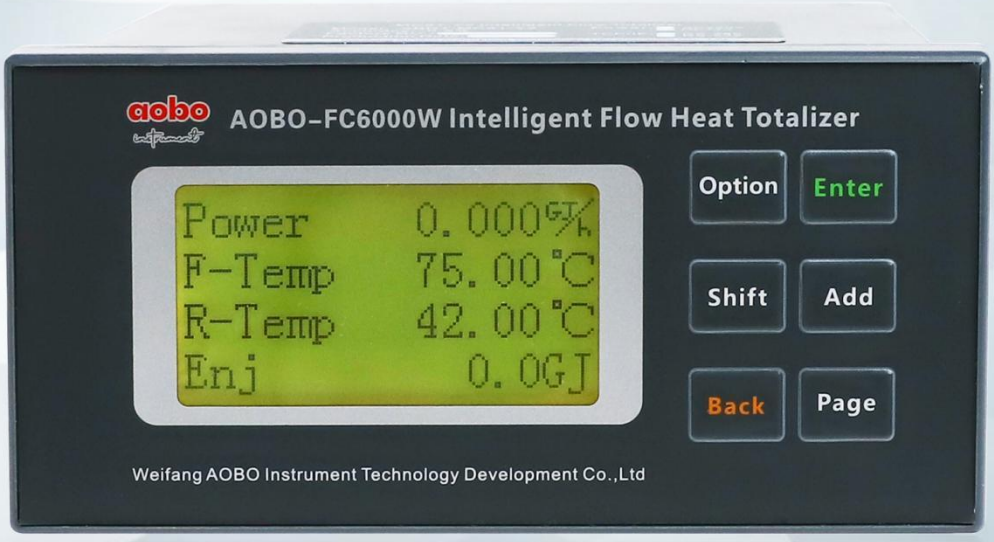
aobo
instrument



Handbook

ABDT-FC6000W
Intelligent Flow/Heat Totalizer

Weifang AOBO Instrument Technology Development Co.,Ltd

CONTENTS

I. Product Overview

ABDT-FC6000W flow/heat totalizer is a heat metering instrument, with 12864 graphical point LCD display, Chinese/English menu setting, 32-bit single chip computer as the core, 24-bit A/D converter to collect analog signal and 12-bit D/A converter to output (4-20) mA signal. The instrument can receive pulse signal or analog current signal from flow sensors and transmitters, double channel flow, pressure and temperature signal as a high precision flow and heat measurement system. The instrument shows parameters such as forward flow, return flow, forward volume, return volume, current power,energy, forward pressure, return pressure, forward temperature, return temperature, density, enthalpy,etc.; the instrument has continuous automatic compensation function and The lAPWS-IF97 formula method is adopted to compute the density enthalpy. The instrument has parameter programming setting function. Setting parameters and accumulated flow value continue after powering off. With RS232/485 communication interface, the totalizer can be connected to the printer, remote DTU modular device, etc.

II. Technical Parameters

1. Flow input

Two-way current signal: (4～20) mA;

Two-way differential pressure signal: (4～20) mA current, differential pressure signal (linear signal);

Two-way frequency signal: (0～5000)Hz, signal standard: $V_{Low} \leqslant 1V$, $V_{High} \geqslant 5V$;

2. Pressure input

Two-way current signal: (4～20) mA;

3. Temperature input

Two-way resistance signal: Pt100 or Pt1000 platinum resistance;

4. Accuracy: 0.2, heat 0.5

5. Communication: standard Modbus RTU protocol, with two communication interfaces

RS485 and RS232;

6. Working power supply: AC: 220V±15% (50/ 60Hz), or DC: 12V±5%;

7. Power consumption: ≤5W;

8. Output power supply: there are two groups. One is 12V (with permissible load ≤30mA) and another is 24V (with permissible load≤200mA); no common-ground for the two groups of power supply.

9. Work environment

Temperature: (-18～50)℃; humidity: (5～85)%RH, no condensation;

10. Installation method: horizontal installation;

11. Outline size: 160×80×120 (W×H×D, unit mm);

12. Opening size: 153×77 (W×H, unit mm).

III. Main Functions

1. Computation mode

Based on the five heat/cold computation modes (Forward Volume-Return Volume, Forward Volume* Enthalpy Difference, Return Volume* Enthalpy Difference, Forward Volume,Return Volume), the computation mode combination can be set by programming. The measured temperature protection function and emergent measurement function for the abnormal temperature are available for the heat measurement.

2. Input function

With two-way flow, two-way temperature, two-way pressure input function, the parameter combination can be set by programming.

3. Display function

Current power, energy,forward temperature, return temperature, forward enthalpy, return enthalpy, forward pressure, return pressure, forward flow, forward volume, return flow, return volume,forward frequency (or current, differential pressure), return frequency (or current, differential pressure),forward density, return density,off times, off time, on time, etc.

4. Data recording function

The totalizer's query function is available for instantaneous flow, current power, daily flow, monthly flow, energy, 10 power-off/on records and 10 programming records. All historical records are stored in the manner of first-in-first-out and recurrent coverage.

5. Automatic repair function

In addition to the software watchdog, a watchdog and a power-off/on reset system are available for the hardware system. In case of program error or unexpected breakdown, it can be ensured to resume operation of the totalizer.

6. Small signal cutoff function

In the environment with slight vibration or disturbance, removing the interference signal improves the measurement accuracy of the totalizer.

7. Power-off protection function

The computation results of the totalizer and the data set by the user will not be lost during power off, and which will be saved for more than 10 years.

IV. Wiring Diagram

Figure 1

1.Single-way communication (by default): RS232 communication, RS485 communication, as shown in Figure 2;

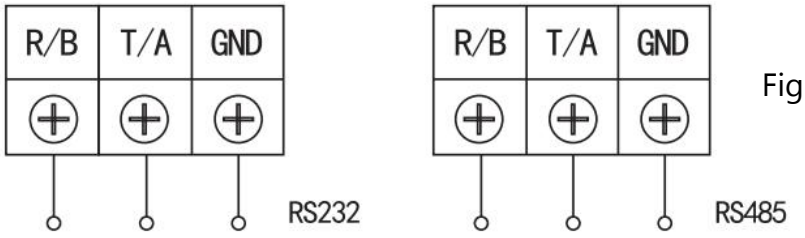


Figure 2

Two-way communication (optional): one way is RS232 communication, another way is RS485 communication, as shown in Figure 2-1;

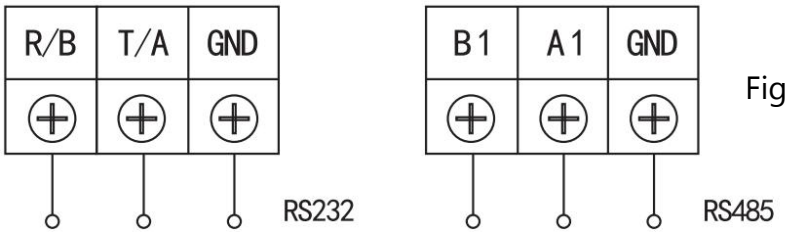


Figure 2-1

*For the totalizer, single-way communication by default, and two-way communication optional;

*To change the communication protocol, contact us to change the instrument hardware and program.

2. Temperature signal (Platinum thermistor), as shown in Figure 2-2;

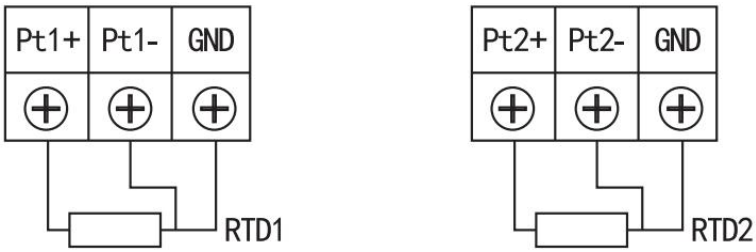


Figure 2-2

3. Pressure signal (transmitter, 24V power supply), as shown in Figure 2-3;

Figure 2-3

4. (4～20)mA flow signal (transmitter, 24V power supply), as shown in Figure 2-4;

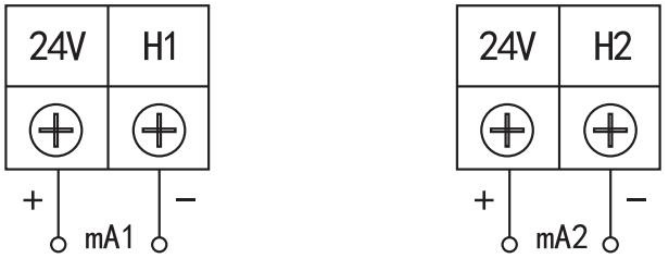


Figure 2-4

5. 220V power supply, 12V power supply, as shown in Figure 2-5;

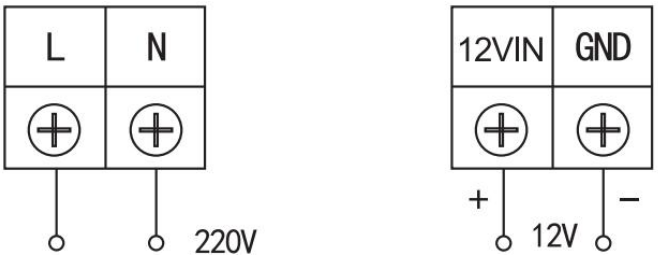


Figure 2-5

6. (4～20)mA output, as shown in Figure 2-6;

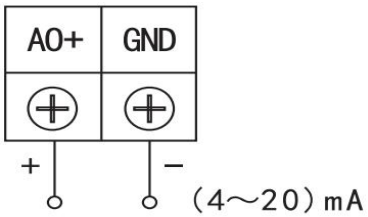


Figure 2-6

7. Frequency or pulse flow signal (12V power supply), as shown in Figure 2-7;

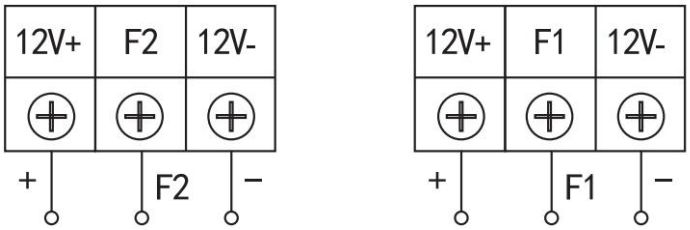


Figure 2-7

V. Display Function

5.1 Totalizer panel

As shown in Figure 3:

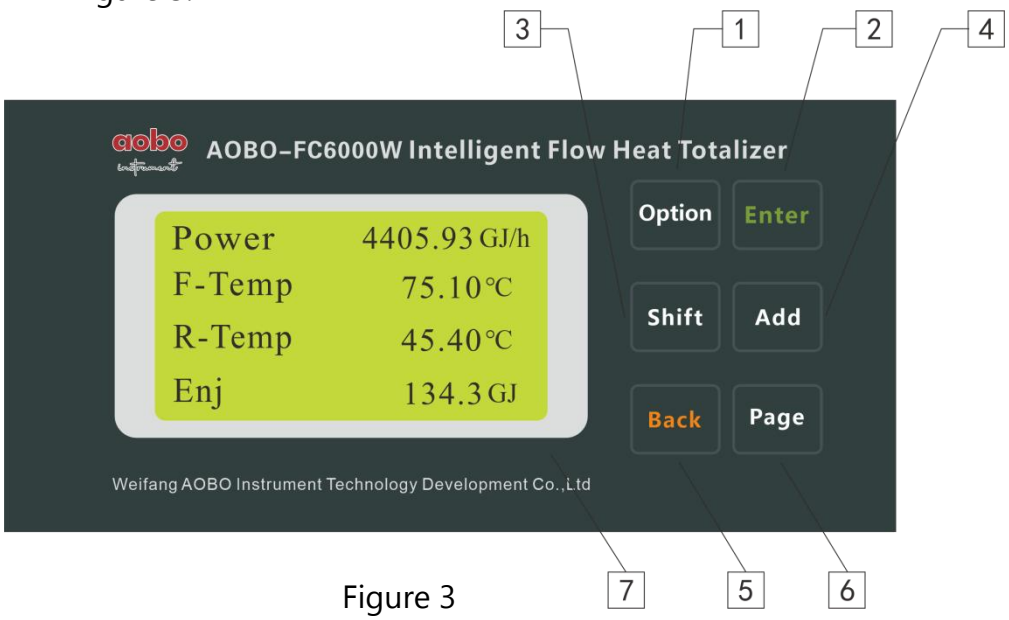


Figure 3

Table 2

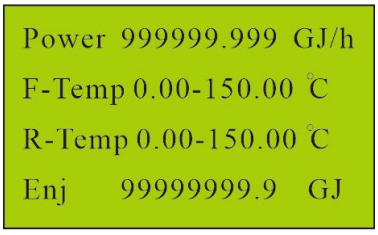
No.	Name	Content
1	Option key	Select key for parameter setting.
2	Enter key	Enter totalizer parameter setting; Confirm the set value changed; To enter the current item in changing the set value.
3	Shift key	Set the cursor position when changing the set value.
4	Add key	Increase number when changing the number; Select the current setting item when changing the set value.
5	Back key	Exit the current setting item when changing the set value.
6	Page key	Call the display picture when the working conditions are displayed; Change the current setting item when changing the set value.
7	Display screen	Display the real-time measured value (fixed display or cycle display); Display the setting parameter(s) in the state of parameter setting.

5.2 Working condition display interface

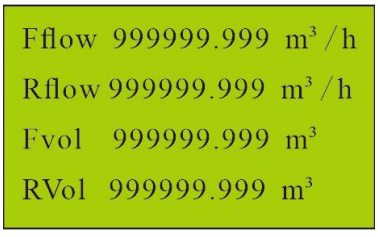
Press the "Page" key to display the desired content. All display pictures can be displayed by the panel keyboard at any time, and which also can be displayed circularly or fixedly through programming. The display pictures of working conditions are as follows:

Interface 1

Interface 2

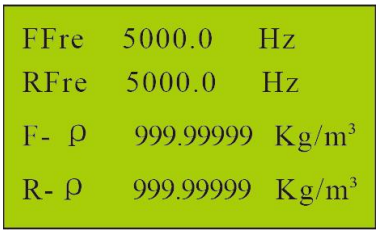


Interface 3

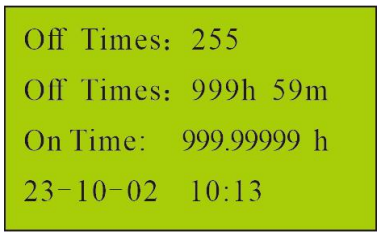


Interface 4

Interface 5



Interface 6



Interface 7

Notes: Comparison Table of Full English Names and Abbreviations(Table 3)

Table 3

Full name	Abbreviation
Energy	Enj
Current power	Power
Forward temperature	F-Temp
Return temperature	R-Temp
Forward flow	FFlow
Return flow	RFlow
Forward volume	FVol
Return volume	RVol
Forward enthalpy	F-H
Return enthalpy	R-H
Forward pressure	F-P
Return pressure	R-P
Forward frequency	FFre
Return frequency	RFre
Forward density	F- ρ
Return density	R- ρ

VI. Programming Method of Totalizer

This totalizer is a multifunctional programmable intelligent totalizer. Therefore, before using the totalizer, the user must carry out simple programming operation for the totalizer, and determine the corresponding parameter(s) according to the output type of the sensor. For example, you need only enter the meter factor K for the pulse output of vortex flowmeter, and you need enter the corresponding flow range and measurement range for (4～20) mA current output. You need only enter the meter coefficient for the pulse output of an electromagnetic flowmeter/ultrasonic flowmeter according to the pulse equivalent (enter meter coefficient of 1000 when the pulse equivalent is 1L, meter coefficient K=1000/pulse equivalent), and you need enter the corresponding flow range and measurement range for (4～20) mA current output.

6.1 User programming

Programming work will be carried out with the help of Chinese/English prompts. Press "Enter" key to enter programming process. Firstly, enter the programming password 000000 at the factory (as shown in Figure 4). After correctly entering the password, press"Enter" key to enter the main menu for programming, as shown in Figure 4-1:

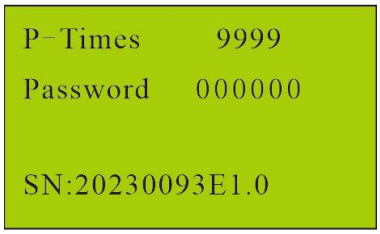


Figure 4

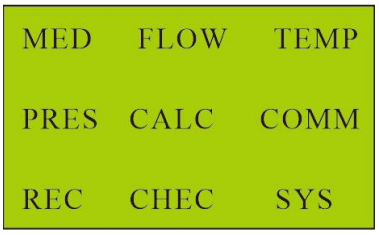


Figure 4-1

Select the sub-menu to be programmed with help of the "Option" key, press "Enter" key to enter the sub-menu, and press "Back" key to return to the previous menu.

6.1.1 Media setting (as shown in Figure 5)

Select "MED(medium)" in the main menu for programming with help of the "Option"key, press "Enter" key to enter the sub-menu, and display and set "temperature and enthalpy corresponding table", "COE(coefficient of expansion)" and "Density" by "Shift" key, "Add" key

and "Page" key.

Note: Temp is Temperature and Enth is enthalpy in the next picture.

Figure 5

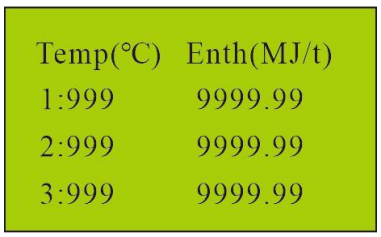


Figure 5-1

If "Water" is selected from the media items, and the automatic compensation will be carried out by the totalizer; if "HTF(Heat Transfer Fluid)" is selected, the compensation parameters (see 9.3.2 for details) need to be entered for the real-time compensation by the totalizer according to the temperature of HTF. See Table 4 for the media setting list.

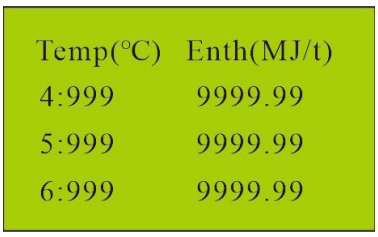


Figure 5-2

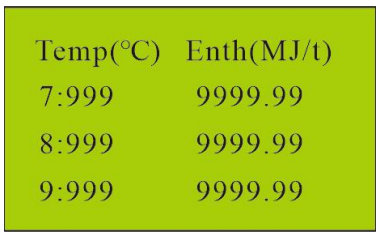


Figure 5-3

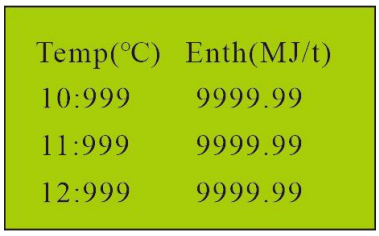


Figure 5-4

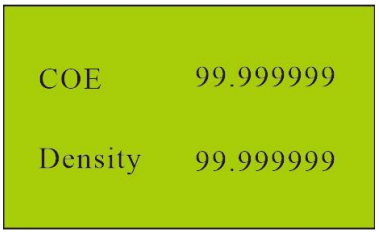


Figure 5-5

6.1.2 Flow setting (as shown in Figure 6)

Select "Flow" in the main menu for programming with help of the "Option" key, press"Enter" key to enter the sub-menu, and press "Add" key to change the set flow mode, i.e., the matched flowmeter type which can be selected from frequency, current and D/P(differential pressure); press "Enter" key to confirm the current content, and press "Page" key to enter the next item. It is possible to set "sensor type", "factor", "range", "signal cutoff" , "D/P range", "max flow range(maximum flow range)" , "D/P density and max D/P range(maximum differential pressure range) " for"F(forward water)" and "R(return water)".

See Table 4 for the flow setting list.

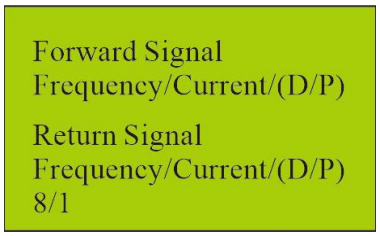


Figure 6

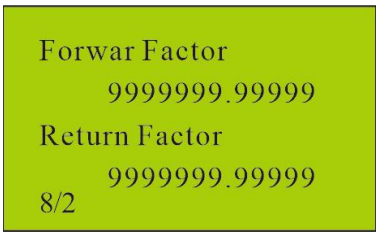


Figure 6-1

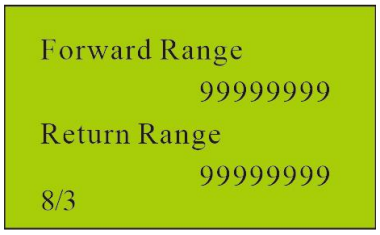


Figure 6-2

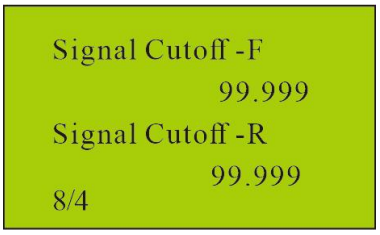


Figure 6-3

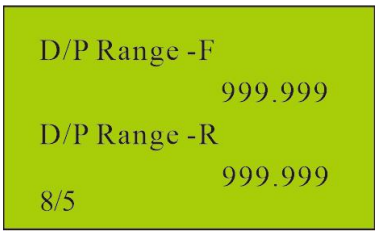


Figure 6-4

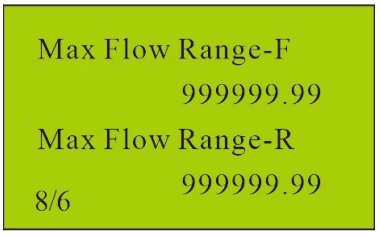


Figure 6-5

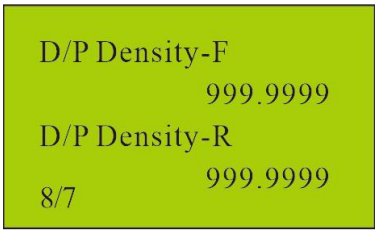


Figure 6-6

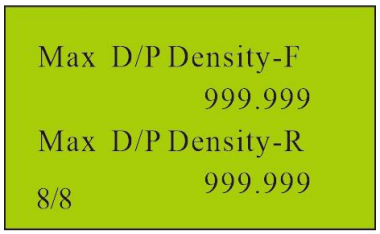


Figure 6-7

6.1.3 Temperature setting (as shown in Figure 7)

Select “TEMP(Temperature)” in the main menu for programming with help of the “Option” key, press “Enter” key to enter the sub-menu for parameter setting, and press “Add” key to select Pt or the set value. Press “Enter” key to confirm the current content, and press “Page” key to enter the next item. It is possible to set “Temp Signal-F(temperature signal-forward)”, “Temp Signal-R(Temperature Signal-Return)”, “Forward Temp Variable

Value (Forward Temperature Variable Value)", "Temp Setting-F(Temperature Setting-Forward)" and "Temp Setting-R (Temperature Setting-Return)". See Table 4 for the temperature setting list.

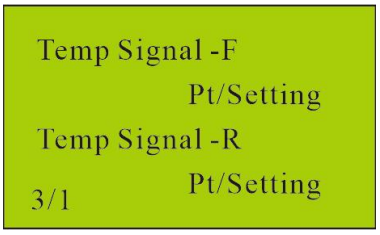


Figure 7

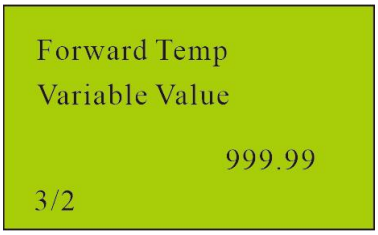


Figure 7-1

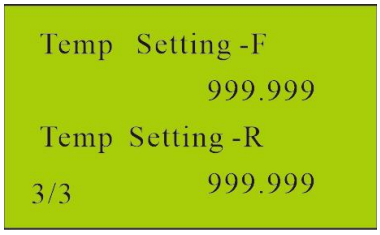


Figure 7-2

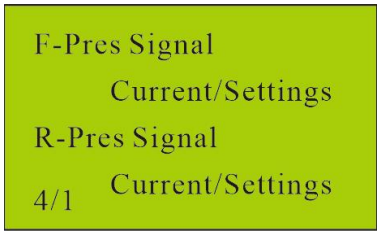


Figure 8

6.1.4 Pressure setting (as shown in Figure 8)

Select "PRES(Pressure)" in the main menu for programming with help of the "Option" key, press"Enter" key to enter the sub-menu for parameter setting, and press "Shift" key and "Add" key to change the set content. Press"Enter"key to confirm the current content, and press "Page"key to enter the next item. It is possible to set "F-Pres Signal(Forward pressure signal)", "R-Pres Signal((Return pressure signal)","F-Pres Range(Forward pressure range)", "R-Pres Range (Forward pressure range)", "F-Pres Unit (Forward pressure unit)","R-Pres Unit (Return pressure unit)", "F-Pres Set (Forward pressure set)" and "R-Pres Set (Return pressure set)" . See Table 4 for the pressure setting list.

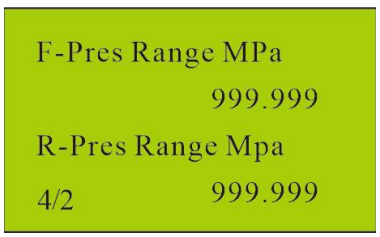


Figure 8-1

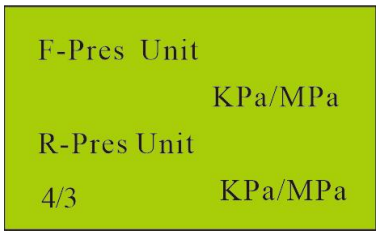


Figure 8-2

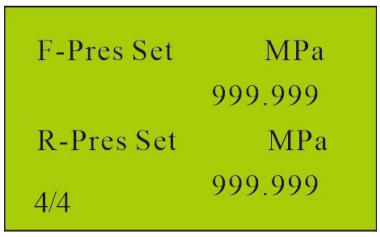


Figure 8-3

Figure 9

6.1.5 Calculation setting (as shown in Figure 9)

Select "CALC(Calculation)" in the main menu for programming with help of the "Option" key, press"Enter" key to display the sub-page for computation, and press "Shift" key and "Add" key to change the set content. Press"Enter" key to confirm the current content, and press "Page" key to enter the next item. It is possible to set "Energy Unit","Compute Mode", "Output Mode", "Output Range", "Volume unit" and"Energy mode". See Table 4 for the computation setting list.

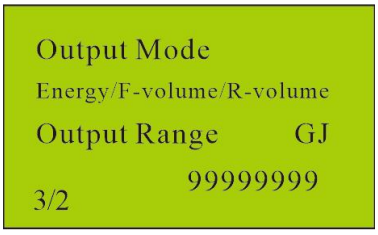


Figure 9-1

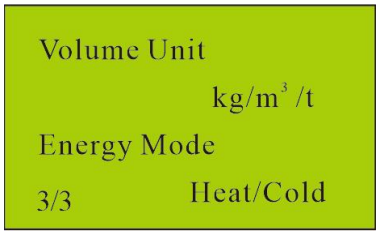


Figure 9-2

6.1.6 Communication setting (as shown in Figure 10)

Select "COMM(Communication)" in the main menu for programming with help of the "Option" key, and press"Enter" key to enter the meter address page. Press "Shift" key and "Add" key to change the meter address. Press"Enter" key to confirm the current content, and press "Page"key to enter the next setting item for"baudrate", "Com Protocol(communication protocol)" and "Check" . See Table 4 for the communication setting list.

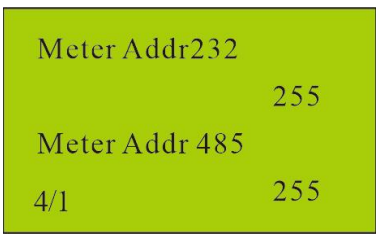


Figure 10

Figure 10-1

Figure 10-2

Figure 10-3

6.1.7 Record query (as shown in Figure 11)

Select "REC(Record)" in the main menu for programming with help of the "Option" key, and press"Enter"key to enter the input password page. Press "Shift" key and "Add" key to enter the password and view the change records. Press"Page" key to enter the next change record. See Table 4 for the record description.

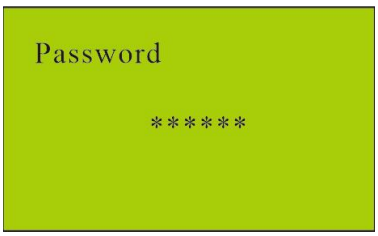


Figure 11

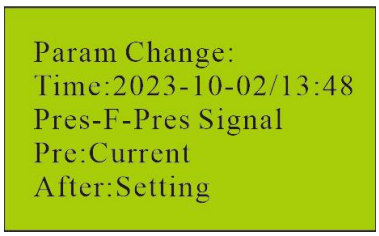


Figure 11-1

6.1.8 System setting (as shown in Figure 12)

Select "SYS(System)" in the main menu for programming with help of the "Option" key, and press"Enter" key to display the system clock page. Press "Shift" key and "Add" key to set the parameters. Press "Page" key to display "Display Mode", "Program Password" and "Clean Password". See Table 4 for the detailed system setting list.

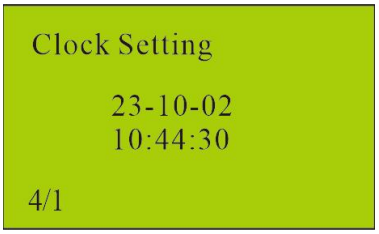


Figure 12

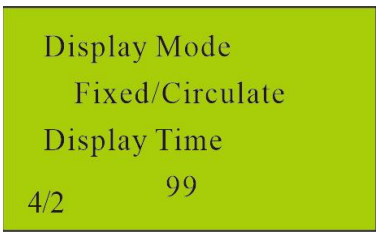


Figure 12-1

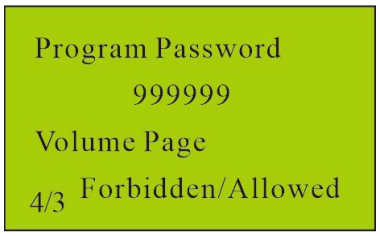


Figure 12-2

Figure 12-3

Menu Settings

Table 4

Setting item (Select key)	Sub-item (page up/down key)	Set content (Increase key)	Function and significance (Increase key and Shift key)	Remarks
MED (Media)	Medium	Hot water	Set the medium type	(0-150)℃
		HTF		(0-500)℃
	Temperature and enthalpy table	12 pages in total	Set the enthalpy corresponding to the temperature	Parameters of heat transfer fluid
	Coe	00.000000	Set the coefficient of expansion	Parameters of heat transfer fluid
	Density	000.00000	Set the density	Parameters of heat transfer fluid
FLOW	Forward signal	Frequency	Frequency input, such as the vortex flowmeter	Meter type
		Current	The flow is proportional to the input current, such as an electromagnetic flowmeter.	
		Differential pressure	The flow is square to the input current, such as an orifice meter.	
	Forward factor	0000000.00000	Coefficient value of the forward water flowmeter	
	Forward range	00000000(m^3)	Forward water flow range	Setting necessary for the current signal
	Signal cutoff-F	00.000	Small signal cutoff-Forward	Removal setting necessary for the slight vibration or disturbance

	D/p range-F	000.000	Set forward differential pressure range	Setting necessary for the differential pressure signal
	Max flow range-F	000000.00	Maximum Flow Range-Forward	
	D/p density-F	000.0000	Differential Pressure Density-Forward	
	Max d/p range-F	000.000	Maximum Differential Pressure Range-Forward	
	Return signal	Frequency	Frequency input, such as the vortex flowmeter.	Meter type
		Current	The flow is proportional to the input current, such as an electromagnetic flowmeter.	
		Differential pressure	The flow is square to the input current, such as an orifice meter.	
	Return factor	0000000.00000	Coefficient value of the return water meter	
	Return range	00000000(m^3)	Return water flow range	Setting necessary for the current signal
	Signal cutoff-R	00.000	Small signal cutoff-return	Removal setting necessary for the slight vibration or disturbance
	D/p range-R	000.000	Set differential pressure range-return	Setting necessary for the differential pressure signal
	Max flow range-R	000000.00	Maximum Flow Range-Return	
	D/p density-R	000.0000	Return water differential pressure density	
	Max d/p range-R	000.000	Maximum Differential Pressure Range-Return	
TEMP (Temperature)	Temp signal-F	Pt	Pt100/Pt1000 for forward water pipe	It is necessary to exactly match with the same type of platinum resistance for the return pipe.
		Set	Make the forward temperature to be displayed as the set	

			temperature	
	Temp signal-R	Pt	Pt100/Pt1000 for return water pipe	It is necessary to exactly match with the same type of platinum resistance for the return pipe.
		Set	Make the return temperature to be displayed as the set temperature	
	Forward temp variable value	000.00(℃)	Lower limit to start heat measurement of forward water pipe, and upper limit to start cold measurement of forward water pipe	When heat is selected, start heat measurement if the real-time temperature is higher than the set temperature value; when cold is selected, start cold measurement if the real-time temperature is lower than the set temperature value.
	Temp setting-F	000.00(℃)	Set a fixed temperature value for forward water	Setting realized when "Setting" is selected for the forward water temperature.
	Temp setting-R	000.00(℃)	Set a fixed temperature value for return water	Setting realized when "Setting" is selected for the return water temperature.
PRESS (Pressure)	F-pres signal	Current	Make the forward pressure signal to be displayed as the current signal	
		Set	Make the forward pressure signal to be displayed as the set pressure	
	F-pres range	000.000	Set pressure range for forward water	
	F-pres unit	MPa/kPa	Set forward pressure	

			unit	
	F-pres set	000.000(MPa)	Set forward pressure value	Setting necessary for the forward pressure signal selected
	R-pres signal	Current	Make the return pressure signal to be displayed as the current signal	
		Set	Make the return pressure signal to be displayed as the set pressure	
	R-pres range	000.000	Set return water pressure range	
	R-pres unit	MPa/kPa	Set return pressure unit	
	R-pres set	000.000(MPa)	Set return pressure value	Setting necessary for return pressure signal
CALC (Calculation)	Energy unit	MJ/GJ/kWh/MWh	Select the energy unit	
	Compute mode	FVol-RVol, FFlow*DH.RVol*DH ,F-Volume, R-Volume	Select the computation mode	
	Output mode	FFlow, RFlow,Energy	Select output mode: Forward Flow, Return Flow, Energy	Select output mode and compute the output current
	Output range	00000000 (m^3/h)	Used for output current computation	
	Flow unit	m^3/kg/t	Select flow unit	
	Energy mode	Heat/cold	Select computation model	
COMM (Communic ation)	Meter addr. 232	000-255	Select 232 communication address	
	Baud rate 232	1200/2400/ 4800/9600	Select to set 232 communication baud rate (Bps)	
	Com protocol 232	AoBoIC/AoBoZ	Select 232 communication protocol	
	Check 232	NONE/0DD/EVEN	Select 232 communication verification mode	

	Meter addr. 485	000-255	Select 485 communication address	
	Baud rate 485	1200/2400/ 4800/9600	Select to set 485 communication baud rate (Bps)	
	Com protocol 485	AoBoIC/ ModbusRTU	Select 485 communication protocol	
	Check 485	NONE/ODD/EVEN	Select 485 communication verification mode	
REC (Record)	Password	10 items in total	Display the recent 10 parameter change records	
CALC (Calibration)	Non professional personnel do not carry out calibration.			
SYS (System)	Clock setting	20-01-01	Set the date, month and year	
		16:11:55	Set the second, minute and hour	
	Display mode	Fixed	Set display mode to fixed display	
		Circulate	Set display mode to Circulate display	
	Display time	00 (Min)	Set the backlight light time	
	Program password	000000	Set programming password	
	Volume page	Allowed/Forbidden	Decide whether or not to display the accumulation page	
	Clean password	000000	Forward volume zero, return volume zero,energy zero, etc.	Carry out zero operation by setting different zero passwords

6.2 Record query (as shown in Figure 13)

Under the working status display screen, press the "Option" key to enter the record query page. Press the "Add" key to sequentially select and query: daily records, monthly records, power-off records, and cumulative display decimal records. Press the "Enter" key to enter the record details (as shown in Figure 13).

Note: Each daily record consists of two pages, with a maximum of 31 records displayable. Each monthly record consists of two pages, with a maximum of 12 records displayable. Each power-off record consists of one page, with a maximum of 10 records displayable.

Figure 13

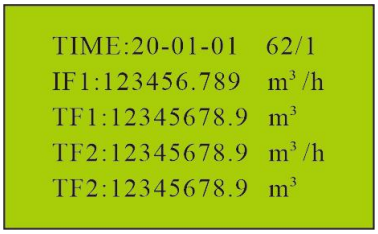


Figure 13-1

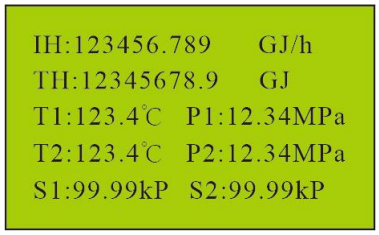


Figure 13-2

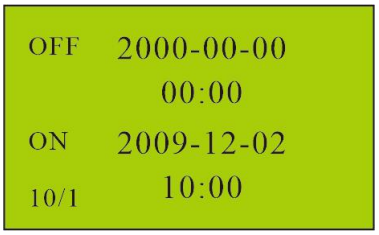


Figure 13-3

6.3 Failure alarm

When letter "U" appeared between the date and the time, there are failures for the display board and the measuring plate, as shown in Figure 14:

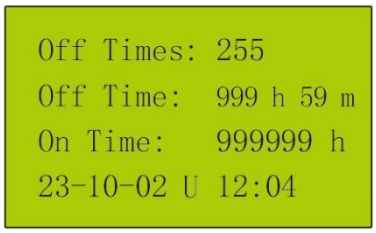


Figure 14

VII. Communication Function

Standard Modbus protocol and RS485 or RS232 communication interface are available for this totalizer for data communication. GPRS wireless transmission or bus mode transmission can be selected for data transmission. When bus mode transmission is selected,

an individual instrument number and a proper baud rate are necessary for each instrument. Instrument number and baud rate shall be set in the communication setting menu.

VIII. Emergent Compensation

The totalizer has the emergent compensation function. In case of pressure breakage, temperature breakage or over range, the compensation function is available as follows (when water is taken as the media):

1. Emergent pressure compensation function

When the pressure is 0, the compensation computation of density enthalpy shall be carried out according to the absolute pressure of 0.6MPa;

2. Emergent temperature compensation function

When the temperature is 0℃, or greater than or equal to 150℃, and Pt is selected as the temperature signal, the compensation computation of density enthalpy shall be carried out according to the set temperature.

IX. Computation Model

1. Flow computation

① Equipped with frequency sensor

$$Flow = Frequency \div Factor \times Density \times 3600$$

② Equipped with current sensor

$$Flow = (Current - 4) \div 16 \times Flow\ range \times Density$$

③ Equipped with differential pressure sensor

$$Mass\ flow = Factor \times \sqrt{Differential\ pressure \times density}$$

$$Volume\ flow = Factor \times \sqrt{Differential\ pressure \div density}$$

2. Differential pressure value computation

$$Differential\ pressure = (Current - 4) \div 16 \times Differential\ pressure\ range$$

3. Density and enthalpy computation

①When water is taken as the media, IAPWS-IF97 formulation will be adopted as the

computation formula for density and enthalpy to automatically compute the water density enthalpy according to the temperature and pressure.

② When heat transfer fluid is taken as the media, the computation model for density and enthalpy is as follows:

Density computation:

$$d = d_0 \times [1 - (T_0 - 20) \times C]$$

Where:

d_0——Density (obtained based on the Physical Characteristics Table of Heat Transfer Fluid);

c——Coefficient Of Expansion (obtained based on the Physical Characteristics Table of Heat Transfer Fluid);

T_0——Current temperature.

Enthalpy computation:

$$HS = \frac{T_0 - TS_1}{TS_2 - TS_1} \times (HS_2 - HS_1) + HS_1$$

Where, $TS_1 < T_0 < TS_2$:

T_0——Current temperature;

TS_1——Temperature 1; HS_1——Enthalpy 1;

TS_2——Temperature 2; HS_2——Enthalpy 2;

Notes: Pt100 shall be selected as the supply/return temperature sensor signal when heat transfer oil is taken as the media; Pt1000 shall be selected as the supply/return temperature sensor signal when water is taken as the media.

4. Computation model for current power:

①FVol*DH(Forward Volume*Enthalpy Difference)

Only forward flow is assumed for the forward/return water flow:

Current power=Forward flow×Forward density×(Forward enthalpy-Return enthalpy)

Current power=Forward flow×Forward density×(Return enthalpy-Forward enthalpy)

②RVol*DH(Return Volume*Enthalpy Difference)

Only the return flow is assumed for the forward/return flow:

Current power=Return flow×Return density×(Forward enthalpy-Return enthalpy)

Current power=Return flow×Return density×(Return enthalpy-Forward enthalpy)

③F-Volume(Forward Volume)

Only the forward flow is assumed for the forward/return flow, and only forward temperature is assumed for the forward/return temperature:

Current power=Forward flow×Forward density×Forward enthalpy

④ R-Volume(Return Volume)

Only return flow is assumed for the forward/return flow, and only return temperature is assumed for the forward/return temperature:

Current power=Return flow×Return density×Return enthalpy

⑤FVol-RVol(Forward Volume-Return Volume)

Two-way computation:

Current power=Forward flow×Forward density×Forward enthalpy-Return flow×Return density×Return enthalpy

Current power=Return flow×Return density×Return enthalpy-Forward flow×Forward density×Forward enthalpy

Note: In "FVol-RVol" model, the program will automatically switch the model to "FVol*DH" model for computation when return flow is higher than forward flow.

X. Example of Computation Mode Setting

Taking "FVol*DH" as the computation model, two pieces ultrasonic flowmeter as the flow input signal, two pieces pressure transmitter as the pressure input signal, two pieces Pt1000 platinum resistance as the temperature input signal, and water as the media, the specific settings for this computation mode are as follows:

After the totalizer is powered on, in the working condition display screen, press"Enter" key to enter the input password interface, enter the password ("000000" by default) with help of the "Shift" key and the "Add" key, and press"Enter" key to enter the parameter

setting interface. Press “Option” key to select “Media”, and press“Enter” key to enter the sub-menu setting interface for “MED”. Press “Add” key to select “Water”, and press“Enter” key for confirmation.

Press “Back” key to return to the parameter setting interface, select “FLOW” with help of the “Option” key, and press“Enter” key to enter the sub-menu for “FLOW”. Press “Add” key to select “Frequency” as the supply flow signal, and press“Enter” key for confirmation. Move the cursor to “Return signal” with help of the “Option” key, press “Add” key to select “Frequency” as the signal, and press“Enter” key for confirmation. Press “Page” key to move the cursor to “Forward Factor”, enter the “Forward Factor” with help of the “Shift” key and the “Add” key, and press“Enter” key for confirmation. Press “Option” key to move the cursor to “Return factor”, enter the “Return factor” with help of the “Shift” key and the “Add” key, and press“Enter” key for confirmation.

Press “Back” key to return to the parameter setting interface, select “TEMP” with help of the “Option” key, and press“Enter” key to enter the sub-menu for “TEMP”. Press “Add” key to select “Pt” as forward temperature signal, and press“Enter” key for confirmation. Move the cursor to “Return temperature signal” with help of the “Option” key, press “Add” key to select “Pt” as the signal, and press“Enter” key for confirmation.

Press “Back” key to return to the parameter setting interface, select “CALC” with help of the “Option” key, and press“Enter” key to enter the sub-menu for “CALC”. Move the cursor to “Compute Mode” with help of the “Option” key, press “Add” key to select “FVol*DH” as the signal, and press“Enter” key for confirmation.

Notes: “Flow range” setting is necessary when the flow signal is set to “Current”;

“Differential pressure range” setting is necessary when the flow signal is set to “Differential pressure”.

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