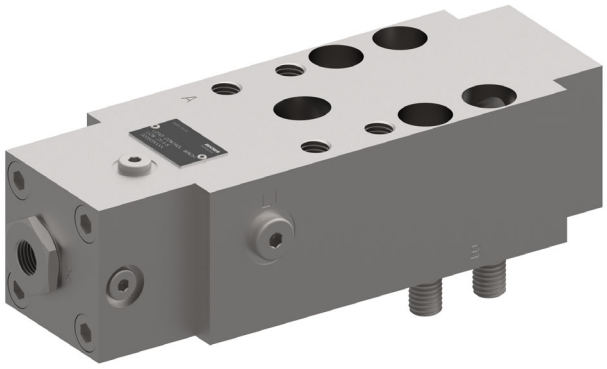
Load-Control Valve for Winches SAE 1¼“ - 6000 psi Flange

Q_{max} = 500 l/min [130 gpm], p_{max} = 420 bar [6000 psi]
leak-free, two-stage hydraulic, SAE-flange design
Series LCW 25-A-S...



- Energy-efficient and vibration-free lowering of loads
- Integrated pilot pressure bypass valve for a smooth start without pressure peaks
- Reduced pilot pressure
- Responsive characteristics over the entire speed range
- Guaranteed closing force for the load-control assembly → reliable shut-off even with a broken spring
- Simple optimization possibilities during acceptance test thanks to modular design
- Symmetrical system (A port at top)
- Satisfies exacting demands on corrosion protection thanks to zinc-nickel coating

1 Description

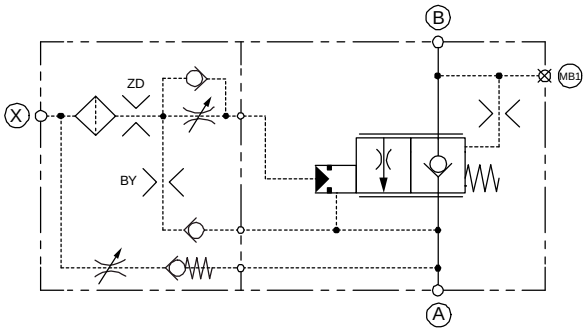
Hydraulic winch drives are used to lift and lower loads. The Load-Control Valves for Winches, series LCW, are ideally suited for oscillation-prone applications, they include, for example, main and auxiliary winches of mobile cranes and are distinguished by their extremely good responsiveness. Damped control of the valve ensures vibration-free operation. Other advantages are in particular the reduced pilot pressure and the integrated pilot pressure bypass valve.
Thanks to different options, the series can be extended and adapted to the requirements of the system. The load-control valve for winches is factory-set with the customer-specific system parameters, thus no adjustments have to be done by the customer (plug and run solution). The LCW has a very compact design and can be mounted directly on the winch drive. This series is perfect for use in high-pressure applications up to 420 bar (6000 psi).
All external parts are zinc-nickel plated according to DIN EN ISO 19598, and are thus suitable for use in corrosive operating environments for use in corrosive operating environments.

2 Symbol

2.1 SAE-flange design-variants

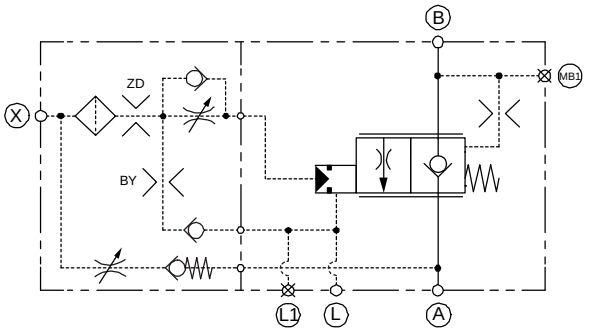
Variant A

Dependent on return-line pressure
(pressure in A is additive to opening pilot pressure).



Variant L

Independent of return-line pressure
(drain line is required).



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3 Technical data

General characteristics		Description, value, unit	
Designation		load-control valve for winches	
Design		leak-free, two-stage hydraulic, SAE-flange design	
Size		SAE 1¼", 6000 psi	
Mounting method		flange mounting (4x hex. socket-head cap screws M14x45 DIN EN ISO 4762, – grade 12.9)	
Supply port	A	SAE 1¼“, 6000 psi	ISO 6162-2 DN32 M14 (SAE J518 Code 62-20, M14x2)
Actuator port	B	SAE 1¼“, 6000 psi	ISO 6162-2 DN32 M14 (SAE J518 Code 62-20, M14x2)
Pilot port	X	G ⅜“	ISO 1179-1
Drain ports	L, L1	G ¼“	ISO 1179-1
Test port	MB1	G ¼“	ISO 1179-1
Weight		approx. 9.60 kg	(approx. 21.20 lbs.)
Mounting attitude		unrestricted	
Ambient temperature range		-25 °C … +100 °C (others on application)	[-13 °F … +212 °F]
Surface corrosion protection		zinc-nickel coating Mounting screws zinc-flake coated (e.g. with Geomet® finish)	

Hydraulic characteristics	Description, value, unit	
Maximum operating pressure	420 bar	(6000 psi)
Maximum pressure at the supply- or return port A	420 bar	(6000 psi)
Maximum pressure at the actuator- / load port B	420 bar	(6000 psi)
Maximum pressure at the pilot port X	420 bar	(6000 psi)
Maximum pressure at the drain port L	50 bar	(700 psi)
Maximum flow rate	500 l/min	(130 gpm)
Flow direction	A → B, free flow through check valve function B → A, controllable cross-section	
Type of operation	hydraulic proportional	
Opening pilot ratio	136:1	
Preload bypass pressure (CV-preload in line X to A)	8 bar (others on request)	(120 psi)
Start of opening pX	11 bar at 0.1 l/min (others on request)	(160 psi at 0.025 gpm)
Full extent of opening pX	50 bar (others on request)	(700 psi)

Hydraulic characteristics		Description, value, unit	
Hydraulic fluid		HL and HLP mineral oil to DIN 51 524; for other fluids, please contact BUCHER	
Hydraulic fluid temperature range		- 25 °C … + 80 °C	(-13 °F … +176 °F)
Temperature rating of seals	NBR MIL	- 25 °C … + 100 °C - 55 °C … + 80 °C	(-13 °F … +212 °F) (-67 °F … +176 °F)
Viscosity range		2.8…1500 mm^2/s (cSt), recommended 10…380 mm^2/s (cSt)	
Minimum fluid cleanliness Cleanliness class to ISO 4406 : 1999		class 20/17/14	

4 Construction and function

Actuator port B of the load-control valve for winches is flange-mounted on the load-pressure side of the hydraulic winch motor. The return line is connected to port A of the load-control valve for winches.
To control the load-control valve for winches, we recommend controlling it from the opposite side (internal control). This means that the pilot oil port X of the load-control valve for winches is connected to the supply port of the winch motor (see chapter Application examples).
This ensures that loads only ever move as fast as defined by the incoming oil flow from the main control valve.

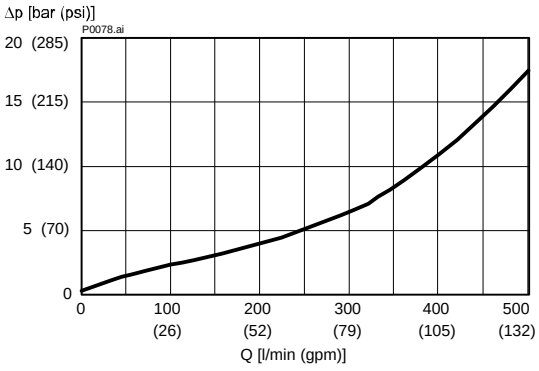
To lift the load, the volume flow is directed via the A port through a low-loss check valve to the winch. In the neutral position the load is held without leakage. To lower the load, the load-control valve for winches is piloted by the rising pressure at the X-port.
The start of opening is defined during the acceptance procedure of the hydraulic winch drive. The lowering of the load is extremely responsive and independent of the load pressure. The damped control guarantees oscillation-free operation.

5 Performance graphs

measured with oil viscosity 33 mm^2/s (cSt)

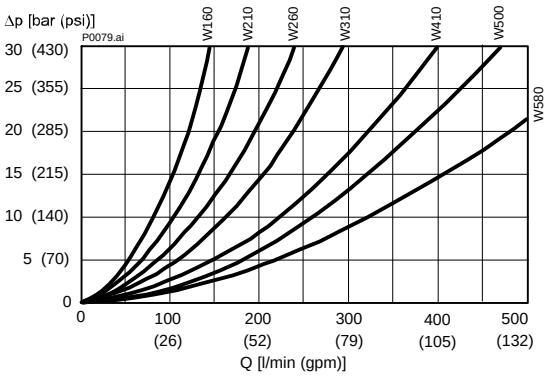
Dp = f (Q) Pressure drop - Flow rate characteristic

Lifting A → B



Dp = f (Q) Pressure drop - Flow rate characteristic

Lowering B → A, valve fully opened



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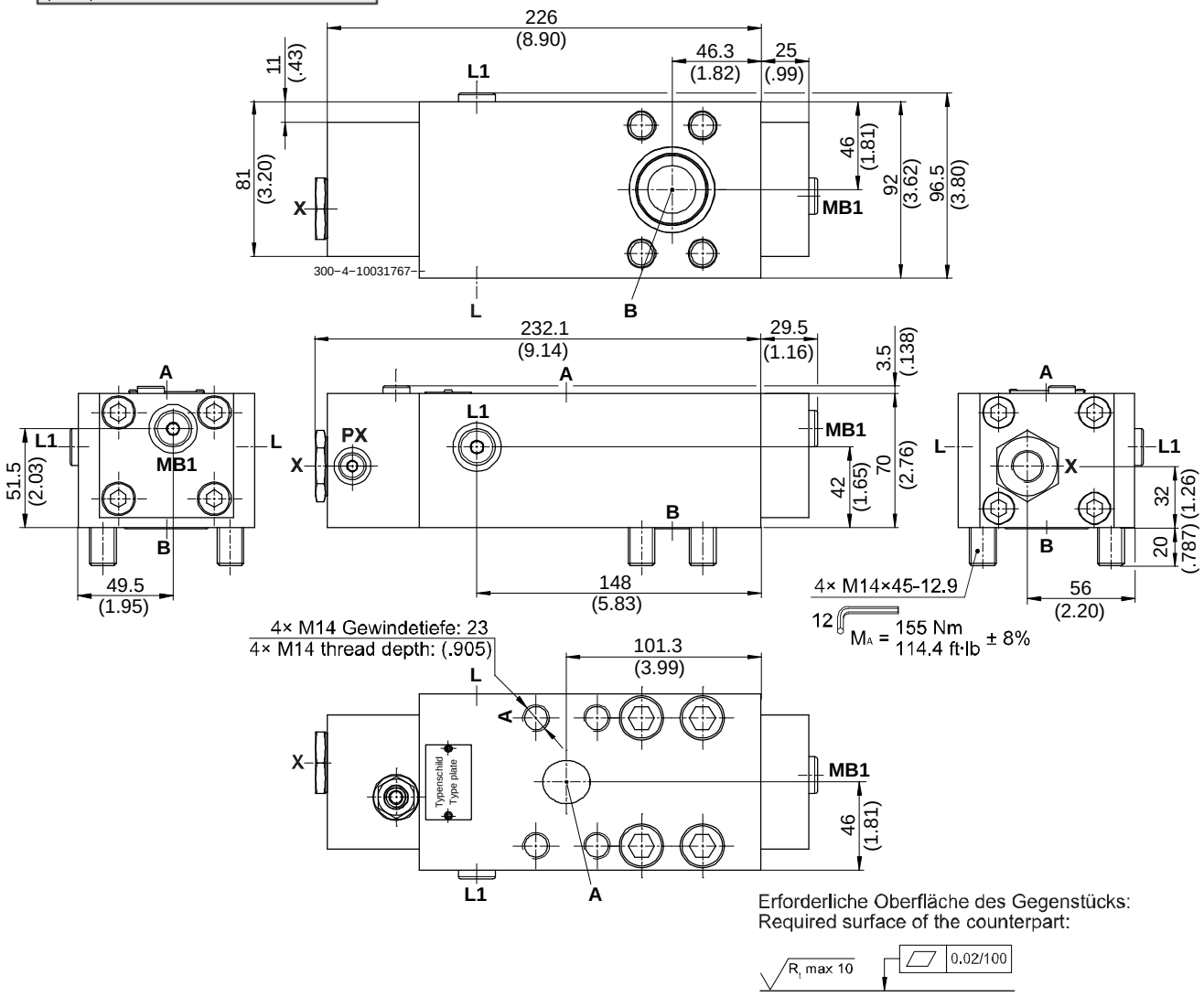
6 Dimensions & sectional view

Beispiel für die Masseinheit:
Example for the dimensional units:
0.79 = 0.79 mm millimeter
(.031) = 0.031" inch



IMPORTANT!:
For variant A (dependent on return-line pressure) both ports L and L1 are omitted.

7 Safety instructions

IMPORTANT!:
Designing load-control valves for winches requires specialist technical skills and product knowledge.
Safety applications must be verified by adequate tests to ensure safety in actual use.

7.1 Assembly / disassembly

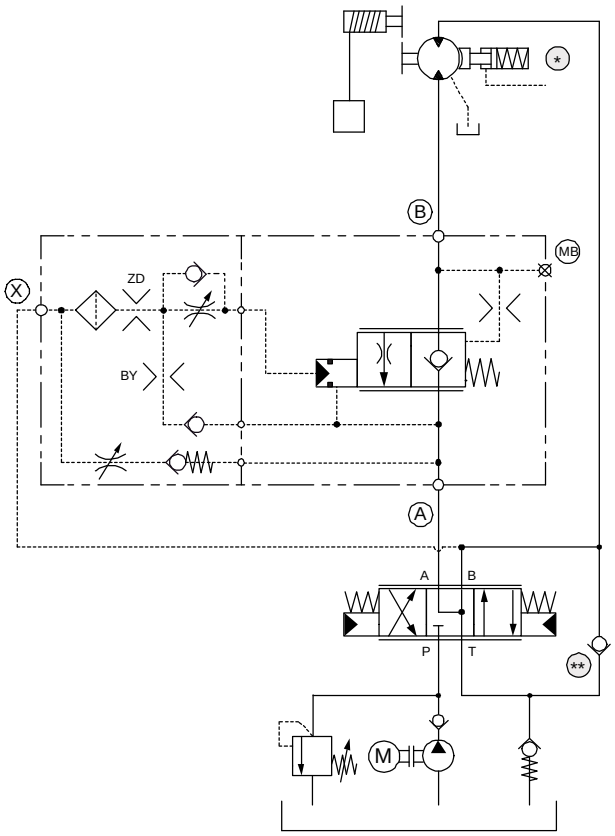
IMPORTANT!: The valve may only be used for its intended purpose within its nominal rating. If you plan to use it outside the nominal rating, you must contact the valve manufacturer.
The ultimate responsibility for safety in the installation and use rests with the end-machine manufacturer of the mobile application.

IMPORTANT!: Seal kit with the external seals is available on application.

IMPORTANT!: Port threads are formed in accordance with DIN 3852.
Use screws to DIN EN ISO 4762, grade 12.9, to mount the valve.
Tightening torques as per the manufacturer's instructions. These can be found on our website:
www.bucherhydraulics.com
(LOGIntern area; registration required)

IMPORTANT!: Protect seals and flange faces from damage.
The mating flange face must be of the quality specified in the data sheet!
Pay attention to the port designations.

8 Application examples



RECOMMENDATION
* Mechanical brake, externally controlled for reduced lowering pressures in the supply line of the motor.
** Anti-cavitation check valve for additional safety.

ATTENTION!:
Cavitation danger!

Control from the opposite line:
To open the valve, we recommend control from the opposite line. This method ensures that the actuator cannot run ahead of the incoming flow.

Brake release (unlocking the mechanical brake):
The mechanical brake must be released before the load-control valve for winches is opened. This prevents draining of the return line to the main spool before the valve opens, thus preventing load fall.

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9 Ordering code

e.g. LCW | 25 | – | A | – | S | N | D | – | W210 | – | 1 | – | A | – | 11 | – | 08 | – | __

LCW	=	series
25	=	size 25 (SAE 1¼")
B	=	model / version
S	=	SAE-flange design
N	=	NBR (Nitrile Butadiene Rubber / BUNA) seals **(standard)**
T	=	MIL (low temperature) seals *(special seals - please contact BUCHER)*
D	=	incl. 4 mounting screws
W160	=	winch spool, B → A 160 l/min [42 gpm] *
W210	=	winch spool, B → A 210 l/min [55 gpm] *
W260	=	winch spool, B → A 260 l/min [68 gpm] *
W310	=	winch spool, B → A 310 l/min [81 gpm] *
W410	=	winch spool, B → A 410 l/min [108 gpm] *
W500	=	winch spool, B → A 500 l/min [132 gpm] *
W580	=	winch spool, B → A 580 l/min [153 gpm] *
1	=	pilot spool 1 mm **(standard)**
A	=	dependent on return-line pressure (pressure in A is additive to op. pilot pressure)
L	=	Independent of return line pressure (drain line is required)
11	=	orifice combination with ZD Ø 0.50 mm / BY Ø 0.50 mm
12	=	orifice combination with ZD Ø 0.60 mm / BY Ø 0.50 mm
13	=	orifice combination with ZD Ø 0.70 mm / BY Ø 0.40 mm
08	=	preload bypass pressure 8 bar (120 psi)
00	=	integrated orifice in the tappet Ø 0.00
01	=	integrated orifice in the tappet Ø 0.30 (is factory-defined)
02	=	integrated orifice in the tappet Ø 0.70

*) measured at 33 bar (478 psi) Δp from B → A, valve fully opened.

IMPORTANT!:
Additional documentation and 3D models (.stp or .igs format) can be downloaded from *www.bucherhydraulics.com* (LOGintern area; registration is necessary)

We also offer customised solutions.
Please talk to our sales team.

info.ch@bucherhydraulics.com www.bucherhydraulics.com

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Classification: 430.325.360.315.330.325.305.310