

# *Pressure Transmitter*

## Klinger Field 401 Manual





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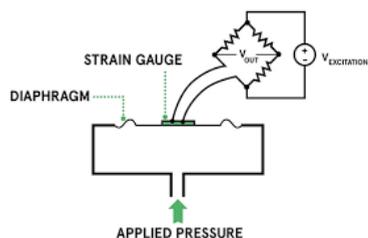
## 1. Introduction

Klinger Field 401 is a family of pressure transmitters intended for standard tasks in all types of industry. The transmitter is delivered in measuring ranges from 10 mbar up to 1,000 bar with a standard accuracy better than 0.2%.

By default, the output signal is analog (4... 20 mA DC) with HART communication protocol.

### Sensor with temperature compensation

The sensor is based on a semiconductor element that is part of a Wheatstone bridge, which is mounted on a ceramic support plate. The sensor is temperature compensated on the ceramic element with a compensation circuit that equalizes temperature operation the range -10 to +70 ° C.



## 2. Content of the box

In the box you'll find:

- 1 Pressure Transmitter
- 1 stk Manual
- Calibration Certificate



Remember to check the type of sign on the meter to ensure the meter is delivered according to the order.



## 3. Safety

### Warning !

Prior to installation, commissioning and operation, it must be ensured that a suitable transmitter is selected in terms of measuring range, design and suitable material (corrosion) for the specific measuring conditions.

To guarantee the specified measurement accuracy and stability, the specified load limits must be observed.

Only qualified persons who are authorized are allowed to install, maintain and service the pressure gauges.

For hazardous media such as oxygen, acetylene, flammable and toxic gases / liquids, as well as refrigeration systems, compressors, etc., in addition to all standard rules, the regulations must be followed as the relevant existing codes.

## 4. Technical Data

<b>Design:</b>	Compact transmitter w. Field Housing
<b>Materials/Housing:</b>	Aluminium (painted)
<b>Ingress Protection:</b>	IP 65 acc. EN 60529
<b>Electrical Connection:</b>	Terminal (separate Terminalbox)
<b>Weight:</b>	850 ... 1.000 g
<b>Process Connection:</b>	G 1/2 B per DIN EN 837-1 M20*1.5
<b>Wetted Parts:</b>	Stainless Steel 1.4301 (AISI 304) Stainless Steel 1.4404 (AISI 316L)
<b>Sensor:</b>	Solid State w. temperature compensation (-10 .. 70 °C)
<b>Ranges:</b>	Sensor 1 (low pressure)            10 mbar ... 40 mbar Sensor 2 (standard)                40 mbar ... 100 bar Sensor 3 (high pressure)            100 bar ... 1.000 bar  Actual Range will be adjusted within the above limitations.
<b>Over pressure:</b>	150% FS
<b>Accuracy:</b>	(Lin./Hyst./Rep.) ≤ 0.2 % of Adjusted Range  option: ≤ 0.1 %
<b>Output:</b>	4-20mA / HART protocol  Other outputs can be delivered (ask for options)
<b>Power supply:</b>	24VDC (10...30 V DC)
<b>Temperature:</b>	Ambient: -20...85 °C Media: -20...85° C * Storage: -40...125 °C
<b>Display:</b>	Intelligent Display (LCD or LED)
<b>Ex-approval:</b>	Option:    Intrinsically safe type Ex iaIICT4 Flameproof safe Ex dIICT6

## 5. Product Selection

### Klinger Field 401A-

#### Range

Xxx, yyy                      Range, Unit: Pa, kPa, MPa,...

#### Accuracy

1	0.1%FS
2	0.2%FS
5	0.5%FS

#### Transmitter type

A	Absolute Pressure
G	Gauge Pressure
N	Vacuum

#### Process Connection

2	M20*1.5-20 Male
6	G1/2-20     Male
9	Other

#### Electrical Connection

4	Terminal Block
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#### Output

S	4-20mA with HART protocol
R	RS485 (Modbus)
T	Other

#### Power Supply

2	24VDC
9	Other

#### Display

M5	LCD intelligent Display
MH	Intelligent 4bits LED indicator with 2-ways relay alarm

#### Ex Approval

	Option
i	Intrinsically safe type Ex iaIICT4
d	Flameproof safe Ex dIICT6

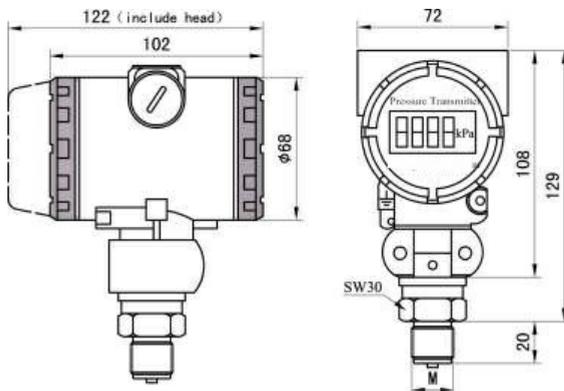
## 6. Dimensions

### Standard type

Electronic Shell: Aluminium alloy

Wetted part: SUS 304  
SUS316L  
PVDF

Weight: about 850g

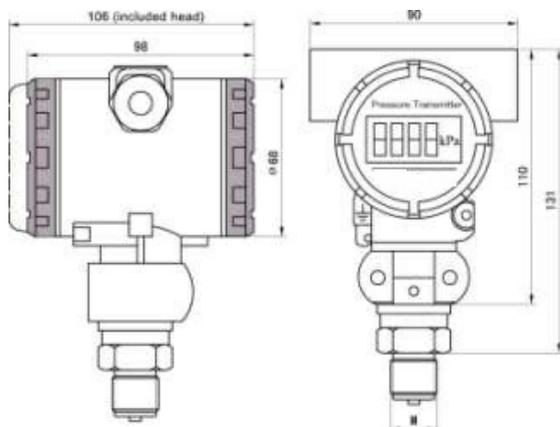


### Ex-version

Electronic Shell: Aluminium alloy

Wetted part: SUS 304  
SUS316L  
PVDF

Weight: about 1.000g



## 7. Mechanical Mounting

Mechanical installation of a pressure transmitter has to be done in accordance with the general technical rules (eg EN 837.2)

The installation is carried out in accordance with the specified connection options using a suitable tool.

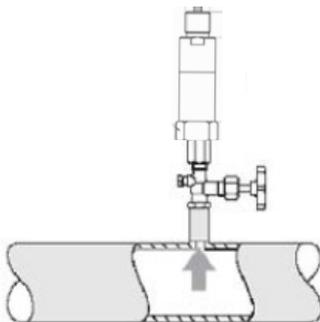
The actual assembly takes place by tightening the nut and not by twisting the housing.

Appropriate sealing rings, washers or other types of sealing must be used.

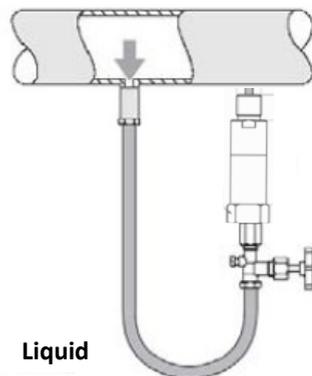


When used for gas measurement, the transmitter should be mounted above the measuring point so that any moisture can run away.

When used in liquid systems, the transmitter should be mounted below the measuring point or on a vertical pipe so that any air does not collect in the connection.



**Gas**

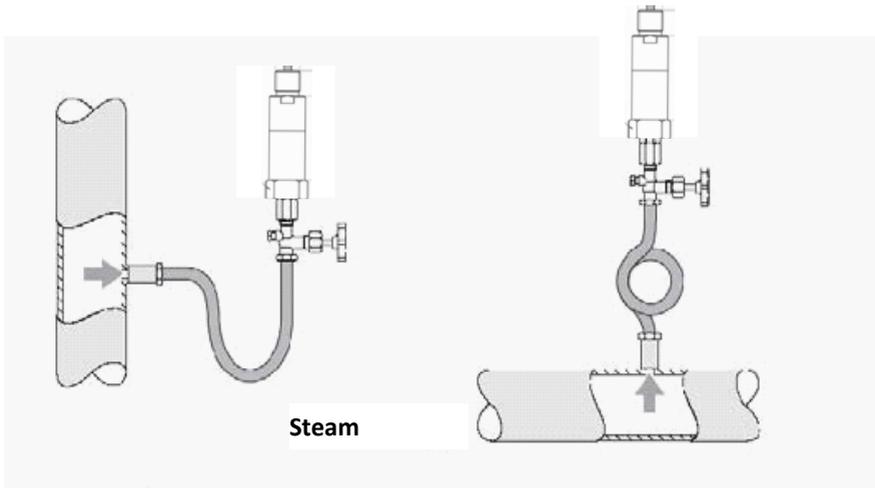


**Liquid**

If steam is to be measured, direct contact between the hot medium and the measuring cell has to be avoided - and it is important to bring the media Temperature down before it comes into contact with the cell.

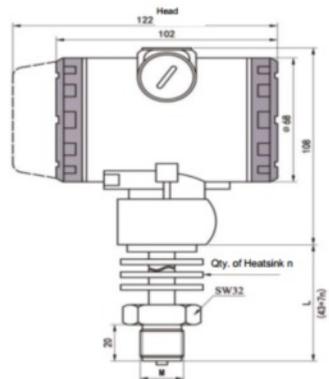
If Klinger Field 401 is used in the standard version, a cooling element must therefore be used between the measuring point and the transmitter - in daily reference a "pig tail".

There are different designs - common is, however, that they contain a "water trap" that must be filled with liquid (condensation) to achieve a separation to the hot medium.



Klinger Field can be delivered in a special high-temperature version, which is delivered with a cooling element mounted - the number of cooling fins determines how high the medium temperature can be during direct installation.

Medium temp. °C	Qty. of Heat sink n	L (mm)
150	4	71
250	8	99
350	12	127



**Note:**

The specified maximum media temperatures apply to ambient temperature <60 ° C  
At higher temperatures the cooling effect is reduced and the maximum permissible medium temperature is reduced.

## 8. Electrical Connection

The terminal block for electrical mounting is located in a separate compartment, behind the cover on the back.

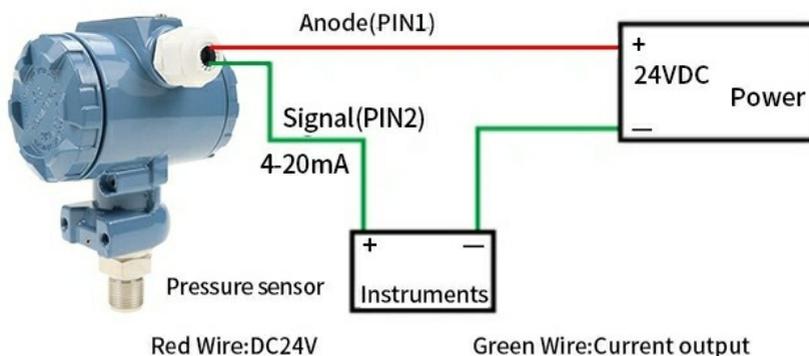
The transmitter is a 2-wire transmitter and the supply / signal is connected at the terminals marked OUT + / -

If the transmitter are equipped with RS485 Communication, you have to use the terminals marked TEST + / -



OUT +	----	24VDC +	OUT -	---	4~20mA
TEST +	-----	RS485A	TEST -	-----	RS485B

### 2-wire current output wiring diagram



## 9. LCD display

Klinger Field is equipped with an intelligent display that can be used for reading measured values, as well as for setting the transmitter's parameters, such as measuring range, output signal, attenuation etc.

In addition to measured values, the display can be adjusted for better reading of the important information.



Fig. 1 - Display



Fig. 2 - mA Metering



Fig. 3 - Value in %



Fig. 4 - Value in Engineering Units

The user can set the variables displayed on the LCD and the number of decimal places displayed through the configuration software. It is regarded as "instrument layout" → "output characteristics" of the layout software setting part.

The LCD supports dual-variable display. The display variables that can be set include current, primary variable percentage and primary variable; each variable can be independently set to display the decimal point position: 0, 1, 2, 3, 4.

If the two display variables are the same, the LCD displays only one variable; otherwise, the LCD will alternately display the set display variables at a time interval of 3 seconds.

### Display Indicators:

\* If it is in communication status, the upper left corner of the LCD blinking displays



\* If the output is square, the LCD displays



\* If the output current is fixed, the LCD displays



\* If write protection is activated, the LCD displays



\* If the temperature display is started, the real-time temperature is displayed at the "88" character in the lower left corner of the LCD, and if the temperature is below -19 grC or above 99 grC, displays



## 10. Setting of the Display

Setting of measuring range / parameters takes place via the 3 keys, marked M, S and Z, as well as a supporting help text on the display.

The basic operation of the buttons is as follows:

1. Press the S key to open the data set interface.  
When the digit flashes, you can change it.
2. If you press the S key again, you can switch the positive and negative data.
3. Press the Z key, the first digit starts flashing, which means it can be changed.  
Then press the S button repeatedly, you can set the number between 0-9 cycles.
4. Press the Z key again and the next digit can be set.  
The method described under 3.
5. After setting the fifth digit, press the Z key to start setting the decimal point.  
4 decimal places flash simultaneously - and the S key is used to select point position.
6. After the decimal point is selected, press the Z key, the arrow starts flashing, you can save Settings.
7. Press the S key to save the settings.
8. Press the Z key, the first digit starts flashing - the settings can now be changed.
9. The M button can be pressed at any time to quickly save the settings without having to wait.



## 11. Range- and Parameter Setting

It is possible to set essential parameters, such as measuring range, output signal and attenuation, via the 3 keys and the display.

Here the Z key is used to change location for changing value. The S key is used to add numbers and store data, while the M key is used for data storage.

The setting process is as follows:

1. Press the Z key for 10 sec. to open the data setting interface.  
The symbol bit in the lower left corner ("88") starts flashing, indicating that the value can be changed.
2. Use the S key together with the Z key to set a value between 1 and 11 for parameter selection  
See the table on page 13 for parameters.
3. The M key is used to confirm the parameter selection - and the flashing cursor is moved to the main display (the large digits).

LEFT-BOTTOM '88' Display	Function
0 or NONE	Normal display.
1	Input operation code by KEY, user can input operation code such as 2,3,5,6 or 7, to perform corresponding function respectively.
2	PV Unit setting
3	PV Lower Range Value setting( Set LRV)
4	PV Upper Range Value setting( Set URV)
5	Damping setting
6	ZERO TRIM
7	Zero and span Migration
8	Output Characteristics [linear output, or Square root output ]
9	Low Trim
10	High Trim
11	Bias Setting

1. Pressing the S key will scroll through the possible options, e.g. 02 PV Units: kPa, Torr, atm, Mpa, inHO, inHG, ftHO, mmHO, mmHG, psi, bar, mbar, gcm, kgcm, Pa
2. The selection is confirmed with the M key
3. If the entered value is outside the permitted value, the value "OVER" is shown in the display - the value is reset by pressing either S or Z.

**Note:**

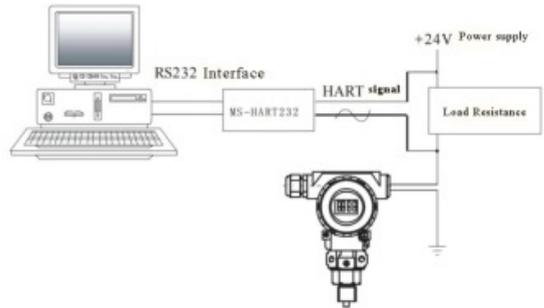
If there is no activity on the keyboard for 10 seconds, the display will exit the setting mode and return to normal process value display.

## 12. Setting by HART protocol

The Klinger Field series supports setup / setting via the HART (Highway Addressable Remote Transducer) protocol.

The user interface uses standard HART communicators or PC software - such as PACTware.

You must use the General (D Generic) DTM for pressure transmitters when you need to access the Klinger Field transmitter.



## 13. Factory Setting

The transmitter has a back up of the configuration and other data when leaving the factory.

If you want to reset the transmitter to the original configuration, this can be done by entering the menu and entering "05678" in menu item 5 (Damping).

Back up the current data requires the use of the HART protocol:

Run the HART-CONFIG Tool software and click the "Data Backup" button under "Additional Features" located in the "Advanced Features" section.

The back up contains the transmitter's measuring range, units, attenuation and other information are stored on the unit where the HART-CONFIG software is installed.



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