

Directional spool valve, direct-operated, with solenoid actuation

FTWE 4 K



- ▶ Size 4
- ▶ Series 4X
- ▶ Maximum working pressure 210 bar
- ▶ Maximum flow 7 l/min

Features

- ▶ 3/2-way version
- ▶ Cartridge valve
- ▶ Minimized frame size
- ▶ DC voltage solenoid switching in oil
- ▶ Electrical connection as single connection
- ▶ With manual override
- ▶ For use in vehicles and mobile working machines

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Type code

01	02	03	04	05	06	07	08	09	10	11
FTWE	4	K		4X	/	210	A		V	*

Valve type

01	Directional spool valve, non-standard design, electrical actuation	FTWE
02	Size 4	4
03	Cartridge valve	K
04	Switching characteristics (others on request)	C

Series

05	Series 40 to 40 (unchanged installation and connection dimensions)	4X
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Maximum nominal pressure

06	210 bar	210
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07	DC voltage solenoid, switching in oil	A
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Supply voltage

08	Control electronics 12 V DC	G12
	Control electronics 24 V DC	G24

Electrical connection¹⁾

09	Device connector 2-pin, DT 04-2P (DEUTSCH)	K40
	Device connector 2-pin, Junior Timer (AMP) ²⁾	C4

Sealing material

10	FKM (fluorocarbon rubber)	V
11	Further details in plain text	*

Notice

For valve types other than those listed in the data sheet, consultation is required!

Preferred types

Type	Material no.
FTWE 4 KC4X/210AG12C4V	R901562627
FTWE 4 KC4X/210AG12K40V	R901562630
FTWE 4 KC4X/210AG24C4V	R901557405
FTWE 4 KC4X/210AG24K40V	R901562629

1)

Plug-in connectors are not included in the scope of delivery and must be ordered separately, see data sheet 08006.

2)

Manual override can only be performed after disconnecting the device plug!

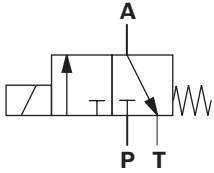
Functional description

General

The Directional spool valve type FTWE 4 K is a direct-operated, pressure-balanced cartridge valve in 3-way version.

It controls the start, stop and direction of a flow.

▼ Version "C" (Standard)



Basic principle

In non-actuated state, the control spool (2) is kept in the initial position by the return spring (3).

► Version "C" (standard)

- Initial position from **A** → **T**
- When actuated, the valve opens from **P** → **A**

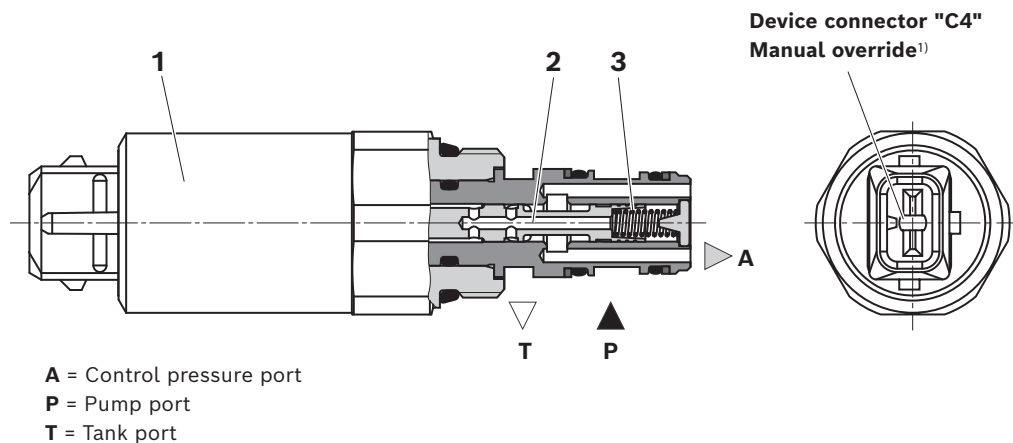
The control spool (2) is actuated by a DC voltage solenoid (1) switching in oil.

The **A** and **P** ports can be permanently loaded with 210 bar working pressure, port **T** with a maximum of 30 bar.

Notice

Special versions on request. Special installation drawings apply to all special versions.

▼ Section



¹⁾ Actuated by pin tool (connector must be removed to actuate manual override; versions "C4" and "K40"). Maximum number of matings is 10 (Specification AMP 108-18013).

Technical data

General					
Weight (approx.)		kg	0.16		
Installation position			Any		
Ambient temperature range		°C	−30 ... +80		
Salt spray test according to ISO 9227		h	600 (NSS test)		
Solenoid surface protection		Coating according to DIN 50962-Fe//ZnNi with thick film passivation			
Hydraulic					
Maximum working pressure	Port A	p _A	bar	210	
	Port P	p _p	bar	210	
Max. counter-pressure	Port T	p _T	bar	30	
Maximum flow (Δp = 5 bar)	P → A	q _v	l/min	7	
Maximum leakage flow	Port T	q _L	cm³/min	≤ 115 (p _p = 100 bar; control current I = 0)	
Hydraulic fluid	See table on page 5				
Hydraulic fluid temperature range		ϑ	°C	−30 ... +80	
Viscosity range		ν	mm²/s	10 ... 380	
Maximum admissible degree of contamination of hydraulic fluid, cleanliness level as per ISO 4406 (c)				Level 20/18/15 ¹⁾	
Load cycles				10 million	
Electric					
Voltage type			DC voltage		
Supply voltage (±15 %)		U	V	12	24
Power consumption	at 20 °C	P	W	14.4	14.4
Coil resistance	Cold value at 20 °C	R	Ω	10	40
Duty cycle			%	100	
Maximum coil temperature ²⁾			°C	150	
Switching time	ON		ms	≤30	
	OFF		ms	≤25	
Type of protection according to ISO 20653	Connector version "C4"			IP6K5 ³⁾	
				IP6K7 and IP6K9K ³⁾ (only with Rexroth plug-in connector, material no. R901022127)	
	Connector version "K40"			IP6K7 and IP6K9K ³⁾	
Switching frequency			Hz	5	
Design according to VDE 0580					

Notice

- ▶ For applications outside these values, please consult us!
- ▶ The technical data was determined at a viscosity of $\nu = 46$ mm²/s (HLP46; $\vartheta_{oil} = 40$ °C).

Notice

For the electrical connection, a protective earth (PE $\perp$) connection is mandatory based on the specification.

¹⁾ Cleanliness levels specified for the components must be maintained in the hydraulic systems. Effective filtration prevents malfunctions and simultaneously extends the service life of the components.
We recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.

²⁾ Surface temperature > 50 °C possible, provide contact protection in compliance with ISO 13732-1 and ISO 4413 standards.

³⁾ With assembled and locked plug-in connector

Hydraulic fluid

Hydraulic fluid		Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils		HL, HLP	FKM	DIN 51524	90220
Environmentally acceptable	Insoluble in water	HEES	FKM	ISO 15380	90221
	Soluble in water	HEPG	FKM	ISO 15380	90221

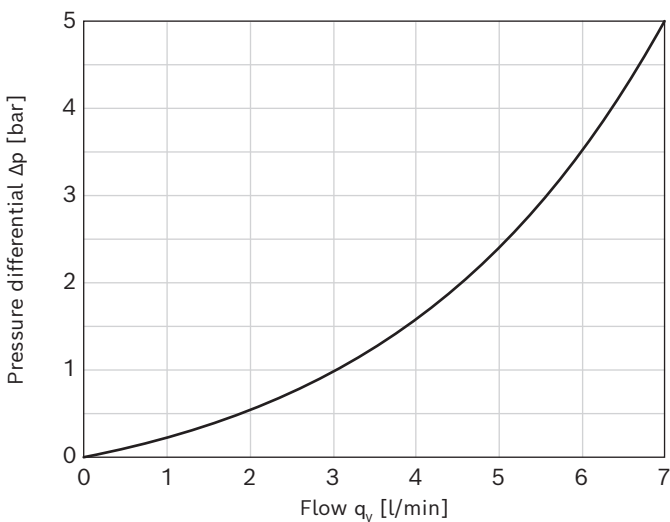
Notice

- Further information and details on using other hydraulic fluids are available in the above data sheets or on request.
- Restrictions are possible with the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!

- The flash point of the hydraulic fluid used must be 40 K above the maximum solenoid surface temperature.
- **Environmentally acceptable:** If environmentally acceptable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

Characteristic curves

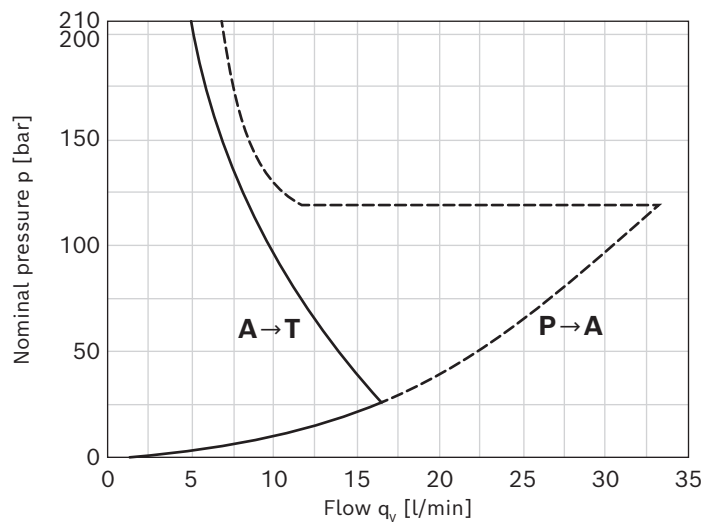
Δp - q_v **flow characteristic curve** (q_v = minimum specification)
P → A; A → T



Notice

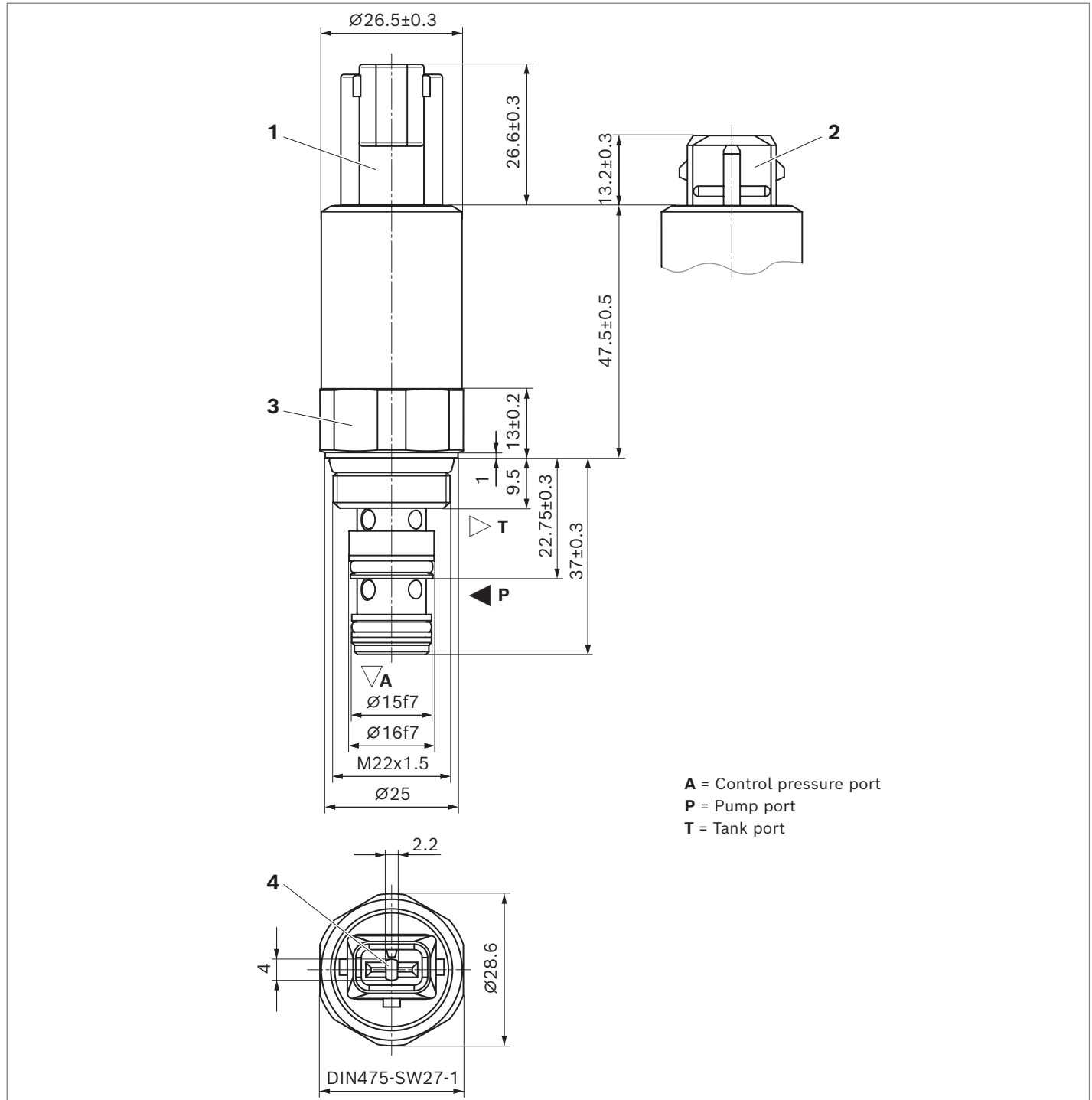
- Characteristic curves measured with HLP46, $\vartheta_{oil} = 40 \pm 5$ °C.
- The performance limit was determined with solenoids at operating temperature and 10 % undervoltage.

Performance limit

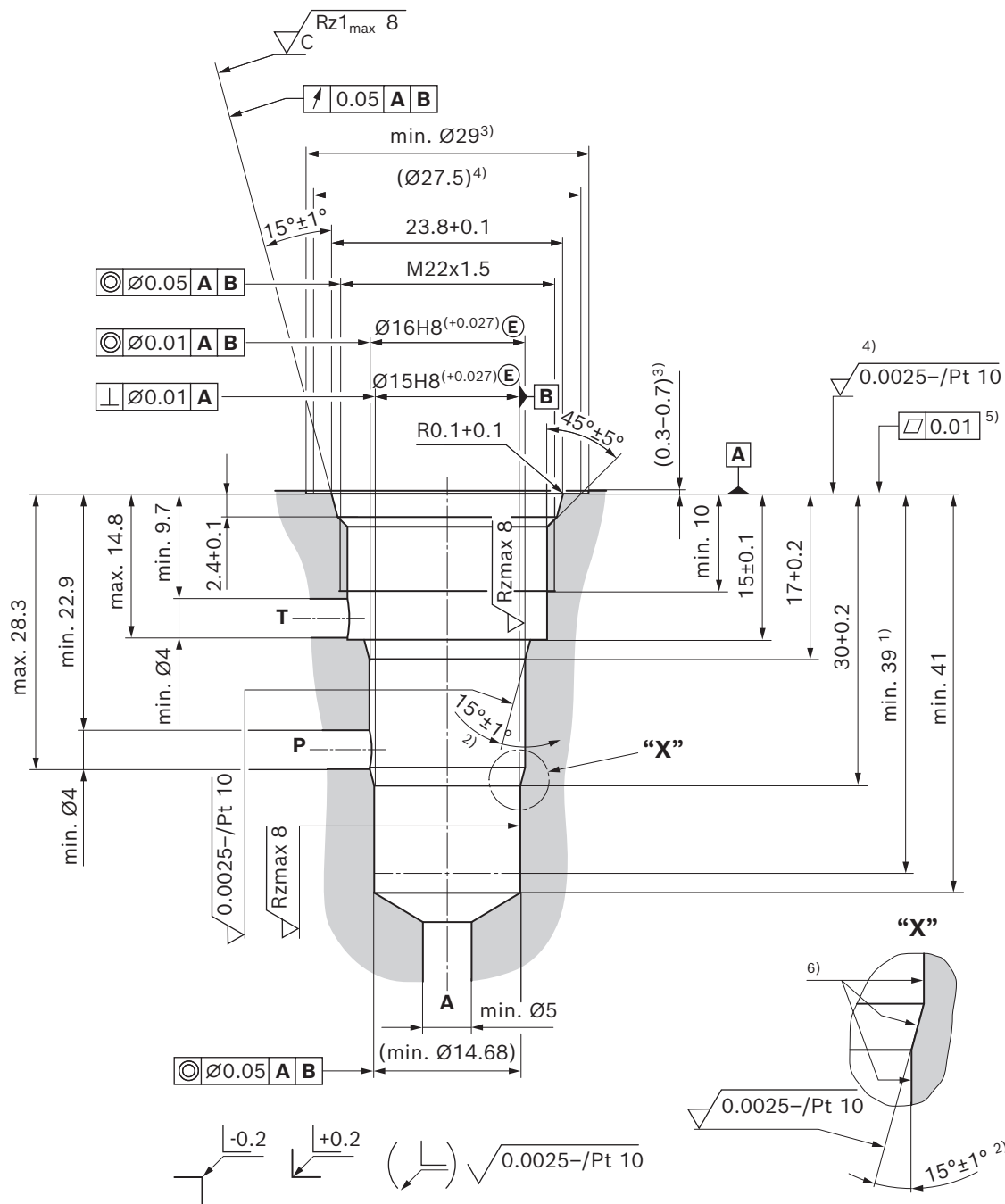


Dimensions

▼ **FTWE 4 K with screw-in thread**



- | | |
|---|---|
| <p>1 Device connector "K40"
(separate order, see data sheet 08006)</p> <p>2 Device connector "C4"
(separate order, see data sheet 08006)</p> <p>3 Hexagon SW27; tightening torque $M_A = 12+5 \text{ Nm}$</p> | <p>4 Manual override:
Actuated by pin tool (connector must be removed to actuate manual override; versions "C4" and "K40"). Maximum number of matings is 10 (Specification AMP 108-18013).</p> |
|---|---|

Mounting cavity**Standards:**

Workpiece edges	ISO 13715
Shape and position tolerance	ISO 1101
General tolerances for machining	ISO 2768-mK
Tolerance	ISO 8015
Surface finish	ISO 1302

1) Depth of fit

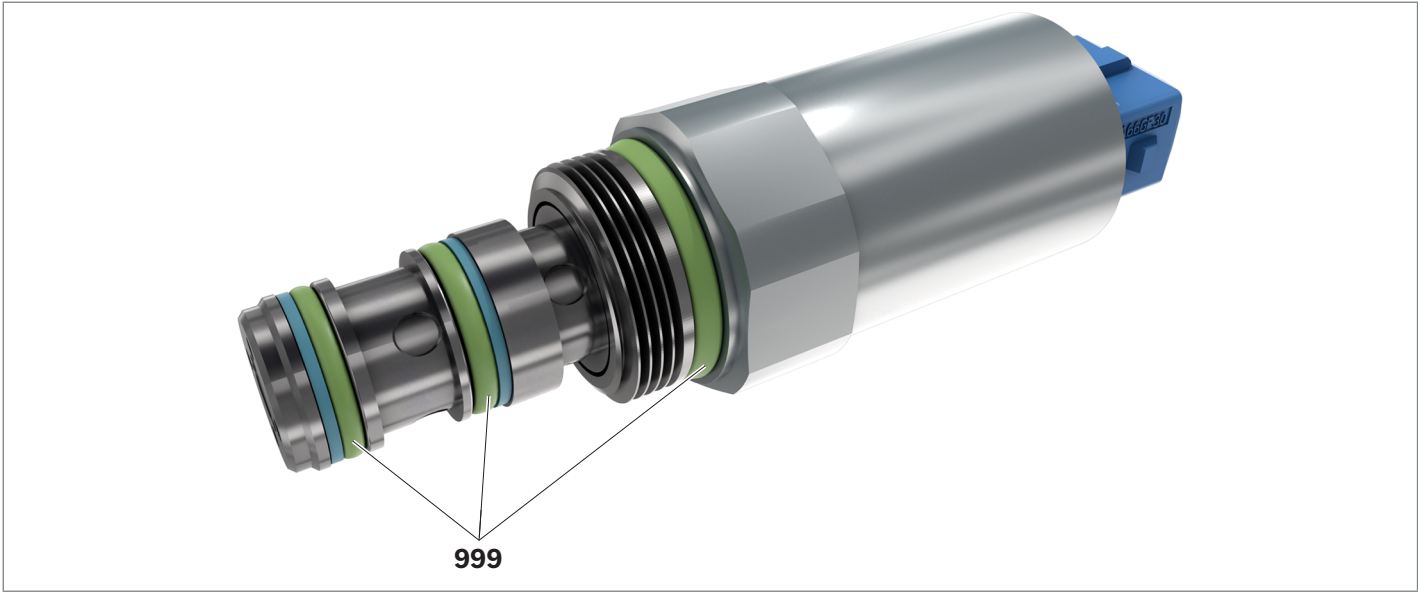
2) All seal ring insertion faces are rounded and free of burrs

3) If counterbore depth >1 mm → counterbore $\varnothing \geq 33$ mm4) Required roughness up to $\varnothing 27.5$ mm5) Required evenness up to $\varnothing 27.5$ mm

6) Overall contour finished with mold tool

Available individual components

▼ FTWE 4 K with screw-in thread



Item	Denomination	Material no.
999	Seal kit of the valve (FKM)	R900846072

Seal kits with other seals on request.

Related documentation

- ▶ Mineral oil-based hydraulic fluids
 - ▶ Environmentally acceptable hydraulic fluids
 - ▶ MTTF_D values
- Data sheet 90220

Data sheet 90221

Data sheet 90294

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