INSTALLATION GUIDE

DI 020 EN A

TURBOTRONIQUE TYPE MTS-xx AND MTP-xx

Described in EU-type examination certificate N°: LNE-26664

Issue	Date	Nature of modifications	Written by	Approved by
A	2017/11/09	Creation *[PJV126]*	DSM	PJ

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).

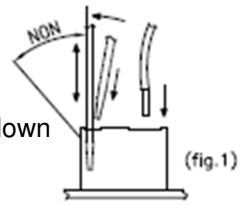
⇨ Connect the supply of the equipment downstream cut-out, on the power supply reserved to the measured distribution.

⇨ 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 measuring system TURBOTRONIQUE type MTS-xx or MTP-xx is covered by the EU type examination certificate N° LNE-26664. Refer to this certificate for any precision about its installation.
For the sealing plan, see Annex to EU type examination certificate N° LNE-26664.

2.2. SPECIAL CONDITIONS FOR INSTALLATION

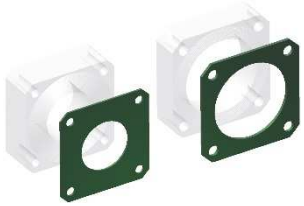
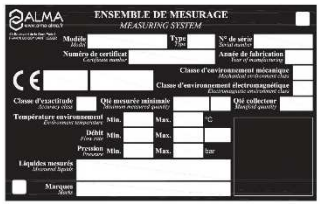
- ⇨ The ALMA model TURBOTRONIQUE measuring systems should be installed on road tankers.
- ⇨ The installation of the measuring system covered by this certificate must be in conformity with the plan which is presented in § “securing and sealing” of the certificate.
- ⇨ If the measuring system is fitted with two delivery points, it has to be equipped with a positive security device enabling a liquid delivery by only one point at once.
- ⇨ The measuring system can be equipped with an additive injection device. This injection has to occur upstream of the meter. If the additive injection is situated downstream of the gas elimination device, the installation has to avoid air injection by means of positive safety detection device, sealed and placed at the low level of the additive tank, which stops injection in case of additive lack.
- ⇨ The measuring system may be fitted with OPW, ALPECO, or EMCO WHEATON product return devices, as well as with a magnetic valve for venting, associated with the wind concentrator enabling product transfers towards the compartments. This has to be installed so that no air or venting of the wind concentrator may occur during delivery.
- ⇨ If a printing device not covered by an evaluation certificate is connected to the ALMA electronic calculator-indicator, a notice stating that the data printed is not subject to legal control must be clearly printed on the delivery notes.
- ⇨ The special installation conditions of the gas elimination devices FSGB48E, SG 80.1 AL, SG 80 IN PERNIN EQUIPEMENTS and FS24 SATAM are defined in the relevant evaluation certificates.
- ⇨ It is mandatory to install a non-return valve on the pipe between the gas elimination device and the transfer point. The non-return valve may be placed and sealed upstream of the meter or downstream as well.

  Otherwise, if the liquid level in the gas elimination device may be lower than the liquid level in the meter, a non-return valve has to be installed at the device outlet, or placed and sealed between the device and the meter.
- ⇨ The hose allowing gas removal at the outlet of the gas elimination device has to be non-pinchable or keep the deformation mark.
- ⇨ The special installation conditions of the meters are defined in evaluation certificates LNE-12393.

3. PART LIST

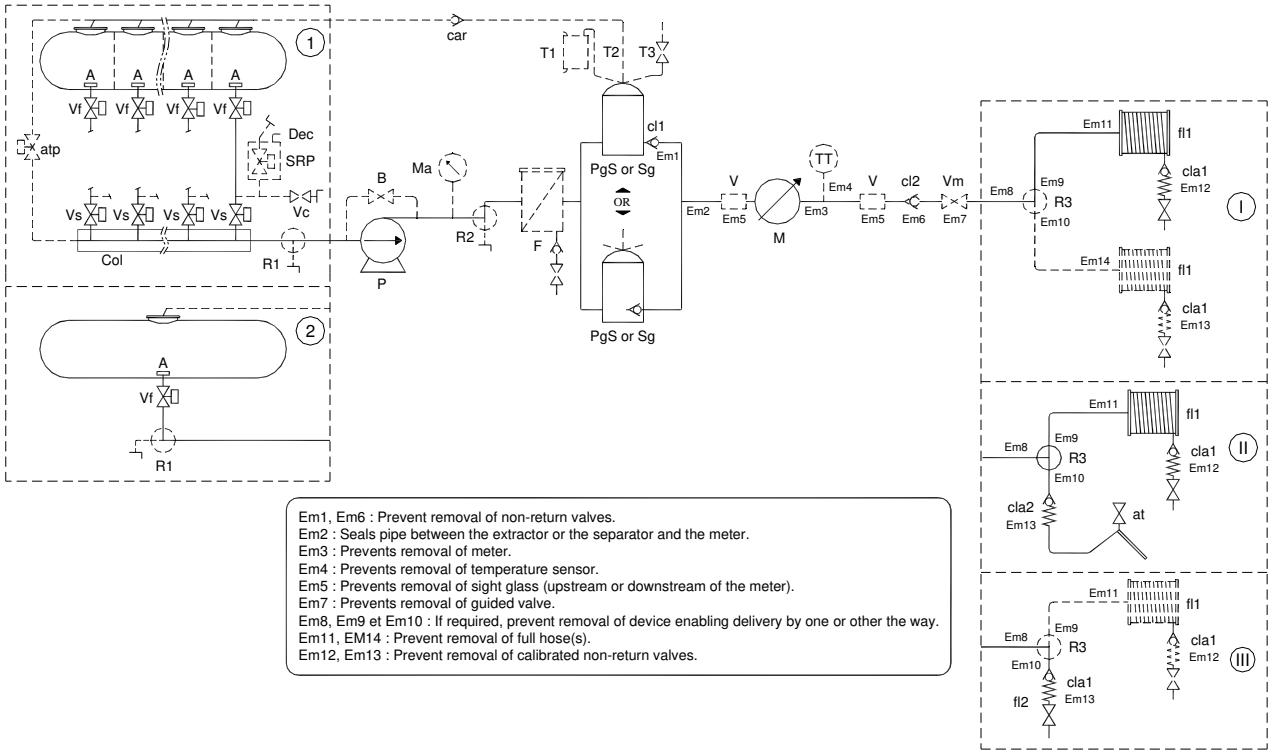
EQUIPMENTS INCLUDED IN THE MEASURING SYSTEM DELIVERED BY ALMA				
Item	**Equipment**	**Designation**	**Qty**	**Option***
1		**CALCULATOR INDICATOR MICROCOMPT+ TURBOTRONIQUE** NON ATEX or ATEX (Provided with a magnetic or RFID supervisor key)	1	
2		**ADRIANE TURBINE METER DN50-50 or DN80-80** (Depending on configuration)	1	
		**ADRIANE TURBINE METER DN80-80 373 PN16 AD-BLUE** (Only for TURBOTRONIQUE Ad-Blue)		
3		**PRINTER TMU-295** (Printer – power supply cable – serial link cable 10m)	1	
4		**CONVERTER 24VDC/24VDC 2.1A 50W** (Printer power supply 24VDC)	1	
5		**NON-RETURN VALVE KIT DN50 or DN80** (Depending on configuration)	1	•

Non-contractual pictures

MATERIELS CONSTITUANT L'ENSEMBLE DE MESURAGE LIVRE PAR ALMA				
Item	**Matériel**	**Désignation**	**Qté**	**Option***
6		**SIGHTGLASS KIT DN50 or DN80 FOR ADRIANE TURBINE METER** (Depending on configuration) (Supplied with pre-drilled screws for sealing)	1	●
7		**CONNECTION KIT DN50 or DN80** (Depending on configuration) (Supplied with pre-drilled screws for sealing)	1	●
8		**NC/NO SOLENOID VALVES KIT** NON ATEX or ATEX	1	●
9		**Pt100 TEMPERATURE PROBE – CT1001-Pe** (Supplied with thermowell)	1	●
10		**KIT FOR MEASURING SYSTEM IDENTIFICATION PLATE** (Plate and sealing device)	1	●
Option*: equipment sold as an option by ALMA must be installed on the measuring system if required by the certificate.				

Non-contractual pictures

4. OVERALL DRAWING OF THE TURBOTRONIQUE MEASURING SYSTEM



Em1, Em6 : Prevent removal of non-return valves.
Em2 : Seals pipe between the extractor or the separator and the meter.
Em3 : Prevents removal of meter.
Em4 : Prevents removal of temperature sensor.
Em5 : Prevents removal of sight glass (upstream or downstream of the meter).
Em7 : Prevents removal of guided valve.
Em8, Em9 et Em10 : If required, prevent removal of device enabling delivery by one or other the way.
Em11, EM14 : Prevent removal of full hose(s).
Em12, Em13 : Prevent removal of calibrated non-return valves.

A: Anti-swirl device.
R1: Two-way cock enabling delivery per meter, draining and filling of the tank without using the meter (optional).
P: The pump may be reversible. In that case, a non-return valve has to be added between cock R2 and gas separator Sg.
B: Pump bypass
Ma: Manometer indicating the forcing back pressure of the pump (optional).
R2: Two-way cock for pumped delivery without meter (optional).
F: Filter which, when external to the separator or the extractor, may be fitted with a draining cock.
Sg: Gas separator.
PgS: Specific gas extractor.
cl1: Non-return valve (compulsory when the gas elimination device is not fitted with internal non-return valve).

T1, T2, T3: Variants authorized for gas evacuation device:
T1: Use of a container to retrieve the liquid particles carried along by gas,
T2: Foam going back to the tank,
T3: Use of a valve for draining.

car: Non-return valve on foam return (optional).
M: Meter
V: Sight glass (compulsory with a specific gas extractor (gas indicator), optional with a gas separator).
cl2: Non-return valve (optional).
TT: Temperature sensor Pt100 (optional).
Vm: Guided valve (optional).
R3: Device enabling, when the measuring system has two delivery paths, to make deliveries one or the other way.
fl1: Full hose on hose reel
fl2: Very short full hose enabling delivery with flowrate (optional).
cla1: Calibrated non-return valve preventing draining of the full hose.
cla2: Calibrated non-return valve preventing draining of the empty hose.

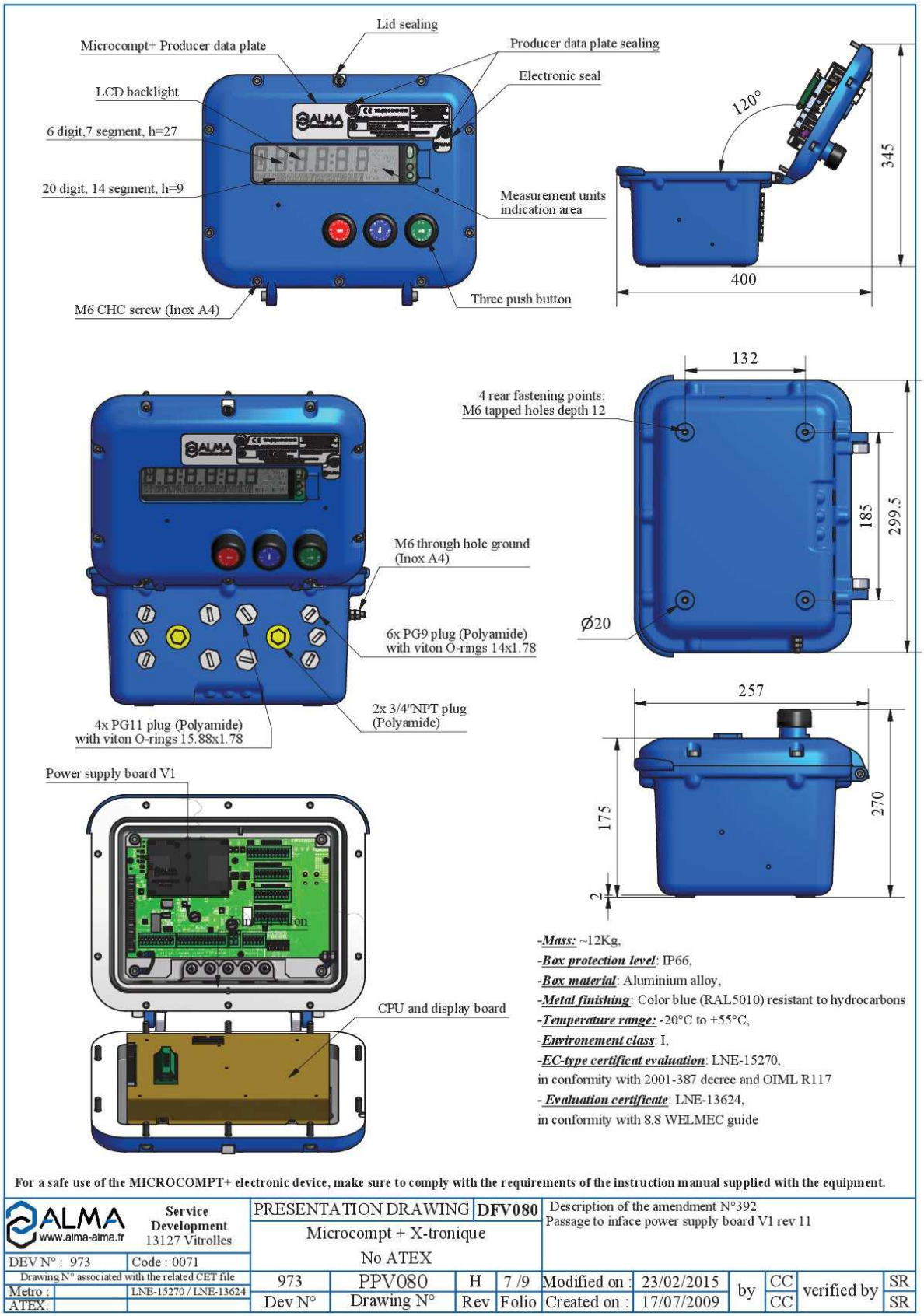
I, II, III: Variant of the delivery device:
Variant I: One or two full hoses with reel,
Variant II: Combination of full hose on reel and empty hose,
Variant III: Combination of short full hose and full hose on reel, if applicable.

Vf: Valve for compartment bottom.
Col: Wind concentrator.
atp: Guided venting (optional).
Vs: Selection valve, installed on pipe of each compartment, enabling communication with wind concentrator (guided or manual).
Vc: Valve for source loading, installed on pipe of each compartment (optional).
SRP: Return Product System on one or more compartment(s) (optional).
Déc: Decompression control (secured).

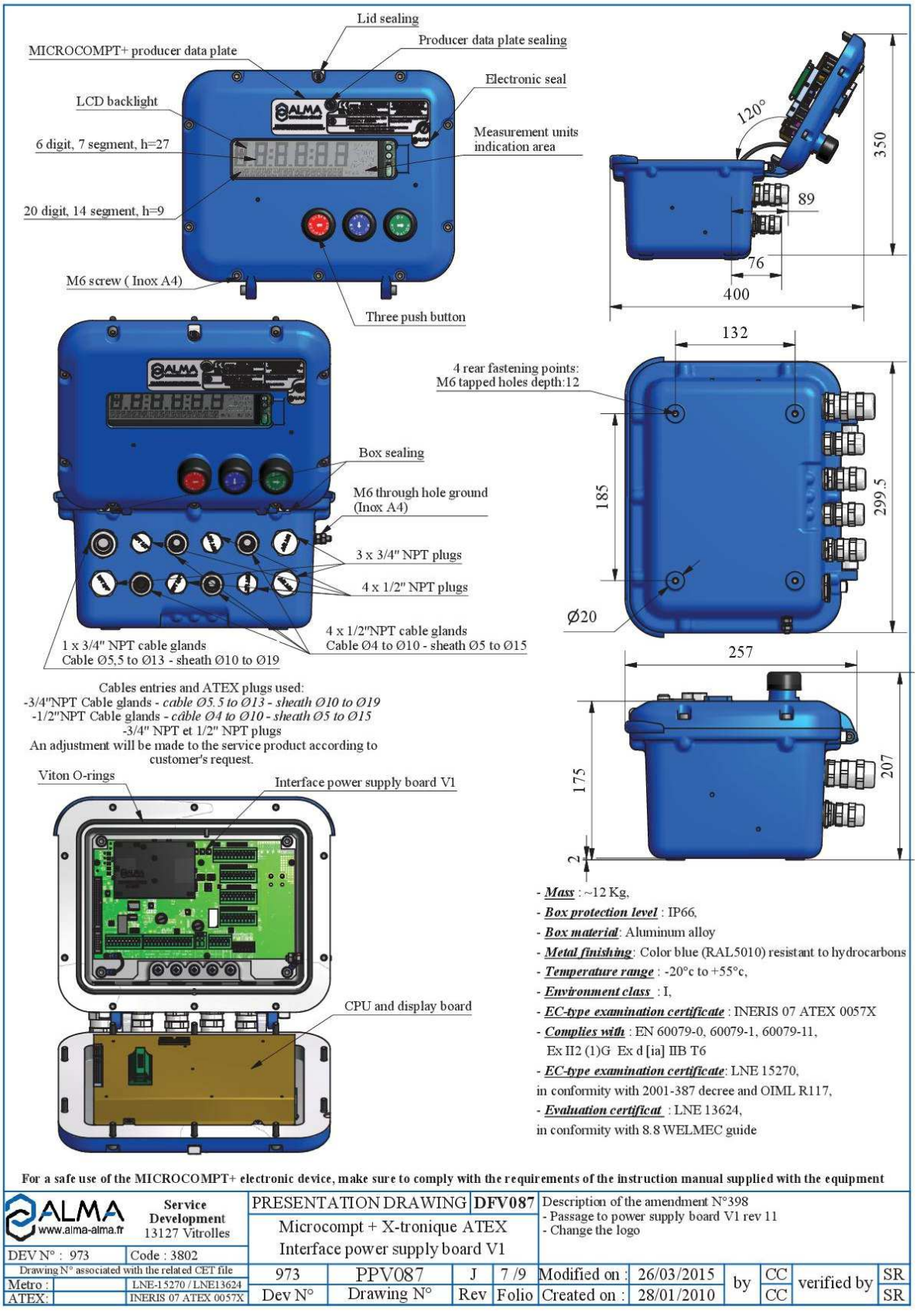
1, 2: Variants of devices associated with the tank
Variant 1: Tank with several compartments and wind concentrator,
Variant 2: Single compartment tank.

5. MICROCOMPT+ TURBOTRONIQUE NON ATEX OR ATEX

5.1. CALCULATOR-INDICATOR MICROCOMPT+ NON ATEX

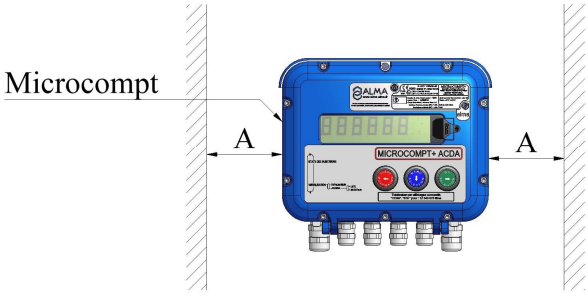


5.2. CALCULATOR-INDICATOR MICROCOMPT+ ATEX

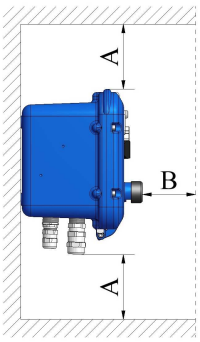


5.3. INSTALLATION RECOMMENDATIONS CALCULATOR-INDICATOR MICROCOMPT+

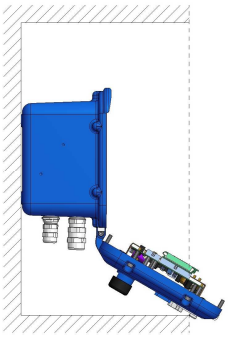
- Fasten the box with 4 M6 screws (holder suitable for vibrations and designed to support the MICROCOMPT). On the box: 4 M6 blind holes tapped length=12 over 185x132).
- Leave an open space around the box in order:
  - To facilitate maintenance operation.
  - To prevent any pressing on pushbuttons and 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.

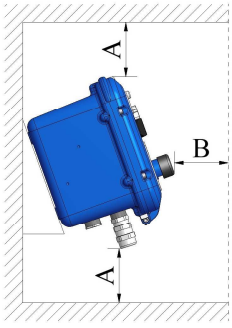


Left hand view
Closed box

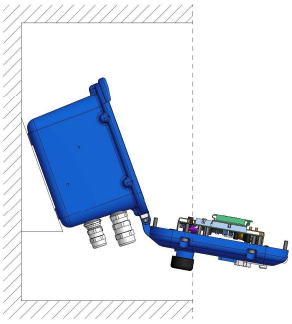


Left hand view
open box

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



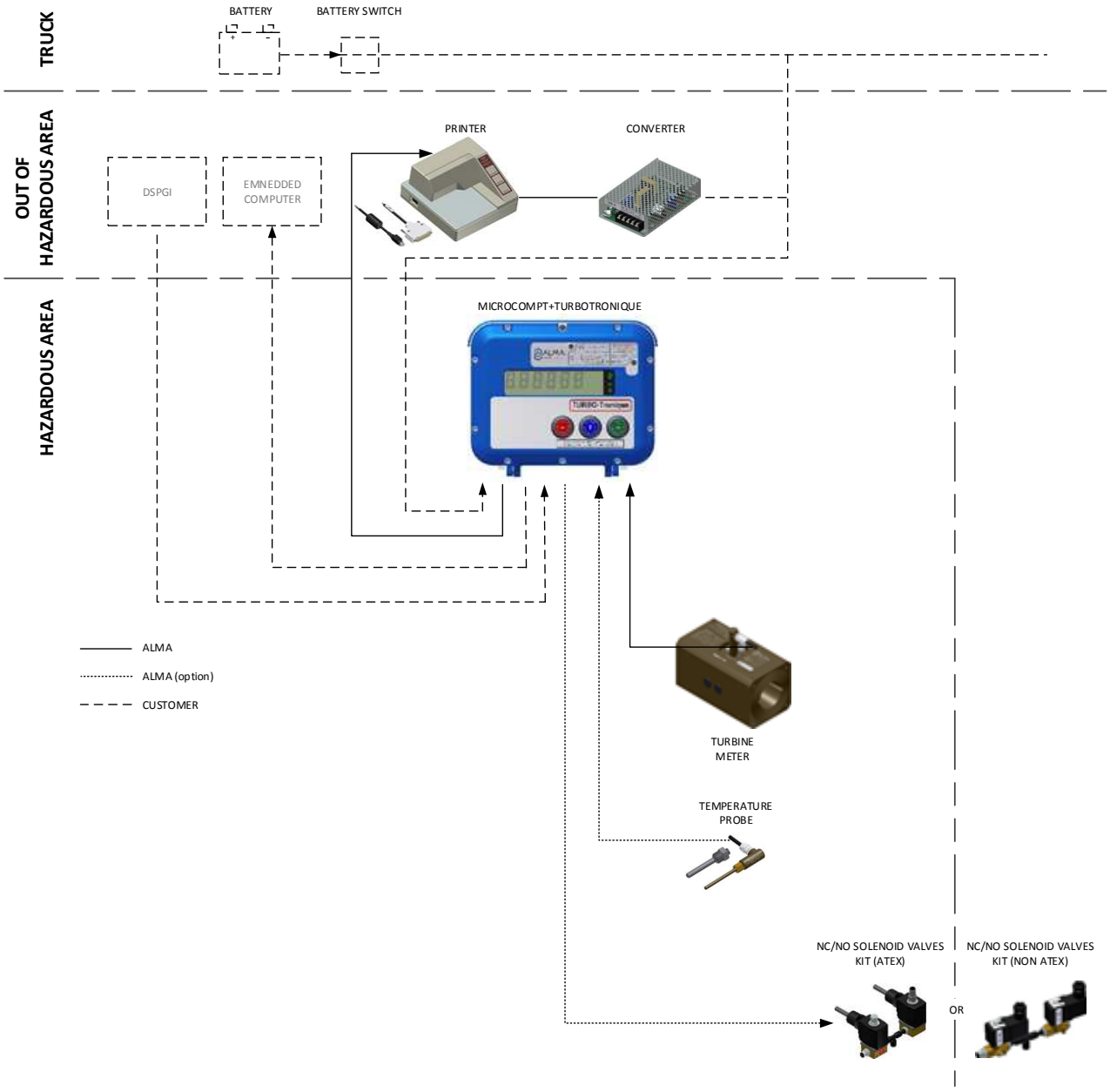
Left hand view
Closed box



Left hand view
open box

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

5.4. ELECTRICAL WIRING CALCULATOR-INDICATOR MICROCOMPT+

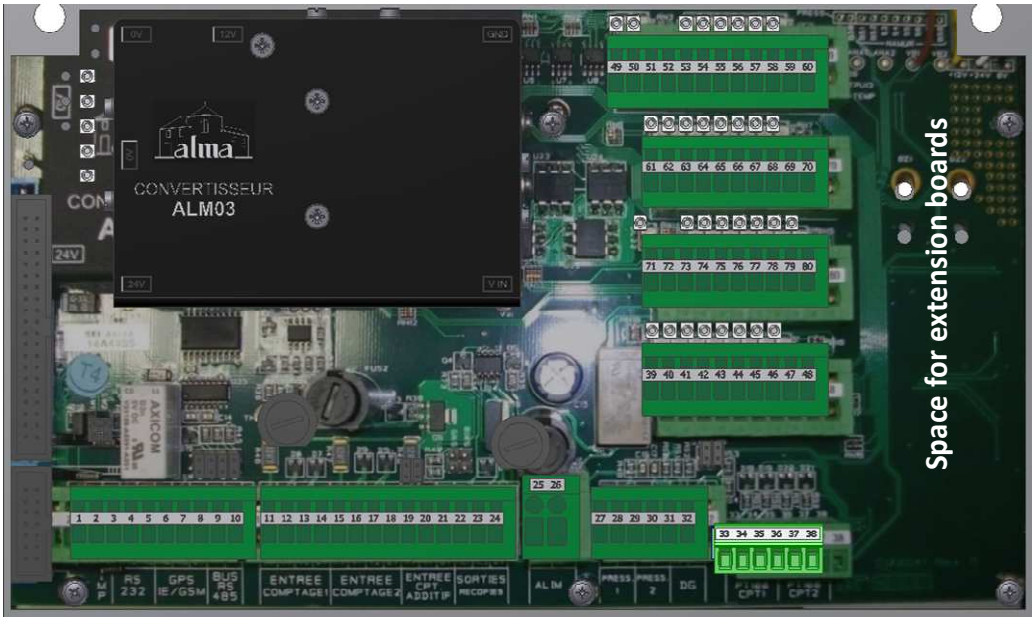


Terminal assignment of the interface power supply board

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
	PRINTER	C1	1/2"NPT	●	ADR 4x0.34 sh.	Rx Printer	Bc	1	Tx	PRINTER	Connect the shielding
						Tx Printer	Mr	2	Rx		
						0V	Vt	3	0V		
•	EMBEDDED COMPUTING	C8	1/2"NPT		3x0.34 sh.	0V		3	0V	RS232	Connect the shielding. ALMA or FTL Light Protocol
						Rx E.C.		4	Tx		
						Tx E.C.		5	Rx		
•	DSPGI DEVICE					Rx	Vt	6	Tx	DSPGI	Gauging system for product identification
						Tx	Bc	7	Rx		
						Ground	Nr	8	Ground		
•	REMOTE DISPLAY					Tx		9	+	RS485	Remote display type SREI TC5-10-24 Ext Use an RS485/RS232 converter
						Rx		10	-		
	TURBINE TRANSMITTER	C2	1/2"NPT	●	ADR 4x0.34 sh.	12V	Jn	11	12V	INPUT TURBINE EMA	Connect the shielding
						V1	Mr	12	V1		
						V2	Vt	13	V2		
						0V	Bc	14	0V		
•	ADDITIVE INJECTOR METERING							19	PO EMA	INPUT ADDITIVE METERING	
								20	PO EMB		
								21	0V		
•	PULSES OUTPUT		1/2"NPT			PO EMA		22	12V	PULSES OUTPUT	
						PO EMB		23	V1		
						0V		24	0V		
	SUPPLY 24VDC	A1	1/2"NPT		2x1	Bat. (+)	1	25	24VDC	POWER SUPPLY	24VDC truck battery (after battery switch and protected by a fuse)
						Bat. (-)	2	26	0V		

EQUIPMENTS CONNECTED TO THE MICROCOMPT+								INTERFACE POWER SUPPLY BOARD			
Option	Equipement	Cable (for information)				Function	Colour or No.	Terminal	Function		Observation
		No.	CG*	Alma	Type						
•	Pt100 TEMPERATURE PROBE	C4	1/2"NPT	•	ADR 3x0.6 sh.	+	Jn	33	+	Pt100	Connect the shielding
						-	Bc	34	-		
						-	Vt	35	-		
	MANIFOLD FLAP CONTROL OR PRODUCT RETURN AUTHORISATION AND/OR ADDITIVATION 2 CONTROL				4 to 7x1	Flap 1	1	39	24VDC = opened flap (outputs FET 24V 5W max.) FET-Field Effect Transistor	EV Flaps or Product return and/or Additivation 2	Depending on configuration: direct connection or via plexmi electronic board. Refer to the assignment table and the connection table of the relevant plexmi board
						Flap 2	2	40			
						Flap 3	3	41			
						Flap 4	4	42			
						Flap 5	5	43			
						Flap 6	6	44			
						Flap 7	7	45			
								46			
					1x1	0V		47	0V		
								48			
	RC-HEATING OIL RECEIVER				2x1	Start/Stop	1	49	Start/Stop	RC-Oil_1	
						LF/HF	2	50	LF/HF	RC-Oil_2	
	COUNTED / PUMPED DISTRIBUTION WAY (with additional commands)				3x1	Gravi/Pmp	1	51	0V	Gravity / Pumped	Closed circuit=product pumped (end position)
						Pct/Pnc	2	52	0V	Pumped counted/ no counted	Closed circuit=product counted
						0V	3	59	0V	0V (GND)	51, 52 and 59 are shunted if manual valves are not instrumented
	PTO CONTROL				1x1	PTO Ctrl		58		PTO control	Power-take-off engaged
	FOOTVALVE CONTROL				1x1	Footvalve		64	24VDC= cde	FOOTVALVE	24VDC=opening (Outputs FET 24V 5W max.) *FET=Field Effect Transistor*
	PRODUCT RETURN CONTROL				3 to 6X1	PR1	1	65	24VDC= author.	Return_1	Depending on configuration: direct connection (Outputs FET Field Effect Transistor 24V 5W max.) or via plexmi electronic board. Refer to the assignment table and connection table of the relevant plexmi board
						PR2	2	66		Return_2	
						PR3	3	67		Return_3	
						Chasse		68		Cde chasse	
	HOSES 1 AND 2 AUTHORISATION CONTROL	C6			3x1	0V	1	70	0V	0V (GND)	Hoses 1 and 2 authorisation control (Outputs FET 24V 5W max.) *FET=Field Effect Transistor*
						Hose 1	2	75	24VDC= distrib.	Hose_1 ctrl	
						Hose 2	3	63		Hose_2 ctrl	
	ADDITIONAL COMMANDS				5X1	PTO	1	61	24VDC= pto	PTO	(Outputs FET 24V 5W max.) *FET=Field Effect Transistor*
						Stop Mot.	2	62	24VDC= stop	Stop motor	
						Acc. Mot.	3	73	24VDC= acc.	Motor acceleration	
						Clutching	4	76	24VDC= clutchin	Clutching	
						Start Mot.	5	77	24VDC= start	Start motor	
	ADDITIVATION 1 CONTROL				2x1	Power	1	71	NO free contact	Additivation 1	Closed contact=additivation (Output: NO free potential relay)
						Control	72	72			
•	KIT SOLENOID VALVES NC/NO (NON ATEX or ATEX)	C5		•	*[3xG0.75]*	NC valve Pump bypass	1 / [Mr]	74	24VDC	NC control	24VDC= opening NC solenoid valve
							2 / [Nl]	80	0V		
						NO valve Exhaust	1 / [Mr]	79	24VDC	NO control	24VDC= closing NO solenoid valve *[cable supplied by ALMA for ATEX version]*
							2 / [Nl]	80	0V		
	MANIFOLD VENT VALVE CONTROL				1x1	Vent valve		78	24VDC	Vent valve control	24VDC=opening (Outputs FET 24V 5W max.) *FET=Field Effect Transistor*
SOME EXTENSION BOARDS MAY BE SET ON TO THE INTERFACE POWER SUPPLY BOARD											

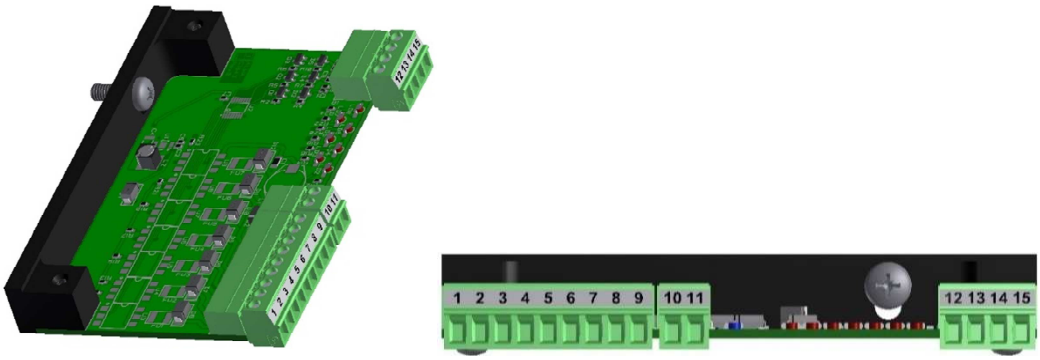
**Refer to the Cable Glands Installation Instructions*

Assignments table according to number of flaps, product returns and depending on the presence or not of a second additive injector:

				MICROCOMPT+ Interface power supply board V1 REV11									
Nb of Flaps	**Nb of Returns**	**Addit #1**	**Addit #2**	**45**	**44**	**43**	**42**	**41**	**40**	**39**	**67**	**66**	**65**
5	0-4	yes	yes	addit#2	ret#4	flap#5	flap#4	flap#3	flap#2	flap#1	ret#3	ret#2	ret#1
5	5	yes	no	ret#5	ret#4	flap#5	flap#4	flap#3	flap#2	flap#1	ret#3	ret#2	ret#1
6	0-3	yes	yes	addit#2	flap#6	flap#5	flap#4	flap#3	flap#2	flap#1	ret#3	ret#2	ret#1
6	4	yes	no	ret#4	flap#6	flap#5	flap#4	flap#3	flap#2	flap#1	ret#3	ret#2	ret#1
6	5-7	yes	yes	addit#2	flap#6	flap#5	flap#4	flap#3	flap#2	flap#1	PLEXMI 1 (ret#1-ret#7)		
7	0-3	yes	no	flap#7	flap#6	flap#5	flap#4	flap#3	flap#2	flap#1	ret#3	ret#2	ret#1
7	4-7	yes	no	flap#7	flap#6	flap#5	flap#4	flap#3	flap#2	flap#1	PLEXMI 1 (ret#1-ret#7)		
8	0-6	yes	no	ret#6	ret#5	ret#4	flap#8	PLEXMI 1 (flap #1- flap#7)			ret#3	ret#2	ret#1
9	0-5	yes	no	ret#5	ret#4	flap#9	flap#8	PLEXMI 1 (flap#1- flap#7)			ret#3	ret#2	ret#1
9	6-9	yes	no	ret#9	ret#8	flap#9	flap#8	PLEXMI 1 (flap#1- flap#7)			PLEXMI 2 (ret#1-ret#7)		

If both PLEXMI electronic boards are useful, PLEXMI 1 is fixed to the MICROCOMPT+ frame and PLEXMI 2 (ret#1-ret#7) has to be installed in a 24VDC-supplied independent box.

Connection of plexmi electronic boards for manifold flaps and product returns



Multiplexing table:

MULTIPLEXING TABLE									
Input 1 (12)	Input 2 (13)	Input 3 (14)	Output 1 (1)	Output 2 (2)	Output 3 (3)	Output 4 (4)	Output 5 (5)	Output 6 (6)	Output 7 (7)
0	0	0	0	0	0	0	0	0	0
24V	0	0	**24V**	0	0	0	0	0	0
0	**24V**	0	0	**24V**	0	0	0	0	0
24V	**24V**	0	0	0	**24V**	0	0	0	0
0	0	**24V**	0	0	0	**24V**	0	0	0
24V	0	**24V**	0	0	0	0	**24V**	0	0
0	**24V**	**24V**	0	0	0	0	0	**24V**	0
24V	**24V**	**24V**	0	0	0	0	0	0	**24V**

PLEXMI board connection table for manifold flaps:

CONNECTED EQUIPMENT								PLEXMI ELECTRONIC BOARD							MICROCOMPT+			
								OUTPUTS				INPUTS			INTERFACE POWER SUPPLY BOARD			
Option	Equipment	Cable (for information) No	CG*	Alma	Type	Function	Colour or No	Termin	Function		Observation	Observation	Function	Termin	Termin	Function		Observation
●	MANIFOLD FLAP CONTROL				4 to 7x1	Flap#1	1	1	Outputs 24VDC (24VDC = opened flap)	Flap#1	500 mA max	Multiplexing** for flap#1 to flap#7	Input 1	12	39	Outputs 24VDC (24VDC = opened flap) outputs FET 24V 5W max	Flap#1 to Flap#7	
						Flap#2	2	2		Flap#2			Input 2	13	40			
						Flap#3	3	3		Flap#3			Input 3	14	41			
						Flap#4	4	4		Flap#4								
						Flap#5	5	5		Flap#5								
						Flap#6	6	6		Flap#6								
						Flap#7	7	7		Flap#7								
													SUPPLY	24VDC 10	S2	24VDC (white)	Supply via Microcompt+	
								8	0V	GND				0V 11	S4	0V (black)		
					1x1	0V		9	0V	GND			GND	0V 15	47	0V		

**Refer to the Cable Glands installation instructions*
*** Refer to the multiplexing table*

PLEXMI board connection table for product returns:

CONNECTED EQUIPMENT								PLEXMIELECTRONIC BOARD							MICROCOMPT+			
								OUTPUTS				INPUTS			INTERFACE POWER SUPPLY BOARD			
Option	Equipment	Cable (for information) No	CG*	Alma	Type	Function	Colour or No	Termin	Function		Observation	Observation	Function	Termin	Termin	Function		Observation
●	PRODUCT RETURN CONTROL				4 to 7x1	Return#1	1	1	Outputs 24VDC (24VDC = opened return)	Return#1	500 mA max	Multiplexing** from return#1 to return#7	Input 1	12	65	24VDC = authorisation	Product return compartment 1 to 7	Output FET 24V 5W max
						Return#2	2	2		Return#2			Input 2	13	66			
						Return#3	3	3		Return#3			Input 3	14	67			
						Return#4	4	4		Return#4								
						Return#5	5	5		Return#5								
						Return#6	6	6		Return#6								
						Return#7	7	7		Return#7								
													SUPPLY	24VDC 10	S2	24VDC (white)	Supply via Microcompt+	
								8	0V	GND				0V 11	S4	0V (black)		
					1x1	0V		9	0V	GND			GND	0V 15	47	0V		

**Refer to the Cable Glands installation instructions*
*** Refer to the multiplexing table*

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

EXTENSION BOARD SONDE AD 5 wires (IS)

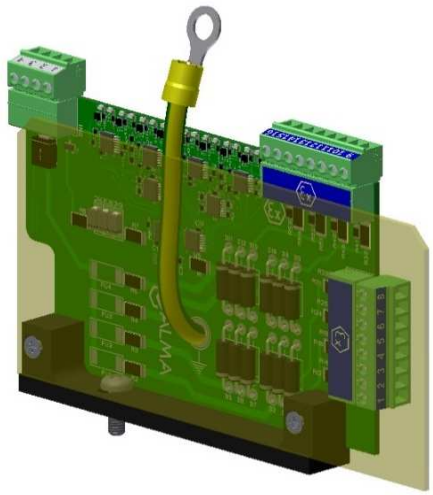
NI IN ATEX 510 C

EQUIPMENTS CONNECTED TO THE MICROCOMPT+								EXTENSION BOARD SONDE AD (IS)			
Option	Equipement	Cable (for information)				Function	Colour or No.	Terminal	Function		Observation
		No.	CG*	Alma	Type						
•	OVERFILL PREVENTION PROBE	C7			*[6x1]*	Common	*[Nr]*	**1**	-	OVERFILL PREVENTION PROBES	*[If cable are supplied by ALMA]*
						Power	*[Rg]*	**2**	+		
						From probe	*[Or]*	**3**	From probe		
						To probe	*[Jn]*	**4**	To probe		

**Refer to the Cable Glands Installation Instructions*

Terminal assignment of the extension board 'sonde AD' 2 wires (IS)

EXTENSION BOARD SONDE AD 2 wires (IS)



NT IN ATEX 15

EQUIPMENT CONNECTED TO THE MICROCOMPT+								EXTENSION BOARD SONDE AD (IS)			
Option	Equipment	Cable (for information)				Function	Colour or No.	Terminal	Function		Observation
		No.	CG*	Alma	Type						
•	OVERFILL PREVENTION PROBE 1					Supply		1	Supply +	OVERFILL PREVENTION PROBE 1	
						Common		2	Common		
•	OVERFILL PREVENTION PROBE 2					Supply		3	Supply +	OVERFILL PREVENTION PROBE 2	
						Common		4	Common		
•	OVERFILL PREVENTION PROBE 3					Supply		5	Supply +	OVERFILL PREVENTION PROBE 3	
						Common		6	Common		
•	OVERFILL PREVENTION PROBE 4					Supply		7	Supply +	OVERFILL PREVENTION PROBE 4	
						Common		8	Common		
•	OVERFILL PREVENTION PROBE 5					Supply		9	Supply +	OVERFILL PREVENTION PROBE 5	
						Common		10	Common		
•	OVERFILL PREVENTION PROBE 6					Supply		11	Supply +	OVERFILL PREVENTION PROBE 6	
						Common		12	Common		
•	OVERFILL PREVENTION PROBE 7					Supply		13	Supply +	OVERFILL PREVENTION PROBE 7	
						Common		14	Common		
•	OVERFILL PREVENTION PROBE 8					Supply		15	Supply +	OVERFILL PREVENTION PROBE 8	
						Common		16	Common		

Channels that are not connected to overfill prevention probes must be connected to a 'Dummy' device. None of the 8 channels must be open.

**Refer to the Cable Glands Installation Instructions*

⚠ This extension board only works with a two-wire optic sensor.

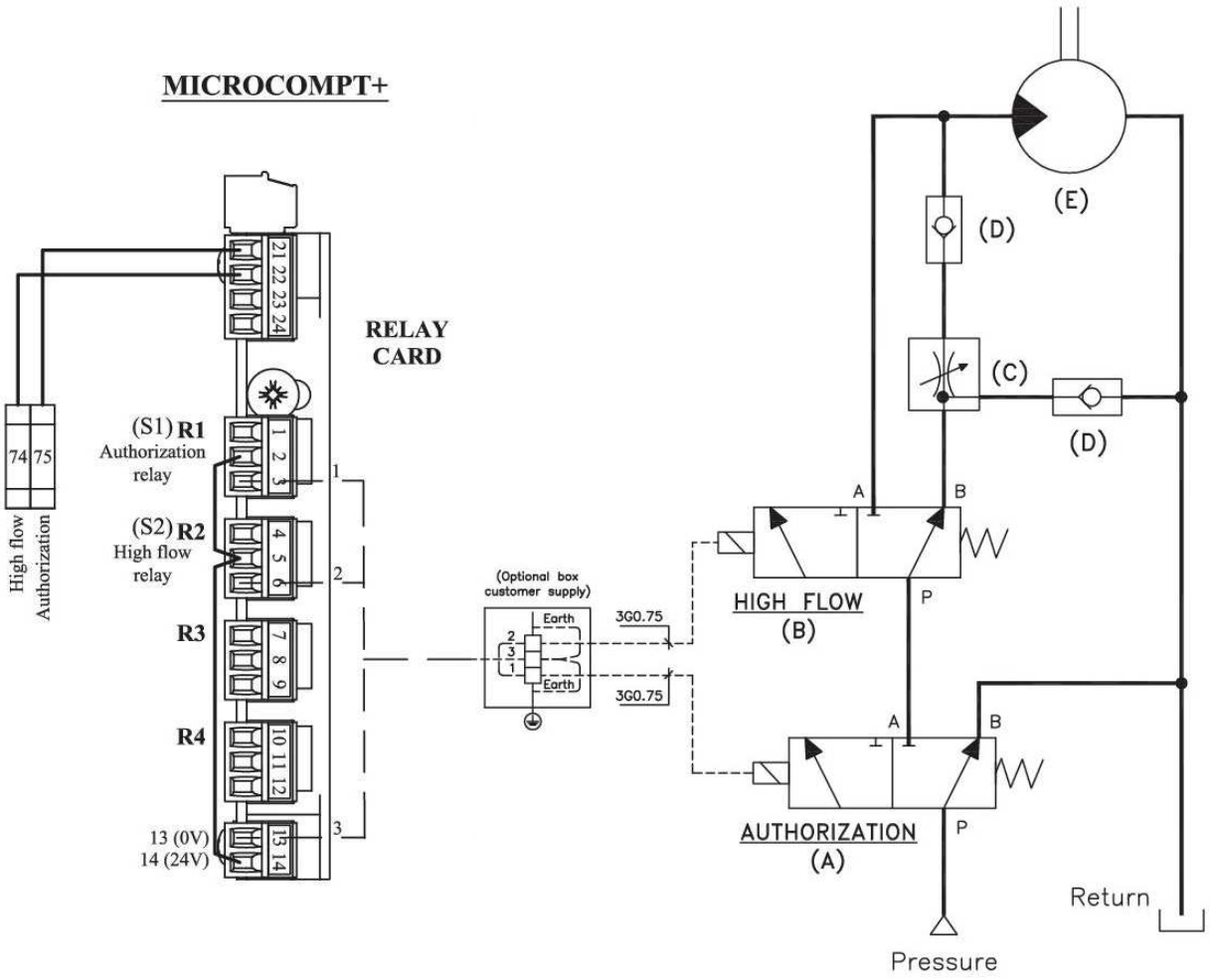
5.5. SPOOL VALVE CONTROL: ELECTRICAL AND HYDRAULIC WIRING

EQUIPMENTS CONNECTED TO THE MICROCOMPT+								INTERFACE POWER SUPPLY BOARD			
Option	Equipement	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
	MANIFOLD FLAP CONTROL OR PRODUCT RETURN AUTHORISATION AND/OR ADDITIVATION 2 CONTROL				4 to 7x1	Flap 1	1	39	24VDC = opened flap (outputs FET 24V 5W max.) FET:Field Effect Transistor	EV Flaps or Product return autorisation and/or Additivation 2	Depending on configuration: direct connection or via plexmi electronic board. Refer to the assignment table and to the connection table of the relevant plexmi board
						Flap 2	2	40			
						Flap 3	3	41			
						Flap 4	4	42			
						Flap 5	5	43			
						Flap 6	6	44			
						Flap 7	7	45			
								46			
					1x1	0V		47	0V		
								48			
	RC-HEATING OIL RECEIVER				2x1	Start/Stop	1	49	Start/Stop	RC- Oil_1	
						LF/HF	2	50	LF/HF	RC- Oil_2	
	COUNTED / PUMPED DISTRIBUTION WAY (with additional commands)				3x1	Gravi/Pmp	1	51	0V	Gravity / Pumped	Closed circuit=product pumped (end position)
						Pct/Pnc	2	52	0V	Pumped counted/ no counted	Closed circuit=product counted
						0V	3	59	0V	0V (GND)	51, 52 and 59 are shunted if manual valves are not instrumented
	PTO CONTROL				1x1	PTO Ctrl		58		PTO control	Power- take- off engaged
	FOOTVALVE CONTROL				1x1	Footvalve		64	24VDC= cde	FOOTVALVE	24VDC=opening (Outputs FET 24V 5W max.) *FET=Field Effect Transistor*
	PRODUCT RETURN CONTROL				3 to 6X1	PR1	1	65	24VDC= author.	Return_1	Depending on configuration: direct connection (Outputs FET Field Effect Transistor 24V 5W max.) or via plexmi electronic board. Refer to the assignment table and to the connection table of the relevant plexmi board
						PR2	2	66		Return_2	
						PR3	3	67		Return_3	
						Chasse		68		Cde chasse	
	ADDITIONAL COMMANDS				5X1	PTO	1	61	24VDC= pto	PTO	(Outputs FET 24V 5W max.) *FET=Field Effect Transistor*
						Stop Mot.	2	62	24VDC= stop	Stop motor	
						Acc. Mot.	3	73	24VDC= acc.	Motor acceleration	
						Clutching	4	76	24VDC= clutchin	Clutching	
						Start Mot.	5	77	24VDC= start	Start motor	
	ADDITIVATION 1 CONTROL				2x1	Power	1	71	NO free contact	Additivation 1 control	Closed contact=additivation
						Control	2	72			(Output: NO free potential relay)
	SPOOL VALVE CONTROL				2x1	HF		74	HF solenoid valve	Spool valve (hydraulic motor)	
						Author.		75	Author. Solenoid valve		
	MANIFOLD VENT VALVE CONTROL				1x1	Vent valve		78	24VDC	Vent valve control	24VDC=opening (Outputs FET 24V 5W max.) *FET=Field Effect Transistor*

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

**Refer to the Cable Glands installation instructions*

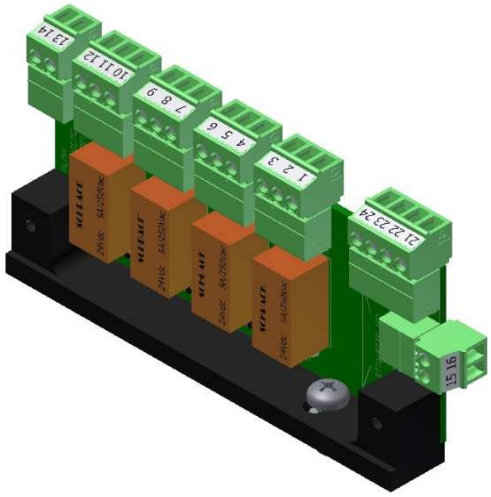
HYDRAULIC DIAGRAM



(A) : AUTHORISATION solenoid valve (not supplied by ALMA)
(B) : HIGH FLOW solenoid valve (not supplied by ALMA)
(C) : Flow regulator (not supplied by ALMA)
(D) : Non return valve (not supplied by ALMA)
(E) : Hydraulic motor (not supplied by ALMA)

Terminal assignment of the relay extension board

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

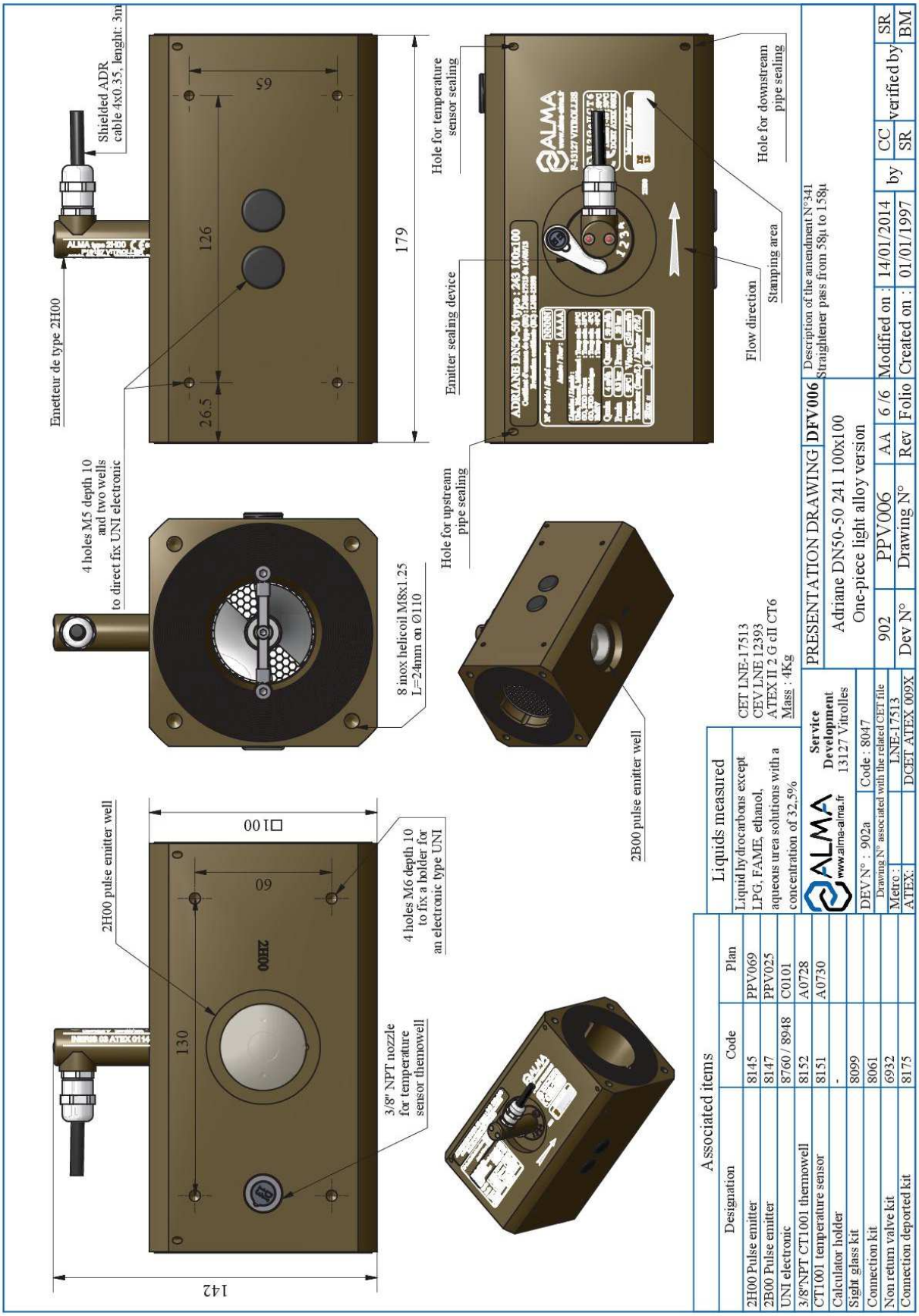


EQUIPEMENT CONNECTED TO THE MICROCOMPT+								RELAY EXTENSION BOARD			
Option	Equipement	Cable (for information) No.	CG*	Alma	Type	Function	Colour or No.	Terminal	Function		Observation
	AUTHORISATION SOLENOID VALVE					Author.		1	NC free contact	RELAY 1	Hydraulic control of hydraulic pump
								2	0V/24VDC		
								3	NO free contact		
	HIGH FLOW SOLENOID VALVE					High flow		4	NC free contact	RELAY 2	High flow control of hydraulic pump
								5	0V/24VDC		
								6	NO free contact		

**Refer to the Cable Glands Installation Instructions*

6. ADRIANE TURBINE METER

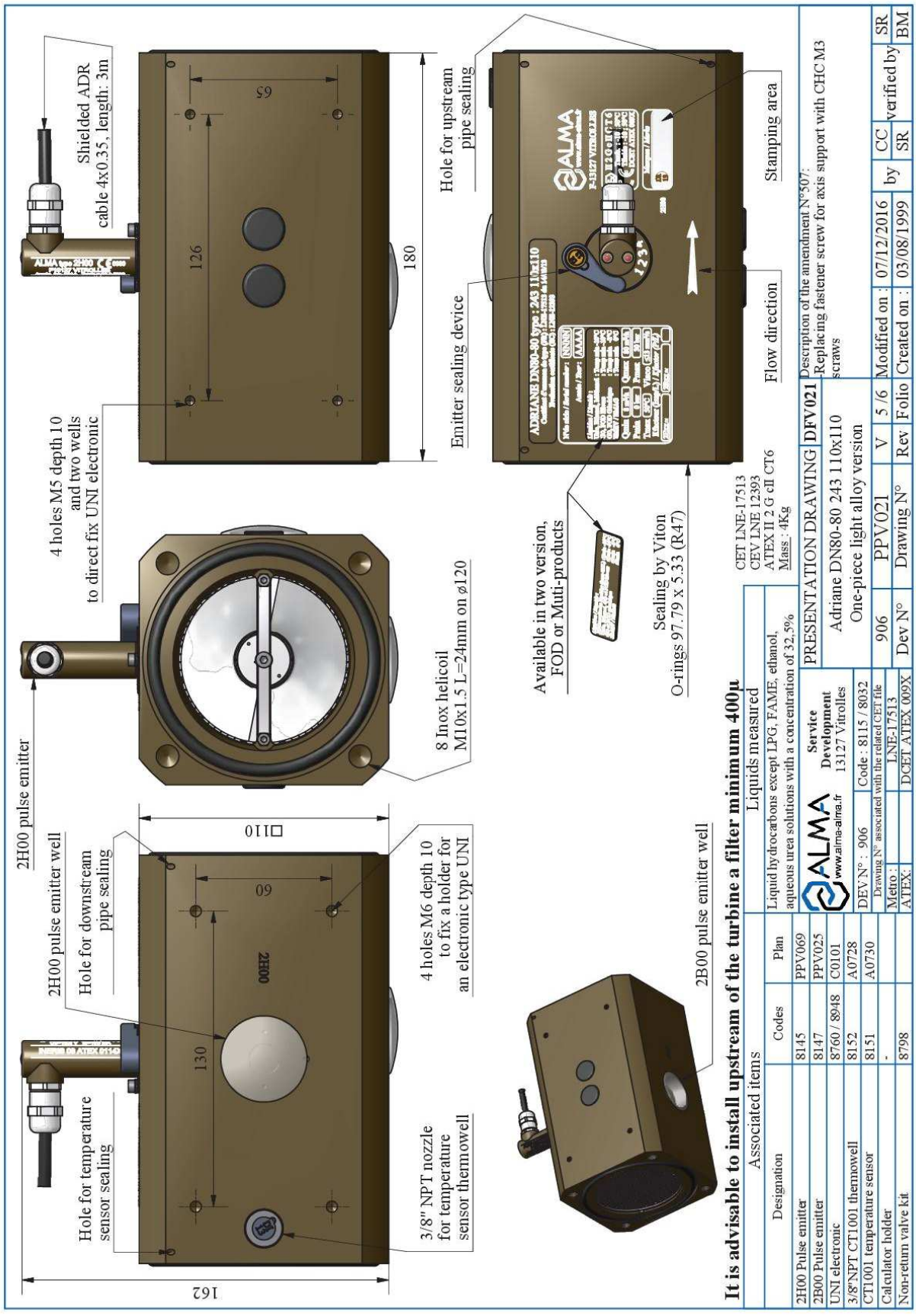
6.1. ADRIANE TURBINE METER DN50-50 243 100x100



Associated items		
Designation	Code	Plan
2H00 Pulse emitter	8145	PPV069
2B00 Pulse emitter	8147	PPV025
UNI electronic	8760 / 8948	C0101
3/8"NPT CT1001 thernowell	8152	A0728
CT1001 temperature sensor	8151	A0730
Calculator holder	-	
Sight glass kit	8099	
Connection kit	8061	
Non return valve kit	6932	
Connection deported kit	8175	

Document available on website alma-alma.fr

6.2. ADRIANE TURBINE METER 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

ALMA
www.alma-alma.fr

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

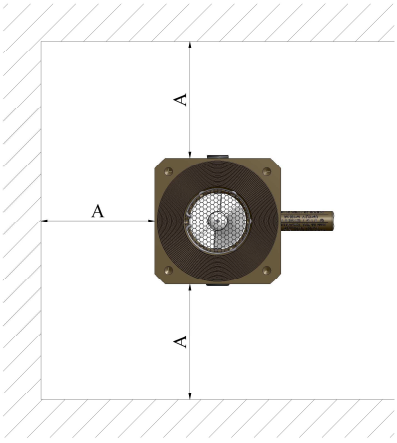
Document available on website alma-alma.fr

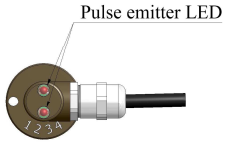
6.3. ADRIANE TURBINE METER DN80-80 373 PN16 ADBLUE

Document available on website alma-alma.fr

6.4. 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

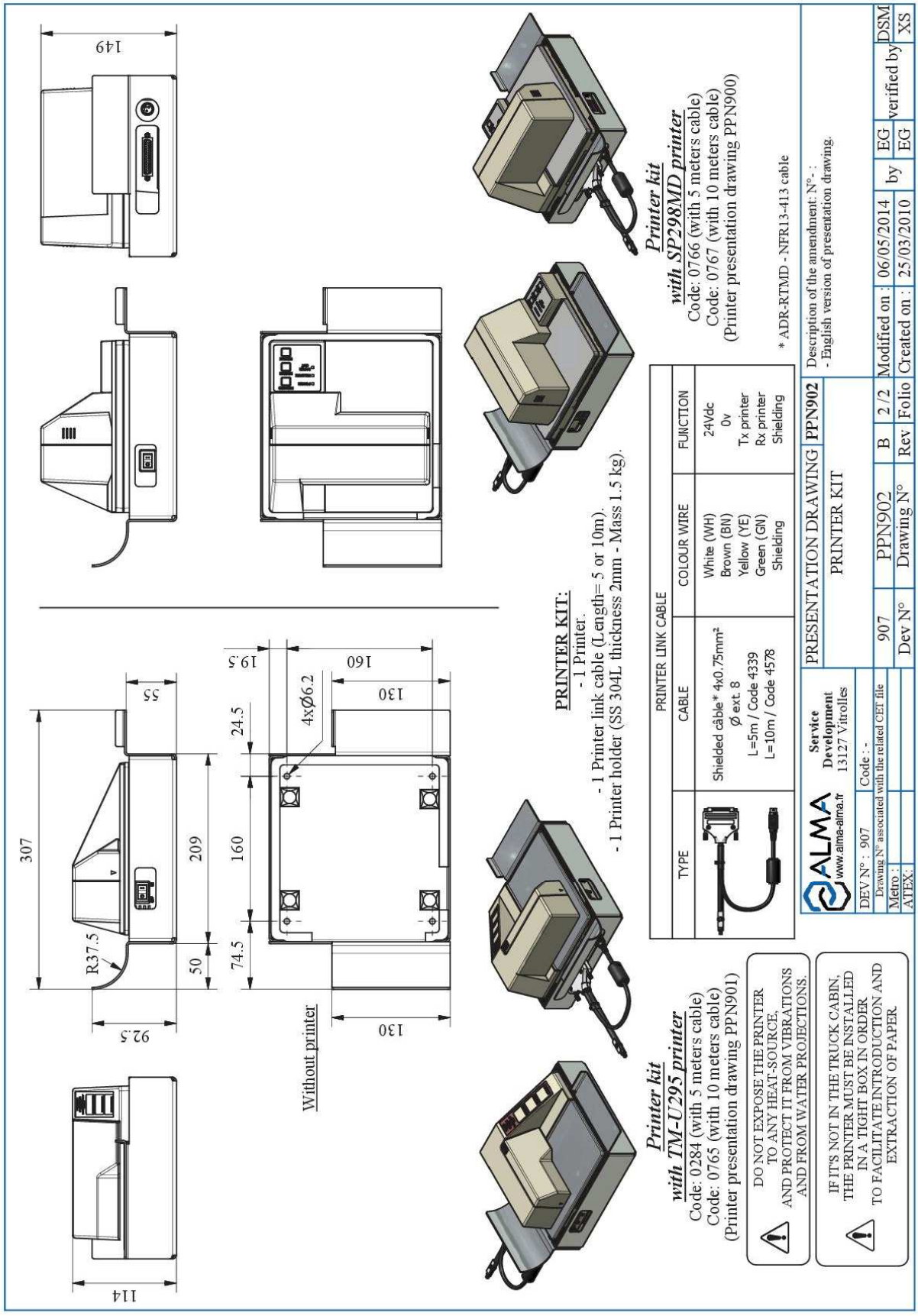
For accuracy class 0.5 and 1.0 measuring systems, the pipes and equipment upstream or downstream the turbine meter must have the same nominal diameter as the meter on a length at least equal to 10 times this diameter upstream and 5 times this diameter downstream.

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.

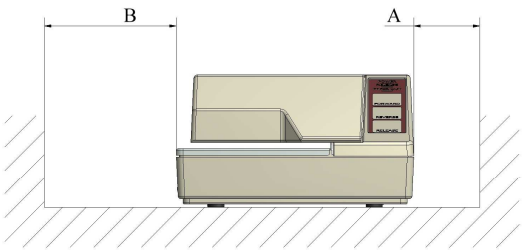
7. PRINTER

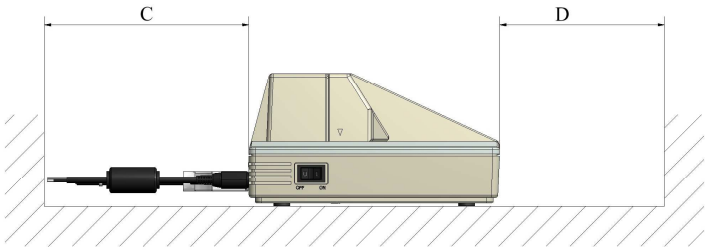


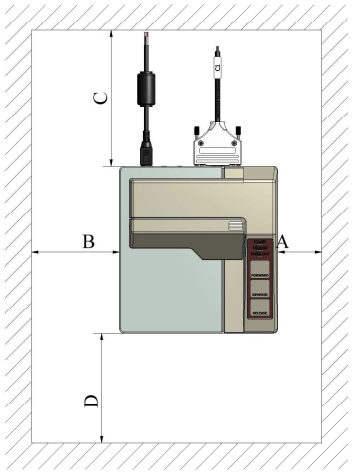
Document available on website alma-alma.fr

7.1. 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.

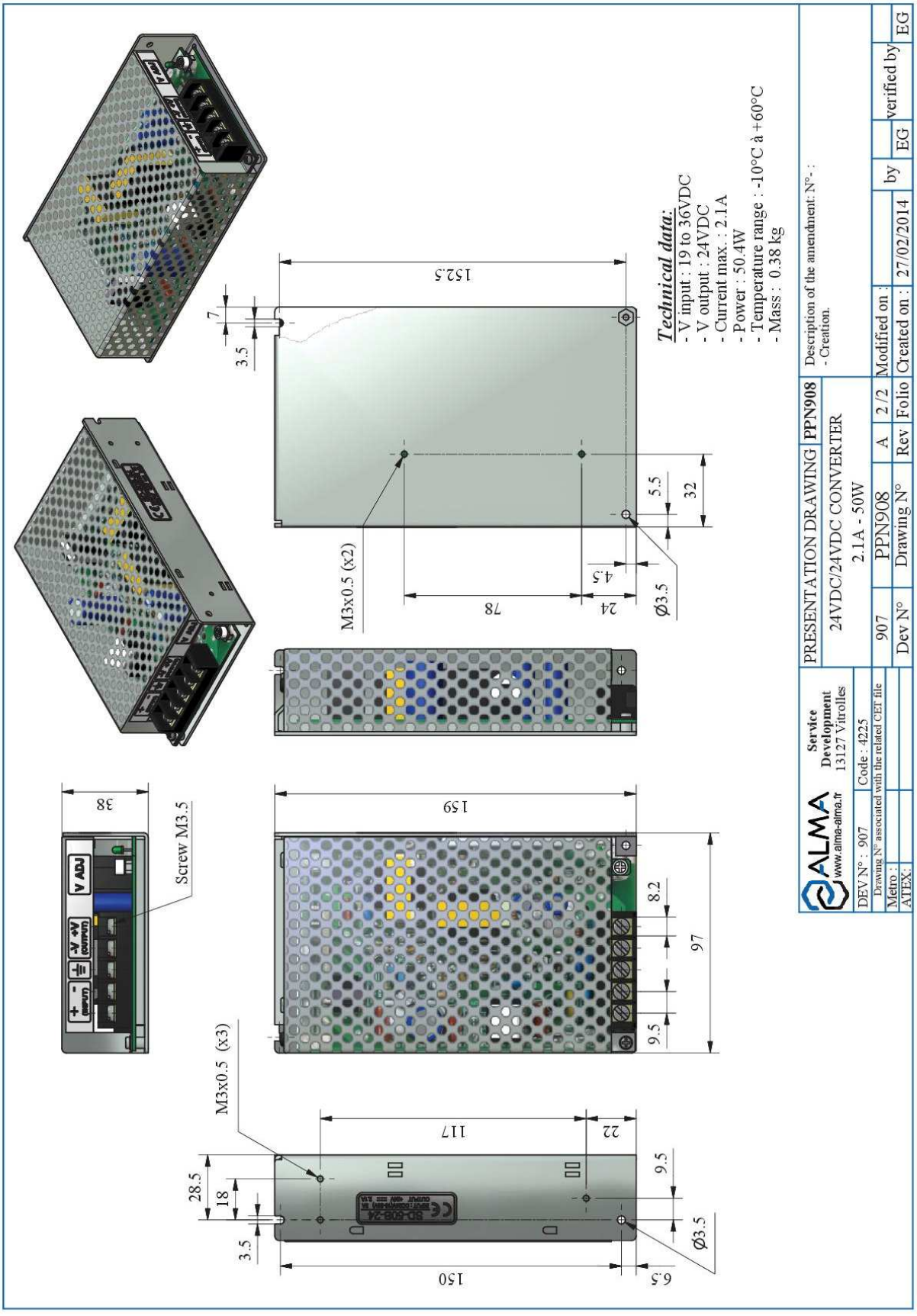






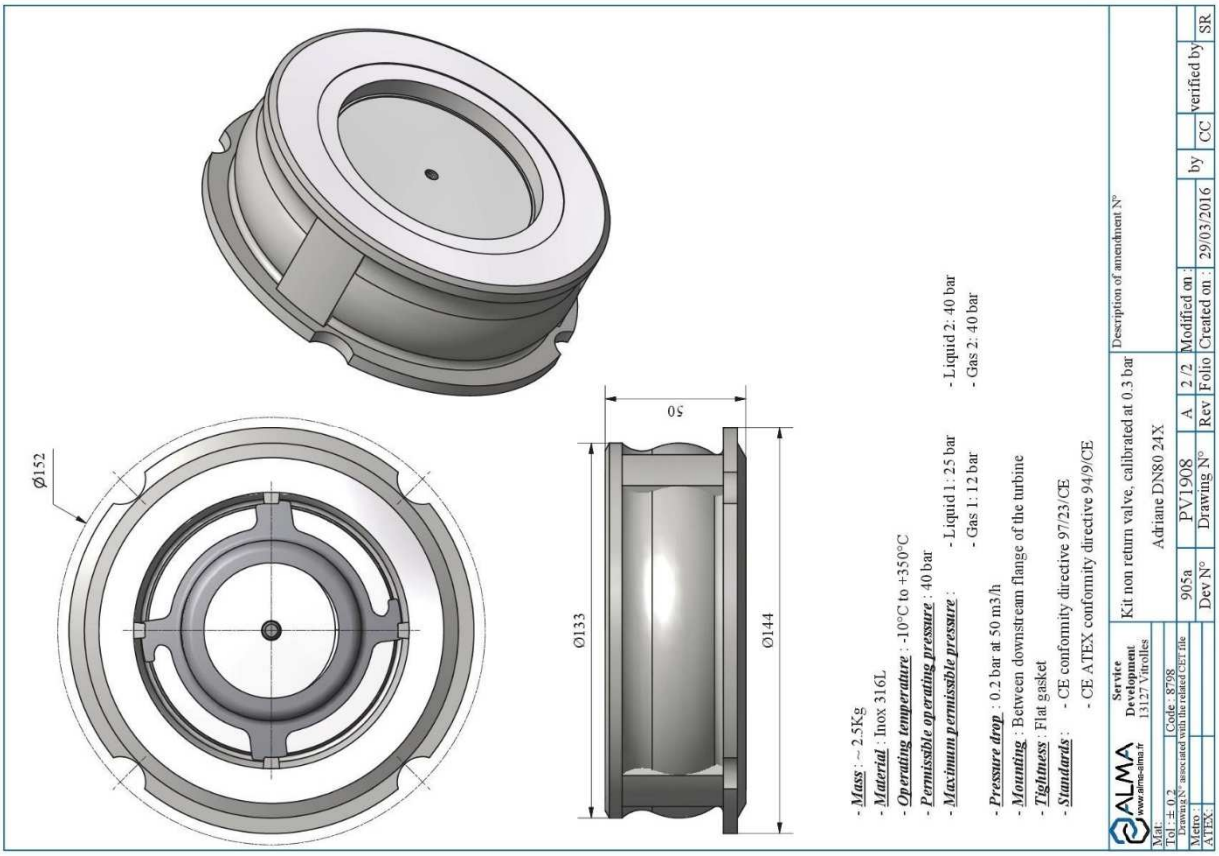
DO NOT EXPOSE THE PRINTER TO ANY HEAT-SOURCE.
PROTECT IT FROM VIBRATIONS AND WATER PROJECTIONS.

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



Document available on website alma-alma.fr

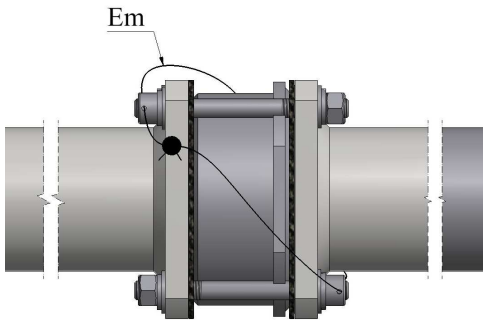
9. NON-RETURN VALVE KIT DN50 OR DN80



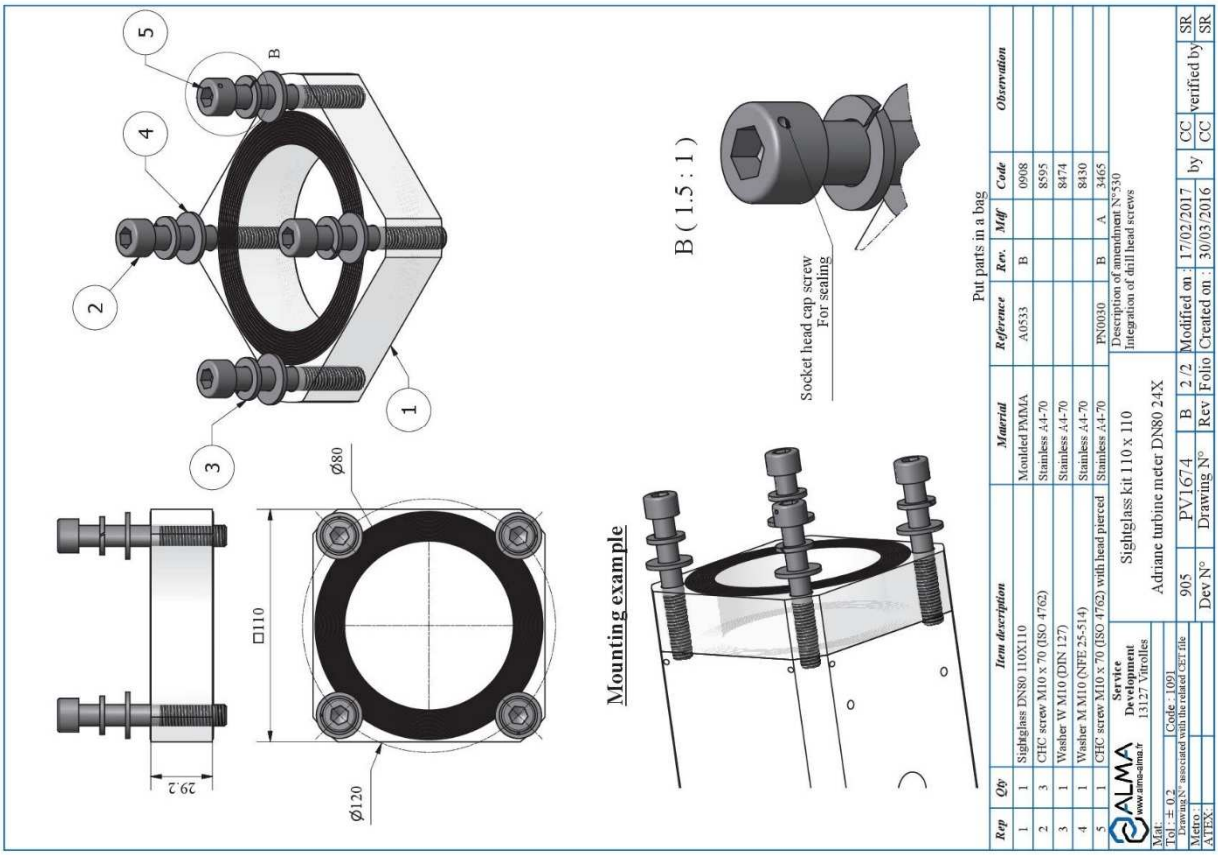
Document available on website alma-alma.fr

9.1. INSTALLATION RECOMMENDATIONS NON-RETURN VALVE KIT DN50 OR 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



10. SIGHTGLASS KIT DN50 OR DN80



Rep	Qty	Item description	Material	Reference	Rev.	Mfg	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	

Put parts in a bag

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

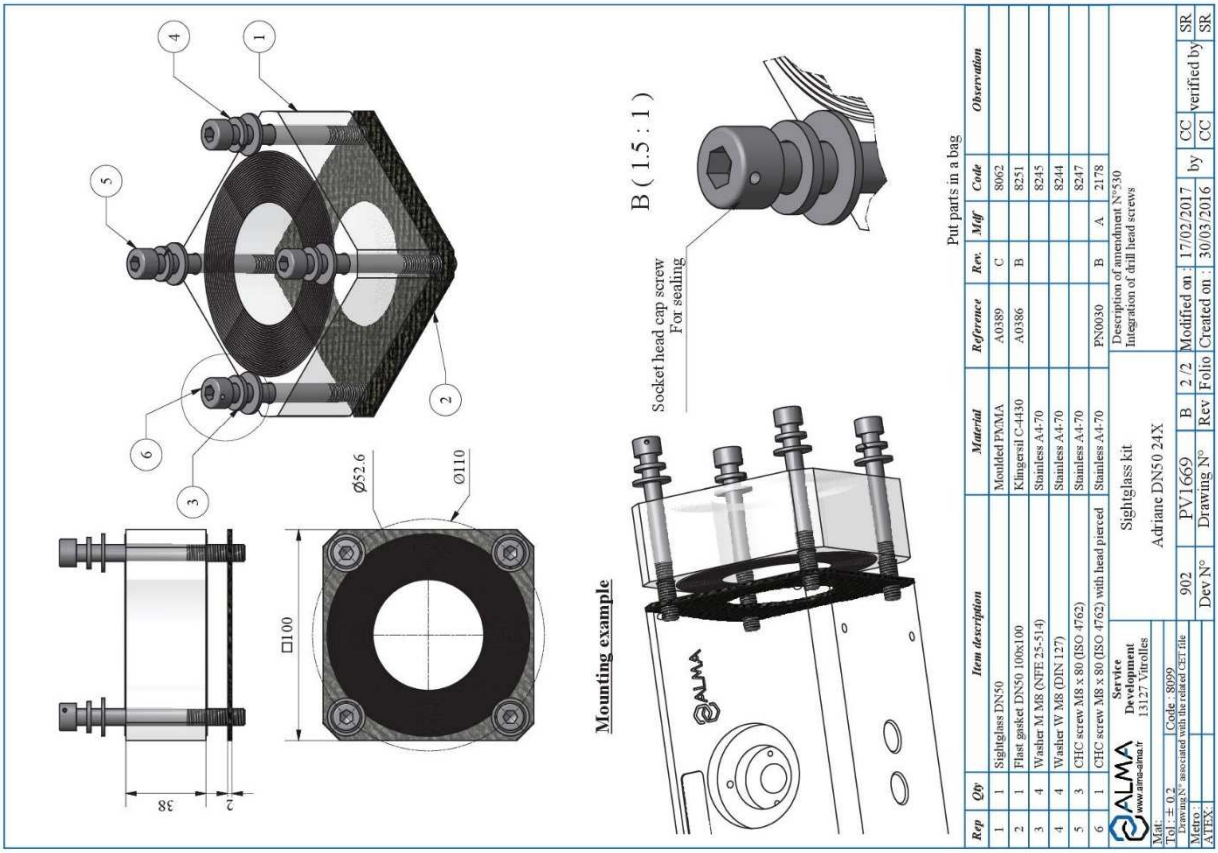
Sightglass kit 110 x 110
Adriane turbine meter DN80 24X

Description of amendment N°530
Integration of drill head screws

Mat: | Tol.: ± 0.2 | Code : 8099 | Drawing N° associated with the related CET file

Metro: | ATEX:

902 | PV1669 | B | 2/2 | Modified on : 17/02/2017 | by | CC | verified by | SR
Dev N° | Drawing N° | Rev | Folio | Created on : 30/03/2016 | by | CC | verified by | SR



Rep	Qty	Item description	Material	Reference	Rev.	Mfg	Code	Observation
1	1	Sightglass DN50	Moulded PMMA	A0389	C		8062	
2	1	Flat gasket DN50 100x100	Klingersil C-4430	A0386	B		8251	
3	4	Washer M M8 (NFE 25-514)	Stainless A4-70				8245	
4	4	Washer W M8 (DIN 127)	Stainless A4-70				8244	
5	3	CHC screw M8 x 80 (ISO 4762)	Stainless A4-70				8247	
6	1	CHC screw M8 x 80 (ISO 4762) with head pierced	Stainless A4-70	PN0030	B	A	2178	

Put parts in a bag

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

Sightglass kit
Adriane DN50 24X

Description of amendment N°530
Integration of drill head screws

Mat: | Tol.: ± 0.2 | Code : 8099 | Drawing N° associated with the related CET file

Metro: | ATEX:

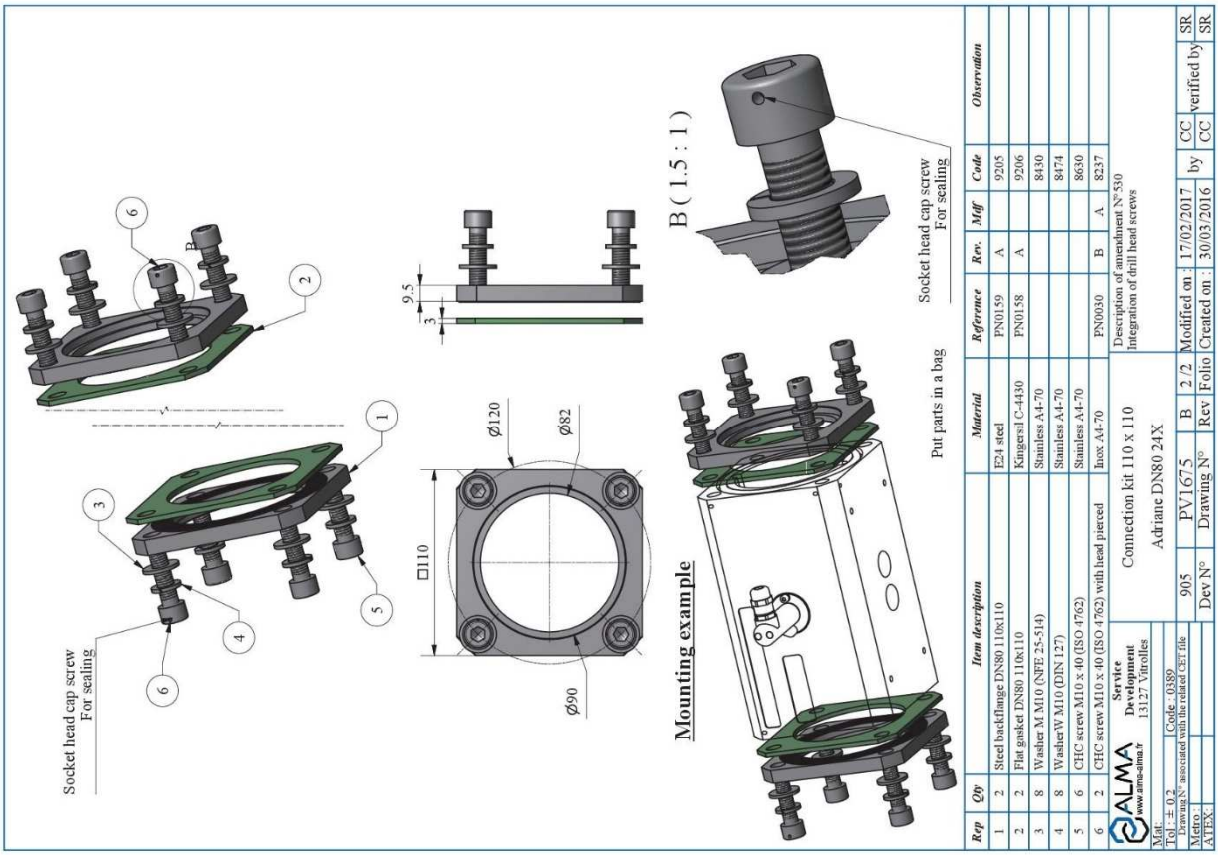
902 | PV1669 | B | 2/2 | Modified on : 17/02/2017 | by | CC | verified by | SR
Dev N° | Drawing N° | Rev | Folio | Created on : 30/03/2016 | by | CC | verified by | SR

Document available on website alma-alma.fr

10.1. INSTALLATION RECOMMENDATIONS SIGHTGLASS KIT DN50 OR DN80

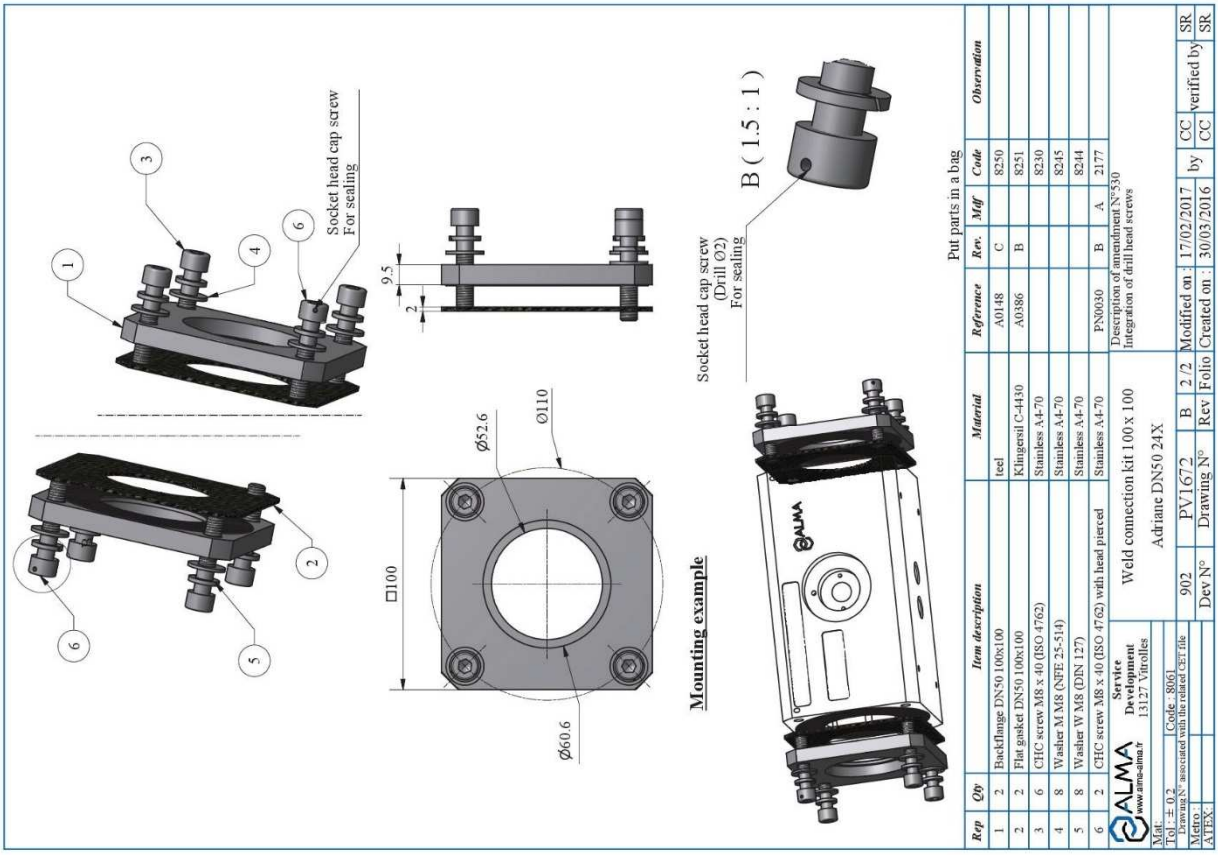
- Refer to the certificate written on the identification plate of the measuring system to suit the sealing requirements
- No loose lead wire on the sealing devices

11. CONNECTION KIT 100x100 DN50 OR DN80



Rep	Qty	Item description	Material	Reference	Rev.	Mfg	Code	Observation
1	2	Steel backflange DN80 110x110	E24 steel	PN0159	A		9205	
2	2	Flat gasket DN80 110x110	Klingersil C-4430	PN0158	A		9206	
3	8	Washer M M10 (NFE 25-514)	Stainless A4-70				8430	
4	8	Washer W M10 (DIN 127)	Stainless A4-70				8474	
5	6	CHC screw M10 x 40 (ISO 4762)	Stainless A4-70				8630	
6	2	CHC screw M10 x 40 (ISO 4762) with head pierced	Inox A4-70	PN0030	B	A	8237	

ALMA Service Development 13127 Vitrolles www.alma-alma.fr
Connection kit 110 x 110
Adriane DN80 24X
Description of amendment N°530
Integration of drill head screws
Mat:
Tol : ± 0.2
Code : 0389
Drawing N° associated with the related CET file
Metro:
ATEX:
905 | PV1675 | B | 2/2 | Modified on : 17/02/2017 | by | CC | verified by | SR
Dev N° | Drawing N° | Rev | Folio | Created on : 30/03/2016 | by | CC | verified by | SR



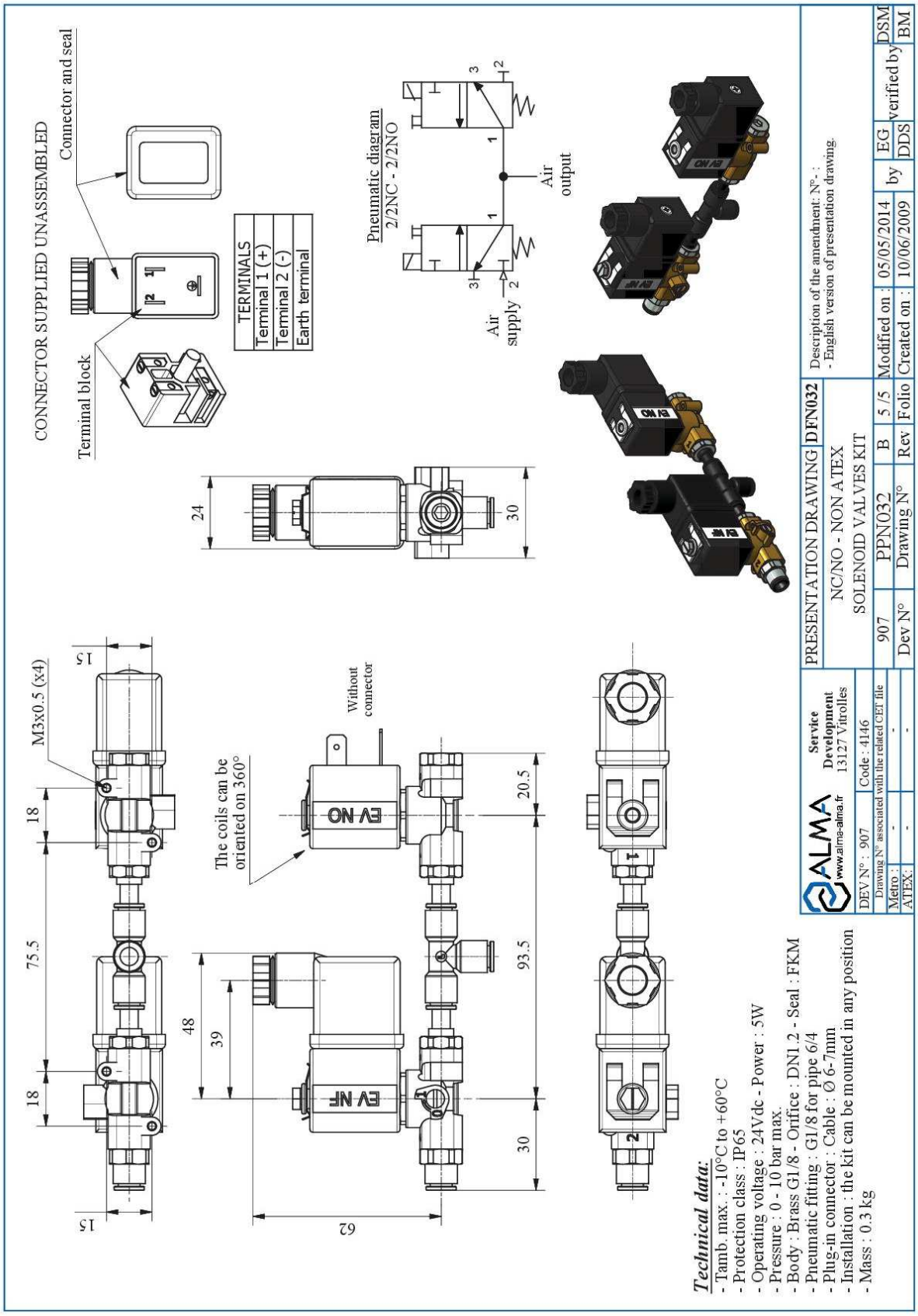
Rep	Qty	Item description	Material	Reference	Rev.	Mfg	Code	Observation
1	2	BackFlange DN50 100x100	teel	A0148	C		8250	
2	2	Flat gasket DN50 100x100	Klingersil C-4430	A0386	B		8251	
3	6	CHC screw M8 x 40 (ISO 4762)	Stainless A4-70				8230	
4	8	Washer M M8 (NFE 25-514)	Stainless A4-70				8245	
5	8	Washer W M8 (DIN 127)	Stainless A4-70				8244	
6	2	CHC screw M8 x 40 (ISO 4762) with head pierced	Stainless A4-70	PN0030	B	A	2177	

ALMA Service Development 13127 Vitrolles www.alma-alma.fr
Weld connection kit 100 x 100
Adriane DN50 24X
Description of amendment N°530
Integration of drill head screws
Mat:
Tol : ± 0.2
Code : 8061
Drawing N° associated with the related CET file
Metro:
ATEX:
902 | PV1672 | B | 2/2 | Modified on : 17/02/2017 | by | CC | verified by | SR
Dev N° | Drawing N° | Rev | Folio | Created on : 30/03/2016 | by | CC | verified by | SR

Document available on website alma-alma.fr

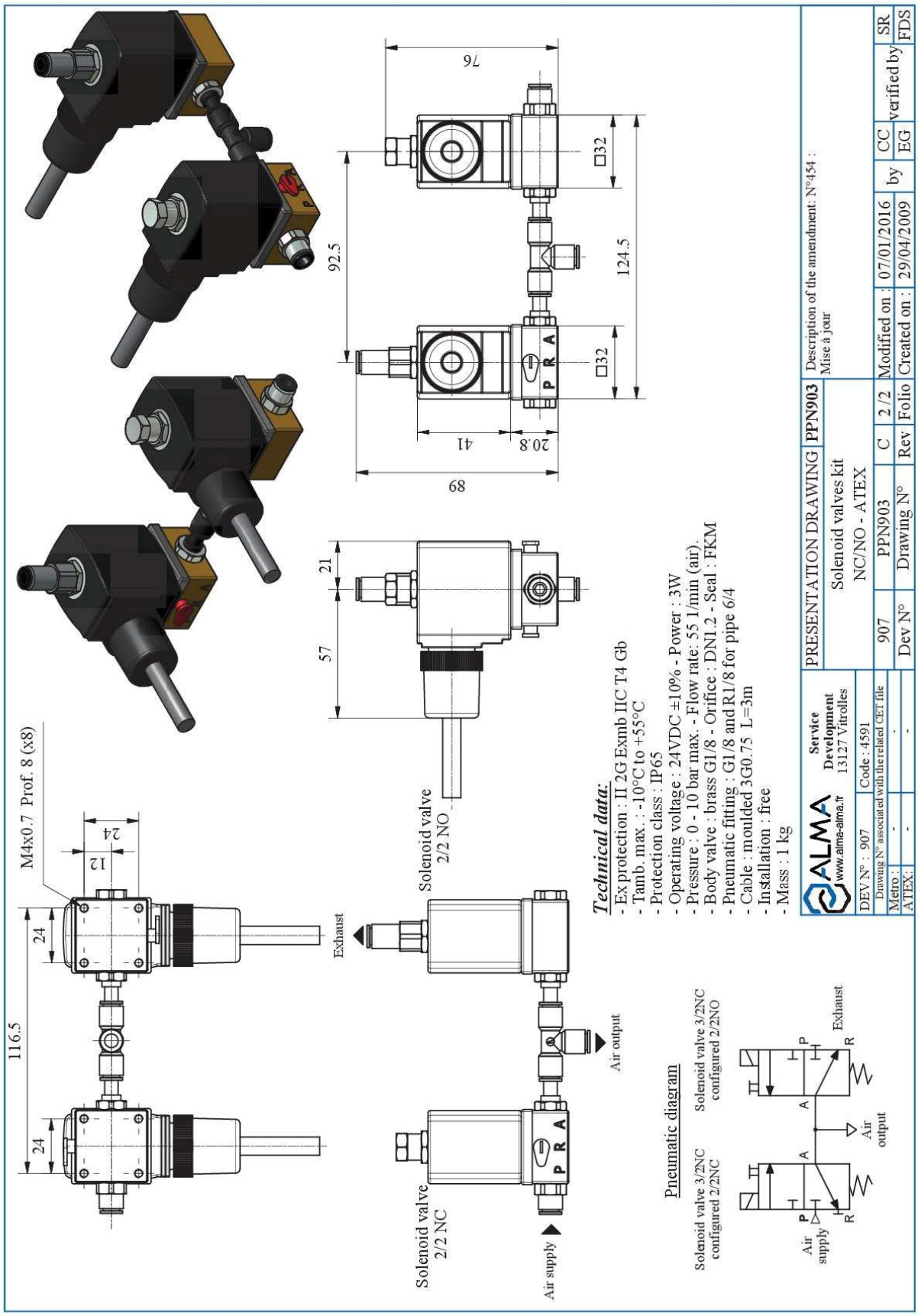
12. NC/NO SOLENOID VALVES KIT NON ATEX OR ATEX

12.1. NC/NO SOLENOID VALVES KIT NON ATEX



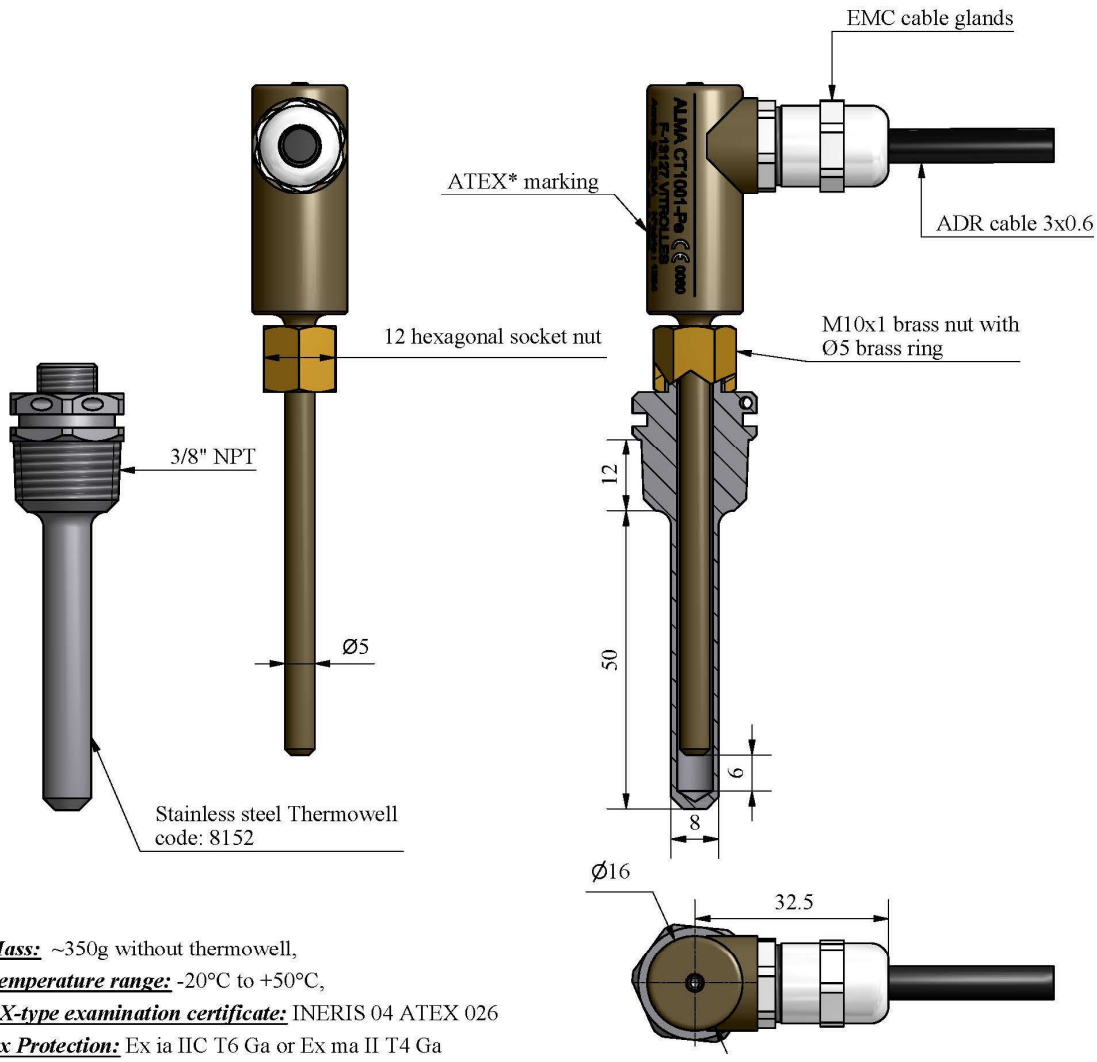
Document available on website alma-alma.fr

12.2. NC/NO SOLENOID VALVES KIT ATEX



Document available on website alma-alma.fr

13. 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

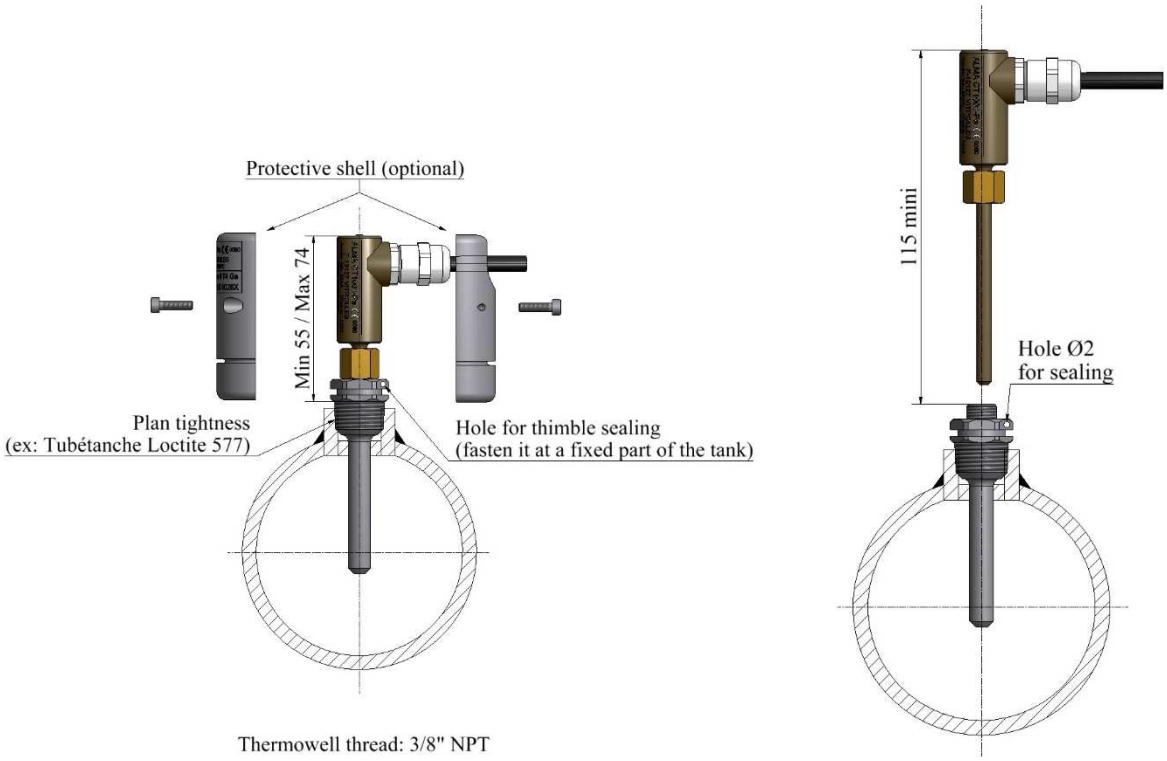
*ATEX "ia" and "ma" certification.
For installation and use in hazardous areas see Instruction manual

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										

13.1. INSTALLATION RECOMMENDATIONS TEMPERATURE PROBE



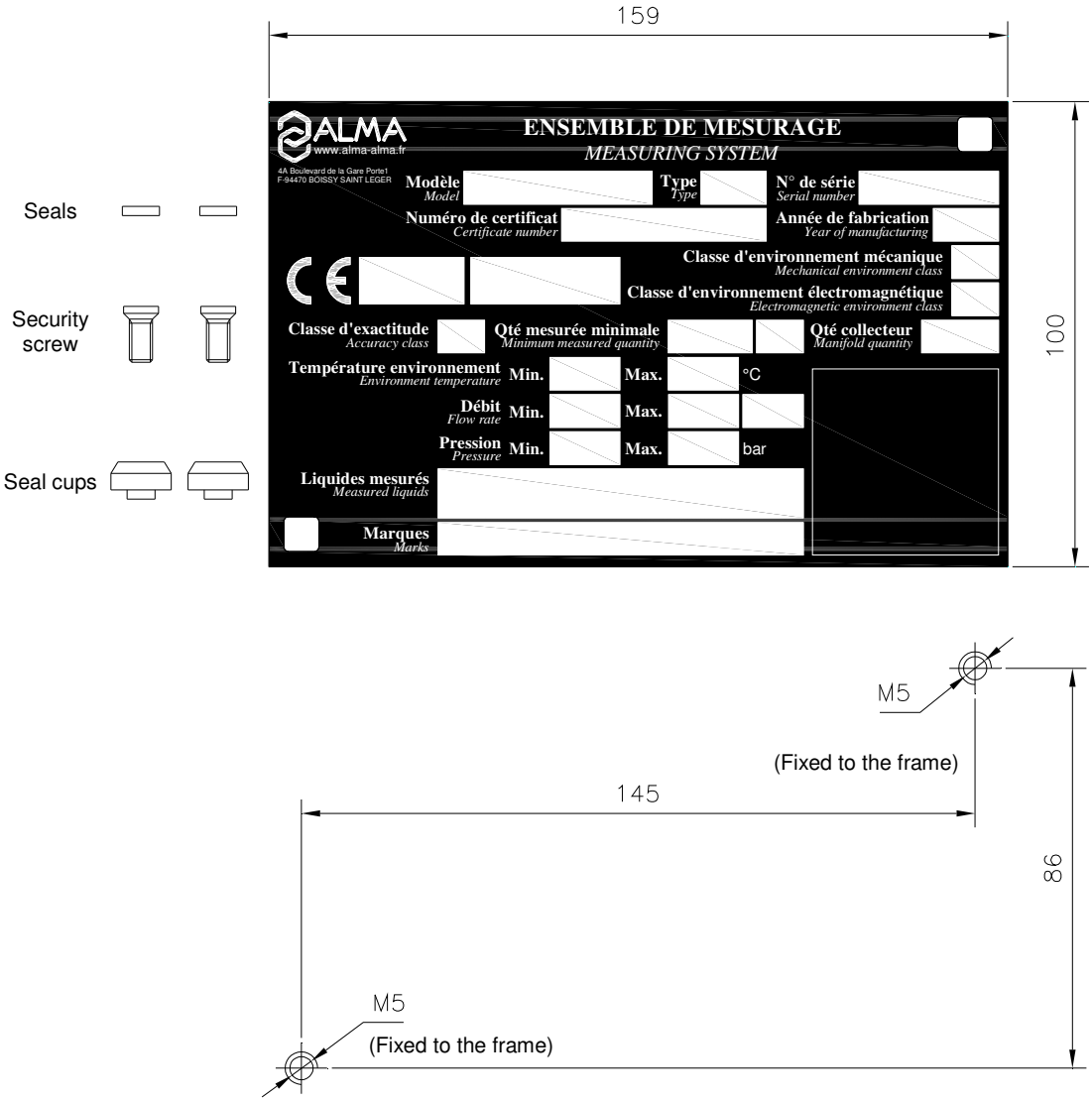
REFER TO INSTRUCTION MANUAL
(DELIVERED WITH THE EQUIPMENT AND AVAILABLE ON ALMA WEBSITE)

INSTALLATION OF THE TEMPERATURE SENSOR

ON THE ALMA TURBINE METER:

14. 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).