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## 1 Product Description

The 2/2 directional valve is used to connect or disconnect a hydraulic line (similar to ball valve). It is a pilot controlled valve, which is designed for high pressure and high volume flow and thus suitable for mobile applications.

### 1.1 Application

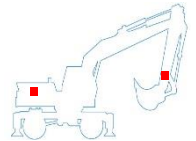
In many hydraulic applications, high return pressures cause unnecessary energy loss or even loss of power. Through an additional direct relief to the tank using a 2/2 directional control valve, these losses can be minimized to a great extent. A typical application is, e.g. in the case of construction machinery, to connect the return line of a hydraulic tool to the tank bypassing the main control valve. When operating a hydraulic hammer, this is often necessary for achieving trouble-free functionality of the equipment and in other applications such as scrap- and demolition shears, a clear increase in power is achieved.

### 1.2 Mounting location (Recommendation)

The directional control valve 2/2 (dump valve) is installed either close to the attachment or directly behind the main valve section

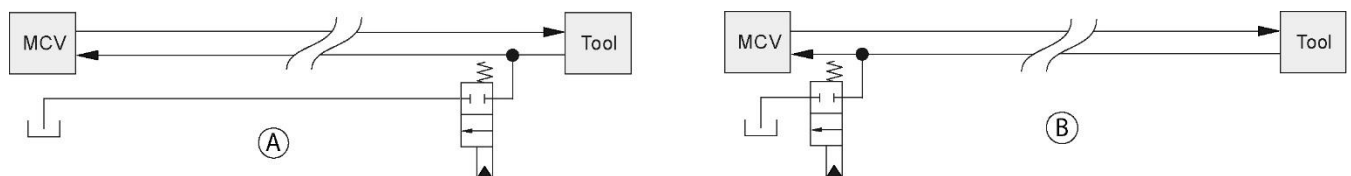
Close to the attachment A

- - pressure loss of the return line and the main valve section are reduced
- - requires an extra tank line from the dump valve to the tank over the entire boom length
- - the hydraulically operated valve requires an additional control line over the entire boom length
- - delayed signal in long hydraulic control lines
- - alternatively, the hydraulically operated valve can be actuated via a short pilot line from the opposite side of the consumer
- - the electrically operated valve requires an electrical signal line over the entire length of the boom

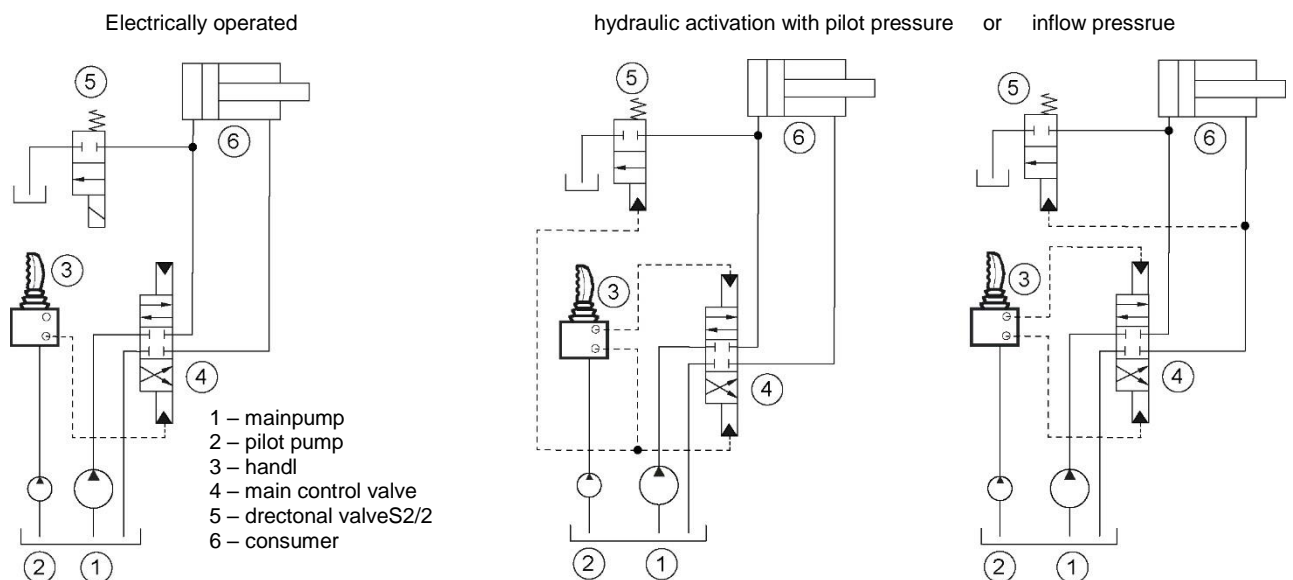


Directly behind the main valve section B

- - only the pressure loss of the main valve section is reduced
- - short signal lines (electrical or hydraulic) are required



### 1.3 Connection recommendations

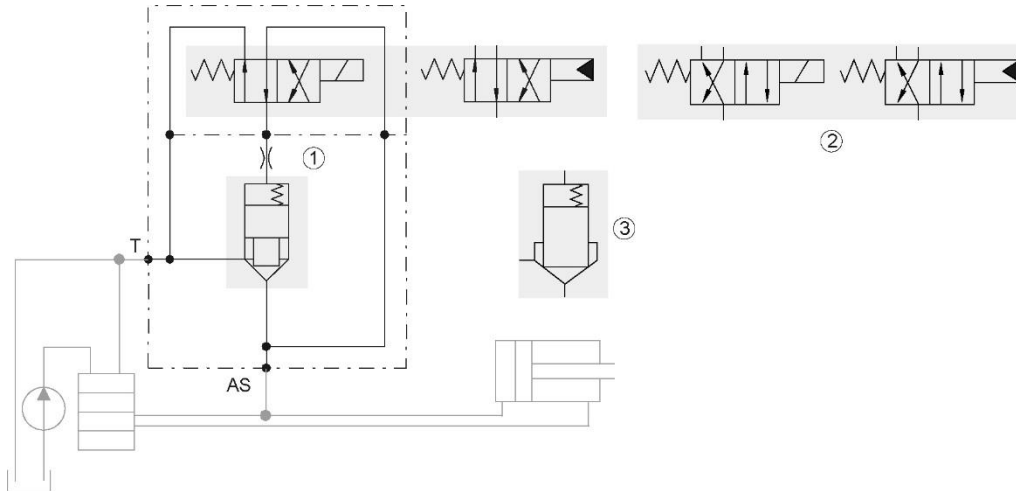


NOTE : The included connection recommendations are not guaranteed. The functionality and the technical specifications of the construction machine must be checked. It must be ensured that the construction machine is suitable in terms of technology and safety for the operation of this additional valve.

### 1.4 Function

The directional valve S2/2 consists of a directional pilot control valve and a large dimensioned cartridge valve. It has an inflow (AS) and an outflow (T). Depending on the version in the idle position the cartridge valve is locked (circuit diagram 1) due to the inlet pressure at AS or open (circuit diagram 2).

The main unit of this valve is available with a stepped cone (circuit diagrams 1) or with a pressure-compensated cone (circuit diagrams 3). The pressure-compensated design should always be selected when pressure occurs at the T connection, which can otherwise lead to an opening of the valve. In order to avoid pressure shocks during opening (caged pressure), dampened versions are available.



### 1.5 Characteristics

- Electrically or hydraulically switchable
- Neutral open or closed
- smooth operating (optional)
- Low leakage

## 2 Technical Data

Criteria	Units	Value
Installation position		Any
Weight	kg	8.5 (electrical), 8.0 (hydraulic)
Max. input pressure (P, A)	bar	350 bar (electrical versions), 420 bar (hydraulic version)
Maximum recommended tank pressure (T)	bar	< 3 if main unit not pressure-compensated, < 200 if main unit pressure-
Pilot control pressure (only hydraulic variant)	bar	At least 10 higher than tank pressure, max. 400
Maximum input flow rate (P)	l/min	400
Hydraulic fluid		Mineral oil (HL, HLP) conforming with DIN 51524, other fluids upon re-
Hydraulic fluid pressure range	°C	-20 to +80
Ambient temperature	°C	< +50
Viscosity range	mm <sup>2</sup> /s	2.8 - 500
Contamination grade		Filtering conforming with NAS 1638, class 9, with minimum retention
Electrical variants:		
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 connector / ISO 4400 angle connector or AMP Junior Timer connector

### 3 Ordering Information

#### 3.1 Type code

D22	1N	05E	400					
00	01	02	03	04	05	06	07	08
00	Product group	2/2 directional control valve						<b>D22</b>
01	Variant	Standard, pilot-controlled, for high volume flows						<b>1N</b>
02	Connections	Inflow AS, outflow T, SAE 1" ISO 6162-2 (SAE J518Code62)						<b>05E</b>
03	Input flow rate	400 l/min						<b>400</b>
04	Max. permissible pressure	350 bar (electrical versions)						<b>350</b>
		420 bar (hydraulic version)						<b>420</b>
05	Actuation	Electrical switching 12 VDC – connection via ISO 4400 angle plug connection						<b>12S001</b>
		Electrical switching 12 VDC – connection via Junior Timer plug						<b>24S001</b>
		Electrical switching 24 VDC – connection via ISO 4400 angle plug connection						<b>12S002</b>
		Electrical switching 24 VDC – connection via Junior Timer plug						<b>24S002</b>
		Electrical switching 12 VDC – connection via Deutsch Stecker DT04-2P						<b>12S003</b>
		Electrical switching 24 VDC – connection via Deutsch Stecker DT04-2P						<b>24S003</b>
Hydraulically switching						<b>HYS03B</b>		
06	Neutral position	Closed						<b>N0</b>
		Open						<b>N1</b>
07	Switching characteristic	Standard		electrical	hydraulic		<b>S0</b>	
		Damped		○	■	○	<b>S1</b>	
				■	○	○	<b>S2</b>	
08	Main unit	Not pressure-compensated, external pressure at outlet port T might open the valve Maximum pressure at port T: < 3 bar						<b>K0</b>
		pressure-compensated: external pressure at outlet port T will not open the valve Maximum pressure at port T: < 200 bar						<b>K1</b>

XXX – not changeable characteristics    XXX – Characteristics selectable by customer  
 ■ available    ○ not available

#### 3.2 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.

Description	Type code	Part-No.
D22-1N SAE1 CD62 400LPM 420BAR HYDRAULIC IDLE-CLOSED	D22 -1N -05E -400 -420 -HYS03B -N0 -S1 -K0	147.901.105.9
D22-1N SAE1 CD62 400LPM 350BAR 12VDC IDLE-CLOSED	D22 -1N -05E -400 -350 -12S001 -N0 -S0 -K0	227.214.207.9
D22-1N SAE1 CD62 400LPM 350BAR 12VDC IDLE-OPEN	D22 -1N -05E -400 -350 -12S001 -N1 -S0 -K0	227.214.208.9
D22-1N SAE1 CD62 400LPM 350BAR 24VDC IDLE-CLOSED	D22 -1N -05E -400 -350 -24S001 -N0 -S0 -K0	227.314.207.9
D22-1N SAE1 CD62 400LPM 350BAR 24VDC IDLE-OPEN	D22 -1N -05E -400 -350 -24S001 -N1 -S0 -K0	227.314.208.9
D22-1N SAE1 CD62 400LPM 350BAR 24VDC IDLE-CLOSED	D22 -1N -05E -400 -350 -24S001 -N0 -S0 -K1	227.314.209.9

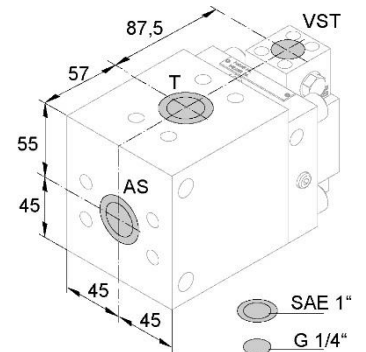
## 4 Description of Characteristics in Accordance with Type Code

### 4.1 Characteristic 1: Variant

Standard-Variant. The directional control valve is a pilot operated valve, designed for high pressure and high volume flows and is thus suitable for mobile applications.

### 4.2 Characteristic 2: Connection

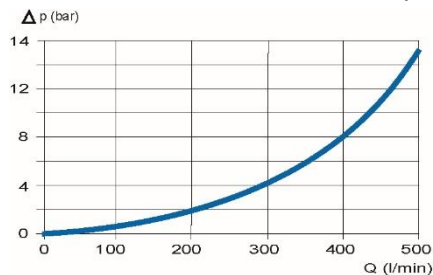
Connection	Connection sizes	Norm	Explanation
AS, T	SAE 1"	ISO 6162-2	AS – inflow, T - drain
M	M8x1		With hydraulic pilot control
VSt	G 1/4"	ISO 1179-1	With hydraulic pilot control



### 4.3 Characteristic 3: Input flow rate

The maximum input flow rate is 400 l/min.

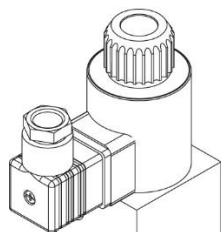
### 4.4 Pressure loss in relation to input flow rate



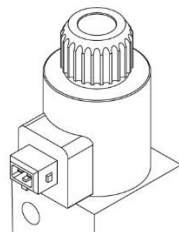
### 4.5 Characteristic 4: Maximum permissible pressure

Je nach Version beträgt der maximal zulässige Druck am Zulauf AS 350 oder 400 bar, am Ausgang T < 3 bar oder <200 bar. Hinweis: Diese Angaben stellen nur die Druckbelastbarkeit dar, das Schalten des Ventils mit hohen Drücken am Anschluss T ist nicht gewährleistet.

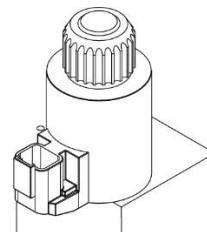
### 4.6 Characteristic 5: Actuation



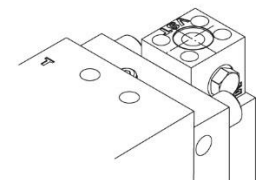
Device socket angle plug: 12S001 / 24S001



Junior Timer connector plug: 12S002 / 24S002



Deutsch DT 04-2P: 12S003 / 24S003



Pilot control connection hydraulic: G1/4"

### 4.7 Characteristic 6: Neutral position

Whether the valve needs to be open (N1) or closed (N0) in the neutral position should be determined on the application. In a hammer/shear installation, it can make sense for fail-safe reasons to be open in unswitched: Some hammers might be destroyed in the case of high return pressure; should there be a defect such as cable break, the valve is open in each case. In shear mode, it must then be closed actively in a specific movement direction.

In order to avoid pressure shocks during opening (caged pressure), dampened versions are available.

### 4.8 Characteristic 7: Switching behavior

If a cylinder is moved into its endstop, high pressure is caged. If the counter movement is then initiated by the machine operator and the 2/2 directional valve opens weakly dampened (S0), the volume can decompress suddenly, which can be associated with a loud noise (decompression shock). For this application, dampened valves ((S1: hydraulically switching and S2: electrically switching) are available. It should be decided depending on the application, whether high dynamics or high dampening makes sense.

### 4.9 Characteristic 8: Main section

The 2/2 directional valve's main section is available in two design variants. As stepped cone (characteristic K0), the valve has a check valve function from connection T to connection AS. This means that if the pressure at T exceeds the pressure at AS by 1.5 bar, the valve opens: suction function.

If this is not wanted, the pressure-compensated design should be selected (characteristic K1).

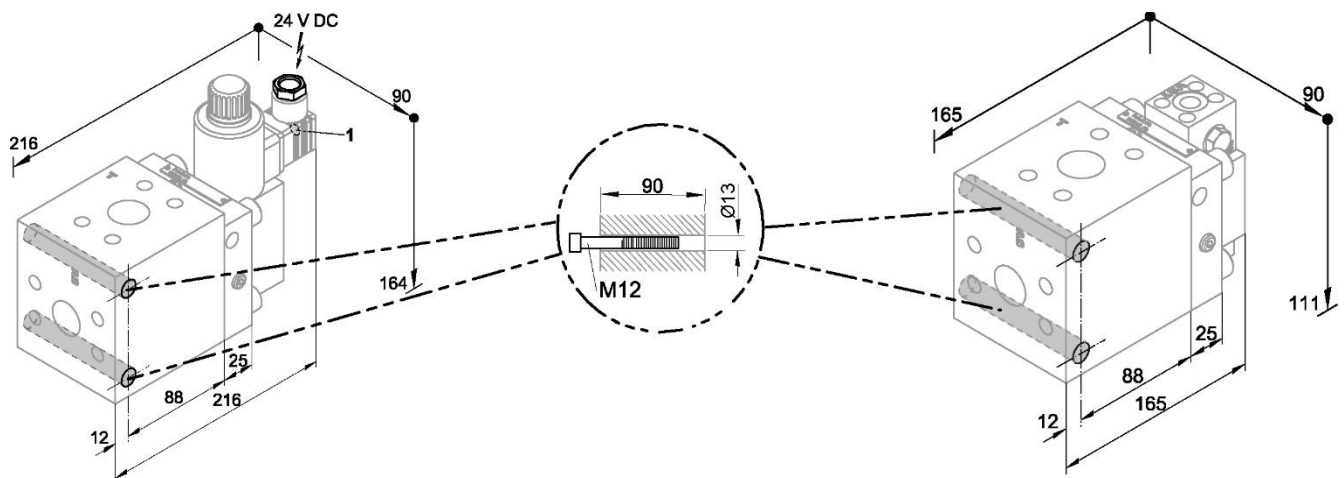
## 5 Installation

### 5.1 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.
- The valve may only be opened with the approval of the manufacturer, otherwise the warranty is invalidated.

### 5.2 Installation space

- The SAE-1" flanges should be tightened with 85Nm.
- The installation is done using two M12 screws on an even supporting element.



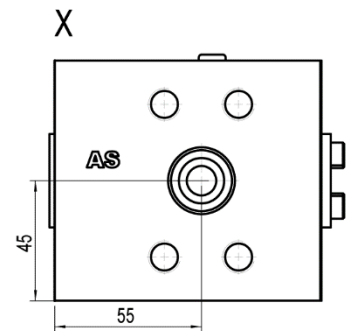
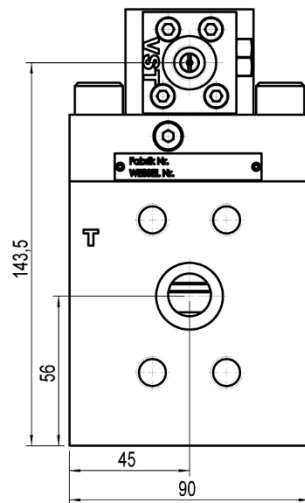
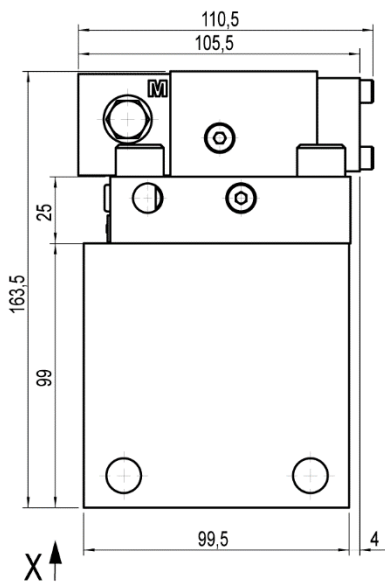
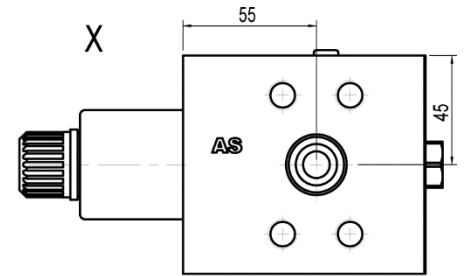
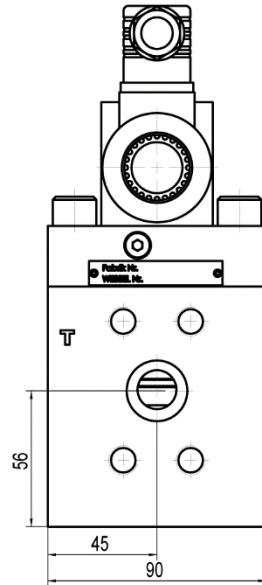
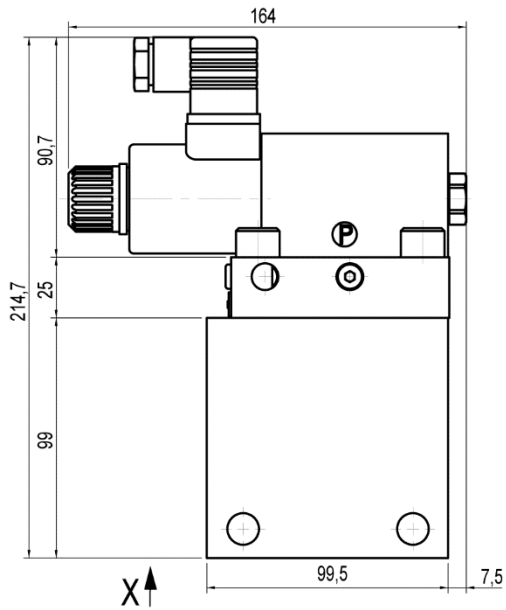
- Observe the connection labels.
- Observe the strength category and torque of the clamp bolts.
- Do not damage seals and flange surface.
- The air must be bled from the hydraulic system.
- Ensure that the support element is level.
- Ensure that the valve is not bent during installation.
- Ensure that there is sufficient free space for setting and installation work.



**CAUTION!**

Hydraulic hoses must not come into contact with the directional control valve 2/2 as they will suffer thermal damage.

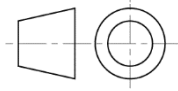
5.3 Dimensions



## 6 Notes, Standards and Safety Requirements

### 6.1 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

### 6.2 Standards

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

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

## 7 Zubehör

- Winkelstecker: Teilenummer: 340.201.900.6