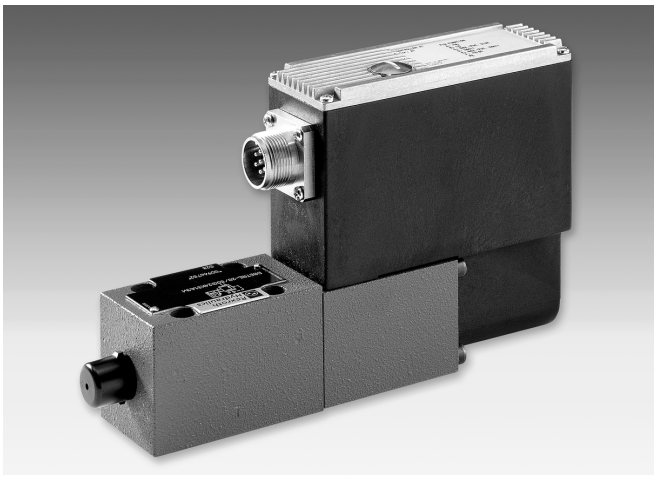
RE 29 168/11.99

engineering
mannesmann
Rexroth

Proportional pressure relief valve
Type DBETRE

Nominal size 6
Series 2X
Max. operating pressure 350 bar
Max. flow up to 3 L/min



H/A/D 6207/99

Type DBETRE-2X/…G24K31A1… with integrated control electronics

Overview of contents

Features

- Direct actuated valve for limiting a system pressure
- Actuation via a proportional solenoid with position transducer
- For subplates:
  Porting pattern to DIN 24 340 form A6 and ISO 4401
  For subplates see catalogue sheet RE 45 052,
  (separate order, see page 9)
- Integrated control electronics
  - Low command value - pressure - characteristic curve - example spread
  - Low hysteresis
  - Good repeatability accuracy

Ordering details

DBETRE – 2X / | G24 | K31 | A1 | | *

Proportional pressure relief valve with integrated electronics

Series 20 to 29 **= 2X**
(20 to 29: unchanged installation and connection dimensions)

Pressure stage
Up to 30 bar **= 30**
Up to 80 bar **= 80**
Up to 180 bar **= 180**
Up to 250 bar **= 250**
Up to 315 bar **= 315**
Up to 350 bar **= 350**

Further details in clear text

M = NBR seals, suitable for mineral oil (HL, HLP) to DIN 51 524

V = FKM seals

Interface for the control electronics
A1 = Command value input 0 to 10 VDC

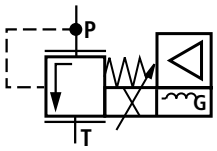
Electrical connections
K31 = With component plug to E DIN 43563-AM6-4 without plug-in connector
Plug-in connector – separate order
see page 5

Control electronics supply voltage
G24 = 24 V DC

Preferred types

Material no.	Type
00966782	DBETRE-2X/80G24K31A1M
00969416	DBETRE-2X/180G24K31A1M
00969417	DBETRE-2X/250G24K31A1M
00969418	DBETRE-2X/315G24K31A1M

Symbol



Function, section

The DBETRE proportional pressure relief valves are remote control valves, of a seat type design and are used to limit a system pressure. With these valves it is possible to steplessly control the system pressure in relation to the command value being applied to the integrated control electronics:

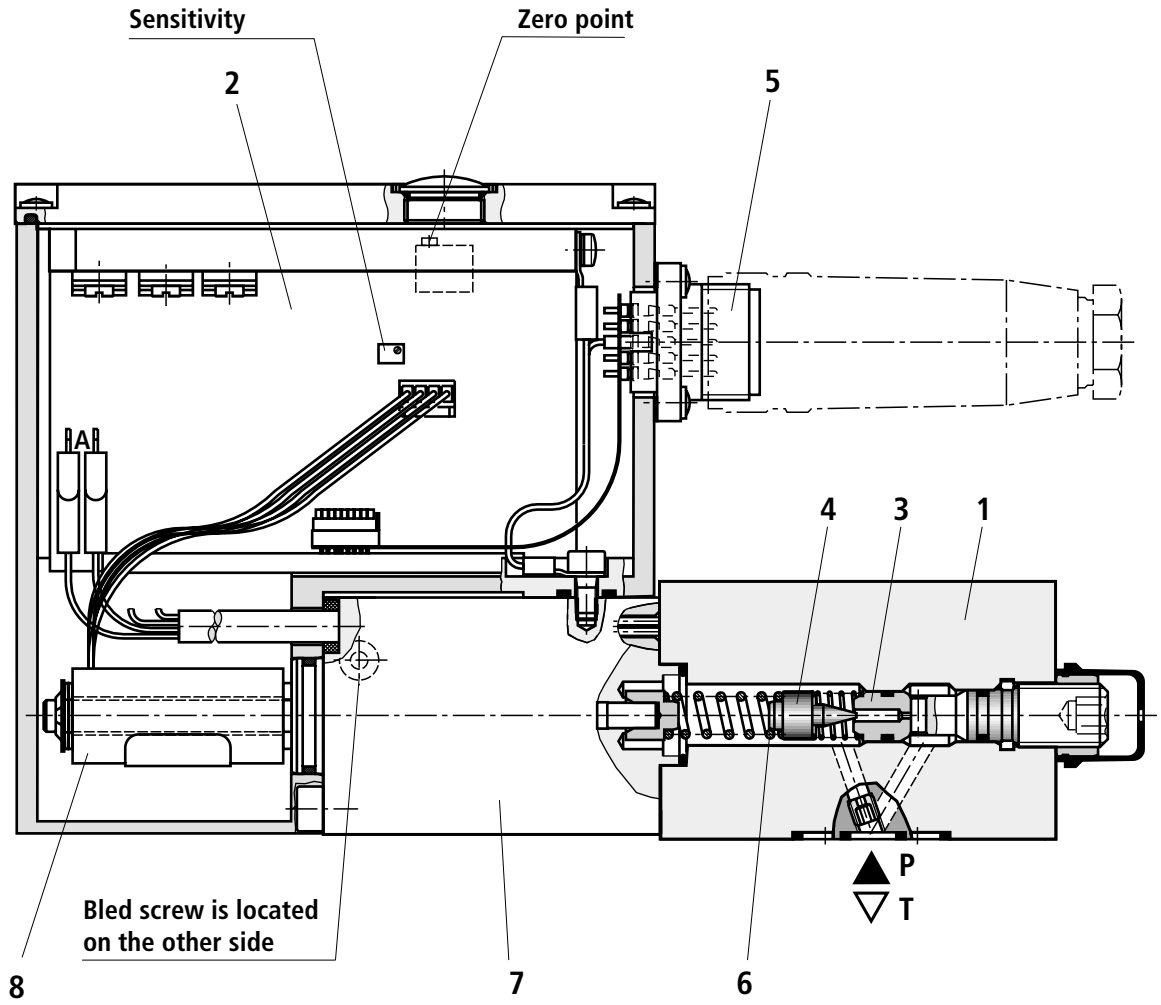
Technical design:

The valve comprises of the following main components:

– Housing (1)
– Proportional solenoid (7) with position transducer (8) and integrated control electronics (2)
– Valve seat (3)
– Valve poppet (4)
– Compression spring (6)

Functional description:

– The pressure setting is achieved via the command value being applied at the component plug (5).
– The command value input influences, via the integrated control electronics, the position of the proportional solenoid (7) armature and therefore the pretension of the compression spring (6).
– The compression spring (6) presses the valve poppet (4) against the valve seat (3). The system pressure being applied in port P acts on the valve poppet (4) and and therefore against the force of the compression spring (6) / the proportional solenoid (2). If the hydraulic force acting on the valve poppet (4) is the same as the spring force, then the valve controls the set pressure in that the valve poppet (4) lifts off the valve seat (3) and permits pressure fluid to flow from P to T.
– Any position deviations of the solenoid armature from the command value are corrected by the closed loop position control.
– Solenoid friction is eliminated by the closed loop position control → Advantages are the low hysteresis and good repeatability accuracy.
– With a zero command value and if the power supply fails, the valves sets itself to the lowest settable pressure.
– For information regarding the integrated control electronics, see page 6.



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

General

Installation		preferably with the proportional solenoid horizontal or pointing downwards
Ambient temperature range	°C	–20 to +50
Storage temperature range	°C	–20 to +80
Weight	kg	2.4

Hydraulic (measured at $\nu = 41$ mm²/s and $\vartheta = 50$ °C)

Operating pressure, max. perm. Port P		bar	380
Max. settable pressure	Pressure stage 30 bar Pressure stage 80 bar Pressure stage 180 bar Pressure stage 250 bar Pressure stage 315 bar Pressure stage 350 bar		The maximum settable pressure is dependent on the flow. (see characteristic curves „settable pressure in bar / command value voltage in %, see pages 7 and 8)
Min. settable pressure with a zero command value		bar	see characteristic curves on pages 7 and 8
Return pressure (port T)			separate and at zero pressure to tank
Flow	Pressure stage 30 bar Pressure stage 80 bar Pressure stage 180 bar Pressure stage 250 bar Pressure stage 315 bar Pressure stage 350 bar	L/min L/min L/min L/min L/min L/min	3 2.5 2.5 2.5 2 2
Pressure fluid			mineral oil (HL, HLP) to DIN 51 524 further pressure fluids on request!
Pressure fluid temperature range		°C	–20 to +70
Viscostiy range		mm²/s	15 to 380
Degree of contamination			Maximum permissible degree of the pressure fluid contamination is to NAS 1638: class 9 A filter is recommended with a minimum retention rate of $\beta_x \geq 75$: x = 10
Hysteresis		%	≤ 1 of the max. settable pressure
Reverse error		%	≤ 0.2 of the max. settable pressure
Response sensitivity		%	≤ 0.2 of the max. settable pressure
Command value - pressure - characteristic curve example spread in relation to the hysteresis characteristic curve, with pressure increasing, flow 1.5 L/min		%	± 1.5 of the max. settable pressure
Step response ($T_u + T_g$) 0 → 100 % or 100 % → 0		ms	30 to 120 (dependent on the system)

Electrical

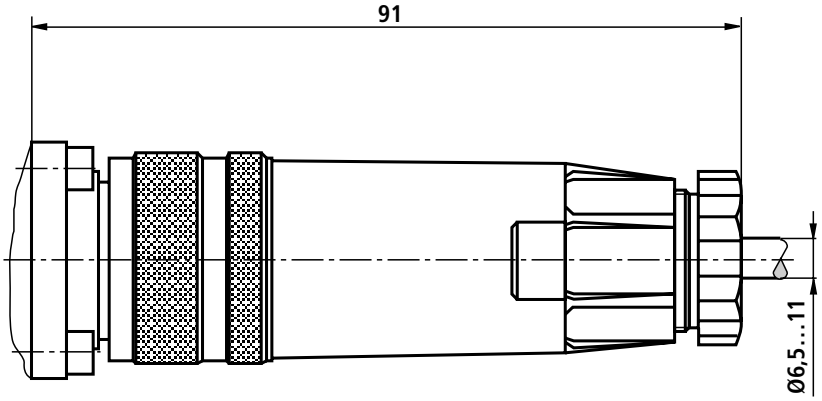
Supply voltage	24 V DC
Command value input	0 to 10 VDC
Electrical connections	with component plug to E DIN 43 563-AM6-3 plug-in connector to E DIN 43 563-BF6-3/Pg11 (separate order, see page 5)
Valve protection to DIN 40 050	IP 65
Control electronics	integrated in the valve, see page 6

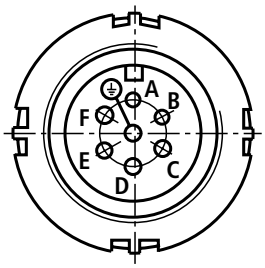
Note:
For details regarding the **environmental simulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29 168-U (declaration regarding environmental compatibility).

Electrical connections, plug-in connector

Plug-in connector

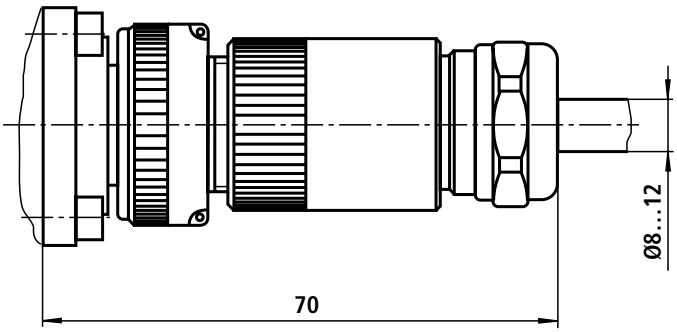
Plug-in connector to E DIN 43 563-BF6-3/Pg11
separate order under material no. **00021267** (plastic version)





Plug-in connector

Plug-in connector to E DIN 43 563-BF6-3/Pg13.5
separate order under material no. **00223890** (metal version)



Component plug contact allocation

	Contact	Signal
Supply voltage	A	24 VDC (u(t) = 19.4 V to 35 V); I_{Nom} = 2.8 A; I_{max} = 3.35 A
	B	0 V
Actual value ref. potential	C	0 V ref. contact F; R_e > 50 kΩ
Differential amplifier input command value	D E	0 to 10 V command value; R_e > 50 kΩ 0 V ref. potentional; R_e > 50 kΩ
Measurement output (act. val.)	F	0 to 10 V actual value (limiting load 2 mA)
	PE	connected with cooling body and valve housing

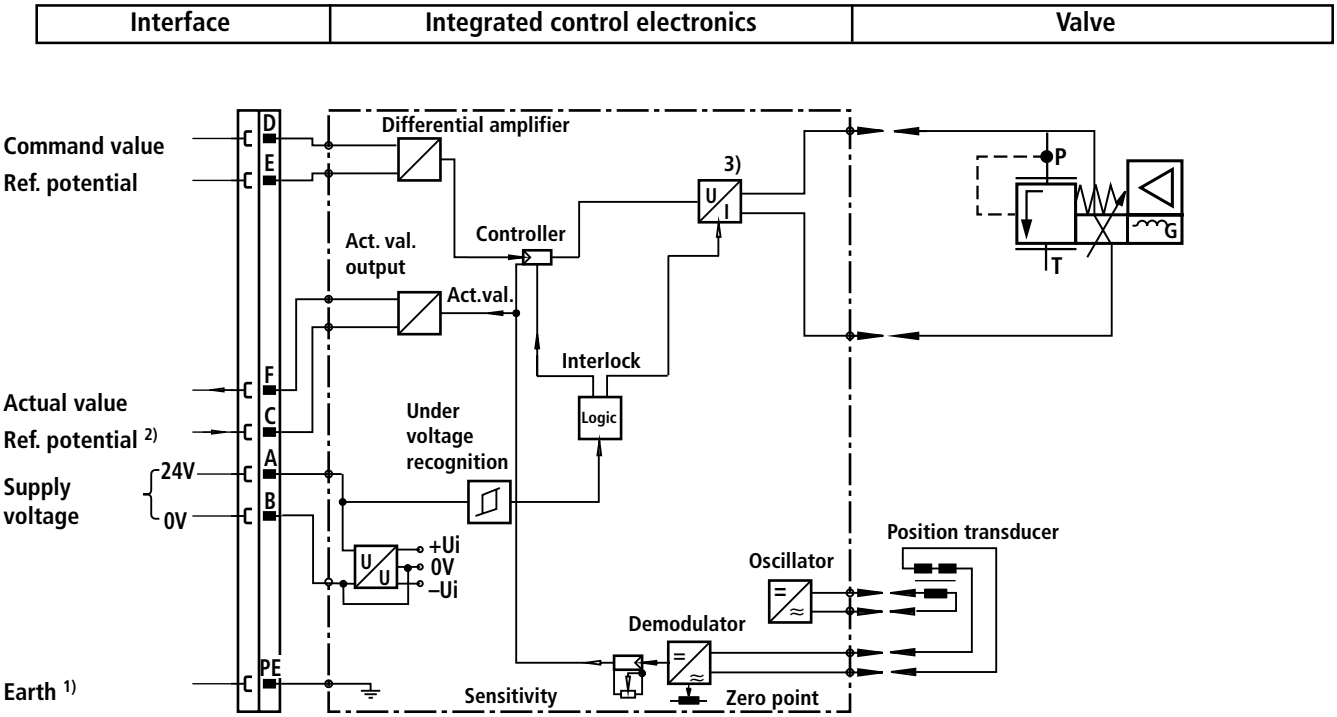
Actual value: Interface: A positive signal at F and the ref. potential at C results in an increase in pressure.
Connect pin C on the control side (star form) with ⊥.

Command value: A positive command value at D and the ref. potential at E results in an increase in pressure

Connection cable: Recommendation: – up to 25 m cable length, type LiYCY 7 x 0.75 mm²
– up to 50 m cable length, type LiYCY 7 x 1.0 mm²
Outside diameter 6.5 to 11 mm (plastic plug-in connector)
Outside diameter 8 to 12 mm (metal plug-in connector)
Only connect the screen on the supply side to ⊥.

Integrated control electronics

Block circuit diagram / integrated control electronics connection allocation



Note: **Electrical signals (e.g. actual value) taken via valve electronics must not be used to switch off the machine safety functions!**
(This is in accordance with the regulations to the European Standard "Safety requirements of fluid technology systems and components – hydraulics", EN 982!)

1) Connection PE is connected to the cooling body and valve housing

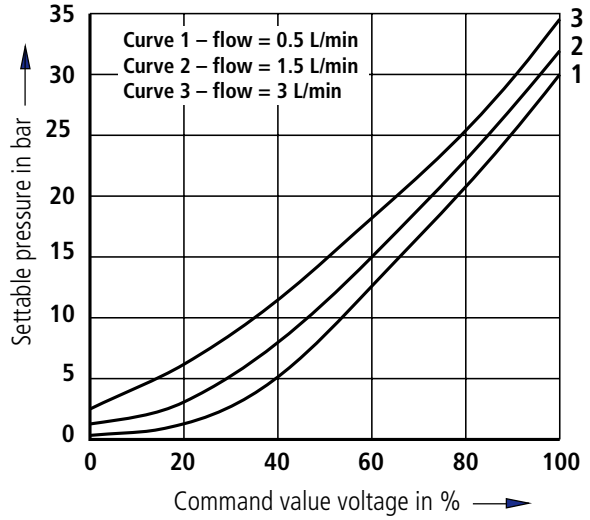
2) Conntect pin C on the control side with ⊥

3) Current controlled output stage

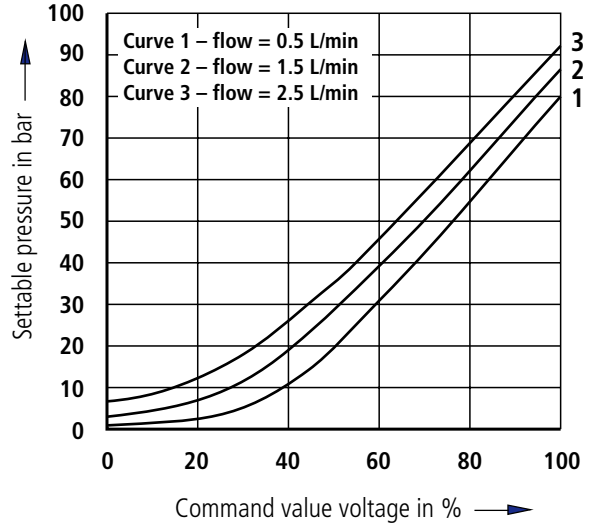
Characteristic curves (measured at $\nu = 41$ mm^2/s and $\vartheta = 50$ °C)

Pressure in port P in relation to the command value

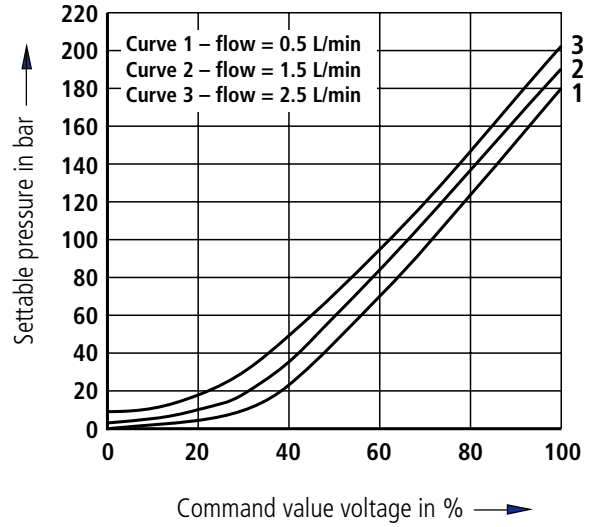
Pressure stage 30 bar



Pressure stage 80 bar

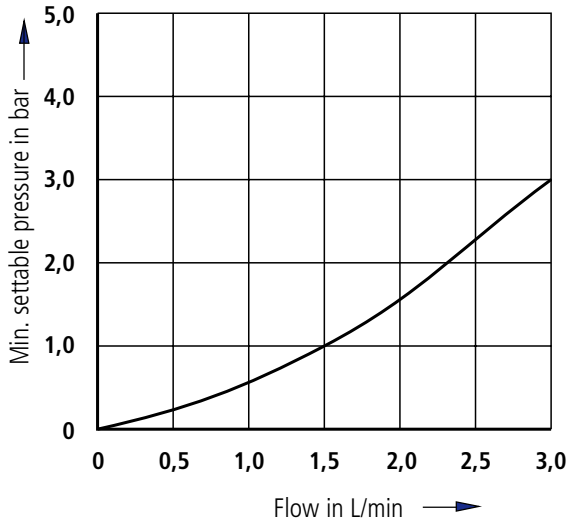


Pressure stage 180 bar

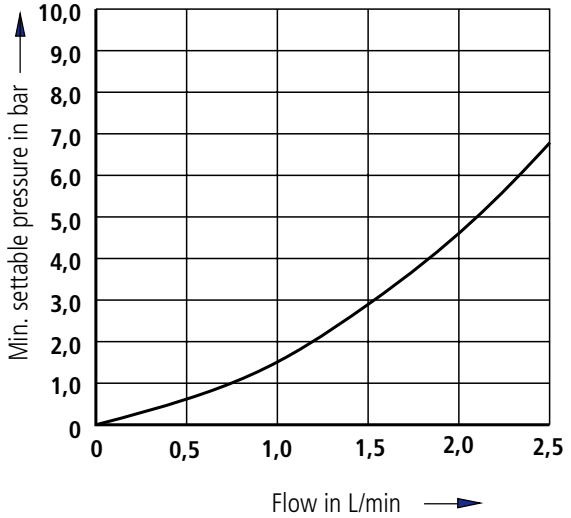


Minimum settable pressure in P at a zero command value

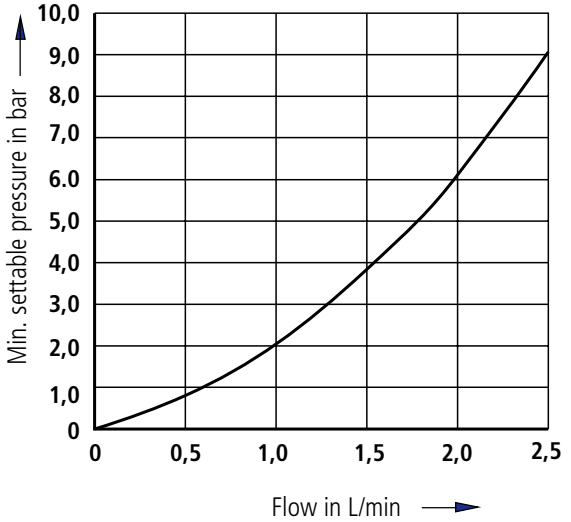
Pressure stage 30 bar



Pressure stage 80 bar



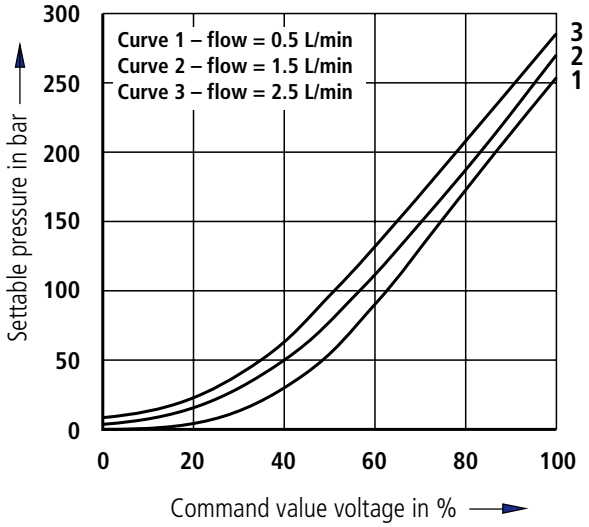
Pressure stage 180 bar



Characteristic curves (measured at $\nu = 41$ mm²/s and $\vartheta = 50$ °C)

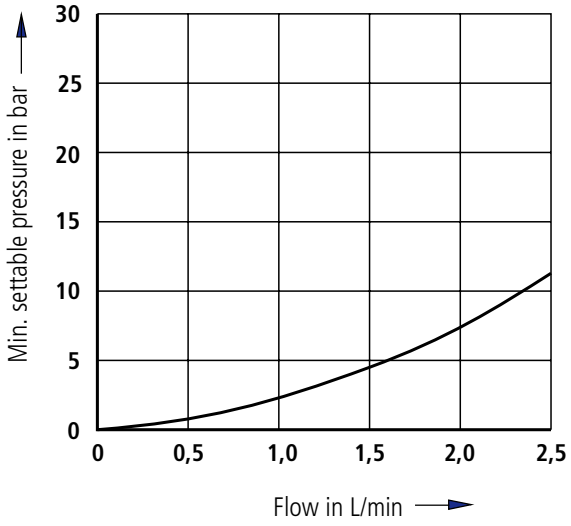
Pressure in port P in relation to the command value

Pressure stage 250 bar

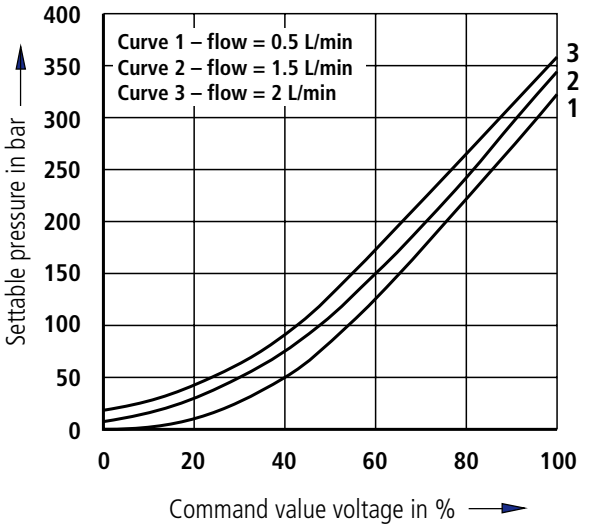


Minimum settable pressure in P at a zero command value

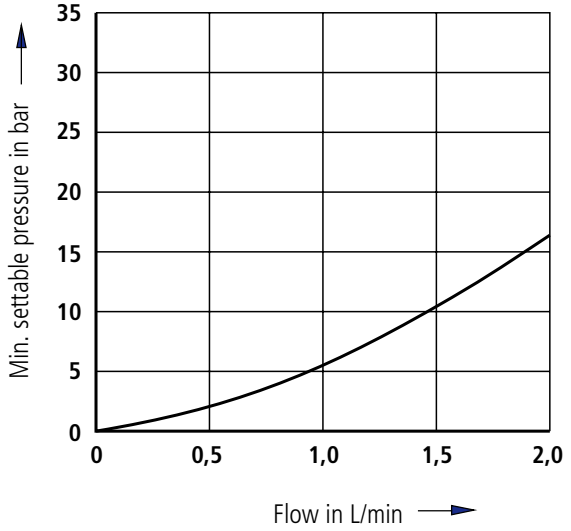
Pressure stage 250 bar



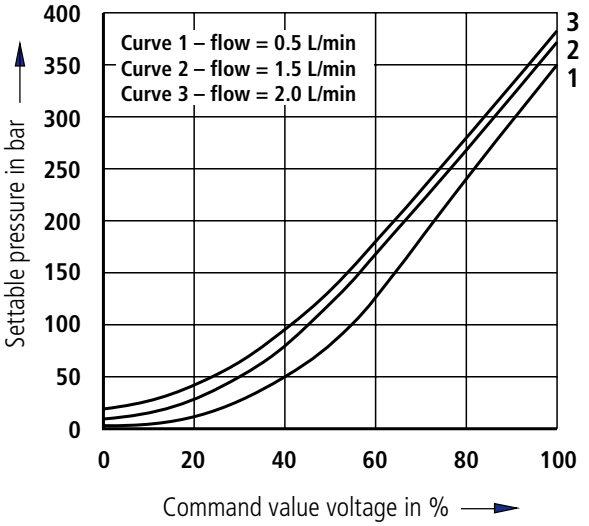
Pressure stage 315 bar



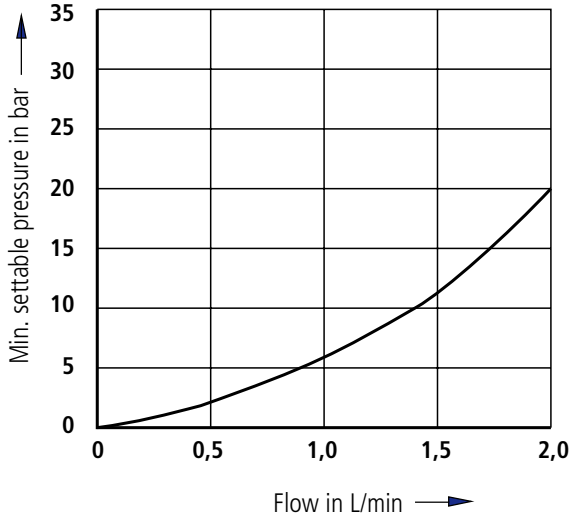
Pressure stage 315 bar



Pressure stage 350 bar

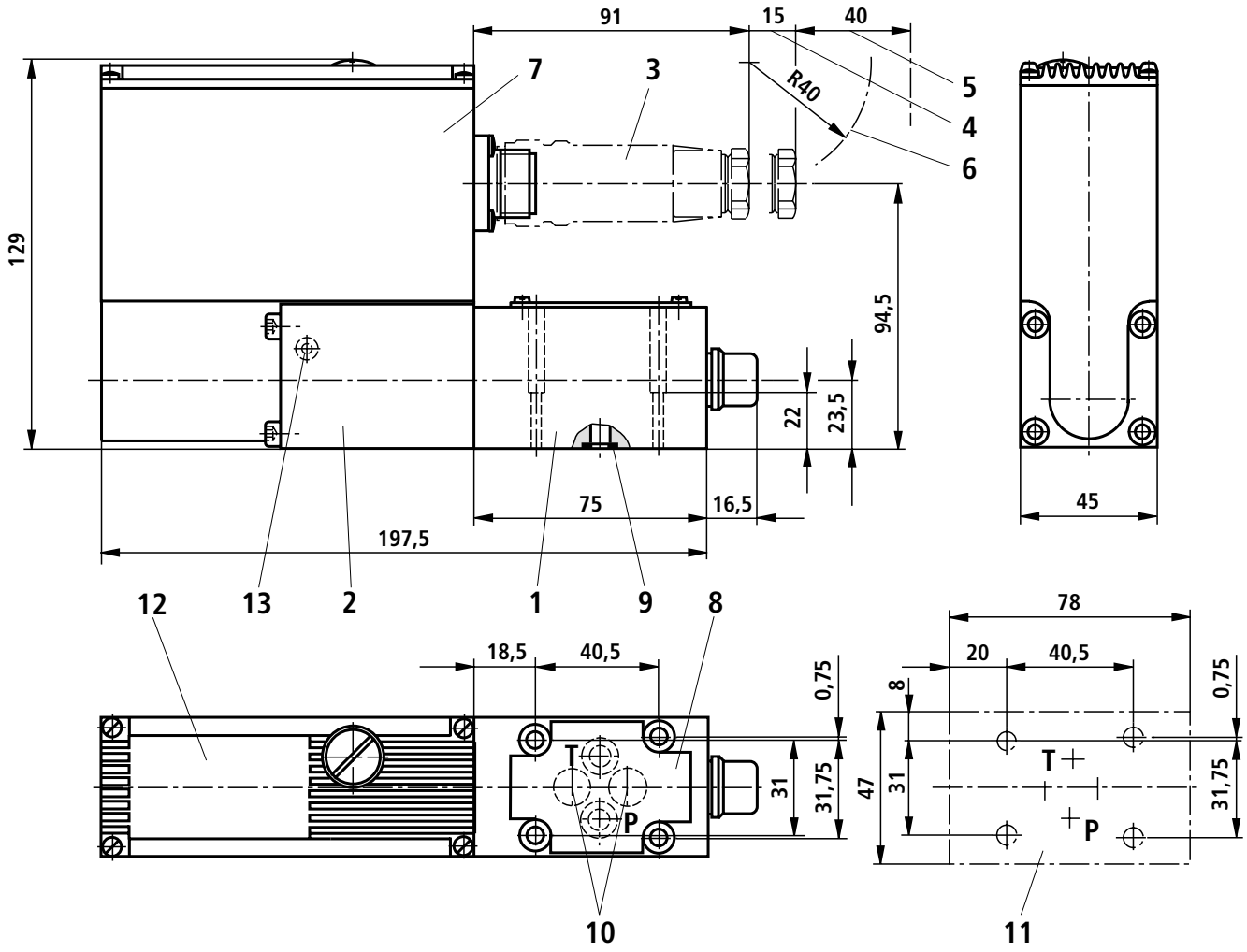


Pressure stage 350 bar



Unit dimensions

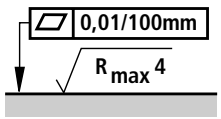
(Dimensions in mm)



Subplates to catalogue sheet RE 45 052 and valve fixing screws have to be separately ordered.

Subplates: G 341/01 (G1/4)
G 342/01 (G3/8)
G 502/01 (G1/2)

Valve fixing screws:
M5 x 30 DIN 912-10.9; M_A = 8.9 Nm



Required surface finish of mating piece

1 Valve housing
2 Proportional solenoid with position transducer
3 Plug-in connector to E DIN 43 563-BF6-3/Pg11 plastic version),
separate order, see page 5
4 Space required to remove the plug-in connector
5 Space required for the cable bend radius when removing the plug-in connector
6 Cable bend radius
7 Integrated control electronics with component plug
8 Name plate
9 R-rings 9.81 x 1.5 x 1.78
10 Blind hole
11 Machined valve mounting surface, port locations to DIN 24 340 form A6; ISO 4401
12 Lable containing the pin allocations for positions 3 and 7
13 Bleed screw

Notes

Mannesmann Rexroth AG
Rexroth Hydraulics
D-97813 Lohr am Main
Jahnstraße 3-5 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0
Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0
E-Mail product.support@rexroth.de
Internet www.rexroth.com

Mannesmann Rexroth Limited
Cromwell Road, St Neots,
Cambs, PE19 2ES
Tel: 0 14 80/22 32 56
Fax: 0 14 80/21 90 52
E-mail: info@rexroth.co.uk