USER MANUAL

Magnetic Flowmeter
MODEL : KC-8850 Series

Golden Rules

Insertion type
KC-8850-I

Sanitary type KC-8850-S

Inline type KC-8850-M

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Warnings and Cautions

Warnings & Cautions

Warning! Agency approval for hazardous location installations varies between flow meter models. Consult the flow meter nameplate for specific flow meter approvals before any hazardous location installation.

Warning! Hot tapping must be performed by a trained professional. U.S. regulation often require a hot tap permit.
The manufacturer of the hot tap equipment and/or the contractor performing the hot tap is responsible for providing proof of such a permit

Warning! All wiring procedures must be performed with the power Off.

Warning! To avoid potential electric shock, follow National Electric Code safety practices or your local code when wiring this unit to a power source and to peripheral devices.
Failure to do so could result in injury or death.
All AC power connections must be in accordance with published CE directives.

Warning! Do not power the flow meter with the sensor jumper wires disconnected.
This could cause over-heating of the sensors and/or damage to the electronics.

Warning! Before attempting any flow meter repair, verify that the line is de-pressurized.

Warning! Always remove main power before disassembling any part of the mass flow meter.

Caution! Before making adjustments to the Smart Electronics device, verify the flow meter is not actively monitoring or reporting to any master control system. Adjustments to the electronics will cause direct changes to flow control settings.

Caution! All flow meter connections, isolation valves and fittings for hot tapping must have the same or higher pressure rating as the main pipeline.

Caution! Changing the length of cables or interchanging sensors or sensor wiring will affect the accuracy of the flow meter. You cannot add or subtract wire length without returning the meter to the factory for re-calibration.

Caution! When using toxic or corrosive gases, purge the line with inert gas for a minimum of four hours at full gas flow before installing the meter.

Caution! The AC wire insulation temperature rating must meet or exceed 71℃ (158℉).

Caution! Printed circuit boards are sensitive to electrostatic discharge. To avoid damaging the board, follow these precautions to minimize the risk of damage :

• before handling the assembly, discharge your body by touching a grounded, metal object
• handle all cards by their edges unless otherwise required
• when possible, use grounded electrostatic discharge wrist straps when handling sensitive components

Safety Information

We use caution and warning statements throughout this book to draw your attention to important information.

This statement appears with information that is important to protect people and equipment from damage. Pay very close attention to all warnings that apply to your application.

This statement appears with information that is important for protecting your equipment and performance. Read and follow all cautions that apply to your application.

Receipt of System Components

When receiving a Golden Rules Thermal mass flow meter, carefully check the outside packing carton for damage incurred in shipment.
If the carton is damaged, notify the local carrier and submit a report to the factory or distributor.
Remove the packing slip and check that all ordered components are present. Make sure any spare parts or accessories are not discarded with the packing material.
Do not return any equipment to the factory without first contacting Golden Rules Customer Service.

Technical Assistance

If you encounter a problem with your flow meter, review the configuration information for each step of the installation, operation and setup procedures.
Verify that your settings and adjustments are consistent with factory recommendations.
Refer to Page 19, Troubleshooting, for specific information and recommendations.
If the problem persists after following the troubleshooting procedures outlined in Page 19, contact Golden Rules by fax or by E-mail (see inside front cover).
For urgent phone support you may call (+82) 032-817-1240 between
09:00 a.m. and 18:00p.m.PST.
When contacting Technical Support, make sure to include this information :

- The flow range, serial number and Golden Rules order number (All marked on the meter nameplate)
- The software version (Visible at start up)
- The problem you are encountering and any corrective action taken
- Application information (Gas, liquid, Pressure, Temperature and piping configuration)

CONTENTS

1. Profile

Golden Rules KC-8850 Series electromagnetic flowmeters follow the Faraday law of electromagnetic induction. They can be used to accurately measure the flow rate of liquids which are electrical conducting, caustic, and mixed with liquids and solids. They are widely used throughout industries of petroleum, chemical engineering, pharmacology, papermaking, electric power, environmental protection and so forth.

Features:

- No Moving Parts, Virtually No Pressure Loss;
- Corrosion protection, abrasion resistant;
- High accuracy, Stable performance;
- High level of anti-vibration and anti-jamming, wide measuring dimensions.
- Multi-Output interface : 4~20mA, Pulse, Alarm Output, RS-485(Modbus) Communication.

2. Structure and Operation Principle

2.1 Structure

KC-8850 series electromagnetic flowmeters are made up of sensor and transducer, together with LCD screen, current and pulse output, alarm signal and RS-485 communication.

2.2 Operating Principle

Farady's Laws of induction form the basis for The electromagnetic flowmeters. It states that A voltage is induced in a conductor as it moves Through a magnetic field.
This principle is applied to a conductive fluid Which flows through a magnetic field generated Perpendicular to the flow direction(see Schmatic). The voltage induced in the fluid is measured at Two electrodes, installed diametrically opposed. This signal voltage UE is proportional to the Magnetic induction B, the electrode spacing D And the average flow velocity v. Nothing that The magnetic induction B and the electrode Spacing D are constants, proportionality exists Between the signal voltage UE and the average Flow velocity v. The equation for the volume Flow shows that the signal voltage UE is linear And proportional to the volume flowrate. The Induced signal voltage is processed in the Converter Into scaled, analog and digital signals.

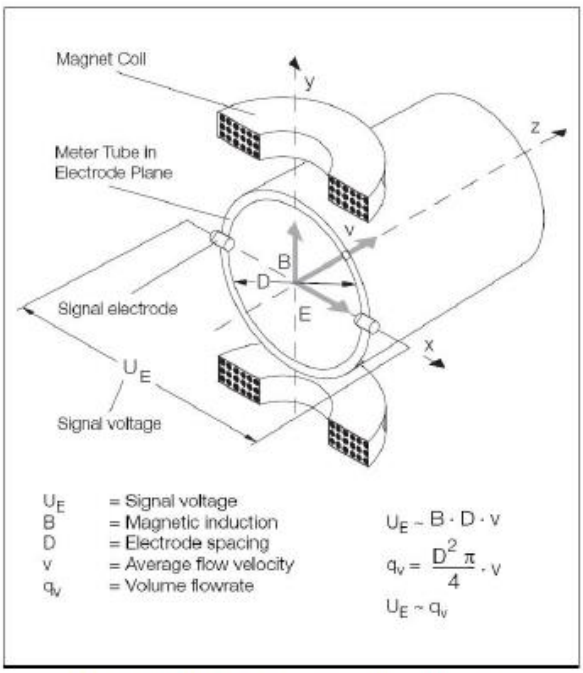


Fig. 1: Electromagnetic Flowmeter Schematic

3. Specificatons

- **Nominal Meter Size**
  10 to 2200mm (3/8 to 79 inch)
- **Liquid Pressure**
  DN10-150 (1.6-4.0MPa), DN200-500 (1.0-1.6MPa)
  DN600-1200 (0.6-1.0MPa), DN1400-2200 (1.0-1.6MPa)
  DN10-150 (CL150-300), DN200-500 (CL125-150)
  DN600-1200(CL125), DN1400-2200 (CL125)
  DN10-150 (10K-30K), DN200-500 (10K-20K)
  DN600-1200 (10K), DN1400-2200 (10K)
- **Accuracy**
  ± 0.5%
- **Minimum Conductivity**
  >5us/sec
- **Electrode Material**
  SS316L (standard), Hastelloy, Tantalum, Titanium
- **Fluid Temperature**
  <80℃ (FEP lining);
  <60℃ (CR lining, PU lining)
- **Liner**
  CR, FEP
- **Relative Humidity**
  <85%
- **Ambient Temperature**
  -10 to 60℃ (14 to 140℉)
- **Current Output**
  0 to 10mA or 4 to 20mA
- **Frequency Output**
  0 to 5000Hz with photoelectric isolation
- **Pulse Output**
  Adjustable from 0.001 to 1000 Ltr/Pulse
- **Alarm Output (option)**
  Upper Alarm-ALMH, Lower Alarm-ALML
  with photoelectric isolation
  Upper Alarm-ALMH, Lower Alarm-ALML
  with photoelectric isolation
- **Communications**
  RS-485 with galvanic isolation,
  MODBUS.
- **Supply Power**
  85 to 250VAC (45 to 63Hz) or
  20 to 36VDC
- **Power**
  S<20W

Specifications

◆ Flow Ranges and Meter Size

Fig. 2: Analog Output Effects

Meter Size		Flow Range (m³/h)				
DN		Flow Velocity				
mm	in	0.2m/s	0.5m/s	10m/s	12m/s	15m/s
10	3/8	0.06	0.14	2.8	3.4	4.2
15	1/2	0.13	0.32	6.4	7.6	9.5
20	3/4	0.23	0.57	11	14	17
25	1	0.35	0.88	18	21	27
32	1 1/4	0.58	1.5	29	35	43
40	1 1/2	0.90	2.3	45	54	68
50	2	1.4	3.5	71	85	106
65	2 1/2	2.4	6	119	143	179
80	3	3.6	9.1	181	217	271
100	4	5.7	14	283	339	424
125	5	8.8	22	442	530	663
150	6	13	32	636	763	954
200	8	23	57	1130	1360	1700
250	10	35	88	1770	2120	2650
300	12	51	127	2550	3060	3820
350	14	69	173	3470	4160	5200
400	16	90	226	4530	5430	6790
450	18	115	286	5730	6870	8590
500	20	141	353	7070	8480	10600
600	24	204	509	10180	12220	15270
700	28	277	693	13860	16630	20780
800	32	362	905	18100	21720	27140
900	36	458	1150	22900	27480	34350
1000	40	565	1420	28280	33930	42410
1200	48	814	2035	40714	48857	61072

Accuracy:

1. (0.5-10)m/s @ ±0.5% of MV
2. (0.2-0.5)m/s @ ±2.0% of MV ±0.02m/s
3. (10-15)m/s @ ±2.0% of MV

4. Model and Sufix Code

Suffix Code																	Description
DC	-50	L	N	F	F	-G1.6	A	L	A	-M	A	U	-C	P	S	-0	Model format
DN	-XXX																Nominal size DN10-2200 mm
Electrodes material		L															316L (No corrosive liquid)
		H															Hastelloy C (anti-corrosion better than 316L)
		M															Monel（Good anti-corrosion）
		V															Titanium(Salty water, sea water)
		T															Tantalum (Good for aqua regia, not for soda and HF)
		C															Tungsten Carbide (Good for solid liquid)
		P															Platinum-Iridium (nearly all liquids except aqua reqia and ammonium salt)
Grounding electrodes material			N														No grounding electrode
			L														L：316L；H：Hastelloy；M：Monel；V：Titanium; T: Tantalum; C: Tungsten Carbide
Lining material				C													Chloroprene Rubber (DN65-2200mm)
				F													FEP / F46 (DN10-500mm)
				P													PU (DN10-500mm)
Process connection					F												Carbon steel flange
					S												SUS304 flange
Working pressure						-G1.6											DN10-150 (1.6-4.0MPa) , DN200-500 (1.0-1.6MPa), DN600-1200 (0.6-1.0MPa), DN1400-2200 (0.6-1.0MPa)
						-A150											DN10-150 (CL150-300) , DN200-500(CL125-150), DN600-1200 (CL125), DN1400-2200 (CL125)
						-J10											DN10-150 (10K-30K) , DN200-500 (10K-20K), DN600-2200 (10K), DN1400-2200 (10K)
Flow sensor housing material							A										Cast aluminum (DN10-100)
							C										Carbon steel (DN125-2200)
							S										SUS304 with painting (DN125-2200)
Liquid temperature								L									<80℃ (FEP lining); <60℃ (CR lining, PU lining)
								T									<120℃ (Compact with cooling fin, FEP lining only)
								E									<180℃ (Compact with cooling fin, FEP lining only)
								S									<120℃ (Remote, FEP lining only)
								H									<180℃ (Remote, FEP lining only)
Flow sensor protection Class									A								IP65 (Compact or remote)
									B								IP68 (Remote)
									C								IP67 (Compact)
Construction										-M							Compact
										-D							Remote (D: Aluminum terminal box)
Power supply											A						85VAC-240VAC
											B						20-36VDC
											C						Lithium battery (Pulse output only for calibration)
Transmitter type												U					Standard type (U: MT101HC-AL. housing)
												W					Wall mounting (MT101)
												S					S: MT206 (Slurry type)；T：MT106 (Slurry, wall mounting)
												N					MT130 (Process control, No display, only signal output)
Output signal 1													-C				C：4-20mA；D：0-10mA；N：No output
Output signal 2														P			P：Pulse output；F：Frequency output；J：Battery supply pulse output; N: No pulse output
Communication (only choose one)															S		S: RS485 (MODBUS)-Std. B: RS485 (MODBUS)-Battery type F: PROFIBUS; H: HART; G: GPRS; A: CDMA;
Cables length																-0	0: No cable (Compact type) 1: 5m of signal and exciting cables (Remote type default) 2: 10m; 3: 15m; 4: 20m; 5: 25m; 6: 50m; 7: 80m; 8: 100m

Note 1: Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also prssible that the instrument itself can be damaged and that fragments from the instruments can contaminate the user's process fluids. Be very careful with highly corrosive process fluids such as hydrochloric acid. sulfuric acid, hydrogen sulfide, sodium hyprochlorite, and high-temperature steam (150'C [302'F] or above). Contact us for detailed information of the wetted parts material.

5. Material Selection

Several liner types, electrode materials, and electrode types are available on KC-8850 Series Electromagnetic Flowmeters to ensure compatibility with virtually any Application.
See Table. 2 for information on liner types, Table. 3 for information on Electrode materials.

Lining Material	General Characteristics
FEP	Highly chemical-resistant Excellent high temperature capabilities
CR	Anti-corrosion of low concentrated acid, alkaline or salt medium, not resistant to oxidizing medium corrosion

Table.2: Lining Material

Electrode Material	General Characteristics
316L Stainless Steel	Good corrosion resistance Good abrasion resistance Not recommended for sulfuric or hydrochloric acids
Hastelloy	Better corrosion resistance High strength Good in slurry applications Effective in oxidizing fluids
Tantalum	Better chemical resistance Not recommended for fluosilic acid, hydrofluoric acid, or sodium hydroxide
Titanium	Better chemical resistance Better abrasion resistance Good for sea water applications Not recommended for hydrofluoric or sulfuric acid

Table.3: Electrode Material

6. Dimensions

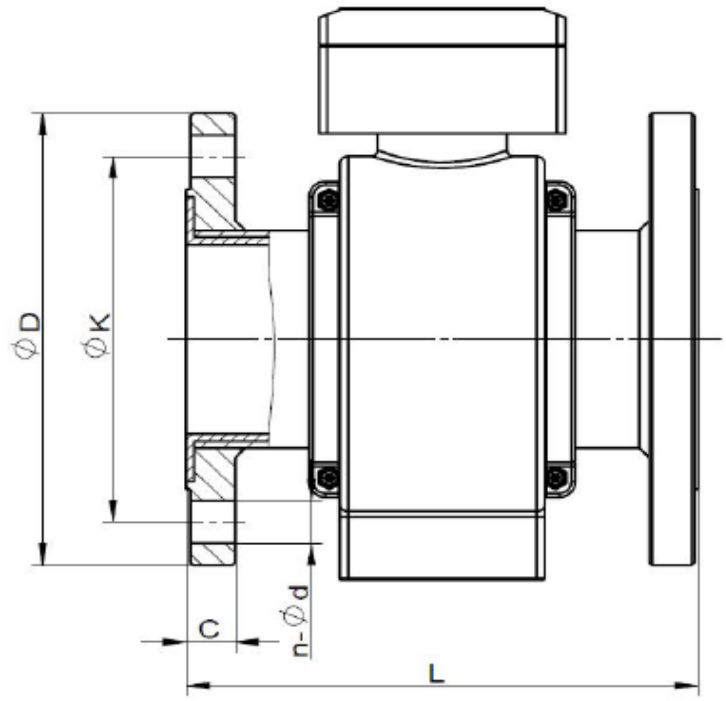


Fig. 3: Dimensions

Specifications

Meter Size DN		Liquid Pressure	Dimensions (mm)			
mm	inch		D	K	L	n-d
10	3/8	DIN PN(10-40)	90	60	200	4-Φ14
		JIS 10K	90	65		4-Φ15
		ANSI CL150	89	60.5		4-Φ15.7
15	1/2	DIN PN(10-40)	95	65	200	4-Φ14
		JIS 10K	95	70		4-Φ15
		ANSI CL150	89	60.5		4-Φ15.7
20	3/4	DIN PN(10-40)	105	75	200	4-Φ14
		JIS 10K	100	75		4-Φ15
		ANSI CL150	98	70		4-Φ15.7
25	1	DIN PN(10-40)	115	85	200	4-Φ14
		JIS 10K	125	90		4-Φ19
		ANSI CL150	108	79.5		4-Φ15.7
32	1 1/4	DIN PN(10-40)	140	100	200	4-Φ18
		JIS 10K	135	100		4-Φ19
		ANSI CL150	117	89		4-Φ15.7
40	1 1/2	DIN PN(10-40)	150	110	200	4-Φ18
		JIS 10K	140	105		4-Φ19
		ANSI CL150	127	98.5		4-Φ15.7
50	2	DIN PN(10-40)	165	125	200	4-Φ18
		JIS 10K	155	120		4-Φ19
		ANSI CL150	152	120.5		4-Φ19
65	2 1/2	DIN PN(10-16)	185	145	200	4-Φ18
		DIN PN(25-40)	185	145		8-Φ18
		JIS 10K	175	140		4-Φ19
		ANSI CL150	178	139.5		4-Φ19
80	3	DIN PN(10-16)	200	160	250	8-Φ18
		DIN PN(25-40)	200	160		8-Φ18
		JIS 10K	185	150		8-Φ19
		ANSI CL150	190	152.5		4-Φ19
100	4	DIN PN(10-16)	220	180	250	8-Φ18
		DIN PN(25-40)	235	190		8-Φ22
		JIS 10K	210	175		8-Φ19
		ANSI CL150	228	190.5		8-Φ19
125	5	DIN PN(10-16)	250	210	250	8-Φ18
		DIN PN(25-40)	270	220		8-Φ26
		JIS 10K	250	210		8-Φ23
		ANSI CL150	254	216		8-Φ22.4

Meter Size DN		Liquid Pressure	Dimensions (mm)			
mm	inch		D	K	L	n-d
150	6	DIN PN(10-16)	285	240	300	8-Φ22
		DIN PN(25-40)	300	250		8-Φ26
		JIS 10K	280	240		8-Φ23
		ANSI CL150	279	241.5		8-Φ22.4
200	8	DIN PN10	340	295	350	8-Φ22
		DIN PN16	340	295		12-Φ22
		DIN PN25	360	310		12-Φ26
		DIN PN40	375	320		12-Φ30
		JIS 10K	330	290		12-Φ23
		ANSI CL150	343	298.5		8-Φ22.4
250	10	DIN PN10	395	350	400	12-Φ22
		DIN PN16	405	355		12-Φ26
		JIS 10K	400	355		12-Φ25
		ANSI CL150	406	362		12-Φ25.4
300	12	DIN PN10	445	400	400	12-Φ22
		DIN PN16	460	410		12-Φ26
		JIS 10K	445	400		16-Φ25
		ANSI CL150	482	432		12-Φ25.4
350	14	DIN PN10	505	460	400	16-Φ22
		DIN PN16	520	470		16-Φ26
		JIS 10K	490	445		16-Φ25
		ANSI CL150	533	476		12-Φ28.4
400	16	DIN PN10	565	515	450	16-Φ26
		DIN PN16	580	525		16-Φ30
		JIS 10K	560	510		16-Φ27
		ANSI CL150	597	540		16-Φ28.4
450	18	DIN PN10	615	565	450	20-Φ26
		DIN PN16	640	585		20-Φ30
		JIS 10K	620	565		20-Φ27
		ANSI CL150	635	578		16-Φ31.8
500	20	DIN PN10	670	620	450	20-Φ26
		DIN PN16	715	650		20-Φ33
		JIS 10K	675	620		20-Φ27
		ANSI CL150	698	635		20-Φ31.8

7. Connection and Operation of Converter

7.1 Keys and Display (MT101)

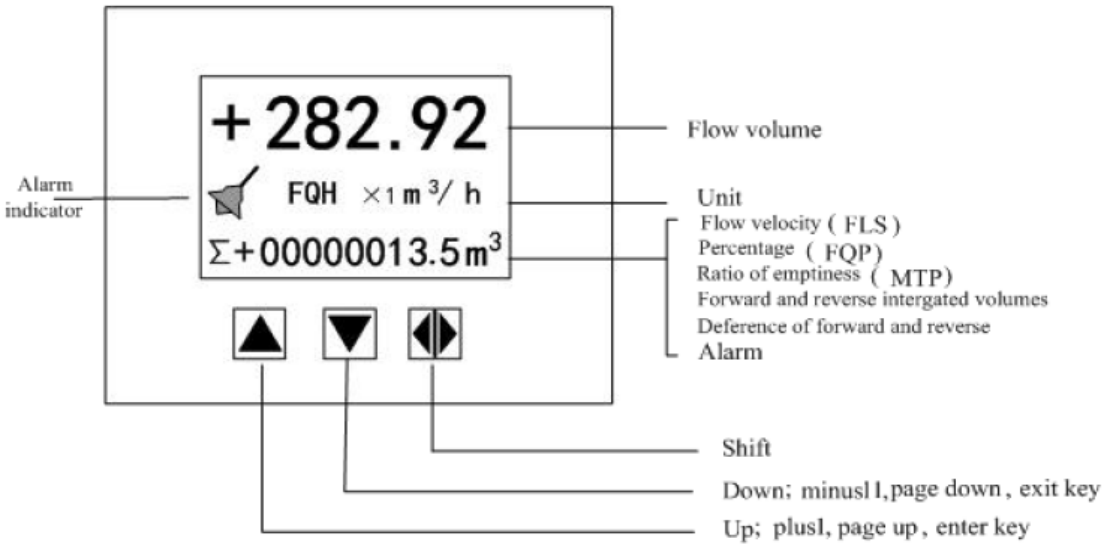


Fig. 4: Define Keys and LCD screen display

Instruction: When measuring, Press enter key, the instruments enter into the setting parameters of select function. Movie the cursor under the enter key. Press it. And then input password when password status “00000” can be seen. Movie the cursor under the enter key again. Press it. And then input settings into selected item of operating manus. Please push “ “ key down for several seconds for returning to running status.

7.2 Connection of Converter (MT101)

7.2.1 Links and Labels of Connector in Model

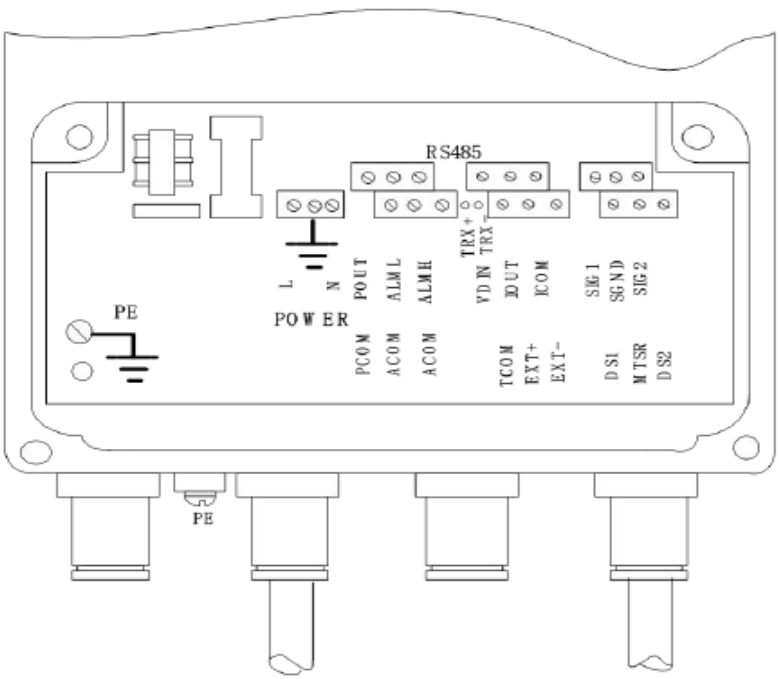


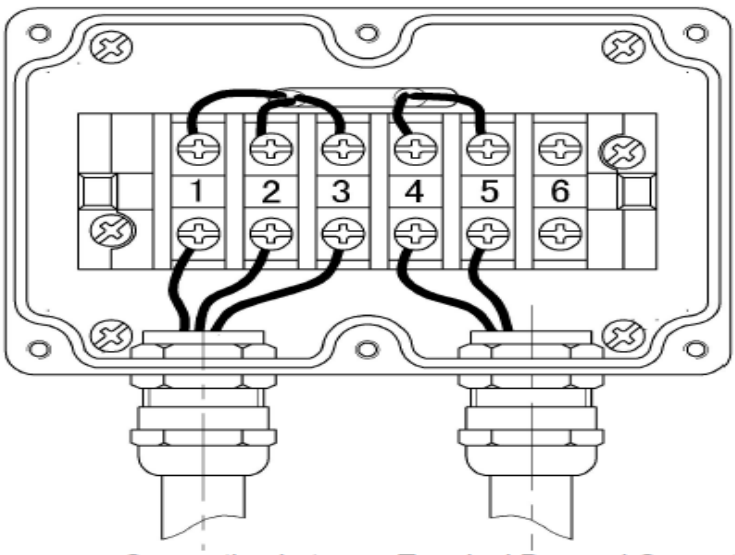
Fig. 5: Labels of connector in Model

7.2.2 Symbols and Description of Connection in Model

Table. 4: Description Of Connectors

SIG1	Signal 1
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
IOUT	Output Current (Output Current for 2-wire)
ICOM	Current Output Ground
POUT	Frequency and Pulse Output
PCOM	Frequency and Pulse Output Ground
ALMH	Alarm Output for Upper Limit
ALML	Alarm Output for Low Limit
ACOM	Alarm Output Ground
TRX+	+Communication Input Signal
TRX-	-Communication Input Signal
TCOM	Communication Input Ground

7.2.3 Connection Instruction for Converter and Terminal Box



Connection between Terminal Box and Converter

Terminal Box Port No.	Cables	Transmitter Port
1	Signal cable (blue)	SIG1
2	Signal cable (brown)	SIG2
3	Shield cable (black)	SGND
4	Exciting cable (brown)	EXT+
5	Exciting cable (blue)	EXT-
6	Reserve	N.A.

7.2.4 Characteristic Cable for Connecton

7.2.4.1 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 50uS/cm, PVVP 2*0.2mm2 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 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 dof lowering the distributed Capacitance of communication cable. When measured conductivity is less than 50uS/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.

7.2.4.2 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 place, the converter from its inside can provide +28Vpower supply and up-pull 10k ohm resistance to output Frequencies (PUL+, PUL-) to isolated OC gate, Alarm Output (ALM+, ALM-), and States 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.

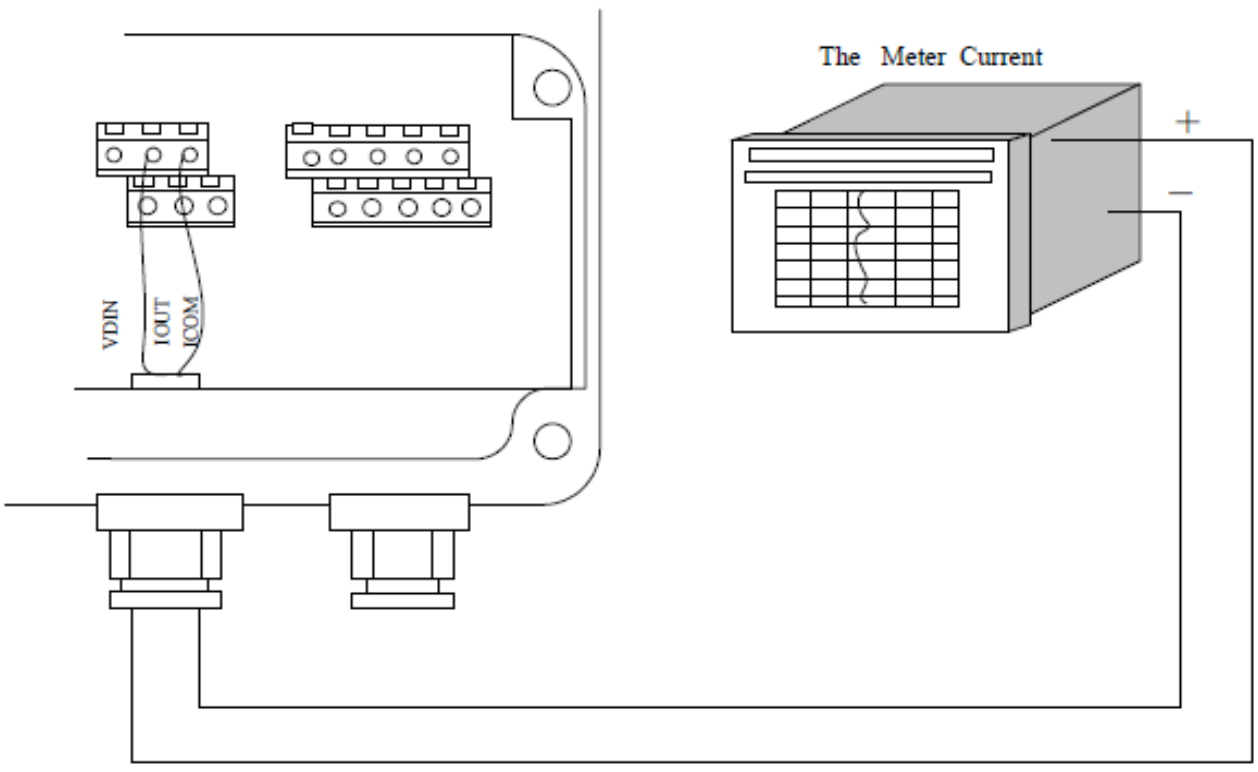


Fig. Connection of Current Output

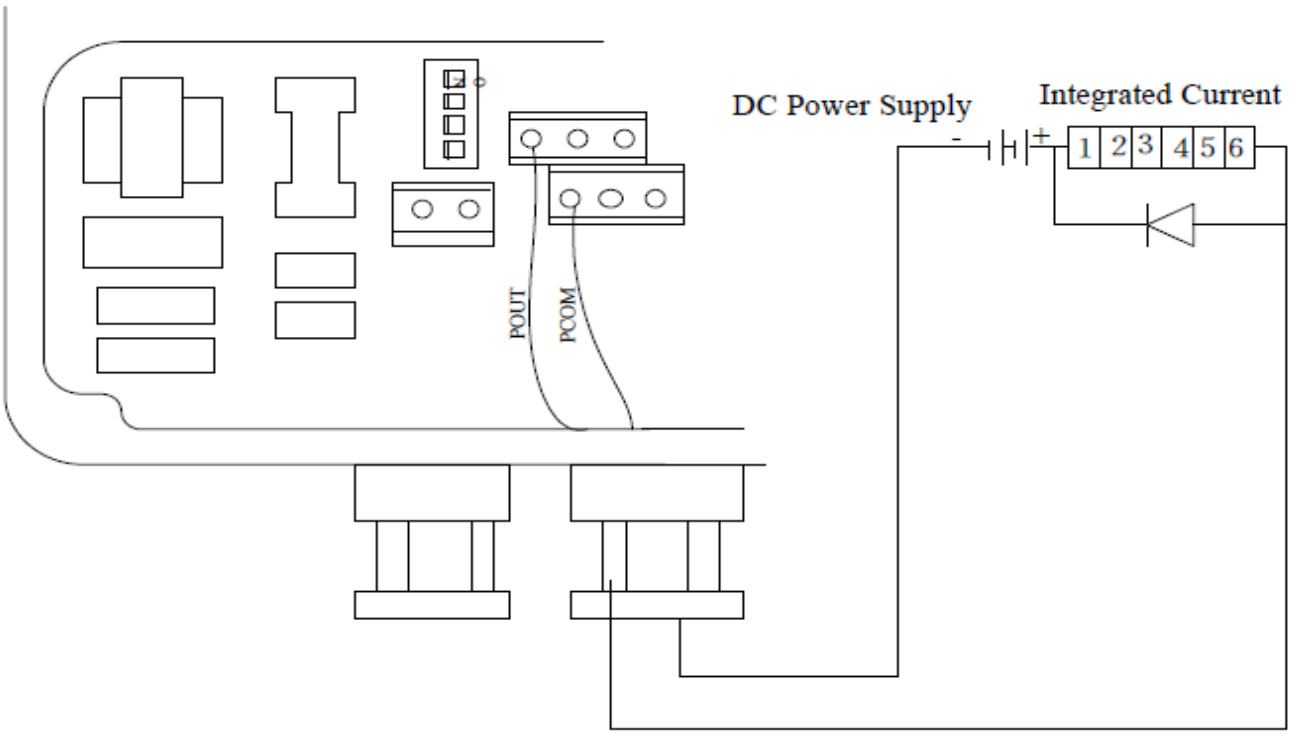


Fig. Connection with Electromagnetic Counter

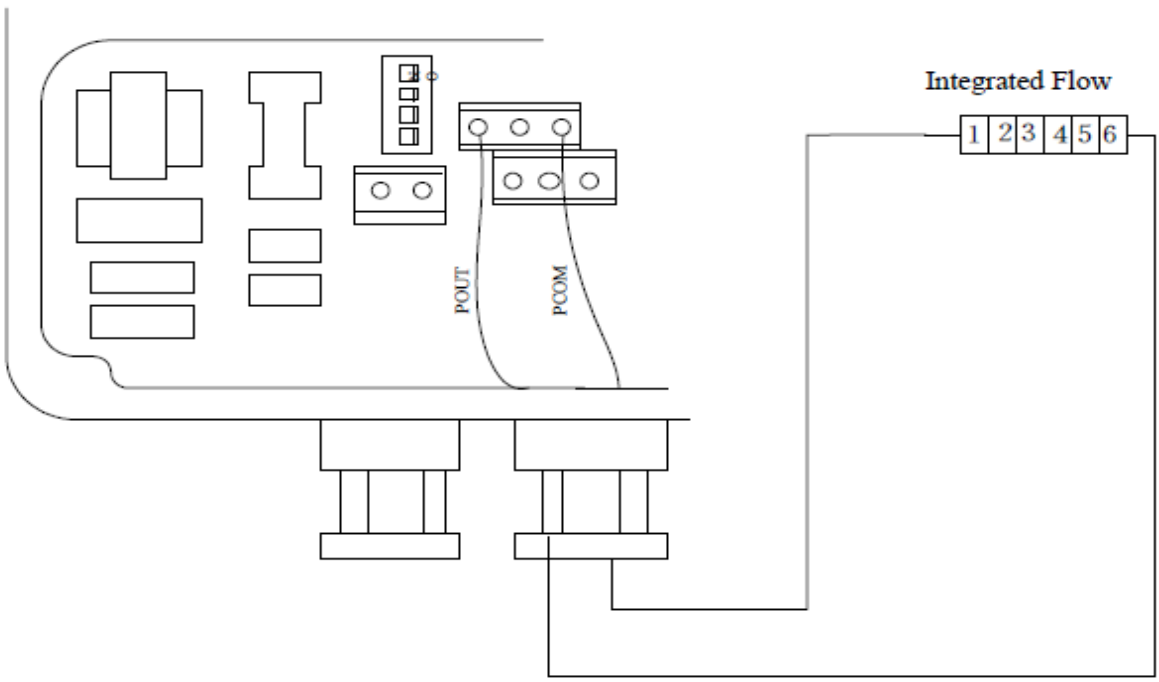


Fig. Connection with Electronic Counter

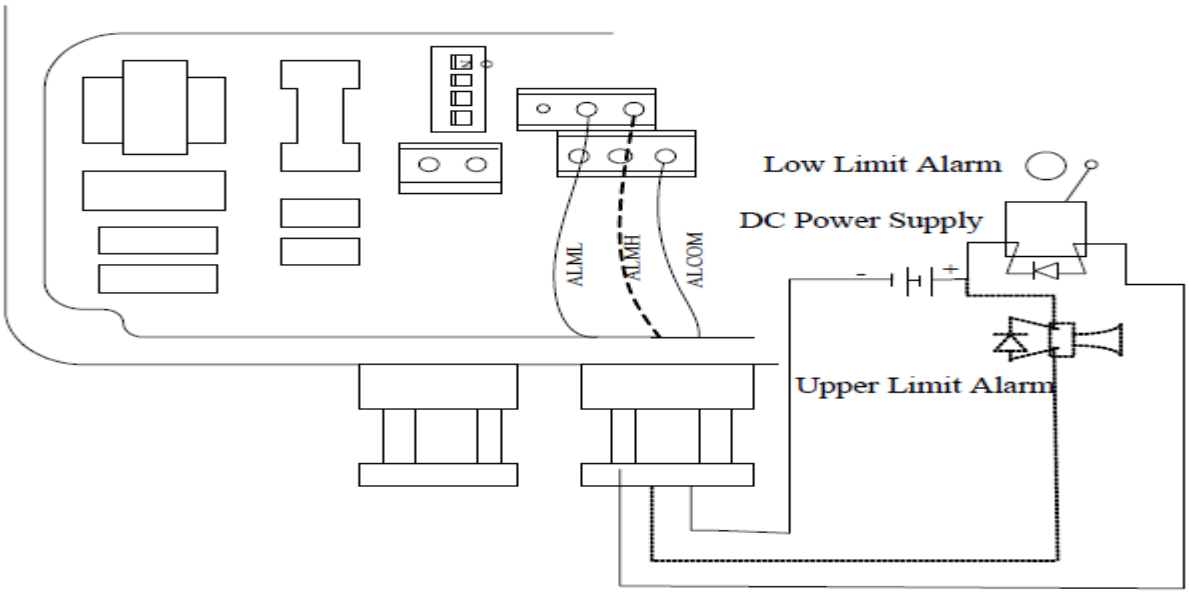


Fig. Connection of Alarm Output

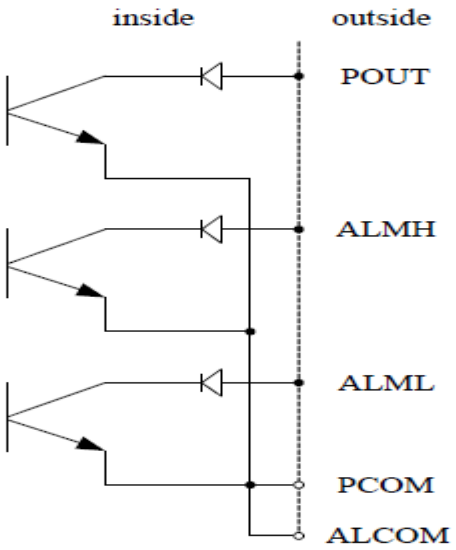


Fig. Connection of OC Gate

7.2.5 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.

7.2.5.1 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 cuount.

7.2.5.2 Pulse Output Mode:

Pulse output mainly applies in count mode. A pulse output delegates a unit flux, such as 1L or 1M3 etc. Pulse output unit divide into 0.001L, 0.01l, 0.1L, 0.01M3, 0.1M3, 1M3. When users choice the pulse unit, They should notice the match of the flux range of flowmeter and pulse unit. For volume flux, count Formula As follows:

QL = 0.0007854 X D2 X V (L/S)

Qr QM = 0.0007854 X D2 X V X 10-3 (M3/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.

7.2.5.3 The Connection of Digital Output

Digital output has three connected points: digital output connection point, digital ground point, and Symbol As follows:

POUT ---- digital output point;

PCOM ---- digital ground point;

POUT ---- is collector cut-off circuit output. Connection the line diagram as follows:

7.2.5.3.1 The Connection of Digital Voltage Output

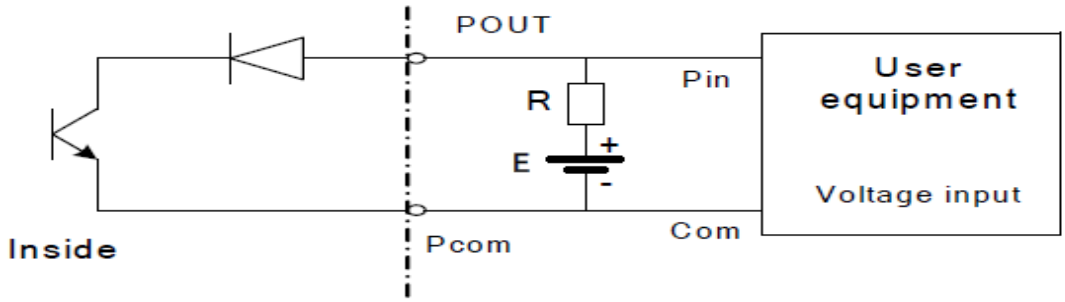


Fig. Connection of Digital Voltage Output

7.2.5.3.2 Digital output connect photoelectricity coupling (PLC ect.)

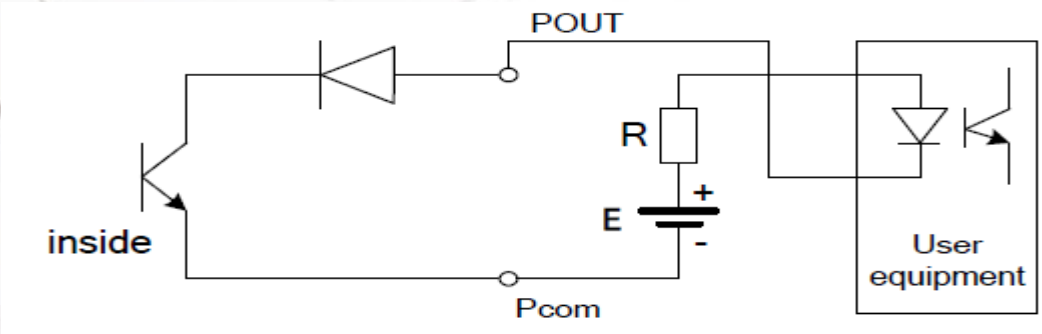


Fig. Digital output connect photoelectricity coupling

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

7.2.5.3.3 Digital Output Connect Relay

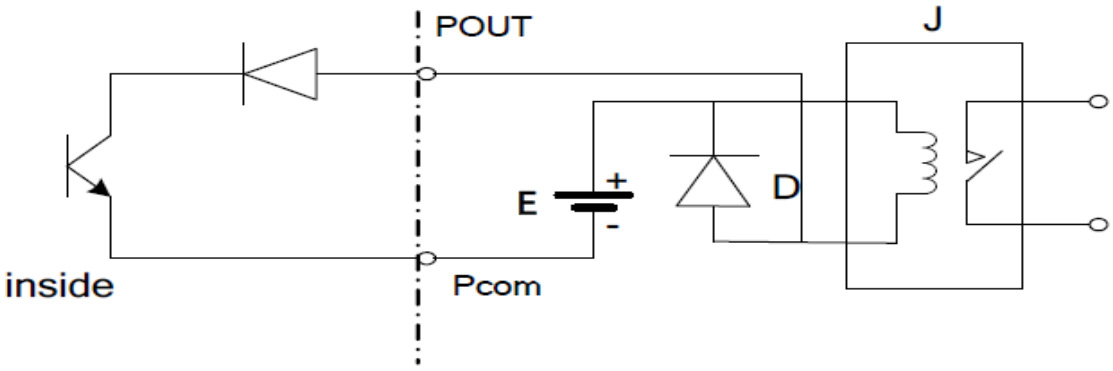


Fig. Digital Output Connect Relay

Commonly relay needs E as 12V or 24V. D is extend diode, now most middle relays has this diode inside. If not have, user can connect one outside.
Table of digital output parameter;

DS output parameter table:

Parameter	Test condition	Mini	Typical	Max	Unit
Volatge	IC=100 mA	3	24	36	V
Current	Vol≤1.4V	0	300	350	mA
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

7.3 Simulated Data Output And Count

7.3.1 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 750ohm resistance.
The percent flux of simulation signal output:

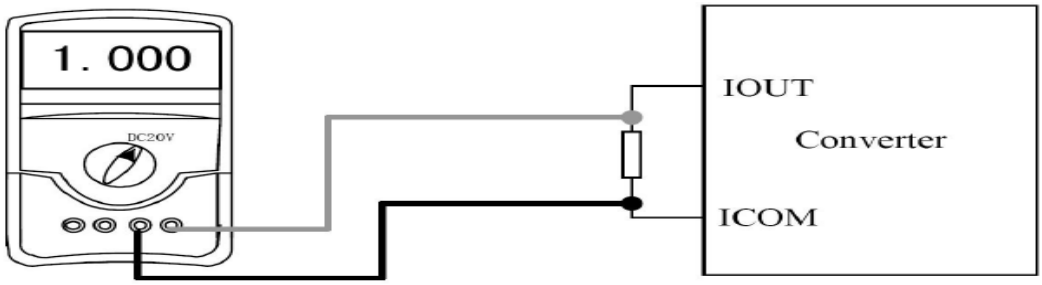
Io = (Measure value / Full scale value) x the scale of current + the zero point of current

The current zero is O 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.
The manufacture's parameter have been adjusted, it can't need adjust.

7.3.2 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% amperemeter or 250ohm 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 amperemeter is 4mA (0.004mA).
(3) The full scale current correct
To select “current correct” to enter. Adjst the converter parameter make amperemeter is 20mA(0.004mA) Ajust 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
Yon can place the standard signal source in 75%50%25%, and check the line degree of current output

8. 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.

8.1 Function Keys

8.1.1 “Down” Key Function in Self-Testing Way

“Down” key: Selecting displayed data on lower line in turn;
“Enter” key: Press it to come into the interface of select function.
“Shift” key: Press it to move the cursor.
Under the measure, adjust of the LCD contract: push “Down” Key and “Shift” Key or “Down” Key and “Enter” Key.

8.1.2 “Down” Key Fuction in Parameters Setting Way.

“Down” key: Subtract 1 from the number at cursor area;
“Up” key: Plus 1 to the number at cursor area;
Push “Shift” key to move the cursor to “Up” key, push “Up” key to the submenu;
Push “Shift” key to move the cursor to “Down” key, push “Down” key return to the father menu.

8.2 Function Keys For 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 “Enter” key getting to the select of parameter and transfer Password (0000). And then correct the password with one of the new passwords that are provided by Manufacturer. Finally, push the “Enter” key to work in Parameters Setting Way.
Basis to the level of secrecy, amend according to the passwords we give. Then push “Enter” key to the Interface needed.

There are 6 Passwords in design and among them 4 for deferent operators in secret and 2 are fixed Passwords for system operation.

8.2.1 The Picture of Select Function

Push "Enter" key to the functions select menu, push "Enter" key to select, there are three functions:

Parameter code	Function content	Explain
1	Parameter code	Select this function It can be enter the picture of parameter.
2	Gross reset	Select this functionIt can be gross reset operation.
3	Record Sensor Fact Alteration	It will record sensor fact history by changed.

8.2.1.1 Parameters Setting

Press "Enter" key: it displays "Parameters Set" function. Input password. Press "Shift" key, Movie Cursor on the "Enter" key, Press it getting to Parameters Setting status.

8.2.1.2 Gross Reset

To push "Enter" key getting to the select of parameter, then push "Up" key to "Clr Total Rec", input The passwords. When the passwords becomes "00000", this function is done, the gross is 0 in the Instrument.

8.2.2 Parameters Setting Menu

There are 55 parameters for KC-8850 Series converter operation. All parameters can be set by users According to the users needs when the converters are running. The List of Parameters is shown below:

Setting Parameters in Menu

Code	Parameter words	Setting Way	Grades	Range
1	Language	Select	2	English
2	Comm Addres	Set count	2	0～99
3	Baud Rate	Select	2	300～38400
4	Snsr Size	Select	2	3～3000
5	Flow Unit	Select	2	L/h、L/m、L/s、m^3/h、m^3/m、m^3/s 、UKG、USG
6	Flow Range	Set count	2	0～99999
7	Flow Rspns	Select	2	1～50
8	Flow Direct	Select	2	Plus/ Reverse
9	Flow Zero	Set count	2	0～±9999
10	Flow Cutoff	Set count	2	0～599.99%
11	Cutoff Ena	Select	2	Enable/Disable
12	Total Unit	Select	2	0.001m^3～1m^3 、0.001L～1L、

Specifications

				0.001UKG ～ 1UKG, 0.001USG～1USG,
13	SegmaN Ena	Select	2	Enable/Disable
14	Analog Type	Select	2	4～20mA/4mA
15	Pulse Type	Select	2	Freque / Pulse
16	Pulse Fact	Select	2	0.001m³～1m³ 、 0.001L～1L、 0.001UKG ～ 1UKG, 0.001USG～1USG,
17	Freque Max	Select	2	1～ 5999 HZ
18	Mtsnsr Ena	Select	2	Enable/Disable
19	Mtsnsr Trip	Set count	2	59999 %
20	Alm Hi Ena	Select	2	Enable/Disable
21	Alm Hi Val	Set count	2	000.0～ 599.99 %
22	Alm Lo Ena	Select	2	Enable/Disable
23	Alm Lo Val	Set count	2	000.0～599.99 %
24	Sys Alm Ena	Select	2	Enable/Disable
25	Clr Sum Key	Set count	3	0～99999
26	Snsr Code1	User set	4	Finished Y M
27	Snsr Code2	User set	4	Product number
28	Field Type	Select	4	Type1,2,3
29	Sensor Fact	Set count	4	0.0000～5.9999
30	Line CRC Ena	Select	2	Enable/Disable
31	Lineary CRC1	User set	4	Set Velocity
32	Lineary Fact 1	User set	4	0.0000～1.9999
33	Lineary CRC2	User set	4	Set Velocity
34	Lineary Fact 2	User set	4	0.0000～1.9999
35	Lineary CRC3	User set	4	Set Velocity
36	Lineary Fact 3	User set	4	0.0000～1.9999
37	Lineary CRC4	User set	4	Set Velocity

38	Lineary Fact4	User set	4	0.0000～1.9999
39	FwdTotal Lo	Correctable	5	00000～99999
40	FwdTotal Hi	Correctable	5	00000～9999
41	RevTotal Lo	Correctable	5	00000～99999
42	RevTotal Hi	Correctable	5	00000～9999
43	PIsntLmtEna	Select	3	Enable/Disable
44	PIsntLmtVal	Select	3	0.010～0.800m/s
45	PIsnt Delay	Select	3	400～2500ms
46	Pass Word 1	User correct	5	00000～99999
47	Pass Word 2	User correct	5	00000～99999
48	Pass Word 3	User correct	5	00000～99999
49	Pass Word 4	User correct	5	00000～99999
50	Analog Zero	Set count	5	0.0000～1.9999
51	Anlg Range	Set count	5	0.0000～3.9999
52	Meter Fact	Set count	5	0.0000～5.9999
53	MeterCode 1	Factory set	6	Finished Y /M
54	MeterCode 2	Factory set	6	Product Serial No
55	CheckMode	Select	2	No Parity/Odd Parity/Even Parity

(Note: Please check from factory for different grade password)

9. Recording Time When Power Turn-Off

There is a clock for timing when power turns off, and it can record 256 numbers of time. Where the power Turn off the form of displayed date is: from Year XXXX, month XX Day XX to XX Month XX Day. When 256 numbers have stored, the time will not recorded anymore.

9.1 Displaying Turn-Off Power Time

Push down key “Enter” to enter the model “Displaying Turn-off Time”, Push “Up” key to display next recording and “Down” key to display preceding. Finally, push down the key “Exit” to return to “Flow Display Model”.

9.2 Erasing “Turn-Off Power” Recording

Holding down “Enter” key to enter the picture of instrument parameter setting and then enter “input Password” model. After input “password 4+11”, and then hold “SHIFT” key and push down “OK” key to erase the “Turn-off Power” Recording.

10. Recording Gross of hour

Push down the “enter” button to enter the panel of the record of the total time, and then push down the “Up” key to show the record. The “increasing” button is used to show the record and the “decreasing” button is used to show the former record, and push down the “exit” key to return to the “decreasing” button

is used to show the former record, and push down the “exit” key to return to the “Display flux” mode. To clear the record of the total time, and then the record of the total is eliminated.

11. Alarm Information

Printed Circuit Board in converters is welded by means of surface welding techniques. Users are not able To repair converters by themselves. Therefore, the cases of converters can not be opened.

FQH: Upper Limit Alarm FQL: Low Limit Alarm
FGP: Empty Pipe Alarm SYS: Exciting Alarm

12. 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.

12.1 Upstream and Downstream Piping

To ensure specification accuracy over widely varying process conditions, install the flowtube a minimum of Five straight pipe diameters upstream and two pipe diameters downstream from the electrode plane(see Fig.8)

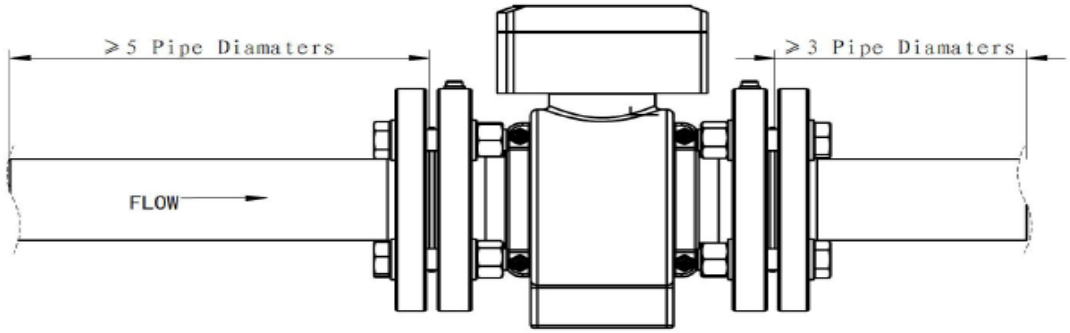


Fig. 8 Upstream and Downstream Straight Pipe Diameters

12.2 Flowtube Orientation

This flowtube should be installed in a position that ensures the flowtube remains full during operating. Horizontal or inclined positions are preferred. Fig.9, Fig.10, and Fig. 11 show the proper flowtube Orientation For the most common installations. The following orientations ensure that electrodes are in the optimum Plan to minimize the effects of entrapped gas. As illustrated in Fig. 10B and Fig. 11B, avoid downwared Flows where back pressure does not ensure that the flowtube remains full at all times.

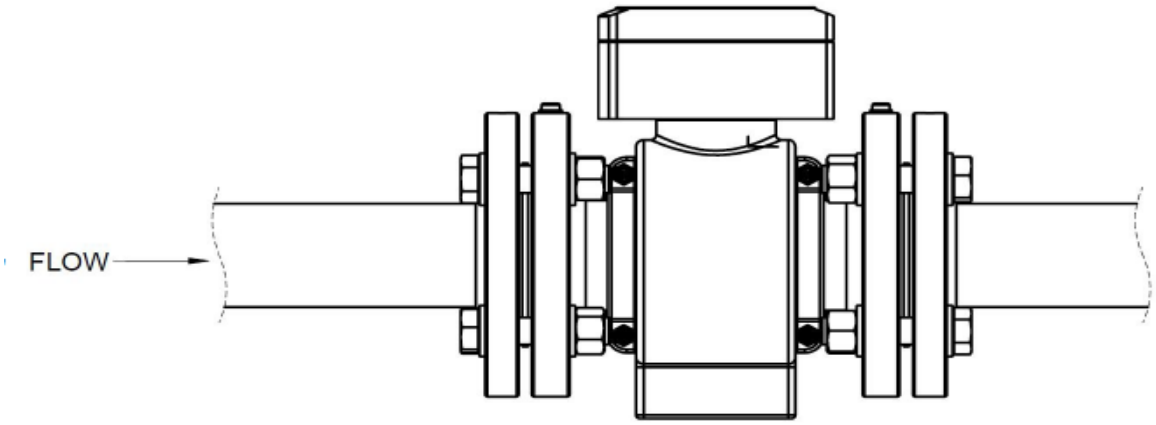


Fig. 9 Horizontal Flowtube Orientation

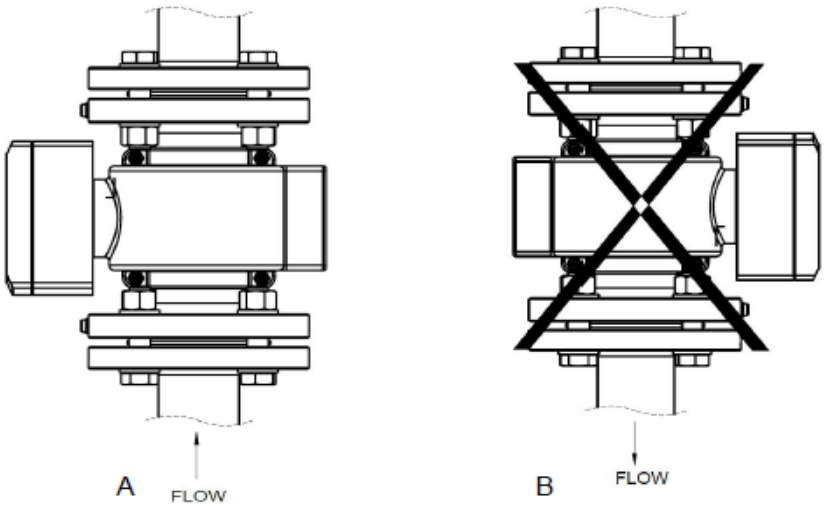


Fig. 10 Vertical Flowtube Orientation

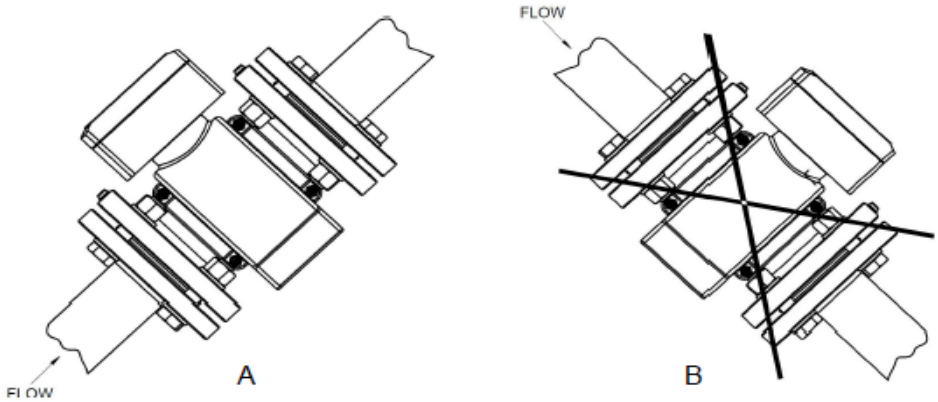


Fig. 11 Incline or Decline Orientation

12.3 Grounding

Grounding the flowtube is one of the most important details of flowtube installation. Proper grounding Ensures that only the voltage induced in the magnetic field of the flowtube is measured.
Use 1)/ 2) to determine which grounding option to follow for proper installation. Attached grounding Rings should be grounded equivalently to non-attached grounding rings.
The flowtube 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.

1) Conductive Unlined Pipe

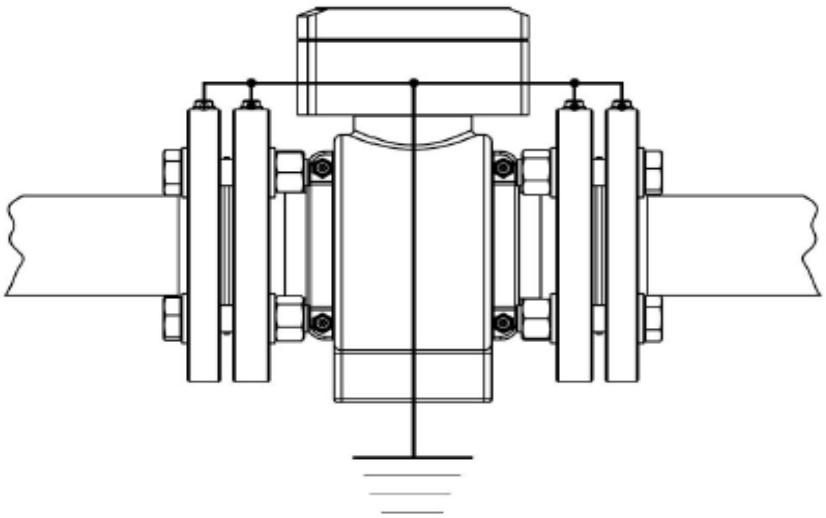


Fig. 12: No Grounding Options or Grounding Electrode in Lined Pipe

2) Conductive Lined Pipe or Non-Conductive Pipe

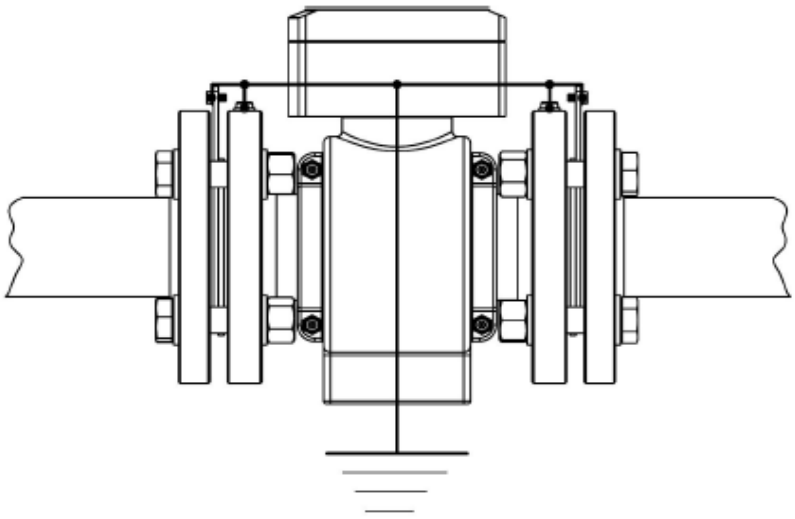


Fig. 13: Grounding with Grounding Rings or Lining Protectors

13. Fault hadling 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;	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.interfenence of external magnetic field; 4.physical properties of flow liquid(such as uniform conductivity or the liquid is sluury with much fiber or grain); 5.unmatched electrode material to liquid	1.prohibit working under the condition 2. that the pipeline isn't full; remove the bubbles of the medium in the sensor pipeline; 3.check the grounding of sensor. to eliminate or be far away from electro magnetic interference. 4.improve the conditions of liquid medium; 5.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 flwo of the liquid, but in fact the liquid flows slightly in the pipeline. There's actually nothing wrong with the electromagnetic flowemeter, 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 electro magnetic 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.

Fault handling

4	inaccurate measurement value	1.the transmitter's set value is incorrect; 2.improper installation position of 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.

Liquid type Magnetic KC-8850Series
Mass & Total Flowmeter
Specialized Manufacturer

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