

Liquid Turbine Flow Meter

MT100TB-LWGY Series



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1. General Information

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



Warning

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.
2. When measuring flammable liquids, observe precautions against fire or explosion.
3. When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.
6. Do not blow compressed air through the turbine.
7. Handle the rotor carefully. Even small scratches or nicks can affect accuracy.
8. When tightening the turbine, use a wrench only on the wrench flats.
9. For best results, calibrate the meter at least 1 time per year.

1.1 Product Description

Operating Principle:

Liquid 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 METERY

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

Application range	Liquid: water; diesel; gasoline (1) Without Impurity (2) Low viscosity
Measured Value	
Primary measured value	Flow Rate
Secondary measured value	Volume flow

Design

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 local display
	A Type: 4-20mA Output without local display
	B Type: Local Display; Lithium Battery Power; No Output
	C Type: Local Display; 24V DC Power; 4-20mA Output; Optional Function: (1) Backup Power Supply: Lithium Battery (2) Modbus RS485 (3) Pulse Output
Connection	Thread: DN4-DN50
	Flange: DN15-DN200 (DIN, ANSI, JIS)
	Wafer: DN15-DN100
Measurement Ratio	Standard – 10:1; Optional: 20:1

Measuring accuracy

Reference conditions	Flow conditions similar to EN 29104
	Medium: Water
	Electrical conductivity: $\geq 300 \mu\text{S/cm}$
	Temperature: +10...+30°C / +50...+86°F
	Inlet section: $\geq 10 \text{ DN}$
	Operating pressure: 1 bar / 14.5 psig
Flow Meter Accuracy	Standard: 1.0% of rate
	Optional: 0.5% of rate

Operating conditions

Temperature	
Process temperature	T1 Level: -20...+80°C
	T2 Level: -20...+120°C
	T3 Level: -20...+150°C
Ambient temperature (all versions)	Standard (with aluminum converter housing):
	-10...+55°C
Storage temperature	-20...+70°
Pressure	
EN 1092-1	DN100...DN200: PN 16
	DN15...DN80: PN 25
	Other pressures on request
ASME B16.5	1/2" ...8": 150 lb RF
	Other pressures on request
JIS	1/2" ...8": 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			
Standard: 2Cr13	EN10088-3	1.4021	X20Cr13
	AISI	420	
	BS	420S37	
	JIS	SUS410J1	
Optional: CD4MCu	DN15...DN80		
Bearings and Shaft	Tungsten Carbide		
Converter Housing	Standard: polyurethane coated die-cast aluminum		

Process connections

Flange	
EN 1092-1	DN15...200 in PN 6...40
ASME	1/2" ...8" in 150 lb RF
JIS	1/2" ...8" in 10...20K
Design of gasket surface	RF
	Other sizes or pressure ratings on request
Thread	DN4...DN50 in PN63

Measurable Flow Rate Range:

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.

Nominal Diameter		Standard Flow Range	Extended Flow Range
(mm)	(in.)	(m3/h)	(m3/h)
4	0.15	0.04 to 0.25	0.04 to 0.4
6	0.25	0.1 to 0.6	0.06 to 0.6
10	0.4	0.2 to 1.2	0.15 to 1.5
15	0.5	0.6 to 6	0.4 to 8
20	0.75	0.8 to 8	0.45 to 9
25	1	1 to 10	0.5 to 10
32	1.25	1.5 to 15	0.8 to 15
40	1.5	2 to 20	1 to 20
50	2	4 to 40	2 to 40
65	2.5	7 to 70	4 to 70
80	3	10 to 100	5 to 100
100	4	20 to 200	10 to 200
125	5	25 to 250	13 to 250
150	6	30 to 300	15 to 300
200	8	80 to 800	40 to 800

3. Model and Selection

Model Selection (See Table 1)

Table 1: Model Selection Guidance for Liquid Turbine Flowmeter

Model Suffix Code										Description
LWGY-										
Diameter										Three Digitals; for example: 010: 10 mm; 015: 15 mm; 080: 80 mm; 100: 100 mm
		N								No display; 24V DC; Pulse Output
Converter		A								No display; 24V DC; 4-20mA Output
		B								Local display; Lithium Battery Power; No output
		C								Local display; 24V DC Power; 4-20mA Output; Optional backup power: Lithium Battery
		C1								Local display; 24V DC Power; 4-20mA Output; Modbus RS485 Communication Optional backup power: Lithium Battery
		H								Local display; 24V DC Power; 4-wire 4-20mA Output & HART Communication
Accuracy			10							1.0% of Rate
			05							0.5% of Rate
Flow Range				S						Standard Range: refer to flow range table
				W						Wide Range: refer to flow range table
Body Material					S					SS304
					L					SS316
Explosion Rating						N				Safety Field without Explosion
						E				ExdIIBT6
Pressuring Rating							N			Per Standard
							H(x)			Customized Pressure Rating
Connection								-DXX		DXX: D06, D10, D16, D25, D40 D06: DIN PN6; D10: DIN PN10 D16: DIN PN16; D25: DIN PN25 D40: DIN PN40
								-AX		AX: A1, A3, A6 A1: ANSI 150#; A3: ANSI 300# A6: ANSI 600#
								-JX		JX: J1, J2, J4 J1: JIS 10K; J2: JIS 20K; J4: JIS 40K
								-TH		Thread; DN4...DN50
Fluid Temperature									-T1	-20...+80°C
									-T2	-20...+120°C
									-T3	-20...+150°C

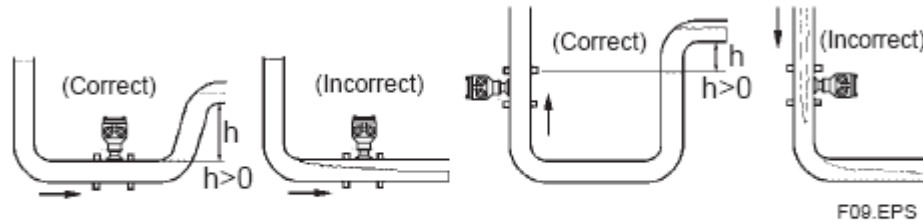
Model Code: LWGY-050C10SSNN-A1-T1

Explanation - Diameter: 50mm; Converter: 24V DC Power Supply, 4-20mA Output, Local Display
Accuracy: 1.0%; Flow range: 4-40 m³/h; Body Material: SS304; No Explosion;
Connection: ANSI 150# Flange; Fluid Temperature: -20...+80°C

4. Cautions for Installation

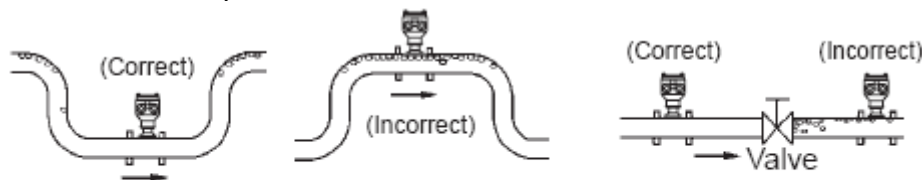
4.1 Mounting Positions

- Pipes must be fully filled with liquids. It is essential that pipes remain fully filled at all times, otherwise flow rate indications may be affected and measurement errors may be caused.



Mounting Positions

- Avoid Air Bubbles. If air bubbles enter a measurement pipe, flow rate indications may be affected and measurement errors may be caused.



Avoiding Air Bubbles

- 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.

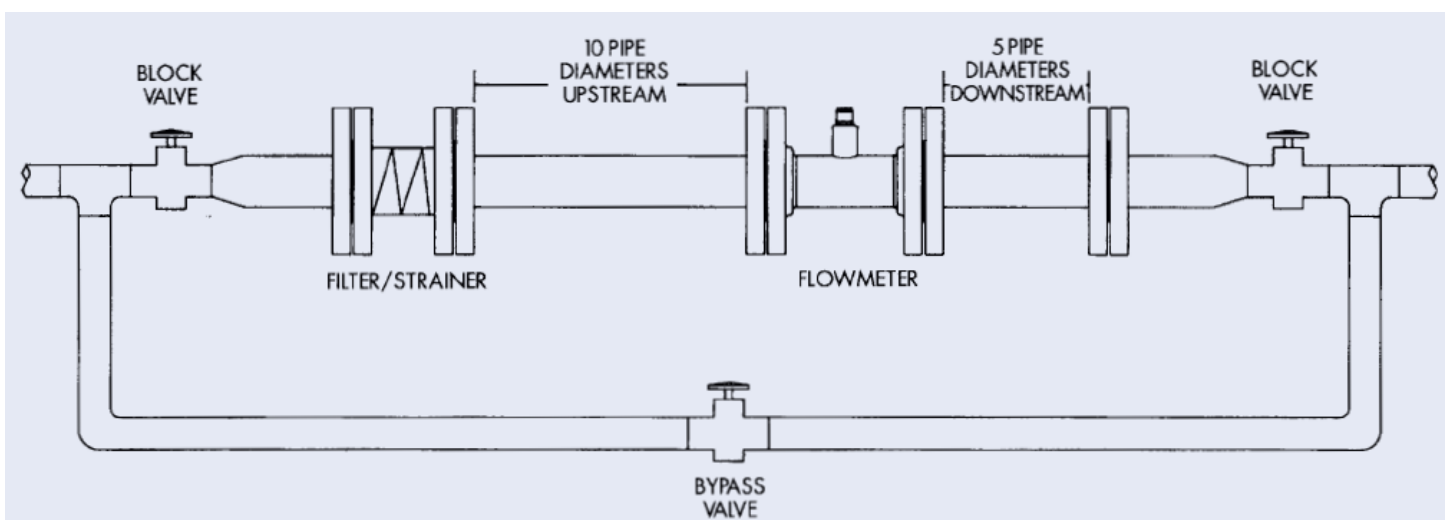
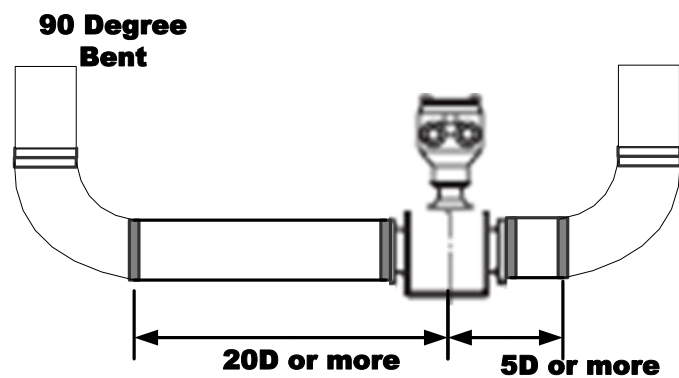
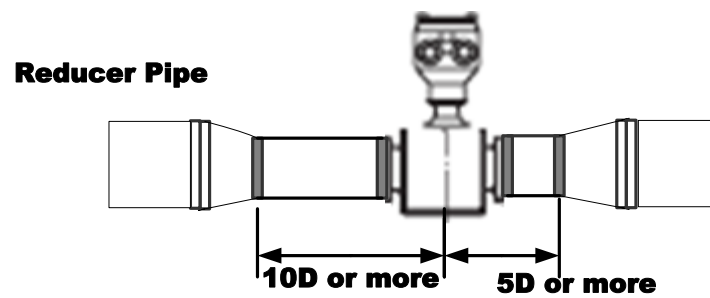
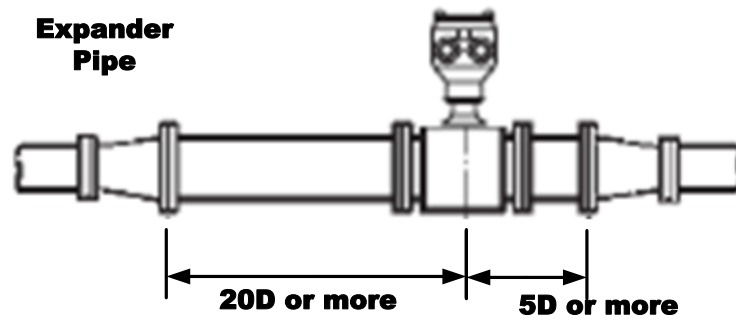


Diagram 1. Typical Flow Meter System Installation

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.

4.3 Anti-Cavitation

Cavitation can be caused by entrained air, and it can seriously damage the rotor on a turbine flow meter. An amount higher than about 100 mg/l of entrained air or gas can produce error. In addition, cavitation can be caused by too little backpressure on the flow meter. For Metery turbine flow meters, you should provide a backpressure (downstream pressure) of at least 1.25 times the vapor pressure, plus 2 times the pressure drop through the flow meter. See formula 1.

$$\text{Formula 1: } P_b \geq 1.25 \times P_v + 2 \times (P_{in} - P_{out})$$

In formula 1: (Pb: Back pressure; Pv: Vapor Pressure; Pin: Inlet Pressure; Pout: Outlet Pressure)

Create backpressure by installing a control valve on the downstream side of the meter at the proper distance detailed above.



Special Notice

- ◆ 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 coverplates. Leave the coverplate installed unless accessory modules specify removal. Don't remove the coverplates when the meter is powered, or electrical shock and explosion hazard can be caused.

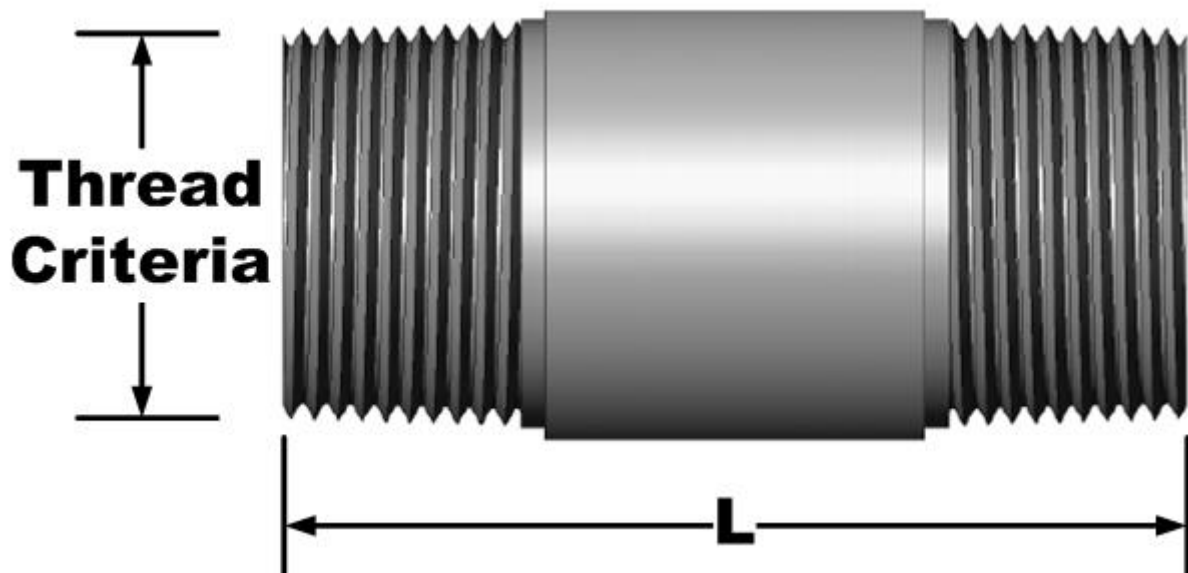
4.4 Connections

4.4.1 Thread Connection

Note: Default thread is Male G thread, Other type thread are available on requests, such as Female NPT thread, Male NPT thread, BSP thread, contact us for more information

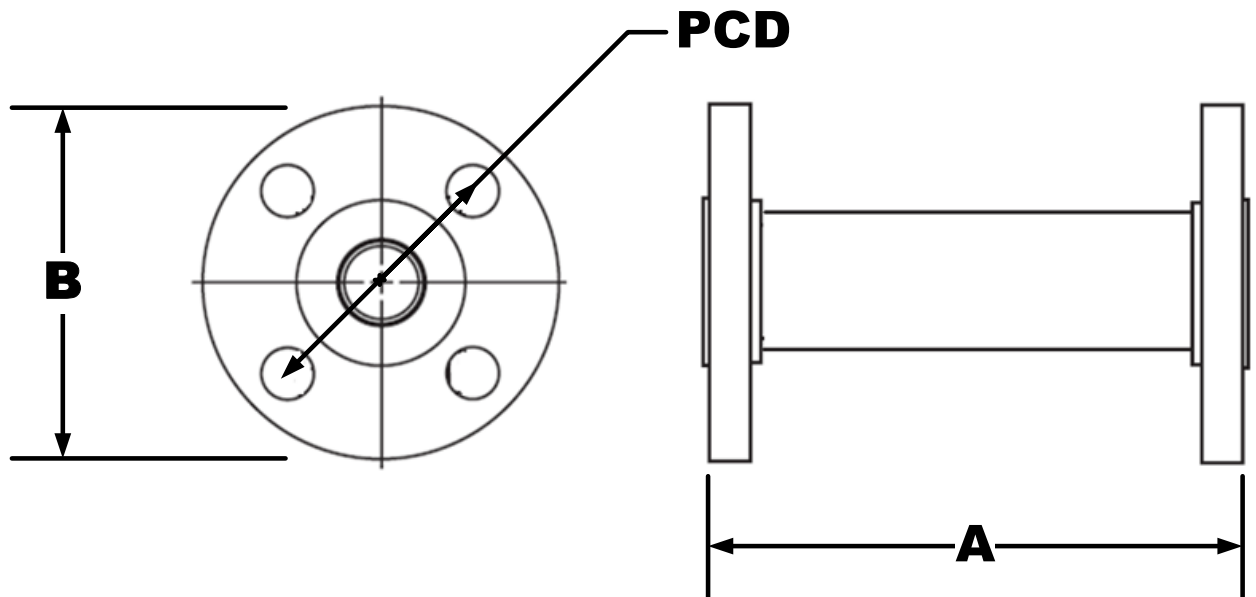
DN4...DN10: Straight Runs and filter are included in the length for DN4 to DN10.

DN15...DN50: Straight Runs are optional on request.



Diameter (mm)	L (mm)	Thread Criteria
4	279	G ½"
6	270	G ½"
10	390	G ½"
15	75	G 1"
20	80	G 1"
25	100	G 1-¼"
32	140	G 2"
40	140	G 2"
50	150	G 2-1/2"

4.4.2 Flange Connection



ANSI Flange Meter Dimensions							
Size Code		A (mm)	ANSI Flange Rating Class	Flange Diameter (B) (mm)	Bolt Hole Diameter (mm)	Bolt Circle Diameter (PCD) (mm)	Bolt Hole Quantity
(inch)	(mm)						
1/2"	15	75	150	89	16	60	4
			300	95	16	67	4
3/4"	20	80	150	99	16	70	4
			300	117	19	83	4
1"	25	100	150	108	16	79	4
			300	124	19	89	4
1-1/4"	32	140	150	115	16	89	4
			300	135	19	98	4
1-1/2"	40	140	150	127	16	99	4
			300	155	22	114	4
2"	50	150	150	152	19	121	4
			300	165	19	127	8
2-1/2"	65	170	150	180	19	140	4
			300	190	22	149	8
3"	80	200	150	191	19	152	4
			300	210	22	168	8
4"	100	220	150	229	19	191	8
			300	254	22	200	8
5"	125	250	150	255	22	216	8
			300	280	22	235	8
6"	150	300	150	279	22	241	8
			300	318	22	270	12
8"	200	360	150	343	22	298	8
			300	381	25	330	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)	
1/2"	15	75	2.5	95	14	65	4
3/4"	20	80	2.5	105	14	75	4
1"	25	100	2.5	115	14	85	4
1-1/4"	32	140	2.5	140	14	100	4
1-1/2"	40	140	2.5	150	18	110	4
2"	50	150	2.5	165	18	125	4
2-1/2"	65	170	1.6	185	18	145	4
3"	80	200	1.6	200	18	160	8
4"	100	220	1.6	220	18	180	8
5"	125	250	1.6	250	18	210	8
6"	150	300	1.6	285	22	240	8
8"	200	360	1.6	340	22	295	12

5. Electrical Wiring



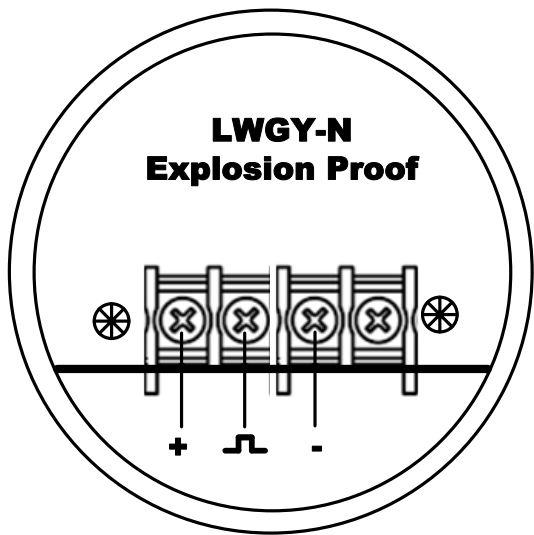
Warning: Electrical Hazard
Disconnect power before beginning wiring.

5.1 LWGY-N; Pulse Output, Basic Model.

Cable Color	Terminal Symbols	Description
Red Wire	Power (+)	Power Supply: "24V+"
White Wire	Common	GND
Yellow Wire	Pulse (+)	Pulse Output

5.2 LWGY-N; Pulse Output, explosion proof model.

Terminal Configuration

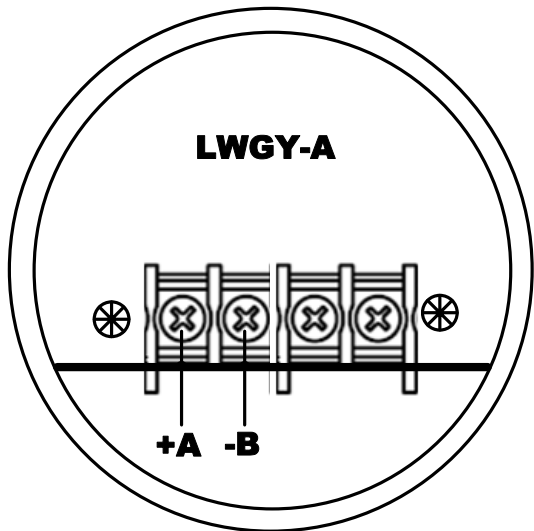


Terminal Wiring

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

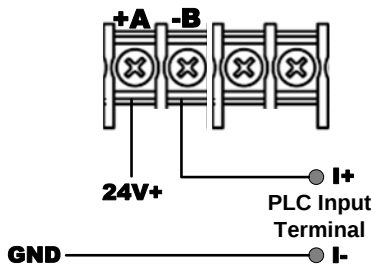
5.3 LWGY-A; two-wire 4-20mA Output, No Local Display.

Terminal Configuration



Terminal Wiring

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

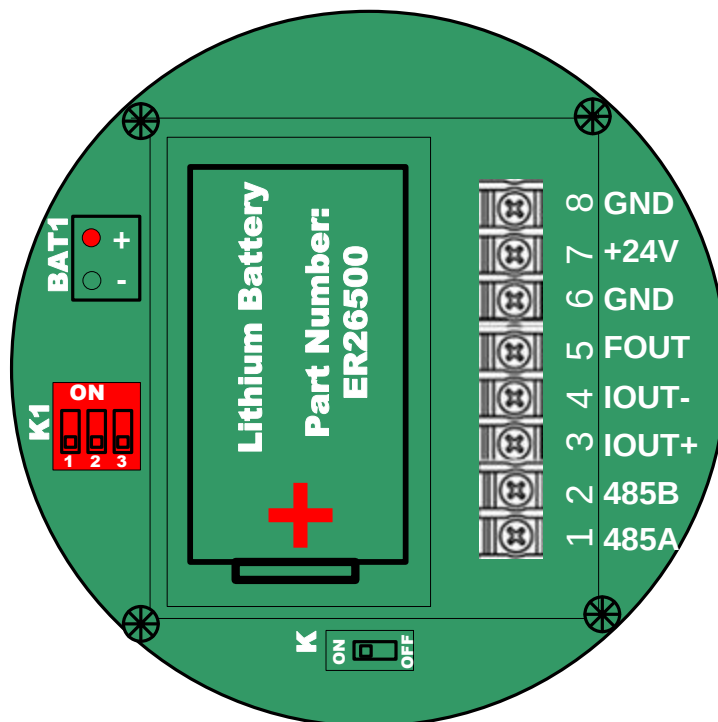


5.4 LWGY-B, LWGY-C, LWGY-C1; Local Display

Note: Terminal configuration is same for LWGY-B, LWGY-C and LWGY-C1, but some functions are ONLY available on specified model. The table lists the function of each model.

Function List for converter with local display						
Model	Primary Power Supply	Optional Dual Power Supply	Output	Optional Dual Output	Communication	Note
LWGY-B	Lithium Battery	Not Available	Not Available	Not Available	Not Available	
LWGY-C	24V DC	Lithium Battery	4-20mA	Pulse	Not Available	Output is only available when 24V Power supply is on.
LWGY-C1	24V DC	Lithium Battery	Pulse	Not Available	Modbus RS485	

Terminal Configuration



DIP Switch: K1			
Function	1	2	3
Original Pulse Output	ON	OFF	OFF
Scaled Pulse Output: 1 m3 / Pulse	OFF	ON	OFF
Scaled Pulse Output: 1L/Pulse; 10L/Pulse; 100L/Pulse Configure it in parameter setting	OFF	OFF	ON

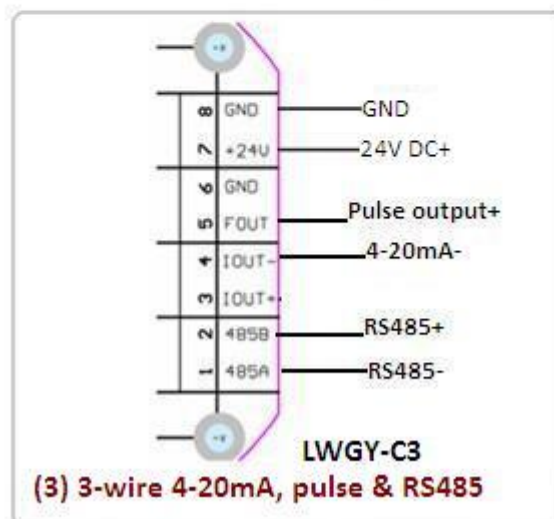
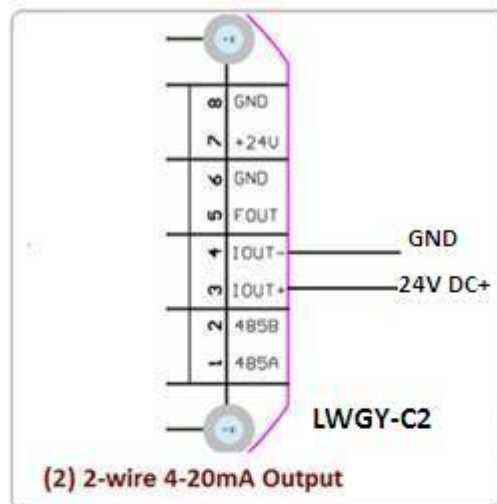
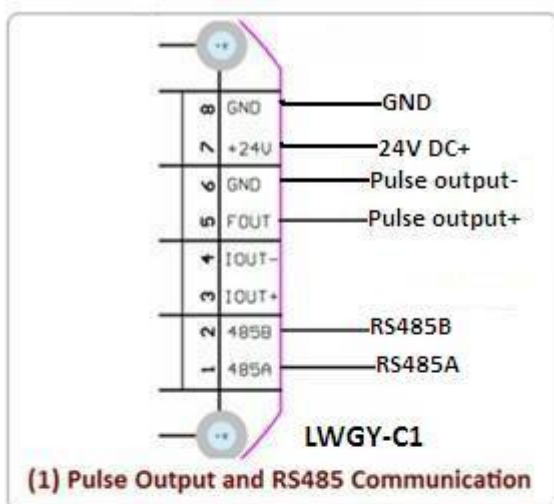
Terminal Wiring

5.4.1 LWGY-B: if the display is blank, put the plug of battery into the battery socket (BAT1).

5.4.2 LWGY-C and LWGY-C1

Model	Function (Optional)	Terminal Code	Terminal Symbols	Description
LWGY-C	(2 wires) 4-20mA Output	3	IOUT+	24V DC+
		4	IOUT-	GND
	(3 wires) 4-20mA Output	7	+24V	24V+ DC Power Supply
		8	GND	GND
	(4 wires) 4-20mA Output	3	IOUT+	Current Output 4-20mA DC (+)
		7	+24V	24V+ DC Power Supply
		8	GND	GND
		3	IOUT+	Current Output (+) Iout+
LWGY-C1	Pulse Output and RS485 Communication	6	GND	Current Output (-) Iout-
		7	+24V	24V+ DC Power Supply
		8	GND	GND
		5	FOUT	Pulse output+
		6	GND	Pulse output-
		1	485A	RS485+
		2	485B	RS485-

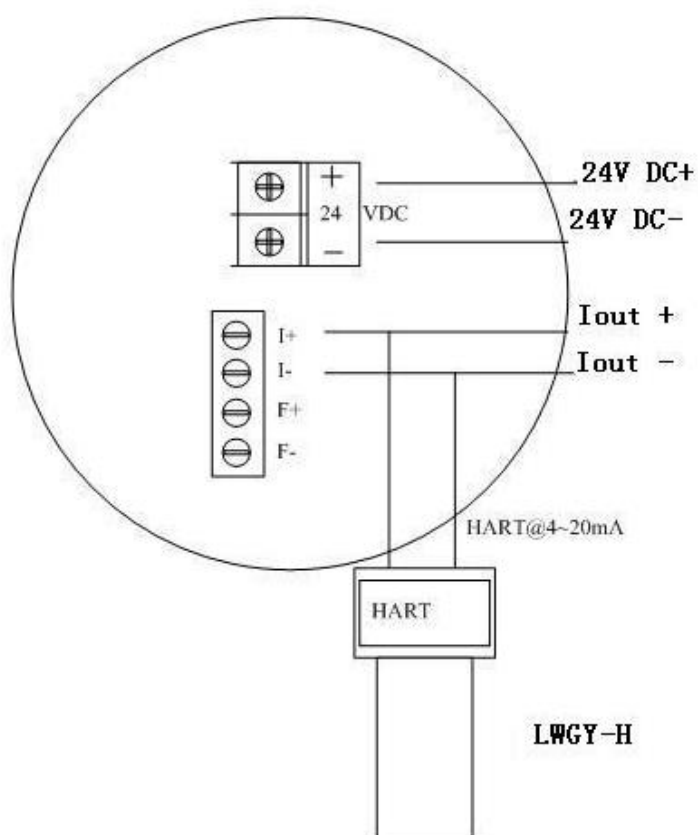
Electrical Wiring Diagram



5.5 LWGY-H

Function List for converter with local display					
Model	Power Supply	Output	Optional Dual Output	Communication	Note
LWGY-H	24V DC	4-20mA (4-wire)	Not Available	HART	

Electrical Wiring Diagram



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 LWGY-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 LWGY-A; No display; 4-20mA Output

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

6.2.1 Zero Point Calibration

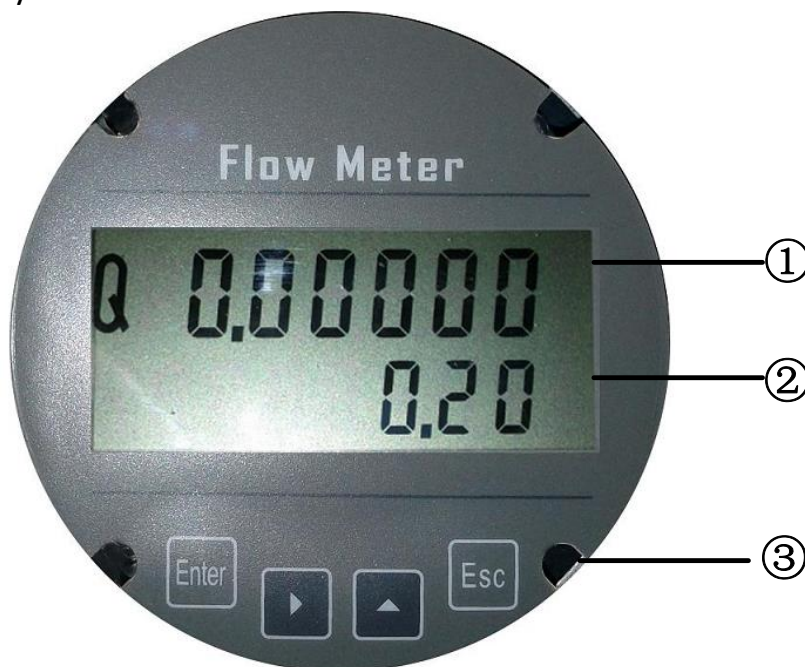
- (1) Shut off the valve where the flowmeter is installed, ensure there is no flow rate in pipe.
- (2) Put high accuracy amperometer into the circuit loop as series connection.
- (3) Adjust the potentiometer W502 to make sure the display on amperometer is 4mA.

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 LWGY-B, LWGY-C, and LWGY-C1; Local Display

Note: all menus are present in all signal converter versions, but some parameter settings are ONLY valid for specified models.

6.3.1 Display and Keys



- ① Flow Rate
- ② Total Flow

③ Keys (See table below for function and representation in text) ④

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				

6.3.2 Parameters Set

Press “Enter” two times at measuring mode, it leads to Password Menu “- - - -”.

- (1) Input correct password and press “Enter” can start parameter setting.
- (2) Press “Enter” again and no password is input can ONLY view all parameters

The total menus in “Parameters Set” are 16, and users can access and modify these menus depending on the input password grade. See table below for more information on password grade.

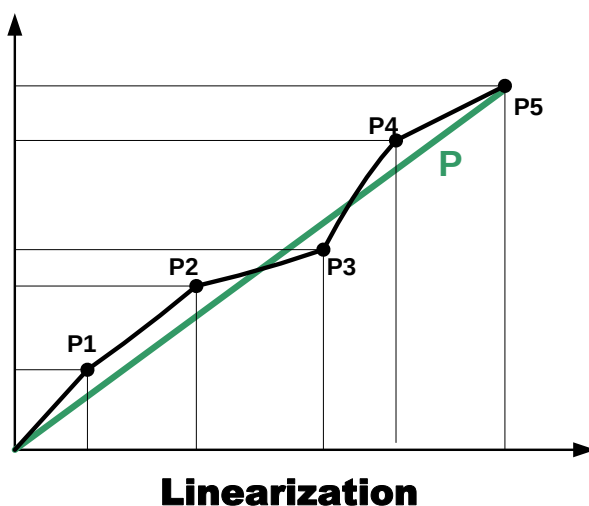
Table. Description of Password Grade

Password Grade	Password	Login Privileges
Grade 1	No Password Requirement	Read Only
Grade 2	1234	Read and Edit
Grade 3	5678	Save all data as factory defaults
Grade 4	1111	Reload factory defaults

Note: parameter setting can be ONLY performed by authorized engineer, as parameter change can affect the accuracy of the flowmeter.

Specific Menu – Parameters Set

Menu	Parameter Name	Setting Method	Grades	Range
F---01	Flow Rate Unit	Select Parameter	Factory ONLY	1; 2; 3
F---02	Scaled Pulse Output In Liters	Select Parameter	User	1: 1 Liter/Pulse 10: 10 Liter/Pulse 100: 100 Liter/Pulse
F---03	Damping Time	Input Value	User	Unit: Second Value: 1-10
F---04	Maximum Flow Rate	Input Value	User	Unit: same as Flow Rate
F---05	Minimum Flow Rate	Input Value	User	Unit: same as Flow Rate
F---06	Maximum Frequency Output	Input Value	User	0-3000 Hz Accuracy: 0.1Hz
F---07	Baud Rate	Select Parameter	User	1200; 2400; 4800; 9600; 19200 Data Format: n; 8; 1
F---08	Device Address	Input Value	User	01-247
F---09	Frequency Output Mode	Select Parameter	User	1; 2
F---10	Total Flow Reset	Input Value	User	Reset the new value and press "Enter" to confirm the change promptly.
P1	Linearization of the Flowcurve: point 1	Input Value	Factory ONLY	First Row: Frequency (P1) Second Row: K-Factor (P1)
P2	Linearization of the Flowcurve: point 2	Input Value	Factory ONLY	First Row: Frequency (P2) Second Row: K-Factor (P2)
P3	Linearization of the Flowcurve: point 3	Input Value	Factory ONLY	First Row: Frequency (P3) Second Row: K-Factor (P3)
P4	Linearization of the Flowcurve: point 4	Input Value	Factory ONLY	First Row: Frequency (P4) Second Row: K-Factor (P4)
P5	Linearization of the Flowcurve: point 5	Input Value	Factory ONLY	First Row: Frequency (P5) Second Row: K-Factor (P5)
P	Average	Input Value	Factory ONLY	First Row: Frequency (P) Second Row: K-Factor (P)



6.3.3 Parameter Function Table

No.	Function	Settings / descriptions
F---01	Flow Rate Unit	Selectable: 1, 2, 3 1: m3; 2: Liter; 3. Factory Reserved Consult the factory first to change the unit, as the K-factor should also be changed.
F---02	Scaled Pulse Output In Liters	Selectable: 1, 10, 100 1: 1 liter/Pulse; 10: 10 Liters/Pulse; 100: 100 Liters/Pulse Only valid for model supporting Pulse Output; and Position 3 of DIP Switch is ON, others two are OFF.
F---03	Damping Time	Value: 1-10 second; Recommended Value: 4 Second
Flow Range		
F---04	Maximum Flow Rate	Unit: same as Flow Rate
F---05	Minimum Flow Rate	Unit: same as Flow Rate
Frequency Output		
F---06	Maximum Frequency Output	Value: 0-3000 Hz Accuracy: 0.1Hz
RS485 Communication		
F---07	Baud Rate	Selectable: 1200; 2400; 4800; 9600; 19200 (Unit: Hz)
		Default Data Format: 9600, n, 8, 1
F---08	Device Address	Value: 01-247
F---09	Frequency Output Mode	Selectable: 1, 2
		1: Original Pulse Output without linearization
		2: Corrected Pulse Output after linearization
Reset Total Flow		
F---10	Total Flow Reset	Reset the new value and press “Enter” to confirm the change promptly.
Linearization		
P1	Linearization of the Flowcurve: point 1	First Row: Frequency (P1) Second Row: K-Factor (P1)
P2	Linearization of the Flowcurve: point 2	First Row: Frequency (P2) Second Row: K-Factor (P2)
P3	Linearization of the Flowcurve: point 3	First Row: Frequency (P3) Second Row: K-Factor (P3)
P4	Linearization of the Flowcurve: point 4	First Row: Frequency (P4) Second Row: K-Factor (P4)
P5	Linearization of the Flowcurve: point 5	First Row: Frequency (P5) Second Row: K-Factor (P5)
P	Average K-Factor	First Row: Frequency (P) Second Row: K-Factor (P)

6.4 LWGY-H

6.4.1 Display and Keys

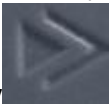


- ① Flow Rate
- ② Sensor K-Factor
- ③ Frequency
- ④ Keys (See table below for function and representation in text)

Key	Measuring mode	Menu mode	Sub-menu or function mode	Parameter and data mode
		Return to measuring mode but prompt whether the data should be saved	Return to measuring mode but prompt whether the data should be saved	Press 2 time and save the data
	-	Select main menu	Select sub-menu or function	Use cursor highlighted to change number, unit, setting
	-	Select main menu	Select sub-menu or function	Use cursor highlighted to change number, unit, setting
	Enter the parameter setting mode	advance to next sub-menu	Advance to next menu	For numerical values, move cursor one position to the right or left

6.4.2 Parameters Set

1. Long press key  for 5 seconds, LCD displays total flow, then long press key  reach to lock screens if need.

2. When power on, firstly press key  and enter the parameter setting mode. In “Parameter set” there are five main menus, when enter first menu “Basic”, do not input password, but enter the second menu “System”, should input ones, the same for the fifth main menu “Detail”.

Note: parameter setting can be ONLY performed by authorized engineer, as parameter change can affect the accuracy of the flowmeter.

Specific Menu – Parameters Set

Main menu	Sub-menu		Setting Method	Grades	Range
Basic	PV Units		Select Parameter	Factory Only	m3/h Other options
	PV Decimal		Select Parameter	User	1; 2; 3
	Total Units		Select Parameter	Factory Only	L, m3, Gal
	Total Decimal		Select Parameter	User	1; 2; 3
	Damping time(s)		Input value	User	Unit: Second Value: 0.1-99.9
System	New password		Input value	User	xxxx
	Language		Select Parameter	User	English; Chinese
	Signal	Qmax (m3/h)	Input value	User	Unit: same as Flow Rate
		Low Cutoff (%)	Input value	User	Unit: %
	Pulse output	Freq Max (Hz)	Input value	User	Unit: Hz
		Liter/Pulse	Input value	User	Unit: Liter/Pulse
		Pulse Width (ms)	Input value	User	Unit: ms
		Pulse Level	Select Parameter	User	Active L; Active H
	HART Address		Input value	Factory Only	00-15
	Total Set		Select Parameter	User	NO; Yes
			Input value	User	Unit:m3
	Load settings		Select Parameter	User	NO; Yes
Calibration	4mA Trim		Input value	User	

		20mA Trim	Input value	User	
Test		Loop test	Input value	User	
		Pulse test	Input value	User	
Detail		New password	Input value	User	XXXX
		Sensor K	Input value	Factory Only	
		Freq Direct	Select Parameter	User	NO; Yes
	Revise	Linearization of the Flowcurve: point 1	Input Value	Factory ONLY	First Row: Frequency (P1) Second Row: K-Factor (P1)
		Linearization of the Flowcurve: point 2	Input Value	Factory ONLY	First Row: Frequency (P2) Second Row: K-Factor (P2)
		Linearization of the Flowcurve: point 3	Input Value	Factory ONLY	First Row: Frequency (P3) Second Row: K-Factor (P3)
		Linearization of the Flowcurve: point 4	Input Value	Factory ONLY	First Row: Frequency (P4) Second Row: K-Factor (P4)
		Save Settings	Select Parameter	Factory Only	NO; Yes

6.4.3 Parameter Function Table

Parameter Function Table			
Main Menu	Submenu	Settings and description	
Basic	PV Units	Selectable:L/s,L/m,L/h,m3/s,m3/m,m3/h,gal/s,gal/m,gal/h Default: m3/h	
	PV Decimal	Selectable: 1, 2, 3 Default: 3 Instantaneous flow of decimal digits	
	Total Units	Selectable: L, m3, Gal Default: m3	
	Total Decimal	Selectable: 1, 2, 3 Default: 3 Cumulative flow of decimal digits	
	Damping time(s)	Floating point: 99.9-0.1 Default: 1.0	
System	New Password	Selectable range: 0000 - 9999 Default: 0200	
	Language	Selectable: Chinese, English Default: English	
	Signal	Qmax (m3/h)	Maximum Flow Rate
		Low Cutoff (%)	Floating Point: 9.9-0.0 Default: 1.0
	Pulse output	Freq Max (Hz)	Floating Point: 5000.0-100.0 Default: 2000.0
		Liter/Pulse	Floating Point: xxx-0.0 Default: 0.0
		Pulse Width (ms)	Floating Point: 1000.0-0.0 Default: 0.0
		Pulse Level	Selectable: Active L, Active H Default: Active L
	HART Address	Selectable: 00-15 Default: 00	
	Total Set	Clear Total	Selectable: No, Yes Default: No
		FWD Preset(m3)	Floating Point: 9999999999.0-0 Default: 0
	Load settings	Selectable: No, Yes Default: No When set Yes, all data restore the factory parameter settings and realize initialization	
Calibration	4mA Trim	Floating Point: 5.0-3.0 Default: 0.0	
	20mA Trim	Floating Point:21.0-19.0 Default: 0.0	
Test	Loop test	Floating Point: 20.0-4.0 Default: 12.0	

	Pulse test	Floating Point: 5000.0-1.0 Default: 1000.0	
Detail	New password	Selectable range: 0000 - 9999 Default: 1111	
	Sensor K	Floating Point: 999999999.0-0.1 Default: 100000.0	
	Freq Direct	Selectable: No, Yes Default: No	
	Revise	Linearization of the Flowcurve: point 1	First Row: Frequency (P1) Second Row: K-Factor (P1)
		Linearization of the Flowcurve: point 2	First Row: Frequency (P2) Second Row: K-Factor (P2)
		Linearization of the Flowcurve: point 3	First Row: Frequency (P3) Second Row: K-Factor (P3)
		Linearization of the Flowcurve: point 4	First Row: Frequency (P4) Second Row: K-Factor (P4)
	Save Settings	Selectable: No, Yes Default: No When set Yes, the factory settings been saved as a copy in system, when transmitter got damage due to any reasons, we could use this copy to restore damaged ones and reach to original settings.	

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. Turbine Flowmeter installed backwards	Install the flowmeter in accordance with the process flow direction
	4. Turbine flowmeter rotor installed backwards	Install the flowmeter rotor in accordance with the process flow direction
	5. 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	1. Caused by trapped air in the process line	Install an air eliminator upstream of turbine flowmeter.
	2. K-factor is too low in electronic/readout device	Verify K-factor used. K-factor should be increased.
Flow rate indication is unstable	1. Battery Power Type: Bad contact on the connector between battery and PCB	Open back cover and repower the flow meter
	2. DC Power Type: supply voltage is abnormal	Check and ensure power supply is 24V DC