ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

Thermal gas mass flowmeter

AI-FM High-precision type Manual

Application area:
Aerospace、Semiconductor processing、
Medical biochemistry、
Electronic powered automobile、
Ferrous metallurgy、VEIS、
the industrial gas production and related industries.

ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

Table of contents

ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

I. Product Introduction

The AI-FM high-precision thermal gas mass flow meter is a high-precision thermal gas flow sensor designed and developed using an advanced microelectromechanical system (MEMS) flow sensing chip. This high-precision flow meter features higher accuracy, higher sensitivity, and strong anti-interference capabilities, making it suitable for measuring and controlling various small-flow-rate clean gases. This flow meter is intrinsically safe and explosion-proof, suitable for environments requiring high accuracy and intrinsic safety. It is cost-effective, easy to install, and requires no temperature or pressure compensation, making it a viable replacement for traditional volumetric or differential pressure flow meters .

II. Product Features

- Employing a microelectromechanical system (MEMS) flow sensing chip, the sensor features high precision, high sensitivity, and strong anti-interference capabilities.
- Zero-point stability of the sensor.
- It has high accuracy and good repeatability within its measurement range .
- Standard mechanical interface, easy to install .
- RS485 communication output, standard MODBUS RTU protocol .
- The LCD displays instantaneous and cumulative flow rates, which are clear, intuitive, and easy to read.
- You can choose between a 4~20mA standard current signal output or a 1~5V/0-10V/0-5V voltage output.
- Intrinsically safe explosion-proof certification.

Business inquiries：+86 181 5734 3325
E-mail：sales@king-sen.com Website：www.asyjx.com
Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

working power supply	DC24V/2.5W	Accuracy (%)	±(1.0 FS) %
medium temperature	-10~55 ℃	humidity	<95%RH (no frost, no ice , no condensation)
Work pressure	≤ 1.5 MPa (3MPA can be customized)	Response time (ms)	50ms
Output method	4-20mA or 1~5V, 0-5V/0-10V selectable .	Mechanical connection	PT1/2 or G1/4 internal threads are available; other thread interfaces can be customized.
show	Instantaneous traffic, cumulative traffic	Communication methods	RS485 (Modbus RS tu protocol)
Range ratio	1:100	preheating time	3-4 minutes (preheating is recommended for best results)
Selectable standard temperature conditions	0°, 20°, 25° are user-adjustable, with 25° as the default.	Selectable gas type	Air, N2, O2, CH4, Ar, CO2, He, H2 , C3H8 (other gases can be obtained by contacting the manufacturer)
Protection level	IP40	Other signal outputs	PNP output can be selected
Pipe diameter	DN8 and DN15 are available.	Storage temperature	-10~65℃

were measured at 25 ℃, 101.32 kPa, and in dry air .

Minimum measurable flow rate: 0.3 N mL / min

Maximum measurable flow rate: 1000 NL/ min

Note: Do not exceed the measurement range, as this may damage the sensor.

ASY Electronics (Jiaxing) Co., Ltd

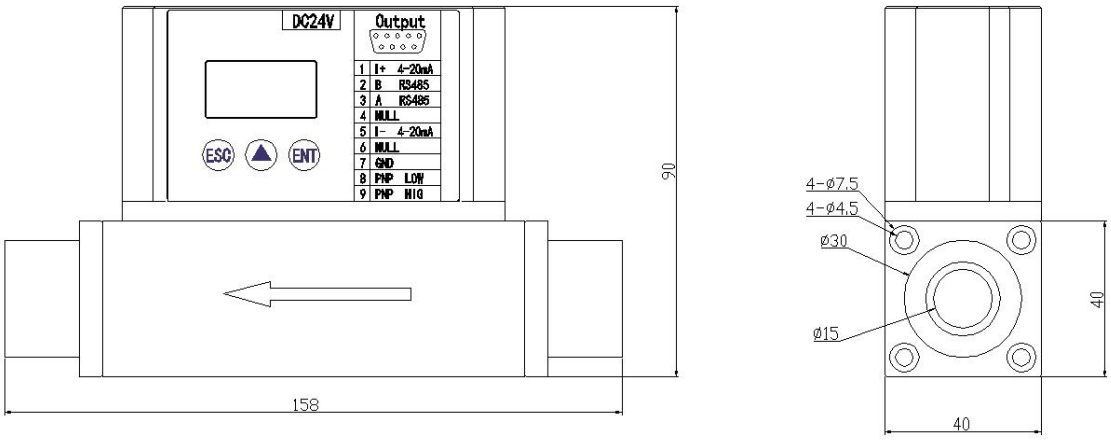
Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

III. Mechanical Dimensions

Mechanical interface connection dimensions
PT1/2 or G1/4 internal threads; other thread interfaces can be customized.



Standard connectors can be used for interface conversion as needed.

Adapter	quick-connector	Pagoda connector
		

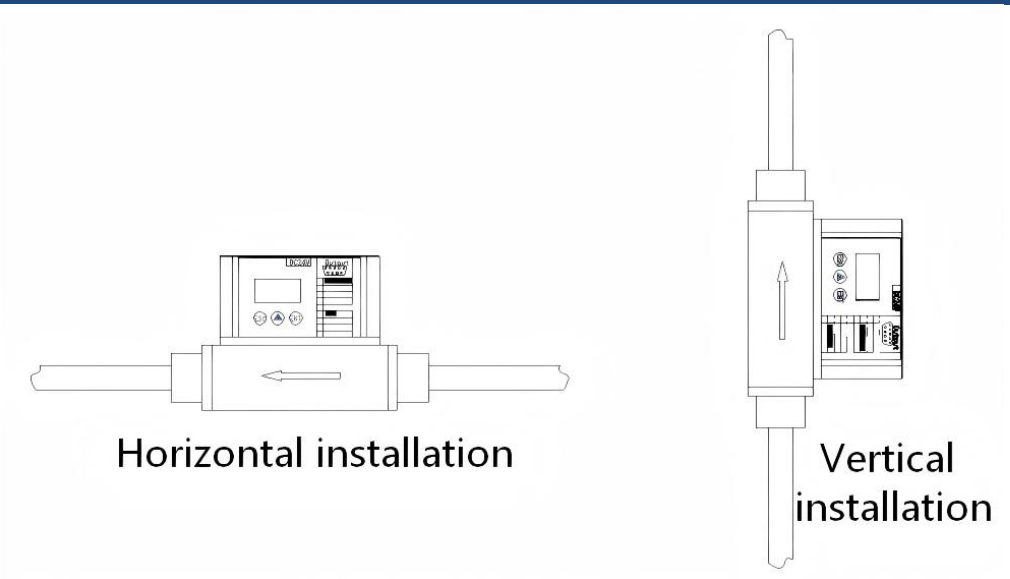
ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

IV. Installation Method

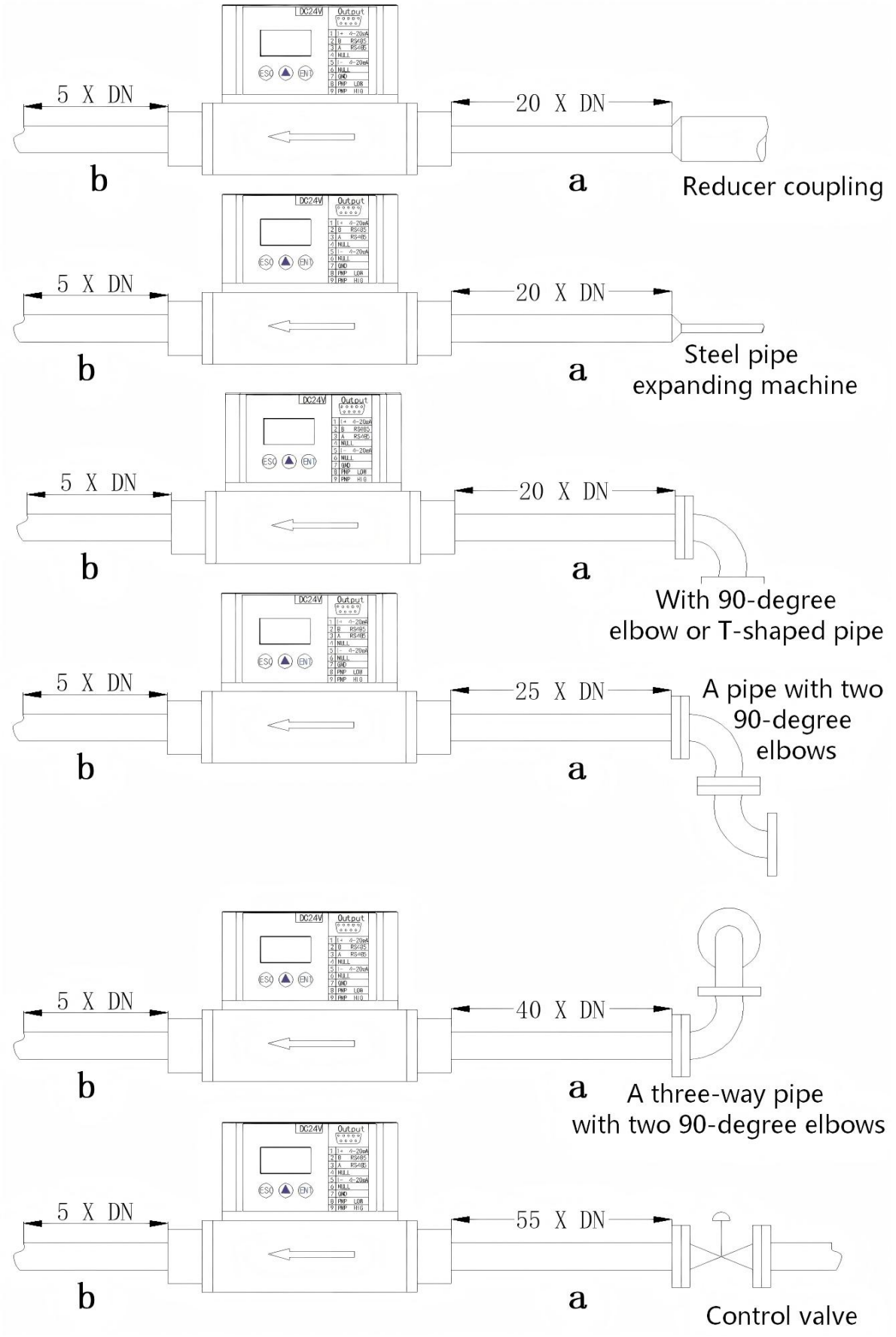


ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China



ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

a = upstream straight pipe section b = downstream straight pipe section

Try to install the control valve and buffer shut-off valve after the thermal gas mass flow meter.

V. Wiring Instructions

DB9 Interface Definition	
P IN	meaning
1	4 -20mA output current I +
2	RS485 communication output B
3	RS485 communication output A
4	P NP LOW (optional)
5	4 -20mA output current I-
6	DC24V power supply is positive.
7	GND power supply negative
8	null
9	null

DB9 Lead Specifications	
color	meaning
yellow	4 -20mA output current I- / voltage output-
black	4 -20mA output current I + / voltage output +
red	RS485 communication output A
brown	RS485 communication output B
blue	Power supply 0V
green	24V power supply
orange color	PNP output

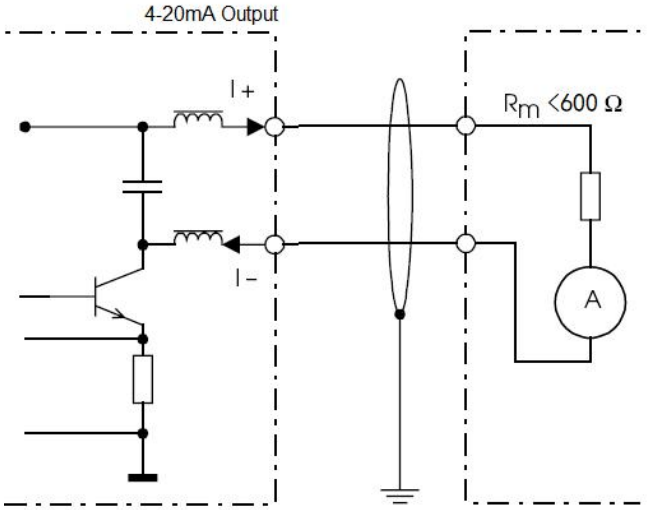
ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

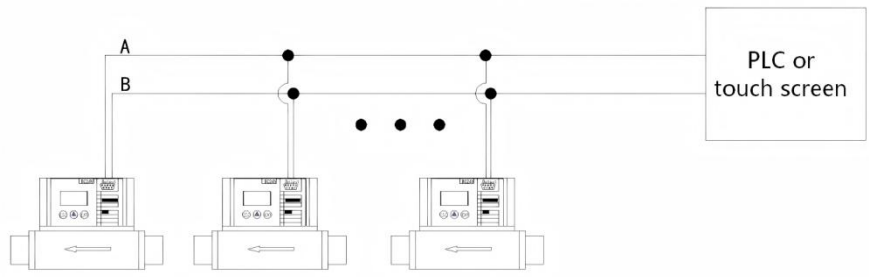
E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

4-20mA Current Output Wiring Instructions



RS485 bus wiring instructions



The default configuration for 485 bus communication is 32 units

button illustrate	logo	meaning	
		Short press (press	Press and hold (for
	E SC	quit	Enter system
	▲	Shift/Select	Enter
	E NT	Adjust upwards	Confirm

VI. Operating Instructions

ASY Electronics (Jiaxing) Co., Ltd

Business inquiries：+86 181 5734 3325

E-mail：sales@king-sen.com Website：www.asyjx.com

Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

show menu	0.00 NL/m Σ 3.14 m³	First line: Displays instantaneous flow rate and unit. The second line displays the cumulative

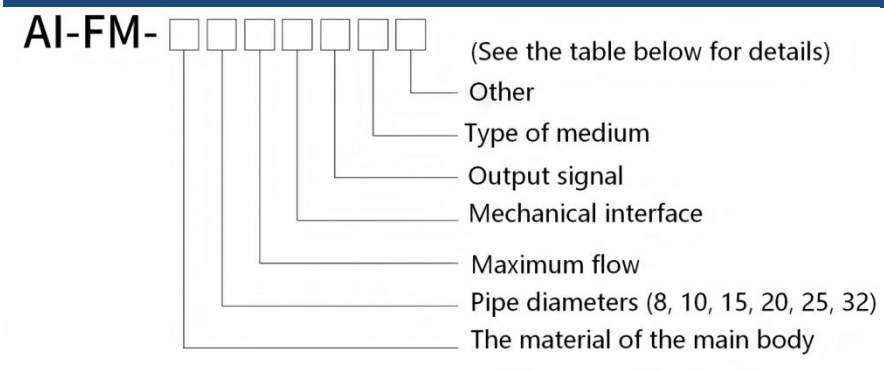
System configuration menu (press and hold the ESC key for more than 1.2 seconds to enter)	
Measuring Medium > Air Instrument Coefficient 1.0 Upper Range Limit 50 Damping Coefficient 7 Alarm Cumulative 0.0 Alarm Upper Limit 0.0 Small Signal Cutoff 1.0 Flow Unit NL/m³ Cumulative Unit m³ Cumulative Quantity Reset 0.00 Medium Density 1.25 Standard Temperature 25 Version 3.4V	Measuring media: air, oxygen, nitrogen, argon, carbon dioxide, hydrogen, helium, methane, propane; other gases can also be selected, and the instrument coefficient can be set independently.
	Instrument coefficient: A product coefficient of a linear flow signal. Display value = Instrument coefficient x Actual measured value.
	The upper limit of the range corresponds to a current output of 20mA. The unit corresponding to the range is the currently displayed flow rate unit.
	Damping coefficient: 0 by default, range 0-20. Reducing the damping coefficient allows for rapid detection of flow rate fluctuations. Increasing the damping coefficient can smooth out the current flow rate display value.
	Small signal excision: percentage value, default 0.05, range 0-100
	Alarm cumulative amount: An alarm will be triggered when the cumulative amount exceeds the set value.
	Alarm limit: An alarm will be triggered if the instantaneous flow rate exceeds the set value.
	Flow rate units: Nm³/h, NL/m, NmL/m, NL/h, kg/h, g/h. When switching flow rate units, please be sure to convert the current upper limit value according to the range unit!
	Cumulative quantities are measured in g, kg, Nm3, NL.
	Clear cumulative data usage: Clears the cumulative data usage value.

Business inquiries：+86 181 5734 3325
E-mail：sales@king-sen.com Website：www.asyjx.com
Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

	Medium density, defaults to air density. If measuring other gases and wanting to display the mass unit, please manually set it to the density of the current gas.
	Standard temperatures: 0°C, 20°C, and 25°C, with 25°C as the default.
	Current software version

Communication Menu	
Device ID>001	MODBUS communication device ID, 0-
baud rate 9600	Baud rate selection: 4800/9600/19200
Check bit None	Checksum: None/Odd/Even
1 stop bit	Stop bits: 1 bit / 2 bits

七、Product Selection



Product Series	Body material	Pipe diameter	Flow range	Mechanical interface	Output signal	medium	other
AI-FM	F2	8	S0	GN0	N0	AIR	T1

For example:
Model: AI-FM-F208S0GN0N0AIRT1 Parameters: **AI-FM** : High-precision model; **Body material** : 316 stainless steel; **Pipe diameter** : DN8; **Flow range** : 1~100NmL/min; **Mechanical interface** : G3/4 internal thread; **Output signal** : 4-20mA + RS485; **Measuring medium** : air;
Other : T1 temperature display

Business inquiries：+86 181 5734 3325
E-mail：sales@king-sen.com Website：www.asyjx.com
Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

Body material	F0: Anodized aluminum ; F1: 304 stainless steel; F2: 316 stainless steel	
Pipe diameter	8	DN8
	15	DN15
Flow range	S0	1~100 NmL/min
	S1	1~1000 NmL/min
	S2	1~100NL/min
	S3	5~500NL/min
	S4	10~1000 NL/min
	SN	Customizable measurement range (starting from 0.3 Nml/min)
Mechanical interface	GN0	G1/4 Internal Thread
	PN1	PT1/2 internal thread
	NT stands for Special Other Threaded Interface	
Output signal	N0	RS485 and 4-20mA (default) PNP
	N1	RS485 and 1-5V PNP
	N2	RS485 and 0-5V PNP
	N3	RS485 and 0-10V PNP
Media type	The measurement medium type is specified as follows: AIR for air (default), N2 for nitrogen, O2 for oxygen, CO2 for carbon dioxide, and MG for mixed gas.	
other	T1 represents temperature display; PT represents temperature and pressure display.	

Note: Flow rate measurements are based on air pressure. Maximum operating pressure is less than 1.0 MPa.

Medium type: Air calibration is used to measure the range of other medium gases.

Serial	gas	Conversion factor	Range percentage
1	Air	1.0	100%
2	Oxygen (O2)	0.9861	98.61%
3	Nitrogen N2	0.994	99.4%
4	Argon AR	1.4066	140.66%
5	Nitric oxide (NO)	0.9702	97.02%

Business inquiries：+86 181 5734 3325
E-mail：sales@king-sen.com Website：www.asyjx.com
Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

6	Nitrogen dioxide (NO2)	0.7366	73.66%
7	Carbon dioxide (CO2)	0.7326	73.26%
8	Methane CH4	0.7147	71.47%
9	Ethane C2H6	0.4781	47.81%
10	Propane C3H8	0.3459	34.59%

Appendix 1: MODBUS Register Address Table

Communication baud rate: 9600, 8, 1, NONE; Floating-point data arrangement: 2^143

Read data function code: 03 (HOLDING REGISTER)

Instrument address: can be set via menu, 0-255

Register address	Register Name	Number of registers	Data types	Data format
4x0001-4x0002	Instantaneous flow	2	float	IEEE754
	send	01 03 00 00 00 02 C4 0B		
	take over	01 03 04 00 00 00 00 FA 33		
4x0003-4x0004	Instantaneous flow rate	2	float	IEEE754
	send	01 03 00 02 00 02 65 CB		
	take over	01 03 04 00 00 00 00 FA 33		
4x0005	Zero point calibration	1	Unsigned int	Unsigned integer
	send	01 0 6 00 04 55 AA 77 24		
	take over	01 0 6 00 04 55 AA 77 24		
4x0007-4x0008	Cumulative integers	2	Unsigned long	Unsigned long integer
	send	01 03 00 06 00 02 24 0A		
	take over	01 03 04 00 00 00 00 FA 33		
4x0009-4x0010	Cumulative decimals	2	float	IEEE754

Business inquiries：+86 181 5734 3325
E-mail：sales@king-sen.com Website：www.asyjx.com
Address：Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

	send	01 03 00 08 00 02 45 C9		
	take over	01 03 04 00 00 00 00 FA 33		
4x0011-4x0012	Cumulative floating-point number	2	float	IEEE754
	send	01 03 00 0A 00 02 E4 09		
	take over	01 03 04 00 00 00 00 FA 33		
4x0013-4x0014	Not used	2	float	IEEE754
4x0015-4x0016	Current acquired signal value	2	float	IEEE754
	send	01 03 00 0E 00 02 A5 C8		
	take over	01 03 04 82 1F 40 36 52 5B		
4x00 23	Register write protection	1	Unsigned int	Unsigned integer
	send	01 06 00 16 55 AA D 7 21		
	take over	01 06 00 16 55 AA D 7 21		
	illustrate	Write 0x55AA to this register to unlock the write protection, at which point you can write to other registers. The write protection will automatically lock after 10 seconds, and you will need to unlock it again before you can continue writing.		

Quality Assurance and After-Sales Service

Business Phone： 18157343325 Lila Xu

Technical Phone： 18057302496 Wailly Yang

Email: sales@king-sen.com

Official website: www.asyjx.com

Address： Room 302, Building 11, No. 79 Jinsui Road, Economic and Technological Development Zone, Jiaxing , Zhejiang P.R. China

*This information product images and technical data is for reference only, if subject to update without prior notice, the specific content of the right to interpret ASY Electronics (Jiaxing) Co., Ltd.

Adhering to the ISO9001 quality management and control system, this product is manufactured using brand-new raw materials and components and undergoes rigorous factory testing. Product quality and performance meet relevant standards and technical specifications. However, due to uncertainties that may arise during transportation or use, we commit to the following service guarantee terms:

Within one year from the date of product delivery, if the product you purchased malfunctions during normal use due to reasons other than improper use or human error...
We will repair any product damage caused by any factors free of charge.

Damage to the equipment caused by the following reasons during use is not covered by the free replacement or repair policy:

- Installation or use conditions that violate the relevant requirements and regulations in this manual;
- Incorrect or contrary to the relevant instrument installation, wiring, or usage specifications of the country in which it is located;
- This product may not be used in conjunction with other products that are electrically incompatible with it or that lack reliable quality assurance and valid certification.
- Self-disassembly or repair;
- Equipment that has been in use for more than one year may experience natural aging or wear and tear.
- Force majeure as defined by applicable law

For products within the warranty period, the user shall bear the cost of sending the product out, and we shall bear the cost of replacement or repair and return of the product.
If the product sent by the user is confirmed by us to be free from defects or damage, the user shall bear the relevant shipping and insurance costs.