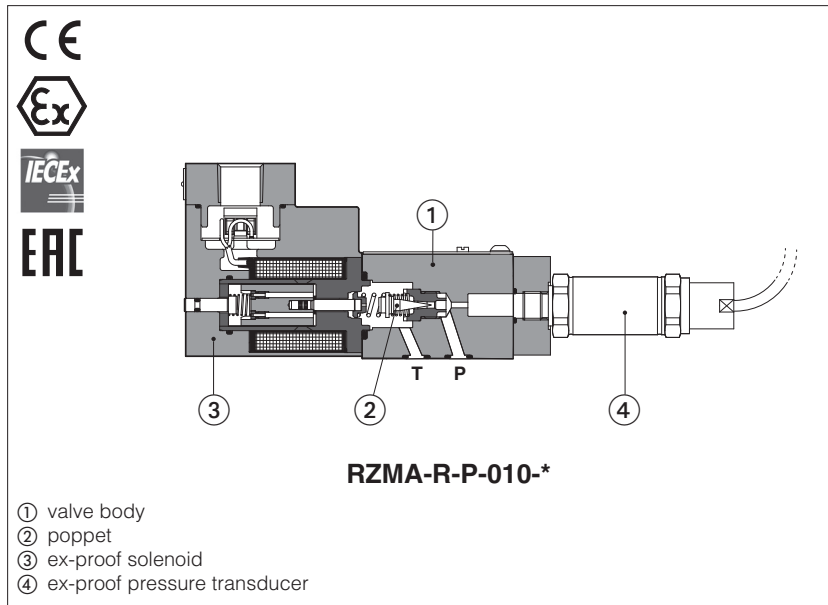


# Ex-proof proportional relief valves high performance

direct or piloted, with on-board pressure transducer - **ATEX, IECEx, EAC**



## RZMA-RES, AGMZA-RES

Ex-proof high performance proportional relief valves direct or piloted with on-board pressure transducer for pressure closed loop controls.

They are equipped with ex-proof 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.

**RZMA**, direct or piloted:

Size: **06** - ISO 4401

Max flow: **4** and **40 l/min**

**AGMZA**, piloted:

Size: **10, 20** and **32** - ISO 6264

Max flow: **200, 400** and **600 l/min**

Max pressure: **250 bar**

## 1 MODEL CODE

<b>RZMA</b>	-	<b>R</b>	-	<b>P</b>	-	<b>010</b>	/	<b>250</b>	/	<b>M</b>	/	<b>*</b>	/	<b>*</b>	/	<b>*</b>
<p>Ex-proof proportional pressure relief valves</p> <p><b>RZMA</b> = subplate size 06 <b>AGMZA</b> = subplate size 10, 20, 32</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 and configuration:</b>  RZMA: direct      <b>010</b> = Qmax 4 l/min  RZMA: piloted    <b>030</b> = Qmax 40 l/min  AGMZA: piloted   <b>10, 20, 32</b> = Qmax 200, 400, 600 l/min</p> <p><b>Max regulated pressure:</b>  <b>80</b> = 80 bar    <b>180</b> = 180 bar    <b>250</b> = 250 bar</p> <p><b>Options (1):</b>  <b>E</b> = external pilot (only for AGMZA)  <b>O</b> = horizontal cable entrance  <b>Y</b> = external drain (only for AGMZA)</p> <p><b>Seals material, see section 7:</b>  - = NBR  <b>PE</b> = FKM  <b>BT</b> = HNBR</p> <p>Series number</p> <p><b>Solenoid threaded connection</b> for cable gland fitting:  <b>GK</b> = GK-1/2" (<b>2</b>)  <b>M</b> = M20x1,5  <b>NPT</b> = 1/2" NPT</p>																

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

## 2 CONFIGURATIONS AND HYDRAULIC SYMBOLS (representation according to ISO 1219-1)



### 3 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

### 4 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	RZMA-010 150 years, RZMA-030 and AGMZA 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 ÷ +80°C / <b>PE</b> option = -20°C ÷ +80°C / <b>BT</b> option = -40°C ÷ +70°C
Surface protection	Zinc coating with black passivation - salt spray test (EN ISO 9227) > 200h
Compliance	Explosion proof protection, see section 8 -Flame proof enclosure "Ex d" RoHs Directive 2011/65/EU as last update by 2015/65/EU REACH Regulation (EC) n°1907/2006

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

Valve model	RZMA		AGMZA		
	010	030	10	20	32
Size code					
Valve size	06		10	20	32
Max regulated pressure [bar]	<b>80 180 250</b>				
Min regulated pressure [bar]	see min. pressure / flow diagrams at sections 17 18 19				
Max pressure at port P, A, B, X [bar]	315				
Max pressure at port T, Y [bar]	210				
Max flow [l/min]	4	40	200	400	600
Response time 0-100% step signal (depending on installation) (1) [ms]	≤ 60		≤ 90	≤ 110	≤ 125
Hysteresis[% of the max pressure]	≤ 0,3				
Linearity[% of the max pressure]	≤ 1,0				
Repeatability[% of the max pressure]	≤ 0,2				

**Note:** above performance data refer to valves coupled with Atos electronic drivers, see section 3


(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

### 6 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

**7 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

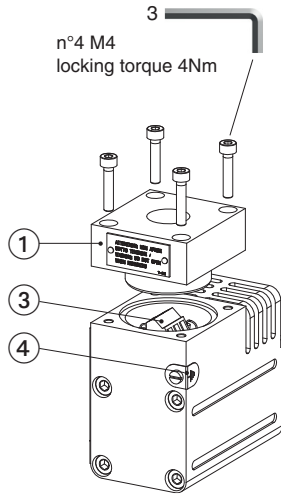
**8 CERTIFICATION DATA**

Valve type	RZMA, HZMA, AGMZA			
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 <b>(1)</b> IECEX: IECEX CES 10.0010x <b>(1)</b> EAC: TC RU C-IT. 08.B.01784 <b>(1)</b>		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, EAC 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> </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 EN 60079-1 EN 60079-31	IEC 60079-0 IEC 60079-1 IEC 60079-31	EN 60079-0 EN 60079-1	IEC 60079-0 IEC 60079-1
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		-	

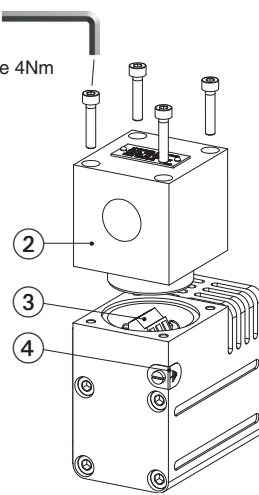
**(1)** The type examiner certificates can be downloaded from [www.atos.com](http://www.atos.com)  
In case the complete valve must withstand with minimum ambient temperature of -40°C, select **/BT** in the model code

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

**9 EX PROOF SOLENOIDS WIRING**



**Standard version**



**Option /O**

- ① cover with threaded connection for vertical cable gland fitting
- ② cover with threaded connection for horizontal cable gland fitting
- ③ terminal board for cables wiring
- ④ screw terminal for additional equipotential grounding

- |  |  |
|--|--|
|  | <p><b>1</b> = Coil    PCB 3 poles terminal board<br/> <b>2</b> = GND    suitable for wires cross sections<br/> <b>3</b> = Coil    up to 2,5 mm<sup>2</sup> (max AWG14)</p> |
|--|--|

**10 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>

**10.1 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.

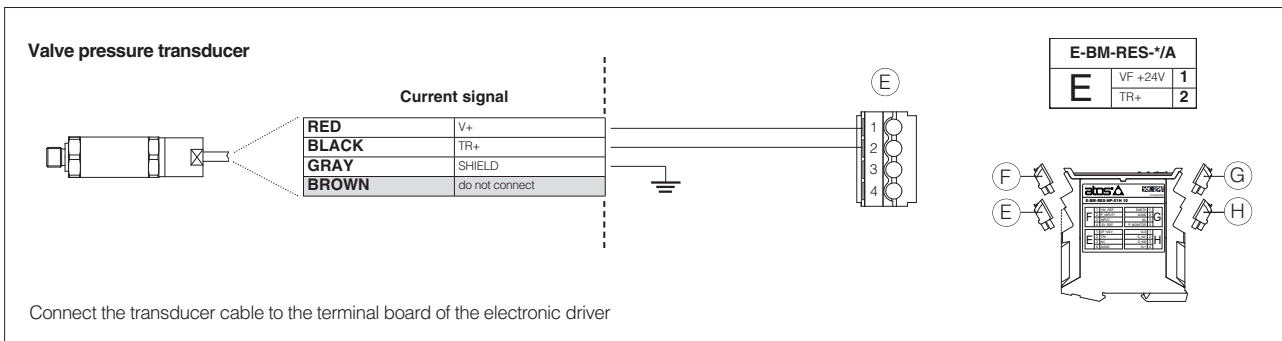
Max ambient temperature [°C]	Temperature class	Max surface temperature [°C]	Min. cable temperature [°C]
	Goup II	Goup II	Goup II
40 °C	T4	-	-
45 °C	T4	135 °C	90 °C
55 °C	T3	200 °C	110 °C
60 °C	-	-	-
70 °C	T3	200 °C	120 °C

**11 CABLE GLANDS**

Cable glands with threaded connections M20x1,5 for standard or armoured cables have to be ordered separately, see tech table **KX800**

**Note:** a Loctite sealant type 545, should be used on the cable gland entry threads

**12 EX- PROOF PRESSURE TRANSDUCER WIRING**



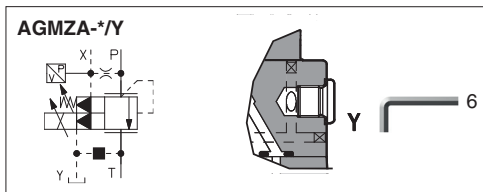
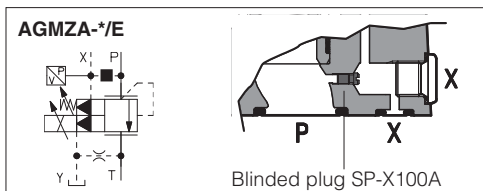
**13 PRESSURE TRANSDUCER FAILURE**

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

**14 HYDRAULIC OPTIONS - only for AGMZA**

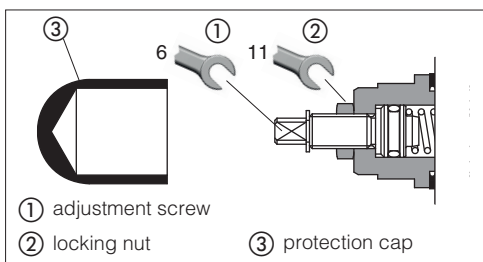
- E** = External pilot option to be selected when the pilot pressure is supplied from a different line respect to the P main line. With option E the internal connection between port P and X of the valve is plugged. The pilot pressure must be connected to the X port available on the valve's mounting surface or on main body (threaded pipe connection G 1/4").
- O** = Horizontal cable entrance, to be selected in case of limited vertical space.
- Y** = The external drain is mandatory in case the main line T is subjected to pressure peaks or it is pressurized. The Y drain port has a threaded connection G 1/4" available on the pilot stage body.



**15 MECHANICAL PRESSURE LIMITER - only for AGMZA**

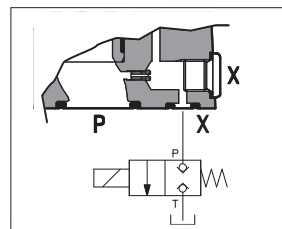
The AGMZA are provided with mechanical pressure limiter acting as protection against overpressure. For safety reasons the factory setting of the mechanical pressure limiter is fully unloaded (min pressure). At the first commissioning it must be set at a value lightly higher than the max pressure regulated 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.



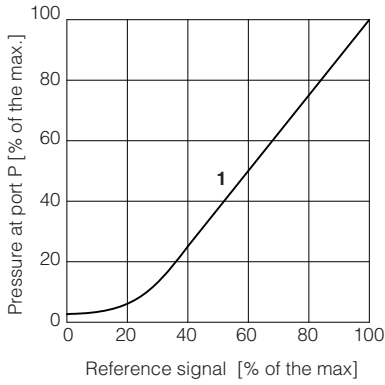
**16 REMOTE PRESSURE UNLOADING - only for AGMZA**

The **P** main line can be remotely unloaded by connecting the valve X port to a solenoid valve as shown in the below scheme (venting valve). This function can be used in emergency to unload the system pressure by-passing the proportional control.

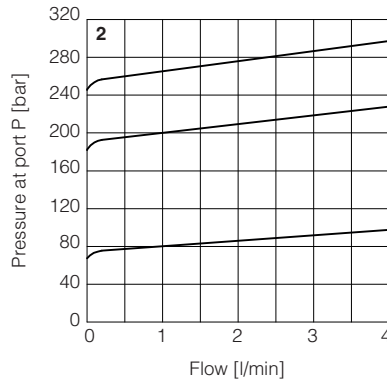


**17 DIAGRAMS RZMA-010** (based on mineral oil ISO VG 46 at 50 °C)

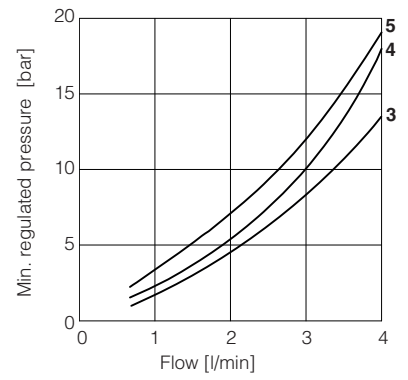
**1 Regulation diagrams**  
with flow rate  $Q = 1$  l/min



**2 Pressure/flow diagrams**  
with reference signal set at  $Q = 1$  l/min



**3-5 Min. pressure/flow diagrams**  
with zero reference signal

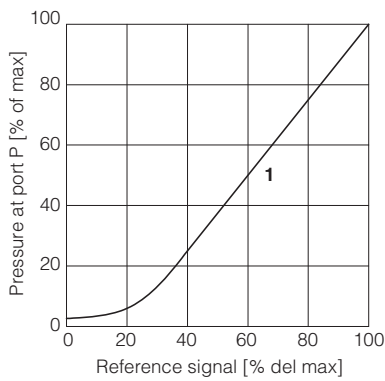


**3 = RZMA/80**  
**4 = RZMA/180**  
**5 = RZMA/250**

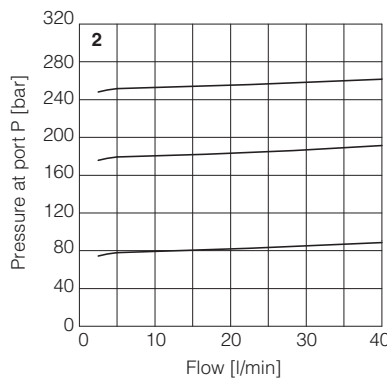
**Note:** the presence of counter pressure at port T can affect the pressure regulation and the minimum pressure

**18 DIAGRAMS RZMA-030** (based on mineral oil ISO VG 46 at 50 °C)

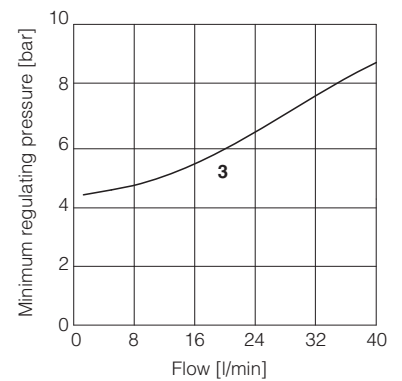
**1 Regulation diagrams**  
with flow rate  $Q = 10$  l/min



**2 Pressure/flow diagrams**  
with reference signal set at  $Q = 10$  l/min



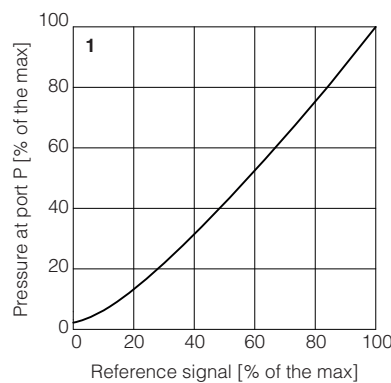
**3 Min. pressure/flow diagrams**  
with zero reference signal



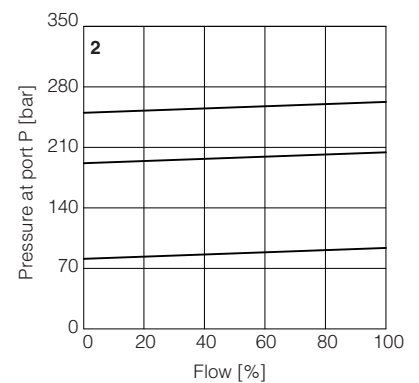
**Note:** the presence of counter pressure at port T can affect the pressure regulation and the minimum pressure

**19 DIAGRAMS AGMZA** (based on mineral oil ISO VG 46 at 50 °C)

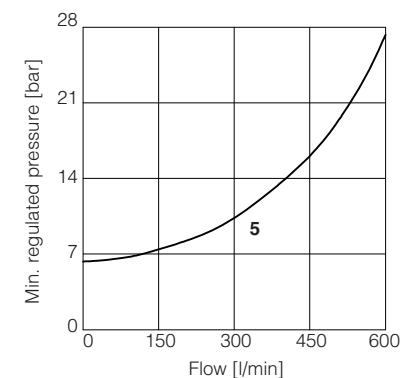
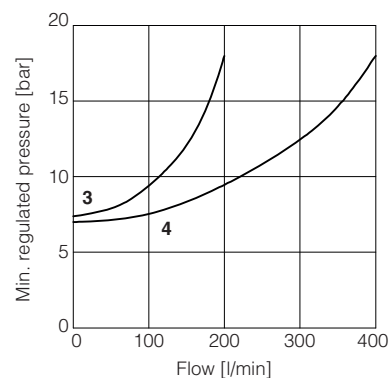
**1 = Regulation diagrams**  
with flow rate  $Q = 50$  l/min



**2 = Pressure/flow diagrams**  
with reference signal set at  $Q = 50$  l/min



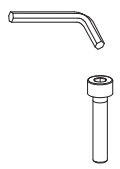

**3-5 = Min. pressure/flow diagrams**  
with zero reference signal



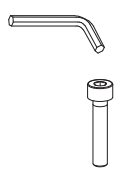

**3 = AGMZA-\*-10**  
**4 = AGMZA-\*-20**  
**5 = AGMZA-\*-32**

**20 FASTENING BOLTS AND SEALS**

**20.1 RZMA valves**

	<b>RZMA-R-P-010</b>	<b>RZMA-R-P-030</b>
	<b>Fastening bolts:</b> 4 socket head screws M5x50 class 12.9 Tightening torque = 8 Nm	<b>Fastening bolts:</b> 4 socket head screws M5x50 class 12.9 Tightening torque = 8 Nm
	<b>Seals:</b> 2 OR 108 Diameter of ports P, T: Ø 5 mm	<b>Seals:</b> 4 OR 108 Diameter of ports P, T: Ø 7,5 mm

**20.2 AGMZA valves**

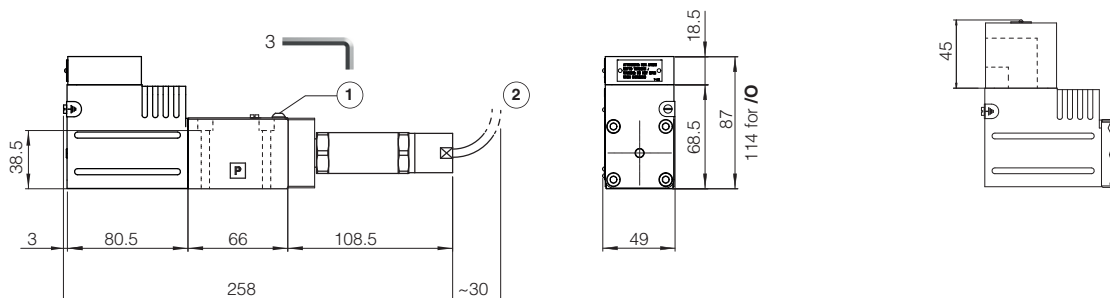
	<b>AGMZA-R-P-10</b>	<b>AGMZA-R-P-20</b>	<b>AGMZA-R-P-32</b>
	<b>Fastening bolts:</b> 4 socket head screws M12x35 class 12.9 Tightening torque = 125 Nm	<b>Fastening bolts:</b> 4 socket head screws M16x50 class 12.9 Tightening torque = 300 Nm	<b>Fastening bolts:</b> 4 socket head screws M20x60 class 12.9 Tightening torque = 600 Nm
	<b>Seals:</b> 2 OR 123 Diameter of ports P, T: Ø 14 mm 1 OR 109/70 Diameter of port X: Ø 3,2 mm	<b>Seals:</b> 2 OR 4112 Diameter of ports P, T: Ø 24 mm 1 OR 109/70 Diameter of port X: Ø 3,2 mm	<b>Seals:</b> 2 OR 4131 Diameter of ports P, T: Ø 28 mm 1 OR 109/70 Diameter of port X: Ø 3,2 mm

**21 INSTALLATION DIMENSIONS FOR RZMA [mm]**

**RZMA-R-P-010**

ISO 4401: 2005  
 Mounting surface: 4401-03-02-0-05 (see table P005)  
 (without ports A and B)

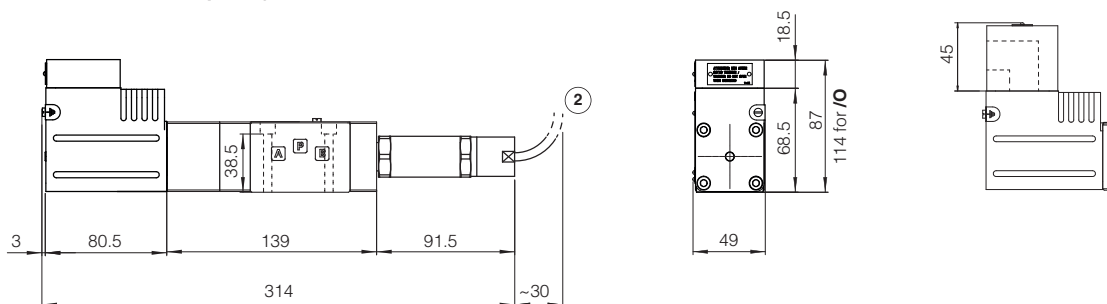
Mass [kg]	
RZMA-R-P-010	3.2



**RZMA-R-P-030**

ISO 4401: 2005  
 Mounting surface: 4401-03-02-0-05 (see table P005)  
 (ports A and B connected to port T)

Mass [kg]	
RZMA-R-P-030	4.2



- ① = Air bleed off
- ② = Cable length 5m

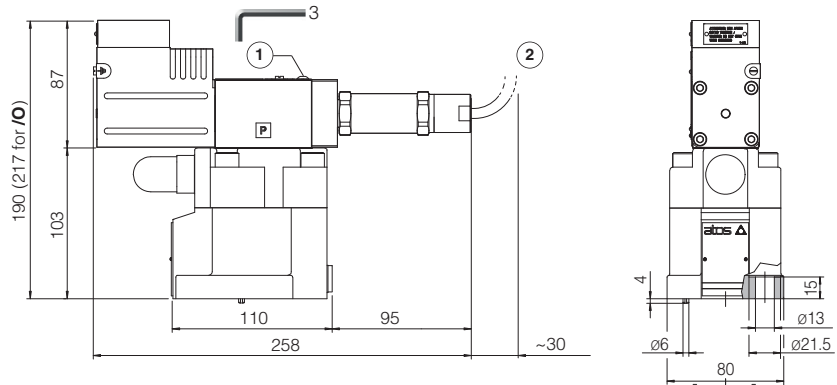
**22** INSTALLATION DIMENSIONS FOR AGMZA [mm]

**AGMZA-R-P-10**

ISO 6264: 2007

Mounting surface: 6264-06-09-1-97  
(see table P005)

Mass [kg]	
AGMZA-R-P-10	6.8
Option /O	+0.35

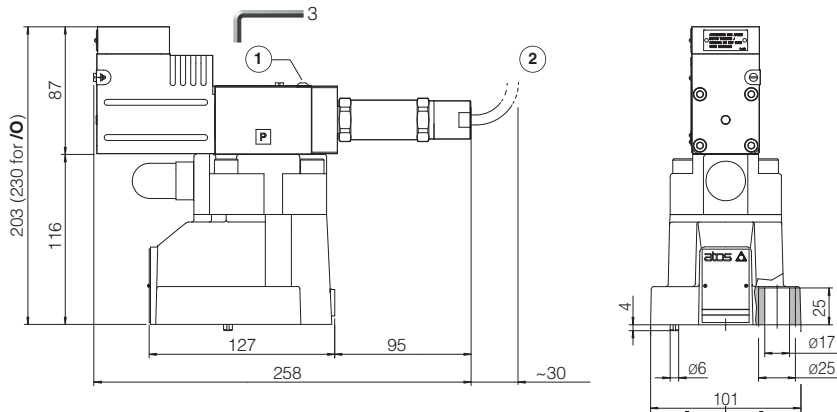


**AGMZA-R-P-20**

ISO 6264: 2007

Mounting surface: 6264-08-13-1-97  
(see table P005)

Mass [kg]	
AGMZA-R-P-20	8
Option /O	+0.35

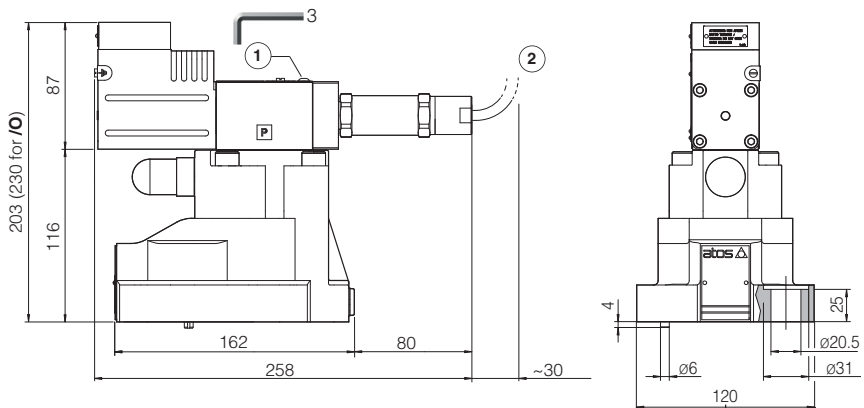


**AGMZA-R-P-32**

ISO 6264: 2007

Mounting surface: 6264-10-17-1-97  
(see table P005)  
(with M20 fixing holes  
instead of standard M18)

Mass [kg]	
AGMZA-R-P-32	9.4
Option /O	+0.35



- ① = Air bleed off
- ② = Cable length 5m

**23** 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
- P005** Mounting surfaces for electrohydraulic valves