Ambetronics Engineers Private Ltd

User Manual
Portable Gas Detector

Model No: PG-100

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1. SAFETY INFORMATION

Before operating the instrument, ensure that this user manual is read. Pay attention to the warnings and cautions. All warnings are listed here and repeated at appropriate place of relevant subjects of user manual.

CONDITION OF SAFE USE

- Single channel Portable Gas Detector (PG-100) is for use in an ambient temperature range of -10°C ≤ Ta ≤ +55°C.
- Users must follow the warnings and cautions as mentioned in the next section before use.

2. WARNINGS / CAUTIONS

- Do not open when an explosive atmosphere is present
- Use USB port in safe area only
- Battery must be replaced by the manufacturer only
- Substitution of components may impair intrinsic safety
- Accessing the internal of the detector to replace the battery and sensor must be done by the manufacturer only. Self-replacement may be harmful and cause potential issues.
- At the end of the working life the old sensor must be replaced with a new one. The old sensor must be sent back to Ambetronics or must be safely disposed.
- This manual is intended for use with pg-100 only. Store the detector in cool and dry place.

3. INTRODUCTION

3.1 OVERVIEW

The single channel portable gas detector (PG-100) is a battery operated, microcontroller-based gas detector that continuously monitors the Toxic/ Combustible/ Oxygen/VOC /NDIR gas concentration in % V/V, % LEL, PPM, PPB, mg/m^3, µg/m^3 depending upon the gas selected.

PG-100 is suitable for handheld application to measure the Gas Concentration in hazardous atmospheres – zone 1 and zone 2 including Gas groups – IIA, IIB and IIC. It can be placed in a particular area using the Data logging feature of PG-100 to log readings which can be accessed later. Also, PG-100 can be used in user-accessible areas and continuously alert the user through the buzzer within its audible range when a certain Alarm set limit exceeds and indicate the same with the help of visual LEDs, user settable Alarm colours & vibrator alert Alarm.

A USB port is provided for charging battery and for Data communication but the port is only to be used in safe area. Warning for the same is provided on the marking label.

Note: PORTABLE GAS DETECTOR (PG-100) COMPLIES WITH IS/IEC 60079-0:2011, IS/IEC 60079-11:2006 & IP – 20 as per IS/IEC 60529:2001.

3.2 FEATURES

- The Plug-in Sensor provides a full year of warranted protection against hazardous gases
- The Portable Detector detects smallest gas leak on service line and joints
- Diffusion type is available with Extended Flexible sensor (Gooseneck) with Length maximum 1 feet.
- Easy handling and programming with 3 keys and one key for power ON/OFF
- Easy software calibration by using front keys
- Digital display of Gas Concentration in PPM, %V/V, %LEL, PPB, mg/m & $\mu g/m^3$ on LCD with backlit
- User settable Alarm 1 and Alarm 2 LCD display alert with 5 colours Red / Blue / Yellow / Cyan / Violet
- Password protected function menu
- LOW, HIGH, TWA & STEL configurable Alarms with Buzzer, vibrator alerts & LED indications.
- Ambient calibration Facility
- "Calibration due" indication and alert
- "Sensor Open/Over" Range Indication.
- High Range Lock Facility
- Optional Data logging & downloading facility. Downloaded data available in ASCII format (Max: 50,000 records)
- Battery status indication on the LCD with battery charging LED indication & LOW BAT indication with Buzzer Beep sound
- Unit conversion user setting
- Power supply with rechargeable battery
- Small, compact and light-weight
- Pump blockage detection facility in suction type

3.3 CERTIFICATE & APPROVALS INTRINSICALLY SAFE

CIMFR TR NO.: IN/CIMFR/TR21/R/1341 **DATE:** 06/08/2021

BIS MARK LICENCE NO: 7800047118

PESO CERT. NO: P543659/1 DATE**:** 11/08/2022

Ex ia IIC T6 Ga: Suitable for Hazardous Gas
Atmospheres Zone 1 and Zone 2,
Including Gas Groups IIA, IIB & IIC
IS/IEC 60079-0: 2011
IS/IEC 60079-11: 2006
IS/IEC 60529: 2001 (IP-20)

3.4 APPLICATIONS

- Emergency response to gas leak
- Incoming Cylinder inspection
- Equipment maintenance
- Pre entry check quality control process
- Waste water treatment plants
- Pulp & Paper Industry
- Steel mills
- Ambient monitoring
- Personal Monitoring
- Refineries & Petrochemical plant including offshore drilling and plant shutdowns

3.5 TECHNICAL SPECIFICATIONS

Table 1

GENERAL		
Sensors	:	Electrochemical / Catalytic / Pellistor / NDIR / VOC / PID
Range/Resolution	:	As specified in the table
Detection Method	:	Diffusion / Suction, Note: *Diffusion type is available with Extended flexible sensor (Gooseneck) with Length maximum 1 feet.
Response Time	:	Less than 10 Sec
Parameter Setting	:	Setting by 3 keys i.e. (SET, SHIFT, INCR)
Alarm Set Point	:	Two independent set points, AL1 & AL2 with LED indication
Alarm Violations & Settable display		• User settable Alarm1 and Alarm2 display alert with 5 color Red / Blue / Yellow / Cyan / Violet • Indicated by Integrated Vibrator & Buzzer (85dB Audible from 1 feet)
Display	:	2-line LCD with backlight. Normal mode White/ Green in colour

ACCURACY			
Sr. No	**SENSOR TECHNOLOGY**		**CALIBRATION ACCURACY**
1	Electrochemical		± 2 % FS
2	Catalytic / Pellistor		± 2 % FS
3	NDIR - CH_4		± 0.2 % V/V OR ±10% of applied gas whichever is max
4	NDIR-CO_2		±10% of applied gas
5	PID Range	O TO 4000 PPM	±10% of applied gas
		0 TO 1000 PPM	±5% of applied gas
		0 TO 40 PPM	±3% of applied gas

ENVIRONMENTAL		
Operating Temp.	:	-10°C To +55°C
Storage Temp.	:	-10°C To +60°C
Humidity	:	Below 95% RH, Non condensing

ELECTRICAL : 3.7V LI-PO RECHARGEABLE BATTERY

BACK UP DETAILS

Sr. No	DETECTOR TYPE	W/O VIOLATION	WITH VIOLATION
1	Toxic/ O_2 / N_2	10 DAYS	24 HOURS
2	PID/NDIR(CO_2 /CH_4)	2 DAYS	18 HOURS
3	Catalytic / Pellistor	4 HOURS	2 HOURS

COMMON DELIVERABLES

• Test Calibration Certificate	• Protection Rubber cover
• Reference calibration gas certificate	• USB cable (only for Data Logging Option)
• User Manual	• AC Charger Adaptor

SUCTION ACCESSORIES

- Calibration & Suction Cap
- Gas Sampling Hose : PVC
- Gas sensing Probe : Std. size 13”, Above 13” available on request

OPTIONAL DATA LOGGING		
Logging Capacity	:	50,000 records with data available in ASCII format
Data Download	:	In PC Through USB interface using TERATERM software

DIMENSION & WEIGHT		
Material	:	ABS Plastic
Size		
Diffusion Type	:	140 mm(H) x 70 mm(W) x 37 mm(D)
Suction Type	:	150 mm(H) x 70 mm(W) x 50 mm(D)
Diffusion Type with Flexible sensor (Gooseneck)	:	140 mm(H) x 70 mm(W) x 50 mm(D), Extended Flexible sensor (Gooseneck) Height: 300mm. **Note:** except AEPL NDIR sensor
Weight		
Diffusion Type	:	225 Grams
Suction Type	:	260 Grams
Diffusion Type with Flexible sensor (Gooseneck)	:	300 Grams

4. GAS WITH RANGE & RESOLUTION

Table 2

ELECROCHEMICAL SENSOR TECHNOLOGY				
SR. NO	**GASES**	**RANGE**	**UNIT**	**RES.**
O1	Oxygen (O_2)	25	% V/V	0.01
O2	Oxygen (O_2)	100	% V/V	0.1
NT1	Nitrogen (N_2)	100	% V/V	0.1
TOXIC GASES				
T1	Ammonia (NH_3)	100	PPM	1
T2	Ammonia (NH_3)	1000	PPM	1
T3	Bromine (Br_2)	10	PPM	0.1
T4	Carbon Monoxide (CO)	1000	PPM	1
T5	Carbon Monoxide (CO)	99.99	mg/m^3	1
T6	Chlorine (CL_2)	20	PPM	0.1
T7	Hydrogen (H_2)	2000	PPM	1
T8	Hydrogen Bromide (HB_r)	100	PPM	1
T9	Hydrogen Chloride (HCL)	100	PPM	1
T10	Hydrogen Cyanide (HCN)	100	PPM	1
T11	Hydrogen Fluoride (HF)	10	PPM	0.1
T12	Hydrogen Fluoride (HF)	100	PPM	1
T13	Hydrogen Sulfide (H_2S)	100	PPM	1
T14	Ozone (O_3)	20	PPM	0.1
T15	Ozone (O_3)	9999	$\mu g/m^3$	1
T16	Phosphine (PH_3)	10	PPM	0.1
T17	Nitrogen Dioxide (NO_2)	20	PPM	0.1
T18	Nitrogen Dioxide (NO_2)	9999	$\mu g/m^3$	1
T19	Nitric Oxide (NO)	250	PPM	0.1
T20	Sulfur Dioxide (SO_2)	50	PPM	0.1
T21	Sulfur Dioxide (SO_2)	2000	PPM	1
T22	Sulfur Dioxide (SO_2)	9999	$\mu g/m^3$	1

CATALYTIC/ PELLISTOR SENSOR TECHNOLOGY				
COMBUSTIBLE GASES				
SR.NO	**GASES**	**RANGE**	**UNIT**	**RES.**
C1	Acetone $(CH_3)_2CO$	100	%LEL	1
C2	Acetylene (C_2H_2)	100	%LEL	1
C3	Ammonia (NH_3)	100	%LEL	1
C4	Butane/n-Butane (C_4H_{10})	100	%LEL	1
C5	Carbon Monoxide(CO)	100	%LEL	1
C6	Ethanol (C_2H_5OH)	100	%LEL	1
C7	Ethyl Acetate $(C_4H_8O_2)$	100	%LEL	1
C8	Ethylene (C_2H_4)	100	%LEL	1
C9	Hexane/n-Hexane (C_6H_{14})	100	%LEL	1
C10	Hydrogen (H_2)	100	%LEL	1
C11	Isopropanol $(CH_3C_2H_4OH)$	100	%LEL	1
C12	Methane (CH_4)/HC	100	%LEL	1
C13	Methyl Ethyl Ketone (C_4H_8O)	100	%LEL	1
C14	Methanol (CH_3OH)	100	%LEL	1
C15	N-Heptane (C_7H_{16})	100	%LEL	1
C16	N-Pentane (C_5H_{12})	100	%LEL	1
C17	Pentane/n-Pentane (C_5H_{12})	100	%LEL	1
C18	Propane/n-Propane (C_3H_8)	100	%LEL	1
C19	Toluene $(C_6H_5CH_3)$	100	%LEL	1
C20	Unleaded Petrol	100	%LEL	1
C21	CNG/LNG/LPG/Natural Gas/Flammable Gas	100	%LEL	1

PORTABLE GAS DETECTOR: PG-100

NDIR SENSOR TECHNOLOGY				
SR.NO	**GASES**	**RANGE**	**UNIT**	**RES.**
N1	Carbon Dioxide (CO_2)	5000	PPM	1
N2	Carbon Dioxide (CO_2)	5	%V/V	0.1
N3	Carbon Dioxide (CO_2)	100	%V/V	1
N4	Methane(CH_4)	100	%LEL	1
N5	Methane(CH_4)	5	%V/V	0.1
N6	Methane(CH_4)	100	%V/V	1
N7	Propane / LPG (C_3H_8)	100	%LEL	1
N8	Propane / LPG (C_3H_8)	5	%V/V	0.1
N9	Propane / LPG (C_3H_8)	100	%V/V	1
N10	NITRUS OXIDE (N_2O)	1000	PPM	1
N11	Sulphur Hexa Fluoride (SF_6)	1000	PPM	1
N12	Refrigerant (R-134a)	1000	PPM	1
PID SENSOR TECHNOLOGY				
SR.NO	**GASES**	**RANGE**	**UNIT**	**RES**
P1	Isobutylene(C_4H_8) / other VOC	40	PPM	0.1
P2	Isobutylene(C_4H_8)/ other VOC	1000	PPM	1
P3	Isobutylene(SPAN C_4H_8)/ other VOC	4000	PPM	1

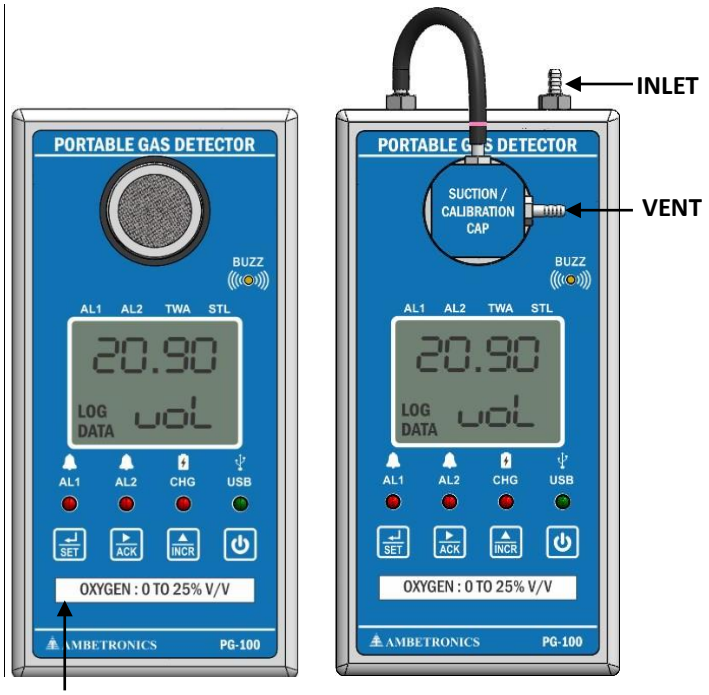
NOTE:

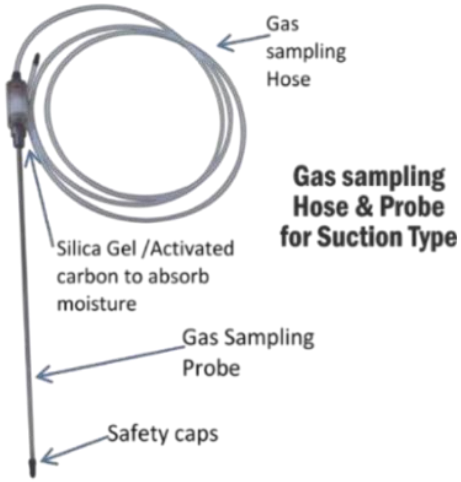
- In above Table, Range of gases start from zero.
- Confirm Gas Sampling Hose length by enquiry & it is available only for Suction type detector.
- **Gases which are not listed, are available on request & for other details contact factory.**
- All VOCs are available in PID detection principle in PPM ranges.
- PID detector will be provided by calibration with Isobutylene gas.
- In PID detector, VOC other than Isobutylene is calibrated with Isobutylene gas by setting VOC correction factor, In Calibration Report, VOC factor with respect to Isobutylene gas will be mentioned.
- Detection value of VOC = Isobutylene gas concentration value x factor.
- *Intrinsic safety certification is only available for Instrument in the case of Diffusion type With Extended Flexible sensor (Gooseneck) with Length maximum 1 feet.

5. HARDWARE AND OPERATIONAL DETAILS

5.1 HARDWARE INTRODUCTION

DIFFUSIN TYPE **SUCTION TYPE**





Actual product appearance may slightly differ

NOTE:

GAS RANGE STRIP WILL BE CHANGE AS PER GAS NAME & RANGE

Figure 1

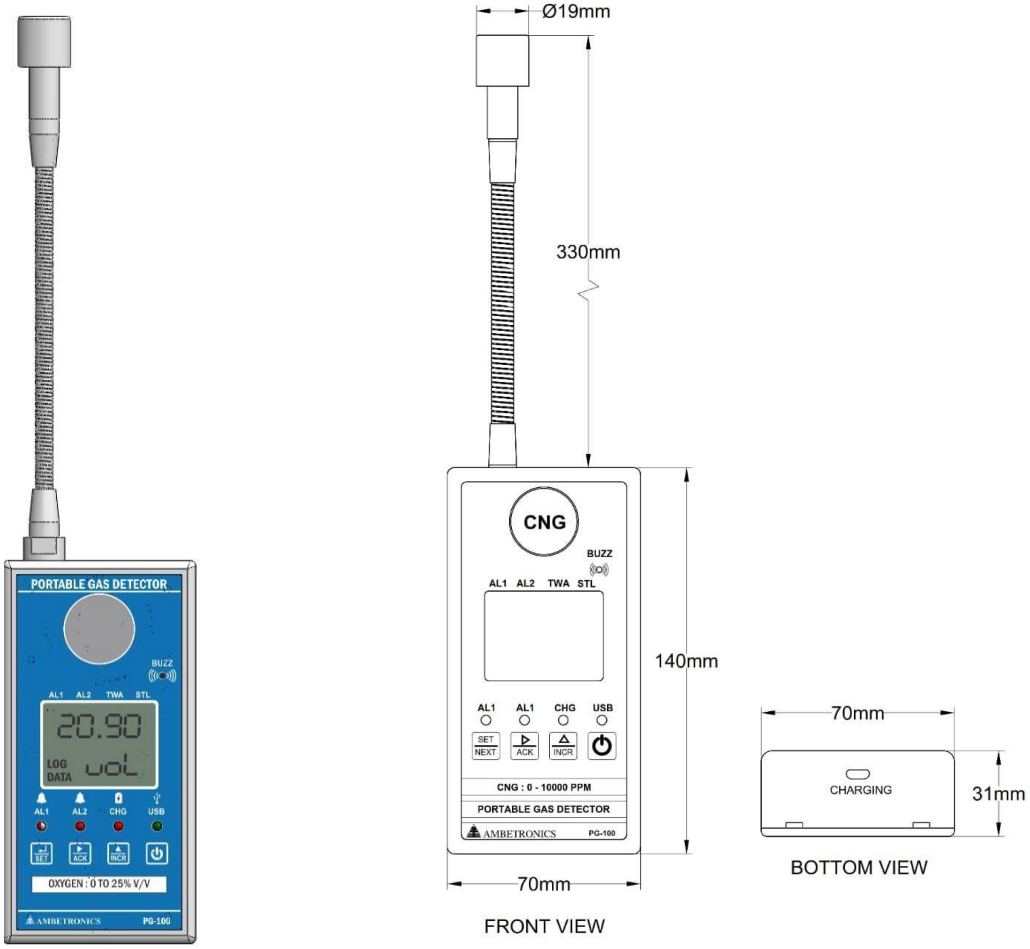


Figure 2 **Diffusion type is available with Extended flexible sensor (Gooseneck)**

BIS MARK LICENCE NO: 7800047118

IS/IEC 60079
Part 11
L-7800047118

Figure 3

Gas Sampling Probe & Hose:

These accessories are required to be used with PG-100-S (Suction Type) detector.
Gas Sampling Probe is connected to Gas Sampling Hose & Hose is connected to the PG-100-S inlet.
For connection, Safety Caps of Gas Sampling Probe & Hose need to remove & after use, refit the Safety Caps again.
For filtration, Silica gel / Activated carbon filter can be used in Gas Sampling Probe. From, factory white smooth particle filter is filled. User can replace this smooth White particle filter with Silica Gel / Activated carbon filter as per application.
Mist / Particle Filter in Gas Sampling Probe is required to protect the sensor & pump from getting affected by Moisture and Dust.

AC Charger adapter & USB Cable

The Device can be charged by using USB cable and connecting to the computer or it can be charged using the AC Charger Adapter provided. Alternatively, you can also connect the AC Charger Adapter available in the market of 5V, 1A rating, **CE** mark.

Note: Damage due to faulty charging is not warranted.

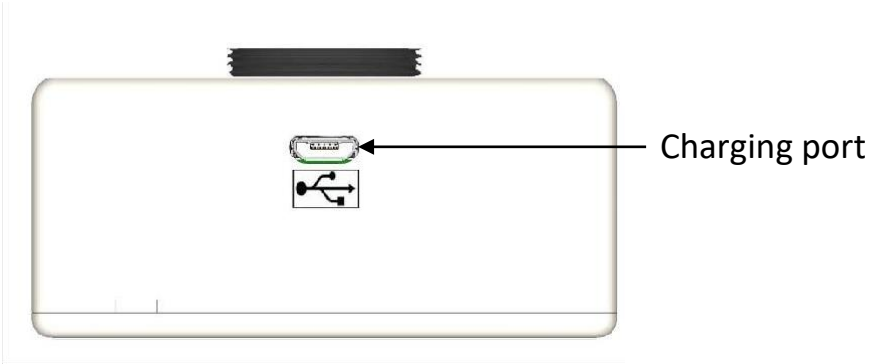


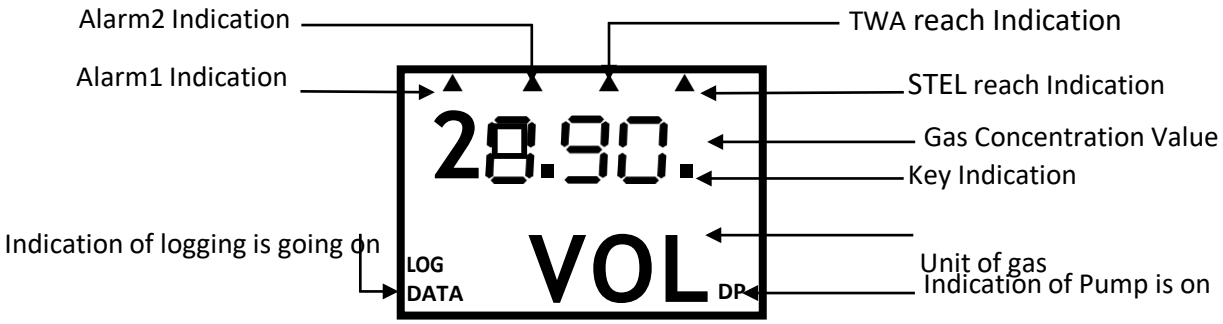
Figure 4

6. DISPLAY DETAILS

6.1 LCD DISPLAY IN NORMAL WORKING MODE

During power ON, the unit does a warm up for Parameters and then enters the normal working mode.

During Power ON Condition



Note: Values indicating only for representation purpose

6.2 CAPTION MEANING

A. MAIN MENU AND GENERAL FUNCTIONS

MENU ESC	Esc to Main Menu	MENU CODE	Code Menu
MENU ALRM	Alarm Menu	MENU OFST	Offset Menu
MENU CAL	Calibration Menu	MENU HRLK	High range lock menu
MENU LOH	Low High Menu	MENU RTC	RTC (Clock)Menu
MENU PUMP	Pump Menu	MENU COMM	Communication Menu
MENU LOG	Log Menu	MENU DWLD	Download Menu
ESC	Escape (Exit) Yes/No	WRNG PSWD	Wrong Password

B. AMBIENT CALIBRATION MENU

P. AIR	Purge Air	AIR / FRSH	Fresh Air
F. PPM	Fresh GC	Z.CAL / WAIT	Zero calibration wait
Z.CAL / DONE	Zero calibration done		

C. CODE CHANGE MENU / PASSWORD CHANGE MENU

ENTR PSWD	Enter Password to Set new Password		
PSWD□□□□	Set Password	NPWD□□□□	Set new password
CNFM YES/NO	Confirm Password Change Yes /No	CHNG SUCC	Password Change Successful

D. ALARM MENU

ALRM PSWD	Enter Password to edit Alarm setting		
PARA BACK	Back to main menu	PARA ALM1	Alarm 1 parameters
PARA ALM2	Alarm 2 parameters	PARA BUZZ	Buzzer (enable or disable)
PARA KBUZ	Key Buzz	PARA VIBR	Vibrator
PARA SNOZ	Snooze time	PARA BKLT	Backlit
PARA BLED	Backlit LED		
PARA STEL	STEL Setting	PARA TWA	TWA Setting
ALMX BACK	Back to Alarm Parameter		
ALMX ENBL	Enable Alarm 1 or 2	ALMX SP	Alarm 1 or 2 Set Point*
ALMX HYST	Alarm 1 or 2 Hysteresis	ALMX LOGC	Alarm 1 or 2 Logic
ALMX DELY	Alarm 1 or 2 Delay	ENBLYES/NO	Alarm enable (Yes or No)
SP 0000	Set Alarm SP* value	HYST 00.00	Set Hysteresis value
LOGC HIGH	High Alarm Logic	LOGC LOW	Low Alarm Logic
DELY 0000	Set Alarm delay value		
BUZZ ENB/DIS	Buzzer Enable /Disable	KBUZ ENB/DIS	Key Buzz ENABLE/ DISABLE
VIBR ENB/DIS	Vibrator Enable /Disable	SNOZ 0000	Set Alarm Snooze time
BKLT OFF		BKLT CONT	Backlit Continuous
BKLT BINK	Backlit Blink		
BLED	Backlit LED	RED/ BLUE/ YELO/CYAN/ VIOL	RED/ BLUE/ YELLOW/CYAN / VIOLET
NORM	NORMAL	WHIT/GREN	WHITE/GREEN
STEL YES/NO	Use STEL Yes/No	STEL SP	Set STEL Point
TWA YES/NO	Use TWA Yes/No	TWA SP	Set TWA Point

Note: *ALM X means (ALM 1/2)

E. OFFSET MENU

OFST PSWD	Enter Password to edit Offset setting
OFST 0000	View or edit offset Parameter

F. CALIBRATION MENU

CAL PSWD	Enter Password to edit Calibration setting		
For Toxic / Combustible/ PID/NDIR Detector			
SET SPAN	Set Span	SPAN 20.90	Set Span Value
CAL ZERO	Zero Calibration	CAL SPAN	Span Calibration
CAL ESC	Escape from Calibration	ZXXX	Zero & Unit of gas
Z ERO SKIP	Zero Cal Skipped	Z ERO SUCC/ FAIL	Fail Zero Cal Success /Fail
SXXX	Span & Unit of gas	SPAN SKIP	Span Cal Skipped
SPAN SUCC/FAIL	Span Cal Success / Fail		
For Oxygen/ Nitrogen Detector			
SPAN LOW	Set Low Span for Oxygen	SPAN HIGH	Set High Span for Oxygen
LXXX	Low & Unit of gas	HXXX	High & unit of gas
LOW SKIP	Low Cal Skipped	LOW SUCC/ FAIL	Low Cal Success /Fail
HIGH SKIP	High Cal Skipped	HIGH SUCC/FAIL	High Cal success / Fail

G. HIGH RANGE LOCK

HRLK PSWD	Enter Password to edit LOHI setting
LOCK YES/NO	LOCK YES /NO

H. LOHI MENU (MINIMUM / MAXIMUM GAS CONCENTRATION VALUE)

LOHI PSWD	Enter Password to edit LOHI setting		
O2 0.00	Min/Max Gas Concentration value	LOW / HIGH CLR	Low / High value clear
CLR YES/NO	Clear Yes/No	BACK YES/NO	Back Yes/No

I. RTC MENU

RTC PSWD	Enter Password to edit RTC settings		
RTC TIME	RTC Time	RTC DATE	RTC Date
RTC ESC	Escape rtc menu	CHNG YES/NO	Change Yes/No
HOUR	Hour	MIN	Minute
SEC	Second	SAVE YES/NO	Save Yes/no
YEAR	Year	MNTH	Month
DATE	Date		

J. PUMP MENU

PUMP PSWD	Enter Password to edit Pump setting		
P-ON YES/NO	Use Pump Yes/No	ON-T	Total Pump ON time
MODE ESC	Escape Pump menu	MODE CONT	Continuous Mode
MODE CYCL	Cyclic Mode	TIME P-ON	Pump ON Time
TIME POFF	Pump OFF Time	POFF/P-ON 0000	Set Pump ON/OFF time

K. COMMUNICATION MENU

COMM PSWD	Enter Password to edit Communication setting		
COMM ID	Comm ID	COMM BAUD	Comm Baud rate
COMM PRTY	Comm Parity	COMM SBIT	Comm Stop bit
COMM TEST	Comm Test	ID 001	ID change or view
BAUD9.6	Baud rate 9.6	PRTY ODD	Parity odd
PRTY EVEN	Parity Even	PRTY NONE	Parity none
STOP ONE/TWO	Stop bit (one or two)	COMM TEST	Communication

L. LOGGING MENU AND DOWNLOAD MENU

LOG PSWD	Enter Password to edit Logging & Download settings		
LOG YES/NO	Log Yes/ No	MODE TYPE	Mode type
MODE SCRL	Mode Scrolling	MODE ERAS	Mode Erase
TYPE CONT	Type Continuous	TYPE CYCL	Cyclic Mode
TYPE TRIG	Trigger Mode	SCRL ENB/DIS	Scrolling Enable/ Disable
S-YY	Start year	S-MM	Start month
S-DD	Start date	S-SS	Start seconds
S-MN	Start minutes	S-HH	Start Hours
E-YY	End year	E-MM	End month
E-DD	End date	E-SS	End seconds
E-MN	End minutes	E-HH	End Hours
INTV SEC	Interval in sec.	SEC 001	Edit interval in sec.
SAVE YES	Save yes	SAVE NO	Save no
ERAS NO/YES	Erase no/yes	SURE NO/YES	Sure no/yes
ERAS WAIT	Erase Wait	ERAS DONE	Erase Done
DWLD EVNT	Download Events	DWLD LOG	Download Logs

DWLD DATE	Set Download Date & Time	STRT YES/NO	Download Start YES/NO
TIME WRNG	Time Wrong	DATA SRCH	Search data
DATA LOAD	Load data	DWNL DONE	Download Complete
DATA NOTF	Data Not Found		

6.3 KEY FUNCTIONALITY

Table 3

SR. NO.	KEY TYPE	PROGRAMMING MODE	NORMAL MODE
1.	SET/NEXT key 	• It is used to Enter the menu & set/save the parameter. • It is also used to set the parameter with or without changing the parameter value	• It used to enter the user menu when pressed for about 5 sec • Press with '▶' key to enable / disable logging in trigger mode
2.	SHIFT key 	• In the 'Operator Setting Mode & Calibration Mode' it is used for moving cursor on to the digit whose value is to be changed • In some menu it is used to select 'YES'	• It used to Acknowledge the Alarm & mute buzzer and vibrator
3.	INCREMENT KEY 	• It is used to change the Digit Value of Desired Parameter & select the parameter in the 'Operator Setting Mode	-NA-
4.	SET + Shift	-NA-	• It used to Start / Stop Logging in Trigger mode
5.	INCR + SET	-NA-	• Press these keys together to start/stop the pump when used in continuous mode / Cyclic mode.
6.	ACK+INCR	-NA-	• Press Together to enter into Ambient calibration mode
7.	POWER KEY 	This key is used to switch off and switch on the device. When pressed for 5 seconds it turns OFF. To turn ON press this key for 2 seconds.	

When pressed SHIFT key 

it will display the following instrument parameters.

Table 4

SENSOR NAME	HIGH RANGE	BATTERY STATUS
SENS CH4	HRNG 100	BAT STAT

↓

CALIBRATION DUE	BATTERY PERCENTAGE	BATTERY VOLTAGE
CAL DUE	PERC 50	VOLT 3.650

↓

CALIBRATION DUE DATE/ MONTH/ YEAR	SENSOR LIFE DUE	SENSOR LIFE DUE DATE/ MONTH/ YEAR
DATE/ MNTH/ YEAR DD/ MM/ YY	LIFE DUE	DATE/ MNTH/ YEAR DD/ MM/ YY

↓

CURRENT DATE/ MONTH/ YEAR	CURRENT TIME	LOGGING %
DATE/ MNTH/ YEAR DD/ MM/ YY	TIME 00:00	LOG P 0.0

↓

Gas Concentration Low Value	Gas Concentration High Value
LO 0.00/P.VOL	HI 0.00/P.VOL

NOTE: * CURRENT DATE, CURRENT MONTH & CURRENT YEAR WILL CONTINUOUSLY TOGGLE.
* LOGGING IS OPTIONAL

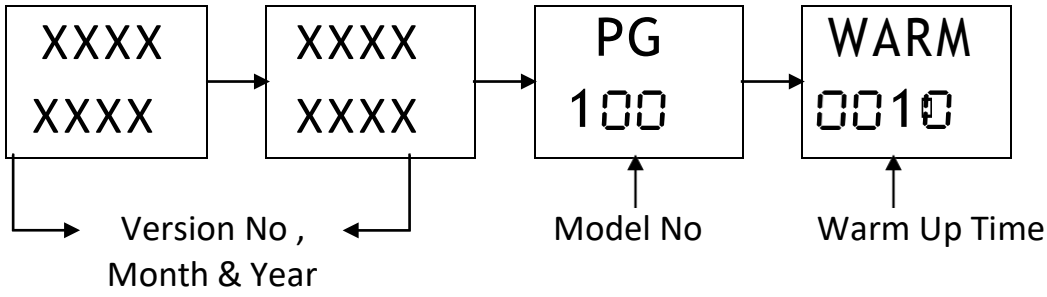
6.4 LED INDICATION

Table 5

Alarm LEDs (AL1 and AL2)	• Keeps flashing when Alarm is active • Steadily ON when acknowledged until snooze time • OFF normally
Battery LED (CHG)	• ON while charging • OFF when battery is fully charged or when not plugged in
USB	• ON when USB connected • OFF when USB unplugged

6.5 POWER ON AND OFF INDICATION ON THE DISPLAY

During Power ON Condition



Shut-down operation

After warm up, the device switches to NWM* displaying the GC and its units as shown in the below.

Note: The values shown above are for representation purpose only.

6.6 SOME IMPORTANT INDICATIONS

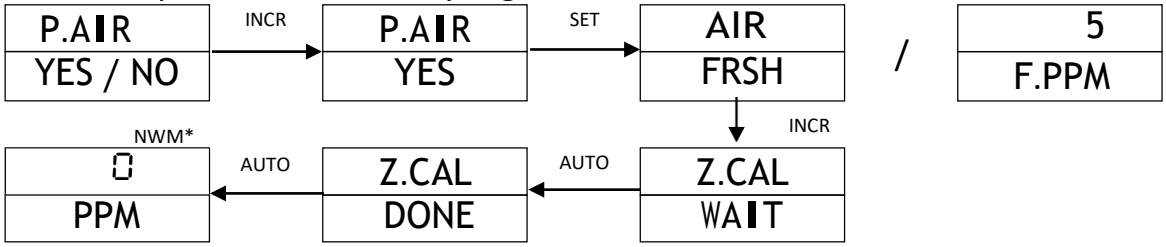
Table 6

SENS OPEN	To indicate sensor is disconnected
OVER RNGE	To indicate the GC has exceeded its range in the detector

NOTE: In sensor open & over range condition device keep flashing with blue & white colours. Confidence Beep sounds after every one minute to ensure detector is working OK.

6.7 AMBIENT CALIBRATION MENU

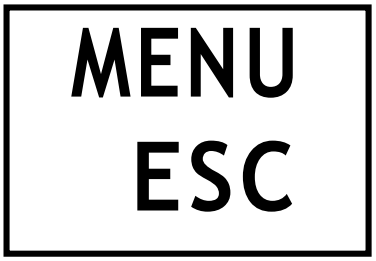
In NWM* press ACK+INCR key together



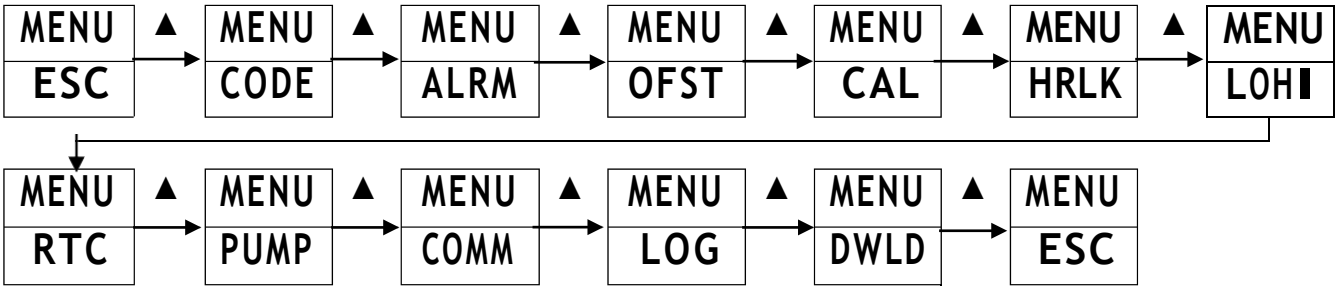
NOTE: Ambient Calibration value for Oxygen is 20.90 % V/V and for Nitrogen is 79.10 %V/V.

7. MENU OPERATION

To enter the programming mode, press set in the play mode for about 5 sec. Once we enter the programming mode, display shows **SELECT MENU**. Below that we see **ESC MENU**. Here on pressing **SET KEY**, we exit the menu.



To view menu headers, press **INC KEY,** we see the headers in following order.



Below now we explain the options available in the different menu functions. To view the steps, refer flowchart in the next section.

Table 7

PASSWORD MENU (Refer flowchart)	This mode is used to change the user password used for making changes in the menus.
ALARM MENU (Refer Flowchart)	This menu is used to make the changes in the Alarm set points. There are two Alarms Alarm 1 and Alarm 2. The Alarm condition can be set to high or low in the Alarm logic submenu and Alarm value can be set in Alarm set point submenu as per the requirement. When the GC exceeds the set point limits, the buzzer and vibrator alerts the operator if enabled. AL1/AL2 LED is used to indicate the Alarm activation. Acknowledge key is used to silence the buzzer and vibrator. AL LED shall remain ON till the GC comes back in set points limits for gas. Alarm menu also contains **STEL** and **TWA** settings for Toxic gases`.
OFFSET MENU	Any errors due to drift/calibration can be adjusted by setting the offset in the GC of up to +/-10% of the full scale. Enter and exit Offset menu shall be the similar Alarm menu.
CALIBRATION MENU	This menu is used to perform the calibration of the detector. This calibration must be performed by qualified personnel only. Ambetronics shall not be responsible for any changes done due to invalid procedure followed for calibration.

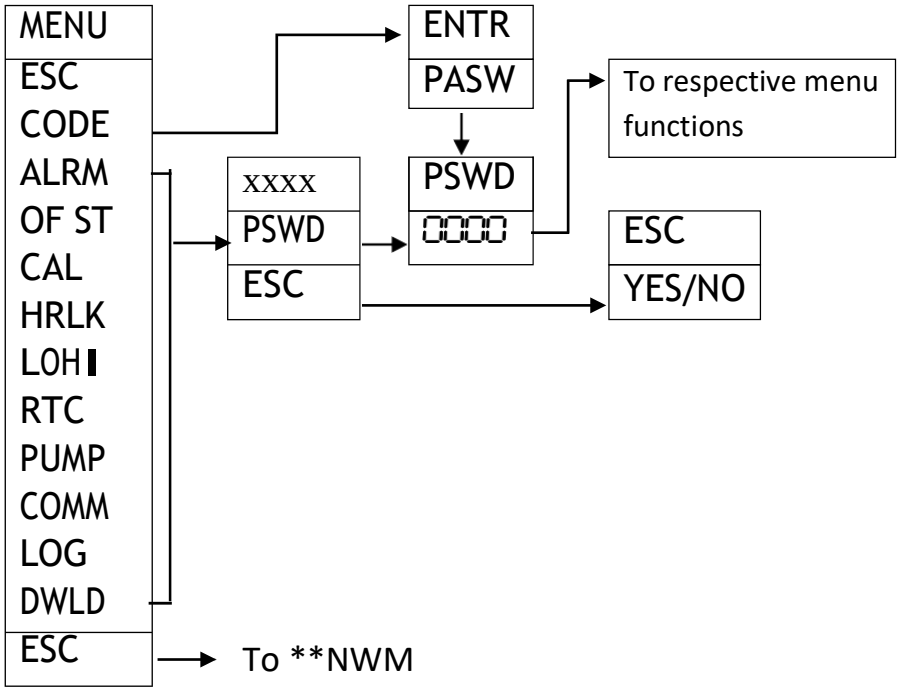
HIGH RANGE LOCK MENU	This menu is use to set high range of selected gas range.
LOHI MENU	This menu is used to view & Clear the LOW/ HIGH (Minimum and Maximum) value of the Gas Concentration.
RTC MENU	**Only Visible in Detector having Data Logging Facility** This menu is used to set Date & Time in detector.
PUMP MENU	**Only Visible for Suction Type Detector** The Pump menu can be operated in two mode Continuous mode & Cyclic mode. If pump is not required to use, Select No, Total Pump on Time (ON-t) is 9999 sec. Press '▲ + SET' key together to start/stop the pump when used in continuous mode / Cyclic mode. **Continuous Mode (CONT) =** If Continuous mode is selected for sampling of gas Pump will be automatically On till pump on time (ON-t) is over **Cycle Mode (CYCL) =** if Cycle mode is selected for sampling of gas, Pump on (P-On) & Pump off (POFF) time is required to be set. **Pump On + Pump Off time ≤ Total Pump On time (On-t)** In any mode pump is operated for set Total pump on time (ON-t) Pump is required for Suction of gas target gas sample to sensor of detector
COMMUNICATION MENU	**Only Visible in Detector having Data Logging Facility** This menu is used to set the device ID, baud rate, parity, stop bit and also to test the USB communication. This menu is visible, when detector is with Data logging option.
LOGGING MENU	**Only Visible in Detector having Data Logging Facility** This menu is used to configure the logging settings. There are 3 modes are available Continuous/ Cyclic/ log on Triggering. Scrolling mode can be enabled/ disabled as per the requirement. Log Data can also be erased using this menu
DOWNLOAD MENU	**Only Visible in Detector having Data Logging Facility** In this menu, data logs or event logs can be selected to downloaded data to PC using hyper-terminal. The logs to be downloaded can be set from the date and time

Note:

- Refer the key functionality or follow on screen instructions to change the settings.
- Communication, RTC, Log, Download menus are visible in user / operating menu setting Mode / Menu, if ordered detector is with Data Logging option.
- The Pump menu is visible in user / operator setting Mode / Menu for Suction type detector.
- Pump is required for Suction of gas target gas sample to sensor of detector

7.1 FLOWCHART

In the below flowchart below menu are available in the device. To scroll down in the list press '▲' key and to select the menu and save the setting, press **SET** key. In all the flow charts '▲' key enters next menu unless specified.



In all menus if incorrect password is entered we can enter the menu but we can't set any values. Exceptions are password and calibration menu. In these menus if wrong password is entered then we can see the **WRNG PSWD** on the display and the unit will return to **ENTR PSWD** screen. If you want to ESC then press ▲ key to return to NWM*

If no key is pressed for about 2 minutes in any menu except calibration menu Display will return to normal working mode

In calibration menu time out is 10 minutes

***Note**: Respective menu name will be seen in all menus except password menu

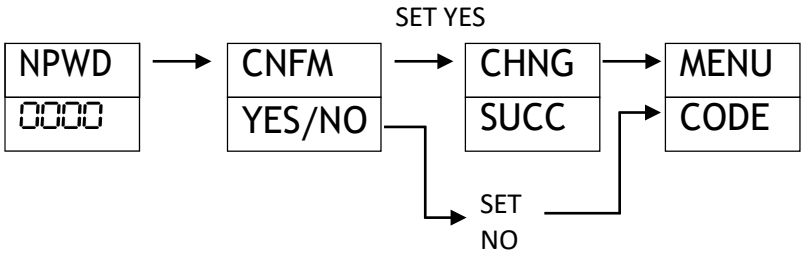
In all the above sub-menus, we need to press SET key to enter the menu and set parameter with ▲& ► keys then press set key to save the settings. Hence the steps aren't needed to be specified.

7.2 PASSWORD MENU SETTINGS

This menu is used to change the user password used for making changes in the menus. In main menu select code menu and enter correct password.

Press SET key to enter the menu and set/save the parameter. Use '▲' key to select menu parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ "Back "to go out of the setting parameter / menu.

After entering the password, the following menu will be displayed



7.3 ALARM MENU

This menu is used to set Alarm set points.

Press SET key to enter the menu and set/save the parameter. Use '▲' key to select menu parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ "Back" to go out of the setting parameter / menu.

After entering the password, the following menu will be displayed

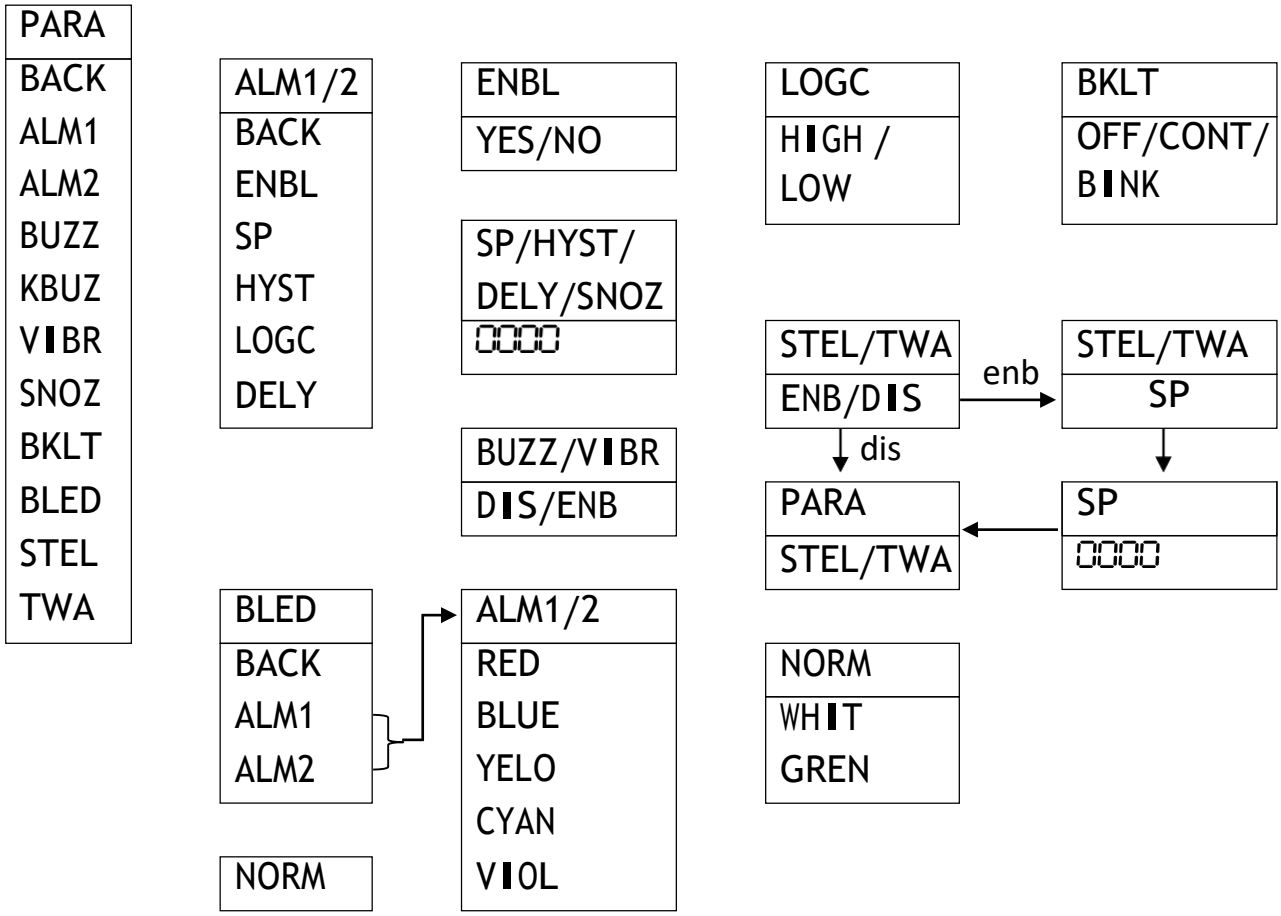


Table 8

Alarm1 and Alarm2	As shown in the above flowchart, we can enable/disable the Alarms, change Alarm set points for each channel. Hysteresis of up to 10% of the range can be set. Logic low/high is used to set Alarm condition logic. Alarm Delay used to provide threshold time to prevent frequent Alarms.
Hysteresis	Hysteresis of up to 10% of the Full-scale range can be set. The Gas level may sometimes fluctuate during an Alarm condition, which causes repeated Alarm indications. To avoid repeated Alarms, hysteresis is used. Hysteresis works with the high & low Alarm Set Point. When logic is high, Alarm is ON when GC > Set Point & Alarm is turned OFF when GC < Set Point - Hysteresis. When logic is low, Alarm is OFF when GC reduce < Set Point & Alarm is ON when GC is > Set Point + Hysteresis.
STEL and TWA	Short Term Exposure Limits (STEL) and Time Weighted Average (TWA) These settings are majorly used for Toxic gases to warn that user is exposed for more than 15 minutes or 8 hours respectively. STEL/TWA Alarm reached. 'STEL RECH'/'TWA RECH' is displayed & shown by '▲' indication on display. TWA / STEL Alarm & their display indication will be disappeared. After resetting the Alarm or disabling the TWA/STEL or making device power to ON. For more details of Alarm 1 & 2 'TWA, STEL display '▲' indication location, refer display details.
STEL ENB	Enable STEL if you want to use it OR leave it disabled
STEL SP	Edit set point for STEL here using ▲& ▶ keys
TWA ENB	Enable TWA if you want to use it OR leave it disabled
TWA SP	Edit set point for TWA here using ▲& ▶ keys
SNOOZE	Turns ON the Alarm again after set seconds if the Alarm condition still holds true. Settable range: 0 to 999 seconds. Snooze time starts after ACK key is pressed (after Alarm acknowledgment).
BACKLIGHT	The Backlight can be selected OFF/ Continuous ON or Blink. These settings are valid only for Alarm conditions. Backlit color can be change • **OFF**: Normally OFF even Alarm occurs and 'Backlight ON' for 1 minute ON upon any key pressed. • **Continuous ON**: The Backlight will be continuously ON even Alarms Are Activated. • **Blink**: Backlight will blink automatically upon Alarms violation. In Normal working mode Backlight will be OFF & ON for 1 minute when any key is pressed. **Refer backlit color Table No 9**

BUZZER AND VIBRATOR	Buzzer generates sound & vibrator activates to alert the user for Alarms violation.

Backlight Colour Description

Normal working mode: WHITE/GREEN
Alarm1 & 2: Red, Blue, Yellow, Cyan, Violet set as your option
Sensor open /over: Blue/White Flash

Table 9

BACKLIGHT	CONTINUE	OFF	BLINK
AL1	Select Red, Blue, Yellow, Cyan, Violet	White	Red, Blue, Yellow, Cyan, Violet /Flash
AL2	Select Red, Blue, Yellow, Cyan, Violet	White	Red, Blue, Yellow, Cyan, Violet /Flash
Both AL1, AL2	Red, Blue, Yellow, Cyan, Violet	White	Red, Blue, Yellow, Cyan, Violet flash as a AL2

Table 10

AL1 LED	AL2 LED	B/V*	AFTER ACK			DESCRIPTION
			AL1 LED	AL2 LED	B/V*	
OFF	OFF	OFF	OFF	OFF	OFF	Open/Over/ Warm-up/All In Range
BLINK	OFF	ON	ON	OFF	OFF	GC crosses Alarm SP1
OFF	BLINK	ON	OFF	ON	OFF	GC crosses Alarm SP2

Note:
1. If the snooze function is activated, the Alarm is reactivated after snooze time.
2. The Alarm LEDs and buzzer will automatically without Acknowledge menu turn off when the GC will return within a safer range
3. '▲' indication for Alarm setting will be disappear automatically when GC will return within safe range

7.4 OFFSET MENU

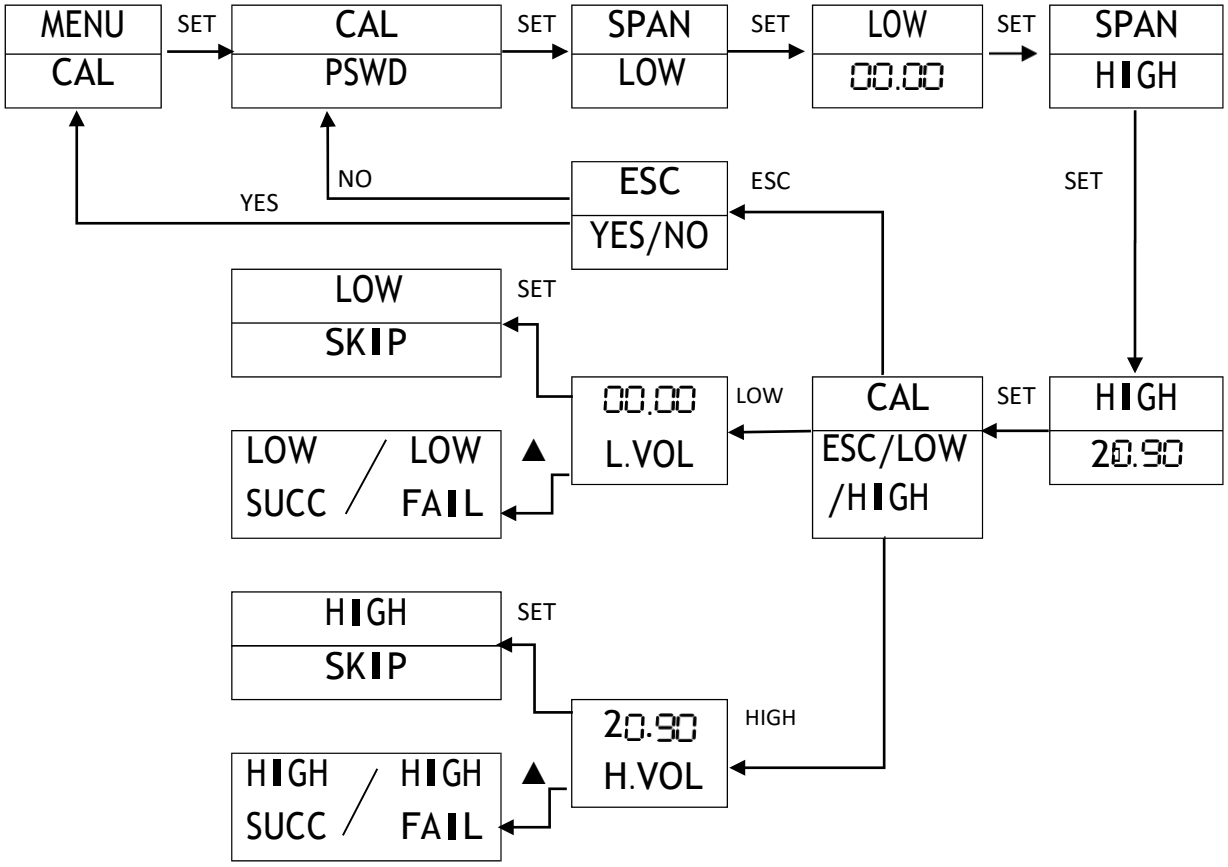
To adjust any error due to drift / calibration by setting the offset.
An offset of maximum ±10% of Full Scale value can be set.
Note: Press SET key to enter the menu and set/save the parameter. Use '▲' key to select menu parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ "Back" to go out of the setting parameter / menu.
After entering the password, the following menu will be displayed.

OFST
+000

7.5 CALIBRATION MENU

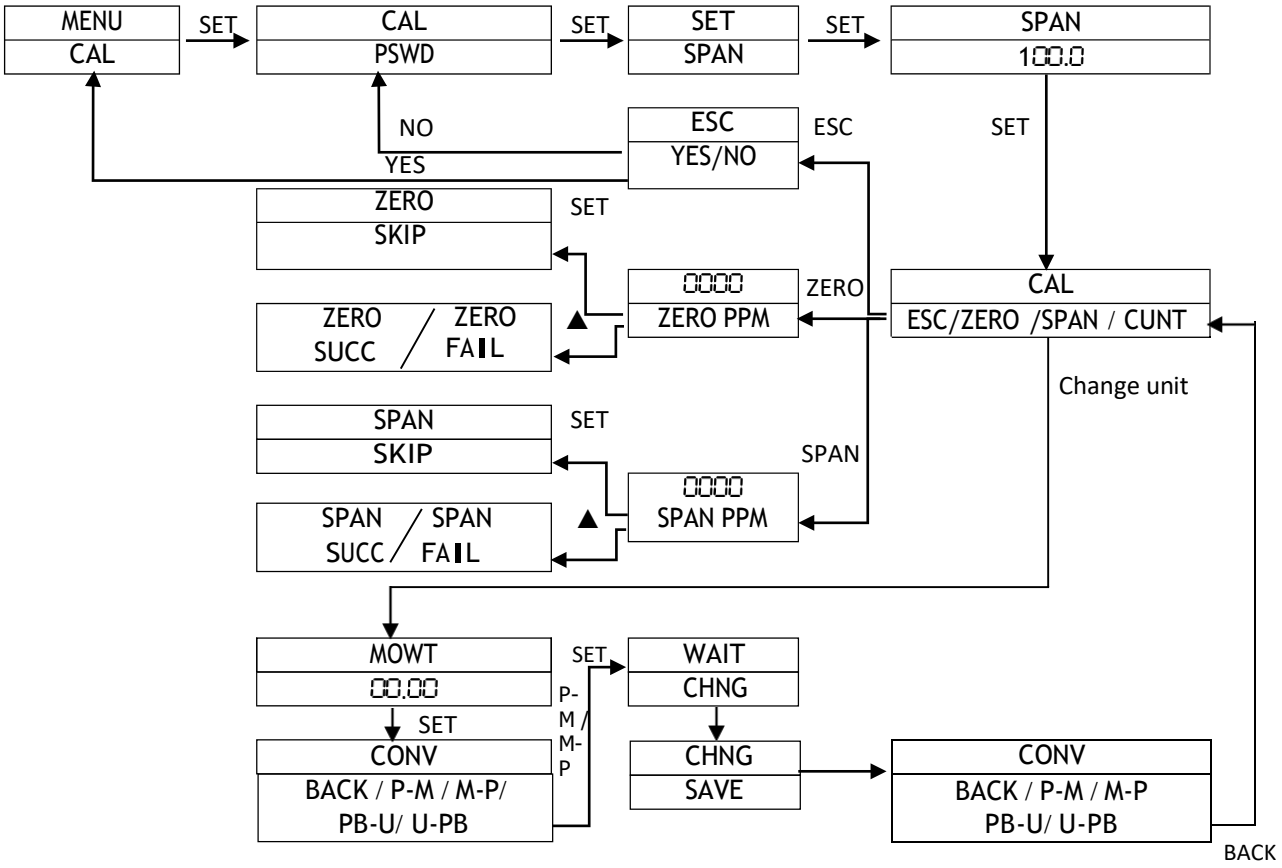
Before initial calibration, allow the detector to stabilize for warm up time per gas type after applying power.
To calibrate the detector, use an appropriate span calibration gas cylinder, constant flow regulator & Ambetronics calibration cap & user manual for calibration procedure.
Press SET key to enter the menu and set/save the parameter. Use '▲' key to select parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ "Back" to go out of the setting parameter / menu.
After entering the password, the following menu will be displayed.

For Oxygen / Nitrogen Detector



After cal succ/fail, Display return to CAL PSWD.

For Toxic, PID, NDIR ($CH_4/CO_2/C_3H_8$) , Combustible (Catalytic /Pellistor) Transmitter / Analyzer



After cal succ/fail, Display return to CAL PSWD

As per Gas Unit, Gas Name, Gas Concentration value will be different.

Table 11

LOW/ZERO SKIP	:	Skips the Low/Zero calibration, when set key is pressed while calibration.
HIGH /SPAN SKIP	:	Skips the High/Span calibration, when set key is pressed while calibration.
LOW /ZERO SUCCESS or LOW/ ZERO FAIL	:	} This message is displayed to inform the status of the calibration whether the particular calibration is done successfully or has failed.
HIGH /SPAN SUCCESS or HIGH / SPAN FAIL	:	
CHANGE UNIT (CUNT)	:	This menu is used to change unit from PPM to mg/m^3 & mg/m^3 to PMM. • P-M : PPM to mg/m^3 • M-P : mg/m^3 to PMM • WAIT CHNG : Wait For changes • CHNG SAVE : Changes saved • PB-U : PPB to ug/m^3 • U-PB : ug/m^3 to PPB

Table 12

Calibration STEPS & Policy:			
HIGH/SPAN	**LOW/ZERO**	**Status**	**REMARKS**
Success	Success	CAL* success	Unit will work as per new CAL* data
Success	fail	CAL* fail	Unit will work as per previous CAL* data
Fail	X	CAL* fail	Unit will work as per previous CAL* data
Success	X	LOW/ZERO CAL* not done	Unit will work with new GAS SPAN & old LOW SPAN data
X	Success	HIGH/SPAN CAL* not done	Unit will work with new GAS SPAN & old LOW SPAN data
X	Fail	CAL* fail	Unit will work as per previous CAL* data
X	X	CAL* not done	Unit will work as per previous CAL* data

N TE:

1 After **'Span / High Cal Success / Fail'** Display return to 'Calibration Password'

2 After **'Zero / Low Cal Fail'** Display return to 'Calibration Password'

3 For PID sensor (Range: 4000 PPM), use Gas in 3500 to 4000 PPM Range for doing SPAN calibration.

7 5.1 CALIBRATION INSTRUCTION FOR OXYGEN / NITROGEN DETECTOR

F r Low calibration use: Set 'Low Cal' between 0% V/V to 5 % V/V

- For 0 % V/V use Pure Nitrogen gas **(99.999%V/V [5.0 Grade], Moisture & Oxygen Level <2 PPM & CO+ CO_2 level < 0.5PPM & T.H.C. < 0.2 PPM & other components should be nil.)**
- 1 % V/V to 5 % V/V use Oxygen Gas Balance Nitrogen (**Use O2 Gas for accurate linearity**)

I r High Calibration use: **Set 'High Cal' between 18% V/V to 23 % V/V**

- Normally set 20.9 % V/V & for 20.9 % V/V:
  Use **Ambient fresh air** or **Compressed Air Cylinder\ (20.9 % V/V, O_2 Balance Nitrogen)** as calibration gas for **'High Cal'.**
- OR use 18 % V/V to 23 % V/V Oxygen gas Balance Nitrogen
  as calibration gas for **'High Cal'.**
  Regulator flow Rate = 0.5 LPM for Low & High Calibration.
  Low / high calibration can be skipped.

7.5.2 CALIBRATION INSTRUCTION FOR TOXIC, PID, COMBUSTIBLE CATALYTIC OR PELLISTOR, NDIR-CH_4 DETECTOR

ZERO CALIBRATION:

Compressed Air Cylinder (20.9 % V/V, O_2 Balance Nitrogen) should be used to perform the Zero calibration if the surrounding area contains any residual amount of Target Gas. If no residual gas is present, then atmospheric background **Ambient fresh air** can be used to perform the Zero Calibration.

SPAN CALIBRATION:

Use Target gas concentration with balance air ¼ th or ½ of Target gas Detector range.
Regulator flow Rate = 0.5 LPM for Zero & Span Calibration.

For Toxic / PID / Catalytic / Pellistor, Zero / Span calibration can be skipped.

For NDIR-CH_4, zero calibration is recommended & cannot be skipped.

7.5.3 IMPORTANT NOTE FOR TOXIC GAS DETECTOR

- Use Surrogate gas for specified Toxic Gas Detector as recommended by manufacturer or refer calibration & Test report for factor.
- For Toxic detectors warm up time is 2 hours

7.5.4 IMPORTANT NOTE FOR COMBUSTIBLE GAS DETECTOR

For Combustible Catalytic / Pellistor gas detector other than Methane / LPG / Hydrogen, Other Combustible Gas detector are calibrated with methane & factors for those gases are mentioned in the Calibration & Test report.

For Combustible Gas Detector warm up time is 1 hour.

7.5.5 IMPORTANT NOTE FOR PID DETECTOR

- All VOCs are available in PID detection principle in PPM ranges.
- PID detector will be provided by calibration with Isobutylene gas.
- In PID detector, VOC other than Isobutylene is calibrated with Isobutylene gas
- by Setting VOC correction factor.
- In Calibration Report, VOC factor with respect to Isobutylene gas will be Mentioned.
- Detection value of VOC = Isobutylene gas concentration value x factor.
- For PID Detector warm up time is 1 hour.
- While Calibration of PID Detector, ensure environment should be free from VOC or other Gases.

7.5.6 CALIBRATION INSTRUCTION FOR NDIR-CO_2 DETECTOR

Zero Calibration:

Use Pure Nitrogen gas **(99.999%V/V Moisture & Oxygen Level <2 PPM & CO+ CO_2 level < 0.5PPM & T.H.C. < 0.2 PPM & other components should be nil.)**

SPAN CALIBRATION:

Use CO_2 gas concentration with balance Nitrogen ¼ th or ½ of CO_2 gas range.

Regulator flow Rate = 0.5 LPM for Zero & Span Calibration

For NDIR- CO_2, zero calibration is recommended & cannot be skipped.

For NDIR-CO_2, warm up time is 5 minutes.

7.5.7 STANDARD CALIBRATION SET UP FOR DIFFUSION TYPE DETECTOR

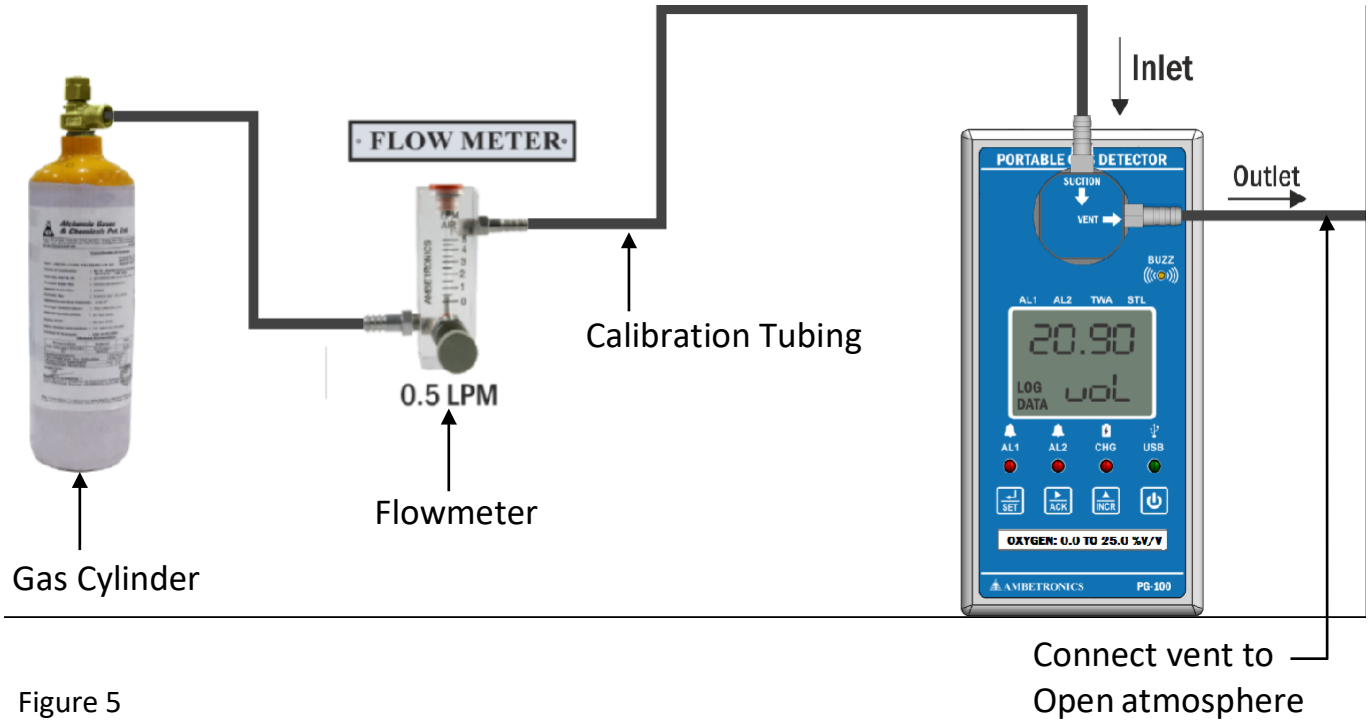


Figure 5

7.5.8 STANDARD CALIBRATION SET UP FOR SUCTION TYPE DETECTOR

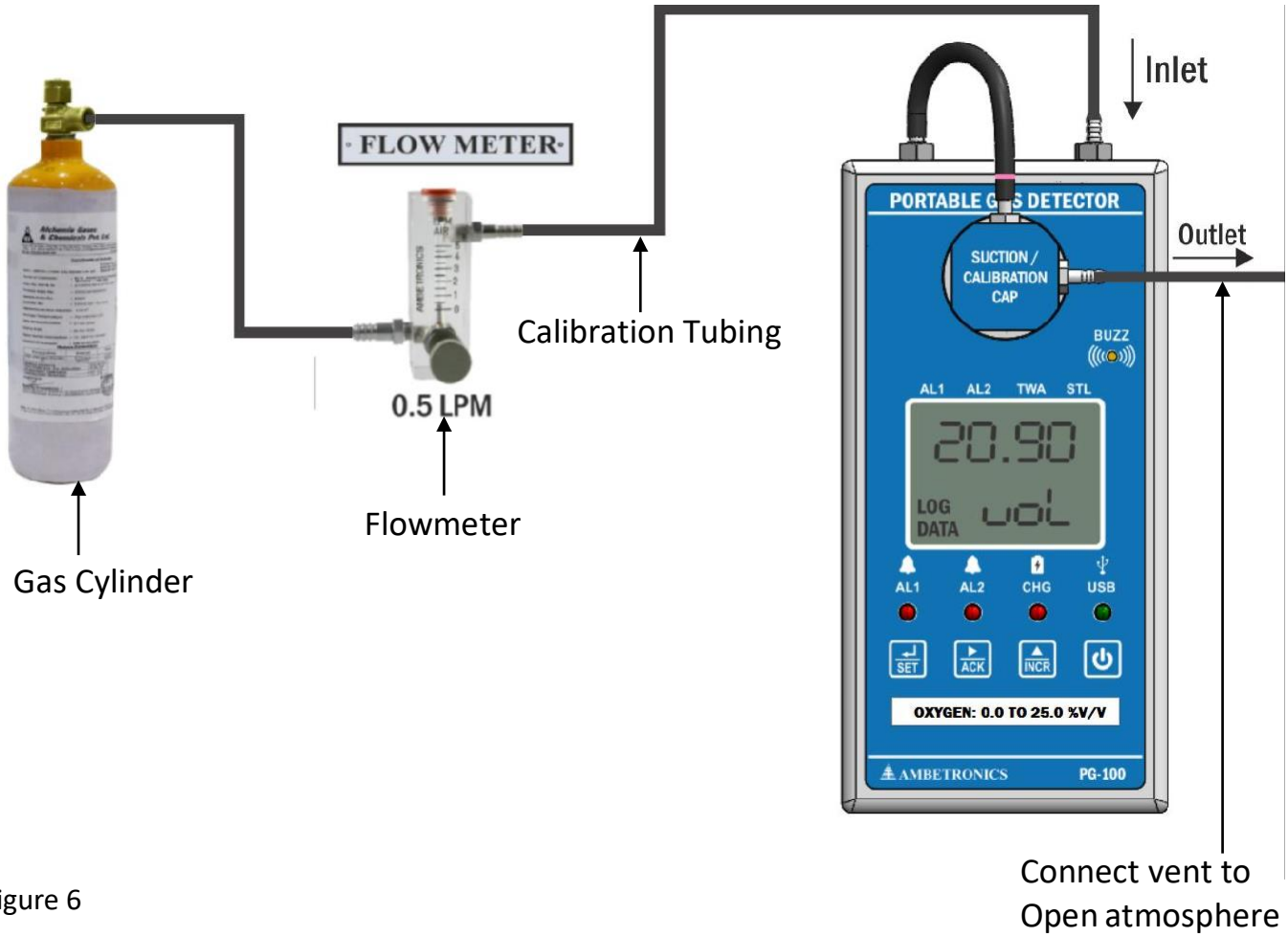


Figure 6

NOTE: Pump Should Be On for Suction Type

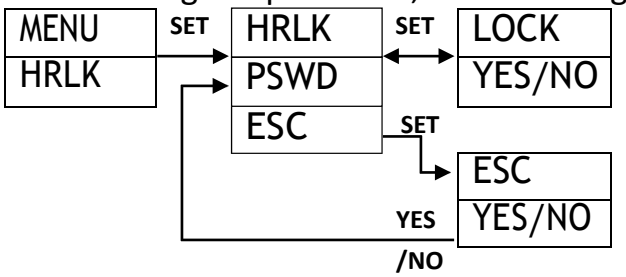
Steps for preparation of calibration set up:

1) Arrange all require component like Calibration Gas Cylinder with Gas Flow Regulator, Calibration Cap, Calibration Tubing, and Detector to be calibrated & connect as shown in Calibration set up.
2) Keep Calibration tubing length as short as possible.
3) While connecting tubing use short piece of rubber tube.
4) Before starting calibration, ensure Calibration Cap, Calibration Tubing, are connected properly to avoid leakage.
5) Use soap water to observe leakage.
6) Pour soap water over joints. If leakage is there, bubbles will be seen & if leakage is not there, bubble will not be seen.
7) Use Teflon tape between joints to avoid leakage.
8) After ensuring leakage is not found, open Calibration Gas Cylinder & set flow rate as recommended & connect Calibration tubing to Detector to be calibrated.
9) For Toxic corrosive gas such as CL_2, HCL, H_2S, SO_2, VOC, NH_3, HF, NO_2 etc. Use Teflon tubing or recommended by manufacturer.

10) For Combustible gas /NDIR- CH_4 /NDIR-CO_2 use normal Tygon tubing or recommended by manufacturer.
11) In Suction Type Detector or in sampling system, Pump should be ON, continuously till Calibration is completed.
Set continuous mode for Pump during Calibration.
12) Follow the calibration procedure mentioned in Operator / User manual.
13) For Zero / Low calibration, Apply Gas maximum 2 min or up to Stabilisation of reading & save Zero / Low calibration as per Calibration procedure.
14) For Span/ High calibration, Apply Gas maximum 2 min or up to Stabilisation of reading & save Span/ High calibration as per Calibration procedure.
15) For any assistance contact factory.

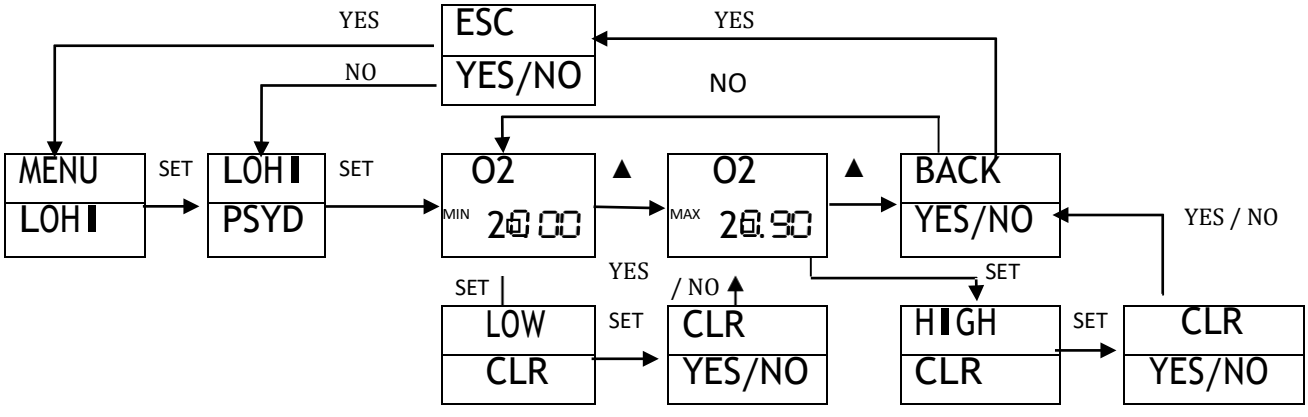
7.6 HIGH RANGE LOCK MENU

This menu is use to set high range of selected gas range
Press SET key to enter the menu and set/save the parameter. Use '▲' key to select parameters. Use '▲' & '▶' keys to edit the parameter value. Use "ESC" to go to the previous menu.
After entering the password, the following menu will be displayed



7.7 LOHI MENU

This menu is used to view the Low/High (Min/ Max) value of the Gas Concentration. This value can be cleared to by selecting CLR YES.
Press SET key to enter the menu and set/save the parameter. Use '▲' key to select parameters. Use '▲' & '▶' keys to edit the parameter value. Use "ESC" to go to the previous menu.
After entering the password, the following menu will be displayed



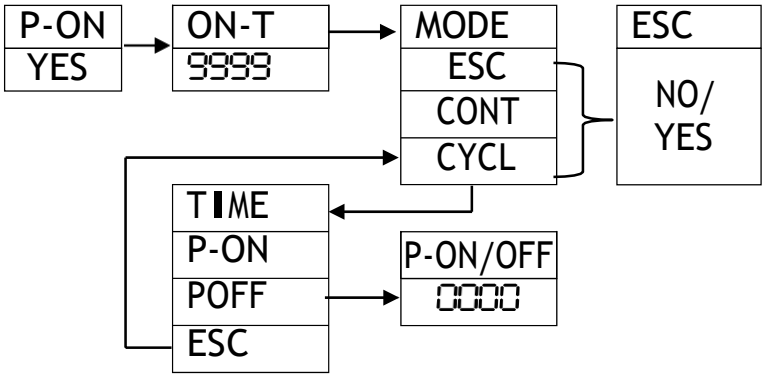
NOTE: This menu is useful to see Low peak & High peak of Gas Concentration during operation. After Power reset Low/High value of Gas Concentration are refreshed.

7.8 PUMP MENU

Only Visible for Suction Type Detector

The pump can be operated in continuous mode or cyclic mode. If in the first case pump is set to OFF, the unit returns to exit menu.

Press SET key to enter the menu and set/save the parameter. Use '▲' key to select parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ "Back" to go out of the setting parameter / menu. After entering the password, the following menu will be displayed.



If pump is not required to use, Select No,

Total Pump on Time (ON-t) is 9999 sec.

Press '▲ + SET' key together to start/stop the pump when used in continuous mode / Cyclic mode.

Continuous Mode (CONT) = If Continuous mode is selected for sampling of gas Pump will be automatically On till pump on time (ON-t) is over

Cycle Mode (CYCL) = if Cycle mode is selected for sampling of gas. Pump on (P-On) & Pump off (POFF) time is required to be set.

Pump On + Pump off time ≤ Total Pump On time (On-t)

In any mode is pump is operated for set Total pump on time (ON-t)

Pump is required for Suction of gas target gas sample to sensor of detector.

- **'Pump on'** indication is shown by **'DP'** on LCD; Refer Display Details.

7.9 COMMUNICATION MENU

Only Visible in Detector having Data Logging Facility

It is used to set serial communication parameters to communicate with remote terminal/ PC.

Press SET key to enter the menu and set/save the parameter. Use '▲' key to select parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ "Back" to go out of the setting parameter / menu. After entering the password, the following menu will be displayed.

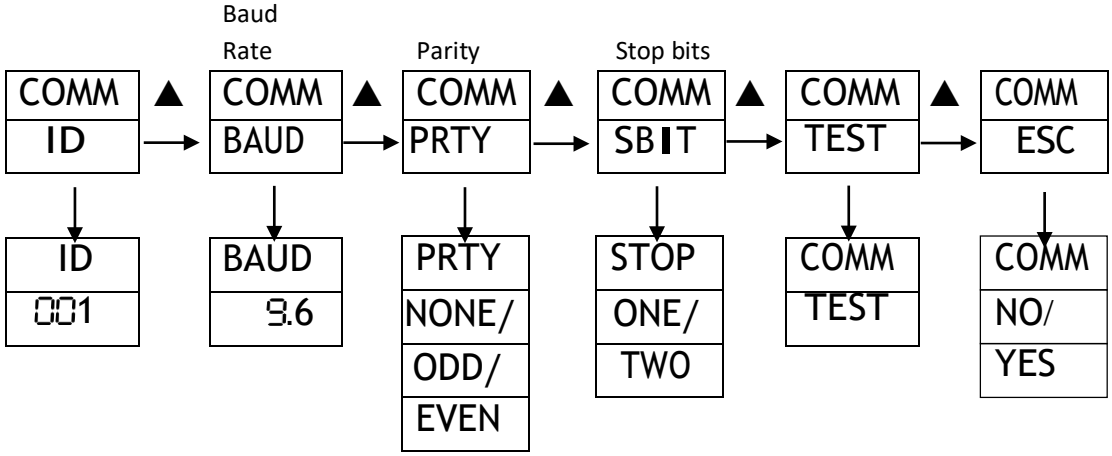


Table 13

DEVICE ID	:	ID can be set from 1 to 250 as per the requirement
BAUD RATE	:	This setting is for viewing only. The value is fixed at 9.6kbps
PARITY	:	This is the parity bit odd or even or none can be set. Same setting is to be done in computer software also
STOPBITS	:	The stop bits indicate the end of data string; selection can be done as 1/ 2 bits. It is usually set ONE
DATABITS	:	Data Bits are not shown but should be considered as 8.
TEST	:	When 'Test' is selected 'Test" on display get steady & "**Ambetronics Engineers Pvt Ltd"** on Hyper-Terminal will be displayed.

NOTE: Ensure the above settings are matched for PG-100 and the terminal software while downloading the logged data.

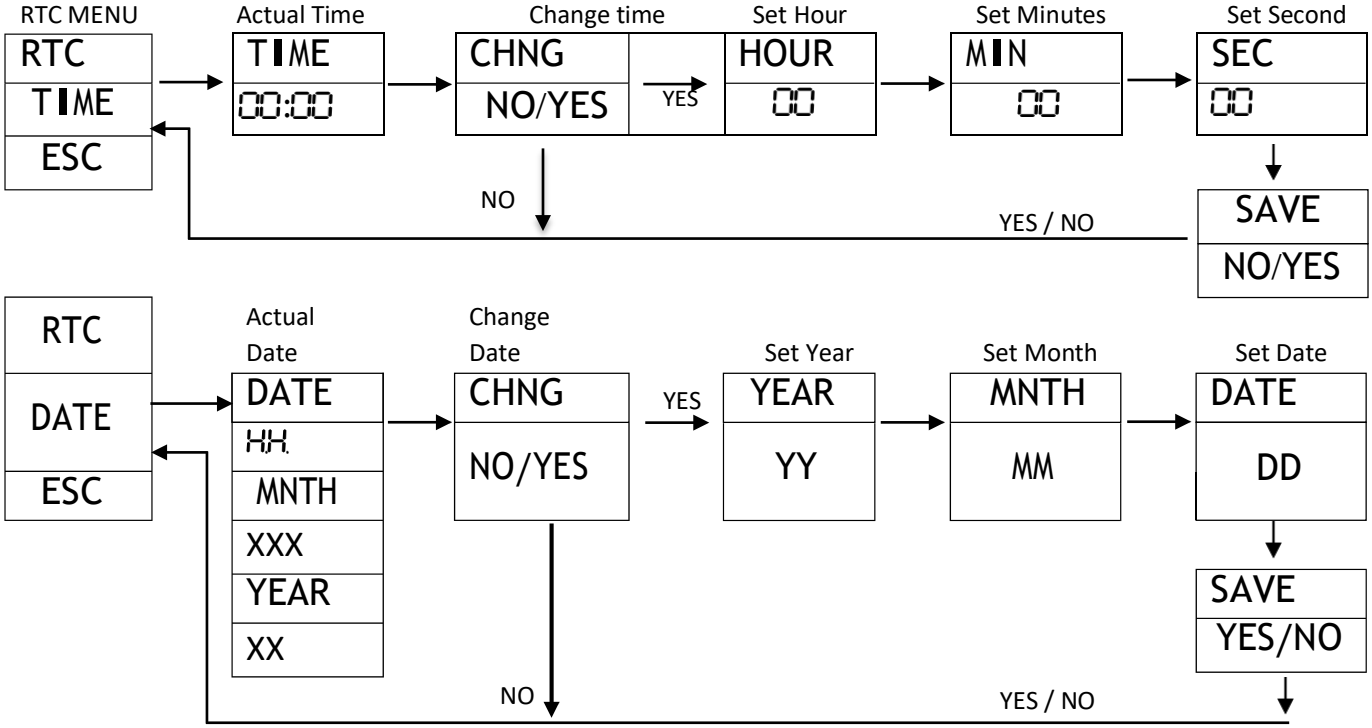
7.10 RTC MENU

Only Visible in Detector having Data Logging Facility

This menu used to set RTC/ Date in detector.

Press SET key to enter the menu and set/save the parameter. Use '▲' key to select parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ " Back "to go out of the setting parameter / menu.

After entering the password, the following menu will be displayed



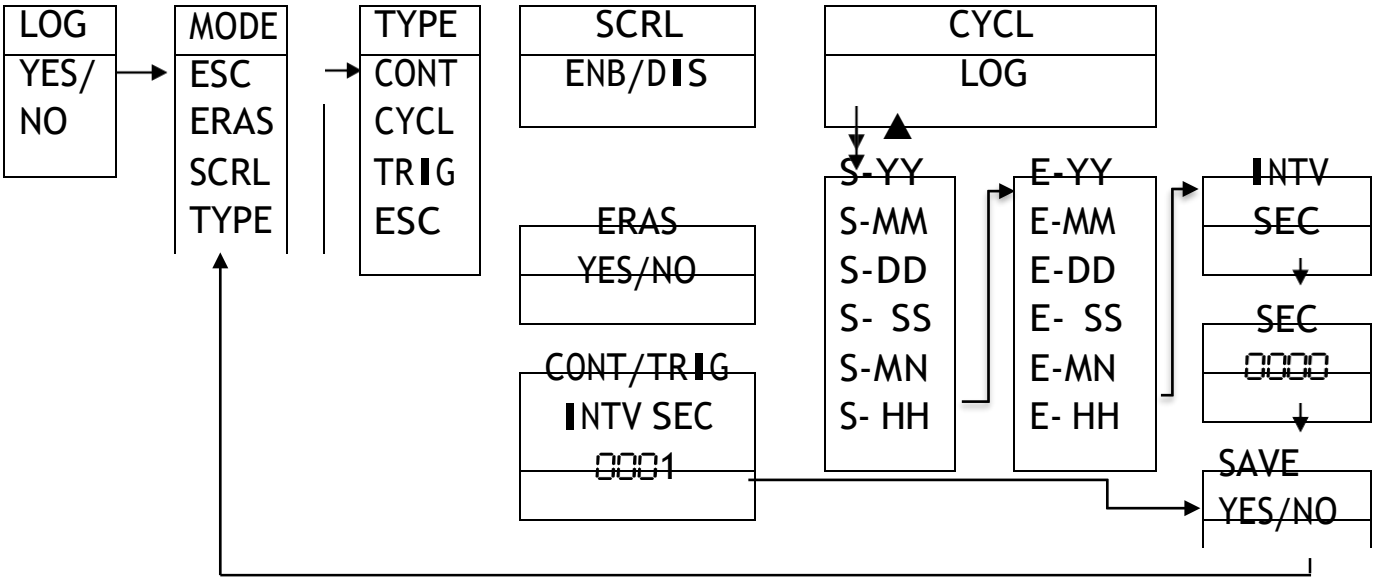
7.11 LOGGING MENU

Only Visible in Detector having Data Logging Facility

This menu is used to configure the logging settings. One has logging mode to select from continuous/ cyclic/ log on Triggering. Scrolling mode can be enabled/ disabled as per the requirement. Log Records can also be erased using this menu.

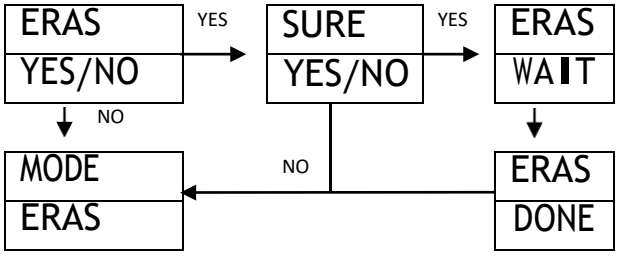
Press SET key to enter the menu and set/save the parameter. Use '▲' key to select parameters. Use '▲' & '▶' keys to edit the parameter value. Use "BACK" to go to the previous menu or setting and use "ESC"/ "Back "to go out of the setting parameter / menu.

After entering the password, the following menu will be displayed

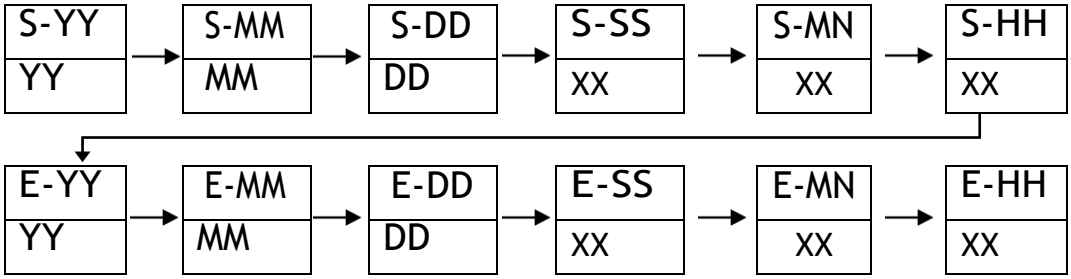


NOTE: S-START, E-END.

Logged data can be deleted (erased) through below flow chart



For cyclic mode selection, the following steps will come to set the start and end date and time before setting the interval as shown below. To set press '▲' key. When 'CYCL LOG' is seen.



XX : Set Numerical value as per parameter
XXX : Set Month value as per parameter

Table 14

LOG **YES/ NO**	Choose 'YES' option to set make setting to start data logging. Or other use keep 'NO'

LOGGING TYPE	There are 3 types of data logging; continuous (CONT) / cyclic (CYCL) / log on triggering (TRIG). In continuous mode the logging will start immediately till the end of memory. In cyclic mode the logging will be on only for the period for which it is enabled. In Triggering mode the logging will start/stop when 'SET' & '▶' keys are pressed together.
LOGGING MODE	If scrolling is **ENB** (Enabled) then the old data will be replaced with new data when memory is full and if it is **DIS** (Disabled), the data will be logged till the memory is full.
DATA ERASE	In this option Logged data can be de deleted.
LOG INTERVAL	Log interval can be set from 1 to 7200 sec.

Note: If logging is enabled, LOG DATA will blink in the left bottom corner of the display screen when the data logging is going on. Logging will reset at time 00:00:00 every day. Hence apart from first day, first log will be at time 00:00:00.

During Logging 'LOG DATA' indication will blink continuously and upon completion of 100% log data the 'LOG DATA' indication will be steady.

7.12 DOWNLOAD MENU

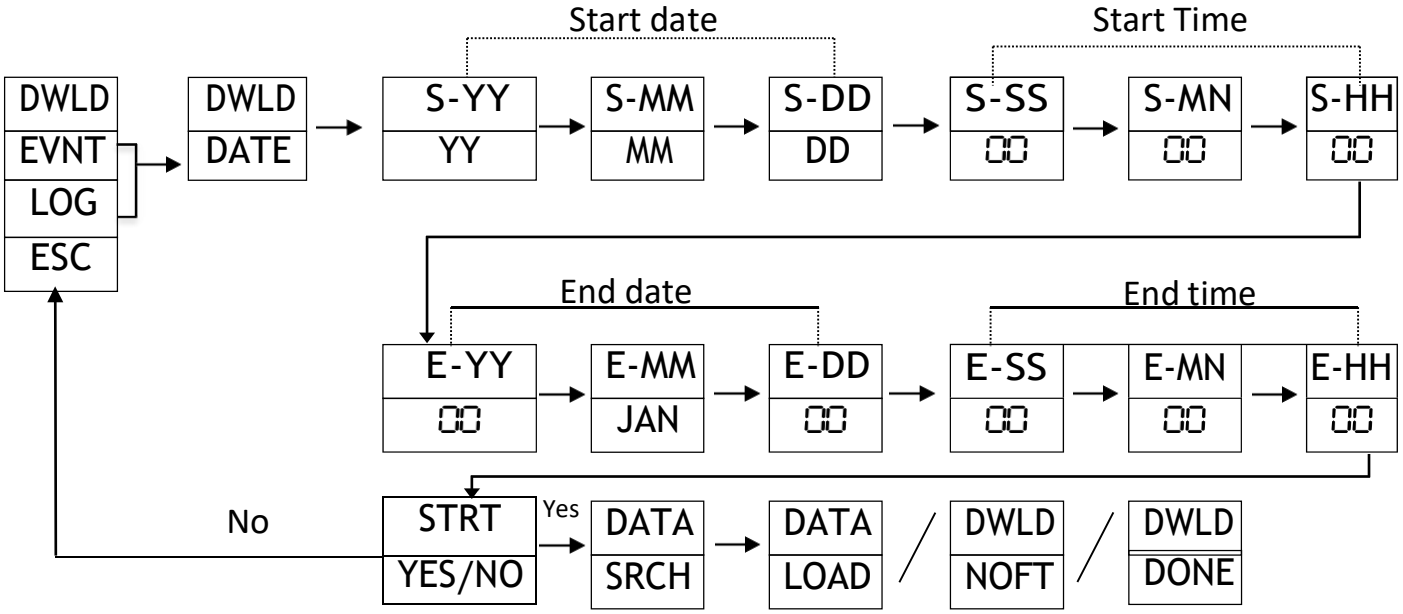
In download menu, you can download the log data or event data. Log data contains the data logged at interval set in the log menu. Event data is stored during Alarms or sensor error condition (Over Range or Sensor Open) condition. The report format can be seen in the next section.

Download procedure for the events and logs will be the same. Enter Start Date &Time and End Date &Time to download data. The procedure is stated below in the flowchart.

Press SET key to enter the menu and set/save the parameter. Use '▲' key to select menu parameters. Use '▲' & '▶' keys to edit the parameter value. Use "ESC" to go to the previous menu.

After entering the password, the following menu will be displayed.

Only Visible in Detector having Data Logging Facility



NOTE: This menu will appear only when logging function is provided.

If no log data is found, "DWLD NOFT" is displayed which means data not found.

If log data is found, "DWLD LOAD" is displayed which means data is found.

If downloading is started, "DATA SRCH" is displayed means data is searched for particular duration.

If Downloading is complete "DYLD DONE" is displayed means data downloading is completed.

If set time is wrong "TIME WRNG" is displayed means set time as wrong.

8. USER GUIDELINES

8.1 LOGGING GUIDELINES

- Once 'EEPROM' memory is full, and if 'SCRL ENB' (SCROLL ENABLE) the new logging data will rewrite the old log data.
- Once 'EEPROM' memory is full and 'SCRL DIS' (SCROLL DISABLE) the new logging data won't be logged into inbuilt 'EEPROM'.
- To start log download, go to download option in the menu, set start date / time & End date / time, connect USB cable to the device and PC and open 'TERA TERM' software by following the steps mentioned below

8.2 TERA TERM SOFTWARE GUIDELINES

This TERA TERM software is used to view the log data that is being transfer through micro USB port.

While downloading the data from the device proceed as per the hardware procedure stated in the flowchart above in the download menu. We recommend you to use the 4.96 or updated software shown below. You can download the software from the following website and install it on your computer.

https://osdn.net/projects/ttssh2/downloads/72009/teraterm-4.105.exe/

Select the COM port as per the device connected. If the new logger is connected, you may need the drivers which can be downloaded from the following site

http://www.ftdichip.com/Drivers/D2XX.htm

The step to use this TERA TERM software is mentioned below.

STEP 1: Click on this logo to open 'TERA TERM' software

Figure 7 **TERA TERM software logo**

STEP 2: Tera Term start-up screen and COM port selection

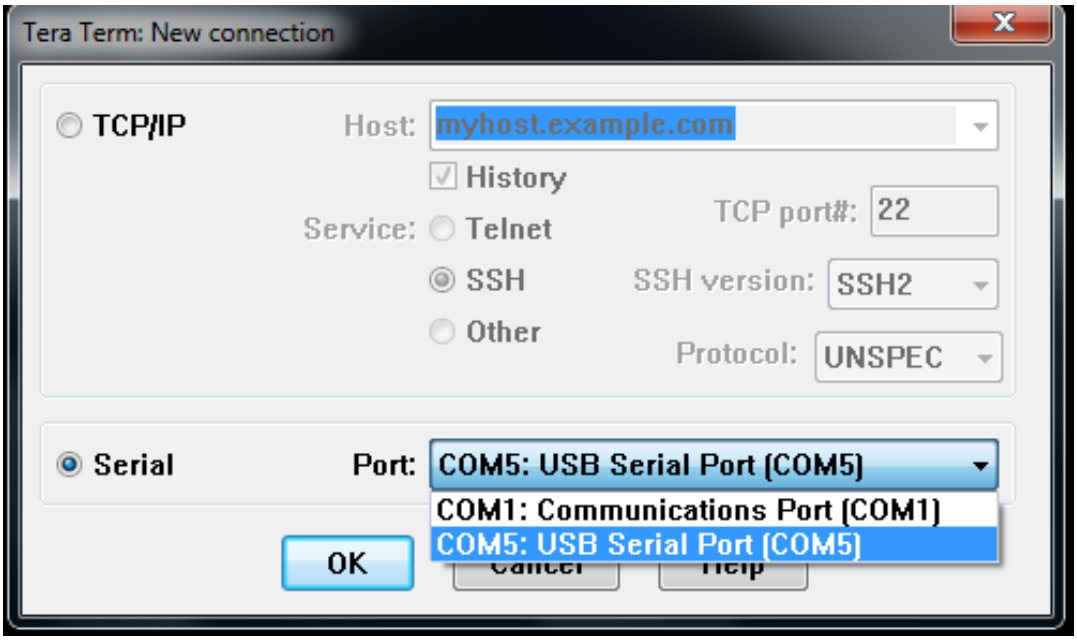


Figure 8

STEP 3: Select Terminal

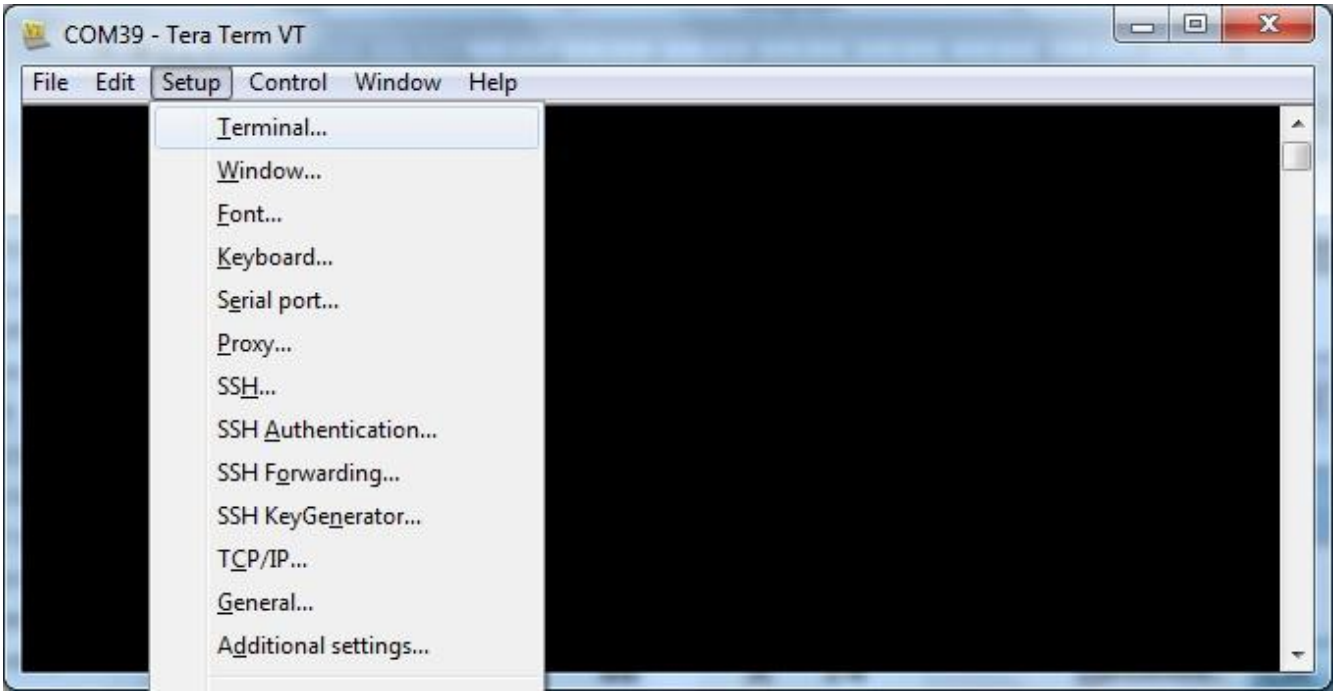


Figure 9

STEP 4: Select New Line

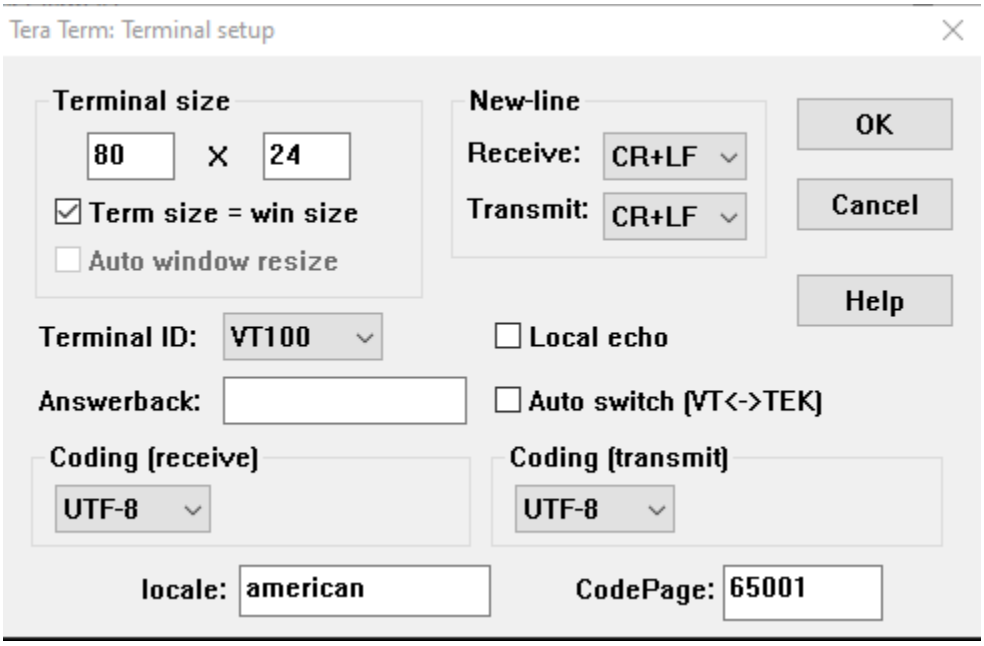


Figure 10

STEP 5: Select Serial Port

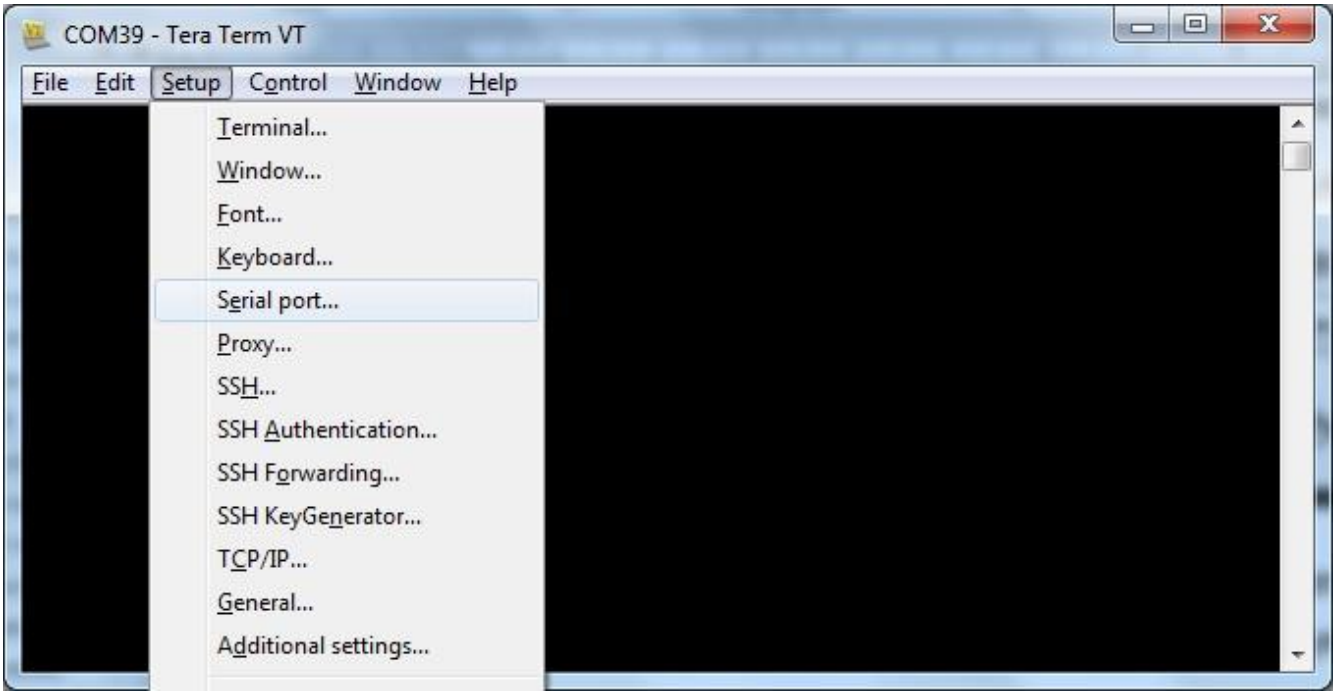


Figure 11

STEP 6: Serial Port Setup

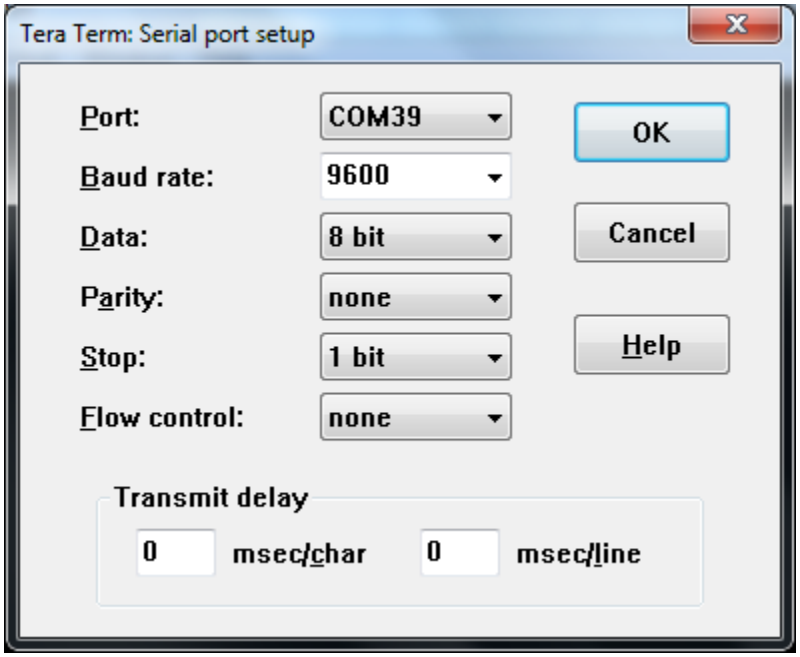


Figure 12

STEP 7: Select file option and click on log

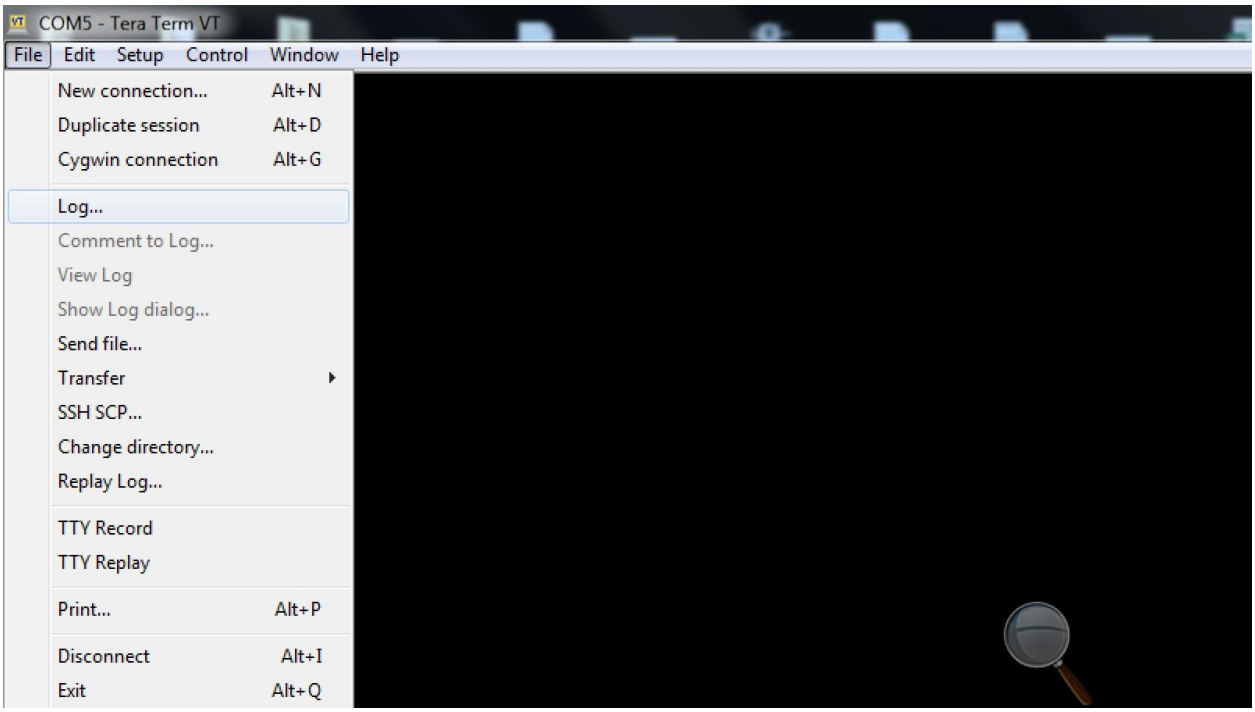


Figure 13

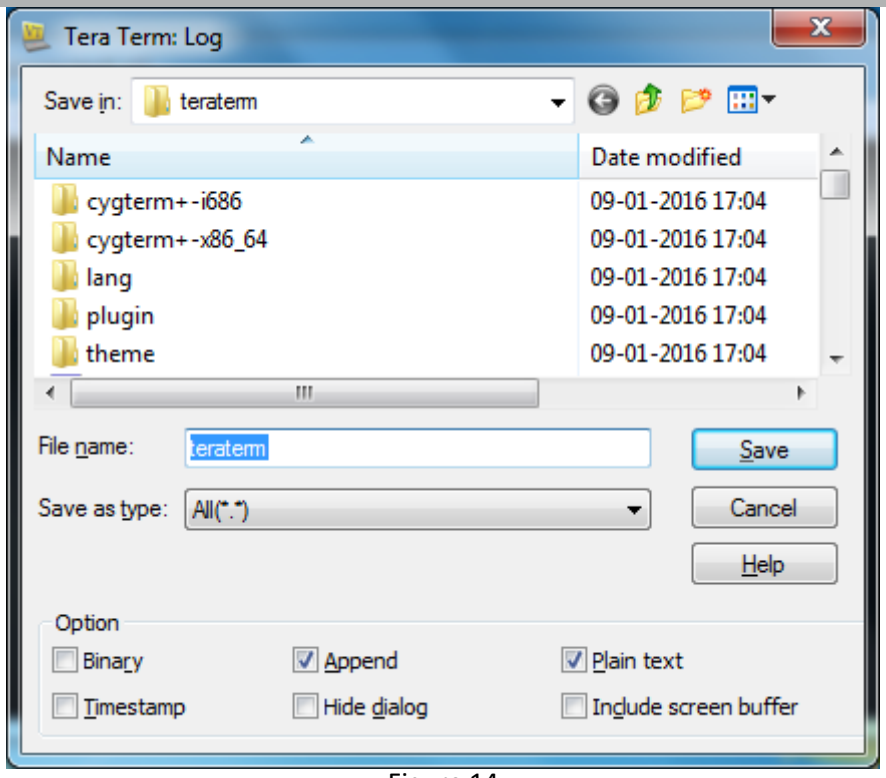


Figure 14

Use **Lucida Console regular** font only to open the file in notepad. Using a different font can disturb the alignment of the text displayed.

STEP 8: Select the file directory where you want to save the log file and give the log file name as per your choice but save in .txt format. (e.g. xxxx.txt)

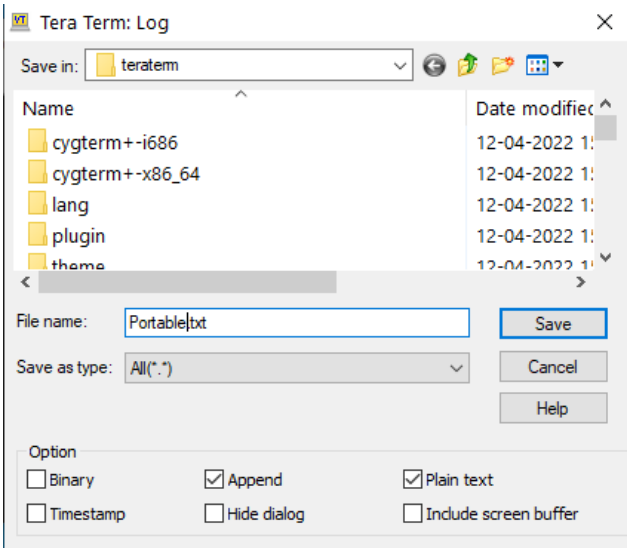


Figure 15

STEP 9: when user starts to download the log data, log data will start to appear on TERA TERM window.

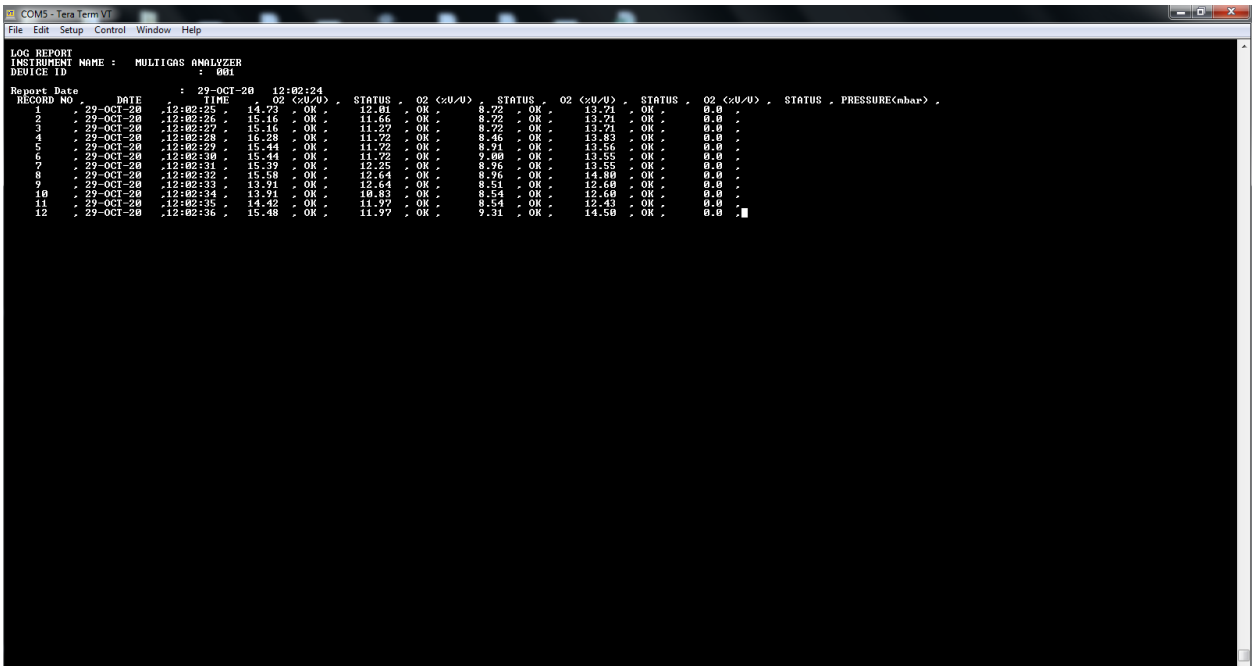


Figure 16

STEP 10: When data download is completed, such footer will appear.

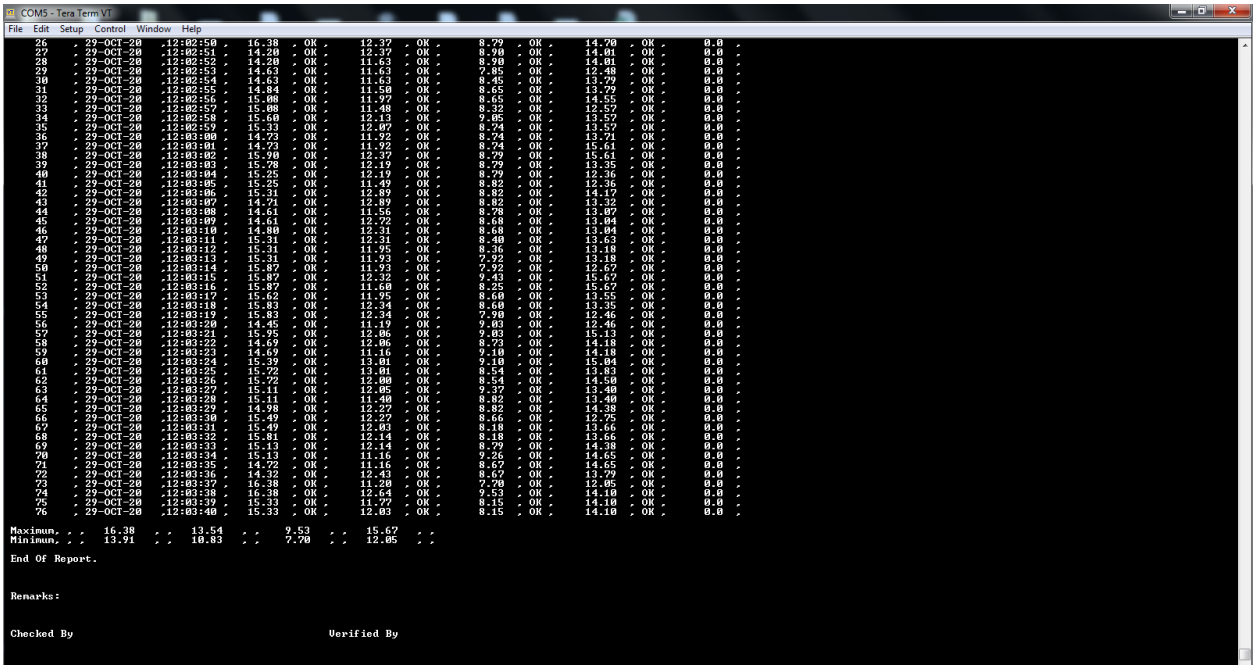


Figure 17

9. APPENDIX

9.1 NOTES

- Esc menu /Back – This menu is available in all menus and can be used to come out of the menu /Parameter /Mode.
- To see the battery status in voltage, percentage, CAL* due days and sensor life days, press shift key (▶) for about 5 sec. and then press it again one by one to see each of them respectively. Refer the captions meaning for the words. Press (↵) key to return to NWM*
- In log Report, the LOW/ HIGH (min/max) calculation mentioned is for the given date & in 24 hours' format only. Verification of the serial nos. of data is essential to avoid skipping of data lines due to loose connection of the USB port.
- Confidence beep sounds after every 1 min to ensure the detector is working properly.

9.2 ACRONYMS USED IN THIS MANUAL

NWM* – Normal Working Mode
GC* – Gas Concentration
SP* – Set point
PV* – Process Value
B/V* – Buzzer / Vibrator
PV* & GC* are of same meaning
Operator Setting menu & User menu are of same meaning.
Operator/User are of same meaning

9.3 FAULT CONDITIONS

Table 15

SR NO	SYMPTOMS	PROBLEMS	SOLUTION
1.	Detector doesn't turn on	Battery Low below 5%	Recharge the Battery with AC Adapter charger
2.	Sensor open	Sensor module is faulty or disconnected	Try to reconnect the sensor module again or replace with the new sensor module /Contact factory
3.	Over range	Sensor reading has exceed the range of the detector	Use detector to check gas of Specified Range

10. ORDERING INFORMATION

Table 16

MODEL NO	_	DETECTION METHOD	DATA LOGGING OPTION	_	GAS NUMBER ,RANGE,RESOLUTION
PG-100		1) S= Suction	1) No Suffix = No Data Logging		Refer Gas List
		2) D= Diffusion	2) L= Data Logging		

NOTE: 1. Select order code e.g. PG-100-SL-T8 i.e. PG-100 –SUCTION & DATA LOGGING – HYDROGEN 2000 PPM

2. Diffusion type is available with Extended Flexible sensor (Gooseneck) with Length maximum 1 feet. Option available for Catalyic / pellister and Oxygen sensor.

11. REVISION HISTORY

Table 17

Sr. No	VERSION NO	REVISION	EFFECTIVE DATE	REMARK
1.	V2.00 JUN 2018	R0		New release for new version of PCB
2.	V2.01 JUL 2018	R1	31/07/2018	Instruction added for intrinsic safety
3.	V2.03 nov 2018	R2	15/12/2018	Technical specification & TWA/STEL added
4.	V2.03 nov 2018	R3	09/04/2019	Technical specification & Menus are updated, Calibration Procedure added.
5.	V2.03 nov 2018	R4	31/07/2019	New sticker updated; BIS MARK added & NDIR / O2 gas list updated
6.	V2.03 nov 2018	R5	06/09/2019	NO, ETO, N10 Removed From Gas List
7.	V2.04 oct 2019	R6	18/10/2019	Software Version Updated, Decimal Point Updated 0.000
8.	V2.04 oct 2019	R7	26/12/2019	Certificate No for PESO Updated, Format changed as per New Standard
9.	V2.05 JAN 2019	R8	06/01/2020	Software Version Updated
10.	V2.07 JAN 2020	R9	16/07/2020	Software Version Updated
11.	V2.08 AUG 2020	R10	18/08/2020	Software Version Updated
12.	V2.09 NOV 2020	R11	12/11/2020	Software Version Updated, Add User Guidelines
13.	V2.09 MAR 2021	R12	24/03/2021	Software Version Updated
14.	V2.10 AUG 2021	R13	21/09/2021	Software Version Updated

15.	V3.00 JAN 2022	R14	03/02/2022	Software & Hardware Updated
16.	V3.01 MAY 2022	R15	14/05/2022	Software Version Updated
17.	V3.02 NOV 2022	R16	02/01/2023	Software & Hardware Updated
18.	V3.03 MAR 2023	R17	31/03/2023	PID Software Update
19.	V3.03 MAR 2023 (89) V4.00 APR 2023 (88)	R18	07/04/2023	Software Version Update
20.	V3.04 MAY 2023 (89) V4.01 MAY 2023 (88)	R19	06/06/2023	Software Update

12. MISCELLANEOUS

Table 18

SR. NO	VERSION NO	REVISION	EFFECTIVE DATE	TOTAL TABLE NO.	TOTAL FIGURE NO.
1.	V2.00 JUN 2018	R0			
2.	V2.01 JUL 2018	R1	31/07/2018		
3.	V2.03 nov 2018	R2	15/12/2018		
4.	V2.03 nov 2018	R3	09/04/2019	Table 16	Figure 12
5.	V2.03 nov 2018	R4	31/07/2019	Table 17	Figure 13
6.	V2.03 nov 2018	R5	06/09/2019	Table 17	Figure 13
7.	V2.04 oct 2019	R6	18/10/2019	Table 17	Figure 13
8.	V2.04 oct 2019	R7	26/12/2019	Table 17	Figure 13
9.	V2.05 JAN 2019	R8	06/01/2020	Table 17	Figure 13
10.	V2.07 JAN 2020	R9	16/07/2020	Table 17	Figure 15
11.	V2.08 AUG 2020	R10	18/08/2020	Table 17	Figure 15
12.	V2.09 NOV 2020	R11	12/11/2020	Table 17	Figure 16
13.	V2.09 MAR 2021	R12	24/03/2021	Table 17	Figure 16
14.	V2.10 AUG 2021	R13	21/09/2021	Table 17	Figure 16
15.	V3.00 JAN 2022	R14	03/02/2022	Table 17	Figure 16
16.	V3.01 MAY 2022	R15	14/05/2022	Table 17	Figure 16
17.	V3.02 NOV 2022	R16	02/01/2023	Table 18	Figure 17
18.	V3.03 MAR 2023	R17	31/03/2023	Table 18	Figure 17
19.	V3.03 MAR 2023 (89) V4.00 APR 2023 (88)	R18	07/04/2023	Table 18	Figure 17
20.	V3.04 MAY 2023 (89) V4.01 MAY 2023 (88)	R19	06/06/2023	Table 18	Figure 17

THE END

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