

MF60 Series Manual

2024

MF60 Series Micro Quality Specification



Application Fields:
Aerospace, Semiconductor
Processing, Medical Biology,
Electronic Automobile, Iron and
Steel Metallurgy, Marine
Electronics, Industrial Gas
Production and Other Industries.

1. Product Introduction

The micro gas mass flow controller is specially designed for the measurement and control of various small flow gases. The sensors in the series are made of advanced micro-electromechanical system (MEMS) flow sensor chips, combined with digital signals processing technology and flow control algorithm can realize precise control and intelligent processing of the flow sizes of various gases .

2. Product Features

★ With micro-electromechanical system (MEMS) flow sensor chip , bypass diverter and electromagnetic proportional valve .

The sensor has high precision and strong anti-interference characteristics. The bypass fluid of the diverter is in a laminar flow state, making the measurement and the control is more stable and accurate. The electromagnetic proportional valve has the characteristics of long service life and high sensitivity .

- ★ The zero point of the sensor is stable.
- ★ High accuracy and good repeatability within the measuring range .
- ★ Fast response time.
- ★ Standard mechanical interface, easy to install .
- ★ RS485 communication output, standard MODBUS RTU protocol .
- ★ LCD is used to display instantaneous flow and cumulative flow, which is clear and intuitive and easy to read.
- ★ 4~20mA standard current signal output and pulse output are optional.

3. Technical Parameters

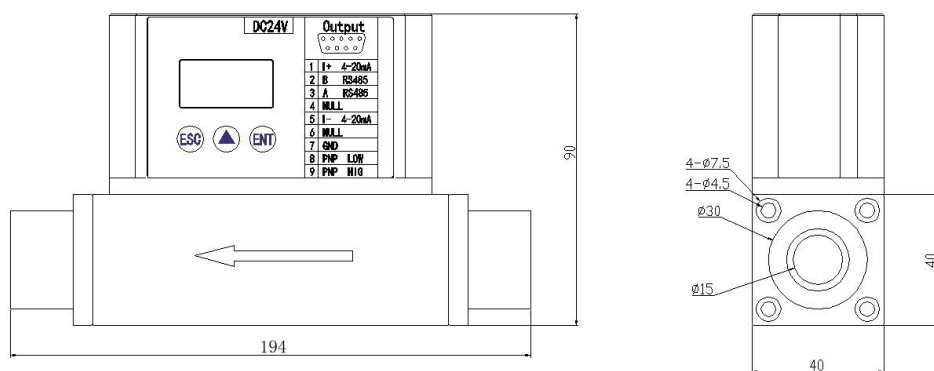
Working Power Supply	DC12-24V/6W
Accuracy (%)	Control Accuracy: $\pm 1.0\%$ SP, Measurement Accuracy: 0-50L/min / $\pm 1.0\%$ FS; Greater than: 50L/min / $\pm 1.5\%$ FS
Control and Measure Range Ratios	1: 100
Valve Type	Normally Closed Type
Operating Temperature	-10~55°C
Humidness	<95%RH(no frost, no icing)
Working Pressure Range	Measurement: 0-1.5MPA Control: 100SCCM-30SPLM Pressure: 0.1-1.0MPA 100SPLM Pressure: 0.1-0.65MPA 300SPLM Pressure: 0.1-0.5MPA
Typical Control Response Time	Less than 1.5S (T90)
Measured Response Time	<50mS
Output Mode	4-20mA or 1-5V
Communication Mode	RS485(Modbus Rtu Protocol)
Control Mode	Button Operation,Modbus,4-20mA(1-5V), 0-5V can be customized
Mechanical Connection	G1/4, PT1/2 Internal Thread
Class Of Protection	IP40
Temperature Conditions Can Be Selected	0°, 20°, 25°, User Adjustable, Default 25°
Gas Type Can Be Selected	Air, N2, O2, CH4, Ar, CO2, He, H2, C3H8
Working Pressure Differential	50 SPLM 0.1MPA -0.7MPA 100SPLM 0.1MPA-0.6MPA 300SPLM 0.1MPA -0.4MPA

Note: The above data were measured at 25 °C , 101.32kPa, dry air.

Minimum Flow Range: 200 SCCM

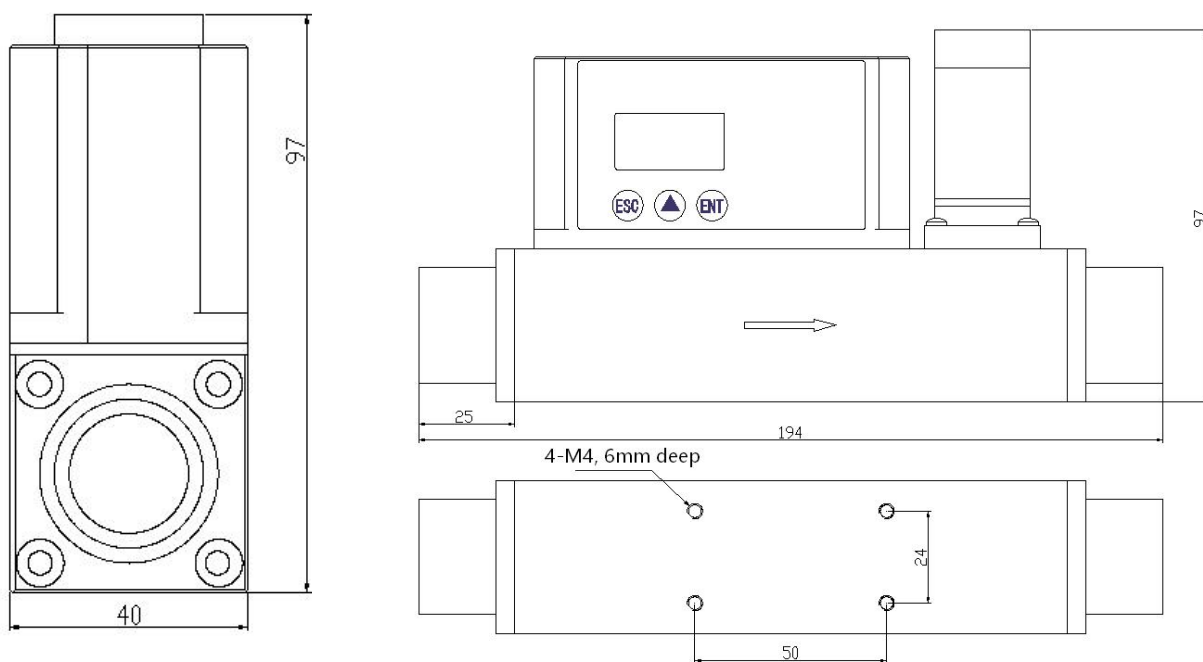
Maximum Flow Range: 300 N L / min

4. Mechanical Dimensions



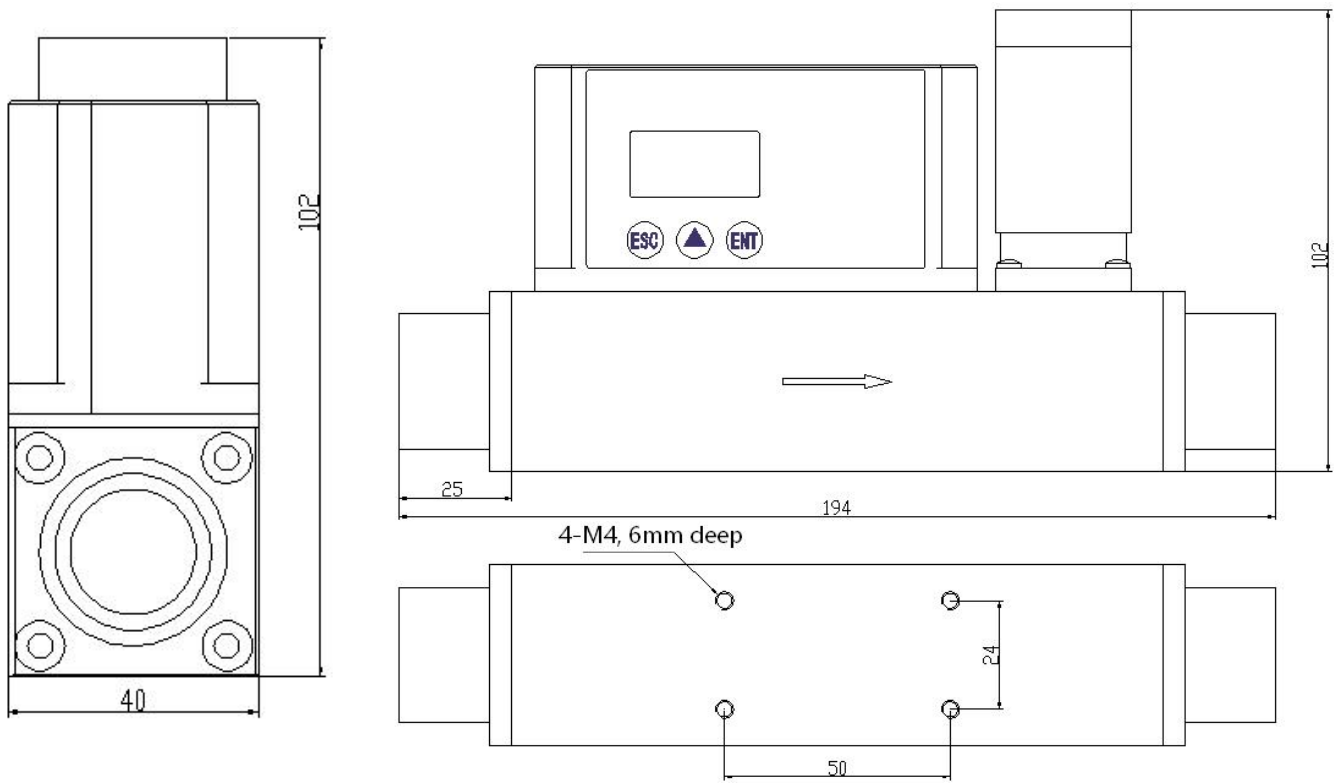
Mechanical Interface Connection Dimensions

G 1/4 Internal Thread



Mechanical Interface Connection Dimensions

PT1/2 Internal Thread -1



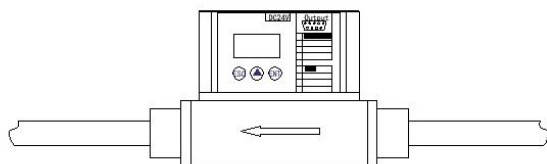
Mechanical Interface Connection Dimensions

PT1/2 Internal Thread -2

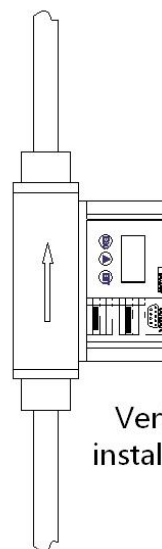
Standard connectors can be used for interface conversion as needed

Transfer Ferrule Connector	Quick-Connect Fitting	Transfer Pagoda Connector
		

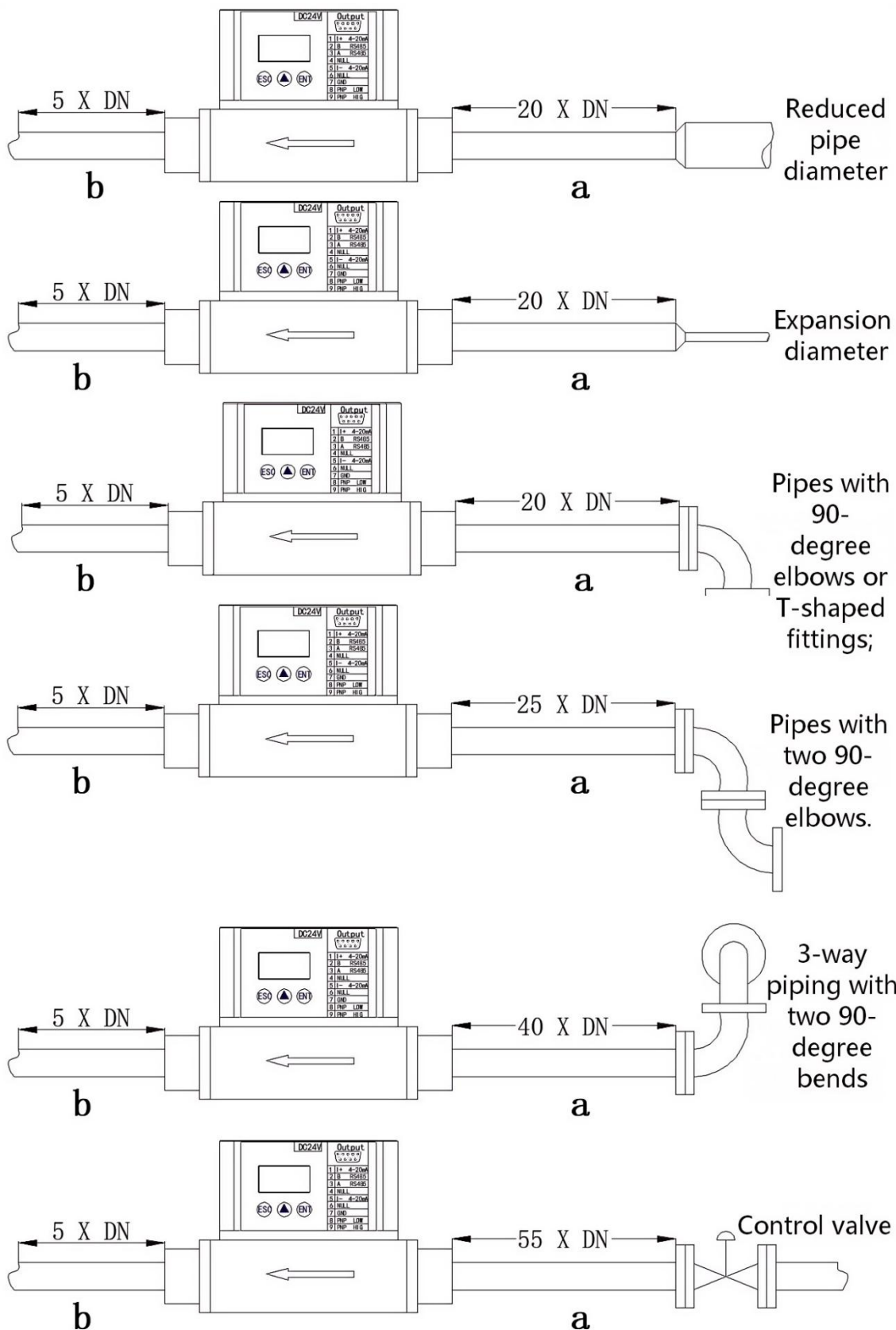
5. Installation Method



Horizontal installation



Vertical installation



a = Front Straight Pipe Section b = Rear Straight Pipe Section

6. Wiring Instructions

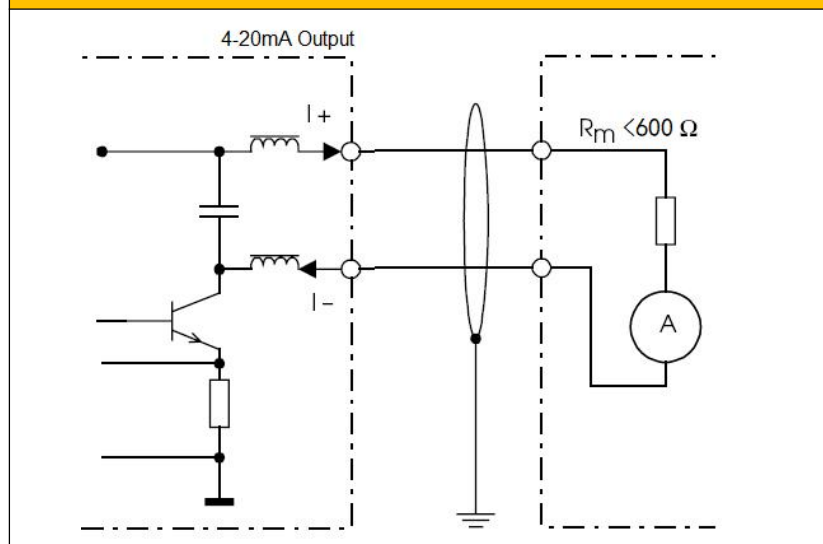
DB9 Interface Definition

PIN	Meaning
1	4 -20mA Current I +
2	RS485 Communication Output B
3	RS485 Communication Output A
4	4-20mA Current Input I+ (Optional)
5	4 -20mA Current I-
6	4-20mA Current Input I- (Optional)
7	GND Negative Power Supply
8	PNP LOW (Optional)
9	PNP HIG (Optional)

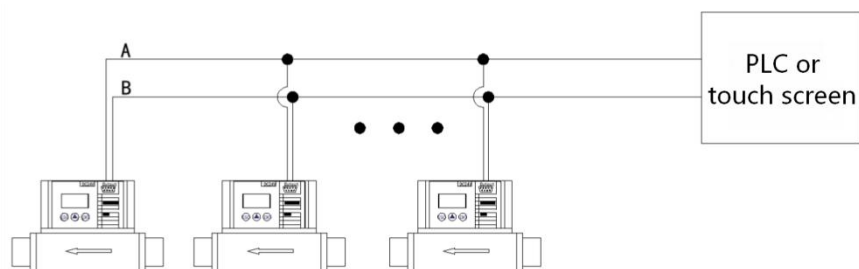
DB9 Pinout Description

Color	Meaning
Green	Positive Power Supply
Blue	Negative Pole of Power supply
Yellow	4 -20mA Current I +
Black	4 -20mA Current I-
Red	RS485 Communication Output A
Brown	RS485 Communication Output B

4 -20mA Current Output Wiring Instructions



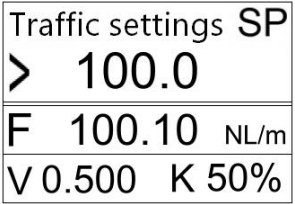
RS485 Bus Wiring Instructions



485 bus communication is configured for 32 units by default.

VII. Operation Instructions

Key Description		
Logo	Meaning	
	Short Press (Press and Release Immediately)	Long Press (More Than 1.2 Seconds)
ESC	Quit	Enter System Configuration
▲	Shift/Select	Enter Communication Configuration
ENT	Adjust Upward	Confirm The Configuration

Display and Control Interface	
 The display shows the set point (SP) as 0.00, the measured flow rate as 0.000 SLM, and the accumulated flow as Σ 3.15 NL.	First Line: Displays the set point flow rate. Second Line: Displays the measured flow rate and unit. Second line: Displays the accumulated flow and unit.
 The control interface shows traffic settings with SP > 100.0, test flow value F 100.10 NL/m, sensor voltage V 0.500, and solenoid valve opening K 50%.	Press ENT to enter the control interface and press ESC to return. SP is the set flow point. F is the test flow value. V is the sensor voltage, and K is the solenoid valve opening.

System Configuration Menu (Press and Hold The ESc Key for More Than 1.2 Seconds to Enter)

Instrument Coefficient	
>	1.0
Lower Range Limit	0.0
Upper Range Limit	14.0
Damping Coefficient	0.0
Upper Alarm Limit	10.0
Allowable Error	0.004
Small Signal Cut-off	0.05
Backlight	On
Version	1.2.0V

Instrument coefficient: The calibration correction coefficient can be changed to compensate for the disturbance of fluid cross-sectional velocity distribution and the influence of specific application environment. The instrument factor is a multiplication factor of the linear flow signal.

Display value = instrument factor x actual measured value

The lower limit of the range corresponds to a current output of 4 mA

The upper limit of the range corresponds to a current output of 20mA

Damping coefficient: default 0 , range 0-20
Reducing the damping coefficient can quickly detect the jump in flow rate.
Increasing the damping factor can smooth the current flow display value.

Small signal cutoff: percentage value, default 0.05 , range 0-100
Flow values that are less than the maximum range percentage are cut off.

Allowable error: valve control error, default is 0.004V.

Alarm upper limit Reserve

Display backlight on or off

Current software version

Communications Menu	
Device ID	Device ID for MODBUS Communication, 0-255
> 001	
Baud Rate	Baud Rate Selection 4800/9600/19200
9600	
Parity	Check Digit: None/Odd/Even
None	
Stop Bits	Stop Bits: 1 bit / 2 bit
1 bit	

8. Quality Assurance and After-Sales Service

In accordance with ISO9001 quality management and control system, this product is produced with brand new raw materials and components and has undergone strict factory testing, product quality and product performance meet the relevant standards and technical documents. However, due to transportation or use, there may be in the face of uncertainties, we promise the following service guarantee terms:

★ Within two weeks from the date of delivery, if the product you purchased has a recognized quality defect, we will replace it free of charge;

★ Within one year from the date of delivery of the product, if the product you purchased has any problem during normal use that is not caused by improper use or human error,

If the product is damaged due to any factors, we will repair it free of charge;

★ Equipment damage caused by the following reasons during use is not within the scope of free replacement or repair:

- Installation or use conditions that violate the relevant requirements and regulations of this manual;

- Incorrect or violation of relevant instrument installation, wiring or usage regulations of the country;

- Use with other products that are electrically incompatible with this product or have no definite quality assurance and valid certification;

- Dismantle or repair by yourself;

- Natural aging or loss of equipment that is more than one year old;

- Force majeure as defined by applicable law

★ For products within the warranty period, the user shall bear the shipping cost of the product, and we shall bear the replacement or repair and return costs of the product;

★ When the products sent by the user are confirmed by us to be free of defects or damage, the relevant shipping and insurance costs incurred shall be borne by the user;

★ Once the product is confirmed, we will send the new or used product within 48

hours or two working days unless there are special circumstances.

Repaired products;

★ If you find any defective or damaged product, please contact your local supplier or us.

Appendix 1. MODBUS Register Address Table

Communication baud rate: 9600,8,1,NONE, floating point data arrangement: 2143

Read data function code: 03 (HOLDING REGISTER)

Instrument address: can be set through the 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	Flow Setting	2	float	IEEE754
	Send	01 03 00 02 00 02 65 CB		
	Take Over	01 03 04 00 00 00 00 FA 33		
4x0005-4x0006	Current Value	2	float	IEEE754
	Send	01 03 00 04 00 02 85 CA		
	Take Over	01 03 04 00 00 00 00 FA 33		
4x0007-4x0008	Accumulating 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
	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	Negative Cumulative Floating Point Number	2	float	IEEE754
	Send	01 03 00 0C 00 02 04 08		
	Take Over	01 03 04 BA 4A 41 F8 CF 2F		

4x0015-4x0016	Current Acquisition 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		
4x0017-4x0018	Flow Rate Lower Limit	2	float	IEEE754
4x0019-4x0020	Flow Rate Upper Limit	2	float	IEEE754
4x0021	Lower Limit Relay Status	1	Unsigned int	Unsigned integer
4x0022	Upper Limit Relay Status	1	Unsigned int	Unsigned integer
4x0051-4x0052	Product Id Number	2	Unsigned long	Unsigned long integer
4x0053	Modbus Device ID	1	Unsigned int	Unsigned integer
4x0054	Baud Rate	1	Unsigned int	Unsigned integer
4x0055	Check Digit	1	Unsigned int	Unsigned integer
4x0056	Stop Bits	1	Unsigned int	Unsigned integer