

OPERATOR'S MANUAL

OD 7685.010

**AUTOCLEAN DISSOLVED OXYGEN
CONTROLLER
MICROPROCESSOR BASED**

Rev. C

Oxygen scales: 0/2000 PPB 0/20.00/40.0 PPM
Temperature scale: -2/+52 °C -28.4/125.6 °F
Power supply: 110/220 Vac

Software: R 2.2x

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1 GENERAL

The instrument is the heart of the Auto-Clean system.

The Auto-Clean monitor uses a blast of high pressure air to remove contaminants from the sensor automatically.

There are no brushes, no grindstones, nothing to clog, break, or wear out. And no need to remove the sensor from the tank for cleaning, either.

The monitor is programmable to clean as often as once every two hours, or as little as once a day.

During each cycle, the sensor membrane is hit with a series of air blasts to insure maximum cleaning efficiency, with a cleaning cycle lasting about 3 minutes.

During the cleaning cycle, D.O. monitor output and alarm contacts are held at pre-cycle values to eliminate false readings or alarms due to the cleaning process.

The Auto-Clean monitor is equipped with a galvanic sensor that uses a durable PTFE membrane, and built it to perform in the most demanding applications with minimal operator attention.

A modular design lets easily to remove the sensing element for service, reducing maintenance costs.

The sensor's principle of operation is simple.

Oxygen diffuses through a PTFE membrane and reduces on the surface of a working electrode, generating a small electrical current proportional to D.O. concentration.

An RTD Temperature element measures water Temperature and corrects the sensor signal for its effect.

The result is a D.O. measurement that's accurate over the operating range of the computer.

2 SPECIFICATIONS

2.1 FUNCTIONAL SPECIFICATIONS

Input

The instrument accepts input from a Galvanic cell.

A second input is provided for 2 or 3 wires Pt100 RTD Temperature sensors.

Temperature compensation

The unit is supplied with manual or automatic Temperature compensation and Temperature information may be displayed on the LCD.

The instrument detects the absence or malfunctioning of the Temperature sensor and automatically switches to manual compensation.

Secondary parameters

The unit is supplied with Pressure, Salinity and Relative Humidity manual compensation.

Measuring ranges

The input range may be selected in PPM, mg/l, % air saturation and mmHg partial pressure.

The Temperature range is selectable in °C or in °F.

Dual Analog output

Either a 0/20 mA or 4/20 mA isolated output may be selected, for use as an interface with computers or data loggers.

A special routine allows selection of the analog output range.
The output current may be set anywhere from 0 to full scale.

Control relays

The D.O. monitor is equipped with two SPDT control relays.

Each control relay may be programmed for set-point, high/low, hysteresis or delay time actuation.

When the unit is configured as main display DO +SET, the full display indicates the current settings and current status of each relay.

Cleaning function

The instrument features two relays (C-D) for autocleaning cycle.
The cleaning function may be activated automatically or manually.

The user may select:

- cleaning time
- holding time
- cycle repetition time

During the CLEAN and HOLD time:

- flashing messages will appear
- analog outputs are maintained in hold
- relays A and B are deactivated

Calibration mode

The instrument may be automatically calibrated in air.

Manual calibration may also be performed.

Software filter

The unit is provided with a dual programmable software filter, to be inserted when the readout is not stable.

Configuration

The electronics for the D.O. monitor system are designed to be as flexible as possible.

A number of programming functions are provided in the Configuration menu and are protected by an access number, which must be entered to allow changes in this setting.

The main display can be configured in order to show the D.O. and Temperature values or the D.O. value and set point status.

Keyboard lock

The Keys on the front panel of the monitor can be used for both changing the display and for calibrations and set-point adjustments.

When the monitor is shipped, all functions are accessible.

However, the adjustment and calibration functions may be locked in order to prevent unauthorized adjustments to the instrument.

Options

091.404 24 VAC power supply

091.701 RS232 isolated output
The output sends the data (D.O. value, °C) to the serial port

2.2 TECHNICAL SPECIFICATIONS

The *Default* values are correspondent to the factory calibration values.
Parameters marked by "*" can be modified in the Configuration procedures.

<p>DISSOLVED OXYGEN</p> <p>* Input cell: 1mil/2mil/5mil</p> <p><u>Input from 5 mil membrane Galvanic Cell</u> Input voltage at 20°C (68 °F) in air: 5/17 mV Temperature compensation: from internal table</p> <p><u>Input from 2 mil membrane Galvanic cell</u> Input voltage at 20°C (68 °F) in air: 12.5/42.5 mV Temperature compensation: from internal table</p> <p><u>Input from 1 mil membrane Galvanic cell</u> Input voltage at 20°C (68 °F) in air: 25/85 mV Temperature compensation: from internal table</p>	<p><i>Default</i></p> <p>5 mil</p> <p>8 mV</p> <p>20 mV</p> <p>40 mV</p>
<p>INPUT SCALES</p> <p>* Main display selection: DO+SET/DO+TEMP</p> <p>* Measuring unit: mmHg/%air/PPM(PPB)/mg/l(µg/l)</p> <p>Selectable scales:</p> <p>* D.O. partial pressure: 0/400mmHg 0/200.0mmHg 0/20.00mmHg</p> <p>* % air saturation: 0/400%aria 0/200.0%aria 0/20.00%aria</p> <p>* PPM: 0/40.0PPM 0/20.00PPM 0/2000PPB</p> <p>* mg/l: 0/40.0mg/l 0/20.00mg/l 0/2000µg/l</p> <p>Display resolution at 20 °C: 1/2000</p> <p>* Digital filter response time (LARGE): 0.5"/50.0"</p> <p>* Digital filter response time (SMALL): 0.5"/50.0"</p> <p>* Autoranging: Off/On</p> <p>Cell sensitivity adjustment: 62.5/212.5%</p> <p>Zero adjustment: +/- 1 mV</p> <p>Air calibration (function of Temp.-Press.-RH)</p>	<p><i>Default</i></p> <p>DO+SET</p> <p>PPM</p> <p>0/200.0</p> <p>0/200.0</p> <p>0/20.00</p> <p>0/20.00</p> <p>2.0"</p> <p>10.0"</p> <p>Off</p> <p>100 %</p> <p>0 mV</p>

TEMPERATURE Input: RTD Pt100 Connection: 2/3 wires Measuring and compensation range: -2/+52 °C (28.4/125.5 °F) Resolution: 0.1 °C (0.1 °F) Zero adjustment: +/- 2 °C (3.6 °F) Manual Temperature: 0/50 °C (32/122 °F)	<i>Default</i> 0°C (°F) 20°C (68°F)
SET-POINT (Relays A-B) *Action: ON-OFF Set-point value: 0/20.00 PPM Hysteresis: 0/2.00 PPM Activation delay: 0/99.9 " *Function: HI/LO (Max/Min) Relay contacts: SPDT	<i>Default</i> SET B 0 PPM 0 PPM 0.0" LO
CLEANING FUNCTION (Relays C-D) *Action: Disable/Manual Clean/Auto+Manual Clean Auto Clean: Cycle repetition: 0.1/24.0h *Number of cycle (N):1/10 *Charging time: 0.5/60.0" *Discharging time: 0.0-10.0" Relay C (compressor) ON for: (Charge time+Discharge time)*(N-1)+(Charge time-2") Relay D (valve) OFF for: Charge time Relay D (valve) ON for: Discharge time *Hold time: 0.1'/20.0' Relays contacts: SPST	<i>Default</i> Disable 24.0h 4 15.0" 3.0" 3.0'

ANALOG OUTPUT Nr. 1	<i>Default</i>
*Input channel connected to Out 1: O2/°C	O2
*current range: 0-20/4-20 mA	4/20 mA
*Point 1 for Output 1:	
Range: 0.0/40.0 PPM	0.0 PPM
Range: 0.00/20.00 PPM	0.00 PPM
Range: 0/2000 PPB	0 PPB
Temperature: 0.0°C/50.0°C	0.0 °C
*Point 2 for Output 1:	
Range: 0.0/40.0 PPM	40.0 PPM
Range: 0.00/20.00 PPM	20.00 PPM
Range: 0/2000 PPB	2000 PPB
Temperature: 0.0°C/50.0°C	50.0 °C
Response time: 10 Sec. for 98%	
Isolation: 250 Vac	
Rmax: 600 ohm	

ANALOG OUTPUT Nr. 2	<i>Default</i>
*Input channel connected to Out 2: O2/°C	°C
*current range: 0-20/4-20 mA	4/20 mA
*Point 1 for Output 2:	
Range: 0.0/40.0 PPM	0.00 PPM
Range: 0.00/20.00 PPM	0.00 PPM
Range: 0/2000 PPB	2000 PPB
Temperature: 0.0°C/50.0°C	0.0 °C
*Point 2 for Output 2:	
Range: 0.0/40.0 PPM	40.0 PPM
Range: 0.00/20.00 PPM	20.00 PPM
Range: 0/2000 PPB	2000 PPB
Temperature: 0.0°C/50.0°C	50.0 °C
Response time: 10 Sec. for 98%	
Isolation: 250 Vca	
Rmax: 600 Ohm	

SERIAL COMMUNICATION (opt. 091.701)	<i>Default</i>
Baud Rate: 4800 bit/s	
Nr. of bit: 8 bit	
Nr. of stop bit: 1 bit	
Parity: None	
Isolated from measuring circuits	
Example of data sent: ±20.00PPM ±50.0°C Z:-0.500mV S:100.0%	
Data sent every: 0.4 sec.	

PARAMETERS ON CONFIG BLOCK (See for *)	<i>Default</i>
Free calibration (access code not required): Keyboard Locked/Unlocked. LCD contrast (0/7). Main display: DO+SET/DO+TEMP Temperature unit: °C/°F	Unlocked 4 DO+SET DO+SET
Under access code number (0): Type of input cell (1 mil/2 mil/5 mil). Measure unit (mmHg,%air,PPM,mg/l). Range of measure (40.0/20.00/2000PPB). Autorange on/off Digital filter response time (large): 0.5/50.0" Digital filter response time (small): 0.5/50.0" Input connected to Out 1 (O2/°C) Range of analog Output 1 (0/20 4/20mA) Point 1 for Output 1 Point 2 for Output 1 Input connected to Out 2 (O2/°C) Range of analog Output 2 (0/20 4/20mA) Point 1 for Output 2 Point 2 for Output 2 Function of relay A (HI/LO). Function of relay B (HI/LO). Cleaning function (Auto/Manual/Disabled) Number of cycle for cleaning function: 1/10 Charging time: 0.5/60.0" Discharging time: 0.0/10.0" Holding time before restarting of normal operation: 0/60.0' Access Number: 0/999	2 mil PPM 20.00 off 2.0" 10.0" O2 4/20 0.00 20.00 °C (°F) 4/20 0.0 50.0 LO LO Disabled 4 20.0" 3.0" 3.0' 0

GENERAL SPECIFICATIONS

Acquisition time: 0.4 Sec. approx.
Alphanumeric display: 1 line x 16 characters

Operating Temperature: 0/50 °C
Humidity: 95% without condensate
Power supply: 110/220 Vac +/- 10% 50/60 Hz
Isolation: 4000 volt between primary and secondary (IEC 348)
Power: 5 VA max.
Terminal block: extractable
Weight: 850 gr.
Dimensions: 96 x 96 x 155 mm.

2.3 PHYSICAL DESCRIPTION

The controller enclosure is designed for surface or panel mounting.

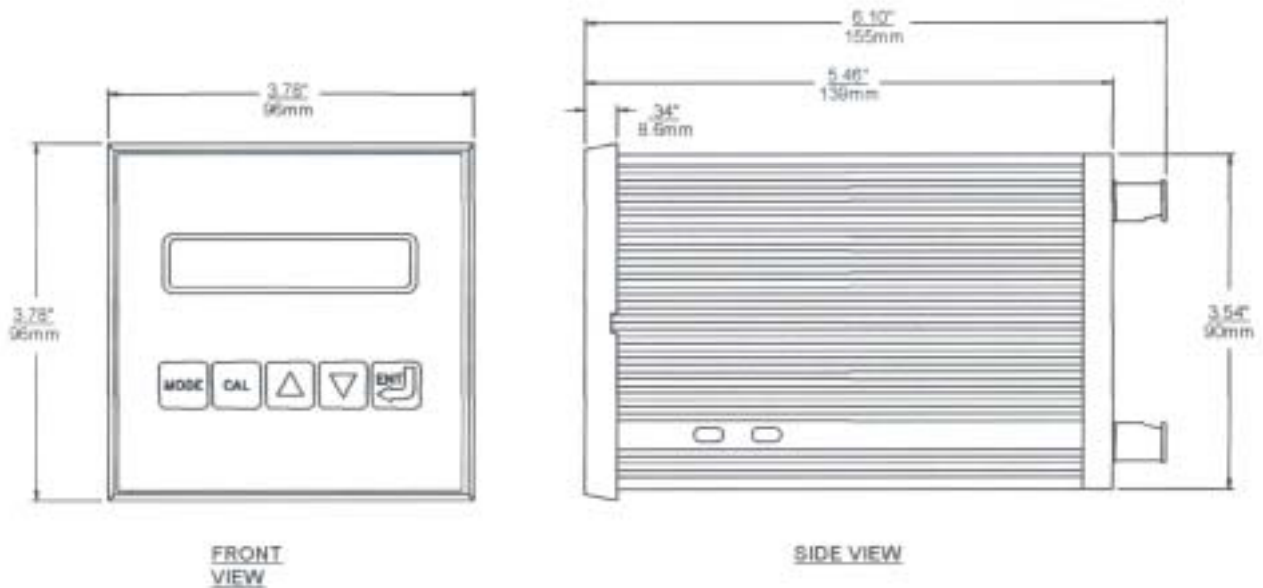
It consists of an anodized aluminium case built according to the standard DIN 43700, with an aluminium panel coated with scratch-proof and non-corrosive polycarbonate membrane.

A transparent waterproof front door SZ7601 can be added to the housing, in order to protect the unit from excessive moisture or corrosive fumes.

Signal and power cable connections are made by using two extractable terminal blocks placed in the back of the instrument.

This makes wiring, installation and general maintenance of the probes and other devices easier.

The package is supplied complete with fixing clamps for panel-mounting.



3 INSTALLATION

3.1 PHYSICAL INSTALLATION

The unit may be installed close to the points being monitored in a suitable switch board or in a water-tight enclosure for field applications.

The enclosure is designed for panel-mounting.

It should be mounted on a rigid surface, in a position protected from the possibility of damage or excessive moisture or corrosive fumes.

For the Auto-clean application the unit is installed in the enclosure containing the autoclean system.

3.2 ELECTRICAL INSTALLATION

All connections within the controller are made on detachable terminal strips located on the rear side. (fig. 2)

All power and output-recorder connections are made at the 13 pin terminal strip, while input signal connections are made at the 12 pin terminal strip.

The electrical installation consists of:

Connecting the power

- connect ground to terminal 4
- connect ac power to 1 - 2 terminals if power voltage is 110 V
- connect ac power to 1 - 3 terminals if power voltage is 220 V
if 091.404 option is installed, connect 24 Vac to 1-3 terminals

Warnings:

- power the device by means of an isolation transformer
- avoid mains-voltage from an auto-transformer
- avoid mains voltage from a branch point with heavy inductive loads
- separate power supply wires from signal ones
- check the mains voltage value

Connecting the sensor

- Sensor cabling is a critical part of the whole system.
- use original cable supplied with the sensor

- connect the anode (Pb) to the terminal 21 marked IN- (white)
- connect the cathode (Pt or Ag) to the terminal 22 marked IN+ (brown)

Connecting alarms, pumps, valves

The output connections referred to set-point 1 and set-point 2 are made at terminal strip and they consist of two independent SPDT relays corresponding to Regulator A and Regulator B.

The output connections referred to Auto-Clean consist of two SPST relays corresponding to autoclean C/D.

Control relay "A"

terminal 6 marked C : common contact
 terminal 5 marked NO : normal open contact
 terminal 7 marked NC : normal closed contact

Control relay "B"

terminal 9 marked C : common contact
 terminal 8 marked NO : normal open contact
 terminal 10 marked NC : normal closed contact

Relay "C" (Autoclean - Compressor)

terminal 12 marked C : common contact
 terminal 11 marked NO : normal open contact

Relay "D" (Autoclean - Solenoid)

terminal 12 marked C : common contact
 terminal 13 marked NO : normal open contact

Connecting a recorder

A dual current output for a remote recorder or P.I.D. regulators is available on terminals 14-15-16.

Connect to terminals 14-16 for the 1st channel output.
 Connect to terminals 15-16 for the 2nd channel output.

Series connection is required for driving more loads having a total input Resistance lower than 600 ohm.

Output current is 0/20 or 4/20 mA isolated.

Connecting the RTD

The instrument has the automatic Temperature compensation carried out by means of RTD Pt100. The Temperature sensor is included into the D.O sensor. To operate the automatic Temperature compensation, connect the RTD as shown in the "connection" figure.

3-wire connection

- connect the terminal of RTD to terminal 23 (red)
- connect the common terminal of RTD to terminals 24 - 25 (black and green)
- the 3 wire-cable must not be interrupted on the overall length.
If an extension is needed, the cable must be fastened to the high insulation terminal strip.
- keep the cable away from power wires

The RTD connection as above described allows the controller to provide a digital readout of Temperature.

If the Temperature sensor is not connected or damaged, the unit will operate in manual Temperature compensation automatically.

2-wire connection

- connect the Pt100 to terminals 23 - 24
- install a jumper to terminals 24 - 25

Checking

Before connecting the system to the power supply:

- check that all cables are properly fastened to prevent strain on the connections
- check that all terminal-strip connections are mechanically and electrically sound

4 OPERATING THE SYSTEM

Pre-operation check

The system's controls and indicators are all located on the front panel (see fig.1).

The meter has a LCD display 1 indicating that unit is on.

The cards of the controllers are adjusted at the factory.

If sensors have been connected correctly, as described in the above sections, the system should function correctly needing only the start up and the parameters calibrations as described in the following section.

The Dissolved Oxygen sensor has a stabilization time when first installed and connected to the powered monitor.

Allow the system to stabilize with the sensor in tap water.





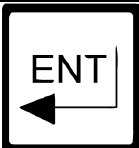
Calibrate the sensitivity after the stabilization occurs.

5 SOFTWARE DESCRIPTION

5.1 KEYBOARD

KEY

FUNCTION

	<ul style="list-style-type: none"> - it allows the operator to go to the next Display - it allows to go back to the main Display. The eventual new parameter values will not be memorized
	<ul style="list-style-type: none"> - it allows the access of calibration sequences
	<ul style="list-style-type: none"> - it allows to increase the displayed parameters - it allows to choose between different functions
	<ul style="list-style-type: none"> - it allows to decrease the displayed parameters - it allows to choose between different functions
	<ul style="list-style-type: none"> - it allows to enter the selected data and to return to the main Display D0

5.2 READOUT SEQUENCES

Applying the power to the instrument the display will show the Part Number and the Release of the unit, then will show the main display (D0).

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Press to visualize the following Display:

D0	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-bottom: 5px;">20.00PPM <input checked="" type="checkbox"/>AL <input type="checkbox"/>BH</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-bottom: 5px;">20.00PPM 20.0°C</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px;">20.00PPM 68°F</div>	actual O2 value, set-point status/functions or O2 value and Temperature value
D1	<div style="border: 1px solid black; border-radius: 10px; padding: 5px;">P:760 sal:20000</div>	Secondary parameters
D2	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; margin-bottom: 5px;">TEMP.: 20.0°C</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px;">TEMP.: 68.0°F</div>	Temperature value in °C or °F
D3	<div style="border: 1px solid black; border-radius: 10px; padding: 5px;">SA:10.00PPM <input checked="" type="checkbox"/>L</div>	Set-point A parameters
D4	<div style="border: 1px solid black; border-radius: 10px; padding: 5px;">SB:10.00PPM <input checked="" type="checkbox"/>H</div>	Set-point B parameters
D5	<div style="border: 1px solid black; border-radius: 10px; padding: 5px;">CLEANING OFF</div>	Cleaning function
D6	<div style="border: 1px solid black; border-radius: 10px; padding: 5px;">01 10.0mA/10.0PP</div>	Analog output Nr.1 /input values

D7	02 10.0mA/ 20 °C	Analog output Nr.2 /input values
D8	Configuration	Configuration Display
D9	OD7685.010 R2.1x	Instrument code and Software release

20.00PPM AL BH

or

20.00PPM 20.0°C M

or

20.00PPM 68°F M

- 20.00PPM: actual D.Oxygen value
- A: Set-point A state
- : deactivated relay
- : the process has reached the set-point and the relay activation is delayed
- : activated relay
- B: Set-point B state
- 20.0°C: actual Temperature value in °C
- 68°F: actual Temperature value in °F
- M: manual Temperature compensation

MESSAGE

MEANINGS

- | | |
|---------------|---|
| " ---- " | the instrument is changing the scale |
| " >>>>> " | the present value is over range |
| " <<<<< " | the present value is under range |
| "CLEAN CYCLE" | the instrument is in AUTO CLEAN function (Relay D on) |
| "HOLD CYCLE" | the instrument is in Hold |



to activate the Zero/Sensitivity calibration procedure

MODE
DISP

to go to

(D1) **P:760 sal:20000** secondary parameters display

CAL

to activate the secondary parameters calibration
(Pressure - Salinity - Relative Humidity)

MODE
DISP

to go to

(D2) **TEMP.: 20.0°C** Temperature value in °C

Or

(D2) **TEMP.: 68.0°F** Temperature value in °F

M: manual value

CAL

to activate the Temperature calibration or the manual
Temperature value selection procedures

MODE
DISP

to go to

(D3) **SA:10.00PPM ■ L** Set-point A parameters

10.00: D.Oxygen Set-point value
: Set-point actual state
L: selected function low/high (L-H)

CAL

to activate the programming sequences for set-point value, hysteresis and delay
time

MODE
DISP

to go to

(D4) **SB:10.00PPM ■ H** set-point B parameters

10.00: D. Oxygen set-point value
: Set-point actual state
H: selected function low/high (L-H)

CAL

to activate the programming sequences for set-point value, hysteresis and delay time

MODE
DISP

to go to

(D5) **CLEANING OFF**

CLEANING OFF: cleaning function disabled

MANUAL CLEAN

MANUAL CLEAN: manual cleaning function

CAL

to activate the sequence "WAITING/START" autocleaning

AUTO CLEAN

AUTO CLEAN: automatic cleaning function

CAL

to activate the "NEXT CYCLE" visualization

MODE
DISP

to go to

(D6)

01 10.0mA/10.0PP

Analog output N°1/correspondent value
(O2/°C) or (O2/°F)

MODE
DISP

to go to

(D7)

02 10.0mA/ 20 °C

Analog output N°2/correspondent
value (O2/°C) or (O2/°F)

MODE
DISP

to go to

(D8)

Configuration

Configuration Display

CAL

- to activate the keyboard lock/unlock and LCD Display contrast selection sequences
- to activate the configuration sequences

MODE
DISP

to go to

(D9)

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Instrument code and software release

MODE
DISP

to go back to the main Display (D0)

5.3 CALIBRATION SEQUENCES


The following procedures will be activable whenever the instrument is not in the keyboard lock condition.

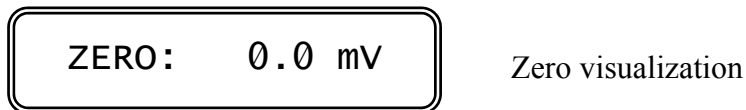
To unlock the keyboard follows the procedures mentioned in chapter "Configuration".


The following procedures allows the sensors calibration, the Set-point and autoclean parameters programming.


5.3.1 Zero sensor calibration

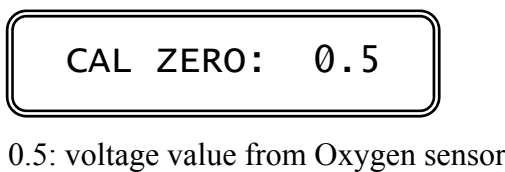


1.  to access the calibration sequences





-  to confirm the displayed value and to access the Sensitivity cell visualization/calibration




2.  to access the Zero calibration routine



3. Choose one of the following action:

 to stop the procedure and to go to (D0)

 to confirm the selected zero of the cell

 +  +  press the 3 keys to turn to factory calibration (zero value to 0)

MESSAGE

FUNCTION

UPDATE

the calibration is accepted

Error message

Z> 1.0mV

Zero > 1.0mV

The above messages will last for 5 minutes



to acknowledge the error messages

NO UPDATE

the calibration is not accepted
the unit turns to (D0)

5.3.2 Sensitivity sensor calibration

SENS: 100.0%

Sensitivity visualization



to go to (D0)



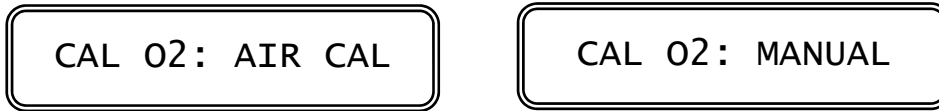
to confirm the value and to go back to (D0)

1. **CAL**

to access the Mode of calibration selection

MODE OF CALIBRATION

Monitors can be calibrated in 2 ways, automatic air or manual calibration.
 Automatic air calibration lets the electronics adjust the calibration based on the Temperature measured by Pt100 in the sensor and programmed values for altitude, salinity and relative humidity.
 Manual calibration allows the value on the display to be adjusted to a value provided from a secondary device, usually a portable DO meter.



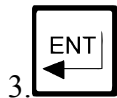
MANUAL (AIR CAL): calibration mode selected



to stop the procedure and to go to (D0)



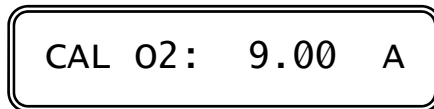
to select the calibration mode



- to confirm the calibration mode
 - to access the cell sensitivity calibration (AIR CAL or MANUAL) as selected

SENSITIVITY CALIBRATION (Air mode)

This procedure is simple and reliable because it uses ambient air as a reference standard, which is generally stable.
 However it requires that the sensor be removed from the tank and allowed to stabilize at air Temperature, which can take 30 minutes.
 This method cannot be used when the air Temperature is below 0 °C.



9.00: actual Oxygen value
 A: automatic calibration mode



to stop the procedure and to go to (D0)



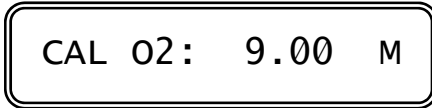
press the 3 keys to turn to factory calibration (Sensitivity value to 100%)




- to start the air mode calibration routine
 - to go back to (D0)




SENSITIVITY CALIBRATION (Manual mode)



This method allows the sensor to be left in the tank and a portable sensor dropped in near it to get a reference measurement. The method works well if the portable meter is stable and reliable, but must be used with caution, since most portable units use thinner membranes that have different response time than the fixed monitor.




9.00: actual Oxygen value
M: manual calibration mode

 to stop the procedure and to go to (D0)

 +  +  press the 3 keys to turn to factory calibration (Sensitivity value to 100%)

2B.   to set the D.O. value measured by the secondary method

3B.  - to confirm the selected value
- to go back to (D0)

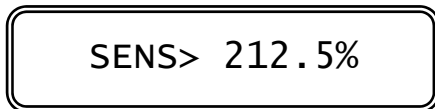
MESSAGE

FUNCTION

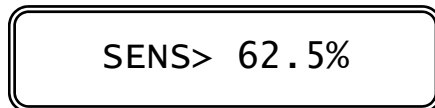


the calibration is accepted

Error messages




Sensitivity > 212.5%



Sensitivity < 62.5%

The above messages will last for 5 minutes

 to acknowledge the error messages

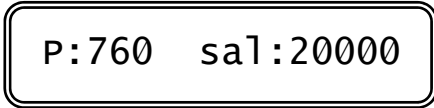



the calibration is not accepted
the unit turn to (D0)

5.3.3 Secondary parameters calibration

1.  to go to

(D1)





2.  to access the calibration sequences

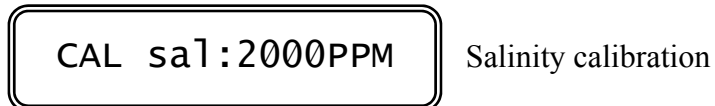


760 mm: Atmospheric value


 to stop the procedure and to go to (D1)


3.  to modify the value


4.  to confirm the value and to access the next step



20000 PPM: Salinity value

 to stop the procedure and to go to (D1)

5.  to modify the value

6.  - to confirm the value
- to access the relative humidity calibration



100%: Relative humidity value



to stop the procedure and to go to (D1)



7. to modify the value



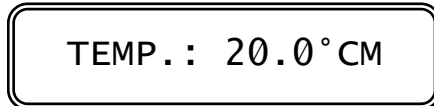
8. to confirm the value and to go back to (D1)

5.3.4 Temperature calibration



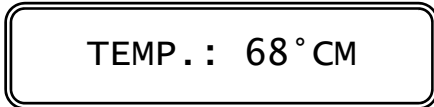
1. to go to

(D2)

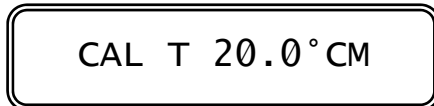


Or

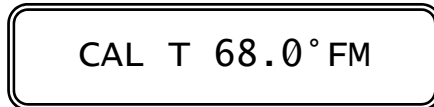
(D2)



2. to access the calibration procedure



Or



'>>>>>' ('<<<<<<'): Temperature value over range



to stop the procedure and to go to (D2)



3. to modify the actual reading



4. to confirm and to go to the manual Temperature adjustment

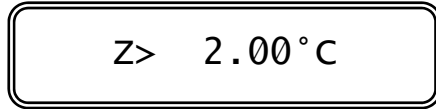
MESSAGE

FUNCTION



the calibration is accepted

Error messages



Zero > 2.00°C (3.6 °F)

The above message will last for 5 minutes



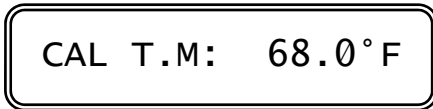
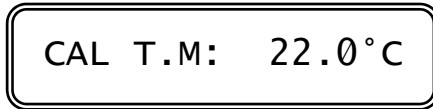
to acknowledge the message



the calibration is not accepted

Manual Temperature calibration

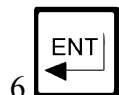
Or



to stop the procedure and to go to (D2)



5. to modify the actual value



6. to confirm and to go back to (D2)

5.3.5 Set-point A/B calibration

The following procedure are suitable for both Set-point A and B in order to insert the Set-point value, the Hysteresis and the Delay time

1.  to go to


(D3)

SA: 10.00PPM L

Or

(D4)


SB: 10.00PPM H


2.  to access the programming sequences


Set-point value

CAL SA S: 10.00

10.00: actual set-point value

 to stop the procedure and to go back to (D3)/(D4)


3.  to insert the set-point value

4.  to confirm and to go to the next step

Hysteresis

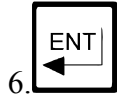
CAL SA I: 0.10

0.10: actual hysteresis value

 to stop the procedure and to go back to (D3)/(D4)



to insert the hysteresis value



to confirm and to go to the delay time selection

Relay delay



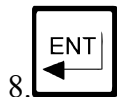
5.0s: actual delay time value



to stop the procedure and to go back to (D3)/(D4)

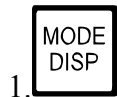


to insert the delay time value



to confirm and to go back to (D3)/(D4)

5.3.6 Cleaning function



to go to

(D5)



(MANUAL CLEAN/AUTO CLEAN)

CLEANING OFF: cleaning function disabled
 MANUAL CLEAN: manual cleaning function
 AUTO CLEAN: automatic cleaning function





to access the calibration sequences
 (only for MANUAL CLEAN or AUTO CLEAN)


Manual cleaning function (MANUAL CLEAN)

CLEAN C. :WAITING (START)

WAITING: The unit is waiting to start a new Clean Cycle.

 to stop the procedure and to go back to (D5)

3A.  to select START or WAITING

4A.  to confirm selection


- If START is selected the unit go back to (D0) and a new Clean Cycle starts.




- If WAITING is selected the unit go back to (D5).


Automatic cleaning function (AUTO CLEAN)

NEXT CYCLE: 24.0h

24.0h: time to the next cleaning cycle


 to stop the procedure and to go back to (D5)


 +  +  press the 3 keys to set to zero the time to the next cleaning cycle


3B.  to turn the unit to the WAITING/START autocleaning

CLEAN C. : WAITING (START)

WAITING: The unit is waiting to start a new Clean Cycle.

 to stop the procedure and to go back to (D5)

4B.  to select START or WAITING

5B.  to confirm selection


- If START is selected the unit go back to (D0) and a manual Clean Cycle start without modify the time of the automatic Clean Cycle


- If WAITING is selected the unit turn to the period of repetition calibration (see steps 6B and 7B)

REPETITION: 24.0h

24.0h: period of repetition

 to stop the procedure and to go back to (D6)

6B.  to select the time value

7B.  to confirm the value and to go back to (D6)

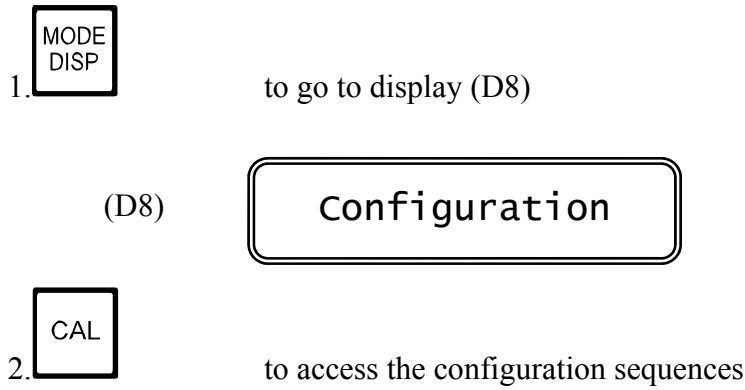
IMPORTANT NOTE:

during the calibration procedure the microprocessor turn the unit to the main Display if no keys have been pressed within 5 minutes.

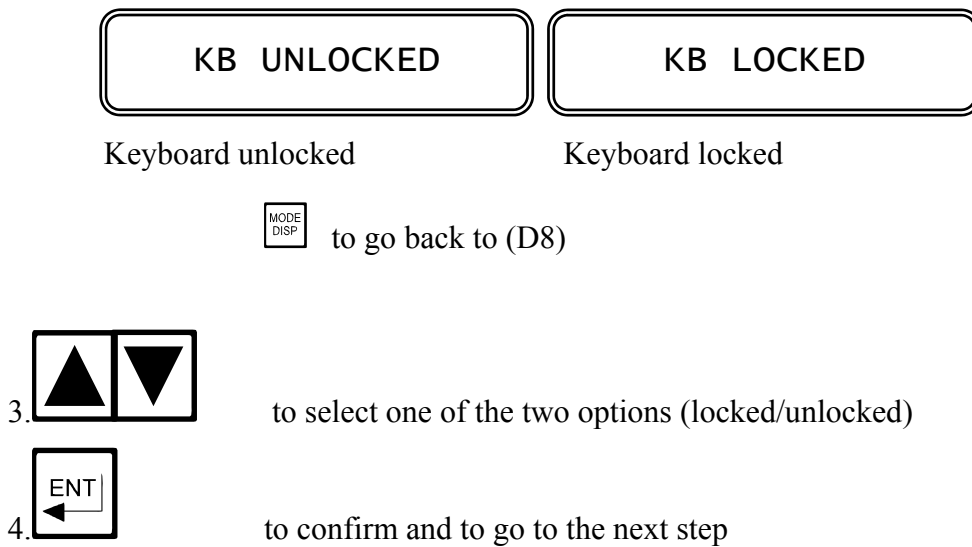
5.4 CONFIGURATION

The following operations are possible:

- keyboard locked/unlocked selection
- Display contrast selection
- access number insertion



5.4.1 Keyboard locked/unlocked



5.4.2 LCD Display contrast

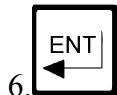
LCD contrast: 4



to go back to (D8)



to select the contrast from 0 to 7



to confirm and to go to the access the next step.

5.4.3 Type of main display

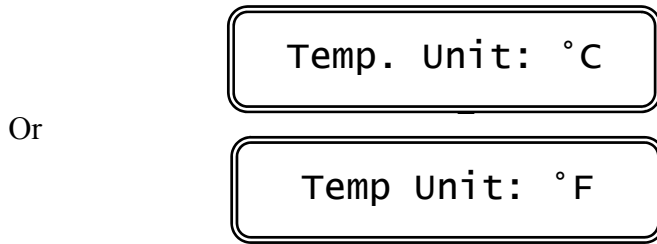
Disp.: DO + SET

Or

Disp.: DO + TEMP

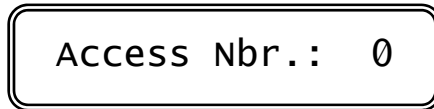
Active keys: - -

5.4.4 Temperature unit



Active keys: - -

5.4.5 Access number

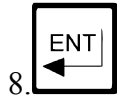


Access number request

to go back to (D8)

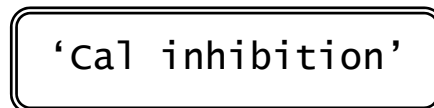


to insert the access number (when keeping the key pressed the number will scroll with 3 speed level)



to confirm and to proceed with the configuration

IMPORTANT NOTE: any inserted number different from the right access code, will allow the visualization of the parameters and not the modification.



Configuration inhibited

5.4.6 Input cell

Input cell: 1 mil

Input cell: 2 mil

Input cell: 5 mil

Active keys:  -   - 

NOTE: select 5 mil if autoclean sensor is installed.

5.4.7 Measuring Unit

M. Unit: mmHg

M. Unit: %air

M. Unit: PPM

M. Unit: mg/l

Active keys:  -   - 





5.4.8 Input range

Range: 2000PPB	Range: 20.00PPM	Range: 40.0 PPM
Range: 2000µg/l	Range: 20.00mg/l	Range: 40.0 mg/l
Range: 20.00mmHg	Range: 200.0mmHg	Range: 400 mmHg
Range: 20.00 %air	Range: 200.0%air	Range: 400 %air

Active keys:  -   - 

5.4.9 Autoranging

Autoranging:OFF	Autoranging:ON
-----------------	----------------

Active keys:  -   - 




5.4.10 Software filter (Large)

SW 90% RT: XX.XS

Active keys:  -   - 

5.4.11 Software filter (Small)

SW 90% RT:XX.XS

Active keys:  -   - 

5.4.12 Input related to analog Output n°1

CAL OUT1: PPM

(°C or °F)

PPM (°C or °F): input selected for analog output n°1

Active keys:  -   - 

5.4.13 Analog output n°1 range

CAL OUT1: 0/20mA

CAL OUT1: 4/20mA

0/20mA (4/20mA): range selected

Active keys:  -   - 

CAL P1: 0.00 PPM

P1: begin of range
0.00PPM: measuring value related to 0/4 mA

Active keys:  -   - 

CAL P2: 20.00 PPM

P2: end of range
20.00PPM: measuring value related to 20 mA

Active keys:  -   - 

IMPORTANT NOTE: if the value related to P1 is higher than the value related to P2, the analog output will be the "reverse", otherwise will be the "direct" type.

5.4.14 Input related to analog output n°2

CAL OUT2: °C or °F

°C: input selected for analog output n°2

Active keys:  -   - 

5.4.15 Analog output n°2 range

CAL OUT2: 0/20mA CAL OUT2: 4/20mA

0/20mA (4/20mA): range selected

Active keys:  -   - 

CAL P1: 0.0 °C or °F

P1: begin of range

0.0 °C (PPM): measuring value related to 0/4 mA

Active keys:  -   - 

CAL P2: 50.0 °C or °F

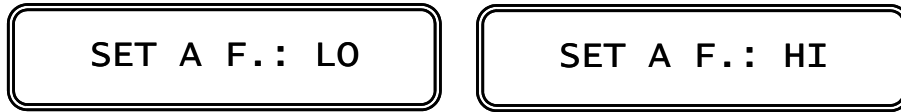
P2: end of range

50.0°C (PPM): measuring value related to 20 mA





Active keys:  -   - 

IMPORTANT NOTE: if the value related to P1 is higher than the value related to P2, the analog output will be the "reverse", otherwise will be the "direct" type.

5.4.16 Set-point A function



LO: Minimum (relay activated for meas. below Set-point)
HI: Maximum (relay activated for meas. above Set-point)

Active keys:  -   - 

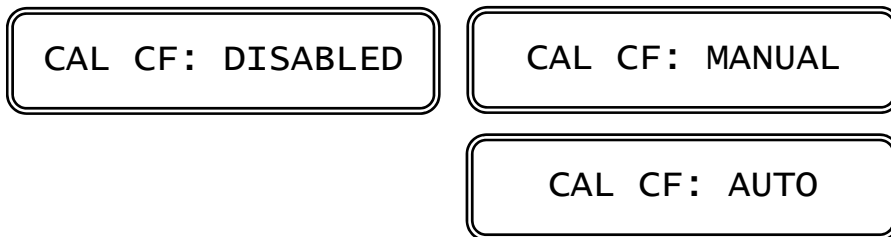
5.4.17 Set-point B function



LO: Minimum (relay activated for meas. below Set-point)
HI: Maximum (relay activated for meas. above Set-point)

Active keys:  -   - 


5.4.18 Cleaning function



Active keys:  -   - 



5.4.19 Number of cycle

N. OF CYCLE: 4

Active keys:  -   - 

5.4.20 Charging time (Relay D off)

CHARGE T.: 20.0"

Active keys:  -   - 





5.4.21 Discharging time (Relay D on)

DISCHARGE T.: 3.0"

Active keys:  -   - 

5.4.22 Holding time

HOLDING T.: 3.0'

Active keys:  -   - 

5.4.23 New access number

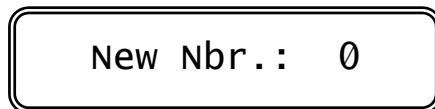


NO : access number changing not required
 YES: access number changing required

Active keys: - -

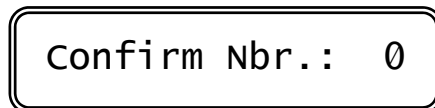
Two possible alternative A or B.

- A. "NO" The unit will go back to the Configuration Display; the operator may verify the parameter setting before leaving the Configuration sequences which is now protected by access number.
- B. "YES" The unit is now ready to the new access number selection.



Active keys: - -

The instrument ask the operator to insert again the new access number.



Active keys: - -

The double insertion of the new code assure the memorization of the right code.

As soon as the new code is memorized the message 'UPDATE' will appear.




Should the operator insert two different numbers, the instrument will not modify the access number and the message 'NO UPDATE' will be shown.

press several time the key to verify the parameter selected before leaving the Configuration routine.

6 CALIBRATION

6.1 ELECTRICAL CALIBRATION

Should a problem arise with a D.Oxygen monitor, a sensor Simulator can be used to determine if the electronic unit is working correctly.

Reset the unit to the Laboratory calibration (press Keys  +  +  as described in the parameters calibration section) and follow the steps:

- Connect to the terminals 21-22 a mV Simulator.
- Simulate the value 0 mV and read the value 0,0 on the display.
- Simulate the value 8 mV - 20 mV - 40 mV depending of membrane.
With these input voltage values the display will show 10.0 PPM or 100%.

6.2 CHEMICAL CALIBRATION

Zero cell calibration

The zero calibration is necessary when installing the system and during the initial start up in order to compensate the eventual dark current of the measuring cell.

Insert the sensor into the water and allow the reading to stabilize for 10 - 20 minutes prior to setting the zero calibration.

This operation may be effected after the electric zero calibration above described and when the cell is connected to the amplifier, in order to read 0.00 on the display.

Immerse the cell in a freshly-prepared 2 % Sodium Metabisulphyte solution or in an equivalent media with total absence of Dissolved Oxygen and follow the procedure described in the "zero calibration section" of this manual.

Sensitivity calibration

Follow the sensitivity calibration procedure described in the calibration section.
This calibration is usually effected at Oxygen saturation or with the sensor in air.

7 PREVENTIVE MAINTENANCE

Controller

Quality components are used to give the controller a high reliability.

The frequency of such maintenance depends on the nature of each particular application.

As in any electronic equipment, the mechanical components, such as switches, relays and connectors, are the most subject to damage.

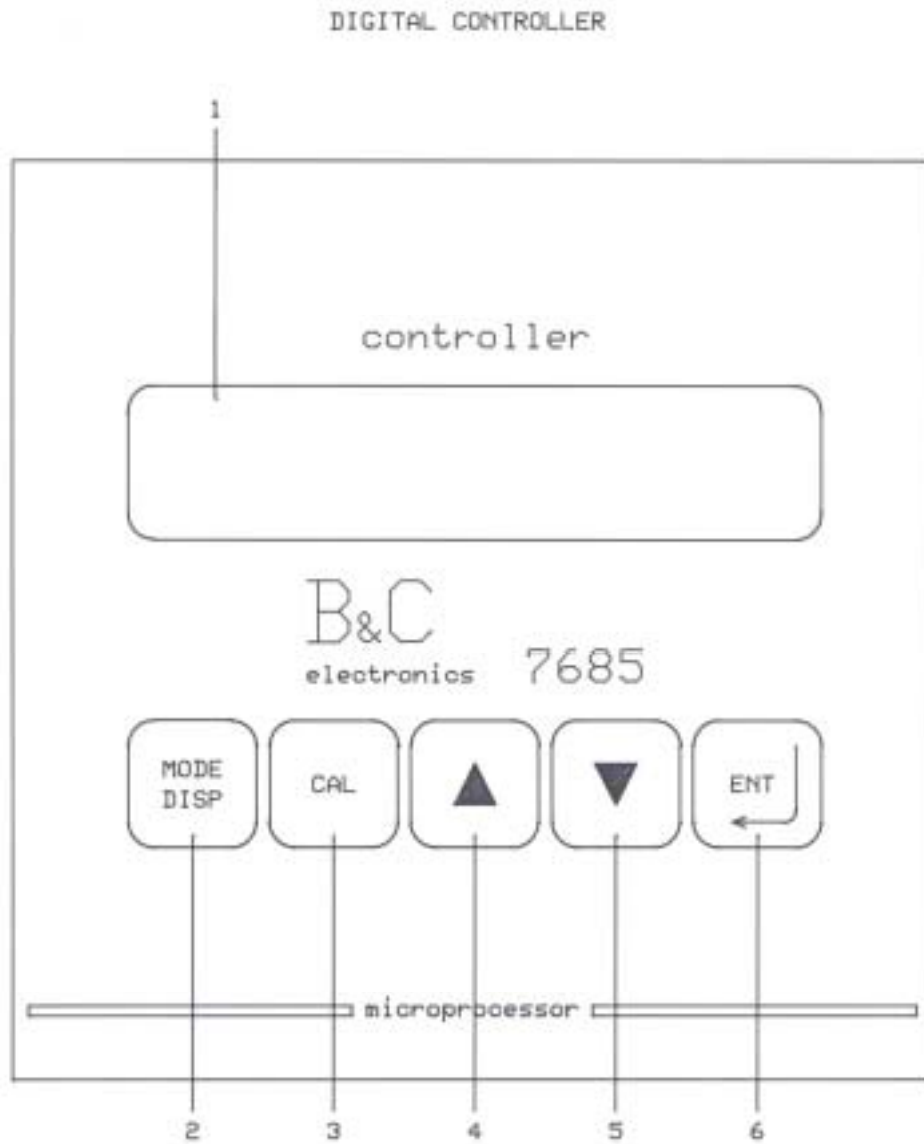
- check for damage of the electrolytic capacitors if the meter is exposed to temperatures above 80 degree C.
- check for damage in all the electronic components if the meter is subjected to excessive voltage
- check for damage of the electronic and mechanical components if the meter is dropped
- repeat periodically the pre-operation check
- check that all the connections are free from moisture and contamination

Disconnect the power supply to the monitor before performing the following procedures:

- Use moisture free air and blow out the interior of the case and terminal board connections as necessary
- Inspect the printed circuit boards for dirt and corrosion; clean as necessary and blow dry
- Tighten all the terminal-board connections and mounting hardware
- Replace the front panel circuit board or the base circuit board

Sensor

See the instruction manual of the sensor.

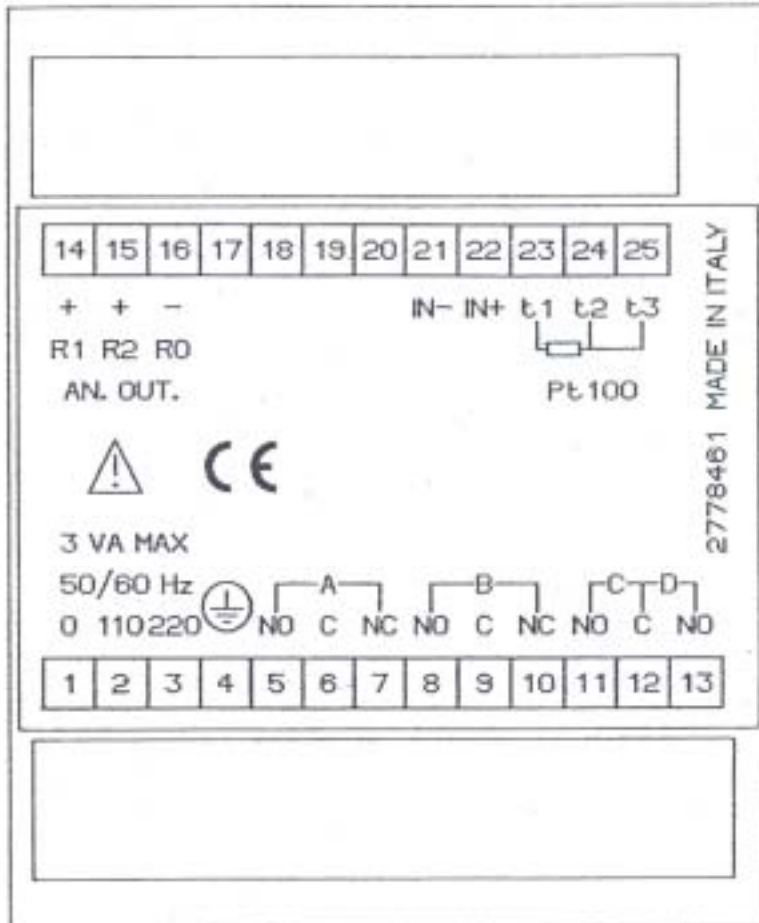


1. DISPLAY
2. MODE-DISPLAY KEY
3. CALIBRATION KEY
4. INCREASE KEY
5. DECREASE KEY
6. ENTER KEY

FIG. 1

OD 7685.010

REAR PANEL CONNECTIONS



- 1. 2. 110 V. Power supply
- 1. 3. 220 V. Power supply
- 4. Ground (power)
- 5. 6. A Relay N.O. contacts
- 6. 7. A Relay N.C. contacts
- 8. 9. B Relay N.O. contacts
- 9.10. B Relay N.C. contacts
- 11.12. C Relay N.O. contacts
- 12.13. D Relay N.O. contacts
- 14. Recorder output channel 1 (+)
- 15. Recorder output channel 2 (+)
- 16. Recorder output channel 1 and 2 (-)
- 17.18 Out Power supply for external circuits
- 21. D.O. sensor input (Pb)
- 22. D.O. sensor input (Ag)
- 23.24.25. Temperature sensor input (Pt100)

FIG. 2

CONTENITORE DIN 43700 MOD. 7685
BOX

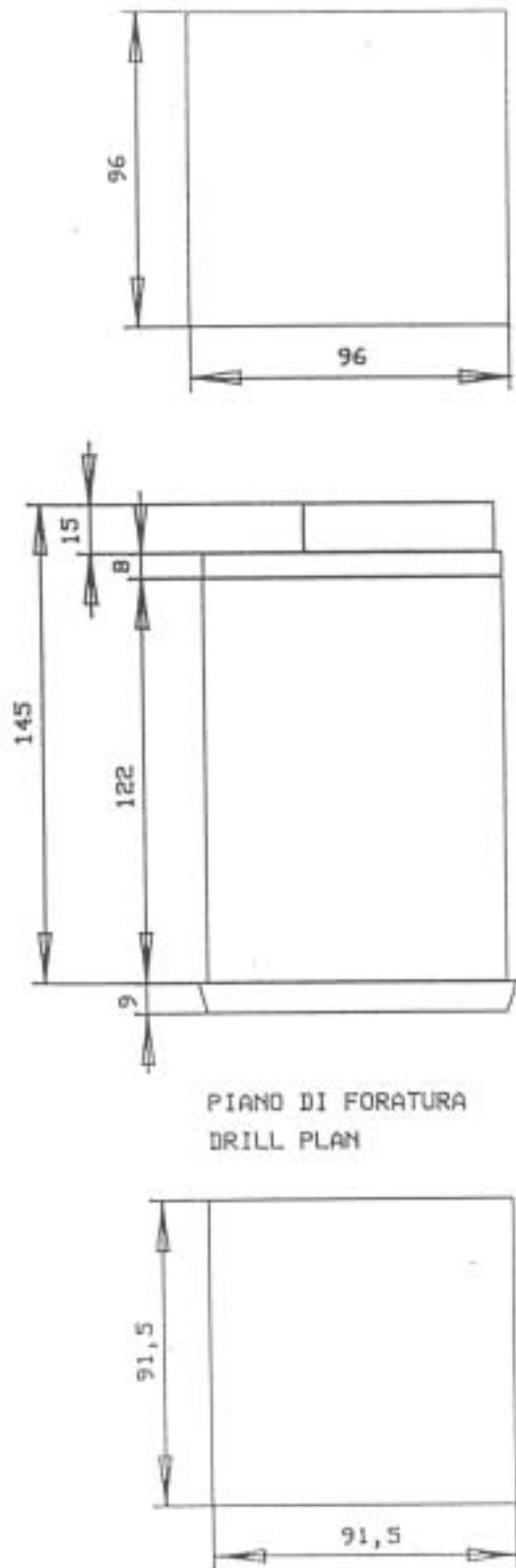


FIG. 3