



# | BM1000

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**DOC.**

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# Overview

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The BM1000 indicators are weighing indicators with several features appropriate for industrial use, including tares, printing tickets, counting scale mode, etc.

## FIRST USE

These indicators are supplied as a part of a full weighing equipment. Any additional configuration (for instance, communication) will have to be done tailored to the needs of the user.

## UPKEEP

The battery should be on full charge as often as possible. The number of times it can be recharged will depend on the condition of the usage, but there are several ways of ensuring a correct use of the device:

- ◆ Avoiding the full discharge of the battery;
- ◆ Recharging it frequently;
- ◆ Not overloading it by using components outside of the specification indicated in this manual
- ◆ In case it is stored away for long periods of time, recharging it fully at least once every three months.

In case the battery lasts for less time than predicted, please contact your supplier so as to take the necessary steps to replace it.

If the fault is attributed to the non compliance of the indications above, it will be deemed as bad usage; as such, the substitution of the battery will be of the full responsibility of the owner.

To keep the indicator in good condition, it should be cleaned according to the following:

1. Turning off the indicator using the ON/OFF key;
2. Disconnecting the indicator from the electrical current, removing the plug from the socket;
3. Using a clean and dry piece of cloth.

Do not use alcohol, detergents or other such abrasive products to clean the indicator, as there is a risk of damage.

It's necessary to avoid water getting into the indicator, as that may damage the electrical components.



## ABILITIES

BM1000P is not only an indicator, it can also:

- ◆ Create users for the indicator;
- ◆ Process weighings using tares;
- ◆ Attach products to weighings;
- ◆ Assign preset tares to products;
- ◆ Multiply the value of tares in a weighing;
- ◆ Perform counting based on a preset unitary weight;
- ◆ Communicate via several protocols;
- ◆ Alternate between two platforms\*;
- ◆ Connect via WiFi and Bluetooth\*.

\*

*The existence of these features will depend on the BM1000 model; it isn't possible to add these features afterwards.*

## INTERFACE | DISPLAY

When in a neutral state, ready to perform weighings, the display can show information other than the weight; on the bottom row two auxiliary numeric indicators can be found, one 8-digit long, to the right, and a 13-digit long one to the left.








Above the main field there are several indicators which can show specific information. Below a table can be found as to why each of those indicators mean:

Net	NET WEIGHT	The viewed amount is the net weight
	STABLE WEIGHT	The weighing is stabilized, without fluctuation
	ZERO WEIGHT	The current zero amount is the real weight (no tare)
	BATTERY IN USE	The indicator is unplugged from the mains
	ACTIVE COMMUNICATION	There is an active connection to another device
	GRAND TOTAL	The viewed amount is a calculated grand total
FIX	FIXED TARE	The current tare in use is fixed
Pcs	COUNTING SCALE MODE	The Counting scale mode is on

The characters in the main field may be displayed in other configurations, namely in the exploration of the system's menus; these cases will be approached in the relevant sections.

## INTERFACE | KEYPAD

The 7-key pad provides a way to navigate through the menus and settings, often using specific key combinations; some of the keys have a secondary indication for this reason.

	<b>ON / OFF</b>	Turns the device on or off, when pressed for 2s
	<b>SHIFT / ESCAPE</b>	Cancels operations and goes back in menus
	<b>ZERO</b>	Corrects residual weight, setting the indicator at zero
	<b>TARE</b>	Uses a semiautomatic tare
	<b>FIXED TARE</b>	Sets a tare for repeated use
	<b>PRINT</b>	Send the information to another device or to a printer
	<b>ENTER</b>	Validates an operation or value

# Operation

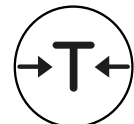
## TURNING THE INDICATOR ON

To turn it on: press the **ON/OFF** button for two second; the indicator will sound a signal, and then run a test to check whether it's working properly. This includes a countdown of all digits from 9 to 0. Some hyphens will be displayed still, and only when the displays proceeds to displaying zeroes can one start weighing:



## TARES

Tares exclude a given weight (for instance, one of a container) when weighing something. The indicator allows different types of tare:



**NORMAL TARE** | Put weight on the platform + **TARE** button

- It takes the weight on the platform as the tare, so as to then perform the weighing of the product itself; after the weighing, the tare also disappears – the indicator goes back to true zero.

**PRESET TARE** | *See prog-8 section*

- It's possible to set up to 4 tares that are stored in the indicator; to call for them, press **ENTER** and **FIX**. The intended tare can be selected using the navigation keys, and pressing enter afterwards; the tare will be deactivated after the weighing.

**FIXED TARE** | Weight on platform + **FIX**

- The tare is fixed in the system for several weighings; the remove the fixed tare, press the **ESC** and **F1** button in rapid succession.

## GRAND TOTAL

Grand total presents the sum of the registered weighings. Anytime a weighing is printed, either to a ticket or to another device, it is registered, and it only goes back to zero when the user clears the data in the indicator.

**ACCESS THE GRAND TOTAL SCREEN** | press **ENTER** twice;

**VIEW** | Access, and press **ENTER** a third time; the indicator will show the number of weighings and the sequentially accumulated weight;

**PRINT** | Access and press **PRINT**;

**CLEAR** | Deletes the data, pressing the **ZERO** key; the system will ask to confirm the action, which is done by pressing the **ZERO** key a second time.

# Operating Modes

The indicator can operate in different modes (**MODF**), which can be activated in the menu 6 of settings; some, like counting scale, can be activated using short-cuts. The operating modes are the following:

- 0 | Normal Mode
- 1 | Counting scale mode (accessible also via its own key)
- 3 | Remote Mode

## COUNTING SCALE MODE | MODF-1

The **COUNTING SCALE MODE** calculates the amount of units of a given product (e. g.: screws) based on a sample or reference unitary weight. The sample will consist of a given amount of units, to serve as a basis for calculating how many units the weight will represent.

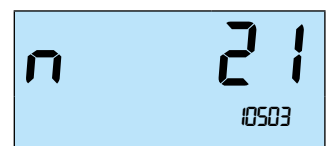
This can be done in one of two ways: through sampling the unitary weight, as described above, or through a product that already has a set unitary weight.

To use the **COUNTING SCALE** mode without a product associated, press the **COU** **N** **T** **I** **N** **G** key. The main indicator will show the number of units (n) e the secondary the current net weight. Place the sample units in the platform and press **EN** **T** **E** **R** to insert the number of units there are; then, place the units one wishes to weigh/count, and press **EN** **T** **E** **R** again for the indicator to show the total number of units that are on the platform.

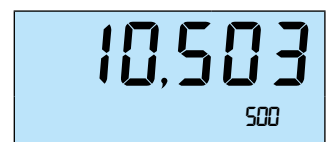
Pressing **SHIFT** and **ENTER** one quickly followed by the other will change the information on display, which can be edited at any moment through the enter key.

1. Number of units + Weight on the platform
  - **ENTER** edits the number of units
2. Number of units + Unitary weight of each unit
  - **ENTER** edits the unitary weight
3. Weight on the platform + Number of units
  - **ENTER** edits the number of units
4. Weight on the platform + unitary weight
  - **ENTER** edits the unitary weight

It is possible to print the result of a weighing in counting scale mode, via the printing key. The result will be as follows:



Main: number of pieces  
Auxiliary: total weight



Main: total weight  
Auxiliary: unit weight



```
Date: 1 Jan 2022
Ticket: 1
Net weight: 2.000 kg
Unit weight: 99.95 g
Number of units: 20
```

To exit the counting mode, press the **COUNTING** key for 3s.

### REMOTE MODE | MODF-3

This mode establishes a repetition behaviour, which establishes the remote interaction with another BM1000 indicator. It's possible to view the information of the first indicator and also emulate its keys as if it were the main indicator.

In order to establish this connection, it requires the following:

- ◆ Both devices must be connected through an available communication channel;

Set the main indicator to the chosen communication channel: parameter CM1/CM2 with the value of 2.

- ◆ Active the R type message.

# Printing

**PRINTING** stands for the sending of information from the indicator to another device, or by printing it physically in a ticket. The way this is done will depend on the modes of communication that have been set up and selected in the device.

It's possible to setup the printing of tickets for single weighings or for several ones in the same ticket. To change between these two possibilities it's necessary to set the communication protocol of the printer:

**MODE 6** | A simple ticket per weighing

**MODE 7** | A ticket for several weighings

In the case of the simple ticket, in which each weighing corresponds to a ticket (**MODE 6**), the operation is simple: when the **PRINTING** button is pressed, a ticket is printed with the following:

- ◆ date (according to the setup);
- ◆ the ID number of the ticket;
- ◆ the gross weight;
- ◆ the tare value;
- ◆ the net weight.

In the case of the ticket with several weighings, as soon as **MODE 7** is activated, the indicator will process each weighing as soon as it's been considered stable, and add it to the list of weighings to be printed in the ticket. The end of a weighing and the beginning of the next one is defined as the moment in which the indicator has a stable weight of **ZERO**.

This collective ticket will have the same information as the simple ticket, plus a total net weight for all the weighings in the ticket, and a total number of weighings registered in it.

If there are any auxiliary fields set up, after the **PRINTING** button is pressed, the indicator will ask to insert that information, using the **ALPHANUMERIC KEYS**, and then **ENTER** to submit it.

*Examples of tickets:*

*- Collective ticket immediately below*

*- Simple ticket, to the left*

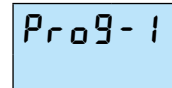
*Note the last line of the collective ticket skips the name of the product in case it wasn't set up.*

Date:	13 Jun 2023
Ticket:	1
Gross:	3.000 kg
Tare:	1.000 kg
NET:	2.000 kg

Date: 13 Jun 2023		Ticket: 2	
OPER.	GROSS kg	TARE kg	NET. kg
-----			
001	Hinges 1"		
A 1	3.975	1.620	2.355
002	Hinges 1" 1/2		
A 2	6.085	1.620	4.465
003	Hinges 2"		
A 3	4.285	0.000	4.285
A 4	6.565	0.000	6.565
-----			
OP.: 4		TOTAL	17.670 kg

# Settings and Programming

The settings for the indicator can be accessed via the settings button (seen on the right) held for two seconds.



## WEIGHT PARAMETERS

There are three weight-related adjustable parameters allowed by the indicator:

**STABILITY** | This refers to the necessary criteria for a weighing to be considered stable; the expressions of this parameter are two-fold: the reading margin (in internal divisions) for the weight to be considered stable, and how many consecutive readings are necessary to establish its stability (12 readings correspond to approximately 1 second).

**DIGITAL FILTER** | This refers to the behaviour of the display regarding weight variations; it can be set to take more or less time to show weight variations detected on the platform.

**ADC FILTER** | This interacts closely with the digital filter; it's connected to the read performed by the scale itself, whereas the digital filter concerns only the displaying of that information; the bigger the number of readings, the less stable the converter will be.

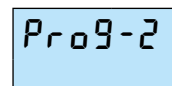
The values for each parameter are set by selecting a digit from 0 to 9; what each digit represents in the three parameters is detailed below::

	Parameter									
	0	1	2	3	4	5	6	7	8	9
Stability										
Read margin (divisions)	8	6	6	3						[*]
Nr of Consecutive readings:	4	6	12	18						
Digital Filter										
ADC Filter	5	6	7	8	9	10	12	15	20	25

[\*] Value 9 of the stability criterion does not establish a specific value; rather, it allows for the insertion of personalized values for the number of consecutive readings [NUM024] and the reading margin [MAR100]

## COMMUNICATIONS PARAMETERS

It is possible for an indicator to have two communications ports; the comms parameters are divided into two groups: the settings applicable to communications in general, having effect over both ports; and the settings specific to how each port is to behave – these are the same for both ports, but the two can have different setups. Thus, when accessing the PROG-2 menu, there are three submenus: a) the parameters applying to both ports, b) the parameters specific to port A, and c) the parameters specific to port B. The map below shows the distribution of the parameters:



- |       |                      |  |   |
|-------|----------------------|--|---|
| 1     | Shared Parameters    |  | <ul style="list-style-type: none"> <li>◆ Automatic Printing</li> <li>◆ Counting Scale Mode Settings</li> <li>◆ Communication Rate</li> <li>◆ Quilo Protocol</li> <li>◆ Weight Messages</li> </ul>                   |
| <hr/> |                      |  |   |
| 2     | Channel 1 Parameters |  | <ul style="list-style-type: none"> <li>◆ Comms Protocol</li> <li>◆ Baud Rate</li> <li>◆ Number of bits</li> <li>◆ Ticket Width</li> <li>◆ Ticket Format</li> </ul>  |
| <hr/> |                      |  |   |
| 3     | Channel 2 Parameters |  | <ul style="list-style-type: none"> <li>◆ Zeros to the Left</li> <li>◆ Extra Lines at End of Ticket</li> <li>◆ Communications Format</li> <li>◆ Request</li> <li>◆ Internal Points</li> <li>◆ Data Origin</li> </ul> |

### AUTOMATATIC PRINTING MODE

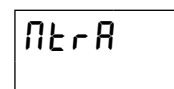
0	Inactive
1	Active

When the automatic printing mode is active, in order to print it's only necessary to place a weight in the platform and press the **PRINT** key. The system records and prints a new weighing every time there is a load on the platform and the weight stabilizes. The cycle ends by pressing the **PRINT** button again with the weight on zero.

### COUNTING SCALE SETTINGS

Definition of the minimum requirements for the performance of sample calculation. In case the set requirements aren't met, an error message is displayed.

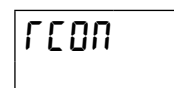
0	Sample > Min Weight
1	Sample > 1:1000 Min Weight
2	Accepts any samples, so long as Weight < Min Weight



### COMMUNICATION RATE

Measured in units of 100 mS; where each digit from 1 to 9 represents a hundred milliseconds - selecting 5 means 500 milliseconds of delay.

0	No delay in sending weight messages
1-9	Milliseconds of delay (in hundreds) in sending weight messages



### QUILO PROTOCOL

Activates the use of the exclusive **QUILO** protocol, which establishes the communication with some types of devices and applications (e.g.: remote setup of the indicator from a computer, or the remote access to the weight).

0	Inactive
1	Active

0, Lo

### WEIGHT MESSAGES

Weight messages contain information which can be sent by the device. In this menu it's possible to determine which types of messages are allowed to be sent, regardless of the configurations of each communication channel. The indicator lists the message types sequentially, which we can in turn set as active or inactive:

0	Inactive
1	Active

FrA

R	Remote
P	Weight
T	Tare
J	Raw readings of ADC converter
C	Counting Scale mode

### COMMUNICATION PROTOCOLS

The indicator is prepared to use several communications protocols. The specifications of each of these are described in the Technical Support Document. Here is a list of the protocols each value refers to.

PRU

0, 1, 2	BM	A	MOBBA	E, 11, 12	DSD (BM)
3, 4, 5	TISA	B	METTLER	10	BERKEL-CASIO
6, 7	[Ticket]	C	GRAVITON	13	STAR, DIALOG60
8, 9	EPELSA	D	MOBBA Mini SP	14	RAFELS
				18	DCPC

### BAUD RATE

	bits/s		bits/s
12	1200	192	19200
24	2400	384	38400
48	4800	576	57600
96	9600	1152	115200

bAU

### NUMBER OF BITS

The 7-bit mode automatically places two stop bits; 8 bits correspond to one stop bit.

0	7 bits
1	8 bits

bits

### PARITY

0	No parity
1	Odd
2	Even

Par

### TICKET WIDTH

0	32 column ticket
1	40 column ticket
2	40 column ticket, double width

RI nP

### PRINTER

0	Printer
1	Small label maker format 1
2	Small label maker format 2
3	Big label maker format 1
4	Big label maker format 2
5	Format preset on the label maker

Pf n

### LABEL FORMAT

When 5 is selected in the previous section, there is a need to insert a name for the preset label format.

### ZEROS TO THE LEFT

Option to complete the weight value with spaces or zeros to the left of the value; parameter which becomes relevant in some protocols like Mobba, Mettler, etc.

0	Inactive
1	Active

Pf n

05-

### EXTRA LINES AT THE BOTTOM OF THE TICKET

In digits, it sets how many extra lines should the ticket have in order to facilitate the cut from the roll.

CTLF

## I/O PARAMETERS

Prog-3

The I/O parameters refer to the option settings for the indicator's input and output channels:

**RELAYS** | A relay is a switch, which means it can only be on or off. Its activation may depend on a number of variables, which are the settings that can be determined in these menus. The indicator can have up to 4 relays.

**CURRENT LOOP** | The current loop (4-20 mA) refers to the analogue communication method used by the indicator to send weight information according to industry standards.

The adjustable parameters for each of the four relays are the same:

Mode	0	Off
	1	On when weight is above X
	2	On when weight is below X
	3	Reserved
Duration	0	Time delay is off; the relay changes the status according to the pervious setting (mode)
	1 a 255	Relay time delay in milliseconds (150 equals 1,5 seconds)
Weight	Activation weight for the relevant relay	

The current loop refers to the amplitude of the current in milliamperes that corresponds to the weight scale allowed by the scale: the current loop ranges from 4 to 20 mA, making it possible to match the maximum and minimum of this current with customizable weight values. The current transmitted by the equipment will correspond to the weight according to this scale.

- ◆ Weight < 'MIN' programmed, the current will be below 4 mA ( $\approx 3.6$  mA);
- ◆ Weight > 'MAX' programmed, the current will be above 20 mA ( $\approx 20.4$  mA);
- ◆ Within the programmed margins, a linear value between 4 and 20 mA will correspond to weight.

Current Loop	0	Deactivated
	1	Activated when the weight is over X
	2	Activated when the weight is under X
Minimum Weight	Minimum weight value for sending weighing	
Maximum Weight	Minimum weight value for sending weighing	
Gross Weight	0	"Weight" refers to net weight
	1	"Weight" refers to gross weight
Fine tuning for: - minimum level - maximum level	It's necessary to insert a reference value in the platform for each level; afterwards, it's possible to adjust the intended alteration with the help of an ammeter connected to the indicator.	

## OPERATION MODE AND LANGUAGE

Prog-6

This section contains the following customizable parameters:

Operation Mode (selecting one activates it)	0	Normal Mode
	1	Counting Scale Mode
	3	Remote Mode
	4	Automatic Weighing with Discontinuous Totalizer
	5	Chromatic Levels of Weighing
Display Retrolighting	0	Always on
	1	Turns off after 20s of inactivity
	2	Always off
	3	Turns off after 20s of inactivity; turns back on when weight is put on the platform, or when the keypad is used
	4	Turns off after 5s; turns back on with a weight over the min
Point / Comma	0	Uses decimal point as separator
	1	Uses comma as separator
Language	0	Spanish
	1	Portuguese
	2	French
	3	German
Real Time Watch	0	Inactive date and time system
	1	Active date and time system

## OTHER PARAMETERS

Within the **LANGUAGE** menu above, extra parameters come available when the zero key is pressed for two seconds:

Real Time Watch	0	Inactive date and time system
	1	Active date and time system
Relays On	0	Deactivates the use of the relay board
	1	Activates the use of the relay board
Shift/Enter	0	Doesn't allow shortcuts to access menus
	1	Allows shortcuts to access menus
Versão	0	Uses version 0 of the device
	1	Uses version 2 of the device
Double Cell	0	Blocks the possibility to swap between platforms
	1	Allows the possibility to swap between platforms



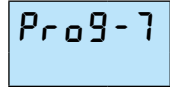
## TICKET PARAMETERS

Configuration of the ticket header, using the numeric keypad to insert the intended characters. The system is similar to keypad mobile phones, in which the keys will correspond to different letters – it's possible to see which ones in the face of the indicator (1 is for punctuation). A list of the available characters and how they are displayed can be found in the annex.

To navigate between characters the direction keys are used, and enter confirms the selection.

The header has a width of 20 characters, and the footer of 16.

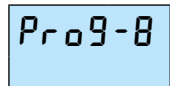
It is still possible to set up 5 auxiliary fields for the insertion of one-off information. These additional fields will be triggered when finishing the ticket with multiple weighings and will be printed in the foot. The use of each line can be activated or deactivated during its editing, using the products key.



## PRESET TARES

The indicator can hold up to 4 tares for more practical use. The weight of each one can be inserted with the numeric keypad and the direction keys (to navigate between digits). To confirm the weight of the tare, press enter; that will open the next tare, which can be set up or skipped.

To avoid going through all the tares, we can use the numeric keypad to select the tare that needs to be setup.



# Character Correspondence

Dec	ASCII	LCD	Dec	ASCII	LCD	Dec	ASCII	LCD
32	[espaço]		63	?	?	94	^	^
33	!	!	64	@	@	95	_	_
34	"	"	65	A	A	96	`	`
35	#	#	66	B	B	97	a	A
36	\$	\$	67	C	C	98	b	B
37	%	%	68	D	D	99	c	C
38	&	&	69	E	E	100	d	D
39	'	'	70	F	F	101	e	E
40	(	(	71	G	G	102	f	F
41	)	)	72	H	H	103	g	G
42	*	*	73	I	I	104	h	H
43	+	+	74	J	J	105	i	I
44	,	,	75	K	K	106	j	J
45	-	-	76	L	L	107	k	K
46	.	.	77	M	M	108	l	L
47	/	/	78	N	N	109	m	M
48	0	0	79	O	O	110	n	N
49	1	1	80	P	P	111	o	O
50	2	2	81	Q	Q	112	p	P
51	3	3	82	R	R	113	q	Q
52	4	4	83	S	S	114	r	R
53	5	5	84	T	T	115	s	S
54	6	6	85	U	U	116	t	T
55	7	7	86	V	V	117	u	U
56	8	8	87	W	W	118	v	V
57	9	9	88	X	X	119	w	W
58	:	:	89	Y	Y	120	x	X
59	;	;	90	Z	Z	121	y	Y
60	<	<	91	[	[	122	z	Z
61	=	=	92	\	\	123	ç	
62	>	>	93	]	]	124	Ç	



# Technical Specifications

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## METROLOGICAL DETAILS

Class	III
Number of verification scale intervals	≤ 6000
Load cell excitation power supply (V DC)	5 V DC
Maximum signal voltage for dead load (mV)	10 mV
Minimum signal voltage for dead load (mV)	0,05 mV
Minimum input-voltage per verification scale interval, e (μV)	0,03 μV/e
Measuring range minimum voltage (mV)	6,05 mV
Measuring range maximum voltage (mV)	20 mV
Operating temperature range (°C)	0-40 °C
Minimum load cell impedance	44 Ω
Maximum load cell impedance	1050 Ω
Value of the fractional error pi	0.5
Recommended specification of the load cell cable:	
Type	6 x 0.5 mm <sup>2</sup>
Size	< 100 m
Section	≤ 0.5 mm <sup>2</sup>
Impedance	< 5.4 Ω

## ENERGY

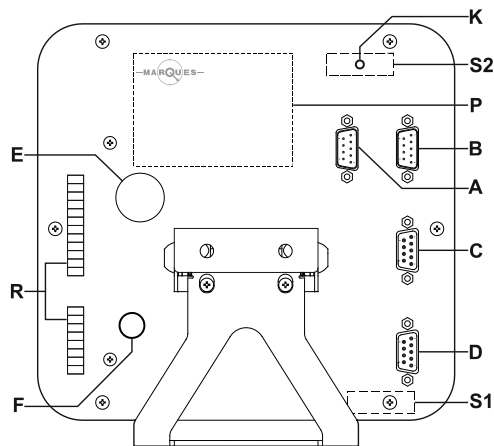
Internal Commuter Source (AC version)	100-240 V AC
Min power	15 W
Frequency	50-60 Hz
External adaptor (DC version)	12 V DC
Min Power	12 W
Conector	2.1x5.5x10 mm
Polarity (positive in the centre)	

## COMMUNICATIONS

RS-232 Series (TX/RX)	Up to 2 ports (not possible with extra connections, like Ethernet)
Ethernet (10/100)	1 (in case the model has this connection)
WIFI (2.4GHz)	1 (in case the model has this connection)

# Physical Characteristics

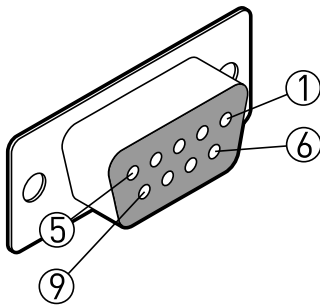
## DESCRIPTION OF THE INDICATOR'S PHYSICAL COMPONENTS



- A** COM2
- B** COM1
- C** Cell connector / Plataform 2
- D** Cell connector / Plataform 1
- E** Reserved
- F** Conector / Feed
- R** I/O Option
- P** Plate of characteristics
- S1** Seal
- S2** Adjust Seal
- K** Adjust Seal

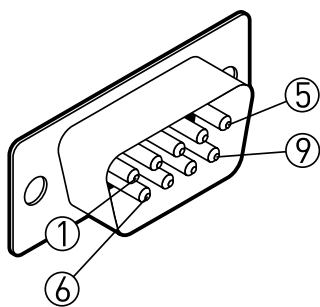
## RS-232 CONNECTORS [COM1 / COM2]

Female plug - DE-9 (D-SUB)



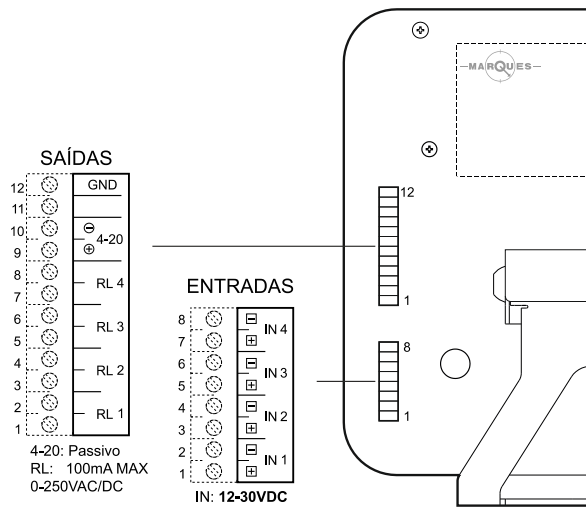
Pin	Function
1	Sense - S-
2	Signal - Out-
3	Shield SH
4	Signal + Out+
5	Sense + S+
6	Excitation - V-
7	
8	
9	Excitation + V+

Male plug - DE-9 (D-SUB)



Pin	Function
1	
2	TxD TX
3	RxD RX
4	
5	Ground GND
6	
7	
8	
9	

## I/O CONNECTORS LAYOUT



**DO NOT GO OVER THE SPECIFIED VOLTAGE OR CURRENT LIMITS: 250V AND 100MA MAX PER CONTACT!**

The necessary current for the current loop to work must be generated externally.

The power between pins 9 and 10 must not exceed 16V.

# Weight Messages and Protocols

## P TYPE WEIGHT MESSAGE

Protocol used in MODE 0. A weight message can be sent from the device through the RS232 port. The indicator makes use of several protocols for communication. The selection of the type of communication is defined in the program 2 section (PROG-2) through the parameter CM1 or CM2, depending on the port being used.

Structure of the message	P	D6	D5	D4	D3	D2	D1	ST	CR	LF
	P P character (ASCII 50h)									
Caption	D6-D1 Weight. Zeros to the left will be substituted by a space (ASCII 20h), depending on the settings of the port.									
	ST Status byte (flag)									
	CR Ending character for the weight message (carriage return)									
	LF Ending character for the weight message (line feed)									
Values for the ST flag	7	6	5	4	3	2	1	0		
		ADC Error	Static Tare	Min Weight	Negative Weight	Zero Weight	Tare	Stable Weight		

## R TYPE MESSAGE

This message is used mostly when a BM1000 indicator is being used as a repeater.

Structure of the message	R	D6	D5	D4	D3	D2	D1	A6	A5	A4	A3	A2	A1	ST	CR	LF
	R R character (ASCII 52h)															
Caption	D6-D1 Weight. Zeros to the left are substituted by a space (ASCII 20h)															
	A6-A1 Estado do caractere de peso correspondente:															
			HEX	ASCII												
			0x00h	(NUL)	<i>Normal digit</i>											
			0x10h	(DLE)	<i>Normal digit with a decimal point</i>											
		0x01h	(SOH)	<i>Intermittent digit</i>												
		0x11h	(DC1)	<i>Intermittent digit with a decimal point</i>												
	ST Status byte (flag)															
	CR/LF Ending characters for the weight message															
Values for the ST flag	7	6	5	4	3	2	1	0								
		Zero Weight	Stable Weight	Net Weight	Tare	Static Tare	Total	Counting Scale	0							

## J TYPE MESSAGE

Using this message requires the activation of FrmJ and lcn on PROG-2; see the programming section for more information.

Structure of the weight message	J C C C C C C C ST K K K K K K CR LF							
Caption	J	J character (ASCII 74h)						
	C (7)	Dots (internal counts)						
	ST	Status byte (flag)						
	K (6)	Weight						
	CR/LF	Ending characters for the weight message						
Values for the ST flag	[Ver a tabela da Mensagem P]							

## C TYPE MESSAGE

Message used in the COUNTING SCALE MODE.

Structure of the weight message	C N N N N N N p p p p p p p P P P P P P ST CR LF													
Caption	C	C Character (ASCII 67h)												
	N	6 digits of the number of units												
	p	7 digits for unit weight	<i>These strings of bytes will always have a floating point, in case decimals are called for; if not, the point is placed at the end of the string.</i>											
	P	7 digit for net weight	<i>the point is placed at the end of the string.</i>											
	ST	Byte de estado (flag)												
CR/LF	Ending characters for the weight message													
Values for the ST flag	[See P-type table]													

## EPELSA PROTOCOL

Protocol used in MODES 8 AND 9; mode 8 entails continuous communication of weight; mode 9 works by request, only being triggered when a request is received.

Request	\$							
Response	STX ST P P P P P P P P CR							
Caption	\$	\$ character - ID for the request message						
	STX	Flag for the beginning of the message						
	ST	Status byte (flag)						
	P	Weight						
	CR	Ending character for the weight message						
Values for the ST flag	7	6	5	4	3	2	1	0
		Stable Weight	Unstable Weight	-	Zero Weight	-	Net Weight	Gross Weight



## TISA PROTOCOL

This protocol can be used to get a calculated price and weight having sent the cost per kg. It is used in Modes 3, 4 and 5 in the following logic:

**MODE 3** | Only responds to requests;

**MODE 4** | Sends information when stable, and responds to requests;

**MODE 5** | Streams information and responds to requests.

Request	98 P P P P P C CR LF	
Response	99 S W W W W W E I I I I I I C CR LF	
	98 Flag of the request message	
	99 Flag of the response message	
	P Weight	0   30h   no error
	S Flag of weight status	1   31h   error
Caption	W Weight	<i>Every time there is a value confirmation flag, this is communicated using the above symbols.</i>
	E Addition flag	
	I Addition	
	C Checksum (XOR)	
	CR/LF Ending characters for the weight message	

## METTLER PROTOCOL

Protocol used in MODE B.

Request	W
Response (stable weight):	STX P P P P P P CR
Response (unstable weight):	STX ? I CR
	W W character
	STX Flag of the beginning of the message
Caption	P Weight (can include a decimal point)
	? e I ? and I characters
	CR Ending character for the weight message

## GRAVITON PROTOCOL

Protocol to be used in MODE C.

Request	NETO CR
Response (stable weight)	[ + / - ] P P P P P P P CR
	NETO N E T O characters (see table at the end for ASCII codes)
	+ / - Indication of positive or negative weight
Caption	20h   Space
	P Weight
	CR Ending character for the weight message

## MOBBA PROTOCOL

Protocol used in MODE A.

Estrutura do pedido	STX ENQ ETX
Estrutura da resposta	STX ST P P P P P P P P
Legenda	STX Flag of beginning of message
	ENQ Request flag
	ETX Flag of end of message
	ST Flag of weight status: [+] positive      [-] negative      [?] unstable
	P Weight

## RAFELS PROTOCOL

Protocol used only on BM1000 TOP/BMX1, on MODE 14.

When the RAFELS mode is selected, weight can be sent automatically or by request. Its operation depends on three parameters: PZER, PMIN and PAUT.

PZER	PMIN	PAUT	Restart Weighing	Weight below min amount
0	1	Automatic or Manual	Must pass through minimum weight to perform a new weighing	Sim
0	1	Automatic or Manual	First weighing is below min weight: the weight amount must be at least 1 scale degree below min weight	Sim
1	0	Automatic	First weighing is above min weight: must go through the min weight in order to be performed	Não
1	0	Manual	Minimal variation of weight set in PZER (min 10e), or going through 0. It doesn't need to be under the minimum weight.	Não
1	1	Automatic	The weight must vary at least the amount defined in PZER (min 10e)	Sim
1	1	Manual	First weighing under minimum weight: the min weight amount must be at least 1 scale degree below minimum weight, or above the value set in PZER	Sim
1	1	Manual	First weighing above min weight: the weight must vary the amount.	Sim

## ASCII CHARACTER TABLE

space	20h	CR	0Dh
P	50h	LF	0Ah
R	52h	STX	02h
J	4Ah	ETX	03h
C	43h	SYN	16h
W	57h	+	2Dh
D	44h	-	2Bh
N	4Eh	?	
E	45h	\$	24h
T	54h		
O	4Fh		
9	39h		
8	38h		
0	30h		
1	31h		

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