

Specification

Power Supply	24VAC/DC(0.1A)
Wiring Terminal	24V、GND、RS485(A+、B-)、NTC10K/100K(S1、S2)
Display	2.8 inch colorful screen
Operation	Touch Key
Communication	Modbus RTU, 2-wires (Dial-code address)
Wireless Conn	Tuya WI FI(2.4G)
IP Class	IP21
Dimension	L86mm*W86mm*H12mm



Precautions:

Low-voltage and communication signal lines must not share the same conduit or trough with high-voltage power lines. Please refer to electrical wiring safety regulations.
Recommended Modbus gateway configuration: Host reception timeout $\geq 1s$ Host read/write retry count ≥ 2 times Read/write one register per operation Minimum delay between characters $\geq 1s$ It is recommended that a single bus connect only one type of detector.

Function Specification

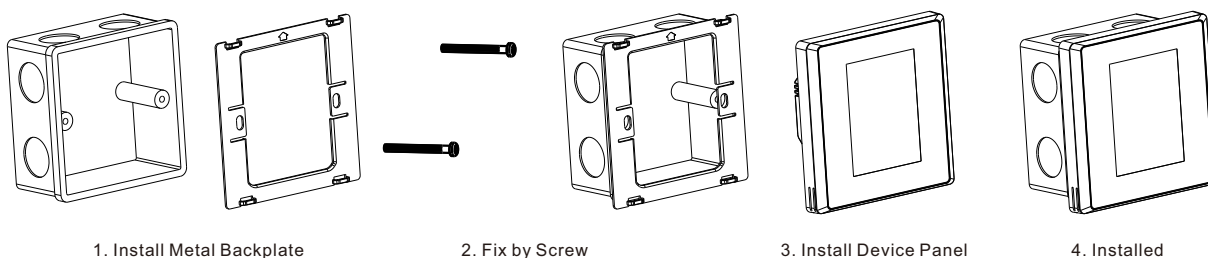
CO2	Measuring range (detection and display range) : 400 ~2000ppm GOOD : Value $\leq 1000ppm$ OK : $1001 \leq \text{Value} \leq 1400ppm$ POOR Value $> 1400ppm$ Accuracy: 1ppm / Level Display
PM2.5	Measuring range (detection and display range): 1 ~999 $\mu g/m^3$ GOOD: Value $\leq 75 \mu g/m^3$ OK: $75 \mu g/m^3 \leq \text{Value} \leq 115 \mu g/m^3$ POOR: Value $> 115 \mu g/m^3$ Accuracy: 1 $\mu g/m^3$
TVOC	Measuring range (detection and display range): 0 ~6.000 mg/m^3 GOOD: Value $\leq 0.600 mg/m^3$ OK: $0.610 mg/m^3 \leq \text{Value} \leq 1.000 mg/m^3$ POOR: Value $> 1.000 mg/m^3$ Accuracy: 0.001 mg/m^3
HCHO	Measuring range (detection and display range): 0 ~ 1.000 mg/m^3 GOOD: Value $\leq 0.100 mg/m^3$ OK: $0.110 mg/m^3 \leq \text{Value} \leq 0.300 mg/m^3$ POOR: Value $> 0.300 mg/m^3$ Accuracy: 0.001 mg/m^3
Inner temperature & Humidity	Detection Range: $0^{\circ}C \sim +50^{\circ}C$ 10% ~95% RH Display accuracy: $0.1^{\circ}C$ 0.1% Accuracy: $\pm 1^{\circ}C \pm 5\%$
External temperature (NTC 10K/ 100K)	Temperature Detection Range: $0^{\circ}C \sim +50^{\circ}C$
Storage environment temperature	$-10 \sim 60^{\circ}C$, 0 ~90% RH(Non-condensation)
Working environment temperature	$0 \sim 50^{\circ}C$, 0 ~80% RH(Non-condensation)



Notice :

HCHO (Formaldehyde): The equivalent eHCHO sensor may be affected by irritating gases such as perfume and alcohol.
CO2 (Carbon Dioxide):
The equivalent eCO2 sensor may be affected by irritating gases such as perfume and alcohol.

Installation



Functional Specification

(1) Network icon:

Disconnected: Flash Slowly
Network Searching: Flash Rapidly(Long press network icon 5 s)
Connected : Keep lighting

(2) External temperature icon:

Always on: Display external temperature
Always off: Display inner temperature

(3) Touch keys(Left/Right):

Single Click: Switch PM2.5/CO2/TVOC/ HCHO
Long Press : Long Press "<" and ">" keys at the same time to enter parameter settings page,
Same action again for 5 seconds to save current setting and exit parameter settings page.

(4) PM2.5 icon:

Display Switch: PM2.5 Value < PM2.5 rating color, Green(GOOD)/Yellow(OK)/Red(POOR)>

(5) CO2 icon:

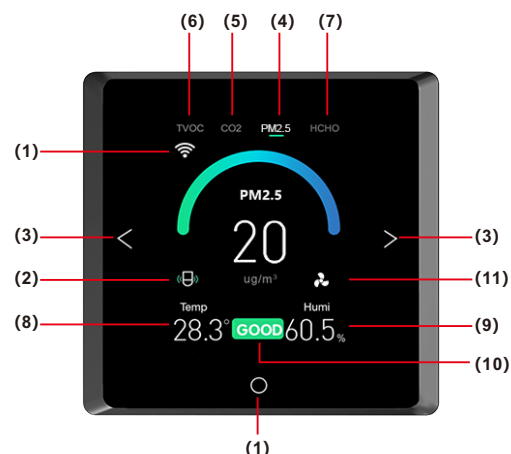
Display Switch: CO2 Value < CO2 Level Display/Value, Green(GOOD)/Yellow(OK)/Red(POOR)>

(6) TVOC icon:

Display Switch: TVOC Value < TVOC Level Display/Value, Green(GOOD)/Yellow(OK)/Red(POOR)>

(7) HCHO icon:

Display Switch: HCHO Value < HCHO Level Display/Value, Green(GOOD)/Yellow(OK)/Red(POOR)>



- (8) **Temperature icon:**
Always on: Inner temperature/NTC external temperature(To Be Setting)
- (9) **Humidity icon:** Always on: Inner humidity
- (10) **APP air quality display:**
GOOD(Green), OK(Yellow), POOR(Red)
Any value of PM2.5/CO2/TVOC/ HCHO fails to the standard, Display priority: POOR> OK > GOOD
- (11) **Sensor operating status:**
Running (fan icon displayed constantly) Sleeping (no fan icon displayed) Working Cycle: 5 minutes (2 minutes running + 3 minutes sleeping)

Parameter I :

Operation (At home page , long press “<” and “>” keys together for 5 seconds to enter) :

Single Click the “<” or “>” key to switch the settings

Smart Backlight → Mute → NTC Tem Display → Reset → Baud Rate → Language →
Gases Sens → Gases Display>Short press “<” or “>” key to adjust parameter<ON→ OFF >

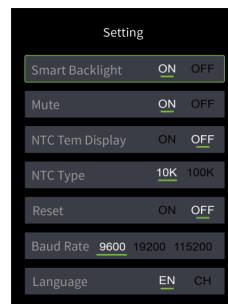
Display :

Option Selected (Highlight)

Parameter Adjustment (Optional content is displayed in white, and a small cursor at the bottom of the content.

Note: Unselected options are displayed in light gray, and selected options are displayed in white)

Note : Long press “<” and “>” keys for 5 seconds to save the current settings and return to home page.



Parameter II:

Operation (At Parameter I page, Long press “>” key for 10 seconds to enter):

Single Click the “<” or “>” key to switch the settings

Temp Calibrate → Humi Calibrate → NTC Temp Calibrate (External Temperature Sensor)

→ CO2 Calibrate → PM2. 5 Calibrate → TVOC Calibrate → HCHO Calibrate

Click “<” or “>” key to switch and adjust parameters.

(Note: Long press can adjust parameter rapidly)

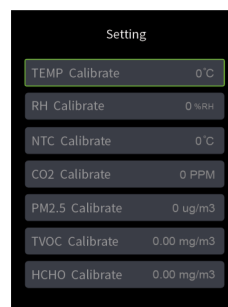
Display :

Option Selected (Highlight)

Parameter Adjustment (Optional content is displayed in white, and a small cursor at the bottom of the content.

Note: Unselected options are displayed in light gray, and selected options are displayed in white)

Note : Long press “<” and “>” keys for 5 seconds to save the current settings and return to home page.



Parameter I

Operation At home page, long press “<” and “>” keys together for 5 seconds to enter Parameter I setting:

Smart Backlight → Mute → NTC Tem Display → NTC Type → Factory Reset → Baud Rate → Language → Gases Sens → Gases Display>Short press “<” or “>” key to adjust parameter, Long press “<” and “>” keys for 5 seconds to save the current settings and return to home page.

No	Parameter	Factory Default	Description
1	Smart Backlight	ON	“OFF”:The screen brightens upon button activity; if inactive, it dims after a 30-second delay “ON ”:The screen brightens upon button activity; if inactive, it adjusts based on ambient light after 30 seconds (dimmed during the day, off at night
2	Mute	ON	“OFF”: Turn Off the button click sound “ON”: Turn on the button click sound
3	NTC Tem Display	OFF	“OFF”: Inner temperature display “ON”: External temperature display
4	NTC Type	10K	10K 100K
5	Factory Reset	OFF	“OFF”:Not restore to factory values “ON”:Restore to factory values
6	Baud Rate	9600	9600 19200 115200
7	Language	EN	EN CH
8	Gases Sens	HIG	“LOW”, “MID”, “HIG”
9	Gases Display	OFF	“OFF” “ON”

Parameter II

Operation at parameter I page, long press “>” key for 10 seconds to enter Parameter II Page:

Single Click “<” or “>” key to switch the settings

< Temp calibrate → Humi calibrate → NTC Temp Calibrate(External Temperature Sensor) → CO2 Calibrate → PM2. 5 Calibrate → TVOC Calibrate → HCHO Calibrate>Single Click

“ <” or “>” key to switch and adjust parameters.

(Note: Long press can adjust parameter rapidly)

Long press “<” and “>” keys for 5 seconds to save the current settings and return to home page

No.	Parameter	Options/Factory default	Description
1	Temp calibrate	±10~10, Default 0	-10~10°C (Step 1°C)
2	Humi calibrate	±20~20, Default 0	-20~20% (Step 1%)
3	NTC temperature calibrate (External temperature sensor)	±10~10, Default 0	-10~10°C(Step 1°C)
4	CO2 calibrate	±1000~1000, Default 0	-1000~1000ppm(Step 50ppm)
5	PM2.5 calibrate	±100~100, Default 0	-100~100ug/m³(Step 5ug/m³)
6	TVOC calibrate	-2~2, Default 0	-2~2mg/m³(Step 0.05mg/m³)
7	HCHO calibrate	-0.30~0.30, Default 0	-0.30~0.30mg/m³(Step 0.01mg/m³)

Modbus Protocol Communication Rules

Modbus RTU Configuration Name	Configuration Data
Baud Rate	9600bps
Parity	No Parity
Data Bits	8 data bits
Stop Bits	1 stop bits

DIP Switch Address Setting

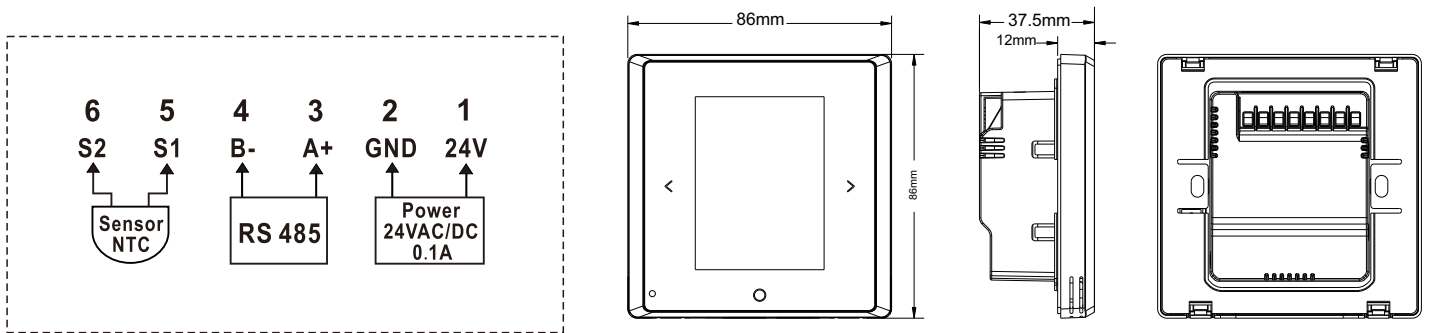
DIP Switch	BIT1	BIT2	BIT3	BIT4	BIT5	BIT6
Address						
1						
2	ON					
3		ON				
4	ON	ON				
Number 1~64 (The actual address is the DIP switch address plus 1, following the international standard)						

Communication Protocol

(The standard MODBUS RTU data format contains fields for address information, function code, data field, and CRC checksum. The read command is 0x03, and the write command is 0x06)

Description	Address(Register No)	Functions	Value Description
Baud rate	0000(40001)	R/W	0: 9600 1: 19200 2: 115200
Smart backlight	0001(40002)	R/W	0: OFF (The screen brightens upon button activity; if inactive, it dims after a 30-second delay) 1: ON (The screen brightens upon button activity; if inactive, it adjusts based on ambient light after 30 seconds (dimmed during the day, off at night))
NTC tem display	0002(40003)	R/W	0: OFF(Inner temperature display) 1: ON(External temperature display)
NTC type	0003(40004)	R/W	1: 10K 2: 100K
Temp calibrate	0004(40005)	R/W	-10~10°C(Step 1°C) Stored as 16-bits Signed Integer
Humi calibrate	0005(40006)	R/W	-20~20%(Step 1%) Stored as 16-bits Signed Integer
NTC temperature compensation (external temperature sensor)	0006(40007)	R/W	-10~10°C(Step 1°C) Stored as 16-bits Signed Integer
CO2 calibrate	0007(40008)	R/W	-1000~1000ppm (Step 1ppm) Stored as 16-bits Signed Integer
PM2.5 calibrate	0008(40009)	R/W	-100~100ug/m³ (Step 1ug/m³) Stored as 16-bits Signed Integer
TVOC calibrate	0009(40010)	R/W	-2~2mg/m³ (Step 0.01mg/m³) Multiplied by 100, stored as 16-bits Signed Integer
HCHO calibrate	0010(40011)	R/W	-0.30~0.30mg/m³ (Step 0.01mg/m³) Multiplied by 100, Stored as 16-bits Signed Integer
Factory reset	0011(40012)	R/W	0: Not Reset 1: Reset
Language	0012(40013)	R/W	0: EN 1: CH
Reserve	0013(40014)	R/W	Reserve
Communication address	0014(40015)	R	1~64 (No Address 0: The actual address is the international standard DIP switch address plus 1.)
Inner temperature	0015(40016)	R	Stored as a 16-bit signed integer, the actual temperature value is obtained by dividing by 10. For example, the register value 0x0119 corresponds to a decimal value of 281, resulting in an actual temperature value of 28.1 degrees
Inner humidity	0016(40017)	R	Stored as a 16-bits signed integer, the actual humidity value is obtained by dividing by 10; For example, the register value is 0x02C6 corresponds to a decimal value of 71.0%, resulting in an actual humidity of 71.0%
NTC temperature (external temperature sensor)	0017(40018)	R	Stored as a 16-bit signed integer, the actual temperature value is obtained by dividing by 10. For example, the register value 0x0119 corresponds to a decimal value of 281, resulting in an actual temperature value of 28.1 degrees
CO2	0018(40019)	R	Stored as a 16-bit signed integer. For example, the register value 0x00A6 corresponds to a decimal CO2 concentration value of 166 ppm
PM2.5	0019(40020)	R	Stored as a 16-bit signed integer. For example, the register value 0x007D corresponds to a decimal PM2.5 concentration value of 125 µg/m³
TVOC	0020(40021)	R	Stored as a 16-bit signed integer, the actual TVOC value is obtained by dividing by 1000. For example, the register value 0x0070 corresponds to a decimal value of 112, resulting in an actual TVOC value of 0.112 mg/m³
HCHO	0021(40022)	R	Stored as a 16-bit signed integer, the actual HCHO value is obtained by dividing by 1000. For example, the register value 0x0050 corresponds to a decimal value of 80, resulting in an actual HCHO value of 0.080 mg/m³
Inner temperature and humidity sensor fault	0022(40023)	R	0: Normal 1: Erro alarm
External temperature sensor fault	0023(40024)	R	0: Normal 1: Erro alarm
CO2 Sensor Fault	0024(40025)	R	0: Normal 1: Erro Alarm
TVOC Sensor Fault	0025(40026)	R	0: Normal 1: Erro Alarm
PM2.5 Sensor Fault	0026(40027)	R	0: Normal 1: Erro Alarm
HCHO Sensor Fault	0027(40028)	R	0: Normal 1: Erro Alarm
CO2 Quality Level	0028(40029)	R	1:GOOD 2:OK 3:POOR
PM2.5 Quality Level	0029(40030)	R	1:GOOD 2:OK 3:POOR
TVOC Quality Level	0030(40031)	R	1:GOOD 2:OK 3:POOR
HCHO Quality Level	0031(40032)	R	1:GOOD 2:OK 3:POOR
Gases Sens	0032(40033)	R/W	1:LOW 2:MID 3:HIG
Gases Display	0033(40034)	R/W	0: OFF 1: ON
Sensor Operating Status	0034(40035)	R	0: Sleeping 1: Running; Working Cycle: 5 minutes (2 minutes running + 3 minutes sleeping)

Wiring diagram and Dimension drawing



Link APP

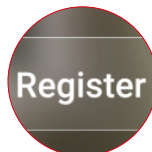
Download

Click App store or Android application market to download "TuyaSmart" APP

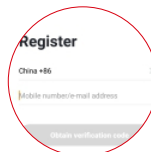


Registration and login

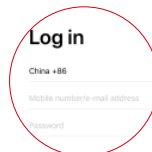
click "Register" to create account. Enter your account password to log in.



Register



Create account



Log in

- 1 Long press "O" 5 seconds for networking pairing window.



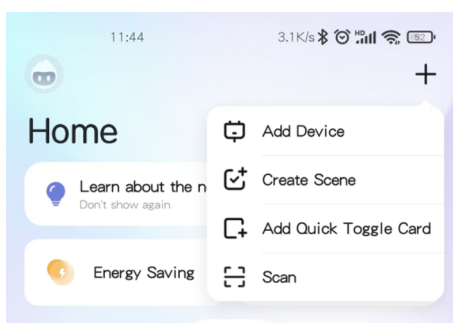
- 2 Click "<" ">" to select, Click "O" confirm.



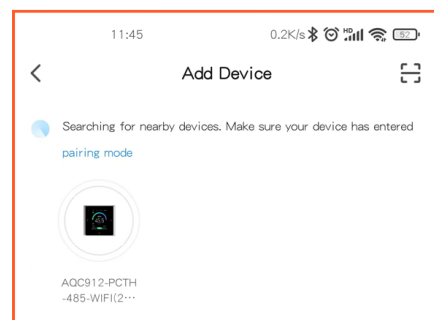
- 3 "Wi-Fi" icon blinks quickly refers to pairing mode.



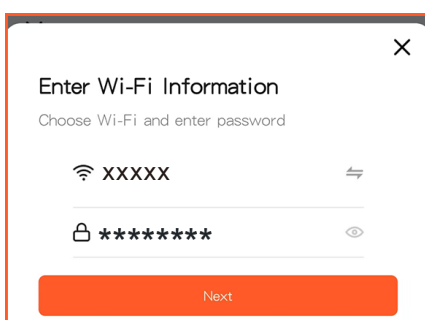
- 4 Ensure that your phone's WIFI is turned on and connected, open "TuyaSmart" APP, click the "+" on the right upper corner.
"Note that the product connection does not support 5G WIFI networks."



- 5 Wait for the scan until the detector icon appears, then click on the icon.



- 6 Enter your wifi password, click "Next".



- 7 Wait for the installation to complete, click "DONE", and the installation is finished.

