rexroth
A Bosch Company

Proportional pressure reducing valve, direct operated, increasing characteristic curve Type DRET5SK

HAD8156

- Size 5
- Series 1X
- Maximum control pressure 160 bar
- Maximum flow 15 l/min at Δp = 7 bar

Features

- Direct-operated proportional pressure reducing valve for reducing system pressure
- Cartridge valve
- R/DRET5SK mounting cavity
- Aactuation via proportional solenoid
- Rotatable solenoid coil
- In case of power failure, minimum pressure is set
- Main application: Brake-by-wire

Contents

Ordering details

01	02	03	04	05		06	07	08	09	10	11	12	13
DRET	**5**	**S**	**K**	**1X**	**/**			**A**		**N0**		**V**	*****

Valve type

01	Proportional pressure reducing valve, direct operated, electric actuation, high control pressure	**DRET**
02	Size 5	**5**
03	Increasing characteristic curve	**S**
04	Cartridge valve	**K**

Series

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

Maximum control pressure[1)]

06	100 bar	**100**
	160 bar	**160**

Filter

07	Filter in **P**	**P**
	Filters in **A** and **P**	**A**

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

Supply voltage

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

Manual override

10	**Without** manual override	**N0**

Electrical connection[2)]

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

Sealing material

12	FKM (fluoroelastomer)	**V**

13	Further details in plain text	*****

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

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

Preferred types

Type	Material number
DRET5SK1X/100PAG12N0K40V	R901510119
DRET5SK1X/100PAG24N0K40V	R901512176
DRET5SK1X/100PAG12N0C4V	R901512180
DRET5SK1X/100PAG24N0C4V	R901512177

Type	Material number
DRET5SK1X/160PAG12N0K40V	R901512178
DRET5SK1X/160PAG24N0K40V	R901485581
DRET5SK1X/160PAG24N0C4V	R901512179
DRET5SK1X/160PAG12N0C4V	R901496577

Functional description

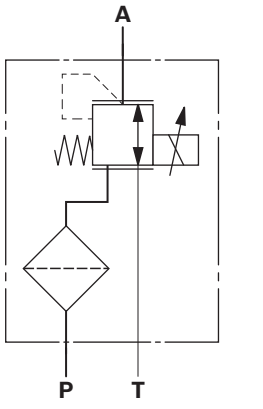
General

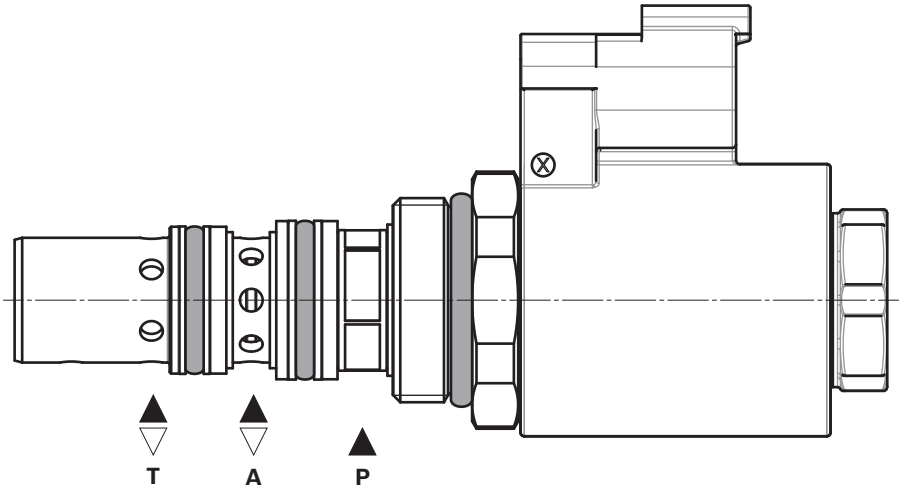
The proportional pressure reducing valve type DRET5SK is a direct-operated cartridge valve in 3-way version.
It reduces the control pressure (port **A**) proportional to the solenoid current and works largely independently from the inlet pressure (port **P**).
Minimum pressure is set in case of power 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 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 brakes, as well as for use in proportional pilot controls (particularly in the mobile applications area).

Basic principle

The valve regulates the pressure in port **A** proportionally to the current on the solenoid.
Version **S** means an increasing characteristic curve, i.e. rising current causes increasing pressure
(see characteristic curve on page 6).
The proportional solenoid converts the electric current into mechanical force that acts on the control spool via the anchor. The control spool controls the connection between the main ports.

Notice
Occurring tank pressure (port **T**) is added to the control pressure (port **A**).





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

Technical data

General					
Weight (approx.)			kg	0.6	
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			°C	–30 ... +100	
Salt spray test according to ISO 9227			h	720 (NSS test)	
Solenoid surface protection				Coating according to DIN 50962-Fe//ZnNi with thick film passivation	

Hydraulic					
Maximum control pressure	Port **A**	p_A	bar	100, 160	
Maximum inlet pressure	Port **P**	p_E	bar	210 (250 bar including pressure peaks)	
Counter-pressure	Port **T**	p_T	bar	160	
Flow (Δp ≤ 7 bar)	**P** → **A**	q_V	l/min	15	
	A → **T**	q_V	l/min	25	
Maximum leakage flow	Port **T**	q_L	ml/min	150	
Maximum pilot flow			ml/min	300 (p_E = 200 bar; $I = I_{max}$; ν = 46 mm²/s)	
Hydraulic fluid				See table on page 5	
Hydraulic fluid temperature range		ϑ	°C	–20 ... +110	
Viscosity range		ν	mm²/s	3.7 to 5	limited function
				5 to 400	full function
				400 to 20000	limited function
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness level as per ISO 4406 (c)				Level 20/18/15 [1]	
Load cycles				10 mil.	
Hysteresis (within tolerance range)			%	≤3 (p_E = 210 bar; PWM = 120 Hz)	
Repeat accuracy			%	< 3 from maximum control pressure	
Step response (depending on system)	0 % → 100 %		ms	≤60	(p_E = 210 bar; ν = 46 mm²/s, q_V = 0 l/min, Dead volume in **P** = 140 cm³)
	100 % → 0 %		ms	≤50	
Mesh width mesh filter element	Port **P** (**A** optional)		µm	180	

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 control current		I_{max}	mA	1550	660
Coil resistance	Cold value at 20 °C		Ω	4.2	23
Duty cycle (ED) and maximum coil temperature[2)]				See characteristic curve on page 7	
Type of protection according to ISO 20653	Connector version "C4"			IP6K5 with installed and locked plug-in connector	
				IP6K7 and IP6K9K with Rexroth plug-in connector, Material no. R901022127	
	Connector version "K40"			IP6K5, IP6K7 and IP6K9K with installed and locked plug-in connector	
Connector orientation				As desired (rotatable)	
Control electronics (separate order)				Type RA... analog amplifier (data sheet 95230)	
				BODAS controller (data sheets 95204, 95205, 95206)	
PW modulation[3)]			Hz	120	120
Design according to VDE 0580					

Notice

- The technical data was determined at a viscosity of ν = 46 mm²/s (HLP46; ϑ_{oil} = 40±5 °C).
- For applications outside these values, please consult us!

Hydraulic fluid

Hydraulic fluid		**Classification**	**Suitable sealing materials**	**Standards**	**Data sheet**
Mineral oils		HL, HLP	FKM	DIN 51524	90220
Biodegradable	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.
- **Biodegradable:** If biodegradable hydraulic fluids are used that are also zinc-solving, there may be an accumulation of zinc.

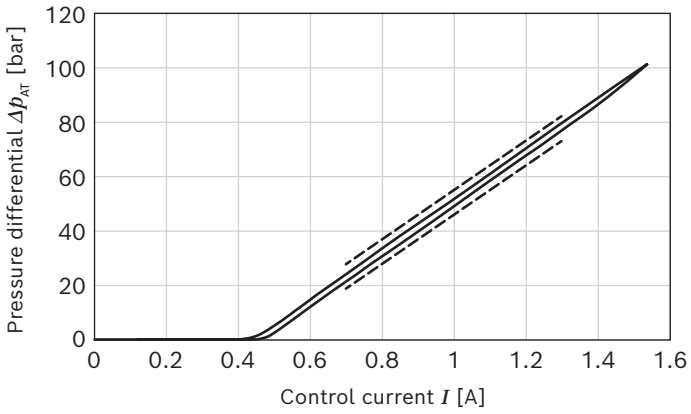
2) Due to the occurring surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 must be observed!

3) The PWM frequency shall be optimized in accordance with the application.
The operating temperature range is to be observed.

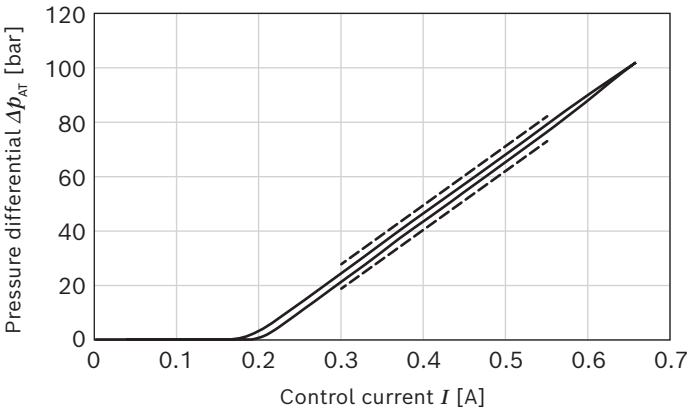
Characteristic curves

Δp-I characteristic curves

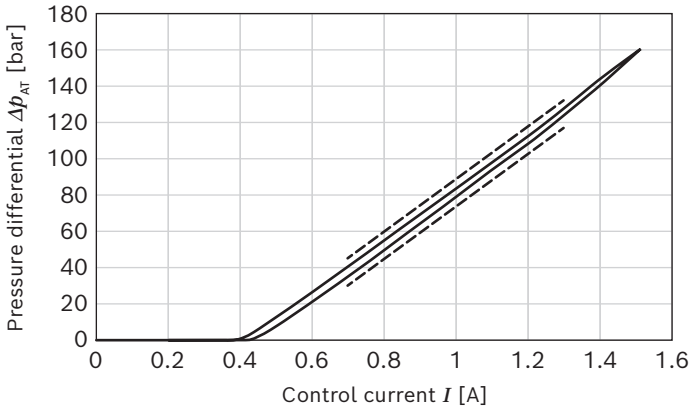
▼ **Pressure stage 100 bar, 12 V**
Pressure setting: 22 bar at 0.7 A



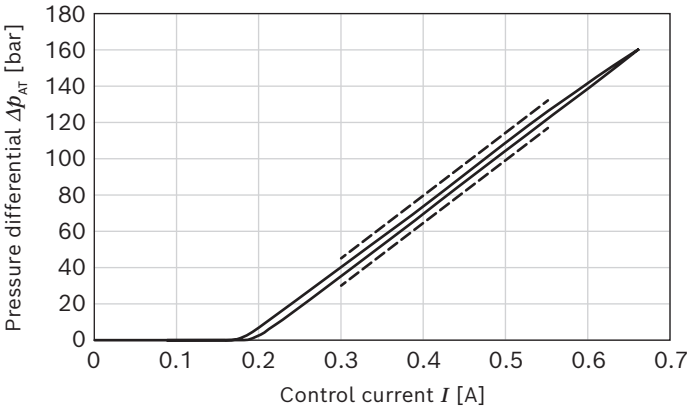
▼ **Pressure stage 100 bar, 24 V**
Pressure setting: 22 bar at 0.3 A



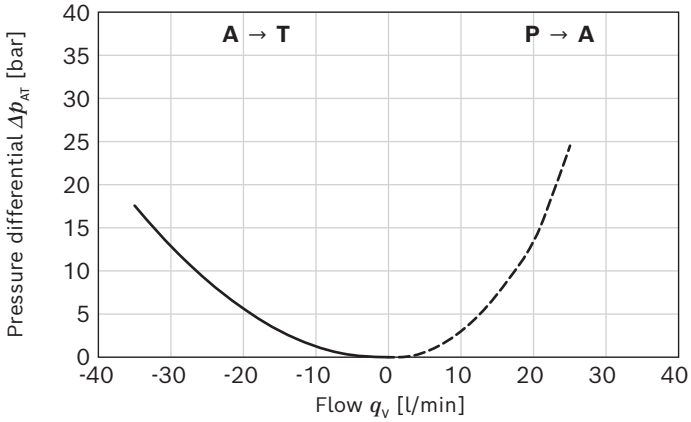
▼ **Pressure stage 160 bar, 12 V**
Pressure setting: 35 bar at 0.7 A



▼ **Pressure stage 160 bar, 24 V**
Pressure setting: 35 bar at 0.3 A



Δp-q_V flow characteristic curve

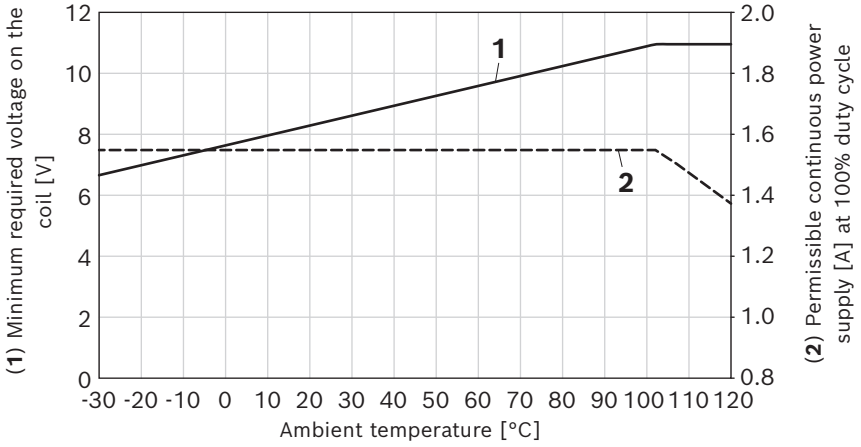


Notice
Characteristic curves measured with HLP46, ϑ_{oil} = 40±5 °C, set with inlet pressure p_E = 210±5 bar.

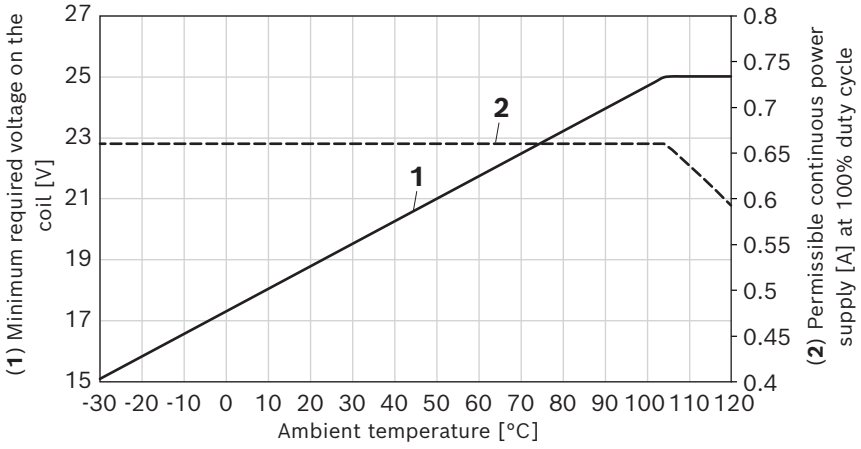
Permissible working range

Minimum terminal voltage on the coil and relative duty cycle depending on the ambient temperature

▼ **Version "G12"** (R_{nom} = 4.3 Ω; $\vartheta_{coil\ max}$ = 185 °C; I_{nom} = 1.55 A)



▼ **Version "G24"** (R_{nom} = 23 Ω; $\vartheta_{coil\ max}$ = 185 °C; I_{nom} = 0.66 A)

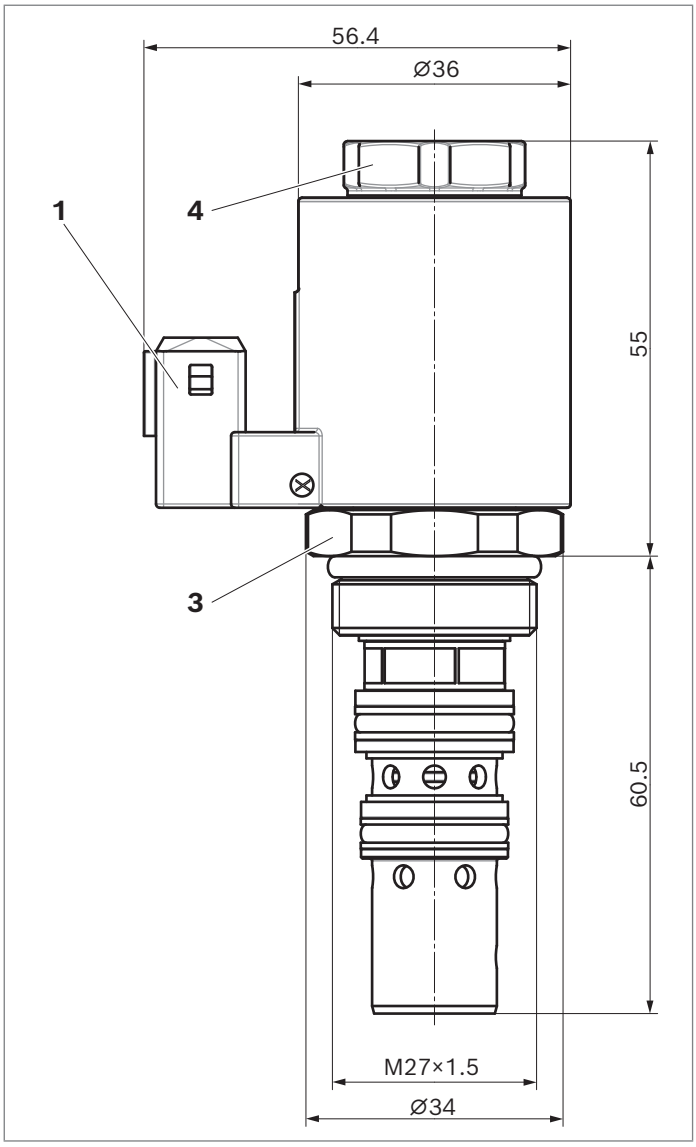


Notice

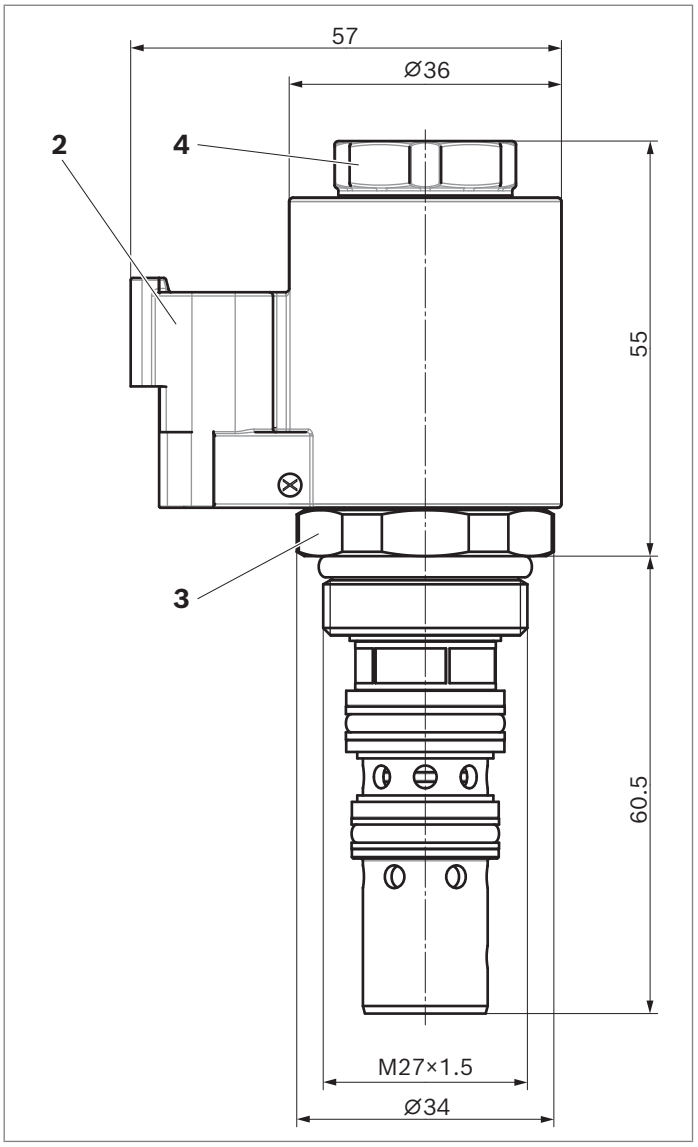
The characteristic curves were determined for coils with valve for medium test block size (80 x 80 x 80 mm), w/o flow in still air.
Depending on installation conditions (block size, flow, air circulation, etc.) heat dissipation may be better.
This increases the range of applications.
In specific instances, unfavorable conditions may limit the range of applications.

Dimensions

▼ **DRET5SK, version "C4"**



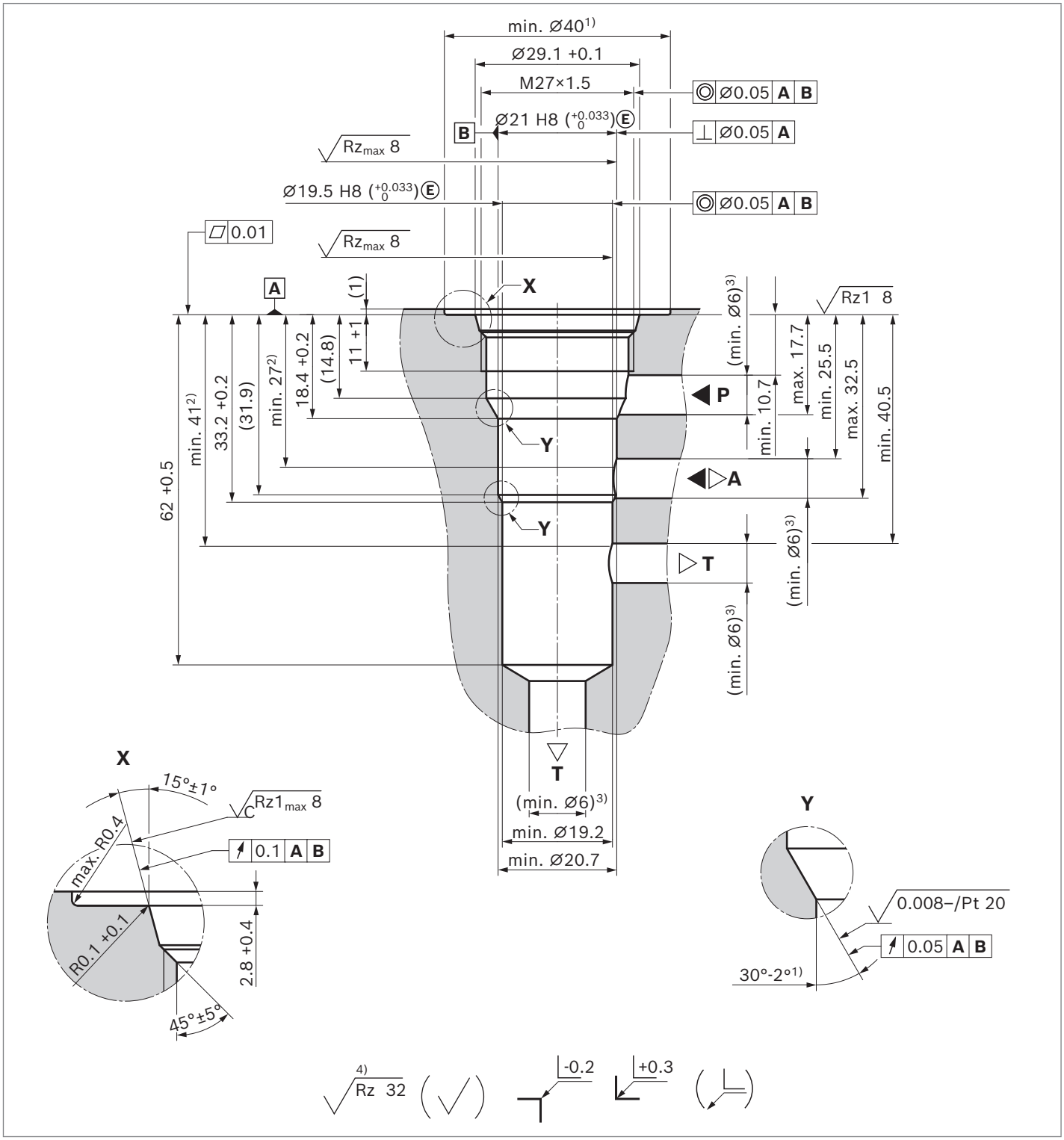
▼ **DRET5SK, version "K40"**



1 Device connector "C4"
(plug-in connector separate order, see data sheet 08006)
2 Device connector "K40"
(plug-in connector separate order, see data sheet 08006)
3 Hexagon SW32: Tightening torque M_A = 40+5 Nm
4 Nut: Tighten nut hand-tight

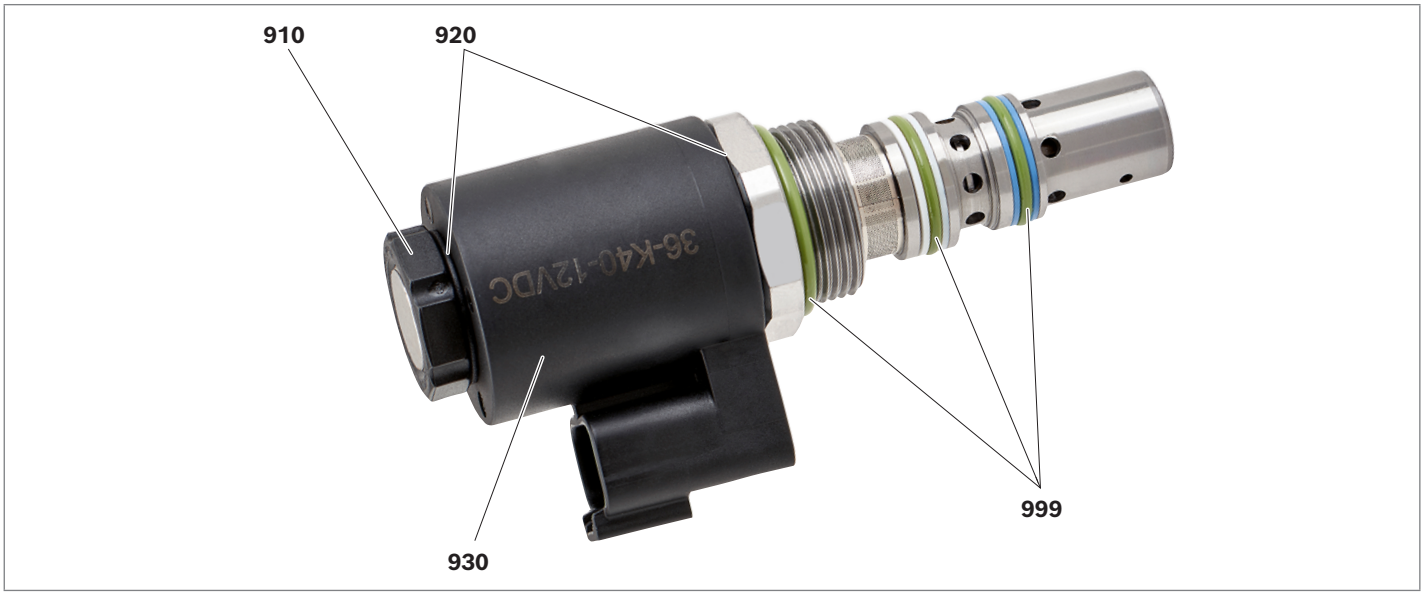
Mounting cavity

▼ **R/DRET5SK**; **3 main ports**



1) All seal ring insertion faces are rounded and free of burrs
2) Depth of fit
3) Min. required cross-section: 28.3 mm²
4) Visual inspection

Available individual components



Item	Denomination		DC voltage	Material no.
910	Nut			R930057042
920	O-ring (solenoid), 2×			R930030579
930	Coil with device connector[1)]	K40	12 V	R901503445
			24 V	R901503446
		C4	12 V	R901503447
			24 V	R901503448
999	Seal kit of the valve (FKM)			R961013182

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
- Selection of the filters — www.boschrexroth.com/filter

1) Replacing the solenoid coil may result in a change of ±5% in the factory pressure setting.

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