INSTALLATION GUIDE

DI 015 EN D

GRAVITRONIQUE

Described in EC-type examination certificate N°: LNE-27785

Issue	Date	Nature of modifications	Written by	Approved by
D	2017/09/14	Installation and sealing drawing New FORM DOC – Updating of drawings	DSM	XS
C	2016/11/15	Updating of drawings and electrical wiring	DSM	FB
B	2015/09/15	Non-return valve 0.03 bar, 4-relais electronic board	DSM	AH
A	2015/05/04	Creation	DSM	AH

CONTENTS

1. GENERAL RECOMMENDATIONS

IN ORDER TO AVOID ALL THE PROBLEMS CONCERNING THE INSTALLATION, THE OPERATION AND THE MAINTENANCE OF THE EQUIPMENTS, BEING ABLE TO CREATE INOPPORTUNE FAILURE, PLEASE RESPECT THE FOLLOWING RECOMMENDATIONS.

BEFORE ANY WORK, MAKE SURE THAT THE EQUIPMENTS ARE NOT POWERED.

1.1. MECANICAL RECOMMENDATIONS

⇨ Respect the recommendations of the instruction manual specifying the installation, operation and maintenance conditions of the ATEX equipment (instruction manual supplied with the equipment).

⇨ Take care to place the equipment in order to facilitate their installation, operation and maintenance by the technicians (working ergonomics).

⇨ Take care to position properly the equipment; the display must be readable without any difficulty.

⇨ Apply a tightening torque suitable with size and material of the fixation element except particular specifications mentioned on the presentation drawing or in the installation guides.

⇨ Mechanically protect the cables with the corrugated conduit if the cables are not ADR (corrugated conduit adapted to vehicles used for "carriage of dangerous goods of road" - hydrocarbons, LPG … - and meet the requirements of French standard NF R13-903).

⇨ Ensure there are a good mechanical strength and a good sealing between cable glands and cables, and between cable glands and corrugated conduit.

⇨ Respect cables and corrugated conduit radii of curvature.

⇨ Leave enough flexibility to wires in order to avoid any risk of stripping.

⇨ Allow the drainage of the water in the lower loop (siphon) of the corrugated conduit (not water retention inside the corrugated conduit).

1.2. ELECTRICAL RECOMMENDATIONS

⇨ Respect the recommendations of the instruction manual specifying the installation, operation and maintenance conditions of the ATEX equipment (instruction manual supplied with the equipment).

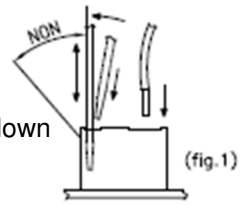
⇨ Connect the supply of the equipment downstream cut-out, on the power supply reserved to the measured distribution.

⇨ Put a delayed protection of 5A upstream the 24VDC supply to protect equipment in case of reverse polarity or overcurrent.

⇨ Use ADR specific cable, if it is not the case, use at minimum a cable resisting to hydrocarbons. Mechanically protect this cable with a corrugated conduit (corrugated conduit adapted to vehicles used for "carriage of dangerous goods by road" - hydrocarbons, LPG … - and meet the requirements of French standard NF R13-903).

⇨ Take care not to damage the terminals of the different electronic boards while wiring.

- Screw terminals: do not damage the screw heads of the terminals.
  - Use insulated lugs and insulated wire ferrules adapted to the section of wires.
- Spring terminals: do not block the springs (if a spring is blocked, the electronic board must be replaced).
  - Use flat screwdriver 0.4x2.5 (see fig.1).
  - Insert the screwdriver slightly tilted, then push it perpendicularly to the terminal.
  - Do not exceed the upright position when the screwdriver is down in order not to block the spring.
  - Insert or remove the wire and remove the screwdriver.



(fig.1)

⇨ Pass the power supply cores (24VDC truck) through the ferrites by carrying out a loop (ALMA supply).

⇨ Do not use wires of section higher than 1.5mm².

⇨ Do not insert more than two wires in a terminal, if necessary use an insulated twin wire ferrule (unless otherwise indicated).

⇨ Strictly respect the polarities of the input/output when wiring, in accordance with serigraphy on the cards and/or with the installation guide indications.

⇨ Whenever possible, perform a wired test, after wiring and before powering.

⇨ Whenever possible, respect the locations of the cables specified in the installation guide.

⇨ Equipment must be connected to the frame ground (external ground connection).

⇨ Whenever possible, use shielded cables with a 360° connection through the metal cable glands (see the documentation delivered with the equipment).

Otherwise, connect the shields to devices inside the equipment (ground terminal, earth bar, earth boss…).

⇨ Whenever possible, label the cables and cores according to the installation guide to facilitate the later maintenance operations.

⇨ Respect a homogeneous wire color code.

⇨ Printer TMU295: before positioning the printer on its support, check that configuration switches of the data link protocol, located under the printer, are well positioned: No3 on 'ON' and the 7 others on 'OFF'.

⇨ Current of the electrical devices:

Electrical devices	Supply voltage	Minimum current	Maximum current
MICROCOMPT+	24VDC +/-10%	0.7 A	1.5 A
PRINTER	24VDC +/-10%	0.1 A	5.5 A (switch-on)

⇨ Color code according to DIN 47100.

⇨ Code for designation of colours according to IEC 60757 (except FR codes):

FR				EN	IT	ES	DE
Couleurs	Codes		Standard codes CEI 60757	Colours	Colori	Colores	Farbe
Blanc	**Bc**		**WH**	White	Bianco	Blanco	Weiß
Marron	**Mr**		**BN**	Brown	Marrone	Marrón	Braun
Vert	**Vt**		**GN**	Green	Verde	Verde	Grün
Jaune	**Jn**		**YE**	Yellow	Giallo	Amarillo	Gelb
Gris	**Gr**		**GY**	Grey	Grigio	Gris	Grau
Rose	**Rs**		**PK**	Pink	Rosa	Rosa	Lila
Bleu	**Bl**		**BU**	Blue	Blu	Azul	Blau
Rouge	**Rg**		**RD**	Red	Rosso	Rojo	Rot
Noir	**Nr**		**BK**	Black	Nero	Negro	Schwarz
Violet	**Vi**		**VL**	Violet	Viola	Violeta	Violett
Orange	**Or**		**OG**	Orange	Arancio	Naranja	Orange
Vert/Jaune	**V/J**		**GNYE**	Green/Yellow	Verde/Giallo	Verde/Amarillo	Grün/Gelb

1.3. PNEUMATIC RECOMMENDATIONS

⇨ Air must be filtered – from 40 to 20µm. Specific recommendations may be added in the installation guides or on the presentation drawings.

⇨ The air lubrication must be permanent and correct to avoid any damage on the pneumatic components.

⇨ The air supply pressure to the inlet of the equipment must be at least 6 bar and max 8 bar. Specific recommendations may be added in the installation guides or on the presentation drawings.

⇨ The pneumatic supply pipes (6/4) must be cut straight (no slanting cut) and should not be crushed after cutting to prevent leakage on fittings.

⇨ Respect the radii of curvature of the pneumatic pipes indicated by the manufacturer.

⇨ Use colored pneumatic pipes to ease maintenance operation.

⇨ In no case the exhaust holes of the pneumatic organs should be plugged, obstructed, unless if that is clearly specified in the installation guides or on presentation drawings.

⇨ The use of muffler is not allowed under any circumstances (fouling, frost…). Put a pneumatic pipe of sufficient length, pointed downwards, so that its end is placed in a protected area (L = 100 mm min.).

⇨ Pressure unit conversion:

PRESSURE UNIT CONVERSION				
Unités	**Bar**	**PSI**	**Pascal**	**kg/cm²**
1 Bar =	1	14,5	100 000 ($1x10^5$)	1,0197
1 PSI =	0.069	1	6894,5	0,07031
1 Pascal =	$1x10^{-5}$	$14,5x10^{-5}$	1	$1,0197x10^{-5}$
1 kg/cm² =	0,98	14,22	98066,5	1

PSI = Pound per Square Inch (livre par pouce carré)
1 bar = 100 kPa = 0.1 MPa (1 MPa = 10 bar)

2. GENERAL PRESENTATION

2.1. USE ACCORDING TO MID CERTIFICATE

The GRAVITRONIQUE measuring system is covered by the EC type examination certificate N° LNE-27785. Refer to this certificate for any precision about its installation.

For the sealing plan, see Annex to EC type examination certificate N° LNE-27785.

2.2. SPECIAL CONDITIONS FOR INSTALLATION IN ANY CASES

- ⇨ Connection pipework between the compartments and the manifold, as between the manifold and the selection valves must have a minimum gradient of 3%.
- ⇨ Pumped mode: Connection pipework between the selection valve for pumped mode and the pump entry should not include reverse slopes.

  If the measuring system is fitted with several delivery points, it needs to be equipped with a device allowing a liquid delivery by only one point at once.
- ⇨ Gravity mode: If appropriate, the connection pipework between the selection valve for gravity mode and decanting valve must have a minimum gradient of 3%. The vehicle on which the measuring system is installed should have a device to check its horizontality.

3. PART LIST

EQUIPMENTS INCLUDED IN THE MEASURING SYSTEM DELIVERED BY ALMA				
Item	**Equipment**	**Designation**	**Qty**	**Option***
1		**CALCULATOR INDICATOR MICROCOMPT+ GRAVITRONIQUE** (Provided with a magnetic or RFID supervisor key)	1	
2		**CONTROL BOX GRAVITRONIQUE**	1	
3		**ADRIANE TURBINE METER DN100-80 243 TTMA with sightglass** (Depending on configuration)	1	
		**ADRIANE TURBINE METER DN80-80 243 110x110** (Depending on configuration)		

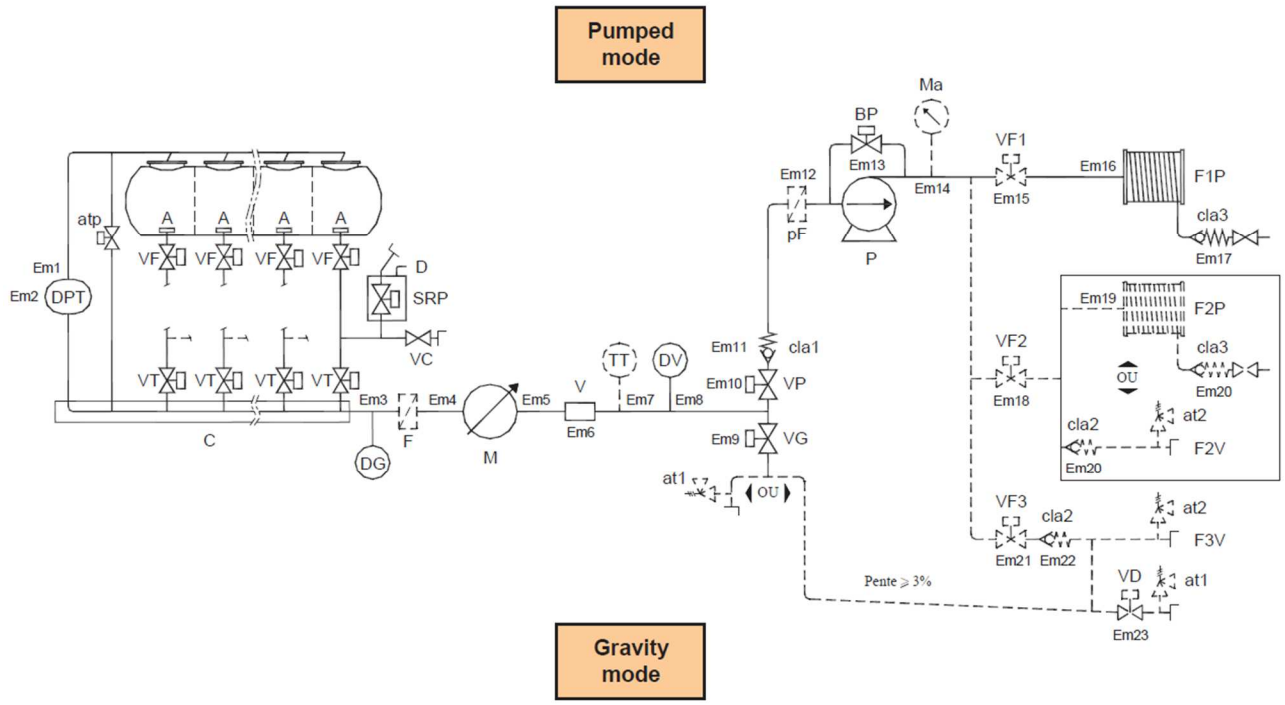
Non-contractual pictures

EQUIPMENTS INCLUDED IN THE MEASURING SYSTEM DELIVERED BY ALMA				
Item	**Equipment**	**Designation**	**Qty**	**Option***
4		**DIFFERENTIAL PRESSURE TRANSMITTER – CP3000 ATEX**	**1**	
5		**NC/NO ATEX SOLENOID VALVES KIT**	**1**	
6		**END-OF-METERING PROBE – DG3001/75** (Supplied if not mounted on the manifold)	**1**	
		VACUITY SENSOR – DG3001/75 (Supplied if not mounted on the manifold)	**1**	
7		**PRINTER TMU-295** (Printer – power supply cable – serial link cable 10m)	**1**	
8		**CONVERTER 24VDC/24VDC 2.1A 50W** (Printer power supply 24VDC)		
9		**VACUUM BREAKER**	**1**	
10		**DN80 NON-RETURN VALVE KIT 0.03 bar**	**1**	
		DN80 NON-RETURN VALVE KIT 0.3 bar (Supplied with an empty hose)	**1**	●

EQUIPMENTS INCLUDED IN THE MEASURING SYSTEM DELIVERED BY ALMA				
Item	**Equipment**	**Designation**	**Qty**	**Option***
11		**PNEUMATIC CONTROL VENT VALVE**	**1**	●
12		**Pt100 TEMPERATURE SENSOR – CT1001-Pe** (Supplied with thermowell)	**1**	●
13		**SIGHTGLASS KIT 110x110 ADRIANE TURBINE METER DN80** (Supplied with pre-drilled screws for sealing)	**1**	●
14		**KIT FOR MEASURING SYSTEM IDENTIFICATION PLATE** (Plate and sealing device)	**1**	●
Option*: equipment sold as an option by ALMA, it must be installed on the measuring system if required by the certificate.				

Non-contractual pictures

4. INSTALLATION AND SEALING DRAWING OF THE GRAVITRONIQUE



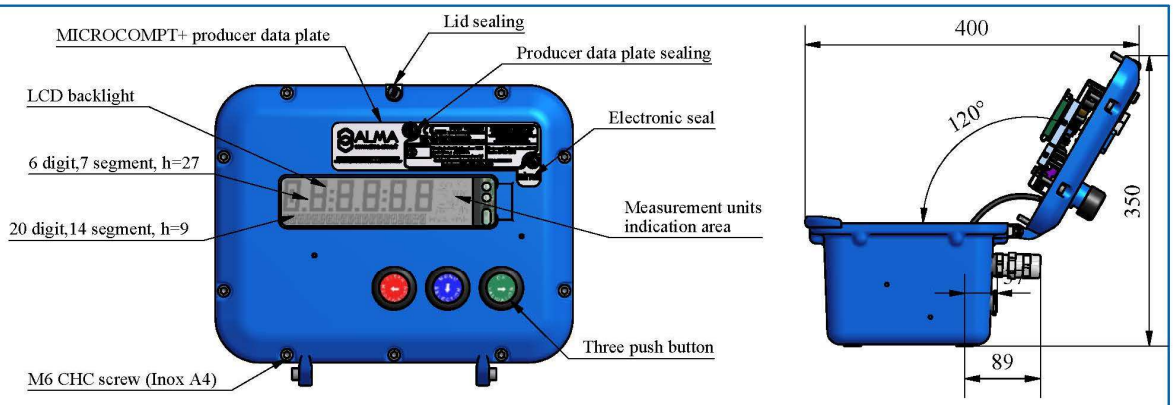
Legend:

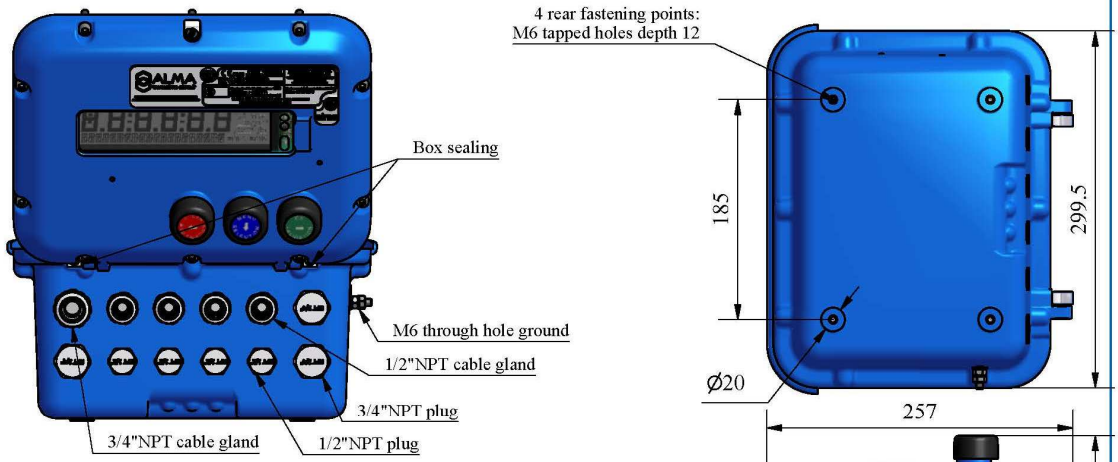
A: Anti-swirl device
DPT: Pressure sensor
atp: Guided release to the atmosphere
VF: Compartment bottom flap
VT: Selection valve installed on every compartment pipe and allowing transfer to the manifold
C: Manifold
D: Pressure relief control (secured)
SRP: Liquid Backup System on compartments
VC: Bottom loading valve installed on every compartment pipe (optional)
DG: gas sensor
F: Filter (optional if prefilter pF is installed)
M: Meter
V: sight glass (can be integrated to the meter)
TT: Temperature sensor PT100 (optional, and can be integrated to the meter)
DV: Optical vacuity sensor
VP: Selection valve pumped mode
VG: Selection valve gravity mode
at1, at2: Automatic release to the atmosphere
cla1: Non-return valve
pF: Pump prefilter (optional if filter F is installed)
P: Pump
BP: Pump by-pass
Ma: Manometer indicating the forcing back pressure of the pump (optional)
VF1, VF2, VF3: Device guided by the calculator, allowing, when the measuring system has several pumped delivery paths, to realize deliveries with one or another of theses paths (optional). Changing the delivery path is impossible during the measurement.
F1P, F2P: Full hose(s) on hose reel (F2P optional)
cla3: Valve calibrated with minimum pressure and preventing the emptying of the full hose.
cla2: Valve calibrated with minimum pressure at the maximum flowrate of an empty hose (optional)
F2V, F3V: Connection for empty hose (optional)
VD: Decanting gravity valve (optional)

Seals:

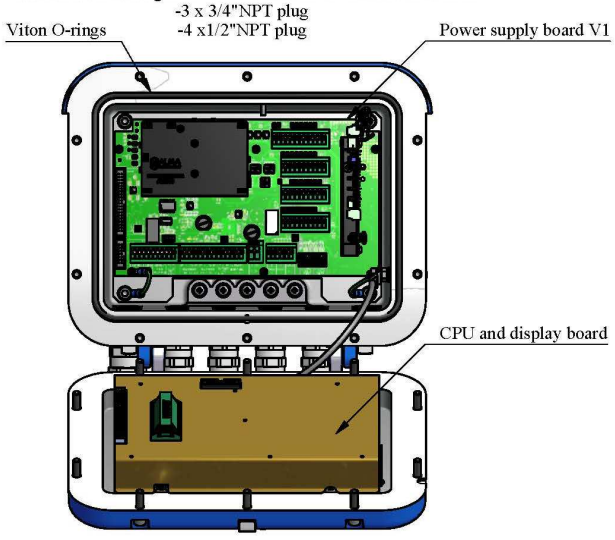
Em1: prevents the removal of pressure sensor DPT.
Em2: seals the pressure sensor adjustment.
Em3: prevents the removal of optical sensor DG-3001.
Em4: seals the inlet pipe of the meter.
Em5: prevents the removal of the meter.
Em6: prevents the removal of the sight glass (when not integrated into the meter).
Em7: prevents the removal of temperature sensor (TT).
Em8: prevents the removal of vacuity sensor type DG-3001 (DV).
Em9: prevents the removal of selection valve for gravity mode.
Em10: prevents the removal of selection valve for pumped mode.
Em11: prevents the removal of non-return valve for pumped mode.
Em12: prevents the removal of the prefilter.
Em13: prevents the removal of the pump and the bypass.
Em14: prevents the removal of manometer.
Em15, Em18, Em21: prevent the removal of valves allowing the delivery with empty or full hose(s).
Em16, Em19: prevents the removal of full hose(s).
Em17, Em20, Em22: prevents the removal of calibrated non-return valves (transfer point).
Em23: prevents the removal of decanting valve (VD).

5. CALCULATOR-INDICATOR MICROCOMPT+ GRAVITRONIQUE





Configuration cable entries configuration:
-1 x 3/4"NPT cable gland - *Cable Ø5.5 to Ø13 - sheath Ø10 to Ø19*
-4 x 1/2"NPT cable gland - *Cable Ø4 to Ø10 - sheath Ø5 to Ø15*
-3 x 3/4"NPT plug
-4 x1/2"NPT plug



- ***Mass*** : ~12 Kg,
- ***Box protection level*** : IP66,
- ***Box material***: Aluminum alloy
- ***Metal finishing***: Color blue (RAL5010) resistant to hydrocarbons
- ***Temperature range*** : -20°c to +55°c,
- ***Environment class*** : I,
- ***EC-type examination certificate*** : INERIS 07 ATEX 0057X
- ***Complies with*** : EN 60079-0, 60079-1, 60079-11, Ex II2 (1)G Ex d [ia] IIB T6
- ***EC-type examination certificate***: LNE 15270, in conformity with 2001-387 decree and OIML R117,
- ***Evaluation certificate*** : LNE 13624, in conformity with 8.8 WELMEC guide

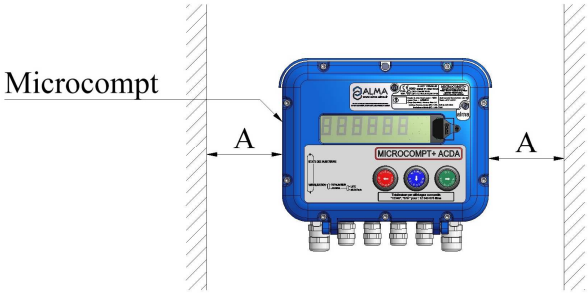
For a safe use of the MICROCOMPT+ electronic device, make sure to comply with the requirements of the instruction manual supplied with the equipment

ALMA www.alma-alma.fr Service Development 13127 Vitrolles		PRESENTATION DRAWING	**DFV094**			Description of the amendment N°396 Passage to interface power supply board V1 rev 11 New logo					
DEV N° : 973	Code : 3695	Microcompt+ Gravity metering									
Drawing N° associated with the related CET file		973	PPV094	I	7 /9	Modified on :	17/03/2015	by	CC	verified by	SR
Metro :	LNE-15270 / LNE13624	Dev N°	Drawing N°	Rev	Folio	Created on :	06/12/2010		CC		SR
ATEX:	INERIS 07 ATEX 00057X										

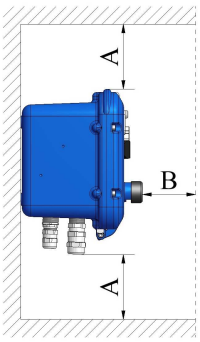
Document available on website alma-alma.fr

5.1. INSTALLATION RECOMMENDATIONS CALCULATOR-INDICATOR MICROCOMPT+

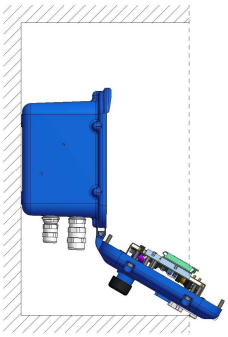
- Fasten the box with 4 M6 screws (holder suitable for vibrations and designed to support the MICROCOMPT). On the box: 4 M6 blind holes tapped length=12 over 185x132).
- Leave an open space around the box in order:
  - To facilitate maintenance operation.
  - To prevent any pressing on pushbuttons and on the glass.
- The space between the front face of the box and the cabinet door shall be sufficient.
- Dimensions: A > 100mm and B > 60mm



- SOLUTION 1: straight box if it's a breast height.

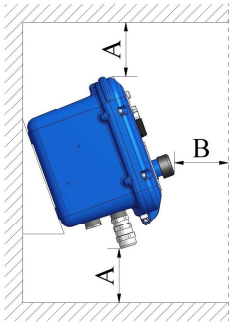


Left hand view
Closed box

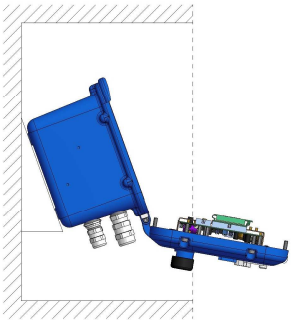


Left hand view
open box

- SOLUTION 2: 20° angle if it's not at breast height.



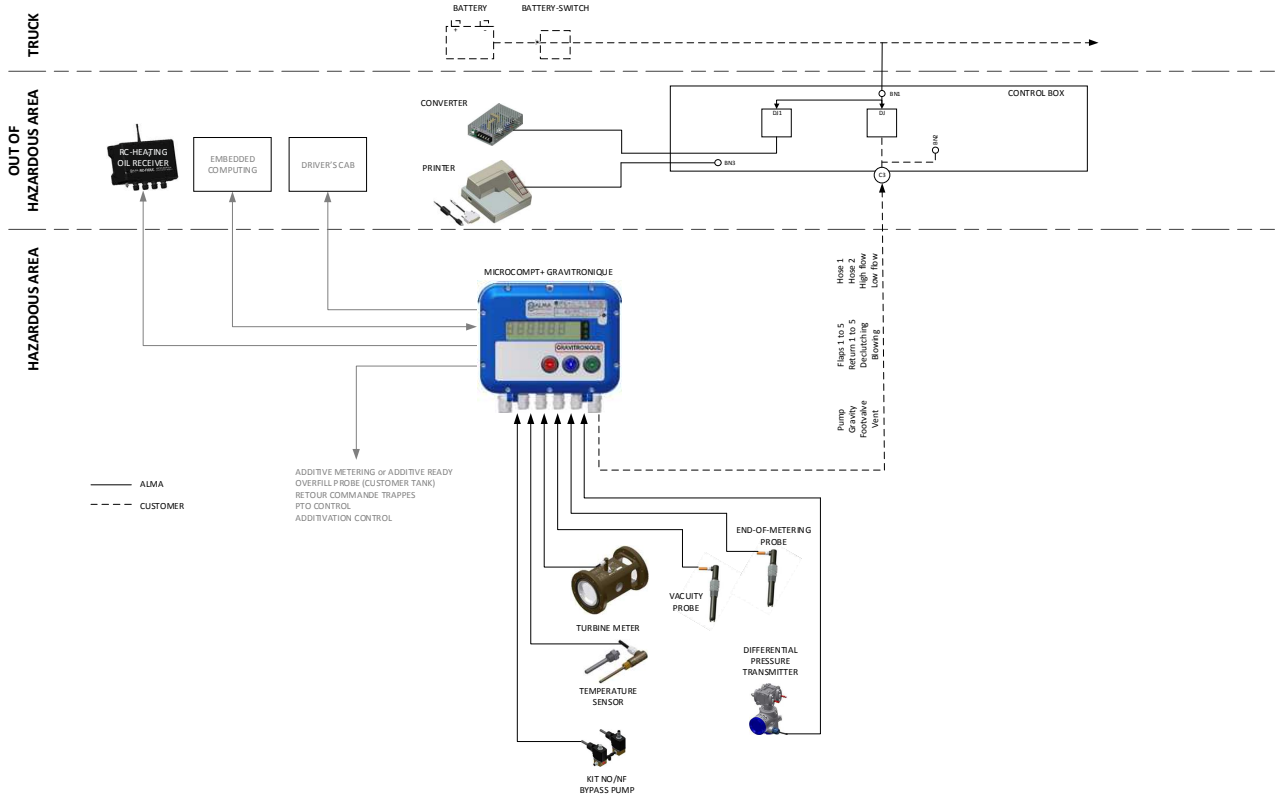
Left hand view
Closed box



Left hand view
open box

REFER TO THE INSTRUCTION MANUAL
(DELIVERED WITH THE EQUIPMENT OR AVAILABLE ON ALMA WEBSITE)

5.2. ELECTRICAL WIRING CALCULATOR-INDICATOR MICROCOMPT+

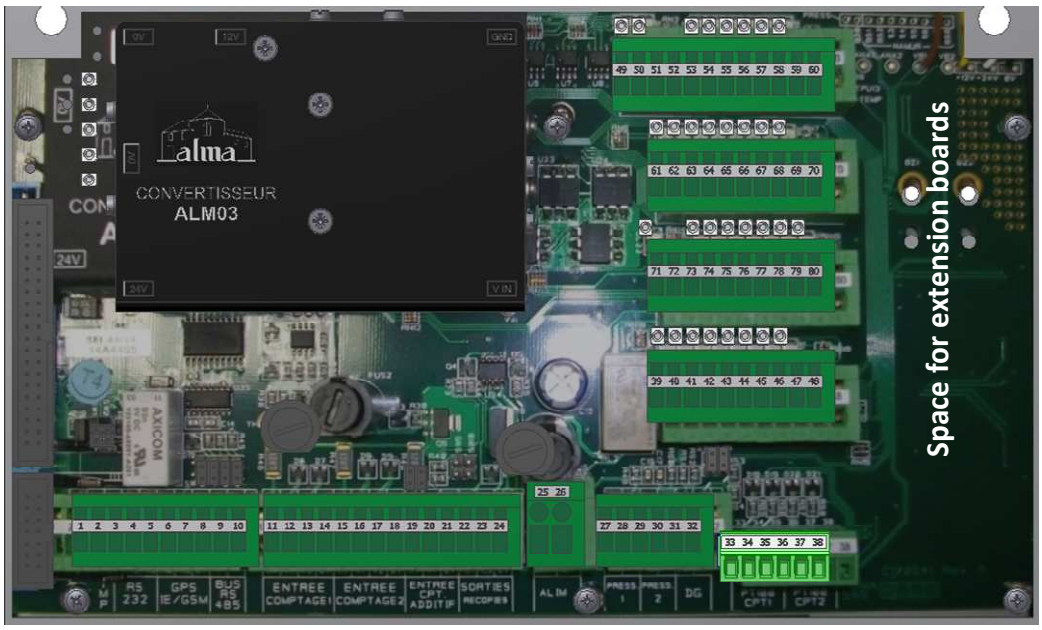


Terminal assignment of the interface power supply board

Any mass braids and shielding must be connected to the MICROCOMPT+ ground bar

TERMINAL ASSIGNEMENT OF MICROCOMPT+ BOARDS

INTERFACE POWER SUPPLY BOARD



EQUIPMENTS CONNECTED TO THE MICROCOMPT+								INTERFACE POWER SUPPLY BOARD			
Option	Equipment	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
	GRAVITRONIQUE CONTROL BOX	C2	1/2"NPT	●	2x1 sh.	Rx Printer		1	Tx	RS232 PRINTER	RS232 serial link
						Tx Printer		2	Rx		
●	EMBEDDED COMPUTING				3x0.34 sh.	0V		3	0V	RS232	Connect the shielding
						Rx E.C.		4	Tx		
						Tx E.C.		5	Rx		
●	EMBEDDED COMPUTING					Rx		9	+	BUS RS485	
						Tx		10	-		
	TURBINE TRANSMITTER EMA	C1	1/2"NPT	●	ADR 4x0.34 sh.	12V	Jn	11	12V	METERING INPUT 1	Connect the shielding
						V1	Mr	12	V1		
						V2	Vt	13	V2		
						0V	Bc	14	0V		
●	ADDITIVE METERING INPUT OR ADDITIVE READY					12V		19	12V	METERING INPUT 2	Connect the shielding
						V1		20	V1		
						0V		21	0V		
●	PT100 TEMPERATURE PROBE			●	ADR 3x0.6 sh.	+	Jn	33	+	PT100	Connect the shielding
						-	Bc	34	-		
						-	Vt	35	-		

EQUIPMENTS CONNECTED TO THE MICROCOMPT+								INTERFACE POWER SUPPLY BOARD			
Option	Equipement	Cable (forr information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
	GRAVITRONIQUE CONTROL BOX	C3	3/4"NPT		20x1	Pump	1	73	FET=Field Effect Transistor Outputs 24VDC (outputs FET 24V 5W max.)		Selection valve pumped distribution
						Gravi	2	79			Selection valve gravity distribution (in case of a double-stage API adaptor, Low Flow is operated with the gravity output control)
						Footvalve	3	44		Footvalve	
						Vent	4	45		Vent	Manifold vent control
						Flap 1	5	39		EV manifold flaps 1to 5	Opening-control flap 1
						Flap 2	6	40			Opening-control flap 2
						Flap 3	7	41			Opening-control flap 3
						Flap 4	8	42			Opening-control flap 4
						Flap 5	9	43			Opening-control flap 5
						Return 1	10	63		Product Return 1to 5	Opening-control return 1
						Return 2	11	64			Opening-control return 2
						Return 3	12	65			Opening-control return 3
						Return 4	13	66			Opening-control return 4
						Return 5	14	67			Opening-control return 5
						Declutching	15	62		Declutching	Pump declutching or Motor acceleration (if automatic transmission)
						Blowing	16	68		Blowing	Product return blowing
						Hose 1	17	76		Valve hose 1	Selection valve hose 1 (pumped)
						Hose 2	18	77		Valve hose 2	Selection valve hose 2 (pumped)
						HF	19	78		API	High flow of an API adaptor or Selection valve hose 3 (pumped) or Opening-control flap 6 or Special return
						LF	20	79			Low flow of an API adaptor
•	RC-HEATING OIL RECEIVER				2x1	Start/Stop	1	49	Start/Stop	RC-Oil_1	
						LF/HF	2	50	LF/HF	RC-Oil_2	
•	OVERFILL PROTECTION (customer tank)							53			Overfill protection probe (customer tank)
	FLAP-CONTROL FEEDBACK							54		Flaps manual control	Flap-control feedback (if manual control of flaps)
•	PTO CONTROL				1x1	PTO Ctrl		58		PTO control	Power-take-off engaged
•	DRIVER'S CAB CONTROL				3x1	PTO	4	61	24VDC= PTO	PTO	(Output FET 24V 5W max.) FET=Field Effect Transistor
•	ADDITIVATION CONTROL				2x1	Supply	1	71	NC free contact	Additivation contol	Closed contact=additivation (Output: NO free potential relay)
						Control	2	72			
	KIT SOLENOID VALVES NC/NO (ATEX) - PUMP BYPASS	C4			3xG0.75	NC valve Pump bypass	1 / Mr	74	24VDC	NC or HF	24VDC = opening NC solenoid valve or HF control
							2 / Bl	80	0V		
						NO valve Exhaust	1 / Mr	75	24VDC	NO or LF	24VDC = closing NO solenoid valve or LF control
							2 / Bl	80	0V		

SOME EXTENSION BOARDS MAY BE SET ON TO THE INTERFACE POWER SUPPLY BOARD

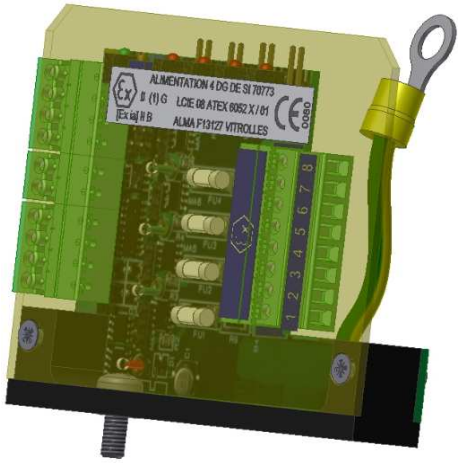
**Refer to the Cable Glands Installation Instruction*

Factory pre-wiring:

								INTERFACE POWER SUPPLY BOARD			
Option	Equipment	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
	EXTENSION BOARD 4-RELAIS					Motor control		22	Start Mot.	To extention board 4-relais	(Open collector output)
								23	Stop Mot.		(Open collector output)

Terminal assignment of the extension board 4DG (IS)

EXTENSION BOARD 4DG (IS)

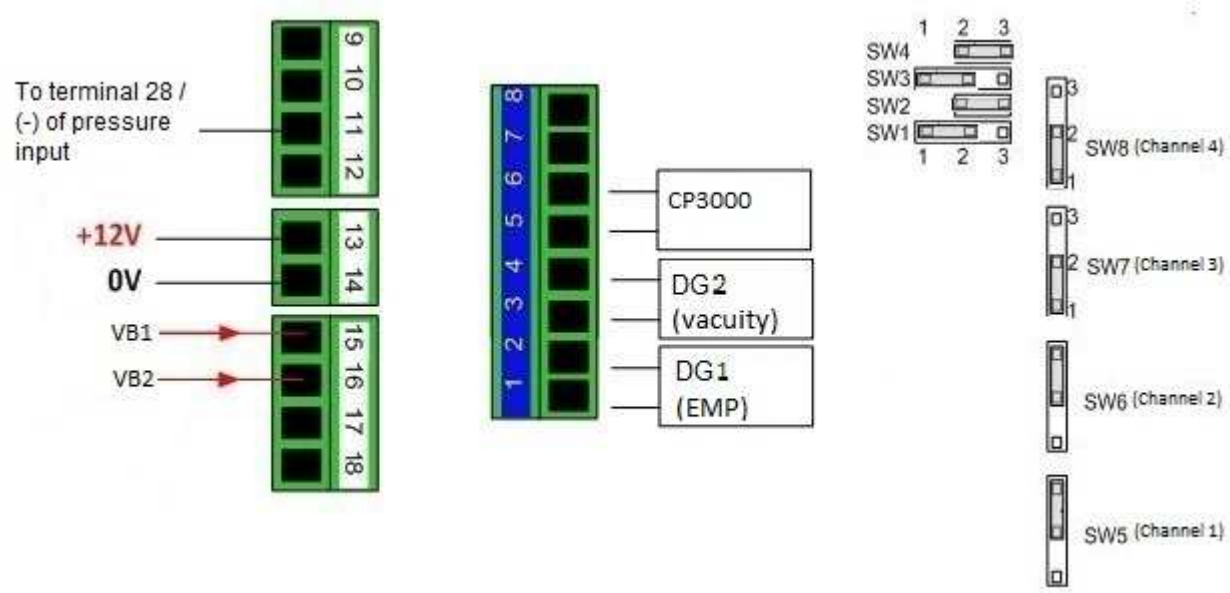


NT IN ATEX 506 C

EQUIPMENTS CONNECTED TO THE MICROCOMPT+								EXTENSION BOARD 4DG (IS)			
Option	Equipment	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
	END-OF-METERING PROBE				3x0.34	EMP	Mr	1	+	EMP	Connect the shielding
							Bl	2	-		
	VACUITY SENSOR				3x0.34	VACUITY	Mr	3	+	VACUITY	Connect the shielding
							Bl	4	-		
	DIFFERENTIAL PRESSURE TRANSMITTER				ADR 2x0.34 sh.	PRESSURE	Bc	5	+	PRESSURE	Connect the shielding
							Mr	6	-		

**Refer to the Cable Glands Installation Instruction*

Jumper configuration on the extension board 4DG:



Terminal assignment of the extension board 'sonde AD' 5wires (IS)

EXTENSION BOARD SONDE AD 5 wires (IS)

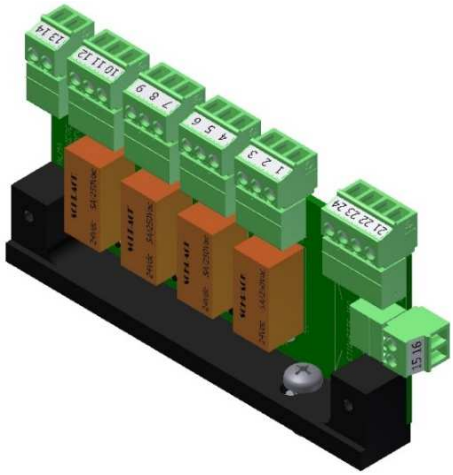
NT IN ATEX 510 C

EQUIPEMENTS CONNECTED TO THE MICROCOMPT+								EXTENSION BOARD SONDE AD (IS)			
Option	Equipement	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminale	Function		Observation
	OVERFILL PROTECTION PROBE PLUG				*[6x1]*	Common	*[Nr]*	**1**	-	OVERFILL PROTECTION PROBES	*[if supplying by ALMA]*
						Supply	*[Rg]*	**2**	+		
						From probe	*[Or]*	**3**	From probe		
						To probe	*[Jn]*	**4**	To probe		

**Refer to the Cable Glands Installation Instruction*

Terminal assignment of the relay extension board

RELAY EXTENSION BOARD (used to control a minimum 5W spool valve)



EQUIPEMENT CONNECTED TO THE MICROCOMPT+								RELAY EXTENSION BOARD			
Option	Equipement	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
•	DRIVER' CAB CONTROL		3x1			Start engine		1	NC	Start engine	Dry contact
								2	Common		
								3	NO		
			3x1			Stop engine		4	NC	Stop engine	Dry contact
								5	Common		
								6	NO		

**Refer to the Cable Glands Installation Instructions*

Factory pre-wiring:

INTERFACE POWER SUPPLY BOARD								EXTENSION BOARD 4-RELAIS			
Option	Equipment	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
	POWER SUPPLY					Supply	Bl	15	24VDC	Supply	
						Mass	N	16	0V		
	MOTOR CONTROL					Engine control	22	21		Engine control	
							23	22			

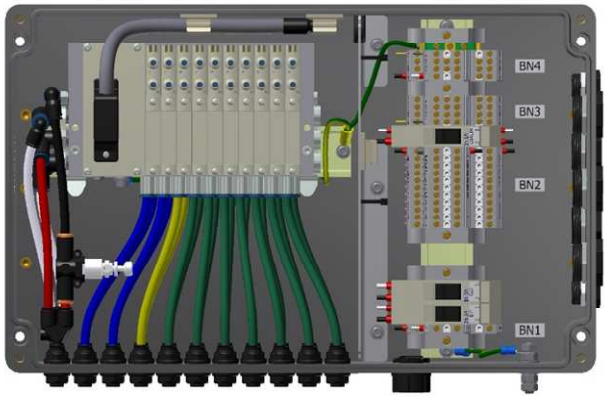
On the extension board 4-relais, cut the diodes D3 and D4 off.

Control box GRAVITRONIQUE

Document available on website alma-alma.fr

Electrical wiring control box

TERMINAL ASSIGNMENT OF CONTROL BOX



EQUIPMENTS CONNECTED TO THE CONTROL BOX								CONTROL BOX TERMINAL BLOCKS				
Option	Equipement	Cable (for information) No.	CG*	Alma	Type	Fnction	Colour or No.	Block	Terminal	Function		Observation
	SUPPLY	A1			2x1	24VDC	1	BN1	1	24VDC	Supply	24VDC truck battery (after battery switch and protected by a fuse)
						0V	2		2	0V		
	MICROCOMPT+	C3	3/4"NPT		20x1	24VDC	2	BN2	1	Gravity		Selection valve gravity distribution (in case of a double-stage API adaptor, Low Flow is operated with the gravity output control)
						24VDC	4		3	Vent		Vent valve control
						24VDC	10		5	Return 1	Product return	Product return 1to 5
						24VDC	11		7	Return 2		
						24VDC	12		9	Return 3		
						24VDC	13		11	Return 4		
						24VDC	14		13	Return 5		
						24VDC	16		15	Blowing		Product return blowing
						24VDC	18		17	Hose 2		Selection valve hose 2 (pumped)
						24VDC	19		19	HF / Hose 3 / Flap 6 / Special return		High flow of an API adaptor or Selection valve hose 3 (pumped) or flap control compartment 6 or Special return
						24VDC	1		2	Pump		Selection valve pumped distribution
						24VDC	3		4	Footvalve		Footvalve control
						24VDC	5		6	Trappe 1	Flap opening	Flap control compartments 1to 5
						24VDC	6		8	Trappe 2		
						24VDC	7		10	Trappe 3		
						24VDC	8		12	Trappe 4		
						24VDC	9		14	Trappe 5		
						24VDC	15		16	Declutch.		Pump declutching or Motor acceleration
						24VDC	17		18	Hose 1		Selection valve hose 1 (pumped)
						24VDC	20		20	Low flow	LF	Lox flow of an API adaptor (in case of a double-stage API adaptor, Low Flow is operated with the gravity output control)

Refer to the Cable Glands Installation Instructions

EQUIPMENTS CONNECTED TO THE CONTROL BOX								CONTROL BOX TERMINAL BLOCKS				
Option	Equipment	Cable (for information)				Function	Colour or No.	Block	Terminal	Function		Observation
		No.	CG*	Alma	Type							
	MICROCOMPT+	C2				+	Bl	DJ1			Microcompt supply	
						-	N					
	PRINTER					Rx		BN3	8		Printer	
						Tx			7			
	PRINTER		1/2"NPT		4x1 sh.	+	Bl	BN4	1	Input	Converter	
						-	N		2			
						+	Bc		3	Outpu		
						-	N		4			
						24VDC	Bc		5	24VDC	RS232 Printer	
						0V	Mr		6	0V		
						Rx	Vt		7	Rx		
						Tx	Jn		8	Tx		

**Refer to the Cable Glands Installation Instructions*

Pneumatic wiring control box

PNEUMATIC INPUT/OUTPUT ASSIGNMENT OF THE CONTROL BOX

Label	Input	Output	Function	Observation
AIR	X		Air supply of the box	Air if: all footvalves opened and valve bar locked
Exhaust		X	Exhaust	Put a tube L=100mm min. (no muffler)
Pump		X	Pumped way selection	
Gravity		X	Gravity way selection	
Footvalve		X	Opening footvalve	
Vent		X	Opening manifold vent	Connection to the vent valve
Product return Cpt 1		X	Product returns	Connection to the product returns
Product return Cpt 2		X		
Product return Cpt 3		X		
Product return Cpt 4		X		
Product return Cpt 5		X		
Manifold flap Cpt 1		X	Opening flaps	Connection to the manifold flaps
Manifold flap Cpt 2		X		
Manifold flap Cpt 3		X		
Manifold flap Cpt 4		X		
Manifold flap Cpt 5		X		
Declutching		X	Declutching pneumatic cylinder	If pneumatic declutching
Blowing		X	Product return blowing	Use "&" cells to connect with each return product control
Hose 1		X	Hose 1 valve control	
Hose 2		X	Hose 2 valve control	
GD – High Flow/ Flex. – Hose 3/ Ret. Spec./ Cpt 6		X	API adaptor open in high flow	Connection to the API adaptor (HF – LF)
Low Flow		X	API adaptor open in low flow	

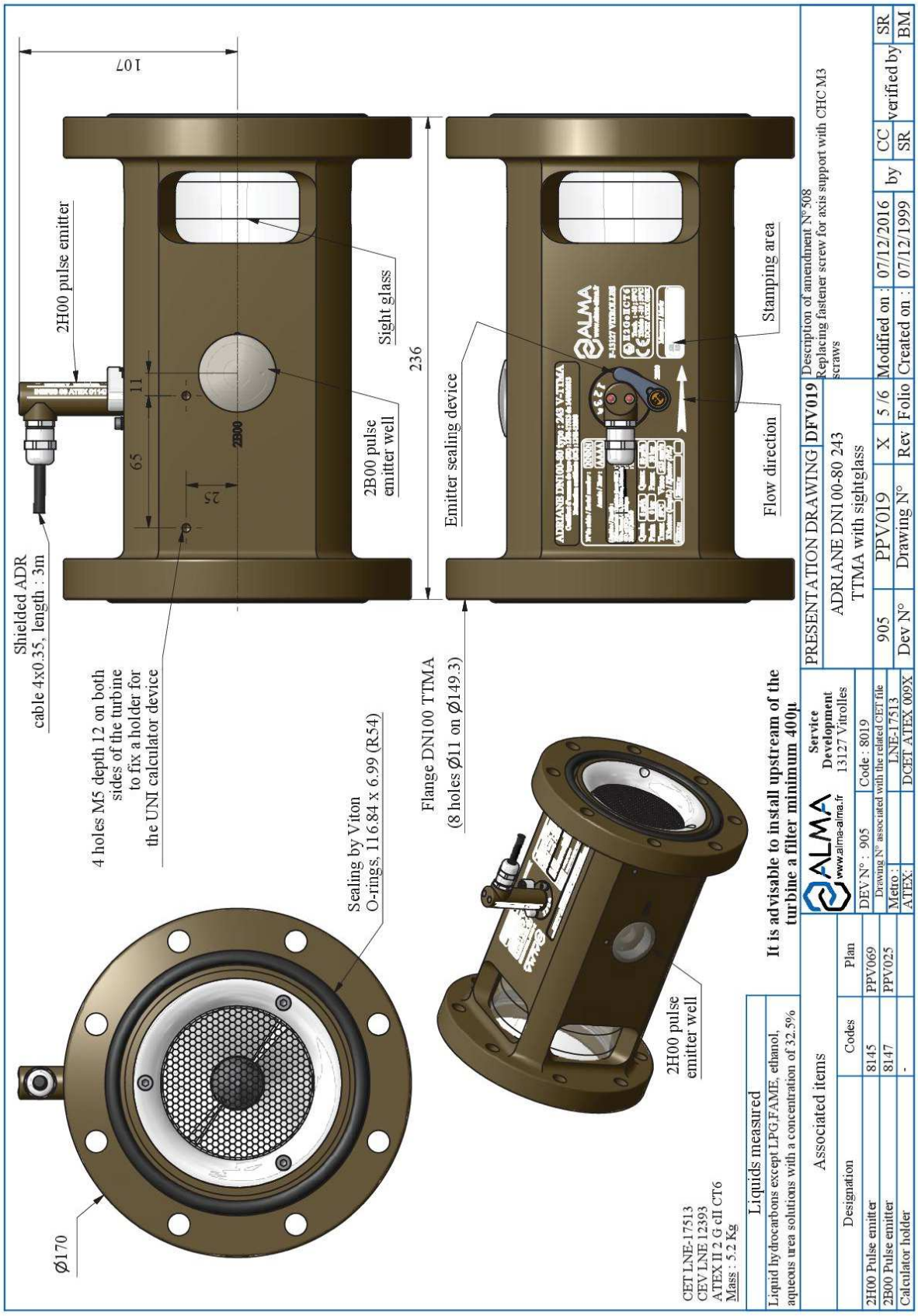
Unused ports must be plugged.

CONDITIONS FOR AIR SUPPLY OF THE CONTROL BOX:

- The pneumatic "&" cells of all footvalves are open.
- The bar is in its locked position (compartment API adapters are locked).

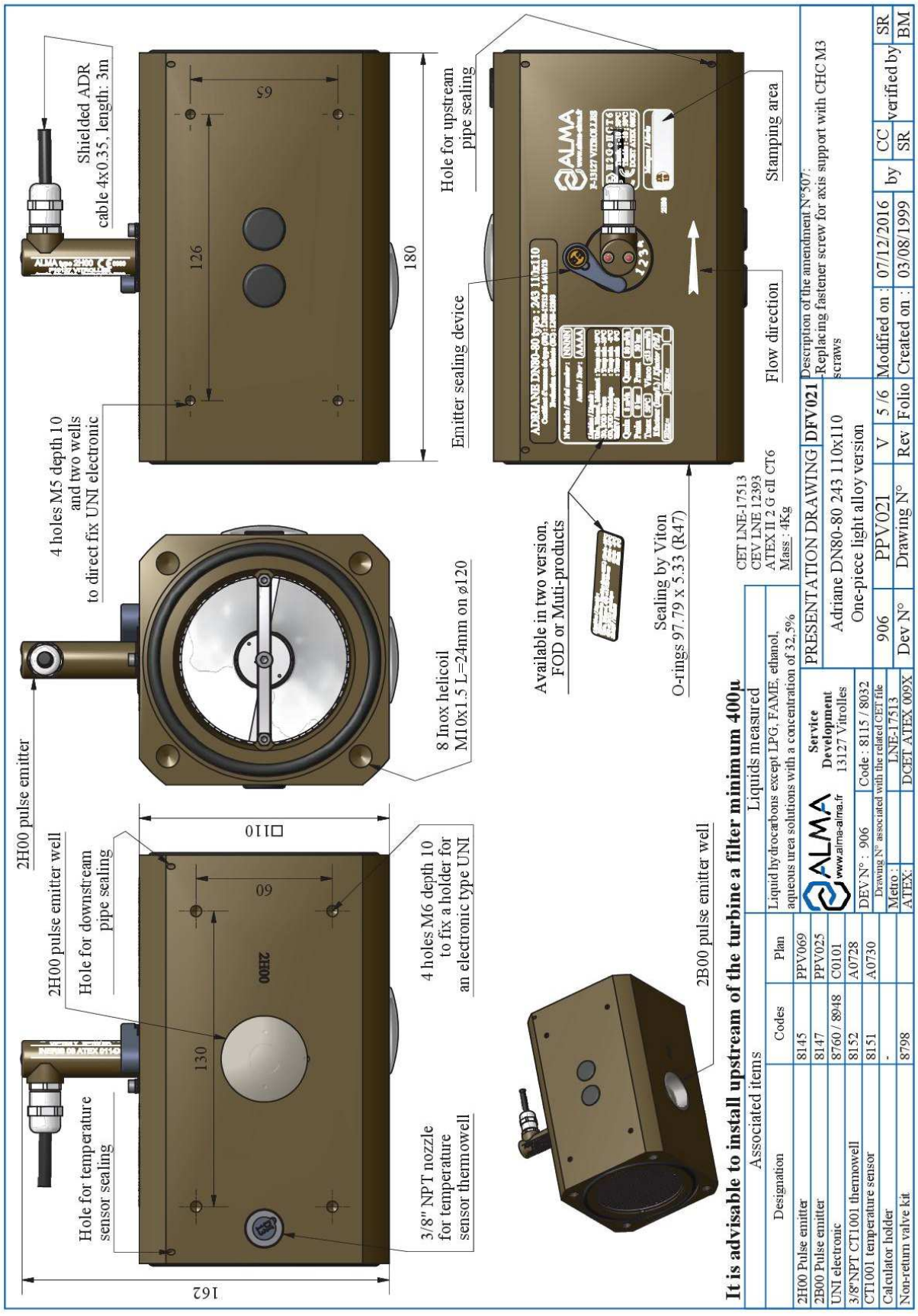
6. ADRIANE TURBINE METER

6.1. TURBINE METER ADRIANE DN100-80 243 TTMA WITH SIGHTGLASS



Document available on website alma-alma.fr

6.2. TURBINE ADRIANE DN80-80 243 110x110



It is advisable to install upstream of the turbine a filter minimum 400µ

Associated items

Designation	Codes	Plan
2H00 Pulse emitter	8145	PPV069
2B00 Pulse emitter	8147	PPV025
UNI electronic	8760 / 8948	C0101
3/8"NPT CT1001 thermowell	8152	A0728
CT1001 temperature sensor	8151	A0730
Calculator holder	-	
Non-return valve kit	8798	

Liquids measured

Liquid hydrocarbons except LPG, FAME, ethanol, aqueous urea solutions with a concentration of 32,5%

CET LNE-17513
CEV LNE 12393
ATEX II 2 G cIl CT6
Mass : 4Kg

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Service Development
13127 Vitrolles

DEV N° : 906 Code : 8115 / 8032
Drawing N° associated with the related CET file
Metro : LNE-17513
ATEX : DCET ATEX 009X

PRESENTATION DRAWING | DFV021

Adriane DN80-80 243 110x110
One-piece light alloy version

906	PPV021	V	5 /6
Dev N°	Drawing N°	Rev	Folio

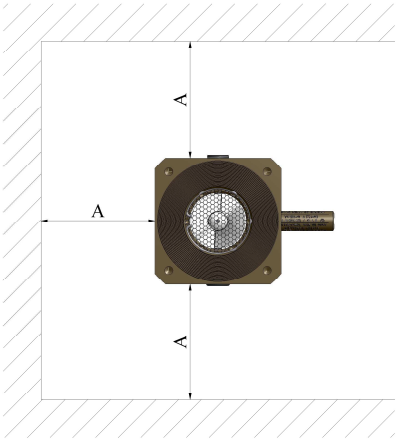
Description of the amendment N°507:
Replacing fastener screw for axis support with CHC M3 screws

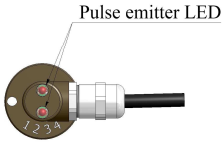
Modified on :	07/12/2016	by	CC	verified by	SR
Created on :	03/08/1999		SR		BM

Document available on website alma-alma.fr

6.3. INSTALLATION AND SEALING RECOMMENDATIONS ADRIANE TURBINE METER

- The identification plate and the led of the pulse emitter(s) shall be visible and accessible.
- The turbine must be installed with respect to the flow direction.
- Put sealing rings each other sides between the turbine and the backflanges.
- Leave an open space all around the turbine in order to ease maintenance.
- Install a 400µ filter (mini) on the pipe upstream from the turbine meter.
- After installation or during the commissioning period, if the new or modified pipes have not been perfectly cleaned or pickled and passivated, the turbine should be protected by a honeycomb sieve – max. 1mm mesh. It must be placed between two flanges upstream from the turbine.
- Dimensions: A > 100mm.





- Refer to the certificate written on the identification plate of the measuring system to suit the sealing requirements
- No loose lead wire on the sealing devices

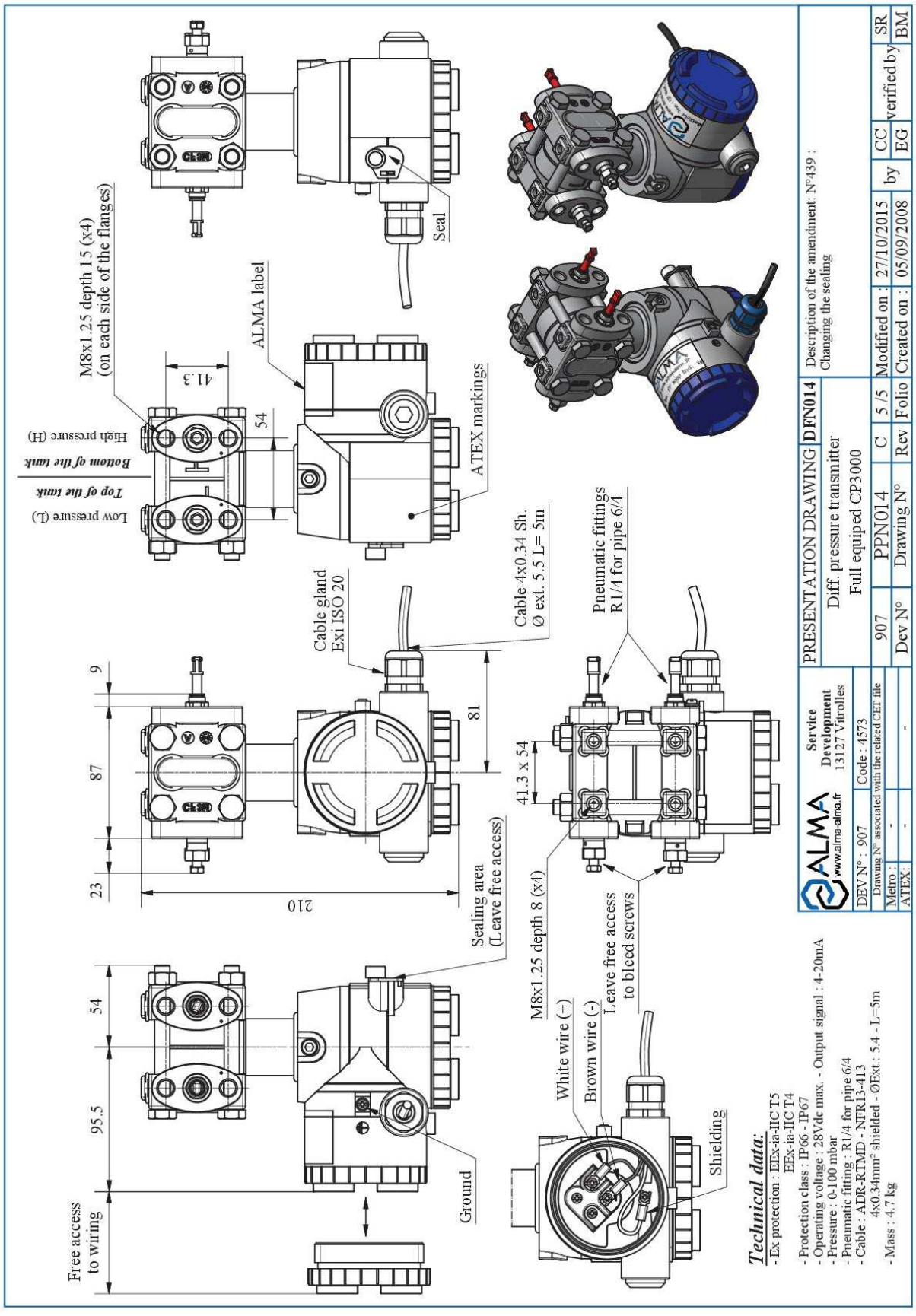
For accuracy class 0.5 and 1.0 measuring systems, the pipes and equipment upstream or downstream the turbine meter must have the same nominal diameter as the meter on a length at least equal to 10 times this diameter upstream and 5 times this diameter downstream.

These lengths can be straight or bent.

It is mandatory that no flowrate adjustment device (e.g. a variable-opening valve) is located upstream at a distance less than 10 times the nominal diameter of the meter:

Provision contained in EU Type Examination or Evaluation Certificate.

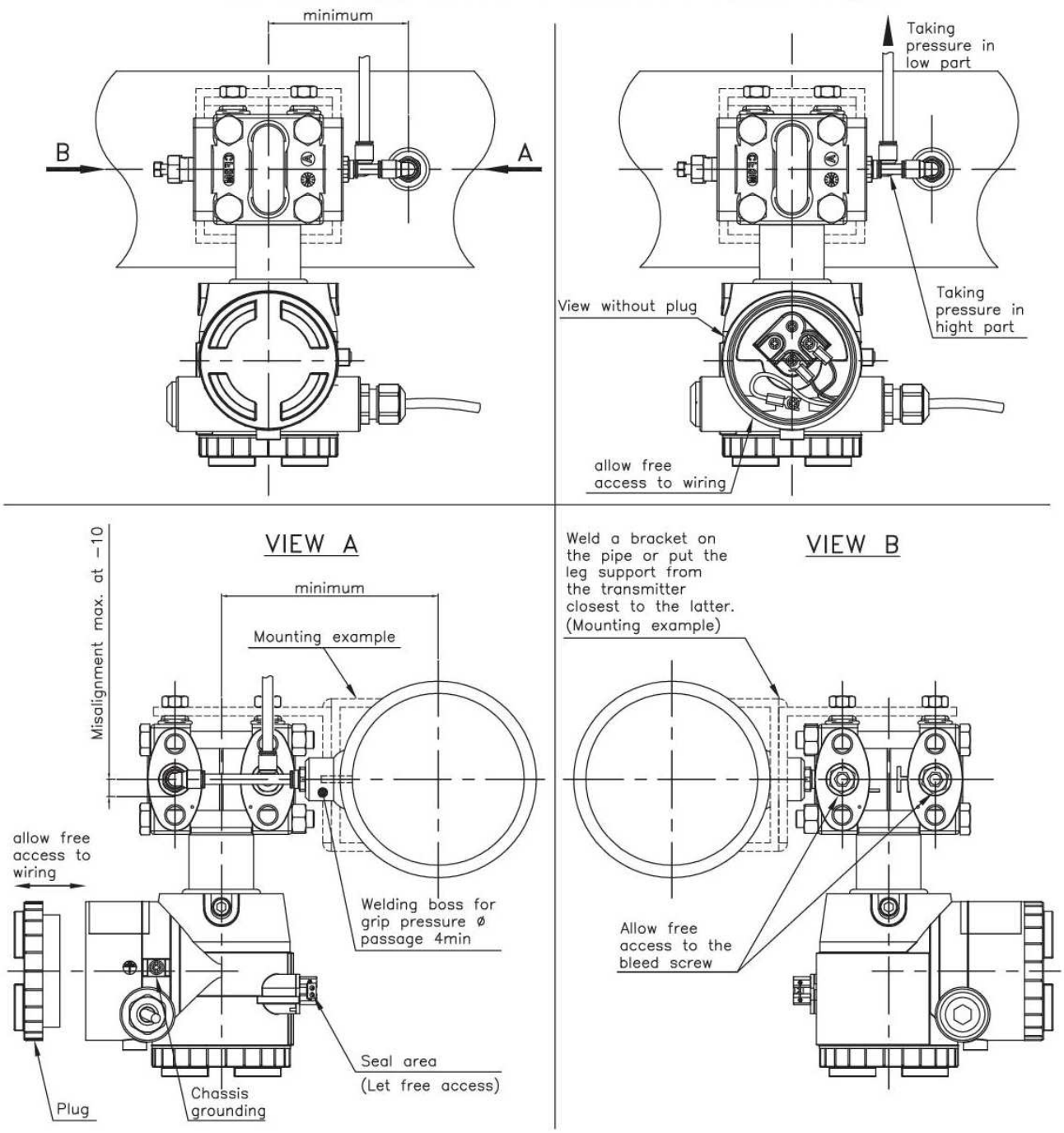
7. DIFFERENTIAL PRESSURE TRANSMITTER CP3000 ATEX



Document available on website alma-alma.fr

7.1. INSTALLATION RECOMMENDATIONS CP3000 ATEX

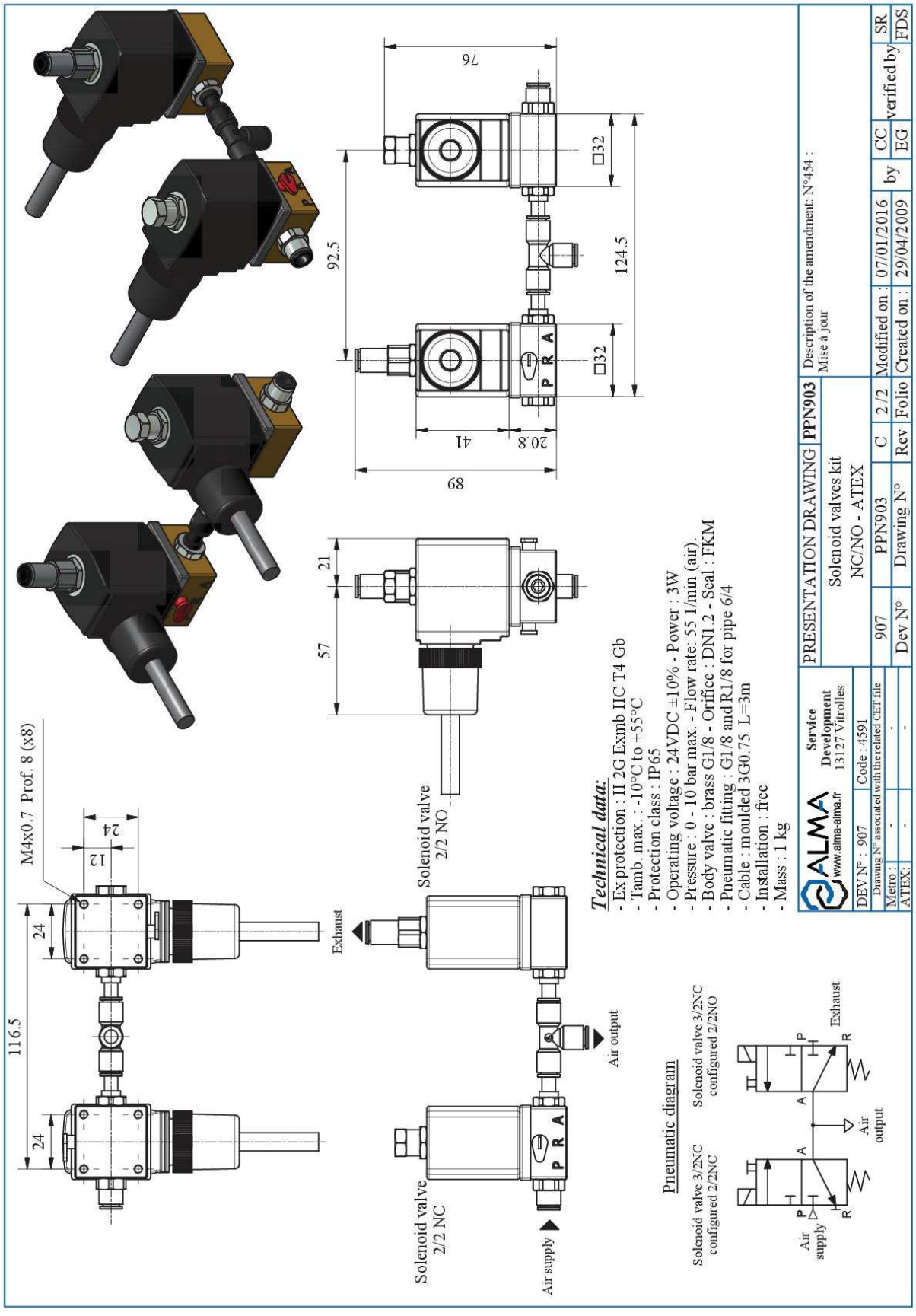
THE PRESSURE TRANSMITTER MUST BE INSTALLED IN UPRIGHT POSITION



REFER TO INSTRUCTION MANUAL

(DELIVERED WITH THE EQUIPMENT AND AVAILABLE ON ALMA WEBSITE)

8. NC/NO SOLENOID VALVES KIT ATEX



Document available on website alma-alma.fr

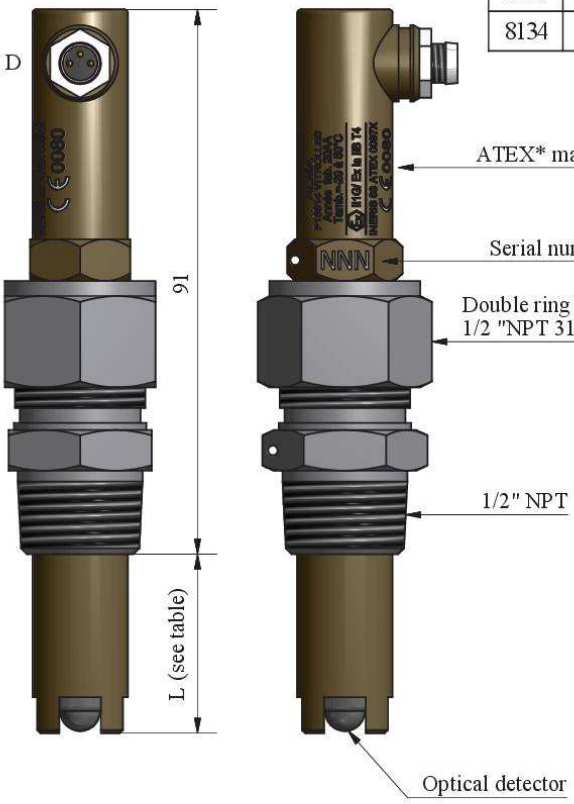
9. END-OF-METERING PROBE / VACUITY SENSOR – DG3001/75-Co

Codification of marking :

DG3001/LLL-Co

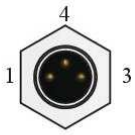
LLL = Maximum Lenght under connection
Co = Connector

Dimensions				
Codes	Types	Lengths under connector (mm)		Materials
		Lmin	Lmax	
0513	DG3001-Co	0	26	Aluminium 6082
8133	DG3001/75-Co	30	71	Aluminium 6082
8134	DG3001/205-Co	75	201	Aluminium 6082

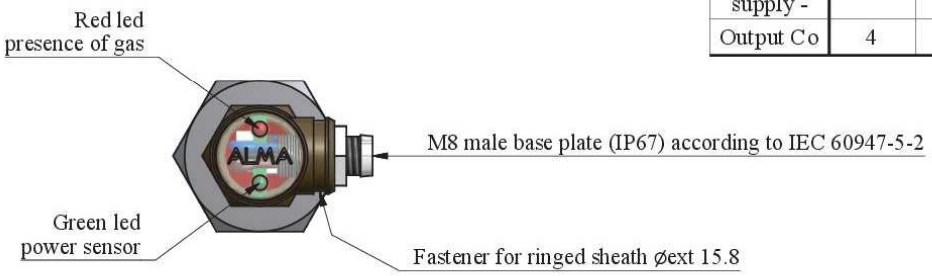


Operation		
Conditions	Gas	Liquid
Output (mA)	35±2	15±1
Open collector output	Saturated	Blocked
Imax on output Co (mA)	30	
Vce (V) for Is=10mA	< 0.4	
State of the red led	On	Off
State of the green led	On	On

Supply			
Voltage VDC	NSI	SI II B	SI II C
On power supply +	7 to 27	7 to 18*	7 to 15*
On output Co	< 27	< 13.2*	



Connection of the connector		
Function	Pin	Wire Color
Power supply +	1	Brown
Power supply -	3	Blue
Output Co	4	Black



NOTE:
- The detector body is made of anodized aluminum alloy of bronze color.
- The optical sensor in contact with the liquid or gas is of polysulfone.
- The O-ring between the body and the detector is made of Viton.
- The sensor dis supplied with any cable, 3 lengths are available: 5m cables (8138), 10m (8139) and 25m (8140).

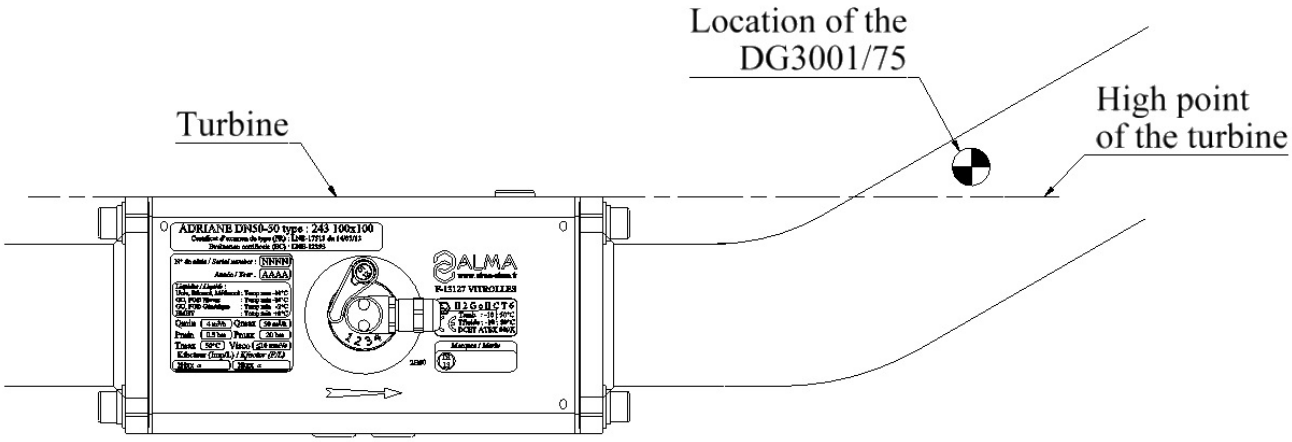
*Refer to § 2 ATEX descriptive notice

ALMA www.alma-alma.fr Service Development 13127 Vitrolles		PRESENTATION DRAWING	DFV014			Description of amendment N°522 Adding CI008 version 2 for DLA01					
DEV N° : 981	Code : 0513	Gas detector output connector DG3001, DG3001/75, DG3001/205									
Drawing N° associated with the related CET file		981	PPV014	V	6 /8	Modified on :	22/12/2016	by	CHR	verified by	SR
Metro :		Dev N°	Drawing N°	Rev	Folio	Created on :	01/04/1999		SR		BM
ATEX:	INERIS 03 ATEX 0097X										

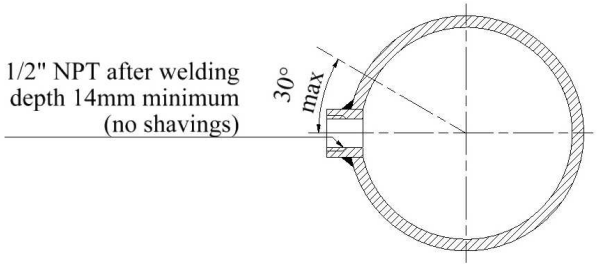
9.1. INSTALLATION RECOMMENDATIONS END-OF-METERING PROBE – DG3001/75

POSITION OF THE END-OF-METERING PROBE:

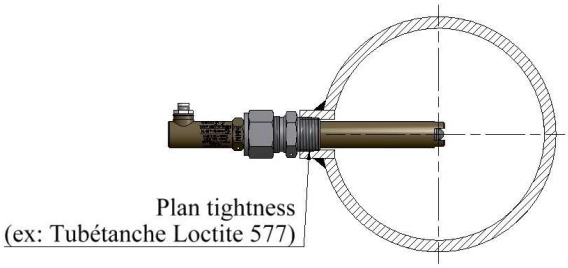
The DG3001/75 should be positioned above the top of the turbine, as close as possible to the turbine



Position of the welding boss for DG3001:
horizontal or tilted up to 30°



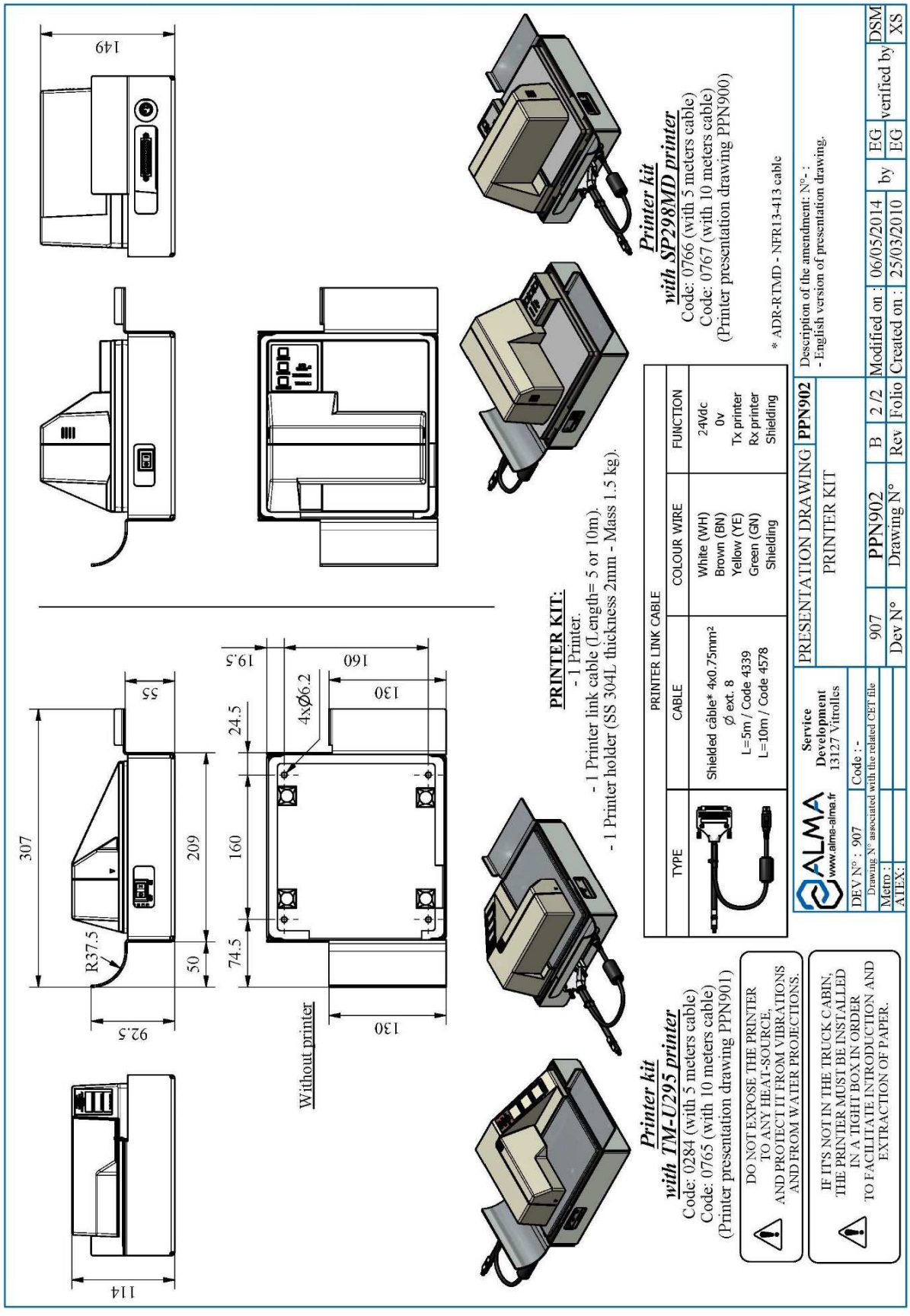
Mounting DG3001:



REFER TO INSTRUCTION MANUAL

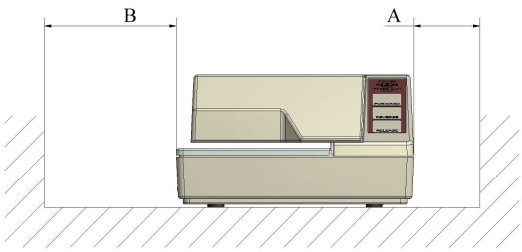
(DELIVERED WITH THE EQUIPMENT AND AVAILABLE ON ALMA WEBSITE)

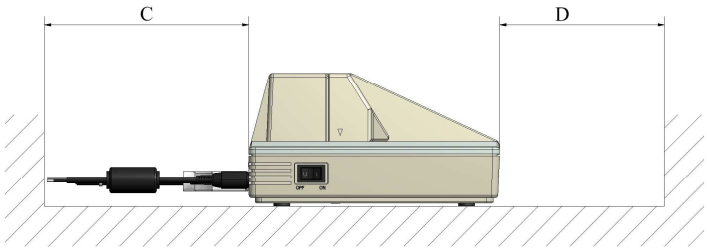
10. PRINTER

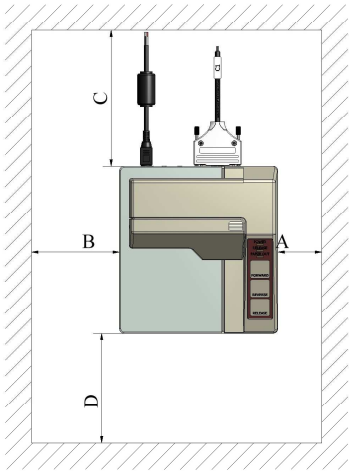


10.1. INSTALLATION RECOMMENDATIONS PRINTER

- The printer must be installed in a tight box and be laid out so as not to obstruct the introduction/extraction of sheet of paper (Dimension D).
- Do not store anything above the printer.
- Leave an open space all around the printer to ease maintenance.
- Dimensions: A ≥ 50mm, B ≥ 100mm, C ≥ 120mm.

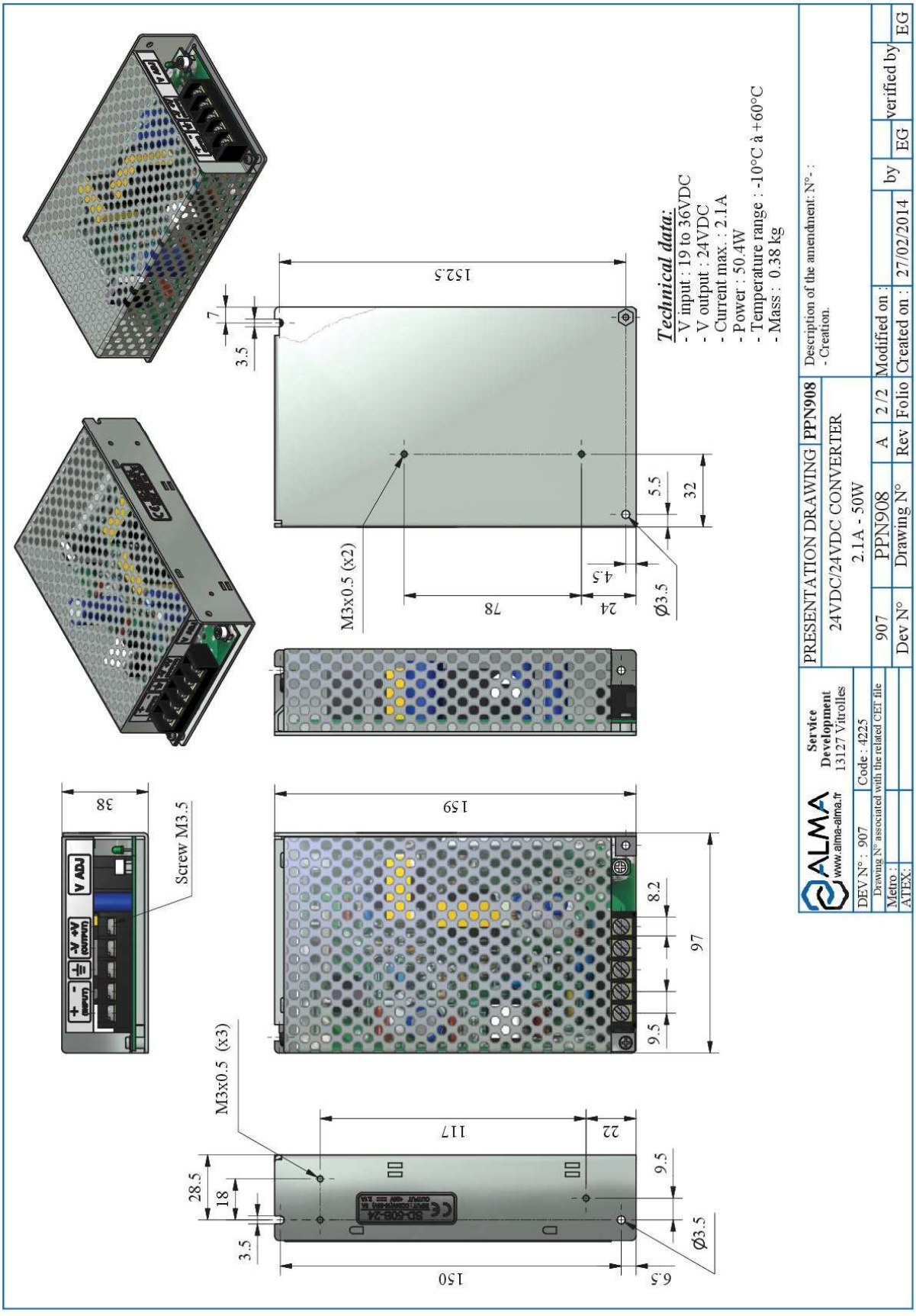




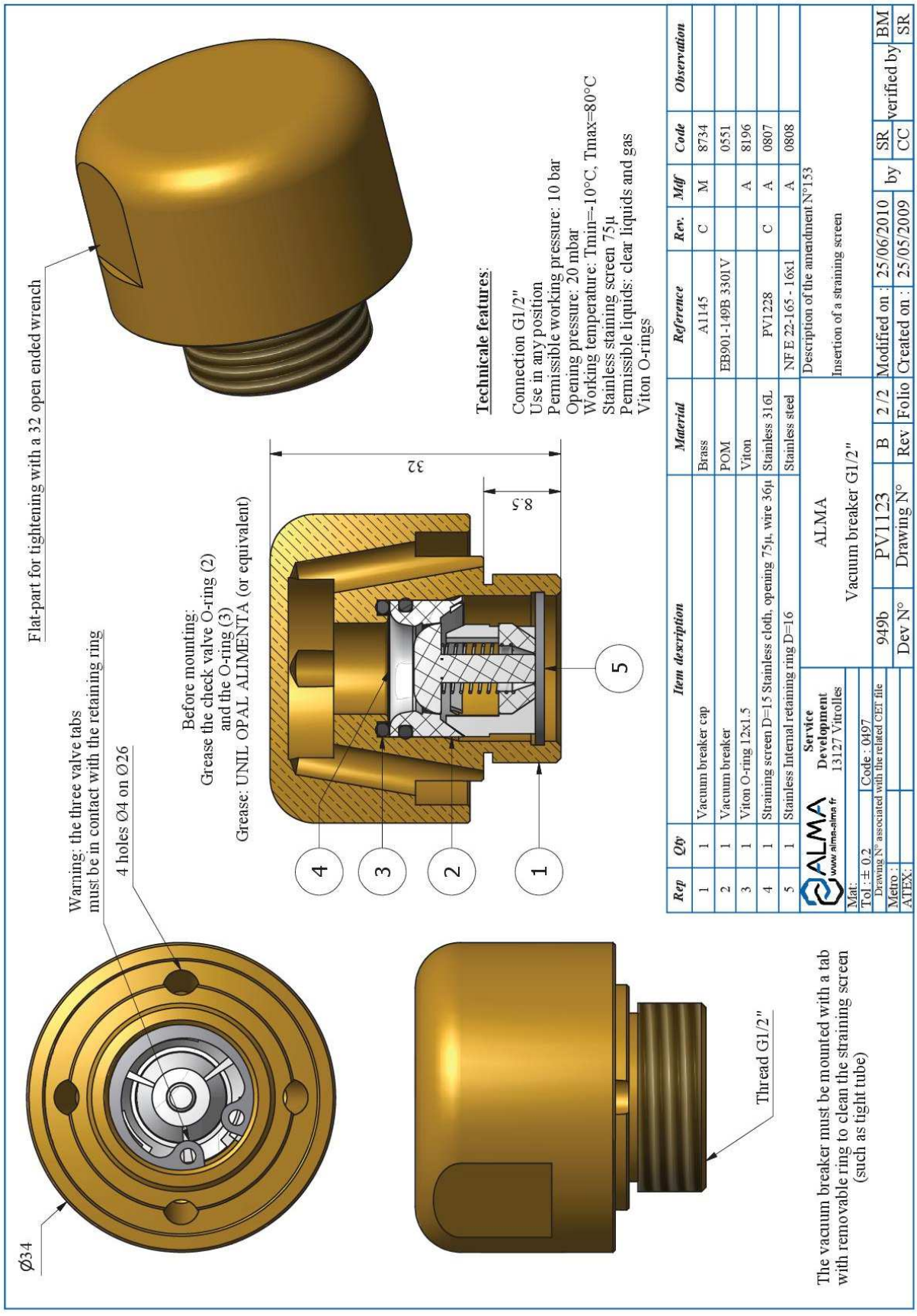


DO NOT EXPOSE THE PRINTER TO ANY HEAT-SOURCE.
PROTECT IT FROM VIBRATIONS AND WATER PROJECTIONS.

11. CONVERTER 24VDC/24VDC 2.1A 50W



12. VACUUM BREAKER



Rep	Qty	Item description	Material	Reference	Rev.	Mdf	Code	Observation
1	1	Vacuum breaker cap	Brass	A1145	C	M	8734	
2	1	Vacuum breaker	POM	EB901-149B 3301V			0551	
3	1	Viton O-ring 12x1.5	Viton			A	8196	
4	1	Straining screen D=15 Stainless cloth, opening 75µ, wire 36µ	Stainless 316L	PV1228	C	A	0807	
5	1	Stainless Internal retaining ring D=16	Stainless steel	NF E 22-165 - 16x1		A	0808	

ALMA Service Développement www.alma-alma.fr 13127 Vitrolles

ALMA

Vacuum breaker G1/2"

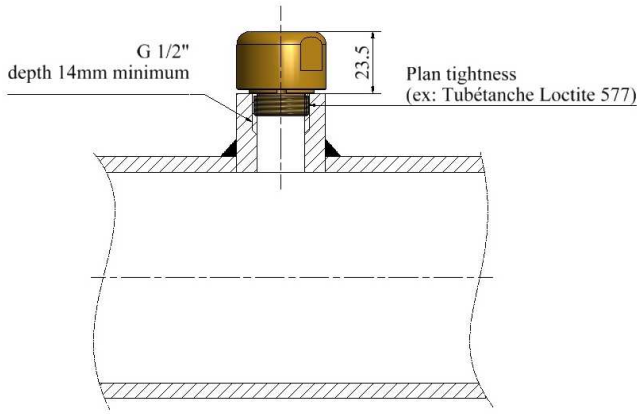
Description of the amendment N°153

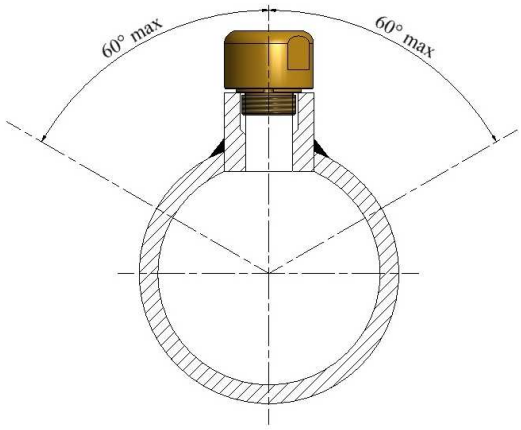
Insertion of a straining screen

Mat:		949b	PV1123	B	2 / 2	Modified on :	25/06/2010	by SR
Tol : ± 0.2	Code : 0497	Dev N°	Drawing N°	Rev	Folio	Created on :	25/05/2009	verified by CC
Drawing N° associated with the related CET file								BM
Metro :								SR
ATEX :								

12.1. INSTALLATION RECOMMENDATIONS VACUUM BREAKER

When associated to a measuring device, the vacuum breaker must be installed downstream.



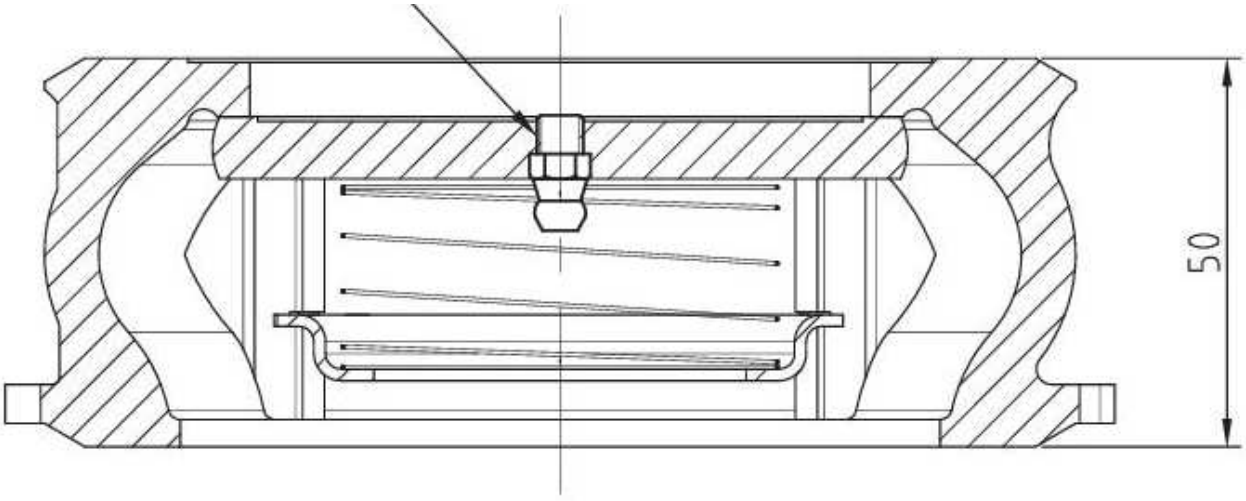


13. DN80 NON-RETURN VALVE KITS

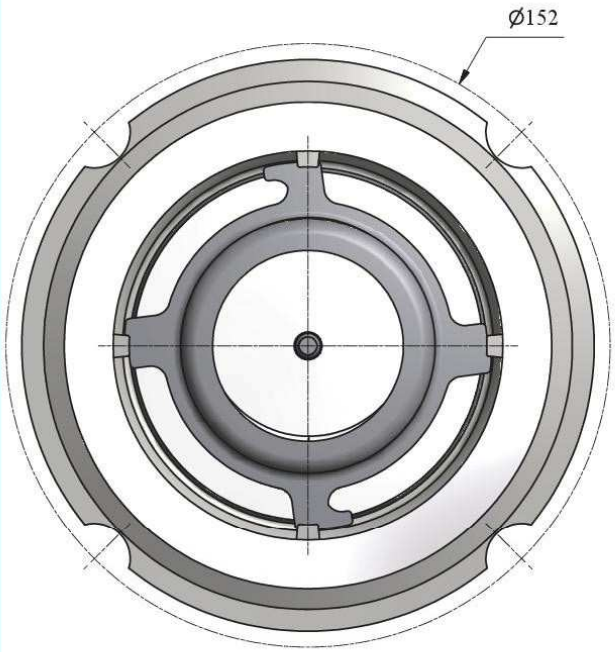
13.1. DN80 NON RETURN VALVE KIT, 0.03 BAR CALIBRATED

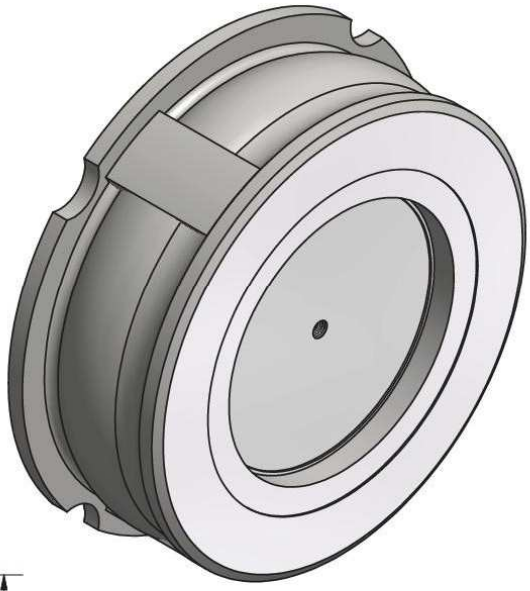
DIMENSIONS FOR DN80 NON-RETURN VALVE KIT – 0.03 bar calibrated:

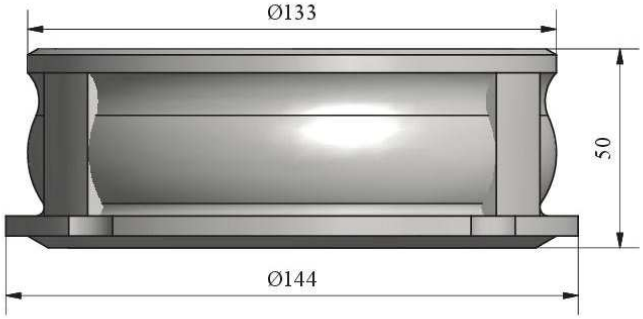
∅144



13.2. DN80 NON RETURN VALVE KIT, 0.3 BAR CALIBRATED (EMPTY HOSE OPTION)





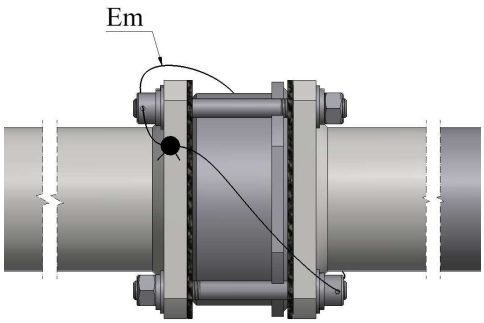


- ***Mass*** : ~ 2.5Kg
- ***Material*** : Inox 316L
- ***Operating temperature*** : -10°C to +350°C
- ***Permissible operating pressure*** : 40 bar
- ***Maximum permissible pressure*** : - Liquid 1 : 25 bar - Liquid 2: 40 bar
  - Gas 1: 12 bar - Gas 2: 40 bar
- ***Pressure drop*** : 0.2 bar at 50 m3/h
- ***Mounting*** : Between downstream flange of the turbine
- ***Tightness*** : Flat gasket
- ***Standards*** : - CE conformity directive 97/23/CE
  - CE ATEX conformity directive 94/9/CE

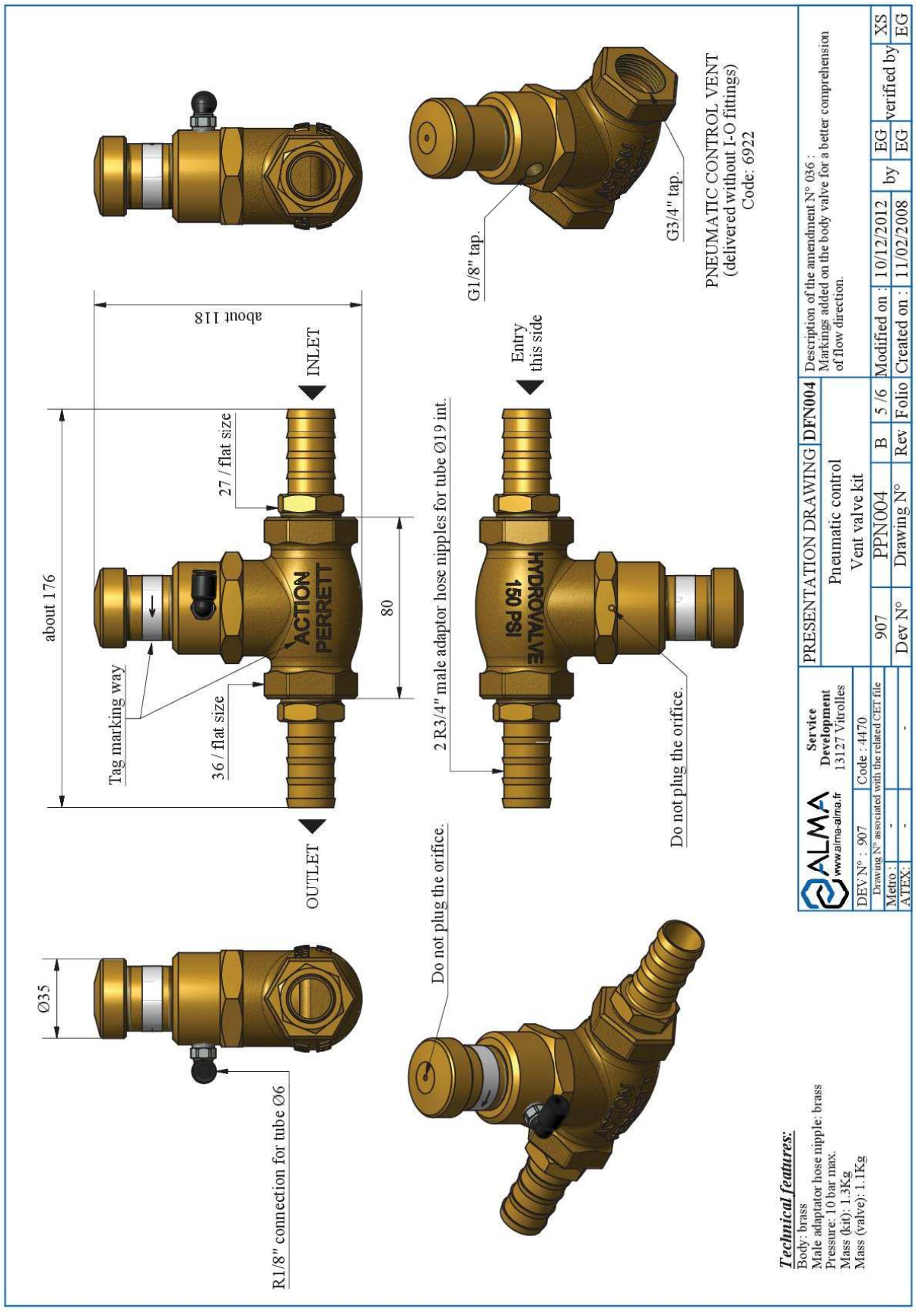
ALMA www.alma-alma.fr	Service Development 13127 Vitrolles	Kit non return valve, calibrated at 0.3 bar Adriane DN80 24X				Description of amendment N°					
Mat:											
Tol : ± 0.2	Code : 8798										
Drawing N° associated with the related CET file		905a	PV1908	A	2 /2	Modified on :		by		verified by	
Metro :		Dev N°	Drawing N°	Rev	Folio	Created on :	29/03/2016		CC		SR
ATEX:											

13.3. INSTALLATION RECOMMENDATIONS DN80 NON-RETURN VALVE KIT

- Refer to the certificate written on the identification plate of the measuring system to suit the sealing requirements
- No loose lead wire on the sealing devices

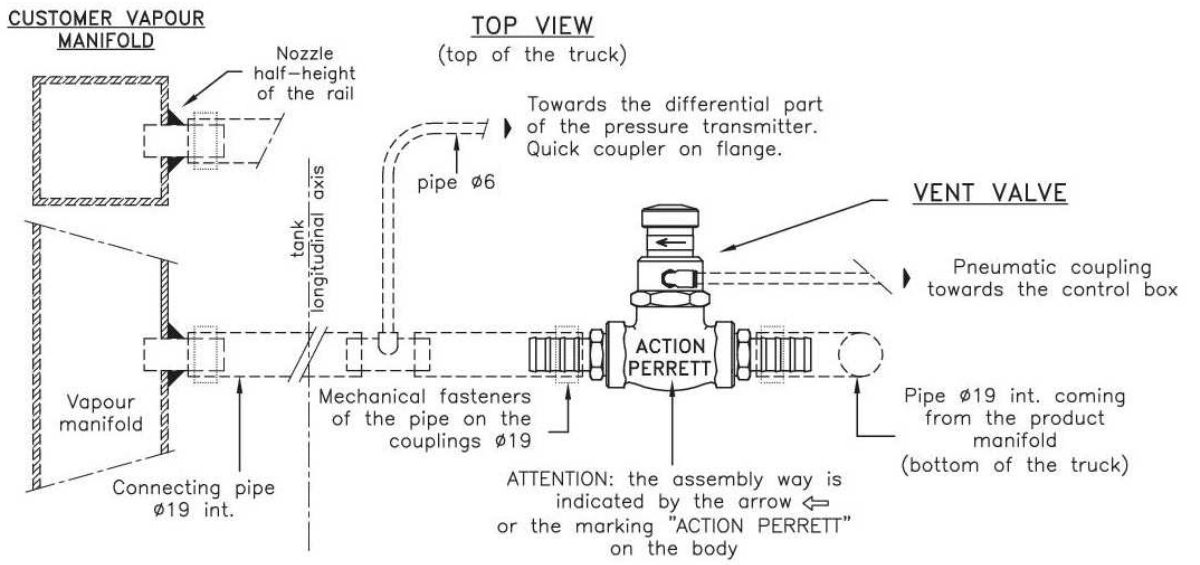


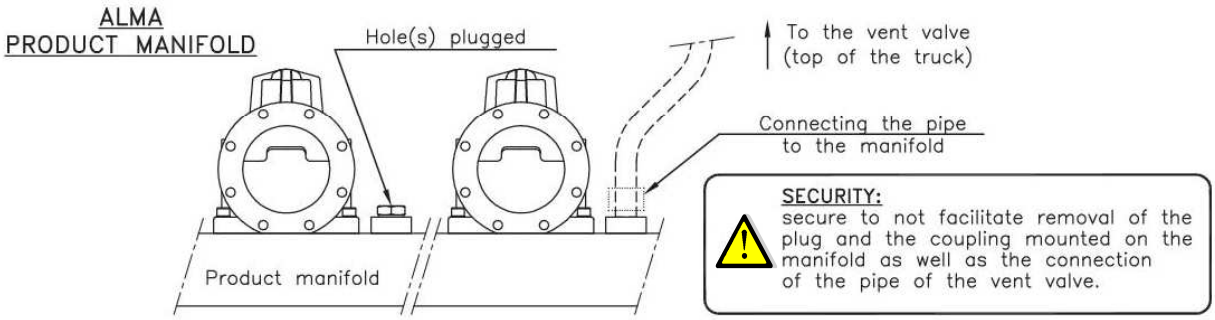
14. PNEUMATIC CONTROL VENT VALVE



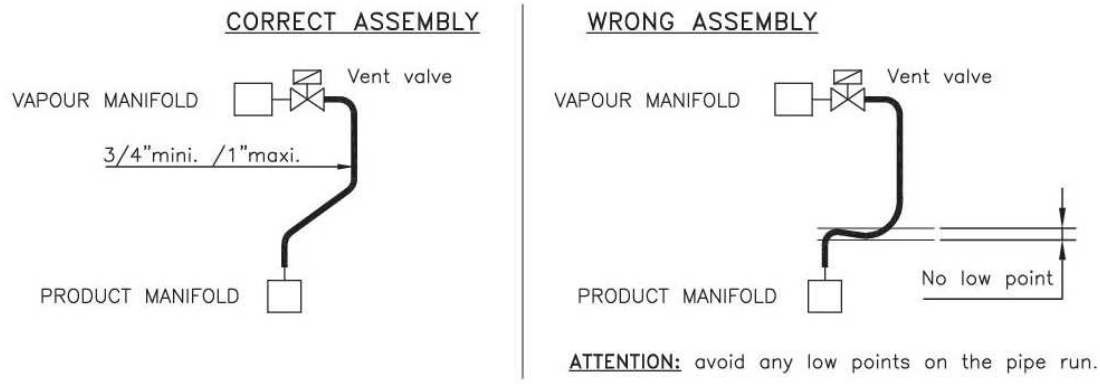
Document available on website alma-alma.fr

14.1. INSTALLATION RECOMMENDATIONS PNEUMATIC CONTROL VENT VALVE

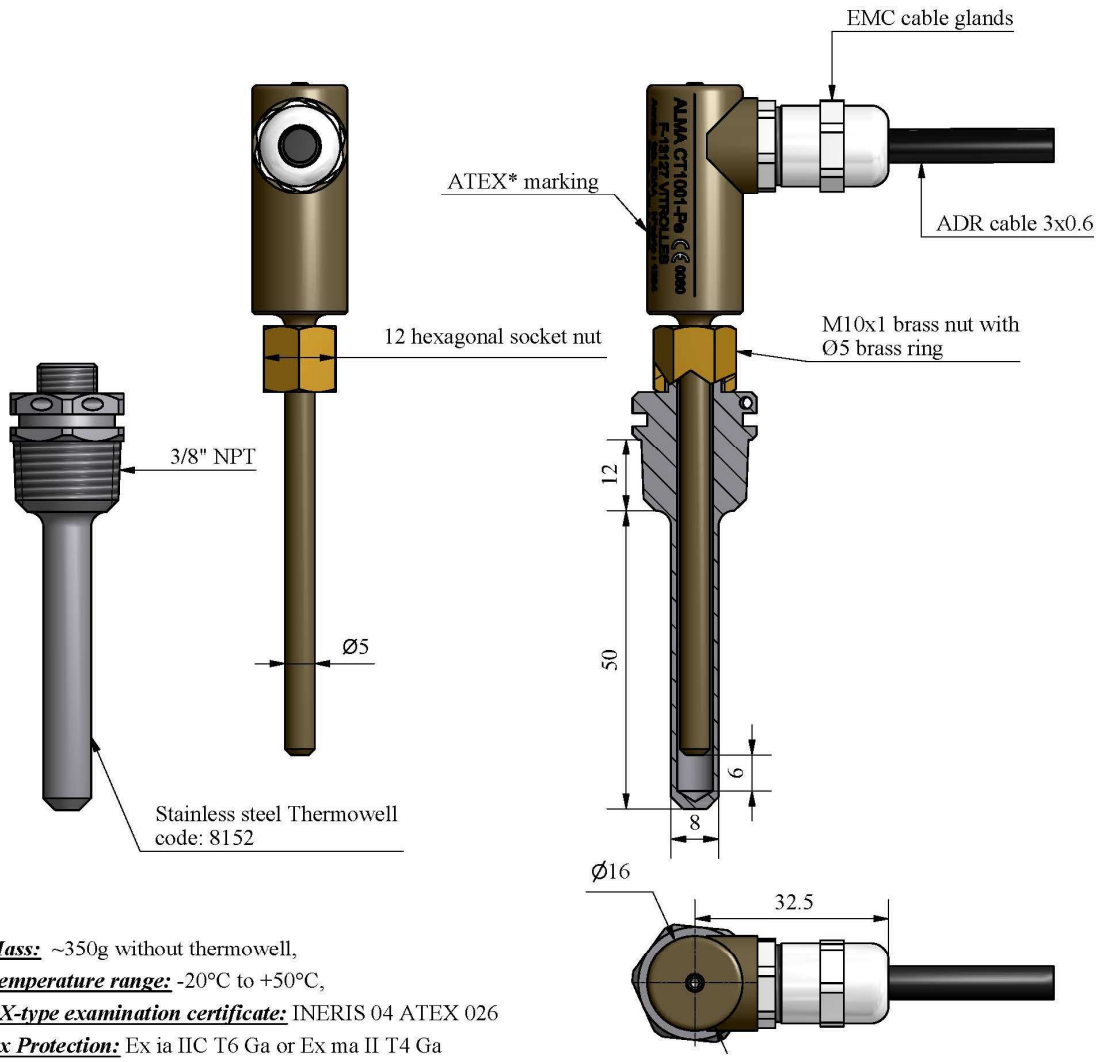




ASSEMBLY OF THE VENT PIPE (not supplied by Alma)



15. TEMPERATURE PROBE Pt100 – CT1001



- ***Mass:*** ~350g without thermowell,
- ***Temperature range:*** -20°C to +50°C,
- ***EX-type examination certificate:*** INERIS 04 ATEX 026
- ***Ex Protection:*** Ex ia IIC T6 Ga or Ex ma II T4 Ga

The sensor body is made of bronze color anodized aluminum alloy;
The ring and the nut are made of brass.
The probe can be be mounted either on a ALMA thermowell or on a thimble connection 1/4 "BSP (M10x1 n5).
Before installation, lubricate the parts in contact with the thermowell or the boss, to prevent corrosion

PT100 features:

- 3 wires
- 1/3 DIN

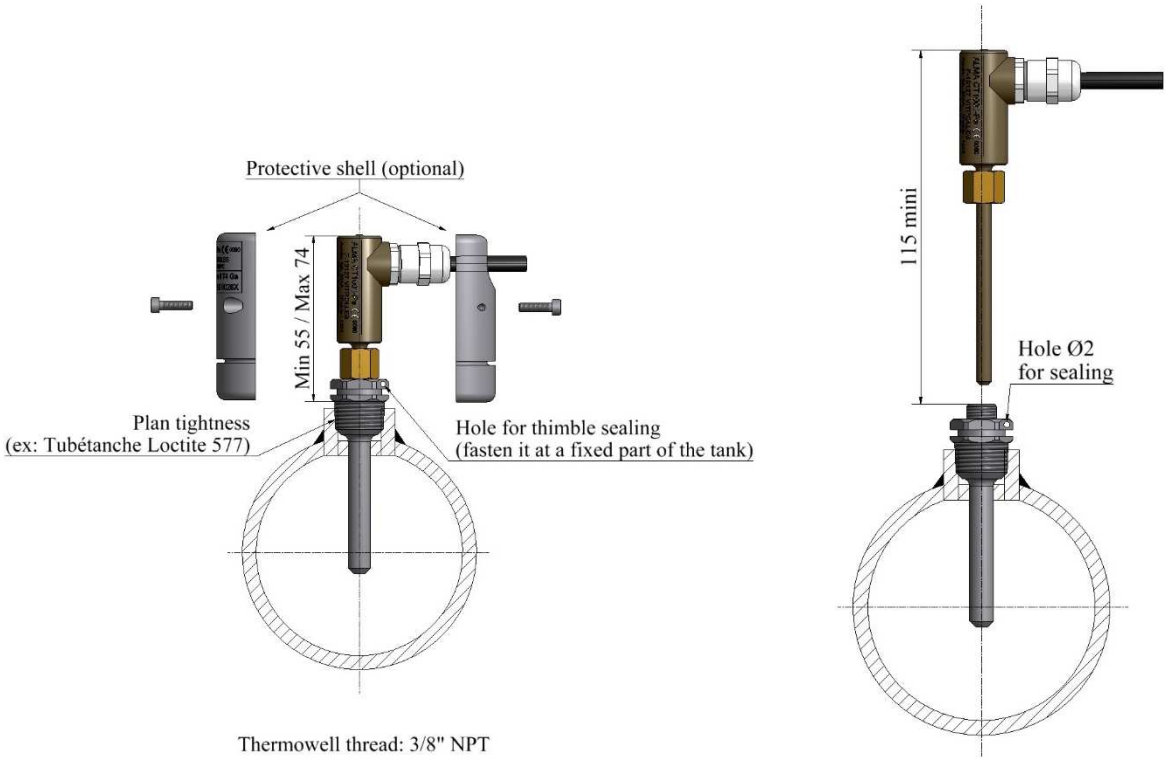
*ATEX "ia" and "ma" certification.
For installation and use in hazardous areas see Instruction manual

Also available with output connector according to IEC 60947-5-2

Connecting the cable		
Function	*Marking on the wire*	*Color wire*
PT100/1	1	Yellow
PT100/2	2	White
PT100/3	3	Green

ALMA www.alma-alma.fr Service Development 13127 Vitrolles		PRESENTATION DRAWING	**DFV042**		Description of the amendment MDV489 Circuit optimized for more efficient assembly						
		Temperature probe CT1001-Pe									
DEV N° : 949d	Code : 8151										
Drawing N° associated with the related CET file		949d	PPV042	J	5 /7	Modified on :	04/10/2016	by	CHR	verified by	SR
Metro :		Dev N°	Drawing N°	Rev	Folio	Created on :	13/09/2003		BM		BM
ATEX:	INERIS 04 ATEX 0026										

15.1. INSTALLATION RECOMMENDATIONS TEMPERATURE PROBE



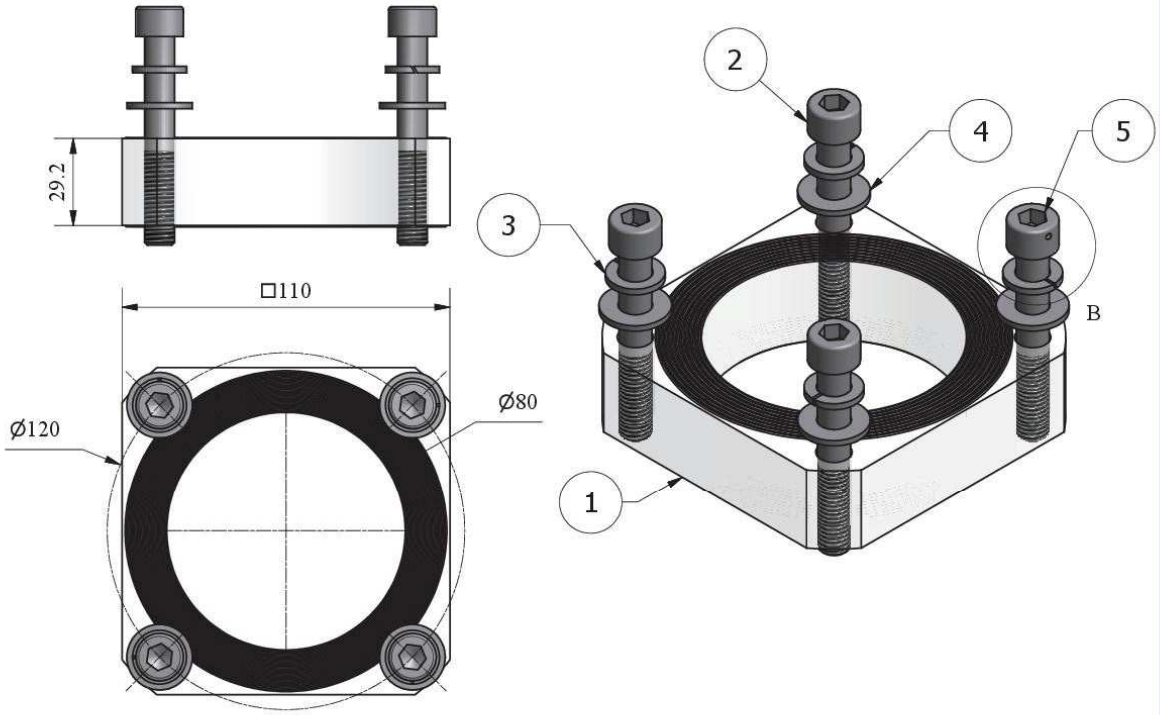
REFER TO INSTRUCTION MANUAL

(DELIVERED WITH THE EQUIPMENT AND AVAILABLE ON ALMA WEBSITE)

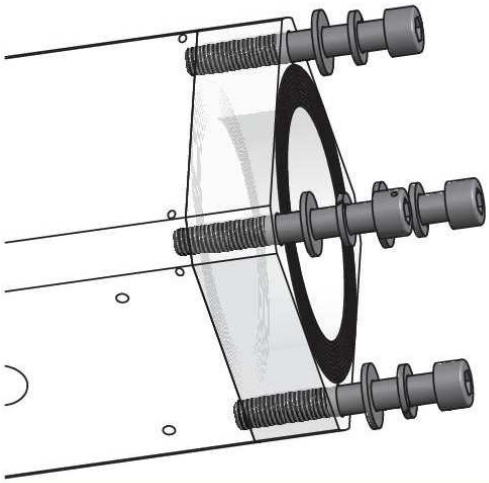
INSTALLATION OF THE TEMPERATURE SENSOR

ON THE ALMA TURBINE METER:

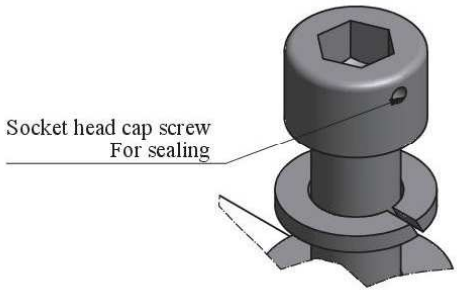
16. SIGHTGLASS KIT 110x110 ADRIANE TURBINE METER DN80



Mounting example



B (1.5 : 1)



Put parts in a bag

Rep	Qty	Item description	Material	Reference	Rev.	Mdf	Code	Observation
1	1	Sightglass DN80 110X110	Moulded PMMA	A0533	B		0908	
2	3	CHC screw M10 x 70 (ISO 4762)	Stainless A4-70				8595	
3	1	Washer W M10 (DIN 127)	Stainless A4-70				8474	
4	1	Washer M M10 (NFE 25-514)	Stainless A4-70				8430	
5	1	CHC screw M10 x 70 (ISO 4762) with head pierced	Stainless A4-70	PN0030	B	A	3465	

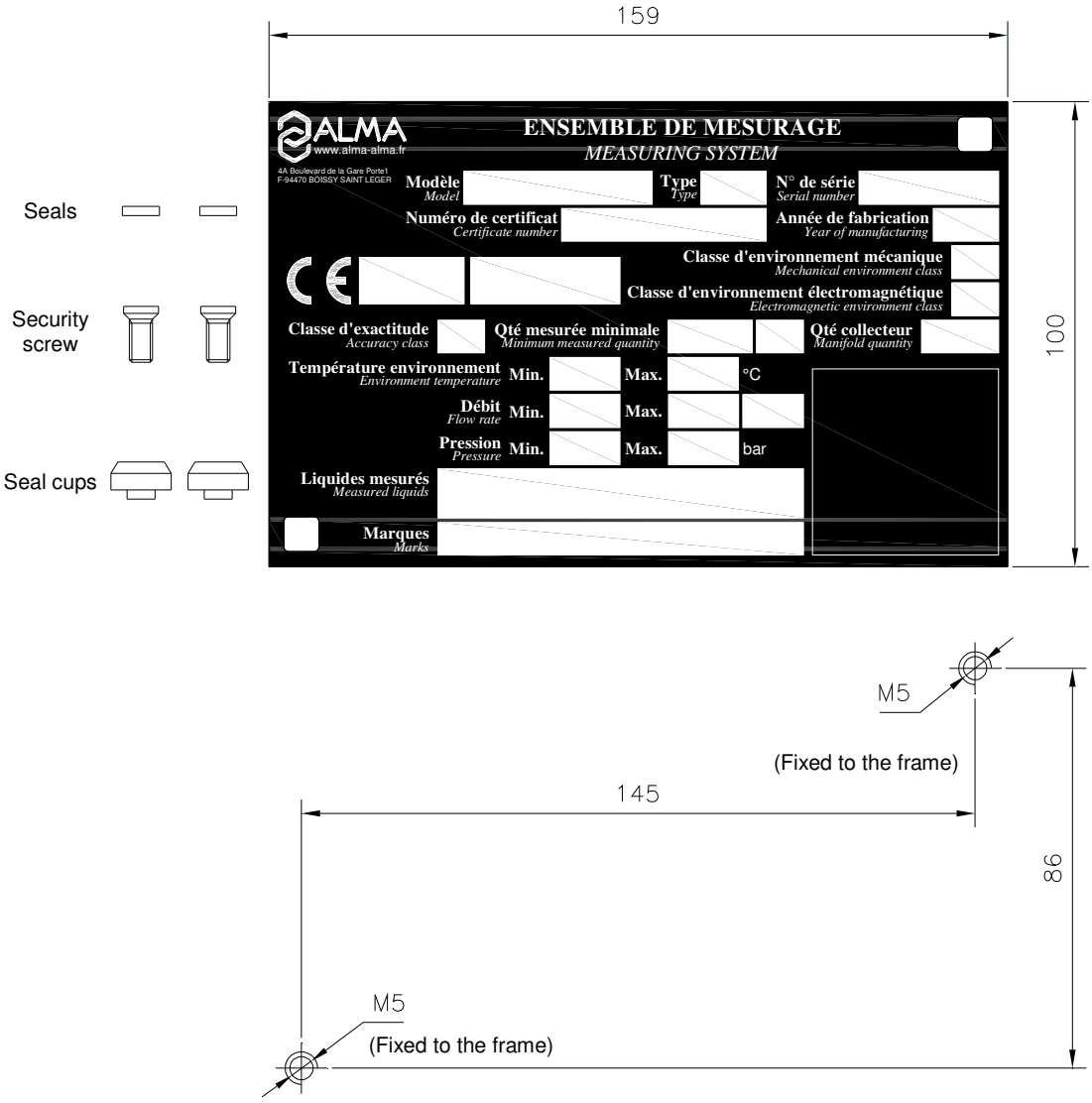
ALMA www.alma-alma.fr Service Development 13127 Vitrolles		Sightglass kit 110 x 110 Adriane turbine meter DN80 24X			Description of amendment N°530 Integration of drill head screws					
Mat:										
Tol : ± 0.2	Code : 1091									
Drawing N° associated with the related CET file		905	PV1674	B	2 /2	Modified on :	17/02/2017	by	CC	verified by SR
Metro :		Dev N°	Drawing N°	Rev	Folio	Created on :	30/03/2016		CC	SR
ATEX:										

16.1. INSTALLATION RECOMMENDATIONS SIGHTGLASS KIT DN80

- Refer to the certificate written on the identification plate of the measuring system to suit the sealing requirements
- No loose lead wire on the sealing devices

17. KIT FOR MEASURING SYSTEM IDENTIFICATION PLATE

The identification plate shall be clearly installed, near the associated indicator device, and of easy access in order to be able to read features and to stamp the regulatory marks.



The security screws of the cups (provided by ALMA) must be screwed in the tap of the frame (do not use removable nuts).