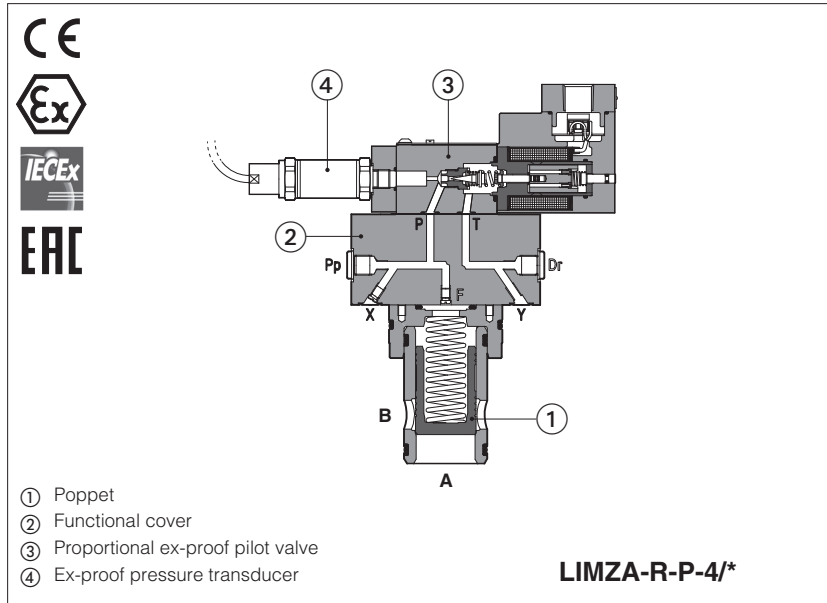


# Ex-proof proportional pressure cartridges high performance

piloted, with on-board pressure transducer - **ATEX, IECEX, EAC**



## LICZA-R, LIMZA-R, LIRZA-R

2-way ex-proof proportional pressure cartridges, high performance with on-board pressure transducer, respectively performing: pressure compensator, relief or reducing functions.

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

● Multicertification **ATEX, IECEX, EAC** for gas group **II 2G**

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

The solenoid is also designed to limit the surface temperature within the classified limits.

Size: **16 ÷ 80** -ISO7368

Max flow: up to **4500 l/min**

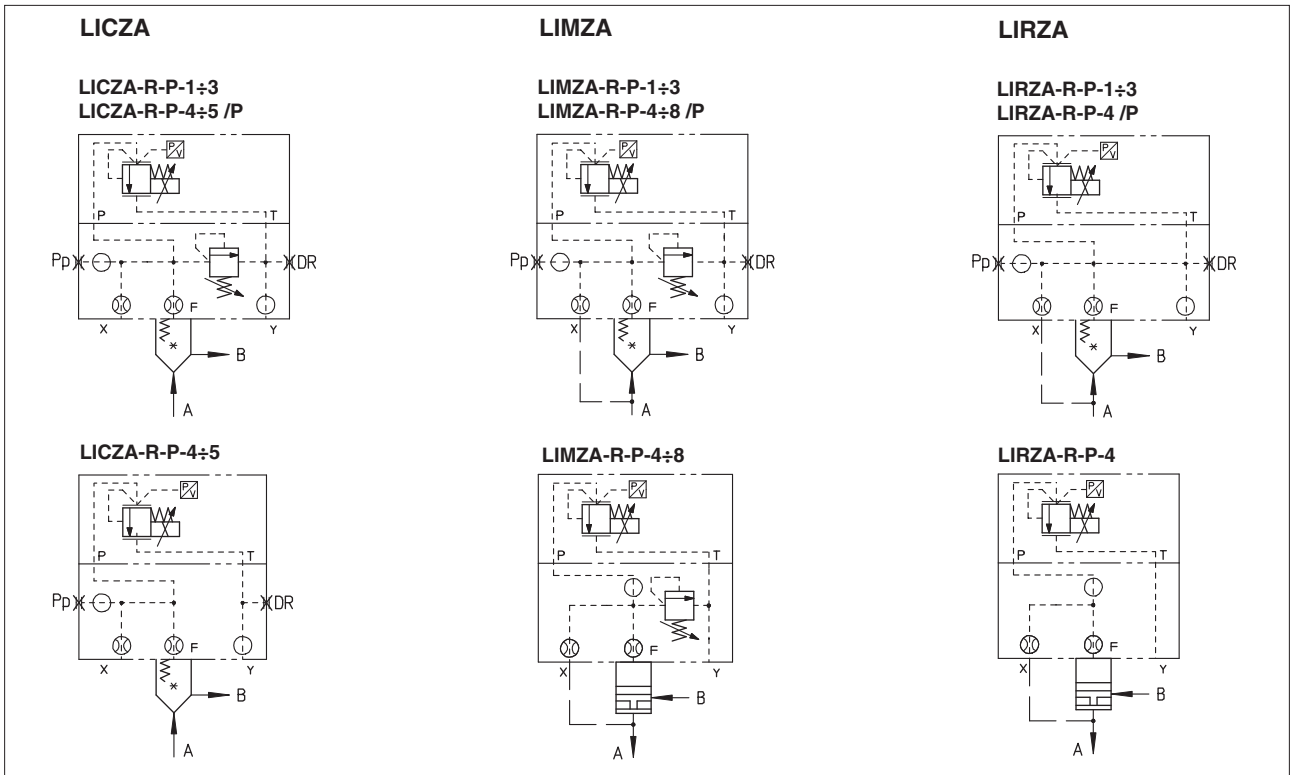
Max pressure: **250 bar**

### 1 MODEL CODE FOR COVERS

<b>LIMZA</b>	-	<b>R</b>	-	<b>P</b>	-	<b>3</b>	/	<b>315</b>	/	<b>M</b>	/	<b>*</b>	/	<b>*</b>	/	<b>*</b>						
<p>Ex-proof proportional pressure cartridges</p> <p><b>LICZA</b> = pressure compensator <b>LIMZA</b> = pressure relief <b>LIRZA</b> = pressure reducing</p> <p><b>R</b> = for off-board driver, see section 3</p> <p><b>P</b> = on-board ex-proof pressure transducer</p> <p><b>Valve size ISO 7368:</b></p> <table border="0"> <tr> <td><b>1</b> = 16</td> <td><b>5</b> = 50 (not for LIRZA)</td> </tr> <tr> <td><b>2</b> = 25</td> <td><b>6</b> = 63 (only for LIMZA)</td> </tr> <tr> <td><b>3</b> = 32</td> <td><b>8</b> = 80; (only for LIMZA)</td> </tr> <tr> <td><b>4</b> = 40</td> <td></td> </tr> </table> <p><b>Max regulated pressure:</b></p> <p><b>80</b> = 80 bar <b>180</b> = 180 bar <b>250</b> = 250 bar</p> <p><b>Seals material, see section 9:</b></p> <p>- = NBR <b>PE</b> = FKM <b>BT</b> = HNBR</p> <p>Series number</p> <p><b>Options (1):</b></p> <p><b>O</b> = horizontal cable entrance <b>P</b> = with integral mechanical pressure limiter (standard for size 1, 2, 3)</p> <p><b>Solenoid threaded connection</b> for cable gland fitting:</p> <p><b>GK</b> = GK-1/2" (2) <b>M</b> = M20x1,5 <b>NPT</b> = 1/2" NPT</p>															<b>1</b> = 16	<b>5</b> = 50 (not for LIRZA)	<b>2</b> = 25	<b>6</b> = 63 (only for LIMZA)	<b>3</b> = 32	<b>8</b> = 80; (only for LIMZA)	<b>4</b> = 40	
<b>1</b> = 16	<b>5</b> = 50 (not for LIRZA)																					
<b>2</b> = 25	<b>6</b> = 63 (only for LIMZA)																					
<b>3</b> = 32	<b>8</b> = 80; (only for LIMZA)																					
<b>4</b> = 40																						

(1) Possible combined options: all combinations are possible  
(2) Approved only for the Italian market

**2 HYDRAULICS SYMBOLS**



**3 MODEL CODE OF CARTRIDGES**

<b>SC LI</b>	-	<b>32</b>	<b>31</b>	<b>2</b>	**	/	<b>*</b>
Cartridge according to ISO 7368						<b>Seals material,</b> see section 9 : - = NBR PE = FKM BT = HNBR	
<b>Cartridges size ISO 7368:</b> 16 25 32 40 50 63 80						Series number	
<b>Type of poppet:</b> 31 = for LIMZA and LICZA 36 = for LICZA 37 = for LIRZA				<b>Spring cracking pressure:</b> 2 = 1,5 bar for poppet 31 3 = 3 bar for poppet 31 and 36 4 = 4 bar only for poppet 37 6 = 6 bar for poppet 31 and 36 7 = 7 bar for poppet 37 (only for size 16, 25, 32, 40)			

**4 TYPE OF POPPET**

Type of poppet	<b>31</b>	<b>36</b>	<b>37</b>
Functional sketch (Hydraulic symbol)			
Typical section			
Area ratio A: Ap	<b>1:1</b>	<b>1:1</b>	<b>1:1</b>

## 5 OFF-BOARD ELECTRONIC DRIVERS

Electronic drivers are factory set with max current limitation for ex-proof valves.

Please include in the driver order also the complete code of the connected ex-proof proportional valve.

Drivers model	E-BM-RES-*/A
Type	Digital
Format	DIN rail panel format
Tech table	GS203

## 6 GENERAL CHARACTERISTICS

Assembly position	Any position
Subplate surface finishing to ISO 4401	Acceptable roughness index, Ra ≤0,8 recommended Ra 0,4 - flatness ratio 0,01/100
MTTFd valves according to EN ISO 13849	75 years, see technical table P007
Ambient temperature range	<b>Standard</b> = -20°C ÷ +70°C <b>/PE</b> option = -20°C ÷ +70°C <b>/BT</b> option = -40°C ÷ +70°C
Storage temperature range	<b>Standard</b> = -20°C ÷ +70°C <b>/PE</b> option = -20°C ÷ +70°C <b>/BT</b> option = -40°C ÷ +70°C
Surface protection	Zinc coating with black passivation - salt spray test (EN ISO 9227) > 200 h
Compliance	Explosion proof protection, see section 10 -Flame proof enclosure "Ex d" RoHs Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

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

Valve model	LICZA					LIMZA					LIRZA						
	1	2	3	4	5	1	2	3	4	5	6	8	1	2	3	4	
Valve size [l/min]																	
Max flow [bar]	200	400	750	1000	2000	200	400	750	1000	2000	3000	4500	160	300	550	800	
Min regulated pressure	see section 16																
Max regulated pres. at port A [bar]	80; 180; 250					80; 180; 250					80; 180; 250						
Max pressure [bar]	Ports: T, Y = 210 Ports: P, A, B, X = 350																
Response time 0-100% step signal (1) (depending on installation) [ms]	≤ 100 ÷ 350					≤ 100 ÷ 350					≤ 100 ÷ 250						
Hysteresis [% of regulated max pres.]	≤ 0,5																
Linearity [% of regulated max pres.]	≤ 1,0																
Repeatability [% of regulated max pres.]	≤ 0,2																

**Note:** above performance data refer to valves coupled with Atos electronic drivers, see section 5


(1) Average response time value; the pressure variation in consequence of a modification of the reference input signal to the valve is affected by the stiffness of the hydraulic circuit: greater is the stiffness of the circuit, faster is the dynamic response

## 8 ELECTRICAL CHARACTERISTICS

Max. power	35W
Insulation class	H (180°) Due to the occurring surface temperatures of the solenoid coils, the European standards ISO 13732-1 and EN982 must be taken into account
Protection degree with relevant cable gland	IP66/67 to DIN EN60529
Duty factor	Continuous rating (ED=100%)
Voltage code	standard
Coil resistance R at 20°C	3,2 Ω
Max. solenoid current	2,5 A

**9 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 mm <sup>2</sup> /s - max allowed range 15 ÷ 380 mm <sup>2</sup> /s		
Max fluid contamination level	normal operation	ISO4406 class 18/16/13 NAS1638 class 7	see also filter section at <a href="http://www.atos.com">www.atos.com</a> or KTF catalog
	longer life	ISO4406 class 16/14/11 NAS1638 class 5	
<b>Hydraulic fluid</b>	<b>Suitable seals type</b>	<b>Classification</b>	<b>Ref. Standard</b>
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 <b>(1)</b>	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

**10 CERTIFICATION DATA**

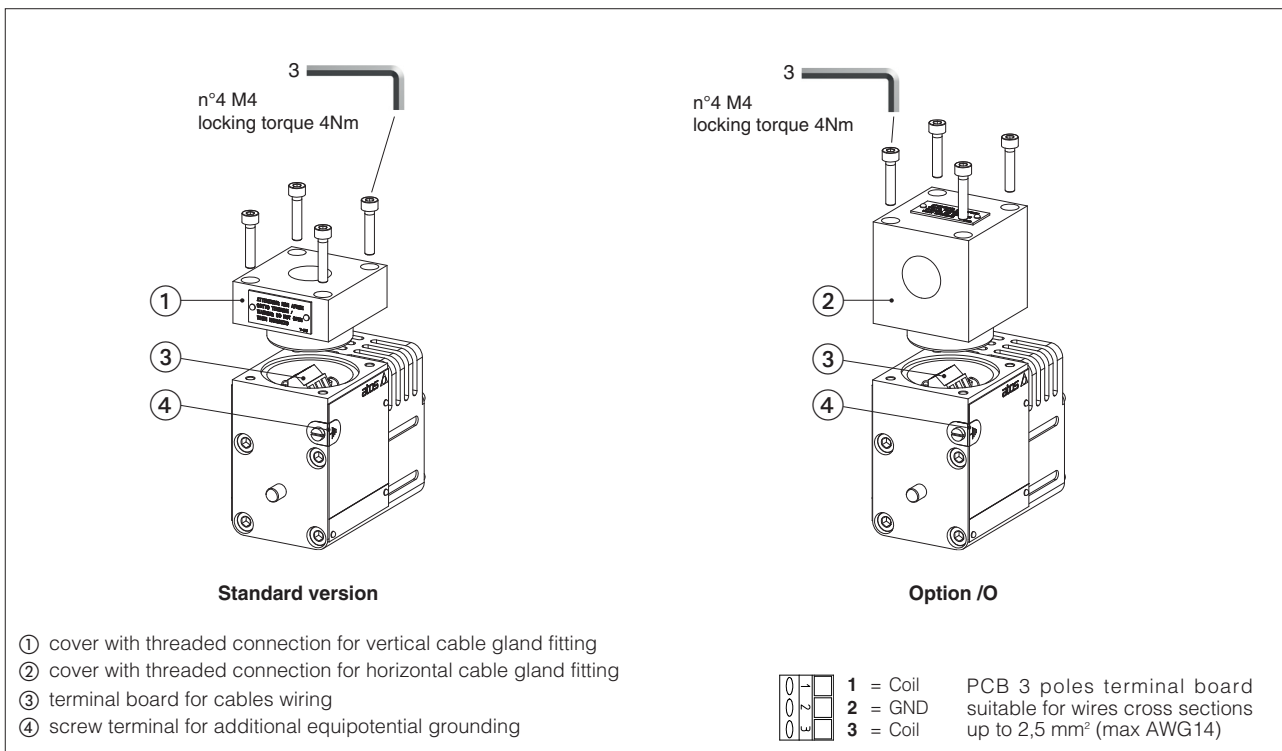
Valve type	LICZA, LIMZA, LIRZA			
Certifications	<b>Solenoid data</b>		<b>Pressure transducer data</b>	
	Multicertification Group II <b>ATEX IECEx EAC</b>		Multicertification <b>ATEX IECEx EAC</b>	
Certified code	<b>MZA-A</b>		<b>Pressure transmitter, Series E-10</b>	
Type examination certificate <b>(1)</b>	ATEX: CESI 02 ATEX 014 IECEX: IECEX CES 10.0010x EAC:RU C - IT.AJK38.B.00425/21		ATEX: KEMA 05 ATEX 2240 X IECEX: IECEX DEK 15.0048X EAC: C-DE.AA71.B.00162/19	
Method of protection	<ul style="list-style-type: none"> <li>• ATEX Ex II 2G Ex d IIC T4/T3 Gb Ex II 2D Ex tb IIIC T135°C/T200°C Db</li> <li>• IECEx Ex d IIC T4/T3 Gb Ex tb IIIC T135°C/T200°C Db</li> <li>• EAC 1Ex d IIC T4/T3 Gb X Ex tb IIIC T135°C/T200°C Db X</li> </ul>		<ul style="list-style-type: none"> <li>• ATEX, EAC Ex II 2G Ex db IIC T6...T1 Gb</li> <li>• IECEx Ex db IIC T6...T1 Gb</li> </ul>	
Temperature class	<b>T4</b>	<b>T3</b>	<b>T6</b>	<b>T5</b>
Surface temperature	≤ 135 °C	≤ 200 °C	≤ 135 °C	≤ 200 °C
Ambient temperature <b>(2)</b>	-40 ÷ +40 °C	-40 ÷ +70 °C	-40 ÷ +40 °C	-40 ÷ +70 °C
Applicable standards	EN 60079-0: 2012+A11:2013 EN 60079-1:2014 EN 60079-31:2014	IEC 60079-0:2017 IEC 60079-1:2017-04 IEC 60079-31:2013	EN 60079-0: 2012+A11:2013 EN 60079-1:2014	IEC 60079-0:2017 IEC 60079-1:2017-04
Cable entrance: threaded connection vertical (standard) or horizontal (option /O)	<b>GK</b> = GK-1/2" <b>M</b> = M20x1,5 <b>NPT</b> = 1/2" NPT		-	

**(1)** The type examiner certificates can be downloaded from [www.atos.com](http://www.atos.com)

In case the complete valve must withstand with minimum ambient temperature of -40°C, select **/BT** in the model code

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

**11 EX PROOF SOLENOIDS WIRING**



**12 CABLE SPECIFICATION AND TEMPERATURE** - Power supply and grounding cables have to comply with following characteristics:

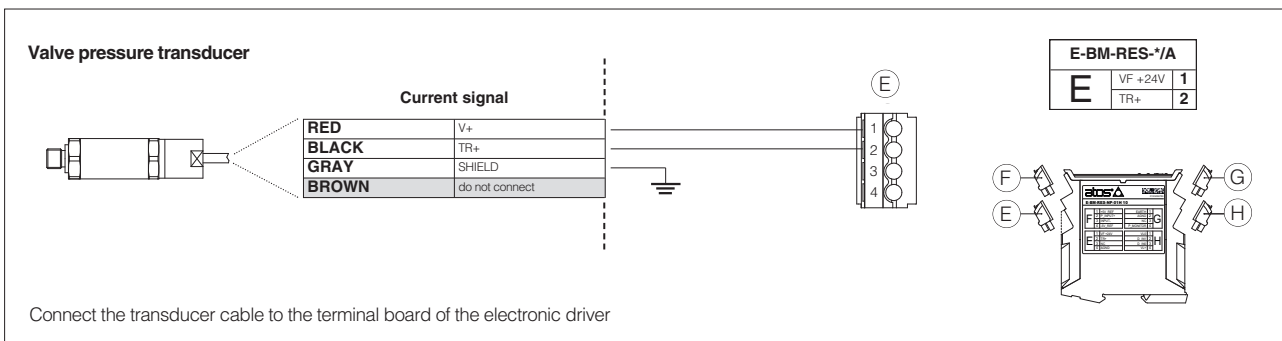
**Power supply:** section of coil connection wires = 2,5 mm<sup>2</sup>      **Grounding:** section of internal ground wire = 2,5 mm<sup>2</sup>  
 section of external ground wire = 4 mm<sup>2</sup>

**12.1 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.

Max ambient temperature [°C]	Temperature class	Max surface temperature [°C]	Min. cable temperature [°C]
	Goup II	Goup II	Goup II
40 °C	T4	-	-
45 °C	T4	135 °C	90 °C
55 °C	T3	200 °C	110 °C
60 °C	-	-	-
70 °C	T3	200 °C	120 °C

**13 EX- PROOF PRESSURE TRANSDUCER WIRING**



## 14 HYDRAULIC OPTIONS

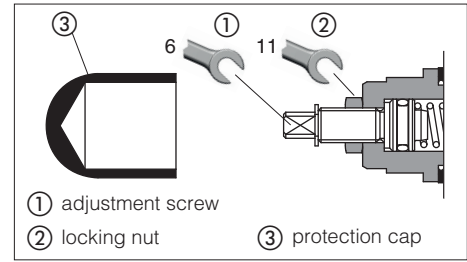
**P** = Integral mechanical pressure limiter (standard for size 1, 2 and 3)

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 ① 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 ① of additional 1 or 2 turns to ensure that the mechanical pressure limiter remains closed during the proportional valve working.

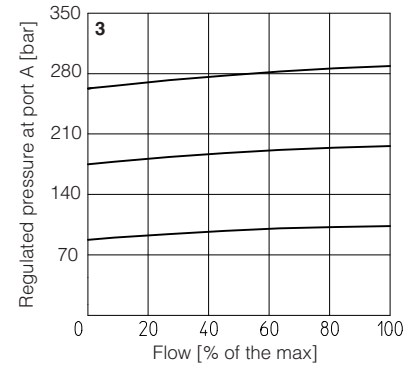
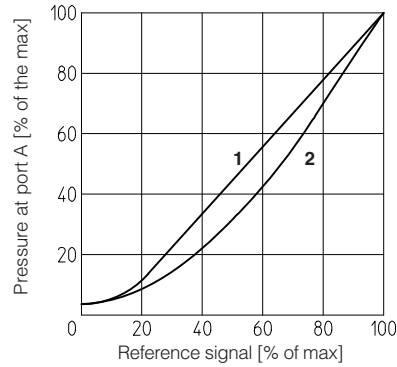


## 15 DIAGRAMS (based on mineral oil ISO VG 46 at 50 °C)

**1 Regulation diagrams LIMZA**

**2 Regulation diagrams LICZA**

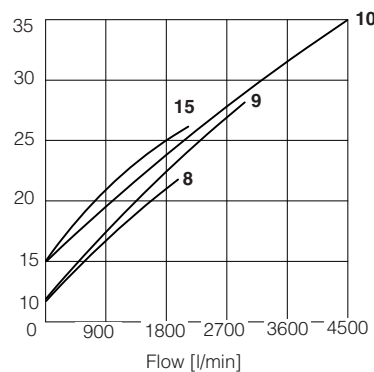
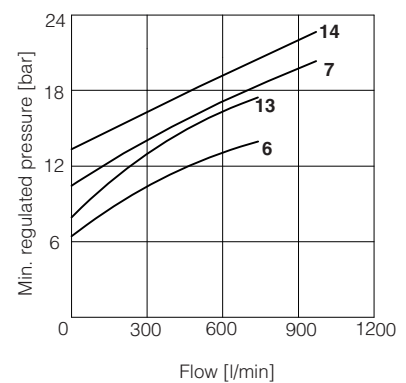
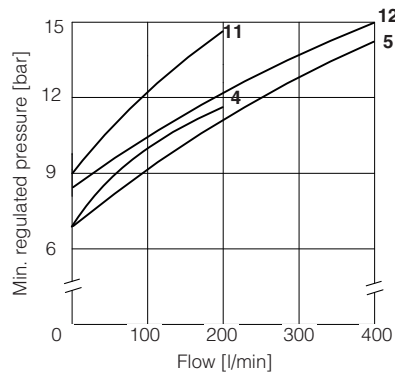
**3 Pressure/flow diagrams LICZA, LIMZA**



**4-14 Min. pressure/flow diagrams with zero reference signal**

**4** = LIMZA\*-1  
**5** = LIMZA\*-2  
**6** = LIMZA\*-3  
**7** = LIMZA\*-4  
**8** = LIMZA\*-5  
**9** = LIMZA\*-6  
**10** = LIMZA\*-8

**11** = LICZA\*-1  
**12** = LICZA\*-2  
**13** = LICZA\*-3  
**14** = LICZA\*-4  
**15** = LICZA\*-5



### Regulation diagrams LIRZA

15 = LIRZA-A

16-19 Min. pressure/flow diagrams  
with reference signal "null"

16 = LIRZA\*-1

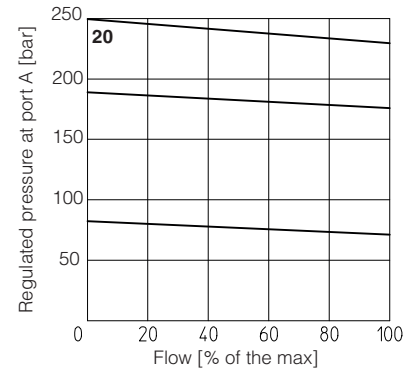
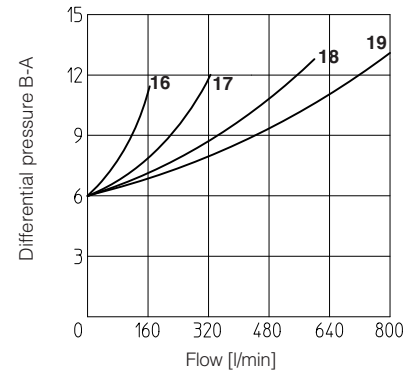
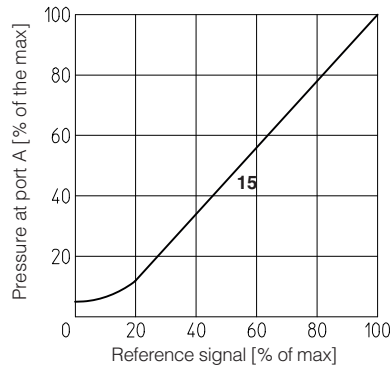
17 = LIRZA\*-2

18 = LIRZA\*-3

19 = LIRZA\*-4

### Pressure/flow diagrams

20 = LIRZA-R

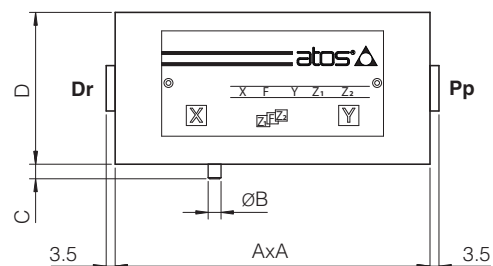


### 16 FASTENING BOLTS AND SEALS

Type	Size	Fastening bolts	Seals
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

### 17 COVERS DIMENSIONS [mm]

Size	AxA	øB	C	D	Port Pp - Dr
1 = 16	65x80	3	4	40	-
2 = 25	85x85	5	6	40	-
3 = 32	100x100	5	6	50	-
4 = 40	125x125	5	6	60	G 1/4"
5 = 50	140x140	6	4	70	G 1/4"
6 = 63	180x180	6	4	80	G 3/8"
8 = 80	ø250	8	6	80	G 3/8"

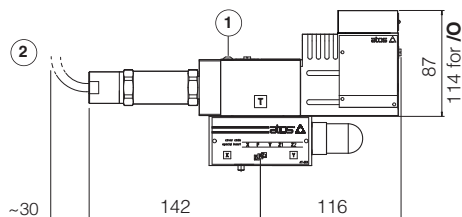


#### Notes:

size 1 cover is not squared but rectangular, dimensions 65x80  
size 8 cover is not squared but circular, dimension ø250

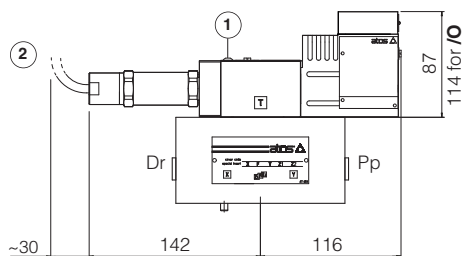
**18** INSTALLATION DIMENSIONS [mm]

LICZA-R-P-1 LIMZA-R-P-1 LIRZA-R-P-1  
 LICZA-R-P-2 LIMZA-R-P-2 LIRZA-R-P-2  
 LICZA-R-P-3 LIMZA-R-P-3 LIRZA-R-P-3

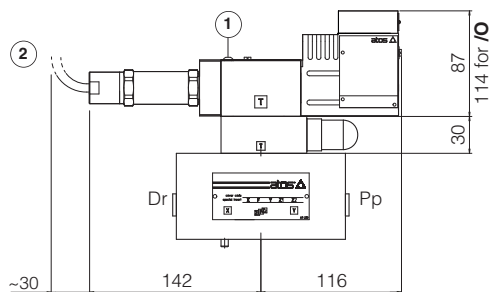


Mass [kg]			
LICZA, LIMZA, LIRZA			Cartridge
Size	Standard	Option /P	SC LI
1 = 16	4,6	standard	0,2
2 = 25	5,3	standard	0,5
3 = 32	6,6	standard	0,9
4 = 40	12,1	13,1	1,7
5 = 50	15,5	16,5	2,9
6 = 63	24,9	25,9	6,7
8 = 80	33,6	34,6	13,1

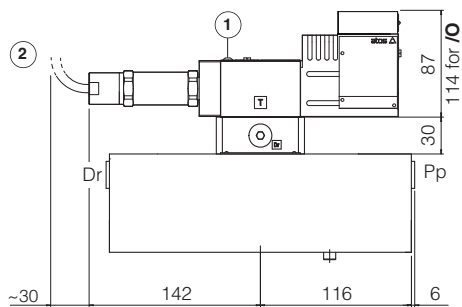
LICZA-R-P-4 LIMZA-R-P-4 LIRZA-R-P-4  
 LICZA-R-P-5 LIMZA-R-P-5  
 LIMZA-R-P-6



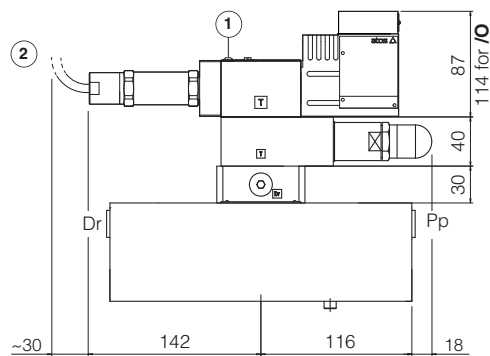
LICZA-R-P-4/P LIMZA-R-P-4/P LIRZA-R-P-4/P  
 LICZA-R-P-5/P LIMZA-R-P-5/P  
 LIMZA-R-P-6/P



LIMZA-R-P-8



LIMZA-R-P-8/P



**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 = Cable length 5m

**19** RELATED DOCUMENTATION

**X010** Basics for electrohydraulics in hazardous environments  
**X020** Summary of Atos ex-proof components certified to ATEX, IECEx, EAC, PESO  
**FX900** Operating and maintenance information for ex-proof proportional valves

**GX800** Ex-proof pressure transducer type E-ATRA-7  
**KX800** Cable glands for ex-proof valves  
**P006** Mounting surfaces and cavity for cartridge valves