

Temperature and Humidity Switch TB750 Series

# User's Manual

TB750 series



FTI Technology Inc

www.ftisensors.com



Temperature and Humidity Switch TB750 series

## Product overview

Temperature and Humidity Switch TB750 series is an integrated instrument for temperature and humidity measuring and monitoring. It is composed of two parts: a multi-function displayer and a sensor (please refer to the figure below). The displayer receives the signal from the sensing unit and converts the signal into a standard industrial signal for output to the client. The product has output and switching alarm capability and is able to perform a variety of control logics through parameter settings.







This switch is intrinsically safe type. It is designed and manufactured in accordance with standards "GB3836.1-2010 "Explosive atmospheres - Part 1: General requirements for equipment", "GB3836.4-2010 "Explosive atmospheres Part 4: Equipment protected by intrinsically safe ", and "Q/FTI01-2017 "TB750 series switch controller" enterprise standards.

# Parameters

Power supply	9~28VDC*1	Ambient temperature	<b>-30~60</b> ℃
Power consumption	360mW(@20VDC)*1	Ambient humidity	0~100%RH
Excitation power	14~24VDC*2	Storage temperature	<b>-40~80</b> ℃
Output signal	4~20mA	Ambient air pressure	86~106kPa
Load capacity	≤500 欧(@24V)	Protection class	IP66
Temperature range	<b>-20~80</b> ℃	Switch characteristics	0.1A/60V AC/DC
Humidity range	0~100%RH	Electrical connection	M16 Waterproof connector *3
Error	±0.3℃; ±2%RH	Explosion-proof type	Intrinsically safe type *4

Note: 1. Only refers to the power supply of the head;

2. The transmitter unit needs an external power supply (excitation power);

3. Suitable for cables with outer diameter of  $\phi$ 4-8;

4. Explosion-proof sign: Ex ia IIC T4;

Power supply intrinsically safe parameters: Ui=28VDC, Ii=93mA, Pi=0.66W, Ci=0uF, Li=0mH Switch intrinsically safe parameters: Ui=30VDC, Ii=50mA, Pi=100mW, Ci=0uF, Li=0mH Signal input and output: Ui=30VDC, Ii=100mA, Pi=0.75W, Ci=0uF, Li=10uH



# Dimensional drawing

Electrical connection



# Installation and operation



TB750 Intrinsically safe wiring diagram



## Fixation and installation

This product should be fixed and installed on the wall or other suitable surfaces by mounting brackets, typically on a vertical wall. M4 screws are recommended for fixation. The mounting size of the bracket-fixing hole is 122mm×116mm.

# **Electrical connection**

The controller has three M16×1.5 waterproof cable connectors, which are power & switch, signal output and sensor connection (factory pre-connected) assigned from left to right. For basic connection please refer to Figure 1 (no explosion-proof requirements).

When applied to explosion-proof systems, it must be used with safety barriers to form a security explosion-proof system (refer to Figure 2). The power supply of the controller can be either an intrinsically safe power supply that meets the requirements or an analog safety barrier with power distribution (refer to figure 2). Figure 2 shows an example of XM33-11EX-Hi as controller power supply, EM33-22EX-Hi as the switching safety barrier, and WM33-22EX-Hi/24 as the analog safety barrier for connection.

#### Note:

Please strictly follow the wiring diagram in the product manual for electrical connection. When this controller is applied to the intrinsic safety system, in addition to this product manual, the installation and operation must also be in accordance with the regulations of GB336.13-2013 "Explosive atmospheres - Part 13: Repair, troubleshooting, mending and reforming of equipment", GB3836.15-2000 "Electrical equipment for explosive gas atmospheres - Part 15: Electrical installation in hazardous places (except for coal mine)", GB3836.16-2006 "Electrical equipment for explosive gas atmospheres - Part 16: Inspection and maintenance of electrical installations (except for coal mines)" and GB3836.18-2010 "Explosive atmospheres - Part 18: Intrinsically safe systems".



# Debugging and settings

#### Overview of parameter settings

The initial state of the controller after power-on is defined as "General state". The state of entering the menu operation and setting parameters is defined as "Setting state".

Corresponding menus set the parameters of the controller, and each parameter has a corresponding menu. There are a few additional menus that perform specific functions.

Setting parameters: press "Enter" in "General state" to enter the setting state if the password is 0. Otherwise, "Password" will display, input correct password to enter the setting state.

Selecting menus: press "Shift" (flip up) or "Change" (flip down) to change between menu items.

Entering or exiting the menus: press "Enter" once.

Modifying parameters: press "Enter" to enter the menu; the lowest bit of the parameter value will be negative displayed, press "Change" to modify the value on the bit. The value on the negative displayed bit will add one with each press of "Change". When it adds up to 9, the bit will automatically become 0. When the lowest bit is modified, press "Shift" once, the nearest next bit will be negative displayed. Modify the value in the same way by pressing "Shift" and "Change" alternately to complete all the modification.

Saving and exiting the menu: Execute the "Ok" menu

The functions of each menu are described below.

### Setting the damping

Corresponding menu: Damping

The damping setting is used to stabilize the sampled signal and allow smoother data display. The damping setting range is 0.0~100.0s. Damping will increase the response time. It should be set reasonably according to the working conditions.

### Temperature switch control parameters: KtA, KtB, KtDelay and KtType

Corresponding menus: Kt-A, Kt-B, Kt-Delay and Kt-Type

Parameters KtA and KtB can be combined to form 3 control schemes as follows:

1. With differential control: KtA<KtB, switch acts when the measured value > KtB, switch resets when the measured value is < KtA.

2. No differential control: KtA=KtB, switch acts when the measured value > KtB, switch resets when the measured value < KtA.

3. Window control: KtA> KtB, switch acts when KtB < measured value < KtA, otherwise switch resets.

Parameter KtDelay is used for switching action delay with a setting range of 0.0~100.0 seconds. This parameter is equally effective for switching action and switching reset. Parameter KtType is used to set the switch contact type: 0 represents normally open type and 1 for normally close type.



## Humidity switch control parameters: KhA, KhB, KhDelay and KhType

Corresponding menus: Kh-A, Kh-B, Kh-Delay and Kh-Type

These 4 parameters are used for the control setting of the humidity switch. Please refer to the temperature switch control parameters for functions.

#### Temperature range

Corresponding menus: Temp-Zero and Temp-Span.

Temp-Zero menu is for setting the starting point of the temperature signal range, that is, the temperature value corresponding to 4mA temperature signal. Temp-Span menu is for setting the end point of the temperature signal range, which is the temperature value corresponding to 20mA temperature signal. The unit of temperature is °C.

#### Humidity range

Corresponding menus: Humi-Zero and Humi-Span

Humi-Zero menu is used for setting the starting point of the humidity signal range, that is, the humidity value corresponding to the 4mA humidity signal. Humi-Span menu is used for setting the end of the range of the humidity signal, which is the humidity value corresponding to the 20mA humidity signal. The unit of humidity is %RH.

### Setting the password

#### Corresponding menu: Pw-Config

This menu is used to set a numeric password in the range of 0~999. When the password is not 0, password protection is activated. To enter the menu, the correct password should be input each time.

### Saving the modification and exiting the setting state

#### Corresponding menu: Ok

It is used to check the correctness of the parameter settings. If the check passes, the device saves the parameters and returns the general state.

If the check fails, it automatically turns to the menu with the wrong settings.

#### Cancelling the modification and exiting

#### Corresponding menu: ESC

It is used to exit the setting state directly without saving any parameter modifications.



#### Product maintenance

If there are problems during installation and use, please contact our company in time and do not open and repair without authorization. The connection must be done strictly according to the "wiring diagram" to prevent damage to the product. During the installation and use of the product, avoid impact and knocking which would cause damage or affect the performance. It is recommended to check the zero point regularly, and if necessary, correct the deviation through parameter settings to reduce the measurement error.



FTI Technology,Inc 8930S.Beck Avenue,Ste107Tempe,Arizo na 85284 USA E-mail:sales@Ftisensors.com www.Ftisensors.com

Electrical connections must only be carried out by properly qualified personnel. Attention must be paid to requirements for category -1G electrical apparatus according to DIN EN 60079-26 and also to installation advice. When the sensor is removed there is a danger of releasing potentially explosive gas mixtures and flames penetrating from the outside.