-style-type: none"> - LS_{max} pressure relief, fixed setting - threaded ports for P (G1"), R (G1") and LS (G1/4") <p>Specify pressure setting in bar at the end of the ordering code</p>
<p>LVS-E-CE*-G110A00</p>	<ul style="list-style-type: none"> - LS_{max} pressure relief (P1 = ...), fixed setting - LS unloading - threaded ports for P (G1"), R (G1") and LS (G1/4") <p>Specify pressure setting in bar at the end of the ordering code</p>

LVS-E-CD*-G110A00


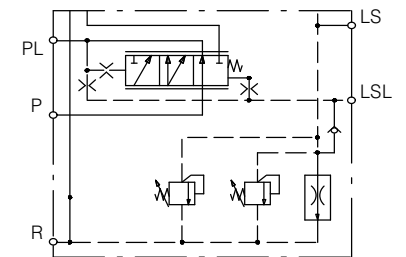
- pressure relief in P (P = ...)
 - LS_{max} pressure relief (P1 = ...), adjustable
 - LS unloading
 - threaded ports for P (G1"), R (G1") and LS (G1/4")
- Specify pressure setting in bar at the end of the ordering code

LVS-E-CCL-G110J..A00


- LS_{max} pressure relief (P1 = ...), fixed setting
 - electrical LS-disable via 2/2 seat valve, normally open
 - threaded ports for P (G1"), R (G1") and LS (G1/4")
- Specify pressure setting in bar at the end of the ordering code

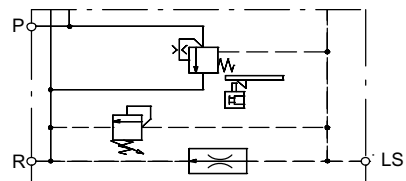
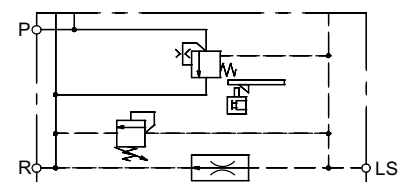
LVS-E-CF2-G110A00


- 2-way compensator
- flow cut-off
- LS unloading
- control $\Delta p = 12$ bar
- threaded ports for P (G1"), R (G1") and LS (G1/4")

LVS-E-CG*-G110A00


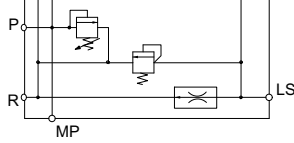
- external priority function
 - dynamic LS_{max} pressure relief in the priority flow (P2 = ...)
 - LS_{max} pressure relief in the surplus flow (P3 = ...), adjustable
 - LS unloading
 - control $\Delta p = 14$ bar
 - threaded ports for P (G1"), R (G1"), LS, LSL and LSP (G1/4")
- Specify pressure setting in bar at the end of the ordering code

2.6 Inlet sections with switchover for systems with LS or fixed-displacement pumps

Model code and symbol	Description
LVS-E-CH*-G...*** 	<ul style="list-style-type: none"> - 3-way compensator - two-stage pressure relief (P1 = ...) - LS unloading - control $\Delta p = 12$ bar - mechanical switchover, open centre - closed centre - threaded ports for P (G1"), R (G1") and LS (G1/4") <p>Specify pressure setting in bar at the end of the ordering code</p>
LVS-E-CHE-G...*** 	<ul style="list-style-type: none"> - 3-way compensator - two-stage pressure relief (P1 = ...) - LS unloading - mechanical switchover, open centre - closed centre - reduced off-load pressure (control $\Delta p = 9$ bar) - threaded ports for P (G1"), R (G1") and LS (G1/4") <p>Specify pressure setting in bar at the end of the ordering code</p>

2.7 Options

Model code	Description
LVS-E-C...-...01	- LS _{max} pressure relief, adjustable
LVS-E-...-...02	- threaded ports for external pilot pressure
LVS-E-C.*-...19	- measuring threaded ports, M16 x 1,5 for system pressure (P inlet)
LVS-E-C.*-...20	- measuring threaded ports, M16 x 1,5 for system pressure (P inlet) - threaded ports for P and T on the top, like A and B of the directional control valve
LVS-E-C...-...22	- pressure relief valve for inlet pressure
LVS-E-CE*...29	- threaded ports for P and T on the top, like A and B of the directional control valve
LVS-E-CE*...30	- LS _{max} pressure relief, adjustable - threaded ports for P and T on the top, like A and B of the directional control valve



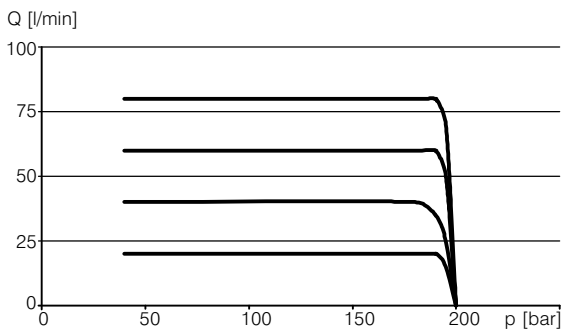
2.8 Performance graphs

2.8.1 Priority valve

residual flow to internal actuators

Q [l/min] = priority flow

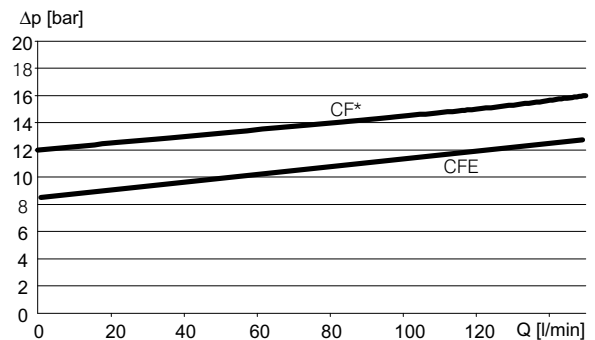
p [bar] = load pressure at priority actuator



2.8.2 Control curve for the 3-way compensator in the inlet plate

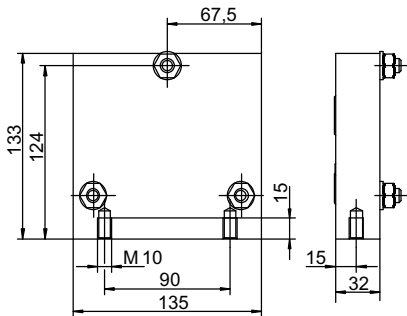
Q [l/min] = flow rate through the block

Δp [bar] = pressure drop from P to LS

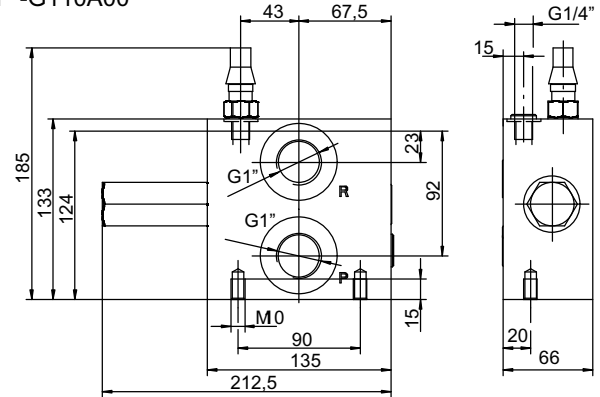


2.9 Dimensions

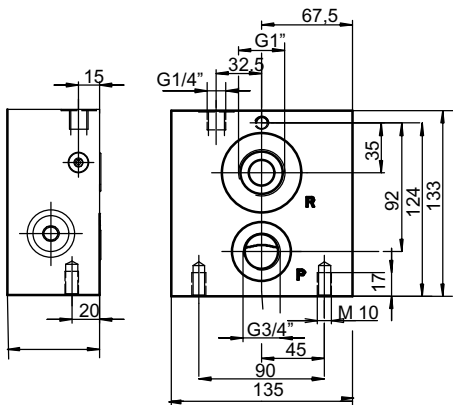
LVS-E-CA*-****00



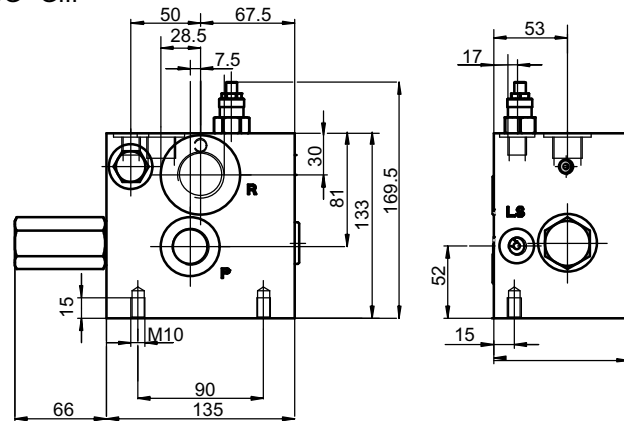
LVS-E-CF*-G110A00



LVS-E-CE*-G...***



LVS-E-CG*-G...***



3 Directional valve sections - general information

The LVS modular valve system includes the nominal sizes 08 and 12. The valve bodies are the same size and can be directly combined with each other.

3.1 Technical data

	LVS08	LVS12
Control types		
- direct acting on/off solenoid	X	-
- direct acting proportional solenoid	X	-
- hand lever operated	-	X
- hydraulically operated	-	X
- two-stage, proportional, electro-hydraulically operated	-	X
- digital pilot head with On Board Electronics	-	X
Nominal flow rate [l/min]	50	180
Maximum inlet pressure [bar]	250	350 *
Maximum pressure at the actuator ports A and B [bar]	280	400 *
Options		
- 2 proportional flow-control functions for A and B		X
- downstream compensator	X	X
- anti-shock and make-up function	X	X
- electrically operated seat valves (integral)	X	-
- manual override by pin	X	X
- manual override by hand lever	X	X
- spool-stroke limiter	-	X
- port for external control pressure	-	X
- bolt-on plate with seat valves	X	X
- bolt-on plate with load-control valves	X	X

* For inlet pressure < 300 bar and actuator pressure < 320 bar contact Bucher Hydraulics

3.2 Functions

3.2.1 Directional function

3-way valves have only one actuator port. 4-way valves are designed for double-acting actuators.

Spool types 6A(5) and 6D(5) are designed to supply 2 motor drives.

In spool type 6A(4), the spool is divided in two parts. The supply and return flows act on one actuator. The load pressure can be defined by means of the opening ratio.

3.2.2 Two independent 3/2 prop. directional valves

By dividing the control spool [6A(5)], 2 motor drives can be implemented in parallel, and independently of one another, in one valve body.

3.2.3 Load-independent operation

When several valves are operated simultaneously, the highest actuator pressure is signalled to the 3-way pressure compensator or to the pump control. The control pressure-difference of the system pressure control (3-way pressure compensator, variable-delivery pump) acts directly on the most highly loaded actuator and ensures load-independent control. The lower loaded actuators can be made load-independent by using individual section compensators.

3.2.4 LS-max pressure relief

If no oil flows out from an actuator port although the valve is in an operated position (ex. cylinder at end-stop), the P pressure is signalled in the LS ring circuit behind all compensators. The compensators in the individual functions would now also close due to their spring forces, and all actuators would remain stationary.

To prevent this from happening, the LS_{max} pressure is limited by a pressure-relief function. The discharge of LS flow reduces the pressure before the LS ring circuit, which results in the planned Δp being kept constant. The actuators in the system now operate without any malfunction.

3.2.5 Downstream compensator

When a valve system that is designed to the proportional flow-sharing principle is receiving sufficient pump flow and has adequately-sized supply lines, it functions like a system with upstream compensators.

For the most highly loaded actuator, the pressure drop across the spool orifice is determined by the system pressure control (pump controller or system pressure compensator). On the individual compensators of the other actuators, the highest system load is reproduced behind the spool metering orifice and thus the system pressure control

also applies to these actuators, and the pressure compensators counteract the effects of the different load pressures on each section.

If the flow demand is more than the pump can supply, the pump pressure simply falls. With the principle of proportional flow-sharing, the flow rate to all actuators is reduced.

3.2.6 Anti-shock and make-up function

The anti-shock valves protect actuators from unacceptably large pressure peaks when the actuator is operated or when external forces act on the actuator. The make-up (anti-cavitation) function supplies oil to the actuator when the tank pressure is higher than the actuator pressure.

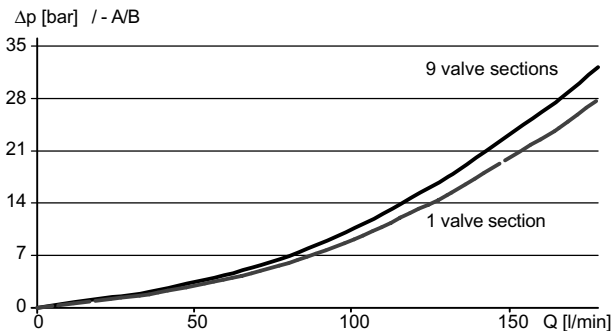
3.2.7 Load sensing

By means of the load sensing system, the highest prevailing actuator pressure is signalled to all proportional flow-sharing valves.

3.3 Performance graphs

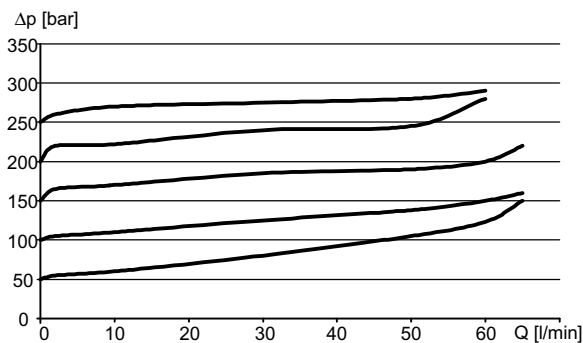
3.3.1 Pressure drop with individual operation

Measured with spool type O = 180 l/min
 Q [l/min] = flow rate from block inlet to actuator
 Δp [bar] = pressure difference from block inlet to actuator



3.3.2 Anti-shock valve

Q [l/min] = flow rate from actuator to tank
 Δp [bar] = pressure difference from actuator to tank



For flow rates < 60 l/min contact Bucher Hydraulics

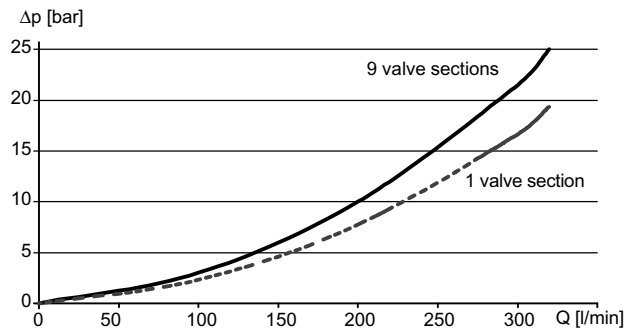
3.2.8 Conversion factors

For a given spool position, the flow rate at the actuator ports can be changed by altering the LS Δp setting at the compensator or pump controller. The corresponding conversion factors are shown in the table below.

LS Δp	Conversion factor
6 bar	0.7
8 bar	0.8
10 bar	0.9
12 bar	1.0
14 bar	1.05
16 bar	1.15
18 bar	1.25
20 bar	1.30

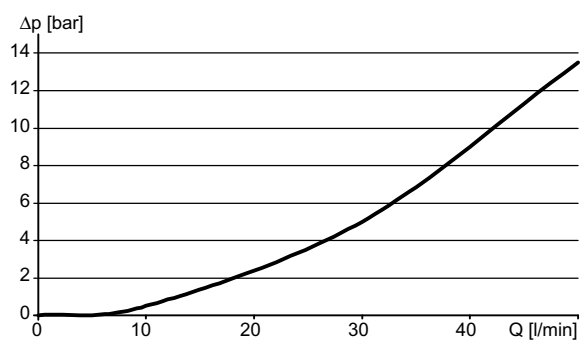
3.3.3 Pressure drop with individual operation

Measured with spool type O = 180 l/min
 Q [l/min] = flow rate from actuator to tank
 Δp [bar] = pressure difference from actuator to tank



3.3.4 Make-up valve

Q [l/min] = flow rate from tank to actuator
 Δp [bar] = pressure difference from tank to actuator



4 Directional sections, LVS08



4.1 Ordering code

L V S 0 8 D D 4 A 5 A J 2 1 A 0 0 B - M M		Pressure setting in bar
Dir. valve section		$P_A = \dots$ $P_B = \dots$
Size	= 08	
Flow rate in l/min		
Actuator port	A B	
6 l/min	= A = A	
10 l/min	= B = B	
16 l/min	= C = C	
25 l/min	= D = D	
32 l/min	= E = E	
40 l/min	= F = F	
50 l/min	= P = P	
With 3-way function	= *	
Spool function		
3-way function	= 3	
4-way function	= 4	
Spool type	= A, D, F, J	
Symbols and combinations, see section. 4.6		
Compensator		
for actuator port B (only with LVS08..3)	= 4	
for actuator ports A + B	= 5	
Pilot head		
On/off solenoid 12V	= A	
On/off solenoid 24V	= B	
Proportional solenoid 12V	= C	
Proportional solenoid 24V	= D	
Plug type		
AMP Junior Timer	= J	
Deutsch DT04-2P-EP04	= T	
Options		
Design stage		
Anti-shock and make-up function		
Actuator A = pos. 1, B = pos. 2	[A, B]	
Without = *		
Make-up valve	= C	
Anti-shock and make-up valve		
- adjustable, 70-230 bar	= A	
- adjustable, 150-380 bar	= B	
- Fixed setting (values in bar)		
25 = D 32 = E 40 = F 50 = G 63 = H		
80 = I 100 = K 125 = L 140 = M 160 = N		
175 = O 190 = P 210 = Q 230 = R 250 = S		
280 = T 300 = U 330 = V 350 = W 380 = X		
400 = Y 420 = Z Cavity prepared = #		
Seat valves, solenoid operated		
Plug type AMP		
Q_{max} 20 l/min, de-energised closed		
- double-acting seat valve in B = J5		
- dbl.-acting seat valve in A+B = J6		
Q_{max} 50 l/min, de-energised closed		
- single-acting seat valve in B = J3		
- sgl.-acting seat valve in A+B = J4		
- double-acting seat valve in B = J7		
- dbl.-acting seat valve in A+B = J8		
Manual override, etc.		
Override pin (standard)	= A	
Port threads to DIN 3852 - Part 2		
Actuator ports A and B G1/2"	= 21	
Prepared for bolt-on plate	= 00	

4.2 Accessories

Description	Ordering code	Data sheet
Plug for AMP Junior Timer with 2 metres of cable	100152575	-
Plug kit for AMP Junior Timer for DIY installation	100152579	-
Plug for Deutsch DT04-2P-EP04 with 2 metres of cable	100153209	-
Electrical joystick (demand-signal source)	FGE	100-P-700051
Electronic controller for 1 axis + 1 on/off solenoid	ELSK107	100-P-700033
Electronic controller for 2 axes	ELSK208	100-P-700001

4.3 Technical data

	Unit	On-off solenoid	Proportional solenoid
Maximum flow rate	l/min	50	
Maximum inlet pressure	bar	250	
Maximum pressure at the actuator ports	bar	280	
Spool increments by actuator flow rates at 12 bar Δp	l/min	6 (A), 10 (B), 16 (C), 25 (D), 32 (E), 40 (F), 50 (P)	
Power consumption	W	30	max. 30 at 2.5 A + 12 V max. 30 at 1.25 A + 24 V
Current	A		0.8 - 2.5 at 12 V 0.4 - 1.25 at 24 V
Duty cycle	%	100% at 2.5 A + 12 V or 1.25 A + 24 V	
Protection class		IP65 (DIN 40050)	
Standard configuration		<ul style="list-style-type: none"> - compensator for actuator ports A + B, and A or B - override pin 	
Options		<ul style="list-style-type: none"> - anti-shock and make-up function for actuator ports A + B or B only, adjustable or fixed setting (cannot be combined with seat valves) - electrically oper. single-acting seat valves in A + B, or B only - electrically op. double-acting seat valves in A + B, or B only 	

4.4 Pilot head

A / B



On/off solenoid with override pin

C / D



Proportional solenoid with override pin and starting point adjustment

4.5 Solenoid connector types

AMP Junior Timer

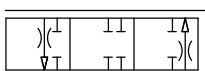


Deutsch plug DT04-2P-EP04



4.6 Spool types and functions

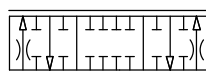
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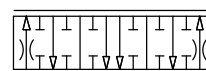
3J



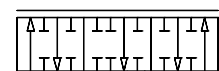
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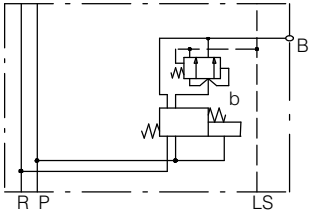

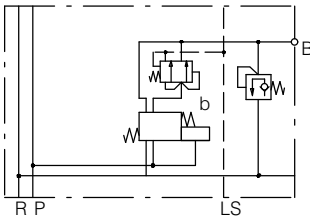

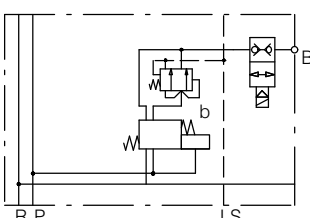

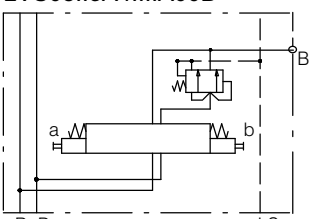
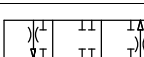
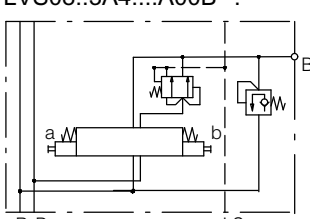
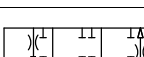
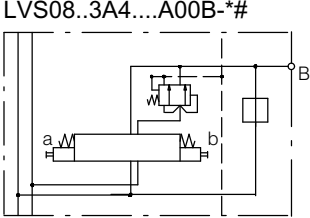
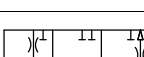
4D

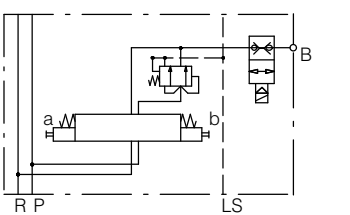
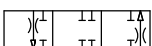
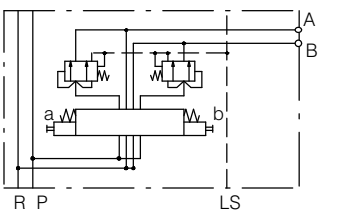
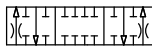

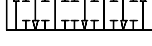
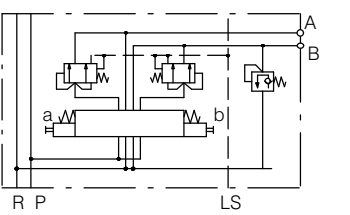
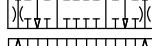
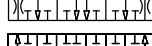
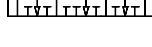
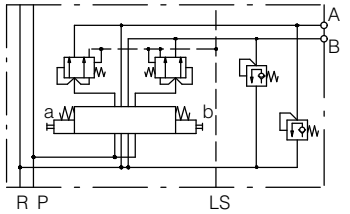

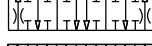
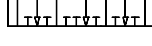
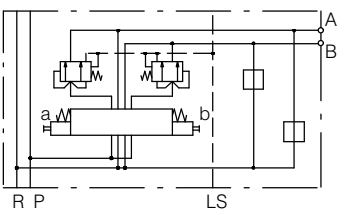
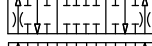

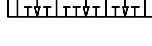
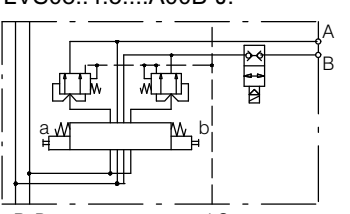
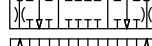
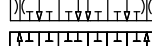
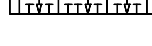
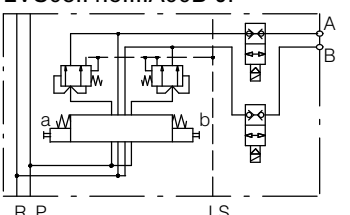
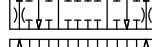
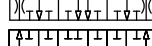
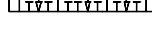


4F



4.7 Valve models, LVS08

Basic module	Spool type	Control type	Description	Bolt-on plate option with code 00
<p>LVS08..3J4....</p> 	3J		On/off solenoid Proportional solenoid	Seat valve in B
<p>LVS08..3J4....A00B-*</p> 	3J		On/off solenoid Proportional solenoid	Seat valve in B
<p>LVS08..3J4....A00B-J.</p> 	3J		On/off solenoid Proportional solenoid	Seat valve in B
<p>LVS08..3A4....A00B</p> 	3A		On/off solenoid Proportional solenoid	Seat valve in B or Load-control valve in B
<p>LVS08..3A4....A00B-*</p> 	3A		On/off solenoid Proportional solenoid	Seat valve in B
<p>LVS08..3A4....A00B-#</p> 	3A		On/off solenoid Proportional solenoid	Seat valve in B

<p>LVS08..3A4....A00B-J.</p> 	<p>3A </p>	<p>On/off solenoid Proportional solenoid</p>	<p>Compensator for actuator port B. Electrically operated seat valve for actuator port B, as single- or double-acting seat valve</p>	
<p>LVS08..4.5....A00B</p> 	<p>4A  4D  4F </p>	<p>On/off solenoid Proportional solenoid</p>	<p>Compensator for actuator ports A and B</p>	<p>Seat valve or Load-control valve in A and B, or B only</p>
<p>LVS08..4.5....A00B-*</p> 	<p>4A  4D  4F </p>	<p>On/off solenoid Proportional solenoid</p>	<p>Compensator for actuator ports A + B. Anti-shock and/or make-up valve for actuator port B, fixed setting or adjustable</p>	<p>Seat valve or Load-control valve in A and B, or B only</p>
<p>LVS08..4.5....A00B-..</p> 	<p>4A  4D  4F </p>	<p>On/off solenoid Proportional solenoid</p>	<p>Compensator for actuator ports A + B. Anti-shock and/or make-up valve for actuator ports A + B, fixed setting or adjustable</p>	<p>Seat valve or Load-control valve in A and B, or B only</p>
<p>LVS08..4.5....A00B-##</p> 	<p>4A  4D  4F </p>	<p>On/off solenoid Proportional solenoid</p>	<p>Compensator for actuator ports A + B. Cavity prepared and plugged, for anti-shock and/or make-up valves</p>	<p>Seat valve or Load-control valve in A and B, or B only</p>
<p>LVS08..4.5....A00B-J.</p> 	<p>4A  4D  4F </p>	<p>On/off solenoid Proportional solenoid</p>	<p>Compensator for actuator ports A + B. Electrically operated seat valve in actuator port B, as single- or double-acting seat valve</p>	
<p>LVS08..4.5....A00B-J.</p> 	<p>4A  4D  4F </p>	<p>On/off solenoid Proportional solenoid</p>	<p>Compensator for actuator ports A + B. Electrically operated seat valve in actuator ports A + B, as single- or double-acting seat valve</p>	

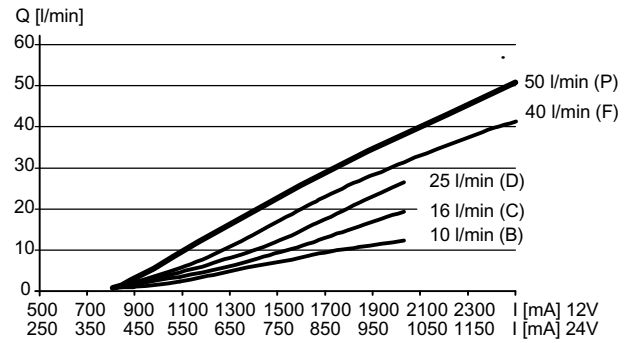
4.8 Performance graphs

4.8.1 Control characteristics

Valve with proportional solenoid and 12 bar pressure drop at the orifice

Q [l/min] = flow rate at the actuator outlet port

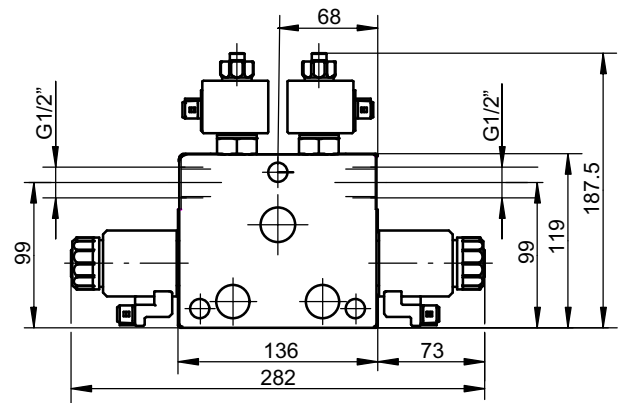
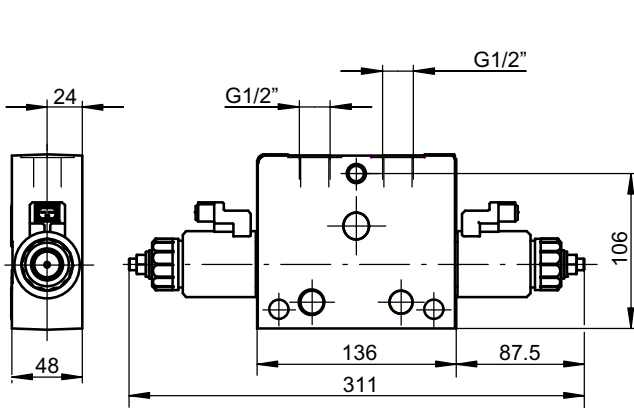
I [mA] = current at the proportional solenoids



4.9 Dimensions

LVS08.....J21A00B

LVS08.....J21A00B-J4



5 Directional sections, LVS12 - hand lever operated



5.1 Ordering code

L V S		1, 2	K, K	4	A	5	M	R	2, 2	*	0, 0	B	-	M, M		
Directional valve															Pressure setting in bar P _A = ... bar P _B = ... bar	
Size = 12																
Flow rate in l/min															Options (see 9.1) Design stage	
Actuator port		A	B													
16 l/min	= C	= C														
25 l/min	= D	= D														
40 l/min	= F	= F														
50 l/min	= P	= P														
63 l/min	= G	= G														
80 l/min	= H	= H														
100 l/min	= K	= K														
125 l/min	= L	= L														
150 l/min	= M	= M														
180 l/min	= O	= O														
With 3-way function		= *														
Spool function															Anti-shock and make-up function Actuator A = pos. 1, B = pos. 2 [A, B] Without = * Make-up valve = C Anti-shock and make-up valve - adjustable, 70-230 bar = A - adjustable, 150-380 bar = B - fixed setting (values in bar) 25=D 32=E 40=F 50=G 63=H 80=I 100=K 125=L 140=M 160=N 175=O 190=P 210=Q 230=R 250=S 280=T 300=U 330=V 350=W 380=X 400=Y 420=Z Cavity prepared = #	
3-way function	= 3															
4-way function	= 4															
3-way function (x2)	= 6															
Spool type = A, D, J Symbols and combinations, see section 5.4															Manual override, etc. Spool-stroke limiter feature = F Without = * not in combination with Detented	
Compensator																
for actuator ports A + B	= 5															
for actuator port A (only in conjunction with 3A)	= 8															
for actuator port B (only in conjunction with 3J)	= 4															
Pilot head															Port threads to DIN 3852 - Part 2 Actuator ports A and B G 3/4" = 22 Prepared for bolt-on plate = 00	
Hand lever	= M															
Detent type																
Detented position in B	= B															
Detented positions in A + B	= R															
Friction detent for A + B	= D															
Spring return (standard)	= *															

5.2 Technical data

	Unit	LVS12 - hand lever operated
Maximum flow rate	l/min	180
Maximum inlet pressure	bar	350 *
Maximum pressure at the actuator ports	bar	400 *
Spool increments by actuator flow rates at 12 bar Δp	l/min	16(C), 25(D), 40(F), 50(P), 63(G), 80(H), 100(K), 125(L), 150(M), 180(O)
Operating force on hand lever	Nm	38
Standard configuration	- compensator for actuator port A and/or B	
Options	<ul style="list-style-type: none"> - anti-shock and make-up function for actuator ports A and B or B only, adjustable or fixed setting - spool-stroke limiter feature - detent or friction detent 	

* For inlet pressure < 300 bar and actuator pressure < 320 bar contact Bucher Hydraulics

5.3 Pilot head



Hand lever

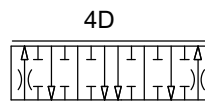
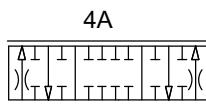
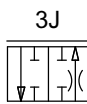
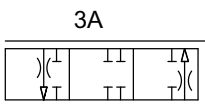


Standard end cover plate



End cover plate with spool-stroke limiter

5.4 Spool types and functions



5.5 Symbols

Basic module	Description
	<ul style="list-style-type: none"> - the flow rate at the actuator outlet ports is varied - up to the predefined maximum flow - by the position of the hand lever - valve models, see section 9

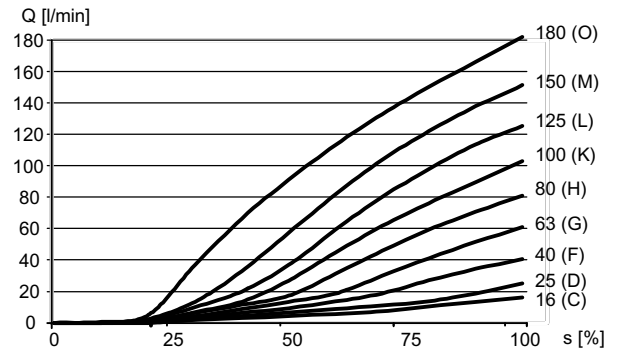
5.6 Performance graphs

5.6.1 Control characteristics

Hand-lever operated valve with 12 bar pressure drop at the orifice

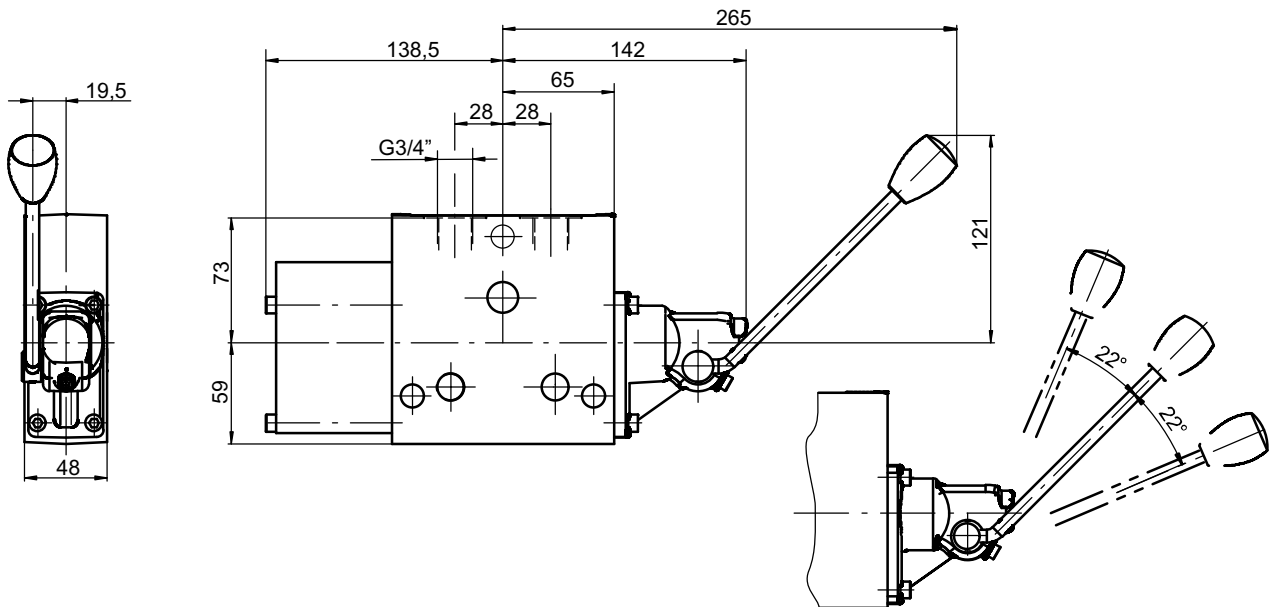
Q [l/min] = flow rate at the actuator outlet port

s [%] = hand-lever way



5.7 Dimensions

LVS12.....M*



6 Directional sections, LVS12 - hydraulically operated



6.1 Ordering code

L V S		1, 2	K, K	4	A	5	E	*	2, 2	F	0, 0	B	-	M, M	
Dir. valve section															
Size		= 08 or 12													
Flow rate in l/min															
Actuator port		A B													
16 l/min		= C = C													
25 l/min		= D = D													
40 l/min		= F = F													
50 l/min		= P = P													
63 l/min		= G = G													
80 l/min		= H = H													
100 l/min		= K = K													
125 l/min		= L = L													
150 l/min		= M = M													
180 l/min		= O = O													
With 3-way function 3J		= *													
With 3-way function 3A		= *													
Spool function															
3-way function		= 3													
4-way function		= 4													
3-way function (x2)		= 6													
Spool type		= A, D, F, J													
Symbols and combinations, see section 6.5															
Compensator															
for actuator ports A + B		= 5													
for actuator port A (only with LVS12..3A)		= 8													
Pilot head															
Hydraulic (standard)		= E													
Hydraulic (port horizontal)		= I													
Hydraulic (Duo head)		= K													
Hydraulic (Duo head + man. op.)		= L													
		Options (see 9.1)													
		Design stage													
		Pressure setting in bar													
		P _A = ... bar													
		P _B = ... bar													
		Anti-shock and make-up function													
		Actuator A = pos. 1, B = pos. 2 A, B													
		Without = *													
		Make-up valve = C													
		Anti-shock and make-up valve													
		- adjustable, 70-230 bar = A													
		- adjustable, 150-380 bar = B													
		- fixed setting (values in bar)													
		25 = D 32 = E 40 = F 50 = G 63 = H													
		80 = I 100 = K 125 = L 140 = M 160 = N													
		175 = O 190 = P 210 = Q 230 = R 250 = S													
		280 = T 300 = U 330 = V 350 = W 380 = X													
		400 = Y 420 = Z Cavity prepared = #													
		Spool-stroke limiter feature													
		Only in conjunction with control type E = F													
		Without = *													
		Port threads to DIN 3852 - Part 2													
		Actuator ports A and B G 3/4" = 22													
		Prepared for bolt-on plate = 00													

6.2 Accessories

Description	Ordering code	Data sheet
Hydraulic joystick	FGH	100-P-70029

6.3 Technical data

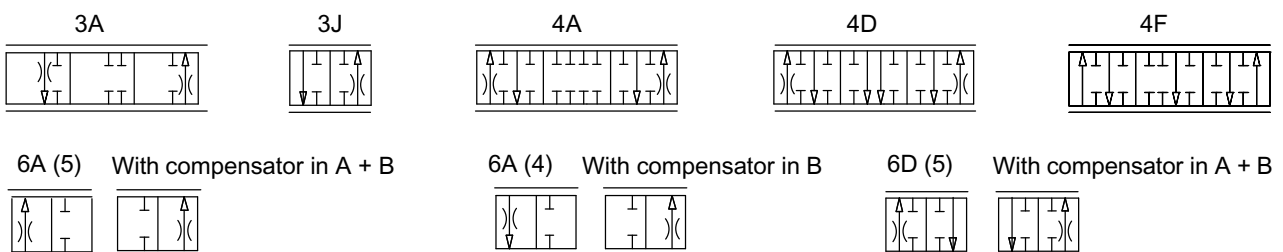
	Unit	LVS12 - hydraulically operated
Maximum flow rate	l/min	180
Maximum inlet pressure	bar	350 *
Maximum pressure at the actuator ports	bar	400 *
Spool increments by actuator flow rates at 12 bar Δp	l/min	16(C), 25(D), 40(F), 50(P), 63(G), 80(H), 100(K), 125(L), 150(M), 180(O)
Pilot pressure	bar	6 - 23
Standard configuration	- compensator for actuator port A and/or B	
Options	<ul style="list-style-type: none"> - anti-shock and make-up function for actuator ports A and B or B only, adjustable or fixed setting - spool-stroke limiter feature 	

* For inlet pressure < 300 bar and actuator pressure < 320 bar contact Bucher Hydraulics

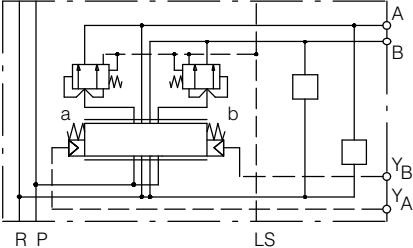
6.4 Pilot head and manual override



6.5 Spool types and functions



6.6 Symbols

Basic module	Description
	<ul style="list-style-type: none"> - the flow rate at the actuator outlet ports is varied - up to the predefined maximum flow - by the level of the pilot pressure - valve models, see section 9

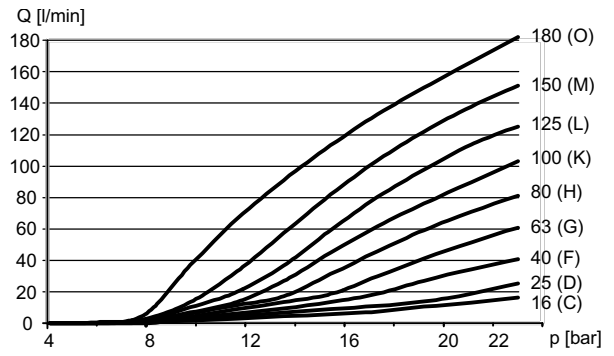
6.7 Performance graphs

6.7.1 Control characteristics

Hydraulically-operated valve with 12 bar pressure drop at the orifice

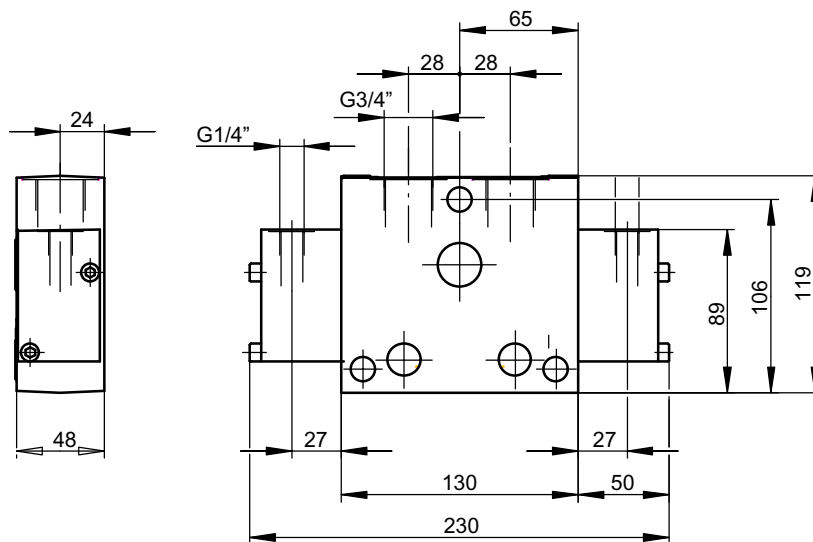
Q [l/min] = flow rate at the actuator outlet port

p [bar] = pilot pressure



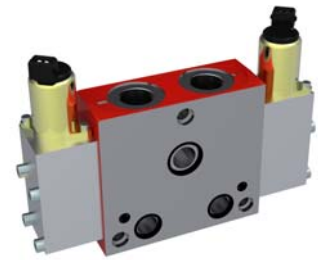
6.8 Dimensions

LVS12....5E.22*00B



7 Directional sections, LVS12

- two-stage, proportional, electro-hydraulic



7.1 Ordering code

	L	V	S	1, 2	K, K	4	A	5	F	J	2, 2	*	0, 0	B	-	M, M		
Dir. valve section																		
Size	= 12																	
Flow rate in l/min																		
Actuator port									A									B
16 l/min									= C									= C
25 l/min									= D									= D
40 l/min									= F									= F
50 l/min									= P									= P
63 l/min									= G									= G
80 l/min									= H									= H
100 l/min									= K									= K
125 l/min									= L									= L
150 l/min									= M									= M
180 l/min									= O									= O
With 3-way function 3J									= *									= *
With 3-way function 3A									= *									= *
Spool function																		
3-way function	= 3																	
4-way function	= 4																	
3-way function (x2)	= 6																	
Spool type																		
= A, D, F, J																		
Symbols and combinations, see section 7.6																		
Compensator																		
for actuator ports A + B	= 5																	
for actuator port A (only with LVS12..3A)	= 8																	
Pilot head																		
Prop. electro-hyd. 12 V (standard)	= F																	
Prop. electro-hyd. 24 V (standard)	= G																	
Prop. electro-hyd. 12 V (horizontal)	= T																	
Prop. electro-hyd. 24 V (horizontal)	= U																	
Prop. electro-hyd. 12 V (rotated 180°)	= V																	
Prop. electro-hyd. 24 V (rotated 180°)	= W																	
Prop. electro-hyd. 12 V (Duo head)	= R																	
Prop. electro-hyd. 24 V (Duo head)	= S																	
Prop. electro-hyd. 12 V (Duo head + man. op.)	= Y																	
Prop. electro-hyd. 24 V (Duo head + man. op.)	= Z																	
Options (see 9.1)																		
Design stage																		
Pressure setting in bar																		
P _A = ...																		
P _B = ...																		
Anti-shock and make-up function																		
Actuator A = pos. 1, B = pos. 2	[A, B]																	
Without = *																		
Make-up valve	= C																	
Anti-shock and make-up valve																		
- adjustable, 70-230 bar	= A																	
- adjustable, 150-380 bar	= B																	
- fixed setting (values in bar)																		
25 = D	32 = E	40 = F	50 = G	63 = H														
80 = I	100 = K	125 = L	140 = M	160 = N														
175 = O	190 = P	210 = Q	230 = R	250 = S														
280 = T	300 = U	330 = V	350 = W	380 = X														
400 = Y	420 = Z	Cavity prepared = #																
Manual override, etc.																		
Override pin	= A																	
Override pin + spool-stroke limiter	= C																	
Without	= *																	
Port threads to DIN 3852 - Part 2																		
Actuator ports A and B G 3/4"	= 22																	
Prepared for bolt-on plate	= 00																	
Plug type																		
AMP Junior Timer	= J																	
Deutsch DT04-2P-EP04	= T																	

7.2 Accessories

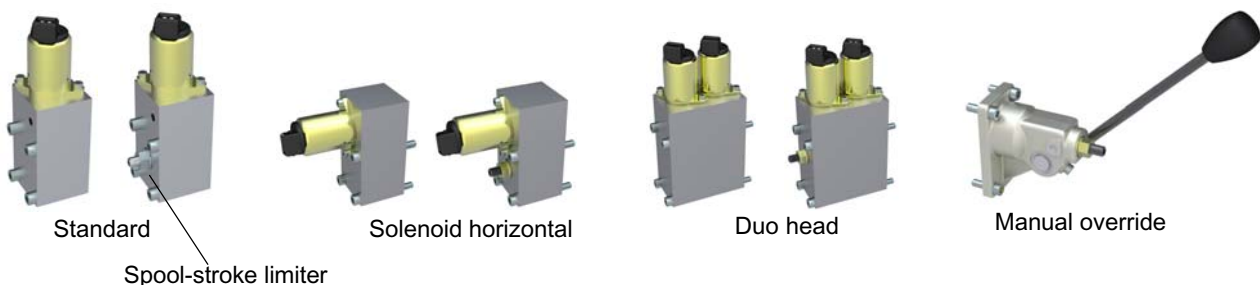
Description	Ordering code	Data sheet
Plug for AMP Junior Timer with 2 metres of cable	100152575	-
Plug kit for AMP Junior Timer for DIY installation	100152579	-
Plug for Deutsch DT04-2P-EP04 with 2 metres of cable	100153209	-
Electrical joystick (demand-signal source)	FGE	100-P-700051
Electronic controller for 1 axis + 1 on/off solenoid	ELSK107	100-P-700033
Electronic controller for 2 axes	ELSK208	100-P-700001

7.3 Technical data



	Unit	LVS12 - 2-stage, proportional, electro-hydraulic
Maximum flow rate	l/min	180
Maximum inlet pressure	bar	350 *
Maximum pressure at the actuator ports	bar	400 *
Spool increments by actuator flow rates at 12 bar Δp	l/min	16(C), 25(D), 40(F), 50(P), 63(G), 80(H), 100(K), 125(L), 150(M), 180(O)
Nominal voltage	V DC	12 or 24
Power consumption	W	max. 18 (at 1.5 A + 12 V or 0.75 A + 24 V)
Energising current	A	0.6 - 1.5 at 12 V 0.3 - 0.75 at 24 V
Duty cycle	%	100
Protection class		IP65 (DIN 40050)
Standard configuration		- compensator for actuator port A + B, and A or B
Options		- anti-shock and make-up function for actuator ports A and B or B only, adjustable or fixed setting - spool-stroke limiter feature

* For inlet pressure < 300 bar and actuator pressure < 320 bar contact Bucher Hydraulics

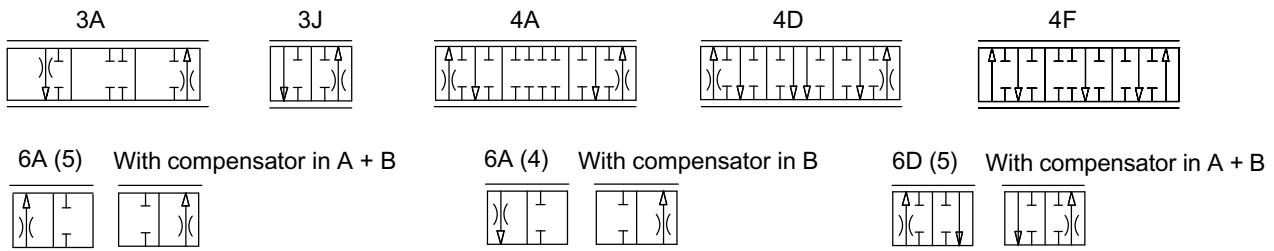
7.4 Pilot head and manual override



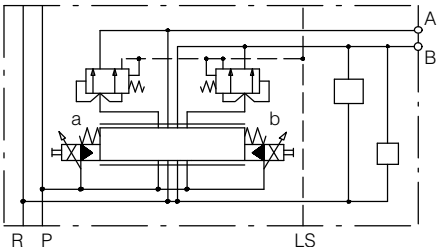
7.5 Solenoid connector types

AMP Junior Timer	Deutsch plug DT04-2P-EP04
	

7.6 Spool types and functions



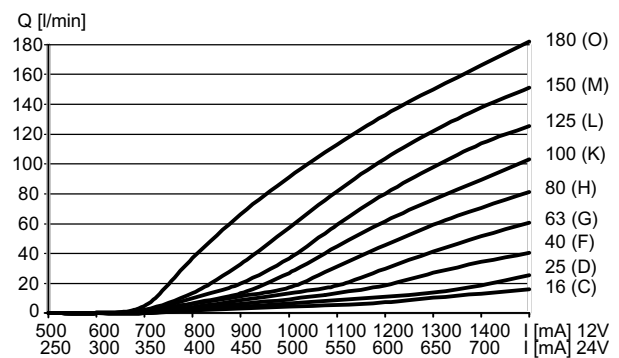
7.7 Symbols

Basic module	Description
	<ul style="list-style-type: none"> - the pilot valves are internally supplied with pump pressure The flow is varied - up to the predefined maximum flow - by the proportional change in the electrical current. - valve models, see section.9

7.8 Performance graphs

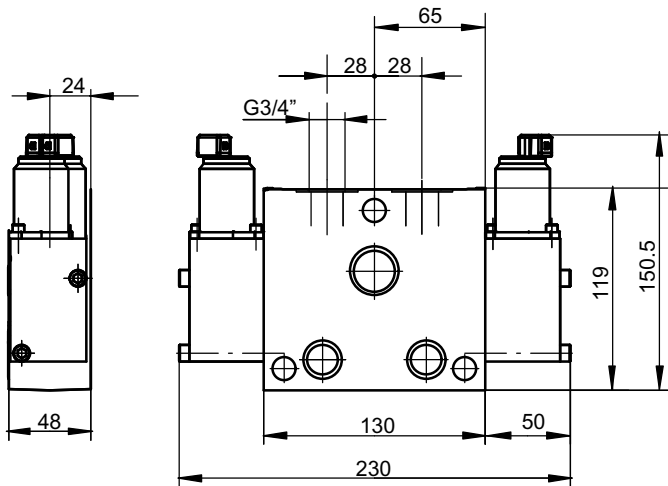
7.8.1 Control characteristic

Proportional, electro-hydraulically operated valve with 12 bar pressure drop at the orifice
 Q [l/min] = flow rate at the actuator outlet port
 I [mA] = current at the solenoids

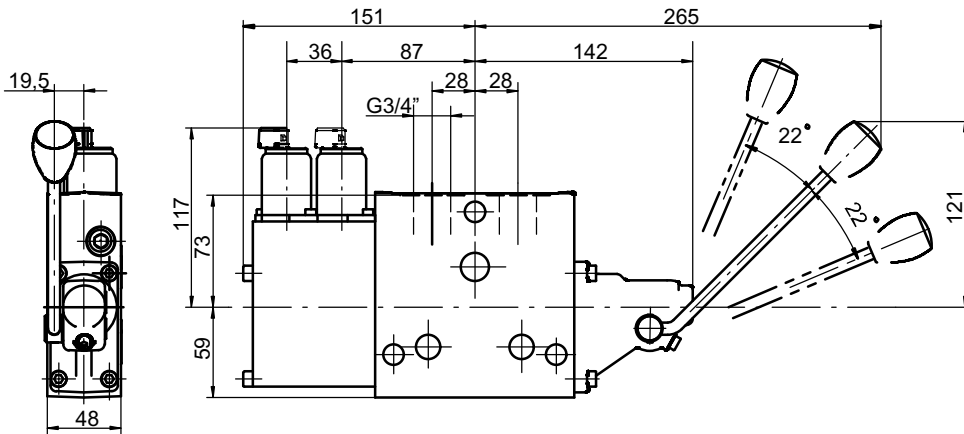


7.9 Dimensions

LVS12....5FJ22*00B



LVS12....5YJ22*00B



8 Directional sections, LVS12 - with digital pilot head



8.1 Ordering code

	L	V	S	1, 2	K, K	4	A	5	H	T	2, 2	*	0, 0	B	-	M, M		
Dir. valve section																		Pressure setting in bar P _A = ... bar P _B = ... bar
Size = 12																		
Flow rate in l/min																		Options (see 9.1) Design stage
Actuator port					A	B												
16 l/min					= C	= C												
25 l/min					= D	= D												
40 l/min					= F	= F												
50 l/min					= P	= P												
63 l/min					= G	= G												
80 l/min					= H	= H												
100 l/min					= K	= K												
125 l/min					= L	= L												
150 l/min					= M	= M												
180 l/min					= O	= O												
With 3-way function 3J					= *													
With 3-way function 3A						= *												
Spool function																		Anti-shock and make-up function Actuator A = pos. 1, B = pos. 2 [A, B] Without = * Make-up valve = C Anti-shock and make-up valve - fixed setting (values in bar) 25=D 32=E 40=F 50=G 63=H 80=I 100=K 125=L 140=M 160=N 175=O 190=P 210=Q 230=R 250=S 280=T 300=U 330=V 350=W 380=X 400=Y 420=Z Cavity prepared = #
3-way function					= 3													
4-way function					= 4													
3-way function (x2)					= 6													
Spool type					= A, D, F, J													Port threads to DIN 3852 - Part 2 Actuator ports A and B G 3/4" = 22
					Symbols and combinations, see section 8.6													
Compensator																		Plug type Deutsch DT 6 pole = T
					for actuator ports A + B = 5 for actuator port A (only with LVS12..3A) = 8													
Pilot head																		
					Digital pilot head = H Digital pilot head + manual operation = P													

8.2 Accessories

8.2.1 Analogue systems

Description	Ordering code	Data sheet
Electrical joystick (demand-signal source)	FGE	100-P-700051
Plug set (contact pins and socket housing right and left)	100153228	

8.2.2 CAN bus systems

Description	Ordering code	Data sheet
Electrical joystick	FCE/JS3	100-P-700051
Master board (parameterisation and service terminal)	ELBE201	100-B-700016
Slave module ELMR201	ELMR201	100-P-700053
Plug (socket housing) DT16-6SA-K002, right	100153228	
Cable harness for connecting the pilot heads in a valve block, 0.12 m	100153222	
CAN terminating resistor (150 ohm)	100153223	
Connecting lead for the valve block, 2 m	100153221	

8.3 Description

In the digital pilot head (electro-proportional operation), an electrical signal (demand signal) is amplified by using a pilot oil flow that, in turn, moves the control spool in the directional valve section. The position of the spool is detected by integral position transducers and this actual value is compared with the demand signal by the on-board electronics. By varying the pilot flow, the position of the spool is adjusted to correspond to the demand signal.

8.3.1 Advantages

Flexible

- Simple parameter changes
- Machine-specific configuration
- Easily extended

Cost-effective

- No adjustments during start-up
- Reduced cabling costs
- Simple, time-saving diagnostics

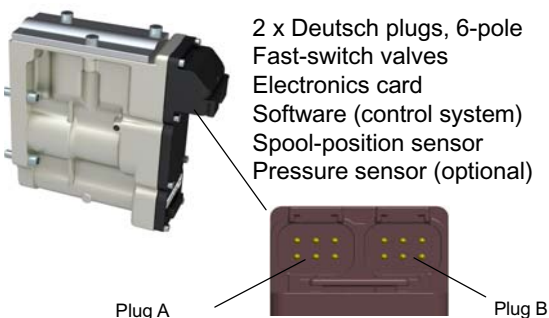
Coordinated system

- Integral sensors
- Proven, high-performance software
- Supported by application know-how

Safe

- Protection class IP67
- Sensors monitor the functionality
- Complies with safety regulations

8.3.2 On-board electronics



8.3.3 Analogue systems

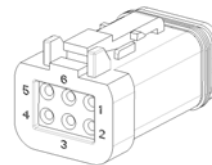
Functionality

- Analogue communication
- Each on-board electronic unit supplied by a separate control cable
- Power supply can be connected serially from pilot head to pilot head
- No interdependency between the individual valves
- Signal from spool-position sensor is available externally if required
- Control signal 2.5 ±2V

Configuration via CAN bus interface

- Flow limiting
- Flow characteristic
- Changing the maximum flow
- Ramps (rate of rise/fall can be adjusted)
- Diagnostics via CAN bus

Plug pin layout



Plug A, left	Plug A, right
1 = power signal	1 = Signal from spool-position sensor
2 = Ground	2 = V _{Reference} , 5V (20 mA)
3 = Ground _{Reference}	3 = Ground
4 = CAN low	4 = CAN low
5 = CAN high	5 = CAN high
6 = V _{Battery}	6 = V _{Battery}

8.3.4 CAN bus systems

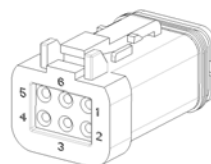
Functionality

- Communication via CAN bus interface and master board
- CAN bus and power supply are looped from pilot head to pilot head
- Intelligent system control
- Signal from spool-position sensor (available externally if required) analogue or CAN protocol
- Analogue sensor can be adapted

Communication via CAN bus

- Flow limiting
- Flow characteristic
- Ramps (rate of rise/fall can be adjusted)
- Diagnostics via CAN bus
- System intelligence
- Master board (parameterisation and service terminal)

Plug pin layout



Plug A, left	Plug B, right
1 = not active	1 = signal from spool-position sensor
2 = ground	2 = V _{Reference} , 5V (20 mA)
3 = Ground _{Reference}	3 = ground
4 = CAN low	4 = CAN low
5 = CAN high	5 = CAN high
6 = V _{Battery}	6 = V _{Battery}

8.4 Technical data

	Unit	LVS12 with digital pilot head
Maximum flow rate	l/min	180
Maximum inlet pressure	bar	350 *
Maximum pressure at the actuator ports	bar	400 *
Spool increments by actuator flow rates at 12 bar Δp	l/min	16(C), 25(D), 40(F), 50(P), 63(G), 80(H), 100(K), 125(L), 150(M), 180(O)
Nominal voltage	V DC	12 or 24
Power consumption	W	7.2
Current	A	0.6 at 12 V / 0.3 at 24 V
Duty cycle	%	100
Protection class		IP67 (DIN 40050)
Configuration options		- flow limiting - flow characteristic - changing the maximum flow - ramps (rate of rise/fall can be adjusted) - Diagnostics via CAN bus
Options		- anti-shock and make-up function for actuator ports A + B or B only, adjustable or fixed setting
Protection class		maximum 10 units per cable harness for 24V, 6 units for 6V

* For inlet pressure < 300 bar and actuator pressure < 320 bar contact Bucher Hydraulics

8.5 Pilot head and manual override

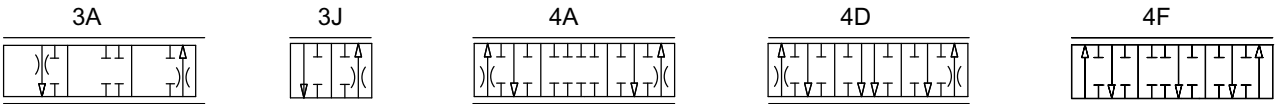
Digital pilot head



Manual override



8.6 Spool types and functions

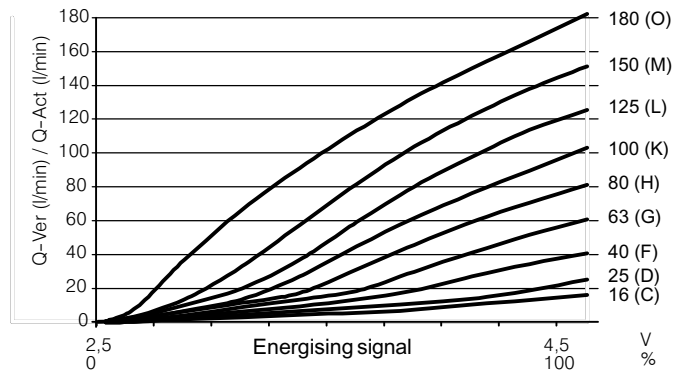


8.7 Symbols

Basic module	Description
	<ul style="list-style-type: none"> - the pilot valves are internally supplied with a reduced control pressure of 30 bar max. The flow is varied - up to the predefined maximum flow - by the proportional change in the electrical current. - valve models, see section.9

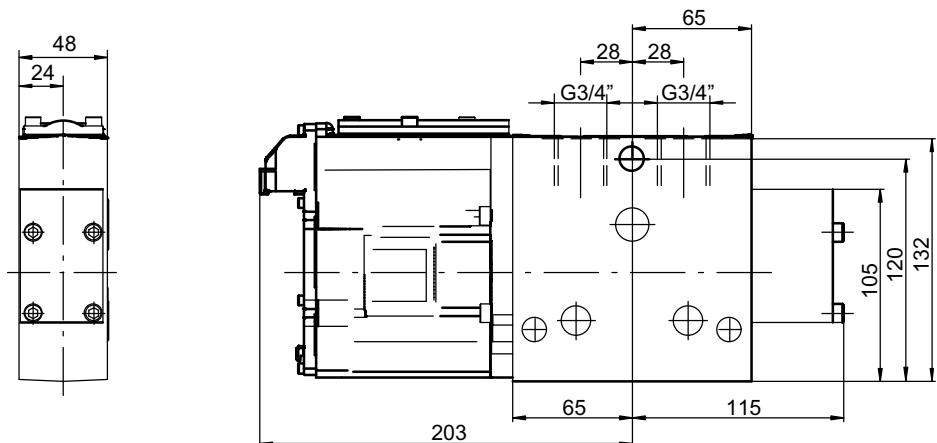
8.8 Performance graphs

Operated by a digital pilot head, with 12 bar pressure drop at the orifice

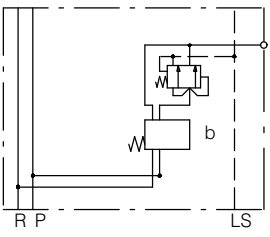

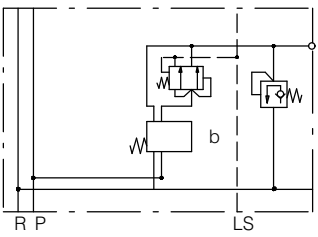

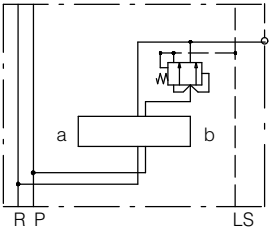
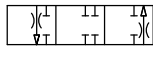
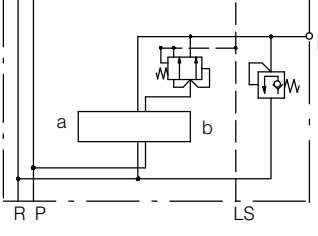
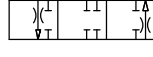
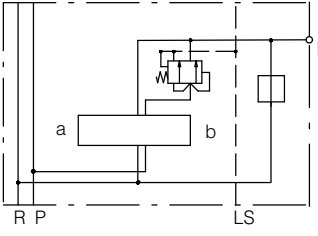
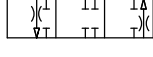


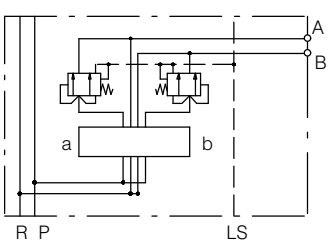
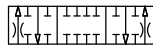
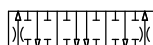
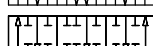
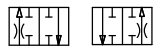


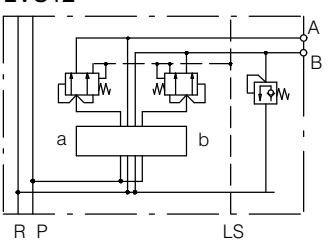
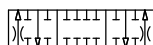

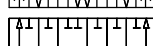
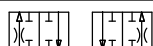


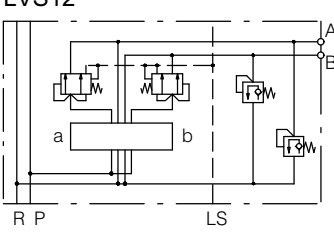
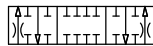
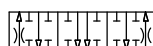
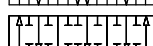
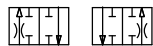


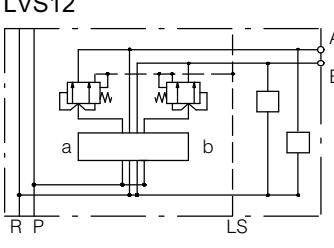

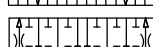
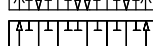
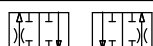


8.9 Dimensions

LVS12....5HT22*00B

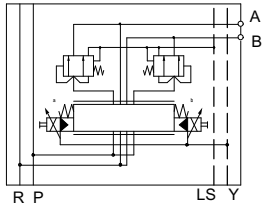


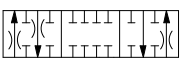
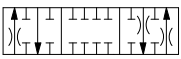
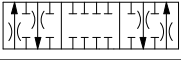
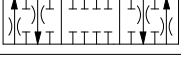
9 Valve models for the LVS12 directional valve system

Model code and symbol	Spool type	Control type	Description	Bolt-on plate with code 00
LVS12...3J4 	3J	 <ul style="list-style-type: none"> - hand lever - hydraulic - prop. electro-hyd. - digital pilot head 	Compensator for actuator port B	Seat valve in B (not for digital pilot head)
LVS12 	3J	 <ul style="list-style-type: none"> - hand lever - hydraulic - prop. electro-hyd. - digital pilot head 	Compensator for actuator port B Anti-shock and/or make-up valve for actuator port B, fixed setting or adjustable	Seat valve in B (not for digital pilot head)
LVS12 	3A	 <ul style="list-style-type: none"> - hand lever - hydraulic - prop. electro-hyd. - digital pilot head 	Compensator for actuator port B	Seat valve or Load-control valve in B (not for digital pilot head)
LVS12 	3A	 <ul style="list-style-type: none"> - hand lever - hydraulic - prop. electro-hyd. - digital pilot head 	Compensator for actuator port B Anti-shock and/or make-up valve for actuator port B, fixed setting or adjustable	Seat valve or Load-control valve in B (not for digital pilot head)
LVS12 	3A	 <ul style="list-style-type: none"> - hand lever - hydraulic - prop. electro-hyd. - digital pilot head 	Compensator for actuator port B. Cavity prepared and plugged, for anti-shock and/or make-up valve	Seat valve or Load-control valve in B (not for digital pilot head)

<p>LVS12</p> 	<p>4A </p> <p>4D </p> <p>4F </p> <hr/> <p>6D </p> <p>6A(4) </p> <p>6A(5) </p>	<p>- hand lever - hydraulic - prop. electro-hyd. - digital pilot head</p> <hr/> <p>- hydraulic - prop. electro-hyd.</p>	<p>Compensator for actuator port B</p>	<p>Seat valve or Load-control valve in A and B, or B only (not for digital pilot head)</p>
<p>LVS12</p> 	<p>4A </p> <p>4D </p> <p>4F </p> <hr/> <p>6D </p> <p>6A(4) </p> <p>6A(5) </p>	<p>- hand lever - hydraulic - prop. electro-hyd. - digital pilot head</p> <hr/> <p>- hydraulic - prop. electro-hyd.</p>	<p>Compensator for actuator ports A + B. Anti-shock and/or make-up valve in actuator port B, fixed setting or adjustable</p>	<p>Seat valve or Load-control valve in A and B, or B only (not for digital pilot head)</p>
<p>LVS12</p> 	<p>4A </p> <p>4D </p> <p>4F </p> <hr/> <p>6D </p> <p>6A(4) </p> <p>6A(5) </p>	<p>- hand lever - hydraulic - prop. electro-hyd. - digital pilot head</p> <hr/> <p>- hydraulic - prop. electro-hyd.</p>	<p>Compensator for actuator ports A + B. Anti-shock and/or make-up valve in actuator ports A + B, fixed setting or adjustable</p>	<p>Seat valve or Load-control valve in A and B, or B only (not for digital pilot head)</p>
<p>LVS12</p> 	<p>4A </p> <p>4D </p> <p>4F </p> <hr/> <p>6D </p> <p>6A(4) </p> <p>6A(5) </p>	<p>- hand lever - hydraulic - prop. electro-hyd. - digital pilot head</p> <hr/> <p>- hydraulic - prop. electro-hyd.</p>	<p>Compensator for actuator ports A + B. Cavity prepared and plugged, for anti-shock and/or make-up valve</p>	<p>Seat valve or Load-control valve in A and B, or B only (not for digital pilot head)</p>

9.1 Options

Model code and symbol	Description
<p>LVS12.....A02B</p> 	<p>- threaded ports for external pilot pressure For electrohydraulic control only</p>
<p>LVS12.....A05B</p>	<p>- Pilot head, max. T-pressure = 200 bar For electrohydraulic control only</p>

LVS12.....A06B		<ul style="list-style-type: none"> - External poert for pilot pressure, actuator port A - Port threads G1/4" , e. g. for load control valves <p>Only for control type elektrohydraulic</p>
LVS12.....A13B		- Tank notch control at actuator port A
LVS12.....A14B		<ul style="list-style-type: none"> - Tank notch control at actuator port B <p>Specify pressure setting in bar at the end of the ordering code</p>
LVS12.....A15B		<ul style="list-style-type: none"> - Tank notch control at actuator port A and B <p>Specify pressure setting in bar at the end of the ordering code</p>
LVS12.....A39B		<ul style="list-style-type: none"> - No drop befor lift function - Tank notch control at actuator port A and B
LVS12.....A47B		<ul style="list-style-type: none"> - External poert for pilot pressure, actuator port A and B - Port threads G1/4" , e. g. for load control valves <p>Only for control type elektrohydraulic</p>

10 Intermediate sections



10.1 Functions

10.1.1 Pressure-reducing valve

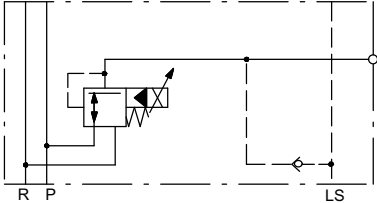
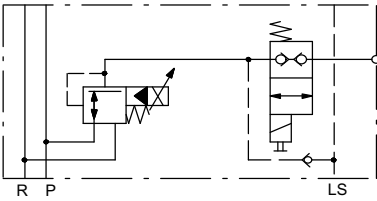
The 3-way pressure-reducing valve holds the pressure at the actuator port at a constant level, as set by the solenoid

current. Via the LS signal, this function can work with all pressure compensators and pump systems.

10.2 Ordering code

<div style="border: 1px solid black; padding: 2px; display: inline-block;">L</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">V</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">S</div> - <div style="border: 1px solid black; padding: 2px; display: inline-block;">Z</div> - <div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">D</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">R</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">A</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">4</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">J</div> - <div style="border: 1px solid black; padding: 2px; display: inline-block;">G</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">1</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">/</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">2</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">A</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">0</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">0</div>	
Intermediate section	
3-way pressure-reducing valve = PDR	
Functions	
No auxiliary valve (Q _{max.} 40 l/min) = A	
Seat valve on the actuator side (Q _{max.} 25 l/min) = B	
Seat valve on actuator side and unloading valve (Q _{max.} 25 l/min) = C	
Pressure range 12 - 100 bar = 4	
15 - 160 bar = 6	
20 - 150 bar = 8	
	Special feature
	Design stage
	Port threads to DIN 3852 - Part 2
	Actuator G1/2" = G1/2
	Nominal voltage and plug type
	12 Volt DC, AMP Junior Timer = FJ

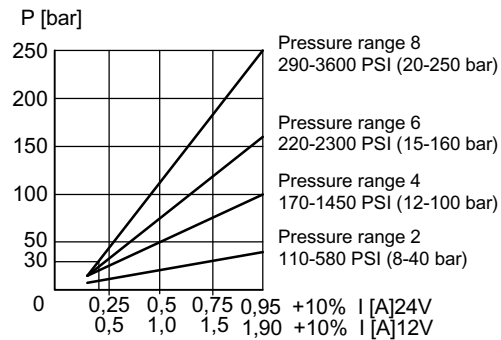
10.3 Valve models

Model code and symbol	Description
<p>LVS-Z-PDRA</p> 	- threaded ports = G1/2"
<p>LVS-Z-PDRB</p> 	<ul style="list-style-type: none"> - seat valve on actuator side - threaded ports = G1/2"

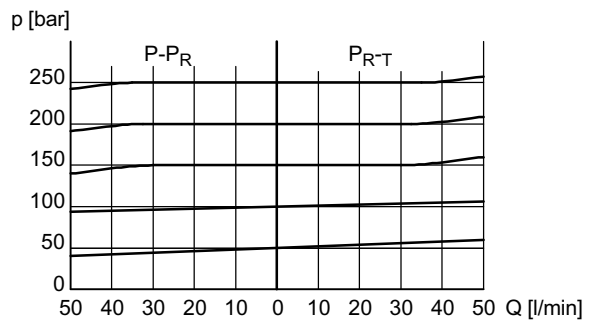
10.4 Performance graphs

10.4.1 Adjustment ranges 3-way prop. pressure-control valve

I [A] = solenoid current



10.4.2 Control characteristic as a function of flow rate

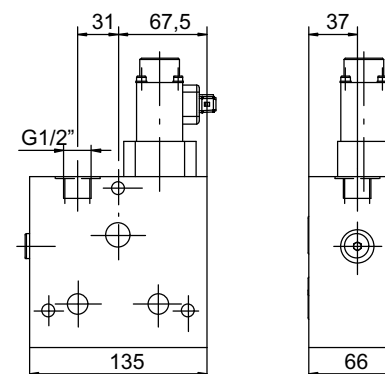


10.4.3 Leakage in working position incl. pilot flow

Primary pressure	[bar]	50	100	200	300
Q _{Lv}	[cm ³ /min]	235	245	250	260

10.5 Dimensions

LVS-Z.PDRA-FJ-G12A00



11 End sections



11.1 Functions

A valve block must be completed with an end section.

11.2 Ordering code

L
V
S
 -
 A
 -
 C
A
L
 -
 G
1
0
0
0
A
0
0
 /
 P
1
=
...
bar

End section

Functions	
No control function, no ports	= CA*
LS - LS connection, R port	= CAL
LS unloading	= CB*
LS _{max} pressure relief (P1= ...)	= CC*
LS unloading, LS _{max} pressure relief (P1= ...)	= CE*
Reduced pilot-pressure for internal and external use Pressure relief for the reduced pressure (P=...) Pressure setting for the reduced pressure (P1= ...)	= CS*

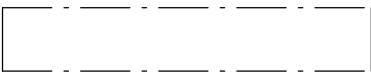
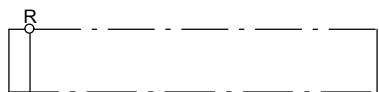
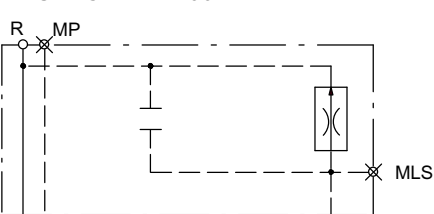
Options

Design stage

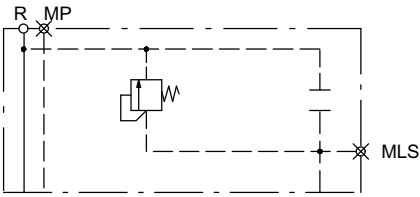
Pressure setting in bar
P = ... bar
P1 = ... bar

Port threads to DIN 3852 - Part 2		
R	G1/2"	= G1/2
R	G3/4"	= G3/4
R	G1"	= G100
Without threaded port		= ****

11.3 Valve models

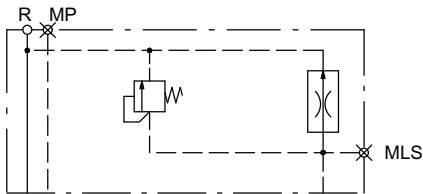
Model code and symbol	Description
LVS-A-CA*-****A00 	- no control function
LVS-A-CAL-....A00 	- threaded port for R
LVS-A-CB*-****A00 	- LS unloading threaded port for R

LVS-A-CC*-****A00



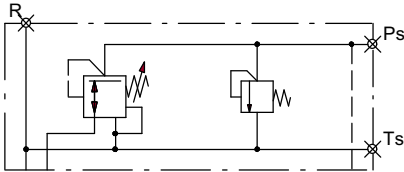
- LS_{max} pressure relief (P1= ...)
 - threaded port for R
- Specify pressure setting in bar at the end of the ordering code

LVS-A-CE*



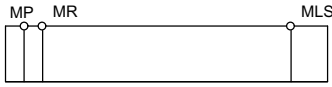
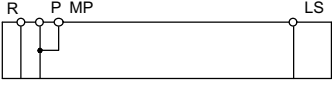
- LS_{max} pressure relief (P1= ...)
 - LS unloading
 - threaded port for R
- Specify pressure setting in bar at the end of the ordering code

LVS-A-CS*



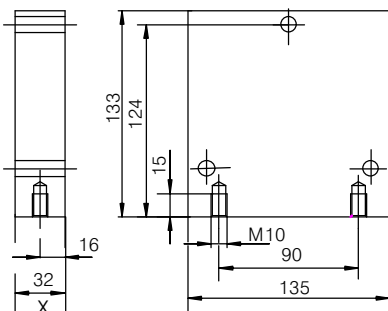
- reduced pilot-pressure for internal and external use
 - pressure relief for the reduced pressure (P = ...)
 - pressure setting for the reduced pressure (P1 = ...)
- Specify pressure setting in bar at the end of the ordering code

11.4 Options

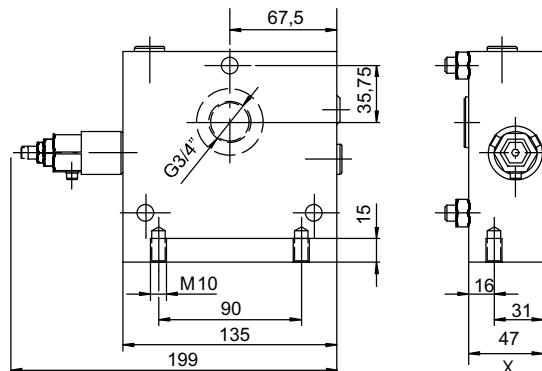
Model code and symbol	Description
LVS-A-...-G..A07 	- threaded ports for MR (G1/2"), MP and MLS (G1/4")
LVS-A-...-G..A10 	- threaded ports for P and R (G1"), MP and LS (G1/4")

11.5 Dimensions

LVS12-A-CA*-****A00



LVS12-A-CS*-G34A00



X [mm]	
CA*	32
CAL	32
CB*	47
CC*	47
CE*	47
CS*	47

12 Bolt-on plates

12.1 General technical data

	Unit	Value
Inlet pressure	bar	350
Nominal flow rate, load-control valve	l/min	LVS08 = 50, LVS12 = 120
Nominal flow rate, DVA and ZVA seat valves (LVS12 only)	l/min	150
Nominal flow rate, PEC seat valves (LVS12 only)	l/min	60

12.2 Functions

12.2.1 Load-control valves

These bolt-on load control valves, with integral anti-shock function, ensure load-independent lowering motion at speeds determined by the inlet flow, with leak-free shut-off when the directional valve is in its neutral position. The anti-shock valve setting should preferably be between 100% and 200% of the highest load pressure. Turning the adjusting screw in the clockwise direction reduces the setting, and this can also be used for emergency lowering of the load.

12.2.2 Seat valves (pilot operated check valves)

Seat valves with electrical override shut off the actuator lines with zero leakage. Directional valve must carry code 00, see box port threads in ordering code

12.2.3 Seat valves with anti-shock/make-up vv. (overrideable check valves with pressure relief on the actuator side)

Bolt-on seat valves with service line anti-shock/make-up valves shut off the actuator lines with zero leakage and protect the actuator from unacceptably large pressure peaks.

12.3 Ordering code

12.3.1 Load-control valves



L V S P B H - S 3 0 - S 3 0 - 2 1 - A 0 0

Bolt-on plate
with load-control valves

Actuator port A

Load-control valve

- with pilot ratio 3 : 1

= S30

- without

= ***

Actuator port B

Load-control valve

- with pilot ratio 3 : 1

= S30

Options

Design stage

Port threads

to DIN 3852 - Part 2

G1/2" (max. 60 l/min)

= 21

G3/4" (max. 120 l/min)

= 22

12.3.2 Seat valves



L₁V₁S P₁R₁E - D₁V₁A - D₁V₁B - 2₁ - J₁1₂ - A 0₁0

Bolt-on plate
with seat valves

Options

Design stage

Actuator port A

Seat valve with electrical override

- single-acting seat valve = DVA
- double-acting seat valve = ZVA
- without = ***

Nominal voltage and plug type

- 12 Volt DC
and AMP Junior Timer = J12
- 24 Volt DC
and AMP Junior Timer = J24

Actuator port B

Seat valve with electrical override

- single-acting seat valve = DVB
- double-acting seat valve = ZVB

Port threads

to DIN 3852 - Part 2

- G1/2" (max. 60 l/min) = 21
- G3/4" (max. 120 l/min) = 22

12.3.3 Seat valves, pressure-relief/make-up check valve



L₁V₁S P₁E₁C - 1₁6₁0 - 1₁6₁0 - 2₁ - J₁1₂ - A 0₁2

Bolt-on plate

Seat valves
with electrical override

- Sgl-act. seat valves in A+B = 00
- Dbl-act. seat valves in A+B = 02

Design stage

Actuator port A

Pressure-relief and make-up check valve

- press. setting e.g. 210 bar ¹⁾ = 210
- make-up check valve only = NVO
- without = ***

Nominal voltage and plug type

- 12 Volt DC
and AMP Junior Timer = J12
- 24 Volt DC
and AMP Junior Timer = J24

Actuator port B

Pressure-relief and make-up check valve

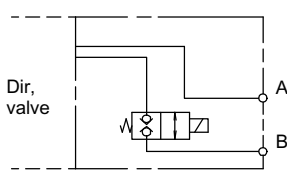
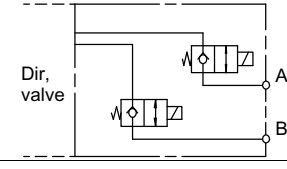
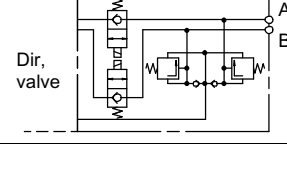
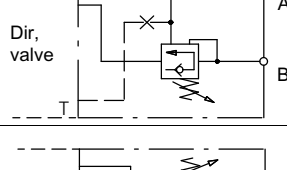
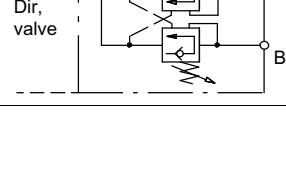
- press. setting e.g. 210 bar ¹⁾ = 210
- make-up check valve only = NVO

Port threads to DIN 3852 - Part 2

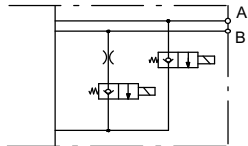
- G1/2" (max. 60 l/min) = 21

1) Pressure settings in bar available for the pressure-relief function (measured at 10 l/min test flow) 25, 32, 40, 50, 63, 80, 100, 125, 140, 160, 175, 190, 210, 230, 250, 280, 300, 330, 350 (for other pressures, consult BUCHER)

12.4 Valve models

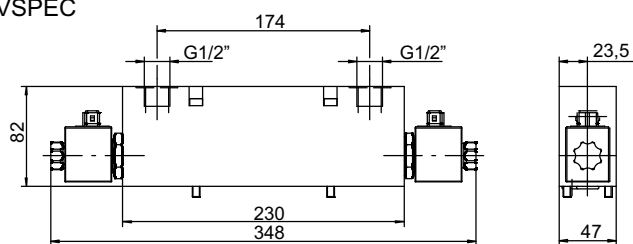
Model code and symbol	Description
LVSPRA-***-DVB 	- seat valve with electrical override (check valve) in actuator port B
LVSPRE-DVA-DVB 	- seat valve with electrical override (check valve) in actuator ports A and B
LVSPEC-.....-21-J..A00 	- seat valve with electrical override with service line anti-shock/ make-up valves (overrideable check valve and pressure relief on the actuator side) in actuator ports A and B
LVSPBH-***-S30 	- load-holding valve in actuator port B
LVSPBH-S30-S30 	- load-holding valve in actuator ports A and B

12.5 Options

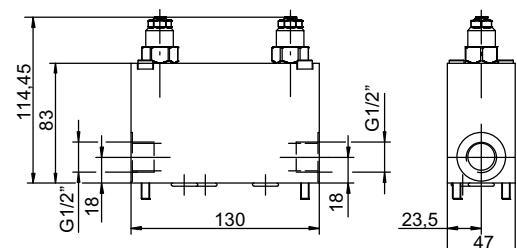
Model code and symbol	Description
LVSPRE-....A01 	- Float function - Orifice \varnothing 5

12.6 Dimensions

LVSPEC



LVSPBH-S30-S30-21A00



13 Accessories

13.1 Assembly kit

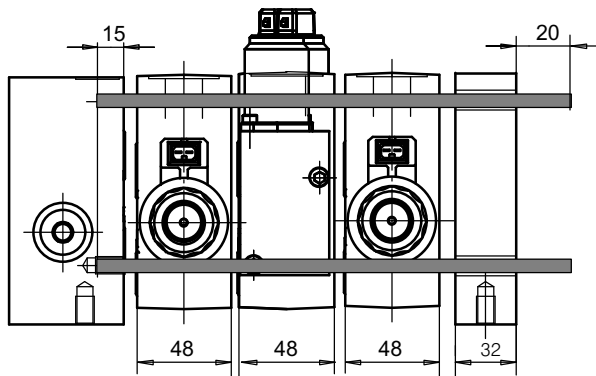
To assemble the individual valve sections with assured functional reliability, 3 tie bolts and hex. nuts are necessary.

Tightening torque = max. 32 Nm in 3 steps (6, 16 and 32 Nm)

13.1.1 Ordering code

3 pcs. tie bolt M10 x (required length in mm)

3 pcs. hex. nut M10, Part No.: 100243580



Calculating the tie bolt length:

$15 \text{ mm} + (48 \text{ mm} \times \text{no. of directional valve sections}) + \text{width of the end section} + 20 \text{ mm}$

Example:

$15 + (48 \times 3) + 32 + 20 = 211 \text{ mm}$

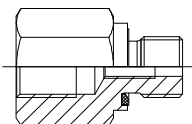
For ordering purposes, always round up the calculated tie bolt length to the next 10 mm.

In our example, we therefore need to order 3 pcs of tie bolt with 220 mm.



IMPORTANT: maximal 10 directional sections in one valve block

13.2 Pipe fittings and orifices

Model code	Description
Order number: 100116329	 <ul style="list-style-type: none"> - Pipe fitting G1/4" for use with max. two orifices M5 (TN3001, Form B) Application: dampening LS signal for system stabilisation - Orifice : <ul style="list-style-type: none"> Ø 0,5 = 100219282 Ø 0,6 = 100209791 Ø 0,8 = 100216052 Ø 1,0 = 100225419

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Classification: 430.300.330.