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# Vortex Flowmeter

## DH 800

### Operator Manual



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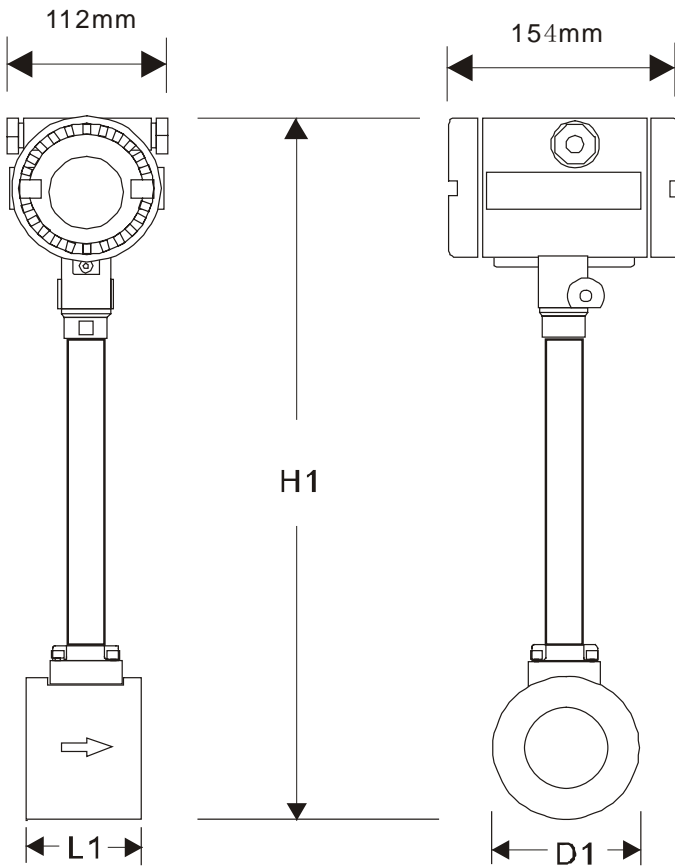
## 1. Flowmeter Check

- A. First check the package if it is good or damage, if broken hard you should notify the meter transport department or contact the customer service center of Api immediately
- B. Open the package and check for meter and all parts attachment if it is good or damage and shortage
- C. Read the operating instruction in detail and comprehends all contents, if any part of that you do not understand full, fax technical service department of Api
- D. Make sure that the specification of the meter you received is conformed to the operating condition
- E. Power on the meter in house, observe the LCD display if it is on normal
- F. Select proper meter install site, make sure to meet the installing condition
- G. Meter be moved to the field and be mounted on the pipe according to the installing requirements
- H. Wiring the power cable, special to care of the shield braid of the cable connected to the grounding terminal of the converter.
- I. Power on the meter in field, first observe if there is any leakage around the meter (care of the personal safety), then the display if it appears any changes of transient flow rate, if it is not, check it as step above carefully, particular to the wiring, power supply, shield braid grounding, the specification of the meter and meter surrounding, or contact technical service center of local agency.

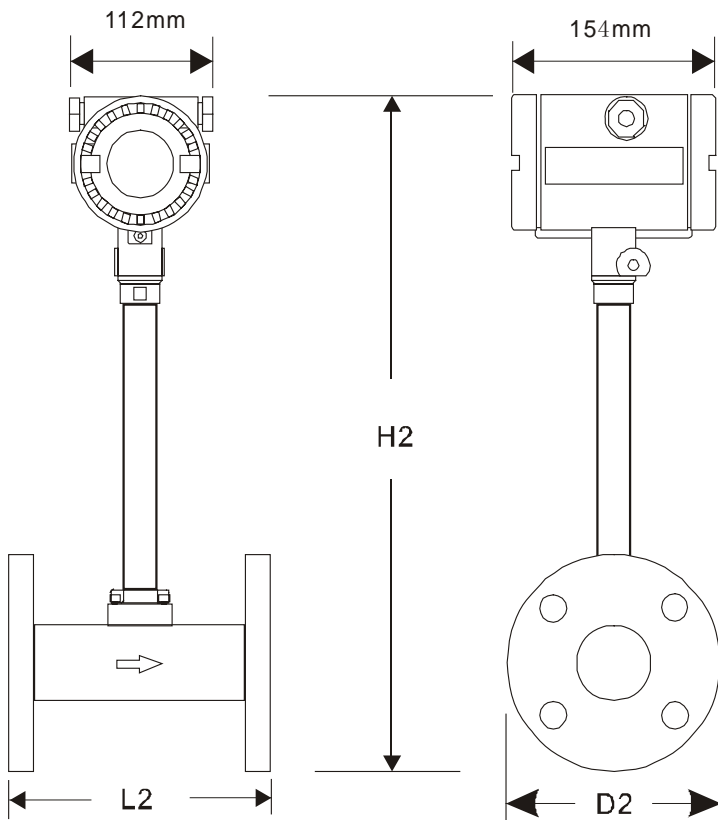
## 2. Specification

● Size (mm)	: 10,15,20,25,32,40,65,80,100,125,150, 200,250,300,350,400,450,500 mm	● Local display	: 4 Line LCD 4 digit Flowrate 8 digit Totalization
● Measuring Range	: Steam – 1.6 to 540,000 Kg/Hr Gas - 3 to4 6,000 m3/Hr Liquid - 0.3 to 4950 m3/Hr	● Output	: 4~20 mA (2wire) Load : 600 Ω
● Material	: Stainless Steel 304 / 316	● Pulse Output	: Standard Pulse Output
● Accuracy	Liquid : +/- 0.7% Gas/Steam : +/- 1.0%	Output Range : 3 to 30VDC, 20mA Max.	
● Repeatability	: +/- 0.2%	● Communication	: RS485
● Connection	: Flange / Wafer	● Data storage	: Operation Parameter, Totalization Figures are stored by EEPROM.
● Flange Type	: JIS 10K / JIS 20K / JIS 40K ANSI 150# / ANSI 300# / ANSI 600# DIN PN 10 / PN 16 / PN25 / PN 40	● Housing Material	: Aluminum Alloy
● Temperature	: -40 ~ +280°C ( Standard Type) -4 ~ +420 °C (Explosion proof Type)	● Cable Entry	: 2x0.5mm <sup>2</sup>
● Ambient Temperature	: -20 ~+60°C	● Power Supply	: 12~36 VDC
● Pressure	: 78 Kg/cm <sup>2</sup> (Max.)	● Key Pad	: 4 keys from internal for Programming and display contro
● Protection	: IP 65. Explosion Proof Exd IIC T6 Intrinsically safe Exia IIC T4	● Option	Pressure Transmitter : Pressure Compensation Signal Input : 0~30 mV DC Temperature sensor : Temperature sensor Signal Input : PT100 ( 3 Wire )

### 3. Diameter



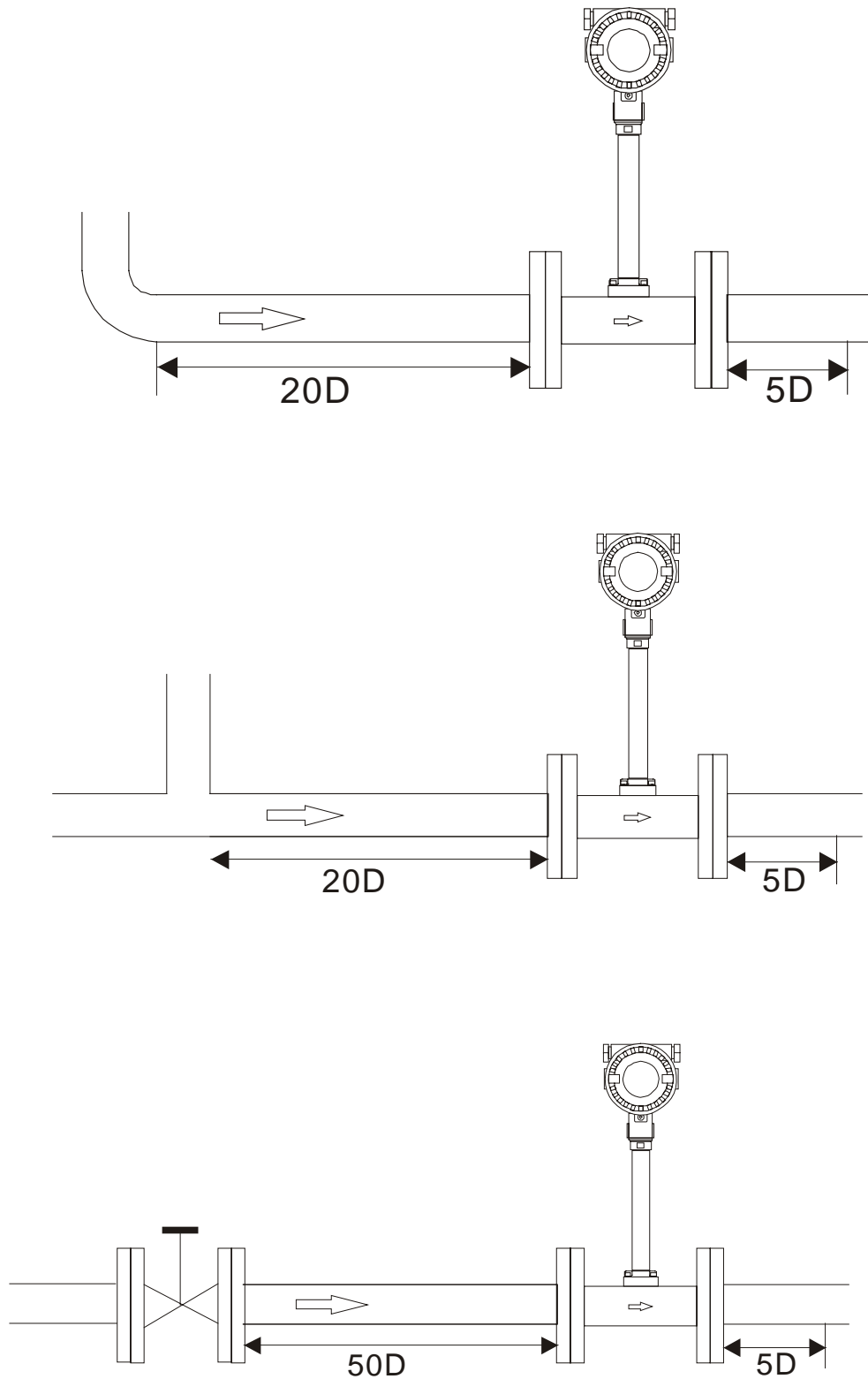
Normal Size		Dimensions (mm)		
mm	Inch	L1	D1	H1
10	3/8"	50	90	480
15	1/2"	50	95	485
20	3/4"	50	105	495
25	1"	50	110	500
32	1-1/4"	50	115	505
40	1-1/2"	78	92	480
50	2"	78	98	485
65	2-1/2"	78	110	500
80	3"	78	134	520
100	4"	78	158	545
125	5"	78	175	565
150	6"	123	200	590
200	8"	143	250	640
250	10"	163	300	690
300	12"	190	350	740
350	14"	165	400	790
400	16"	185	450	840
450	18"	205	500	890
500	20"	225	550	940

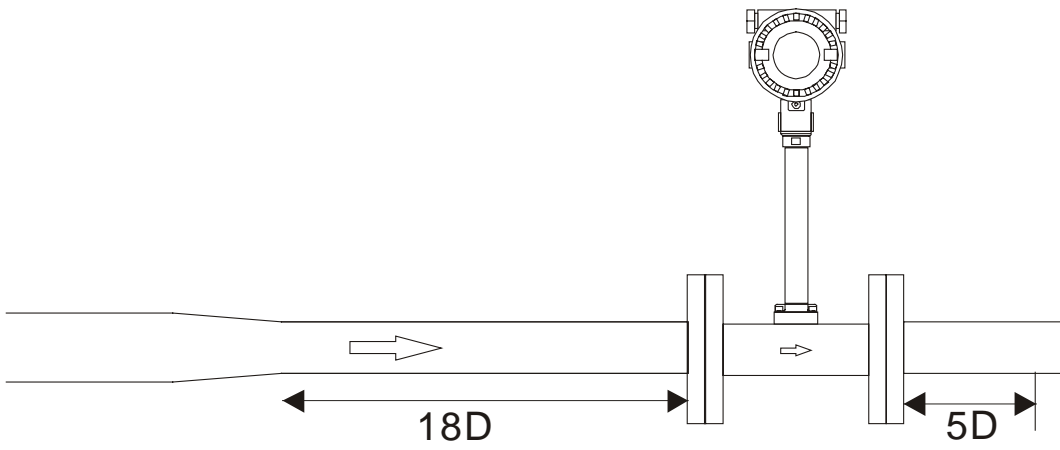
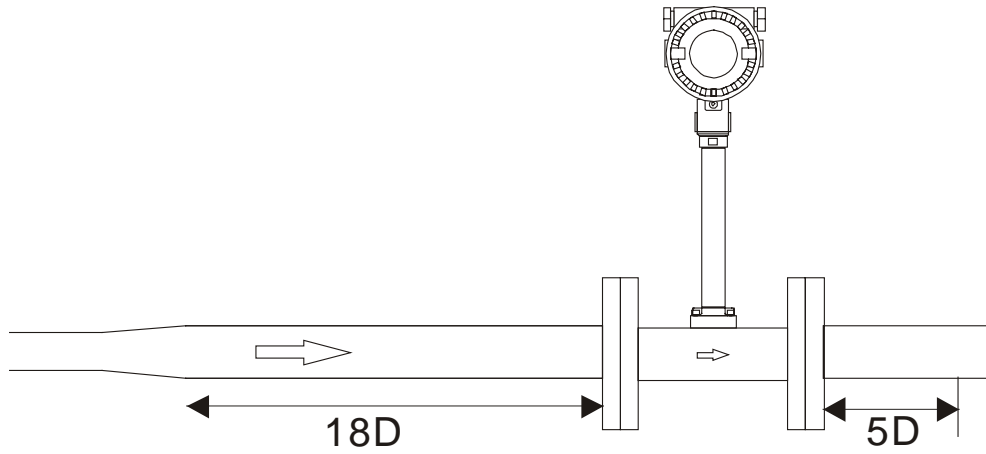


mm	Inch	L2	H2
10	3/8"	200	475
15	1/2"	200	480
20	3/4"	200	490
25	1"	200	500
32	1-1/4"	200	515
40	1-1/2"	200	525
50	2"	200	540
65	2-1/2"	200	560
80	3"	225	575
100	4"	250	610
125	5"	275	625
150	6"	300	675
200	8"	350	735
250	10"	400	800
300	12"	450	860
350	14"	500	930
400	16"	550	995
450	18"	600	1045
500	20"	650	1105

## 4. Installation

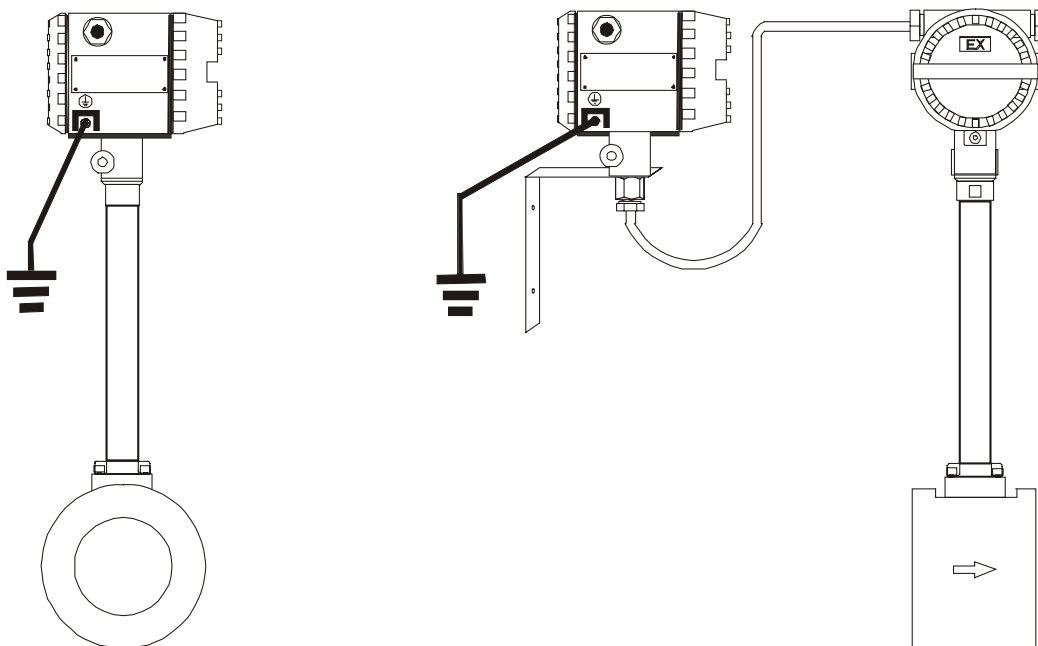
Vortex Flowmeter Pipe installed location is very important, it concerned to measuring accuracy, please left the multiple space in the upstream and downstream of the straight pipe as you can, if the pipe is confirmed with not enough straight pipe, please install 2/3 of total straight pipe length on the upstream, 1/3 on downstream, but the Flowmeter can't matched factory accuracy. Example





● **Grounding measure**

VF7000 requested the perfect grounding, to erase the interference, the grounding as follow, only need to put the converter housing connected with grounding. Sensor don't need to connected grounding again..  
 Grounding point, ex.: Stairs, metal fence...etc.

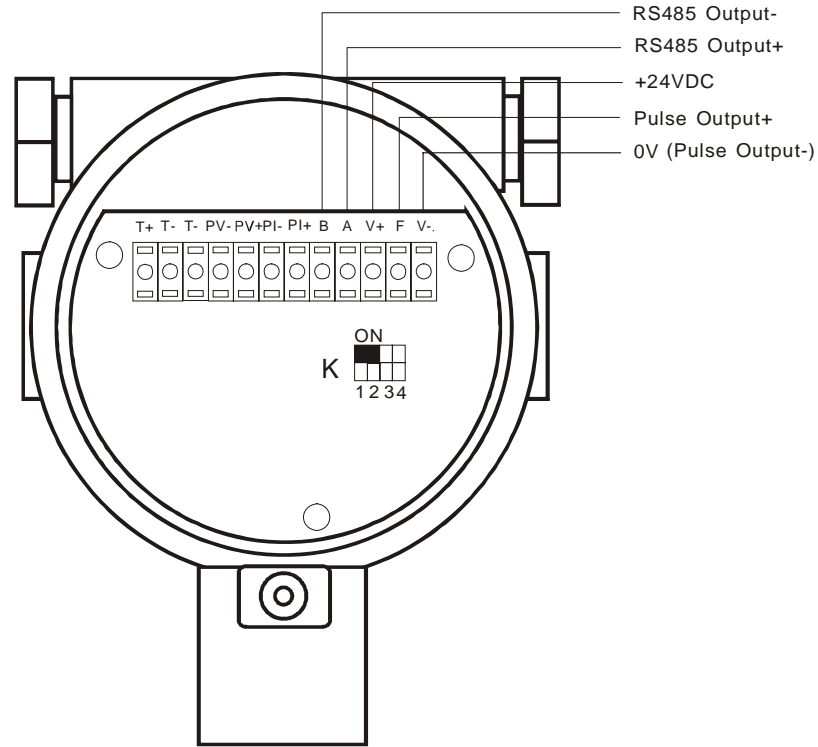


## 5. Wiring Chart

This meter uses two wires to transmit 4-20 mA output signal to other external equipment, power supply 11 ~ 36VDC, the maximum loading resistance for output circuit is 600Ω (including resistance of cable wire)

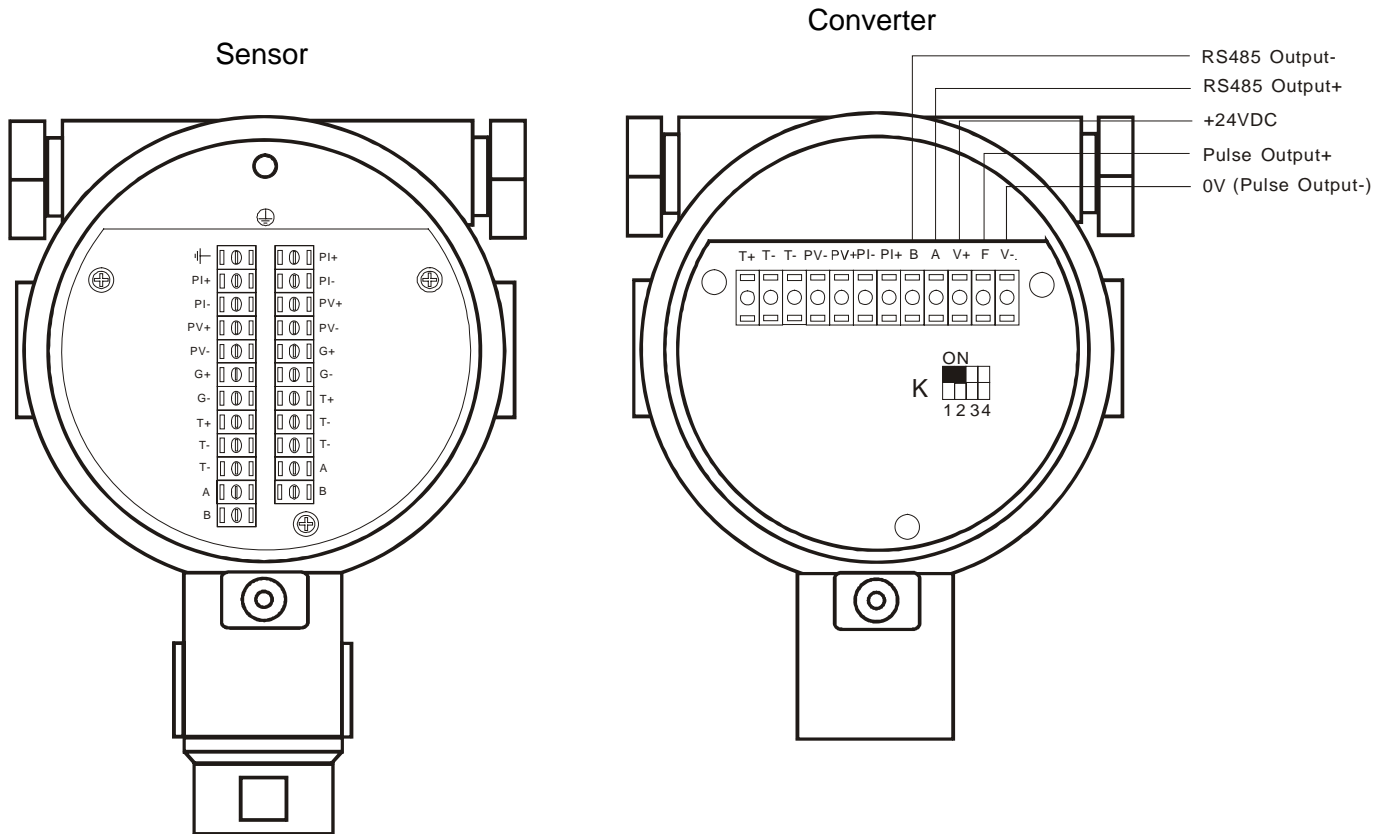
In general condition, 600V PVC isolating wire or cable be used as connecting wire. The two core shielding wire (RWP2×0.5mm) be used in the place where electricity noise occurred easily, the out layer of shielding wire should be connected to the grounding screw in the house of amplifier fixedly. Uses appropriate cable to conform with the operating temperature if the temperature is too high or low.

### 5.1 compact version



4-20 mA Output	Pulse Output	Sensor Input	
		Temperature	Pressure
ON OFF 1 2 3 4	ON OFF 1 2 3 4	PT100 Ω RTD (3 Wire)	Pressure Transmitter 4 Wire

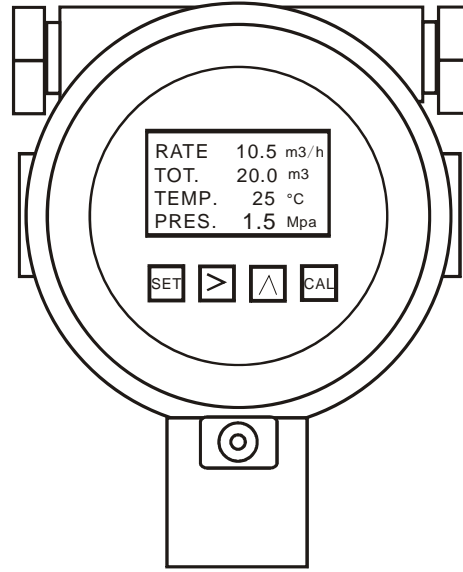
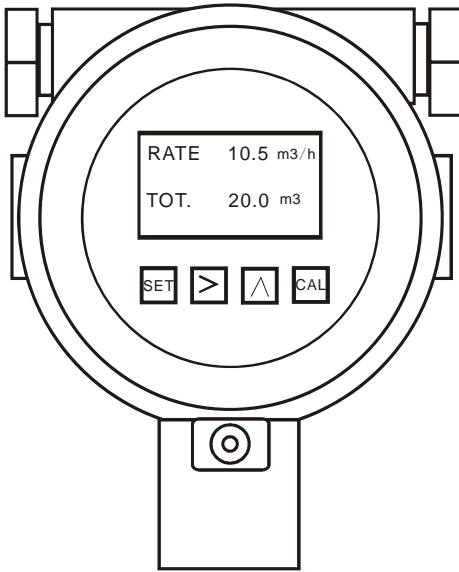
## 5.2 separate version



4-20 mA Output	Pulse Output	Sensor Input	
		Temperature	Pressure
<p>V+ F V-</p> <p>mA</p> <p>12-36 VDC Power Supply</p>	<p>V+ F V-</p> <p>12-36 VDC Power Supply</p> <p>Pulse Output</p>	<p>T+ T- T-</p> <p>A B b</p> <p>PT100 Ω RTD (3 Wire)</p>	<p>PV- PV+ PI- PI+</p> <p>Voltage Output Max. 2uA</p> <p>Pressure Input 0-30VDC</p> <p>Pressure Transmitter 4 Wire</p>
<p>ON OFF</p> <p>1 2 3 4</p>	<p>ON OFF</p> <p>1 2 3 4</p>		



## 6. Panel Display



## 7. Function

### 7.1 Button Function

Key Name	Button	Measure state Function	Parameter Setting State Function
Setting	SET	Go to the parameter setting mode	Save the parameter setting so far, and go to next parameter.
Move	>	Select the contents selected	Move
Up	^	Change the contents selection	Revised the present display
Calibration	CAL	Go to the calibration parameter setting	Save the calibration setting at present, and go to next parameter.

### 7.2 Display Function

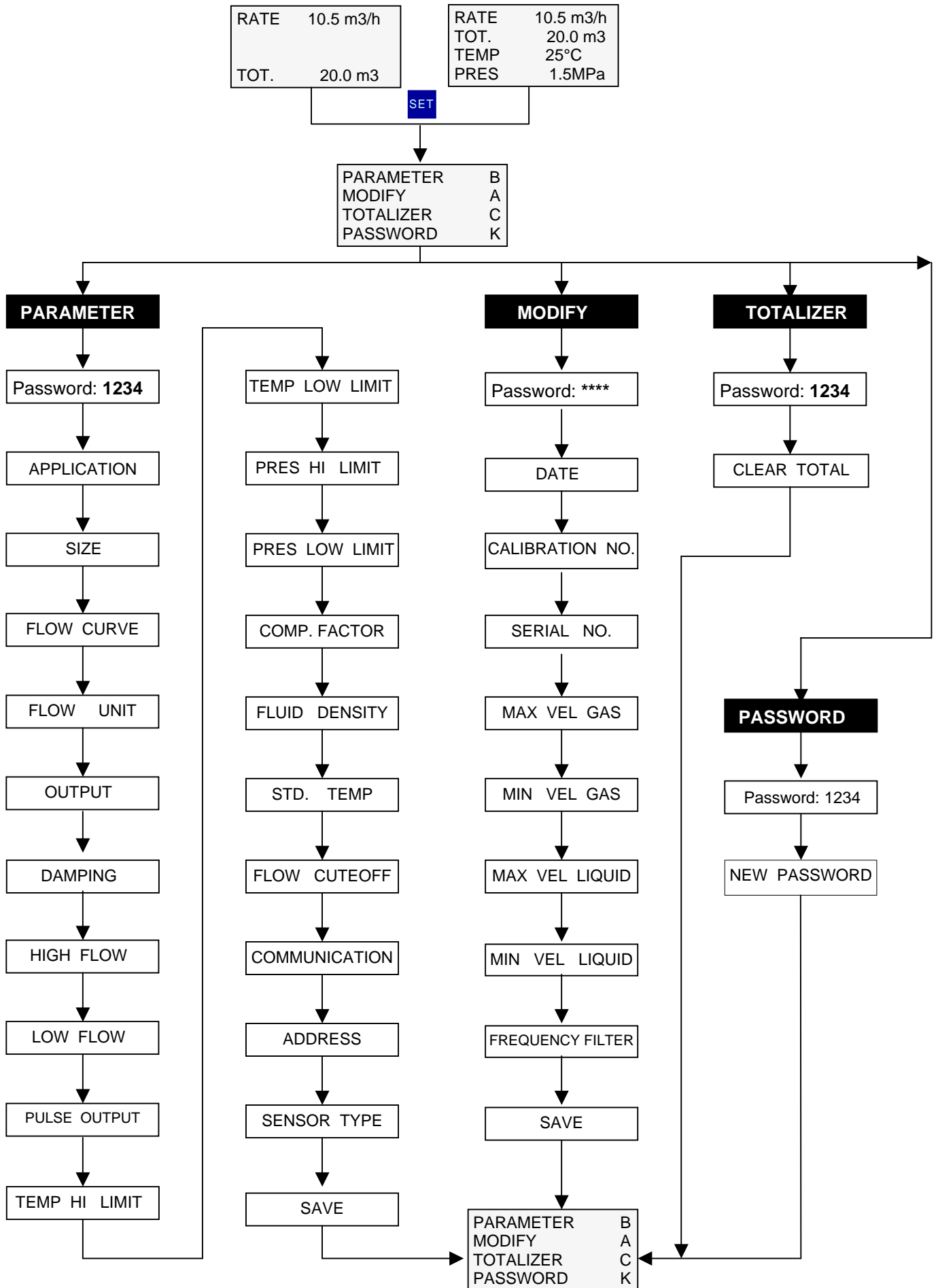
RATE	10.5 m3/h
TOT.	20.0 m3

Display without Temp./ Pressure compensation  
If choose the application of "1. Gas" or "2. Liquid ", only 2 lines will display,  
That is flowrate and totalizer.

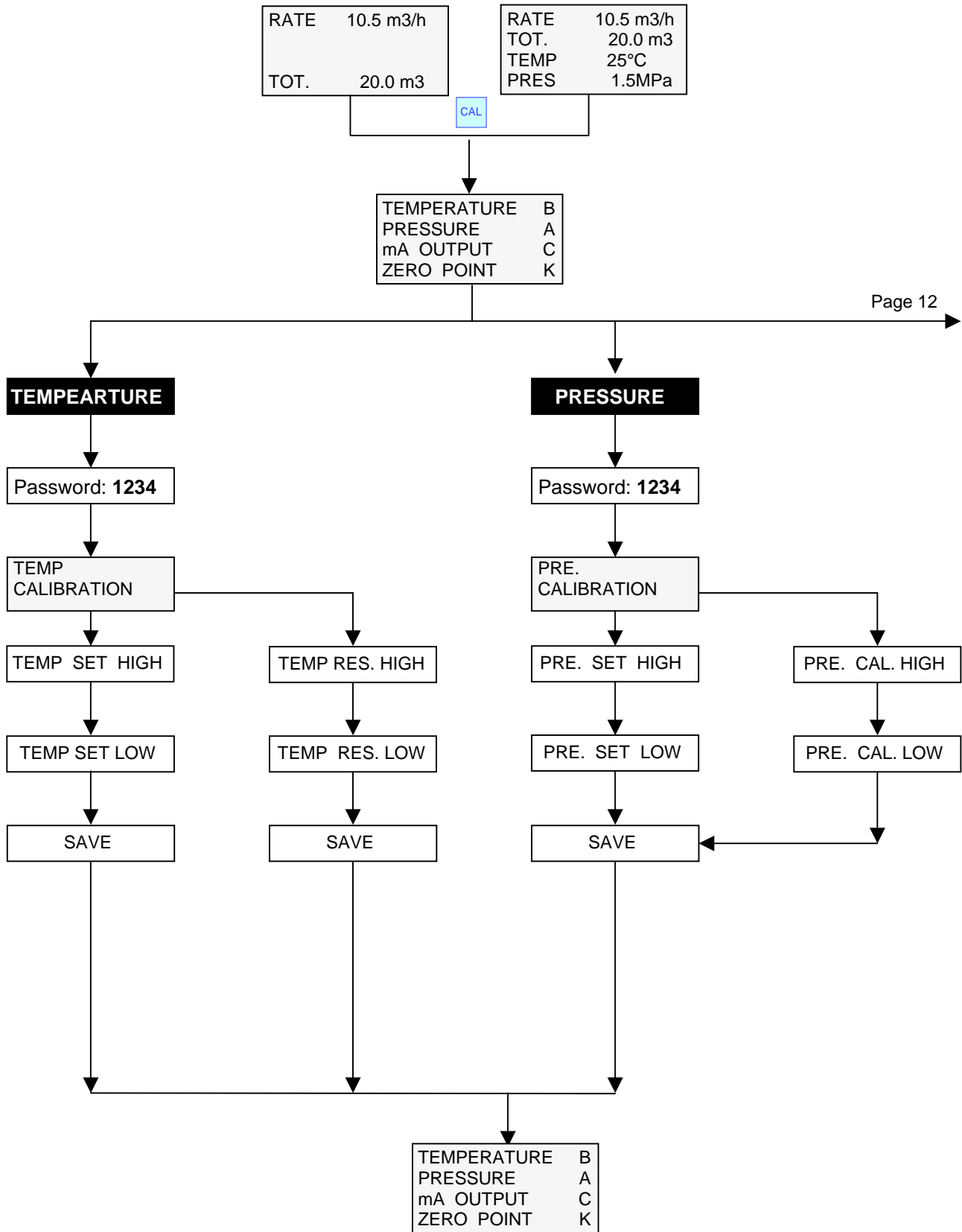
RATE	10.5 m3/h
TOT.	20.0 m3
TEMP	25°C
PRES	1.5MPa

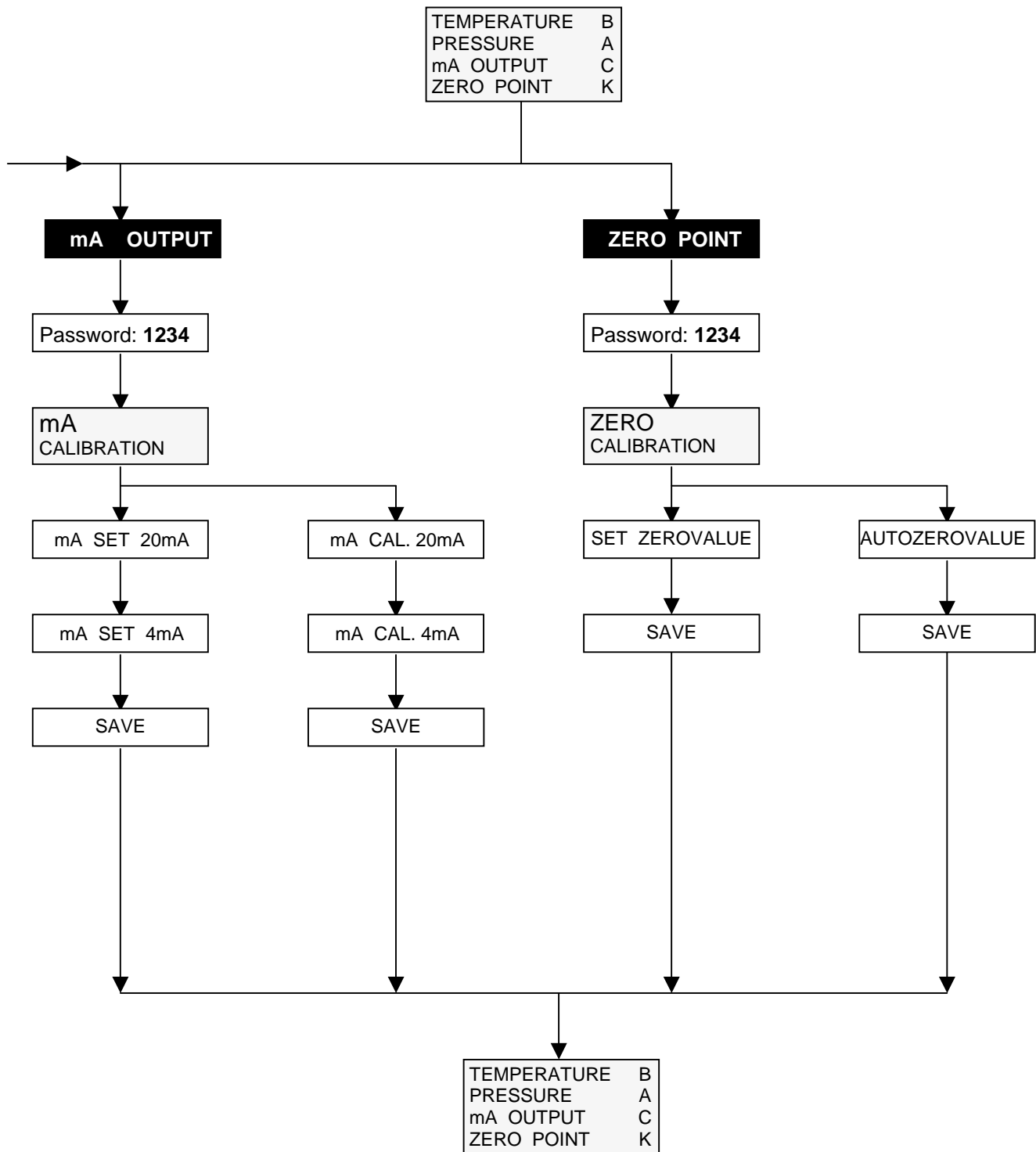
Display and Temp. / Pressure compensation  
If choose other application ,there will be 4 lines display,  
That is flowrate, Totalizer, Temp.and Pressure.

## 8. General Parameter Operation chart



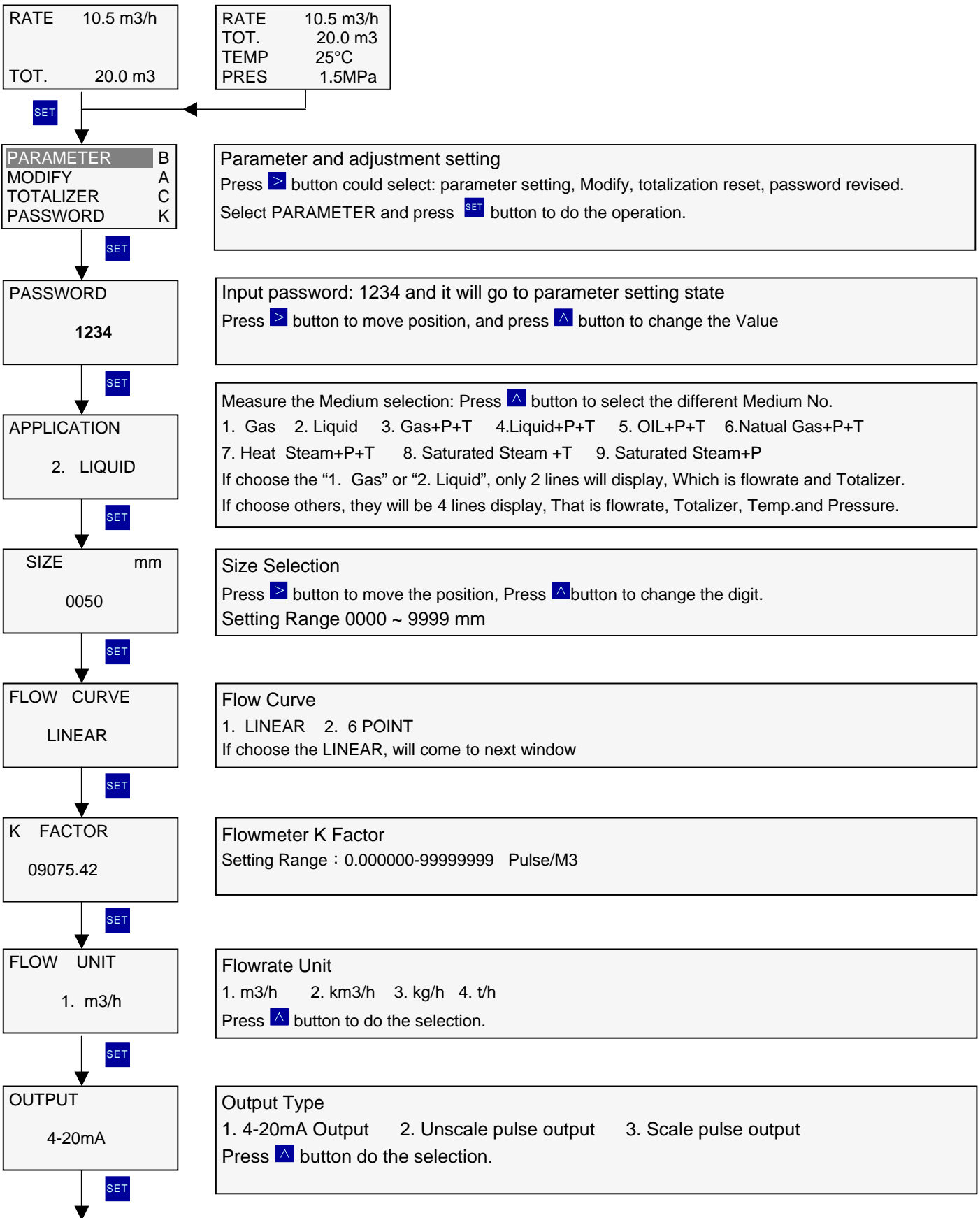
## 9. Calibration Parameter Operation Chart





# 10. General Parameter Setting

## 10.1 Parameter and Adjustment information setting



DAMPING      Sec.  
05

SET

HIGH FLOW    m3/h  
050.00

SET

LOW FLOW    m3/h  
0.000

SET

PULSE OUTPUT m3  
09765.00

SET

TEMP HI    LIMIT  
0430      °C

SET

TEMP LOW    LIMIT  
0.00      °C

SET

PRES HI    LIMIT  
0002.000    Mpa

SET

PRES LOW    LIMIT  
0000.000    MPa

SET

COMP. FACTOR  
1.000000

SET

Reaction Time  
Setting Range : 01-99 seconds  
Press **▶** button to move the position, press **▲** button to change the digit.

Flowrate Up Limit  
Setting Range : 0.000000-99999999 m3/h

Flowrate Lower Limit  
Setting Range : 0.000000-99999999 m3/h

Pulse Output  
Setting Range : 0.000000-99999999 Pulse/M3

Temp. Up Limit  
Setting Range : -999 -+9999 °C  
When Temp. High and low limit are the same, it's stable Temper

Temp Lower Limit  
Setting Range : -999 -+9999 °C  
When Temp. High and low limit are the same, it's stable Temperature.

Pressure high Limit  
Setting Range : -98888-+99999999 Mpa  
When pressure high and low limits are the same, it's stable pressure.

Pressure Low Limit  
Setting Range : -98888-+99999999 Mpa  
When pressure high and low limits are the same, it's stable pressure.

Compress Factor  
Setting range : 0.000000~99999999  
Original setting digit : 1.000000

FLUID DENSITY  
0740.000 kg/m3

SET

GAS PRESSURE  
0.101325 Mpa

SET

STD. TEMP.  
00 °C

SET

FLOW CUTOFF  
00.000 m3/h

SET

COMMUNICATION  
NO

SET

ADDRESS  
0000

SET

SENSOR TYPE  
STANDRAD

SET

SAVE  
YES NO

SET

PARAMETER B  
MODIFY A  
TOTALIZER C  
PASSWORD K

Density Setting  
Setting Range : 0.000000~99999999 kg/m3  
Fluid density setting only for Engineering Unit are Kg/m3 or T/m3

ATM Pressure  
Setting Range : 0.000000-99999999 Mpa  
Local Pressure original setting value : 0.101325 Mpa

Standard Temperature  
Setting Range : 00-99 °C  
Local pressure original setting value : 00

Low Flowrate Cut Off  
Setting Range : 0.000000-99999999  
When it's lower than the setting value, it won't display, Normally setting the Max. flowrate is 5%

Communication mode  
1. No 2. RS-485 3. RS-232

Communication Address  
Setting Range : 0000-9999

Sensor Type  
1. Standard Type 2. Special 3. Insert Type

Parameter Save  
Select whether to save the parameter setting, and turn back to main function  
Press **SET** for 3 second, then loose, and turn back to main function

## 10.2 Totalization Zero Clearing

PARAMETER	B
MODIFY	A
TOTALIZER	C
PASSWORD	K

SET

PASSWORD
1234

SET

CLEAR TOTAL
YES NO

Parameter and adjust information setting main function

Press **>** button could select: parameter setting, Modify, totalization reset, password revised.

Select TOTALIZER and press **SET** button to do the operation.

Input Password : **1234** and it will go to totalization zero clearing operation

Totalization Zero Clearing

Select if it needs Totalization Zero Clearing

## 10.3 Password Revised

PARAMETER	B
MODIFY	A
TOTALIZER	C
PASSWORD	K

SET

NEW PASSWORD
0000

SET

SAVE
YES NO

Parameter and adjust information setting main function

Press **>** button could select: parameter setting, Modify, totalization reset, password revised.

Select PASSWORD and press **SET** button to do the operation.

Password Revised

Revised to new password

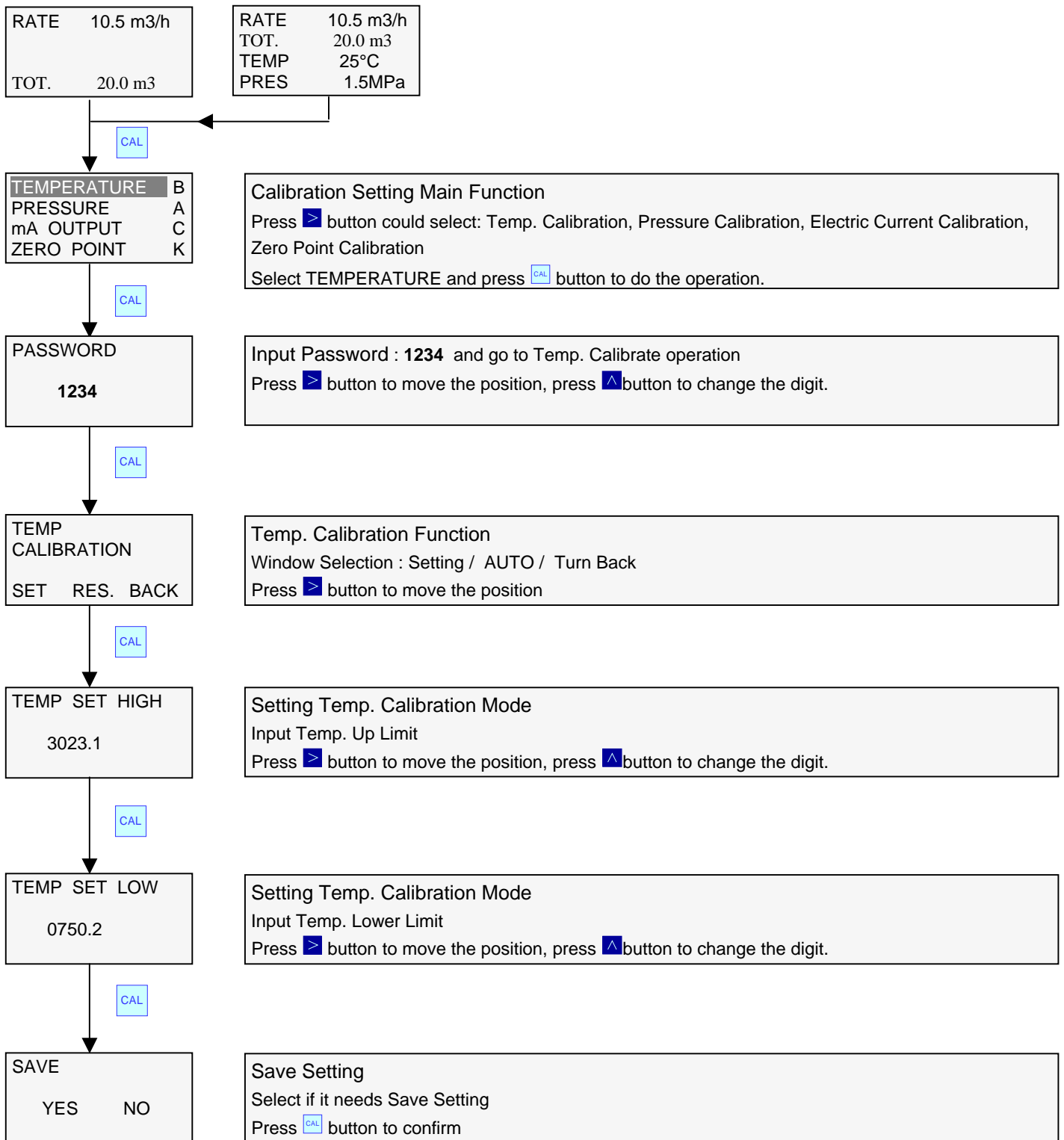
Save Parameter

Select if it needs Save Parameter Setting, and go back to Main Function

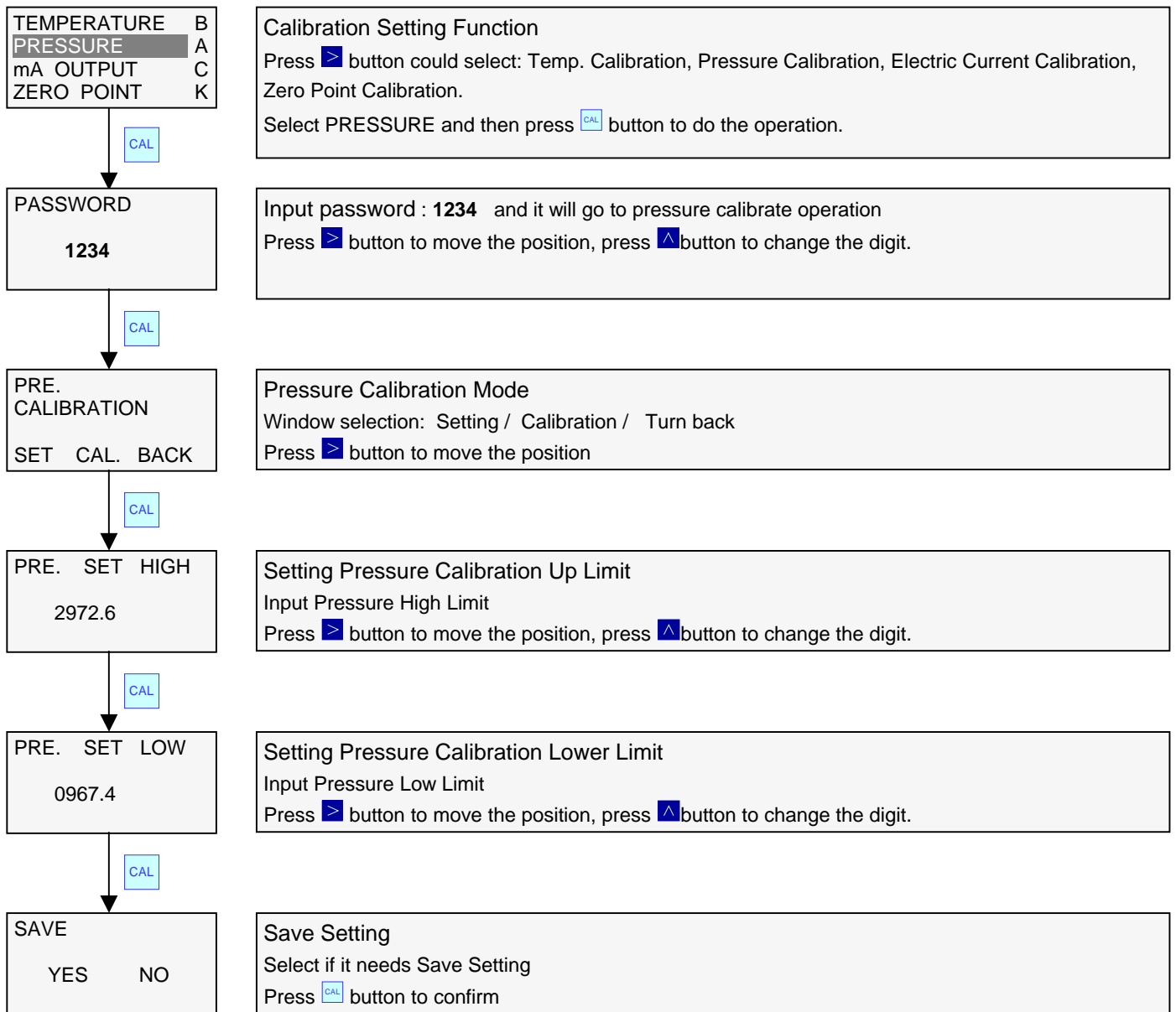


# 11. Calibration Parameter Setting

## 11.1 Temp. Calibrate Operation



## 11.2 Pressure Calibrate Operation



### 11.3 Electric current output calibration

TEMPERATURE B  
 PRESSURE A  
**mA OUTPUT C**  
 ZERO POINT K

CAL

PASSWORD  
 1234

CAL

mA  
 CALIBRATION  
 SET CAL. BACK

CAL

mA SET 20mA  
 004235

CAL

mA SET 4mA  
 000711

CAL

SAVE  
 YES NO

**Calibration Setting Function**  
 Press **▶** button could select: Temp. Calibration, Pressure Calibration, Electric current calibration, Zero point calibration.  
 Select mA OUTPUT and press **CAL** button to do the operation.

**Input Password : 1234** and it will go to the electric current calibrate operation  
 Press **▶** button to move the position, press **▲** button to change the digit.

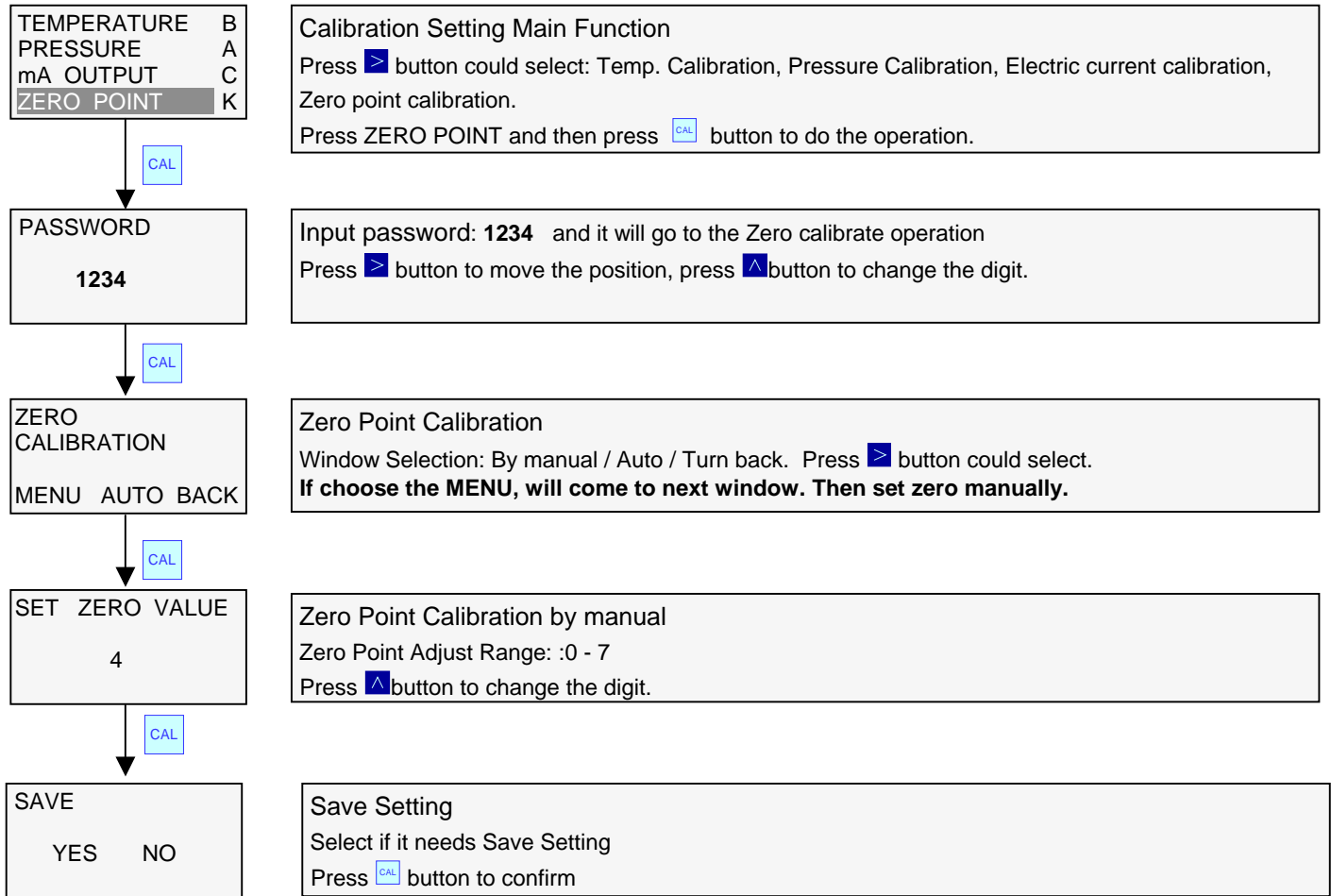
**Electric Current Calibration**  
 Window Selection : Setting, AUTO, Turn back  
 Press **▶** button to move the position,

**Adjust 20mA Output**  
 20 mA electric current output value amended, if mA output value too low, please increase the value, if the value too high, please decrease the value.  
 Press **▶** button to move the position, press **▲** button to change the digit.

**Adjust 4mA Output**  
 4 mA electric current output value amended, if mA output value too low, please increase the value, if the value too high, please decrease the value.  
 Press **▶** button to move the position, press **▲** button to change the digit.

**Save Setting**  
 Select if it needs Save Setting  
 Press **CAL** button to confirm

## 11.4 Zero Point Calibration Operate



### ● Zero Adjustment

When sensor installed in the pipe, the pipe with no flowrate, and shows the low flow rate in display, then please does the Zero Adjustment.

**Situation 1:** Zero Adjustment could through the shortcut key of electrical board as follow.

Press the **ZERO** button about 5 seconds, the light is turned on, then loosen the button, when light about 5 seconds, it start glitter, and will enter into zero adjustment status, the glittering time about 3 seconds, the zero adjustment is completed once the light turn off.

**Situation 2:** Through the window to do the zero adjustment. It will search the zero position. Please check 11.4 Zero Point Calibration Operate. When you finished the auto zero adjustment, the small flowrate still exist, please press CAL button at Zero Point Calibration selected MENU (hand zero adjustment), if the value is 3, please add the zero point value. Change to 4, whether the status improved, if it still exists, please adds one more point. The bigger the value is, the better the anti-interference. But when the value too big, it will cause no signal, please select carefully.

