

User's Manual

Carbon Monoxide Alarm / Detector

Model: TSP-CO series



Specifications

Parameters		
Power Supply	24VAC/VDC	
Power Consumption	2.8W	
Connection Standard	Wire cross-sectional area<1.5mm ²	
Operating Environment	-10-50℃,10~95%RH	
Storage Environment	-10-60℃/ 0~90%RH,non-condensing	
Dimension/Net Weight	95mm(W)*117mm(L)*36mm(H) /280g	
Manufacturing Standard	ISO 9001	
Housings and IP class	PC/ABS fire-proof material; IP30protection class	
Design Standard	CE-EMC Approval	
Sensor		
CO Sensor	Japanese Electrochemical CO Sensor	
Sensor Lifetime	Up to 3~5years and replaceable	
Warm Up Time	60 minutes(First use),1 minute(daily use)	
Response Time(T90)	<130 seconds	
Signal Refreshing	One second	
CO Range (Optional)	0-100ppm(Default)/0-200ppm/0-300ppm/0-500ppm/0~1000ppm	
Accuracy	<±1 ppm (15~20℃/ 30~60%RH)	
Stability	±5% (over 900days)	
Temperature or Humidity Sensor (Optional)	Temperature	Relative Humidity
Measuring Range	-20℃-60℃	0 -100%RH
Accuracy	±0.5℃ (20~40℃)	±3.0%RH (25℃, 10%-90%RH)
Display Resolution	0.1℃	0.1%RH
Stability	±0.1℃/year	±1%RH/year
Outputs		
LCD Display(Optional)	OLED screen, display real-time measured values with CO & Temp or CO, Temp & RH. (LCD display is required for models with relay outputs)	
Analog Output	1x0-10VDC/4-20mA linear output for CO measured value	
Analog Output Resolution	16Bit	
Relay Dry Contact outputs	Two on/off relay outputs, max current 5A (230VAC/30VDC),	

	Resistive load separately controls CO, Temperature or Humidity
RS485 Communication (Optional)	BACnet MS/TP, Communication Baud:9600bps(Default) Modbus RTU, CommunicationBaud:9600bps(Default) 15KV anti-static protection
Three-color working indicator lights	Green: CO level < 25ppm Yellow: 25ppm ≤ CO level < 70ppm Red: CO level ≥ 70ppm (alarm setpoint)
Buzzer Alarm	When CO concentration exceeds the alarm value, the buzzer will ring
Alarm Standards	
Audible alarm and CO set point	Chinese Standard: GB15322 European Standard: EN50291 American Standard: UL2034
Calibration Functions (Follow-up Supply)	
DIP Switches	Used for zero calibration mode setting
Sensor air chamber Accessories	Connect windpipe, cover the air chamber to make zero calibration

Models Guide

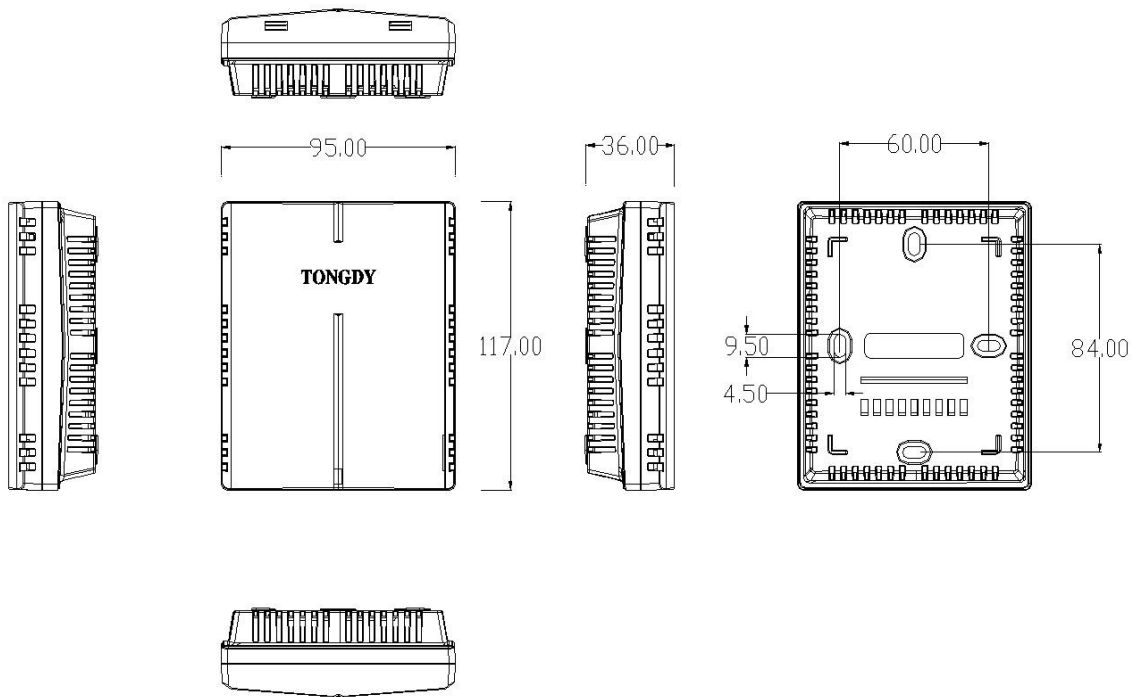
Models		Descriptions
CO Transmitters/Alarm	TSP-CO-X100	1x0~10V or 4~20mA analog output for CO value
	TSP-CO-X101	1x0~10V or 4~20mA analog output for CO value with Modbus RS485 interface
	TSP-CO-X102	1x0~10V or 4~20mA analog output for CO value with BACnet interface
	TSP-CO-X001	Modbus RS485 interface
	TSP-CO-X002	BACnet interface
X: D (with LCD display and setting buttons) B (without LCD display)		
CO Controller/Alarm	TSP-CO-D110	1x0~10V or 4~20mA analog output and 1x on/off relay output for CO value
	TSP-CO-D111	1x0~10V or 4~20mA analog output and 1x on/off relay output for CO value with Modbus RS485
	TSP-CO-D010	1x on/off relay output for CO value
	TSP-CO-D020-T	2x on/off relay outputs for CO and temperature value

Notice:

- All models with -T suffix mean this model has temperature measuring
- Suffix CO range selection for all models:
-001: 0~100ppm
-002: 0~200ppm
-003: 0~300ppm
-005: 0~500ppm

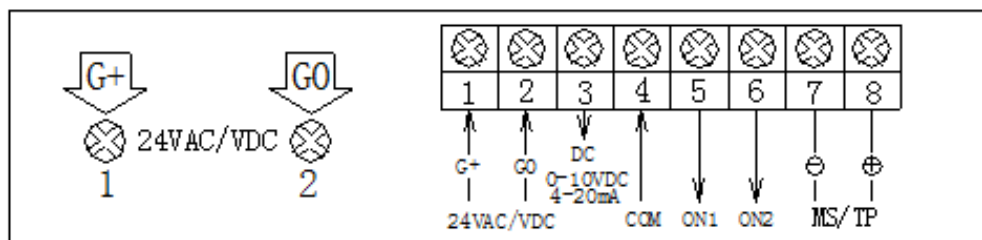
-010: 0~1000ppm

Dimension and Mounting



- ◆ Please note the power supply is 24VAC/VDC. 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.

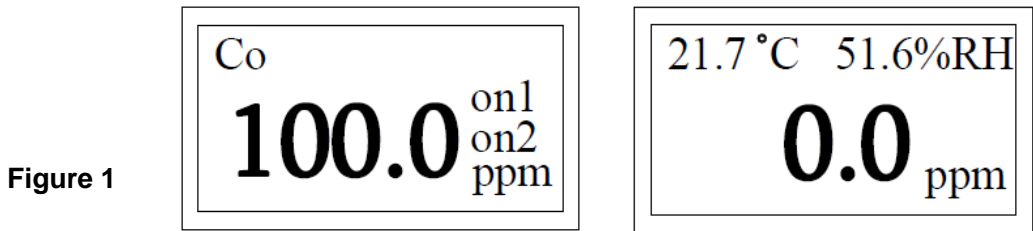
Wiring Diagram



Terminal	Function	Electrical Data
1	G+	Power (+)
2	G0	Power ground (-)
3	AN(CO)	Analog output (+)
4	COM	max current 5A with resistive load or 2.5A with Inductive load
5	ON1	
6	ON2	max current 5A with resistive load or 2.5A with Inductive load
7	B (RX-)	
		RS485 interface

Instruction

1. Please always cut off the power before open or clean the detector.
2. After turn on the power, all parameters settings can be switched by **SET** key. The **▼** or **▲** key is used to increase or decrease the parameter setting values.
3. There is a LED indicator light in the middle bottom of the front cover. Green stands for normal operation, Red stands for alarm indication. When the normal operation, the green LED light is on for 0.1 second with every 5 seconds.
4. The OLED screen shows CO measured value or CO / Temp measured values or CO / Temp / RH measured values. As shown figure 1.



5. The default Relay 1 set point is 20ppm and Relay 2 set point is 40ppm. Press **SET** key can toggle to show the two set points. Moreover, the two relay set points can be changed by **▼** or **▲** key. Please refer the 'P13' item of advanced parameter setting about the control logic of the two relay outputs. As shown table 1. When the CO measured value is higher than set point of Relay 1, **on1** will show on the screen. When the CO measured value is higher than set point of Relay 2, **on2** will also show on the screen. **Dec** on the screen stands for decrease mode and **Inc** is for increase mode. As shown figure 2.

	Relay 1 (ON1)	Relay 2 (ON2)
1	Decrease CO measured value	Decrease CO measured value
2	Decrease CO measured value	Decrease Temp measured value (Cooling)
3	Decrease CO measured value	Increase Temp measured value (Heating)
4	Decrease CO measured value	Decrease RH measured value (Dehumidification)
5	Decrease CO measured value	Increase RH measured value (Humidification)
6	Decrease RH measured value (Dehumidification)	Decrease Temp measured value (Cooling)
7	Decrease RH measured value (Dehumidification)	Increase Temp measured value (Heating)
8	Increase RH measured value (Humidification)	Decrease Temp measured value (Cooling)
9	Increase RH measured value (Humidification)	Increase Temp measured value (Heating)

Table 1

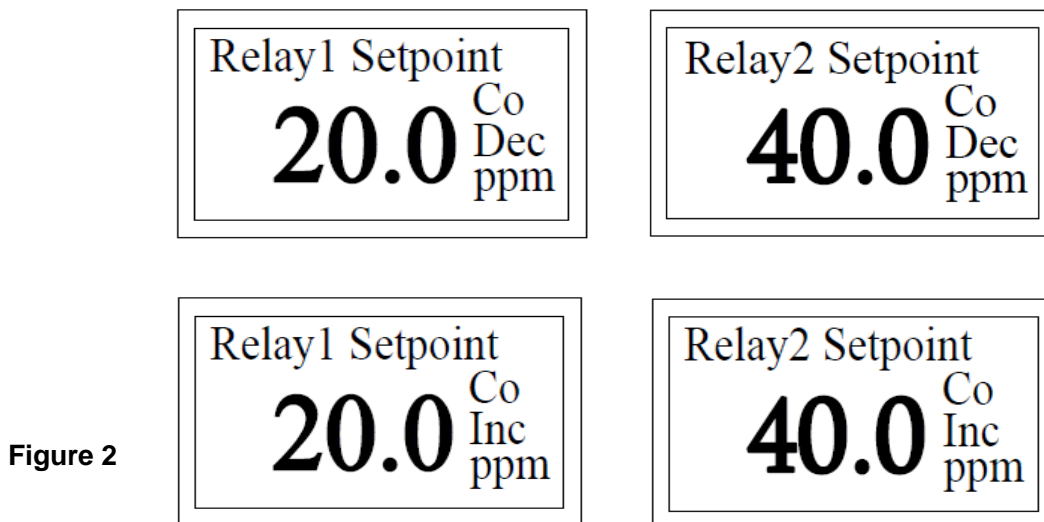


Figure 2

6. Audible alarm description for CO. When the CO measured value exceeds the alarm set point, on-board buzzer and LED audible alarm output. When an alarm occurs, the red LED light is on, the buzzer sounds for 100 milliseconds. When red LED light is off, the buzzer doesn't sound for 100 milliseconds. This will be cycled four times. Then when red LED light is off, the buzzer doesn't sound for 5 seconds. After this cycle takes over 4 minutes, the stop time will be changed from 5 seconds to 1 minute, until CO measured value decreased to that the alarm is released automatically or press the **SET** key to force release. Afterward, the LED and buzzer will stop output. Please note when to press the **SET** key to force release, only audible alarm stops output, the relay is still running according to the control logic. When CO alarm, the alarm will be cancelled if pressed **SET** button once, then press again to continue the alarm. When CO alarm, the screen will show alarm information, and the page of alarm information and measured value will display alternately every 10 seconds. The page of alarm information is displayed as follows. As shown figure 3.

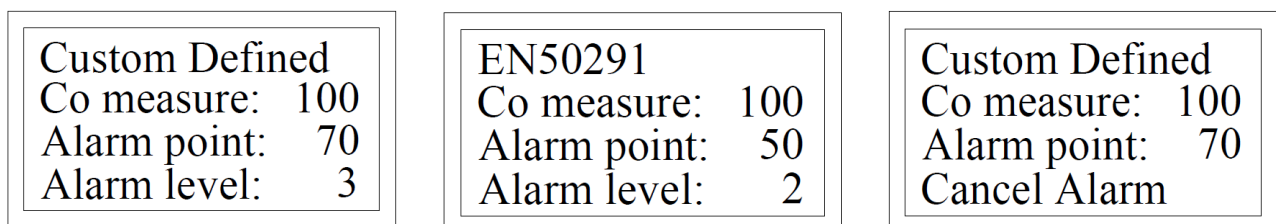


Figure 3

7. CO audible alarm standard selection is as follows.

1	CO audible alarm is invalid.
2	User defines three CO audible alarm points.
3	GB15322 Chinese standard
4	EN50291 European standard
5	UL2034 American standard

8. The above standard CO alarm points are as follows.

a. User defines alarm points (That can be changed).

CO audible alarm points	30ppm	50ppm	70ppm
Alarm time	Alarm will be triggered if the value is exceeded for 5 seconds	Alarm will be triggered if the value is exceeded for 5 seconds	Alarm will be triggered if the value is exceeded for 5 seconds

b. Chinese standard with CN GB15322 (That can't be changed).

CO audible alarm points	150ppm
Alarm time	Alarm will be triggered if the value is exceeded for 5 seconds

c. European standard with EN EN50291 (That can't be changed).

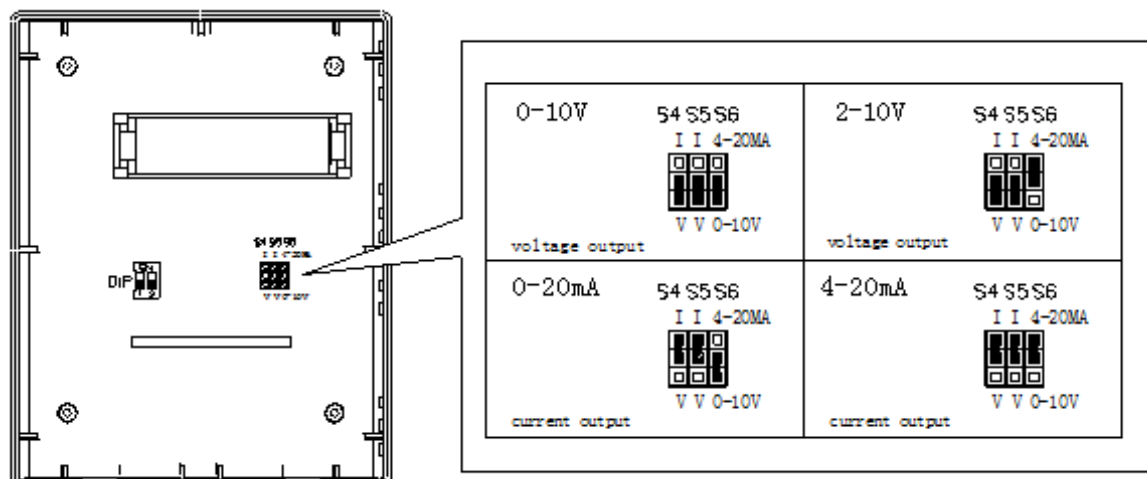
CO audible alarm points	30ppm		50ppm		100ppm		300ppm
Alarm time	120 minutes before alarm	Alarm occurs after 120 minutes	60 minutes before alarm	Alarm occurs before 90 minutes	10 minutes before alarm	Alarm occurs before 40 minutes	Alarm occurs within 3 minutes

d. American standard with UL UL2034 (That can't be changed).

CO audible alarm points	70ppm		150ppm		400ppm	
Alarm time	60 minutes before alarm	Alarm occurs before 240 minutes	10 minutes before alarm	Alarm occurs before 50 minutes	4 minutes before alarm	Alarm occurs before 15 minutes

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 three black blocks of S6 & S4 & S5. The S6=OFF corresponding to 0-10V and the S6=ON corresponding to 4-20mA. At the same time, connect 'V' side of S4 & S5 corresponding to 0-10V and connect 'A' side of S4 & S5 corresponding to 4-20mA. As shown figure 4.



Advanced parameter Setup

Cut off the power and open the cover, there are two DIP switches on the middle left side of circuit board.

DIP1=OFF Normal use, DIP1=ON Set advanced parameter Default: OFF

DIP2 Useless

When DIP1=ON, all advanced parameters can be set. The ▼ or ▲ key is used to set or change the corresponding set points. The digital flash indicates in the process of setting. After the digital isn't flash, the modified digital is saved. Press **SET** key can toggle each parameter, the 'Pxx' as a guide is shown in the upper right corner of screen.

LCD	Parameter	Range of setup	Default
P1(AV2)	CO audible alarm point 1 of user-defined (Effective only for P4(AV5)=2)	0-100ppm	30
P2(AV3)	CO audible alarm point 2 of user-defined (Effective only for P4(AV5)=2)	0-100ppm	50
P3(AV4)	CO audible alarm point 3 of user-defined (Effective only for P4(AV5)=2)	0-100ppm	70
P4(AV5)	CO audible alarm standard selection	1- CO audible alarm is invalid. 2- User defines three CO audible alarm points. 3- GB15322 Chinese standard 4- EN50291 European standard 5- UL2034 American standard	4
P5(AV6)	Device case number (Valid for BACnet model & shown 'Invalid' for Modbus model)	0-99999 (Required to power again after modification)	9001
P6(AV7)	485 communication address	Modbus version: 1-247. BACnet version: 0-127 (Required to power again after modification)	1
P7(AV8)	485 communication baud rate	1-4800bps. 2-9600bps. 3-14400bps. 4-19200bps. 5-38400bps. 6-56000bps. 7-57600bps. 8-76800bps. 9-115200bps. (Required to power again after modification)	2
P8(AV9)	485 Parity bits and Stop bits Selectable (Valid for Modbus model & show 'Invalid' for BACnet model)	1- None parity, 1 stop bit. 2- None parity, 2 stop bit. 3- Odd parity, 1 stop bit. 4- Even parity, 1 stop bit. (Required to power again after modification)	1
P9(AV10)	CO single point calibration target value	0-100ppm (e.g. Through RS485 communication and set the target value to 16, then the current environment will be considered to be 16ppm after save it.	0
P10(AV11)	Temperature calibration	+ -3.0C/+ -6.0F	0.0
P11(AV12)	Humidity calibration	-5.0%RH~5.0%RH	0.0

P12(AV13)	Temperature unit	1- Celsius. 2- Fahrenheit	1
P13(AV14)	Control logic selection for two relay outputs	1-9 (Corresponding Table 1)	1
P14(AV15)	Differential of relay for CO	0-100ppm e.g. P13=3, P14=20, Relay1 set point= 70ppm When CO measured value \geq 70, Relay1 ON When CO measured value $<$ 70-20, Relay1 OFF	2
P15(AV16)	Differential of relay for Temp	0-50C/0-100F e.g. P13=3, P15=3, Relay2 set point=25C When Temp measured value \leq 25, Relay2 ON When Temp measured value $>$ 25-3, Relay2 OFF	2C/4F
P16(AV17)	Differential of relay for RH	0-50%RH e.g. P13=5, P16=5, Relay2 set point=45% When RH measured value \leq 45, Relay2 ON When RH measured value $>$ 45-5, Relay2 OFF	2
P17(AV18)	CO zero point auto calibration	0-Disable 1-Enable	1
<i>The following parameters are useless for users and also can't be changed.</i>			
P18(AV19)	<i>Ineffective</i>	--	--
P19(AV20)	<i>Adjust current measured value manually (AD value calibration)</i>	-9999~9999	0
P20(AV21)	<i>TGS5042 ID number</i>	1000-3750	1623
P21(AV22)	<i>Test reference voltage</i>	11400-12690	12000
P22(AV23)	<i>Test reference resistance</i>	0-65534	10000
P23(AV24)	<i>Sensor calibration, 1st point measured value</i>	0~ upper limit of measuring range	0
P24(AV25)	<i>Sensor calibration, 2nd point measured value</i>	0~ upper limit of measuring range	50% of max
P25(AV26)	<i>Sensor calibration, 3rd point measured value</i>	0~ upper limit of measuring range	Max
P26(AV27)	<i>Sensor calibration, 1st point AD value</i>	0-65534	0
P27(AV28)	<i>Sensor calibration, 2nd point AD value</i>	0-65534	32767
P28(AV29)	<i>Sensor calibration, 3rd point AD value</i>	0-65534	65534
P29	<i>Hardware Test</i>	0-2 0- Normal control. 1- Relay1=OFF, Relay2=OFF, Analog output 0V/4mA, Green LED off, Red LED on, buzzer beeps once with every 5 seconds. 2- Relay1=ON, Relay2=ON, Analog output 10V/20mA, Green LED on, Red LED off, buzzer doesn't sound.	0
P30	<i>Display version information</i>	--	--