



MI101 / MI102 / MI102S

INDICATOR

USER GUIDE

Preface

Thank you for purchasing the MI series indicator from Millennium Mechatronics Limited, New Zealand. The MI101/MI102 Indicator is an accurate, fast and versatile general purpose weighing indicator with counting and check-weighing functions.

Each indicator comes with the following features:

- Large, easy to read display with LED backlight.
- Automatic zero tracking.
- Animal scale mode.
- Check-weighing with an audible alarm.
- Automatic Accumulation.
- 30000 divisions max.
- Parts counting (**MI-102 series only**)
- IP65 waterproof protection (**MI-102s only**)

This manual provides information related to the installation and operation of the indicator.

If you find that the product is malfunctioning or broken, please contact technical support by email on info@meltrons.com.

For product updates and new product releases, please visit our website at www.meltrons.com



Important Safety Instruction:

- Do not use the indicator in a location where the accuracy of the indicator will degrade.
- Avoid extreme temperatures and do not place the indicator in direct sunlight or near air conditioning vents.
- Avoid unstable power sources and do not use the indicator near large electrical equipment such as welding equipment or large motors.
- Do not use in the indicator in high humidity conditions that might cause condensation. Avoid direct contact with water and do not spray water on the indicator.
- Only use the adapter supplied with the indicator.

Contents

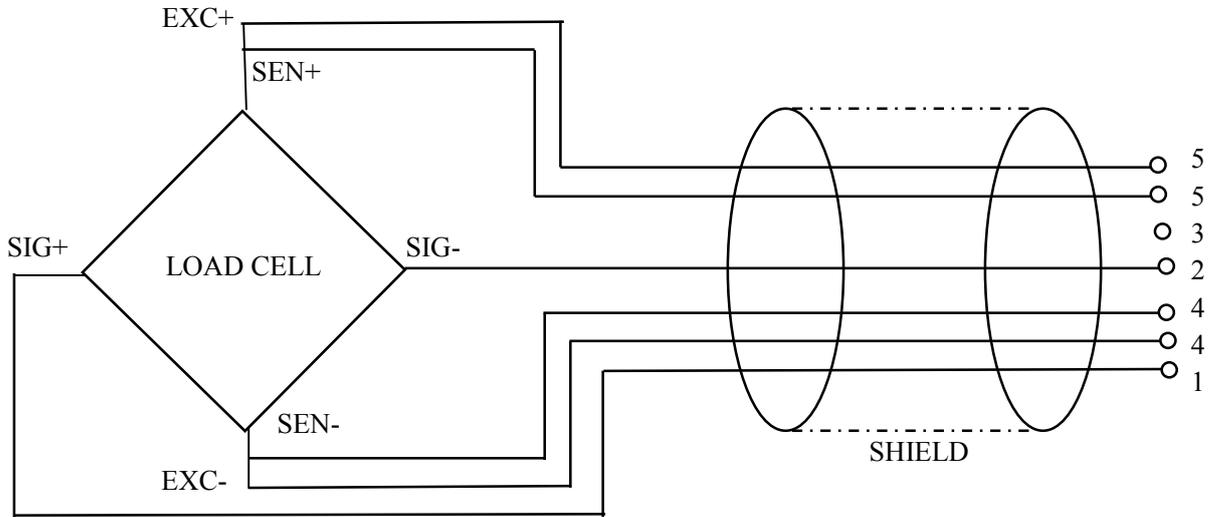
Preface.....	I
Overview.....	- 1 -
Specifications:.....	- 1 -
Pin Connection Diagram:.....	- 2 -
Pin Connection:.....	- 2 -
RS-232 Connector:.....	- 2 -
Checkweight Output Diagram:.....	- 3 -
Key Description:.....	Error! Bookmark not defined.
Operation.....	- 4 -
Start up:.....	- 4 -
Zeroing:.....	- 4 -
Taring:.....	- 4 -
Accumulated Weight:.....	- 4 -
Check Weighing:.....	- 5 -
Animal Mode:.....	- 5 -
Keyboard Lock:.....	- 6 -
Backlight:.....	- 6 -
Auto power off:.....	- 6 -
Parameter Settings.....	- 7 -
Non-Linear Calibration:.....	- 9 -
Linear Calibration:.....	- 9 -
RS-232 Configuration.....	- 10 -
Basic Information.....	- 10 -
Default Print Out.....	- 11 -
Continuously Output Protocol.....	- 11 -
Battery Operation.....	- 12 -
Additional Information.....	- 12 -
Tpup Information Table:.....	- 12 -
LP-50 Information Table:.....	- 14 -
Error Codes.....	- 15 -

Overview

Specifications:

Model	MI101 / MI102 / MI102S
Resolution	1 ~ 30000
Interface	RS-232 Output Optional
Analogue output	Optional 4-20mA / 0-10V (MI-102 only)
Stabilisation Time	1 Second typical
Operating Temperature	0°C ~ 40°C / 32°F ~ 104°F
Power supply	External AC adapter, 9V 800mA
	AC powered, 115V/230V
Calibration	Automatic External
Display	5½ digits LCD display with 2" high digits, attached LED backlight
Housing	MI101/ MI102: Indicator ABS plastic
	MI102s: Stainless Steel
Load cell drive voltage	Max 5V/150mA
Load cells	Up to four 350 ohms cells/ eight 700 ohms load cells
Battery	Rechargeable Sealed Lead Acid battery.

Pin Connection Diagram:



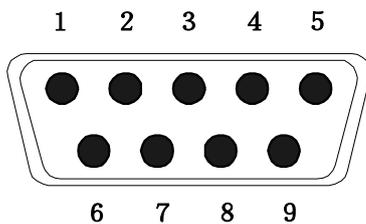
Load Cell 5 Pin Diagram

Pin Connection:

Pin	5 Pin Configuration	7 Pin Configuration
1	Signal +	Signal -
2	Signal -	Signal +
3	Shield	Shield
4	Exc - Sen -	Exc -
5	Exc + Sen +	Sen -
6		Sen +
7		Exc +

RS-232 Connector:

9 pin D-type connector on MI-101 and MI-102, round connector on MI-102s.



2	RXD	Input	Receiving data
3	TXD	Output	Transmission data
5	GND	—	Signal ground

Checkweight Output Diagram:

9 Pin Air Connector

pin1~pin6: checkweighing output

Pin 1 hi (output)

Pin 2 ok (output)

Pin 3 low (output)

Pin 4 beep (output)

Pin 5 vcc (5V output)

Pin 6 com (gnd)

Analog output (MI102and MI102S only)

Pin 7 (+ output to 4 to 20mA/ 0-10V)

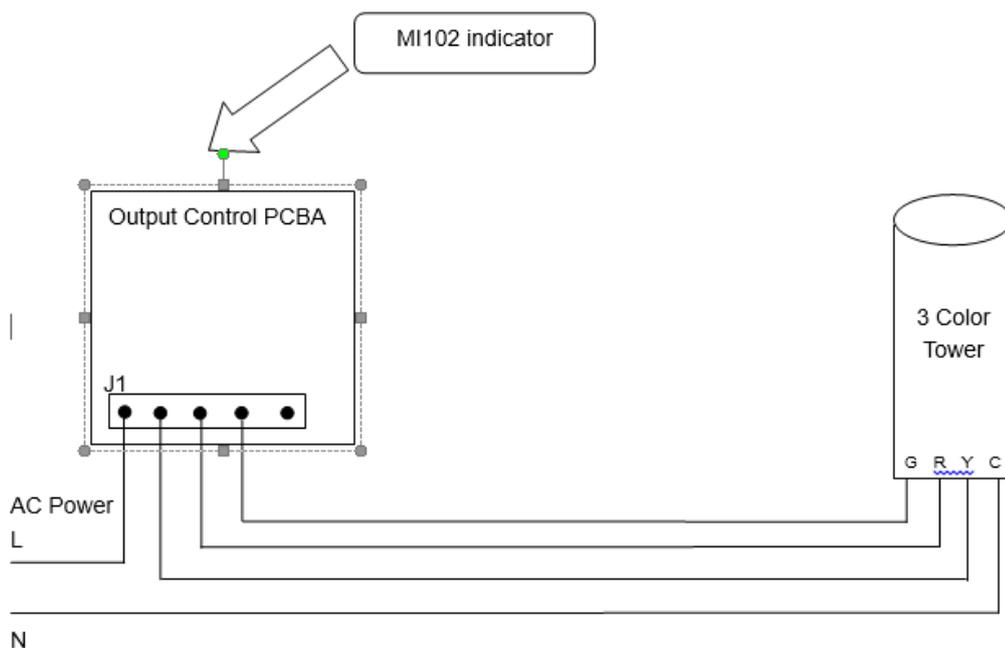
Pin 8 (GND output to mA/V)

Pin 8 (GND (-) from the external power)

Pin 9 (+ 10 ~ 24V DC from the external power)

Checkweighing output application sample

(Need an additional output control PCBA)



Operation

Start up:

To start the device, just press the power button . Please make sure that there is no weight on the scale or else the scale will be calibrated wrongly. If you want to enter the settings mode, enter the password now.

Zeroing:

In case the scale is not calibrated to zero, make sure the scale is unloaded and press the **Zero** button.

Taring:

Taring is zeroing the display when a weighing instrument is loaded. This allows the weight readout of an empty container to be reset to zero and the net weight to be read after filling the container.

To use the taring option, turn on the indicator and let it self-calibrate. When the device is ready for use, place the empty container on the scale and press the **TARE** button. The scale will then reset to zero. After this, the scale will display the net weight. To cancel the TARE weight, empty the scale and press the **Zero**.

Accumulated Weight:

This function is used to measure the total weight of a group of items individually and then display the total weight at the end.

To use this function turn the scale on and let it self-calibrate. When this is done, place the weight that you want to measure on the scale. When the stable symbol is shown on the indicator, press the **M+** button on the screen to save the weight. Do this to all the weights that you would like to measure. At the end, press the **MR** button to show the accumulated weight.

To clear the accumulated weight, press **M+** and **MR** together.

Check Weighing:

This function allows you to set a high and low range value into the indicator's memory. When a unit being measured is not in this range an audible alarm is sounded to notify you. This function can be used effectively for quality control procedures.

To set the value for the high and low range, start the machine and let it calibrate itself. When the machine is fully calibrated press **G/N** and **Print** together. This will display "Set H" on the screen. Pressing **Zero** (enter) will let you set the high limit or press **TARE** (next) to select a different option.

To set the higher limit, press **Zero**. This is confirmed by a red light next to the word 'HI' which will turn on. Then use the **MR** to move right and the **M+** to move left. The **TARE** key can be used to increment the number. To enter 65.5kg press **M+** once and then press **TARE** five times till the number 5 is shown. Then press **M+** once more and then press **TARE** five times till the number 5 again. Lastly, press **M+** and then press **TARE** six times till the number 6 is shown. Then press enter to save the value. This method can also be used to set the lower limit.

To clear the high limit, go into the options and press **Print**. This will clear the limit. You can also do this to clear the lower limit.

The beep function is used to set up an audible alarm on the indicator. There are three different options available.

oH	An alarm is sounded when the weight of the unit is inside the set range.
nG	An alarm is sounded when the weight of the unit is outside the set range.
no	No alarm is sounded.

Animal Mode:

When using the scale to measure livestock, animal mode clears fluctuations caused by movements providing you with a stable reading. To be able to use this function, animal mode needs to be turned on. This can be done by entering the settings panel during the warm-up period. Then using the **TARE** button search for the "P4 OTH" option and the "Ann" option. Here you can select whether to enable animal mode.

To use animal mode press **TARE** and **Zero** simultaneously. This will cause the indicator to beep twice and a "HOLD" sign will show up on the screen.

Keyboard Lock:

This function allows you to lock the keyboard after 10 minutes since the last time a button was pressed.

To enable this option, you have to enter the setting panel, and make your way using the **TARE** button to the “P4 OTH” option and then the “LOCK” option. Here you can toggle this option on and off.

When the keyboard is not in use, the keyboard is locked and if any key is pressed, the display will show “K-LCK”. To unlock the keyboard, hold **PRINT**, **MR**, **ZERO** for two seconds. This will display “ULCK” and will unlock the keyboard.

Backlight:

To adjust the backlight on the indicator, press and hold the **ZERO** key for 3 seconds. This will cause the display to show “setbl”. Press **ZERO** to enter backlight setting. You will have three options to choose from:

bL ON	Backlight always turned on.
bL AU	Auto backlight. This turn on the backlight for only 5 seconds after a key is pressed.
bL oFF	Turns backlight off

Press the **TARE** key to select the option you require. Press **G/N** when you are finished to take you back to the main screen.

Auto power off:

This function is a power saving function that allows the indicator to automatically turn off when not in use.

To use this, press and hold **ZERO** for 3 seconds. The display will then show “SEtBL”. Then press the **TARE** key till the display shows “SEtoF” and press **ZERO**. You have an option of 0/3/5/15/30 minutes to choose from. When you have selected your option press **TARE** to save it. Then press **G/N** to return back to the main menu.

Parameter Settings

To enter settings mode, turn on the indicator and then press **Print** while the indicator is calibrating itself. Then press **M+ G/N TARE** as the password to enter settings mode.

Settings table:

Function	Sub-Function	Description												
P0 CHH	Set H Set Lo BEEP	This setting can be used to set the parameters for the check weighing function. To learn to use this follow the instruction on page 5.												
P1 REF	AZN0.	This option is used to set the auto tracking range of the indicator. Options: 0 = 0.5d, 1d, 2d, 4d												
	0AUTO	This option is used to select the auto zero range on the indicator. Options : 0%, 2%, 5%, 10%, 20%, 50%, 100%												
	0RAGE	This option is used to select the manual zero range when pressing the ZERO key. Options: 0%, 2%, 4%, 10%, 20%, 50%, 100%												
	0TARE	This option is used to select the manual zero range when pressing the ZERO key. Options: 0%, 2%, 4%, 10%, 20%, 50%, 100%												
	SPEED	Used to set the ADC speed. 7.5/15/30/60 times/second												
	ZERO	Shows the load on the load cells in the scale when no weight is applied on the scale.												
P2 Con	Mode	This option is used to set RS-232 communication mode Options: <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"><i>CONT</i></td> <td>Continuous send</td> </tr> <tr> <td><i>ST1</i></td> <td>send one frame data after stable</td> </tr> <tr> <td><i>STC</i></td> <td>send data continuously when stable</td> </tr> <tr> <td><i>PR1</i></td> <td>when print key is pressed, send one frame data (printer mode)</td> </tr> <tr> <td><i>PR2</i></td> <td>when the M+ key is pressed, the printer will print the current weight and the accumulated weight at the same time.</td> </tr> <tr> <td><i>AUTO</i></td> <td>auto accumulate (auto print) mode. When the weight is stable, the indicator will print the result and then return to zero</td> </tr> </table>	<i>CONT</i>	Continuous send	<i>ST1</i>	send one frame data after stable	<i>STC</i>	send data continuously when stable	<i>PR1</i>	when print key is pressed, send one frame data (printer mode)	<i>PR2</i>	when the M+ key is pressed, the printer will print the current weight and the accumulated weight at the same time.	<i>AUTO</i>	auto accumulate (auto print) mode. When the weight is stable, the indicator will print the result and then return to zero
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		<p>ASK automatically ask mode, bi-direction, <i>Command R:</i> read data <i>Command T:</i> TARE <i>Command Z:</i> zero</p> <p>Wireless Wireless mode</p> <p>Note: If you have selected the wireless model, the communication mode has to be set to wireless.</p>	
	BAUD	This option is used to set the baud rate for all comms. Options: 600/1200/2400/4800/9600	
	Pr	This option is used to set parity verify Optional: 7E1/7O1/8N1	
	p _{type}	t _{pup} : Sets the printer as a t _{pup} model. LP-50: Set the printer as LP-50 model	
	lab	“Lab x”, set gross/acc print format	
	prt	“prt”, set the date/time print format	
	lang	Select the print language Options: English, Chinese	
P3 CAL	count	The display will show the internal count on the scale. SHOULD NOT BE ZERO.	
	dECI	This option is used to select the decimal Options : 0, 0.0, 0.00, 0.000	
	Dual	Off	r1Inc Option used to increment the scale. Options: 1, 2, 5, 10, 20, 50, 100, 200
			Cap1 Sets the maximum capacity that the scale can take.
		On	Do not use this option without consulting Millennium Mechatronics first.
CAL	This option is used to calibrate the indicator and scale so that an accurate weight is given. There are two options for calibration, noLin and LinEr. noLin: Non- linear calibration uses only one weight to calibrate the scale. For instructions follow the steps on page 9 LinEr: Linear calibration should be selected if you want to use multiple weights to calibrate the scale. This gives a more accurate reading than a nonlinear calibration. To see how to calibrate in linear mode follow the instruction on page 9.		
	Gra	This setting lets you adjust the value of gravity (9.6~10).	
P4 OTH	Ann	This function is used to set animal mode on and off. It is helpful when measuring animals and livestock.	

		Instruction on pg 5.
	Lock	Is used to turn on and off the key-board lock.
P5 Unt		Sets the unit, when the unit is set as on, then this unit could be active. Note, Tj and Hj could not be used at the same time.
P6 xcl		Use this function for external calibration of the scale.
P7 rst		This resets the indicator and all parameters to factory settings.
P8 uwb		On Bluetooth models, turns the function on/off. The PS232 cannot be used when Bluetooth mode is on.

Non-Linear Calibration:

To do a basic (non-linear) calibration of the scale, make your way to the “CAL” section in the setting menu. Then select “noLin”. The screen will then display “unLd”. At this point remove any weights on the platform then press the **ZERO** key. The scale will then show the last calibration weight used to calibrate the indicator. If this is not correct use the **M+**, **MR**, **TARE** keys to select the right weight. When the correct value is entered, press **ZERO** to confirm and the display will then display “load”. At this point, load the calibration weight onto the scale. After the stable sign is displayed, press **ZERO** to finish calibration.

Please note that the closer this weight is to the max load you expect to measure, the more accurate your result will be. For example, if the max load that you expect to measure is 300kg, the closer the calibration weight is to 300kg, the more accurate the calibration will be.

After calibration, the scale should be checked to verify the calibration and linearity is correct. If necessary, repeat calibration. Be certain that the scale is stable before accepting any weight.

Linear Calibration:

Linear calibration allows you to calibrate the scale over a range thus providing a more accurate calibration. This is done by using a range of calibrating weights.

To use linear calibration, make your way to the “CAL” section in the setting menu. Then select “LinEr”. Press **ZERO** to enter calibration. The display will then show “PIN” at which point press **G/N**, **M+**, **MR** to enter. The display will then show “Load0” at which point unload any weights on the platform of the scale. When the stable sign is displayed on the screen, press **ZERO** to continue.

The display will then show “Load1”. At this point enter Press **ZERO** to continue. The display will then show “Load2”. At this point enter Press **ZERO** to continue. The display will then show “Load3”. At this point apply the full capacity of the weights that you wish to measure. The device will calibrate itself automatically and then press **ZERO** to finish the calibration.

If the calibration is acceptable the display will return to normal. If an error message is shown try calibration again as a disturbance may have prevented a successful calibration. If the problem persists, contact Millennium Mechatronics Limited for more support.

After calibration, the scale should be checked to verify the calibration and linearity is correct. If necessary repeat calibration, especially to be certain the scale is stable before accepting any weight.

RS-232 Configuration

The MI101/MI102 indicator can be ordered with an optional RS-232 output.

Basic Information

Specifications:

- RS-232 output of weighing data
- ASCII code
- 7/8 data bits
- Parity selectable
- Baud rate from 600bps to 9600bps

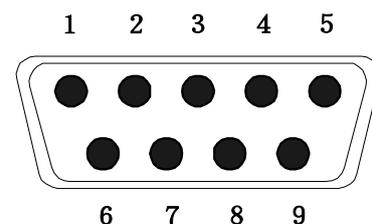


Figure 1: Pin Configuration

2	RXD	Input	Receiving data
3	TXD	Output	Transmission data
5	GND	—	Signal ground

Default Print Out

Data Format for normal weighing operations, parts counting or recalling of totals from memory will each be different. Examples follow:

Normal Output

S/N	The number increments every time a new value is stored in memory
GW	GW for gross weight, NT for net weight and a unit of weight
<lf>	
<lf>	Includes 2 line feeds

When recalling the Total weight stored in the accumulation memory the output format is:

*****	A line of stars is shown
<lf>	Includes 1 line feed
Total No: 3	Times of the accumulation memory
Total wt.: 0.447KG	Weight of the accumulation memory

Continuously Output Protocol

con1: weighing mode string setup

		,			-/□								k	g	CR	LF
-HEADER1-			-HEADER2-					-- WEIGHT DATA --					WEIGHT UNIT		TERMINATOR	

Header1: ST=Stable weight , US=Unstable Weight

Header2: NT= Net , GS=Gross

Battery Operation

The Indicator can be operated from the battery if desired. The battery life is approximately 30 hours (MI101) or 80 hours (MI102).

When the battery needs charging a symbol on the weight display will turn on. The battery should be charged when the symbol is on. The scale will still operate for about 10 hours after which it will automatically switch off to protect the battery.

To charge the battery plug into the mains power switch. The scale does not need to be turned on.

The battery should be charged for 12 hours for full capacity.

Just under the quantity display is an LED to indicate the status of battery charging. When the scale is plugged into the mains power the internal battery will be charged. If the LED is green the battery has a full charge. If it is Red the battery is nearly discharged and yellow indicates the battery is being charged.

As the battery is used it may fail to hold a full charge. If the battery life becomes unacceptable then contact your distributor.

Additional Information

Tpup Information Table:

LAB TYPE PRT	0	1	2	3
	tpup	tpup	tpup	tpup
0	GS: 0.888kg	NT: 0.666kg TW: 0.222kg GW: 0.888kg	GS: 0.222kg TOTAL: 0.222kg	NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 0.222kg
1	DATE: 04/06/06 GS: 0.888kg	DATE: 04/06/06 NT: 0.666kg TW: 0.222kg GW: 0.888kg	DATE: 04/06/06 GS: 0.222kg TOTAL: 0.444kg	DATE: 04/06/06 NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 0.444kg

2	TIME: 11/11/11 GS: 0.888kg	TIME: 11/11/11 NT: 0.666kg TW: 0.222kg GW: 0.888kg	TIME: 11/11/11 GS: 0.222kg TOTAL: 0.666kg	TIME: 11/11/11 NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 0.666kg
3	DATE: 04/06/06 TIME: 11/11/11 GS: 0.888kg	DATE: 04/06/06 TIME: 11/11/11 NT: 0.666kg TW: 0.222kg GW: 0.888kg	DATE: 04/06/06 TIME: 11/11/11 GS: 0.222kg TOTAL: 0.888kg	DATE: 04/06/06 TIME: 11/11/11 NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 0.888kg
4	NO.: 4 GS: 0.888kg	NO. : 4 NT : 0.666kg TW: 0.222kg GW: 0.888kg	NO.: 4 GS: 0.222kg TOTAL: 1.000kg	No.: 4 NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 1.000kg
5	DATE: 04/06/06 NO.: 5 GS: 0.888kg	DATE: 04/06/06 NO.: 5 NT: 0.666kg TW: 0.222kg GW: 0.888kg	DATE: 04/06/06 NO.: 5 GS: 0.222kg TOTAL: 1.222kg	DATE: 04/06/06 No.: 5 NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 1.222kg
6	TIME: 11/11/11 NO.: 6 GS: 0.888kg	TIME: 11/11/11 NO.: 6 NT: 0.666kg TW: 0.222kg GW: 0.888kg	TIME: 11/11/11 NO.: 6 GS: 0.222kg TOTAL: 1.444kg	TIME: 11/11/11 No.: 6 NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 1.444kg
7	DATE: 04/06/06 TIME: 11/11/11 NO.: 7 GS: 0.888kg	DATE: 04/06/06 TIME: 11/11/11 NO.: 7 NT: 0.666kg TW: 0.222kg GW: 0.888kg	DATE: 04/06/06 TIME: 11/11/11 NO.: 7 GS: 0.222kg TOTAL: 1.666kg	DATE: 04/06/06 TIME: 11/11/11 No.: 7 NT: 0.222kg TW: 0.666kg GW: 0.888kg TOTAL: 1.666kg

LP-50 Information Table:

PRT	LAB TYPE	0	1	2	3
		LP-50	LP-50	LP-50	LP-50
0		2000/00/00 00:00 S/N 1 GW 0.888kg	As left	As left	As left
1		DATE: 2000/00/00 TIME: 00:00 GW: 0.888kg	As left	As left	As left
2		DATE: TIME: 00:00 S./NO.: 2 GROSS WT: 0.888kg	As left	As left	As left
3		2000/00/00 00:00 S/N 0003 GW 0.888kg	As left	As left	As left
4		2000/00/00 00:00 S/N 4 GW 0.888kg	As left	As left	As left
5		DATE: 2000/00/00 TIME: 00:00 GW: 0.888kg	As left	As left	As left
6		DATE: TIME: 00:00 S./NO.: 6 GROSS WT: 0.888kg	As left	As left	As left
7		2000/00/00 00:00 S/N 7 GW 0.888kg	As left	As left	As left

Error Codes

ERROR CODES	DESCRIPTION	RESOLUTION
-----	Over range	<ul style="list-style-type: none"> • Remove weight from the scale. • If the problem persist contact Meltrons for assistance.
Err 4	Zero Setting Error	<ul style="list-style-type: none"> • The scale was outside the normal zero setting range either when it was turned on or when the ZERO key was pressed. • Remove weight from the scale and try again. Use the TARE key to set the display to zero value. • If the problem persist contact your dealer for assistance.
Err 6	A/D out of range	<ul style="list-style-type: none"> • The values from the A/D converter are outside the normal range. Remove weight from the scale if overloaded, make sure the pan is attached. • Indicates the load cell or the electronics may be faulty. • If the problem persist contact your dealer



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