UNI EN ISO 9001:2000
CERT. N. 9115 BCEL

OPERATOR'S MANUAL

CL 7685.001

D. OZONE - CHLORINE CONTROLLER MICROPROCESSOR BASED

Rev. B

Scales: 0/.2000/2.000/20.00/200.0 PPM
Temperature scale: -2/+52 °C
Power supply: 110/220 Vac

Software: R 2.1x

B&C Electronics Srl – Via per Villanova 3 – 20040 Carnate (Mi) – Italy P.IVA 00729030965
Tel +39 039 63 1721 – Fax +39 039 607 6099 bc@bc-electronics.it - www.bc-electronics.it

1 FEATURES

* Input from: Potentiostatic sensor
  Selective membrane sensor

* Selectable input range
* Autorange * Immediate or Postponed calibration mode

* Input from Pt100
* Temperature readout
* Automatic or manual Temperature compensation

* Alphanumeric back-lighted LCD
* Dual software filter

* 0/20 mA or 4/20 mA programmable isolated output
* P.I.D. regulation for stepping motor or 4/20 mA actuators
* Alarm relay
* Automatic and manual operation

* Software:
  - user friendly
  - 3 access level
  - keyboard lock
  - watch-dog.

* EEPROM parameter storage
* Automatic overload protection and reset
* Extractable terminal blocks
* 96X96 (1/4" DIN) housing

2 SPECIFICATIONS

2.1 FUNCTIONAL SPECIFICATIONS

Input

The instrument accepts input from:
- Potentiostatic sensor
- CL7901 Chlorine sensor and OZ7901 D.Ozone sensor

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

Measuring scales

The input range may be selected:

- 0/.2000 PPM and 0/2.000 PPM for D.Ozone
- 0/2.000 PPM and 0/20.00 PPM for Chlorine

Scales are extended 10 times by installing a jumper.

Autoranging function may be activated for the measuring range 0/1.999 PPM. Autoranging allows the operator to calibrate the unit in low range, against an high concentration of free Chlorine/Dissolved Ozone solutions.

Software filter

The unit is provided with 2 programmable software filters, for small and large signal changings, to be inserted when the readout is not stable.

Temperature compensation

The unit is supplied with manual or automatic Temperature compensation and Temperature information may be displayed on the LCD.
The instrument detects of the absence or malfunctioning of the Temperature sensor and automatically switches to manual compensation.

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.

The output Current may be set anywhere from 0/20.00 or 0/2.000 PPM.

Regulation

The unit allows a PID regulation in two ways:

- relays output for "stepping motor", with feedback possibility
- analog regulating output for 4/20 mA (0/20 mA) actuator

The set-point will consider the following parameters:

C: Set-point value

DB: dead band for the regulating action (only when relays output is selected)

BP: proportional band

Td: derivative time

Ti: integral time

Alarm relay

The unit contains a third SPDT relay designated as an alarm relay.

This relay may be used to warn of various conditions that might indicate operational problems.

The relay will activate on higher or lower limit conditions.
In addition this relay may be programmed for either normal or fail-safe operation.

Operating mode

The instrument is provided with 2 programmable modes of operation.

- Automatic operation:

The Automatic mode is the normal operation mode of the unit.

- Manual operation:

This mode of operation would normally be used for control system troubleshooting.
The unit will allow relays and analog regulating output to be manually actuated by pushing up/down keys.

During the manual operation the signal analog output, alarm and sensor calibration are active.

Calibration mode

The instrument may be programmed for the immediate or postponed calibration.

The immediate calibration mode allows the operator to calibrate the unit immediately against a field measurement on the same sample that the sensor is measuring.

The postponed calibration mode allows the operator to calibrate the unit against a laboratory measurement on the same sample that the sensor is measuring.

The calibration may be done later even if the sample concentration that the sensor is measuring has been changed.

Configuration

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

The factory configuration has been designed in order to allow the prompt operation for the most popular applications.

Options

091.404	24 VAC power supply
091.701	RS232 isolated output The output sends the data (PPM, °C) to the serial port of the computer

2.2 TECHNICAL SPECIFICATIONS

The *Default* values have been selected in order to allow a prompt operation of the unit in the most popular applications.

Parameters marked by " * " can be modified in the Configuration procedures.

OPERATING MODE	*Default*
Automatic/Manual	Auto

OZONE AND CHLORINE MEASURING	*Default*
* Measuring type: Ozone/Chlorine	Ozone
* Cell type: Polarographic/Potentiostatic	Polarographic
Polarographic cell:	
Input Current at 20°C: 20/400 nA/PPM	160nA/PPM
Cell Sensitivity: 12.5/250 %	100 %
Zero: +/- 200 nA	0 nA
* Ozone comp.Temp.Coefficient: 0/4.0 %/°C	2.5%/°C
* Chlorine comp.Temp.Coefficient: 0/4.0 %/°C	2.0%/°C
* Polarization Voltage:	-200mV
* Jumper x10: Off/On	Off
* Input scale: - Jumper x 10 Off: 2.000/20.00PPM - Jumper x 10 On : 20.00/200.0PPM	2.000PPM
Potentiostatic cell:	
Input Current at 20 °C: 250/5000 nA/PPM	2000nA/PPM
Cell Sensitivity: 12.5/250 %	100 %
Zero: +/- 2000 nA	0 nA
* Ozone comp.Temp.Coefficient: 0/4.0 %/°C	2.5%/°C
* Chlorine comp.Temp.Coefficient: 0/4.0 %/°C	2.0%/°C
* Polarization Voltage:	-200mV
* Jumper x10: Off/On	On
* Input scale: - Jumper x 10 On : 2.000/20.00PPM - Jumper x 10 Off: .2000/2.000PPM	2.000PPM
Display resolution at 20 °C: 1/2000 T.ref for Temp.compensation: 20 °C	
* Calibration mode: Immediate/Postponed	IMM
Software filter 90% RT:	
* Large signal variation (>0.010 0.100PPM): 0.1"/20.0"	2.0"
* Small signal variation (<0.010 0.100PPM): 0.1"/20.0"	10.0"

ACTUATOR PARAMETERS	*Default*
* regulating type: Stepping motor/Analog	Stepping m.
* motor time: 10.0/120.0 sec	20.0 s
* motor dead time: 0.0/20.0 sec	0.1 s
motor start position in manual: 0.0/100.0%	0.0 %

TEMPERATURE	*Default*
Input: RTD Pt100	
Connection: 2/3 wires	
Measuring and compensation range: -2/+52 °C	
Resolution: 0.1 °C	
Zero adjustment: +/- 2 °C	0 °C
Manual Temperature value: -2/+52 °C	20°C

SET-POINT	*Default*
Set point: 0.00/2.00 PPM (depending of scale)	0.00 PPM
* Dead band: 0.2/20.0% (stepping motor)	1.0 %
* Proportional band: 0.1/400.0%	14.0%
* Derivative action: 0/1200 Sec.	40 Sec
* Integral action: 0/3600 Sec.	160 Sec

ACTUATOR ACTIONING	*Default*
A relay: increasing action	
B relay: decreasing action	
relays contacts: SPDT	

ALARM (Relay contacts C-D)	*Default*
Low value: 0.000/2.000PPM (as scale selected)	2.000PPM
High value: 0.000/2.000PPM (as scale selected)	2.000PPM
Delay: 0.0/99.9 Sec.	0.0 Sec.
* Alarm activation: ACT/DEA	ACT
Relay contacts SPDT	

ANALOG OUTPUT 1 (measuring output)	*Default*
* Current range: 0-20/4-20 mA	0/20 mA
* Point 1 corresponding to 0 mA or 4 mA:	
Range .2000PPM: .0000/.2000	0.0000 PPM
Range 2.000PPM: 0.000/2.000	0.000 PPM
Range 20.00PPM: 0.00/20.00	0.00 PPM
Range 200.0PPM: 0.0/200.0	0.0 PPM
* Point 2 corresponding to 20 mA:	
Range .2000PPM: .0000/.2000	0.2000 PPM
Range 2.000PPM: 0.000/2.000	2.000 PPM
Range 20.00PPM: 0.00/20.00	20.00 PPM
Range 200.0PPM: 0.0/200.0	200.0 PPM
Response time: 10 Sec. for 98 %	
Isolation: 250 Vca	
Rmax: 600 Ohm	

ANALOG OUTPUT 2 (regulating output)	*Default*
* Current range: 0-20/4-20 mA	0/20 mA
* Point 1 corresponding to 0 mA or 4 mA: 0.0 % / 100.0 %	0.0%
* Point 2 corresponding to 20 mA: 0.0 % / 100.0 %	100.0%
Response time: 10 Sec. for 98 %	
Isolation: 250 Vca	
Rmax: 600 Ohm	

RS232 OUTPUT (option 091.701)	*Default*
Speed: 4800 bit/s	
Bit Nr.: 8 bit	
Stop bit: 1 bit	
Parity: None	

CONFIGURATION (*)	*Default*
Free calibration (access code not required):	
Keyboard locked/unlocked	unlocked
LCD contrast (0/7).	4
Under access code number:	
Type of measuring (O3/Cl)	Ozone
Cell type (Polarographic/Potentiostatic)	Polar.
Jumper x10 (Off/On)	Off
measuring range (.2000/2.000/20.00/200.0)	2.000
Autoranging (Off/On)	Off
Large Software filter: (0.1/20.0)	2.0"
Small Software filter: (0.1/20.0)	10.0"
Polarization	-200mV
calibration mode (IMM./POST)	IMM
Temperature coefficient (0.00/4.00)	2.5%/°C
Analog output N°1 range: (0/20 4/20)	0/20 mA
Point 1 (corresponding to 0 mA or 4 mA): (0/2000)	0.000PPM
Point 2 (corresponding to 20 mA)): (0/2000)	2.000PPM
Actuator regulation (Stepping motor/analog)	Stepping m.
Output regulating range: (0/20 4/20)	0/20 mA
Actuator position feedback: On/Off (not implemented)	Off
Motor time	20.0s
Motor dead time	0.1s
Set-point dead band	1.0%
Proportional band	14%
Derivative time	40s
Integral time	160s
Alarm relay status (ACT/DEA)	ACT
Access number selection: 0/999	0

GENERAL SPECIFICATIONS

Alphanumeric display: 1 line x 16 characters
Response time to 98% of value changing
with TC=2%/°C - T=20°C - S=100% :
< 5 sec for range 20.00 (Jumper x10 Off);
< 15 sec for range 2.000 (Jumper x10 Off).

Operating Temperature: 0/50 °C.
Humidity: 95% without condensate
Power supply: 110/220 Volt ac +/- 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 PHISICAL SPECIFICATIONS

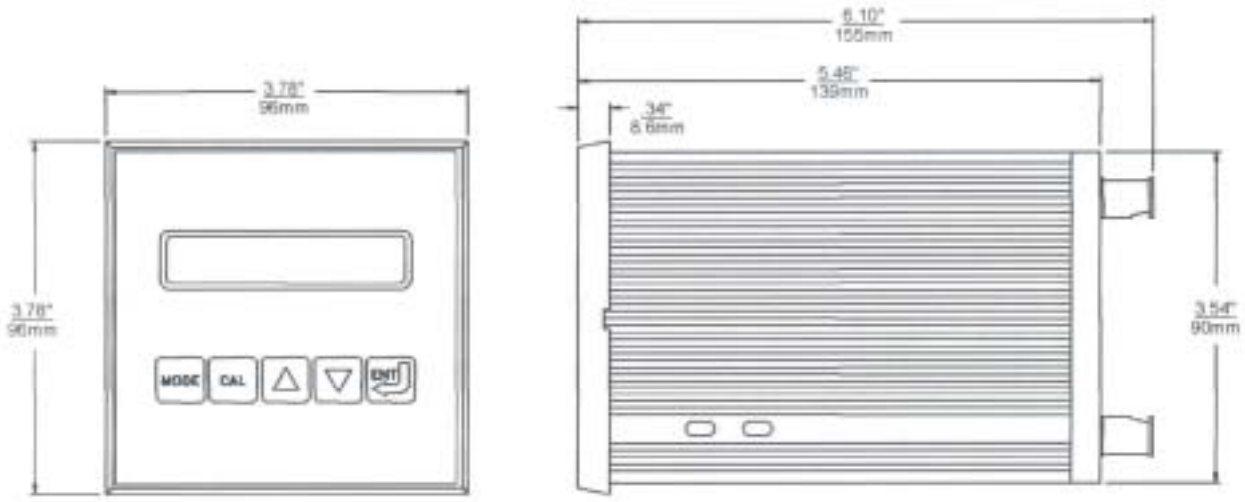
The controller enclosure is designed for surface or panel mounting.

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 SZ 7602 can be added to the housing, in order to protect the unit from excessive moisture or corrosive fumes.

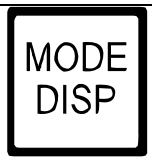
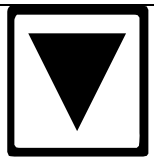
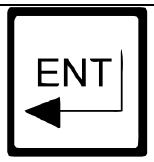
Signal and power cable connections are made by using two special extractable terminal blocks placed in the back of the instrument.
This makes wiring, installation and general maintenance of the probes and other devices easier.

The package is supplied complete with fixing clamps for panel-mounting. (Fig.3)



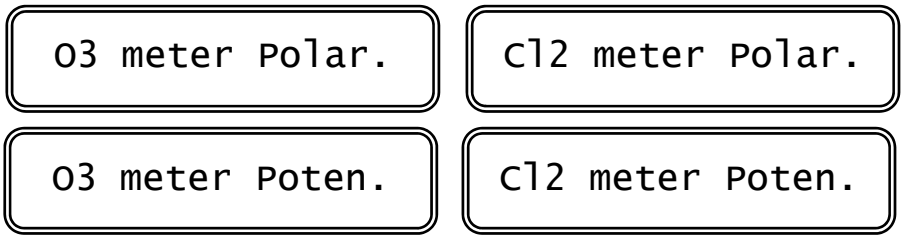
3 SOFTWARE DESCRIPTION

3.1 KEYBOARD

KEY	FUNCTION
	- 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
	- it allows the access of calibration sequences
	- it allows to increase the displayed parameters - it allows to choose between different functions
	- it allows to decrease the displayed parameters - it allows to choose between different functions
	- it allows to enter the selected data and to return to the main Display **D0**

3.2 READOUT SEQUENCES

Applying the power to the instrument the display will show the selected input for approximately 3 seconds, then will show the main display (D0).



Press MODE DISP to visualize the following Display:

D0	xx.xxPPM M ↑ x%	Actual measuring value and deviation
D1 or	x.xxx PPM O3 x.xxx PPM Cl2	Actual Ozone value Actual Chlorine value
D2	xxx.x% ↑ x%	Actuator's model
D3	TEMP.: xx.x°CM	Actual Temperature value
D4	SET: x.xxxPPM	Set-point parameters
D5	AL x.xx/xx.xxPPM	Alarm parameters
D6	01 xx.xmA/xx.xPPM	Analog output N°1/input value
D7	02 xx.xmA/xx.x%	Analog output N°2/input value
D8	Configuration	Configuration display

D9	CL7685.001 R2.1x	P/N and software release

(D0) xx.xxPPM M ↑ x% Measures main display and deviations

xx.xx PPM	measuring value
↑ (↓)	increasing the regulation (decreasing)
x%	+/-% deviation from the set-point

MESSAGE	FUNCTION
"------"	the instrument is changing the scale
" >>>> "	over range
" <<<< "	under range
"values flashing"	alarm conditions
"M flashing"	manual operating mode selected

CAL to activate the manual/automatic mode selection procedure

MODE DISP to go to

(D1) x.xxx PPM O3 Actual Ozone value

Or

x.xxx PPM Cl2 Actual Chlorine value

x.xxx PPM	measuring value in PPM
O3	Dissolved Oxygen
Cl2	Residual Chlorine

CAL to activate the Zero/Sensitivity calibration procedure

MODE DISP to go to

(D2) `xxx.x%  M ↑  x%` Actuator's model

xxx.x% actuator's value

↑ (↓) increasing the regulation (decreasing)
x% measuring deviation from the set-point value (% of the scale)

MESSAGE	FUNCTION
"M flashing"	manual operating mode has been selected

CAL to activate the actuator start calibration procedure (when the instrument is operating in the manual mode)

MODE DISP to go to

(D3) `TEMP.:  xx.x°CM` Temperature value

xx.x °C actual Temperature value
M manual value

MODE DISP to go to

(D4) `SET: x.xxxPPM` Set-point value

x.xxx PPM Set-point value

CAL to activate the programming sequences for set-point value

MODE DISP to go to

(D5) `AL x.xx/xx.xxPPM` alarm parameters

CAL to activate the alarm values programming sequences

MODE DISP to go to

(D6) 01 xx.xmA/x.x pp

01	selected analog output
xx.xmA	actual analog output value
x.x pp	actual input measuring value (PPM)

MODE DISP to go to

(D7) 02 xx.xmA/xxx.x%

02	selected analog output
xx.xmA	actual analog output value
xxx.x%	Valore della variabile di regolazione in %

MODE DISP to go to

(D8) Configuration Configuration Display

CAL to activate the keyboard lock/unlock and LCD Display contrast selection sequences; plus the visualization and modification of the instrument configuration parameters

MODE DISP to got to

(D9) CL7685.001 R2.1X Instrument code and software release

MODE DISP to go back to the main Display (D0)

3.3 CALIBRATION SEQUENCES

The following procedures will be available whenever the keyboard is unlocked.
To unlock the keyboard follows the procedures mentioned in chapter 3.4.

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

3.3.1 MANUAL/AUTOMATIC MODE

Normally the instrument works in automatic mode.

Follow this procedure to change the operating mode Automatic/Manual.

1. 

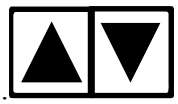
to go to

(D0)

```
X.XXXPPM M ↑  x%
```

2. 

to access the operating mode selection

3. 
to select one of the following Display

```
CAL MODE:AUTO
```

```
CAL MODE:MANUAL
```

to stop the procedure and to go to (DO)

4. 

- to confirm the selected operating mode
- to go back to (DO)

MESSAGE	FUNCTION
UPDATE	the selection is memorized

3.3.2 ZERO AND SENSITIVITY CALIBRATION

Zero calibration

1. [MODE DISP] to go to

(D1) `x.xxx PPM O3`

2. [CAL] to access the calibration sequences

`ZERO: x.x µA` Zero visualization

[ENT] to confirm the displayed value and to access the sensitivity cell visualization/calibration

3. [CAL] to access the zero calibration routine

`CAL ZERO: x.x`

x.x Current value of the sensor

4. choose one of the following actions:

[MODE DISP] to stop the procedure and to go back to (D1)

[ENT] to confirm the selected zero of the cell

[▲] + [▼] + [ENT] press the three keys to turn to factory calibration

MESSAGE	FUNCTION
`UPDATE`	The calibration is accepted
`Z > 2000 µA`	Zero > 2000µA

The instrument goes to the sensitivity calibration sequences

Sensitivity calibration

SENS: xxx.x %	Sensitivity visualization

MODE DISP to go back to (D1)

ENT to confirm the displayed value and to go back to (D1)

1. CAL to access the sensitivity calibration routine

The Sensitivity calibration is suggested when the readout is very low compared with the DPD test. This adjustment must be effected when installing the flow cell and Chlorine or D.Ozone sensor after the stabilization of the readout.

The instrument features two calibration mode: Immediate and Postponed

IMMEDIATE CALIBRATION

This mode of calibration is useful when the concentration of the sample is stable and the value is known.

The instrument shows for a few seconds the following message:

IMMEDIATE CAL

Then it will show the measuring value:

CAL O3: x.xx PPM	(Cl)

x.xx PPM actual Ozone value (Chlorine)

MODE DISP to stop the procedure and to go back to (D1)

▲ + ▼ + ENT press the three keys to turn to factory calibration

2A. ▲ ▼ to set the value

3A. ENT to confirm the selected value and to go back to (D1)

MESSAGE	FUNCTION
UPDATE	the calibration is accepted
SENS > 250.0%	Sensitivity > 250.0%
SENS > 12.5%	Sensitivity < 12.5%
NO UPDATE	calibration is not accepted

POSTPONED CALIBRATION

This mode of calibration is useful when the value of Ozone (Cl) on water is unstable or when an immediate test is not available.

The instrument shows for a few seconds the following message:

SAMPLE VAL. REC.

Then it will show the measuring value:

CAL O3 x.xx PPM (Cl)

x.xx PPM actual Ozone value (Chlorine)

MODE DISP to stop the procedure and to go back to (D1)

▲ + ▼ + ENT to press the three keys to turn to factory calibration

2B. ENT to confirm the value

The instrument will show the following message:

SAMPLE V. UPDATE

After a few seconds the unit go back to (D1).

When the correct Ozone (Cl) value will be known from laboratory analysis, the operator must access the sensitivity calibration following the same above procedure.
The instrument shows for a few seconds the following message:

SAMPLE V. ADJUST

Then it will show the previously stored sample value:

SAMPLE V. : X.XX

MODE DISP to stop the procedure and to go back to (D1)

▲ + ▼ + ENT to press the three keys to turn to factory calibration

3B. ▲▼ to display the Ozone (Cl) value same as the contents into the water

4B. ENT to confirm the value and to go back to (D1)

MESSAGE	FUNCTION
UPDATE	the calibration is accepted
SENS > 250.0%	Sensitivity > 250.0%
SENS < 12.5%	Sensitivity < 12.5%
NO UPDATE	the calibration is not accepted

3.3.3 ACTUATOR'S START VALUE CALIBRATION IN MANUAL OPERATING MODE

1. MODE DISP to go to

(D2)

```
xxx.x% M ↑  x%
```

2. CAL to access the calibration sequences

The instrument will show the following message:

```
CAL MEMO:  xx.x%
```

MODE DISP to stop the procedure and to go back to (D1)

3. ▲ ▼ to set the value

4. ENT to confirm the selected value and to go back to (D2)

3.3.4 TEMPERATURE CALIBRATION

1. MODE DISP to go to

(D3)

```
TEMP.:  xx.x °C
```

2. CAL to access the calibration procedure

```
CAL T  xx.x °C
```

>>>>>> Temperature value overrange

MODE DISP to stop the procedure and to go back to (D3)

▲ + ▼ + ENT to press the three keys to turn to factory calibration

3. ▲ ▼ to modify the actual reading

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

CAL T.M: xx.x°C

MODE DISP to stop the procedure and to go back to (D3)

5. ▲ ▼ to modify the actual value

6. ENT to confirm and to go back to (D3)

MESSAGE	FUNCTION
" UPDATE "	The calibration is accepted

Error messages

Z > 2.0°C	Zero > 2.0°C.

The above message will last for 5 minutes

ENT to acknowledge the message:

" NO UPDATE "	The calibration is not accepted

3.3.5 SET-POINT CALIBRATION

1. MODE DISP to go to

(D4) SET: x.xxxPPM Set-point value

2. CAL to access the calibration sequences

Set value

CAL SET: x.xxx

x.xxx Set-point value

MODE DISP to stop the procedure and to go back to (D4)

3. ▲ ▼ to set the value

4. ENT to confirm and to go back to (D4)

3.3.6 ALARM CALIBRATION

1. MODE DISP to go to

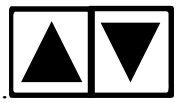
(D5) AL x.xx/xx.xPPM

2. CAL to access the calibration sequences

CAL AL MIN:x.xxx

AL MIN low alarm calibration
x.xxx actual low alarm value

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

3.  to insert the alarm value

4.  to confirm and to go to the high alarm insertion

```
CAL AL MAX:x.xxx
```

AL MAX high alarm calibration
x.xxx actual high alarm value

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

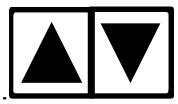
5.  to insert the alarm value

6.  to confirm and to go to the Delay Time selection

```
CAL AL D:   x.xs
```

AL D delay alarm calibration
x.xs delay time value

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

7.  to insert the delay value

8.  to confirm and to go back to (D5)

MESSAGE	FUNCTION
" UPDATE "	The calibration is accepted

3.4 CONFIGURATION

The following operations are possible:

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

1. MODE DISP to go to

(D8) Configuration

2. CAL to access the configuration sequences

3.4.1 KEYBOARD LOCKED/UNLOCKED

KB UNLOCKED | KB LOCKED

Keyboard unlocked | Keyboard locked

MODE DISP to go back to (D8)

3. ▲ ▼ to select one of the two options (locked/unlocked)

4. ENT to confirm and to go to the next step

3.4.2 LCD DISPLAY CONTRAST

LCD contrast: x

MODE DISP to go back to (D8)

1. ▲ ▼ to select the contrast from 0 to 7

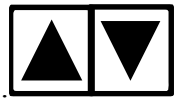
2. 

to confirm and to go to the access number insertion

3.4.3 ACCESS NUMBER

Access Nr.: xxx	Access number request

to go back to (D8)

1. 
to insert the access number (when keeping the key pressed the number will scroll with 3 speed level)

2. 

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.

‘Cal Inhibition’	Configuration inhibited

3.4.4 TYPE OF MEASURING

Input source:O3	Input source:Cl2

Active keys: 

–  – 

3.4.5 TYPE OF CELL

Input: Polar.	Input: Poten.

Active keys: 

–  – 

3.4.6 SCALE MULTIPLIER X10

Install a jumper between 20-22 terminal and select "jumper x10: ON" in order to extend the input range.

Active keys: MODE DISP – ▲ ▼ – ENT

Input range

Active keys: MODE DISP – ▲ ▼ – ENT

3.4.7 AUTORANGE

Active keys: MODE DISP – ▲ ▼ – ENT

3.4.8 SOFTWARE FILTER

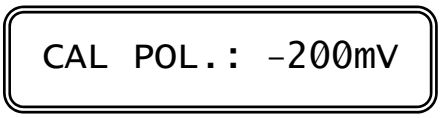
x.xs: response time of the Large software filter (sec.)

Active keys: MODE DISP – ▲ ▼ – ENT

x.xs: response time of the Small software filter (sec.)

Active keys: MODE DISP – ▲ ▼ – ENT

3.4.9 CELL POLARIZATION VOLTAGE



POL.-200 mV actual polarization Voltage

Active keys: MODE DISP – ENT

This Polarization Voltage is calibrated during the manufacturing and it may be changed by means of the internal trimmer marked BM(R14).

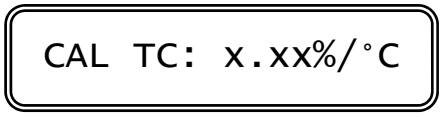
Remove the back panel to adjust the trimmer, watching the readout.

3.4.10 CALIBRATION MODE

POST (IMM) postponed calibration mode (immediate)

Active keys: MODE DISP – ▲ ▼ – ENT

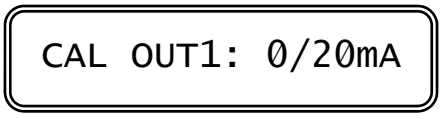
3.4.11 TEMPERATURE COEFFICIENT

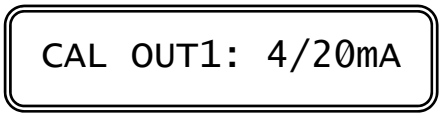


x.xx%/°C Temperature coefficient value

Active keys: MODE DISP – ▲ ▼ – ENT

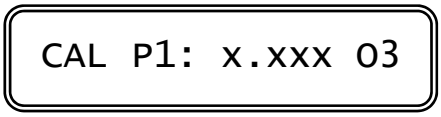
3.4.12 ANALOG OUTPUT N°1 RANGE





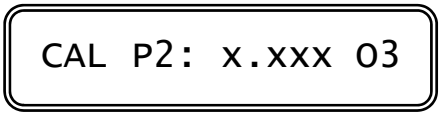
0/20mA (4/20mA) Range selected

Active keys: MODE DISP – ▲ ▼ – ENT



P1 begin of range
x.xxx O3 measuring value related to 0 mA (or 4 mA)

Active keys: MODE DISP – ▲ ▼ – ENT



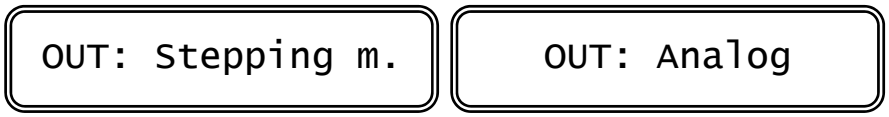
P2 end of range
x.xxx O3 measuring value related to 20 mA

Active keys: MODE DISP – ▲ ▼ – ENT

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.

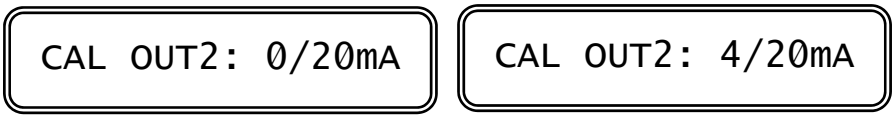
3.4.13 ACTUATOR TYPE

It is possible to select the type of regulation between the stepping motor (action of the relays A and B) and the analog output (current signal from the output No. 2).



Active keys: MODE DISP – ▲ ▼ – ENT

3.4.14 ANALOG OUTPUT N°2 RANGE



0/20mA (4/20mA) Range selected

Active keys: MODE DISP – ▲ ▼ – ENT

3.4.15 FEEDBACK ACTUATOR FUNCTION

This function is not available in the Release R:2.1x.
You must select Off.

Active keys: MODE DISP – ▲ ▼ – ENT

3.4.16 SERVOMOTOR TIME

This calibration allows to store into the memory the elapsed time for the complete excursion of the servomotor.

Active keys: MODE DISP – ▲ ▼ – ENT

3.4.17 MOTOR DEAD TIME

This calibration allows to store into the memory the time passed by the servomotor in order to reverse its action.

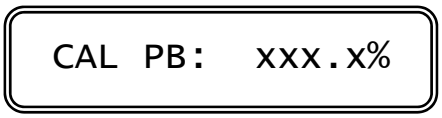
Active keys: MODE DISP – ▲ ▼ – ENT

3.4.18 SET-POINT DEAD BAND

This calibration allows to store into the memory a percentage band hooked to the set-point: within this band the actuator is enable.

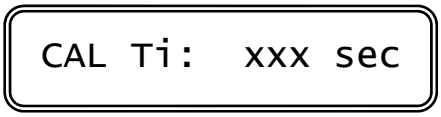
Active keys: MODE DISP – ▲ ▼ – ENT

3.4.19 PROPORTIONAL BAND



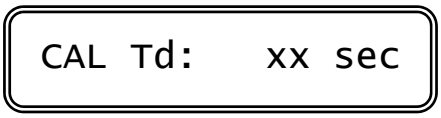
Active keys: MODE DISP – ▲ ▼ – ENT

3.4.20 INTEGRAL TIME



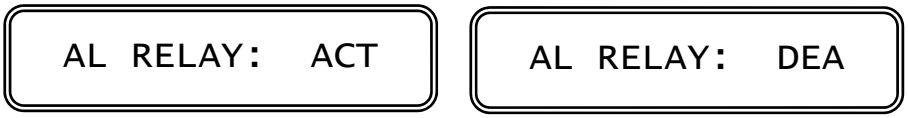
Active keys: MODE DISP – ▲ ▼ – ENT

3.4.21 DERIVATIVE TIME



Active keys: MODE DISP – ▲ ▼ – ENT

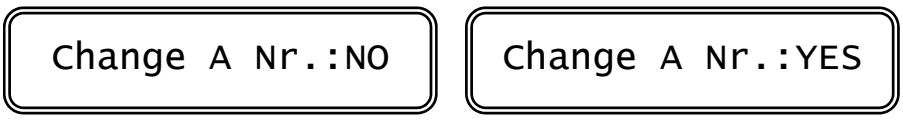
3.4.22 ALARM RELAY



ACT (DEA) relay activated (deactivated) when the alarm is active

Active keys: MODE DISP – ▲ ▼ – ENT

3.4.23 NEW ACCESS NUMBER



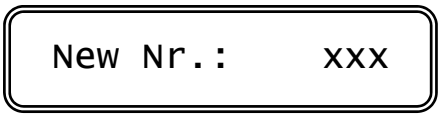
NO access number changing not required
YES access number changing required

Active keys: MODE DISP – ▲ ▼ – ENT

Two possible alternatives A or B:

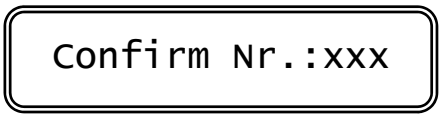
A. "NO" The unit will go back to the Configuration Display; the operator may verify the parameter setting before leaving the Configuration sequences which is now protected by access number.

B. "YES" The unit is now ready to the new access number selection.



Active keys: MODE DISP – ▲ ▼ – ENT

The instrument asks to insert again the new access number.



Active keys: MODE DISP – ▲ ▼ – ENT

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.

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

4 INSTALLATION

Packing list

The instrument packaging contains:

- N° 1 instrument with serial number label
- N° 2 brackets for panel mounting
- N° 1 English instruction manual according to IEC N° 278 standard
- N° 1 warranty certificate with Technical Assistance card, included in the instruction manual.

Unpacking of the instrument

1) Remove from the packaging the instruction manual containing the warranty certificate.

2) Open the packaging and remove the instrument enclosed in a plastic transparent bag.

3) Remove the transparent bag preserving the two brackets.

Storage

For long storage periods hold the instrument in a dry place.

WARNINGS:

THE FAILURES COMING FROM ERRONEOUS CONNECTIONS ARE NOT COVERED BY WARRANTY

4.1 PHYSICAL INSTALLATION

The instrument can be installed near the sensor or in a distant area, in the electrical cabinet.

The panel mounting should be made in a position protected from humidity, corrosive fumes and shocks.

The Fig. 4 shows the instrument dimensions and the panel cutout dimensions.

- Install the instrument in the panel.

- Mount the two clamps on the sides of the instrument, with the screw head turned to the back of the instrument.

- Turn the screw until a complete blockage of the housing.

In the field mounting application, the use of a protection cabinet will assure a long time reliability; it is also available a transparent door. (mod. SZ7601).

4.2 ELECTRICAL INSTALLATION

Refer to the back panel drawing, described in Fig. 2 and in Fig 3.

All connections are made with extractable terminal blocks on the back panel.

The power connections are on the lower terminal block (13 positions).
The input and output signals are on the upper terminal block (12 positions).

Connecting the power

- terminal 4 connect to the ground
- terminals 1-2 connect to the ac power (if power is 110 V)
- terminals 1-3 connect to the ac power (if power 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 point with heavy inductive loads
- control the mains voltage value
- an internal device protects the unit against power overloads. Disconnect the power and wait few minutes before powering again.
- Avoid interruption on the cable if a high insulation terminal block is not available. Keep the cable away from power wires on the overall length.

Connecting the Potentiostatic Sensor

Sensor cabling is a critical part of the whole system.
Refer to Fig.2.

- 17 terminal connect to the white wire
- 18 terminal connect to the black wire
- 19 terminal connect to the shield
- 20-22 terminals install a jumper

Use a low noise coax cable on overall length between sensor and input terminals of the meter.
Avoid interruption on the cable if a coax connector and a high insulation terminal strip are not available.

Connecting the Polarographic sensor

Sensor cabling is a critical part of the whole system.
Refer to Fig.3.

- 17 terminal connect to the white wire
- 18 terminal connect to the brown wire
- 17-19 terminals install a jumper

Use a low noise coax cable on overall length between sensor and input terminals of the meter.
Avoid interruption on the cable if a coax connector and a high insulation terminal strip are not available.

Connecting the RTD

The Temperature readout and the automatic Temperature compensation is provided by connecting the Pt100.
If the Temperature sensor is not connected or damaged, the unit will operate in manual Temperature compensation automatically.
To operate the automatic Temperature compensation, connect the Pt100 as shown in Figures 2-3.

3-wire connection

- 23 terminal connect to the Pt100
- 24-25 terminals connect to the common terminal of Pt100

- 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.

2-wire connection

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

Connecting a recorder

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

- 14 terminal connect to (+) of the recorder
- 16 terminal connect to (-) of the recorder

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

Connecting the analog actuator

The analog regulating output is available between the rear terminals 15-16.

he output Current is isolated from the instrument inputs, and it is possible to choose between the 0/20 mA or 4/20 mA standards via software.

- 15 terminal connect to the actuator terminal (+)
- 16 terminal connect to the actuator terminal (-)

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

Connecting the stepping motor

Using P.I.D. regulations through "stepping motors" actuators, it is possible to use the regulation relays contacts available on the rear terminal block, corresponding to the SPDT Regulator "A" (increase) and Regulator "B" (decrease).

RELAY "A" INCREASE

6	terminal	marked C	common contact
5	terminal	marked NO	normal open contact

It has to be connected to the "increase" actuator input.

RELAY "B" DECREASE

9	terminal	marked C	common contact
8	terminal	marked NO	normal open contact

It has to be connected to the "decrease" actuator input.

Connecting alarm

RELAY "C" ALARM

12	terminal	marked C	common contact
11	terminal	marked NO	normally open contact
13	terminal	marked NC	normally closed contact

5 OPERATING THE SYSTEM

The installed unit allows the following operations:

- measuring;
- measuring and regulating (P.I.D.);
- measuring, regulating and recording.

The factory configuration allows a prompt operation in the most popular applications.

Measuring

1. Connect the sensors

2. Power the unit.
   The Display go to (D0).

3. The unit is factory configured as D.Ozone by polarographic sensor on the scale 2.000 PPM.
   Go to the Configuration menu to select other sensors and measuring scales if necessary.
   From (D0) press 9 times [MODE DISP] to start the Configuration sequences

4. Calibrate the measuring value
   The unit is configured for the immediate calibration mode; go to the Configuration menu to select the postponed calibration mode.

Measuring and regulating

Add the following to the above operations:

1. By operating in manual, press [CAL] [▲] [ENT] ; or go to step 4.

2. The unit is factory configured as P.I.D by stepping motor through A and B relays.
   Configure as analog actuator if needed.

3. Select new D. parameters if necessary

4. Select min/max Set-point deviation and alarm delay if necessary
   From D0 display press 5 times [MODE DISP] to start the alarm calibration sequences.

Measuring, regulating and recording

Add the following to the above operations:

1. N°1 analog output is factory configured as 0/20 mA corresponding to the input scale as selected.

2. Select 4/20 mA, new corresponding points to the input scale if necessary

Manual operation

When the instrument is programmed for the manual operation the flashing 'M' will appear on the Display.

Analog output and alarm relay will remain activated.

 while pressing the key, A relay will be activated

 while pressing the key, B relay will be activated

Same keys adjust the regulating Current to the analog actuator.

During the manual operation, the operator may effect the sensor calibration and the instrument configuration.

Manual Temperature compensation

The manual compensation is in alternative to the automatic compensation.

1) Do not install the Pt100

2) Select the manual Temperature value

6 CALIBRATION

To turn to the Factory calibration press ▲ ▼ ENT keys during the calibration procedure. (See "Zero/Sensitivity calibration" and "Temperature calibration").

The calibration procedure is same for both Potentiostatic and membraned sensors.

Refer to the instruction manual of the specific sensor.

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 flow cell and adjust to the proper flow rate of distilled water.

Allow the reading to stabilize for 10 - 20 minutes prior to setting the zero calibration (it is not essential that the water be distilled, but it is important that the water contain no Ozone/Chlorine).

The zero calibration must be done only after the electric zero calibration that may be effected also keeping the wet sensor out of the flow cell (in air).

Sensitivity calibration

Always check the zero, the proper flow rate and the stabilization of the readout prior to sensitivity calibration.

Collect a sample from the effluent or outlet of the flow cell and do a Laboratory analysis to determine the Chlorine concentration (DPD method is suggested).

Follow the sensitivity calibration procedure described in the calibration section.

If the Immediate calibration has been selected, wait for the readout stabilization prior to adjust the value on the display.

We suggest to select the Postponed calibration if the Ozone/Chlorine content in the sample is not steady.

Clean the Platinum rings of the potentiostatic sensor or the membrane of the polarographic sensor by means of filter paper or similar prior to starting the calibration. (see Maintenance section)

Electrical check

Should a problem arise with the residual 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 ▲ + ▼ + ENT as described in the parameters calibration section) and follow the steps:

- Connect to the terminals 18-25 a sensor Simulator (example OD 105.1 B&C Electronics Simulator)

- Simulate the value 0 nA and read the value 0.0 PPM on the display.
  In alternative disconnect the sensor to read 0.0 PPM

- Simulate the value 2000 nA (if potentiostatic sensor is used) and read the value 1.00 PPM on the display.

- Simulate the value 1600 nA (if polarographic sensor is used) and read the value 1.00 PPM on the display.

Return the unit to the factory if these values will not be displayed.

Temperature calibration

Immerse the Temperature sensor (built-in the polarographic sensor) in the liquid at known Temperature value.

Adjust the Temperature readout by following the first 4 steps of the section.

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 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

The unit is protected against power overloads.
Overloads switch off the unit. Disconnect the power and wait for 5 or 10 minutes before connecting the power.

Sensor

The state of the Platinum surfaces is critical for the normal operation of the Potentiostatic system and should be inspected during the recalibration, if deviations of more than 0.2 mg/l as compared to DPD are detected.

Suggested methods for cleaning the electrode include chemical cleaning as following:

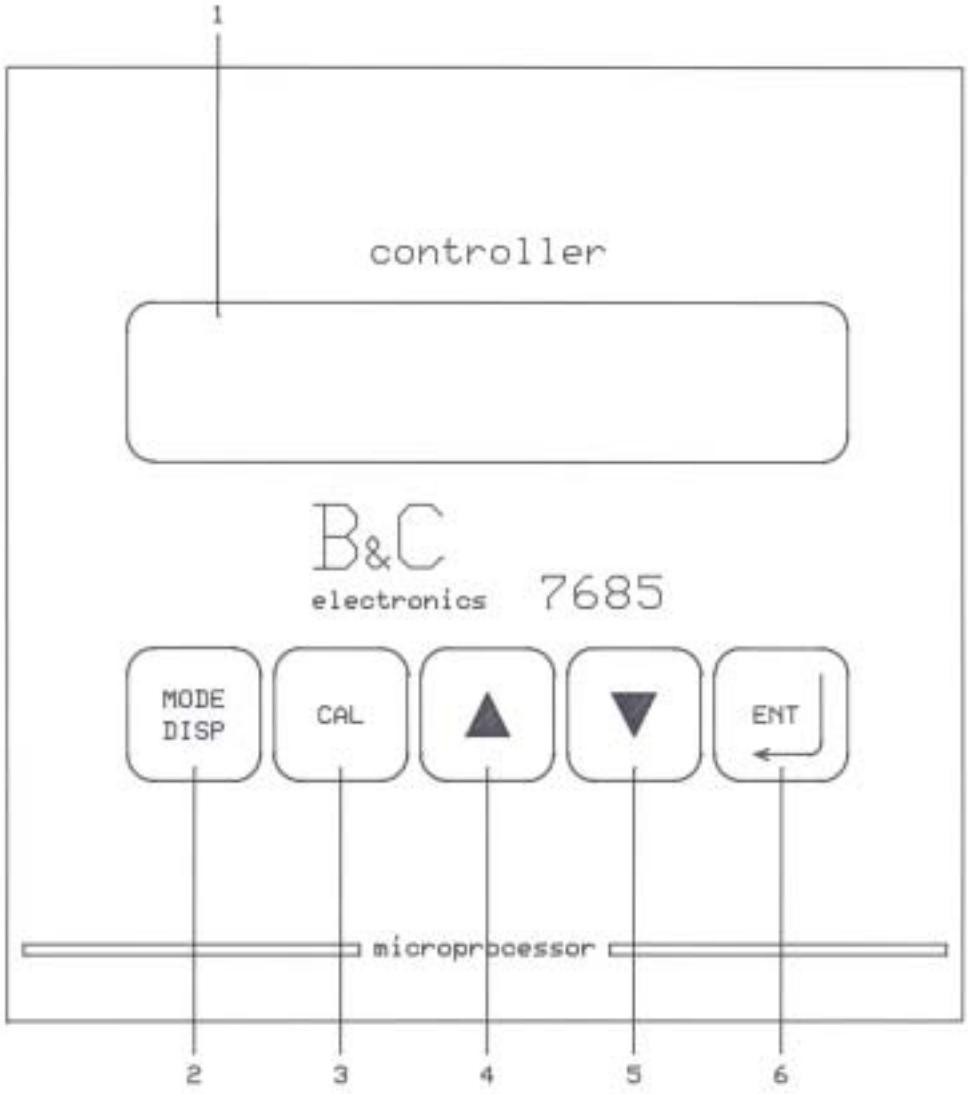
- remove the Chlorine electrode from the cell
- immerse the sensor in a 3% HCl solution for few seconds
- reinstall the sensor into the cell.

- in alternative clean the Platinum rings by carefully wiping it with a soft tissue soaked with ATA or AJAX liquid or a similar cleaning reagent.
  Rinse carefully and re-install the sensor into the cell.
  This kind of cleaning is very strong and requires 4 hours of operation before calibrating the system.

- after cleaning the electrode, the DPD calibration procedure must be repeated

The polarographic sensor needs a periodic replacement of the membrane and the electrolyte.
Refer to the specific instruction manual of the sensor.

DIGITAL CONTROLLER



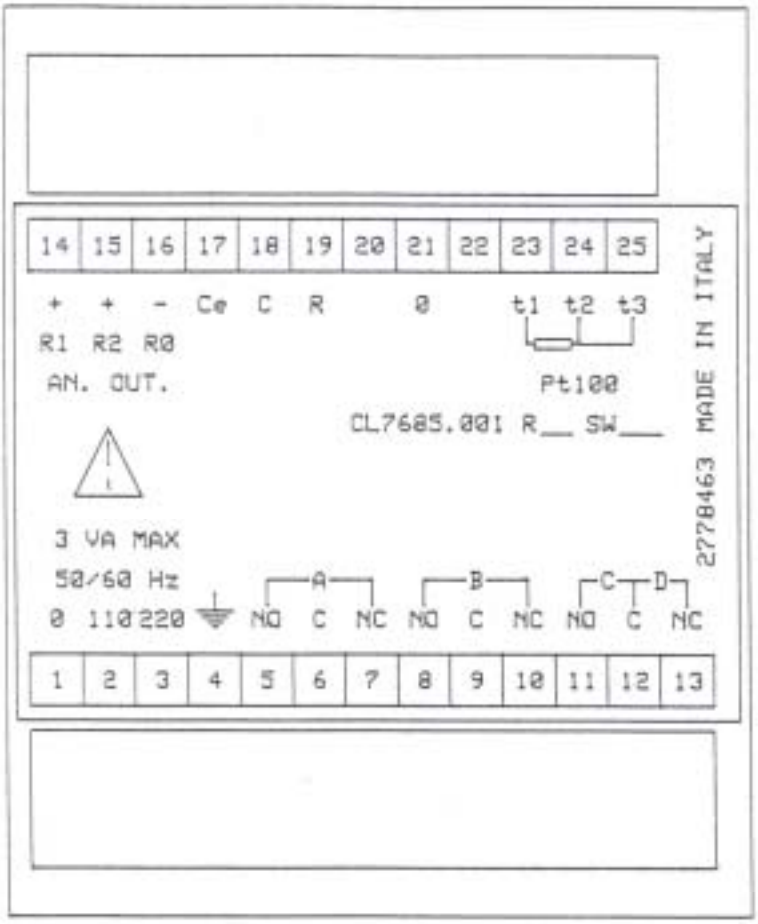
1. DISPLAY
2. MODE-DISPLAY KEY
3. CALIBRATION KEY
4. INCREASE KEY
5. DECREASE KEY
6. ENTER KEY

FIG. 1

CL 7685.001

POTENTIOSTATIC CELL

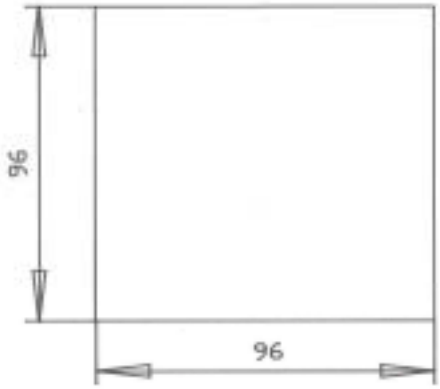
REAR PANEL CONNECTIONS

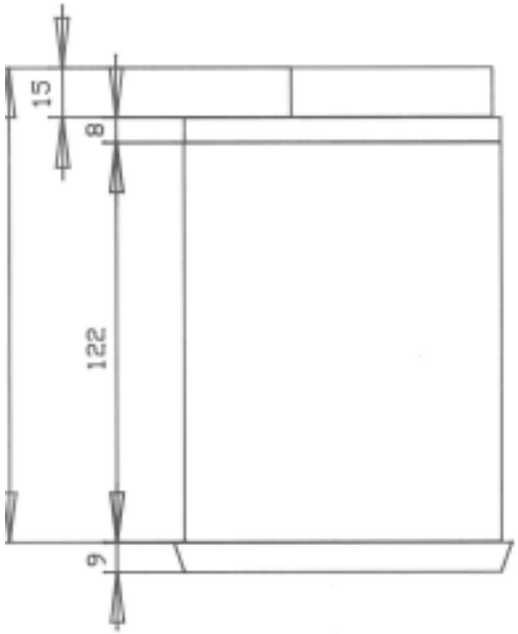


1. 2.	110 V. Power supply
1. 3.	220 V. Power supply
4.	Ground (power)
5. 6.	A Relay N.O. contacts
6. 7.	A Relay N.C. contacts
8. 9.	B Relay N.O. contacts
9.10.	B Relay N.C. contacts
11.12.	CD Relays N.O. (Alarm)
12.13.	CD Relays N.C. (Alarm)
14.	Recorder output channel 1 (+)
15.	Recorder output channel 2 (+)
16.	Recorder common output channels 1 and 2 (-)
17.	Sensor input (white wire)
18.	Sensor input (black wire)
19.	Reference electrode input (shield)
20.22.	External jumper
23.	Pt100 input
24.25.	Pt100 common input

FIG. 2

CONTENITORE DIN 43700 MOD. 7685
BOX





PIANO DI FORATURA
DRILL PLAN

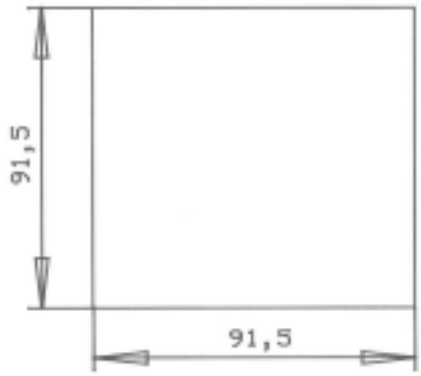
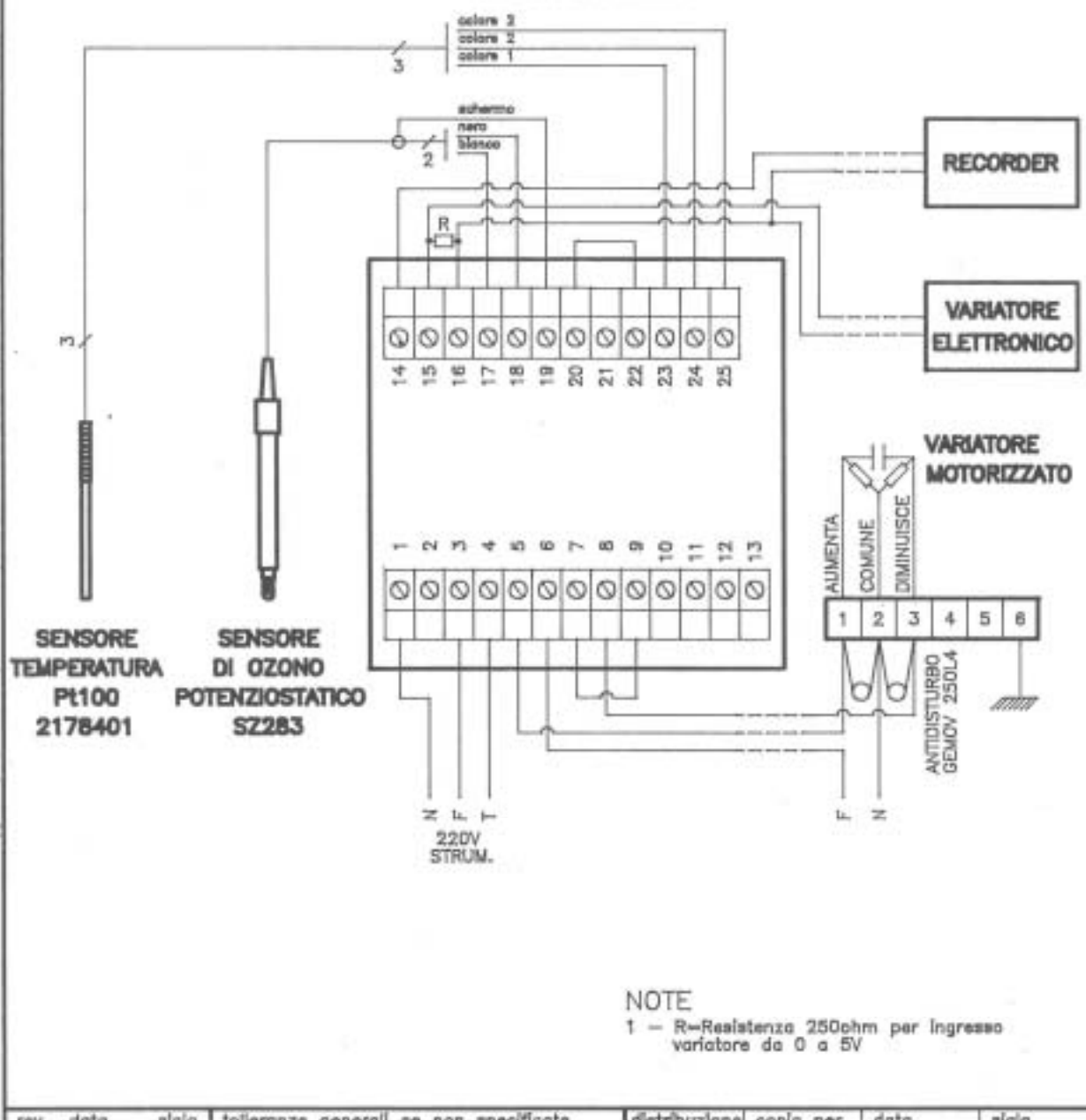
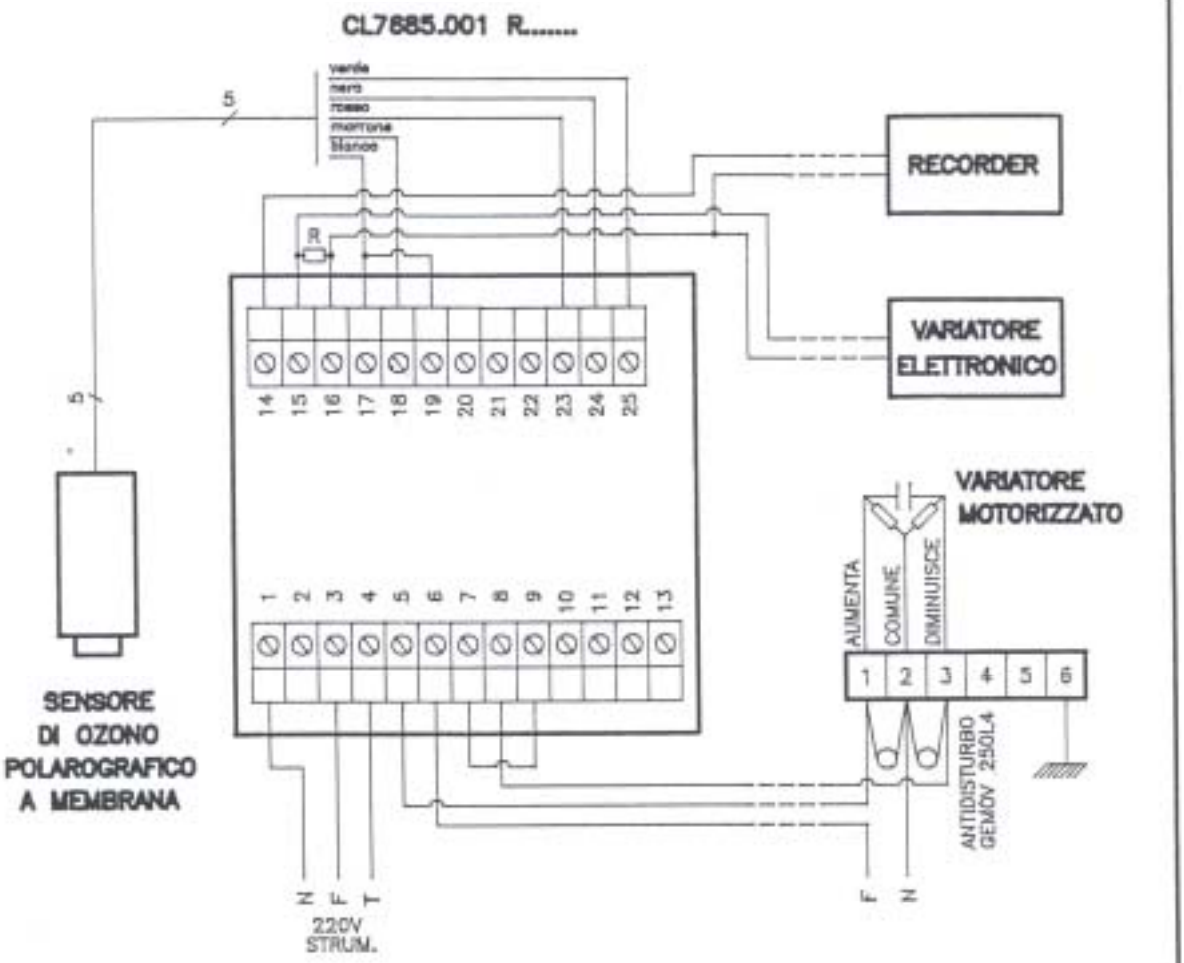


FIG. 4



NOTE
1 – R=Resistenza 250ohm per ingresso variatore da 0 a 5V

rev. data sigla desc.	tolleranze generali se non specificate angoli ±30' tornitura ±0,10mm piegature ±0,25mm foratura ±0,10mm fresature ±0,10mm	distribuzione –AT	copia per AT	data 18/10/95	sigla PPA
	materiale	B&C electronics		A4	data 17-10-95
	trattamento				disegnato PPA
	finitura	scala	unita'	foglio 1/1	approvato AB
A4DSMEC	descrizione SCHEMA APPLICATIVO CL7685.001 MISURA/REGOLAZIONE OZONO SENSORE POTENZIOSTATICO + Pt100	codice SCELCL03	rev. 0	cod.dis. SCELCL03	



NOTE

1 – R=Resistenza 250ohm per ingresso variatore da 0 a 5V

La B&C Electronics si riserva a termine di legge le proprieta' del presente disegno con divieto di riprodurlo per intero o in parte o comunicarlo a terzi senza autorizzazione

A4DISMEC

rev.	data	sigla
desc.		

tolleranze generali se non specificate
angoli ±30' torniture ±0,10mm
piegature ±0,25mm forature ±0,10mm
fresature ±0,10mm

distribuzione	copia per	data	sigla
–AT	AT	18/10/95	PPA

materiale

trattamento

finiture

B&C electronica

A4

data 17-10-95

disegnato PPA

scala | unita' | foglio 1/1 | approvato AB

descrizione SCHEMA APPLICATIVO
CL7685.001 MISURA/REGOLAZIONE OZONO
SENSORE POLAROGRAFICO A MEMBRANA

codice SCELCL02 | rev. 0 | cod.dis. SCELCL02

N O T E

N O T E