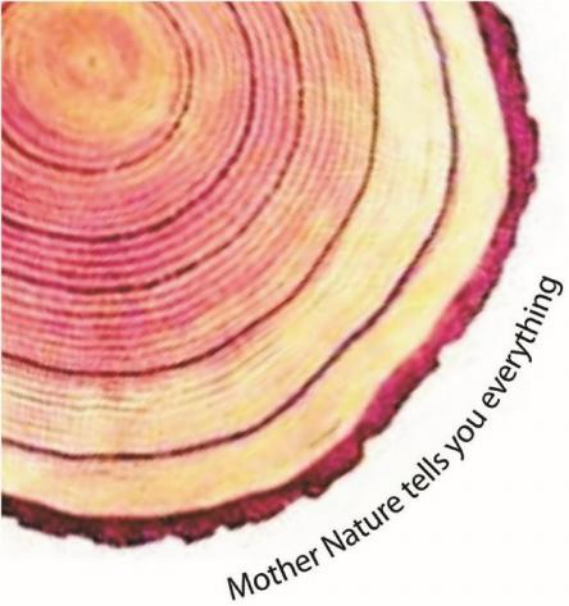

OPERATING MANUAL

LM Pro

LM PRO Series
Pressure Data logger
Model No.: 63xx

g-tek™ Record it... Control it... Perfect it.

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G-Tek Corporation Pvt. Ltd.
3, mahavir estate, karelibaug
vadodara-390 018
tel.: +91-265-2461912
email: info@gtek-india.com
url: www.gtek-india.com

CONTENTS

1 LIST OF TABLES

2 LIST OF FIGURES

3 SAFETY AND THE ENVIRONMENT

3.1 USE

- This instruction manual is an essential component of the product.
- Please read this documentation carefully and pay attention to the safety instructions and warning notices to prevent injuries and damage to the product.
- Keep this document handy so that you can refer to it when necessary.

3.2 ENSURE SAFETY

- Operate the product properly, for its intended purpose and within the parameter specified in the technical data. Using it beyond the specified limit can cause the damage to the product and personnel also.
- Do not use the product if there are signs of damage to the housing.
- Carry out only the maintenance and repair work on this instrument that is described in the documentation. Follow the prescribed steps exactly. Use only original spare parts from G-Tek.

3.3 PROTECTING THE ENVIRONMENT

- Dispose of faulty rechargeable batteries/spent batteries in accordance to the local regulations or valid legal specifications.
- At the end of its useful life, send the product to the separate collection for electric and electronics devices (observe local regulations) or return the product to G-Tek for disposal.

4 SPECIFICATIONS

4.1 USE

- The LM-P-PRO series of differential pressure data logger / indicator is very helpful in monitoring differential pressure especially for clean rooms. Large 0.56" LED digital display eliminates the human error in reading the data. The device is field programmable for most common of the eight measuring units. The decimal point gets selected automatically for displaying with best resolution.
- It also has a feature to set the high and low alarm limit. Whenever the limit is crossed, appropriate LED indicates the alarm condition. Display also starts blinking, for better attention.

- Programming of various parameters like, unit, alarm limits, calibration parameters (zero and span), communication parameters etc. are all settable through 4 keys. Data is scanned every second. It has RS485 2/4 wire communication port to connect to any SCADA using MODBUS RTU/ASCII protocol. User can get the current data and device identification information over protocol.

- Device also has an optional memory to store the data. It is possible to store the data at an interval between 1 second to 18 hours interval. The stored data can only be retrieved through our web- based data acquisition software gtekNetTM. It is also possible to configure the entire device from this software. gtekNetTM enables the user to see, modify, generate report with 21CFRPart 11 compliance using any standard browser from anywhere over network connected device.

4.2 FEATURES

- Differential Pressure
- 8 engineering units of measure → Pascal, KPA, mBar, PSI, mmWC, inWC, mmHg, InHg
- Digital Display
- Alarm set point high / low
- Alarm Indicator
- Wide power supply 5-30V DC
- RS 485 MODBUS compatible
- SS 314 Front facia

4.3 TECHNICAL DATA

Table 1 Specifications

Specifications For LM-P RS485 data logger	
Model No	LM-P RS485 data logger
Display Details	
Display	Digital, 4 digits ultra-bright LED Numeric/semi alphabetic display
Status Indicator	Unit Indication, High and Low Alarm Indication, and storage on Indication
Display Refresh rate*	1 reading / second
Analog Input Details	
Input Media	Air and non-combustible and non-corrosive gases. For Wetted Materials, consult factory.
Pressure Sensor	MEMS sensor either Differential or Absolute pressure
Measurement parameters [8 units]	Pascal (PA), Kilo pascal (KPA), milli bar (mbar), psi (PSI), mm of Water Column (mmWC), inch of Water Column (INWC), mm of Hg (mmHG), inch of Hg (INHG)
Measuring range Pressure	-500 to +500 pascal (refer Table2 for other units' range)
Pressure Accuracy	± 1.5 %FSD
Pressure Input port	Quick Connect/Disconnect port 3 mm tube ID
Environmental conditions	
Temperature	(Operating) -5 to +65 ^{o}C (Storage) -40 to +125 ^{o}C
Relative Humidity	(Operating) 10 to 80 % RH Noncondensing (Storage) 5 to 90 % RH Noncondensing
Altitude	<2000 meter
****Batch Storage Data/Memory Details**	
Start / Stop Batch	Remote Start – Stop through gtekNet™
Store Interval	0 To 240 min in Step of 1 Sec
Memory Size	4000 records totals; Rollover
Power Requirements	
Supply Voltage	5 – 30 V DC,1 A
Communication Details	
Communication	EIA 4 wire RS 485
Protocol	Modbus RTU/ASCII Protocol
Baud rate	User settable – 4.8k, 9.6k, 19.2k & 38.4k bps
Parity	User settable – None, Even & Odd
Device Address	1 to 247 – User settable
Alarm Details	
Alarm Set-point	High/Low individually settable for channel
Buzzer	Audible alarm on high/low condition
Alarm high/low status	Alarm High/low individual status LEDs

Mechanical Dimensions and Mounting	
Housing Material	ABS Plastic
Mounting Orientation	Mounting unit in vertical plane
Size (L x W x D) mm	190 x 190 x 40
Panel Cutout (Diameter) mm	115
Housing (Diameter) mm	112
Weight	500 gms Approx.

Table 2 Pressure Units with their range

Unit No.	Pressure Unit	Unit list on Display	Pressure Range#
1	Pascal	PA	-500 to +500
2	Kilo Pascal	KPA	-0.500 to +0.500
3	Milli Bar	MBAR	-5.00 to +5.00
4	Pound Square per inch	PSI	-0.072 to +0.072
5	mm of Water Column	MH2O	-50.9 to +50.9
6	Inch of Water Column	IH2O	-2.01 to +2.01
7	mm of mercury	MMHG	-3.75 to +3.75
8	Inch of mercury	INHG	-0.147 to +0.147

NOTE: Please refer the order code for detailed features.

 # Pressure range will be as per the selected order code. Table 2 show the pressure range for ± 5 mbar sensor.

*** Display refresh rate is settable by user from menu.**

The starred (**) parameter varies with order code selection. As per selection, if the device is with no memory, then some features like batch operation and store interval are not provided.

5 UNPACKING AND INSPECTION OF DATA LOGGER

- 6X Pressure data logger is dispatched in a recyclable, environment friendly package specially designed to give adequate protection during transit.
- If the outer box shows sign of damage, it should be opened immediately, and the device be examined.
- If there is evidence of damage, the device should not be operated, and the local representative contacted for instructions. Ensure that all accessories and documentation is removed from the box.
- There are two variants of LM P RS 485 data logger(refer order code) – Square and Round plate as shown in figure 1 and figure 2.
- If the 6X Pressure data logger is for immediate use, you can start installing it as per Installation instructions.
- **Please preserve the original packing along with all internal packing for future transport requirements.**

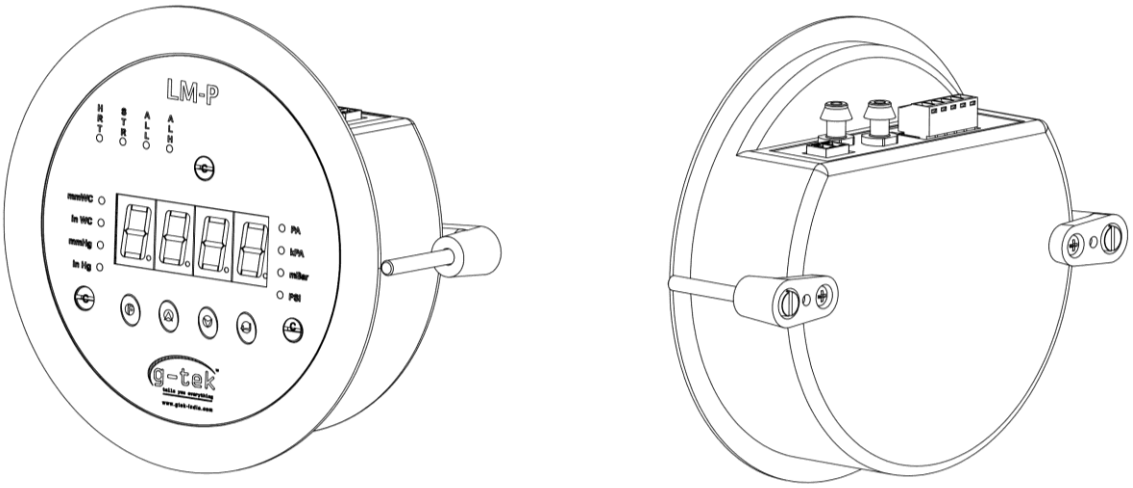


Figure 1 Front and back view of Round plate LM P RS485 data logger (Model No:63xx)

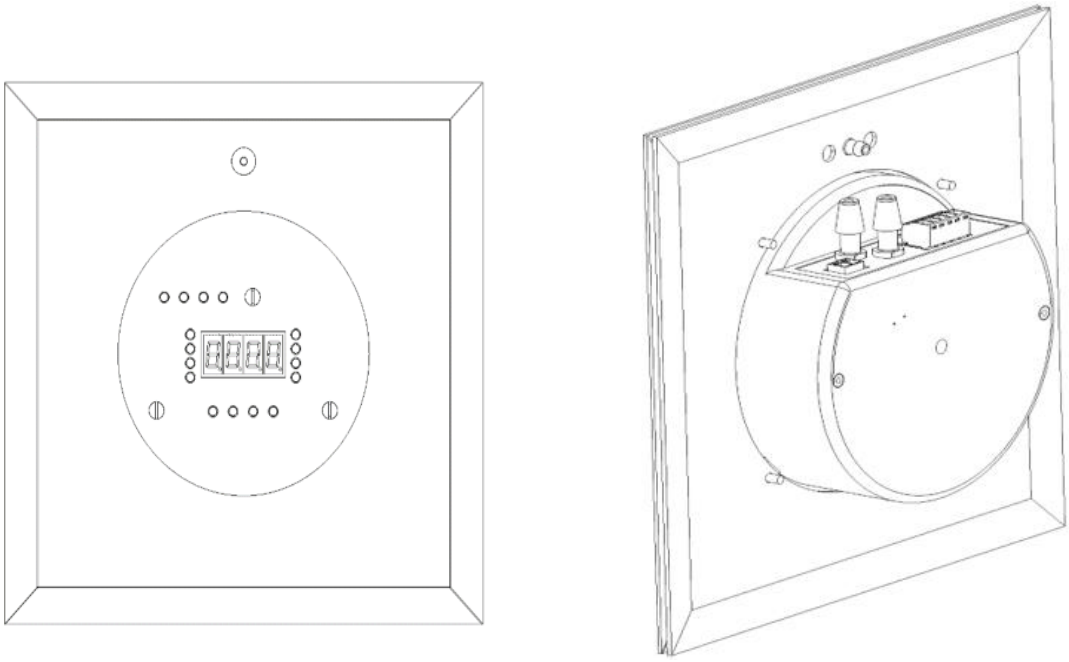


Figure 2 Front and back view of Square plate LM P RS485 data logger ((Model No:64xx)

5.1 OVERALL MECHANICAL DIMENSIONS FOR ROUND PLATE DATA LOGGER

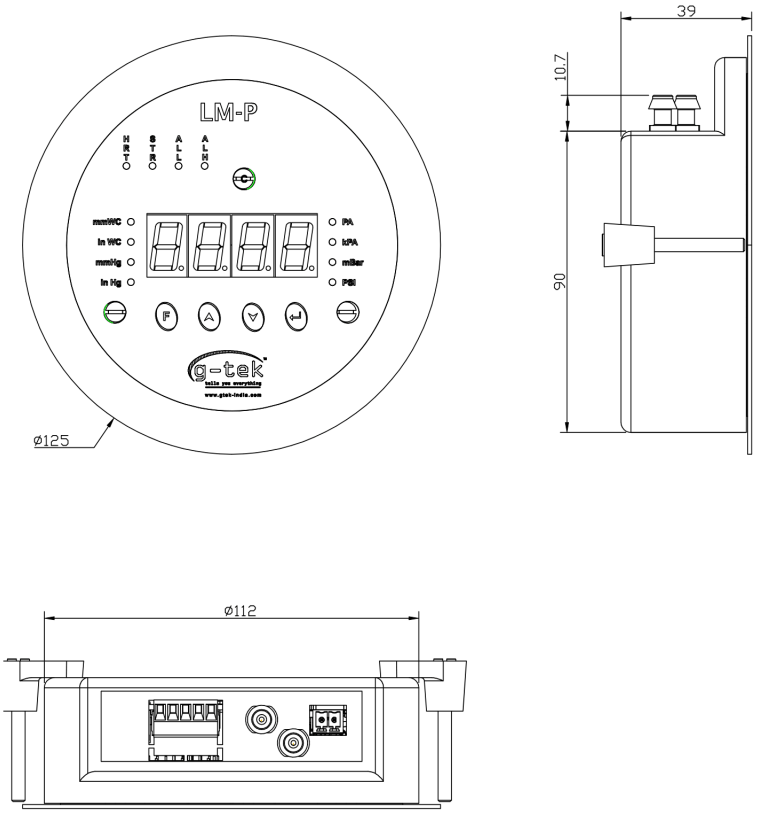


Figure 3 Overall mechanical dimensions for Round plate data logger (Model No:63xx)

5.2 OVERALL MECHANICAL DIMENSIONS FOR SQUARE PLATE DATA LOGGER

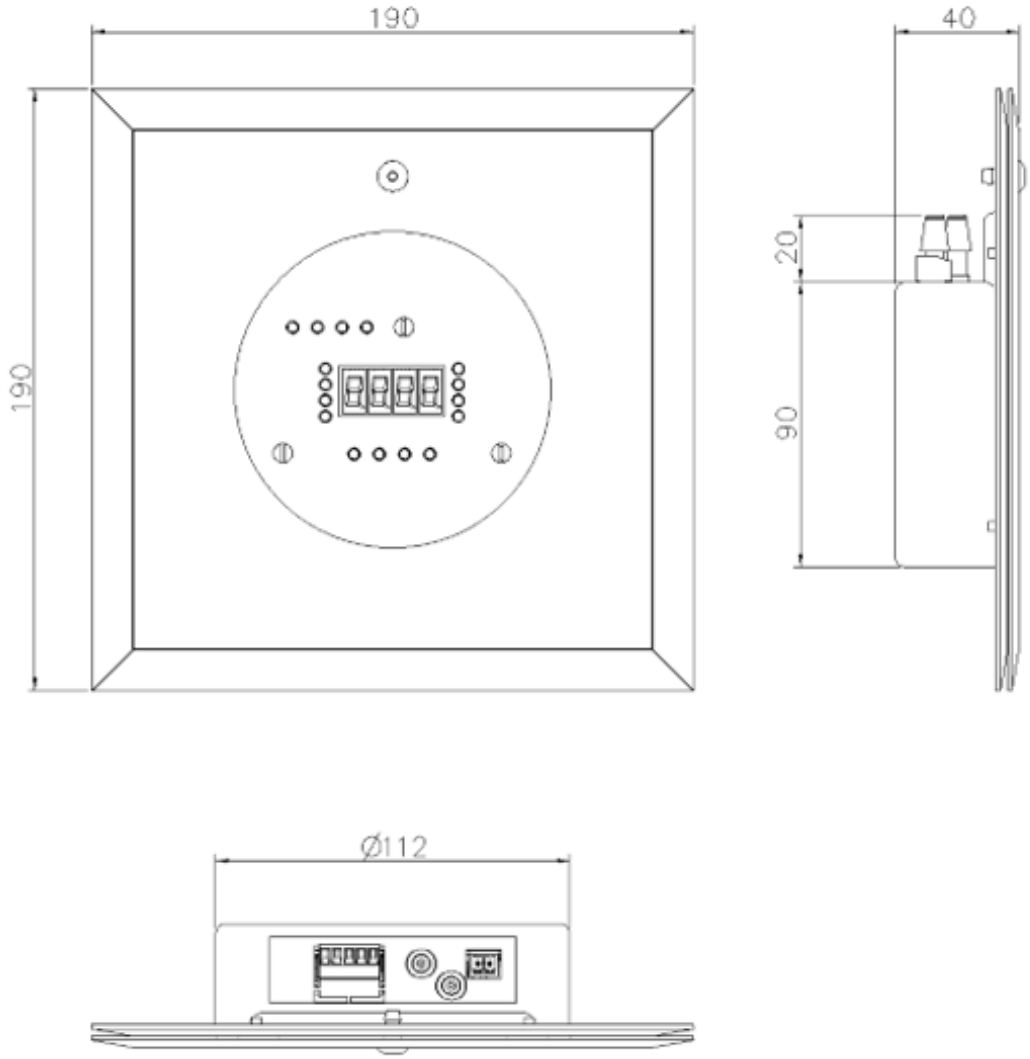


Figure 4 Overall mechanical dimensions for Square plate data logger (Model No:64xx)

Overall Dimensions (approx.)	**Round plate(63xx)**	**Square plate(64xx)**
Dimensions (L x W x D) (mm)	40(D)	190 x 190 x 40
Panel Cutout (Diameter) mm	115	115
Housing (Diameter) mm	112	112
Diameter(mm)	125	-

6 ELECTRICAL INSTALLATION

6.1 WIRING DIAGRAM FOR DATA LOGGER

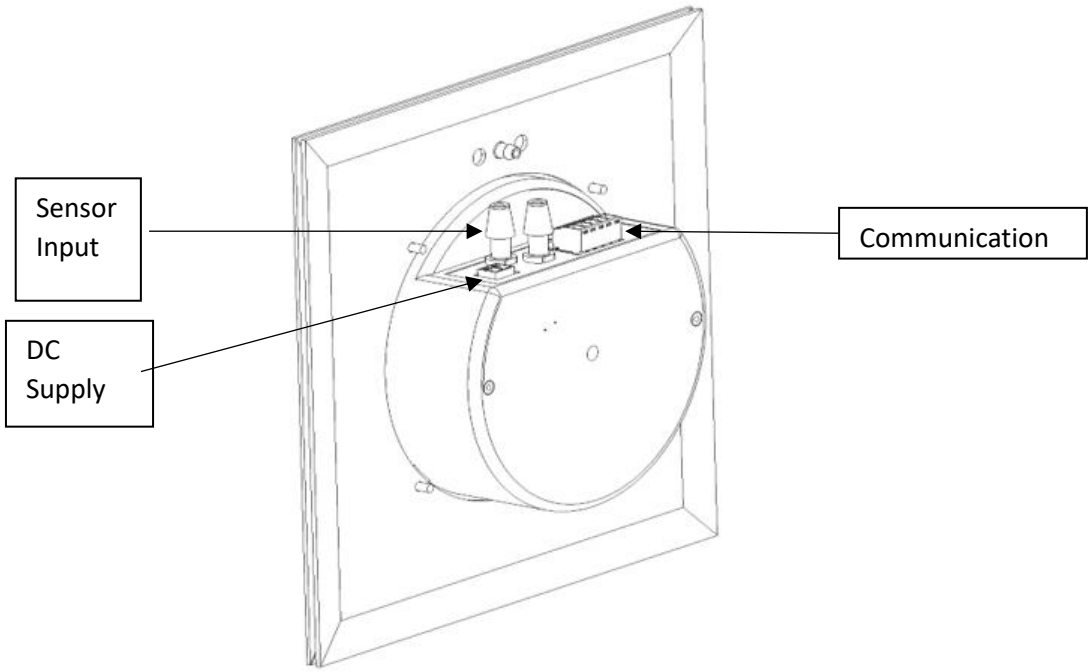
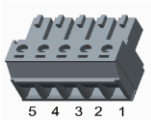


Figure 5 Wiring Diagram of Data logger

Table 3 Connection notations

Code	Connector Name	Pin Number of connectors	
		1	2
Sensor input	Pressure sensor	(+)	(-)
DC supply	5 - 24 V DC supply adapter	(+)	(-)

Table 4 RS485 Connection notations



Code	Connector Name	Pin Number of connectors				
		1	2	3	4	5
Communication	RS485	RX (+)	RX (-)	TX (-)	TX (+)	GND

***Note: All wiring diagram connection are same for both models.**

6.2 RS485 CONNECTION DIAGRAM

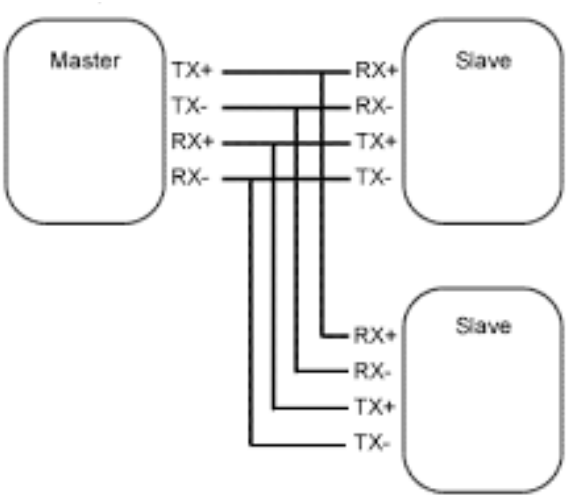


Figure 6 4-Wire RS485 Wiring diagram

- Multiple LM P RS485 devices can be connected with 4-wire RS485 is shown in figure 6.
- User can refer figure 7, if 4- wire to 2-wire RS485 conversion is required.

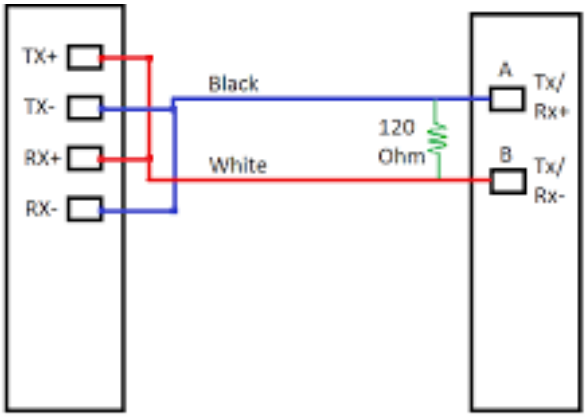


Figure 7 2-Wire RS485 wiring diagram

7 OPERATION

7.1 FRONT PANEL OF DATA LOGGER

After the proper wiring is done, Power ON the device. The heartbeat LED is blinking at every one second, The Display will show "GTEC" message for few seconds and then reading of pressure input. The default pressure is in pascal, which is indicated by PA LED (unit1). User can reconfigure the configuration parameters by entering programming menu (Refer Configuration section).

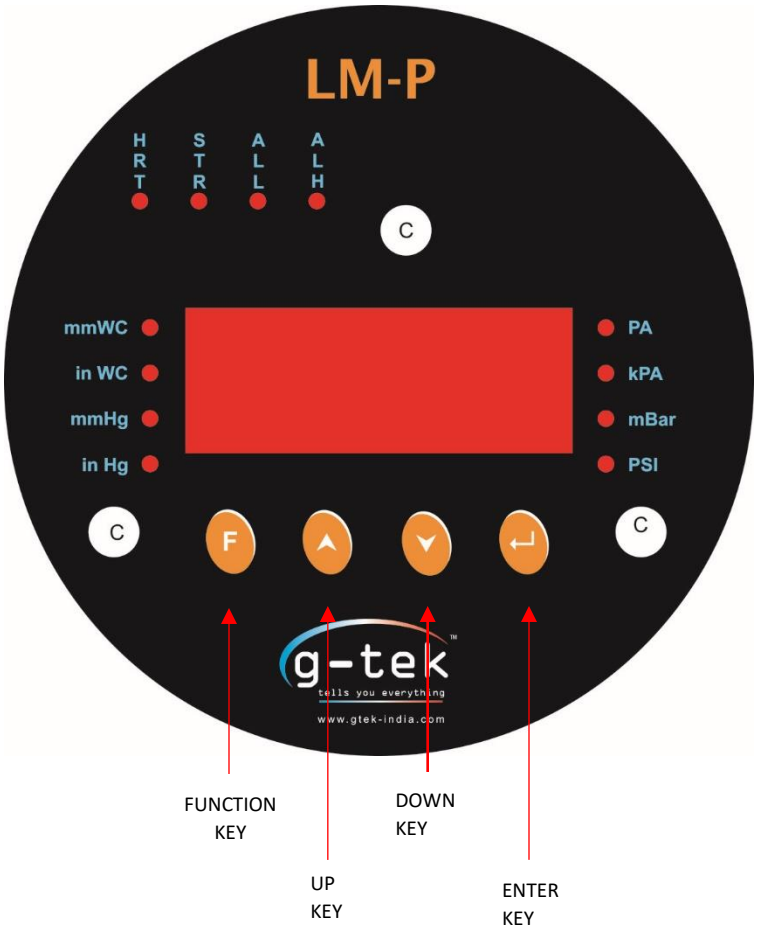


Figure 8 Front panel of data logger

KEYS:

- There are four multifunction keys available on the front panel of the Device to configure the different parameters. The functions of these keys are described as below:

This key is used to enter the main menu sequence as well as come out from the main menu.

This key is used to increment the digits or go to the next parameter.

This key is used to decrement the digits or go back to the previous parameter

This key is used to save the parameter values, to enter a menu/submenu

7.2 ZERO OFFSET

- User can do the zero offset for pressure reading by press and hold FUNCTION, DOWN and ENTER key for at the same time. After pressing these keys, zero offset will be applied, and display parameter will show '0' on display.

NOTE: After applying zero offset, for calibration process, the user should set offset and multiplier as 0 and 1, respectively.

7.3 STATUS OF LED INDICATION

- Table 5 provides brief description of LED status, which will be explained in detail in their individual section.

Table 5 Status of LED's

Status LED'S	Description
Heartbeat (HB_LED)	This LED shows Device Status. It will blink every 1 sec.
**Storage (SL_LED)	This LED shows Batch start indication, which means the device has started collecting data. It will blink every 1 sec if the batch is started
ALL (Alarm Low)	ALL LED display and unit LED will blink, if the pressure reading goes below alarm set point low value. In normal condition, Pressure value above alarm set point low, ALL LED will remain in OFF state.
ALH (Alarm High)	ALH LED, display and unit LED will blink, if the pressure reading goes above alarm set point high value. In normal condition, Pressure value below alarm set point low, ALH LED will remain in OFF state.
Unit LEDs(8 LEDs)	This LEDs shows unit status. You can identify the selected unit by this indication LED. E.g.: The default unit is pascal, when you power the device, pa LED is ON, it will change according the selection of unit.

7.4 SEVEN SEGMENT LED DISPLAY

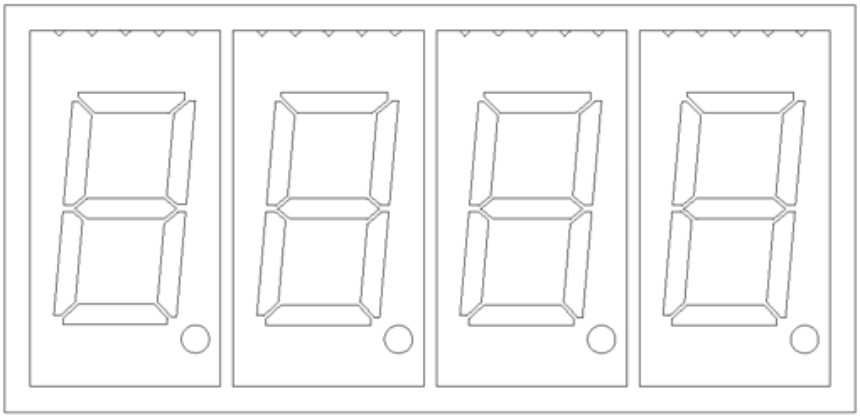


Figure 9 Seven segment LED display

- The seven segment LED display has 4 digits displaying capability which is shown in figure 9.
- It can display the integer values in the range of -1999 to 9999.
- The LED display has the precision of 3 digits after decimal point.
- Note that, the display range of pressure value are set by menu using proper pressure unit
- For example, if the selected pressure unit is pascal then the display range will be -500 TO 500. If pressure value goes out of this pressure range in positive side, then display will show OVER Range (OVER).
- If pressure value goes out of this pressure range in negative side, then display will show UNDER Range (UNDR).

6 CONFIGURATION

Usage of Keys:

- To enter in the function menu for modification or to come out from the function menu/submenu.
- Up Key is used to increment the parameter value. It is also used to go to the next parameter/sub-menu.
- Down Key is used to decrement the parameter value. It is also used to go back to the last parameter/sub-menu.
- To store the parameter value and use to enter in the function for modification.

6.1 CONFIGURABLE ITEM

Table 6 Configurable item

Channel Configuration Parameter	
Alarm on delay	Delay time, after which the buzzer will be activated
Alarm off delay	Delay time, after which the buzzer will be activated
Set point High	The upper limit of value, after which buzzer and ALH LED will be blink.
Set point Low	The lower limit of value, after which buzzer and ALL LED will be blink.
Unit	There are 8 pressure units available in this device.
Offset	A small correction may be required when actual sensor is connected to the Pressure device. This is a mathematical value which is directly added to the reading.
Multiplier	A value to remove any scale error. This is a mathematical value which is directly multiplied to the reading. Displayed reading = (reading x multiplier) + offset

6.2 MAIN MENU SEQUENCE

- Device can be Configured using front panel Keyboard, by entering the function key. User can enter the configuration as per their requirement. Figure 10 shows the main menu sequence.

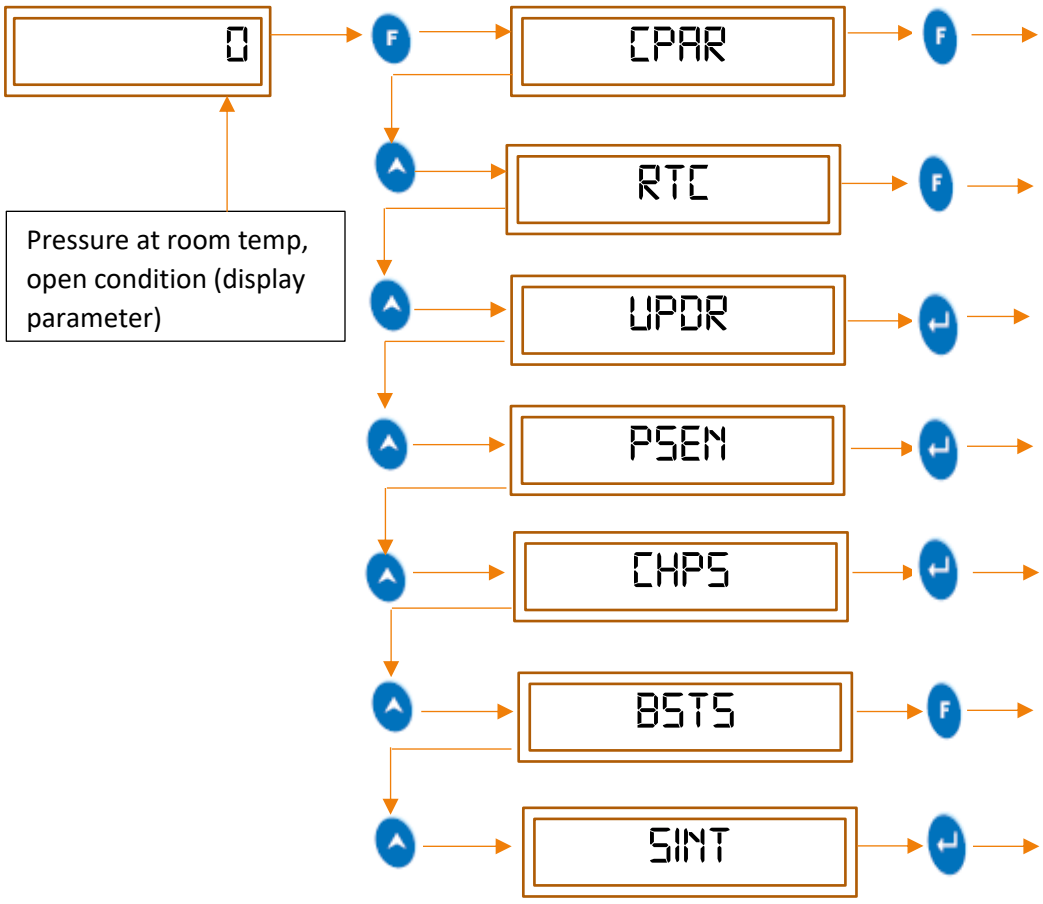


Figure 10 Main menu sequence

6.3 CPAR (CONFIGURABLE PARAMETERS)

- To set parameters, follow the procedure shown in figure 11, by pressing appropriate key of device user can configure the parameters. The parameters are discussed subsequently in detail.

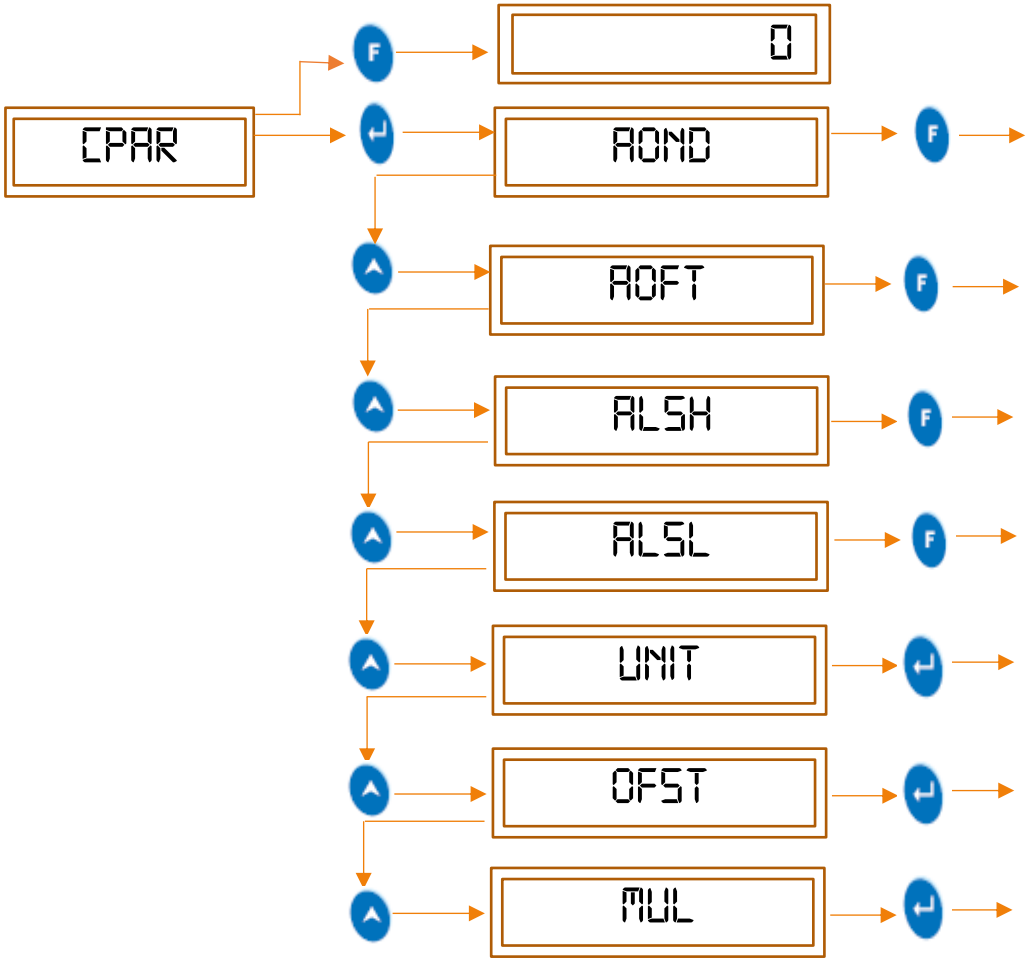


Figure 11 Configurable parameters

Note: -
- To go to the next parameter.
- To go back to the last parameter
- To come out from functions/ sub menu

6.3.1 AOND (Alarm on delay)

- Alarm On time is user settable parameter, which will allow the sensors to settle in terms of output readings. For example, if output is expected to be stable in 10 minutes than device will generate continuous alarm condition after this time.
- The buzzer will remain into active state till the pressure value come down in limit (within setpoint high and low value).
- After the alarm ON time delay, if pressure reading is still out of range, then the alarm will be activated. If pressure reading comes down within limit, after alarm time delay, the alarm will be deactivated.
- To set the Alarm on time delay, follow the procedure shown in figure 12, by pressing the appropriate buttons given on the front panel of the Device.

Figure 12 AOND (Alarm on delay)

6.3.2 AOFT (Alarm off delay)

- The alarm will be acknowledged by pressing **UP** key and **ENTER** key at the same time. The buzzer will be deactivated for specific Alarm OFF time delay.
- Alarm Off time is user settable parameter, which will temporary off buzzer, as input by user. The buzzer will remain into active state till the pressure value come down in limit (within setpoint high and low value).
- After the alarm OFF time delay, if pressure reading is still out of range, then the alarm will be activated. If pressure reading comes down within limit, after alarm time delay, the alarm will be deactivated.
- To set the Alarm off time, follow the procedure shown in figure 13, by pressing the appropriate buttons given in the front panel of the Device.

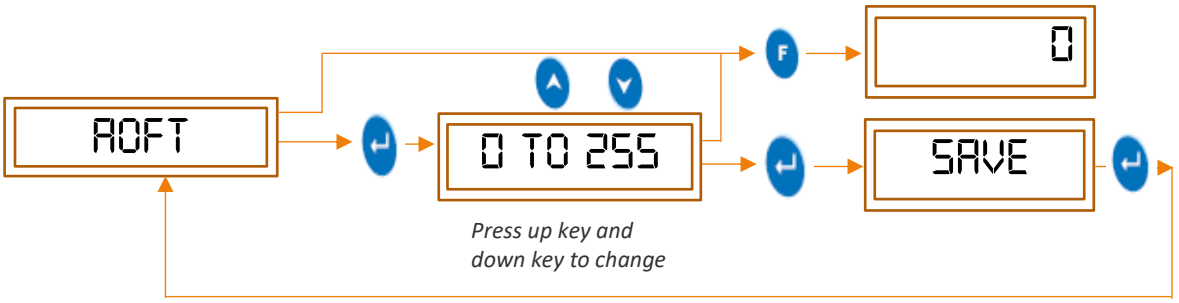


Figure 13 AOFT (Alarm off delay)

6.3.3 ALSH (Alarm set point high)

- In this parameter, we should set the value to alert us whenever device reading goes higher than the set value. The device will generate alarm if the reading goes out range and that value should be set from -500 to 500 pascal.
- To set the Alarm set point high, follow the procedure shown in figure 14, by pressing the appropriate buttons given in the front panel of the Device.

Figure 14 ALSH (Alarm set point high)

6.3.4 ALSL (Alarm set point low)

- In this parameter, we should set the value to alert us whenever device reading goes lower than the set value. The device will generate the alarm if the reading goes out range and that value should be set from -500 to 500 pascal .
- To set the Alarm set point high, follow the procedure shown in figure 15, by pressing the appropriate buttons given in the front panel of the Device.

Figure 15 ALSL (Alarm set point low)

NOTE: The default pressure unit is pascal, if user changes the unit then **ALSH (Alarm set point high), ALSL (Alarm set point high), OFST (Offset)** will also be changed as per the selected unit.

6.3.5 UNIT

- In this parameter, we should set the unit for the pressure input, by pressing appropriate key from the menu.
- The procedure for selecting the unit is shown in figure 16.

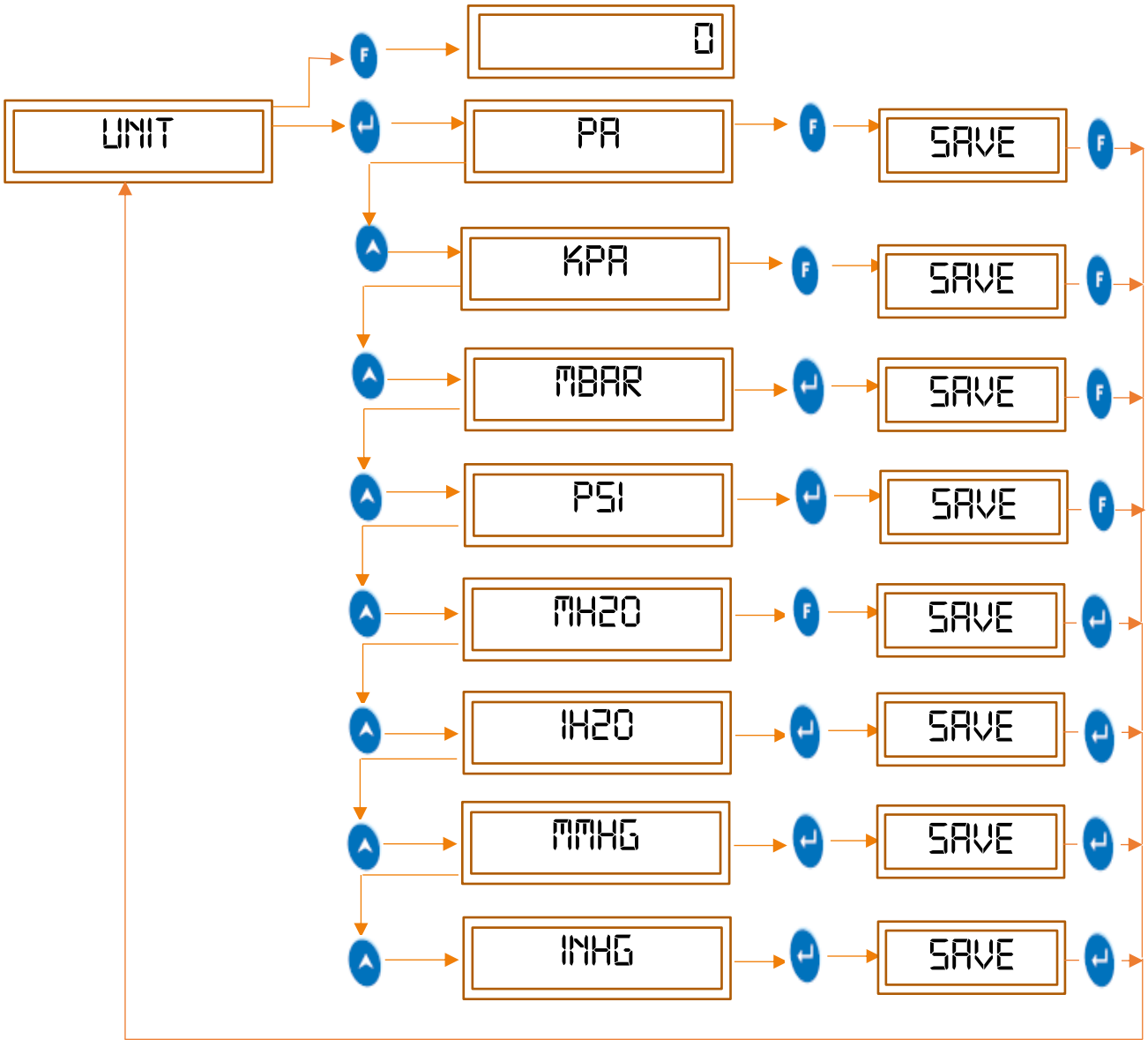


Figure 16 Unit Sequence

6.3.6 OFST (offset)

- Offset is the amount of deviation that occurs in the output due to calibration errors of the sensor.
- Thus, if there is a deviation in the output compared to the expected output, offset value should be set appropriately to null the effect of deviation.
- To set the offset, follow the procedure shown in figure 17.

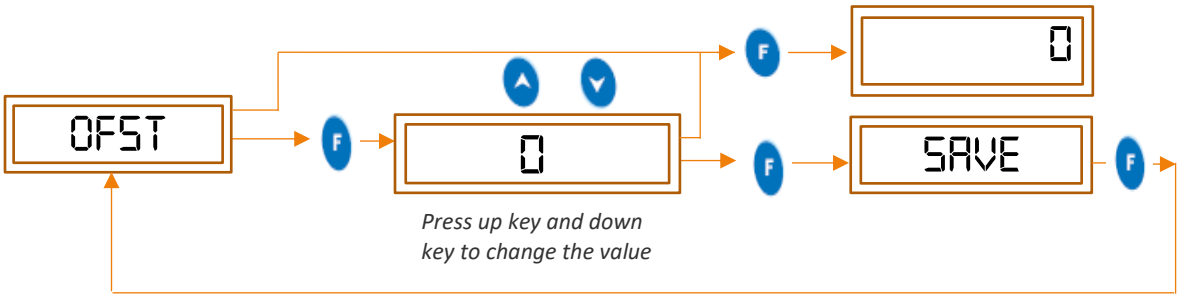


Figure 17 OFST (Offset)

6.3.7 MUL (Multiplier)

- Multiplier is a function given for the user flexibility. If the user wants to observe the output in the range other than the actual output range, multiplier value should be set.
- To set the Multiplier, follow the procedure shown in figure 18.

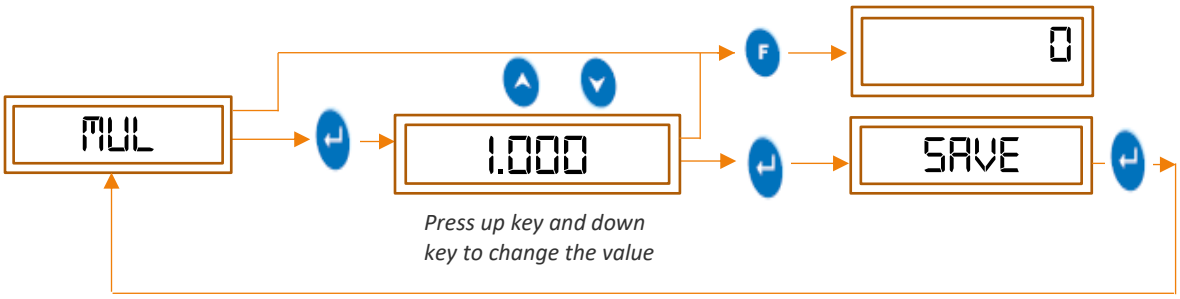


Figure 18 MUL (Multiplier)

6.4 RTC (REAL TIME CLOCK)

- RTC enables us to use a real-timeclock and calendar in Device. It is a feature that keeps track of the current time even when the device is turned off. The real-time clock is driven by a special battery that is not connected to the normal power supply. It serves needs of real time data for Device.
- By using “RTC” parameter menu, user can set Date, Month, Year, Hour, Minute, second for Device by following the below mentioned steps.
- To set the RTC, follow the procedure presented in figure 19.

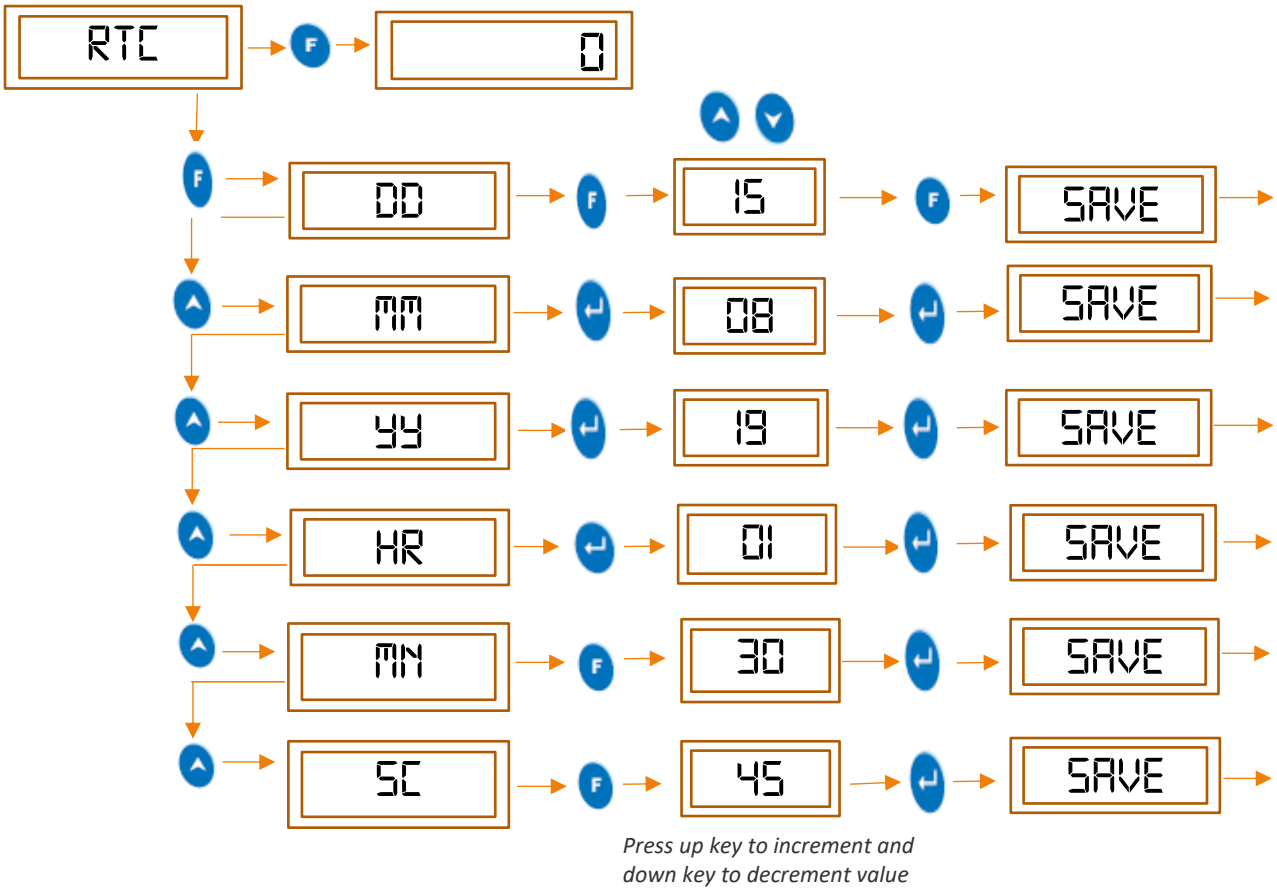


Figure 19 RTC (Real time clock)

6.5 UPDR (UPDATE DISPLAY REFRESH RATE)

- Normally display refresh rate is 1 reading / second. In case the user wants to increase the display refresh rate, "UPDR" option is provided.
- To set the refresh rate follow the procedure shown in figure 20.

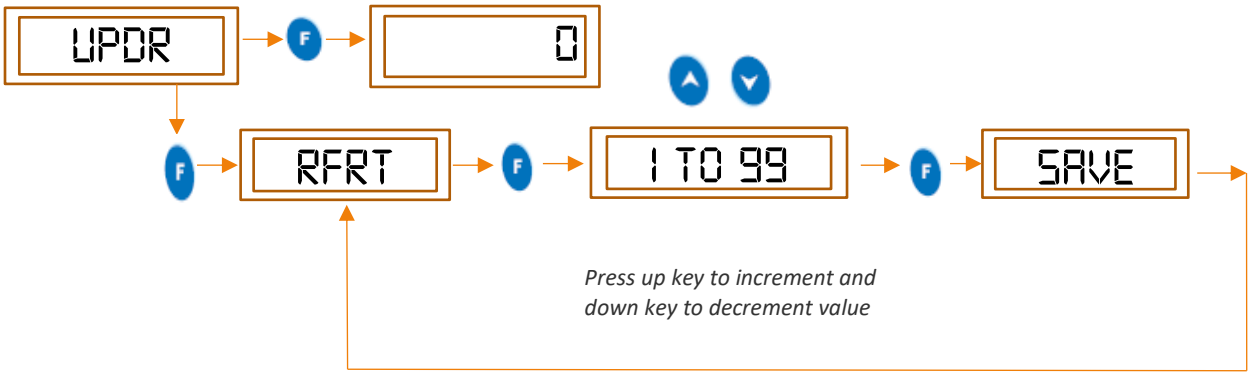


Figure 20 UPDR (Update Display Refresh Rate)

6.6 PSEN (PASSWORD ENABLE)

- For accessing the main menu if the user wants to enable the password authentication, it can be done using the procedure shown in figure 21.
- If user selects "YES" option, then password authentication will be enabled for main menu.
- Main menu will be accessed only after entering the correct password.
- If user selects "NO" option, then password authentication will be disabled for main menu.

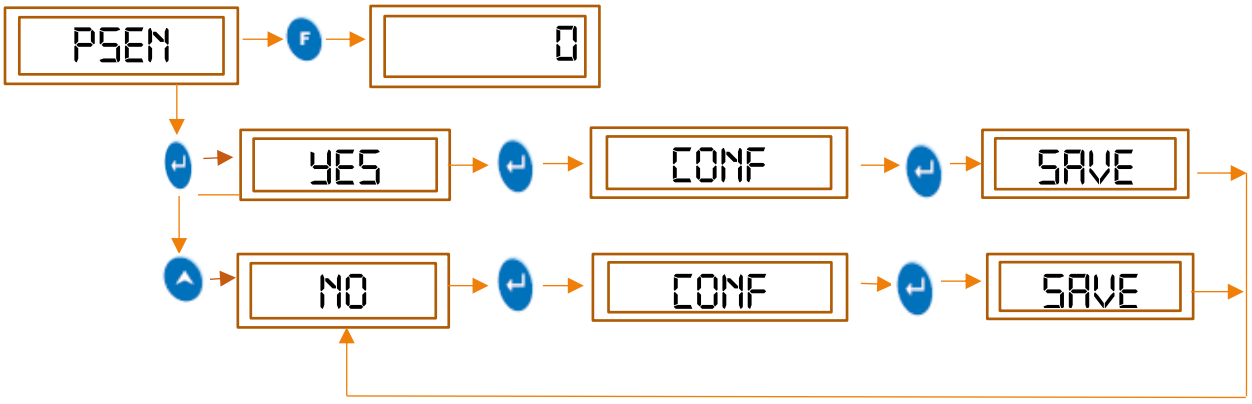


Figure 21 PSEN (Password Enable)

6.7 CHPS (CHANGE PASSWORD)

- User can set password to enter in main menu from using change password feature.
- If PSEN Option is enabled by user, then user can change password by following the steps displayed in figure 22.
- User can set the 3-digit password using this function.
- Note that, if PSEN Option is disabled by user, then this function is not used.

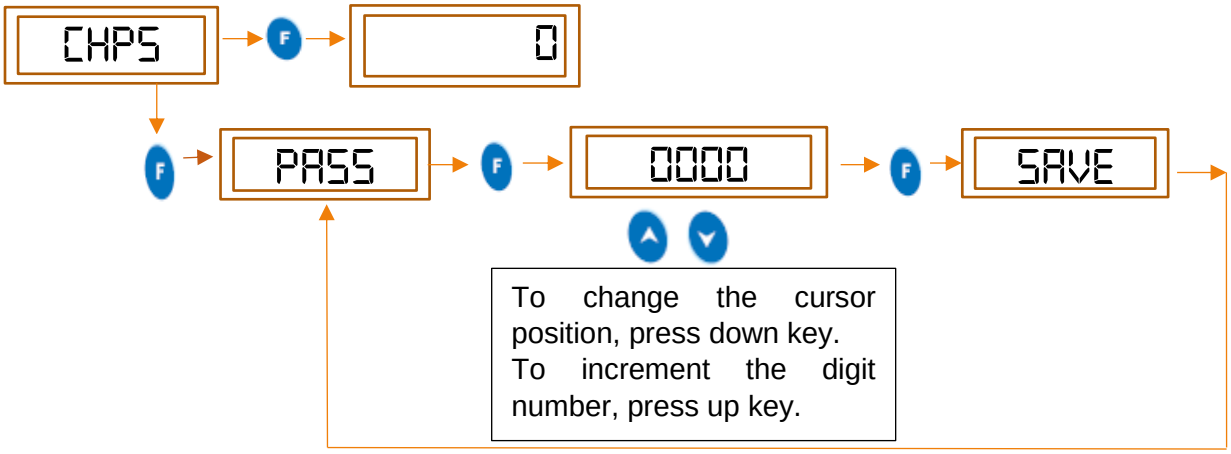


Figure 22 CHPS (Change Password)

6.8 **BSTS (BATCH START/STOP)

- Every time new batch is started, device memory will be cleared first (The clear string will blink for few seconds), then the new data is stored in memory. To start the batch, follow the procedure shown below by pressing the appropriate buttons given on the front panel of the Device.
- To set the Batch start/stop, follow the procedure shown in figure 23 and 24.

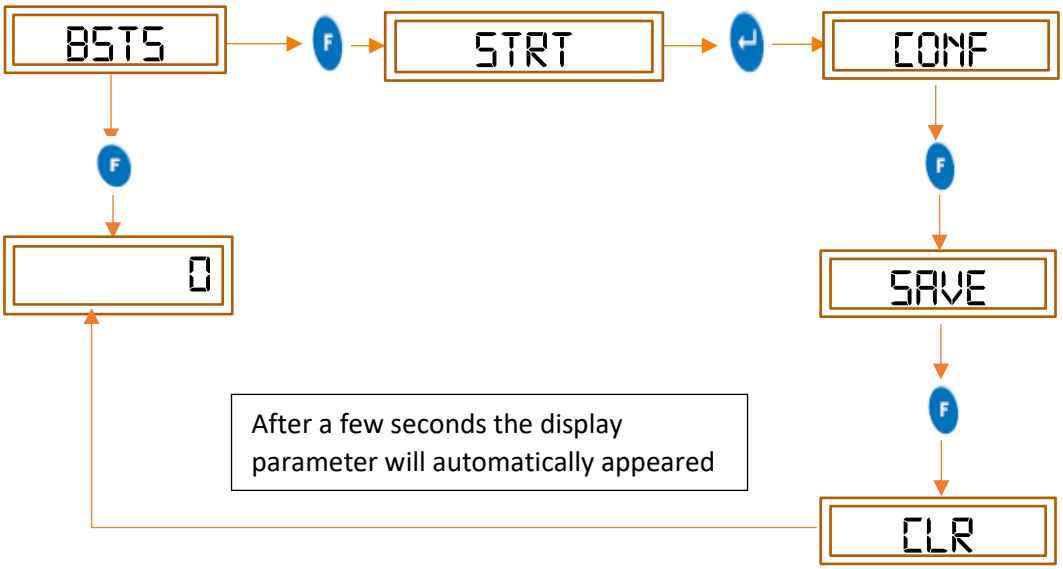


Figure 23 BSTS (Batch start)

**BSTS (BATCH STOP)

- To stop the batch, follow the procedure shown below by pressing the appropriate buttons given on the front panel of the Device.

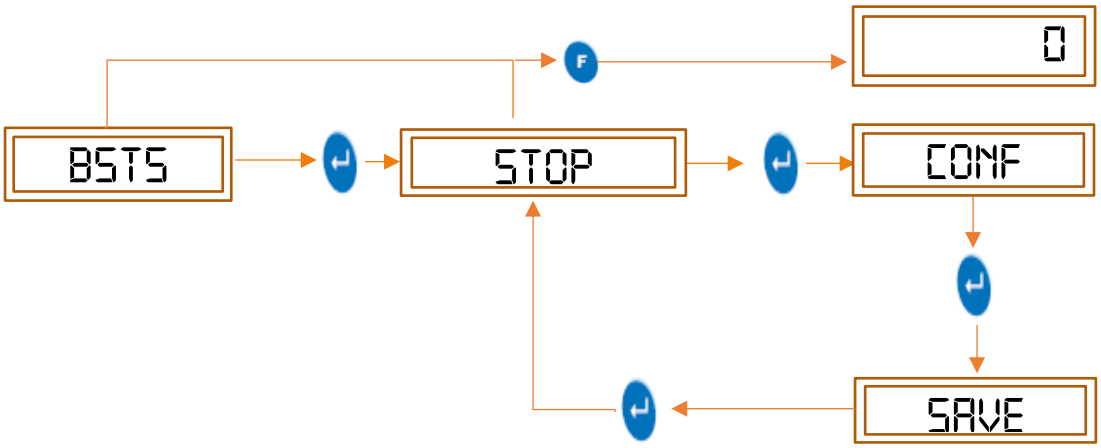


Figure 24 BSTS (Batch stop)

Note: RTC, Store interval and communication parameters will not be changed, in the running condition of the batch.

6.9 **SINT (STORE INTERVAL)

- Store interval is used to set a fixed time interval after which the current data from sensor is stored to the memory of Device while batch is running.
- Store interval can be set in seconds and minutes combination by following the below mentioned procedure by pressing the appropriate buttons given on the front panel of the Device.
- To set the Store interval, follow the procedure shown in figure 25.

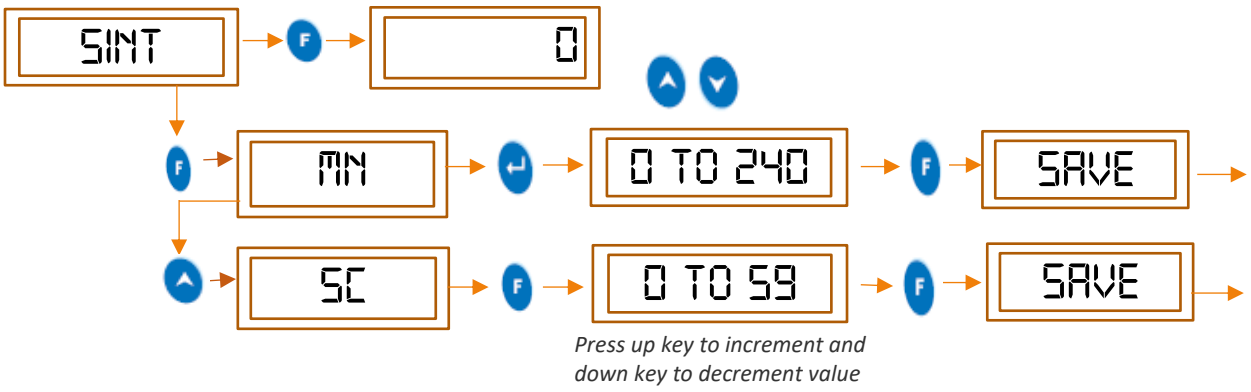


Figure 25 SINT (Store interval)

7 COMMUNICATION

Password Authentication

- To enter to the communication menu, password is required, the device will allow the access of menu only after password authentication. Basically, device will ask for 4-digit password. If password is wrong, then the display will come out from password string and show pressure reading parameter.
- Each time to access menu, password authentication is necessary.
- For example, if password is “0040” then follow the procedure shown below to enter password.

For password: Press UP and DOWN key at a time to enter in the password-string, follow the below procedure for communication as shown in figure 26.

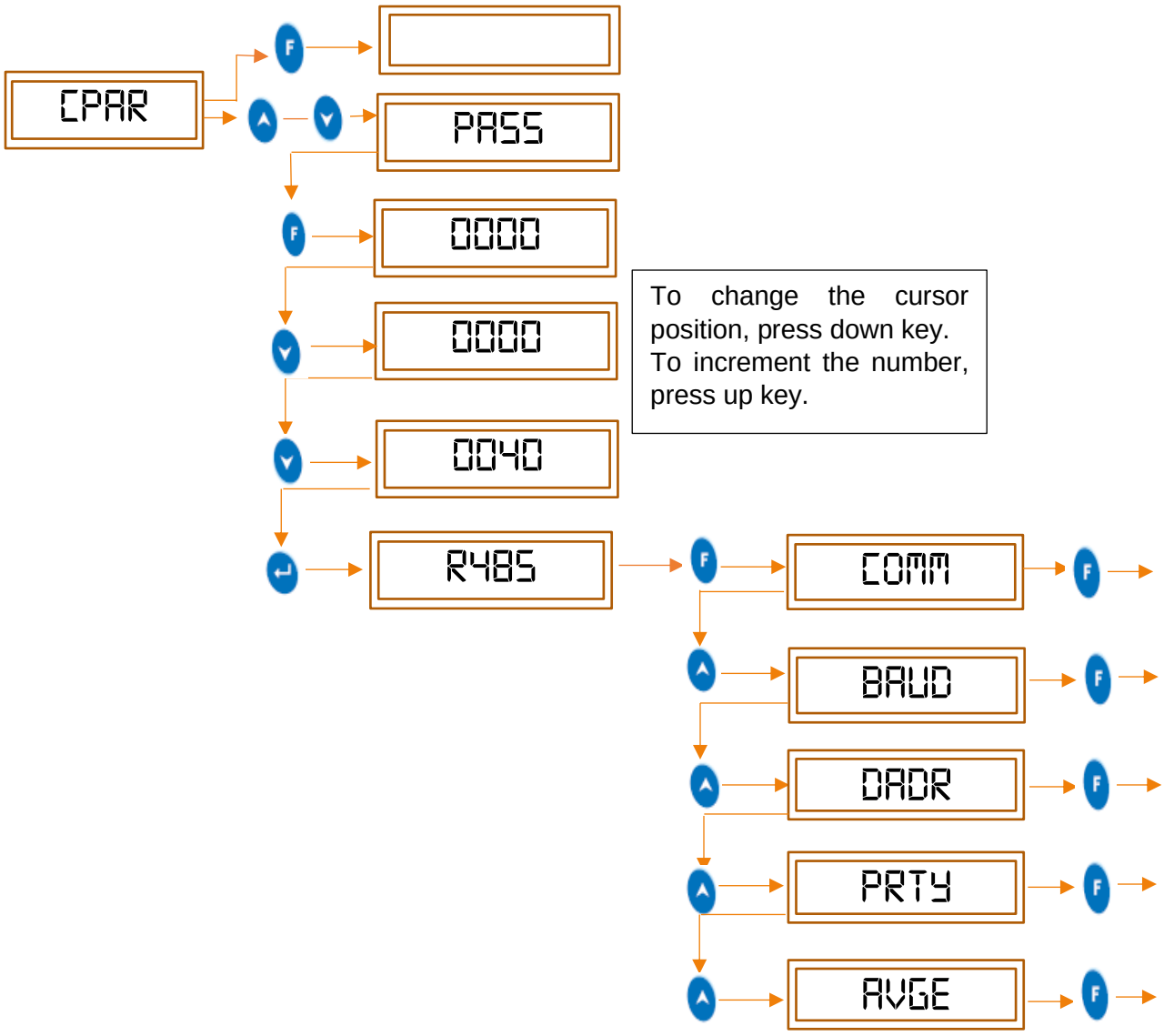


Figure 26 Communication (Password authentication)

7.1COMM (COMMUNICATION TYPE)

- In modbus serial communication , there are two modes - RTU and ASCII. The two modes are incompatible so a device configured for ASCII mode cannot communicate with one using RTU.
- Modbus ASCII messages require twice as many bytes to transmit the same content as a Modbus RTU message.
- To set the communication type select the options as shown in figure 27.

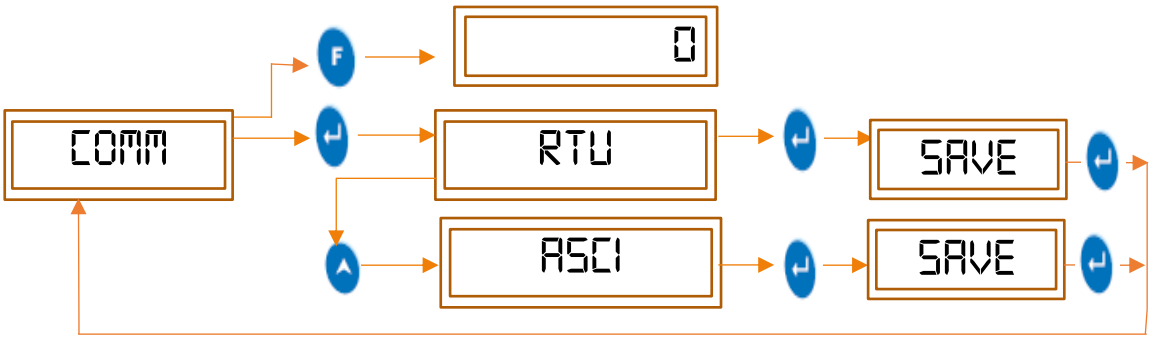


Figure 27 COMM (Communication Type)

7.2 BAUD (BAUD RATE)

- The baud rate is the rate at which information is transferred in a communication channel. In the serial port context, "9600 baud" means that the serial port can transfer a maximum of 9600 bits per second.
- The settable baud rates are: 4.8k, 9.6k, 19.2k, 38.4k bps. To set device baud rate follow the steps given in figure 28.

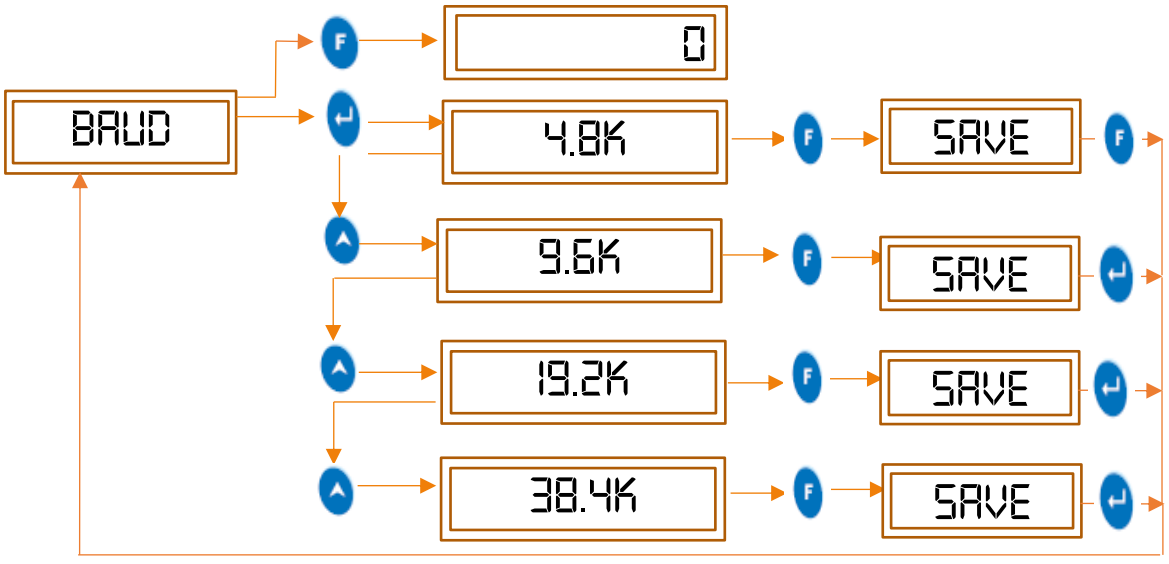


Figure 28 BAUD (Baud rate)

7.3 DADR (DEVICE ADDRESS)

- Address range of the devices that can be connected for MODBUS RS485 communication is from 1-247.
- To set device address follow the steps given below by pressing the appropriate buttons given on the front panel of the Device.
- To set the Device address, follow the procedure shown in figure 29.

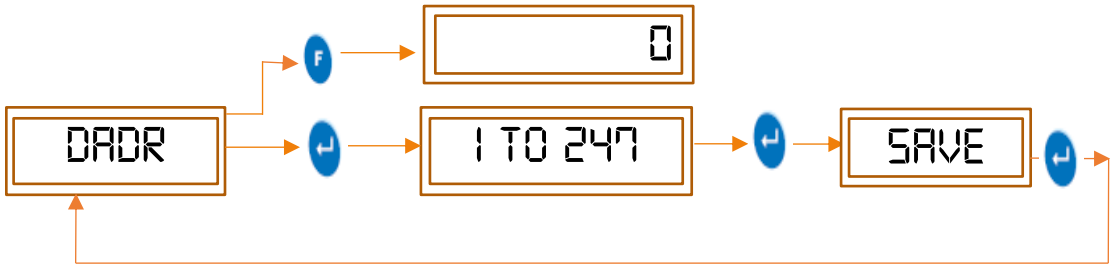


Figure 29 DADR (Device address)

7.4 PRTY (PARITY)

- A parity check is the process that ensures accurate data transmission between devices during communication.
- If there are same parity bits in the communication devices, then the devices will communicate with each other.
- E.g. If the pressure device has parity bit odd, then it can only communicate with the device having odd parity bit, otherwise there is no communication between them.
- Similarly, If the pressure device has parity bit even, then it can only communicate with the device having even parity bit.
- If the pressure device has parity bit none, then it can communicate with the device having any parity bit (none, even and odd).
- To set the Parity, follow the procedure shown in figure 30.

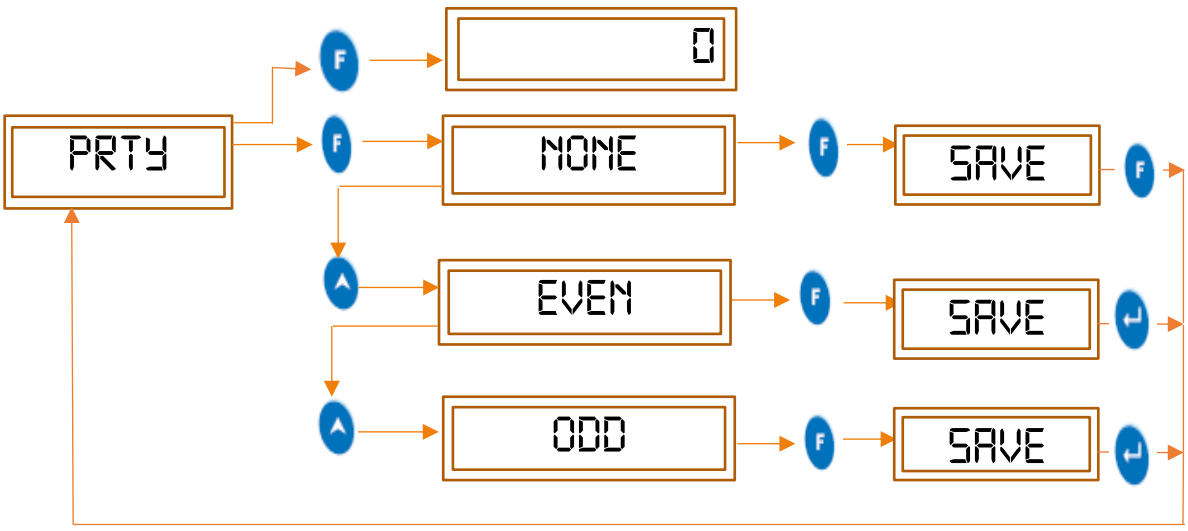


Figure 30 PRTY (Parity)

7.5 AVGE (AVERAGE ENABLE)

- When the pressure input is fluctuating very much, the display reading will not be stable. To get the more stable reading, averaging of pressure input data is required.
- Averaging of pressure input data can be enabled/disabled by selecting YES/NO option in Average Enable menu as shown in figure 31.

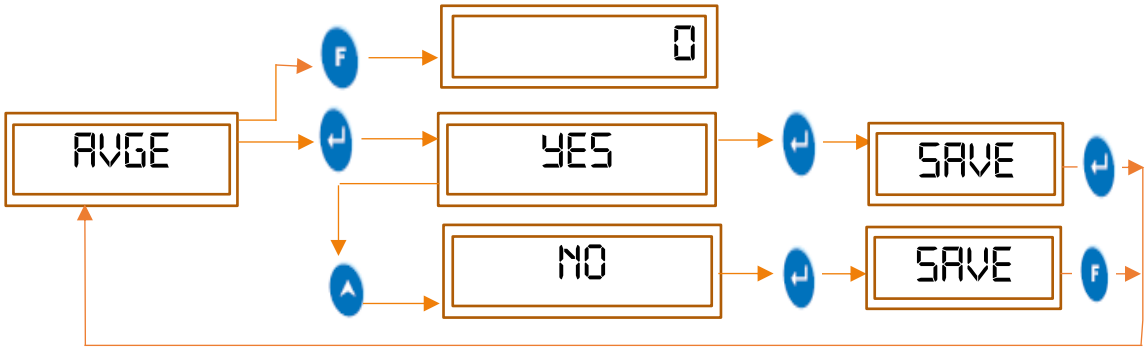


Figure 31 AVGE (Average Enable)

8 MODBUS RTU COMMUNICATION

8.1 MODBUS RTU PROTOCOL

The Modbus RTU protocol uses a Master/Slave technique to communicate between devices. Any application that utilizes the Modbus RTU protocol will have a Modbus Master and at least one Modbus Slave. A Modbus Master is typically a host supervisory computer running software that will communicate with one or more Modbus Slave devices.

The security of standard MODBUS Serial Line is based on two kinds of error checking:

- **Parity checking** (even or odd) should be applied to each character.
- **Frame checking** (LRC or CRC) must be applied to the entire message.

Both the character checking and message frame checking are generated in the device (master or slave) that emits and applied to the message contents before transmission. The device (slave or master) checks each character and the entire message frame during receipt.

When devices communicate on a MODBUS serial line using the RTU (Remote Terminal Unit) mode, each 8–bit byte in a message contains two 4–bit hexadecimal characters. The main advantage of this mode is that its greater character density allows better data throughput than ASCII mode for the same baud rate. Each message must be transmitted in a continuous stream of characters.

8.2 MODBUS RTU MESSAGE FRAMING

A MODBUS message is placed by the transmitting device into a frame that has a known beginning device that receive a new frame to begin at the start of the message, and to know when the message is completed. Partial messages must be detected, and errors must be set as a result. In RTU mode, message frames are separated by a silent interval of at least 3.5-character times.

Start	Address	Function	Data	CRC Check	End
≥ 3.5 character	8 bits	8 bits	N x 8 bits	16 bits	≥ 3.5 character

The entire message frame must be transmitted as a continuous stream of characters.

8.3 MODBUS ASCII MESSAGE FRAMING

In ASCII mode, a message is delimited by specific characters as start of frames and end of frames. A message must start with a **'colon' (:)** character (ASCII 3A hex) and it ends with a **'carriage return – line feed' (CRLF)** pair (ASCII 0D and 0A hex).

A typical message frame is shown below:

Start	Address	Function	Data	LRC	End
1 char :	2 chars	2 chars	0 up to 2x252 char(s)	2 chars	2 chars CR,LF

Each data byte needs two characters for encoding. The data size for ASCII data field is double the maximum data size for RTU data field.

8.4 MODBUS FUNCTION CODES

The Modbus registers are organized contiguously in memory map to which we can read and write using following Modbus functions:

Function code (hex)	Description
0x03 Read Holding Registers	Read content of read only and read/write locations <Register Address High> <Register Address Low>
0x10Write/Preset Multiple Registers	Set the content of read/write locations <Register Address High> <Register Address Low>

When the slave device responds to master, it uses the function code to indicate either a normal response or exception response. A normal response echoes the original function code of the query, whereas an exception response returns an error code with its most significant bit set to logic 1. The error code is followed by an exception code, which will be generated when device receives Modbus query with some error. The exception codes are listed below:

Exception code	Description
0x01 - Illegal Function	The function code received in the query is not allowed or invalid.
0x02- Illegal Data Address	The data address received in the query is not an allowable address for the slave device or is invalid.
0x03 - Illegal Data	A value contained in the query data field is not allowed value for the device or is invalid.

8.5 Read Current Pressure Data in RTU mode

To read the current pressure data from the LM P RS485 data logger, the function code is 0x03(hex). The register address for accessing the current pressure data is 0x0050 (hex) and number of registers required is 0x0002(hex).

The Query request format for reading current pressure data is as below:

Field Name	Value (hex)	Description
Device Address	0x60	Value between 0x01 to 0xF7 (1 t o247)
Function code	0x03	Read holding registers
Start address High	0x00	Most significant byte of start address
Start address Low	0x50	Least significant byte of start address
Number of Registers High	0x00	Most significant byte of Number of registers
Number of Registers Low	0x02	Most significant byte of Number of registers
Error Check	0xCC6B	2 Byte CRC

The normal Query response format for the read current pressure data request is as below:

Field Name	Value (hex)	Description
Device Address	0x60	Value between 0x01 to 0xF7 (1 t o247)
Function code	0x03	Read holding registers
Byte Count	0x04	Number of bytes
Data Register High	0x3D	Most significant byte of data requested
Data Register Low	0x1C	Least significant byte of data requested
Data Register High	0x40	Most significant byte of data requested
Data Register Low	0x00	Least significant byte of data requested
Error Check	0x 775F	2 Byte CRC

Colored bytes in the response shows the pressure current data as float value (4 bytes).

Here, 0x3D1C4000 (hex) = 0.038 (decimal), this shows the current pressure in pascal at with zero pressure input to the sensor.

The current pressure data query request and response is shown in table below.

Table 7 MEI Current pressure data query

Read data	Device Id (hex)	Function code (hex)	Address (hex)	No. of Registers		Query Request	Query Response
				High (hex)	Low (hex)		
Current Pressure Data	60	03	00B0	00	01	60030050000 2CC6B	600304 3D1C4000 775F

Colored byte in response is the value of the registers requested.

8.6 READ DEVICE INFORMATION IN RTU MODE

The function code reading the identification and additional information relative to physical and functional description of the device is 0x2B/0x0E(hex). The read device identification interface is modeled as an address space composed of a set of addressable data elements. The data elements are named as objects and an object Id identifies them.
The interface consists of 3 categories of objects:

- Basic Device Information: All objects of this category are mandatory – Vendor Name, Product code and revision number.
- Regular Device Information: In addition to basic data objects, the device provides optional identification and description of data objects. All the objects of this category are defined in the standard, but their implementation is optional.
- Extended Device Information: In addition to regular data objects, the device provides additional identification and description private data about physical device itself. All these data are device dependent.

The standard and extended device information of LM P RS485 data logger can be read by query request using Modbus function code 0x2B/ 0x0E (hex), which is shown in following example.
Query request format for Read Extended MEI:

Field Name	value (hex)	Description
Device address	0x60	Value between 0x01 to 0xF7 (1 t o247)
Function code	0x2B	Read Device Identification
MEI Type	0x0E	MEI type
Read Device ID code	0x03	MEI Standard Interface
Object ID	0x80	Object ID
Error Check	0xCD7F	2 byte CRC

The Normal response format for Read Extended MEI query is as below:

Field Name	value (hex)	Description
Device address	0x60	Value between 0x01 to 0xF7 (1 t o247)
Function code	0x2B	Read Device Identification
MEI Type	0x0E	MEI type
Read Device ID code	0x03	MEI Standard Interface
Conformity level	0x03	Conformity level
More Follows	0x00	More Follows
Next Object Id	0x80	Next Object Id
Number of objects	0x01	Number of objects
Object ID1	0x80	Object Id1 number
Object length	0x08	Length of the object
Object value	3031313930303031	Serial number “01190001”
Error Check	0xC2E6	2-byte CRC

The query response of read device information for both MEI Type - MEI standard and MEI Extended are shown in table below.

Table 8 MEI Query response

MEI type	Device Id (hex)	Function code (hex)	MEI Type (hex)	Read Device ID (hex)	Object ID (hex)	Query Request	Query Response
MEI Standard	60	2B	0E	01	00	602B0E0100 CDBF	602B0E0101000003001 1472D54656B20436F72 706F726174696F6E0107 363331322D323002065 630312E30307B2A2746 4B3DEF0D
MEI Extended	60	2B	0E	03	80	602B0E0380 CD7F	602B0E0303008001800 83031313930303031C2 E6

Colored byte in response is the value of the registers requested.

9 TROUBLESHOOTING GUIDE

Table 9 Troubleshooting guide

PROBLEM	CORRECTIVE ACTION
How to get the status of the batch (running or not)?	• Note the STR LED status on display. The STR LED will be blinking at every 1 second interval. • The user can also see the status from menu for batch operation, it will show stop option.
How Alarm condition is shown on display?	• ALL (Alarm Low) or ALH (Alarm High) LED will be ON according to alarm high/low condition.
If LED display is Blank, then what should be done?	• Check if power supply adapter is properly connected to the device. • Also check if adapter is faulty or not. • Check power supply polarity is proper or not.
Why Display shows "UNDR" / "OVER"?	• If the pressure input goes out of range of then display shows "UNDR" / "OVER" on display.
How to acknowledge Buzzer?	• Buzzer is acknowledged by pressing UP and ENTER keys simultaneously. Buzzer will be silent for Alarm OFF time delay (AOFT).
How to give Zero Offset or how to remove offset value at zero condition?	• At zero condition (open condition), if any value shows on display, user can remove this offset value by pressing a FUNCTION ,DOWN and ENTER keys at the same time.
How to change the unit of the pressure input?	• Follow the steps given in section 6.3.5. After selecting the required unit , its corresponding unit LED will be ON and pressure reading on display will be in that unit.
How to change the baud rate and parity of the device?	• For changing the baud rate and parity, the user needs to enter in communication menu using password(refer section 7). Note that , if the batch is in running condition then the baud rate and parity cannot be changed.
What is the procedure , if user forgets password?	• No, there is no such procedure to reset password, in this situation contact factory immediately.
Why the RTC is not updated?	• If RTC battery is drained and power is off for some time period, then it can be possible that RTC might not work. • Check the RTC battery voltage.
What to do if device does not communicate with remote software?	• Check the baud rate ,parity and device address of the device is selected properly. • Check the RS485 connection(twisted pair polarity) and cable continuity .

Note: if you face any other problem, please contact G-Tek Corporation Pvt. Ltd.

10 ORDER CODE

Table 10 shows the Order code for the data logger:

Table 10 Order code

Data Logger		Sensor Type		Pressure Range		Communication Type		-	Software Type		Memory Type	
6	6X Pro	0	Universal Input	0	No Pressure	0	None		2	None	0	No Memory
		1	Temperature	1	± 5mbar	1	RS-232		4	Gtek net Non-Secure	1	Memory
		2	Humidity	2	± 10mbar	2	RS-485		5	Gtek net Secure		
		3	Pressure - R	3	± 20mbar	3	USB		6	LM View Non-Secure		
		4	Pressure - S	4	± 40mbar	4	TCP/IP		7	LM view Secure		
		5		5	± 100mbar	5	RF					
		6		6		6						
		7		7		7						
		8		8		8						
		9		9	Other	9						

Pressure – R (Round plate)
Pressure – S (Square plate)