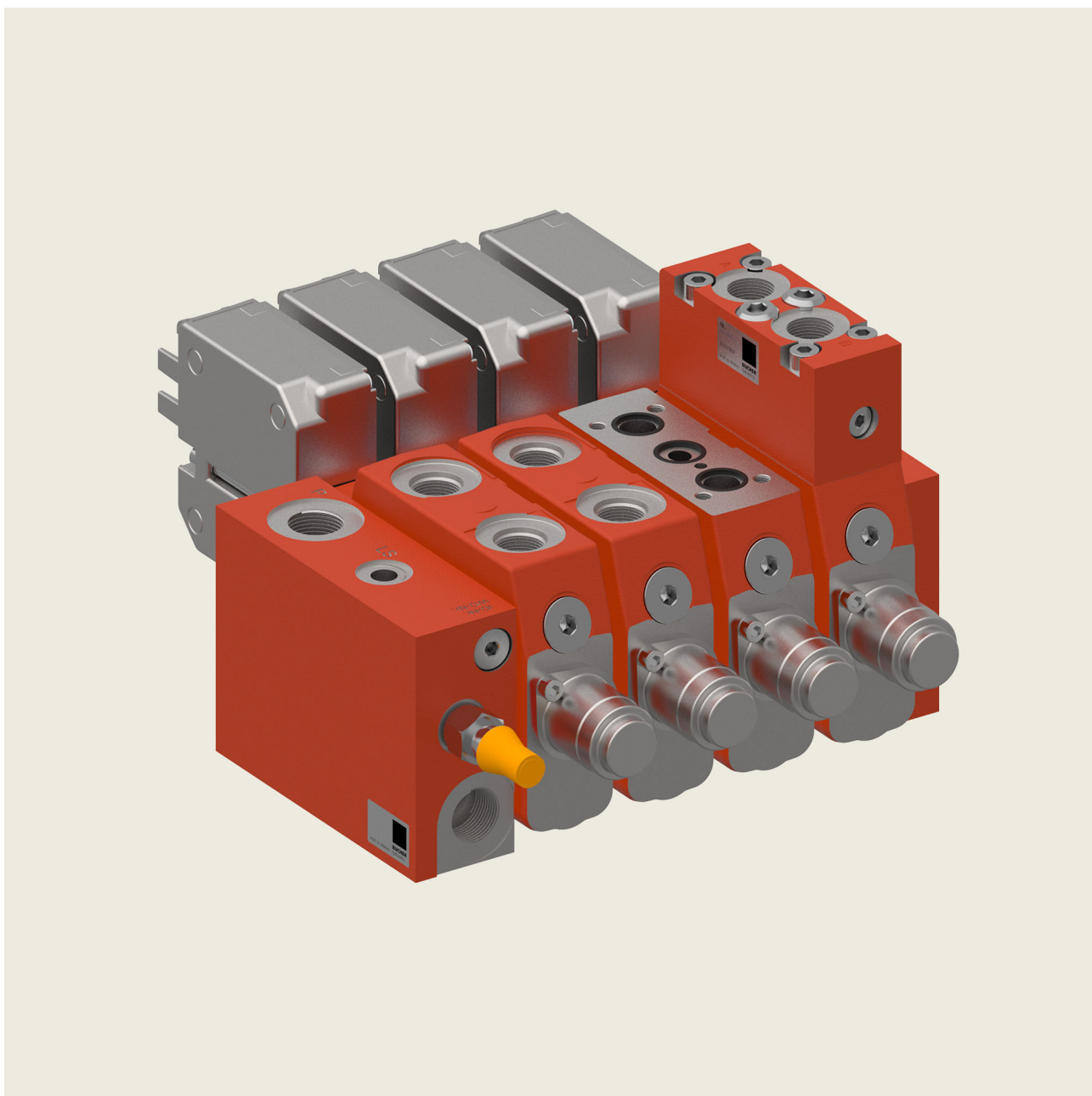


Build Program

LCV



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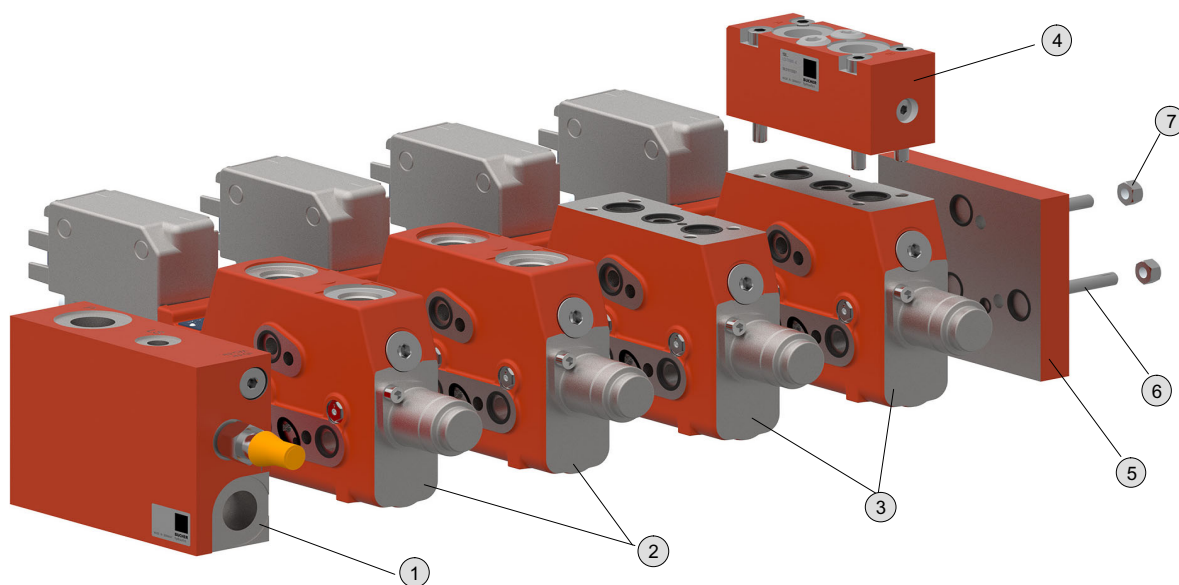
1 General description

The LCV valve series has been developed for tractors and similar applications. The directional control valves are actuated electromechanically by a stepper motor (CAN actuator). The design of the flange surfaces between the individual valve sections ensures exceptionally smooth spool operation.

The valve sections can be supplied either with threaded ports or with a flanged interface, allowing quick couplings to be mounted directly on the control block without additional

adapters on the valve section.

The directional control valves are equipped with a primary pressure compensator, while the functionality of a secondary pressure compensator can be replicated via an electric flow sharing system. This ensures that all connected consumers remain supplied, even in case of pump underflow. The system enables a combination of priority control and flow sharing without requiring an additional priority valve.



Item	Description
1	Inlet section
2	Valve section with threaded ports
3	Valve section with flange interface
4	Bolt-on Top section

Item	Description
5	End section
6	Threaded tie rod
7	Hexagon nut

1.1 Advantages

- Energy-optimized, Cost-optimized, Application-optimized
- Integrated seat valves with Thermal Relief Valve
- Opening point and maximum flow rates preset and stored
- Compact control block & system solutions with low pressure losses

1.2 Application Examples

- Tractors
- Self-propelled machines



1.3 General Technical Data

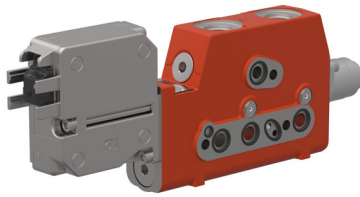
Hydraulic characteristics	Unit	Description, value
Recommended mounting attitude		spool axis horizontal
Nominal flow rate	l/min	250
Inlet pressure P	bar	max. 250 ¹⁾ (280) ²⁾
Actuator pressure A+B	bar	max. 280 ¹⁾ (350) ²⁾
Return line pressure	bar	max. 40
Hydraulic fluid		recommendation: high-quality fluids with a mineral-oil base, such as HLP oils to DIN 51524 part 2.
Fluid temperature	°C	-40 ... +100
Ambient temperature	°C	-40 ... +80
Oil viscosity	mm ² /s	7 ... 20000
Minimum fluid cleanliness level		ISO 4406 code 22/19/15
Electrical characteristics	Unit	Description, value
Rated voltage range of the solenoids	V DC	12V $\triangle$ 10,8 ... 16 / 24V $\triangle$ 21,6 ... 32
CAN signal	ms	every 10 ms
Threaded ports		ISO 6149-1 and DIN 3852-1 / DIN 3852-2
Tie rod		M8, tensile grade 10.9 (tightening torque 19 ⁺⁵ Nm)
Corrosion protection		valve sections primed, color: traffic grey RAL 7043, coating thickness 30 to 50 μ m

1) The specified pressures are operating pressures.

2) The stated pressures are the maximum absolute pressure limits for a tank line pressure of 10 bar.

Note: Some components have lower individual pressure ratings.

2 Directional Control Valve Sections with CAN Actuator



2.1 Description

Directional control valves that are actuated by an electro-mechanical actuator do not require an additional pilot oil supply for operation.

Advantages of this type of actuation include switching times that are almost independent of temperature and valve dynamics that are unaffected by system pressure fluctuations. Furthermore, no additional hydraulic energy is required to maintain the valve securely in its switching position.

The high stiffness of this actuation principle ensures insensitivity to external force influences, while the high dynamics enable short switching times. The electromechanical actua-

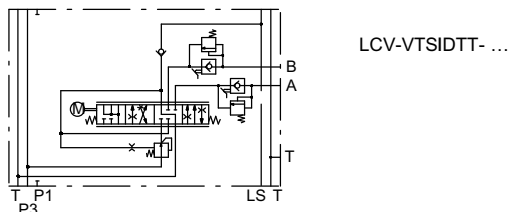
tor allows position control without the need for sensors, and the valve exhibits no hysteresis.

By adding external sensors, the functionality of the actuator can be extended. CAN communication enables simple and flexible control, and an integrated diagnostic function is also available.

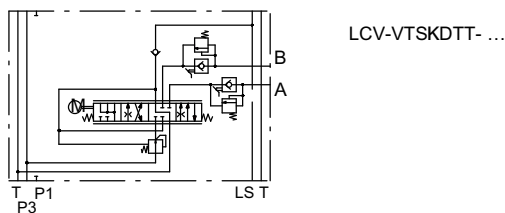
The directional control valves achieve very high positioning and repeat accuracy, as the stepper motor compensates the mechanical tolerances. The valve characteristic curve is linearized; a parameterizable characteristic curve is possible and can be modified later if required.

2.2 Symbol

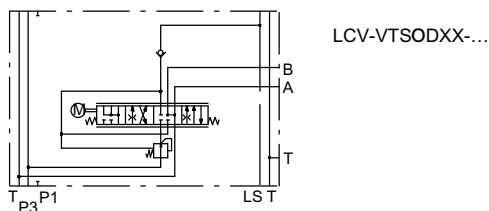
2.2.1 A/B = closed center position and tank notch



2.2.2 A/B = closed center position

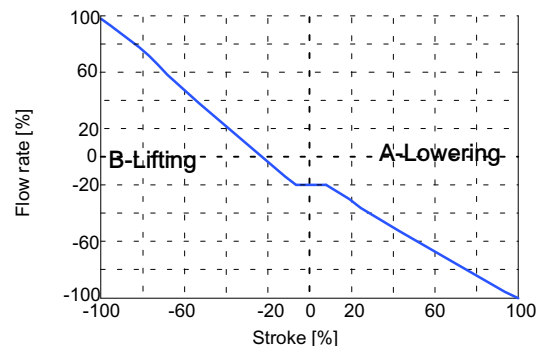


2.2.3 A/B = open center position

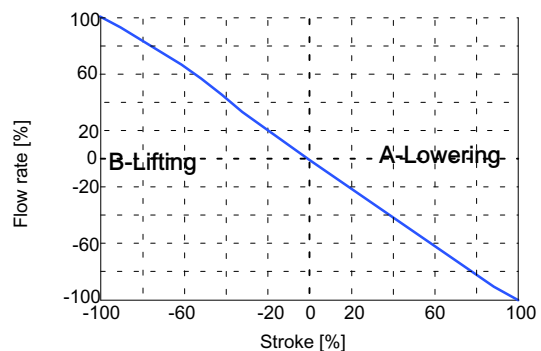


2.3 Characteristic Curves

2.3.1 Characteristic curve LCV-VTSIDTT-... and LCV-VTSKDTT-...



2.3.2 Characteristic curve LCV-VTSODXX-...

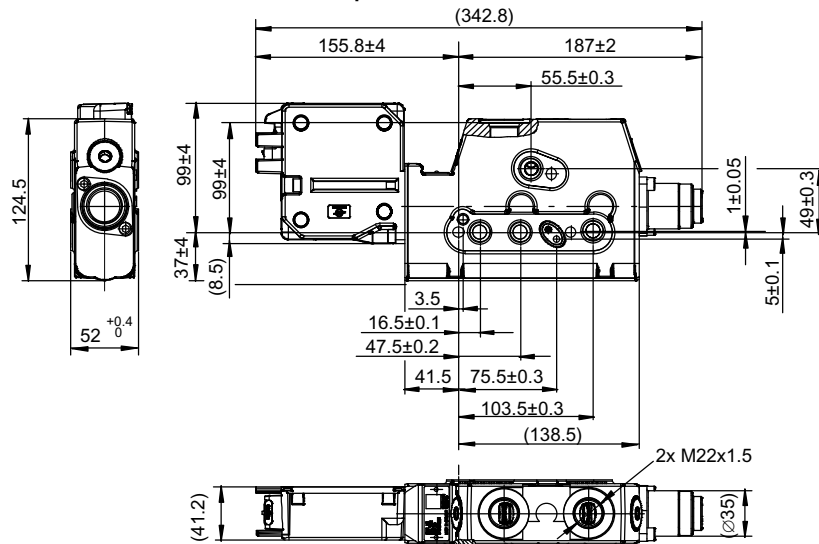


2.4 Technical Data

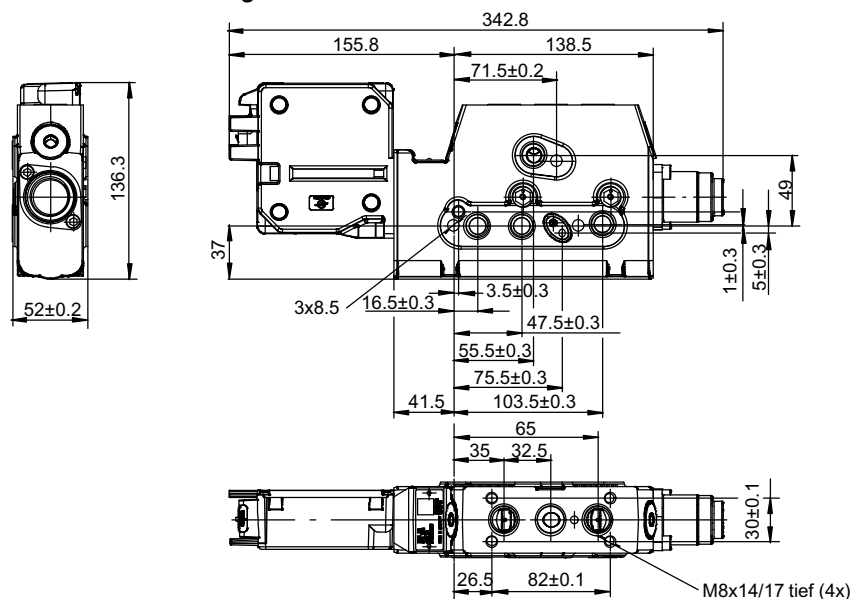
General characteristics	Unit	Description, value
Nominal flow rate A+B	l/min	120
Rated voltage	V DC	12, 24
Consumer ports either with threaded or flanged interface. Consumer ports according to ISO 6149-1, thread M22x1,5.		
Integrated seat valves - Zero-Leak (leakage < 1 ml/min) - Thermal relief valve		
Opening point and maximum flow set and stored		
Maximum flow and characteristic curve configurable		

2.5 Dimensions

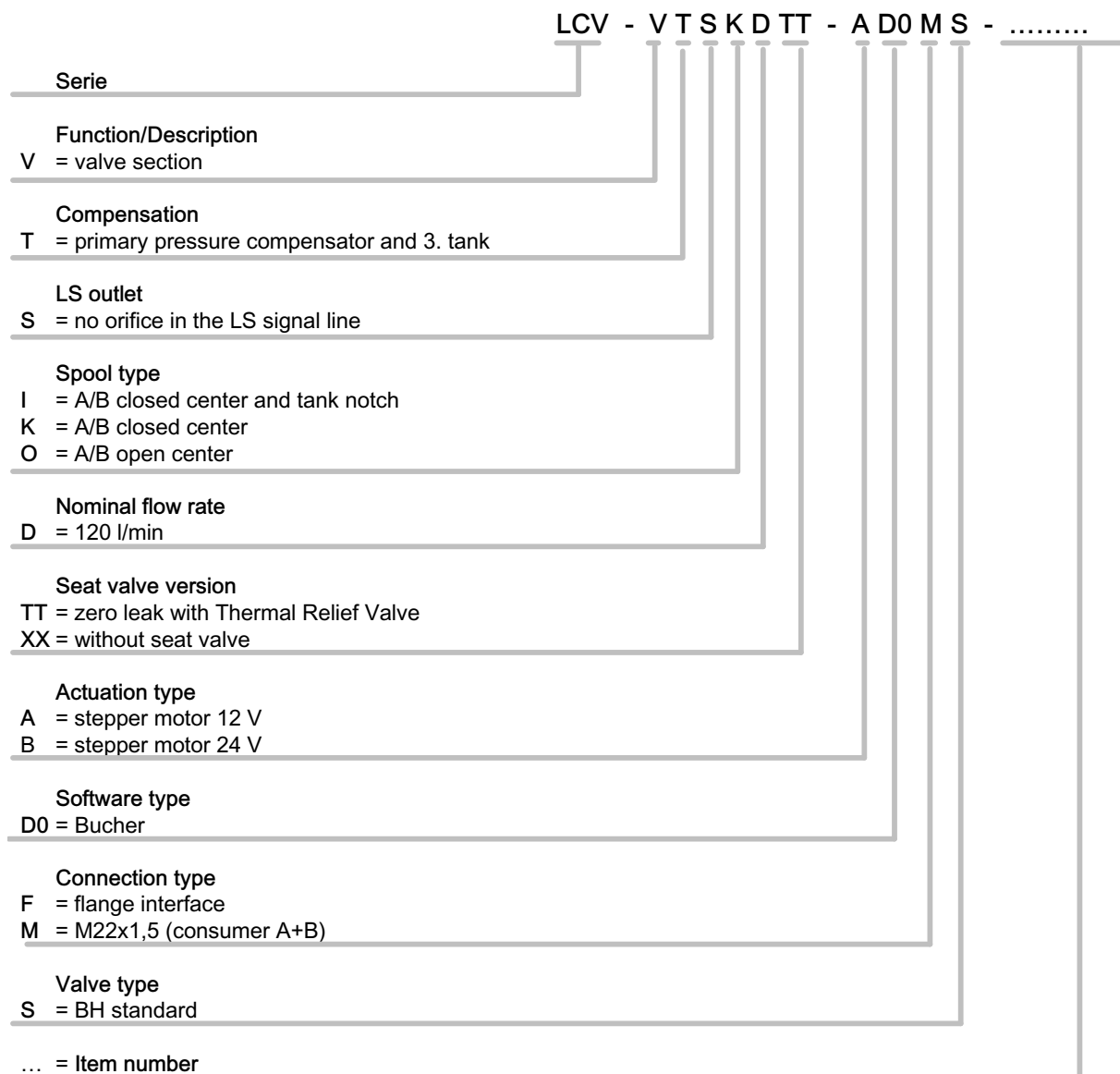
2.5.1 Valve section with threaded ports



2.5.2 Valve section with flanged interface



2.6 Ordering Code



2.6.1 Ordering information

Item	Description	Item number
Directional control valve section	LCV-VTSKDTT-AD0MS	100044180
Directional control valve section	LCV-VTSKDTT-BD0MS	100044181
Directional control valve section	LCV-VTSKDTT-AD0FS	100044182
Directional control valve section	LCV-VTSKDTT-BD0FS	100044183
Directional control valve section	LCV-VTSIDTT-AD0MS	100044184
Directional control valve section	LCV-VTSIDTT-BD0MS	100044185
Directional control valve section	LCV-VTSIDTT-AD0FS	100043515
Directional control valve section	LCV-VTSIDTT-BD0FS	100043516
Directional control valve section	LCV-VTSODXX-AD0MS	100044186
Directional control valve section	LCV-VTSODXX-BD0MS	100044187
Directional control valve section	LCV-VTSODXX-AD0FS	100044188
Directional control valve section	LCV-VTSODXX-BD0FS	100044189

3 Functional Sections

3.1 Pump Systems

3.1.1 LS-pump system

For systems with a variable displacement pump (Load Sensing system), in addition to the P line, the LS line to the pump regulator is connected. A pressure compensator in the inlet section is not required. In the neutral position of all directional control valves, the LS line is connected to the tank and the pump swashes back. When a directional control valve is actuated, the consumer pressure is reported to the pump regulator, and the pump swashes out until the defined control Δp is reached

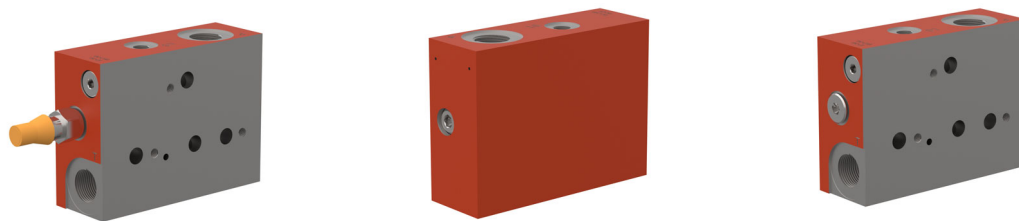
3.1.2 Constant pump system

The valve block includes a 3-way pressure compensator in the inlet section. In neutral position, the 3-way pressure compensator is connected to the tank, and the total flow supplied to the block is directed to the tank through the 3-way pressure compensator with minimal pressure losses. When a directional control valve is actuated, the consumer pressure is reported to the 3-way pressure compensator. The 3-way pressure compensator maintains the Δp constant. This ensures that the flow rate is independent of the load and proportional to the orifice opening of the directional control valve.

3.2 Overview of Function Sections

Directional valve section	Function
Inlet sections	- Load sensing pump system • functionless / with LSmax pressure relief valve / with Pmax pressure relief valve and LS unloading valve • external priority - Constant pump system • 3-way pressure compensator and LSmax pressure relief valve • open center - closed center switchable
End sections	- functionless
Bolt-on sections	- with secondary pressure relief valve & measuring ports in A+B

3.3 Inlet Sections for LS-Pump Systems



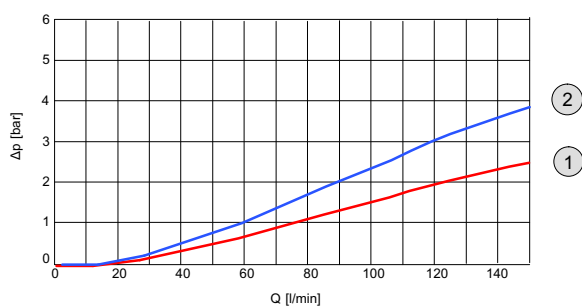
3.3.1 Description

Inlet section with LSmax pressure relief valve, Pmax pressure relief valve and LS unloading valve.

3.3.2 Overview of the sections

Symbol	Description	Item number
	LCV-CTLXAXX-XPXGS	100043802
	LCV-CTXXXXX-XPXGS	100043803
	LCV-CTLSXXX-XPXGS	100043948

3.3.3 Characteristic curve



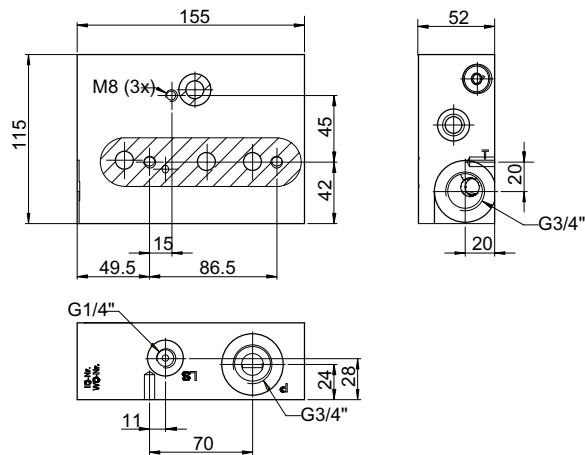
Item	Description
1	$Q \Rightarrow P$
2	$Q \Rightarrow T$

3.3.4 Technical data

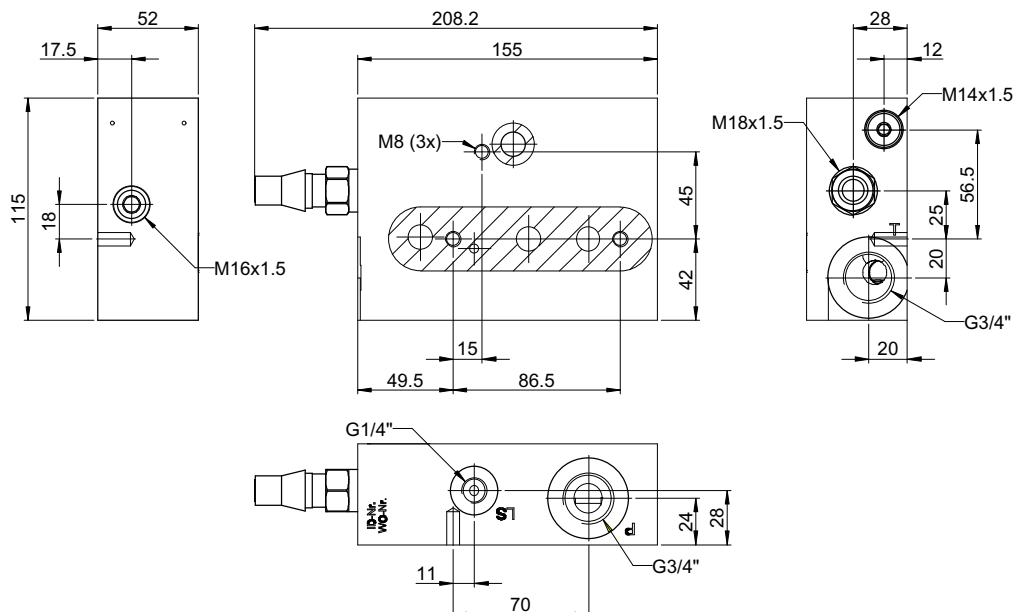
General characteristics	Unit	Description, value
Nominal flow rate	l/min	250
Threaded ports to DIN 3852-2 P = G 3/4" T = G 3/4" LS = G 1/4"		
LSmax pressure relief valve adjustable: pressure range: 80 - 280 bar flow rate: max. 20 l/min		
Pmax pressure relief valve fixed setting [bar] pressure stages: I = 80 / K = 100 / L = 125 / M = 140 / N = 160 / O = 175 / P = 190 / Q = 210 / R = 230 / S = 250 / T = 280		
LS unloading valve 0,4 l/min		

3.3.5 Dimensions

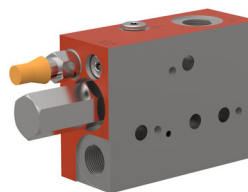
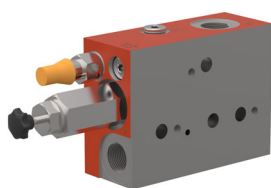
3.3.5.1 Inlet section, functionless



3.3.5.2 Inlet section for LS pump systems



3.4 Inlet Sections for Constant Pump Systems



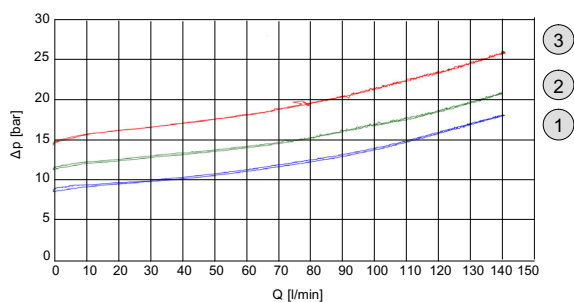
3.4.1 Description

Inlet section with 3-way pressure compensator, LSmax pressure relief valve, LS relief valve and OC-CC switching screw.

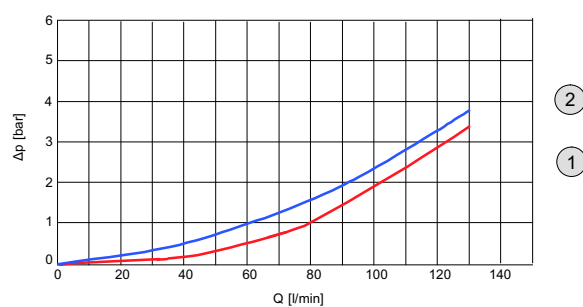
3.4.2 Overview of the sections

Symbol	Description	Item number
	LCV-CMLXAXX-XPXGS	100043848
	• 3-way pressure compensator • LSmax pressure relief valve • LS unloading valve • OC-CC switching screw •	
	LCV-CFLXAXX-XPXGS	100043849
	• 3-way pressure compensator • LSmax pressure relief valve • LS unloading valve • •	

3.4.3 Characteristic curve



Item	Description
1	Control $\Delta p = 9$ to 12 bar
2	Control $\Delta p = 12$ to 14 bar
3	Control $\Delta p = 14$ to 18 bar



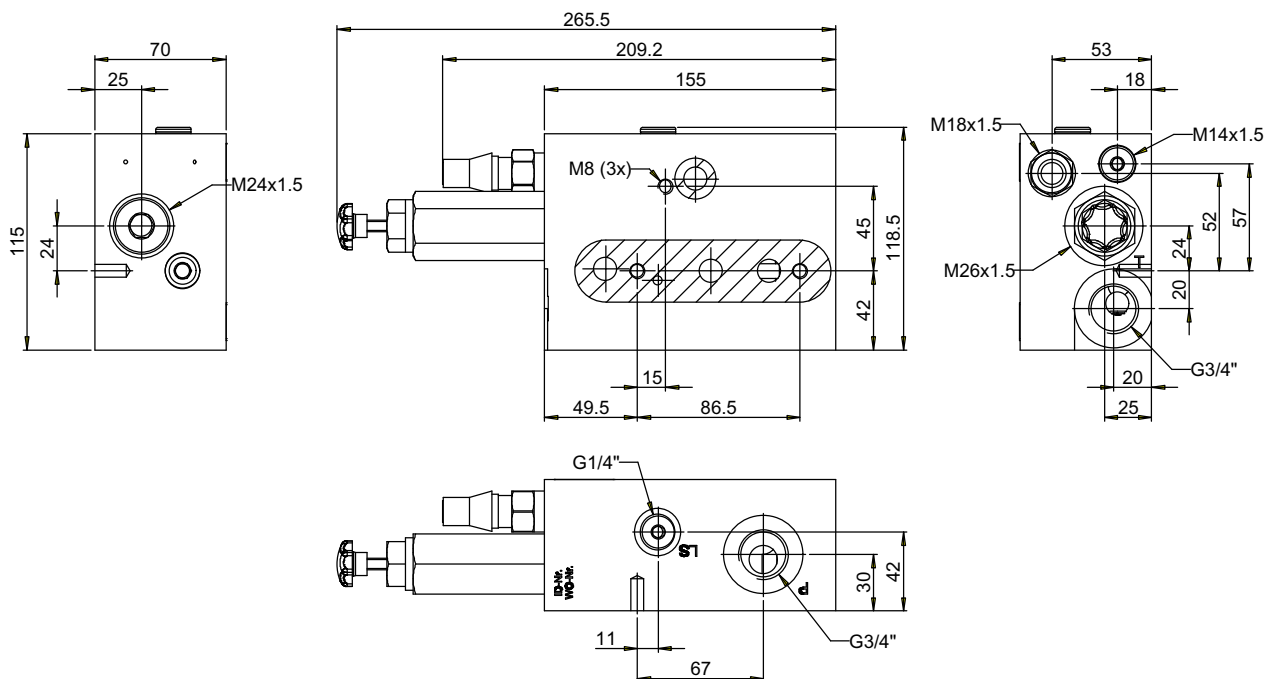
Item	Description
1	$Q \Rightarrow P$
2	$Q \Rightarrow T$

3.4.4 Technical data

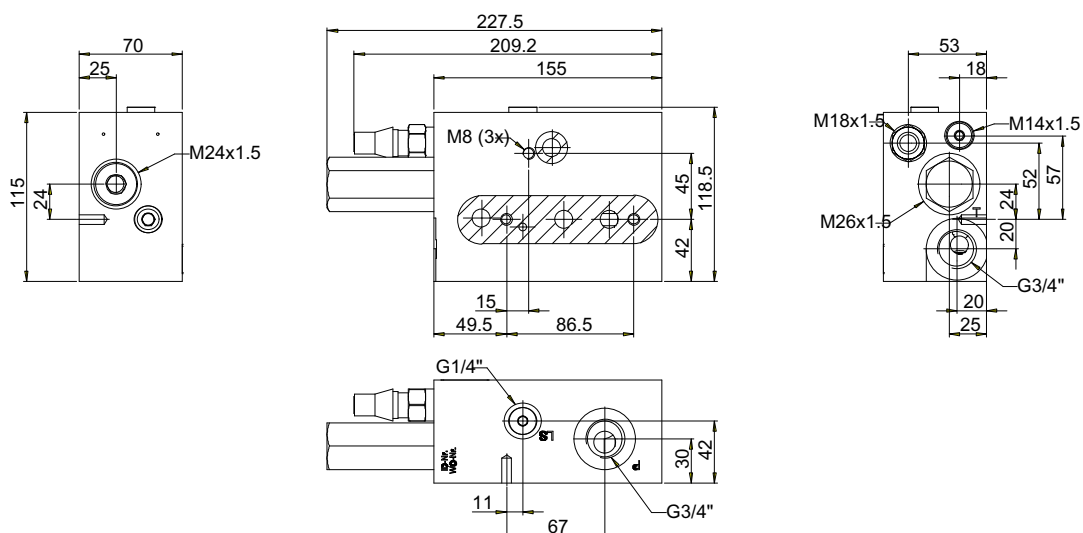
General characteristics	Unit	Description, value
Nominal flow rate	l/min	250
Threaded ports to DIN 3852-2:	P = G 3/4" T = G 3/4" LS = G 1/4"	
LSmax pressure relief valve adjustable:	pressure range: flow rate:	80 - 280 bar max. 20 l/min
Pmax pressure relief valve fixed setting [bar]		
pressure stages: I = 80/ K = 100/ L = 125/ M = 140/ N = 160/ O = 175/ P = 190/ Q = 210/ R = 230/ S = 250/ T = 280		
LS unloading valve 0,4 l/min		

3.4.5 Dimensions

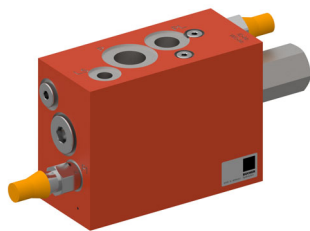
3.4.5.1 Inlet section for constant pump systems, switchable



3.4.5.2 Inlet section for constant pump systems



3.5 Inlet Section for Steering



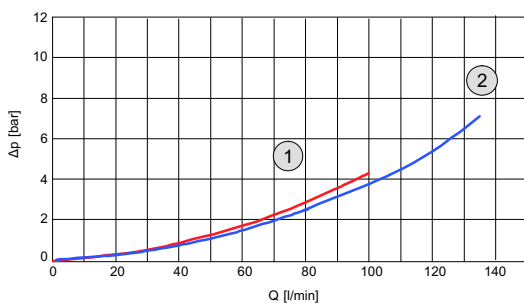
3.5.1 Description

Inlet section with priority pressure compensator, priority pressure relief valve, LSmax pressure relief valve and LS unloading valve.

3.5.2 Overview of the sections

Symbol	Description	Item number
	LCV-CGLXFX-XPXGS • Priority pressure compensator • LS unloading valve • Priority pressure relief valve • LS pressure relief valve	100043850

3.5.3 Characteristic curve

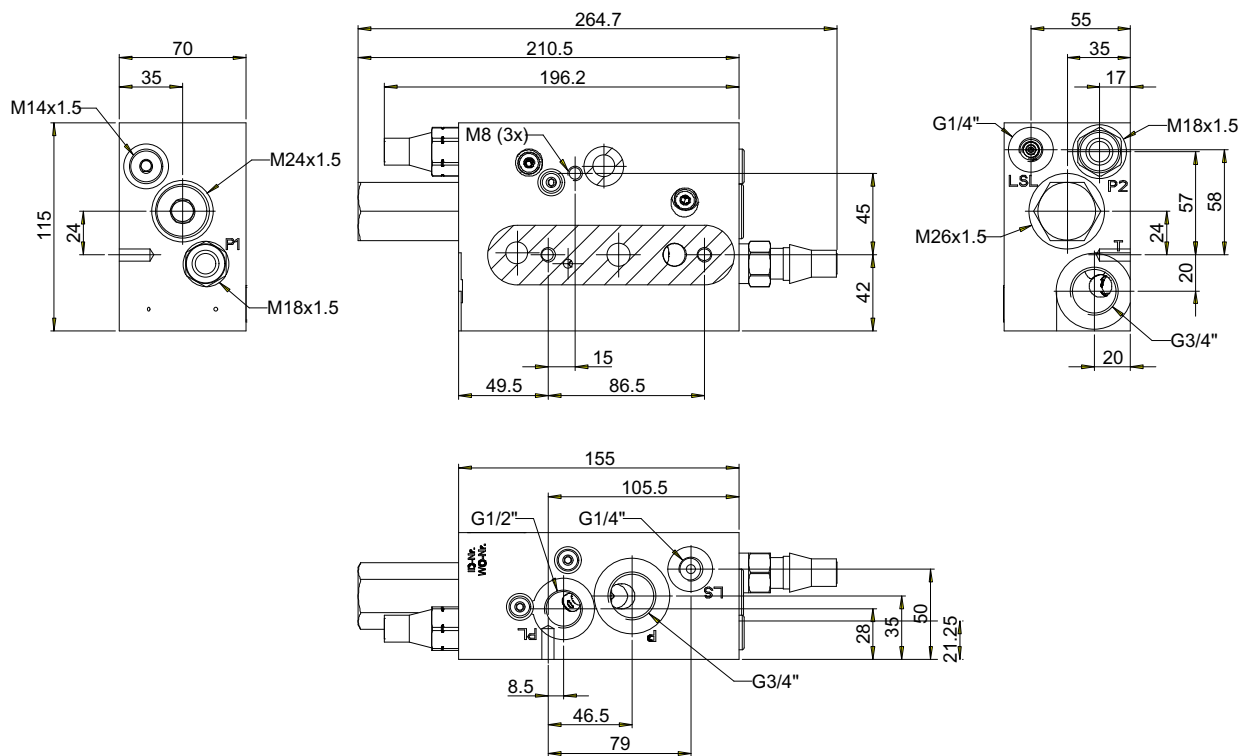


Item	Description
1	$Q \Rightarrow P$
2	$Q \Rightarrow T$

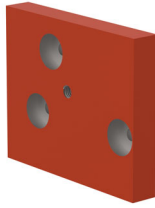
3.5.4 Technical data

General characteristics	Unit	Description, value
Nominal flow rate	l/min	250
Threading ports to DIN 3852-2 P = G 3/4" T = G 3/4" LS = G 1/4"		
LSmax pressure relief valve, adjustable pressure range: 80 - 280 bar flow rate: max. 20 l/min		
Pmax pressure relief valve, fixed setting [bar] pressure stages: I = 80 / K = 100 / L = 125 / M = 140 / N = 160 / O = 175 / P = 190 / Q = 210 / R = 230 / S = 250 / T = 280		
LS unloading valve 0,4 l/min		

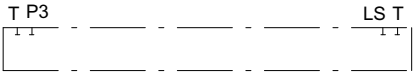
3.5.5 Dimensions



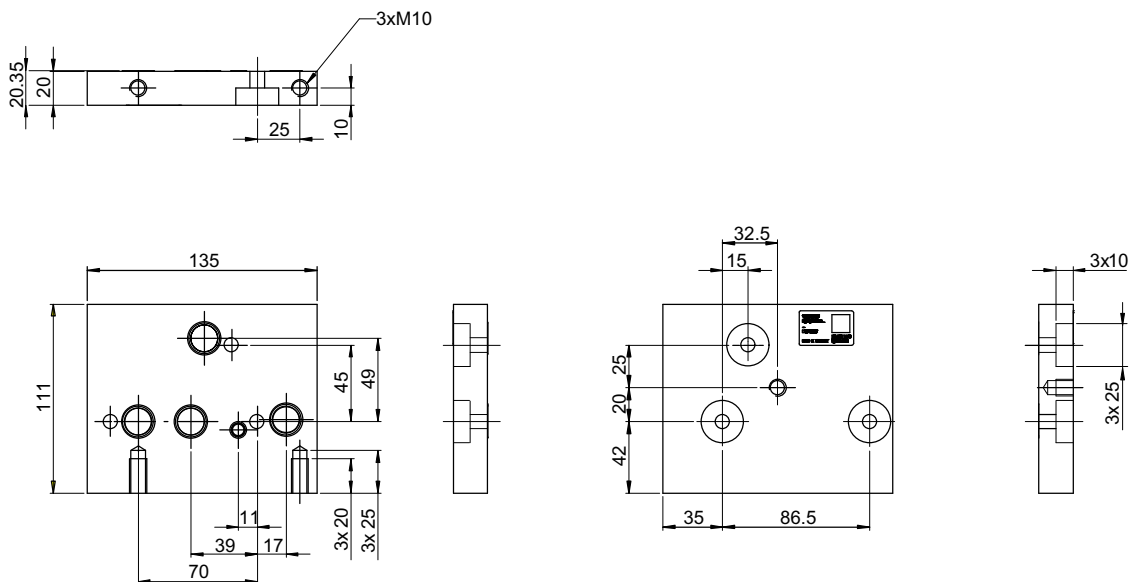
3.6 End Sections



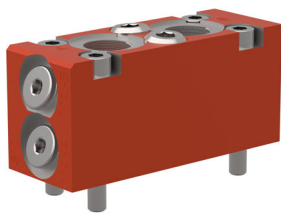
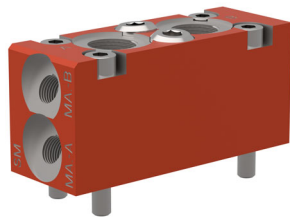
3.6.1 Overview of the sections

Symbol	Description	Item number
	LCV-CTXXXXX-XXDXS • functionless • with D-rings	100043262

3.6.2 Dimensions



3.7 Bolt-on-Top Sections



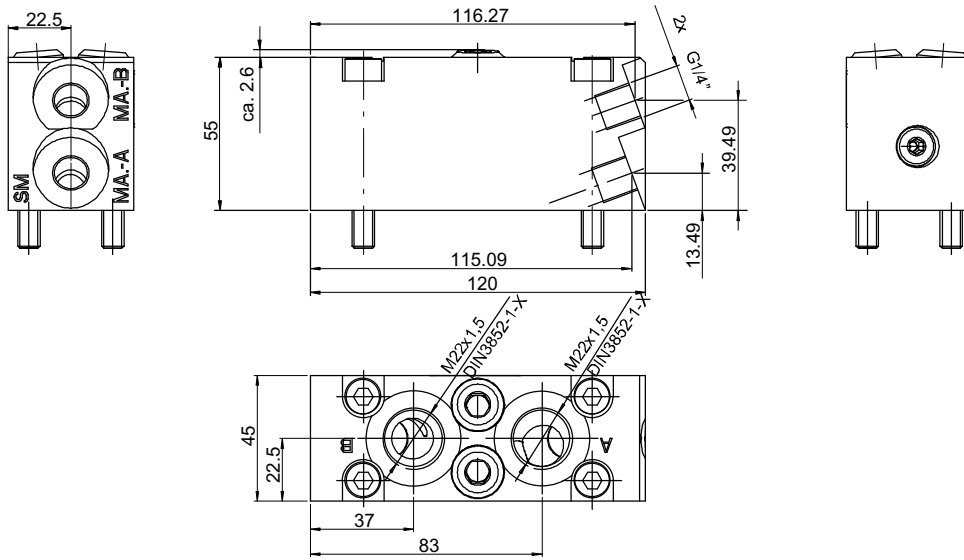
3.7.1 Description

Flange-mounted valves with pressure relief function.

3.7.2 Overview of the sections

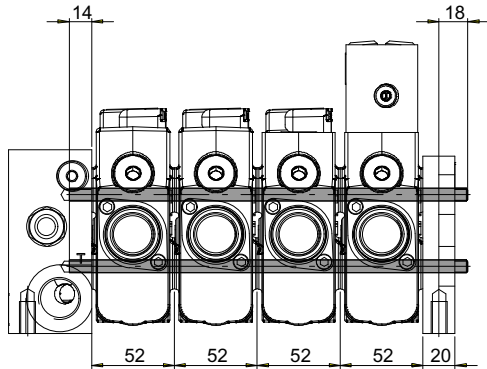
Symbol	Description	Item number
	LCV-TTXXXOO-XXXMS	100043951
	• pressure relief valve in consumer ports A and B, P = 175 bar • measuring ports A and B closed • actuator ports according to ISO 6149-1, thread M22x1,5	
	LCV-TTXXXPP-XXXMS	1000444614
	• pressure relief valve in consumer ports A and B, P = 190 bar • measuring ports A and B open • actuator ports according to ISO 6149-1, thread M22x1,5	
	LCV-TTXXXQQ-XXXMS	100044615
	• pressure relief valve in consumer ports A and B, P = 210 bar • measuring ports A and B open • actuator ports according to ISO 6149-1, thread M22x1,5	
	LCV-TTXXXRR-XXXMS	100043468
	• pressure relief valve in consumer ports A and B, P = 230 bar • measuring ports A and B open • actuator ports according to ISO 6149-1, thread M22x1,5	
	LCV-TTXXXSS-XXXMS	100043617
	• pressure relief valve in consumer ports A and B, P = 250 bar • measuring ports A and B open • actuator ports according to ISO 6149-1, thread M22x1,5	
	LCV-TTXXXTT-XXXMS	100043952
	• pressure relief valve in consumer ports A and B, P = 280 bar • measuring ports A and B closed • consumer ports according to ISO 6149-1, thread M22x1,5	

3.7.3 Dimensions



4 Block Assembly

To assemble the individual valve sections with assured functional reliability, 3 tie rods and hex. nuts are necessary. Maximum tightening torque 19^{+5} Nm, tighten in steps of 6, 12 and 19 Nm.



Calculating the tie rod length:

14 mm + (52 mm x no. of directional control valve sections) + width of the end section + 18 mm

Example:

$14 + (52 \times 4) + 10 + 18 = 250$ mm

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

In our example, we therefore need to order 3x tie rod M10 x 210 mm.

IMPORTANT: A maximum of 8 directional control valve sections can be linked together in one control block

5 Liability

In the design and operation of hydraulic systems, all aspects of the potential failure modes and all planned operational conditions and uses of the equipment have to take into consideration.

Concerning risk assessment, please refer to the relevant Standards. The use of components that are not Original Bucher Replacement Parts and Accessories nullifies all warranty.

6 Note

This catalogue is intended for users with specialist knowledge. The user must check the suitability of the equipment described here 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 concerning the use of these pumps, please consult Bucher Hydraulics.

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www.bucherhydraulics.com

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Classification: 430.300.330.