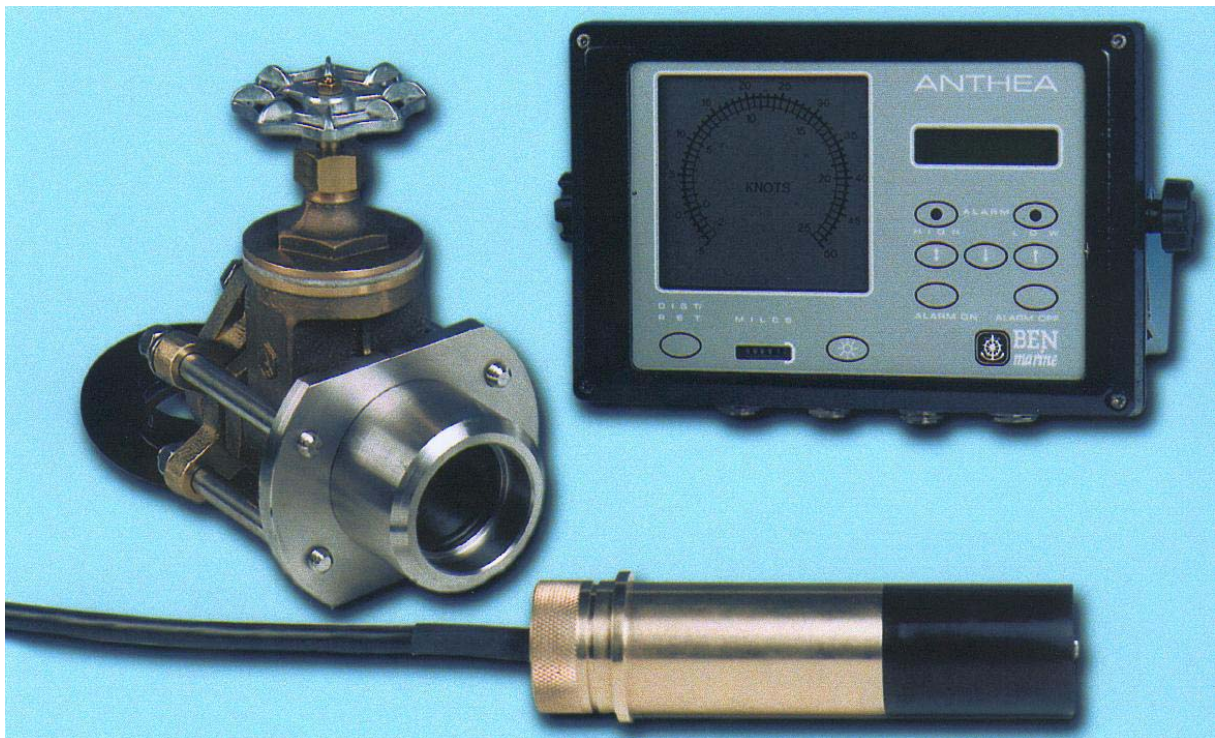


NOTICE D'INSTALLATION
OPERATION AND INSTALLATION MANUAL

ANTHEA



97MU001-F

| IND. | Author | Date | Description |
|------|--------|----------|---|
| A | JCN | 1997 | Initial Version |
| B | | | |
| C | | | |
| D | EE | 2006 | Modification GA120 scale 32 knots (p°4, 24, 25) |
| E | EE | 22/02/07 | Additive software for Blind setting p°4, Installation plan p°5 RGD100 RS232/RS422 Connecting p°23. |
| F | IQ | 11/10/07 | Change name of i2e into Amesys International |

97MU001-F

ANTHEA OPERATION AND INSTALLATION MANUAL

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EC TYPE EXAMINATION CERTIFICATE

AMESYS/BEN Marine Distributors

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1. DESCRIPTION

ANTHEA is a new generation of electromagnetic log. For standard operation, it uses model 48 BEN 48mm flat-surfaced sensors. It can be adapted to other BEN sensors having the same electrical characteristics.

ANTHEA includes a high and low speed alarm, controlling a visual and/or acoustic alarm if required. This alarm can be acknowledged and stopped via front panel keyboard.

This alarm is very useful on board trawlers. Indeed, any strain modification of the net is detected faster and in a more accurate way via speed measuring than by traction effort measuring.

It is also used to keep a speed considered as economical or to keep a mandatory speed.

ANTHEA includes an automatic gain adjustment for optimum accuracy. A permanent self-test indicates any possible log faults on LCD screen.

1.1 EQUIPMENT DESCRIPTION

Standard equipment includes :

- one main cabinet with :
 - ◆ 1 LCD screen for digital and pseudo-analog speed display
 - ◆ 1 electromechanical mile totalizer
 - ◆ 1 daily mile totalizer (on LCD)
 - ◆ 1 display unit for the different alarms adjustment (high and low)
 - ◆ 1 dimmer
- one 48.1.RVB16 sensor with 16m length cable, retractable at sea.
- one hull-fitting with valve, 48.1.RVB (retractable-valve-bronze alloy), screw-on type
or
- one hull-fitting with valve, 48.1.RVI (retractable-valve-stainless), weld-on type.

Options :

- GA 120 analog speed and distance repeater

scale - 2 + 16 knots

scale - 3 + 24 knots

scale - 5 + 25 knots

scale 0 + 48 knots

scale 0 + 32 knots

- RGD 100 combined repeater

- digital and pseudo-analog speed

- covered distance/with reset

- covered distance/without reset

- XY version

ANTHEA "ECO" includes :

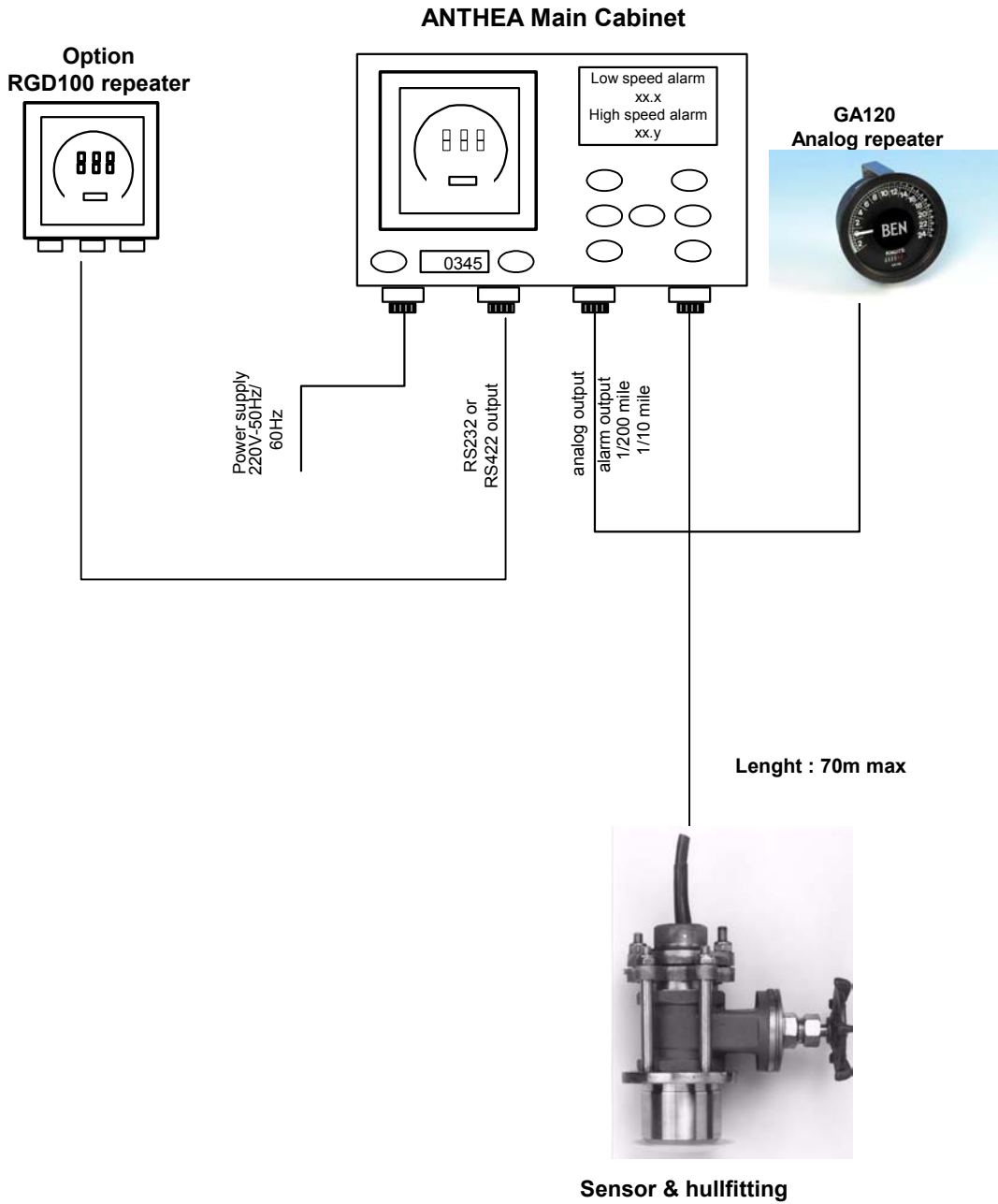
- 1 blind cabinet
- 1 sensor 48.1 RB with 16m length cable (not retractable at sea)
- 1 hull fitting 48.1 without valve, weldable or screw-on type
- 1 GA 120 analog speed and distance repeater
- 1 Software license for linearization and alarm's thresholds adjustment (CDROM + connectors to allow PC connection).

Available outputs are :

- current output 0.500 μ A which allows to connect an analog speed and distance repeater GA120 type
- one 1/10 mile output
- two 1/200 mile output
- one RS232/RS422 NMEA0183 output (IEC 61162-1)

Installation plan (see plan 6631-M)

The blind ANTHEA' processing board is identical to the standard ANTHEA's one.



1.2 MAIN FEATURES

- Watertight main cabinet made of a molded alloy, installed on a bracket or flush mounted.

IP 65 watertightness
Size : 244 x 164 x 95 mm

- LCD screen for :

Speed display on circular bargraph
Digital speed display : 0,1 knot definition
Covered distance/reset : 99999,9
Double scale : 25 or 50 knots
Test and alarm

- Electromechanical mile totalizer without reset

6 digits - Unit : 0.1 nautic mile

- LCD screen, 2 lines, 16 digits for :

Alarms adjustment (high, low)
3-linearization-point adjustment
Error message display
Display of :

| | |
|--------------------|---------------------------|
| longitudinal speed | for XY version (optional) |
| transversal speed | |
| resultant speed | |
| drift angle | |

- High and low speed alarm display
- Brightness control
- Permanent self-test
- Automatic gain control
- Accuracy (after calibration) ± 2 % on the LCD display (The results are guaranteed for a depth > 3 meters)
- For a roll leading to an oscillation of ± 3 Knots of the displayed speed with a period of 4 seconds, the damping function of the equipment reduce this oscillation to a value inferior of $\pm 0,3$ Knots.
- Variation of the displayed speed according to water temperature is less than 0,2 Knot.
- Variation of the displayed speed according to water salinity is less than 0,2 Knot.

Note : maximum length between sensor and electronic unit = Please refer to drawing "Cabling and installation configuration".

1.3 TECHNICAL FEATURES

Power supply :

24 Vdc (+ 30 % - 10 %)
 or 220Vac 50/60Hz ($\pm 10\%$)
 Option : 110V 50/60 Hz (+/- 10 %)

Outputs :

2 x 1/200 mile, potential free contact outputs, 24V, 250mA
 1 x 1/10 mile, open collector output, 24V, 500mA
 2 x potential-free contact alarm output, 50V, 2A
 1 x analog output 0 to 500 μ A
 1 x RS232/RS422 – NMEA0183 format (IEC 61162-1)

Damping adjustment via 4-16-32 sec. strap

Equipment Description

| P/N | Name | Qty | Weight | Description |
|----------------|------------------------|-----|--------|--|
| PVBEN296 | Main unit | 1 | 4 kg | IP65 metal unit |
| PVBEN008 | Sensor 48.1RVB16 | 1 | 4 kg | Retractable with 16m cable |
| PUBEN016 | Hull fitting 48.1 RVI | 1 | 5 kg | Weldable with valve |
| <u>Options</u> | XY version | | | |
| | GA120 galvanometer | | 0,5 kg | |
| PVBEN295 | Repeater 144x144 | | 3 kg | Digital speed, distance and alarm repeater |
| Filscgp9822 | 2 shielded pairs cable | | | Sensor cable |

1.4 SENSORS AND HULL FITTING

| Sensor type | Material | Hull fitting | Hull material | Drawing n° |
|-----------------|--------------|---|------------------------------------|------------|
| 48.1.RVB | Bronze alloy | 48.1.RVB Hull fitting, bronze alloy, screw-on, valve, for sensor retractable at sea | Plastic fiber polyester Wood | D0342 |
| 48.1.RVB | | 48.1.RVI Stainless steel, weld-on, with valve, for sensor retractable at sea | Stainless steel | D0343 |
| 48.1.RB | Bronze alloy | 48.1.RB Screw-on, without valve, for sensor retractable in dry dock | Plastic fiber polyester Wood | C1301 |
| 48.1.RB | | 48.1.RI (stainless steel), weld-on, with valve, for sensor retractable in dry dock | Stainless steel | C1287 |
| 48.1.RVB | Bronze alloy | 48.1.RBL bronze alloy, screw-on, without valve, for thick hull mounting | Plastic fiber polyester Wood | C1285 |
| 48.1.RA | Aluminum | 48.1.RA Aluminum weld-on, without valve, sensor retractable in dry dock | Aluminum | C1287 |

2. CHOICE OF HULL EQUIPMENT

1. According to vessel size
 - Hull-fittings with valve (48.1 RVI - 48.1 RVB)
 - . Are used on all types of vessels
 - Hull-fittings without valve (48.1 RB - 48.1 RA - 48.1 RBL - 48.1 RI)
 - are used on :
 - . 500 toners maximum
 - . Fishing ships not longer than 45m
 - . Yachts
2. Hull fitting cannot be used in dangerous compartments (fuel, hydrocarbons, chemicals).
3. Hull strength must be checked before installation of hull fitting.
4. Hull fitting must be installed in compliance with the specifications of the ship classification company.
5. Power supply wiring must comply with the specifications of the ship classification company.

Sensor location

The flush sensor must be installed in the foremost area of the vessel, when possible in a perpendicular position in the lower section of the bulb on the keel line. Deviation from the perpendicular measured in relation to the vessel's center line is not to exceed 5°.

In relation to the port/starboard yaw axis, deviation to a maximum of 30° may be permissible in particularly favorable conditions.

The installation position is to be at least 0.5m from echo sounder transmitter and similar devices;

The sensor must be positioned at least 10m away from corrosion protection electrodes. The maximum AC voltage component of the supply voltage of active corrosion protection electrodes is not to exceed 20mV eff.

The flat sensor surface measures the water speed along the hull. This measured speed is not equal to the vessel's true speed. Measured speed is lower than vessel's speed. At vessel's extreme fore, near true speed is obtained, but towards the aft of vessel speed value differs. The area along the hull where speed is different from vessel's speed is called the "boundary layer". Its thickness increases from fore to aft. The main cause is water running along the hull, which decreases up front. Because of the hull profile, hydrodynamic penetration coefficient is minimum in the fore.

Speed does not depend on fouling of the hull located in the boundary layer. Therefore, the ratio of the vessel's speed and measured speed is constant.

The sensor must be located near the bow, as far forward as possible. It must always remain immersed (if the sensor emerges occasionally, this can cause a short disturbance which doesn't effect the total distance information).

In order to protect the sensor against docking maneuvers, it is recommended to weld two strips on both sides of the sensor close to the hull-casing flanges. In order to avoid hydrodynamic disturbances, it is strongly suggested to profile these strips. Their dimensions will be calculated depending on the desired protection.

The line joining the electrodes of the sensor must be perpendicular to the vessels longitudinal axis.

ATTENTION : It is mandatory to install the sensor in a dry area. In case of sustained immersion, it is strongly advised to use a special watertight sensor.

For vessels with a bulge bow, the area located within distance equal to twice the height of the bulge can be disturbed. The sensor must be preferably located in the bulge. When it is not possible to install the sensor up front, it is recommended to fix it on a streamlined bulge.

For special installation cases (bow thruster...), please contact an AMESYS/BEN Marine certified agent.

When the sensor is to be retracted from inside the hull, which is the general case, make sure that the sensor location is easily accessible, avoiding costly and long operations. Cargo holds, for instance, cannot be considered as accessible ; in this case, an AMESYS/BEN Marine certified agent will advise you.

General rules for sensor installation

Before proceeding or drilling, etc. make sure that there is room enough for retraction of the sensor and vital service work. If the hull plating is not flat enough at the selected area, it is necessary to flatten the hull or fit a flattened hull reinforcement.

Welding the hull casing to the hull requires special care. For welding to a carbon steel hull, use electrodes in austenitic alloy : 24 Cr, 12 Ni, 3 Mo or 20 Cr, 12 Ni, 3 Mo". Welding will be preferably made in argon atmosphere.

All BEN hull-fittings are fitted with a plastic outer cap (part n°16 on drawing D0343). **This part is vital and shall be carefully put in place and stick using tightness cement during installation.** If broken, replace it immediately. A spare outer cap is always supplied either with the fitting or with the spares.

Fibered plastic or sandwich hulls : plastic hulls are not as resistant to screw pressure as metallic ones. Concerning sandwich hulls, the sandwiched materials must be replaced by a solid wooden ring or the equivalent. On standard plastic hulls, a large surface metallic washer can be placed inside and outside, under the condition that it is covered with plastic material joined smoothly to the hull surface. Tightness between hull and washer must be assured. For this type of hull, the inner part of the drilling must be covered for tightness by self polymerizing polyester.

For wooden hulls, hull thickness (including the reinforcement) must be less than the total thickness the hull-fitting can tolerate. AMESYS/BEN Marine has developed systems for different thicknesses of hulls. Contact an AMESYS/BEN Marine agent for further information.

Anti-fouling paint must not be removed by abrasion. In certain cases, it is neither possible nor recommended to put the sensor immediately in its working position. In this case, it is necessary to prevent sensor (and connected-cable) damage until it is put in its final position.

When installation is over, do not forget to clean the sensor.

2.1 SCREWED-TO-HULL-FITTING WITH VALVE TYPE 48.1.RVB WITH 48.1.RVB16 SENSOR OR 65.1.RVB WITH 65.2.RVB.20 SENSOR

(Drawing n° D0342)

Steel hulls may be too thin and require suitable reinforcement : minimum total thickness must be 25 mm.

Check that actual thickness of the hull (including the reinforcement) is less than the tolerated thickness.

Note : Reinforcement is always recommended on any type of hull.

1. Remove the sensor from the hull-fitting and from piece (16). Remove the 0-rings.
2. Drill a 64.5 mm diameter hole in the hull for 48 sensors or 93 mm diameter hole for 65 sensors. Remember to flatten external surface in order to get a perfect bearing of piece (1). For plastic hull, take into account the instruction § “ General rules for sensor installation ”. Do an external chamfer (about 5 mm - 45°) for easy mounting and proper positioning of piece (1).

Safety of the vessel depends from Installation.

3. Position hull casing (1) and use self polymerizing mastic for tightness (rubber, silicone rilsan for example). Mastic layer must be thin. Let it harden to a pasty consistency.
4. Screw casing nut (2) on hull casing, and torque it with hammer or caulking tool. To avoid the hull casing from unscrewing, block it with a wedge.

5. Screw the four thru-bolts ref (3) into the nut threaded holes (piece ref. 2) and butt them firmly against the hull plating in order to prevent future unscrewing of the nut. Safety is increased if a blind hole of a few mm depth is drilled facing the bolt. For plastic hulls, it is recommended to glue the nut to the hull with polymerizing fibered polyester.
6. Clean and grease 0-rings (11) and (12). Put them in place. Install the gate valve and properly adjust it (with regard to thru-bolt ref.3).
7. Put the upper 0-ring (6) in place in its landing, suitably greased. Install the upper flange (5).
8. Screw the safety nuts (19) on thru-bolt (3) forcing moderately and equally.
9. Put 0-ring (13) in place.
10. Fill the inner part of outer bush (16) with self polymerizing silicone rubber such as "syntofer". Remember to fill only the part indicated on D0342 drawing.
11. Introduce isolating part ref (16) with force. Make sure that it is properly positioned. Check that nothing protrudes and try to introduce the sensor from the outside. Let the mastic harden.
12. Grease flat seal (7) and put it in place.
13. Carefully lubricate the sensor and introduce it in its proper location. Take care to not grease the electrode.
14. Use grease supplied with spares. When properly positioned, the sensitive surface of the sensor protrudes at least 1 mm from external bush, and the red mark on the sensor head is directed towards the bow.
15. Fix sensor flange (8) with screws (9) and washers (20) ; put circlip 15. Connect the link (10). Check link length : it must be long enough to allow closing of the valve and short enough to prevent sensor from escaping and passing over 0-ring (6).

When using anti-fouling paint,

DOT NOT PAINT THE ELECTRODES - DO NOT GREASE THE ELECTRODES

Note : to avoid sensor damage, it is recommended to put sensor in place just before departure, or while at sea (in this case, do not forget to close the valve).

2.2 WELDED-TO-HULL-FITTING WITH VALVE TYPE 48.1.RVI WITH 48.1RVB. 16 SENSOR OR 65.1.RVI WITH 65.2.RVB.20 SENSOR

(Drawing n° D0343)

Drill a 77 mm diameter hole in the hull for 48 sensors and a 92 mm diameter hole for 65.2 sensors. Do an external chamfer of 5 mm (45°) for welding.

Prior to weld in the hull casing (1) the hull fitting is to be fully dismantled and O-rings are to be taken off.

1. Hull-casing (1) must be properly positioned, follow suggested procedure on drawing C1287. Weld the hull-fitting to the hull. After three or four spots have been welded on the internal side of the hull, remove the tools. Check that the lower part of hull-casing (1) does not protrude the hull, and grind the external seam flush with the hull.

IMPORTANT : Hull-fitting mechanical tolerances are very precise. In order to avoid any possible damage, do not heat the hull-fitting when welding it.

2. Weld piece ref (2) on hull-casing (1).
3. Weld the four try-bolts (3) on lower flange (2) - might already be done in factory -
4. Clean and oil up bearing surface of 0-ring (11) and (12). Put them in place. Install and position the gate valve (4).
5. Put 0-ring (6) and position upper flange (5).
6. Screw nuts (19) - do not forget the washers (18) - on the thru-bolts (3).
7. Put the lower 0-ring seal ref (13) in place.
Fill the inner part of the outer bush ref (16) with self polymerizing silicone rubber. Be careful to not over fill. Force the isolating part inside and clips it. Check positioning of hull-casing and also check that nothing protrudes inside by carefully introducing the sensor. Let the paste harden the time required.
8. Put flat seal (7) in place. Carefully lubricate the sensor and introduce it. Use grease supplied with spares.
9. When properly positioned, the sensitive surface of the sensor protrudes at least 1 mm from external bush, and the red mark on the head is directed towards the bow.
10. Fix sensor flange(8) with screws (9) and washers (20) ; put circlip 15.
11. Connect the link (10). Check link length : it must be long enough to allow closing of the valve and short enough to prevent sensor from escaping and passing over 0-ring (6).

To avoid sensor damage, it is recommended to put sensor in place just before departure, or while at sea (in this case, do not forget to close the valve). When using anti-fouling paint.

DO NOT PAINT THE ELECTRODES - DO NOT GREASE THE ELECTRODES

2.3 SCREWED-TO-HULL-FITTING WITHOUT VALVE TYPE 48.1.RB OR 48.1.RBL WITH 48.1.RB OR 48.1.RVB SENSOR (Drawing n° C1285/C1301)

Above fittings are in bronze (48 RB) or in aluminum (48 RA) according to the sensor material (C1287). Those fittings are convenient for hulls not over 30 mm thickness, including hull reinforcement. Minimum clearance for sensor retraction is 150 mm distance from inside hull. For thick hulls, a longer hull-fitting has been designed (see drawing C1285 ; 48 RBL hull-fitting). This hull-fitting concerns only wooden vessels. Maximum thickness of the hull is 110 mm. Minimum clearance for sensor retraction is 410 mm. A threaded cap ref (25) is supplied with the hull-fitting in order to obstruct the opening when the sensor is removed.

1. Drill a 64.5 mm diameter hole in the hole for 481 sensors. Remember to flatten external surface in order to get a perfect bearing of piece (1). Do an external chamfer (about 5 mm - 45° -) for easy mounting and proper positioning.
2. Position hull-casing (1). Tightness is obtained by a self polymerizing silicone rubber in order to prevent rotation of the body when unscrewing.
3. Fill the inner part of outer bush ref (16) with the mastic mentioned above. Be careful to fill only the part indicated on drawing C1301. Force the bush, check that the bush is properly engaged and that nothing protrudes. Test the clearance by introducing the sensor preferably from outside. Let the paste harden.
4. Put the washer (24) and the nut (23). The nut (23) must be locked by a conventional mechanical system (refer to the drawing). As to the RBL hull-fitting, it is possible to add a second nut acting as a lock-nut (see drawing C1285).
5. Position 0-ring (13) - previously greased - and flat seal (7) and carefully introduce the sensor.

Take care to not grease the electrode.

Use grease supplied with spares.

When using anti-fouling paint,

DO NOT PAINT THE ELECTRODES.

Attention : Red mark on sensor-head must be directed towards the bow.

6. Screw sensor nut (8). Do not forget the circlips (15).

DO NOT GREASE THE ELECTRODES

2.4 WELDED-TO-HULL-FITTING WITHOUT VALVE TYPE 48.1.RI WITH 48.1.RB SENSOR

(Drawing n° C1287)

1/ Drill a 77 mm diameter hole in the hull. Do an external chamfer of 5 mm (45°) for welding.

2/ Position hull-casing (1). To obtain accurate positioning, follow suggested procedure on the drawing. After three or four spots have been welded on internal side of hull, remove the mechanical system and check the positioning. Hull-casing must be flush with the hull. After welding, grind the external seam on a level with hull surface in order to allow piece (16) to butt on piece (1).

IMPORTANT : Hull-fitting mechanical tolerances are adjusted. In order to avoid any destroying risk, do not heat the hull-fitting when welding it.

3/ Fill the inner part of outer bush ref (16) with self polymerizing silicone rubber. Fill only the part indicated on the drawing. Replace the bush, check that bush is properly engaged and that nothing protrudes. Test the clearance by introducing the sensor preferably from outside. Let the paste harden.

In most cases, lower flange (2) is already welded to hull casing (1).

4/ Weld the thru-bolts (3).

5/ Grease 0-ring (13) and position it.

6/ Do not forget flat seal (7). Introduce and grease the sensor. Install sensor-flange (8). Screw the thru-bolts with (19) + (18). Do not forget circlips (15).

Attention : To introduce sensor, use grease supplied with spares. When using anti-fouling paint, DO NOT PAINT THE ELECTRODES, DO NOT GREASE THE ELECTRODES. When properly positioned, the sensitive surface of the sensor protrudes at least 1 mm from external bush. The red mark on the sensor head is directed towards the fore of the vessel.

2.5 LENS PROBE WITH HULLFITTING MADE OF STAINLESS STEEL

A/ INSTALLATION PROCEDURE

1. Drill a 184mm hole in the hull. Do an external chamfer of 5mm (45°) for welding.
2. Position hull-fitting in the correct mounting direction.

**The reference mark drawn on hull-fitting is oriented towards bow, it must be exactly parallel to the vessel axis.
The hull-fitting defines the mounting direction of the lens probe.**

When the hull-fitting is welded, grind the external seam on a level with hull surface in order not to create hydraulic interferences around the probe.

3. Weld a steel pipe to back of hull-fitting.
Ø = 40mm - Thickness = Minimum 5mm
This pipe will be stopped at 50mm above maximum waterline.
4. Introduce the probe after pulling watertight cable into the pipe.
5. Brush probe bottom with watertight rubber before fixing it with its 4 screws.

**Caution : DO NOT GREASE THE ELECTRODES.
When using anti-fouling paint, DO NOT PAINT THE ELECTRODES.**

B/ DISMOUNTLING AND CHANGING OF SENSOR

- 1/ Cut off power supply of the electronic.
- 2/ Disconnect the watertight cable sensor from the electronic.
- 3/ Strongly attach the watertight cable to a rope of at least the length of pipe.
- 4/ Send a diver to unscrew the four fixation screws of sensor.
- 5/ Screw-up the two extraction screws in order to push out the sensor from its hullfitting.
- 6/ Extract the complete defective sensor with its watertight cable and the rope attached to it.
- 7/ Strongly attach the new sensor's watertight cable to the rope and pull back up the cable for a new connection.

Caution : Before replacing the sensor in its hullfitting, don't forget to apply the watertight o'ring by silicone mastic.

This equipment is DNV and GL typed approved.

3. INSTALLING THE ELECTRONIC UNIT

The ANTHEA can be flush mounted on to the bulkhead at any angle attached with 4 screws.

The ANTHEA can be supplied with a bracket upon which it can be mounted with variable inclination. The bracket is attached with four screws.

- ◇ The cover of the ANTHEA is hinged. Leave enough space on the left side for opening.
- ◇ After terminal connecting, pull out as many wires as possible before tightening stuffing boxes in order to limit HF radiations inside unit.
- ◇ If wires are hardened, they should not be hardened beyond stuffing boxes input and should be grounded to casing via stuffing boxes.

The equipment is designed for a battery power supply of 24 volts -10% +30%. Its average consumption is 200 mA.

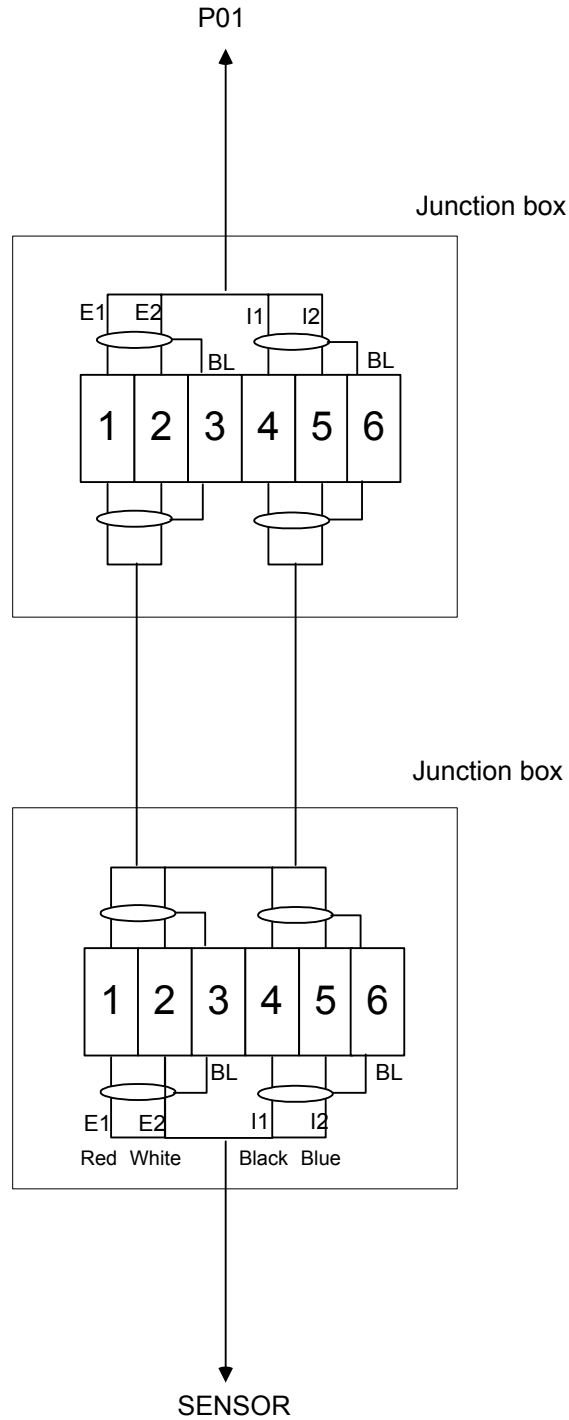
The ANTHEA is protected against polarity reversal of the power supply ; if it does not work, reverse the wires.

The sensor cable is 16 meters long. For greater lengths (up to 50 m), use two junction boxes and two separate shielded cables (see drawing on next page).

For a 24 V power supply, the value of the fuse is 1A.

For a 220 V power supply, the value of the fuse is 125mA.

ANTHEA MAIN CABINET

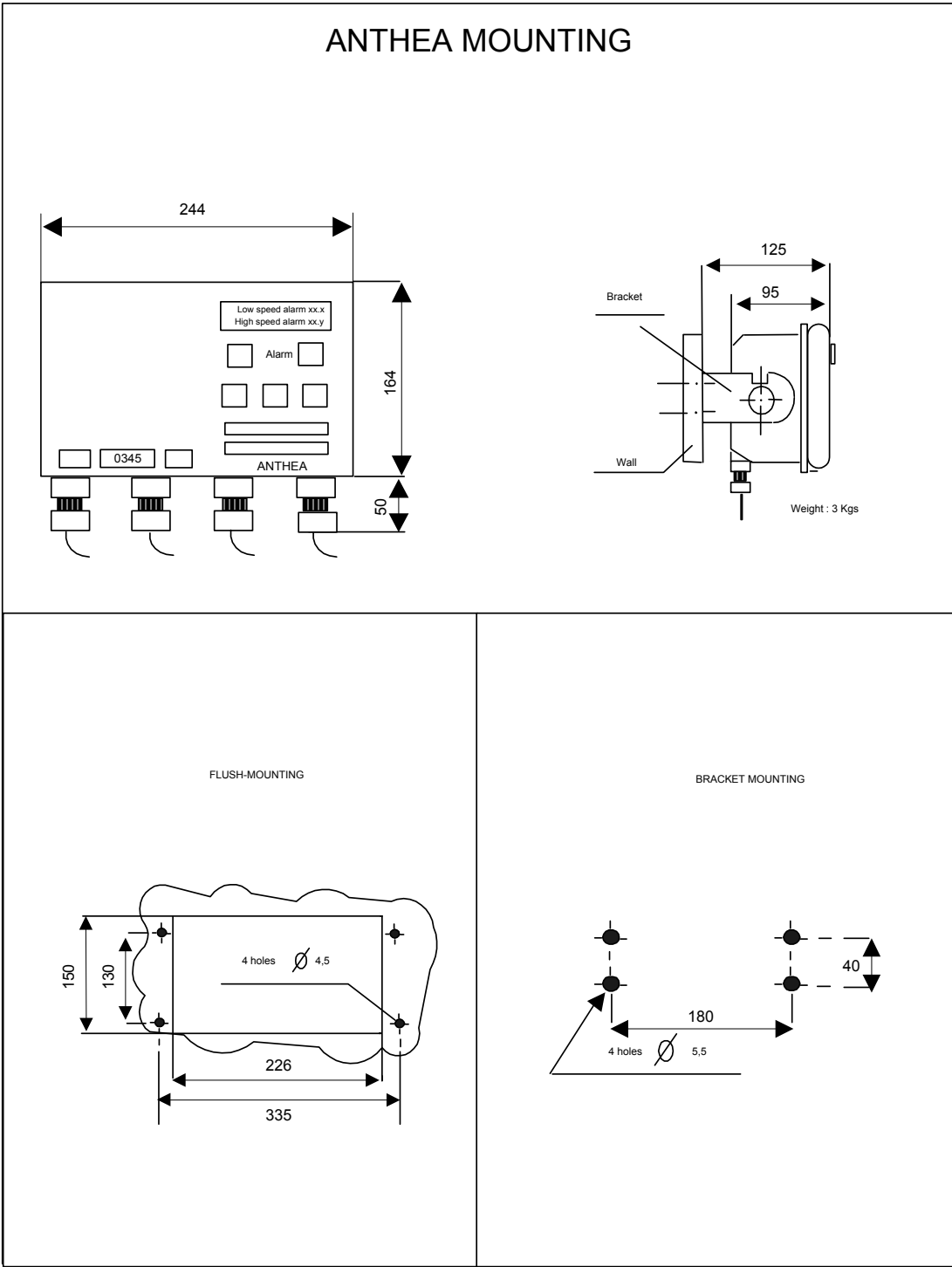


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3.1 ELECTRONIC CASES : SIZE AND INSTALLATION



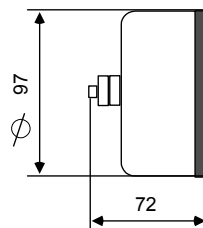
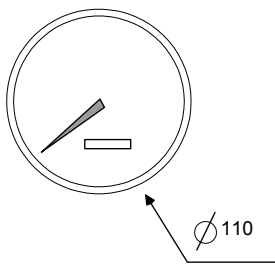
3.2 INSTALLING THE ANALOG SPEED AND DISTANCE REPEATER

The speed and distance repeater is a wide-angle galvanometer with a waterproof front surface.

It can be placed on an outside panel. The rear part of this panel however, must be protected from water projections.

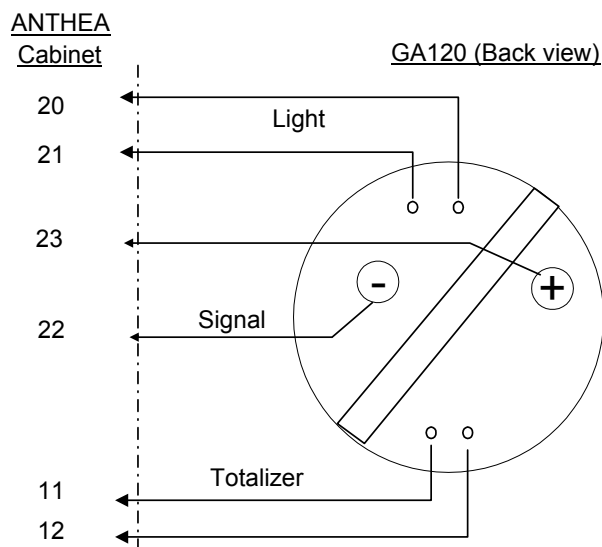
This repeater also has a 12V - 35 mA lighting. Power supply comes from the ANTHEA.

ANALOG SPEED AND DISTANCE REPEATER GA120



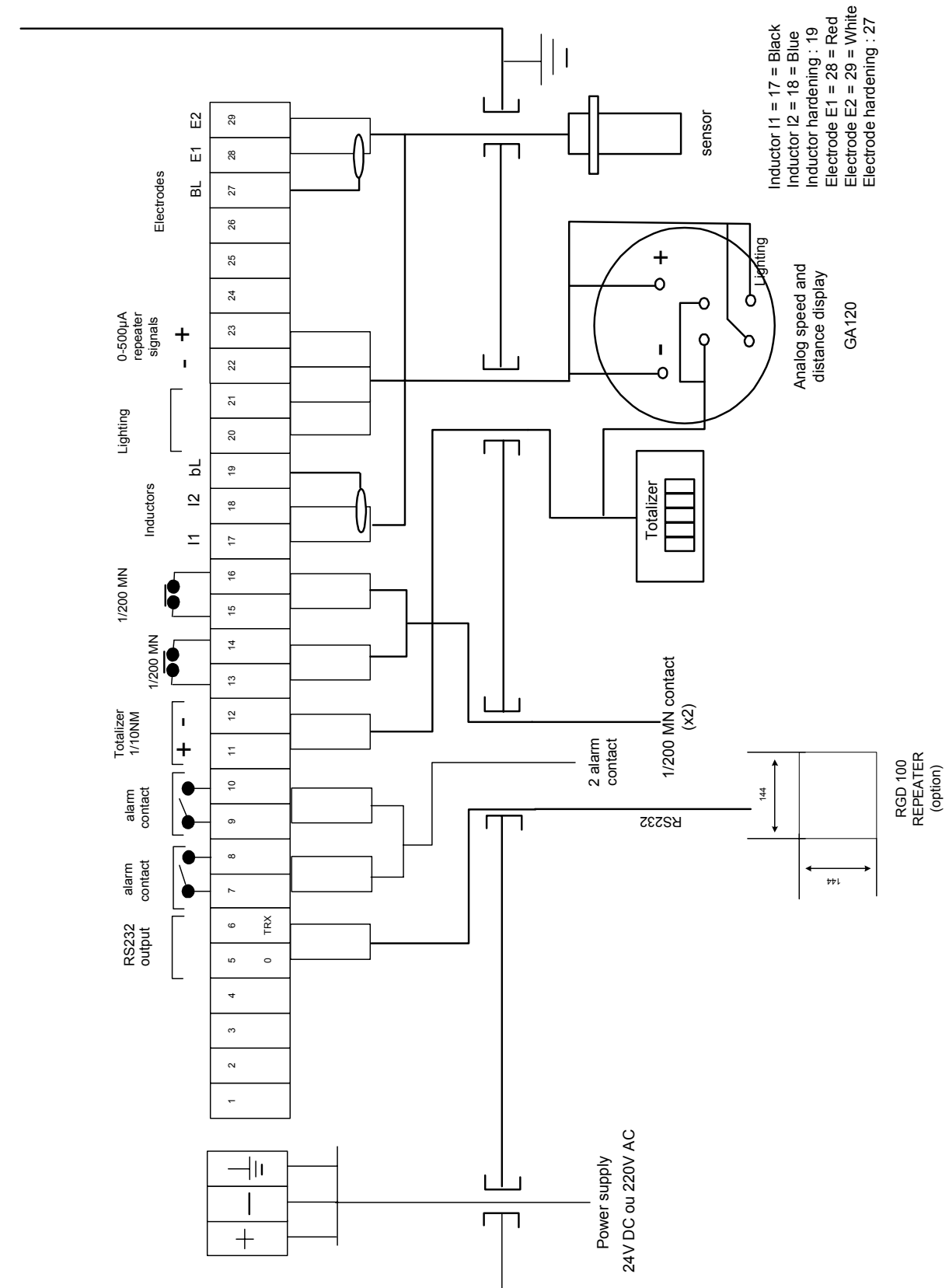
GA120 (Front view)

GA120 CONNECTIONS



3.3 SUB-SYSTEM CONNECTIONS

ANTHEA CONNECTIONS



3.4 COMBINED SPEED AND DISTANCE REPEATER : INSTALLATION

The repeater is a 144 x 144 mm watertight case.

It shows :

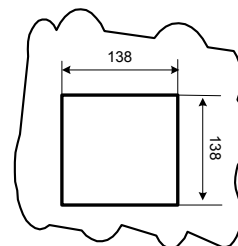
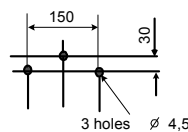
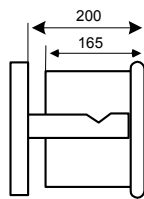
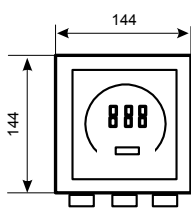
Digital and pseudo-analog speed 1/20 knot definition
Distance/reset : 1/10 mile definition

Log status (test - alarms)
Reset and brightness control are on front panel

Power supply : 24Vdc -10 % to 30 % (in option 220Vac or 115Vac)

Wiring is made via terminal and stuffing box, 5 repeaters can be connected

RGD100 REPEATER

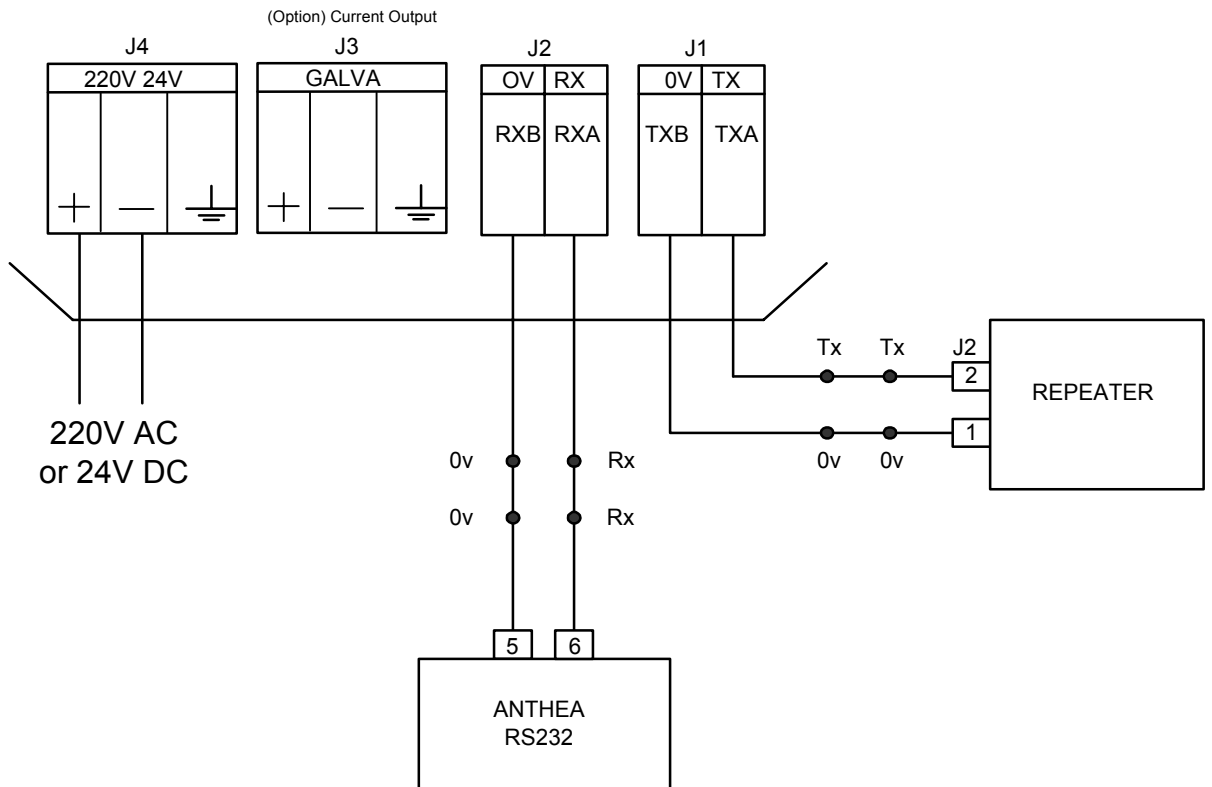


Bracket mounting

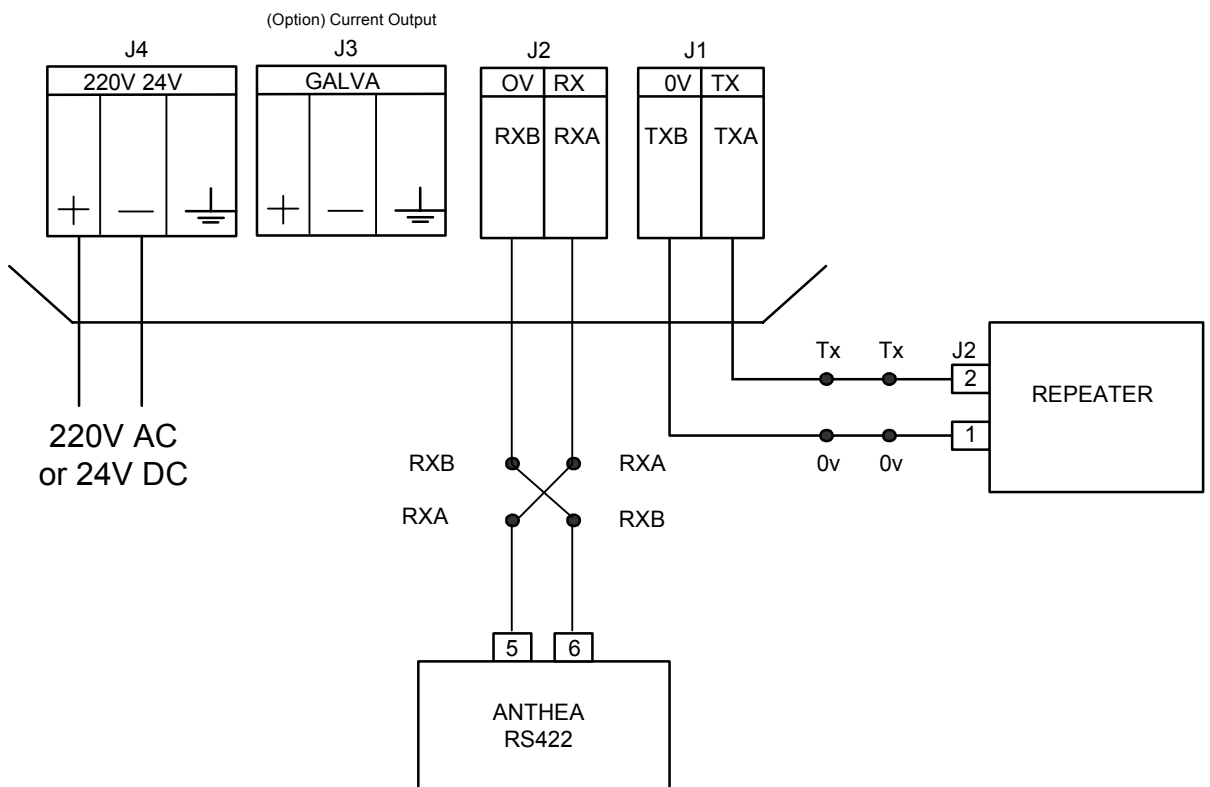
Flush mounting

RGD100 CONNECTING

RGD100 RS232



RGD100 RS422



97MU001-F

ANTHEA OPERATION AND INSTALLATION MANUAL

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4. TESTS, ADJUSTMENTS AND CALIBRATION UPON FIRST USE

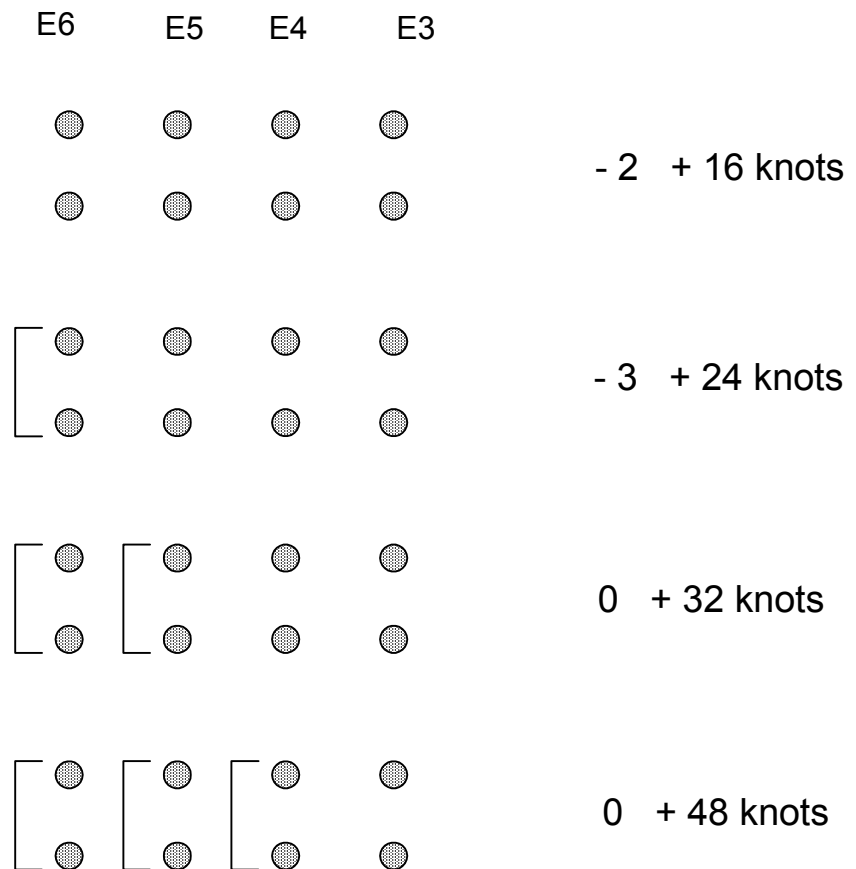
Preliminary tests

Once installation is completed, a first test must be performed before turning the power on.

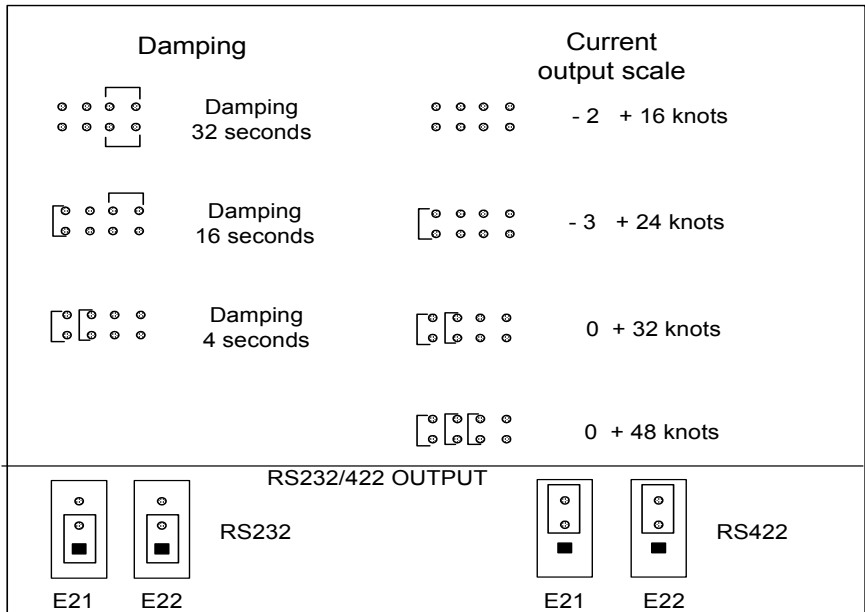
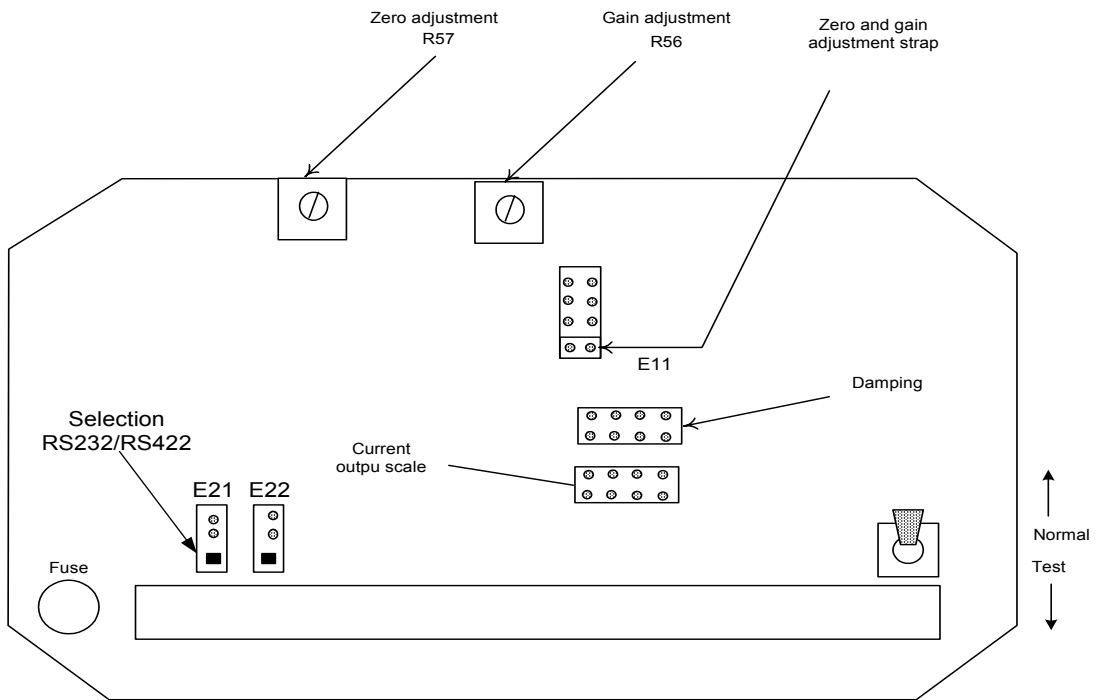
Open the ANTHEA and move the Normal - Test switch (S1) to the Test position. Turn the button clockwise to turn the device on. If nothing appears on the speed repeater, this means that the ANTHEA is not receiving any current. Check the battery charge, then the fuse.

When working, the log is at about 80 % of the scale in Test mode.

In case a GA120 galvanometer is used, make sure that strap position corresponds to the galvanometer scale, that is :



ANTHEA BOARD STRAP POSITIONS







Zero adjustment

When ship is motionless on dead calm water, speed can be above zero. You then have to correct this zero shifting.

Make sure there is no undertow.

You can easily check it by putting sensor back to front to check zero does not change.

If it does, zero can be adjusted by equalizing absolute speed values when sensor is in normal position and is back to front. Do not forget then to put sensor back in correct position (red mark towards ship bow).

| | | |
|---|--|-----|
| Zero adjustment process |  | E15 |
| Put strap E11 |  | E13 |
| Adjust with R57 potentiometer |  | E12 |
| Once adjustment has been achieved, take strap E11 off so as to set it |  | E11 |

Gain adjustment process

Switch "TEST" mode on, and wait a few seconds till speed stabilizes.





Note test value.

Calculate new test value, i.e. :

Example : Indicated speed on "TEST" position is 20 knots and we want to correct gain by -0,8 %.

$$\frac{20.0 \times 0,8}{100} = 19,84 \text{ knots}$$

Gain adjustment process

| | | |
|--|---|-----|
| Gain adjustment process |  | E15 |
| Strap E11 |  | E13 |
| Adjust gain with R56 potentiometer |  | E12 |
| Once gain has been adjusted, take strap E11 off, so as to set adjustment |  | E11 |

Switch to "NORMAL" position.

4.1 LOG CALIBRATION

An E/M log measures speed and distance in relation to water. When there is no current, the distance indicated by the log is the distance in relation to the bottom or the true distance.

Several methods can be used :

a) Empirical method

Using the average of the measurements of long distances covered in comparison with the actual distances.

b) Rational method

Using the measurements of speed in covering the same base distance several times.

The device is set for the average sensitivity of its sensors in the factory.

If the first method is used, calculate the average relative error for a certain number of runs at different times and with different tide levels, but at roughly the same speed.

It is convenient to calculate these errors in percentages. The average error is calculated by taking the average of the relative errors. A large enough number of runs must be made, as in the following tables :

| Runs listed by order | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------------|------|------|------|------|------|------|------|------|------|------|
| Error | - 2% | - 5% | + 7% | - 6% | + 2% | + 1% | + 4% | + 3% | + 1% | + 3% |

$$- 2 - 5 + 7 - 6 + 2 + 1 + 4 + 3 + 1 + 3 = + 8$$

The average relative error is $\frac{8}{10} = + 0,8 \%$

The correction is : - 0,8 %

4.2 CALIBRATION OVER SHORT DISTANCES

It is possible to calibrate the log with precision by covering a known base distance defined by alignment on the shore, preferably following a route defined by an alignment.

Calculating true or real speed :

Clock the time needed to cover the base distance : the true or real speed V_r is :

$$V_r = \frac{D_r}{T_r} \times 3600$$

D_r = Real distance covered

T_r = Time taken to cover the distance in seconds

The factor 3600 comes from the fact that the speed is measured in knots (miles per hour) and the time in seconds.

Calculation of the log speed

The log speed must not be read on the speed display as the measurement would not be precise enough. The average speed must be determined by clocking the time taken to complete the distance.

A second stop watch is useful, but if you only have one, the same method can be used by taking the times on the first stop watch as you go.

With a second stop watch, measure the time taken to cover the distance displayed on the distance counter. Start the stop watch as soon as the first one tenth of a mile figure changes after entering the base distance zone. Stop the stop watch when the base distance has been covered or just before reaching the end of the distance when the one tenth of a mile figure changes.

Do not change the speed or the direction of the boat until this measurement has been taken.

Log speed V_l is : $V_l = \frac{D_l}{T_l} \times 3600$

Let D_d and D_f respectively be the distances displayed at the beginning and at the end of the trip ; the distance displayed on the log will be :

$$D_l = D_f - D_d$$

If the time measured between the display of D_d and D_f is T_l , the average speed indicated on the log is :

$$V_l = \frac{D_l}{T_l}$$

Tr and T1 are not identical, since the beginning and the end of each of these timings are not identical.

If the base distance is long enough to be able to accept an approximation of a tenth of a mile, just not the indications on the distance counter upon entering and leaving the base distance zone.

The above measurements are to be taken over several runs.

a) When in a zone where the current remains constant throughout the tests, the base distance zone should be covered a second time in the opposite direction, carrying out the same operations. The average of the speeds obtained is then calculated :

$$V \text{ average} = \frac{V1 + V2}{2}$$

b) If the current is not constant, a third run in the same direction as the first will be made, as long as the tests are made consecutively with no time out between any two test runs. The average is calculated as follows :

$$V \text{ average} = \frac{V1 + 2V2 + V3}{4}$$

V1 = speed calculated on the first run

V2 = speed calculated on the second run

V3 = speed calculated on the third run

Always try to operate at the speed given by the log, modifying the engine speed controls if necessary.

Do not perform the measurements while the tide is turning.

Having found the average real speeds and the average log speeds, a simple calculation will provide the percentage of error of the log.

The percent error is :

$$\frac{100V1 + Vr}{V1}$$

This error may be positive or negative.

Example : suppose that 1.1 miles are covered in a clocked time of Tr1 = 364 seconds.

The real speed will be :

$$\frac{1,1 \times 3600}{364} = 10,9 \text{ knots}$$

The average real speed will be :

$$\frac{10,1 + 10,9}{2} = 10,5 \text{ knots}$$

Suppose that during the first run over the base distance, the stop watch was started when the distance counter was at : **24.1 miles**, and that it was stopped when the distance counter was at : **25.4 miles**, the stop watch will have run 400 seconds.

The distance read from the distance counter will be : $25.4 - 24.1 = 1.3$ mile.

Calculating the indicated speed gives :

$$\frac{1,3 \times 3600}{400} = 11,7 \text{ knots}$$

During the second run the stop watch was started when the distance counter was at **26.0 mile** and stopped when the distance counter was at **27.2 miles**, the stop will have run 372 seconds.

The distance read from the distance counter is : $27.2 - 26 = 1.2$ miles.

The speed calculated is :

$$\frac{1,2 \times 3600}{372} = 11,6 \text{ knots}$$

The average value of the speeds indicated is :

$$\frac{11,7 + 11,6}{2} = 11,65 \text{ knots}$$

Error correction :

First evaluate the error in percentage.

In the above example, the error :

$$\frac{100 \times (11,65 - 10,5)}{11,65} = + 10 \%$$

The correction to be made is therefore : - 10 %.

Switch "TEST" on and wait a few seconds till speed display is stabilized.

Note test value.

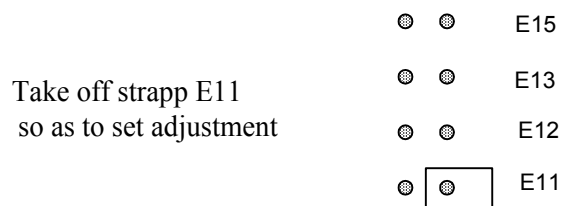
Calculate new test value : for example :

Test value = 18 knots

$$\text{New value} = 18 \text{ knots} - \frac{18 \times 10}{100} = 16,2 \text{ knots}$$



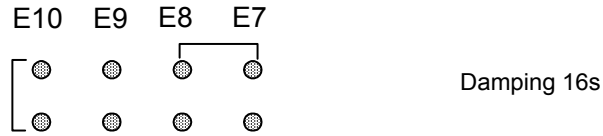
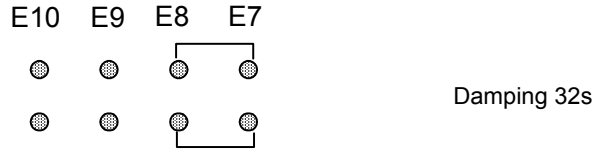
Adjust potentiometer R56 so as to bring test value back to 16,2 knots.



Switch on "Normal" position (N).

4.3 DAMPING ADJUSTMENT

Three damping possibility are available : 4s, 16s, 32s.



5. USE OF ANTHEA

5.1 BRIGHTNESS CONTROL

Press (*) to adjust brightness.

Optimum brightness can be adjusted on speed circular bargraph.

When (*) key is released, the circular bargraph resumes its speed indicating function.

Press "Dist/Reset" to reset daily totalizer appearing on LCD screen.

Scale change on LCD screen :

5.2 WARNING SIGNAL ADJUSTMENT

There are two alarm thresholds, upper and lower threshold.

LCD screen (2 x 16-digits lines) gives following informations :

*Low speed xx.x
High speed xx.x

When the alarm is inhibited, there is a star (*) on the beginning of one of the 2 LCD lines.

With ↓ and ↑ keys desired alarm threshold can thus be adjusted. Then, press ⇅ to alter second alarm threshold. The star then appears on second line. The second alarm threshold can then be adjusted.

Press "ALARM ON" to validate previously entered adjustments. Stars on message beginning disappear.

Alarm detection then becomes operational.

If the ship speed exceeds preset thresholds, corresponding warning signal lights up.

Press "ALARM ON" once again to validate the buzzer.

Press "ALARM OFF" once to suppress the buzzer.

To put it on again, press "ALARM ON".

Press "ALARM OFF" once again to suppress the alarm function.

Example : Adjustment of alarm lower threshold = 3,2 and adjustment of alarm upper threshold = 13,4 knots.

| Press | To | Display |
|--------------|---|---------------------------------------|
| ↓ and ↑ | Enter alarm lower threshold at 3.2 knots | * Low speed 03.2 High speed xx.x |
| ↕ | Go to other line | Low speed 03.2 * High speed xx.x |
| ↓ and ↑ | Enter alarm upper threshold at 13.4 knots | Low speed 03.2 * High speed 13.4 |
| "Alarm on" | Validate alarm detection | a Low speed 03.2 High speed 13.4 |
| Alarm On | Validate buzzer | a Low speed 03.2 k High speed 13.4 |

| Display | Press | Display |
|---------------------------------------|-----------------------------------|-------------------------------------|
| a Low speed xx.x k High speed xx.x | "Alarm OFF" Buzzer off | a Low speed xx.x High speed xx.x |
| a Low speed xx.x High speed xx.x | "Alarm OFF" Alarm function off | * Low speed xx.x High speed xx.x |

5.3 LINEARITY ADJUSTMENT

Draw an error curve of log.

Example :

| | Real speed (in knots) | Display speed (in knots) | Enter correction couples |
|--|--------------------------|-----------------------------|--------------------------|
| | 5 | 5,2 | |
| | 14 | 14,6 | |
| | 22 | 20,4 | |

| Press | To | Display (on the 2 x 16-digit lines) |
|-----------------------------------|---|---|
| Both \updownarrow and \square | Set program on linearization mode | *1 True speed xx.x 1 Log speed xx.x |
| \downarrow and \uparrow | Adjust 1st linearization point (real speed) | * 1 True speed 05.0 1 Log speed xx.x |
| \updownarrow | Go to other line | 1 True speed 05.0 * 1 Log speed xx.x |
| \downarrow and \uparrow | Adjust 1st linearization point (log speed) | 1 True speed 05.0 * 1 Log speed 05.2 |
| \updownarrow | Go to other line | *2 True speed 14.0 2 Log speed xx.x |
| \downarrow and \uparrow | Adjust 2nd linearization point (real speed) | *2 True speed 14.0 2 Log speed xx.x |
| \updownarrow | Go to other line | 2 True speed 14.0 *2 Log speed xx.x |
| \downarrow and \uparrow | Adjust 2nd linearization point (log speed) | 2 True speed 14.0 *2 Log speed 14.6 |

Same process for 3rd correction point.

Program starts again normally after the 3 correction points have been entered.

0 knots corresponds to zero correction.

5.4 CHANGE OF CIRCULAR BARGRAPH SCALE

The ANTHEA has an automatic analog scale switch over allowing an optimum reading.

When the ship speed overpass 25 Knots, the log is automatically switching-over on the 50 Knots scale.

The log will switch-over again on the 25 Knots scale when speed is inferior to 24 Knots (Hysteresis of 1 Knot).

6. ERROR MESSAGES

Any possible fault of log is detected by a permanent self test and displayed on the 2 x 16-digit lines LCD screen.

Possible error messages are :

- "Measure not valid"
- "Sensor current"
- "Log interface"
- "Faulty memory"

Measure not valid :

This message appears in the event of a faulty analog component, or when sensor is out of water.

Sensor current :

This message appears when sensor is no more current on sensor. Check the sensor (inductor) connections.

Faulty memory :

This message appears when the EPROM memory happens to be erased.

Log interface :

This message appears after a transmission fault between the display board and the measuring board.

If any of these messages appears, please contact one of AMESYS/BEN engineers.

7. SERIAL OUTPUT NMEA 0183 IEC 61162-1

7.1 DATA TRANSMISSION

- baud rate 4800
- data bits 8 (D7 = 0) , parity none
- stop bits 1

7.2 FORMAT OF SENTENCE INFORMATION

Version single axis:

\$ V M V H W , , , , x x x . x x , N , , * h h <CR> <LF>

\$ V M V L W , x x x x x . x , N , x x x x x . x , N * h h <CR> <LF>

\$ P B E N , 0 1 , a a a a * h h <CR> <LF>

Version dual axis :

\$ V M V H W , , , , x x x . x x , N , , * h h <CR> <LF>

\$ V M V L W , x x x x x . x , N , x x x x x . x , N * h h <CR> <LF>

\$ P B E N , 0 1 , a a a a * h h <CR> <LF>

\$ V M V B W , x x x . x x , x x x . x x , A , , , V , , V , , V * h h <CR> <LF>

7.3 SENTENCE DESCRIPTION

--. Water speed and heading

\$ V M V H W , , , , x x x . x x , N , , * h h <CR> <LF>

\$ V M V H W : Start of sentence and identifier

x x x . x x : longitudinal water speed in Knots

N : Knots

hh : Cheksum

message recurrence 0.5 second

--. Dual ground / water speed

\$ V M V B W , x x x . x x , y y y . y y , A , , , V , , V , , V * h h <CR> <LF>

\$ V M V B W : Start of sentence and identifier

x x x . x x : Longitudinal water speed , knots

y y y . y y : Transversal water speed, knots

A : data valid , **V** : data invalid

hh : Cheksum

message recurrence 0.5 second

-- Distance travelled through the water

\$ V M V L W , x x x x x . x , N , y y y y y . y , N* h h <CR> <LF>

\$ V M V L W : Start of sentence and identifier

x x x x x . x : Total cumulative distance, nautical miles

y y y y y . y : Distance since reset, nautical miles

N: nautical miles

hh : Cheksum

message recurrence 1 second

-- Proprietary sentences

\$ P B E N , 0 1 , a a a a * h h <CR> <LF>

\$ P B E N , 0 1 , : Start of sentence and identifier

a a a a : alarms

hh : Cheksum

message recurrence 1 second

| |
|-----------------|
| DRAWINGS |
|-----------------|

| N° | |
|---------|--|
| | Cabling and installation configuration |
| C1285 | Probe 48.1 RVB/hullfitting 48.1 RBL |
| C1287 | Probe 481 RA/hullfitting 48.1 RA Probe 481 RB/hullfitting 48.1 RI |
| C1301 | Probe 481RB/hullfitting 48.1 RB |
| D0342 | Probe 48.1 RVB/hullfitting 48.1 RVB Probe 65.2 RVB/hullfitting 65.1 RVB |
| D0343 | Probe 48.1 RVB/hullfitting 48.1 RVI Probe 65.2 RVB/hullfitting 65.1 RVI |
| 11850C | BSR Cabling |
| F0344-M | DOB 232/422 Outlines and mounting |
| F0189-C | DOB Connection |
| F0256-C | DOB Configuration |
| 6631-M | Blind ANTHEA : size and installation |
| 7851-M | “ Lens ” sensor and hullfitting |
| F0354-M | “Lens” sensor and Aluminium hullfitting |

26 JOINT FLAT SEAL
25 BOUCHON THREADED CAP

15 CIRCLIPS
8 ECROU CAPTEUR PROBE NUT
7 JOINT FLAT SEAL

23 ECROU DOUILLE CASING NUT
24 RONDELLE WASHER

14 CAPTEUR PROBE
1 PASSAGE DE COQUE HULL CASING

13 JOINT O-RING
16 PIECE ISOLANTE ISOLATING PART

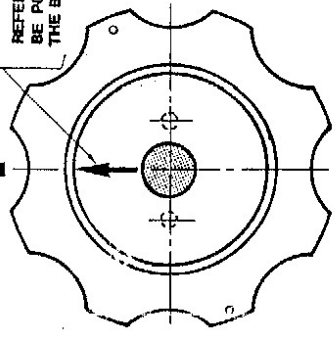
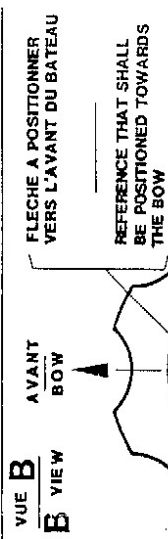
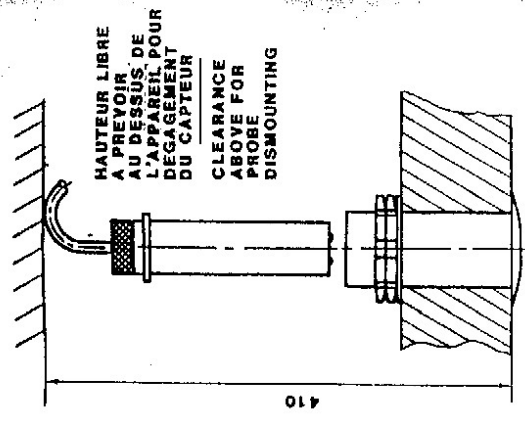
APPLICABILITE
POUR NAVIRE JUSQU'A 3 METRES DE TRANT D'EAU
APPLICATION
FOR VESSEL UP TO 3 DRAFT METERS

| | |
|---------|---------------|
| MATIERE | HULL MATERIAL |
| COQUE | WOOD |
| BOIS | WOOD |

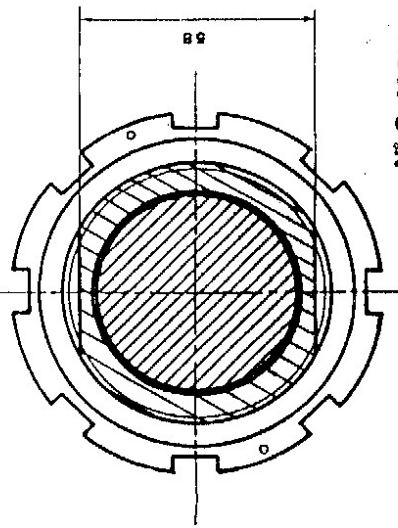
| REP REF. N° | MATIERE MATERIAL | N° PLANS DRAWING | CODE |
|-------------|------------------|------------------|------|
| 1 | CJ SN 12 | A 4727 | |
| 7 | NEOPRENE | | |
| 8 | CJ SN 12 | A 4729 | |
| 13 | PERBUNAN | | |
| 14 | CU SN 9P | E 0696 | |
| 15 | BRONZE | | |
| 16 | MORYL | B 1959 | |
| 23 | CJ SN 12 | A 4730 | |
| 24 | CJ SN 12 | | |
| 25 | CJ SN 12 | A 4728 | |
| 26 | NEOPRENE | | |

NOTA
IMMOBILISER LE REP 8 APRES SERRAGE PAR LE FIL A FRENER AVEC LE REP 23

NOTE
IMMOBILIZE PART REF 8 WITH PART REF 23 BY BRAKING WIRE



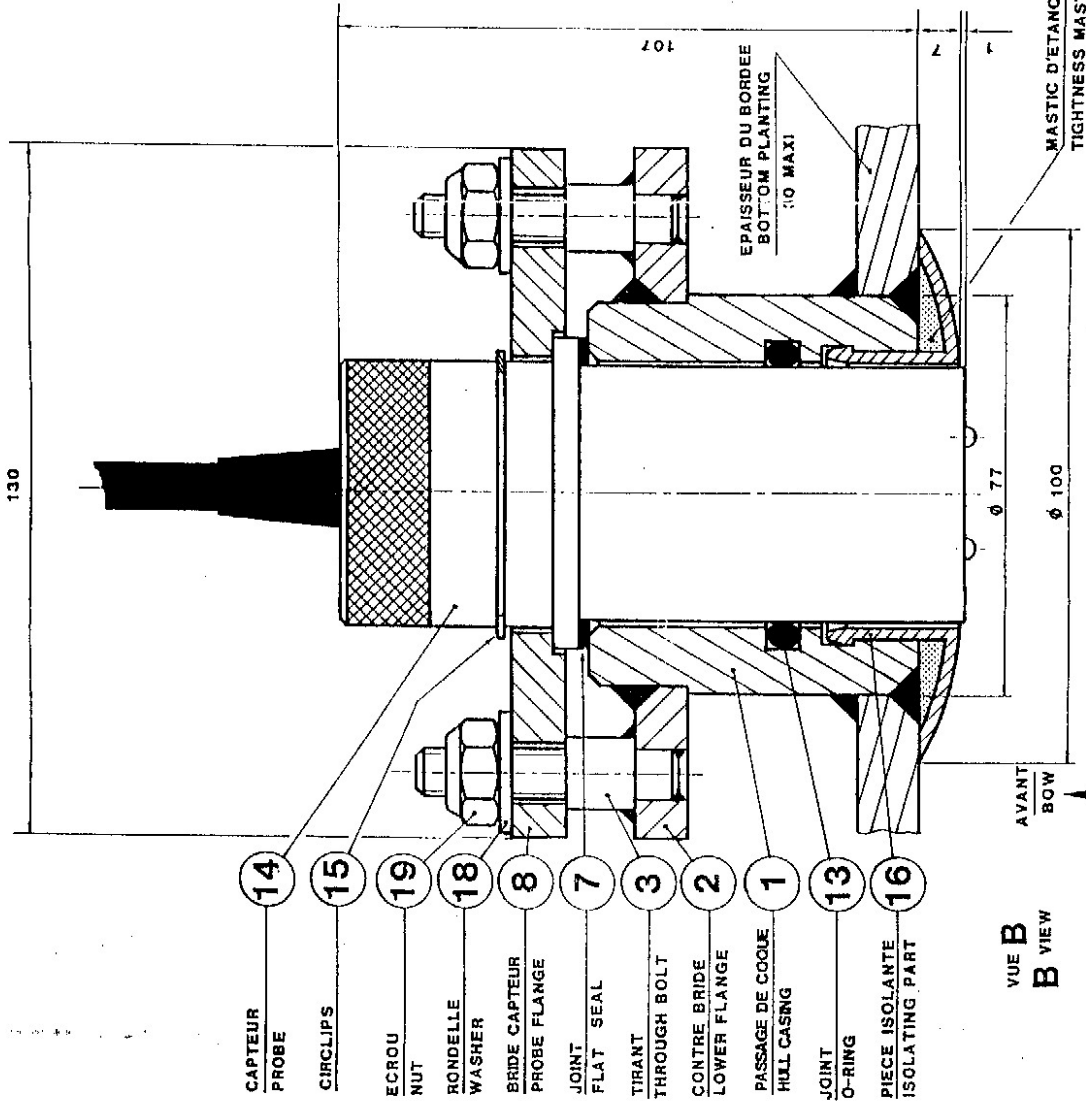
COUPE AA



N° C 1285
CAPTEUR 481 RVB / PIECE DE COQUE 481 RBL

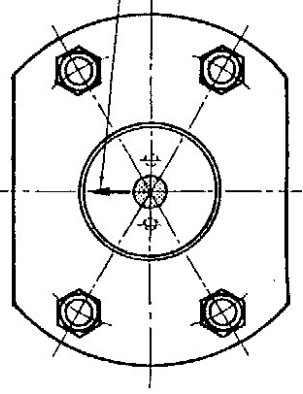


PT



- 14 CAPTEUR PROBE
- 15 CIRCLIPS
- 19 ECROU NUT
- 18 RONDELLE WASHER
- 8 BRIDE CAPTEUR PROBE FLANGE
- 7 JOINT FLAT SEAL
- 3 TIRANT THROUGH BOLT
- 2 CONTRE BRIDE LOWER FLANGE
- 1 PASSAGE DE COQUE HULL CASING
- 13 JOINT O-RING
- 16 PIECE ISOLANTE ISOLATING PART

VUE B
B VIEW



FLECHE A POSITIONNER
VERS L'AVANT DU BATEAU
REFERENCE THAT SHALL
BE POSITIONED TOWARDS
THE BOW

| REP. REF.M | MATIERE MATERIAL RA / RA | MATIERE MATERIAL RB / RI |
|------------|--------------------------|--------------------------|
| 1 | AG 4 | Z2CN18 10 304 L |
| 2 | AG 4 | Z2CN18 10 304 L |
| 3 | AG 4 | Z2CND17 12 316 L |
| 7 | HYDROILIT | HYDROILIT |
| 8 | AG 4 | Z2CN18 1C 304 L |
| 13 | PERBUNAN | PERBUNAN |
| 14 | AG 5 | CU SN 9P |
| 15 | XC 75 1070 | BRONZE |
| 16 | NORYL | NORYL |
| 18 | Z2CN18 10 304 L | Z2CN18 10 304 L |
| 19 | AG 4 | Z2CN18 10 304 L |

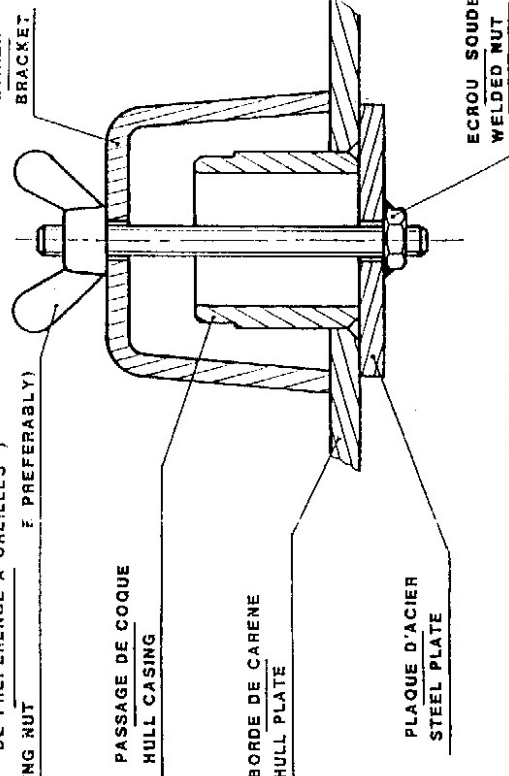
APPLICABILITE
POUR NAVIRE JUSQU'A 3 METRES DE TIRANT D'EAU

APPLICATION
FOR VESSEL UP TO 3 DRAFT METERS

| MATIERE COQUE | HULL MATERIAL |
|------------------|---------------|
| 481 RA ALUMINIUM | ALUMINIUM |
| 481 RB ACIER | STELL |

OUTILLAGE PRECONISE POUR SOUDURE
ADJUSTED SYSTEM FOR WELDING

ECROU DE PREFERENCE A OREILLES)
FASTENING NUT (F PREFERABLY)



CAPTEUR 481 RA / PIECE DE COQUE 481 RA
PROBE 481 RA / HULL FITTING 481 RA

CAPTEUR 481 RB / PIECE DE COQUE 481 RI
PROBE 481 RB / HULL FITTING 481 RI

N° C 1287



26 JOINT FLAT SEAL

25 BOUCHON THREADED CAP

14 CAPTEUR PROBE

15 CIRCLIPS

8 ECROU CAPTEUR PROBE NUT

7 JOINT FLAT SEAL

23 ECROU DOUILLE CASING NUT

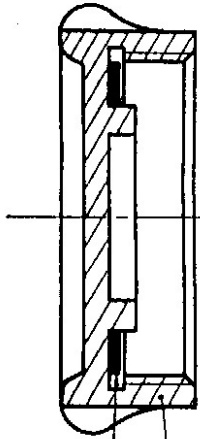
24 RONDELLE WASHER

13 JOINT O-RING

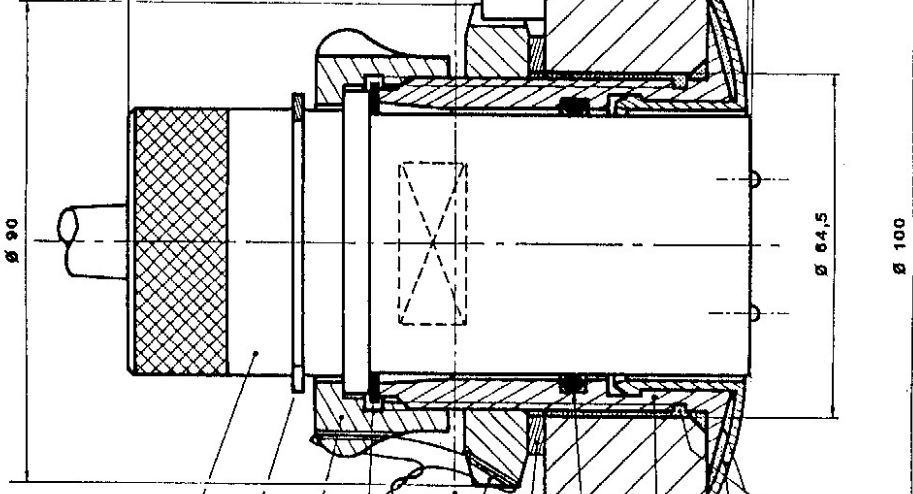
1 PASSAGE DE COQUE HULL CASING

16 PIECE ISOLANTE ISOLATING PART

MASTIC D'ETANCHEITE TIGHTNESS MASTIC



B-V



NOTA 2

NOTE 2

A-T

107

A-T

MAXI 30 MINI 10
HULL PLANTING
EPAISSEUR DU BORDE

NOTA 1

NOTE 1

NOTA 2

NOTE 2

| REP REF.N | MATIERE MATERIAL | N° PLANS DRAWING | CODE |
|-----------|------------------|------------------|------|
| 1 | CU SN 12 | A 5141 | |
| 7 | NEOPRENE | | |
| 8 | CU SN 12 | A 4729 | |
| 13 | PERBUNAN | | |
| 14 | CU SN 9P | E 0595 | |
| 15 | BRONZE | | |
| 16 | NORYL | B 1959 | |
| 23 | CU SN 12 | A 4730 | |
| 24 | CU SN 12 | | |
| 25 | CU SN 12 | A 4728 | |
| 26 | NEOPRENE | | |

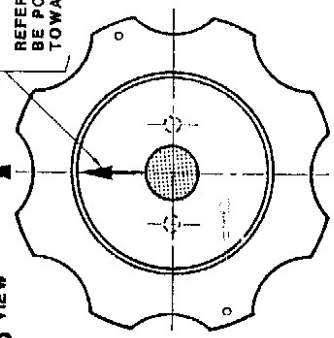
VUE B
B VIEW

APPLICABLE POUR NAVIRE JUSQU' A 3 METRES DE TIRANT D'EAU
FOR VESSEL UP TO 3 DRAFT METERS

| MATIERE COQUE | HULL MATERIAL |
|----------------|---------------|
| PLASTIQUE BOIS | PLASTIC WOOD |
| ACER | STELL |

FLECHE A POSITIONNER VERS L'AVANT DU BATEAU
REFERENCE THAT SHALL BE POSITIONED TOWARDS THE BOW

AVANT BOW



HAUTEUR LIBRE A PREVOIR AU DESSUS DE L'APPAREIL POUR DEGAGEMENT DU CAPTEUR
CLEARANCE ABOVE FOR PROBE DISMOUNTING

COUPE AA

NOTA 1
NOTE 1

EVENTUELLEMENT PREVOIR L'IMMOBILISATION DE L'ECROU PAR RAPPORT A LA COQUE (FOURNITURE CHANTIER)

IF POSSIBLE IMMOBILIZE NUT WITH REGARD TO HULL (YARD SUPPLY)

IMMOBILISER LE REP 8 APRES SERRAGE PAR LE FIL A FRESNER AVEC LE REP 23

IMMOBILIZE PART REF 8 WITH PART REF 23 BY DRAGING WIRE

N° C 1301



CAPTEUR 481 RB / PIECE DE COQUE 481 RB

PROBE 481 RB / HULL FITTING 481 RB

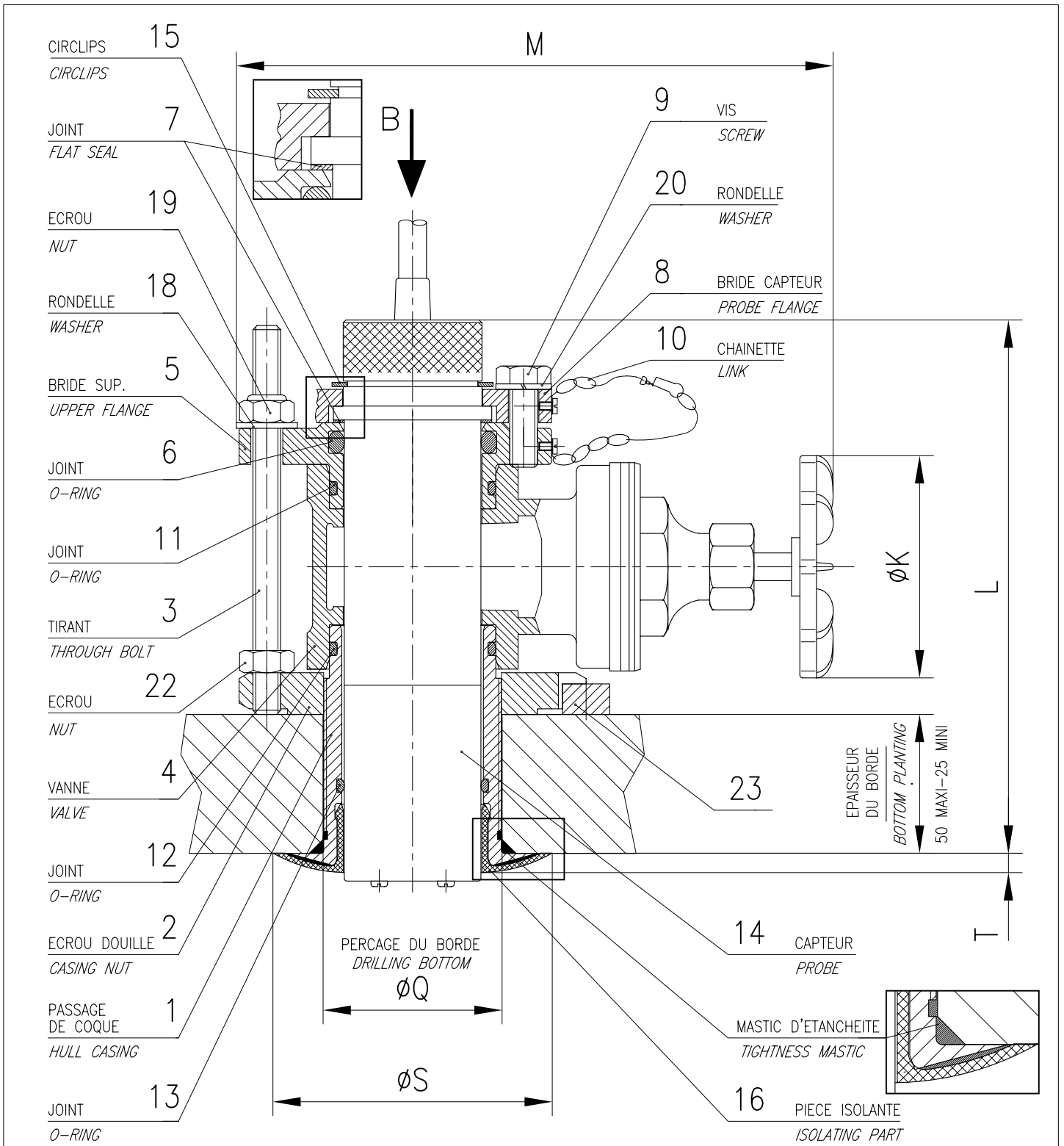
CAPTEUR 481 RVB / PIECE DE COQUE 481 RVB
CAPTEUR 651 RVB / PIECE DE COQUE 651 RVB

PROBE 481 RVB / HULL FITTING 481 RVB
PROBE 651 RVB / HULL FITTING 651 RVB

BEN

N° D 0342

folio 1/4



APPLICABILITE
 POUR TOUS TYPE DE NAVIRES

APPLICATION
 ALL VESSEL TYPES

| | MATIERE COQUE | HULL MATERIAL |
|--------|----------------------------|--------------------------|
| 481RVB | BOIS PLASTIQUE | WOOD PLASTIC |
| 651RVB | BOIS PLASTIQUE ACIER | WOOD PLASTIC STEEL |

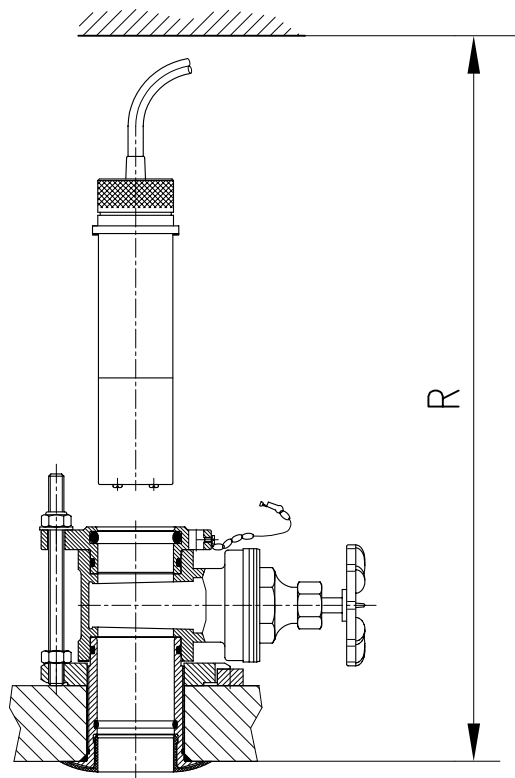
BEN

N° D 0342

folio 2/4

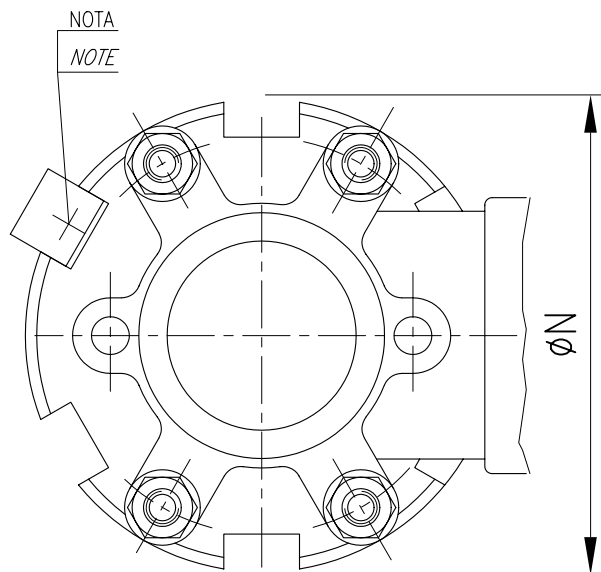
HAUTEUR LIBRE A PREVOIR AU DESSUS
DE L'APPAREIL POUR DEGAGEMENT DU CAPTEUR

CLEARANCE ABOVE FOR PROBE DISMOUNTING



VUE DE DESSUS CAPTEUR RETIRE

VIEW FROM ABOVE WHEN PROBE PULLED OUT



NOTA

EVENTUELLEMENT,PREVOIR L'IMMOBILISATION DE L'ECROU
PAR RAPPORT A LA COQUE (FOURNITURE CHANTIER).

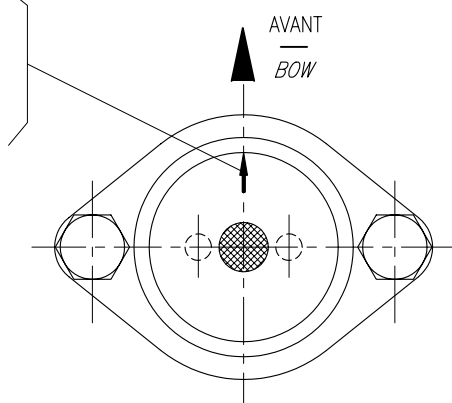
NOTE

IF POSSIBLE IMMOBILIZE NUT WITH REGARD TO HULL
(YARD SUPPLY).

VUE B
B VIEW

FLECHE A POSITIONNER
VERS L'AVANT DU BATEAU

REFERENCE THAT SHALL
BE POSITIONED TOWARDS
THE BOW



BEN

N° D 0342

folio 3/4

| TYPE | K | L | M | N | Q | R | S | T |
|------|------|-------|-----|------|-------|-----|------|-----|
| 48 | ∅100 | 194 | 230 | ∅125 | ∅64.5 | 415 | ∅100 | 7 |
| 65 | ∅125 | 244.5 | 305 | ∅156 | ∅93 | 500 | ∅130 | 8.5 |

- NOTA CONCERNANT LE REP.23 POUR LES CHANTIERS.

- LE REP.23 SERT DE BLOCAGE A L'ECROU REP.2 PAR RAPPORT A LA COQUE
- LE FREIN DE L'ECROU SERA SOIT SOUDE SOIT VISSE SUR LA COQUE
- DANS LE CAS D'UNE COQUE PLASTIQUE, LE FREIN D'ECROU SERA COLLE OU VISSE OU STRATIFIE SUR LA COQUE.

- NOTA CONCERNANT LES COQUES PLASTIQUE POUR LES CHANTIERS.

- COQUE PLASTIQUE PLEINE PEAU.
 - APRES AVOIR PERCE LA COQUE ENDUIRE LE PERCAGE DE RESINE.
- COQUE PLASTIQUE TYPE SANDWICH.
 - PREVOIR UN FOURREAU EN BOIS OU EN CONTREPLAQUE ENTRE PIECE DE COQUE ET COQUE POUR EVITER L'ECRASEMENT DE LA COQUE LORS DU SERRAGE DE L'ECROU . CE FOURREAU DOIT FAIRE CORPS AVEC LA COQUE.

- NOTE FOR SHIPYARDS CONCERNING PART REF.23

- *THE PART REF.23 (NUT BREAK) IS USED TO BLOCK THE CASING NUT (REF.2) WITH REGARD TO HULL.*
- *IT IS WELDED OR SCREWED ON THE HULL.*
- *FOR PLASTIC HULL , IT IS STICKED , SCREWED OR STRATIFIED ON THE HULL.*

- NOTE FOR SHIPYARDS CONCERNING PLASTIC HULL.

- FULL (SOLID) SKIN TYPE PLASTIC HULL.
 - *AFTER THE DRILLING OF THE HULL , COAT THE HOLE WITH RESIN.*
- SANDWICH TYPE PLASTIC HULL.
 - *USE A WOOD OR PLYWOOD SHEATH BETWEEN THE HULL FITTING AND THE HULL TO AVOID THE CRUSHING OF THE HULL WHEN BLOCKING THE NUT. THE SHEATH MUST FORM A PART WITH THE HULL.*

| REP. REF.M | MATIERE MATERIAL | N° PLANS DRAWING | CODE |
|---------------|-----------------------|---------------------|------|
| 1 | CU SN 12 | 3761-M 5751-M | |
| 2 | CU SN 12 | 3762-M 5752-M | |
| 3 | Z2CND17-12-03 316L | 4666-M | |
| 4 | CU PB5 SN5 ZN5 | 3742-M 3945-M | |
| 5 | CU SN 12 | 3743-M 5754-M | |
| 6 | PERBUNAN | | |
| 7 | HYDROILIT | | |
| 8 | CU SN 12 | 3744-M 5755-M | |
| 9 | Z2CN18.10 304L | | |
| 10 | Z2CN18.10 304L | | |
| 11 | PERBUNAN | | |
| 12 | PERBUNAN | | |
| 13 | PERBUNAN | | |
| 14 | CU SN 9P | 3723-M E0661 | |
| 15 | BRONZE | | |
| 16 | NORYL | 3745-M 5756-M | |
| 18 | Z2CN18.10 304L | | |
| 19 | Z2CN18.10 304L | | |
| 20 | Z2CN18.10 304L | | |
| 22 | Z2CN18.10 304L | | |

BEN

N° D 0342

folio 4/4

CAPTEUR 481 RVB / PIECE DE COQUE 481 RVI
CAPTEUR 651 RVB / PIECE DE COQUE 651 RVI

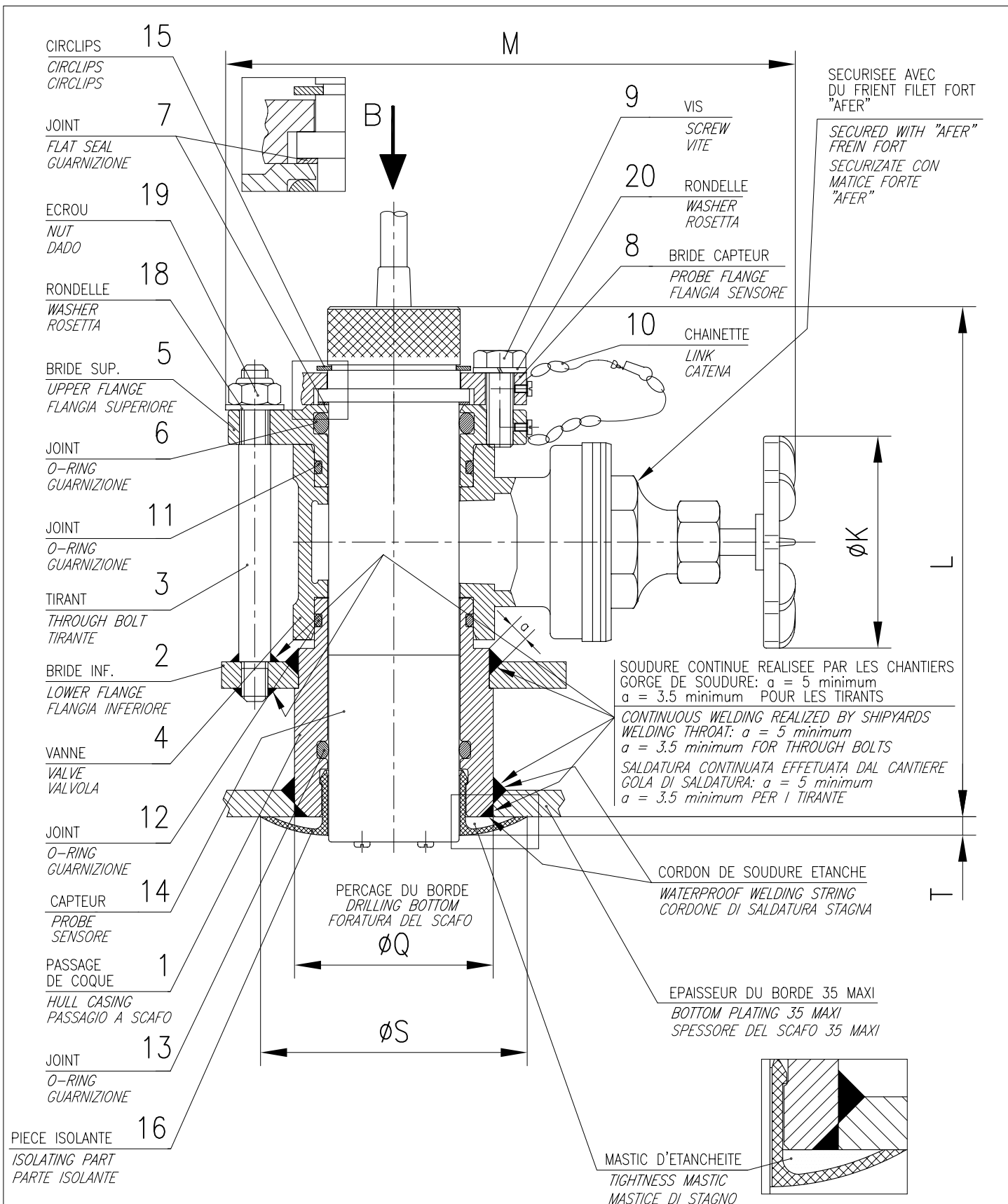
PROBE 481 RVB / HULL FITTING 481 RVI
PROBE 651 RVB / HULL FITTING 651 RVI

SENSORE 481 RVB / PASSAGIO A SCAFO 481 RVI
SENSORE 651 RVB / PASSAGIO A SCAFO 651 RVI

BEN

N° D 0343 B

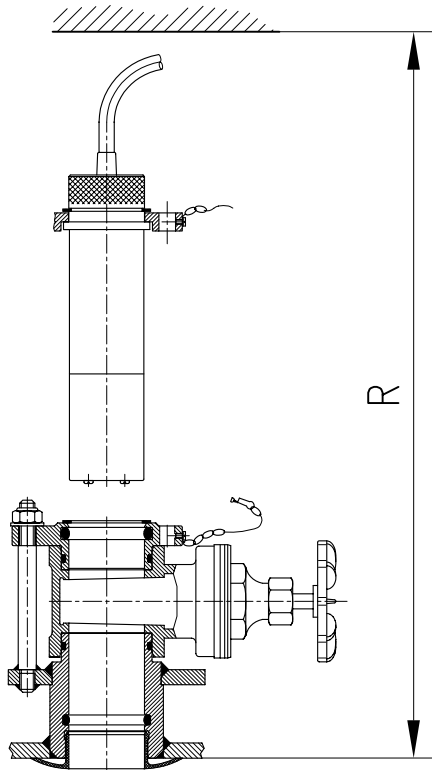
folio 1/5



APPLICABILITE POUR TOUS TYPE DE NAVIRES COQUE ACIER
 APPLICATION ALL VESSEL TYPES STEEL HULL
 APPLICABILE PER OGNI TIPI DI NAVE SCAFO IN ACCIAIO

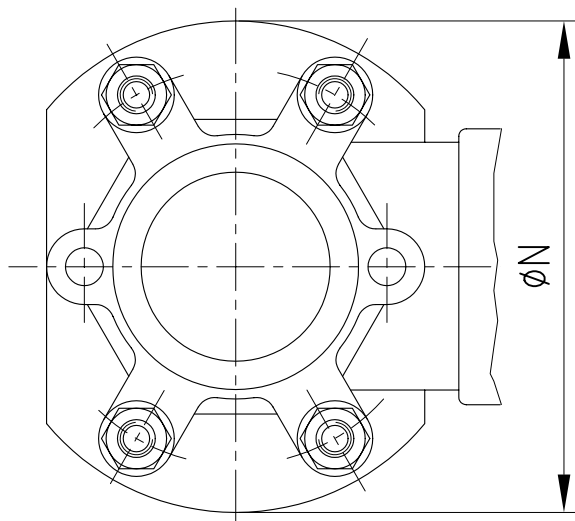
HAUTEUR LIBRE A PREVOIR AU DESSUS
DE L'APPAREIL POUR DEGAGEMENT DU CAPTEUR

CLEARANCE ABOVE FOR PROBE DISMOUNTING
ALTEZZA LIBERA DA LASCIARE SOPRA L'APPARECHIO
PER RITIRO DEL SENSORE



VUE DE DESSUS CAPTEUR RETIRE

VIEW FROM ABOVE WHEN PROBE PULLED OUT
VISTA DI SOPRA SENSORE RITIRATO



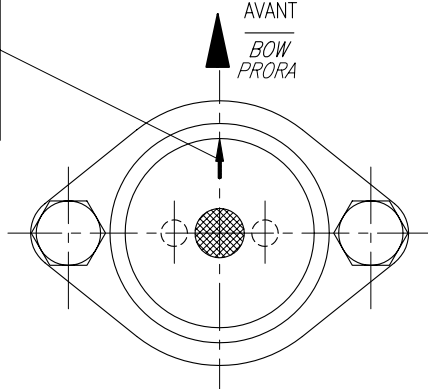
FLECHE A POSITIONNER
VERS L'AVANT DU BATEAU

REFERENCE THAT SHALL
BE POSITIONED TOWARDS
THE BOW

FRECCIA DA
INDIVIDUARE VERSO
LA PRORA

VUE B
B VIEW
VISTA B

AVANT
BOW
PRORA



BEN

N° D 0343 B

folio 3/5

| TYPE TYPE TIPO | K | L | M | N | Q | R | S | T |
|----------------------|------|-------|-----|------|-----|-----|------|-----|
| 48 | ∅100 | 194 | 230 | ∅130 | ∅77 | 415 | ∅100 | 7 |
| 65 | ∅125 | 244.5 | 305 | ∅160 | ∅92 | 500 | ∅130 | 8.5 |

- NOTA POUR LES CHANTIERS.

- PREPARATION DE LA COQUE:

- FAIRE UN TROU ∅Q DANS LE BORDE.
- FAIRE UN CHANFREIN D'ENTREE DE 5mm A 45°.
- DRESSER LA COQUE SUR UN ∅S.

- APRES SOUDURE DU PIQUAGE SUR LA COQUE:

- PEINDRE L'EXTERIEUR DU PIQUAGE PAR L'INTERIEUR DE LA COQUE APRES SOUDURE DE LA BRIDE REP.2 SUR LE PIQUAGE TOUT EN PRESERVANT L'EXTREMITE SUPERIEURE SIEGE DU JOINT D'ETANCHEITE REP.12 AVEC DE LA PEINTURE TYPE : ZINC EPOXY OU ZINC SILICATE.

- NOTE FOR SHIPYARDS.

- HULL PREPARATION:

- DRILL A HOLE ∅Q IN THE HULL.
- MAKE AN INLET CHAMFER OF 5mm AT 45°.
- STRAIGHTEN THE HULL ON THE ∅S.

- AFTER THE WELDING OF THE HULL CASING (REF.1) ON THE HULL.

- AFTER THE WELDING OF THE LOWER FLANGE (REF.2) ON THE HULL CASING (REF.1) AND WHILE PROTECTING THE UPPER PART (WHERE O-RING REF.12 IS LOCATED), PAINT THE OUTSIDE OF THE HULL CASING (REF.1) WITH A PAINT TYPE : ZINC EPOXY OR ZINC SILICATE.

- NOTA PER I CANTIERI

- PREPARAZIONE DELLO SCAFO:

- PRATICARE UN FORO ∅Q NEL SCAFO
- PRATICARE UNA MODANATURA D'INGRESSO DI 5mm A 45°
- TORNIRE IL SCAFO SU UN ∅S

- DOPO SALDATURA DELL'IMPUNTITURA DELLO SCAFO

- DIPINGERE L'ESTERNO DELL'IMPUNTITURA DAL'INTERNO DELLO SCAFO DOPO SALDATURA DELLA FLANGIA RIF. 2 SULL'IMPUNTITURA, PRESERVANDO L'ESTREMITA SUPERIORE DELLA GUARNIZIONE DI STAGNO RIF.12 CON PITTURA TIPO: ZINCO EPOXY O ZINCO SILICATO.

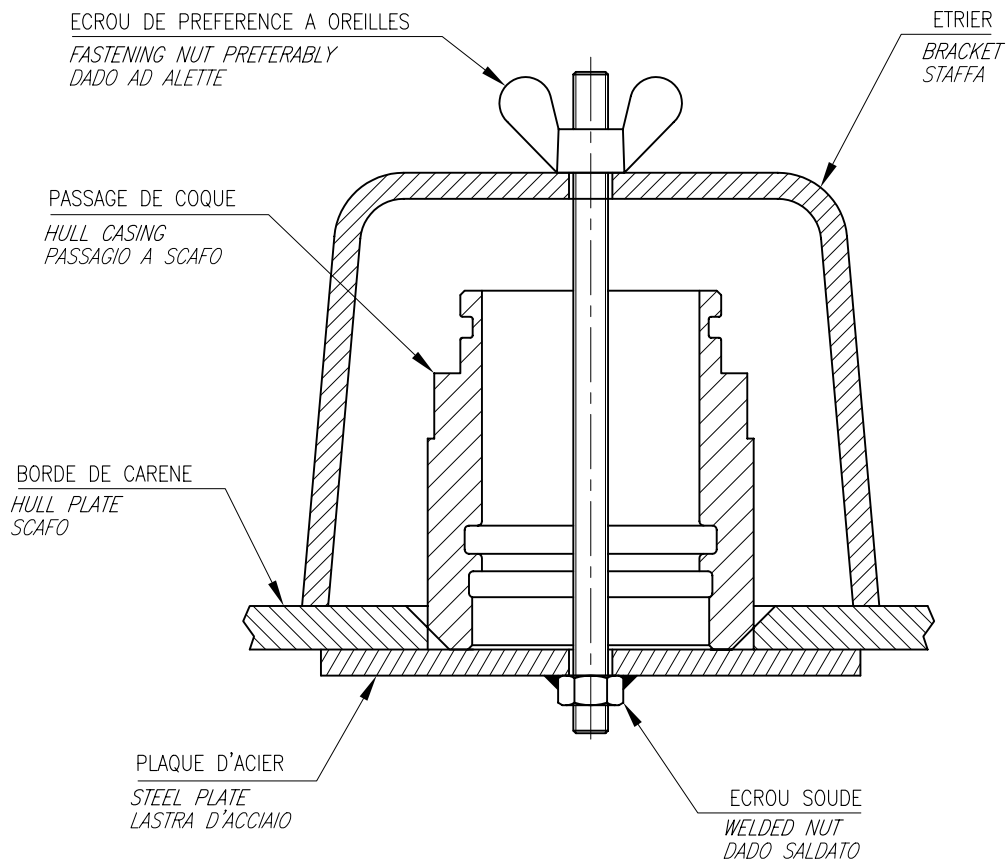
| REP. REF.M RIF. | MATIERE MATERIAL MATERIE | N° PLANS DRAWING PIANTA |
|-----------------------|--------------------------------|-------------------------------|
| 1 | Z3CND17-12-03 316L | 3739-M 5757-M |
| 2 | Z3CND17-12-03 316L | 3740-M 5758-M |
| 3 | Z3CND17-12-03 316L | 3741-M 5759-M |
| 4 | CU PB5 SN5 ZN5 | 3742-M 3945-M |
| 5 | CU SN 12 | 3743-M 5754-M |
| 6 | PERBUNAN | |
| 7 | HYDROILIT | |
| 8 | CU SN 12 | 3744-M 5755-M |
| 9 | Z2CN18.10 304L | |
| 10 | Z2CN18.10 304L | |
| 11 | PERBUNAN | |
| 12 | PERBUNAN | |
| 13 | PERBUNAN | |
| 14 | CU SN 9P | 3723-M E0661 |
| 15 | BRONZE | |
| 16 | NORYL | 3745-M 5756-M |
| 18 | Z2CN18.10 304L | |
| 19 | Z2CN18.10 304L | |
| 20 | Z2CN18.10 304L | |

BEN

N° D 0343 B

folio 4/5

OUTILLAGE PRECONISE POUR SOUDURE
ADJUSTED SYSTEM FOR WELDING
ATTREZZATURA PRECONIZZATO PER SALDARE



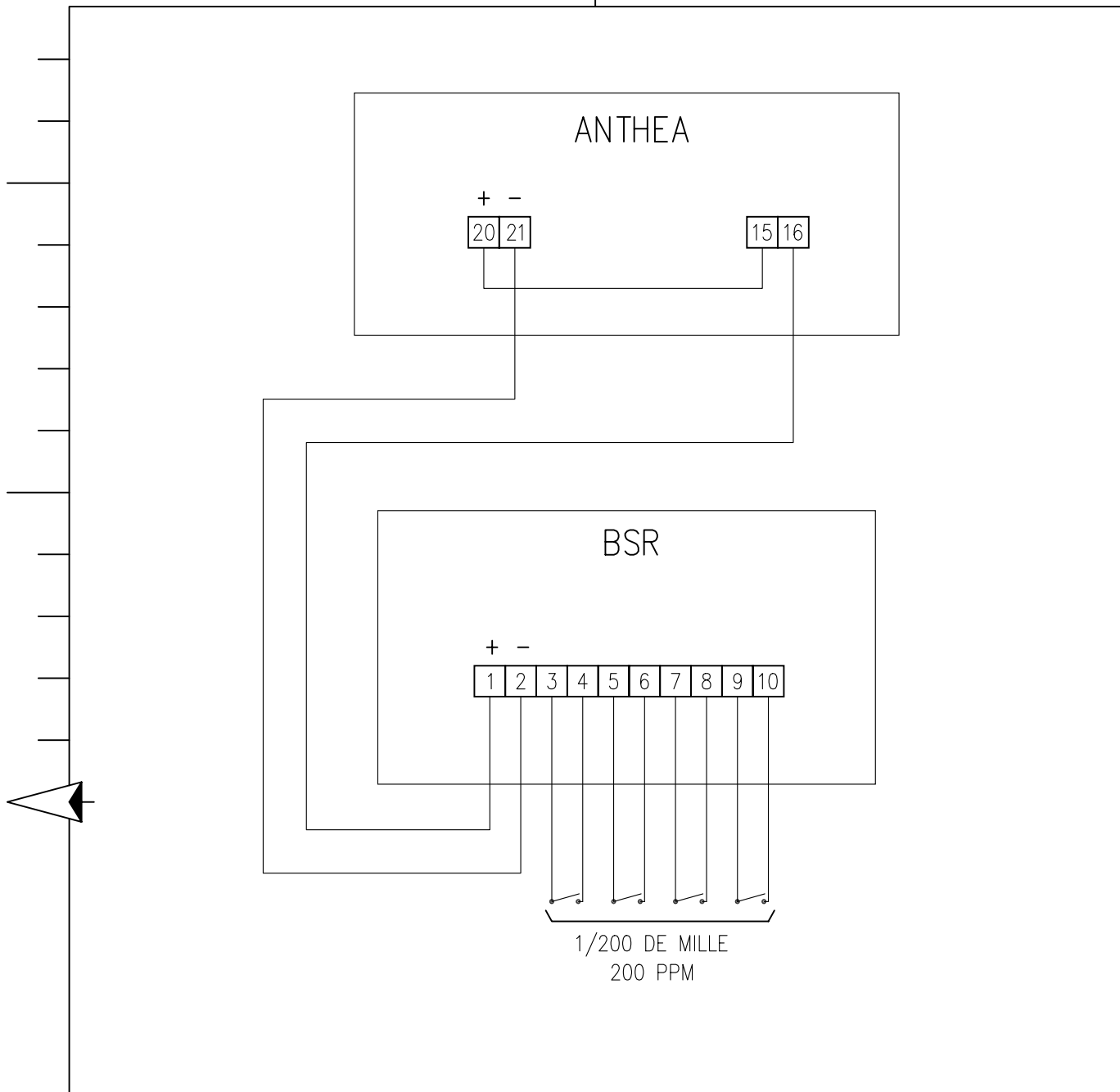
BEN

N° D 0343 B


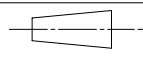
folio 5/5

B

A



2

| | | | | |
|---|----------|---|---|--------------|
| | | | | |
| 0 | 09.07.97 | Version initiale | ALLEGRE | NOUGIER |
| Ind. | Date | Modifications | Dessine | Verifie |
| Matiere | : | - | Tol. Gen. | : |
| Traitement | : | - | Usinage | : |
| Protection | : | - | Echelle | : |
|  | | Titre : ANTHEA / BSR CABLAGE / CABLING | | |
| ZAC de Pichaury II Les Milles 13794 Aix en Provence Cedex03 | | Format : A4 | Folio : 1/1 | Ind. 0 |
| | | F7582 |  | N° : 11850-C |
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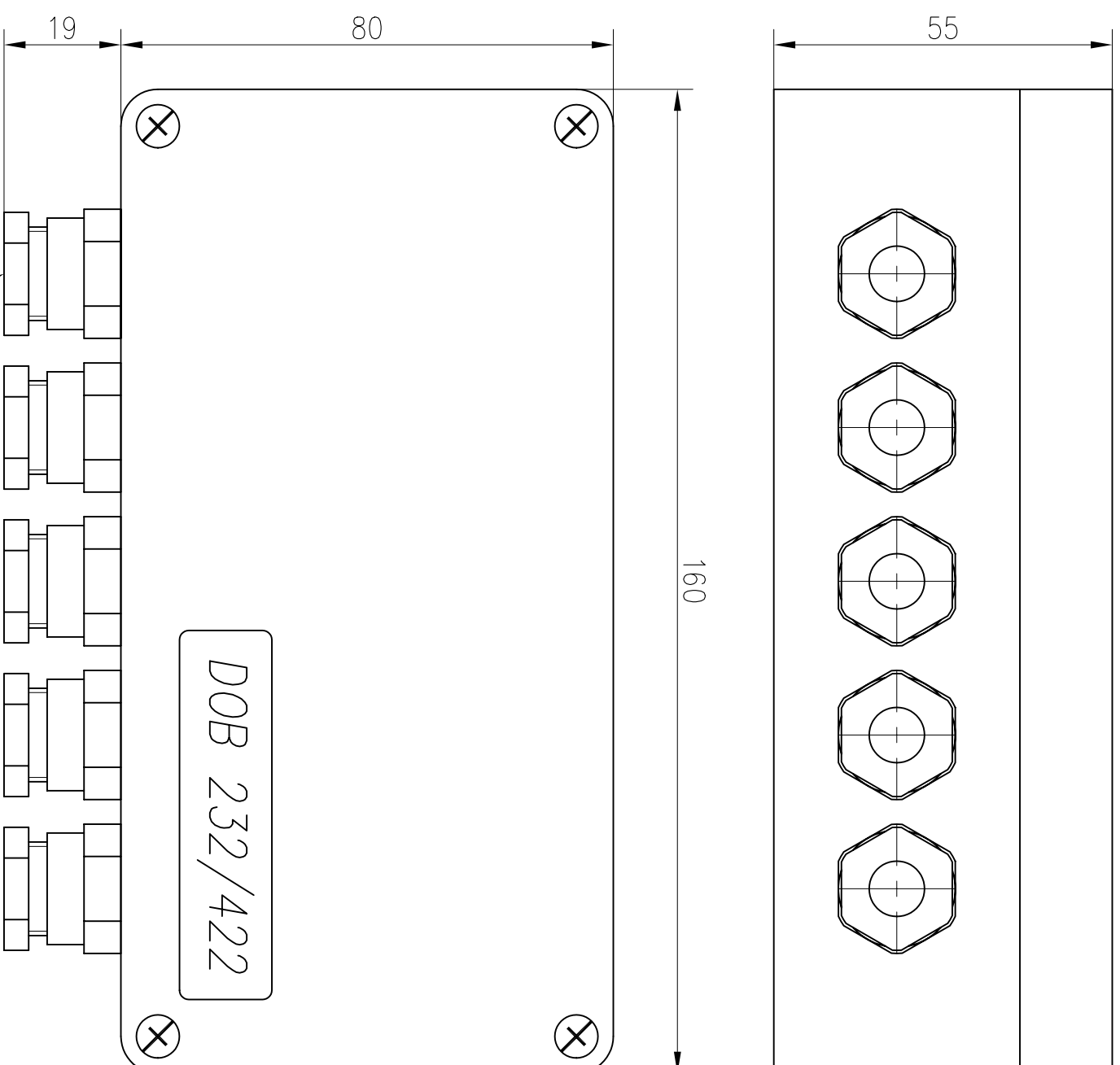
1

B

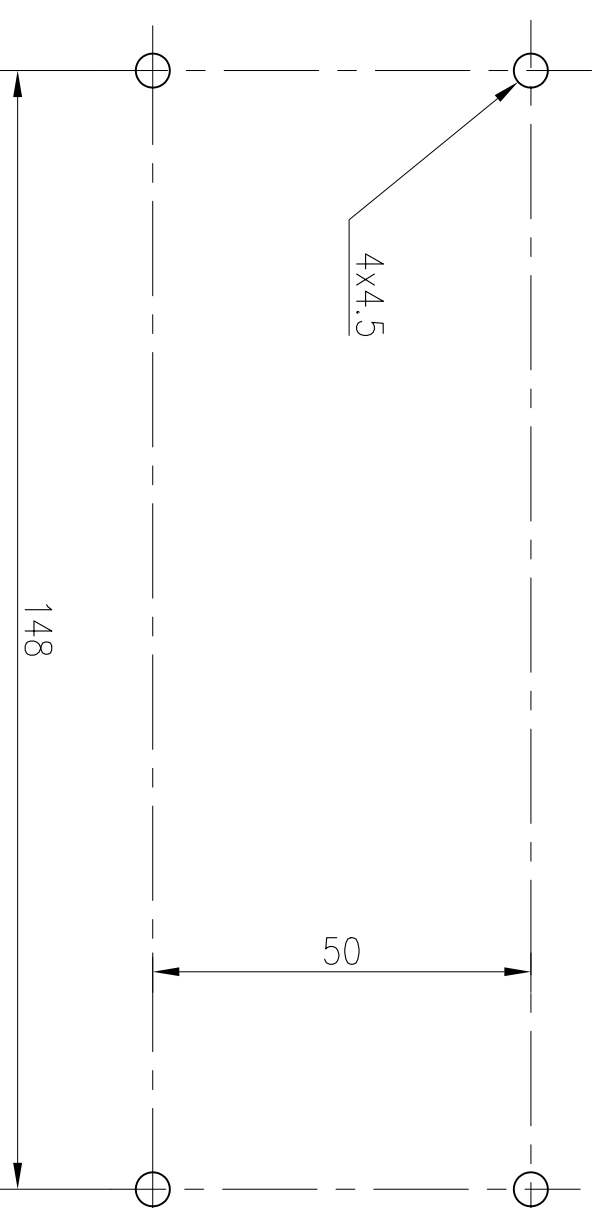
A

11850-C.DWG

ENCOMBREMENT OUTLINES



PERCAGE POUR FIXATION DRILLIND FOR MOUNTING

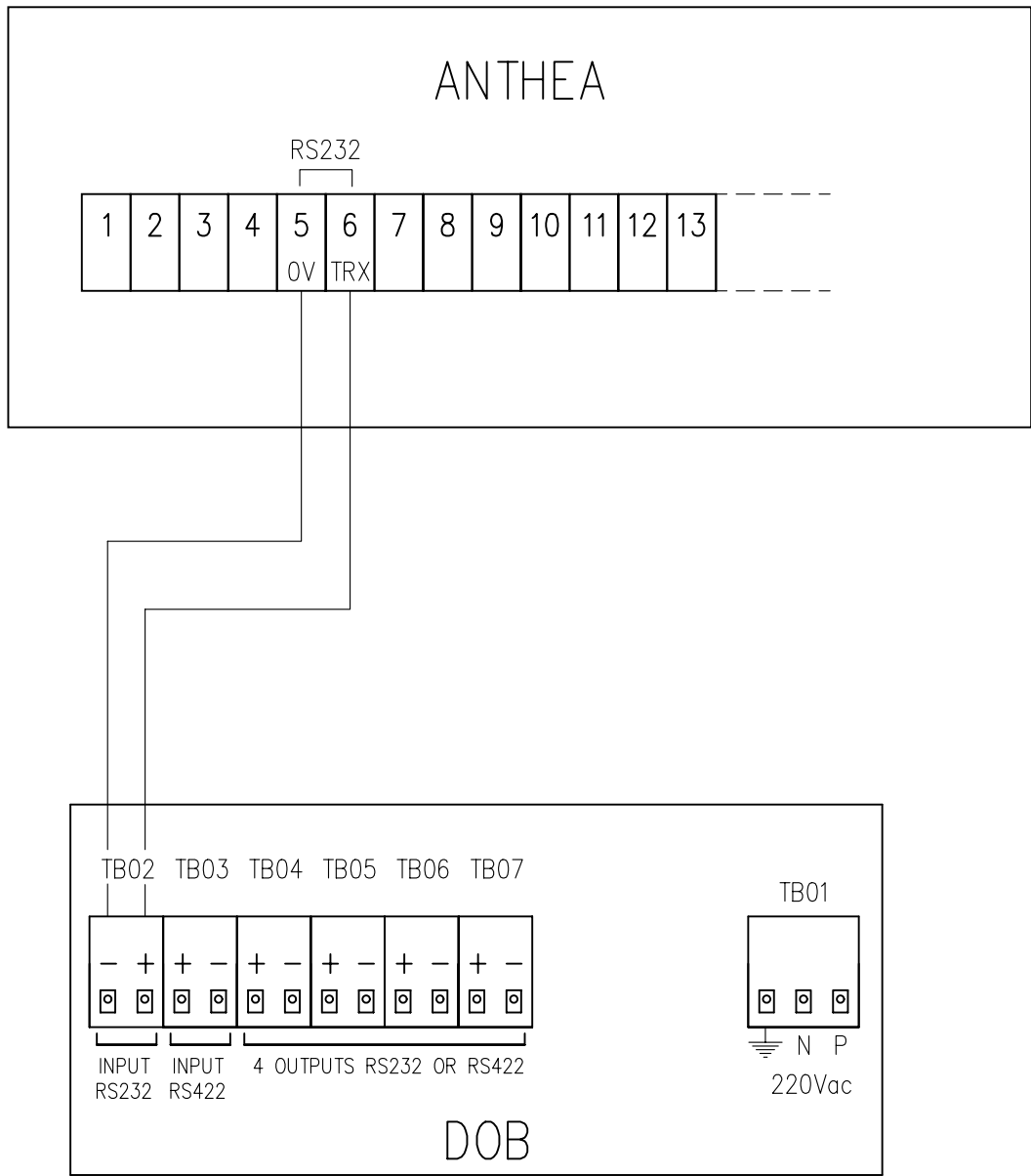


ZAC de Pichoury II
BP102000
13793 AIX EN PROVENCE
CEDEX 3

DOB 232/422
ENCOMBREMENT ET POSE
DOB 232/422
OUTLINES AND MOUNTING

| | | | | |
|---------------------|-------------------|------------------|------------|---------|
| Dess. <i>Drawn.</i> | Ver. <i>Chec.</i> | Date <i>Date</i> | Folio: 1/1 | Ind. 10 |
| ALLEGRE | NOUGIER | 12.09.2001 | N° : | F0344-M |

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ZAC de Pichaury II
 BP102000
 13793 AIX EN PROVENCE
 CEDEX 3

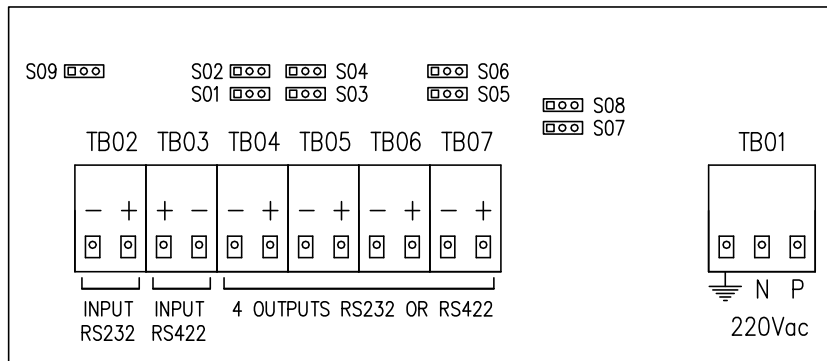
DOB CONNECTION

CONNEXION DOB

| | | | | | | | | |
|---------------------|-------------------|------------------|------------|---------|--|--|--|--|
| Dess. <i>Drawn.</i> | Ver. <i>Chec.</i> | Date <i>Date</i> | Folio: 1/1 | Ind. 0 | | | | |
| ALLEGRE | NOUGIER | 10/09/02 | N° : | F0189-C | | | | |

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DOB 232/422



S0X ^{1 2 3}
□ □ □

USER'S INSTRUCTION

| INPUT/OUTPUT | DESCRIPTION | RS232/RS422 | STRAP | MARK |
|--------------|-------------|-------------|-------------|------|
| INPUT | TB03 | RS422 | S09 | 2-3 |
| INPUT | TB02 | RS232 | S09 | 1-2 |
| OUTPUT | TB04 | RS422 | S01 and S02 | 1-2 |
| | TB05 | RS422 | S03 and S04 | 1-2 |
| | TB06 | RS422 | S05 and S06 | 1-2 |
| | TB07 | RS422 | S07 and S08 | 1-2 |
| OUTPUT | TB04 | RS232 | S01 and S02 | 2-3 |
| | TB05 | RS232 | S03 and S04 | 2-3 |
| | TB06 | RS232 | S05 and S06 | 2-3 |
| | TB07 | RS232 | S07 and S08 | 2-3 |



ZAC de Pichaury II
BP102000
13793 AIX EN PROVENCE
CEDEX 3

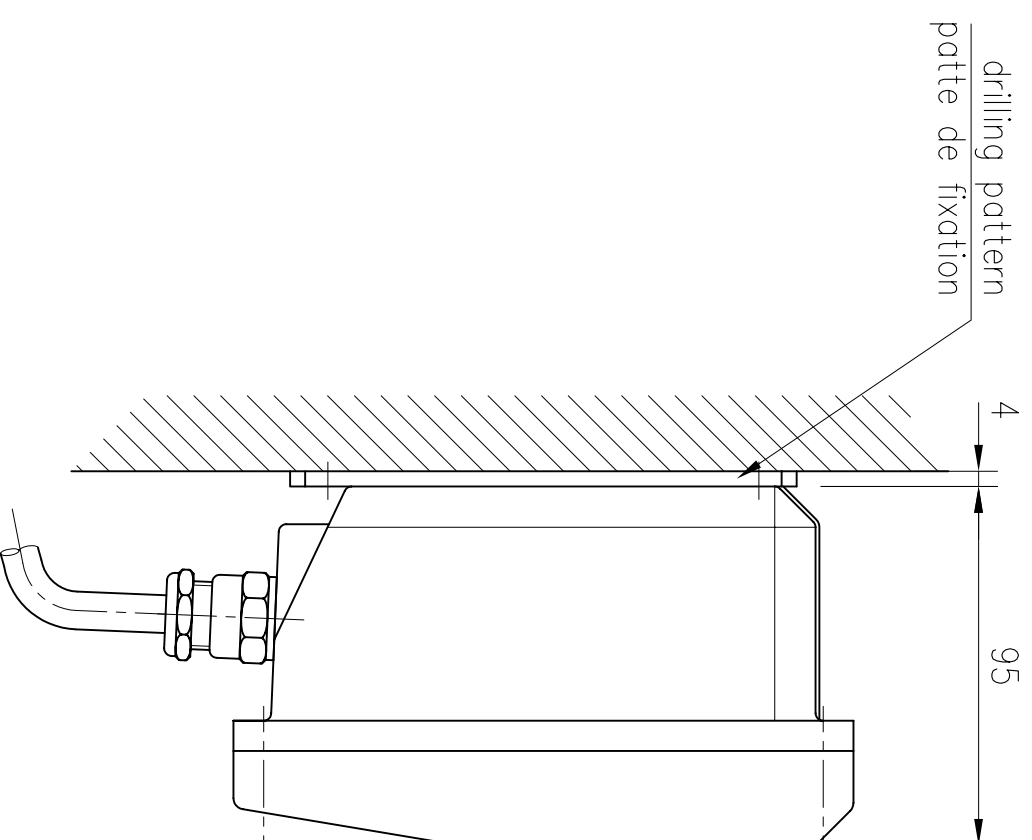
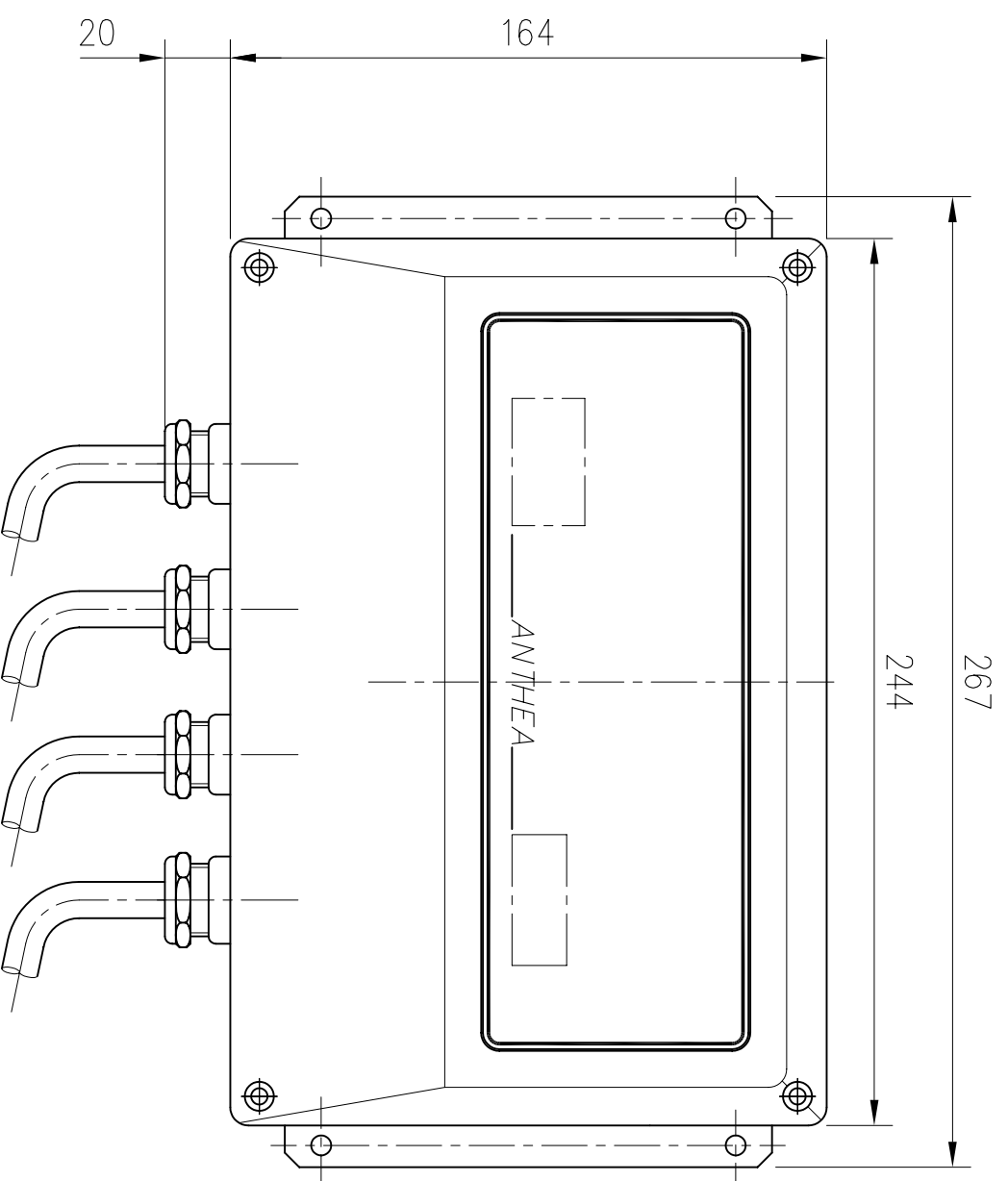
DOB 232/422 CONFIGURATION

CONFIGURATION DOB 232/422

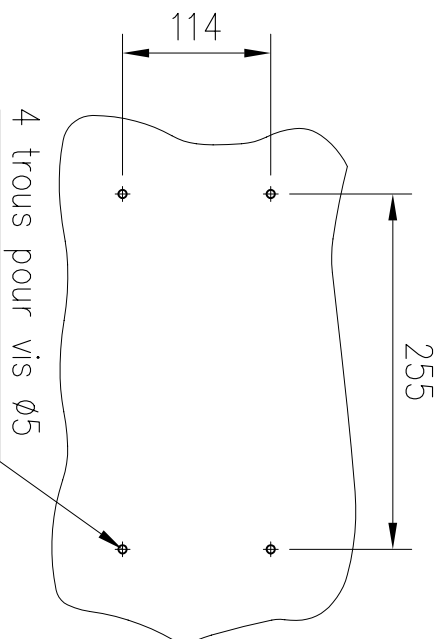
| | | | | | | | | |
|--------------|------------|-----------|------------|----------|--|--|--|--|
| Dess. Drawn. | Ver. Chec. | Date Date | Folio: 1/1 | Ind. 0/A | | | | |
| ALLEGRE | ZELMAT | 01/12/03 | N° : | F0256-C | | | | |

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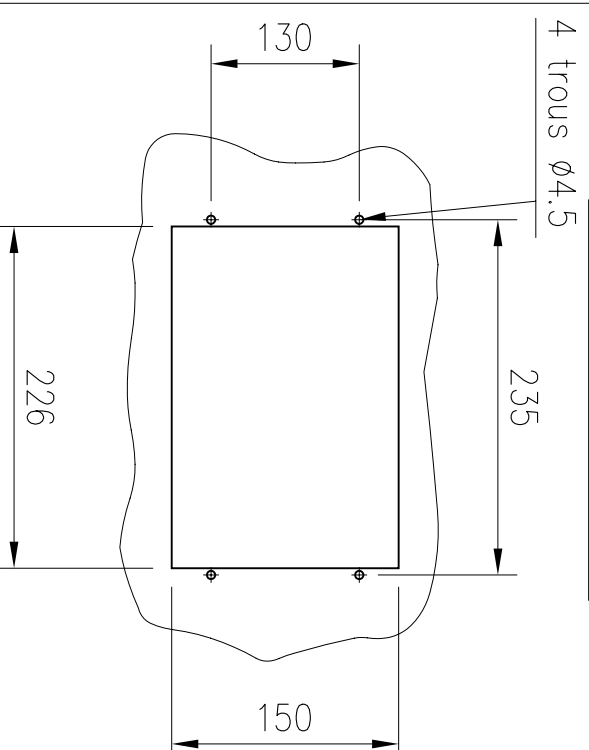
F0256A-C.DWG



FIXATION – BULK HEAD –
–PLAN DE PERCAGE
MONTAGE AVEC PATTES DE FIXATION–



FLUSH MOUNTED
–PLAN DE PERCAGE
MONTAGE ENCASTRE–



| | | | | | | | | |
|------------|---|----------|----------|--|---------------|-------------|---|-----|
| Ind. | 0 | Date | 17.10.95 | Version initiale | Modifications | Tol. Gen. : | – | |
| Matiere | | | | | | | Usinage : | – |
| Traitement | | | | | | | Echelle | 1/2 |
| Protection | | | | | | | Titre : ANTHEA BLIND – MOUNTING ENCOMBREMENT ET POSE | |
| A | | 25.09.96 | | CHANGEMENT PATTES DE FIXATION EN ACCORD AVEC FABRICATION ENTRE-AXES 98X235 DEVIENT 114X255 | | ALLEGRE | NOUGIER | |
| 0 | | 17.10.95 | | Version initiale | | F.CANDEL | NOUGIER | |
| | | | | | | Dessine | Verifie | |

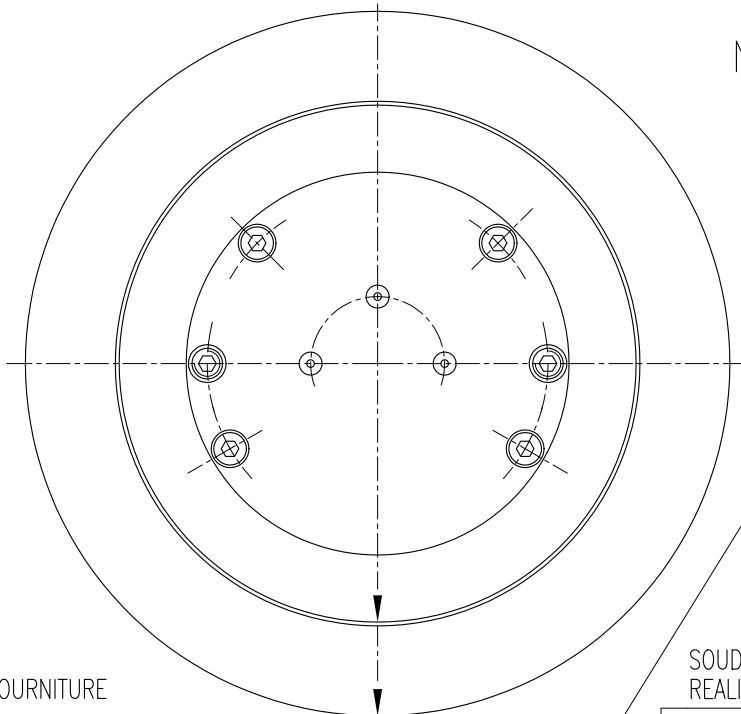


ZAC de Pichaury II
Les Milles 13794
Aix en Provence Cedex03

| | | | | | | | | | |
|----------|-------|---------|-----|------|--------|--|--|--|--|
| Format : | A3 | Folio : | 1/1 | Ind. | 0 A | | | | |
| | F7582 | | | N° : | 6631-M | | | | |

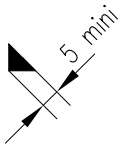
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N.B. : LA BAGUETTE DE SOUDURE EST COMPATIBLE POUR LE SOUDAGE DE LA PIECE DE COQUE SUR LA TOLE DE LA COQUE
 THE STEEL SUPPLIED IS COMPATIBLE FOR THE HULL FITTING WELDING TO THE SHEET STEEL HULL



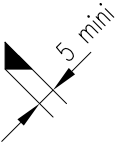
500mm AU DESSUS DE LA LIGNE DE FLOTTAISON MAXIMALE
 500mm ABOVE THE MAXIMUM WATER LINE

SOUDURE CONTINUE ET ETANCHE REALISEE PAR CHANTIER
 CONTINUOUS WATERPROOF WELDING REALIZED BY SHIPYARD



SOUDURE PLEINE PENETRATION CONTINUE ET ETANCHE (N.B.) REALISEE PAR CHANTIER

CONTINUOUS WATERPROOF BY FULL PENETRATION WELDING (N.B.) REALIZED BY SHIPYARD



TUBE $\phi 40$ Ep=5 mini FOURNITURE CHANTIER
 MAT: Z3CND17-12-03
 TUBE $\phi 40$ Ep=5 mini YARD SUPPLY
 MAT: Z3CND17-12-03

AVANT DU NAVIRE
 FRONT OF BOAT

PIECE DE COQUE
 MAT: Z3CND17-12-03
 HULL FITTING
 MAT: Z3CND17-12-03

CAPTEUR
 SENSOR

EPAISSEUR DU BORDE 40 MAXI
 BOTTOM PLATING THICKNESS 40 MAXI

115

2 VIS D'EXTRACTION HC M8-16
 2 EXTRACTION SCREWS HC M8-16

130

PERCAGE DU BORDE $\phi 184$
 BOTTOM PLATING DRILLING $\phi 184$

JOINT D'ETANCHEITE PAR MASTIC SILICONE
 WATERTIGHT O'RING BY SILICONE MASTIC

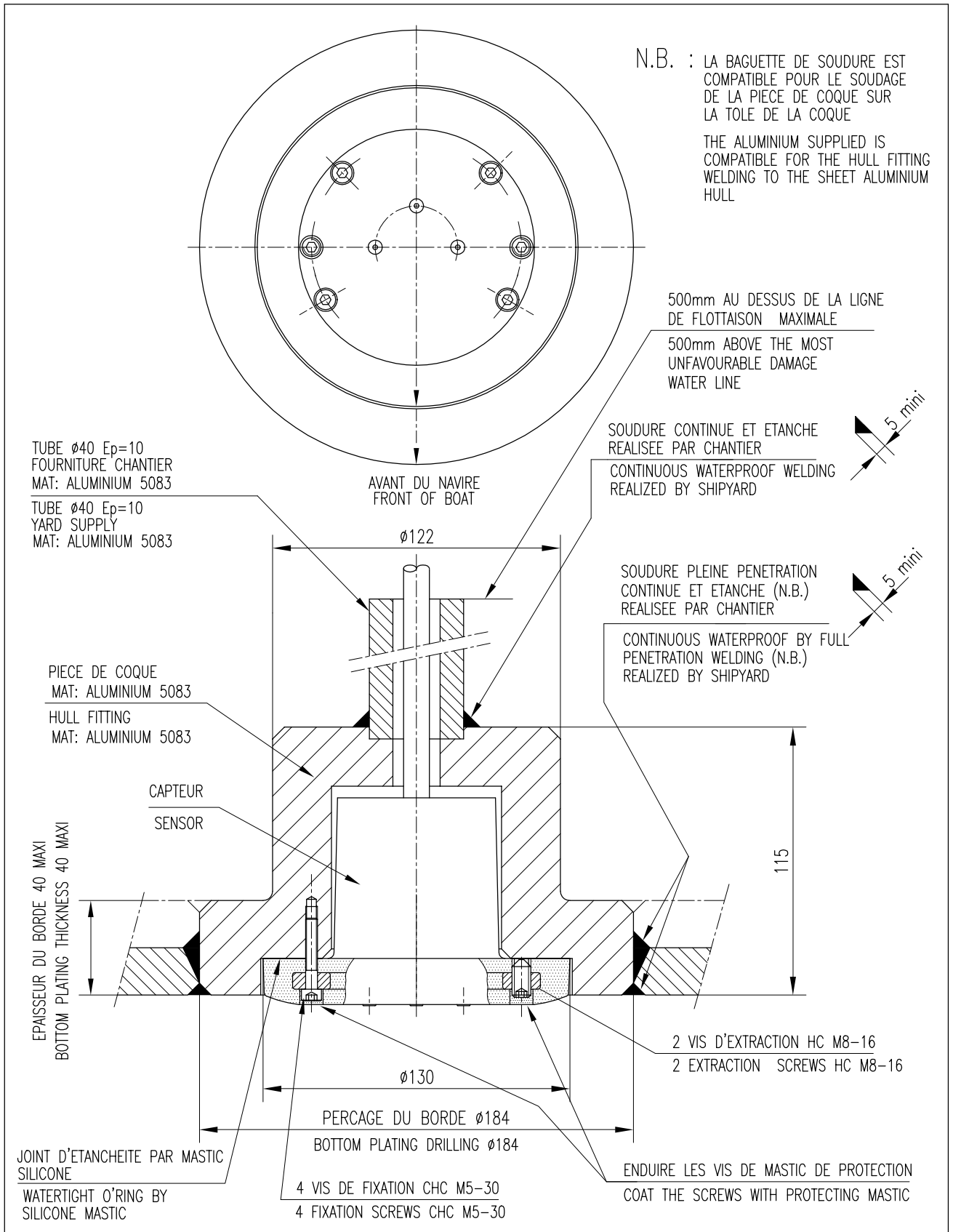
4 VIS DE FIXATION CHC M5-30
 4 FIXATION SCREWS CHC M5-30

ENDUIRE LES VIS DE MASTIC DE PROTECTION
 COAT THE SCREWS WITH PROTECTING MASTIC

BEN

CAPTEUR LENTILLE ET PIECE DE COQUE
 LENS SENSOR AND HULL FITTING

N° 7851-M IND. A



ZAC de Pichaury II
BP102000
13793 AIX EN PROVENCE
CEDEX 3

CAPTEUR LENTILLE ET PIECE DE COQUE ALUMINIUM

LENS SENSOR AND ALUMINIUM HULL FITTING

Dess. Drawn.

Ver. Chec.

Date Date

Folio: 1/1

Ind. 0

ALLEGRE

NOUGIER

18/10/2001

N° :

F0354-M

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17 Bis Place des Reflets - La Défense 2
92400 Courbevoie - France
Tel. 33 1 42 91 52 91
Fax 33 1 42 91 28 94



Certificate N°:
08293/B0 EC
File Number : NAV 05/1356/01
MED item number : A.1/4.7

This Certificate is not valid where presented without the full attached
Schedule composed of 10 sections.



EUROPEAN COUNCIL DIRECTIVE 96/98 EC on MARINE EQUIPMENT (M.E.D.)

**EC TYPE EXAMINATION CERTIFICATE
(CERTIFICATE OF TYPE APPROVAL)**

This is to certify that Bureau Veritas, acting within the scope of its notification, did undertake the relevant type approval procedures for the equipment identified below which was found to be in compliance with the International Instruments and testing standards under the requirements of Council Directive 96/98/EC, as amended.

SPEED AND DISTANCE MEASURING EQUIPMENT (SDME)

Ship speed log ANTHEA

MANUFACTURED BY:

I2E DIFFUSION
Aix-en-Provence - FRANCE

REGULATIONS & STANDARDS in accordance with Council Directive 96/98/EC, as amended by Commission Directive 2002/75/EC : SOLAS 74, as amended, Regs. V/19.2.3.4 - IMO Resolution : A.824(19), as amended by MSC 96(72) ; IMO Resolution A.694(17) - MSC 97(73) 13.3 (2000 HSC Code) ; IEC 61023 (1999), IEC 60945 (1996), IEC 61162.

Expiry date: 16/12/2008

Local Office : BUREAU VERITAS MARSEILLES

At Paris la Défense, on : 16/12/2003

E. DANION

Responsable Marine
Secteur Sud



J. BENOIT

Marine Equipment Certification Manager
BUREAU VERITAS, EC Notified Body N°0062



The Manufacturer is allowed to affix the MED Conformity Mark to approved equipment and issue a Declaration of Conformity, only when the production/product assessment module referred to in the Directive 96/98/EC, is fully complied with.

This Certificate remains valid until its date of expiry, unless cancelled or revoked, providing the conditions in the attached Schedule are complied with and the equipment remains satisfactory in service. This Certificate does not apply to equipment which has been varied or modified from the specimen tested.

Should the specified standards be amended during the validity of this Certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended standards apply.

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Issued under the authority of the French Maritime Administration.



THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

The ship speed log type **Anthea** consists of two versions as follows, both being supplied by 24 Vcc (+30% -10%) or 220 Vac 50/60 Hz, or 110Vac 50/60 Hz (+/-10%).

- **1.1 The standard equipment** which includes:

- 1.1.1 One main cabinet with:

- ⇒ One LCD screen for digital and pseudo-analog speed display
- ⇒ Double scale: 25 or 50 knots
- ⇒ One electromechanical mile totalizer
- ⇒ One daily mile totalizer (on LCD)
- ⇒ One display unit for the different alarm thresholds adjustments (high and low) and 3 calibration points adjustments
- ⇒ One dimmer
- ⇒ One output serial line available on RS422 or RS232 standard (IEC 61162)

- 1.1.2 One 48.1 RVB 16 sensor, retractable at sea

- 1.1.3 One hull fitting with valve, 48.1 RVB (screw-on type)
 - or

- 1.1.4 One hull-fitting valve, 48.1 RVI (weld-on type)

- 1.1.5 One Lens sensor with Lens hull-fitting

- 1.1.6 Options:

- ⇒ GA120 analog speed and distance repeater
- ⇒ RGD100 combined digital repeater for speed and distance
- ⇒ XY version


- **1.2 BLIND ANTHEA and DEBEG 4671 reference** which includes:

- ⇒ One blind cabinet with one output serial line available on RS422 or RS232 standard (IEC 61162), with 3 calibration points adjustments and alarm thresholds adjustments (high and low).
- ⇒ One sensor 48.1 RB or 48.1.RVB.16 sensor removable at sea
- ⇒ One hull fitting 48.1 RB without valve (screw-on type) or 48.1.RVI (weld on type)
- ⇒ or one Lens sensor with Lens hull fitting

- **1.3 Options:**

- ⇒ GA 120 analog speed and distance repeater
- ⇒ RGD 100 combined digital speed and distance repeater
- ⇒ Blind cabinet with linearization correction
- ⇒ X/Y version.

2. DESIGN DRAWINGS and/or SPECIFICATIONS

- 2.1 In accordance with the manufacturer's drawings and documents:
- Operation and installation manual N° 97MU001-C (Anthea) and 03MU002-B (Blind Anthea)
 - Report for delivery of the log type Anthea used with RGD100 repeater N° 96EPV007-A, dated 20 March 1996 issued by 12E in France.
- 2.2 Manufacturing documentation: to be approved by the Society prior to EC  marking authorization.
- 2.3 Manual(s) for installation, use and maintenance:
- to be stamped by a Society's Surveyor
 - to be available in one of the IMO languages in addition to the ship's flag language.

3. TYPE TEST REPORTS / LABORATORY RECOGNITION STATUS

- 3.1 Vibration test report N° 500689 CTSN EMI/NP/98 dated 9 April 1998 issued by DGA in France
- 3.2 Report on type approval testing of the loch ANTHEA in accordance with IEC 60945 and IEC 61023. Reports:
- N° BSH/30/25L/95 dated 7 May 1996
 - N° 005/96/U dated October 1995
 - Issued by Federal Maritime and Hydrographic Agency (BSH) Germany
 - N° 95/905-2 dated 6 November 1995 issued by EMV-Labor MAZ Germany
 - N° 20/6248/95-S4320 dated 24 August 1995 issued by BSH Germany.
 - N° BSH/30/25L/1/98 dated 02 July 1998 issued by BSH, Germany.
 - Report of conformity with IEC 61162 dated 19/09/2002.
 - N° RG-03-91006/1 dated 18/04/03 issued by EMITECII France
 - EMC report dated 11/09/02 issued by ESIM France
 - N° D011785 dated 17/02/03 issued by LNE

4. MATERIALS or COMPONENTS REQUIRED TO BE TYPE APPROVED or TYPE TESTED

Nil.


5. OTHER MATERIALS and/or COMPONENTS

Nil.

6. APPLICATION / LIMITATION OF USE

- 6.1 In drydock, never paint nor grease the electrodes of the sensor.
- 6.2 According to vessel size
- Hull-fittings with valve (48.1 RV1 - 48.1 RVB - 65.1 RVI - 65.1 RVB)
 - * are used on all types of vessels
 - Hull-fittings without valve (48.1 RB - 48.1 RA - 48.1 RBL - 48.1 RI) are used on:
 - * 500 toners maximum
 - * Fishing ships not longer than 45 m
 - * Yachts.
- 6.3 Hull fitting cannot be used in dangerous compartments (fuel, hydrocarbons, chemicals).
- 6.4 Hull strength must be checked before installation of hull fitting.
- 6.5 Hull fitting must be installed in compliance with the specifications of the Ship Classification Society.
- 6.6 Power supply wiring must comply with the specifications of the Ship Classification Society.


7. PRODUCTION SURVEY REQUIREMENTS

- 7.1 Arrangements shall be made for a Society's Surveyor to carry out, on a periodic basis, visits of the manufacturer's premises and product audits.
- 7.2 The production conformity assessment Module shall be "D" Production Quality Assurance.
- 7.3 Each manufactured equipment is to bear the  conformity mark and number of the Notified Body undertaking surveillance module (where BV, 0062).
- 7.4 Each electromagnetic log intended to be fitted on board a ship registered with a national register adhering to the Directive shall be delivered with a Declaration of Conformity, which shall be signed by the manufacturer.
- 7.5 Each equipment is to be supplied with manual(s) for installation, use and maintenance (cf. 2.3 above).

8. ON BOARD INSTALLATION & MAINTENANCE REQUIREMENTS

As per requirements of regulations stated on the front page of the certificate and according to the manufacturer's specifications.

9. MARKING FOR IDENTIFICATION

- Maker's name or trade mark,
- Serial number of the units,
- Equipment type number or model identification under which it was type-tested,
-  conformity mark and number of the Notified Body undertaking surveillance module (where BV, 0062),
- Last two digits of year mark affixed.

10. OTHERS

10.1 - This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the electromagnetic log at any time, and that **I2E DIFFUSION, 1030 Av. Guillibert de la Lauzière, ZAC de Pichaury II, 13290 LES MILLES - FRANCE**, will accept the responsibility for informing shipbuilders or their sub-contractors of the proper methods of use and general maintenance of the electromagnetic log and the conditions of this approval.

10.2 - This certificate supersedes EC Type Examination Certificate n° 08293/A4 EC issued on 12/09/2003 by the Society.

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BUREAU VERITAS MARSEILLES



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* Service stations.