Ex-proof digital proportional pressure cartridges high performance with on-board driver and pressure transducer - ATEX and IECEx

LICZA-RES, LIMZA-RES, LIRZA-RES
2-way ex-proof digital proportional pressure cartridges, high performance with pressure transducer, respectively performing: pressure compensator, relief or reducing functions.

They are equipped with ex-proof on-board digital driver, pressure transducer and proportional solenoid certified for safe operations in hazardous environments with potentially explosive atmosphere.

- Multicertification ATEX and IECEx for gas group II 2G and dust category II 2D

The flameproof enclosure of on-board digital driver, solenoid and transducer, prevents the propagation of accidental internal sparks or fire to the external environment.

The driver and solenoid are also designed to limit the surface temperature within the classified limits.

Size: 16 = 80 ISO7368
Max flow: up to 4500 l/min
Max pressure: 250 bar

1 MODEL CODE FOR COVERS

<table>
<thead>
<tr>
<th>LICZA-RES-P-BC-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

**Ex-proof proportional pressure cartridges**

LICZA = pressure compensator
LIMZA = pressure relief
LIRZA = pressure reducing

**RES** = on-board driver

**P** = on-board ex-proof pressure transducer

Fieldbus interfaces, USB port always present:
NP = Not present
BC = CANopen
BP = PROFIBUS DP
EH = EtherCAT

Valve size ISO 7368:
1 = 16
2 = 25
3 = 32
4 = 40
5 = 50 (not for LIRZA)
6 = 63 (only for LIMZA)
8 = 80, (only for LIMZA)

**Seals material, see section [1]:**
- = NBR
PE = FKM
BT = HNBR

**Series number**

**Dynamic response preset, see section [1]:**
- = omit for PID 1 fast (default)
2 = PID 2 standard
3 = PID 3 smooth

**Hydraulic options (1):**
P = with integral mechanical pressure limiter (standard for size 1, 2, 3)

**Electronics options (1):**
I = current reference input and monitor
4 ÷ 20 mA (omit for std voltage 0 ÷ 10 VDC)

Cable entrance threaded connection:
M = M20x1.5

Max regulated pressure:
80 = 80 bar
160 = 160 bar
250 = 250 bar

(1) Possible combined options: /IP
### 2 HYDRAULICS SYMBOLS

#### LICZA
- LICZA-RES-1÷3
- LICZA-RES-4÷5 /P

#### LIMZA
- LIMZA-RES-1÷3
- LIMZA-RES-4÷8 /P

#### LIRZA
- LIRZA-RES-1÷3
- LIRZA-RES-4 /P

### 3 MODEL CODE OF CARTRIDGES

<table>
<thead>
<tr>
<th>SC</th>
<th>LI</th>
<th>32</th>
<th>31</th>
<th>2</th>
<th>**</th>
<th>/</th>
<th>*</th>
</tr>
</thead>
</table>

Cartridge according to ISO 7368

Cartridges size ISO 7368:
- 16
- 25
- 32
- 40
- 50
- 63
- 80

Type of poppet:
- 31 = for LIMZA and LICZA
- 36 = for LICZA
- 37 = for LIRZA

Seals material, see section:
- - = NBR
- PE = FKM
- BT = HNBR

Series number

Spring cracking pressure:
- 2 = 1.5 bar for poppet 31
- 3 = 3 bar
- 4 = 4 bar
- 6 = 6 bar for poppet 31 and 36
- 7 = 7 bar for poppet 37

### 4 TYPE OF POPPET

<table>
<thead>
<tr>
<th>Type of poppet</th>
<th>31</th>
<th>36</th>
<th>37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional sketch (Hydraulic symbol)</td>
<td>![Functional sketch 31]</td>
<td>![Functional sketch 36]</td>
<td>![Functional sketch 37]</td>
</tr>
<tr>
<td>Typical section</td>
<td>![Typical section 31]</td>
<td>![Typical section 36]</td>
<td>![Typical section 37]</td>
</tr>
<tr>
<td>Area ratio A: $A_p$</td>
<td>1:1</td>
<td>1:1</td>
<td>1:1</td>
</tr>
</tbody>
</table>
Atos digital proportionals valves are CE marked according to the applicable directives (e.g. Immunity and Emission EMC Directive). Installation, wirings and start-up procedures must be performed according to the general prescriptions shown in tech table FX900 and in the user manuals included in the E-SW-* programming software.

### GENERAL NOTES

#### WARNING: the below operation must be performed in a safety area

Valve's functional parameters and configurations can be easily set and optimized using Atos E-SW programming software connected via USB port to the digital driver (see table GS003). For fieldbus versions, the software permits valve’s parameterization through USB port also if the driver is connected to the central machine unit via fieldbus.

The software is available in different versions according to the driver's options (see table GS003):

- **E-SW-BASIC** support: NP (USB), PS (Serial), IR (Infrared)
- **E-SW-FIELDBUS** support: BC (CANopen), BP (PROFIBUS DP), EH (EtherCAT), EW (POWERLINK), EI (EtherNet/IP), EP (PROFINET IRT)
- **E-SW-*PQ** support: valves with SP, SF, SL alternated control (e.g. E-SW-BASIC/PQ)

#### WARNING: drivers USB port is not isolated! For E-C-SB-USB/M12 cable, the use of isolator adapter is highly recommended for PC protection

#### WARNING: see tech table GS500 for the list of countries where the Bluetooth adapter has been approved

### GENERAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Assembly position</th>
<th>Any position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subplate surface finishing to ISO 4401</td>
<td>Acceptable roughness index, Ra ≤ 0.8 recommended Ra 0.4 - flatness ratio 0.01/100</td>
</tr>
<tr>
<td>MTTFd valves according to EN ISO 13849</td>
<td>75 years, see technical table P007</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td>Standard = -20°C ÷ +60°C, PE option = -20°C ÷ +60°C, BT option = -40°C ÷ +60°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>Standard = -20°C ÷ +70°C, PE option = -20°C ÷ +70°C, BT option = -40°C ÷ +70°C</td>
</tr>
<tr>
<td>Surface protection</td>
<td>Zinc coating with black passivation - salt spray test (EN ISO 9227) &gt; 200 h</td>
</tr>
<tr>
<td>Compliance</td>
<td>Explosion proof protection, see section 12 - Flame proof enclosure “Ex d” - Dust ignition protection by enclosure “Ex t” RoHs Directive 2011/65/EU as last update by 2015/65/EU REACH Regulation (EC) n°1907/2006</td>
</tr>
</tbody>
</table>

### HYDRAULIC CHARACTERISTICS - based on mineral oil ISO VG 46 at 50 °C

<table>
<thead>
<tr>
<th>Valve model</th>
<th>LICZA</th>
<th>LICZA</th>
<th>LICZA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve size (l/min)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Max flow [bar]</td>
<td>200</td>
<td>400</td>
<td>750</td>
</tr>
<tr>
<td>Min regulated pressure</td>
<td>see section 27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max regulated pres. at port A [bar]</td>
<td>80, 180, 250</td>
<td>80, 180, 250</td>
<td>80, 180, 250</td>
</tr>
<tr>
<td>Max pressure [bar]</td>
<td>Ports: P, A, B, X = 350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time 0-100% step signal (1) (depending on installation) [ms]</td>
<td>≤ 100 ÷ 350</td>
<td>≤ 100 ÷ 350</td>
<td>≤ 100 ÷ 250</td>
</tr>
<tr>
<td>Hysteresis [% of regulated max pres.]</td>
<td>≤ 0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity [% of regulated max pres.]</td>
<td>≤ 1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability [% of regulated max pres.]</td>
<td>≤ 0.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WARNING:** the below operation must be performed in a safety area

USB or Bluetooth connection

**Warning:** fieldsbus version allow the valves through fieldbus or analog signals available on the terminal board.
10 ELECTRICAL CHARACTERISTICS

Power supplies
Nominal: +24 VDC
Rectified and filtered: VIN = 20 – 32 VMAX (ripple max 10 % VRMS)
Max power consumption: 35 W

Analog input signals
Voltage: range ±10 VDC (24 VMAX tolerant)
Input impedance: Ri = 50 kΩ
Current: range ±20 mA
Input impedance: Ri = 500 Ω

Insulation class
H (180°C). Due to the occurring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account

Monitor outputs
Voltage: range 0 – 10 VDC max 5 mA
Current: range 0 – 20 mA @ max 500 Ω load resistance

Enable input
Range: 0 – 9 VDC (OFF state), 15 – 24 VDC (ON state), 9 – 15 VDC (not accepted)
Input impedance: Ri = 87 kΩ

Fault output
Output range: 0 – 24 VDC (VN state = VL+ [logic power supply]; OFF state = 0 V) @ max 50 mA, external negative voltage not allowed (e.g. due to inductive loads)

Pressure transducer power supply
+24VDC @ max 100 mA (E-ATRA-7 see tech table GX800)

Alarms
Solenoid not connected/short circuit, cable break with current reference signal, over/under temperature, valve spool transducer malfunctions

Protection degree to DIN EN60529
IP66/67 with relevant cable gland

Duty factor
Continuous rating (ED=100%)

Tropicalization
Tropical coating on electronics PCB

Additional characteristics
Short circuit protection of solenoid current supply; current control by P.I.D. with rapid solenoid switching; protection against reverse polarity of power supply

Electromagnetic compatibility (EMC)
According to Directive 2014/30/UE (Immunity: EN 61000-6-2; Emission: EN 61000-6-3)

Communication interface
USB
Atos ASCII coding
CANopen
PROFIBUS DP
EtherCAT

Communication physical layer
not insulated
USB 2.0 + USB OTG
optical insulated
optical insulated
optical insulated
RS485

Communication physical layer
not insulated
USB 2.0 + USB OTG
optical insulated
optical insulated
optical insulated
RS485

Note: a maximum time of 500 ms (depending on communication type) have be considered between the driver energizing with the 24 Vdc power supply and when the valve is ready to operate. During this time the current to the valve coils is switched to zero

11 SEALS AND HYDRAULIC FLUIDS
- for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature
NBR seals (standard) = -20°C + 60°C, with HFC hydraulic fluids = -20°C +50°C
FKM seals (PE option) = -20°C + 80°C
HNBR seals (BT option) = -40°C + 60°C, with HFC hydraulic fluids = -40°C + 50°C

Recommended viscosity
20 ÷ 100 mm²/s - max allowed range 15 ÷ 500 mm²/s

Hydraulic fluid
Suitable seals type
Classification
Ref. Standard

Mineral oils
NBR, FKM, HNBR
HL, HLP, HLPD, HVLP, HVLPD
DIN 51524

Flame resistant without water
FKM
HFDU, HFDR
ISO 12922

Flame resistant with water (1)
NBR, HNBR
HFC

The ignition temperature of the hydraulic fluid must be 50°C higher than the max solenoid surface temperature

(1) Performance limitations in case of flame resistant fluids with water:
- max operating pressure = 210 bar
- max fluid temperature = 50°C

12 CERTIFICATION DATA

Valve type
LICZA, LIMZA, LIRZA

Certifications
Multicertification Group II
ATEX IECEx

Solenoid certified code
OZA-RES

Type examination certificate (1)
- ATEX: TUV IT 18 ATEX 068 X
- IECEx: IECEx TPS 19.0004X

Method of protection
- ATEX 2014/34/EU Ex II 2G Ex db IIC T6/T5/T4 Gb
Ex II 2D Ex tb IIIC T85°C/T100°C/T135°C Db
- IECEx Ex db IIC T6/T5/T4 Gb
Ex tb IIIC T85°C/T100°C/T135°C Db

Temperature class
T6
Surface temperature ≤ 85 °C
Ambient temperature (2) -40 ÷ +40 °C

T5
Surface temperature ≤ 100 °C
Ambient temperature (2) -40 ÷ +55 °C

T4
Surface temperature ≤ 135 °C
Ambient temperature (2) -40 ÷ +70 °C

Applicable Standards
EN 60079-0: 2012+A11:2013
EN 60079-31:2014
IEC 60079-0:2017
IEC 60079-1:2014
IEC 60079-31:2013

Cable entrance: threaded connection
M = M20x1.5

(1) The type examiner certificates can be downloaded from www.atos.com
(2) The driver and solenoids are certified for minimum ambient temperature -40°C.

WARNING: service work performed on the valve by the end users or not qualified personnel invalidates the certification
13 Dynamic Response

The valve is provided with 4 PIDs configurations to match different hydraulic conditions. The required PID configuration can be selected before the valve commissioning, through Atos E-SW software via USB port. Only for RES the PID can be also selected in real time, through PLC via fieldbus.

<table>
<thead>
<tr>
<th>PID</th>
<th>Dynamic response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fast - default (1)</td>
</tr>
<tr>
<td>2</td>
<td>Standard</td>
</tr>
<tr>
<td>3</td>
<td>Smooth</td>
</tr>
<tr>
<td>4</td>
<td>Open Loop</td>
</tr>
</tbody>
</table>

(1) interchangeable with previous TERS version

14 Pressure Transducer Failure

In case of pressure transducer failure, the valve’s reaction can be configured through Atos E-SW software to:
- cut off the current to solenoid, therefore the regulated pressure will be reduced to minimum value (default setting)
- automatically switch the pressure control from closed loop (PID1,2,3) to open loop (PID4), to let the valve to temporarily operate with reduced regulation accuracy

15 Hydraulic Options

P = Integral mechanical pressure limiter (standard for size 1, 2 and 3)

The LICZA, LIMZA and LIRZA standard size 1, 2, 3 and option /P are provided with mechanical pressure limiter acting as protection against overpressure. For safety reasons the factory setting of the mechanical pressure limiter is fully unloaded (min pressure).

At the first commissioning it must be set at a value lightly higher than the max pressure regulated with the proportional control.

For the pressure setting of the mechanical pressure limiter, proceed according to following steps:
- apply the max reference input signal to the valve’s driver. The system pressure will not increase until the mechanical pressure limiter remains unloaded.
- turn clockwise the adjustment screw until the system pressure will increase up to a stable value corresponding to the pressure setpoint at max reference input signal.
- turn clockwise the adjustment screw of additional 1 or 2 turns to ensure that the mechanical pressure limiter remains closed during the proportional valve working.

16 Electronic Options

I = It provides 4 ÷ 20 mA current reference signal, instead of the standard 0 ÷ 10 Vdc. Input signal can be reconfigured via software selecting between voltage and current, within a maximum range of ±10 Vdc or ±20 mA. It is normally used in case of long distance between the machine control unit and the valve or where the reference signal can be affected by electrical noise; the valve functioning is disabled in case of reference signal cable breakage.

17 Possible Combined Options

/I/P

18 Cables Specification and Temperature

Power supply and signals: section of wire = 1.0 mm²

Grounding: section of external ground wire = 4 mm²

13.1 Cable temperature

The cable must be suitable for the working temperature as specified in the “safety instructions” delivered with the first supply of the products.

<table>
<thead>
<tr>
<th>Max ambient temperature [°C]</th>
<th>Temperature class</th>
<th>Max surface temperature [°C]</th>
<th>Min. cable temperature [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 °C</td>
<td>T6</td>
<td>85 °C</td>
<td>80 °C</td>
</tr>
<tr>
<td>55 °C</td>
<td>T5</td>
<td>100 °C</td>
<td>90 °C</td>
</tr>
<tr>
<td>70 °C</td>
<td>T4</td>
<td>135 °C</td>
<td>110 °C</td>
</tr>
</tbody>
</table>

19 Cable Glands

Cable glands with threaded connections M20x1,5 for standard or armoured cables have to be ordered separately, see tech table KX600

Note: a Loctite sealant type 545, should be used on the cable gland entry threads.
1 Regulation diagrams LIMZA
2 Regulation diagrams LICZA

3 Pressure/flow diagrams LICZA, LIMZA

4-14 Min. pressure/flow diagrams
with zero reference signal
4 = LIMZA-*-1 11 = LICZA-*-1
5 = LIMZA-*-2 12 = LICZA-*-2
6 = LIMZA-*-3 13 = LICZA-*-3
7 = LIMZA-*-4 14 = LICZA-*-4
8 = LIMZA-*-5 15 = LICZA-*-5
9 = LIMZA-*-6 10 = LIMZA-*-8

Regulation diagrams LIRZA
15 = LIRZA-A

16-19 Min. pressure/flow diagrams
with reference signal “null”
16 = LIRZA-*-1 17 = LIRZA-*-2
18 = LIRZA-*-3 19 = LIRZA-*-4

Pressure/flow diagrams
20 = LIRZA-A
21 POWER SUPPLY AND SIGNALS SPECIFICATIONS

Generic electrical output signals of the valve (e.g. fault or monitor signals) must not be directly used to activate safety functions, like to switch-ON/OFF the machine’s safety components, as prescribed by the European standards (Safety requirements of fluid technology systems and components-hydraulics, EN-982).

21.1 Power supply (V+ and V0)

The power supply must be appropriately stabilized or rectified and filtered: apply at least a 10000 μF/40 V capacitance to single phase rectifiers or a 4700 μF/40 V capacitance to three phase rectifiers.

A safety fuse is required in series to each power supply: 2.5 A time lag fuse.

21.2 Power supply for driver’s logic and communication (VL+ and VL0)

The power supply for driver’s logic and communication must be appropriately stabilized or rectified and filtered: apply at least a 10000 μF/40 V capacitance to single phase rectifiers or a 4700 μF/40 V capacitance to three phase rectifiers.

The separate power supply for driver’s logic on pin 3 and 4, allow to remove solenoid power supply from pin 1 and 2 maintaining active the diagnostics, USB and fieldbus communications.

A safety fuse is required in series to each driver’s logic and communication power supply: 500 mA fast fuse.

21.3 Pressure reference input signal (P_INPUT+)

The driver controls in closed loop the current to the valve pressure proportionally to the external reference input signal.

Reference input signal is factory preset according to selected valve code, defaults are 0 ÷ 10 Vcc for standard and 4 ÷ 20 mA for \(/I\) option.

Input signal can be reconfigured via software selecting between voltage and current, within a maximum range of ±10 Vcc or ± 20 mA.

Drivers with fieldbus interface can be software set to receive reference signal directly by the machine control unit (fieldbus reference).

Analog reference input signal can be used as on-off commands with input range 0 ÷ 24Vcc.

21.4 Pressure monitor output signal (P_MONITOR)

The driver generates an analog output signal proportional to the actual pressure of the valve; the monitor output signal can be software set to show other signals available in the driver (e.g. analog reference, fieldbus reference).

Monitor output signal is factory preset according to selected valve code, defaults settings are 0 ÷10 Vcc for standard and 4 ÷ 20 mA for \(/I\) option.

Output signal can be reconfigured via software selecting between voltage and current, within a maximum range of 0 ÷10 Vcc or 0 ÷ 20 mA.

21.5 Enable input signal (ENABLE)

To enable the driver, supply a 24 Vcc on pin 6: Enable input signal allows to enable/disable the current supply to the solenoid, without removing the electrical power supply to the driver; it is used to active the communication and the other driver functions when the valve must be disabled for safety reasons. This condition does not comply with norms IEC 61508 and ISO 13849.

Enable input signal can be used as generic digital input by software selection.

21.6 Fault output signal (FAULT)

Fault output signal indicates fault conditions of the driver (solenoid short circuits/not connected, reference signal cable broken for 4 ÷ 20 mA input, spool position transducer cable broken, etc.). Fault presence corresponds to 0 Vcc, normal working corresponds to 24 Vcc.

Fault status is not affected by the Enable input signal. Fault output signal can be used as digital output by software selection.

22 TERMINAL BOARD OVERVIEW

(1) For BC and BP executions the fieldbus connections have an internal pass-through connection
### 23.1 Main connections signals

<table>
<thead>
<tr>
<th>CABLE ENTRANCE</th>
<th>PIN</th>
<th>SIGNAL</th>
<th>TECHNICAL SPECIFICATIONS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>V0</td>
<td>Power supply 0 Vcc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>V+</td>
<td>Power supply 24 Vcc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>VLD</td>
<td>Power supply 0 Vcc for driver’s logic and communication</td>
<td>Gnd - power supply</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>VL+</td>
<td>Power supply 24 Vcc for driver’s logic and communication</td>
<td>Gnd - power supply</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>FAULT</td>
<td>Fault (0 Vcc) or normal working (24 Vcc), referred to VLD</td>
<td>Output - on/off signal</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>ENABLE</td>
<td>Enable (24 Vcc) or disable (0 Vcc) the driver, referred to VLD</td>
<td>Input - on/off signal</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>AGND</td>
<td>Analog ground</td>
<td>Gnd - analog signal</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>INPUT-</td>
<td>Negative pressure reference input signal for INPUT+</td>
<td>Input - on/off signal</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>P_MONITOR</td>
<td>Pressure monitor output signal: 0 – 10 Vcc / 0 – 20 mA maximum range, referred to AGND</td>
<td>Output - analog signal</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>P_INPUT+</td>
<td>Pressure reference input signal: ± 10 Vcc / ± 20 mA maximum range</td>
<td>Input - analog signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Defaults are: 0 – 10 Vcc for standard and 4 – 20 mA for /l option</td>
<td>Software selectable</td>
</tr>
</tbody>
</table>

### 23.2 USB connector - M12 - 5 pin

<table>
<thead>
<tr>
<th>CABLE ENTRANCE</th>
<th>PIN</th>
<th>SIGNAL</th>
<th>TECHNICAL SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>1</td>
<td>+5V_USB</td>
<td>Power supply</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>ID</td>
<td>Identification</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>GND_USB</td>
<td>Signal zero data line</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>D-</td>
<td>Data line -</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>D+</td>
<td>Data line +</td>
</tr>
</tbody>
</table>

### 23.3 BC fieldbus execution connections

<table>
<thead>
<tr>
<th>CABLE ENTRANCE</th>
<th>PIN</th>
<th>SIGNAL</th>
<th>TECHNICAL SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>14</td>
<td>CAN_L</td>
<td>Bus line (low)</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>CAN_SHLD</td>
<td>Shield</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>CAN_GND</td>
<td>Signal zero data line</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>CAN_H</td>
<td>Bus line (high)</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>not used</td>
<td>Pass-through connection (1)</td>
</tr>
</tbody>
</table>

(1) pin 19 and 22 can be fed with external +5V supply of CAN interface

### 23.4 BP fieldbus execution connections

<table>
<thead>
<tr>
<th>CABLE ENTRANCE</th>
<th>PIN</th>
<th>SIGNAL</th>
<th>TECHNICAL SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>14</td>
<td>SHIELD</td>
<td>Bus line (low)</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>+5V</td>
<td>Power supply</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>DGND</td>
<td>Data line and termination signal zero</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>LINE_B</td>
<td>Bus line (low)</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>LINE_A</td>
<td>Bus line (high)</td>
</tr>
</tbody>
</table>

### 23.5 EH fieldbus execution connections

<table>
<thead>
<tr>
<th>CABLE ENTRANCE</th>
<th>PIN</th>
<th>SIGNAL</th>
<th>TECHNICAL SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>14</td>
<td>NC</td>
<td>do not connect</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>TX-</td>
<td>Transmitter</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>TX+</td>
<td>Transmitter</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>RX-</td>
<td>Receiver</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>RX+</td>
<td>Receiver</td>
</tr>
</tbody>
</table>

### Diagram

- Driver view
- B

- CABLE ENTRANCE
- PIN
- SIGNAL
- TECHNICAL SPECIFICATIONS
- NOTES
CABLE ENTRANCE OVERVIEW

Cables entrance description:
1. main connections
2. USB connector always present (factory plugged)
3. fieldbus interface (input)
4. fieldbus interface (output)
5. threaded plug

PRESSURE TRANSUDER CONNECTION
(factory wired)

TERMINAL BOARD AND FIELDBUS TERMINATOR

Remove the 4 screws of driver’s rear cover to access terminal board and fieldbus terminator

WARNING: the above operation must be performed in a safety area

Terminal board - see section 22

Fieldbus terminator only for BC and BP executions (1)

USB CONNECTOR

USB CABLE length 4m

PRESSURE TRANSUDER CONNECTION
(factory wired)

METALLIC PROTECTION CAP - supplied with the valves

(1) Drivers with BC and BP fieldbus interface are delivered by default 'Not Terminated'. All switches are set OFF
(2) Pin layout always referred to driver’s view
### Communication Interfaces

<table>
<thead>
<tr>
<th>Communication interfaces</th>
<th>To be ordered separately</th>
<th>Cable entrance overview</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cable gland quantity</td>
<td>Threaded plug quantity</td>
<td></td>
</tr>
<tr>
<td>NP</td>
<td>1</td>
<td>A none</td>
<td>Cable entrance P are factory plugged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cable entrance A is open for customers</td>
</tr>
<tr>
<td>BC, BP, EH &quot;via stub&quot;</td>
<td>2</td>
<td>C1 A 1 C2</td>
<td>Cable entrance A, C1, C2 are open for customers</td>
</tr>
<tr>
<td>connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC, BP, EH &quot;daisy chain&quot;</td>
<td>3</td>
<td>C1 C2 A</td>
<td>Cable entrance A, C1, C2 are open for customers</td>
</tr>
<tr>
<td>connection</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FASTENING BOLTS AND SEALS

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Fastening bolts</th>
<th>Seals</th>
</tr>
</thead>
</table>
| LIMZA LICZA LIRZA | 1 = 16 | 4 socket head screws M8x45 class 12.9  
Tightening torque = 35 Nm | 2 OR 108 |
|      | 2 = 25 | 4 socket head screws M12x45 class 12.9  
Tightening torque = 125 Nm | 2 OR 108 |
|      | 3 = 32 | 4 socket head screws M16x55 class 12.9  
Tightening torque = 300 Nm | 2 OR 2043 |
|      | 4 = 40 | 4 socket head screws M20x70 class 12.9  
Tightening torque = 600 Nm | 2 OR 3043 |
| LIMZA LICZA | 5 = 50 | 4 socket head screws M20x80 class 12.9  
Tightening torque = 600 Nm | 2 OR 3043 |
| LIMZA | 6 = 63 | 4 socket head screws M30x90 class 12.9  
Tightening torque = 2100 Nm | 2 OR 3050 |
|      | 8 = 80 | 8 socket head screws M24x90 class 12.9  
Tightening torque = 1000 Nm | 2 OR 4075 |

### COVERS DIMENSIONS [mm]

<table>
<thead>
<tr>
<th>Size</th>
<th>AxA</th>
<th>ØB</th>
<th>C</th>
<th>D</th>
<th>Port Pp - Dr</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = 16</td>
<td>65x80</td>
<td>3</td>
<td>4</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td>2 = 25</td>
<td>85x85</td>
<td>5</td>
<td>6</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td>3 = 32</td>
<td>100x100</td>
<td>5</td>
<td>6</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>4 = 40</td>
<td>125x125</td>
<td>5</td>
<td>6</td>
<td>60</td>
<td>G 1/4&quot;</td>
</tr>
<tr>
<td>5 = 50</td>
<td>140x140</td>
<td>6</td>
<td>4</td>
<td>70</td>
<td>G 1/4&quot;</td>
</tr>
<tr>
<td>6 = 63</td>
<td>180x180</td>
<td>6</td>
<td>4</td>
<td>80</td>
<td>G 3/8&quot;</td>
</tr>
<tr>
<td>8 = 80</td>
<td>Ø250</td>
<td>8</td>
<td>6</td>
<td>80</td>
<td>G 3/8&quot;</td>
</tr>
</tbody>
</table>

Notes:
- Size 1 cover is not squared but rectangular, dimensions 65x80
- Size 8 cover is not squared but circular, dimension Ø250
**Note:** for ISO 7368 mounting surface and cavity dimensions, see tech. table P006

1 = Screw for air bleeding: at the first valve commissioning the air eventually trapped inside the solenoid must be bled-off through the screw
2 = Space to remove the USB connector
3 = The dimensions of cable glands must be considered (see tech table KX800)

---

**RELATED DOCUMENTATION**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X010</td>
<td>Basics for electrohydraulics in hazardous environments</td>
</tr>
<tr>
<td>X020</td>
<td>Summary of Atos ex-proof components certified to ATEX, IECEx, EAC, PESO</td>
</tr>
<tr>
<td>FX900</td>
<td>Operating and maintenance information for ex-proof proportional valves</td>
</tr>
<tr>
<td>GS500</td>
<td>Programming tools</td>
</tr>
<tr>
<td>GS510</td>
<td>Fieldbus</td>
</tr>
<tr>
<td>GX800</td>
<td>Ex-proof pressure transducer type E-ATRA-7</td>
</tr>
<tr>
<td>KX800</td>
<td>Cable glands for ex-proof valves</td>
</tr>
<tr>
<td>P006</td>
<td>Mounting surfaces and cavities for cartridge valves</td>
</tr>
</tbody>
</table>

09/19