Proportional pressure reducing valve FTDRE2K

RE 58032
Edition: 11.2017
Replaces: 04.2014

H7981

- Size 2
- Series 3X and 4X
- Maximum control pressure 18, 24, 30 bar
- Maximum working pressure 100 bar
- Maximum flow 2 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
- Actuated via proportional solenoid
- In case of power failure, minimum pressure is set.
- Recommended electronic controls: Mobile amplifiers type RA and RC

Content

Type code

01	02	03	04		05	06	07	08	09	10		11
FTDRE	**2**	**K**		**/**		**A**				**V**	**-8**	*****

Valve type

01	Proportional pressure reducing valve, non-standard design, electrical actuation	**FTDRE**
02	Size 2	**2**
03	Cartridge valve	**K**

Series

04	Series 30 to 39 (unchanged installation and connection dimensions)	**3X**
	Series 40 to 49 (unchanged installation and connection dimensions)	**4X**

Maximum control pressure

05	Series 3X	18 bar	**18**
		24 bar	**24**
	Series 4X	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	**With** manual override (Series 3X only)	**No desig.**
	Without manual override	**N0**

Electrical connection[1]

09	Device connector 2-pin DT04-2P (Deutsch)	**K40**
	Device connector 2-pin, Junior Timer (AMP)	**C4**

Sealing material

10	FKM (fluoroelastomer)	**V**

12	Further details in plain text	*****

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

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

Preferred types

Series 3X

Type	Material no.
FTDRE 2 K3X/18AG12C4V-8	R900726604
FTDRE 2 K3X/18AG12K40V-8	R901047323
FTDRE 2 K3X/18AG24C4V-8	R900701407
FTDRE 2 K3X/18AG24K40V-8	R901023204
FTDRE 2 K3X/18AG12N0C4V-8	R901377809
FTDRE 2 K3X/18AG12N0K40V-8	R901377815
FTDRE 2 K3X/18AG24N0C4V-8	R901377808
FTDRE 2 K3X/18AG24N0K40V-8	R901377814

Series 4X

Type	Material no.
FTDRE 2 K4X/30AG12N0C4V-8	R901163327
FTDRE 2 K4X/30AG12N0K40V-8	R901163511
FTDRE 2 K4X/30AG24N0C4V-8	R901163577
FTDRE 2 K4X/30AG24N0K40V-8	R901163136

Functional description

General

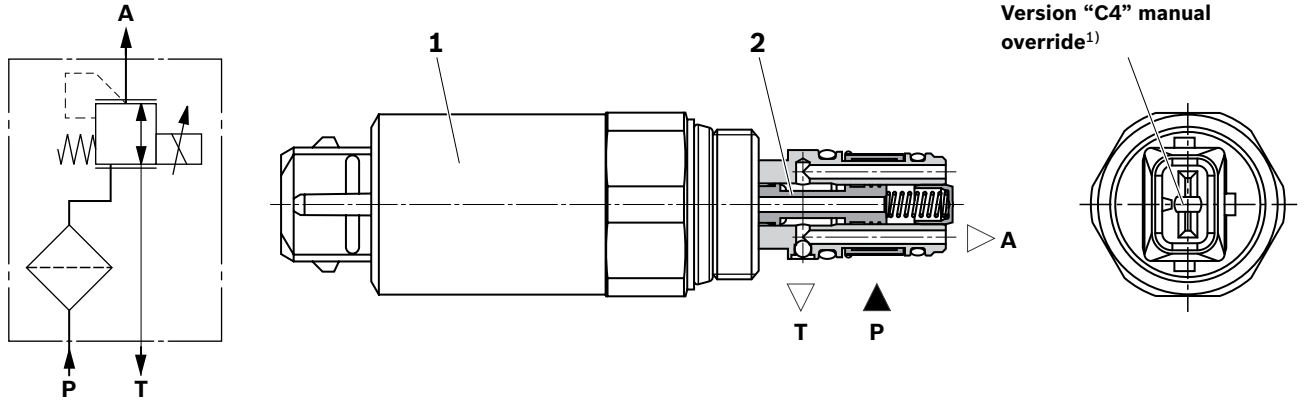
The proportional pressure reducing valve type FTDRE2K is a direct operated cartridge valve in 3-way design. It reduces the control pressure (port **A**) proportional to the solenoid current and works largely independently from the inlet pressure (port **P**).
Minimum pressure is set in case of power failure or if the setpoint value is 0. The actuation takes place via a proportional solenoid. The inside of the solenoid is connected with the 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 an 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.



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

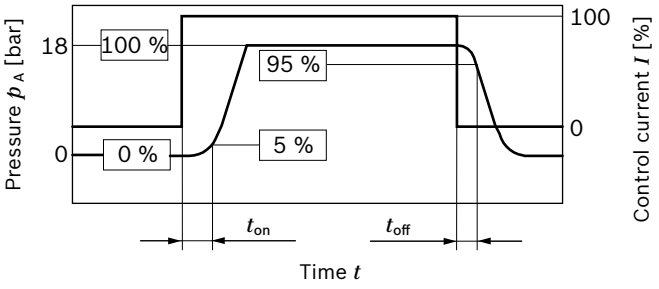
1) Not in Version “N0”. Actuated by pin tool (plug must be removed to actuate manual override [versions “C4” and “K40”]). Maximum number of matings is 10 (Specification AMP 108-18013).

Technical data

General				
Weight (approx.)		kg	0.16	
Installation position			Any; 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	18 bar version	°C	–30 to 120	
	24 bar version	°C	–30 to 80	
	30 bar version	°C	–30 to 110	
Salt spray test according to ISO 9227		hr	600 (NSS test)	
Solenoid surface protection			Coating according to DIN 50962-Fe//ZnNi with thick film passivation	

Hydraulics				**Series 3X**	**Series 4X**
Maximum control pressure	Port **A**	p_A	bar	18, 24	30
Maximum inlet pressure	Port **P**	p_E	bar	100	
Counter-pressure	Port **T**	p_T	bar	Depressurized (maximum 30 bar) Counter-pressure increases set pressure, even when current I = 0	
Flow (Δp = 7 bar)	**P** → **A**	q_V	l/min	≥ 2 (maximum 7.5)	≥ 2.5 (maximum 7.5)
Maximum leakage flow	Port **T**	q_L	cm³/min	≤ 60 (p_E = 50 bar; control current I = 0)	
Maximum pilot flow			cm³/min	≤ 500	≤ 400
				(p_E = 50 bar, $q_{V\,A}$ = 0; control current $I = I_{max}$)	
Hydraulic fluid				See table on page 5	
Hydraulic fluid temperature range	18 bar version	ϑ	°C	-30 to 120	–
	24 bar version	ϑ	°C	-30 to 80	–
	30 bar version	ϑ	°C	–	-30 to 110
Viscosity range		ν	mm²/s	10 to 380	
Maximum admissible degree of contamination of hydraulic fluid, cleanliness level as per ISO 4406 (c)				Class 20/18/15 [1]	
Load cycles				10 mil.	
Maximum step response during control current change (see characteristic curve below)		t_{on}	ms	40	≤ 30
		t_{off}	ms	20	≤ 30 (20 maintained)
Mesh width mesh filter element	Port **P**		µm	160	180

▼ **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.

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

Electrical					
Voltage type				DC voltage	
Supply voltage		U	V	**12**	**24**
Maximum solenoid current	18/30 bar version	I_{max}	mA	1800	800
	24 bar version[2]	I_{max}		2200	980
Coil resistance	Cold value at 20 °C	R	Ω	2.4	12
Duty cycle			%	100 See characteristic curve on page 7	
Maximum coil temperature[3]			°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)				Type RA analog amplifier (Data sheet 95230)	
				Type RC BODAS controller (data sheets 95204, 95205, 95206)	
Recommended dither frequency (PMW) Chopper frequency (recommended)[4]			Hz	150	
Design in accordance with VDE 0580					

Notice

- The technical data was determined at a viscosity of ν = 46 mm²/s (HLP32; ϑ_{Oil} = 40 °C).
- Please contact us if the unit will 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 sealing materials**	**Standards**	**Data sheet**
Mineral oils		HL, HLP	FKM	DIN 51524	90220
Bio-degradable	insoluble in water	HEES	FKM	ISO 15380	90221
	soluble in water	HEPG	FKM	ISO 15380	

Notice

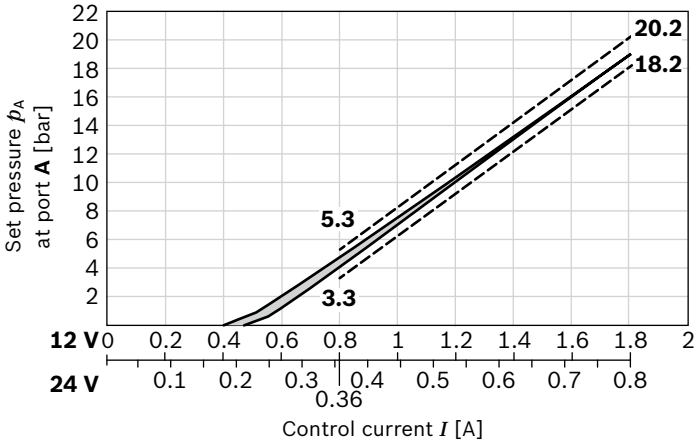
- Further information and details on using other hydraulic fluids are available in the above data sheets or on request.
- Restrictions are possible with the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.).
- The flash point of the hydraulic fluid used must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

2) Observe working temperatures, see characteristic curve on page 7 and 8
3) Due to the arising surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 must be observed.
4) The chopper frequency is to be optimized after the application. The use temperature range is to be observed.

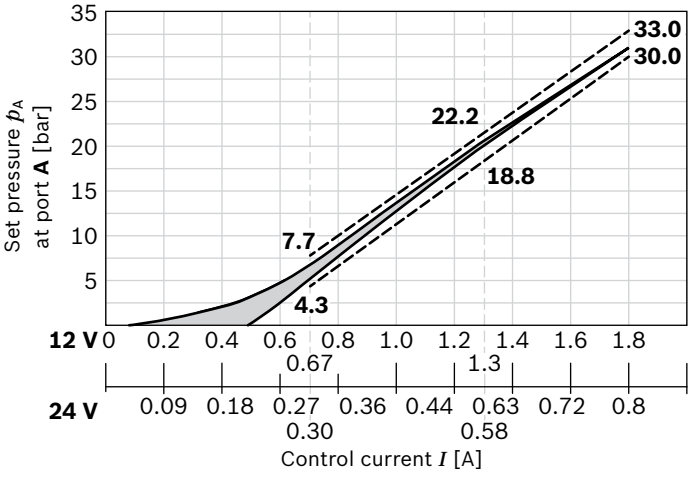
Characteristic curves

p-I characteristic curve with tolerance band

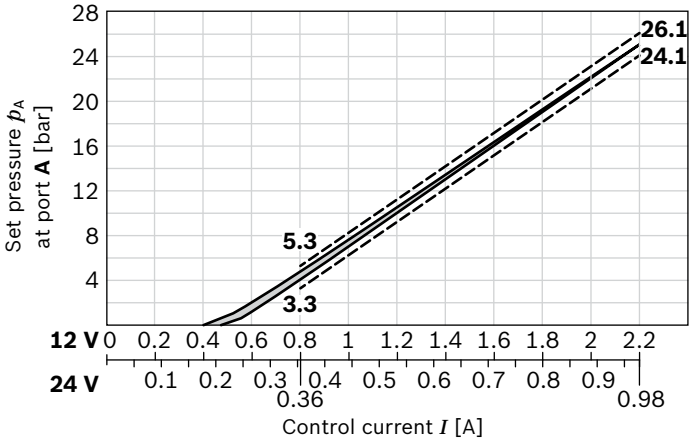
▼ **Control pressure 18 bar**



▼ **Control pressure 30 bar**



▼ **Control pressure 24 bar**



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

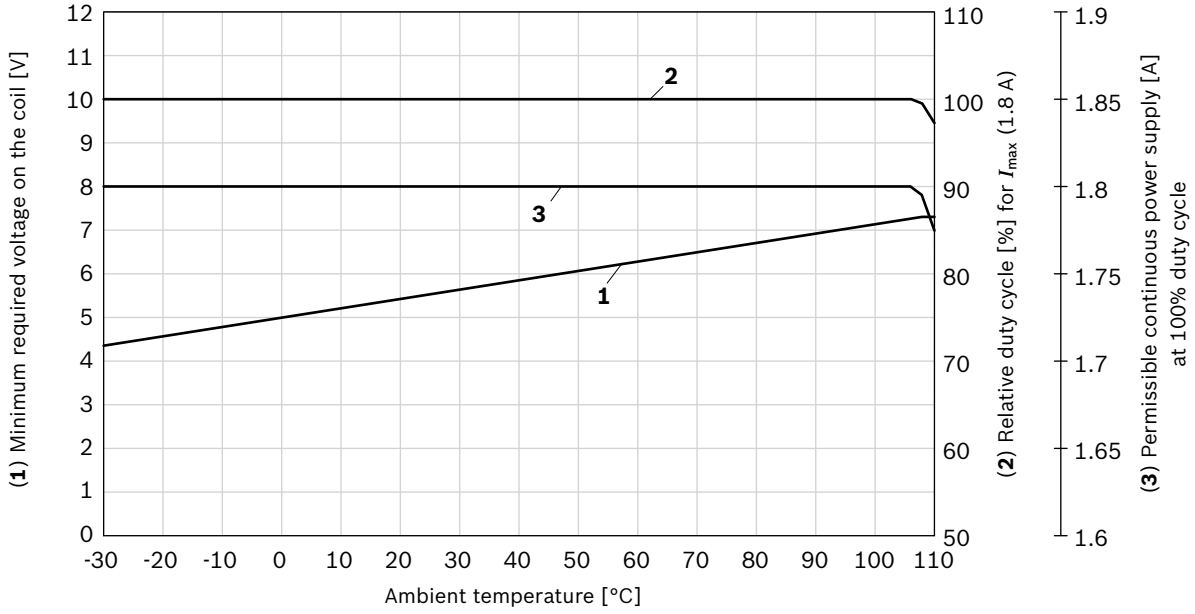
Measuring conditions

Amplifier		RA analog amplifier (Data sheet 95230)
Chopper frequency	Hz	200
Inlet pressure	bar	50
Dead volume at control pressure port **A**	ml	135

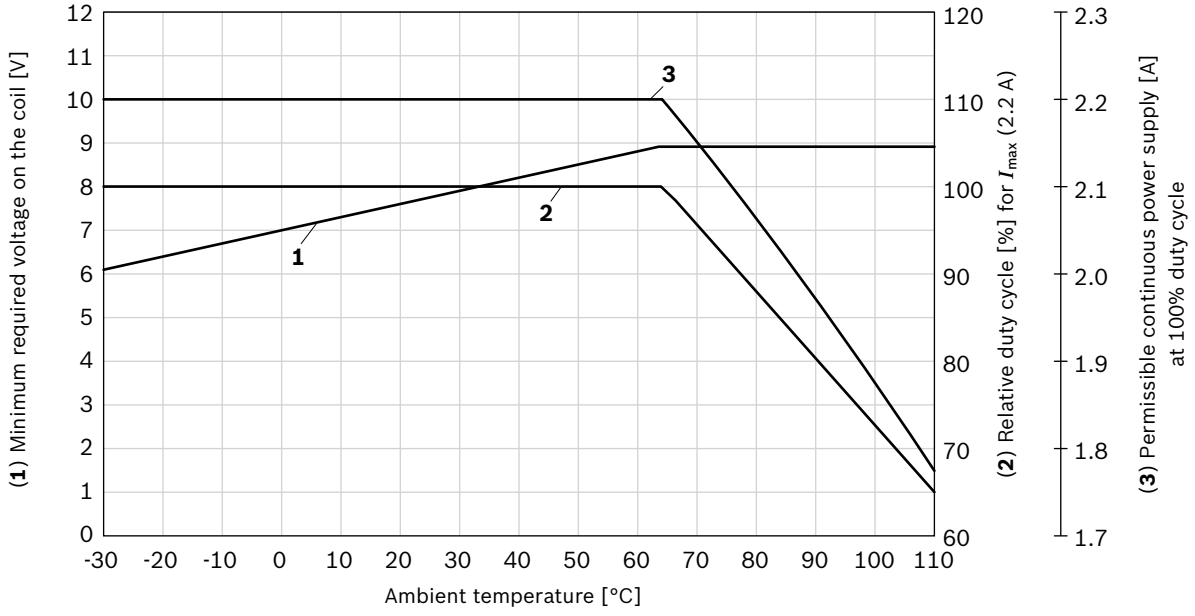
Permissible working range

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

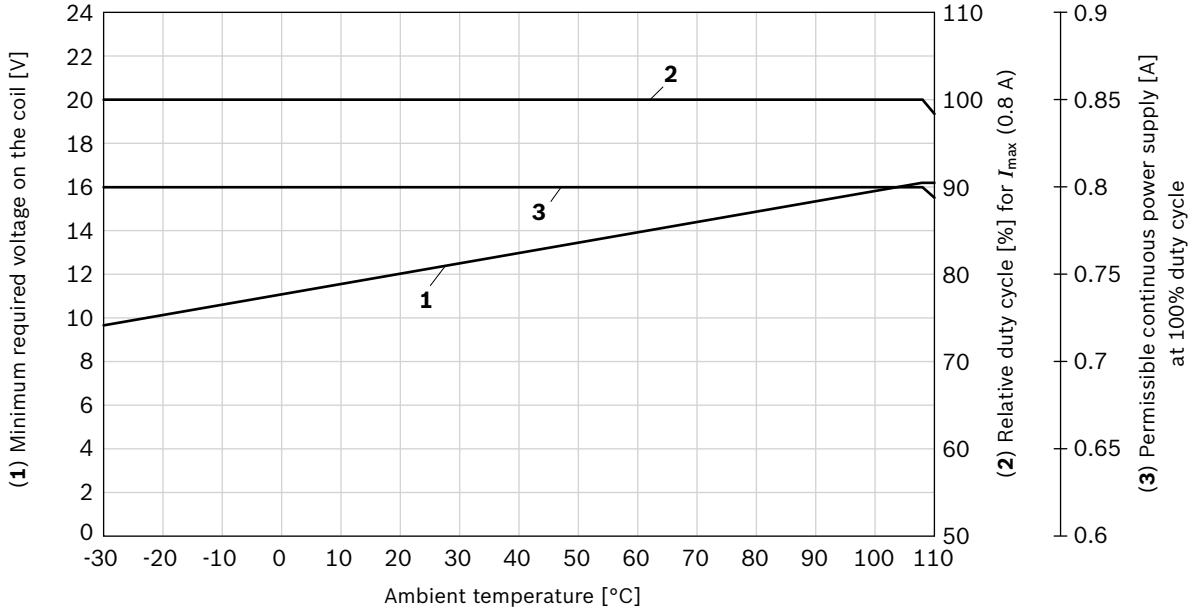
▼ **18 and 30 bar control pressure, 12 V** (R_{nom} = 2.4 Ω; I_{max} = 1.8 A)



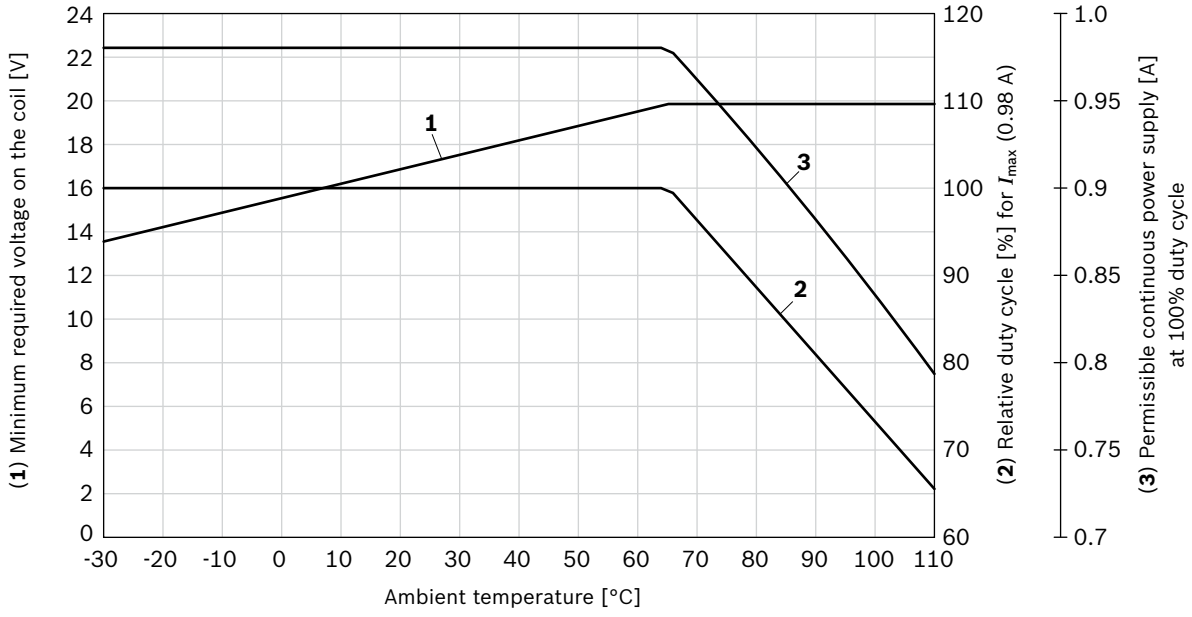
▼ **24 bar control pressure, 12 V** (R_{nom} = 2.4 Ω; I_{max} = 2.2 A)



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

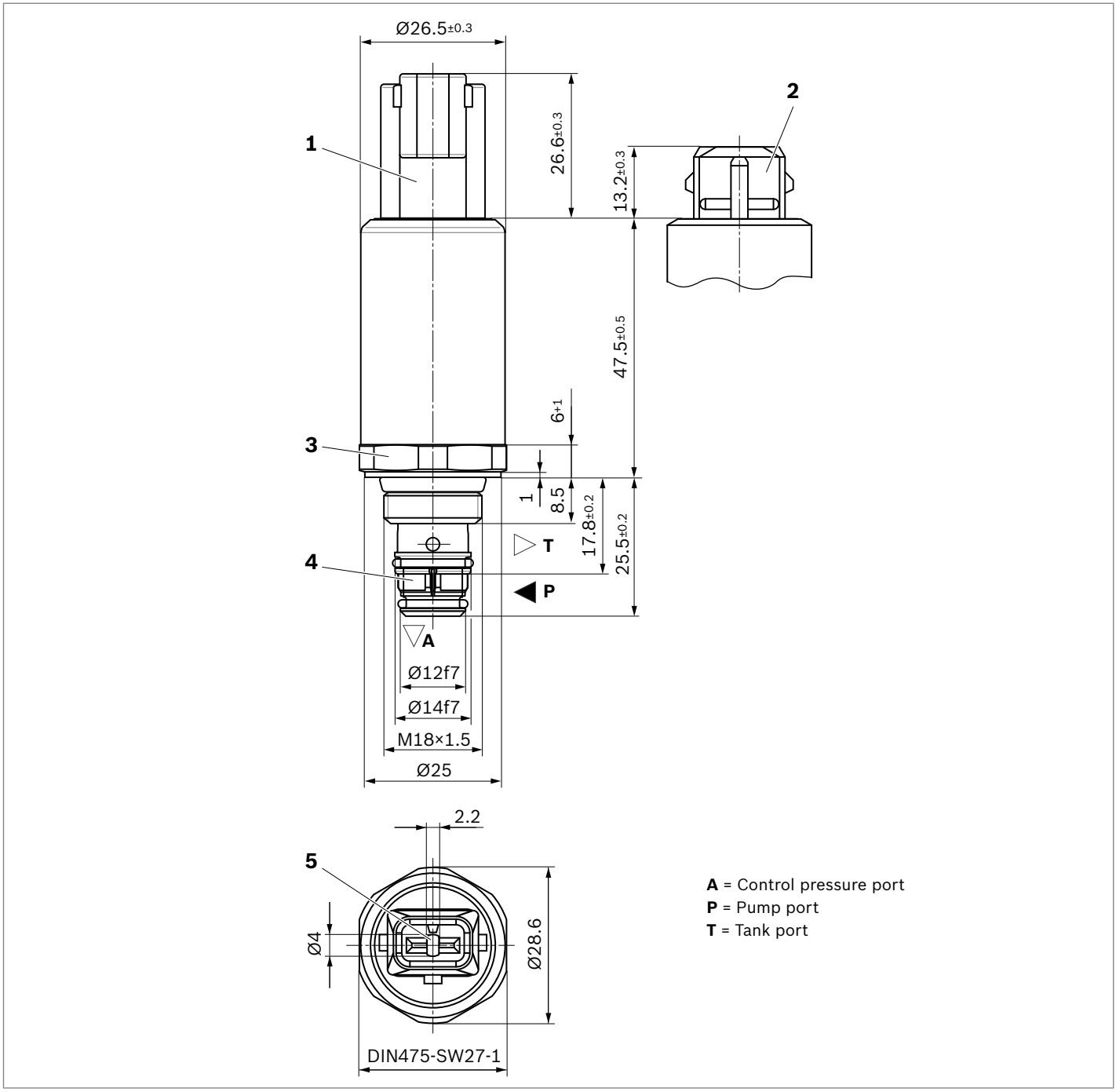


▼ **24 bar control pressure, 24 V** (R_{nom} = 12 Ω; I_{max} = 0.98 A)



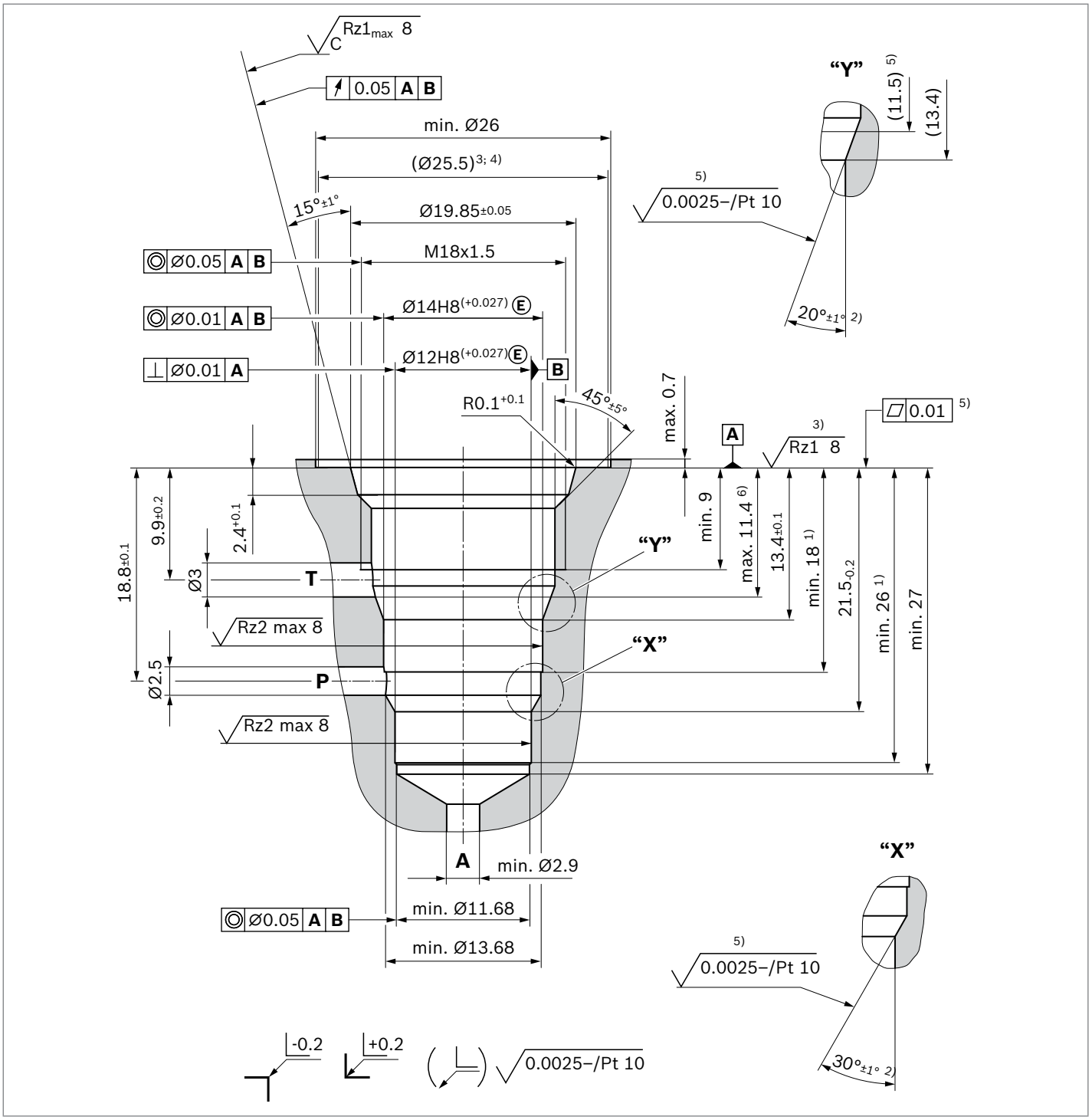
Dimensions

▼ **FTDRE2K 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 Series 3X mesh filter: 160 µm; Series 4X: 180 µm
5 Manual override (not in Version “N0”).
Actuated by pin tool (plug must be removed to actuate manual override [versions “C4” and “K40”]). Maximum number of matings is 10 (Specification AMP 108-18013).

▼ **Mounting cavity**



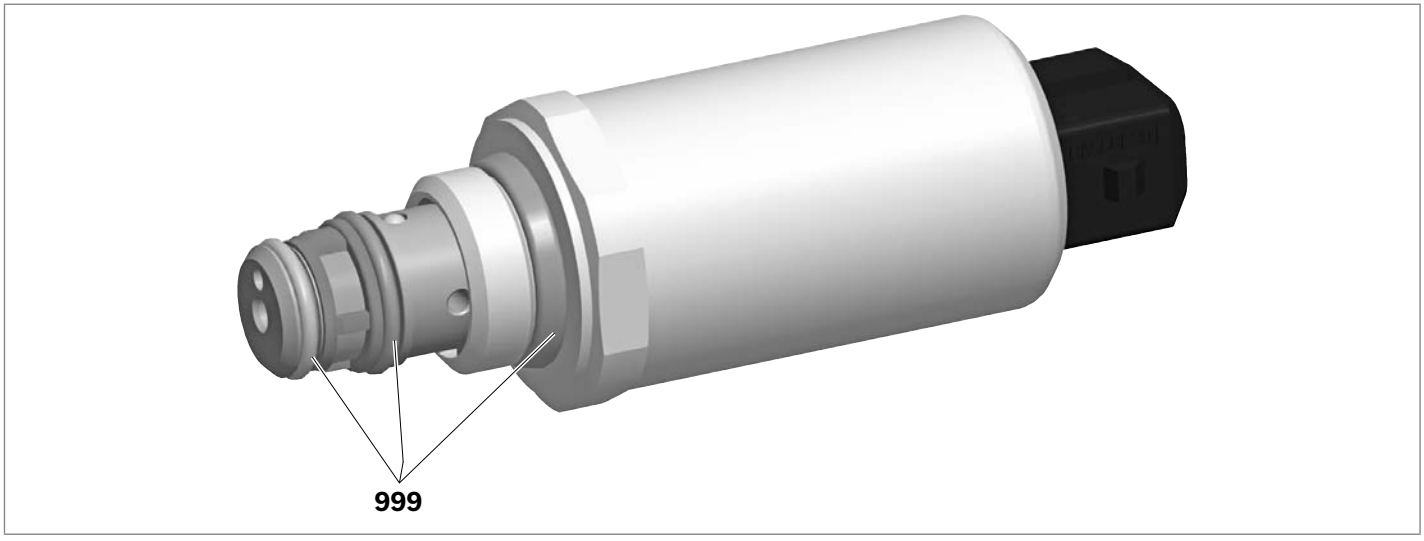
Standards:

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) Fit depth
2) All seal ring insertion faces are rounded and free of burrs
3) Required roughness up to d = 25.5 mm
4) Required evenness up to d = 25.5 mm
5) Required roughness from 11.5 ... 13.4 mm
6) Stepped beveling available

Available individual components

▼ **FTDRE2K with thread**



Item.	Designation	Material no.
999	Seal kit of the valve (FKM)	R961007179

Related documentation

▶ Electronic controls:		
– 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
▶ Filter selection		www.boschrexroth.com/filter
▶ $MTTF_d$ values		Data sheet 90294

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