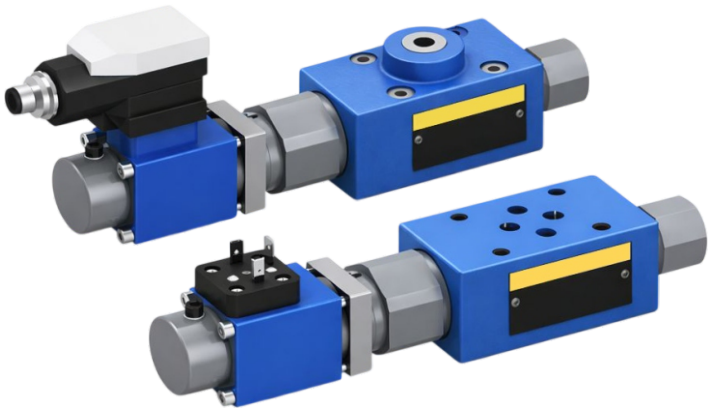
VALVOLE DI PRESSIONE

DRE(E) AND ZDRE(E)

Proportional pressure reducing valve

Pilot operated pressure reducing valve in ports A and P1 with pressure limitation.
Operation by means of proportional solenoids.
Types DREE and ZDREE with integrated electronics (OBE).



Technical data

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 HLP46) ϑ_{OIL} = 40 °C ± 5 °C				
Maximum working pressure	P and P2		bar	315
	P1, A and B		bar	210
	T		bar	Separate and at zero pressure to tank
Maximum set pressure in channels P1 and A	– Pressure rating 50		bar	50
	– Pressure rating 100		bar	100
	– Pressure rating 210		bar	210
	– Pressure rating 315		bar	315 [1]
Pilot flow			L/min	0.65
Maximum flow			L/min	30
Hydraulic fluid temperature range			°C	–20 ... +80
Viscosity range			mm^2/s	15 ... 380
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)				Class 20/18/15 [2]
Hysteresis			%	±2.5 of the maximum set pressure
Repetition accuracy			%	< ±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
	90% → 10%		ms	~150
				Measured with 1 liter standing hydraulic fluid column

1) Only available for "Z" version.
2) 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 life cycle of the components.

TECHNICAL DATA

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	– SATER-FREE	HFDU, HFDR	FKM	ISO 12922
	– CONTAINING WATER	HFC (FUCHS HYDROTHERM 464 PETROFER ULTRA SAFE 620)	NBR	ISO 12922

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	18
	– 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
PROTECTION CLASS OF THE VALVE ACCORDING TO EN 60529			IP 65 WITH MATING CONNECTOR MOUNTED AND LOCKED
CONFORMITY			CE ACCORDING TO EMC DIRECTIVE 2004/108/EC TESTED ACCORDING TO EN 61000-6-2 AND EN 61000-6-3

☞ **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!

– THERE MAY BE LIMITATIONS REGARDING THE TECHNICAL VALVE DATA (TEMPERATURE, PRESSURE RANGE, SERVICE LIFE, MAINTENANCE INTERVALS, ETC.)!

– THE FLASH POINT OF THE PROCESS AND OPERATING MEDIUM USED MUST BE AT LEAST 40 K HIGHER THAN THE MAXIMUM SOLENOID SURFACE TEMPERATURE.

– FLAME-RESISTANT – CONTAINING WATER:

-MAXIMUM OPERATING PRESSURE 210 BAR
-MAXIMUM HYDRAULIC FLUID TEMPERATURE 60°C
-EXPECTED LIFE CYCLE AS COMPARED TO HLP HYDRAULIC OIL 30% TO 100%

TECHNICAL DATA

THE VALVE TYPES 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 SET-UP:
THE VALVE CONSISTS OF THREE MAIN ASSEMBLIES:
- PILOT CONTROL VALVE (1)
- PROPORTIONAL SOLENOID (2)
- MAIN VALVE (3) WITH MAIN CONTROL SPOOL (4)

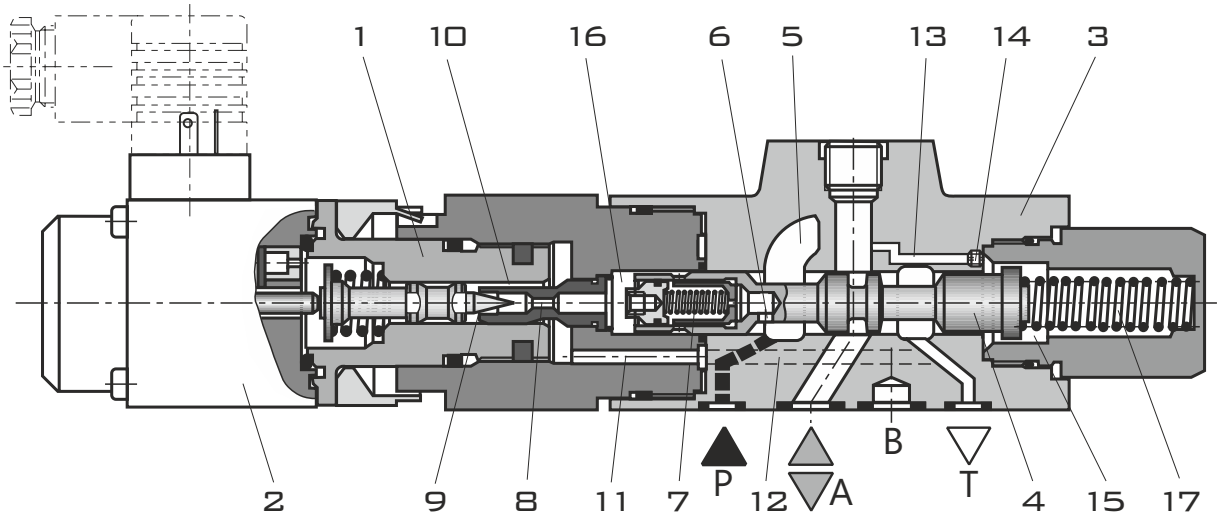
FUNCTION:
TYPE DRE
GENERAL FUNCTION:
→ COMMAND VALUE-DEPENDENT SETTING OF THE PRESSURE TO BE REDUCED IN CHANNEL A VIA THE PROPORTIONAL SOLENOID (2).
→ IN THE DEPRESSURIZED PORT P, THE SPRING (17) HOLDS THE MAIN CONTROL SPOOL (4) IN THE INITIAL POSITION.
→ THUS, OPENING THE CONNECTION FROM A TO T AND 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 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. THE PRESSURE IN PORT A IS ALMOST EQUAL TO THE PRESSURE SET 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...

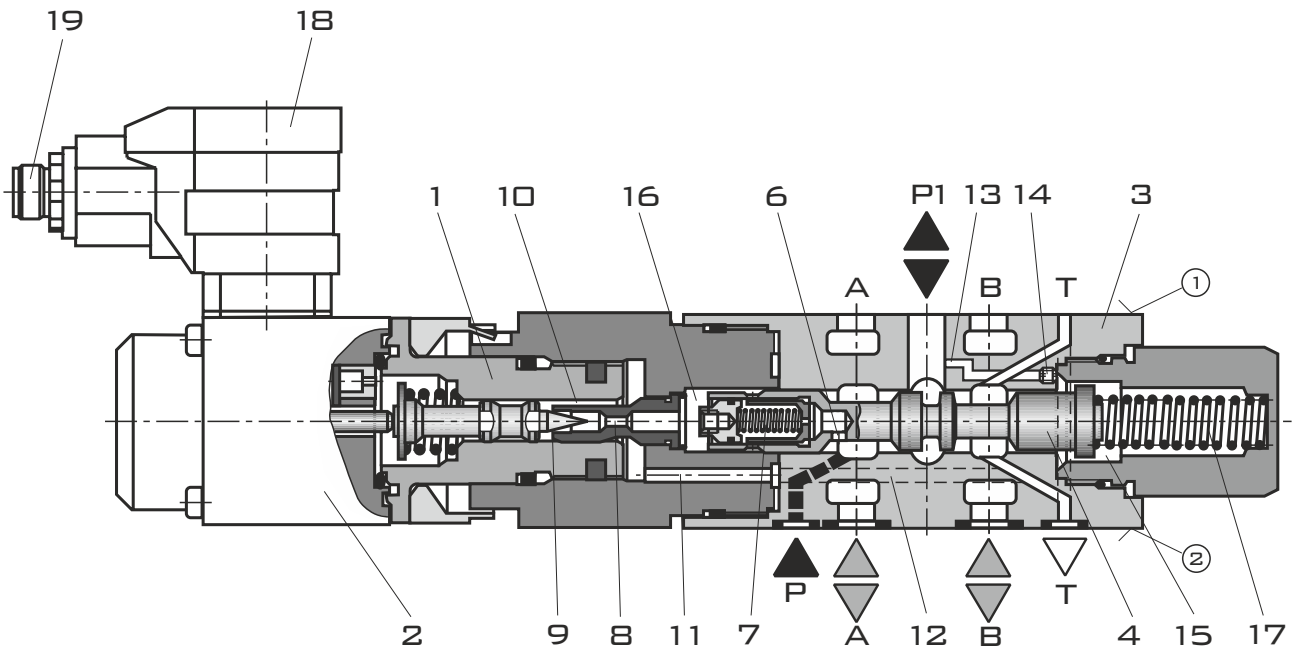


Technical data

Type (Z)DREE – with integrated electronics (OBE)
With regard to function and structure, these valves 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 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...

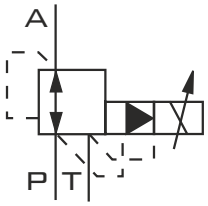
①= component side, ② = plate side



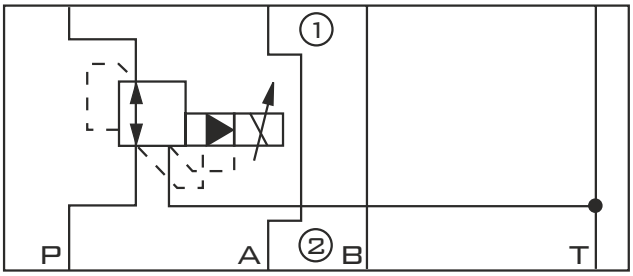
SCHEMES

① = COMPONENT SIDE, ② = PLATE SIDE

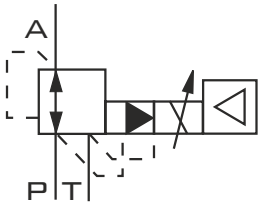
TYPE DRE 6...



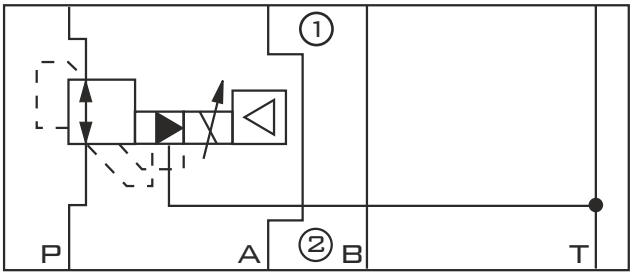
TYPE ZDRE 6 VP...



TYPE DREE 6...



TYPE ZDREE 6 VP...

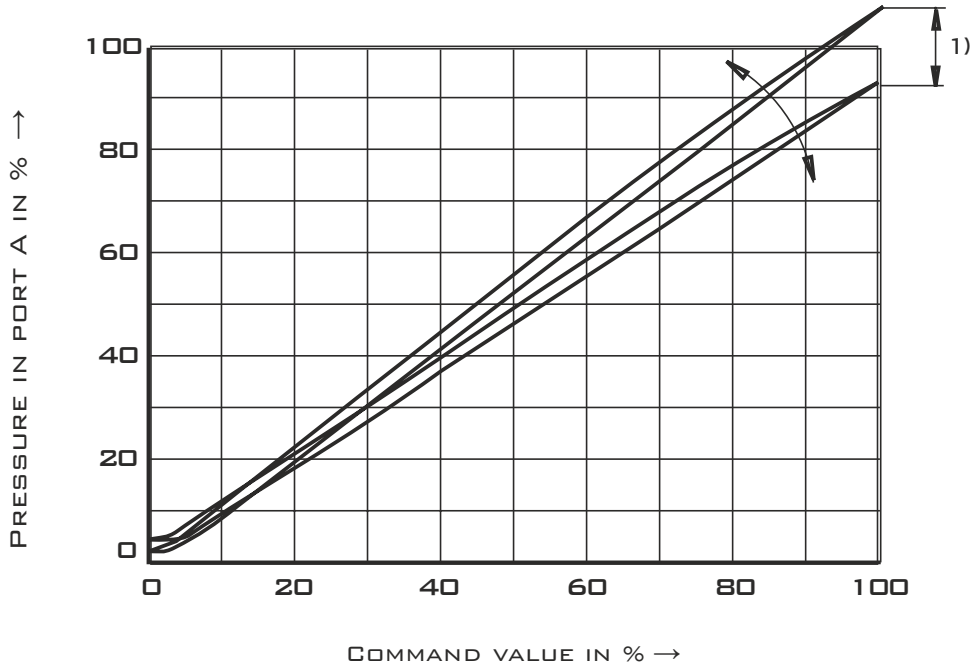


CHARACTERISTIC CURVES

MEASURED WITH HLP46 ϑ_{OIL} = 40 °C ± 5 °C

PRESSURE IN PORT A DEPENDING ON THE COMMAND VALUE (MANUFACTURING TOLERANCE) WITHOUT FLOW

TYPE (Z)DRE



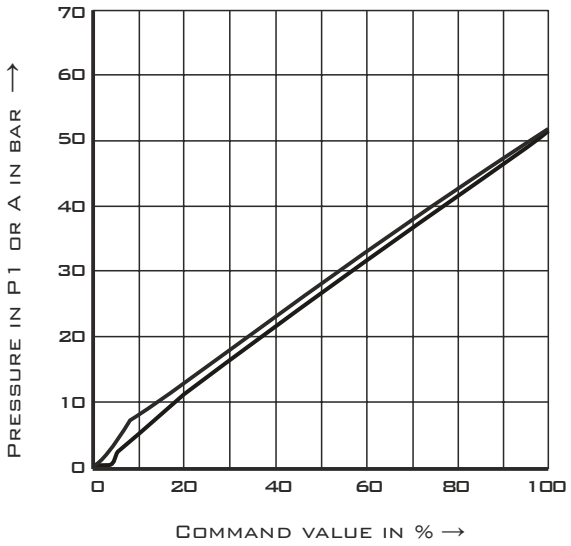
[1] WITH TYPE (Z)DRE, THE MANUFACTURING TOLERANCE AT THE EXTERNAL AMPLIFIER (TYPE AND DATA SHEET SEE PAGE 2) CAN BE ADJUSTED USING THE COMMAND VALUE ATTENUATOR POTENTIOMETER "GW". DIGITAL AMPLIFIERS ARE ADJUSTED USING THE PARAMETER "LIMIT".
THE CONTROL CURRENT INDICATED IN THE TECHNICAL DATA MUST NOT 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 % - NOT EXCEED THE MAXIMUM SET PRESSURE OF THE RELEVANT PRESSURE RATING AT ANY VALVE.

CHARACTERISTIC CURVES: TYPE (Z)DRE

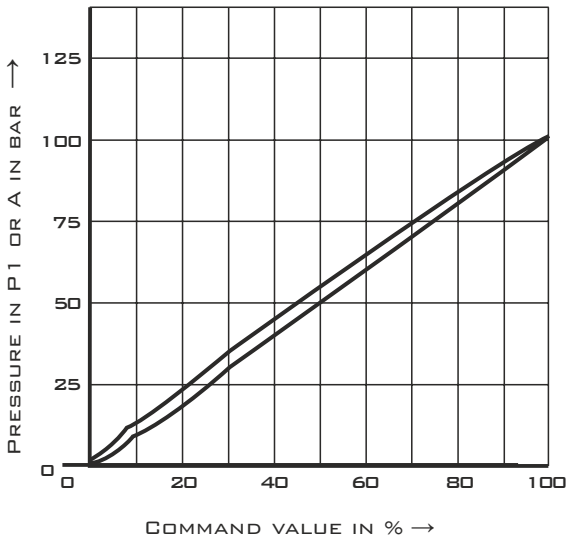
MEASURED WITH HLP46, ϑ_{OIL} = 40 °C ± 5 °C

PRESSURE IN PORT P1 OR A DEPENDING ON THE COMMAND VALUE

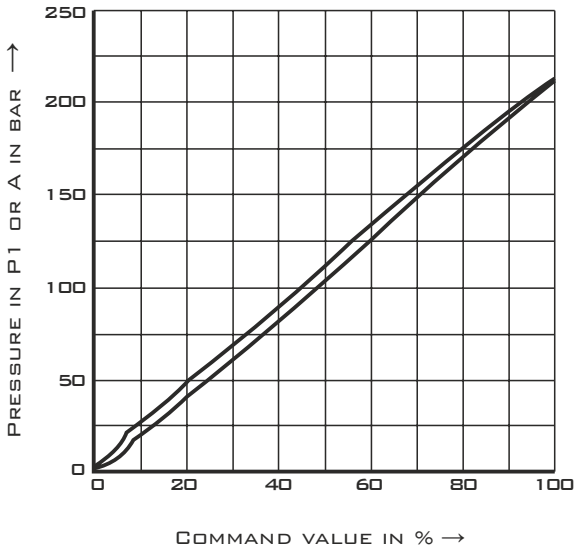
PRESSURE RATING 50 BAR TYPE (Z)DRE



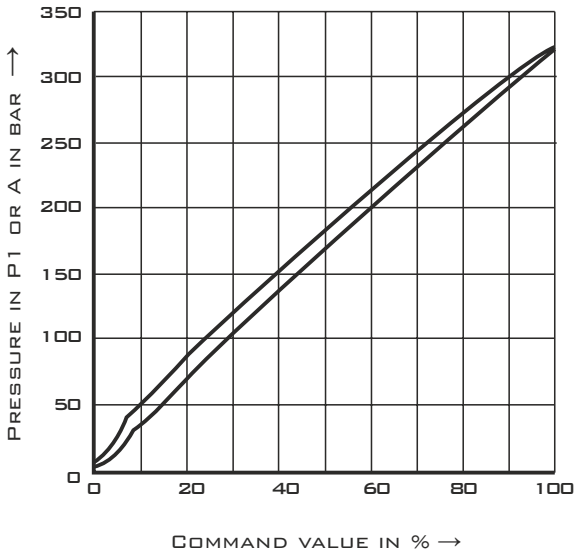
PRESSURE RATING 100 BAR TYPE (Z)DRE



PRESSURE RATING 210 BAR TYPE (Z)DRE



PRESSURE RATING 315 BAR TYPE ZDRE

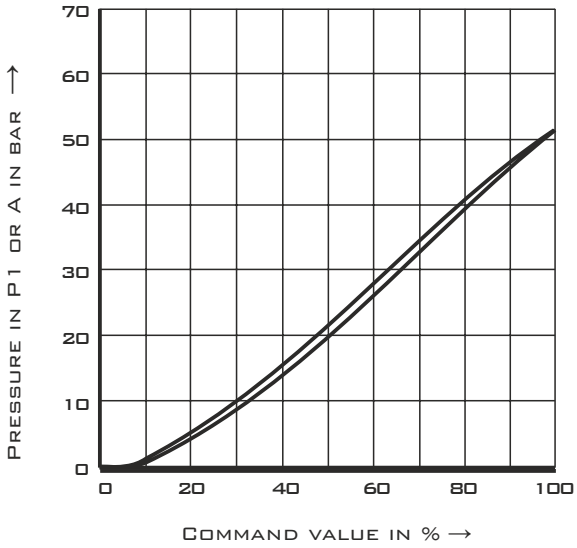


CHARACTERISTIC CURVES: TYPE (Z)DREE

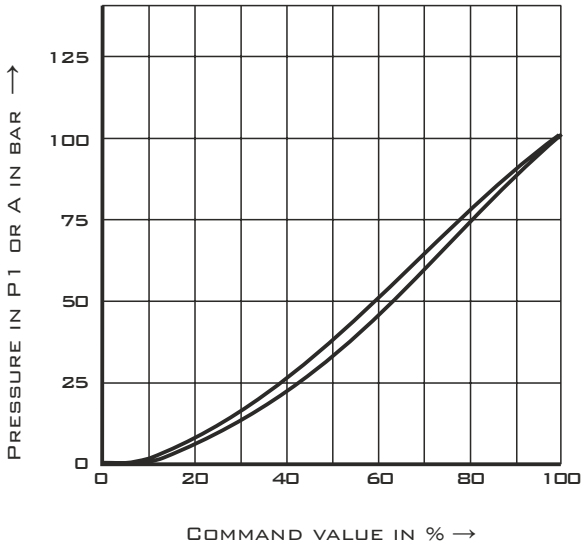
MEASURED WITH HLP46, ϑ_{OIL} = 40 °C ± 5 °C

PRESSURE IN PORT P1 OR A DEPENDING ON THE COMMAND VALUE

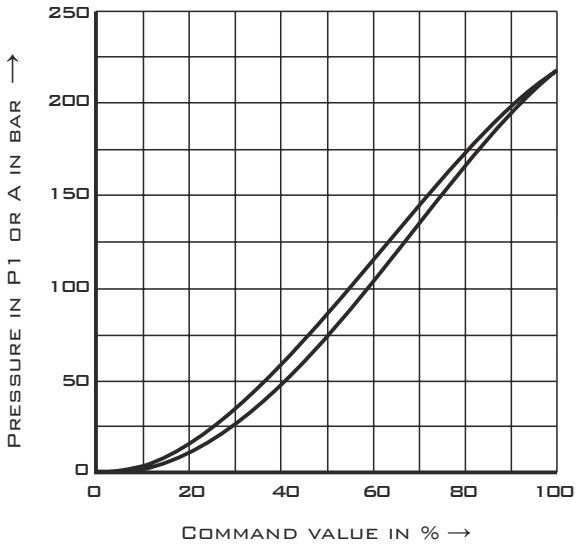
PRESSURE RATING 50 BAR TYPE (Z)DREE



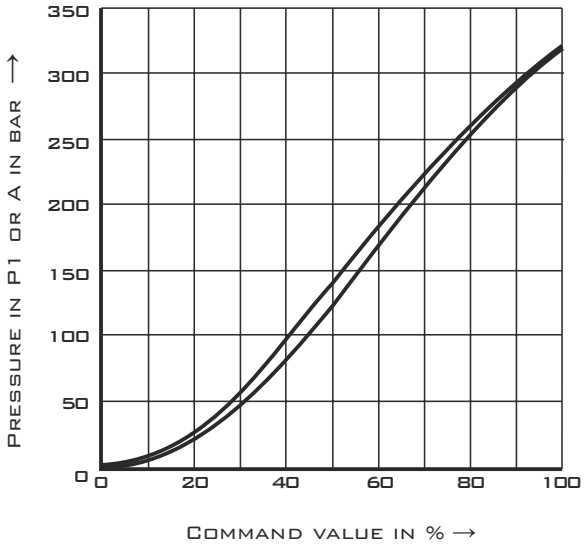
PRESSURE RATING 100 BAR TYPE (Z)DREE



PRESSURE RATING 210 BAR TYPE (Z)DREE



PRESSURE RATING 315 BAR TYPE ZDREE

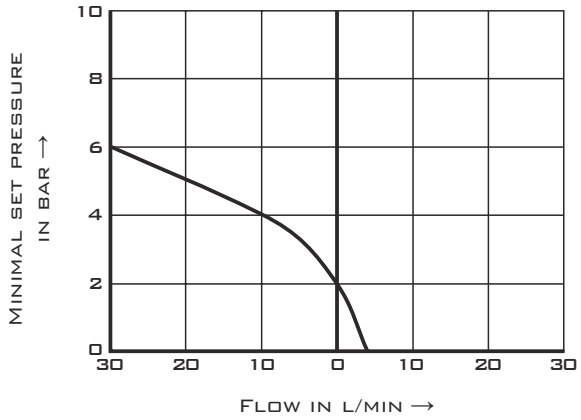


CHARACTERISTIC CURVES

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)

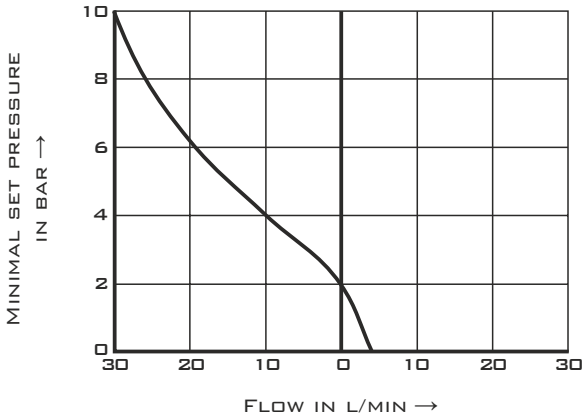
PRESSURE RATING 50 BAR



TYPE DRE A → T
TYPE ZDRE P1 → T

TYPE DRE P → A
TYPE ZDRE P → P1

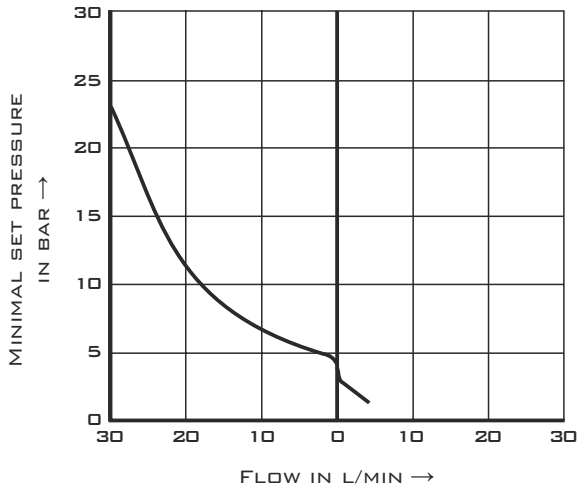
PRESSURE RATING 100 BAR/210 BAR



TYPE DRE A → T
TYPE ZDRE P1 → T

TYPE DRE P → A
TYPE ZDRE P → P1

PRESSURE RATING 315 BAR



TYPE ZDRE P1 → T

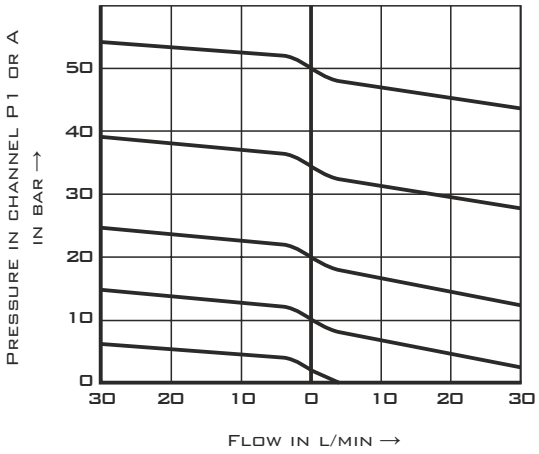
TYPE ZDRE P → P1

CHARACTERISTIC CURVES

MEASURED WITH HLP46, ϑ_{OIL} = 40 °C ± 5 °C

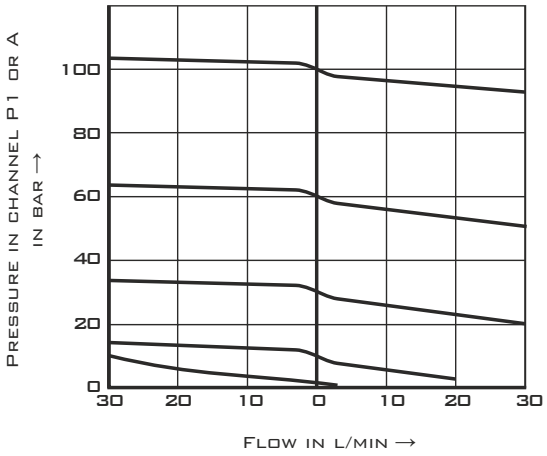
PRESSURE IN CHANNEL P1 OR A – FLOW

PRESSURE RATING 50 BAR



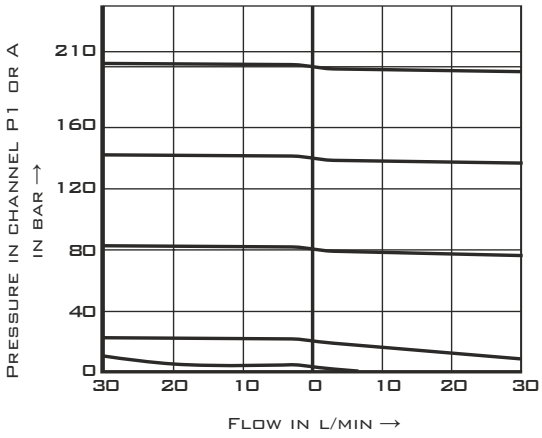
TYPE DRE A → T TYPE DRE P → A
TYPE ZDRE P1 → T TYPE ZDRE P → P1

PRESSURE RATING 100 BAR



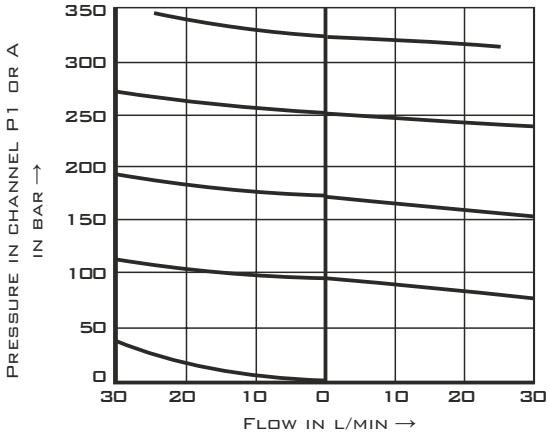
TYPE DRE A → T TYPE DRE P → A
TYPE ZDRE P1 → T TYPE ZDRE P → P1

PRESSURE RATING 210 BAR



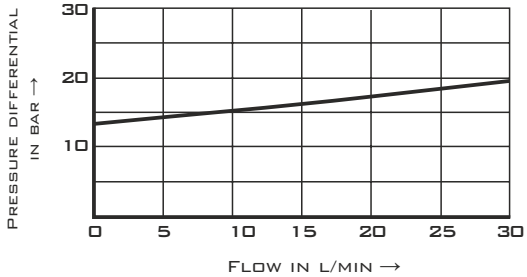
TYPE DRE A → T TYPE DRE P → A
TYPE ZDRE P1 → T TYPE ZDRE P → P1

PRESSURE RATING 315 BAR

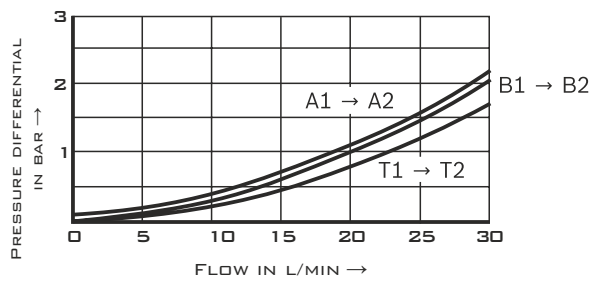


TYPE ZDRE P1 → T TYPE ZDRE P → P1

Δp-qv CHARACTERISTIC CURVES



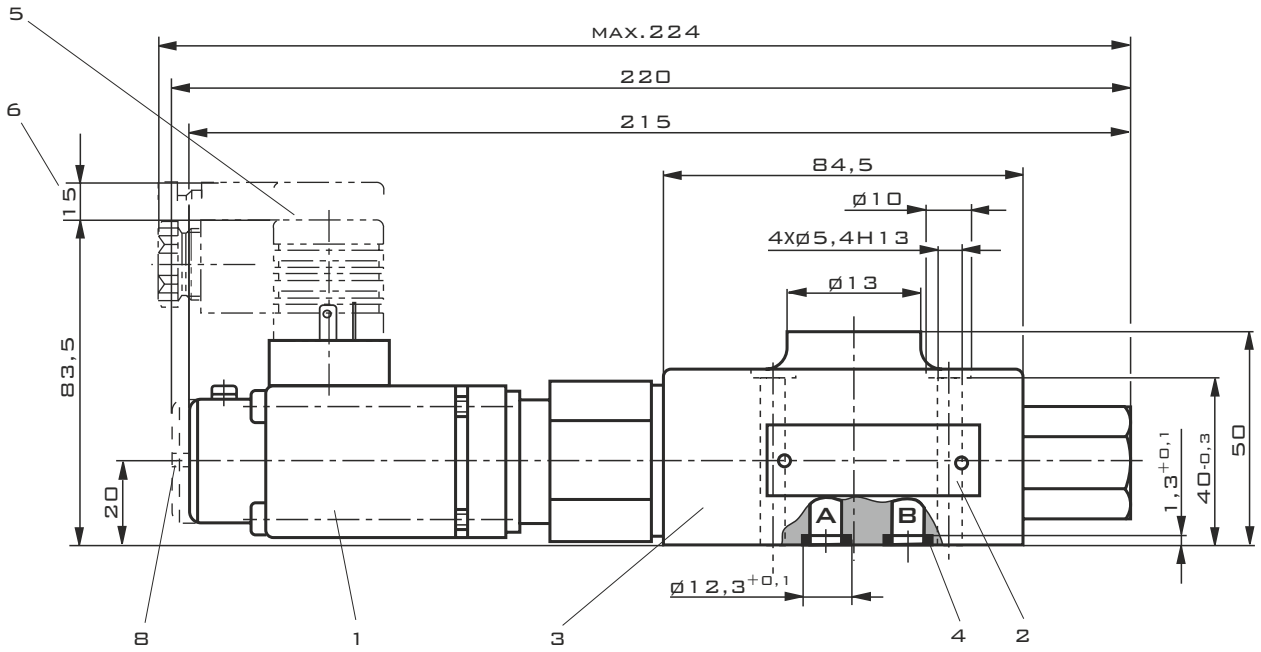
TYPE DRE(E) P → A
TYPE ZDRE(E) P2 → P1

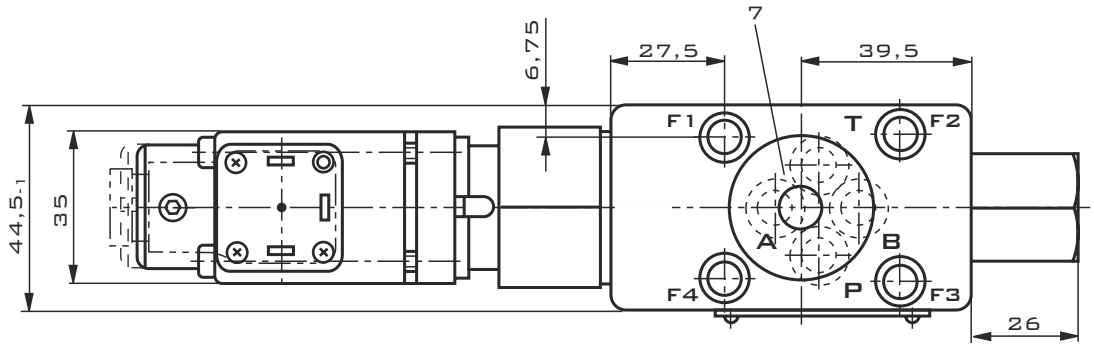


☞ NOTICE!

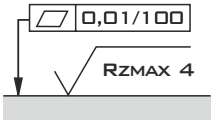
THE SHOWN ***Δp*** VALUE CORRESPONDS TO THE MINIMUM PRESSURE AVAILABLE IN PORT P (P2) MINUS THE MAXIMUM PRESSURE TO BE CONTROLLED IN PORT A (P1).

INSTALLATION DIMENSIONS: TYPE DRE





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 15
6 SPACE REQUIRED FOR REMOVING THE MATING CONNECTOR
7 PORTING PATTERN ACCORDING TO ISO 4401-03-02-0-05
8 PROPORTIONAL SOLENOID WITH MANUAL OVERRIDE



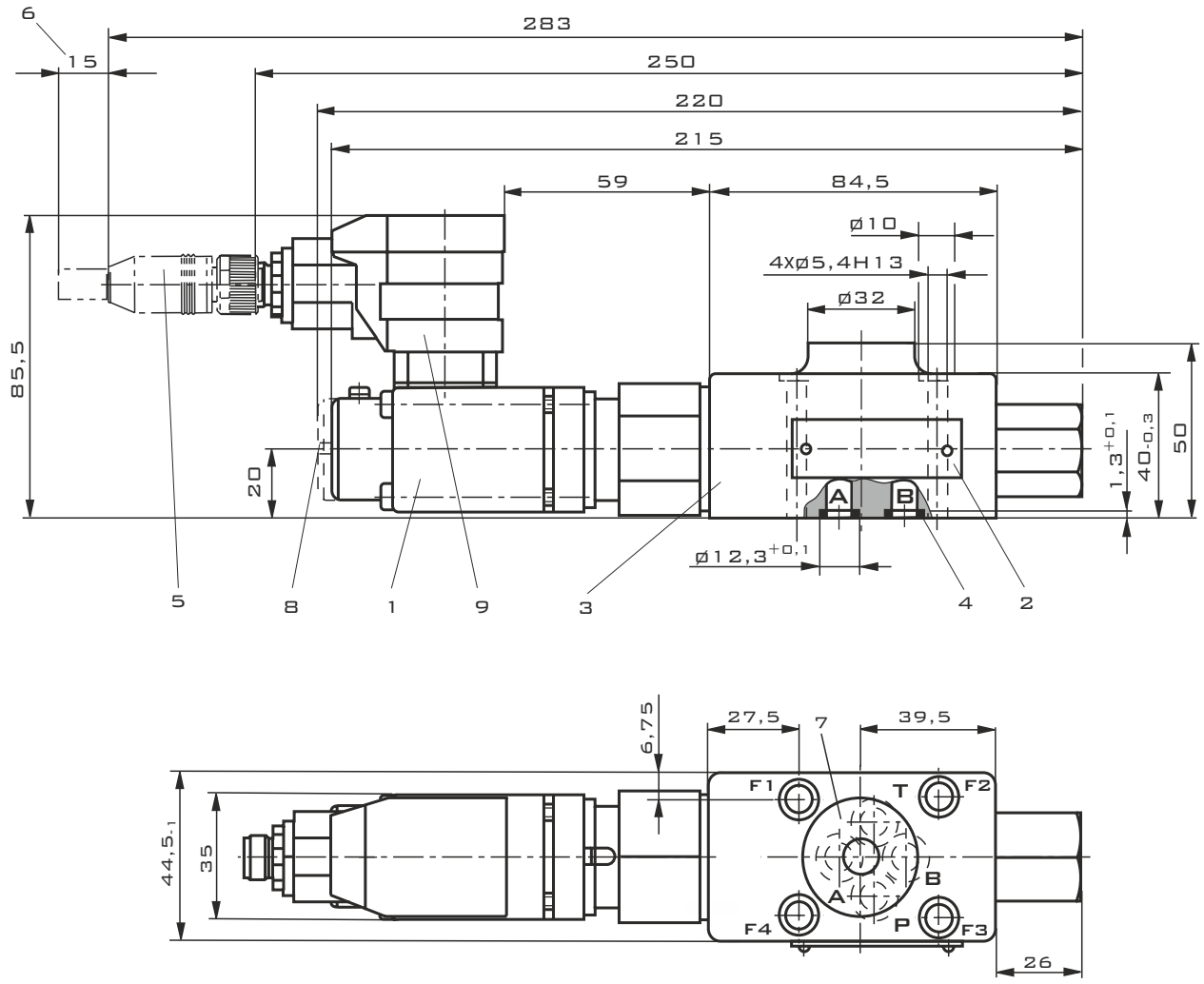
REQUIRED SURFACE QUALITY OF THE VALVE CONTACT SURFACE

☞ **NOTICE!**

THE DIMENSIONS ARE NOMINAL DIMENSIONS WHICH ARE SUBJECT TO TOLERANCES.

VALVE MOUNTING SCREWS AND SUBPLATES SEE PAGE 15.

INSTALLATION DIMENSIONS: TYPE DREE



1 PROPORTIONAL SOLENOID WITHOUT MANUAL OVERRIDE
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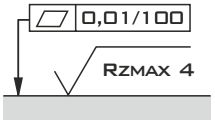
9 INTEGRATED ELECTRONICS (OBE)



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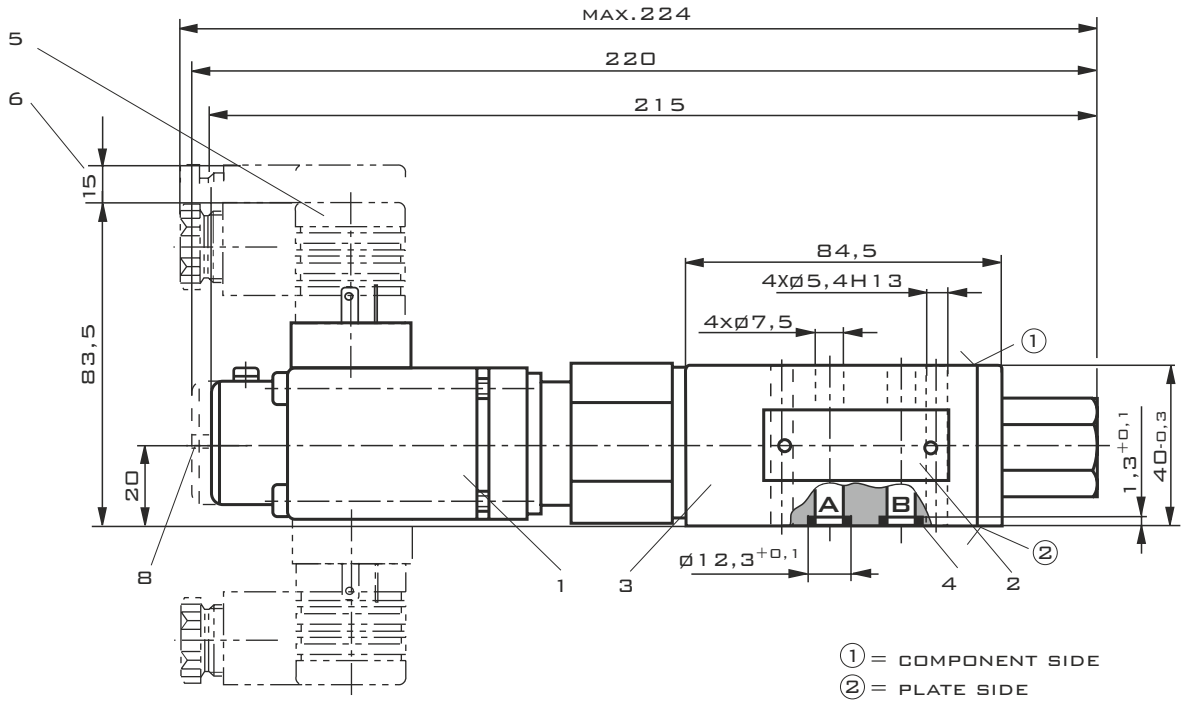
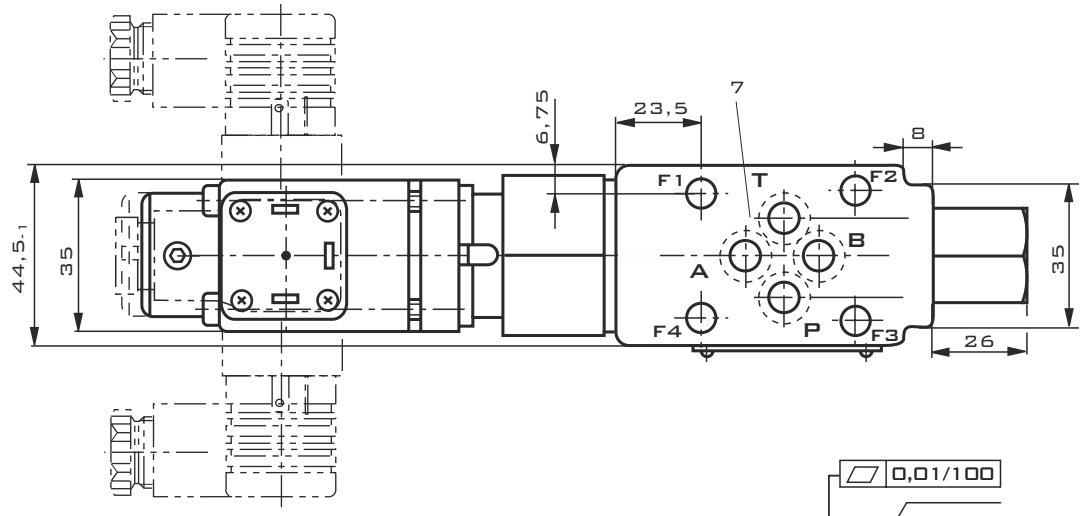
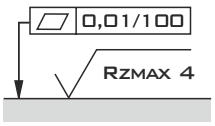
INSTALLATION DIMENSIONS: TYPE (Z)DRE



① = COMPONENT SIDE
② = PLATE SIDE





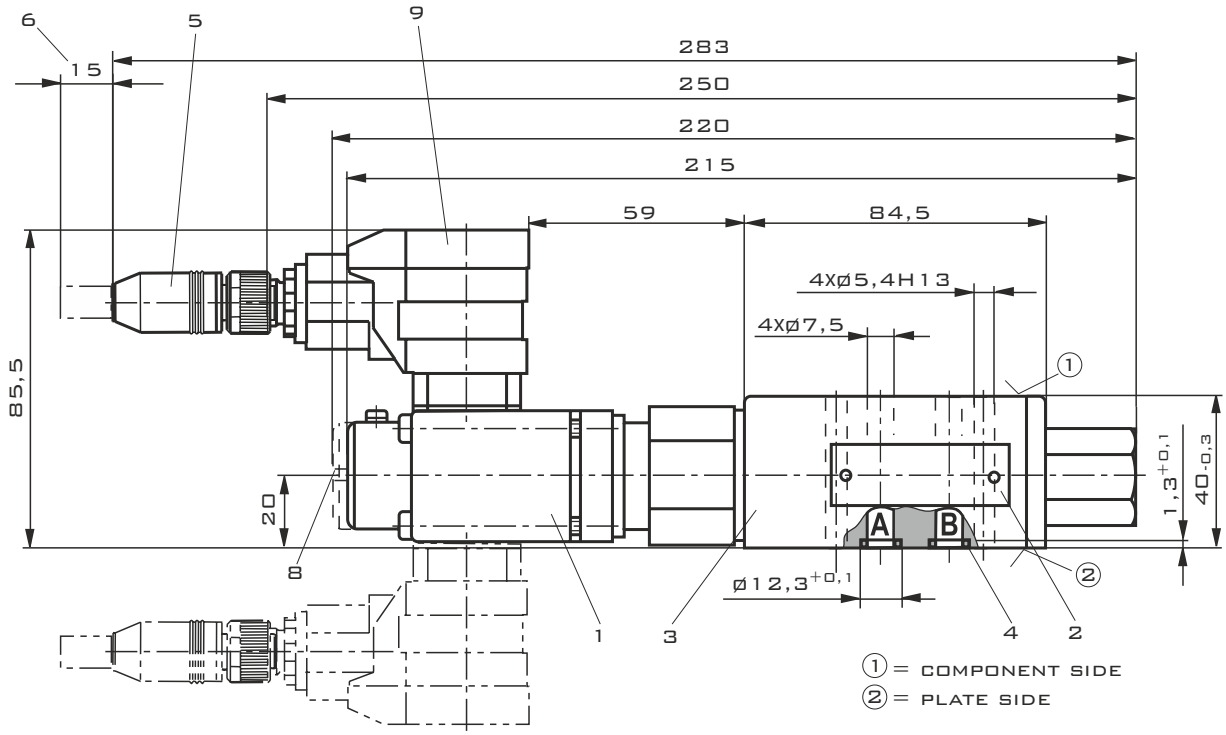
REQUIRED SURFACE QUALITY OF THE VALVE CONTACT SURFACE

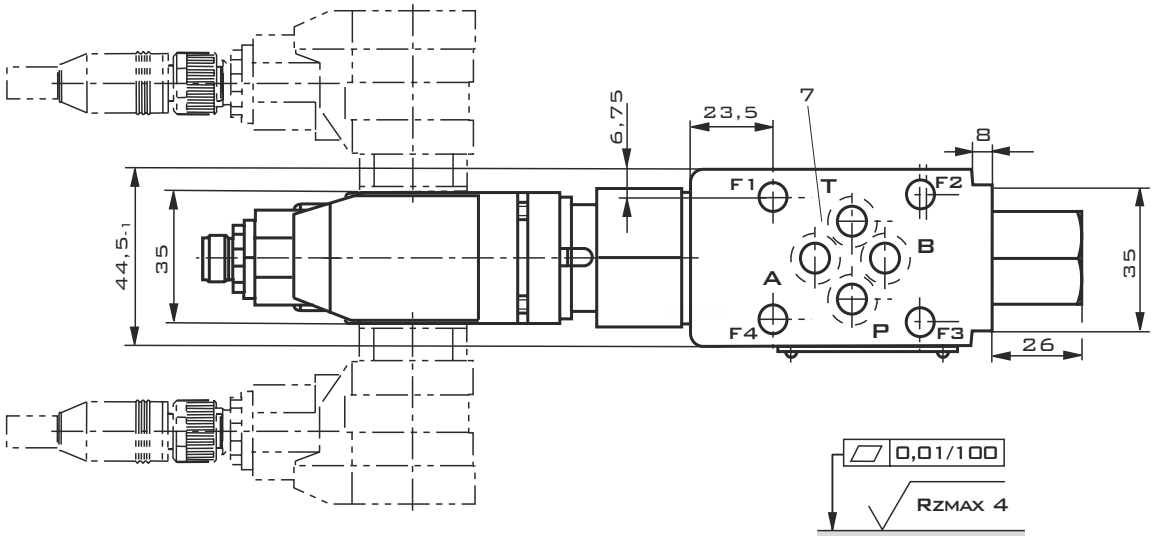
☞ **NOTICE!**

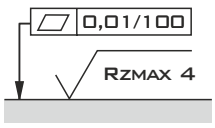
THE DIMENSIONS ARE NOMINAL DIMENSIONS WHICH ARE SUBJECT TO TOLERANCES.

ITEM EXPLANATIONS SEE TYPE DRE ON PAGE 11,
VALVE MOUNTING SCREWS AND SUBPLATES SEE PAGE 15.

INSTALLATION DIMENSIONS: TYPE (Z)DREE







REQUIRED SURFACE QUALITY OF THE VALVE CONTACT SURFACE

☞ **NOTICE!**

THE DIMENSIONS ARE NOMINAL DIMENSIONS WHICH ARE SUBJECT TO TOLERANCES.

ITEM EXPLANATIONS SEE TYPE DREE ON PAGE 11,
VALVE MOUNTING SCREWS AND SUBPLATES SEE PAGE 15.

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!

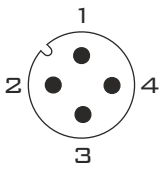
ELECTRICAL CONNECTION

TYPE (Z)DREE

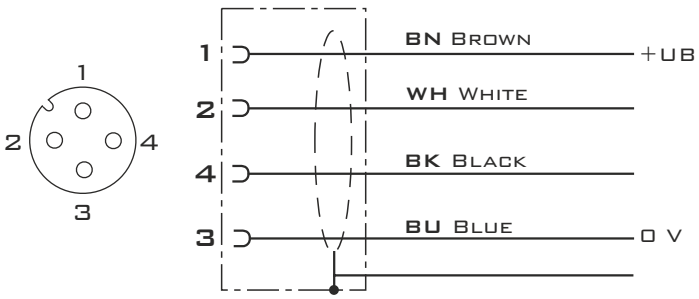
CONNECTOR PIN ASSIGNMENT	CONTACT	ALLOCATION INTERFACE "A1"	ALLOCATION INTERFACE "F1"
SUPPLY VOLTAGE	1	24 VDC (U(T) = 21 V TO 35 V); $I_{MAX} \leq 1.5$ A	
COMMAND VALUE INPUT	2	0 TO 10 V; R_E = 20 KΩ	4 TO 20 MA; R_E = 100 Ω
WEIGHT	3	0 V	
	4	REFERENCE POTENTIAL COMMAND VALUE	

M12 PLUG-IN CONNECTOR PORT

CONNECTOR ON AMPLIFIER

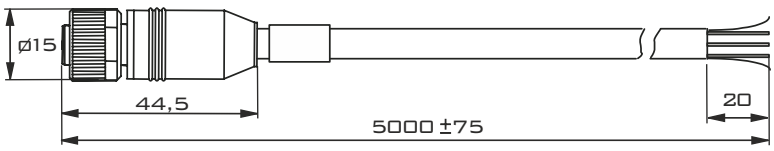


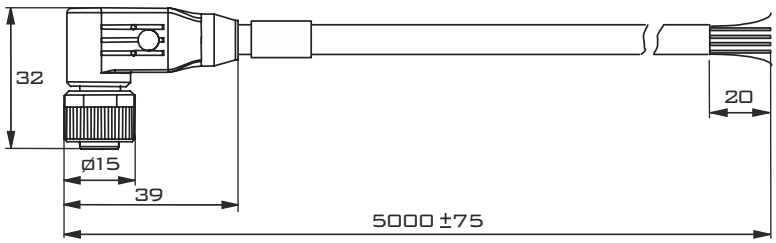
MATING CONNECTOR AND WIRE COLORS WITH PRE-ASSEMBLED CABLE SET



THE CONNECTION FOR THE PROTECTIVE EARTHING CONDUCTOR IS NOT PROVIDED

CONNECTION CROSS-SECTION:
4 X 0.75 MM ² SHIELDED
(CONNECT SHIELD IN CONTROL CABINET)

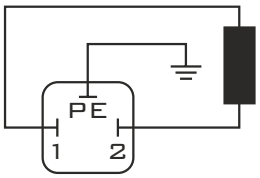




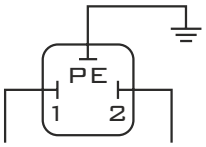
ELECTRICAL CONNECTION

TYPE (Z)DRE

CONNECTION TO CONNECTOR



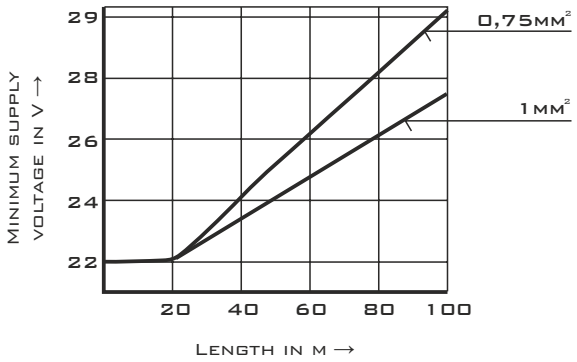
CONNECTION TO MATING CONNECTOR



CONNECTION CABLE FOR TYPE (Z)DRE

- RECOMMENDATION 6-WIRE, 0.75 OR 1 MM^2 PLUS PROTECTIVE EARTHING CONDUCTOR AND SCREENING
- 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).



ORDER CODE

	DRE		6			—	1X	/		M	G24					*

SUBPLATE MOUNTING = NO CODE

SANDWICH PLATE = Z

PROPORTIONAL PRESSURE REDUCING VALVE = DRE

FOR EXTERNAL CONTROL ELECTRONICS = NO CODE

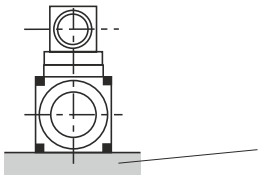
WITH INTEGRATED ELECTRONICS (OBE) = E

SIZE 6 = 6

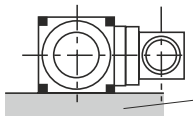
PRESSURE REDUCTION IN CHANNEL A (SUBPLATE MOUNTING) = NO CODE

PRESSURE REDUCTION IN CHANNEL P1 (SANDWICH PLATE) = VP

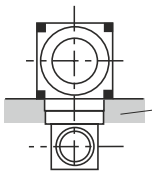
POSITION OF THE MATING CONNECTOR (OMITTED IN CASE OF SUBPLATE MOUNTING)



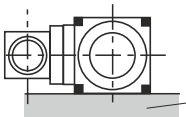
VALVE CONTACT SURFACE (SEAL RING RECESSES IN THE HOUSING) = 1



VALVE CONTACT SURFACE (SEAL RING RECESSES IN THE HOUSING) = 2



VALVE CONTACT SURFACE (SEAL RING RECESSES IN THE HOUSING) = 3



VALVE CONTACT SURFACE (SEAL RING RECESSES IN THE HOUSING) = 4

1X = COMPONENT SERIES 10 ... 19 (10 ... 19: UNCHANGED INSTALLATION AND CONNECTION DIMENSIONS)

PRESSURE RATING

50 = 50 BAR

100 = 100 BAR

210 = 210 BAR

315[1] = 315 BAR

M = WITHOUT CHECK VALVE

G24 = DIRECT VOLTAGE 24 V

N9 = WITH MANUAL OVERRIDE

NO CODE = WITHOUT MANUAL OVERRIDE

TYPE DRE; ZDRE:
WITHOUT MATING CONNECTOR; CONNECTOR DIN EN 175301-803

K4 = MATING CONNECTOR, SEPARATE ORDER, SEE PAGE 15

TYPE DREE; ZDREE:
WITHOUT MATING CONNECTOR; CONNECTOR M12

K24 = CABLE SET, SEPARATE ORDER, SEE PAGE 15

A1 = COMMAND VALUE 0 TO 10 V

F1 = COMMAND VALUE 4 TO 20 MA

NO CODE = TYPE (Z)DRE

M = NBR SEALS

V = FKM SEALS

FURTHER DETAILS IN THE PLAIN TEXT

[1] ONLY AVAILABLE FOR "Z" VERSION