



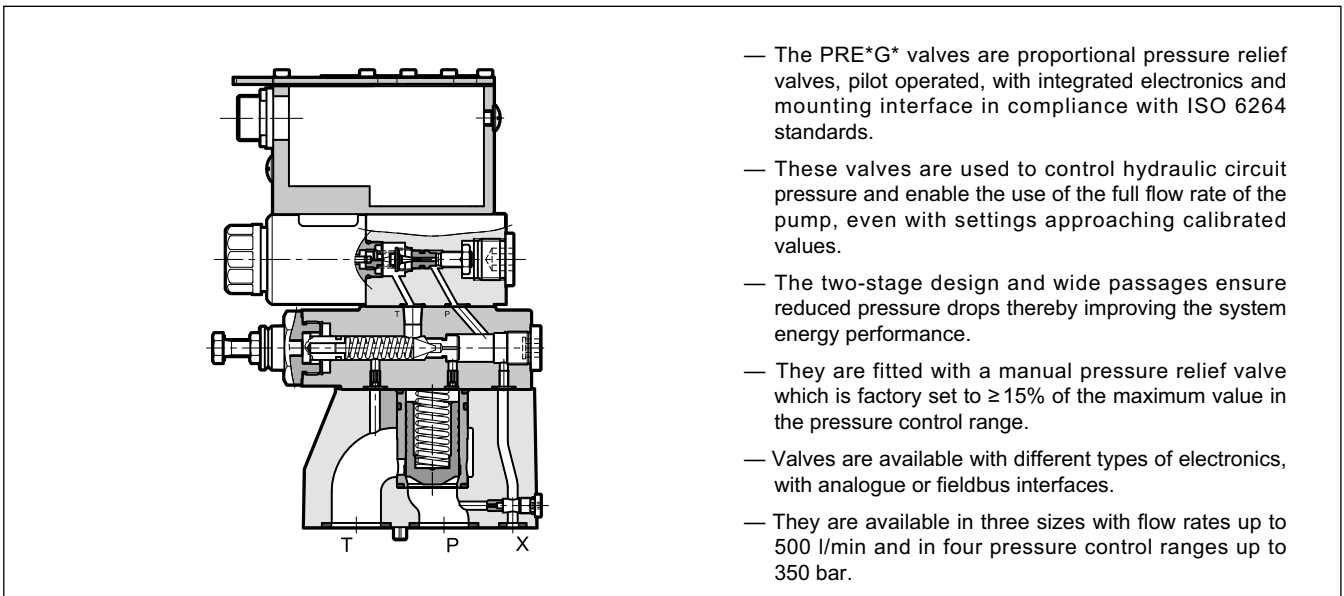
PRE*G*

PROPORTIONAL PRESSURE RELIEF VALVES, PILOT OPERATED, WITH INTEGRATED ELECTRONICS

**SUBPLATE MOUNTING
ISO 6264**

p max 350 bar
Q max (see table of performances)

OPERATING PRINCIPLE



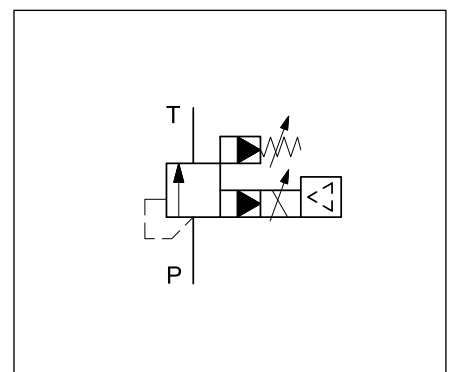
- The PRE*G* valves are proportional pressure relief valves, pilot operated, with integrated electronics and mounting interface in compliance with ISO 6264 standards.
- These valves are used to control hydraulic circuit pressure and enable the use of the full flow rate of the pump, even with settings approaching calibrated values.
- The two-stage design and wide passages ensure reduced pressure drops thereby improving the system energy performance.
- They are fitted with a manual pressure relief valve which is factory set to $\geq 15\%$ of the maximum value in the pressure control range.
- Valves are available with different types of electronics, with analogue or fieldbus interfaces.
- They are available in three sizes with flow rates up to 500 l/min and in four pressure control ranges up to 350 bar.
- The valves are easy to install. The driver directly manages digital settings.

PERFORMANCES

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

| | | PRE10G* | PRE25G* | PRE32G* |
|----------------------------|------------|---|---------|---------|
| Maximum operating pressure | bar | 350 | | |
| Maximum flow | l/min | 200 | 400 | 500 |
| Step response | | see paragraph 8 | | |
| Hysteresis | % of p nom | < 3% | | |
| Repeatability | % of p nom | < $\pm 1\%$ | | |
| Electrical characteristic | | see paragraph 3 | | |
| 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 | 5.5 | 6.3 | 8.5 |

HYDRAULIC SYMBOL



1 - IDENTIFICATION CODE

1.1 - Standard electronics

| | | | | | | | | |
|----------|----------|----------|----------|----------|-------------|----------|------------|--|
| P | R | E | G | - | / 32 | - | K11 | |
|----------|----------|----------|----------|----------|-------------|----------|------------|--|

Pilot operated pressure relief valve

Electro-proportional control

Size: _____
10 = ISO 6264-06
25 = ISO 6264-08
32 = ISO 6264-10

Standard electronics for pressure control in open loop

Pressure control range _____
070 = up to 70 bar **210** = up to 210 bar
140 = up to 140 bar **350** = up to 350 bar

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

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

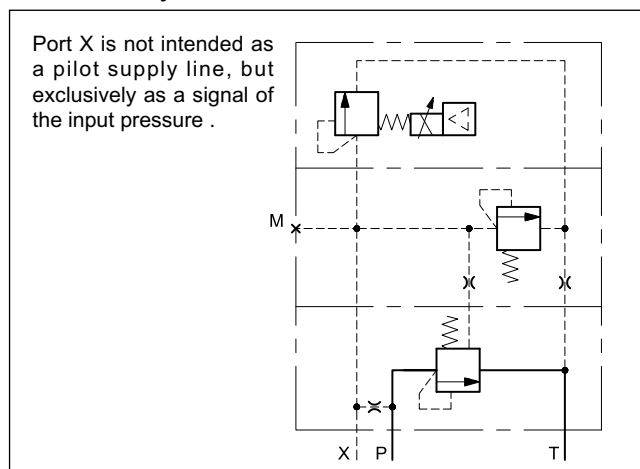
Pin C function:
A = external enable
B = internal enable
C = 0V monitor

Connection 6 pin + PE

Reference signal:
E0 = voltage 0 + 10V **E1** = current 4 + 20 mA

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

1.2 - Detailed symbol



NOTE: The standard valve is supplied with surface treatment of phosphating black on the valve body.

The zinc-nickel finishing makes the valve suitable to ensure a salt spray resistance up to 240 hours (test operated according to EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).

1.3 - Compact electronics

| | | | | | | | | |
|----------|----------|----------|-----------|----------|-------------|----------|------------|--|
| P | R | E | GL | - | / 10 | - | K12 | |
|----------|----------|----------|-----------|----------|-------------|----------|------------|--|

Pilot operated pressure relief valve

Electro-proportional control

Size: _____
10 = ISO 6264-06
25 = ISO 6264-08
32 = ISO 6264-10

Digital integrated electronics for open loop compact box

Pressure control range _____
070 = up to 70 bar **210** = up to 210 bar
140 = up to 140 bar **350** = up to 350 bar

Series No. _____
 (the overall and mounting dimensions remain unchanged from 10 to 19)

Option:
/ W7 = Zinc-nickel surface treatment (see **NOTE** par. 1.1)
 Omit if not required

Connection 5 pin M12

Interfaces:
E0 = analogue, voltage 0 + 10V
E1 = analogue, current 4 + 20 mA
IOL = IO-Link interface
CA = CAN Open

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

1.4 - Electronics with fieldbus communication

| | | | | | | | | | | | | | | | | | |
|----------|----------|----------|-----------|----------|----------|-----------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| P | R | E | GH | - | / | 32 | - | K16 | / | / | / | / | / | / | / | / | / |
|----------|----------|----------|-----------|----------|----------|-----------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|

Pilot operated pressure relief valve

Electro-proportional control

Size: _____
10 = ISO 6264-06
25 = ISO 6264-08
32 = ISO 6264-10

Digital integrated electronics for open loop with fieldbus communication

Pressure control range _____
070 = up to 70 bar **210** = up to 210 bar
140 = up to 140 bar **350** = up to 350 bar

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

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

Reference signal: _____
E0 = voltage 0 ÷ 10 V
E1 = current 4 ÷ 20 mA
FD = full digital version (on request)

Option:
/ W7 = Zinc-nickel surface treatment (see **NOTE** par. 1.1)
 Omit if not required

X4 Analogue transducer:
0 = none
1 = version 1 (single/double transducer)

X7 Digital transducer:
0 = none
1 = version 1 (SSI type)
2 = version 2 (Encoder type)

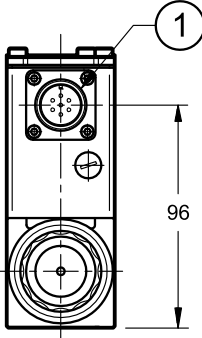
X2, X3 Fieldbus type:
CA = CAN Open
PD = PROFIBUS DP
EC = EtherCAT
EN = Ethernet /IP
PN = Profinet
PL = PowerLink

X1 Main connection configuration:
D1 = one command
D0 = full digital version (on request - available for reference signal FD type only)

Main connection 11 pin + PE

2 - COMPARISON AMONG INTEGRATED ELECTRONICS

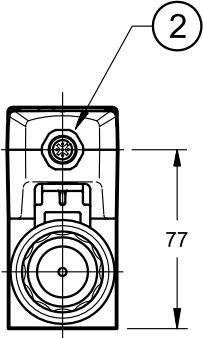
G type



1

96

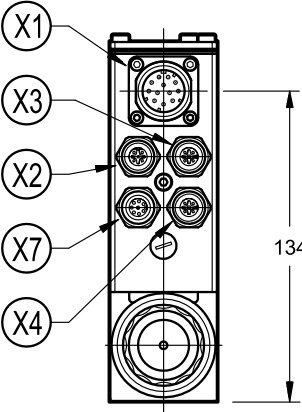
GL type



2

77

GH type



X1
X3
X2
X7
X4

134

dimensions in mm

| | |
|----|------------------------------------|
| 1 | Connection 6 pin + PE |
| 2 | Connection M12 5 pin, code A, male |
| X1 | Main connection 11 pin + PE |
| X2 | Fieldbus communication (IN) |
| X3 | Fieldbus communication (OUT) |
| X4 | Connection for analogue transducer |
| X7 | Connection for digital transducer |

NOTE 1: Depending on the chosen version, X4 and X7 connections may not be present. Please refer to sections 4, 5 and 6 for connections descriptions and pinouts.

NOTE 2: Related mating connectors have to be ordered separately. See catalogue 89 000.

3 - 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 |

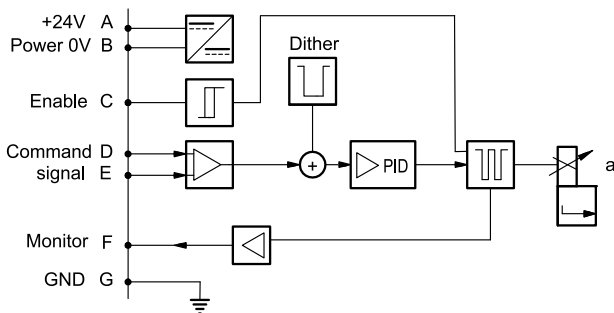
4 - PRE*G - STANDARD ELECTRONICS

4.1 - Electrical characteristics

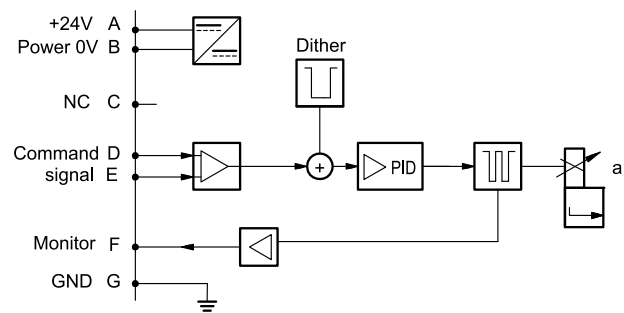
| | | | |
|---------------------------------------|------------------------------|------------|---|
| Command signal: | voltage (E0) current (E1) | V DC mA | 0 + 10 (Impedance Ri = 11 kOhm) 4 + 20 (Impedance Ri = 58 Ohm) |
| Monitor signal (current to solenoid): | voltage (E0) current (E1) | V DC mA | 0 + 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) |

4.2 - On-board electronics diagrams

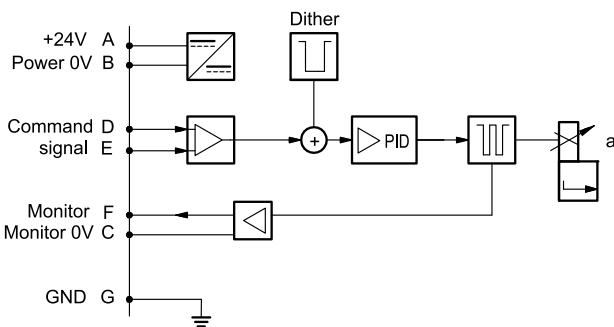
VERSION A - External Enable



VERSION B - Internal Enable

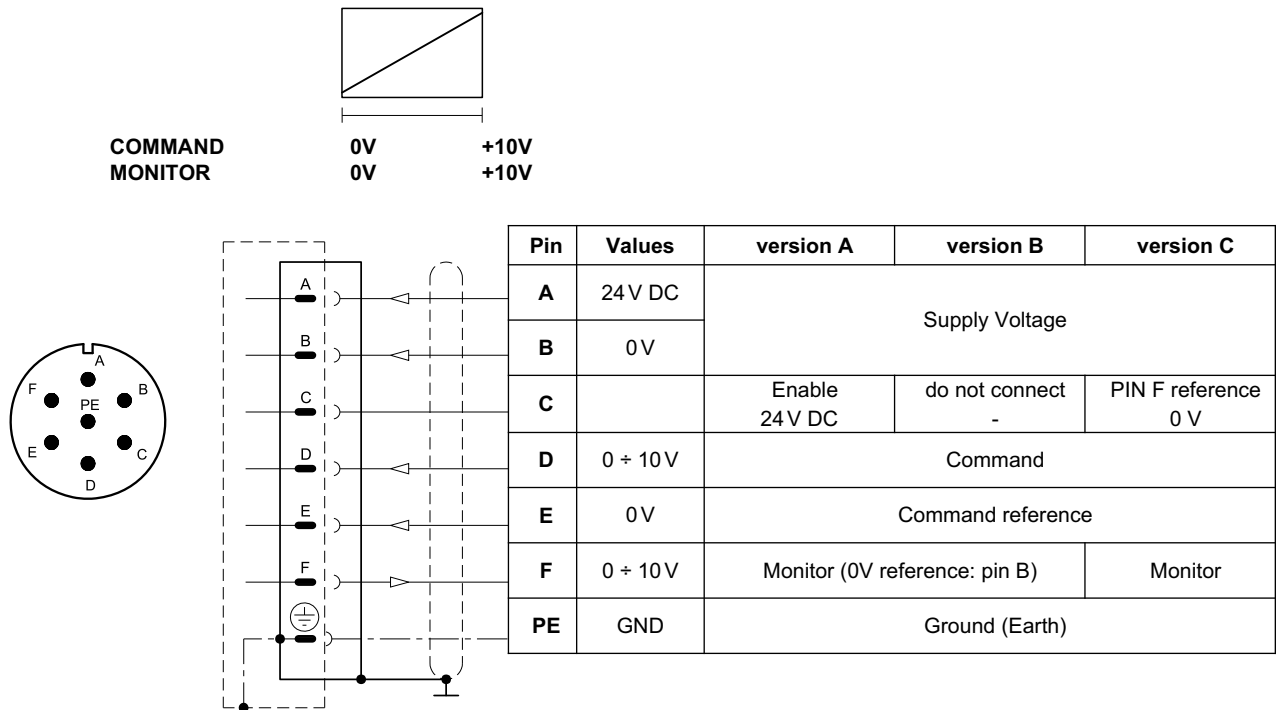


VERSION C - 0V Monitor



4.3 - Versions with voltage command (E0)

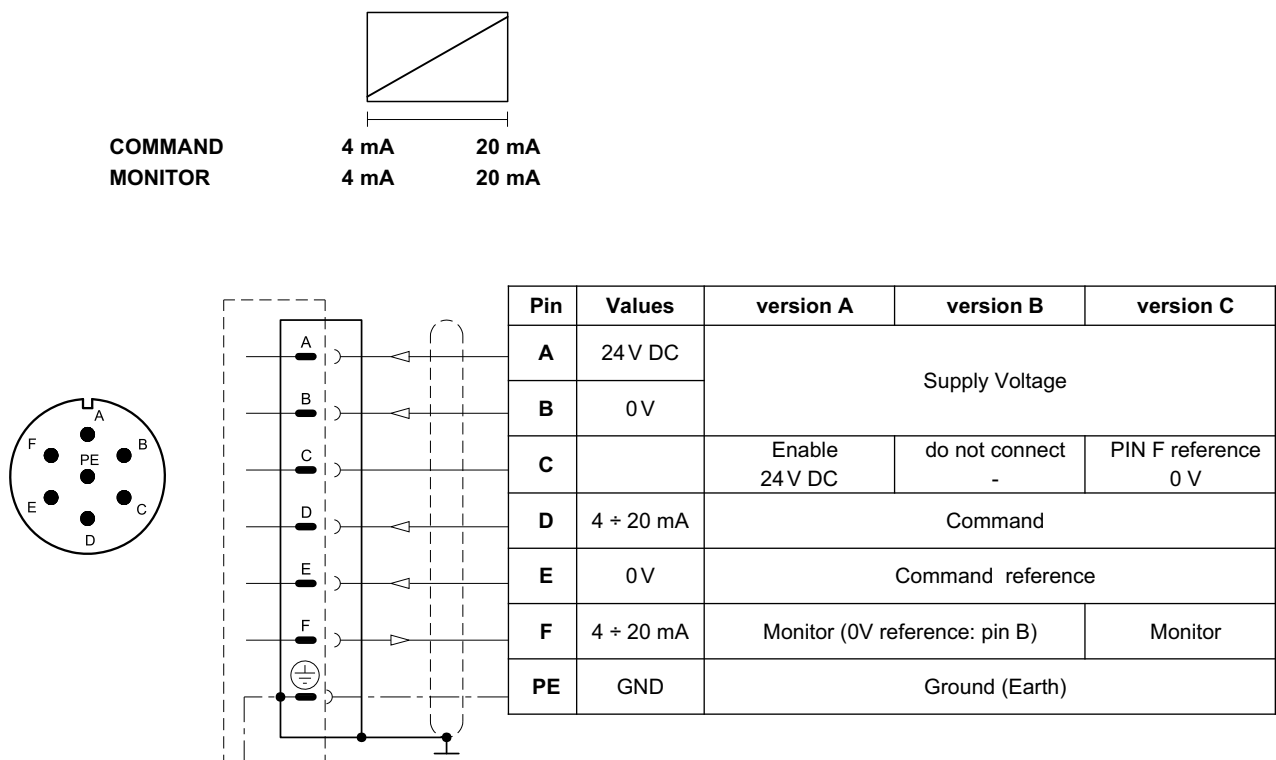
The reference signal is between 0 ÷ 10V. The monitor feature of versions B and C becomes available with a delay of 0,5 sec from the power-on of the card.



4.4 - Versions with current command (E1)

The reference signal is supplied in current 4 ÷ 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.



5 - PRE*GL - COMPACT ELECTRONICS

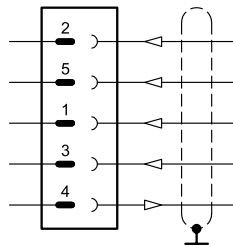
In versions 'IOL' and 'CA' pin 3 and pin 5 are galvanic isolated up to 100 V to avoid earth loops. In IO-Link networks, the length of the connecting cables is limited to 20 metres.

5.1 - 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) |

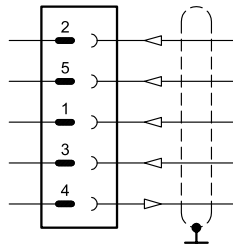
5.2 - Pin tables

'E0' connection



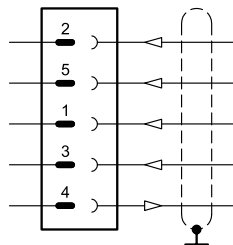
| Pin | Values | Function |
|-----|---------|-------------------------------------|
| 2 | 24 V DC | Supply voltage (solenoid and logic) |
| 5 | 0V | |
| 1 | 0 ÷ 10V | Command |
| 3 | 0V | Command reference |
| 4 | 0 ÷ 5V | Monitor (0V reference: pin 5) |

'E1' connection



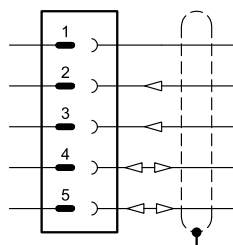
| Pin | Values | Function |
|-----|-----------|-------------------------------------|
| 2 | 24 V DC | Supply voltage (solenoid and logic) |
| 5 | 0V | |
| 1 | 4 ÷ 20 mA | Command |
| 3 | 0V | Command reference |
| 4 | 4 ÷ 20 mA | Monitor (0V reference: pin 5) |

'IOL' connection



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

'CA' connection



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

6 - PRE*GH - FIELDBUS ELECTRONICS

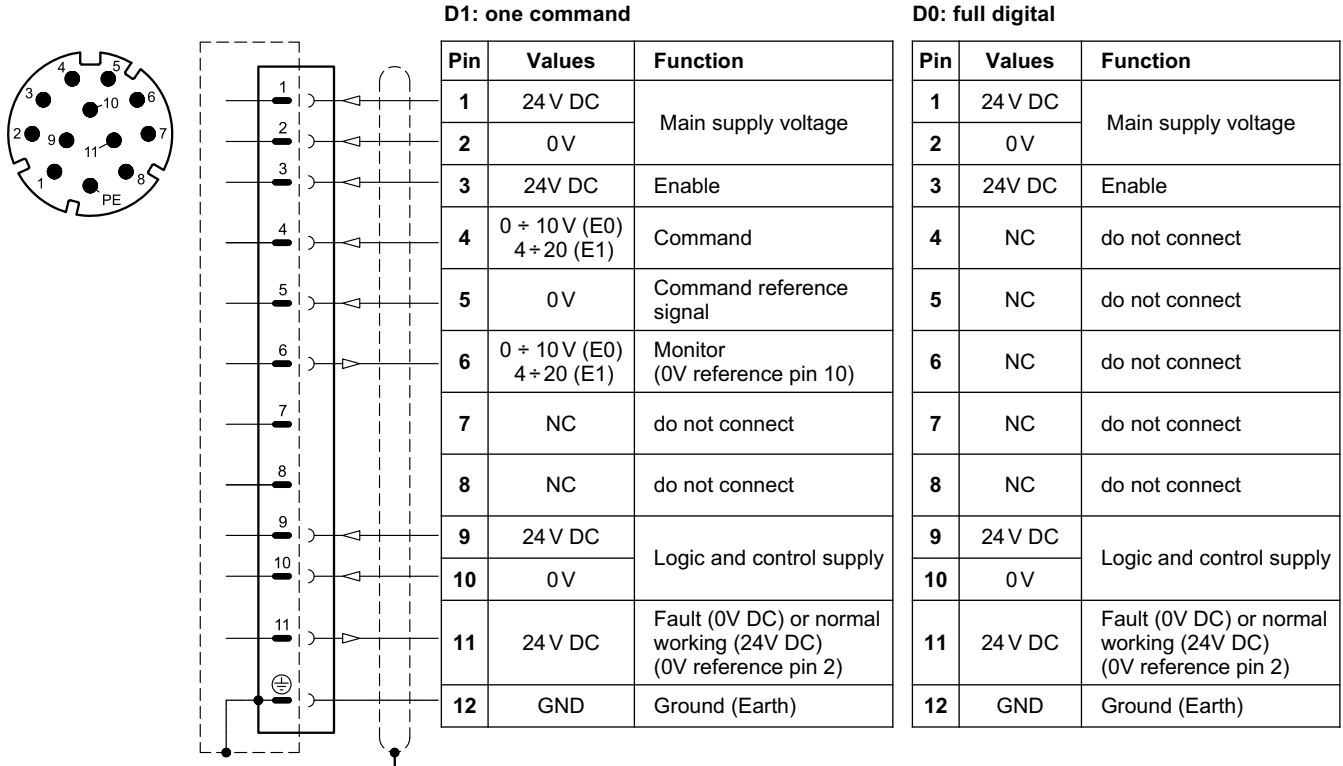
The 11+ PE pin connection allows separate supply voltage for electronics and solenoids.

Command - valve position schemes as for the standard electronics. Please refer to pictures in par. 4.3 and 4.4.

6.1 - 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) |

6.2 - X1 Main connection pin table



6.3 - FIELDBUS connections

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

6.3.1 - 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) |

6.3.2 - 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 | |

6.3.3 - 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

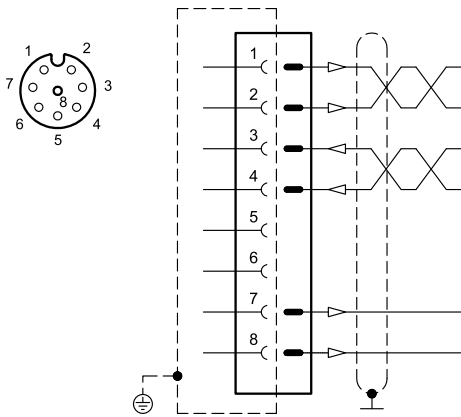


| Pin | Values | Function |
|---------|--------|-------------|
| 1 | TX+ | Transmitter |
| 2 | RX+ | Receiver |
| 3 | TX- | Transmitter |
| 4 | RX- | Receiver |
| HOUSING | shield | |

6.4 - Digital transducer connection

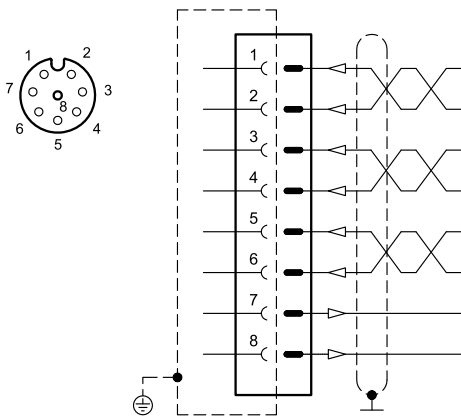
X7 connection: M12 A 8 pin female

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



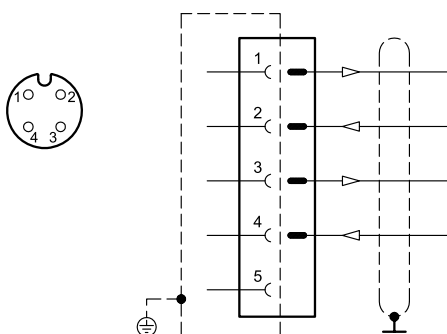
| Pin | Values | Function | Notes |
|-----|--------|-------------------------|------------------------|
| 1 | ENC_Z+ | input channel Z+ | Input - digital signal |
| 2 | ENC_Z- | input channel Z- | |
| 3 | ENC_A+ | input channel A+ | |
| 4 | ENC_A- | input channel A- | |
| 5 | ENC_B+ | input channel B+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

6.5 - Analogue transducer connection

X4 connection: M12 A 4 pin female

VERSION 1: single / double transducer

(single or double is a software-selectable option)



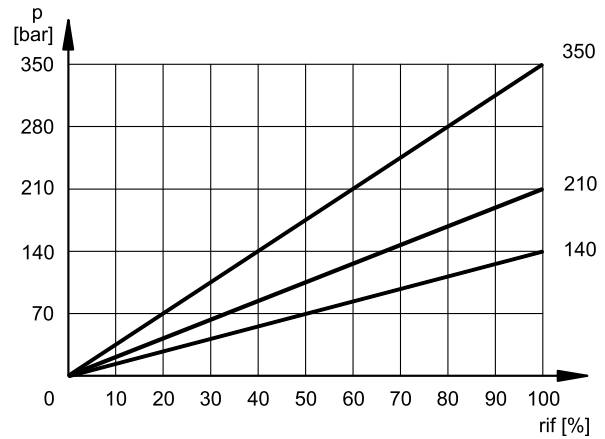
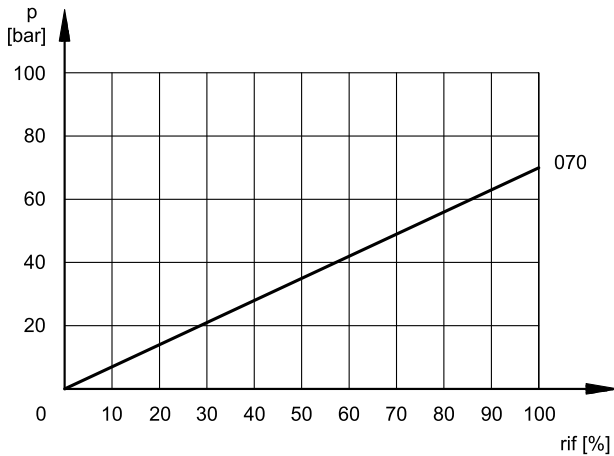
| Pin | Values | Notes |
|-----|-------------------|--|
| 1 | +24 V | Remote transducer power supply (out) 100 mA |
| 2 | ±10 V 4 ±20 mA | Input signal of transducer 1 (range software selectable) |
| 3 | 0V | Common reference signal for transducer power and signals |
| 4 | ±10 V 4 ±20 mA | Input signal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

7 - CHARACTERISTIC CURVES

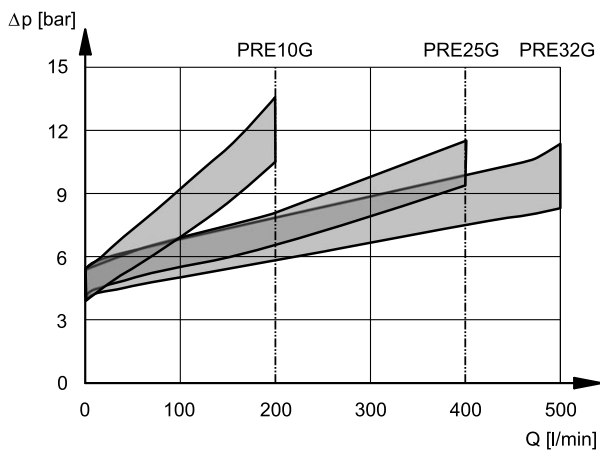
(obtained with mineral oil with viscosity of 36 cSt at 50°C)

Typical control characteristics, according to the reference signal for available pressure control ranges, measured with input flow rate $Q = 50$ l/min. Characteristic curves measured without backpressure in T, with linearity compensation set by the onboard electronics.

PRESSURE CONTROL $p = f(I)$

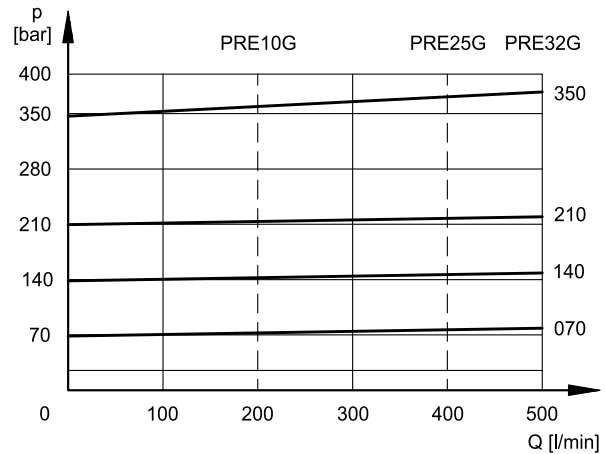


MINIMUM CONTROLLED PRESSURE $p_{min} = f(Q)$



minimum regulated pressure for pressure control ranges between 70 bar and 350 bar.

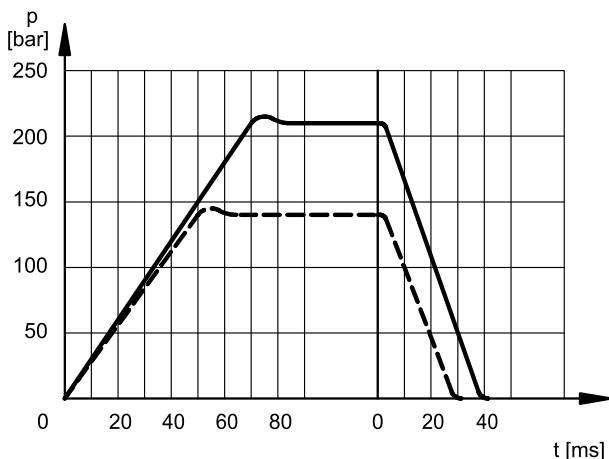
PRESSURE VARIATION $p_{max} = f(Q)$



8 - STEP RESPONSE

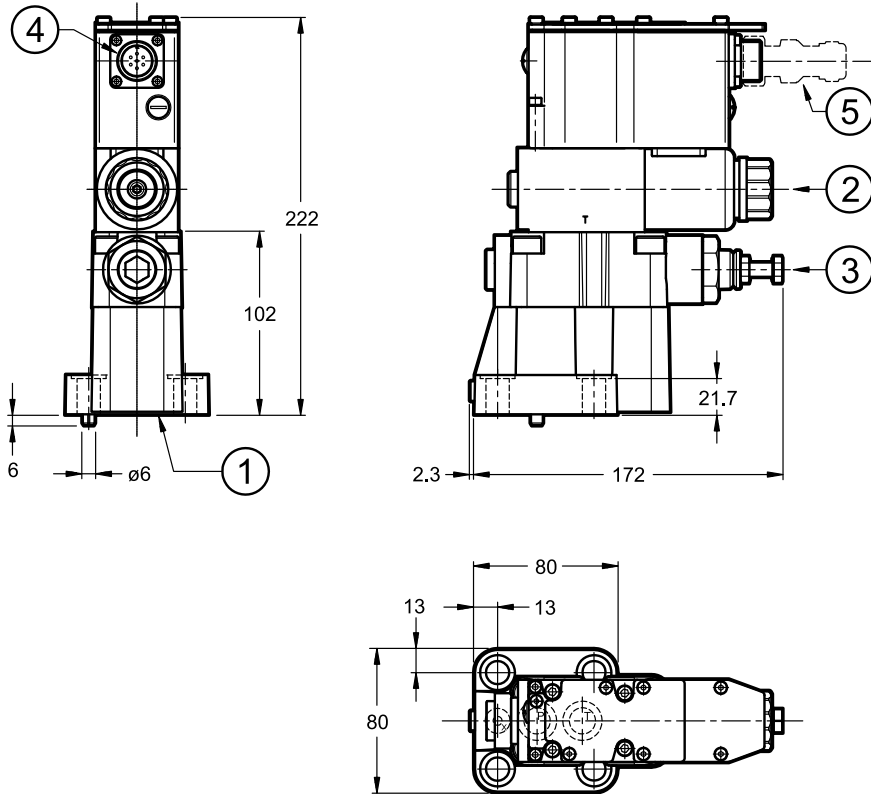
(obtained with mineral oil with viscosity of 36 cSt at 50°C)

Response times obtained with PRE*G-210 valves, with an input flow rate of 50 l/min and a pressure oil volume of 2 litres. The response time is affected both by the flow rate and the oil volume in the pipework.

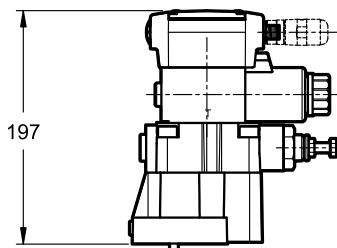


9 - OVERALL AND MOUNTING DIMENSIONS PRE10G*

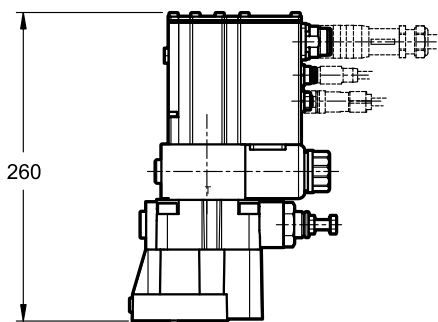
dimensions in mm



PRE10GL



PRE10GH



NOTE 1: 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.

NOTE 2: Mounting interface at par. 12.

| | |
|---|---|
| 1 | Mounting surface with sealing rings: 2 OR type 123 (17.86x2.62) - 90 Shore 1 OR type 109 (9.13x2.62) - 90 Shore |
| 2 | Breather: Allen key 4 |
| 3 | Factory-set pressure relief valve |
| 4 | Main connection 6 pin + PE |
| 5 | Mating connector To be ordered separately. See catalogue 89 000 |

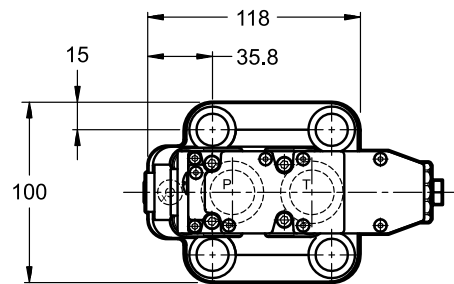
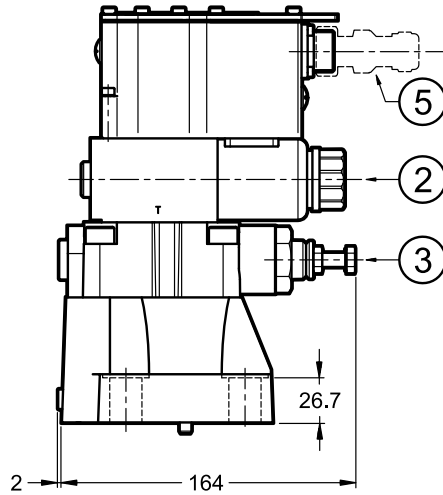
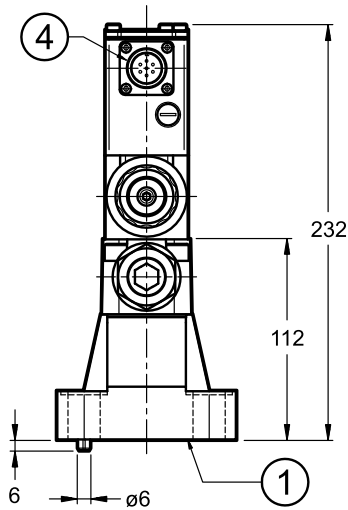
Valve fastening: 4 SHCS M12x40 - ISO 4762

Torque: 69 Nm (screws A8.8)

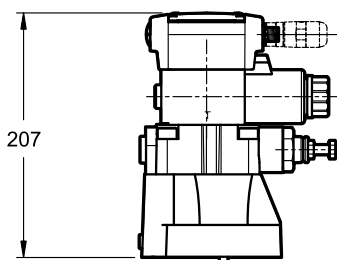
Thread of mounting holes: M12x20

10 - OVERALL AND MOUNTING DIMENSIONS PRE25G*

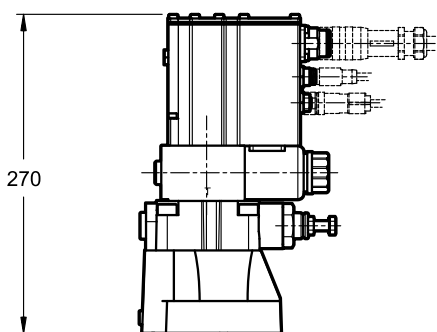
dimensions in mm



PRE25GL



PRE25GH



NOTE 1: 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.

NOTE 2: Mounting interface at par. 12.

| | |
|---|--|
| 1 | Mounting surface with sealing rings: 2 OR type 3118 (29.82x2.62) - 90 Shore 1 OR type 109 (9.13x2.62) - 90 Shore |
| 2 | Breather: Allen key 4 |
| 3 | Factory-set pressure relief valve |
| 4 | Main connection 6 pin + PE |
| 5 | Mating connector To be ordered separately. See catalogue 89 000 |

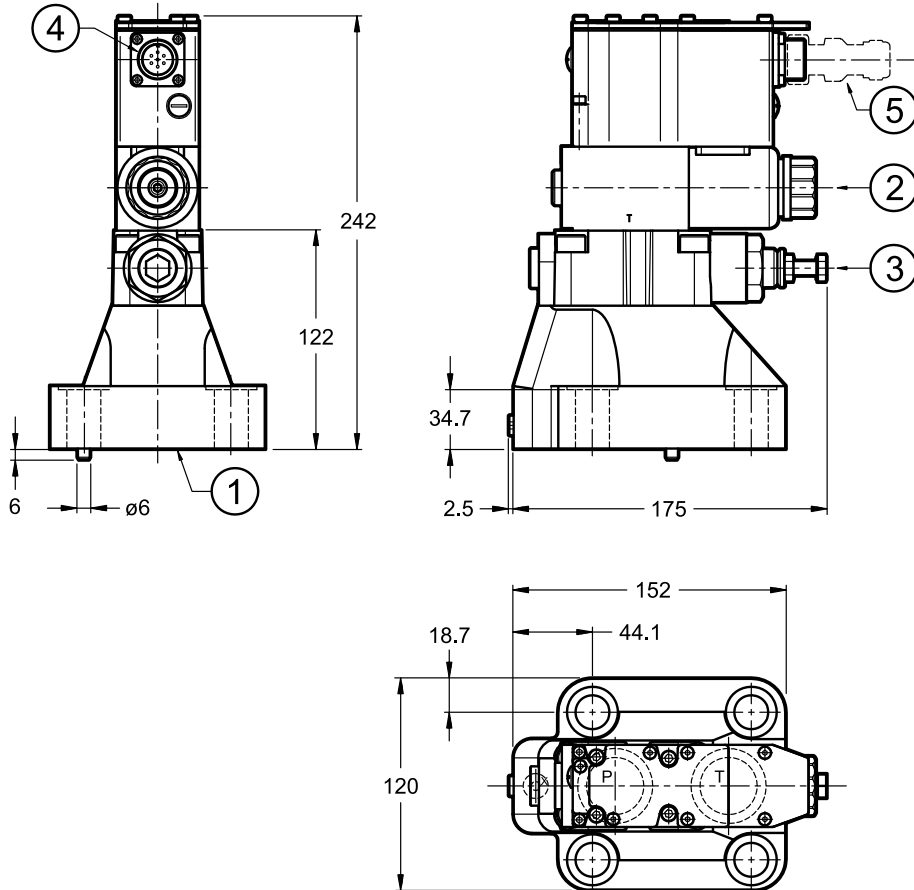
Valve fastening: 4 SHCS M16x60 - ISO 4762

Torque: 170 Nm (screws A8.8)

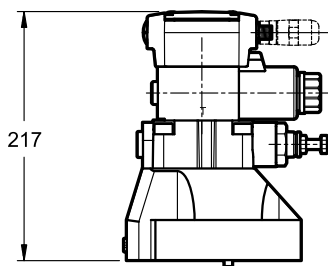
Thread of mounting holes: M16x25

11 - OVERALL AND MOUNTING DIMENSIONS PRE32G*

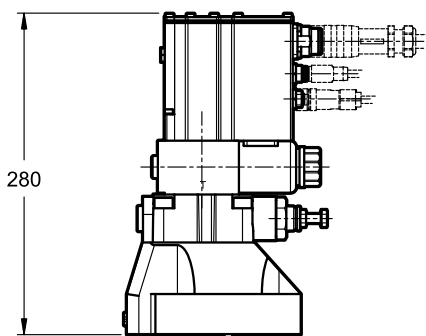
dimensions in mm



PRE32GL



PRE32GH



NOTE 1: 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.

NOTE 2: Mounting interface at par. 12.

| | |
|---|--|
| 1 | Mounting surface with sealing rings: 2 OR type 4137 (34.52x3.53) - 90 Shore 1 OR type 109 (9.13x2.62) - 90 Shore |
| 2 | Breather: Allen key 4 |
| 3 | Factory-set pressure relief valve |
| 4 | Main connection 6 pin + PE |
| 5 | Mating electrical connector To be ordered separately. See catalogue 89 000 |

Valve fastening: 4 SHCS M18x60 - ISO 4762

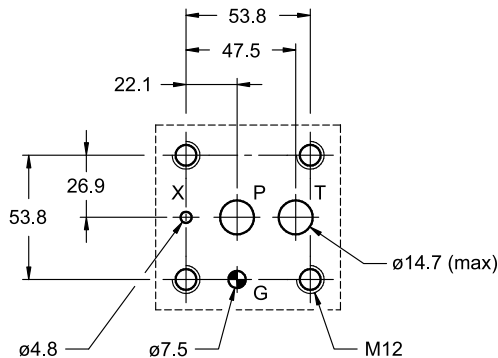
Torque: 235 Nm (screws A8.8)

Thread of mounting holes: M18x27

12 - MOUNTING INTERFACES

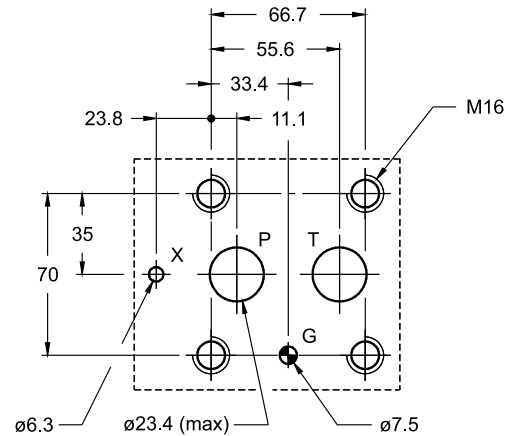
PRE10G*:

ISO 6264-06-09-*-97
(CETOP 4.4.2-2-R06-350)



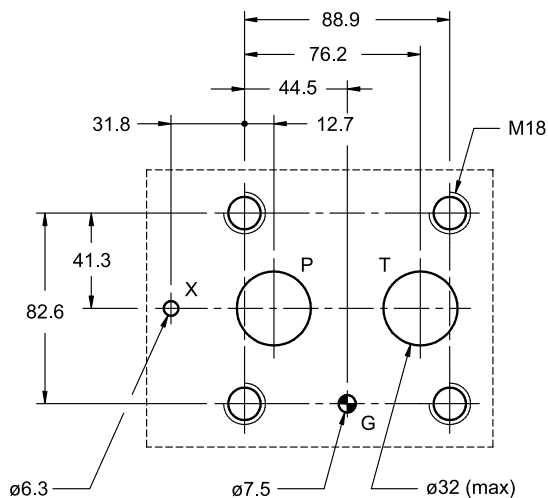
PRE25G*:

ISO 6264-08-13-*-97
(CETOP 4.4.2-2-R08-350)



PRE32G*:

ISO 6264-10-17-*-97
(CETOP 4.4.2-2-R10-350)



13 - 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.

14 - INSTALLATION

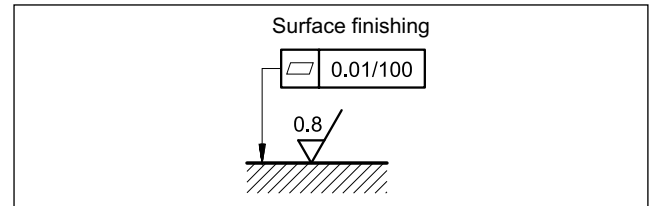
We recommend to install the valves either in horizontal position, or vertical position with the solenoid downward. If the valve is installed in vertical position and with the solenoid upward, you must consider possible variations of the minimum controlled pressure, if compared to what is indicated in paragraph 7.

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.

Ensure the solenoid tube is always filled with oil. At the end of the operation, make sure of having correctly replaced the drain screw. 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.



15 - ACCESSORIES

(to be ordered separately)

15.1 - 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.

15.2 - 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.

15.3 - 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 mm²
- up to 40 m cable length : 1,5 mm² (IO-Link excluded)

Cross section for signals (command, monitor):

- 0,50 mm²

15.4 - 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.

16 - SUBPLATES

(see catalogue 51 000)

| | PRE10G* | PRE25G* | PRE32G* |
|----------------------|----------------------------|-----------------------|-----------------------|
| Type | PMRQ3-AI4G rear ports | PMRQ5-AI5G rear ports | PMRQ7-AI7G rear ports |
| P, T port dimensions | P: 1/2" BSP T: 3/4" BSP | 1" BSP | 1" 1/4 BSP |
| X port dimensions | 1/4" BSP | 1/4" BSP | 1/4" BSP |