Version 1.00

User's Guide

M2200

P02 & M02 Packing Scale

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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:

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

Both Neutral and Live are fused.

Contents

Introduction 3

M2200 IN GENERAL 3
- Default Settings 3
- Communication 3
- Initial Inspection 4

ABOUT THIS MANUAL 4
- Improvements 4
- Warranty Information 5

TECHNICAL SPECIFICATIONS 6

Operation 9

BEFORE YOU START 9

THE USER INTERFACE 9
- Function Keys 10
- The Scale page 10
- The System Page 11

CREATING PRODUCTS 12
- Selecting a Nominal Mode 13

WORKING WITH TARE 15
- Normal Tare 15
- Automatic Tare 16
- Preset Tare 17
- Marine Adjustments 18

CLEANING 19

ERROR CODES 21

Installation 23

IN GENERAL 23

SYSTEM SETTINGS 23

Adjustments 25

IN GENERAL 25
- Weighing Range and Resolution 26
- Unit of Weight 27
- Setting Response Time 27

ADJUSTING THE SCALE **28**
The Span Adjust Option 29

Programming 31

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**

Appendix 39

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**

Glossary of Terms 47

Index 49

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[1]:

- 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.

[1] 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.

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

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

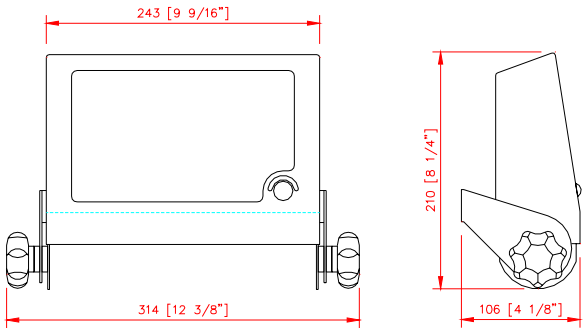
Capacity and Resolution:

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

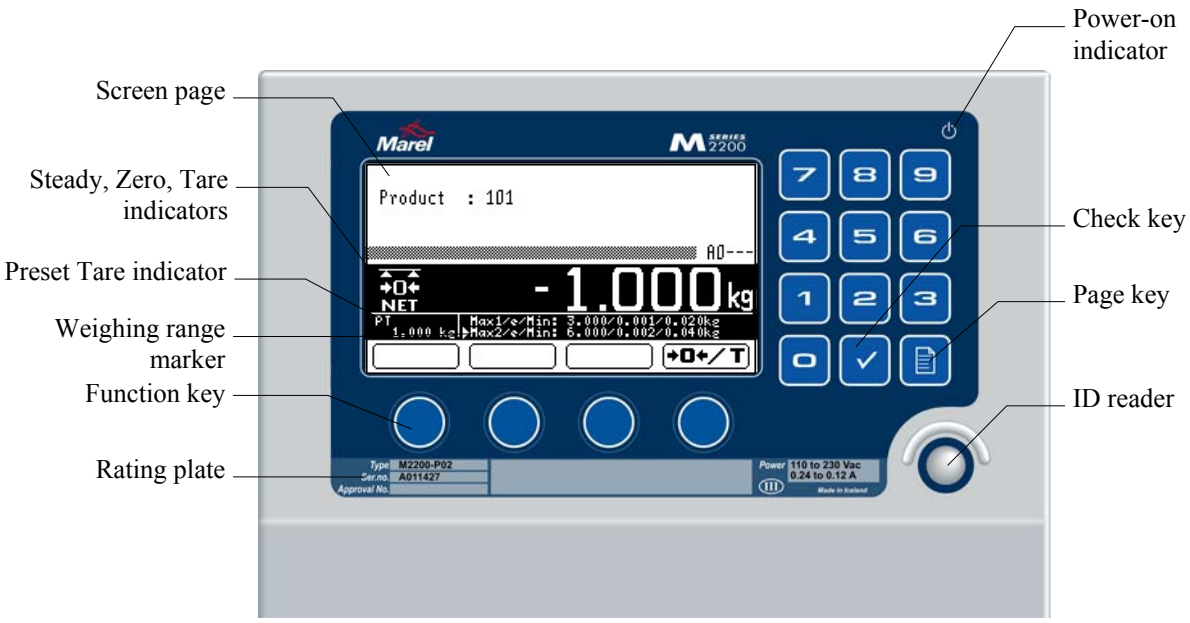


Figure 1 M2200 Indicator, front view.

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).

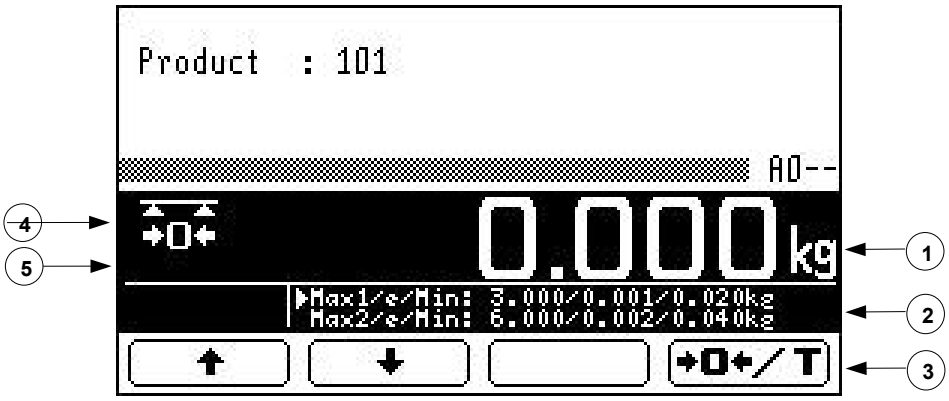


Figure 2 The Scale page.

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 →0←/T (ZERO/TARE) key is used to take a new operational zero point provided the operating zero stays within ±2% of max weight from the initial zero point.[2]

The operating zero is the reference point for all weighings, and therefore a correct operating zero is necessary to ensure accurate weighing results. The →0← indicator illuminates when the scale is at zero.

[2] 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 ±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

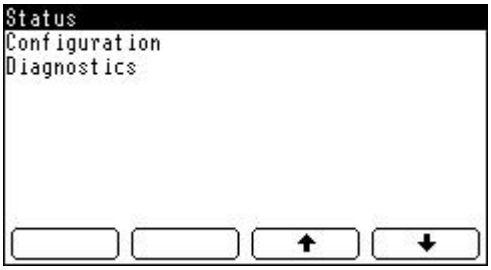


Figure 3 The System page.

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

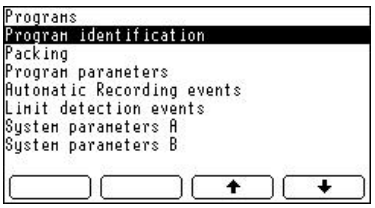


Figure 4 The Settings page

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.

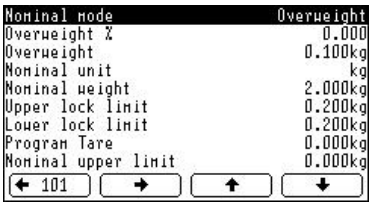


Figure 5 The Packing page

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

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.

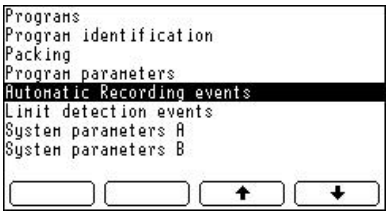


Figure 6 The Settings page, the Automatic recording option

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 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.

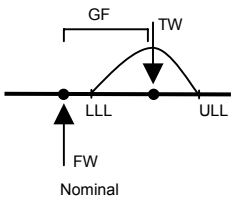
Note: It is possible to overwrite new parameter settings if you browse from one product to another with the Left and Right arrows (see Figure 5, for example).
To prevent accidental overwriting, you are instructed to save your work frequently (steps 2, 4, and 7).

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 maximun allowed deviation (downwards) from the target weight
Upper Lock Limit	ULL	**Upper Lock Limit**	The maximun allowed deviation (upwards) from the target weight

Overweight



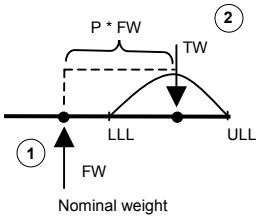
Use this mode to pack to a fixed weight. The nominal weight is fixed. The target weight is calculated as:

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 %

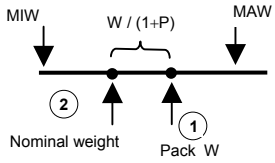


Use this mode to pack to a fixed weight using a percentage of the nominal weight to reach the target weight.
The target weight is calculated as:

TW = FW * (1+GP/100)

Parameters that need to be specified:
”Nominal weight”, “Overweight %”, “Upper lock limit”, “Lower lock limit”.

Range



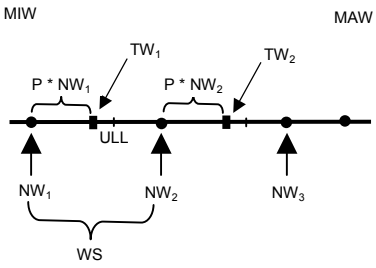
Use this mode to pack catch weight (packs of variable weight). The minimum allowed nominal weight is MIW and the maximum allowed nominal weight is MAW. There is no target weight.

The nominal weight is calculated as:

NW = W / (1+GP/100)

Parameters that need to be specified:
”Nominal weight”, “Overweight %”, “Nominal upper limit”.

Steps



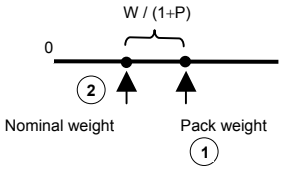
This mode is normally only used to pack salmon. The nominal weight is the lowest weight below W calculated by successively adding WS to MIW.

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

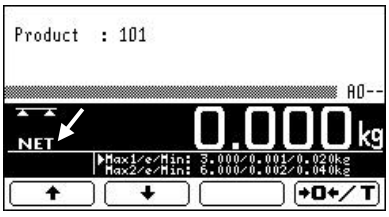


Figure 8 Scale page, tare in use.

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.

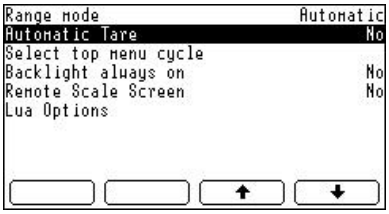
Direct sale to the public

Note: In some market areas the scale's tare function may be protected with a software switch.[3] 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 →0←/T (normal tare, see above).
6. Remove the tray, and place a new tray on the platform.
7. If the second tray is within ± 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 →0←/T.

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 ± 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.

[3] According to standard regulations on conditions for direct sale to the public.

Preset Tare

To use Preset tare

Figure 9 The Scale Ops page.

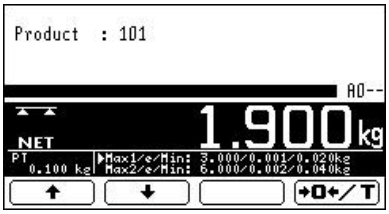


Figure 10 Scale page, Preset tare in use.

1. Assuming the Scale Ops page has been defined as part of the Top Menu Cycle,[4] 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 ☑ to confirm.
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 ☑ to confirm.
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).

[4] 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:

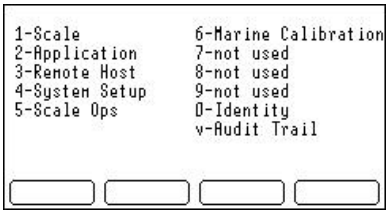


Figure 11 Top Level Menu.

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.

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.[5]

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 1% 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.

[5] 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:
E-05	Unstable weight (initial zero)	Stabilize the scale.
E-14	ADC not responding	Contact your Marel agent
E-15	Parameter fault	Clear the W&M parameter fault counter in **Top Level Menu → 4-System Setup → System → Configuration → Weighing Configuration → View Critical Faults** 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.
E-17	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.
E-18	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.
E-23	24 V power voltage too high	Provide correct voltage
E-25	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.

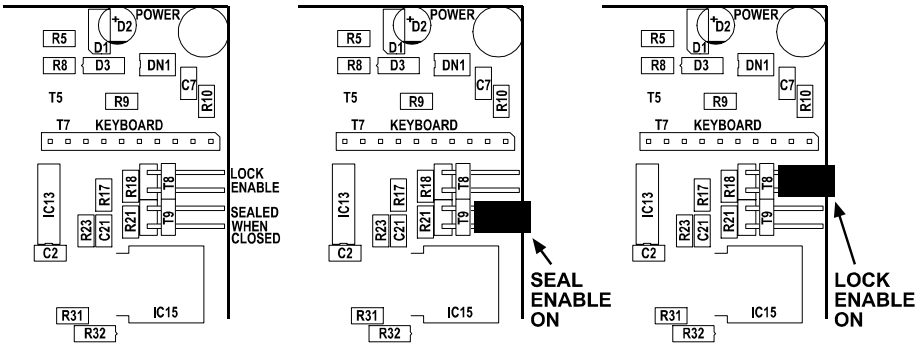


Figure 12 Lock Enable jumper.

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).

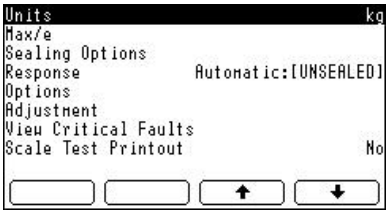


Figure 13 The W&M page

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.

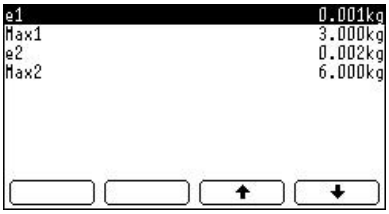


Figure 14 Setting the weighing range.

2 Select an option to work with (e.g. e1 or max1), press ☑ and use the numeric keypad to enter a new value.

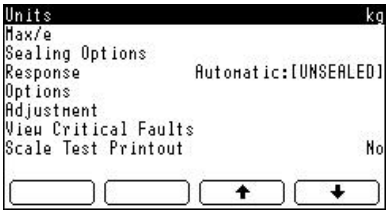
3 Press ▤ to return to the previous page.

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.

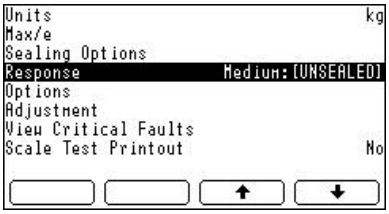
3 Press ▤ to return to the previous page.

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**.

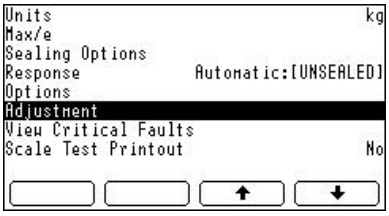


Figure 15 The W&M page.

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).

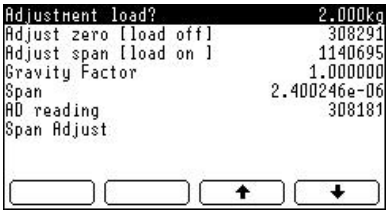


Figure 16 The Adjustment page.

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.

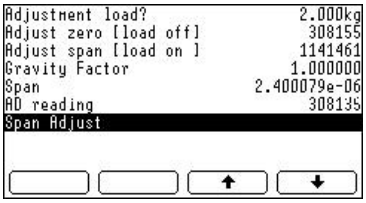
Tip

- 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



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

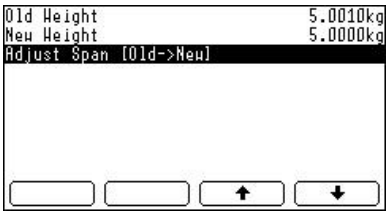


Figure 17 The Span Adjust page.

1 Enter the current weight value (e.g. 5.0010 kg) in the **Old Weight** field on the Span Adjust page.

2 Enter the desired weight (5.000 kg) in the **New Weight** field.

3 Select **Adjust Span (Old → New)** and press ☑ to confirm.

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.

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

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

Miscellaneous Functions

Function:	Description:
Request(event)	Request automatic events “steady”, “motion”, etc.
Pack(weight)	Return packing results as six values: 1. Nominal weight as string with units 2. Deviation from acceptable range in divisions 3. Deviation from target weight in divisions 4. Target weight 5. Lower accept limit 6. Upper accept limit
clock()	Clock with 10 ms resolution
sleep(dur)	Suspend Lua application e.g. sleep(0.5)
Edit(char, string, cursor)	Returns string and cursor
GetWeight()	Return current weight, stability, zero, net
ScaleTrim(value)	Return a number trimmed to the scale’s current division
Trim(value, div)	Return a number trimmed to the given resolution
SetInfo(string)	Set name of Lua application
Io(n)	Convert between linear i/o address and module-block-line
DoubleDigits(string)	Convert string with decimal digits to wide digits
DIOActive(node)	Say if given CAN module is connected

Communication Port Functions

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

Event	Value	Description
exit	None	Lua application should exit
manual	Weight	Manual recording result
drop	Weight	Automatic recording result
catch	Weight	Automatic recording result
inc	Weight	Automatic recording result
dec	Weight	Automatic recording result
capture	Weight	Automatic recording result
above	Limit ID	Upper limit exceeded
below	Limit ID	Weight is below lower limit
steady	Weight	Scale has become steady
motion	Weight	Scale has become unsteady
update	Weight	Scale display updated
reading	Weight	Scale engine updated
ibutton	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 to see the weight display directly.

Markings in the EU

In the European Union a Non-Automatic Weighing Instrument (NAWI) must be 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

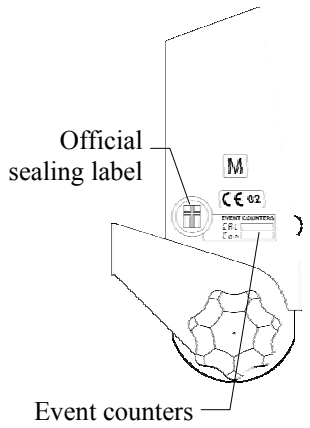


Figure 18 M2200 Indicator; event counters and sealing label.

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:

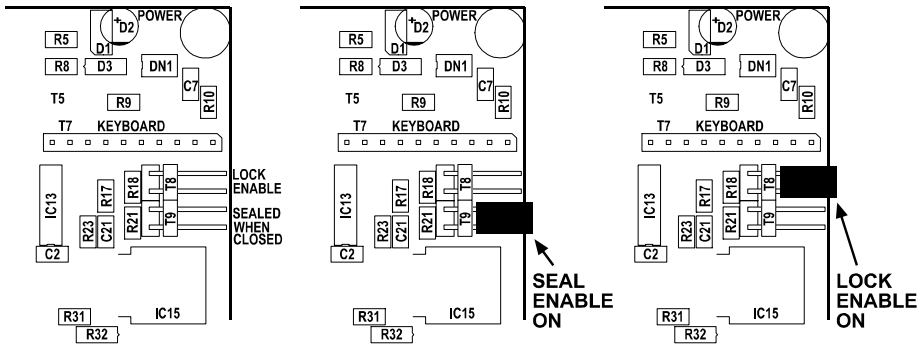


Figure 19 Detail of the circuit board; the seal.

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

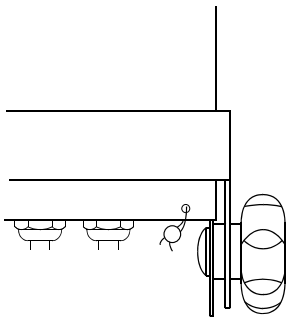


Figure 20 Exterior lead seal.

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)*[6]
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

[6] * 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/

WELMEC
European Cooperation in Legal Metrology
www.welmec.org/

European Countries:

Austria
The Bundesamt für Eich-und Verrmessungswesen (BEV)
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

Finland
Turvatekniikan keskus (TUKES)
www.tukes.fi

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

Germany
Physikalisch-Technische Bundesanstalt (PTB)
www.ptb.de/

Greece
Hellenic Institute of Metrology

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

Iceland
Löggildingarstofa (LS)
www.ls.is

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

Italy
Ufficio Centrale Metrico (UCM)
www.minindustria.it/

Latvia
Latvian National Metrology Centre

Luxembourg
Administration des Contributions

Netherlands
Nederlands Meetinstituut B.V.
www.nmi.nl

Norway
Justervesenet
www.justervesenet.no

Poland
Central Office of Measures (Glowny Urzad Miar)

Portugal
Instituto Português da Qualidade (IPQ)
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

Sweden
Swedish Testing and Research Institute (SP)
www.sp.se

Switzerland
Swiss Federal Office of Metrology (OFMET)
www.metas.ch

United Kingdom
National Weights and Measures Laboratory (NWML)
www.nwml.gov.uk

Other countries:

Australia
National Standards Commission
www.nsc.gov.au

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

Canada
Measurement Canada
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

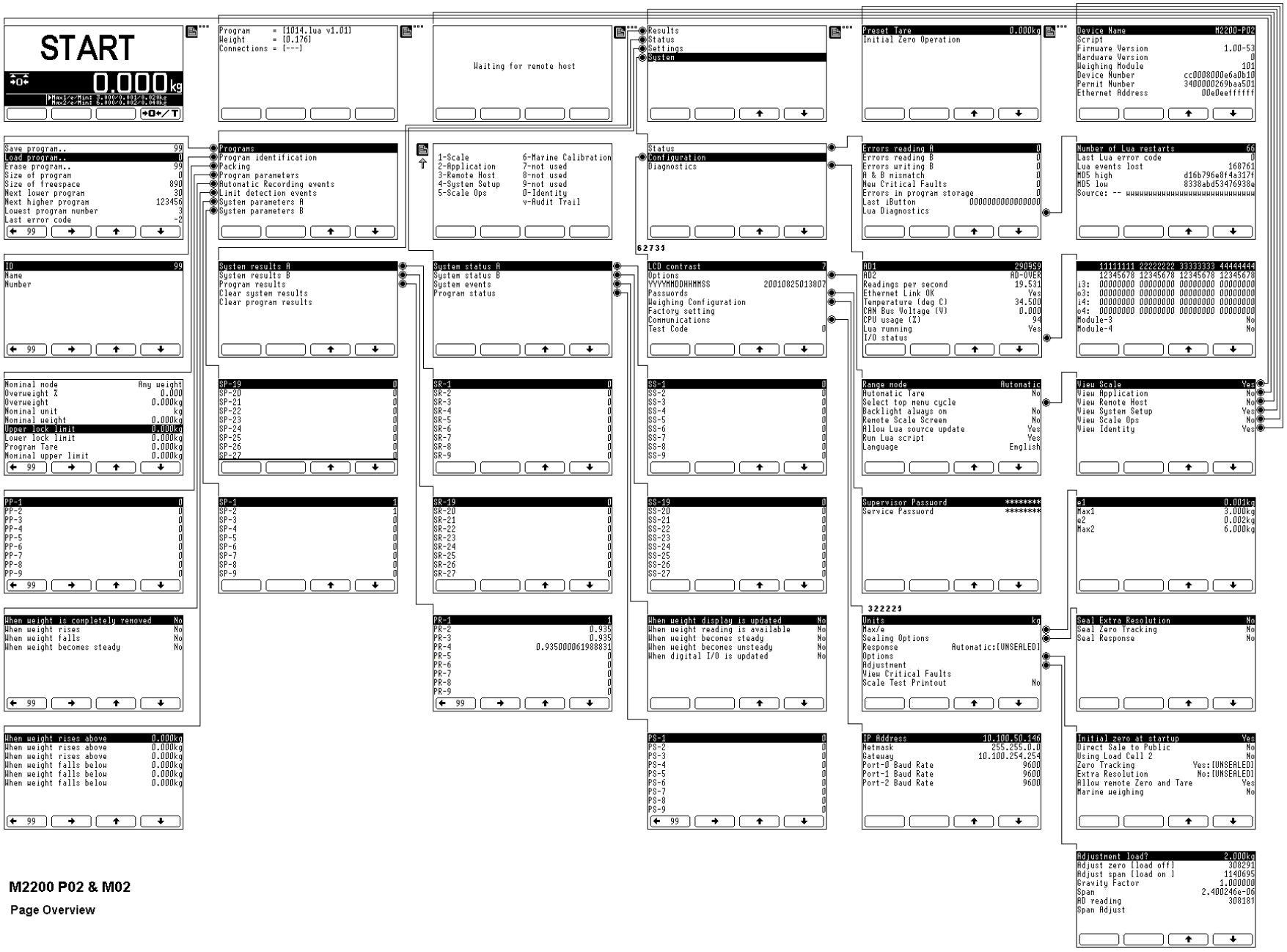
New Zealand
Weight & Measures
www.consumer-ministry.govt.nz/weights.html

Russia
Gosstandart of Russia
www.gost.ru

South Africa
SABS
www.sabs.co.za/

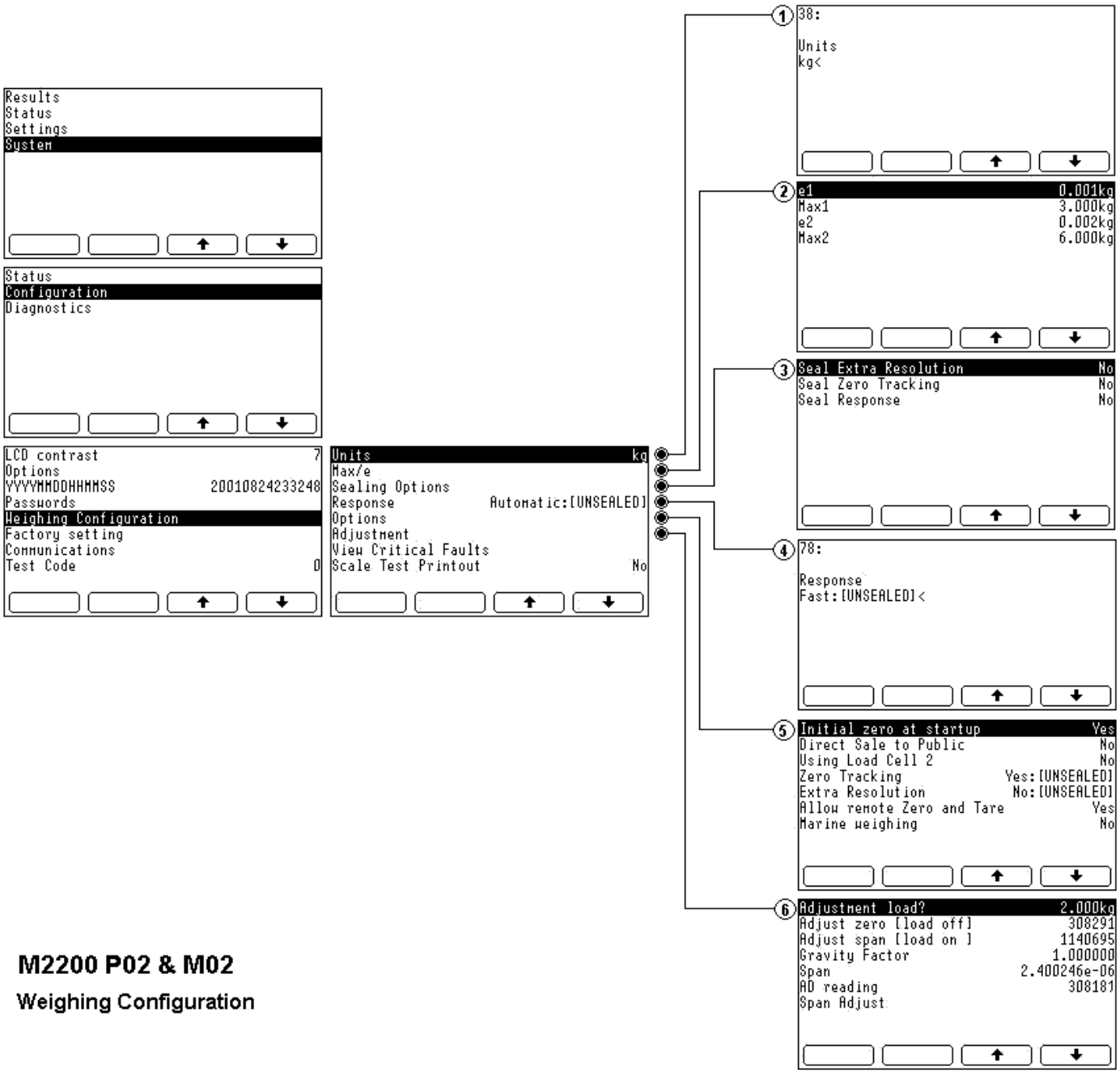
USA
The National Conference on Weight and Measures
www.ncwm.net/main.html
NIST, National Institute of Standards and Technology
ts.nist.gov/ts/

M2200 P02 & M02 Page Overview



M2200 P02 & M02

Page Overview



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