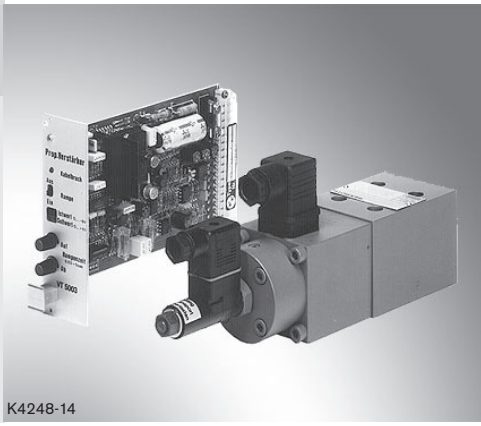
Proportional pressure relief valve

RE 29166/02.07 1/10
Replaces: 08.04

Type DBETR

Nominal size 6
Component series 1X
Maximum operating pressure 350 bar
Maximum flow 3 l/min


K4248-14

Overview of contents

Features

- Valve for electrical remote control of pressure
- Direct operated proportional pressure relief valve, of poppet design
- Proportional solenoid actuation with inductive position transducer (pressure balanced)
- For subplate mounting:
  Porting pattern to ISO 4401-03-02-0-94
  Subplates to catalogue sheet RE 45052
  (separate order), see page 9
- Electrical closed loop position control of the spring pre-tension, hence low hysteresis
- Good repeatability
- Valve and electronic control from one source
- Control electronics:
  - Analogue amplifier VT-VRPA1-100-1X/ in Eurocard format (separate order), see page 5
  - Analogue amplifier of modular design VT-MRPA1-100-1X/V0/0 (separate order), see page 5

Ordering details

DBETR	–	1X	/		G24	K4		*

Component series 10 to 19 **= 1X**
(10 to 19: unchanged installation and connection dimensions)

Pressure stage:
Up to 30 bar **= 30**
Up to 80 bar **= 80**
Up to 180 bar **= 180**
Up to 230 bar **= 230**
Up to 315 bar **= 315**
Up to 350 bar **= 350**

Control electronics supply voltage
24 V DC **= G24**

Further details in clear text

M = NBR seals, suitable for mineral oil (HL, HLP) to DIN 51524

V = FKM seals

Electrical connections

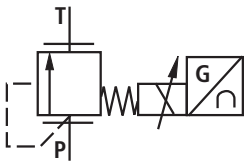
K4 = **Without** plug-in connector
with component plug to DIN EN 175301-803
for the proportional solenoid
and GSA20 for the position transducer
Plug-in connector – separate order,
see page 6

Preferred types

Type	Material number
DBETR-1X/30G24K4M	R900954438
DBETR-1X/80G24K4M	R900334966
DBETR-1X/180G24K4M	R900491698
DBETR-1X/230G24K4M	R900370146
DBETR-1X/315G24K4M	R900485944
DBETR-1X/350G24K4M	R900352424

Further preferred types and standards can be found within the EPS (Standard Price List).

Symbol



Function, section

Proportional pressure relief valve type DBETR is a remote control valve. In design terms it is a direct operated pressure relief valve of poppet design.

This valve regulates pressure in proportion to the electrical command value.

The valve consists basically of a housing (1), proportional solenoid (2) with inductive positional transducer (3), valve seat (4) and valve poppet (5).

Pressure is set by adjusting the command value potentiometer (0 to 9 V). Adjusting the command value causes tensioning of the compression spring (2) via the electronic controls and the proportional solenoid (6). Tensioning of the compression spring (6), i.e. the position of the spring plate (7), is sensed by the inductive positional transducer (3). Any deviations from the command value are corrected by the closed loop positional control.

The use of this principle eliminates the effect of solenoid friction.

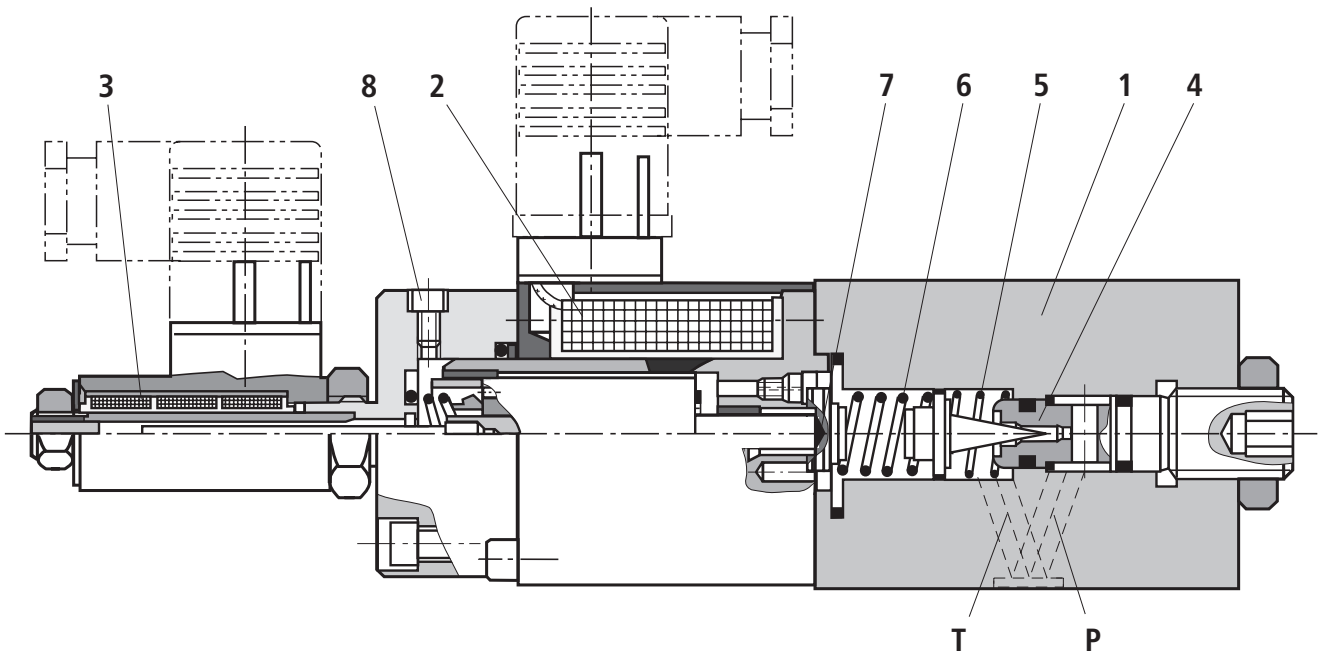
Advantages: – Low hysteresis
– Good repeatability

If the command value is zero or in the event of a power failure to the poroportional solenoid or cable breakage at the positional transducer the lowest possible setting pressure will be set.

Note!

To ensure optimum valve function bleeding must be carried out at the commissioning stage:

- Remove item 8,
- Pour pressure fluid into open screw hole at item 8,
- When no further bubbles appear screw in item 8.
- Emptying of tank lines is to be avoided. With the appropriate installation conditions, a back pressure valve is to be installed (back pressure approx. 2 bar).



Technical data (for applications outside these parameters, please consult us!)

General

Weight		kg	4.0	
Installation			Preferrably horizontal	
Storage temperature range		°C	– 20 to +80	
Ambient temperature range		°C	– 20 to +50	

Hydraulic (measured with HLP46 at 40 °C ± 5 °C)

Operating pressure	– Port P	bar	to 350	
	– Port T, with pressure control	bar	to 2	
	– Without pressure control, T port	bar	to 100	
Max. settable pressure	– Pressure stage 30	bar	30	
	– Pressure stage 80	bar	80	
	– Pressure stage 180	bar	180	
	– Pressure stage 230	bar	230	
	– Pressure stage 315	bar	315	
	– Pressure stage 350	bar	350	
Min. settable pressure			(See p_{min}-q_V-characteristic curves on pages 7 and 8)	
Max. flow	– Pressure stage 30	l/min	3	
	– Pressure stage 80	l/min	3	
	– Pressure stage 180	l/min	3	
	– Pressure stage 230	l/min	3	
	– Pressure stage 315	l/min	2	
	– Pressure stage 350	l/min	2	
Pressure fluid			Mineral oil (HL, HLP) to DIN 51524, Other pressure fluids on request!	
Pressure fluid temperature range		°C	– 20 to + 80	
Max. permissible degree of pressure fluid contamination Cleanliness class to ISO 4406 (c)			Class 20/18/15 [1)]	
Viscosity range		mm^2/s	15 to 380	
Hysteresis		%	< 1 of max. settable pressure	
Repeatability		%	< 0.5 of max. settable pressure	
Linearity		%	< 1.5 of max. settable pressure	
Typical variation		%	± 3 of max. settable pressure	
Stepped response $T_u + T_g$ (0 to 100 %), dependent on the system			$p_{min} - p_{max}$	$p_{max} - p_{min}$
	– Pressure stage 30, 80, 180	ms	100	50
	– Pressure stage 230, 315, 350	ms	150	100

[1)] The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of filters see catalogue sheets RE 50070, RE 50076, RE 50081, RE 50086 and RE 50058.

Technical data (for applications outside these parameters, please consult us!)

Electrical (solenoid)

Supply voltage		V	24 DC
Max. power consumption		VA	50
Coil resistance	– Cold value at 20 °C	Ω	10
	– Max. warm value	Ω	13.9
Duty		%	100
Electrical connections			With component plug to DIN EN 175301-803
			Plug-in connector to DIN EN 175301-803 [1]
Schutzart nach EN 60529			IP65 with mounted and fixed plug-in connector

Electrical (inductive position transducer)

Coil resistance	– Total resistance of the coils at 20 °C		1 and 2	2 and ⏚	and 1
(see also page 6)		Ω	31.5	45.5	31.5
Electrical connections			With component plug GSA20		
			Plug-in connector GM 209N (Pg9) with flat seal [1]		
Inductivity		mH	6 to 8		
Oscillator frequency		kHz	2.5		
Protection to EN 60529			IP65 with mounted and fixed plug-in connector		

[1] Separate order, see page 6

When connecting the electrics, the protective conductor (PE ⏚) must be connected according to the relevant regulations.

Control electronics (separate order)

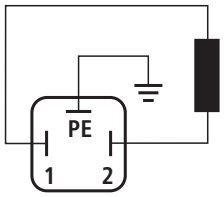
Amplifier in Eurocard format	Analogue	VT-VRPA1-100-1X/ to catalogue sheet RE 30118
Amplifier of modular design	Analogue	VT-MRPA1-100-1X/V0/0 to catalogue sheet RE 30221

Note: **For details regarding the environmental simulation test covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29166-U (declaration regarding environmental compatibility).**

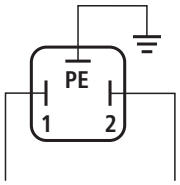
Electrical connections, plug-in connectors (in mm)

Proportional solenoid

Connection at component plug

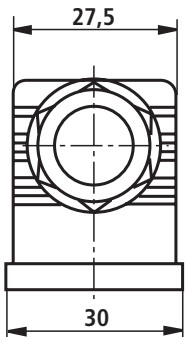


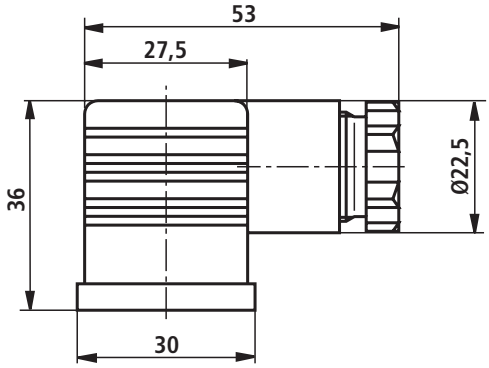
Connection at plug-in connector



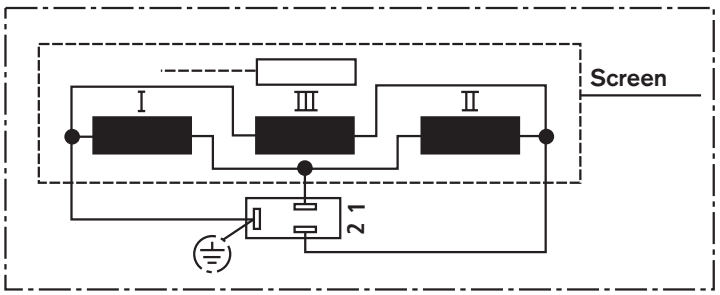
To amplifier

Plug-in connector to DIN EN 175301-803
Separate order under Material No. **R901017011** (plastic version)



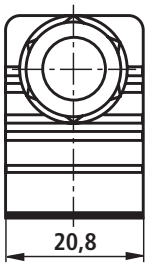


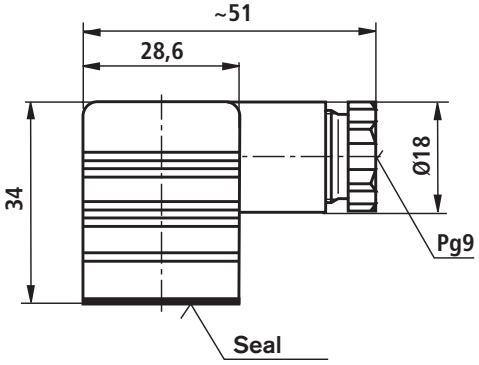
Inductive position transducer



Plug-in connector GM 209N (Pg9) with flat seal GM 207-3
Separate order under Material No. **R900013674** (plastic version)

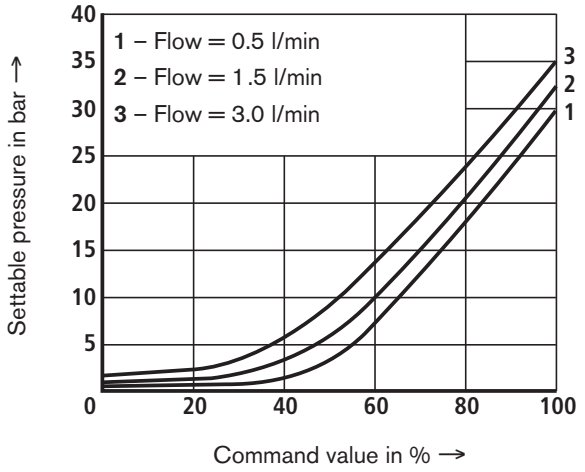
Flat seal GM 207-3
Separate order under Material No. **R900013675**



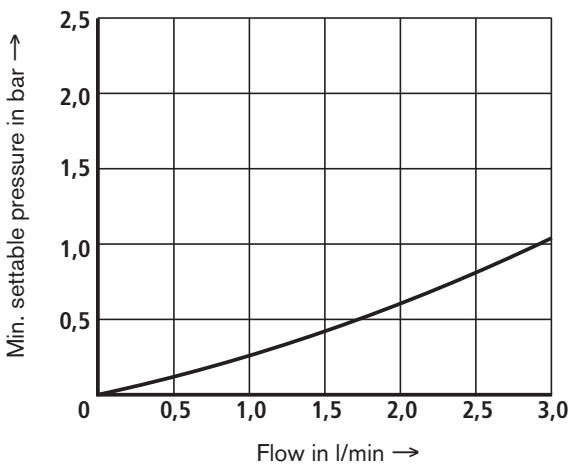


Characteristic curves (measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C and **without** back pressure)

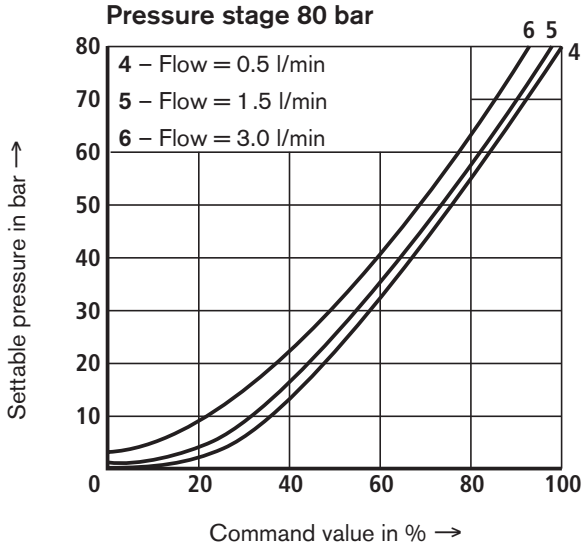
Pressure stage 30 bar



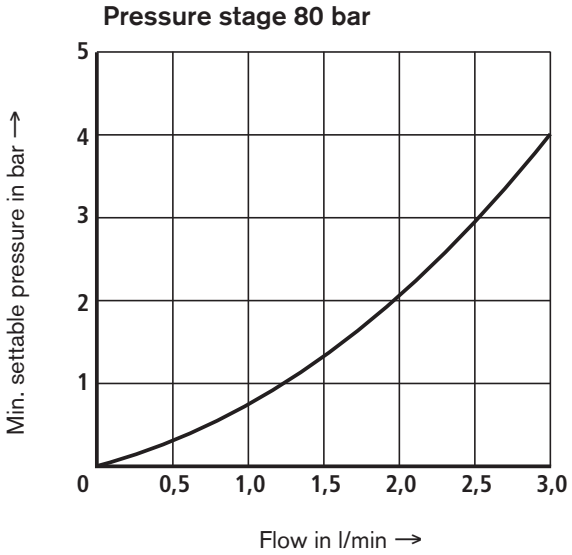
Pressure stage 30 bar



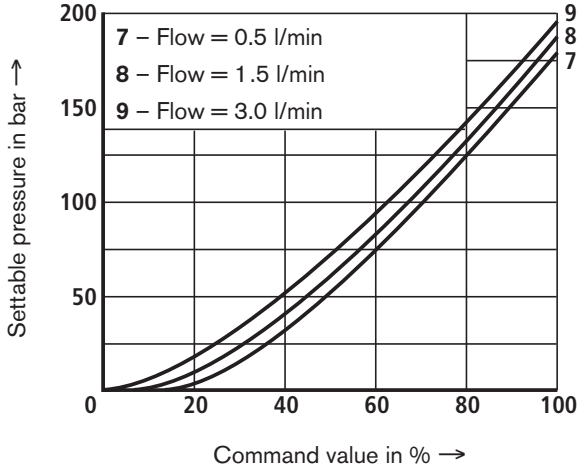
Pressure stage 80 bar



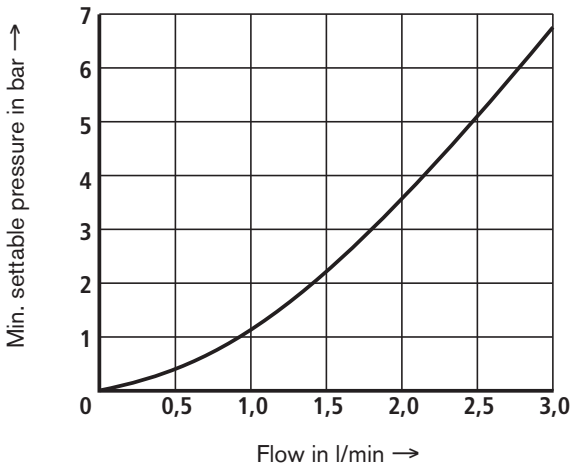
Pressure stage 80 bar



Pressure stage 180 bar

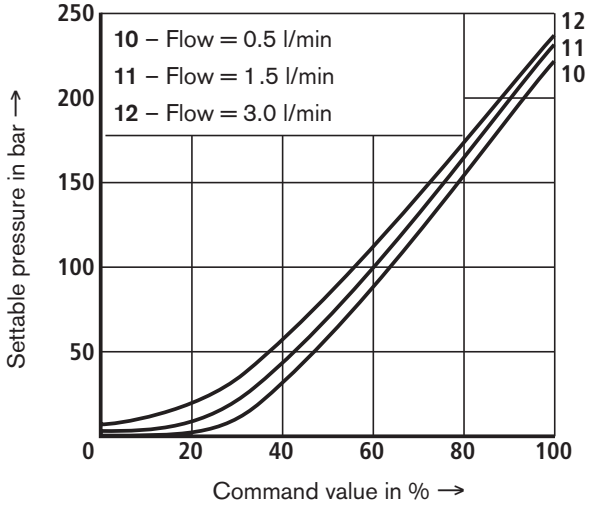


Pressure stage 180 bar

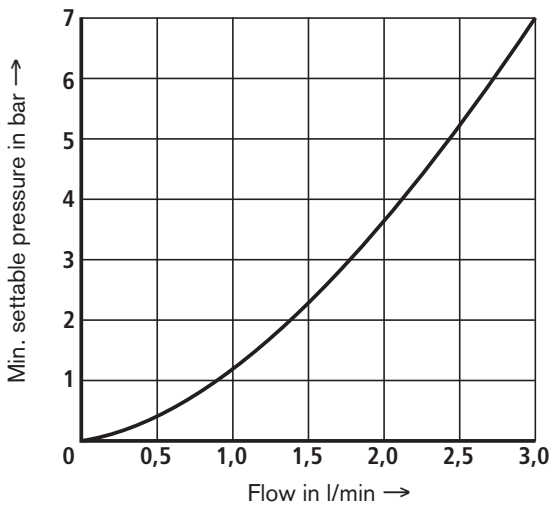


Characteristic curves (measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C and **without** back pressure)

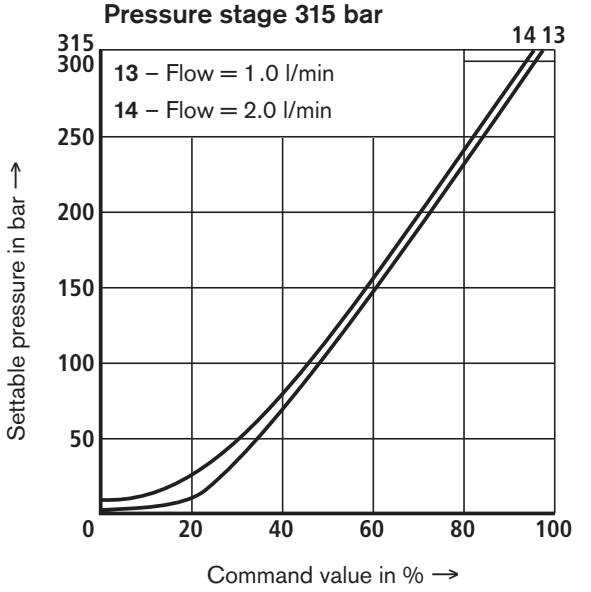
Pressure stage 230 bar



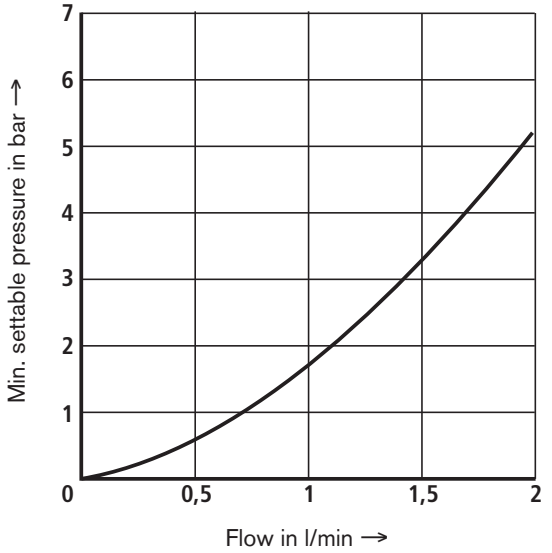
Pressure stage 230 bar



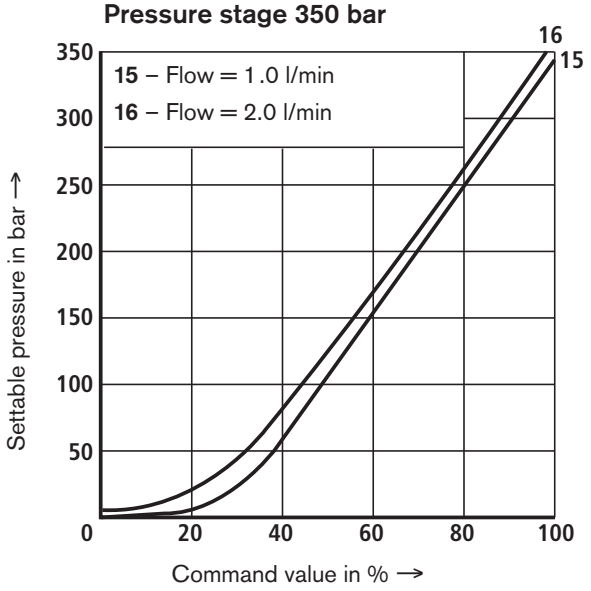
Pressure stage 315 bar



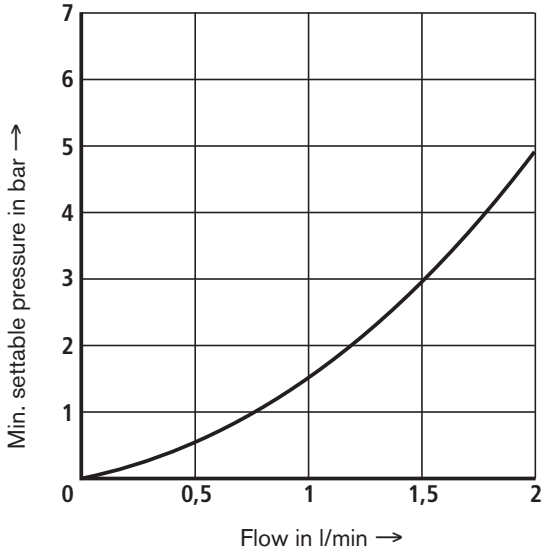
Pressure stage 315 bar



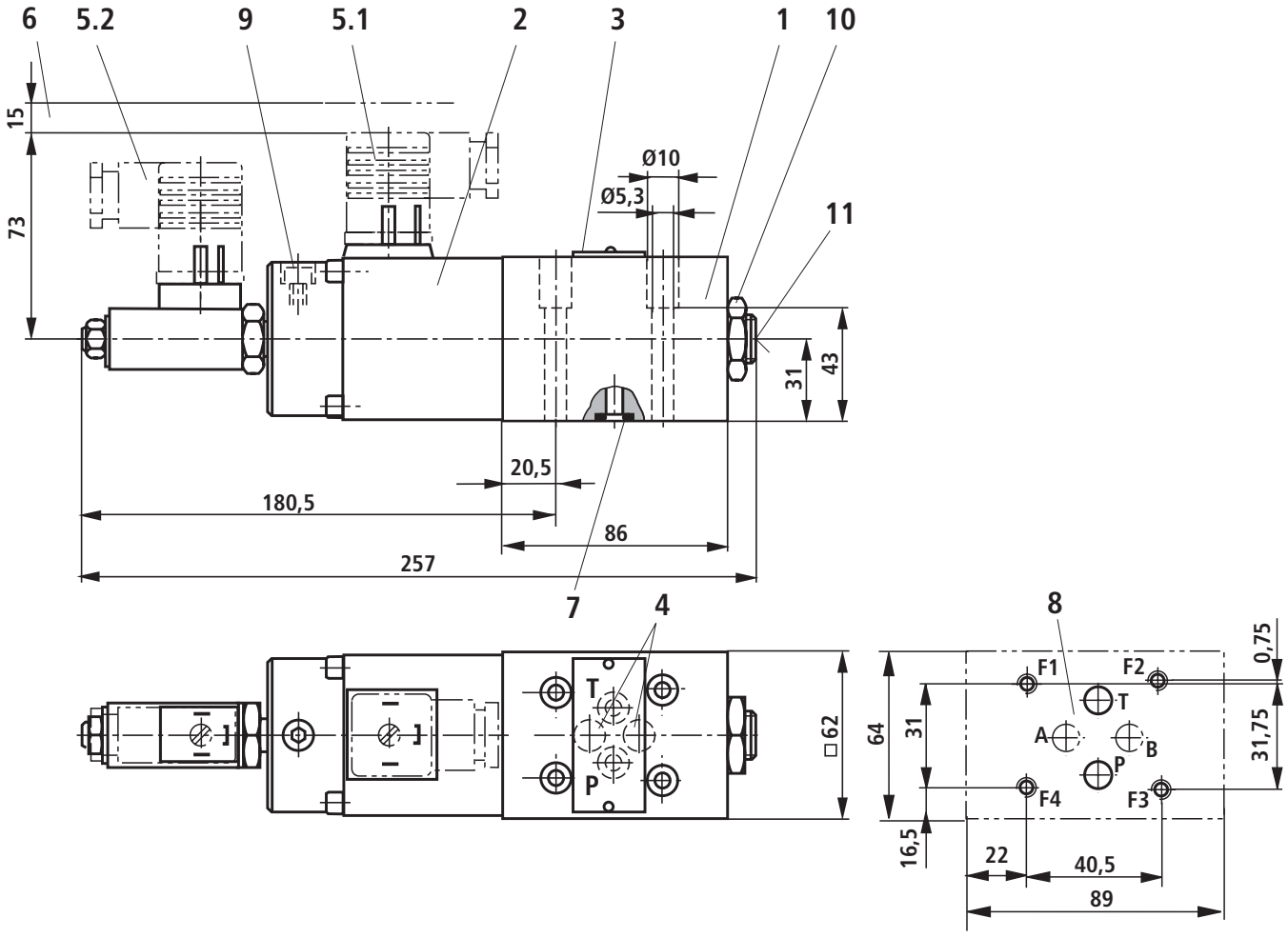
Pressure stage 350 bar



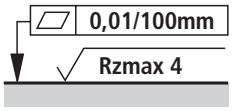
Pressure stage 350 bar



Unit dimensions (in mm)



1 Valve housing
2 Proportional solenoid with inductive position transducer
3 Name plate
4 Blind hole
5.1 Plug-in connector to DIN EN 175301-803, separate order, see page 6
5.2 Plug-in connector to GM209 (Pg9) manufacturer Hirschmann; separate order, see page 6
6 Space required to remove the plug-in connector
7 Identical seal rings for P, T and blind hole
8 Machined valve mounting surface, location of the ports to ISO 4401-03-02-0-94
Deviations from the standard:
– Locating pin not present
– „A“ and „B“ ports **not** drilled
9 Bleed screw
10 Lock nut 27A/F
11 Internal hexagon 8A/F



Required surface quality of the valve contact face

Subplates to catalogue sheet RE 45052 and valve fixing screws must be ordered separately.

Subplates: G 341/01 (G1/4)
G 342/01 (G3/8)

Valve fixing screws:
(not included within the scope of supply)
Due to strength (tensile) reasons only use the following valve fixing screws:

4 S.H.C.S. ISO 4762 - M5 x 50 - 10.9-flZn-240h-L
(friction value 0.08 - 0.14 to VDA 235-102);
Tightening torque $M_A = 7$ Nm ± 10%
Separate order, Material No. **R913000064.**

Notes

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