Proportional pressure reducing valve
FTDRE4K-046

RE 58040
Edition: 11.2017
Replaces: 05.2017

H7980

- Size 4
- Series 1X
- Maximum control pressure 18, 30 bar
- Maximum working pressure 250 bar
- Maximum flow 5 l/min (at Δp = 7 bar)

Features

- Direct operated proportional pressure reducing valve for reducing system pressure
- Cartridge valve
- Suitable for mobile and industrial applications
- Actuation via proportional solenoid
- In case of a power failure, the minimum pressure is set
- Recommended electronic controls:
  Mobile amplifier type RA and RC

Contents

Type code

01	02	03	04		05	06	07	08	09	10		11
FTDRE	**4**	**K**	**1X**	**/**		**A**				**M**	**–046**	*****

Valve type

01	Proportional pressure reducing valve, non-standard design, electrical actuation	**FTDRE**
02	Size 4	**4**
03	Cartridge valve	**K**

Series

04	Series 10 to 19 (10 to 19; unchanged installation and connection dimensions)	**1X**

Maximum control pressure

05	18 bar	**18**
	30 bar	**30**

06	Proportional solenoid, switching in oil	**A**

Supply voltage

07	Electronic controls 12 V DC	**G12**
	Electronic controls 24 V DC	**G24**

Manual override

08	**Without** manual override	**N0**

Electrical connection[1)]

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

Sealing material

10	NBR (nitrile rubber)	**M**

11	Further specifications in plain text	*****

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

Preferred types

Type	Material no.
FTDRE 4 K1X/18AG12N0C4M–046	R901451321
FTDRE 4 K1X/30AG24N0K40M–046	R901451364

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

Functional description

General

The proportional pressure reducing valve type FTDRE4K-046 is a direct operated cartridge valve in 3-way design. It reduces the control pressure (port **A**) proportional to the solenoid current and works largely independently from the inlet pressure (port **P**).
With a setpoint value of 0 or in case of a power failure, the minimum pressure is set. The actuation takes place via a proportional solenoid. The inside of the solenoid is connected with the tank port **T** and filled with hydraulic fluid.
With these valves, the system pressure can be reduced continuously depending on the electrical setpoint value.
The valve is suitable for actuating couplings, pumps and directional valves, as well as for use in proportional pilot controls (particularly in the mobile area, but also for industrial applications).

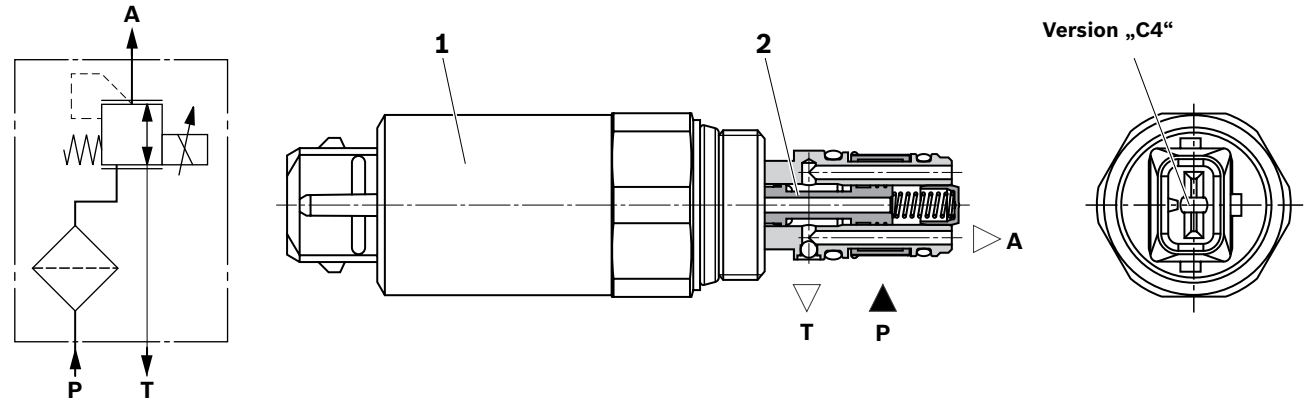
Basic principle

The valve regulates the pressure in the port **A** proportional to the current on the solenoid.
The proportional solenoid (**1**) converts the electric current into mechanical force that acts on the control spool (**2**) via the anchor. The control spool controls the connection between the main ports.

Notice

- Occurring tank pressure (port **T**) adds up to the control pressure (port **A**).
- In uninstalled state or in a system that is not vented completely, the valve must not be energized, as the entering air otherwise has a significant negative effect on the dynamic behavior of the valves.

▼ **Section and symbol**



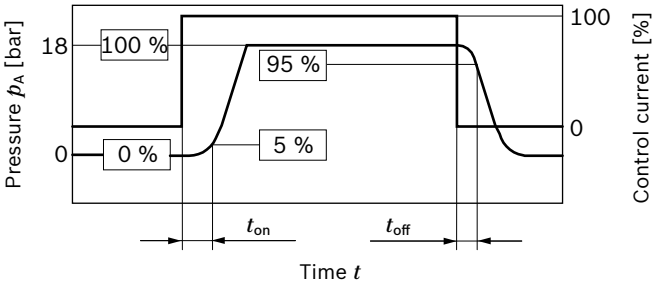
A = Control pressure port
P = Pump port
T = Tank port

Technical data

General			
Weight (approx.)		kg	0.19
Installation position			Any; the position of the electrical connection should preferably be hanging down (with the valve in horizontal position or with the electrical connection pointing upwards, a minimum counter-pressure must be generated so that the valve remains filled with oil).
Ambient temperature range	Version 18 bar	°C	–30 to +100
	Version 30 bar	°C	–30 to +100
Salt spray test according to ISO 9227		h	600 (NSS test)
Surface protection solenoid			Coating according to DIN 50962-Fe//ZnNi with thick film passivation

Hydraulic				
Maximum control pressure	Port **A**	p_A	bar	18, 30
Maximum inlet pressure	Port **P**	p_E	bar	250
Counter-pressure	Port **T**	p_T	bar	Depressurized (maximum 30) Counter-pressure increases set pressure, including with current I = 0
Flow (Δp = 7 bar)	**P** → **A**	q_V	l/min	≥ 5 (maximum permissible 7.5)
Maximum leakage flow	Port **T**	q_L	cm³/min	≤ 100 (p_E = 100 bar and control current I = 0)
Maximum pilot flow			cm³/min	≤ 350 (p_E = 100 bar, $q_{V\,A}$ = 0 and control current $I = I_{max}$)
Hydraulic fluid				See table page 5
Hydraulic fluid temperature range		ϑ	°C	–20 to +80
Viscosity range		ν	mm²/s	10 to 380
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness level as per ISO 4406 (c)				Class 20/18/15 [1]
Load cycles				2 mill.
Maximum step response with control current change (see characteristic curve below)		t_{on}	ms	40
		t_{off}	ms	20
Mesh width mesh filter element	Port **P**		µm	160

▼ **Maximum step response**



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.
When selecting filters, see www.boschrexroth.com/filter.
We recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.

Electric					
Voltage type				DC voltage	
Supply voltage		U	V	**12**	**24**
Maximum solenoid current		I_{max}	mA	1800	800
Coil resistance	Cold value at 20 °C	R	Ω	2.4	12
Duty cycle			%	100 See characteristic curves page 7.	
Maximum coil temperature[2)]			°C	150	
Type of protection according to DIN EN 60529	Connector version “C4”			IP65 (with installed and locked plug-in connector)	
				IP67 and IP69K (with Rexroth plug-in connector, material no. R901022127)	
	Connector version “K40”			IP67 and IP69K (with installed and locked plug-in connector)	
Electronic controls (separate order)				Analog amplifier type RA... (Data sheet 95230)	
				BODAS controller type RC... (Data sheet 95204, 95205, 95206)	
Recommended dither frequency (PMW) Chopper frequency (recommended)[3)]			Hz	200	
Design in accordance with VDE 0580					

Notice

- The technical data was determined at a viscosity of ν = 46 mm²/s (HLP32; ϑ_{oil} = 40±5 °C)
- Please contact us if the unit is to be used outside the specified range of values!
- For the electrical connection, a protective earth (PE ⏚) connection is mandatory based on the specification.

Hydraulic fluid

Hydraulic fluid	Classification	Suitable seal materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR	DIN 51524	90220

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 flashpoint of the hydraulic fluid used must be 40 K above the maximum solenoid surface temperature.

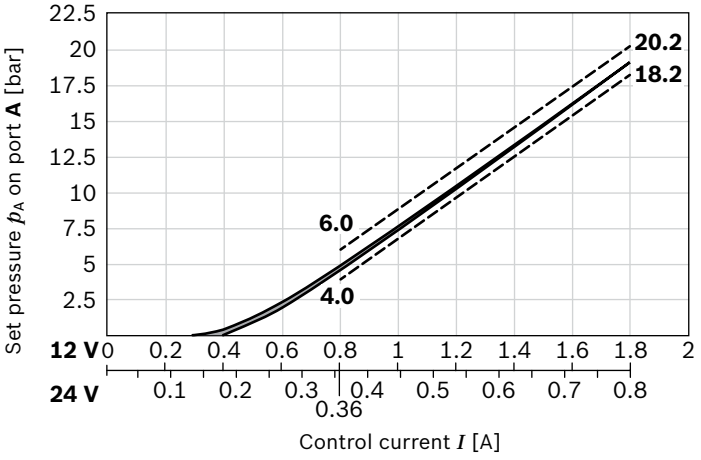
2) Due to the arising surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 must be observed.

3) The chopper frequency is to be optimized after the application. The use temperature range is to be observed.

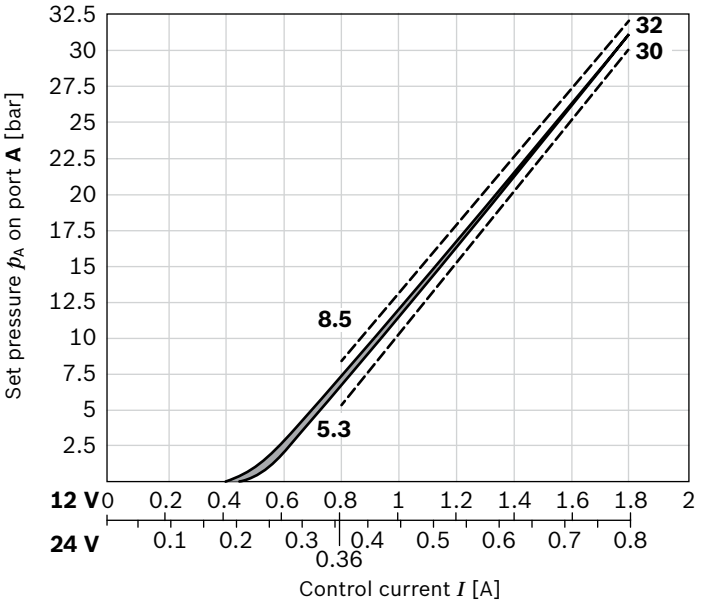
Characteristic curves

p-I characteristic curves with tolerance band

▼ **Control pressure 18 bar**



▼ **Control pressure 30 bar**



Notice
Characteristic curves measured with HLP46,
ϑ_{oil} = 40$^{\pm 5}$ °C)

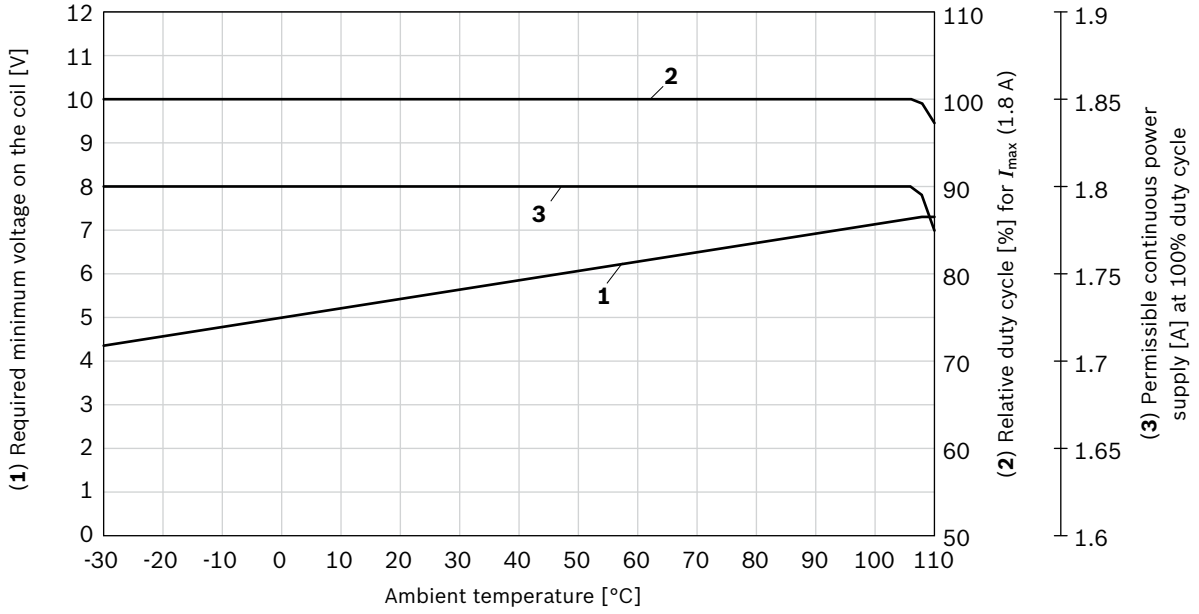
Measuring conditions

Amplifier		Analog amplifier RA (data sheet 95230)
Chopper frequency	Hz	200
Inlet pressure	bar	50
Dead volume on the control pressure port **A**	ml	135

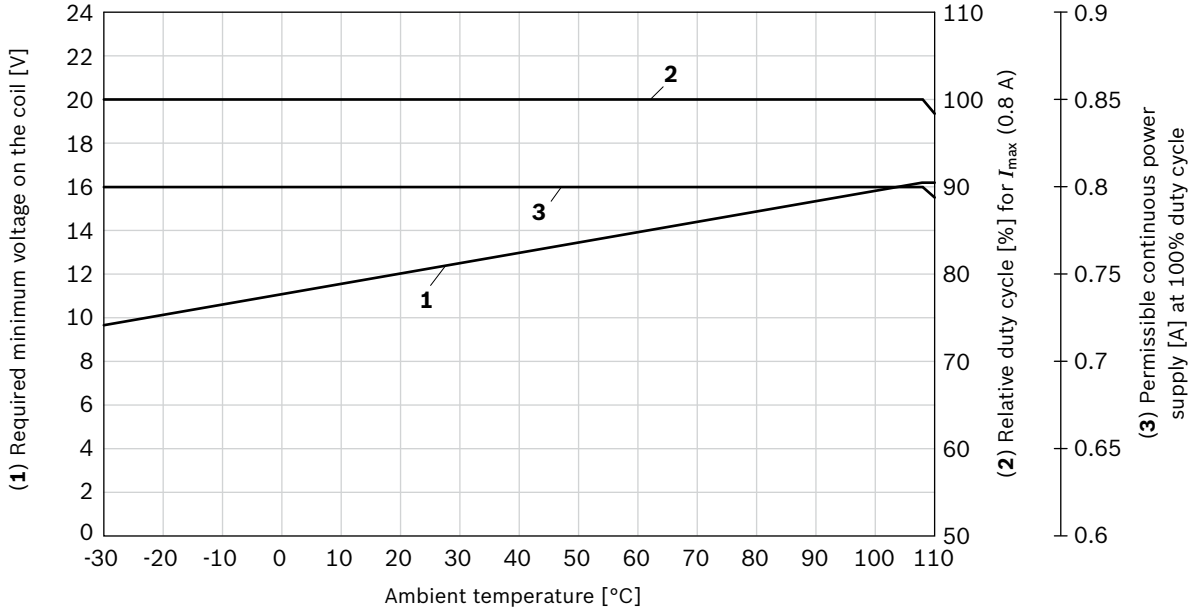
Permissible working range

Minimum terminal voltage on the coil, relative duty cycle and permissible working range depending on the ambient temperature

▼ **Control pressure 18 and 30 bar, 12 V** (R_{nom} = 2.4 Ω; I_{max} = 1.8 A)

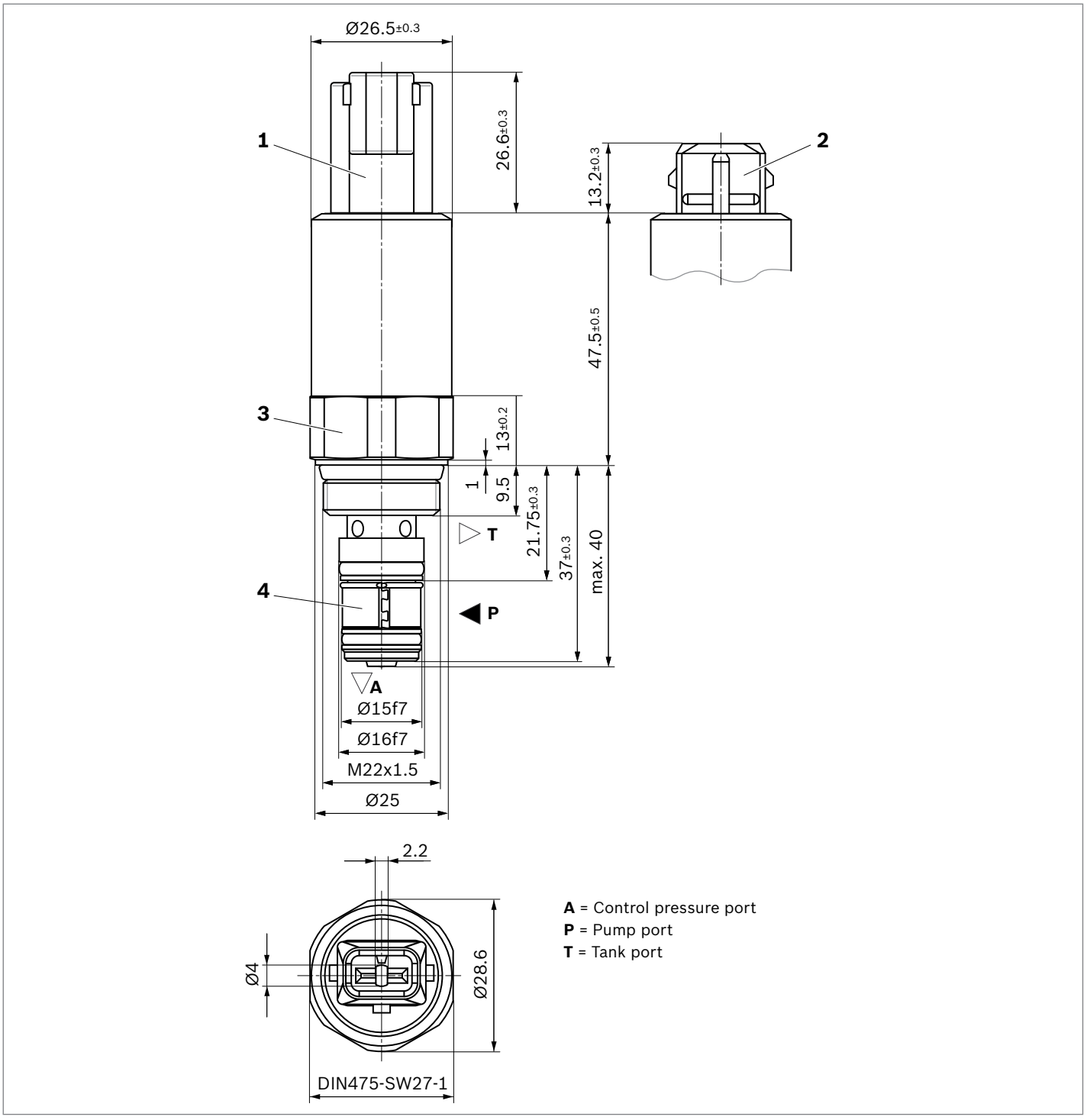


▼ **Control pressure 18 and 30 bar, 24 V** (R_{nom} = 12 Ω; I_{max} = 0.8 A)



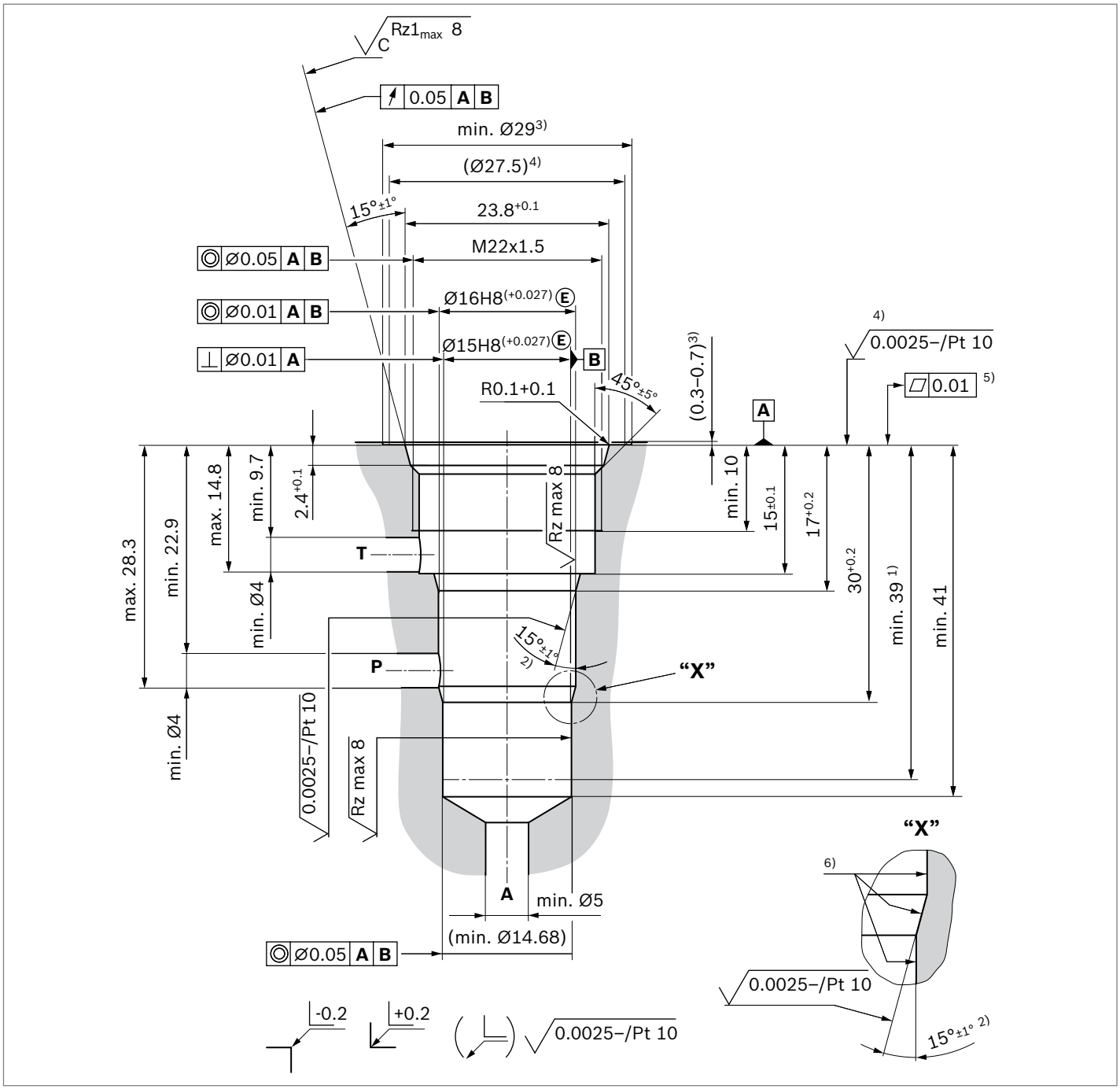
Dimensions

▼ **FTDRE4K-046 with thread**



1 Plug-in connector for device connector “K40” (separate order, see data sheet 08006)
2 Plug-in connector for device connector “C4” (separate order, see data sheet 08006)
3 Width across flats 27mm; M_A = $20^{\pm 2}$ Nm
4 Mesh filter 160 µm

▼ **Mounting cavity**

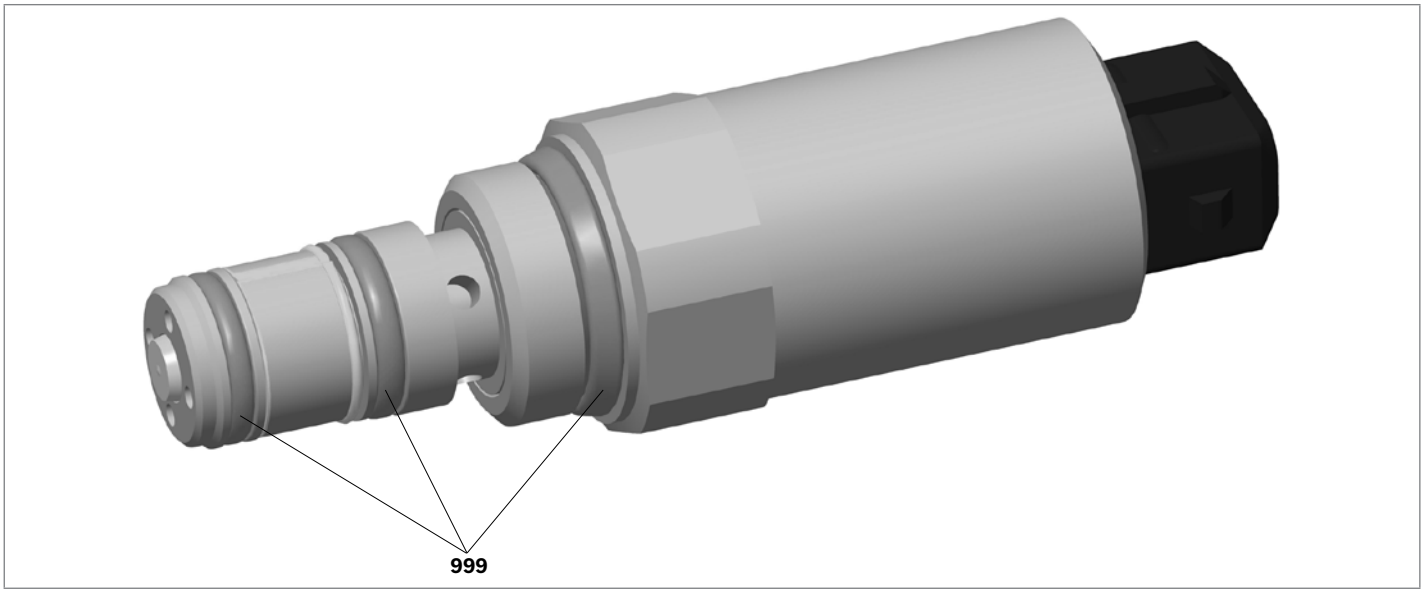


Standards:

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

1) Fit depth
2) All seal ring insertions faces are rounded and free of burrs
3) If counter bore depth > 1 mm → counter bore Ø ≥33 mm
4) Necessary roughness to Ø27.5 mm
5) Necessary evenness to Ø27.5 mm
6) Complete contour finished with forming tool

Available individual components



Item	Designation	Material no.
999	Seal kit of the valve (NBR)	R961012158

Seal kits with other seals on request.

Related documentation

- Electronic controls:
  - Analog amplifier type RA... data sheet 95230
  - BODAS controller type RC... data sheet 95204, 95205, 95206
- Mineral oil-based hydraulic fluids data sheet 90220
- Environmentally acceptable hydraulic fluids data sheet 90221
- Filter selection www.boschrexroth.com/filter
- $MTTF_d$ values data sheet 90294

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