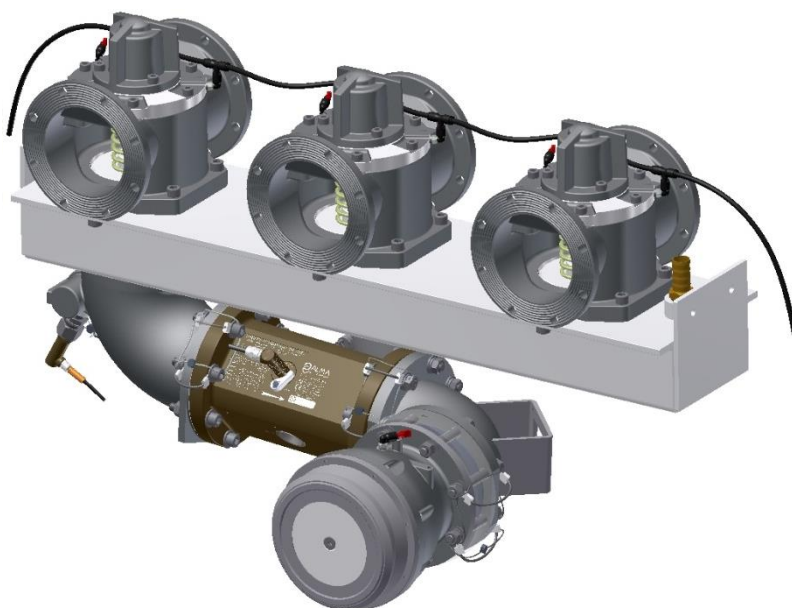


# INSTALLATION GUIDE

## DI 004 EN E

### GRAVICOMPT TYPE MNFLD

Described in EC-type examination certificate N°: LNE-20517



|       |            |                                                                    |            |             |
|-------|------------|--------------------------------------------------------------------|------------|-------------|
| E     | 2015/09/14 | Turbine meters DN80                                                | DSM        | XS          |
| D     | 2015/05/12 | Updating of drawings, wiring diagram, installation recommendations | DSM        | XS          |
| C     | 2013/10/10 | Creation                                                           | EG         | AH          |
| Issue | Date       | Nature of modifications                                            | Written by | Approved by |

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## 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.**

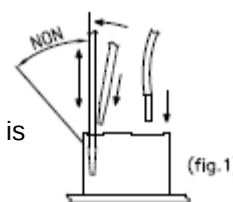
### MECHANICAL RECOMMENDATIONS

- Respect the recommendations of the instruction manual specifying the installation, operation and maintenance conditions of the ATEX equipments (instruction manual supplied with the equipments).
- Take care to place the equipments 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).

|                                                                                                                                  |                                                                                      |                                                                                    |
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## ELECTRICAL RECOMMENDATIONS

- Respect the recommendations of the instruction manual specifying the installation, operation and maintenance conditions of the ATEX equipments (instruction manual supplied with the equipments).
- Connect the supply of the equipments downstream cut-out, on the power supply reserved to the measured distribution.
- Put a delayed protection of 5A upstream the 24VDC supply to protect equipments 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.



- 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.
- Equipments 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 equipments). 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 colour code.

|                                                                                                                                  |                                                                                      |                                                                                    |
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- 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: No 3 on "ON" and the 7 others on "OFF".
- Current of the MICROCOMPT+ and printer:

| ALMA equipment | Supply voltage | Current mini. | Current maxi.        |
|----------------|----------------|---------------|----------------------|
| MICROCOMPT+    | 24VDC +/-10%   | 0.7 A         | 1.5 A                |
| IMPRIMANTE     | 24VDC +/-10%   | 0.1 A         | 5.5 A<br>(switch-on) |

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

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# INSTALLATION GUIDE DI 004 ENE GRAVICOMPT TYPE MNFLD

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**Units of measure:**  
Length: mm  
Angle: degree (° ' ")  
Temperature: °C

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## 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 equipments 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/cm <sup>2</sup>      |
| 1 Bar =                  | 1                  | 14,5                  | 100 000 (1x10 <sup>5</sup> ) | 1,0197                  |
| 1 PSI =                  | 0.069              | 1                     | 6894,5                       | 0,07031                 |
| 1 Pascal =               | 1x10 <sup>-5</sup> | 14,5x10 <sup>-5</sup> | 1                            | 1,0197x10 <sup>-5</sup> |
| 1 kg/cm <sup>2</sup> =   | 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)

|                                                                                                                                  |                                                                                      |                                                                                    |
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## 2. GENERAL PRESENTATION

### MEASURING SYSTEM INSTALLED ACCORDING TO MID CERTIFICATE

The GRAVICOMPT MANIFOLD measuring system is covered by the EC type examination certificate N° LNE-20517. Refer to this certificate for any precision about its installation.

For the sealing plan, see Annex to EC type examination certificate N° LNE-20517.

### SPECIAL CONDITIONS FOR INSTALLATION IN ANY CASES

The piping linking each compartment and the transfer valve must have a minimum slope of 3%. The vehicle on which the measuring system is installed must be fitted with a device to ensure it is horizontal.

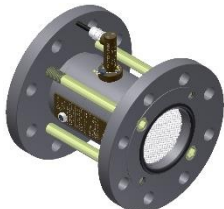
When the turbine is placed just upstream of the unloading valve, a flow-sight ring or a flange of at least 40 mm thick must be inserted.

## 3. PART LIST

| EQUIPMENTS INCLUDED IN THE MEASURING SYSTEM DELIVERED BY ALMA |                                                                                     |                                                                                                                                            |                 |         |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Item                                                          | Equipment                                                                           | Designation                                                                                                                                | Qty             | Option* |
| 1                                                             |    | <b>CALCULATOR INDICATOR<br/>MICROCOMPT+ GRAVICOMPT MANIFOLD</b><br>(Provided with a magnetic supervisor key)                               | See table below |         |
| 2                                                             |  | <b>CONTROL BOX GRAVICOMPT COLLECTEUR</b><br>(One control box supplied regardless of the number of measuring systems installed on the tank) |                 |         |
| 3                                                             |  | <b>DIFFERENTIAL PRESSURE TRANSMITTER – CP3000</b><br>(Supplied if not installed on the manifold)                                           |                 |         |
| 4                                                             |  | <b>END OF METERING PROBE – DG3001/75</b><br>(Supplied if not installed on the manifold)                                                    |                 |         |

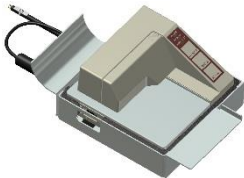
Non-contractual pictures

|                                                                                                                                  |                                                                                      |                                                                                    |
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| EQUIPMENTS INCLUDED IN THE MEASURING SYSTEM DELIVERED BY ALMA |                                                                                     |                                                                             |                 |         |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------|---------|
| Item                                                          | Equipment                                                                           | Designation                                                                 | Qty             | Option* |
| 5                                                             |    | PNEUMATIC CONTROL VENT VALVE KIT                                            | See table below |         |
| 6                                                             |    | TURBINE METER ADRIANE DN100-80 243<br>TTMA WITHOUT SIGHTGLASS               |                 |         |
|                                                               |    | TURBINE METER ADRIANE DN80-80 243 110x110                                   |                 | •       |
|                                                               |   | TURBINE METER ADRIANE DN80-80 373 PN16 ADBLUE                               |                 | •       |
| 7                                                             |  | GRAVICOMPT MANIFOLD EQUIPED                                                 |                 | •       |
| 8                                                             |  | GRAVITY COUPLER<br>(4" API / 3" symmetrical coupling – with vacuum breaker) |                 | •       |

### Non-contractual pictures

|                                                                                                                                  |                                                                                      |                                                                                            |
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| EQUIPMENTS INCLUDED IN THE MEASURING SYSTEM DELIVERED BY ALMA                                                           |                                                                                    |                                                                                    |                 |         |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------|---------|
| Item                                                                                                                    | Equipment                                                                          | Designation                                                                        | Qty             | Option* |
| 9                                                                                                                       |   | <b>PRINTER TMU-295</b><br>(Printer – power supply cable – serial link cable 10m)   | See table below | •       |
| 10                                                                                                                      |   | <b>CONVERTER 24VDC/24VDC 2.1A 50W</b><br>(Printer power supply 24VDC)              |                 | •       |
| 11                                                                                                                      |   | <b>PT100 TEMPERATURE SENSOR – CT1001</b><br>(Supplied with thermowell)             |                 | •       |
| 12                                                                                                                      |  | <b>KIT FOR MEASURING SYSTEM IDENTIFICATION PLATE</b><br>(Plate and sealing device) |                 | •       |
| Option*: equipment sold as an option by ALMA. Must be installed on the measuring system if required by the certificate. |                                                                                    |                                                                                    |                 |         |

| Item | Quantity according to configuration:<br>Manifold nb/MICROCOMPT+ nb |     | Designation                        | Option |
|------|--------------------------------------------------------------------|-----|------------------------------------|--------|
|      | 1/1                                                                | 2/2 |                                    |        |
| 1    | 1                                                                  | 2   | MICROCOMPT+ INDICATOR              |        |
| 2    | 1                                                                  | 1   | CONTROL BOX GRAVICOMPT             |        |
| 3    | 1                                                                  | 2   | DIFFERENTIAL PRESSURE TRANSMITTER  |        |
| 4    | 1                                                                  | 2   | END-OF-METERING PROBE – DG3001/75  |        |
| 5    | 1                                                                  | 2   | PNEUMATIC CONTROL VENT VALVE KIT   |        |
| 6    | 1                                                                  | 2   | TURBINE METER : 3 different models |        |
| 7    | 1                                                                  | 2   | MANIFOLD EQUIPED                   | •      |
| 8    | 1                                                                  | 2   | GRAVITY COUPLER                    | •      |
| 9    | 1                                                                  | 1   | PRINTER                            | •      |
| 10   | 1                                                                  | 1   | CONVERTER                          | •      |
| 11   | 1                                                                  | 2   | PT100 TEMPERATURE SENSOR – CT1001  | •      |
| 12   | 1                                                                  | 2   | IDENTIFICATION PLATE               | •      |

|                                                                                                                                  |                                                                                      |                                                                                    |
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- 
- Microcompt
- A
- A

- 
- Left hand view closed box
- Left hand view opened box
- Opening  $\geq 90^\circ$

- 
- Left hand view closed box
- Left hand view opened box

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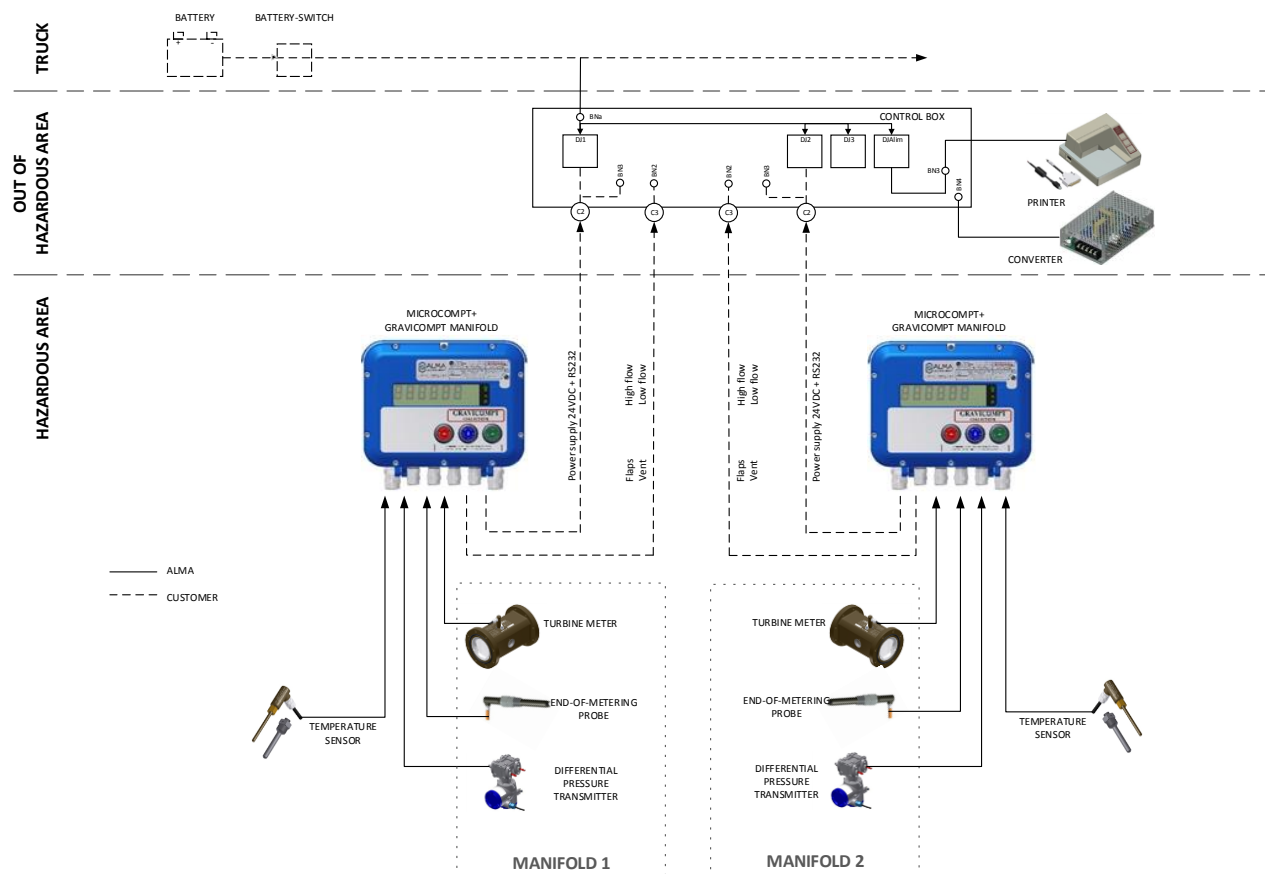


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|--------------------------------------------------------------------------------------------------------------|

## ELECTRICAL WIRING MICROCOMPT+

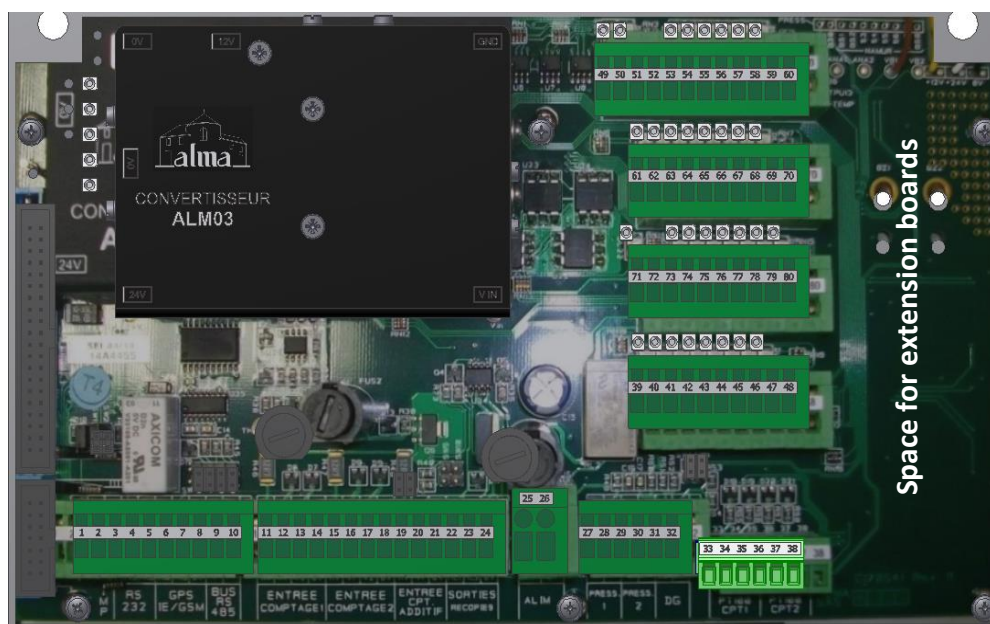


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**Any mass braids and shielding must be connected to the MICROCOMPT+ ground bar**

## TERMINAL ASSIGNMENT OF MICROCOMPT+ BOARDS

## INTERFACE POWER SUPPLY BOARD



| EQUIPMENTS CONNECTED TO THE MICROCOMPT+                                 |                         |                         |                |      |                       |            |               | INTERFACE POWER SUPPLY BOARD |                                        |                               |                               |             |
|-------------------------------------------------------------------------|-------------------------|-------------------------|----------------|------|-----------------------|------------|---------------|------------------------------|----------------------------------------|-------------------------------|-------------------------------|-------------|
| Option                                                                  | Equipments              | Cable (for information) |                |      |                       | Function   | Colour or No. | Terminal                     |                                        |                               | Function                      | Observation |
|                                                                         |                         | No.                     | CG*            | Alma | Type                  |            |               |                              |                                        |                               |                               |             |
|                                                                         | GRAVICOMPT CONTROL BOX  | C2                      | 1/2"NPT        |      | 4x1 sh.               | 24VDC      | 1             | 25                           | 24VDC                                  | SUPPLY                        | Power supply 24VDC MICROCMPT+ |             |
|                                                                         |                         |                         |                |      |                       | 0V         | 2             | 26                           | 0V                                     |                               |                               |             |
|                                                                         |                         |                         |                |      |                       | Rx Printer | 3             | 1                            | Tx                                     | RS232 PRINTER                 | Serial link RS232             |             |
|                                                                         |                         |                         |                |      |                       | Tx Printer | 4             | 2                            | Rx                                     |                               |                               |             |
|                                                                         | TURBINE TRANSMITTER     | C4                      | 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                                     |                               |                               |             |
| ●                                                                       | PT100 TEMPERATURE PROBE | C7                      | 1/2"NPT        | ●    | ADR 3x0.6 sh.         | +          | Jn            | 33                           | +                                      | PT100                         | Connect the shielding         |             |
|                                                                         |                         |                         |                |      |                       | -          | Bc            | 34                           | -                                      |                               |                               |             |
|                                                                         |                         |                         |                |      |                       | -          | Vt            | 35                           | -                                      |                               |                               |             |
|                                                                         | GRAVICOMPT CONTROL BOX  | C3                      | 3/4"NPT (left) |      | 5x1(min)<br>13x1(max) | HF         | 1             | 74                           | API                                    | High flow of an API adaptater |                               |             |
|                                                                         |                         |                         |                |      |                       | LF         | 2             | 75                           |                                        | Low flow of an API adaptater  |                               |             |
|                                                                         |                         |                         |                |      |                       | Vent       | 3             | 76                           | VENT                                   | Manifold vent                 |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 1     | 4             | 61                           | Manifold flaps solenoid valves 1 to 10 | Opening - control flap 1      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 2     | 5             | 62                           |                                        | Opening - control flap 2      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 3     | 6             | 63                           |                                        | Opening - control flap 3      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 4     | 7             | 64                           |                                        | Opening - control flap 4      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 5     | 8             | 65                           |                                        | Opening - control flap 5      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 6     | 9             | 66                           |                                        | Opening - control flap 6      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 7     | 10            | 67                           |                                        | Opening - control flap 7      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 8     | 11            | 68                           |                                        | Opening - control flap 8      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 9     | 12            | 77                           |                                        | Opening - control flap 9      |                               |             |
|                                                                         |                         |                         |                |      |                       | Flap 10    | 13            | 78                           |                                        | Opening - control flap 10     |                               |             |
|                                                                         |                         |                         |                |      | Footvalve             |            | 73            | Footvalves                   | Footvalves                             |                               |                               |             |
| SOME EXTENSION BOARDS MAY BE SET ON TO THE INTERFACE POWER SUPPLY BOARD |                         |                         |                |      |                       |            |               |                              |                                        |                               |                               |             |

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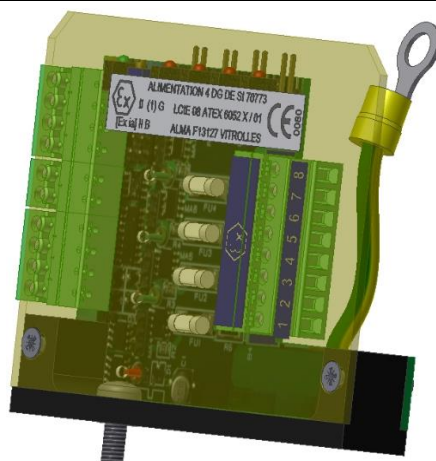


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## GRAVICOMPT TYPE MNFLD

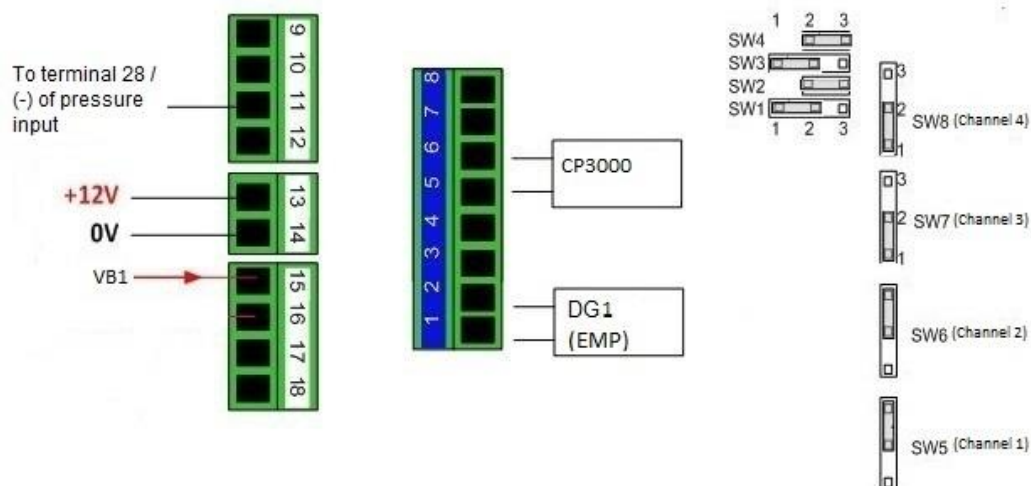
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| <b>Units of measure:</b>        |
| Length: mm                      |
| Angle: degree ( $^{\circ}$ ' ") |
| Temperature: $^{\circ}\text{C}$ |



| EQUIPMENTS CONNECTED TO THE MICROCOMPT+ |                                   |                         |         |      |                |          |               | EXTENSION BOARD 4DG (IS) |          |                       |                       |
|-----------------------------------------|-----------------------------------|-------------------------|---------|------|----------------|----------|---------------|--------------------------|----------|-----------------------|-----------------------|
| Option                                  | Equipments                        | Cable (for information) |         |      |                | Function | Colour or No. | Terminal                 | Function |                       | Observation           |
|                                         |                                   | No.                     | CG*     | Alma | Type           |          |               |                          |          |                       |                       |
|                                         | END-OF-METERING PROBE             | C5                      | 1/2"NPT | ●    | 3x0.34         | EMP      | Mr            | 1                        | +        | END-OF-METERING PROBE |                       |
|                                         |                                   |                         |         |      |                |          | Bl            | 2                        | -        |                       |                       |
|                                         | DIFFERENTIAL PRESSURE TRANSMITTER | C6                      | 1/2"NPT | ●    | ADR 2x0.34 sh. | PRESSURE | Bc            | 5                        | +        | PRESSURE              | Connect the shielding |
|                                         |                                   |                         |         |      |                |          | Mr            | 6                        | -        |                       |                       |

Jumper configuration on the extension board 4DG:



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|--------------------------------------------------------------------------------------------------------------|

## 5. CONTROL BOX GRAVICOMPT MANIFOLD

380  
200

250  
400

120  
1

**Technical data**

- Enclosure : black polyester 250x400x120 (Non ATEX).
- Protection class : IP66
- Temperature range : -5°C to +60°C
- Mass : 5,9 kg
- Electrical part :
  - Operating voltage : 24VDC (truck).
  - 2 to 4 thermal-magnetic circuit breakers 3A (24VDC output power supply, Microcompt+ connection).
  - 1 thermal-magnetic circuit breaker 1A (24VDC output power supply, printer connection by converter 50W).
  - 1 serial link RS232 (printer connection).
  - Terminals : 2,5mm<sup>2</sup> max.
  - Distributor operating voltage : 24VDC ±10%
  - (current per coil : pull 1.12W(47mA) - holding 0.37W(15.5mA)).
- Pneumatic part :
  - valve terminal (20 outlets 3/2NC max.).
  - Fluid : compressed air preferably non-lubricated (Operate your system with non-lubricated compressed air if possible. Operation with lubricated compressed air will cause a "washing" of lifetime lubrication of pneumatic valves. If the compressed air is lubricated, it must be permanent and properly set in order to avoid any malfunction of pneumatic valves).
  - Filtration : 40µm
  - Operating pressure : 1.5 to 10 bar.
  - Pilot pressure : 1.5 to 8 bar (pressure regulator calibrated to 6 bar).
  - Flow rate : 150 l/min.
  - Pneumatic fitting : for pipe 6/4.
  - Seal unused outlets with plugs.

**PRESENTATION DRAWING** DFN046

GRAVICOMPT  
CONTROL BOX

907 PPN046 D 7/7

Dev N° Drawing N° Rev Folio

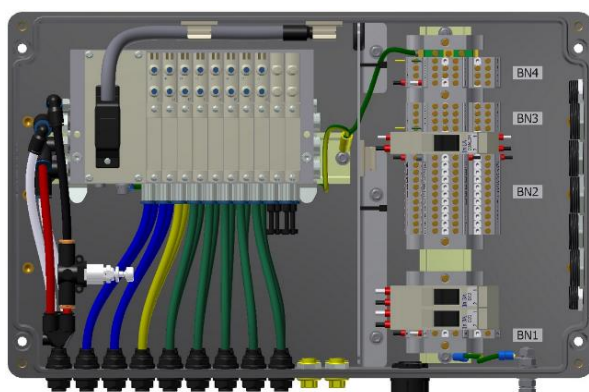
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|                                                                                                                                  |                                                                                      | Page 15 / 36                                                                       |

## TERMINAL ASSIGNMENT OF THE CONTROL BOX



| EQUIPMENTS CONNECTED TO THE CONTROL BOX |                                                                                |                         |     |      |                        |          |               | TERMINAL BLOCKS OF THE CONTROL BOX |          |                        |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|-----------------------------------------|--------------------------------------------------------------------------------|-------------------------|-----|------|------------------------|----------|---------------|------------------------------------|----------|------------------------|----------------------|--------------------------------------------------------------------|-----------------|--------|----------------------------------|-------------------------|-------|----|----|---------|--------------------------|
| Option                                  | Equipments                                                                     | Cable (for information) |     |      |                        | Function | Colour or No. | Block                              | Terminal | Function               |                      | Observation                                                        |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                | No.                     | CG* | Alma | Type                   |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         | 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+ 1<br>(Supply and RS232)                                            | C2                      |     |      | 4x1 bl.                | 24VDC    | 1             | DJ1                                | 1        | 24VDC                  | Supply<br>Microcompt | MICROCOMPT 1- Supply<br>DJ1circuit breaker 3A                      |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          | 0V                     |                      |                                                                    | 2               | 2      | 0V                               |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          | Rx                     | 3                    | BN3                                                                | 1               | Rx     | RS232<br>Printer                 | Printer                 |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          | Tx                     | 4                    |                                                                    | 2               | Tx     |                                  |                         |       |    |    |         |                          |
|                                         | MICROCOMPT+ 2<br>(Supply and RS232)                                            | C2                      |     |      | 4x1 bl.                | 24VDC    | 1             | DJ2                                | 1        | 24VDC                  | Supply<br>Microcompt | MICROCOMPT 2 - Supply<br>DJ2 circuit breaker 3A                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          | 0V                     |                      |                                                                    | 2               | 2      | 0V                               |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          | Tx                     | 3                    | BN3                                                                | 3               | Rx     | RS232<br>Printer                 | Printer                 |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          | Rx                     | 4                    |                                                                    | 4               | Tx     |                                  |                         |       |    |    |         |                          |
|                                         | MICROCOMPT+ 1<br>LF/HF                                                         | C3                      |     |      | 5x1 (min)<br>13x1(max) | 24VDC    | M1 - 2        | BN2                                | 1        | LF 1                   | API                  | MICROCOMPT 1- LF/HF manifold 1                                     |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        | 24VDC    | M1 - 1        |                                    | 2        | HF 1                   |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         | MICROCOMPT+ 2<br>LF/HF                                                         |                         |     |      |                        | 24VDC    | M2 - 2        |                                    | 3        | LF 2                   | API                  | MICROCOMPT 2 - LF/HF manifold 2                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        | 24VDC    | M2 - 1        |                                    | 4        | HF 2                   |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         | MICROCOMPT+ 1                                                                  |                         |     |      |                        | 24VDC    | M1 - 3        |                                    | 5        | Vent 1                 | Vent                 | Vent manifold 1                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         | MICROCOMPT+ 2                                                                  |                         |     |      |                        | 24VDC    | M2 - 3        |                                    | 6        | Vent 2                 |                      |                                                                    | Vent manifold 2 |        |                                  |                         |       |    |    |         |                          |
|                                         | MICROCOMPT+ 1 and<br>MICROCOMPT+ 2<br>(depending on the tank<br>configuration) |                         |     |      |                        |          |               |                                    |          | 5x1 (min)<br>13x1(max) | 24VDC                | 4                                                                  | 7               | Flap 1 | Opening of the manifold<br>flaps | Opening- control flap 1 |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 5  | 8  | Flap 2  | Opening- control flap 2  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 6  | 9  | Flap 3  | Opening- control flap 3  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 7  | 10 | Flap 4  | Opening- control flap 4  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 8  | 11 | Flap 5  | Opening- control flap 5  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 9  | 12 | Flap 6  | Opening- control flap 6  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 10 | 13 | Flap 7  | Opening- control flap 7  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 11 | 14 | Flap 8  | Opening- control flap 8  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 12 | 15 | Flap 9  | Opening- control flap 9  |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    |          |                        |                      |                                                                    |                 |        |                                  |                         | 24VDC | 13 | 16 | Flap 10 | Opening- control flap 10 |
|                                         |                                                                                |                         |     |      |                        |          |               | BN2                                | 17       | free                   |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    | 18       | free                   |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    | 19       | free                   |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    | 20       | free                   |                      |                                                                    |                 |        |                                  |                         |       |    |    |         |                          |
|                                         |                                                                                |                         |     |      |                        |          |               |                                    | 21       | 0V                     |                      | Valve terminal                                                     |                 |        |                                  |                         |       |    |    |         |                          |

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Length: mm  
Angle: degree ( $^{\circ}$ ,  $'$ ,  $"$ )  
Temperature:  $^{\circ}\text{C}$

| EQUIPMENTS CONNECTED TO THE CONTROL BOX |                                           |                         |     |      |            |             |               | TERMINAL BLOCKS OF THE CONTROL BOX |          |          |                  |                                                       |
|-----------------------------------------|-------------------------------------------|-------------------------|-----|------|------------|-------------|---------------|------------------------------------|----------|----------|------------------|-------------------------------------------------------|
| Option                                  | Equipments                                | Cable (for information) |     |      |            | Function    | Colour or No. | Block                              | Terminal | Function |                  | Observation                                           |
|                                         |                                           | No.                     | CG* | Alma | Type       |             |               |                                    |          |          |                  |                                                       |
| •                                       | CONVERTER<br>24VDC 5W<br>(Printer supply) | A2                      |     |      | 4x1        | 24VDC (in)  | 1             | BN4                                | 1        | 24VDC    | Printer supply   | Converter INPUT                                       |
|                                         |                                           |                         |     |      |            | 0V (in)     | 2             |                                    | 2        | 0V       |                  | Converter OUTPUT                                      |
|                                         |                                           |                         |     |      |            | 24VDC (out) | 3             |                                    | 3        | 24VDC    |                  |                                                       |
|                                         |                                           |                         |     |      |            | 0V (out)    | 4             |                                    | 4        | 0V       |                  |                                                       |
| •                                       | PRINTER CABLE<br>(Supply and RS232)       | C1                      |     | •    | 4x0.75 bl. | 24VCC       | Bc            | BN4                                | 5        | 24VDC    | RS232<br>Printer |                                                       |
|                                         |                                           |                         |     |      |            | 0V          | Mr            |                                    | 6        | 0V       |                  |                                                       |
|                                         |                                           |                         |     |      |            | Rx          | Vt            |                                    | 7        | Rx       |                  |                                                       |
|                                         |                                           |                         |     |      |            | Tx          | Jn            |                                    | 8        | Tx       |                  |                                                       |
|                                         |                                           |                         |     |      |            | Shielding   | Braid         |                                    | T        | Sh.      |                  |                                                       |
|                                         | GROUND<br>(tank frame)                    |                         |     |      | 1x2.5      |             | V/J           |                                    |          |          |                  | Connect to the through-hole-ground of the control box |

\*Refer to the Cable Glands installation instructions

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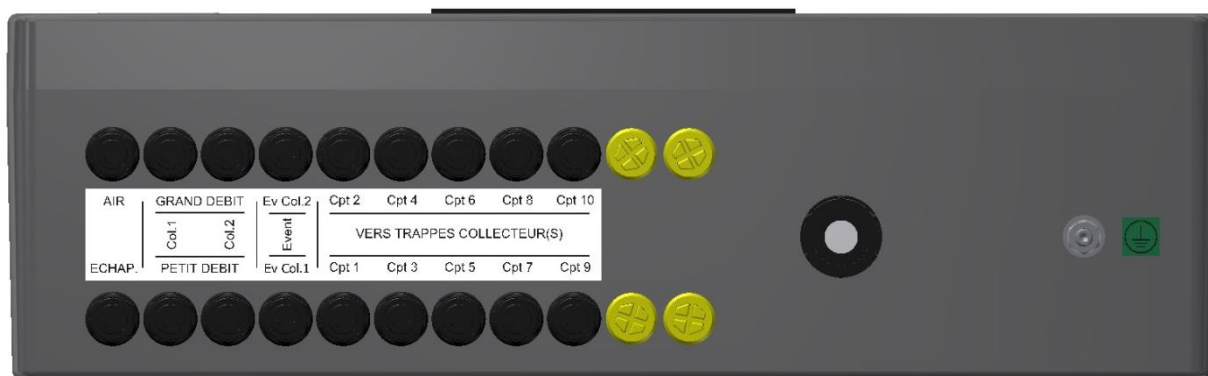
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Length: mm  
Angle: degree (° ' ")  
Temperature: °C

## 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 |
| ECHAP.              |       | X      | Exhaust                                     | Put a tube L=100mm min. (no muffler)               |
| GRAND DEBIT – Col.1 |       | X      | Opening of the API adapter for high flow    | Connection to the API adapter manifold 1 (HF – LF) |
| PETIT DEBIT – Col.1 |       | X      | High to low flow position API adapter       |                                                    |
| GRAND DEBIT – Col.2 |       | X      | Opening of the API adapter for high flow    | Connection to the API adapter manifold 2 (HF – LF) |
| PETIT DEBIT – Col.2 |       | X      | High to low flow position API adapter       |                                                    |
| Ev Col.1 – Event    |       | X      | Vent valve opening                          | Connection to the vent valve manifold 1            |
| Ev Col.2 – Event    |       | X      | Vent valve opening                          | Connection to the vent valve manifold 2            |
| Cpt 1               |       | X      | Opening of the manifold flap compartment 1  | Connection to the manifold flaps                   |
| Cpt 2               |       | X      | Opening of the manifold flap compartment 2  |                                                    |
| Cpt 3               |       | X      | Opening of the manifold flap compartment 3  |                                                    |
| Cpt 4               |       | X      | Opening of the manifold flap compartment 4  |                                                    |
| Cpt 5               |       | X      | Opening of the manifold flap compartment 5  |                                                    |
| Cpt 6               |       | X      | Opening of the manifold flap compartment 6  |                                                    |
| Cpt 7               |       | X      | Opening of the manifold flap compartment 7  |                                                    |
| Cpt 8               |       | X      | Opening of the manifold flap compartment 8  |                                                    |
| Cpt 9               |       | X      | Opening of the manifold flap compartment 9  |                                                    |
| Cpt 10              |       | X      | Opening of the manifold flap compartment 10 |                                                    |

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).

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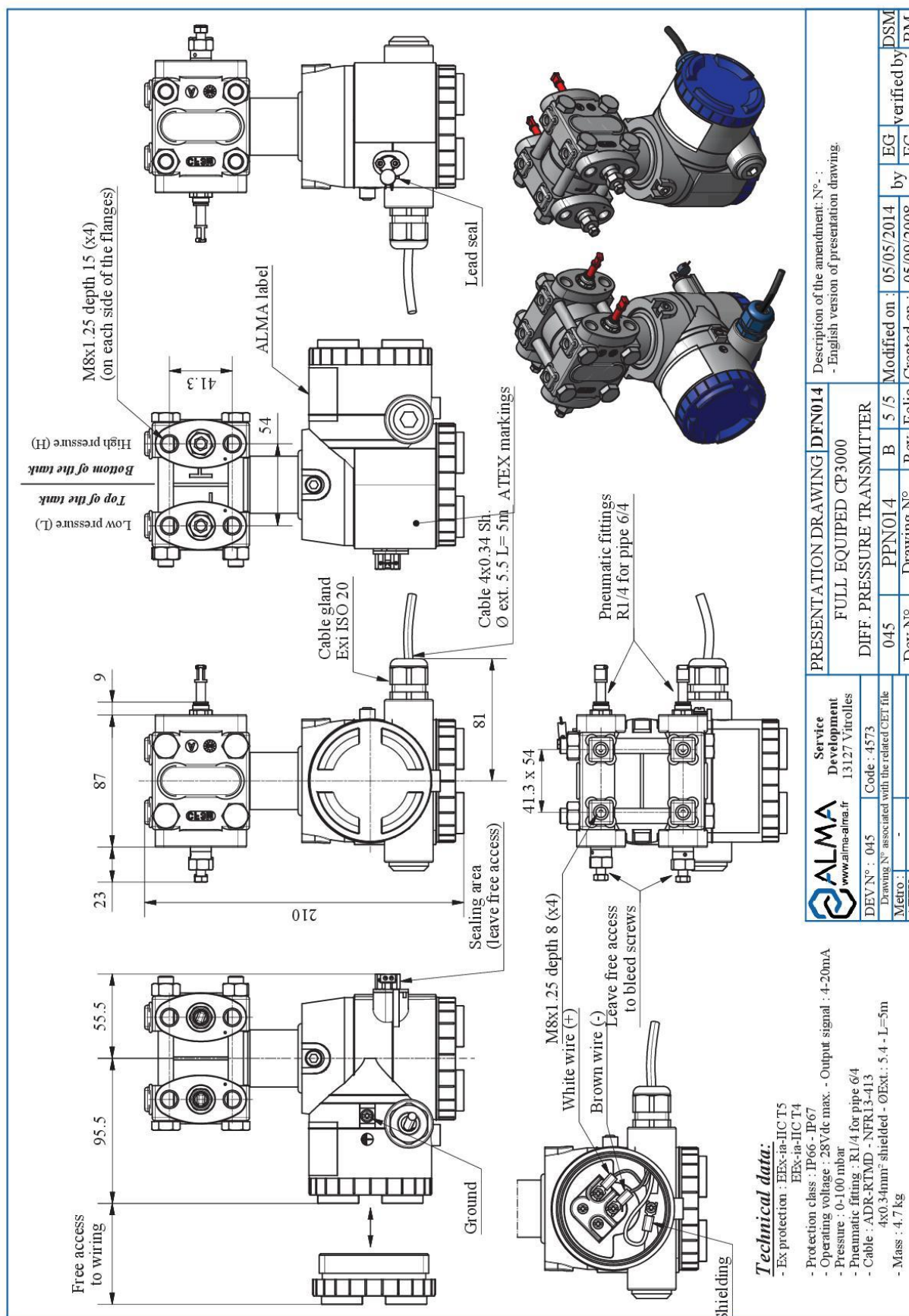
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GRAVICOMPT TYPE MNFLD

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Angle: degree (° ' ")  
Temperature: °C

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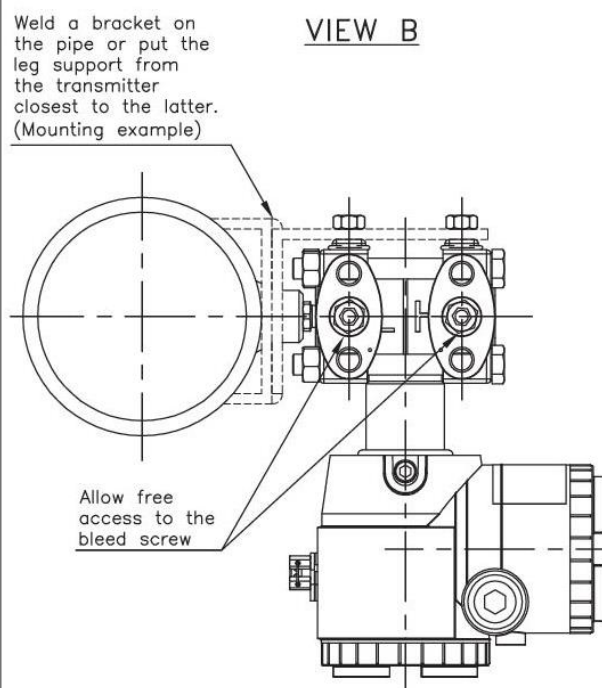
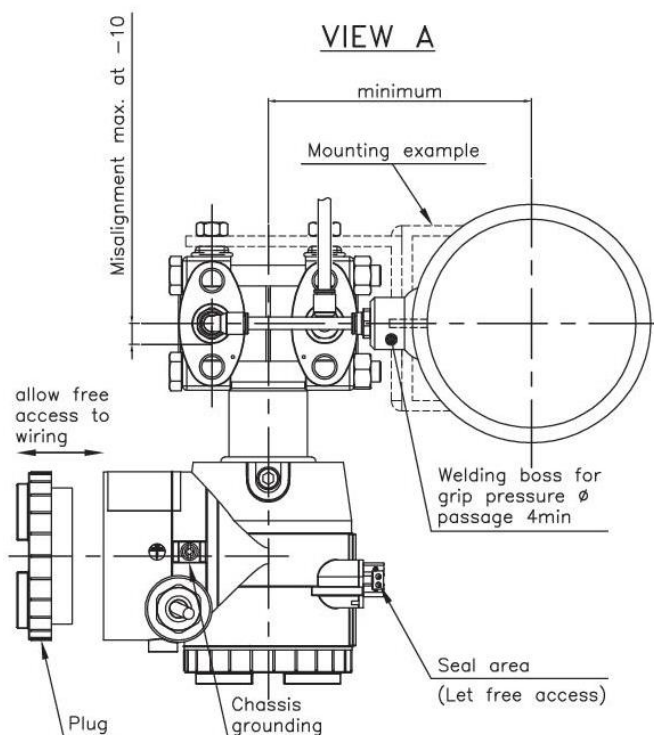
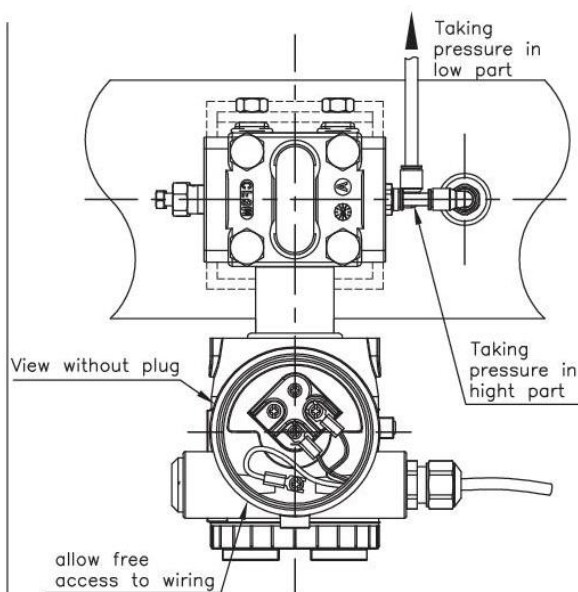
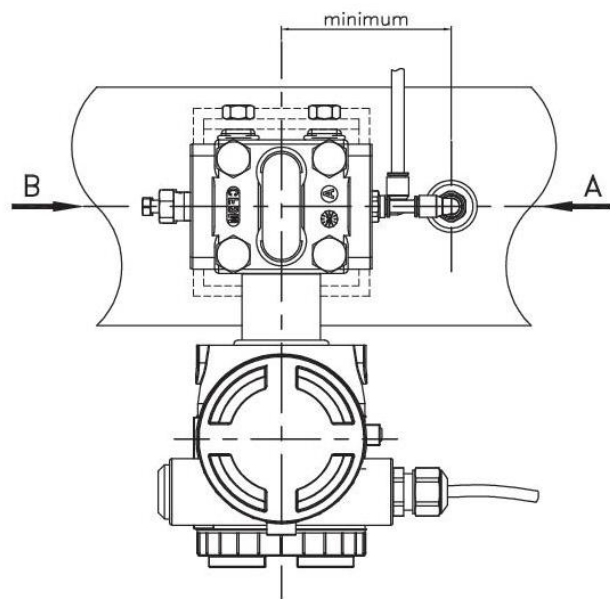
## 6. DIFFERENTIAL PRESSURE TRANSMITTER – CP3000

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|                                                                                                                                  |                                                                                             |                                                                                                        |
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|                                                                                                                                  | <p>This document is available at <a href="http://www.alma-alma.fr">www.alma-alma.fr</a></p> | <p>Page 19 / 36</p>                                                                                    |

# **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)

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**Units of measure:**  
Length: mm  
Angle: degree (° ' ")  
Temperature: °C

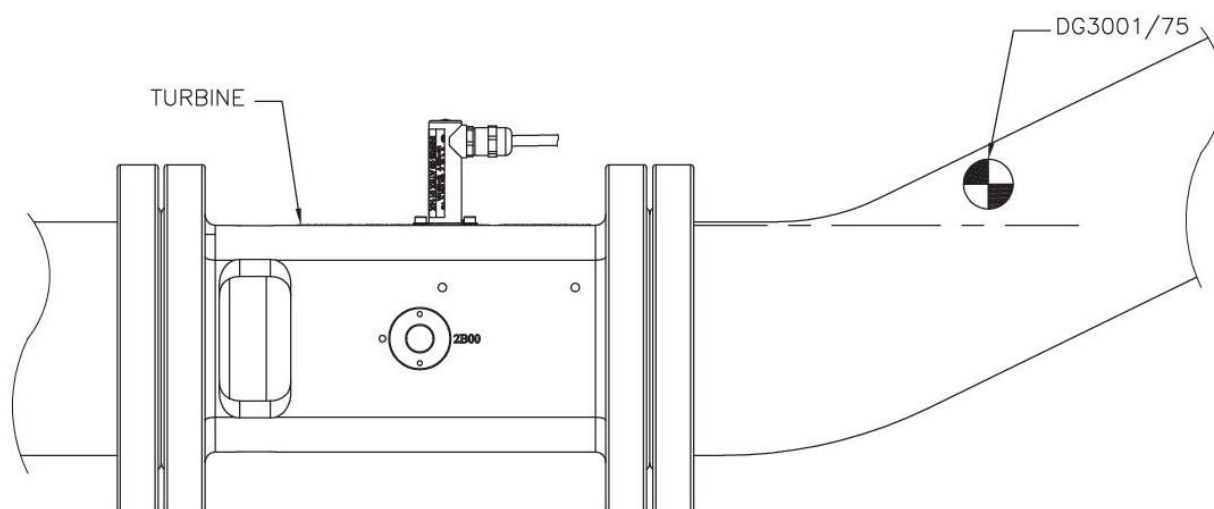
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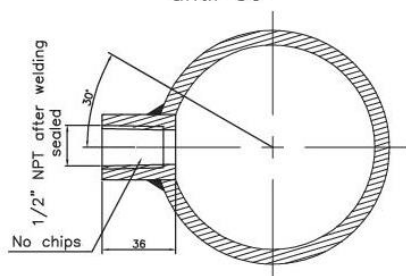
## INSTALLATION RECOMMENDATIONS DG3001/75

## POSITION OF THE END-OF-METERING PROBE:

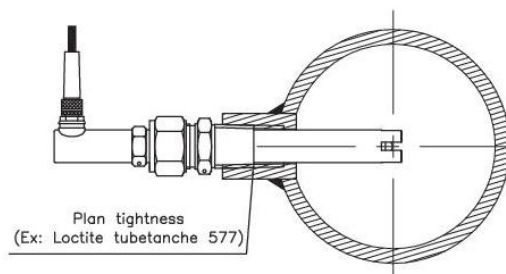
The DG3001/75 should be positioned above the top of the turbine, as close as possible to the turbine



Position of the welding boss  
for DG3001  
– horizontal position or  
until 30°



Mounting DG3001

**REFER TO INSTRUCTION MANUAL**

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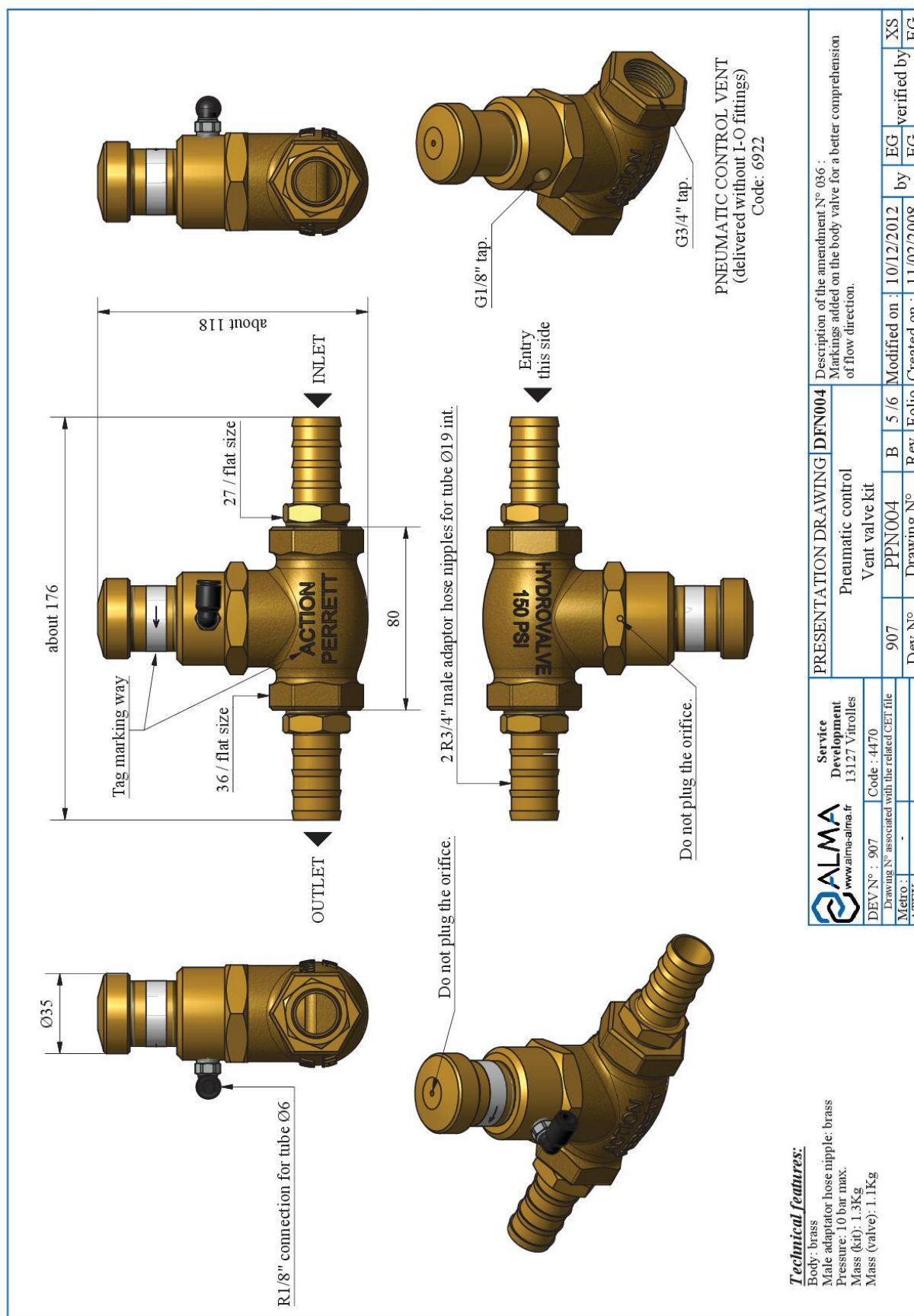
INSTALLATION GUIDE DI 004 ENE  
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**Units of measure:**  
Length: mm  
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Temperature: °C

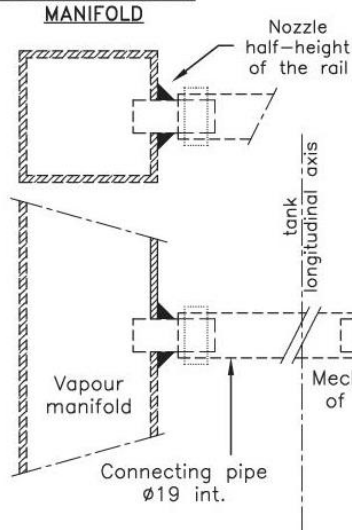
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## 8. PNEUMATIC CONTROL VENT VALVE KIT



# INSTALLATION RECOMMENDATIONS PNEUMATIC CONTROL VALVE

## CUSTOMER VAPOUR MANIFOLD



## TOP VIEW (top of the truck)

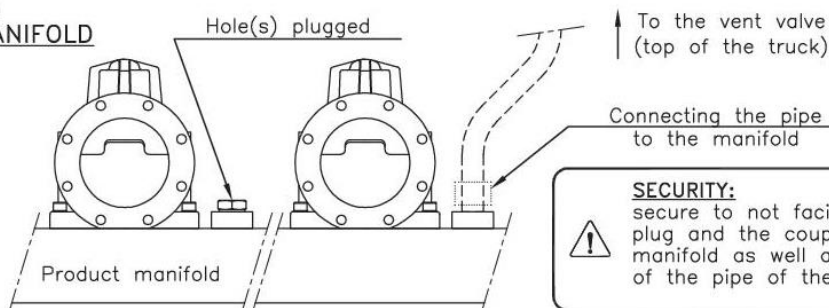
Towards the differential part of the pressure transmitter. Quick coupler on flange.

## VENT VALVE

Pneumatic coupling towards the control box

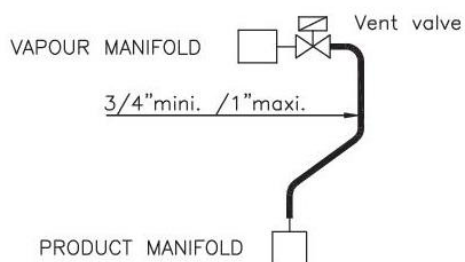
ATTENTION: the assembly way is indicated by the arrow  $\leftarrow$  or the marking "ACTION PERRETT" on the body

## ALMA PRODUCT MANIFOLD

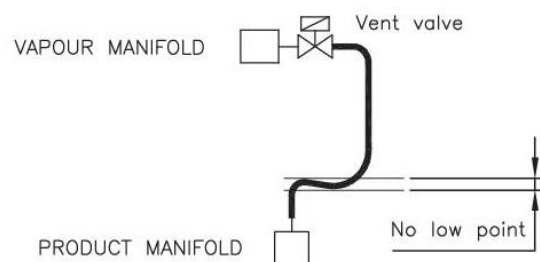


## ASSEMBLY OF THE VENT PIPE (not supplied by Alma)

### CORRECT ASSEMBLY



### WRONG ASSEMBLY



**ATTENTION:** avoid any low points on the pipe run.

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## INSTALLATION GUIDE DI 004 ENE GRAVICOMPT TYPE MNFLD

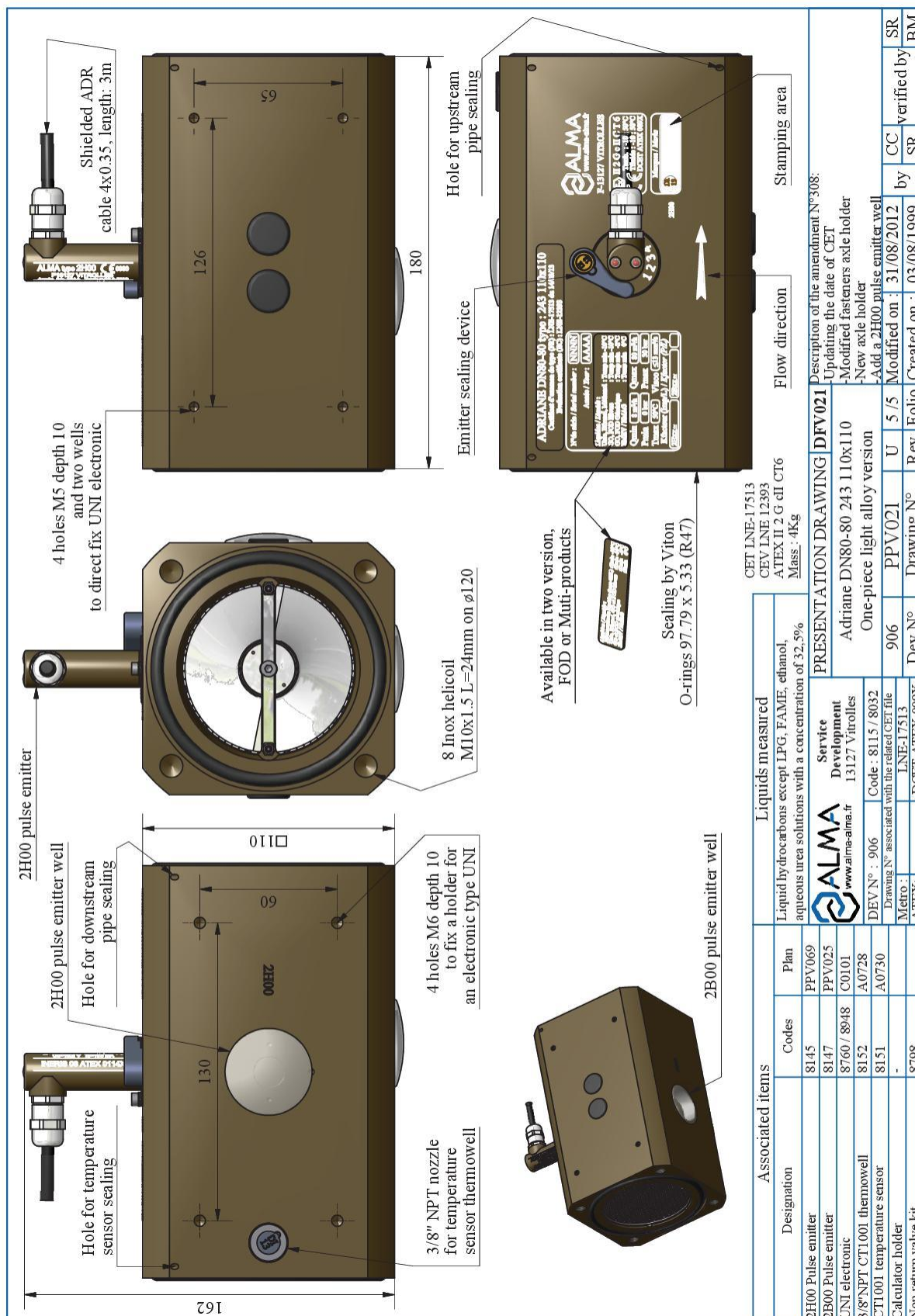
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Length: mm  
Angle: degree (° '' ''')  
Temperature: °C

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**TURBINE METER ADRIANE DN80-80 243 110X110**

Document available on website [alma-alma.fr](http://alma-alma.fr)

**TURBINE METER ADRIANE DN80-80 243 PN16 ADBLUE**

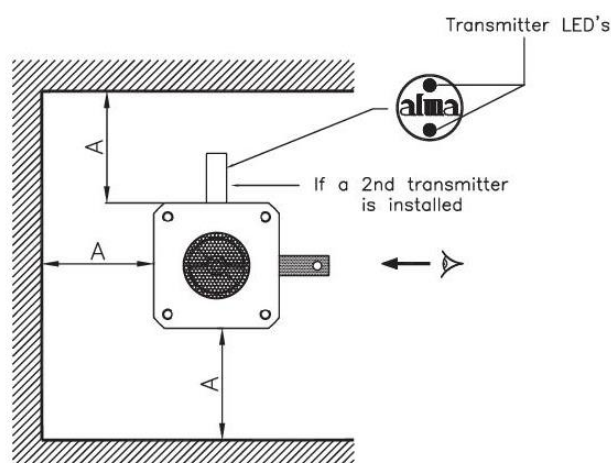


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|                                                                                                                                  |                                                                                             |                                                                                                               |
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## INSTALLATION 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 400 $\mu$  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.



The meter may be installed:

- Between two straight pipe sections that have the same nominal diameter as the meter and which lengths is at least equal to 10 times this diameter upstream and 5 time downstream.
- Between two pipes that have the same nominal diameter as the meter, with shorter or no straight sections, provided that no flowrate adjustment device (eg. a variable-opening valve) is located upstream at a distance less than 10 times the nominal diameter.

Provision contained in EC Type Examination or Evaluation Certificate.

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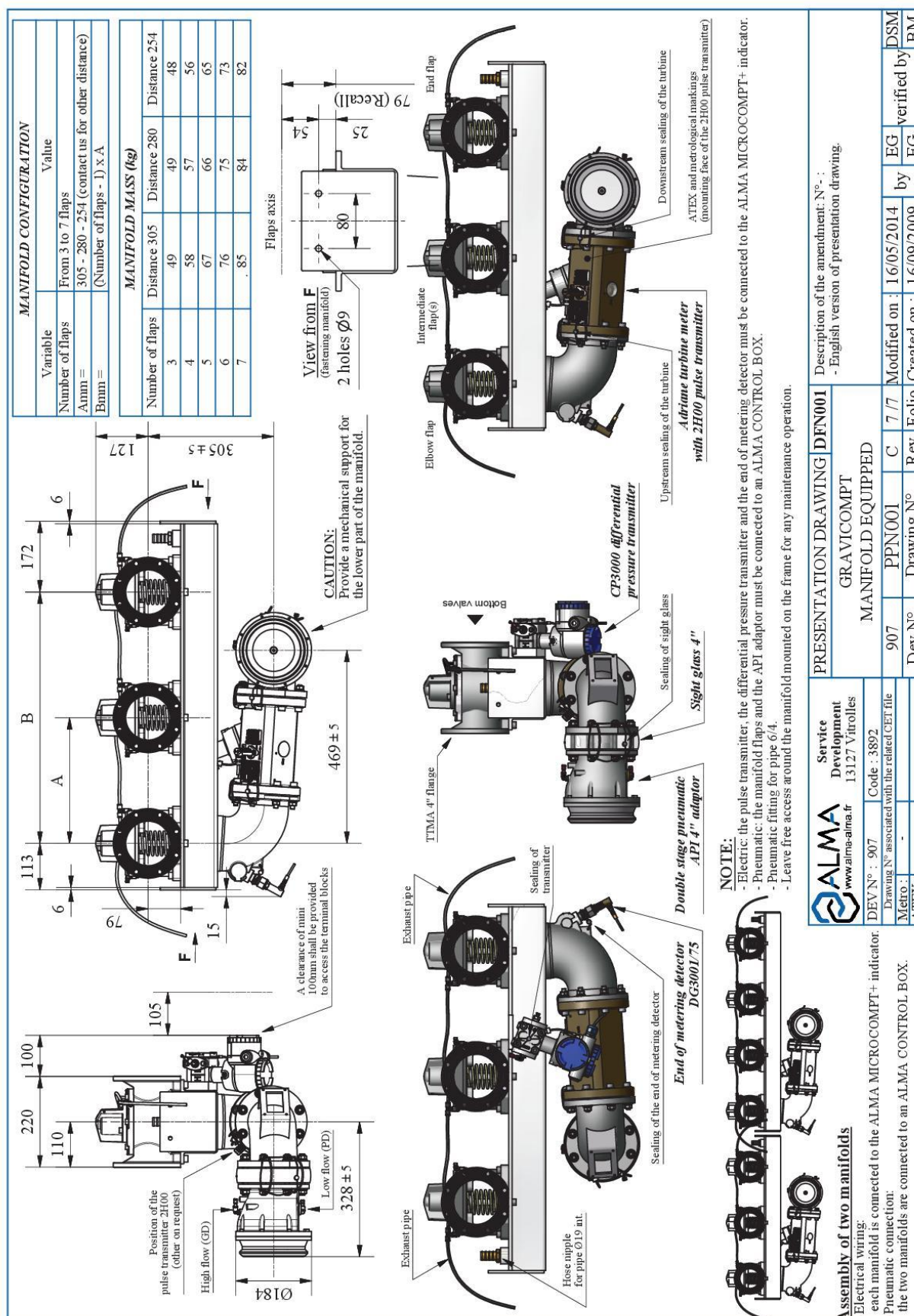
### INSTALLATION GUIDE DI 004 ENE GRAVICOMPT TYPE MNFLD

**Units of measure:**  
Length: mm  
Angle: degree (° ' ")  
Temperature: °C

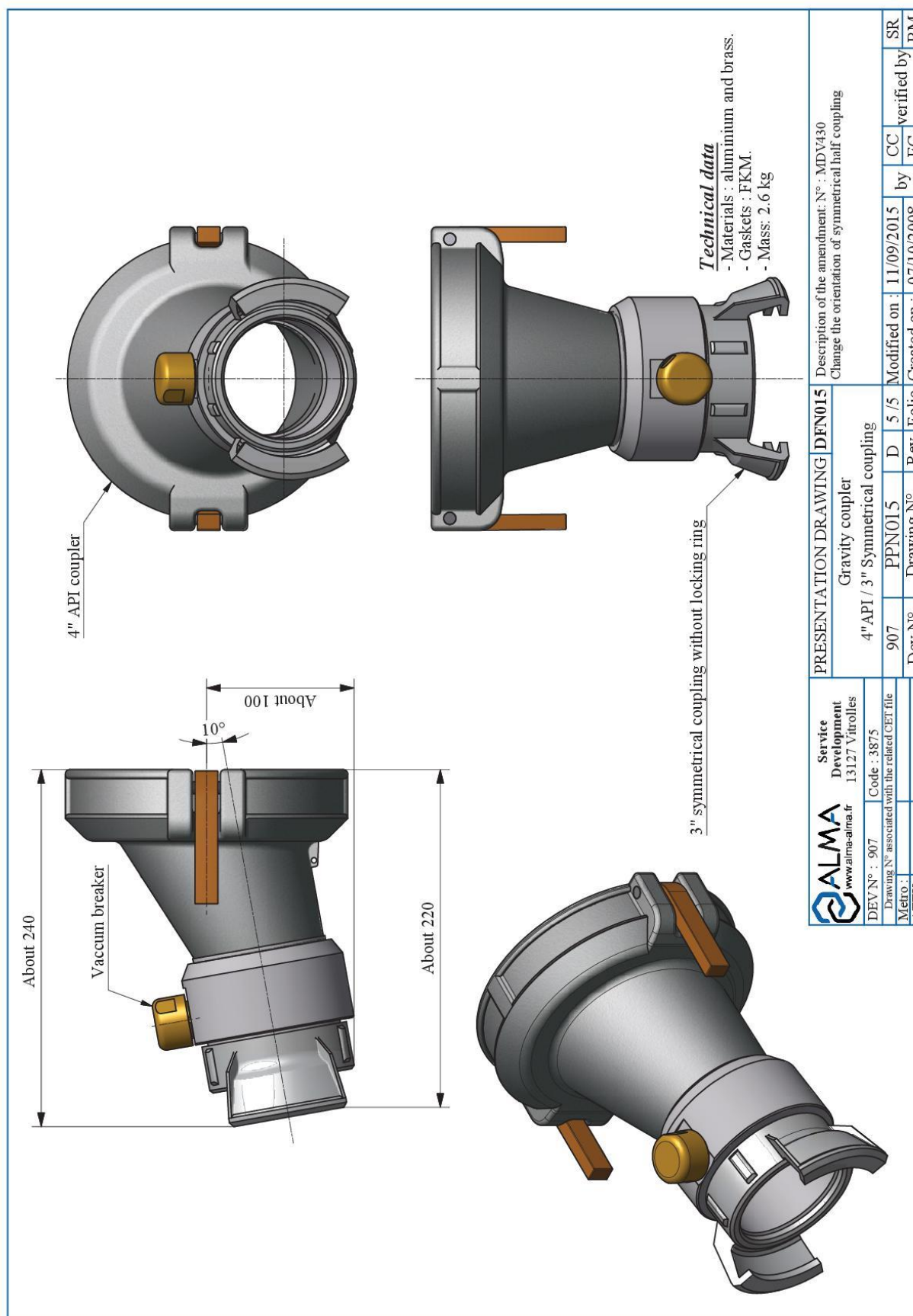
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## 10. GRAVICOMPT MANIFOLD EQUIPED

Document available on website [alma-alma.fr](http://alma-alma.fr)

## 11. GRAVITY COUPLER



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|                                                                                                                                  |                                                                                             |                                                                                                               |
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|                                                                                                                                  | <p>This document is available at <a href="http://www.alma-alma.fr">www.alma-alma.fr</a></p> | <p>Page 30 / 36</p>                                                                                           |

## 12. PRINTER

**Printer kit**  
**with TM-U295 printer**  
Code: 0284 (with 5 meters cable)  
Code: 0765 (with 10 meters cable)  
(Printer presentation drawing PPN901)

**Printer kit**  
**with SP298MD printer**  
Code: 0766 (with 5 meters cable)  
Code: 0767 (with 10 meters cable)  
(Printer presentation drawing PPN900)

\* ADR-RTMD - NFR13-413 cable

Description of the amendment: N° :  
- English version of presentation drawing.

| PRINTER LINK CABLE |  | COLOUR WIRE | FUNCTION   |
|--------------------|--|-------------|------------|
| CABLE              |  | White (WH)  | 24Vdc      |
|                    |  | Brown (BN)  | 0v         |
|                    |  | Yellow (YE) | Tx printer |
|                    |  | Green (GN)  | Rx printer |
|                    |  | Shielding   | Shielding  |

**PRINTER KIT:**  
- 1 Printer.  
- 1 Printer link cable (Length= 5 or 10m).  
- 1 Printer holder (SS 304L thickness 2mm - Mass 1.5 kg).

**Without printer**

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

DEV N° : 907 Code : -  
Drawing N° associated with the related CEI file  
Metro :

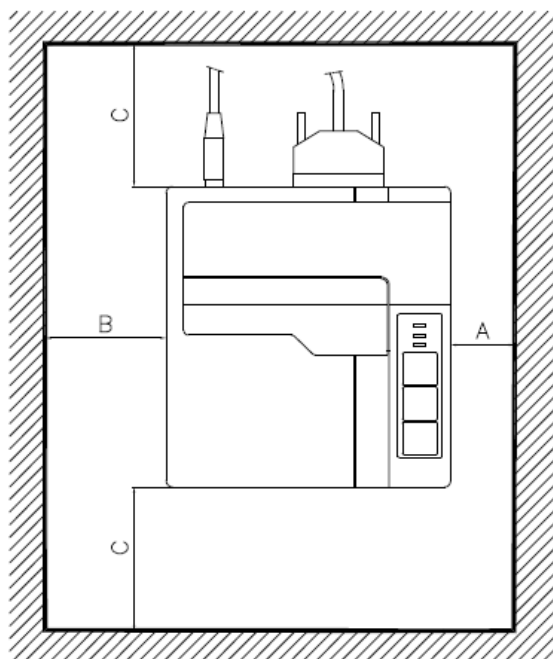
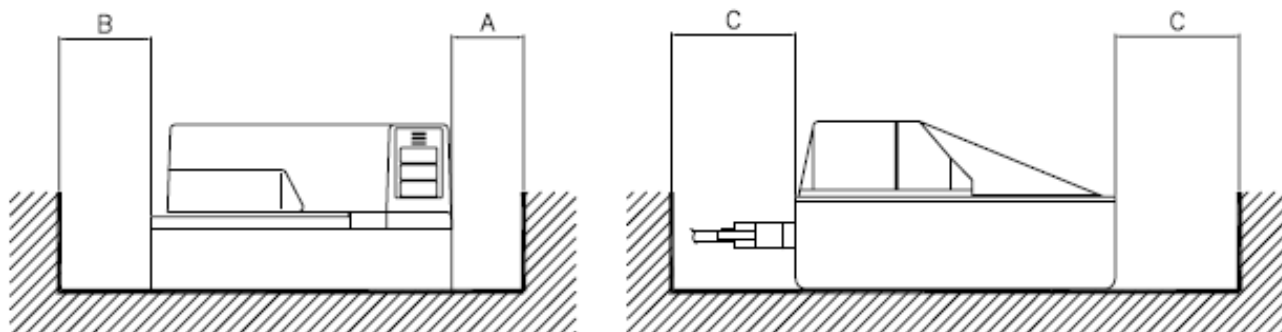
DO NOT EXPOSE THE PRINTER TO ANY HEAT-SOURCE, AND PROTECT IT FROM VIBRATIONS AND FROM WATER PROJECTIONS.

IF IT'S NOT IN THE TRUCK CABIN, THE PRINTER MUST BE INSTALLED IN A TIGHT BOX IN ORDER TO FACILITATE INTRODUCTION AND EXTRACTION OF PAPER.

EG verified by EG  
Created on : 25/02/2010  
Modified on : 06/05/2014

## INSTALLATION RECOMMENDATIONS PRINTER

- Do not store anything above the printer.
- Leave an open space all around the printer to ease maintenance.
- Dimensions:  $A \geq 50\text{mm}$  and  $B \geq 100\text{mm}$ .



BOTTOM VIEW

The printer must be installed in a tight box and be laid out so as not to obstruct the introduction and the extraction of paper.



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

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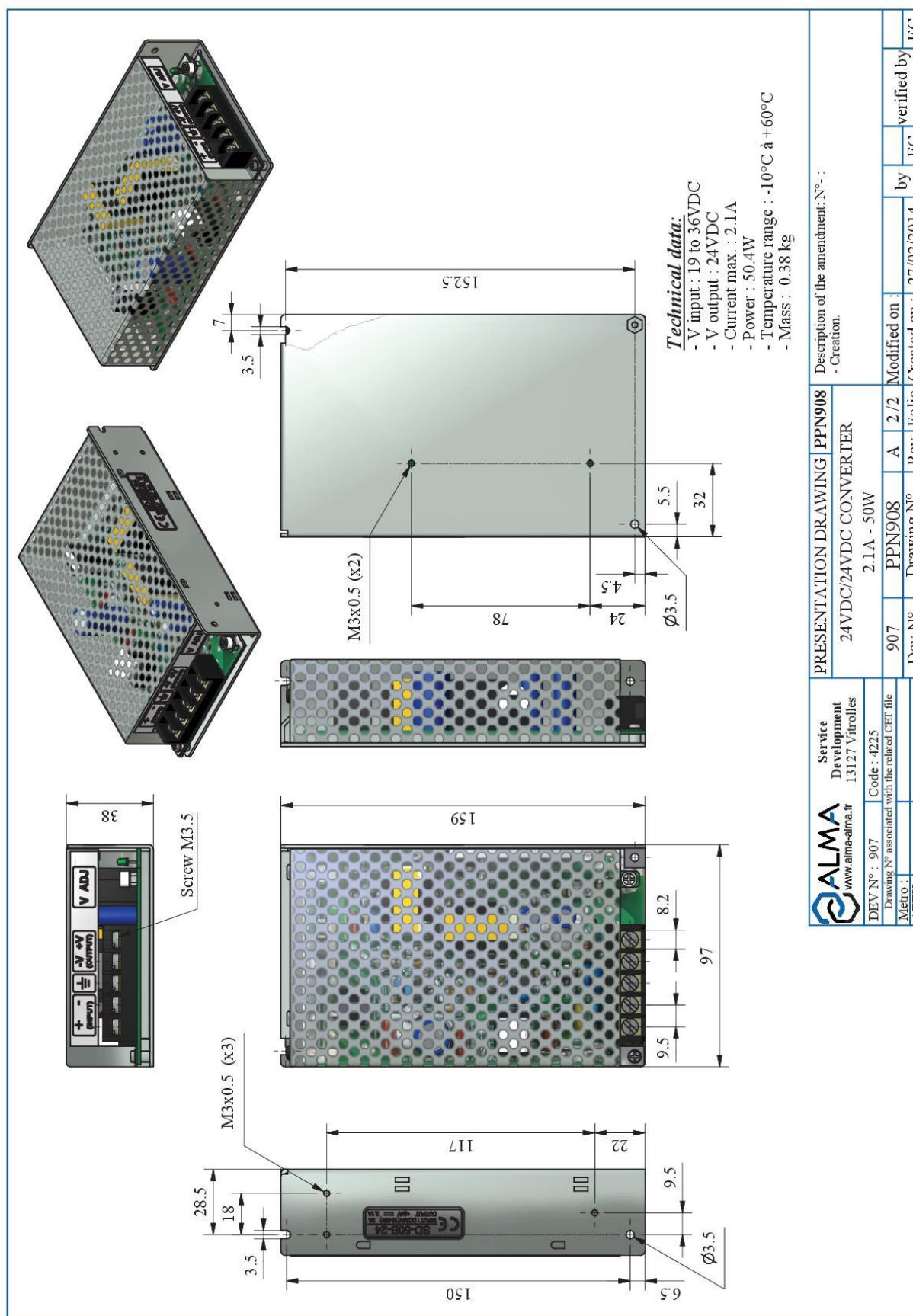
### INSTALLATION GUIDE DI 004 ENE GRAVICOMPT TYPE MNFLD

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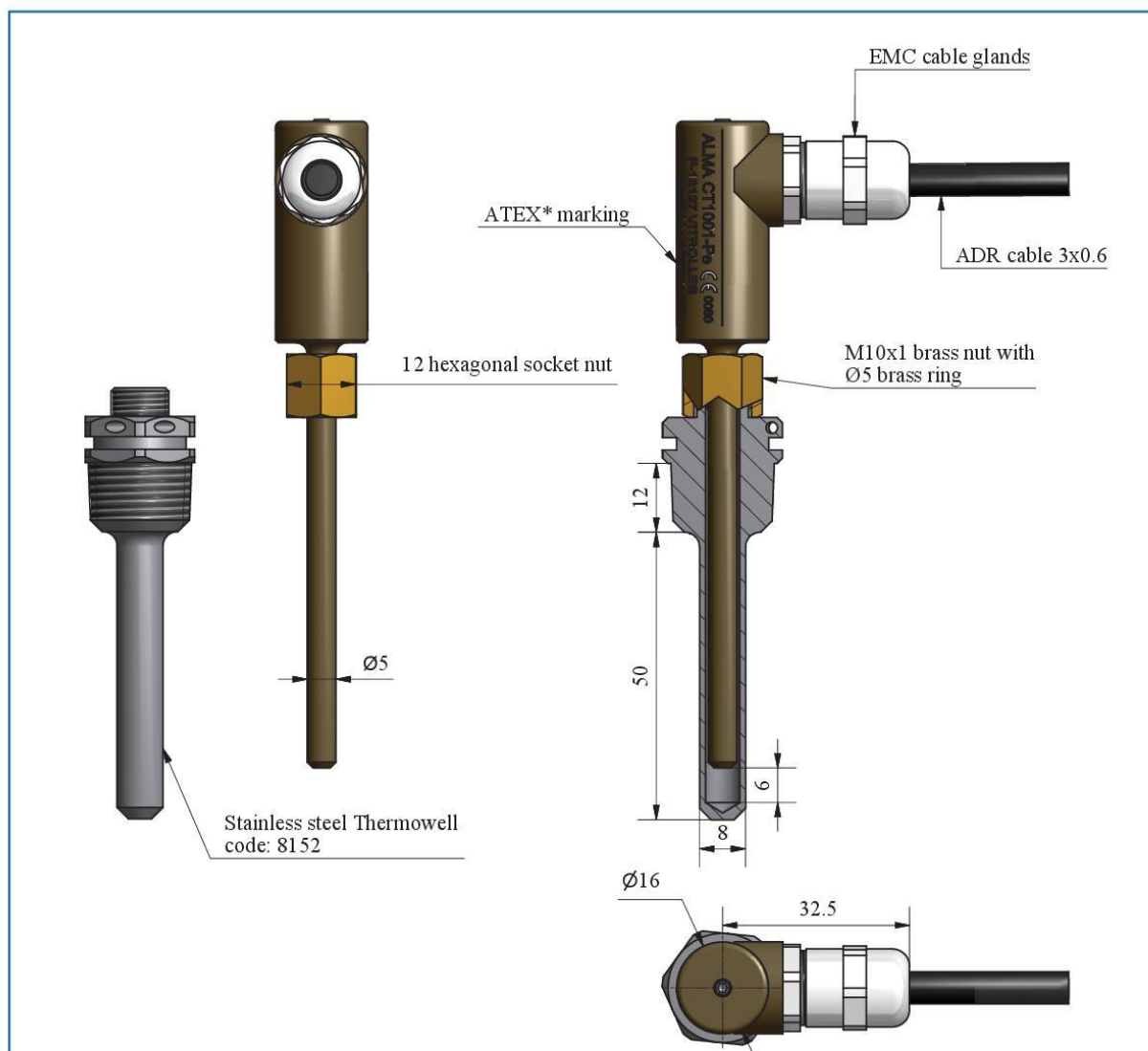
**Units of measure:**  
Length: mm  
Angle: degree (° ' ")  
Temperature: °C

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### 13. CONVERTER 24VDC/24VDC 2.1A 50W

Document available on website [alma-alma.fr](http://alma-alma.fr)

#### 14. PT100 TEMPERATURE PROBE – CT1001



The sensor body is made of bronze color anodized aluminum alloy; The ring and the nut are made of brass. The probe can 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 |                            |                   |
|----------------------|----------------------------|-------------------|
| <i>Function</i>      | <i>Marking on the wire</i> | <i>Color wire</i> |
| PT100/1              | 1                          | Yellow            |
| PT100/2              | 2                          | White             |
| PT100/3              | 3                          | Green             |

|                                                                                                                     |                                                 |  |                             |            |                                |       |                                                                    |    |          |             |          |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--|-----------------------------|------------|--------------------------------|-------|--------------------------------------------------------------------|----|----------|-------------|----------|
|  <b>ALMA</b><br>www.alma-alma.fr | <b>Service Development</b><br>13127 Vitrolles   |  | <b>PRESENTATION DRAWING</b> |            | <b>DFV042</b>                  |       | Description of the amendment N°312:<br>Adding a strengthening part |    |          |             |          |
|                                                                                                                     | DEV N° : 949c                                   |  | Code : 8151                 |            | Temperature probe<br>CT1001-Pe |       |                                                                    |    |          |             |          |
|                                                                                                                     | Drawing N° associated with the related CET file |  |                             |            |                                |       |                                                                    |    |          |             |          |
| Metro :<br>ATEX :                                                                                                   | INERIS 04 ATEX 0026                             |  | 949c                        | PPV042     | I                              | 5 / 7 | Modified on : 13/06/2013                                           | by | CC<br>BM | verified by | SR<br>BM |
|                                                                                                                     |                                                 |  | Dev N°                      | Drawing N° | Rev                            | Folio | Created on : 13/09/2003                                            |    |          |             |          |

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|                                                                                                                                  |                                                                                             |                                                                                                        |
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ADRIANE DN80-10 Type: 243 110x110 mm  
Cast iron manhole cover (EN 12412) for use in CP-3  
EN 12412-1

Technical specifications:

| Parameter         | Value           |
|-------------------|-----------------|
| Material          | EN 12412-1      |
| Weight            | 11.5 kg         |
| Load capacity     | 100 kN          |
| Temperature range | -40°C to +120°C |
| Installation      | See manual      |

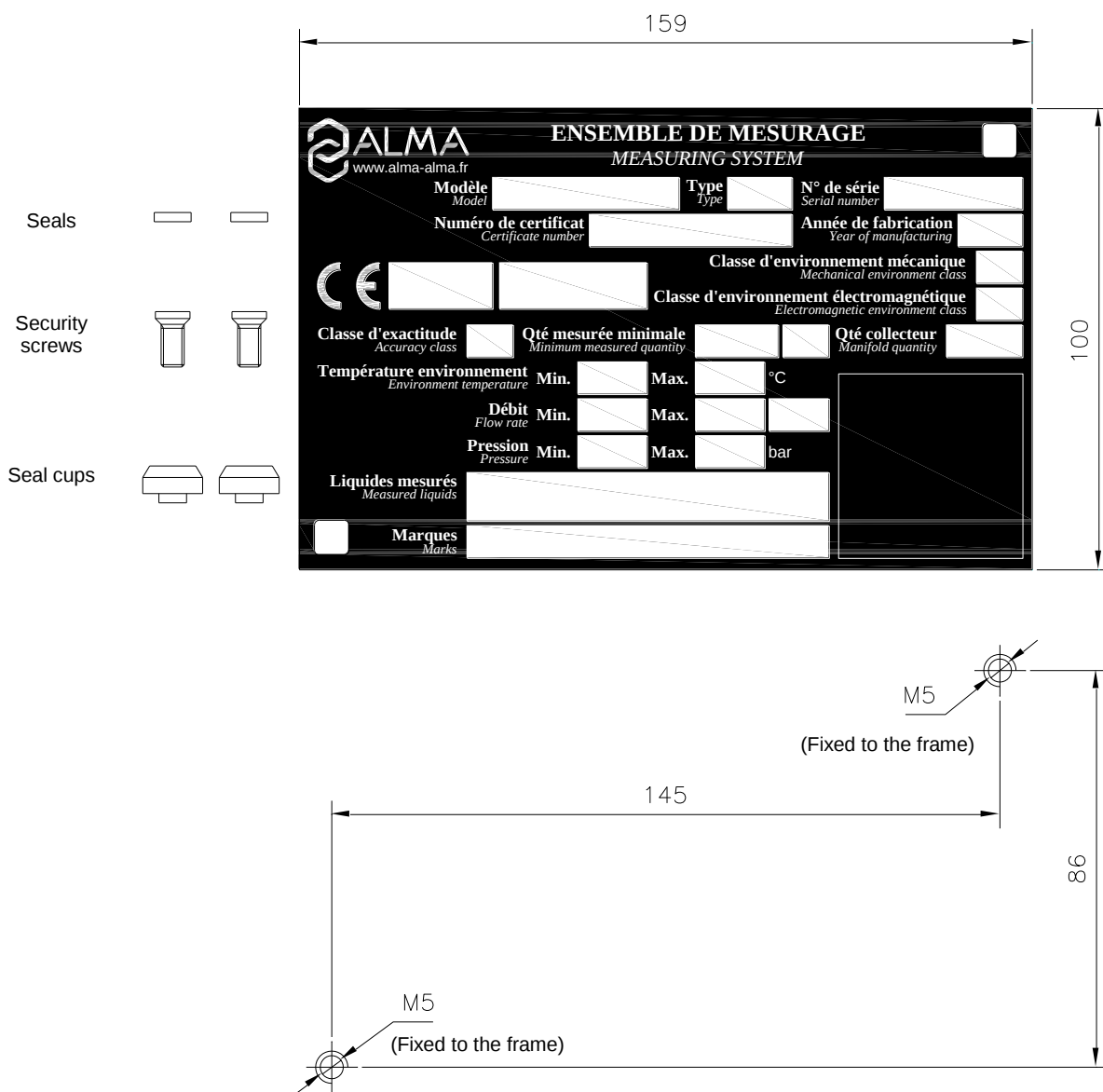
CE mark and other markings:

- CE
- 110x110 mm
- 100 kN
- 11.5 kg
- 100 kN
- 11.5 kg
- 100 kN
- 11.5 kg



## 15. 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).

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INSTALLATION GUIDE DI 004 ENE  
GRAVICOMPT TYPE MNFLD

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