User's Manual

Carbon Dioxide Detector

Model: AT-VLC-ND-A2-RS
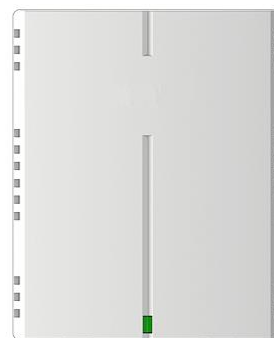
Specifications

| General Data	
Power supply	24VAC/VDC±10%
Consumption	3.5 W max. ; 2.0 W avg.
Analog outputs	Two 0~10VDC/4~20mA for CO2/Temperature measurements PID control output is selectable for CO2
RS485 interface	Modbus protocol 4800/9600(default)/19200/38400bps; 15KV antistatic protection, independent base address.
LED light condition selectable	3-color mode (default) Green: ≤1000ppm Orange: 1000~1400ppm Red: >1400ppm Red flashing: CO2 sensor faulty	Working light mode Green on: working Red flashing: CO2 sensor faulty
Operation condition	0~50℃; 0~95%RH, non condensing
Storage condition	-10~60℃ / 0~80%RH
Net Weight / Dimensions	190g /117mm(L)×95mm(W)×36mm(H)
Installation	wall mounting with 65mm×65mm or 2"×4"wire box
Housing and IP class	PC/ABS fireproof plastic material, protection class: IP30
Standard	EMC approval
Carbon Dioxide	
Sensing element	Non-Dispersive Infrared Detector (NDIR)
CO_2 measuring range	0~2000ppm (default)
CO_2 Accuracy @22℃(72℉)	±60ppm + 3% of reading or ±75ppm (whichever is greater)
Temperature dependence	0.2% FS per℃
Stability	<2% of FS over life of sensor (15 year typical)
Pressure dependence	0.13% of reading per mm Hg
Calibration	ABC Logic Self Calibration Algorithm

|	
Response time	<2 minutes for 90% step change typical
Signal update	Every 2 seconds
Display resolution	1ppm
Warm-up time	2 hours (first time) / 2 minutes (normal operation)
Temperature and RH (option)	
Temperature sensor (selectable)	Digital integrated temperature and humidity sensor or NTC thermistor
Measuring range	-20~60℃/-4~140F 0~100%RH relative humidity
Accuracy	Temp.: <±0.5℃@25℃ RH: <±3.0%RH （20%~80%RH）

Dimension and Mounting
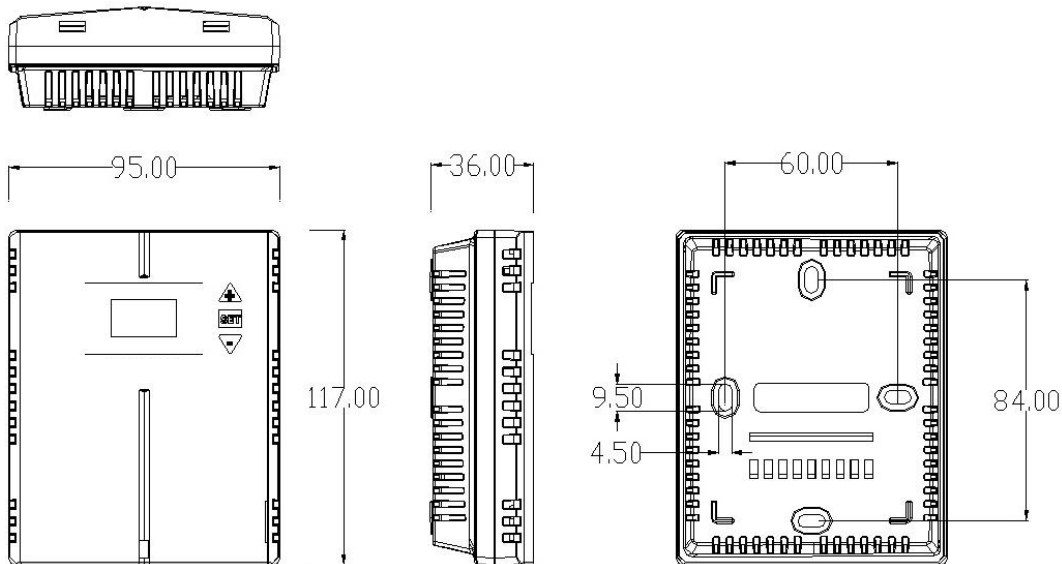
◆ Please note the power supply is 24VAC/VDC±10%. Don't install the detector with over the voltage.

◆ First of all, please prepare a flat head screwdriver and gently put it deep inside of the hole on the bottom of the detector housing. Then slant the screwdriver and open the cover gently. Do not mount it near diffuser or any steam source, in direct sunlight.

◆ Mount the wall plate. Place the detector against the wall at desired location; make sure wires can be passed through the notch on the wall plate.

◆ Connect wires to terminal strips. Make sure wiring connection correct and secure.

◆ Finally close the cover gently.

Wiring Diagram
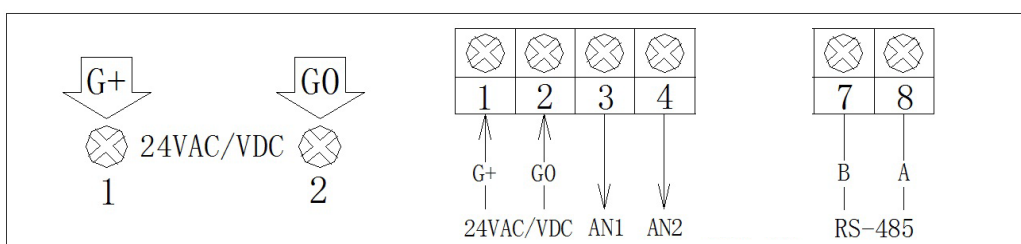
Analog Output Selection

◆ The default analog output is 0-10V. If you want to change to 4-20mA output, please follow the below.

◆ Open the cover, you can see five black blocks of J1 & S1~S4. The J1=OFF corresponding
to 0-10V and the J1=ON corresponding to 4-20mA. At the same time, connect 'V' side of S1~S4
corresponding to 0-10V and connect 'A' side of S1~S4 corresponding to 4-20mA. As shown figure 4.
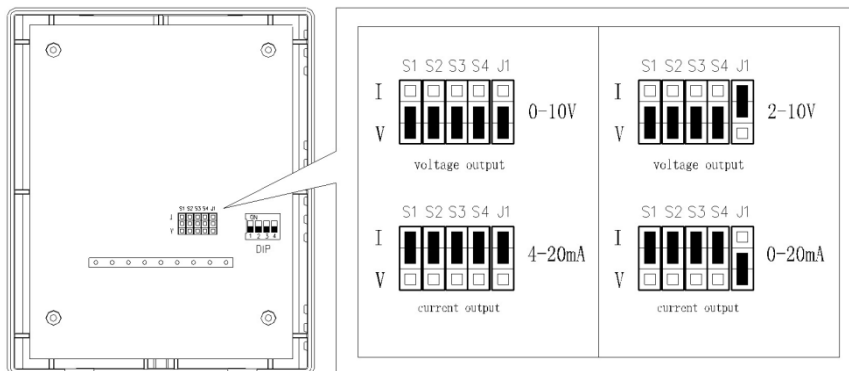
Modbus Register

Mode:　　　RTU　(MSB First)

Baud Rate:　1-4800　　2-9600　　3-14400　　4-19200　　5-38400 bps　　　default:　2-9600bps

Start Bits:　1

Data Bits:　8

Stop Bits:　1　/　2　　　　　　　　　　　　　　　　　　　　　default :　2

Parity:　　None　/ Odd　/ Even　　　　　　　　　　　　　default:　None

Modbus Address:　1~247　　　　　　　　　　　　　　　default:　1

Register　Map

Support　Function:　3　4　6　16

Starting Register Decimal	Data Description	Function	Read/ Write	Length	Format	Valid Response	
0	CO2 Measurement	4	R	2	Float inverse	0~5000 ppm	
2	Temperature Measurement	4	R	2	Float inverse	0.0~50.0 ℃	
4	Humidity Measurement	4	R	2	Float inverse	0.1~100.0 %RH	
Starting Register Decimal	Data Description	Function	Read/ Write	Length	Format	Selection	Default
0	Modbus Address	3/6	R/W	1	INT16	1~247	1
1	Modbus rate	3/6	R/W	1	INT16	1-4800bps 2-9600bps 3-14400bps	2

							4-19200bps 5-38400bps	
2	Modbus Stop Bit	3/6	R/W	1	INT16		1-None 1Stop Bit; 2-None 2Stop Bit; 3-Odd 1Stop Bit; 4-Even 1Stop Bit	2
3	CO2 offset	3/6	R/W	1	INT16		-300~300ppm	0
4	Temperature offset	3/16	R/W	2	Float inverse		-5.0~5.0 ℃	0.0
6	Relative Humidity offset	3/16	R/W	2	Float inverse		-10~10 %RH	0.0
8	Logic of Relay Control	3/16	R/W	1	INT16		0- Increase CO2 1- Decrease CO2	1
10	Warm-up Time	3/6	R/W	1	INT16		1~600 Seconds	10
11	CO2 Max. Measurement	3/6	R/W	1	INT16		400~10,000 ppm	2000
12	CO2 PID Control Setpoint	3/6	R/W	1	INT16		400~5,000 ppm	800
13	CO2 Relay Control min. Setpoint	3/6	R/W	1	INT16		400~5,000ppm	780
14	CO2 Relay Control max. Setpoint	3/6	R/W	1	INT16		400~5,000ppm	820
15	LED work mode	3/6	R/W	1	INT16		0- 3 color mode; 1- 2 color mode	0
16	Buzzer alarm	3/6	R/W	1	INT16		0- Disable 1- Enable	1
17	Buzzer alarm Setpoint of CO2	3/6	R/W	1	INT16		400~5,000ppm	1400
18	LED switch from green to yellow	3/6	R/W	1	INT16		400~5,000ppm	1000
19	LED switch from yellow to red	3/6	R/W	1	INT16		400~5,000ppm	1400