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1 Product Description

Brake valves of this design are used as safety valves for applications as traction motors in wheel- or track excavators, as well as winch motors. They protect the hydromotor against exceeding speed or cavitation in the inlet side when driving downhill or when loads are dragging.

1.1 Application

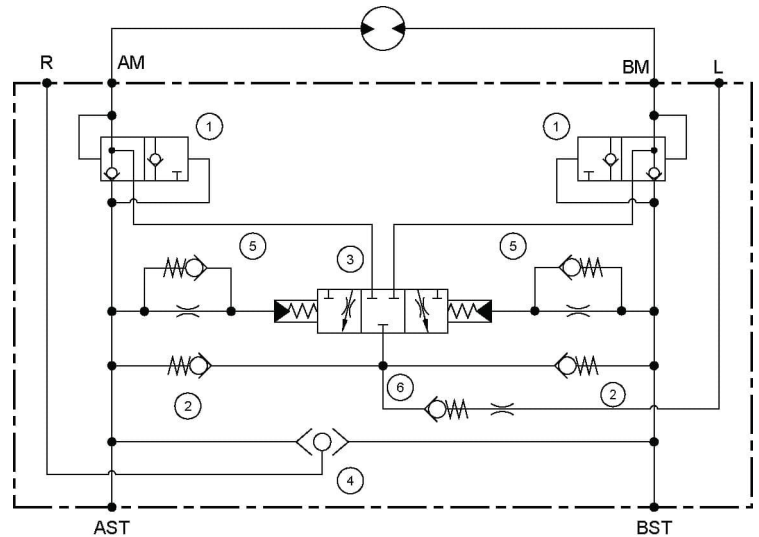
The load brake valve is used for traction drives in wheel or crawler excavators in combination with Linde- or Rexroth motors. In downhill travel the valve protects the motor against too high speed. Braking of the vehicle is supported and internal suction valves prevent for cavitation.

1.2 Mounting location

The Load Holding Valve Winch is flanged directly onto the motor (winch).

2 Function

The brake valve is designed as a symmetrical spool valve. The inlet flow into the connected hydromotor is routed via patented flow diverters (1). Even with a high damping these flow diverter valves allow a quick reverse of the motor without circulating the oil volume flow through the brake valve's main piston (3). The brake valve is designed flowoptimized and can be used for volume flows up to 350 l/min with only small pressure losses. That facilitates high driving speed with little power loss. The braking function is regulated between 15 and 40 bar of inlet pressure. The piston motion is damped. Two different damping variants are offered: Damped opening (Application: Winches and crawler vehicles) and damped closing (Application: Wheel excavators). Both variants are available as versions with more or less damping capability (5). Versions with considerable damping are additionally equipped with so called cold-start-valves, that ensure a reasonable response time even with cold oil. In case of insufficient oil supply the returning volume flow is fed into the inlet side of the motor via a suction valve (2). A connection for the regulator pressure of the motor via shuttle valve (4) and a leakage port via flush valve (6) are available.



2.1 Characteristics

- Wear-optimised housing and main valve
- Suitable for „high-speed excavator“ as well
- Good cold start conduct
- Smooth braking is easy on hydraulic components and increases comfort
- Low flow resistance
- Compact construction and easy to install
- Allows flushing the drive housing to prevent overheating

3 Technical Data

Criteria	Unit	Value
AM, BM		SAE 1" (DIN ISO 6162-2, SAE J518/2 (CODE62))
Max. Betriebsdruck	bar	420 (peak 500)
Druckeinstellung		See type code feature 04: Pressure setting
Max. Volumenstrom	l/min (us gal/min)	250 (66)
Gewicht	kg	11,7
Connection	Connection sizes	
AM, BM	SAE1" in flange face	bar 420 (peak 500 bar)
ASt, BSt	SAE1"	bar 420
R	5 mm	bar 420
T	9 mm	bar < 5
Einbaulage		any
Hydraulic fluid		Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon request
Hydraulic fluid temperature range	°C	-20 – +80
Environmental temperature:	°C	< +50
Viscosity range	mm2/s	2,8 – 500
Contamination grade		Filtering conforming with NAS 1638, class 9, with minimum retention rate $\beta_{10} \geq 75$

4 Ordering Information

LBM								
00	01	02	03	04	05	06	07	08
00	Produktgruppe							LBM
01	Variant	direct connection (Applications which need pressure limiting valves. Check if existant in the motor.)	HMR-01 oder HMR-02 BG 75 / 105 / 135	00				
		direct connection (Applications where pressure limiting valves are not necessary)	A2FM80/61W-V...010; A2FM90/61W-V...010; A6VM80HZ3.....010; A6VM107HZ3.....010					
		with function plate A (contains pressure limiting valves for the protection of the motor)	A2FM80/61W-V...010; A2FM90/61W-V...010; A2FM80/61W-V...100; A2FM90/61W-V...100; A2FE80/16W-V....100; A2FE90/61W-V....100; A6VM80HZ3.....010; A6VM107HZ3.....010	A1				
		with function plate B (Pressure limiting valves are existant in motor. Function plate contains regulator and flush ports)	A2FM80/61W-V...1810; A2FM90/61W-V...1810; A2FM80/61W-VAL 181; A2FM90/61W-V.... 181; A6VM80HZ3..... 010; A6VM107HZ3... 010	B1				
02	Spool	Design of the spool optimized for the specified volume flow; [l/min]		160 250				
03	Remaining opening	closed (required for winch applications)		00				
		open with diameter 1,2mm		12				
		open with diameter 1,6mm		16				
		open with diameter 1,8mm		18				
		open with diameter 2,0mm		20				
04	Damping characteristics	damped opening, strong damping		B1				
		damped opening, medium damping (orifice 0,25mm)		B2				
		damped opening, minor damping (orifice 0,5mm)		B3				
		damped closing, strong damping		C1				
		damped closing, medium damping (orifice 0,25mm)		C2				
		damped closing, minor damping (orifice 0,5mm)		C3				
05	Flushing drain	closed		S00				
		open with orifice 2,0mm		S01				
06	Stroke limitation	without stroke limitation		L00				
		with stroke limitation		L01				
07	Idle Position	piston in idle position open (smooth stopping), 2 control edges		00				
		piston in idle position open (smooth stopping), 4 control edges		01				
		piston in idle position closed, 2 control edges (required for winch applications)		11				
		piston in idle position closed, 4 control edges (required for winch applications)		12				

Unfortunately, various configurations cannot be implemented for technical reasons. If you have any questions, please contact us for advice.

4.1 Currently available

The versions listed below are available standard-versions. Further versions in the range of the above mentioned features are available on request.

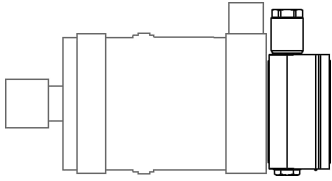
Designation	Type Code	Part No.
LBM ANSCHL. AUF MOTOR 420BAR 250LPM	LBM -00 -250 -00 -C1 -S01 -L00 -01	537.064.115.9
LBM ANSCHL. AUF MOTOR 420BAR 250LPM	LBM -00 -250 -20 -B3 -S01 -L01 -11	537.064.125.9
LBM ANSCHL. AUF MOTOR 420BAR 250LPM	LBM -00 -250 -20 -B1 -S01 -L01 -11	537.064.127.9
LBM ANSCHL. AUF MOTOR 420BAR 250LPM	LBM -00 -250 -00 -C1 -S01 -L00 -12	537.064.129.9
LBM ANSCHL. MIT PLATTE 420BAR 250LPM	LBM -B1 -250 -00 -C1 -S01 -L00 -12	537.064.131.9
LBM ANSCHL. MIT PLATTE 420BAR 250LPM	LBM -B1 -250 -20 -B3 -S01 -L01 -11	537.064.132.9
LBM ANSCHL. AUF MOTOR 420BAR 160LPM	LBM -00 -160 -00 -C3 -S00 -L00 -11	537.064.135.9

5 Description of Characteristics in Accordance with Type Code

5.1 Variant Direct connection

The brakevalve can be flanged directly onto LINDE hydromotors HMR-01 and HMR-02 of the sizes 75, 105 and 135.

Lindemotor HMR



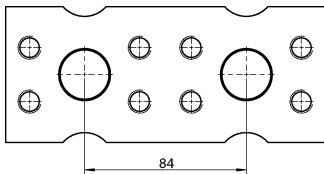
A port for the connection of the motor's regulator pressure is available via a shuttle valve as well as a leakage port for the motor flush via a flush valve. As pressure relief valves are strongly recommended for the protection of the motor's inlet ports, it has to be determined, if the hydromotor is already equipped with them.

The direct connection is also possible for REXROTH hydromotors A2FM of the size NG80 and NG90.

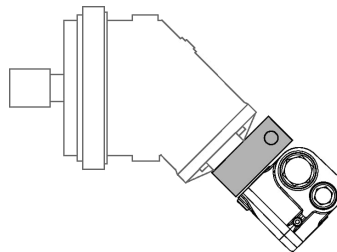
Function plates

The connection to LINDE and REXROTH hydromotors can also be made by means of a function plate with a flange design as shown in the figure at the side. The utilisation of the function plate together with pressure relief valves protects the motor against too high brake pressure.

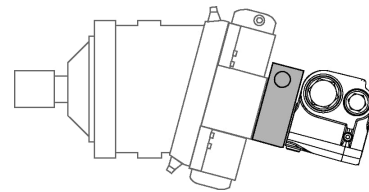
Hole pattern of Function plate A



A2FM Function plate A

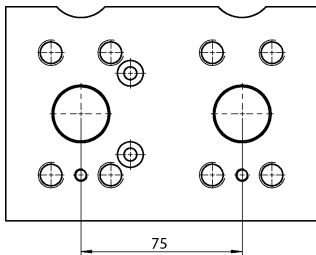


A6VM Function plate A

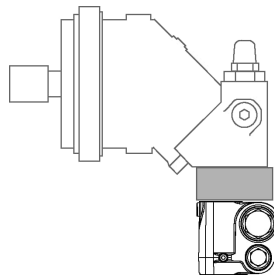


For REXROTH hydromotors with internal pressure relief valves a function plate as shown at the side is available. Regulator pressure and flush oil are provided by the brakevalve.

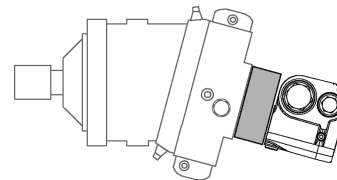
Hole pattern of function plate B



A2FM Function plate B

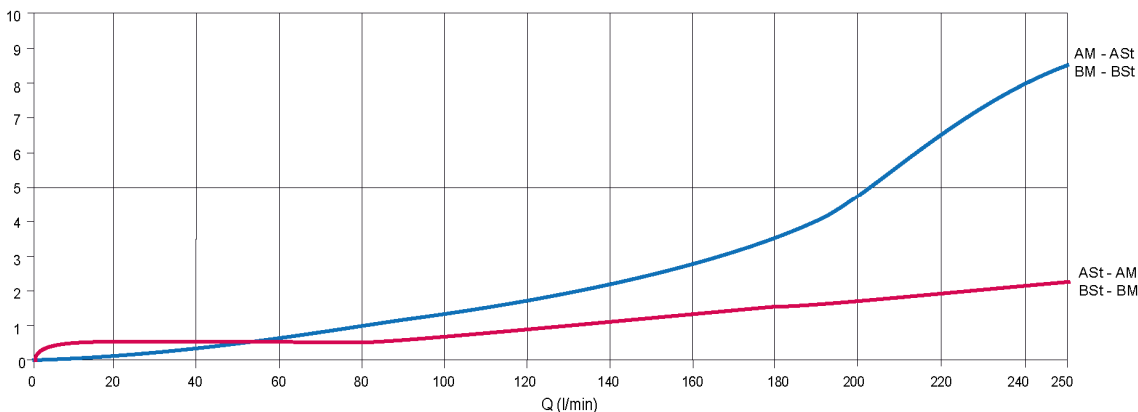


A6VM Function plate B



5.2 Spool

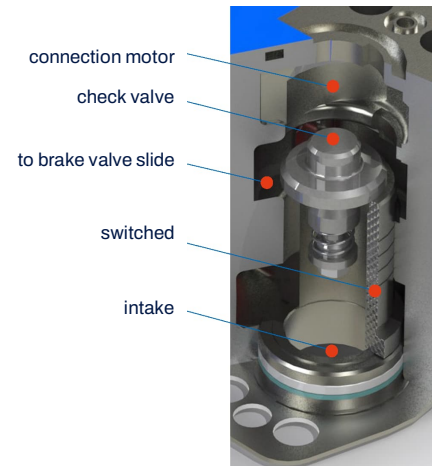
ΔP (bar)



5.3 Remaining opening (orifice in flow diverter valve)

Patented Flow Diverter

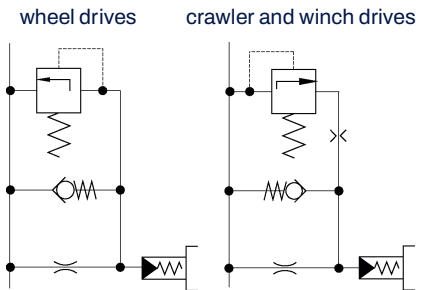
The flow diverter valves allow a quick reverse of the motor without circulating the oil volume flow through the brakevalve's main spool. Therefore the connecting cavity to the brake valve is locked when the inlet check valve opens.



5.4 Damping characteristics

In the application "wheel excavator" a strong damping might be required: If the foot is taken off the accelerator the excavator should slow down slowly and may not stop abruptly. For this request a damping is offered which only works with the clearance of the spool. In order to achieve a quick response, e.g. during operation at low oil temperature, the damping can temporarily be overridden by means of pressure relief valves.

For the use with track- and winch drives a brakevalve with a damped opening and quick closing feature is recommended.



5.5 Flushing drain

Über den Anschluss L im Flanschbild wird ca. 5 l/min Spülöl zur Verfügung gestellt.

5.6 Stroke limitation

Additionally a piston stroke limitation is available. By this it is possible to throttle back the return flow of the motor in order to syn-chronize the speed of two crawler tracks.



5.7 Idle position

Spool

The main spool is available as for idle position open or for idle position closed. For the usage with drives of wheel excavators or crawler excavators it is recommended always to use a spool with a neutral open design. For winch drive applications a spool with a neutral closed design is imperative.

WESSEL Brake Valve spools are offered with optimized designs for different volume flow requirements.



6 Installation

6.1 General remarks

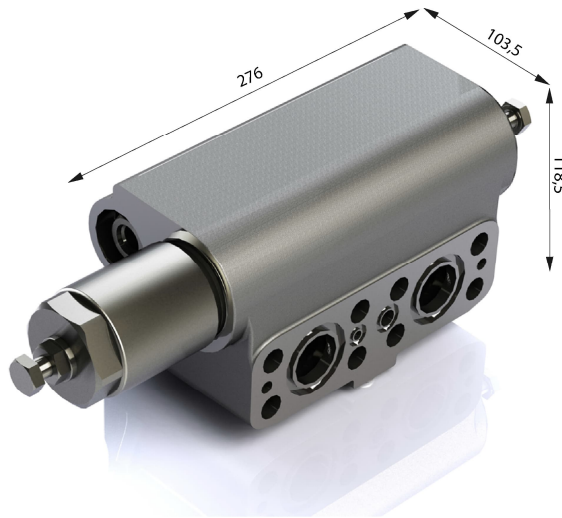
- Observe all installation and safety information of the construction machine manufacturer.
- Only technically permitted changes are to be made on the construction machine.
- The user has to ensure that the device is suitable for the respective application.
- Application exclusively for the range of application specified by the manufacturer.
- Before installation or deinstallation, the hydraulic system is to be depressurized.
- Settings are to be made by qualified personnel only.
- Opening is only to be performed with the approval of the manufacturer, otherwise the warranty is invalidated.
- The included connection recommendations are not guaranteed. The functionality and the technical specifications of the construction machine must be checked.

6.2 Mounting Space

- Anschlussbezeichnungen beachten.
- Festigkeitsklasse und Anziehmoment (siehe Anhang) der Befestigungsschrauben beachten.
- Dichtungen und Flanschfläche nicht beschädigen.
- Hydrauliksystem muss entlüftet sein.
- Montage Ventil: mit 4 Zylinderschrauben DIN912-8.8 am Verbraucher.

	SAE	Thread A	Thread depth B	Tightening torque Nm
	SAE CODE 62			
	1"	M12	109,5	60

6.3 Dimensions SAE ¾"



7 Notes, Standards and Safety Requirements

7.1 General remarks

- The views in drawings are shown in accordance with the European normal projection variant
- A comma (,) is used as a decimal point in drawings
- All dimensions are given in mm



7.2 Standards

The following standards are to be observed because of the surface temperatures on the load control valve:

- EN 563, Temperatures on surfaces that can be touched.
- EN 982, Safety-technical requirements for fluid-technical systems and their components.

7.3 Safety requirements

- WESSEL-HYDRAULIK GmbH guarantees utilization of standard and proven safety principles in accordance with ISO 13849-2: 2003, Tables C.1 and C.2 for the construction of the valve described here.
- WESSEL-HYDRAULIK GmbH has a certified quality management system in accordance with DIN EN ISO 9001.
- The MTTFd value can be adopted from machine manufacturers with 150 years of experience for the described valve!
- Note: The user is therefore responsible for complying with the fundamental and proven safety principles according to ISO 13849-2: 2003, Tables C.1 and C.2 for the implementation and operation of the hydraulic component!

8 Zubehör