

• Description

The 4PID-SMART-C01 Module is the gas detector based on the principle of photoionization detection (Photo-Ionization Detector, PID). This is a widely used and highly sensitive sensor module for the concentration of VOCs present in the environment. The module uses SemeaTech 4PID sensors as the sensitive component (specific technical parameters of the sensor refer to the datasheet) and performs gas concentration detection through signal sampling, amplification, filtering and conversion. It features built-in temperature compensation, linear correction and other functions, ensuring excellent stability and selectivity.

The 4PID-SMART-C01 Module supports UART signal output modes, allowing direct output of digital and analog voltage signals that represent gas concentration data, which is easy to operate.

• Feature

- Unified electrical and mechanical interfaces for easy replacement of PID sensor modules with different detection ranges;
- Built-in mature compensation and correction algorithm, direct output of gas concentration data, greatly reducing the user's development cycle;

• Specifications

Product Model:	4PID-SMART-C01
Detectable Gas Types:	VOCs
Detection Principle:	Photoionization detection
Ionization Energy:	10.6 eV
Detection Range:	Refer to PID sensor datasheet
Detection Resolution:	Refer to PID sensor datasheet
Measurement error:	< ±10%FS
Operating Voltage:	(3.3 ~ 5.5) VDC
Operating Current:	≤ 40 mA @ 3.3 VDC
Output mode:	UART (3.0V TTL)
Installation:	7pins plug-in
Operating temperature:	-20°C ~ 45°C
Operating humidity:	0% ~ 95%RH non-condensing
Operating pressure:	1 ± 0.1 atm
Enclosure material:	Aluminum
Dimensions:	Φ 24.2 x 31.0 mm
Weight:	27 g
Expected Operating Life:	2 years (excluding UV lamp and detection electrode)

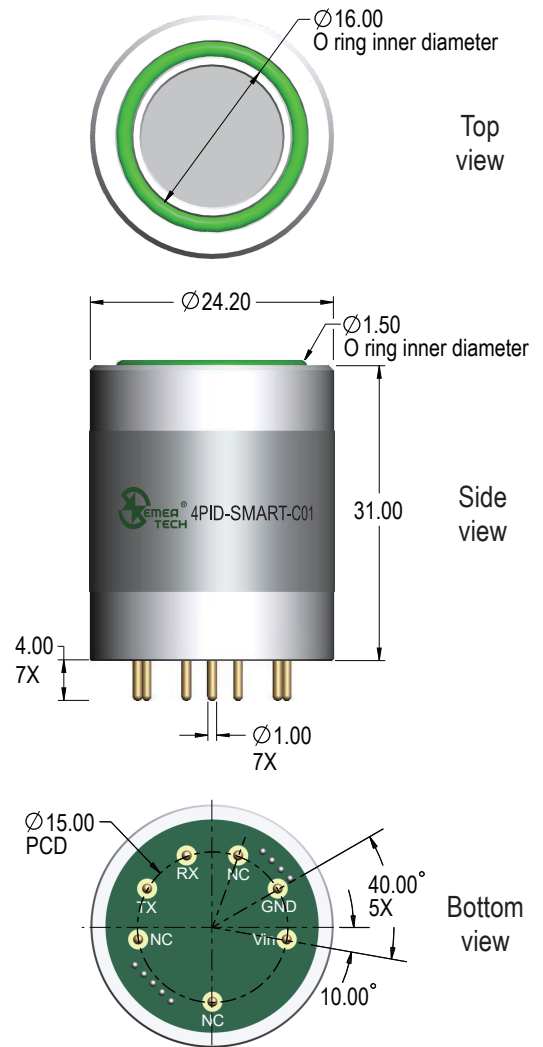
• Pin out

NC	Vacant
VIN	Power input positive
GND	Power input negative
NC	Vacant
RX	Serial port receiving
TX	Serial port sending
NC	Vacant

Website: www.semeatech.com

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• Product Dimensions



All dimensions in mm

All tolerances ±0.20mm unless otherwise stated

• Communication Settings

Baud Rate	9600 bps
Data bits	8
Stop bit	1
Check bit	None

This module utilizes a serial port (TX/RX) for data transmission, following a question-and-answer style communication method. All data transfers occur in hexadecimal (HEX) format.

1. Command for terminal Read Module Information

Example: AA 0F 01 C5 80 EE

Byte1--AA: Start byte of a command;

Byte2--0F: Information reading command;

Byte3--01: Module address (default at;0x01);

Byte4--C5: CRC16 (Modbus);

Byte5--80: CRC16 (Modbus);

Byte6--EE: Command end byte;

Note: In this command Byte 2 and Byte 3 will be checked with CRC 16 (Modbus).

Module response (Sending Information Data to Terminal).

Example: AA 0F 01 2A 00 C8 00 64 00 0A 00 05 02 D1 3B EE

Byte1--AA: Start byte of a command;

Byte2--0F: Information reading command;

Byte3--01: Module address;

Byte4--2A: Sensor type (isobutylene);

Byte5/6--00/C8: Modular measurement range (hexadecimal);

Byte7/8--00/64: Calibration of gas concentration (hexadecimal);

Byte9/10--00/0A: High Alarm Point (Hexadecimal);

Byte11/12--00/05: Low Alarm Point (Hexadecimal);

Byte13--02: Sensor reading units (PPM: 0x02 PPb: 0x03);

Byte14--D1: CRC16 (Modbus);

Byte15--3B: CRC16 (Modbus);

Byte16--EE: Command end byte;

Note: In this command Byte 2 ~ Byte 13 will be checked with CRC 16 (Modbus).

2. Commands for gas concentration request

Example: AA 01 01 C1 E0 EE

Byte1--AA: Start byte of a command;

Byte2--01: Information reading command;

Byte3--01: Module address;

Byte4--C1: CRC16 (Modbus);

Byte5--E0: CRC16 (Modbus);

Byte6--EE: Command end byte;

Note: In this command Byte 2 and Byte 3 will be checked with CRC 16 (Modbus).

Module response (Sending Information Data to Terminal).

Example: AA 01 01 80 00 00 00 15 CA EE

Byte1--AA: Start byte of a command;

Byte2--01: Information reading command;

Byte3--01: Module address;

Byte4--80: Data symbol bit (0x80: negative; 0x00: positive);

Byte5/6 -- 00/00 : Data (ppm/ppb) integer part (0-65535);

Byte7-- 00: Data (ppm/ppb) fractional part (0.00-0.99);

Byte8 -- 15: CRC16 (Modbus);

Byte9 -- CA: CRC16 (Modbus);

Byte10 -- EE: Command end byte;

Note: In this command Byte 2 ~ Byte 7 will be checked with CRC 16 (Modbus).

3. Command for terminal sending Module Zero-setting

Example: AA 02 01 C1 10 EE

Byte1--AA: Start byte of a command;

Byte2--02: Command for Zero-setting;

Byte3--01: Module address;

Byte4--C1: CRC16 (Modbus);

Byte5--10: CRC16 (Modbus);

Byte6--EE: Command end byte;

Note: In this command Byte 2 and Byte 3 will be checked with CRC 16 (Modbus);

Zero-setting success, module sending:

AA 02 01 10 D0 5C EE

Zero-setting failure, module sending:

AA 02 01 20 D0 48 EE

Note: 1) In this command Byte 2 and Byte 3 will be checked with CRC 16 (Modbus);

2) During calibration , the LED flashes at a rate of 1 second /time for 30 seconds;

Byte1--AA: Start byte of a command;

Byte2--02: Command for Zero-setting;

Byte3--01: Module address;

Byte4—10/20: Signs of success/failure

Byte5—D0: CRC16 (Modbus);

Byte6—5C/48: CRC16 (Modbus);

Byte7—EE: Command end byte;

Note: In this command Byte 2 、 Byte 3 and Byte 4 will be checked with CRC 16 (Modbus).

4. Command for terminal sending Module Calibration

Example: AA 03 01 C0 80 EE

Byte1--AA: Start byte of a command;

Byte2--03: Command for Calibration;

Byte3--01: Module address;

Byte4--C0: CRC16 (Modbus);

Byte5--80: CRC16 (Modbus);

Byte6—EE: Command end byte;

Note: In this command Byte 2 and Byte 3 will be checked with CRC 16 (Modbus);

Calibration success, module sending:

AA 03 01 10 81 9C EE

Calibration failure, module sending:

AA 03 01 20 81 88 EE

Byte1--AA: Start byte of a command;

Byte2--03: Command for Calibration;

Byte3--01: Module address;

Byte4—10/20: Signs of success/failure;

Byte5—81/81: CRC16 (Modbus);

Byte6—9C/88: CRC16 (Modbus);

Byte7—EE: Command end byte;

Note: In this command Byte 2 、 Byte 3 and Byte 4 will be checked with CRC 16 (Modbus).

5. Command for Module Address Modification

Example: AA 04 02 C82 B1 EE

Byte1--AA: Start byte of a command;

Byte2--04: Command for Address Modification;

Byte3--02: Module new address;

Byte4--82: CRC16 (Modbus);

Byte5--B1: CRC16 (Modbus);

Byte6--EE: Command end byte;

Note: In this command Byte 2 and Byte 3 will be checked with CRC 16 (Modbus).

Address Modification success, module sending:

Example: AA 04 02 10 30 AD EE

Byte1--AA: Start byte of a command;

Byte2--04: Command for Address Modification;

Byte3--02: Module new address;

Byte4--10: Signs of success/failure;

Byte5--30: CRC16 (Modbus);

Byte6--AD: CRC16 (Modbus);

Byte7--EE: Command end byte;

Note: In this command Byte 2 ~ Byte 4 will be checked with CRC 16 (Modbus).

6. Command for Adjustment of Calibration Gas Concentration

Example: AA 05 01 01 F4 51 3F EE

Byte1--AA: Start byte of a command;

Byte2--05: Command for concentration adjustment;

Byte3--01: Module address;

Byte4/5--01/F4: Concentration to be modified (hexadecimal, 0x1F4);

Byte6--51: CRC16 (Modbus);

Byte7--3F: CRC16 (Modbus);

Byte8--EE: Command end byte;

Note: In this command Byte 2 ~ Byte 5 will be checked with CRC 16 (Modbus).

Adjustment success, module sending:

AA 05 01 10 01 F4 E8 2E EE

Adjustment failure, module sending:

AA 05 01 20 01 F4 E8 21 EE

Byte1--AA: Start byte of a command;

Byte2--05: Command for concentration adjustment;

Byte3--01: Module address;

Byte4—10/20: Signs of success/failure;

Byte5/6—01/F4 : Concentration to be modified (hexadecimal, 0x1F4);

Byte7—E8/E8: CRC16 (Modbus);

Byte8—2E/21: CRC16 (Modbus);

Byte9—EE: Command end byte;

Note: In this command Byte 2 ~ Byte 6 will be checked with CRC 16 (Modbus).

Warning

- 1) This product does not have any intrinsic safety certification or explosion proof certification. Please do NOT use this product in any hazardous locations.
- 2) This product does not have reverse power protection and Electrostatic Discharge (ESD) protection. Please carefully verify the electrical polarity and make the ESD protection before each use or installation.
- 3) Please use a stable DC power supply for this gas sensor module. It is highly recommended to use a power supply with the output voltage fluctuation less than 1%.