



Electromagnetic Flow Meter

Owner's Manual –Software

**Series Model: L-mag511B, 521B, W800L, W800W,
211B, 221B, W800F**



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1. Device Description

Magnetic flowmeters are designed exclusively to measure the flow and conductivity of electrically conductive, liquid media.

Your measuring device is supplied ready for operation. The factory settings for the operating data have been made in accordance with your order specifications.

The following versions are available:

- Compact version (the signal converter is mounted directly on the measuring sensor)

Part Number	Power Supply
511B	110-240 Vac
521B	18-36V DC
W800L	Battery
W800W	Battery

- Remote version (electrical connection to the measuring sensor via field current and signal cable)

Part Number	Power Supply
211B	110-240 Vac
221B	18-36V DC
W800F	Battery

2. Electrical Connection

2.1 Safety Instruction



DANGER!

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!



DANGER!

Observe the national regulations for electrical installations!

WARNING!
Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

INFORMATION!
Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

2.2 Important notes on electrical connection

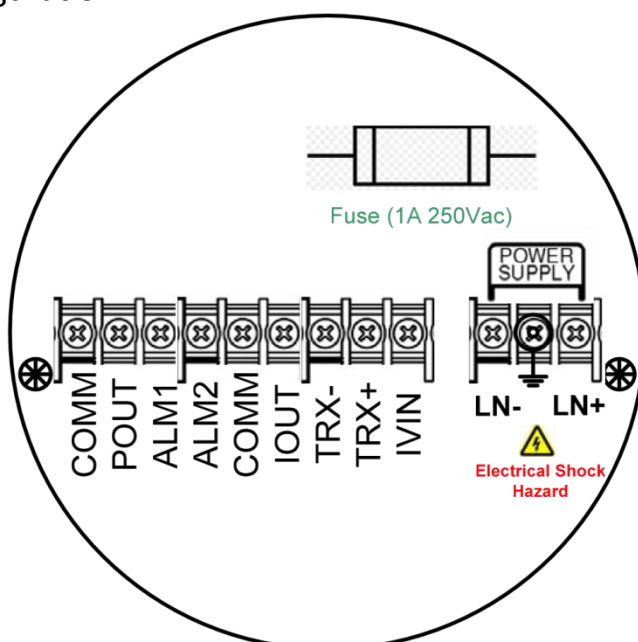
CAUTION!

- Use suitable cable entries for the various electrical cables.
- The sensor and converter are configured together in the factory. For this reason, please connect the devices in pairs. Ensure that the sensor constant GK are identically set.

2.3 Electrical Wiring

2.3.1 Electrical wiring for compact housing

Terminal Configuration



Terminal Wiring

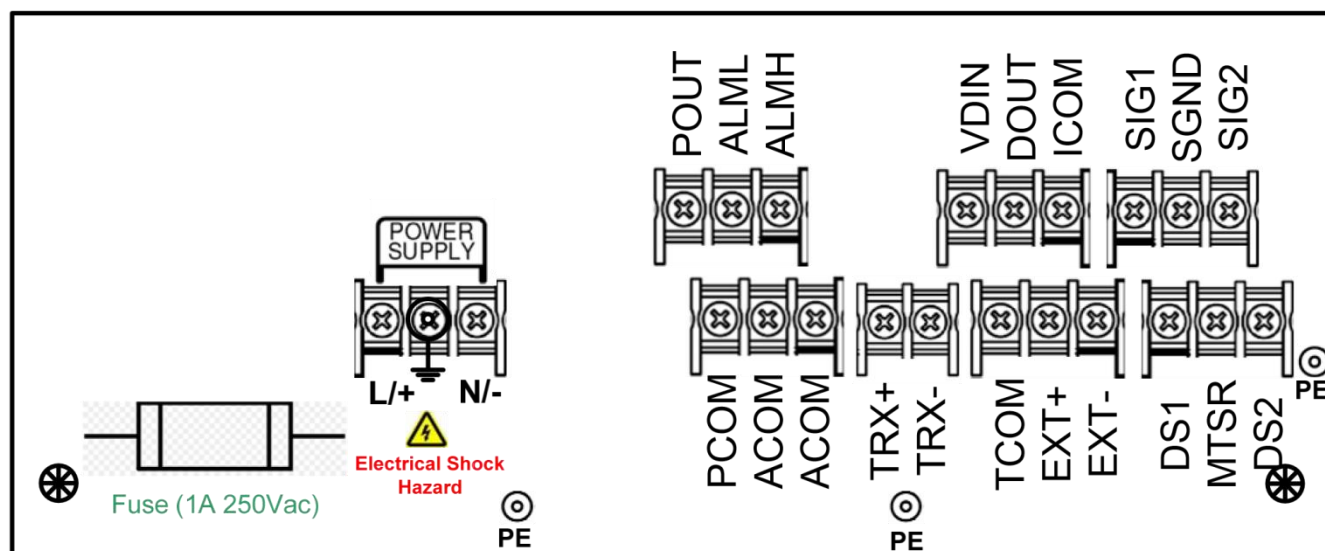
POUT	Frequency(Pulse) Output for Bi-directional Flow
ALM1	Alarm Output for Upper Limit
ALM2	Alarm Output for Low Limit

COMM	Frequency, Pulse and Current Common (GND)
COMM	Frequency, Pulse and Current Common (GND)
IOUT	Current Output of Flux (Two Routes Out)
IVIN	Two Routes 24V Power Supply
TRX+	+Communication Signal Input
TRX-	-Communication Signal Input
LN+	L: Live Wire of 110-240Vac; +: 24V DC +
LN-	N: Naught Wire of 110-240Vac; - : 24V DC -

Note: don't connect 110-240Vac Power on 521B converter which is DC Power Supply Type.

2.3.2 Electrical wiring for Remote housing

Terminal Configuration



Terminal Wiring

Pulse Output	POUT	Frequency(Pulse) Output for Bi-directional Flow
	PCOM	Pulse Output Ground
Alarm Output	ALMH	Alarm Output for Upper Limit
	ACOM	Alarm Output Ground
Alarm Output	ALML	Alarm Output for Low Limit
	ACOM	Alarm Output Ground
RS485 (Function Optional)	TRX+	Communication RS485+
	TRX-	Communication RS485-
	VDIN	24V Pull Power Supply
Analog Current Output	IOUT	Analog Current Output
	ICOM	Analog Current Output Ground
Power Supply	L / +	L: Live Wire of 110-240Vac; +: 24V DC +
	N / -	N: Naught Wire of 110-240Vac; - : 24V DC -

Signal from Sensor	SIG1	Signal 1
	SGND	Signal Ground
	SIG2	Signal 2
	TCOM	
	EXT+	Exciting Current+
	EXT-	Exciting Current-
	DS1	Shielded Exciting1
	MTSR	
	DS2	Shielded Exciting2

Note: don't connect 110-240Vac Power on 221B converter which is DC Power Supply Type.

2.4 Description of outputs

2.4.1 Digital Frequency Output

Frequency Output Range 1 to 5000 Hz

Output Electric isolate Photoelectric isolate > 1000V

Field-effect transistors Output Frequency

Output Capacity Maximum Voltage: 36V DC

	Maximum Current: 250 mA
2.4.2 Digital Pulse Output	
Pulse Output Range	1 to 100 Pulse/s
Pulse Output Value	0.001-1.000 m ³ /cp; 0.001-1.000 Liter/cp
Pulse Output Capacity	Field-effect transistors
2.4.3 Alarm output	Output Maximum Voltage: 36V DC Maximum Current: 250 mA
Alarm Output Junction	ALMH: Upper Limit; ALML: Lower Limit
Alarm Output Capacity	Field-effect transistors Output Maximum Voltage: 36V DC Maximum Current: 250 mA

2.5 Connection diagrams of outputs

2.5.1 Current output

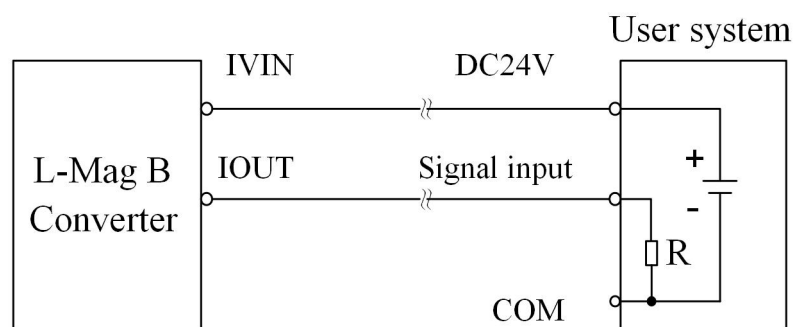


Fig.4.6 (a) L_Mag 511 two

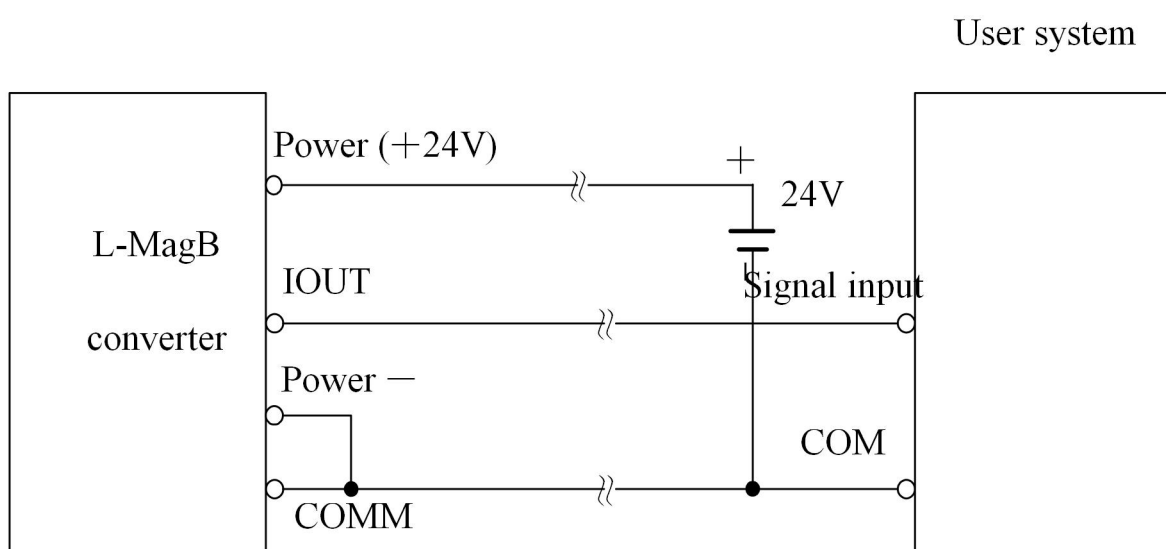


Fig.4.6 (b) L_Mag 511 three connection (power supply and current output are not insulated)

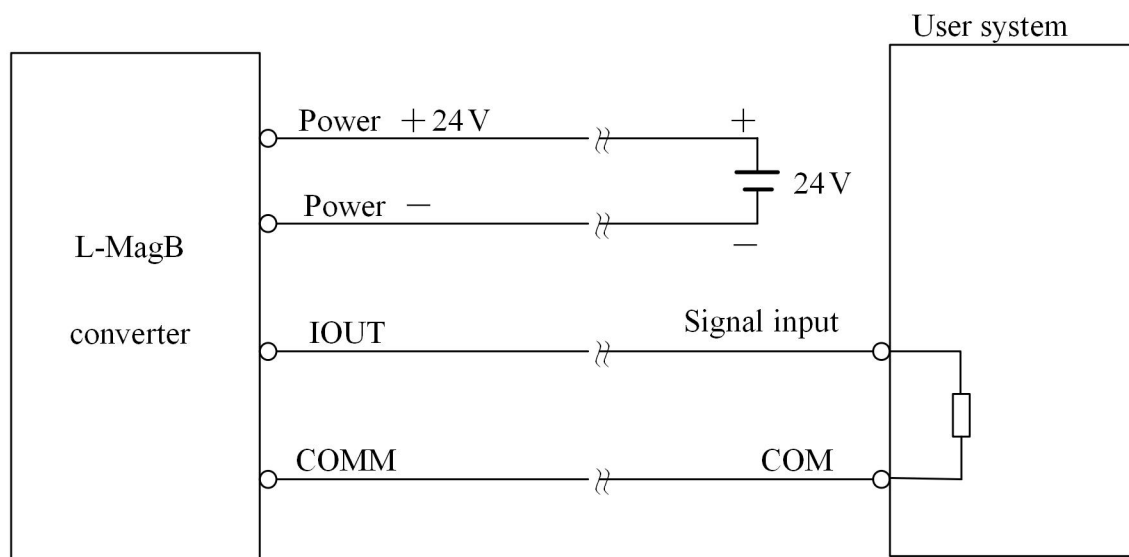
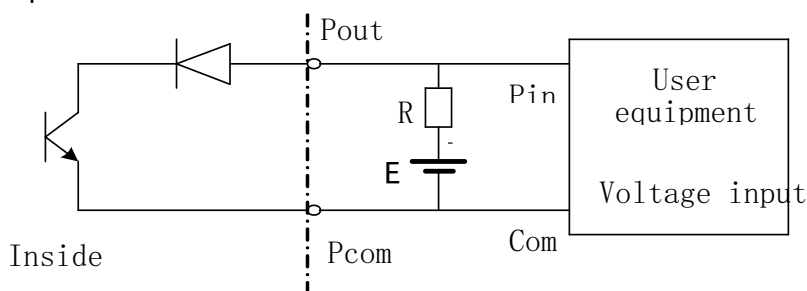


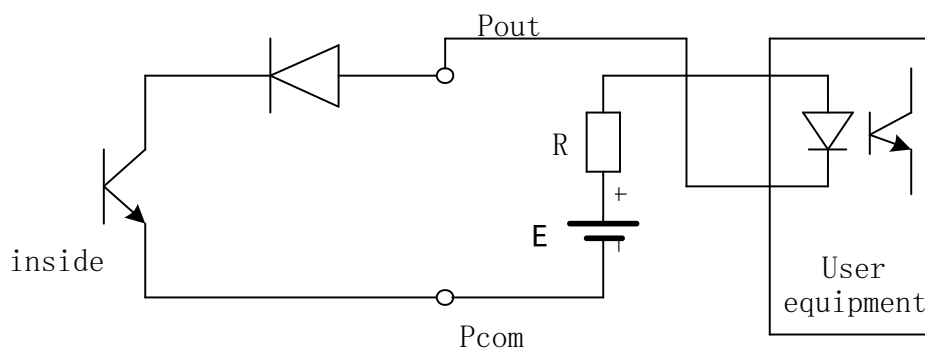
Fig.4.6 (c) L_Mag 511 four connection(power supply and current output are

2.5.2 Digital Voltage Output



The connection of digital voltage output

2.5.3 Digital Output to Photoelectricity Coupling



Digital output to photoelectricity coupling

Generally, photoelectricity coupling current is about 10mA. When $E/R=10\text{mA}$,
 $E=5\sim 24\text{V}$.

2.5.4 Digital Output to Relay

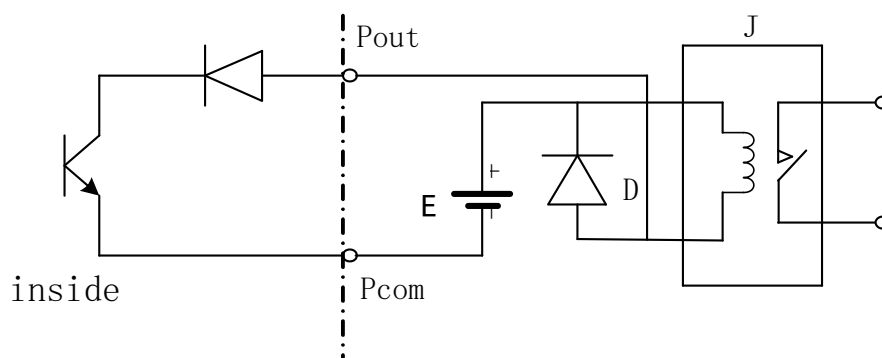


Fig.4.5(c) Digital output to relay control

Generally, E (Voltage) of the relay is 12V or 24V; D is extended diode, most middle relays have this diode inside. If not, user should connect one outside.

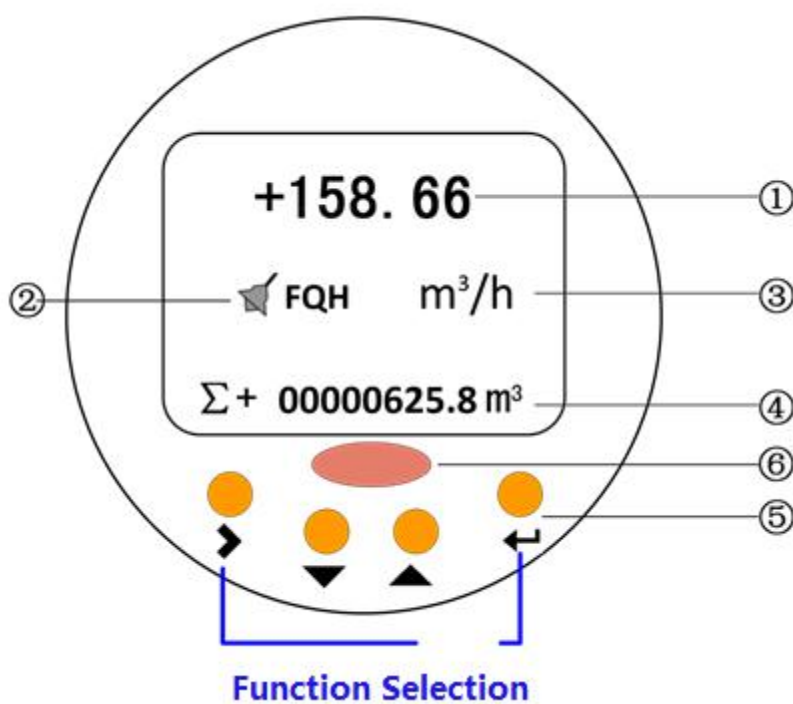
Table of digital output parameter: POUT

Parameter	Test Condition	Mini	Typical	Max	Unit
Voltage	IC=100 mA	3	24	36	V
Current	Vol≤1.4V	0	300	350	mA
Frequency	IC=100 mA Vcc=24V	0	5000	7500	HZ
High voltage	IC=100 mA	Vcc	Vcc	Vcc	V
Low Voltage	IC=100 mA	0.9	1.0	1.4	V

3. Operation and Setup

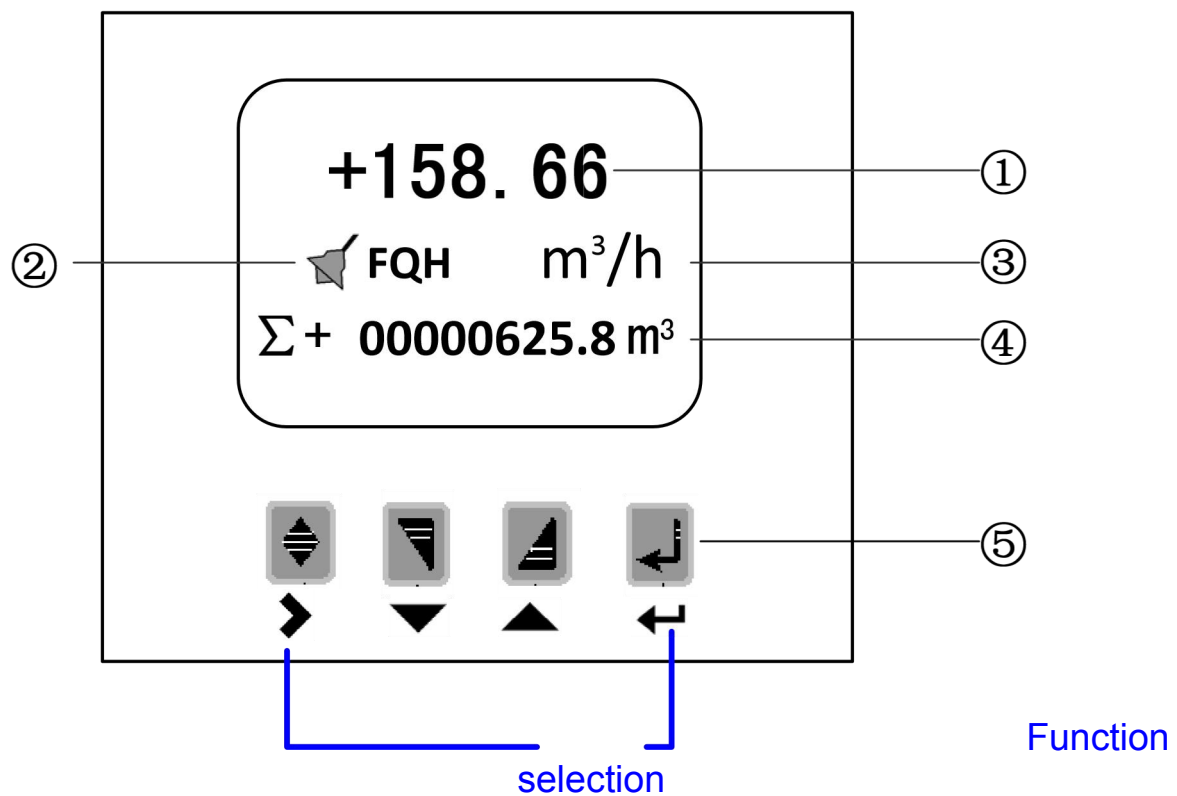
3.1 Description of Menu

3.1.1 Compact Type



- ① Flow Rate
- ② Alarm symbol and Message: FQH; FQL; FGP; SYS
- ③ Flow Rate Unit
- ④ Flow Velocity; Percentage; Positive, Negative or Net Total (Switchable)
- ⑤ Keys (See table below for function and representation in text)
- ⑥ Infrared sensor (not present in all signal converter versions)

3.1.2 Remote Type

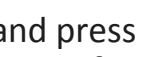


- ① Flow Rate
- ② Alarm symbol and Message: FQH; FQL; FGP; SYS
- ③ Flow Rate Unit
- ④ Flow Velocity; Percentage; Positive, Negative or Net Total (Switchable)
- ⑤ Keys (See table below for function and representation in text)

Key	Measuring mode	Menu mode	Sub-menu or function mode	Parameter and data mode
	Function selection (1) Parameters Set (2) Clr Total Rec: Reset Totaliser (3) Fact Modif Rec: check the modification record on factor	-	-	-
 (Enter Key)	Enter the function selection	Return to measuring mode but prompt whether the data should be saved	Press 1 time, return to menu mode, data saved	Return to sub-menu or function, data saved
At any modes, press and hold for 3 seconds to return the measuring mode				
↓ or ↑ 	Switch between display pages: Flow velocity, Percentage, Positive Total, Negative Total, Net Total	Select menu	Select sub-menu or function	Use cursor highlighted to change number, unit, setting and to move the decimal point
 Or 	Adjust LCD Contrast	-	-	For numerical values, move cursor one position to the right or left
It returns to the measuring mode automatically after 3 minutes without any action under parameter setting mode.				

3.2 Function Selection Menu

At measuring mode, press  can lead to function selection menu including three sub-menu.

Key (Measuring mode)	Function selection	Description
	(1) Parameters Set	Choose this menu and one page with password protect can be displayed. Input the correct password and press  to enter the parameters set.
	(2) Clr Total Rec	Choose this menu and one page with password protect can be  displayed. Input the correct password and press  to perform the total flow reset. <i>Note: factory default password is "10000"; change this password when get the flowmeter to avoid unintended reset on total flow.</i>
	(3) Fact Modif Rec	Track the modification record on factor

3.3 Parameters Set

Press , it leads to function selection menu and the first menu is "Parameters Set", press  to confirm the enter "Parameters Set". Input ct password, and press .

The total menus in "Parameters Set" are 54, 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	Mean Access
Grade 1	00521	Read Only	Menu 1 to 54
Grade 2	03210	Read and Edit	Read: Menu 1 to 54 Edit: Menu 1 to 24
Grade 3	06108	Read and Edit	Read: Menu 1 to 54 Edit: Menu 1 to 25
Grade 4	07206	Read and Edit	Read: Menu 1 to 54 Edit: Menu 1 to 38
Grade 5	Please consult U-ideal Instrument	Read and Edit	Read: Menu 1 to 54 Edit: Menu 1 to 52

Specific Menu – Parameters Set

Menu	Parameter Name	Setting Method	Grades	Range
M1	Language	Select Parameter	2	English
M2	Comm Addres	Input Value	2	0~99
M3	Baud Rate	Select Parameter	2	600~14400
M4	Snsr Size	Select Parameter	2	3~3000
M5	Flow Unit	Select Parameter	2	L/h, L/m, L/s, m3/h, m3/m,m3/s
M6	Flow Range	Input Value	2	0~99999
M7	Flow Rspns	Select Parameter	2	1~50
M8	Flow Direct	Select Parameter	2	Plus/ Reverse
M9	Flow Zero	Input Value	2	0~±9999
M10	Flow Cutoff	Input Value	2	0~599.99%
M11	Cutoff Ena	Select Parameter	2	Enable/Disable
M12	Total Unit	Select Parameter	2	0.001m3~1m3, 0.001L~1L
M13	SegmaN Ena	Select Parameter	2	Enable/Disable
M14	Analog Type	Select Parameter	2	0~10mA /4~20mA
M15	Pulse Type	Select Parameter	2	Freque / Pulse
M16	Pulse Fact	Select Parameter	2	0.001m3~1m3, 0.001L~1L,
M17	Freque Max	Select Parameter	2	1~ 5999 HZ
M18	Mtsnsr Ena	Select Parameter	2	Enable/Disable
M19	Mtsnsr Trip	Input Value	2	59999 %
M20	Alm Hi Ena	Select Parameter	2	Enable/Disable
M21	Alm Hi Val	Input Value	2	000.0~ 599.99 %
M22	Alm Lo Ena	Select Parameter	2	Enable/Disable
M23	Alm Lo Val	Input Value	2	000.0-599.99 %
M24	Sys Alm Ena	Select Parameter	2	Enable/Disable

Menu	Parameter Name	Setting Method	Grades	Range
M25	Clr Sum Key	Input Value	3	0-99999
M26	Snsr Code1	User set	4	Finished Y M
M27	Snsr Code2	User set	4	Product number
M28	Field Type	Select Parameter	4	Type1,2,3
M29	Sensor Fact	Input Value	4	0.0000-5.9999
M30	Line CRC Ena	Select Parameter	4	Enable/Disable
M31	Lineary CRC1	User set	4	Set Velocity
M32	Lineary Fact 1	User set	4	0.0000-1.9999
M33	Lineary CRC2	User set	4	Set Velocity
M34	Lineary Fact 2	User set	4	0.0000-1.9999
M35	Lineary CRC3	User set	4	Set Velocity
M36	Lineary Fact 3	User set	4	0.0000-1.9999
M37	Lineary CRC4	User set	4	Set Velocity

M38	Lineary Fact4	User set	4	0.0000-1.9999
M39	FwdTotal Lo	Correctable	5	00000-99999
M40	FwdTotal Hi	Correctable	5	00000-9999
M41	RevTotal Lo	Correctable	5	00000-99999
M42	RevTotal Hi	Correctable	5	00000-9999
M43	PlsntLmtEna	Select Parameter	5	Enable/Disable
M44	PlsntLmtVal	Select Parameter	5	0.010-0.800m/s
M45	Plsnt Delay	Select Parameter	5	400-2500ms
M46	Pass Word 1	User correct	5	00000-99999
M47	Pass Word 2	User correct	5	00000-99999
M48	Pass Word 3	User correct	5	00000-99999
M49	Pass Word 4	User correct	5	00000-99999
M50	Analog Zero	Input Value	5	0.0000-1.9999
M51	Anlg Range	Input Value	5	0.0000-3.9999
M52	Meter Fact	Input Value	5	0.0000-5.9999
M53	MeterCode 1	Factory set	6	Production Date: Y /M
M54	MeterCode 2	Factory set	6	Product Serial No

3.4 Parameter Function Table

No.	Function	Settings / descriptions
Language		
M1	language	English/Chinese Language selection depends on the device version.
RS485 Communication		
M2	Comm Address	Value: integer 01 to 99 Device Address for RS485 (Not Present in all converter)
M3	Baud Rate	Selectable: 600, 1200, 2400, 4800, 9600, 19200 Baud Rate for RS485 Not Present in all converter)
Sensor Diameter		
M4	Snsr Size	Select the sensor size (See the nameplate)
Flow Parameter: Unit, Range, Response Time, Direction, Zero Calibration, Small Flow Cutoff		
M5	Flow Unit	Selectable: L/h (liter/hour), L/m (liter/minute), L/s (liter/second) M3/h (cubic meter/hour), m3/m (cubic meter/min), m3/s (cubic meter/second)
M6	Flow range	Value: 0-99999 (This parameter represents the Max. Flow Rate of flowmeter) Change this value will affect other parameter (M10) and current output value.
M7	Flow Rspns	Damping time / Time constant, default value: 3 second Set large value can enhance the stability of flow display and output digital, which is suitable for accumulative total from pulse output; the small value means fast respond rate, which is suitable for production control.

M8	Flow Direct	Selectable: Plus/Reverse
		Define polarity of flow direction. Plus/Forwards (according to the arrow on the measuring sensor) or Reverse/Backwards (in the opposite direction to the arrow)
M9	Flow Zero	Zero Calibration
		First row - small words: FS – new zero calibration value Second row - large words: zero point correction value To ensure the flowmeter's accuracy, FS should be 0. Change the value at second row to make sure FS is 0. Note: ONLY perform "Flow Zero" when the pipe is full filled static fluid.
M10	Flow Cutoff	Sets output value of all outputs to "0": (Low flow cutoff)
		For example: Flow Cutoff value = 20% Then the Min. Flow rate = 20% of Max. Flow rate (the value in M6) Note: this function is ONLY effective if M11 (SegmaN Ena) is Enable.
M11	Cutoff Ena	Selectable: Enable / Disable The switch on M10 (Flow Cutoff).
M12	Total Unit	Selectable: 0.001 m ³ , 0.01 m ³ , 0.1 m ³ , 1 m ³ 0.001 L, 0.01 L, 0.1L, 1L 9 Digitals, this parameter can control the resolution for accumulative flow.

No.	Function	Settings / descriptions
Outputs:		
M13	SegmaN Ena	The switch to control outputs of Reverse Flow: current or pulse output.
		The output function is ONLY effective for reverse flow if M13 is Enable. For example, M13="Disable", then there is still no output even though there is reverse flow rate in pipe. <i>Note: this switch can't control output of Plus Flow Rate.</i>
M14	Analog Type	Selectable: 4-20mA / 0-10mA
		Select the correct current output mode base on user's application.
M15	Pulse Type	Selectable: Freque (Frequency) / Pulse Freque: Frequency Output Pulse: Scaled Pulse Output
M16	Pulse Fact	Selectable: 0.001L, 0.01L, 0.1L, 1L; 0.001 m ³ , 0.01 m ³ , 0.1 m ³ , 1 m ³
		The scaled pulse output value for each pulse, ONLY effective if M15 is selected as "Pulse". For example, M16="0.1L", it means each pulse is 0.1L Max. Pulse Output: 100 Pulses/Second.
M17	Freque Max	Value: 1-5000Hz. Max. Frequency is corresponding to M6 (Flow range).
Alarms:		

M18	Mtsnsr Ena	Selectable: Enable / Disable Empty Pipe Detect is ONLY valid if M18 (Mtsnsr Ena) = Enable.
M19	Mtsnsr Trip	First row: measured conductivity value (V1) Second row: the value (V2) which can trigger the Empty Pipe Alarm. Generally, set V2 as three to five times of V1. Flow indication, pulse output and current output “=0” when pipe empty Note: perform this parameter set when the pipe is full filled with fluid.
M20	Alm Hi Ena	Selectable: Enable / Disable Upper Flow Limit Alarm is ONLY valid if M20 (Alm Hi ENa) = Enable
M21	Alm Hi Val	Value: 0% - 199.9% (The value to trigger the Upper Flow Limit Alarm) Upper Flow Limit Alarm is ONLY triggered when M20= Enable and Flow rate > M21*M6
M22	Alm Lo Ena	Selectable: Enable / Disable Low Flow Limit Alarm is ONLY valid if M22 (Alm Lo Ena) = Enable
M23	Alm Lo Val	Value: 0% - 199.9% (The value to trigger the Low Flow Limit Alarm) Low Flow Limit Alarm is ONLY triggered when M22= Enable and Flow rate < M10*M6
M24	Sys Alm Ena	Selectable: Enable / Disable System Exciting Alarm is ONLY valid if M24 = Enable
Reset Totalizer Password:		
M25	Clr Sum Key	The password which is used to reset the totalizer. Note: please set M25 “Clr Sum Key” first, and use this password to perform reset according to Section 3.2

No.	Function	Settings / descriptions
Sensor:		
M26	Snsr Code1	User can set sensor production date in M26 to track whether the Sensor Factor is correct
M27	Snsr Code2	Sensor Serial Number
M28	Field Type	Selectable: 1/16; 1/20; 1/25 Three types of Exciting frequency. Usually use 1/16 for small size sensor, and others two for large size sensor.
M29	Sensor Fact	Input Measuring Sensor Constant: GK User can get this factor from the calibration certificate.
Linearity Correction:		
M30	Line CRC Ena	Selectable: Enable / Disable This parameter is used to control the linearity correction function. Enable: use the linearity correction; Disable: linearity correction is not used even M31 to M38 are set.
M31	Lineary CRC1	Correction Point 1: the velocity of point 1

M32	Lineary Fact 1	Linearity Fact 1: the correction factor for point 1
M33	Lineary CRC2	Correction Point 2: the velocity of point 2
M34	Lineary Fact 2	Linearity Fact 2: the correction factor for point 12
M35	Lineary CRC3	Correction Point 3: the velocity of point 3
M36	Lineary Fact 3	Linearity Fact 3: the correction factor for point 43
M37	Lineary CRC4	Correction Point 4: the velocity of point 4
M38	Lineary Fact4	Linearity Fact 4: the correction factor for point 4
Set Value for Total Flow:		
For flowmeter maintenance or replacement, maybe the previous total flow should be set. And change M39 to M42 can accomplish this function.		
M39	FwdTotal Lo	Set Value: 00000 - 99999
		Low byte of Positive Total Flow
M40	FwdTotal Hi	Set Value: 0000 - 9999
		High byte of Positive Total Flow
M41	RevTotal Lo	Set Value: 00000 - 99999
		Low byte of Negative Total Flow
M42	RevTotal Hi	Set Value: 0000 - 9999
		High byte of Negative Total Flow
Peak Suppression Function:		
M43	PlsntLmtEna	The switch for Peak Suppression Enable: Peak Suppression ON; Disable: Peak Suppression OFF.
		For paper pulp, slurry and other serosity, "Peak Interference" can occur when the solid grain scrubs or strikes the electrodes. Peak suppression arithmetic can restrain this interference via the setting of M43, M44 and M45.
M44	PlsntLmtVal	This parameter determines the change rate of Peak Interference, based on the percent of flow velocity; ten grades: 0.010m/s (Grade 1), 0.020m/s, 0.030m/s, 0.050m/s, 0.080m/s, 0.100m/s, 0.200m/s, 0.300m/s, 0.500m/s, 0.800m/s (Grade 10) The sensitivity of Peak Suppression is highest for Grade 1.
M45	Plsnt Delay	This parameter can determine the width of time to restrain Peak Interference and the unit is ms.
		If the duration of one signal is less than the value in M45, this signal can be determined as Peak Interference and will be suppressed; otherwise it will be determined as normal signal.
Password Management:		
M46	Pass Word 1	M46 to M49 can be changed using Grade 5 Password to enter parameter setting.
M47	Pass Word 2	
M48	Pass Word 3	
M49	Pass Word 4	

Factory Use ONLY: Zero point calibration or Full scale calibration

M50	Analog Zero	Zero Point Calibration for current output to make sure the Zero point is 0 mA / 4 mA.
M51	Anlg Range	Full scale calibration for current output to make sure the Full Scale is 10mA or 20mA.
M52	Meter Fact	Factory Use ONLY.
M53	MeterCode 1	Converter Production Date
M54	MeterCode 2	Converter Serial Number

4. Infrared Interface

Note: the infrared interface is optional with extra charge.

Only available for 511B and 521B compact type converter.

4 keys for operator control of the signal converter without opening the housing. Infrared interface for reading and writing all parameters with IR interface (option) without opening the housing.

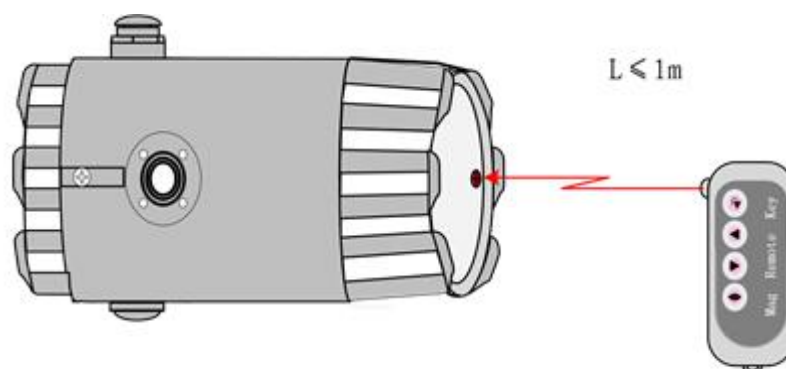


Fig4.1 Infrared Interface for operator control of the signal converter without opening the housing

5. Alarm information

Converters have self-diagnose function. This information  displays at the left of LCD. The explanations of Alarm are as below:

FQH: Upper Flow Limit Alarm

FQL: Low Flow Limit Alarm

FGP: Empty Pipe Alarm

SYS: System Exciting Alarm

6. Troubleshooting

Symptom	Probable Cause	Solution
No Display	1. No power	Apply correct power
	2. Fuse blown	Replace a fuse with same parameter
	3. Contrast of LCD is too low	Increase the contrast
Empty Pipe Alarm	1. Fluid is not full filled the pipe	Increase the flow rate
	2. Electrode was polluted	Clean the electrode if voltage of DS1 and DS2 > 1V.
	3. Fluid's conductivity is too small	If connect three terminals SIG 1, SIG 2, SIGGND. and the alarm disappears, which means the fluid's conductivity is small. Replace other kind of flowmeter
Flow rate indication is unstable	1. Grounding issue	Make sure meter is properly grounded to a good earth ground
	2. Air	Make sure fluid does not contain air bubbles
	3. Converter location – outside electrical interference	Make sure Converter is not too close to sources of electrical interference

