

The tension transducer STA-05 instruction manual

1. Preface:

Tension transducer STA-05 is the tension of Intelligent tension transducer instrument. By using of key operation will complete zero alignment, calibration, convert the left or right tension sensor signal into a standard industrial control signals, 0~10V / 0~5V and 0~20 mA output signal can be provided to PLC for automatic control.

2. Features :

- 32 bit CPU guarantees high speed, precision, anti-jamming capability and ensures reliability.
- The outside has no adjustable potentiometer.
- The tension sensor can select Differential sensor or Strain-gauge sensor.
- 0~10V/0~5V and 0~20mA output signals can be provided to PLC and display instrument.
- Use dispensing technology, small volume, light weight.
- Using DIN rail mounting, simple and convenient.

3. Product category:

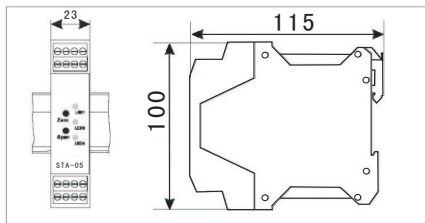
STA-05B: Using strain-gauge sensor, input signal range -5mv ~ +10mv.

STA-05C: Using differential sensor, input signal range -100mv ~ +200mv

4. Installation dimensions :

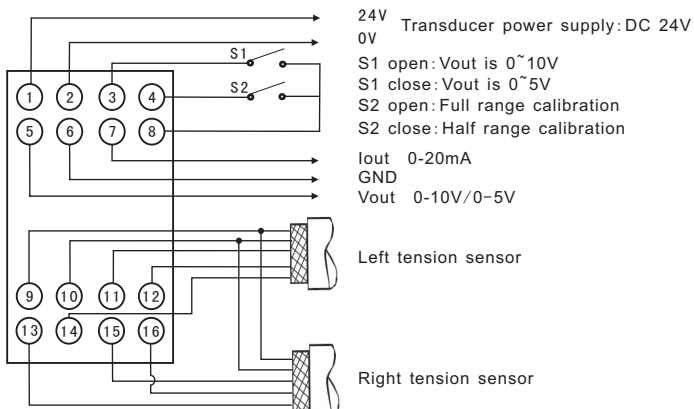


Outline drawing



Installation size(unit: mm)

5. Electrical wiring and port introduction



port introduction:

- ① 24V+ : Positive terminal of tension transducer power supply.
- ② 24V- : Negative terminal of tension transducer power supply.
- ③ Mc1 : Select output voltage range.
Mc1 with MCC disconnect: output 0~10V.
Mc1 with MCC connect: output 0~5V.
- ④ Mc2 : Select the calibration value.
Mc2 with MCC disconnect: Full scale calibration.
Mc2 with MCC connect: Half scale calibration.
- ⑤ Vout : Positive terminal of output voltage, 0~10V or 0~5V.
- ⑥ GND : Negative terminal of output voltage/current.
- ⑦ Iout : Positive terminal of output current, 0~20mA.
- ⑧ MCC : Negative terminal of control signal.
- ⑨ 5V : Positive terminal of tension sensor power supply on both sides.
- ⑩ 0V : Negative terminal of tension sensor power supply on both sides.
- ⑪ L+ : Positive terminal of tension sensor input signal on left side.
- ⑫ L- : Negative terminal of tension sensor input signal on left side.
- ⑬ PE : Input terminal of tension sensor shielding cable.
- ⑭ R+ : Positive terminal of tension sensor input signal on right side.
- ⑮ R- : Negative terminal of tension sensor input signal on right side.

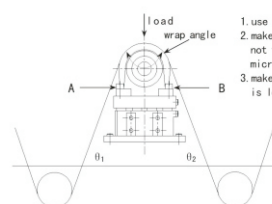
Note :

- (1). If STA-05 tension transducer install STS Differential sensor by wuhan true engine company , wiring colors as follows :
“5V+” —red, “0V”—black, “Terminal +” —yellow, “Terminal-” —green.
- (2). If STA-05 tension transducer install STSA Strain-gauge sensor by wuhan true engine company , wiring colors as follows :
“5V+” —red, “0V”—black, “Terminal +” —green, “Terminal-” —white.
- (3). If only use one tension sensor , please use wires to connect L+ with R+ , L- with R- .

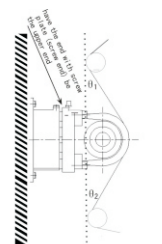
6. Tension Detector Mounting

Select a reel where the film tension needs to be measured. Mount the bearing houses securely on the tension detectors; fix the base of detector on the body of machine. Use a spherical universal bearing house to avoid the detectors on both sides interacting on each other, causing errors on calibration.

The tension detector could be floor, wall or panel mounted, suitable for either horizontal or vertical position. But never mount the detector with the front surface upwards.



Sensor level installation schematic



Sensor wall installation schematic

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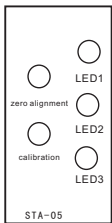
7. Notes of Using Tension Detector

1. Set screws A and B should not be too long when the bearing houses are installed on the detector. Otherwise the force could not cause relevant deformations and displacements on the detector. Use spherical universal bearing houses to avoid the detectors on both sides interacting on each other, causing errors on calibration.
2. The wrap angle of film over detector reel shouldn't be larger than 120°, around 60° would be perfect. The signal detected by detector would be too weak to control tension effectively with a large wrap angle.
3. The load force caused by film tension should not point to the screw ends of tension detector. Otherwise there will be very low or even no output.
4. The screw ends of tension detector should point upwards when installed on a wall.
5. If the film is pulled across the reel from below, the force caused by film tension pulls but not pushes the tension detector. So the negative and positive detector signal wires should exchange when connected to the controller terminals.

8. Operation and using

(1) Panel and indicators introduction

Panel operation as follows, it has two buttons and three LED. One button used to zero alignment, another used to calibrate, three LED used to indicate the working state of tension transducer.

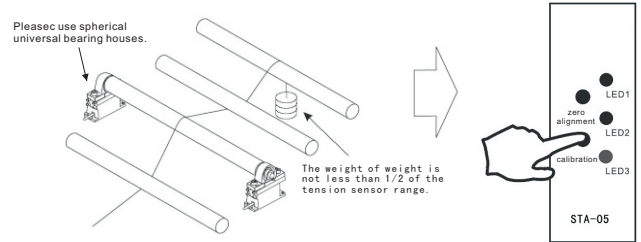


LED state	Tension transducer state	Output
LED1 ✱ twinkle LED2 ○ Close LED3 ○ Close	zero alignment	
LED1 ○ Close LED2 ○ Close LED3 ✱ twinkle	calibration	
LED1 ○ Close LED2 ● Green LED3 ○ Close	Normal	have output
LED1 ✱ twinkle LED2 ● Red LED3 ● Close	The left tension sensor signal failure	have output
LED1 ○ Close LED2 ● Red LED3 ✱ twinkle	The right tension sensor signal failure	have output
LED1 ✱ twinkle LED2 ● Red LED3 ✱ twinkle	Both sides signal failure	have output
LED1 ○ Alternately LED2 ● Green LED3 ○ Alternately	Zero alignment or calibration failure, LED1、LED3 alternately twinkle	have output

Note:

- A. LED2 turns red, LED1、LED3 red twinkle, there are several ways as follows:
 - [1] Tension sensor connection drops or poor contact. LED1 twinkle shows left tension sensor has problem, LED3 twinkle shows right tension sensor has problem, please check sensor connection.
 - [2] The difference of signal between left sensor and right sensor is too large. When the LED twinkle, it shows the sensor signal is too small, please adjust the sensor or change it.
- B. LED2 turns green, LED1、LED3 alternately twinkle, it shows zero alignment and calibration has problem, this reason refer to part 9.
- (2). Zero calibration operation:
 - a. Machine power off, there is no film or film is loose.
 - b. Press "Zero alignment" button for 3~5 sec, LED1 turns on.
 - c. When LED1 starts twinkle, loosen "Zero alignment" button, the twinkle stops, LED1 turns off, so complete zero alignment.
 - d. After zero alignment, if LED1、LED3 alternately twinkle, it shows zero alignment has problem, please refer to part 9.

(3) Span calibration operation:



- a. Machine power off. Thread a string through the reel center like what the material does during the actual operation.
- b. Hang weights on the end of the string while the other end is fixed well. The weights should be more than half of the rated measurement range of the detector.
- c. Make sure that weights fall naturally, the bearing houses of detector reel are spherical universal ones and well lubricated.
 - When full-scale calibration, MC2 with MCC disconnect, the weights should correspond to full scale.
 - When half-scale calibration, MC2 with MCC connect, the weights should correspond to half scale.
- e. Press "Calibration" button for 3~5 sec, LED3 turns on.
- f. When LED3 starts twinkle, loosen "Calibration" button, the twinkle stops, LED3 turns off, so complete calibration.
- g. After calibration, if LED1、LED3 alternately twinkle, it shows calibration has problem, please refer to part 9.

9. Remove faults

1. Abnormal zero tuning:
 - 1) Maybe the mass of the detector reel is more than the rated value of the tension detector, please confirm the mass of the detector reel, and according to the demand, you can decrease the mass of the detector or reselect tension sensor in a wide range.
 - 2) The type of tension transducer do not match with the tension sensor. STA-05B can only use the Strain-gauge sensor, STA-05C can only use the Differential sensor.
 - 3) Tension transducer input signals should not be more than half of the scope of input signal. If too big or too small, please check the wiring of sensor. Re-wiring or replace the tension detector.
2. Abnormal calibration
 - 1) The signal is too big, reason as follows:
 - a. The mass of weight is more than the range of tension sensor, please confirm the weights and the rated value of tension sensor.
 - b. STA-05B can only use the Strain-gauge sensor
 - 2) The signal is too small, reason as follows:
 - a. Wrap angle is too large, please wrap again and reduce the wrap angle.
 - b. The force caused by film tension point to the screw ends of tension detector, please change the direction of the sensor.
 - c. STA-05C can only use the Differential sensor.
 - d. Tension detector malfunctions, please replace it; The wrong wiring, please re-wiring; The cable is damaged, please replace it.