	Intelligent	Pressure/	
Ι	Differential Press Operation	ure Transmitte Manual	er
		Vers	ion:202304

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1. Product Overview

Intelligent pressure / differential pressure transmitter uses imported silicon piezoresistive pressure sensor and monocrystalline silicon differential pressure sensor as signal measuring element, digital modular circuit design, digital signal processing technology, which make it has excellent anti-interference ability and signal stability. Multi-parameter LCD display, the three-button operation can also easily achieve zero reset, zero point migration, range setting, damping setting and other parameters setting without the manual operator.

Intelligent pressure/differential pressure transmitter can be widely used in petroleum, chemical, steel, electric power, light industry, environmental protection and other fields,to achieve the measurement of various pressure, differential pressure, flow, liquid level and other industrial process measurement, suitable to various harsh environment and corrosive medium.

2. Technical Specification

Measuring Range :

Pressure: Gauge pressure (G): 0-2.5MPa, minimum 0-500Pa Sealed gauge pressure (S): 0-60MPa, minimum 0-3.5MPa Absolute pressure (A): 0-60MPa, minimum 0-2kPa Negative pressure: -0.1MPa-60MPa Differential pressure: -1MPa-1MPa

Measuring Accuracy :

Pressure: 0.25%FS 0.1%FS

Differential Pressure: 0.075%FS 0.1%FS 0.2%FS

Allow Ambient Temperature:

-40~85°C, - 20~70°C (Display)

Allowable Medium Temperature:

-40°C~+105°C

-40°C~+250°C

-40°C~+350°C

Allowable Storage Temperature:

-40°C~+85°C

Temperature Influence:

优于 0.2%/10°C

Power Supply:

24V DC (12~30VDC

Output:

(4~20)mA Two-wire, HART

RS485(MODBUS-RTU)

Long Term Stability:

Exceeding 0.2% FS annually

Process Connection Standard:

M20 * 1.5 or G1/2, flange, other customized

)

Explosion Proof Grade:

Ex d[ia Ga] IIC T6 Gb

Load Characteristics:

Current type: $\leq \{(Us-12) \div 0.02\} \Omega$ (Us=supply voltage)

3. Installation

The DP-20 series is a pressure transmitter that can be directly installed on pipelines using M20 \times 1.5 or other external threads, with a tightening torque not exceeding 40N. m; The DP-3X series is a differential pressure transmitter that can be installed on pipelines or walls with a mounting bracket.

4. Dimension



5. Electrical Connection





6. Button Functions

6.1 Through the buttons, you can adjust the zero of the main variable; zero migration [zero adjustment], range migration [full adjustment]; set the unit, range, damping, set the display variable, calibrate the lower limit and the upper limit.

6.1.1 Button function code quick lookup table

When using the buttons for field configuration, the "88" in the lower left corner of the LCD is used to indicate the current setting variable type, that is, the setting function currently executed by the button. The corresponding relationship is as follows:

Display of "88" in the	Setting Variable
Lower Left Corner	
0 or blank	Normal display
1	Input operation code (you can directly input the number corresponding to the following functions to directly perform the corresponding function settings)
2	Set unit
3	Set range lower limit
4	Set range upper limit
5	Set damping

6	Adjust zero of main variable
7	Set decimal point of main variable
8	Output characteristic [set linear output or square root output]
9	Calibrate lower limit [input "9" to enter the calibration lower limit function]
10	Calibrate upper limit

Note: By inputting the operation code corresponding to each function, you can quickly enter the corresponding function. For example, inputting "5" directly enters the damping setting function.

6.1.2 Button mode description

This product supports two operation modes: "two-button" and "three-button".

Three-button operation mode: The operation is faster and is suitable for products with 3 buttons on the LCD. At this time, the Z button is used to enter the prompt data setting interface and shift; the S button is used to enter the data setting interface, increase the number and save the data; the M button is used to save the data.
Two-button operation mode: This operation mode is usually used when there are only 2 non-contact buttons outside. At this time, the Z button is used to enter the prompt data setting interface and shift; the S button is used to enter the data setting interface and shift; the multiple and save the data setting interface and shift; the multiple and such a setting interface and shift; the solution is used to enter the data setting interface, increase the number and save the data.

6.1.3 Data Setting Method

When the "88" in the lower left corner shows $1 \sim 7$, it indicates that the transmitter is in the field configuration mode. At this time, you can input the password, modify the parameters, or perform migration through the buttons.

During the data setting process, the "S" button is used to adjust the numbers and decimal points, the "Z" button is used for shifting, and the "M" button is used for saving.

The setting process is as follows:

(1) Press the S button to enter the data setting interface, and the sign bit starts to flash at the same time, indicating that the sign bit can be modified.

(2) If the S button is pressed again, the positive and negative of the data can be switched (the positive sign is indicated by the up arrow).(3) Press the Z button, the first digit position starts to flash, indicating that it can be modified. At this time, long-press or continuously press the S button multiple times, and the set number cycles between 0 and 9.

(4) Press the Z button again to set the second to fifth digits in turn. The setting method is exactly the same as the first digit.

(5) After setting the fifth digit, press the Z button to start setting the decimal point. The four decimal points start to flash at the same time, indicating that the decimal point can be set. At this time, press the S button, and the decimal point position cycles.

(6) After the decimal point is set, press the Z button, and the left arrow starts to flash, indicating that the setting can be saved.

(7) Press the S button to save the setting; press the Z button, and the sign bit starts to flash, and you can start setting the data again.

Note: If it is in the "three-button" operation mode, during the data setting process, the M button can be pressed at any time to quickly save the setting, without having to wait until the down arrow flashes to save the setting.

6.2 Button operation instructions

6.2.1 Zero Adjustment Function of the Main Variable

In the real-time normal display state, simultaneously press the "M" + "Z" buttons and hold for 5 seconds to directly enter the zero adjustment function of the main variable.

After entering the "zero adjustment of the main variable" function, the function code in the lower left corner shows "6", the current value of the main variable is displayed in the middle, and "YES" or "NO" is displayed in the lower area.

- When "YES" is displayed, press the "M" or "Z" button to execute the "zero adjustment of the main variable" operation. After executing this function, the output pressure is "0".
- When "NO" is displayed, press the "M" or "Z" button to end the "zero adjustment of the main variable" operation.
- Press the "S" button to switch between "YES" and "NO".

6.2.2 Factory reset function

If the instrument backup has been done at the factory, in the real-time normal display state, simultaneously press the "M" + "S" + "Z" buttons and hold for 5 seconds to restore the factory settings.

6.2.3 Configuration function

6.2.3.1 Function overview

In the real-time normal display state, press the Z button to enter the configuration data setting state.

After entering this state, "01" is displayed in the lower left corner of the LCD, prompting to input the operation code. Inputting different operation codes will enter different function setting interfaces. After the corresponding function settings are completed, the cyclic setting will be automatically performed.

Display of "88" in the Lower Left Corner	Setting Variable
2	Set unit
3	Set range lower limit
5	Set damping
6	Adjust zero of main variable
7	Adjust decimal point of main variable
8	Output characteristic [set linear output or square root output]
9	Calibrate lower limit
10	Calibrate upper limit

The operation code input can be completed as described in 6.1.3 Data Setting Method, as well as the range upper and lower limits, damping setting, calibration lower limit, and calibration upper limit.

Instructions:

• If it is in the two-button setting mode, when the down arrow flashes, press the S button to achieve the save function of the M button.

• If the set data exceeds the limit, "OVER" is displayed on the LCD. At this time, pressing the S button or Z button can reset the setting.

• After the configuration data setting is completed and returns to the normal display state, if the user presses the Z button again within 10 seconds, the configuration setting process will be restarted, and the input code verification step will be skipped.

• After entering the configuration data setting, if no button is pressed within 2 minutes, it will return to the normal display.

• If in "Function 1", after inputting the operation code, the following functions are executed:

Input "00002" to enter the unit setting.

Input "00003" to enter the range lower limit setting.

Input "00005" to enter the damping setting.

Input "00006" to enter the zero adjustment of the main variable.

Input "00007" to enter the decimal point adjustment of the main variable.

Input "00008" to enter the output characteristic adjustment.

Input "00009" to enter the calibration lower limit.

If other data is input, it will return to the normal display. This can avoid human misoperation.

6.2.3.2 Unit setting

During the unit setting process, the currently selected unit flashes in the lower right corner of the LCD. The unit setting process is as follows: Press the "S" button to select the main variable unit in turn; (kPa, atm, MPa, mmHO, mmHG, psi, bar, mbar, gcm, kgcm, Pa, etc.)
Press the "Z" button or "M" button to confirm the currently selected main variable unit and directly enter the "range lower limit setting" function interface.

6.2.3.3 Range setting

When setting the range, the "range lower limit" must be input first, and then the "range upper limit".

During the range setting process, the operation code in the lower left corner shows "03" or "04", corresponding to the input of "lower limit" and "upper limit" respectively. After the range lower limit is input, it will automatically enter the setting of the "range upper limit". For the data input method, refer to "6.1.3 Data Setting Method".

6.2.3.4 Damping setting

You can directly enter the damping setting page by inputting the operation code "5", or directly enter the damping setting after setting the range upper limit.

When the operation code in the lower left corner shows "05", it indicates that the damping value is being set. The input range of the damping value is $0 \sim 32$ seconds.

For the data input method, refer to "6.1.3 Data Setting Method".

6.2.3.5 Output characteristic setting

During the output characteristic setting, the currently selected output characteristic (linear LIN output or square root SQRT output) flashes in the lower right corner of the LCD. The setting process is as follows:

- 1. Press the "S" button to select the current output mode in turn; (LIN, SQRT)
- 2. Press the "Z" button or "M" button to confirm the currently selected output characteristic and end the current round of setting, returning to the "end setting" function interface [the function code "0" is displayed in the lower left corner of the LCD]. If there is no button operation within 10 seconds, it will return to the normal display, otherwise it will continue to set from the range unit [without the need to input the operation code again].

Note: LIN represents linear current output; SQRT represents square root current output.

6.2.3.6 Calibration Lower Limit

Directly enter the calibration lower limit page by inputting the operation code "9". When the operation code in the lower left corner shows "09", it indicates that the lower limit can be calibrated. During calibration, the corresponding pressure needs to be applied externally. After the pressure is stable, input the lower limit calibration value through "6.1.3 Data Setting Method".

6.2.3.7 Calibration Upper Limit

First input the operation code "9" to enter the calibration lower limit page, and then press the Z button to enter the calibration upper limit page. When the operation code in the lower left corner shows "10", it

indicates that the upper limit can be calibrated. During calibration, the corresponding pressure needs to be applied externally. After the pressure is stable, input the upper limit calibration value through "6.1.3 Data Setting Method".

6.2.3.8 Zero Migration and Range Migration [Zero Adjustment and

Full Adjustment]

In the real-time normal display state, simultaneously press the "S" and "Z" buttons and hold for more than 5 seconds for "zero migration", that is, the "zero adjustment" operation: the current pressure is set as the range lower limit, and the transmitter output is adjusted to 4mA. In the real-time normal display state, simultaneously press the "S" and "M" buttons and hold for more than 5 seconds for "range migration", that is, the "full adjustment" operation: the current pressure is set as the range upper limit, and the transmitter output is adjusted to 20mA.

6.2.3.9 Display Variable Setting

The liquid crystal display screen can display three variables: "current", "percentage", and "main variable". In the real-time normal display state, the S button can be used to change the display variable. The method is as follows: Press the "S" button, the current display variable (such as: current) changes and cycles through "current, percentage, main variable". When the desired display variable (such as: main variable) appears on the screen, release the "S" button, that is, the display variable is changed from "current" to "main variable".

7. Notes

- 1. All supplied products are accompanied by a product certificate and an operation manual. Please carefully check the technical parameters therein to avoid errors.
- 2. When tightening the thread, it should be tightened slowly, pay attention to sealing, and the torque should not be directly applied to the transmitter housing, but only to the hexagon of the pressure interface.
- 3. The wiring should be carried out in strict accordance with the requirements of our company's operation manual.
- 4. This product is prohibited from being disassembled, collided, dropped, hit hard, or poked the pressure tapping hole with sharp instruments, as all these behaviors may damage the product's appearance and internal circuits.
- 5. It can work after power-on, but the output is stable after 30 minutes of preheating.
- 6. If any abnormality is found during use, the power should be turned off and the use should be stopped for inspection or contact with our company's technical department.
- 7. During transportation and storage, the packaging should be restored and stored in a cool, dry, and ventilated warehouse.
- 8. For product quality problems (excluding product damage caused by human factors or improper installation and selection), free repair is provided within 12 months.

9. If the equipment needs to be recalibrated, modified, or repaired, please be sure to contact us before the equipment is returned to the factory so that we can handle it according to your requirements as soon as possible. Please provide the quantity of the returned equipment and a description of the return situation. Before sending the equipment back to our company, please clean the equipment and pack it properly.

8. Frequently Asked Questions and Answers

Question: What should I do if the transmitter output does not increase when the pressure rises?

Answer: In this case, first check whether the pressure interface is leaking or blocked. If it is confirmed that it is not, check the wiring method. If the wiring is correct, check the power supply. If the power supply is normal, check whether the sensor zero position has output, or perform a simple pressurization to see if the output changes. If there is a change, it proves that the sensor is not damaged. If there is no change, the sensor is already damaged. Other possible reasons for this situation may be instrument damage or problems in other parts of the entire system.

Question: The transmitter output does not change when pressurized, and then suddenly changes when pressurized again, and the zero position of the transmitter does not return when the pressure is released.

Answer: The most likely cause of this phenomenon is the pressure sensor sealing ring. Generally, it is because the sealing ring specification is incorrect (too soft or too thick). When the sensor is tightened, the sealing ring is compressed into the sensor pressure tapping port, blocking the sensor. When pressurized, the pressure medium cannot enter, but when the pressure is very high, it suddenly flushes open the sealing ring and the pressure sensor is affected by the pressure and changes. When the pressure is reduced again, the sealing ring returns to block the pressure tapping port, and the remaining pressure cannot be released, so the sensor zero position cannot come down. The best way to eliminate this reason is to remove the sensor and directly check whether the zero position is normal. If it is normal, replace the sealing ring and try again.

Question: What are the reasons for the unstable output signal of the transmitter?

Answer: The pressure source itself is an unstable pressure, the anti-interference ability of instruments or pressure sensors is weak, the sensor wiring is not secure, the sensor itself vibrates severely, and the sensor is faulty.

