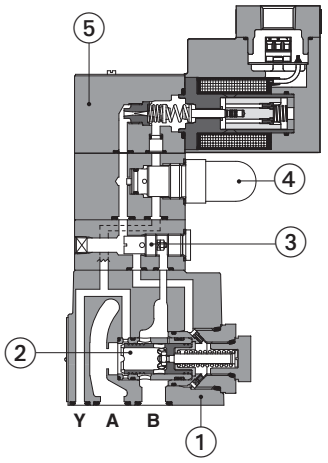
Ex-proof proportional reducing valves

direct or piloted, without transducer - **ATEX, IECEx, EAC, PESO** or **cULus**



① main valve body
② main spool
③ pilot flow compensator
④ mechanical pressure limiter
⑤ ex-proof pilot relief valve

AGRCZA-A-010*

RZGA-A, HZGA-A
KZGA-A, AGRCZA-A

Ex-proof proportional reducing valves direct or piloted, for open loop pressure controls.
They are equipped with ex-proof proportional solenoid, certified for safe operations in hazardous environments with potentially explosive atmosphere.

Certifications:

- Multicertification **ATEX**, **IECEx, EAC** and **PESO** for gas group **II 2G** and dust category **II 2D**
- Multicertification **ATEX** and **IECEx** for gas group **I M2** (mining)
- **cULus** North American certification for gas group **C&D**

RZGA, HZGA, direct or piloted:
Size: **06** - ISO 4401
Max flow: **12** and **40 l/min**

KZGA, piloted:
Size: **10** - ISO 4401
Max flow: **100 l/min**

AGRCZA, piloted:
Size: **10** and **20** - ISO 5781
Max flow: **160** and **300 l/min**

Max pressure: **250 bar**

1 MODEL CODE

RZGA	/	*	-	A	-	010	/	250	/	M	/	*	/	*	*	/	*

RZGA Ex-proof proportional pressure reducing valves
RZGA = subplate size 06
HZGA = modular size 06
KZGA = modular size 10
AGRCZA = subplate size 10, 20

Certification type
Multicertification:
- = omit for Group II 2G / 2D **(1)**
M = Group I M2 (mining)
North American Certification:
UL = cULus

A = without transducer

Valve size and configuration:

010 = RZGA direct	size 06	Qmax 12 l/min
033 = RZGA piloted	size 06	Qmax 40 l/min
031 = HZGA piloted	size 06	Qmax 40 l/min
031 = KZGA piloted	size 10	Qmax 100 l/min
10 = AGRCZA piloted	size 10	Qmax 160 l/min
20 = AGRCZA piloted	size 20	Qmax 300 l/min

Max regulated pressure:
for all versions except RZGA-010
80 = 80 bar **180** = 180 bar **250** = 250 bar
only for RZGA-010
32 = 32 bar **100** = 100 bar **210** = 210 bar

Solenoid threaded connection for cable gland fitting:
GK = GK-1/2" - not for **cULus (4)**
M = M20x1,5 - not for **cULus**
NPT = 1/2" NPT

Options (3):
O = horizontal cable entrance **(2)**
P = with integral mechanical pressure limiter (only for AGRCZA)
R = with check valve (only for AGRCZA)

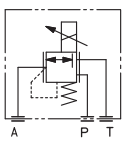
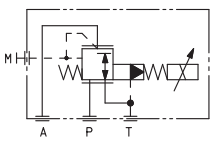
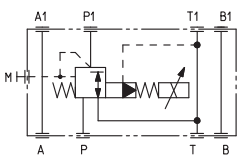
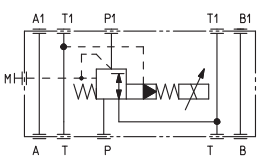
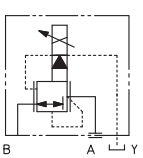
Voltage code:
- = standard coil for 24 VDC Atos drivers
24 = with 24 VDC coils

Series number

Seals material, see section 7 :
- = NBR
PE = FKM
BT = HNBR **(2)**

(1) The valves with Multicertification for Group II are also certified for Indian market according to **PESO** (Petroleum and Explosives Safety Organization). The PESO certificate can be downloaded from www.atos.com
(2) Not for multicertification **M** group I (mining) **(3)** Possible combined options: /OP, /OR, /PR, /OPR **(4)** Approved only for the Italian market

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

RZGA*-A-010	RZGA*-A-033	HZGA*-A-031	KZGA*-A-031	AGRCZA*-A-*
				

3 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-AS-* /A	E-BM-AES-* /A
Type	digital	digital
Format	DIN-rail panel	
Data sheet	G030	GS050

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	75 years; 150 years only for RZGA-010, see technical table P007
Ambient temperature range	**Standard** = -20°C ÷ +70°C **/PE** option = -20°C ÷ +70°C **/BT** option = -40°C ÷ +70°C
Storage temperature range	**Standard** = -20°C ÷ +80°C **/PE** option = -20°C ÷ +80°C **/BT** 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" -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

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

Valve model		RZGA		HZGA	KZGA	AGRCZA	
Size code		**010**	**033**	**031**		**10**	**20**
Valve size		06		10			20
Max regulated pressure	[bar]	**32; 100; 210**		**80**	**180**	**250**	
Max pressure at port P, A, B, X	[bar]	315					
Max pressure at port T, Y	[bar]	210					
Min regulated pressure	[bar]	0,8	2,5	2,5	3	1,0	
Max flow	[l/min]	12	40	40	100	160	300
Response time 0-100% step signal (depending on installation) **(1)**	[ms]	≤ 55			≤ 70		
Hysteresis[% of the max pressure]		≤ 1,5					
Linearity[% of the max pressure]		≤ 3					
Repeatability[% of the max pressure]		≤ 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 occuring 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	**Multicertification**: IP66/67 to DIN EN60529 **UL**: raintight enclosure, UL approved	
Duty factor	Continuous rating (ED=100%)	
Voltage code	standard	option /24
Coil resistance R at 20°C	3,2 Ω	17,6 Ω
Max. solenoid current	2,5 A	1,1 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 mm²/s - max allowed range 15 ÷ 380 mm²/s		
Max fluid contamination level	normal operation	ISO4406 class 18/16/13 NAS1638 class 7		see also filter section at www.atos.com or KTF catalog
	longer life	ISO4406 class 16/14/11 NAS1638 class 5		
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

8 CERTIFICATION DATA

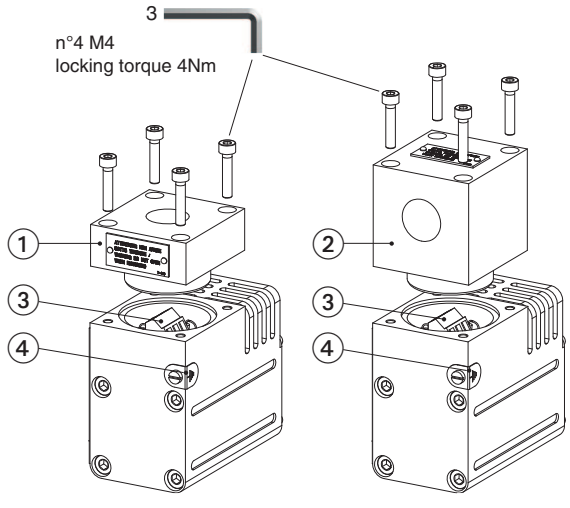
Valve type	RZGA, HZGA, KZGA, AGRCZA		RZGA/**M**, HZGA/**M**, KZGA/**M**, AGRCZA/**M**	RZGA/**UL**, HZGA/**UL**, KZGA/**UL**, AGRCZA/**UL**	
Certifications	Multicertification Group II **ATEX IECEx EAC PESO**		Multicertification Group I **ATEX IECEx**	North American **cULus**	
Solenoid certified code	**MZA-A**		**MZAM-A**	**OZA-A/EC**	
Type examination certificate **(1)**	ATEX: CESI 02 ATEX 014 IECEx: IECEx CES 10.0010x EAC: TC RU C-IT. 08.B.01784 PESO: P338131		ATEX: CESI 03 ATEX 057x IECEx: IECEx CES 12.0007x	20170324 - E366100	
Method of protection	• ATEX, EAC Ex II 2G Ex d IIC T4/T3 Gb Ex II 2D Ex tb IIIC T135°C/T200°C Db • IECEx Ex d IIC T4/T3 Gb Ex tb IIIC T135°C/T200°C Db • PESO Ex II 2G Ex d IIC T4/T3 Gb		• ATEX Ex I M2 Ex db I Mb • IECEx Ex db I Mb	• UL 1203 Class I, Div.I, Groups C & D Class I, Zone I, Groups IIA & IIB	
Temperature class	**T4**	**T3**	**-**	**T4**	**T3**
Surface temperature	≤ 135 °C	≤ 200 °C	≤ 150 °C	≤ 135 °C	≤ 200 °C
Ambient temperature **(2)**	-40 ÷ +40 °C	-40 ÷ +70 °C	-20 ÷ +60 °C	-40 ÷ +55 °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	UL 1203 and UL429, CSA 22.2 n°30-1986 CSA 22.2 n°139-13	
Cable entrance: threaded connection vertical (standard) or horizontal (option /O)	**GK** = GK-1/2" **M** = M20x1,5 **NPT** = 1/2" NPT			1/2" NPT	

(1) The type examinator certificates can be downloaded from www.atos.com
(2) The solenoids **Group II** and **cULus** are certified for minimum ambient temperature -40°C
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

Multicertification



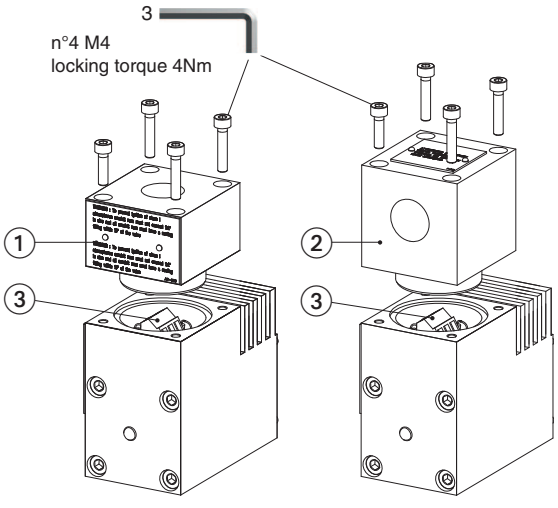
Standard version **Option /O**

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

1 = Coil
2 = GND
3 = Coil

PCB 3 poles terminal board suitable for wires cross sections up to 2,5 mm² (max AWG14)

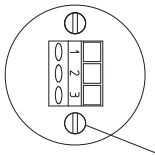
cULus certification



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

⚠ **Pay attention to respect the polarity**



1 = Coil **+**
2 = GND
3 = Coil **-**

PCB 3 poles terminal board suggested cable section up to 1,5 mm² (max AWG16), see section 10 note 1

alternative GND screw terminal connected to solenoid housing

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

Multicertification Group I and Group II

Power supply: section of coil connection wires = 2,5 mm²

Grounding: section of internal ground wire = 2,5 mm²
section of external ground wire = 4 mm²

cULus certification:

- Suitable for use in Class I Division 1, Gas Groups C
- Armored Marine Shipboard Cable which meets UL 1309
- Tinned Stranded Copper Conductors
- Bronze braided armor
- Overall impervious sheath over the armor

Any Listed (UBVZ/ UBVZ7) Marine Shipboard Cable rated 300 V min, 15A min. 3C 2,5 mm² (14 AWG) having a suitable service temperature range of at least -25°C to +110°C ("/BT" Models require a temperature range from -40°C to +110°C)

Note 1: For Class I wiring the 3C 1,5 mm² AWG 16 cable size is admitted only if a fuse lower than 10 A is connected to the load side of the solenoid wiring.

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.

Multicertification

Max ambient temperature [°C]	Temperature class		Max surface temperature [°C]		Min. cable temperature [°C]	
	Goup I	Goup II	Goup I	Goup II	Goup I	Goup II
40 °C	-	T4	150 °C	-	90 °C	-
45 °C	-	T4	150 °C	135 °C	-	90 °C
55 °C	-	T3	150 °C	200 °C	-	110 °C
60 °C	-	-	150 °C	-	110 °C	-
70 °C	N.A.	T3	N.A.	200 °C	N.A.	120 °C

cULus certification

Max ambient temperature [°C]	Temperature class	Max surface temperature [°C]	Min. cable temperature
55 °C	T4	135 °C	100 °C
70 °C	T3	200 °C	100 °C

11 CABLE GLANDS - only **Multicertification**

Cable glands with threaded connections GK-1/2", 1/2"NPT or 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

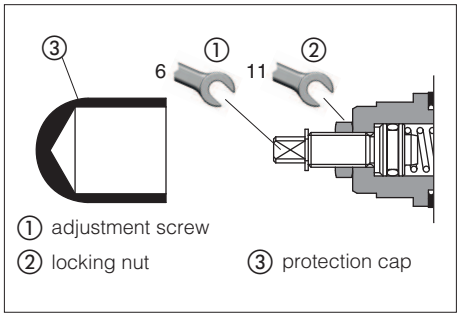
12 OPTIONS

O = Horizontal cable entrance , to be selected in case of limited verical space.

P = Integral mechanical pressure limiter

The AGRCZA-***/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:

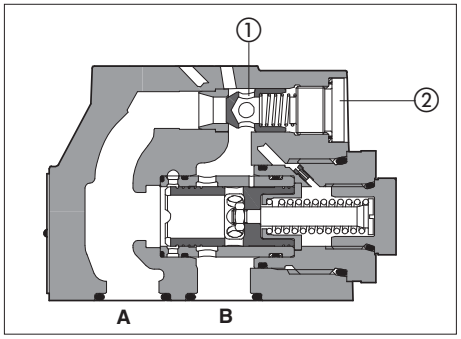
- apply the max reference input signal to the valve's driver. The system pressure will not increase until the mechanical pressure limiter remains unloaded.
- turn clockwise the adjustment screw ① until the system pressure will increase up to a stable value corresponding to the pressure setpoint at max 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.



R = Integral check valve for free reverse flow

The AGRCZA-***/R** are provided with integral check valve for free reverse flow A→B

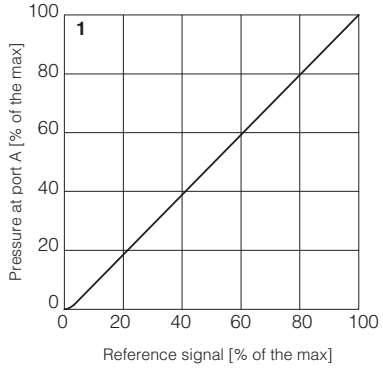
① Check valve - cracking pressure = 0,5 bar
② Plug



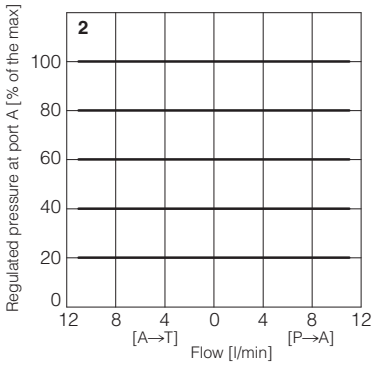
12.1 Possible combined options: /OP, /OR, /PR, /OPR

13 DIAGRAMS RZGA-010 (based on mineral oil ISO VG 46 at 50 °C)

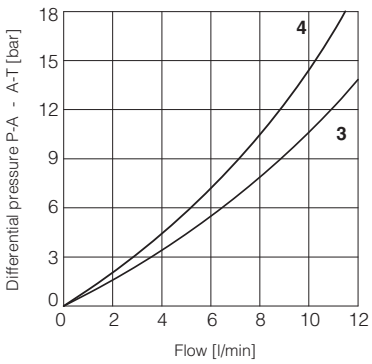
1 Regulation diagrams
with flow rate Q = 1 l/min



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



3-4 Min. pressure/flow diagrams
with zero reference signal



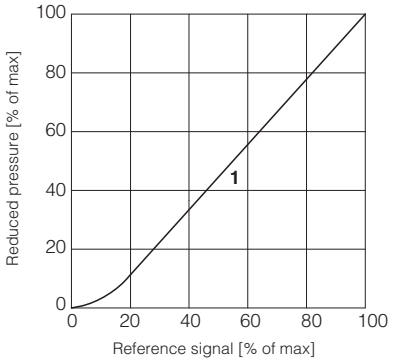
3 = Pressure drops vs. flow P→A
4 = Pressure drops vs. flow A→T

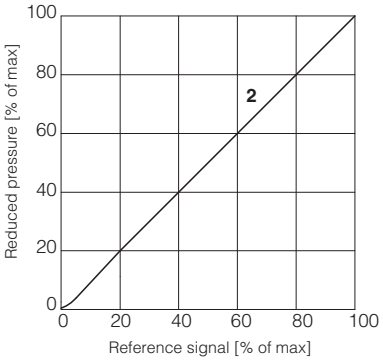
14 DIAGRAMS RZGA-033, HZGA, KZGA (based on mineral oil ISO VG 46 at 50 °C)

14.1 Regulation diagrams
with flow rate Q = 10 l/min

1 = RZGA, HZGA
2 = KZGA

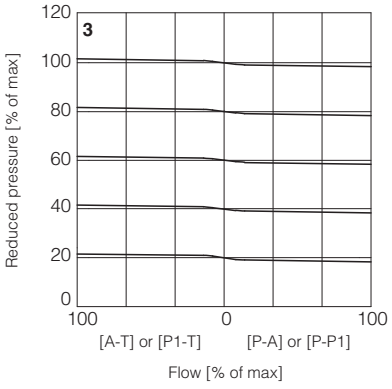
Note:
The presence of counter pressure at port T can affect the effective pressure regulation.





14.2 Pressure/flow diagrams
with reference pressure set with Q = 10 l/min

3 = RZGA, KZGA

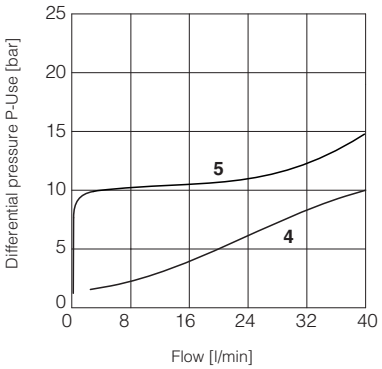


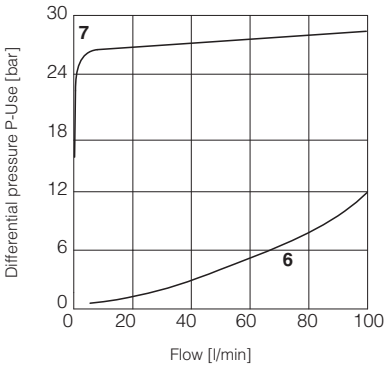
14.3 Pressure drop/flow diagram
RZGA, HZGA

4 = A-T or P1-T
5 = P-P1 or P-A

KZGA

6 = P1-T
7 = P-P1

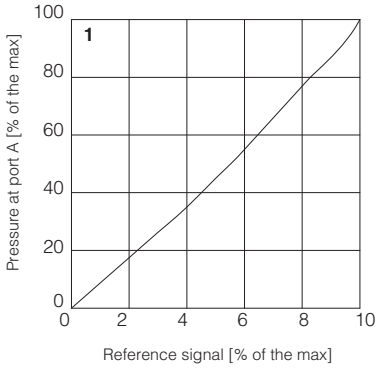


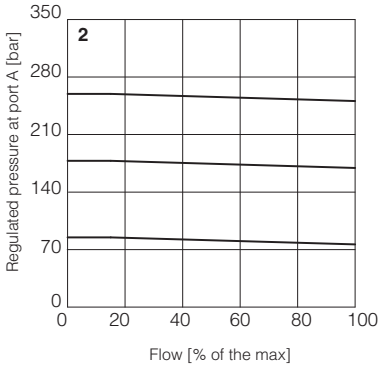


15 DIAGRAMS AGRCZA (based on mineral oil ISO VG 46 at 50 °C)

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

2 Pressure/flow diagrams
with reference pressure set with Q = 10 l/min

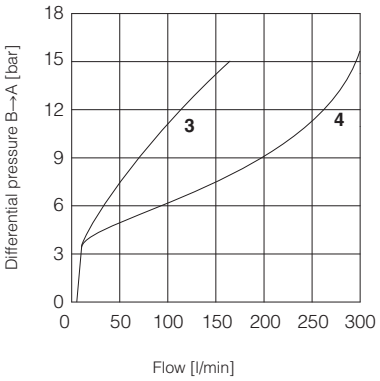


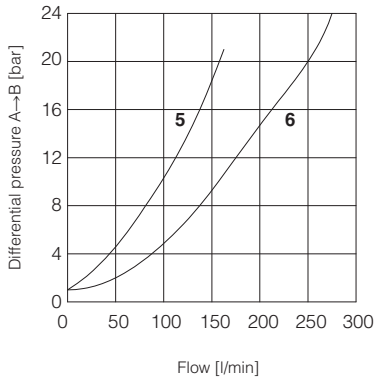


3-6 Pressure drop/flow diagrams
with zero reference signal

Differential pressure B→A
3 = AGRCZA-*-10
4 = AGRCZA-*-20

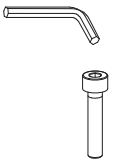
Differential pressure A→B (through check valve)
5 = AGRCZA-*-10/*/R
6 = AGRCZA-*-20/*/R



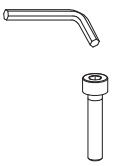


16 FASTENING BOLTS AND SEALS

16.1 RZGA, HZGA and KZGA valves

	RZGA-A-010	RZGA-A-033	HZGA-A-031	KZGA-A-031
	**Fastening bolts:** 4 socket head screws M5x50 class 12.9 Tightening torque = 8 Nm	**Fastening bolts:** 4 socket head screws M5x50 class 12.9 Tightening torque = 8 Nm	**Fastening bolts:** 4 socket head screws M5 class 12.9 Tightening torque = 8 Nm	**Fastening bolts:** 4 socket head screws M6 class 12.9 Tightening torque = 16 Nm
	**Seals:** 2 OR 108 Diameter of ports P, T: Ø 5 mm (max)	**Seals:** 4 OR 108 Diameter of ports P, T: Ø 7,5 mm (max)	**Seals:** 4 OR 108 Diameter of ports P, T: Ø 7,5 mm	**Seals:** 5 OR 2050 Diameter of ports P, A, B, T: Ø 11,5 mm (max) 1 OR 108 Diameter of port Y: Ø 5 mm

16.2 AGRCZA valves

	AGRCZA-A-10	AGRCZA-A-20
	**Fastening bolts:** 4 socket head screws M110x45 class 12.9 Tightening torque = 70 Nm	**Fastening bolts:** 4 socket head screws M110x45 class 12.9 Tightening torque = 70 Nm
	**Seals:** 2 OR 3068 Diameter of ports A, B: Ø 14 mm 2 OR 109/70 Diameter of ports X, Y: Ø 5 mm	**Seals:** 2 OR 4100 Diameter of ports A, B: Ø 22 mm 2 OR 109/70 Diameter of ports X, Y: Ø 5 mm

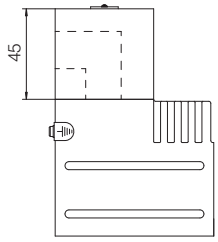
17 INSTALLATION DIMENSIONS FOR RZGA [mm]

RZGA-A-010

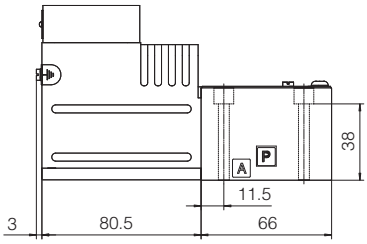
ISO 4401: 2005 (see table P005)
Mounting surface: 4401-03-02-0-05
(without port B)

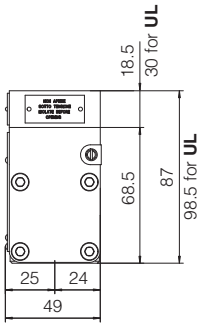
Mass [kg]	
RZGA-A-010	2,7
Option /O	+0,35

option /O



RZGA-A-010*



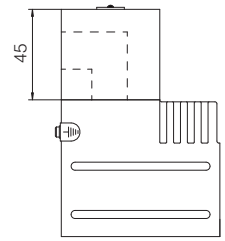


RZGA-A-033

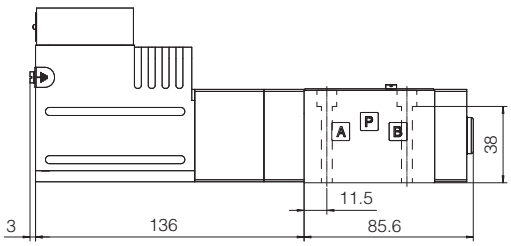
ISO 4401: 2005 (see table P005)
Mounting surface: 4401-03-02-0-05
(ports A and B connected to port T)

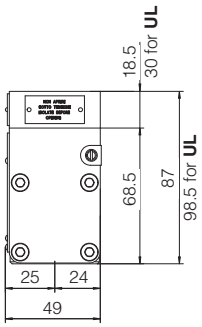
Mass [kg]	
RZGA-A-033	3,7
Option /O	+0,35

option /O



RZGA-A-033*



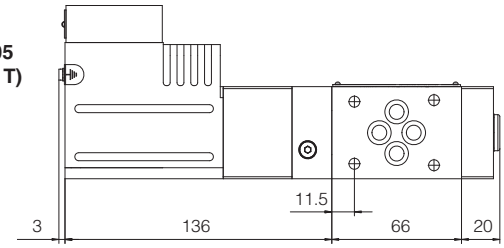


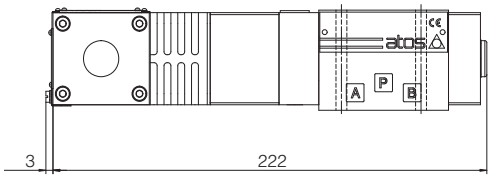
18 INSTALLATION DIMENSIONS FOR HZGA and KZGA [mm]

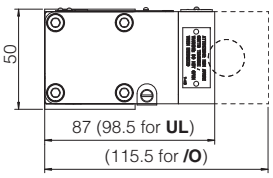
HZGA-A-031

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

Mass [kg]	
HZGA-A-031	3,7
Option /O	+0,35



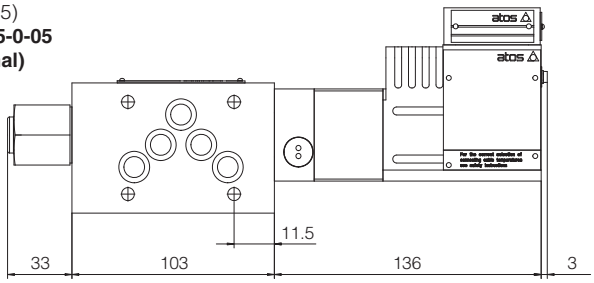


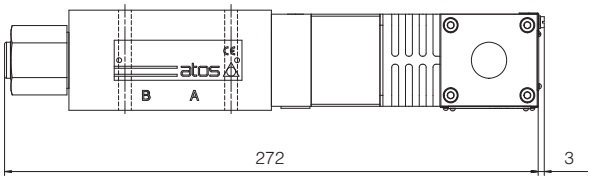


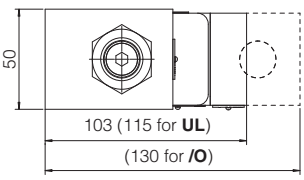
KZGA-A-031

ISO 4401: 2005 (see table P005)
Mounting surface: 4401-05-05-0-05
(without X port, Y port optional)

Mass [kg]	
KZGA-A-031	3,7
Option /O	+0,35







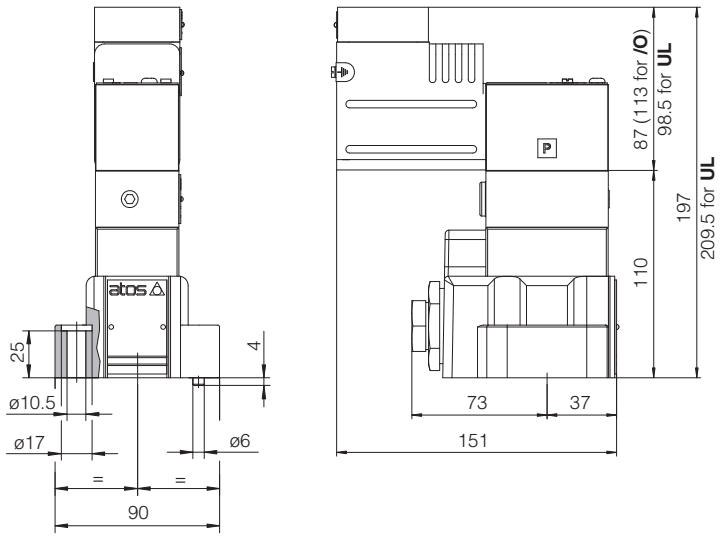
19 INSTALLATION DIMENSIONS FOR AGRCZA [mm]

AGRCZA-A-10

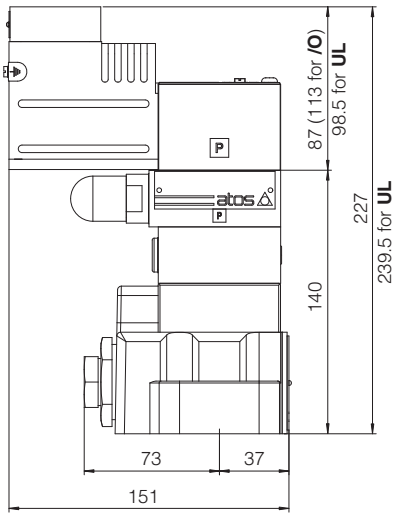
ISO 5781: 2000 (see table P005)
Mounting surface: 5781-06-07-0-00

Mass [kg]	
AGRCZA-A-10	5,7
Option /P	+0,5

AGRCZA-A-10



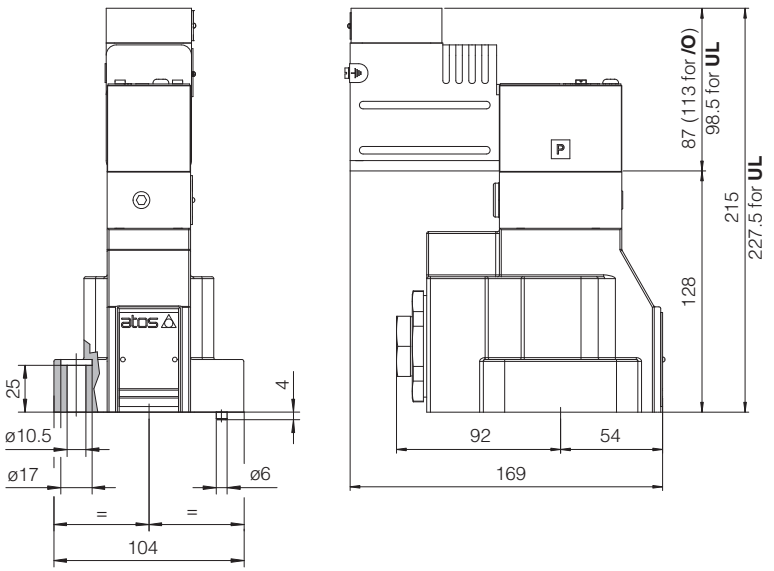
option /P

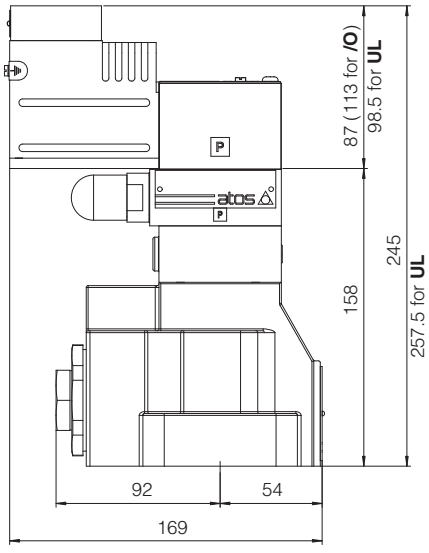


AGRCZA-A-20

ISO 5781: 2000 (see table P005)
Mounting surface: 5781-08-10-0-00

Mass [kg]	
AGRCZA-A-20	8,2
Option /P	+0,5





20 RELATED DOCUMENTATION

X010	Basics for electrohydraulics in hazardous environments
X020	Summary of Atos ex-proof components certified to ATEX, IECEX, EAC, PESO
X030	Summary of Atos ex-proof components certified to cULus
FX900	Operating and manintenance norms for ex-proof proportional valves
KX800	Cable glands for ex-proof valves
P005	Mounting surfaces for electrohydraulic valves