LEFOO

LFT6727

DIGITAL DISPLAY SANITARY PRESSURE TRANSMITTER

Product Operation Manual

INTRODUCTION AND OVERVIEW

BRIEF INTRODUCTION

The Digital Display Sanitary Pressure Transmitter by our company is a multi-functional digital instrument, which is carefully designed on the basis of advanced, mature and reliable silicon sensor , combined with advanced microcontroller unit technology and sensor digital conversion technology.

The core component, the microcontroller unit, with its powerful functions and high-speed computing capability ensures the excellent quality of the transmitter. The entire design framework focuses on reliability, stability, high accuracy and intelligence.

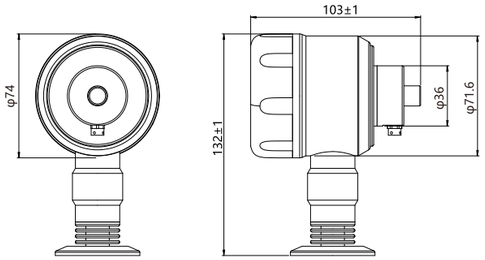
With a powerful interface operation function, the digital meter can display pressure, percentage and current, and 0 to 100% analog indication, and the key operation can easily complete the setting of basic parameters such as zero shift, range setting and damping setting without standard pressure source, which greatly facilitates the field debugging.

The signal conversion, signal acquisition and processing and current output control use integrated special integrated circuits (ASICS), making the transmitter stable, reliable, vibration-resistant and other characteristics, with good interchangeability.

The transmitter housing features a fully stainless steel construction,with its connection components fabricated using integral welding and polishing processes.The liquid-contact surface is made of sanitary-grade material with a roughness value(Ra)<0.8,offering advantages such as a smooth surface,absence of sanitary dead zones, resistance to contamination,easy cleaning(via clamp-type interfaces),and suitability for sterilization.This makes it a specialized sanitary pressure transmitter designed for applications in the food,beverage,pharmaceutical,and bioengineering industries.

OVERVIEW

1.1 OVERALL APPEARANCE OF THE MACHINE



1.2 INTELLIGENT TRANSMITTER WORKING PRINCIPLE

1.2.1 WORKING PRINCIPLE

Figure 1-1 shows the basic working principle electrical block diagram of the smart transmitter. The operating principle and the functions of each component are described below.

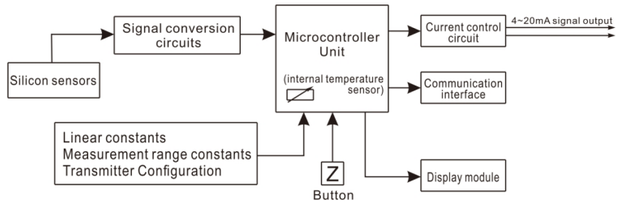


Figure 1-1 Transmitter schematic frame diagram

1.2.2 SMART CIRCUIT BOARD

1)A/D conversion

The A/D conversion circuit uses a dedicated low-power integrated circuit to convert the analog current output from the demodulator into a digital quantity with an accuracy of up to 18 bits, which is provided to the microprocessor as the input signal.

2)Microprocessor

The microprocessor of the smart transmitter controls the A/D and D/A conversion work and also performs self-diagnostics and implements digital communication. During operation, a digital pressure value is processed by the microprocessor and stored digitally to ensure precise corrections and engineering unit conversions. In addition, the microprocessor can also perform linearization of the sensor, range ratio, damping time and other function settings.

3)EEPROM Memory

EEPROM stores all configuration, characterization and numerically fine-tuned parameters. This memory is non-volatile, so even if the power is cut off, the stored data can still be kept intact to realize intelligent communication at any time.

4)D/A conversion

The D/A converter converts the corrected digital signal from the microprocessor into a 4 to 20 mA analog signal and outputs it to the loop.

5）Digital Communication

Transmitters with the HART protocol can test and configure smart transmitters through a communicator. Or complete the communication through any upper system host that supports the HART communication protocol. The HART protocol uses the industry standard BELL202 Frequency Phase Shift Keying (FSK) technology to achieve communication by superimposing 1200Hz or 2200Hz digital signal on the 4~20mA signal, and the frequency signal does not cause any interference to the 4 to 20mA process when communicating. No HART protocol transmitter can test and configure smart transmitters through special adapters and software.

6）Display and keys

Smart transmitters with LCD display can show the pressure value, the current value, the 0%-100% proportional display and the temperature value of the sensor measured by the transmitter, while the transmitter can be configured via the keys on the LCD panel.

SPECIFICATION

2.1 Measurement Range and Maximum Value

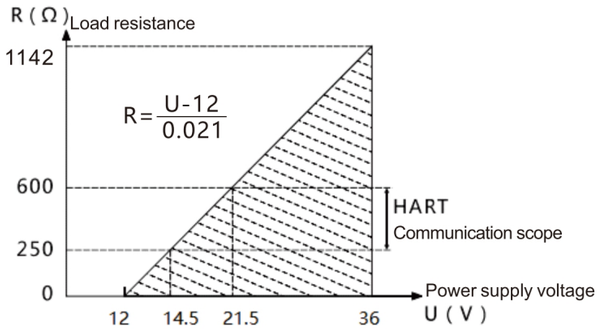
Pressure Type	minimum range		range ability	Overload Pressure
Gauge pressure	B	10KPa	±20KPa	120KPa
	C	20KPa	±40KPa	120KPa
	D	40KPa	±100KPa	300KPa
	E	100KPa	-100~250KPa	1MPa
	F	250KPa	0~500KPa	1.5MPa
	H	500KPa	-0.1~1MPa	3MPa
	I	1MPa	0~1. 6MPa	3MPa
	J	1. 6MPa	-0.1~2.5MPa	5MPa
	K	2.5MPa	0~4MPa	6MPa

2.2 Reference accuracy

Linear Precision	±0 .2%FS	Nominal range：20KPa、40KPa、100KPa、250KPa、500KPa、1MPa、1.6MPa、2.5MPa、4MPa

2.3 Power supply and load condition

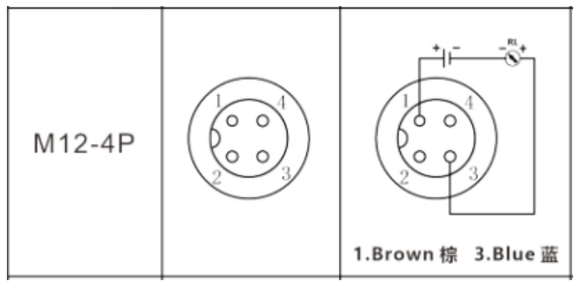
Project	Operating condition
Supply voltage	4~20mA: 12~36VDC
	4~20mA+Hart: 14.5~36VDC
Load resistance	0~1142Ω is working state,250~600Ω HART communication
Transmission distance	<1000米
Power consumption	≤500mW@24VDC, 20.8mA



2.4 Environmenal condition

Project	Operating condition
Operating ambient temperature range	-20~70℃
Operating environment humidity range	5%~100%RH@40℃
Storage ambient temperature range	-40~85℃
Protection level	IP67
*Please consult an engineer for details	

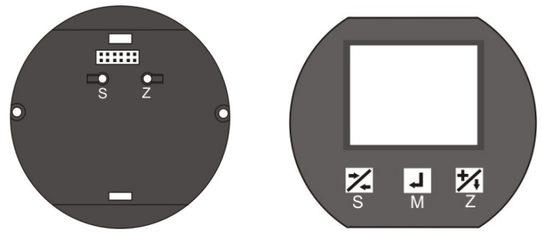
2.5 Electrical Connections



DEBUGGING AND OPERATION

3.1 Overview

Figure 1: Non-Display Panel Diagram **Figure 2: LCD Display Panel Diagram**



Quick function (only 4~20 mA / 4~20 mA + Hart)

3.2 No LCD display transmitter button operation

When the transmitter has no display, the following operations can be performed using the buttons S and Z on the circuit board (as shown in Figure 1): Operation (485 type does not have this function)

3.2.1 Clear

The transmitter is powered on and in a zero pressure state. Press and hold the S and Z buttons for more than 5 seconds. Then release the two buttons at the same time, press and hold the two buttons again for about 2 seconds, and the transmitter will clear the current pressure value. zero.

3.2.2 Lower limit calibration (zero active migration)

Make sure the transmitter is powered on and under pressure at the lower limit of the range: Press and hold the S and Z buttons simultaneously for 5 seconds Then release both buttons at the same time, and press and hold the Z button for about 2 seconds. The transmitter will use the current pressure as the lower limit of the range , but the range of the transmitter will not change. For example: the range of the transmitter is 0-5 kPa The current pressure is -1 kPa , When the implementation After this operation, the measuring range of the transmitter changes to -1-4 kPa.

3.2.3 Upper limit calibration (full point calibration)

Make sure the transmitter is powered on and under pressure at the upper limit of the range, and press and hold the S and Z buttons for 5 seconds. Then release both buttons at the same time, and press the S button again for about 2 seconds! The transmitter uses the current pressure as the upper limit of the range, but the lower limit of the transmitter will not change. For example: the transmitter range is 0-5 kPa The current pressure is 4kPa, After performing this operation, the measuring range of the transmitter changes to 0-4 kPa.

3.3 Transmitter with LCD display and button operation

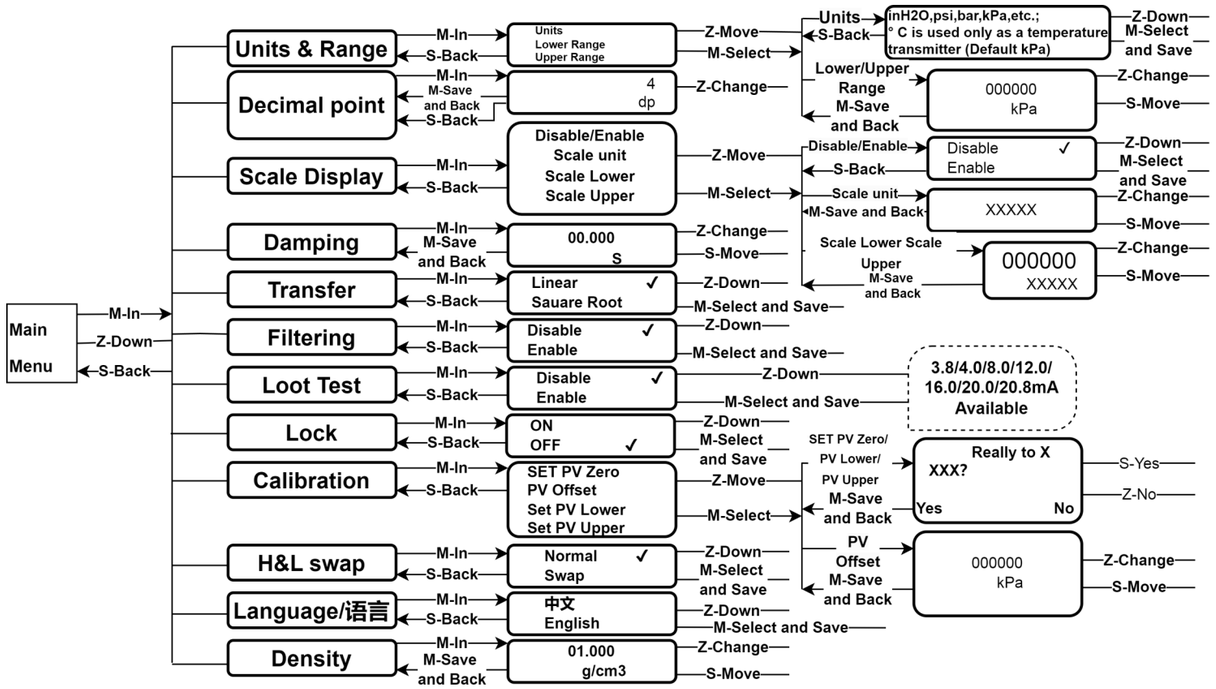
When the transmitter is equipped with a liquid crystal display, it can not only realize the above-described operations, but also The three buttons on the LCD display head are used to set the parameters of the transmitter. Please refer to Figure 2 for the buttons.

Note: If the transmitter parameters cannot be modified, please set the menu item "Write Protection" to "Off".

3.3.1 Key Description

Button Icons	Button Name	Key functions
S	S	In menu mode, it is the return function. In parameter setting mode, it is the return function. For the shift function, this button also has the 3.2-point S button function.
M	M	Menu and parameter confirmation buttons.
Z	Z	In the menu state, it is to select the function; in the parameter setting state, it is+1 function, this key also has 3.2 items of Z key function.

3.3.2 MENU STRUCTURE



Current Type Operation Menu

1.Upper/Lower Range Limits:

This setting is used to actual the upper and lower range values. Adjust according to actual measurement requirements. Note: Both the upper and lower range limits must be within the product's measurement span.

2.Damping Time:

This setting defines the time interval from sampling to output. Select an appropriate damping time based on required measurement accuracy, the measured medium, container conditions, and pressure range. A suitable damping time can reduce noise interference and filter out abnormal values. Default damping time is 0.2 seconds, and the minimum adjustable value is 0 seconds.

3.Output Characteristics:

Use linear output when measuring differential pressure or liquid level. Use square root output when measuring flow.

4.Pressure Filtering:

This function allows adjustment of the transmitter's filtering intensity to reduce noise interference and eliminate abnormal values. The filtering effect is stronger than that of damping time. It is recommended to enable this function only when damping adjustment alone does not achieve the desired filtering performance.

Default: Off

5.Write Protection:

When enabled, all parameter modifications are locked and cannot be changed. Before performing any parameter adjustments, ensure this function is set to Off. Default: Off

6.High/Low Pressure Side Swap:

If the high- and low-pressure sides are installed incorrectly on-site and it is inconvenient to reinstall, this function allows for logical swapping of the high and low pressure inputs without physical reconnection.

7.Ratio Display:

This function allows for custom unit definition (up to 5 characters) and linear scaling between the upper and lower display limits. For example, if the current range and unit is 0–40 kPa, but the user wants the display to show 0–400 LLL, the custom unit can be set as LLL, with the lower limit set to 0 and the upper limit set to 400 to match the display requirement.

3.3.3 Menu Function

Damping value

Unit	Setting Range
S	0~60

Output characteristic

Parameter	Signal Type
Liner	Linear output
Square Root	Square Root output

Process unit

Process unit	Illustrate	Illustrate	lilustrate
inH20	inches of water @4℃	Torr	Trust
inHg	inches of mercury@ 0℃	atm	Standard atmospheric pressure
ftH20	feet of water @4℃	Mpa	Mpa
mmH20	mm water @4℃	mH2O	Meters of water @4℃
mmHg	mmHg@0℃	mHg	Meters of mercury @ 0℃
psi	pounds per square inch	m	Meter
bar	bar	mm	Millimeters
mbar	millibar	cm	centimeter
g/cm2	glcm2	%	show percentage
kg/cm2	kglcm2	mA	Display current value
pa	pa	g/cm3	glcm3
kpa	kpa		

Fault alarm signal

Parameter	Fault alarm signal output
High	20.8mA
Low	3.8mA
keep	Maintain the effective current value before the fault
None	Saturated output to 20.8mA Or saturated output to 3.8mA

CURRENT FIXED

Parameter	Output fixed current value
3. 8mA	Fixed at 3.8mA
4. 0mA	Fixed to 4mA
8. 0mA	Fixed to 8mA
12.0mA	Fixed to 12mA
16.0mA	Fixed at 16mA
20.0mA	Fixed at 20mA
20.8mA	Fixed at 20.8mA

3.3.4 Configuration Operation

When configuring the transmitter, make sure the transmitter is powered on and in the measurement display state, press and hold the M button After the main menu interface is displayed for about 5 seconds, release the key to enter the configuration menu interface. Press the S key to return to the main menu, and press the Z key to select a menu item. The key is the confirmation key. When entering the specific parameter setting interface, press the S key to cycle through the parameters that need to be modified. The digits, decimal points and negative signs are included. Press the Z key to modify the selected digit. The digit is +1, and the small tree point is Circular movement, the negative position is positive or negative selection, press M key to save the changes and return to the previous menu.

Example:

Modify Unit

On the main menu page, press the Z key to move the selection up and down, select "Range Units", and short press M Enter; press the Z key to move the selection up and down, select "Unit", and press M to enter; press the Z key to select the unit, and press the M key to confirm the selection. Appear √ means the operation is successful, otherwise please check whether "Write Protect" is "Off"; press S to return to the previous level.

Modify the lower limit

On the main menu page, press the Z key to move the selection up and down, select "Range Units" , and press M to enter; press the Z key to move up and down Move the selection, select "Lower Limit", and press M to enter; press S to select the modification digit, and press Z to modify the number. If the key does not respond, please check whether "Write Protect" is "Off"; press M to save and return to the previous layer.

Restore factory settings

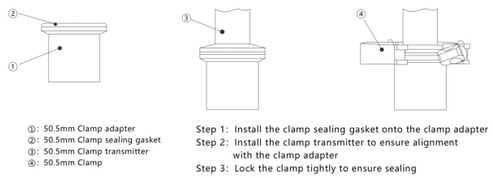
On the main menu page, press the Z key to move the selection up and down, select "Damping Time", short press M to enter; press the S key to select Modify the digit, short press Z key to modify the number, set the number to "88.888 "; press M to save, then the transmitter parameters will be restored Restore to factory settings.

For other operations, see the menu structure.

If no key is pressed for about 90 seconds in the menu or parameter setting state, the transmitter will automatically exit the parameter configuration and return to the default state. Return to measurement state.

INSTALLATION AND WARNING

Note: Contact with the diaphragm at the bottom of the transmitter may damage it; do not touch it!
Install the connecting wire before recommending its use.



WARNING

1.Please place the transmitter horizontally before adjustment.

2.After the transmitter is installed in the field, the zero point of the transmitter should be adjusted.

3.Before pressurizing the transmitter, install and tighten the process connections.

4.The transmitter should be installed in a dry environment and should avoid being exposed to rain. In a harsh environment, a transmitter protection box should be used.

5.It is forbidden for the user to disassemble and assemble the transmitter.

6.Do not remove the transmitter meter cover in an explosive/flammable environment while energized.

7.Please check whether the supply voltage of the transmitter is in accordance with the supply voltage requirement in the operation manual by the user.

8.The external grounding screw of the transmitter shall be reliably connected to earth.

9.The installation of the transmitter in explosive atmospheres must comply with relevant international, national and local standards, codes and guidelines. Please consult the Explosion Protection section of the instruction manual for the qualifying provisions relating to safe installation.

10.The installation and use of the intrinsically safe transmitter with external safety grille shall be carried out in accordance with its operating instructions.

11.The transmitter calibration and temperature compensation with HART communication must be performed with the communication equipment and software provided by our company.