MI104 INDICATOR

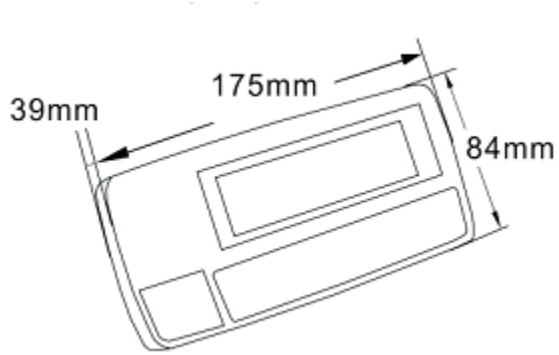
Weighing Indicator

User Manual

Millennium Mechatronics

CONTENTS

1. SPECIFICATIONS



Model	**MI104**
Resolution	1/30,000
Indicator housing	ABS Plastic
Stabilisation Time	1 Seconds typical
Operating Temperature	0°C ~ +40°C / 32°F - 104°F
Power supply (external)	AC Adaptor (12V/500mA) / Ni-MH battery (1.2V/2000mAh x 6)
Calibration	External
Display	6 digits 22mm LCD display, attached backlight
Interface	RS-232 Output Optional
Zero range	0mV~5mV
Signal input range	0~15mV
ADC	Sigma delta
ADC update	Max 60 times /second
Load cell Excitation voltage	Max 5V/150mA

2. INTRODUCTION

- The MI104 Compact weighing indicator amplifies the signals from load cell(s), converts it to digital display as a mass/ force value.
- It is suitable for general weighing or more specialized applications such as check weighing, animal weighing and accumulation applications.
- MI104 Indicator can be connected to a Serial printer or a PC.
- MI104 has a large (22mm high) LCD with white LED back light display

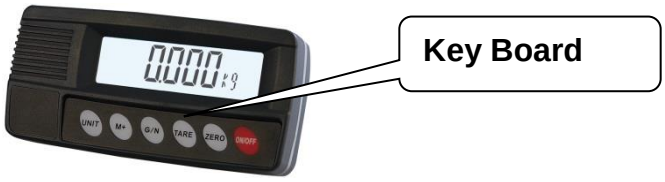
3. INSTALLATION

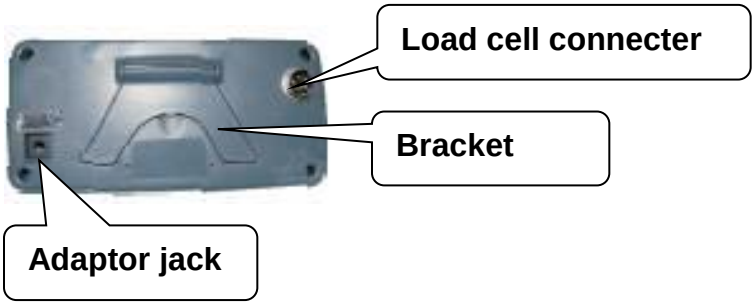
Unpacking

When you receive the indicator / scale, inspect it to make sure that it is not damaged and that all are parts are included:

- Remove the Indicator from the carton.
- Remove the protective covering. Store the packaging to use if you need to transport the indicator later.
- Inspect the indicator for damage.
- Make sure all components are included.
  1. Indicator
  2. Adaptor
  3. Manual
  4. Load cell Output connecter -5 pin
  5. RS-232 Output Connecter- 9 pin

Installation





- Place the Indicator on a table.
- Connect the load cell cable in to the indicator load cell connecter. Load cell connecter (5 pin)is located on the back side of the indicator.
- Connect the adaptor pin in to the indicator adaptor jack.
  Adaptor jack is located on the back side of the indicator.
- Connect the power Adaptor to your AC power socket.

- Turn on the On/Off key. If you want to turn off, press the key again.
- Display will show the software version number and will start self-checking.
- After self-checking, display will come to normal weighing mode.
- Warm-up time of 15 minutes is recommended for stabilization after switching on.
- Calibrate with accurate calibration weights, minimum 1/3 of the scale capacity is recommended for calibration.
- For calibration see details in Section 6- Parameter.

Load cell connections

Connect load cell cables to the terminal as shown below.

5Pin Connection	
Pin 1	Signal +
Pin 2	Signal -
Pin 3	Shield
Pin 4	Exc -
Pin 5	Exc +

MI104 can connect upto four 350 ohm load cells/ eight 700 ohm load cells. The load cell excitation voltage is 5V DC ±5% between Excitation + and Excitation -.

Connect Adaptor and Charging

- To charge the battery insert the power adaptor pin to jack. Plug the Adaptor into the mains power. The indicator does not need to be turned on.
- The battery should be charged 6 hours for full capacity.
- The symbol status of the battery

  Battery voltage is very low 

  Low voltage 

  Fully charged 

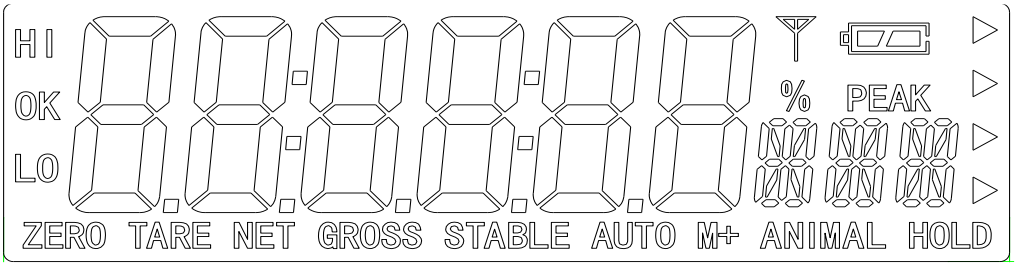
  .
- Do not use any other type of power adaptor , except the one supplied with the scale.
- Verify that the AC power socket outlet is properly protected.

Note: Please charge the battery fully before using the scale for the first time.

4. DESCRIPTION

Overall View

Display



DISPLAY	FUNCTION
HI **OK** **LOW**	Check weighing
ZERO	Indicator for Zero display
TARE	Indicator for Tare display
GROSS	Indicator for Gross weight
NET	Indicator for Net weight
STABLE	Indicator for Display stability
AUTO	Indicator for Auto Accumulation
M+	Indicator for Accumulation
ANIMAL	Indicator for Animal Weighing Mode
HOLD	Indicator for Hold/ Lock
	Indicator for Charging status of battery.

Key Board

KEY	FUNCTION
	Turn the power On/ Off
	Used to reset to Zero. In setting mode can use to confirm entry
	Used to record tare values and change the value from gross value to net value. In setting mode, this key can be used to increase the value and scroll (up) in menu.
	When the scale has been tared and display is in gross or net mode. When using the settings mode, can be used to move active digits to the right.
	For print the results, to the PC or printer using the optional RS-232 interface. It also adds the value to the accumulation memory if the accumulation function is not automatic. When using the settings mode, this key can be used to move active digits left.
	Switch to unit of weight(kg/lb/oz). In setting mode, escape back to menu/ weighing mode.

5. OPERATION

Initial Start – Up:

Warm-up time of 15 minutes stabilizes the measured values after switching on.

5.1. Power ON/OFF:

Switch on the balance by pressing 

key.
The display is switched on after the self test(countdown). To switch off, press again the key.

5.2. Zero

You can set the display to zero any time by pressing 

key.

5.3. Tare

The weight of any container can be tared by pressing 

button so that with subsequent weighing , the net weight of the object being weighed is displayed.

- Load weight on the platform.
- Press 

key. Zero is displayed, and tare is subtracted.
- Remove weight on the platform. Tared weight is displayed. It can set only one tare value. It can display with a minus value.
- Press G/N to change between gross weight and net weight.
- To clear the tare value, remove the load and press 

key. Zero is displayed, tare weight is cleared.

5.4. Weighing

- Place goods to be weighed on the platform.
- Wait few seconds for “STABLE” to appear on display.
- Read the display.
- Avoid overloading. When display appears **“ol”** reduce the load or unload.

5.5. Check Weighing

It can set an upper or lower limit when weighing with the limits range.
The unit will indicate whether a display value(weight) is within upper or lower limits with an alarm sound . For details see the parameter F3 oFF.

- **Check mode 1**: No beep sound when within the limits. Function turned off.
- **Check mode 2:** When the weight is between the limits. OK will shown and beeper will be sound.
- **Check mode 3:** When the weight is out of the limits, **t**he beeper will sound and OK will shown.

5.6. Enter to Menu

In the weighing mode, press UNIT and M+ together.

Display will be appear `F0 H-L`

5.7. Set limits

Press ZERO to enter the function.

Press TARE key to select the limit.

Display will appear `Set hi` or `Set Lo`

Press ZERO key to enter, press G/N key to move active digits.

Press TARE to change the value. After enter the value press ZERO to sure.

Press UNIT to escape.

5.8. Set check weighing mode.

After entering the settings mode,

Press TARE until display will be appear

F3 oFF

Press ZERO key to enter, press TARE until display show

bEEP

Press ZERO key to enter, press

Check mode 1	bP 1
Check mode 2	bP 2
Check mode 3	bP 3

Select desired setting by pressing TARE and press ZERO key to confirm, press UNIT to escape.

Note: The load weight must greater than 20 scale divisions for the check weighing operations.

To disable the check weighing function, enter zero into both limits.

5.9. Accumulation

Accumulation

- Place the goods on the platform to be weigh

  Wait few seconds for display stable, then press M+. The value will be saved and printed (if the printer is connected).

  Display will be appear | ACC 1 | this display will appear two seconds only.

  Remove the load and wait few seconds for display return to zero.

- Place the second goods on the platform.

Wait few seconds for display stable. Then press 

. The value will be saved.

Followed by the total number of weight will be displayed

ACC 2

It can continue the process until the maximum capacity or value.

Note: When you change the weighing unit this saved values will be clear.

Accumulated Total

Manually, the scale can be set to accumulation by pressing 

, when an optional printer is connected. See details in **F4 Prt.**

Memory Recall

When display shows Zero, you can see the number of weighing and total weight by pressing 

, display will be shown for two seconds.

Delete the Memory

When display of Zero, you can see the number of weighing and total weight by pressing 

, display will be shown for two seconds. Press 

during this display. The memory

ACC 0

eted and display will be shown

5.10. Accumulation Automatically

In this function the individual weighing values are automatically added into the memory. There is no need to press any keys.
For this function, set to parameter **F4 Prt and** select **P AutO.**

After select this function, display indicator AUTO will be shown.

- Place the goods on the platform to be weighed
  After the display is stable, the beep will sound twice.

- Unload the goods, the weighing value will be saved automatically and will be follow beep sound once.

It can continue the process until the maximum capacity or value.

5.11. Animal Weighing

MI104 can use for moving (fluctuating) loads.
For this function, set to parameter **P4 CHk** to **ModE 2**

After select this function, display indicator ANIMAL will be shown.

- Bring the load / animal on to the platform.
- When the display gets stable for few seconds , the reading will be locked followed by a beep.

5.12. Peak Hold

MI104 can operate peak hold function, peak reading will be stored and will update automatically when a newer peak is reached.

For this function, select parameter **P4 CHk** to **ModE 4**

In the normal weighing mode press 

and 

keys together to turn on or turn off Peak hold operations.

To cancel the peak reading from Hold, press Zero key for 2 seconds.

6. PARAMETERS

KEYS OPERATIONS INTO THE MENU

Enter the menu

- In weighing mode, press 

key and 

key together.

Select the menu

- Press 

, it can change the menu block one by one.
- Using increase the digit.

Enter the selected menu

- Press 

, it can confirm, which will be shown displayed.

Change the digit

- Press 

, it can change the active digit.

Return to weighing mode

- Press 

, exit from the menu.
-

PARAMETER BLOCK

Menu	Sub-Menu	Description
F0 H-L Weighing with set limits	**SET Lo**	Lower limit value
	SET Hi	Upper limit value.
F1 toL	**to CLr**	Clear the accumulation memory with out printout
	to P-C	Print the total accumulation memory and clear the total memory
	to Prt	Print the total accumulation and keep all the memory.
F2 Unt	**G**	Weighing units
	Lb	
	Oz	
	Tj	
	th	

<table>
<tr><td rowspan="6">F3 oFF</td><td rowspan="3">Bl</td><td>El on</td><td>Display of back light on</td></tr>
<tr><td>El au</td><td>Display of back light on automatically</td></tr>
<tr><td>El off</td><td>Display of back light off</td></tr>
<tr><td rowspan="3">beep</td><td>Bp 1</td><td>Beep sound off during the check weighing</td></tr>
<tr><td>Bp 2</td><td>Beeper will be sounded with in the check weighing limits</td></tr>
<tr><td>Bp 3</td><td>Beeper will be sounded above the check weighing limits</td></tr>
<tr><td rowspan="16">F4 prt</td><td colspan="3">RS 232 mode</td></tr>
<tr><td>P prt</td><td colspan="2">By pressing 

, weighing value will be added to the memory and print the print out</td></tr>
<tr><td>P cont</td><td colspan="2">Send data continuously</td></tr>
<tr><td>Seire</td><td colspan="2">Also send data continuously</td></tr>
<tr><td>Ask</td><td colspan="2">Bi- direction , through PC
Commands R= Send, T= Tare, Z= Zero</td></tr>
<tr><td>P cnt 2</td><td colspan="2">No documented</td></tr>
<tr><td>P stab</td><td colspan="2">Send data of stable weighing values</td></tr>
<tr><td>P auto</td><td colspan="2">Automatic accumulation.
Individual weighing values are automatically added</td></tr>
<tr><td colspan="3">Set BAUD rate
After setting the RS 232 mode, display will be shown current baud rate b XXX. Avail able baud rate: b600, b1200, b2400, b4800 and b9600 If necessary change the baud rate by pressing 

and enter by pressing 
</td></tr>
<tr><td colspan="3">Set print out format
If enter settings p prt, p auto, p cont and connected optional printer</td></tr>
<tr><td>Pr X</td><td>Print format</td><td rowspan="2">Only for p prt, p auto format</td></tr>
<tr><td>Lab X</td><td>Print format</td></tr>
<tr><td>Cont 1</td><td colspan="2" rowspan="3">Only for p cont only
N.A</td></tr>
<tr><td>Cont 2</td></tr>
<tr><td>Cont 3</td></tr>
<tr><td colspan="3">Set printer type</td></tr>
<tr><td>Ty-tp</td><td colspan="2">Ticket printer</td></tr>
</table>

	Ty 711	Label printer
	Lp 50	Label printer
prog	**pin**	Enter the programming and calibration menus by using password (Refer section 7 – Calibration on password entry).

PROGRAM PARAMETERS

Menu	Sub Menu	Description	
P1 ref	**A2n 0**	**0.5d**	Auto zero point settings
		1d	
		2d	
		4d	
	0 – auto	**P1 0**	Zero setting range. When the display is turn on the scale is set to zero
		P1 2	
		P1 5	
		P1 10	
		P1 20	
	0 – range	**P 2 0**	Manually zero setting range, by pressing ZERO
		P 2 2	
		P 2 5	
		P 2 10	
		P 2 20	
	Speed	**S 7.5**	
		S 15	
		S 30	
		S 60	
P2 cal> **SigRa>**	**dECi**	**C 0**	Decimal point settings
		C 0.0	
		C 0.00	
		C 0.000	
		C0.0000	
	inC	**1**	Increment settings
		2	
		5	
		10	
		20	
		50	
	CAP	**00000**	Enter the scale capacity
	CAL	**Linear**	Linear calibration
		nonlin	**Normal calibration**
P3 pro	**Tri**	The display will show XXXXX. For trimming the load cells,	

		You can calculate new rate by this formula & enter it: **New rate = Old rate*Display weight/ Calibration weight.**
	Count	This display will show XXXXX for indicating the internal counts.
	Reset	Factory default settings
	gra	Set the local gravity
P4 chk	**Mode 1**	Normal weighing mode. (check weighing, accumulation)
	Mode 2	Animal weighing mode. (scale can lock reading, when little unstable)
	Mode 3	This is a subtraction scale (print out "-" weight)
	Mode 4	Peak Hold mode. (Scale can hold maximum reading)

7. CALIBRATION

- In weighing mode, press UNIT key and M+ key together. **Fo h-l**
- Press TARE repeatedly until display shows. **prog**
- Press ZERO, display will show. **pin**
- Enter the password. Press G/N, UNIT and ZERO Display will show **P1 ref**
- Press TARE, display will show. **P 2 cal**
- Enter the function by pressing ZERO twice, display will show **dec**
- Press TARE repeatedly until display shows. **cal**

- Enter the function by pressing ZERO, display will show

```
linear
```

- Press TARE to select for normal calibration

```
Nonlin
```

Normal Calibration:

```
Nonlin
```

- Enter the function by pressing ZERO, display will show

```
unload
```

-
- Make sure there are no loads on the platform and wait few seconds for stable indicator on.

- Enter the function by pressing ZERO, display will show Value of last weight used for calibration

```
06.000
```

- Change this number to the weight being used for calibration now, by using the keys M+, G/N, TARE

- Enter the selected setting by pressing ZERO, display will show.

```
load
```

- Load the calibration weight on the scale (or load cell) and wait few seconds for display stability.

- After the STABLE indicator is on, press ZERO, display will show.

```
pass
```

After the calibration , the display will start a self test. Remove the load from scale during the self test. Display will come to weighing mode automatically.

If display shows error or incorrect value, repeat the procedure again.

linear

Linear Calibration

The linearity error caused by the performance of the weighing unit can be corrected by “Linearity Calibration”. The digital linearization function can reduce the linearity error. MI104 employs a 3-point linearisation.

linear

Precise weight (1/3rd, 2/3rd and full capacity) are needed for Linear calibration.

- Enter the function by pressing 

, display will be shown

Load 0

- Make sure there are no loads on the platform and wait few seconds for STABLE display on.
- Enter the function by pressing 

, display will be shown

Load 1

- Load the first calibration mass weight on the platform (mass weight should be1/3 of the max capacity) and wait few seconds for STABLE display .
- Then press 

, display will be shown

Load 2

- Load the second calibration mass weight on the platform (mass weight should be2/3 of the max capacity) and wait few seconds for STABLE display .
- Then press 

,display will be shown

Load 3

- Load the third calibration mass weight on the platform (mass weight should be the max capacity) and wait few seconds for STABLE display .
- Then press 

,display will be shown

pass

After the calibration the display will start a self test. Remove the load from platform during the self test. Display will come to weighing mode automatically.

If display shows any error or incorrect value, repeat the procedure again.

8. RS-232 OUTPUT

MI104 Indicator can send data through RS 232 output.

Specifications:

RS-232 output of weighing data
Code : ASCII
Data bits : 8 data bits
Parity : No Parity
Baud rate : 600bps to 9600bps selectable

RS-232 (9pin Round connector suppled with MI104)

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

9pin Round Connector (MI104) and 9 pin DB9 Connecter for PC/Printer:

Indicator (9 Pin Round)	Computer / Printer (DB9)
Pin 2:	Pin 3
Pin 3:	Pin 2
Pin 5:	Pin 5

Note: If data not getting in to PC, inter-change the Pin 2 and Pin 3 connections from one of the connecter. (9 pin round connector is supplied with MI104 Indicator.)

Continuously output protocol
Weighing Mode;

HEADER1: ST=STABLE , US=UNSTABLE

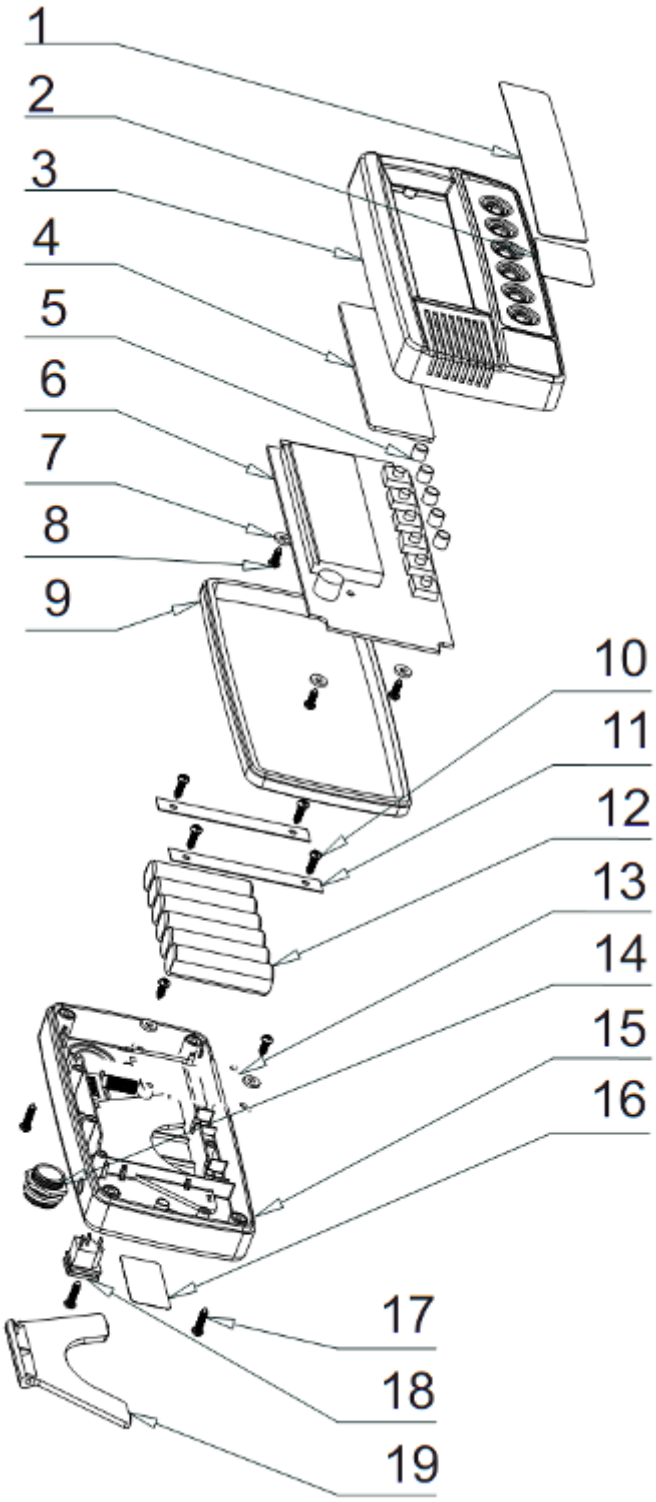
HEADER2: NT=NET , GS=GROSS

Print Out Formats

Note: Lab 0 & 2 for English , Lab 1 and 3 are optional.

Lab / Pr	0	1	2	3
0	2011/12/30 11:11 **WEIGHT: 1.00kg**		**WEIGHT: 1.00kg**	
1	2011/12/30 11:11 **WEIGHT: 1.00kg** **TOTAL: 1.00kg**		**WEIGHT: 1.00kg** **TOTAL: 1.00kg**	
2	2011/12/30 11:11 NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg		NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg	
3	2011/12/30 11:11 NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg TOTAL: 10.00kg		NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg TOTAL: 10.00kg	
4	2011/12/30 11:11 **S/NO: 10** **WEIGHT: 1.00kg**		**S/NO: 10** **WEIGHT: 1.00kg**	
5	2011/12/30 11:11 S/NO: 10 WEIGHT: 1.00kg TOTAL: 10.00kg		S/NO: 10 WEIGHT: 1.00kg TOTAL: 10.00kg	
6	2011/12/30 11:11 S/NO: 10 NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg		S/NO: 10 NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg	
7	2011/12/30 11:11 S/NO: 10 NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg TOTAL: 10.00kg		S/NO: 10 NET: 1.00kg GROSS: 1.00kg TARE: 0.00kg TOTAL: 10.00kg	

9. DRAWING



No	Parts Name
1	Key board overlay
2	Overlay
3	Upper cover
4	Display protection Plate
5	Key pad hat
6	Main board PCBA
7	Insulated washer
8	Seal thread screw
9	Rubber sealing ring
10	Self-thread screw
11	Battery Clamp
12	Ni- NH battery
13	Washer
14	5 pin air connector
15	Bottom cover
16	Name plate
17	Self-thread screw
18	Adaptor jack
19	Bracket