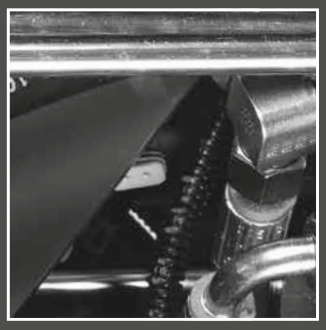
CLAAS
INDUSTRIETECHNIK

Hydraulic Systems

Product Catalogue

Valve Series





CL06

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CLAAS INDUSTRIETECHNIK

At home in every field – system solutions from CLAAS Industrietechnik

CLAAS Industrietechnik is your innovative, reliable partner for the development and supply of hydraulic components and drive technology systems. Our strengths: our 600 employees in Paderborn, Germany develop and produce specific solutions tailored to the needs of customers and industries. Hence you will find our products and systems in agricultural and construction machinery, in municipal service technology and a wide range of special applications. Our customers appreciate the high-level product benefits and top-class technology we offer. As different as the customer-specific applications are our products always share the same strengths: innovation, reliability and quality to meet the highest requirements.

Modular efficiency: hydraulic valves from CLAAS Industrietechnik

High-quality switching and proportional valve technology is one of the core competences of CLAAS Industrietechnik. Our system approach includes the whole range from design and simulation to integration in our customers' applications. Herewith we develop solutions for a wide variety of challenges in hydraulic and electronic system technology.

Our test facilities are used to validate all components and systems thoroughly during the development process. Our switching valves, directional valves, pressure and flow control valves are used as basic components. At the start of a development project, our engineers try to get a complete understanding of the application together with our customers. After this, they develop individual solutions on the basis of our modular philosophy. The wide range of combination options available with the basic elements of our modular mobile hydraulic system is adapted to your application in a technically and economically efficient way. With it we offer a holistic project handling for all hydraulic tasks.

Combination of hydraulics and electronics

Solving complex control tasks demands a close interaction of hydraulics and electronics. The combination of the modular mobile hydraulic system and our electronic control systems developed and tested in our own company provides the basis for customized solutions that are precisely tailored to your needs.

Overview of valve series CL06

The valve series CL06 is designed for use in mobile machines. Used in an open circuit, these valves ensure the smooth control of hydraulic loads, such as engines and cylinders. This valve series can be used with all pump systems:

- Fixed displacement pump
- Variable displacement pump
- Load-sensing pump

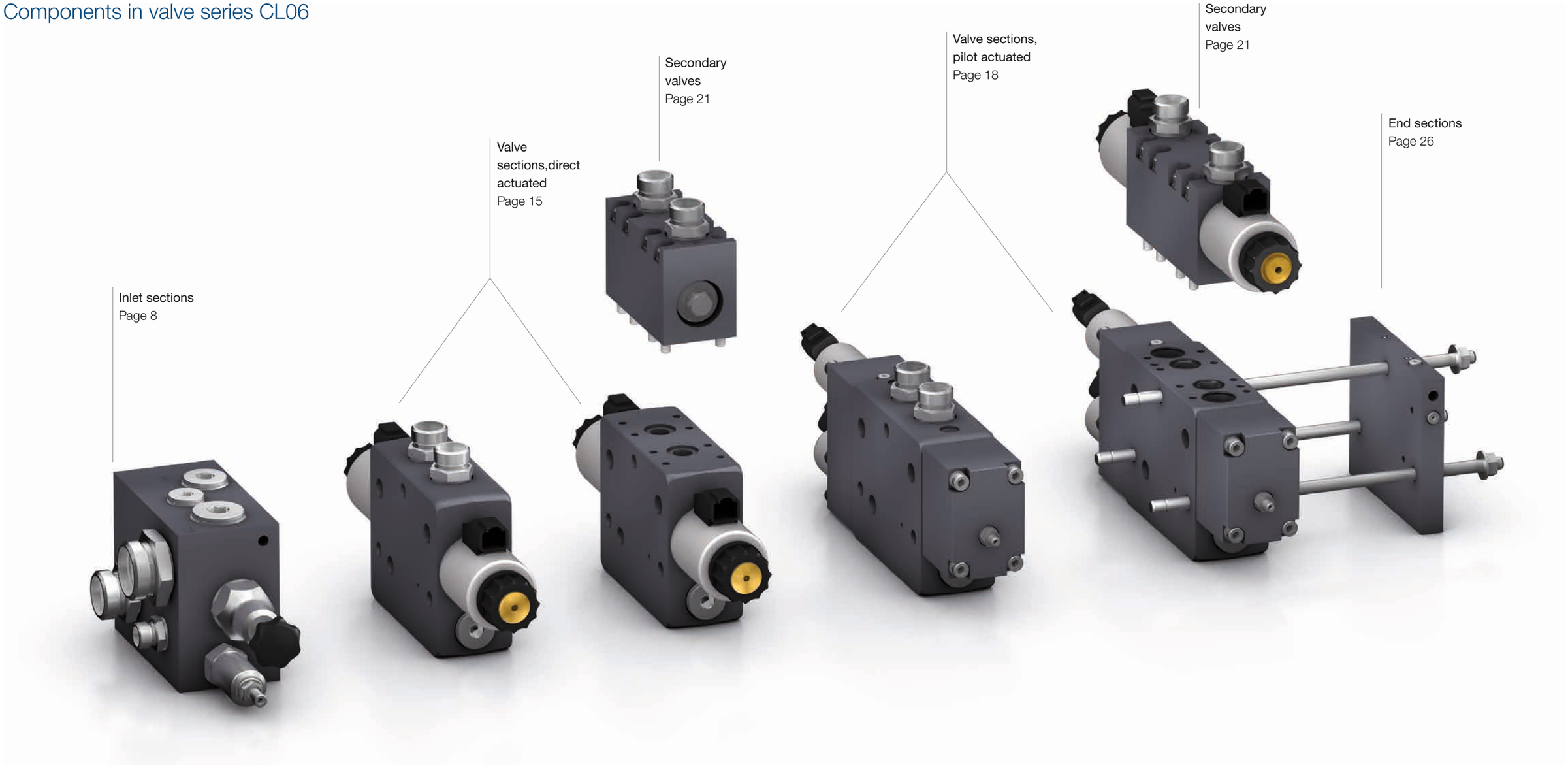
The modular design of the valve series permits a wide range of flexible combinations to meet your requirements. Each valve block has the following structure:

- Inlet section
- Valve sections
- Flange-mounted secondary valves
- End section

As well as accomodating P (pump) -, T (tank)- and LS (load-sensing) -line from the hydraulic system, the inlet section is also used for adaptation to the relevant hydraulic system.

The valve sctions are designed as load-sensing directional spool valve. Standardised flanges enable various secondary valves to be mounted on top. The end section completes the valve block, while also offering other standard functions, such as the forwarding of P, T and LS.

Components in valve series CL06



General technical data

Installation position	Preferably horizontal, other installation positions on request
Ambient temperature	–25° C to +50° C
Input volume flow, max.	140 l/min
Volume at a valve section	90 l/min
Inlet operating pressure, max.	350 bar
Load operating pressure, max.	400 bar
Tank operating pressure, max.	30 bar (210 bar pressure-resistant < 30 min)
Oil temperature	-25 °C to +80 °C
Oil viscosity	10 cSt to 500 cSt

Optimum operating viscosity	35 cSt
Permissible oil types	Mineral oil HL, HLP, HVLP according to DIN 51524, other liquids on request
Oil cleanliness	ISO 4406: 21/18/14, NAS 1638: Class 9
Seals	NBR; others on request
Max. number of sections, that can be flange-mounted	8 per side
Corrosion protection	Painted Primer + Top coat 30 µm Galvanized: Coating thickness 8 µm

Inlet sections

Each valve block starts with an inlet section where the P, T and LS system ports are located to supply the valve block.
Together with the end section, the inlet section fastens the entire valve block. The system ports are on one side of the inlet section, while up to eight sectional valves can be flange-mounted on the other side.
Valve sections can be attached on both sides in the case of the “Priority” inlet section.

The following inlet sections are available:

- Standard inlet sections
- Inlet section with pressure relief valve
- Open-centre inlet section for fixed displacement pump
- Closed-centre inlet section for variable displacement pump
- Priority inlet section

Customized inlet sections are available on request.

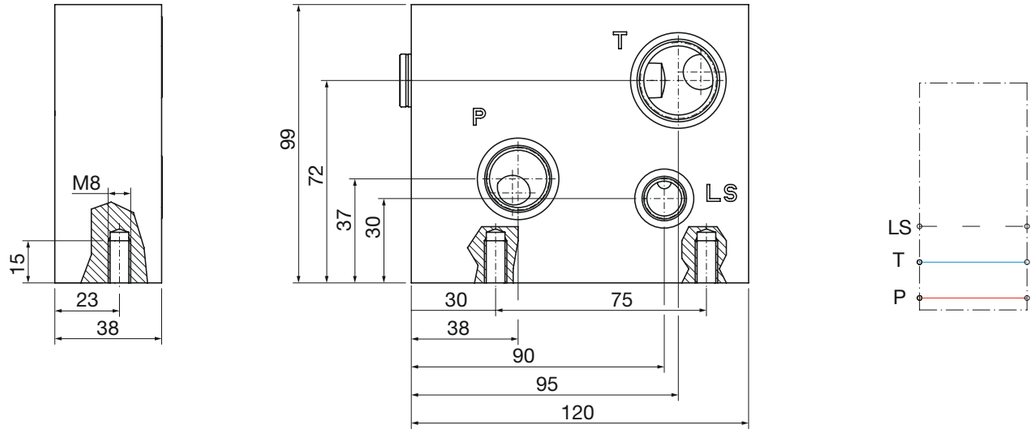
General technical data

Operating pressure, max.	350 bar
Port threads	according to DIN ISO 6149-1 P: M22 x 1,5 T: M27 x 2 LS: M14 x 1,5 M: M14 x 1,5

Standard inlet section

- For standard applications
- P, T and LS connections for supplying the valve block on the front

Dimensional drawing and circuit diagram



Order code

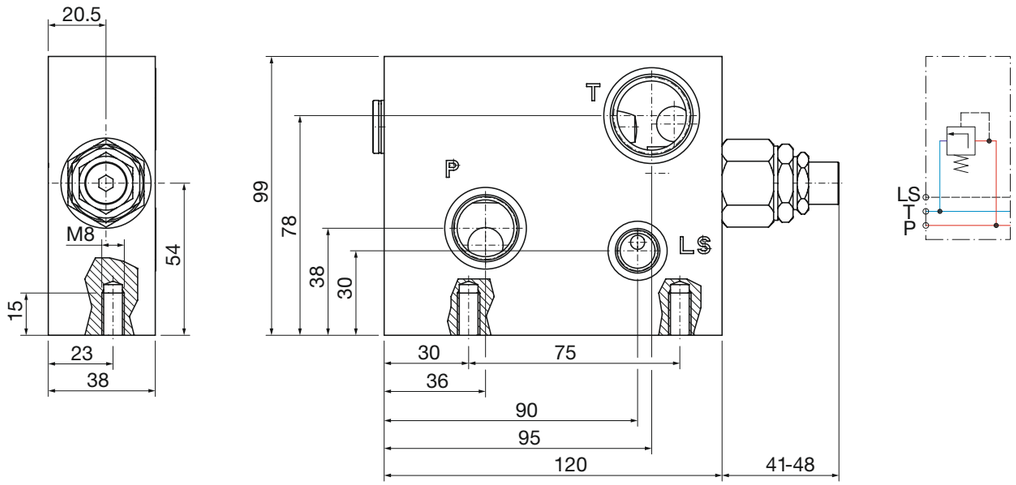
EB06 - S - 000 - 000

Series	EB06
Standard	S

Inlet section with pressure relief valve

- With pressure relief valve
- Additional protection for the following components
- P, T and LS ports on the front for supplying the valve block

Dimensional drawing and circuit diagram



Order code

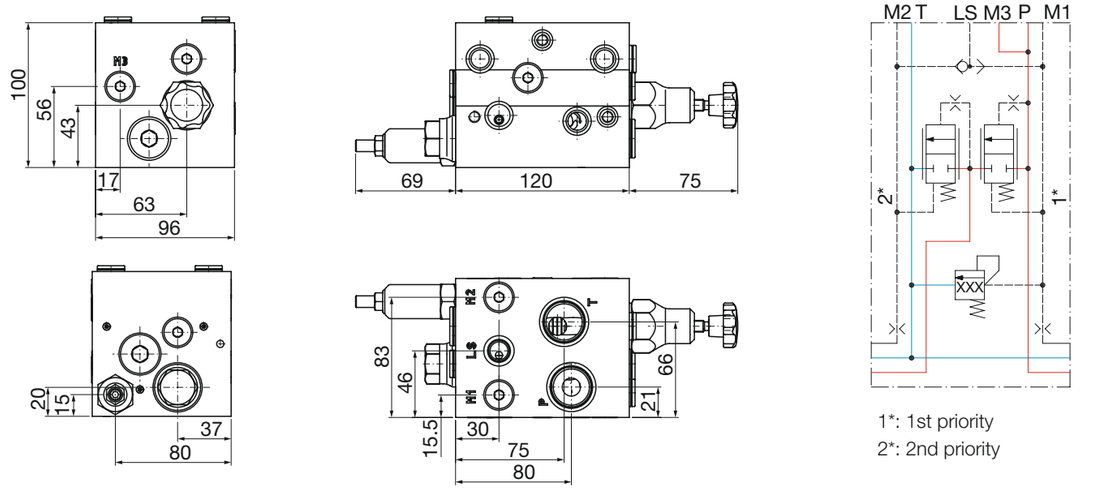
EB06 - S - 000 - ☐

Series	EB06
Preset pressure of the relief valve up to 250 bar, e.g. 220 bar → 220	☐

Priority inlet section

- Priority function for one side; in cases of undersupply (pump flow rate < required flow rate) the priority side is supplied first
- CL06 valve sections can be flange-mounted on both sides
- Also possible: protection with LS pressure relief valve
- P port: M27x2

Dimensional drawing and circuit diagram



1*: 1st priority
2*: 2nd priority

Order code

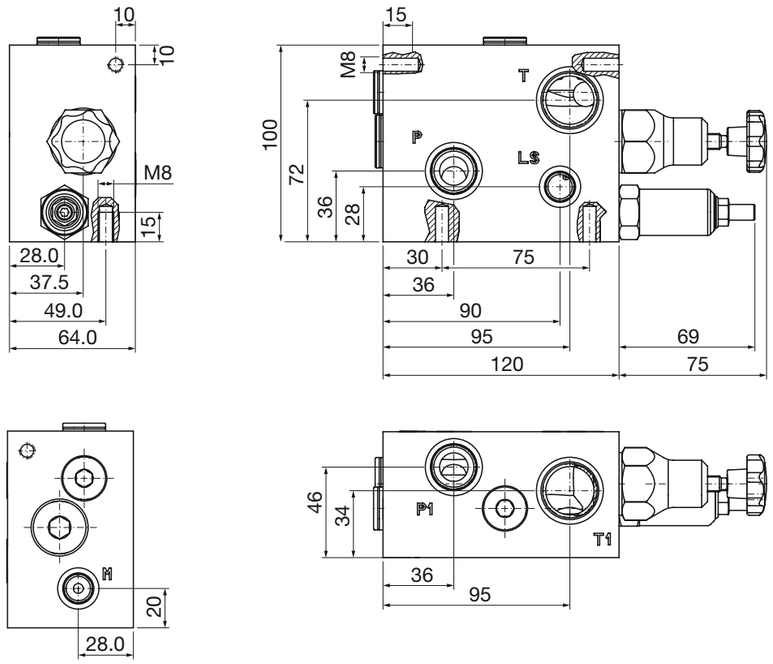
EB06 - PR - 000 - ☐

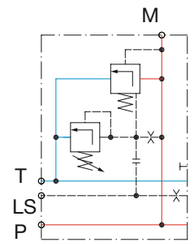
Series		EB06
Priority section		PR
Pressure relief valve	no pressure relief valve	000
	with pressure relief valve:	
	Preset pressure of the pressure relief valve, up to 250 bar, e.g. 220 bar → 220	☐

Open-centre / closed-centre inlet section

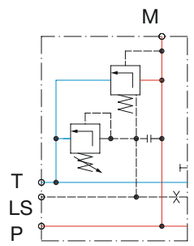
- Open-centre inlet section for use with fixed displacement pump
- Closed-centre inlet section for use with variable displacement pump
- Pressure compensator for circulation control and for load-independent flow control
- The pressure compensator is fixed at 11 bar, optional as adjustable version with blocking function
- P, T and LS ports on the front for supplying the valve block

Dimensional drawing and circuit diagram





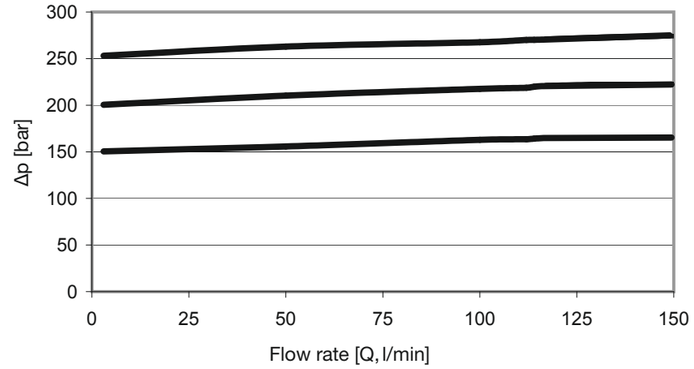
Closed-Centre



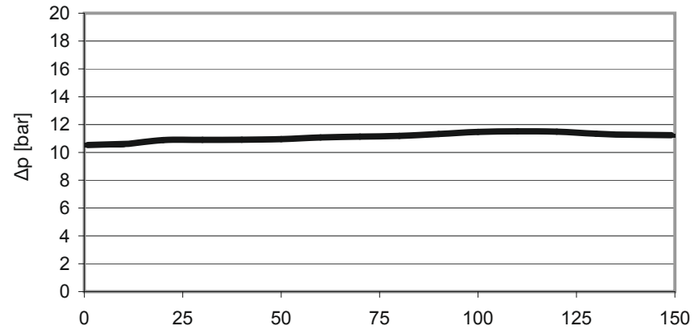
Open-Centre

Characteristic curves

Behaviour of the pressure relief valve depending on the inlet flow rate:



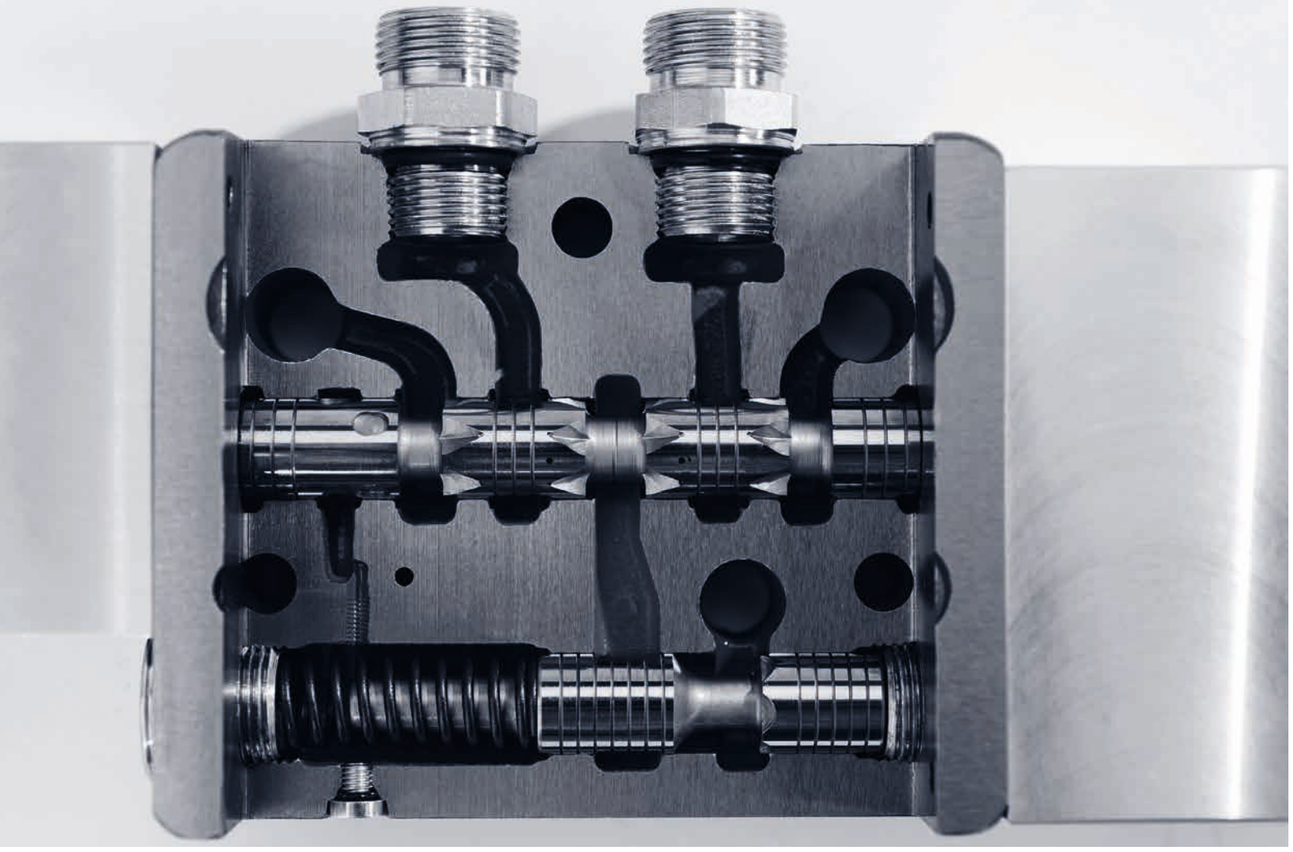
Behaviour of the pressure compensator, depending on the inlet flow rate:



Order code

EB06 - ☐ - ☐ - ☐

Series		EB06
Hydraulic system	Open-Centre OC	OC
	Closed-Centre CC	CC
Pressure compensator	Fixed, control pressure differential 11 bar	DW1
	Adjustable	DW2
Pressure relief valve	no pressure relief valve	000
	with pressure relief valve:	
	Preset pressure of the pressure relief valve, up to 250 bar, e.g. 220 bar → 220	



Valve sections

The valve sections are the core of a valve block. They are designed in a way that several primary functions are accommodated in the same housing in front of the spool valve. The shuttle valve for the LS chain is located between two mounted valve sections.
For additional functions secondary valves can be flanged on.

The following valve sections are available:

- direct actuated
- pilot actuated

Valve section, direct actuated

- Switching or proportional
- Switching solenoid or proportional solenoid with manual override. This ensures the operation of the valve section, even if the electrical control fails.

Technical data

Series	Directional spool valve	
Direction of flow	P → A / B →T; P → B / A →T	
Centre position	open; closed	
Max. operating pressure	pump side	350 bar
	load side	400 bar
Working ports A, B	M18 x 1,5 according to DIN ISO 6149-1	
Spool size	10, 15, 20, 25, 30, 35, 40 l/min (switching 60 l/min)	
Hysteresis	± 10 %, based on nominal value with proportional actuation	
Control pressure differential	min. 7–8 bar	
Internal leakage	< 60 cm^3/min at a load pressure of 100 bar (HLP46 at 40° C)	
Nominal current		
Power supply 12 V	10–40 l/min	0 … 1,9 A
Power supply 24 V	10–40 l/min	0 … 0,95 A
Nominal power consumption	34 W	
Nominal voltage	12/24 V DC	
Protection class	IP 65	
Connector type	DIN 43650 DT04-2P-EP04 AMP-Junior-Timer	
Duty cycle	100 %	
PWM frequency	100 … 150 Hz; recommended 130 Hz	

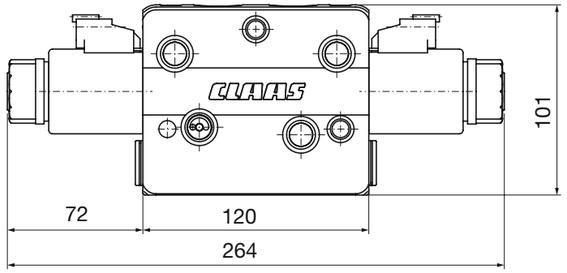
Nominal flow rate

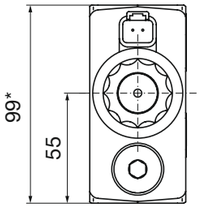
The flow rate at working ports A and B can be set in the factory in increments of 20 % of the nominal volumetric flow. This means, for example, that different cylinder movement speeds can be achieved.

Tolerance of the nominal flow rate

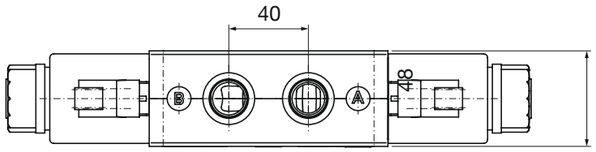
Nominal flow rate	Tolerance
10 l/min	± 2 l/min
15 l/min	± 2,5 l/min
20 l/min	± 3 l/min
25 l/min	± 3,5 l/min
30 l/min	± 4 l/min
35 l/min	± 4 l/min
40 l/min	± 4 l/min

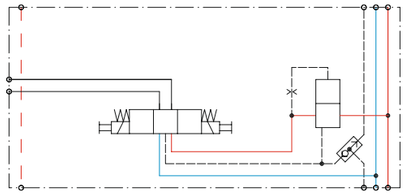
Dimensional drawing and circuit diagram





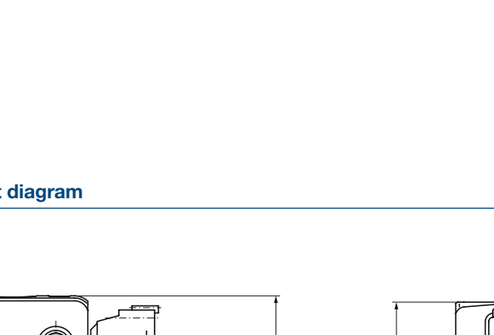
*: with secondary valve





Characteristic curves

Characteristic curve for flow rate at 12 V:



Pressure loss A/B -> T:

Order code

CL06 - EM - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

Series		CL06
Control	Electromagnetic	EM
Actuation	Switching, SW	1
	Proportional	2
Spool type		43A
		43C
		43D
		33E
		33F
		42G
		42H
		32I
		32J
Nominal flow rate	Nominal flow rate for sides A and B (e.g. side A 12 l/min and side B 20 l/min → 1220)	
Primary function	No primary function	–
	Check valve	RV
	Pressure compensator	DW
Connector type	DIN 43650	DIN
	DT04-2P-EP04	DT
	AMP-Junior-Timer	AMP
Nominal voltage	12 V	12
	24 V	24
Secondary valve	-	–
	Order code for secondary valve, see components of secondary valves	

Valve section, pilot actuated

- Electrohydraulically pilot actuated valve section
- Proportional design

Technical data

Series	Directional spool valve	
Direction of flow	P → A / B →T; P → B / A →T	
Centre position	open; closed	
Max. operating pressure	pump side	350 bar
	load side	400 bar
Working ports A, B	M18x1,5 according to ISO 6149-1	
Spool size	20, 30, 40, 50, 60 l/min	
Hysteresis	± 5 %, based on nominal value	
Control pressure differential	min. 7–8 bar	
Internal leakage	< 60 cm^3/min at a load pressure of 100 bar (HLP46 at 40° C)	
Nominal current		
Power supply 12 V	0 … 1,5 A	
Power supply 24 V	0 … 0,8 A	
Nominal power consumption	18 W	
Nominal voltage	12/24 V DC	
Protection class	IP 65	
Connector type	DT04-2P-EP04 AMP-Junior-Timer	
Duty cycle	100 %	
PWM frequency	100 … 150 Hz; recommended 130 Hz	

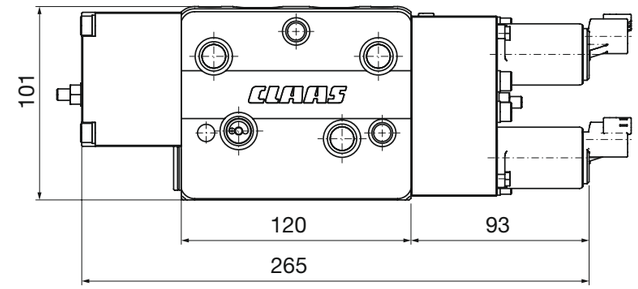
Nominal flow rate

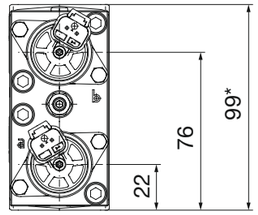
The flow rate at working ports A and B can be continously set in the factory. This means, for example, that different cylinder movement speeds can be achieved.

Tolerance of the nominal flow rate

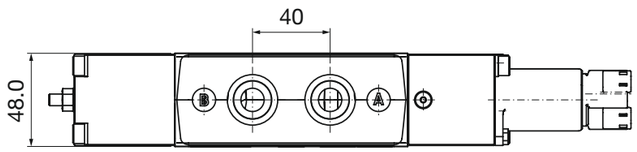
Nominal flow rate	Tolerance
20 l/min	± 2 l/min
30 l/min	± 3 l/min
40 l/min	± 4 l/min
50 l/min	± 4,5 l/min
60 l/min	± 5 l/min

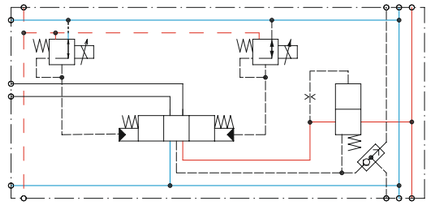
Dimensional drawing and circuit diagram





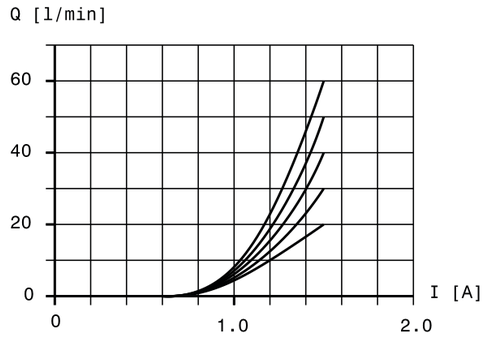
*: with secondary valve



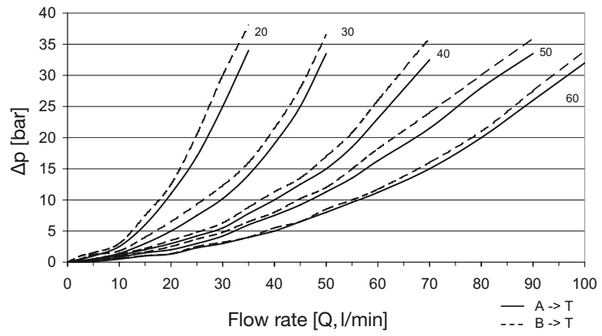


Characteristic curves

Characteristic curve for flow rate at 12 V:

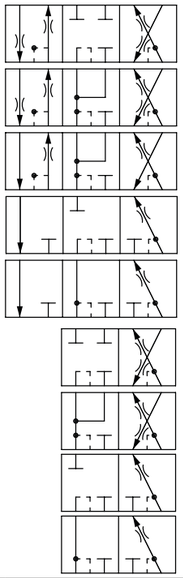


Pressure loss A/B -> T:



Order code

CL06 - EH - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

Series		CL06
Control	Electrohydraulic, proportional	EH
Spool type		43A
		43C
		43D
		33E
		33F
		42G
		42H
		32I
		32J
Nominal flow rate	Nominal flow rate for sides A and B (e.g. side A 35 l/min and side B 40 l/min → 3540)	
Primary function	No primary function	–
	Check valve	RV
	Pressure compensator	DW
Connector type	DT04-2P-EP04	DT
	AMP-Junior-Timer	AMP
Nominal voltage	12 V	12
	24 V	24
Secondary valve	-	–
	For order codes for secondary valve see secondary valve components	

Secondary valves

With secondary valves additional functions can be added.
They are flange-mounted on the top of the valve section.
They can be replaced easily.

The following secondary valves are available:

- Check valve
- Counterbalance valve
- Blocking valve
- Shock/anti-cavitation valve

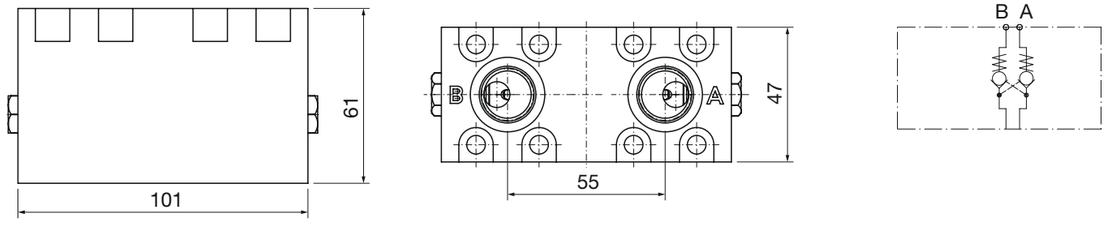
Check valve

- Hydraulically actuated
- For an oil-tight seal on the load side
- One-sided or two-sided versions
- Also used together with shock/anti-cavitation valves SNV

Technical data

Max. operating pressure	350 bar
Port threads	M18 x 1,5; DIN ISO 6149-1
Variant 1 / Standard	
Nominal flow rate	40 l/min
Pilot ratio	3,5:1
Pressure drop	4 bar at 40 l/min
Variant 2	
Nominal flow rate	60 l/min
Pilot ratio	2,7:1
Pressure drop	6 bar at 60 l/min 2,5 bar at 40 l/min

Dimensional drawing and circuit diagram

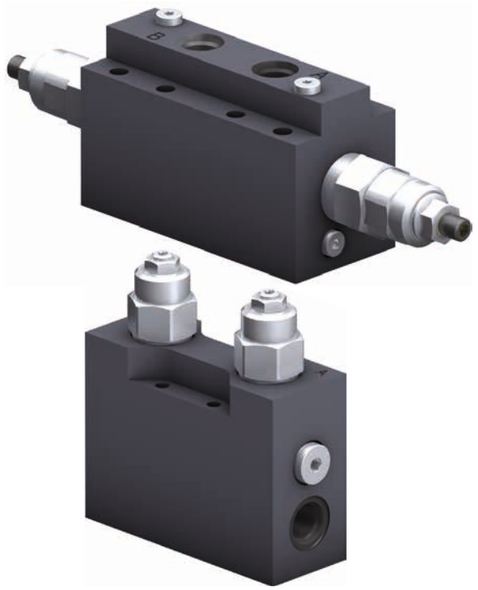


Order code

RV - ___ - ___ - ___ - ___

Side A	No check valve	0
	Variant 1	1
	Variant 2	2
Side B	No check valve	0
	Variant 1	1
	Variant 2	2
Shock/anti-cavitation valve, side A	None	000
	Anti-cavitation only	NAS
	Shock/anti-cavitation, preset pressure in bar (standard 240 bar)	
Shock/anti-cavitation valve, side B	None	000
	Anti-cavitation only	NAS
	Shock/anti-cavitation, preset pressure in bar (standard 240 bar)	

Counterbalance valve



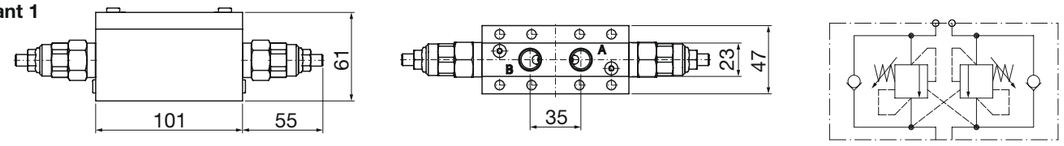
- Controls the movement of loads by regulating the flow rate to and from the actuator
- Mainly used to lower over-running loads
- Secure load-holding, setting of the pressure relief valve to 1.3 times the max. load pressure
- One-sided and two-sided versions

Technical data

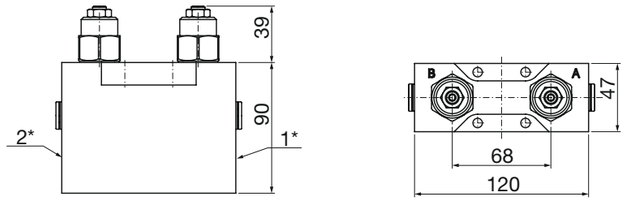
Max. operating pressure	350 bar (max. 270 bar load pressure)
Variant 1 / Standard	
Port threads	M14 x 1,5; DIN ISO 6149-1
Ports	on top
Nominal flow rate	30 l/min
Pilot ratio	4:1
Pressure drop	7 bar at 20 l/min
Variant 2	
Port threads	M22 x 1,5; DIN ISO 6149-1
Ports	on the side
Nominal flow rate	120 l/min
Pilot ratio	4,5:1
Pressure drop	7 bar at 60 l/min

Dimensional drawing and circuit diagram

Variant 1



Variant 2



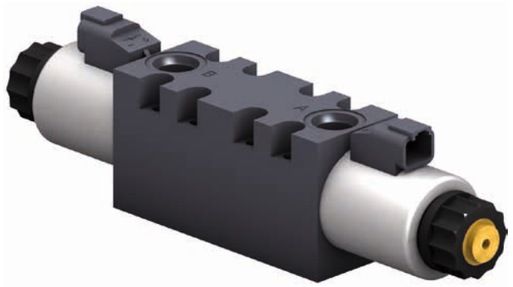
1*: Port A
2*: Port B

Order code

SBV - ___ - ___ - ___ - ___

Side A	None	000
	Pilot ratio 4:1; Variant 1	S41
	Pilot ratio 4,5:1, Variant 2	S45
Side B	None	000
	Pilot ratio 4:1; Variant 1	S41
	Pilot ratio 4,5:1, Variant 2	S45
Side A	Preset pressure, up to 350 bar, e.g. 220 bar → 220	
Side B	Preset pressure, up to 350 bar, e.g. 220 bar → 220	

Blocking valve

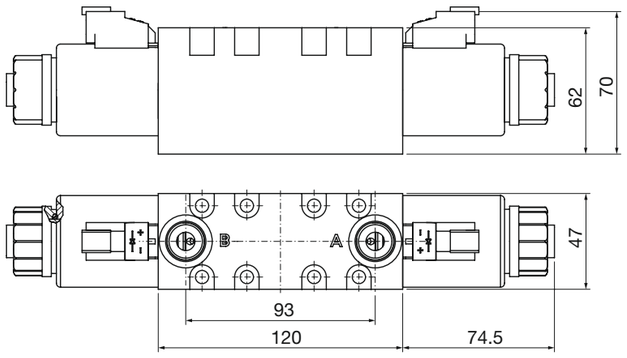


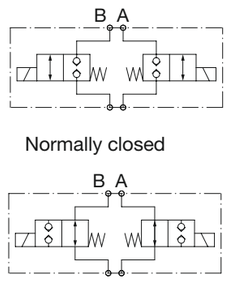
- Electrically actuated
- For an oil-tight seal on the load side
- Without current open or closed
- Also used together with shock/anti-cavitation valves SNV

Technical data

Max. operating pressure	350 bar
Port threads	M18x1,5; DIN ISO 6149-1
Nominal flow rate	50 l/min
Pressure drop (closed)	7 bar at 25 l/min 18 bar at 40 l/min
Pressure drop (open)	5 bar at 25 l/min 12 bar at 40 l/min

Dimensional drawing and circuit diagram





Normally closed

Normally open

Order code

SV - ☐ - ☐ - ☐ - ☐ - ☐ - ☐

Side A	None	0
	Normally closed	1
	Normally open	2
Side B	None	0
	Normally closed	1
	Normally open	2
Shock/anti-cavitation valve, Side A	None	000
	Anti-cavitation only	NAS
	Shock/anti-cavitation, preset pressure in bar (standard 240 bar)	
Shock/anti-cavitation valve, Side B	None	000
	Anti-cavitation only	NAS
	Shock/anti-cavitation, preset pressure in bar (standard 240 bar)	
Connector type	DIN 43650	DIN
	DT04-2P-EP04	DT
	AMP-Junior-Timer	AMP
Nominal voltage	12 V	12
	24 V	24

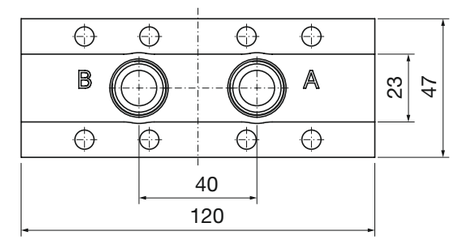
Shock/anti-cavitation valve

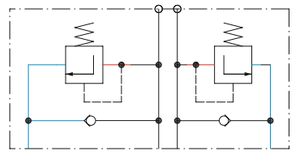
- Protects actuator from pressures peaks
- Suction function prevents cavitation
- One-sided and two-sided versions
- Also used together with check valves and blocking valves (the shock/anti-cavitation valve is integrated in the secondary valve housing of the check valve or blocking valve)

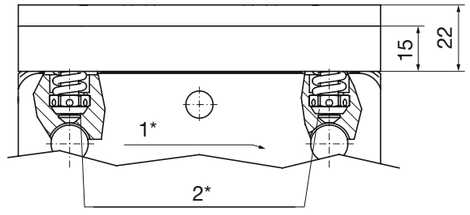
Technical data

Max. operating pressure	380 bar
Port threads	M18x1,5; DIN ISO 6149-1
Nominal flow rate	60 l/min
Pressure drop	5 bar at 40 l/min

Dimensional drawing and circuit diagram





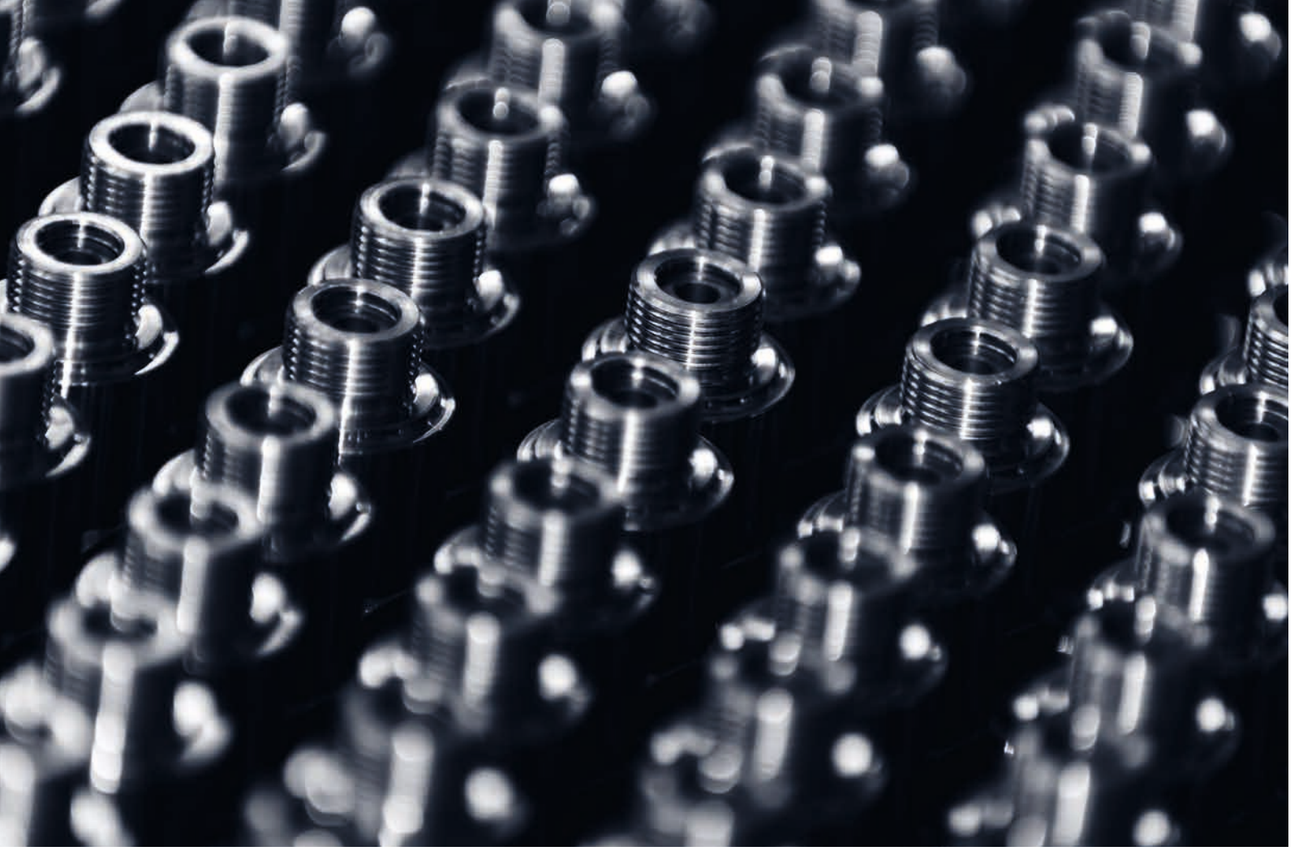


1*: Valve housing
2*: Integrated shock/anti-cavitation valve

Order code

SNV - ☐ - ☐

Shock/anti-cavitation, Side A	None	000
	Anti-cavitation only	NAS
	Shock/anti-cavitation, preset pressure in bar (standard 240 bar)	
Shock/anti-cavitation, Side B	None	000
	Anti-cavitation only	NAS
	Shock/anti-cavitation, preset pressure in bar (standard 240 bar)	



End sections

Together with the inlet section the end section fastens the valve block. Inlet and end section are used for mounting the valve block.

The following end sections are available:

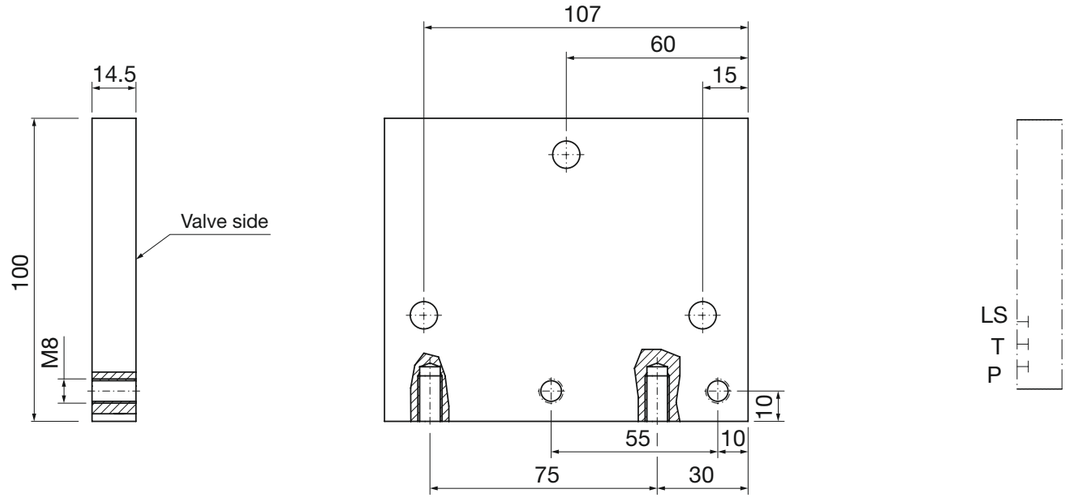
- Standard
- LS pressure relief
- External ports

Standard end section

- For standard applications

Note: LS pressure relief must be provided at an other location in the system

Dimensional drawing and circuit diagram



Order code

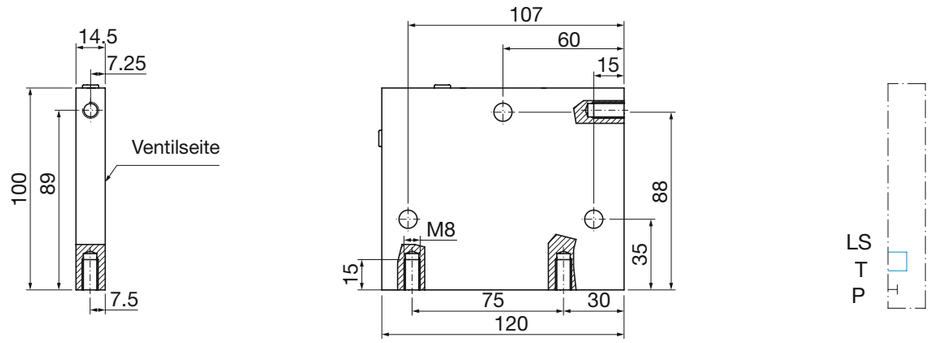
	EP06 - S
Series	EP06
Standard	S

End section with LS pressure relief

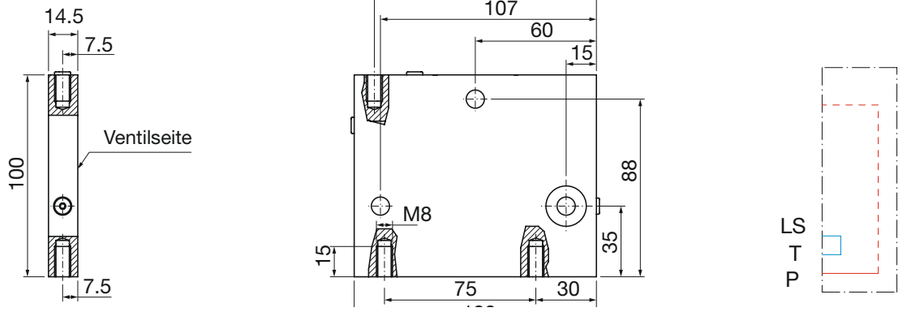
- LS pressure relief, direct actuated LS1
- LS pressure relief, pilot actuated LS2

Dimensional drawing and circuit diagram

Variant LS1



Variant LS2



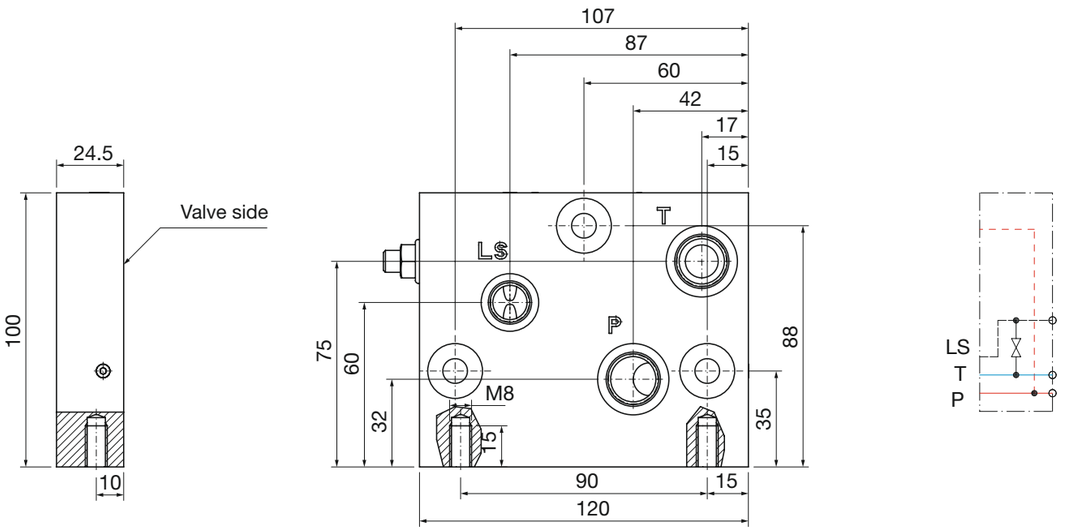
Order code

		EP06 - ☐
Series		EP06
LS pressure relief	direct actuated	LS1
	pilot actuated	LS2

End section with external ports

- LS pressure relief
- Additional ports
  P (M18x1,5), T (M18x1,5) und LS (M14x1,5)

Dimensional drawing and circuit diagram



Order code

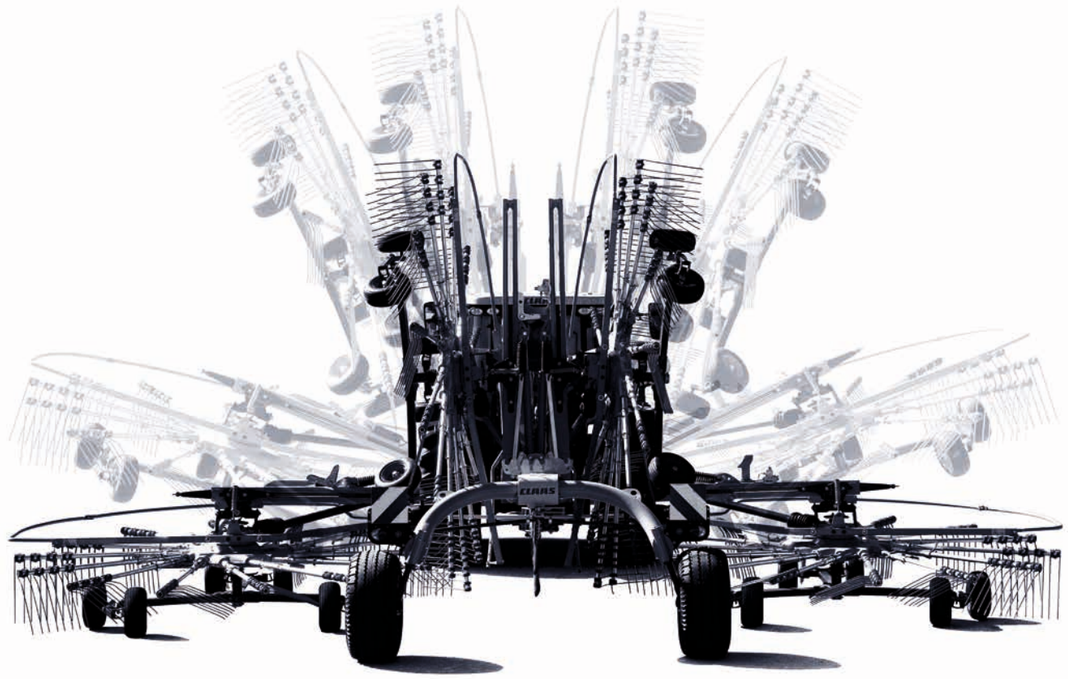
		EP06 - W
Series		EP06
External ports		W

Modular mobile hydraulic system – individual control block

The modular mobile hydraulic system is characterised by the combination of different valve series in a single valve block:

- CL06 proportional valves
- CL04 und CL02 directional cartridge valves
- ND50 low pressure valves

The valve sections are flanged on a central inlet block, e.g. CL06 on the left side and CL04 on the right side. Special adapter sections also enable various valve series to be connected together directly.
The possibility of connecting individual valve sections means that all customer-specific functions can be realized in just one valve block.



Up to 8 valve sections from one series or if combined with special adaptors from different series can be flanged together.

Up to 8 valve sections from one series or if combined with special adaptors from different series can be flanged together.

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