

# **BAYKON**

## **LM-91**

**WEIGHT INDICATOR  
OPERATION MANUEL**

# **I. GENERAL DESCRIPTION**

The LM-91 scale indicator is designed for airport terminal scale. It is used with platforms including strain gauge load cells.

## **I.1. FEATURES:**

- Keyboard calibration and setup.
- Indication for Zero and Net weight.
- Selectable increments form 1000, 2000, 2500, 3000, 4000, 5000, 6000, 8000, 10000 and 12000.
- Pushbutton Zero, Tare, Clear and Print.
- Automatic zero maintenance.
- Pushbutton zero range is +/- 20 % of full scale capacity.
- RS 232C data output. Baud rate is selectable at 300, 1200, 2400, 4800 and 9600.
- Output for Customer Remote display.
- Digital filter with selectable ranges for vibration or motion.
- Available in static painted steel or stainless steel enclosures.
- Over capacity blanking over selected full scale capacity.
- Under zero display blanking with minus sign.

## **I.2. SPECIFICATIONS:**

- Operation voltage is 220 V - 50 Hz and power consumption is 20 W maximum.
- The unit operates from -10 °C / 45 °C at 0 to 95% relative humidity.
- Sensitivity: Minimum 0.5  $\mu$ V / Increment.
- Zero Temp. Coefficient is 0,5  $\mu$ V / °C.
- Span Temp. Coefficient is 0,001 % / °C.
- Resolution: 1 / 100.000 internal and max. 1 / 12.000 displayed . Excitation current is provided for up to 4-350 ohm load cells.

# **II. OPERATING INSTRUCTION**

## **CAUTION**

- 1. DO NOT APPLY POWER TO THE INDICATOR UNTIL THE SUPPLY VOLTAGE HAS BEEN VERIFIED.**
- 2. BE SURE POWER IS OFF BEFORE MAKING CONNECTION OR DISCONNECTION OF LOAD CELL AND DATA OUTPUT CABLE.**
- 3. BE SURE POWER IS OFF BEFORE OPENING THE ENCLOSURE.**

## II.1. DISPLAY

The weight is shown by 6 digit LED display. The displays blanks at over capacity and at under capacity with the minus sign.



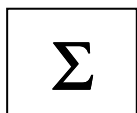
**Zero indication:** Will appear when the scale is within +/- 0.25 increments and there is no motion.



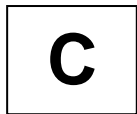
**Net indication:** Will appear when the scale is tared.

## II.2. KEYBOARD

### Keys for weighing operation:

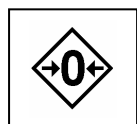


**TOTAL:** Pressing this key adds the scale weight value to the total value and increases the the value in Quantity display by 1. When the Total key is pressed, the weight data including ( Total weight+ Quantity+ Scale weight ) is sent automatically via RS232 serial output.



**CLEAR:** Pressing this key clears the Total value and the value in the Quantity display. When the Clear key is pressed, only scale weight data is sent automatically via RS232 serial output.

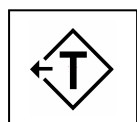
### Keys for scale and calibration:



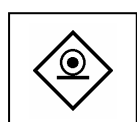
**ZERO:** This key is used for re-zeroing the scale. It is active in 20% of scale capacity and if there is no motion.



**TARE:** The scale is tared by this key. It is active if this key is enabled in setup and there is no motion. The tared weight is displayed as a negative value when the weight is removed from the platform.



**CLEAR:** Tare value is cleared by this key. Tare can also be cleared autotmatically when the scale is gross zero if Auto Clear Tare function is enabled in setup.







**ENTER:** This key is used during calibration and programming.

### III. PROGRAMMING AND CALIBRATION

The following chart can be used as a quick reference for programming.

STEP	DESCRIPTION	DEFAULT	MUST BE
S1	- Internal Counter	0	<b>0</b>
S2	- Digital Filter	1	Selectable
S3	- Tare Active	0	<b>0</b>
S4	- Auto Clear Tare	0	<b>0</b>
S5	- Serial Port Parameter		
	1- Mode (Demand/Continuous)	0	<b>0</b>
	2- Baud rate	9600	Selectable
CALIB	CALIBRATION		

The keys on the unit will have the following functions throughout the programming procedure.

$\Sigma$ TOTAL	<b>C</b> CLEAR	 Previous Step	 No ( 0 )	 Yes ( 1 )	 Enter Next step
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#### PROGRAMMING AND CALIBRATION STEPS:

1. Unplug power cable and disconnect printer/host cable if exists.
2. Insert Calibration connector to the serial port connector of the indicator.
3. Apply power, display will advance to ( **S1 0** ).
4. Follow the chart in the following pages.

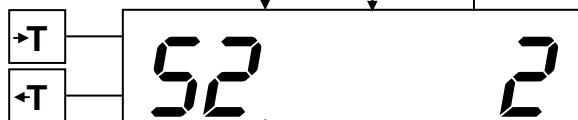
#### INTERNAL COUNTER/ NORMAL

0 = Normal weighing mode  
1 = Internal counter is displayed.



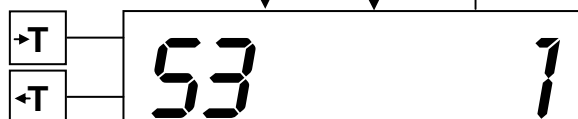
#### DIGITAL FILTER

0 = No filtering  
1 = Low filtering  
2 = Medium filtering  
3 = Strong filtering



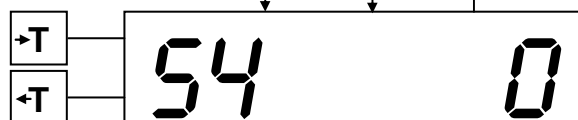
#### TARE KEY

0 = Disabled  
1 = Enabled



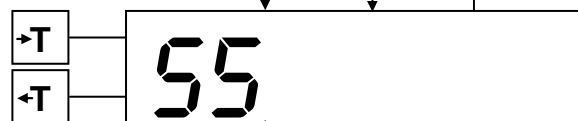
#### AUTO CLEAR TARE

0 = Disabled  
1 = Enabled



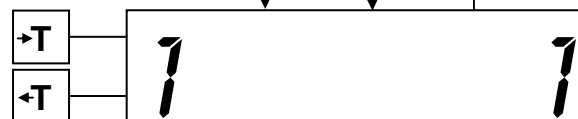
#### PRINTER OUTPUT

0 = To skip to calibration.  
1 = To access printer parameters.



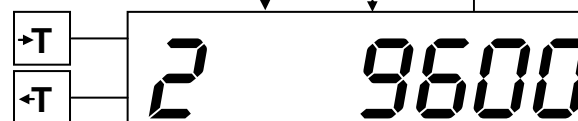
#### COMMUNICATION MODE

0 = Continuous Mod.  
1 = Demand Mod.



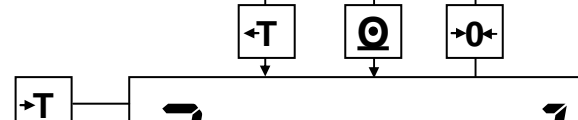
#### BAUD RATE

1200, 2400, 4800 and 9600  
can be selected.



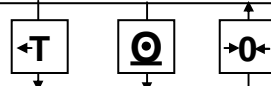
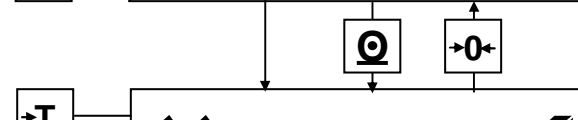
#### CHECKSUM

0 = Checksum will be sent.  
1 = Checksum will not be sent.



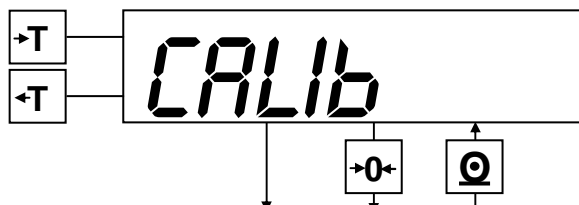
#### DATA FORMAT

0 = Displayed weight  
1 = Gross, Net and tare values  
in single line.  
2 = Gross, Net and tare values  
as multiple lines.



### CALIBRATION

0 = Calibration will be skipped,  
Setup will proceed to the last  
step which is SAVE.  
1 = To access calibration.



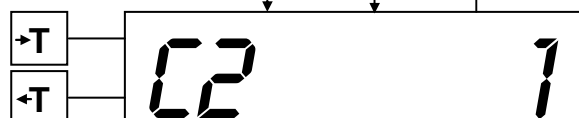
### TOTAL INCREMENT

Can be selected as 1000, 2000, 2500,  
3000, 4000, 5000, 6000, 8000, 10000  
and 12000.



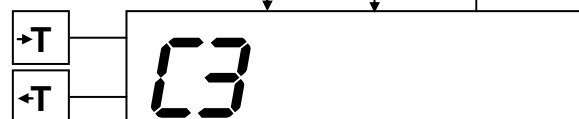
### INCREMENT SIZE

Can be selected as 1, 2 and 5.



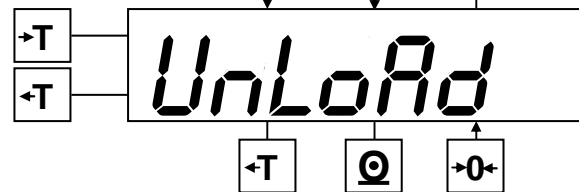
### DECIMAL POINT

Can be selected as 0.0001, 0.001,  
0.01, 0.1, 1 AND 10.



### EMPTY SCALE

Remove all weight from the platform.

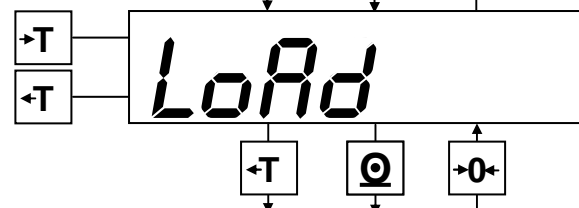


### WAIT



### LOAD SCALE

Place test weight on the platform.



ENTER TEST WEIGHT

→T  
←T

28.00



WAIT

→T  
←T

dEL 10



EMPTY SCALE

Unload the platform.

→T  
←T

UnLoAd



WAIT

→T  
←T

dEL 10



CALIBRATION DONE

→T  
←T

CAL F



SAVE ?

→T  
←T

SAVE



END OF CALIBRATION

→T  
←T

CALEnd

UNPLUG THE POWER CABLE.  
REMOVE THE CALIBRATION CONNECTOR AND APPLY POWER.

## NOTES:

### I. Relation between scale capacity and increment size

In the following table, the possible values for C1, C2 and C3 are indicated.

<b>C1</b>	1000, 1500, 2000, 3000, 4000, 5000, 6000, 8000, 10000, 12000
<b>C2</b>	1, 2, 5
<b>C3</b>	0.0001, 0.001, 0.01, 0.1, 1, 10

Scale capacity= C1 x C2 x C3

C1 = CAPACITY/ INCREMENT SIZE

C2 = READABILITY/ C3

C3 = DECIMAL POINT POSITION

**Example 1** : Let the scale is 300 kg x 0.1 kg

Capacity: 300 kg    Readability: 0.1 kg

C3 = 0.1

C2 = 0.1 / 0.1 = 1

C1 = 300 / 0.1 = 3000

### Calibration connector:

DB9 type female connector with pin 7 and 8 is shorted.

## 4. CONNECTORS

### 4.1. LOAD CELL CONNECTOR ( DB9 female )

PIN NO	MEANING	LOAD CELL 6 LINE CABLE	LOAD CELL 4 LINE CABLE
1	+ EXCITATION	+ EXCITATION	+ EXCITATION
2	+ SENSE	+ SENSE	+ EXCITATION
3	SHIELD	SHIELD	SHIELD
4	- SENSE	- SENSE	- EXCITATION
5	- EXCITATION	- EXCITATION	- EXCITATION
7	+ SIGNAL	+ SIGNAL	+ SIGNAL
8	- SIGNAL	- SIGNAL	- SIGNAL

⌋ : Short circuit

### 4.2. DATA OUTPUT CONNECTOR (DB9 male )

Pin no	RS 232C
2	T X D
5	GND
7	CAL
8	CAL



## DATA FORMAT

1. After each press of TOTAL key, the following data is sent automatically:

STX	SP	T4	T3	T2	T1	SP	Q2	Q1	SP	W4	W3	W2	W1	CR	LF
-----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

2. After each press of CLEAR key, the following data is sent automatically:

STX	SP	W4	W3	W2	W1	CR	LF
-----	----	----	----	----	----	----	----

STX : Start of Text Character -ASCII Hex 02

SP : Space chracter -ASCII Hex 20

CR : Carrige return -ASCII Hex 0D

LF : Line fedd -ASCII Hex 0A

Tx : Total Weight Value ( T4 is most significant digit )

Qx : Quantity Value ( Q2 is most significant digit )

Wx : Scale weight data ( W4 is most significant digit )

### Communication parameters:

**Baud rate** : sealeable from 300 to 9600

Parity : Even

Data bit : 7

Stop Bit :1

## 6. ERROR TABLE

CODE	DESCRIPTION	POSSIBLE CAUSE & SOLUTION
E 1	Scale in motion	- Please check power connection.
E 2	Illegal test weight value entered.	- Please enter correct test weight value .
E 3	Calibration Error	- Re calibrate the scale. - Check the load cell connection. - Check the mechanic of the platform. - Replace main board.
E 4	Calibration Error	- Re calibrate the scale. - Check the load cell connection. - Check the mechanic of the scale. - Replace main board.
E 5	Over capacity	- Reduce test weight used. - Control calibration parameters. ( C1, C2 and C3 )
E 6	Insufficient test weight	- Increase test weight used. - Control calibration parameters. ( C1, C2 and C3 )

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