

# **M2200**

---

## **P02 & M02 Packing Scale**

Information in this document is subject to change without further notice, and does not represent a commitment by Marel hf. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of Marel hf.

Marel® is a registered trademark of Marel hf.

Printed in Iceland, February 2003.

Copyright © 2003, Marel hf. All rights reserved.

030219ENG

## **STANDARD SAFETY NOTICE FOR MAREL SCALES**

All persons involved in the use and/or installation of this product should be aware of the following instructions.

Failure to follow these instructions or other safety instructions in the manual voids all warranties and may result in malfunction of the product, property damage, serious personal injury, or death.

### **WARNING**

- *The installation and use of this product must comply with all applicable national, state, and local codes.*
- *Turn the electrical power off when servicing the scale.*
- *Electrical installations and repairs must be performed by a licensed electrician, in accordance with manufacturer's specifications and national and local electrical codes.*
- *There are no serviceable parts inside the housing. Do not open the housing as there is hazardous voltage inside.*

### **Do Not**

pull at the upper frame inside the platform casing or the load cell may bend.

### **Do Not**

drop the scale, e.g. from a table to the floor. The scale is a high-precision weighing instrument and is sensitive to shock.

### **ATTENTION!**

Marel scales are Class I equipment and **MUST** have a protective earthing connection for safe operation.

### **ONLY USE A EARTHED MAINS CONNECTION**

Power supply cords, color coding:

	<b>International</b>	<b>North-American</b>
<b>Earth</b>	Green/Yellow	Green or Green/Yellow
<b>Neutral</b>	Light Blue	White
<b>Live</b>	Brown	Black

**Both Neutral and Live are fused.**

---



# Contents

<b>Introduction</b>	<b>3</b>
<b>M2200 IN GENERAL</b> .....	<b>3</b>
Default Settings.....	3
Communication.....	3
Initial Inspection .....	4
<b>ABOUT THIS MANUAL</b> .....	<b>4</b>
Improvements .....	4
Warranty Information .....	5
<b>TECHNICAL SPECIFICATIONS</b> .....	<b>6</b>
<b>Operation</b>	<b>9</b>
<b>BEFORE YOU START</b> .....	<b>9</b>
<b>THE USER INTERFACE</b> .....	<b>9</b>
Function Keys .....	10
The Scale page .....	10
The System Page.....	11
<b>CREATING PRODUCTS</b> .....	<b>12</b>
Selecting a Nominal Mode.....	13
<b>WORKING WITH TARE</b> .....	<b>15</b>
Normal Tare .....	15
Automatic Tare .....	16
Preset Tare .....	17
Marine Adjustments.....	18
<b>CLEANING</b> .....	<b>19</b>
<b>ERROR CODES</b> .....	<b>21</b>
<b>Installation</b>	<b>23</b>
<b>IN GENERAL</b> .....	<b>23</b>
<b>SYSTEM SETTINGS</b> .....	<b>23</b>
<b>Adjustments</b>	<b>25</b>
<b>IN GENERAL</b> .....	<b>25</b>
Weighing Range and Resolution.....	26
Unit of Weight .....	27
Setting Response Time .....	27

ADJUSTING THE SCALE .....	28
The Span Adjust Option.....	29
<b>Programming</b> .....	<b>31</b>
IN GENERAL .....	31
MODEL .....	31
TCP SERVER PORTS.....	32
REGISTERED LUA FUNCTIONS.....	32
Screen Functions .....	32
Miscellaneous Functions.....	33
Communication Port Functions .....	33
Model Access Functions .....	34
Event Functions .....	34
Digital Input Functions .....	34
Digital Output Functions.....	35
Real-time Clock Functions.....	35
Timer* Functions.....	35
SCREEN CONTROL CHARACTERS.....	36
EVENTS.....	36
<b>Appendix</b> .....	<b>39</b>
LAWS AND REGULATIONS.....	39
MARKING AND SEALING .....	39
Markings in the EU .....	40
SEALING THE M2200 AFTER ADJUSTMENTS .....	41
Protected Parameters.....	42
ADDITIONAL INFORMATION .....	43
M2200 P02 & M02 PAGE OVERVIEW.....	45
<b>Glossary of Terms</b> .....	<b>47</b>
<b>Index</b> .....	<b>49</b>

# Introduction

---

## M2200 in General

The M2200 consists of an M2200 indicator with an LCD display and, if used as a scale, of a separate load cell weighing platform. Depending on the platform type, the M2200 scale is available with a dual range weighing capability.

The M2200 is available in three models:

- M2200-P02-xxxx-V1    packing scale, land-based
- M2200-M02-xxxx-V1    packing scale, marine
- M2200-T02-xxxx-V1    registration terminal

The M2200 indicator is designed to run different user applications and a variety of applications is available for use in various setups. Use of these applications is described in separate manuals.

## Default Settings

On delivery the M2200 scale has the following default settings<sup>1</sup>:

- Range mode                      AUTOMATIC
- Automatic tare                  NO
- Backlight always on          NO

## Communication

The following communication options are available for the M2200 scale:

- **CAN.** The M2200 is specially designed to operate in a networked environment (CANopen). When the scale is connected to this type of network, the network can supply the power.  
The scale is a CAN Master and it can control up to two I/O modules.

---

<sup>1</sup> These settings can be changed via **System Setup → Configuration → Options**.

- **RS-232.** The M2200 can communicate with external equipment using RS-232 (serial connections). Weighing results can be printed on an external label printer or the data can be transmitted to a PC for storing and further processing.
- **Ethernet.** Application programs in the scale can communicate with a computer network via Ethernet network.

## Initial Inspection

Prior to use, inspect the M2200 for damages incurred during shipment. If the scale/terminal has been damaged, contact your local Marel service center immediately.

---

## About This Manual

This manual is a collection of information on the M2200. Some of this information is aimed directly at the M2200 operator, while other sections are intended for technicians and software programmers.

The manual is divided into six parts:

- General Introduction – this section, for all users.
- Operation – operating instructions for the operator.  
Also includes documentation on various M2200 applications.
- Installation – instructions for technicians on communication options, how to set up network connections, etc.
- Adjustments – instructions for technicians on how to make adjustments to the scale's weighing parameters.
- Programmer's Guide – instructions for software programmers on how to create Lua scripts for the M2200.
- Appendix – information on laws and regulations relating to the use of scales and instructions in how to seal the scale.

## Improvements

You can help improve this manual and the equipment you purchased. If you find any errors in the manual, please let us know. You can contact us at: Marel hf., Austurhraun 9, IS-210 Gardabaer, Iceland; phone (+354) 563-8000, fax (+354) 563-8001, attn. Documentation & Localization, email: [documentation@marel.is](mailto:documentation@marel.is).




## **Warranty Information**

Warranties given by Marel hf. are revoked if the equipment in question has not been used according to specifications. The same applies if the equipment has been modified in any way without Marel's consent.

---

# Technical Specifications

<b>Manufacturer:</b>	Marel hf.
<b>Indicator Type:</b>	M2200-Pxx, Mxx, Txx, x defines the software application.
<b>Enclosure:</b>	Designed for wash down; AISI 316 stainless steel; degree of protection exceeds IP67.
<b>Approvals:</b>	Certificate of EU Type-Approval No. DK 0199.56
<b>Accuracy Class:</b>	
<b>Maximum number of verification scale intervals:</b>	$n'_{\max} = 7500$ (for each range)
<b>Maximum tare effect:</b>	-Max
<b>Load Cell Excitation:</b>	
<b>Voltage:</b>	14 Vdc $\pm 5\%$
<b>Characteristics:</b>	Direct Current
<b>4 or 6-wire systems:</b>	6 wire system using excitation voltage sensing (3 $\Omega$ max cable resistance). Optional 4 wire system (0.2 $\Omega$ max).
<b>Rated minimum input impedance of load cells:</b>	85 $\Omega$ for load cell
<b>Maximum input range:</b>	70 mV
<b>Minimum signal voltage for dead load:</b>	-70 mV
<b>Maximum signal voltage for dead load in case of "added dead load":</b>	60 mV
<b>Minimum input voltage per scale interval (v.s.i):</b>	0.4 $\mu\text{V/e}$
<b>Operating temperature range:</b>	Min -10° C, Max +40° C
<b>Display and indicators:</b>	LCD, 128 x 240 pixel graphical display
<b>Power Requirements:</b>	110-230 VAC 0.16-0.1 A internal power supply
<b>Specification of interfaces:</b>	RS-232 bi-directional interface, 9600 Baud (1200-38400 Baud), 8 data bits and no parity. CAN (Controller Area Network) Bus Interface (ISO 11898).

### Capacity and Resolution:

The tables below shows typical values of Max and e when configuring a M2200 indicator.

Other values can be used, but a 3000 division weighing range is often the maximum allowed with regard to load cell specifications.

The indicator can be configured to operate as a single or dual range scale that changes from a low to a high range with the load on the platform.

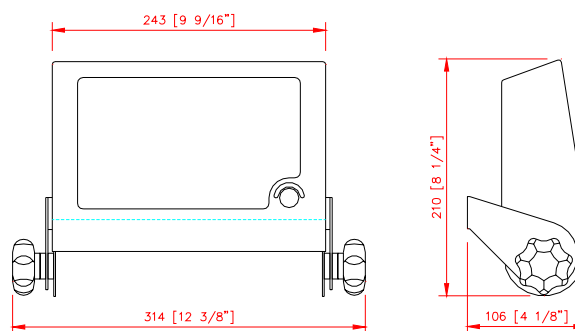
Example:

First weighing range: Max1 = 3 kg, e = 1 g  
(low weighing range, high resolution)

Second weighing range: Max2 = 6 kg, e = 2 g  
(high weighing range, low resolution)

### Dimensions:

#### M2200 Indicator



*Single range*

Metric Units		Avoirdupois Units			
Max	e =d	Max	e =d	Max	e =d
3 kg	1 g	6 lb	0.002 lb	96 oz	0.05 oz
6 kg	2 g	15 lb	0.005 lb	240 oz	0.1 oz
15 kg	5 g	30 lb	0.01 lb	480 oz	0.2 oz
25 kg	10 g	50 lb	0.02 lb	800 oz	0.5 oz
30 kg	10 g	60 lb	0.02 lb	960 oz	0.5 oz
60 kg	20 g	150 lb	0.05 lb	2400 oz	1 oz
150 kg	50 g	300 lb	0.1 lb		
300 kg	100 g	600 lb	0.2 lb		
600 kg	200 g	1500 lb	0.5 lb		
1000 kg	500 g	2000 lb	1 lb		
1500 kg	500 g	3000 lb	1 lb		
2000 kg	1 kg	4000 lb	2 lb		
3000 kg	1 kg	6000 lb	2 lb		
4000 kg	2 kg	8000 lb	5 lb		
6000 kg	2 kg	15000 lb	5 lb		

*Dual range*

Metric Units		Avoirdupois Units			
Max1/Max2	e =d	Max	e =d	Max	e =d
3 / 6 kg	1 / 2 g	6 / 15 lb	0.002 / 0.005 lb	96 / 240 oz	0.05 / 0.1 oz
6 / 15 kg	2 / 5 g	15 / 30 lb	0.005 / 0.01 lb	240 / 480 oz	0.1 / 0.2 oz
15 / 25 kg	5 / 10 g	30 / 50 lb	0.01 / 0.02 lb	480 / 800 oz	0.2 / 0.5 oz
15 / 30 kg	5 / 10 g	30 / 60 lb	0.01 / 0.02 lb	480 / 960 oz	0.2 / 0.5 oz
30 / 60 kg	10 / 20 g	60 / 150 lb	0.02 / 0.05 lb	960 / 2400 oz	0.5 / 1 oz
60 / 150 kg	20 / 50 g	150 / 300 lb	0.5 / 0.1 lb		
150 / 300 kg	50 / 100 g	300 / 600 lb	0.1 / 0.2 lb		
300 / 600 kg	0.1 / 0.2 kg	600 / 1500 lb	0.2 / 0.5 lb		
600 / 1000 kg	0.2 / 0.5 kg	1500 / 2000 lb	0.5 / 1 lb		
600 / 1500 kg	0.2 / 0.5 kg	1500 / 3000 lb	0.5 / 1 lb		
1500 / 2000 kg	0.5 / 1 kg	3000 / 4000 lb	1 / 2 lb		
1500 / 3000 kg	0.5 / 1 kg	3000 / 6000 lb	1 / 2 lb		
3000 / 4000 kg	1 / 2 kg	6000 / 8000 lb	2 / 5 lb		
3000 / 6000 kg	1 / 2 kg	6000 / 15000 lb	2 / 5 lb		

# Operation

## Before You Start

Before you apply power to the M2200 scale, check the following:

- Make sure there are no foreign objects that can interfere with the platform's movements.
- The platform must be empty when you power-on the scale.
- The scale must be properly mounted on a stable, level and non-vibrating foundation.
- Use the built-in spirit level to level the scale platform.



## The User Interface



Figure 1 M2200 Indicator, front view.

The user interface consists of an M2200 front panel with a keypad and a screen with programmable function keys and various screen items.

## Function Keys

The keypad has numeric keys and two special keys, Check  and Page .

### Check key



Use the Check key to confirm your actions, e.g. your selection of a menu option.

### Page key



Use the Page key to browse through the pages and to exit pages.

## The Scale page

The main weighing page, the Scale page, shows weighing results in the unit of weight selected for the scale (1).

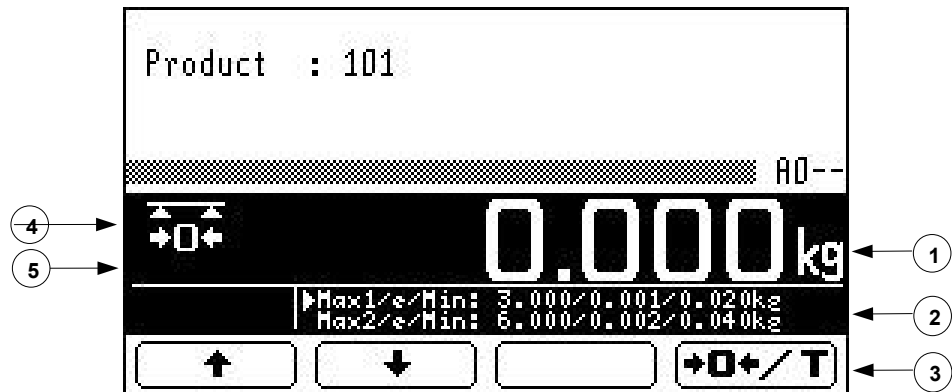



Figure 2 The Scale page.


Other features on the Scale page:

- Weighing range and resolution (2)
- Two arrow keys and a ZERO/TARE key (3)
- Steady and Zero indicators (4)
- NET (Tare) and PT (Preset Tare) indicators (5 - not displayed).

---

### Zero

The  (ZERO/TARE) key is used to take a new operational zero point provided the operating zero stays within  $\pm 2\%$  of max weight from the initial zero point.<sup>2</sup>

The operating zero is the reference point for all weighings, and therefore a correct operating zero is necessary to ensure accurate weighing results. The  indicator illuminates when the scale is at zero.

---

<sup>2</sup> If automatic zero tracking is selected (**Top Level Menu** → **4- System Setup** → **System** → **Configuration** → **Weighing Configuration** → **Options** → **Zero Tracking**), the scale will automatically track small variations in the zero point. The maximum tracking rate is 0.5 divisions per second.

### To take a new operational zero point

- 1 Remove any weight from the platform.
- 2 Press **↔0↔/T**

The Zero indicator (**↔0↔**) appears on the display.

#### Tip

If zero can no longer be set using the **↔0↔/T** key, you can use the option **Initial Zero Operation** on the Scale Ops page to take a new initial zero. The range of the initial zero can be  $\pm 10\%$  of max weight calculated from the calibration zero point.

## The System Page

The System page (**Top Level Menu → 4-System Setup → System**) provides access to various system options, for example configuration and diagnostics.

---

**Note:** To access the Top Level Menu page press and hold the PAGE  key for ca. three seconds.

---

*The System Setup page*

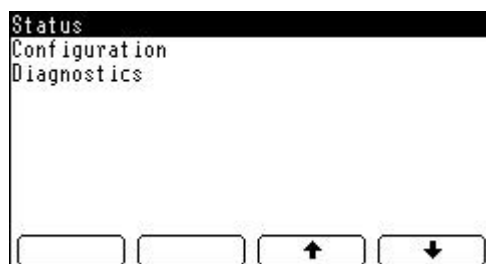



Figure 3 The System page.

Use the up and down arrow keys to scroll through the menu options.

Use the Check  key to select an option and display the relevant page.

---

# Creating Products

You can create a number of products, also called programs, that contain your own packing parameters.

The following example shows how to create a product and specify the necessary parameters for a stand-alone packing scale.

---

**Note:** M2200 applications use the packing parameters in different ways and some applications do not use them at all.

---

## To create a product

- 1 From the Top Level Menu select **4-System Setup → System → Settings → Program identification**. Here you can type an ID, name, and number for your product.
- 2 Select **Programs → Save** to save your product with the new name and ID.
- 3 Select **Packing** and type the parameter values you need for your application, for example:
  - **Nominal mode:** Overweight
  - **Overweight:** 0.100 kg
  - **Nominal weight:** 2 kg
  - **Upper lock limit:** 0.200 kg
  - **Lower lock limit:** 0.200 kg



Figure 4 The Settings page



Figure 5 The Packing page

There are five different nominal modes available: Overweight, Overweight %, Range, Steps, Any weight.

Each mode is explained in more detail in “Selecting a Nominal Mode” on page 13.

- 4 Select **Programs → Save** to save your parameter settings.
- 5 Select **Automatic Recording**, if you want the scale to record weighing results automatically. There are four options available:
  - record when the weight on the platform is removed from the platform. This option is most commonly used for automatic recording.
  - record when the weight on the platform is increased
  - record when the weight on the platform is decreased
  - record when the weight on the platform changes and has become steady.



Figure 6 The Settings page, the Automatic recording option





Figure 7 The Settings page, the Limit detection option

- 6 Select **Limit detection**, if you need to specify weight limits to control conveyors, for example for starting or stopping the conveyors.
- 7 Select **Programs** → **Save** to save your parameter settings.

---

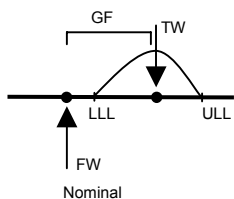
**Note:** It is possible to overwrite new parameter settings if you browse from one product to another with the Left and Right arrows (see Figure 5, for example). To prevent accidental overwriting, you are instructed to save your work frequently (steps 2, 4, and 7).

---

## Selecting a Nominal Mode

Your choice of nominal mode determines how the M2200 calculates the nominal weight and uses the packing parameters. The following terms and abbreviations are used in the examples:

Term:	Abbr:	Parameter name:	Definition:
Nominal weight	NW		The weight of a product as specified on the packaging label
Target weight	TW		The weight the scale operator is trying to achieve for a package using one of the available calculating methods
Pack weight	W		The final (real) weight of the package
Fixed weight	FW	Nominal Weight	A fixed normal weight
Giveaway weight	GF	Overweight	A fixed extra weight which is added to a fixed nominal weight to obtain the target weight
Giveaway %	GP	Overweight %	Same as GF, except that the extra weight is given as a percentage of the nominal weight
Minimum weight	MIW	Nominal Weight	Used in the Range and Steps modes to specify a lower limit
Maximum weight	MAW	Nominal Upper Limit	Used in the Range and Steps modes to specify an upper limit
Weight step	WS	Nominal Step Size	
Lower Lock Limit	LLL	Lower Lock Limit	The maximum allowed deviation (downwards) from the target weight
Upper Lock Limit	ULL	Upper Lock Limit	The maximum allowed deviation (upwards) from the target weight



## Overweight

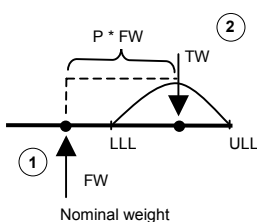
Use this mode to pack to a fixed weight. The nominal weight is fixed. The target weight is calculated as:

$$TW = FW + GF$$

Here you must specify upper and lower lock limits. The pack weight will be somewhere in the range between the lower and upper limits.

Parameters that need to be specified:

"Nominal weight", "Overweight", "Upper lock limit", "Lower lock limit".



## Overweight %

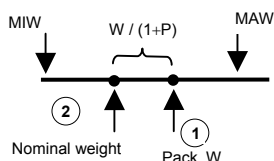
Use this mode to pack to a fixed weight using a percentage of the nominal weight to reach the target weight. The target weight is calculated as:

The target weight is calculated as:

$$TW = FW * (1 + GP/100)$$

Parameters that need to be specified:

"Nominal weight", "Overweight %", "Upper lock limit", "Lower lock limit".



## Range

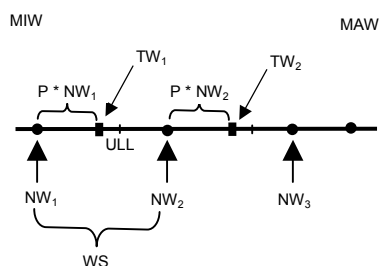
Use this mode to pack catch weight (packs of variable weight). The minimum allowed nominal weight is MIW and the maximum allowed nominal weight is MAW. There is no target weight.

The nominal weight is calculated as:

$$NW = W / (1 + GP/100)$$

Parameters that need to be specified:

"Nominal weight", "Overweight %", "Nominal upper limit".



## Steps

This mode is normally only used to pack salmon. The nominal weight is the lowest weight below W calculated by successively adding WS to MIW.

The target weight is calculated as:

$$TW = NW * (1 + GP/100)$$

You must specify an upper lock limit for each step. This means that products whose weight exceeds the upper lock limit for step 1, for example, will fall into the weight class for step 2.

Parameters that need to be specified:

"Nominal weight", "Overweight %", "Nominal upper limit", "Upper lock limit", "Nominal step size".

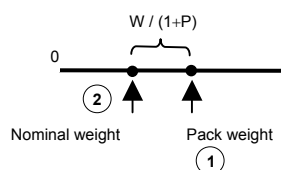
### Any weight

Use this mode to pack catch weight (packs of variable weight). There are no restrictions on the nominal weight and there is no target weight.

The nominal weight is calculated as:

$$NW = W / (1 + GP/100)$$

Parameters that need to be specified:  
“Overweight”.



---

## Working with Tare

The scale has three tare functions:

- Normal tare
- Automatic tare
- Preset tare

### *Normal and automatic tare*

The first two work in a similar way, except that Automatic Tare automatically compensates for slightly different weight of trays or boxes which are placed on the platform.

This means that you can place different trays on the scale's platform without having to press **[+0+/-T]** every time you change trays – the Automatic Tare function will do that for you.

### *Preset tare*

Preset Tare, however, is different in that it is the user himself who enters a tare value of his own choice, instead of a weight detected by the scale.

This method can be useful in certain situations, for example in packing systems where the weight of the packing material is known.

## Normal Tare

### To enter tare

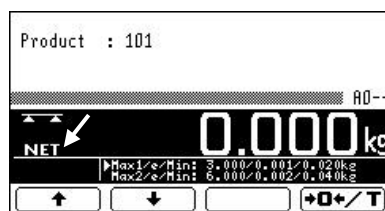


Figure 8 Scale page, tare in use.

- 1 Place a tray (the tare weight) on the platform, and press **[+0+/-T]**.
- 2 The NET indicator appears on the Scale page to show that a tare is in use.
- 3 Subsequently, the NET weight on the platform is shown on the Scale page.

### To remove tare

- 1 Empty the platform.
- 2 Press **[+0+/-T]**.  
The NET indicator is turned off.

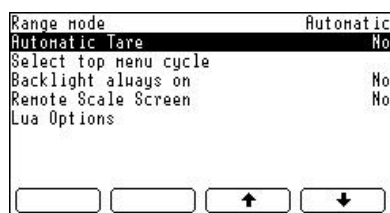
---

**Note:** In some market areas the scale's tare function may be protected with a software switch.<sup>3</sup> This changes the way you work with tare:

- You must remove tare (see above) before you can set a new tare value that is lower than the current tare value.
- 

## Automatic Tare

### To use Automatic tare



- 1 Check whether the Automatic Tare option is currently selected on your scale. By default, this option is not selected.
- 2 From the Top Level Menu select **4-System Setup → System → Configuration → Options**.
- 3 On the **Options** menu select **Automatic Tare** and press .
- 4 Enter YES to work with Automatic Tare and press several times, until you return to the Scale page.
- 5 Place a tray (the tare weight) on the platform, and press (normal tare, see above).
- 6 Remove the tray, and place a new tray on the platform.
- 7 If the second tray is within  $\pm 30\%$  of the first tray, the weight of this tray will be automatically tared and the weight indicator on the Scale page will show zero.

When using automatic tare, you should check the tare from time to time:

- ◆ Place a tray on the platform, and notice if the weight indicator on the Scale page returns to zero. If not, tare the scale again by pressing .

Automatic tare is not available if the scale is configured for “direct sale to the public”.

---

**Note:** The Automatic Tare function can compensate for up to 30% variation in the tare.

The second tray you put on an empty platform will be tared automatically if it is within  $\pm 30\%$  of the weight set by the manual tare operation. For this function to work it is important that the scale is stable and with an empty platform before you place the second tray on the scale.

---

---

<sup>3</sup> According to standard regulations on conditions for direct sale to the public.

# Preset Tare

## To use Preset tare



Figure 9 The Scale Ops page.

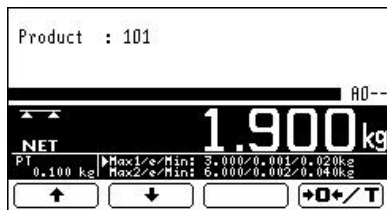









Figure 10 Scale page, Preset tare in use.

- 1 Assuming the Scale Ops page has been defined as part of the Top Menu Cycle,<sup>4</sup> press  twice from the Scale page until the Scale Ops page is displayed (if not, select **Top Level Menu** → **5-Scale Ops**). Select Preset Tare and press .
- 2 Enter the size of the tare, using the decimal point, if needed, and press .
- 3 Press  until you return to the Scale page.

The NET indicator appears on the Scale page to show that tare is now active. The preset tare value is displayed in a separate field directly below the NET indicator.

## To remove Preset tare

- 1 Select **Preset Tare** on the Scale Ops page and press .
- 2 Press the CLEAR key to clear the preset tare value and then press .
- 3 Press  until you return to the Scale page. The Preset Tare value is now 0.000 kg.

The value of Preset tare must be within the weighing range in use on the scale. Otherwise, it will not be active.

Preset tare values are rounded to the nearest division in use on the scale.

### Example:

Preset tare entered as 1.003 kg will be rounded to 1.004 kg in a weighing range with a resolution of 2 g (e=2 g).

In a weighing range with a 5 g resolution (e=5 g), the same preset tare value will be rounded to 1.005 kg.

Preset tare cannot be enabled, if the M2200 scale is set up for “direct sale to the public” (see **Top Level Menu** → **System** → **Configuration** → **Weighing Configuration** → **Options** → **Direct Sale to Public** = Yes).

<sup>4</sup> Select **Top Level Menu** → **System** → **Configuration** → **Options** → **Select Top Menu Cycle** → **View Scale Ops**.

# Marine Adjustments

The motion compensation of the M2200 M02 marine scale must be adjusted every once in a while to ensure the weighing results are accurate and stable.

**IMPORTANT!** For optimum marine adjustment results, always adjust the scale in the physical environment where it will be used for weighing, i.e. at sea and not on land or in the shelter of harbour.

The scale must be adjusted at initial start-up. After that the scale submits a warning, the CAL indicator flashes on the Scale page, whenever an adjustment should be performed.




The scale must also be adjusted

- when the scale is unstable without the weighing platform being touched;
- when the displayed weight is inaccurate, even when the scale has a correct zero;
- when the scale is unable to assume the initial zero point, even with an empty platform.

## Tip

- It is a good maintenance rule to check the adjustment routinely by placing a weight on the weighing platform to verify that the Scale page shows a steady and accurate weight.

## To adjust the marine scale

- 1 Make sure the platform is empty.
- 2 Press and hold the  key to display the Top Level Menu and select **6-Marine Calibration**. Follow the instructions on the display:
- 3 After the message “Monitoring empty platform” is displayed, you are asked to place a reference weight on the platform and press . The message “Monitoring loaded platform” is displayed while the scale performs the adjustment.
- 4 After the adjustment, the message “Fit nn” where nn is a number between 0 and 99) appears on the display. Values above 25 indicate a poor adjustment. In that case you must repeat steps 1 to 4 above.
- 5 Remove the reference weight from the platform., and press  to return to the Scale page.

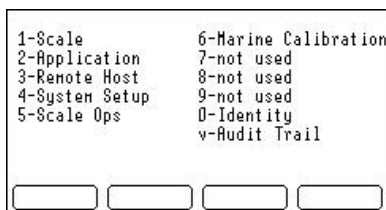


Figure 11 Top Level Menu.

**Note:** The message “L: Fit xx” appears when a marine scale has been adjusted without the platform being in motion.

---

# Cleaning

---

**Note:** A thorough daily rinse of the M2200 is very important to help prevent corrosion and rust problems. Use clean cold water. Never rinse with seawater.

---

- Clean the M2200 with detergents approved for use in the food industry. Follow the manufacturer's instructions for use.
- Do not use excessively strong solutions of detergent. Base solutions corrode aluminum parts, for example load cells. The use of chlorine can cause rust spots to appear on the stainless steel.
- Do not use high-pressure jets on the M2200. Instead, use low water pressure or pour water over by hand.

---

## Detergents

The acidity of detergents used on Marel equipment should preferably be pH 12-13.<sup>5</sup>

Strong base solutions are the main ingredients in most cleaning agents, for example potassium hydroxide (KOH) or caustic soda (NaOH). Because of its corrosive effects, caustic soda is not a desirable detergent for the M2200. If possible, use detergent solutions with KOH instead.

Always use detergents according to the detergent manufacturer's instructions.

**Do not** use a detergent containing sodium hypochlorite for daily cleaning. Sodium hypochlorite is a common ingredient in detergents, but as it contains chlorine it should be used with great care because of chlorine's corrosive effect on stainless steel.

---

## Daily cleaning

- Use high alkaline foaming detergent, pH 12-13, for regular daily cleaning. **Do not** use a detergent containing sodium hypochlorite for daily cleaning. The foaming detergent must be selected carefully and should contain some corrosion inhibitors and preferably potassium hydroxide (KOH) instead of sodium hydroxide (NaOH).
- Spray the detergent on all surface areas and leave to work for approximately 20 minutes. Rinse the detergent off.
- To kill any remaining bacteria, it is necessary to finish the daily cleaning procedure by spraying a quarternary ammonium solution over the area and onto surfaces (after drying), using a 300 ppm active ingredient.

---

<sup>5</sup> Marel has developed the detergent *Frima fip 6* in cooperation with Icelandic cleaning agents manufacturer Frigg hf. *Frima fip 6* is an alkaline foaming detergent suitable for use in all branches of the food industry and specially designed to minimize the damaging effect of a harsh wash-down environment on Marel's equipment.

- Before you resume processing the next morning or after breaks, rinse the quarternary ammonium solution off surfaces in contact with the raw material using clean water.

---

## Disinfectants

When choosing a disinfecting agent, please note that chlorine corrodes stainless steel. Chlorine is, however, an effective disinfectant, so occasional use of chlorine may be necessary to control the growth of microorganisms.

Marel recommends the following procedure:

- Use chlorine to disinfect once a week after performing the regular cleaning with a high alkaline foaming detergent.
- Make sure the strength of chlorine does not exceed 200 ppm.
- Spray the disinfectant on surfaces and leave to work for approximately 30 minutes.
- After disinfecting, carefully rinse the equipment.
- On days when chlorine is not used, use a disinfectant containing quarter ammonium compounds instead.
- Make sure the strength of quarter ammonium compounds does not exceed 750 ppm.

---

**Note:** Rotating different disinfectants (e. g. chlorine, peracid or acid-anionic) in your hygiene program may ensure more effective sanitation.

---

As chlorine evaporates very quickly, its disinfecting effects will fade soon after it is sprayed on the equipment. Letting chlorine stay on the equipment will not improve the disinfecting effect, but only damage the equipment. Quarter ammonium compounds are considerably more stable and are active for a much longer time. Therefore, the benefit of leaving them on the equipment for an extended period of time is much greater.

---

## Training staff

It is important that new cleaning personnel receive proper training and are made aware of areas on the machinery which are difficult to clean.



---

## Error Codes

Error code:	Description:	Action:
<b>E-05</b>	Unstable weight (initial zero)	Stabilize the scale.
<b>E-14</b>	ADC not responding	Contact your Marel agent
<b>E-15</b>	Parameter fault	Clear the W&M parameter fault counter in <b>Top Level Menu → 4-System Setup → System → Configuration → Weighing Configuration → View Critical Faults</b> before you start readjusting the parameters. Press CLEAR to accept the shown default settings. Configure all required parameters and calibrate the scale, if required. Restart the scale. If the error persists, there may be a problem with the hardware. Contact your Marel agent.
<b>E-17</b>	Initial zero too low	Increase the weight on the platform. If this does not solve the error, there may be a problem with the load cell. Contact your Marel agent.
<b>E-18</b>	Initial zero too high	Remove or reduce the weight on the platform. If this does not solve the error, there may be a problem with the load cell. Contact your Marel agent.
<b>E-23</b>	24 V power voltage too high	Provide correct voltage
<b>E-25</b>	24 V power supply voltage too low	Check the power supply voltage

---

**Note:** If the error persists contact your local Marel agent for assistance.

---



# Installation


---

## In General


The M2200 P02-M02 scale is delivered from the factory with certain default settings. Some of these settings can be changed to suit the user's needs and it may be necessary to specify others before the scale is taken into use, depending on the intended usage.

---

## System Settings

Access to most user settings is through the **Top Level Menu → 4-System Settings → System → Configuration → Options**. Select a setting and press  to access the setting's available values.

Available settings:

- **LCD contrast**  
Enter a numeric value to change the light contrast on the LCD display. Default value is 7.
- **Range mode**  
For dual range scales. Available options are First range, Second range, Automatic (default).
- **Automatic tare**  
Here you can specify whether automatic tare is to be used or not.
- **Select top menu cycle**  
Here you can specify which pages should be accessible directly from the Scale page by using the  key.
- **Backlight always on**
- **Remote scale screen**  
For use when the scale is controlled by a remote host.
- **Allow Lua source update**
- **Run Lua script**

- **Language**
- **YYYYMMDDHHMMSS**

The scale's clock. The format is year-month-day-hour-minutes-seconds.
- **Passwords**

Here you can change the Supervisor password. If the Lock Enable jumper (T8) is in place on the circuit board, you can change the Service password as well.
- **Weighing Configuration**

Provides access to the weighing parameters. This option is described in detail in "Adjustments" on page 25.
- **Factory setting**

Clears all error counters and erases most user settings.
- **Communications**

Here you specify the scale's TCP/IP address, net mask, and gateway. You also specify a serial port's baud rate here, if the scale is to be connected to peripheral equipment, for example a printer or a bar code reader.
- **Test code**

For service and production use only. Should be 0 (zero) in normal use.

# Adjustments

---

## In General

Adjusting the M2200 scale requires the use of a so-called Service password.

On delivery from the factory the default Service password is:

*Service password*

- 62735

Another password, the Weighing configuration password, is needed to access the scale's weighing configuration options.

The Weighing configuration password is fixed:

*W&M Config password*

- 322225

You can change or remove the Service password, if the Lock Enable jumper (T8) is in place on the circuit board.

Go to the Audit Trail page (**Top Level Menu → v-Audit Trail**) to see if the jumper is installed in your scale's circuit board.

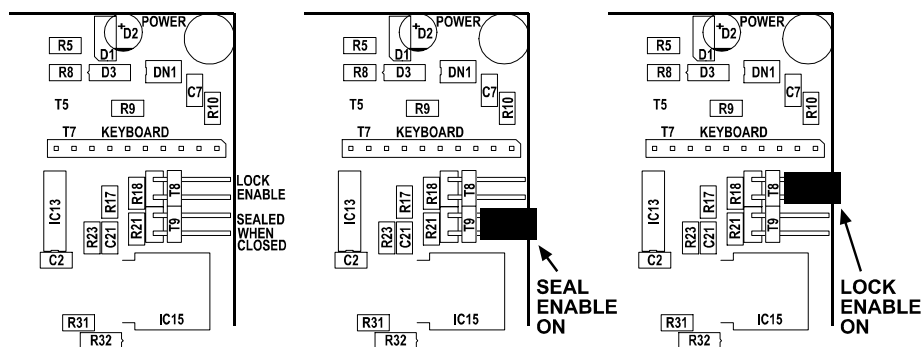




Figure 12 Lock Enable jumper.

### To change or remove the Service password

- 1 From the Top Level Menu page select **4-System Setup → System → Configuration**.
- 2 Enter the new password and press  to confirm and return to the Top Level Menu page.
- 3 To remove the password, press CLEAR and then  to confirm and return to the System Setup page.

---

**Note:** When changing the Service password, make sure you enter the new password correctly.

If you make a mistake and enter a different password, you will have to remove the Lock Enable jumper (T8) to activate the default password to enter the Configuration page and choose a new password.




---

### *Adjusting the scale*

Before you can start adjusting the scale, you must specify the following system options:

- the unit of weight for the scale
- the scale's weighing range
- the scale's resolution

All these options are accessible through the **Configuration** option on the System page:

- 1 From the Top Level Menu select **4-System Setup** → **System** → **Configuration** and press .
- 2 If required, enter the service password and press . Select **Weighing Configuration**.
- 3 If required, enter the Weighing configuration password (322225) and press . The Weighing Configuration page is displayed (see Figure 13).

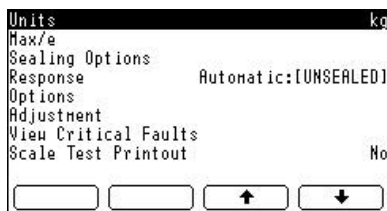


Figure 13 The W&M page

## **Weighing Range and Resolution**

The scale's weighing range and resolution are set on the same page. The weighing range is the range from zero to maximum capacity.


Setting the resolution determines the minimum readable weight change the scale should display (in Figure 14 the resolution is 1 g up to 3 kg and 2 g when the weight on the platform is anywhere between 3 and 6 kg).

---

**Note:** If Max2 = Max1 and e2 = e1, only one weighing range is in use. Dual range is only active if Max2 > Max1.

---

### **To set the weighing range and resolution**

- 1 Select **Max/e** on the Weighing Configuration page and press .  
The page displayed shows the weighing range and resolution for the scale.

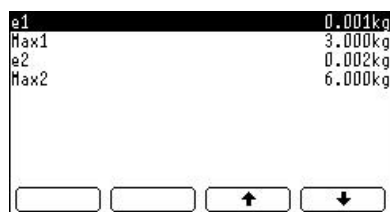


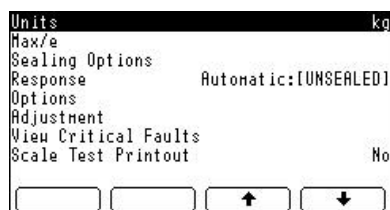
Figure 14 Setting the weighing range.

- 2 Select an option to work with (e.g. e1 or max1), press and use the numeric keypad to enter a new value.
- 3 Press to return to the previous page.
- 4 Repeat to set the remaining values.

## Unit of Weight

Use the **Units** option on the Weighing Configuration page to select a unit of weight for the M2200 scale. Available units are kg, g, lb or oz.

### To select a unit of weight



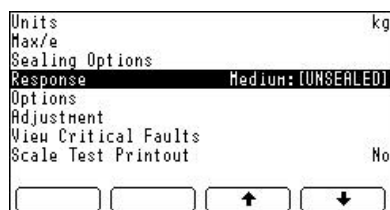
- 1 Select **Units** on the Weighing Configuration page and press .
- 2 Use the arrow keys to select a unit.
- 3 Press to return to the previous page.

**Note:** The unit of weight configuration does not affect the adjustment of the scale. If the unit, for example, is changed from kg to lb, the scale will still show “2.000” when a 2 kg weight is placed on the platform. You must readjust the scale to activate the new unit of weight.

## Setting Response Time

The Response option on the Weighing Configuration page lets you specify the response time for the scale. There are four options available: Automatic, Fast, Medium, and Slow.

### To set the response time:



- 1 Select **Response** on the Weighing Configuration page and press .
- 2 Use the arrow keys to select one of the four available response options.
- 3 Press to return to the previous page.

---

# Adjusting the Scale

The M2200 scale is adjusted using a known weight which is normally close to the maximum capacity of the weighing platform.

Follow the instructions below to adjust the M2200 scale. For instructions on how to perform regular adjustments on marine scales please refer to the Operation section, “Marine Adjustments” on page 18.

*Marine adjustments?*

---

**Note:** If the hardware seal supplied with the scale is enabled, the adjustment instructions below do not apply unless you open the seal first as described in the Extras section of this manual, “Sealing the Scale after Adjustments”.

---

## To adjust the scale

- 1 Start the adjustment by letting the scale run for at least 10 minutes to warm up.
- 2 Level the scale platform and remove all objects from the platform.
- 3 Make sure the platform feet are correctly adjusted on a stable and non-vibrating surface.
- 4 From the Top Level Menu select **4-System Setup → System → Configuration → Weighing Configuration**.
- 5 Enter the Weighing Configuration password.
- 6 On the Weighing Configuration page, select **Adjustment**.

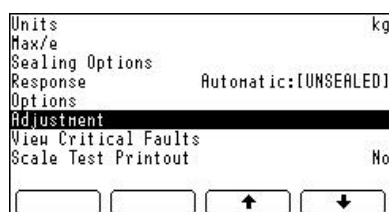


Figure 15 The W&M page.

The next adjustment step is to specify the size of the weight to be used for the adjustment.

---

**Note:** The size of the adjustment weight should not be less than a third of the scale’s maximum capacity. For example, you can use a 5 kg weight to adjust a 15 kg scale. You should, however, use a weight close to the maximum capacity to verify the correctness of the adjustment. We recommend using a class M1 weight (class F in USA).

---

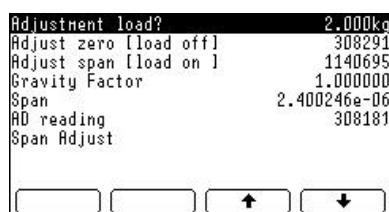








Figure 16 The Adjustment page.

- 7 Select **Adjustment load?** on the Adjustment page and press .
- 8 Enter the weight of your adjustment load and press  to confirm. Press  to return to the previous page.
- 9 Select **Adjust zero (load off)** and press . Follow the instructions on the display (press  to confirm). After you see the confirmation message on the display, press  to return to the Adjustment page.



- 10 Place your adjustment load on the platform. For best results, keep the weight on the platform for 20 seconds.
- 11 With the load on the platform select **Adjust span (load on)** and press . Press again to confirm. After you see the confirmation message on the display, press to return to the Adjustment page.

You have now completed adjusting the scale. You can verify the quality of the adjustment by placing the reference weight on the platform and checking if the scale shows the known size of the weight correctly.

### Tip

- From the Top Level Menu select **v-Audit Trail** (CHECK key) to view the Cal and Con counters. Make a note of the event counter numbers. You can use these numbers later to determine if the adjustment has been altered.

---

**Note:** To comply with OIML R76 requirements the scale must be able to reach max weight + 10%. The adjustment zero point must therefore not be set too high. Additionally, max weight + dead platform weight must not exceed the load cell capacity.

---

For information on how to seal the scale after adjusting see Appendix, the “Sealing the M2200 after Adjustments” section on page 41.

## The Span Adjust Option

Adjustment load?	2.000kg
Adjust zero [load off]	308155
Adjust span [load on]	1141461
Gravity Factor	1.000000
Span	2.400079e-06
AD reading	308135
<b>Span Adjust</b>	
<input type="text"/> <input type="text"/> <input type="button" value="↑"/> <input type="button" value="↓"/>	

The Span Adjust option (**Top Level Menu → 4-System Setup → System → Configuration → Weighing Configuration → Adjustment → Span Adjust**) lets you tune the span parameter. This option is mostly used when adjusting large capacity scales.

### To adjust the span

Old Weight	5.0010kg
New Weight	5.0000kg
<b>Adjust Span [Old-&gt;New]</b>	
<input type="text"/> <input type="text"/> <input type="button" value="↑"/> <input type="button" value="↓"/>	

- Enter the current weight value (e.g. 5.0010 kg) in the **Old Weight** field on the Span Adjust page.
- Enter the desired weight (5.000 kg) in the **New Weight** field.
- Select **Adjust Span (Old → New)** and press to confirm.

Figure 17 The Span Adjust page.



# Programming

---

## In General

The M2200-P02 firmware accepts application software written in the Lua programming language.

Lua is a powerful light-weight programming language designed for extending applications. Lua is also frequently used as a general-purpose, stand-alone language.

Lua combines simple procedural syntax with powerful data description constructs based on associative arrays and extensible semantics. Lua is dynamically typed, interpreted from byte codes, and has automatic memory management with garbage collection, making it ideal for configuration, scripting, and rapid prototyping.

For more information on Lua see [www.lua.org](http://www.lua.org).

---

## Model

The Model is a linear array of the parameters and system values built into the M2200-P02 firmware. Each value is stored with its own checksum and attributes. Some values are also stored in backup storage. Some model values are readable and writable, some are read only. Some model values are also protected by an audit trail using the CAL and CON event counters. In some cases the names of model values can be changed, for example to support translation of the front panel interface.

The model can be accessed with dot commands through the command port TCP 52200. The dot commands use two dimensions: the first is the model ID, the second is “1” for the name of the model entry, “2” for the value of the model entry, and “3” for the mode of the entry.

The Lua application has access to the Model with an API.

---

## TCP Server Ports

The following is a list of TCP ports that can be used to communicate with the P02 firmware or the Lua application. A small web server is also available on port 80. The dot commands on port 52200 use the standard Marel dot command syntax and may be used to read or write all Model values.

- 52200 dot commands
- 52202 download Lua source, if allowed
- 52203 upload Lua source
- 52210 Lua standard output, for example using Lua print()
- 52211 message port “comm4” in Lua, persistent output queue
- 52212 terminal port “comm5” in Lua
- 52213 remote host port “comm6” in Lua

---

## Registered Lua Functions

These functions can be called from the Lua code. Some are for handling the display while others deal with the scale or the digital inputs and outputs. In addition to these functions most of the standard Lua functions are also available.

### Screen Functions

The display functions can access three screens:

- Screen #1 is the screen where the scale is displayed.
- Screen #2 is a full screen for use by the application.
- Screen #3 is for use by a remote host.

The row number is from 1 to 10. The column number is from 1 to 40.

Function:	Description:
<b>DispClrScr(scr)</b>	Clear the display
<b>DispStr(scr, row, col, string)</b>	Show string
<b>DispStr(scr, string)</b>	Show string in current position
<b>DispGetScr()</b>	Get currently selected screen
<b>DispBar(scr, row, col, length, mode, value)</b>	Show packing bar

<b>SetSymbol(id, bitmap)</b>	Set bitmap for a character in the range 160-255
<b>GetSymbol(id)</b>	Get bitmap for a character
<b>ResetSymbols()</b>	Set variable bitmaps to default value

## Miscellaneous Functions

Function:	Description:
<b>Request(event)</b>	Request automatic events “steady”, “motion”, etc.
<b>Pack(weight)</b>	Return packing results as six values: <ol style="list-style-type: none"> <li>1. Nominal weight as string with units</li> <li>2. Deviation from acceptable range in divisions</li> <li>3. Deviation from target weight in divisions</li> <li>4. Target weight</li> <li>5. Lower accept limit</li> <li>6. Upper accept limit</li> </ol>
<b>clock()</b>	Clock with 10 ms resolution
<b>sleep(dur)</b>	Suspend Lua application e.g. sleep(0.5)
<b>Edit(char, string, cursor)</b>	Returns string and cursor
<b>GetWeight()</b>	Return current weight, stability, zero, net
<b>ScaleTrim(value)</b>	Return a number trimmed to the scale’s current division
<b>Trim(value, div)</b>	Return a number trimmed to the given resolution
<b>SetInfo(string)</b>	Set name of Lua application
<b>lo(n)</b>	Convert between linear i/o address and module-block-line
<b>DoubleDigits(string)</b>	Convert string with decimal digits to wide digits
<b>DIOActive(node)</b>	Say if given CAN module is connected

## Communication Port Functions

Function:	Description:
<b>CommStr(comm-x, string)</b>	
<b>CommFlush(comm-x)</b>	Flush input buffers
<b>CommActive(comm-x)</b>	Say if port is active e.g. TCP port has been opened
<b>PQueueFree()</b>	Get free space on persistent record queue
<b>PQueueUsed()</b>	Get used space on persistent record queue

Acceptable values for comm-x:

Values:	Description:
1	RS232-0
2	RS232-1
3	RS232-2
4	Message port TCP 52211
5	Terminal port TCP 52212
6	Remote host port TCP 52213

## Model Access Functions

Function:	Description:
NameValue(id, len)	Get name and value of model entry
GetModelName(id)	Get name of model entry
SetModelName(id, name)	Set name of model entry
GetModelValue(id)	Get value of model entry as string
SetModelValue(id, value)	Set value of model entry using string
ClearModelValue(id)	Clear model value
DoModel(id)	Execute model entry
GetModelNumber(id)	Get model value as number
SetModelNumber(id, number)	Set model value using number
AddModelNumber(id, number)	Add number to current model value

## Event Functions

Function:	Description:
NextEvent()	Get string event, optional wait duration

## Digital Input Functions

Function:	Description:
DICfgMode(n, mode)	Mode: “low”, “high”, “direct”, “invert”, “count falling”, “count rising”, “count both”, “toggle on fall”, “toggle on rise”
DIGet(n)	get status of input
DICrI(n)	clear edge counter

## Digital Output Functions

Function:	Description:
DOCfgMode(n, mode, inv)	Mode: “low”, “high”, “direct”,
DOSet(n, state)	Set output
DOGet(n)	Get status of output

## Real-time Clock Functions

Function:	
ClkFormatTime()	Return current time as string
ClkFormatDate()	Return current date as string

## Timer\* Functions

Function:	
TmrSet(n, dur)	Set timeout value
TmrStart(n)	Start timer
TmrStop(n)	Stop timer
TmrReset(n)	Restart timer countdown
TmrChk(n)	Check if timer has expired
TmrFormat(n)	Return timer value as string

\* The timer resolution is 100 ms.

---

## Screen Control Characters

These characters can be used to control the display, for example through the remote host port (tcp 52213).

They can be sent as backslash quoted decimal numbers.  
This is the way backslash is used in standard Lua output:

Operation:	Value:
keyclick	\007
newline	\010
start of screen	\012
start of current line	\013
normal video	\014
reverse video	\015
backlight on	\018
backlight off	\020
clear to end of line	\021
goto x, y	\022, 32+x, 32+y
clear screen	\026

---

## Events

These events are sent to the Lua application. Some events are enabled by default, others need to be enabled either from the application itself using Request(event) or by setting parameters in the model.

Most events also have an associated value, for example the “steady” event which has the new steady weight as its value.

The “edge” event has the linear I/O line number as its value. In order to convert the linear I/O number to an I/O number in the module-block-line format use the "Io(x)" function.

Event	Value	Description
timeout	Timer-ID	Timer has timed out
edge	Input-ID	Edge has been detected
comm1	Input string	RS232-0
comm2	Input string	RS232-1
comm3	Input string	RS232-2
comm4	Input string	TCP/IP record port
comm5	Input string	TCP/IP user port
online	Port number	TCP port is now online
offline	Port number	TCP port is now offline
unknown	None	Should not happen
close	Screen ID	Lua screen being closed
open	Screen ID	Lua screen being opened
digit	0-9	Numeric value of keypad digit pressed
enter	None	Enter key pressed
softkey	1-4	Soft key pressed



<b>Event</b>	<b>Value</b>	<b>Description</b>
<b>exit</b>	None	Lua application should exit
<b>manual</b>	Weight	Manual recording result
<b>drop</b>	Weight	Automatic recording result
<b>catch</b>	Weight	Automatic recording result
<b>inc</b>	Weight	Automatic recording result
<b>dec</b>	Weight	Automatic recording result
<b>capture</b>	Weight	Automatic recording result
<b>above</b>	Limit ID	Upper limit exceeded
<b>below</b>	Limit ID	Weight is below lower limit
<b>steady</b>	Weight	Scale has become steady
<b>motion</b>	Weight	Scale has become unsteady
<b>update</b>	Weight	Scale display updated
<b>reading</b>	Weight	Scale engine updated
<b>ibutton</b>	Button-ID string	iButton has been read



# Appendix

---

## Laws and Regulations

Most countries have laws and regulations regarding the use of balances and scales in trade. The general rule is that scales used for trade have to be inspected or verified before being put into use. Some sort of periodic re-verification is generally also required.

Scales may also have to be readjusted and re-verified when moved from one part of a country to another, in particular if transported north or south. This is because of a different gravity constant at the new location.

---

**IMPORTANT:** It is the responsibility of the owner and user of a weighing scale to know which laws and regulations apply to his particular use of the scale and to conform to these laws and regulations.

---

---

## Marking and Sealing

Officials may place several marks and a seal on a scale used for trade. The marks indicate that the scale conforms to law and regulation and may also indicate in which part of a country the adjustment applies to.

A seal may make it impossible to alter the adjustment of a scale without breaking the seal, or it may indicate the status of a software seal. In the latter case, the seal may consist of an inscribed number which indicates the status of a calibration counter which is incremented every time an adjustment is made to the scale.

---

**IMPORTANT:** It is the responsibility of the owner to maintain the scale's markings. If markings are removed, the scale no longer conforms to laws and regulations.

It is also the responsibility of the owner to maintain the seal and have the scale re-verified if the seal is broken or if an un-authorized adjustment has been made.

---

Some scales may have the marking “*Not for direct sale to the public*”. This does not imply that the scale is inferior in any way. Instead, the marking indicates that the scale has a more flexible tare device and that it does not have a separate weight display for the customer, which is otherwise a requirement when the customer cannot see the weight display directly.

## Markings in the EU

In the European Union a Non-Automatic Weighing Instrument (NAWI) must be CE marked and bear the green “M” metrology sticker if it is to be used for one of the following purposes (the EU directive is more detailed):

- 1 Determination of mass for commercial transactions.
- 2 Determination of mass for the calculation of a toll, tariff, tax bonus, penalty, remuneration, indemnity or similar type of payment.
- 3 Determination of mass for the application of laws or regulations; expert opinion given in court proceedings.
- 4 Determination of mass in the practice of medicine, for the weighing of patients, for the purpose of monitoring, diagnosis and medical treatment.
- 5 Determination of mass for making up medicines on prescription in pharmacy and determination of mass in analyses carried out in medical and pharmaceutical laboratories.
- 6 The determination of price on the basis of mass for the purposes of direct sales to the public and the making-up of pre-packages.

Laws and regulations for the use of scales in the European Union are harmonized under Directive 90/384/EEC (Non-Automatic Weighing Instrument or NAWI), and the standard EN45501.

## Sealing the M2200 after Adjustments

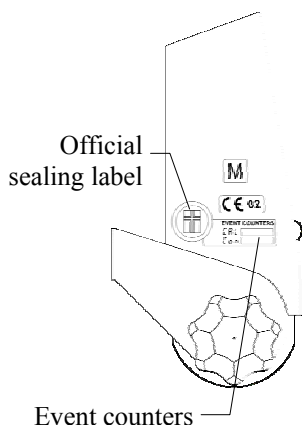


Figure 18 M2200 Indicator; event counters and sealing label.

When you have completed adjusting the scale or after the configuration parameters in the Protected parameters table on page 42 have been changed, the scale must be sealed again to maintain the official authorization of the scale.

There are two ways of sealing the scale:

- with a sealing label on the adjustment sticker (when the event counters, Cal and Con, are used to monitor modifications on the scale) or
- with an exterior wire and plumb seal (when the adjustment seal is used to lock the scale).

The event counters are displayed on the Audit Trail page (**Top Level Menu** → **v-Audit Trail**) and can be viewed any time.

Follow the instructions below on how to seal the scale.

### To seal the scale with a sealing label

- 1 From the Top Level Menu select **v-Audit Trail** (CHECK key) and note the new adjustment number.
- 2 Write the number on a new adjustment sticker and replace the old sticker on the M2200 Indicator.
- 3 Have a notified body or a WM authority seal the new sticker with a new official sealing label.

In some market areas the use of the event counters as a sealing device is not recognized by the authorities. The scale is shipped to these markets in a sealed state using the Seal Enable hardware seal (T9) on the scale's circuit board, shown in Figure 19:

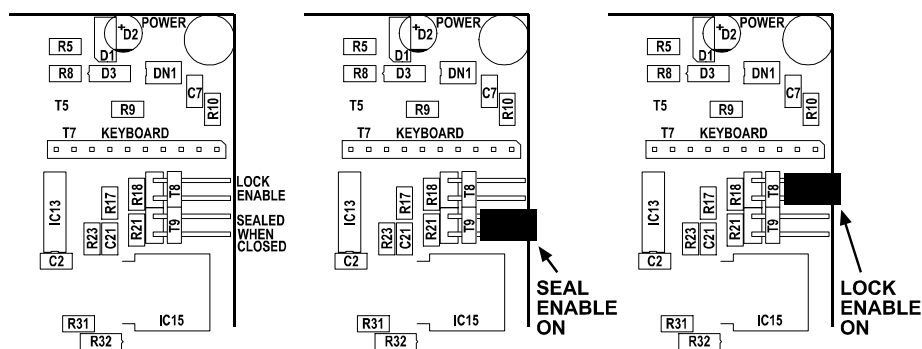


Figure 19 Detail of the circuit board; the seal.

In such circumstances, a notified body or a WM authority must adjust the scale and then seal it as described below.

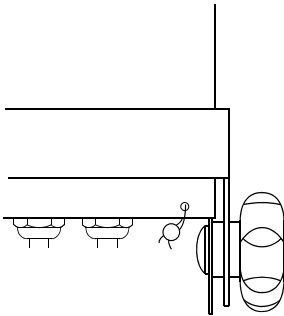


Figure 20 Exterior lead seal.

### To seal the scale with a wire and plumb seal

- 1 Open the scale's top cover.
- 2 Unlock the adjustment seal.
- 3 Adjust the scale according to instructions in "Adjusting the Scale" on page 28.
- 4 Put the adjustment seal back on in a locked position. Modification of the adjustment or configuration settings is no longer possible.
- 5 Check the Audit Trail page to verify that the Seal Enable hardware seal has status YES.
- 6 Seal the scale with an exterior lead seal as shown in Figure 20.

## Protected Parameters

The table below shows which parameters are protected by the Cal and Con counters and the Seal Enable jumper.

CAL and CON counter protection

CAL		CON	
Parameter:		Parameter:	
Units	kg	Response	Med: (UNSEALED)* <sup>6</sup>
AD at Zero	151509	Max1	3.000 kg
AD at Load	1283398	e1	0.001kg
Span	1.766958e-06	Max2	6.000kg
G Adjust Factor	1.000000	e2	0.002kg
Using Load Cell 2	No	Zero Tracking	Yes: (UNSEALED)*
		Extra Res.	No: (UNSEALED)*
		Initial zero, startup	Yes
		Direct Sale to Public	Yes
		Seal Extra Res.	No**
		Seal Zero Tracking	No**
		Seal Response	No**
		Allow Remote Zero and Tare	No
		Blank display below zero	No
		Remove tare entering first range	No

<sup>6</sup> \* These parameters are sealed or not sealed according to the selected sealing options.

\*\* The setting of the sealing option is always sealed.

---

# Additional Information

Further information on regional laws and regulations can be obtained at the following organisations:

## International:

OIML  
International Organization of Legal Metrology  
[www.oiml.org/](http://www.oiml.org/)

WELMEC  
European Cooperation in Legal Metrology  
[www.welmec.org/](http://www.welmec.org/)

## European Countries:

Austria  
The Bundesamt für Eich-und Vermessungswesen (BEV)  
[www.bev.gv.at/](http://www.bev.gv.at/)

Belgium  
General Inspection of Metrology

Bulgaria  
State Agency for Standardisation and Metrology (SASM)

Czech Republic  
Czech Office for Standards, Metrology and State Testing (COSMT)

Denmark  
Erhvervsfremme Styrelsen  
[www.efs.dk/godkend\\_metro](http://www.efs.dk/godkend_metro)

Finland  
Turvatekniikan keskus (TUKES)  
[www.tukes.fi](http://www.tukes.fi)

French  
Sous-Direction de la Métrologie (SDM)  
[www.ensmp.fr/industrie/darpmi/](http://www.ensmp.fr/industrie/darpmi/)

Germany  
Physikalisch-Technische Bundesanstalt (PTB)  
[www.ptb.de/](http://www.ptb.de/)

Greece  
Hellenic Institute of Metrology

Hungary  
National Office of Measures (Országos Mérésügyi Hivatal, OMH)  
[www.omh.hu/](http://www.omh.hu/)

Iceland  
Löggildingarstofa (LS)  
[www.ls.is](http://www.ls.is)

Ireland  
National Office of Weights and Measures  
National Metrology Laboratory (NML) of FORBAIRT  
[www.netc.ie/techserv/metrolog.html](http://www.netc.ie/techserv/metrolog.html)

Italy  
Ufficio Centrale Metrico (UCM)  
[www.minindustria.it/](http://www.minindustria.it/)

Latvia  
Latvian National Metrology Centre

Luxembourg  
Administration des Contributions

Netherlands  
Nederlands Meetinstituut B.V.  
[www.nmi.nl](http://www.nmi.nl)

Norway  
Justervesenet  
[www.justervesenet.no](http://www.justervesenet.no)

Poland  
Central Office of Measures (Główny Urząd Miar)

Portugal  
Instituto Português da Qualidade (IPQ)  
[www.ipq.pt/](http://www.ipq.pt/)

Republic of Lithuania  
State Metrology Service (SMS)

Romania  
Romanian Bureau of Legal Metrology (BRML)

Slovakia  
Slovak Office of Standards, Metrology and Testing (UNMS)

Slovenia  
Slovenian Standards and Metrology Institute (SMIS)

Spain  
Centro Espanol de Metrologia (CEM),  
[www.cem.es](http://www.cem.es)

Sweden  
Swedish Testing and Research Institute (SP)  
[www.sp.se](http://www.sp.se)

Switzerland  
Swiss Federal Office of Metrology (OFMET)  
[www.metas.ch](http://www.metas.ch)

United Kingdom  
National Weights and Measures Laboratory (NWML)  
[www.nwml.gov.uk](http://www.nwml.gov.uk)

## Other countries:

Australia  
National Standards Commission  
[www.nsc.gov.au](http://www.nsc.gov.au)

Brazil  
Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (INMETRO)  
[www.inmetro.gov.br/](http://www.inmetro.gov.br/)

Canada  
Measurement Canada  
[strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/Home](http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/Home)

China  
State General Administration for Quality Supervision and Inspection and Quarantine (AQSIQ)  
[www.aqsiq.gov.cn](http://www.aqsiq.gov.cn)

New Zealand  
Weight & Measures  
[www.consumer-ministry.govt.nz/weights.html](http://www.consumer-ministry.govt.nz/weights.html)

Russia  
Gosstandart of Russia  
[www.gost.ru](http://www.gost.ru)

South Africa  
SABS  
[www.sabs.co.za/](http://www.sabs.co.za/)

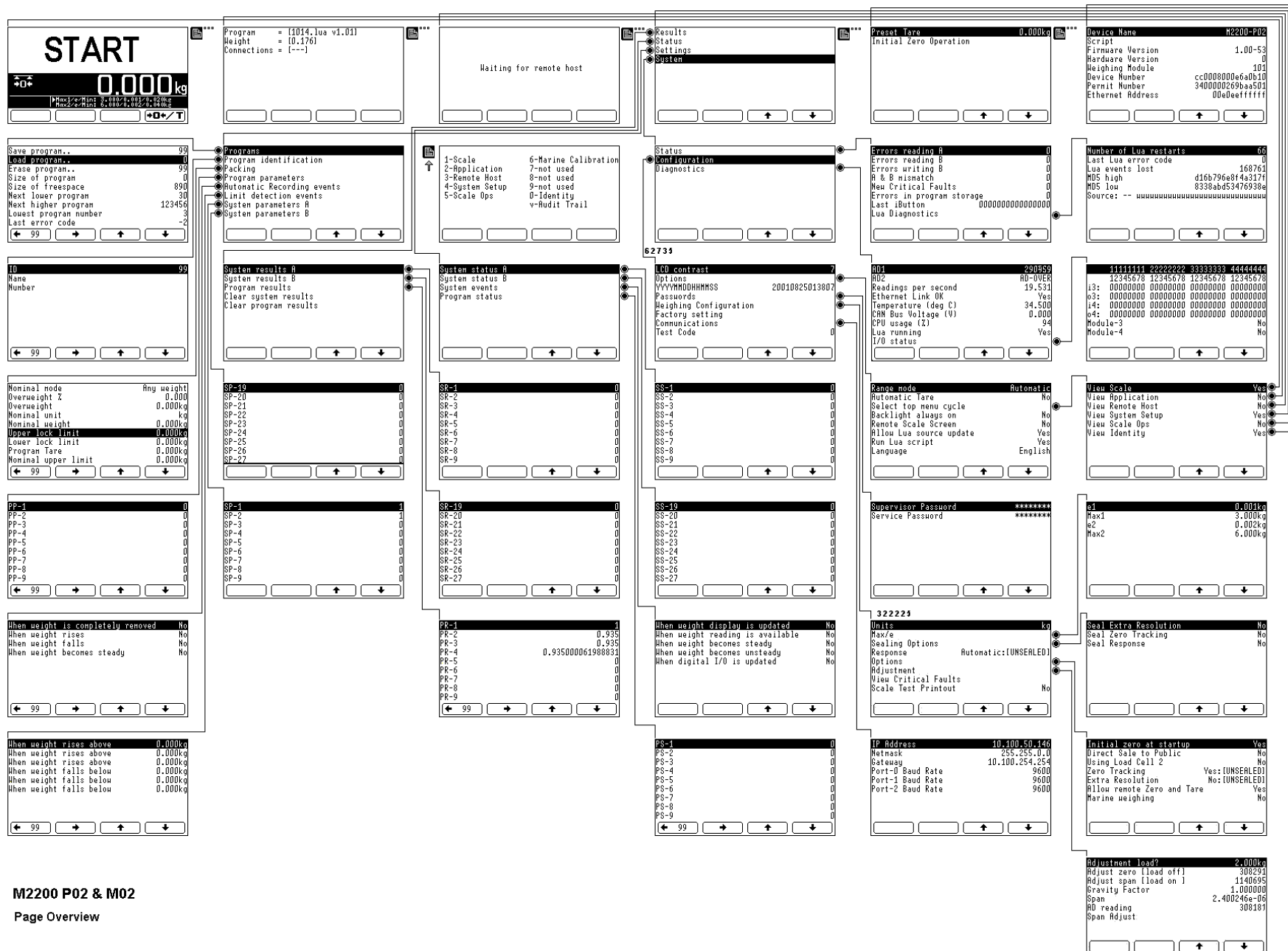
USA  
The National Conference on Weight and Measures  
[www.ncwm.net/main.html](http://www.ncwm.net/main.html)  
NIST, National Institute of Standards and Technology  
[ts.nist.gov/ts/](http://ts.nist.gov/ts/)





---

## **M2200 P02 & M02 Page Overview**



M2200 P02 & M02

Page Overview

Units kg  
Max/e  
Sealing Options  
Response Automatic:[UNSEALED]  
Options  
Adjustment  
View Critical Faults  
Scale Test Printout No

The diagram illustrates the sequence of screen displays for the 3800 calibration process. The sequence is as follows:

- Screen 38:**
  - Units
  - kg<
  - Navigation buttons: [ ] [ ] [Up] [Down]
- Screen 78:**
  - e1 0.001kg
  - Max1 3.000kg
  - e2 0.002kg
  - Max2 6.000kg
  - Navigation buttons: [ ] [ ] [Up] [Down]
- Screen 38:**
  - Seal Extra Resolution No
  - Seal Zero Tracking No
  - Seal Response No
  - Navigation buttons: [ ] [ ] [Up] [Down]
- Screen 78:**
  - Response
  - Fast: [UNSEALED] <
  - Navigation buttons: [ ] [ ] [Up] [Down]
- Screen 38:**
  - Initial zero at startup Yes
  - Direct Sale to Public No
  - Using Load Cell 2 No
  - Zero Tracking Yes: [UNSEALED]
  - Extra Resolution No: [UNSEALED]
  - Allow remote Zero and Tare Yes
  - Marine weighing No
  - Navigation buttons: [ ] [ ] [Up] [Down]
- Screen 78:**
  - Adjustment load? 2.000kg
  - Adjust zero [load off] 308291
  - Adjust span [load on ] 1140695
  - Gravity Factor 1.000000
  - Span 2.400246e-06
  - AD reading 308181
  - Span Adjust
  - Navigation buttons: [ ] [ ] [Up] [Down]

## M2200 P02 & M02

### Weighing Configuration



# Glossary of Terms

**Indicator**

See *M2200 Indicator*.

**Giveaway weight**

Fixed, extra weight which is added to a fixed nominal weight to obtain the target weight.

**M2200**

The Marel M2200 scale.

**M2200 Indicator**

The display unit for the M2200 series.

**Max**

The maximum value of a single range scale.

**Max1**

The maximum value of the lower range in a dual range scale.

**Max2**

The maximum value of the higher range in a dual range scale.

**Multiple range**

On scales with two or more weighing ranges with different maximum capacities and different scale intervals for the same weighing platform, each range extending from zero to its maximum capacity.

**Nominal weight**

The weight of a product as specified on the packaging label.

**Overweight**

The weight range the operator intends to stay over the nominal weight while trying to achieve the target weight.

**Pack weight**

The final (real) weight of the package.

**Password**

Used to limit unauthorized access to the scale's setup parameters.

**Range**

See *Weighing range*.

**Resolution**

The number of divisions in the total weighing interval.

Example: If the weighing interval is 15 kg and the division (e) is 5 g, the resolution is 1:3000.

**Scale page**

An M2200 page that shows the weight on the platform.

**Tare**

The weight of the container on the platform and the allowance made for the container when weighing.

**Target weight**

The weight the scale operator is trying to achieve for a package.

**Weighing range**

The range from zero to maximum capacity.

# Index

## A

- Accessing Top Level Menu 11
- Acidity 19
- Adjustment sticker 41
- Adjustments, marine 18
- Allow Lua source update 23
- Any weight, packing mode 15
- Applying power 9
- Audit Trail, page 41
- Automatic
  - recording 12
  - tare 3, 15, 16, 23

## B

- Backlight 3, 23

## C

- CAL counter 29, 41, 42
- Calibration message (CAL) 18
- CAN network 3
- Changing
  - passwords 25
  - settings 23
- Check key 10
- Cleaning 19
- Cleaning, daily routine 19
- Clock format 24
- Communication 3, 24, 32
- Communication ports, Lua functions 33
- CON counter 29, 41, 42
- Contrast, LCD 23
- Control characters 36
- Creating products 12

## D

- Damages 4
- Data processing 3
- Default settings 3
- Detergents, choosing 19
- Digital
  - input, Lua functions 34
  - output, Lua functions 35
- Dimensions 7
- Direct sale to the public 16, 17, 40

- Disinfectants 20
- Display, LCD 3

## E

- Entering tare 15
- Error codes 21
- Ethernet 3
- Event counters 29, 41, 42
- Events 36
- Events, Lua functions 34

## F

- Factory settings 24
- Fit message 18
- Fixed weight 13

## G

- Giveaway weight 13

## H

- Hardware seal 28

## I

- Indicator 3
- Inspection for damages 4
- Installing 9

## J

- Jumpers
  - Lock enable 24, 25
  - Seal enable 41

## K

- Keys
  - Check key 10
  - Page key 10

## L

- Language 24

- LCD contrast 23
- Leveling 28
- Limit detection 13
- Lock enable, jumper 24, 25
- Lua functions 32
- Lua source update 23
- Lua, programming language 31

## **M**

- M2200
  - adjustment 28
  - communication 3
  - installing 9
  - leveling 28
- M2200 Indicator 3
- Marine adjustments 18
- Marks 39
- Max capacity 28
- Max/e 26
- Maximum weight 13
- Messages
  - CAL (calibration) 18
  - Fit 18
- Minimum weight 13
- Model access, Lua functions 34
- Model, liner array 31
- Motion compensation 18

## **N**

- NET, indicator 15
- Network facilities 3
- Nominal modes 12, 13
- Nominal weight 13
- Normal tare 15

## **O**

- OIML 29
- Operational zero point 10
- Overweight, packing mode 14

## **P**

- Pack weight 13
- Packing
  - modes 12
  - parameters 12
- Page key 10
- Pages
  - Audit Trail 41
  - System 11
  - Weighing Configuration 26
- Parameters 42
- Parameters, packing 12
- Passwords 24, 25
- Preset tare 15, 17
- Products, creating 12

- PT NET, indicator 17

## **R**

- Range mode 23
- Range mode, setting 3
- Range, packing mode 14
- Real-time clock 35
- Recording weighing results 12
- Regulations for use 39
- Remote scale screen 23
- Removing
  - passwords 25
  - tare 15
- Resolution 17, 26
- Response time 27
- RS-232 3
- Run Lua script 23

## **S**

- Screen control 36
- Screen functions, Lua 32
- Seal Enable, jumper 41
- Sealing, after adjustment 41
- Seals 28, 39, 41
- Select Top menu cycle 23
- Server ports 32
- Service password 24, 25
- Settings
  - changing 23
  - default 3
- Steps, packing mode 14
- Supervisor password 24

## **T**

- T8, Lock enable jumper 24, 25
- T9, Seal enable jumper 41
- Tare 15
  - automatic 16, 23
  - entering 15
  - normal 15
  - preset 17
- Tare, function 10
- Target weight 13
- TCP server ports 32
- TCP/IP 24
- Test code 24
- Timer, Lua functions 35
- Top Level Menu 29, 41
- Top Level Menu, accessing 11

## **U**

- Unit of weight 27
- User interface 9



## **W**

Weighing  
  configuration 24  
  configuration, password 25  
  range 26  
Weight step 13

## **Z**

Zero, function 10