ATO

Combustible Gas Sensor

(Model: MH-T7041A)

Manual

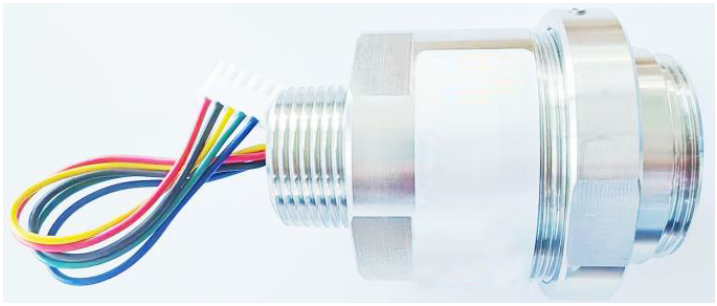
Version: 1.1

Valid from: 5th, Dec 2023

MH-T7041A Infrared CH4 Gas Sensor

1. Product Description

MH-T7041A is a universal type intelligent sensor to detect CH4 gas, taking advantage of non-dispersive infrared (NDIR) principle. With high selectivity, no oxygen dependence, high performance and long lifespan features, MH-T7041A also has built-in temperature compensation feature. MH-T7041A is a compact and high-performance sensor based on infrared absorption of gas detection technology, micro-machining and sophisticated circuit design.



2. Features

- High sensitivity, high resolution, low power consumption
- Output method: UART.
- Temperature compensation, excellent stability
- Long lifespan
- Anti-poisons, anti-vapor interference

3. Application

Widely used for industrial field instrumentation, industrial-process control and safety protection

4. Specification

Table 1 Technical Index

Product Model	MH-T7041A
Gas Detected	Combustible gas (see Table 2 for details)
Working Voltage	(5.0±0.1) V DC
Average Current	<100mA
Interface Level	<60mA (peak current < 150mA) @5VDC
Measurement Range	0~100%VOL optional (view table 2)
Output Signal	UART (TTL voltage)
Warm-up Time	<30s
Response Time	T_{90} < 30s
Working Temperature	-40℃ ~ 70℃
Working Humidity	0 to 95%RH, non-condensing
Dimension	Φ51×65mm
Weight	450g
Lifespan	>10 years

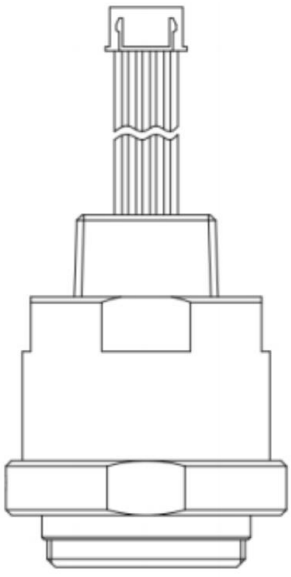


Fig 1 Sensor structure diagram

Table 2

Gas name	Molecular Formula	Range	Resolution	Note
Methane	CH4	0～5% Vol	0.01% Vol	±3%FS @(10℃-40℃) ±5%FS @(--40℃-10℃, 40℃-70℃)
Methane	C_3H_8	0～100% LEL	1% LEL	

Note: The range in the above table is the common range range, users can customize according to their own needs.

5. Dimension Drawing

(No dimensional tolerance is ±0.2)

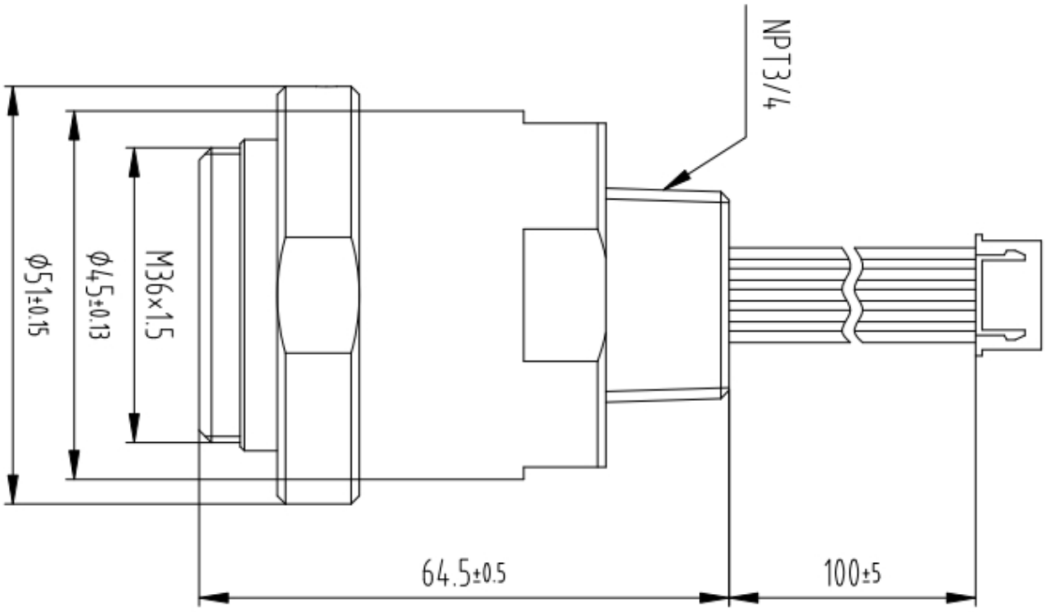


Figure 2 Dimension Drawing of Sensor

Table 3 Pin Definition

Pin	Description
Pin 1	Shell, grounded
Pin 2	UART(RXD) 0-3.0V data input
Pin 3	UART(TXD) 0-3.0V data output
Pin 4	GND
Pin 5	Vin voltage input

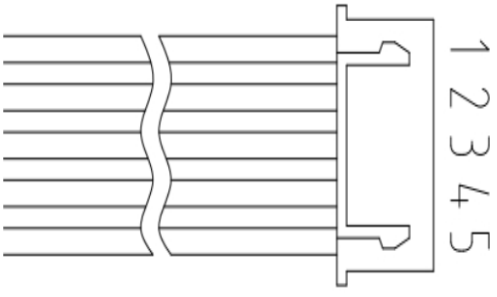


Figure 3 Pin definition drawing

6. UART Output

Hardware connection

Connect the Vin-GND-RXD-TXD of the sensor to the user's 5V-GND-TXD-RXD. (The user end must use TTL level, and if it is RS232 level, conversion must be performed). The detector can directly read the gas concentration value through the UART interface of the sensor, without the need for calculation.

Software connection

Set the serial port baud rate to 9600, data bit to 8, stop bit to 1, and parity bit to none.

0x86	Read Gas Concentration
0x87	Calibrate zero point（ZERO）
0x88	Calibrate span point（SPAN）

0 x86 - Gas Concentration Reading

1	0x86	**Gas Concentration Reading**							
Send	0	1	2	33	4	5	6	7	8
	Start Byte	Sensor Number	Command	--	--	--	--	--	Check Code
	0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79
Return Value									
Return	0	1	2	3	4	5	6	7	8
	Start Byte	Command	Concentration high level	Concentration low level	--	--	--	--	Check Code
	0xFF	0x86	0x02	0x60	0x47	0x00	0x00	0x00	0XD1

Gas concentration= high *256 + low

0 x87 - Calibrate Zero Point

Send	0	1	2	3	4	5	6	7	8
	Start Byte	Sensor Number	Command	--	--	--	--	--	Check Code
	0xFF	0x01	0x87	0x00	0x00	0x00	0x00	0x00	0x78
Sensor no return value									

0 x88 - Calibrate Span Value

Send	0	1	2	3	4	5	6	7	8
	Start Byte	Sensor Number	Command	High span value	Low span value	--	--	--	Check Code
	0xFF	0x01	0x88	0x07	0xD0	0x00	0x00	0x00	0XA0
Sensor no return value									

Checksum & calculation method

The checksum = (invert (byte0 +... + byte7)) + 1

For example, Gas Concentration Reading

	Command Sent							
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	Sensor Number	Command	-	-	-	-	-	Check Value
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	Checksum

A. Add all the bytes together except byte 0

0x01 + 0 x86 + 0 x00 + 0 x00 + 0 x00 + 0 x00 + 0 x00 = 0x87

B. Get the value from step A, then invert it.

0xFF– 0x87 = 0x87

C. Plus one based on the value of step B

0x78 + 0x01 = 0x79

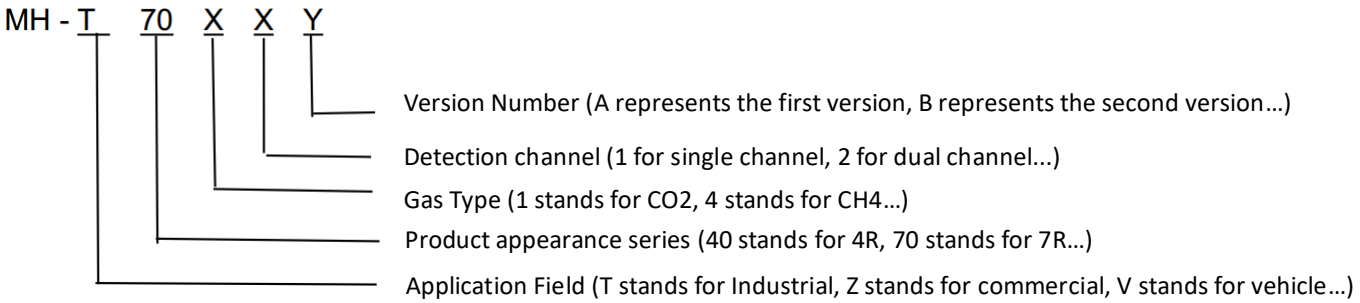
C Language Calibrate & Calculate and Routine

```
char getCheckSum(char *packet)
{
    char i, checksum;
    for( i = 1; i < 8; i++)
    {
        checksum += packet[i];
    }
    checksum = 0xff – checksum;
    checksum += 1;
    return checksum;
}
```

7. Ordering instructions

In order to be able to provide a sensor that meets the needs of the customer, the customer is requested to provide the following details.

1. Sensor Model Name.



2. Sensor detection range and resolution (refer to Table 2)

7. Cautions

- Sensors should be calibrated regularly, with a recommended calibration cycle of 6 months.
- Do not use sensors for a long time in environments with high dust density.
- Please use the sensor within its power supply range.