

ZDE3

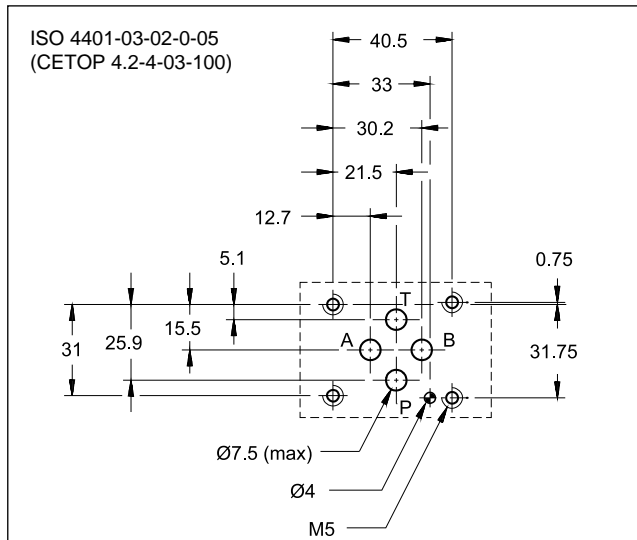
DIRECT OPERATED PRESSURE REDUCING VALVE WITH ELECTRIC PROPORTIONAL CONTROL SERIES 30



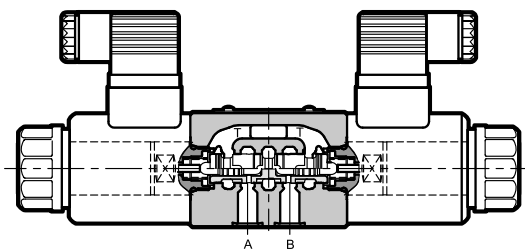
SUBPLATE MOUNTING ISO 4401-03

p max 100 bar
Q max 15 l/min

MOUNTING INTERFACE



OPERATING PRINCIPLE



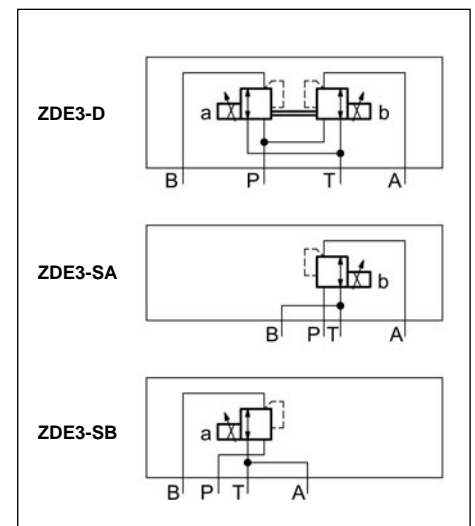
- ZDE3 valves are direct operated pressure reducing valves with electric proportional control, with mounting interface in compliance with ISO 4401 standards.
- These valves are used to reduce pressure in the secondary circuit branches thus ensuring stability of controlled pressure in the event of variations of the flow rate through the valve.
- The valves can be actuated by a current control supply unit by an external electronic card, to maximize the valve performances (see p. 11).

PERFORMANCES

(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

Pressure allowed on P port	bar	30 ÷ 100
Pressure allowed on T port (see p. 3)	bar	0 ÷ 30
Controlled pressure	bar	23
Minimum controlled pressure	see Δp -Q diagram	
Maximum flow	l/min	15
Step response	see point 4	
Hysteresis (with PWM 200 Hz)	% of p nom	< 4%
Repeatability	% of p nom	< $\pm 1\%$
Electrical characteristic	see point 3	
Ambient temperature range	°C	-20 / +50
Fluid temperature range	°C	-20 / +80
Fluid viscosity range	cSt	10 ÷ 400
Fluid contamination degree	According to ISO 4406:1999 class 18/16/13	
Recommended viscosity	cSt	25
Mass: single solenoid valve	kg	1,6
double solenoid valve	kg	2

HYDRAULIC SYMBOLS



1 - IDENTIFICATION CODE

	Z	D	E	3	-	/	30	-		/	
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Pressure reducing valve ————

Electric proportional control ————

Size ISO 4401-03 ————

Solenoids: _____

D = pressure reduction in A and B ports
SA = pressure reduction in A port (solenoid on side B)
SB = pressure reduction in B port (solenoid on side A)

Series No. _____
 (from 30 to 39 sizes and mounting dimensions remain unchanged)

Seals: _____

N = NBR seals for mineral oil (**standard**)
V = FPM seals for special fluids

NOTE: The standard valve is supplied with surface treatment of phosphating black.
 The zinc-nickel finishing makes the valve suitable to ensure a salt spray resistance up to 240 hours. For a salt spray resistance up to **600** hours refer to **paragraph 8**.
 (test operated according to EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).

Option:
/W7 = Zinc-nickel surface treatment (see **NOTE**)
 Omit if not required

Manual override (see p. 7)

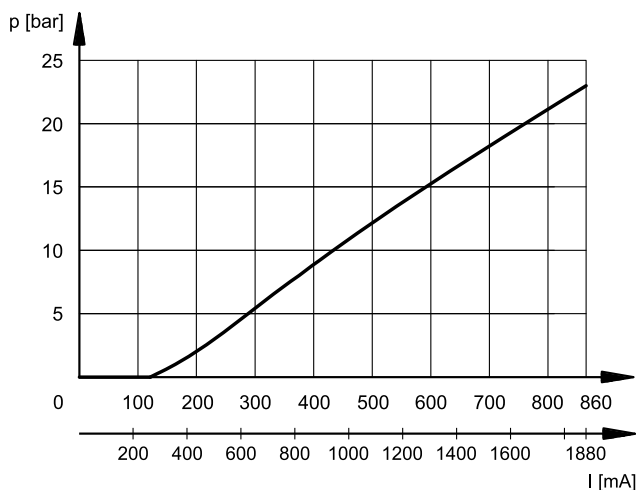
Coil electrical connection:
 (see point 5)
K1 = plug for connector type EN 175301-803 (ex DIN 43650) (**standard**)
K7 = plug for connector type DEUTSCH DT04-2P male

D12 = Nominal solenoid voltage 12V DC
D24 = Nominal solenoid voltage 24V DC

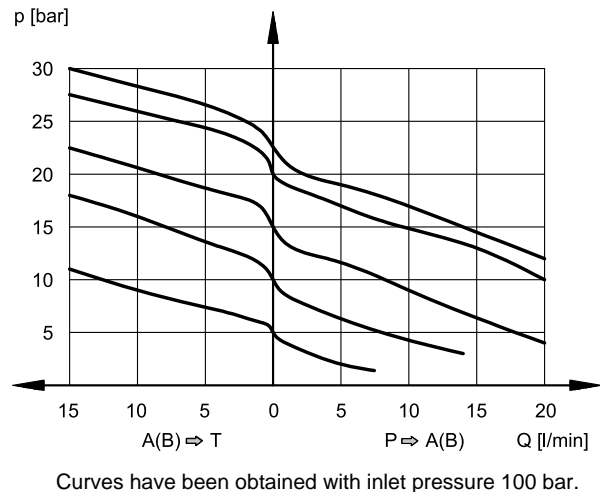
2 - CHARACTERISTIC CURVES

(values obtained with a ZDE3-D/30N-D24K1 PWM 100 Hz and oil with viscosity 36 cSt at 50°C)

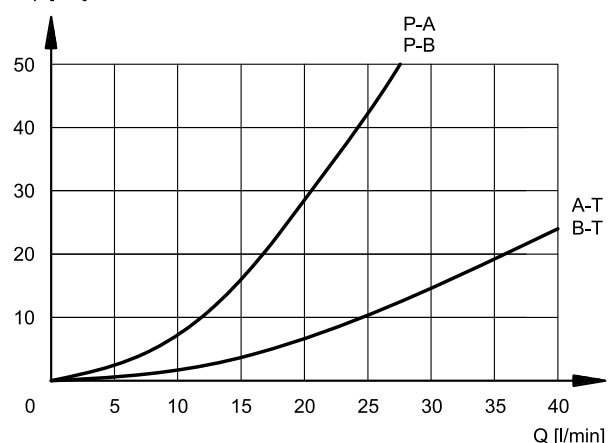
PRESSURE CONTROL $p = f(I)$



PRESSURE VARIATION $p = f(Q)$



PRESSURE DROP $\Delta p = f(Q)$



3 - ELECTRICAL CHARACTERISTICS

Proportional solenoid

The proportional solenoid comprises two parts: tube and coil.

The tube, screwed to the valve body, contains the armature which is designed to maintain friction to a minimum thereby reducing hysteresis.

The coil is mounted on the tube secured by means of a lock nut and can be rotated through 360° depending on installation clearances.

Protection from atmospheric agents IEC 60529

The IP protection degree is guaranteed only with both valve and connectors of an equivalent IP degree correctly connected and installed.

electric connection	electric connection protection	whole valve protection
K1	IP65	IP65
K7	IP65/67	

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE (at 20°C)	Ω	3.66	17.6
K1 coil			
K7, WK1, WK7 coil	4.4	18.6	
NOMINAL CURRENT	A	1.88	0.86
DUTY CYCLE		100%	
PWM FREQUENCY	Hz	200	100
ELECTROMAGNETIC COMPATIBILITY (EMC)	According to 2014/30/EU		
CLASS OF PROTECTION : Coil insulation (VDE 0580) Impregnation	class H class F		

4 - STEP RESPONSE

(with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

Step response is the time taken for the valve to reach 90% of the set pressure value following a step change of reference signal.

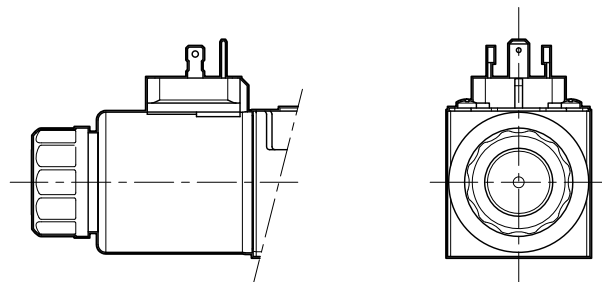
The table illustrates typical step response times measured with input flow rate of Q = 5 l/min and p = 50 bar.

REFERENCE SIGNAL STEP	0 → 100%	100 → 0%
Step response [ms]	30	30

5 - ELECTRIC CONNECTIONS

Connectors for standard K1 connection are always supplied with the valve.

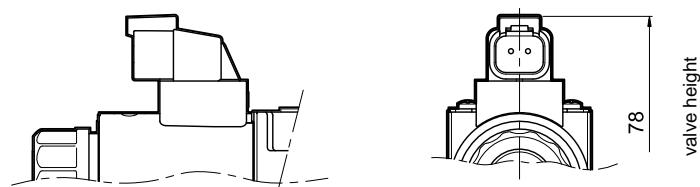
connection for EN 175301-803
(ex DIN 43650) connector
code **K1 (standard)**
code **WK1** (W7 version only)



connection for
DEUTSCH DT06-2S male connector
code **K7**



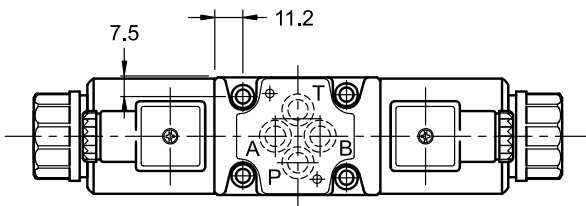
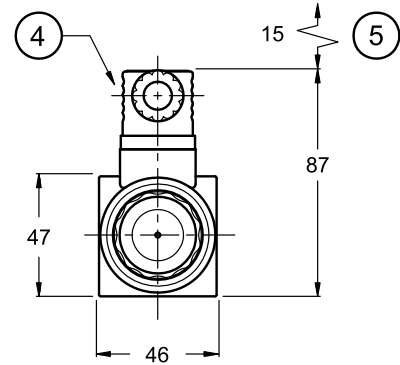
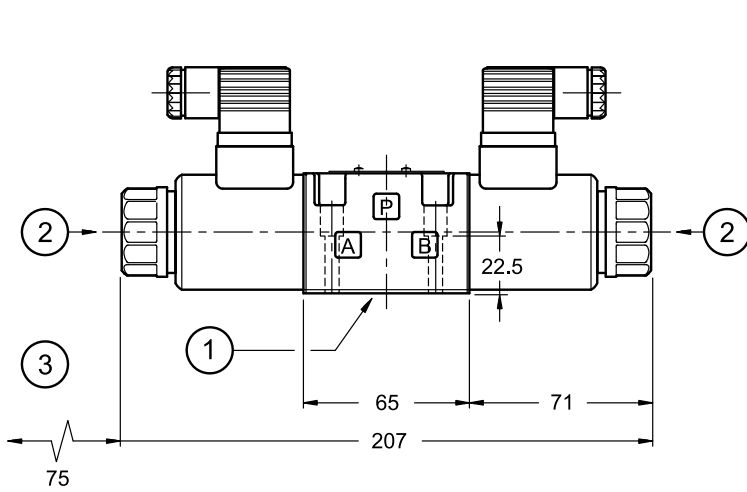
connection for
DEUTSCH DT06-2S male connector
code **WK7** (W7 version only)



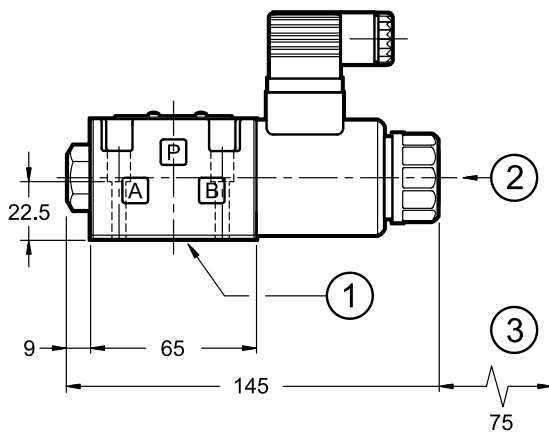
6 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm

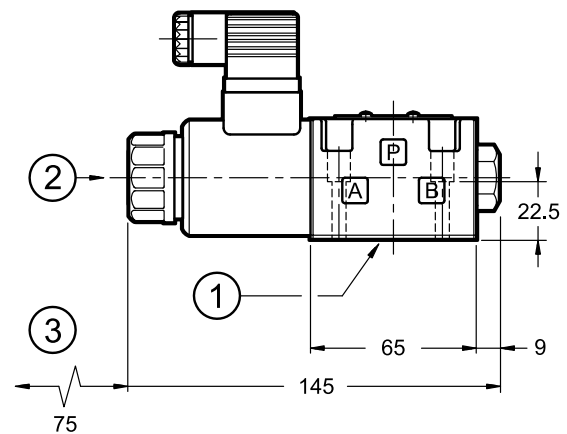
ZDE3-D



ZDE3-SA



ZDE3-SB



Fastening bolts: 4 bolts M5x30 - ISO 4762
Torque: 5 Nm (A8.8)
Threads of mounting holes: M5x10

1	Mounting surface with sealing rings: 4 OR type 2037 - 90 shore (9.25x1.78)
2	Locking ring with boot protected manual override
3	Coil removal space
4	EN 175301-803 (ex DIN 43650) electrical connector
5	Connector removal space

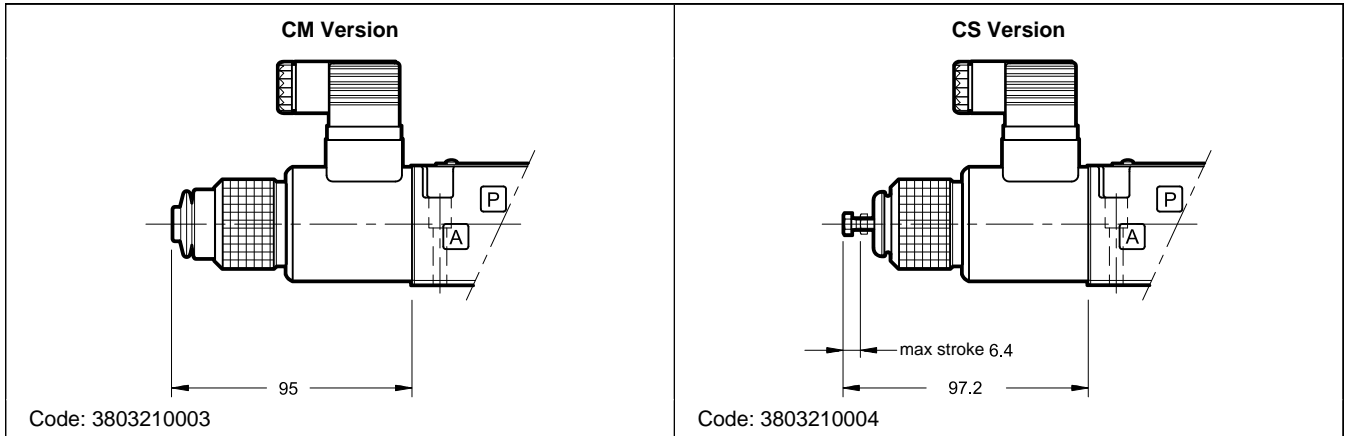
7 - MANUAL OVERRIDE

The standard valve has solenoids whose pin for the manual operation is integrated in the tube. The operation of this control must be executed with a suitable tool, minding not to damage the sliding surface.

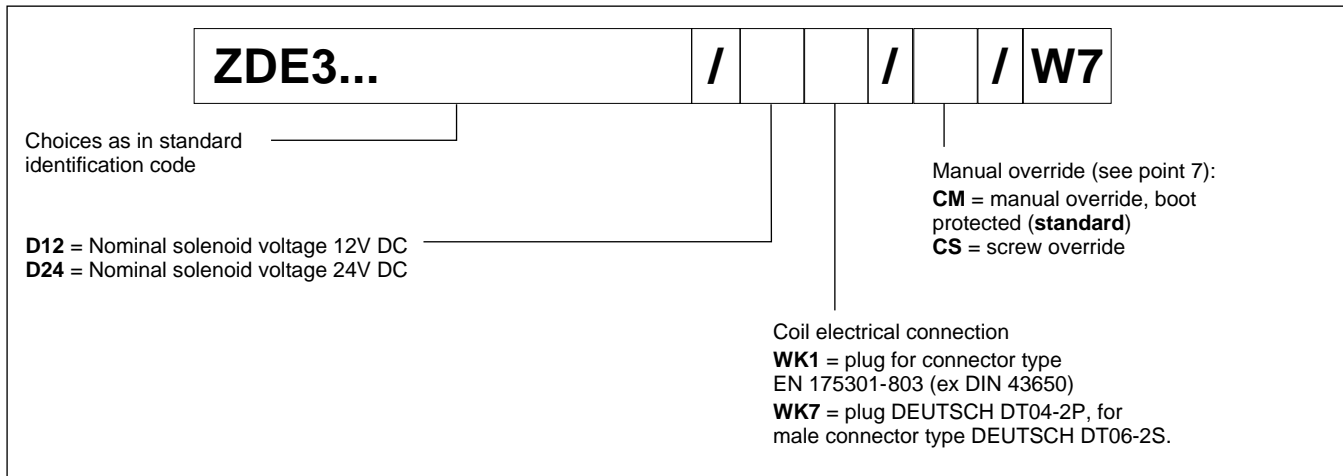
Two different manual override version are available upon request:

- **CM** version, manual override belt protected
- **CS** version, screw override with metal ring nut, provided with a M4 screw and a blocking locknut to allow the continuous mechanical operation.

NOTE: The manual override use doesn't allow any proportional regulation; indeed using this kind of override, the main stage spool will open completely and the whole inlet pressure will pass through A or B line.



8 - HIGH IP AND CORROSION RESISTANCE VERSION



8.1 - Corrosion resistance

This version features the zinc-nickel coating on all exposed metal parts of the valve, making it resistant to exposure to the salt spray for **600** hours (test performed according to UNI EN ISO 9227 and assessment test performed according to UNI EN ISO 10289).

The boot protected manual override is fitted as standard in order to protect the solenoid tube. See the dimensions of the CM manual override in point 7.

8.2 - Coils

The coils feature a zinc-nickel surface treatment. The electrical characteristics do not change compared to the standard version: see table in point 3.

8.3 - Protection from atmospheric agents IEC 60529

The IP protection degree is guaranteed only with both valve and connectors of an equivalent IP degree correctly connected and installed.

electric connection	electric connection protection	whole valve protection
WK1 EN 175301-803 (ex DIN 43650)	IP66	IP66
WK7 DEUTSCH DT04 male	IP66/IP68/IP69 IP69K*	IP66/IP68/IP69 IP69K*

(*) The IP69K protection degree is not taken into account in IEC 60529 but it is included in ISO 20653.

NOTE: As regards the liquid ingress protection (second digit), there are three means of protection.

Codes from 1 to 6 are related to water jets.

Rates 7 and 8 are related to immersion.

Rate 9 is reserved for high pressure and temperature water jets.

This means that IPX6 covers all the lower steps, rate IPX8 covers IPX7 but not IPX6 and lower, instead IPX9 does not cover any of them.

Whether a device meets two types of protection requirements it must be indicated by listing both the tests separated by a slash.

(E.g. a marking of an equipment covered both by temporary immersion and water jets is IP66/IP68).

9 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other fluid types such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics. The fluid must be preserved in its physical and chemical characteristics.

10 - INSTALLATION

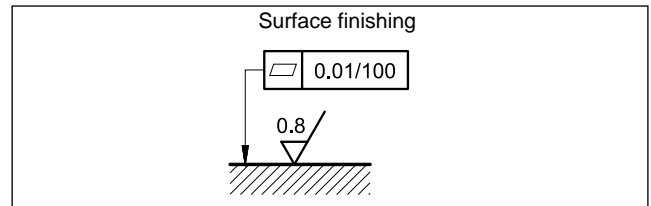
The ZDE3 valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed fluid can easily leak between the valve and support surface.

Connect the valve T port directly to the tank. Add any backpressure value detected in the T line to the reduced pressure value.

Maximum admissible backpressure in the T line, under operational conditions, is 30 bar.



11 - ELECTRONIC CONTROL UNITS

ZDE3-SA* ZDE3-SB*

EDC-111	for solenoid 24V DC	plug version	see cat. 89 120
EDC-142	for solenoid 12V DC		
EDM-M111	for solenoid 24V DC	DIN EN 50022 rail mounting	see cat. 89 252
EDM-M142	for solenoid 12V DC		

ZDE3-D*

EDM-M211	for solenoid 24V DC	rail mounting DIN EN 50022	see cat. 89 252
EDM-M242	for solenoid 12V DC		

12 - SUBPLATES

(see catalogue 51 000)

Type PMMD-AI3G ports on rear
Type PMMD-AL3G side ports
P, T, A, B port threading: 3/8" BSP



ZDE3
SERIES 30

DUPLOMATIC
MOTION SOLUTIONS
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