



RAMSEY
WEIGHT INDICATOR/TRANSMITTER MINI 11-100P/F



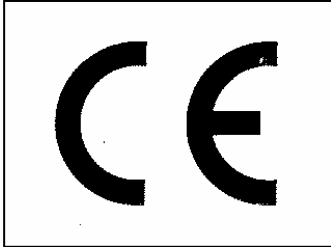
MINI 11-100F



MINI 11-100P



OPERATING AND SERVICE MANUAL



DIRECTIVES

CEE 93/68
CEE 89/336 (EMI-EMC)
CEE 73/23 (Low Voltage Dir.)

STANDARDS

EMI : EN 55011 – CEI 110-6
EMC : EN 50082-1, IEC 801-2e, IEC 801-4
LVD : EN 61010-1

On request, this manual is available in ITALIAN language

File : MN-11100PF-D002A(En)

Date : December 2004

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1. INTRODUCTION

1.1 GENERAL

This manual contains all the instructions and informations necessary for installing and the main parameters used for scale calibration.

1.2 TECHNICAL SPECIFICATIONS

POWER SUPPLY

Voltage 115VAC – Fuse (T1A) Dimens. 5x20mm
230VAC – Fuse (T0.5A) Dimens. 5x20mm (+10% -15%)
Frequency 50/60 Hz
Power 25 V.A.
Installation Class (III)

TRANSDUCER

Power Supply of load cell 10VDC 0.5%
Minimum load 88 Ohm (6 cells max, 350 Ohm)
Input Signal -25mV / + 25mV
Sensing Max fall of tension between the jumpers of power supply and sensing 3V
Max lenght of the connection between the load cell and 11-100 by Ramsey standard cable, without sensing = 60m

INDICATOR ACCURACY

Resolution 32000 divisions (with input at 25mV)
Linearity +/- 0.05 on measure range
Zero thermal drift +/- 0.5 $\mu\text{V}/^\circ\text{C}$
Span thermal drift +/- 25 ppm/ $^\circ\text{C}$

MEMORY

EPROM size of 32 Kbytes
Static RAM size of 32 Kbytes
E2PROM size of 16 Kbytes for permanent data recording
Data retention in case of power off : no time limit
CPU TMPZ 84C015.AF-6 8 bit, clock frequency 12.288 MHz

INPUTS

Three digital dry contact inputs are available on the instrument. A 24VDC supply is available for supplying the external contacts.

Available Functions :

- Set Tare (Default on input 1)
- Reset Tare (Default on input 2)
- Totalize Weight
- Clear Total
- Hold Weight Indication
- Clear Peack Memory
- Alarms Reset (Default on input 3)
- Not Used

OUTPUTS

Four relay outputs are provided (only for the models with an N.O. contact without tension. Each contact can drive 0.5A at 240VAC or 48vdc max.

Available Functions :

- Alarm
- Ready
- Weight Stable
- Weight has been totalized
- Total Cleared
- Threshold 1 (Default on output 1)
- Threshold 2 (Default on output 2)
- Threshold 3 (Default on output 3)
- Threshold 4 (Default on output 4)
- Not used

ENVIRONMENTAL SPECIFICATIONS

- Operating Temperature : -10 to +50°C
- Stocking Temperature : -20 to +70°C
- Humidity (operating & stocking) : < 90% (without condensation)

PACKAGING

Mod.11-100F Field Mounting – Reinforced fiberglass housing dim. 300x250x160mm
Protection IP65 Weight 6kg

Mod.11-100P Panel Mounting – Prot. IP54, all housing IP00 Weight 1kg

WIRING

The instrument has been provided with a removable terminal block.

Maximum cable section : 1.5mm²

DISPLAY

- Type LCD
- Characters height 8mm
- Number of characters 16
- Type of display Alphanumeric
- Displaying Good quality in all conditions

SIGNAL LED

- Quantity 5
- Functions Threshold 1,2,3,4
Stable weight
Cumulative alarms
Instrument is ready
Weight totalized
Total cleared

CURRENT OUTPUT BOARD

- Selectable 0-20mA; 4-20mA; 20-0mA; 20-4mA
- Maximum load 500 Ohm
- Maximum tension on load 20VDC
- Resolution 12 bit (4096 divisions)
- Linearity 0.1 %
- Insulation Galvanic, 1500 VRMS

Selectable functions :

- Net
- Gross (Default)
- Peak Weight

1.3 ADDITIONAL BOARD

SERIAL COMMUNICATION BOARD (OPTION) Cod.11-100-11

Available standars (select by jumpers)

- RS 423 (RS 232) Null modem (ready/busy signal)
- RS 422 (RS 485) Two wires not-isolated
- RS 422 (RS 485) Four wires not-isolated
- Wires connection Terminal block
- Available protocols (on request)

Ramsey PC MASTER (Standard) – Siemens 3964R – AEG Modbus
Allen Bradley DF1

SERIAL OUT (COMM MINI LINE) (OPTION)

Used only with Thermo Ramsey instruments

1.4 MINI LINE

Available model in the MINI line :

- 11-100P/F-RC Weight indicator with four threshold relays and insulated output 0-20 or 4-20mA.
- 11-100P/F-RCS Weight indicator with four threshold relays and serial output RS 423 and RS 422 and insulated output 0-20mA or 4-20mA.

1.5 WARRANTY

Thermo Fisher Ramsey warranty is given for a period of twelve mounths from the start – up, but no longer than eighteen months from delvery, the good operation of the delivered devices. *Thermo Ramsey's* obligation under warranty is conditioned upon the return of the defective equipment within eight days from discovery, transportation charges prepaid to *Thermo Ramsey's* workshop, with a detailed description of the defects. *Thermo Ramsey's* obligation is relevant only to repairs and/or replacements that

Thermo Ramsey considers to be suitable for the good operation of the device according to normal use and required as a consequence of a fact of its own. If not specifically and expressively defined with a written act, it will be excluded every obligation for *Thermo Ramsey* on repairs or replacements and/or othr service outside its workshop.

2. PRELIMINARY CHECK

2.1 INSPECTING AND UNPACKING

The instrument MINI 11-100 is a completely checked and properly packed at the factory. To be sure of the absence of any damage due to the transport, check the package very carefully before unpacking. In case of damages inform the carrier.

2.2 STOCKING

If the instrument has not to be immediately installed, it could be stored completely packed in a covered place, with temperature from -20 and $+70^{\circ}\text{C}$ and relative humidity less than 90%. The instrument is provided with a battery for data retention without any limit of time.

3. INSTALLATION

3.1 MOUNTING

The mounting place must be carefully selected, avoiding places where there is vibrations, high temperature or humidity.

Model 11-100P is supplied for mounting on a covered front panel with any inclination compared to the horizontal position.

Model 11-100F is supplied for mounting in open air. It is suggested a mounting in a protected position against rain about, in a place with strong vibrations, it is better to provide a mounting using non vibrating devices.

The instruments must be positioned with a suitable height in order to easily read the display and conveniently access to the key board.

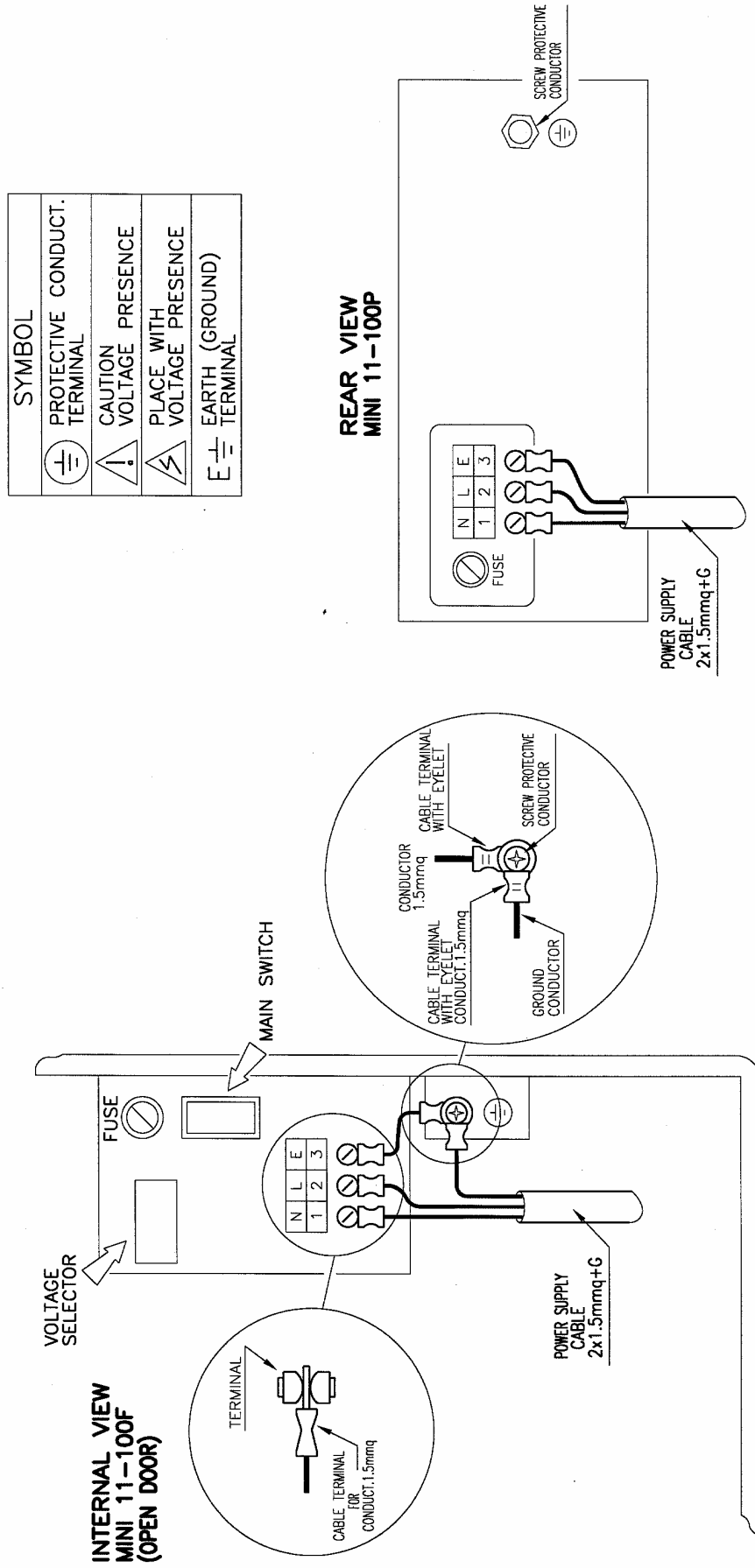
3.2 ELECTRICAL CONNECTIONS

THE INSTRUMENT MUST BE CONNECTED WITH EQUIPMENTS INSTALLATION CLASS (III)

Electrical connections to terminals have to be executed using flexible cable section 1.5mm max (certified by IEC227 or IEC245 standard) provided with cable terminal. For Model 11-100F the input/output cables must be executed using press cables (certified by standards) for the keep the instrument protection IP65.

- Load cell connection cable : 4 x 1.5mmq, max 60m
Exceeding 60m add shielded cable 2 x 1.5mmq
for sensing connection.
- Output current cable : Shielded cable 2 x 1.5mmq
- Output and input commands : Use 1.5mmq cable.

POWER SUPPLY CONNECTION



WARNING

- 1- Don't put signal cables near power cables
- 2- Connect shields only where indicated on diagrams
- 3- Connect ground as specified by standards
- 4- Never use a Megger to verify connections

3.3 USING THE SENSING

When the distance of load cell and/or cells are more than 60m use a shielded cable 2x1.5mm, connected to 13(+) and 16(-) terminal blocks (see Dwg ST11-100P/F/04). Sensing function is used to feed back the power supply to maintain the load cell(s) voltage equal to the desired value even in case of high cable impedance. If the sensing has to be used, S1 and S2 jumpers on Mother board must be opened.

3.4 SUPPLY VOLTAGE

The MINI is a dual voltage instrument 115VAC or 230VAC

To select the appropriate voltage (Mod.11-100F) by the voltage selector mounted near the main switch (see pag.7A).

(Mof.11-100P) the voltage selector (INT2) is on the AC BOARD internal instrument.

Before powering on the instrument, check if the power supply you are using is appropriate.

Verify electrical connections and particularly check that no conductors at high tension have been connected to terminals or signal connectors.

3.5 CLEANING INSTRUMENT INSTRUCTIONS

Conclude the instrument installation and wiring, clean residuals of rubber or wire. Is not necessary other particularly cleaning because the instrument MOD.11-100F have protection IP65.

IF THE INSTRUMENT IS NOT INSTALLED AND CONNECTED IN COMPLIANCE WITH THE INDICATIONS OF THIS MANUAL, *Thermo Scientific* DOES NOT ASSUME RESPONSABILITY ABOUT THE INSTRUMENT.

4. SET UP OF SCALE PARAMETERS

4.1 GENERAL

If no specific application has been requested, the instrument will be supplied with following data :

Scale capacity	300.0 kg
Measure unit	kg
Resolution	0.1 kg

If a specific application has been requested besides this manual, our Technical Department will deliver a documentation containing all the specific data of your scale.

4.2 SET UP

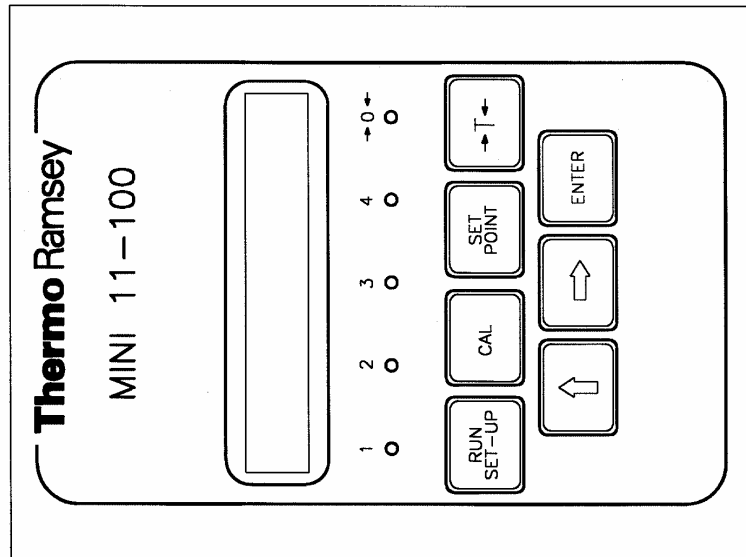
WARNING : press **RUN** to cancel each wrong selection

At the end of each selection push **[RUN]** to come back to normal running. There are three ways to access to parameters of MINI instruments :

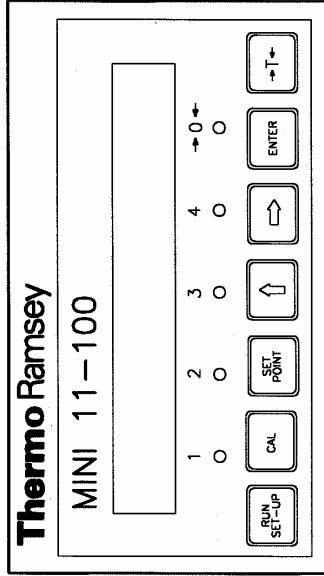
- a) With the function key **[SET UP]**, to modify all data of the instrument general set up.
- b) With the function key **[CAL]** for calibrations.
- c) With the function key **[SET POINT]**, to insert the parameters of the thresholds.

The drawing in the following pages show how to enter numeric data.








PANNELLO FRONTALE FRONT PANEL



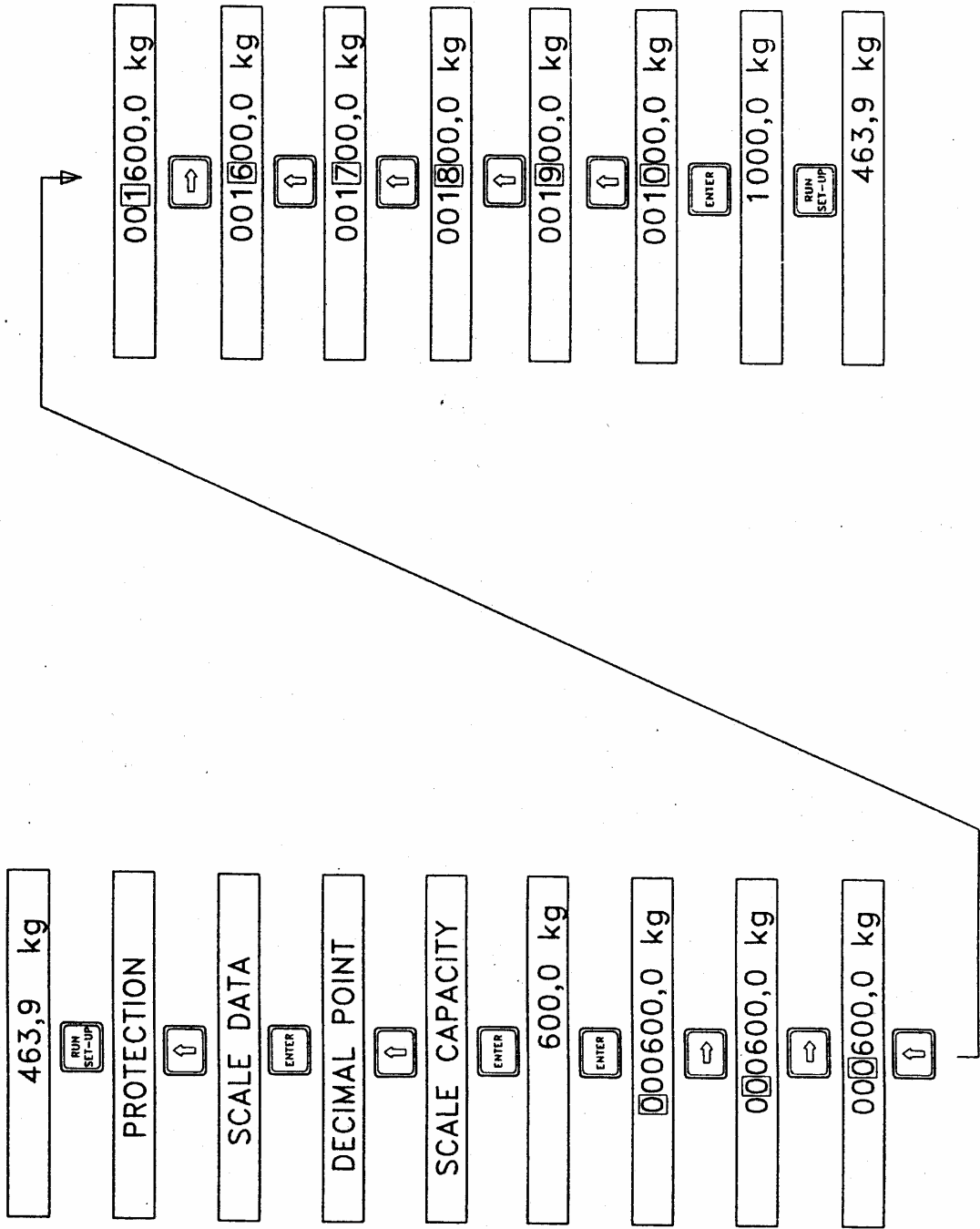
MINI 11-100F



MINI 11-100P

- | | | | |
|---|---|---|--|
|  | — ENTRA NELLE SEQUENZE DI PREDISPOSIZIONE |  | — PASSA AL CAMPO SUCCESSIVO NELLE IMPOSTAZIONI NUMERICHE |
|  | — TERMINA LE SEQUENZE DI IMPOSTAZIONE |  | — PASSA ALLA PROSSIMA CIFRA |
|  | — RUN INDICATOR |  | — SCROLL THE NEXT FUNCTION |
|  | — PERMIT ENTRY INTO MENU ACCESS MODES | | — WHEN ENTERING NUMERIC DATA INCREMENT NUMBER |
| | — ENTRA NELLE SEQUENZE DI CALIBRAZIONE | | — TORNA AL CAMPO PRECEDENTE |
| | — CALIBRATIONS MENU | | — NELLE IMPOSTAZIONI NUMERICHE PASSA ALLA CIFRA SEGUENTE |
| | — ENTRA NELLE SEQUENZE DI IMPOSTAZIONE | | — NELLE VISUALIZZAZIONI NUMERICHE TORNA AL TITOLO |
| | — SET THRESHOLDS | | — SCROLL BACK TO PREVIOUS FIELD |
| | — MEMORIZZA LA TARA | | — WHEN ENTRY NUMERIC DATA SCROLL THE NEXT DIGIT |
| | — CANCELLA TARA IN MEMORIA | | — ABORT NUMERIC ENTRIES |
| | — SET TARE | | — APRE UN CAMPO DI MODIFICA |
| | — RESET TARE | | — CHIUDE UN CAMPO DI MODIFICA |
| | | | — START MODIFYING A NUMERIC VARIABLE |
| | | | — STOP MODIFYING A NUMERIC VARIABLE |

EXAMPLE OF NUMERIC ENTRY
 CHANGE SCALE CAPACITY FROM 600,0 TO 1000,0 kg



4.3 SCALE CAPACITY

The scale capacity is expressed in engineering units and it is usually a value higher than the working rate, compared to the nominal capacity of load cells used in the application.

Ex : Load cell used – N°3 with max capacity 500kg – Total rate 1500kg
Working rate 500kg – Scale capacity defined at 600.0

- SELECTING THE DECIMAL POINT

Push **[SET-UP] [↑] [ENTER]**, the display will show **DECIMAL POINT**; push **[ENTER]** to display the value in memory. Push **[ENTER]** and use **[↑]** key until the desired value is displayed, then **[ENTER]** again. Finally press **[RUN]**. Select the value from the following table :

0	0	3	0.000
1	0.0	4	0.0000
2	0.00		

- SELECTING THE SCALE CAPACITY

Push **[SET-UP] [↑] [ENTER] [↑]** and the display will show **SCALE CAPACITY** ; Push **[ENTER]** and the actual value of scale will be shown (300.0).

Press **[ENTER]** and digit **000300.0**, press **[ENTER]**.

Compose the new value **600.0** pressing **[↑] [→]** followed by **ENTER**. Press **[RUN]**.

4.4 MEASURE UNIT

The measure unit can be selected among the following :

g kg q t LB LT

Act as follows :

Press **[SET-UP] [↑] [ENTER] [↑] [↑] [↑]** and MEASURE UNIT will be displayed. Press **[ENTER]** and the instrument will show the memorized measure unit. Push **[ENTER]** and use **[↑]** till you read the information you need and then press **[ENTER]** . Push **[RUN]** .

4.5 SCALE DIVISION

The scale division usually represents the instrument's resolution and it does not exceed 3000 divisions.

Ex : Full scale 600.0 (6000 divisions)

Minimum division = $6000 : 3000 = 2$ (200 g resolution)

Push **[SET-UP] [↑] [ENTER] [↑] [↑] [ENTER]**, the display will show the scale division in memory. Press **[ENTER]** and use the **[↑]** key until the desired value is shown, then **[ENTER]** again and then **[RUN]**.

4.6 SAMPLE WEIGHT

The calibration with sampling weights is considered as the most reliable. To perform this kind of calibration some type-tested sample weights are needed or just use sample masses already weighed with a scale having a high accuracy. The value is suggested to be included between 40 and 80% of full scale.

Ex : defined sample weight = 420.0 kg

Press **[CAL] [↑] [ENTER]** ; the display will show **SAMPLE WEIGHT**. Press **[ENTER]** and the value in memory will be displayed ; push **[ENTER]** again and use the **[↑]** and **[→]** key to compose the desired value ; then **[ENTER]** again and **[RUN]**.

5. SCALE CALIBRATION

5.1 GENERAL

A scale calibration is made of a ZERO calibration with empty scale and SPAN calibration using a sample weight.

Before starting any kind of operation, make sure of the right mounting of load cells and empty the scale so that the tare weight is only acting on load cell(s).

WARNING ! Press **[RUN]** to escape each wrong operation.

5.2 AUTO ZERO CALIBRATION

Press **[CAL] [ENTER]** and the display will show WAIT.

Wait till the message disappears (or press **[ENTER]** if you want to reduce the calibration time).

At the end the instrument will show **0.0 kg**.

Check for the repeatability of scale : putting on and off the weight the indication must come back to zero +/- one division.

5.3. AUTO SPAN CALIBRATION WITH SAMPLE WEIGHTS

Press the sample weight possibly in the centre of scale (ex.: 420.0 kg).

Push **[CAL] [↑]** and the display will show **AUTO SPAN WEIGHTS ;**

Push **[ENTER] [↑]**, the display will show **WEIGHTS LOADED ?**

Push **[ENTER]** the following message will appear : **WAIT**

At the end the value of the sample weights will be displayed.

Check for the repeatability of scale : putting on and off the weight the indication must be come back to the initial value +/- one division.

If the control gives negative results, carefully check the mechanical part.

5.4 AUTO SPAN CALIBRATION WITH ELECTRONIC RESISTOR

5.4.1 GENERAL

An instrumental calibration can be made with the MINI. Use a precision resistor to simulate a weight on the scale when a calibration with sample weights is completely impossible. If the instrument has been ordered for a specific application, a resistor of the proper value will be installed inside the instrument before delivery by *Thermo*

Ramsey ;

its value computed by our Tech. Departement keeping count of the load cells capacity and the scale capacity used in the application.

If the instrument has not been set, than a 49.9 Kohm resistor will be used.

5.4.2 ACCURACY

Using the electronic resistor, the calibration error in the best condition will be lower than strictly connected to the mechanical installation and to the values of constants inserted to obtain the equivalent load.

Usually we can have an error lower than +/- 1-2%.

EQUIVALENT COMPUTATION WITH ELECTRONIC RESISTOR

Use the following formula to obtain the value of equivalent weight :

$$\text{CALC R CAL} = \frac{P \times N \times 500}{K} \times \frac{RC}{(2 \times R_s \times N) + R_c}$$

Where :

- CALC R CAL = Equivalent weight in kg
- P = Nominal capacity of load cell in kg
- N = Number of load cells in parallel
- K = Load cell sensibility mV/V (usually 2mV/V)
- Rc = Bridge resistor power supply side (usually 350 Ohm)
- Rs = Calibration resistor in Ohm

For some standard values of resistors see the following table :

ELECTRONIC CAL. – EQUIVALENT LOAD TABLE (Valid for load cells Mod.10-27/28/30/31A/32/9363).							
ELECTRONIC REISTOR	F.S. OF A SINGLE LOAD CELL	EQUIVAL. LOAD	% OF SIMULATED WEIGHT REFERRED TO THE TOTAL AMOUNT OF NOMINAL CAPACITY OF LOAD CELL				
KOhm	kg	kg	1	2	3	4	6
20	50	109.1	Not Used	Not Used			
	100	218.2	Not Used	Not Used	72.7	54.5	36.36
	200	436.04	Not Used	Not Used	3	5	
49.9	50	43.76					
	100	87.52	87.52	43.76	29.1	21.8	14.58
	200	175.04			7	8	
100	50	21.85					
	100	43.71	43.71	21.85	14.5	10.9	7.28
	200	87.42			7	2	
150	50	14.57					
	100	29.15	29.15	14.57	9.71	7.28	4.86
	200	5.83					
221	50	9.89					
	100	19.78	19.78	9.89	6.59	4.94	3.29
	200	39.57					
499	50	4.38					
	100	8.76	8.76	4.38	2.92	2.19	1.46
	200	17.53					

How to read the table :

- 1) Three scale capacities (commonly used) have been used.
- 2) If the scale capacity is multiple of one of the three values, the decimal point will be moved right as many places as many nulls have been added to the scale capacity.
 Ex.: F.S. 50 kg = 43.76 kg equivalent load
 F.S. 500 kg = 437.6 kg equivalent load

Example of resistor used in a weighing system with more than one load cell.

- Total scale capacity = 10000 kg
- Nominal capacity of one load cell = 5000 kg
- Number of load cells = 3
- Total capacity of load cells = 15000 kg
- (Nominal cell capacity 5000 kg x 3 load cells)

Now, choose a resistor to simulate a weight included between 40 and 80% of scale capacity :

Resistor to be used	= 49.9 Kohm	
Simulated weight	= 4.376 kg	
% of simulated weight referred to the total capacity of load cells (15000 kg)		= 29.17 %
% of simulated weight referred to the scale capacity		= 43.76 %

5.4.3 AUTO SPAN CALIBRATION WITH ELECTRONIC REISTOR

After having calculated the value of the resistor as shown in the previous paragraph follow these procedures :

Make sure that the scale is empty and that the indicator shows 0 +/- one division. Otherwise proceed to AUTO ZERO calibration (see paragraph 5.2).

Enter **[CAL] [↑] [↑] [ENTER] [↑] [ENTER] [ENTER]** and insert the value of equivalent weight observing the decimal point previously defined inside the SCALE CAP function. End with **[ENTER] [RUN]**.

Enter **[CAL] [↑] [↑] [ENTER] [↑][↑]** the message SCALE EMPTY ? will be displayed. Press **[ENTER]**, the message WAIT will be displayed for some seconds. At the end the display will go back to the normal run.

5.4.4 MODIFYNG THE FILTER FACTOR

This function is mainly useful when the weighing system is subject to vibrations. By altering the value of this parameter, oscillations due to yhe mechanical vibrations can be removed.

Push **[CAL] [↑] [↑][↑] [ENTER]**, the value of the currently defined filter will be displayed. To alter the value push **[ENTER]** followed by **[↑][→]** to select the desired value. Then push **[ENTER] [RUN]**.

6. ACCESS PROTECTION TO KEYBOARD

6.1 PROTECTION LEVELS

The access to keyboard of the instrument can be protected by mean of some password. Protection levels are the following :

NONE The instrument is not protected

ACTIVE Process parameters cab be altered, but set up data are not accessible.

6.2 ACCESS CODE

The instrument is supplied with the default code :

20000000

6.3. PROTECTION INSERTION

Push **[SET UP] [ENTER]**, and the word **NOT ACTIVE** will be displayed. Push **[ENTER] [ENTER]** and use keys **[↑]** and **[→]** to enter the password (**20000000** if not already altered) and finally push **[ENTER]** ; at the end the word **ACTIVE** will be displayed. Push **[RUN]**.

To remove protection push **[SET UP] [ENTER]** and the word **ACTIVE** will be displayed. Push **[ENTER] [ENTER]** and use keys **[↑]** and **[→]** to enter the password (**20000000** if not already altered) and finally push **[ENTER]** ; at the end the word **NOT ACTIVE** will be diplayed. Press **[RUN]**.

6.3 MODIFYING THE PASSWORS

The password can be altered by using the following procedure :

Press **[SET UP] [↑] [↑] [↑][↑] [↑] [↑]**, the word **TEST** will be displayed. Press **[ENTER] [ENTER] [ENTER]** and use keys **[↑]** and **[→]** to edit the new password, terminate with **[ENTER]**.

The new password will be displayed only when the protection is not active.

WARNING !

Before enteringa new password, be sure to make a written copy of it and to store it in a safe place. If the new password will be forgotten, the only way to restore acces to the set up data will be to send the instrument to *Thermo Ramsey* for service.

7. NORMAL USE

7.1 KEYS OF NORMAL USE

The functions which can be used during normal running are the following :

[RUN] key	Always returns to the display of the weight. If used while the weight. If used while the net weight is displayed, will open the SET UP menu.
[CAL] key	Access the calibration functions
[↑] key	Select, NET LOAD, GROSS LOAD, TARE OR ALARMS
[SET POINT] key	Allow to set the thresholds.
[-T-] key	Set and reset tare. When some tare has been cleared, the symbol T is displayed on the left side of the screen.

7.2 Use of [-T-] key

This function is used for many applications, the most common are :

- Clearing the weight of the possible left over on the weight hopper
- Clearing the weight of the container of material that must be weighted.

To activated this function press **[-T-]** and the indicator will be set to zero.

To show that the function is active, the symbol **T** will appear on the left side of the display.

WARNING ! This key is always enable. If pressed while the scale is not empty, the indicator will istantaneously display zero.

To go back to the previus function press **[-T-]**.

8. ALARMS

8.1 GENERALS

Inside the program of the MINI some control functions are included, which allow to verify the correct working of the instrument, of the load cells and of the weighing process.

8.2 ALARMS IDENTIFICATION

When the instrument generates an alarm, the cause is displayed alternatively to the weight indication. To identify the cause, see the following table :

THRESHOLD 1 Weight exceeds threshold Nr.1

THRESHOLD 2 Weight exceeds threshold Nr.2

THRESHOLD 3 Weight exceeds threshold Nr.3

THRESHOLD 4 Weight exceeds threshold Nr.4

COLD START Set up data were lost during power off

LOAD CELL FAIL - The power supply to the load cell(s) could be interrupted
- Possible short circuit of the power cables of the load cell(s)
- Possible short circuit of the shield cable with one of the power cable.

MAX ZERO OCC The auto zero tracking function has compensated all the possible error of zero according to the specified limit.

8.3 RUNNING OPTIONS

Each alarm can be set as follows :

- **NONE** no action
- **ALARM** alarm, acts on alarm cumulative output

8.4 ALARMS RESET

To clear the alarm follow the procedure below :

Press **[↑]**, the display will show : **ALARMS** ;

Press **[ENTER]**, the display will show the pending alarm ;

Press **[ENTER]**, until the display will show the message : NO ALARMS and then press **[RUN]**.

Only alarms that are actually not existing will be reset. If the condition that caused the alarm message is still existing, the alarm will not be cleared.

8.5 HOW TO ENABLE OR DISABLE AN ALARM FUNCTION

To enable or disable an alarm act as follows :

Press **[SET UP] [↑] [↑] [↑] [↑] [↑] [ENTER]**. The description of the first alarm will be displayed : THRESHOLD 1.

Press **[↑]** until the desired alarm is displayed.

Press **[ENTER] [ENTER]** and use the **[↑]** key to properly set the alarm code, at the end press **[ENTER] [RUN]**.

9. OPTIONAL FUNCTIONS

9.1 GENERAL

In addition to the normal weight indication, the instrument provides some auxiliary functions making it suitable for simple automation process. Adding the SERIAL COMMUNICATION BOARD (OPTIONAL) a serial signal can be transmitted to supervisor or control instruments, or printer.

Optional boards are usually installed by *Thermo Ramsey* personnel only.

9.2 OPTIONS AVAILABLE IN STANDARD INSTRUMENT

The following list contains options that are already implemented in the standard instrument and that can be recalled without installing additional hardware.

9.2.1 SETTING THRESHOLDS (THRESHOLD 1/2/3/4)

The instrument provides four thresholds, each having the following features :

- **SET THRESHOLD Nr.** Weight over (or under) which to take action
- **VAR THRESHOLD Nr.** Variable on which the threshold is calculated. Can be the **NET WEIGHT** or the **GROSS WEIGHT**.
- **TYPE THRESHOLD Nr.** Can be :
 - HIGH** The relay is activated when the weight is over the set point.
 - LOW** The relay is activated when the weight is lower than the set point.
- **HYSTERESIS THR. Nr.** Hysteresis used before restoring the normal status of the relay. The relay is released when :
 - HIGH** The weight is lower than the set point minus the hysteresis.
 - LOW** The weight is higher than the set point plus the hysteresis.

Examples :

THRESHOLD 1 = 300 kg VAR. THRESHOLD 1 = NET WEIGHT

TYPE THRESHOLD 1 = HIGH HYST THRESHOLD 1 = 27 kg

The relay is excited when the net weight is higher than 300 kg and is released when the net weight is lower than 273 kg.

THRESHOLD 1 = 20 kg VAR. THRESHOLD 1 = GROSS WEIGHT

TYPE THRESHOLD 1 = LOW HYST THRESHOLD 1 = 3 kg

The relay is excited when the gross weight is lower than 20 kg and is released when the gross weight is higher than 23 kg.

To alter parameters act as follows :

Press [**SET POINT**] followed by [**↑**] as many times as required to display the desired parameter. Then press [**ENTER**] and [**↑**] [**→**] until the displayed value is the desired one. At the end press [**ENTER**] [**RUN**].

The contacts of the output relays are available on the rear terminals.

9.2.2 DIGITAL INPUTS SETTING

The instrument can be connected to three dry contacts. One of the following functions can be assigned to each input :

SET TARE Copy gross weight into the tare memory. Net weight is set to zero

RESET TARE Clear tare memory. Net weight is set equal to gross weight.

UPDATE TOTAL Add net weight to the total.

CLEAR TOTAL Set the total to zero.

HOLD WEIGHT Stop updating the displayed weight. Net and gross weights are frozen.

CLEAR PEAK The memory containing the “pesk” weight is cleared.

NOT USED The input is not used.

CLEAR ALARMS Reset all pending alarms.

9.2.3 DIGITAL OUTPUT SETTING

The instrument has four relays that provide four dry contacts on the rear terminals block. One of the following functions can be assigned to each output :

THRESHOLD 1 High or low threshold Nr.1

THRESHOLD 2 High or low threshold Nr.2

THRESHOLD 3 High or low threshold Nr.3

THRESHOLD 4 High or low threshold Nr.4

NOT USED The output is not used

ALARM Relay is off when an alarm occurs

INSTRUMENT READY Relay is on when the instrument is powered on, not in alarm condition, not in calibration

WEIGHT STABLE Relay is on when the weight is stable (weight Indication varies less than one division)

TOTAL UPDATED The total has been updated adding the net weight. A pulse is generated on this output.

TOTAL CLEARED The total has been cleared. A pulse is generated on this output.

9.2.4 AZT OPTION (AUTO ZERO TRACKING FUNCTION)

This function is used to keep the net weight equal to zero, if the are variations are contained within a predefined band.

To enable the function press **[SET UP] [↑] [ENTER] [↑] [↑] [↑] [↑]**, the display will indicate **AZT**. Press **[ENTER] [ENTER]** and use keys **[↑]** and **[→]** to enter the percentage value of the **AUTO ZERO TRACKING BAND** with reference to the scale capacity. End with **[ENTER]**.

Press **[↑]** the display will show **AZT TIME**. Press **[ENTER][ENTER]** and use keys **[↑]** and **[→]** to enter thr percentage value of the **AUTO ZERO TRCKING TIME** used to average the weight before zeroing. End with **[ENTER]**.

Press **[↑]** the display will show **AZT LIMIT**. Press **[ENTER][ENTER]** and use keys **[↑]** and **[→]** to enter the percentage value of the **AUTO ZERO TRACKING LIMIT**, with reference to the calibration zero. End with **[ENTER] [RUN]**.

Example :

SCALE CAPACITY = 500 kg

AUTO ZERO TRACK = 2.0 %

TIME AZT = 5 sec

LIMIT AZT = 5.0 %

Weights within plus and minus 1.0 kg (equal to 2% Of 500 kg) will be zeroed but up to a maximum of plus minus 2.5 kg (equal to 5% of 500 kg).

The weight will ahve to stay stable for a least 5 sec. Before the auto zeroing can take place.

9.2.5 TOTALIZER (OPTION)

This option is used to know the amount of material weighed with the scale. If the scale is used for a number of weighings and if the number and the total amount has to be recorded, set the instrument as follows :

Press **[SET UP] [↑][↑]**, the message **OPTIONS** will be displayed; press **[ENTER] [↑] [↑] [↑]**, the message **TOTALIZER** will be displayed. Press **[ENTER] [ENTER]** and use **[↑]** to select **YES**. End with **[ENTER] [RUN]**.

To use the totalizer option it is suggested to select one of the digital inputs for the **UPDATE TOTAL** function (see par. 9.2.2). Each time the input is closed, the instrument will add the net weight to the **totalization** register, and the **counter** register will be incremented by one.

To display the two register (**total** and **counter**) just press **[↑]** while the instrument is displaying the net weight until the following is displayed :

TOTAL	pressing [ENTER] the accumulated total is displayed
COUNTER	pressing [ENTER] the number of totalizations is displayed

To clear register act as follow :

Press **[↑]** until the TOTAL is displayed. Press **[ENTER] [ENTER]** and **0** will be displayed. To confirm zeroing press **[ENTER]**. To alter the value press **[↑]** and **[→]**; to skip zeroing (saving the old value) press **[RUN]**.

A digital input can also be programmed to clear the totalization register from remote (9.2.2).

9.2.6 PEACK DET (OPTION)

Use the function to display and save a quick transient signal.

Follow this procedure to enable the function :

Press **[SET UP] [↑] [↑]**, the message **OPTIONS** will be displayed. Press **[ENTER] [↑]**, the message **PEACK SENSOR** will be displayed. Press **[ENTER]** and then use the **[↑]** key to select **YES**. End with **[ENTER] [RUN]**.

The displayed weight will than not be the net weight, but the highest weight after the last clearing (peack weight).

The memory is cleared using a digital input that must be programmed for the CLEAR PEACK WEIGHT (see 9.2.2).

9.2.7 CLOCK (OPTION)

This option is used to configure the CLOCK component installed on the Serial Communication Board

Press **[SET UP]** [**↑**] [**↑**], the message **OPTION** will be displayed;

Press **[ENTER]** [**↑**] [**↑**] [**↑**] [**↑**], the message **CLOCK** will be displayed.

Press **[ENTER]** and then use the [**↑**] key to select one of these choices

- MM 58174
- MM 58274
- NOT USED

End with **[ENTER]** **[RUN]**

to identify the installed component read the reported code on the white label attached over the integrated circuit, installed on the left side of the battery (top view with terminals toward the top).

9.3 OTHER SPECIAL FUNCTIONS

Here follows a list of the special functions inside the instrument.

9.3.1 CURRENT (mA) OUTPUT

If the instrument was already set by the factory, after installing the follow this procedure :

Press **[SET UP]** [**↑**] [**↑**], the message **OPTIONS** will be displayed. Press **[ENTER]**, the message **CURRENT OUTPUT** will be displayed; press **[ENTER]** **[ENTER]** and use the [**↑**] key to select **YES**. End with **[ENTER]** **[RUN]**.

9.3.1.1 MODIFYING mA RANGE

The instrument is pre-set to the 4-20 mA operating range.

Other available ranges are : 0-20mA; 20-0mA; 20-4mA.

Close the jumper J1 on the optional board or insert a resistance of 500 Ohm on the terminal block 29 and 30 to select the output with 0-10V.

To select a range different from the default one, act as follows :

Press **[SET UP]** [**↑**] [**↑**] [**↑**] [**↑**], the message **CURRENT OUTPUT** will be displayed. Press **[ENTER]**, the message **mA RANGE** will be displayed; press **[ENTER]** **[ENTER]** and use the [**↑**] key to select the desired range. End with **[ENTER]** **[RUN]**.

9.3.1.2 mA VALUE SELECTION

The mA output can transmit one of the following variables :

GROSS The current output is proportional to the gross weight and is not affected by the **[-T-]** key.

NET The current output is a proportional to the net weight and it is set to the minimum value when the **[-T-]** key is pressed.

PEACK WEIGHT The current output is proportional to the peack weight in memory.

To select the current referred to the peak weight, act as follows :

Press **[SET UP] [↑] [↑] [↑] [↑]**, the message **CURRENT OUTPUT** will be displayed. Press **[ENTER] [↑]**, the message **mA VALUE** will be displayed; press **[ENTER] [ENTER]** and use the **[↑]** key to select the desired variable. End with **[ENTER] [RUN]**.

9.3.1.3 mA ZERO AND mA 100% SELECTION

Special function to use the 4-20mA signal within a defined range:

mA ZERO The percentage of the transmitted variable corresponding to the minimum signal.

mA 100% The percentage of the transmitted variable corresponding to the maximum signal.

Example: To transmit a 4-20mA signal in a range from 20% to 80% of the scale capacity.

mA ZERO : set 20%

mA 100% : set 80%

By default the output signal is transmitted on all the work range of the scale so the standard set up is the following :

mA ZERO : set 0%

mA 100% : set 100%

9.3.1.4 mA ABS VAL SELECTION

The mA output can be set for a charging or discharging batch.

CHARGE BATCH mA is proportional to the material loaded in the hopper.

DISCHARGE BATCH Hopper has been filled up and SET TARA has been made **[-T-]**, the mA signal is proportional to the material taken out from the hopper.

For uses with charge batch select : mA ABS VAL = NO

For uses with discharge batch select : mA ABS VAL = YES

To make the selection press **[SET UP] [↑] [↑] [↑] [↑]**, the message **CURRENT OUTPUT** will be displayed. Press **[ENTER] [↑] [↑] [↑] [↑]**, the message **mA ABS VAL** will be displayed ; press **[ENTER] [ENTER]** and use the **[↑]** key to select the desired value. End with **[ENTER] [RUN]**.

9.3.2 SERIAL COMMUNICATION LINE

(AVAILABLE with OPTION Serial Communication Board)

The serial communication line allows to connect the instrument to computers and PLC's. The line can be configured as RS 423 or RS 422.

9.3.2.1 SET UP OF THE SERIAL COMMUNICATION LINE

The standard instrument is supplied with :

- RS 423
- CTS (not checked)

To set the serial output, select some jumpers on the serial board Cod. 11-100-11, looking at the following table.

OUTPUT		JUMPER (J1)	
RS 423 (RS 232)		(A) Open	(B) Closed
RS 422 (RS 485)		(A) Closed	(B) Open

TERMINATOR SELECTION (J2)		
YES	(A) Open	(B) Closed
NO	(A) Closed	(B) Open

Access SET UP data, press [↑] [↑], the message OPTION will be displayed. Press [ENTER] and [↑] and the message SERIAL LINE will be displayed. Press [ENTER] [ENTER] [↑] and select YES, end with [↑] key select the SERIAL COMMUNICATION function. Press [ENTER] [ENTER] and select the desired function by [↑]. End with [ENTER].

PPROTOCOL can be selected between the following :

- **PC MASTER**, Ramsey standard
- **3964R**, Siemens standard
- **DF1**, Allen Bradley standard
- **MODBUS**, AEG standard

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Then with [↑] set the communication data.

LINE SPEED can be **300, 600, 1200, 2400, 4800, 9600, 19200, 38400** baud
STOP BITS can be **1** or **2**
PARITY can be **EVEN, ODD, NONE**
WORD LENGHT can be **7** or **8**

The communication protocols are described on a separate manual.

9.4 SET UP DATA RECORDING

SET UP parameters must be defined according to specific application. The table in the next page, allows to record all data you have inserted. The values in brackets are initialization data : in case of general zeroing (COLD START) the values in brackets will appear on the display. In case of loss of data, due to failure or special maintenance, the instrument will be quickly restored to its normal functions.

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9.5 TEST FUNCTIONS

The instrument MINI 11-100 is equipped with some test functions to detect possible failure.

PASSWORD On password can be installed to access the instrument.

A/D GROSS Reading of the number, between 0 and 32000 divisions, calculated by the A/D converter.

A/D NET Reading of the number, less the tare (zero), calculated by the A/D converter. This value is included between 0 and 32000 divisions (the signal is not filtered).

LOAD CELL SIGN. Reading of the load cell signal. This value must be included between 0 and 30mV.

E2PROM Check if the writing is right. Usually 0 will be displayed.

VERSION The version of the installed program is displayed (31.xx.xx.xx).

MEMORY TEST Check the writing on RAM is right. Press **[ENTER]** to start the memory test. If it will be positive, the message RAM OK will be displayed, on the contrary RAM ERROR.

INPUT TEST Test of the three digital inputs.

Open contact = 0 Closed contact = 1

OUTPUT TEST Test of the four digital outputs. Use **[↑]** and **[→]** to enable / disable the outputs.

LAMP TEST Test of the display and leds on the frontal panel.

FORCE VAL Force a signal of current output. Use key **[↑]** and **[→]** to set a value Referred to the scale capacity.

10. ADVANCED USE

To use the advanced functions of the instrument refer to Service Manual. For those companies who intend to train their personnel, *Thermo Ramsey* organizes some individual and group courses of instruction. For information, contact Service Departement.

11. MAINTENANCE

11.1 PREVENTING MAINTENANCE

No preventing maintenance is required. Periodical verifications of calibration could be needed for mechanical reasons related to the weighing system (tare modification, supports movements, etc.).

The interval between calibration verifications depends upon the use and the required accuracy.

We suggest starting to check for zero and span once a day with simulated method. Then use longer intervals up to the maximum that is compatible with the required accuracy.

12. SPARE PART LIST

Thermo Electron supplies the following spare parts :

MINI 11-100F

Mother Board CPU

Supply and Relays Chassis

Serial Out Board

Display Board

Key Board

Set N°10 fuse 1A 5x20 supply 115V

Set N°10 fuse 0.5A 5x20 supply 230V

MINI 11-100P

Mother Board CPU

Supply and Relays Chassis

Serial Out Board

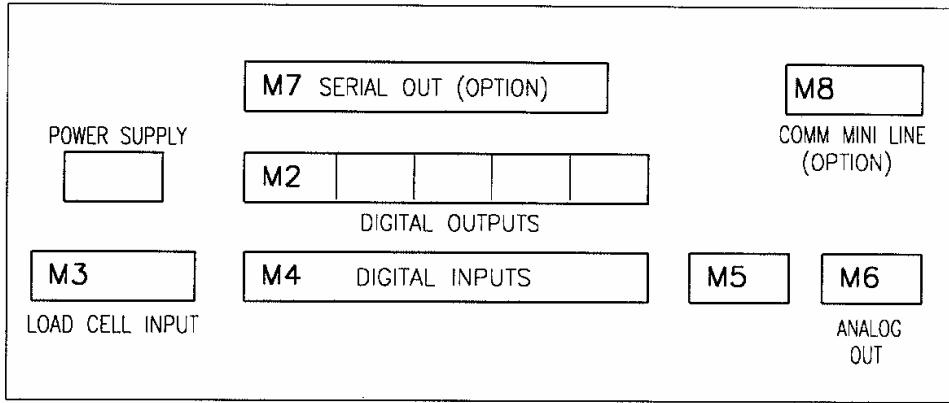
Key and Display group

Set N°10 fuse 1A 5x20 supply 115V

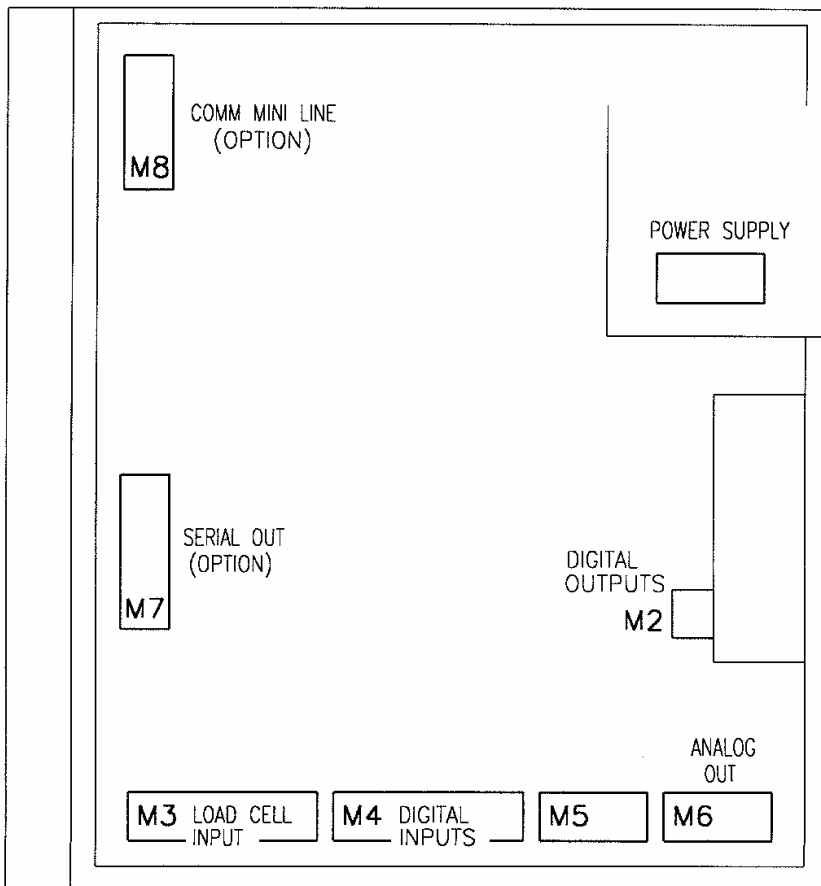
Set N°10 fuse 0.5a 5x20 supply 230V

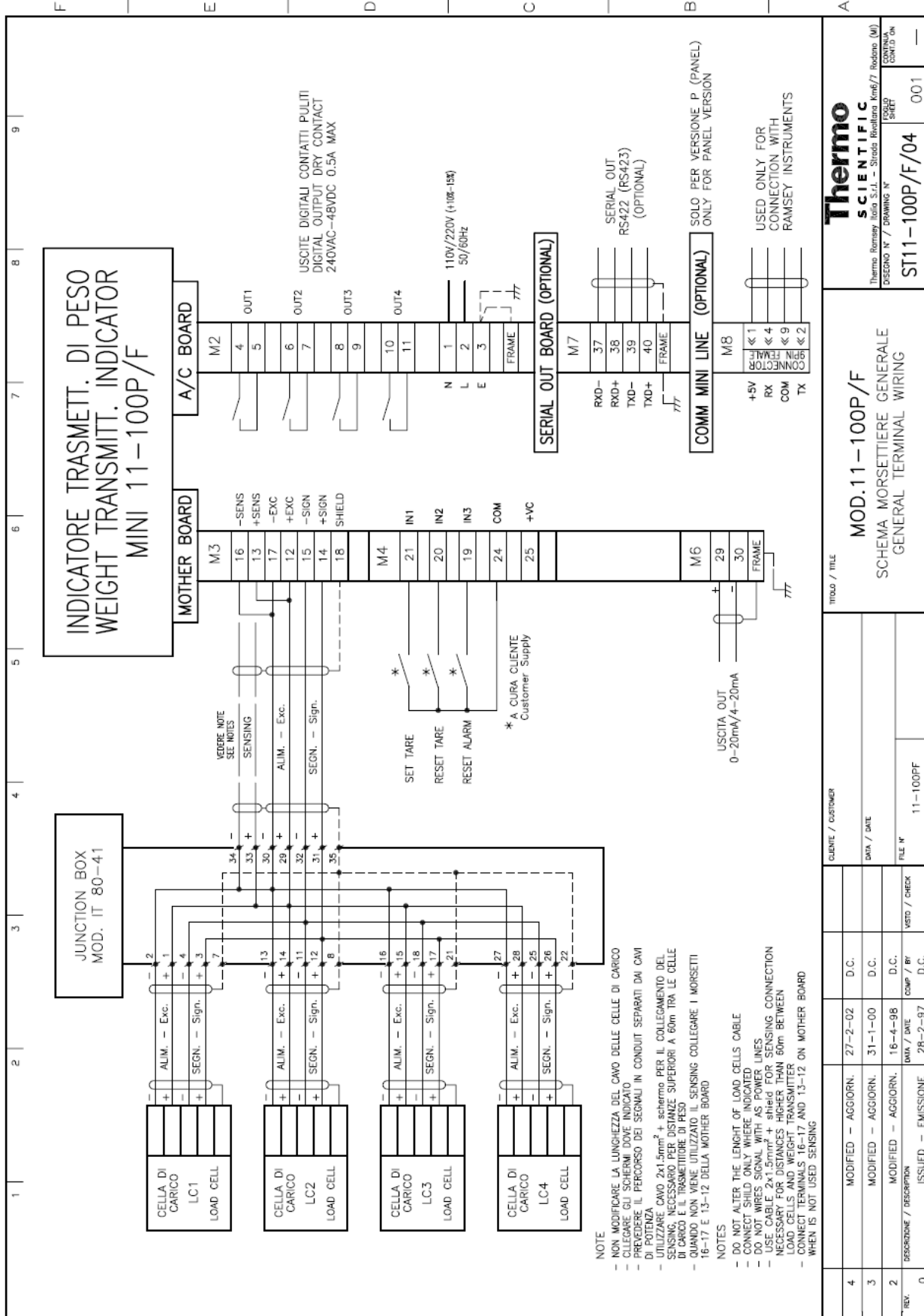
TERMINAL BLOCK LAYOUT

MOD.11-100P (REAR VIEW)



MOD.11-100F
(INTERNAL INSTRUMENT VIEW)





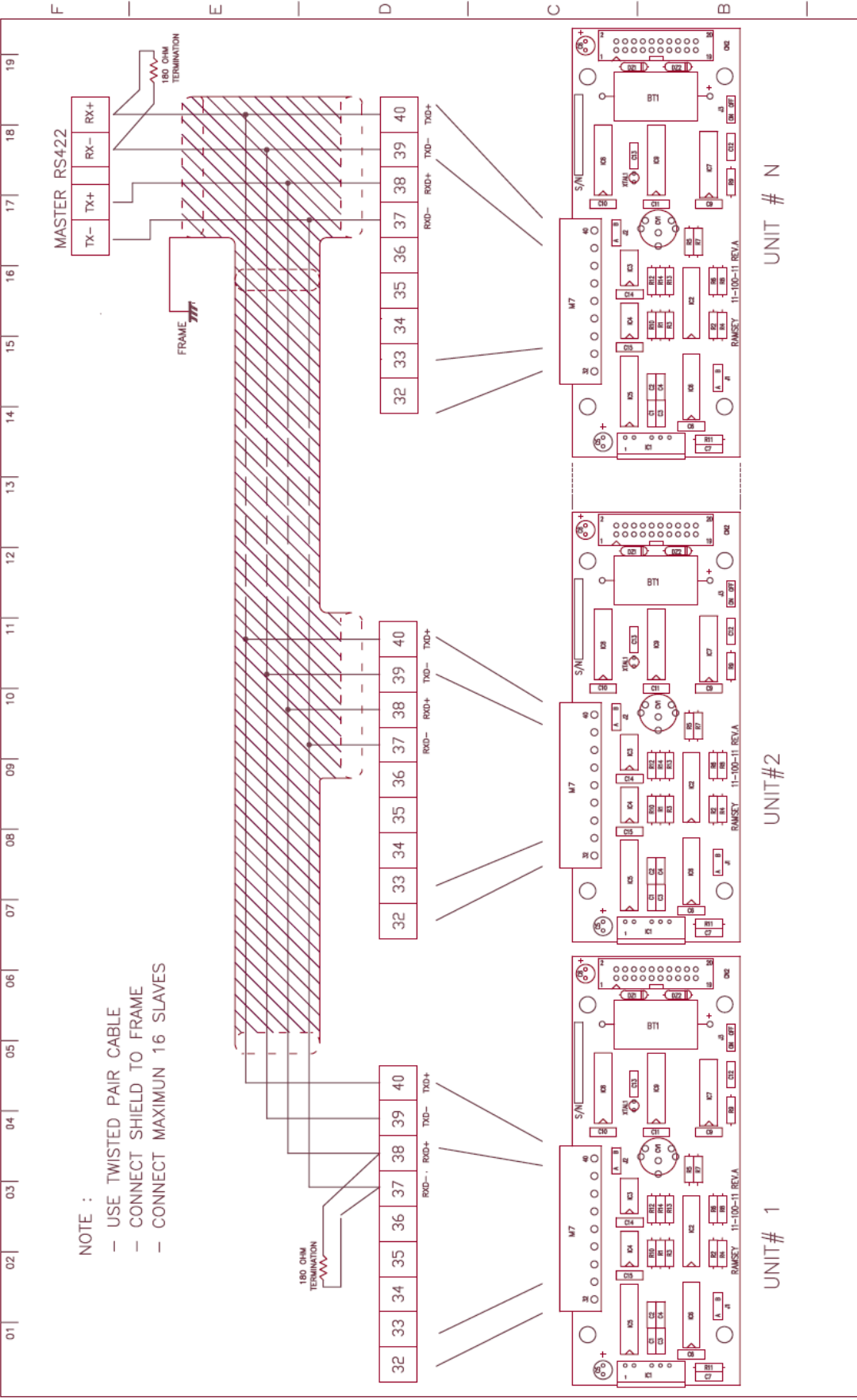
**INDICATORE TRASMETT. DI PESO
WEIGHT TRANSMITT. INDICATOR
MINI 11-100P/F**

Thermo
SCIENTIFIC
Thermo Ramsey Italia S.r.l. - Strada Riciclaria Nord/7 - Rodano (MI)
DISEGNO N° / DRAWING N°
ST11-100P/F/04

MOD. 11-100P/F
SCHEMA MORSETTIERE GENERALE
GENERAL TERMINAL WIRING

REV.	DESCRIZIONE / DESCRIPTION	DATA / DATE	COMP / BY	VERO / CHECK	FILE N°	CALIBRE / CUSTOMER	TITOLO / TITLE
4	MODIFIED - AGGIORN.	27-2-02	D.C.				
3	MODIFIED - AGGIORN.	31-1-00	D.C.				
2	MODIFIED - AGGIORN.	16-4-98	D.C.				
0	ISSUED - EMISSIONE	28-2-97	D.C.		11-100PF		

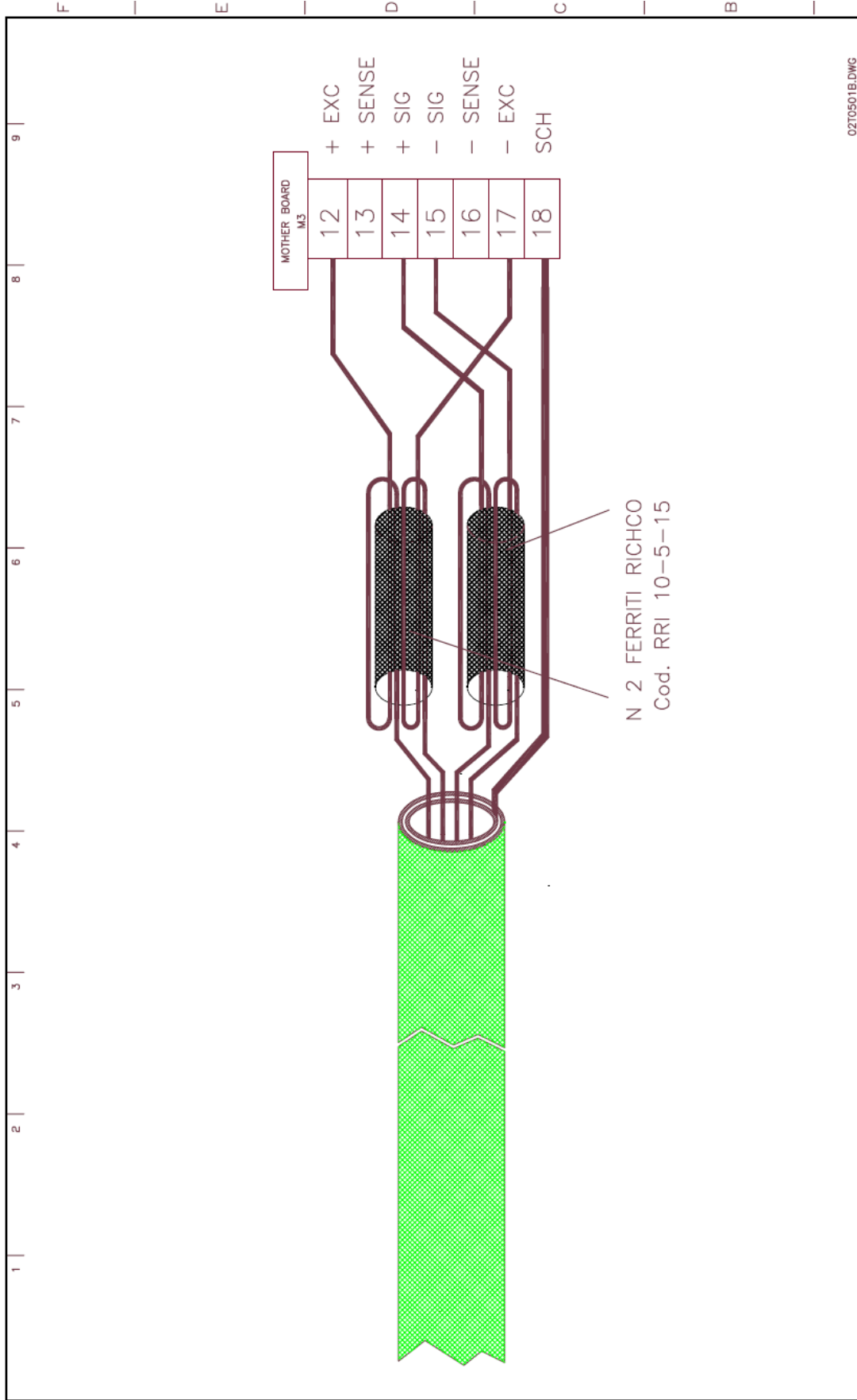
- NOTE**
- DO NOT ALTER THE LENGTH OF LOAD CELLS CABLE
 - CONNECT SHLD ONLY WHERE INDICATED
 - DO NOT WIRE SIGNAL WITH AS POWER LINES
 - USE CABLE 2x1.5mm² + shield FOR SENSING CONNECTION
 - NECESSARY FOR DISTANCES HIGHER THAN 60m BETWEEN LOAD CELLS AND WEIGHT TRANSMITTER
 - CONNECT TERMINALS 16-17 AND 13-12 ON MOTHER BOARD WHEN IS NOT USED SENSING
- NOTE**
- NON MODIFICARE LA LUNGHEZZA DEL CAVO DELLE CELLE DI CARICO
 - COLLEGARE GLI SCHIERMI DOVE INDICATO
 - PREVEDERE IL PERCORSO DEI SEGNALI IN CONDUIT SEPARATI DAI CAVI DI POTENZA
 - UTILIZZARE CAVO 2x1.5mm² + schermo PER IL COLLEGAMENTO DEL SENSING, NECESSARIO PER DISTANZE SUPERIORI A 60m TRA LE CELLE DI CARICO E IL TRASMETTITORE DI PESO
 - QUANDO NON VIENE UTILIZZATO IL SENSING COLLEGARE I MORSETTI 16-17 E 13-12 DELLA MOTHER BOARD



NOTE :
 - USE TWISTED PAIR CABLE
 - CONNECT SHIELD TO FRAME
 - CONNECT MAXIMUM 16 SLAVES

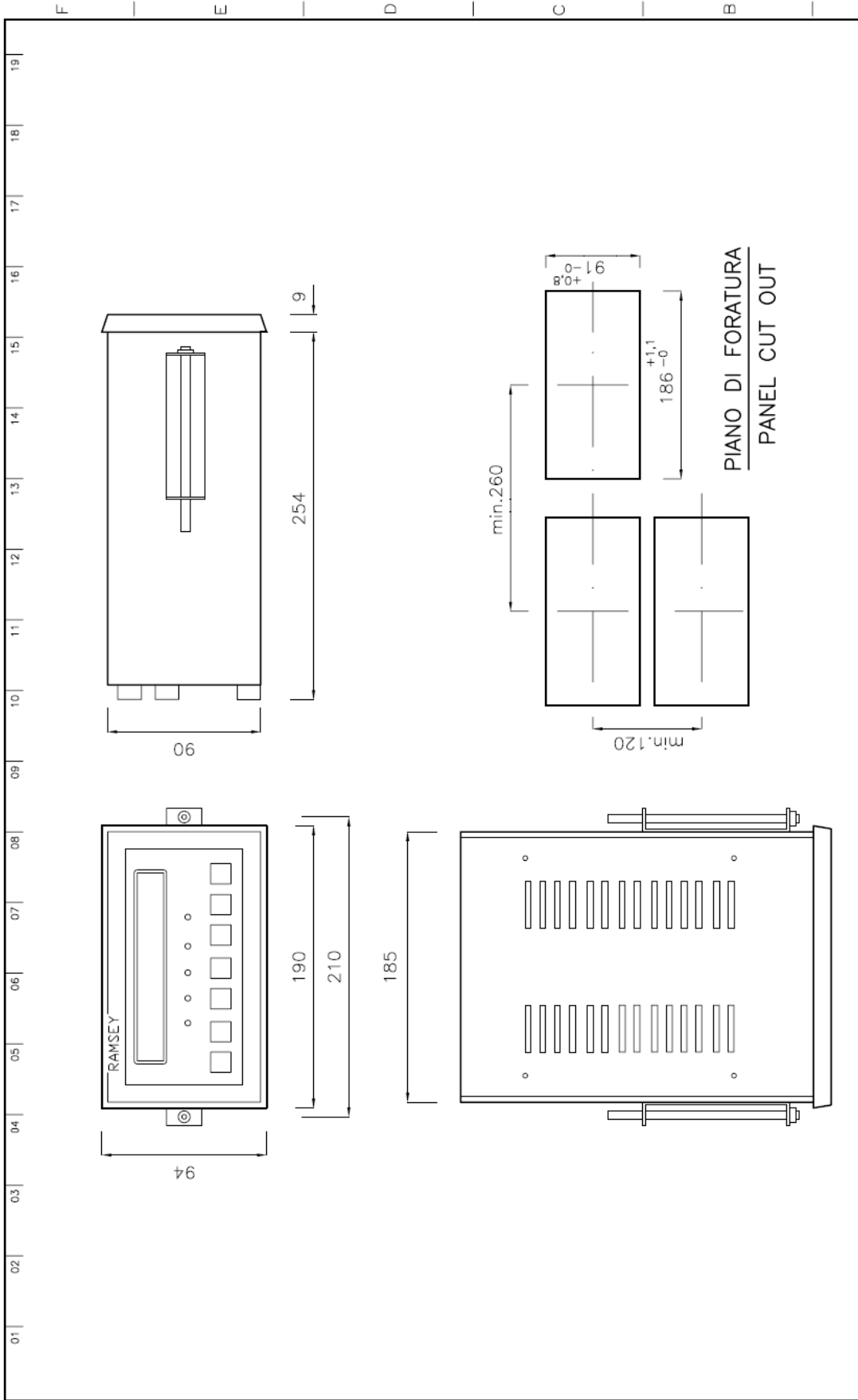
TITOLO / TITLE		CLIENTE / CUSTOMER	
MINI 11-100/101F/P			
OPTIONAL BOARD		DATA / DATE	
SERIAL CONNECTION RS422		COMP / BY	
		VISTO / CHECK	
		VISTO / CHECK	
REV.	E.C.O. 00-004	DATA / DATE	COMP / BY
B		31-01-00	Cattoloni
A	DESCRIZIONE / DESCRIPTION	14-02-96	Cattoloni
		ISSUE	
		ST11-100/101F/P-04S2	

Thermo SCIENTIFIC
 Thermo Ramsey Italia S.r.l. - Strada Rivelliana Km6/7 Rodano (MI)
 DESIGNO N. / DRAWING N. SOLO SILET
 CONTINUA CONT'D ON

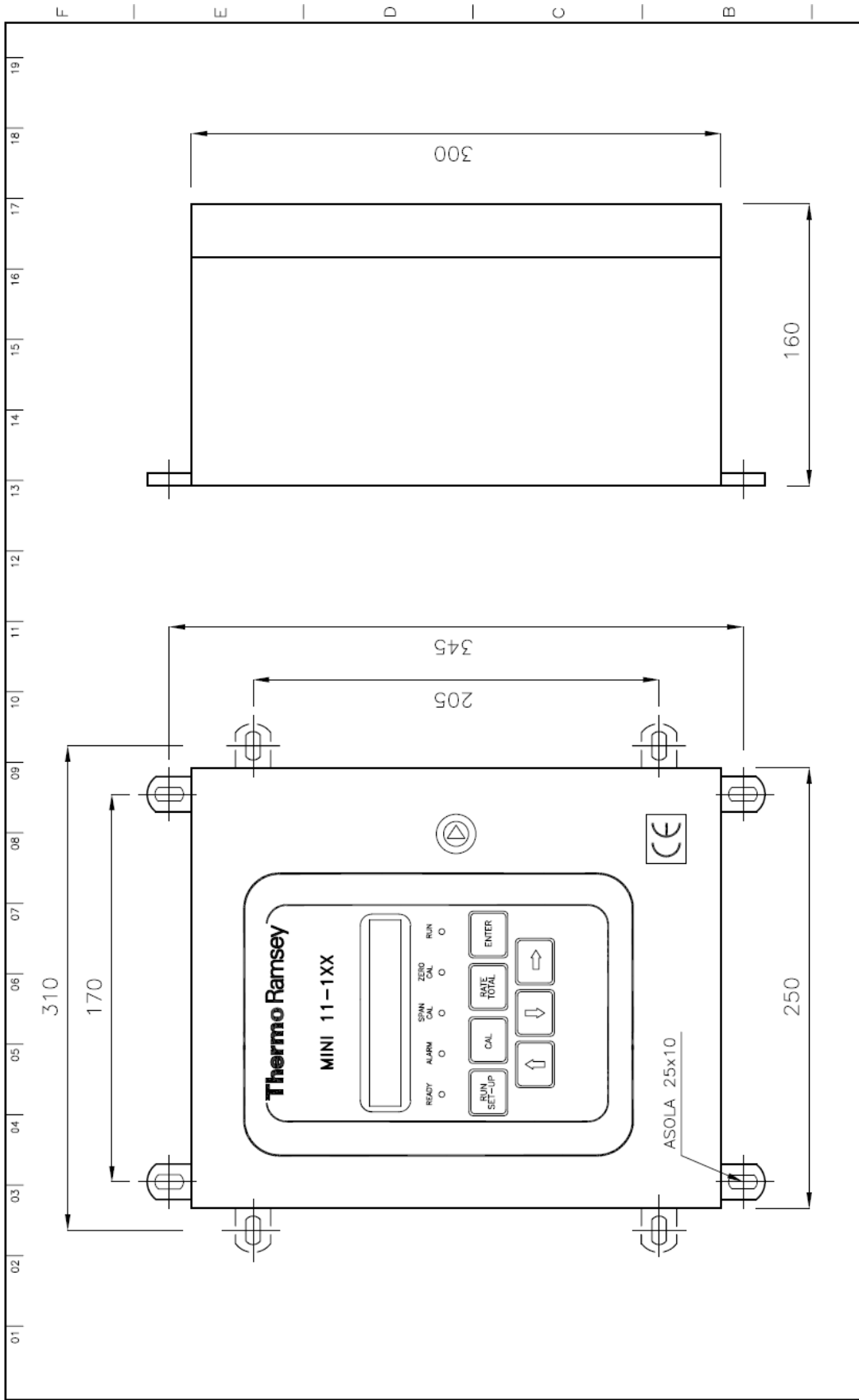


02T0501B.DWG

		CLIENTE / CUSTOMER		TITOLO / TITLE		Thermo SCIENTIFIC Thermo Ramsey Italia S.r.l. - Strada Rivoltana Km5/7 Rodano (MI) DISEGNO N° / DRAWING N°		MODELLO / SHEET DV 16-091 001 CONTRO / COPY ON ---	
		DATA / DATE		MINI 11-100/101F/P		PARTICOLARE DI COLLEGAMENTO			
		VERBA / CHECK		CELLA DI CARICO					
		DATA / DATE		E.C.O. 17-003					
B		01-07-97		Cattoloni					
A		27-08-96		Cattoloni					
		DESCRIZIONE / DESCRIPTION		E.C.O. 16-008					



01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	
CLIENTE / CUSTOMER											TITOLO / TITLE			Thermo Scientific Thermo Ramsey, Italia S.r.l. - Strada Rivallana Km6/7 Rodano (MI) CONTR. DA SHEET					
DATA / DATE											MINI MOD.11-100P/101P								
FILE N°											DIMENSIONI DI INGOMBRO								
D.D.C.											OVERALL DIMENSIONS								
D.C.											DV17-006								
REV.	DESCRIZIONE / DESCRIPTION		DATA / DATE	COMP / BY	USO / CHECK		FILE N°		D.D.C.				DV17-006		001				
0	EMISSIONE / ISSUED		3-2-97																



REV. 0		EMISSIONE		24-7-98		COMP / BY		C.D.		VISTO / CHECK		FILE N°		DV16-0790	
												DATA / DATE		CLIENTE / CUSTOMER	
														TITOLO / TITLE	
														Thermo SCIENTIFIC Thermo Ramsey Italia S.r.l. - Strada Rivoltana Km6/7 Rodans (MI) DISCEND N° / DRAWING N° DV16-079 001 -	
														MINI MOD.11-100F/11-101F DIMENSIONI DI INGOMBRO OVERALL DIMENSIONS	

INSTRUMENT PROGRAMMING TABLE

<p style="text-align: center;">SET UP (Default)</p> <p>Protection = _____ (not active)</p> <p style="text-align: center;">SCALE DATA</p> <p>DECIMAL POINT = _____ (0,0) SCALE CAPACITY = _____ (300,0 kg) SCALE DIVISION = _____ DIV1 MEASURE UNITS = _____ kg AUTOZERO TRACK = _____ 0,0 % TIME AZT = _____ 5,0 s LIMIT AZT = _____ 2,0 s</p> <p style="text-align: center;">OPTIONS</p> <p>CURRENT OUTPUT = _____ SERIAL COM = _____ TOTAL = _____ PEACK DET = _____ CLOCK = _____ LANGUAGE = _____</p> <p style="text-align: center;">INPUTS/OUTPUTS</p> <p>INPUT 1 = _____ (set tara) INPUT 2 = _____ (reset tara) INPUT 3 = _____ (reset alarms) OUTPUT 1 = _____ (threshold 1) OUTPUT 2 = _____ (threshold 2) OUTPUT 3 = _____ (threshold 3) OUTPUT 4 = _____ (threshold 4)</p> <p style="text-align: center;">CURRENT OUTPUT</p> <p>*RANGE mA = _____ (4+20 mA) *VALUE mA = _____ (gross) *mA ZERO = _____ (0,0 %) *mA 100 % = _____ (100 %) *mA ABS VALUE = _____ (no)</p> <p style="text-align: center;">ALARMS</p> <p>THRESHOLD 1 = _____ (not used) THRESHOLD 2 = _____ (not used) THRESHOLD 3 = _____ (not used) THRESHOLD 4 = _____ (not used) COLD START = _____ (alarm) LAOD CELL FAIL = _____ (alarm) MAX ZERO CORR = _____ (alarm)</p> <p style="text-align: center;">SERIAL COM</p> <p>*PROTOCOLL = _____ (Pc-Master) *BAUD RATE = _____ (19200) *STOP BITS = _____ (2) *PARITY = _____ (not used) *WORD LENGTH = _____ (8) *CTS = _____ (no) *ADDRESS = _____ (1)</p>	<p style="text-align: center;">TEST (Default)</p> <p>PASSWORD = _____ (20000000) A/D GROSS = _____ A/D NET = _____ LC SUP = _____ E2PROM = _____ SOFTWARE VER = _____ MEMORY TEST = _____ INPUT TEST = _____ OUTPUT TEST = _____ LAMP TEST = _____ FORCE VALUE = _____</p> <p style="text-align: center;">CAL</p> <p>AUTO ZERO = _____ AUTO SPAN WEIGHT = _____ SAMPLE WEIGHTS = _____ (100,0 kg) AUTO SPAN RESIST = _____ CALIBRATION RES = _____ (200,0 kg) FILTER = _____ (2,0 s) ZERO = _____ (2119) SPAN = _____ (550058)</p> <p style="text-align: center;">SET POINT</p> <p>SET THRESHOLD 1 = _____ (3,0 kg) SET THRESHOLD 2 = _____ (200,0 kg) SET THRESHOLD 3 = _____ (300,0 kg) SET THRESHOLD 4 = _____ (350,0 kg) VAR THRESHOLD 1 = _____ (gross) TYPE THRESHOLD 1 = _____ (low) HYST THRESHOLD 1 = _____ (0,5 kg) DLY THRESHOLD 1 = _____ (0,5 s) VAR THRESHOLD 2 = _____ (net) TYPE THRESHOLD 2 = _____ (high) HYST THRESHOLD 2 = _____ (0,5 kg) DLY THRESHOLD 2 = _____ (0,5 s) VAR THRESHOLD 3 = _____ (net) TYPE THRESHOLD 3 = _____ (high) HYST THRESHOLD 3 = _____ (0,5 kg) DLY THRESHOLD 3 = _____ (0,5 s) VAR THRESHOLD 4 = _____ (gross) TYPE THRESHOLD 4 = _____ (high) HYST THRESHOLD 4 = _____ (0,5 kg) DLY THRESHOLD 4 = _____ (0,5 s)</p>
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NOTE
The Items signed with * are displayed only when the relevant OPTIONS menu has been enable with YES.