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Gas Turbine Flow Meter Model: LWQ



**Gas Turbine Flow Meter
Operation Manual**

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www.suremeter.com
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1. GENERAL INFORMATION

This manual will assist you in installing, using and maintaining the flow meter. It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedure.



For your safety, review the major warnings and cautions below before operating your equipment.

- | | |
|---|--|
| 1. Use only fluids that are compatible with the housing material and wetted components of your turbine. | 5. During turbine removal, gas may spill. Follow the gas manufacturer's safety precautions for clean up of minor spills. |
| 2. When measuring flammable gases, observe precautions against fire or explosion. | 6. Do not blow compressed air through the turbine. |
| 3. When handling hazardous gases, always follow the manufacturer's safety precautions. | 7. Handle the rotor carefully. Even small scratches or nicks can affect accuracy. |
| 4. When working in hazardous environments, always exercise appropriate safety precautions. | 8. For best results, calibrate the meter at least 1 time per year. |

1.1 Product Description

Gas flows through the turbine housing causing an internal rotor to spin. As the rotor spins, an electrical signal is generated in the pickup coil. This signal is converted into engineering units (liters, cubic meters, gallons etc.) on the local display where is applicable. Optional accessory modules can be used to export the signal to other equipment.

Upon receipt, examine your meter for visible damage. The turbine is a precision measuring instrument and should be handled carefully. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact us.

Make sure the turbine flow model meets your specific needs. For your future reference, it might be useful to record this information on nameplate in the manual in case it becomes unreadable on the turbine. Refer to the nameplate for your customized product's specification.

2. Technical Data

Measuring system& Measuring accuracy

Application range	Gas: Natural Gas, LPG, Air	
	(1) Dry gas without water	
	(2) Gas without corrosion	
Measured Value		
Primary measured value	Flow Rate	
Secondary measured value	Volume flow	
Tertiary measured value	Temperature; Pressure	
	(ONLY available for compensation model)	
Reference conditions	Flow conditions similar to ISO 9951	
	Medium: Gas	
	Temperature: +10...+30°C / +50...+86°F	
	Inlet section: ≥ 10 DN	
	Operating pressure: 1 bar / 14.5 psig	
Flow Meter Accuracy	Standard: 1.5%	Qmin to 0.2Qmax: 3%; 0.2Qmax to Qmax: 1.5%
	Optional: 1.0%	Qmin to 0.2Qmax: 2%; 0.2Qmax to Qmax: 1.0%

Features	
Modular construction	The measurement system consists of a flow sensor and a signal converter. It is available as compact and as separate version.
Compact version converter	N Type: Pulse output without display
	A Type: 4-20mA Output without local display
	E1 Type: Local Display; Lithium Battery Power; No Output
	E2Type: Local Display; 24V DC/ Battery Power; 2 wire 4-20mA Output;
	E3 Type: Local Display; 24V DC/ Battery Power; Pulse output
	E4 Type: Local Display; 24V DC/ Battery Power; 3 wire 0-20mA output
	E5 Type: Local Display; 24VDC/Battery Power; 3 wire 4-20mA output
	H Type: Local Display; 24VDC Power; Hart
	Compensation Type
	D1: Local Display; 24V DC Power; Dual Power: Battery;
	4-20mA(2-wire);T&P Compensation; RS485
	D2: Local Display; 24V DC Power; Dual Power: Battery;
	4-20mA(3-wire);T&P Compensation; Modbus RS485
Measurement Ratio	Standard: 10:1 Optional: 20:1

Operating conditions

Temperature	
Process temperature	-20...+80°C
Ambient temperature	Standard (with aluminum converter housing):
(all versions)	-10...+55°C
Storage temperature	-20...+70°
Pressure	
EN 1092-1	DN25 ...DN300: PN 16
	Other pressures on request
ASME B16.5	1"...12": 150 lb RF
	Other pressures on request
JIS	1"...12": 10 K
	Other pressures on request

Installation conditions

Installation	Take care that flow sensor is always fully filled
	For detailed information see chapter "Cautions for Installation"
Flow direction	Forward
	Arrow on flow sensor indicates flow direction.
Inlet run	≥ 10 DN
Outlet run	≥ 5 DN

Materials

Sensor housing	SS304
	Other materials on request
Flanges	SS304
	Other materials on request
Rotor	ABS Plastic (Acrylonitrile - Butadiene – Styrene)
	Aluminum Alloy
Bearings and Shaft	SS304
Converter Housing	Standard: polyurethane coated die-cast aluminum

Connections

Flange	
EN 1092-1	DN25...80 in PN 16...40
	DN100...150 in PN16...25
	DN200...300 in PN16
ASME	1"...3" in 150...300 lb RF
	4"...12" in 150 lb RF
JIS	1"...3" in 10...20K
	4"...12" in 10K
Design of gasket surface	RF
	Other sizes or pressure ratings on request
Thread	DN25...DN50 in PN16

Measurable flow rate range:

Nominal Diameter		Standard Flow Range (SFR)		Extended Flow Range (EFR)		Standard Pressure Rating
(mm)	(in.)	Code	(m ³ /h)	Code	(m ³ /h)	(Mpa)
25	1"	S	2.5 to 25	W	4 to 40	1.6
40	1.5"	S	5 to 50	W	6 to 60	
50	2"	S1	6 to 65	W1	5 to 70	
		S2	10 to 100	W2	8 to 100	
65	2.5"	S	15 to 200	W	10 to 200	
80	3"	S1	13 to 250	W	10 to 160	
		S2	20 to 400			
100	4"	S1	20 to 400	W	13 to 250	
		S2	32 to 650			
125	5"	S	25 to 700	W	20 to 800	
150	6"	S1	32 to 650	W	80 to 1600	
		S2	50 to 1000			
200	8"	S1	80 to 1600	W	50 to 1000	
		S2	130 to 2500			
250	10"	S1	130 to 2500	W	80 to 1600	
		S2	200 to 4000			
300	12"	S	200 to 4000	W	320 to 6500	
400	16"	S	400 to 8000	W	260 to 8000	

Note: The flow range as blow is for reference only. Consult the factory if you have special requirement. Refer to the nameplate or certificate for actual flow range.

3. 2 Converter Function Table

Converter Mode	Power Supply		Display	Output Type					Modbus Rs485	Hart
	24VDC	Battery		Pulse	Scaled Pulse	Current				
						2 wire	3-wire	3-wire		
						4-20mA	4-20mA	0-20mA		
N	●			●						
A	●					●				
E1		●	●							
E2	●	○	●	●	●	●			○	
E3	●	○	●	●	●				○	
E4	●	○	●	●	●			●	○	
E5	●	○	●	●	●		●		○	
H	●		●	●	●	●				●
D1	●	○	●	●	●	●			○	
D2	●	○	●	●	●		●		●	

Description of the symbols: ● Default Function; ○ Optional ● SURE Protocol

3. Model and Selection

3.1 Model Selection Table

Converter

N: Pulse Output without display
A: 4-20mA (2-wire) without display
E1: No output, Battery Power Supply
E2: 24V DC; 2-wire 4-20mA output; RS485
E3: 24V DC; Pulse output; RS485
E4: 24V DC; 3-wire 0-20mA; RS485
E5: 24VDC; 3-wire 4-20mA; RS485
H: 24VDC; 2-wire 4-20mA output; Hart
D1: 4-20mA (2-wire); T & P Compensation
D2: 4-20mA (3-wire); T & P Compensation

Diameter

XXX: 3 digits; For example:
025: 25mm; 050: 50mm; 080: 80mm
100: 100mm; 150: 150mm; 300: 300mm
Flow range
XX: 2 digits;
Refer to Flow Range Table

Body Material

S: Stainless Steel 304
L: Cast Aluminum
X: Stainless Steel 316

Rotor Material

S: ABS Plastic
L: Aluminum Alloy

Explosion Proof

N: Without Ex Proof
E1: Exia II CT4
E2: Exd II BT6

Connection

THR: Thread Connection; DN25, DN40 and DN50
Flange Connection:
ANSI Flange gA15; ANSI 150#; A30: ANSI 300#; A60: ANSI 600#
DIN Flange gD16; DIN PN16; D25: DIN PN25; D40: DIN PN40
JIS Flange gJ10; JIS 10K; J20: JIS 20K; J40: JIS 40K

Accuracy

N: 1.5%
G: 1.0%

LWQ- X -XXX XX X X X -XXX -X

4. CAUTIONS FOR INSTALLATION

4.1 Mounting Positions

- ★ Avoid all pipe locations where the flow is pulsating, such as in the outlet side of piston or diaphragm pumps.
- ★ Avoid locations near equipment producing electrical interference such as electric motors, transformers, variable frequency, etc.
- ★ Install the meter with enough room for future access for maintenance purposes

 **Warning:** Precaution for direct sunshine and rain when the meter is installed outside.

4.2 Required Lengths of Straight Runs

Flow altering device such as elbows, valves and reducers can affect accuracy. See diagram below for typical flow meter system installation.

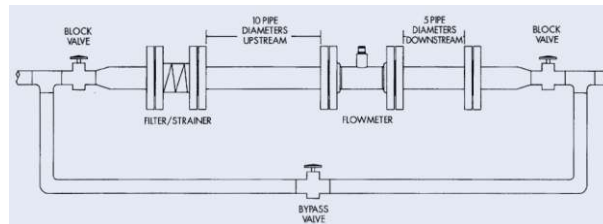
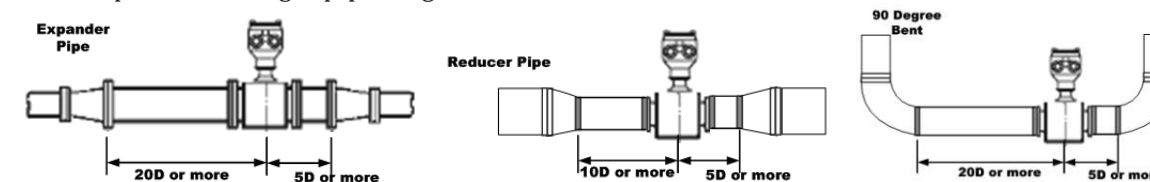


Diagram 1. Typical Flow Meter System Installation

The recommended guidelines are given to enhance accuracy and maximize performance. Distance given here are minimum requirements; double them for desired straight pipe lengths.

- ★ Upstream: allow a minimum straight pipe length at least 10 times the internal diameter of the pipe. For example, with the 50mm pipe, there should be 500mm of straight pipe immediately upstream. Desired upstream straight pipe length is 1000mm.
- ★ Downstream: allow a minimum straight pipe length at least 5 times the internal diameter of the pipe. For example, with the 50mm pipe, there should be 250mm of straight pipe immediately upstream. Desired upstream straight pipe length is 500mm.

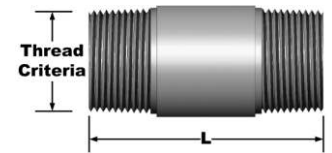


- ★ Foreign material in the liquid being measured can clog the meter's rotor and adversely affect accuracy. If this problem is anticipated or experienced, install screens to filter impurities from incoming liquids.
- ★ To ensure accurate measurement, drain all air from the system before use.
- ★ When the meter contains removable cover plates. Leave the cover plate installed unless accessory modules specify removal. Don't remove the cover plates when the meter is powered, or electrical shock and explosion hazard can be caused.

4.3 Connections

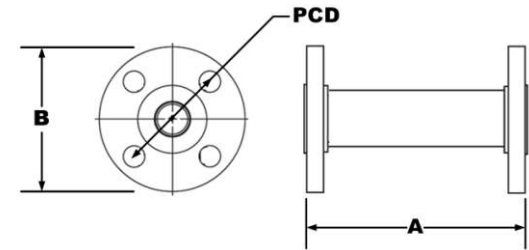
4.3.1 Thread Connection

Note: Default Thread is Male G Thread, other thread are available on request. For example: Female NPT Thread, Male NPT Thread; Consult us for more information



Diameter (mm)	L (mm)	Thread Criteria
25	170	G 2"
40	140	G 2"
50	150	G 2-1/2"

4.3.2 Flange Connection



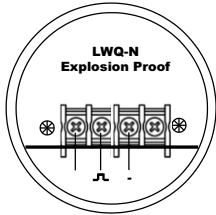
ANSI Flange Meter Dimensions							
Size Code		A (mm)	ANSI Flange Rating Class	Flange Diameter (B)	Bolt Hole	Bolt Circle	Bolt Hole Quantity
(inch)	(mm)			(mm)	(mm)	(mm)	
1"	25	170	150	108	16	79	4
1-1/2"	40	200	150	127	16	99	4
2"	50	200	150	152	19	121	4
2-1/2"	65	240	150	180	19	140	4
3"	80	240	150	191	19	152	4
4"	100	300	150	229	19	191	8
5"	125	240	150	255	22	216	8
6"	150	450	150	279	22	241	8
8"	200	500	150	343	22	298	8
10"	250	500	150	460.4	25	362	12
12"	300	300	150	482.6	25.4	431.8	12

DIN Flange Meter Dimensions							
Size Code		A	DIN Flange Pressure Rating	Flange Diameter (B)	Bolt Hole Diameter	Bolt Circle Diameter (PCD)	Bolt Hole Quantity
(inch)	(mm)	(mm)	MPa	(mm)	(mm)	(mm)	
1"	25	170	1.6	115	14	85	4
1-1/2"	40	200	1.6	150	18	110	4
2-1/2"	65	240	1.6	185	18	145	4
3"	80	240	1.6	200	18	160	8
4"	100	300	1.6	220	18	180	8
5"	125	240	1.6	250	18	210	8
6"	150	450	1.6	285	22	240	8
8"	200	500	1.6	340	22	295	12
10"	250	500	1.6	405	26	355	12
12"	300	300	1.6	460	26	410	12


5. Electrical Wiring

 **Warning: Electrical Hazard; Disconnect power before beginning wiring.**

5.1 LWQ-N: Pulse Output, Explosion Proof Model

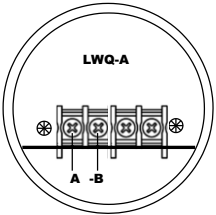


Terminal Configuration

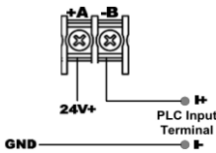
Terminal Symbols	Description
+	Power Supply: "24V+"
-	GND
	Pulse Output

Terminal Wiring

5.2 LWQ-A: Two-wire 4-20mA Output, No Local Display



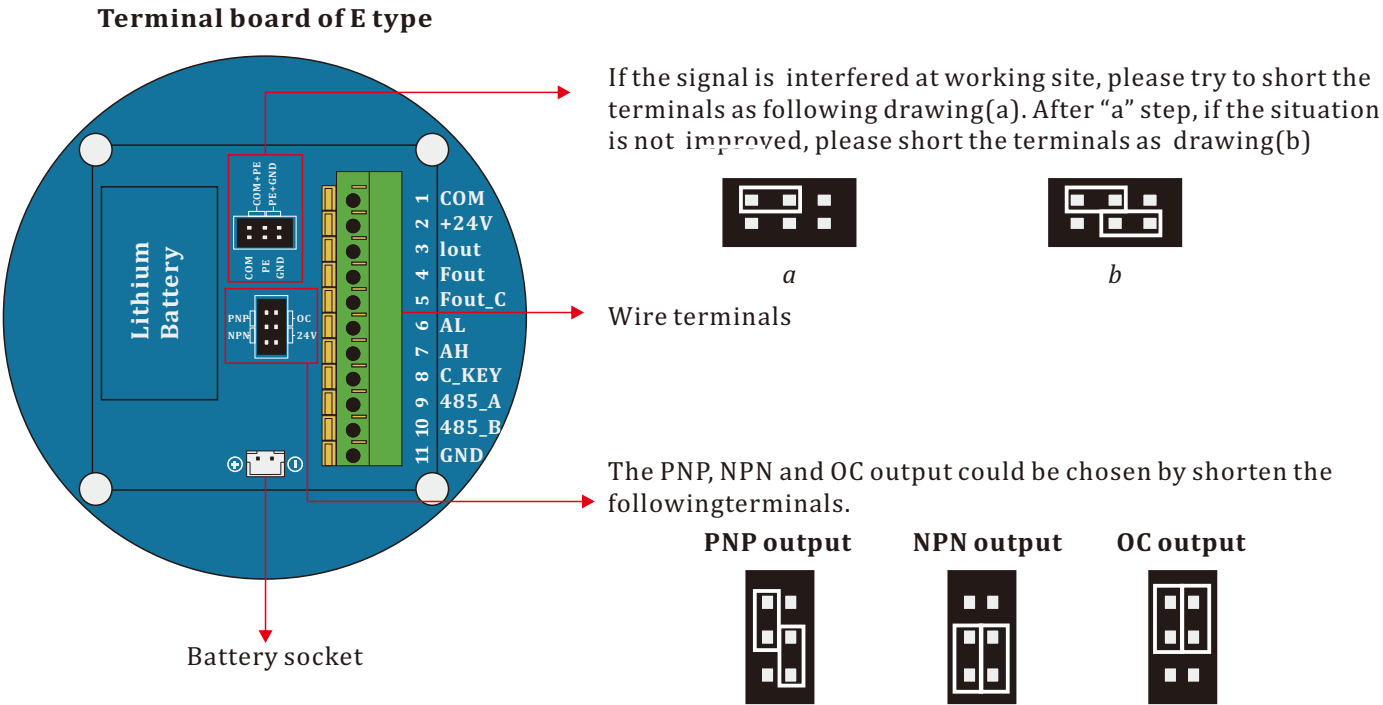
Terminal Configuration



Terminal Wiring

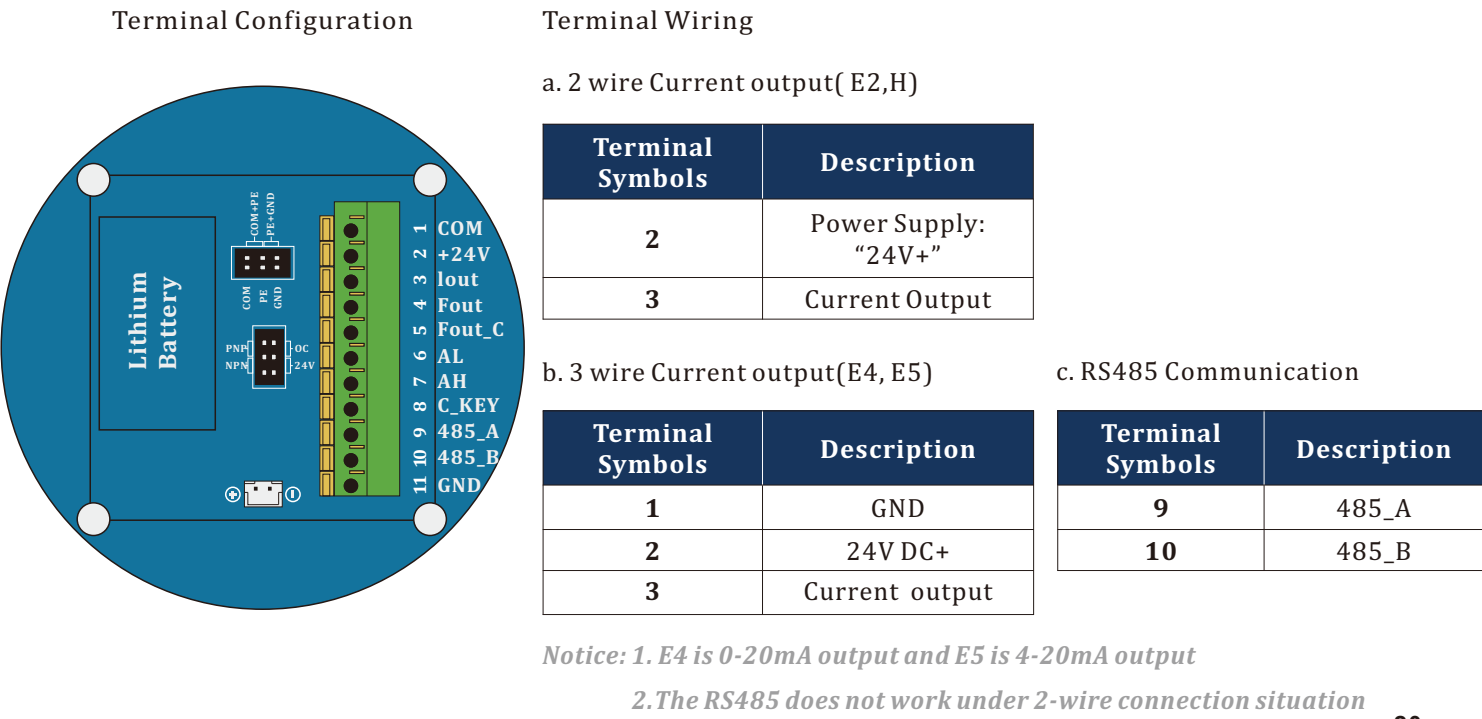
Terminal Symbols	Description
+A	Power Supply: "24V+"
-B	Current Output

5.3 LWQ-E series



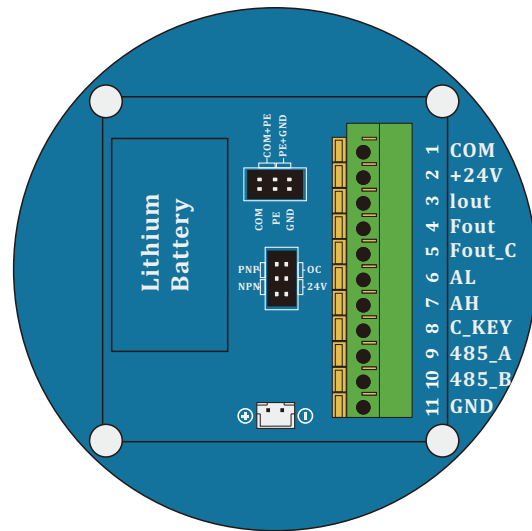
5.5.1 Current output(E2,E4, E5,H)

Notice: (LWGY-E1 IS POWERED SUPPLY BY BATTERY ONLY, NO OUTPUT)



5.5.2 Frequency & Pulse output(E2, E3, E4,E5)

Terminal Configuration



Terminal Wiring

Frequency & Pulse output(E2, E3, E4,E5,H,R)

Terminal Symbols	Description
1	GND
2	24V DC+
5	Frequency/Pulse output

Note: The parameter need to set as following form.

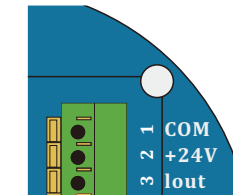
Output Type	Menu P7	Menu P8	Menu P9
Frequency	1	---	---
Scaled Pulse	2	Need to set	Need to set

5.5 LWQ-H Electrical

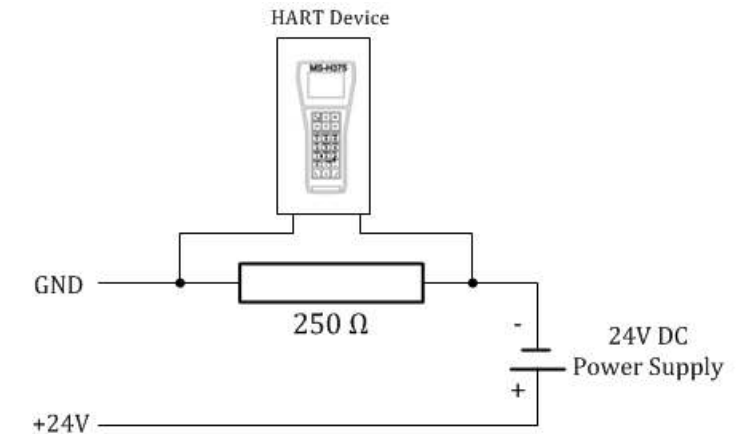
Wiring Diagram

Model	Power Supply	Output	Optional Dual Output	Communication
LWQ-H	24V DC	4-20mA (2 wire)	Not Available	HART

Terminal Wiring

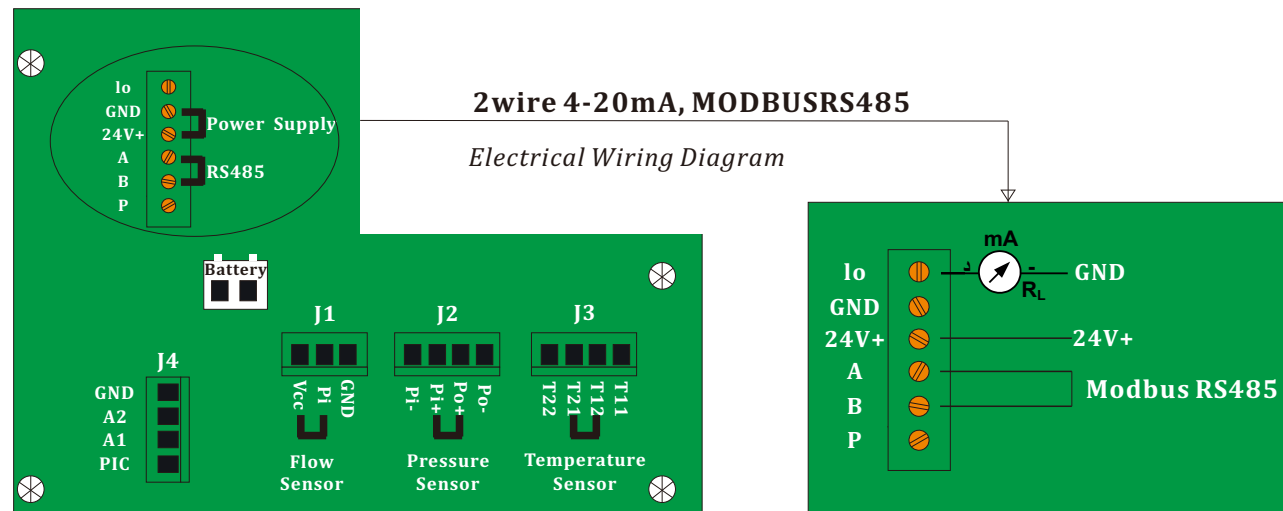


Terminal Symbols	Description
2	Power Supply: "24V+"
3	Current Output



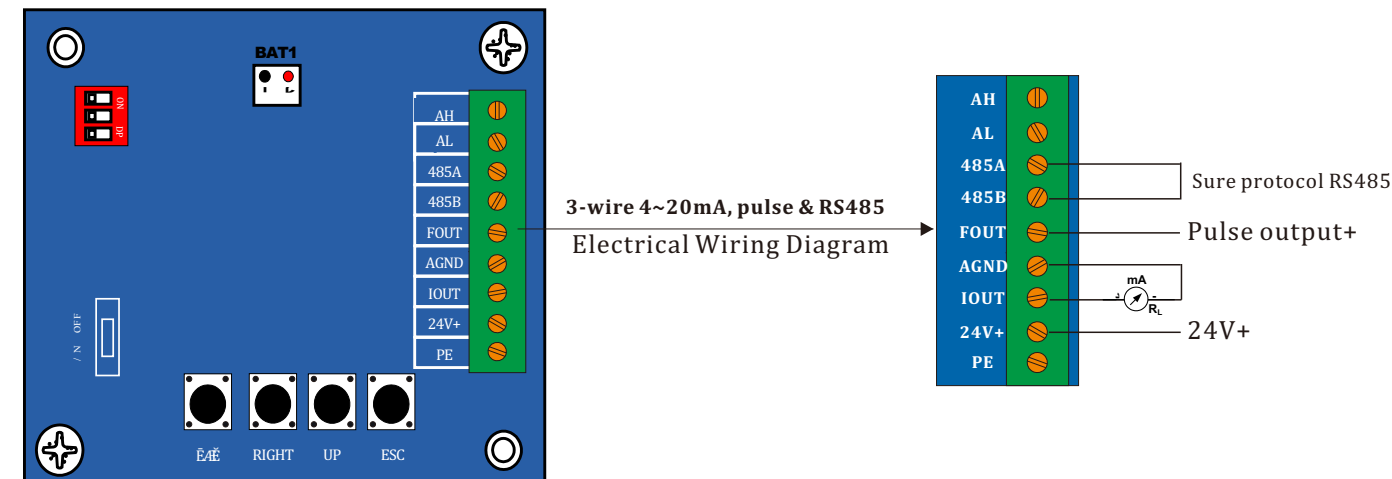
5.4 LWQ-D: Local Display (Temperature & Pressure Compensation)

5.4.1 LWQ-D1: 2wire 4-20mA, RS485




Note: mA meter
0...20 mA or 4...20mA and other R_L is the internal resistance of the measuring point including the cable resistance

5.4.2 LWQ-D2: 3 wire 4-20mA, Pulse & Sure protocol RS485



Note: mA meter
0...20 mA or 4...20mA and other R_L is the internal resistance of the measuring point including the cable resistance

6. Programming and Setup

 *All flowmeters are tested and calibrated prior to leaving the factory, and the unique K-factor is provided on the calibration certificate. Keep the calibration certificate well to avoid the loss of K-factor.*

6.1 LWQ-N: No display; Pulse Output

Customer should set the correct K-factor into PLC or Flow totalizer in order to get the correct flow rate.

6.2 LWQ-A: No display; 4-20mA Output

Only perform the Zero Point Calibration where it's necessary.

6.2.1 Zero Point Calibration

- (1) Shut off the value where the flowmeter is installed, ensure there is no flow rate in pipe.
- (2) Put high accuracy amperometer into the circuit loop as series connection.
- (3) Adjust the potentiometer W502 to make sure the display on amperometer is 4mA.

6.2.2 Full Scale Calibration: It's ONLY available for factory; Return the flowmeter to factory for full scale calibration where is applicable.

6.3 LWQ-E

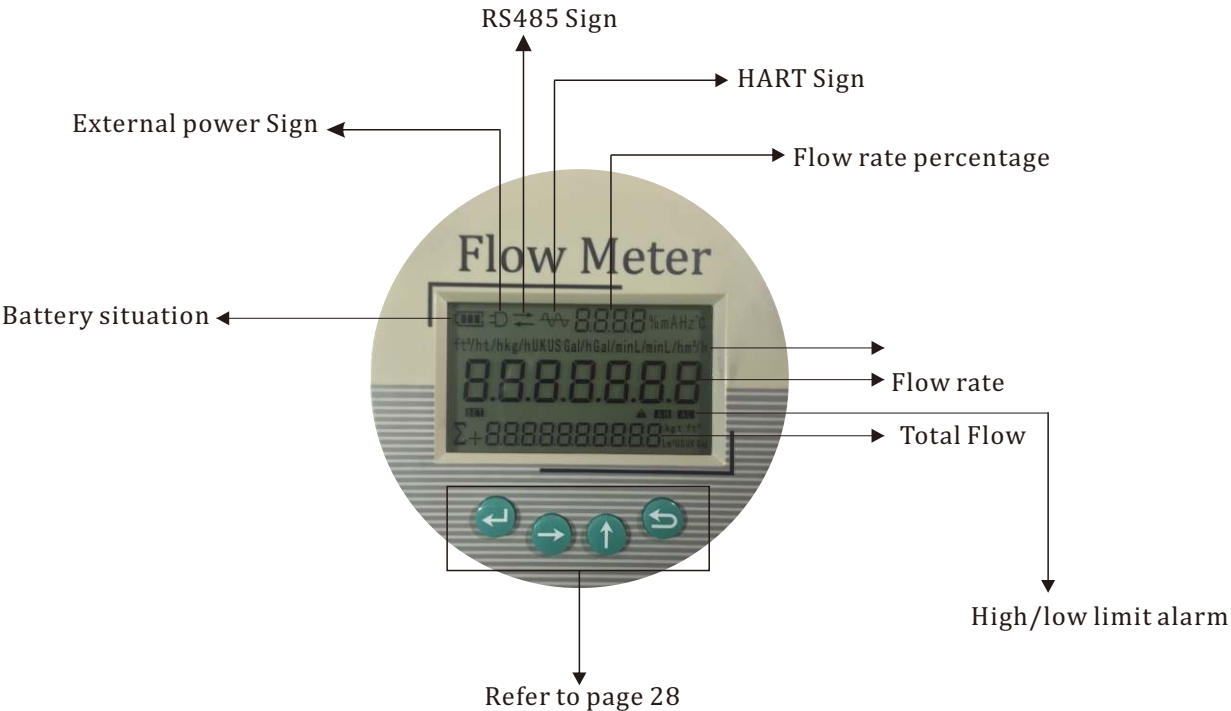
6.3.1 Description

- (1) Under any setting status, press “ESC” means no save current setting and back to measuring mode.
- (2) No password inputting or pressing “Enter” with incorrect password can ONLY view all parameters. The total menus in “Parameters Set” are 26, and users can access and modify these menus depending on the input password grade. See table below for more information on password grade.

Table. Description of Password Grade

Password	Login Privileges
No Password	Read Only
1234	Modify Parameter P1-P14
1010	Modify Parameter P16-P26
5555	SettingTotal rate reset
1111	Save all data as factory defaults
5678	Reload Factory Defaults
9999	Total Flow

6.3.2 Display And Key



6.3.3 Operation

Key	Measuring Mode	Menu Mode	Sub-menu or Function Mode	Parameter and Data Mode
Enter 	1. Display the frequency corresponding to flow rate 2. Enter the parameter setting mode	Select menu	Press 1 time, return to menu mode, data saved	Save the value and advance to next menu
				For numerical values, move cursor one position to the right or left
			Select sub-menu or function	Use cursor highlighted to change number, unit, setting
Esc 		Return to measuring mode but prompt whether the data should be saved	Return to measuring mode but prompt whether the data should be saved	Return to measuring mode but prompt whether the data should be saved

Note: *Data are not saved when press “Esc” to return to measuring mode. If the value need to be changed, press “Enter” to save value first*

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Menu	Parameter name	Setting Method	Grades	Range		
P--1	Unit	Select Parameter	User	Value	Flow Rate Unit	Total Rate Unit
				0	m ³ /h	m ³
				1	L/h	L
				2	L/min	m ³
				3	US Gal/min	US Gal
				4	UK Gal/min	UK Gal
				5	US Gal/h	US Gal
				6	UK Gal/h	UK Gal
				7	Kg/h	Kg
				8	t/h	t
				9	ft ³ /h	ft ³
P--2	Damping Time	Input Value	User	Unit: Second Value:0-9		
P--3	Maximum Flow Rate	Input Value	User	Unit: The same as Flow Rate		
P--4	Minimum Flow Rate	Input Value	User	Minimum flow rate(when the flow rate is lower than it, the flow rate will show 0); Unit: The same as Flow Rate		

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Menu	Parameter name	Setting Method	Grades	Range	
P--5	Maximum Frequency output	Input Value	User	Accuracy: 0.1Hz	
P--6	Relative density	Input Value	User	Relative density: 1(water density at 4 ℃)	
P--7	Frequency Output Mode	Select Parameter	User	0: No Frequency output 1: Corrected Pulse output after 2: Scaled Pulse output	
P--8	Scaled-pulse output	Select Parameter	User	0.01	0.01L/Pulse
				0.1	0.1L/Pulse
				1	1L/Pulse
				10	10L/Pulse
				100	100L/Pulse
P--9	Pulse width	Input Value	User	The value should be multiple of 10; The units is ms	
P--10	Communication	Select Parameter	User	0: RS485 1: Hart	

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Menu	Parameter Name		Setting Method	Grades	Range
P--11	RS485	Address:	Input	User	Max is 255
		Baud Rate:	Select Parameter	User	1200, 2400, 4800, 9600, 19200
		Verification:	Select Parameter	User	N(No verify)
					O(Odd verify)
					E(Even Verify)
		Data Length	Select Parameter	User	7,8
		Stop bits length	Select Parameter	User	1, 2
	Hart	Device Address	Select Parameter	User	
P--12	High Limit Alarm		Select Parameter	User	Yes: On
					1%-100%: Percentage of upper limit flow rate
P--13	Low Limit Alarm		Select Parameter	User	1%-100%: Percentage of upper limit flow rate
P--14	Backlight		Select Parameter	User	0: Off Backlight
					1: Automatic mode
					2: ON mode
P--15	Total Rate		Input value	User	It could be modified with right code

Menu	Parameter Name	Setting Method	Grades	Range
P--16 F--1	Linearization of the Flowcurve: point 1	Input value	Factory ONLY	First Row: Frequency (P1)
				Second Row: K-Factor (P1)
P--17 F--2	Linearization of the Flowcurve: point 2	Input value	Factory ONLY	First Row: Frequency (P2)
				Second Row: K-Factor (P2)
P--18 F--3	Linearization of the Flowcurve: point 3	Input value	Factory ONLY	First Row: Frequency (P3)
				Second Row: K-Factor (P3)
P--19 F--4	Linearization of the Flowcurve: point 4	Input value	Factory ONLY	First Row: Frequency (P4)
				Second Row: K-Factor (P4)
P--20 F--5	Linearization of the Flowcurve: point 5	Input value	Factory ONLY	First Row: Frequency (P5)
				Second Row: K-Factor (P5)
P--21 F--6	Linearization of the Flowcurve: point 6	Input value	Factory ONLY	First Row: Frequency (P6)
				Second Row: K-Factor (P6)
P--22 F--7	Linearization of the Flowcurve: point 7	Input value	Factory ONLY	First Row: Frequency (P7)
				Second Row: K-Factor (P7)
P--23 F--8	Linearization of the Flowcurve: point 8	Input value	Factory ONLY	First Row: Frequency (P8)
				Second Row: K-Factor (P8)
P--24 F--9	Average K-Factor	Input value	Factory ONLY	First Row: Frequency (P)
				Second Row: K-Factor (P)

6.4 LWQ-D with Temperature and Pressure Compensation

 **Warning: Electrical Hazard Disconnect power before beginning wiring.**

6.4.1 LWQ-D1 Display(2- wire 4-20mA)

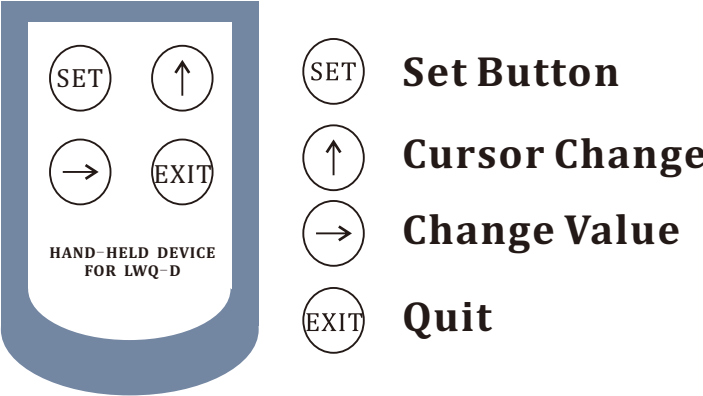
6.4.1.1 Display



Representation	
总量 Total	Total Flow; Unit: Nm ³
日量 Summ.	Total Flow in one day; Unit: Nm ³
流量 Flow	Flow rate; Unit: Nm ³ /h
温度 Temp.	Temperature; Unit: Celsius Degree
压力 Pres.	Pressure; Unit: Kpa Note:It's gauge pressure unless where there is particular declare

6.4.1.2 Hand-held operator

 **Warning: Push “Set” Button to save your setting**



6.4.1.3 Parameters Illustration (LWQ-D1)

Parameter Number	Parameter Name	Description
000	VTOT	Total flow based on operating status
001	VM	Total flow based on operating status
002	FS	Full Scale
003	KM	Average K-Factor
004	F1	F1(The frequency corresponding to K1)
005	E1	E1(First K-Factor)
006	F2	F2(The frequency corresponding to K1)
007	E2	E2(First K-Factor)
008	F3	F3(The frequency corresponding to K1)
009	E3	E3(First K-Factor)
010	F4	F4(The frequency corresponding to K1)
011	E4	E4(First K-Factor)
012	F5	F5(The frequency corresponding to K1)
013	E5	E5(First K-Factor)
014	F6	F6(The frequency corresponding to K1)
015	E6	E6(First K-Factor)

Parameter Number	Parameter Name	Description
017	E7	E7(First K-Factor)
018	F8	F8(The frequency corresponding to K1)
019	E8	E8(First K-Factor)
100	Tcnst	Temperature Constant
101	Pcnst	Pressure Constant
102	T0	Zero Point Correction for temperature sensor
103	Tk	Linearization for temperature sensor
104	P0	Zero Point Correction for temperature sensor
105	Pk	Linearization for temperature sensor
106	Pfs	FullScale-Pressure Sensor
107	Pair	Local Atmospheric Pressure
108	Po	Isolated pulse output setting
109	PIC	
110	Zs	Value:0/1
		0:No correction on compressibility factor;
		1:Correction on compressibility factor

Parameter Number	Parameter Name	Description
111	N2	Molar Percentage-N2
112	CO2	Molar Percentage-CO2
113	H2	Molar Percentage-H2
114	CO	Molar Percentage-CO
115	GR	Specific Gravity
116	DT	Date
117	TM	Time
118	CD	Password
200	I4	Zero Calibration for 4-20mA Output
201	I20	Full Calibration for 4-20mA Output
202	BD	Baud Rate: RS485
203	AR	Device Address: RS485
204	Ps	Value:0/1/2
		0:Original Pulse
		1:Scaled pulse output at operating status
		2:Scaled pulse output at standard status





6.4.2 LWQ-D2

6.4.2.1 Display



Representation	
标准量显示	Flow displayed based on Standard Status
总量 Total	Total Flow; Unit: Nm ³
日量 Sum.	Total Flow in one day; Unit: Nm ³
流量 Flow	Flow rate; Unit: Nm ³ /h
温度 Temp.	Temperature; Unit: Celsius Degree
压力 Pres.	Pressure; Unit: Kpa Note:It's gauge pressure unless where there is particular declare

6.4.2.2 Keys (See table below for function and representation in text)

Key	Measuring Mode	Sub-menu or Function Mode	Parameter and Data Mode
 SET	1. Display the frequency corresponding to flow rate 2. Enter the parameter setting mode	Press 1 time, return to menu mode, data saved	Save the value and advance to next menu
 RIGHT			For numerical values, move cursor one position to the right or left
 UP			Use cursor highlighted to change number, unit, setting
 ESC		Return to measuring mode but prompt whether the data should be saved	Return to measuring mode but prompt whether the data should be saved
Note: Data are not saved when press “Esc” to return to measuring mode. If the value need to be changed, press “Set” to save value first			

6.4.2.3 Parameters Set

Parameter Number	Description	
01	The Max Flow Rate(Standard Status) corresponding to 20mA)	
02	k1(First K-Factor)	linearization of the Flowcurve point 1
03	f1(The frequency corresponding to k1)	
04	k2(Second K-Factor)	linearization of the Flowcurve point 2
05	f2(The frequency corresponding to k2)	
06	k3(Third K-Factor)	linearization of the Flowcurve point 3
07	f3(The frequency corresponding to k3)	
08	k4(Fourth K-Factor)	linearization of the Flowcurve point 4
09	f4(The frequency correspoding to k4)	
10	k5(Fifth k-Factor)	linearization of the Flowcurve point 5
11	f5(The frequency correspoding to k5)	
12	k6(Sixth K-Factor)	
13	Pressure Upper Limit	
14	Local Atmospheric Pressure	
15	Device Address: RS485	
16	Totalizer Reset(2:Clear Totalizer without compensated;3:Clear totalizer which has beencompensated;9:Clear all)	
17	Reserved Parameter	

7. Troubleshooting

Symptom	Probable Cause	Solution
More Volume/Output than displayed or registered	1. Rotor may drag due to foreign matter obstruction.	Check for debris inside the meter. Clean and reassemble.
	2. Magnetic pickup not screwed down all the way into the turbine flowmeter body. This causes it not to detect all the rotor blades as they pass	Screw the magnetic pickup all the way down into the turbine flow-meter body. Hand-tighten only.
	3. K-factor is too high in electronic/readout device	Verify K-factor used. K-factor should be decreased.
Less Volume/Output than displayed or registered	K-factor is too low in electronic/readout device	Verify K-factor used. K-factor should be increased.
Flow rate indication is unstable	1. Gas flow rate is not stable	Keep the valve position and make sure the gas in pipe is stable
	2. Battery Power Type: Bad contact on the connector between battery and PCB	Open back cover and repower the flow meter
	3. DC Power Type: supply voltage is abnormal	Check and ensure power supply is 24V DC

Limited Warranty Policy

Tianjin SURE Instrument hereby provides a limited warranty against defects in materials and workmanship. This product includes a 1-year warranty. The warranty period shall begin on the date of the original new equipment purchase. Warrantor’s obligation hereunder shall be limited to repairing defective workmanship or replacing or repairing any defective parts.

In the event Purchaser believes the SURE product is defective, the product must be returned to SURE, transportation prepaid by Purchaser, within the appropriate warranty period relative to the product. If SURE’s inspection determines the workmanship or materials are defective and the required maintenance has been performed and, has been properly installed and operated, the product will be either repaired or replaced, at SURE’s sole determination, free of additional charge, and the goods will be returned, transportation paid by SURE, using a transportation method selected by SURE.

Prior to returning the product to SURE, Purchaser must obtain a Returned Material Authorization (RMA) Number from SURE’s Customer Service Department within 30 days after discovery of a purported breach of warranty, but not later than the warranty period; otherwise, such claims shall be deemed waived.

If SURE’s inspection reveals the SURE product to be free of defects in material and workmanship or such inspection reveals the goods were improperly used, improperly installed, and/or improperly selected for

service intended, SURE will notify the purchaser in writing and will deliver the goods back to Purchaser upon Receipt of Purchaser's written instructions and agreement to pay the cost of transportation. If Purchaser does Not respond within thirty (30) days after notice from SURE, the goods will be disposed of in SURE's discretion.

SURE does not warrant the product to meet the requirements of any safety code or other jurisdiction, and Purchaser assumes all risk and liability whatsoever resulting from the use thereof, whether used singly or in combination with other machines or apparatus.

This warranty shall not apply to any SURE product or parts thereof, which have been repaired outside SURE's factory or altered in any way, or have been subject to misuse, negligence, or accident, or have not been operated in accordance with SURE's printed instructions or have been operated under conditions more severe than, or otherwise exceeding, those set in the specifications.

FOR NON-WARRANTY REPAIRS OR CALIBRATIONS, consult us for current repair/calibration charges. Have the following information available BEFORE contacting us:

1. P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of the product
3. Repair instructions and/or specific problems relative to the product.

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