User Manual

Electromagnetic Flow meter_GT300-E

With Signal Converter: S400(D), R400

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Index

1. Connection and Operation of Converter:

1.1 Keys and Display

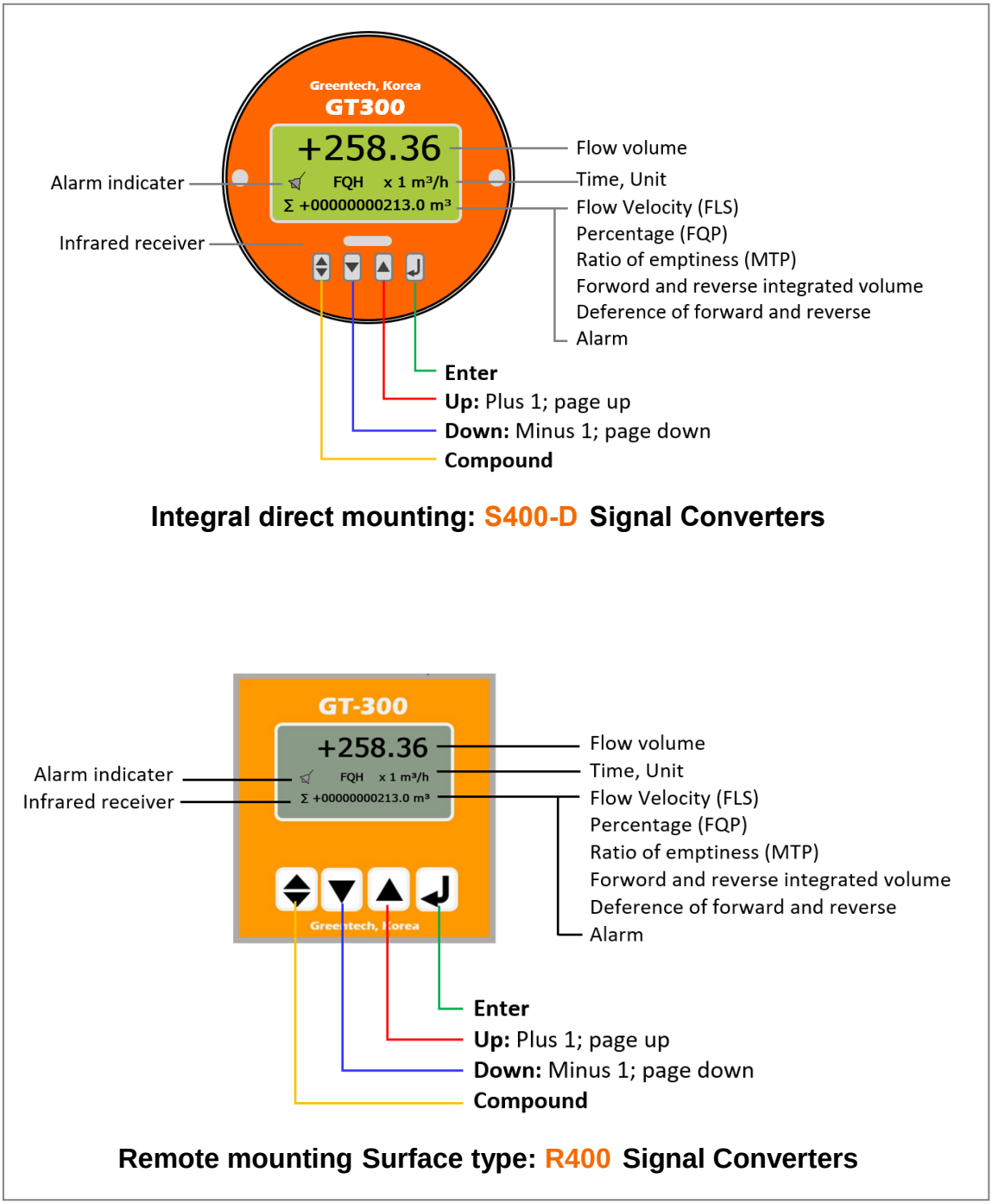


Fig. 1: Define Keys and LCD screen display

Instruction: When measuring, press "**Compound Key + Enter**" will appear password of changing state, based on distinction of secrecy, and you could change the password as we provide (initial password is **12314**). Then press "**Compound + Enter**" Key again, and you can enter the state of setting parameter.

If you want to return to the running state, push "**Enter**" for several seconds.

1.2 Connection of Converter (S400-D)

1.2.1 Symbols and Description of Connectors in Model

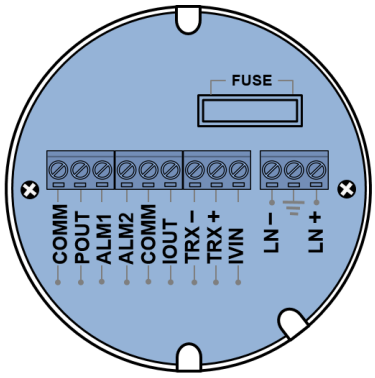


Fig. 2: Labels of connector in Model

COMM	: Frequency, Pulse and Current Common (GND)
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)
IOUT	: Current Output of Flux (Two Routes Output)
TRX-	: - Communication Signal Input (RS485-B)
TRX+	: + Communication Signal Input (RS485-A)
IVIN	: Two Routes 24V Power Supply
LN-	: 85-250VAC or DC **-** Power Supply
LN+	: 85-250VAC or DC **+** Power Supply
FUSE	: Fuse for Power Supply

Table. 1: Description of Connectors

1.2.2 Output and Power Supply Cables

All cables for signals transferring and power supply has to be prepared users. However, it should be careful to choose the cables that meet the upper limit load of consuming current.
Pulse current output, alarm current output and external power supply can be seen in Fig. 3.
When inductive load is connected to converter, diode should be used as in Fig. 3.

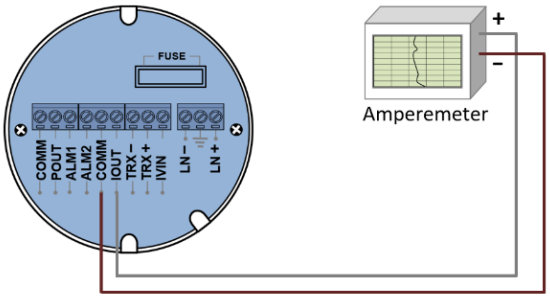


Fig. 3 (a): Output and Power Supply cable

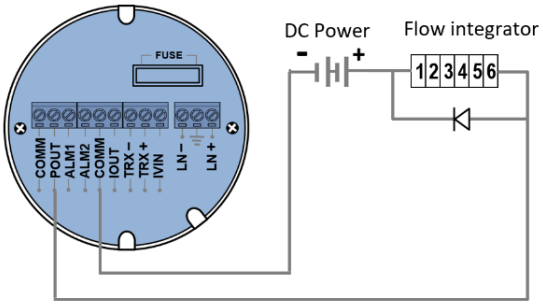


Fig. 3 (b): Connection of Electro-Magnet Counter

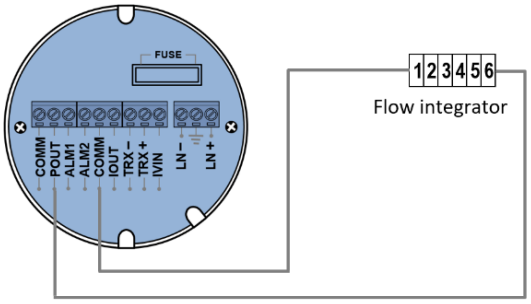


Fig. 3 (c): Connection of Electronic Counter

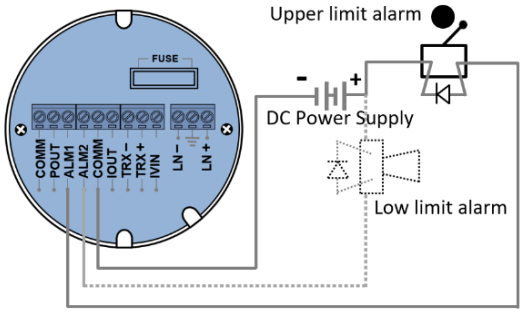


Fig. 3 (d): Connection of Alarm Output

1.3 Connection of Converter (R400)

1.3.1 Symbols and Description of Connectors in Model

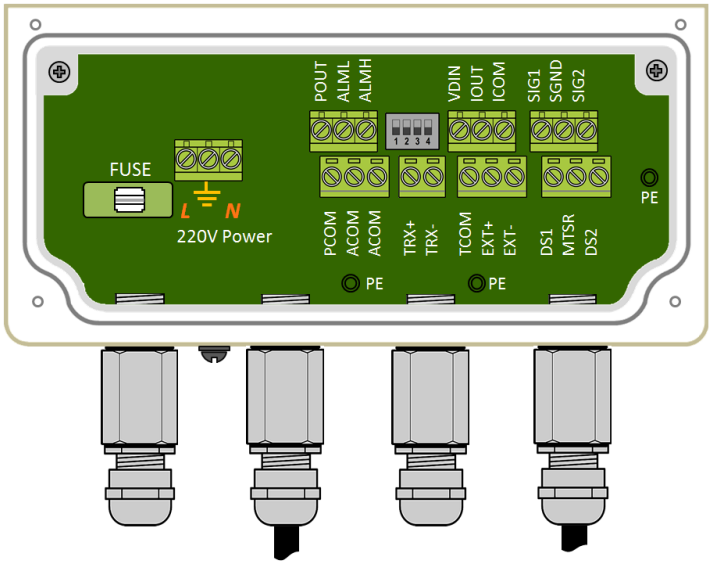


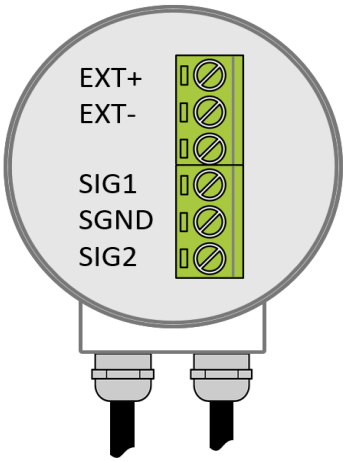
Fig. 4: Labels of connector in Model

1.3.2 Symbols and Description of Connectors in Model

SIG1	: Signal 1	To separate model sensor
SIG2	: Signal 2	
SGND	: Signal Ground	
DS1	: Shielded Exciting 1	
DS2	: Shielded Exciting 2	
EXT+	: Exciting Current +	
EXT-	: Exciting Current -	
VDIN	: 24VDC Input for 2-wire output current	Analog current output
IOUT	: Output Current (Output Current for 2-wire)	
ICOM	: Current Output Ground	
POUT	: Frequency and Pulse Output	Frequency (Pulse) output
PCOM	: Frequency and Pulse Output Ground	
ALMH	: Alarm Output for Upper Limit	Two alarm output
ALML	: Alarm Output for Low Limit	
ACOM	: Alarm Output Ground	
TRX+	: +Communication Input Signal	Communication input
TRX-	: -Communication Input Signal	
TCOM	: Communication Input Ground	
L	: 85-250VAC or DC **24VDC +** Power Supply	Power Supply
N	: 85-250VAC or DC **24VDC -** Power Supply	
FUSE	: Fuse for Power Supply	

Table. 2: Description of Connectors

1.3.3 Connection Instruction for Converter and Terminal Box



Port No.	Wire	Converter Port
1	EXT+	Field current 1
2	EXT-	Field current 2
3		
4	SIG1	Signal 1
5	SGND	Com
6	SIG2	Signal 2

Fig. 5: *Port of Converter*

1.3.4 Characteristic Cable for Connection

**** Signal Cable and Shield Current Cable**

When separated models of converters are assembled with sensors for measuring flow of fluid which conductivity is larger than 50μS/cm, PVVP 2*0.2 mm^2 model cable (metal shielded signal cable covered with PVC) can be used as communication cable for flow signals and for Field Current.
The length of signal cable should be less than 100m. Make sure the signal wire and field current wire have the same length.
The converter can output equivalent level of shielded exciting signal voltage so that interference to flow measurement signals can reduced by means of lowering the distributed capacitance of communication cable.
When measured conductivity is less than 50μS/cm or signals are transferred in remote distances, double-conductor and double-shielded signal cable at equivalent level of voltage can be used.
For example, special STT3200 cable or BTS model signal cable (triple-shielded) can be used for signal communication.
When the model STT3200 cables are used for exciting current and signals, two cables can be put together as one cable.

**** Output and power line**

All cables for signals transferring and power supply has to be prepared by users.
However, it should be careful to choose the cables that meet the upper limit load of consuming current.

Note: When DIP switch next to terminal is set to ON places, the converter from its inside can provide +28Vpower supply and up-pull 10kΩresistance to output Frequencies (PUL+, PUL-) to isolated OC gate, Alarm Output (ALM+.ALM-), and Status Control (INSW).

Therefore, when converter has frequency output and works with sensor together, DIP switch can be set as ON getting frequency signals from PUL+ and PCOM terminals.

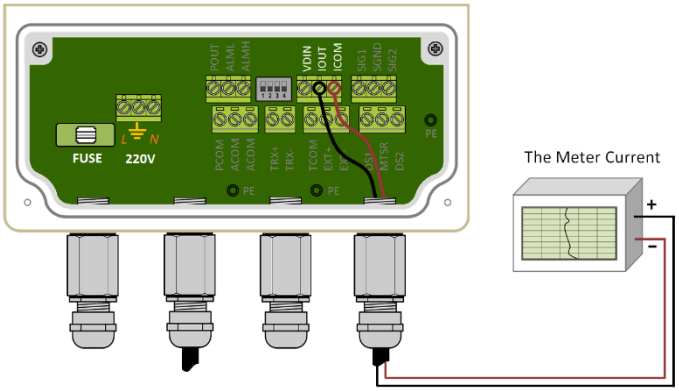


Fig. 4 (a): *Connection of Current Output*

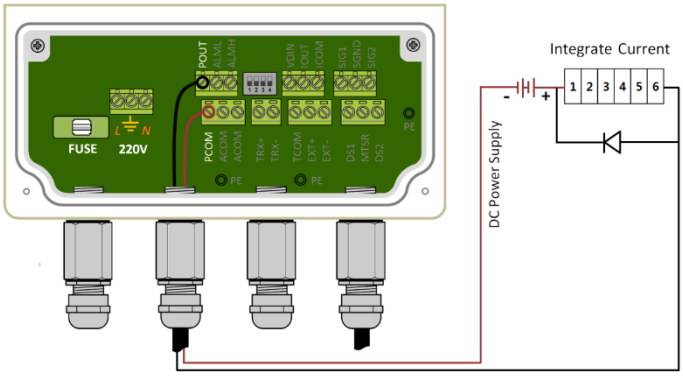


Fig. 4 (b): *Connection with Counter*

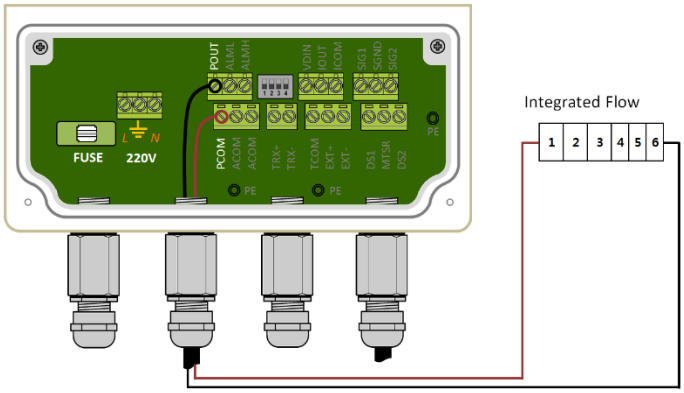


Fig. 4 (c): *Connection with Electronic Counter*

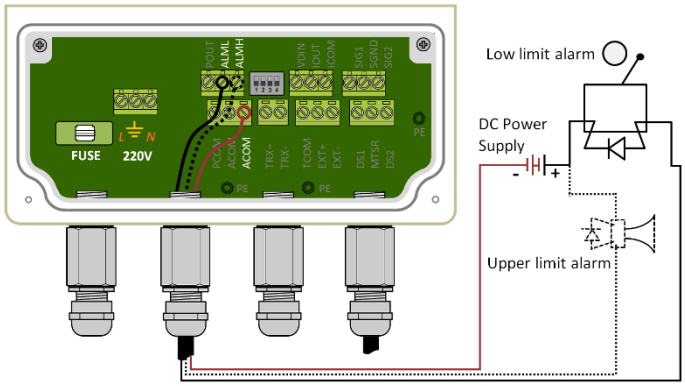


Fig. 4 (d): *Connection of Alarm Output*

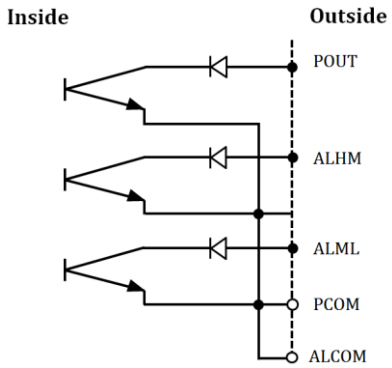


Fig.5: *Connection of OC Gate*

1.4 Digital Data Output and Count

Digital output is frequency output and pulse output. Frequency output and pulse output use the same connection output point, therefore, users can only choice one of frequency output and pulse output at the same time.

1.4.1 Frequency Output:

The range of frequency output is 0~5000Hz and frequency output opposes percent flux.

F= (Measure value / Full scale value) • the range of frequency

The up limit of frequency output can be adjusted. It can be choice from 0~5000Hz, and also can be choice low frequency: such as 0~1000Hz or 0~5000Hz.

Frequency output mode general can be used in control application, because it responses the percent flux. Users can choice pulse output when the equipment is applied to count.

1.4.2 Pulse Output Mode:

Pulse output mainly applies in count mode.
Pulse output delegates a unit flux, such as 1L or $1m^3$ etc.
Pulse output unit divide into 0.001L, 0.01L, 0.1L, 1L, $0.001m^3$, $0.01m^3$, $0.1m^3$, $1m^3$, 0.001UKG, 0.01UKG, 0.1UKG, 1UKG, 0.001USG, 0.01USG, 0.1USG, 1USG.
When users choice the pulse unit, they should notice the match of the flux range of flowmeter and pulse unit:

QL=$0.0007854\times D^2\times V$ (L/s) or **QM**=$0.0007854\times D^2\times V\times 10^{-3}$ (m^3/s)
Note: D-nozzle (mm) **V**-velocity of flow (m/s)

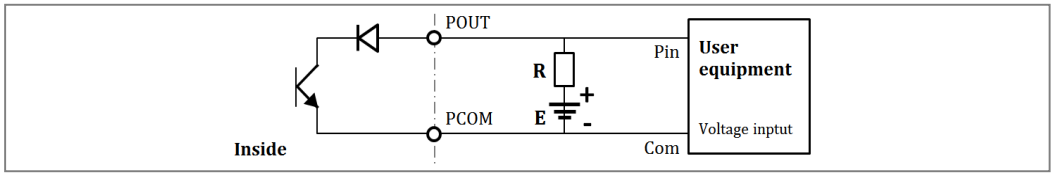
The oversize flux and too small pulse unit will be made the pulse output over the up limit.
Generally, pulse output should be controlled below 2000P/S. However, the too small flux and too large pulse unit will be made the instrument exports a pulse long time.
Otherwise, pulse output is different from frequency output.
When pulse output cumulates a pulse unit, it exports a pulse.
Therefore, pulse output is not equality. Generally, measure pulse output should choice count instrument, but not frequent instrument.

1.4.3 The Connection of Digital Output

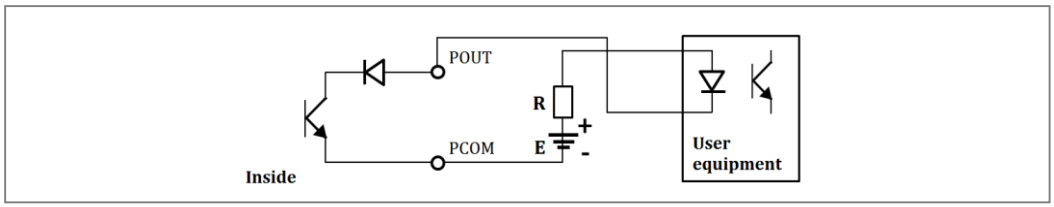
Digital output has three connected points: digital output connected point, digital ground point, and symbol as follows:

POUT ----- digital output point; **PCOM** ----- digital ground point;
POUT is collector cut-off circuit output. Connect the line diagram as follows:

1.4.4 Digital Voltage Connect Mode

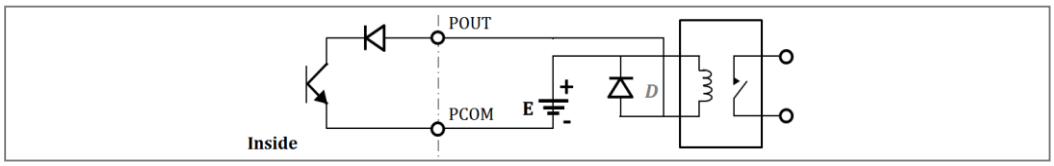


1.4.5 Digital output connect photoelectricity coupling (PLC etc.)



Commonly user's photoelectricity coupling current is about 10mA, so about E/R=10mA, E=5~24V.

1.4.6 Digital Output Connect Relay



Commonly relay needs E as 12V or 24V. D is extending diode, now most middle relays has this Diode inside. If not have, user can connect one outside.

Parameter	Testing condition	Minimum	Type	maximal	Unit
Working voltage	IC=100 mA	3	24	36	V
Working current	Vol1.4V	0	300	350	mA
Working frequency	IC=100mA Vcc=24V	0	5000	7500	Hz
High voltage	IC=100mA	Vcc	Vcc	Vcc	V
Low voltage	IC=100mA	0.9	1.0	1.4	V

Table. 2: DS output parameter table

1.5 Simulated Data Output and Count

1.5.1 Simulation Signal Output

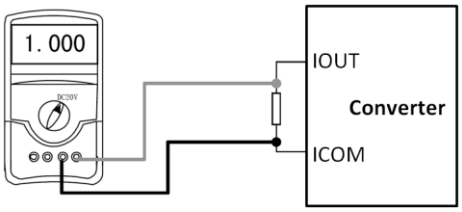
Simulation signal output can be separated two signals: 0~10mA, 4~20mA.
User can select one when parameter setting.
Simulation signal output inner is 24V under 0~20mA, it can drive 750Ω resistance.
The percent flux of simulation signal output:

$$I_0 = (\text{Measure value} / \text{Full scale value}) \times \text{the scale of current} + \text{the zero point of current}$$

The current zero is 0 when 0~10mA, and the current zero is 4mA when 4~20mA.
It can be advanced simulation signal output distinguish.
User can select the range of measure.

1.5.2 Simulation Signal Output Adjust.

(1) The Converter adjust preparative
When the converter is running 15 minutes, the inner of converter becomes stabilization.
Preparative 0.1% ampere meter or 250Ω 0.1% voltage instrument



(2) Current zero correct

When the converter getting into parameter setting, selecting to “Current zero correct” and enter to it.

The standard of signal fountain getting to “0”.

Adjust parameter make ampere meter is 4mA (0.004mA).

(3) The full scale current correct

To select “current correct” to enter.

Adjust the converter parameter make ampere meter is 20mA (0.004mA)

Adjust the current zero and the full range, the current function of the converter reached exactness. The line degree of current output of conversion should be controlled within the scope of 0.1%

(4) Current line degree checking

You can place the standard signal source in 75%, 50%, 25%, and check the line degree of current output

1.6 Converter’s connection of current output

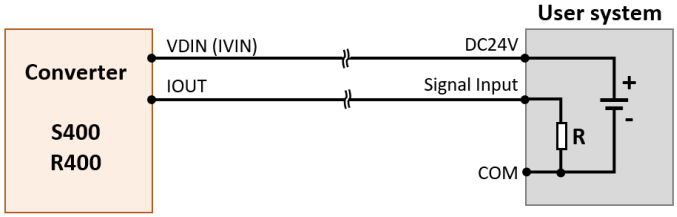


Fig.1.6 (a): Two connection

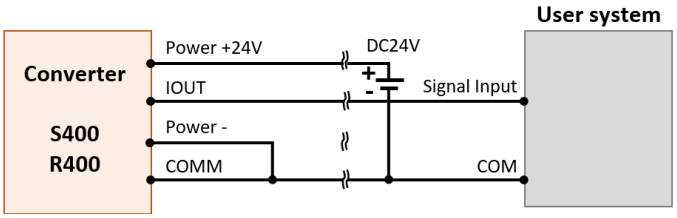


Fig.1.6 (b): Three connection (power supply and current output are not insulated)

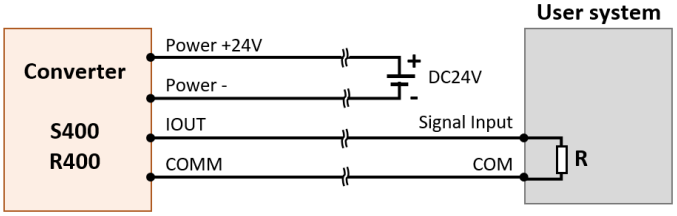


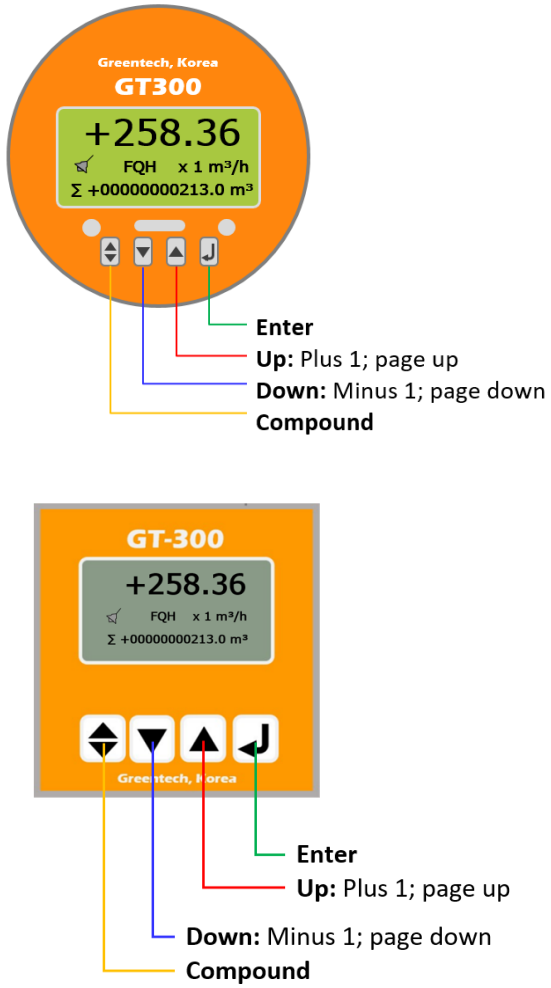
Fig.1.6 (c): Four connection (power supply and current output are insulated)

2. Setting Parameters

Converters can be operated in two ways: ***1. Self-testing way*** ***2. Parameters setting way***

As soon as turning on the converter, it works in self-testing way doing all testing functions and displaying test data automatically. However, when it works in parameters testing way, parameters should be input by operators through keying three keys on its panel.

Function Keys & Display



Keys' Function in Self-Testing Way

Down key: Selecting displayed data on lower line in turn;
Up key: Selecting displayed data on higher line in turn;
Compound key + **Enter** key: Come into parameter setting;
Enter key: Press it to come into the picture of select function; Under the measure, adjust of the LCD contract is used
Compound key **+ Up** key or **Compound** key **+ Down** key for several seconds.

Keys' Function for Parameters Setting

Down key: Subtract 1 from the number at cursor area;
Up key: Plus 1 to the number at cursor area;
Compound key **+ Down** key: Cursor turns left;
Compound key **+ Up** key: Cursor turns right; **Enter** key: In/Out submenu;
Enter key: Press for two seconds under any state and will return to automate measure way.

Note:

(1) When use **Compound** key, you should press **Compound** key and **Up** or **Down** both;
(2) It will return to the measure way automatically after 3 minutes when under the parameter setting way;
(3) Direct select of zero correction about the flow, you can move the cursor to the left **+** or **-** , and use **Down** or **Up** to switch.

Define Keys and LCD screen display (S400_Integral, R400_Remote type)

2.1 Setting Parameters

To set or correct working parameters, the converter should be running in parameters setting way instead of measuring status.
In measuring status, push **Compound + Enter** keys getting to the select of parameter and transfer password (12314), and then correct the password with one of the new passwords that are provided by manufacturer (Initial password is 12314).
Finally, push the **Enter** keys to work in Parameters Setting still go to initial mode.

A. Functions Select Menu

Push **Compound + Enter** keys to the functions select menu, push **Up** or **Down** keys to select, there are three functions:

code	Functions	Explain
1	Parameters Set	Select this function; It can enter the picture of parameter.
2	Clr Total Rec	Select this function, It can be gross reset operation.
3	Fact Modif Rec	Select this function, It can be check the factor's modify Record

B. Parameters Setting

Press **Compound + Enter** key, it displays **Parameters Set** function.
Input password (Initial password is **12314**).
Press **Compound + Enter** key, it getting to Parameters Setting status.

C. Clr Total Rec

To push **Compound + Enter** keys getting to the select of parameter, then push **Up** key to **Clr Total Rec**, input the passwords.
When the passwords becomes **"12314"**, this function is done, the gross is 0 in the instrument.

D. Fact Modif Rec

To push **Compound + Enter** keys getting to the select of parameter, then push **Up** key to **Fact Modify Rec** (Detail consult the Appendix Five)

2.2 Setting Parameters in Menu

There are 54 parameters, user can set every parameter. The List of Parameters is shown below:

No.	Parameters Words	Setting Way	Limits of Parameters	Grades
1	Language	Select	English	2
2	Comm Addres	Set count	0 ~ 99	2
3	Baud Rate	Select	300 ~ 38400	2
4	Snsr Size	Select	3 ~ 3000mm	2
5	Flow Unit	Select	L/h, L/m, L/s, m^3/h, m^3/m, m^3/s, UKG, USG	2
6	Flow Range	Set count	0.0000 ~ 99999	2
7	Flow Rspns	Select	01 ~ 64 SEC	2
8	Flow Direct	Select	Enable / Disable	2
9	Flow Zero	Set count	0000 ~ ±9999	2
10	Flow Cutoff	Set count	000.00 ~ 599.99%	2
11	Cutoff Ena	Select	Enable / Disable	2
12	Total Unit	Select	0.001L ~ 1L, 0.001m^3 ~ 1m^3, 0.001UKG ~ 1UKG, 0.001USG ~ 1USG	2
13	SegmaN Ena	Select	Enable / Disable	2
14	Analog Type	Select	0 ~ 10mA / 4~20mA	2
15	Pulse Type	Select	Frequency / Pulse	2
16	Pulse Fact	Select	0.001L ~ 1L, 0.001m^3 ~ 1m^3, 0.001UKG ~ 1UKG, 0.001USG ~ 1USG	2
17	Freque Max	Select	0000 ~ 9999	2
18	Mtsnsr Ena	Select	Enable / Disable	2
19	Mtsnsr Trip	Set count	00000 ~ 59999	2
20	Alm Hi Ena	Select	Enable / Disable	2

21	Alm Hi Val	Set count	000.00 ~ 599.99 %	2
22	Alm Lo Ena	Select	Enable / Disable	2
23	Alm Lo Val	Set count	000.00 ~ 599.99 %	2
24	Sys Alm Ena	Select	Enable / Disable	2
25	Clr Sum Key	Set count	0 ~ 99999	3
26	Snsr Code1	User set	Finished Y / M (0 ~ 99999)	4
27	Snsr Code2	User set	Product number	4
28	Field Type	Select	Mode 1, 2, 3	4
29	Sensor Fact	Set count	0.0000 ~ 5.9999	4
30	Line CRC Ena	Select	Enable / Disable	2
31	Lineary CRC1	User set	00.000 ~ 19.999 m/s	4
32	Lineary Fact 1	User set	0.0000 ~ 1.9999	4
33	Lineary CRC2	User set	00.000 ~ 19.999m/s	4
34	Lineary Fact 2	User set	0.0000 ~ 1.9999	4
35	Lineary CRC3	User set	00.000 ~ 19.999 m/s	4
36	Lineary Fact 3	User set	0.0000 ~ 1.9999	4
37	Lineary CRC4	User set	00.000 ~ 19.999 m/s	4
38	Lineary Fact4	User set	0.0000 ~ 1.9999	4
39	FwdTotal Lo	Correctable	00000 ~ 99999	5
40	FwdTotal Hi	Correctable	0000 ~ 9999	5
41	RevTotal Lo	Correctable	00000 ~ 99999	5
42	RevTotal Hi	Correctable	0000 ~ 9999	5
43	PlsntLmtEna	Select	Enable / Disable	3
44	PlsntLmtVal	Select	0.010 ~ 0.800 m/s	3
45	Plsnt Delay	Select	400 ~ 2500 ms	3
46	Pass Word 1	User correct	00000 ~ 99999	5
47	Pass Word 2	User correct	00000 ~ 99999	5
48	Pass Word 3	User correct	00000 ~ 99999	5
49	Pass Word 4	User correct	00000 ~ 99999	5
50	Analog Zero	Set count	0.0000 ~ 1.9999	5
51	Anlg Range	Set count	0.0000 ~ 3.9999	5
52	Meter Fact	Set count	0.0000 ~ 5.9999	5
53	MeterCode 1	Factory set	Finished Y / M (0 ~ 99999)	6
54	MeterCode 2	Factory set	Product Serial No. 0 ~ 99999	6

Parameters of converters can decide the running status, process and output ways as well as state of output. Correct option and setting of parameters can keep the converters running optimally and get higher accuracies of output bother in display and in measurement.
There are 6 grades of passwords for setting parameters function.
Grades 1 to grade 5 of passwords are for users and grade 6 of password is for manufacturer.
Users can reset their passwords of grades 1~4 in grade 5.

Users can check converters parameters in any grade of password. However, if users want to change parameters of converters, deferent grade of parameters have to be used by the users.

- Grade 1 of password (set by manufacturer as **12311**): users can only read parameter.
- Grade 2 of password (set by manufacturer as **12312**): users can change 1~24 parameters.
- Grade 3 of password (set by manufacturer as **12313**): users can change 1~25 parameters.
- Grade 4 of password (set by manufacturer as **12314**): users can change 1~38 parameters.
- Grade 5 of password (Fixed): users can change **1~52** parameters.
- Grade 6 of password (Fixed: **12314**): users can change **1~54** parameters.

Password Grade 5 can be set by skilled users. Grade 4 is mainly used for resetting total volume in password. Grades 1~3 can be set by anyone who can be chosen by users.

2.3 Details Parameters

2.3.1 Language

There are 2 languages for GT300E_S400(D) Converter operation.
They can be set by users according to the users needs.

2.3.2 Comm Addres

It means this instrument's address when communicates with many, and has 01~99, holding the 0.

2.3.3 Baud Rate

300, 1200, 2400, 4800, 9600, 38400, baud rate.

2.3.4 Snsr Size

GT300E_S400(D) Converters can be equipped with some deferent sensors that have deferent diameter of measuring pipes.
The pipes in deferent diameters from 3mm to 3000mm can be chosen in relative table.

2.3.5 Flow Unit

The flow unit can choose form the parameters (L/s, L/m, L/h, m^3/s, m^3/m, m^3/h), and the user can choose the proper unit according to the technological requirement and using habit.

2.3.6 Flow Range

Flow range means upper limit value, and lower limit value is set "0" automatically.
So, it makes the range, and makes the relation of percent display, frequency output and current output with flow:

percent display = (flow measure / measure range) * 100 %;
frequency output = (flow measure / measure range) * frequency full;
current output = (flow measure / measure range) * current full + base point;
pulse output will not affect.

2.3.7 Flow Rspns

It means time of filter measure value. The long one can enhance the stability of flow display and output digital, and fits for gross add up of pulse flow; the short one means fast respond rate, and fits for production control. It is set by select.

2.3.8 Flow Direct

If users think the direct and design are differ, just change the direct parameter is OK, but not change exciting or signal.

2.3.9 Flow Zero

Make sure the sensor is full of flow, and the flow is stillness. Flow zero is shown as velocity of flow, mm/s.

FS = 00000
±00133

Converter's zero-flow correction displays like this:
Upper small words: FS means measure value of zero;
Lower large words: correction value of zero.
When FS is not "0", make FS = 0.
Note: if change the value on next line and FS increases, please change the "+, -" to correct FS to zero. Flow zero is the compound value of the sensor, and should be recorded in sensor list and band. The unit will be mm/s, and the sign will be opposite with correction value.

2.3.10 Flow Cutoff

Flow cutoff is set in percentage of Upper Limit Range of flow, and users can delete all Negligible Small Signals of flow volume and percentage out of displaying and outputting them.

2.3.11 Total Unit

Converter display is counter with 9 bits, and the max is 999999999.
Integrator units are L, m^3 (liter, stere).
Flow integrator value: 0.001L, 0.010L, 0.100L, 1.000L :
0.001m^3, 0.010m^3, 0.100m^3, 1.000m^3 :
0.001 UKG, 0.010 UKG, 0.100 UKG, 1.000 UKG ;
0.001 USG, 0.010 USG, 0.100 USG, 1.000 USG :

2.3.12 SegmaN Ena

When “SegmaN Ena” is “enable”, if the flow flows, the sensor will export pulse and current. When it is “disable”, the sensor will export pulse as “0” and current as “0” (4mA or 0mA) for the flow flows reversals.

2.3.13 Analog Type

Output current types can be chosen by users as 1~10mA or 4~20mA practically.

2.3.14 Pulse Type

Two kinds of Pulse Outputs are can be chosen: Frequency Output and Pulse Output. Frequency Output is continuous square waveform and Pulse output is a serial wave of square wave. Frequency output is mainly used for instant flow and total integrated flow in short time measurement.

Frequency output can be chosen in equivalent frequency unit and volume of integrated flow can be displayed. Frequency Output can be used in long time measurement for total integrated flow with volume units.
Frequency output and pulse output are usually from OC gates so that DC power supplies and load resistors have to be required

2.3.15 Pulse Fact

Equivalent pulse Unit is referred to one pulse for value of flow. The range of pulse equivalent can be chosen:

Pulse Equivalent	Flow	Pulse Equivalent	Flow
1	0.001L/cp	9	0.001m^3/cp
2	0.01L/cp	10	0.01m^3/cp
3	0.1L/cp	11	0.1m^3/cp
4	1.0L/cp	12	1.0m^3/cp
5	0.001m^3/cp	13	0.001USG/cp
6	0.01 m^3/cp	14	0.01 USG/cp
7	0.1 m^3/cp	15	0.1 USG/cp
8	1.0 m^3/cp	16	1.0 USG/cp

Under the same flow, the smaller pulse, the higher frequency output, and the smaller error will be.
The highest pulse output is 100cp/s, and mechanism electromagnetic counter can get 25 frequency/s.

2.3.16 Freque Max

Frequency output range is as the upper limit of flow measure, just the percent flow 100%.
Frequency output upper limit can be selected between 1~5000Hz.
The state of empty pipe can be detected with the function of converter.

In the case of Empty Pipe Alarm, if the pipe was empty, the signals of analog output and digital output would be zero and displayed flow would be zero, too.

2.3.17 Mtsnsr Ena

The state of empty pipe can be detected with the function of converter. In the case of Empty Pipe Alarm, if the pipe was empty, the signals of analog output and digital output would be zero and displayed flow would be zero, too.

2.3.18 Mtsnsr Trip

When the pipe is full of liquid (whether flowing or not), the parameter of “Mtsnsr” could be modified more easily.
The parameter displayed upper line is real MTP, and the parameter displayed bellow is the “Mtsnsr trip” that should be set.
When setting “Mtsnsr trip”, you could be according to the real MTP, the value that should be set is usually three to five times of real MTP.

2.3.19 Alm Hi Ena

Users can choose “Enable” or “Disable”

2.3.20 Alm Hi Val

The parameter of upper limit alarm is percentage of flow range and can be set in the way of setting one numerical value between 0%~199.9%.
When the value of flow percentage is larger than the value of setting value, the converter outputs the alarm signal.

2.3.21 Alm Lo Val

The same as upper limit alarm.

2.3.22 Sys Alm Ena

Selecting Enable will have the function, and selecting Disable will cancel the function.

2.3.23 Clr Sum Key

User use more than 3 byte code to enter, Then set this password in Clr Total Rec.

2.3.24 Snsr Code

It is referred to the produced date of sensor and the serial number of product that can keep the sensors coefficient right and accurate.

2.3.25 Sensor Fact

“Sensor Coefficient” is printed on the Label of the sensor when it is made in factory.
The “sensor coefficient” has to be set into Sensor Coefficient Parameter when it runs with converter.

2.3.26 Field Type

GT300E_S400(D) affords three exciting frequency types: 1/16 frequency (type 1), 1/20 frequency (type 2), 1/25 frequency (type 3).
The small-bore one should use 1/16 frequency, and large-bore one should use 1/20 or 1/25 frequency. When using, please select type 1 first, if the zero of velocity is too high, select the type 2 or type 3.

Note: Demarcate on which exciting type, working on it only.

2.3.27 FwdTotal Lo, Hi

Positive total volume high byte and low byte can change forthcoming and reverse total value, and be used to maintenance and instead.

User use 5 byte code to enter, and can modify the positive accumulating volume (∑+).

Usually, it is unsuitable to exceed the maximum the counter set (999999999)

2.3.28 RevTotal Lo, Hi

User use 5 byte code to enter, and can modify the negative accumulating volume (∑-).
Usually, it is unsuitable to exceed the minimum the counter set (999999999).

2.3.29 PlsntLmtEna

For paper pulp, slurry and other serosity, the flow measure will have "cuspidal disturb", because the solid grain friction or concussion the measure electrode.
GT300E_S400(D) converters use variation restrain arithmetic to conquer the disturbing by designing three parameters to select disturb character.
Set it "enable", start variation restrain arithmetic; set it "disable", close variation restrain arithmetic.

2.3.30 PlsntLmtVal

This coefficient can disturb the variation of cuspidal disturb, and calculate as percent of flow velocity, thus ten grades: 0.010m/s, 0.020m/s, 0030m/s, 0.050m/s, 0.080m/s, 0.100m/s, 0.200m/s, 0.300m/s, 0.500m/s, 0.800m/s, and the smaller percent, the higher delicacy of cuspidal restrain.

Note: when using it, must test for select by the fact, and sometimes it is not the higher delicacy is good.

2.3.31 Plsnt Delay

This coefficient can select the width of time of restrain cuspidal disturb and the unit is ms. If the duration is shorter than flow change in some time, GT300E_S400(D) will think it is cuspidal disturb, and if it is longer, GT300E_S400(D) will think it is natural. It also needs to select parameter in fact.

2.3.32 Pass Word 1~4

Users can use 5 grades of passwords to correct these passwords.

2.3.33 Analog Zero

When the converters are made in the factory, output current has been calibrated to zero scale, that is, accurate 0mA or 4mA output.

2.3.34 Anlg Range

When the converters is made in the factory, output current have been calibrated to full scale, that is, accurate 10mA or 20mA output.

2.3.35 Meter Fact

This fact is the special one of sensor-made-factory and the factory use this fact to unite GT300E_S400(D) Electromagnetic flowmeters converters to make sure all the instruments can interchange by 0.1%.

2.3.36 MeterCode 1 and 2

Converter code records the date of manufacturing and serial number of converter.

3. Alarm Information

PCB of electromagnetic flowmeters converters uses SMT, so for user, it is unable to service, and cannot open the shell of converter.
Intelligent converters have self-diagnose function. Without trouble of power and hardware circuit, the normal trouble can be alarmed correctly.
This information displays on the left of LCD. The trouble is like this:

FQH	: Flow high limit alarm	**FQL**	: Flow low limit alarm
FGP	: Flow empty pipe alarm	**SYS**	: System exciting alarm
UPPER ALARM	: Flow high limit alarm	**LOWER ALARM**	: Flow empty pipe alarm
LIQUID ALARM	: Flow empty pipe alarm	**SYSTEM ALARM**	: System exciting alarm

4. Installation

This section covers the steps required to physically install the flowtube.
Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations.
Please refer to the following safety messages before performing any operation in this section.

WARNING

Failure to follow these installation guidelines could result in death or serious injury: Installation and servicing instructions are for use by qualified personnel only.
Performing any servicing other than that contained in this manual may result in death or serious injury.
Do not perform any servicing other than that contained in the operating instructions, unless qualified.

CAUTION

The flowtube liner is vulnerable to handling damage.
Never place anything through the flowtube for the purpose of lifting or gaining leverage.
Liner damage can render the flowtube useless.

CAUTION

To avoid possible damage to the flowtube liner ends, do not use metallic or spiral-wound gaskets. If frequent removal is anticipated, take precautions to protect the liner ends.
Short spool pieces attached to the flowtube ends are often used for protection.

CAUTION

Correct flange bolt tightening is crucial for proper flowtube operation and life.
All bolts must be tightened in the proper sequence to the specified torque limits.
Failure to observe these instructions could result in severe damage to the flowtube lining and possible flowtube replacement.

4.1 Upstream and Downstream Piping

To ensure specification accuracy over widely varying process conditions, install the flow tube a minimum of five straight pipe diameters upstream and two pipe diameters downstream from the electrode plane (see Fig. 3).

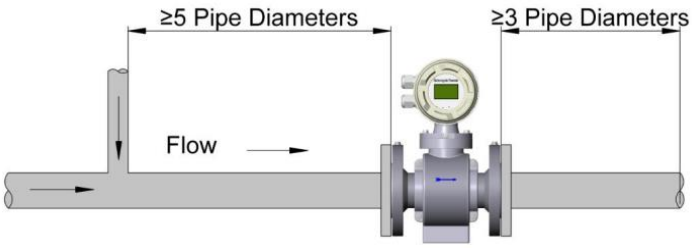


Fig. 3: Upstream and Downstream Straight Pipe Diameters

4.2 Flow tube Orientation

The flow tube should be installed in a position that ensures the flow tube remains full during operation. Horizontal or inclined positions are preferred. Fig. 4, Fig 5, and Fig.6 show the proper flow tube orientation for the most common installations.
The following orientations ensure that the electrodes are in the optimum plane to minimize the effects of entrapped gas. As illustrated in Fig. 6B and Fig. 6B, avoid downward flows where back pressure does not ensure that the flow tube remains full at all times.

Fig. 4: Horizontal Flow tube Orientation

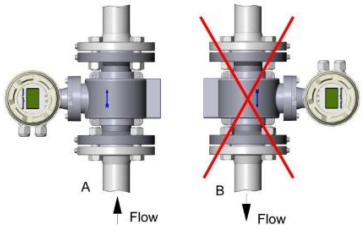


Fig. 5: Vertical Flow tube Orientation

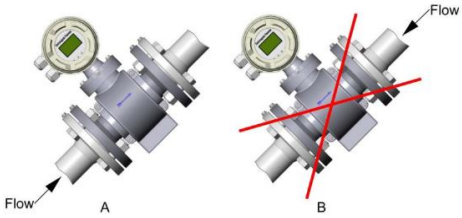


Fig. 6: Incline or Decline Orientation

4.3 Flow Direction

The flow tube should be mounted so that the FORWARD end of the flow arrow, shown on the flow tube identification tag, points in the direction of flow through the tube (see Figure 7).
In this mounting configuration, the conduit ports point upstream.

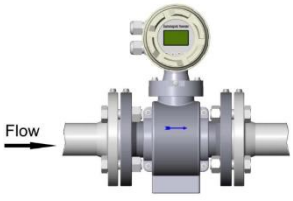


Fig. 7: Flow Direction

4.4 Grounding

Grounding the flow-tube is one of the most important details of flow-tube installation. Proper grounding ensures that only the voltage induced in the magnetic field of the flow-tube is measured. Following the figure to determine which grounding option to follow for proper installation. Attached grounding rings should be grounded equivalently to non- attached grounding rings. The flow-tube case should always be grounded in accordance with national and local electrical codes. Failure to do so may impair the protection provided by the equipment. The most effective grounding method is direct connection to earth ground with minimal impedance.

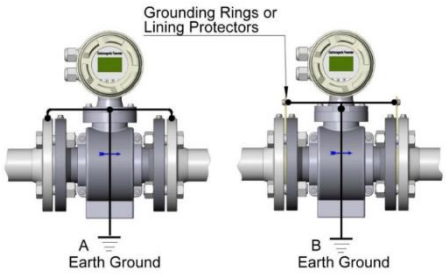
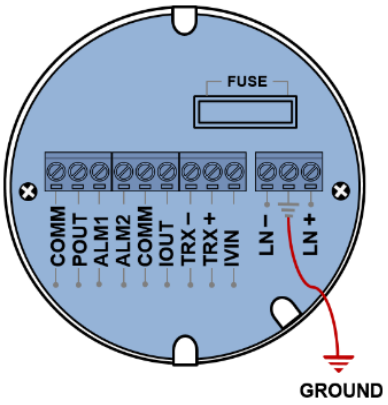
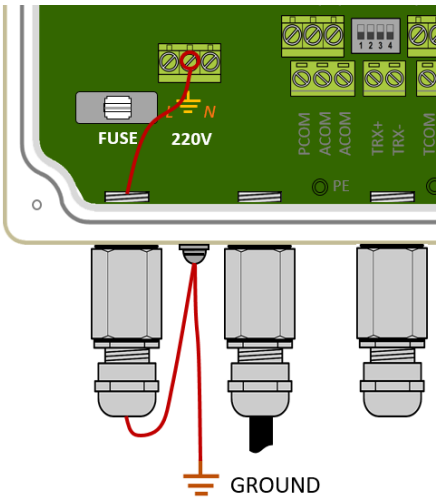


Fig. 8: Grounding instruction

Appendix Lightning protection notes

When installing, users must connect the converter's earthing terminal with the shell, and then earthing them reliably, because the electrical current can be put into the earth through the shell by the gas discharger of lightning protection.
If the shell has not been earthing reliably, once lightning, it may cause a personal accident when there is somebody operating the converter.
The specific details, you can see the connection diagram.





5. Fault handling and cause analysis

No	Fault Phenomenon	Reason	Solution
1	No flow signals	1. Power fault, such as power-off 2. Connection cable (excitation circuit or signal circuit) system fault 3. Liquid flow fault 4. Fault caused by damaged sensor parts or the attachment layer of measuring inner wall 5. Fault caused by damaged transmitter parts.	1. Check the connection of power 2. Check the connection cable (excitation circuit or signal circuit) 3. Check the flow range to find out if the conductivity is satisfied 4. Clean measuring electrodes 5. Check and repair transmitter
2	Output fluctuation	1.The flow itself is fluctuating or pulsating 2. the pipeline is not full or the liquid contains bubbles 3. Interference of external magnetic field 4. Physical properties of flow liquid (such as uniform conductivity or the liquid is slurry with much fiber or grain) 5. Unmatched electrode material to liquid	1. Prohibit working under the condition that the pipeline isn't full ; remove the bubbles of the medium in the sensor pipeline 2. Check the grounding of sensor. To eliminate or be far away from electromagnetic interference. 3. Improve the conditions of liquid medium 4. Choose the sensor electrode properly
3	Flow Zero instability Flow Zero shift	1. The pipeline is not full or the liquid contains bubbles 2. It is thought to be no flow of the liquid, but in fact the liquid flows slightly in the pipeline. There's actually nothing wrong with the electromagnetic flowmeter, in contrast, it truthfully reflect the status of the flow. 3. It doesn't make a perfect grounding for the sensor so that there's still interference from external stray current. 4. Reasons for liquid (such as uniform conductivity, electrode contamination, etc.) 5. Signal circuit insulation degradation	1. Prohibit working under the condition that the pipeline isn't full ; remove the bubbles of the medium in the sensor pipeline 2. Check the grounding of sensor. To eliminate or be far away from electromagnetic interference. 3. Improve the conditions of liquid medium; clean the sensor measuring pipe and the electrodes. 4. Improve flowmeter installation environment and make sure the signal circuit insulation performance reach the standard.
4	Inaccurate Measurement value	1. The transmitter's set value is incorrect 2. improper installation position if transmitter; the pipeline is not full or the liquid contains bubbles 3. The signal cable isn't well handed or the cable insulation performance degrades during use. 4. Resistance variation between electrodes of the sensor or electrode insulation degradation 5. There exists inflow or outflow of branch pipes which are not included in measured selenium.	1. Set properly 2. Change installation position 3. Improve flowmeter installation environment and make sure the signal circuit insulation performance reach the standard 4. Check or discharge branch pipe inflow or outflow
5	Output signal over full-scale value	1. For sensor; no liquid connection between electrodes, introduction of electrical interference from liquid 2. For connecting cable; cable disconnection, incorrect wiring 3. For transmitter; unmatched sensor; incorrect setting 4. For post position meter: no electrical isolation; incorrect setting.	1. Check the conductivity of the medium and clean the electrodes. 2. Check the connecting cable and make correct wiring. 3. Choose matched sensor and set correctly. 4. Make electrical isolation for post position meter and set correctly.

6. Trouble-shooting

1) Instrument has no display

1) Check whether the powers supply is on;
2) Check whether the fuse is complete;
3) Check whether the supply voltage meets the requirement.

2) Empty pipe alarm

1) Check whether the connection of electrode signals is correct;
2) Check whether the measuring tube of the sensor is full of fluid;
3) Use the wire to input the converter's signal into the terminal SIG1, SIG2 and SGND for 3-point short circuit. If the "empty pipe" presents "canceled", it indicates the converter is in normal condition.
   The problem may be caused by the low electrical conductivity of measured fluid or the small threshold of empty pipe. Increase the threshold until the empty pipe alarm disappears;
4) When there is a flow, measure the resistance of the terminal SIG1 and SIG2 against the terminal SGND respectively, which should be less than 50kΩ (if the medium is water, it is recommended to use pointer multi meter for measurement. Charging and discharging phenomena can be observed during measurement).

3) Checking electrode and coli status.

1) Check whether the sensor's electrode is normal: the DC voltage between DS1 and DS2 measured by multi meter should be less than 1V. Otherwise, it indicates that the sensor's electrode is polluted and should be cleaned.
2) Disconnect the wire terminal which is plugged in the ring circle part (SIG1 and SIG2 to SGND), There is the wire from the electrodes, use the multi-meter to measure the Resistance of the wire, If the value less than 0.3, 0.4Ω, the electrodes is okay.
3) Disconnect the wire terminal which is plugged in the ring circle part below (DS1 & DS2), and measure the resistance of the two wire, if the value is 40-60Ω, the magnetic coil is okay.

4) Excitation alarm

1) Check whether the excitation alarm is closed when the converter is connected to the standard signal generator;
2) Check whether the connection of the excitation coils is correct;
3) Check whether the connection of the sensor's electrode is correct;
4) If the three items above are all normal, it indicates the converter fails.