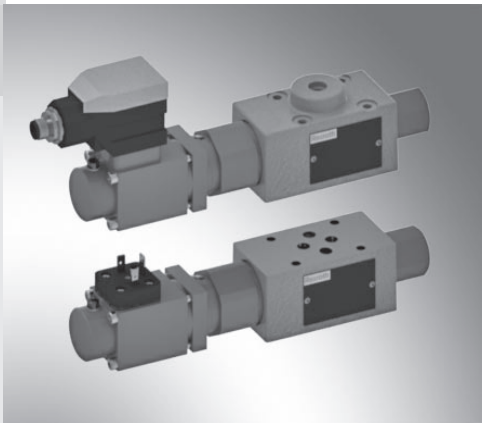
Rexroth
Bosch Group

Proportional pressure reducing valve, pilot operated

RE 29175/01.12 1/18
Replaces: 11.09

Type DRE(E) and ZDRE(E)



Size 6
Component series 1X
Maximum operating pressure 210 bar
Maximum flow 30 l/min

CE

Table of contents

Features

- Pilot-operated valve for reducing the pressure in ports A and P1 with pressure limitation
- Operation by means of proportional solenoids
- For subplate mounting or sandwich plate design: Porting pattern according to ISO 4401-03-02-0-05
- Little manufacturing tolerance of the command value pressure characteristic curve due to electrical adjustment in case of operation with external control electronics
- Minimum set pressure in ports A or P1, see page 12
- Types DREE and ZDREE with integrated electronics (OBE)
- CE : With types DREE and ZDREE, the EMC directive 2004/108/EC is satisfied
  - EN61000-6-2:2011
  - EN61000-6-3:2011

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

	DRE		6		–1X/		M	G24		

Subplate mounting **= no code**
Sandwich plate **= Z**

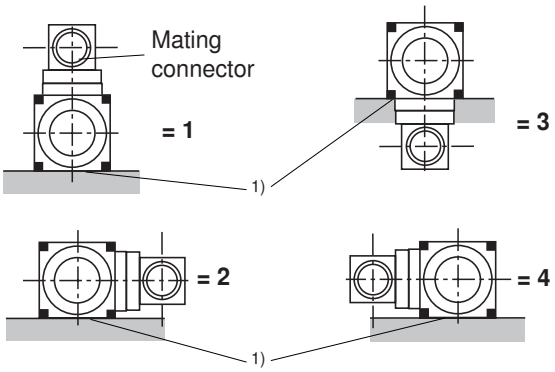
Proportional pressure reducing valve **= DRE**

For external control electronics **= no code**
With integrated electronics (OBE) **= E**

Size 6 **= 6**

Pressure reduction in channel A (subplate mounting) **= no code**
Pressure reduction in channel P1 (sandwich plate) **= VP**

Position of the mating connector (omitted in case of subplate mounting)



1) Valve mounting face
(seal ring recesses in the housing)

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

Pressure rating
50 bar **= 50**
100 bar **= 100**
210 bar **= 210**

Without check valve **= M**

Supply voltage
Direct voltage 24 V **= G24**

With manual override **= N9**
Without manual override **= no code**

			*

Further details in the plain text

Seal material

M = NBR seals

V = FKM seals

Interface electronics

A1 = Command value 0 to 10 V

F1 = Command value 4 to 20 mA

no code = Type (Z)DRE

Electrical connection type DRE; ZDRE:

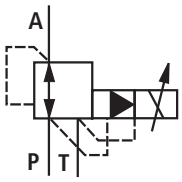
K4 = **Without** mating connector, with connector according to DIN EN 175301-803
Mating connector, separate order, see page 18

Type DREE; ZDREE:

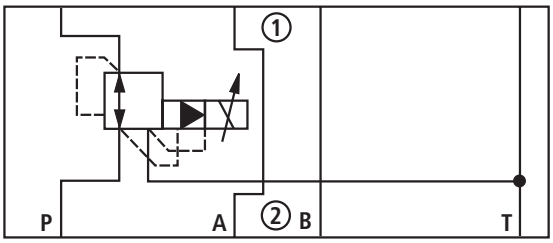
K24 = **Without** mating connector, with connector M12
Cable set, separate order, see page 18

Symbols (① = component side, ② = plate side)

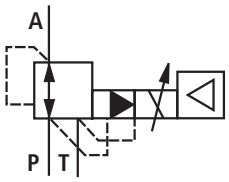
Type DRE 6…



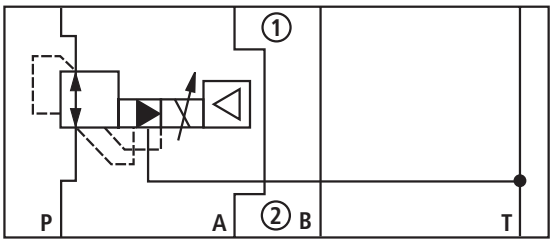
Type ZDRE 6 VP…



Type DREE 6…



Type ZDREE 6 VP…



Function, section

Valves of type DRE and ZDRE are electrically pilot operated 3-way pressure reducing valves with pressure limitation of the actuator.

They are used for reducing a system pressure.

Technical structure:

The valve consists of three main assemblies:

- Pilot control valve (1)
- Proportional solenoid (2)
- Main valve (3) with main control spool (4)

Function:

Type DRE

General function:

- Command value-dependent setting of the pressure to be reduced in channel A via the proportional solenoid (2).
- In the depressurized port P, the spring (17) holds the main control spool (4) in initial position.
- Thus, opening the connection from A to T and blocking of the connection from P to A.
- Pressure connection from port P to the ring channel (5).
- Pilot oil flows from the bore (6) to port T, via the flow controller (7), the nozzle (8) to the pilot control valve (1), the throttle gap (9) to the longitudinal groove (10) and the bores (11, 12).

Pressure reduction:

- Build-up of the pilot control pressure in the control chamber (16) as function of the command value.
- Movement of the main control spool (4) to the right, hydraulic fluid flows from P to A.
- Actuator pressure pending in port A to the spring chamber (15) via channel (13) and nozzle (14).
- Increase in the pressure in port A to the set pressure of the pilot control valve (1) leads to the movement of the main control spool (4) to the left. Pressure in port A is almost identical with the set pressure at the pilot control valve (1).

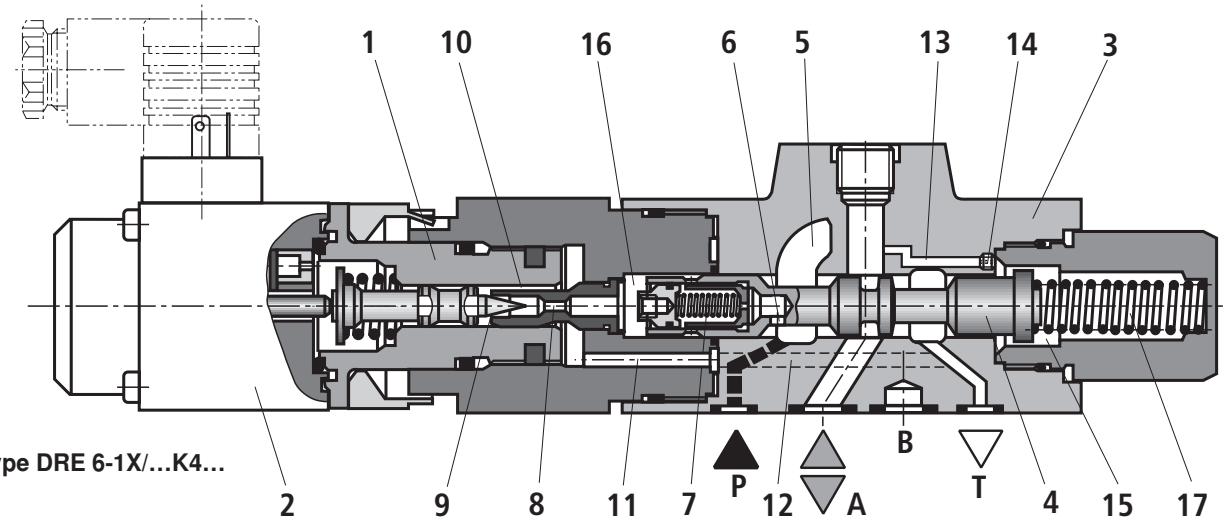
Pressure limitation:

- If the pressure in port A exceeds the set pressure of the pilot control valve (1), the main control spool (4) is moved further to the left.
- Thus, opening of the connection from A to T and limitation of the pressure pending in port A to the set command value.

Type ZDRE

In principle, the function of this valve corresponds to the function of type DRE 6.

The pressure is, however, reduced in channel P1.



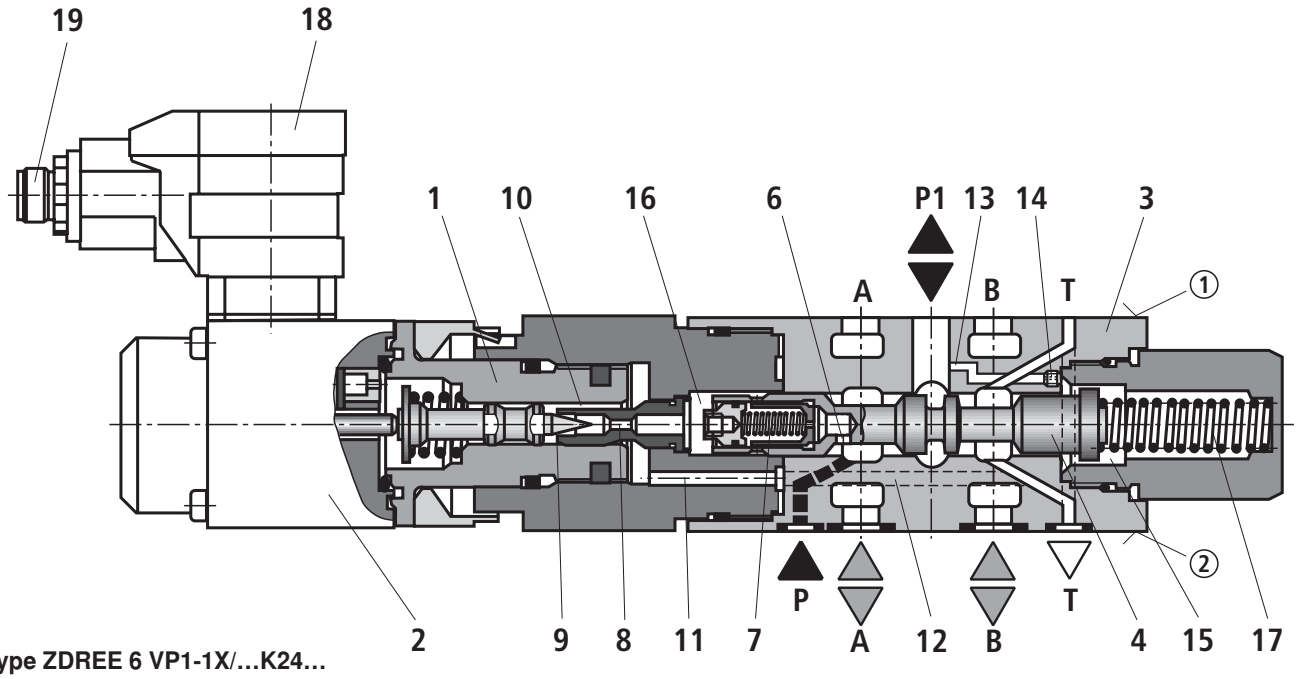
Type DRE 6-1X/…K4…

Function, section

Type (Z)DREE – with integrated electronics (OBE)

With regard to function and structure, these types correspond to type (Z)DRE. On the proportional solenoid (2), there is moreover a housing (18) with the control electronics.

Supply and command value voltage and/or command value current are applied to the connector (19).
In the factory, the command value pressure characteristic curve is adjusted with little manufacturing tolerance.



Type ZDREE 6 VP1-1X/…K24…

① = component side

② = plate side

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

general

Weight	– Type (Z)DRE 6		kg	2.0
	– Type (Z)DREE 6		kg	2.1
Installation position				Any
Storage temperature range			°C	–20 to +80
Ambient temperature range			°C	–20 to +70

hydraulic (measured with HLP 46; ϑ_{Oil} = 40 °C ± 5 °C)

Maximum operating pressure	– Port P or P2		bar	315
	– Port P1, A, and B		bar	210
	– Port T		bar	Separately and to the tank at zero pressure
Maximum set pressure in channels P1 and A	– Pressure rating 50 bar		bar	50
	– Pressure rating 100 bar		bar	100
	– Pressure rating 210 bar		bar	210
Minimum set pressure with command value 0 in channels P1 and A			bar	See characteristic curves page 12
Pilot flow			l/min	0.65
Maximum flow			l/min	30
Hydraulic fluid				See table page 7
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)				Class 20/18/15 [1]
Hydraulic fluid temperature range			°C	–20 to +80
Viscosity range			mm^2/s	15 to 380
Hysteresis			%	±2.5 of the maximum set pressure
Repeatability			%	< ±2 of the maximum set pressure
Linearity	– Type (Z)DRE 6		%	±3.5 of the maximum set pressure
Manufacturing tolerance of the command value pressure characteristic curve, related to the hysteresis characteristic curve, pressure increasing	– Type (Z)DRE 6		%	±2 of the maximum set pressure
	– Type (Z)DREE 6		%	±3 of the maximum set pressure
Step response $T_u + T_g$		10 % → 90 %	ms	~150 Measured with 1 liter standing hydraulic fluid column
		90 % → 10 %	ms	~150

[1] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter.

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

hydraulic

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons		HL, HLP	NBR, FKM	DIN 51524
Environmentally compatible	– Insoluble in water	HETG	NBR, FKM	ISO 15380
		HEES	FKM	
	– Soluble in water	HEPG	FKM	ISO 15380
Flame-resistant	– Water-free	HFDU, HFDR	FKM	ISO 12922
	– Water-containing	HFC Fuchs Hydrotherm 464 Petrofer Ultra Safe 620	NBR	ISO 12922

☞ **Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- The flash point of the process and operating medium used must be at least 40 K higher than the maximum solenoid surface temperature.
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- **Flame-resistant - containing water:**
  - Maximum operating pressure 210 bar
  - Maximum hydraulic fluid temperature 60 °C
  - Expected service life as compared to HLP hydraulic oil 30 % to 100 %

electric

Supply voltage		V	24 direct voltage
Minimum control current		mA	100
Maximum control current		mA	1600
Solenoid coil resistance	– Cold value at 20 °C	Ω	5
	– Maximum hot value	Ω	7.5
Switch-on duration		%	100
Protection class of the valve according to EN 60529			IP 65 with mating connector mounted and locked

electrical, integrated electronics (OBE)

Supply voltage	Nominal voltage	VDC	24
	Lower limit value	VDC	21
	Upper limit value	VDC	35
Current consumption		A	≤ 1.5
Required fuse protection		A	2.0 time-lag
Inputs	Voltage	V	0 to 10
	Current	mA	4 to 20
Output	Actual current value	mV	1 mV ≙ 1 mA
Protection class of the valve according to EN 60529			IP 65 with mating connector mounted and locked
Electromagnetic compatibility			EN 61000-6-2: 2011-06; EN 61000-6-3: 2011-09

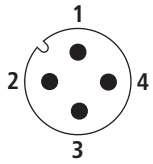
Electrical connection (dimensions in mm)

Type (Z)DREE

Device connector allocation	Contact	Assignment interface "A1"	Assignment interface "F1"
Supply voltage	1	24 VDC (u(t) = 21 V to 35 V); $I_{max} \leq 1.5$ A	
Command value input	2	0 to 10 V; R_E = 20 kΩ	4 to 20 mA; R_E = 100 Ω
Ground	3	0 V	
	4	Reference potential command value	

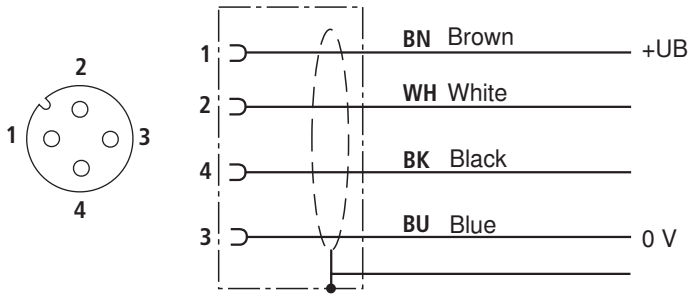
M12 plug-in connector port

Connector at the amplifier



Mating connector and wire colors with pre-assembled cable set

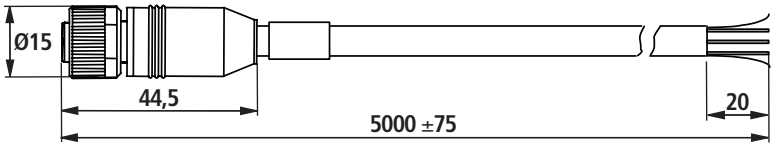
Please order the cable set separately, see page 18

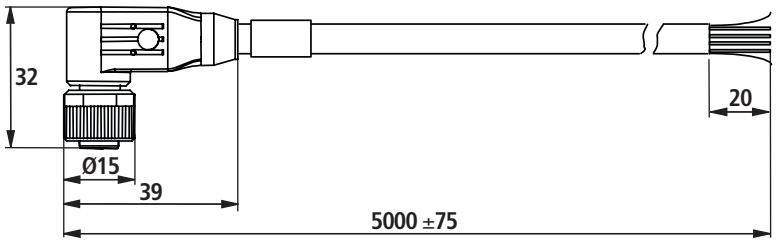


The connection for protective earthing conductor is omitted

Connection cross-section:

4 x 0.75 mm² shielded
(connect shield in the control cabinet)

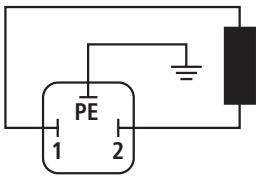




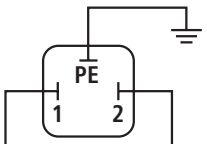
Electrical connection (dimensions in mm)

Type (Z)DRE

Connection at connector



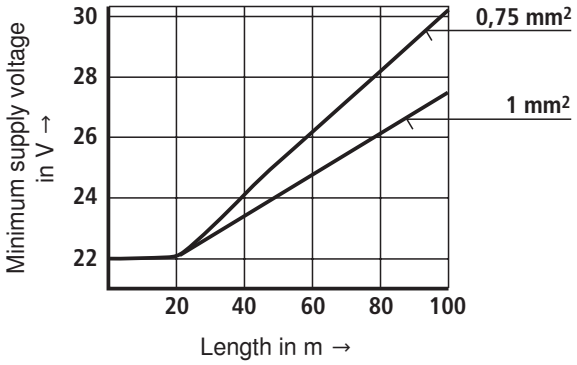
Connection at mating connector



Connection cable for type (Z)DRE

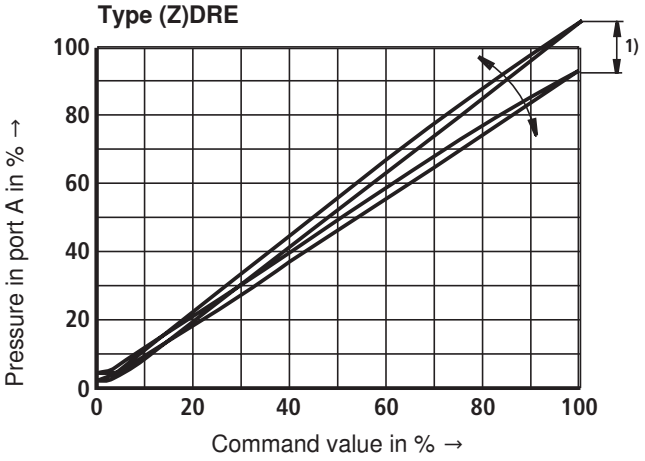
- Recommendation 6-wire, 0.75 or 1 mm² plus protective earthing conductor and shielding
- Only connect the screening to PE on the supply side
- Maximum admissible length 100 m

The minimum supply voltage at the power supply unit depends on the length of the supply line (see diagram).



Characteristic curves (measured with HLP46, ϑ_{Oil} = 40 °C ± 5 °C)

Pressure in port A depending on the command value (manufacturing tolerance)
without flow

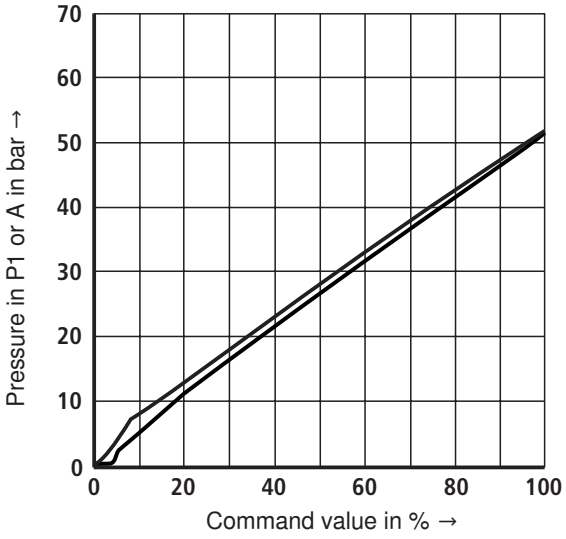


[1] With type (Z)DRE, the manufacturing tolerance at the **external amplifier** (type and data sheet see page 7) can be adjusted using the command value attenuator potentiometer "**Gw**". With the digital amplifier, the setting is made using the "**Limit**" parameter.
In this connection, the control current according to the technical data must not be exceeded!
In order to be able to adjust several valves to the same characteristic curve, the pressure must - with a command value of 100 % - at no valve exceed the maximum set pressure of the relevant pressure rating.

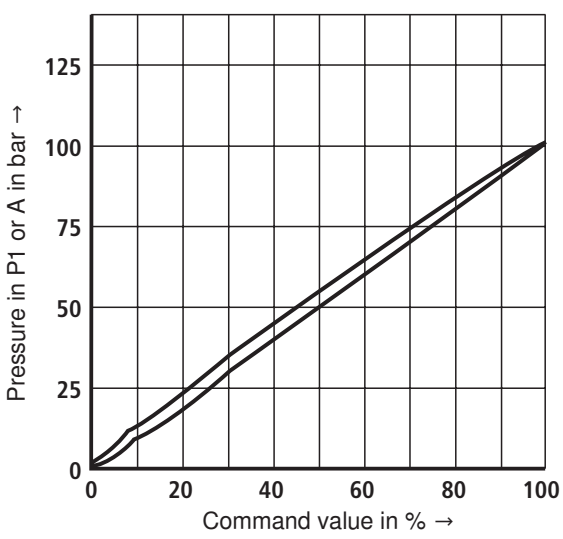
Characteristic curves: Type (Z)DRE (measured with HLP46, ϑ_{Oil} = 40 °C ± 5 °C)

Type (Z)DRE: Pressure in port P1 or A depending on the command value

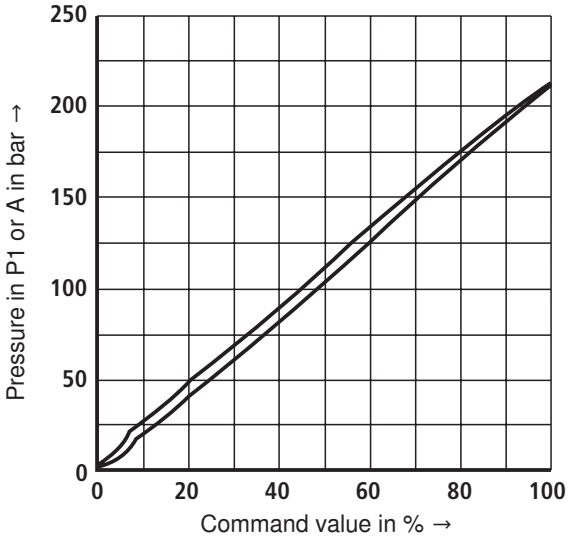
Pressure rating 50 bar Type (Z)DRE



Pressurerating 100 bar Type (Z)DRE



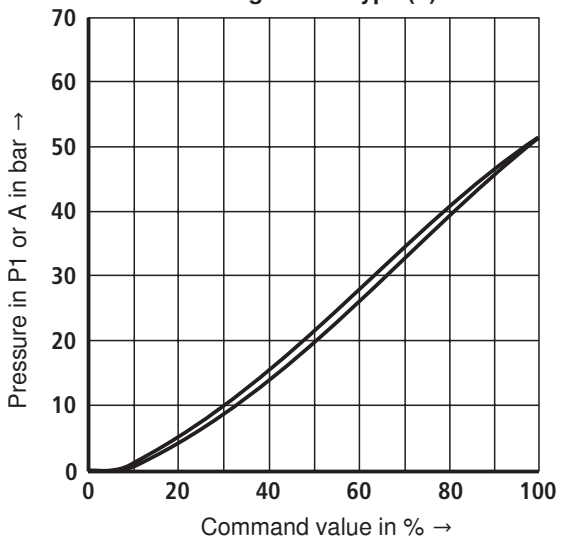
Pressure rating 210 bar Type (Z)DRE



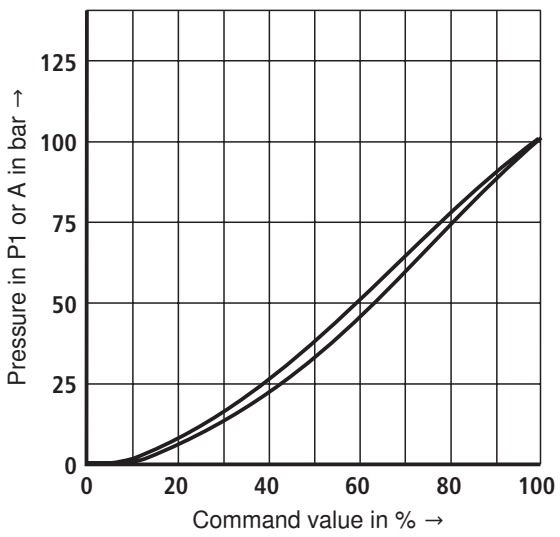
Characteristic curves: Type (Z)DREE (measured with HLP46, ϑ_{Oil} = 40 °C ± 5 °C)

Type (Z)DRE(E): Pressure in port P1 or A depending on the command value

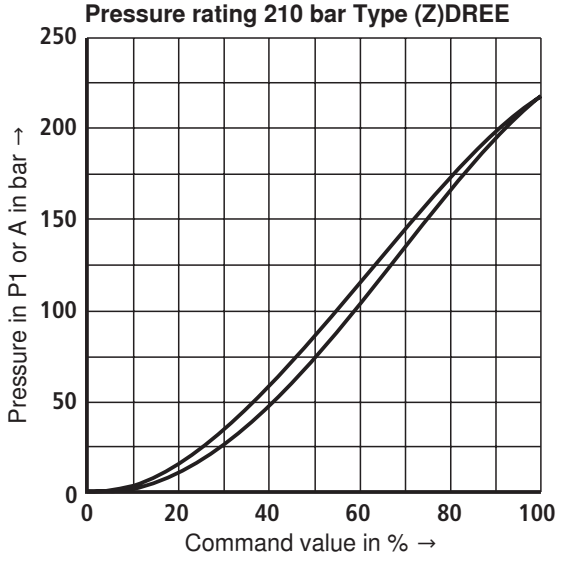
Pressure rating 50 bar Type (Z)DREE



Pressure rating 100 bar Type (Z)DREE



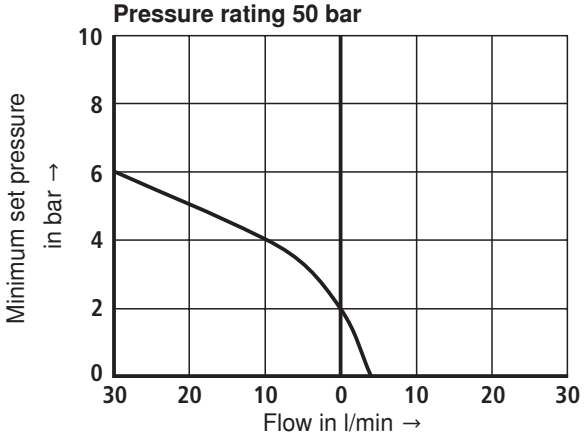
Pressure rating 210 bar Type (Z)DREE



Characteristic curves (measured with HLP46, ϑ_{Oil} = 40 °C ± 5 °C)

Minimum set pressure in port P1 or A with command value 0 V (without counter pressure in channel T)

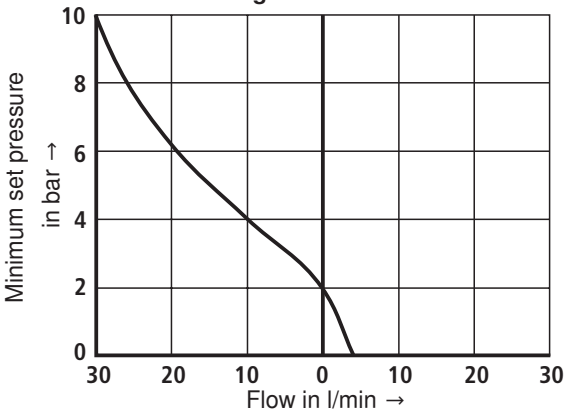
Pressure rating 50 bar



Type DRE A → T Type DRE P → A

Type ZDRE P1 → T Type ZDRE P → P1

Pressure rating 100 bar / 210 bar

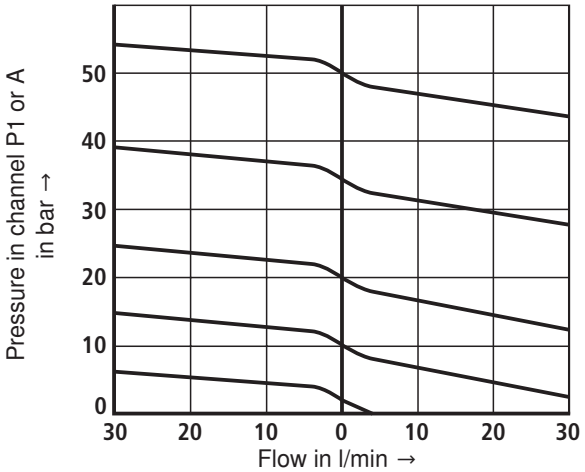


Type DRE A → T Type DRE P → A

Type ZDRE P1 → T Type ZDRE P → P1

Pressure in channel P1 or A – flow

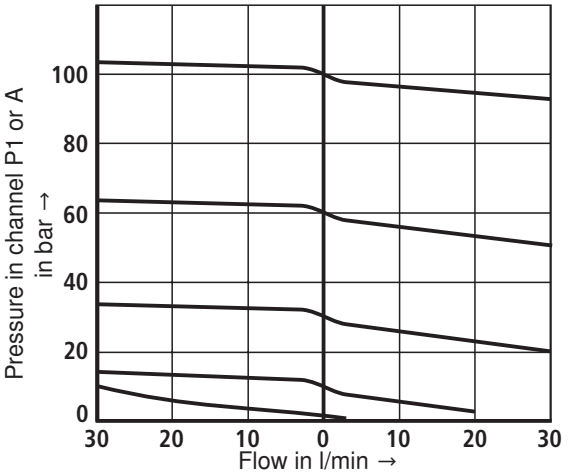
Pressure rating 50 bar



Type DRE A → T Type DRE P → A

Type ZDRE P1 → T Type ZDRE P → P1

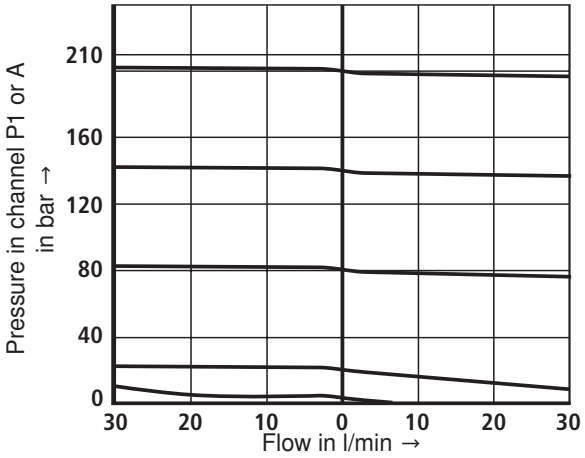
Pressure rating 100 bar



Type DRE A → T Type DRE P → A

Type ZDRE P1 → T Type ZDRE P → P1

Pressure rating 210 bar

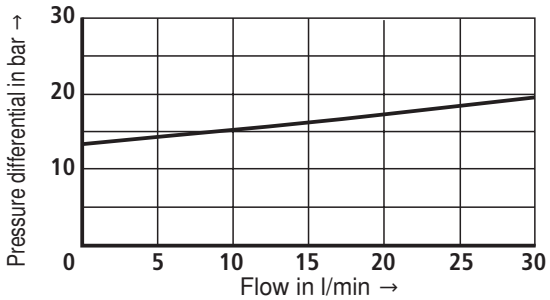


Type DRE A → T Type DRE P → A

Type ZDRE P1 → T Type ZDRE P → P1

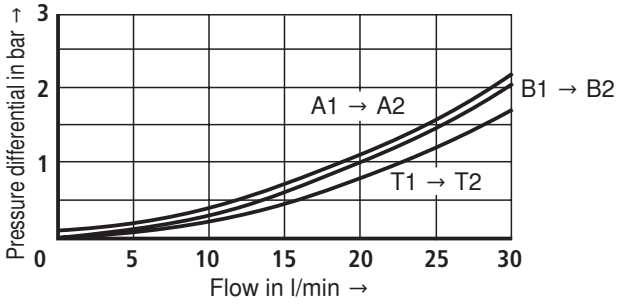
Characteristic curves (measured with HLP46, ϑ_{Oil} = 40 °C ± 5 °C)

***Δp-q*$_V$ characteristic curves**



Type DRE(E) P → A

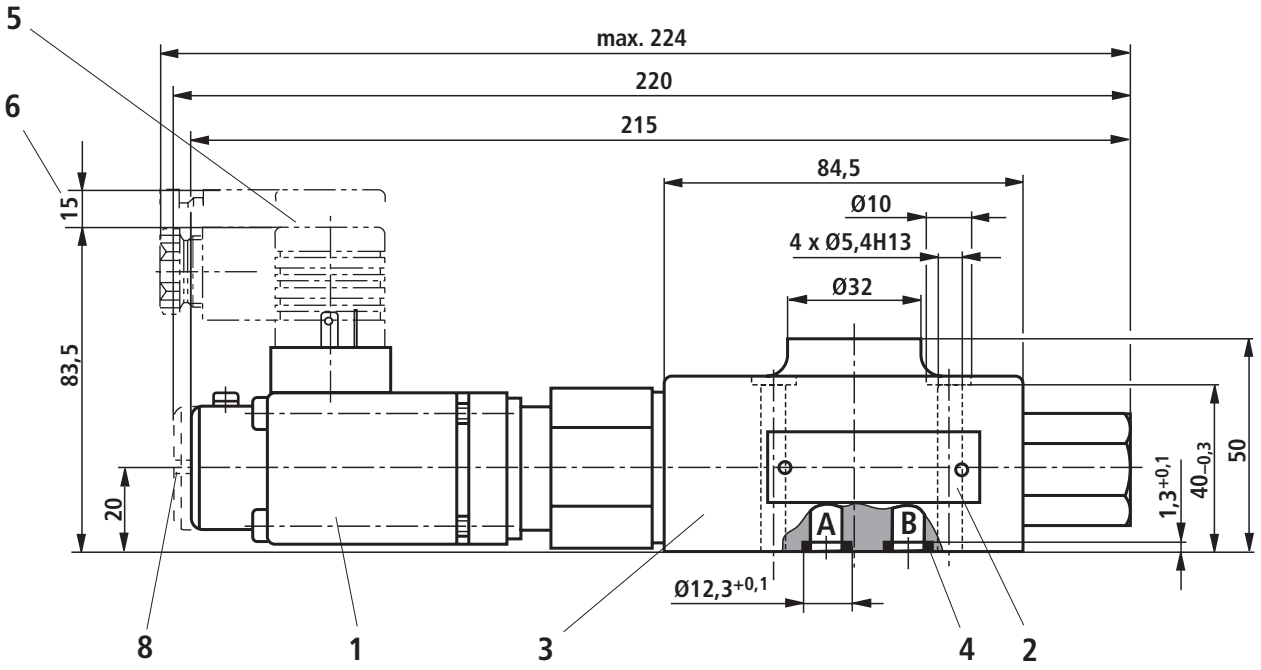
Type ZDRE(E) P2 → P1

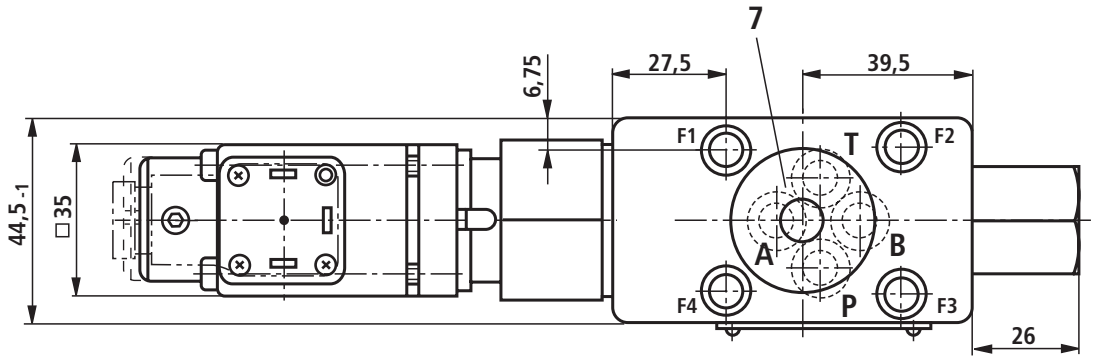


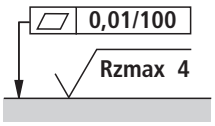
☞ **Notice!**

The shown Δ*p* value corresponds to the minimum pressure available in port P (P2) minus the maximum pressure to be controlled in port A(P1).

Unit dimensions: Type DRE (dimensions in mm)





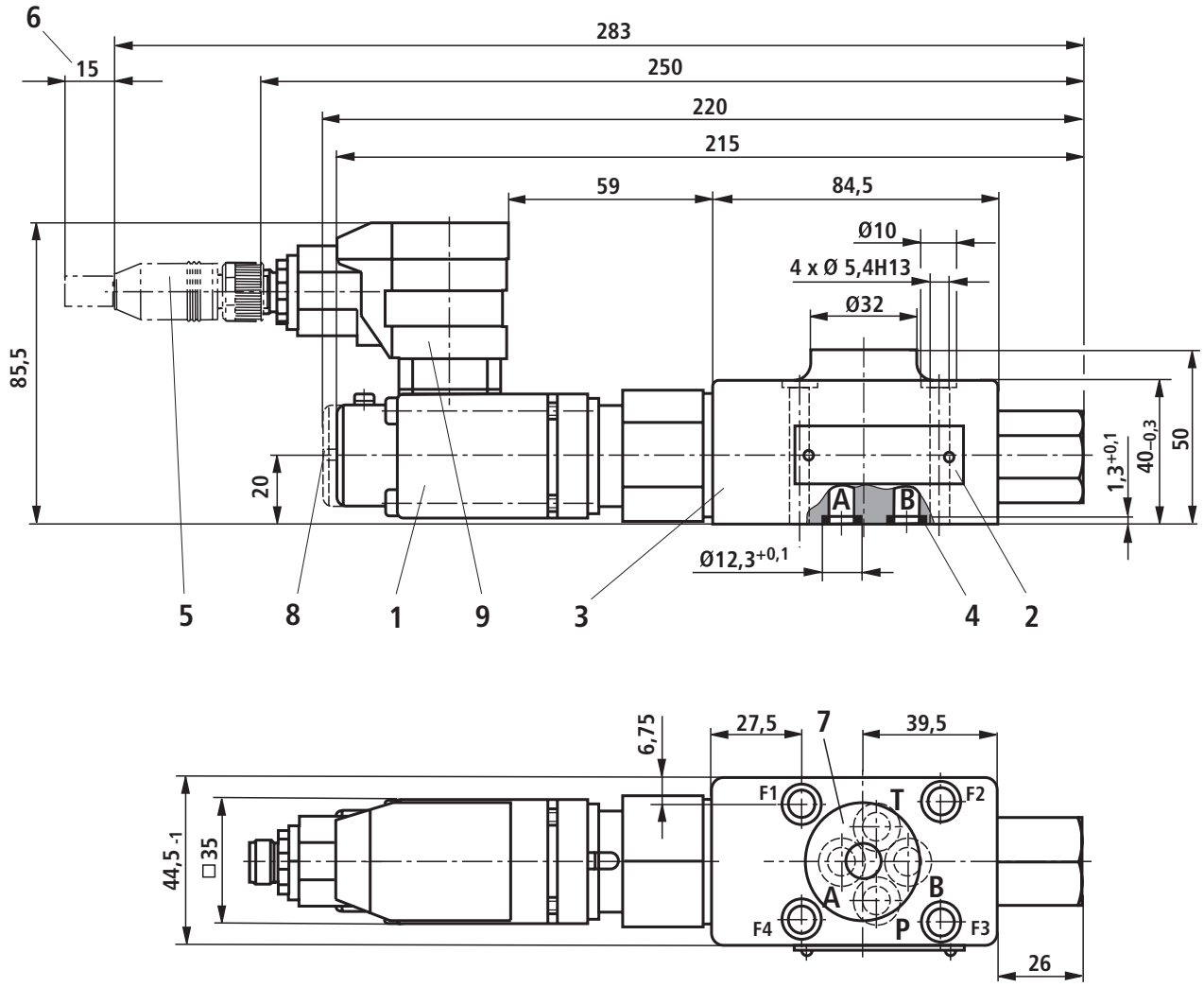


Required surface quality of the valve contact surface

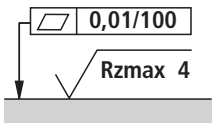
1 Proportional solenoid **without** manual override
2 Name plate
3 Valve housing
4 Identical seal rings for ports A, B, P, and T
5 Mating connector, separate order, see page 18
6 Space required to remove the mating connector
7 Porting pattern according to ISO 4401-03-02-0-05
8 Proportional solenoid **with** manual override

Subplates and valve mounting screws see page 18

Unit dimensions: Type DREE (dimensions in mm)



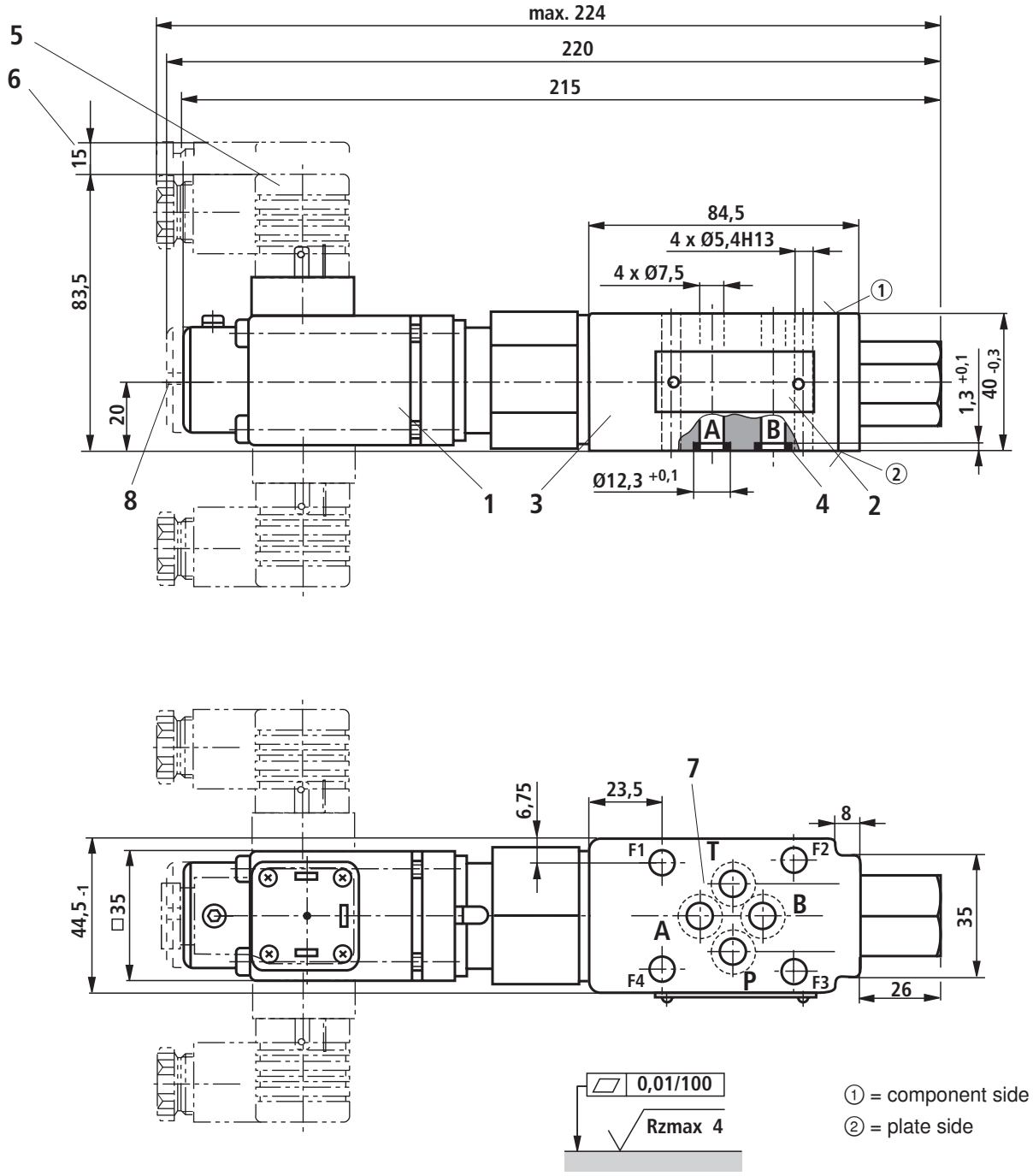
1 Proportional solenoid **without** manual override
2 Name plate
3 Valve housing
4 Identical seal rings for ports A, B, P, and T
5 Mating connector, separate order, see page 18
6 Space required to remove the mating connector
7 Porting pattern according to ISO 4401-03-02-0-05
8 Proportional solenoid **with** manual override
9 Integrated electronics (OBE)



Required surface quality of the valve contact surface

Subplates and valve mounting screws see page 18

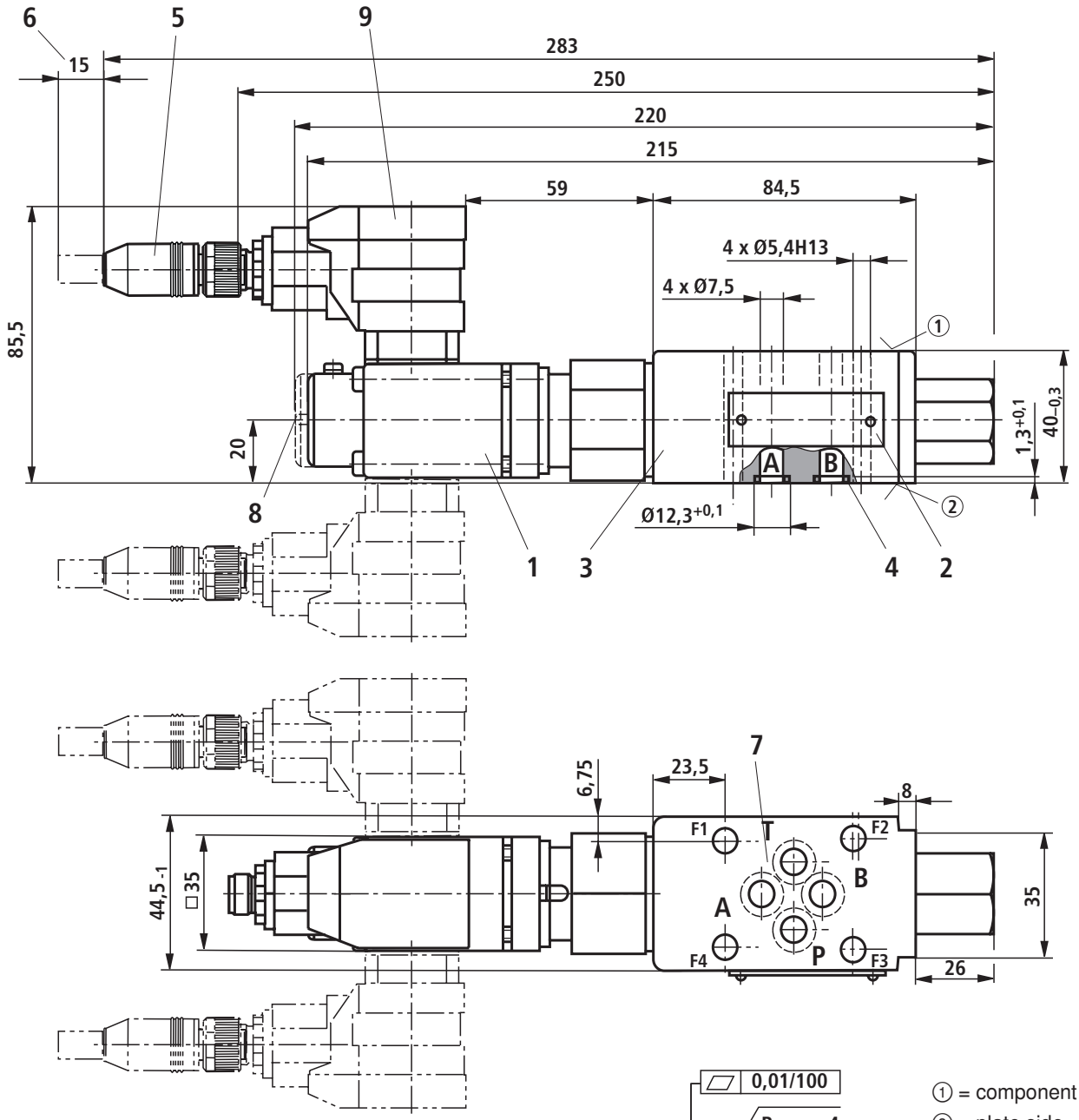
Unit dimensions: Type ZDRE (dimensions in mm)



Required surface quality of the valve contact surface

Item explanations see type DRE page 14, subplates and valve mounting screws see page 18

Unit dimensions: Type ZDREE (dimensions in mm)



Item explanations see type DREE page 15, subplates and valve mounting screws see page 18

Unit dimensions

Hexagon socket head cap screws		**Material number**
Type DRE(E)	4x ISO 4762 - M5 x 50 - 10.9-flZn-240h-L (Friction coefficient μ_{total} = 0.09 to 0.14) Tightening torque M_A = 7 Nm ±10 %	
Type ZDRE(E)	4x ISO 4762 - M5 - 10.9-flZn-240h-L (Friction coefficient μ_{total} = 0.09 to 0.14) Tightening torque M_A = 7 Nm ±10 %	

Notice: The tightening torque of the hexagon socket head cap screws refers to the maximum operating pressure!

Subplates	**Data sheet**
Size 6	45052

Accessories (not included in the scope of delivery)

Proportional amplifier for type (Z)DRE	**Data sheet**	**Material number**
VT-MSPA1-10 in modular design	30223	R901142355
VT-VSPD-1 in Euro-card format	30523	R901077287
VT-VSPA1-10 in Euro-card format	30100	R901152628

Mating connector for type (Z)DRE	**Data sheet**	**Material number**
Mating connector (black) DIN EN 175301-803	08006	R901017011

Cable sets for type (Z)DREE		**Material number**
Cable set VT-SSPA1-1X/M12/1/V00	assembled cable with straight mating connector	R901241656
Cable set VT-SSPA1-1X/M12/2/V00	assembled cable with angular mating connector	R901241651

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 18-0
Fax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without its consent.
The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 18-0
Fax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without its consent.
The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 18-0
Fax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without its consent.
The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.