

RE 29 165/11.02

Replaces: 12.98

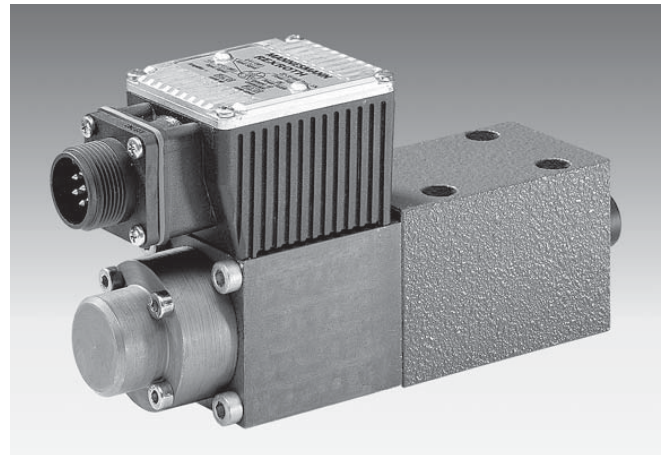
**Proportional pressure relief valve
Types DBET and DBETE**

Nominal size 6

Series 5X

Maximum operating pressure 350 bar

Maximum flow 2 L/min



H/A/D 607/9/98

Type DBETE-5X/G24K31... with integrated control electronics

Overview of contents

Contents	Page
Features	1
Ordering details	2
Preferred types	2
Symbols	2
Function, section	3
Technical data	4 and 5
Control electronics	5 and 6
Electrical connections, plug-in connectors	5
Characteristic curves	7 and 8
Unit dimensions	9

Features

- Direct operated valve for the limitation of a system pressure
- Operation via proportional solenoids
- For subplate mounting:
 - Porting pattern to DIN 24 340, Form A6
 - Subplates to catalogue sheet RE 45 052, (separate order, see page 9)
- External control electronics for type DBET:
 - Analogue amplifier types VT-VSPA1-1 and VT 2000 in Eurocard format (separate order, see page 5)
 - Digital amplifier type VT-VSPD-1 in Eurocard format (separate order, see page 5)
 - Analogue amplifier type VT 11030 of modular design (separate order, see page 5)
- Integrated control electronics for type DBETE:
 - Low example spread for the command value-pressure-characteristic curve
 - Independently adjustable up and down ramps
- Special protection types on request!
For details regarding the sea water resistant version see catalogue sheet RE 29 165-M



© 2002
by Bosch Rexroth AG, Industrial Hydraulics, D-97813 Lohr am Main

All rights reserved. No part of this document may be reproduced or stored, processed, duplicated or circulated using electronic systems, in any form or by means, without the prior written authorisation of Bosch Rexroth AG. In the event of contravention of the above provisions, the contravening party is obliged to pay compensation.

This document was prepared with the greatest of care, and all statements have been examined for correctness. This document is subject to alterations for reason of the continuing further developments of products. No liability can be accepted for any incorrect or incomplete statements.

Ordering details

DBET	- 5X /	G24	*
Proportional pressure relief valve			Further details in clear text
For external control electronics With integrated control electronics	= No code = E		M = NBR seals, suitable for mineral oil (HL, HLP) to DIN 51 524 V = FKM seals
Series 50 to 59 (50 to 59: unchanged installation and connection dimensions)	= 5X		Electrical connections For DBET: K4 = Without plug-in connector, with component plug to DIN EN 175 301-803 Plug-in connector – separate order, see page 5 For DBETE: K31 = Without plug-in connector, with component plug to E DIN 43 563-AM6-3 Plug-in connector – separate order, see page 5
Pressure stage Up to 50 bar Up to 100 bar Up to 200 bar Up to 315 bar Up to 350 bar	= 50 = 100 = 200 = 315 = 350		G24 = Supply voltage for the control electronics 24 V DC
Special protection types on request!			

Preferred types

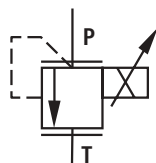
Type DBETE

Material No.	Type
R900528808	DBETE-5X/50G24K31M
R900560201	DBETE-5X/100G24K31M
R900946670	DBETE-5X/200G24K31M
R900936987	DBETE-5X/315G24K31M

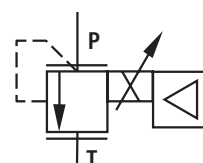
Further preferred types and standard units are to be found in the EPS (Standard Price List).

Symbols

For external control electronics (type DBET)



With integrated control electronics (type DBETE)



Function, section

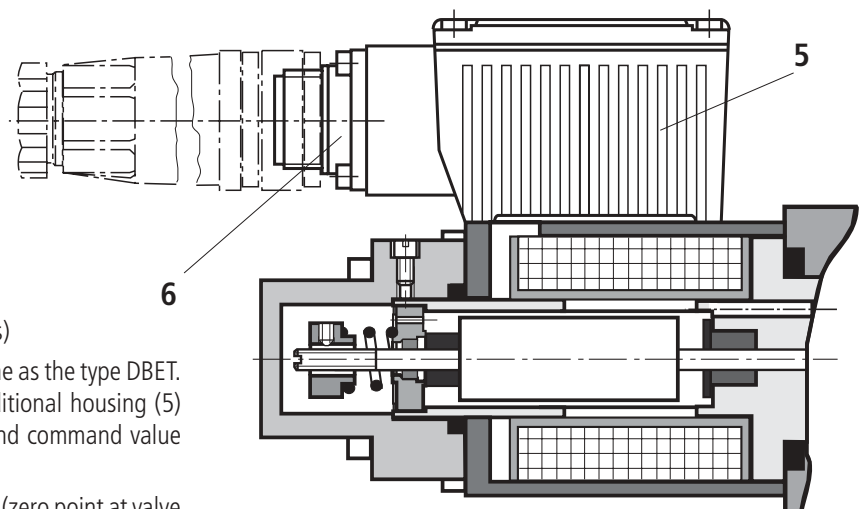
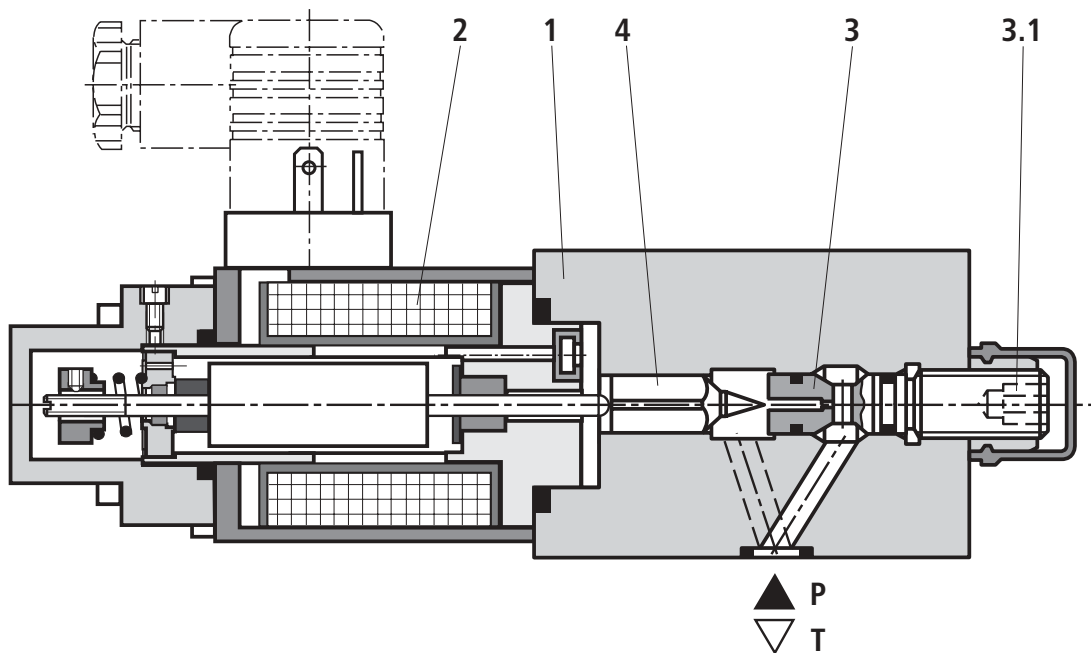
Type DBET (for external control electronics)

The type DBET proportional pressure relief valves are remote control valves of poppet design and are used to limit a system pressure. They are operated by a proportional solenoid. With these valves, the system pressure to be limited can be infinitely set in relationship to the electrical command value.

These valves consist of the housing (1), a proportional solenoid (2), the valve seat (3) and the valve poppet (4).

The proportional solenoid converts electrical current proportionally into a mechanical force. An increase in the current causes a proportionally higher solenoid force. The armature chamber of the solenoid is filled with pressure fluid and is pressure tight.

The setting of the system pressure is carried out command value dependent via the proportional solenoid (2). The solenoid force pushes the valve poppet onto the seat (3). The pressure present in port P of the system acts on the valve poppet (4) and thus against the force of the proportional solenoid. If the hydraulic force on the valve poppet (4) is equal to the solenoid force then the valve controls the set pressure by lifting the valve poppet off the valve seat (3), and thus permitting pressure fluid to flow from P to T. With minimum control current, which relates to a zero command value, the minimum settable pressure is set.



Type DBETE (with integrated control electronics)

The function and design of these valves is the same as the type DBET. The proportional solenoids are fitted with an additional housing (5) which contains the control electronics. Supply and command value voltages are applied at the component plug (6).

The command value-pressure-characteristic curve (zero point at valve seat (3.1) and the increase at the I_{\max} potentiometer (R30) in the control electronics) are factory pre-set with a low example spread.

The ramp time for pressure increase and decrease may be set independently from each other at two potentiometers.

For further details regarding the integrated electronics see page 6.

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

Installation			Optional
Storage temperature range		°C	- 20 to + 80
Ambient temperature range	DBET	°C	- 20 to + 70
	DBETE	°C	- 20 to + 50
Weight	DBET	kg	2.0
	DBETE	kg	2.1

Hydraulic (measured with HLP 46; $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$)


Max. operating pressure	Port P	bar	350
Max. settable pressure	Pressure stage 50 bar	bar	50
	Pressure stage 100 bar	bar	100
	Pressure stage 200 bar	bar	200
	Pressure stage 315 bar	bar	315
	Pressure stage 350 bar	bar	350
Min. settable pressure with a zero command value		bar	See characteristic curves on page 8
Return pressure	Port T		Separate and at zero pressure to tank
Max. flow		L/min	2
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 Further pressure fluids on request!
Pressure fluid temperature range		°C	- 20 to + 80
Viscosity range		mm ² /s	15 to 380
Cleanliness class to ISO code			Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (c) class 20/18/15 ¹⁾
Hysteresis (see command value-pressure-characteristic curve)			± 1.5 % of max. settable pressure
Repeatability			< ± 2 % of max. settable pressure
Linearity			± 3.5 % of max. settable pressure
Example spread of the command value-pressure-char. curve, referring to the hysteresis-char. curve, pressure increasing	DBET		± 2.5 % of max. settable pressure
	DBETE		± 1.5 % of max. settable pressure
Switching time		ms	30 to 150 (system dependent)

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 50 070, RE 50 076 and RE 50 081.

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

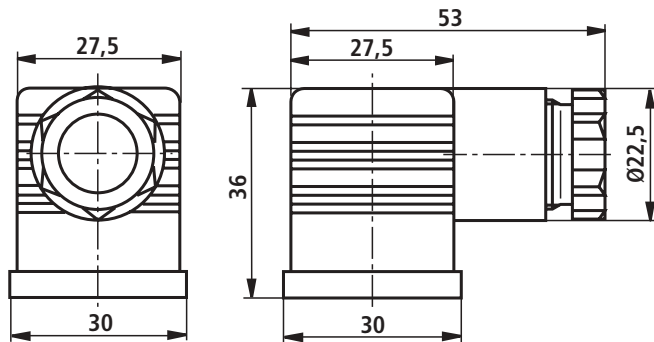
Electrical

Supply voltage			24 V DC
Min. control current	DBET and DBETE	mA	100
Max. control current	DBET	mA	800
	DBETE	mA	1600
Coil resistance	Cold value at 20°C	Ω	19.5 for DBET; 5.4 Ω for DBETE
	Max. warm value	Ω	28.8 for DBET; 7.8 Ω for DBETE
Duty		%	100
Electrical connections	DBET		With component plug to DIN EN 175 301-803 Plug-in connector to DIN EN 175 301-803 ¹⁾
	DBETE		With component plug to E DIN 43 563-AM6-3 Plug-in connector to E DIN 43 563-BF6-3/Pg11 ¹⁾
1) Separate order, see below			
Valve protection to DIN 40 050			IP 65 with mounted and fixed plug-in connector
Control electronics			
– For DBETE			Integrated into the valve, see page 6
– For DBET			
• Amplifier in Eurocard format (separate order)		Analogue	VT-VSPA1-1 to catalogue sheet RE 30 111 VT 2000 to catalogue sheet RE 29 904
		Digital	VT-VSPD-1 to catalogue sheet RE 30 123
• Amplifier of modular design (separate order)		Analogue	VT 11030 to catalogue sheet RE 29 741

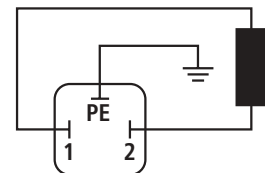
 **Note:** For details regarding the **environmental simulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29 165-U (declaration regarding environmental compatibility).

Electrical connections, plug-in connectors

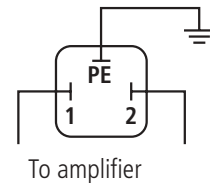
For type DBET (for external control electronics)
Plug-in connector to DIN EN 175 301-803
Separate order under Material No. **R900074684**



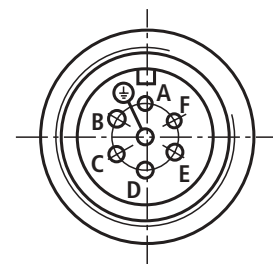
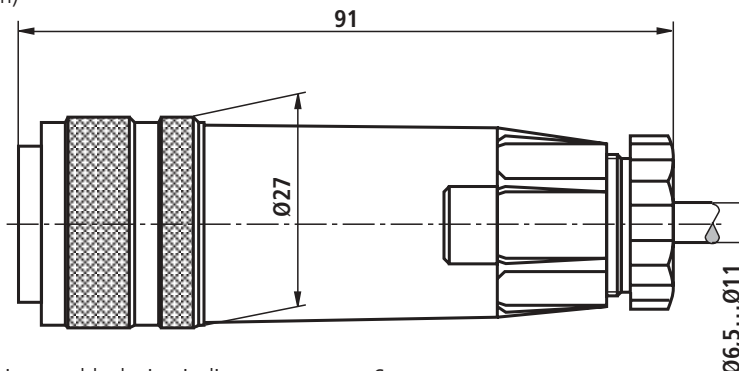
Connections at component plug



Connections at plug-in connector



For type DBETE (with integrated control electronics)
Plug-in connector to E DIN 43 563-BF6-3/Pg11
Separate order under Material No. **R900021267**
(plastic version)



For pin allocation see block circuit diagram on page 6

Integrated control electronics for type DBETE

Function

The control of the integrated electronics is at the two differential amplifier ports D and E.

The ramp generator produces from a command value jump (0 to 10 V or 10 to 0 V) a delayed increase or decrease in the solenoid current. At potentiometer R14 the rate of increase in time and at potentiometer R13 the rate of decrease in time of the solenoid current can be set.

Only over the full command value range is the maximum ramp time of 5 s possible. With smaller command value changes the ramp time is accordingly shortened.

Via the characteristic curve generator, the command value-solenoid current characteristic curve is so matched to the valve, that non-linearities in the hydraulics are compensated for, so that a linear command value-pressure-characteristic curve is obtained.

The current controller controls the solenoid current independently from the solenoid coil resistance.

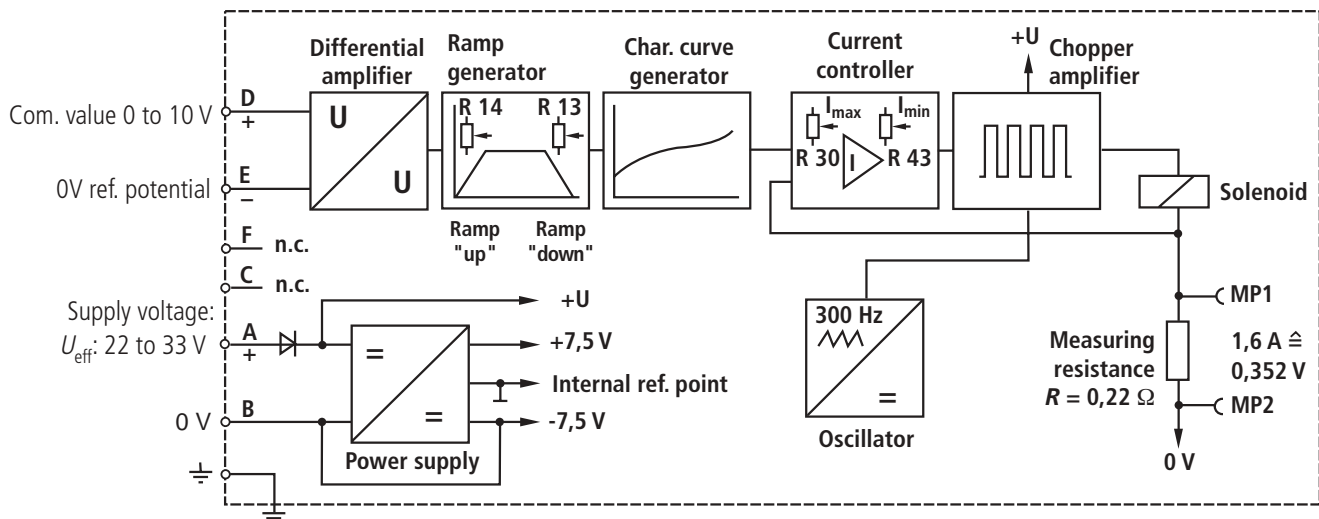
At potentiometer R30, the increase rate of the command value-current-characteristic curve, and thereby also the increase rate of the command value-pressure-characteristic curve of the proportional pressure valve can be changed.

The potentiometer R43 is used to adjust the biasing current. This adjustment should not be changed. If required, the zero point of the command value-pressure-characteristic curve is adjustable at the valve seat.

The power stage of the electronics for the control of the proportional solenoid forms a chopper amplifier. It is pulse width modulated with a pulse frequency of 300 Hz.

The solenoid current may be measured at the two measurement sockets MP1 and MP2. A voltage drop of 0.352 V at the measurement resistor relates to a solenoid current of 1.6 A.

Block circuit diagram / pin allocation of the integrated control electronics



Supply voltage

Power supply with rectification

Single phase rectification or three phase bridge: $U_{eff} = 22$ to 33 V

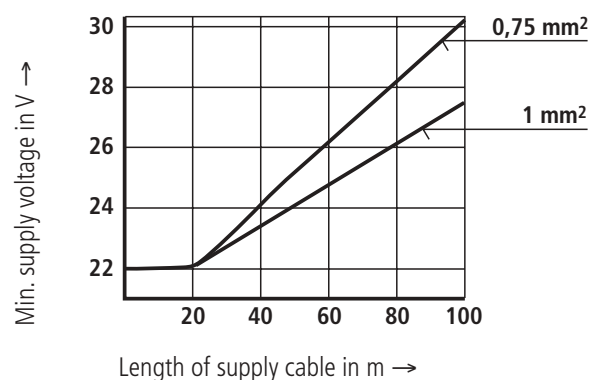
Residual ripple at power supply: $< 5\%$

Output current: $I_{eff} = \text{max. } 1.4$ A

- Supply cable:
- Recommended 5 core 0.75 or 1 mm² with protective conductor and screen
 - Outside diameter 6.5 to 11 mm
 - Screen at 0 V power supply
 - Max. permissible length 100 m

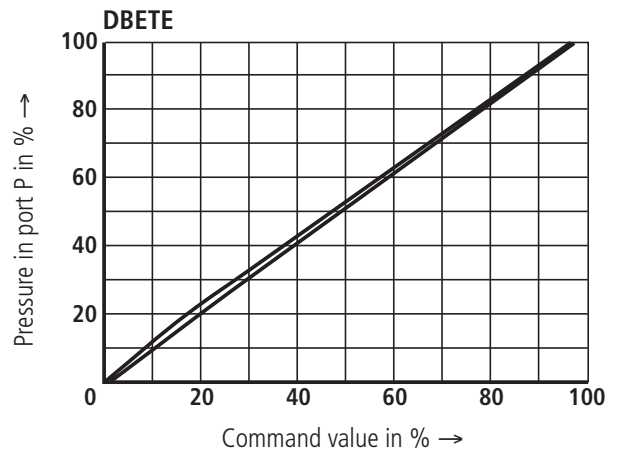
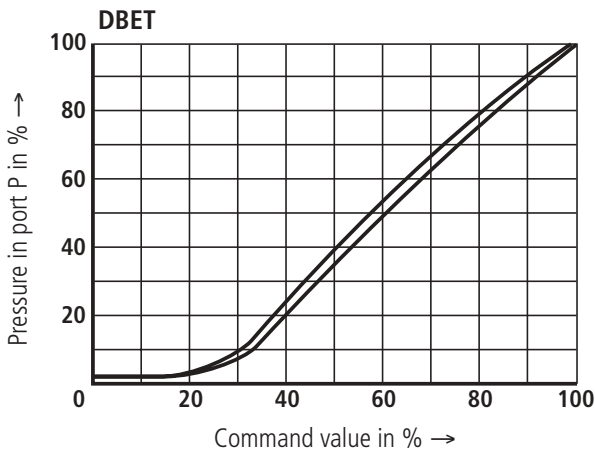
The minimum power supply voltage at the power supply is dependent on the length of the supply cable (see diagram).

For lengths > 50 m a capacitor with a value of 2200 μF must be fitted in the supply cable near to the valve.

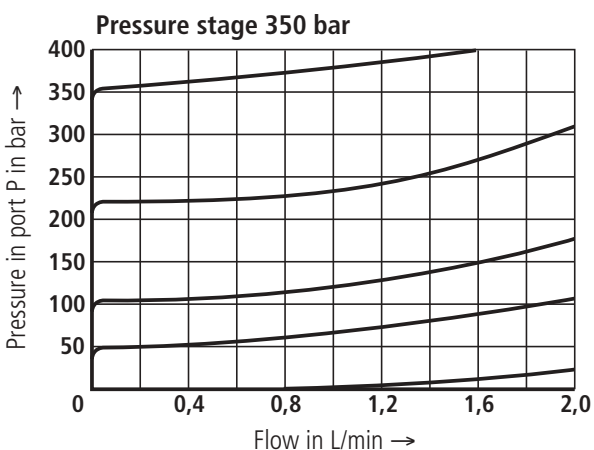
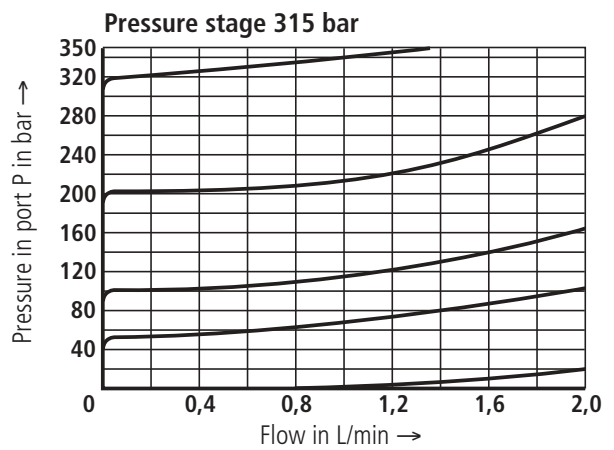
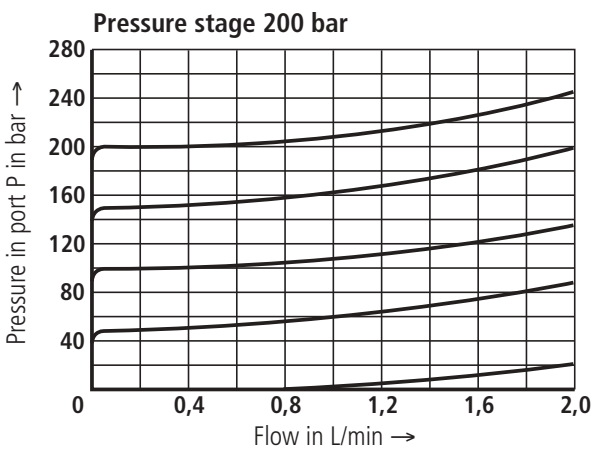
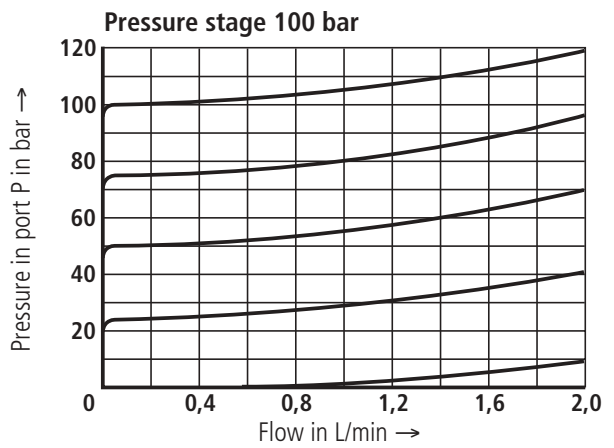
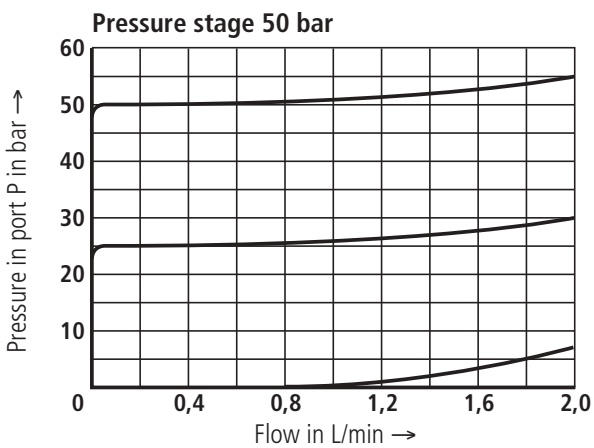


Characteristic curves (measured with HLP 46; $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$)

Pressure in port P in relation to the command value ($q_v = 0.8 \text{ L/min}$)

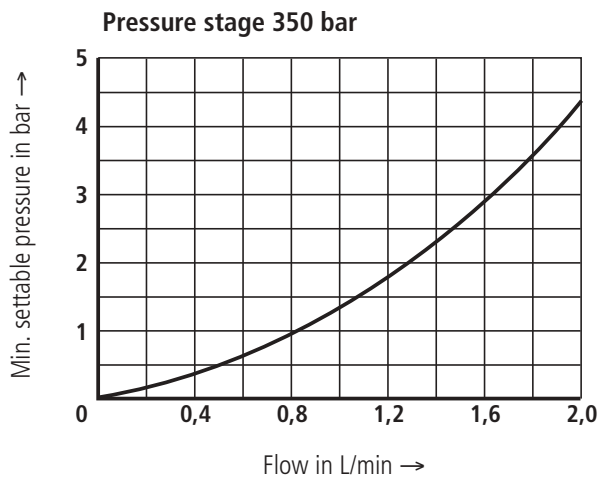
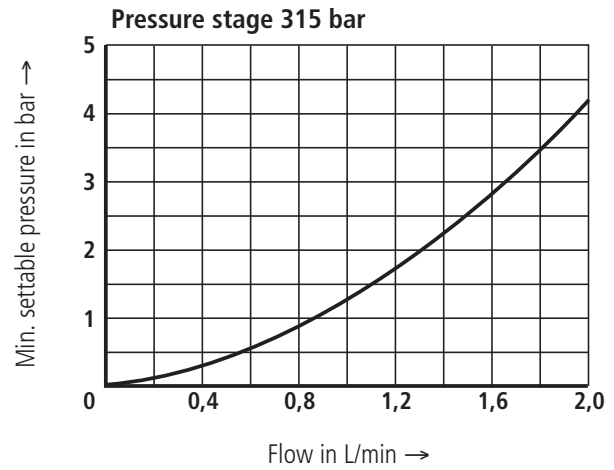
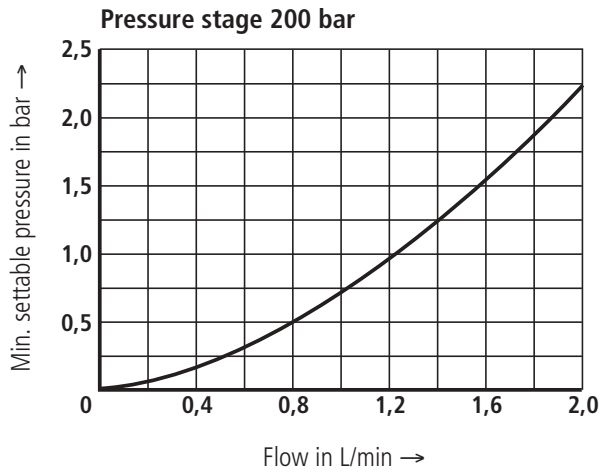
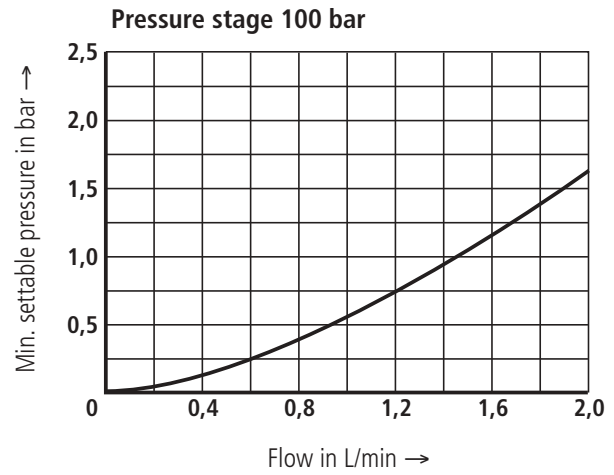
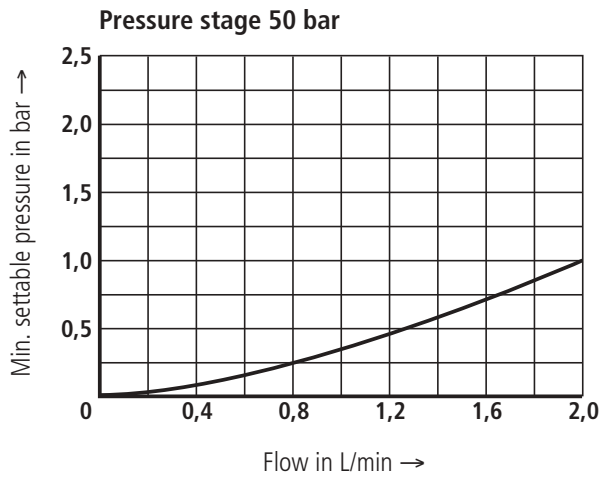


Pressure in port P in relation to the flow



The characteristic curves were measured without back pressure in port T.

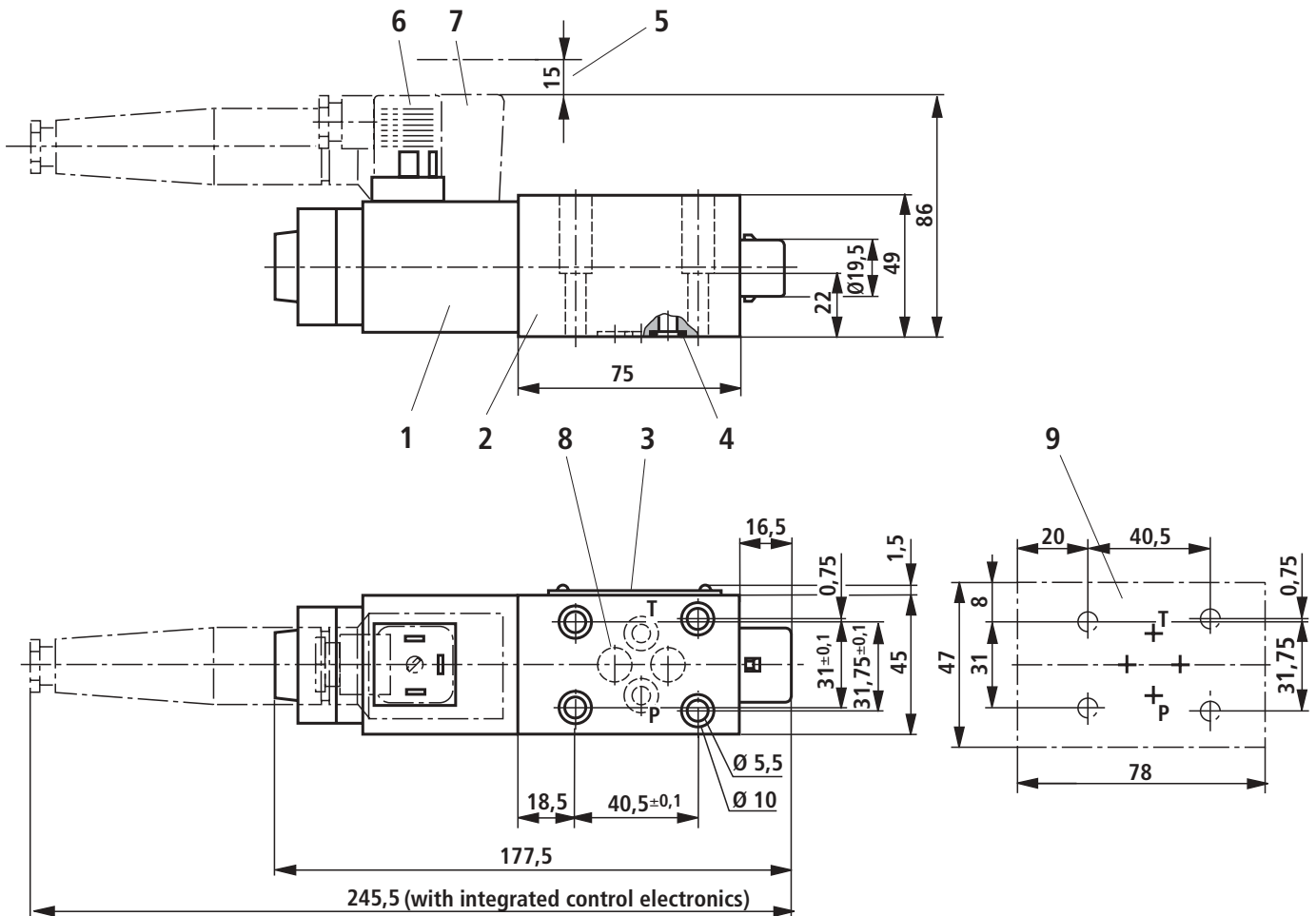
Min. settable pressure in port P with a zero command value



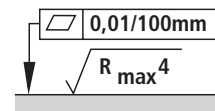
The characteristic curves were measured without back pressure in port T.

Note: So that the minimum settable pressure can be achieved the bias current must not exceed 100 mA.

Unit dimensions (dimensions in mm)



- 1 Proportional solenoid
- 2 Valve housing
- 3 Name plate
- 4 Identical seal rings for ports P, T and blind counterbore (Pos.8)
- 5 Space required to remove the plug-in connector
- 6 Plug-in connector for type DBET (separate order, see page 5)
- 7 Integrated control electronics with component plug and plug-in connector for type DBETE (separate order, see page 5)
- 8 Blind counterbore
- 9 Porting pattern to DIN 24 340; Form A6



Required surface finish of the mating piece

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

Subplates: G 341/01 (G 1/4)
G 342/01 (G 3/8)
G 502/01 (G 1/2)

Valve fixing screws: M5 x 30 DIN 912-10.9;
 $M_A = 8.9 \text{ Nm}$

Bosch Rexroth AG
Industrial Hydraulics

D-97813 Lohr am Main
Zum Eisengießer 1 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0
Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0
eMail documentation@boschrexroth.de
Internet www.boschrexroth.de

Bosch 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@boschrexroth.co.uk

The data specified above only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. It must be remembered that our products are subject to a natural process of wear and ageing.