FvLuoky TEMP

Intelligent TEMP Transmitter

FT100 Series

User Manual

FY/JC 10 A / O 15/10 V 1.1

FuYi Intelligent Instrument (Shanghai) Co., Ltd.

CONTENT

FT100-T/C Series Thermocouple

1,Summary

Thermocouple has many advantages such as bendability, high pressure resistance, heat fast response time and strong and durable and so on, as measure temperature sensor, and display instruments, recording instruments and electronic regulator usually used, at the same time, also can be used as a prefabricated thermocouple temperature sensing element, it can directly measure all kinds of production process from 0 ℃ ~ 1800 ℃ in the scope of liquid, steam and gas medium, as well as the temperature of the solid surface.

2,Key Index

1) Measuring range and tolerance

Type	Graduation	Range(℃)	Grade	Tolerance Δ(℃)
Platinum rhodium 30 - platinum	B	600 ~ 1800	Ⅱ	±1.5℃/±0.25% |t
Platinum rhodium 10 - platinum	K	0 ~ 1600	Ⅱ	
Nickel-chrome-Nickel-silicon	K	-40 ~ 1000	Ⅰ	±1.5℃/±0.4% |t
		-40 ~ 1200	Ⅱ	±2.5℃/±0.75% |t
Nickel chromium silicon - nickel silicon	N	-40 ~ 1100	Ⅰ	±1.5℃/±0.4% |t
		-40 ~ 1300	Ⅱ	±2.5℃/±0.75% |t
Nickel-chromium copper silicon	E	-40 ~ 800	Ⅰ	±1.5℃/±0.4% |t
		-40 ~ 900	Ⅱ	±2.5℃/±0.75% |t
Iron - copper silicon	J	-40 ~ 750	Ⅰ	±1.5℃/±0.4% |t
Copper - copper silicon	T	-40 ~ 350		±0.5℃/±0.4% |t

NOTE： (1)"T" is the measured temperature of the temperature sensing component, the allowable deviation value or the absolute temperature calculated value, pick the larger one;

(2) The temperature value in parentheses is the short-term use value.

2) Insulation resistance at room temperature

When the ambient air temperature of 15 ℃ ~ 35 ℃, relative humidity is not more than 80%, the insulation type armoured thermocouple accidentally or between silk and outer casing

The insulation resistance between the wires shall be in accordance with the following table

Diameter (mm)	Testing Pressure (V)	Resistence MΩ.m
0.5 ~ 1.5	50V±10%	≥1000
> 1.5	500V±10%	

3）Nominal Pressure

At room temperature, the protective tube can withstand static external pressure. In fact, the allowable working pressure is not only related to the material, diameter and wall thickness of the protective tube, but also related to its structure form, installation method, depth of placement, type, concentration and velocity of measured medium.

4）Thermal Response Time(TRT)

In the case of step change in temperature, the output change of the sensor is equal to 50% of step change in this stage, and the time required is called thermal response

Time is expressed as 0.5s

The thermal response time of the armored thermocouple is not greater than specified in the following table：

TRT τ0.5s DIA(mm)	Contact type	Insulation type
2.0	0.4	0.5
3.0	0.6	1.2
4.0	0.8	2.5
5.0	1.2	4.0
6.0	2.0	6.0
8.0	4.0	8.0

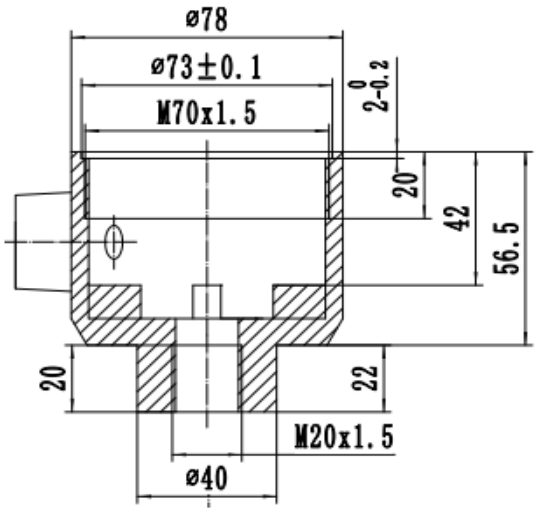
5）Minimum Depth of Placement

The thermocouple shall not be less than 8 ~ 10 times of the outer diameter of its protection tube, and the thermal resistance shall not be less than 15 times of the outer diameter of its protection tube and the length of temperature sensing element. However, the length of some products does not meet the requirements of this item, and the measurement accuracy is affected accordingly. But for the vast majority of tests The process temperature is not affected.

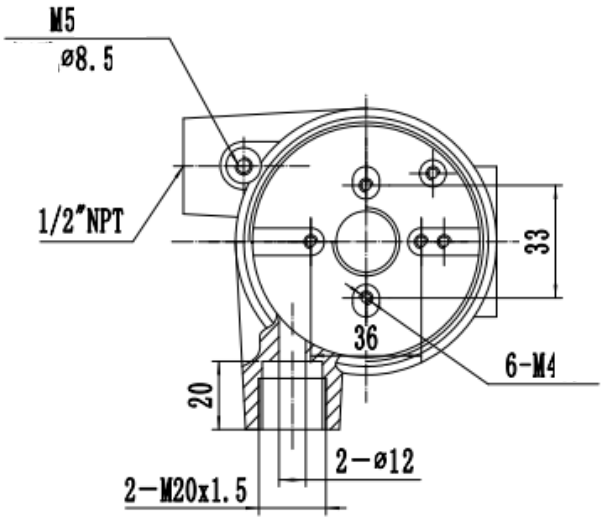
electrical interface ：M20*1.5，G1/2"，1/2"NPT。

6）IP Rate：IP65。

3,Wiring Box Dimensions Drawing

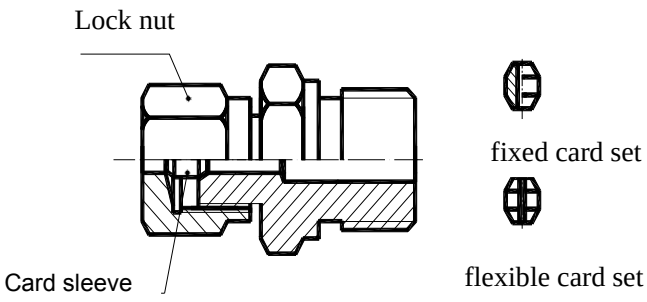


Outline Drawing (I)

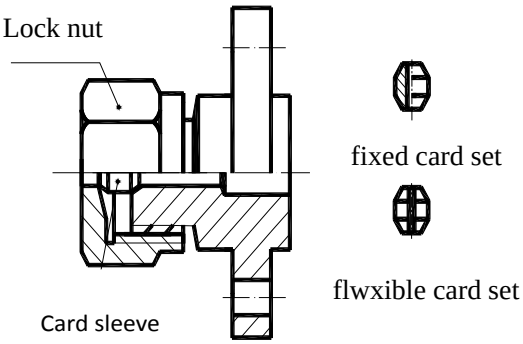


Internal Drawing (II)

4,Installation and External Dimensions (Unit:mm)



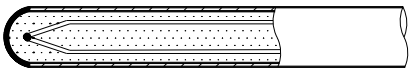
Threaded card set



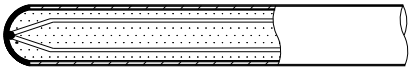
Flanged card set

5,Measure End Structure

Insulation type



Contact type



FT100-RTD Series Thermal Resistance

1,Summary

Armoured platinum resistance is a platinum resistance element (ceramic components, components or thick film components) connection on the armoring fuses, protecting tube on reload to save components, forming a sealed, temperature sensor, it compared with fabricated platinum resistance, and a small diameter, flexible, thermal inertia small, good shock resistance, long service life, good stability, etc.

Armoured platinum resistance and common platinum resistance, measuring temperature range for - 200 ~ 600 ℃, as long as the ordinary copper wires and display instrument, due to its electrical output performance is good, so can display, data recorder, recorder, controller, scanner and computer to provide accurate temperature change input signal.

The thermoelectric performance of metallized platinum resistance is basically the same as that of common platinum resistance.

2,Key Index

1）Measuring Range and Tolerance

Type	Graduation	Range(℃)	Accuracy Grade	Tolerance △t(℃)
Pt	Pt10 Pt100	-200～500	Grade A	±(0.15+0.002|t|)
			Grade B	±(0.30+0.005|t|)
Cu	Cu50 Cu100	-50～150		±(0.30+0.006|t|)

2) Insulation Resistance

Heat resistance temperature insulation resistance of the test voltage for dc 10 ~ 100 v, the environment temperature within the scope of the 15 ~ 35 ℃, relative humidity should be modest At 80%, platinum thermal resistance of normal temperature insulation resistance shall be not less than 100 M Ω.

3) Nominal Pressure

Generally refers to the static external pressure that the protection tube can bear under normal temperature without rupture, and the test pressure is generally 1.5 times of the nominal pressure. Actually, the nominal pressure is not only related to the material, diameter and wall thickness of the protection tube, but also to its structural form, installation method, depth of placement, and quilt The type, concentration and velocity of the measured medium are related.

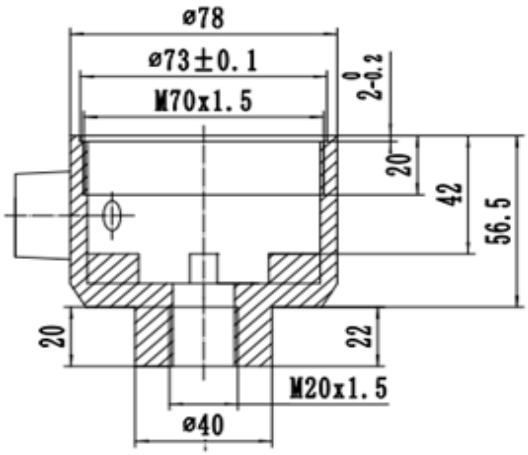
4) Thermal Response Time(TRT)

Diameter	TRT s
φ6	2
φ12	3
φ16	5

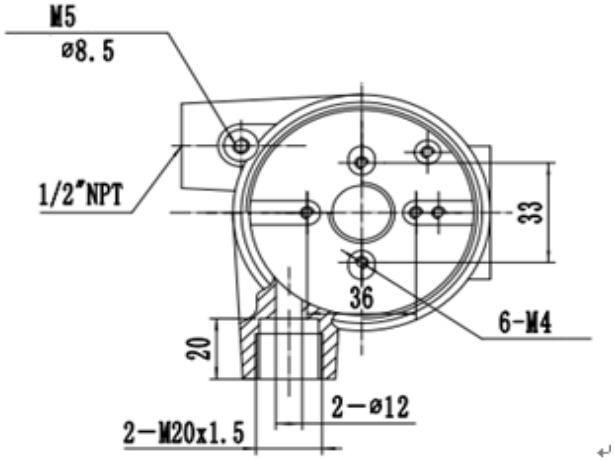
5) Electrical Interface：M20*1.5，G1/2"，1/2"NPT。

6) IP Rate：IP65。

3,Wiring Box Dimensions Drawing

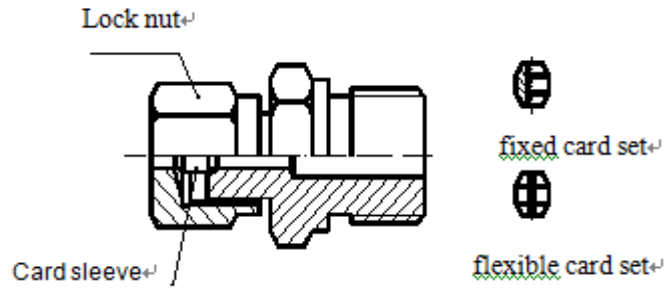


Outline Drawing (I)

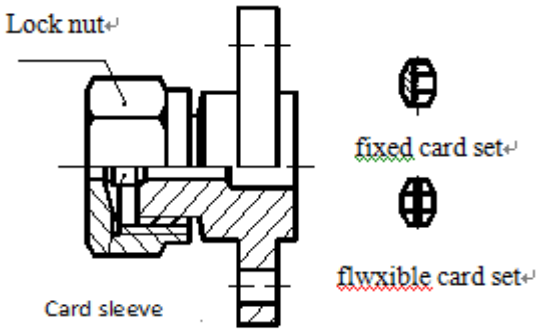


Internal Drawing (II)

4,Installation and External Dimensions (Unit: mm)

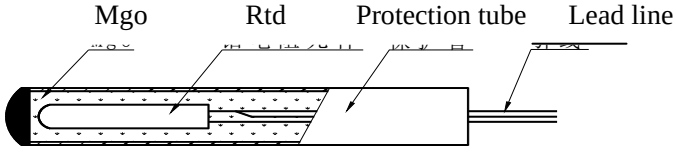


Threaded card set



Flanged card set

5,Measure End Structure



FT100-X Series Integrated Temperature Transmitter

1,Summary

Ft100-x series integrated temperature transmitter is a temperature change module unit, which is used together with industrial thermocouple and thermal resistance. It adopts two-wire transmission mode (two conductors serve as common transmission lines for power input and signal output).The industrial thermocouple and thermistor signals are converted into 4-20ma output signals which are linear with the input signal or with the temperature signal.

2,Key Index

1）Error Limit：

Accuracy	Thermal Resistance	Thermocouple
A	±(0.1%F.S+ Thermal resistance error)	-
B	±(0.2%F.S+ Thermal resistance error)	±(0.2%F.S+ Thermocouple error)

2）Transfer Accuracy：≤0.2% or 0.2K

3）Output Signal：4～20mA two-wire type

4）Limiting Current：≤25mA

5）Supply Voltage：9～30VDC

6）Response Time：1S

7）Lightning Protection：±4000V（≤5 次）

8）Resistance to pulse train：±4000V

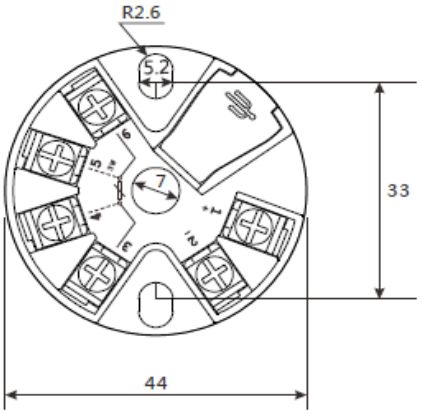
9）RFI：>10V/m（80MHz...1000MHz）

10）Ambient Temperature：-40℃～85℃

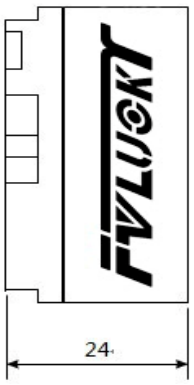
11）Thermal Drift：0.008% FS/1℃

12）Stability：≤0.1℃/Year or 0.05%/Year

3,Dimensional Drawing

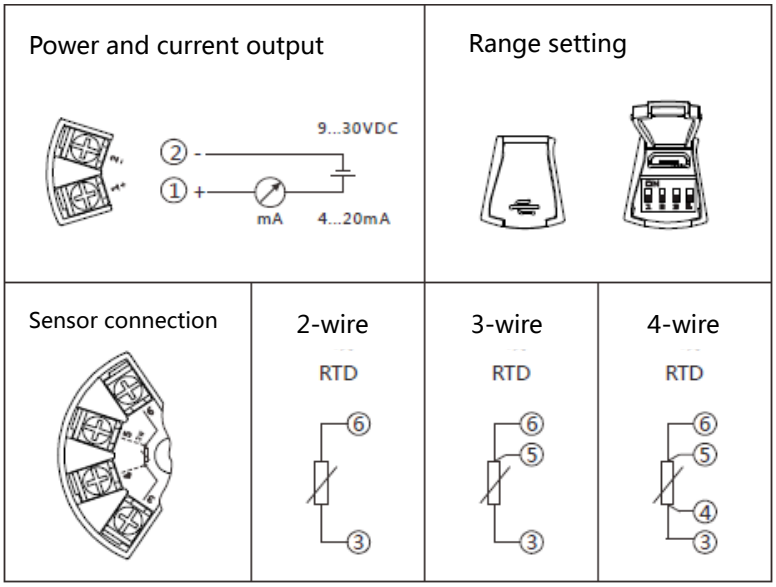


Drawing (I)

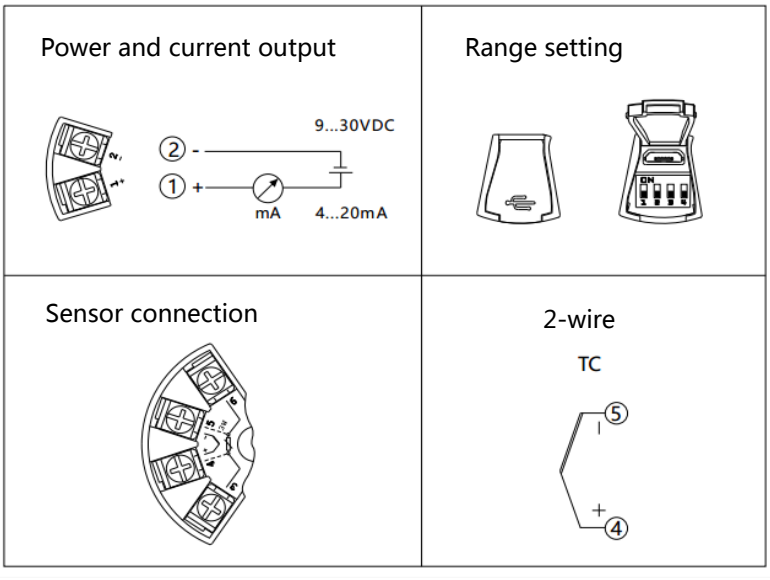


Drawing (II)

4,Wiring Diagram

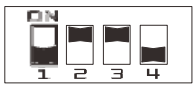
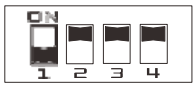
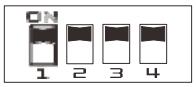


Thermal resistance - temperature module wiring diagram(III)

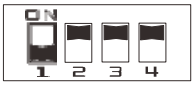
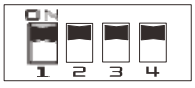


Thermocouple - temperature module wiring diagram(IV)

5,Range and Setting

Dial Position	Range	Dial Position	Range
	K 0...400℃		E 0...400℃
	K 0...600℃		E 0...500℃
	K 0...800℃		E 0...600℃
	K 0...900℃		E 0...700℃
	K 0...1000℃		E 0...800℃
	K 0...1100℃		E 0...900℃
	K 0...1200℃		E 0...1000℃
	K 0...1300℃		Software entry

Thermocouple - temperature module setup diagram

Dial Position	Range	Dial Position	Range
	0...50℃		-50...50℃
	0...100℃		-50...100℃
	0...150℃		-50...150℃
	0...200℃		-50...200℃
	0...250℃		-50...250℃
	0...300℃		-50...300℃
	0...400℃		-50...400℃
	0...500℃		Software entry

Thermal resistance - temperature module setup diagram

Protection Sleeve Material and Basic Performance

Name&Brand	Similar Brands	Main Features and Uses
high alumina CT1		Containing 85% AL2O3 protection tube, used in oxidizing atmosphere temperature 1300 ℃, crisp, quenching, thermal shock is easy to crack.
corundum CT2		Containing 99% AL2O3 protection tube, used in oxidizing atmosphere temperature 1600 ℃, crisp, quenching, thermal shock is easy to crack.
silicon carbide SiC	GK-SiC	More capable thermal shock, but brittle, highest temperature resistant 1700 ℃.
Carbon Steel	CS	Good mechanical strength, but the easy oxidation, applicable temperature 500 ℃.
0Cr18Ni9Ti	321	In the phosphoric acid and dilute nitric acid have good corrosion resistance, available at 800 ℃.
0Cr18Ni12Mo2Ti	320，S17	In urea, dilute sulphuric acid and acetic acid with high corrosion resistance, used in petroleum chemical industry, power plant steam pipe, the temperature below 600 ℃.
12Cr1MoV		Used for power plant main steam of the infirmary, easy to rust, in 500 ~ 600 ℃ has higher strength and creep resistance.
GH3030、GH3039		Nickel-based alloy, with excellent high temperature oxidation resistance, the highest temperature 1100 ℃.
00Cr19Ni13Mo3	317l	Ultra-low carbon molybdenum-containing stainless steel with excellent corrosion resistance, especially in the urea and chemical fiber industry.
3yc21B	Hastelloy B-2	Alloy resistant to Hci.H2SO4 has excellent corrosion performance. It also has good stability in various concentrations of H3PO4, acetic acid, formic acid, hydrofluoric acid, etc., but is not resistant to oxidative medium corrosion.
3yc24	Hastelloy C-276	Nickel-based high Cr, Mo, corrosion resistant alloy in chloride solution and sea water, all kinds of organic acid, inorganic acid, wet chlorine, fluosilicate, hypochlorous acid, acid salt has good stability in strong corrosive medium, such as heat temperature up to 900 ℃
3yc24	Hastelloy C-22	
3yc22	Monel 400	It has excellent corrosion resistance of reducing medium and high corrosion resistance in hydrofluoric acid, alkali, sulfuric acid and hydrochloric acid.
3yc22B	Monel K-500	
Ti		Excellent performance of antioxidant acid, nitric acid and chromic acid, resistant to inorganic chlorinated solvent, organic chloride, wet chlorinated gas, saline solvent and seawater.
3yc52	Ni45Cr17Al	With excellent oxidation resistance and relaxation stability, can be in 1300 ℃ atmosphere, sulfur, chlorine used in the atmosphere.
0Cr18Ni9	304	Widely used in food, beverage, chemical and other situations requiring corrosion resistance.
0Cr17Ni12Mo2 00Cr17Ni14Mo2	316 316L	Use temperature 800 ℃, the best austenitic stainless steel corrosion resistance, is widely used in food and chemical industry.
Cr25Ni20	Cr25Ti	Has good high temperature oxidation resistance, generally used in the oxidizing atmosphere heat treatment furnace temperature 1000 ℃.
Metal coated with anti-corrosion layer		Resistance to acid, alkali, oxidant, slightly swelling in the aromatic hydrocarbon and halogenated hydrocarbon, using temperature is - 195 ~ 190 ℃.
Metal covered with anti-corrosion layer		Resistant to boiling hydrochloric acid, sulfuric acid, nitric acid and aqua hydrochloride. Not resistant to molten alkali metals, high temperature fluorine and chlorine trifluoride.
Metal sprayed with anti-corrosion layer		Outer casing for wear-resistant thermocouple temperature 0 ℃ ~ 350 ℃ or 0 ~ 350.
Metal surfacing with hard alloy		Used for high temperature wear resistance thermocouple outer casing, using temperature about 1000 ℃.
Tantalum		Boiling acid thermocouple outer casing.

Selection Code

Model of temperature transmitter									
FT100-	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**—X**	**Description**
TYPE	**B**								**Dial Switch**
	C								**Dial Switch +PC Configuration**
	X								**LCD**
Ex Grade		**N**							**Intrinsic Safety**
		Ex							**Ex d IIC T4-6**
Shell			**-Z**						**Cast Aluminum**
			-N						**SS 304**
Power Supply				**1**					**24 V DC**
				2					**12 V DC**
Output Signal					**1**				**4~20MA**
					2				**4~20MA with HART**
Electrical Interface						**-M**			**M20 *1.5 Thread**
						-N			**1/2" NPT**
Accuracy Class							**A**		**0.2**
							B		**0.3**

Temperature sensor model	
Sensor Type	**T/C (K, S, B, E, J, T, R, N), Cu50, Cu100, Pt100, Pt1000**
Sensor accuracy rating	**RTD (A / B), T/C (I/P)**
Sensor material	**SUS304,SUS316,SUS316L,SUS304+PTFE, Ti, Hc, Inconel600,Ceramic**
Sensor diameter (D)	**3 / 4 / 5 / 6 / 8 / 10 / 12 / 16 / 20 / 22 / 25mm**
Sensor length (L)	**50mm-2000mm**
Sensor connection mode	**M20*1.5, G1/2", 1/2"NPT, DN25, DN40, DN50 (SS304/316/316L)**
Range	**-200℃~ +2000℃**

Illustration

1、FT100-BN-Z12-MA+Pt100/A/316L/φ12/50mm/G1/2"/0~200°C

Intelligent temperature transmitter, dial switch, explosion-proof grade: intrinsic safety, cast aluminium shell, power supply: 24V DC, signal output: 4-20mA, electrical interface: M20*1.5 thread, accuracy grade: 0.2. Sensor: Pt100, Accuracy Grade: A, Solution Material: SUS316L, Diameter: 12mm, Insertion Length: 50mm, Connection Mode: G1/2 ", Range: 0-200°C

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