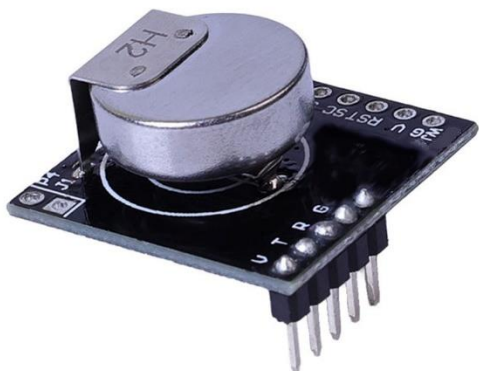


H2-20000F TX – HYDROGEN DIGITAL TRANSMITTER MODULE



INTRODUCTION

The H2-20000F TX Hydrogen module combines our proven selective fuel cell H₂ sensor with accurate advanced electronic control technology, converting H₂ concentration into ppm. The module provides advantages of precision measurement, long-service life and ability to work under a wide temperature range. The module comes precalibrated and ready to integrate directly into systems.

FEATURES

- Mini size ideal for portable, fixed, low power and battery applications
- Low integration cost
- High H₂ precalibrated range
- Long lifetime technology with no risk of leakage
- Low power consumption
- High sensitivity, fast response
- Selective detection, high precision
- Wide temperature range
- No poisoning from silicones

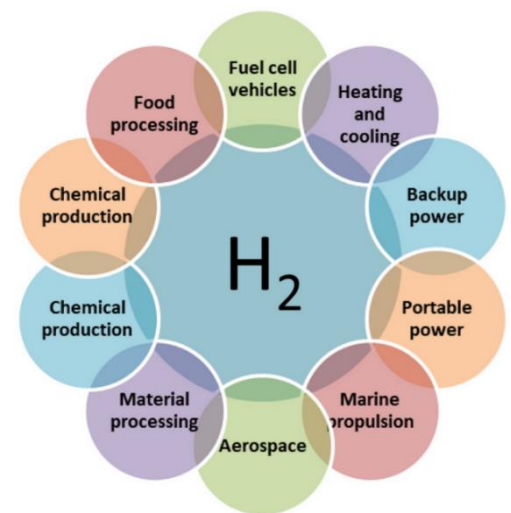
TYPICAL APPLICATIONS

- Industrial Detection & Safety Monitoring
- Portable and fixed instruments
- Hydrogen industrial plants and leak monitoring
- Hydrogen energy vehicles
- Safety monitoring in Hydrogen energy storage and transportation
- Battery charging stations and warehouses
- Battery manufacturing
- Energy engineering
- Petroleum and petrochemical industry monitoring applications
- Process applications in metallurgy, food processing, electronics industry
- Power transformers
- Fire safety



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SPECIFICATION



Measuring Principle:	Mini fuel cell
Detectable Gases:	Hydrogen H2
Standard Range:	0 – 20,000ppm H2
Maximum Over-Range:	50,000ppm
Optional Ranges on request:	0-1000ppm, 0-5000ppm H2
Input Voltage:	4.5 – 6.0 V
Response Time (T90):	< 60 seconds
Repeatability:	3 % typically
Lower Detectable Limit (LDL):	30 ppm
Accuracy:	+/- 4% Full Scale (25°C +/-3°C)
Linearity:	Linear
Expected Operating Life:	10 years in air
Operating Temperature Range:	-40°C to +70°C
Humidity Range (non-condensing):	10 – 90% RH
Pressure Range:	1 atm +/- 10%
Weight:	4 g
Warranty Period:	12 months from date of manufacture
Part Number:	2112B60035

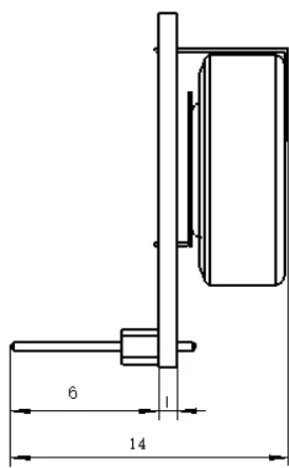
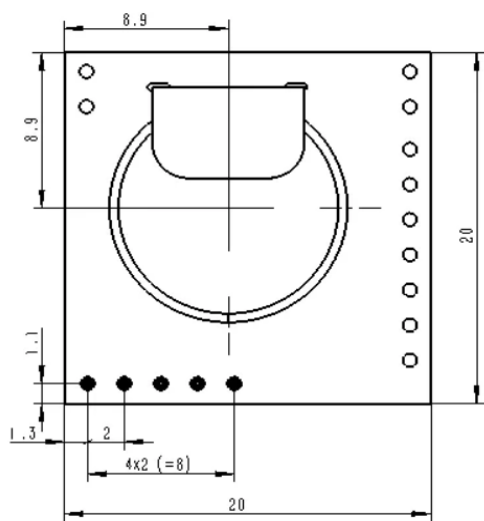
All performance specifications are based upon the following environment conditions: +20°C, 50% relative humidity and 1 atm (1013 mBar or ambient pressure).



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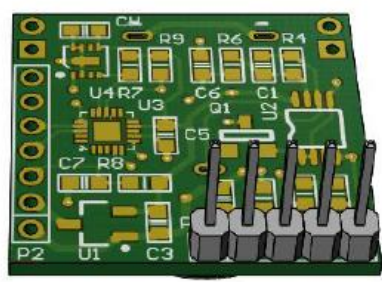
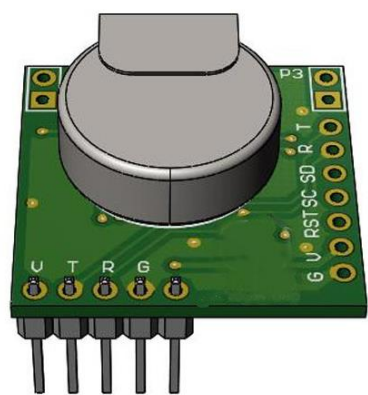
DIMENSIONS

All dimensions are in millimetres mm.
All tolerances are +/- 0.15mm.



PIN OUTPUTS

PIN	DEFINITION
PIN 1	Vin (3.3 – 5V)
PIN 2	GND
PIN 3	TXD
PIN 4	RXD
PIN 5	Vin (5V)



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COMMUNICATION PROTOCOL

General Settings: The Module uses TTL serial communication. Communication configuration parameters are:

Baud Rate	9600
Data Bits	8 Bits
Stop Bit	1 Bit
Parity Bit	None

COMMUNICATION COMMANDS

There are two communication types: Active upload type and Q&A type. The default type is active upload and it sends gas concentration once every second. **Commands are as follows:**

0	1	2	3	4	5	6	7	8
Start	Gas	Unit ppb	No Decimal Byte	Concentration (High Byte)	Concentration (Low Byte)	Full Range (High Byte)	Full Range (Low Byte)	Check Sum
0xFF	H2=0x17	Ppb+0x04	0x00	0x00	0x25	0xFF	0xFF	0x25

Gas Concentration = Concentration (high byte)*256 + concentration (low byte)

SWITCH TO Q&A MODE:

0	1	2	3	4	5	6	7	8
Start	Reserved	Switch Command	Q&A	Reserved	Reserved	Reserved	Reserved	Checksum
0xFF	0x01	0x78	0x41	0x00	0x00	0x00	0x00	0x46

SWITCH TO ACTIVE UPLOAD MODE

0	1	2	3	4	5	6	7	8
Start	Reserved	Switch Command	Active Upload	Reserved	Reserved	Reserved	Reserved	Checksum
0xFF	0x01	0x78	0x40	0x00	0x00	0x00	0x00	0x47



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TO READ GAS CONCENTRATION:

0	1	2	3	4	5	6	7	8
Start	Reserved	Command	Reserved	Reserved	Reserved	Reserved	Reserved	Checksum
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79

TO RETURN

0	1	2	3	4	5	6	7	8
Start	Command	Concentration (High Byte) (ug/m3)	Concentration (Low Byte) (ug/m3)	Reserved	Reserved	Concentration (High Byte) (ppb)	Concentration (Low Byte) (ppb)	Check Sum
0xFF	0x86	0x00	0x2A	0x00	0x00	0x00	0x20	0x30

Gas Concentration = Concentration (high byte)*256 + concentration (low byte)

Checksum calibration

```

/*****
*Function name: unsigned char FucCheckSum(uchar *i,uchar ln)
*Function description: checksum calibration[Take Not(Byte1+Byte2+...Byte7) +1]
*Note: Take Not(Byte1+Byte2+...ByteX (X>2)
*****/
```

```

unsigned char FucCheckSum(unsigned char *i, unsigned char ln)
{
    unsigned char j, tempq=0;
    i+=1;
    for(j=0; j<(ln-2); j++)
    {
        tempq+=*i;
        i++;
    }
    tempq=(~tempq)+1;
    return(tempq);
}
```



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CROSS SENSITIVITY

Gas	Concentration (ppm)	Output Signal (ppm H2 equivalent)
Alcohol	1000	< 10ppm

NOTES

- Avoid changing or moving the sensor on the module.
- Avoid moving or changing electronic elements on PCB.
- Avoid exposure to organic vapours, organic solvents and high gas concentrations.
- Sensors are designed to operate in a wide range of harsh environments and conditions. However, it is important to avoid exposure to high concentrations of solvent during storage, fitting into instrumentation and operation. When using sensors on PCBs, degreasing agents should be used prior to the sensor being fitted.
- Protect from excessive vibration and shock.
- See Operating Notes for more details.

By the nature of the technology used, any sensor can potentially fail to meet specification without warning. Euro-Gas makes every effort to ensure reliability of all sensors but where life safety is a performance requirement of the product and, where practical, Euro-Gas recommends that all gas sensors and instruments using sensors are checked for response to gas before use.

The data contained in this document is believed to be accurate and reliable. The data given is for guidance only. Euro-Gas Management Services Ltd accepts no liability for any consequential losses, injury or damage resulting from the use of this datasheet or the information contained in it. Customers should test the sensors under their own conditions to ensure that the sensors are suitable for their own requirements and in accordance with the plans and circumstances of the specific project and any standards/regulations pertaining to the country in which the sensors will be utilised. Performance characteristics on this data sheet outline the performance of newly supplied sensors. Output signal can drift below the lower limit over time. This datasheet is not intended to form the basis of a contract and in the interest of product improvement, Euro-Gas reserves the right to alter design features and specifications without notice. 2510