



Australian Government
Department of Industry and Science

National Measurement Institute

Supplementary Certificate of Approval

No S699

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Marel Model MU1 Digital Indicator System

submitted by Marel Australia Pty Ltd
42 Borthwick Ave
Murarrie QLD 4172

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 76, *Non-automatic weighing instruments, Parts 1 and 2*, dated July 2004.

This approval becomes subject to review on 1/11/21, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – certificate issued	4/10/16

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI S699' and only by persons authorised by the submitter.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NMI S699' in addition to the approval number of the instrument, and only by persons authorised by the submitter.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0B.

The values of the performance criteria (maximum number of scale intervals etc.) applicable to an instrument incorporating the pattern approved herein shall be within the limits specified herein and in any approval documentation for the other components.

Special

Certain aspects of this instrument (in particular label formats where labels are printed) are able to be configured by the user. Whilst NMI believes that acceptable label formats can be achieved for typical basic sales modes, it is also possible for the instrument to be configured to produce unacceptable formats, and use of some formats may be inappropriate for different sales modes. It is the responsibility of the user to ensure that acceptable and appropriate formats are used in any particular situation event that such modifications (if any are required by NMI) are not made to the satisfaction of NMI, this approval may be withdrawn.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.



Dr A Rawlinson

TECHNICAL SCHEDULE No S699

1. Description of Pattern

approved on 4/10/16

A Marel model MU1 digital indicator system, comprising a Marel model MU1 module analog data processing device (Figure 2), incorporated within a Marel M6215 digital mass indicator display (Figure 1). The approved specifications of the system are shown in Table 1, and the system may be configured to form part of a class III or IIII weighing instrument as follows:

- A weighing instrument (class III) with a single weighing range of up to 10,000 (*) verification scale intervals; or
- A multiple range weighing instrument (class III) with up to two weighing ranges, in which case it is approved for use with up to 10,000 (*) verification scale intervals per weighing range. The changeover between weighing ranges is automatic; or
- A weighing instrument (class IIII) with a single weighing range of up to 1000 (*) verification scale intervals; or
- A multiple range weighing instrument (class IIII) with up to two weighing ranges, in which case it is approved for use with up to 1000 (*) verification scale intervals per weighing range. The changeover between weighing ranges is automatic.

Instruments may be fitted with output sockets (output interfacing capability) and other interfaces for the connection of auxiliary and/or peripheral devices.

This approval does not include the use of the indicator as an automatic weighing instrument, unless specifically mentioned in a certificate of approval for such an instrument.

The instrument is NOT FOR TRADING DIRECT WITH THE PUBLIC and shall be so marked.

TABLE 1 – Specifications

Maximum number of verification scale intervals	10,000 for class III (*) 1000 for class IIII
Minimum sensitivity	0.25 μV /scale interval
Fraction of maximum permissible error	$p_i = 0.5$
Excitation voltage	6 V DC (i.e. ± 3 V)
Maximum excitation current	70.6 mA
Minimum load impedance	85 Ω
Maximum input impedance	1100 Ω
Measuring range minimum voltage	0 mV
Measuring range maximum voltage	± 30 mV
Number of wires	4 or 6 wires, shielded
Temperature range	-10°C to +40°C

1.1 Indicator System Modules

The indicator comprises three substantial modules:

(a) A Marel model MU1 analog data processing device

This is a sealable module which has connectors for connection to a platform/load cell(s) – a six wire connection (including sense capability), plus shield is available.

In addition, the module has a USB connection which is used to provide communications with the module, and to provide power to it (5 VDC).

The MU1 module provides the excitation voltage to the load cells, carries out the analog to digital conversion of the load cell signals as well as filtering of those signals, and processes that data to form the weighing result.

The module contains the data relating to calibration and setup of the instrument, and carries out related processing including zeroing and taring.

The module also contains memory to provide for a Data Storage Device (see 1.8 below).

(b) A Marel model M6215 PC based computer system / display unit

This is a PC based computer system with integrated LCD touch screen display, provided in a housing intended to be water resistant.

The PC system supplies power to the MU1 module (via its USB connection), and receives data from and communicates to the MU1 module.

The indicator may use input devices (keyboard/mouse) of the PC based computer system to provide input to the weighing indicator function (e.g. entry of a Preset Tare value).

(c) Marel MU1 PC display software

The Marel MU1 PC display software, runs on the PC based computer system and interacts with the MU1 module via the PC system's data link to it (via the USB connection) – and forms the display and operator interface of the weighing instrument.

The MU1 PC display software is able to authenticate the communication with the MU1 module and also provides an interface to the settings for configuration and calibration of the instrument. The MU1 module will only communicate with one instance of the MU1 PC display software at a time, and will not communicate with any software which it cannot authenticate.

A number of alternative user interfaces are available (see Figures 3 and 4).

Note: In all cases the Marel logo acts as a button providing access to additional menu items.

1.2 Linearisation Facility

Instruments are fitted with a linearisation correction facility having a single correction point.

1.3 Power Supply

The M6215 PC based computer system operates from mains AC power (110-240 V AC nominal).

The MU1 module operates via a USB (5V DC) connection from the M6215 PC based computer system.

1.4 Zero

A zero-tracking device may be fitted.

The initial zero-setting device has a nominal range of not more than 20% of the maximum capacity of the instrument.

The instrument has a semi-automatic zero-setting device with a nominal range of not more than 4% of the maximum capacity of the instrument.

1.5 Tare

A semi-automatic subtractive tare device of up to the maximum capacity of the instrument may be fitted.

A pre-set subtractive tare device of up to the maximum capacity of the instrument (up to the maximum capacity of the low range, for multiple range instruments) may be fitted.

The instrument also has provision for an automatic tare device (which may or may not be enabled). This operates such that the weight of a container which is within 30% of a previously set initial semi-automatic tare value may be automatically tared.

1.6 Price Calculation Facility

The MU1 module has provision for calculation of a price value, based on the weight value and settings of Unit price, Unit-price division, and Price-division (within the 'General' menu of the MU1 PC display software).

The price and unit price information is not displayed on the main interface of the MU1 PC display software.

Use of this facility is approved only where both unit-price division and Price-division are \$0.01, and the scale interval of the instrument is in kilograms.

This facility is intended for the printing of labels by a printer attached to the PC based computer system.

1.7 Interfaces

The MU1 module or MU1 PC display software may be provided with a software interface, for the connection of auxiliary and/or peripheral equipment (including connection to other software running within the PC based computer system, and other equipment such as external displays or printers connected via physical interfaces such as Ethernet or USB connections).

Any interfaces shall comply with clause 5.3.6 of document NMI R76 (the basic intent of which is that it shall not be possible to alter weighing results via the interfaces).

Any measurement data output from the MU1 module or MU1 PC display software or its interfaces shall only be used for trade in compliance with Supplementary Certificate No S1/0B (in particular in regard to the data and its format).

Note: Any additional software within the PC based computer system which carries out any manipulation of the weighing result (such as application of tare, or price calculation), and which is to be used for trade, will require specific approval – either as a separate approval or as a variant within this certificate.

1.8 Data Storage Device

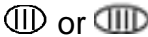

The MU1 module has an internal data storage device (also known as 'alibi memory') for storing records of weighing operations.

When a request for weighing with data storage ('alibi') is made to the MU1 module, the module returns a weight value with an 'alibi number'. If necessary this number may be used at a later time to look up the corresponding record in the data storage device, which will provide information regarding

- The weighing unit involved
- A signature of the application data stored on the PC computer by the MU1 PC display software.
- The weight value
- Tare value(s)
- Price value

1.9 Markings and Notices

Instruments carry the following markings:

Manufacturer's mark, or name written in full	Marel
Name or mark of manufacturer's agent
Indication of accuracy class	 or 
Maximum capacity (for each range)	<i>Max</i> kg #1
Minimum capacity (for each range)	<i>Min</i> kg #1
Verification scale interval (for each range)	<i>e</i> = kg #1
Maximum subtractive tare	<i>T</i> = - kg #2
Serial number of the instrument
Pattern approval mark for the indicator	NMI S699
Pattern approval mark for other components #3

#1 These markings are also shown in the MU1 PC display software, adjacent to the weighing results, with an indicator showing the range currently in use, in a form such as shown in Figure 3.

#2 This marking is required if *T* is not equal to *Max*.

#3 May be located separately from the other markings.

Note: For multiple range instruments the markings shall be as above, with the exception that the maximum capacity, minimum capacity and verification scale interval for each range shall be marked, with clear identification, e.g."

Range	Max	Min	e
1 kg
2 kg

In addition, instruments not greater than 100 kg capacity carry a notice stating NOT TO BE USED FOR TRADING DIRECT WITH THE PUBLIC, or similar wording.

1.10 Software Versions

The MU1 software consists of three software modules.

- MU1 Module metrology firmware: version 1.00 (This is in the form 'a.bb', where 'a' indicates functional changes and 'bb' indicates 'bug fixes'. Firmware 1.bb is approved).

- (ii) MU1 Module operation firmware: version 111220 (This is in the form of the date 'yymmdd', versions 111220 and subsequent are approved).
- (iii) MU1 PC display software: version 1.046 (This is in the form 'x.yyy' ('yyy' indicating bug fixes, versions with x = 1 and where yyy is 046 or greater, are approved.)

Items (i) and (ii) operate within the MU1 module, whereas (iii) operates on the PC providing the display/interface.

Information regarding the installed software modules is accessible from the MU1 PC display software by first pressing the Marel logo, and then pressing the 'Sealing and identification' button.

1.11 Sealing Provision

The MU1 module can be configured into three different security modes:

Open: This mode is NOT APPROVED; it does not provide security or sealing of metrological features.

Locked: In this mode important configuration and calibration settings are only able to be modified if the hardware button provided on the MU1 module is pressed. Access to this button can be restricted by application of a destructible adhesive label (See Figure 5).

Normal: In this mode important configuration and calibration settings are only able to be modified after provision of a password – pressing of the hardware button of the MU1 module is not required.

Information regarding the current security mode is accessible from the MU1 PC display software by first pressing the Marel logo, and then pressing the 'Settings' button, the mode setting is shown below 'Access control – enabled by the MU1 push button'.

To prevent alteration of the security mode, it is necessary to restrict access to the hardware button of the MU1 module. This may be achieved by either sealing the cover of the MU1 module, as shown in Figure 5, or by sealing access to an enclosure within which the MU1 module is located (e.g. by sealing a join in the M6215 housing using a destructible adhesive label).

In both the Locked and Normal modes, audit trail event counters will increment if the configuration ('CON') or calibration ('CAL') settings are modified.

These counters are non-resettable, and increment up to 999. The values of these event counters may be accessed by from the MU1 PC display software by first pressing the Marel logo, and then pressing the 'Sealing and identification' button.

At verification the CON xxx and CAL yyy values shall be recorded and marked on the instrument.

It is therefore possible at any time to determine whether the calibration or configuration has been altered by comparing the CAL and CON values with those recorded at the time of verification.

Note 1: When the MU1 module is 'unlocked' – i.e. after the password has been entered, it is necessary to ensure that all menu windows (General, Settings, Adjustment) are closed, for the instrument to again be sealed (i.e. the password is required again for any further changes).

Note 2: The indicator incorporates a mode in which indications are displayed with a higher resolution than the verification scale interval. However access to

this is available only when the instrument is un-sealed (it's operation is indicated by 'x10' in the display).

1.12 Verification Provision

Provision is made for the application of a verification mark.

2. Description of Variant 1

approved on 4/10/16

The system having more than one MU1 module connected to the one Marel model M6215 PC based computer system / display unit. The PC based computer system / display unit will require a number of instances of the MU1 PC display software, one for each MU1 module.

It is essential that each instance of the MU1 PC display software, and its associated MU1 module and load receptor are clearly identified to avoid any confusion in weighing operations. Markings shall be provided for each weighing instrument combination.

TEST PROCEDURE No S699

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

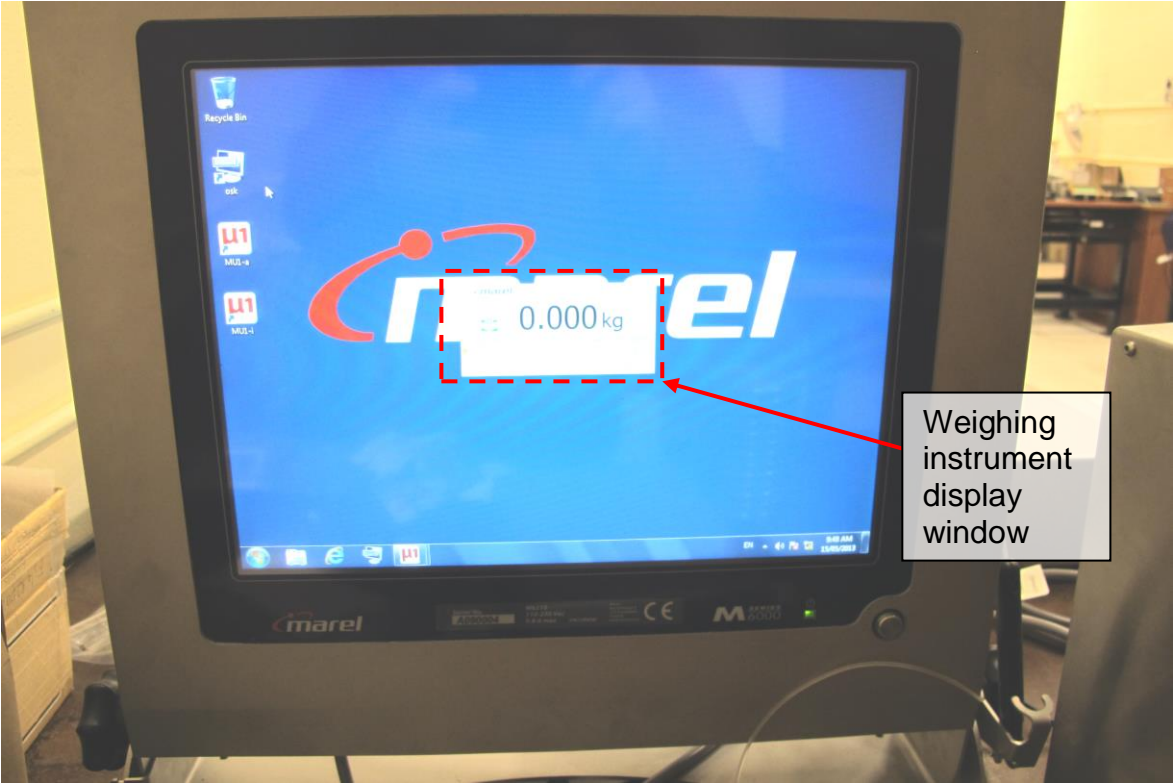
Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Tests

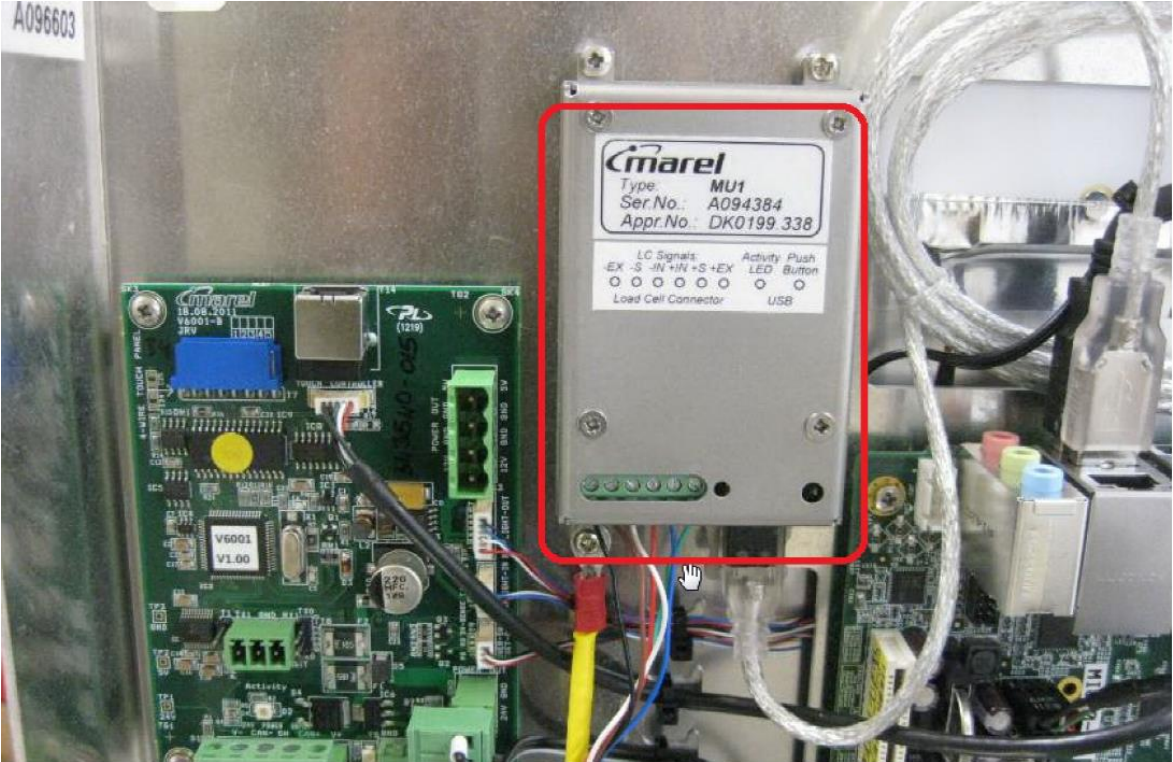
For multi-interval and multiple range instruments with verification scale intervals of $e_1, e_2 \dots$, apply e_1 for zero adjustment, and maximum permissible errors apply $e_1, e_2 \dots$, as applicable for the load.

FIGURE S699 – 1



Marel M6215 Indicator (which incorporates a Marel MU1 module)

FIGURE S699 – 2



Marel MU1 Module (highlighted), within M6215 Indicator

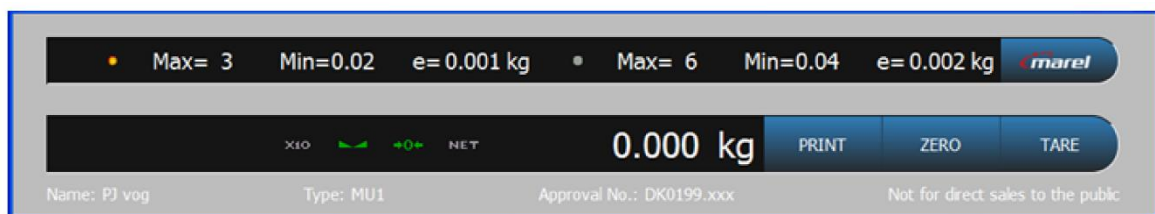
FIGURE S699 – 3



(a) Display window format



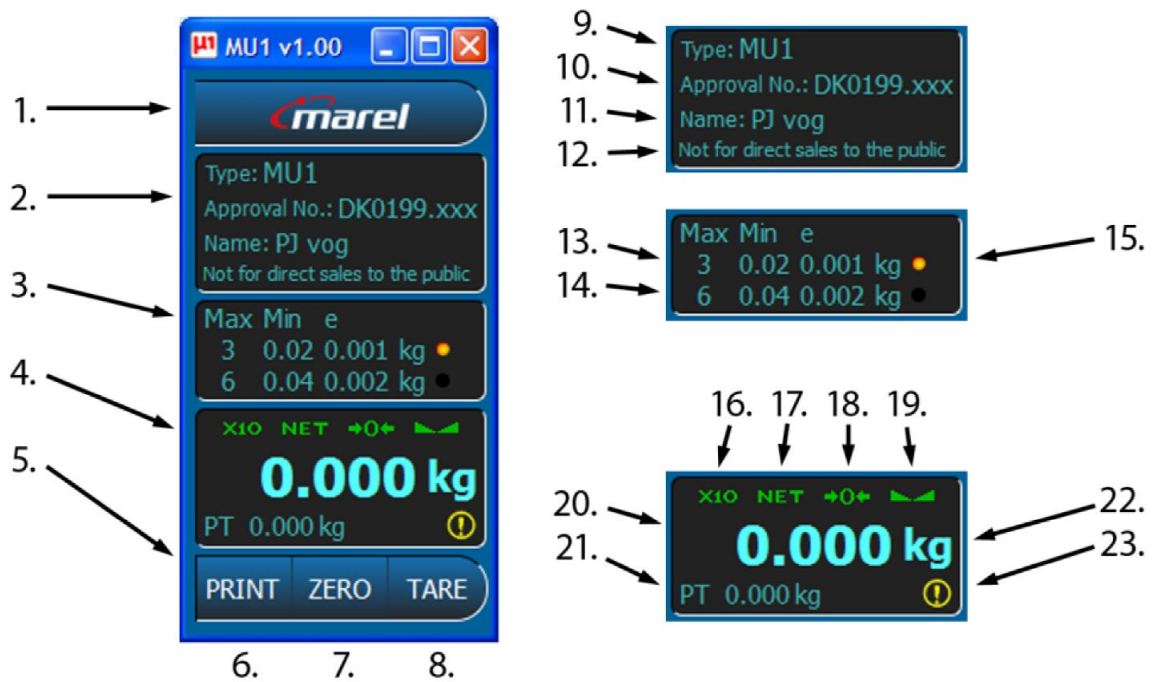
(b) Alternative display window format



(c) Alternative display window format

Alternative display window formats
 Note: 'Approval No' should be replaced by NMI S699,
 'Name' will vary between displays.

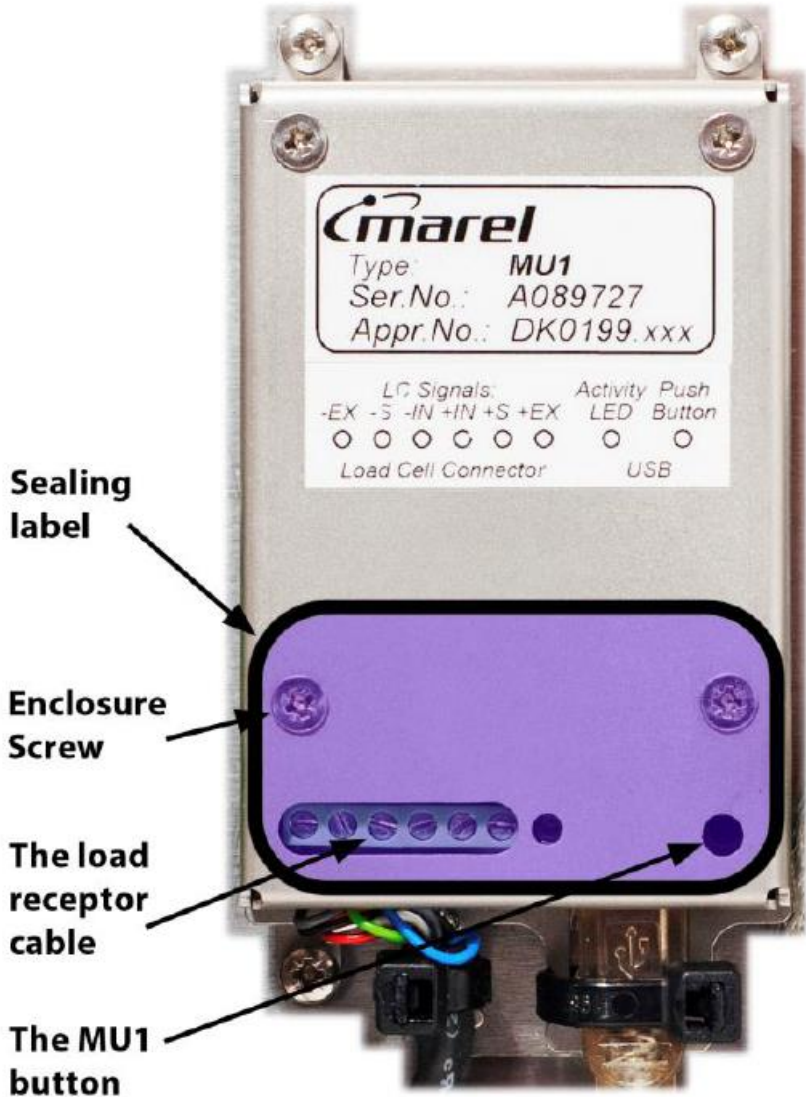
FIGURE S699 – 4



1.	The Marel button and logo (setup menu)	13.	Weighing range 1, "Max ₁ ", "Min ₁ " and "e ₁ "
2.	The marking and identification window	14.	Weighing range 2, "Max ₂ ", "Min ₂ " and "e ₂ "
3.	The metrological markings and indication of actual weighing range	15.	Weighing range indicator
4.	The primary indication window	16.	Indicator for extra test resolution
5.	The print, zero, and tare buttons	17.	The "NET" indicator
6.	The "PRINT" button	18.	The "ZERO" indicator
7.	The "ZERO" button	19.	The "STABLE" indicator
8.	The "TARE" button	20.	The primary weight display
9.	The type identification (MU1)	21.	The preset tare, "PT," display
10.	The type approval mark	22.	The weighing unit indication
11.	The name assigned to the individual instrument	23.	The "Alarm" indicator
12.	Additional markings, if applicable		

Explanation of display items

FIGURE S699 – 5



Sealing of MU1 module

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