Piezoelectric vortex flowmeter

Operation manual

WTYG Type

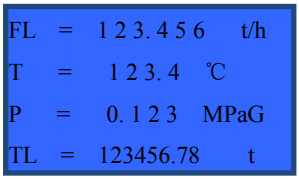
1 Functional description of the keys

1.1 Preview function of keys

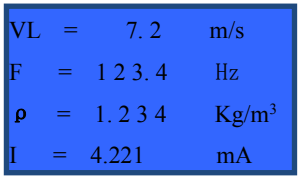
SET	Measurement mode: Switch from Measurement mode to menu mode. Menu mode: Enter the selected menu Digital adjustment mode: Save the value and exit this option Content selection mode: Save the selection and exit this option
	Menu mode: Turn Digital adjustment mode: Shift Calibration model: Start the sampling
	Measurement mode: Switching display interface Menu mode: Select menu Digital adjustment mode: Digital adjustment/Toggle signs Content selection mode: Select the content
	Menu mode: exit this option Digital adjustment mode: exit this option Content selection mode: exit this option

Note: Digital adjustments include decimal points.

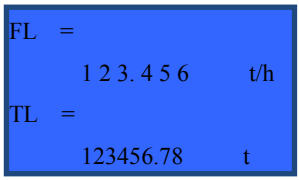
1.2 Displays in measuring mode



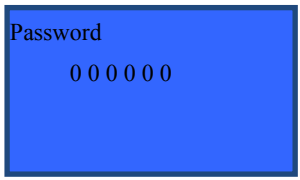
Main display (1)



Auxiliary display

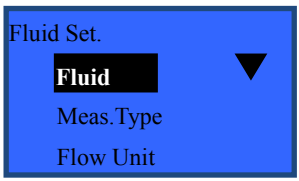


Main display(2)

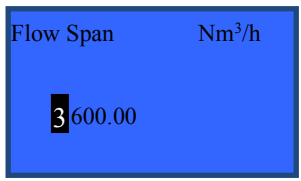


Password interface

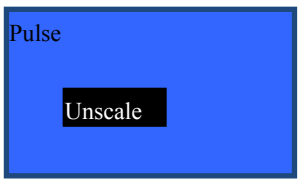
1.3 Displays in menu mode



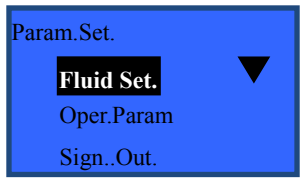
Menu mode



Digital adjustment mode



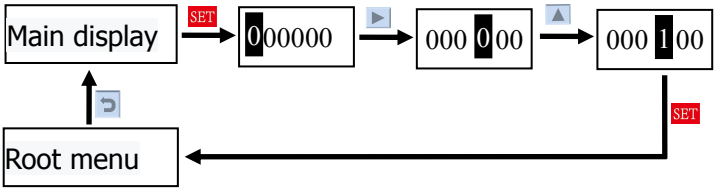
Content selection mode



Root menu

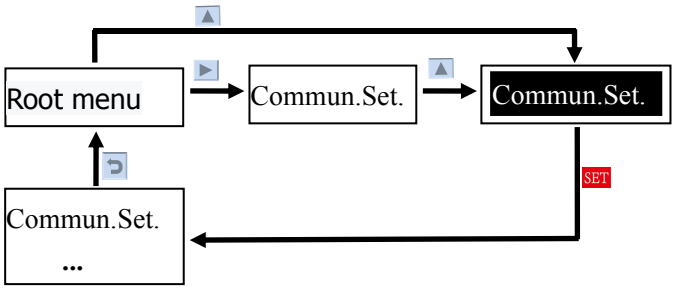
1.4 Basic Operation of keys

● **Password input:** (default password: 00100)



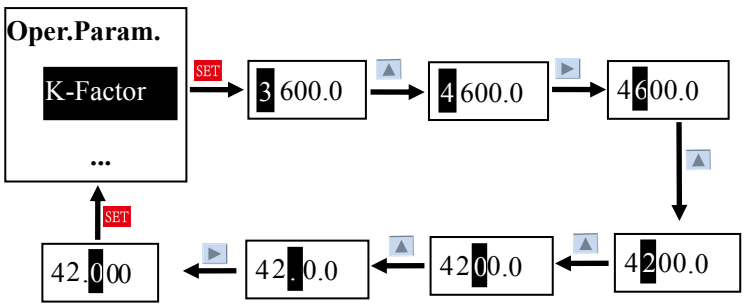
● **Menu mode:**

For example, enter the communication Settings menu.



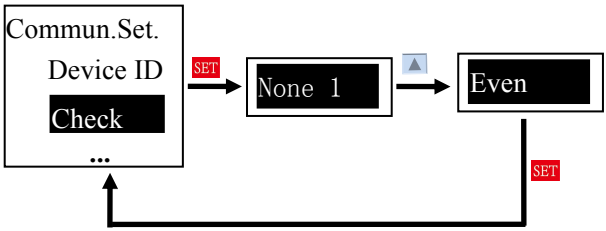
● **Digital adjustment mode:**

For example, set the meter coefficient to 42.0



● Content selection mode：

For example, change not check to even check.



● In the **Root menu**, press button to exit the **Menu mode** and return to the **Measurement mode**;
If no operation is performed in the **Menu mode**, the system automatically returns to the **Measurement mode** 5 minutes later.

● Display contents toggle in Measurement mode

In the **Measuring mode**, press button to switch between the **Main display** and **Auxiliary display.**
In the **Auxiliary display**,If no operation, the system will automatically return to the **Main display** 5 minutes later.

2 Parameter specification

2.1 List of Parameters Table 2-1

Root menu	First level menu	Content or parameters
Fluid.Set.	Fluid	Gas/Liquid/Steam
	Meas.Type	Mass/Volume/Normal
	Flow Unit	t/kg/g/m^3/L/cm^3/Nm^3/NL/Ncm^3
	Time Unit	h/m/s/
	Compen.Mode	Gas T&P/Cons.Fact./Sup.T&P /Sat.Temp/Sat.Pres.
Oper.Param.	Flow Span	float
	K-Factor	float
	Low Cut	float
	Dens.Opr.	float
	Dens.Norm.	float
	Pulse Rate	float
	Freq.Span	float
	F-Factor	float，default 1.0
	Dry.Fact.	float，default 1.0
	Temp.Norm.	float，default 20^{o}C
	Local Atmos	float，default 1013.25kPa
	zg	float，default 1.0
	zn	float，default 1.0

Continue 2-1

Sign.Out.	Pulse	No/Unscale/Scale/Frequency
	Analog	No/Yes
	Commun.	No/Yes
Temp.Set.	Sensor	No/Yes
	Unit	ºC/ºF
	Const	float
Pres.Set.	Sensor	No/Yes
	Unit	MPa/kPa/Pa
	Const	float
Commun. Set.	Device ID	Span :1~255，default 01
	Check	Even/Odd/None1/None，default None1
	Baud Rate	2400/4800/9600/19200，default 9600
	Constant Delay	No/20ms/50ms/100ms default No
Meter.Set.	Langue	Chinese/English
	Fir.Disp.	First/Second
	Disp.Unit	m/s，m^3/h
	Norm.Size	uint
	Tot.Reset	No/Yes
	50Hz Suppr.	No/Yes
	Sign.Proc.	Stard.Mode /Antiv.Mode1/Antiv.Mode2/ Antiv.Mode3／Antiv.Mode4
	BL.Contr.	No/Auto/Yes
	Contrast	Span:55~65
	Damping	Span:1~64s
	Pass.Set.	Default 000100

3 Electrical Connection

3.1 Power supply and Output signal configuration

(1)Powered by batteries or 24V,and output pulse signal ---------- Ⅰ Type

(2)Powered by 24V,and output 4-20mA or pulse signal ---------- Ⅱ Type

(3)Powered by batteries or 24V,and output 4-20mA or pulse signal----------Ⅲ Type

(4)Powered by 24V,and output 485 or pulse signal ----------Ⅳ Type

(5)Powered by 24V,and output 485,4-20mA signal or pulse signal----------Ⅴ Type

(6)Powered by batteries or 24V,and output 485,4-20mA signal or pulse signal----------Ⅵ Type

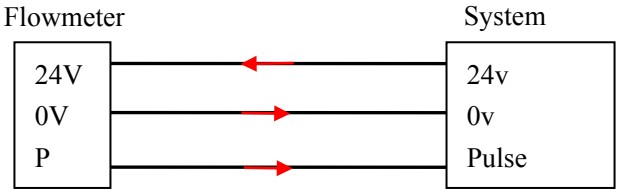
3.2 Connection to loop power supply

(1) Start battery power

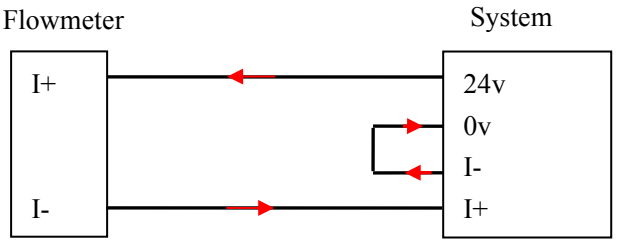
Unscrew the meter back cover and turn the switch to the "ON" end.

(2) Pulse output connection

In this case, you can choose Unscale, Scale or Frequency signal output.

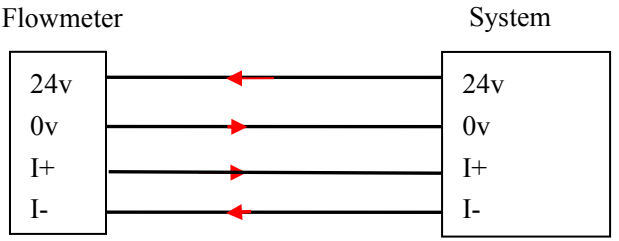


(3) 2-wire 4~20mA output connection



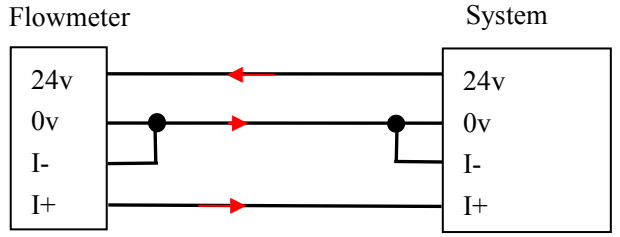
(4) 4-wire 4~20mA output connection

This case only applies to Ⅴ Type or Ⅵ Type.

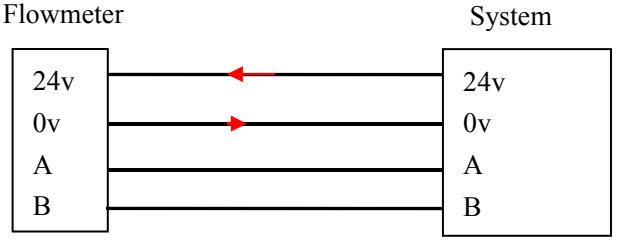


(5) 3-wire 4~20mA output connection

This case only applies to Ⅴ Type or Ⅵ Type.



(6) 485 signal output connection



4 Communication protocol(Modbus_RTU)

(1) This instrument uses an instruction in MODBUS protocol：

03	Read one or more hold registers

（2） Data format

Float is a single float in the protocol. Its format complies with IEEE754 standard and the encoding sequence is 3412, that is, sending the low word first and then the high word.

（3） Content of communication protocol

A	ModAddr	MemAddr	Length	Data format	Description
R	40001-2	0x00	2	SINGLE	Temperature value
R	40003-4	0x02	2	SINGLE	Pressure value
R	40005-6	0x04	2	SINGLE	Sensor frequency(Hz)
R	40007-8	0x06	2	SINGLE	Flow value
R	40009-10	0x08	2	SINGLE	Value over hundreds of total,TOT100
R	40011-12	0x0A	2	SINGLE	Value below hundreds of total,TOT10
R	40013-14	0x0C	2	SINGLE	Density value
R	40015-16	0x0E	2	SINGLE	Current value
R	40017-18	0x10	2	SINGLE	Velocity value
R	40019-20	0x12	2	SINGLE	Volume Value
R	40021	0x13	1	USHORT	FU+TotU
R	40022	0x14	1	USHORT	PU+TU

FU:Flow unit;TotU:Total unit;PU:Pressure unit;TU:Temp unit

Note:

- Total flow calculation expression:
  TOTAL=T0T100*100+T0T10
- Exception code:
  "01" - Function code error;
  "02" - MemAddr error, 0≤MemAddr+registers≤22
  "03" - registers, 0≤registers≤22

(4) Unit code (HEX)

Flow unit code:

M	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x87	0x08
	t/h	kg/h	g/h	t/m	kg/m	g/m	t/s	kg/s	g/s
V	0x40	0x41	0x42	0x43	0x44	0x45	0x46	0x87	0x48
	m^3/h	L/h	cm^3/h	m^3/m	L/m	cm^3/m	m^3/s	L/s	cm^3/s
N	0x80	0x81	0x82	0x83	0x84	0x85	0x86	0x87	0x88
	Nm^3/h	NL/h	Ncm^3/h	Nm^3/m	NL/m	Ncm^3/m	Nm^3/s	NL/s	Ncm^3/s

Total unit code:

M	0x00	0x01	0x02
	t	kg	g
V	0x40	0x41	0x42
	m^3	L	cm^3
N	0x80	0x81	0x82
	Nm^3	NL	Ncm^3

Temp unit code:

T- unit	0x00	0x01
	^0C	^oF

Pressure unit code:

P-unit	0x00	0x01	0x02
	MPa	kPa	Pa

(5) For example, read temperature and pressure data.

request		response	
Fields	(Hex)	Fields	(Hex)
Device Id	01	Device Id	01
Function code	03	Function code	03
AddrHi	00	Byte	08
AddrLo	00	Register1Hi	00
RegisterHi	00	Register1Lo	00
RegisterLo	04	Register2Hi	43
CRCLo	44	Register2Lo	34
CRCHi	09	Register3Hi	00
		Register3Lo	00
		Register4Hi	3f
		Register4Lo	00
		CRCLo	3b
* byte = Register*2		CRCHo	10

Host request: 01 03 00 00 00 04 44 09

Device response: 01 03 08 00 00 43 34 00 00 3f 00 3b 10

Explanation:

00004334 is the temperature data, and 43340000, a hexadecimal float, is the standard format converted base on the protocol. It is converted to a decimal float of 180.0. Similarly, 00003F00 is converted to a decimal float of 0.5.