

CPF

**Cantilever load cell with a microprocessor amplifier
and built-in display**

USER'S MANUAL



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Warnings

The present manual is for device fitters and operators. It provides indications on the intended use of the device, technical specifications and instructions for installation, adjustment and use.

This manual is an integral part of the device and must be kept until the device is decommissioned. It reflects the technical state of the device at the time of its sale.

The plant builder may include the present manual in the documentation for plant use.

Re S.p.A. reserves the right to update its production and/or manuals without updating products already sold and previous manuals.

Since the device forms part of a plant, the plant builder is responsible for ensuring that all parts comply with the laws in force in the country in which it is installed.

The device must be fitted and adjusted by qualified technical personnel.

It may be moved manually.

Information about device recovery



The device bears a clear, visible and indelible indication allowing identification of the manufacturer and the separate collection symbol (symbol on side).

This symbol, showing a wheeled bin with a cross through it, unequivocally indicates that the device was released after 13.08.2005 and that it must be subject to separate collection.

- In European Union member states

The device falls within the electrical and electronic equipment category, which must be disposed of not amongst undifferentiated urban waste, but through separate collection. Therefore, at the end of the device's lifetime, it must be disposed of in conformity with the European standards adopted in the member state in which it was installed.

WEEE (Waste Electrical and Electronic Equipment) may be intended for individual, collective or mixed collection and recovery systems at designated centres (for more information contact the relevant local authorities) or may be returned to the distributor when a new item of equipment is purchased. This eliminates or reduces potentially negative effects on the environment deriving from improper use of the equipment or parts of it.

For correct waste management, the relevant authorities promote the reduction of final waste disposal by means of re-use, recycling and other forms of recovery to obtain raw materials from waste.

In the event of illegal disposal of WEEE, offenders will be punished in accordance with the sanctions established by the member state in which it was installed.

- In non-EU countries

Recovery and final disposal of the device must be carried out in conformity with the standards in force in the country in which it was installed. It may be advisable to take into account the information provided regarding European Union member states.

Using the device correctly

The CPF cantilever load cell is a device that houses a special board for receiving an input signal coming from a load cell, amplifying it in a completely analog mode (without converting or digitally processing it) and transforming it immediately into a signal within the following range:

- 0÷5V, 0÷10V, -5÷5V, -10÷10V
- 0÷20mA, 0÷24mA, 4÷20mA

At the same time a special processor acquires and processes the signal while showing on the display the tension in Kg detected by the cells.

The device includes a display with a keyboard for programming all the functions and calibrating the tool simply and quickly.

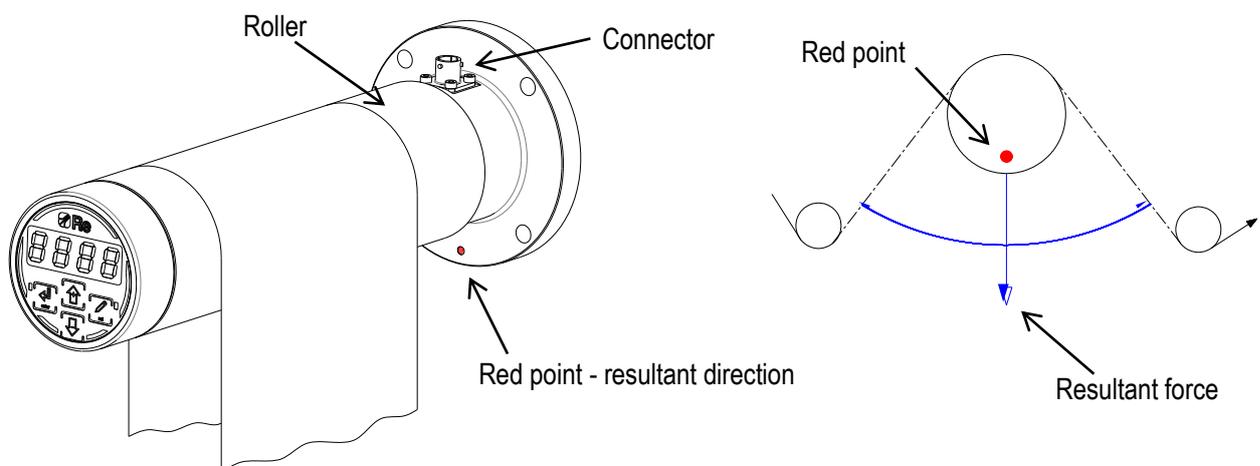
This device is not designed to operate in open, corrosive, explosive or excessively dusty environments.

Technical specifications

- Wide gain and zeroing range
- Red, 4-figure display
- Processor-assisted calibration (requires no manual adjusting via trimmers and/or testers) and a simple, intuitional function menu.
- Analog amplification with a voltage output of 0÷5V, 0÷10V, -5÷5V, -10÷10V or a current of 0÷20Ma, 0÷24mA, 4÷20mA that can be selected from the function menu (no processing delays or signal deterioration due to the Analog/Digital conversion).

Mounting

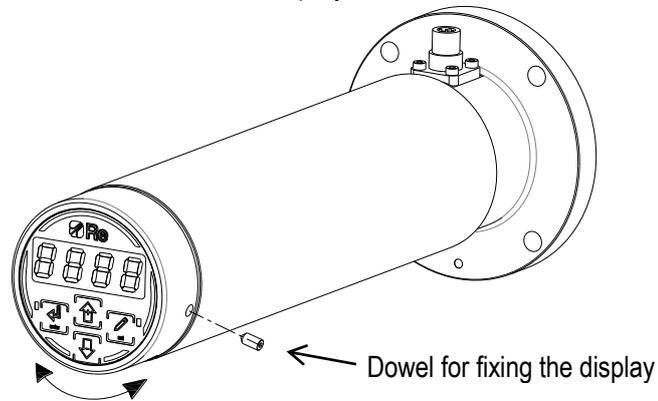
The cantilever load cells must be mounted in such a way that the red point is precisely in the direction of the resultant force that was defined during analysis of the application.



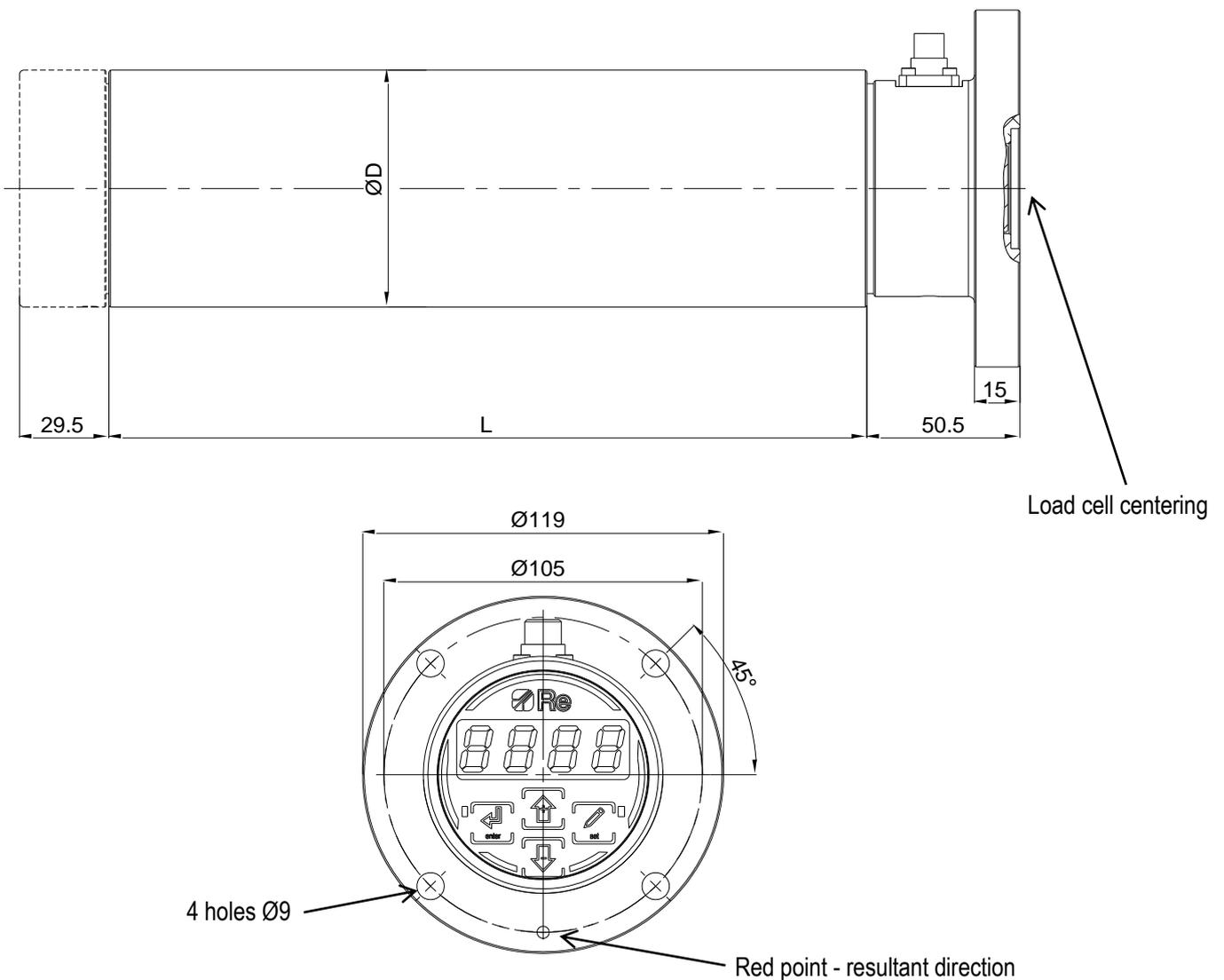
Display positioning

If you need rotate the display, remove the dowel placed on the side (see the drawing) and rotate the display till to reach the desired position.

Place the dowel and tighten in order to fix the display.

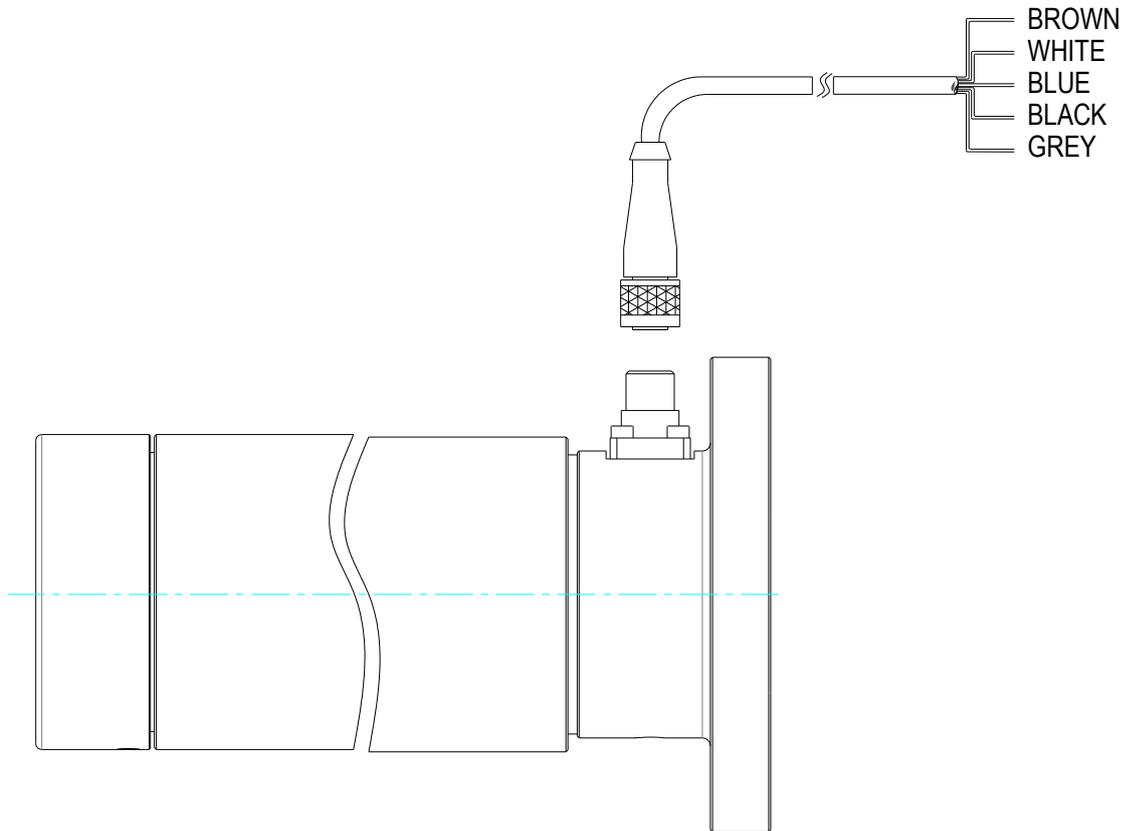


Mechanical dimensions



Electrical connection diagram

Amplified load cell



5-pole movable connector	Wire colour	Description
PIN 1	BROWN	24Vdc
PIN 2	WHITE	0V
PIN 3	BLUE	N.C.
PIN 4	BLACK	N.C.
PIN 5	GREY	AOUT

Earth connection

The load cell must be connected to the earth on the system it is installed on.
The earth connection must be as short as possible.



Attention: Failing to make an earth connection may make the device vulnerable to electric/electromagnetic disturbance and cause it to malfunction.

Electrical features

Power supply

24Vdc. Max. absorbed current: 100mA

Outputs

Analog outputs in voltage. Set in **F.3**:
 0÷5V
 0÷10V
 -5÷5V
 -10÷10V
 Rload = 1KΩ min

Analog outputs in voltage. Set in **F.3**:
 0÷20mA
 0÷24mA
 4÷20mA
 Rload = 500Ω max

Precision: 12 bit (4096 punti)

Sampling time: 1 ms

Strain gauge

Jumper resistance: 350Ω

Insulation resistance: 10GΩ

Sensitivity: 1,6mV/V

Max. sensitivity (limit switch): 8mV/V

Working temperature

10÷50°C

Protection class

IP40

Quick start up

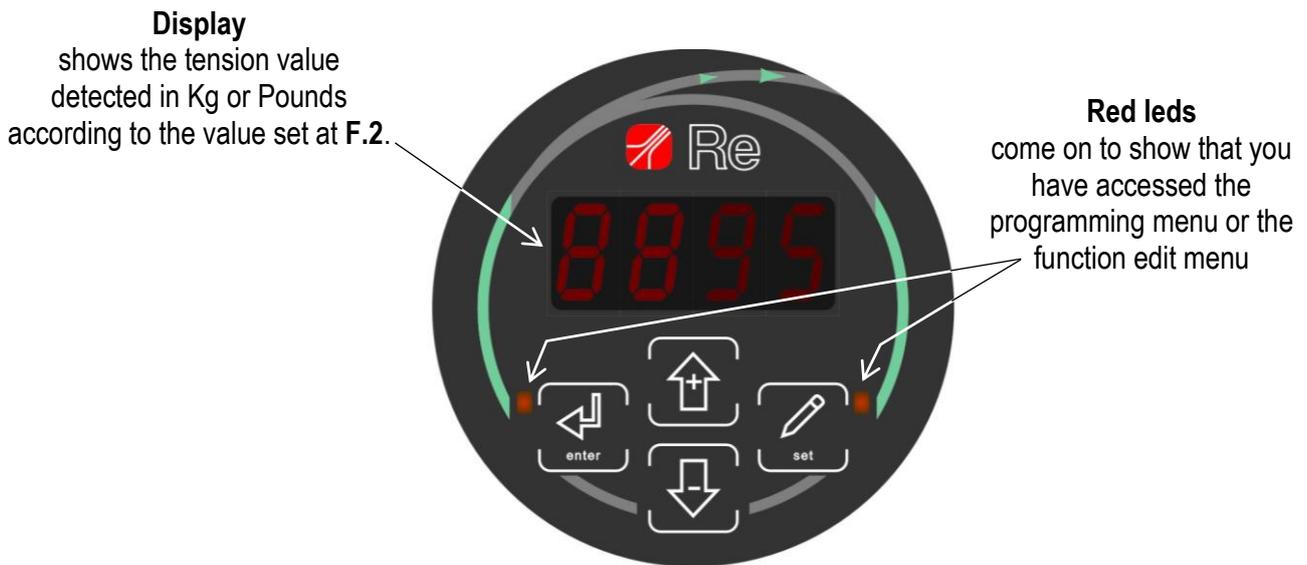
This section describes the installation and test procedures that must be carried out if you wish to set the instrument up quickly. A more detailed description of how each function works is given in the next section of this manual (from page 8).



Attention! Before starting up the device obtain a sample weight of at least 10% (recommended 20%) of the nominal full scale of the load cells.

1. Assemble the load cells mechanically.
2. Make the necessary electrical connections as illustrated in § *Electrical connection diagrams*, on page 4.
Attention! To ensure the device operates correctly observe closely all the instructions given on page 4.
3. Connect the instrument to its power supply.
4. Access the programming environment by pressing the **enter** key for 3 seconds. The display will show the number of the function you are in.
5. Using the + or – keys select the **F.2** function. Press **set** to view the unit of measure set. Using the + or – keys select the required value: **0=Kilograms, 1=Pounds**. Confirm by pressing the **set** key. Press the + key to move onto the next function.
6. Using the + or – keys select the **F.3** function. Press **set** to view the type of outlet selected: **0=0÷5V, 1=0÷10V, 2=-5÷+5V, 3=-10÷+10V, 4=4÷20mA, 5=0÷20mA, 6=0÷24mA**. Using the + or – keys select the required output: Confirm by pressing the **set** key. Press the + key to move onto the next function.
7. The display will indicate **F.4**. Press **set**, and the value set in the function will be shown on the display. Using the + or – keys set the value in Kg or Pounds (according to the value set previously at **F.2**) for the nominal (total) full scale of the cells. Confirm by pressing the **set** key. Press the + key to move onto the next function.
8. The display will indicate **F.5**. Press **set**, and the value set in the function will be shown on the display. Using the + or – keys set the value in Kg or Pounds (according to the value set previously at **F.2**) for the sample weight (**at least 10% of the full-scale**) to be used for calibration. Confirm by pressing the **set** key. Press the + key to move onto the next function.
9. The display will indicate **F.6**. Make sure that the roller on which the cells are applied is free of any load whatsoever. Press **set**, and the “–” symbol will appear on the display. Press the + or – key and wait for the instrument to perform the zero operation (the flashing CAL message indicates that the operation is in progress). At the end of the procedure, if calibration has been successful the word **YES** is displayed, or **BAD** if it has not. The message flashes three times then the number of the function is shown again. Press the + key to move onto the next function.
(If the calibration is not successful, see § *Troubleshooting* on page 11)
10. The display will indicate **F.7**. Load the sample weight by tying a string to it and passing it along what will be the material path (use a string that can be extended), making sure that the weight carrying string maintains the infeed and outfeed angles of the material on the measurement roller, as shown in the diagram on page 9. Press **set**, and the “–” symbol will appear on the display. Then press the + or – key and wait for the instrument to perform the gain calibration (the flashing CAL message indicates that the operation is in progress). At the end of the procedure, if calibration has been successful the word **YES** is displayed, or **BAD** if it has not. The message flashes three times then the number of the function is shown again.
(if the calibration is not successful, see § *Troubleshooting* on page 11)
11. Press and hold down the **enter** key for 3 seconds to exit programming and saving the settings.

Device functioning



To **enter the programming environment** keep pressed the **enter** key for about 3 seconds. The display shows the function number and the LED close to the **enter** key flashes.

To **scroll the programming function menu** use the + or – keys.

To **edit function parameters**:

- display the desired function number;
- press the **set** key: the display shows the value set in the function and the LED close to the **set** key flashes;
- press + or – keys and set the desired value, then press **set** to confirm and go back to the programming functions menu.

To **save the parameters**, press **enter** for about 3 seconds and the instrument exit the menu.

Programming functions

Function	Description	Range	Factory setting
F.2	Unit of measure	0 ÷ 1	0
F.3	Type of output AOUT	0 ÷ 6	0 (0÷5V)
F.4	Full scale of the load cells	0 ÷ 99	20
F.5	Setting a sample weight for calibration	10% of F.4 ÷ F.4	10
F.6	Zeroing the load cells	*	*
F.7	Load cell gain	*	*
F.11	Decimal point	0 ÷ 2	0
F.12	Display filter	0 ÷ 8	4
F.13	Analog output filter AOUT	0 ÷ 10	0
F.14	Storing the password	0 ÷ 999	0
F.15	Reset	*	*
F.16	Display brightness	0 ÷ 15	4
F.18	Firmware version	*	*

Detailed description of the programming function

Function 2 – Unit of measure

This function allows viewing to be set and to enter parameters in either Kg or Pounds. This setting can be made even after running a zeroing operation and calibrating the gain.

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to set the value to **0** = Kg, or **1** = Pounds

Press **set** to confirm.

Function 3 – Type of output AOUT

This function allows to set one of the following modes for the analog output:

- **0** = 0÷5V
- **1** = 0÷10V
- **2** = -5÷5V
- **3** = -10÷10V
- **4** = 4÷20mA
- **5** = 0÷20mA
- **6** = 0÷24mA

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to set the desired value.

Press **set** per confirm.

Function 4 – Full scale of the load cells

This function allows to set the nominal value (in Kg or in Pounds depending on **F.2** parameter) of the full scale of the load cell.

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to set the desired value.

Press **set** per confirm.

Function 5 – Setting a sample weight for calibration

In this function, the value in Kg or Pounds of the sample weight to be used for calibration must be set (according to the value set at **F.2**); this weight must be **at least 10% of the full-scale, otherwise calibration will not be performed!**

Press **set** to access the function and the function value set is displayed.

Press the **+** or **-** key to set the sample weight value.

Press **set** per confirm.

Function 6 – Zeroing the load cells



Attention! Make sure that the roller (measurement roller) on which the cells are applied is **free of any load**.

Press **set** to access the function and the symbol “-” is displayed.

Press the **+** or **-** key and wait for the instrument to perform the zero operation (the flashing **CAL** message indicates that the operation is in progress).

At the end of the procedure, if calibration has been successful the word **YES** is displayed, or **BAD** if it has not. The message flashes three times then the number of the function is shown again.

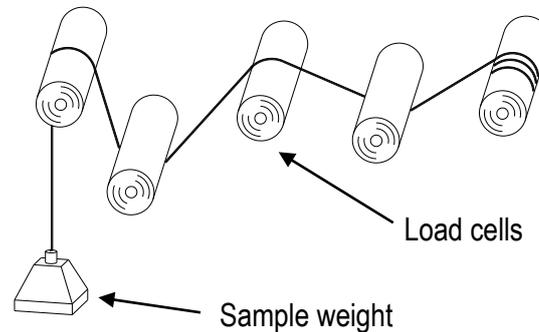
If the **BAD** message is flashing on the display, check that the load cells have been assembled correctly, the electrical connections have been made and the right type of input has been set and then run the function again.

To exit this function without zeroing the load cells, press **set**.

After this function, the F.7 function must always be run otherwise calibration will not be complete.

Function 7 – Load cell gain

Load the sample weight by tying a string to it and passing it along what will be the material path (use a string that can be extended), making sure that the weight carrying string maintains the infeed and outfeed angles of the material on the measurement roller, as shown in the diagram on the following page.



Press **set** to access the function and the symbol “-” is displayed.

Press the **+** or **-** key and wait for the instrument to perform the calibration (the flashing **CAL** message indicates that the operation is in progress).

At the end of the procedure, if calibration has been successful the word **YES** is displayed, or **BAD** if it has not. The message flashes three times then the number of the function is shown again.

If the **BAD** message is flashing on the display, check that the load cells have been assembled correctly, the electrical connections have been made and the right type of input has been set and that the sample weight must be at least 10% of the full-scale and then run the function again.

To exit the load cells Gain function without performing it, press **set**.

Function 11 – Decimal point

This function allows you to set the decimal point display. This setting can be made even after running a zeroing operation and calibrating the gain.

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to set the value to **0** to have not the decimal point, **1** to have one digit after the decimal point, or **2** to have two digits after the decimal point.

Press **set** per confirm.

Function 12 – Display filter

The device shows the tension detected by the load cells on the display and updates the value at regular intervals. This filter stops the displayed value from changing continually on account of vibrations or sudden tension peaks and shows a stable average value instead.

The value of this parameter is higher and filter action is higher too.

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to set the desired value.

Press **set** per confirm.

Function 13 – Analog output AOUT filter

This function allows you to choose whether to filter the output:

- **0** = the output is not filtered and the sampling time is 1mS;
- **1÷10** = the output is filtered by a special filter whenever a less reactive but more stable output is required that is immune to vibrations.

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to set the desired value.

Press **set** per confirm.

Function 14 – Storing the password

This function allows to set the password (numeric value), in order to prevent accidental tampering by persons not authorised to program the instrument.

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to set the desired value.

Press **set** per confirm.

Set **0** if you want disable this function.

If this function is enabled, every time an attempt is made to access the programming menu, the message **P.000** is shown on the display: press **+** or **-** and enter the password, then press **set** to confirm.

If the password is wrong an **Err** message will flash on the display three times, whereas if it is right, access will be given to the programming menu.

Function 15 – Reset

This function allows to reset all the function values (included the calibration parameters) and return to the factory settings

Press **set** to access the function.

Press **+** for about 3 seconds, the word **RES** flashes on the display and the device re-start automatically with the factory values.

Function 16 – Display brightness

This function allows you to adjust the level of brightness on the display.

Press **set** to access the function and the function value set is displayed.

Press **+** or **-** to adjust brightness to the level required.

Press **set** per confirm.

Function 18 – Firmware version

The function is a read only one and shows the firmware version of the device.

Press **set** to access the function and the firmware version is displayed.

Press **set** again to exit the function.

Troubleshooting - (for applications with Re devices)

This section describes the possible problems you could have in the applications with RE cantilever load cells.

After installing the load cell, two mandatory operations are the functions of cell zero calibration and cell gain calibration, as indicated in the user's manual of the control device; if the calibrations are not successful, see the following instructions.

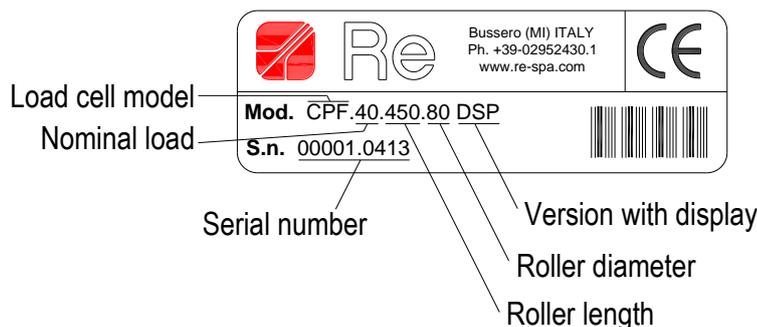
➡ **Problem:** The cell zeroing calibration is not successful.

Possible causes	Remedies
A positive load charges the cells (in the direction to the red point); e.g. the roller pushes heavily.	Change the red point angle to lighten the load on the cell.
A negative load charges the cells (in the opposite direction to the red point); e.g. the roller pushes heavily.	Change the red point angle to lighten the load on the cell.

➡ **Problem:** The calibration of cell gain is not successful.

Possible causes	Remedies
The value set in the function of setting the calibration weight (see user's manual of the control device) is different to the known weight, or the load read by the cell is less than the set value.	Decrease the set value in the function of setting the calibration weight.
The value set in the function of setting the calibration weight (see user's manual of the control device) is different from the known weight or the load read by the cell is more than the set value.	Increase the set value in the function of setting the calibration weight.

Identification data



Guarantees

Re S.p.A. guarantees this device against all defects relative to the materials and manufacturing for a period of 12 months from the date of delivery.

Should your device develop operating faults during the guarantee period, please contact the Company's agent in your country, or, if this is not possible, contact Re S.p.A. directly.

The guarantee includes spare parts and labour. It does not include shipment costs for device delivery or recall.

The guarantee is invalidated by:

- Improper use of the device
- Incorrect installation
- Faulty electrical connections or power supply
- Lack of maintenance
- Changes or work involving non-original components or carried out by persons without Re S.p.A. authorisation
- Complete or partial failure to observe the instructions
- Exceptional events.

At the end of the guarantee period, support will be provided by the support network, which will carry out repairs at the current rates.

Revision history

<i>No. revision</i>	<i>Date</i>	<i>Changes</i>
10/15	14/10/2015	First revision
10/16	19/10/2016	Removed CAN communication

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