



ZDE3

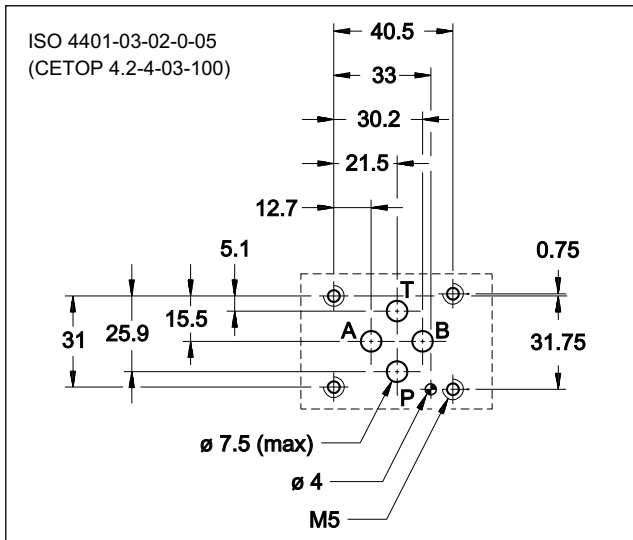
DIRECT OPERATED PRESSURE REDUCING VALVE WITH ELECTRIC PROPORTIONAL CONTROL

SERIES 30

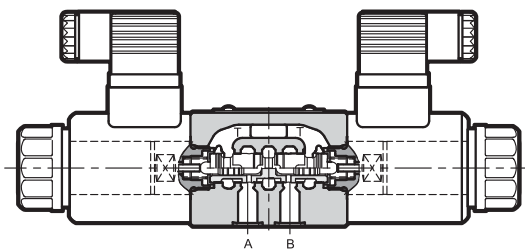
SUBPLATE MOUNTING
ISO 4401-03 (CETOP 03)

p max 100 bar
Q max 15 l/min

MOUNTING INTERFACE



OPERATING PRINCIPLE



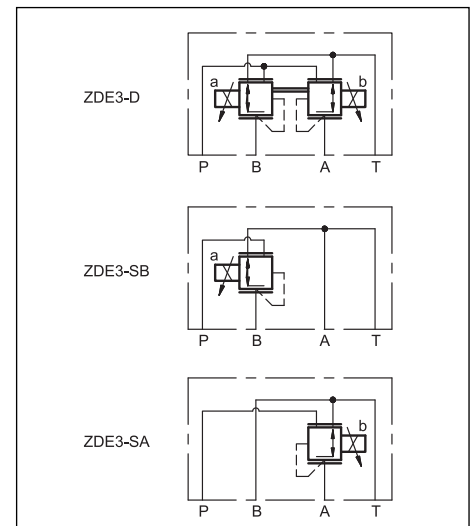
- ZDE3 valves are direct operated pressure reducing valves with electric proportional control, with mounting interface in compliance with ISO 4401 (CETOP RP121H) standards.
- The valves are used to reduce pressure in the secondary circuit branches thus ensuring stability of controlled pressure in the event of variations of the flow rate through the valve.
- The valve can be controlled directly by a current control supply unit or by means of the relative electronic control units to exploit valve performance to the full (see par. 10).

PERFORMANCES

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

| | | |
|---|---|-------------|
| Operating pressure range: | bar | 30 + 100 |
| Pressure allowed on T port (see par. 6) | bar | 0 + 30 |
| Controlled pressure | bar | 23 |
| Minimum controlled pressure | see Δp -Q diagram | |
| Maximum flow | l/min | 15 |
| Step response | see paragraph 5 | |
| Hysteresis (with PWM 200 Hz) | % of p nom | < 4% |
| Repeatability | % of p nom | < $\pm 1\%$ |
| Electrical characteristic | see paragraph 4 | |
| 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 | | 2 |

HYDRAULIC SYMBOLS



1 - IDENTIFICATION CODE

| | | | | | | | | | | | |
|--|----------|----------|----------|----------|----------|----------|-----------|----------|--|----------|--|
| | Z | D | E | 3 | - | / | 30 | - | | / | |
|--|----------|----------|----------|----------|----------|----------|-----------|----------|--|----------|--|

Pressure reducing valve: _____

Electric proportional control _____

Size ISO 4401-03 (CETOP 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)

Manual override (see par. 9)

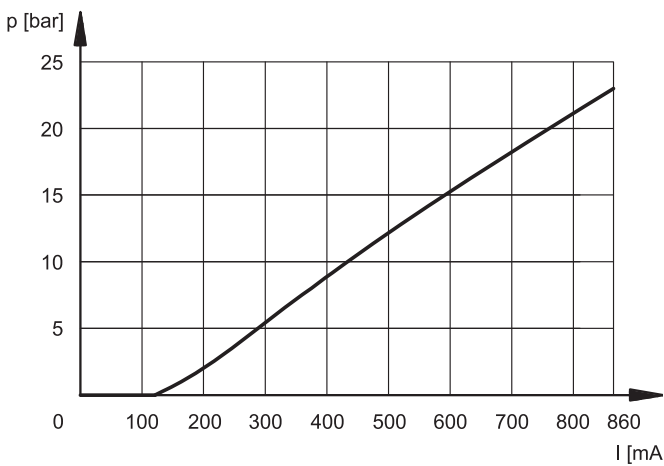
Coil electrical connection: (see paragraph 7)
K1 = plug for connector type DIN 43650 (**standard**)
K7 = plug for connector type DEUTSCH DT04-2P male
K12 = plug for M12 connector K1 coils and DUAL DIN 43560

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

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

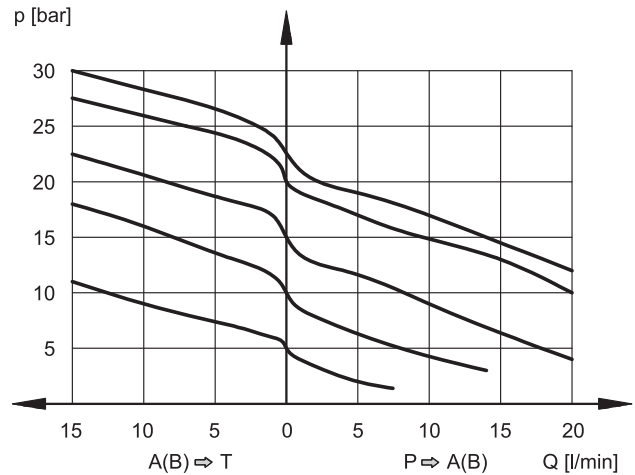
2 - CHARACTERISTIC CURVES (obtained with ZDE3-D/30N-D24K1 and oil with viscosity 36 cSt at 50°C)

PRESSURE CONTROL $p=f(I)$



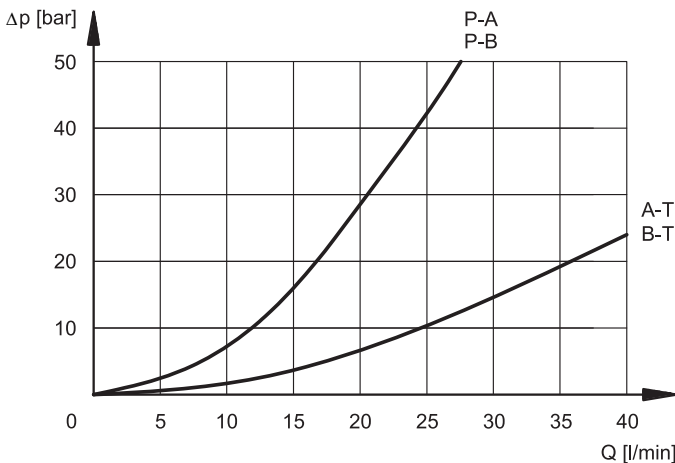
SA and SB versions pressure regulation is less than 0.5 bar.

PRESSURE VARIATION $p=f(Q)$



The curves have been obtained with inlet pressure 100 bar.

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



3 - 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.

4 - 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.

| | | | |
|---|--------------------------|-----------------|-----------------|
| NOMINAL VOLTAGE | V DC | 12 | 24 |
| RESISTANCE (at 20°C) | Ω | K1 COIL 3.66 | K7 COIL 17.6 |
| | | 4 | 19 |
| MAXIMUM CURRENT | A | 1.88 | 0.86 |
| DUTY CYCLE | | 100% | |
| PWM FREQUENCY | Hz | 200 | 100 |
| ELECTROMAGNETIC COMPATIBILITY (EMC) | According to 2004/108/CE | | |
| PROTECTION FROM: Atmospheric agents (CEI EN 60529) | IP 65 | | |
| CLASS OF PROTECTION : Coil insulation (VDE 0580) Impregnation: | class H class F | | |

5 - STEP RESPONSE

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

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 |

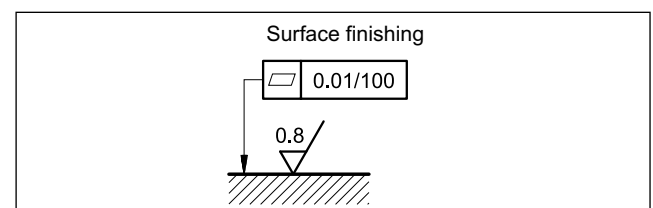
6 - INSTALLATION

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.

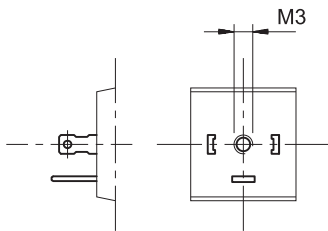
Connect the valve T port directly to the tank. Add any backpressure value detected in the T line to the reduced pressure value. Maximum admissible backpressure in the T line, under operational conditions, is 30 bar.



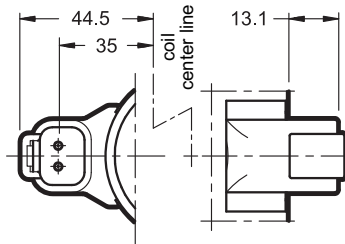
7 - ELECTRIC CONNECTIONS

The valve is supplied with connection K1. Alternatively, there are connections K7 and K12 DUAL DIN. DUAL DIN connector allows you to power two solenoids with connection K1 with a single cable with socket M12.

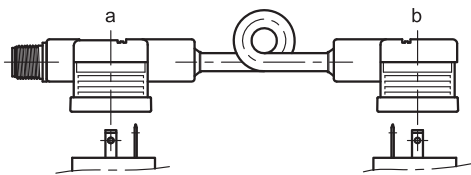
connection for DIN 43650 connector type
code **K1 (standard)**



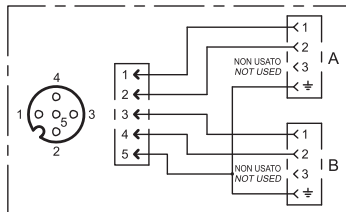
connection for DEUTSCH DT04-2P male
connector type
code **K7**



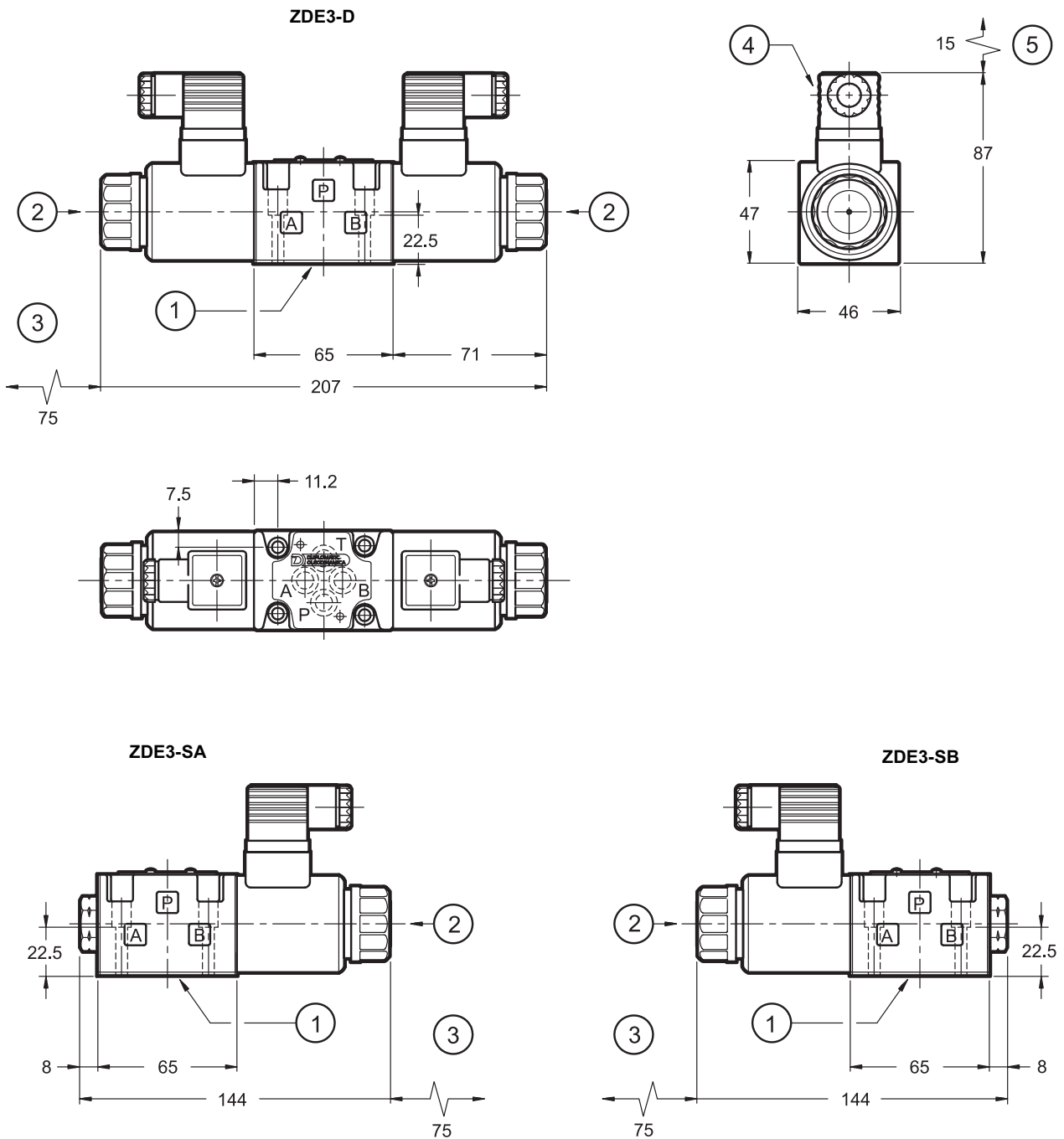
connection for DUAL DIN 43650 connector type
code **K12**



CONNECTOR M12x1 CONNECTION SCHEME



8 - OVERALL AND MOUNTING DIMENSIONS



dimensions in mm

Fastening bolts: n° 4 bolts A8.8 M5x30
Torque: 5 Nm

| | |
|---|---|
| 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 | DIN 43650 electrical connector |
| 5 | Connector removal space |

9 - MANUAL OVERRIDE

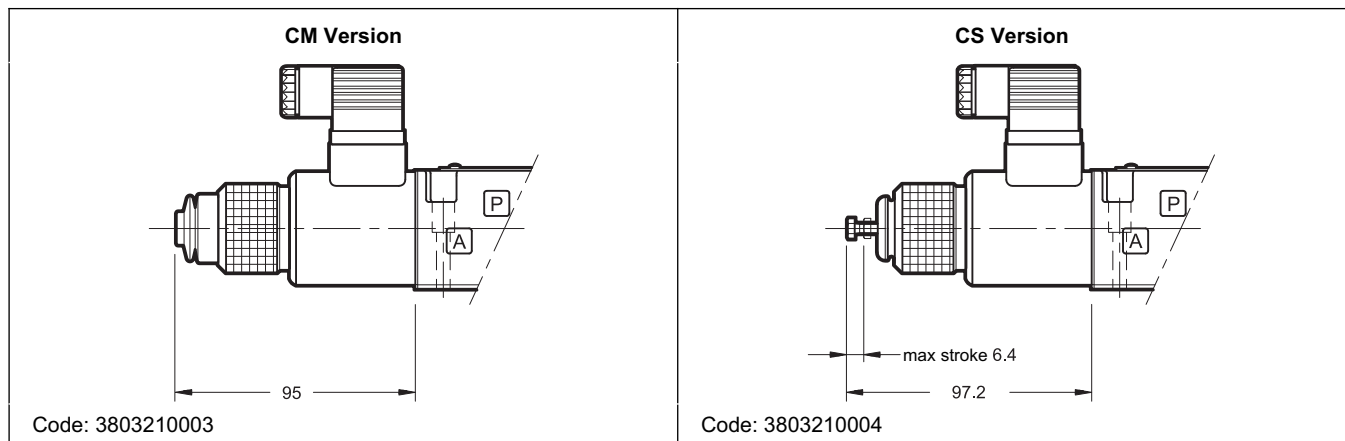
The standard valve has solenoids whose pin for the manual operation is integrated in the tube. The operation of this control must be executed with a suitable tool, minding not to damage the sliding surface.

Two different manual override version are available upon request:

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



CAUTION! 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.



10 - 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. 89 250 |
| EDM-M142 | for solenoid 12V DC | | |

ZDE3-D*

| | | | |
|-----------------|---------------------|-------------------------------|-----------------|
| EDM-M211 | for solenoid 24V DC | rail mounting DIN EN 50022 | see cat. 89 250 |
| EDM-M242 | for solenoid 12V DC | | |

11 - SUBPLATES (See catalogue 51 000)

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

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