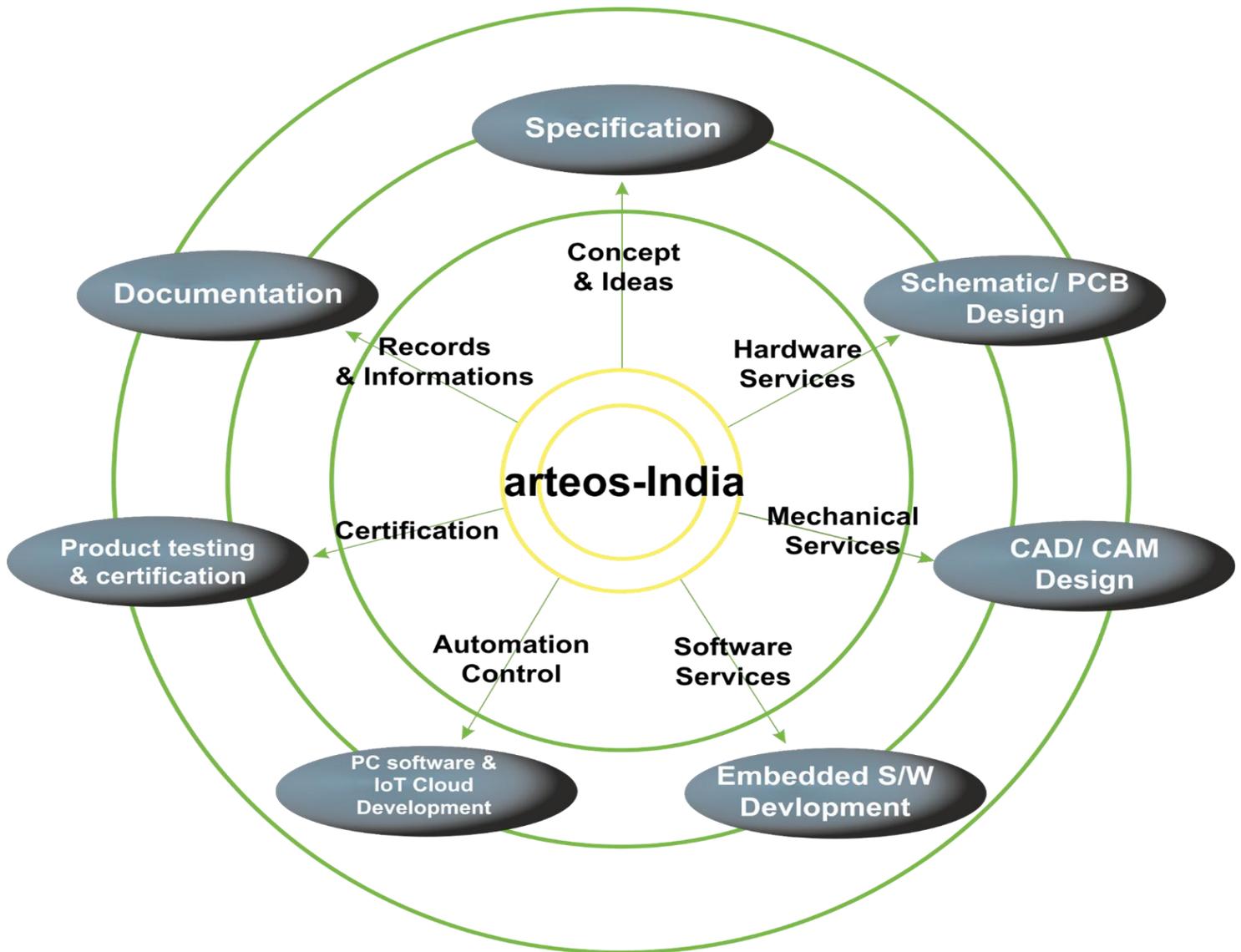




GF2: E&K-Service

Beispiele unserer Arbeiten





Elektronikentwicklung & Embedded Hardware

- Entwicklung kundenspezifischer Leiterplatten
- Integration von analogen und digitalen Sensorsystemen
- Signalaufbereitung und High-Resolution ADC Design
- Entwicklung von Industrie-Mikrocontrollersystemen
- High-Speed PCB Design für industrielle Anwendungen

CAD- und CAM-Service

CAD-Designleistungen:

- 2D- und 3D-Konstruktionsmodellierung (mechanisches Design)
- Gehäusekonstruktion und Industriedesign
- PCB-Layout-Design (Single- und Multilayer-Leiterplatten)
- Optimierung der Bauteilplatzierung
- Thermische und strukturelle Analyse
- Design for Manufacturing (DFM)
- Stücklisten (BOM) und technischer Dokumentation erstellen

CAM-Services:

- CNC-Programmierung und Werkzeugpfadgenerierung
- Gerber- und Fertigungsdaten
- Bestückungsdaten für die Elektronikfertigung
- 3D-Druck und Prototypenunterstützung
- Produktionsreife Fertigungsdaten für die Serienfertigung

Embedded Software & RTOS

- Entwicklung von Firmware für industrielle Mikrocontrollersysteme
 - Implementierung von Echtzeitbetriebssystemen (RTOS)
 - Entwicklung von Embedded Linux Systemen
 - Integration industrieller Kommunikationsprotokolle
- Typische Protokolle: Modbus, CAN/CANopen/Ethernet/TCP-IP/ WLAN

Industrial IoT & Edge Computing

- Edge Processing und Datenlogging
- Echtzeit-Monitoring und Alarmmanagement
- sichere Datenübertragung (TLS / Verschlüsselung)
- Integration in Cloud- und SCADA-Systeme
- Entwicklung von Web- und Mobile-Dashboards

Systemtest, Verifikation und Validierung

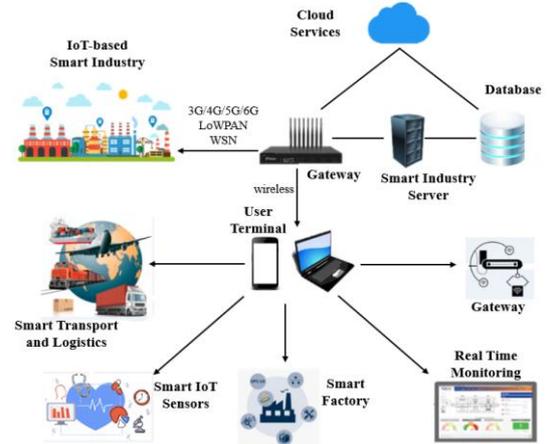
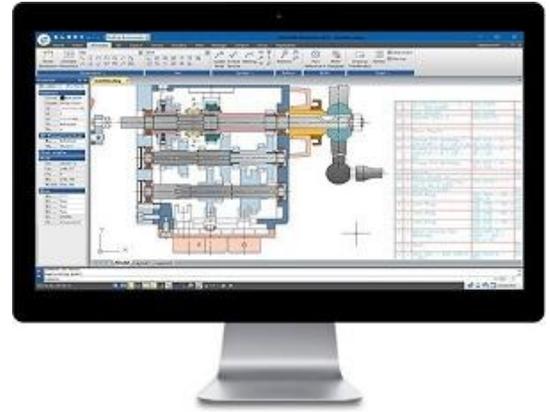
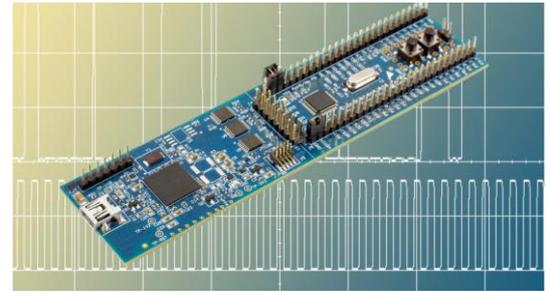
- Funktionale System- und Produkttests
- Hardware- und Firmware-Verifikation / -Validierung
- Kommunikationsprotokolle prüfen (RS485 Modbus, Ethernet, IoT)

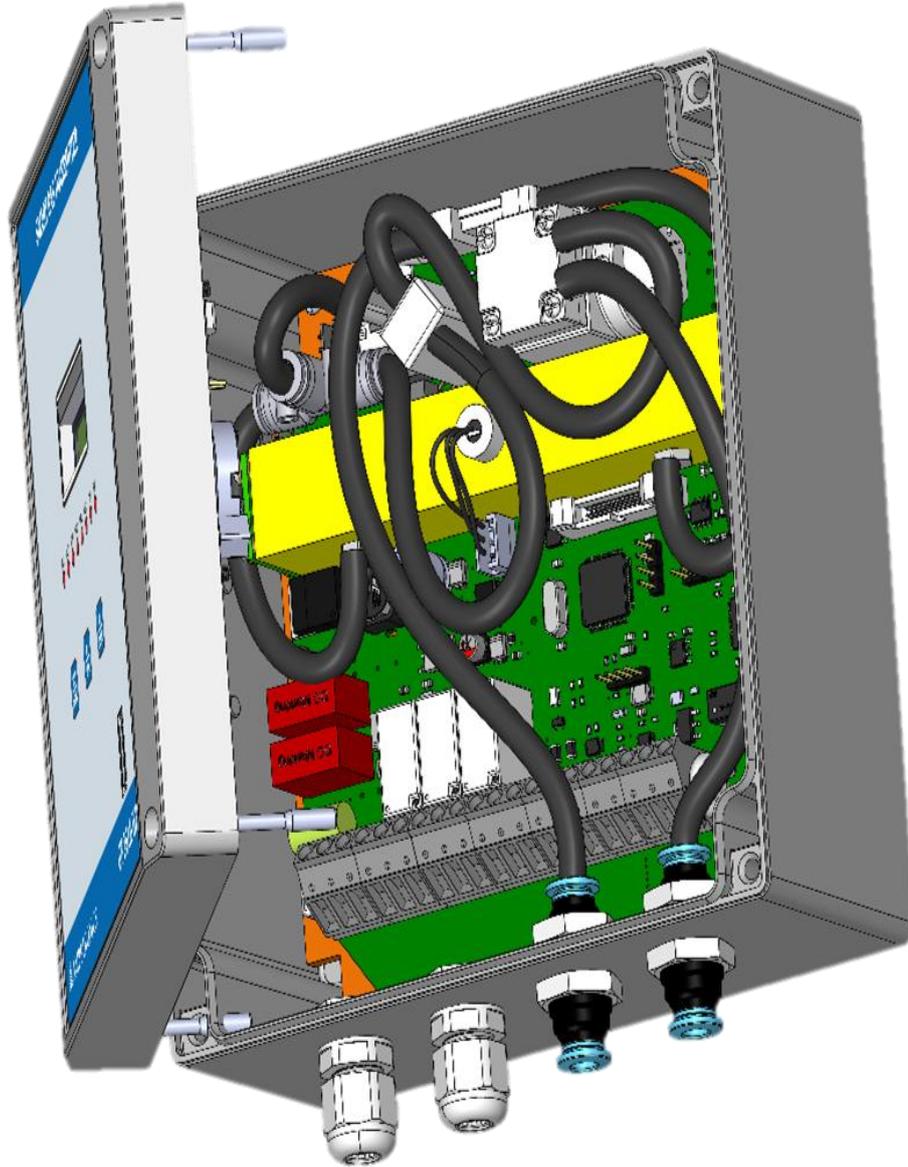
Zertifizierung (Unterstützung & Bearbeitung)

- CE-Konformität
- UL- / FM-Zulassungen
- TÜV-Zertifizierung für funktionale Sicherheit (SIL1 – SIL3)
- ATEX-Zulassung für explosionsgefährdete Bereiche
- IECEx-Zertifizierung

Dokumentation

- Produkt,
- Produktion,
- Firmware,
- Hardware,
- ISO 9001 konform



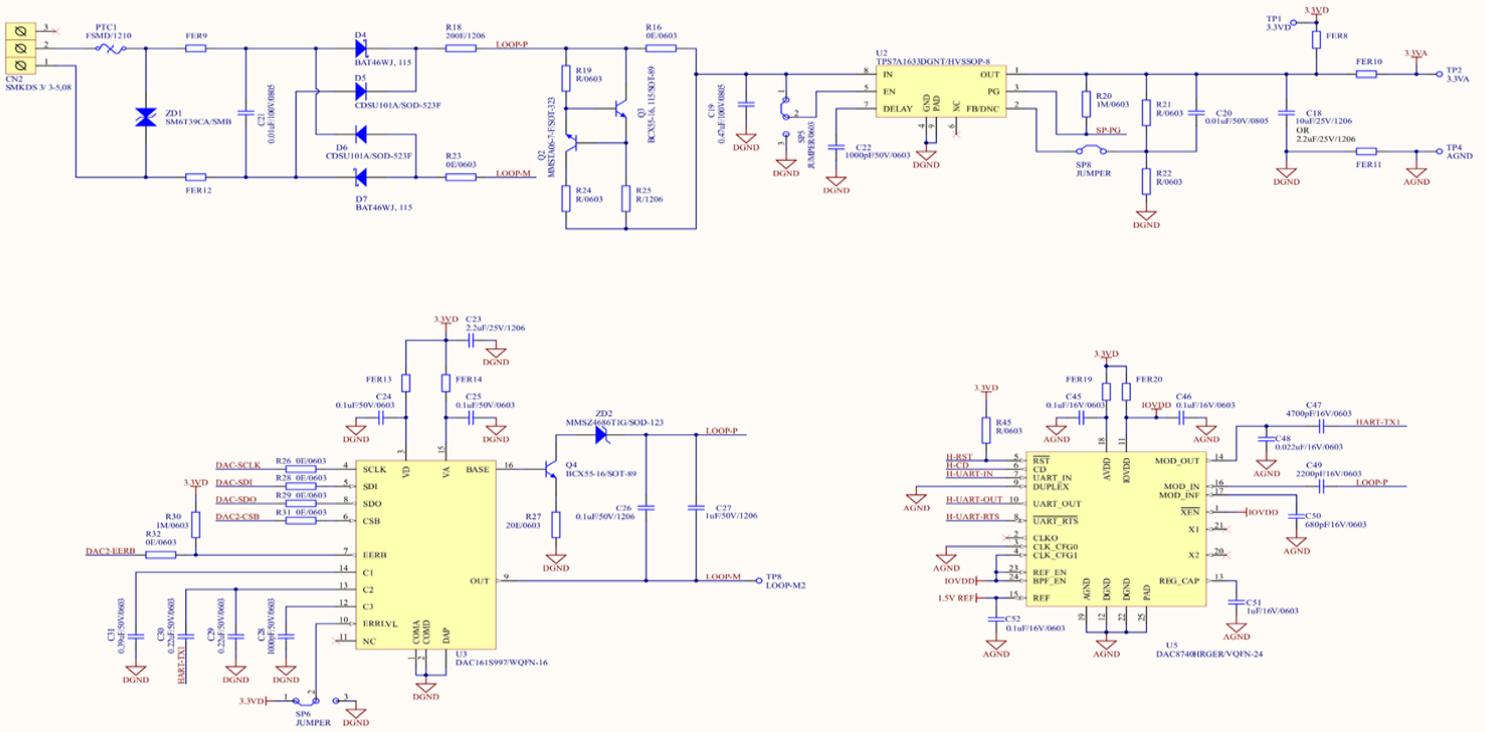




Schaltungs-Diagramm

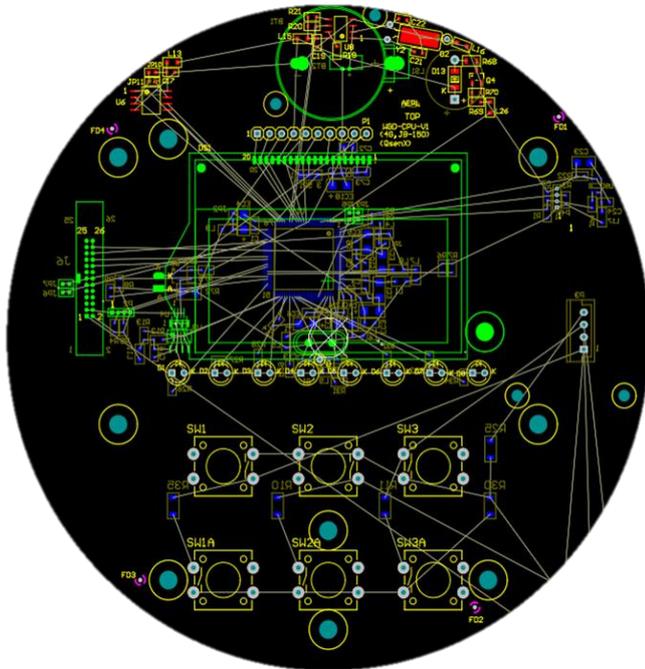


TWO WIRE 4-20mA WITH HART

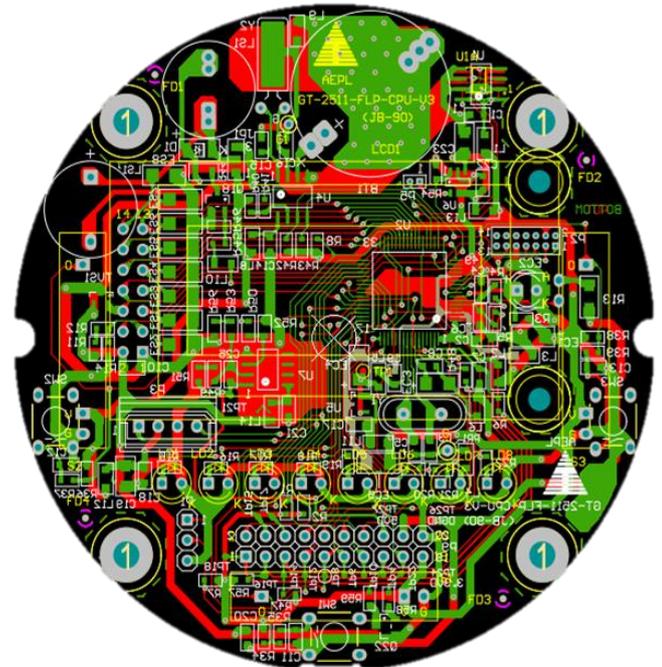




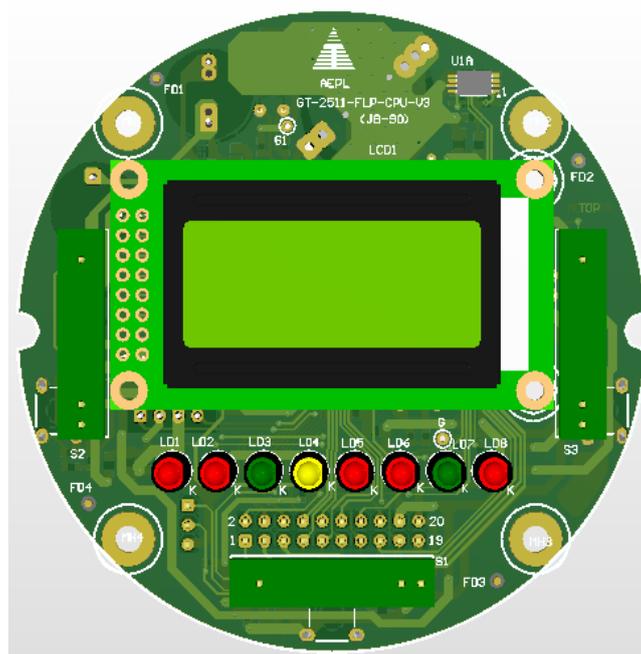
STEP 1



STEP 2



STEP 3





Stückliste / Bill of Material (BOM)

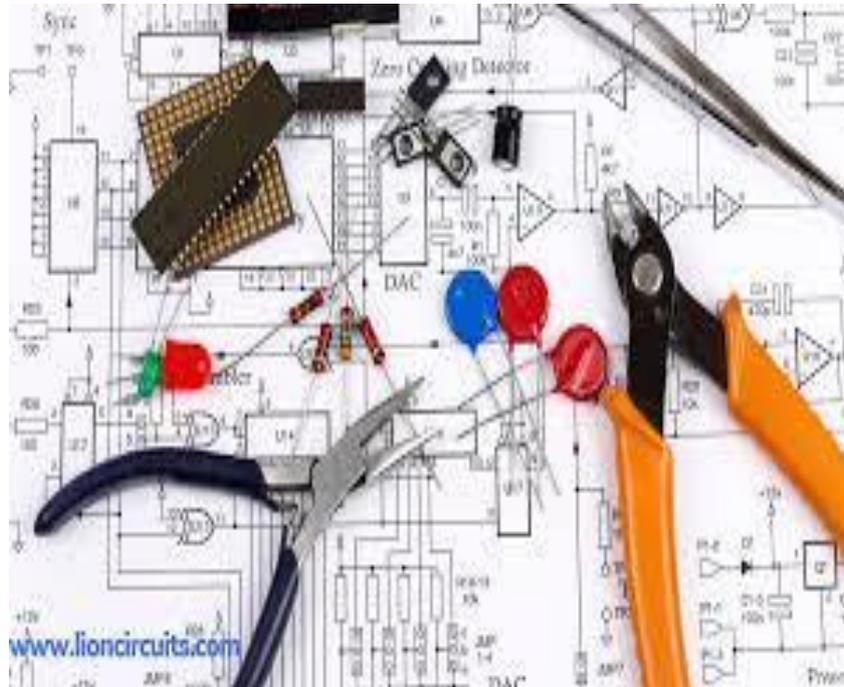


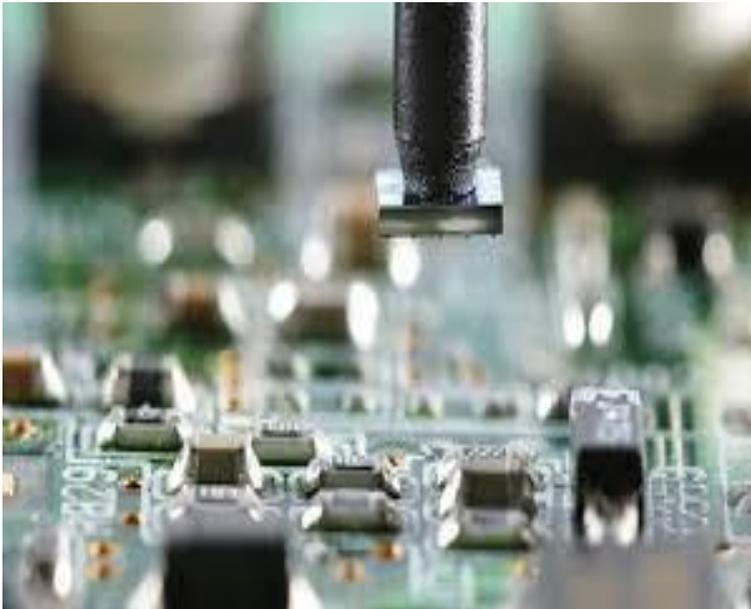
MATERIAL LIST

PRODUCT NAME : SMART GAS DETECTOR
 MODEL NO : GT-2511-FLP-JB90
 PCB NO : GT-2511-FLP-CPU-V3
 CIRCUIT DIAGRAM REFERENCE : RTC SECTION

DATE: 25-05-2023
 REVISION: 3R0

SR NO	NOTATION	VALUE	DESCRIPTION	MAKE	APN	QTY PER PCB	SOLDER POINTS	REMARK
LEADED COMPONENTS								
1) MISC								
1	BATTERY FOR BT1	3V, CR2032 SOLDARABLE BATTERY	COIN BATTERY	MAXELL		1	NA	
				PANASONIC				
2	Y2	32.768kHz CRYSTAL	CYLINDRICAL CAN	FRONTER		1	3	
				JAUCH QUARTZ				
SMD COMPONENTS								
2) RESISTORS								
3	R40	4.7K/1%/0603	100PPM/1/10W	ROYAL OHM		1	2	
				VISHAY				
				YAGEO				
3) CAPACITORS								
4	C14	0.1uF/50V/0603	X7R/10%/MLCC	VISHAY		1	2	
				AVX				
				GUJARAT POLY ELECTRONICS				
				KEMET				
				WALSIN				
4) INDUCTORS								
5	L8	742792096	FERRITE BEAD/0805	WE		1	2	
		FBMA-11-201209-102A10T		KING CORE				
6	L9	74279206	FERRITE BEAD/0805	WE		1	2	
		FBMA-11-201209-300A30RT		KING CORE				
5) ICS								
7	U4	BQ32000D	SOIC-8	TEXAS INSTRUMENTS		1	8	
FOR MORE DETAILS REFER STICKER DETAILS, CIRCUIT DIAGRAM & COMPONENT PLACEMENT OF GT-2511-FLP-JB90 (RTC SECTION)								
NOTE: 1. ALL SMD RESISTORS OF 0805 PACKAGES ARE $\pm 1\%$, 100PPM/°C, 1/8W OR UNLESS OTHERWISE SPECIFIED.								
2. ALL SMD CAPACITORS OF 0805 PACKAGES ARE $\pm 10\%$, X7R, MULTILAYER CERAMIC CHIP CAPACITOR (MLCC) OR UNLESS OTHERWISE SPECIFIED.								
3. ALL LEADED MFR RESISTORS ARE $\pm 1\%$, 100PPM/°C, 1/4W OR UNLESS OTHERWISE SPECIFIED.								
4. THE ROWS WILL BE ADDED AS PER THE COMPONENTS WILL BE USED & SEQUENCE WILL BE MAINTAINED ACCORDINGLY AS SUGGESTED BY R&D DEPT.								
5. EQUIVALENT MATERIAL OF OTHER MAKE CAN BE USED, BY CONSULTING WITH THE R&D DEPT.								
MADE BY: PRIYA		CHECKED BY: YATIN			APPROVED BY: VIDYA			
DATE: 25-05-2023		DATE: 25-05-2023			DATE: 25-05-2023			
DEPT AEPL- R&D		FORMAT NO: RD/AM/F/11		REV: 0.0		DATE: 01-01-2013		PAGE: 1 OF 1







Embedded Systems Software Development Tools

 MPLAB	 ARDUINO Arduino Software	 PSPICE	 MATLAB
 Proteus	 Visual Studio	 LabVIEW	 ARMKEIL Microcontroller Tools
	Visual Studio	Keil	

www.mathworks.com

Embedded Systems Software



KEIL
Tools by ARM

ARDUINO

Qt

LabVIEW

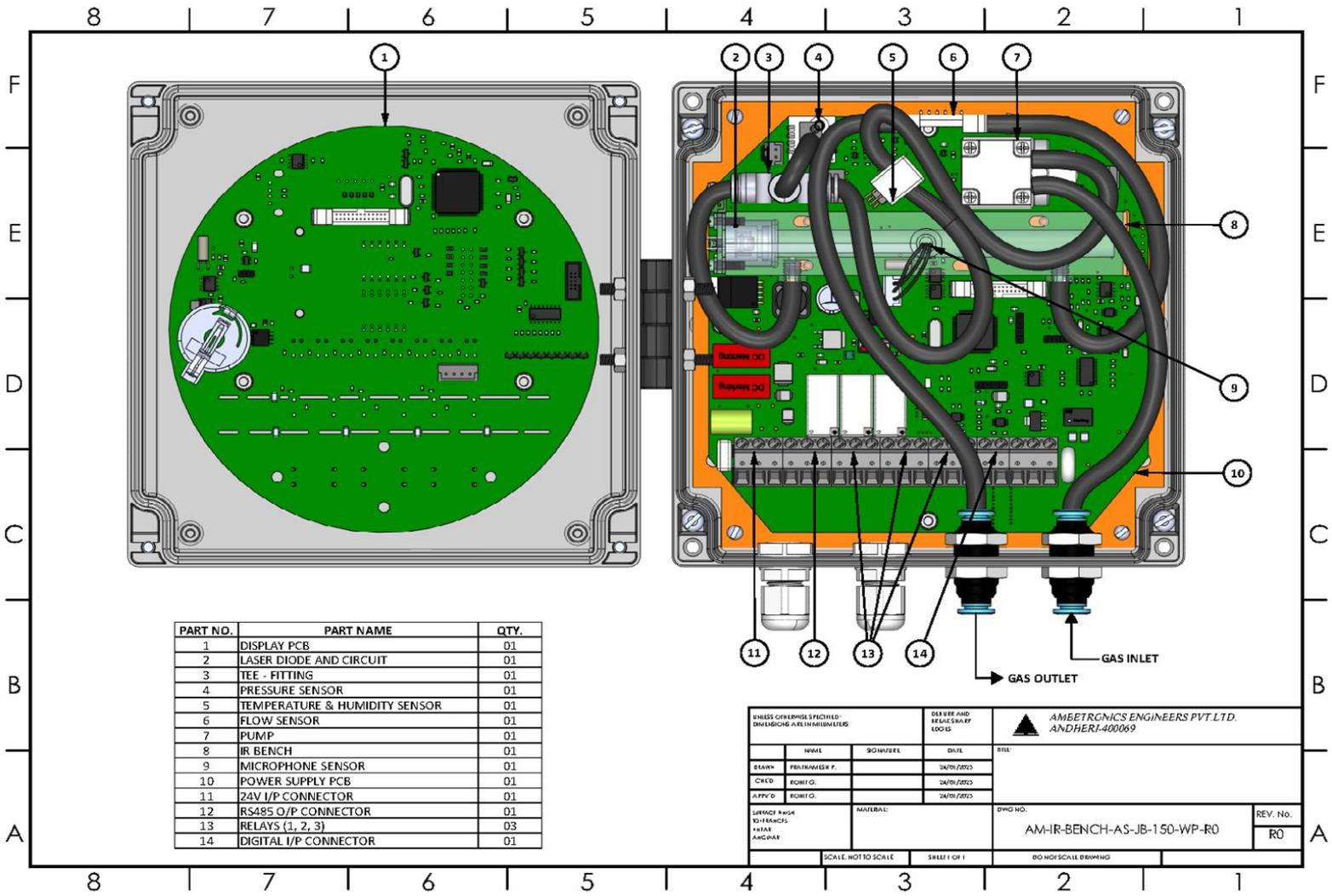
MATLAB

www.eduche.com



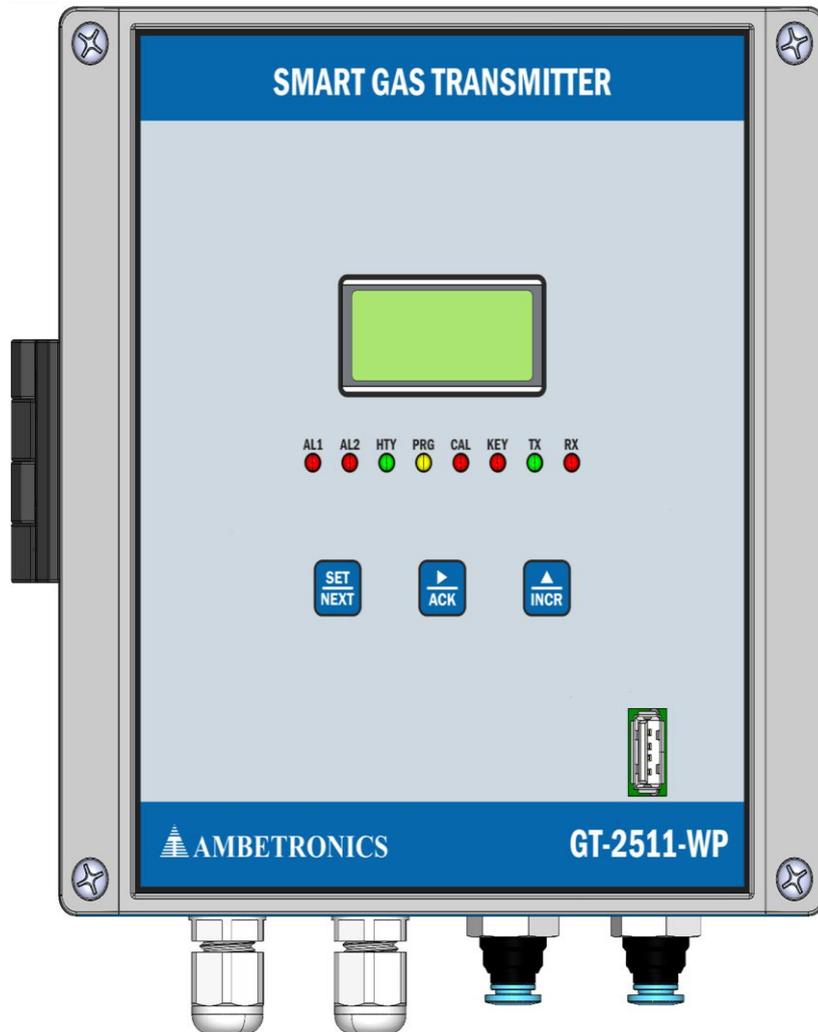


Zeichnung für die Endprodukt-Montage



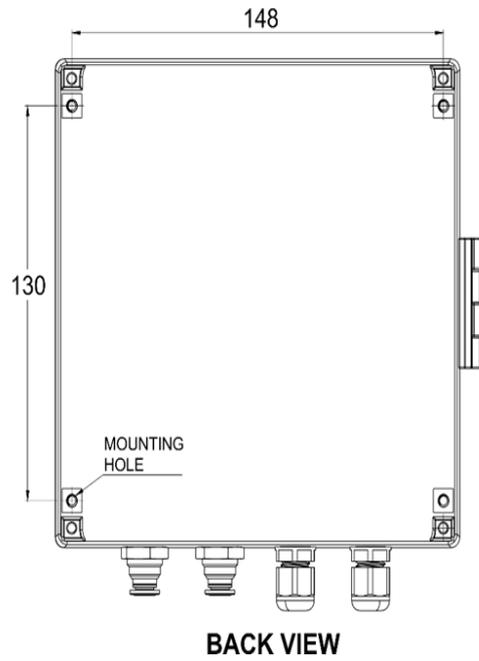
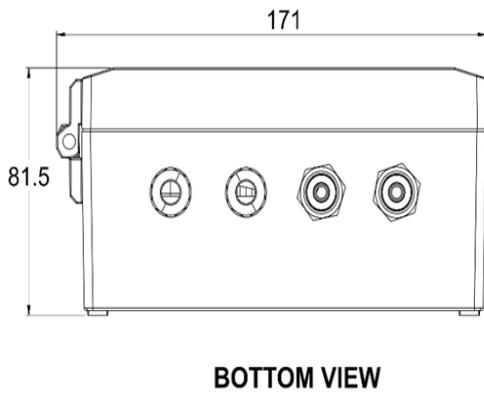
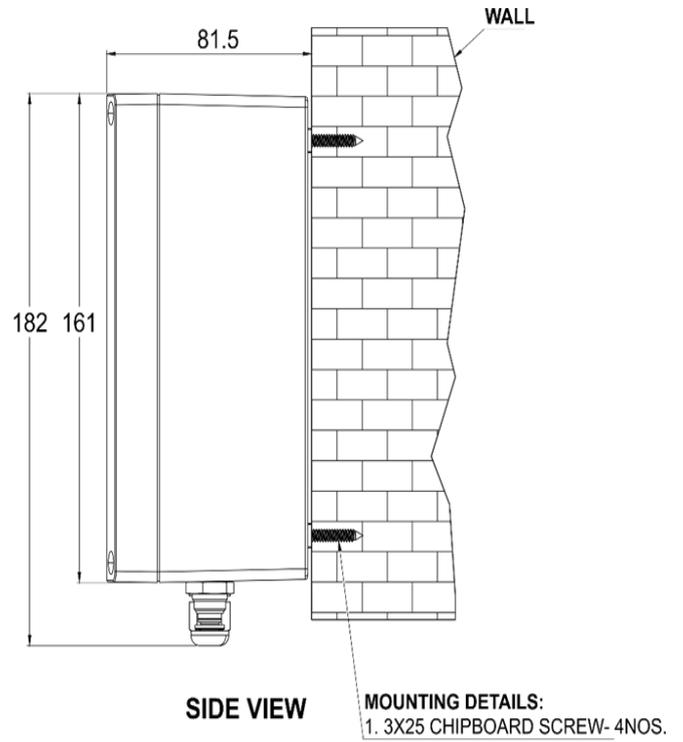
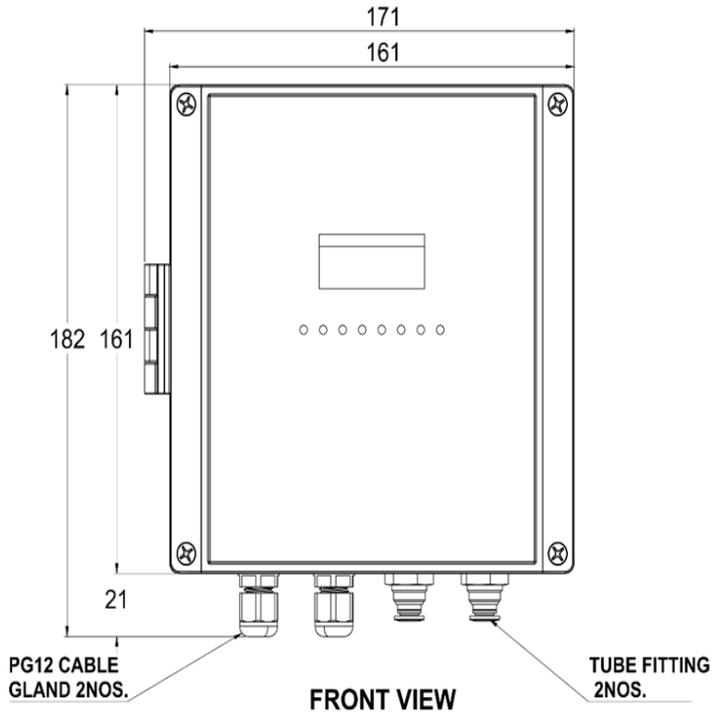
PART NO.	PART NAME	QTY.
1	DISPLAY PCB	01
2	LASER DIODE AND CIRCUIT	01
3	TEE - FITTING	01
4	PRESSURE SENSOR	01
5	TEMPERATURE & HUMIDITY SENSOR	01
6	FLOW SENSOR	01
7	PUMP	01
8	IR BENCH	01
9	MICROPHONE SENSOR	01
10	POWER SUPPLY PCB	01
11	24V I/P CONNECTOR	01
12	RS485 O/P CONNECTOR	01
13	RELAYS (1, 2, 3)	03
14	DIGITAL I/P CONNECTOR	01

CHECKED: _____ DIMENSIONS ARE IN MILLIMETERS		DESIGNED AND REDUCED BY _____		AMBETRONICS ENGINEERS PVT.LTD. ANDHERI-400069	
DATE:	DATE:	DATE:	DATE:	REVISION: _____	
BY:	BY:	BY:	BY:	_____	
CHKD:	CHKD:	CHKD:	CHKD:	_____	
APP'D:	APP'D:	APP'D:	APP'D:	_____	
SPECIAL INSTRUCTIONS: NONE		MATERIAL: _____		DWG NO. AM-IR-BENCH-AS-JB-150-WP-R0	
SCALE: NOT TO SCALE		SHEET 1 OF 1		REV. No. RO	
DO NOT SCALE DRAWING					





Skizze für die Produkt-Montage





SIG2GTY / SIG4GTY V1.0.1

Media: Type: USB

Serial Port Connection: Port: COM9, Baudrate: 9600, Stop Bits: 1, Parity: None

SIG SMART IoT GATEWAY

CHANNEL

Name: DETECTOR-7, Device ID: 8, Function: 04 Input Register (3x), Address Register: 0, Decimal Point: 0, Unit: %LEL

Sr. No.	Name	Device ID	Function	Register	Decimal Point	Unit	Status
1	DETECTOR-1	1	Input Registers	0	0	%LEL	SYNC
2	DETECTOR-2	2	Input Registers	0	0	%LEL	SYNC
3	DETECTOR-3	3	Input Registers	0	0	%LEL	SYNC
4	DETECTOR-4	4	Input Registers	0	0	%LEL	SYNC
5	DETECTOR-5	5	Input Registers	0	0	%LEL	SYNC
6	DETECTOR-6	6	Input Registers	0	0	%LEL	SYNC
7	DETECTOR-7	7	Input Registers	0	0	%LEL	SYNC

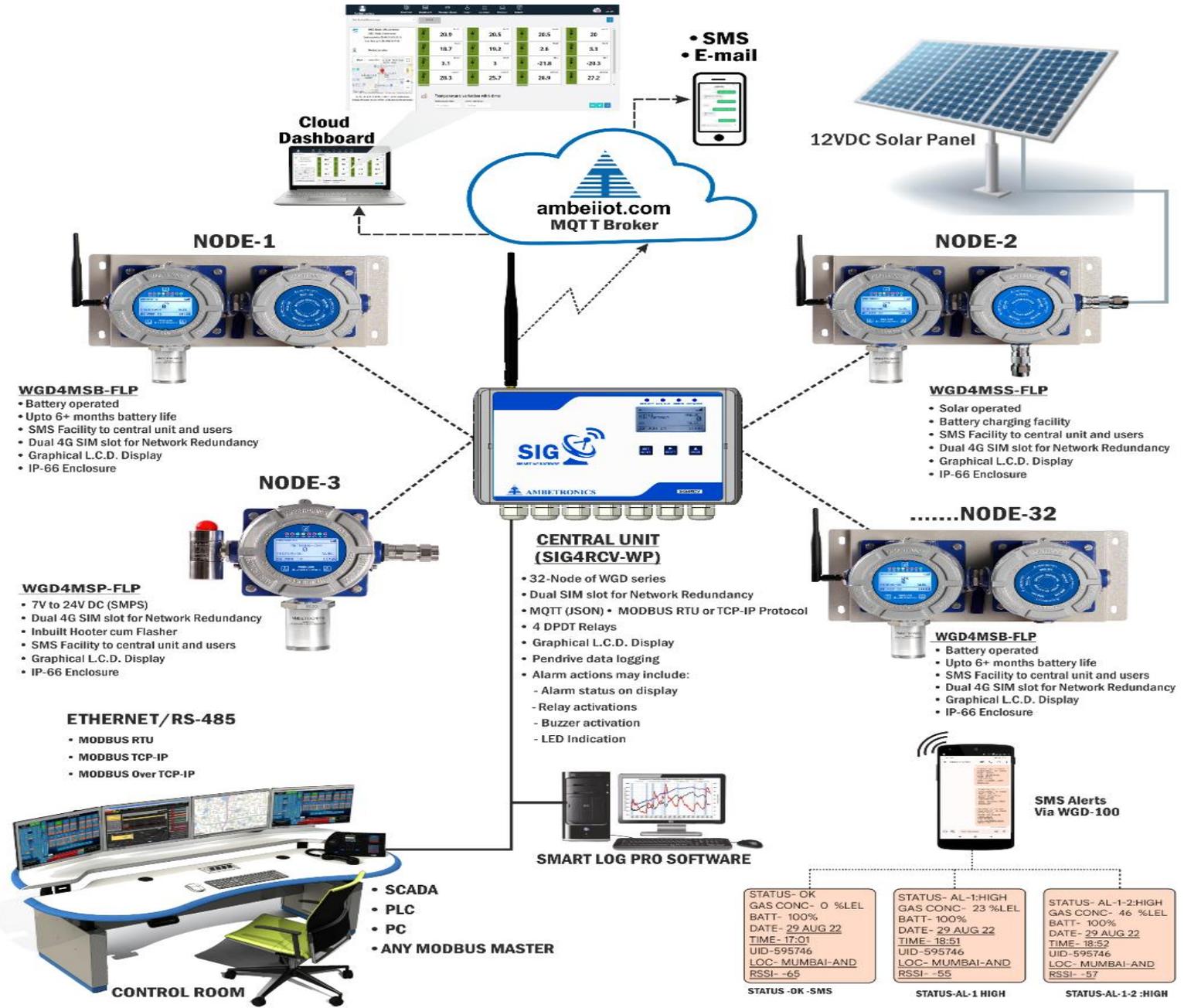
Device ID
 Address Register

7 / 7

Model Name - SIG2GTY / SIG4GTY Device UID - 780320

*To Apply Changes, Please Restart Device And Software.

AMBETRONICS ENGINEERS PRIVATE LIMITED





Ambetronics Engineers Private Ltd

User Manual Smart IoT Gateway

Model No : SIG Series

Version: 1.03
Effective date: 10-02-2022
Rev no: R0

4. INTRODUCTION



Figure 1 SIG4GTU-WP

Figure 2 SIG2MCM-WP

4.1 OVERVIEW

SMART IoT GATEWAY (SIG) is versatile device which reads Modbus memory map of any RS-485 Modbus protocol device and sends the data to the cloud server. The stored data can be viewed as per the customer requirements on Dashboard. SIG mainly consist of GSM module and Microcontroller based control circuit. It supports generic Modbus RTU protocol for data acquisition and it can give output on Modbus RTU/ Modbus TCP/IP or Modbus RTU over TCP/IP (Optional) also uses MQTT protocol to communicate with IT applications like database on cloud. Multiple slave devices can be configured to SIG. It remotely monitors all industrial sensors data to the cloud server.

SIG is very reliable and highly scalable solution for IoT deployment.

4.2 FEATURES

- 48- Nodes (with GSM), 70- Nodes (without GSM)
- Global supporting GSM module (2G/3G/4G) , Dual SIM slots
- 128 x 64 GLCD Display
- Two settable Alarm set-points per channel (High/Low)
- 4 - Double changeover Relays
- Buzzer and Bi-colour LED indications
- SMS / Email Alerts
- MQTT / TCP-IP Connection
- Cloud Base Support System

4.3 APPLICATIONS

- Refineries & Petrochemical Area
- Emergency response to off-site leak detection
- Tank Farms
- Waste water treatment plants
- Power and Industrial Plants
- Leak detection in Gas Pipelines
- Cold Storage Area
- Coal Mine and Confined Area
- Pharmaceuticals Plants



1. EUT Details:

Equipment Under Test (EUT) Portable Gas Detector
 Manufacturer M/s. Ambtronics Engineers Pvt. Ltd.
 Model PG-100
 Serial No. 211206

2. Product Specifications:

- Input Voltage: Battery Powered 3.7 Vdc (Rechargeable)
- EUT Configuration (as given by the customer):
 EUT is The Single Channel Portable Gas Detector (Model No. PG-100). It is a battery operated, microcontroller based gas detector that continuously monitors the Toxic / Combustible / Oxygen / VOC / NIDR gas concentration in % V/V, % LEL, PPM depending upon the gas selected. PG-100 is suitable for handheld application to measure the Gas concentration in hazardous atmospheres – zone 0, 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 & 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.
- Test conditions: Input Voltage: Battery Powered 3.7 Vdc

3. Test Specification:

Test	Radiated Emission Test
Applicable Standard	CISPR 11 Edition 6.0 2019-01
Class	Class B
Frequency Range	30-1000 MHz
IF BW	120 kHz
Step Frequency	40 kHz
Detectors	Quasi Peak
Measurement Time (with Quasi-Peak Detector)	1 Sec
Transducer	Biconilog Antenna
Distance	3 meter

4. Ambient:
 Temperature: 23.0 °C Relative Humidity: 57 % Atmospheric Pressure: 1006 mbar

5. Test Instrumentation Used:

Sr. No.	Instrument*	Manufacturer	Model No.	Serial No.	Calibration / Verification Date
1	EMI Receiver	Keysight	N9038A	MYS4450102	26-APR-2021
2	Biconilog Antenna	ETS - Lindgren	3142B	00026423	08-NOV-2019
3	Shielded Anechoic Chamber	ETS - Lindgren	3 m Chamber	00013022	27-JAN-2021

*All instruments listed above are traceable to National / International calibration institutions & standards.

SAMEER-EMC Centre, Navi Mumbai | RPT/EMC/DEC/21/22/34/PG-100RE | Page 3 of 6
 ULR No. | TC96992100000003F

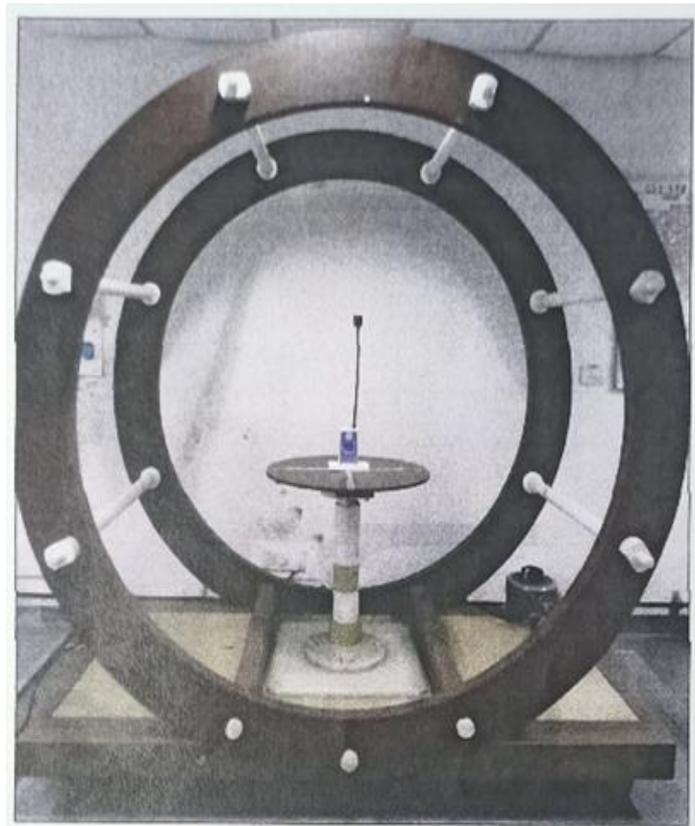


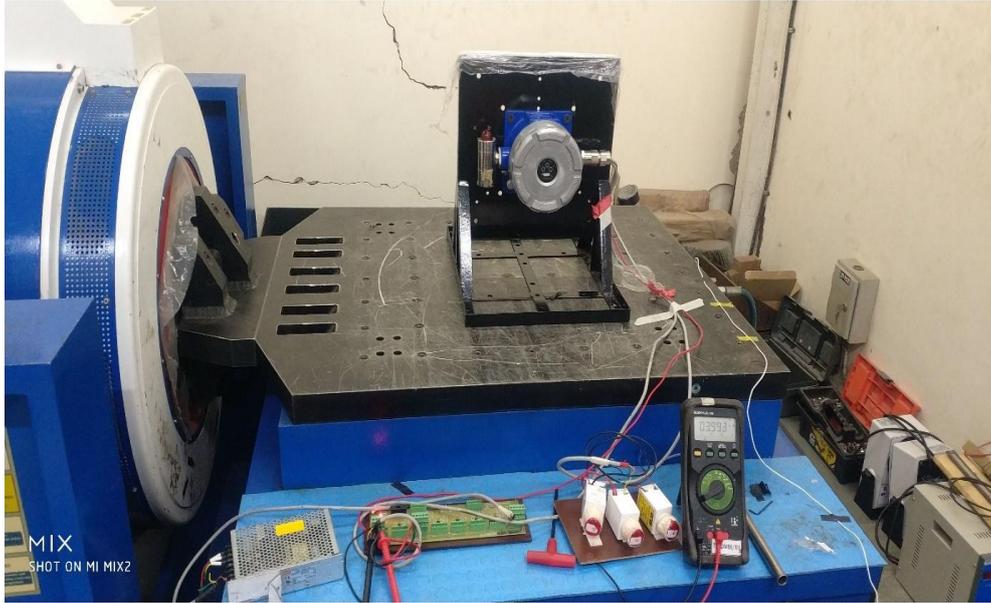
Figure 1.2: PFMF Test Setup

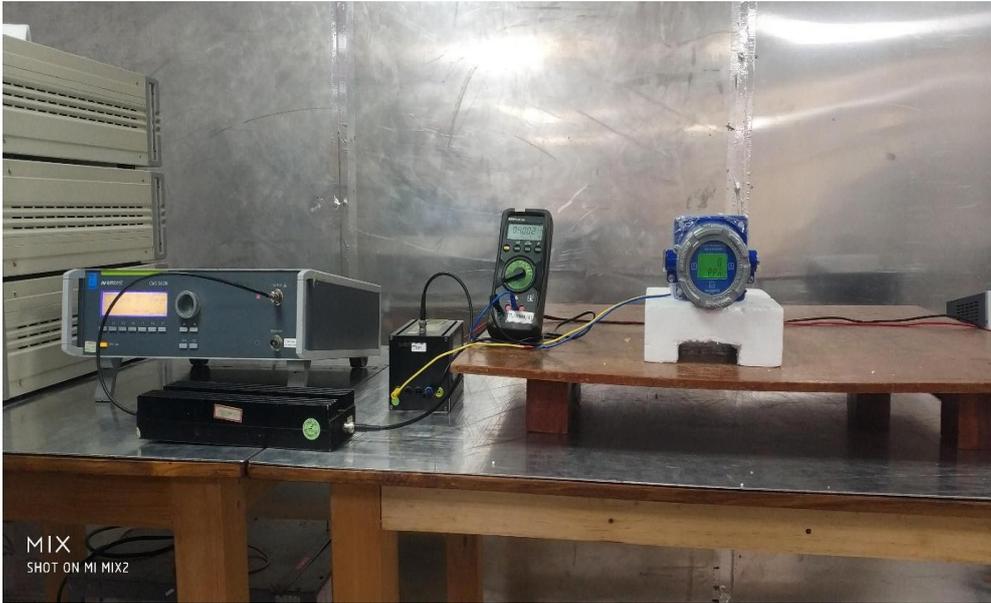
Annexure - 2

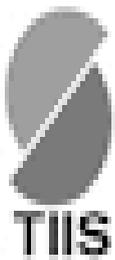
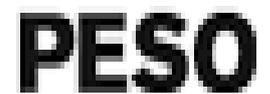
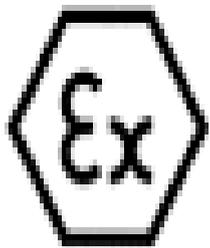
Plot 2.1: Radiated Emission in Horizontal Polarization
 EUT Orientation: 30°, Antenna Height: 1 meter

Sr.	FREQ	CPD AMPTD	OFF	CPD LLA
1	943.88 MHz	33.306 dBuV/m	---	-13.694 dB
2	796.36 MHz	31.711 dBuV/m	---	-15.289 dB
3	626.62 MHz	30.926 dBuV/m	---	-16.074 dB
4	30.360 MHz	20.666 dBuV/m	---	-19.434 dB
5	600.60 MHz	26.196 dBuV/m	---	-20.804 dB
6	410.62 MHz	26.268 dBuV/m	---	-21.742 dB
7	38.120 MHz	16.341 dBuV/m	---	-24.659 dB
8	211.24 MHz	16.117 dBuV/m	---	-24.863 dB
9	168.88 MHz	14.055 dBuV/m	---	-26.946 dB
10	323.76 MHz	20.840 dBuV/m	---	-26.160 dB

Table 2.1: Radiated Emission in Horizontal Polarization
 EUT Orientation: 30°, Antenna Height: 1 meter







arteos GmbH

Seligenstädter Str. 91

D-63500 Seligenstadt, Germany

Contact: Faraz Syed (deutsch, engl., hindi)

Festnetz: 06182 / 640 340

Handy: 0170 / 691 29 10

f.syed@arteos.com www.arteos.com

Status: Februar 2026

Seite 19 von 19