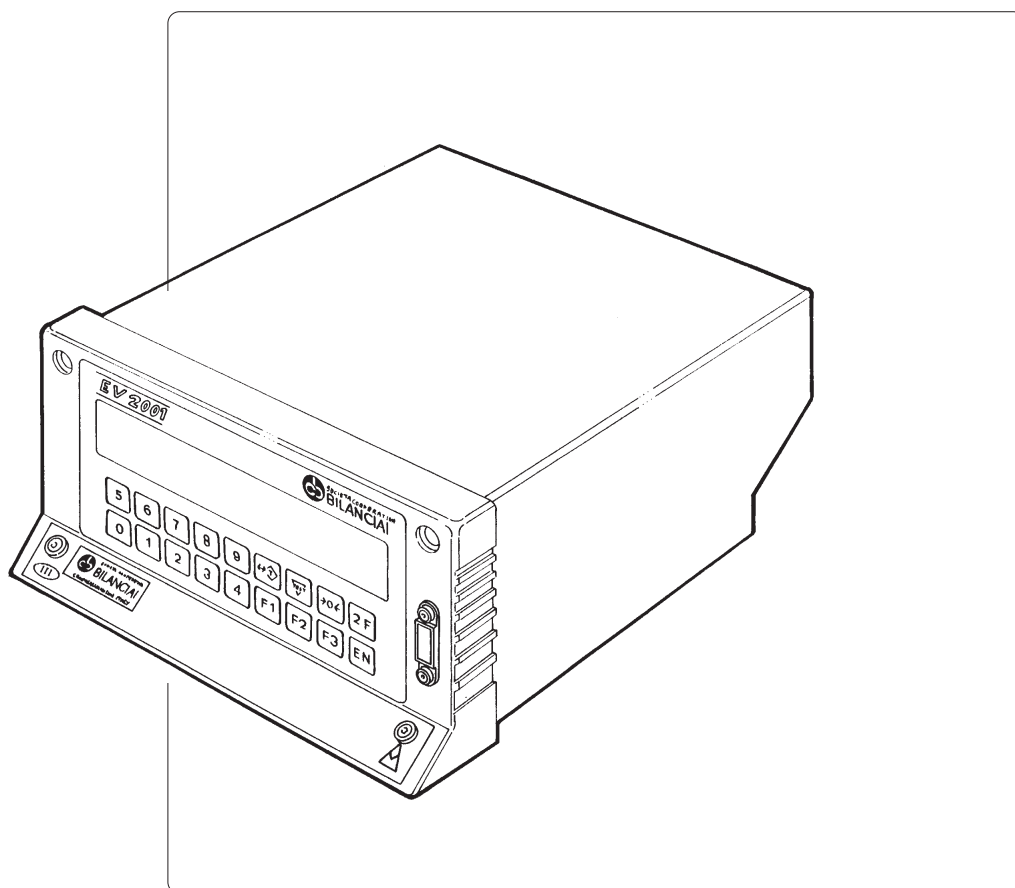


## EV 2001 Terminal



TYPE-EXAMINATION



**Use and maintenance handbook**



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## CONFORMITY DECLARATION

Manufacturer's name:

**SOCIETA' COOPERATIVA BILANCIAI**

Address:

Via S. Ferrari 16  
41011 CAMPOGALLIANO (MO) ITALY

declares that the product:

electronic terminal, model:

**EV 2001**

with options:

all those included in this handbook

complies with:

↑ norms EN45501, EN50081-1 according to the provisions of the directive 89/336 EEC (Electro-magnetic compatibility)

↑ norm EN60950 according to the provisions of the directive 73/23 EEC (Low voltage directive).

The terminal is further suitable for realizing weighing instruments with non-automatic operation approved by the "CE-type approval certificate" in compliance with the directive 90/384 EEC.

The CE mark has been applied on the product.

Campogalliano, 2<sup>nd</sup> December 1996

The technical director  
Eng. Luciano Diacci

Declaration issued in compliance with EN45014.

## Introduction

This handbook is aimed at making the operator acquainted with explanation texts and pictures, the provisions and the essential criteria for installation, correct use of the instrument and careful maintenance.

The operator is completely responsible for the operating safety of the system; therefore he must know in detail how to use it properly.

The user has to make sure that the installation complies with the regulations in force about the system.

The equipment must be installed only by skilled personnel who has previously read and understood this handbook.

**Always keep it at hand!!!!**

**Always observe the instructions!!!!**

### Important!!

**"Skilled personnel"** is the personnel who, because of his professional knowledge and experience, has been expressly authorized by the "person responsible for the system safety" to execute installation, use and maintenance of the terminal.

### Important!!

For no reason the user must tamper with the plant.

For any failure turn to the nearest Service Centre.

Any disassembling trial or modification by the user or non-authorized personnel shall invalidate the guarantee and the Manufacturer shall not be responsible for any damage to persons or things.

The information and the pictures below are up-dated at the edition date.

Coop Bilanciai works for the continuous optimization of its products with possible modifications to some parts of the system.

The technical data contained in this handbook are exclusive property of the company COOP. BILANCIAI and must be considered as confidential.

Therefore no - even partial - reproducing and publishing of this handbook is allowed without written authorization by the manufacturer.

Moreover, this handbook shall not be used for purposes other than those connected to installation, use and maintenance of the terminal.

In order to explain in detail and clearly the operation and the adjustments required, some pictures may show the terminal without protection safeguards.

**Do not** use the terminal in these conditions, but remove the protection safeguards for the period necessary for the required repair or maintenance operations, then restore the terminal.



## Definitions

The symbols used in the handbook for making the user aware of the different danger levels in the "Use and maintenance" operations of the instrument are given below.



**DANGER!!**



Information or procedure that, if not properly executed, causes death or serious person's injuries.



**ATTENTION!!**



Information or procedure that, if not properly executed, may cause death or serious person's injuries.



**CAUTION!!**



Information or procedure that, if not properly executed, might cause slight person's injuries or damages to the instrument.



**WARNING**



Information or procedure that gives the operator advice on the best utilization of the system so that it can last longer, avoid damages or programming loss. In this way the work can be optimized in accordance with the metric standards.



**NOTE**

Important information or procedure.

**Prohibited uses**

If there are any variances between the instructions of this handbook and the equipment in your hands, please ask the Reseller or the After-Sales Service of Coop. Bilanciai for explanations.

The terminal or the complete system supplied must not work on moving machines or systems.

Different uses are allowed only if they are expressly authorized by Coop. Bilanciai.

**WARNING**

The use conditions of the electronic terminal for weighing instruments are ruled by the regulations in force in the country where they are used.

Utilization under conditions that do not comply with these regulations is not allowed.

## 1

# Identification data

## 1.1 Description of "EV 2001" and "EV 2001 MD" terminals

"EV 2001" terminal is a high accuracy electronic weighing instrument, expressly designed for this purpose.

It guarantees extremely precise weighing and enables the connection with any external devices.

The terminal can be connected to strain gage load cells which receive - directly or through a lever system - the weight transmitted by the weighing platform.

This terminal is also provided in the "EV 2001MD" version.

This version, also called multi-interval type, is characterized by the possibility to operate in manifold weighing ranges, each one having its own resolution (interval).

These instruments display the weight value by automatically selecting the resolution as a function of the range corresponding to the concerned weight.

The terminal allows max. three ranges with 3000 intervals each to be displayed.

The instrument features, i.e. its operation with one or more weighing ranges, are given on the plate containing the technical metrological data of the instrument (see par. 1.4).

The data concerning these features are given as shown in the example in table 1.1.1 and described below.

	1 single weighing range	2 weighing ranges 1° 0°-3000 kg      int. e=1 kg 2° 3000°-6000 kg      int. e=2 kg
Maximum capacity (Max)	6000 kg	3000/6000 kg
Minimum capacity (Min)	40 kg	20 kg
interval (e)	2 kg	1/2 kg

- “EV 2001” terminal display

Connect the electronic terminal to a weighing platform.

The minimum interval of terminal reading is always the same for the whole weighing range for any mass deposited on the platform.

The interval is 2 kg.

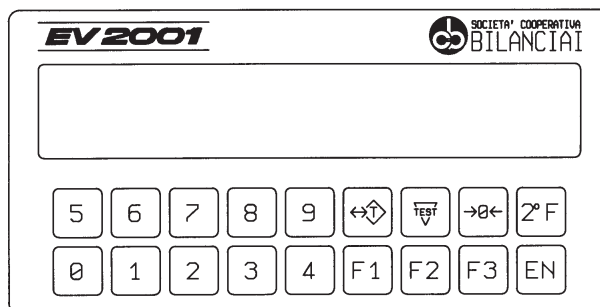
- “EV 2001 MD” display

Connect the “EV 2001 MD” terminal to a weighing platform and put a mass on it within the second extension, then unload the platform slowly.

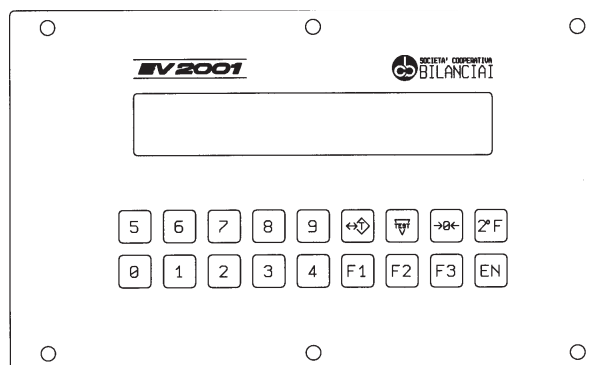
Passing from the second to the first extension, the display will show the updated value of the minimum interval which passes from 2 kg to 1 kg (see “EV 2001” terminal).

## 1.2 Front panels

Fig.1.2.1 shows the front panels of the instruments described in this handbook in order to help their identification.



Front panel EV2001 and EV2001 MD



Front panel EV2001 and EV2001 MD stainless steel version

fig. 1.2.1 - front panels

### 1.3 Identification data

An exact description of the type, the serial number and the production year will make it easier for our After-Sales Service to answer all your questions in the best way.

Always give these data whenever you contact our technical assistance department.

We suggest you note down the data concerning your instrument in the form below.

Serial number no.....

Production year.....

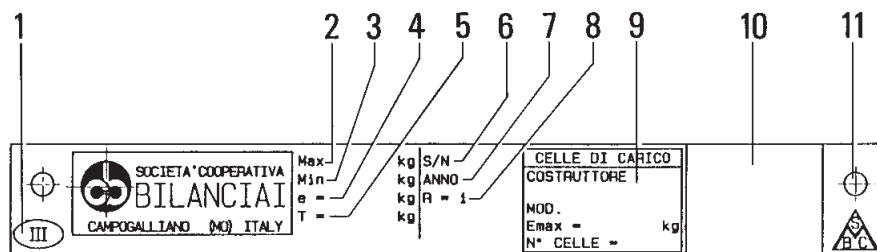
Maximum capacity Max=.....

Interval e=.....

## 1.4 Location and de- scription of the identification plates

Each terminal is provided with a plate with the metrological features of the instrument.

Fig. 1.4.1 shows an example of standard plate.



### Plate key

- 1 - Accuracy class of the instrument
- 2 - Maximum capacity or full scale of the instrument
- 3 - Minimum weighing. Under this value the weighing accuracy is not guaranteed.
- 4 - Value of the interval or intervals (EV2001 MD)
- 5 - Maximum tare that can be zero-set
- 6 - S/N serial number
- 7 - Instrument production year
- 8 - Lever reduction ratio
- 9 - Data concerning the load cells used in the weighing instrument
- 10- Conformity mark M (where required):
  - M on green background = instrument subject to metrological check
  - ~~No mark~~ = instrument not subject to metrological check
  - M (M marked with an X, on red background)= additional equipment not subject to metrological checks connected to an "EC" instrument being supervised
- 11- Instrument seals or fixed plates (where required by the standard)

fig. 1.4.1 - identification plate



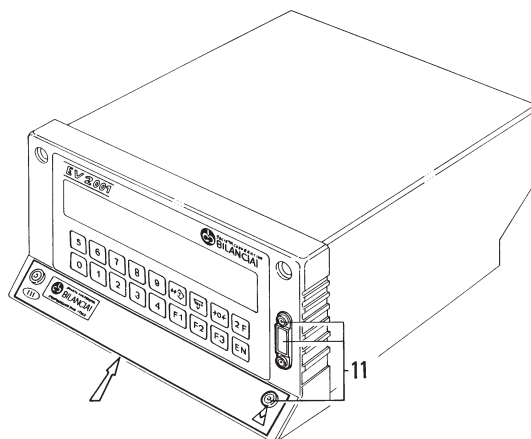
### WARNING



The data on the plate, the closing and certifying seals of the terminal must no way be modified or removed.

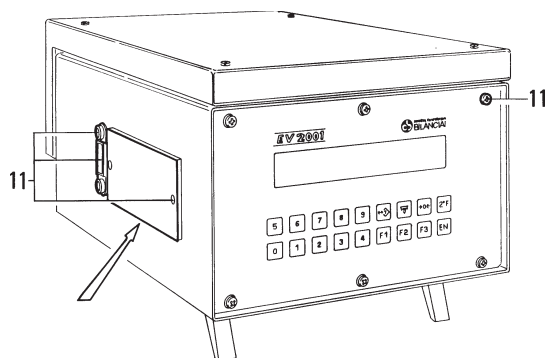
If they are impaired or removed, the guarantee immediately falls off and the manufacturer is no longer responsible for any material and economic damage.

Fig. 1.4.2 shows the location of the identification plate or seals concerning some instruments.



Identification plate

EV 2001, table-type



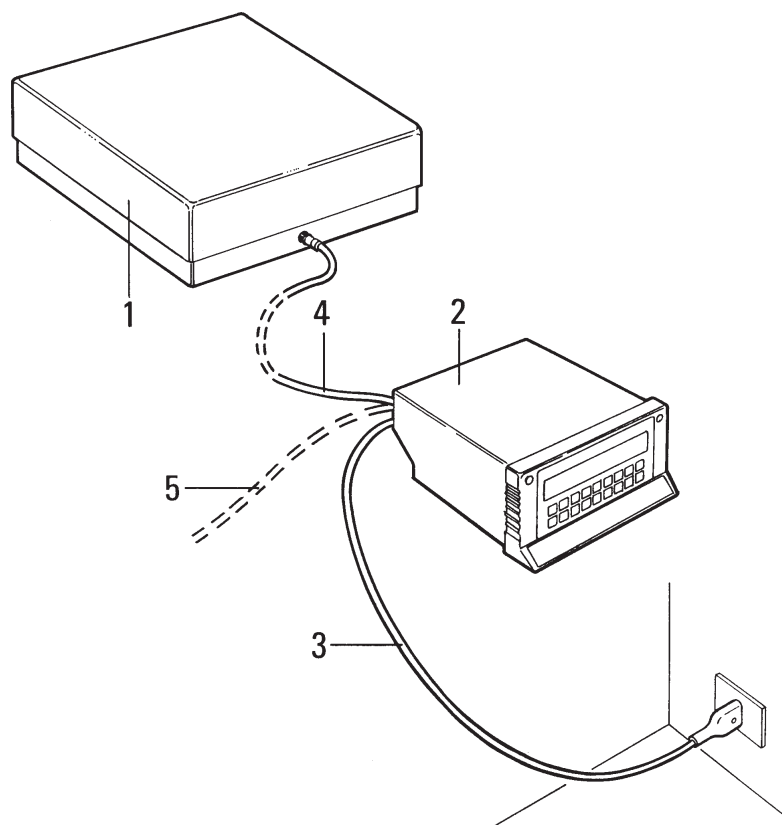
Identification plate

EV 2001, stainless  
steel table-type

fig. 1.4.2 - identification plates and seals

## 1.5 Main parts

For an easier understanding of this handbook the main parts of the system are given below.



- 1 - Weighing platform
- 2 - Weight display terminal
- 3 - Mains cable
- 4 - Terminal-weighing platform connecting cable
- 5 - Possible connecting cables for external devices (PLC, PC, I/O, etc).

fig. 1.5.1 - main parts



## 2 Safety rules

### 2.1 Warning and danger plates



#### ATTENTION!!



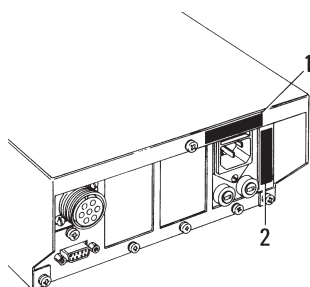
Observe the warnings on the plates carefully.

Make sure all plates are present and can be read; if this is not the case, stick or replace them asking the after-sale service.

Keep the terminal and all the connections with external devices perfectly efficient.

During operation the instrument is subject to dangerous voltages, so the maintenance operations must be performed only by skilled personnel.

### 2.2 Plate location



1

**ATTENTION**

Before opening the terminal disconnect the mains cable

2

**Società Cooperativa Bilanciai - EV 2001**220V 100mA  
50/60Hz

Fuses

F 500 mA 250V

1- Danger plate "dangerous voltages".

It signals that inside the terminal some elements are supplied with 220 V AC or 110 V AC.

2- Manufacturer plate. It shows the voltage, the connecting frequency and the fuse type.

fig. 2.2.1 - voltage danger plate

## 2.3 General safety rules

Read this handbook carefully before starting and using the terminal and before any maintenance or other intervention.

Do not allow non-authorized personnel to intervene on the instrument.

Do not press the terminal control keys with pointed objects.

## 2.4 Safety rules for the installers

During the installation always connect the system to a socket with a single-phase voltage corresponding to the value on the label at the back of the instrument (110/220 VAC - 15% + 10%); the socket must be provided with a suitable earth pole with resistance at least lower than 1  $\Omega$ . Also make sure that between earth and neutral there is no potential difference.

The lack of earth connection causes a wrong and dangerous working of the instrument.

The power supply line must be privileged. If existing, use the power supply line of the computers. When the line is not stable, introduce a continuity unit or mains stabilizer. Particularly for the "stainless steel" versions it is advisable to install a suitable bipolar switch on the line, upstream of the terminal. If the terminal is to be connected to other devices such as computers etc., before executing the connections disconnect them from the electric mains.

The terminal has been designed to bear temperature changes between - 10° C and + 40° C and for moisture not exceeding 85% (see also the technical data on page 65).

For environments with lot of dust or moisture use the stainless steel version or put the terminal into a suitable protection case.



**DANGER!!**



In case of installation of the stainless steel terminal, the plug for the connection to the mains (110/220 VAC) must be used only in dry rooms.

If necessary, the Customer shall replace the plug with one provided with a protection degree suitable for the installation type.

Failing to observe this recommendation may cause electrocution danger.

## 2.5 Rules for the main- tenance personnel

Each maintenance and repair intervention must be executed only by skilled personnel.

Before opening the terminal do disconnect it from the power supply mains and wait a few minutes before intervening on the inner parts.

## 3

## Testing, delivery and installation

### 3.1 Testing

All the terminals produced by Coop. Bilanciai are carefully checked and tested in every part.

During testing the terminals undergo a series of complete working cycles. In this step any failure due to defective components are shown.

This procedure guarantees a properly working and reliable product in all its parts.

### 3.2 Delivery of the terminal



#### CAUTION!!



Carefully observe the instructions on the instrument package. It may be impaired by moisture or strong impacts as its components are electronic. Therefore both transport and storage must be performed with particular care.

Never overlap more than 15 boxes in order not to damage the underlying packages.

The whole material delivered by Coop. Bilanciai has been checked before the shipment.

The terminal is delivered suitably protected in a carton package, if not otherwise agreed.

### 3.3 Package dimensions and weight

When you receive the terminal, check if there are any damages occurred during transport; if this is the case, please make a complaint to the carrier.

For stainless steel and special versions, weight and dimensions may be different (check weight and dimensions in the accompanying documents).

**Package weight = 6 kg**

All measures are expressed  
in millimetres.

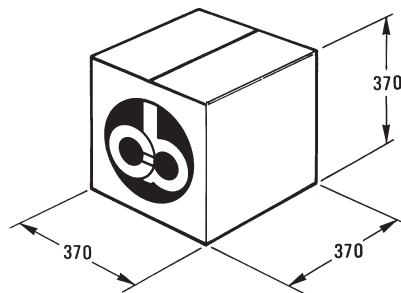


fig. 3.2.1 - instrument package

### 3.4 List of the supplied material

With the "EV 2001" terminal, in the package there is an envelope containing the following material:

- No. 2 fins for rack assembly of the instrument and relevant fixing screws;
- No. 2 spare fuses;
- No. 1 connecting mains cable of the terminal to the power supply line;
- No. 1 9-pole male connector for the serial interface connection;
- No. 1 "use and maintenance" handbook.

### 3.5 Terminal handling



**CAUTION!!**



The terminal must be handled with extreme caution, particularly if it has no package.

Coop. Bilanciai is not responsible for any damages due to a wrong terminal handling.

### 3.6 Installation of the table-type terminal ("standard" and "stainless steel" "EV 2001")



#### CAUTION!!



In the table-type installation, leave enough space around the terminal, in particular leave a space of at least 100 mm in the rear part.

This prevents the cables from being incorrectly pressed, what might cause their breaking.

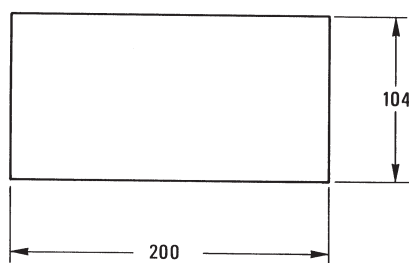
Do not put the terminal connecting cables next to power supply cables which may impair the instrument working.

If the cable is short, do not extend it with joints, but please contact the manufacturer.

### 3.7 Rack-type installation

In the event of rack-type installation the panel on which the terminal is installed must have holes as shown in fig. 3.7.1.

*-Drilling dimension for the rack-type application of the terminal*



The size is expressed in millimetres

fig. 3.7.1 - drilling for rack-type installation

For the rack-type fixing of the terminal operate as follows:

- in the instrument application point drill as shown in fig. 3.7.1;
- introduce the terminal in the hole;
- go into the inner part of the panel and install the fins "2" of the terminal (see fig. 3.7.2);
- then tighten the screws "1" and fix the terminal on the supporting panel.

In particularly adverse environments, in order to obtain a good cooling of the terminal, provide for a forced ventilation.

The volume of the board in which the terminal is installed must guarantee a sufficient air circulation.

All air intakes must be protected with filters.

During the installation do not let metal drilling chips, electric cables or other fall into the terminal.

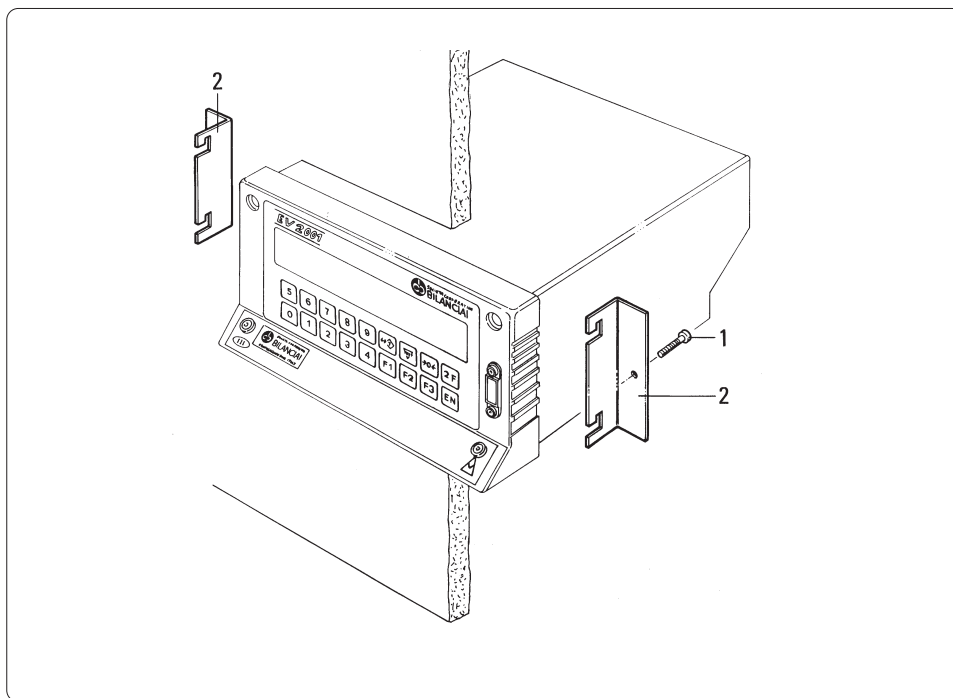


fig. 3.7.2 - rack-type installation of the instrument

### 3.8 “EV 2001” standard terminal connection



#### **DANGER!!**



The power supply line of the terminal must have voltage and frequency as indicated at the back of the terminal.

Always connect the terminal to an efficient earth plate.

Any installation, maintenance and repair intervention must be performed only by skilled personnel and only if the terminal is disconnected from the power supply line.

For a correct electrical connection operate as follows:

- press the switch "1" on "O" (zero);
- connect the female end "2" to the socket and plug the male end of the cable in the suitable power socket;
- screw the male connector of the connecting cable of the weighing platform tight to the connector "4" of the instrument;
- plug the connecting cables of the terminal into the external devices following the instructions given in par. 3.12 "Serial line installation" and in chapter 7 "Option installation".

Press the switch on "I"; the terminal is ready for use.

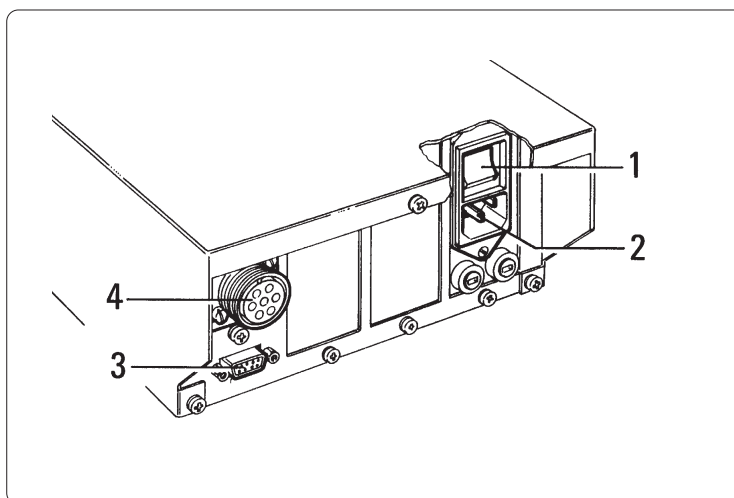


fig. 3.8.1- terminal connection

### 3.9 Connection of "stainless steel table-type EV2001" terminal

For the terminal connection just open it and perform the connections below.

- Untighten the screws "1" and remove the cover "2" (fig. 3.9.1).
- Disconnect the yellow/green cable "3" connecting the case basement and the cover "2".



**ATTENTION!!**



Connect the instrument to earth with a yellow/green cable "5" not included in the delivery using the hole in point "4" of fig 3.9.1.

An incorrect connection impairs the operator's safety.

Once the cover has been removed, it is possible to reach the existing connectors on the back of the terminal operating in the same way as for "EV 2001 standard" terminal (see par. 3.8).

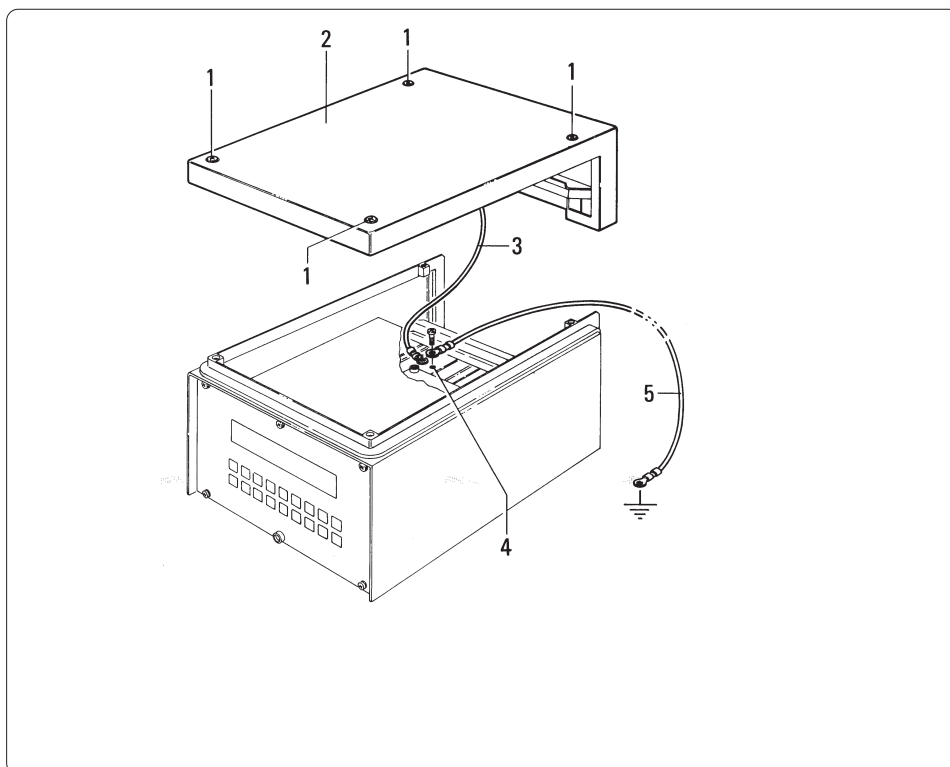


fig. 3.9.1 - electric connection for table-type EV2001



Note:

before closing the terminal with the cover "2" make sure the switch "1" is in position "I" (see fig. 3.8.1)

- Re-connect the cable "3" to the cover "2".



**ATTENTION!!**



If the cable "3" is not connected to the cover "2", the cover "2" is not earthed.

- Re-install the cover and tighten the screws "1".

Now the terminal is connected and ready for use.



**DANGER!!**



In case of installation of the stainless steel terminal, the plug for the connection to the mains (110/220 VAC) must be used only in dry rooms.

If necessary, the Customer shall replace the plug with one provided with a protection degree suitable for the installation type.

Failing to observe this recommendation may cause electrocution danger.

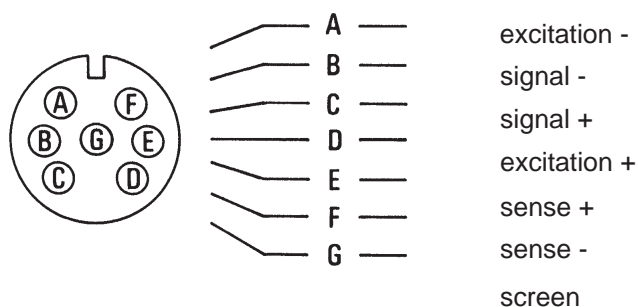


### 3.10 Connection to the weighing platform

The circular connector (fig. 3.10.1) on the back of the instrument (detail "4" fig. 3.8.1) must be connected to the weighing platform.

A cable suitable for this purpose is supplied with the terminal.

The instructions for the use of each pole are given below.



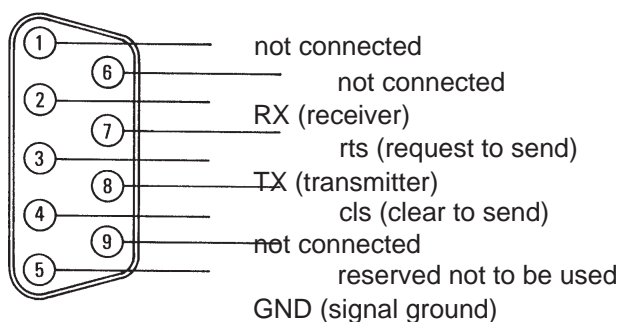
7-pole female circular connector of the terminal.

Extension for the terminal connection to the weighing platform

fig. 3.10.1 - connector to the weighing platform

### 3.11 Standard serial output

The instrument has a serial channel "RS232" on a 9-pole female connector (EIA 1 part. "3" fig. 3.8.1)



9-pole female box connector (placed on the terminal)

Output for the serial connection to various devices

fig. 3.11.1 - standard serial output connector



## CAUTION!!



For this connection use a high quality serial cable following the recommendations of the transmission standard "RS232".

In particular, the cable must not be longer than 15 metres and the screening braid must be connected to the terminal frame.

### 3.12 Example of serial connection to the Personal Computer

It is possible to connect the instrument to a serial terminal "RS232".  
Through the remote controls it is possible to communicate with the "EV 2001" terminal.

Fig. 3.12.1 shows the connection diagramme of the "EV 2001" terminal to the serial port of a personal computer.

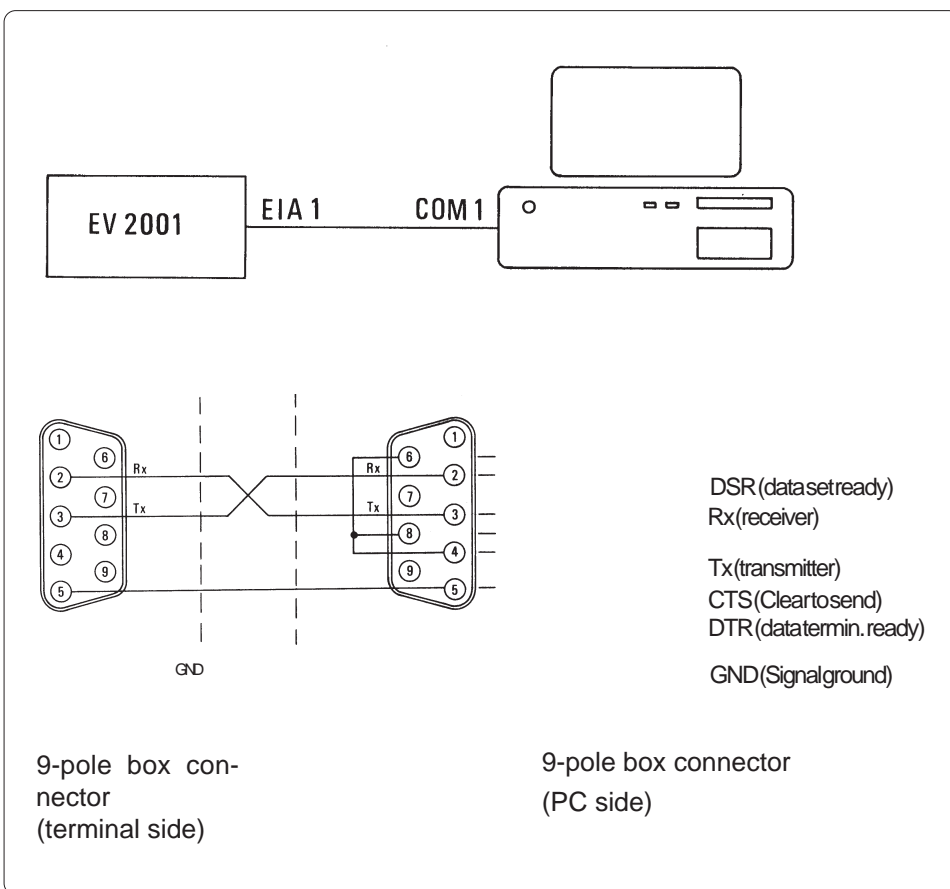


fig. 3.12.1 - example of serial connection

With the following "BASIC" language programme it is possible to display 100 weight readings.

Note line 10 for the PC serial line configuration for receiving from "EV 2001" terminal with Bilanciai standard transmission (see par. 6.3.1)

```
10 OPEN "COM1:4800,E,7,2,PE,CS,DS" AS #1
15 I=1
20 LINE INPUT #1,A$
30 PRINT A$,I
32 I=I+1
35 IF I<100 THEN GOTO 20
40 CLOSE#1
50 END
```

### **3.13** **Connection of** **possible options**

For the connection of possible options on the "EV2001" terminal see chapter 7.



## 4 Controls



### ATTENTION!!



Only authorized personnel may intervene on the terminal.

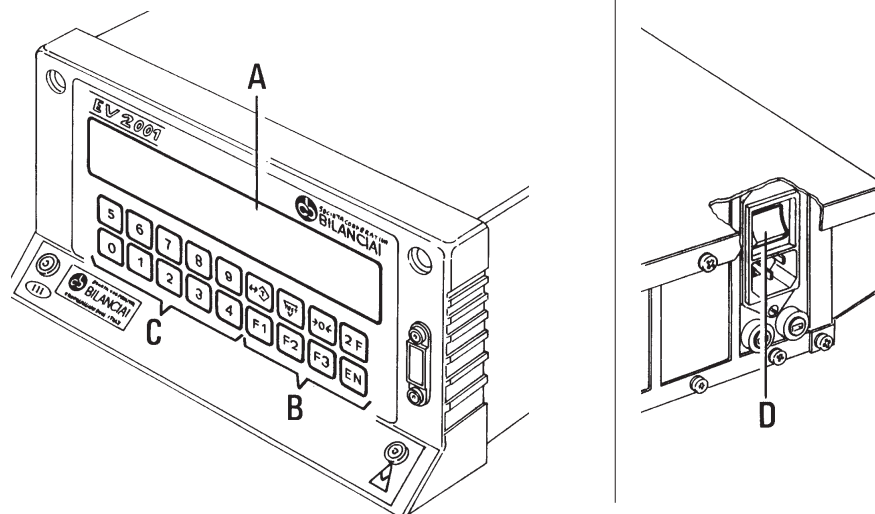
The operator must be sure that the terminal is complete with all covering and protecting crank-cases and check that the cables are undamaged and correctly connected.

When the weighing instrument is introduced into complex systems so as to cause danger for the plant operators, perform many idle manoeuvres with the assistance of skilled personnel in order to achieve the necessary experience for a safe operation.

### 4.1 Keyboard and control description

The front panel consists of a "FIP" (Fluorescent Indicator Panel) display including all the main symbols in accordance with the metric regulations in force.

The keyboard consists of 10 numeric keys and 8 function keys.



- A) Weight and additional signal display  
 B) Function keys  
 C) Numeric keys  
 D) Terminal power switch.

fig. 4.1.1 - control keys

## 4.2 Description of the symbols and val- ues displayed

The display (fig. 4.2.1) shows the following information:

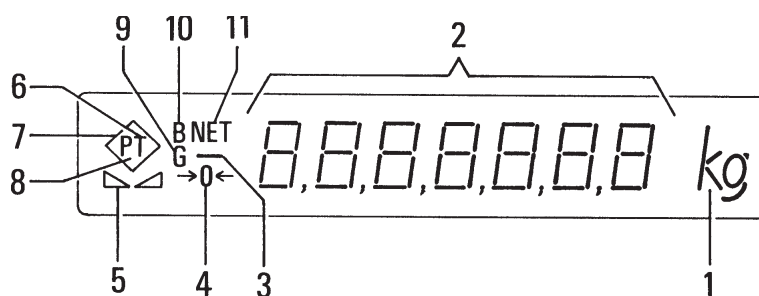


fig. 4.2.1 - display messages

1) **kg**













Measure unit of the displayed weight.

The symbol blinks if the weight is within the minimum weighing range.

Besides the measure unit "kg" it is possible to display other measure units, i.e. "t", "g", "lb".

2) **8,8,8,8,8,8,8**

Weight display digits (seven decimal digits).

- |     |   |   |
|-----|---|---|
| 3)  |    | <p><i>"Minus" sign.</i></p> <p>If lightened, it indicates that the displayed weight is negative.</p>  |
| 4)  |    | <p><i>"Center zero" symbol.</i></p> <p>It signals that the weight detected by the platform is approximately zero, within the partition - 1/4 " 1/4 of the interval.</p>   |
| 5)  |    | <p><i>Stable weight symbol.</i></p> <p>If lightened, it indicates that the weight is stable and can be acquired.</p>  |
| 6)  |    | <p><i>Tare symbol.</i></p> <p>The illumination of the symbol  (tare) indicates a tare stored through acquisition.</p>  |
| 6)  |   | <p><i>Tare symbol.</i></p> <p>It signals the operator that the indicated value is a tare stored through acquisition.</p>  |
| 7)  |  | <p><i>Symbol of tare entered from the keyboard.</i></p> <p>The symbol  (pre-set tare) on the display signals the operator the acquisition of the value of the tare entered from the keyboard.</p> |
| 8)  |  | <p><i>Tare symbol.</i></p> <p>It indicates the operator that the displayed value is a value of tare entered by the numeric keys of the keyboard.</p>  |
| 9)  |  | <p><i>Gross weight symbol.</i></p> <p>(if the measure unit is expressed in "lb"). When the symbol "G" (gross) is lightened, the weight displayed by the terminal is the gross weight.</p>   |
| 10) |  | <p><i>Gross weight symbol.</i></p> <p>The illumination of the symbol "B" (BRUTTO) indicates a gross weighing.</p>   |
| 11) |  | <p><i>Net weight symbol.</i></p> <p>The lightened symbol "NET" indicates that the displayed value is the net weight.</p>  |

### 4.3 Keyboard and power switch description

For better information see par. 6.2.

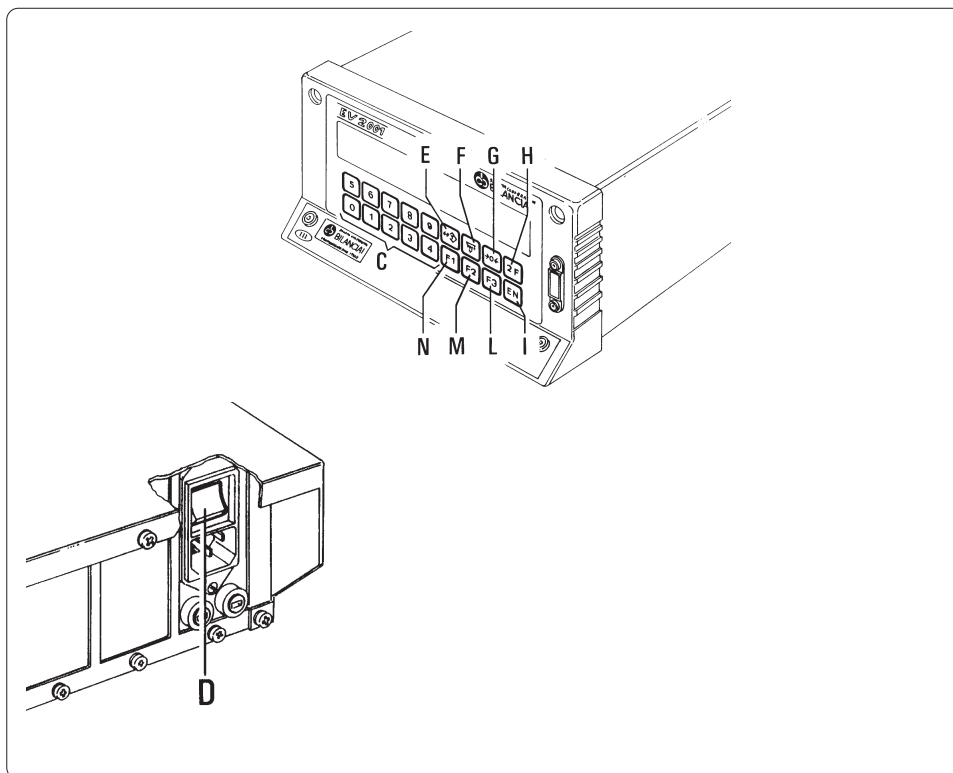


fig. 4.3.1 - keyboard and power switch

E)

*Enter key and tare deletion.*

Press to acquire the weight on the platform as tare value. For further details see par. 6.1.

F)







*Test execution key of the terminal.*

Press the key to activate the following check and control procedures of the terminal correct working, i.e.:

- check of every luminescent segment of the display.
- RAM and EPROM memory control.
- Control of the amplifications and conversions of the weighing platform signal.

The test does not alter the terminal operation and does not lose the value of the displayed weight. During the testing the operator will see all the display segments illuminated for three seconds and not illuminated for one second.



- G)**  *Weighing platform zero-setting key*  
Press the key to set the instrument to zero.  
For better information see par. 6.1.
- H)**  *Key for selecting the second function*  
The key is used for entering weight data.
- I)**  *“Enter” or confirmation key.*  
Press to confirm the operation.
- L)**  *Display key for entered tare.*  
Press the key to display the entered tare value at any time. This value will be displayed for four seconds, then the display will show the value of the weight on the weighing platform.
- M)**  *Transmission request key.*  
Press the key to activate the input of a data string in the format and with the protocol addressed to the selected serial output (see par. 6.1)
- N)**  *Key for code display and/or entering*  
Press the key to enter or to display at any time a six-digit code number to combine with the type of product to be weighed (see par. 6.1).
- C)** *Keys for entering the numeric values.*  
Press the keys from 0 to 9 to enter the values from the keyboard (for example the tare).
- D)** *Terminal power switch.*  
pos.=0, the terminal is switched off  
pos.= I, the terminal is supplied by the mains current.



## 5 Switching on/off

### 5.1 Terminal switching on



#### ATTENTION!!



Before switching on the terminal, check:

- the voltage and frequency correspondence with those required by the terminal;
- the presence and the integrity of the protecting crankcases;
- the presence of warning and danger plates.

If this is not the case, contact the maintenance operator or directly our Assistance Service.

- 1 - Press the switch "1" in position "I" (fig. 5.1.1).



#### DANGER!!



"EV 2001 stainless steel version" terminals are always power supplied; then, for the switching on, press the switch installed upstream of the power supply line.

- 2 - Wait until the initial check test (lamp-test) of the proper working of all the segments of display "2" is completed.
- 3 - Wait for the instruction "lock" (only for instruments subject to metrological control).

- 4 - When the operations are completed, if the display shows a value other than zero, press the key "3" to set the reading to zero.

If, pressing the key, the value is not set to zero:

- check that the platform is really unloaded, switch the instrument off and repeat the switching on procedure;
- if the trouble persists, contact the Assistance Service.

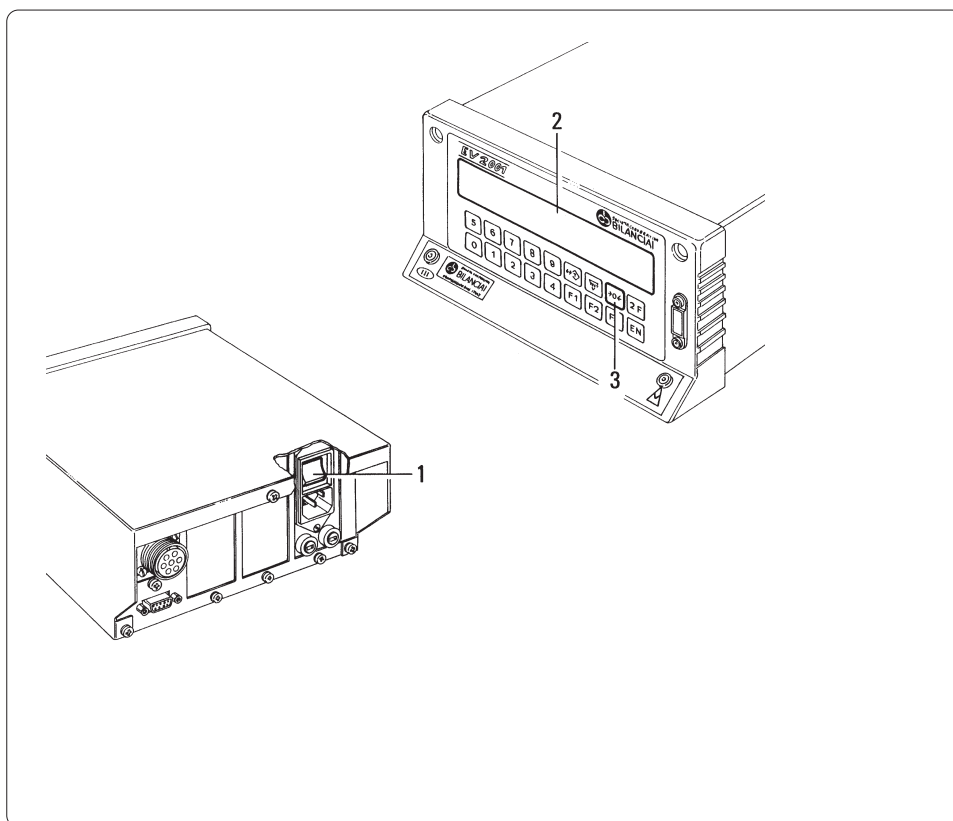


fig. 5.1.1

## 5.2 Terminal switching off

- 1 - Press the key "1" fig. 5.1.1 on "O" to interrupt the power supply to the terminal and any other operation.  
In the stainless steel versions act on the bipolar switch.



### CAUTION!!



If there is a connection to computer or other remote unit, before switching off the terminal make sure no data transmission is in progress, in order not to lose the data transmitted to the units connected to the terminal or not to acquire wrong data from them. Therefore you have to wait until the transmission is completed and then to transmit these units the connection interruption.

## 6 How to use the terminal

### 6.1 Weighing operations


The most common weighing and terminal use operations are given below.



Note: \_\_\_\_\_

during all data entering operations described in the following paragraphs **DO NOT WAIT MORE THAN 4 SECONDS** between the pressing of two keys, because in this case the weighing terminal would exit the entering procedure to display the weight again.


#### 6.1.1 Weight zero-setting


Pressing the key  causes the weight zero-setting with an accuracy of one fourth of the minimum instrument interval. This zero-setting must meet the following requirements:

- the weight must be stable;
- the weighing platform must be unloaded;
- no tare must have been entered.



6.1.2  
*Setting a tare for acquisition*

Position the tare that must be acquired on the weighing platform and wait until the value is stable.


Press the key  to acquire the tare value.

The terminal display is set to zero and the symbols  and "NET" blink showing the operator that the tare value has been acquired.



6.1.3  
*Setting a tare for entering (from the keyboard)*


Enter the tare weight by the numeric keys and press the key  to display the net weight automatically. The symbols  and "NET" will light up indicating that the tare has been entered manually from the keyboard. The tare value must be entered with the same interval of the instrument. After entering the tare the displayed weight will always be the "net" weight.

6.1.4  
*Tare display*


To check the value of the entered tare at any time, press the key . This value will be displayed for 4 seconds, then the weight value will appear.

6.1.5  
*Tare deletion*

Check that the display shows either symbol   on, indicating that a tare has been entered.

Press the key  to delete the tare and to return to the gross weight display.

### 6.1.6 Tare self-reset while unloading

If the terminal is configured with "locked tare", this value can only be deleted by pressing the key .

This condition is called "locked tare reset", as to obtain this reset the operator must intervene by pressing that key.

It is possible to achieve the automatic tare reset whenever the instrument is unloaded and the weight returns to "0" (zero).

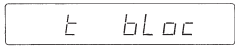



This condition is called "unlocked tare reset".

To obtain this second operation mode, act as follows:



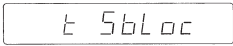



Note:

remember that you must not wait longer than four seconds between the pressing of two keys, otherwise the terminal exits from the started procedure and displays the weight again.

Operation	Displayed value
Press the key <b>F3</b> twice on end. The display signals that the terminal operates in "locked tare reset".	
In four seconds press the key  and the display shows the signal of terminal operation in "unlocked tare reset".	
After four seconds the weight value reappears.	

From now on, whenever the instrument is unloaded and the terminal is reset, any stored tare value is also cancelled.

To return to the operation of "locked tare reset", follow the procedure below:

Operation	Displayed value
Press the key <b>F3</b> twice on end and the display signals the terminal operation in "unlocked tare reset".	
After that, immediately press the key  and the display communicates that now it is working in "locked tare reset".	  
After four seconds the weight value reappears.	



6.1.7  
*Pre-setting or  
set-point entering*

Press the key **2°F** and the display shows the message "SEL".

Then select one of the keys from **1** to **4** corresponding to the set-point to be changed; the display shows the value that you can modify.

Digit the new value on the numeric keyboard and press the key **EN** to confirm the acquisition of the value. This must be included within "zero" and the maximum capacity.

During weighing, when the value of entered weight is reached, the terminal activates an output that can be used for controlling - for instance - the opening and closing of a solenoid valve.

The output will remain activated until the weight becomes lower than the fixed value.



Note: \_\_\_\_\_  
the pre-setting management requires the installation of the optional card "4 input 4 output" (see paragraph 7.6).  
\_\_\_\_\_

6.1.8  
*Code setting*

"EV 2001" terminal gives the possibility to set and to display a six-digit code at any time for many uses.

Press the key **F1** to display the entered code. Digit the new code by the keyboard to change the code number and confirm pressing the key **EN**. This code appears in the transmission protocol "net+code".

6.1.9  
*Transmission request*

Press the key **F2** to send a data string in the format and in the protocol set on the selected serial output.



The string is sent if:

- the terminal is set up for the transmission on request;
- the transmission protocol "RS485" has not been selected.





## 6.2 Examples of use

Some typical examples of standard use of the terminal are given below..



### 6.2.1 Gross weight reading

- 1 - With the weighing platform unloaded check that the terminal display shows the value 0 (zero). Otherwise press the zero-setting key  of the terminal.
- 2 - Lay the object to be weighed on the weighing platform.
- 3 - Wait until the symbol  (stable weight) is displayed and read the gross weight value.

### 6.2.2 Net weight reading

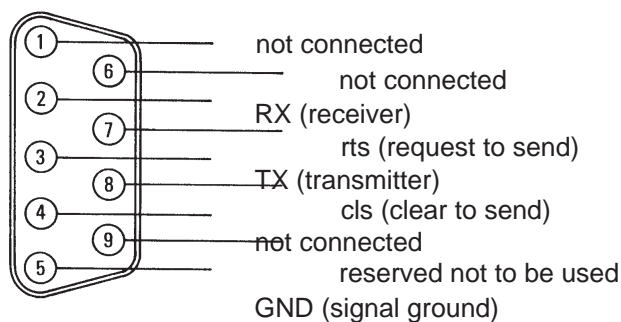
- 1 - With the weighing platform unloaded check that the terminal display shows the value 0 (zero). Otherwise press the zero-setting key .
- 2 - Lay the tare on the weighing platform (e.g. empty box, pallet, etc...)
- 3 - Press the tare key . The value will be acquired and the display is set to zero.
- 4 - Load the goods in the container or on the pallet.
- 5 - Read the net weight value in the display.  
  
It is possible to read the stored tare value by pressing the key  and the tare will be displayed for 4 seconds.
- 6 - Press the key  to display the gross weight. In this way the gross weight is displayed, but the tare value previously entered is deleted.

### 6.2.3 Net weight reading with known tare

- 1 - With the weighing instrument unloaded, check that the displayed value is 0 (zero); otherwise press the zero-setting key .
- 2 - Digit the value of the known weight of the container (tare).
- 3 - Press the key  for tare value acquisition.
- 4 - Lay the container with the goods on the weighing platform.
- 5 - Read the net weight value displayed.

### 6.3 Cyclic serial trans- missions and upon request

“EV 2001” standard version terminal is provided with a serial output in the 9-pole connector.



9-pole box female connector  
(placed on the terminal)

Output for the serial connection  
to the various devices

fig. 3.12.1 - standard serial output connector



#### CAUTION!!



For this connection use a high quality serial cable following the recommendations of the transmission standard “RS232”.

In particular, the cable must not be longer than 15 metres and the screening braid must be connected to the terminal frame.



#### CAUTION!!



The conditions of maximum use are:

$V_{in\ Max.} = \pm 12V$  only referred to pole 5 “GND”

## 6.3.1

*Bilancial standard  
transmission protocol*

The transmitted weight is net.

Bilancial standard protocol has to send a data string for 10 times a second, in case of unstable weight, and 5 times a second in case of stable weight. The string is made as follows:

1° character	\$ (24H) string beginning character
2° character	s=stability s=0 stable weight s=1 unstable weight s=3 weight not valid (negative or overloaded)
3° character	ten thousand weight
4° character	thousand weight
5° character	hundred weight
6° character	ten weight
7° character	weight unit
8° character	CR (0DH) string end character.

Serialization:

1 start bit  
7 data bits  
even parity  
2 stop bits  
speed 4800



Note: \_\_\_\_\_  
if the maximum capacity of the instrument is a six-digit number, the less important digit is eliminated.



Note: \_\_\_\_\_  
the dot next to the numbers indicates an ordinal number.

6.3.2  
*Transmission protocol  
net+code*

The transmitted weight is net+code.

The net+code protocol has to send a data string for 10 times a second, in case of unstable weight, and 5 times a second in case of stable weight. The string is made as follows:

1° character	\$ (24H) string beginning character
2° character	s=stability s=0 stable weight s=1 unstable weight s=3 weight not valid (negative or overloaded)
3° character	ten thousand weight
4° character	thousand weight
5° character	hundred weight
6° character	ten weight
7° character	weight unit
8° character	space
9° character	1° code digit
10° character	2° code digit
11° character	3° code digit
12° character	4° code digit
13° character	5° code digit
14° character	6° code digit
15° character	CR (0DH) string end character

Serialization:

1 start bit  
7 data bits  
even parity  
2 stop bits  
speed 4800



Note: \_\_\_\_\_  
if the maximum capacity of the instrument is a six-digit number, the less important digit is eliminated.  
\_\_\_\_\_

6.3.3  
"AN" format  
transmission protocol

The AN protocol has to send a data string for 10 times a second, in case of unstable weight, and 5 times a second in case of stable weight. The string is made as follows:

1° character	STX (02H) string beginning character
2° character	} net weight with sign and possible decimal point
3° character	
4° character	
5° character	
6° character	
7° character	
8° character	
9° character	
10° character	
11° character	} tare with possible decimal point
12° character	
13° character	
14° character	
15° character	
16° character	
17° character	
18° character	
19° character	
20° character	space
21° character	S1
22° character	S2
23° character	CR(0DH)
24° character	LF (0AH) last character

"S1" is an "ASCII" character which must be translated in hexadecimal.

The bits identify the state of the weighing platform.

bit 0="1" in range

bit 1="1" stable weight

bit 2="1" center of zero

bit 3="1" net weight displayed

Example:

the "ASCII" "0AH" input character is written as hexadecimal digit A:

1	0	1	0
<b>bit3</b>	<b>bit2</b>	<b>bit1</b>	<b>bit0</b>

bit1 = "1" indicates the stable weight

bit3 = "1" indicates the net weight displayed

“S2” is an “ASCII” character which must be translated in hexadecimal and read “bit by bit” with the following meaning:

bit 0=“0” not used

bit 1=“0” not used

bit 2=“0” not used

bit 3=“1” print request: a print key has been pressed or the input no. 3 is active.

Serialization:

1 start bit

7 data bit

even parity

2 stop bits

speed 4800

#### 6.3.4 “ACK-NAK” transmission protocol

The transmitted string is the same as that of the Bilanciai standard protocol. It is sent only upon request by the user through:

- transmission request key
- activation of input no. 3
- ENQ (05H) enquiry control

After the weight transmission the instrument behaves as follows:

- if it receives the “ACK” (06H) character, it waits for a new request
- if it receives the “NAK” (15H) character, it transmits the string again because the previous transmission was not successful.

## 6.4 Controls on serial line (remote controls)

“EV 2001” standard terminal is provided with a serial output available on the 9-pole connector (see par. 3.12). It is possible to communicate with the instrument through a serial terminal (PC) using the controls listed below.

The positions of the single “ASCII” characters are indicated in every string.

The control characters are put in brackets (for example: <CR>)

If necessary, the hexadecimal value is indicated (e.g.: 0DH)

The connection must be executed with a standard serial cable “RS232” and it is also necessary to create a transmission and reception programme which observes the communication protocol set in “EV 2001”.

If the syntax of the instructions sent by the communication programme is not correct, the instrument sends the following string to the remote unit:

?	?	<CR>	<LF>
1°	2°	3°	4°

In this case repeat the instruction.

If the instruction is accepted and if a data item has to be transmitted, this requirement is met; otherwise the instrument simply answers with the following string:

O	K	<CR>	<LF>
1°	2°	3°	4°



### WARNING



The remote controls are not executed if the cyclic serial transmission is in progress; in this case it must be interrupted by the “EX” control before giving other remote controls.

#### 6.4.1 RS485

If the transmission type “RS485” has been selected, at the end of each remote control, before <CR> there must be two characters specifying the number of the instrument the master unit is going to poll. With the “RS 485” transmission type the continuous transmissions are disabled. Only the remote controls are used.

X	B	O	1	<CR>
1°	2°	3°	4°	5°



## 6.5 Control list



Note: \_\_\_\_\_  
in the answers of "EV 2001" "u m" means measure unit (**kg, g, lb, t**).

### *- Interruption of the cyclic transmission*

E	X	<CR>
1°	2°	3°

This control is not available with the protocol "RS485" where the transmission is always and exclusively on request.

### *Re-activation of the cyclic transmission*

S	X	<CR>
1°	2°	3°

If positive the terminal begins to transmit cyclically (about every 100 ms) in the previously selected format.

This control is not available with the protocol "RS485" where the transmission is always and exclusively on request.

### *Gross weight request*

X	B	<CR>
1°	2°	3°

If positive the terminal answers with the following string:

<space>	0	0	0	0	,	0	0	0	<space>	u	m	<space>	B	<CR>	<LF>
1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°

### *Net weight transmission request*

X	N	<CR>
1°	2°	3°

If positive the terminal answers with the following string:

<space>	0	0	0	0	,	0	0	0	<space>	u	m	<space>	N	T	<CR>	<LF>
1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°

### *Tare transmission request*

X	T	<CR>
1°	2°	3°

If positive, the terminal answers with the following string:

<space>	0	0	0	0	,	0	0	0	<space>	u	m	<space>	T	E	<CR>	<LF>
1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°

The 15° character has the value:

E = if the tare has been entered manually

R = if the tare has been acquired

**- Instrument state transmission request**

**X            S            <CR>**

**1°           2°           3°**

If positive, the terminal answers with the following string:

**S1           S2           <CR>           <LF>**

**1°           2°           3°           4°**

"S1" is an "ASCII " character which must be translated in hexadecimal.

The bits identify the state of the weighing platform.

bit 0="1" in range

bit 1="1" stable weight

bit 2="1" center of zero

bit 3="1" net weight displayed

Example:

the "ASCII" "0AH" input character is written as hexadecimal digit A:

**1           0           1           0**

**bit3       bit2       bit1       bit0**

bit1 = "1" indicates the stable weight

bit3 = "1" indicates the net weight displayed

"S2" is an "ASCII" character that must be translated in hexadecimal and read "bit by bit" with the following meaning:

bit 0="0" not used

bit 1="0" not used

bit 2="0" not used

bit 3="1" print request: a print key has been pressed or the input no. 3 is active.

**- Instrument zero-setting**

**A            Z            <CR>**

**1°           2°           3°**

The transmission of this control has the same effect as the pressing of the instrument zero-setting key. The negative answer indicates that there are no instrument zero-setting conditions.

**- Tare acquisition**

**A            T            <CR>**

**1°           2°           3°**

The transmission of this control has the same effect as the pressing of the tare enter key for acquisition. The negative answer indicates unstable or non-valid weight.

**- Enter a tare**

n	n	n	n	n	n	n	A	T	<CR>
1°	2°	3°	4°	5°	6°	7°	8°	10°	11°

The transmission of this control has the same effect as the pressing of the tare set key for entering. The "AT" control must be preceded by a weight expressed with max. 7 characters.

Do not use the decimal point but only set the digits with reference to their position on the display.

**- Deletion of a previously entered tare**

C	T	<CR>
1°	2°	3°

The transmission of this control has the same effect as the pressing of the tare deletion key.

**- Request of set-point value transmission**

S	P	n	<CR>
1°	2°	3°	4°

If the instrument receives this instruction, it transmits the value programmed in the set-point in the following format:

<space> 0 0 0 0 , 0 0 0 <space> u m <space> S n <CR> <LF>  
1° 2° 3° 4° 5° 6° 7° 8° 9° 10° 11° 12° 13° 14° 15° 16° 17°

where "n" is the pre-setting to which the transmitted weight is referred (n=1,2,3,4).

**- Set-point value acquisition**

y	y	y	y	y	y	y	S	P	n	<CR>
1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°

If the instrument receives this instruction, the set-point "n" will have the value "yyyyyy" (n=1,2, 3,4).

**- Keyboard lock**

L	K	<CR>
1°	2°	3°

The main purpose of this remote control is to prevent unskilled personnel from entering data which could impair the correct operation of the instrument (e.g.: set-point programming, tare setting, etc...).

**Keyboard unlock**

U	K	<CR>
1°	2°	3°

It cancels the LK instruction.

**- Keyboard and display lock**

L	D	<CR>
---	---	------

1°	2°	3°
----	----	----

The message "DISPLOCK" is displayed instead of the weight and all keys are disabled.

**- Keyboard and display unlock**

U	D	<CR>
---	---	------


1°	2°	3°
----	----	----

The whole keyboard and the display are restored.

**- Request of instrument test execution**

T	S	<CR>
---	---	------

1°	2°	3°
----	----	----

The instrument performs an inner test as if the key  had been pressed, thus making an inner calibration check.

This instruction is executed both with errors and cyclic transmissions in progress.

## 7 Options

### 7.1 Option connection

On the "EV 2001" terminal it is possible to connect the options listed below. To connect the options it is necessary to connect to the connectors of the suitable slot (see fig. 7.1.1)

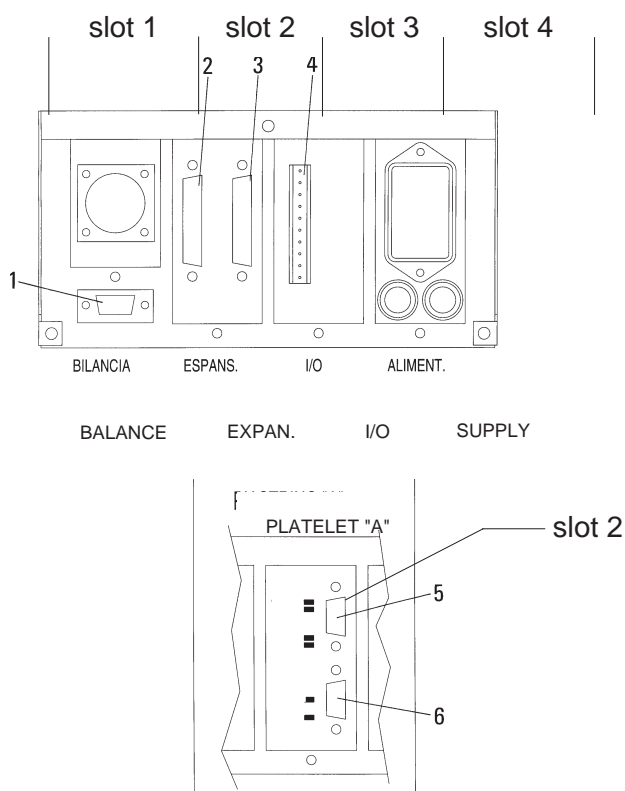


fig. 7.1.1 - connection to the slot connectors

slot no.	connector	
1	1	RS 232 standard
2	3	BCD calc. (cod. 402981)
2	2	BCD -5V (cod 403161) BCD - 24 V surge (cod. 403162) BCD - 24V sink (cod. 403163)
3	4	I/O (cod. 460635)
2	5	Analog output+RS485/RS422 (cod. 403001)
2	6	Serial output "current loop " or RS232 (cod. 403001)

**CAUTION!!**

Connect the peripheral devices by means of screened cables for the connections to the 9 and 25-pin connectors, connecting the screen both from the EV2001 and from the device outside the metal case of the connector (do not connect the screen braid to any pin of the box connectors).

## 7.2

### 5V TTL parallel BCD weight output

On the 25-pole box connector (fig. 7.2.1) we can detect the BCD signals of the weight as it is shown by the instrument display, i.e. the interval number per the interval value.

**CAUTION!!**

Max. use conditions

$$V_{\text{out Max}} = +5V$$

$$I_{\text{out Max}} = \pm 10 \text{ mA}$$

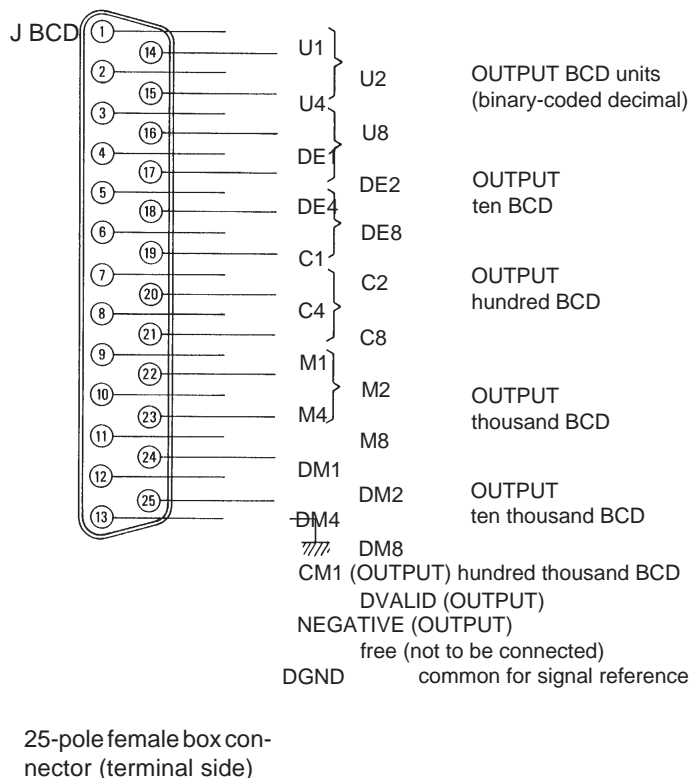


fig. 7.2.1 5V TTL parallel BCD weight output connector

where:

DVALID = (OUTPUT) can have the following meaning:

0: the data will be valid after 10 ms

1: the data will remain valid for at least further 10 ms

NEGATIVE = (OUTPUT). It has the value "0" (zero) when the weight becomes negative.

The example of a connection between the EV2001 terminal and an external device in BCD code with 5 V is given below.

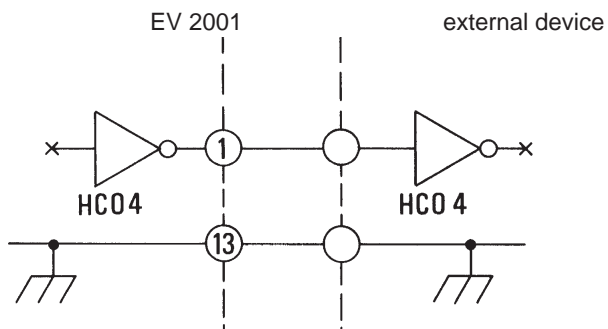


fig. 7.2.2 - example of connection between the terminal and the external device in BCD 5V

### 7.3 24 V parallel BCD weight output source current (common positive)

On the 25-pole box connector (fig. 7.3.1) we can detect the BCD signals of the weight as it is shown by the instrument display, i.e. the interval number per the interval value.



#### CAUTION!!

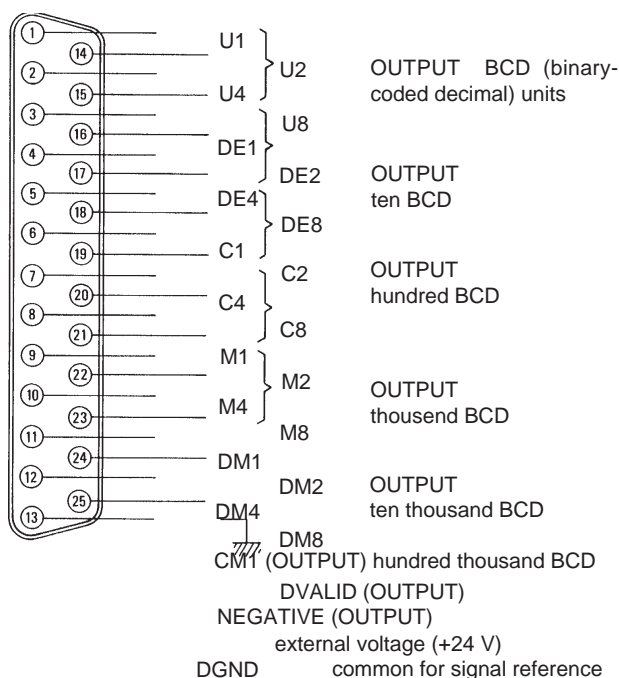


The max. use conditions for this output are as follows:

$$V_{\text{out max.}} = +24\text{V}$$

$$I_{\text{out max.}} = +10\text{ mA}$$

J BCD



25-pole female box connector  
(terminal side)

fig. 7.3.1 - source current 24 V BCD weight output connector

where:

DVALID = (OUTPUT) can have the following values:

0 (open transistor): the data will be valid after 10 ms

1 (closed transistor): the data will remain valid for at least further 10 ms

NEGATIVE = (OUTPUT) has the value "0" (zero) when the weight becomes negative.

The example of a connection between the "EV2001" terminal and an external device in "BCD" 24 V "source current" is given below.



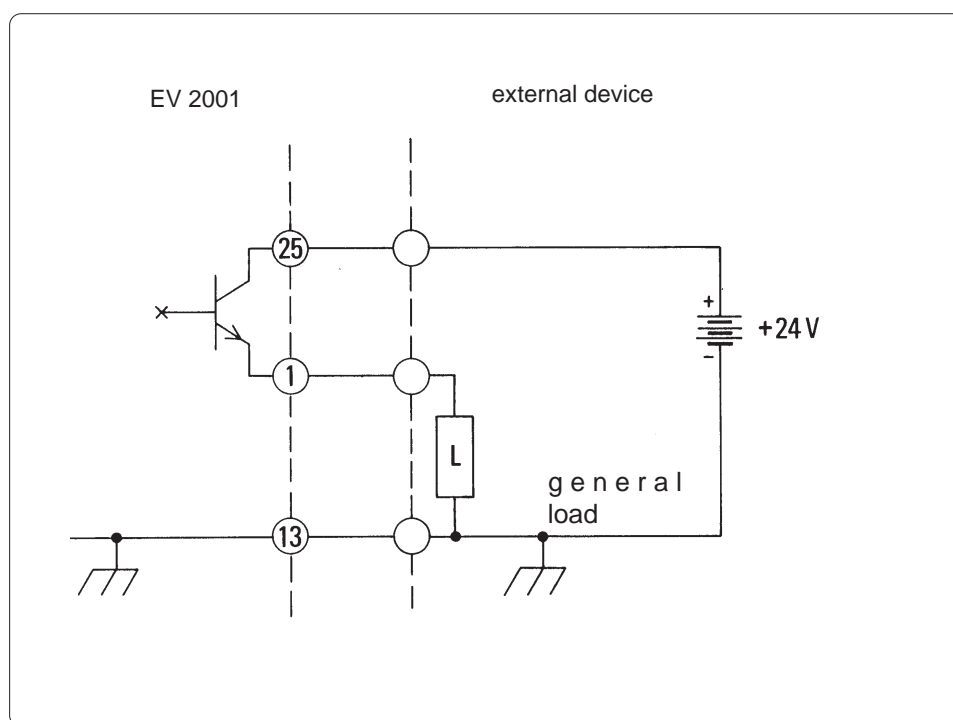


fig. 7.3.2 - example of 24V source current connection

#### 7.4 24 V parallel BCD weight output “sink current” (common negative)

On the 25-pole box connector (fig. 7.4.1) we can detect the BCD signals of the weight as it is shown by the instrument display, i.e. the interval number per the interval value.



#### CAUTION!!



The max. use conditions for this output are as follows:

$$V_{\text{out max}} = +24\text{V}$$

$$I_{\text{out max.}} = -10\text{ mA}$$

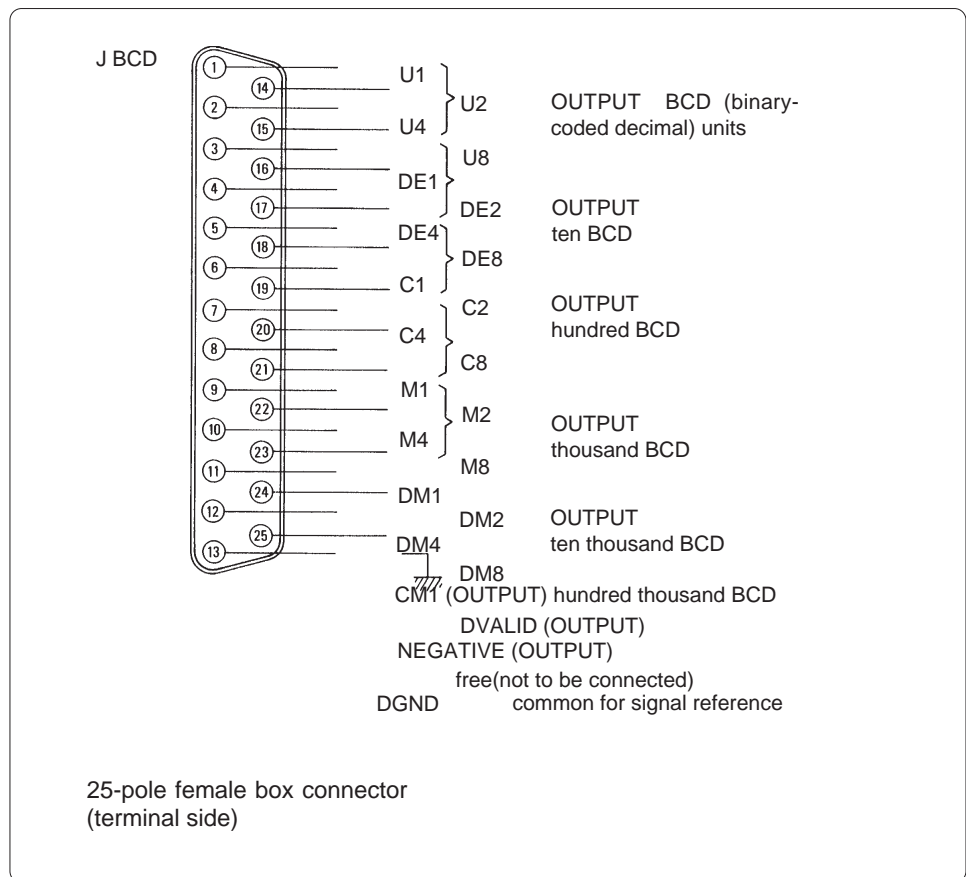


fig. 7.4.1 - sink current 24 V parallel BCD weight output connector

Where:

DVALID = (OUTPUT) can have the following values:

0 (open transistor): the data will be valid after 10 ms.

1 (closed transistor): the data will remain valid for at least further 10 ms.

NEGATIVE = (OUTPUT) which has the value "0" (zero) when the weight becomes negative.

The example of a connection between the "EV2001" terminal and an external device in "BCD" language, 24V "sink current" is given below.

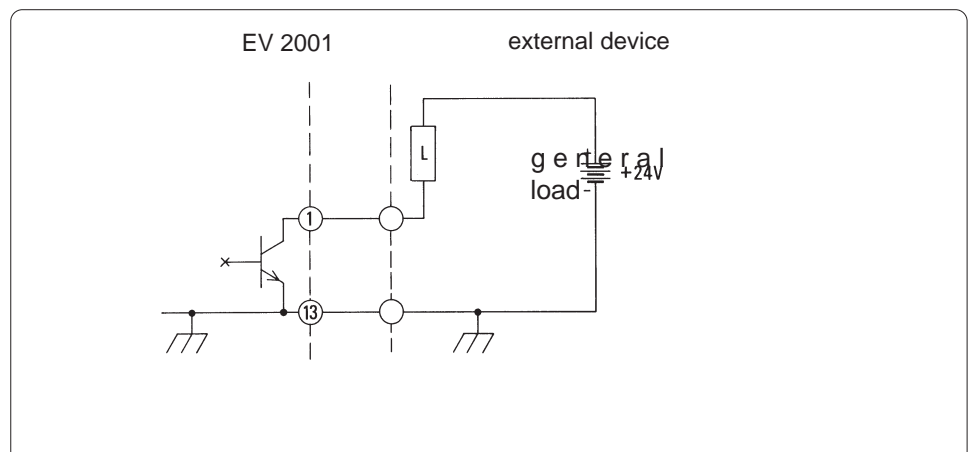


fig. 7.4.2 - BCD 24V sink current connection example

## 7.5 “BCD” weight output to computer

On the 25-pole box connector (fig. 7.5.1) the following BCD signals of weight representation in intervals can be detected, not considering the interval value.



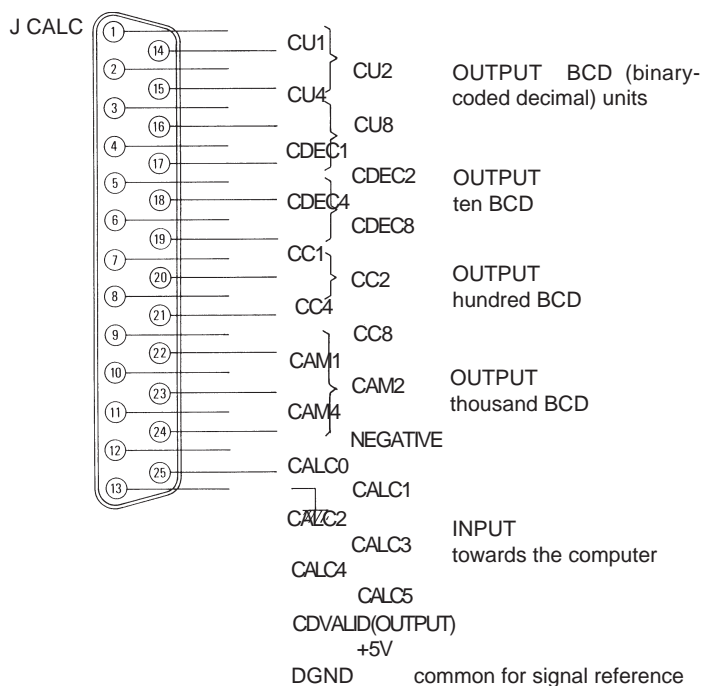
### CAUTION!!



The max. use conditions for this output type are:

$$V_{\text{out max}} = +5V$$

$$I_{\text{out max}} = \pm 10 \text{ mA}$$



25-pole female box connector  
(terminal side)

fig. 7.5.1 - connector for BCD weight output to computer

Where:

NEGATIVE = negative (OUTPUT) which has the value “0” (zero) if the weight becomes negative.

CDVALID = (OUTPUT) which can have the following values:

0: the data will be valid after 10 ms

1: the data will remain valid for at least 10 ms

+5V= available only for Coop Bilanciai. The jumper BR1 is only for the first EV2001 connected to IDC.

The weight value, in “BCD” signals, is required through an external device (PC, PLC, etc.) by controlling the lines “CALC 0.....CALC 5” following the code as in table 7.8.1:

CALC5	CALC4	CALC3	CALC2	CALC1	CALC0	balancenno.=instrumentno.**
0	0	0	0	0	0	1
0	0	0	0	0	1	2
0	0	0	0	1	0	3
.	.	.	.	.	.	.
1	1	1	1	1	0	63
1	1	1	1	1	1	64*

\* always enabled if the calling device is not present

\*\* set during installation by authorized personnel of Coop Bilanciai

tab. 7.5.2

If an address line is not connected, it automatically positions at high logic level "1" because of inner "pull-up" resistances.

If "EV2001" is selected, the data item is present, otherwise the lines are put in "high-impedance state".

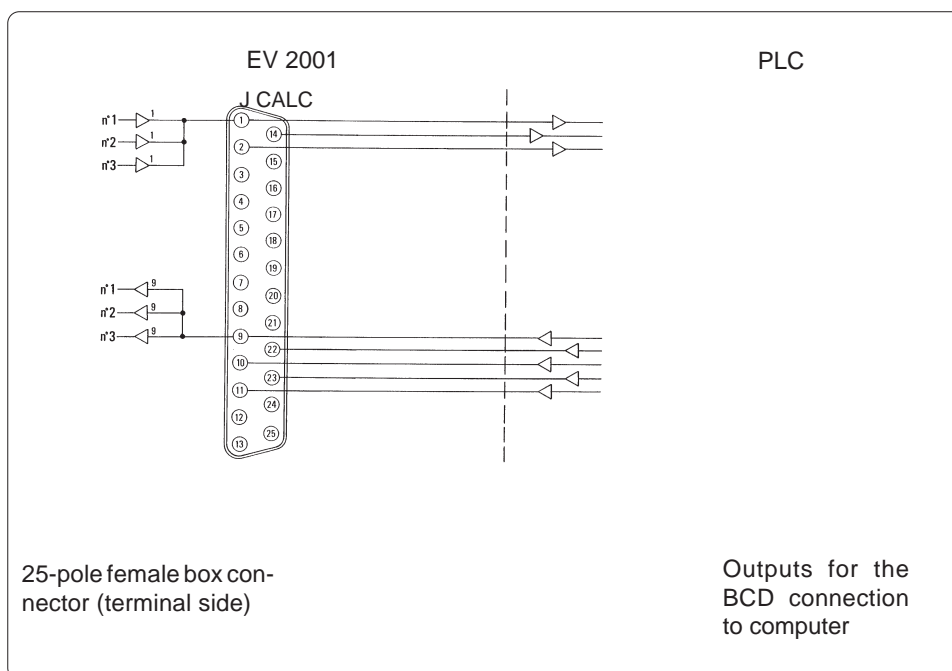


fig. 7.5.3 - connector to several terminals

When several terminals must be connected to a single external device, the connectors must be connected in parallel as in the following diagramme.

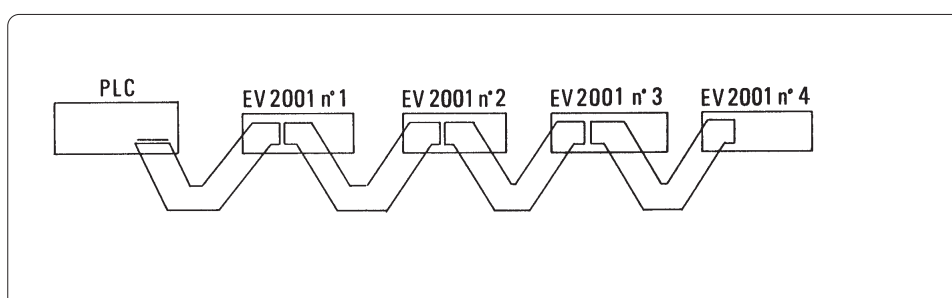


fig. 7.5.4 - example of the connection of several terminals to a single external device

## 7.6 4 input 4 output card

With the optional card we can have 4 output contacts (OUTPUT) in order to control external devices and 4 inputs (INPUT) to manage the same number of external contacts.


The basic version has the following meanings for the four input signals:

IN1: balance zero-setting. Same function as the key .

The function is activated when the input passes from OPEN to CLOSED

IN2: tare entering and deletion. Same function as the key .

The function is activated when the input passes from OPEN to CLOSED

IN3: data serial transmission. Same function as the key .

The function is activated when the input passes from OPEN to CLOSED

IN4: "set-points" disabling.

The function is activated with the input CLOSED.

The outputs are deactivated.

The four output signals, instead, are linked to the pre-settings of the terminal and always concern the net weight.

Example: let's suppose we have entered the values below following the instructions in par. 6.1.6.

PRES.1=1000

PRES.2=2000

PRES.3=3000

PRES.4=4000

If among the customizing parameters the pre-settings have been set in "O-C" mode (i.e. contact from open to closed), the output "1" will close when the increasing weight reaches the value 1000, the output "2" will close when the increasing weight reaches the value 2000, and so on.

On the contrary, if the pre-settings had been set in C-O mode (i.e. contact from closed to open), the output 1 would have opened after reaching the weight 1000, and so on.

As indicated also next to the terminal board, the clamps have the following meaning.

## 10 pin 4 input 4 output terminal board

Clamp	Description
1	common output
2	output 1
3	output 2
4	output 3
5	output 4
6	input1
7	input2
8	input 3
9	input4
10	common input

### 7.6.1 Output contacts

The contacts available in output are of the relay type.

With them the interface relays can be controlled towards the remote control switches.

If inductive loads are controlled, it is advisable to introduce circulation diodes or similar devices on them, in order not to overcharge the outputs with very high voltages.



### CAUTION!!



The max. use conditions of these output contacts are as follows:

In case of direct current (DC)

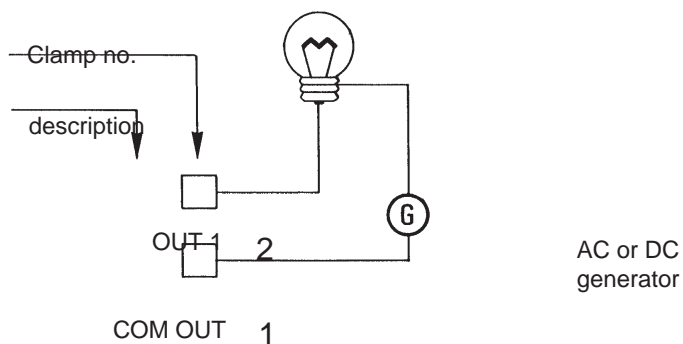
$$V_{\text{out max}} = +24\text{V}$$

$$I_{\text{out max.}} = 500 \text{ mA}$$

In case of alternated current (AC)

$$V_{\text{out max.}} = 110\text{V}$$

$$I_{\text{out max.}} = 200 \text{ mA}$$



(COM OUT = common for OUTPUTS)

fig. 7.6.1 - example of output contact connection

### 7.6.2 Input contacts

Moreover, the card allows 4 external inputs to be read.

When the circuit is closed the external devices must be able to absorb 10 mA (for example, they can be a closed relay contact).

When the circuit is open the external devices must not absorb more than 10  $\mu$ A (for example, they can be an open relay contact).



### CAUTION!!



The max. use conditions of these input contacts are as follows:

- direct current
- $V_{\text{out max.}} = +24V$

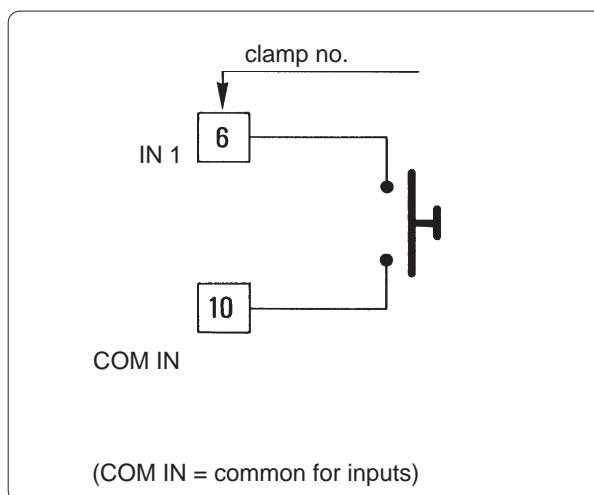


fig. 7.6.2

## 7.7 Second serial card and voltage or current analog outputs

With the optional card concerned you can have an optional serial output and two analog outputs.

The serial output can be programmed to have different string formats and different transmission types, whereas on the analog outputs it is possible to detect a voltage or current signal proportional to the indicated net weight value of the terminal.

The use and installation features for every output type are given below.

This card offers 4 serial output types and allows the format of the transmitted string to be customized, entering the setup parameters concerning the serial transmissions as required.



Note: \_\_\_\_\_

with the standard programme, when the second serial card (EIA 2) is selected, the standard serial card (EIA 1) is excluded from use.

7.7.1  
Second serial card  
(output "RS232")

On the connector "6" of fig. 7.1.1 there are the signals "Tx", "Rx", and "GND"



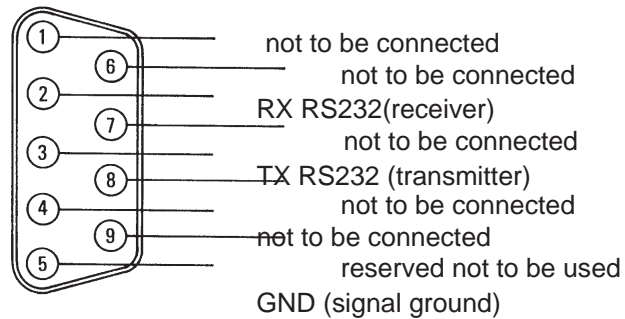
**CAUTION!!**



The max. use conditions are:

$V_{in\ Max.} = \pm 12V$  only referred to pole 5 "GND"

Screened cable; max. length = 15 m

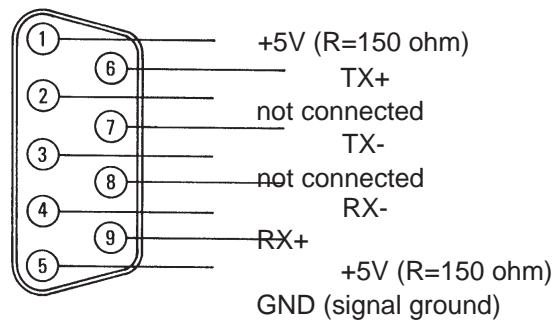


9-pole female box connector  
(on the terminal)

fig. 7.7.1 - RS232 output connector

7.7.2  
Second serial card  
(20mA "current loop"  
output)

The output on the connector "6" of fig. 7.1.1 manages the "Tx" and "Rx" lines and can be configured as to be used actively or passively.



9-pole female box connector  
(on the terminal)

fig. 7.7.2 - "20mA" current loop output connector



**CAUTION!!**

The max. use conditions are:

Direct current

For the output (transistor Tx+, Tx-)

$$V_{\text{out max}} = +24\text{V}$$

$$I_{\text{out max}} = 20 \text{ mA}$$

For the input (diode Rx+, RX-)

$$V_{\text{in max}} = +24\text{V}$$

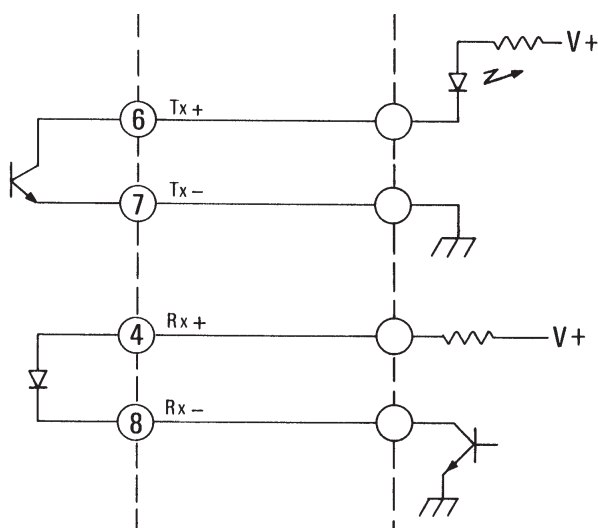
$$I_{\text{in max}} = 20 \text{ mA}$$

Screened cable

max. length = 500 m

Some examples of connections showing the location of the signals on the output connector are given below.

- Example of passive current loop connection.



EV 2001

external device

fig. 7.7.3 - passive current loop connection

- Example of active current loop connection

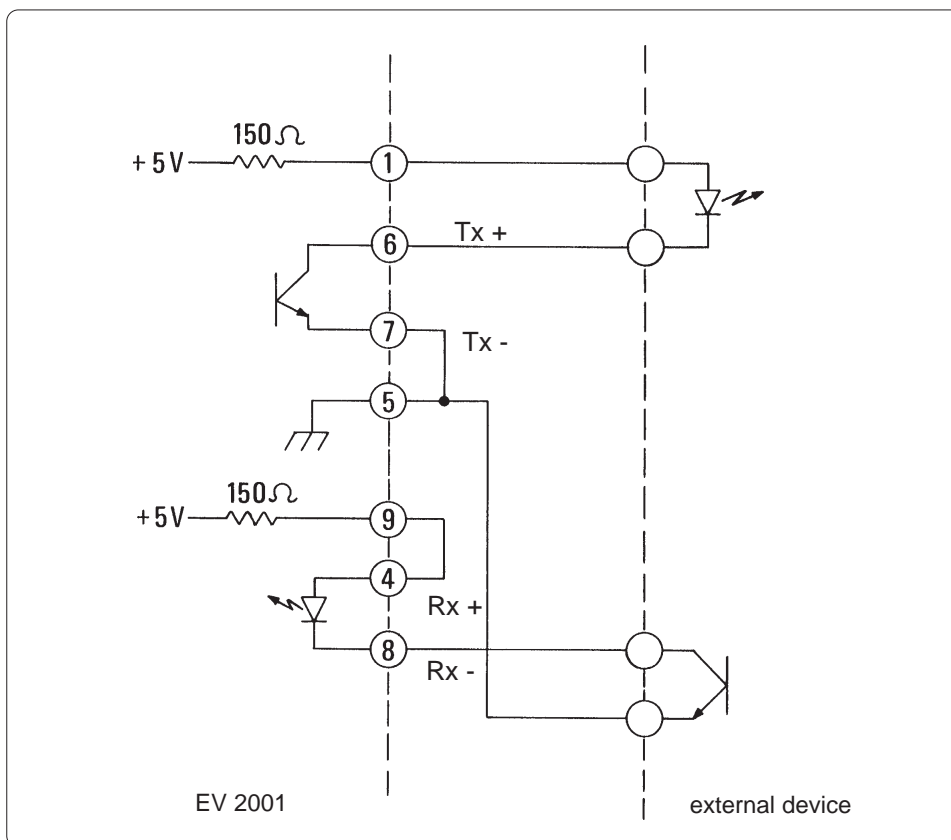


fig. 7.7.4 - example of active current loop connection

7.7.3  
Second serial card  
(output "RS422")

The output on connector "5" of fig. 7.1.1 manages the "Tx" and "Rx" lines.  
Up to 10 terminals can be connected to "Tx" line.



**CAUTION!!**



Max. use conditions

$V_{in\ max} = \pm 12V$  on the two-wire line

Line max. length = 1200 m

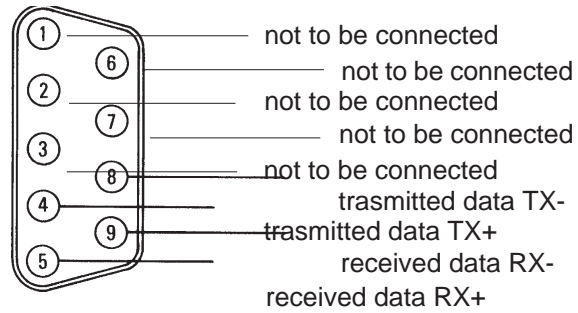
Connecting cable

Twisted screened double-wire (screened braid+aluminum bus bar+earth wire)

Characteristic impedance = 120 ohm

Capacity <100 pf/m

Min. conductor section = 0.22 mm<sup>2</sup> (24AWG)



9-pin female box connector (on the terminal)

Outputs for "RS422" and "RS485" serial connection

fig. 7.7.5 - RS422 serial output connector

#### 7.7.4 Second serial card (output "RS485")

It is possible to execute on the connector "5" of fig. 7.1.1 a multidrop connection with standard "RS485". The "second serial" option, in fact, also includes the standard control protocol "RS485".

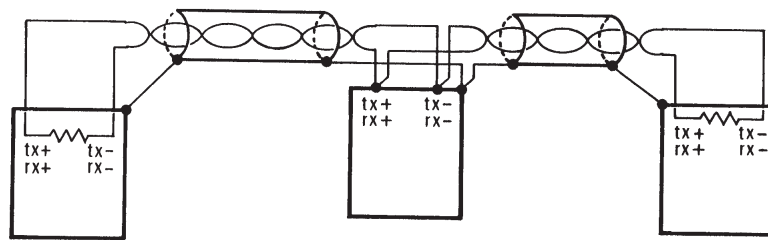


fig. 7.7.6 - Example of RS 485 serial output connection

For the connection to the connector use the "Y" connections supplied. "Y" connections link the pins Tx+ Rx+ and the pins Tx- Rx-.

**CAUTION!!***Max. use conditions*

$V_{in\ max.} = \pm 12V$  on the two-wire line

Max. device number (receiver+transmitter) = 32

Line max. length = 1200 m

*Connecting cable*

Twisted screened double-wire (screened braid+aluminum bus bar+earth wire)

Characteristic impedance = 120  $\Omega$

Capacity <100 pf/m

Min. conductor section = 0.22 mm<sup>2</sup> (24AWG)

*Termination resistance*

Termination resistance value = 220 ohm

In the devices by Bilanciai the termination resistance is in the termination connector of the line supplied with the terminal.

In a RS 485 line the termination resistance must be connected only to the first and the last device.

*Cable installation (see fig. 7.7.6)*

Connect the pins "RX+" and "TX+" on a conductor of the couple.

Connect the pins "RX-" and "TX-" on the other conductor of the couple.

Connect the screen to the chassis on each device through metal box connector caps or with an earth cable with external cable terminal.

The conductors that are not used must be connected to the screen.

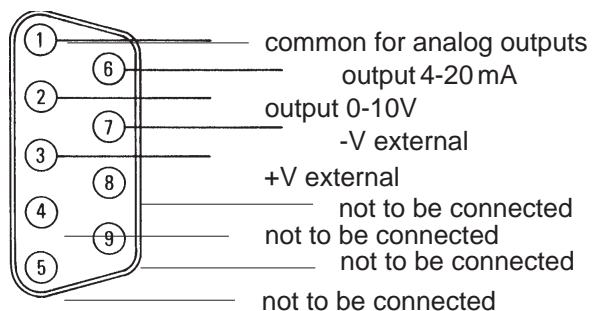
7.7.5  
Second serial card  
(analog outputs)

The feature of the analog outputs available on the connector "5" of fig. 7.1.1 is as follows:

- Outputs: 4-20 mA, 0-10V
- Resolution: 0.025% FS
- Accuracy: 0.5% FS (max. error from -10 °C to + 40 °C);  
0.2% FS (max. error from +10 °C to +30 °C)
- External load: 250 ohm not insulated current output (only on request)  
500 ohm insulated current output e  $V_{ext} = 30V$  (standard)
- External power supply:  $+24V < V_{ext} < +30V$   $I = 100\ mA$
- Screened cable with max. length 200 m
- Updating: 10 times a second



Note: \_\_\_\_\_  
the output is always proportional to the net weight.



9-pole female box connector  
(placed on the terminal)

Analog outputs

fig. 7.7.7 - analog output connector

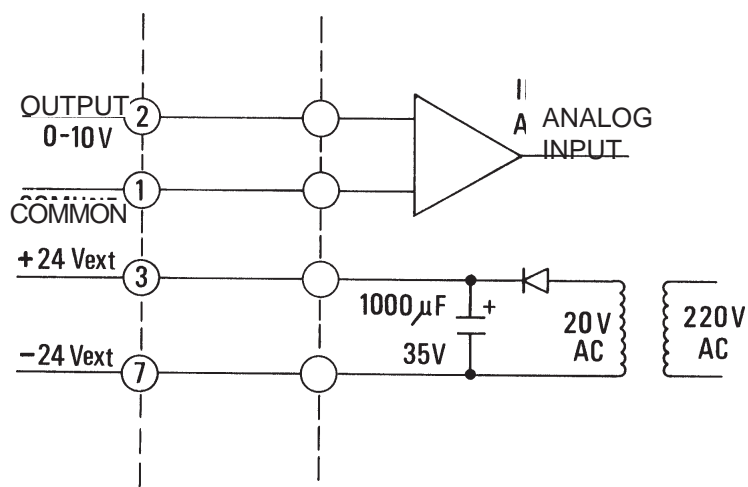


**CAUTION!!**



When connecting to these outputs, disconnect the negative pole of the external power supply from the common pin of the analog signal "pin1".

For this purpose, connect as in the example below with insulated voltage output.



EV 2001

external device

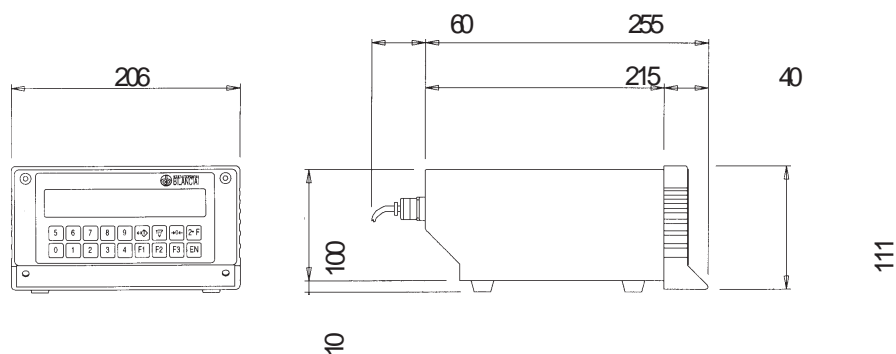
fig. 7.7.8 - example of analog output connection



## 8 Technical data

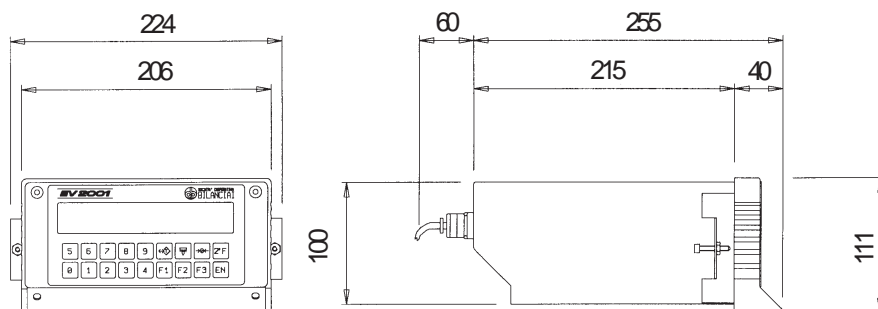
### 8.1 Overall dimensions and weight of the standard terminal

EV2001 "table-type version"



Terminal weight: **kg 3.6**

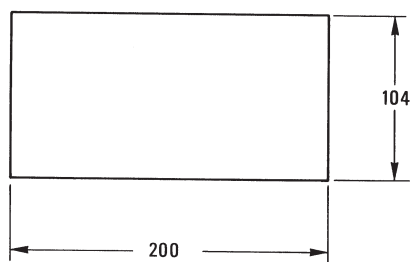
EV2001 "rack-type version"



Terminal weight: **kg 3.6**

Note: the dimensions are expressed in millimetres

fig. 8.1.1 - dimensions and weight of table-type and rack-type EV2001

*-Drilling dimension for the rack-type application of the terminal*

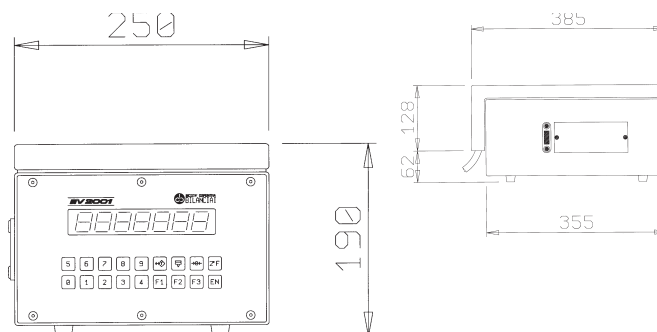
The dimensions are expressed in millimetres

fig. 8.1.2 - drilling for rack-type assembly

## 8.2

**Overall dimensions and weight of the stainless steel table-type EV2001 terminal**

### EV2001 stainless steel table-type



Terminal weight: **kg 10**

Note: the dimensions are expressed in millimetres

fig. 8.2.1 - dimensions and weight of stainless steel table-type EV2001



### 8.3 Technical data

#### *Cell input:*

-max. input signal	38mV
-sensitivity	1 microV/interval
-input impedance	100Mohm
-zero stability	<5 ppm/C°
-full scale stability	<5 ppm/C°
-cell power supply voltage	15V
-max. load to be applied	8 cells of 350 ohm
-sense circuit impedance	100 Kohm
-linearity error	<0.01%
-max. time between two sampling	100 ms
-conversion type	doubleslope with autozero synchronized with the mains
-inner resolution	120,000 counts

#### *Power supply:*

-voltage	220 V AC (+10% -15%) (special version 110 V AC + 10% - 15%)
-mains frequency	50/60 HZ
-max. power required	20W
-fuses	type F 0.5A 250V (fast) (220 V AC version) type F 1 A 250 V (fast) (special 110 VAC version)
-mains standard connector with earth pole	
-bipolar knife switch on both power supply lines	
-mains filter for eliminating EMI and RFI interferences on power supply and connections towards external devices.	

#### *Operation mode*

-working temperature:	-10.. +40 °C
-storage temperature:	-20.. +70 °C
-moisture:	85%notcondensedR.H.
-protection degree (stainless steel table-type EV2001):	IP55

## 8.4 Spare part list

<i>Code no.</i>	<i>Description</i>
402941	-CPU card (specify programme code)
460614	-power supply card (220 VAC version)
460630	-power supply card (special 110 VAC version)
402961	-load cell input card
402931	-main card
403161	-parallel BCD card with weight output 5V
403162	-parallel BCD card with common positive weight output 24V (source current)
403163	-parallel BCD card with common negative weight output 24V (sink current)
402981	-parallel BCD card to computer with orientable output 5V
460635	-INPUT OUTPUT relay card
403001	-additional serial output and analog output card
183481	-keyboard (painted version)
183502	-keyboard (stainless steel table-type version)
523602	-fuses F 0,5 A 250 V (220 VAC version)
523603	-fuses F 1 A 250 V (special 110 VAC version)
543629+ 545230	-9-pin male connector with cap to be welded
543613+ 545206	-25-pin male connector with cap to be welded
541516	-26-pin male cylindric connector for free encoder
541527	-7-pin male cylindric connector for free cell
548602	-mains cable (Italian 10 A plug)
548640	-plug mains cable for outside (plug type SCHUKO 10/16 A with double ground contact)
515828	-10 pin female terminal board for INPUT OUTPUT

## 9

# Maintenance

## 9.1 Introduction



### DANGER!!



Any cleaning and maintenance intervention must be executed with the terminal disconnected from the power supply line.

To guarantee constant and proper operation of the terminal and to prevent the guarantee from being null, any part replacement must be performed exclusively with original spare parts. Only technicians who have been expressly authorized by Coop Bilanciai have to care for the maintenance.



### WARNING



The data on the plate, the closing and certifying seals of the terminal must no way be modified or removed. If they are impaired or removed, the guarantee immediately falls off and the manufacturer is no longer responsible for any material and economic damage.

## 9.2 Checks performed in Coop Bilanciai works

The weighing system you purchased has been carefully tested and checked in our works in order to be properly set in every part (platform, electronic terminal) in accordance with the metric regulations.

### 9.3 Checks to be performed during installation

When installing the terminal, to check that it has not been damaged during transport, carefully perform the checks listed below:

- make sure the power supply voltage corresponds to that of the terminal.
- Check the presence and the integrity of the warning and danger plates and that containing all identification data of the instrument.
- Check the integrity of the front panel, the electronic component case and the rear connectors, as an uncorrect transport might have damaged them.
- Test the operation in order to check the integrity and the correct working of all inner components of the terminal and the integrity of the luminous segments of the display.

### 9.4 Periodical checks

Besides what above described, make regular checks on the basis of the indicated terms.

Before every working shift

- Check the perfect operation of the display segments pressing the key



Periodically

- Check the correct power supply.
- Check the integrity of all the keys of the terminal and of the connecting cables to the external devices.
- Check the correct weight display with known weights. The term varies depending on the use frequency of the weighing system.

### 9.5 How to perform the required checks

Besides the periodical checks the electronic terminal does not need particular maintenance operations; however, for cleaning the painted or plastic parts do use a wet cloth with a non-toxic, non-corrosive and non-abrasive cleaning agent.

## 9.6 How to replace the fuses

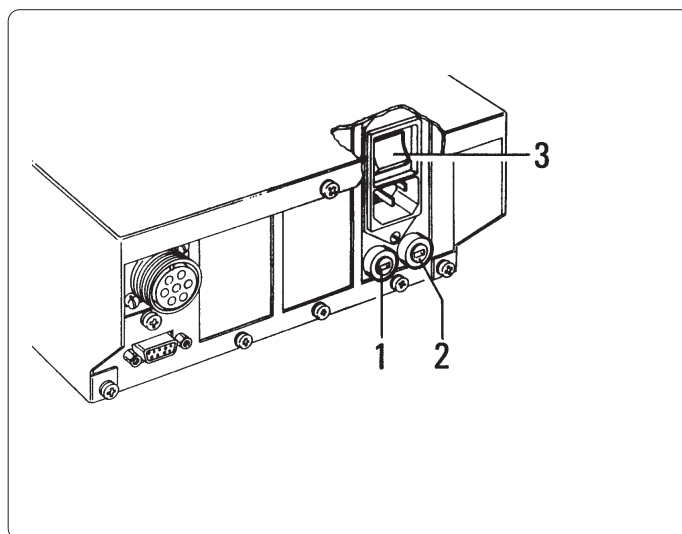


fig. 9.3.1 - fuses

**DANGER!!**

Disconnect the cable of the INPUT/OUTPUT card  
and the mains cable

When replacing a fuse, operate as follows:

- put the switch "3" in position "O" and disconnect the mains cable.
- By means of a screw-driver unscrew the fuse holder "1" or "2".
- Then remove the defective fuse and replace it with another one with the same value.
- Close the fuse holders, re-connect the mains cable and put the switch "3" in position "I".

**DANGER!!**

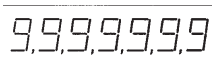
Only use fuses of the type: F 0.5A 250V (fast) (for 220 VAC version), F 1A 250 V (fast) (for special 110 VAC version).

If, when switching on the instrument, the fuses burn once more, stop replacing them and contact the After-Sales service for intervention.

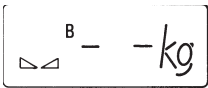
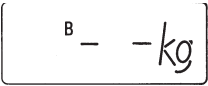



# 10 Troubleshooting

## 10.1 Temporary error message coding

Failure	Cause	Remedy
Temporary errors are due to a wrong weighing operation.		
 blinking	The balance is overload- ed	Reduce the weight to a lower value than the max. capacity, in or- der to take it to the weighing range.
- Display off:	No power supply	Check the correct power supply of the terminal  Check the fuse integ- rity  Check the mains ca- ble integrity  Check the correct connection of the de- vices outside the ter- minal.

## 10.2 Permanent error message coding

Failure	Cause	Remedy
	There is a load on the platform when switching on.	Remove the load from the platform before switching on the terminal again.
	Unstable platform when switching on	Check the presence of vibrations and air flows on the weighing platform.
	Keyboard display disabling parameter entered or remote control	Send the UD control
With permanent errors the display goes off and only an error code is displayed; switch the terminal off and on again to erase the error.		
<b>-01-</b> Converter failure	Balance connector disconnected or interrupted	Switch off the terminal and check the correct connection. If necessary, disconnect and re-connect the connector and switch on the terminal.
<b>-03-</b> Balance card calibration error	Conversion card failure	Contact the Assistance Service
<b>-nn-</b> Failure of inner devices	Conversion card failure	Wait until the terminal reaches the operating temperature and press the "test" key. If the error persists, contact the Assistance Service for the possible re-calibration or replacement of the conversion card.
	Voltage drop, lightning or inner failures	Switch the terminal off and on. If the error persists, contact the Assistance Service, exactly indicating the numeric code (n.nn) displayed and the use conditions of the terminal when the error occurs.



**10.3**  
**State of the**  
**options in the**  
**event of errors**

	Error 01	Error 02	Error 03	Error 04	Error 05
REMOTE CONTROLS	??	??	??	NO	NO
INPUT	NO	NO	NO	NO	NO
TRANSM.	NO	NO	NO	NO	NO
BCD CALC.	FFFFF neg=1	FFFFF neg=1	FFFFF neg=1	NO	NO
BCD AUX.	FFFFF neg=1	FFFFF neg=1	FFFFF neg=1	NO	NO
OUTPUT ACTIVE	NOT ACTIVE	NOT ACTIVE	NOT ACTIVE	NO	NO
ANALOG	0	0	0	NO	NO

Note: "NO" means "not managed".

"??" is the answer on the serial line.

"FFFFF" is the state of the hexadecimal outputs.



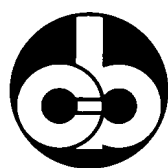
# 11 Glossary

## 11.1 Glossary of the non-common technical terms

<i>AUTOZERO</i>	Automatic reset function of the terminal under certain conditions.
<i>BAUD RATE</i>	Data transmission speed.
<i>BRAID</i>	Sheath on the wires for their protection against any electric or magnetic interferences.
<i>CENTER ZERO</i>	The weight partition is defined around zero within $\pm 1/4$ of interval.
<i>CONNECTOR</i>	Plug or socket for the terminal connection to the external equipment.
<i>DATA TRANSMISSION</i>	Data exchange between two or more devices through electric cables.
<i>DEFAULT</i>	Value given by the data memory if there is no entry from the keyboard. The data entered by the manufacturer are recalled as default value.
<i>DISPLAY</i>	Light screen in which the numeric data and the symbols as system outputs are displayed and can be read immediately.
<i>ENTERING</i>	Press the key you want to activate or the symbol to be displayed.

<i>FULL SCALE</i>	It is the maximum weighing capacity of the instrument, but it does not necessarily correspond to the max. structural capacity of the weighing platform.
<i>INTERFACE</i>	Group of circuits and channels connecting the terminal to the external devices.
<i>INTERVAL</i>	Minimum variation of the detectable weight.
<i>IP--</i>	Protection degree for cases and enclosures containing electric or electronic parts. It indicates the protection of electronic systems against the penetration of solid foreign matter (the first digit) and of liquids (the second digit).
<i>LAMP-TEST</i>	Test automatically executed when switching on or when pressing the "TEST" key to check the complete efficiency of the terminal.
<i>LUMINESCENT</i>	Able to give out light due to a chemical effect.
<i>MASK</i>	Graphic representation of the display - according to the manufacturer's provisions - of data, figures or symbols.
<i>MINIMUM WEIGHING</i>	It corresponds to the partition between 0 (zero) and a pre-determined number of intervals. In this area there is a high relative error.
<i>MULTIPLICATION</i>	Interval value (for example, a multiplication by 10; this means that the minimum interval is 10).
<i>NOVRAM</i>	Electronic device where the terminal configuration is stored. The data are kept even in case of power supply lack.
<i>OPERATOR</i>	Person who uses the system. He must have read this handbook and be fully acquainted with the operating controls.
<i>OPTION</i>	Whatever not included in the standard supply.
<i>PIN</i>	Foot, rheophore, pole to which the cable is connected.
<i>PLC</i>	Freely programmable electronic component inside which there is the machine control programme where it is installed.
<i>POLE</i>	See PIN.
<i>PRE-SETTING</i>	See "set point".
<i>RACK</i>	Wall installation for electronic instruments.

<i>RANGE</i>	See "weighing range".
<i>SCANNER</i>	Bar code reader.
<i>SCANNING</i>	Check of the data one by one.
<i>SENSE</i>	Control signal of the cell power supply.
<i>SERIALIZATION</i>	Data transmission character by character.
<i>SET-POINT</i>	Weight reference values included in the weighing range of the instrument and used in the next checks and operations.
<i>SLOT</i>	Position or location of the card inside the terminal.
<i>STRING</i>	Sequence of alpha-numeric characters which are exchanged between the terminal and the external device during the serial transmission.
<i>TRANSMISSION PROTOCOL</i>	Data coding and sorting system in a transmission towards an external device.
<i>WEIGHING PLATFORM</i>	Part of the supply for laying the goods to be weighed.
<i>WEIGHING RANGE</i>	Weighing range within the minimum weighing and the maximum capacity.



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