PROCESS INDICATOR
MANUAL-V2.1
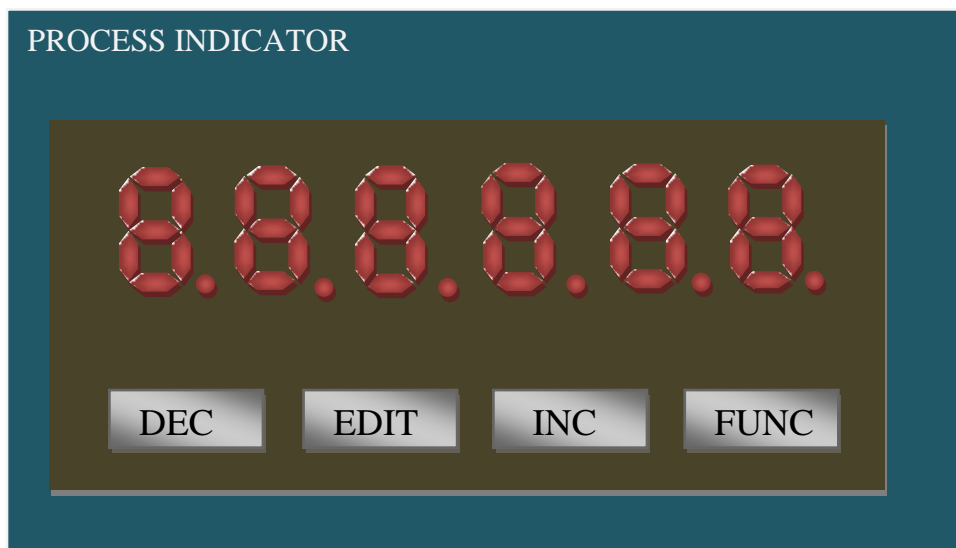
LIST OF CONTENTS

1. PROCESS INDICATOR FRONT VIEW:

TECHNICAL SPECIFICATION:

Instrument Type	:	Process Indicator
Power Supply	:	230v AC
Communication	:	RS232 / RS485
Mother Board	:	PImv
Display	:	0.39" Seven segment LED display (6-digits)
Input keys	:	Micro switch -4 Nos.
ADC Resolution	:	1 in 10000 counts.

2. MODES OF OPERATION.

A. **NORMAL** mode.

B. **CALIBRATION** mode.

On power on, the system performs self test, retrieves stored calibration and system setup data and enters NORMAL operation mode. This is the weighing mode.

Layout of front panel display with three status LEDs and six seven segment 10 mm LEDs. Layout of keypad and its functions are as follows.

A.NORMAL mode

2.1 Functions of keys in NORMAL mode.

a. **DEC** key is the ZERO key used to ZERO the displayed weight if the value is within the specified ZERO range of the instrument [**Zrr**].

b. **EDIT** key is used for tare function. The weight will make zero temporarily, again press the same key then released the zeroed weight.

c. **INC** key is the GROSS / NET key used to toggle between gross and net weight display after taring the weight using TARE key. Once Tare is released Gross / Net key does not have any function.

d. **FUNC** key is the special FUNCTION key. The function assigned to this key in NORMAL mode of operation PASSWORD entry.

B. CALIBRATION mode :

2.3 CALIBRATION OF WEIGHT INDICATOR

THE CORRECT PASSWORD FOR YOUR SYSTEM IS : 1 4 5

The calibration mode functions are defined. FUNC key is used to select cursor [blinking digit]. Press INC or DEC to change the value. Enter the required value using ENTER key.
The main function menu will appear if the password is correct, otherwise it goes back to normal mode.

Use Increment or Decrement key to move from one function to another. Use ENTER key to select any displayed function and to register the desired value. Use ESCAPE key to quit from any function or to jump to the previous menu. Use ESCAPE key to shift cursor during data entry.

The functions available in the main menu are,

1. **CAL** - System calibration
2. **AdC** - Internal ADC settings
3. **dAC** - Analog Retransmission function
4. **dIS** - Display Stability settings
5. **ZEr** - System Zero settings
6. **Edt** - Calibration data entry
7. **Con** - Communication Parameter menu
8. **Diag** - Diagnostic mode
9. **End** - Quit main menu

Each Menu along with its sub-menus are described below.

2.3.1. SYSTEM CALIBRATION (CAL)

To calibrate the System, select the function CAL and press the ENTER key.
Sub – functions of CAL are as follows

a. CAP   -   Capacity
b. OFF   -   Offset
c. SPN   -   Span
d. RES   -   Resolution
e. TES   -   Test mode

a. CAPACITY (_CAP):   **Factory Default Value : 10000**

To enter into the sub – function CAP, press the ENTER key. The cursor position is indicated by the blinking digit. To enter the desired capacity, position the cursor using ESCAPE key and set the required value using INC and DEC keys. Register the value by pressing the ENTER key.

b. OFFSET (_OFF):

Selecting this function displays the raw count from ADC. Empty the platform and press ENTER key to register the offset count for the system.

c. SPAN (_SPn):

Selecting this function displays the raw count from ADC minus the registered Offset count. Load the platform with a known weight and register the displayed count by pressing ENTER key. Then enter the known weight value. The known weight used for SPAN calibration should not exceed the capacity of the platform.

d. RESOLUTION (_rES):   **Factory Default Value :1**

This function is used to select the display resolution. One of the four display resolutions is selected.

                1.   0.001
                2.   0.002
                3.   0.005
                4.   0.01
                5.   0.02
                6.   0.05
                7.   0.1
                8.   0.2
                9.   0.5
                10.   1
                11.   2
                12.   5
                13.   10
                14.   20
                15.   50

e. TEST MODE (_tES):

In this mode, ADC raw count is displayed. This is only for trouble shooting.

2.3.2 INTERNAL SETTINGS FOR ADC (ADC)

Sub – functions of ADC are as follows

a. GAIN   -   Internal Gain settings of ADC.
b. Avg   -   Normalization of ADC output [Averaging]
c. Cnt   -   Reset of Averaging function – For fast response to step changes.

a. **GAIN SELECTION (rnV):**   **Factory Default Value : 6**

This selects the input range [load cell millivolt range for the instrument].

G = 0   -   0-2.500V
G = 1   -   0-1.250V
G = 2   -   0-0.625V
G = 3   -   0-0.312V
G = 4   -   0-0.156V
G = 5   -   0-0.078V
G = 6   -   0-0.039V

Use INC, DEC, FUNC keys to change value and EDIT key to register.

b. **AVERAGING OF ADC COUNTS (Avg):**   **Factory Default Value : 10**

This instrument uses standard normalization techniques to achieve fast averaging of the load cell signal. The range is from 0 – 100. Large values ensure very stable display readings. However, the response of the system shall be slow.
Use INC, DEC, FUNC keys to change value and EDIT key to register.

c. **RESET OF AVERAGING FUNCTION (Cnt):**   **Factory Default Value : 10**
This number, entered in display counts, ensures fast response to step changes in load cell input. The averaging function is suspended temporarily if the ADC detects count variations larger than the set counts.
Use INC, DEC, FUNC keys to change value and EDIT key to register.

2.3.3 ANALOG RETRANSMISSION FUNCTION [DAC]

Three sub-functions of DAC are:
a. _DMODE   -   Gross / Nett mode.
b. DACRNG   -   DAC Ranges
c. _DACOP   -   DAC output checking.

a. **DAC OPERATING MODE**(_DMODE) :   **Factory Default Value : 0**

This defines the whether the DAC opeartes in the Gross mode or Nett mode. Select 0 for Gross mode or 1 for Nett mode. Use INC / DEC keys.
Use INC and DEC keys to change value and EDIT key to register.

b. DAC RANGE(_DACRNG):   **Factory Default Value :** 0-5V

This mode is used to select the analog output range.

1. 0-5V
2. 4-20 mA
3. 0-20 mA
4. 0-24mA

C. DAC OUTPUT(DACOP):
This menu is used to check the DAC output range with the Actual weight and capacity**.**

Use INC and DEC keys to change value and EDIT key to register.

2.3.4. DISPLAY STABILITY (dIS)

The sub-functions of DIS are:-

a. StC   -   Duration for stability
b. Stb   -   Stability Band in terms of divisions

STB   - Stability band   &   STC   - Stability count
These parameters are used for determining whether the weight is Stable or not. If the variation in weight is within the number of divisions mentioned in STB, for STC times then the Weight is assumed Stable.

2.3.5. SYSTEM ZERO SETTINGS (ZER)

The sub-functions of ZER are :-
a. AZL   -   Auto zero limit in divisions
b. AZr   -   Auto zero range in divisions
c. Zrr   -   Zero range in divisions
d. PZr   -   Power on Zero range in divisions

AZL   - Auto zero Limit   &   AZR   - Auto zero Range
Auto zero is registered only when the current weight is less than the number of divisions set in AZL and the weight with reference to the original Calibrated Zero, is within the number of divisions set in AZR.

ZRR   - Zero key range
When the Zero key in indicator is pressed, the displayed value is automatically zeroed if the Weight is less than the number of divisions set in ZRR.

POZ   - Power On Zero

When the indicator is Powered ON, the displayed value is automatically zeroed if the Weight is less than the number of divisions set in POZ. If the Weight is more then the message "Unload "is displayed.

Set POZ to zero, if power on zero checking is not required.

2.3.6. CALIBRATION DATA ENTRY (Edt)

If the offset count, gain count and Gain load are all known then the system can be calibrated by simply entering the values in this mode instead of going through the calibration procedure.

Use INC, DEC, FUNC keys to change value and EDIT key to register.

a. OFFSET (_OFF):

To enter Offset value as registered during calibration.

b. GAINCNT (_SPn):

To enter gain counts as registered during calibration.

c. GAINLOAD (_GLd):

To enter weight with which the system was calibrated during calibration.

2.3.7. COMMUNICATION PARAMETER MENU(COM) :

a. Id   -   Terminal Identification for indicator
b. PORT   -   Port Number selection
c. Baud   -   Baud rate selection
d. PAR   -   Parity selection

a. TERMINAL IDENTIFICATION (Id) :   Factory Default Value : 0

This defines the Terminal Identification for the indicator. Selectable from 0-9.
Use INC, DEC, FUNC keys to change value and EDIT key to register.

b. PORT NUMBER SELECTION (PORT):   Selectable from 0-1.

The systems consist of two comm port. Select the required port to configuration the port (baud rate/ parity).

    0→ FOR PORT1
    1→ FOR PORT2

c. BAUD RATE SELECTION (Baud) :   Factory Default Value: 9600

First select the port number and then select the baud rate

- Baud rate selection

This selects the baud rate for the indicator.
a) 1200
b) 2400
c) 4800
d) 9600
e) 14400
f) 19200
g) 38400
h) 57600
i) 115200

Use INC, DEC, FUNC keys to change value and EDIT key to register.

d.PARITY SELECTION (PAR):　　　　　　　　**Factory Default Value: N 8 1**

First select the port number and then select the baud rate

- Parity selection

This selects the Parity for the indicator.

a)　　　N 7 2
b)　　　E 7 1
c)　　　O 7 1
d)　　　N 8 1
e)　　　N 8 2
f)　　　E 8 1
g)　　　O 8 1
h)　　　N 9 1
i)　　　N 9 2
j)　　　E 9 1
k)　　　O 9 1

COMMUNICATION FORMAT

<002><TERMID><S/U><G/N><SIGN><6 DIGIT DATA><3>

2.3.8 DIAGNOSTIC MENU:
LED:
　　　The user can be checking the led display status. The user can ensure the led segments for all the digits are working properly.
KEY:
　　　The user can ensure keys are working properly. If the user Press any one of four keys then the display shows the name of the key.

For Example:

The user press the ENTER key then the display shows the "ENTER" for few seconds.

If the user wants to exit from this menu means Press the FUNC key then the display shows the keys name and the quit from this menu.

COMM:

The user can be checking the communication status.

If the user sent any token to the indicator, the indicator received the data then it will send the"P<1(Port number) >RECEIVED" message.

If the indicator not received the token data means then the indicator send the "P<1(Port number) >DATA MISSED" message.

ADC:

If the user Press the ENTER key then the display shows the following message

If the Analog to digital convertor is in working status means then "INITOK" message will appear.

If the Analog to digital convertor is failure means then "I_FAIL" message will appear.

IO:

The user can check output card status.

The indicator switch on the output for few seconds then switch off all the outputs one by one. At the same time the display shows the outputs Number.

For Example: "OP_1" this means the Output 1switched on few seconds.

2.3.9 QUIT MAIN MENU (End)

By selecting this function the system quits the setup mode and enters normal mode. All the data set in the setup mode is stored in EEPROM only when this function is selected.

2.4 ERROR MESSAGES
1. **OVErLd** – If Actual Weight exceeds Capacity.
2. **UnLoad**- If the actual weight exceeds the Power on limit(available in zero setting menu)

BATCHING MENU:

The functions available in the batching menu are,

2.5 SETUP MODE OF WEIGHT INDICATOR:

To enter the calibration / setup modes from normal mode of operation, press the FUNC key once.
Use DEC, INC, FUNC & EDIT keys to enter the correct password.

THE CORRECT PASSWORD FOR YOUR SYSTEM IS : 222

The Setup mode functions are defined. FUNC key is used to select cursor [blinking digit].
Press INC or DEC to change the value. Enter the required value using ENTER key.
The main function menu will appear if the password is correct, otherwise it goes back to normal mode.
Use Increment or Decrement key to move from one function to another. Use ENTER key to select any displayed function and to register the desired value. Use ESCAPE key to quit from any

function or to jump to the previous menu. Use FUNC key to shift cursor during data entry.
The functions available in the main menu are,

1. Mode – Mode operation
2. Spt-1 – LOW
3. Spt-2 – HIGH
4. Drop – peak set mode

2.5.1 <u>MODE OPERATION (Mode):</u>
Choose the correct option depending on requirement 0, 1,2,3,4
Use INC, DEC, FUNC keys to change value and EDIT key to register.

MODE 0 : NOT USE

MODE 1:
　　　If Wt> SPT 1　　O/p1 ON, O/p 2 OFF
　　　If Wt > SPT 2　O/p 1 ON, O/p 2 ON

MODE 2 :
　　　If Wt < SPT 1 O/P1 ON,O/P2 OFF
　　　If SPT 1 < = Wt < = SPT 2 O/p1 OFF, O/p 2 OFF
　　　If Wt > SPT2 O/p1 OFF, O/p2 ON

MODE 3,4:NOT USE

2.5.2　<u>SET POINT OUTPUT 1(Spt1):</u>
　　　Enter SPT 1 using INC, DEC and FUNC keys. Enter using EDIT key. Set point 1 is used for
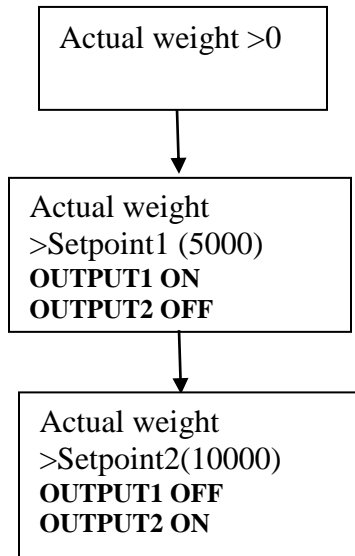　　　lower set point.

2.5.3 <u>SET POINT OUTPUT 2(Spt2):</u>
　　　Enter SPT 2 using INC, DEC and FUNC keys. Enter using EDIT key. Set point 2 is used for
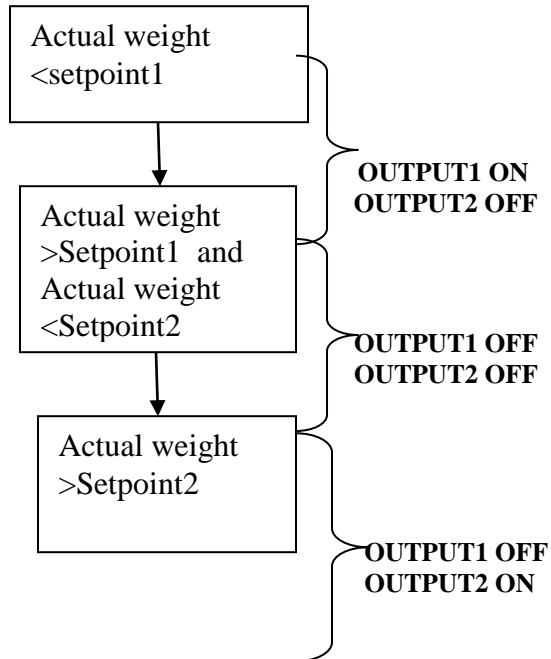　　　higher set point.

For example:
　　　Setpioint1=5000, Setpoint2=10000.

Mode 1:   **MODE 2 :**

```
┌─────────────────────┐
│  Actual weight       │
│  <setpoint1          │──┐
└─────────────────────┘  │
                          │
┌─────────────────────┐  │
│  Actual weight >0   │   │       OUTPUT1 ON
└─────────────────────┘           OUTPUT2 OFF
          │
          ▼
┌─────────────────────┐      ┌─────────────────────┐
│  Actual weight      │      │  Actual weight       │
│  >Setpoint1 (5000)  │      │  >Setpoint1  and     │──┐
│  **OUTPUT1 ON**     │      │  Actual weight       │
│  **OUTPUT2 OFF**    │      │  <Setpoint2          │
└─────────────────────┘      └─────────────────────┘
          │                         │        **OUTPUT1 OFF**
          ▼                                  **OUTPUT2 OFF**
┌─────────────────────┐      ┌─────────────────────┐
│  Actual weight      │      │  Actual weight       │
│  >Setpoint2(10000)  │      │  >Setpoint2          │──┐
│  **OUTPUT1 OFF**    │      │                      │
│  **OUTPUT2 ON**     │      └─────────────────────┘
└─────────────────────┘                     **OUTPUT1 OFF**
                                             **OUTPUT2 ON**
```

Mode 1 boxes:

- Actual weight >0
- Actual weight >Setpoint1 (5000) **OUTPUT1 ON OUTPUT2 OFF**
- Actual weight >Setpoint2(10000) **OUTPUT1 OFF OUTPUT2 ON**

Mode 2 boxes:

- Actual weight <setpoint1 → **OUTPUT1 ON OUTPUT2 OFF**
- Actual weight >Setpoint1 and Actual weight <Setpoint2 → **OUTPUT1 OFF OUTPUT2 OFF**
- Actual weight >Setpoint2 → **OUTPUT1 OFF OUTPUT2 ON**

2.5.4 DROP:

If the drop value is set to '0' means then the Indicator Act as a normal WEIGHT INDICATOR.
The drop is other than zero then the indicator act as a PEAK LOAD INDICATOR

2.6 IMPORTANT PASSWORDS:

145→ main menu
222→ set menu
111→calibration menu (Available features -- calibration menu, Edit menu, Default setting menu is available)

2.7   TROUBLE SHOOTING FOR WEIGHING SCALE

The instrument has been designed to give trouble free operation over a long period in hostile Industrial environments. The modular concept makes maintenance very easy. Each instrument undergoes a rigorous quality approval program to give only the best and reliable instrument. The burn in test is performed both at the component level, before assembly and at the finished product level after assembly under energized conditions.

In view of the above, there can hardly be any requirement for maintenance servicing. As the front panel is of bright colour, periodical cleaning of the front panel with wet cloth/ soap water is recommended.

Some basic diagnostic / fault finding procedure is given below in case of some minor problems.

 a) NO DISPLAY IN THE INDICATOR:

1. Mains (230v) to panel input.
2.   Check the display card to Motherboard connections and ensure that there is no loose connection in the connector. Check the micro controller 5VDC supply.

b) NO RESPONSE FOR KEY COMMANDS

1. Check and clean the push button contact.

c) WEIGHT NOT UPDATED IN LED DISPLAY

1. Check load cell connections for loose contacts.
2. Check for excitation voltage of load cell should be 5 V DC +/- 100 mV.
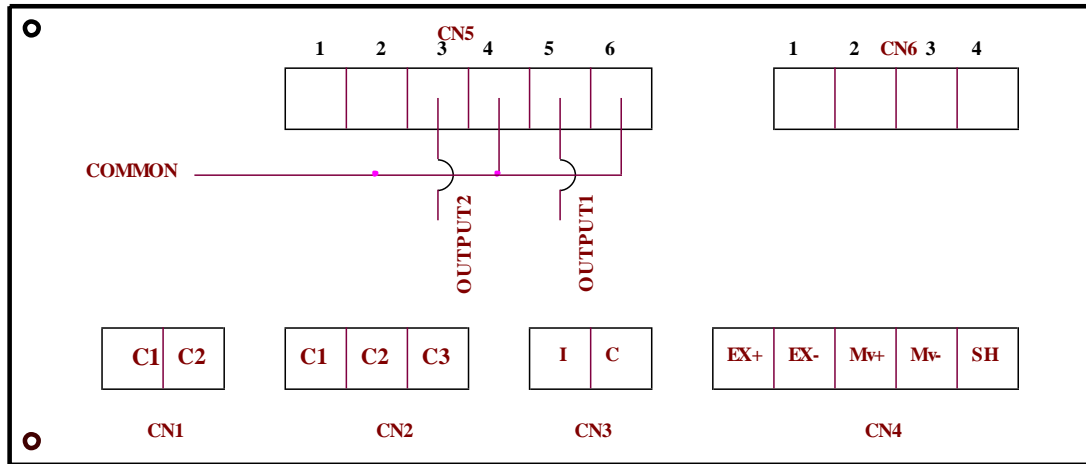3. Check the load cell cable.

d) INCORRECT LOAD READING

1. Inspect load cell for any mechanical load shunting. Remove shunt loads.
2. Tightening the Load Cell Bolts.
3. Check calibration. Recalibrate the instrument, if necessary.
4. Check Load Cell wiring connections in Box.
5. Clean load cell and weighing machine.

MAINTENCE FOR WEIGHING SCALE

a. Clean load cell area and control panels.
b. Check the load cell bolts weekly once.
c. Check the supply terminals.
d. Check the load cell cable connections.

2.8 INDICATOR BACK PANEL :

CN1

SUPPLY 230V AC:
   C1   PHASE
   C2   NEUTRAL

SUPPLY 24V DC
   C1   POSITIVE(+)
   C2   NEGATIVE(-)

CN2

RS232:
   C1   RECEIVER
   C2   TRANSMITTER
   C3   GROUND

RS485:
   C1   DATA-
   C2   DATA+
   C3   NO CONNECTION

CN4

EX+   EXCITATION +

EX-   EXCITATION -

Mv+ MILLI VOLT +

Mv- MILLI VOLT -

SH   SHIELD

****