

PIUSI

OCIO_{2.0}

Tank level management system



**MADE
IN
ITALY**

Installation and User Manual

EN

BULLETIN MO293B EN_00

ENGLISH

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BULLETIN MO293B

1 FACSIMILE COPY OF DECLARATION EU CONFORMITY

The undersigned PIUSI S.p.A.

Via Pacinotti 16/A z.i. Rangavino - 46029 Suzzara - Mantova - Italy

DECLARES under its own responsibility, that the equipment described below:

Description: **Level gauge**

Model: **OCIO 2.0**

Serial Number: refer to the Lot Number shown on the CE plate affixed to the product

Year of manufacture: refer to the year of manufacture shown on the CE plate affixed to the product.

complies with the following legislation:

- Electromagnetic Compatibility

The technical file is available to the competent authority upon request to PIUSI S.p.A. or by sending an email to: doc_tec@piusi.com.

THE ORIGINAL DECLARATION OF CONFORMITY IS SUPPLIED SEPARATELY WITH THE PRODUCT

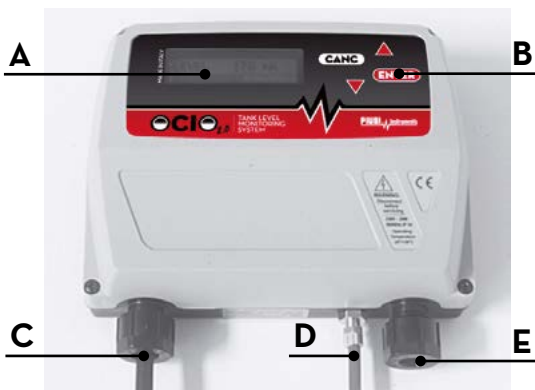
2 WHAT IS OCIO

OCIO is an electronic device for measuring and controlling tank levels. OCIO detects the tank level by processing a pressure reading taken by a probe lowered into the tank. The components of OCIO are:

THE CONTROL UNIT

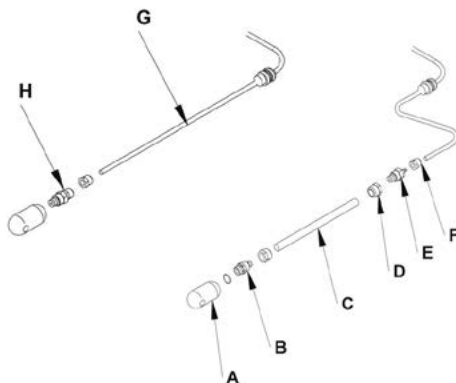
housed in a plastic case, suitable for outdoor installation, equipped with a display (LCD) and keyboard

- A. Display
- B. Keypad
- C. Power cable gland
- D. Probe connection
- E. Alarm cable gland



The PROBE
to be inserted into the tank and
connect to the control unit

- A. Ballast
- B. Oil connection . oil
- C. 12x9 tube
- D. M16x1 ring nut
- E. M16x1 fitting
- F. M8x0.5 ring nut
- G. 6x4 pipe
- H. Standard fitting . OCIO.



OCIO allows:

- continuously updated display of the tank level
- the setting of two distinct alarm levels capable of controlling remote signals

OCIO is suitable for use on tanks:

- atmospheric, non-pressurized tanks, i.e., tanks in which the internal pressure is always equal to atmospheric pressure
- of different sizes and volumes; it is possible to select one of the different geometries available and enter the dimensions of the tank
- containing fluids that are not flammable, explosive, or corrosive (such as diesel fuel, lubricating oils, water, food products).

OCIO is a totally autonomous device that only requires a power supply.

ATTENTION



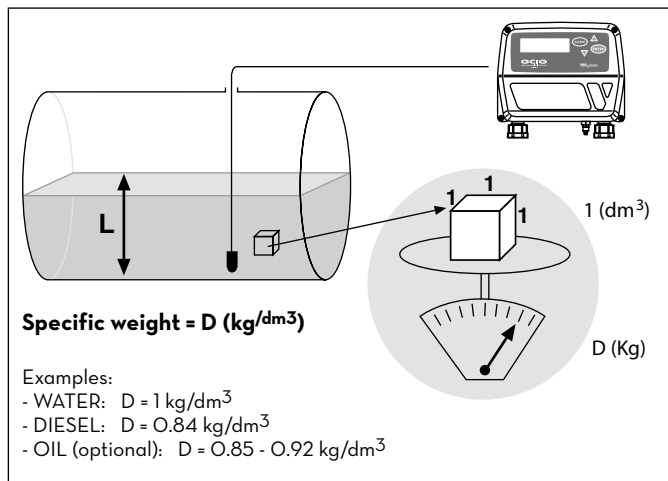
To ensure correct use of the device, it is necessary to read and follow the instructions and warnings contained in this manual.

Improper use may cause damage to people or property.

3 HOW OCIO WORKS

A fluid inside a tank generates pressure at the bottom of the tank, which depends on:

- the level of the fluid (L)
- the specific weight of the fluid (D)



OCIO reads the pressure generated by the fluid via the probe, which is held at the bottom of the tank by the ballast.

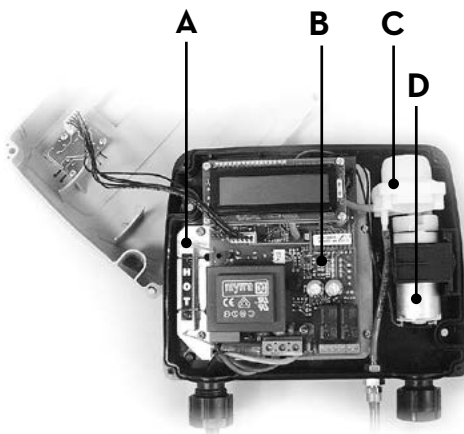
Taking into account the SPECIFIC WEIGHT (D) value, characteristic of the fluid contained in the tank, OCIO automatically calculates the height (L) of the fluid contained in the tank and displays it on the screen. Through a simple CALIBRATION process, it is possible to enter the SPECIFIC WEIGHT (D) value of any fluid.

In the CONTROL UNIT, a small electric COMPRESSOR is automatically activated when necessary by the microprocessor of the ELECTRONIC BOARD.

This, together with a special CONTROL VALVE, ensures that the correct reading conditions are always maintained inside the PROBE.

A HEATING ELEMENT, controlled by the microprocessor, prevents the temperature inside the housing from falling below a set value, improving reading accuracy and avoiding condensation problems on the electronics.

- A. Heating element
- B. Electronic board
- C. Control valve
- D. Compressor



ATTENTION



Even when the fluid level changes, or in the event of changes of environmental conditions (atmospheric pressure and temperature) OCIO thus guarantees accurate and constantly updated readings.

4 HOW TO INSTALL OCIO

OCIO is quick and easy to install and can even be fitted to tanks that are already full.

ATTENTION



The CONTROL UNIT is an electrical device NOT suitable for installation in potentially explosive atmospheres.

NE

4.1 MECHANICAL INSTALLATION

POSITIONING
Control unit

Using the probe supplied with OCIO (total length 10 meters), the CONTROL UNIT can be installed outdoors, in an easily accessible position, on the tank itself or in its immediate vicinity. The probe cable must be laid with care to avoid damage that could compromise its perfect seal.

NOTE



If deemed appropriate, by extending the probe cable, the CONTROL UNIT can be installed up to 50 meters from the tank without any impact on the performance of the instrument. The utmost care must be taken to ensure a perfect seal at any joints.

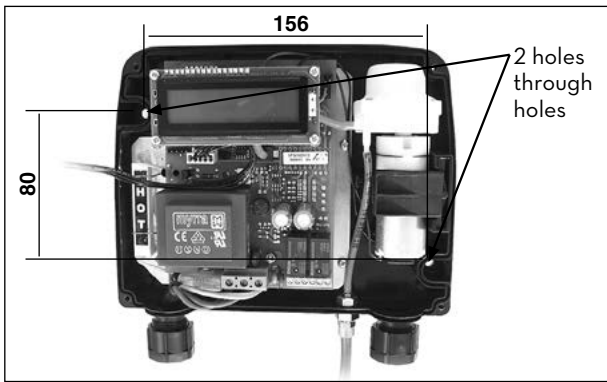
The CONTROL UNIT can be used in both horizontal and vertical positions. In the case of outdoor installation, vertical installation is preferable and protection from direct exposure to sunlight is recommended.

Mechanical
FASTENING
Control unit

There are two alternatives for fixing the housing:

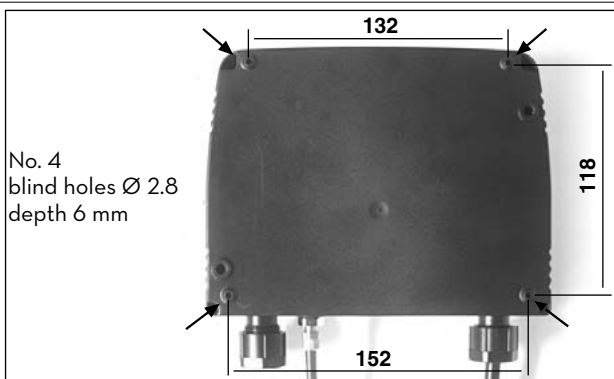
DIRECT WALL
FASTENING

The case must be opened for fixing.



FASTENING WITH BRACKET (NOT supplied with OCIO).

The case does NOT need to be opened for mounting



ASSEMBLY and probe connection

The probe supplied is suitable for use with OCIO for fluids with a viscosity of less than 30 Cst. (diesel fuel, water, etc.). If you wish to use OCIO for fluids with a viscosity between 30 and 2000 Cst, you will need to purchase the "OIL" probe kit, which is not supplied with OCIO.

"STANDARD" PROBE:

- Make sure that the tank is equipped with a nozzle at the top, fitted with a cap or ring, of a size that allows the insertion of the STANDARD ballast terminal (see dimensions in the technical data).
- Drill a DN 1/2" threaded hole in the nozzle cap.
- Fit the cable gland supplied with the probe, equipped with a DN 1/2" male thread, onto the spigot cap.
- Insert the probe into the cable gland
- Connect the probe to the ballast terminal fitting and tighten securely
- Insert the terminal into the nozzle and make sure it reaches the bottom of the tank
- Fit the cap (or plug) of the nozzle onto the nozzle itself
- Tighten the cable gland after checking that the terminal is resting on the bottom of the tank
- Connect the probe tube to the fitting provided on the outside of the CONTROL UNIT casing and tighten securely
- Above 1000 Cst, wait a few minutes for the probe to stabilize.

"OIL" type PROBE (optional):

- Make sure that the tank is equipped with a nozzle at the top, fitted with a cap or plug, of a size that allows the ballast terminal to be inserted.
 - Make a DN 1/2" gas threaded hole in the spout cap
 - Fit the cable gland supplied with the probe, equipped with a DN 1/2" gas male thread, onto the spout cap.
 - Insert the DN 4x6 pipe into the cable gland.
 - Connect the two pipes (DN 4x6 and DN 9x12) using the fitting supplied with the "OIL" kit, tightening carefully. Cut the DN 9x12 pipe so that its length is slightly less than the height of the tank; the entire DN 9x12 pipe will thus remain inside the tank.
 - Connect the DN 9x12 pipe to the ballast terminal fitting already installed, then tighten securely.
 - Insert the terminal into the nozzle and make sure that it reaches the bottom of the tank
 - Fit the nozzle cap (or plug) onto the nozzle itself.
 - Tighten the cable gland after checking that the terminal is resting on the bottom of the tank
 - Connect the probe tube to the fitting provided on the outside of the CONTROL UNIT housing and tighten securely.
-

4.2 ELECTRICAL CONNECTIONS

NOTE



- The electrical connection must be carried out by qualified personnel. It is the installer's responsibility to verify that current regulations are complied with
- Always disconnect the power supply during installation and maintenance
- Before making the connection, always check the electrical data on the OCIO nameplate
- Use cables with minimum suitable cross-sections for connection to the power supply line
- Check that the control unit's ground terminal is correctly connected to the grounding system.
- Before connecting any device to the clean contacts of the minimum and maximum level alarms, check that the maximum voltage and currents are not greater than those permitted by the contacts.
- Use cables with minimum cross-sections suitable for the currents involved
- Always close the control unit cover before supplying power

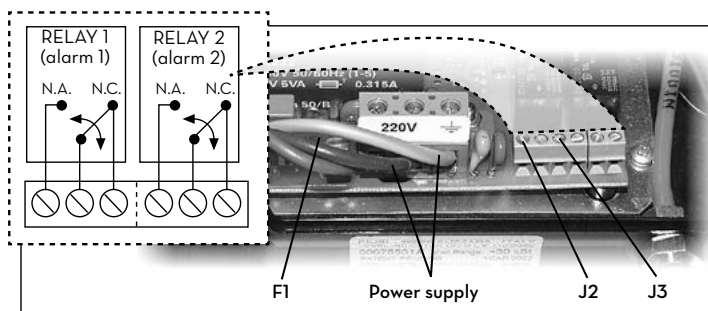
POWER SUPPLY Control unit

To power the control unit, the case must be opened as it is supplied without a power cable and plug. The board is protected against overloads by fuse F1. If the instrument fails to operate, check the condition of the fuse.

NOTE



The power supply data to be observed, depending on the OCIO model, are shown on the label on the cover of the CONTROL UNIT housing.



**ELECTRICAL
CONNECTION
alarm electrical con-
nection
(Optional activity)**

If the power outlet is further away, the installer must use a power extension cord in accordance with current safety regulations.

The case must be opened in order to connect the alarms. The CONTROL UNIT case is equipped with a second cable gland for connecting the alarms. This cable gland is equipped with a sealing cap, which must be removed for use.

The alarm output consists of two NORMALLY OPEN CLEAN CONTACTS, which switch to CLOSED when the corresponding alarm is activated.

The two clean contacts are available for connection to the terminals:

J2: alarm no. 1

J3: alarm no. 2

The capacity of these contacts is specified in the Technical Data section

ATTENTION



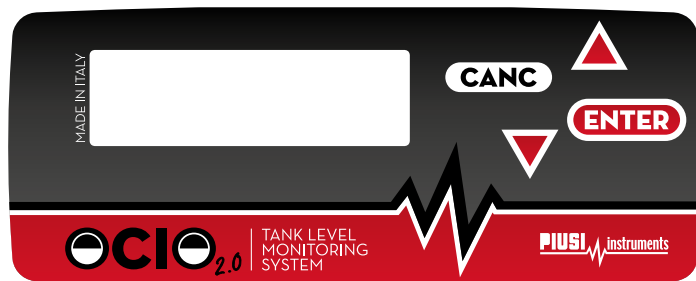
OCIO is not a SAFETY device.

In particular, OCIO ALARMS are designed to be used as local or remote INDICATORS, and NOT as DIRECT ACTUATION OF SAFETY EQUIPMENT.

It is therefore PROHIBITED to connect equipment to the OCIO alarm outputs whose failure or delayed intervention could have consequences for the SAFETY of people or property or for the ENVIRONMENT.

5 TO GET STARTED

Thanks to the keyboard and display that guides the operator, OCIO is simple and intuitive to use.



The following paragraphs describe the functions of OCIO using graphical representations of the actions on the keys and the indications that appear on the LCD.

Illustration of the 4 KEYS on the OCIO keyboard



Representation of possible KEY ACTIONS

SHORT PRESS

(press and release immediately)



LONG PRESS

(press and hold briefly)



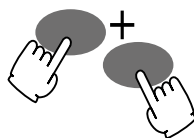
CONTINUOUS TAPPING

(press and hold)

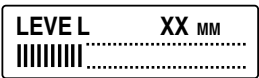


TAP SIMULTANEOUS

(press the first key and, while holding it down, briefly press the second key, then release)

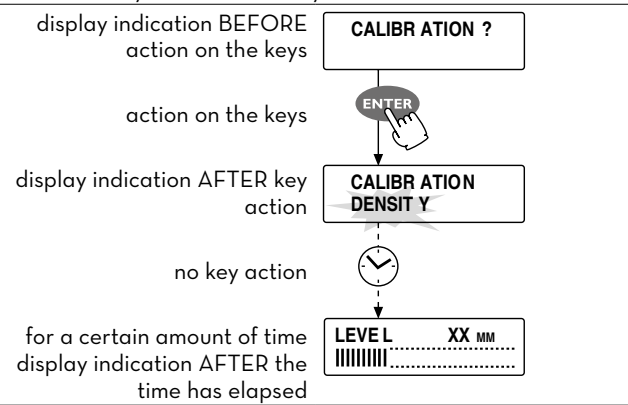


Representation of a generic LCD INDICATION



The transition from one LCD INDICATION to another can be generated:

- by one of the KEY ACTIONS illustrated above
- by the PASSING OF A CERTAIN AMOUNT OF TIME without any action on the keys



6 WHEN TURNING ON

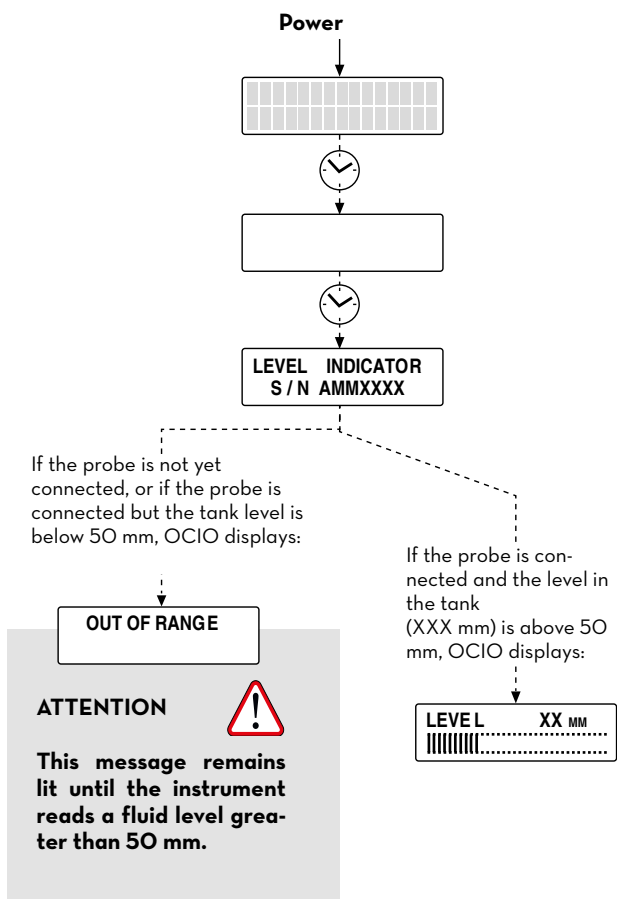
When switched on, OCIO performs a self-test, carrying out the following steps in sequence:

- turning on all display segments
- turning off all display segments
- briefly activating the compressor
- display the SERIAL NUMBER for a few seconds
- AUTOMATICALLY entering the level display mode.

ATTENTION



OCIO is supplied calibrated for tanks containing DIESEL. If the tank contains a different fluid, CALIBRATION is required.



7 CONFIGURATION

NE

CONFIGURATION is the activity through which OCIO is adapted to specific conditions of use. This activity must be performed during installation of the instrument by personnel who have carefully read these instructions.

NOTE

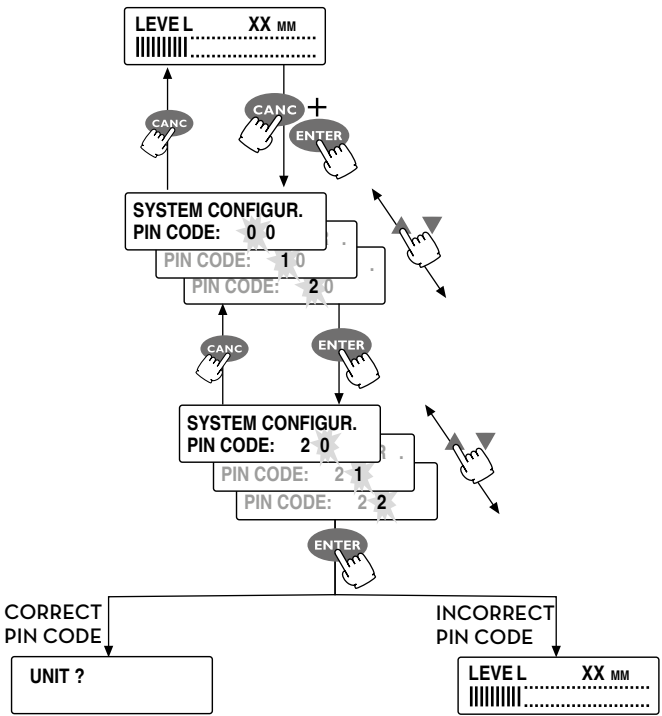


OCIO can be used connected to a PC equipped with the appropriate software or in 'STAND ALONE' mode. When connected to a PC, the configurations made via the keyboard have no effect because the PC software acts as 'MASTER' and re-configures OCIO with the parameters present in the software.

7.1 HOW TO ENTER CONFIGURATION

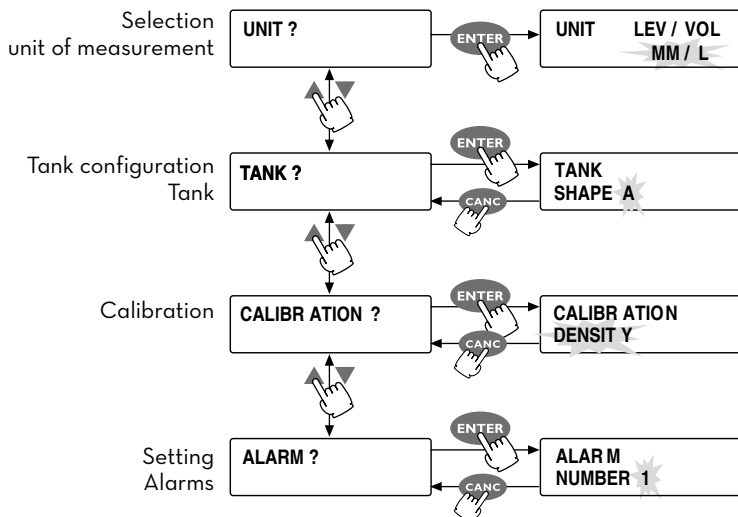
To access CONFIGURATION mode, you must enter a 2-DIGIT PIN CODE (NOT MODIFIABLE).

This PIN CODE coincides with the last two digits of the SERIAL NUMBER and is therefore different from instrument to instrument (see section. SERIAL NUMBER display)



7.2 CONFIGURATION ACTIVITIES

Once you have entered CONFIGURATION, the following activities are accessible by pressing the indicated keys:



ATTENTION



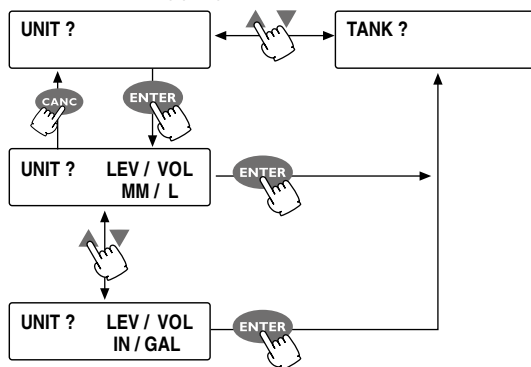
The ALARM SETTINGS function is only available after the TANK CONFIGURATION has been completed.

For the display of measured values, OCIO allows you to select between:

- METRIC UNITS (millimeters and liters)
- ANGLO-SAXON UNITS (inches and gallons)

Any data (tank dimensions and specific fluid weight) must be entered in the appropriate units of measurement.

SELECTION MEASUREMENT UNIT



**CONFIGURATION
TANKS**

OCIO allows you to display two types of measurements:

- The LEVEL of fluid inside the tank
- The VOLUME of fluid present

NOTE



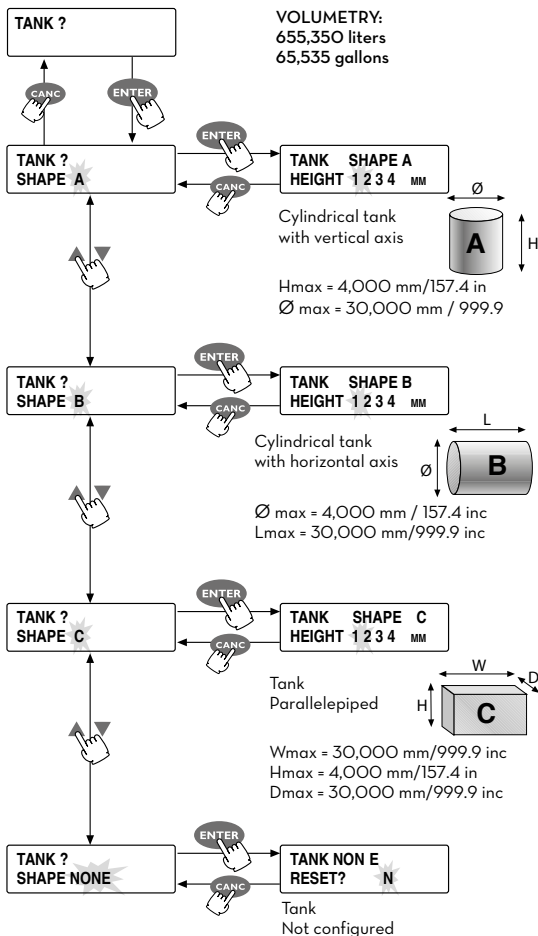
OCIO always detects a LEVEL and from this it is able to calculate the VOLUME of fluid present in the tank ONLY IF the tank in which OCIO is installed has been configured.

Configuring the tank means

- TYPE: select the type of tank
- DIMENSIONS: enter the dimensions of the tank

TYPE

OCIO allows you to select between 3 types of tanks (A, B, C), or NOT TO CONFIGURE the tank (select NONE)



DIMENSIONS

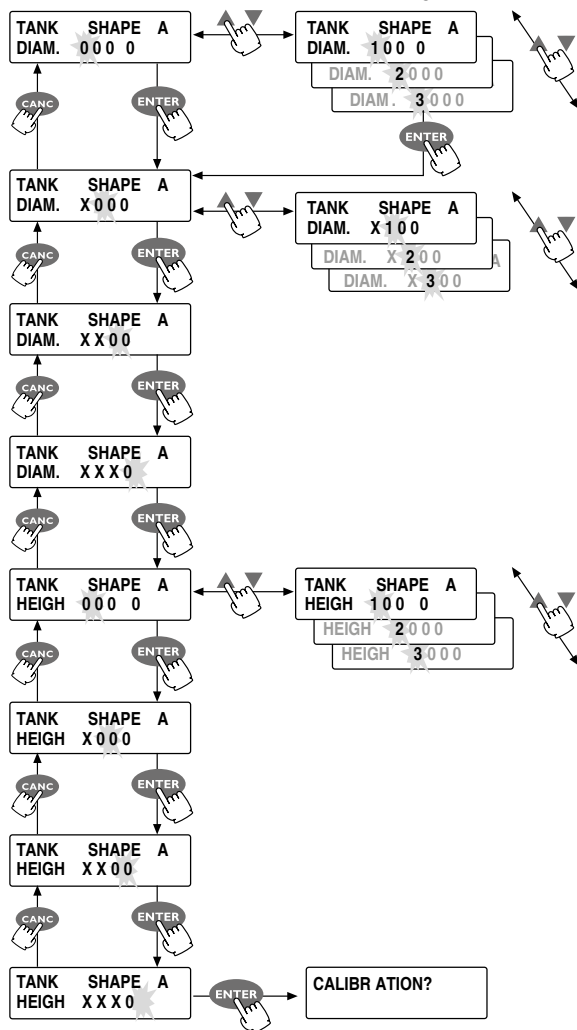
Insertion

TANK DIMENSIONS

OCIO requires you to enter 2 or 3 dimensions depending on the type of tank:

These dimensions must be entered in the selected units of measurement

(MILLIMETERS or INCHES). The method for ENTERING the tank dimensions is the same regardless of the TYPE.



7.3 CALIBRATION

OCIO measures the level of a fluid by measuring the pressure generated by the fluid itself, which, as is well known, depends not only on the level but also on the SPECIFIC WEIGHT of the fluid.

CALIBRATION is the activity by which the SPECIFIC WEIGHT (DENSITY) of the fluid is assigned to OCIO.

ATTENTION



OCIO is factory calibrated for use in tanks containing DIESEL, characterized by a SPECIFIC WEIGHT (DENSITY) of 0.84 kg/dm³ at a reference temperature of 20 °C.

The value of "DENSITY" is therefore set by default to 0.840

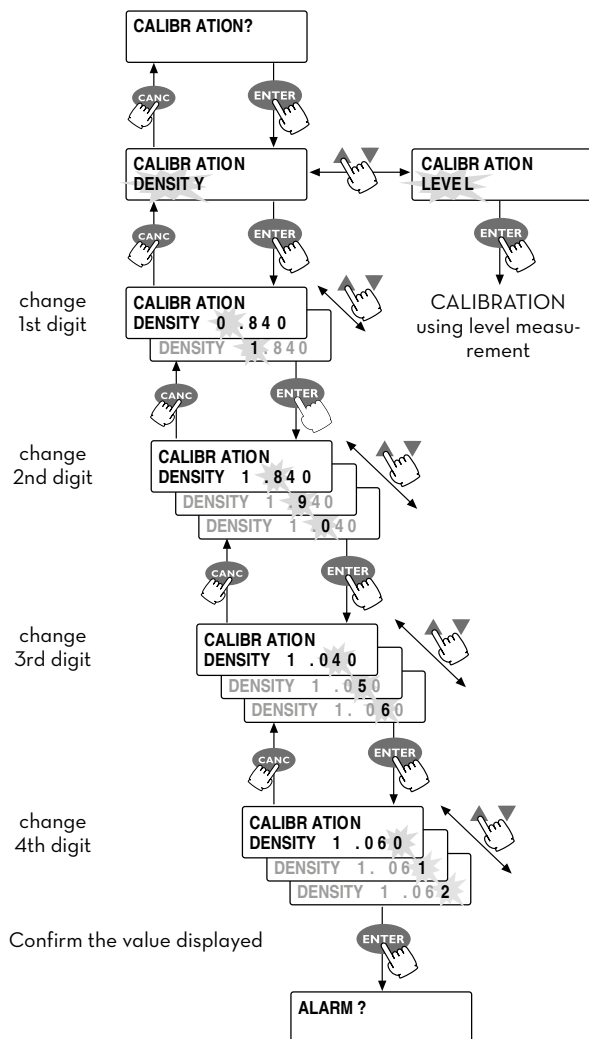
When using OCIO in tanks containing diesel fuel, CALIBRATION IS NOT NECESSARY.

CALIBRATION using known SPECIFIC WEIGHT

When the SPECIFIC WEIGHT of the fluid is known, OCIO can be CALIBRATED simply by entering this value.

The value must be entered in:

- Kg / dm³ if METRIC UNITS have been selected
- oz / inch³ if AMERICAN UNITS have been selected



CALIBRATION via note LEVEL MEASUREMENT

When the SPECIFIC WEIGHT is unknown, it is possible to perform a CALIBRATION by having OCIO take a reading of a KNOWN LEVEL.

The procedure consists of:

- inserting the OCIO probe into a container whose level can be measured accurately, containing the same fluid as the tank in which OCIO will be installed
- using the OCIO keyboard, enter the known level value
- confirm the start of the CALIBRATION READING by OCIO.

At the end of the CALIBRATION READING, OCIO automatically calculates the SPECIFIC WEIGHT value of the fluid, which is then used for subsequent level readings.

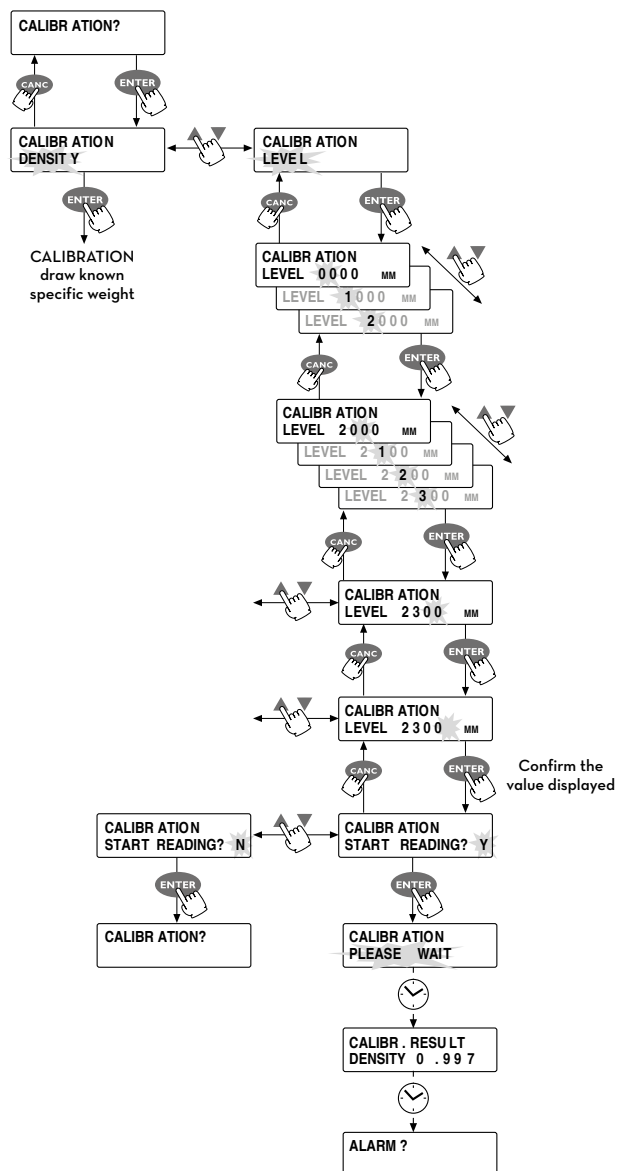
- Make sure that the fluid used for calibration is the same as that which will be contained in the tank
- measure the level using a RELIABLE method, such as a precision graduated rod
- Enter the measured level in OCIO in the selected UNITS OF MEASUREMENT (METRIC UNITS = millimeters; AMERICAN UNITS = inches).
- Install the OCIO probe so that it rests correctly on the bottom of the container used for calibration.
- whenever possible, use the same tank in which OCIO is to be installed for calibration
- if the same tank is not used, use a container of such a size as to ensure that the level is not affected by the pumping of air carried out by OCIO during the calibration reading
- Always perform calibration using a level that is at least equal to or greater than 70% of the maximum level that OCIO will measure.

NOTE



EXAMPLE:

if OCIO is to be installed in a HORIZONTAL CYLINDRICAL tank with a DIAMETER OF 1 METER, it is advisable to perform CALIBRATION (in the same tank or in another container) by reading a level equal to or greater than 70 centimeters.



7.4 ALARM SETTINGS

OCIO allows the management of two alarms through which it is possible to:

- activate remote indicators (acoustic or visual)
- interlock the operation of any pumps connected to the tank.

For each of the two alarms, both normally open and normally closed contacts are available. That is, there are 3 terminals available for each of the two alarms.

Alarms can only be set after configuring an OCIO tank

OCIO is not a SAFETY device.

ATTENTION



It is therefore PROHIBITED to connect to the OCIO alarm outputs

devices whose failure or delayed intervention could have consequences for the SAFETY of people or property or for the ENVIRONMENT.

- **defining the TYPE of alarm:**

- LOW LEVEL alarm = LOW the alarm is activated when the level falls below the set value
- HIGH LEVEL alarm = HIGH the alarm is activated when the level rises above the set value

The type of alarm can be selected freely; it is therefore possible to have:

- two alarms of different types (one type H and one type L)
- two alarms of the same type (both H type or both L type).

Setting the OCIO alarms means:

- **Define the VALUE at which the alarm is activated.**

The value at which the alarm is activated is ALWAYS expressed as a PERCENTAGE VALUE of the maximum capacity of the tank.

Alarms can be assigned any value within the following limits:

- H-type alarm: values NOT HIGHER than 90%
- type L alarm: values NOT LESS THAN 3%

By assigning a value of 0% to the alarm (both type H and type L), it will not be activated under any conditions.

NOTE



To prevent small level variations from causing the alarm to continuously activate/deactivate, OCIO:

- activates the alarm when the set value is reached in a "stable" manner (i.e., for at least X consecutive readings)
- deactivates the alarm only when a value that deviates from the alarm value by at least 2% is reached.

EXAMPLE:

H type alarm set at 75%:

- is activated when the level rises to 75% and remains there for at least X readings.
- deactivated when the level drops to 73% alarm type L set at 15%
- activated when the level drops to 15% and remains there for at least X readings
- deactivated when the level rises to 17%

Confirm the set value and return to the Configuration menu.

8 DAILY USE

ZE

The daily use of OCIO is extremely simple and intuitive

**Indication of
LEVEL or volume**

- OCIO automatically enters this mode after being turned on
OCIO can display one of the following three INDICATIONS:
- LEVEL (in mm or inches)
 - VOLUME (in liters or gallons)
 - PERCENTAGE VOLUME (in % of total volume)

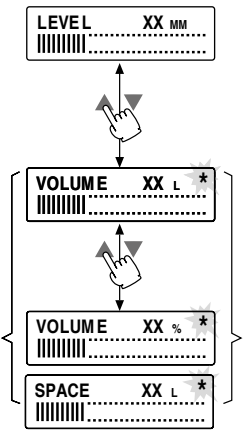
NORMAL CONDITIONS (no active alarms)

The user can freely switch between DISPLAYS by simply pressing a key.
OCIO remains in the selected INDICATION type until a different selection is made or until an alarm condition occurs.

The LEVEL BAR is an analog indication of the percentage of tank filling, present only if the tank has been CONFIGURED.

The asterisk (top right) flashes every time OCIO reads and, if necessary, updates the indicated LEVEL or VOLUME value.

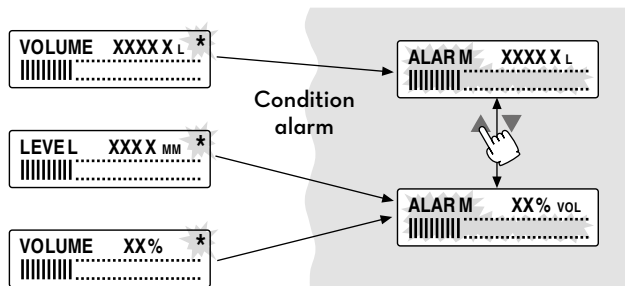
VOLUME indications are only possible if the tank has been configured.



ALARM CONDITIONS (one or both alarms active)

As soon as an ALARM CONDITION occurs, OCIO activates the outputs and modifies the INDICATION displayed.

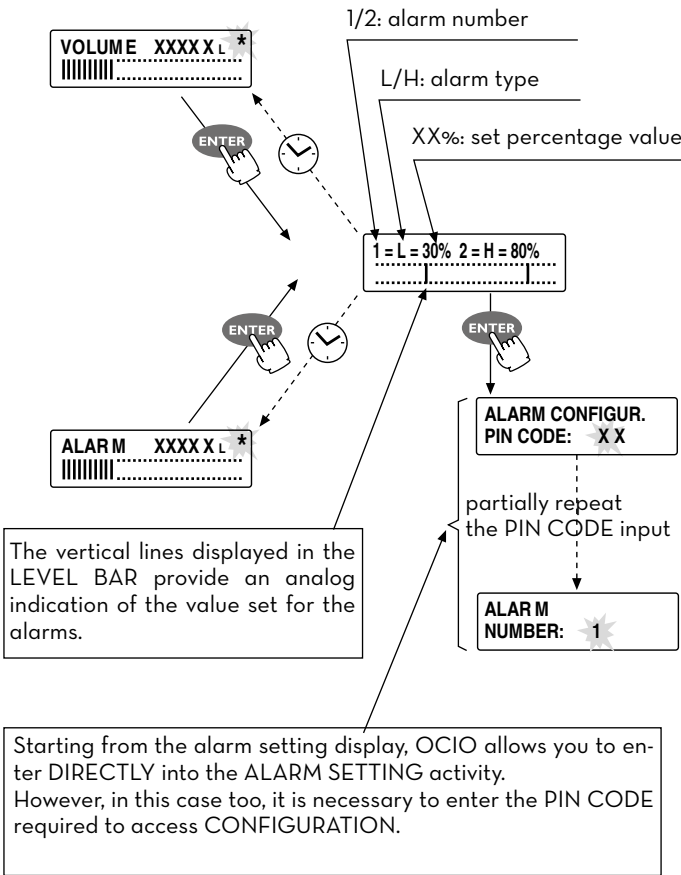
Depending on the type of indication selected under normal conditions, when an alarm is triggered, OCIO displays one of the following two ALARM INDICATIONS, characterized by a FLASH that alerts the user to the alarm condition



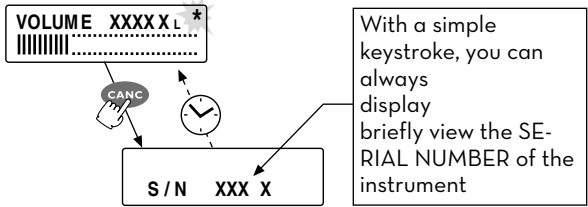
When OCIO detects that the alarm condition has been resolved, it automatically returns to the previously selected indication.

**Display of the
SETTING OF
ALARM SYSTEMS**

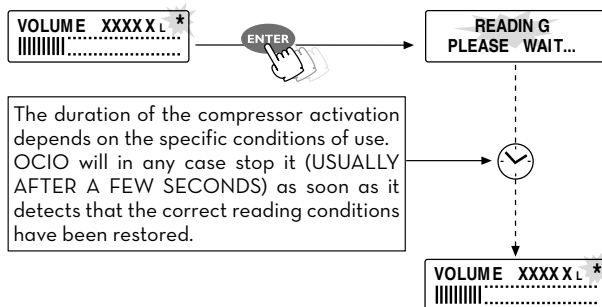
Both in NORMAL conditions (no active alarms) and in ALARM conditions, OCIO allows you to view the alarm set values



**Display of the
SERIAL NUMBER
of the instrument**



MANUAL activation of the compressor

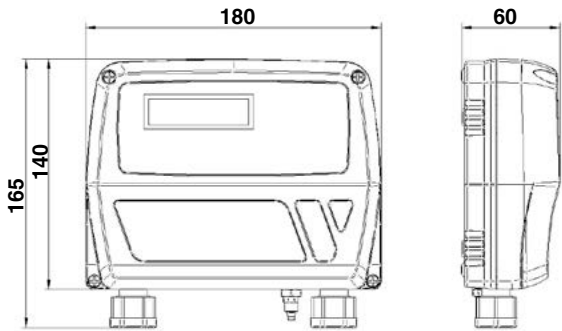


9 TECHNICAL DATA

Power supply	230 V +/- 5 50-60 Hz	
	110 V +/- 5 % 50-60 Hz	
Dimensions	control unit housing: 165x180x60 mm	
	sensor probe: - terminal Ø 29.5 x L = 60	
Protection rating	IP54	
Sensing probe List of materials	Piping	Rilsan
	Ballast terminal	Brass
Sensing probe Dimensions	For liquids with viscosity < 30 Cst: - tubing: diameter I/E = 4 mm / 6 mm (L = 10 m) - terminal: diameter 29.5 mm length 60 mm	
	For liquids with viscosity < 2000 Cst (optional): - tubing: for terminal section diameter I/E = 9 mm / 12 mm (L = 3 m)	
Compatible fluids	any fluid that is NOT flammable, NOT explosive, NON-corrosive, compatible with the probe materials.	
Limiting environmental conditions	Temperature:	- 20 °C + 50 °C
	Humidity:	up to 90%
Tank geometry selectable from the following types:	- parallelepiped	
	- vertical cylindrical (flat bottoms)	
	- horizontal cylindrical (flat bottom).	
Tank dimensions	freely selectable during installation	
MAXIMUM HEIGHT:	4 meters	
Tank volume	from a few dozen liters up to 999,000 liters	

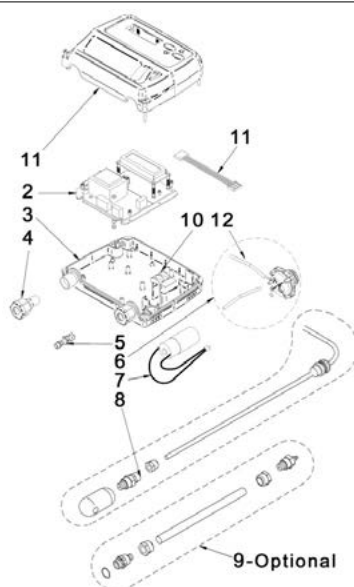
Indication selectable between:	LEVEL (FULL SCALE = 400 cm water column)	
	content as a PERCENTAGE of the total tank volume	
	content in VOLUME (liters or gallons)	
Accuracy	+/- 1% of full scale (after correct calibration)	
Repeatability	+/- 0.5% of full scale	
Alarms	H = HIGH LEVEL (the contact CLOSES if the detected level is HIGHER than the set alarm level)	
	L = LOW LEVEL (the contact CLOSES if the detected level is LOWER than the set alarm level)	
Contact capacity (resistive load):	2 Amps - 277 Volts AC	
	5 Amps - 125 Volts AC	
	5 Amps - 30 Volts DC	

10 DIMENSIONS



11 SPARE PARTS

1. Housing cover
2. Board assembly
3. Case base
4. Ring nut
5. Ø 6 tube fitting
6. Valve body
7. Compressor
8. Diesel fuel probe kit
9. Oil probe kit (optional)
10. Condenser stand
11. Board connection cable
12. Polyurethane tube



The translations, except for the original Italian text, were generated with the support of artificial intelligence and may contain inaccuracies. In case of discrepancies, the Italian version shall prevail.



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12.2025