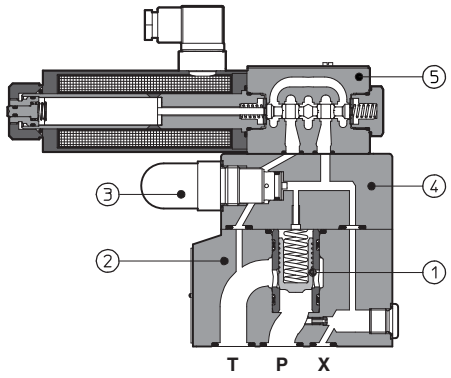
Intrinsically safe pressure relief valves

piloted, subplate or in line mounting - **ATEX, IECEx, EAC**



① main poppet
② valve main body
③ mechanical pressure limiter
④ cover
⑤ intrinsically safe pilot valve

AGAM-10/10/-WO**

AGAM, ARAM

Intrinsically safe pressure relief valves equipped with solenoid pilot valve for venting or multiple pressure selection, certified for safe operation in hazardous environment with potentially explosive atmosphere.

Certifications:

- Multicertification **ATEX**, **IECEx, EAC**: for gas group **II 1G** surface plants zone 0, 1, 2
- Multicertification **ATEX** and **IECEx**: **I M1** tunnels or mining plants

See section 7 for certification data

The valves must be electrically powered through specific "safety barriers" limiting the max current to the solenoid, see section 11.

AGAM: pressure relief, subplate mounting
Size: **10, 20** and **32** - ISO 6264
Max flow: **200, 400** and **600 l/min**

ARAM: pressure relief, threaded connections
Size: **G 3/4"** and **G 1 1/4"**
Max flow: **350** and **500 l/min**

Max pressure: **350 bar**

1 MODEL CODE

AGAM	/	*	-	20	/	20	/	210/100/100	-	WO	/	*	*	/	*

AGAM
Intrinsically safe pressure relief valves, piloted

AGAM
subplate mounting

ARAM
threated connections

Certification type:
- = Omit for Group II 1G
M = Group I (mining)

Valve size:
10 = AGAM (ISO 6264-06)
20 = AGAM (ISO 6264-08)
32 = AGAM (ISO 6264-10)
20 = ARAM G 3/4"
32 = ARAM G 1 1/4"

Configuration, see section 2 :
10 **20** **22**
11 **21** **32**

Max regulated pressure
of first (second / third) setting, see section 4 :
50 = 50 bar **100** = 100 bar
210 = 210 bar **350** = 350 bar

WO = intrinsically safe pilot solenoid valve

Options (2):
E = external pilot
V = regulating handweel for pressure adjustment
WP = ⚠ prolonged manual override protected by rubber cap
Y = external drain

Series number

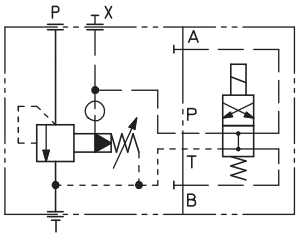
Seals material, see section 6 :
- = NBR
PE = FKM
BT = HNBR **(1)**

(1) Not for certification **M** Group I **(mining)**
(2) Possible combined options: all combinations are available

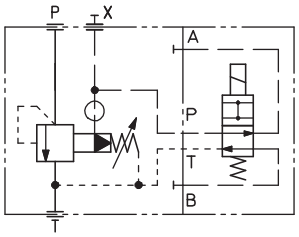
⚠ The pressure at T port makes difficult the manual override operation that can be possible only if its value is lower than 50 bar

2 CONFIGURATIONS AND HYDRAULIC SYMBOLS

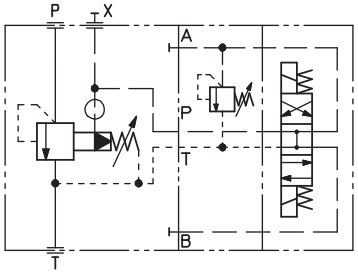
AGAM-/10**
ARAM-/10**
one setting pressure
+ venting with
de-energized solenoid



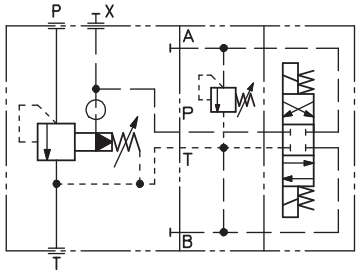
ARAM-/11**
AGAM-/11**
one setting pressure
+ venting with
energized solenoid



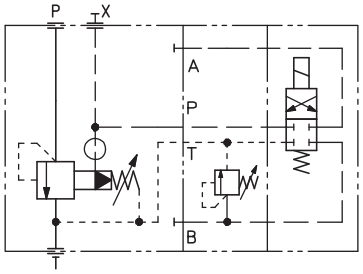
AGAM-/20**
ARAM-/20**
two setting pressure
+ venting with
de-energized solenoid



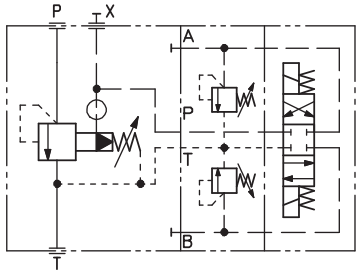
AGAM-/21**
ARAM-/21**
two setting pressure
+ venting with
energized solenoid



AGAM-/22**
ARAM-/22**
two setting pressure
without venting



AGAM-/32**
ARAM-/32**
three setting pressure
without venting



3 GENERAL CHARACTERISTICS

Assembly position	Horizontal position only
Subplate surface finishing to ISO 4401	Acceptable roughness index, Ra ≤0,8 recommended Ra 0,4 - flatness ratio 0,01/100
MTTFd values according to EN ISO 13849	75 years, for further details see technical table P007
Ambient temperature	**Standard** = -20°C ÷ +60°C **/PE** option = -20°C ÷ +60°C **/BT** option = -40°C ÷ +60°C
Storage temperature range	**Standard** = -20°C ÷ +70°C **/PE** option = -20°C ÷ +70°C **/BT** option = -40°C ÷ +70°C
Surface protection	Zinc coating with black passivation - salt spray test (EN ISO 9227) > 200h
Compliance	Intrinsically safe protection “Ex ia”, see section 7 RoHs Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

4 HYDRAULIC CHARACTERISTICS

Valve size		**10**	**20**	**32**
Max operating pressure	[bar]	port P = **350** port T, Y = **210**		
Max regulated pressure	[bar]	**50**	**100** **210**	**350**
Pressure range	[bar]	4÷50;	6÷100; 7÷210;	8÷350
Max flow **AGAM (1)**	[l/min]	200	400	600
Max flow **ARAM (1)**	[l/min]	-	350	500

(1) see diagrams at section 11 and 12

5 ELECTRICAL CHARACTERISTICS - see also section 7

Nominal resistance at 20°C	157 Ω
Coil insulation	Class H
Minimum supply current	70mA
Protection degree	IP65; IP66/IP67 with mating connector suitable for the protection class
Duty factor	100%
Electrical connector	DIN 43650 2 pin+GND

6 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	15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s		
Max fluid contamination level	ISO 4406 class 20/18/15 NAS 1638 class 9, see also filter section at www.atos.com or KTF catalog		
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	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

7 CERTIFICATION DATA

Valve type		AGAM, ARAM			AGAM**/M**, ARAM**/M**
Certification		**ATEX, IECEx** (Group II), **EAC**			**ATEX, IECEx** (Group I)
Solenoid code		**COW-150**			**COW-150/M**
Type examination certificate **(1)**		ATEX: TUV IT 22 ATEX 051X; EAC:RU C - IT.AЖ38.B.00425/21 IECEx: IECEx TPS 22.0057X;			ATEX: TUV IT 22 ATEX 051X IECEx: IECEx TPS 22.0057x
Method of protection		• ATEX, Ex II 1G Ex ia IIC T6 Ga Ex II 1G Ex ia IIC T5 Ga • IECEx Ex ia IIC T6 Ga Ex ia IIC T5 Ga • EAC 1Ex ia IIC T6/T5 Ga X			• ATEX, Ex I M1 Ex ia I Ma • IECEx Ex ia I Ma
Temperature class		**T6**		**T5**	**-**
Electrical characteristics (max values)	Ci , Li	≅ 0	≅ 0	≅ 0	≅ 0
	Ui [V]	30V	30V	30V	30V
	Ii [mA]	800mA	2200mA	2200mA	2200mA
	Pi [W]	3W	6.82W	6.82W	6.82W
Ambient temperature		Standard: -40 ÷ +60°C /BT option: -40 ÷ +60°C	Standard: -40 ÷ +45°C /BT option: -40 ÷ +45°C	Standard: -40 ÷ +60°C /BT option: -40 ÷ +60°C	Standard: -40 ÷ +60°C /BT option: -40 ÷ +60°C
Applicable standards		EN 60079-0 EN 60079-11		IEC 60079-0 IEC 60079-11	

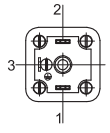
(1) The type examinator certificates can be downloaded from www.atos.com

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

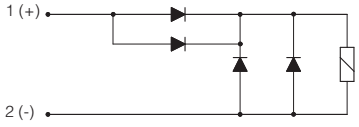
8 EX PROOF SOLENOIDS WIRING

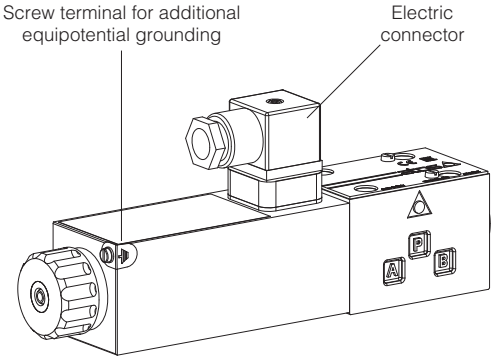
Connector wiring	
1	Coil +
2	Coil -
3	GND

ELECTRIC CONNECTOR
DIN 43650



INTERNAL ELECTRICAL SCHEME





9 OPTIONS

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 ¼").

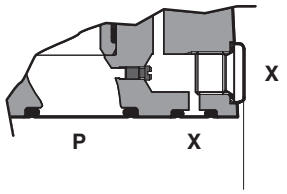
V = Regulating handweel for pressure adjustment

WP = Manual override protect by metallic cap

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 ¼" available on the pilot stage body.

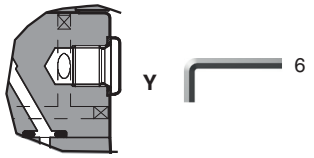
9.1 Possible combined options: all combinations are available

E option



Blinded plug SP-X100A

Y option



10 INTRINSICALLY SAFE BARRIERS - see tech. table **GX010**

Intrinsically safe valves must be powered through safety barriers certified according to Ex-i protection mode, limiting the energy to the solenoid.

To select the proper intrinsically safe barriers following data must be considered:
1) Vmax and Imax of the solenoid as specified in section 7 must not be exceeded also in fault conditions;
2) For proper operation, the minimum supply current value must be provided (such as 90mA for coil 108 Ω, with Y-BXNE 412).

The barriers type **Y-BXNE 412** are galvanically isolated electronic devices, complying with European Norms EN60079-0/06, EN60079-11/07 and ATEX certified according to protection mode Ex ia IIC.

The barriers Y-BXNE-412 are double channel type, suitable to operate valves with double or single solenoid. Two single solenoid valves can be connected to the barrier (one to each channel) but they cannot be contemporary operated.

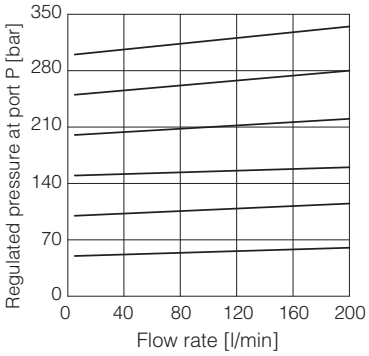
MODEL CODE OF I.S. BARRIER

Y-BXNE 412 00	*

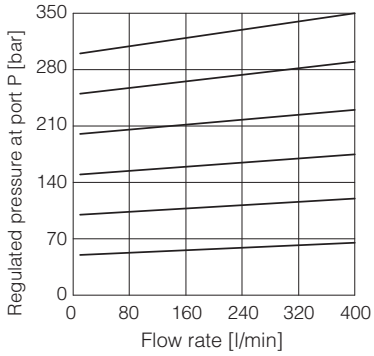
Supply voltage
E = 110/230 VAC
2 = 24÷48 VDC

11 REGULATED PRESSURE VERSUS FLOW DIAGRAMS based on mineral oil ISO VG 46 at 50°C

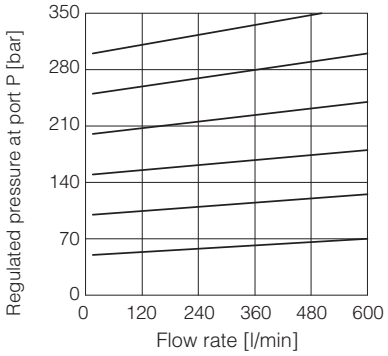
AGAM-10



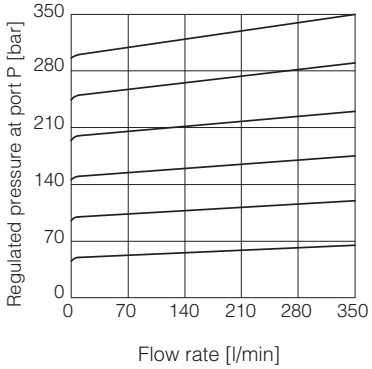
AGAM-20



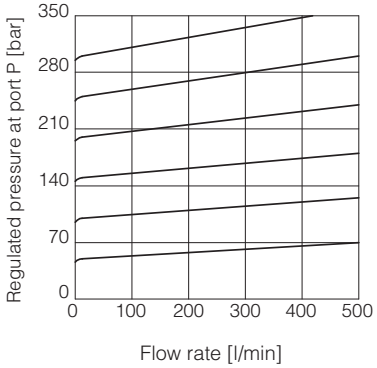
AGAM-32



ARAM-20

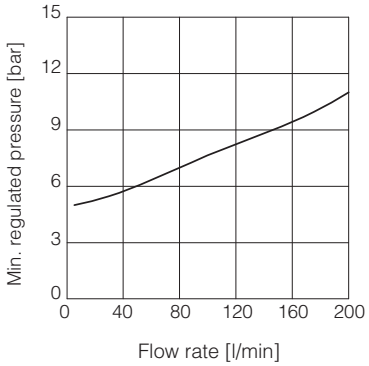


ARAM-32

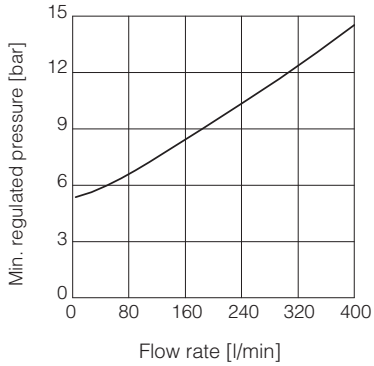


12 MINIMUM PRESSURE VERSUS FLOW DIAGRAMS based on mineral oil ISO VG 46 at 50°C

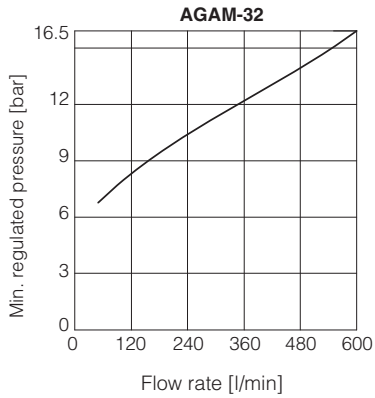
AGAM-10



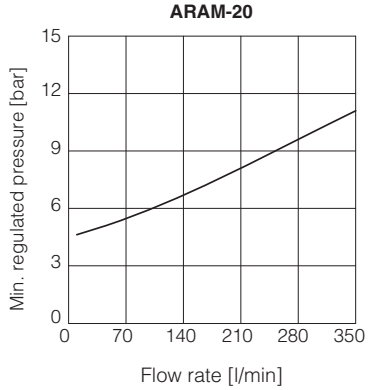
AGAM-20



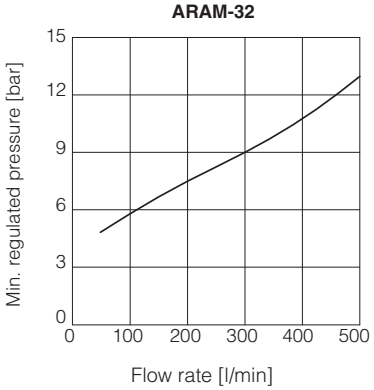
AGAM-32



ARAM-20

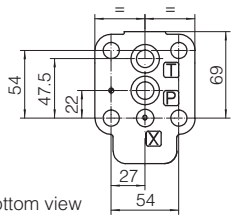


ARAM-32



13 INSTALLATION DIMENSIONS FOR AGAM-*-WO [mm]

AGAM-10

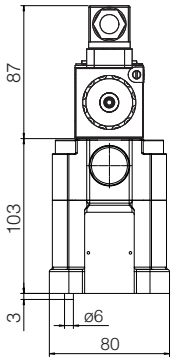


Valve's bottom view

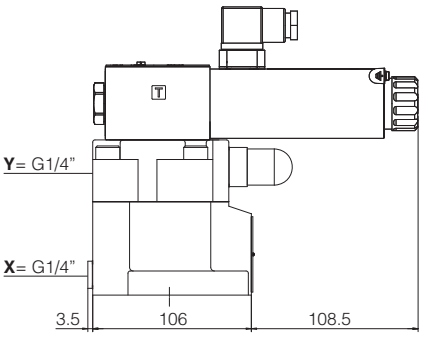
ISO 6264: 2007 (see table P005)
Mounting surface: 6264-06-09-1-97
Fastening bolts:
4 socket head screws M12x35 class 12.9
Tightening torque = 125 Nm
Seals: 2 OR 123; 1 OR 109/70
Ports P, T: Ø = 14,5 mm
Ports X: Ø = 3,2 mm

X = port connection for external pilot (option /E)
Y = port connection for external drain (option /Y)

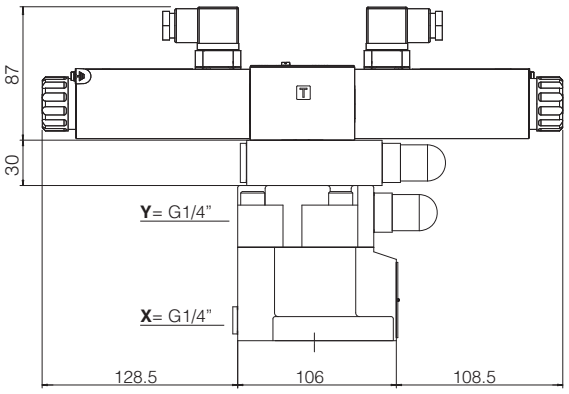
Mass [kg]	
AGAM-10/10 10/11	6,45
AGAM-10/20 10/21	7,55
AGAM-10/22 10/32	7,25 9



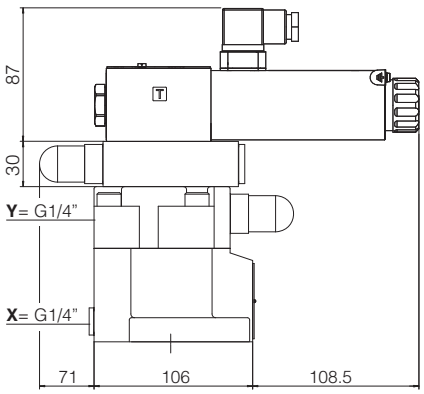
AGAM-10/10/-WO**
AGAM-10/11/-WO**



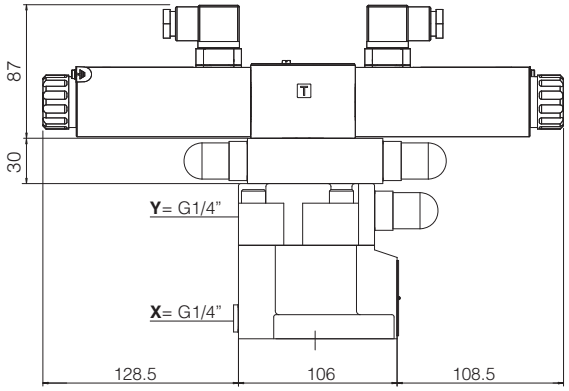
AGAM-10/20/-WO**
AGAM-10/21/-WO**



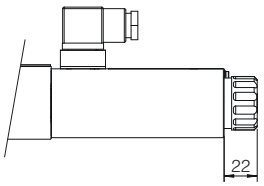
AGAM-10/22/-WO**



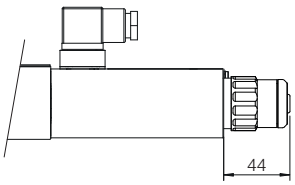
AGAM-10/32/-WO**



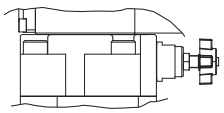
Standard



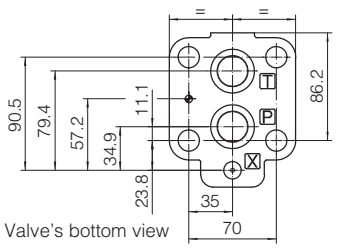
Option /WP



Option /V



AGAM-20

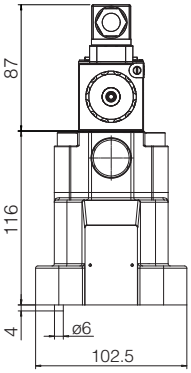


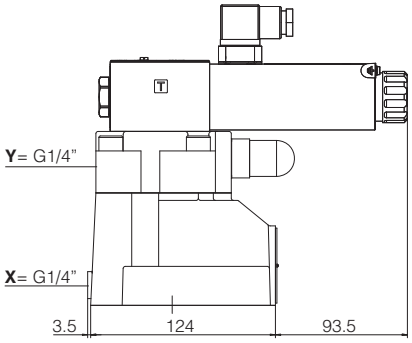
ISO 6264: 2007 (see table P005)
Mounting surface: 6264-08-11-1-97
Fastening bolts:
4 socket head screws M16x50 class 12.9
Tightening torque = 300 Nm
Seals: 2 OR 4112; 1 OR 109/70
Ports P, T: Ø = 24 mm
Ports X: Ø = 3,2 mm

X = port connection for external pilot (option /E)
Y = port connection for external drain (option /Y)

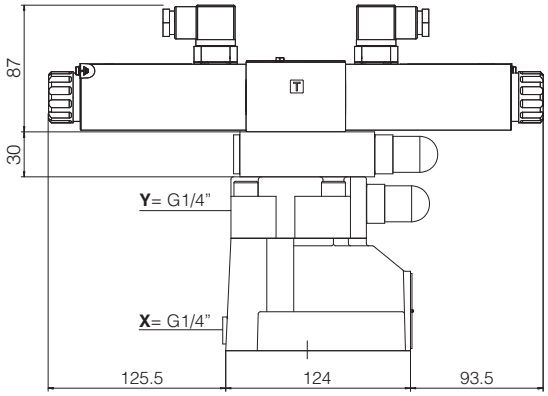
Mass [kg]	
AGAM-20/10 20/11	7,65
AGAM-20/20 20/21	8,75
AGAM-20/22 20/32	8,45 10,2

AGAM-20/10/-WO**
AGAM-20/11/-WO**

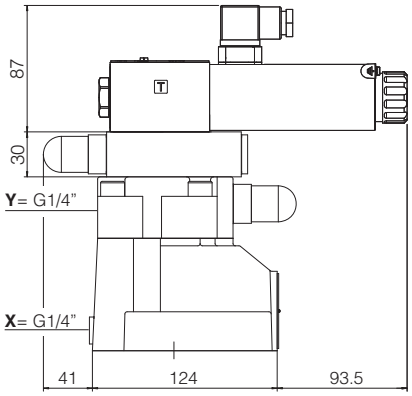




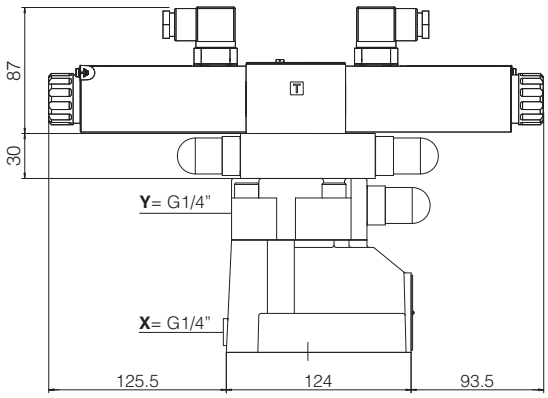
AGAM-20/20/-WO**
AGAM-20/21/-WO**



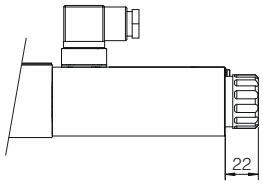
AGAM-20/22/-WO**



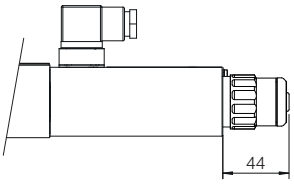
AGAM-20/32/-WO**



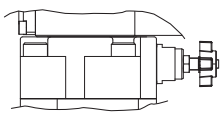
Standard



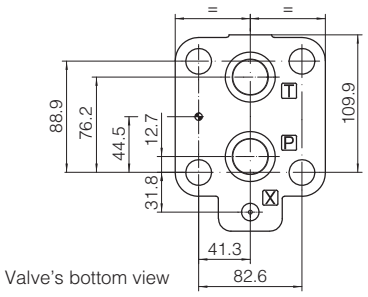
Option /WP



Option /V



AGAM-32

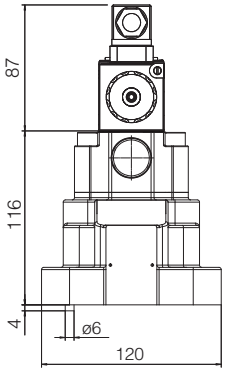


Valve's bottom view

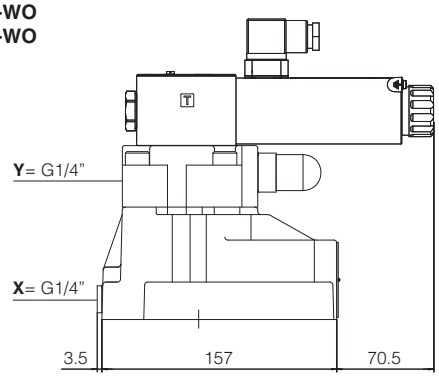
ISO 6264: 2007 (see table P005)
Mounting surface: 6264-10-17-1-97
(with M20 fixing holes instead of standard M18)
Fastening bolts:
4 socket head screws M20x60 class 12.9
Tightening torque = 600 Nm
Seals: 2 OR 4131; 1 OR 109/70
Ports P, T: Ø = 28,5 mm
Ports X: Ø = 3,2 mm

X = port connection for external pilot (option /E)
Y = port connection for external drain (option /Y)

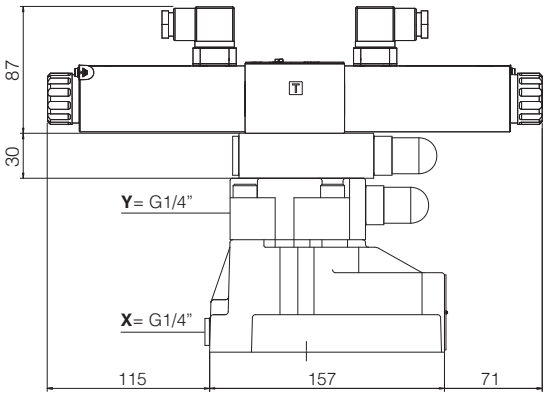
Mass [kg]	
AGAM-32/10 32/11	9,05
AGAM-32/20 32/21	10,05
AGAM-32/22 32/32	9,85 11,6



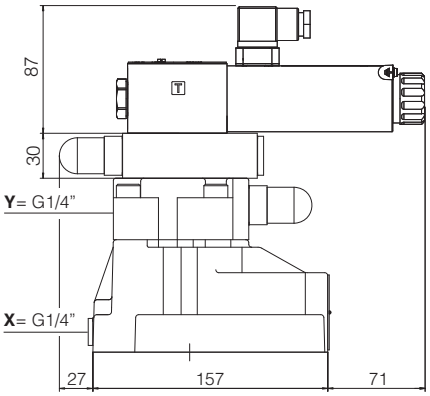
AGAM-32/10/-WO**
AGAM-32/11/-WO**



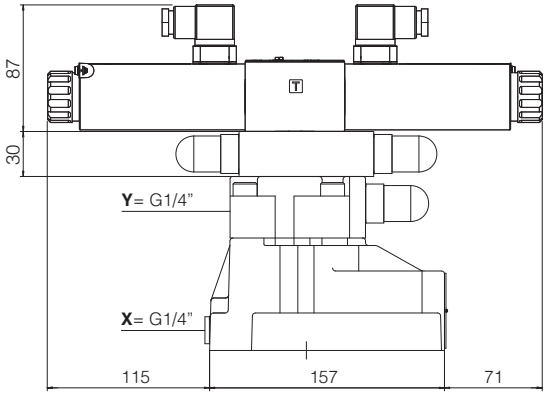
AGAM-32/20/-WO**
AGAM-32/21/-WO**



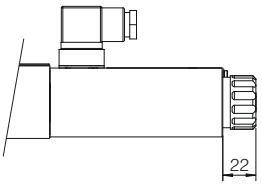
AGAM-32/22/-WO**



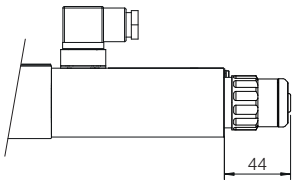
AGAM-32/32/-WO**



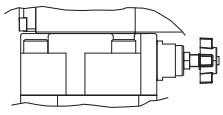
Standard



Option /WP



Option /V

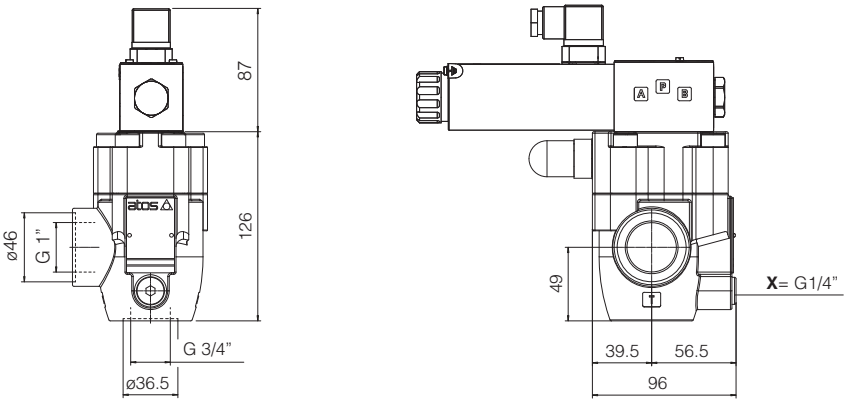


ARAM-20

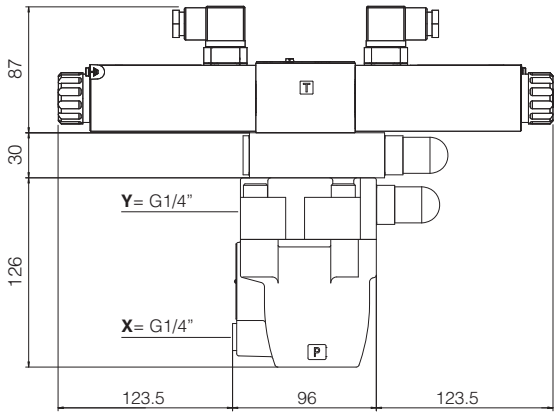
X = port connection for external pilot (option /E)
Y = port connection for external drain (option /Y)

Mass [kg]	
ARAM-20/10 20/11	6,75
ARAM-20/20 20/21	8,45
ARAM-20/22 20/32	8,15 10,1

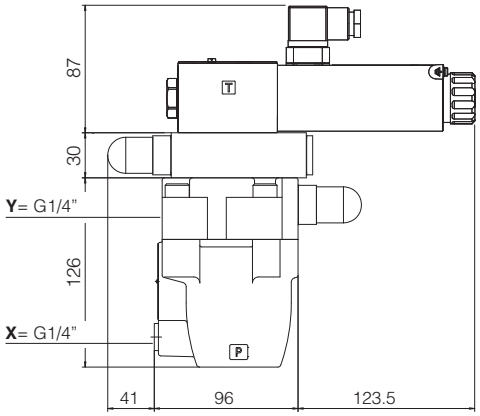
ARAM-20/10/-WO**
ARAM-20/11/-WO**



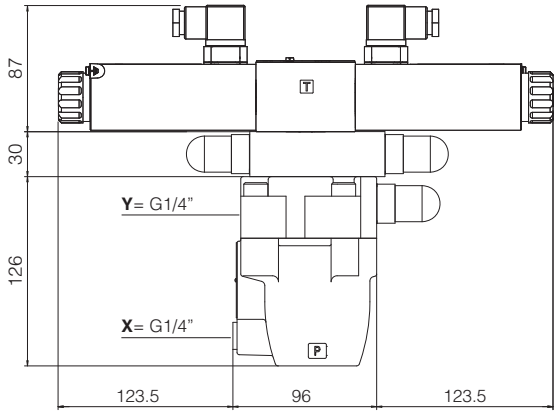
ARAM-20/20/-WO**
ARAM-20/21/-WO**



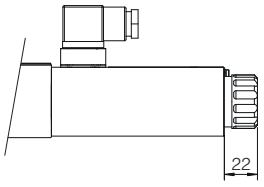
ARAM-20/22/-WO**



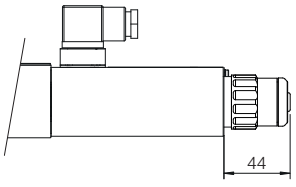
ARAM-20/32/-WO**



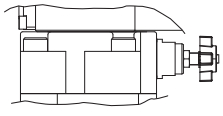
Standard



Option /WP



Option /V

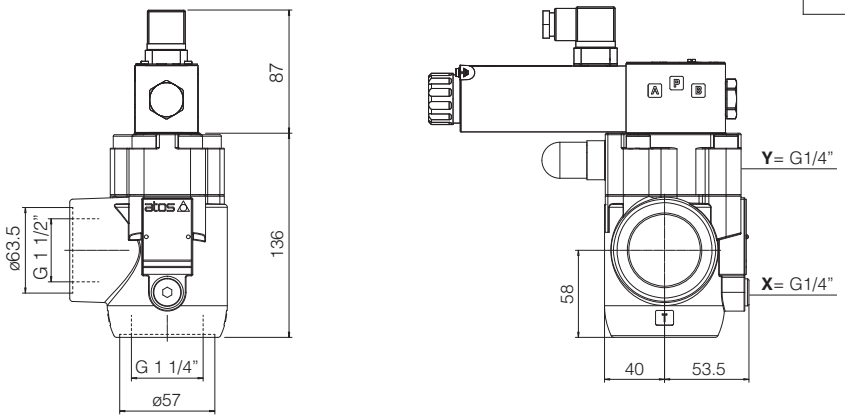


ARAM-32

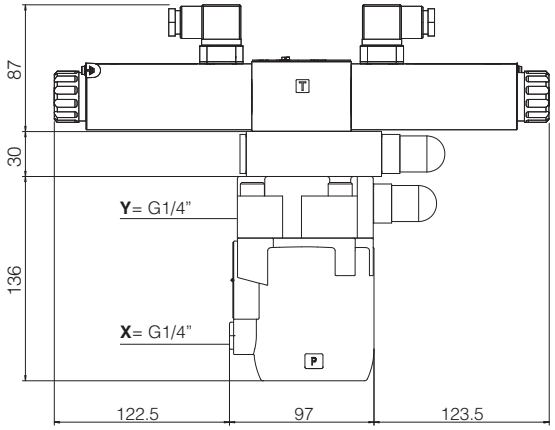
X = port connection for external pilot (option /E)
Y = port connection for external drain (option /Y)

Mass [kg]	
ARAM-32/10 32/11	7,05
ARAM-32/20 32/21	9,05
ARAM-32/22 32/32	8,55 10,7

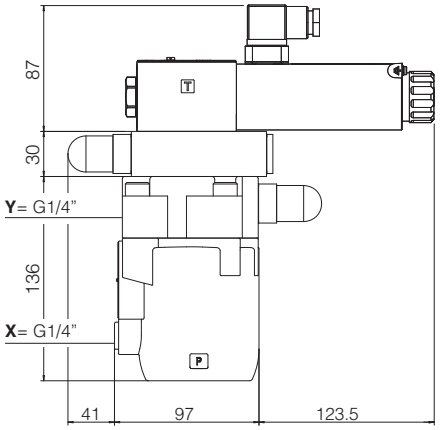
ARAM-32/10/-WO**
ARAM-32/11/-WO**



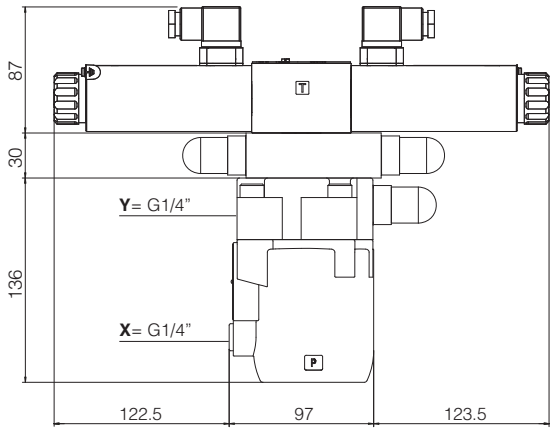
ARAM-32/20/-WO**
ARAM-32/21/-WO**



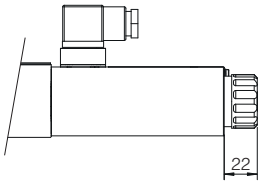
ARAM-32/22/-WO**



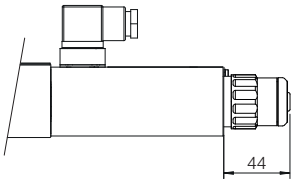
ARAM-32/32/-WO**



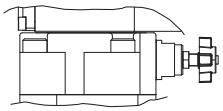
Standard



Option /WP



Option /V



15 RELATED DOCUMENTATION

X010	Basics for electrohydraulics in hazardous environments
X050	Summary of Atos intrinsically safe components certified to ATEX, IECEx, EAC
EX950	Operating and maintenance information for intrinsically safe valves
P005	Mounting surfaces for electrohydraulic valves