Variabel Areal Flowmeter

Klinger SH250

Manual

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1. GENERAL INFORMATION

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

Warning

For your safety, review the major warnings and cautions below before operating your equipment.

1. Use only fluids that are compatible with the housing material and wetted components of your Electromagnetic Flow Meter.
2. When handling hazardous liquids, always exercise appropriate safety precautions.
3. When measuring flammable liquids, observe precautions against fire or explosion.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. Handle the sensor carefully. Even small scratches or nicks can affect accuracy.
6. For best results, calibrate the meter at least 1 time per year.
7. Do not purge the flow meter with compressed air.
8. During Electromagnetic Flow Meter removal, liquid may spill. Follow the manufacturer's safety precautions for clean up of minor spills

1.2 Unpacking and inspection

Upon receipt, examine your meter for visible damage. The meter is a precision measuring instrument and handled carefully. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact us.

Make sure the flow meter model meets your specific needs. For your future reference, it might be useful to record this information on nameplate in the manual in case it becomes unreadable on the meter.

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 internal coil assemblies.

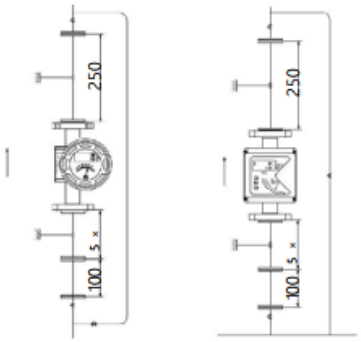
2. TECHNICAL DATA

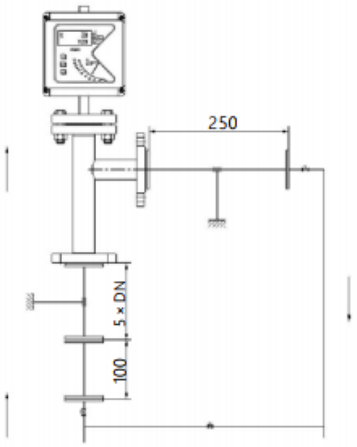
Measuring range	Water (20°C): 1-200000 L/h
	Air(20°C, 0.1013 MPa): 0.03- 6000m³/h
Range ratio	10:1; special 20:1
Accuracy	1.5% of rate
Pressure	DN15- DN50 ≤ 4.0 MPA; DN80- DN200≤ 1.6 MPa (common)
	DN15- DN50≤ 32MPa; DN80- DN200≤ 16 MPa (special)
Pressure loss	7kPa- 70kPa
Medium Temp.	SS304: -40°C- +100°C
	PTFE: 0°C- 100°C
	High Temp.: 110°C- 450°C
Viscosity	DN15< 5mPa.s: < 30mPa.s
	DN25<250mPa.s
	DN50- DN150<300mPa.s
Ambient Temp.	Pointer type: -40oC- +85oC
	Remote: +40°C- +85°C (liquid crystal is not damage) -30°C- +80°C (liquid crystal is able to operate)
Connection	DIN 2501 flanges
Power supply	a. 4-20mA 24V DC (12V DC- 32V DC) 2 wires system
	b. Alarm type: 4-20mA 24V DC (18V DC- 28V DC) 4 wires system
	c. 85- 265V AC 50Hz
	d. Battery: 3.6V @ 7.5 AH (lithium)
Load	Almax= 300Ω
Alarm output	a. H& L Alarm
	b. Switch value(1A@ 30V DC)
	c. Relay output (1A@ 30V DC or 0.25A @ 250V AC or 0.5@ 125V AC)
Protection	IP65
Explosion- proof	Exia II CT5Ex
	Exd II BT6

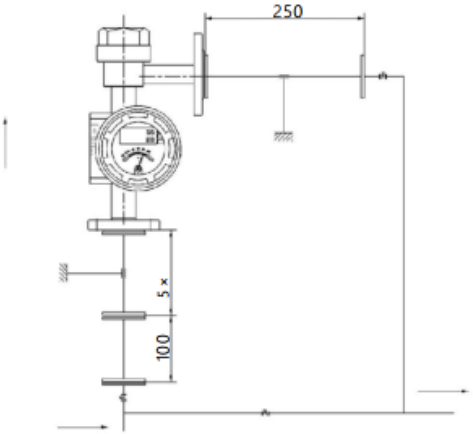
3. INSTALLATION

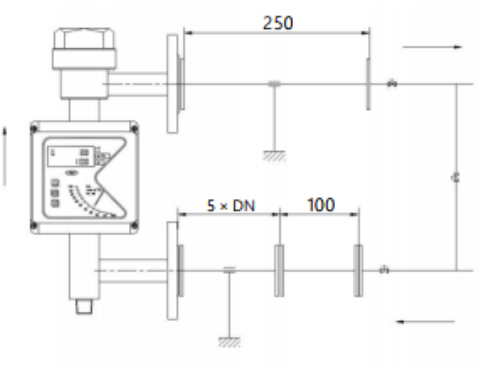
3.1 Installation instruction

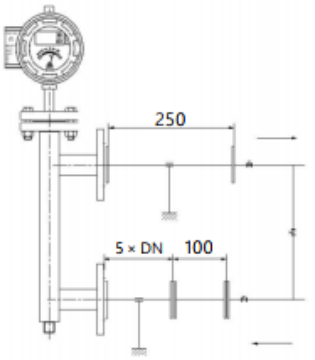
In it: 5× DN: Up straight pipe
250: Down straight pipe
100: For filter

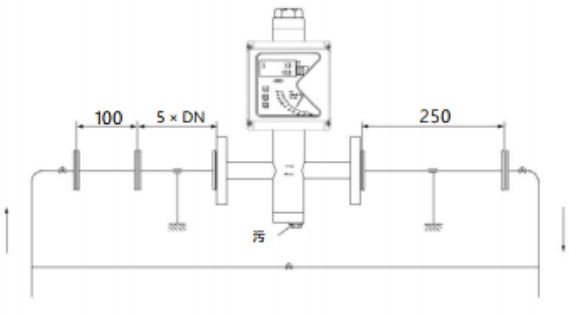


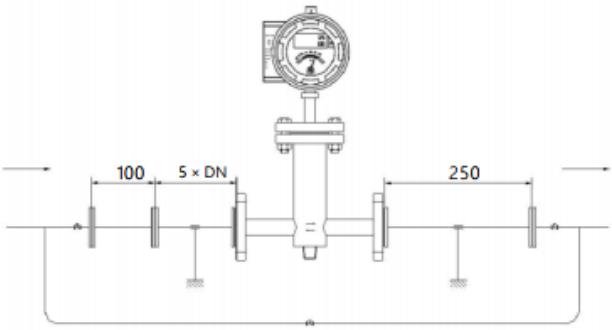


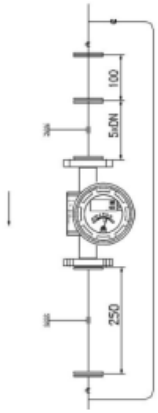


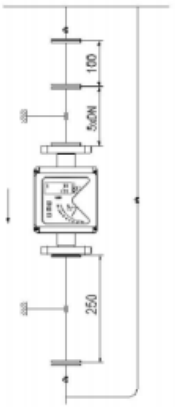

250
5 × DN
100


250
5 × DN
100


100
5 × DN
250


100
5 × DN
250





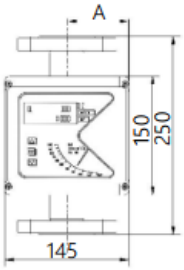
In it: 5× DN: Up straight pipe
250: Down straight pipe
100: For filter

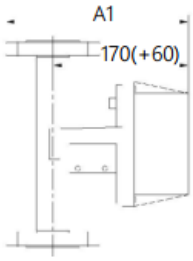
3.2 Installation consideration

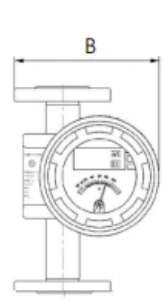
1. The pipe is cleared before installation.We recommend to install magnet filter up the instrument.
2. You should take out stuffing for fixing pointer.
3. The central line of instrument must be straight line with pipe line.The angle between pipe line and central line of instrument is not exceading 20.
4. The instrument diameter is the same with pipe diameter and straight pipe H instrument & L instrument should be 5 times meter's diameter and 250mm.
5. There are not any stealmagnet materials around the meter.
6. We recommend install a valve at output flow for gas measurement.
7. When there is stress, you should add supporter at front and behind instrument.
8. When installing instrument lining PTFE, the press force should not overlight.
9. LCD display should avoid straight light.
10. When low temperature,need steam jacket.

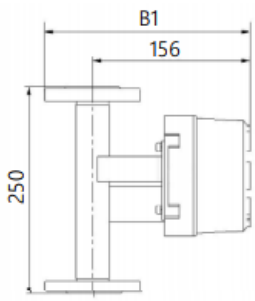
4. DIMENSION & WEIGHT

4.1



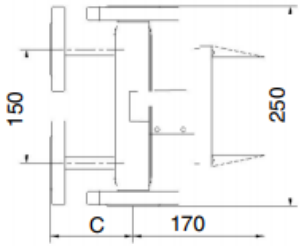


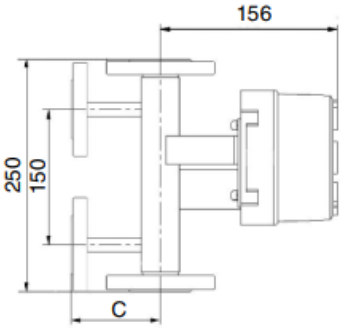




dimention,weight & pressure loss				
DN/Size	A 1	A 2	G1	△ P
DN15	22 0	24 1	3. 7	1 4
DN25	23 0	260	5.2	1 9
DN50	255	30 0	8.7	2 3
DN80	27 0	33 0	14 .2	3 3
DN100	280	350	15. 2	4 2
DN150	32 0	405	33 .7	60
DN200	350	460	48. 7	7 0

In it: G, instrument weight(kg) P(kPa) press. loss.

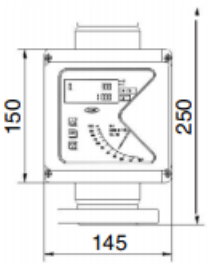


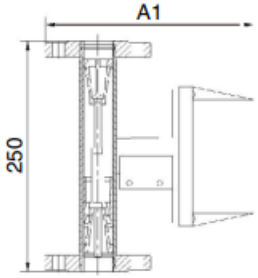


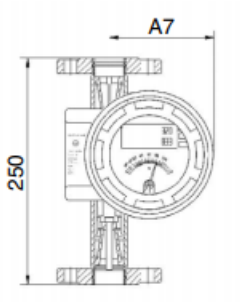
dimention&weight		
DN/Size	C	G2
DN15	100	6.5
DN25	110	10.5
DN50	120	14
DN80	140	20
DN100	150	21
DN150	185	26
DN200	210	30

Note: G_2(kg) weight of instrument

dimension & weight (lining PTFE)





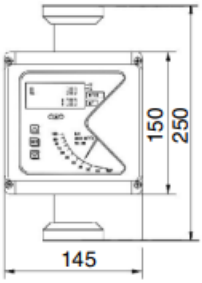


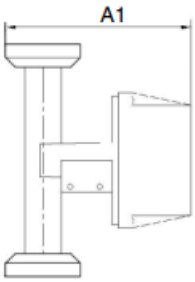
dimesion&weight			
DN/Size	A1	A7	G3
DN15	220	135	6
DN25	230	155	7.5
DN50	255	195	11
DN80	270	225	16.5
DN100	280	250	17.5

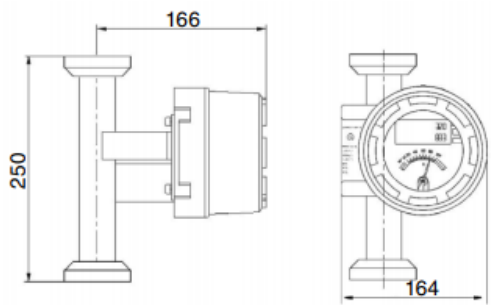
Note: G_2:weight; ΔP: pressure loss (kPa)

Lining PTFE measuring tube

hygiene type dimension & weight

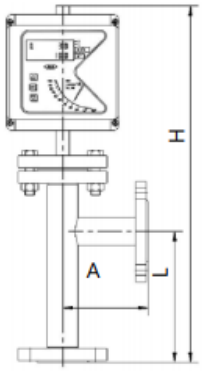




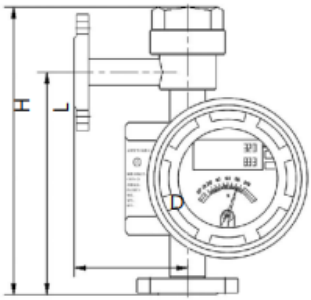


dimesion&weight			
DN/Size	A1	G4	P
DN15	190	2.4	14
DN25	200	3.5	19
DN50	215	4.8	23
DN80	230	7.2	33
DN100	240	8.1	42

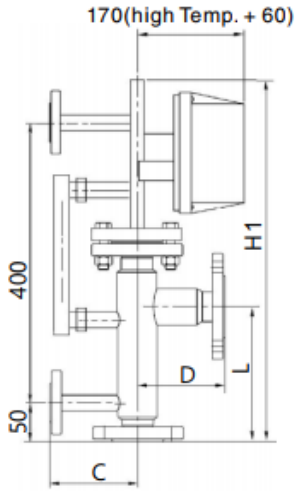
Note: G_4:weight; ΔP: pressure loss (kPa)



DN15- DN200

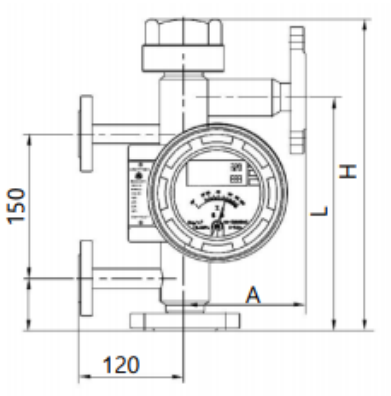


DN15- DN25



DN15- DN200

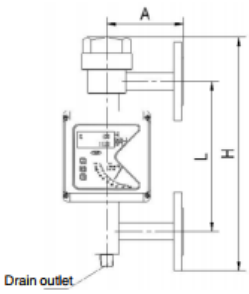
Jacket Type



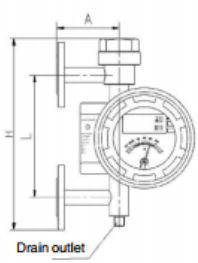
DN15- DN25

DN	H(mm)	L(mm)	A(mm)	G5	ΔP
DN15	350	250	120	7	18
DN25	350	250	120	8	22
DN50	600	250	120	15	28
DN80	700	250	150	25	35
DN100	700	250	150	29	45
DN150	760	300	180	53	58
DN200	800	350	200	61	70

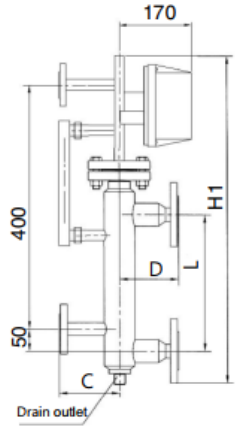
Note: $G_s$weight; ΔP: pressure loss (kPa)



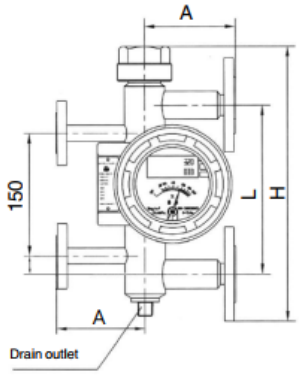
DN15- DN25



DN15- DN200



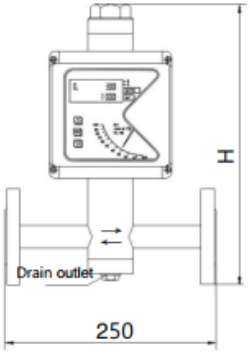
DN15- DN200



DN15- DN25

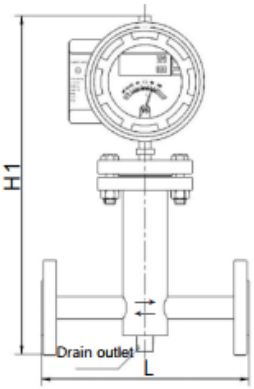
dimension & pressure loss							
D N	**H(mm)**	**H1(mm)**	**C**	**L(mm)**	**D(mm)**	**G6**	**ΔP**
DN15	370	550	100	250	120	5	20
DN25	370	550	110	250	120	8	28
DN50		560	120	250	120	14	36
DN80		565	140	300	150	31	45
DN100		570	150	300	150	50	58
DN150		570	185	350	180	67	63
DN200		620	210	400	200	81	70

Note: G_s:weight; ΔP: pressure loss (kPa)

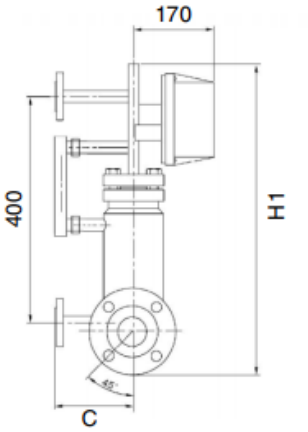


DN15- DN25

53 Type

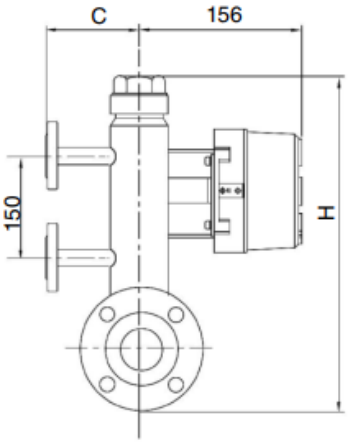


DN15- DN200



DN15- DN200

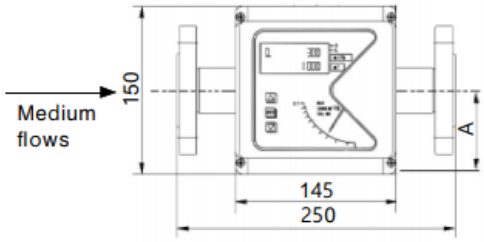
53/T

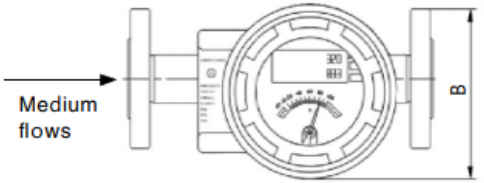


DN15- DN25

dimension & weight							
D N	H(mm)	H1(mm)	L(mm)	C	G7(kg)	ΔP	G7/T(kg)
DN15	350	520	250	143	6.5	30	8
DN25	370	530	250	150	10.5	35	12.5
DN50		560	250	170	21	40	24
DN80		580	400	190	32	45	35
DN100		610	400	210	48	50	53
DN150		630	400	238	58	55	64
DN200		650	400	290	69	60	76

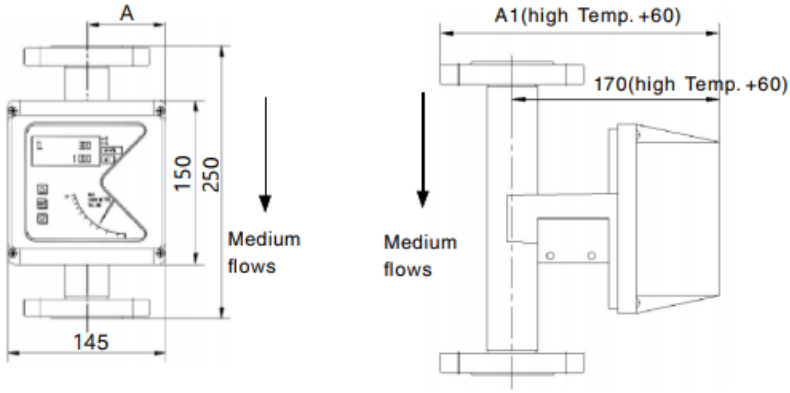
Note: G weight; ΔP: pressure loss (kPa)





Note: G,weight; ΔP: pressure loss (kPa)
Temperature≤ 200°C
No 316L;Ti; Hc PTFE material

DN/Size	A	B	G8	Δ P
DN15	74	241	3.7	14
DN25	83	260	5.2	19
DN50	98	300	8.7	23
DN80	110	330	14.2	33
DN100	120	350	15.2	42
DN150	140	405	33.7	60
DN200	160	460	48.7	7 0

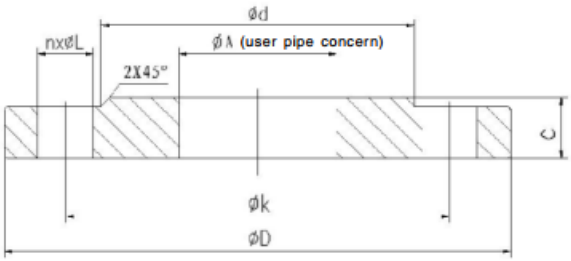


Dimensions and weight 54 to the table with 50 type pressure loss

Note:Temperature≤ 200°C; No 316L;Ti; Hc PTFE material

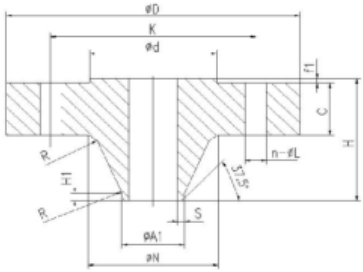
4.7 Flange dimension

4.7.1 Flange standard HG 20592-97



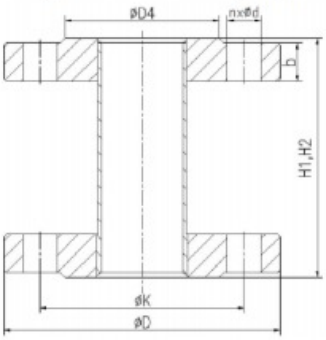
4.7.2 High pressure flange standard HG 2059- 97 pressure PN25MPa

DN	PN	ØD	K	Ød	n	ØL	bolt
15	4.0	95	65	46	4	14	M12
25	4.0	115	85	65	4	14	M12
50	4.0	165	125	99	4	18	M16
80	1.6	200	160	132	8	18	M16
100	1.6	220	180	156	8	18	M16
150	1.6	285	240	211	8	22	M20
200	1.6	340	295	266	12	22	M20

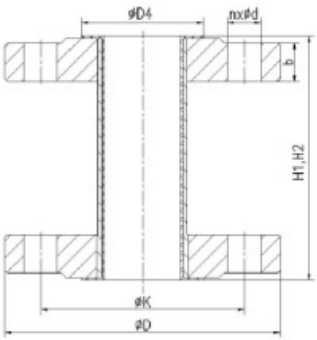


DN	D	K	d	C	f1	H	n	L	R	H1	A1	N	S	bolt
DN15	130	90	46	26	2	60	4	18	3	6	18	48	3.2	M16
DN25	150	105	65	28	2	65	4	22	4	8	32	60	3.6	M20
DN40	185	135	84	34	2	80	4	26	5	10	45	84	5	M24
DN50	200	150	99	38	2	85	8	26	5	10	57	95	6.3	M24
DN80	255	200	132	46	2	102	8	30	6	12	102	136	11	M27
DN100	300	235	156	54	2	120	8	33	6	14	127	164	14.2	M30 x 2
DN125	340	275	184	60	2	140	12	33	6	16	159	206	16	M30 x 2
DN150	390	320	211	68	2	160	12	36	8	18	180	242	17.5	M33 x 2
DN200	485	400	284	82	2	190	12	42	8	25	244.5	305	25	M39 x 3

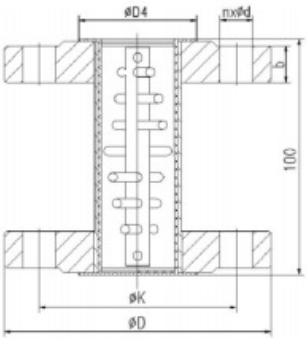
4.8 Magnet filter and straight pipe



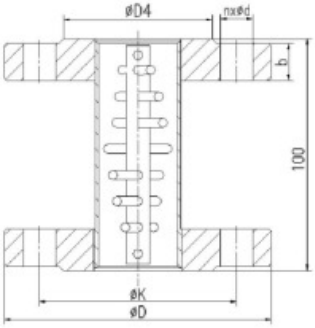
straight pipe



straight pipe with PTFE



Magnet filter lining PTFE



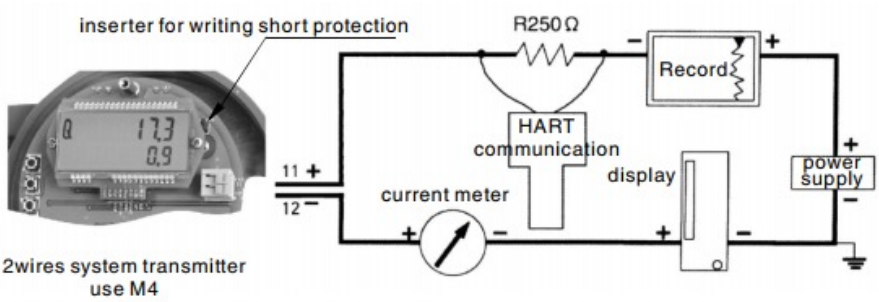
Magnet filter

DN	PN	D	K	D4	n xØd	b	H1 (inlet)	H2 (outlet)	weight (kg)	PTFE (kg)
15	4.0	95	65	45	4x14	14	75	250	1.59	1.6
25	4.0	115	85	68	4x14	16	125	250	2.65	2.8
50	4.0	165	125	102	4x18	20	250	250	6.3	6.6
80	1.6	200	160	138	8x18	20	400	250	8.29	8.74
100	1.6	220	180	162	8x18	22	500	250	10.5	11.02
150	1.6	285	240	212	8x22	24	750	250	17.8	18.95
200	1.6	340	295	266	12x22	26	1000	250	22.19	23.1

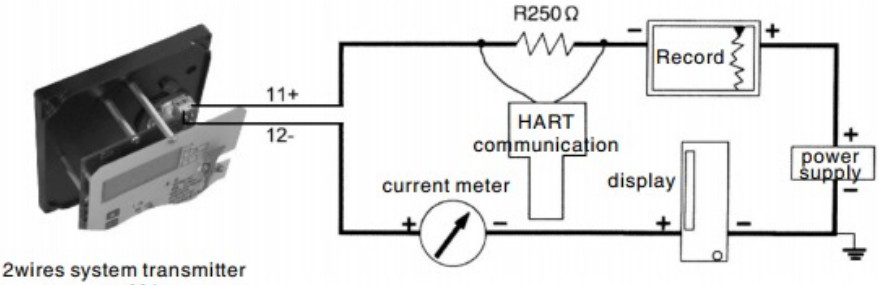
Note: DN> 100; 150 instead of 100; H1: import length; H2: output length.

5. WIRING

5.1 2wires system 4-20mA output (with HART)



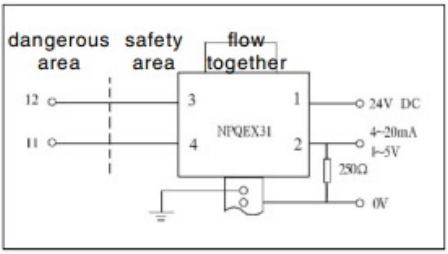
2wires system transmitter
use M4



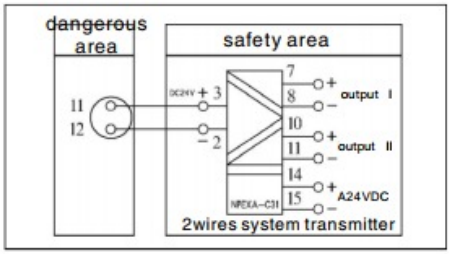
2wires system transmitter
use M4

5.2 Intrinsic- safety

Intrinsic- safety indicator must use safety device for example NPQEX- C31, NPEXA- C31, NPEXA- C311

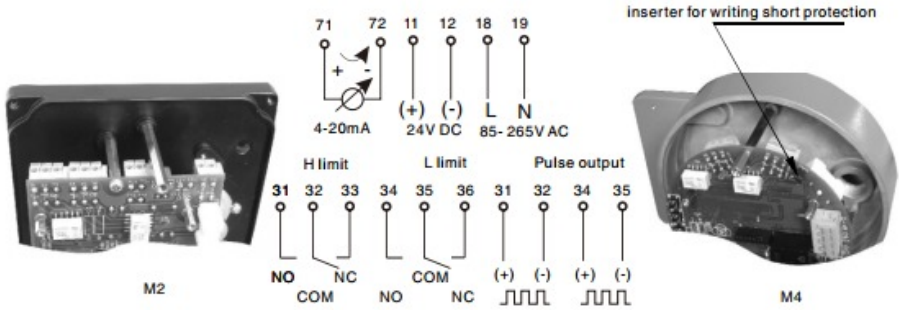


Oinar safety device

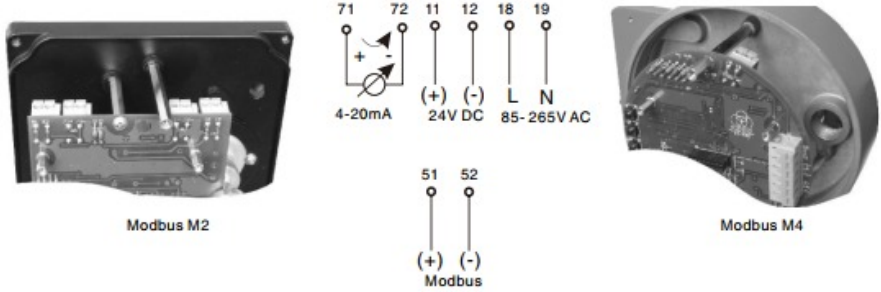


Isdate safety device

5.3 Power supply 24V DC, 220V AC with alarm and pulse output



5.4 With Modbus



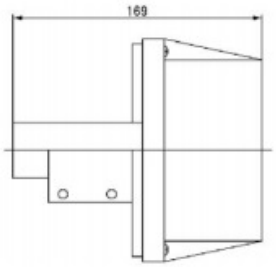
5.5 Switch on and switch off value alarm

Normal open or normal closing, explain at order

5.6 Indicator information

5.6.1 Indicator M1

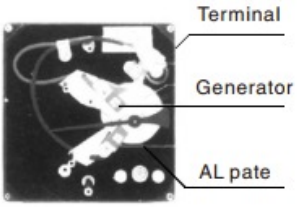
A. Pointer axial with pointer turns round as instantaneous flow rate displaying. If you request, two scales for two kinds of medium can be made.
B. Limit alarm device
The limit alarm device is made from SJ 3.5 initiator and aluminum plate in the indicator, you may fix alarm value by changing Al plate position.



M1 indicator

H and L limit alarm, H limit alarm, or L limit alarm are realized by SJ 3.5 initiator transit or relay WE77/ Ex-1 or WE77/ Ex-2. One alarm with an initiator SJ 3.5 and a transistor relay WE77/ Ex-1, and two alarms with two initiator SJ 3.5 & a transistors relay WE77/ Ex-2.

M1K1



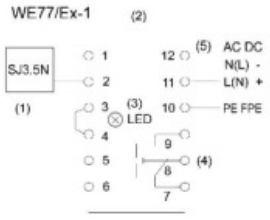
C. Technical date for transistor relay WE77 and initiator SJ 3.5

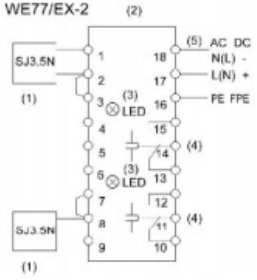
Model	WE77/EX-1	WE77/EX-2
Power supply	220V AC,24V DC	
Power	3.5VA	
Operation temp	-25°C- 60°C	
Open voltage	8(13.5)V	8(13.5)V
Short current	8(31)mA	8(62)mA
Permit inductance	3(31)mH	1(7.6)mH
Permit capacity		160(539)nF
Model	**SJ3.5-N**	**SJ3.5-SN**
Power supply	8V DC	8V DC
Effective area open	⩾ 3mA DC	
Effective area close	⩽ 1mA DC	⩽ 1mA DC
Self inductance	250 μ H	100 μ H
Self capacity	50nF	60nF
Operation temp	-25°C- +70°C	-40°C- +100°C

D. WE77 transistors relay operating way: Open current
WE77 operates in close current also by jumping

Model	WE77/Ex-1	WE77/Ex-2
Operating state	terminal connation wire	
Close current	4-5	3-4; 6-7
Open current	3-4	2-3; 7-8

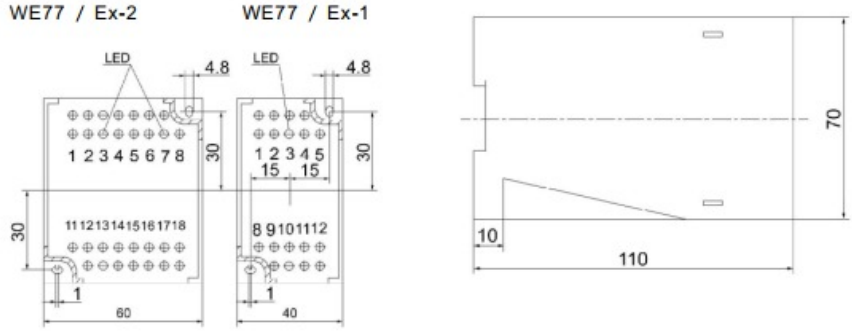
E. Wiring of initiator SJ 3.5 and transistor relay WE77/ Ex.



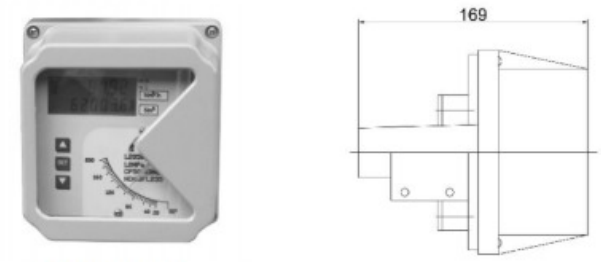


In it: a. SJ 3.5
b. WE77/ Ex
c. Lamp relay operating lamp
d. Relay output
e. Power supply for WE77/ Ex

F. Installation and dimension for WE77/Ex



5.6.2 Indicator M2



M2 indicator

A. M2 shell is square. There is a software submenu circuit plate approved ExiaIICT5 in the shell. M2 indicator has pointer display for instantaneous flow and also has liquid crystal display for instantaneous flow and accumulative total flow. There are 3 Kays for operating. Its output are 4- 20mA and alarm signal.

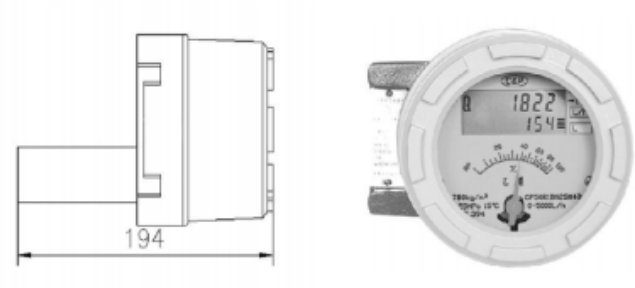
B. Alarm way:
M2 Alarm way is different from M1, M2 alarm way is relay output, by Kay operation. It has protection. It has protection function of broken power, logic, you may give alarm output at the software not using jumper. It can connect with PLC by relay and safety device.

C. Indicator M2 also has following functions:
Multi-data calibration functions setting.
Date store for future use
Date renewing
Protection of broken power
Can select liquid crystal background light not at 2 wire system

D. Battery type
Li lithium battery also provides power supply of M2 & M4, batter supply is 3.6V at 7.5 AH.
Batter can operate over when 3 years continue. Its is at -10°C- +45°C

5.6.3 Indicator M4

Indicator M4 is a display of multi- functions. It includes all of functions of M1, M2, M4 three indicators. M4 has an independent pointer system based M4. Indicator M4 instead of M1, M4 indicators.



M4 indicator

6. DEBUGGING

See the intelligent variable area flow meter software operation instruction Ver-5.0

7. MAINTENANCE

7.1 Indicator and transducer can at dismount random.
7.2 You should clear instrument and magnet filter regular.
7.3 Steal- magnet matter and liquid can not be come into in instrument and instrument shell should connect ground.
7.4 You should open slowly valve front instrument.
7.5 Operating and using instrument should be corrected. If not, EEPROM will damage and data in it will be lost.
7.6 Instrument storage: Temperature: -40°C- +55°C; Humidity: RH 90%
7.7 You should break power supply, when you open shell for Exd instrument
7.8 LCD display will be black when environment temperature < -30°C or > 85°C LCD will not damage. When the temperature returns to normal temperature range.

8. FAILURE ANALYSIS AND SOLUTION

8.1 Vibration

8.1.1 Gentle vibration:
caused by media fluctuation, can be prevented by damping.

8.1.2 Middle vibration:
caused by media flow status, regarding to the gas, normally caused by the unstable operation pressure, which can be prevented by stable pressure or flow control device, or increase the meter damping.

8.1.3 Strong vibration:
caused by media pulsation, unstable air pressure, or the client supplied gas operation pressure, temperature, and flow cannot comply with real situation on the meter, which is over the measuring scope under big differential.

8.2 Pointer stop at some position without movement

Main reason is the float blocked.
During the normal operation, the valve open too fast, which caused the float quickly move up and strike the movement controller, and the movement controller will be out of shape and then block the float. The float oriented lever may also be not concentric with the movement control ring, and block the float. To solve this, first shall take apart the meter, and take away the movement controller to make the shape back to original, then check the if it is concentric with the oriental lever, assembly the float and to make it move up and down. smoothly, meanwhile the meter shall be assembly vertically or horizontally, otherwise meter will be blocked and has measurement error.

8.3 Large measuring error

8.3.1 Assembly procedure cannot comply with the requirement
A: Regarding the vertical installed meter, it shall be vertical assembly and the incline shall not be more than 2.
B: Regarding the horizontal installed meter, it shall be horizontally assembly and the incline angel shall not be more than 2.
C: No magnetic subject is allowed within area of 100mm from the meter.
D: The assembly position shall be away from the valve diameter changing port, pump outlet, non- direct pipe line port, to meet the requirement of 5d ahead and 250mm behind of the direct pipe line.

8.3.2 Big media density change is also on reason of the bigger measurement error. Before calibration, all the media density will be converted according to client supplied media density, it will be calibrated based on water flow under standard status, if the media density has big media density in the formula, convert to the error revised factor, then the real flow rate will be the measured flow rate times with the factor.

8.3.3 Gas media will be effected by the temperature and pressure, suggest to use the pressure and temperature compensation method to get the real flow rate.

8.3.4 With long time usage and pipe vibration, the meter sensor magnetic steel, pointer, weight, and rotating magnetic steel parts will be less crowded, which will make bigger measurement error.
The solution: to test it by move the pointer manually, to make the pointer in the position of RP, check it the output is 4mA and flow rate is 0%, and then test by the degree, if not comply with the requirement, then to calibrate the parts on the position. It is requirement that the professional technician to make the calibration, otherwise it will make the position lose and shall be back to the manufacture for calibration.

8.4 No current output

8.4.1 Check if the wire connection is correct.

8.4.2 No liquid crystal display, if there are display but no output, may the output tube damaged the circuit board need to be replaced.

8.4.3 Lose the calibration value. The meter calibration value lose due to the E2PROM failure, it can caused no current output, but the current value is not changed. Solution to recover the operation by data recovery, if not succeed, first set the data of code 2000, then set the data of code 2008, the method is calibrating the data from RP- 100% by push the pointer manually.

8.5 No site display

8.5.1 Check if the wire connection is correct.

8.5.2 Check if the power supply is correct.

8.5.3 Reinstall the liquid crystal module, and check if the connection point is solid.

8.6 The site liquid is 0 of full scope

8.6.1 Set the scope and zero data by checking the 2000 code. it is required that the ZERO value is lower than Span value, the two values are not equal.
8.6.2 Check the sample data, push the pointer manually to check the change of the sample value, if there are no changes, then it will be sample circuit failure, it is necessary to replace with the circuit board.

8.7 No correct alarm

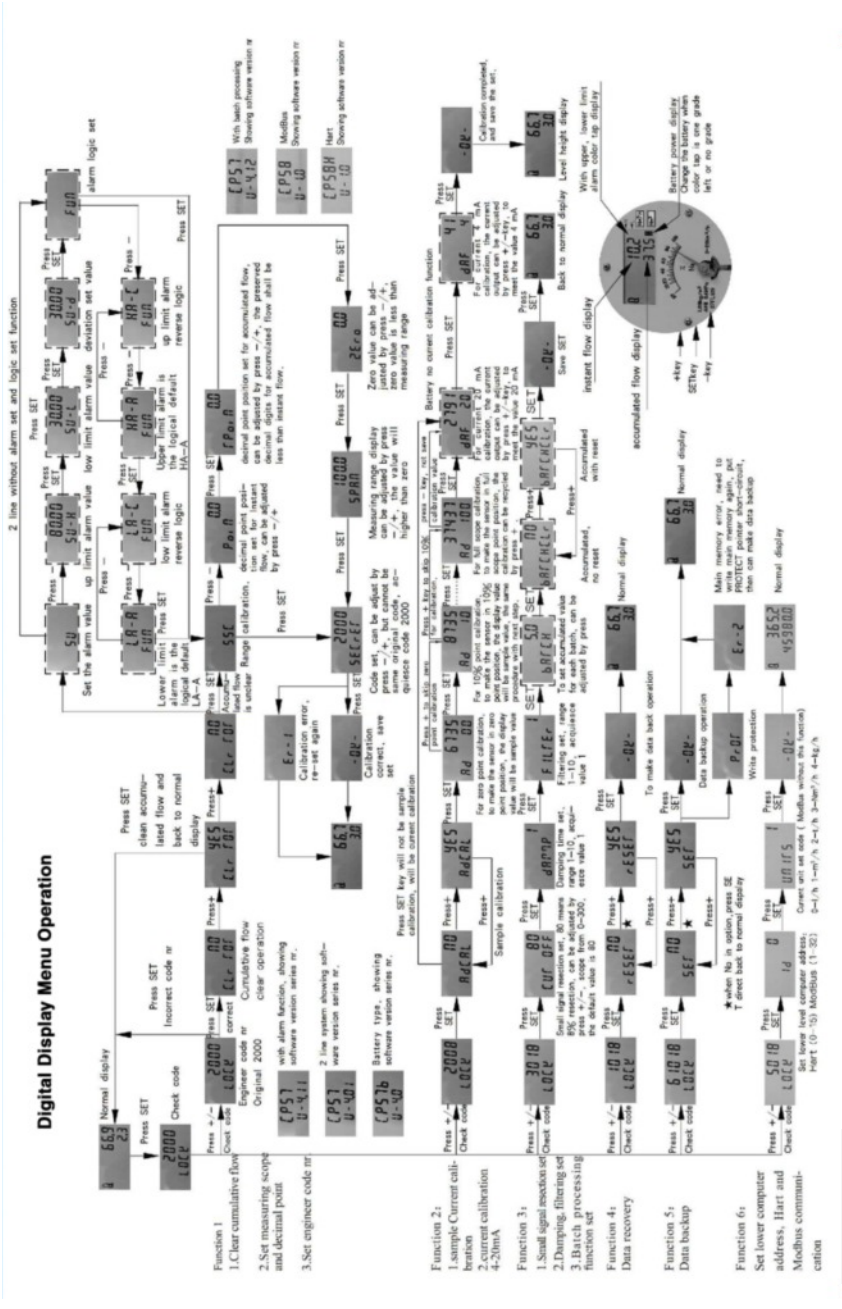
8.7.1 Check the error set value D cannot be too higher.
8.7.2 In the function of FUN, check if the logic function is correct. HA-A means up limit of positive logic. LA-A means low limit of positive logic.
8.7.3 Check alarm set value of SU.
8.7.4 Check if the liquid crystal tap display is correct, there are output but no movement, check the outside power supply and if the negative pole of the outside power supply is correct connected.
8.7.5 Circuit board failure, replace with new.

8.8 Accumulated pulse output is not correct

8.8.1 Check the alarm of the accumulated pulse output is set on ZERO.
8.8.2 Circuit board failure, replace with new.

9. ACCESSORIES

The meters have packed when they left the factory and the accessories are as following:
a. Specification
b. Certificate of Quality
c. Packing List
d. Other attachments (e.g.: companion flange, fastener, etc.) will be displayed in the contract.



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