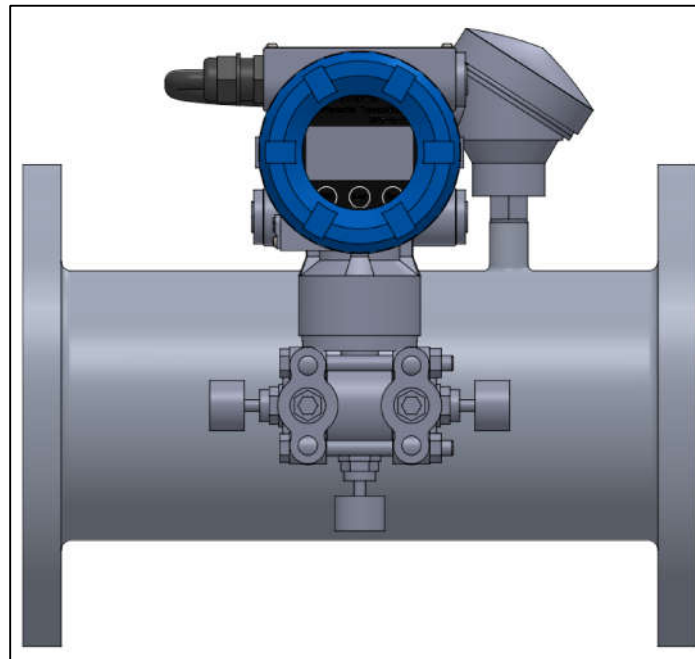


국제공인교정기관
(액체,기체 유량분야)

Instruction Manual



DPE-S-PT Series

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*. Safe use of differential pressure flowmeter

A. Installation

- When installing the flowmeter on site, it must be installed by a professional engineer or experienced employee.
- For high-temperature and high-pressure lines, do not burn the pipes around the installation, and do not dismantle the connecting bolts when the process line is under pressure.
- When discharging condensate and bubbles from the Vente valve after installing the flowmeter, be careful not to cause inhalation of liquids, gases, and vapors used in the process line.

B. Wiring

- Before connecting the power cable, check the flowmeter supply voltage and apply the power.

C. Operating

- In areas where explosion and dust sparks occur, check the environment before opening the cover.
- When installed outdoors, protect the device by installing a sun screen to avoid sunlight.

D. Maintenance

- Regular glass management is required to prevent foreign substances from sticking to or contaminating the flow directions and instruments, and to prevent foreign substances and dust from blocking the differential pressure, if an untrained user does not disassemble or disassemble the machine, contact our technical department.

E. Arbitrary Disassembly and Modification

Users cannot receive warranty for failure or damage to the device when they make modifications without using it as it did at the time of shipment, such as random disassembly, modification, and nameplate disassembly.

F. Assurance

- In the event of improper maintenance, design conditions, or storage carelessness, natural disasters, fires, earthquakes, etc. cannot be guaranteed free of charge.

*. Select an installation location

A. Field temperature

If temperature changes occur significantly in the flowmeter installation area or continuous exposure to radiant heat, there must be protection and ventilation for suitable external heat.

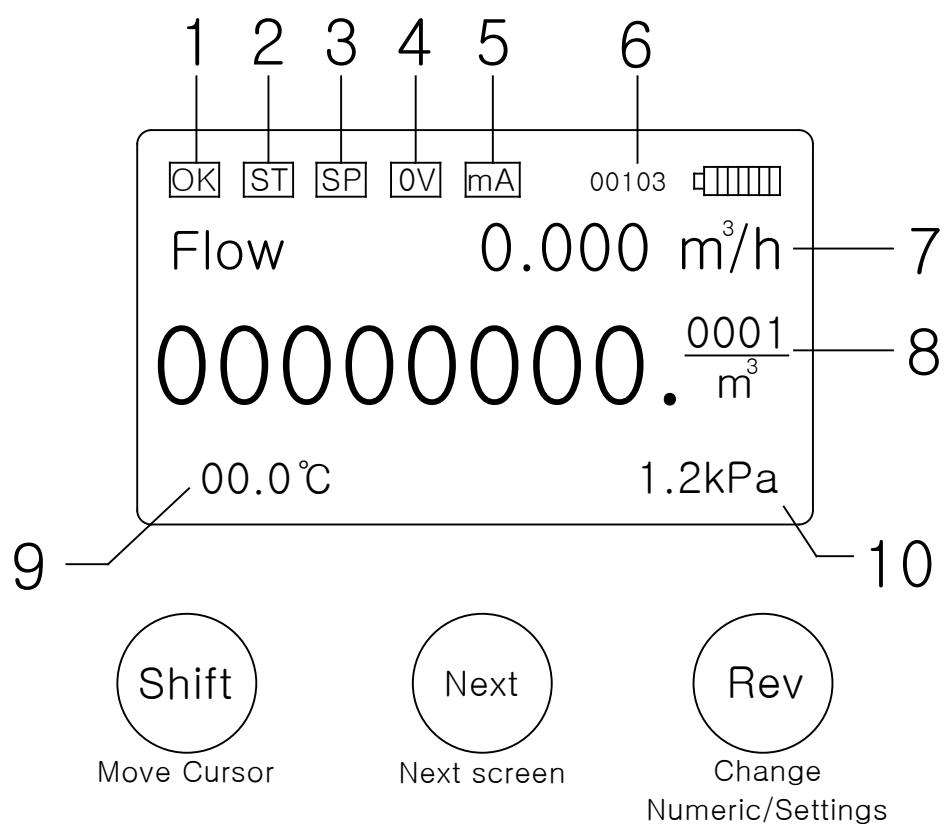
B. Environment

In the event of inevitable installation in corrosive environments and in external moisture inflows, measures must be taken to protect the device.

C. Shock and Vibration

It is designed to withstand the general impact and vibration of the instrument, but it must be installed in a location where vibration and shock are minimized for reliable measurement and use.

*. System Alarm Introduction



1. System normal ("OK"), Error("ERR")
2. Absolute temperature("ST"), Disappears when temperature sensor is detected
3. Absolute pressure("SP"), Disappears when pressure sensor is detected
4. Operation above the flowmeter setting Hz ("OV") Disappears during normal operation
5. When operating above the flowmeter setting (DC4-20 mA) ("mA")
Disappears during normal operation
6. RS485 Setpoint (00103 / 00)
7. Instantaneous flow (Total of 8 digits/Unit of instantaneous flow)
8. Cumulative flow rate (minimal point, 4-digit indication/accumulation unit)
(Number, 8 digits)
9. TEMP. "ST" is detected (absolute temperature)
"ST" Gone (Gauge temperature)
10. PRESS. "SP" is detected (absolute Pressure)
"SP" Gone (Gauge Pressure)

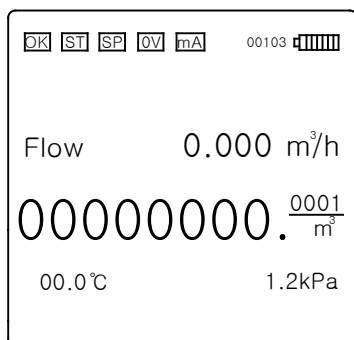
MENU

-- Main menu --

1. Display unit
2. Self-test
3. Total reset
4. Setup
5. Calibration
6. Password

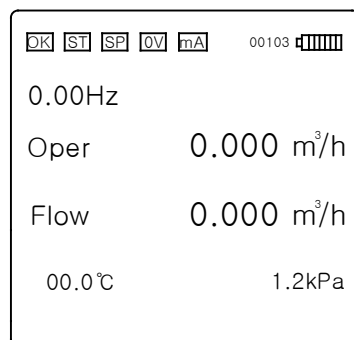
1. Instantaneous flow/accumulated flow unit setting
2. System Check
3. Initialize cumulative flow
4. Parameter Settings
5. Set temperature/pressure/current output/calibration factor
6. Set each menu password

Flow screen



Flow : Temperature, pressure corrected flow rate

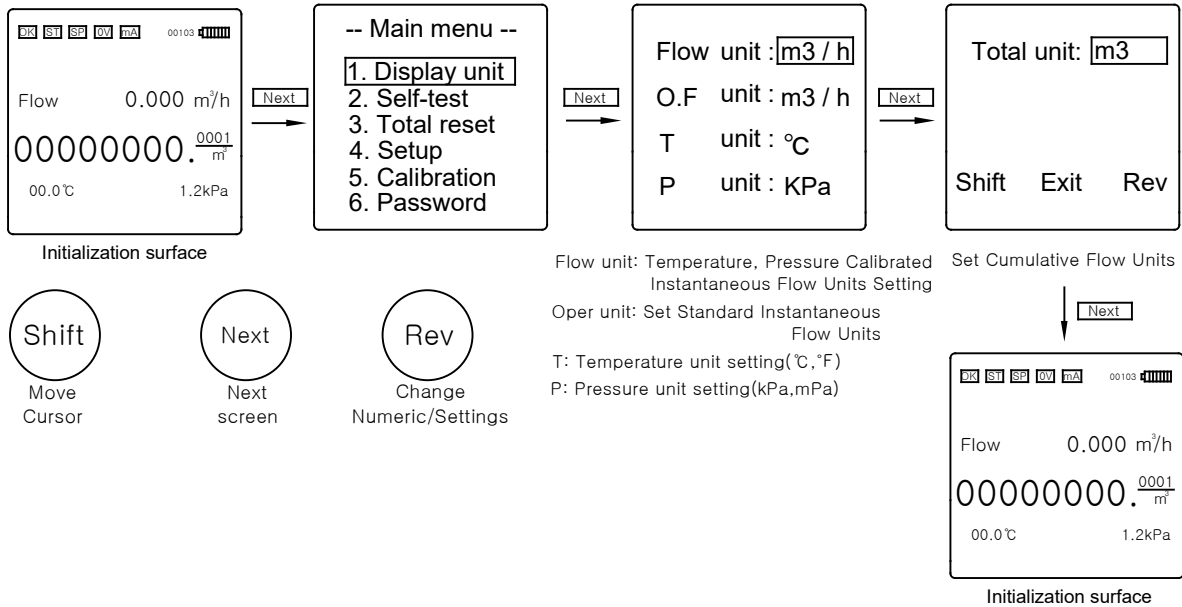
REV
→



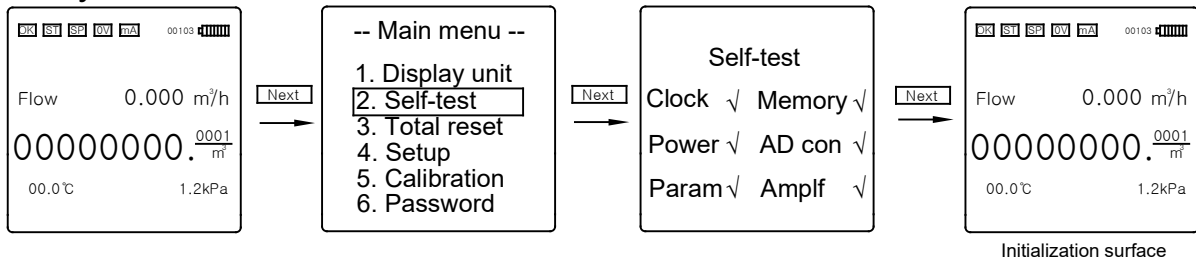
Flow : Temperature, pressure corrected flow rate

Oper : Standard flow rate

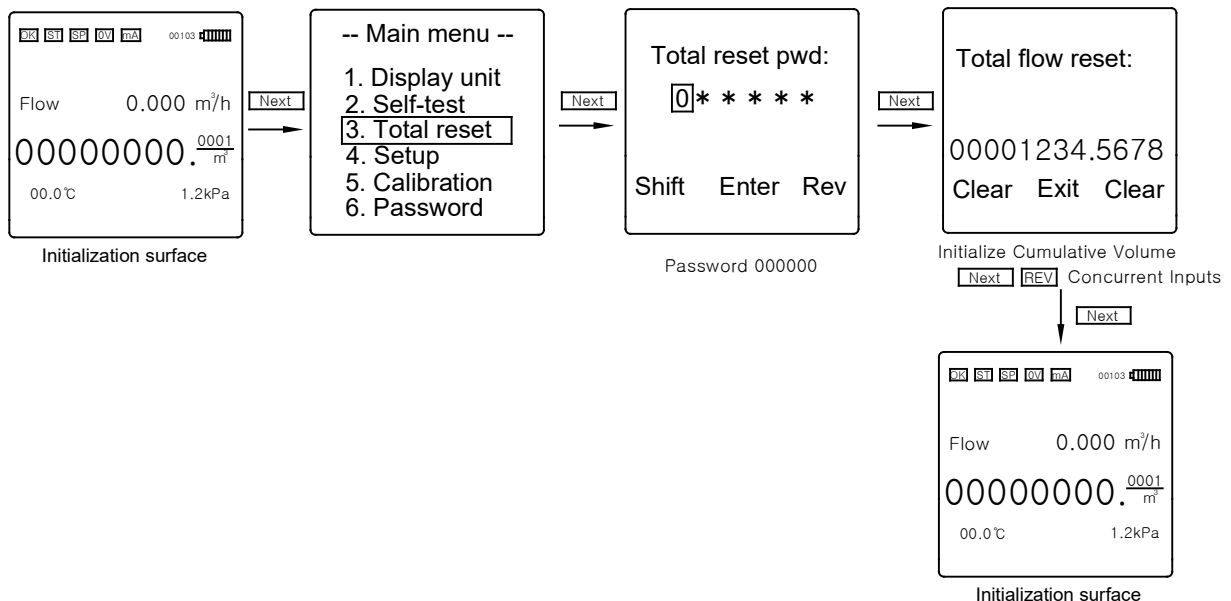
1. Instantaneous flow/accumulated flow unit setting



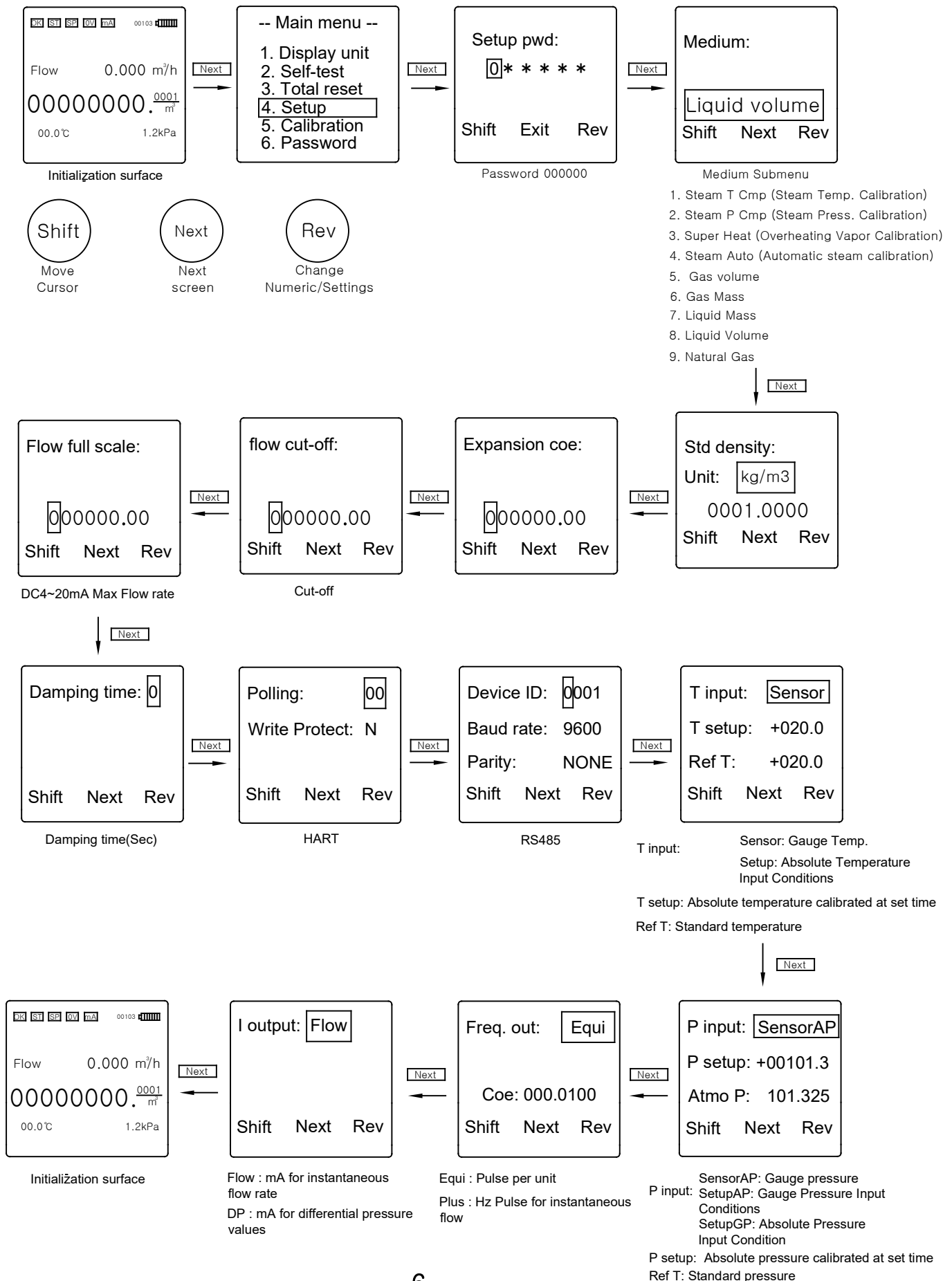
2. System check



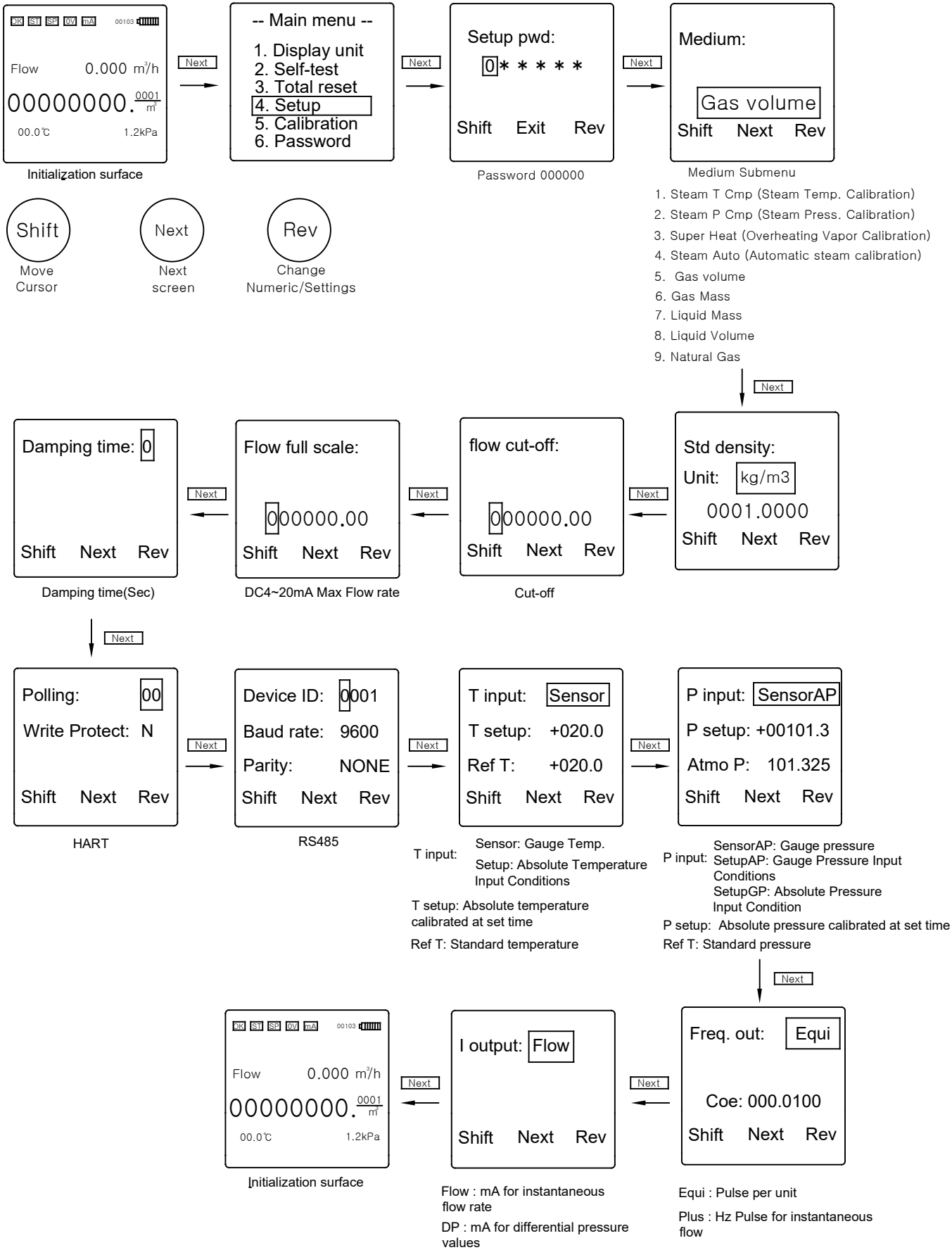
3. Initialize cumulative flow



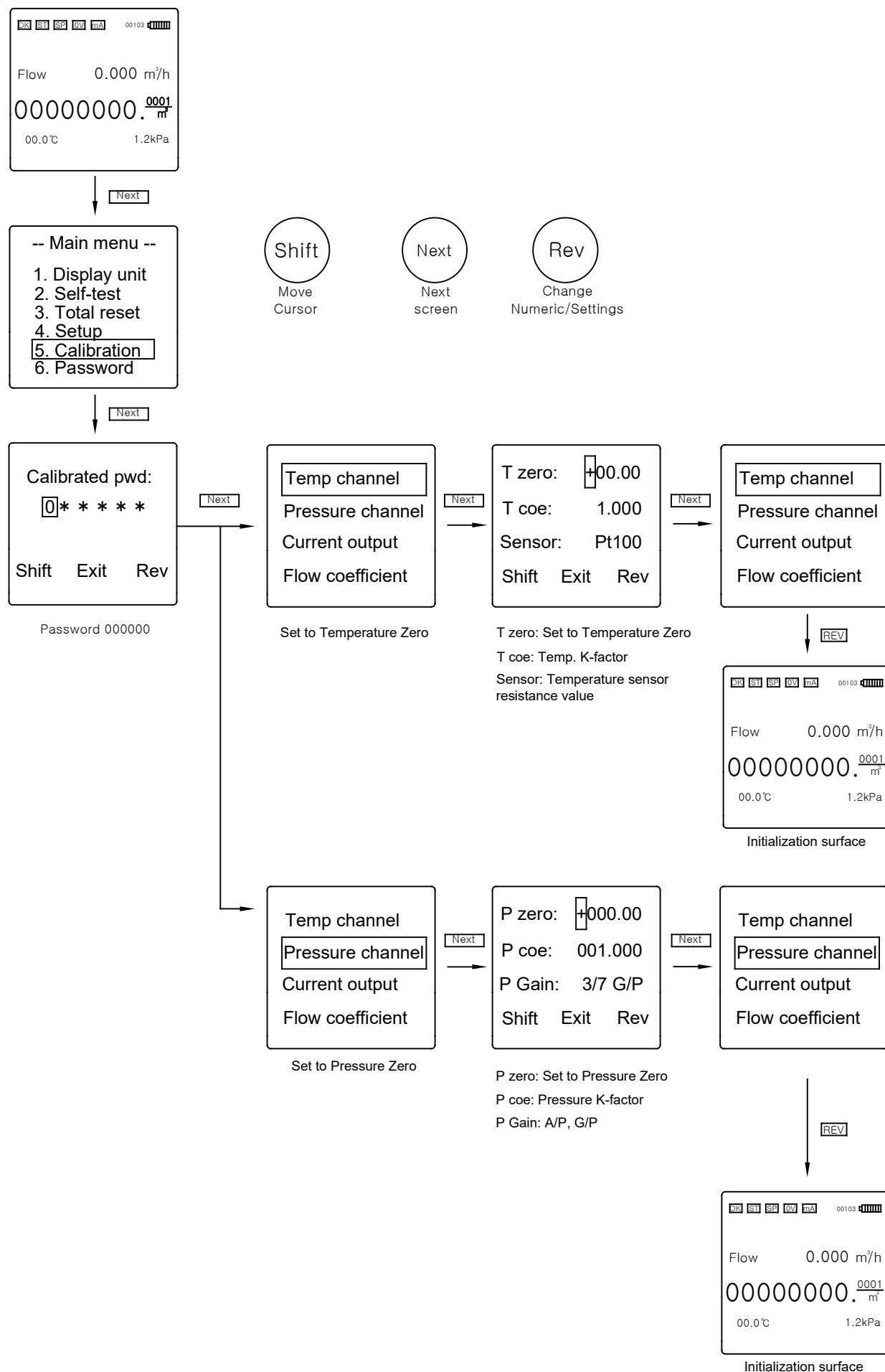
4.1 Setup (Water)



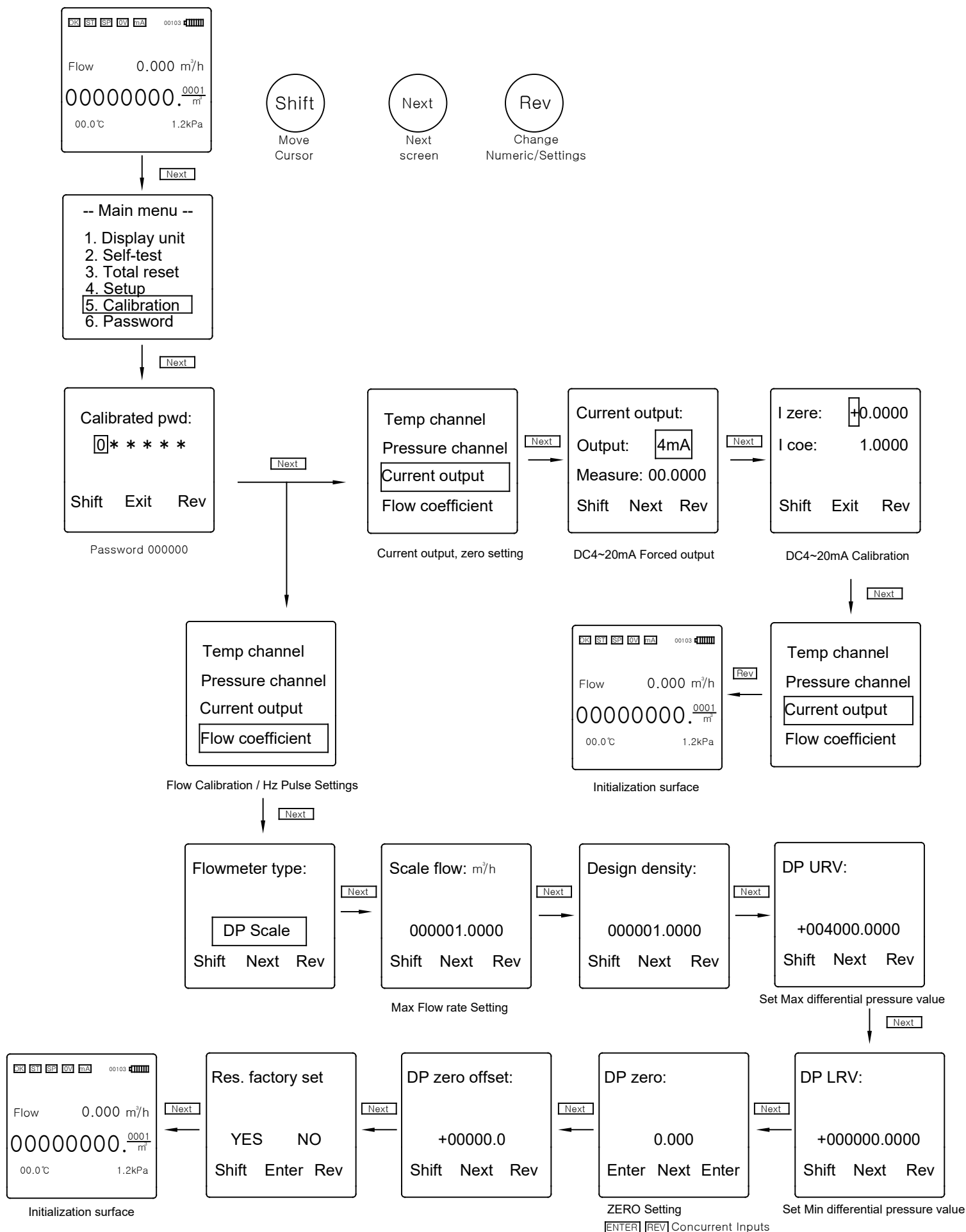
4.2 Setup (GAS)



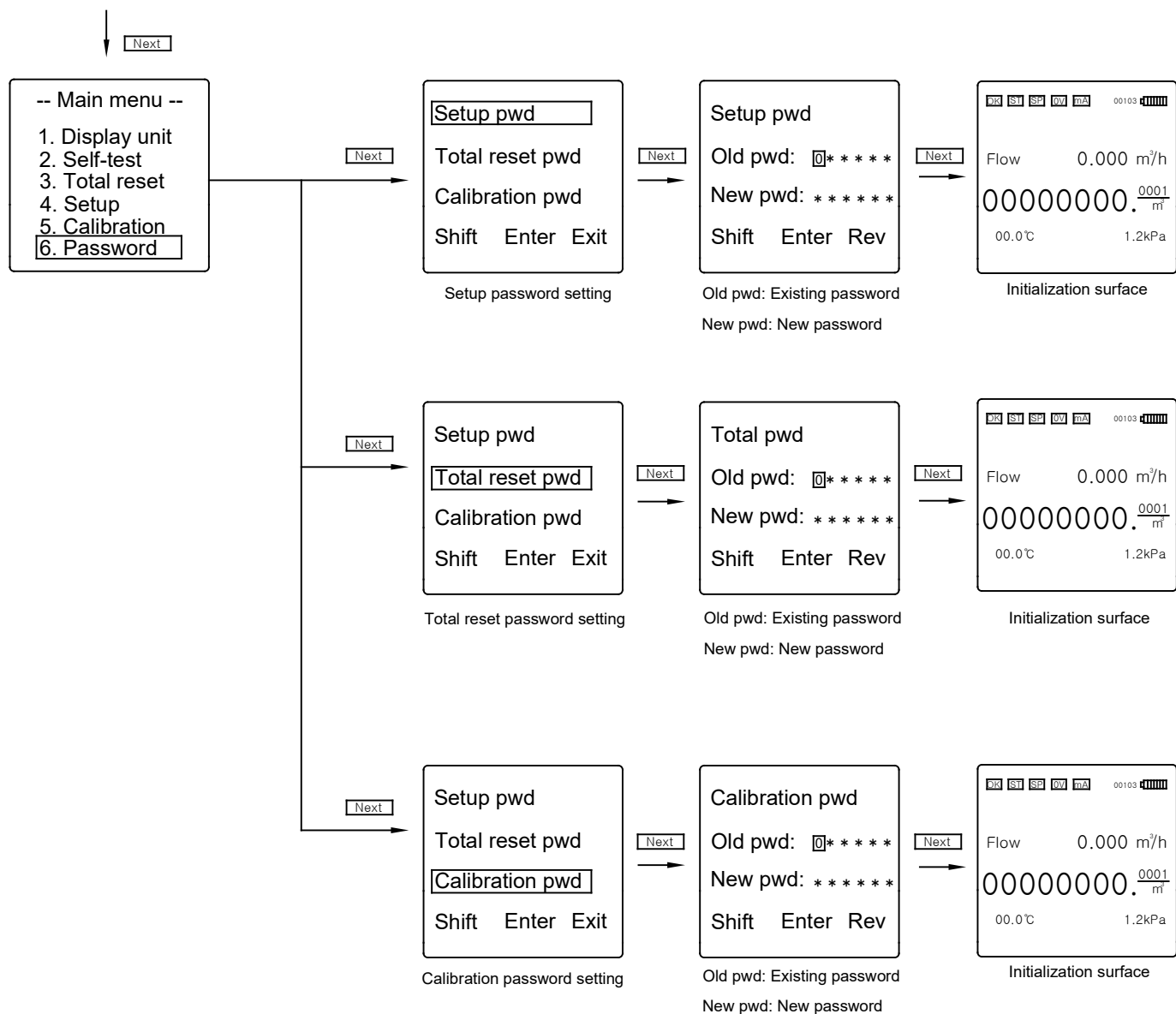
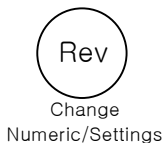
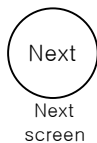
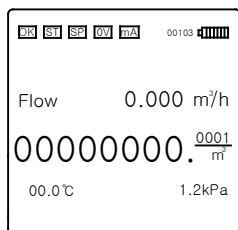
5.1 Calinbration (Temp., Pressure, Output)



5.2 Calibration (Current output, correction factor)



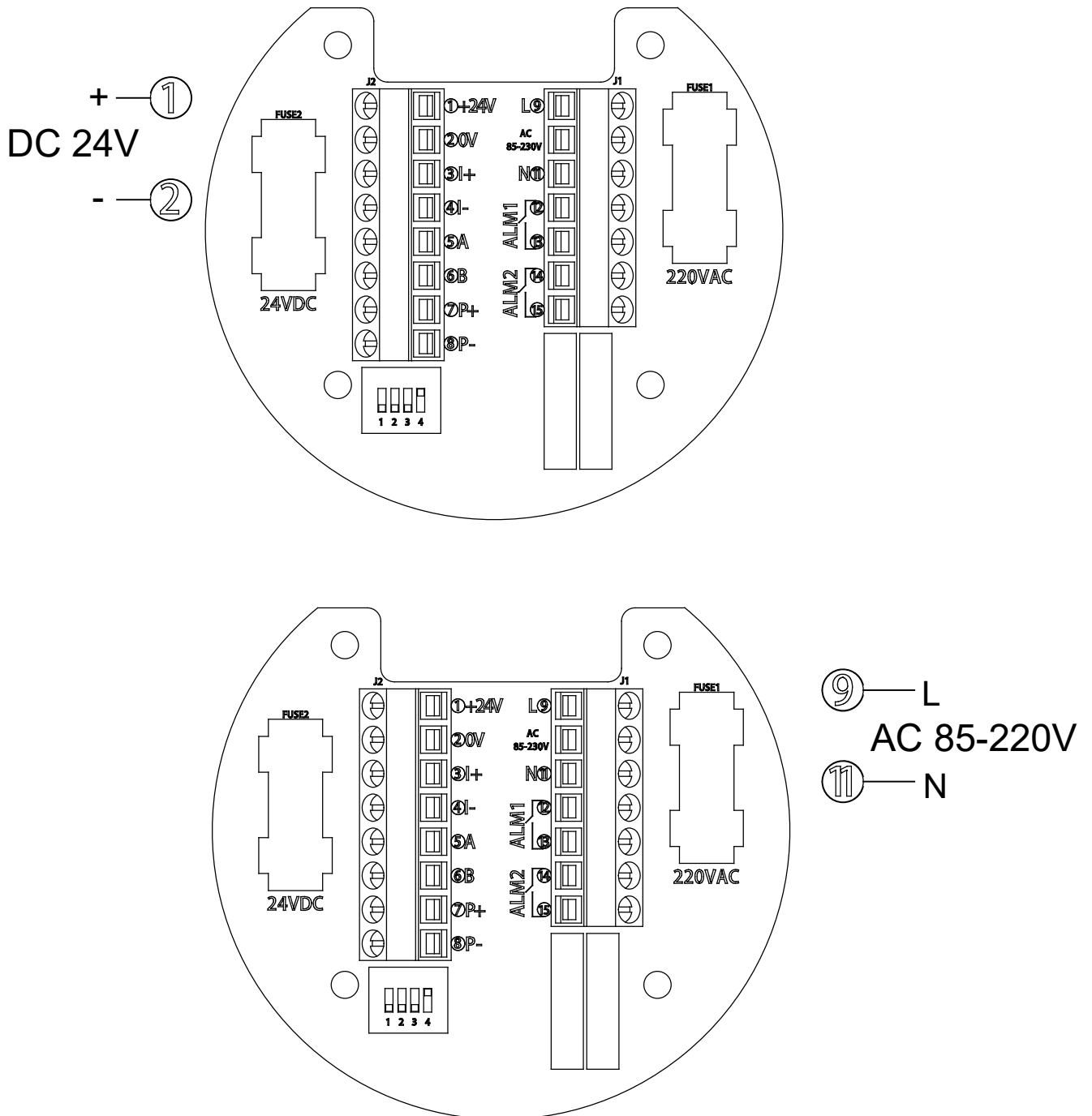
6. Password

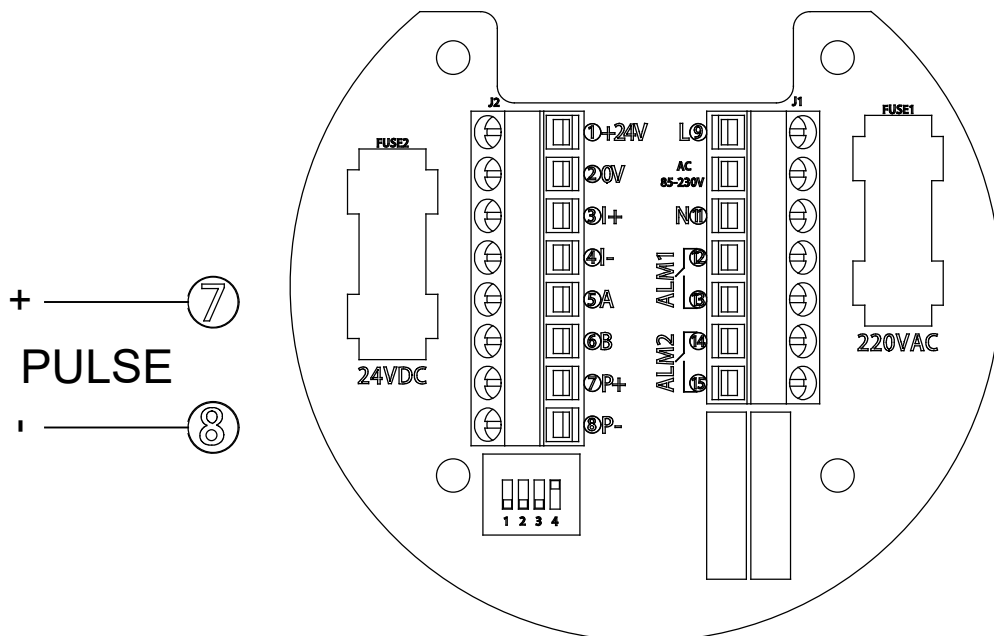
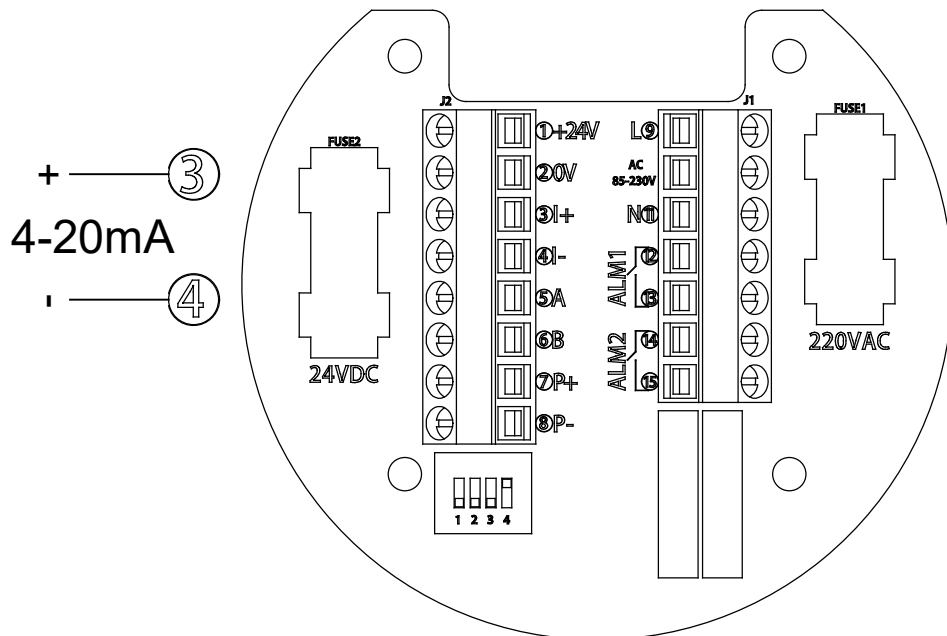
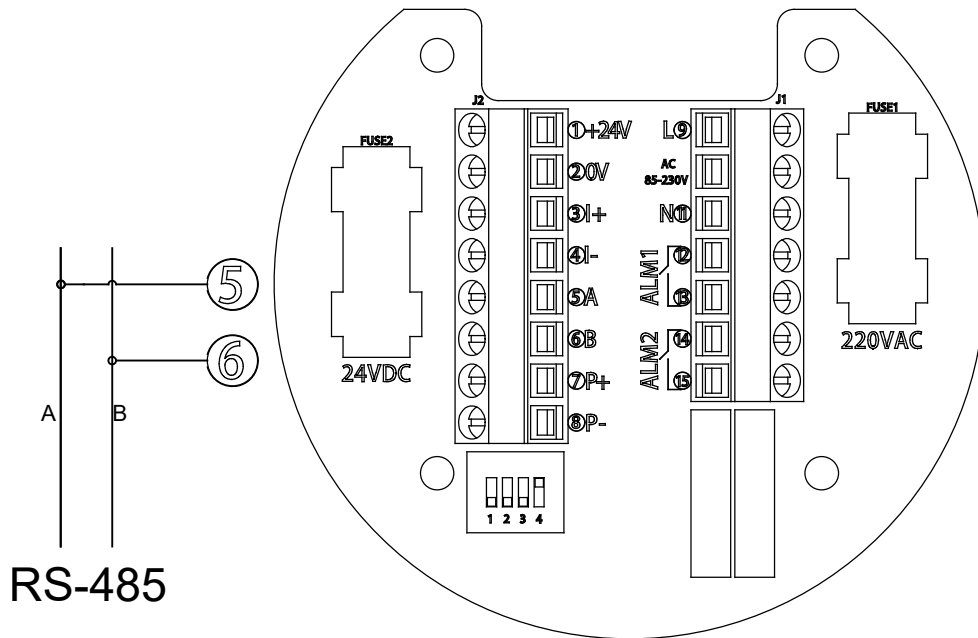


7. Wiring

Pecautions on Wring

- Where the DPE-S-PT is routed as far away as possible from the source of electrical noise, such as a transformer, motor, as possible.
- To prevent noise, do not wire the signal cable with the same duct as the power cable.
- Check the power of use.





8. Communication protocol (RTU)

DPE-S-PT communication protocol (RTU)

1. Protocol overview

1.1 Communication protocol

This flowmeter uses MODBUS RTU protocol (Slave).

Electrical Interface: RS485 2W

Serial communication of parameters: (baudrate=1200 /2400/4800/9600 bps
start bits=1, databits =8, parity= no, stopbits =1)

1.2 Frame format

Address	Function code	Data	CRC	End
8 bit	8 bit	n*8 bit	16 bit	T1-T2-T3-T4

Two frames are separated by a silent interval of at least 4 character times(T1-T2-T3-T4).

1.3 Address

Address range: "1-255".

2. Command

2.1 This flowmeter supply command :

Function code 03 (Read-Only)	Read single or multiple hold registers
------------------------------	--

2.2 Data frame:

Data format: Integer/Float:

32 Float of format is IEEE754, Single precision(4 bytes), order of sequence is 3-4-1-2.

After conversion to 1-2-3-4 order, From high to low were 31, 30, 29, 0, etc...

31	30-23	22-0
Sign	Exponent	Fraction

Laid out as bits, floating point numbers look like this:

Single: SEEEEEEE EMMMMMMM MMMMMMMM MMMMMMMM

The sign bit 0 denotes a positive number, and 1 denotes a negative number.

Function code 03 (Read single or multiple hold registers) :
MODBUS Request

Address	1 BYTE	01-255
Function code	1 BYTE	03
Starting Address	2 BYTE	0x-0xFFFF
Quantity of Registers	2 BYTE	1-20
CRC Low-Order Byte	1 BYTE	
CRC High-Order Byte	1 BYTE	

MODBUS Reponse

Address	1 BYTE	01-255
Function code	1 BYTE	03
Byte count	1 BYTE	2*N(N = Quantity of Registers)
CRC Low-Order Byte	1 BYTE	
CRC High-Order Byte	1 BYTE	

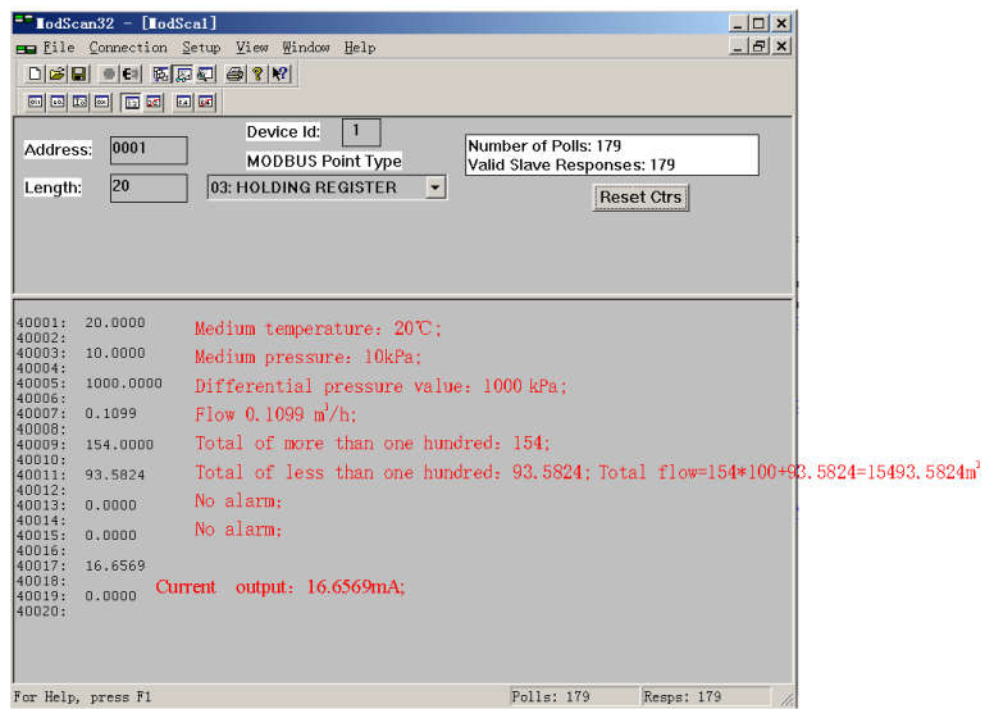
For example

Request		Reponse	
Domain name	Data (HEX)	Domain name	Data (HEX)
	01	Address	01
Function code	03	Function code	03
Starting Address (High)	00	Byte count	08
Starting Address (Low)	00	Registers high (0001)	0C
Quantity of Registers(High)	00	Registers low (0001)	E8
Quantity of Registers(Low)	04	Registers high (0002)	C2
		Registers low (0002)	FB
		Registers high (0003)	C9
		Registers low (0003)	26
		Registers high (0004)	C3
		Registers low (0004)	7B
CRC Checking		CRC Checking	

2.3 Data item define

R/W	Registers address	Data length	Data type	Description
R	40001-2	2	SINGLE	Medium temperature (℃)
R	40003-4	2	SINGLE	Medium pressure (kPa)
R	40005-6	2	SINGLE	Differential pressure value (kPa)
R	40007-8	2	SINGLE	Flow
R	40009-10	2	SINGLE	Total of more than one hundred
R	40011-12	2	SINGLE	Total of less than one hundred
R	40013-14	2	WORD	Reverse
R	40015-16	2	WORD	Reverse
R	40017-18	2	SINGLE	4-20mA current output (mA)
R	40019-20	2	Reserves	

MODSCAN32 Communication interface (03 command):



Read data register (in this case, the meter data read)

Master request: 01 03 00 00 00 14 45 C5

 Device ID Function code start Address length CRC

Response frame from slave: 01 03 28 6B 49 C0 37 88 00 45 E0 FC E0 42 C7 BF FB 45 F3

00 00 40 80 1B 11 42 86 FC 18 44 79 00 00 FF 00 00 00 41 B0 04 00 00 00 4D 43

01 :Device ID、

03 :Function code

28 :Byte length

6B 49 C0 37 :-2.86°C; Temperature

88 00 45 E0 :7185.00 kPa; Pressure

00 00 42 C8 :100 kPa; Differential pressure value

CC CD 3D CC :0.1 ; flow rate

00 00 40 80 :4.0 , Total of more than one hundred

1B 11 42 86 :67.052Total of less than one hundred; Total flow=4.0*100+67.0528=467.0528

FC 18 44 79 : Reverse

00 00 FF 00 : Reverse

00 00 41 B0 :22.00 mA Current output value

04 00 00 00 :Reverse

4D 43 :CRC check

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