RE 58008/2021-06-11
Replaces: 2014-07

rexroth
A Bosch Company

Directional spool valve, direct-operated, with solenoid actuation
FTWE 4 K

- Size 4
- Series 1X
- 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

Contents

Type code

01	02	03	04	05		06	07	08	09	10	11
FTWE	**4**	**K**		**1X**	**/**	**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 10 to 19 (unchanged installation and connection dimensions)	**1X**

Maximum nominal pressure

06	210 bar	**210**

07	DC voltage solenoid, switching in oil	**A**

Supply voltage

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

Electrical connection[1)]

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 KC1X/210AG12C4V	R900568315
FTWE 4 KC1X/210AG12K40V	R901119907
FTWE 4 KC1X/210AG24C4V	R900568316
FTWE 4 KC1X/210AG24K40V	R900772014

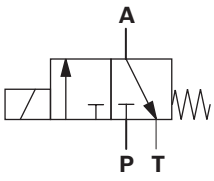
1) Plug-in connectors are not included in the scope of delivery and must be ordered separately, see data sheet 08006.
2) Manual override can only be performed after disconnecting the device plug!

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

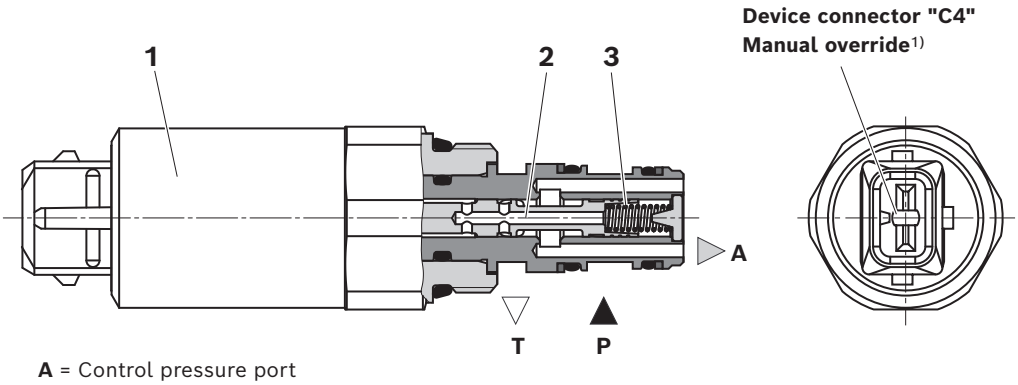
In non-actuated state, the control spool (**2**) is kept in the initial position by the return spring (**3**).

- 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**



A = Control pressure port
P = Pump port
T = Tank port

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 ν = 46 mm²/s (HLP46; ϑ_{oil} = 40 °C).

Notice

For the electrical connection, a protective earth (PE ⏚) 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

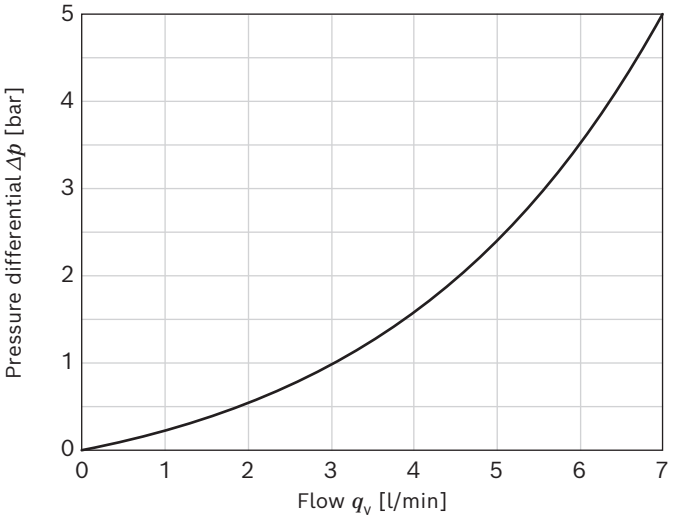
Hydraulic fluid

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

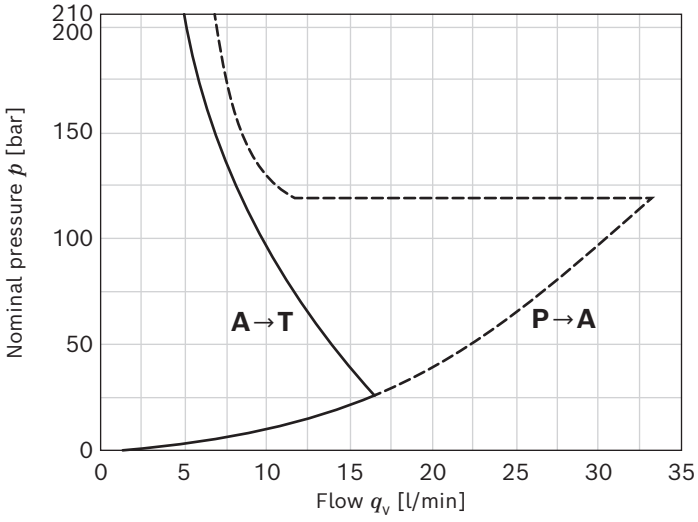
Notice
- Further information and details on using other hydraulic fluids are available in the above data sheets or on request.
- Restrictions are possible with the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the hydraulic fluid used must be 40 K above the maximum solenoid surface temperature.
- **Environmentally acceptable:** If environmentally acceptable hydraulic fluids are used that are also zinc-solving, there may be an accumulation of zinc.

Characteristic curves

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



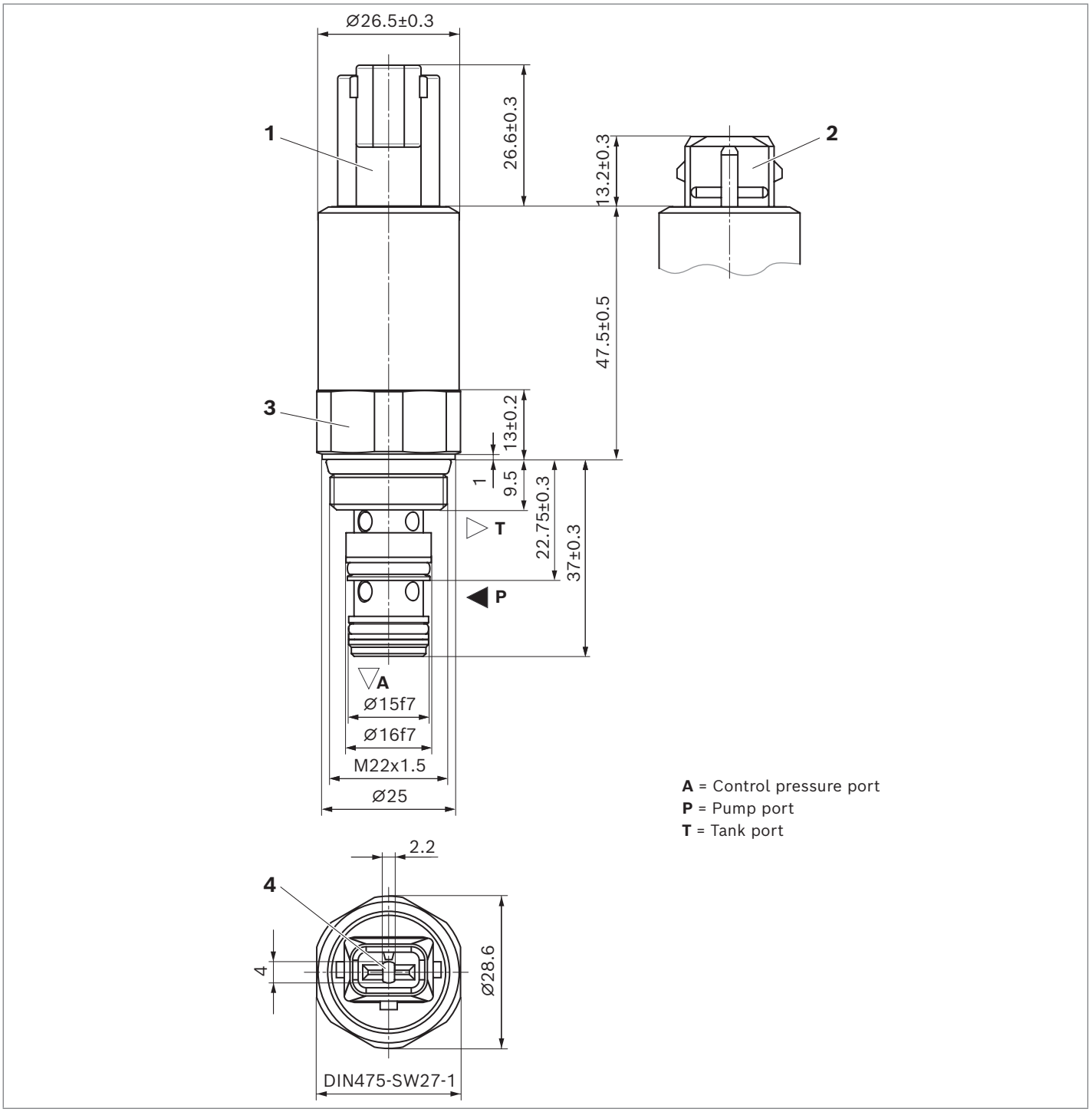
Performance limit



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

Dimensions

▼ **FTWE 4 K with screw-in thread**



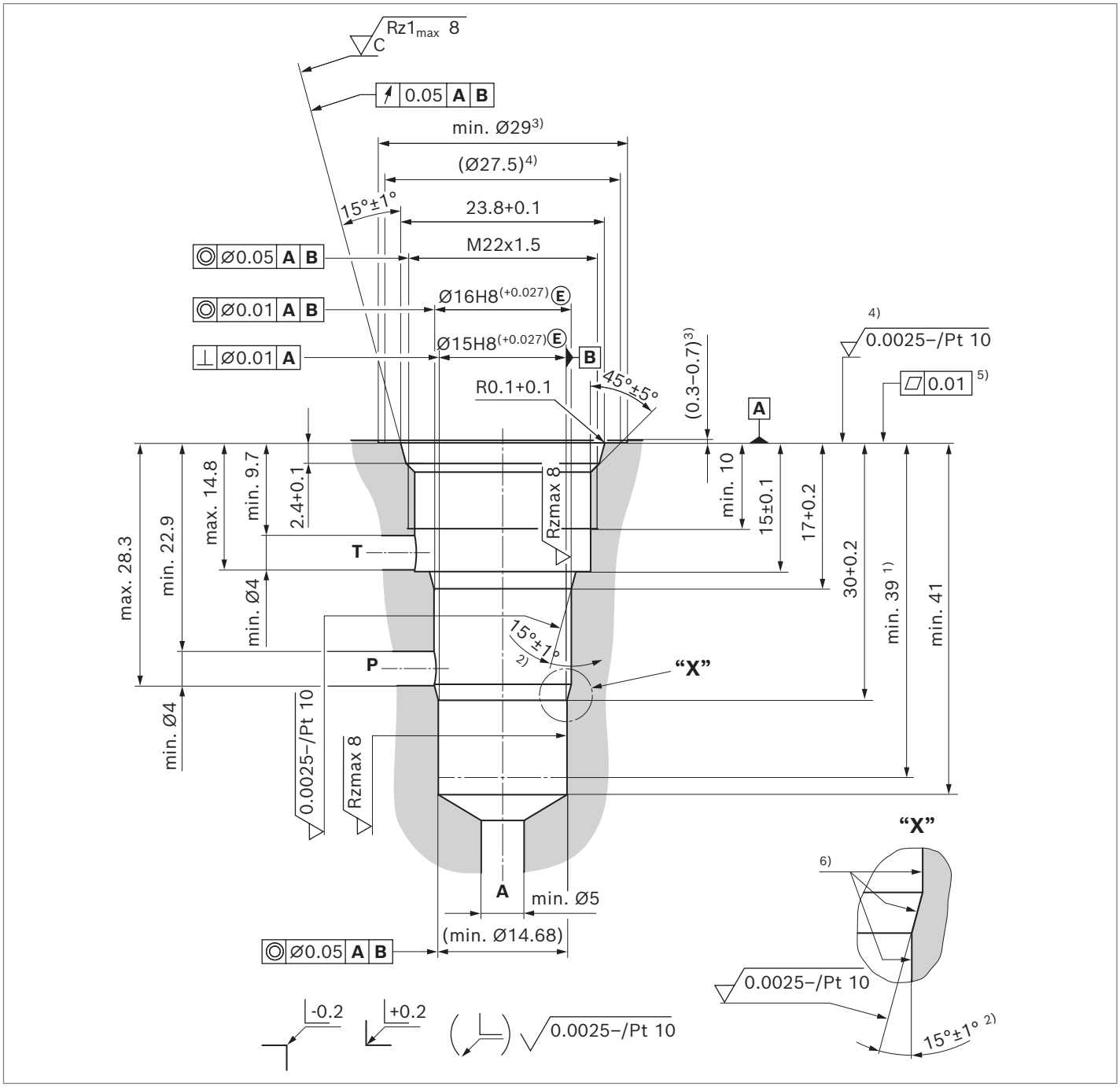
1 Device connector "K40"
(separate order, see data sheet 08006)

2 Device connector "C4"
(separate order, see data sheet 08006)

3 Hexagon SW27; tightening torque M_A = 12+5 Nm

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).

Mounting cavity



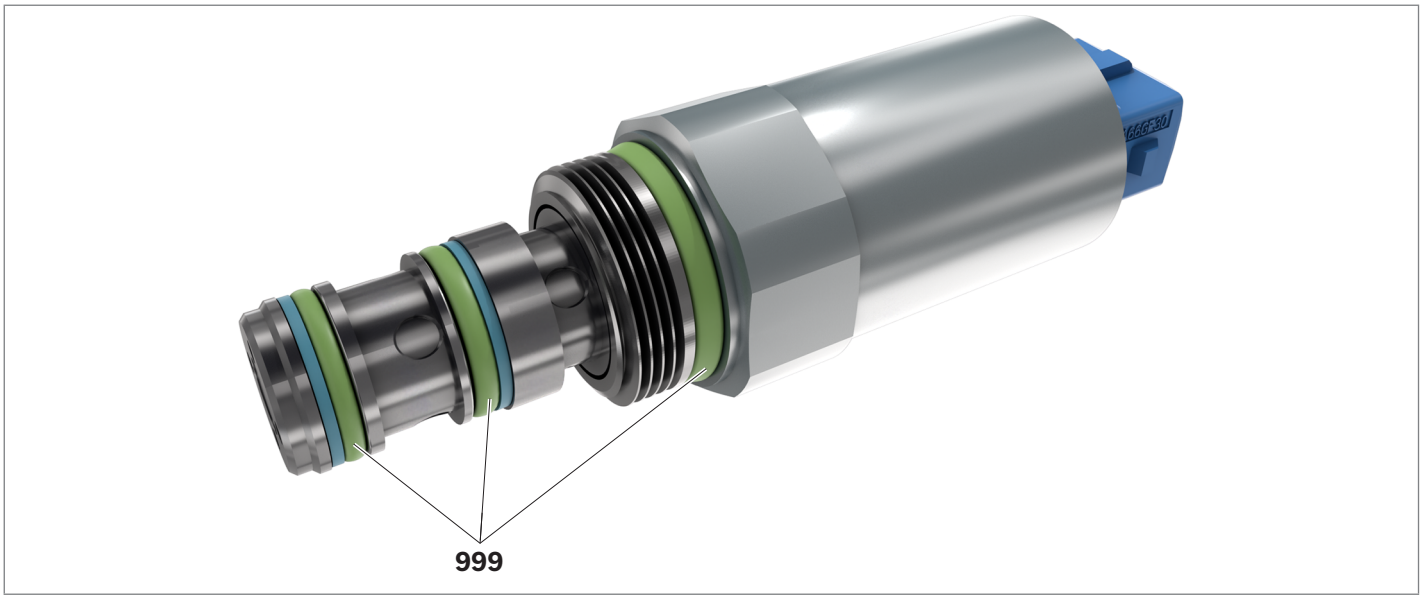
Standards:

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 Ø ≥33 mm
4) Required roughness up to Ø 27.5 mm
5) Required evenness up to Ø 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

- Control electronics:
  - Analog amplifier — Type RA... — Data sheet 95230
  - BODAS controller — Type RC... — Data sheets 95204, 95205, 95206
- Mineral oil-based hydraulic fluids — Data sheet 90220
- Environmentally acceptable hydraulic fluids — Data sheet 90221
- $MTTF_D$ values — Data sheet 90294

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