PYXIS

Load cells microprocessor amplifier

USER'S MANUAL

Re

Contents

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 wheelie 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 <u>European Union</u> 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.

Intended use of the device

The ultra-compact tension amplification and display device, *PYXIS,* has been designed to be fitted onto the DIN bar of machine electrical control panels.

It includes a display with a keypad for programming all the functions and calibrating the instrument quickly and easily.

The *PYXIS* receives input signals sent from load cell/s and amplifies them completely analogically (with no digital conversions or processing), transforming them immediately into a 0÷10V or 4÷20mA signal. A special processor simultaneously acquires and processes the signal, showing the tension in Kg registered by the load cells on the display.

The *PYXIS* also includes a number of auxiliary outputs: two digital alarm outputs (on which both the thresholds and the activation procedures can be programmed) and a 0÷10V analog output with a programmable digital filter that is useful for piloting a remote display or other devices.

The device is not suitable for work outside, in corrosive, explosive or highly dusty rooms.

Technical characteristics

- Input for load cells with a differential (mV) or single (mA) type signal that can be configured using the jumpers on the card.

- Option of connecting up to 4 load cells in mV in parallel.

- Wide gain and zeroing range.

- Yellow 3-figure display.

- Processor-assisted calibration (that does not need to be adjusted manually with trimmers or testers) plus a simple and user friendly menu.

- Analog amplification with an output of 0÷10V or 4÷20mA that can be selected from the Functions menu (with no processing delay or signal degradation caused by the Analog/Digital conversion).

- Analog 0÷10V output with adjustable digital filter.

- 2 optoisolator digital outputs (solid state relays that are normally open) for indicating alarms.

- Compact container for assembly on DIN bar.
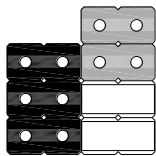
- Fuse 5x20 1,6A/F.

Setting the type of input
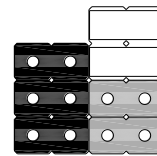
To change the type of input for the load cells:

- remove the black safety cap on the right side of the instrument (by inserting a small screwdriver in the slot shown in the diagram and levering it out);
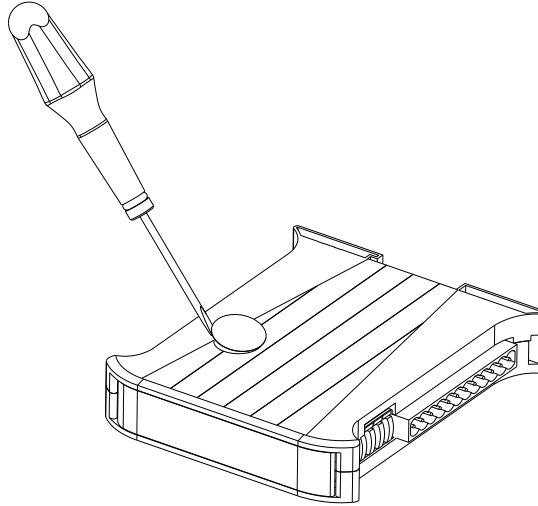
- using a small pair of pliers position the jumpers as follows:

for mV load cells   for mA load cells

- replace the safety cap.

Fast start up

In this section, the installation and test procedure for a fast start up of the device are described.
More explanations on the functioning of the single functions are detailed in the following part of the manual (page 8).

Caution! __Before starting__:

- make sure that the position of the jumpers on the card corresponds to the type of load cell input required for the application, as described in *§ Setting the type of input* on page 3.

- use a sample weight that weighs **at least 10**% (20% is recommended) of the nominal full-scale value of the load cells.

1. Assembly mechanical parts of load cells and *PYXIS* amplifier.

2. Carry out electrical connections following the *§ Electrical connection diagrams* on page 13.

   __Important!__ For the system to operate correctly, follow the instructions on page 14, carefully.

3. Feed the instrument.

4. Enter the programming mode pressing the key ⏎ for 3 seconds, the display shows you the number of function you are working on (**F. 1**).

5. Press key ⊕ and select function **F. 2**. Press ⏎, the display shows the type of input set: **0** = load cells input in **mV**, **1** = load cells input in **mA** and verify this corresponds to the type of load cell used. Press ⏎ to exit the function and ⊕ to choose the following function.

   __Warning!__ If the value does not correspond to the type of load cell used, **turn the device off and then adjust the jumpers** so they are set correctly, as described in *§ Setting the type of input* on page 3. Then turn the device on, return to the programming menu and press ⊕ twice in order to position on **F. 3**.

6. The display shows **F. 3**. Press ⏎, the display shows the value set on the function. Use the keys ⊕ or ⊖ and set **0** if you use the **0÷10V** analog output AOUT1, **1** if you use the **4÷20mA** analog output AOUT1. Press ⏎ to confirm and ⊕ to choose the following function.

7. The display shows **F. 4**. Press ⏎, the display shows the value set on the function. Use the keys ⊕ and ⊖ and set the value (expressed in kg) of load cells full-scale nominal value (total). Press ⏎ to confirm and ⊕ to choose the following function.

8. The display shows **F. 5**. Press ⏎, the display shows the value set on the function. Use the keys ⊕ and ⊖ and set the value (expressed in kg) of the sample weight (**at least 10% of the full-scale**) that will be used for calibration. Press ⏎ to confirm and ⊕ to choose the following function.

9. The display shows **F. 6**. Make sure that the roller the load cells are applied to (measuring roller) is free of any load. Press ⏎ and wait for the instrument to zero (a flashing dot indicates that the operation is in progress). At the end of the procedure the display shows the notice **YES** if the calibration has had a

successful conclusion, the notice **BAD** otherwise. The notice flashes three times, then the function number is shown again. Press ⊞ to choose the following function.

10. The display shows **F. 7**. Charge the sample weight hung by a rope (use an inextensible one) following the same way as the material one, paying attention the rope keeps the same measurement roll input and output angles as the material, as shown on page 9. Press ⏎ and wait the instrument complete the gain calibration (a flashing dot indicates that the operation is in progress). At the end of the procedure the display shows the notice **YES** if the calibration has had a successful conclusion, the notice **BAD** otherwise. The notice flashes three times, then the function number is shown again. Press ⊞ to choose the following function.

11. Repeat the steps 9 and 10 till to reach the desired precision for calibration.

12. If the output AOUT2 is used, press ⊞ till to select **F.13** then press ⏎ to enter the function. Use the keys ⊞ and ⊟ and set **0** if you desire to connect a remote display, **from 1 to 10** if you desire to use the AOUT2 for the adjustment with digital filter.

13. Select **F.18** pressing repeatedly the key ⊞ then press ⊞ once more for 3 seconds to exit the programming mode and save the settings carried out

Instrument functioning

Outside programming mode
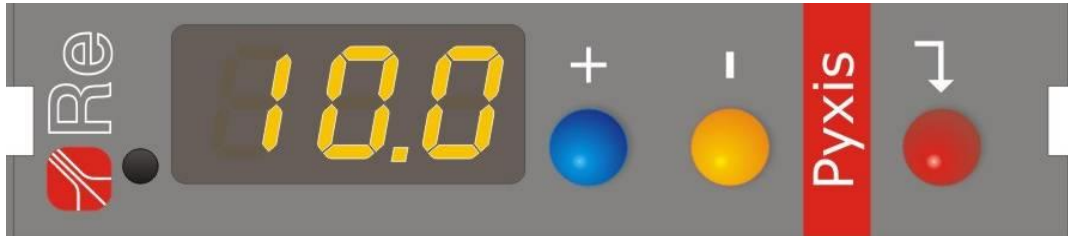
Display

- The display shows the read tension value.
- When one or more alarms are active, if the **F.17** is set to **1** (see *§ Detailed description of programming function*) the display alternates the tension reading with either the **AL.1** or **AL.2** message, depending on which alarm is active (alarm 2 takes precedence).
- If the instrument is not calibrated, the **CAL** message flashes on the display; press any of the keys and the message will disappear.

Password

Pressing at the same time keys ⊕, ⊖ and ⏎, the password set on **F.14** (see *§ Detailed description of programming functions*) is shown.

Alarm thresholds

If you press ⊖ the display shows the first alarm threshold value, if you press ⊕ the display shows the second alarm threshold value.

Alarms

Alarms become active when the read tension value is included in the selected ranges. When one of the alarms is activated, the corresponding relay closes the circuit connected to it.

Led

The device includes a RED led on the front of it that lights up to indicate a fault in the fuse.

Inside programming mode

The available programming functions to the instrument are synthetically listed below. For a more detailed description please refer to § *Detailed description of programming functions* on page 8.

To access the programming mode keep pressed ⏎ for at least 3 seconds. The display shows the function number (F. 1).

To run programming functions menu use the keys ⊕ or ⊖.

To modify the parameters related to each function:

- choose the desired function number;
- press ⏎, the display shows the function value set at the moment;
- press the keys ⊕ or ⊖ and set the desired value for the function, so press the key ⏎ to confirm.

To store the carried out settings select **F. 1** and keep pressed ⊖, or select **F.18** and keep pressed ⊕, after around 3 seconds the instrument exit the menu.

Function	Description	Values range	Default settings
F. 1	Password entering	0→999	0
F. 2	Load cell type displaying	0→1	*
F. 3	AOUT1 output type selection	0→1	0 (0÷10V)
F. 4	Load cells full-scale setting	0→999	100
F. 5	Calibration sample weight setting	0→F. 4	20
F. 6	Load cells zeroing	*	*
F. 7	Load cells gain calibration	*	*
F. 8	First alarm threshold	0→F. 4	F. 4
F. 9	Second alarm threshold	F. 8→F. 4	F. 4
F.10	Alarms activation ranges selection	0→1	0
F.11	Decimal point setting	0 - 0.1 - 0.02	0
F.12	Display filter	0→100	80
F.13	Auxiliary analog output (AOUT2) filter	0→10	0
F.14	Password memorizing	0→999	0
F.15	Reset	*	*
F.16	Display brightness	0→15	4
F.17	Active alarms displaying	0→1	0 (OFF)
F.18	Firmware release	*	*

Detailed description of programming functions

Function 1 – Password entering

To access to the other programming functions it is necessary to enter here the password set on function 14.

Press ⏎ to enter the function, the display shows its value.

Press ⊕ or ⊖ and set the right password.

Press ⏎ to confirm the password.

Whenever the password is not correct, if you try to access to the other functions, the notice **PAS** flashes on the display.

Function 2 – Load cell type displaying

This function is in read only mode and shows the type of input for load cells, set through the jumpers on the card.

Press ⏎ to enter the function, the display shows:
- **0** if the input is set for load cells in **mV**
- **1** if the input is set for load cells in **mA**

Press ⏎ again to exit the function.

➡ **Warning!** Do NOT change the position of the jumpers on the card while it is operating! If the value does not correspond to the type of load cell used, **turn the device off and then adjust the jumpers** so they are set correctly, as described in *§ Setting the type of input* on page 3. Then turn the device on, return to the programming menu and continue calibrating the device (see *§ Rapid start up*, page 4).

Function 3 – AOUT1 output type selection

This function allows to set the voltage mode (0÷10V) or the current loop (4÷20mA) for the analog output AOUT1

Press ⏎ to enter the function, the display shows its value.

Press ⊕ or ⊖ and set **0** if you want **0÷10V** output, **1** if you want **4÷20mA** output

Press ⏎ to confirm.
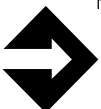
➡ **Warning!** Every time the type of output is changed using this function it is necessary to recalibrate the gain (F. **7**).

Function 4 – Load cell full-scale settings

Set here the load cell full-scale nominal value (expressed in kg); if you use two load cells, set the sum of the load cells full-scale nominal values.

Press ⏎ to enter the function, the display shows its value.

Press ⊕ or ⊖ and set the desired value (in Kg).

Press ⏎ to confirm.

Function 5 – Calibration sample weight setting

The value in Kg of the sample weight that will be used for calibration should be set on this function; this weight should be **at least 10% of the full-scale value otherwise calibration will not be performed!**

Press ⏎ to enter the function, the display shows its value.

Press ⊕ or ⊖ and set the sample weight value.

Press ⏎ to confirm.

Function 6 – Load cell zeroing

Warning! Make sure that the roller the load cells are applied to (measuring roller) is **free of any load**.

Press ⏎ and wait for the instrument to zero (a flashing dot indicates that the operation is in progress). During this procedure, the display will show a number between -**15 and +15** which indicates the "offset" quantity compensated by the instrument.

At the end of this procedure the display shows the notice **YES** if the calibration has had a successful conclusion, the notice **BAD** otherwise. The notice flashes three times, then the function number is shown again.

If the notice **BAD** flashes, please check the load cells are rightly mounted, the electrical connections are carried out correctly and the type of input is set rightly, then run again the function.

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

Function 7 – Load cell gain calibration

Charge the sample weight hung by a rope (use an inextensible one) following the same way as the material one, paying attention the rope keeps the same measurement roll input and output angles as the material, as shown in this diagram

Load cells

Sample weight
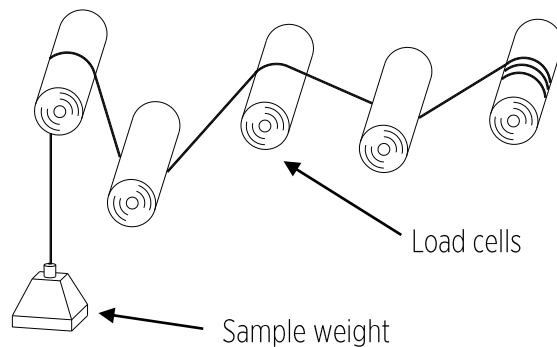
Press ⏎ and wait the instrument completes the calibration (a flashing dot indicates that the operation is in progress).

During this procedure the display shows a number: this indicates the gain range in use:

Number displayed	Gain range	Total gain (x8)
16	16 ÷ 32	128 ÷ 256
32	32 ÷ 64	256 ÷ 512
64	64 ÷ 128	512 ÷ 1024
128	128 ÷ 1024	1024 ÷ 8192

At the end of the procedure the display shows the notice **YES** if the calibration has had a successful conclusion, the notice **BAD** otherwise. The notice flashes three times, then the function number is shown again.

If the notice **BAD** flashes, please check the load cells are rightly mounted, the electrical connections are carried out correctly, the type of input is set rightly, and the sample weight is at least the 10% of the full-scale, then run again the function.

Warning!

- Before running this function, be sure that the type of output AOUT1 set on **F. 3** is correct.
- When calibrating gain the previous zero calibration will probably be affected slightly, so we suggest that both calibration operations are repeated (**F. 6** and **F. 7**) to reduce this phenomenon.

Function 8 – First alarm threshold

Set here the material tension value (expressed in Kg) at which a first alarm signal is desired.

Press ⏎ to enter the function, the display shows its value.

Press ⊞ or ⊟ and set the tension value (in Kg) at which the first alarm signal is desired.

Press ⏎ to confirm.

Function 9 – Second alarm threshold

Set here the material tension value (expressed in Kg) at which a second alarm signal is desired.

Press ⏎ to enter the function, the display shows its value.

Press ⊞ or ⊟ and set the tension value (in Kg) at which the second alarm signal is desired.

Press ⏎ to confirm.

Function 10 – Alarms activation ranges selection

This function allows to select the activation ranges within which the read tension value must be included in order to activate "AL.1" and "AL.2".

Press ⏎ to enter the function, the display shows its value.

Press ⊞ or ⊟ and set:

- **0** if you want <u>to activate the alarms when the tension **goes over** the threshold</u>:

0		AL.1	AL.1 + AL.2	Full-scale

Second alarm threshold (F. 9)

First alarm threshold (F. 8)
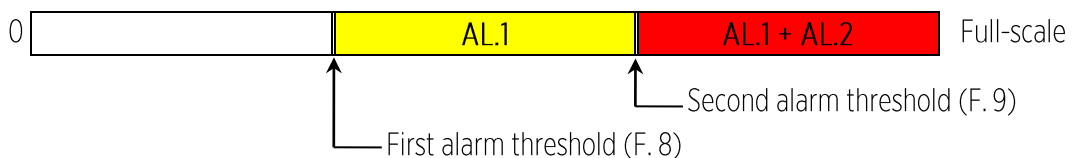
- **1** if you want <u>to activate the alarms when the tension is **less then the first alarm threshold** or **more than the second alarm threshold**</u>:

0	AL.1		AL.2	Full-scale

Second alarm threshold (F. 9)

First alarm threshold (F. 8)

Press ⏎ to confirm.

Function 11 – Decimal point settings

This function allows to set the decimal point display. You can set this function also after load cell zeroing and gain calibration.

Press ⏎ to enter the function, the display shows its value.

Press ⊞ or ⊟ and set: **0** for no decimal point, **0.1** for one figure after the decimal point, **0.02** for two figures after the decimal point.

Press ⏎ to confirm.
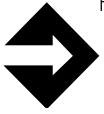
Important: The decimal point setting depends on the set full-scale value. E.g. it is not possible to select **0.02** if the set full-scale is more than 9.

Function 12 – Display filter

The instrument displays the tension registered by the load cells and updates the value at regular intervals (about 6 times a second); when this filter is activated it stops the value displayed changing continuously on account of vibrations or sudden tension peaks and instead displays a stable average tension.

As high is this parameter value, as high is the filter action.

Press ⏎ to enter the function, the display shows its value.

Press ⊞ or ⊟ and set the desired value.

Press ⏎ to confirm.

Function 13 – Auxiliary analog output (AOUT2) filter

The auxiliary analog output AOUT2 can function in two different ways:

- if $F.13 = 0$ the output is filtered by the display filter (see $F.12$), so it can be used to pilot a remote display;
- if $F.13 = 1 \div 10$ the output is filtered by a special filter, so it can be used for making adjustments instead of the AOUT1, whenever a less reactive, but more stable output that is less prone to vibration, is required. This is a filter that calculates the average of the latest N tension values (with a N value that can be selected from 5 different values) with 2 different settable sampling speeds, for a total of 10 different kinds of response.

F.13	Sampling time	Number of samples
0	150 ms	-
1	0,5 ms typical	10
2	0,5 ms typical	25
3	0,5 ms typical	50
4	0,5 ms typical	75
5	0,5 ms typical	100
6	10 ms	10
7	10 ms	25
8	10 ms	50
9	10 ms	75
10	10 ms	100

Press ⏎ to enter the function, the display shows its value.

Press ⊞ or ⊟ and set the desired value.

Press ⏎ to confirm.

Function 14 – Password memorizing

This function allows to set the password (numerical value) requested by **F. 1**, in order to avoid accidental tampering in the programming of the instrument by unauthorized persons.

Press ⏎ to enter the function, the display shows its value.

Press ⊕ or ⊖ and set the desired value.

Press ⏎ to confirm.

Function 15 – Reset

This function allows restoring all entered parameters on the various functions (included the calibration parameters) to the factory value.

Press ⏎ to enter the function, the display shows the word **RES**.

Press ⊕ for about 3 seconds, the **RES** message will flash on the display and the device will automatically be restarted with the values set by the manufacturer.

Function 16 – Display brightness

This function allows to adjust the display brightness.

Press ⏎ to enter the function, the display shows its value.

Press ⊕ or ⊖ to adjust the intensity till to reach the desired level.

Press ⏎ to confirm.

Function 17 – Active alarms diaplaying

This function allows to disable/enable the current active alarms displaying

Press ⏎ to enter the function, the display shows its value.

Press ⊕ or ⊖ and set **0** to disable the displaying, **1** to enable it.

Press ⏎ to confirm.

Function 18 – Firmware release

The function is in read only mode and shows the device firmware release.

Press ⏎ to enter the function, the display shows the firmware release.

Press ⏎ again, to exit the function

Electrical connection diagrams

PYXIS amplifier

All the connecting cables must be shielded

All the screens of shielded cables must be connected to the earth

Earth connection must be as short as possible

Load cell

Load cell

Power supply 24Vdc

+

Analog output (AOUT1)
Auxiliary analog output (AOUT2) *
Display power supply 24Vdc
Alarm 1
Alarm 2

+ | - | + | - | + | -
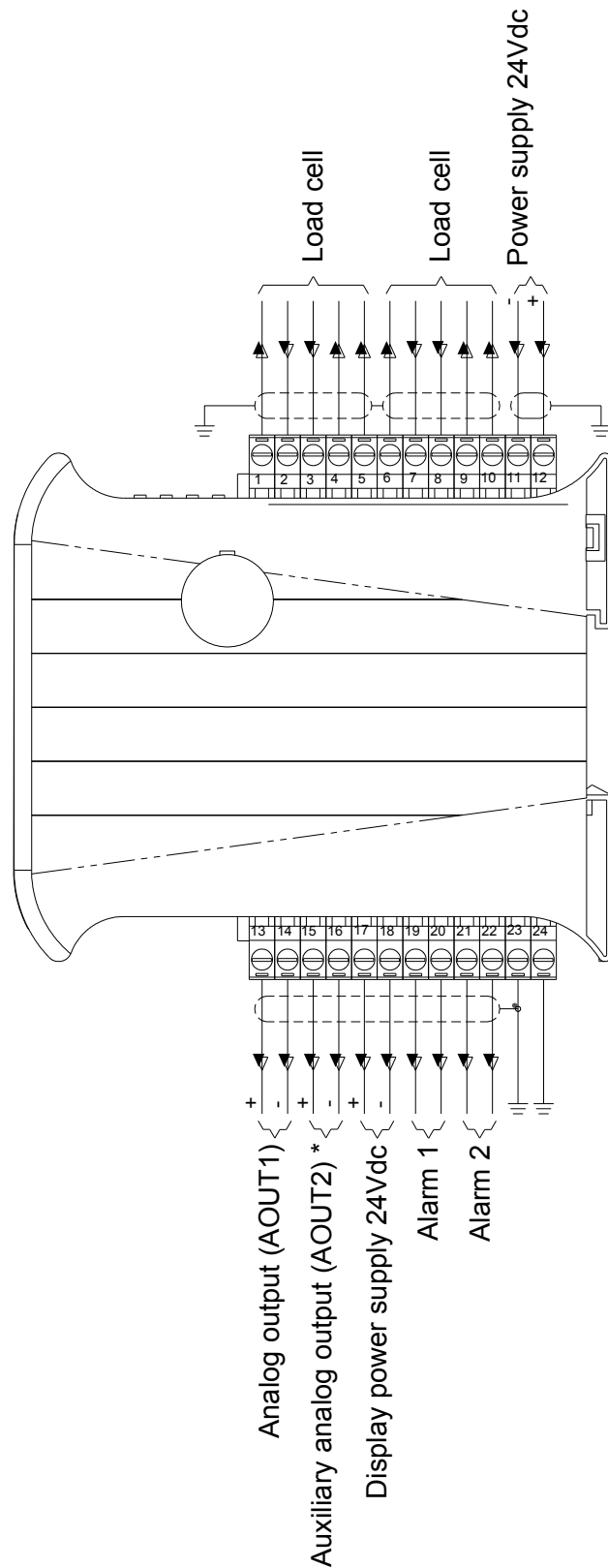
* F13=0 with remote display
  F13=1÷10 with programmable filter

Connection cables data

Load cells cables	4 wires, twisted pair:	A-B, C-D
	Minimum wires section:	0,22mm^2
	Maximum cable legth:	10m
	Shielding	
Others connection cables	Shielding	

mV load cells connection

Load cell/s pin	Re wires colour	PYXIS terminal strip	
		for connection of 1st load cell	for connection of 2nd load cell
A	White	5	10
B	White/Black	4	9
C	Red/Black	3	8
D	Red	2	7

mA load cells connection

➢ With 2 wires preamplifier (mod. preampl. 4/20mA)

Load cell/s pin	Re wires colour	PYXIS terminal strip	
		for connection of 1st load cell	for connection of 2nd load cell
A	White	1	6
B	White/Black	3	8

➢ With 3 wires preamplifier (mod. 4/20mA EVO)

Load cell/s pin	Re wires colour	PYXIS terminal strip	
		for connection of 1st load cell	for connection of 2nd load cell
A	Red	1	6
B	Black	4	9
E	Violet	3	8

N.B. : It is possible to connect till 2 mA load cells.

Earth connection
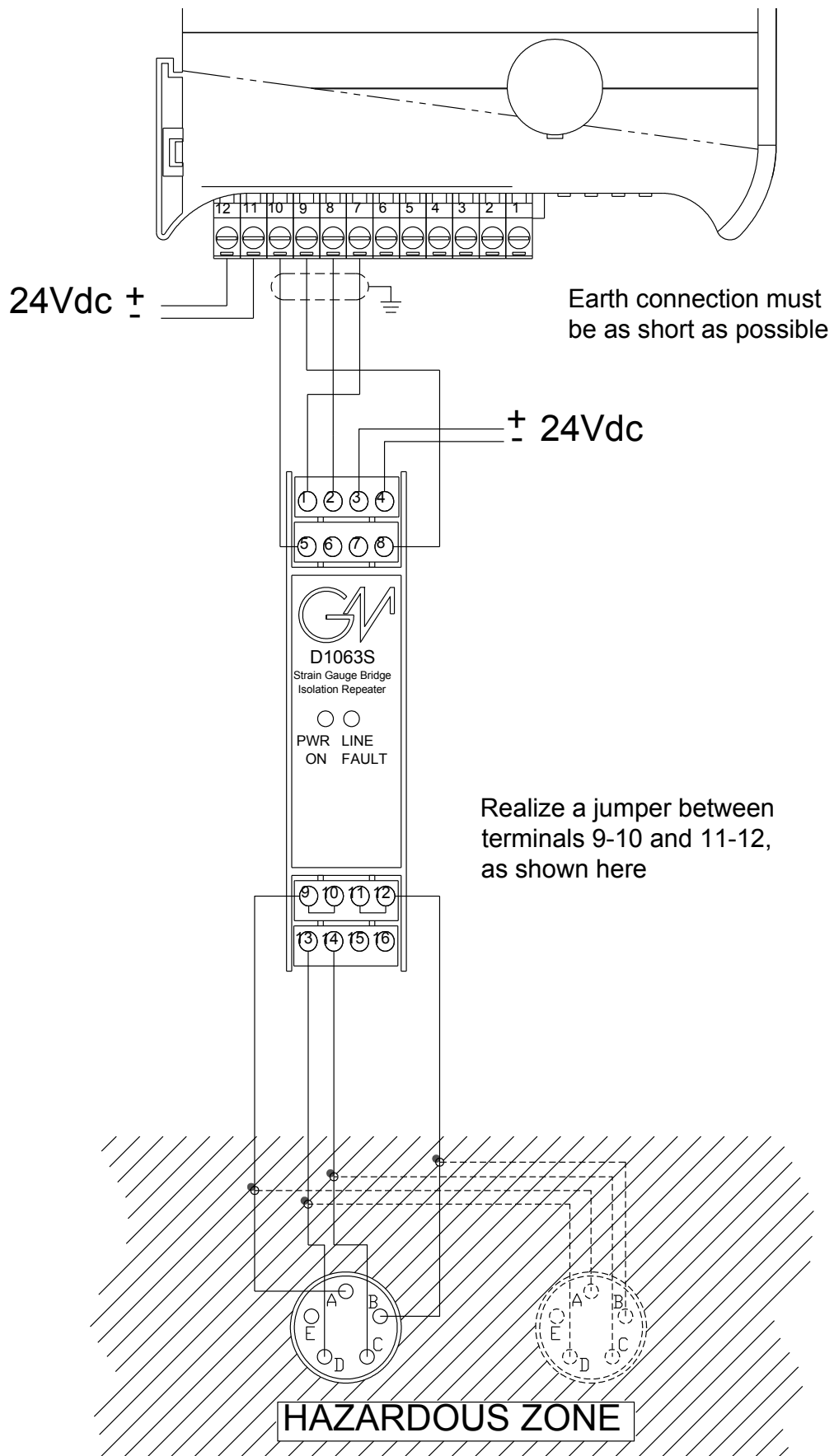
It's required to connect the shields of all device connected cables and the earthing of the plant where the device is intalled, to the earthing terminals (23 and 24).
The earthing connection must be as short as possible.

Caution: Failing to wire up these electrical connections makes the device vulnerable to electrical/electromagnetic disturbance which may cause it to malfunction.

Re

Isolation repater connection for Re load cells in mV

24Vdc ±

Earth connection must
be as short as possible

± 24Vdc

GM

D1063S
Strain Gauge Bridge
Isolation Repeater

PWR   LINE
ON   FAULT

Realize a jumper between
terminals 9-10 and 11-12,
as shown here

HAZARDOUS ZONE

DL-48 display connection (optional)

Supply

Universal power supply
24÷240Vac/Vdc

Supply

```
        1  2  3  4  5
        ○  ○  ○  ○  ○

        6  7  8  9  10
```

Vin

Signal input
0÷10Vdc

GND
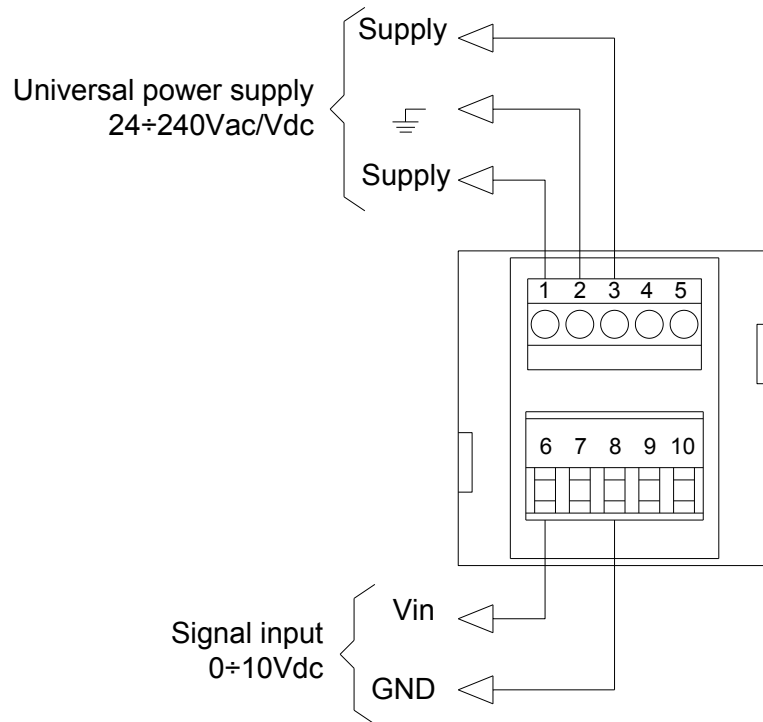
Display DL-48		Pinout PYXIS
Pin	Signal	
1	24÷240Vac/Vdc	17
2	Earth	23 or 24
3	24÷240Vac/Vdc	18
4	N.C.	-
5	N.C.	-
6	+Vin	15
7	N.C.	-
8	GND	16
9	N.C.	-
10	N.C.	-

Note: polarity is not relevant in direct current connection

Electrical characteristics

Description		Electrical characteristics	Terminals number
Power supply		24Vdc (18÷30Vdc MAX) max. absorbed current: 250mA (excluded the remote display)	Pin 11, 12
Load cells power supply	2 outputs for load cells in mV power supply	6,8Vdc Total maximum load: 80mA (max 4 x 350Ω cells in parallel)	Pin 4, 5 Pin 9, 10
	2 outputs for load cells in mA power supply	24Vdc Total maximum load: 100mA	Pin 1, 4 Pin 6, 9
Inputs	Double analog input for load cells	Selectable through jumpers: 0÷60mV or 4÷40mA (input impendence: 70Ω)	Pin 1÷10
Outputs	1 "pure" analog output proportional to the tension used for adjustment	Selectable in F. 3 0÷10V, R$_{load}$ = 2KΩ min or 4÷20mA, R$_{load}$ = 250Ω max (self-limit: 3,5÷23mA)	Pin 13, 14
	1 analog output with digital filter programmable for remote displaying or adjustment (see F.13, page 11)	0÷10V, R$_{load}$ = 2KΩ min Resolution: 12 BIT (2,5mV)	Pin 15, 16
	2 N.O. relay digital optoisolator outputs (contacts are closed when the respective alarms are activated)	24Vdc/Vac Max. current: 100mA Isolation voltage: 3750V$_{rms}$	Pin 19÷22
	1 output for remote display power supply	24Vdc Max. current: 250mA	Pin 17, 18
Earth	At which connect all shields of cables and the earthing of the plant		Pin 23, 24
Working temperature		0÷50°C	

Replacing the fuse on Pyxis 1,6 A/F

PHASE 1

Remove the Pyxis card from its DIN guide by pressing a lever against the red clip as shown in the photo

PHASE 2

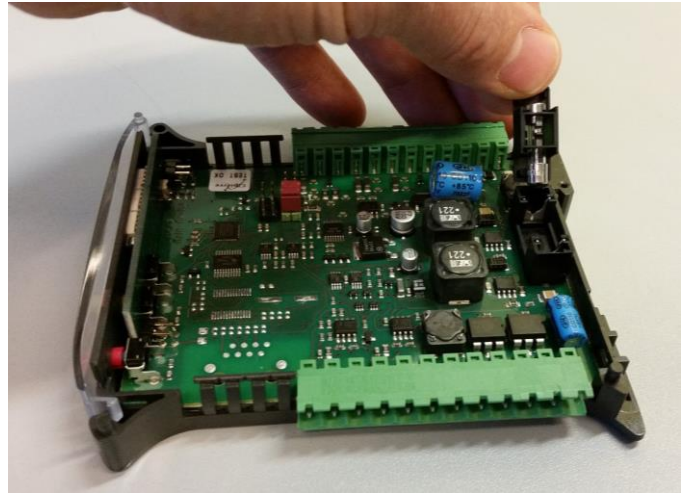Press the base of the container to release the clip

PHASE 3

Detach the cover from the base by pressing the points indicated by the arrows

PHASE 4

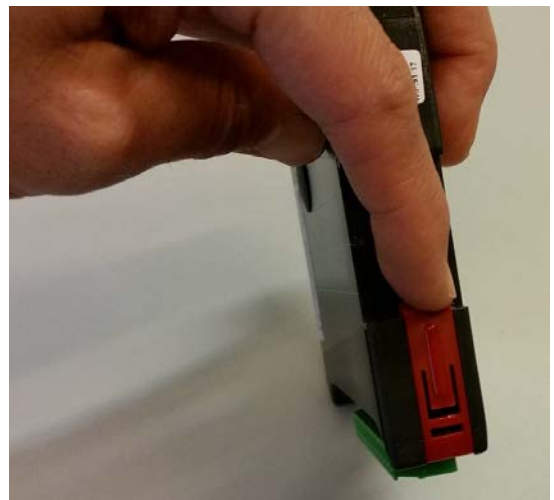Remove the blown fuse from its holder and replace it with a new one

PHASE 5

Reinsert the cover in the container base, ensuring that the slot covers indicated by the arrow are inserted in the guides
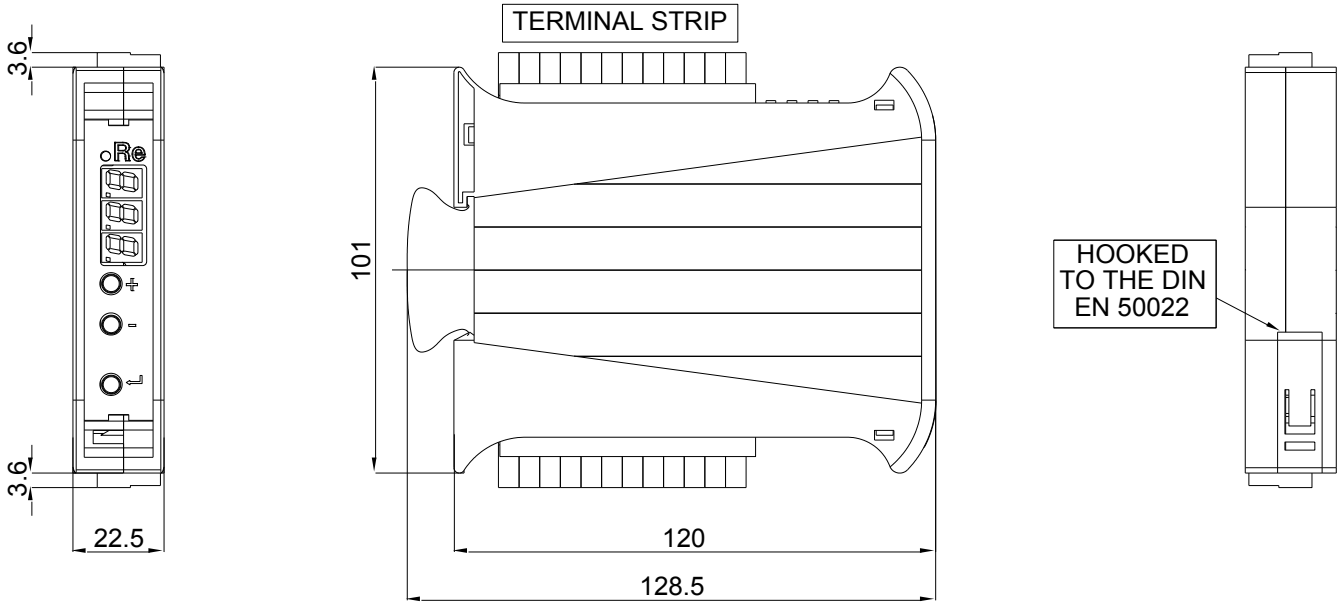

Slot cover

PHASE 6

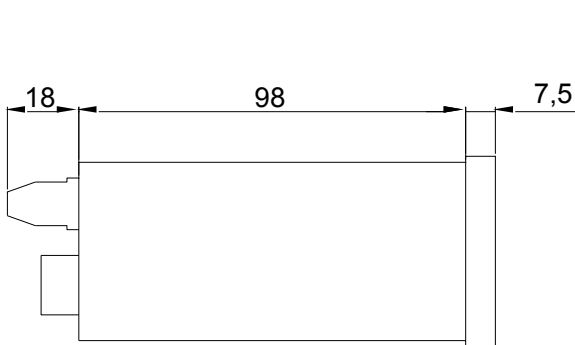Insert the spring clip into the card guide and remount it on the DIN guide

Mechanical dimensions
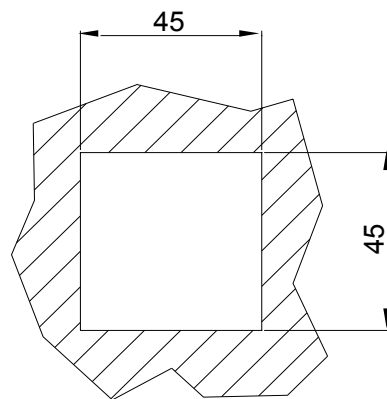
PYXIS

TERMINAL STRIP

3.6

Re

101

3.6

22.5

120

128.5

HOOKED
TO THE DIN
EN 50022

Display DL-48 (optional)

18   98   7,5

45

45

display DL-48 dimensions   *hole dimensions*

Guarantee

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

No. revision	Date	Changes
04/18	09/04/2018	Added "Replacing the fuse on Pyxis 1,6A/F" paragraph