BUCHER hydraulics

Proportional Directional Valves

Series LCV

BUCHER hydraulics

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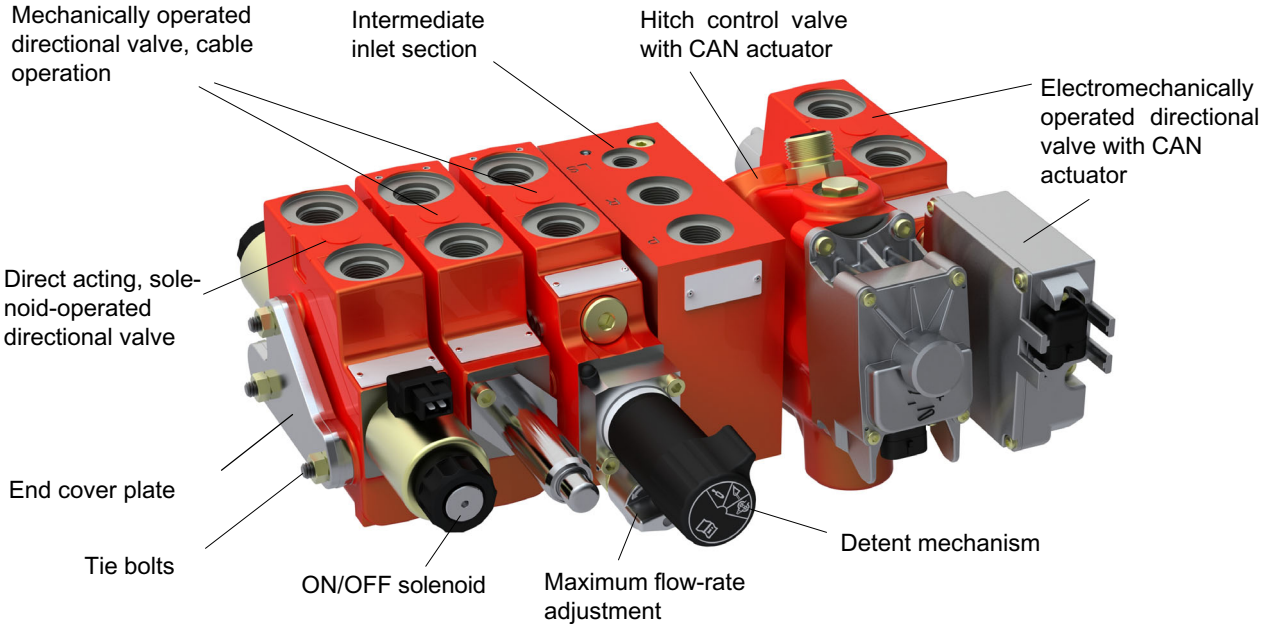
1 General description



The LCV valve series is designed for tractors and similar applications.
The valves can be controlled either mechanically with a Bowden cable or electromechanically with a stepper motor (CAN actuator). Valve sections with different control operators can be combined in one block.
The design of the flange face between the individual valve sections enables very smooth and easy actuation of the control spool.
Push-in couplings can be screwed directly into the control block without requiring additional adapters in the directional sections.
Directional valves with a primary pressure compensator ensure a constant flow rate to the actuator with the lowest load pressure, even when the pump supply is less than the total demand.
Directional valves with secondary pressure compensators ensure that all connected actuators receive some flow, even when the pump supply is less than the total demand.
By combining valve sections with primary and secondary pressure compensators, we can create a priority circuit without any additional priority valve.

1.1 Advantages

- Energy-optimised design
- Cost-optimised
- Extremely low internal leakage
- Compact valve-block solution with low pressure losses

1.2 Application examples

- Tractors
- Agricultural machines
- Municipal equipment
- Forestry machines

1.3 General technical data

Description	Unit	Value
Max. inlet pressure	bar	250
Max. actuator pressure in A and B	bar	250
Max. back pressure	bar	40
Viscosity range	mm^2/s	7 … 40000
Temperature range	C°	-40 … +100
Minimum fluid cleanliness level		ISO 4406, code 20/18/15
Hydraulic fluid		Recommendation: high-quality fluids with a mineral-oil base, such as HLP oils to DIN 51524 Part 2; for other fluids, contact BUCHER

2 Directional valve sections with CAN actuator

2.1 Description

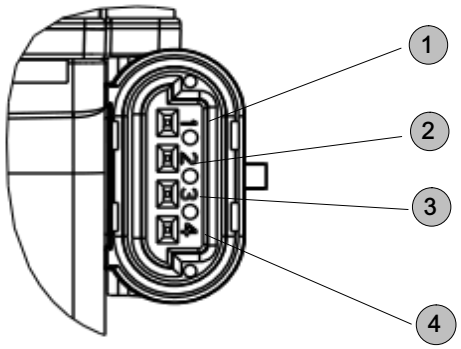
Valve sections that are controlled by a CAN actuator (stepper motor) do not require any additional pilot-oil circuit, and the switching times are therefore virtually independent of temperature.
With this type of control, the valve response is unaffected by pressure fluctuations in the hydraulic system, and no additional hydraulic energy is required to hold the valve securely in its operating position.
The CAN bus-compatible actuator facilitates spool-position control systems without vulnerable sensors. The CAN communication provides for diagnosis and an easy and flexible control function.
The high drive stiffness makes the system resistant to the effects of external forces, and the high dynamic response ensures short switching times.
The valves achieve very high spool-position accuracy and repeatability, because the CAN actuator compensates for mechanical tolerances.
Configurable valve characteristics are stored in the individual CAN actuators.

- Orifice in the LS signal line for limiting the LS take-off flow
- Spool type (detent function n/a)
- Actuation via CAN actuator (stepper motor)
  12 V / 24 V
- Actuator port threads to ISO 6149-1, M22x1.5

2.2 Technical data

General characteristics	Unit	Description, value
Duty cycle		100 %
Activation control protocol		Can Bus, SAE J1939
Plug connection		Delphi Metri Pack 150
Spool-positioning speed	mm/s	80
Electrical characteristics	**Unit**	**Value**
Nominal voltage	V DC	12 V_{min} = 9 / V_{max} = 16 24 V_{min} = 16 / V_{max} = 33
Enclosure protection		IP6K9K

2.2.1 Plug connection



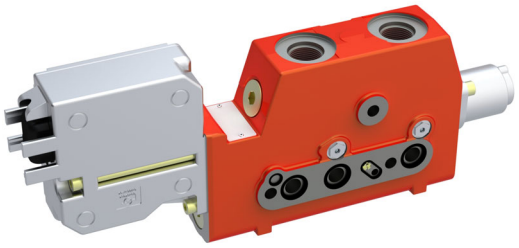
1	CAN +
2	CAN -
3	Ground (GND)
4	Supply voltage 12 / 24 V

2.3 With CAN actuator and primary pressure compensator

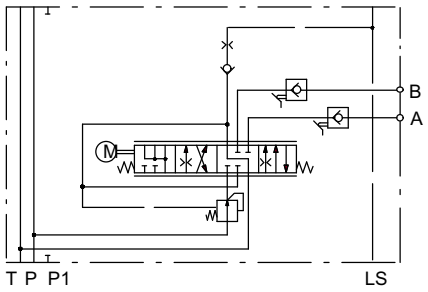
2.3.1 Description

Electromechanically operated directional valve, load-compensated

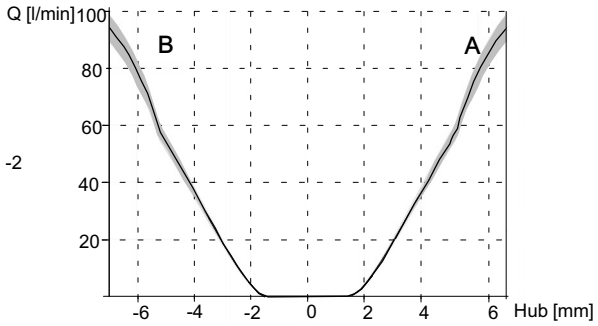
- nominal flow at ports A and B = 100 l/min with 10 bar pressure compensator
- leakage at the actuator ports < 1 ml/min at 100 bar and 35 cSt, piloted via hydromechanical seat valves
- seat valves with thermal PRVs optional



2.3.2 Symbol



2.3.3 Performance graph



1	The grey shaded area indicates the tolerances that may arise

2.3.4 Breakdown of the model code

L C V – V U R K H Z Z – A 0 0 M S – 100033146

Series

Function / code
Valve section = V

Compensation
Primary pressure compensator = U

LS take-off
Take-off flow reduced = R

Spool type / detent function
A/B closed mid-position
4/4 A/B spring return + float fixed pos. = K

Nominal flow rate
100 l/min = H

Leakage at actuator ports
Actuator ports A+B ≤ 1 ml/min
(piloted via hydromechanical seat valves) = ZZ

Type of actuator
Stepper motor 12 V = A
Stepper motor 24 V = B

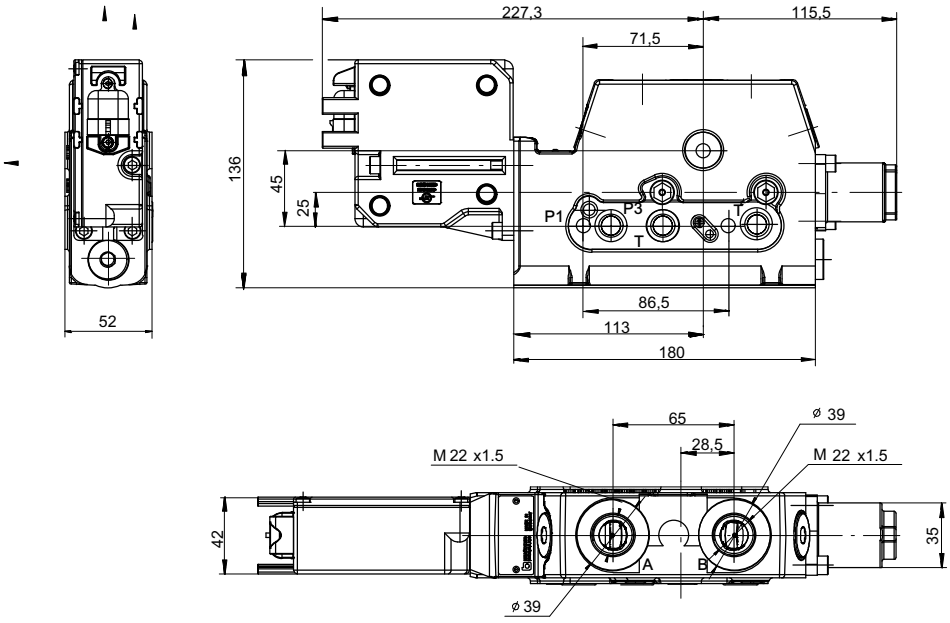
Software version
Bucher = 00

Connection type:
Port threads to ISO 6149-1
Actuator A + B = M22x1,5 = M

Differing from standard
BH standard = S

ID number

2.3.5 Dimensions



2.3.6 Ordering information

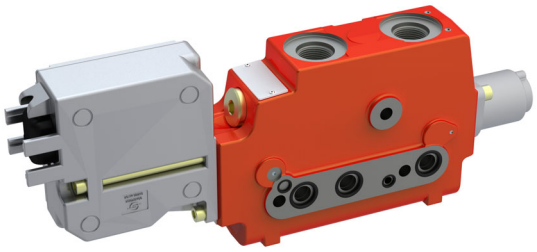
Type	Description	Part number
Directional valve section	LCV-VURKHZZ-A00MS-100033146 (12 Volt)	100033146
Directional valve section	LCV-VURKHZZ-B00MS-100036348 (24 Volt)	100036348

2.4 With CAN actuator and secondary pressure compensator

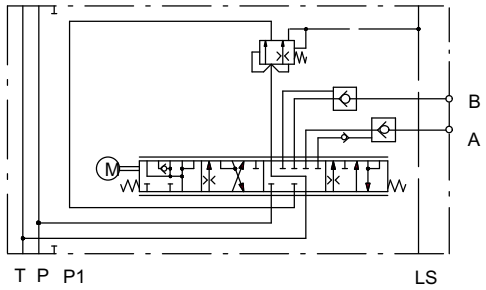
2.4.1 Description

Electromechanically operated directional valve, load-compensated

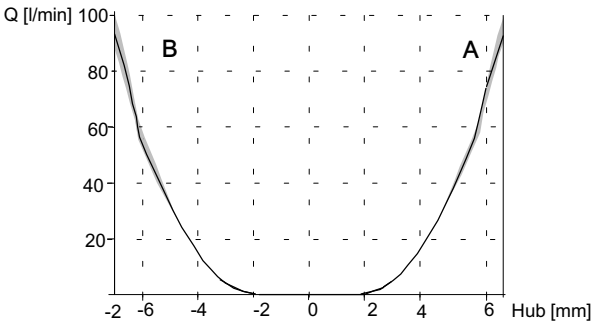
- valve section with 1 bar secondary press. compensator
- nominal flow at actuator ports A and B = 100 l/min with 10 bar pressure differential at the valve block
- leakage at the actuator ports < 6 ml/min at 100 bar and 35 cSt, piloted via hydromechanical seat valves



2.4.2 Symbol



2.4.3 Performance graph



1	The grey shaded area indicates the tolerances that may arise

2.4.4 Breakdown of the model code

L C V - V D R K H L L - A 0 0 M S - 100034507

Series

Function / code
Valve section = V

Compensation
Secondary pressure compensator = D

LS take-off
Take-off flow reduced = R

Spool type (detent function n/a)
A/B closed mid-position
4/4 A/B spring return + float fixed pos. = K

Nominal flow rate
100 l/min = H

Leakage at actuator ports
Actuator A+B ≤ 6 ml/min
(with hydraulically piloted seat valves) = LL

Type of actuator
Stepper motor 12 V = A
Stepper motor 24 V = B

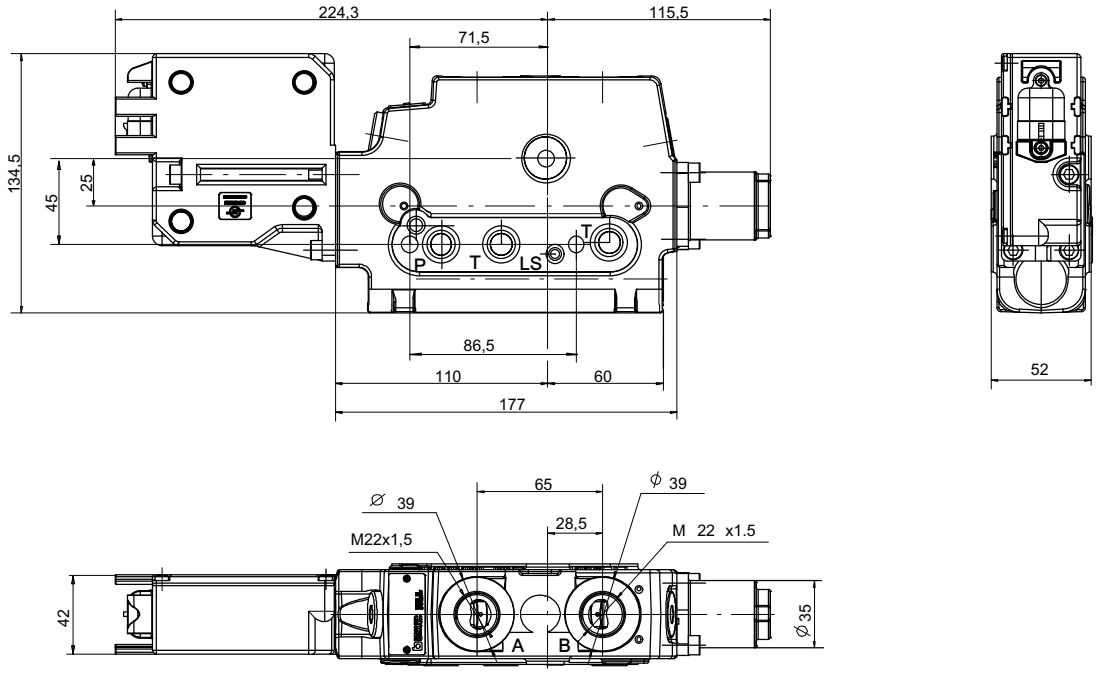
Software version
Bucher = 00

Connection type:
Port threads to ISO 6149-1
Actuator A + B = M22x1,5 = M

Differing from standard
BH standard = S

ID number

2.4.5 Dimensions



2.4.6 Ordering information

Type	Description	Part number
Directional valve section	LCV-VDRKHLL-A00MS-100034507 (12 Volt)	100034507
Directional valve section	LCV-VDRKHLL-B00MS-100036349 (24 Volt)	100036349

3 Mechanically operated directional valve sections

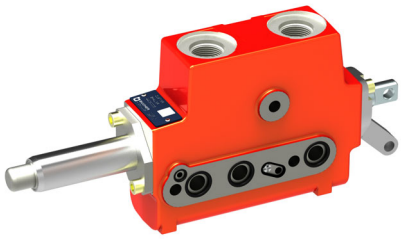
3.1 Description

- Non-compensated LS valve
- Operating positions:
  Max. actuating force with detent = 160 N
  Max. actuating force without detent = 30 N
- Nominal flow rate Q = 60 l/min with 10 bar pressure differential at the valve block, with individual operation
- Mounting surface prepared for coupling adapter, or with threaded port to ISO 6149-1, M22x1.5
- Operating lever is not included in the delivery

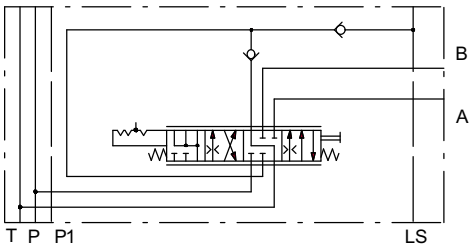
3.2 Without pressure compensator (spool positions 1 and 2 and float position detented)

3.2.1 Description

- nominal flow rate Q = 60 l/min with 10 bar pressure differential at the valve block
- Leakage at the actuator ports ≤ 20 ml/min at 100 bar and 35 cSt
- connection: Mounting surface prepared for coupling adapter, or with threaded port to ISO 6149-1, M22x1.5



3.2.2 Symbol



3.2.3 Breakdown of the model code

L C V - V X S R M S S - V X X F S -

Series

Function / code
Valve section = V

Compensation
without pressure compensator = X

LS take-off
Take-off flow (standard) = S

Spool type / detent function
A/B closed mid-position
4/4 detent in all 4 positions = R

Nominal flow rate
60 l/min = M

Leakage at actuator ports
A + B ≤ 20 ml/min = SS

Type of actuator
Linkage with lever bearing = V

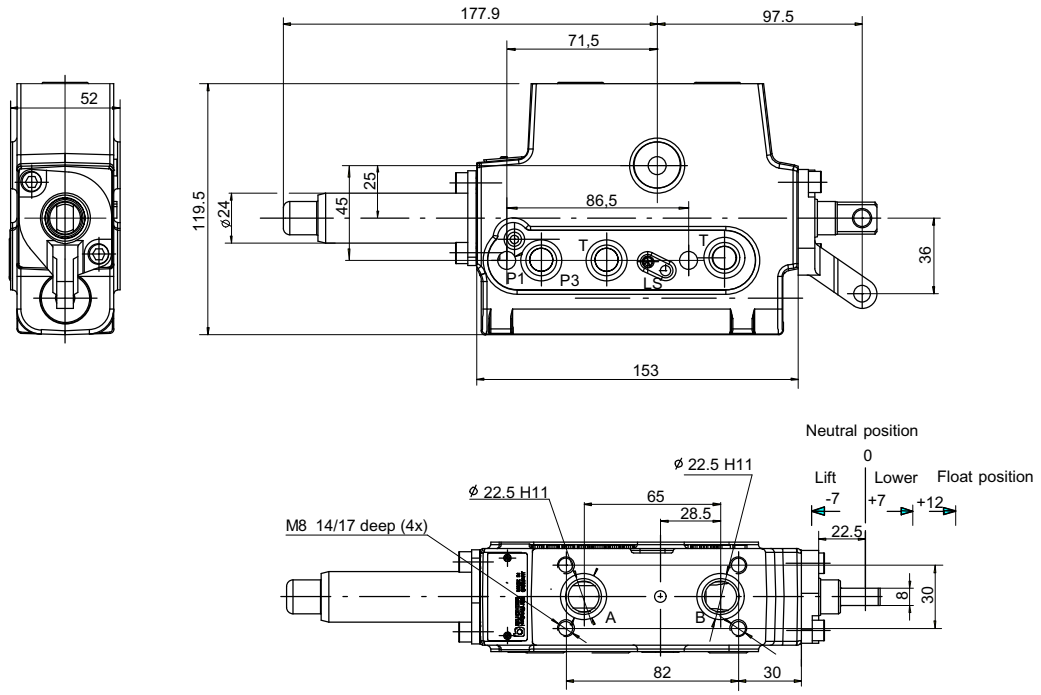
Software version
without = XX

Connection type
Flange face = F
Port threads to ISO 6149-1 for actuator ports A + B
= M22 x 1,5 = M

Differing from standard
BH standard = S

ID number

3.2.4 Dimensions



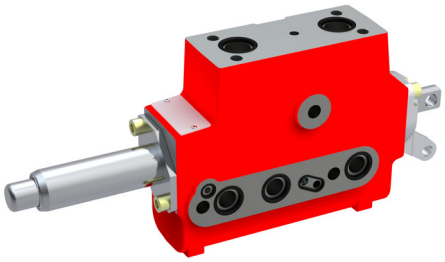
3.2.5 Ordering information

Type	Description	Part number
Directional valve section	LCV-VXSRMSS-VXXFS - 100032807 (connection type: flange face)	100032807
Directional valve section	LCV-VXSRMSS-VXXMS - 100036329 (connection type: port threads)	100036329

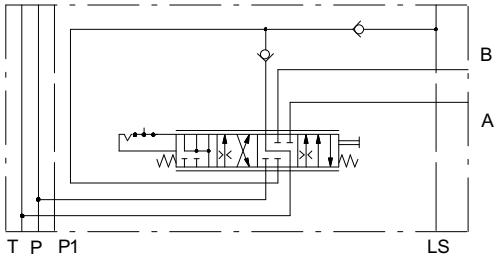
3.3 Without pressure compensator (float position detented)

3.3.1 Description

- nominal flow rate Q = 60 l/min with 10 bar pressure differential at the valve block
- Leakage at actuator ports A and B ≤ 20 ml/min at 100 bar and 35 cSt
- mounting surface prepared for coupling adapter



3.3.2 Symbol

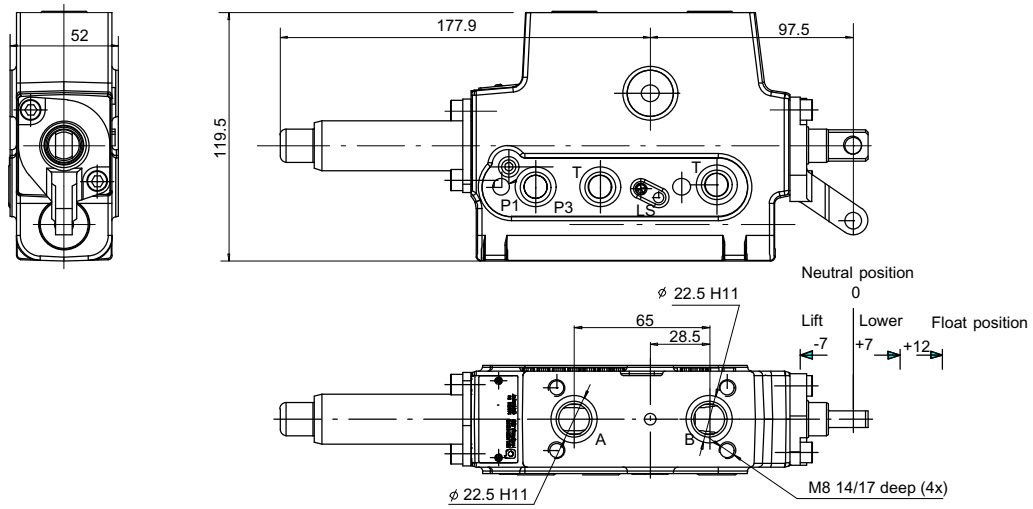


3.3.3 Breakdown of the model code

L C V – V X S K M S S – V X X F S – 100032927

Series		
Function / code	Valve section	= V
Compensation	without pressure compensator	= X
LS take-off	Take-off flow (standard)	= S
Spool type / detent function	A/B closed mid-position 4/4 A/B spring return + float fixed pos.	= K
Nominal flow rate: 60 l/min		= M
Leakage at actuator ports	Actuator ports A + B ≤ 20 ml/min	= SS
Type of actuator	Linkage with lever bearing	= V
Software version: without		= XX
Connection type	Flange face	= F
Differing from standard	BH standard	= S
ID number		

3.3.4 Dimensions



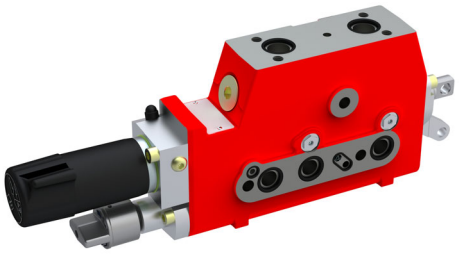
3.3.5 Ordering information

Type	Description	Part number
Directional valve section	LCV-VXSKMSS-VXXFS-100032927	100032927

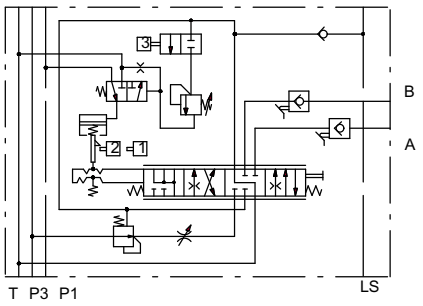
3.4 With primary compensator (load compensated, detented oper. position is selectable)

3.4.1 Description

- operating positions:
  Max. actuating force with detent = 200 N
  Max. actuating force without detent = 50 N
- nominal flow rate Q = 100 l/min with 10 bar pressure differential at the valve block
- Leakage at actuator ports A and B ≤ 1 ml/min at 100 bar and 35 cSt
- mounting surface prepared for coupling adapter



3.4.2 Symbol



3.4.3 Breakdown of the model code

L C V - V U S M H Z Z - L X X F S - 100032923

Series

Function / code
Valve section = V

Compensation
Primary pressure compensator = U

LS take-off: Take-off flow (standard) = S

Spool type / detent function
A/B closed mid-position
4/4 A/B optional detent, kick out, NSP = M

Nominal flow rate: 100 l/min = H

Type of actuator
Linkage with lever bearing
+ rotary knob for flow setting = L

Leakage at actuator ports
Actuator ports A + B ≤ 1 ml/min = ZZ

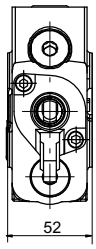
Software version: without = XX

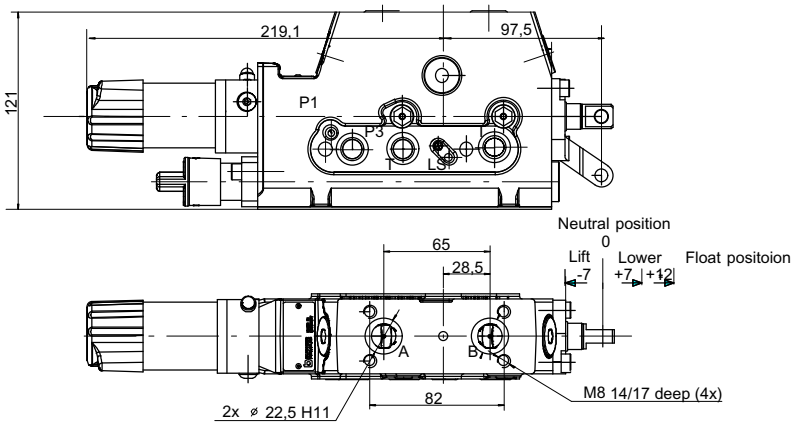
Connection type
Flange face = F

Differing from standard
BH standard = S

ID number

3.4.4 Dimensions





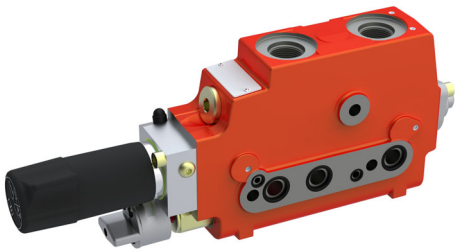
3.4.5 Ordering information

Type	Description	Part number
Directional valve section	LCV-VUSMHZZ-LXXFS-100032923	100032923

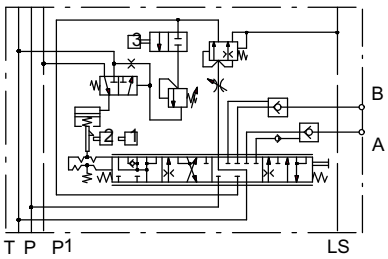
3.5 With secondary compensator, load compensated, detented operation position is selectable

3.5.1 Description

- nominal flow rate Q = 100 l/min with 10 bar pressure differential at the valve block
- leakage at the actuator ports ≤ 6 ml/min at 100 bar and 35 cSt, piloted via hydromechanical seat valves
- actuator port threads to ISO 6149-1, M22x1.5



3.5.2 Symbol



3.5.3 Breakdown of the model code

L C V – V D S M H L L – K X X M S – 100037213

Series

Function / code
Valve section = V

Compensation
Secondary pressure compensator = D

LS take-off
Take-off flow (standard) = S

Spool type / detent function
A/B closed mid-position
4/4 A/B optional detent, kick out, NSP = M

Nominal flow rate: 100 l/min = H

Leakage at actuator ports: A + B ≤ 6 ml/min = LL

Type of actuator
cable remote control + rotary knob for flow setting = K

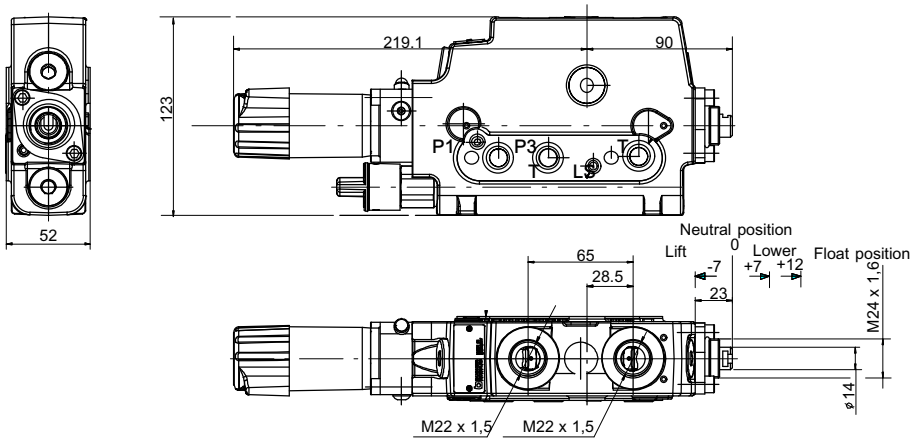
Software version
without = XX

Connection type
port threads to ISO 6149-1 for actuator ports A + B = M22x1,5 = M

Differing from standard
BH standard = S

ID number

3.5.4 Dimensions



3.5.5 Ordering information

Type	Description	Part number
Directional valve section	LCV-VDSMHLL-KXXMS-100037213	100037213

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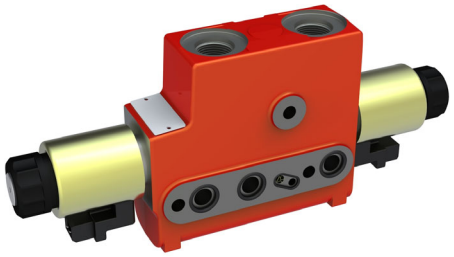
4 Solenoid operated directional valve sections

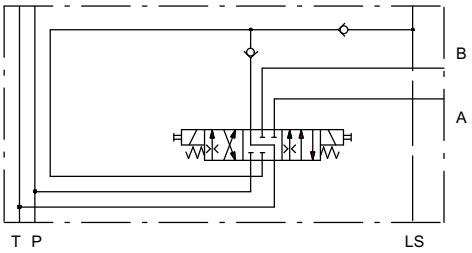
4.1 Electrically operated with on/off solenoid

4.1.1 Description

- leakage at the actuator ports ≤ 20 ml/min at 100 bar and 35 cSt
- Actuator port threads to ISO 6149-1, M22x1.5



4.1.2 Symbol

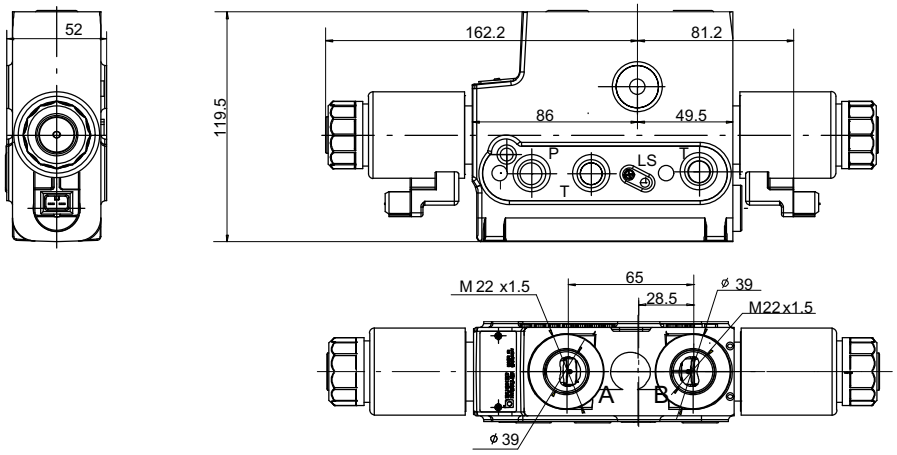


4.1.3 Breakdown of the model code

L C V – V X S A L S S – C X X M S – 100035318

ID number		
Series		
Function / code	Valve section	= V
Differing from standard	BH standard	= S
Compensation	without pressure compensator	= X
Connection type	Port thread to ISO 6149-1 for actuator ports A + B = M22 x 1,5	= M
LS take-off	Take-off flow (standard)	= S
Software version:	without	= XX
Spool type / detent function	A/B closed mid-position 4/3 A/B closed spring return	= A
Type of actuator:	Solenoid 12 V	= C
Nominal flow rate:	20 - 40 l/min	= L
Leakage at actuator ports	A + B ≤ 20 ml/min	= SS

4.1.4 Dimensions



4.1.5 Ordering information

Type	Description	Part number
Directional valve section	LCV-VXSALSS-CXXMS-100035318	100035318

5 Hitch control valve

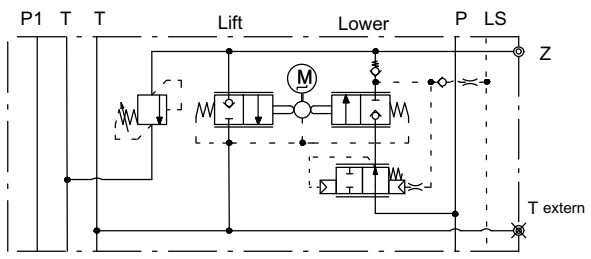
5.1 Description

With its straightforward and rugged valve design, the LCV hitch control valve has the optimum layout for applications in tractors and harvesters.
Because it is controlled by a CAN actuator, the hitch control valve does not require any additional hydraulic supply.
The zero overlap of the two seat-valve poppets provides fast-acting and responsive operation.
The hardened valve seats are tolerant of contamination and achieve high levels of sealing with a very long service life.
Low pressure drops offer fast, responsive lowering even with small loads.
Using the manual override, the valve can be operated in lifting and lowering mode.

5.2 General technical data

Description	Unit	Value
Nominal flow rate, lifting	l/min	30, 60, 100
Nominal flow rate, lowering	l/min	160
Max. inlet pressure at P	bar	250
Max. actuator pressure at Z	bar	250
Max. actuator pressure at T	bar	20
Duty cycle		100 %
Activation control protocol		Can Bus SAE J1939
Plug connection		Delphi Metr. Pack 150
Spool-positioning speed	mm/s	80
Electrical characteristics	**Unit**	**Value**
Nominal voltage	V DC	12
CAN actuator, directional valve, neutral	mA	210
CAN actuator, directional valve, holding	mA	560
CAN actuator, directional valve, moving	mA	1700
CAN actuator, directional valve, max.	mA	3000 (peak at 80 mm/s)
Enclosure protection		IP6K9K

5.3 Symbol

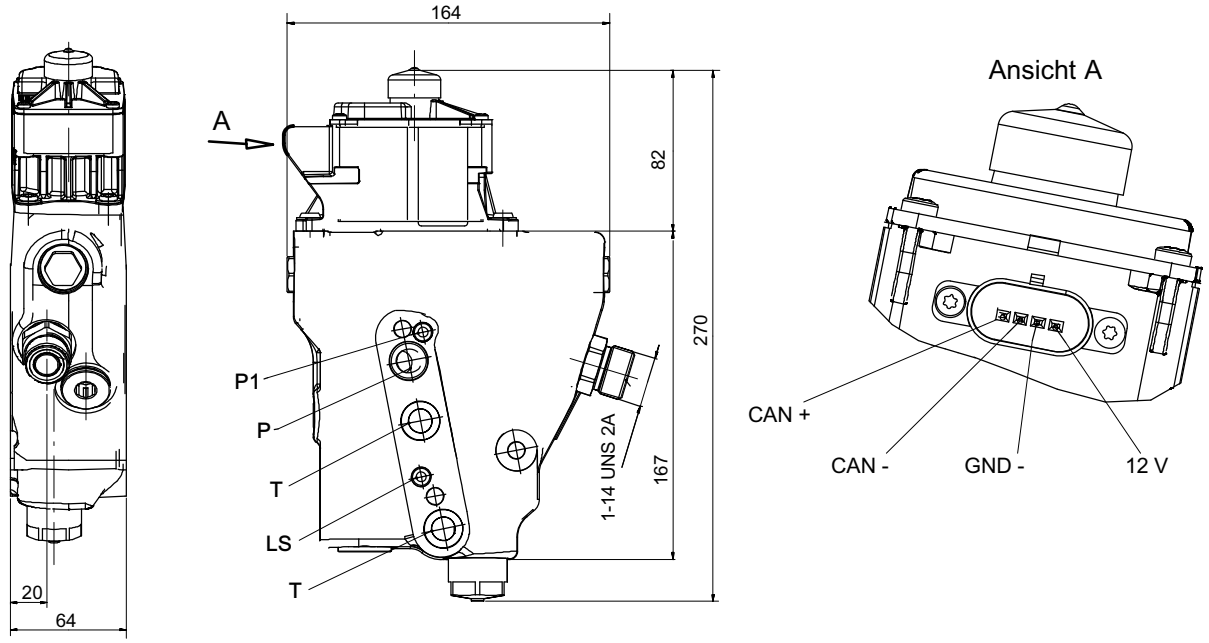


5.4 Breakdown of the model code

L C V - H U R T H Z X - A 0 0 U S - 400672444

Series		
Function / code		
Hitch control valve	= H	
Compensation		
Primary pressure compensator	= U	
LS take-off		
Take-off flow reduced	= R	
Spool type / detent function		
A/B closed mid-position		
3/2 spring return	= T	
Nominal flow rate [l/min]		
30	= L	
60	= M	
100	= H	
Leakage at actuator ports		
A+B ≤ 0,5 ml/min	= ZX	
Type of actuator		
Stepper motor 12 V	= A	
Software version		
Bucher	= 00	
Connection type		
UNF	= U	
Differing from standard		
BH standard	= S	
ID number		

5.5 Dimensions



5.6 Ordering information

Type	Description		Part number
Hitch control valve	LCV-HURTLZX-A00US	(30 l/min)	400673328
Hitch control valve	LCV-HURTMZX-A00US	(60 l/min)	400672565
Hitch control valve	LCV-HURTHZX-A00US	(100 l/min)	400672444

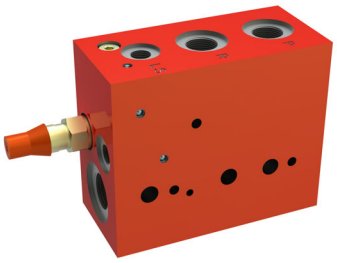
6 Auxiliary-function sections for LS pump systems

6.1 With $LS_{max.}$ pressure relief and LS unloading control

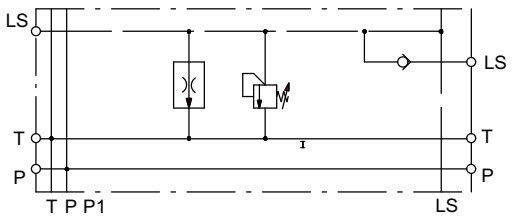
6.1.1 Description

Intermediate section for LS- pump systems with $LS_{max.}$ pressure relief and LS unloading control

- without pressure compensator
- LS unloading control (0.7 l/min)
- port threads to DIN 3852 -1



6.1.2 Symbol

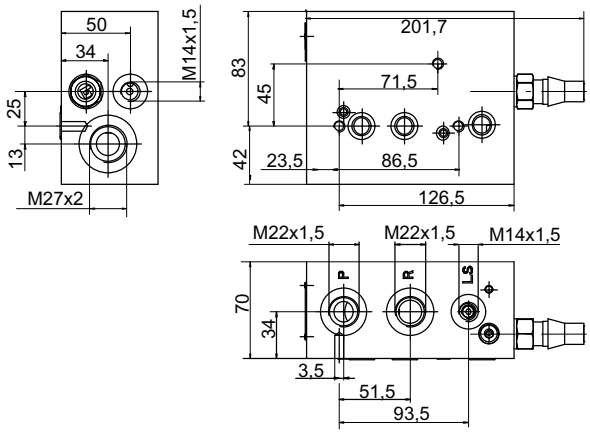


6.1.3 Breakdown of the model code

L C V – M X H X A X X – X P O M S – 100032500

Series		
Function / code Intermediate section	= M	
Pressure-compensator function no control function	= X	
LS unloading control 0,7 l/min	= H	
Pump pressure relief no control function	= X	
$LS_{max.}$ pressure relief PRV for all valves in the block	= A	
Leakage at actuator ports without	= XX	
Type of actuator: without	= X	
Interface in the block Z-plate, O-ring at the bottom (standard)	= PO	
Port threads to DIN3852-1 for actuator ports A + B = M22 x 1,5	= M	
Differing from standard BH standard	= S	
ID number		

6.1.4 Dimensions



6.1.5 Ordering information

Type	Description	Part number
Intermediate section	LCV-MXHXAXX-XPOMS-100032500	100032500

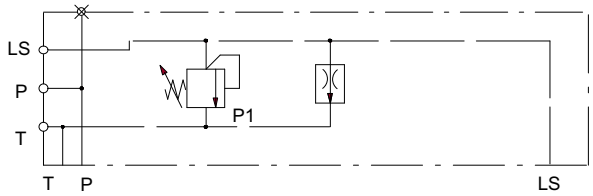
6.2 With $LS_{max.}$ pressure relief and LS unloading control

6.2.1 Description

End section for LS pump systems, with LS max. pressure relief and LS unloading control

- port threads to ISO 6149-1
- with LS unloading control (0.7 l/min)

6.2.2 Symbol

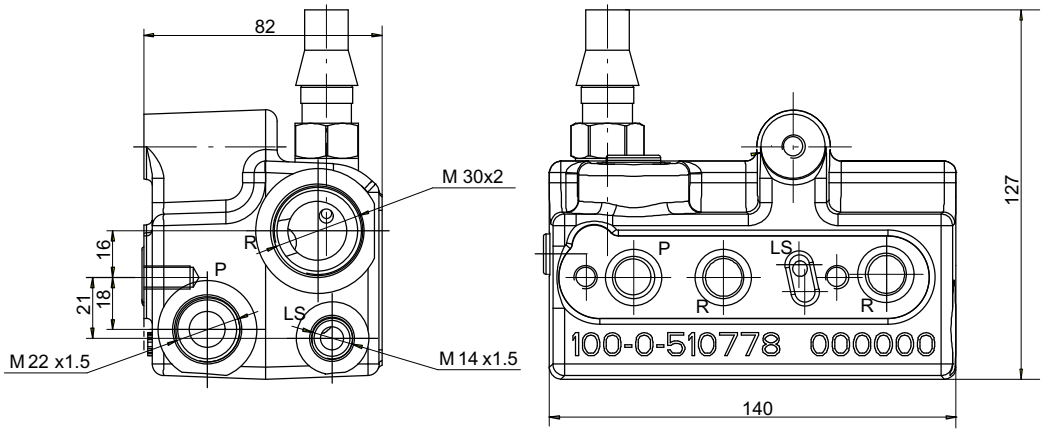


6.2.3 Breakdown of the model code

L C V - C X H X A X X - X P X M S - 100029451

Series		
Function / code	End section	= C
Pressure-compensator compensation	no control function	= X
LS unloading control	0,7 l/min	= H
Pump pressure relief	no control function	= X
$LS_{max.}$ pressure relief	in 1 = PRV for all valves in the block	= A
Pressure relief for actuator ports A and B	without	= XX
Type of actuator	without	= X
Interface in the block	without O-ring (in the diagram below)	= PX
Port threads	Metric	= M
Differing from standard	BH standard	= S
ID number		

6.2.4 Dimensions



6.2.5 Ordering information

Type	Description	Part number
End section	LCV-CXHXAXX-XPXMS-100029451	100029451

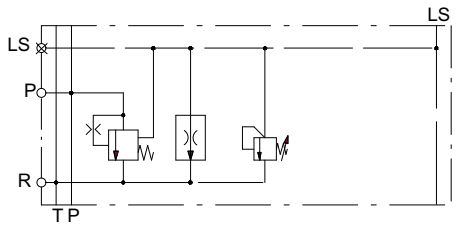
6.3 With $LS_{max.}$ pressure relief, LS unloading control and pressure compensator

6.3.1 Description

Intermediate section for fixed displacement pumps with system pressure compensator, $LS_{max.}$ pressure relief, LS unloading compensator

- compensator function
- with LS unloading control (0.7 l/min)
- port threads to ISO 6149-1

6.3.2 Symbol

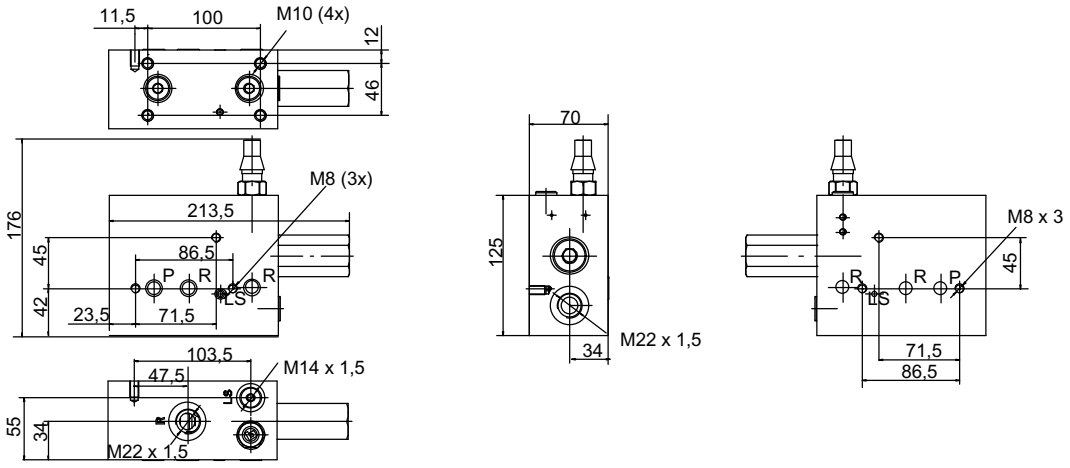


6.3.3 Breakdown of the model code

L C V - M P H X A X X - X P O M S - 100030165

Series		
Function / code Intermediate section	= M	
System pressure compensator	= P	
LS unloading control 0,7 l/min	= H	
Pump pressure relief no control function	= X	
$LS_{max.}$ pressure relief in 1, 2 and 3	= A	
Pressure relief for actuator ports A and B without	= XX	
Type of actuator: without	= X	
Interface in the block Z-plate, O-ring at the bottom (standard)	= PO	
Port threads to DIN3852-1 M22 x 1,5	= M	
Differing from standard BH standard	= S	
ID number		

6.3.4 Dimensions



6.3.5 Ordering information

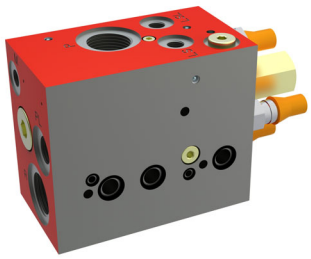
Type	Description	Part number
Intermediate section	LCV-MPHAXX-XPOMS-100030165	100030165

6.4 With $LS_{max.}$ pressure relief, LS unloading control and pressure compensator with priority function

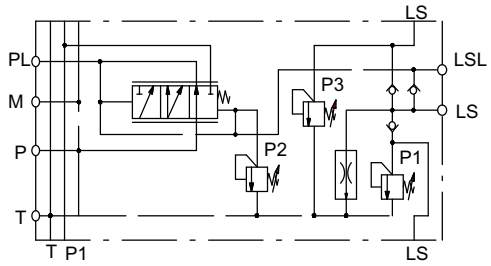
6.4.1 Description

Intermediate section for LS pump systems with $LS_{max.}$ pressure relief, LS unloading control and pressure compensator

- compensator function
- with LS unloading control (0.7 l/min)
- port threads: BSP inch



6.4.2 Symbol

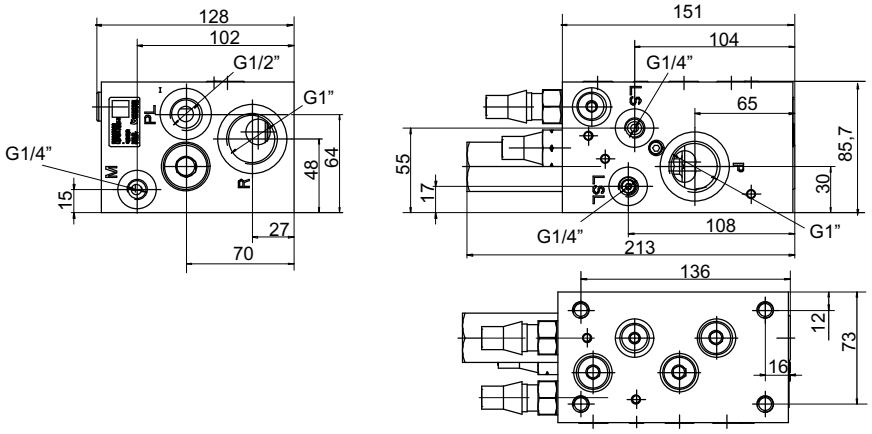


6.4.3 Breakdown of the model code

L C V – M E H X G X X – X P O G S – 100033998

Series		
Function / code Intermediate section	= M	
Pressure-compensator function Priority externally	= E	
LS unloading control 0,7 l/min	= H	
Pump pressure relief no control function	= X	
$LS_{max.}$ pressure relief in 1, 2 and 3	= G	
Pressure relief for actuator ports A and B without	= XX	
Type of actuator: without	= X	
Interface in the block Z-plate, O-ring at the bottom (standard)	= PO	
Port threads BSP inch	= G	
Differing from standard BH standard	= S	
ID number		

6.4.4 Dimensions



6.4.5 Ordering information

Type	Description	Part number
Intermediate section	LCV-MEHXGXX-XPOGS-100033998	100033998

7 End sections

7.1 End cover plate with no control function (without O-rings)

7.1.1 Description

End cover plate for LS pump systems

- no control function
- without O-rings

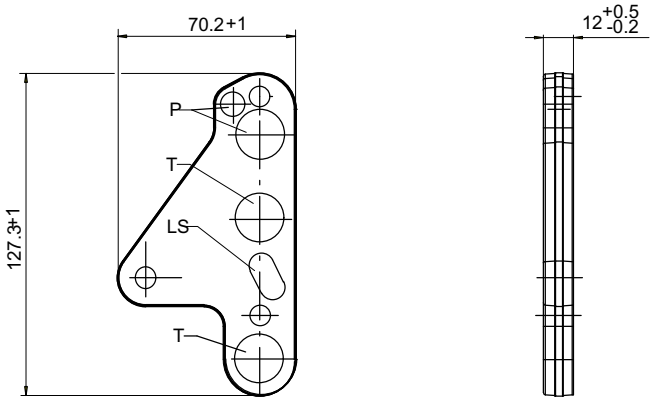
7.1.2 Symbol

7.1.3 Breakdown of the model code

L C V – C X X X X X X – X P X X S – 100030163

Series		
Function / code End cover plate	= C	
Pressure-compensator compensation no control function	= X	
LS unloading control without	= X	
Pump pressure relief no control function	= X	
$LS_{max.}$ pressure relief without	= X	
ID number		
Differing from standard BH standard	= S	
Connection type without	= M	
Interface in the block without O-ring (in the diagram below)	= PX	
Type of actuator without	= X	
Pressure relief for actuator ports A and B without	= XX	

7.1.4 Dimensions

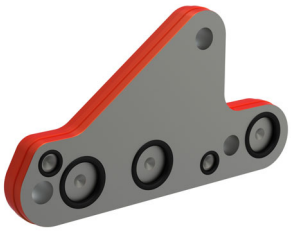


7.1.5 Ordering information

Type	Description	Part number
End cover plate	LCV-CXXXXXX-XPXXS-100030163	100030163

7.2 End cover plate with no control function (with O-rings)

7.2.1 Description



End cover plate for LS pump systems.

- no control function
- with O-rings

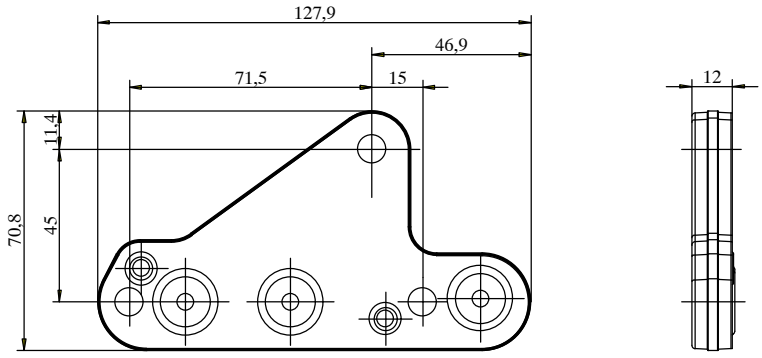
7.2.2 Symbol

7.2.3 Breakdown of the model code

L C V – C X X X X X X – X X O X S – 100030167

Series		
Function / code End cover plate	= C	
Pressure-compensator compensation no control function	= X	
LS unloading control without	= X	
Pump pressure relief no control function	= X	
$LS_{max.}$ pressure relief without	= X	
Pressure relief for actuator ports A and B without	= XX	
Type of actuator without	= X	
Interface in the block with O-Ring (in the diagram below)	=XO	
Connection type without	= M	
Differing from standard BH standard	= S	
ID number		

7.2.4 Dimensions



7.2.5 Ordering information

Type	Description	Part number
End cover plate	LCV-CXXXXXX-XXOXS-100030167	100030167

8 Notes

This catalogue is intended for users with specialist knowledge. The user must check the suitability of the equipment described herein in order to ensure that all of the conditions necessary for the safety and proper functioning of the system are fulfilled. If you have any doubts or questions, please contact Bucher Hydraulics.

9 Mounting instructions

Expert and product knowledge is required for the layout of this valve type. Use exclusively for the intended purpose within the indicated values. The valve manufacturer must be consulted for use of the appliance outside the specifications. All applications must be verified by sufficient tests to ensure safety in the application. The ultimate responsibility for safety during installation and use resides with the end appliance manufacturer.

CAUTION:
Maintenance work may only be performed by expert personnel with mechanical knowledge. In principle, only the sealing parts may be replaced or checked. When replacing seals, ensure that they are well oiled or greased before mounting.

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Classification: 430.300.330.