Solar powered alarm unit for oil-water separators
BAMOBOX SOLAR (BBS)

BAMO INTERNATIONAL
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SUMMARY

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Safety instructions

- Installation, commissioning and maintenance works must be done by trained technicians.
- All European and local rules for electrical devices must be respected.
- The device must be connected only to a power supply in conformity with the specifications mentioned on its information plate.
- The device must be disconnected from all sources of power during installation and maintenance works.
- The device may only be operated under the conditions specified in this manual.
- Respect all recommendations, for installation and mounting of Ex devices, from standards EN60079-14 and EN600079 CENELEC.
- The device should not be modified or completed.
- All sensors/ probes connecting cables must be out of any place where electrostatic risk exists.

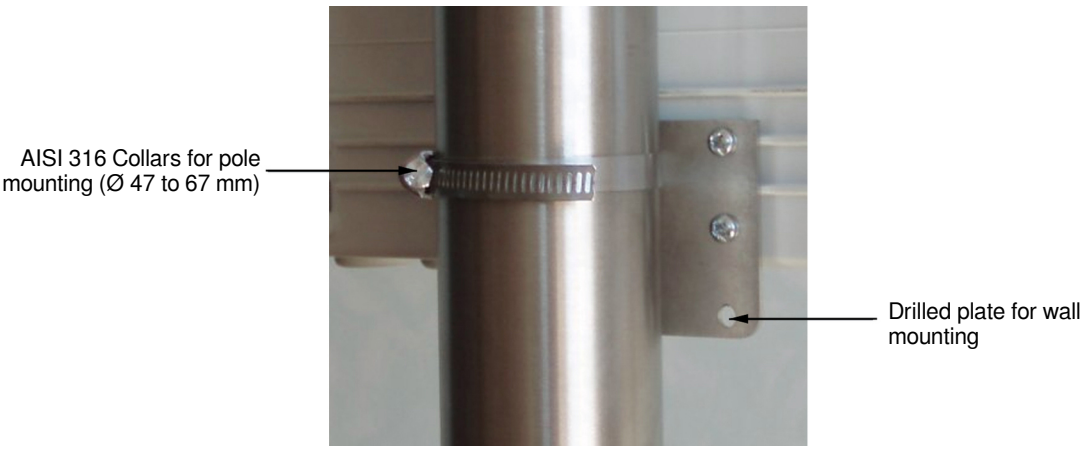
Important: The installation of the NivOil® system must be in accordance with the corresponding technical information.

— The unit BAMOBOX BBS must be mounted outside the hazardous area —

1. BBS CABINET

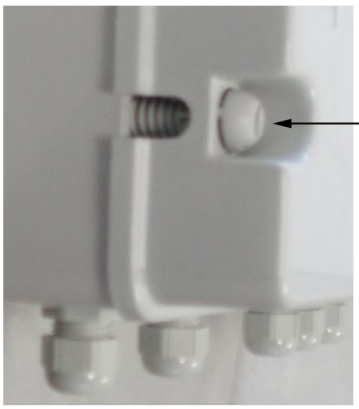
1.1 Mounting the cabinet

- Fix the cabinet using the two metal collars to the pole.
  Collars are suitable for a pole diameter from 47 to 67 mm
  For a wall mounting use the 2 plates.

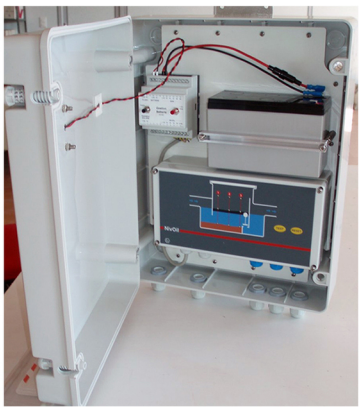


1.2 Opening the cabinet

The lid turns around the hinge on the left side.
To avoid removing completely the lid, do not fully unscrew the two screws on the left side.
- Make the screw heads protrude from the lid, as shown in the left photo below.
- Completely unscrew the two screws on the right side, slightly pull the lid, then disengage it, pivoting it toward the left.



—> Open the lid toward the left



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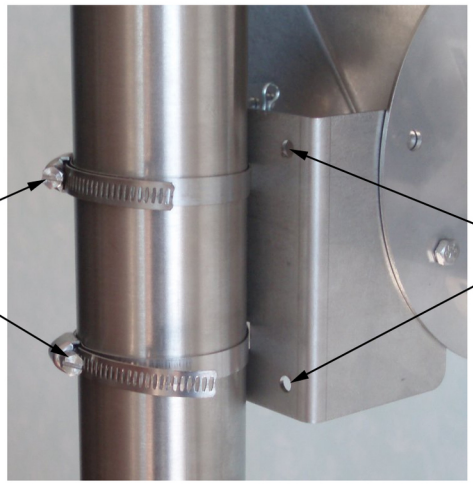
2. SOLAR PANEL

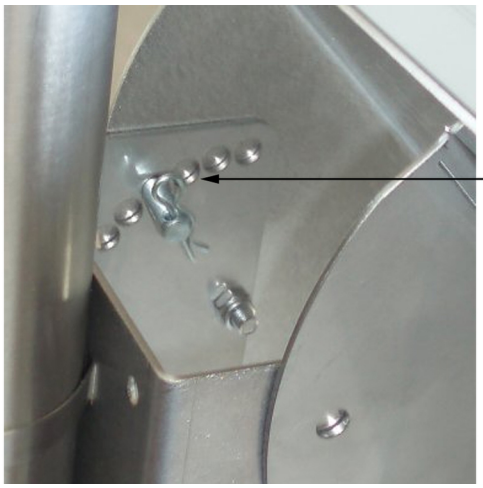
2.1 Mounting

- Fix the solar panel on the pole with the metal collars.
  The clamps are designed for fixing on a tube Ø 47 to 67 mm.



2.2 Positioning the solar panel

- Orient the panel to the South by loosening the collars to allow the rotation of the panel around the pole.
- Adjust incline close to an angle of 60° (from horizontal) by choosing the convenient hole and block the position with the stop bolt.



3. ALARM UNIT FOR OIL-WATER SEPARATOR: NivOil®

3.1 Mounting the probes in the separator

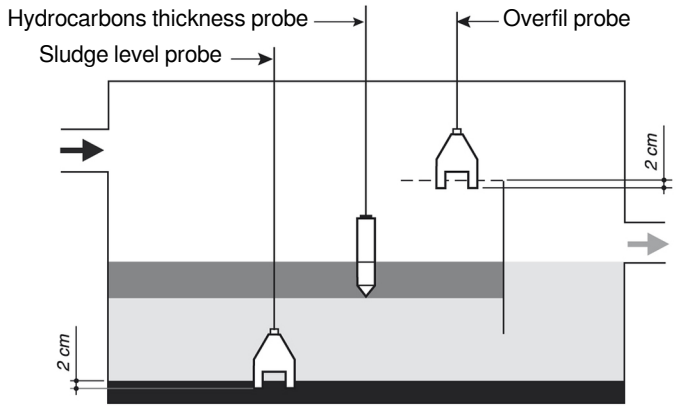
— The unit BAMOBOX BBS must be mounted outside the hazardous area —

Cables coming from the Ex area and going to the safe area, must pass through pressure glands or wall-ducts IP67 according EN 60529.

Hydrocarbons thickness probe
Fit it such as the sensor tip corresponds to the bottom of the hydrocarbons layer at the greater thickness to detect.
The graduated stem (5, 10 and 15 cm marks) makes the adjustment easier and indicate the thickness of hydrocarbons layer above water.

Overfil probe:
Fit it such as the ends of U probe are 2 cm under the alarming level.

Sludge level probe:
Fit it such as the ends of U probe are 2 cm under the alarming level.



Caution: The sensors must not be mounted in a turbulent area, nor subjected to shocks during assembly or maintenance operations.

3.2 Recommendation for cable extension

When necessary, it is possible to extend the sensor cable by complying with the following requirements:
Cable: The maximum total length is 300 m
Use our 2-wire extension cable for 1 ATEX probe
- The end of the cables will be prepared as shown (Fig. A)

To facilitate cable extension while respecting the Ex classification of the area, use the cable coupling "CEt02" suitable for zone
The CEt02 (Fig. B) is delivered with 2 WAGO terminal blocks (Fig.C) for fast connections.

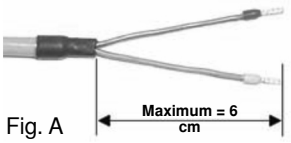


Fig. A

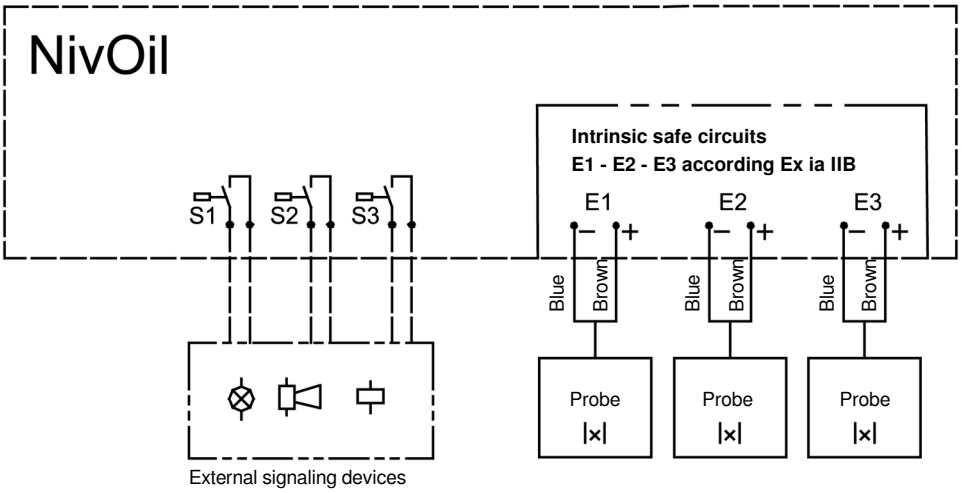
Fig. B


Fig. C

Cable cross section: up to 4 mm²
Protection: IP 65 (not for a continuous immersion)
The shield must not be connected.
- Both ends of coupling must be inserted until they block and the cable glands correctly tightened.

3.3 Connecting the probes to the alarm unit

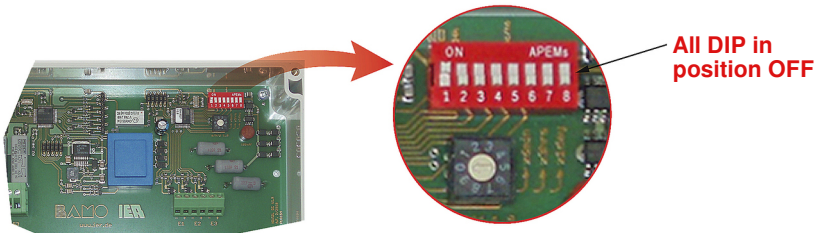
Connect the probes to the alarm unit NivOiL® as shown on the diagram below and in accordance with the obligations due to Ex areas (The detection loop, as an intrinsic safe circuit, must not be connected to the ground).



[x]: Each probe is connected indifferently to any input E1, E2 or E3.
The alarm unit NIvOil automatically recognizes the function of the connected probe.

3.4 Setting up the alarm unit NivOiL®

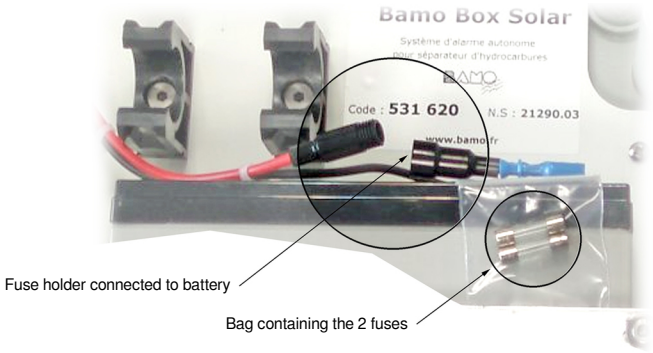
For its use in a BamoBox Solar (BBS) the alarm unit NivOil® is specifically configured at the factory.



Caution: This setting must not be modified under any circumstances.

3.5 Commissioning

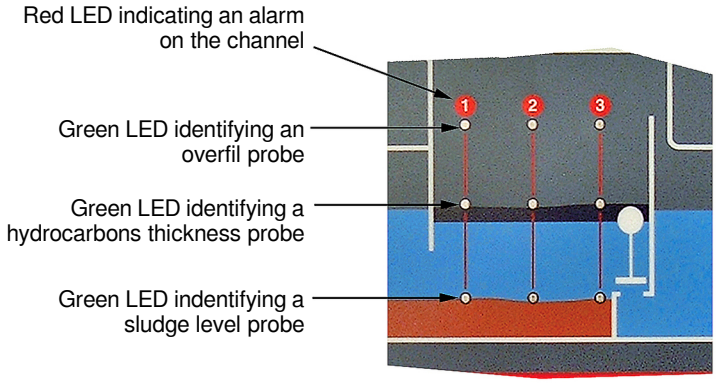
During the first start-up, after connecting the probes to the NivOil® and checking the configuration of the device (as specified in paragraph 3.4), insert 1 fuse in the fuse holder connected to the battery.
(The second fuse is supplied as a spare.)

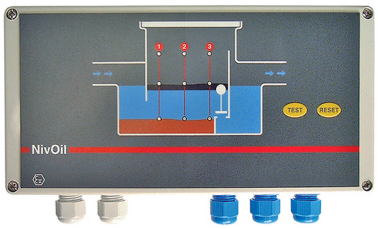


3.6 NivOil operation

The 3 type of probes can be connected indistinctly to any of the three inputs of the NivOil®, equipped with automatic recognition.

The LED corresponding to the type of the probe lights up on the synoptic on the front; If a channel is not connected all LED remain off.





On each power-up, the alarm unit automatically launches a sequence of tests:
- **LED operation**
- **Probe connection test (Short-circuit and cable breakage)**
- **Probe Recognition Sequence**

If the sequence is correct, the corresponding green LED lights up on each connected channel.
If a probe is faulty, all LEDs of corresponding channel are flashing (Unconnected channel remain off)

During the first commissioning, the NivOil® memorizes the probe type connected on each channel.
If a sensor is connected to a previously unused channel, it will be identified and memorized when the power is turned back on.

If a probe is removed, it will result in all the LEDs of the corresponding channel flashing (fault).
Then proceed to a RESET to confirm the removal of the sensor and reset the unit (press for at least 5 seconds).
If a sensor is removed without a reset, all LEDs will flash indicating the fault.

When an alarm is detected, the red LED corresponding to the channel flashes until the fault that triggered the alarm is corrected.

4. MAIN OPERATING BOX

4.1 Main operating box function

The main operating box controls all the elements of the Bamo Box Solar by fulfilling several functions:
- Battery overcharge protection
- Battery over-discharge protection
- NivOil management with a monitoring cycle once per hour
- Flashing light beacon management in the event of an alarm (optional)
- GSM modem management in the event of an alarm (optional)

To reduce the consumption of the system as much as possible, the main operating box switches ON the NivOil® for 3 minutes every hour.
If no alarm is detected at the end of these 3 minutes, the box switches off the NivOil until the next cycle.

In case of an alarm is detected at the end of these 3 minutes, the box memorizes the fault and performs the following operations:
- Beacon flashing (optional)
- Sending an SMS indicating the channel number in alarm (option)

When the fault that caused the alarm is corrected, it is MANDATORY to press the black RESET button of the box to check that the system is operational again.

4.2 Use of push buttons

The RESET button is used to restart a detection cycle to check that the device is working properly.
This action MUST be carried out after an alarm has been triggered, to check that the fault has indeed been corrected.

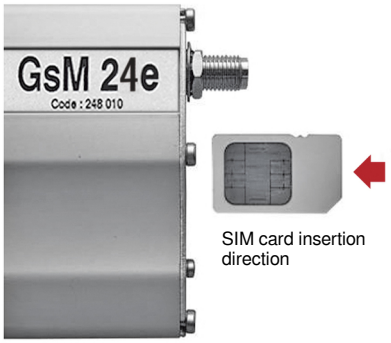
The GSM button is used to power the modem for its programming (entry of the telephone number and the message to be sent).
At the end of the programming, push again to switch off the modem(otherwise it will switch off automatically after 10 minutes).

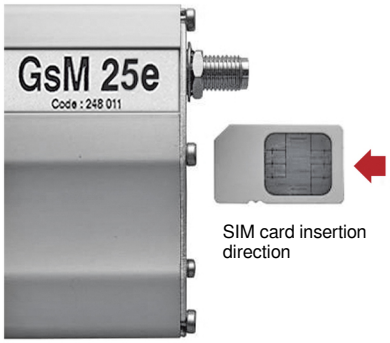
The LED on the modem lets you know at any time whether it is powered or not.

5. GSM MODEM FOR SENDING SMS (Option)

5.1 Inserting the SIM card

CAUTION: The direction of insertion of the SIM card on the GSM24e modem is different from that of the GSM25e.
WARNING: Before inserting the SIM card, ensure that the PIN code has been deactivated.





5.2 Modem LED

Status of the modem is shown by its LED at rear side.
This is the LED located next to the SIM card reader.
Following are the different states of the GSM LED.

Lit LED on steady	The modem is powered on, it is ready to operate but it is not recognized by the network; the PIN code is not entered, or the antenna is not connected.
Flashing LED (slow flashing)	**1 time every 2 seconds:** The modem is powered on, the Pin code is activated, the modem is recognized by the network and it is ready to call or receive calls.
Flashing LED (fast flashing)	**1 time every 1 second:** The modem is powered up and is in Voice, Data or Fax connection.
LED off	The modem is off or in the RESET phase

5.3 Modem programming with GSMSet software

WARNING: Do not power on the modem until the following tasks have been completed:
(The modem LED is off and the NivOil is inactive.)

- **Instal the software GSMSet**
  The GSMSet software is made available on simple request addressed to our services (Phone, FAX or E-Mail).

- Connect the serial link cable to the PC
- Connect the modem to the serial link cable
- Launch the GSMSet software
- Choose language
- Choose the corresponding COM PORT
- **Click on the button "CONNECTION"**

Power up the modem by pressing the RED button on the box.
–> The modem LED lights up.

Then perform the following steps in the order listed:

1) – Run the modem self-configuration "AUTO-CONFIGURATION" (only on first connection)
2) – Enter the recipient(s) phone number(s)
3) – Delete one recipient phone number, if necessary
4) – Enter the identification of the BBS System
5) – Enter the text to be sent in the event of an alarm on channel 1, 2 or 3

- **Click on the button "Déconnexion"**

6. TECHNICAL FEATURES

CABINET

Operating temperature	-25 ... +60 °C
Dimensions	300 x 380 x 130 mm
Protection	IP56
Mass	5800 g

SOLAR PANEL

Power	5 Wc
Technology	Polycrystalline multi panel
Dimensions	365 x 195 mm
Mass	1800 g

BATTERY

Power	7 Ah
Dimensions	150 x 100 x 65 mm

OPTIONS

6.0.1 Flashing light beacon

Dimensions	Ø 75 x 45 mm

6.0.2 GSM MODULE

Functions GSM / GPRS	E-GSM Quad-bandes 850/900/1800/1900 MHz
Functions VOICE	Voice (GSM mode) Telephony, Emergency Numbers 112 Echo cancellation and noise reduction
Functions DATA	GPRS Class 10 (Up to 4Rx / 2Tx) TCP/IP (PPP RFC, TCP Socket, UDP Socket, SMTP, SMS point to point MT/MO and SMS CB
INTERFACES	Antenna GSM / Connector SMA-F Power supply 5.5 ... 32 V DC / connector micro-FIT RS232 + Audio via a female 15-pin Sub-D Controls AT, GSM 07.05 and 07.07 3 opto-coupled inputs 3 ... 32 V DC / Connector micro-FIT 1 logic output open-collector, 60 V DC, 1 A / Connector micro-FIT SIM card reader SIM 3 V; 1.8 V Cables Power and inputs / outputs
AVERAGE CONSUMPTION	GSM 850 / 900 MHz 105 mA at 12 V communicating GSM 1800 / 1900 MHz 80 mA at 12 V communicating Standby mode: 5 mA @ 12 V
ENVIRONNEMENT	Operating temperature -20 ... +55 °C Storage temperature -30 ... +85 °C Case in aluminum, IP 31, Height 25 mm, Length 73 mm, Wide 54 mm Mass 92 g
APPROVALS	R & TTE (Radio & Telecom. Terminal Equipment) Automotive approval E24 10R-020250 ("E"Mark)
OPTIONS	Flash memory extended Shock detector Buzzer output Antenna GSM (SMA-M) Serial Data Cable - 15M/9F or Data / Audio cable - 15M/9F/RJ9 Power source 230 V AC - 12 V DC GenBlue 10e: Bluetooth® adaptor / RS232 self powered

7. TECHNICAL FEATURES

NivOiL-CU/12 – Alarm unit

Power	10 ... 27 V DC
Consumption	0.1 W / 12 V DC (3 probes connected and 1 detection cycle per hour)
Protection	IP65 according EN 60529
Temperature limits	-20 ... +60 °C
Probe inputs	3 inputs, automatic recognition of probe type Hydrocarbon thickness Overfil level Sludge level
Monitoring	The alarm unit NivOil has a probe connection test (Short-circuit and cable breakage).
Signaling	1 Operation LED on each channel 1 Alarm LED on each channel Built-in audible alarm, disabled by DIP
Cntrols	2 push buttons on the front, test and alarm clearance
Outputs	3 relay outputs, 250 V AC max. 0.45 A / 10 W, free potential contacts
Intrinsic safety	Ex II 3 (1) G Ex nAC [ia Ga] IIB / IIA T4 Gc
ATEX certificate	BVS 10 ATEX E 011 / NivOil CU/12 may be mounted in zone 2
ATEX	RL 94/9/EG (ATEX 95) EN 60079-0 (General requirements) – EN 60079-11 (Intrinsic safety) EN 60079-26 (Groupe II, category 1G)

NivOiL-OP/10 – Hydrocarbons thickness probe

Operating principle	Capacitive, high frequency
Body	PE antistatic stem
Sensor end	Stainless steel
Cable	Elastomer resistant to oils and hydrocarbons, blue colour; wires 2x 1mm², connection to terminals,10 m long cable (other lengths on request, Max. 300m)
Protection	IP68 according EN 60529
Temperature	-20 ... +60 °C
Intrinsic safety	Ex II 1 G Ex ia IIB T4
ATEX certificate	BVS 07 ATEX E 091 X / This probe may be mounted in zone 0

NivOiL-HPS/10 – Overfil probe

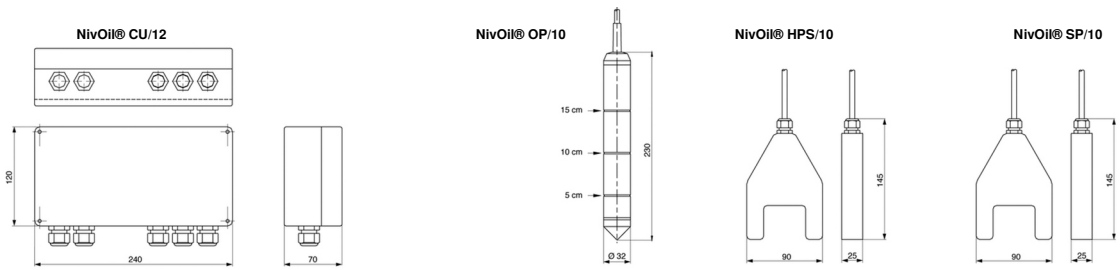
Operating principle	Ultrasonic detection
Body	PVC
Cable	Elastomer resistant to oils and hydrocarbons, blue colour; wires 2x 1mm², Connection on screw terminals, length 10 m (Other length on request Max. 300m)
Protection	IP68 according EN 60529 Temperature -20 ... +60 °C
Intrinsic safety	Ex II 1 G Ex ia IIB T4
ATEX Certification	BVS 09 ATEX E 021 X / This probe may be mounted in zone 0

NivOiL-SP/10 – Sludge level probe

Operating principle	Ultrasonic detection
Body	PVC
Cable	Elastomer resistant to oils and hydrocarbons, blue colour; wires 2x 1mm², Connection on screw terminals, length 10 m (Other length on request Max. 300m)
Protection	IP68 according EN 60529
Temperature	-20 ... +60 °C
Intrinsic safety	Ex II 1 G Ex ia IIB T4
ATEX Certification	BVS 09 ATEX E 021 X / This probe may be mounted in zone 0

EC Conformity: The instrument meets the legal requirements of the current European Directives

8. DIMENSIONS



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