Bass Instruments

Electromagnetic Flowmeter

EMDE

User Manual

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Bass Instruments | DESTA | mesens Pressure Sensors | BETTER

CONTENT

CONTENT

CONTENT

BASS INSTRUMENTS

Bass Olcme Enstrumanları A.Ş. was founded in Istanbul in 2006 to develop specialized solutions for measuring, monitoring, and controlling fluid parameters such as flow, pressure, level and temperature.

For nearly 20 years, Bass Olcme Enstrumanları A.Ş. has been making a significant impact in the industry and continues its operations in a 1,050 m² facility.

Our factory, spanning 10,000 m² of open space and 3,500 m² of enclosed area, is home to Turkey's most advanced and largest liquid and gas flow laboratory. Thanks to this state-of-the-art facility, all testing requirements of both the public and private sectors are met domestically, eliminating the need for international testing alternatives.

Our company exports to more than 40 countries and maintains a strong presence in the industry with its globally proven and reliable products.

Our company holds four patents, demonstrating our commitment to innovation and technological advancement in the industry.

Our company is a key supplier of products to leading firms in Turkiye and around the world across various industries, including Chemicals and Petrochemicals, Water and Wastewater, Textiles, Gas and Oil, Food and Beverage, Paper, Iron and Steel, Pharmaceuticals, Energy, Heating, Ventilation, and Air Conditioning.

Certificates

With its expert team, our company develops specialized solutions and operates in compliance with ISO 9001, ISO 14001, ISO 45001 standards and CE directives, and our calibration laboratory is accredited in accordance with ISO/IEC 17025.

We operate in relevant industries with our products certified for harsh conditions in compliance with ATEX directives and SIL (Safety Integrity Level) declaration, and with WRAS (Water Regulations Advisory Scheme) approved products for potable water applications.

With our EAC-certified products, we actively participate in numerous projects within the Eurasian Economic Union.

1 - Overview

1.1 Basic Function

- Low-frequency square wave exciting, exciting frequency: 5.000Hz (1/10)、4.167Hz (1/12)、3.125Hz (1/16) ;
- Exciting current:125mA;
- No need to add additional electrode for empty pipeline measurement;
- Current speed range: 0.1 --- 15m/s, current speed resolution: 1mm/s;
- AC liner power, range of voltage: 220VAC(±10%); DC power:DC24V(±10%);
- Communication function: MODBUS RTU protocol (RS-232 or RS-485) standard; or HART communication option;
- Support English, Turkish
- Analog output:0-10mA or 4-20 mA;
- Frequency output can be set;
- Equivalent pulse output can be set;
- Alarm functions: support excitation, pipes empty, Upper and lower alarm;
- Upper and lower alarm objects can be set: Flow volume 、Flow percentage 、Forward integrated flow, reverse integrated flow, difference integrated flow;
- Three integrator gross inside, respective register :Forward integrated flow, reverse integrated flow, diffe-renceintegrated flow
- Small flow linear correction functions: Support small flow four-point liner correction;
- Data back up and restore: manufacturer original information backup and restore;
- Data export and import: use of external EEPROM can import, export the instrument parameters (except converter parameters)and accumulation.

1.2 Basic Parameters and Performance

Storage temperature: - 20°C~ +70°C
Operating temperature: - 20°C ~ +120°C for PTFE, -20°C ~ +180°C for PFA
Relative Humidity: 5% ~ 90%
Dissipation power: < 10 W(with sensor)

Analog current output
Load resistor: 0~1200Ω for 0~10mA , 0~600Ω for 4~20mA,
Accuracy: 0.1%±10μA

Digital frequency output

Frequency output range: 1 ~ 5000Hz

Output electric isolate: Photoelectric isolate. Isolate voltage: > 1000VDC;

Frequency output: Internal pull Up resistor of 1500Ω, the drive current 16mA. The highest voltage is 24VDC for external power supply, and the maximum load current is 100mA.

Digital pulse output

The equivalent pulse: 0.001 ~ 1.000 m³ / cp, 0.001 ~ 1.000 Ltr / cp

Pulse output width: Square wave output, and the maximum high level is 50ms.

Pulse output isolate: Photoelectric isolate. Isolate voltage: > 1000VDC;

Pulse output: Internal pull Up resistor of 1500Ω, the drive current 16mA.

The highest voltage is 24VDC for external power supply, and the Maximum load current is 100mA.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Diameter (mm)	Range (m/s)	Accuracy	High Accuracy
3 ~ 20	<0.3	± 0.25%FS	± 0.2%FS
	0.3 ~ 1	± 1.0 R	± 0.5 R
	1 ~ 15	± 0.5% R	± 0.25% R
25 ~ 600	0.1 ~ 0.3	± 0.25%FS	± 0.2%FS
	0.3 ~ 1	± 0.5% R	± 0.3% R
	1 ~ 15	± 0.3% R	± 0.2% R
700 ~ 3000	<0.3	± 0.25%FS	± 0.2%FS
	0.3 ~ 1	± 1.0 R	± 0.5 R
	1 ~ 15	± 0.5% R	± 0.25% R

1.3 Digital Communication Port and Protocol

1.3.1 MODBUS Protocol

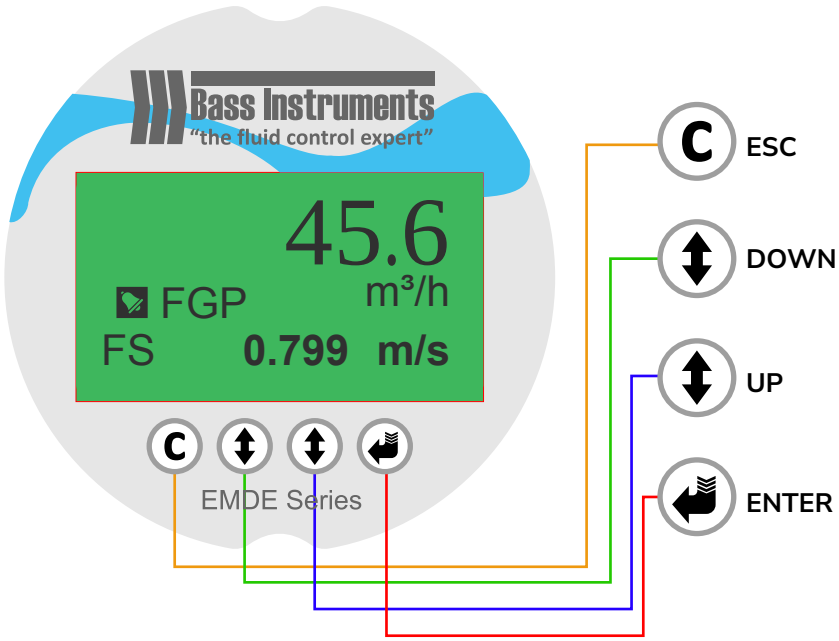
Physical interface RS-485, 100 0V electric isolate, format of RTU. You can use Modbus-Config-Tool software to set parameters, or read real -time flow, totalized fow value, etc.

1.3.2 HART Protocol

The standard HART of communication protocol, you can use the HART-Config-Tool software, or HART handheld, to set parameters, or read real-time flow, tottalzed flow value, etc.

2 - Converter Display and Keys Operation

2.1 Measurement State Display



Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Note: When there more than one alarm, the alarm status display cycle.

FQH	Flow high limit alarm	FQL	Flow low limit alarm
FGP	Flow empty pipe alarm	SYS	System exciting alarm

The converter contains four key: Esc key, Up key, Down key and Enter key. On measuring state display, the keys functions are:

- Push“Down key”to change line3 displaying value. Cycle display flow rate, percentage flow, empty ratio, forward integrated flow, reverse integrated flow and difference Integrated flow, flow volume, current out.
- Long push “Enter” 3 seconds, enter into ‘Password‘ interface.
- Push“Esc key + Up key”, LCD screen contrast increases
- Push“Esc key + Down key”, LCD screen contrast decrease

2.2 Keys and Display

2.2.1 Key Function

ESC
Return previous menu, or abort edit

DOWN
Add 1 to the number at cursor area, or next menu

UP
Shift right, or previous menu

ENTER
Enter into input state, or save the parameter

2.2.2 Keys Operation Method

1. Single Key Operation

Operation method: Push the key, then lift. The single keys operation function as follow:

- ESC key : Return previous menu,or abort edit.
- Down key : Shift right, or previous menu.
- Up key : Add 1 to the number at cursor area, or next menu.
- Enter key : Enter,enter into input state, or save the parameter

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

2. Combination Key Operation

Use the ESC Key and other keys perform the operation. Operation method: Hold down the ESC Key, then push another key.

a) Measurement State (Normal Display State)

- Push“Esc key + Up key”, LCD screen contrast increases
- Push“Esc key + Down key”,LCD screen contrast decrease

b) Paramedit State

- ESC Key + Down Key: Cursor shift left.
- ESC Key + Up Key : Subtract 1 to the number at cursor area.
- ESC Key + Enter Key: Return previous menu,or abort edit.

2.2.3 Enter Password

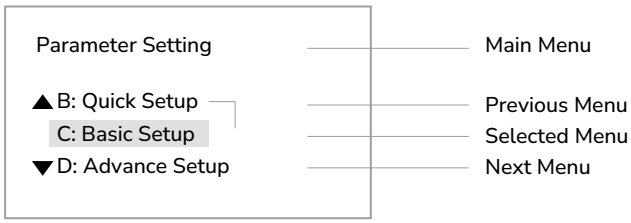
To enter the password for example, illustrate the keys operation process:

1）When the display on measurement state (Normal Display State), push “Enter key” for 3 seconds, will enter into ‘Set Param 0000’ Input the passwords (The password and the level, please refer the “parameter set” part, the second level password of 03210)
2）Then push “Up key” to add 1 to the number at cursor area .
3）Push “Down Key” cursor shift left.
4）To finish inpu, push “Enter key”, if password is correct, then enter into the parameter setting.

Note: Press “Enter key”,for three seconds under any state and will return to automate measure way.

2.2.4 Menu Browse State

1）Menu browse State Display
Menu browse state is used to view, select parameter , LCD displays up to four lines, as shown below:



2）Key Operation on Browse State

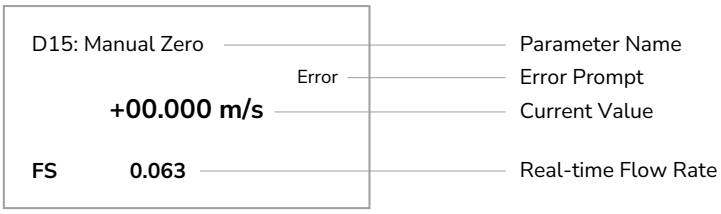
Esc key: Return main menu;
Down key: Previous menu
Up key: Next menu
Enter key: Enter into menu browsestate, or parameter browse state.
More than 10 minutes without push any key, or push 3 seconds the “Enter Key”, direct return to automate measurement state.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

2.2.5 Parameters Browse State

1）Browse state display

Parameter browse state is used to view various types of parameter values , LCD displays up to four lines, as shown below:



Error: When the parameter value error display;
The fourth line real-time flow rate: Flow rate value displayed when browser zero flow correction coefficient, the factory calibration coefficients, flow correction coefficent 1, flow correction coefficient 2, flow correction coefficient 3, flow correction coefficient 4.

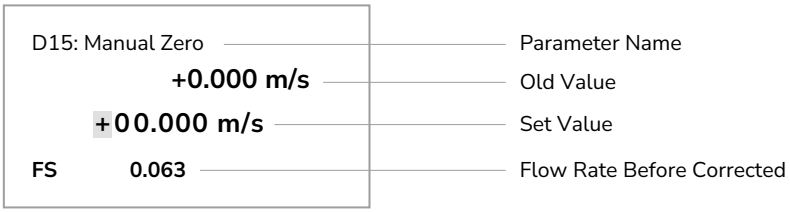
2）Key Operation on Browse State

Enter key : Enter into parameter editing state if have rights, otherwise, prompt error.
ESC key : Return parent menu.
More than 10 minutes without push any key, or push 3 seconds the “Enter Key”, direct return to automate measurement state.

2.2.6 Edit State

1）Edit state display

Users can modify the parameter values in edit mode, the LCD displays:



The fourth line real-time flow rate: Flow rate value ddsplayed when browser zero flow correction coefficient, the factory calibration coefficients, flow correction coefficizent 1, flow correction coefficient 2, flow correction coefficient 3, flow correction coefficient 4.

2) Key Operation on Edit State

ESC key : Abort edit, return param browse state.
Down key : The cursor moves to the right (data input) or upward selection (select input)..
Up key : Add 1 to the number at cursor area(data input) or downward selection (select input).
ESC key + Down key : Cursor shift left.
ESC key + Up key : Subtract 1 to the number at cursor area(data input).
Enter key : Save the new parameter and return to browse state. If the parameter unreasonable, will prompt “fault”.

More than 10 minutes without push the key, or push 3 seconds the “Enter Key”, direct return to automatic measure state. Black 17 core wire.

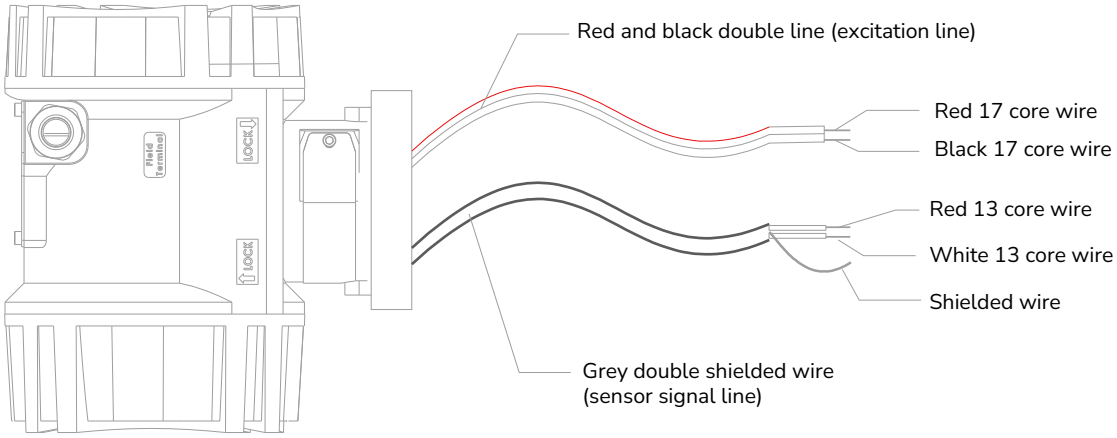
Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

3 - Connections of Sensor and Output

3.1 Compact Meter

3.1.1 Sensor Wiring

The sensor wiring (signal line and excitation line) of compact meter is shown below:)



Illustrate :

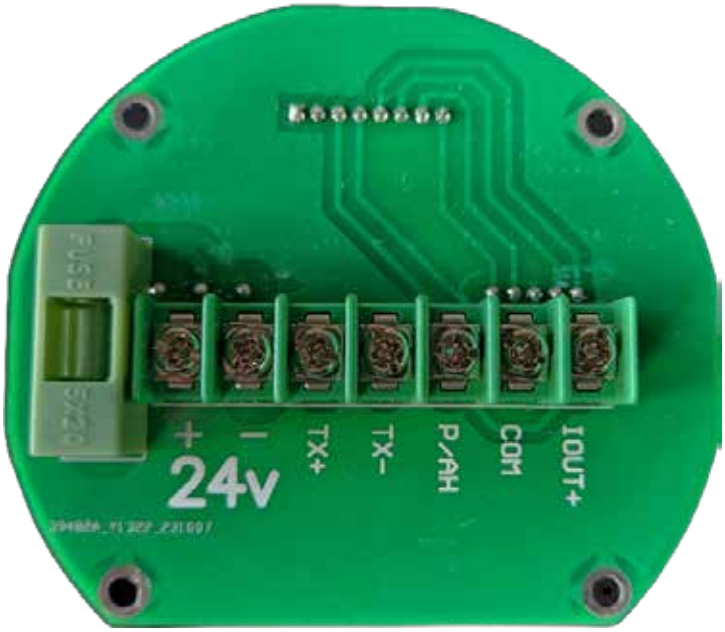
Excitation Line Red 17 core wire
Black 17 core wire
→ Connectiong excitation current

Sensor Signal Line Red 13 core wire
Blue 13 core wire
White 13 Shielded wire
→ Connectiong sensor signal

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

3.1.2 Wiring Terminal

Remove the bottom cover of the converter, and you can see the terminal board.



24V +	24V Power Supply +
24V -	24V Power Supply -
TX +	Communication Input Signal, RS485 A
TX -	Communication Input Signal, RS485 B
P / AH	Alarm Output for Lower Limit / Flow Direction Output
COM	Frequency (Pulse) Output Ground/Top and Bottom Alarm Ground 0~10mA, 4-20mA, 4-12-20mA, 0-20mA Output Current Ground
IOUT	0~10mA, 4-20mA, 4-12-20mA, 0-20mA Output Current Positive

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

3.2 Remote Meter

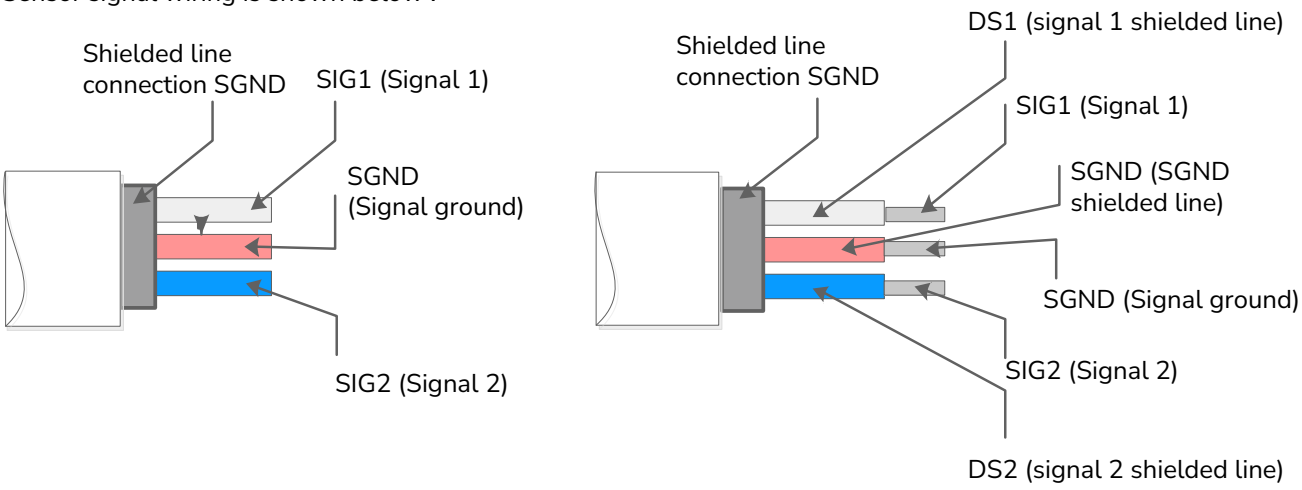
3.2.1 Wiring Terminal

24V power Supply terminals:

24V +	24V Power Supply +
24V -	24V Power Supply -
TX +	Modbus A Output
TX -	Modbus B Output
P / AH	Pulse and Alarm Output Terminal
PCOM	Pulse and Alarm Output Terminalcom
AL	Alarm Output
Io	mA+ Output
ICOM	mA- Output
CD1	Excitation + Coil input
CD2	Excitation - Coil input
DS1	Signal 1 Input Shield
SIG1	Signal Input
SGND	Signal Shield Input
SIG2	Signal 2 Input
DS2	Signal 2 Input Shield

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Sensor signal wiring is shown below :



3.3 Grounding

Contact area of copper Connector PE on Converter Cabinet for grounding should be larger than 1.6mm2. Contact resistance should be less than 10Ω.

3.4 Frequency Output, Pulse Output, Upper Limit Alarm

The frequency output, pulse output and upper limit alarm output share the same wiring terminal of P/AH. Set as follow:

P/AH Function	Function Description	P/AH Output
Frequency Output	Frequency Mode	Frequency Output Range is 0～5000HZ, and corresponding the percent of flow
Pulse Output	Pulse Mode	Equivalent Pulse
Upper Alarm	Upper Alarm Output	**Upper alarm mode (Always open):** P/AH Output Low: Upper Alarm Limit P/AH Output High: No Upper Alarm Limit
		Upper alarm mode (Always close): P/AH Output Low: No Upper Alarm Limit P/AH Output High: Upper Alarm Limit

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

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

3.4.1 Frequency Output Mode

Frequency output range , 0～5000Hz, and corresponding the percent of flow.

$$F = \frac{\text{Measure value}}{\text{Fullscale value}} \quad X \quad \text{frequency range}$$

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 ~ 2000HZ etc.

3.4.2 Pulse Output Mode

Pulse output mainly applies in count mode. For each output of a pulse, the corresponding volume or quality is determined by the pulse factor and the total unit..

Pulse factor refers to the number of pulses output per unit total. When setting pulse factor, the user should pay attention to match the flow range and the pulse factor of the flowmeter. Count formula as follows:

For volume flow : Q (m3/s)=0.0007854×D2×V×10-3
For mass flow: Q (kg/s)=0.0007854×D2×V×10-3× ρ

Note: D -nozzle (mm)

V-velocity of flow (m/s)

ρ—density（kg/m3）

3.4.3 P/AH for Frequency, Pulse, Upper Limit Alarm output Wiring

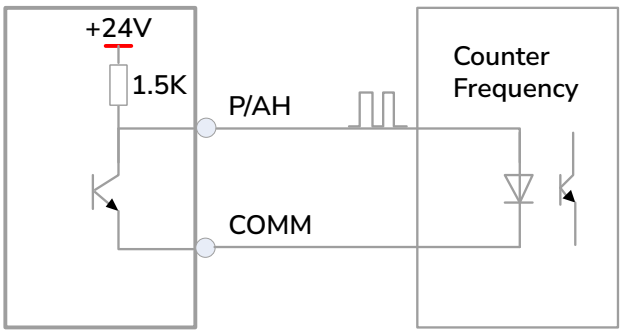
Frequency/pulse digital output has 2 connected points: output connected point, ground point, the symbols as follows:

P/AH——Output

PCOM——Ground

Frequency, equivalent pulse output wiring ways:

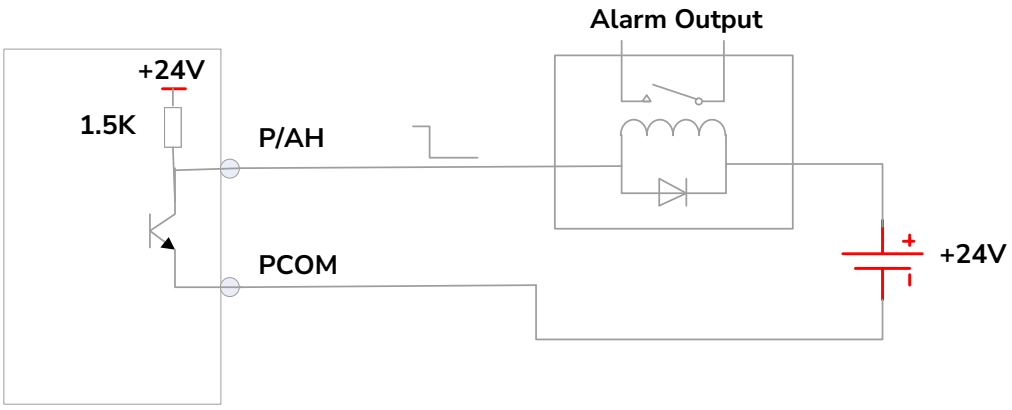
User equipment connected between P / AH and PCOM, The wiring can be referred to below. The pulse output voltage is 24V, and the converter is equipped with 1.5KΩ current limiting resistor, which can provide 16mA driving current for user equipment.



Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Alarm output mode of connection

Frequency output range , 0～5000Hz, and corresponding the percent of flow.



3.5 AL for Lower Limit Alarm output or Flow Direction Output

The lower limit alarm output and flow direction output share the same wiring terminal of AL. Set as follow:

AL Function Selection	Function Description	P/AH Output
Flow Direction	Frequency Mode	AL output low: Flow is reverse
		AL output high: Flow is forward
Lower Alarm	Lower Limit Alarm Output	**Upper alarm mode (Always open):** AL Output Low: Upper Alarm Limit AL Output High: No Upper Alarm Limit
		Upper alarm mode (Always close): AL Output Low: No Upper Alarm Limit AL Output High: Upper Alarm Limit

The lower alarm output and flow direction output wiring way is same to P/AH.

3.6 Current Output and Calculate Formula

3.6.1 Current Output

There are two analog output mode: 0～10mA and 4～20mA, the inner voltage is 24V. When select 4~20mA, it can drive 600Ω resistance.

The percent flow of simulation current output :

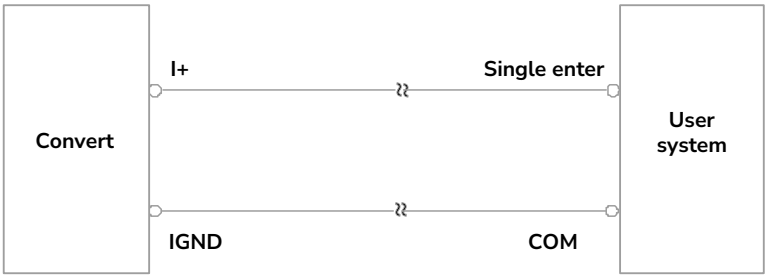
$$I_0 = \frac{\text{Measure value}}{\text{Fullscale value}} \text{ X the scale of current + the zero point of current}$$

The manufacture's parameter has been adjusted, and it need not adjust.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

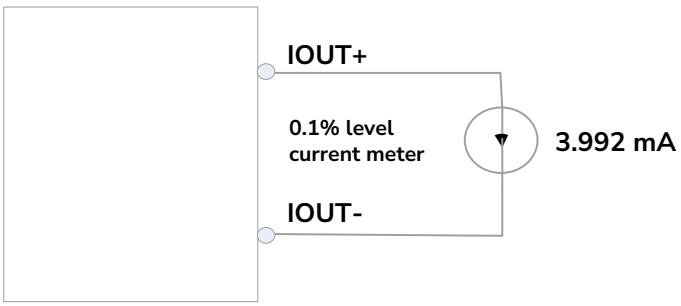
3.6.2 Connection of Current Output

Connection of current output as follow:



3.6.3 Current Output Trim

1) Instrument timing prepare Preparative ampere meter. The accuracy shoud better than 0.1%.



2) Current Zero Correction

Through the key, Enter the “current zero correction” parameter edit mode, LCD display as shown below. At this point the converter outputs 4mA, the user only needs to input actual current value measured by the current meter, then push the "Enter Key" to complete 4mA corrected.

F17: Adjust 4mA
4.000 mA
+ 3 .900 mA

3) Current Full correction

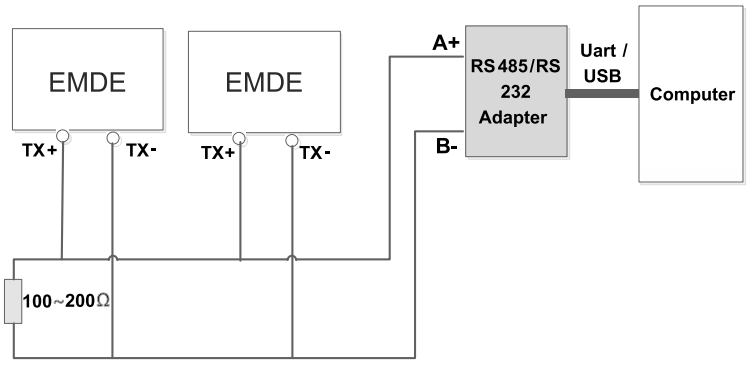
Through the key, Enter the “ Current full correction” parameter edit mode,At this point the converter outputs 20mA, the user only need to input actual current value measured by the current meter , then push the “Enter Key” to complete 20mA corrected.

F18: Adjust 20mA
20.000 mA
+ 1 9 .510 mA

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

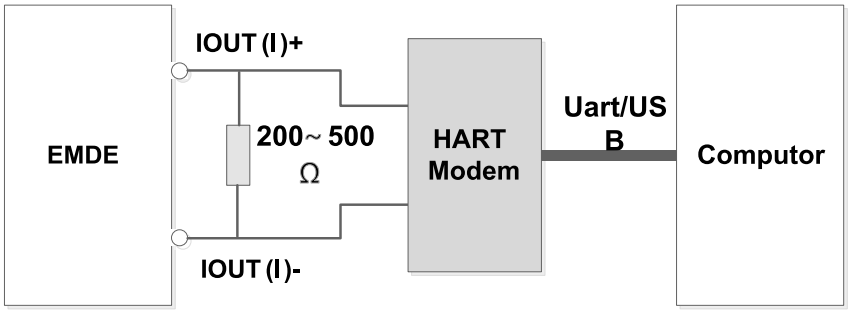
3.7 Digital Communication Wiring

3.7.1 Modbus Communication Wiring



3.7.2 HART Communication Wiring

The HART communication wiring is shown below:



4 - Parameter Setting and Configuration

4.1 Parameter Setting

The converter parameters are shown in the table 4-. Before use the instrument, the user should be setting the parameters according to the particular cases. Make sure the parameters running status, data processing algorithms, output ways as well as work ways.

In order to prevent parameters are free to modify, there are 4 grades of passwords for setting parameters function, Corresponding 4-levels permissions user. Grades 1 to gra de 3 of passwords are for users and grade 4 of password is for manufacturer. The 4 th level permission can modify the 1~3 level permissions password. The following table lists the permissions of users at all levels, and t he default password of the factory.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Table 4-1

User Grade	Access Authority	Password Attribute	Default Password
1	Users can only view the instrument parameters under the menu of B, C, D, F, G, K, and do not have the right to modify.	Correctable	00521
2	Users can view and modify the instrument parameters under the menu of B, C, D, F, G and K.	Correctable	03210
3	Users can view and modify the instrument parameters under the menu of B, C, D, F, G, H and K.	Correctable	06108
4	The manufacturer's special password can view and modify all parameters.	Uncorrectable	

It is suggested that higher-level personel master the level 4 password. Grade 3 is mainly used for resettin total volume in password. Grades 1~ 2 can be set by any one who can be chosen by users.

Table 4-1

Code	Parameter Name	Setting Way	Parameter Range	Default Value	Grades
B	Quick Setup				2
B10	Language	Select	English / Turkish	English	2
B11	Flow Rspns	Set count	1.0～50.0S, damping	4.0	2
B12	Flow Unit	Select	m ³ /, s m ³ /m³, n m³ /, h L/s, L/min, L/h, gal/s, gal/min, gal/h, Ugal/s, Ugal/min, Ugal/h, kg/s, kg/min, kg/h, t/s, t/min, t/h, ft/³s, ft/³min, ft/³h, lb/s, lb/min, lb/h	m³ / h	2
B13	Decpoint	Select	0～5, set the decimal point of instantaneous flow.	1 DecPt	2
B14	Flow Range	Set Count	0.0～9999999.0	424.2	2
C	Basic Setup				2
C10	Sensor Size	Select	3～3000 mm	100	2
C11	Meter Factor	Set Count	0.0001～9.9999	1.0	2
C12	Total Unit	Select	0.001m³ ～ 1m³ 、 0.001L ～ 1L ,0.001ft³ ～ 1 ft³ 0.001gal ～ 1gal , 0.001Ugal～1Ugal, 0.001kg～1kg, 0.001t～1t, 0.001Lb～1Lb	1 m³	2
C13	Flow Direct	Select	Normal/Reverse	Normal	2
C14	Flow Cutoff	Set Count	0.0～99.0%	1.0%	2
C15	Cutoff En.	Select	Enable / Disable	Enable	2
C16	1nd Line	Select	Q[Unit]、Q[%]、V[m/s]、mA	Q[Unit]	2
C17	2nd Line	Select	V[m/s]、Q[Unit]、Q[%]、MTP[%]、Totalzer Net Totalizer->F 、Totalzer<R、mA	V[m/s]	2
C18	Version	Read nly			2

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Code	Parameter Name	Setting Way	Parameter Range	Default Value	Grades
D	**Advance Setup**				2
D10	Modbus Addr.	Set count	1～247	1	2
D11	Modbus Baud.	Select	1200～38400bps	9600	2
D12	Modbus Par.	Select	None, Odd, Even	None	2
D13	Modbus SBL	Select	1, 2 Stop Bt	1	2
D14	Manual Zero	Set count	-9999～+9999	0.0	2
D15	Autom. Zero	Select	YES / NO	NO	2
D16	Density Unit	Select	g/cm3, kg/m3, lb/gal, lb/Ugal, lb/ft3	kg/m3	2
D17	Density	Set count	0.1～5.0	1	2
D18	Pls.Lmt En.	Select	Enable/Disable	Disable	2
D19	Pls.Lmt Val.	Select	0～100%	10%	2
D20	Plsnt Delay	Set count	0～60000 ms	3000	2
D21	Browse PSWD	Set count	00000～65535, Bowse PassWord	00521	2
D22	Set PassWord	Set count	00000～65535	03210	2
D23	Reset	Select	YES / NO	NO	2
D24	Outport Parameter	Select	Enable/Disable	Enable	2
D25	Import Parameter	Select	Enable/Disable	Enable	2
F	**Output**				
F10	Measure Mode	Select	Forward、Forward/Reverse、Reverse	Forward/Reverse	2
F11	Iout Mode	Select	0～10mA /4～20m A	4～20m A	2
F12	P/AH FC Sel.	Select	Pulse , Frequency , Upper limit alarm, Lower alarm, flow drection	Freque	2
F13	AL FC Select	Select	Lower alarm, flow direction	L_Alarm	2
F14	Pluse Factor	Set count	0.001～1000.0	10	2
F15	Pluse Width	Set count	0.1～250.0ms	0.5	2
F16	Max Frequency	Set count	2～5000 Hz	5000	2
F17	Adjust 20mA	Set count	18.000～22.000mA	20.0	2
F18	Adjust 20mA	Set count	3.500～4.500mA	4.0	2
G	**Alarm**				2
G10	MtSensor En.	Select	Enable / Disable	Enable	2
G11	Mtsnsr Trip	Set count	1～65535	50	2
G12	Alm High En.	Select	Enable / Disable	Disable	2
G13	Alm High Obj	Select	Q[%], Q[Unit], Totalzer Net Totalizer->F, Totalzer<R	Q[Unit]	2
G14	Alm High Mod	Select	Always Open / Always Close	AlwaysOpen	2
G15	Alm Hgh Val	Set count	-200.0～+200.0 %	200.0	2
G16	Alm Low En.	Select	Enable / Disable		2
G17	Alm Low Obj	Select	Q[%], Q[Unit], Totalzer Net, Totalizer->F, Totalzer<R	Q[Unit]	2

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Code	Parameter Name	Setting Way	Parameter Range	Default Value	Grades
G18	Alm Low Mod	Select	Always Open / Always Close	Always Open	2
G19	Alm Low Val	Set count	-200.0～+200.0 %	-200.0	2
G20	Sys Alm En.	Select	Enable/Disable	Enable	2
G21	Alm Iout En.	Select	Enable/Disable	Disable	2
G22	LAlarm Iout	Set count	3.0～3.8mA	3.8 mA	2
G23	HAlarm Iout	Set count	21.5～23.0mA	22 mA	2
H	**Total Set**				3
H10	TOT Reset	Select	YES / NO	NO	3
H11	TOT->F	Set count	000000000～999999999	0.0	3
H12	TOT <-R	Set count	000000000～999999999	0.0	3
H13	Tot P assWord	Set count	0～65535	6 108	3
K	**Test**				2
K10	Iout Test	Set count	0.01～23.0mA	12.0	2
K11	Pulse Test	Set count	2～5000 Hz	1000	2
K12	Display Test	Read Only			2
V	**Factory Set**				4
V10	Feld Type	Select	Type 1(1/10)、Type 2(1/12), Type 3(1/16) , Exctaton type	Type 1	4
V11	Sensor Fact	Set count	0.0001～5.9999	1.0	4
V12	Line CRC En.	Select	Enable/Disable	Disable	4
V13	Line CRC1	Set count	0.0～15.0	0.3	4
V14	Line Fact1	Set count	0.0000～1.9999	1.0	4
V15	Line CRC2	Set count	0.0～15.0	0.225	4
V16	Line Fact2	Set count	0.0000～1.9999	1.0	4
V17	Line CRC3	Set count	0.0～15.0	0.15	4
V18	Line Fact3	Set count	0.0000～1.9999	1.0	4
V19	Line CRC4	Set count	0.0～15.0	0.075	4
V20	Line Fact4	Set count	0.0000～1.9999	1.0	4
V21	Work Mode	Select	Mode 1、Mode 10	Mode 1	4
V22	Backup Param	Select	YES / NO	NO	4
R	**Inter Set**				4
R10	LOGO Enable	Select	Enable/Disable	Enable	4
R11	Sensor Code	Set count	0～4294967296	0	4
R12	Meter Code	Set count	0～4294967296	0	4
R13	Language En	Select	Enable/Disable	Enable	4
R14	Language	Select	English/Turkish	English	4
R15	Line Frequency	Select	50Hz/60Hz	50Hz	4

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.2 Quick Setup Parameters

4.2.1 Language

EMDE supports 2 languages, English and Turkish can be customized..

Note: vendors can open or prohibit language selection by " Language En" param.

4.2.2 Flow Response(Damping time)

It means time of filter measure value. The values range from 1 to 50 seconds. 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.

4.2.3 Flow Unit

Instant flow unt hass 24 options: m³/s, m³/min, m³/h, L/s, L/min, L/h, gal/s, gal/min, gal/h, Ugal/s, Ugal/min, Ugal/h, kg/s, kg/min, kg/h, t/s, t/min, t/h, ft³/s, ft³/min, ft³/h, lb/s, lb/min, lb/h.

4.2.4 Decpoint

The display precision is used to set the decimal display digit of the main display variable, and the 0~5 bits after the decimal point are optional.

4.2.5 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 + current zero

Note: pulse output will not affect.

4.3 Basic Setup Parameters

4.3.1 Sensor Size

EMDE converter optional sensor diameter range: 3, 6, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000, 1200, 1400, 1600, 1800, 2000, 2200, 2400, 2500, 2600, 2800, 3000mm.

4.3.2 Meter Factor

The meter coefficient is set up for the field users accorrding o the actual use.

4.3.3 Total Unit

Converter display is counter with 9 bits, and the max is 999999999. Total units are 0.001L, 0.010L, 0.100L, 1.000L, 0.001m 3, 0.010m3, 0.100m3, 1.000m3 and so on. Users should select the appropriate unit based on the actual flow.Total units for display are L or m3. The display unit and the decimal digits represent the real total unit.

Example: The forward integrated flow is 1000.12345, and total unit is 0.001m3, the third line will display:

∑+ 1000.123 m³

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.3.4 Flow Direct

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

4.3.5 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. If the flow lower than flow cutoff setting, then it will be set to 0, and the corresponding percentages, the current output signal frequency (pulse) output signal is also 0.

Note: Flow cutoff does not affect flow rate value.

4.3.6 Cutoff En.

Open or close flow cutoff function.

4.3.7 1nd Line

“1nd line” is used to select the variables displayed by the first principal variable (variable displayed in large font on the first line) in the automatic measurement state. The variables available are: flow volume, flow percentage, flow rate and curre nt.

4.3.8 2nd Line

“2nd line” is used to select the variables displayed by the second principal variable (the variable shown in small font on the third line) in the automatic measurement state. The variables available are: flow rate, flow volume, flow percentage, empty pipe ratio, forward totalize, reverse totalize, differenttial totalize and current.

4.4 Advance Setup Parameters

4.4.1 Modbus Addr.

EMDE electromagnetic flow converter supports RS -232/RS-485 serial communication of Modbus RTU protocol.

1)Modbus Addr .: Optional range 01 to 247, and the default address is 1.
2)Modbus Baud. : 1200, 2400, 4800, 9600, 19200, 38400bps, and the default baud rate is 9600bps.
3)Modbus Pari.: For setting the check bits of serial ports in Modbus communication, you can choose:
None (no check), Odd (odd check), Even (even check), default is None (no check).
4)Modbus SBL : Used to set the stop bit of the serial port when Modbus communicates, can choose: 1 or 2 bits, default choice is 1 bit.

4.4.2 Manual Zero

Make sure the sensor is f ull of flow, and the flow is 0 (stillness). If the measurement value is not zero, users can set the flow rate to 0 through the flow zero correction. Flow zero is shown as flow rate, m/s. Converter’s zero-flow correction displays like this:

```
D15: Manual Zero
                +0.000 m/s
   + 0 .063 m/s
FS  0.063
```

The fourth line displays the flow rate which without adjustment, the unit is m/s. Correction method: Input the value behind FS.c to line 3 .

Note: Flow zero correction value is a signed value, it should have same sign with line 4.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.4.3 Automatic Zero

Under the same condition of manual zero correction, if the automatic zero correction function is implemented, the converter directly completes zero correction (no need to input zero correction value) and the current flow rate is modified to zero point flow rate.

4.4.4 Density

Density is used to set the density of the tested liquid, and mass flow measurement will be used to this parameter.

4.4.5 Variation Restrain

Such as pulp or mud liquids, solid particles in the fluid shock measuring electrode will form a "peak noise", in order to overcome such interference, EMDE converter using the rate of change suppression algorithm, EMDE converter design has three parameters: spike suppression allowed, spike suppression coefficient, spike suppression time, the rate of change suppression characteristics for selection.

1)Pls.Lmt En.
Set it "enable", then start variation restrain arithmetic.

2)Pls.Lmt Val.
This coefficient setting the rate of change of peak interference supression, its value is flow rate and the unit is m/s. There are 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. The smaller grade, the higher sensitivity of interference suppression.

Note: In the practical appication, you can based on the actual situation try to multiple choices the higher sensitivity not means the better you choose

3) Plsnt Delay
This coefficient can select the width of time of restrain cuspidal disturb and the unit is ms. If the dura tion is shorter than flow change in some time, EMDE converters will think it is cuspidal disturb, and if it is longer, EMDE converters will think it is natural. It also needs to select parameter in fact.

4.4.6 Browse PSWD

"Browse PSWD " is the first level user password, the first level user can only view the instrument parameters under the menu of B, C, D, F, G, K level, and can not modify the parameter values. Only users with level 2 and above can modify the "view password".

4.4.7 Set Password

Set PassWord is the second level user password. The second level user can modify the instrument parameters under the menu of B, C, D, F, G and K. Only users with level 2 and above can modify the password.

4.4.8 Reset

Restore the factory settings restore the parameters in Tab le 4-1 to the previous backup state except current output test, pulse output test, display output test, forward total settings and reverse total settings.

4.4.9 Export Parameter

EMDE provides pluggable external EEPROM for the import and export of instrument parameters. Export instrument parameters refer to the parameters in Table 41 except current zero correction value, current fullness correction value, instrument coding, current output test, pulse output test and display output test, and positive and negative totalize and totalize overflow value are exported to external EEPROM. When the converter is damaged, the user only needs to replace the new converter and import the instrument parameters from the external EEPROM into the new converter, so that the instrument c an resume to the user's original setting state and continue to run. At the same time, positive and negative totalize will continue to accumu late.

4.4.10 Inport Parameter

Refer to “export instrument parameters”.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.5 Output Parameters

4.5.1 Measure Mode

The measurement mode is used to select the measurement direction allowed by the converter.

1) Forward : only measure the positive flow (flow > 0.0); ;f the flow os is negative, the positive and negative cumulants are not accumulated, the frequency (or pulse) output is 0, and the current output is 4 mA (or 0 mA).

2) Reverse : only reverse flow (flow < 0.0)) is allowed; if flow is positive, the positive and negative cumulants are not accumulated, the frequency (or pulse) output is 0, and the current output is 4 mA (or 0 mA).

3) Forward/Reverse: Allowed forward and reverse flow measurement.

4.5.2 Iout Mode

EMDE converter output current can be chosen by 0~10 mA or 4~20 mA.

4.5.3 P/AH Function Select

Upper limit alarm output, frequency output and pulse output share the same wiring terminal of P/AH, you can choose the type of the current output signal by setting the output mode. For more details, please check the 3rd section.

4.5.4 AL Function Select

Lower limit alarm output and flow direction output share the same wiring terminal of AL, you can choose the type of the current output signal by setting the output mode. For more details, please check the 3rd section.

4.5.5 Pulse Factor

Pulse factor refers to the number of pulses output corresponding to the flow of one cumulant unit, ranging from 0.001 to 1000.0.

4.5.6 Pulse Width

Pluse width refers to the width of the high level of the pulse output square wave, which ranges from 0.1 to 250.0ms.

4.5.7 Max Frequency

The frequency output range refers to the maximum value of frequency or pulse output. The unit is Hz.

4.5.8 Adjust 20mA / 4mA

The current output of the converter has been corrected when it leaves the factory. If the user finds that the error is large in the process of using, it can be calibrated again. The calibration method is referred to in the third part.

Note: The current type of 0 ~ 10mA does not need to be corrected separately.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.6 Alarm Parameters

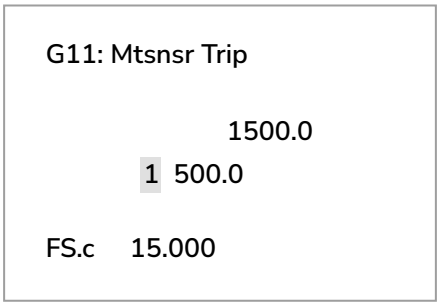
4.6.1 Empty Pipe Alarm

1) MtSensor En.

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. The flow empty pipe alarm signal FGP and will be displayed.

2) Mtsnsr Trip

When empty pipe alarm is not accurate, the user can reset the empty pipe alarm thresholds to achieve the empty pipe alarm recalibration. Please ensure full pipe before calibration (with or without the flow rate may be), otherwise the calibration wlll be inaccurat e. Enter into 'Mtsnsr Trip', the LCD will display empty ratio in line 4 behind FS.c. The line 3 is empty ratio threshold setting by user. Please wait the pipes alarm threshold is stable , can set the empty pipes alarm threshold, otherwise pipes alarm correction will be not accurate. Empty pipes alarm threshold set is actual empty pipes value 10 times higher than FS.c, the recommended minimum is set to 1500. If the threshold setting is too small, it may be lead to misinformation.



Third line: the user input empty pipes alarm threshold.
Fourth line: FS.c indicate the current pipe sampling value.

4.6.2 Upper and Lower Limit Alarm

1) Alm High/Low Enable

The user selects the upper and lower limits of the alarm, or prohibits the upper and lower limits of the alarm.

2) Alm High/Low Object

'Alm High/Low Object' are used to specify the corresponding variables of upper and lower alarm. The optional variables are: flow percentage, flow volume, differential totalize, forward totalize and reverse totalize.

3) Alm High / Low Mode

'Alm High/Low Mode' are used to specify the output levels of upper and lower alarm output terminals P/AH and AL when they are not alarmed.A detailed description can be found in the third part.

4) Alm High / Low Value

The parameter of Upper limit alarm is percentage of flow range and can be set in the way of setting one numerical value between -200.0%~200.0%.When the value of flow percentage is larger than the value of setting value, the converter outputs the alarm signal and alarm instruction FQH/FQL.

If P/AH and AL set the alarm output, then output corresponding alarm status.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.6.3 Sys Alm Enable

When the converter is not contacted the excitation coil, or when the excitation coil is open, will lead to excitation alarm. The excitation alarm signal SYS and will be displayed, and the output follows 0.

Excitation alarm function can be “Enable” or “Disable”.

4.6.4 Alm Iout Enable

The current output of alarm is used to prohibit or allow the upper and lower alarm limits to fix the current output on the upper and lower alarm current values.

4.6.5 LAlarm/HAlarm Iout

‘LAlarm/HAlarm Iout’ is used to specify the output value of the alarm current when the alarm is on the upper and lower limits.

4.7 Total Set

4.7.1 Total Reset

Clean up positive totalize, reverse totalize, differential totalize and totalize overflow counter, and make all values return to zero.

4.7.2 Preset Positive/ Reverse Totalize

‘TOT->F / TOT<-R’ can change the positive /reverse total value, mainly for instrument maintenance and instrument replacement. Users can modify the forward tota（l ∑+） and the reverse tota（l ∑-） by entering with a level 3 password. The total setting should not exceed the maximum value displayed by the liquid crystal (999999999).

4.7.3 Total Password

The tot password corresponds to the protection password of the "Total Set" menu, and is also the password of level 3 privileges. Users with level 3 privileges and above can modify this password.

4.8 Test

4.8.1 Iout Test

Current output test is used to test whether the current output is normal or not. Iout current terminal will output the specified test value at the time of current output test.

4.8.2 Pulse Test

Pulse output test is used to test whether the pulse output is normal or not. When the pulse output test is performed, the P/AH output terminal will output the specified test value.

4.8.3 Display Test

Display output test is used to test whether the LCD display is normal or not. When performing the display output test, the LCD screen will display four lines of "1234567890ABCDEF" string. Users can see if there is any problem with the display output.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.9 Factory Set

4.9.1 Field Type

EMDE converter provides three exciting frequency types: 5Hz (type 1), 4.167Hz（type 2）,3.125Hz (type 3),. The small-bore one should use 1/10 frequency, and large-bore one should use 1/12 or 1/16 frequency.

Note: Demarcate on which exciting type, working on it only. You should demarcate the converter again when you modified the ways of excitation.

4.9.2 Sensor Fact

“Sensor Fact” is printed on the Label of the sensor when it is made in factory. The “Sensor Fact” has to be set into Sensor Coefficient parameter when it runs with converter. Sensor factor calculate formula:
Sensor factor = actual flow (rate) / EMDE. CM measured flow (rate)

Note: Please disable “Line CRC Ena ” to turn off the non-linear correction function before you calibrate the sensor parameter, otherwise the cal,bration will be inaccurate.

4.9.3 Work Mode

The mode of work includes: mode 1, mode 10, choice. Mode 1 is used in most cases. Mode 10 is recommended only when the measured liquid contains particulate matter which leads to instability of measurement.

4.9.4 Sensor 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.

4.9.5 Backup Parameter

Backup factory settings are used to backup instrument parameters. In Table 41, other parameters except current output test, pulse output test, display output test, preset forward tot and preset reverse total are backed up to the internal EEPROM. The 4 level users have backup function.
Suggestion: Make instrument parameter backup before flowmeter leavvng the factory. If the user mistakenly modifies the parameters, it can be restored to the backup state by performing the "Reset" function.

4.9.6 Nonlinear Correction Function

1)Line CRC1,Line CRC2,Line CRC3,Line CRC1: four Correction point;
2)Line Fact1, Line Fact2, Line Fact3, Line Fact4: Corresponds to the coefficient of Line CRC1,Line CRC2, Line CRC3,Line CRC1.

Nonlinear correction function is used for line regulation of flow which under 0.3 m/s. This function is designed to four segments, and includes four flow velocity points and four correction factors. Nonlinear correction coefficient works on the basis of the original transducer calibration coefficent, so please turn off nonlinear correction function before calibrating the coefficient.

Flow correction coefficient cal culated as:
Correction coefficient = actual flow / EMDE mea sure d flow Correction coefficient > 1.0 is positive correction (increase flow), correction coefficient <1.0 is negative correction (decrease flow). The correction points should keep the folllowing relationship:

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

15.0m/s>= Correction point1> Correction point2> Correction point3> Correction point 4> 0 Nonlinear correction points (flow rate) and correcttion coefficient corresponding relationship as shown in the following table:

original flow velocity	Coefficient
15.0m/s ≥ Flow rate ≥ Correction point 1	Correction coefficient 1
Correction point 1 > Flow rate ≥ Correction point 2	Correction coefficient 1 and 2 linear interpolation
Correction point 2 > Flow rate≥Correction point 3	Correction coefficient 2 and 3 linear interpolation
Correction point 3 > Flow rate≥Correction point 4	Correction coefficient 3 and 4 linear interpolation
Correction point 4 > Flow rate≥0.00m/s	Correction coefficient 4

Note: In order to ensure that the flow between the correcttion point 1 and 15m /s is not effect by the correction coefficient, the correction coefficient must is 1.000!

Application example:
Assuming the meters test the four small flow points when the nonlinear correction function is not turned on, the data is in the table below, you can see the flow rate of 4 points has bias:

Actual Flow (m/s)	EMDE Measured Flow (m/s)
0.225	0.221
0.150	0.145
0.075	0.069

We can enable nonlinear correction function to achieve higher accuracy. Selects four points correction, and the correction points and coefficients calculatated in the followowing table:

	Correction Flow (m/s)	Correction Flow Velocity
1	0.300	1.0 (must 1.0 ！ ！ ！)
2	0.225	1.018 (0.225 / 0.221 = 1.018)
3	0.150	1.034 (0.150 / 0.145 = 1 .034)
4	0.075	1.087 (0.075 / 0.069 = 1 .087)

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

4.10 Inter Set

4.10.1 LOGO Enable

Logo display can choose "Enable" or " Disable ", when set to " Enable ", the converter will display logo information when powered on; otherwise, the logo information will not be displayed.

4.10.2 Sensor Code

Sensor Code can be used to mark the time and number of the sensor leaving the factory matching with the converter, so as to coordinate the setting of sensor coefficients.

4.10.3 Meter Code

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

4.10.4 Language Enable

'Language En' allows the choice of " Enable " or " Disable ". When set to " Enable ", level 1-3 users can select the language through the "B10: Language" menu, otherwise level 1-3 users can not modify the language.

4.10.5 Language

EMDE supports two languages in Turkish and English. When the "language En" option is set to " Enable ", the manufacturer (level 4 privileges) can change the language option through menu,this and ordinary users (level 1-3 privileges) will not be able to change the language option.

4.10.6 Line Frequency

'Line Frequency' is the power supply frequency (or city frequency), power frequency parameters are set to be consistent with the power supply frequency to reduce power frequency interference.

5 - Troubleshooting

5.1 No Display

1) Check the power supply connection;
2) Check the power fuse;
3) Check the power voltage;

5.2 Empty Pipe Alarm

1) Check İf the sİgnal cable İs OK

2) If measured flud full of testtİng ppe of sensor

3) Short circuit SIG 1, SIG 2, SGND of converter, İf no "Empty Alarm" displayed then the converter works OK.

In this case, it is possible that conductivity of measured fluid may be small or empty threshold of empty pipe are set wrongly. Then increases the empty pipe threshold until the empty pipe alarm disappear.

4) Check if the electrode-poles are OK or not. Resistances of SIG1 to SIGGND and SIG2 to SIGGND are all less than 50kΩ (conductivity of water) during measurement operation.

5) The DC voltage should be less than 1V between DS1 and DS2. Test the voltage by voltmeter.

If DC voltage is larger than 1V, the electro poles of sensor were polluted that have to be cleaned.

5.3 Exciting Alarm

1) Check if exciting cables is ok.
2) Check if the sensor electrode wiring is ok
3) If 1,2,are OK, the converter is failed

5.4 Measure Flow Disallow

1) Check if the ground is ok.
2) Check if the signal cable is ok
3) If measured fluid full of testing pipe of sensor
4) Check the sensor fact coefficient and sensor zero coefficient whether set as the sensor scutheon

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

6 - Appendix: The Flow and The Flow Rate Corresponding Table

DN (mm)	Flow Range(L/s)		Flow Range(m³/h)		Ordering Code
	Qmin	Qmax	Qmin	Qmax	
10	0,0078	0,785	0,0282	2,827	0010
15	0,0176	1,767	0,0636	6,361	0015
20	0,0314	3,141	0,1130	11,3	0020
25	0,0490	4,908	0,1767	17,67	0025
32	0,0804	8,042	0,2895	28,95	0032
40	0,1256	12,56	0,4523	45,23	0040
50	0,1963	19,63	0,7068	70,68	0050
65	0,3318	33,18	1,194	119,4	0065
80	0,5026	50,26	1,809	180,9	0080
100	0,7853	78,53	2,827	282,7	0100
125	1,227	122,7	4,417	441,7	0125
150	1,767	176,6	6,361	636,1	0150
200	3,141	314,1	11,30	1130	0200
250	4,908	490,8	17,67	1767	0250
300	7,068	706,8	25,44	2544	0300
350	9,621	962,1	34,63	3463	0350
400	12,56	1256	45,23	4523	0400
450	15,90	1590	57,25	5725	0450
500	19,63	1963	70,68	7068	0500
600	28,27	2827	101,7	10178	0600
700	38,48	3848	138,5	13854	0700
800	50,26	5026	180,9	18095	0800
900	63,61	6361	229	22902	0900
1000	78,53	7853	282,7	28274	1000
1200	113,09	11309	407,15	40715	1200
1400	153,93	15393	554,17	55417	1400
1600	201,06	20106	723,82	72382	1600
1800	254,46	25446	916,08	91608	1800
2000	314,15	31415	1130,97	113097	2000
2200	380,13	38013	1368,47	136847	2200

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Protocol Overview

EMDE Electromagnetic Flowmeter Converter Communication protocol is the standart MODBUS-RTU mode.

- Communication interface : RS-485
- Support standard Modbus-RTU : Support functions code 03, 04, 06, 16.
- Register length limit : Functions code 03 and 04 supports max 64 registers.
- Register length limit : Functions code 16 supports max 2 registers

Serial Communication Parameters

- The length of data bits: 8
- Parity check: None
- Stop bits: 1
- Baud rate: 600, 1200, 2400, 4800, 9600, 19200 bps
- Address: 1 - 247.

Modbus RTU Protocol

Function 03 can access max 64mconsectuvemholding register, The frame as follows:

Request Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	3
Start Register Address	2 Bytes	256 ~ 347
Register Count	2 Bytes	1 - 64
CRC Check	2 Bytes	XX XX

The Correct Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	3
Bytes Count	1 Byte	N* x 2
Register Values	N* x 2 Bytes	Data
CRC Check	2 Bytes	XX XX

*N = Register Count

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Error Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	131
Error Code	1 Byte	1 or 2 or 3 or 4
CRC Check	2 Bytes	XX XX

Example:
If you want to read the converter range, the register start address is 261 (0x0105), assume the range value is 424.00. The float format is 4 bytes IEEE-754. Then 424.0 should be Ox43, OxD4, OxO0, 0x00.

Request		Response	
Domain name	Data (Hex)	Domain name	Data (Hex)
Device Address	20	Device Address	20
Function Code	03	Function Code	03
Register Address High Byte	01	Bytes Count	04
Register Address Low Byte	05	Register(0x0105) Values High Byte	43
Register Count High Byte	00	Register(0x0105) Values Low Byte	D4
Register Count Low Byte	02	Register(0x0106) Values High Byte	00
CRC Check Code Byte 0	D3	Register (0x0106) Values Low Byte	00
CRC Check Code Byte 1	47	CRC Check Code Byte0	9E
		CRC Check Code Byte1	8D

Read Input Registers (Function Code 04)

Function 04 can access max 64 consecutive holding registers. The frame as follows:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	4
Start Register Address	2 Bytes	768 ~ 788
Register Count	2 Bytes	1 - 64
CRC Check	2 Bytes	XX XX

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

The Correct Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	4
Bytes Count	1 Byte	N* x 2
Register Values	N* x 2 Bytes	Data
CRC Check	2 Bytes	XX XX

*N = Register Count

Error Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	132
Error Code	1 Byte	1 or 2 or 3 or 4
CRC Check	2 Bytes	XX XX

Example:
Ifyou want to read the positive total flow and unit, the register start address is 772 (0x0304), assume the positive total flow value is 1234. The data format is long. Then 1234 should be 0x00,0x00,0x04,0xD2. and assume total flow unit is 0.00lL(unit code = 4), the flow unit is L/s (unit code = 3).

Request		Response	
Domain name	Data (Hex)	Domain name	Data (Hex)
Device Address	20	Device Address	20
Function Code	04	Function Code	04
Register Address High Byte	03	Bytes Count	06
Register Address Low Byte	04	Register(0x0304) Values High Byte	00
Register Count High Byte	00	Register(0x0304) Values Low Byte	00
Register Count Low Byte	03	Register(0x0305) Values High Byte	04
CRC Check Code Byte 0	F7	Register (0x0305) Values Low Byte	D2
CRC Check Code Byte 1	3F	Register(0x0306) Values High Byte	04
		Register (0x0306) Values Low Byte	03
		CRC Check Code Byte0	17
		CRC Check Code Byte1	0A

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Set Single Holding Registers (Function Code 06)

Request Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	6
Start Register Address	2 Bytes	256 ~ 347
Register Values	2 Bytes	Data
CRC Check	2 Bytes	XX XX

The Correct Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	6
Start Register Address	2 Bytes	256 ~ 347
Register Values	2 Bytes	Data
CRC Check	2 Bytes	XX XX

Error Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	134
Error Code	1 Byte	1 or 2 or 3 or 4
CRC Check	2 Bytes	XX XX

Example: If you want to change the flow unit to m3/h (unit code = 2), the register start address is 260 (0x0104).

Request		Response	
Domain name	Data (Hex)	Domain name	Data (Hex)
Device Address	20	Device Address	20
Function Code	6	Function Code	6
Start Address High Byte	01	Start Address High Byte	01
Start Address Low Byte	04	Start Address Low Byte	04
Register Values High Byte	00	Register Values High Byte	44
Register Values Low Byte	02	Register Values Low Byte	02
CRC Check Code Byte 0	03	CRC Check Code Byte 0	73
CRC Check Code Byte 1	A6	CRC Check Code Byte 1	A7

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Write Holding Registers (Function Code 16)

Request Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	16
Start Register Address	2 Bytes	256 ~ 347
Register Count	2 Bytes	N* = 1-2
Byte Count	1 Byte	N* x 2
Register Values	N* x 2 Bytes	Data
CRC Check	2 Bytes	XX XX

*N = Register Count

The Correct Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	16
Start Register Address	2 Bytes	256 ~ 347
Register Count	2 Bytes	1-2
CRC Check	2 Bytes	XX XX

Error Response Frame:

Device Address	1 Byte	1 - 247
Function Code	1 Byte	144
Error Code	1 Byte	1 or 2 or 3 or 4
CRC Check	2 Bytes	XX XX

Example: If you want to set the converter range to 424.00, the register start address is 261 (0x0105). The float format is 4 bytes IEEE-754. Then 424.0 should be 0x43, 0xD4, 0x00, 0x00.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Request		Response	
Domain name	Data (Hex)	Domain name	Data (Hex)
Device Address	20	Device Address	20
Function Code	10	Function Code	10
Register Address High Byte	01	Register Address High Byte	01
Register Address Low Byte	05	Register Address Low Byte	05
Register Count High Byte	00	Register Count High Byte	00
Register Count Low Byte	02	Register Count Low Byte	02
Byte Count	04	CRC Check Code Byte0	56
Register(0x1005) Values High Byte	43	CRC Check Code Byte1	84
Register(0x1005) Values Low Byte	D4		
Register(0x1006) Values High Byte	00		
Register(0x1006) Values Low Byte	00		
CRC Check Code Byte0	C4		
CRC Check Code Byte1	80		

EMDE Parameters

1) Float Type (4 Bytes IEEE-754 Format Float)

Transmissionn Sequence	Data 1	Data 2	Data 3	Data 4
Bits Sequence	Bit31...Bit24	Bit23...Bit16	Bit15...Bit8	Bit7...Bit0

2) Integer Type (4 Bytes Signed Integer)

Transmissionn Sequence	Data 1	Data 2	Data 3	Data 4
Bits Sequence	Bit31...Bit24	Bit23...Bit16	Bit15...Bit8	Bit7...Bit0

3) Unsigned Integer Type (4 Bytes Unsigned Integer)

Transmissionn Sequence	Data 1	Data 2	Data 3	Data 4
Bits Sequence	Bit31...Bit24	Bit23...Bit16	Bit15...Bit8	Bit7...Bit0

4) Short Type (2 Bytes Signed Integer)

Transmissionn Sequence	Data 1	Data 2
Bits Sequence	Bit15...Bit8	Bit7...Bit0

5) Unsigned Short Type (2 Bytes Unsigned Integer)

Transmissionn Sequence	Data 1	Data 2
Bits Sequence	Bit15...Bit8	Bit7...Bit0

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Register Address Instructions

Modbus register address coding is generally divided into two types: Modbus RTU standard protocol addressing mode, PLC addressing mode (such as: Modicon company, GE companies).

E4000 uses the Modbus RTU standard protocol addressing mode, register address begin from 0x0000. If the PC software uses the PLC addressing mode (register address begin from 0x0001), the input register address should plus 1. This kind of equipment in the transmitting message before the register address of minus 1, such as: acces to the 0x0001 register, the sent message register address 0x0000.

Input Register

Parameter Name	**Function Code**	**Register Address**		**Data Type**	**Value Range**
		Dec	**Hex**		
Differential Total Flow	**04**	768	0x0300	Integer	-999999999 -999999999
Reverse Total Flow	**04**	770	0x0302	Unsigned Integer	0 - 999999999
Forward Total Flow	**04**	772	0x0304	Unsigned Integer	0 - 999999999
Unit (Total unit and flow unit)	**04**	774	0x0306	Unsigned short	**High Byte: Total Unit** 0 — “0.001m3” 1 — “0.01m3” 2 — “0.1m3” 3 — “m3” 4 — “0.001L” 5 — “0.01L” 6 — “0.1L” 7 — “L” 8 — “0.001ft3” 9 — “0.01ft3” 10 — “0.1ft3” 11 — “ft3” 12 — “0.001gal” 13 — “0.01gal”

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

					14 -- “0.1gal” 15 -- “gal” 16 -- “0.001lgal” 17 -- “0.01lgal” 18 -- “0.1lgal” 19 -- “lgal” 20 -- “0.001kg” 21 -- “0.01kg” 22 -- “0.1kg” 23 -- “kg” 24 -- “0.001t” 25 -- “0.01t” 26 -- “0.1t” 27 -- “t” 28 -- “0.001Lb” 29 -- “0.01Lb” 30 -- “0.1Lb” 31 -- “Lb” **Low Byte: Flow Unit** 0 -- “m³/s” 1 -- “m³/m” 2 -- “m³/h” 3 -- “L/s” 4 -- “L/m” 5 -- “L/h” 6 -- “ft³/s” 7 -- “ft³/min” 8 -- “ft³/h” 9 -- “gal/s” 10 -- “gal/min” 11 -- “gal/h” 12 -- “lgal/s” 13 -- “lgal/min” 14 -- “lgal/h” 15 -- “kg/s” 16 -- “kg/min” 17 -- “kg/h” 18 -- “t/s” 19 -- “t/min” 20 -- “t/h” 21 -- “lb/s” 22 -- “lb/min” 23 -- “lb/h”
Flow	**04**	775	0x0307	Float	/
Alarm Flag	**04**	777	0x0309	Unsigned	Bit0: Empty Pipe Alarm

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

				short	State Bit1: Excitation alarm State Bit2: High Flow Limit Alarm State Bit3: Low Flow Limit Alarm State Bit4-Bit15: Reserve。 Bits define: 1 -- Alarm 0 – No Alarm
Flow Rate	**04**	778	0x030A	float	/
Flow Percent	**04**	780	0x030C	float	/
Empty Pipe Ratio	**04**	782	0x030E	float	/
Reverse Total Overflow Count	**04**	784	0x0310	Unsigned Integer	0 - 65535
Forward Total Overflow Count	**04**	786	0x0312	Unsigned Integer	0 - 65535
Differential Total Overflow Count	**04**	788	0x0314	Integer	0 - 65535

Holding Register

Parameter Name	**Function Code**	**Register Address**		**Data Type**	**Value Range**
		Dec	**Hex**		
Language	03,06,16	256	0x0100	Unsigned short	0 -- English, 1 -- Chinese
Slave MODBUS Address	03,06,16	257	0x0101	Unsigned short	1-247
Baud Rate	03,06,16	258	0x0102	Unsigned short	1200、2400、4800、9600、19200、38400
Sensor Size	03,06,16	259	0x0103	Unsigned short	3 ～ 3000mm
Flow Unit	03,06,16	260	0x104	Unsigned short	0 -- “m³/s”、 1 -- “m³/m”、 2 -- “m³/h”、 3 -- “L/s”、 4 -- “L/m”、 5 -- “L/h”、 6 -- “ft3/s”、 7 -- “ft3/min”、 8 -- “ft3/h”、

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

					9 -- “gal/s”、 10 -- “gal/min”、 11 -- “gal/h”、 12 -- “lgal/s”、 13 -- “lgal/min”、 14 -- “lgal/h”、 15 -- “kg/s”、 16 -- “kg/min”、 17 -- “kg/h”、 18 -- “t/s”、 19 -- “t/min”、 20 -- “t/h”、 21 -- “lb/s”、 22 -- “lb/min”、 23 -- “lb/h”、
Flow Range	**03,16**	261	0x0105	Float	0.00001 - 99999
Damping	**03,16**	263	0x0107	Float	0.0～50.0S, damping
Flow	**03,06,16**	265	0x0109	Unsigned short	0 -- Forward / 1 -- Reverse
Flow	**03,16**	266	0x010A	Float	-9999 - 9999
Flow Cutoff	**03,16**	268	0x010C	Float	0-99
Cut Disp Ena	**03,06,16**	270	0x010E	Unsigned short	0: Disable / 1: Enable
Total Unit	**03,06,16**	271	0x010F	Unsigned short	0 -- “0.001m3”、 1 -- “0.01m3”、 2 -- “0.1m3”、 3 -- “m3”、 4 -- “0.001L”、 5 -- “0.01L”、 6 -- “0.1L”、 7 -- “L”、 8 -- “0.001ft3”、 9 -- “0.01ft3”、 10 -- “0.1ft3”、 11 -- “ft3”、 12 -- “0.001gal”、 13 -- “0.01gal”、 14 -- “0.1gal”、 15 -- “gal”、 16 -- “0.001lgal”、 17 -- “0.01lgal”、 18 -- “0.1lgal”、 19 -- “lgal”、

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

					20 -- “0.001kg”、 21 -- “0.01kg”、 22 -- “0.1kg”、 23 -- “kg”、 24 -- “0.001t”、 25 -- “0.01t”、 26 -- “0.1t”、 27 -- “t”、 28 -- “0.001Lb”、 29 -- “0.01Lb”、 30 -- “0.1Lb”、 31 -- “Lb”。
Measure Mode	**03,06,16**	272	0x0110	Unsigned short	0 – “forward”、 1 – “forward/reverse” 2 – “reverse”
Analog Type	**03,06,16**	273	0x0111	Unsigned short	0 – 0-10mA、 1 – 4-20mA、 2 – 4～12～20mA、 3 – 0～20mA
P/AH FC Sel.	**03,06,16**	274	0x0112	Unsigned short	0 – Frequency、 1 – Pulse、 2 – Upper limit alarm、 3 – Low limit alarm、 4 – Direct、 5 – Mtsensor Alm、 6 – Sys Alm
1nd Line	**03,06,16**	275	0x0113	Unsigned short	0 -- Q[Unit]、 1 -- Q[%]、 6 -- V[m/s]、 7 -- mA。
Frequency Max	**03,06,16**	276	0x0114	Unsigned short	1-5000
Mtsensor Ena	**03,06,16**	277	0x0115	Unsigned short	0: Disable 1: Enable
Mtsnsr Trip	**03,16**	278	0x0116	Float	1 ～ 65535.0
Alm High Ena	**03,06,16**	280	0x0118	Unsigned short	0: Disable 1: Enable
Alm High Val	**03,16**	281	0x0119	Float	-200.0 - 200.0
Alm Low Ena	**03,06,16**	283	0x011B	Unsigned short	0: Disable 1: Enable
Alm Low Val	**03,16**	284	0x011C	Float	-200.0 - 200.0
Sys Alm Ena	**03,06,16**	286	0x011E	Unsigned short	0: Disable 1: Enable

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Clr Sum Key	**06,16**	287	0x011F	Unsigned short	Total Flow Clear Password (Default 6108)
Sensor Code 1	**03,16**	288	0x0120	Unsigned Integer	0 - 999999
Meter Factor	**03,16**	290	0x0122	Float	0.0001 ～ 9.9999
Excitation Type	**03,06,16**	292	0x0124	Unsigned short	0 -- Type 1(1/10), 1 -- Type 2(1/12), 2 -- Type 3(1/16)
Sensor Fact	**03,16**	293	0x0125	Float	0.0000 - 5.9999
Line CRC Ena	**03,06,16**	295	0x0127	Unsigned short	0: Disable 1: Enable
Line CRC 1	**03,16**	297	0x0129	Float	-15.0 - 15.0
Line Fact 1	**03,16**	299	0x012B	Float	-15.0 - 15.0
Line CRC 2	**03,16**	301	0x012D	Float	-15.0 - 15.0
Line Fact 2	**03,16**	303	0x012F	Float	-15.0 - 15.0
Line CRC 3	**03,16**	305	0x0131	Float	0.0000 - 1.9999
Line Fact 3	**03,16**	307	0x0133	Float	0.0000 - 1.9999
Line CRC 4	**03,16**	309	0x0135	Float	0.0000 - 1.9999
Line Fact 4	**03,16**	311	0x0137	Float	0.0000 - 1.9999
Pls. Lmt En.	**03,06,16**	313	0x0139	Unsigned short	0: Disable 1: Enable
Pls. Lmt Val.	**03,06,16**	314	0x013A	Unsigned short	0 ～ 100%
Plsnt Delay	**03,06,16**	315	0x013B	Unsigned short	0 ～ 60000
Flow Display Decpoint	**03,06,16**	322	0x0142	Unsigned short	1 -- 1 Decpoint, 2 -- 2 Decpoint, 3 -- 3 Decpoint, 4 -- 4 Decpoint, 5 -- 5 Decpoint, 0 -- 0 Decpoint,
AL FC Select	**03,06,16**	323	0x0143	Unsigned short	0 -- Lower Alarm, 1 -- Flow Direction, 2 -- Upper limit alarm, 3 -- Mtsensor Alm, 4 -- Sys Alm
Work Mode	**03,06,16**	324	0x0144	Unsigned short	0 -- Mode 1、 1 -- Mode 2
2nd Line	**03,06,16**	325	0x0145	Unsigned short	0 -- V[m/s].

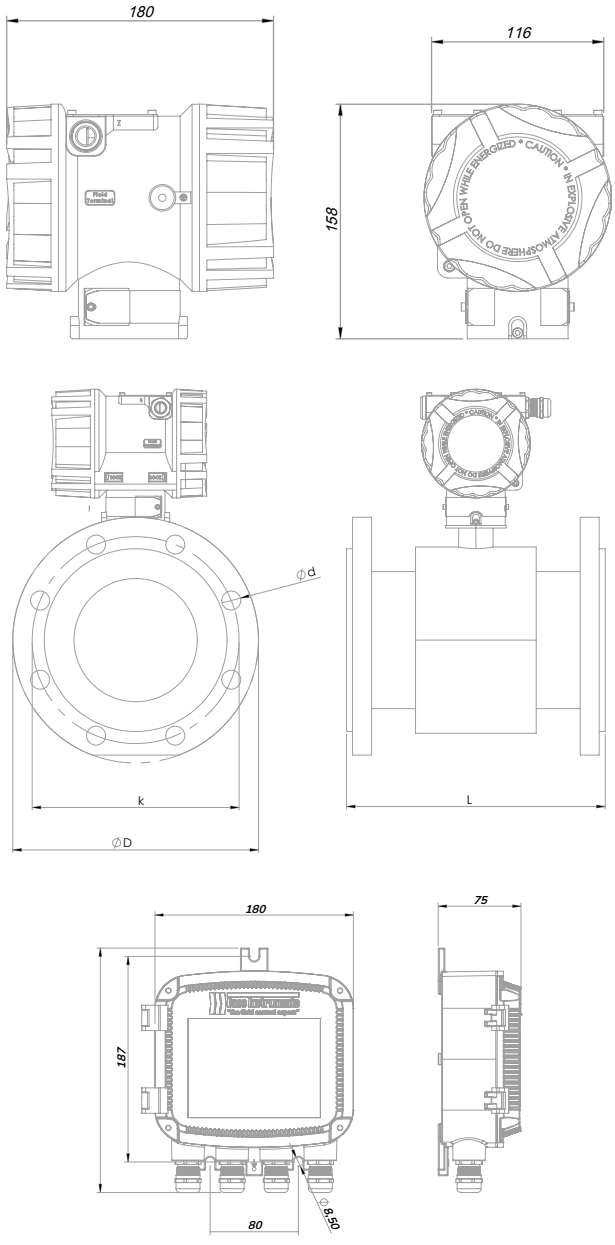
Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

					1 -- Q[%], 2 -- MTP[%], 3 -- Totalizer->F, 4 -- Totalizer<-R, 5 -- Totalizer Net, 6 -- Q[Unit], 7 -- mA,
LCD Contrast	**03,06,16**	326	0x0146	Unsigned short	0 ～ 5
Pluse Factor	**03,06,16**	327	0x0147	Float	0.001～1000.0
Pluse Width	**03,06,16**	329	0x0149	Float	0.1～250.0ms
Density	**03,06,16**	331	0x014B	Float	0.1～5.0
Density Unit	**03,06,16**	333	0x014D	Unsigned short	0 -- “g/cm3”、 1 -- “kg/m3”、 2 -- “lb/gal”、 3 -- “lb/cf”、
Alm Iout En.	**03,06,16**	334	0x014E	Unsigned short	0 -- Disable / 1 -- Enable
HAlarm Iout	**03,06,16**	335	0x014F	Float	21.5～23.0mA
	03,06,16	337	0x0151	Float	3.0～3.8mA
Write Project	**03,06,16**	339	0x0153	Unsigned short	0 -- Disable / 1 -- Enable
Modbus Pari.	**03,06,16**	340	0x0154	Unsigned short	0 -- “None”、 1 -- “Odd”、 2 -- “Even”
Modbus SBL	**03,06,16**	341	0x0155	Unsigned short	1～2
Alm High Object	**03,06,16**	342	0x0156	Unsigned short	1 -- Q[%]、 3 -- Totalizer->F、 4 -- Totalizer<-R、 6 -- Q[Unit]、 5 -- Totalizer Net
P/AH Alm Mode	**03,06,16**	343	0x0157	Unsigned short	0 -- “Active High” / 1 -- “Active Low”
Alm Low Obj	**03,06,16**	344	0x0158	Unsigned short	1 -- Q[%]、 3 -- Totalizer->F、

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

					4 -- Totalizer<-R、 6 -- Q[Unit]、 5 -- Totalizer Net
AL Alm Mod	**03,06,16**	345	0x0159	Unsigned short	0 -- “Active High” 1 -- “Active Low”
Language En	**03,06,16**	346	0x015A	Unsigned short	0 -- Disable 1 -- Enable
LOGO Enable	**03,06,16**	347	0x015B	Unsigned short	0 -- Disable 1 -- Enable

7 - Dimension, Installation and Pipe Requirements



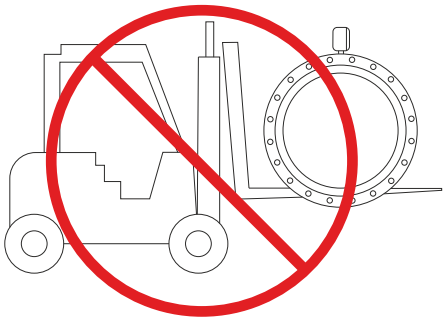
Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Size	Pressure Rating (Bar)	D	k	n-d	L
15	40	95	65	4xø14	200
20	40	105	75	4xø14	200
25	40	115	85	4xø14	200
32	40	140	100	4xø18	200
40	40	150	110	4xø18	200
50	40	165	125	4xø18	200
65	16	185	145	4xø18	200
80	16	200	160	8xø18	200
100	16	220	180	8xø18	250
	25	235	190	8xø22	250
125	16	250	210	8xø18	250
	25	270	220	8xø26	250
150	16	285	240	8xø22	300
	25	300	250	8xø26	300
200	10	340	295	8xø22	350
	16	340	295	12xø22	350
	25	360	310	12xø26	350
250	10	395	350	12xø22	450
	16	405	355	12xø26	450
300	10	445	400	12xø22	500
	16	460	410	12xø26	500
350	10	505	460	16xø22	550
	16	520	470	16xø26	550
400	10	565	515	16xø26	600
	16	580	525	16xø30	600
450	10	615	565	20xø26	600
	16	640	585	20xø30	600
500	10	670	620	20xø26	600
	16	715	650	20xø33	600
600	10	780	725	20xø30	600
	16	840	770	20xø33	600
700	10	895	840	24xø30	700
800	10	1015	950	24xø34	800
900	6	1075	1020	24xø30	900
1000	6	1175	1120	28xø30	1000
1200	6	1405	1340	32xø33	1200
1400	6	1630	1560	36xø36	1400
1600	6	1830	1760	40xø36	1600
1800	6	2045	1970	44xø39	1800
2000	6	2265	2180	48xø42	2000

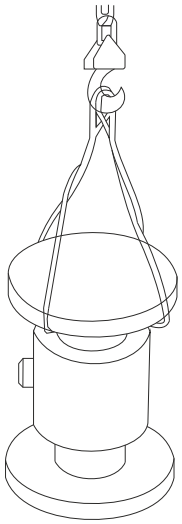
Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

Installation

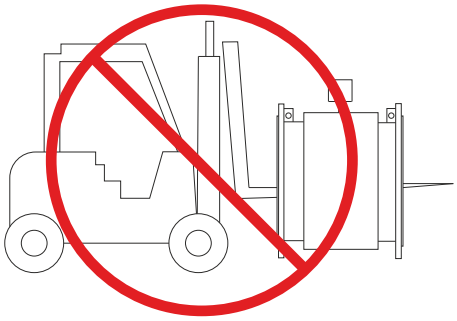
Transportation and Handling



Do not lift the detector from the converter housing, the junction box or the connecting cable. Use lifting lugs for larger sizes is recommended. Very large meter sizes are packed and crated with the meter laying on its side for shipping safety and stability reasons. In order to lift the meter in vertical position, it's recommended to use a sling rigged method as shown below.



Warning: NEVER introduce the forklift, chains, wire slings or any other sharp object inside the flow tube for lifting or handling purpose. This could permanently damage the isolating liner and could render the meter inoperable.
If using a forklift, do not lift the detector from its body between the flanges. The housing could be accidentally dented and permanent damage could be caused to the interna coil assemblies.

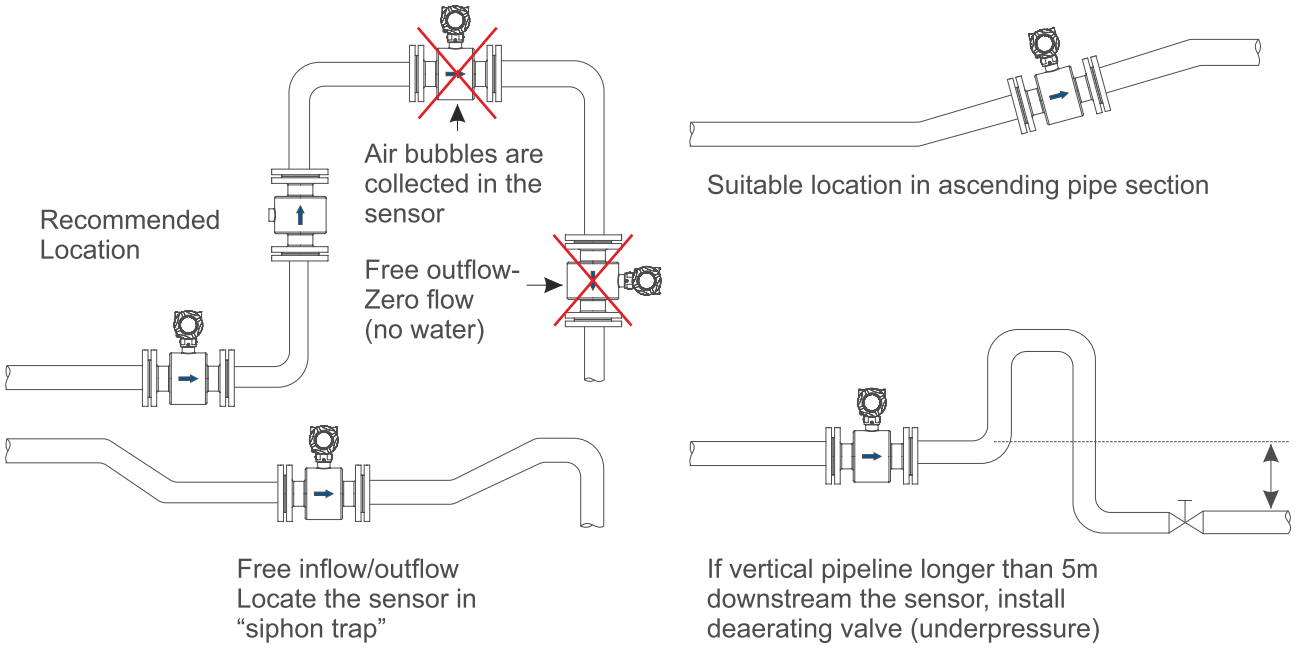


Storage

Pack the measuring device in such a way as to protect it reliably against impact for storage (and transportation). The original packaging provides optimum protection. The storage temperature corresponds to the operating temperature range of the measuring transmitter and the appropriate measuring sensors. Do not remove the protective plates or caps on the process connections until you are ready to install the device. This is particularly important in the case of sensors with PTFE linings.
The measuring device must be protected against direct sunlight during storage in order to avoid unacceptably high surface temperatures.
Choose a storage location where moisture does not collect in the measuring device. This will help prevent fu gus and bacteria infestation which can damage the liner.

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

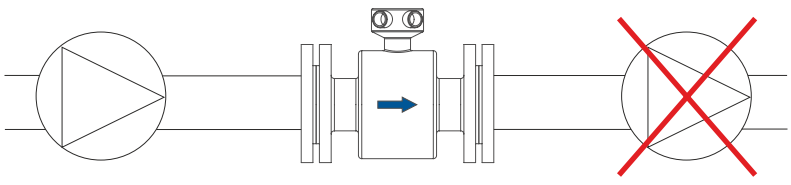
Mounting



To avoid any measurement errors which are caused by air bubbles or failures on the lining, pay attention to the following recommendations:

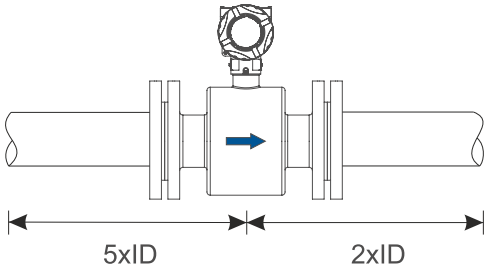
During assembling correctly seat the sensor, tighten screws uniformly and move on a diagonal one after another. It should be noted that the parallelism of flanges has a greater effect on packing than excessive tightening forces on curved and seated flanges. The sensor must be installed inside piping so that the axis of sensor electrode is always horizontal. A PTFE(teflon) lining calls for extra care during handling and assembly. During installation / operation avoid excessive underpressure in pipes. Please do not change and damage the outlet extensive on both ends of the sensor. The sensors are shipped from the factory with special covers to avoid any shape deformations (PTFE elastic memory should cause a partial compensation in future). Please remove the covers just before installation, and when you insert it between counterflanges, replace by a number of smooth metal sheet pieces which are removed just before tightening the bolts.
Packing-the extended part of lining does not operate properly as a seal, hence appropriate packing must be inserted between sensor and pipeline. If the packing protrudes into a flow profile at any point, this will cause turbulence and reduce the measurement quality.
During installation, make sure the sensor slides into piping if the pipeline is not flexible enough. It is recommended that installation inserts (especially for greater internal diameters) should be used.
During installation of the sensor, counter flanges must not be welded (danger of the sensor lining failure).
Installation of Pump

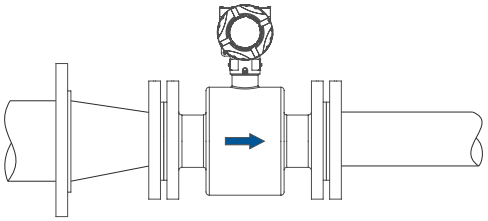
Do not install the sensor on the intake side of a pump. This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube.



Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

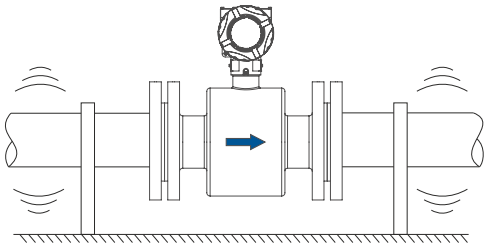
Required Lengths of Straight Runs



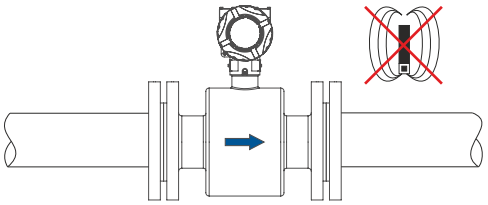


No Straight Run Required

Vibrations and Magnetic Fieds

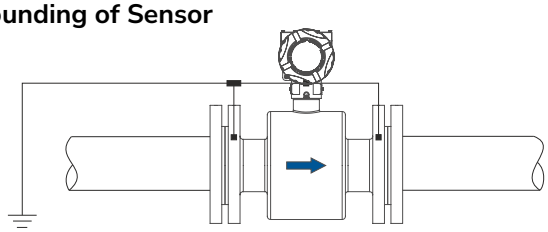


Vibrations of the pipes should be avoided by anchoring the pipe before and after the sensor.

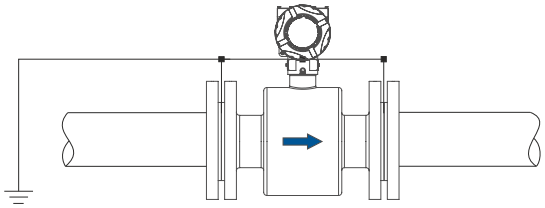


Strong magnetic fields close to the sensor should be avoided

Grounding of Sensor

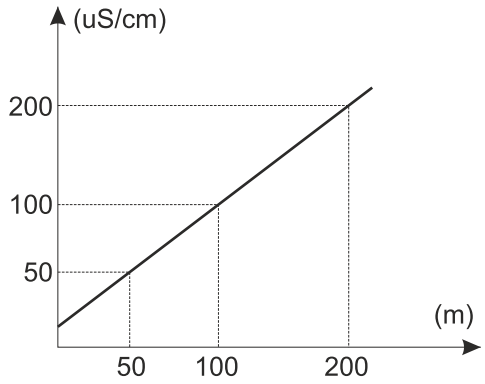


Grounding in metal pipes



Grounding in plastic pipes

Length of Connection Cable



Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr

8 - Maintenance

No special maintenance work is required. When cleaning the exterior of measuring devices, always use cleaning agents that do not attack the surface of the housing and the seals.

Symptom	Probable Cause	Solution
Measurement is not accurate	1.Parameter wrong	Check the parameters (Transmitter, K-factor and size)
	2.Pipe is not fully filled	Check if meter is fully filled
Flow rate indication is unstable	1.Grounding issue	(1) Make sure meter is properly grounded to a good earth grounding (2) Please use grounding ring when the pipe is not conductive, such as PVC or other plastic pipe
	2.Air	Make sure fluid does not contain air bubbles
	3.Converter location outside	Make sure converter is not too close to sources of electrical interference
No Display	1. No power	Apply correct power
	2. Incorrect power	Check power supply
	3. Wiring connections	Check power input/output connections
	4. Fuse blown	Replace fuse
	5. 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, SGND and the alarm disappears, which means the fluid's conductivity is small. Replace other kind of flowmeter

Bass Ölçme Enstrümanları A.Ş.
Esenşehir Mah. Füsun Sok. No:59 Ümraniye/İSTANBUL TR-34776
+90 216 660 01 63-64
bass.com.tr