UNI EN ISO 9001:2008
CERT. N. 9115 BCEL

*Instruction Manual*

# C 135

# Handheld

# EC - TDS - Temperature meter

| | |
|---|---|
| EC scales: | 0/20.00 µS – 0/200.0 µS – 2000 µS |
| | 0/20.00 mS – 0/200.0 mS |
| TDS scales: | 10.00 ppm – 0/100.0 ppm |
| | 0/10.00ppt – 0/100.0 ppt |
| Temperature scales: | -10.0/+110.0 °C |
| | 14.0/212.0 °F |
| Power Supply: | 9 Vdc |
| Firmware: | R 1.0x |




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# 1 PRODUCT PRESENTATION

## 1.1 FUNCTIONAL PURPOSE OF THE UNIT

The basic system for EC, TDS and temperature measuring is made of three parts:

- the meter described in this instruction manual;
- a conductivity cell with 2 or 4 electrodes
- a Pt1000 temperature sensor

The instrument has the necessary electric circuits and firmware to perform the following functions:

1) as the proper sensor is connected, it displays the EC, TDS and temperature values;
2) if a Pt1000 temperature sensor is connected, it will display the temperature values;
3) it performs an automatic or manual temperature compensation for EC measures;
4) it performs the manual or automatic EC calibration
5) it allows the memorization and the visualization up to 80 readings

## 1.2 FUNCTIONAL PRINCIPLES

The conductivity meter is used to detect the electric conductivity of liquids and to control the salt content or the ionic concentrations of liquids.

The measuring of conductivity is normally done by means of two electrodes completely surrounded by the liquid.
The electrodes must have definite dimensions and arranged locations to define the cell constant K.
This meter can be used with a 4 electrodes conductivity cell (option not included), suggested for high measuring range.

In order to prevent the electrodes polarisation, the measuring is done by alternate current.
The temperature changing of the sample may cause a considerable error, because of the changing of the ions activity.

This instrument features a manual or automatic temperature compensation, referred to temperature of 20 °C or 25 °C.

This meter provides the measuring of the concentration of the total dissolved salt (TDS) through and internal conversion of the conductivity value to ppm or ppt.

## 1.3 SENSORS AND ACCESSORIES

### EC cells

*SZ 3252* *Black platinum cell K=1, epoxy body, 1.5 m cable with BNC*
*SZ 3271* *Graphite cell K=1, epoxy body, 1 m cable with BNC*

### Temperature probes

*SP 51501* *Pt1000 probe in s.steel, 1.5 m cable + stereo jack*
*SI 51511* *Pt1000 probe in epoxy, 1.5 m cable + stereo jack*

### Accessories

*BC 921* *carrying case*

### Standard solutions

*12,88 mS and 1413 µS*

# 2 GENERAL WARNINGS AND INFORMATION FOR ALL USERS

## 2.1 WARRANTY

This product is guaranteed for all manufacturing defects.
Please take a look at the terms and conditions described on the Warranty Certificate at the end of the manual.

## 2.2 AFTER SALES SERVICE

B&C Electronics offers to all of its Customers the following services:

- a free of charge Technical Assistance over the phone for problems regarding installation, calibration and regular maintenance;
- a Repairing Service in our Carnate (Italy) headquarter for all types of damages, calibration or for a scheduled maintenance.

Please take a look at the Technical Support data sheet at the end of the manual for more details.

## 2.3 CE MARKING

This instrument is manufactured according to the following European Community directives:

- 72/23/EEC “Electrical safety – low tension” amended in 93/68/EEC

The CE marking is placed on the packaging and on the S/N label of the instrument.

## 2.4 SAFETY WARNINGS

It is important to underline the fact that electronic instruments are subject to accidents. For this, it is important to take all necessary precautions to avoid damages caused by malfunctions.

All types of operations must be performed by authorized and trained staff.

# 3 INSTRUCTION MANUAL CONTENTS

This chapter describes the manual and gives suggestions to all users on how to read it and use it.

The manual is written according to the following norms:

- UNI 10893 "Instructions for use".
- UNI 10653 "Quality of product technical documentation".

## 3.1 MANUAL REVISION

This chapter shortly describes the differences between previously released versions of the same manual, so to help users that are already familiar with the product.

Rev. A: First release.

## 3.2 SYMBOLS

Throughout the manual You may find the following symbols, which are both dictated by a Norm or that are simply conventional:

| **Symbol** | **Meaning** |
|---|---|
|  | *Attention: pay great attention to what written next to this symbol* |
| ----------<br>**WARNINGS**<br>---------- | *This symbol is used to warn users that if the instructions are ignored or not correctly followed, damage to the instrument can be caused* |
| **Note** | *This symbol is to invite the user to pay particular attention to a specific section of the manual.* |
| "*" | *This symbol can be found in those chapters where there have been changes from the previous releases.* |

## 3.3 HOW TO READ THE INSTRUCTION MANUAL

The manual includes all necessary information to fully comprehend the product, to use it and preserving it, and finally to achieve the performances for which You have selected it and purchased it.

The manual is intended for experienced and prepared personnel, who has knowledge of electronic instrumentations for field application.

The index guides the reader through the chapters and through the contents that he wishes to know or exploit.

In particular, the first chapters narrate the general characteristics and they allow the reader to become more familiar with the product by describing its accessories and its use.
The user can then verify the necessary know-how to use the meter.

**Note**

*Maintenance staff could be more interesting in the chapters regarding:*

- user instructions;
- calibration;
- maintenance;
- warranty/repair terms and conditions.

### 3.3.1 Using the instrument on the field

The end user can operate the meter by reading the EC/TDS//temperature and eventually recording up to 80 readings through the three keys on the front panel.

### 3.3.2 Plant maintenance staff

Maintenance staff can select the scales, set the desired parameters of the “set up” menu and perform the calibration of the measuring by using the standard solutions.

The set-up menu allows the selection of:

- the measuring scale;
- the TDS scale on/off and the conversion factor;
- the response time value of the filter software;
- the °C/°F temperature measuring unit;
- the reference temperature
- the compensation temperature coefficient
- the auto switching-off time:

# 4 SPECIFICATIONS

## 4.1 FUNCTIONAL SPECIFICATION

Display

The instrument has an alphanumeric LCD display 8x1 characters.
The display shows the measures values and the messages to the operator.
After the switching-off time the display will switch off automatically.

Keyboard

The instrument has 3 keys that perform a second functions when pressed for more than 3 seconds.

Input

The meter can be connected to a 2 electrodes cell (4 electrodes cell as option).
If it is connected to a temperature PT1000 sensor, the meter can provide the temperature readout.

Scales

The meter can provide the conductivity measuring in µS or mS, the TDS in ppm or ppt and the temperature in °C or °F.

Temperature compensation

When measuring the electric conductivity and the temperature, the meter performs the automatic temperature compensation, referred to 20 °C or 25 °C.
When the temperature sensor is not connected or it is malfunctioning, the meter performs the pH manual temperature compensation. The temperature display will show the message °CM or °FM and the manual value.

Calibration

During the EC calibration, the meter recognize automatically the memorized standard solutions.

Power supply

The meter is operated by a 9 Vdc battery type MN 1604 or 6LR61.

Instrument setup

The meter has the set up menu to select the measuring scale, the TDS scale on/off and the conversion factor, the response time value of the filter software, the °C/°F temperature measuring unit; the reference temperature, the compensation temperature coefficient, the auto switching-off time:

Data logger

The meter can memorize up to 80 EC/TDS and temperature measures. At the end of the calibration procedure it is possible to enter the date of the last calibration.

## 4.2 TECHNICAL SPECIFICATIONS

The DISP number next to the default values shows the location of data in the menu.
SETUP parameters are indicated by : "S x.y" where:
x=paragraph y=sequence….1…2…3…

| MAIN MEASURE | | Default | Display |
|---|---|---|---|
| CONDUCTIVITY | | | 1.0 |
| Input: | 2 wires K=1 cell (BNC) | | |
| Cond. Scale: | 20/200/2000 µS 20/200 mS | 2000 µS | S2.0 |

| Scale | Resolution | Under Range | Over range |
|---|---|---|---|
| 20.00 µS | 0.01 µS | -1.00 µS | 21.00 µS |
| 200.0 µS | 0.1 µS | -10.0 µS | 210.0 µS |
| 2000 µS | 1 µS | -100 µS | 2100 µS |
| 20.00 mS | 0.01 mS | -1.00 mS | 21.00 mS |
| 200.0 mS | 0.1 mS | -10.0 mS | 210.0 mS |

Under Range: -<<<< µS /mS
Over Range: >>>> µS /mS

Zero: +/- 10 % 0 % 1.1
Calibration of zero is performed for each range starting from the lower one

Sensitivity: 60 % / 160 % 100 % 1.2
Calibration: man/auto with KCl standard solution

| KCl solution | 0.01N | | 0.1N | 1N |
|---|---|---|---|---|
| Tref 20°C | 1278 µS | 3.62 mS | 11.67 mS | 102.1 mS |
| Tref 25°C | 1413 µS | 4.00 mS | 12.88 mS | 111.8 mS |

TC during the calibration: KCl solution TC

TDS measure: On/Off Off S3.0

Conductivity to TDS factor: 0.450 / 1.000 0.500 S4.0

(TDSfactor=1)

| Scale | TDS scale | Resolution |
|---|---|---|
| 20.00 µS | 20.00 ppm | 0.01 ppm |
| 200.0 µS | 200.0 ppm | 0.1 ppm |
| 2000 µS | 2000 ppm | 1 ppm |
| 20.00 mS | 20.00 ppm | 0.01 ppt |
| 200.0 mS | 200.0 ppm | 0.1 ppt |

Under range: -<<<< ppm/ppt
Over range: >>>> ppm/ppt

| SECONDARY MEASURE | | Default | Display |
|---|---|---|---|
| TEMPERATURE | | | 2.0 |
| Input: | RTD Pt1000 | | |
| Wiring: | 3 wires (stereo jack) | | |
| Temperature unit: | °C/°F | °C | S6.0 |
| Temperature compensation: | manual without RTD | | |
| | auto with RTD | | |
| Temperature range: | -10.0 / 110.0 °C | | |
| | 14.0 / 230.0 °F | | |
| Resolution: | 0.1 °C/°F | | |
| Zero adjustment: | +/- 2.0 °C | 0.0 °C | 2.1 |
| | +/- 3.6 °F | 0.0 °F | 2.1 |
| Manual temperature: | 0.0 / 100.0 °C | 20.0 °C | 2.0b |
| | 32.0 / 212.0 °F | 68.0 °F | 2.0b |
| Reference temperature: | 20 / 25 °C | 20 °C | S7.0 |
| Temperature coefficient: | 0.00 / 3.50 %/°C | 2.20 %/°C | S8.0 |

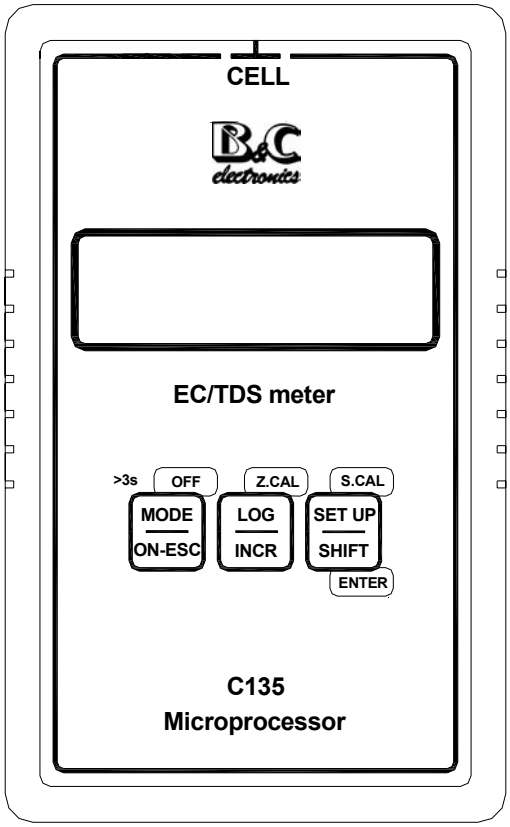
| | | Default | Display |
|---|---|---|---|
| SET-UP PARAMETERS | | | 4.0 |
| P/N and firmware release: | C 135 Rev. 1.XX | | S1.0 |
| Conductivity scale: | 20/200/2000 µS 20/200 mS | 2000 µS | S2.0 |
| TDS measure: | On / Off | Off | S3.0 |
| Conductivity to TDS factor: | 0.45 / 1.00 | 0.50 | S4.0 |
| Response time 90%: | 1 / 10 s | 2 s | S5.0 |
| Temperature unit: | °C/°F | °C | S6.0 |
| Reference temperature: | 20 / 25 °C | 20 °C | S7.0 |
| Temperature coefficient: | 0.00 / 3.50 %/°C | 2.20 %/°C | S8.0 |
| Auto OFF time: | 30 / 600 s | 90 s | S9.0 |

| | | Default | Display |
|---|---|---|---|
| DATA LOGGER | | | 3.0 |
| Memory type: | non volatile EEPROM (100k write) | | |
| Memory capacity: | 80 data erasable (block erase) | | |
| Data ID: | 0 / 79 | | |
| Data format: | REC N°XX / XXXX µS / XXX.X °C<br>(TR=XX°C / X.XX%/°C) | | |
| | REC N°XX / XXXX ppm / XXX.X °C<br>(TR=XX°C / X.XX%/°C) | | |

GENERAL SPECIFICATIONS

| | |
|---|---|
| Operating temperature: | 0 / 60 °C |
| Relative humidity: | 20 / 95 % non condensing |
| Power supply: | 9 V battery (6LR61 680 mAh) |
| Low battery: | < 7.5 V (< 6.5 V auto power-off) |
| Autonomy: | 150 hours approx. continuously |
| Weight: | 180 g approx. battery included |
| Size: | 125 x 75 x 25 mm |
| Display: | LCD COG 8x1 characters |
| Character dimension: | 11.97 x 4.97 mm |
| Long message mode: | alternate message bar (title + variable) |
| Cell/RTD Connections: | BNC/Jack |

# 5 OPERATING PROCEDURES




| KEY | Function on pressing < 3 s | Function on pressing > 3 s |
|---|---|---|
| à | - MODE Scroll display<br>- ON Switch ON<br>- ESC Escape | - OFF Switch OFF |
| è | - LOG Memo record (during measure)<br>- INCR Increase value<br>Scroll set-up functions | - Z.CAL Zero calibration (during measure) |
| ì | - SET UP Access Set-up (during measure)<br>- SHIFT Cursor shift<br>Start selected set-up functions | - S.CAL Sensitivity cal. (during measure)<br>- ENTER Enter (when in cal or set-up) |

## 5.1 OPERATING INSTRUCTIONS

### 5.1.1 Main measuring

*EC/TDS measuring*

Connect the EC sensor and the temperature sensor to the meter.
The model EC -95 is delivered with sensors already connected.
Immerse the sensors in the sample.

Press the key ò .
The meter will switch ON and it will show the scale of the last calibration and the date entered at the end of the last zero or sensitivity calibration or reset.
After few seconds it will turn to the display D1.0 and it will show the EC value of the sample in the scale previously selected in the set-up menu.
If the TDS has been selected ON in the set-up menu, the meter will show the value in ppm or in ppt.
The TDS value is coming from the EC measuring through a conversion factor, selectable 0.450/1.000.

From the TDS display press the key ò .to visualize the conductivity
When the temperature sensor is connected, the meter will perform the automatic temperature compensation.

*Temperature measuring*

Press one time (or two times if TDS is ON) the key ò .
The meter will go to the D2.0 (or D3) display and it will show the temperature value of the sample in °C or °F according to the set-up selection.
The automatic/manual temperature compensation is available only for the EC and TDS measuring.

*Data logging*

During the EC or TDS measuring, press the key é to memorize:

- the EC or TDS value,
- the temperature value,
- the reference temperature value,
- the temperature coefficient value.

The record will be stored in the memory with an assigned number from 0 to 79.
When the memory is full the display will show the message `Mem. Full`.

The memory can be erased by the user by pushing é + ù for more than 3 seconds.

*Low battery*

In case of the battery voltage lower than 7.5 Vdc, the message **Low Batt** will appear when switching on the meter.
If the voltage is lower than 6.5 Vdc the power will be switched off automatically.

### 5.1.2 EC calibration

The meter can perform the manual/automatic calibration with the recognition of the following KCl standard solutions: (only for 2000 µS, 20 mS, 200 mS scales).
The recognition is performed when the reading is within ± 30% of the standard solution value.

| KCl solution | 0.01N | | 0.1N | 1N |
|---|---|---|---|---|
| Tref 20°C | 1278 µS | 3.62 mS | 11.67 mS | 102.1 mS |
| Tref 25°C | 1413 µS | 4.00 mS | 12.88 mS | 111.8 mS |

During the calibration the meter will keep automatically the temperature coefficient of the KCl even if the user has configured the temperature coefficient specific of the sample.

#### Zero calibration

This calibration is normally not necessary unless the sensor and the cable have lost the isolation or it is necessary to calibrate a customs zero value of the sample.
Switch-on the meter and dip the sensor in the zero solution or keep the clean and dry sensor in air to perform the zero calibration.

é push the key for 3 seconds.
It appears the D1.1 display and message **Zero Cal** alternate to the EC value (it should be zero or close to zero)

ù push the key to read the message
**Zeroing** alternate to **Scale x** where **x** will run from 5 to 1 indicating the zeroed scale.

If the new value is out of the accepted limits the display will show the error message **Zero err**

ù push the key for 3 seconds to delete the message and to turn to main display

If the new value is accepted, the display will show the message **Last cal** for few seconds and then it proposes to insert the date by the flashing cursor under last digit. **XX/XX/XX**

é push the key to modify the last digit if necessary

ù push the key to position the cursor on the other digit to be modified with same procedure.

ù push the key for 3 seconds to confirm the date value.

The message **Update** indicates the values have been memorized.
This date value will be shown when switching ON the meter and when ending the next zero or sensitivity calibration so to be modified with the new date.

**Note:**
*The zero reset to factory calibration can be done from the main display:*

é push the key for 3 seconds.

It appears the D1.1 display and message **Zero Cal** alternate to the EC value (it should be zero or close to zero)

ù + é push the two keys for 3 seconds to read the message **RES Zero** and the message **Last cal** for few seconds and then it proposes to insert the date by the flashing cursor under last digit. **XX/XX/XX**

é push the key to modify the last digit if necessary

ù push the key to position the cursor on the other digit to be modified with same procedure.

ù push the key for 3 seconds to confirm the date value.

The message **Update** indicates the values have been memorized.

## Sensitivity calibration

Switch-on the meter and dip the sensor into the standard solution.

ù push the key for 3 seconds.

It appears the D1.2 display and message **Sens Cal** alternate to the EC value.
Allow the EC value stabilization.

ù press the key to access the conductivity value modification.
If the measured value is close to the memorized KCl standard solution, the display will propose the standard solution value.
The display visualizes the value with the flashing cursor on the last digit **xx.xx mS**

é press the key to modify the last digiti f necessary.

ù press the key to position the cursor on the other digit to be modified by following the same procedure.

ù push the key for 3 seconds to confirm the standard solution value.

If the new value is out of the accepted limits the display will show the error message **Sens err**
If the new value is accepted, the display will show the message **Last cal** for few seconds and then it proposes to register the date by the flashing cursor under last digit. **XX/XX/XX**

é push the key to modify the last digit if necessary

ù push the key to position the cursor on the other digit to be modified with same procedure.

ù push the key for 3 seconds to confirm the date value.
The message **Update** indicates the new calibration values have been memorized.

This date value will be shown when switching ON the meter and when ending the next zero or sensitivity calibration so to be modified with the new date.

**Note:**
*The sensitivity reset to factory calibration can be done from the main display:*

ù push the key for 3 seconds.
It appears the D1.1 display and message **Sens Cal** alternate to the EC value.

ù + é push the two keys for 3 seconds to read the message
**RES Sens** and the message **Last cal** for few seconds and then it proposes to insert the date by the flashing cursor under last digit. **XX/XX/XX**

é push the key to modify the last digit if necessary

ù push the key to position the cursor on the other digit to be modified with same procedure.

ù push the key for 3 seconds to confirm the date value.
The message **Update** indicates the values have been memorized.

In many applications it is enough to frequently perform only the sensitivity calibration by using the standard solution close to the measuring value in the process, and the zero check/calibration periodically.

### 5.1.3 TDS calibration

The TDS calibration is done by adjusting the EC/TDS coefficient accordingly to the ppm or ppt contents of the sample.
We suggest to calibrate the TDS measuring when the EC measuring has been previously calibrated.

### 5.1.4 Temperature calibration

Automatic temperature

This calibration can be done when the Pt1000 sensor is connected and the user wants to adjust the temperature readout in one point of the scale.

Dip the Pt1000 into the sample at known temperature.

ò push the key from the main display in order to reach the D2.0 display.

é push the key for 3 seconds.
It appears the D2.1 display and message **Zero cal** alternate to the temperature value.

ù push the key to read the temperature value with the flashing cursor on the last digit

**XXX.X °C** or **XXX.X °F** .

é push the key to modify the last digit if necessary

ù push the key to position the cursor on the other digit to be modified with same procedure.

ù push the key for 3 seconds to confirm the adjusted value.

The message **Update** indicates the new calibration values have been memorized.

If the new value is out of the accepted limits the display will show the error message **Zero Err**

ù push the key for 3 seconds to delete the message and to turn to main display

**Note:**
*The zero reset to factory calibration can be done from the main display:*

é push the key for 3 seconds.
It appears the D2.1 display and message **Zero Cal** alternate to the temperature value

ù + é push the two keys for 3 seconds to read the message
**RES Zero**

Manual temperature

This calibration can be done when the Pt1000 sensor is not connected.

ò push the key from the main display in order to reach the D2.0 display.

ù push the key to read the manual temperature value with the flashing cursor on the last digit
**XXX.X °CM** or **XXX.X °FM**

é push the key to modify the last digit if necessary

ù push the key to position the cursor on the other digit to be modified with same procedure.

ù push the key for 3 seconds to confirm the adjusted value.
At this point the procedure is same as the above steps.

The message **Update** indicates the new calibration values have been memorized.
If the new value is out of the accepted limits, the display will show the message **min/Max 0/100 °C** or **32/212 °F** for few seconds.

### 5.1.5 Data Logger

This function allows the memorization and the reading of the memorized measuring values.

é push the key to memorize the actual EC value.
The meter will memorize the Tref. and the temperature coefficient as well.
The meter will assign and show a progressive number from 0 to 79 to the memorized values.
Follow the next procedure to read the memorized values.
When the record number will reach 79, the message **Mem.Full**.

Data logged visualization

ò push the key two times from the main display in order to reach the D3.0 display **View Log**.

ù push the key to read the number of the record, the alternate values of the EC and temperature.

ù push the key to read for few seconds, the alternate values of the Tref and the temperature coefficient.

é push the key more times to read the previous memorized records.

Erase the logged data

To erase all the memorized data

ò push the key two times from the main display in order to reach the D3.0 display.

ù push the key to read the number of the record, the alternate values of the EC and temperature

é + ù press the two keys for 3 seconds.
The message **Logged erased** will appear.

ò push the key to turn to the main display.

To verify if records are erased:

ò push the key to reach the display
**View Log**

ù push the key to read the message
**Empty**.

### 5.1.6 Set-up

This function allow the user to:
- select the measuring scale
- select the TDS measuring on/off and the EC/TDS conversion factor
- choose the filter software response time
- select the temperature measuring unit °C/°F
- select the reference temperature for the temperature compensation
- select the coefficient for the temperature compensation
- choose the time of the automatic switch-off

#### Measuring scale

The instrument is delivered with the 2000 µS scale.
The next procedure describes the new scale selection.

ù push the key from the main display
The message **Set up** will appear.

ù push the key. The p/n and the firmware release will appear.
**C 135** and **Rev. 1.xx**

é push the key.
The message **EC scale** alternate to scale **2000 µS** will appear.

ù push the key and then é to select the new scale.

ù push the key for 3 seconds to confirm the selected scale.
The message **Update** will appear and turn to the TDS measuring.

ò push the key one time to turn to the Set-up menù or push two times to turn to the main display...

TDS scale

ù push the key from the main display.
The message **Set up** will appear.

ù push the key. The p/n and the firmware release will appear.
**C 135** and **Rev. 1.xx**

é push the key two times.
The message **TDS meas** and **On** or **Off** will flash.

ù push the key and than é to select On or Off.

ù push the key for 3 seconds to confirm the selection On or Off.
The message **Update** will appear followed by **TDS fact.** and the conversion factor **0.500** value alternating

ù push the key and than é to select the new conversion factor value.

ù push the key for 3 seconds to confirm the selected conversion value.
The message **Update** will appear followed by **Resp Time** and the corresponding **2 s** value flashing.

**Note**: if the value is out of the accepted limit, the display will show the message **min/Max 0.45/1.0** for few seconds.

ò push the key one time to turn to the Set-up menù or push two times to turn to the main display.

## Response time of the filter software

The meter is delivered with response time of 2 seconds and it can be modified up to 10 seconds by means of the following procedure.

ù push the key from the main display.
The message **Set-up** will appear.

ù push the key. The p/n and the firmware release will appear.
**C 135** and **Rev. 1.xx**

ù push the key and than é four time.
The display **Resp.Time** and the actual value in seconds will flash.

ù push the key. The actual response time with the flashing cursor on the last digit
**XX.s** will appear.

é push the key to modify the last digit if necessary.

ù push the key to position the cursor on the other digit to be modified with the same procedure.

ù push the key for 3 seconds to confirm the new time in seconds.
The message **Update** will appear. If the new value is out of the accepted limits the display will show the message **min/Max 1/10 s** for few seconds.
The display will show the message **T.UNIT °C** or **°F**.

ò push the key two times to turn to the main display, unless it is requested to modify the temperature measuring unit.
The message **Update** will appear and turn to the temperature unit °C/°F selection..

ò push the key one time to turn to the Set-up menù or push two times to turn to the main display.

## Temperature measuring unit

The meter is delivered with the °C temperature measuring unit and it can be modified to °F by means of the following procedure.
(Follow the same procedure to turn back to °C unit)

ù push the key from the main display.
The message **Set-up** will appear.

ù push the key. The p/n and the firmware release will appear.
**C 135** and **Rev. 1.xx**

é push the key three times.
The message **T Unit °C** (°F) will appear.

ù push the key and then é to set the °F (°C) measuring unit.

ù push the key for 3 seconds to confirm the °F (°C) measuring unit.
The message **Update** will appear followed by **Temp.Ref** and **20.0 °C** (or 25 °C) flashing value.

ò push the key one time to turn to the Set-up menù or push two times to turn to the main display.

Reference temperature

ù push the key from the main display.
The message **Set-up** will appear.

ù push the key. The p/n and the firmware release will appear.
**C 135** and **Rev. 1.xx**

é press the key few times till the message.
**Temp.Ref** e **20.0 °C** (o 25.0 °C).

ù push the key and then é to select 25 °C or (20 °C) reference temperature value.

ù push the key for 3 seconds to confirm the reference temperature value.
The message **Update** will appear followed by **Temp. CO** alternate to the corresponding temperature coefficient **X.XX %/°C** .

ò push the key one time to turn to the Set-up menù or push two times to turn to the main display.

Temperature coefficient

ù push the key from the main display.
The message **Set-up** will appear.

ù push the key. The p/n and the firmware release will appear.
**C 135** and **Rev. 1.xx**

é push the key few times till the message

**Temp. CO** e **X.XX %/°C**.

ù push the key. The actual value with the flashing cursor on the last digit
**X.XX %/°C** will appear.

é push the key to modify the last digit if necessary.

ù push the key to position the cursor on the other digit to be modified with the same procedure.

ù push the key for 3 seconds to confirm the new value.
The message **Update** will appear.
If the new value is out of the accepted limits the display will show the message
**min/Max 0.0/3.50** for few seconds.

The display will show the message **Auto Off 90 s** to select the auto switching off time. .

ò push the key one time to turn to the Set-up menu or push two times to turn to the main display.

## Switching off time

The meter will switch off automatically if any keys is not pressed within the time configured in the Set-up menu.
The meter is delivered with the automatic switching off time of 90 seconds but it can be modified to 30/600 seconds by means of the following procedure.

ù push the key from the main display.
The message **Set-up** will appear.

ù push the key. The p/n and the firmware release will appear.
**C 135** and **Rev. 1.xx**

é push the key four times.
The message **Auto Off** and the actual value in sec. will appear.

ù push the key to read the time value with the flashing cursor on the last digit
**XXX s**

é push the key to modify the last digit if necessary

ù push the key to position the cursor on the other digit to be modified with same procedure.

ù push the key for 3 seconds to confirm the adjusted value.
The message **Update** will appear
If the new value is out of the accepted limits the display will show the message **min/Max 30/600 s** for few seconds.

The display will show the p/n and the firmware release **C 135** and **Rev. 1.xx**

Ò push the key one time to turn to the Set-up menu or push two times to turn to the main display.

### 5.1.7 Maintenance of the unit

Quality components are used to give the meter a high reliability.
In this way it needs just the battery replacement.

#### Battery replacement

The meter controls the voltage of the battery.
If the value is lower than 7.5 volt the display will show the message **Low Batt.**
The meter will switch off automatically if the battery voltage is lower than 6.5 volt.

To replace the battery, remove the cover of the battery place on the back of the instrument.
Replace the 9 Vdc battery,
Place the battery cover in the previous position.

### 5.1.8 Maintenance of the sensor

The state of the electrode's surface is critical for the normal operation of the system and should be inspected more frequently when using alkaline liquids, oil and grease containing water, and bio-applications.

Suggested methods for cleaning the electrode include chemical cleaning and washing detergents:

- dip the sensor for 30 seconds in a 5% HCl solution or detergent in case of grease contamination,
- rinse thoroughly the sensor into deionised water,.

## 5.2 STORAGE AND TRANSPORTATION

In case of long storage period, keep the instrument in a dry area.

In case of tranportation, use the original carton box.

# 6 DISPOSAL

If it shall became necessary to throw away this electronic equipment, please follow the disposal laws of your Country.

# WARRANTY CERTIFICATE

1) Your product is covered by B&C Electronics Warranty for 5 years from the date of shipment. In order for this Warranty to be valid, the Manufacturer must determine that the instrument failed due to defective materials or workmanship.

2) The Warranty is void if the product has been subject to misuse and abuse, or if the damage is caused by a faulty installation or maintenance.

3) The Warranty includes the repair of the instrument at no charge. All repairs will be completed at the Manufacturer's facilities in Carnate, Italy.

4) B&C Electronics assumes no liability for consequential damages of any kind, and the buyer by accepting this equipment will assume all liability for the consequences of its use by the Customer, his employees, or others.

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## REPAIRS

1) In order to efficiently solve your problem, we suggest You to ship the instrument along with the Technical Support's Data Sheet (following page) and a Repair Order.

2) The estimate, if requested by the Customer, is free of charge when it is followed by the Customer confirmation for repair. As opposite, if the Customer shall not decide to have the instrument repaired, he will be charged to cover labor and other expenses needed.

3) All instruments that need to be repaired must be shipped pre-paid to B&C Electronics. All other expenses that have not been previously discussed will be charged to Customer.

4) Our Sales Dept. will contact You to inform You about the estimate or to offer you an alternative, in particular when:
   - the repairing cost is too high compared to the cost of a new instrument,
   - the repairing results being technically impossible or unreliable

5) In order to quickly return the repaired instrument, unless differently required by the Customer, the shipment will be freight collect and through the Customer's usual forwarder.

*B&C Electronics Srl - Via per Villanova 3 - 20866 Carnate (MB) - P.IVA 00729030965*
*Tel (+39) 039 63 1721 - Fax (+39) 039 607 6099 - info@bc-electronics.it - www.bc-electronics.it*

# TECHNICAL SUPPORT

*Data sheet*

In case of damage, we suggest You to contact our Technical Support by email or phone. If it is necessary for the instrument to be repaired, we recommend to photocopy and fill out this data sheet to be sent along with the instrument, so to help us identifying the problem and therefore accelerate the repairing process.

□ *ESTIMATE* □ *REPAIR*

COMPANY NAME

ADDRESS ZIP CITY

REFER TO MR./MISS. PHONE

MODEL S/N DATE

Please check the operator's manual to better identify the area where the problem seems to be and please provide a brief description of the damage:

□ SENSOR
□ BATTERY
□ CALIBRATION
□ DISPLAY
□ KEYS
□ FRONT LABEL
□ ENCLOSURE
□ PERIODICAL MALFUNCTIONING

➢ *DESCRIPTION*

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