

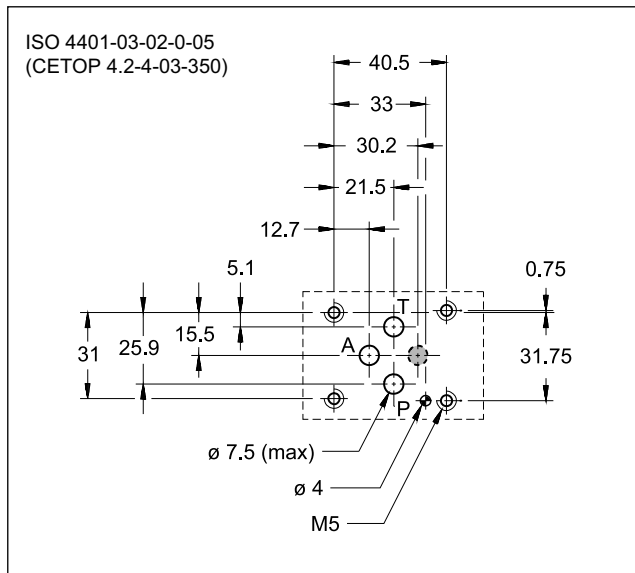
# PZE3G\*

## PROPORTIONAL 3-WAY PRESSURE REDUCING VALVE, PILOT OPERATED, WITH INTEGRATED ELECTRONICS

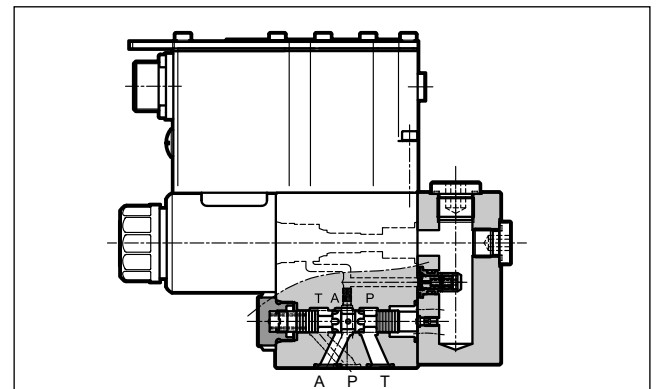
**SUBPLATE MOUNTING  
ISO 4401-03**

**p max 350 bar  
Q max 40 l/min**

### MOUNTING SURFACE



### OPERATING PRINCIPLE



- PZE3G\* valve is a proportional 3-way pressure reducing valve, pilot operated, with on-board electronics with mounting surface according to ISO 4401-03 standards.
- This valve controls the outlet pressure on port A, reducing the inlet pressure from line P or relieving the overpressure from line A into T keeping it at the set value. (typically: hydraulic counter-weight or load balancing)
- It is suitable to modulate the pressure in hydraulic circuits.

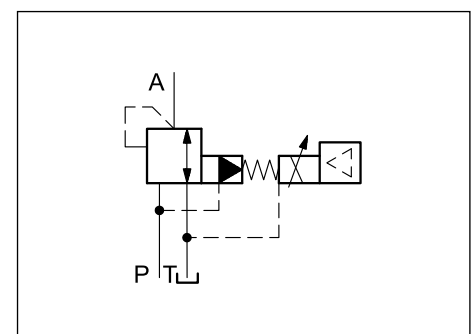
### PERFORMANCES

(obtained with mineral oil with viscosity of 36 cSt at 50°C and p = 140 bar)

Maximum operating pressure: - P port - T port	bar	350 2
Maximum flow (see p max = f(Q) diagram)	l/min	40
Step response	see paragraph 7	
Hysteresis	% of p nom	< 3%
Repeatability	% of p nom	< ±1%
Electrical characteristic	see paragraph 2	
Ambient temperature range	°C	-20 / +60
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	kg	2.7

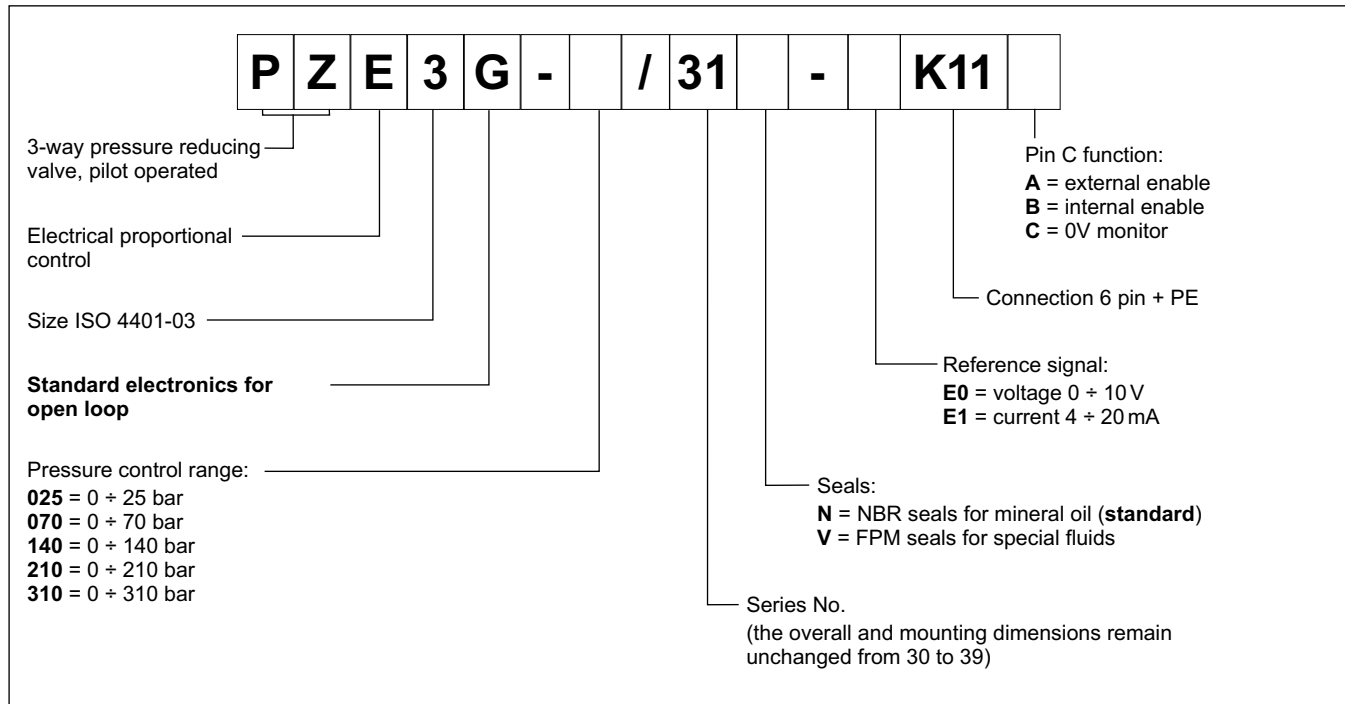
- It is available with different types of electronics, with analogue or fieldbus interfaces.
- Valves are easy to install. The driver directly manages digital settings

### HYDRAULIC SYMBOL

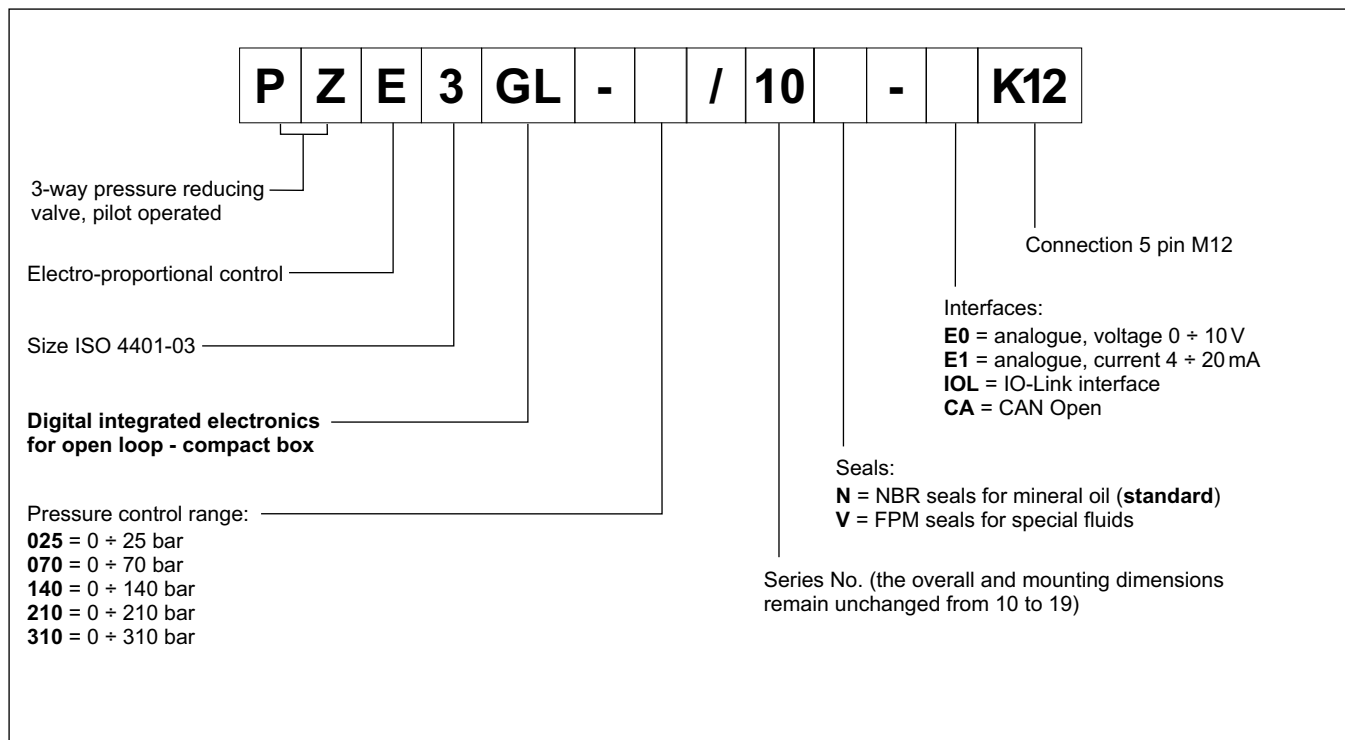


## 1 - IDENTIFICATION CODE

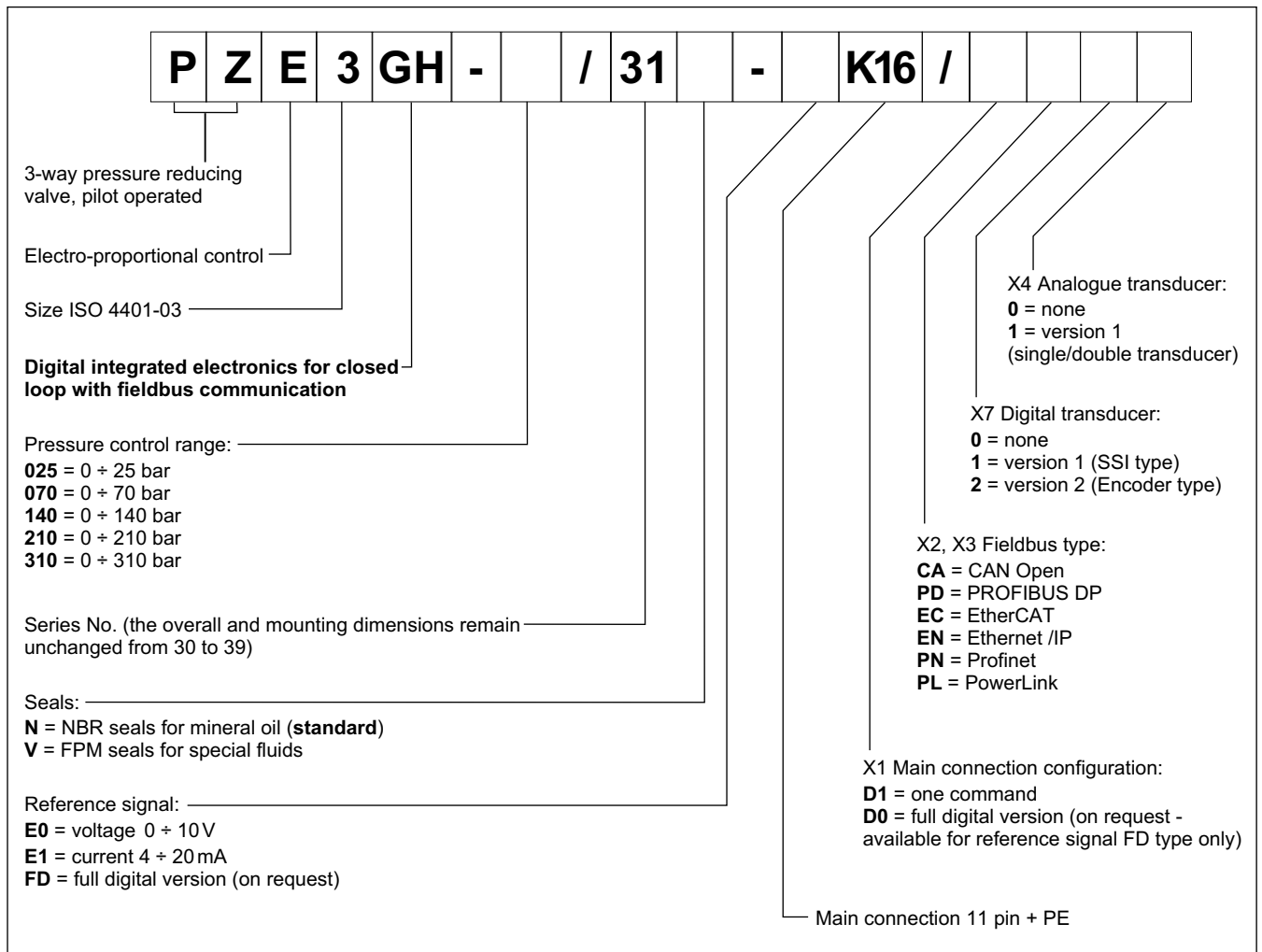
### 1.1 - Standard electronics



### 1.2 - Compact electronics



### 1.3 - Electronics with fieldbus communication



## 2 - ELECTRONICS COMMON DATA

Duty cycle		100% (continuous operation)
Protection class according to EN 60529		IP65 / IP67
Supply voltage	V DC	24 (from 19 to 30 VDC), ripple max 3 Vpp
Power consumption	VA	25
Maximum solenoid current	A	1.88
Fuse protection, external	A	2A time lag
Managed breakdowns		Overload and electronics overheating, cable breakdown, supply voltage failures
Electromagnetic compatibility (EMC) emissions EN 61000-6-4, immunity EN 61000-6-2		According to 2014/30/EU standards

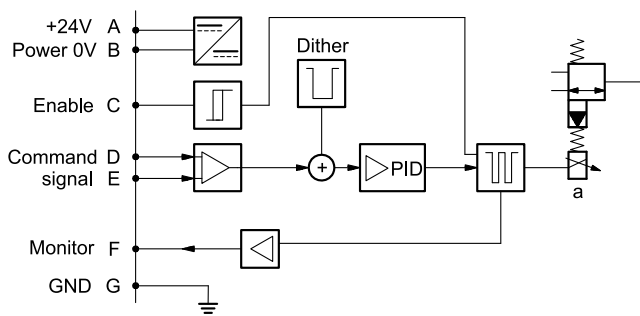
## 3 - PZE3G - STANDARD ELECTRONICS

### 3.1 - Electrical characteristics

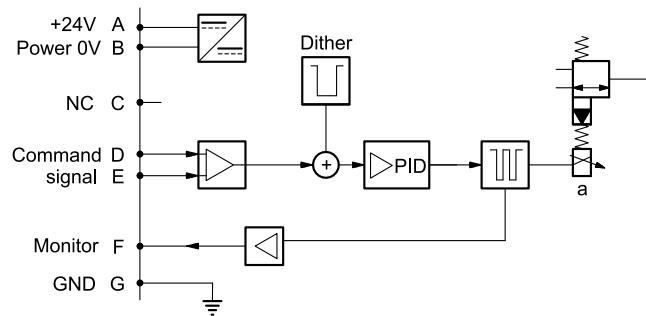
Command signal:	voltage (E0) current (E1)	V DC mA	0 + 10 (Impedance Ri = 11 kOhm) 4 + 20 (Impedance Ri = 58 Ohm)
Monitor signal (current to solenoid):	voltage (E0) current (E1)	V DC mA	0 + 10 (Impedance Ro > 1 kOhm) 4 + 20 (Impedance Ro = 500 Ohm)
Communication for diagnostic			LIN-bus Interface (by means of the optional kit)
Connection			6 pin + PE (MIL-C-5015-G - DIN EN 175201-804)

### 3.2 - On-board electronics diagrams

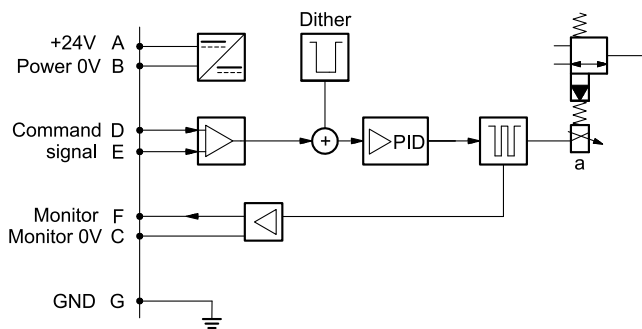
#### VERSION A - External Enable



#### VERSION B - Internal Enable

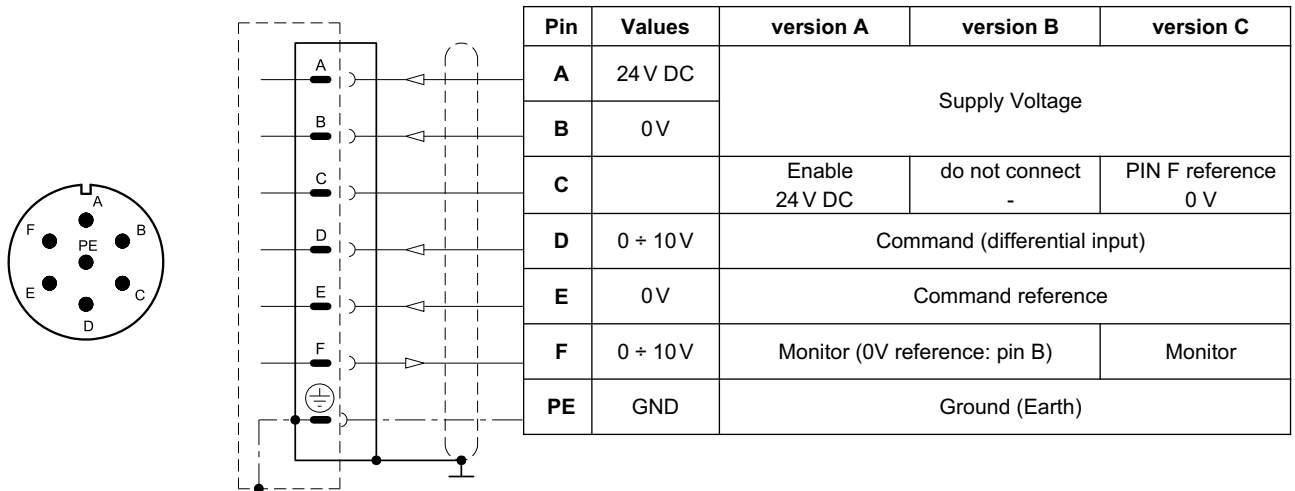
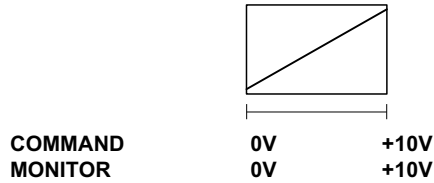


#### VERSION C - 0V Monitor



### 3.3 - Versions with voltage command (E0)

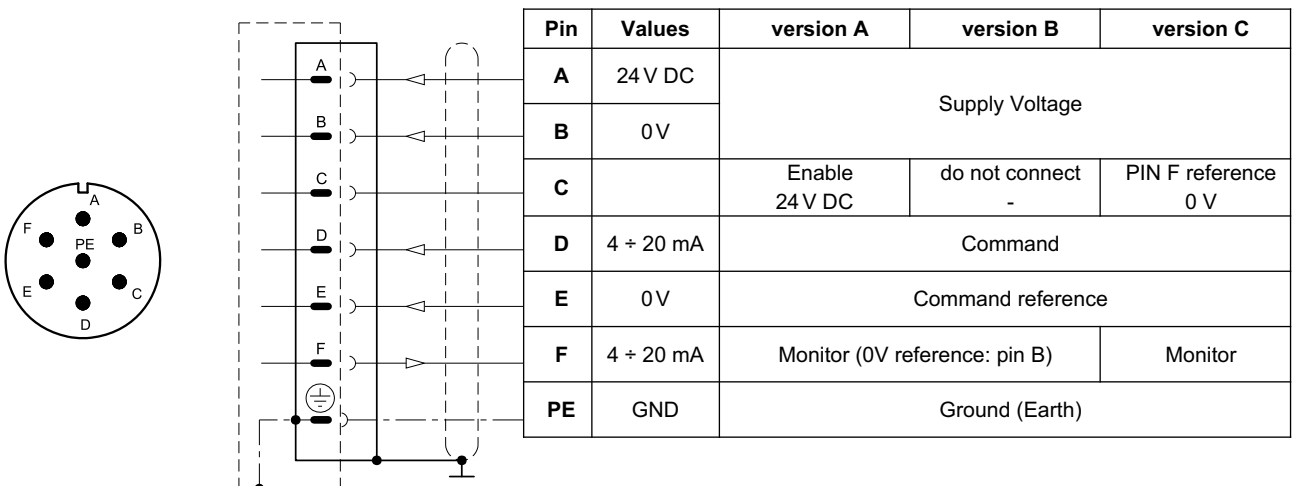
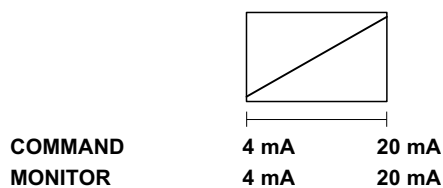
The reference signal is between  $0 \div 10V$ . The monitor feature of versions B and C becomes available with a delay of 0,5 sec from the power-on of the card.



### 3.4 - Version with current command (E1)

The reference signal is supplied in current  $4 \div 20$  mA. If the current for command is lower the card shows a breakdown cable error. To reset the error is sufficient to restore the signal.

The monitor feature of versions B and C becomes available with a delay of 0,5 sec from the power-on of the card.



## 4 - PZE3GL - COMPACT ELECTRONICS

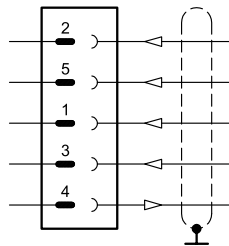
In versions 'IOL' and 'CA' pin 3 and pin 5 are galvanic isolated up to 100 V to avoid earth loops. In IO-Link networks, the length of the connecting cables is limited to 20 metres.

### 4.1 - Electrical characteristics

Command signal:	voltage (E0) current (E1)	V DC mA	0 ÷ 10 (Impedance Ri = 11 kOhm) 4 ÷ 20 (Impedance Ri = 58 Ohm)
Monitor signal (current to solenoid):	voltage (E0) current (E1)	V DC mA	0 ÷ 5 (Impedance Ro > 1 kOhm) 4 ÷ 20 (Impedance Ro = 500 Ohm)
IO-Link communication (IOL):	Data rate	kBaud	IO-Link Port Class B 230.4
Can Open communication (CA):	Data rate	kbit	10 ÷ 1000
Data register (IOL and CA versions only)			solenoid voltage supply, solenoid faults (shortcircuit, bad config, internal), box temperature, switch-on time, vibrations
Connection			5-pin M12 code A (IEC 61076-2-101)

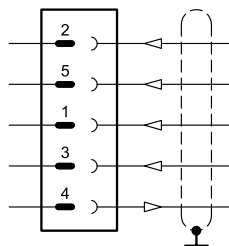
### 4.2 - Pin tables

#### 'E0' connection



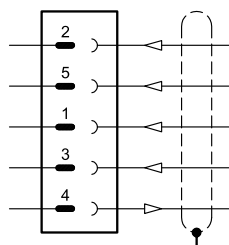
Pin	Values	Function
2	24 V DC	Supply voltage (solenoid and logic)
5	0 V	
1	0 ÷ 10 V	Command
3	0 V	Command reference
4	0 ÷ 5 V	Monitor (0V reference: pin 5)

#### 'E1' connection



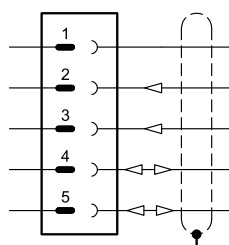
Pin	Values	Function
2	24 V DC	Supply voltage (solenoid and logic)
5	0 V	
1	4 ÷ 20 mA	Command
3	0 V	Command reference
4	4 ÷ 20 mA	Monitor (0V reference: pin 5)

#### 'IOL' connection



Pin	Values	Function
2	2L+ 24 V DC	Supply of the power stage
5	2L- 0 V (GND)	Internal galvanic isolation from PIN 3
1	1L+ +24 V DC	IO-Link supply voltage
3	1L- 0 V (GND)	
4	C/Q	IO-Link Communication

#### 'CA' connection



Pin	Values	Function
1	CAN_SH	Shield
2	24 V DC	Supply voltage
3	0 V (GND)	
4	CAN H	Bus line (high)
5	CAN_L	Bus line (low)

## 5 - PZE3GH - FIELDBUS ELECTRONICS

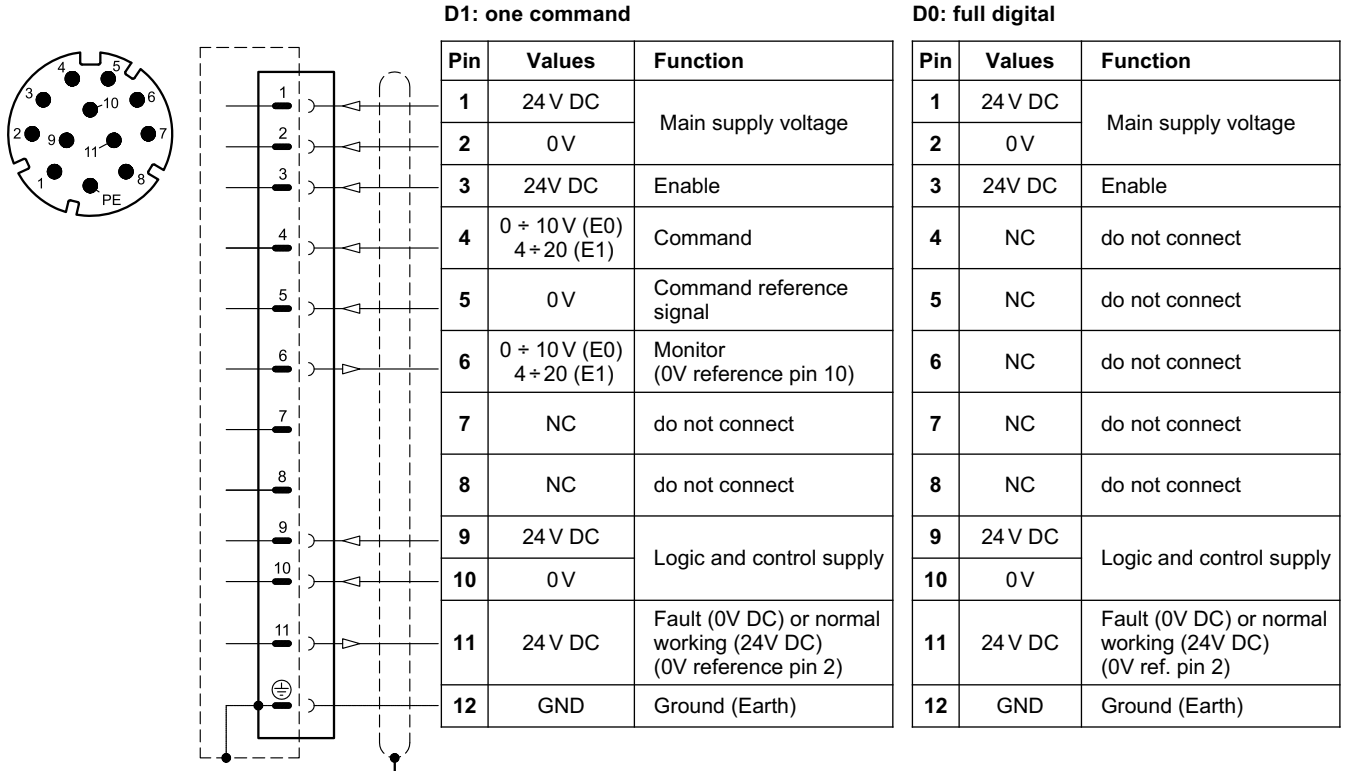
The 11+ PE pin connection allows separate supply voltage for electronics and solenoids.

Command - valve position schemes as for the standard electronics. Please refer to pictures in par. 3.3 and 3.4.

### 5.1 - Electrical characteristics

Command signal: voltage (E0) current (E1) digital (FD)	V DC mA	0 ÷ 10 (Impedance Ri = 11 kOhm) 4 ÷ 20 (Impedance Ri = 58 Ohm) via fieldbus
Monitor signal (current to solenoid): voltage (E0) current (E1)	V DC mA	0 ÷ 10 (Impedance Ro > 1 kOhm) 4 ÷ 20 (Impedance Ro = 500 Ohm)
Communication / diagnostic		via Bus register
Communication interface standards CAN Open PROFIBUS DP EtherCAT, Ethernet /IP, Profinet, PowerLink		EN 50325-4+DS408 EN 50170-2 / IEC 61158 IEC 61158
Communication physical layer CAN Open PROFIBUS DP EtherCAT, Ethernet /IP, Profinet, PowerLink		optical insulated CAN ISO 11898 optical insulated RS485 fast ethernet, insulated 100 Base TX
Power connection		11 pin + PE (DIN 43651)

### 5.2 - X1 Main connection pin table



### 5.3 - FIELDBUS connections

Please wire following guidelines provided by the relative standards communication protocol.

#### 5.3.1 - Communication connection CA (CAN Open)

**X2 (IN) connection:** M12 A 5 pin female



Pin	Values	Function
1	CAN_SH	Shield
2	NC	Do not connect
3	GND	Signal zero for data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

**X3 (OUT) connection:** M12 A 5 pin male



Pin	Values	Function
1	CAN_SH	Shield
2	NC	Do not connect
3	GND	Signal zero for data line
4	CAN_H	Bus line (high)
5	CAN_L	Bus line (low)

#### 5.3.2 - Communication connection PD (PROFIBUS DP)

**X2 (IN) connection:** M12 B 5 pin male (IN)



Pin	Values	Function
1	+5 V	Termination signal supply
2	PB_A	Bus line (high)
3	0V	Signal zero for data line and termination
4	PB_B	Bus line (low)
5	SHIELD	

**X3 (OUT) connection:** M12 B 5 pin female



Pin	Values	Function
1	+5 V	Termination signal supply
2	PB_A	Bus line (high)
3	0V	Signal zero for data line and termination
4	PB_B	Bus line (low)
5	SHIELD	

#### 5.3.3 - Communication connections: EC (EtherCat), EN (Ethernet/IP), PN (PROFINET), PL (POWERLINK)

**X2 (IN) connection:** M12 D 4 pin female



Pin	Values	Function
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
HOUSING	shield	

**X3 (OUT) connection:** M12 D 4 pin female



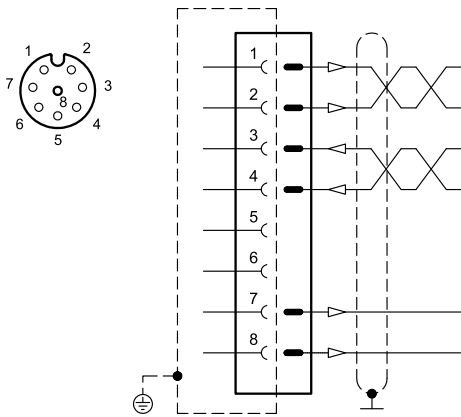
Pin	Values	Function
1	TX+	Transmitter
2	RX+	Receiver
3	TX-	Transmitter
4	RX-	Receiver
HOUSING	shield	



## 5.4 - Digital transducer connection

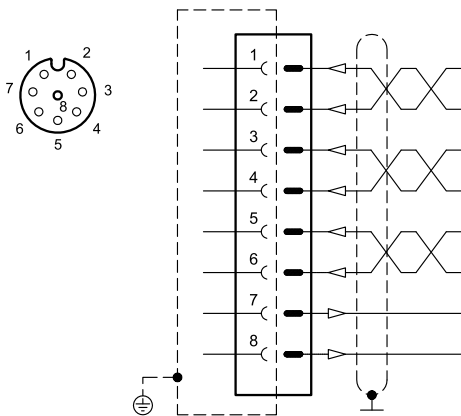
**X7 connection:** M12 A 8 pin female

### VERSION 1: SSI type



Pin	SSI Values	Function	Notes
1	CLK+	Serial synchronous clock (+)	Input - digital signal
2	CLK-	Serial synchronous clock (-)	
3	MIS0+	Serial position data (+)	
4	MIS0-	Serial position data (-)	
5	NC	-	do not connect
6	NC	-	
7	+24 V	transducer power supply	Output power supply
8	0V	-	Common GND

### VERSION 2: ENCODER type



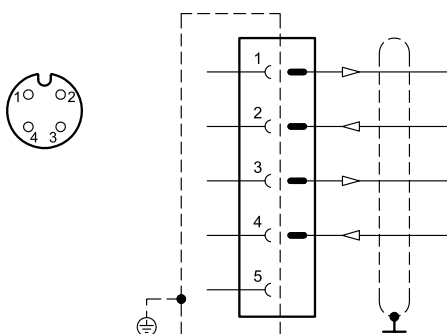
Pin	Values	Function	Notes
1	ENC_Z+	input channel Z+	Input - digital signal
2	ENC_Z-	input channel Z-	
3	ENC_A+	input channel A+	
4	ENC_A-	input channel A-	
5	ENC_B+	input channel B+	
6	ENC_B-	input channel B-	
7	+5V	transducer power supply	Output power supply
8	0V	-	Common GND

## 5.5 - Analogue transducer connection

**X4 connection:** M12 A 4 pin female

### VERSION 1: single / double transducer

(single or double is a software-selectable option)



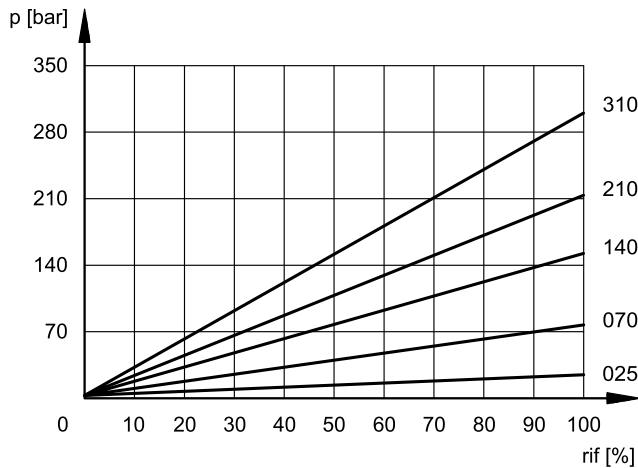
Pin	Values	Notes
1	+24 V	Remote transducer power supply (out) 100 mA
2	±10 V 4 ±20 mA	Input signal of transducer 1 (range software selectable)
3	0V	Common reference signal for transducer power and signals
4	±10 V 4 ±20 mA	Input signal of transducer 2 (range software selectable)
5	-	

## 6 - CHARACTERISTIC CURVES

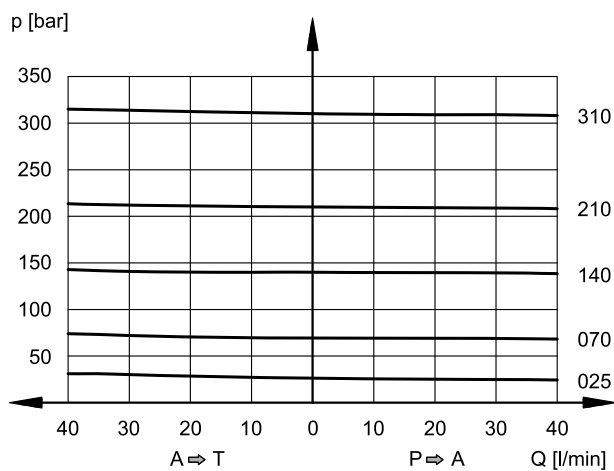
(measured with viscosity of 36 cSt at 50°C)

Typical control characteristics, according to the reference signal for available pressure control ranges. Characteristic curves measured without backpressure in T, with linearity compensation set by the onboard electronics.

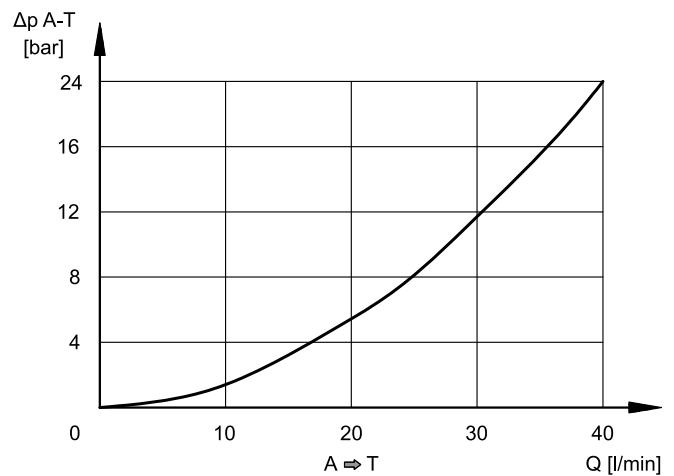
**PRESSURE CONTROL  $p = f(I)$**



**SET PRESSURE  $p_{max} = f(Q)$**



**MIN. CONTROLLED PRESSURE  $p_{min} = f(Q)$**



Pressure drops A → T vs. flow, without backpressure in T port and reference signal = 0 %

## 7 - RESPONSE TIMES

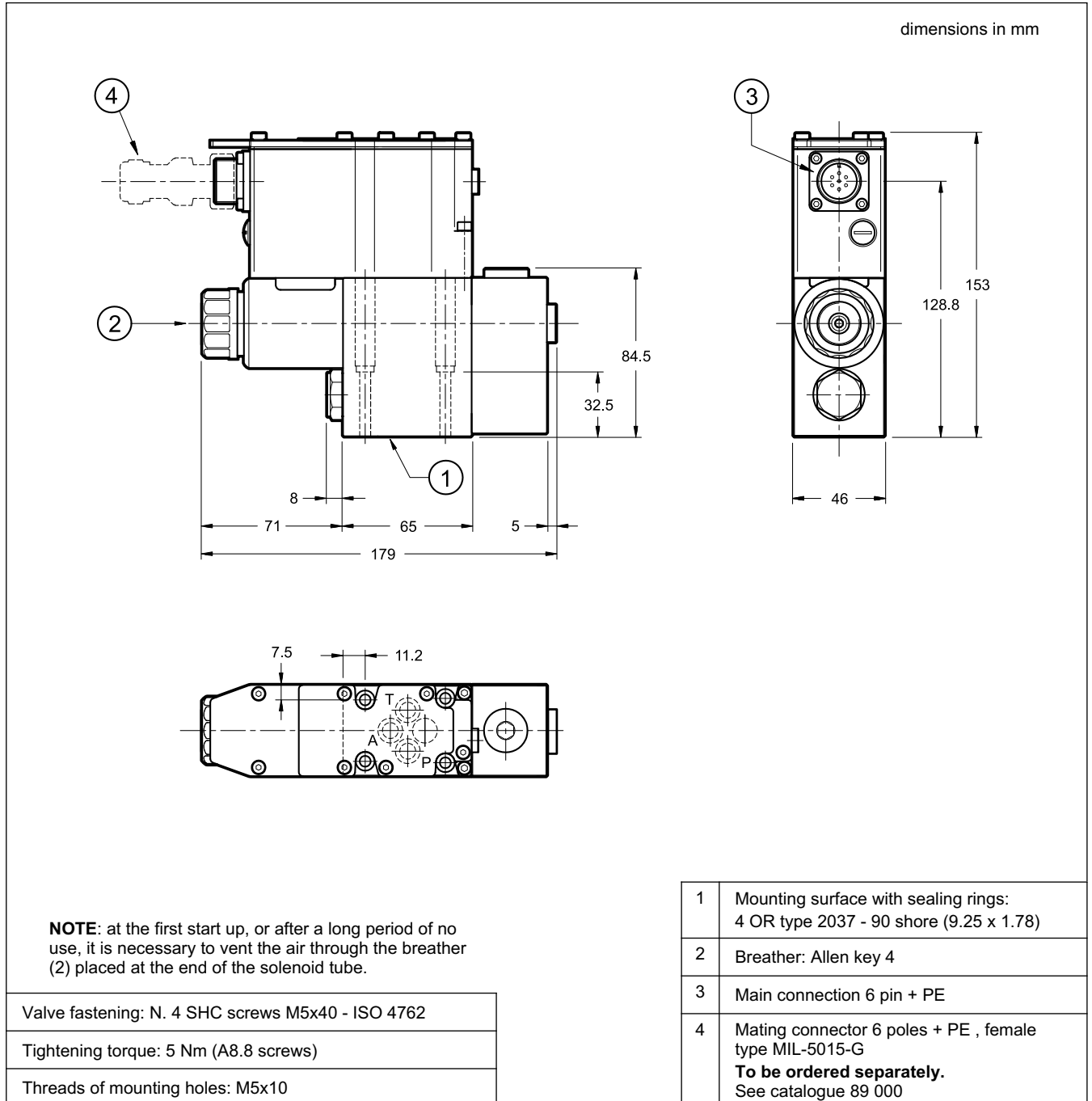
(obtained with mineral oil with viscosity of 36 cSt at 50°C)

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 response time is affected both by the flow rate and the oil volume in the pipework.

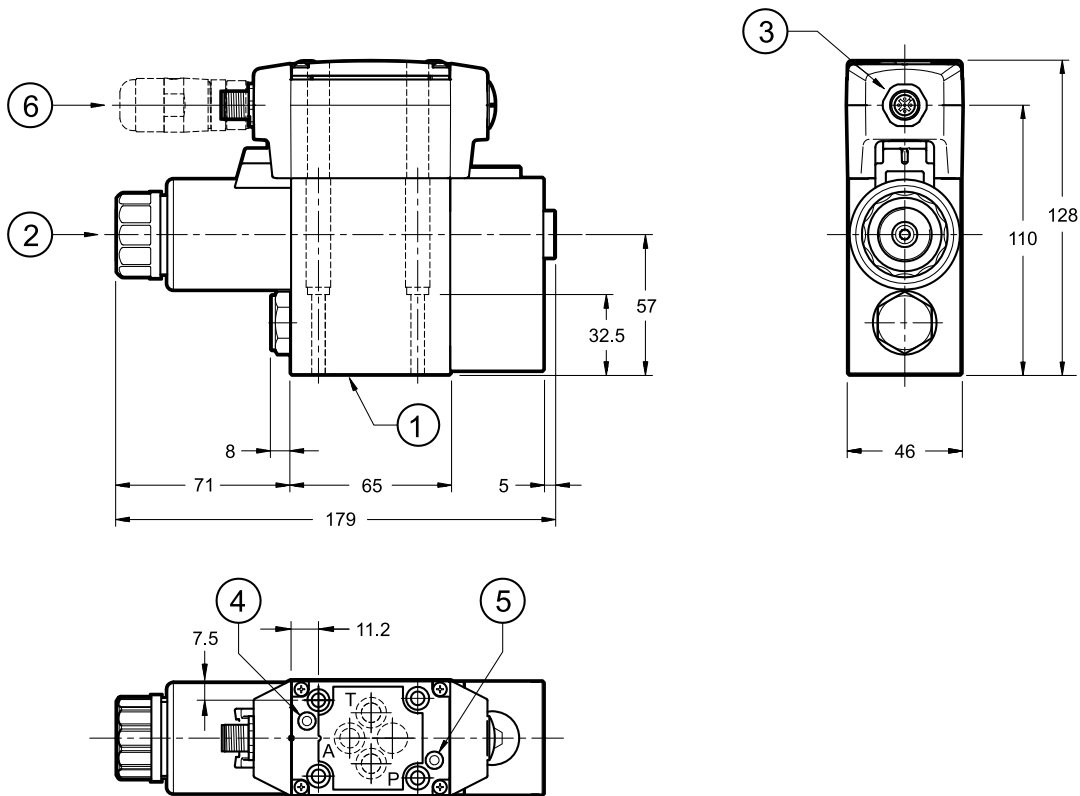
REFERENCE SIGNAL STEP	0 → 100%	100 → 0%
Step response [ms]	80	80

## 8 - PZE3G - OVERALL AND MOUNTING DIMENSIONS



## 9 - PZE3GL - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm



**NOTE:** at the first start up, or after a long period of no use, it is necessary to vent the air through the breather (2) placed at the end of the solenoid tube.

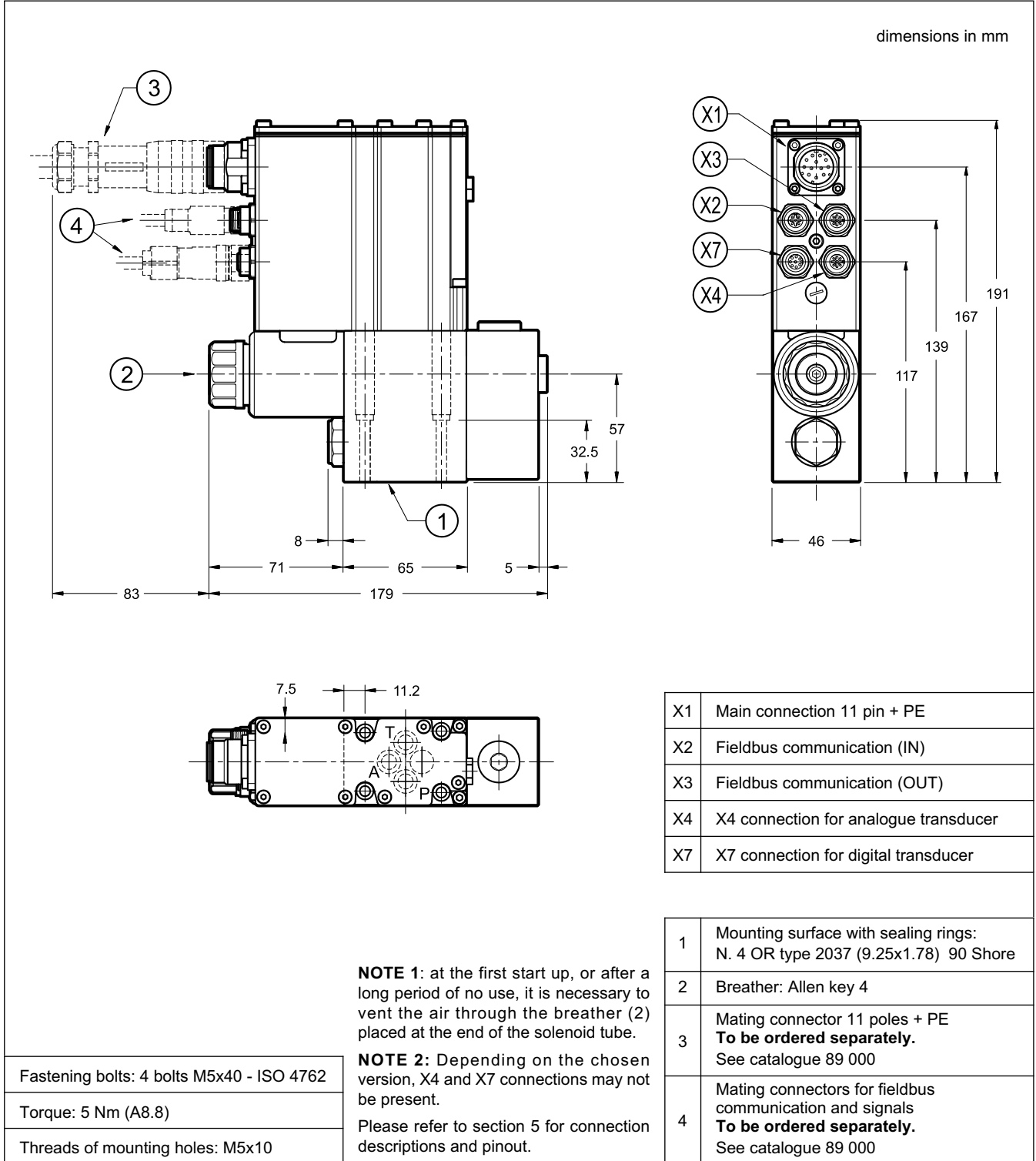
Fastening bolts: 4 SHC screws M5x40 - ISO 4762

Torque: 5 Nm (A8.8)

Threads of mounting holes: M5x10

1	Mounting surface with sealing rings: N. 4 OR type 2037 (9.25x1.78) 90 Shore
2	Breather: Allen key 4
3	Connection M12 A 5 pin
4	L1 LED
5	L2 LED
6	Mating connector M12 5 poles - code A, female <b>To be ordered separately.</b> See catalogue 89 000

10 - PZE3GH - OVERALL AND MOUNTING DIMENSIONS



## 11 - 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 kinds of fluid 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.

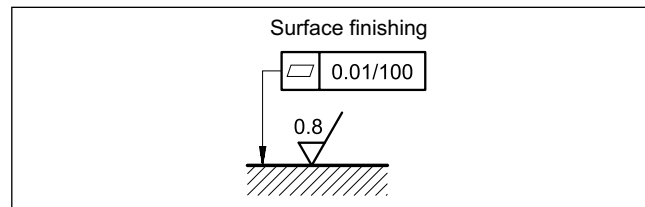
## 12 - INSTALLATION

We recommend to install the valves either in horizontal position, or vertical position with the solenoid downward. If the valve is installed in vertical position and with the solenoid upward, you must consider possible variations of the minimum controlled pressure, if compared to what is indicated in section 6.

Ensure that there is no air in the hydraulic circuit. In particular applications, can be necessary to vent the air entrapped in the solenoid tube, by using the appropriate drain screw in the solenoid tube. So, ensure the solenoid tube is always filled with oil. When finished, make sure you have screwed the screw back in correctly.

**Connect the valve T port directly to the tank. Add any backpressure value detected in the T line to the controlled pressure value. Maximum admissible backpressure in the T line, under operational conditions, is 2 bar.**

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.



## 13 - ACCESSORIES

(to be ordered separately)

### 13.1 - Mating connectors

Mating connectors must be ordered separately. See catalogue 89 000.



For K11 and K16 versions we recommend the choice of a metal connector to avoid electromagnetic disturbances and to comply with EMC regulations on electromagnetic compatibility. If you opt for a plastic connector, make sure that it guarantees and maintains the IP and EMC protection characteristics of the valve.

### 13.2 - Mating connectors for fieldbus communication and for sensors.

Duplomatic offers spare parts to be wired and also ready-to-use cord sets. Please refer to cat. 89 000.

### 13.3 - Connection cable

The optimal wiring provides for 7 isolated conductors, with separate screen for the signal wires (command, monitor) and an overall screen.

Cross section for power supply:

- up to 20 m cable length : 1,0 mm<sup>2</sup>
- up to 40 m cable length : 1,5 mm<sup>2</sup> (IO-Link excluded)

Cross section for signals (command, monitor):

- 0,50 mm<sup>2</sup>

### 13.4 - Kit for start-up LINPC-USB

Device for service start-up and diagnostic, available for valves with K11 and K16 connection, see catalogue 89 850.

## 14 - SUBPLATES

(see catalogue 51 000)

PMMD-AI3G with ports on rear
PMMD-AL3G with side ports
Ports dimensions P, T, A, B: 3/8" BSP thread