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1 Product Description

Volume flow control

This valve can be used to control a flow rate to an attachment. Depending on the type of installation, it operates on the principle of a 3-way or a 2-way flow controller.

The output flow can be switched on and off electrically and is independent of the output and input pressure as well as the input flow.

Pressure restriction

The output flow pressure is limited to a maximum value by a pressure relief valve. This pressure limit is based on the pressure cut-off principle. This means that when the set pressure limit for the output flow is reached, this is controlled downwards until the flow is once again below the limit pressure.

Sizes

Valves of this design are available in SAE 1" and SAE 1 1/4" sizes, both under Code 62. The recommended maximum input flow rates are 300 l/min (SAE 1") and 550 l/min (SAE 1 1/4").

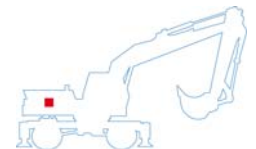
1.1 Intended purpose

The flow control valve (pressure balance control) is used to split an input volume flow into a priority flow and a residual volume flow. The valve allows the operation of single-acting attachments (hydraulic hammers, vibration compactors, mowers, salt spreaders, etc.) on machines that are not equipped for them. The attachment can be used simultaneously and independently of the normal machine functions.

1.2 Mounting location (Recommendation)

The flow control valve is operated in open center systems (NFC systems) in the flow between the pump and the main control unit.

In closed center systems (load sensing systems), it is recommended that the flow control valve be installed as a bypass between the pump and the main control system, meaning by means of a T-piece parallel to the main control valve.



2 Function

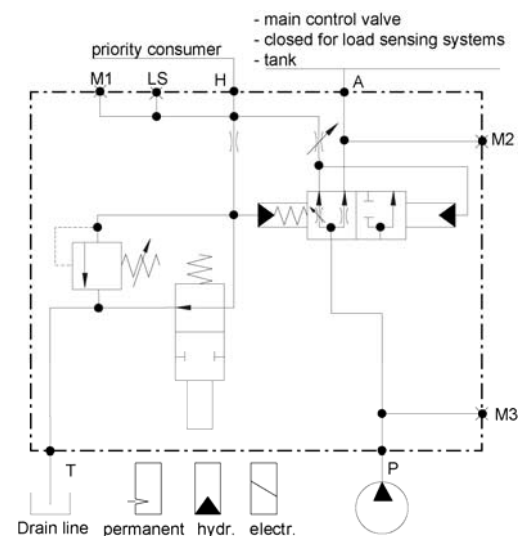
The electrically actuated flow control valve splits the input flow (connector P) into a priority flow (connector H) for operating a simple-actuating attachment and a residual flow (connector A) for normal machine functions.

When the flow control valve is activated electrically, the attachment is provided with a priority supply. The maximum operating pressure and flow for the attachment are adjustable. The residual flow is supplied to the main control system of the machine. When the flow control valve is not switched on, the entire input volume flow is available for normal machine functions.

A check valve or throttle check valve (preset to approx. 8 bar) is mounted onto the connection for the attachment. This thus prevents uncontrolled movements due to oil leaks and prevents external loads from affecting the flow control function.

The flow control valve is electrically actuated by means of a pilot valve. The pilot valve is provided with control pressure from the main pressure circuit via an integrated pressure relief valve.

The flow control valve can be used in open center systems (throttle systems, NFC systems, etc.) as well as in closed center systems (LS systems). It is possible to prioritize the function above other attachments in both systems, whereas in the LS system you can also assign an equivalent level to other attachments.



For attachments with low start-up pressures or pulling loads, an additional pilot valve is required in the hydraulic circuit of the attachment.

2.1 Properties

- Precision flow distribution
- Wide range for adjusting the usable priority flow
- The split flow to the attachment is independent from the valve input pressure
- Protection against pressure loss of the consumer independently of flow rate based on the pressure cut-off principle
- Small pressure loss in free-flow
- Muted pressure cut-off valve (prevents damage due to extreme pulsing of the powered attachment)

3 Technical Data

	Einheit	SAE 1"	SAE 1 1/4"
Installation position		Any	
Weight	kg	15.7	Weight
Max. pressure (P, A)	bar	420	
Max. pressure (H)	bar	320	
Adjustable attachment pressure	bar	100-320 – plant preset default 150	
Setting range output flow	l/min	60-300	Setting range output flow
Output flow rate accuracy	%	± 10	
Maximum recommended tank pressure (T)	bar	< 1	
Maximum input flow rate (P)	l/min	350	Maximum input flow rate (P)
Minimum input flow (P)		~ 20% above the set output flow	
Hydraulic fluid		Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon request	
Hydraulic fluid pressure range	°C	-20 to +80	
Ambient temperature	°C	< +50	
Viscosity range	mm ² /s	2.8 - 500	
Contamination grade		Filtering conforming with NAS 1638, class 9, with minimum retention rate $\beta_{10} \geq 75$	
Supply voltage	VDC	12 or 24	
Voltage tolerances	%	± 10	
Solenoid switch power consumption	W	33	
Solenoid switch flow rate consumption	A	2.9 at 12 VDC, 1.4 at 24 VDC	
Solenoid switch duty cycle	%	100	
Protection class according to DIN 40050		IP 65	
Current supply		Device socket for ISO 4400 angle connector or AMP Junior Timer connector	

4 Order Information

FC1	2N			420			0	
00	01	02	03	04	05	06	07	08
00	Product group	Current control valve for simple-actuation applications						FC1
01	Construction type							2N
02	Connections for pump (P), output (A), attachment (H)	SAE 1" – M12 – Code 62					05E	
		SAE 1 1/4" – M14 – Code 62					05G	
03	Input flow rate	300 l/min					300	
		550 l/min					550	
04	Max. permissible pressure	420 bar					420	
05	Actuation	Hydraulically connection G1/4					HYS03B	
		Electrical switching 12 VDC – connection via ISO 4400 angle plug connection					12S001	
		Electrical switching 24 VDC – connection via ISO 4400 angle plug connection					24S001	
06	Hydraulic system	2-way flow controller – suitable for closed center systems					CC	
		3-way flow controller – suitable for open center systems					OC	
07	Q output: to be set by customer						001	
08	Check valve		SAE 1"	SAE 1 1/4"				
		No check valve	■	■		00		
		Check valve SAE 1", Code 62	■	○		06		
		Throttle check valve SAE 1", Code 62	■	○		21		
		Check valve 38S	○	■		03		
Throttle check valve 38S	○	■		15				

XXX – permanently predetermined characteristics XXX – characteristics selectable by customer ■ available ○ not available
 Different configurations are unfortunately not implementable for technical reasons. Please let us know if you have questions

4.1 Versions currently available

The versions listed below are available as standard. Further versions as part of the options given on the type code can be configured upon request. Therefore normally minimum order quantities are required.

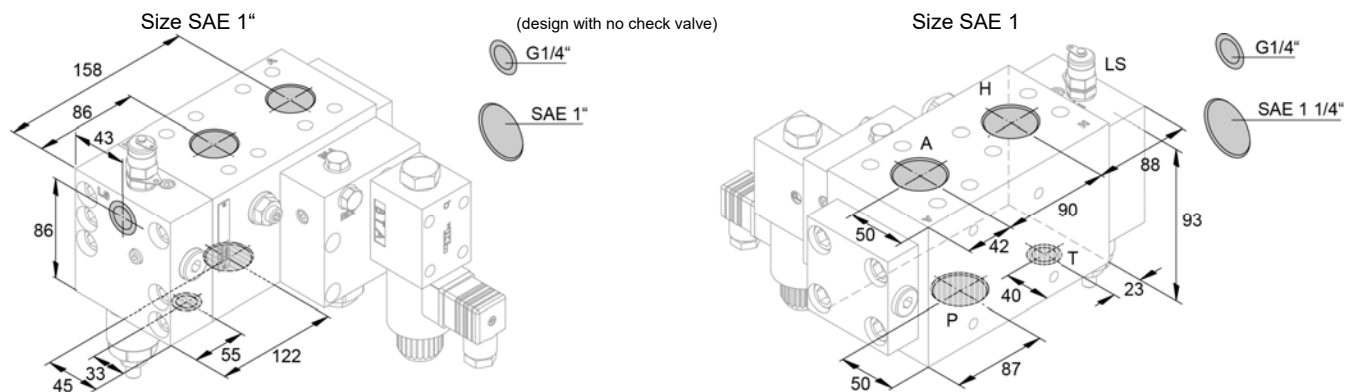
Designation	Type Code	Part Nr.
FC1-2N SAE1 CD62 300lpm, 420bar, hydr	FC1 -2N -05E -300 -420 -HYS03B -00 -001 -06	137.924.204.9
FC1-2N SAE1 CD62 300LPM 420BAR 24VDC	FC1 -2N -05E -300 -420 -24S001 -OC -001 -00	237.364.621.9
FC1-2N SAE 1 CD62 300LPM 420BAR 24VDC LS	FC1 -2N -05E -300 -420 -24S001 -CC -001 -00	237.364.626.9
FC1-2N SAE1 CD62 300LPM 420BAR 24VDC DRV1	FC1 -2N -05E -300 -420 -24S001 -OC -001 -21	237.364.627.9
FC1-2N SAE1 CD62 300LPM 420BAR 24VDC RV1 LS	FC1 -2N -05E -300 -420 -24S001 -CC -001 -06	237.364.628.9
FC1-2N SAE11/4 CD62 550LPM 420BAR 24VDC	FC1 -2N -05G -550 -420 -24S001 -OC -001 -00	238.364.611.9
FC1-2N SAE11/4 CD62 550LPM 420BAR 24VDC	FC1 -2N -05G -550 -420 -24S001 -OC -001 -15	238.364.612.9
FC1-2N SAE11/4 CD62 550LPM 420BAR 24VDC DIN	FC1 -2N -05G -550 -420 -24S001 -OC -001 -03	238.364.613.9

5 Description of Characteristics in Accordance with Type Code

5.1 Characteristics 1: Construction type

- The 2N design valve is available in two sizes:
- Connector size SAE 1" – 300 l/min
- Connector size SAE 1 1/4" – 550 l/min
- Optionally, different check and throttle check valves are available for output H

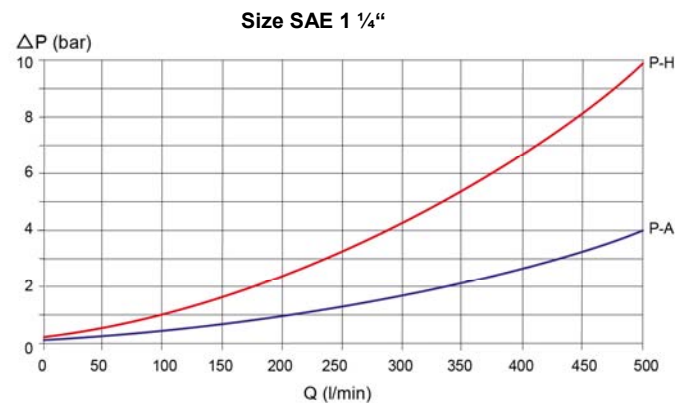
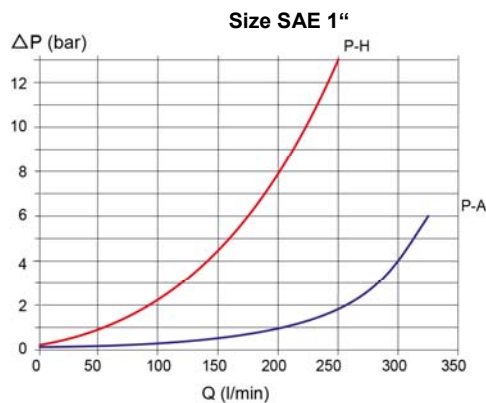
5.2 Characteristics 2: Connections



	SAE size	max. working pressure (bar)	A	B
	SAE CODE 62			
	1"	420	27,8	57,2
	1 1/4"	420	31,8	66,7

5.3 Characteristics 3: Input flow rate

Maximum input flow: see type code. Pressure loss in relation to input flow rate



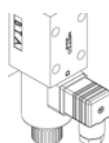
5.4 Characteristics 4: Maximum permissible pressure

The maximum permissible input (P) and output (A) pressure of the flow control valve is 420 bar

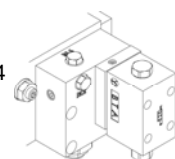
5.5 Characteristics 5: Actuation

The flow control valve is electrically actuated

Device socket for plug-in connector:
12S001 / 24S001



Hydraulisch-prop, connector G1/4



5.6 Characteristics 6: Hydraulic system

CC hydraulic system

On valves which are pre-fitted for closed center systems (Option: CC, 2-way flow controller) (bypass installation), output line A is closed off. The LS connector is provided for the signaling line. This installation enables the parallel operation of applications, but has energy disadvantages.

OC hydraulic system

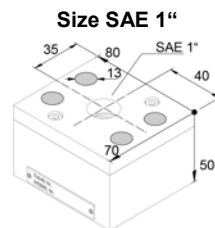
On valves which are pre-fitted for open center systems (Option: OC, 3-way flow controller), output line A is open and the LS connection is closed off. In this design, the remainder of the input flow is led onward. Parallel application operation is not possible.

5.7 Characteristics 7: Output flow rate

The output flow can be adjusted by the user

5.8 Characteristics 8: Check valve

For attachments with low inertia levels (e.g. hydraulic motors) or pulling loads, an additional pre-pressurization valve is required on the working port.



Size SAE 1 1/4" Anschluss 38S



6 Installation

6.1 General remarks

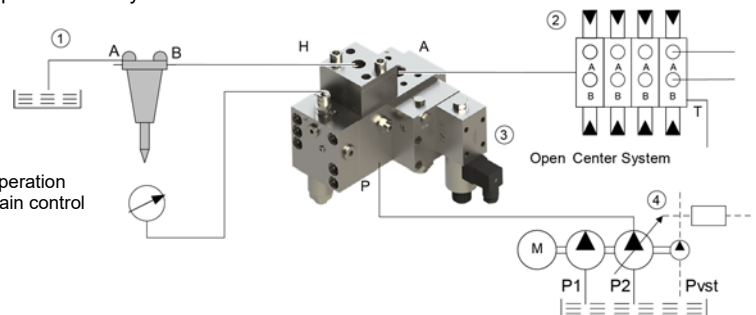
- Observe all installation and safety information of the construction machine manufacturer.
- Only technically permitted changes are to be made on the construction machine.
- The user has to ensure that the device is suitable for the respective application.
- Application exclusively for the range of application specified by the manufacturer.
- Before installation or dismantling, the hydraulic system is to be depressurized.
- Settings are to be made by qualified personnel only.
- May only be opened with the approval of the manufacturer, otherwise the warranty is invalidated.

6.2 Connection suggestion



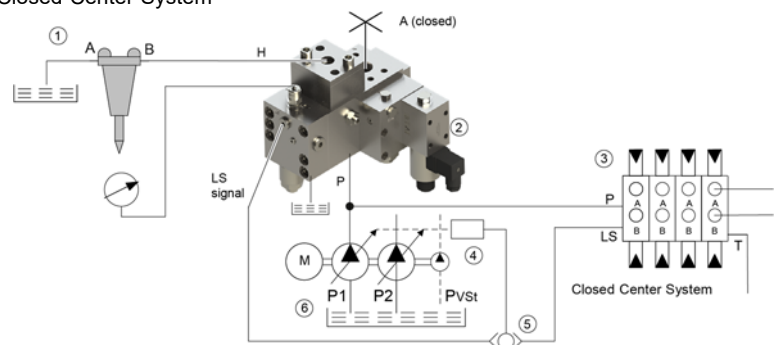
Note: The included connection recommendations are not guaranteed. The functionality and the technical specifications of the construction machine must be checked. It must be ensured that the construction machine is suitable in terms of technology and safety for the operation of the attachment.

Open-Center-System



- 1 New user (Hammer)
- 2 Main control system, additional functions available for hammer operation
- 3 Flow control valve (priority valve) Installation in line: Pump for main control
- 4 Master pump with drive

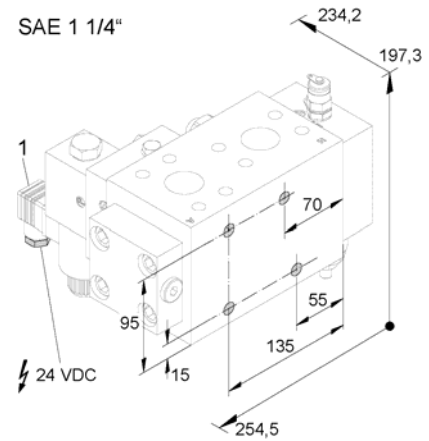
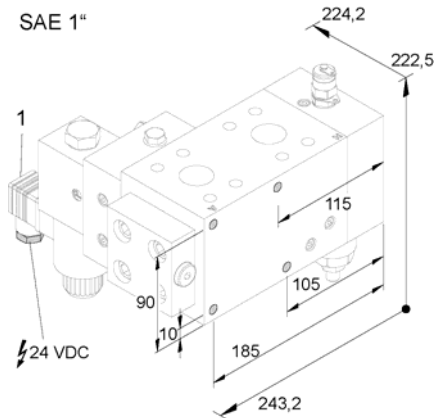
Closed-Center-System



- 1 New user
- 2 Flow control valve, 2-way (bypass installation)
- 3 Main control system
- 4 LS controller
- 5 Switch valve
- 6 Master pump with drive

6.3 Installation - space

- Observe the connection labels.
 - Observe the strength category and torsional moment of the clamp bolts.
 - Do not damage seals and flange surface.
 - The air must be exhausted from the hydraulic system
 - Ensure that the support element is level
 - Ensure that the valve is not bent during installation
 - Ensure that there is sufficient free space for setting and installation work
- a. Install the flow control valve on the support element using M10 bolts.
 - b. Make the hydraulic connection.
 - c. Make electrical connections.
 - d. Secure connector with screw (1).

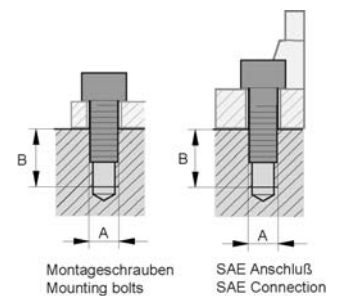


6.4 Anzugsmomente

	Thread A	Strength class	Thread depth B	Tightening torque Nm
Mounting bolts	M10	8.8	14	48
SAE 1"	M12	12.9	21	85
SAE 1 1/4"	M14	10.9	25	140



Attention: Tightening torques must be observed. Torque wrench needed.



6.5 Setting the output flow rate



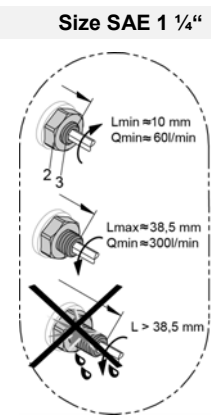
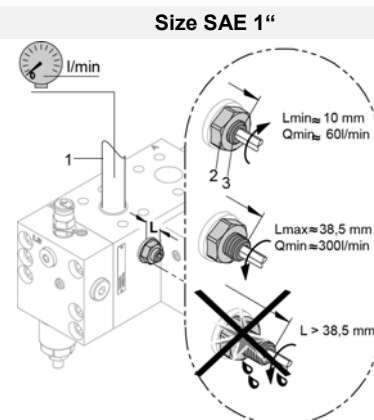
WARNING

Observe the max value of the setting screw.



ATTENTION

During operation, the flow control valve can heat up to the oil temperature.



NOTE: The counter-nut (2) is to be replaced after being used five times.

- a. Ensure that the flow control valve is not under pressure.
- b. Install the flow measurement device in the line (1) to the attachment.
- c. Switch on the hydraulics.
- d. Undo the counter-nut (2).
- e. Adjust the priority flow
 - Increase:** Turn the set-screw (3) to the left until the desired value is achieved.
 - Decrease:** Turn the set-screw (3) to the right until the desired value is achieved.
- f. Tighten the counter-nut (2).
- g. Switch off the hydraulics.
- h. Depressurize the flow control valve.
- i. Depressurize the attachment.
- j. Remove the flow measurement device.

6.6 Setting the pressure relief for the attachment



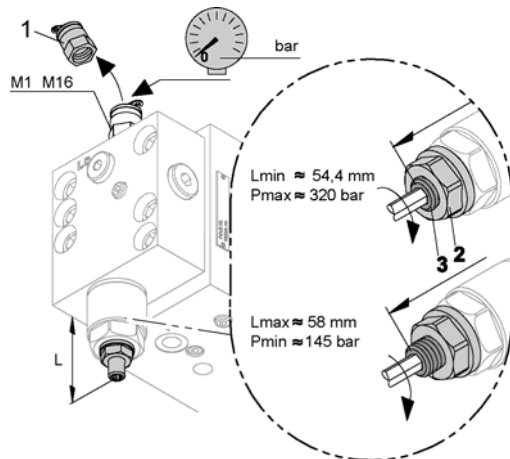
ATTENTION:

During operation, the valve can heat up to the oil temperature.



CAUTION! : Do not unscrew the set-screws (3) more than 26 mm out of the housing. Do not loosen the cap (1) while the priority valve is under pressure.

The pressure limit setting is applicable to both sizes.



NOTE

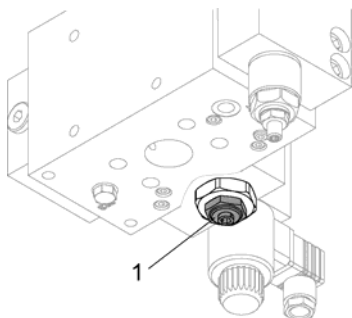
The counter-nut (2) is to be replaced after being used five times.

The maximum operating pressure of the attachment can be set between 100 – 320 bar. The factory setting is 150 bar.

- Ensure that the flow control valve is not under pressure.
- Remove the locking cap (M1).
- Connect the pressure gauge.
- Switch on the hydraulics.
- Undo the counter-nut (2).
- Adjust the maximum operating pressure of the attachment
Increase: Turn the set-screw (3) to the right.
Decrease: Turn the set-screw (3) to the left.
- Tighten the counter-nut (2).
- Switch off the hydraulics.
- Depressurize the flow control valve.
- Remove the measurement device.
- Screw on the locking cap (M1).
- Check tightness.

1 mm = 50 bar

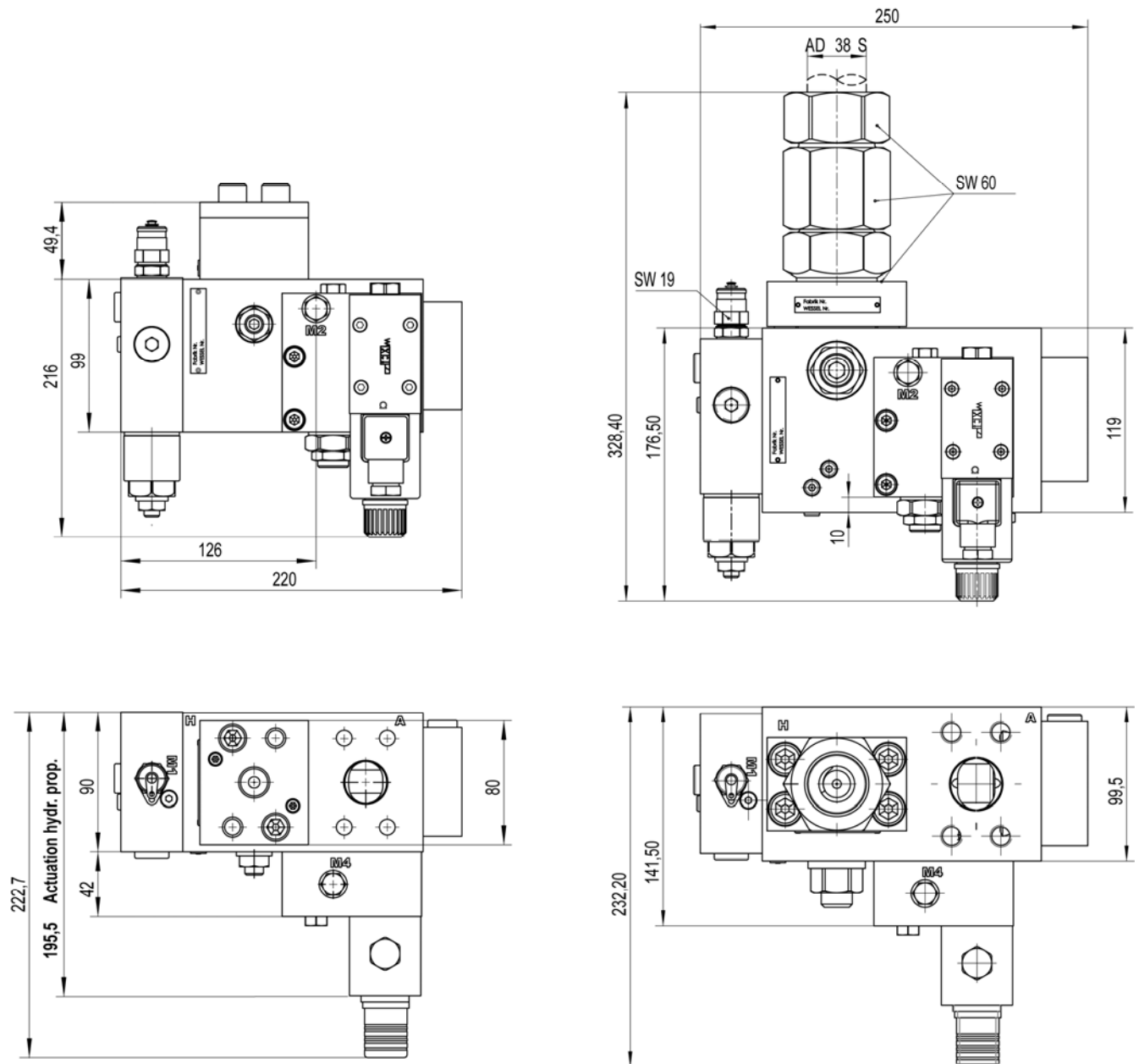
6.7 Setting the pressure relief valve



The pilot valve is provided with control pressure from the main pressure circuit via an integrated pressure relief valve. The pressure relief valve is set at the manufacturing plant. Changes to this setting are **unnecessary** and will lead to the voiding of the warranty.

Applies to both sizes.

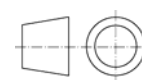
7 Dimensions



8 Notes, Standards and Safety Requirements

8.1 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



8.2 Standards

The following standards must be observed when installing and operating the valve:

- DIN EN ISO 13732-1:2008-12, Temperatures on accessible surfaces