Industrial weighing system
- Grassobbio -

MB01 Terminal
Instructions



This publication may contain information with typographic errors. Corrections will be included in new editions of the publication.

Edition dated 23/02/2015- Rev. “3”

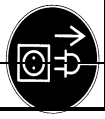
Table of Contents

1. INTRODUCTION 2
1.1 UNINTENDED USES 2
1.2 SAFETY 3
1.3 CARE AND MAINTENANCE 3
2. TESTING AND INSTALLATION 4
2.1 Testing and storage 4
3. INTRODUCTION 5
3.1 Description 5
3.2 Technical specifications 6
3.3 Preliminary Operations 7
4. OPERATIONAL CONTROLS - INSTRUCTIONS 8
4.1 General information 8
4.2 Front panel 8
4.3 LED indicators 9
4.4 List of selectable functions 10
4.5 Key functions in normal mode 10
5. USING THE TERMINAL 11
5.1 Message on startup 11
5.2 Weighing operations 12
5.2.1 Zeroing device 12
5.2.2 Acquiring tare weight 12
5.2.3 Setting a pre-determined tare weight 13
5.2.4 Deleting a tare weight 13
5.2.5 Setpoint setup 13
5.2.6 Setting the clock 13
5.2.7 Deleting printouts from memory 13
5.2.8 Printing 13
5.2.9 Weighing and printing in WEIGH-BRIDGE mode 14
5.2.10 WEIGH-BRIDGE mode printing diagram 16
5.2.11 Weighing and *single printing* in BENCH SCALE mode 17
5.2.12 Weighing and *totals printing* in BENCH SCALE mode 18
5.2.13 BENCH SCALE mode printing diagram 19
5.2.14 Setpoint setup 20
5.2.15 Operating logic **Error. The bookmark is not defined.**
5.2.15 Setpoint setup diagram 22
5.2.16 Setting the clock 23
5.2.17 Deleting printouts from memory 24
5.2.18 Displaying 1/10 e M 24
5.2.19 Multi-division function (MD) 25
5.2.20 Multiple range weighing function (MR) 26
6. INTERFACES 27
6.1 Maxidisplay repeater device 27
6.1.1 Maxidisplay cable connection 27
6.1.2 Transmission string format 27
6.2 TM 295 Cable connection 28
6.3 TM 295 printer programming 28
6.4 KUBE 200 Cable connection 29
6.5 KUBE 200 printer programming 29
6.6 DP 24 Cable connection 30
6.7 DP 24 printer programming 30

6.8 CAN BUS connection 31
6.9 SETPOINT connection diagram 32
6.10 Input connection diagram 33
7. APPENDICES 34
7.1 : Error codes 34
7.2 :Rear panel 36
7.3 Loading cell connector 37
7.4 :Metric plate location 38

Terminology

INDEX OF SOME TERMS USED IN THE MANUAL FOR EASIER CONSULTATION:

e	=	**minimum verification division**
Max	**=**	**maximum instrument capacity**
Min	**=**	**minimum capacity**
n	**=**	**number of divisions**
Load receiver device	**=**	**scale or structure**
Absolute zero	**=**	**instrument zero calibration (+/- 1/4 e)**
Instrument	**=**	**computerized device**
Sample weight	**=**	**mass to be used as a reference for calibration**
G	**=**	**gross weight**
N	**=**	**net weight**
T	**=**	**tare weight**
PT	**=**	**Pre-set tare weight**
MD	**=**	**abbreviation for "multi-division"**
MR	**=**	**abbreviation for "multiple range weighing"**
Baud rate	**=**	**serial channel transmission speed**
Frame	**=**	**transmission format**
Lights	**=**	**indicators (e.g., LED)**
etc	**=**	**etcetera**
g	**=**	**grams**
kg	**=**	**kilograms**
g1	**=**	**gravitational acceleration at the location where the instrument is installed**
g2	**=**	**gravitational acceleration at the location where the instrument was calibrated**
s###	**=**	**minute second**
ms	**=**	**thousandth of a second**
	=	**note, important information or procedure**
	**=**	**attention, information or procedure that, if not followed exactly, could cause death or severe personal injury**
	**=**	**mains socket**
	=	**not approved function**



1. INTRODUCTION

The purpose of the manual is to inform the operator of the fundamental criteria and indications for installation and correct use of the instrument using illustrations and guided examples.
The equipment must be installed only by specialized personnel who must have read and learned the contents of this manual.



"Specialized personnel" refers to those individuals with training and professional experience who have been expressly authorized by the Plant safety supervisor to install, use and maintain the terminal.

During the design phase, particular care was given in order to be able to use the instrument according to European Standards, fulfilling the requirements set forth in **L.D. 29.12.1992** no. 517 that was modified with Legislative Decree no. 40 dated February 24, 1997. It is the user's responsibility to make sure that installation is compliant with the legislation mentioned above.

The installer shall be responsible for parametrizing and calibrating it according to the specific needs while strictly following the indications above.



Tampering with the devices and use of the equipment by untrained individuals is forbidden. For this purpose, the manual must be consulted and followed whenever operating on the installation parameters.

In the event of any anomalies, contact your authorized service centre.

The information and illustrations below are updated as of the edition date shown on the cover. The technical information in this manual is the exclusive property of the manufacturer and therefore it is forbidden to make copies or share the information contained herein without the manufacturer's written authorization.

The edition date and document number identify the correspondence between the manual and the firmware installed.

According to its corporate quality policy, the manufacturer is committed to continuous improvement of its products. This could lead to changes in system components without compromising its metrological characteristics.

If there is a difference between what is described in this manual and your equipment, contact your authorized service centre.

1.1 UNINTENDED USES

Unless otherwise agreed upon during the order process, the terminal or complete system you received must not operate on moving machines or installations as it may not be possible to ensure weighing precision as specified in **EN45501**.

Anything not expressly described in this manual is to be considered improper use of the equipment.



Any attempt to tamper with the legal constraint points or change the programming parameters related to the weight data and primary indications by the user or unauthorized personnel will automatically void the warranty and will release the manufacturer of all liability regarding any injuries or damage.

1.2 SAFETY



The voltage is high enough to be life-threatening.

Maintenance and repairs done on electrical and electronic parts must only be performed by qualified technicians, after having adopted suitable safety measures.

Strictly follow the electrical rating plate on the appliance. If it is missing or illegible, request it from your authorized service centre.

Tampering with the devices and use of the equipment by untrained individuals is forbidden. For this purpose, the manual must be consulted and followed whenever using or maintaining the terminal.

The power supply for the equipment is single phase, from 230V + 10% - 15% and must be provided with an effective earth, making sure that the equipotential earth is compliant with current regulations. Make sure there is not potential difference between the earth and neutral.

Failure to earth the equipment is an incorrect and dangerous use of the instrument.

The electrical supply line must be dedicated. If already existing, use the computer power line. When there is no stable line, install a sine wave UPS or mains stabilizer.
If the terminal must be connected to other devices such as computers, etc. before hooking it up, unplug them from power.

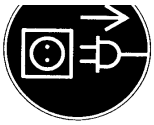


The safety instructions contained in this manual are not intended to exclude other situations or conditions that could be hazardous. Therefore, common sense, attention and caution are important factors which cannot be made part of the machine and therefore must be followed by the authorised person who uses it and performs maintenance on it.



If the system must be installed in areas where there is a risk of explosion, this must be indicated in the order specifications. The standard equipment is not set up to operate in areas with a potentially explosive atmosphere.

1.3 CARE AND MAINTENANCE



Before cleaning, the device must be unplugged from the mains.

Do not use harsh products (such as solvents). Use a cloth with detergent. Avoid liquid infiltrations in the instrument. Dry with a soft cloth.
If the operating safety of the device is no longer assured, immediately shut it off, unplug it from the mains, store it in a safe place and contact your authorized service centre. This could occur in the following situations:

- The device shows visible signs of damage or tampering.
- There is a visually obvious malfunction.
- The device was stored for a long time in unsuitable conditions.

2. TESTING AND INSTALLATION

2.1 Testing and storage

Each instrument produced and inspected is subjected to testing in order to ensure a functioning product with long life and, if provided, legalized by an official from the Notified Body.

- Upon receipt of the instrument, check for any damage that may have occurred during transport.
- Carefully unpack the instrument. Keep the original packaging for any later transport or movement.
- Store the instrument on a flat, solid and protected surface where there are no extreme changes in temperature and humidity and where it is safe from possible tampering by unauthorized personnel.
- Do not stack objects on it.
- Caution is recommended when handling the instrument.



Store the instruments as they were received. Do not stack pallets or any other type of object on it.

3. Introduction

3.1 Description

The instrument is an analogue to digital converter for loading cells built especially for an industrial environment. Therefore its features allow operation in harsh conditions.
The instrument satisfies the requirements in International Recommendation EN45501.
For greater safety, the instrument is equipped with automatic tests and a diagnostics program that gives the type of error.
It comes with either a table, wall or rack container. The control panel is splash proof with tactile sensation keys. The visor is highly visible. Some information is highlighted with separate lighted indicators.
It is equipped with EMI/RFI radio frequency filters and optical isolation to ensure operation in harsh environments.
The specific part of analogue / digital conversion is controlled with an integrated single - chip, suitably interfaced to the microcontroller.
The type of conversion used is cascaded DELTA SIGMA modulation (2 channel). All gain adjustment and zero filter functions are digitally controlled.
All electronic boards and instrument components ensure high quality.

It can be connected to any OIML R60 certified loading cell and is approved for single scale operation.
The instrument can be used individually or combined with other industrial equipment for various uses, some of which are described below:
- Weighing road and rail vehicles
- Detecting weights within production lines
- Weighing various products with different bench scale solutions (at floor level or elevated)
- Weighing in automatic loading and/or dosing systems.
- Weighing suspended loads (aerial weighing in the food industry, etc.)
- Determination of mass for calculating a toll, fee, tax, bonus, penalty, remuneration, indemnity or similar compensation, to determine price based on weight for direct sale to the public and for determining other factors such as the quantity, parameters and characteristics related to mass.
- Combination with data acquisition systems and computers
- Management of coordination devices for weighing operations
- Network connections for data transfer
- Handling systems
- With devices for automating the scale operation through automatic material handling.

3.2 Technical specifications

hardware characteristics:

- **Display LCD 16 x 2 lines**
- 20 key keyboard
- RS232/485 serial channel on the CPU board
- 3 24 Volt setpoint outputs
- 3 inputs (selectable remote keys)
- calendar clock

software characteristics:

- Dual phase calibration management

- Control of 1 RS232 printing device (TM295 / KUBE 200/DP24)

- Control of 1 RS485 TX continuous device for repeater

- Memory capacity up to a max. of ***200 weights***

- Vehicle printing operation

  ENTRY PRINTOUT (PRINT + YES) EXIT

  PRINTOUT (PRINT + NO + YES)

  PRINTOUT WITH TARE (PRINT + YES)
- Sequential Ticket **number deletion**

3.3 Preliminary operations

1- Perform a new scale calibration

2- Program the scale specifications (Max W., div, decimals, unit of measure) 3-

Set date and time

a. Required at first startup

4- Select the fields you wish to print

a. F7 function ***key*** at terminal startup

5- Set the connection characteristics for serial 1,2

a. Setup machine menu "***SERIAL"***

6- Weighing and printing operation

a. Set the material on the scale
b. Press the **PRINT button** to activate the vehicle weighing procedure
c. Press the **YES button** to perform the entry printout
d. Press the **NO key** to perform the exit printout after having recalled the num. from memory

7- ***Setting the setpoints***

a. Press the **PROG key**
b. Press the **YES key** to enter setpoint 1
c. Press the **key**.

4. Operational controls - instructions

4.1 General information

This chapter describes the control operations that can be performed using the keys on the front panel

4.2 Front panel

Figure 1 shows the front panel of the instrument. The references along with the following description give a complete view of the possible commands.



Fig. 1 - Front display

4.3 **LED indicators**

1: Stable 

This is on when the stable indication conditions are met as per parameters P06 and P07.

2: Central zero →0←

This is lit in the interval around zero from -1/4 **e to**+1/4 **e**.

3: Min **min**

This is lit when the gross weight is negative or between 0 and 20 **e** reduced to 5 in applications for determining a transport fee.

4: Non metrological data symbol M

When lit, the data shown is not bound to metric verification.

4.4 List of selectable functions

..... and during normal operation (pressing the two keys together)

Keys					Description of function performed
				=	**Displaying 1/10 e**

	Yes			=	**Confirm the item displayed**
	No			=	**Exit from the item displayed**
	ZERO			=	**Scale zeroing**
	→T ←			=	**Tare acquisition**
	T			=	**Setting known tare**
	PROG			=	**Programming setpoint/clock/print deletion**
	Print			=	**print**
	On/off			=	**Display on/off**
				=	**lock tare weight**
				=	**unlock tare weight**
	0……9			=	**Recall saved tare**

4.5 Key functions in normal mode

Zero Key - Zeroing device

Weighing scale zeroing key.

→T← key - Tare acquisition

Key for setting the weight on the scale as the tare weight.

→T Key - setting the tare

When this key is pressed, the tare weight must be set using the number keypad.
The indicator will show the net weight in the top line and the set tare weight in the bottom row.

Prog Key - programming setpoint/clock

Accesses the setup for the three setpoint values or, by pressing NO, to the date and time setup.

Print Key - data printing (weigh-bridge/bench

If the WEIGH-BRIDGE function is enabled, it accesses the entry printout or, when NO is pressed, the exit printout.
If the BENCH SCALE function is enabled, when the key is pressed the weight detected at that moment is printed.

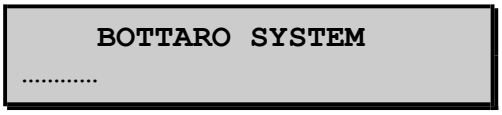
Keys from 0....9 - tare point memorization

Accesses the setup for the three setpoint values or, by pressing NO, to the date and time setup.

5. Using the terminal

5.1 Message on startup

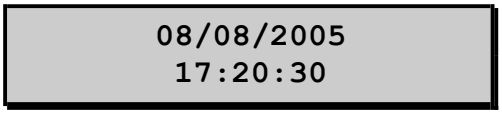
When the terminal is started, the display test is performed and for about two seconds the following is displayed:



The ***software version*** and the ***use ZONE*** will be displayed (for about two seconds).



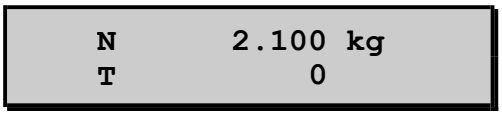
The ***date and time*** *in the machine memory* will then be shown



The work screen will then be shown where the 2 lines usually display the following fields:

Line 1 shows N XXXXXXX and the unit of measure where N stands for net
Line 2 shows T XXXXXXX and the unit of measure where T stands for tare. The

following is an example:



5.2 Weighing operations

The following are the usual terminal weighing and use operations.

5.2.1 Zeroing device

Pressing the **ZERO** key for two seconds will zero out the weight indicator with a precision of 0.25 e. When the key is pressed, the gross weight displayed will be acquired as the new zero value as long as the following conditions are met for 1 second:

a) stable indication
b) gross weight **less** than ± **2%** (subsequent zeroing) of the **F.S.** around the calibration zero point. If out-of-range, the display will flash for 3 seconds.
c) no tare device is in operation

Please Note: if the requirements mentioned above are not met, NO ZERO will be displayed. The zero value acquired will not be saved in the event of a power outage.

5.2.2 Tare acquisition

Place the tare that must be acquired on the scale and wait until the value stabilizes.

When the →T← key is pressed, the gross weight displayed will be acquired as the tare weight as long as the following conditions are met for 1 second:

a) the indication must be **stable**
b) the value must be **greater than or equal to 1 e.**
c) the value must be **positive**
d) the value must be **less than the F.S.**
e) the preset tare device must not be in operation.

If points **b**, **d** and **e** are not met, the "**Tare no**" error message is displayed. When the weight is unloaded the weight removed will be shown with the minus sign

With the multiple range weighing (MR) function, upon automatic switching to the higher weight range, the tare division value will be compared automatically to the division related to the range obtained.

Please Note: the tare value acquired will not be saved in the event of a power outage.

5.2.3 Setting a pre-determined tare weight

During operation, a known tare weight can be set, which will then be shown on the second line of the display.

The function is not accepted if:

a) *an automatic tare device is already active*
b) *the value is* ***greater than or equal to the F.S.***

Press the →T key and set the tare weight using the numeric keypad then confirm with the **Yes** key.

If points **a** and **b** are not followed, the display will automatically return to the standard mode

If a value is set that is not in line with the division of the instrument, the tare value is automatically rounded to the correct division.

5.2.4 Deleting a tare weight

If a known tare has been set using key →T, or acquired using key →T←, the value can be deleted as follows: Press the T key.
The second line on the display will show →

```
N       2,100 kg
T  >        0 kg
```

Confirm with **Yes** and the display will return to weighing mode and the tare will be deleted.

5.2.5 Setpoint setup

Press the **Prog** key to access the setpoint output setup (description in paragraph 6.2.11).

5.2.6 Setting the clock

Press the **Prog** key to access the date and time setting (see paragraph 5.2.16)

5.2.7 Deleting printouts from memory

Press the **Prog** key to delete the weights in the memory (see paragraph 5.2.17)

5.2.8 Printing

When **Print** is pressed, the machine can print in two different modes: 1

WEIGH-BRIDGE mode (see paragraph 5.2.9)

BENCH SCALE mode (see paragraph 5.2.11)

5.2.9 Weighing and printing in WEIGH-BRIDGE mode

Press the **PRINT** key when all the following conditions have been met:

- *stable and positive weight*
- *net weight > 0*

*The display will show the message **ENTRY PRINTOUT ?**. When the **YES** key is pressed the machine will print the weight of the entering vehicle. The printout will include the following data:*

- *entry weight date*
- *entry weight time*
- *memory no. for recall upon exit*
- *weight detected*

Printout example:

Date	Time	Seq. no.
12-10-00	**5:45**	
Memory no.	Entry weight	
3	**27940**	**kg**

Note: The memory number is assigned automatically when the entry printout is performed and is deleted automatically with the exit printout, therefore this number will increase each time a vehicle enters and, until the exit printout is performed, the number will be occupied and not usable even in the event of a power outage (maximum 200).



Please Note: This function is enabled in the internal programming of the instrument and can only be changed by authorized personnel.

For more information call the help centre.

Press the **PRINT** key when all the following conditions have been met:

- *stable and positive weight*
- *net weight > 0*

*the display will show the message **ENTRY PRINTOUT ?**. when the **NO** key is pressed the machine will switch automatically to **EXIT PRINTOUT?**. When confirmed with the **YES** key the MB01 will show the message **Memory No. ?**. At this point you will need to use the numeric keypad to enter the entry printout memory no. (previously printed on the ticket) and then confirm with **Yes.** The machine will then printout the exiting vehicle weight with the following data:*

- *exit weight date*
- *exit weight time*
- *memory no. recalled upon exit*
- *weight detected*
- *the difference between the entry weight and exit weight*
- *the sequential weighing number*

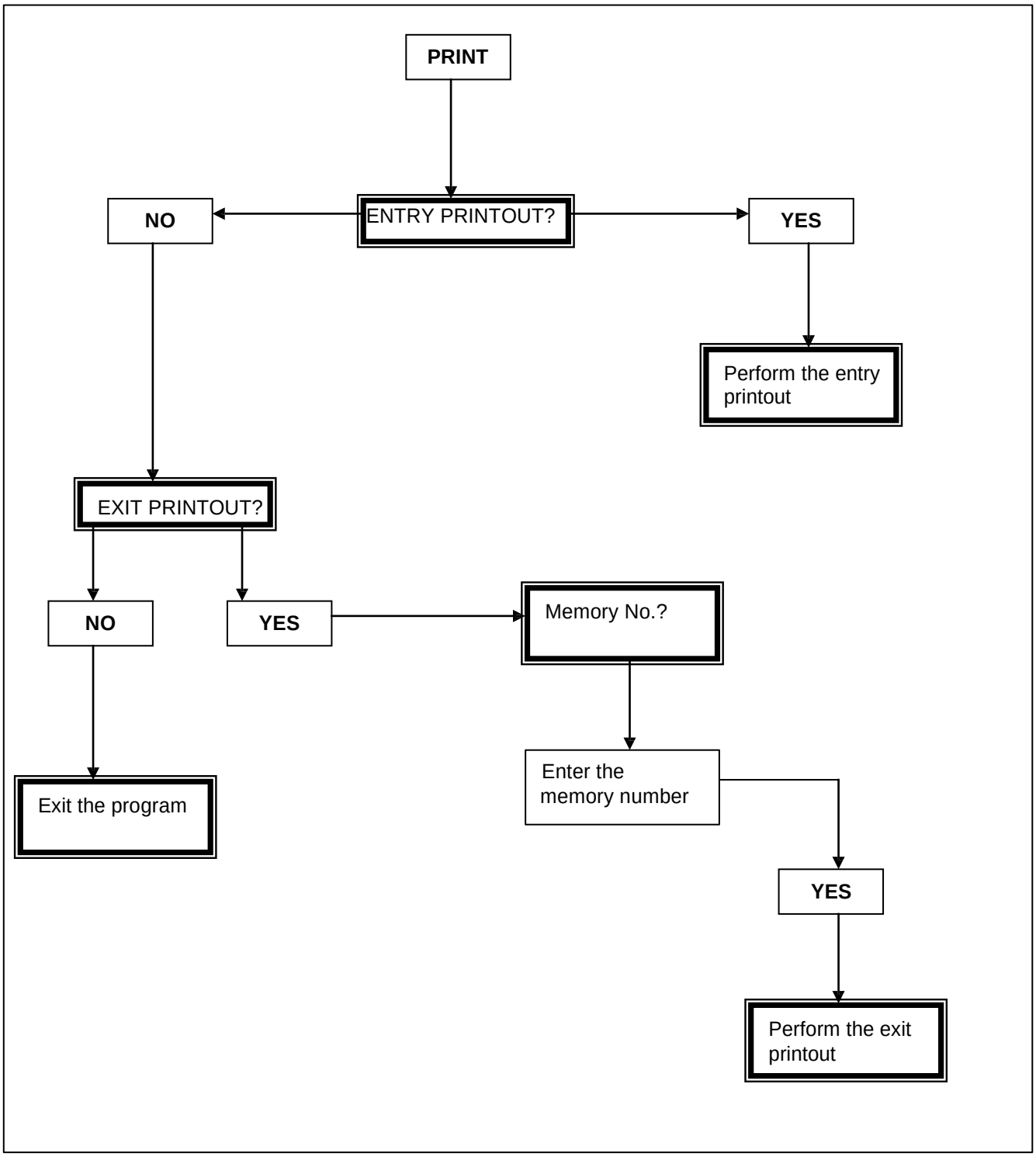
Printout example:

Date	Time	Seq. no.	
		1	
Memory no.	Entry weight		
Date	Exit weight		
12-10-00		**27940**	**kg**
Time	Entry weight		
15:30		**10000**	**kg**
Memory no.	Net weight		
3		**17940**	**kg**



Please Note: In the EXIT PRINTOUT phase, it is important to recall the exact memory number because once it is confirmed and printed it will be automatically deleted from the memory and can no longer be used!!!

5.2.10 WEIGH-BRIDGE mode printing diagram



5.2.11 Weighing and *single printing in* BENCH SCALE mode

Press the **PRINT** key when all the following conditions have been met:

- *stable and positive weight*
- *net weight > 0*

*The display will show the message **SINGLE PRINTOUT ?**. When the **YES** key is pressed the machine will print the following:*

- *weigh date*
- *weigh time*
- *sequential no.*
- *net weight*
- *gross weight*
- *the tare weight if present*

Printout example:

Date	Time	Seq. no.
12-10-00	**15:30**	**1**
	Gross weight	
	27940	**kg**
	tare	
	10000	**kg**
	Net weight	
	17940	**kg**

5.2.12 Weighing and *totals printing in* BENCH SCALE mode

Press the **PRINT** key when all the following conditions have been met:

- *At least one single weight;*

*The display will show the message **SINGLE PRINTOUT ?**. When the **NO** key is pressed the machine will show the message **TOTALS PRINTOUT ?** Confirm with the **YES** key and the totals printout will begin with the sum of all the NET, GROSS AND TARE weights printed individually up to the last printed total. The printout will include the following data:*

- *TOTALS printout date*
- *TOTALS printout time*
- *no. of single weights included in the totals that are being printed*
- *the TOTAL gross weight*
- *the TOTAL net weight*
- *the TOTAL tare weight if present*

Printout example:

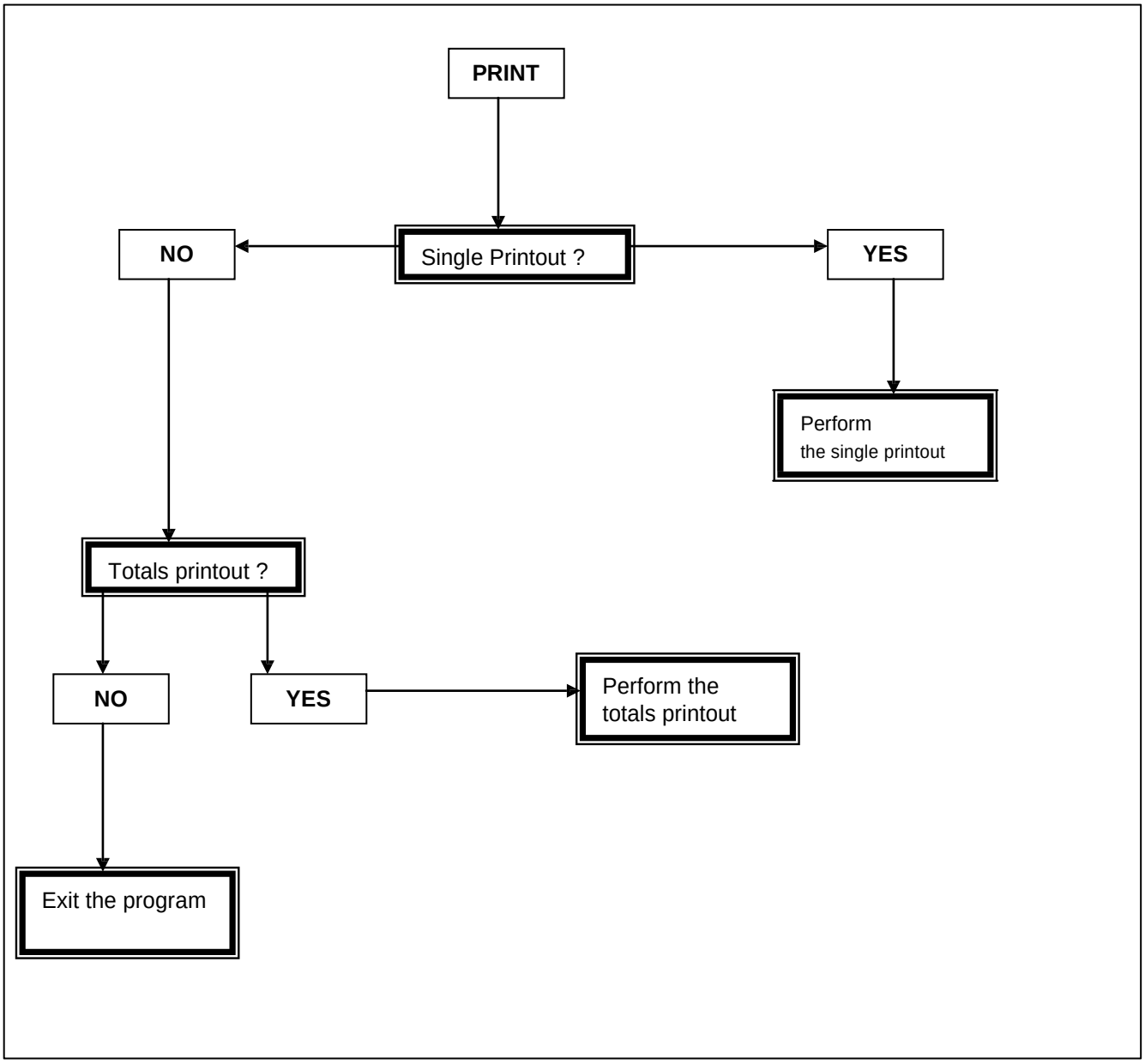
Date	Time	Seq. no.
12-10-00	**15:30**	**1**

Total gross weight			
		27940	**kg**
Total tare weight			
		10000	**kg**
Total net weight			
		17940	**kg**

Please Note: This "BENCH SCALE MODE" function is enabled in the internal programming of the instrument and can only be changed by authorized personnel.

For more information call the help centre.

5.2.13 BENCH SCALE mode printing diagram



5.2.14 Setpoint setup

The system allows three interdependent alarm setpoints. Each output has two values (Val.1, Val. 2) that can be used to change the operating logic, either **normally open** (diagram 1) or **normally closed** (schema 2), or **weight control** (diagram 3).

1) After pressing the **Prog** key the message will appear**:**

```
Program
Outputs ?
```

2) Confirm with the **Yes** key and the following message will appear**:**

```
Program Outputs   1
          6-13
```

3) Where OUTPUT 1 identifies which set point is being programmed and 6-13 the pin number of the DB 15 connector where the output is located. Confirming with **Yes** will display:

```
Output  1       6-13
Val.1 >       1000
```

4) Now use the numeric keypad to set the first weight value above which the contact will switch over and confirm with **Yes**

```
Output  1       6-13
Val.2 >       2000
```

5) Now use the numeric keypad to set the second weight value above which the contact will switch over again and confirm with **Yes**.

After confirming, the display will return to the standard display and will activate the output with the set values. If you wish to also set outputs 2 and 3, repeat the operation paying attention at step 2 to press **No** to select the desired output and perform the rest of the procedure from step 3 as described.



MAXIMUM ALLOWED VOLTAGE 24 V AC/DC

5.2.15 Operating logic

Diagram 1

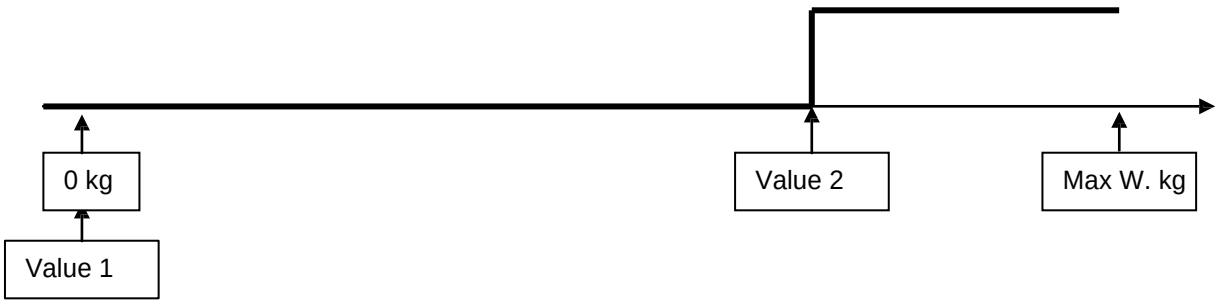


Diagram 2

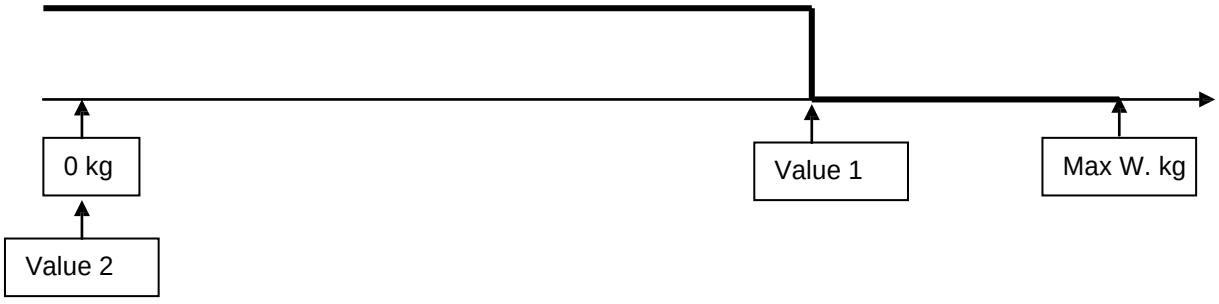


Diagram 3

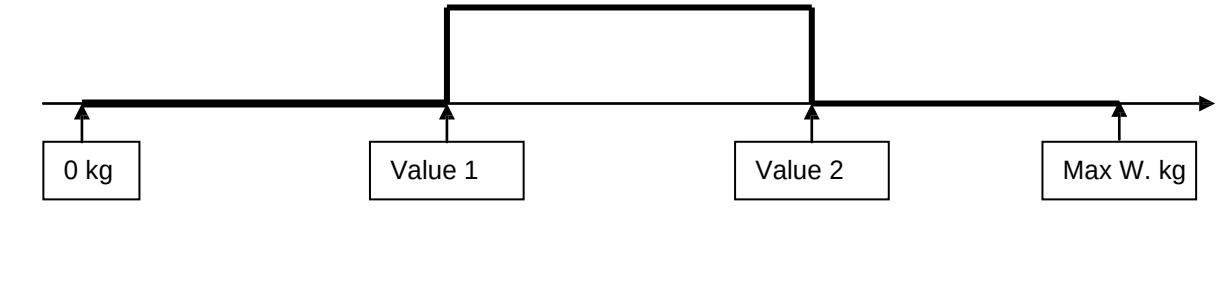
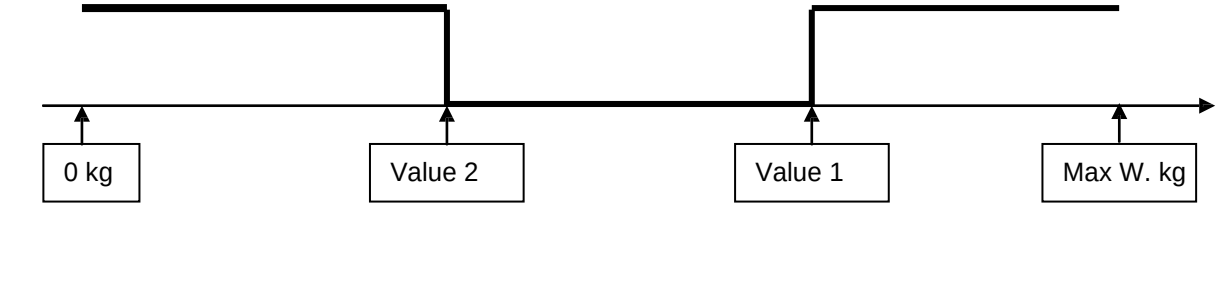
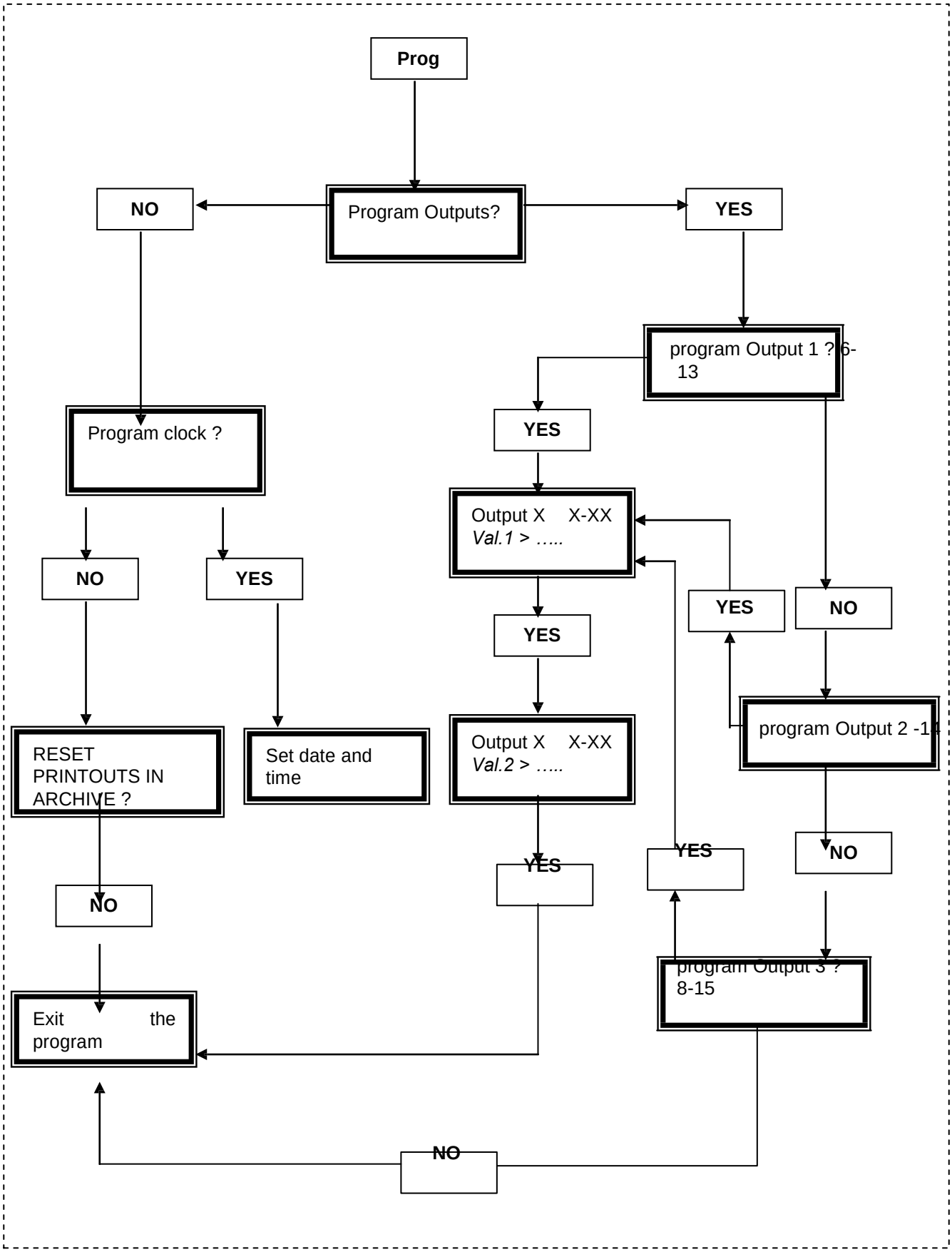


Diagram 3.1



5.2.16 SETPOINT setup diagram



5.2.17 Setting the clock

Press the **Prog** key and the display will show:

```
     program
outputs ?
```

Press the **NO** key and the display will show:

```
program clock
?
```

Press the **YES** key and the display will show:

```
Set time
   >
```

set the current hour in two digits from 0 to 23 and confirm with **YES**. The display will show:

```
Set minutes
   >
```

set the current hour in two digits from 0 to 59 and confirm with **YES**. The display will show:

```
Set day
   >
```

set the current day in two digits from 1 to 31 and confirm with **YES**. The display will show:

```
Set month
   >
```

set the current month in two digits from 1 to 12 and confirm with **YES**. The display will show:

```
Set year
   >
```

set the year expressed in four digits and confirm with **YES**. The display will show:

```
RESET PRINTOUTS
IN ARCHIVE ?
```

Press **NO** to exit the program and return to the weight display. Press **Yes** to reset the archive (see chapter 5.2.17)

5.2.18 Deleting printouts from memory

Press the **Prog** key and the display will show:

```
     program
outputs ?
```

Press the **NO** key and the display will show:

```
program clock
?
```

Press the **NO** key and the display will show:

```
RESET PRINTOUTS
IN ARCHIVE ?
```

press the **YES** key. For a few seconds the display will be blank then return to show the standard weighing screen:

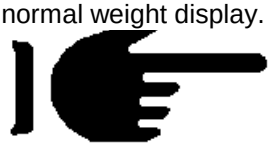
Please note: after the following operation, the weights can no longer be recovered .

5.2.19 Display 1/10 e

The instrument has a device for which the 1/10 division can be displayed as long as the related parameter is enabled.
Once the terminal has been programmed in this manner, during normal display the last digit on the weight display (on the right) will remain off.

Pressing ⇧ and ⇩ at the same time activates the procedure and the last digit is lit up and is the value of the 1/10 division.

This display will remain active for about 5 seconds after which the terminal will automatically return to the normal weight display.



This function is only possible if it was enabled in the setup program.

5.2.20 Multi-division function (MD)

Through **internal programming** you can enable the multiple division function in two weight ranges each with a minimum verification division.
The instrument, whether loading or unloading, automatically updates the verification division to the value related to the partial weighing range.
The drawing below illustrates the function for a multiple division application in three weight ranges:

0 kg **$Min_2 = Max_1$** **Max_2**

Resolution e_1	Resolution e_2
Min = 20 e_1 Partial range 1 →	Partial range 2 →

Where Max_1 =maximum capacity of the partial weight range defined by the division e_1. Min_1 =minimum capacity of the partial weight range defined by the division e_1.

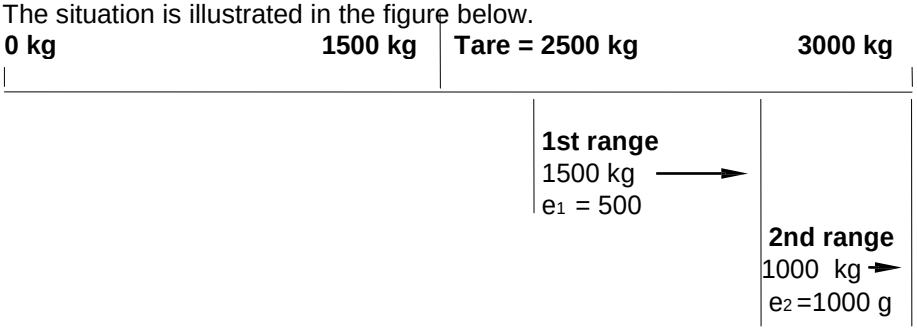
Tare acquisition

When a tare weight is acquired, the weighing always starts from the lower range, that is the one with the lesser verification division.
A self-weighed tare value can be equal to **Max_r** minus **e_1**.

Example: 3000 kg scale with two division ranges:
Partial range 1: 0 ÷ 1500 kg **e_1** = 500 g
Partial range 2: 1500 ÷ 3000 kg **e_2** = 1000 g

If a tare of 2500 kg is acquired, weighing starts with the division e_1 (500 g), with **Max_1** equal to 1500 kg. Since the full scale is 3000 kg, in this example, since the first range of 1000 kg is exceeded, only 500 kg remains in the second range (e_2 =1000 g) for arrive at full scale: 3500 kg (tare) + 1500 kg (first range) + 1000 kg (second range) = 6000 kg.

The situation is illustrated in the figure below.



If in multiple divisions the operating range is not signalled by acquiring a tare, it always restarts from the first weighing range.

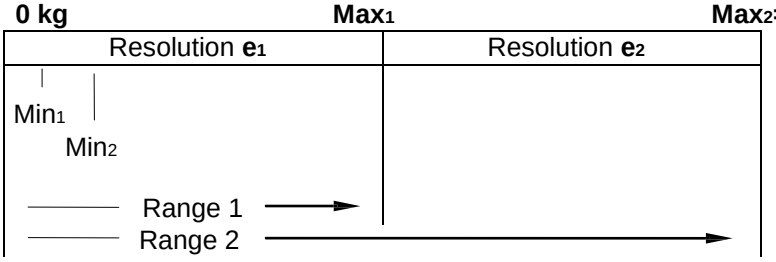
Entering tare weight (preset tare)

If a tare is entered, the maximum value of the tare may not be greater than the Max_1 value, which is the maximum capacity of the first partial weighing field.

5.2.21 Multiple range weighing function (MR)

Through **par.18= 003** or **004** you can enable the multiple range weighing function, getting instruments with two or more distinct scales, each having a range from zero to the maximum capacity. Each scale has its own verification division and minimum capacity and is a distinct weighing range.
Switching from one weighing range to the next occurs automatically when the load exceeds the maximum capacity of the lower range. This switching only occurs for increasing loads and the value of the higher division reached is maintained in discharge until balance is reached with the instrument unloaded (zero). When this condition is reached (meaning zero) switching occurs of the verification division compared to the minimum division.
The drawing below illustrates the function for a multiple range weighing application in three weight ranges:

0 kg **Max_1** **Max_2= Max**



Min_1 = 20 e_1 **Min_2 = 20 e_2**

Where Max_1 =maximum capacity of the partial weight range defined by the division e_1. Min_1 =minimum capacity of the partial weight range defined by the division e_1.

Acquiring and entering tare (preset tare)
For multiple range weighing instruments there is no limitation on entering the tare as in the multiple division function. When entering a preset tare weight, upon automatic switching to the higher weighing range the value is automatically transferred to the higher range and rounded to the value of the new division. The tare value, which can either be acquired or entered, is equal to **Max_r - e_r**.
In multiple range weighing instruments using indication ***C1***, ***C2*** notification is given of which weighing range is being used.



Display example

6. Interfaces

6.1 Maxidisplay repeater device

The terminal can be programmed to control the ***Maxidisplay repeater*** device through a RS 485 serial connection. This selection is made in the SERIAL PAR. menu under general programming that can be accessed after pressing the setup key.

The parameters set by the manufacturer on the MB 01 (version 1.14) terminal are as follows:

APPLICATION PARAMETERS	Description
Baud rate serial channel RS 485	**9600 baud rate**
Data format	**8/none/1**

6.1.1 Maxidisplay cable connection

MAXIDISPLAY 9 way male			side **MB01 EQUIPMENT** side 9 way female ***SERIAL 485***	
Pin no.	Description		Pin no.	Description
8	RXD	⟵	8	TXD -
6	RXD +	⟵	6	TXD +

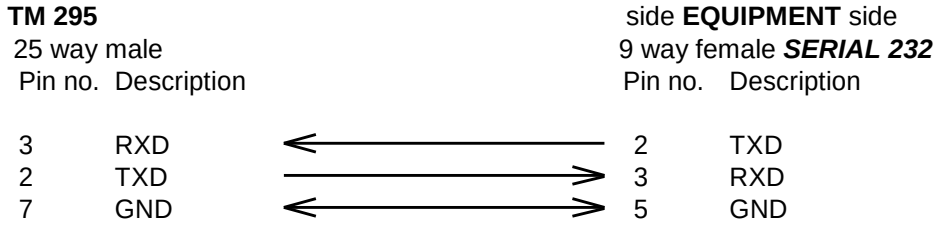
Please Note: on the maxidisplay board, the J3 jumper must be between 1 and 2

6.1.2 Transmission string format

The transmission string on the 485 serial channel can be transmitted only in ***Continuous*** mode and only on a 485 serial channel that is enabled for the Maxidisplay connection. The 11 digit string transmitted is as follows:

Num. of Digits	Description	meaning
1	$	Start char
2	space	
3	1	
4	1 dig weight	
5	2 dig weight	
6	3 dig weight	
7	4 dig weight	
8	5 dig weight	
9	6 dig weight	
10	7 dig weight	
10	CR	End char

6.2 TM 295 Cable connection



6.3 TM 295 printer programming

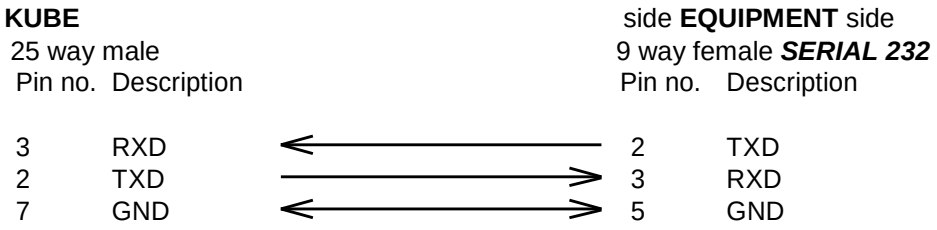
To program the printer so it communicates properly with the MB01 instrument you must make sure the switches (SW1) under the printer are in the proper position.
The RS 232 serial connection, like the 485, is controlled by default with a speed of 9600 and a data format of 8,N,1. To select the same mode on the printer, set the switches as shown in the diagram below.

SW 1

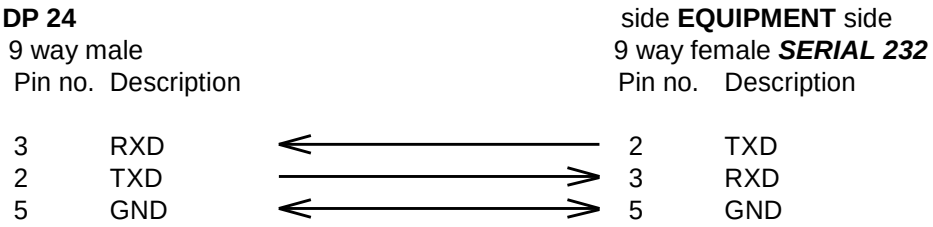
Switch No.	OFF	ON
1	□	
2	□	
3		□
4	□	
5	□	
6	□	
7	□	
8	□	
9	□	
10	□	

After setting the switch to the position indicated, turn the printer off and back on.

6.4 KUBE 200 Cable connection



6.6 DP 24 cable connection



6.7 DP 24 printer programming

For proper printer operation it must be programmed as follows:

PRINT = REVERSE

DOUBLE WIDTH

FONT 1

CR-LF HONOR CR

TEXT = DISABLE

BAUD : 9600

PROT. : 8,N,1

CONTROL XON-XOFF

6.8 CAN BUS connection

The MB terminal is equipped with a CAN BUS output that can be used to connect up to 30 scales in line. Using the optional board, the CAN BUS signal can be switched to serial RS 232, easily controlled by a PC. The commands to enable and disable the transmission are shown below. The data string transmitted in CONTINUOUS mode is also described. In other words after the start transmission command the string containing the weight detected at that time is sent in continuous mode until the terminal receives the stop command. At this point the transmission will be interrupted until a new command is received.
The CAN network allows the reception of weights from each individual instrument connected and it is done without sending the scale address. Therefore once the start transmission command is sent, all of the connected terminals will start to transmit. Each individual instrument must have an address programmed inside the MB01 view in the GENERAL PARAMETERS section under item SCALE ADDRESS. The address is defaulted to 1.

Command	**Code**			**ASCII Code**		
Start transmission	**:**	**1**	**CR**	**OX3A**	**OX31**	**OXOD**
Stop transmission	**:**	**0**	**CR**	**OX3A**	**OX30**	**OXOD**

The string sent from the terminal will have 19 digits, as follows:

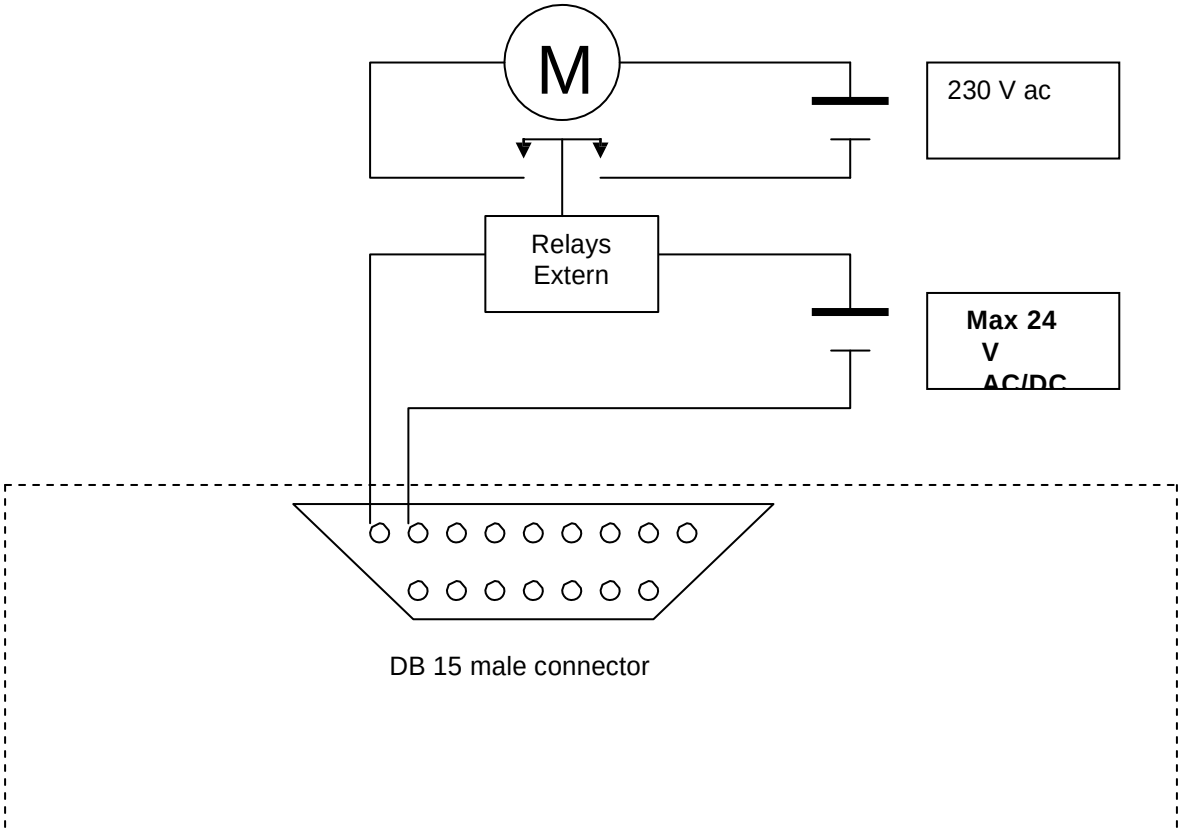
Digit number	Value	Meaning
1	$	String start digit
2		Space
3		Space
4		Space
5		Space
6		Space
7		Space
8		Space
9	From 1 to 30	Scale address
10	;	;
11	Weight digit	First digit Most significant value
12	Weight digit	second digit
13	Weight digit	third digit
14	Weight digit	fourth digit
15	Weight digit	fifth digit
16	Weight digit	sixth digit
17	Weight digit	eighth digit
18	Weight digit	ninth digit Least significant value
19	CR	String end digit

6.9 SET-POINT connection diagram

DB 15 male connector

Pin no.	Output no.
6 13	**Output 1**
7 14	**Output 2**
8 15	**Output 3**

Example of connection between MB01 weight detection terminal and external systems:



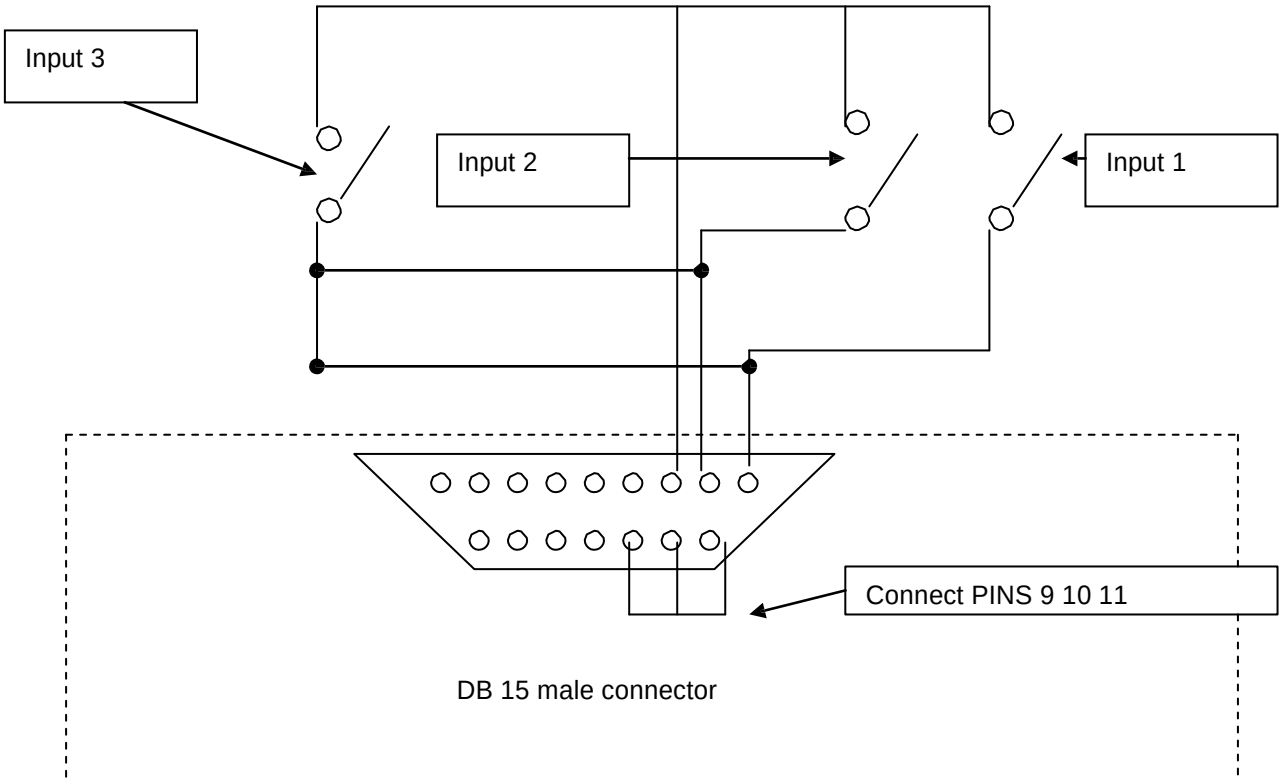
6.10 Input connection diagram

The terminal has two inputs that can be associated with various functions to be selected from among: zeroing, tare acquisition, single printout and totals printout and are set in the setup area.
For proper operation 12 Vdc power supply is needed which can be external, from an external power supply as long as it is stable and without disturbances, or inside the MB01 terminal as in the attached diagram.
Any external contacts must be at normally open "NO".

DB 15 male connector

Pin no.	Output no.
1 3	**input 1**
2 3	**input 2**
1 + 2	**input 3**
3	
3	0 Vdc
11	12 Vdc

Example of connection between MB01 weight detection terminal and external systems:



7. Appendices

7.1 : Error codes

CELL FAILURE ERROR

The mV terminal input value is incorrect
Causes:

a) the connection cable between the cells and converter is broken or damaged
b) the loading cells are faulty
c) the internal converter is faulty
d) the cell connector is not connected correctly

Solutions:

call technical assistance

	PARAMETER	1	2	3	4	5	6	7	8
1	SCALE ADDRESS	Set value from 1 to 31							
2	CONFIRM CE	**NO**	YES	-	-	-	-	-	-
3	CONVERSION TIME	Set value from 1 to 15							
4	MEDIA CONVERSIONS	Set value from 1 to 32							
5	STABILITY RANGE (e)	0	**1**	2	3	4	5	6	7
6	STABILITY TIME (s)	Set value from 0 to 4 (STEP 0.5)							
7	ZERO TRACKER	Set value from 0.5 to 6.0 div							
8	DISPLAY NEGATIVE	**NO**	YES	-	-	-	-	-	-
9	EXECUTION MODE	**BENCH**	WEIGH-BRIDGE	No printer	piece	Eng. unit	-	-	-
10	USE ZONE	**ZONE A**	ZONE B	ZONE C	ZONE SICILY 2				
11	CALIBRATION ZONE	**ZONE A**	ZONE B	ZONE C	ZONE SICILY 2				

Installation parameters

Installation date: .....

Instrument S/N .....

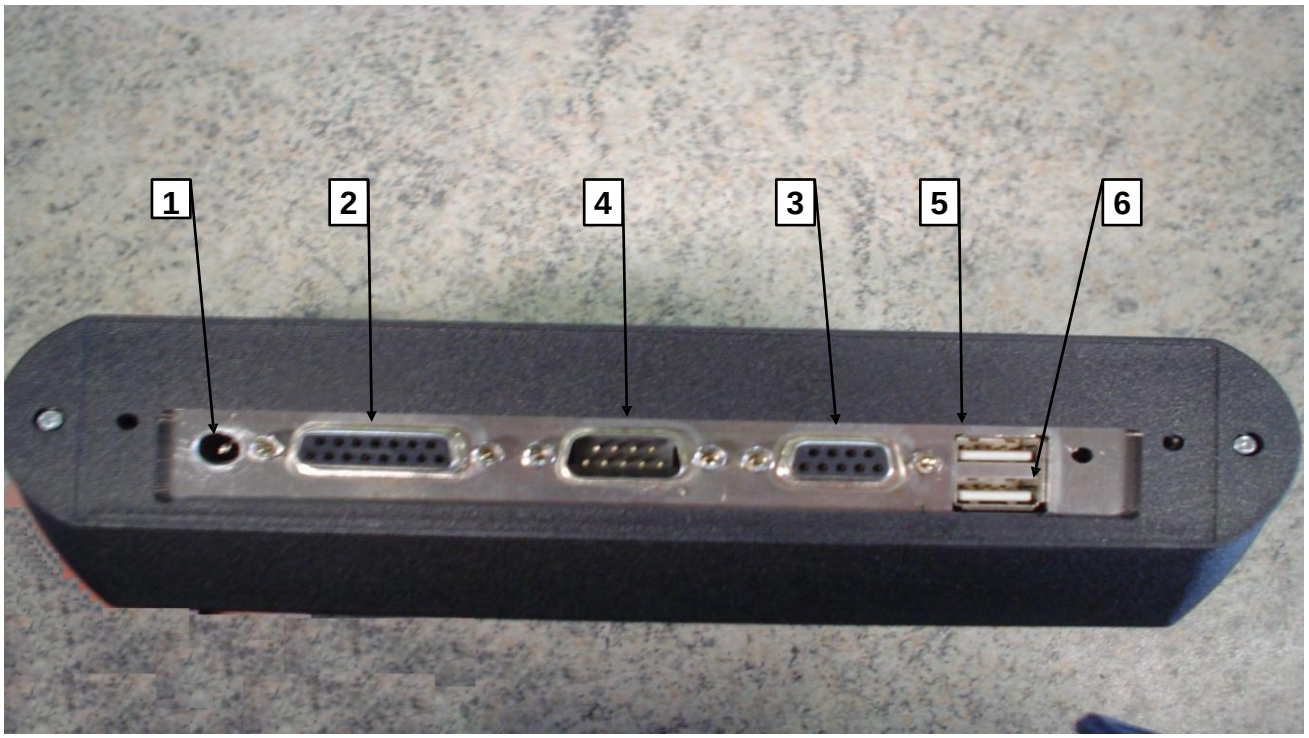
Installer: .....

Installing co.: .....

Highlight the installation parameters and attach a copy to the instrument

7.2 : Rear panel

The figure shows the layout of the external instrument connection in the table version:



Description:

1 12 Vdc POWER SUPPLY VOLTAGE INPUT CONNECTOR

2 FOR I/O

3 CONNECTOR FOR LOADING CELL

4 SERIAL CHANNEL CONNECTOR 1 AND 2 RS 232 AND RS

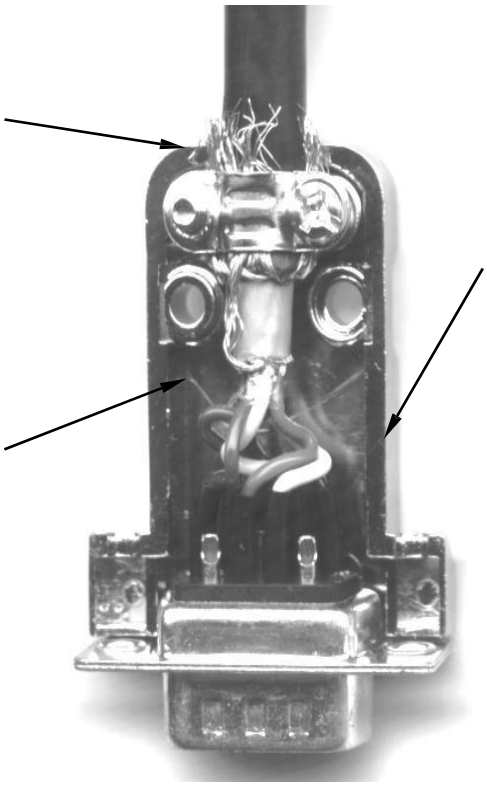
5 485 CAN BUS 1 OUTPUT CONNECTOR

6 CAN BUS 2 OUTPUT CONNECTOR

7.3 : Loading cell connector

To minimize electrical and radio interference, it is absolutely necessary that all connection cables between the instrument and transducer are shielded and that the entire system is connected to an excellent earth.
The instrument supplier can provide a specifically designed connection cable provided with double shielding to be soldered to the shield terminals and the earth.
For the cable protection shielding connection, refer to the figure below.

External cable shield to tighten in the metal cable clip with end burrs to be tightened between the two guards on the cap.



Cover shielded in conductive material

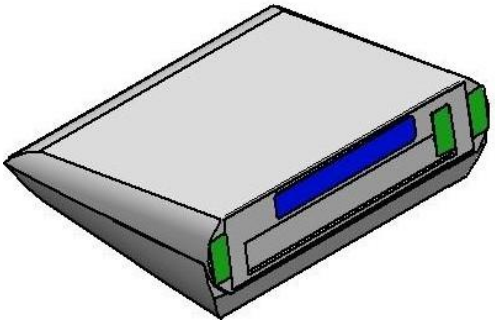
End of the internal cable shield to be tightened in the metal cable clip **Please Note: connect to pin 3 on the connector**

DB 9 male connector

Pin no.	meaning
1	- POWER SUPPLY
2	- SENSE
3	Shield
4	+ SENSE
5	+ POWER SUPPLY
7	- OUT
8	+ OUT

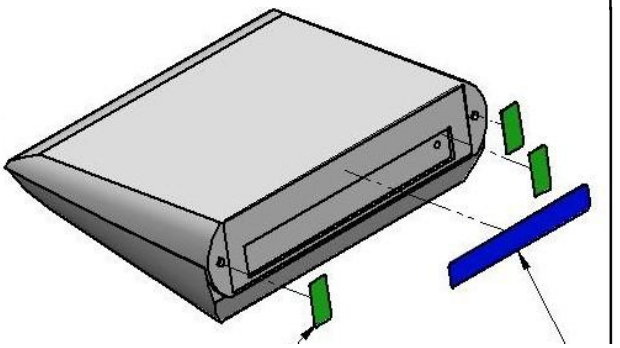
7.4 :Metric plate location

FIGURE A



W3 CLOSING

FIGURE B



IDENTIFICATION PLATE