

# TECHNICAL MANUAL

## BENCH SCALE



**APD-1: Bench scale with weight indicator which can be mounted attached to the platform or can be mobile.**



APD-1\_01.00\_11.05\_EN\_T

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**NOTE FOR THE TECHNICIAN:**

Please take note that when the “step.... (USER MAN.REF.)” is mentioned, this refers to the user manual.

**1. REQUIREMENTS FOR THE INSTALLATION**

To obtain the best results it is recommended to install the scale in a place with the following conditions:

- **A flat, level surface on which to rest.**
- **Stable and vibration free.**
- **No dust or strong vapours.**
- **No draughts.**
- **Make sure the platform is level or that the loading cells are resting evenly.**
- **Moderate temperature and humidity (15-30°C and 40-70%).**
- **Mains power supply is restricted to within  $\pm 10\%$  of the rated voltage.**
- **Electric protections (fuses etc.) are provided by the technician installing the instrument.**
- **Do not install anywhere where there is the risk of explosion.**
- **Make sure that the indicator, the load cell and serial cable shields and other connected instruments are grounded well (section “EARTHING SYSTEM”).**
- **All the instrument’s connections have to be made respecting the rules applicable in the zone and in the installing environment. Furthermore one needs to respect the recommended minimal distances that are mentioned for the various cable categories. (section “ELECTRICAL PRECAUTIONARY MEASURES”).**
- **Everything not expressly described in this manual has to be considered as improper use of the equipment.**
- **Avoid welding with load cells installed.**
- **Use waterproof sheaths and couplings in order to protect the load cell cables.**
- **The extension cables of the load cells or of the signal amplifier used for connecting the serial ports must be shielded and must respect the allowed maximum distances (section “ELECTRICAL PRECAUTIONARY MEASURES”). In addition these must be laid on their own in a raceway or metal pipe.**
- **Connection of the cell or amplifier cables on the electrical panel shall be independent and, if possible, connected directly to the indicator’s terminal board without laying other cables in the raceway.**
- **Install “RC” filters on the contactor coils, on the solenoid valves and on all devices producing electric disturbances.**
- **If it is possible that condensation could form inside the weight transmitter it is advisable to leave the instrument powered at all times.**

## 1.1 ELECTRICAL PRECAUTIONARY MEASURES

### 1.1.1 CABLES CLASSIFICATION

The various cables are classified depending on the transmitted signals

#### Category I

- Field bus, LAN (PROFIBUS, Ethernet, p , , , Devicenet...)
- Shielded data cables
- Shielded cables for analogue/digital signals < 25V (sensors, load cells...)
- Low tension power supply cables (< 60V)
- Coaxial cables

#### Category II

- DC supply cables with tension > 60V and < 400V
- AC supply cables with tension > 25V and < 400V

#### Category III

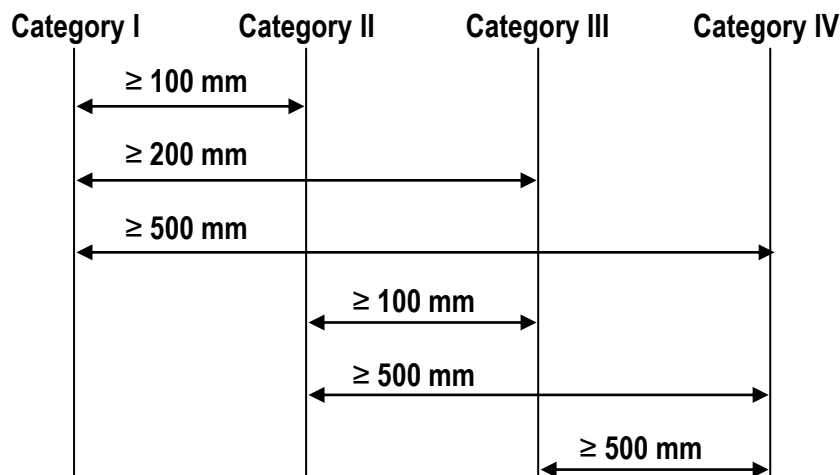
- Power supply cables with tension > 400V
- Telephone cables

#### Category IV

- Any cable subject to lightning

### 1.1.2 RECOMMENDED DISTANCES AMONG CABLES

- When the cables are laid next to each other, these must be at the distances in the table below
- These distances are valid if in the air; these are reduced if the raceways are separated by grounded metallic shields.
- Different category cables can cross each other (90°)



### 1.1.3 MAXIMUM CABLE LENGTH

#### LOAD CELL CABLE

The maximum reachable length from the line using the appropriate load cell cable with a 0,25 mm<sup>2</sup> section, is 50 m.

#### RS232 CABLE

The maximum reachable length from the line using the RS232 cable with a maximum baud rate of 19200, is about 15 m.

## 1.2 EARTHING SYSTEM

For the right earthing and the optimal functioning of the system, it is necessary to connect the indicator and the load cell to the earth.

All earthing cables must have the shortest possible length in order to minimize their resistance.

### INDICATOR

In the case of the indicator there is no external ground connection, so the grounding of the indicator must be made by grounding the COM1 earth terminal, by inserting an appropriate connector on the case, or in another way retained suitable by the installer.

### LOAD CELL

One should connect the shieldings of the cell cables to the grounding point (or grounding bar) inside the container.

### CONNECTED SERIAL CABLES AND INSTRUMENTS

Ground the cable's shield (both at the cable termination on the indicator side and the cable termination of the connected instrument side) and the earth connection of the connected instrument using the copper cables having at least a 16 mm<sup>2</sup> cross-section;

To avoid possible side effects, the earth references of the connection and power supply cable of the indicator and of the connected instrument must be at the same potential.

### GENERAL NOTES:

- Use earth plate of suitable length, in order to obtain a total resistance of earthing plant lower than 1  $\Omega$ .
- In the case the weighing system regards large and/or outdoor structures:
  - the ground connection should be made by connecting the grounding cables to a grounding bar, and the grounding bar to a grounding cable with a cable section that isn't less than 50 mm<sup>2</sup>.
  - the cable cross-section must be greater (for example 50 mm<sup>2</sup> instead of 16 mm<sup>2</sup> and 100 mm<sup>2</sup> instead of 50 mm<sup>2</sup>), because the voltage can be greater (for example thunderbolts);
  - the ground pole must be positioned at a distance of at least 10 metres from the weighbridge structure;
  - one needs to open the SENSE inside the indicator in order to offset the drifts due to the increase in temperature.
- One should check and remove, if necessary, the connection between the earth and the neutral wire of the electrical installation.

## 2. CONNECTIONS TO TRANSDUCER

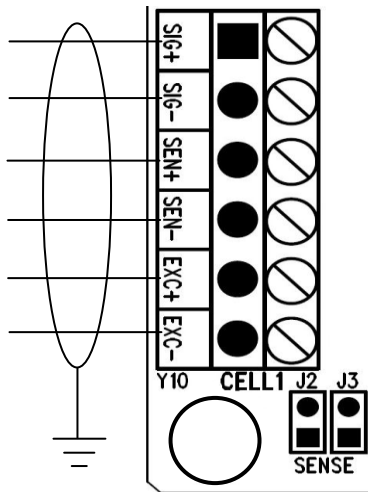
After having followed the instructions regarding the platform or the load receivers, the screened cable leading from the load cell(s) must be connected to the instrument through the CELL1 connector or the CELL1, 2, 3, 4 connector (see the section "CONNECTION SCHEMES") through the relative input (section "INSTALLATION", **USER MAN. REF.**).

The CELL1 and SENSE connectors of the indicator may be connected to the 6-wire load receiver (with use of SENSE), or simply 4-wire, to the CHANNEL 1; for this, through jumper J2 and J3 it is possible to choose whether to short-circuit the SENSE with the POWER SUPPLY (jumpers closed) or not (jumpers open).

The sense allows compensating for any drops in voltage in the part of the cable that connects the instrument to the transducer. It is useful when the distance between the indicator and the transducer is greater than 10 m.

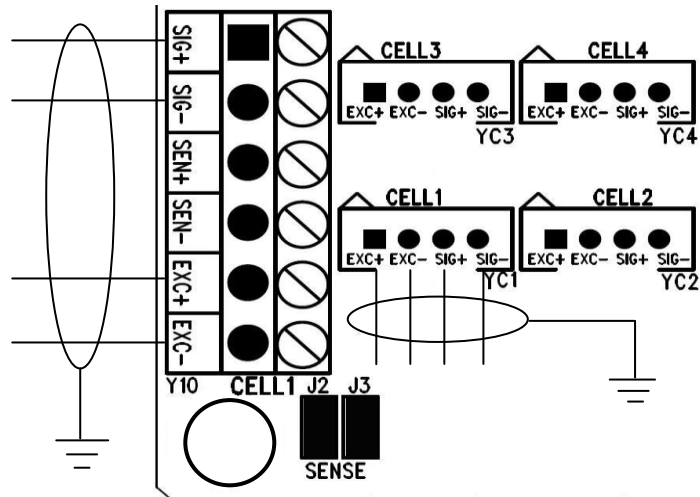
The CELL1, 2, 3, 4 connector allow the 4-wire load receivers connection (without use of SENSE), to more CHANNELS. To make the connection qualified personnel must open the instrument (see the paragraph "CONNECTION SCHEMES").

**6-WIRE CONNECTION**



J2 OPEN  
J3 OPEN

**4-WIRE CONNECTION**



J2 CLOSE  
J3 CLOSE

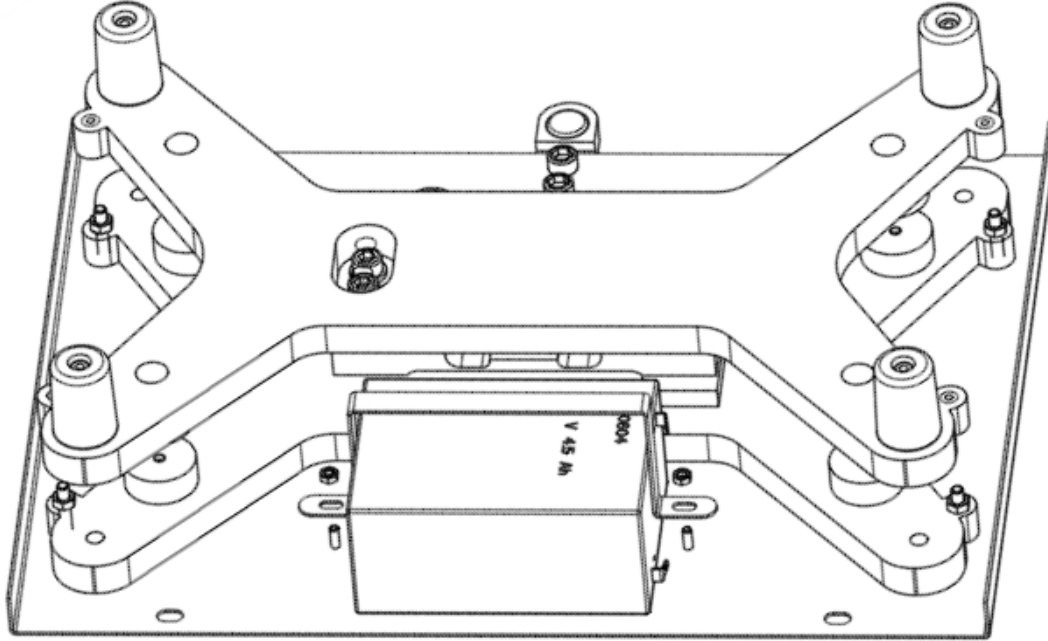
### 3. INSTRUCTIONS FOR BATTERY REPLACEMENT

Execute the operations with the 6Vdc adapter not connected to the mains.

Remove the weighing plate. Extract the four screws with washers in the lower part of the scale and then remove the upper part of the body of the scale. To replace the battery already in the instrument, disconnect the power supply cables from the battery and take off the strap, by unscrewing the nuts.

Place the new battery, secure the strap and connect the power supply cables to the battery, paying attention to respect the polarity of the cables (the red wire goes to the +, the black wire to the -). Reposition and fix the upper part of the body of the scale and the weighing plate.

The picture below shows the battery in the scale.



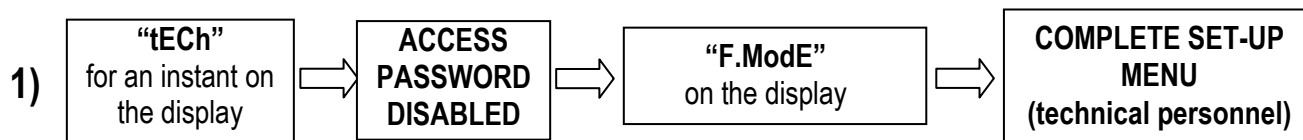
The battery charges when the external power supply is inserted and it automatically powers the unit when the power supply cable is removed.

## 4. SETUP ENVIRONMENT

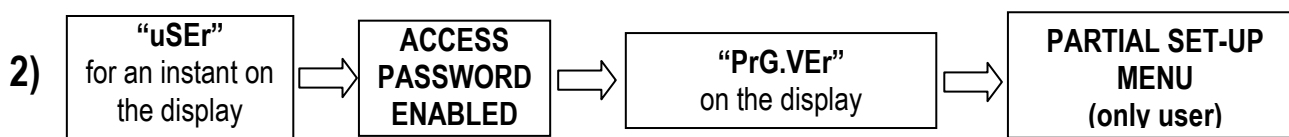
With "SETUP ENVIRONMENT" we intend a specific menu, inside which it's possible to set all the functioning parameters of the scale.

To enter it, turn on the instrument and, while the firmware version is being displayed, press the TARE key for an instant.

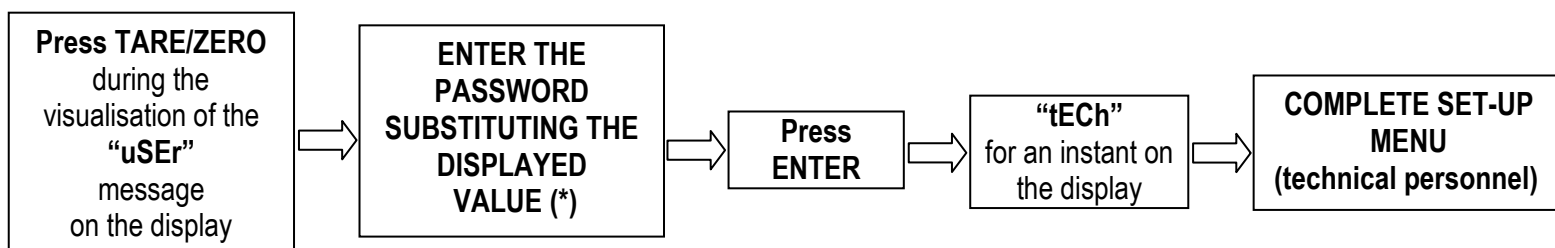
The indicator shows:



or



If you are in choice 2) and you want to access the complete set-up menu one should:



(\*) If one has forgotten the password, one should communicate the displayed number to the manufacturer, who will supply a valid password JUST FOR THAT SPECIFIC NUMBER.

In the Set-Up condition, the instrument keys allow the user to perform the following functions:

- ZERO** Scrolls the programming steps forward in sequence.  
If one needs to enter a numeric value, this decreases the digit to be modified (blinking).
- TARE** Allows to scroll backwards through the programming steps.  
In the case in which one enters a numeric value, the selected digit (blinking) increases.
- M+** Allows to quickly position on the first step of a menu.  
In the case in which one needs to enter a numeric value, select the digit to be modified (blinking) from left to right.
- MR** Allows to enter a step or confirm a parameter inside a step.
- MODE/C** Allows to exit a step without confirming the possibly modified parameter and go to the preceding level.  
When entering a numeric value it quickly zeros the displayed value.

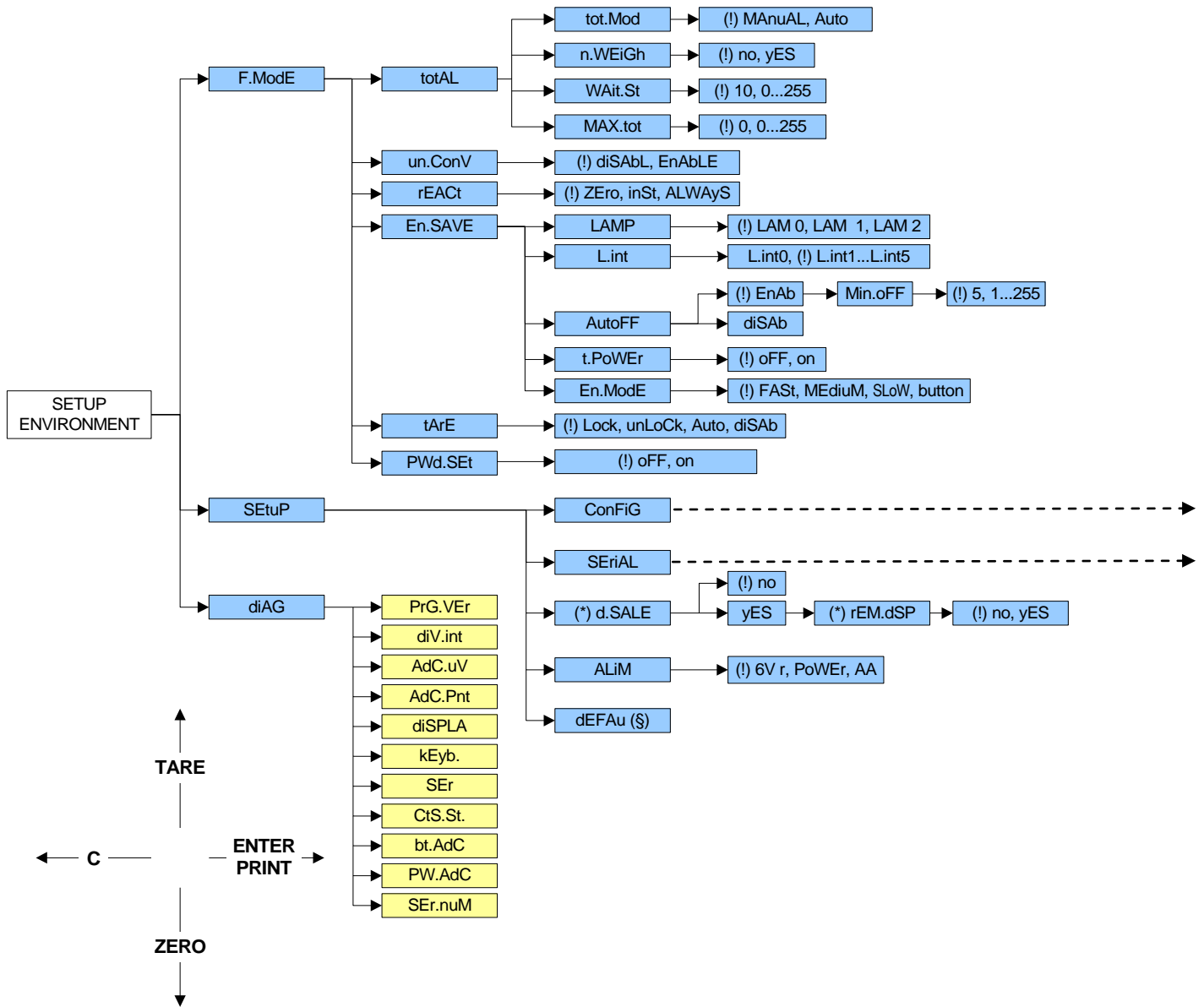


In the parameter description and in the block diagram:

- The **METRIC** parameters are shown with the (\*) symbol, **and, with approved instrument, these may not be visible or read only. See the explanation of the parameter for the details.**  
**NOTE: The instrument is approved when the J1 jumper (CAL) of the motherboard is open (see the electrical scheme in the final chapter).**
- The **CONDITIONAL STEPS** are shown with the (§) symbol, **and are not displayed in specific conditions, shown in the step description.**
- The **DEFAULT VALUES** are shown with the (!) symbol placed next to the step and at the end of it.

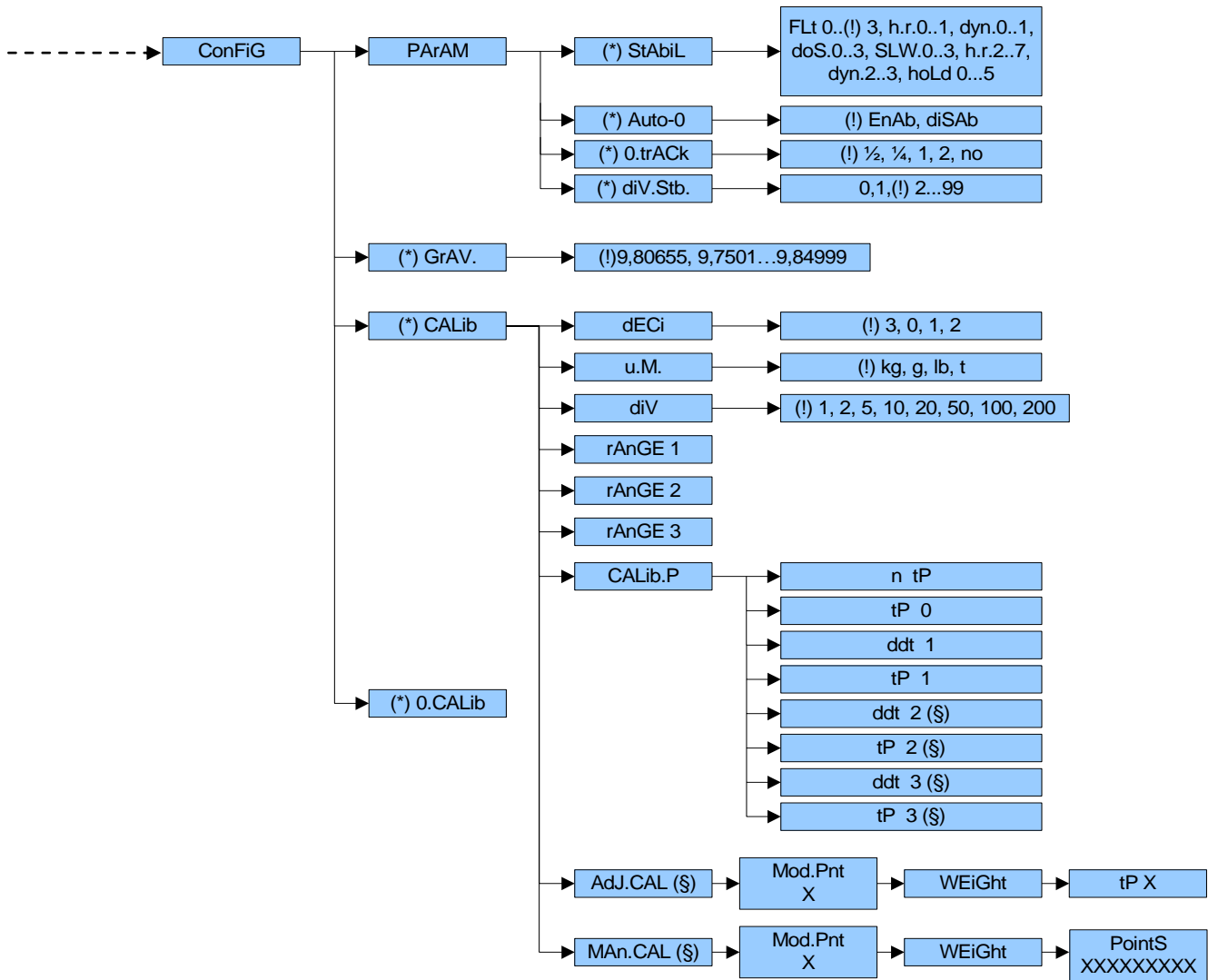
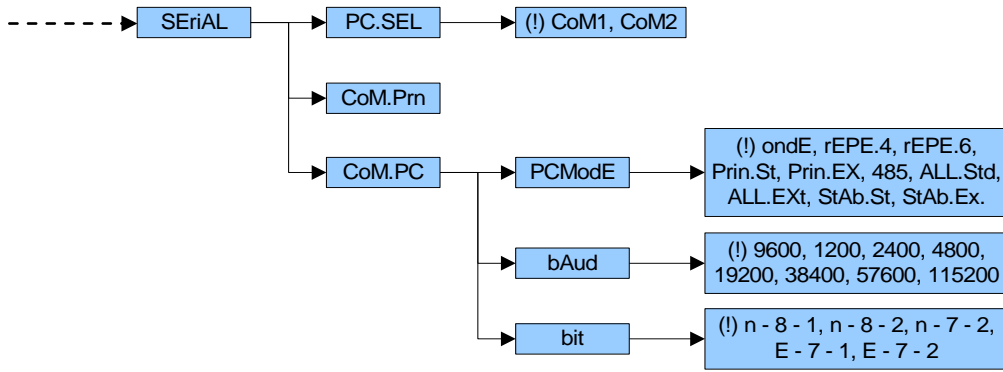
**TO EXIT THE SET-UP ENVIRONMENT, PRESS THE MODE/C KEY MANY TIMES UNTIL THE INDICATOR SHOWS "SAVE?" IN THE DISPLAY: CONFIRM WITH MR TO SAVE ANY CHANGES MADE OR PRESS ANOTHER KEY TO NOT SAVE.**

### 4.1 SET-UP ENVIRONMENT BLOCK DIAGRAM



**LEGEND**

- = USER & TECH MENU'
- = ONLY TECH MENU'
- (\*) = METROLOGICAL PARAMETER
- (§) = CONDITIONED STEP
- (!) = DEFAULT VALUE



## 4.2 DESCRIPTION OF THE STEPS

### F.ModE SCALE FUNCTIONING

#### totAL TOTALIZER MODE

##### tot.Mod TYPE OF TOTALISATION

In this step one can set the type of totalisation.

**MAnuAL** manual totalisation

**Auto** automatic totalisation

(!) **MAnuAL**

##### n.WEiGh NUMBER OF WEIGHS

It is possible to select whether to enable or disable the visualization of the information of totalisation when the totalisation is executed.

**no** only the text “- tot -“ is displayed

**yES** the number of weighs and the total weight are displayed

(!) **no**

##### Wai.St WAIT STABILITY

One can set the wait time of the weight stability for the totalisation pending, from 0 to 255 (measured in seconds).

**NOTE:** the value 0 disables the wait stability, with the value 255 the wait stability time is infinite.

(!) **10**

##### MAX.tot MAXIMUM NUMBER OF TOTALISATIONS

One can set the maximum number of totalisations, from 0 to 255. If one sets the value 0, there is no limit to the number of totalisations allowed.

(!) **0**

#### un.ConV UNIT CONVERSION

In this step it is possible to enable or disable the conversion of the unit of measure of the weight.

**diSAbl** conversion disabled

**EnAbLE** conversion enabled

(!) **diSAbl**

#### rEAct REENABLING OF THE SCALE FUNCTIONS

While using the scale, it is possible to incur in the “**no.0.unS**” error shown on the display accompanied by an acoustic signal; this means that the function which one wants to carry out must be reenabled (in order to avoid accidental executions).

It is possible to set the reenabling in the following modes:

**ZErO** passage of the net weight by zero

**inSt** instability

**ALWAYs** always

(!) **ZErO**

#### En.SAVE ENERGY SAVING

##### LAMP DISPLAY BACKLIGHTING

Through this step one programmes the backlight functioning:

**LAM 0** backlighting disabled

**LAM 1** The backlight turns on if the weight changes and it turns off automatically after stability (no change) has been maintained for at least 10 seconds.

**LAM 2** The background light is always on.

(!) **LAM 0**

**L.int INTENSITY OF DISPLAY BACKLIGHT**

Through this step one selects the intensity of the backlighting of the display:

L.int 1 (minimum), L.int 2, L.int 3, L.int 4, L.int 5 (maximum).

(!) **L.int 1**

**AutoFF AUTO SWITCH-OFF**

It is possible to enable the automatic switch off of the scale (from 1 to 255 minutes), or disable it; the auto switch-off starts working when, **with unloaded scale**, the weight has not been moved or a key has been pressed during the set time: the display shows the blinking “- OFF -” message and an acoustic signal is emitted; then the scale turns off.

**disAb** auto switch-off disabled.

**EnAb** auto switch-off enabled (one will be asked to enter the number of minutes after which the scale must turn off: enter a number from 1 to 255).

(!) **EnAb, 005**

**t.PoWEr TTL/TILT POWER**

Not managed.

**En.Mode ENERGY SAVING MODE**

This step allows to change the weight updating and the on/off feeding of the load cells:

**MAX** weight update always enabled

**FASt** weight update every 2 seconds

**MEDiuM** weight update every 5 seconds

**SLoW** weight update every 10 seconds

**button** updating of the weight by pressing any key; the instrument is normally in standby (the display is off except the point): by pressing any key “- on -” is displayed for an instant, then the weight on the scale is displayed for 30 second; after this time the instrument returns in standby.

(!) **FASt**

**tArE LOCKED / UNLOCKED / DISABLED TARE SELECTION**

**LoCk** locked tare

**unLoCk** unlocked tare

**Auto** automatic tare

**diSAb** disabled tare

See the section “TARE OPERATIONS” for further functioning details, **USER MAN. REF..**

(!) **LoCk**

**PWd.SET SET ACCESS PASSWORD**

One selects whether to enable or disable the access password to the technical menu:

**on** password enabled

**oFF** password disabled

By selecting **on**, one can insert a password of up to 5 digits. When finished entering, press MR to confirm.

**NOTE:** The maximum enterable value is **65534**.

(!) **oFF**

## SEtuP SCALE CONFIGURATION

### ConFiG METRIC CONFIGURATION

#### PArAM METRIC PARAMETERS

##### (\*) StAbiL FILTER INTEGRATION

By pressing the MR key one accesses the selection of the type and degree of filter intervention for the stability of the weight indication:

- FLt 0 – 3** filter for simple weighing
- h.r.0 – 1** filter for high resolution
- dyn.0 – 1** filter for a moving weight
- doS.0 – 3** filter for dosage
- SLW.0 – 3** filter for a rather unstable weight
- h.r.2 – 7** filter for high resolution
- dyn.2 – 3** filter for a moving weight
- hoLd 0– 5** not managed

The higher the filter value, and greater is its intervention relative to the type of filter used.

##### **(!) FLt 3**

(\*) With approved instrument it is possible to select just the **FLt 0 – 3**, **h.r.0**, **h.r.1**, **dyn.0**, **dyn.1**, **SLW.0**, **SLW.1** parameters.

##### (\*) Auto-0 AUTOZERO AT THE START UP

By pressing MR one chooses whether to enable (**EnAb**) or disable (**diSAb**) the automatic acquisition of the gross zero upon start-up. By choosing **EnAb**, if upon start-up a detected weight is within +/- 10% of the capacity, it is zeroed; if the weight is not within this tolerance, the non approved instrument's display will show the present weight after a few instants, while an approved instrument will continuously show "ZEro" on the display, until a weight within tolerance is placed.

##### **(!) EnAb**

(\*) With approved instrument the parameter is read-only.

##### (\*) 0.trACK ZERO TRACKING

This menu allows setting the zero tracking, in other words, the compensation parameter of the scale's thermal drift; the set value corresponds to the number of divisions that is reset in the fixed time of 1 second.

- tr ½** +/- half division.
- tr ¼** +/- one fourth of a division.
- tr 1** +/- one division.
- tr 2** +/- two divisions.
- tr no** tracking disabled.

##### **(!) tr ½**

(\*) With approved instrument it is possible to select just the **tr. no**, **tr. ½**, **tr. ¼** parameters.

##### (\*) diV.Stb DIVISIONS BY STABILITY

In this step one enters the number of divisions by which the scale detects the weight stability; the higher the number of divisions, less is the sensitivity, and consequently the stability is more easily detected. The possible values are 0 (weight always stable)...99.

##### **(!) 2**

(\*) With approved instrument the parameter is read-only.

**(\*) GrAV. GRAVITY ZONE AND ZONE OF USE**

Through this step one selects the acceleration value **of calibration and of use** of the scale:

Manual entry of the g value: one may manually enter the gravitational acceleration value; **one must modify the 6 decimal digits of the gravitational acceleration.**

In case one enters a wrong g value: the minimum decimal value is suggested (9,75001); a wrong value is any decimal number that is not between 9,75001 and 9,84999 (inclusive).

**(!) g = 9,80655**

**(\*)** With approved instrument the parameter is read-only.

**(\*) CALib SCALE CALIBRATION**

See the section "SCALE CALIBRATION".

**(\*)** With approved instrument the parameter is read-only.

**(\*) 0.CALib ZERO CALIBRATION**

See the section "SCALE CALIBRATION".

**(\*)** If the instrument is approved, the step is not displayed.

**SERIAL SERIALS, PRINTOUTS, ETC...****PC.SEL PC SERIAL SELECTION**

Through this step one can select the PC serial port and therefore invert the serial ports.

**COM1** The communication between the scale and the PC takes place through the **COM1** serial port.

**COM2** The communication between the scale and the PC takes place through the **COM2** serial port.

**(!) COM1**

**CoM.Prn PRINTER SERIAL PORT**

Parameters related to the printout configuration. Contact the reseller for more details.

**CoM.PC PC SERIAL PORT****PCModE TRANSMISSION ON THE PC SERIAL**

**ondE** transmission on external command PC (given from PC or PLC, for example).

**rEPE.4** transmission to 4 digit remote display.

**rEPE.6** transmission to 6 digit remote display.

**Prin.St.** transmission of standard string when the MR key is pressed.

**Prin.EX** transmission of extended string when the MR key is pressed.

**NOTE:** The transmission of the standard or extended string upon the pressing of the MR key is confirmed by "trAnSM" on the display. The transmission through the key is carried out by pressing the M+ key or takes place automatically in case of automatic totalisation.

**485** transmission with 485 protocol, by confirming with MR, one is required to enter the machine code (the message "Ad485" appears for an instant): enter a value between 0 and 98.

**ALL.Std** continuous transmission with standard string.

**ALL.Ext** continuous transmission with extended string.

**StAb.St** transmission with each weigh with standard string.

**StAb.EX** transmission with each weigh with extended string.

**(!) ondE**

For the transmission modes and protocol specifications, see the sections "SERIAL PORT TRANSMISSION MODES" and "TRANSMISSION PROTOCOLS".

**bAud SET BAUD RATE**

By pressing the MR key one accesses the selection of the data transmission speed (measured in Baud = bit/second). The possible values are:

1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

**(!) 9600**

**bit SET PARITY, WORD, STOP BIT**

By pressing the MR key one accesses the selection of the available values: n-8-1, n-8-2, n-7-2, E-7-1, E-7-2.

**(!) n-8-1**

**(\*) d.SALE LIMITATION OF THE SCALE FUNCTIONS**

**no** limitations disabled

**yES** limitations enabled

Refer to the section "LIMITATIONS OF THE TARE FUNCTIONS" (**USER MAN.REF.**) for the description of its functioning.

**(!) no**

If the limitations are enabled, the next step is displayed:

**(\*) rEM.dSP REMOTE DISPLAY**

**no** remote display disabled

**yES** remote display enabled

**(!) no**

(\*) With approved instrument the parameters are read-only.

**ALiM POWER SUPPLY MODE**

In this step one configures the instrument's power supply.

**PoWEr** with power adapter, through the PC via USB port or with 4 not rechargeable AA batteries

**AA** 4 rechargeable AA batteries

**6V r** 6V rechargeable battery

**(!) 6V r**

**dEFAu INITIALIZATION OF THE INSTRUMENT (§)**

Through this step one can initialize the instrument with the subsequent activation of the default parameters. By pressing MR, a confirmation message ("dFLt?") will appear: confirm again with MR or exit with any other key.

**NOTE: The initialization of the instrument causes a cancellation of the present calibration and the activation of the default parameters. In any case if one exits the setup environment WITHOUT CONFIRMING the modification made, all the parameters of the last saving made will remain (including the calibration).**

**(§) In case of approved instrument, the default DOES NOT HAVE EFFECT on the metrological parameters (those marked with (\*)).**



## **diAG DIAGNOSTICS MENU**

It is a submenu inside which it is possible to check the software components and the scale hardware.

### **PrG.Ver CHECKING THE SOFTWARE VERSION**

By pressing MR the display shows the software version in the XX.YY.ZZ format.

### **diV.int CALIBRATION INTERNAL DIVISIONS**

By pressing MR the display shows the calibration internal divisions.

### **AdC.uV MICROVOLTS**

By pressing MR the display shows the microvolts relative to the weight on the scale.

In the case the load cell is not connected or faulty it is possible that floating values are shown, or the message "Error" appears, if these exceed the underload / overload value of the converter.

**Note:** The maximum voltage that the instrument accepts in input is 30 mV (30000  $\mu$ V); the weighing system is powered by the indicator at 5 Vdc.

A correct operation will have a value less than 30000 with a weight of full scale capacity on the weighing system.

### **AdC.Pnt CONVERTER POINTS**

By pressing MR the display shows the A/D converter points relative to the weight on the scale.

In the case the load cell is not connected or faulty it is possible that floating values are shown, or the message "Error" appears, if they exceed the underload / overload value of the converter.

### **diSPLA DISPLAY TEST**

By pressing MR the indicator turns on all the display segments and symbols. One exits by pressing the MODE/C key or the MR key.

### **kEyb. KEYBOARD TEST**

By pressing the keys one at a time, the display shows their relative codes. One exits by pressing the same key three times.

### **SER TEST OF THE SERIAL PORTS**

By pressing MR the indicator displays "S xy" in which x indicates the status of the printer serial port while y indicates the status of the PC serial port. Both can take on two values:

0 Serial port does not work

1 Serial port works

During the test one should shortcircuit TXPC with RXPC (in the PC terminal board) and TXPR with RXPR (in the PRN). Furthermore the ASCII "TEST"<CRLF> string is continuously transmitted on both the serial lines.

At this point, by pressing any key, the instrument gives the possibility to transmit on the PC port or COM1, all the data received from the PRN port or COM2 and vice versa: the display shows "COM1-2", press the MODE/C key to exit from the step.

### **CtS.St. TEST OF THE CTS STATUS**

Diagnostic check for use of the manufacturer.

### **bt.AdC**

Diagnostic check for use of the manufacturer.

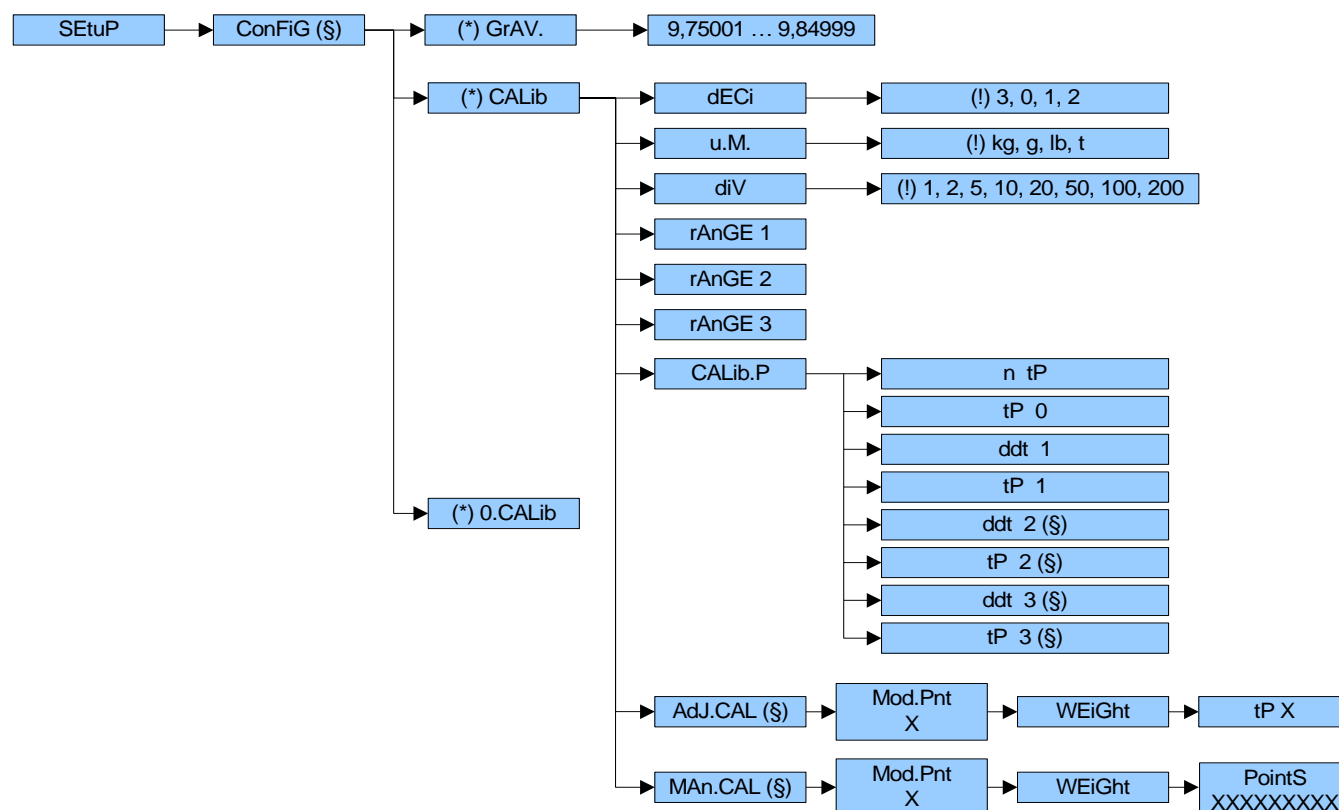
### **PW.AdC**

Diagnostic check for use of the manufacturer.

### **SER.nuM**

Diagnostic check for use of the manufacturer.

## 5. CALIBRATION



**IMPORTANT:** with Approved Instrument, the following parameters:

- are read only: “GrAV.”, “rAnGE 1”, “rAnGE 2”, “rAnGE 3”, “diV”, “dECi”, “u.M.”, “ntP”, “ddt1”, “ddt 2”, “ddt 3”.
- are not displayed: “0.CALib”, “tP0”, “tP1”, “tP2”, “tP3”.

**Premise:** this procedure is to be followed if one needs to calibrate a single-cell scale; the scale is connected to a single channel on the board; connect the cable from the load cell on CHANNEL 1 of the board (terminal board or CELL 1 connector); see the section “CONNECTIONS TO TRANSDUCER” for further details.

- 1) Enter the SET-UP environment of the scale (when turned on, press the TARE key for an instant while the firmware version is displayed).
- 2) Select the **SEtUP** >> **ConFIG** >> **CALib** step and press MR.
- 3) Select the “dECi” step and press MR.  
The selectable values are 0.0 (a decimal), 0.00 (two decimals), 0.000 (three decimals), 0 (no decimal); confirm with ENTER/PRINT.  
**(!)(&) 0.000**
- 4) Select the “u.M.” step and press MR.  
Set the unit of measure (g, Lb, t, kg) and press MR.  
**(!) kg**
- 5) Select the “diV” step and press MR.  
Set the minimum division of the scale or first range in case of n ranges and press MR (selectable values: 1, 2, 5, 10, 20, 50, 100, 200).  
**(!)(&) 1**
- 6) Select the “rAnGE1” step and press MR;  
Set the total capacity of the scale or the first range in case of multirange functioning:  
**ZERO** Decreases the selected digit (blinking).  
**TARE** Increases the selected digit (blinking).  
**M+** Selects the digit to be modified (blinking), from left to right.  
**MODE/C** Quickly zeros the displayed value.  
Confirm with the MR key.
- 7) Select the “rAnGE2” (only in the case of a dual range scale) and press MR;  
Set the capacity of the second range and press MR.

- 8) Select the "rAnGE3" (only in the case of a triple range scale) and press MR;  
Set the capacity of the triple range and press MR.
- 9) Select the "CALib.P" step and press MR.
- 10) Select the "ntP" step and press MR.
- 11) With the ZERO or TARE keys set the number of points with which one wants to calibrate (from 1 to 3, with 1 one does the zero point and one weight point) and press MR.
- 12) Select the "tP0" (scale zero point) step: unload the scale and wait a few seconds, then press MR.
- 13) Select the "ddt1" (setting first sample weight) step; press MR, enter the weight value and confirm with MR.
- 14) Select the "tP1" (acquisition of first sample weight) step: put the weight on the scale, wait a few seconds and press MR.

**NOTE:** The number of converter points will be shown alternating to the weight acquisition message. If the weight is sufficiently stable, the weight acquisition is made, otherwise the display shows "ErMot" and "StorE?". With MR the acquisition is made anyway, with MODE/C the display shows "rEtry?". In this last case with MR one can repeat the weight acquisition, with MODE/C one can exit from the step.

- 15) **If a calibration point has been set**, once the weight acquisition has been made, the display shows for an instant the value of the internal divisions and then the "n tP" step.

**If there are various calibration points, repeat the operations for the "ddt2", "tP2", "ddt3", "tP3" points.**

- 16) Once the calibration has been made for all the necessary points, press the MODE/C key various times until the display shows "SAVE?": confirm with MR to memorize and return to weighing.

**N.B.:** the calibration points must be increasing (point 1 < point 2 < point 3).

### **5.1 IN CASE THE ZONE OF USE IS DIFFERENT FROM THE CALIBRATION ZONE ONE SHOULD:**

- 1) Enter in the SET-UP environment of the scale (when turned on, press for an instant the TARE key while the firmware version is displayed).
- 2) Enter in the **SEtuP >> ConFiG >> GrAV.** step and set the gravity acceleration value for the CALIBRATION ZONE.
- 3) Carry out the calibration as previously described.
- 4) Save and exit from the SET-UP environment (press many times the MODE/C key until the display shows "SAVE?" and confirm with MR).
- 5) Enter the SET-UP environment of the scale and enter the **SEtuP >> ConFiG >> GrAV.** step and set the gravity acceleration value for the ZONE OF USER.
- 6) Save and exit the SET-UP environment.
- 7) The weight error caused by the error of a different gravitational attraction value between the calibration zone and the zone of use is corrected automatically.

With APPROVED instrument, when turned on, the value of the zone of use or the gravitational acceleration value is displayed.

### **5.2 QUICK CALIBRATION OF ZERO**

It is useful to calibrate just the point of ZERO when a permanent tare weight is put onto the platform.

- 1) Enter in the SET-UP environment of the scale (when turned on, press for an instant the TARE key while the firmware version is displayed).
- 2) Enter in the **SEtuP >> ConFiG >> 0.CALib** step and press MR key (the display shows "CAL.0?").
- 3) Put the tare on the scale and press MR key to confirm the operation.
- 4) Once the zero calibration is made, press many times the MODE/C key until the display shows "SAVE?": confirm with MR to store and return to weighing.

### **5.3 QUICK CALIBRATION OF A DEFINED WEIGHT**

It is useful to recalibrate the point of a defined weight except 0 weight when the user wants to recalibrate the scale.

- 1) Enter in the SET-UP environment of the scale (when turned on, press for an instant the TARE key while the firmware version is displayed).
- 2) Enter in the **SEtuP >> ConFiG >> CALib >> AdJ.CAL (§)** step and press MR key (the display shows "Mod.Pnt").
- 3) Enter the number of the sample weight to be recalibrated (between 0 and 3) and press MR key to confirm the value; the "WEiGht" message is displayed for an instant, then enter the weight value of the selected sample and confirm by pressing MR.
- 4) The display shows "tP" followed by the number of the sample weight to be recalibrated; put the weight on the scale,

wait a few seconds and press MR.

- 5) Once the reacquisition of the sample weight has been made, the display shows for an instant the value of the internal divisions and then the indicator exits from the "AdJ.CAL" step; then press many times the MODE/C key until the display shows "SAVE?": confirm with MR to store and return to weighing.
- (§) The step is displayed only if the number of points of calibration has been entered.

#### **5.4 MANUAL CALIBRATION OF A DEFINED WEIGHT**

It is useful to manually recalibrate the point of a defined weight except 0 weight when the user knows the number of points of the converter and wants to recalibrate the scale.

- 1) Enter in the SET-UP environment of the scale (when turned on, press for an instant the TARE key while the firmware version is displayed).
- 2) Enter in the **SEtUP >> ConFiG >> CALib >> MAn.CAL (§)** step and press the MR key (the display shows "Mod.Pnt").
- 3) Enter the number of the sample weight to be manually recalibrated (between 0 and 3) and press MR key to confirm the value; the "WEiGht" message is displayed for an instant, then enter the weight value of the selected sample weight and confirm by pressing MR.
- 4) The display shows "PointS" for an instant, then enter the number of converter points and confirm by pressing MR. Once this value has been acquired, the indicator exits from the "MAn.CAL" step; then press many times the MODE/C key until the display shows "SAVE?": confirm with MR to store and return to weighing.
- (§) The step is displayed only if the number of points of calibration has been entered.

## **6. DISPLAY OF THE GEOGRAPHICAL UTILISATION AND CORRECTION ZONE OF THE WEIGHING ERROR DUE TO THE DIFFERENT GRAVITATIONAL ATTRACTION BETWEEN THE CALIBRATION AND UTILISATION ZONE.**

### **6.1 INDICATION AND/OR DISPLAY OF THE GEOGRAPHICAL UTILISATION ZONE (compulsory for the legal for trade instruments).**

This instrument conforms to the laws currently in force regarding non-automatic weighing instruments. Such g-sensitive instruments are influenced by the gravitational acceleration value "g" of the utilisation zone hence it is compulsory to indicate, with a label or on the display, the coded name of the utilisation zone where the weighing machine can be used.

### **6.2 CORRECTION OF THE WEIGHING ERROR INTRODUCED BY A DIFFERENT GRAVITATIONAL ATTRACTION VALUE BETWEEN THE CALIBRATION AND UTILISATION ZONE (compulsory for legal for trade instruments).**

This instrument conforms to the laws currently in force regarding non-automatic weighing instruments. Such g-sensitive instruments are influenced by the gravitational acceleration value "g" of the utilisation zone so a special programme has been created to compensate for any differences in the gravitational attraction between the place where the weighing machine is calibrated and the place of utilisation.

During configuration the "g" values relative to the utilisation zone and to the zone of calibration are entered at a certain programming step which eliminates the weight error introduced by the different gravitational attraction value.

## 7. SERIAL OUTPUTS

The instrument has two bidirectional serial outputs, which have the output in ASCII code compatible with the majority of printers, remote displays, PCs and other devices.

### 7.1 SERIAL PORTS

#### 7.1.1 COM1 PORT

It is bi-directional (full duplex) and uses an RS232/485 for transmitting data.

It is mainly used to connect computers, PLCs, additional remote displays.

The transmission speed may be selected in the SET UP among these: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud (bit/sec.).

Connection in RS232 between PC and indicator:

	PC 9 pin (male)	PC 25 pin (male)	INDICATOR COM1 232	STANDARD CABLE
<b>RX</b>	2	3	1 TX	Pink
<b>TX</b>	3	2	2 RX	Yellow
<b>GND</b>	5	7	6 GND	Grey

Connection in RS232 between PC and indicator, through board with RJ45 connector connected to COM1 232 (\*):

	PC 9 pin (male)	PC 25 pin (male)	INDICATOR (RJ45 connector)	STANDARD CABLE
<b>RX</b>	2	3	6 T/+	Orange
<b>TX</b>	3	2	3 R/-	Blue/White
<b>GND</b>	5	7	5 GND	Green/White

(\*) May be present depending on the model.

Below is the RS485 connection of the indicator through terminal board:

	INDICATOR COM1 485
<b>Line 485 +</b>	A(+)
<b>Line 485 -</b>	B(-)
<b>Earth (Ground)</b>	3 $\perp$

#### 7.1.2 COM2 PORT

It is bi-directional (full duplex) and uses an RS232/TTL for transmitting data.

It is mainly used to connect to printers, computers and PLCs.

The transmission speed may be selected in the SET UP among these: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud.

Connection in RS232 between PC and indicator:

	PC 9 pin (male)	PC 25 pin (male)	INDICATOR COM1 232	STANDARD CABLE
<b>RX</b>	2	3	1 TX	Pink
<b>TX</b>	3	2	2 RX	Yellow
<b>GND</b>	5	7	6 GND	Grey

Connection in RS232 between PC and indicator, through board with RJ45 connector connected to COM2 232 (\*):

	PC 9 pin (male)	PC 25 pin (male)	INDICATOR (RJ45 connector)	STANDARD CABLE
<b>RX</b>	2	3	6 T/+	Orange
<b>TX</b>	3	2	3 R/-	Blue/White
<b>GND</b>	5	7	5 GND	Green/White

(\*) May be present, depending on the model.

One should connect the 6-pin AMP female connector coming from the RJ45 board onto the COM2 232 AMP male connector of the main board (see the section "MOTHER BOARD").

Connections from LP542S, DP24, DP190 printer to indicator:

	DP24/LP542S 9pin (female)	DP190 Terminal Board	INDICATOR COM2 232	STANDARD CABLE
<b>GND</b>	5	GND	6 GND	Grey
<b>CTS</b>	8	BU	3 CTS	Brown
<b>RX</b>	3	RX	1 TX	Pink

Connection between the TPR printer and indicator, both powered by 6V battery:

TPR	Battery Switch Indicator Board (*)	STANDARD CABLE
GND	GND	Black
RX	RXOUT	Grey
<b>POWER SUPPLY</b>		
+VP	+VOUT	Red
GND	GND	Black

Battery Switch Indicator Board (*)	INDICATOR COM2 232	STANDARD CABLE
GND	6 GND	Black
RX-IN	1 TX	Grey
<b>POWER SUPPLY</b>		
+VIN	+	Red
GND	-	Black

TPR	INDICATOR COM2 232	STANDARD CABLE
DTR	3 CTS	Yellow

**Note:** if there is the Battery Switch board, it is necessary to set the "PWr.Prn" parameter on "EXt.oFF" (SEtuP >> SEriAL >> CoM.Prn >> PWr.Prn).

(\*) May be present depending on the model.

Connection between the TPR printer and indicator with independent power supply:

TPR	INDICATOR COM2 232	STANDARD CABLE
GND	6 GND	Black
DTR	3 CTS	Yellow
RX	1 TX	Grey

## 7.2 SERIAL PORT TRANSMISSION MODES

### 7.2.1 PC.SEL – SELECTION OF THE PC PORT

It is possible to select the serial port to be used as a PC port. This setting is made in the **SEtuP >> SEriAL >> PC.SEL** step.

### 7.2.2 PC PORT

Please find below the various selectable serial weight transmission modes of the PC serial port through the corresponding “PCModE” step of the SET-UP environment.

- **TRANSMISSION REQUESTED FROM AN EXTERNAL DEVICE** (“ondE” parameter)

In this case the instrument waits for a command before transmitting (see the section “FORMAT OF THE SERIAL COMMANDS”).

With Baud rate at 9600, through the READ command, it is possible to make up to 14 requests per second, while with Baud rate at 115200 through the READ command, it is possible to make up to 24 requests per second.

The transmission works with weight <, =, > 0 with approved or unapproved instrument.

**NOTE:** This protocol is active also in the other functioning modes, only on the PC serial output.

- **4 – 6 DIGIT REMOTE DISPLAY TRANSMISSION** (“rEPE.4” and “rEPE.6” parameter)

The weight displaying takes place both in the scale as well as in a weight repeater of 4 or 6 digits (normally the capacity will be properly set up for a correct displaying).

**N.B.** When either transmission mode is selected, the relative serial output is automatically set to 4800, N-8-1. In any case it's possible to set it differently.

Independently from the set transmission speed it's possible to obtain up to 6 transmissions per second.

- **TRANSMISSION WHEN THE TOTALISATION IS EXECUTED** (“Prin.St”, “Prin.EX” parameter)

The instrument communicates the weight data through the serial port in two ways:

- when the M+ key is pressed, if the manual totalisation has been set;
- automatically, if the automatic totalisation has been set.

The transmission takes place if the weight is stable and the conditions for the totalisation are respected (see the section “TOTALISATION”, **USER MAN.REF.**)

Reenabling the transmission depends on how the “rEACt” step has been set in the SET-UP environment (passing by zero of the NET weight, weight instability or always).

The data is transmitted using the standard string (Prin.St) or the extended string (Prin.EX); see the section “TRANSMISSION PROTOCOLS” for the description of the two strings.

**Notes:**

- The transmission is confirmed by the “trAnSM” message on the display.
- In any case it's possible to receive data through the transmission commands upon request.
- With an unstable weight the display shows the “unStAb” message.
- If the transmission has not been reenabled the display shows the “no.0.unS” message.
- In any case it's possible to receive the data through the transmission commands upon request.

- **TRANSMISSION IN RS 485 SERIAL MODE** (“485” parameter)

The protocol is the same as the transmission upon request (ondE parameter), except that the instrument responds only if its machine code is the one requested (before the request the machine code must be put, I.E. 00READ<CRLF>).

If a broadcast address command (99) is received no answer is given. If the command is correct it is executed anyways.

- **CONTINUOUS TRANSMISSION** (“ALL.Std” and “ALL.ExT” parameter)

This mode is used for interfacing to the PC, remote displays and other devices which request a constant updating of the data independently from the weight stability.

If one selects this mode for the PC, independently from the set transmission speed one can obtain up to 4 transmissions per second.

If one selects this mode for the PRINTER port, the instrument transmits the data in relation to the set transmission speed:

- with Baud rate at 9600 one can obtain up to 24 transmissions per second.
- with Baud rate at 115200 one can obtain up to 26 transmissions per second.

The transmission works with weight  $<$ ,  $=$ ,  $>$  0 with approved or unapproved instrument.

The data is transmitted using the standard string (ALL.Std) or the extended string (ALL.Ext); see the section "TRANSMISSION PROTOCOLS" for the description of the two strings.

- **TRANSMISSION UPON STABILITY** ("StAb.St" and "StAb.EX" parameter)

Each time a weight on the scale becomes stable, a communication string is transmitted on the PC serial port.

For not approved instruments:

- The transmission takes place if the weight is stable and the net weight in absolute value is  $>$  10 divisions.
- Reenabling the transmission depends on how the "rEACt" step has been set in the SET-UP environment (passage by zero of the NET weight or instability of the NET weight of 10 divisions; by choosing "ALWAYs" it works upon instability).

For approved instruments:

- The transmission takes place if the weight is stable and the net weight in absolute value is  $>$  20 divisions.
- Reenabling the transmission depends on how the "rEACt" step has been set in the SET-UP environment (passage by zero of the NET weight or instability of the NET weight of 20 divisions; by choosing "ALWAYs" it works upon instability).

The data is transmitted using the standard string (StAb.St) or the extended string (StAb.EX); see the section "TRANSMISSION PROTOCOLS" for the description of the two strings.

**THE CONNECTION AND THE SOFTWARE CONFIGURATION OF THE SERIAL OUTPUTS MUST BE CARRIED OUT BY TECHNICAL PERSONNEL WHO KNOW THE PROCEDURES ON THE BASIS OF THE NEEDS OF THE USER.**



## 7.3 FORMAT OF THE SERIAL COMMANDS

### Version reading command

[CC]VER<CR LF>

Instrument response: [CC]VER,vvv,APDbbb<CR LF>

In which: vvv is the firmware version  
b space character, ascii 32 decimal character.

### Extended weight read command

[CC]REXT<CR LF>

Instrument response: EXTENDED STRING (see the section "TRANSMISSION PROTOCOLS").

### Extended weight read command with date and time

[CC]REXD<CR LF>

Instrument response: EXTENDED STRING (see the section "TRANSMISSION PROTOCOLS").

### Weight read command

[CC]READ<CR LF>

Instrument response: STANDARD STRING (see the section "TRANSMISSION PROTOCOLS").

### Weight reading command with sensitivity times 10

[CC]GR10<CR LF>

Instrument response: STANDARD STRING (see the section "TRANSMISSION PROTOCOLS").

### Reading command of microvolts relative to the weight

[CC]MVOL<CR LF>

Instrument response: STANDARD STRING (see the section "TRANSMISSION PROTOCOLS").

### Tare command

[CC]TARE<CR LF> or [CC]T<CR LF> (short command).

Instrument response: [CC]OK<CR LF> if the command has been RECEIVED; the instrument's response does not mean necessarily that the scale executes the tare.

### Zero command

[CC]ZERO<CR LF> or [CC]Z<CR LF> (short command)

Instrument response: [CC]OK<CR LF> if the command has been RECEIVED; the instrument's response does not mean necessarily that the scale executes the zero.

### Clear command

[CC]CLEAR<CR LF> or C<CR LF> (short command)

Instrument response: [CC]OK<CR LF> if the command has been RECEIVED; the instrument's response does not mean necessarily that the instrument executes the command.

The command works also within the SET-UP environment.

### Test command

[CC]ECHO<CR LF>

Instrument response: [CC]ECHO<CR LF>.

### Reading command of power supply status

[CC]ALIM<CR LF>

Instrument response: [CC]PW: p BT: b

In which: p: instrument's type of power supply: 0 if powered by battery  
1 if powered by the mains

b: battery level (from 0 to 9).

[CC]ALIMN<CR LF>

Response of the instrument: [CC]PW:bpptppbBT:bvvvv  
 in which: **b** space character, ascii decimal 32 character.

ppppp: power supply level of the instrument  
 vvvv: battery level expressed in mV.

### Reading command of converter points relative to the weight

[CC]RAZF<CR LF>

Instrument response: STANDARD STRING (see the section "TRANSMISSION PROTOCOLS").

### Tare block command

[CC]TLCKt<CR LF>

t → E to lock the tare

t → D to unlock the tare

Response: [CC]OK<CR LF>

**Note:** the transmitted values are valid until the indicator is turned off. To permanently save these on the instrument one should use the saving command (CMDSAVE).

### Tare status command

[CC]TLCK<CR LF>

Response:

[CC]TLCKE<CR LF> if the tare is locked.

[CC]TLCKD<CR LF> if the tare is unlocked.

### Data saving command

[CC]CMDSAVE<CR LF>

Response: [CC]OK<CR LF>

### Tare insertion command

[CC]TMANVVVVVV<CR LF> or [CC]WVVVVV <CR LF> (short command)

in which: VVVVVV: manual tare value with the decimal point, from 1 to 6 characters; the non significant zeros can be omitted.

Instrument response: [CC]OK<CR LF> if the command has been RECEIVED; the instrument's response does not mean necessarily that the scale executes the tare.

### Command for viewing temporarily a message on the display

[CC]DISPNNVVVVV <CR LF>

in which: NN: is the indicator display number, standard 00 (ascii hex)

V is the message: - if present it is shown on the NN display.

- if not present, it interrupts the visualisation activated through a previous DISP command.

### **NOTES**

In the case in which the display shown in the command is of the numeric type (for example the standard display 00), and if in the transmitted message there are two consecutive points the message is stopped after the first of the two points. When the display is showing a message transmitted serially through the DISP command, the indicator does not display those messages usually shown in the scale status (ZERO, TARE, HOLD, ...).

Instrument response: [CC]OK<CR LF>

The message remains for the time set through the DINT command:

The ASCII characters having the decimal code greater than 31 are accepted.

### **With approved instrument:**

One needs to wait for the end of the current visualisation before being able to view the next one.

### Command for setting display visualisation interval

[CC]DINTNNNN<CR LF>

in which: NNNN is the visualisation interval (in milliseconds), expressed in ascii hex character; for example, in order to set a visualisation time of 2 seconds (2000 milliseconds, which converted into hex it becomes 07D0), the command becomes DINT07D0<CR><LF>.

By setting a time equal to zero, the message transmitted with the DISP command remains permanently shown on the display.

Instrument response: [CC]OK<CR LF>

**With approved instrument:**

The minimum settable time is 1 millisecond (0001HEX), and maximum settable time is 5 seconds (5000 milliseconds, 1388 HEX).

**PC confirmation command**

[CC]PCOK<CR LF>

The scale shows on the display the "-PCOK-" message for about 2 seconds.

Instrument response: [CC]OK<CR LF>.

**Serial command which supplies the scale status**

[CC]STAT<CR LF>

Instrument response:

[CC]STATXX<CR LF>

in which XX is a decimal value which supplies the status of the scale; the possible values are:

**XX scale status**

00 normal scale status

01 normal scale status in input or totalisation

02 instrument in technical set-up

03 instrument in boot phase

04 instrument in rx/tx set-up phase

05 instrument in test phase of the serial ports

07 instrument in firmware update phase

08 instrument in stand-by

09 instrument in automatic zero phase

**Key pressure simulation command**

[CC]KEYPXX<CR LF>

in which XX is the code of the pressed key:

00: M+ key;

02: MR key;

03: TARE key;

04: ZERO key;

10: MODE/C key.

Instrument response: OK<CR LF>: accepted command.

In case the simulated key has two linked functions (key briefly pressed or at length, like the TARE key), if the KEYP command is followed by the release command of the (KEYR) key within a maximum time of 1,5 seconds, the simple function will be executed (key briefly pressed); otherwise the second function will be made (key pressed at length).

**Key release simulation command**

[CC]KEYR<CR LF>

Response: [CC]OK<CR LF>

**NOTA:** The instrument does not transmit the OK answer to the following short commands: P, Q, T, W, X, Z.

**Key disabling command**

[CC]KEYEt<CR LF>

t → E to enable the keys

t → D to disable the keys

Response:

[CC]OK<CR LF>

**Status command of the keys**

[CC]KEYE&lt;CR LF&gt;

Response:

[CC]KEYEE&lt;CR LF&gt; if the keyboard is enabled

[CC]KEYED&lt;CR LF&gt; if the keyboard is disabled

**Scale information reading:** [CC]RALL<CR LF>

Instrument answer:

SS,B,NNNNNNUM,LLLLLLUM,YYTTTTTTTUM,XXXXXXXXUM,SSS,AAA,CCC,TTT&lt;CR LF&gt;.

in which:

SS	UL Underload OL Overload ST Stability of the display US Unstability of the display
B	Number of platform on which the totalisation has been made.
NNNNNNUM	Net weight with unit of measure.
LLLLLLUM	Gross weight with unit of measure.
YY	"PT" if the tare is manual, otherwise YY= " " (two empty spaces) if the tare is semiautomatic.
TTTTTTTUM	Tare weight on 8 characters including possible sign and decimal point, with unit of measure.
XXXXXXXXUM	Last net weight totalized with unit of measure.
SSS	Scale status: 000 weighing 001 numerical input or totalisation 002 technical setup
AAA	Counter of pressed keys.
CCC	Code of last key pressed.
TTT	Counter of totalisations.
XXXXX	Last rewriting number stored in the Alibi memory.
YYYYYY	Last weigh number stored in the Alibi memory.

**LEGEND**

[CC]= instrument code, e.g. 00 (only with RS485 protocol).

&lt;CR LF&gt;= Carriage Return + Line Feed (ASCII characters 13 and 10).

**SERIAL ERRORS**

Upon each serial command received the instrument transmits a response which may be a response to a command (see the command description) or the indication of the command error:

ERROR	DESCRIPTION
ERR01	A correct command has been transmitted from the PC to the scale, but it is followed by letters inserted involuntarily.
ERR02	A correct command has been transmitted from the PC to the scale, but it contains wrong data.
ERR03	A not allowed command has been transmitted. It may be a command not used in the selected functioning mode or the command reaches the scale in the instant in which the keyboard buffer is already occupied by another command.
ERR04	An inexistent command has been transmitted.
ERR05	There has been an error in the response of the scale.
ERR06	There has been an error in the checksum.

## 7.4 TRANSMISSION PROTOCOLS

The weight data transmission on the serial ports may take place in two formats:

### 7.4.1 STANDARD STRING

**[CC]hh,kk,pppppppp,uu<CR LF>**

in which: **[CC]** INSTRUMENT CODE IN THE FORMAT OF TWO ASCII DECIMAL DIGITS ONLY IN THE CASE THAT THE 485 PROTOCOL IS SELECTED (FOR EXAMPLE 00).

**hh**        UL   Underload  
              OL   Overload  
              ST   Stability of the display  
              US   Unstability of the display

,            Comma character

**kk**        NT   Net weight  
              GS   Gross weight  
              VL   Value in microvolts relative to the weight  
              RZ   Value in converter points relative to the weight

,            Comma character

**pppppppp** 8 digits (including any sign and decimal point) which identify the weight. The insignificant digits are filled with spaces. Through the MVOL and RAZF command the scale transmits the relative value on 10 digits instead of 8.

,            Comma character

**uu**        Unit of measurement "kg" "bg" "bt" "lb" "mv" (microvolts) "vv" (converter points)

**<CR LF>**    Carriage Return + Line Feed (ASCII decimal character 13 and 10).

The transmitted weight is the GROSS weight (GS) if no TARE WEIGHT has been entered; otherwise, the NET WEIGHT (NT) will be transmitted.

## 7.4.2 EXTENDED STRING

**[CC]B, hh, NNNNNNNNNN, YTTTTTTTTTT, uu, NO DATE TIME <CR LF>**

in which: <b>[CC]</b>	INSTRUMENT CODE IN THE FORMAT OF TWO ASCII DECIMAL DIGITS JUST IN CASE THE 485 PROTOCOL IS SELECTED (FOR EXAMPLE 00)
<b>B</b>	scale number (always 1).
,	Comma character
<b>hh</b>	UL Underload OL Overload ST Stability of display US Instability of display
,	Comma character
<b>NNNNNNNNNN</b>	Net weight on 10 characters including possible sign and decimal point.
,	Comma character
<b>YY</b>	"PT" if the tare is manual, otherwise YY = " " (two empty spaces) if the tare is semiautomatic.
<b>TTTTTTTTTT</b>	Tare weight on 10 characters including possible sign and decimal point.
,	Comma character
<b>uu</b>	Unit of measure "Kg" "bg" "bt" "lb
,	Comma character (only with REXD command)
<b>NO DATE TIME</b>	Date and time are not managed (only with REXD command)
<b>&lt;CR LF&gt;</b>	Carriage Return + Line Feed (ascii decimal character 13 and 10).

The insignificant digits of the net, tare and gross weights will be filled with spaces (space character, 32 decimal ascii code character)

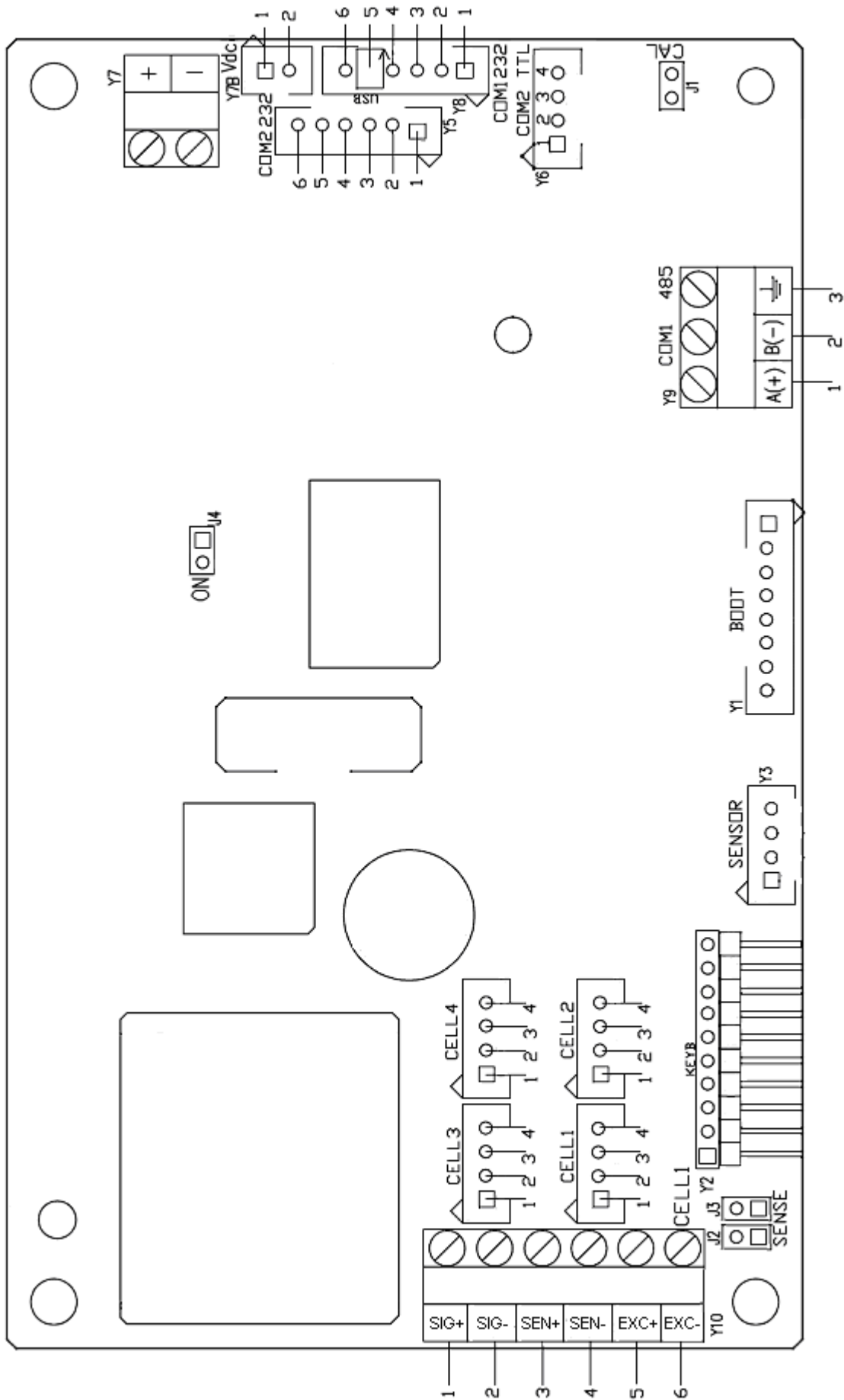
## 8. ENERGY SAVING

If the scale is powered by battery, it is possible to set the following parameters in the setup (see the paragraph "SETUP ENVIRONMENT") in order to increase the battery life:

- **Backlight functioning**  
F.ModE >> En.SAVE >> LAMP
- **Display intensity**  
F.ModE >> En.SAVE >> L.int
- **Auto Switch-Off**  
F.ModE >> En.SAVE >> AutoFF
- **Weight updating**  
F.ModE >> En.SAVE >> En.ModE

## 9. CONNECTION SCHEMES

### 9.1 MOTHER BOARD





## MEANING OF MOTHER BOARD TERMINAL BOARDS AND JUMPERS

### Vdc POWER SUPPLY Y7

- 1 + 4,8 - 12 Vdc +12 Vdc
- 2 - 0 Vdc (GND)

### Vdc POWER SUPPLY Y7B

- 1 4,8 - 12 Vdc +12 Vdc
- 2 0 Vdc (GND)

**ON** = if closed it enables the automatic start-up of the indicator as soon as power is supplied.

### LOAD RECEPTOR

#### CELL1

- 1 **SIG +** SIGNAL +
- 2 **SIG -** SIGNAL -
- 3 **SEN +** REFERENCE +
- 4 **SEN -** REFERENCE -
- 5 **EXC +** POWER SUPPLY +
- 6 **EXC -** POWER SUPPLY -

#### CELL1, CELL2, CELL3, CELL4

- 1 **EXC +** POWER SUPPLY +
- 2 **EXC -** POWER SUPPLY -
- 3 **SIG +** SIGNAL +
- 4 **SIG -** SIGNAL -

**J2** and **J3** = if closed, REFERENCE + and POWER SUPPLY +, REFERENCE – and POWER SUPPLY –are jumpered on the board

**J1 CAL**= if closed, it enables the access to the metrological parameters.

#### **COM1 232**

- 1 TX
- 2 RX
- 4 +5V
- 5 Vin USB
- 6 GND

#### **COM2 232**

- 1 TX
- 2 RX
- 3 CTS
- 4 +5V
- 6 GND

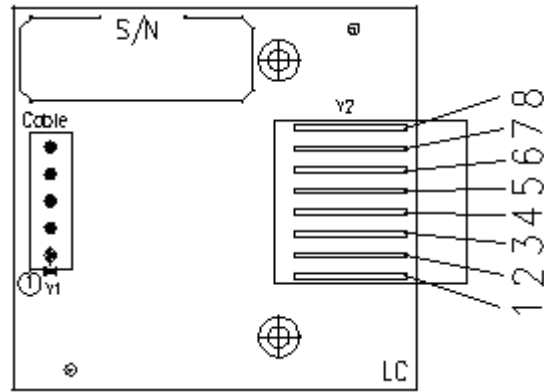
#### **COM1 485**

- 1 **A(+)** Line 485 +
- 2 **B(-)** Line 485 -
- 3  $\perp$  Earth

#### **COM2 TTL**

- 1 +5V
- 2 GND
- 3 TX-TTL
- 4 RX-TTL

## 9.2 RS232 SERIAL PORT WITH RJ45 CONNECTOR



**6 TX** TRANSMISSION  
**3 RX** RECEPTION  
**5 GND**

**NOTE:** To pass the serial cable through the hole in the case and connect it to the serial port, the cable must have a connector with 6 pins.