Non-contact AC voltage isolation module user's manual

CE-VJ03N-1TMS4-1.0/100VAC

1 Introduction and Application

This product is an AC voltage detection module that uses the principle of capacitance detection to realize non-contact detection.

It can be widely used in industries with high safety requirements such as military industry, chemical industry, railway, petroleum, etc., which are inconvenient to use direct contact measurement methods or need to improve monitoring safety. It is also very suitable for use in power industries that require AC high-voltage monitoring.

2 Features

High security: The non-contact detection method has no effect on the tested circuit, and completely eliminates the potential short-circuit hazard that may be caused by the contact measurement voltage method;

High accuracy: better than 1% detection accuracy;

Wide range: 100mVAC~6KVAC~ 40.5KV AC (with different probes);

Convenient installation: The module adopts the PCB installation method, and the probe has two forms of closed loop and PCB;

High reliability: high isolation and high voltage resistance (non-contact probe) between the input terminal and the circuit under test.

3 Case style

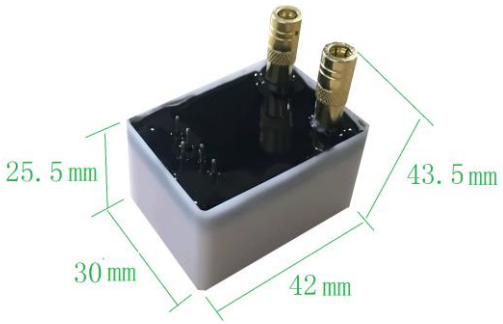

Figure1, reference outline drawing of MS4 type (PCB mounting)

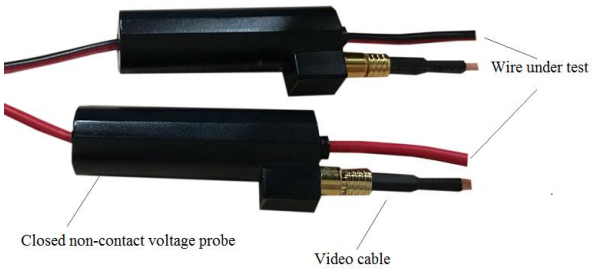

Figure2, MS4 closed type high precision non-contact probe (open type can be customized).

4 Part number

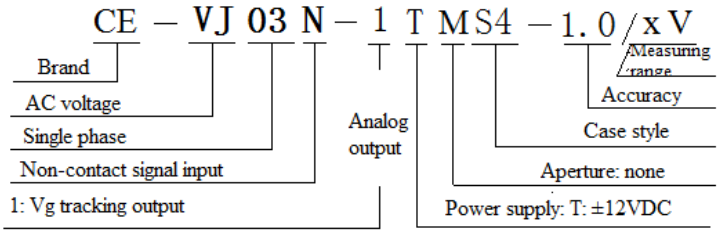

Figure3, product selection table

5 Specifications

*Measuring range: 100mVAC~10VAC, 10VAC ~1KVAC, 1KVAC ~ 40.5KVAC (different measuring ranges must be matched with different types of probes);

*Output: 0-5VAC (tracking output, output range can be customized);

*Frequency range: 1.7KHz-2.6KHz (other frequency ranges can be customized);

*Power supply: ±12VDC;

*Accuracy: ≤1.0 grade (under normal temperature standard environment);

*Load capacity: load ≥ 2KΩ (voltage output)

*Temperature drift: ≤200ppm/℃ (when matched with PCB probe);

Temperature drift performance description: When matched with a closed probe, the temperature drift of the module is relatively large. You need to design a digital circuit to compensate before reaching ≤500ppm/℃. The digitally compensated product is a digital output;

*Isolation voltage: the insulation withstand voltage of the non-contact probe ≥5KVAC (can be customized as required);

* Response time: ≤1us;

*Rated power consumption: <0.1W;

*Surge immunity: non-contact input port: four-level 4KV (L-N/2Ω/combined wave);

*Working environment: temperature: -40~85℃; humidity: ≤90% no dew(temperature 26℃);

*Storage temperature: -40~85℃.

6 Connections Diagram

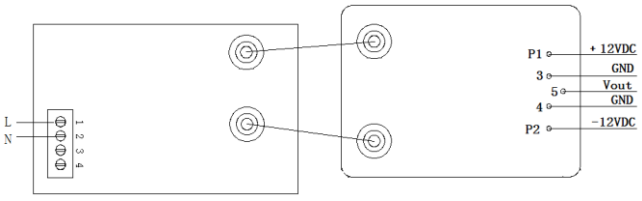

Figure4, Reference wiring diagram of CE-VJ03N-1TMS4-1.0 (PCB probe) (product bottom view)

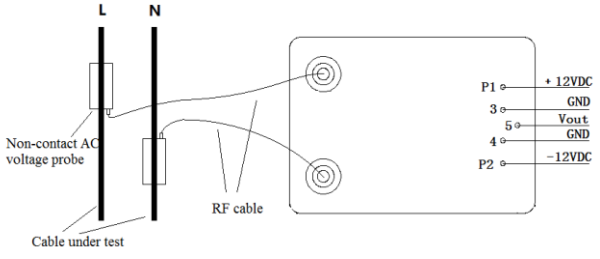

Figure5, reference wiring diagram of CE-VJ03N-1TMS4-1.0

(closed probe) (bottom view of the module)

7 Mounting Diagram

All products adopt DIN35 guide rail installation size: card slot width 35.5mm.

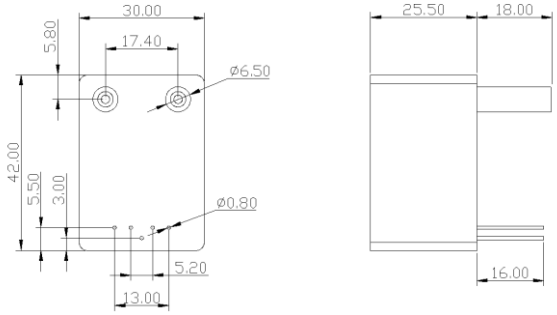

Figure6. Outline and installation dimensions of MS4 (bottom view and right side view)

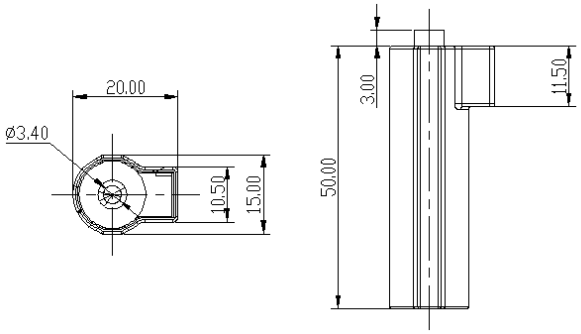

Figure7. Installation dimension drawing of closed probe.

8 Installations

8.1 Module installation method:

Insert the module pins corresponding to the printed board pads so that the bottom of the module is in parallel contact with the printed board, and solder the pins on the printed board;

8.2 The power supply of the product requires the use of a linear stabilized power supply. The isolation voltage of the power supply is ≥2000VAC, and the AC ripple <10mV. Multiple modules can share one power supply. However, the power circuit cannot drive loads that can generate spikes, such as relays, so as not to conduct interference signals to the transducer.

8.5 The module with a tracking voltage output, and the output voltage value can be customized. The load resistance RL≥2KΩ can ensure the output accuracy and linearity within the entire rated input range. If there are special load requirements, it needs to be ordered separately.

8.6 When installing a closed non-contact voltage probe, one end of the wire to be measured must be passed through the probe hole. When installing an open non-contact voltage probe, the wire to be measured does not need to be disconnected.

8.7 In order to ensure the stability of the closed-mouth non-contact voltage probe, it is recommended to use epoxy resin or other curable glue to encapsulate the closed-mouth non-contact probe and the wire to be measured. For PCB-type probes, use the screw fix the probe in the proper position.

9 Examples of module electrical performance verification

9.1 Description of electrical performance test:

Since the performance test process of a module equipped with a closed probe is easily affected by the configuration of the test environment (PCB probes have no such impact), the following test requirements need to be paid attention to:

a. The wire type standard of the input wire under test is 1.5mm^2 multi-strand flame-retardant wire with insulating sheath.

b. During the test, the relative position between the wire and the probe needs to be fixed after the wire under test passes through the probe.

c. During the test, all devices, modules, and wires are in a static state and no displacement occurs.

9.2 According to the transducer terminal definition, follow the pin definition shown in Figure 4 to connect the test circuit.

9.3 The test verification should be carried out under the following environmental conditions (the PCB probe is taken as an example below):

- Auxiliary power supply: nominal value ±5%, ripple ⩽ 10mV;
- Ambient temperature: 25℃±5℃;
- Relative humidity: RH(45～80)%;
- Signal source and multimeter with accuracy above 0.05, and frequency shift meter with accuracy better than 1%.

9.4 Power on and preheat for 2min;

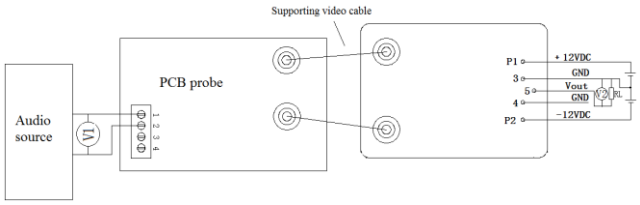

Figure 8, test wiring (V1 is a multimeter, V2 is a frequency shift meter)

9.5 Linearity detection:

Apply the signal source output voltage signal Vin=100VAC/2.3KHz to the tested wires L and N, at this time the module output voltage value detected on the frequency shift meter is Vout, and the amplitude of the input voltage is changed to 80%*Vin (Frequency unchanged), the corresponding theoretical output value of the module is 80%*Vout.

9.6 Use a frequency shift meter to measure the actual output voltage value 80%*Vout of the module, and compare it with the theoretical output value under the corresponding linear point. The error is within the range of ±Vout*1% as qualified, otherwise it exceeds the standard.

9.7 Repeat the two operations of 8.5 and 8.6, and the error values of each point (80%, 50%, 10%) obtained are within the specified accuracy range, and the linear accuracy level of the

module is qualified.

9.8 Frequency response test:

Apply the signal source output voltage signal Vin=100VAC/1.7KHz to the tested wires L and N. At this time, the module output voltage value detected on the frequency shift meter is Vout1, keep the input voltage amplitude unchanged, and change the frequency to 2.6 KHz, the output voltage value of the module detected on the frequency shift meter is Vout2. If |Vout1-Vout2| ≤ Vout1*1%, the module frequency response performance is qualified, otherwise it exceeds the standard.

10 Notes

10.1 When the module leaves the factory, it has been accurately adjusted in accordance with the "Product Standards". Pay attention to the power information on the product label. After confirming that the wiring is correct, you can power on and work, otherwise the product will be damaged.

10.2 Power supply requirements: the accuracy is not less than 5%, the ripple is less than 10mV, and the power polarity cannot be connected wrongly, otherwise the module will be burned.

10.3 The module is an integrated structure and is a precision product. It is strictly forbidden to apply any external force to the module and cannot be disassembled. At the same time, avoid collision and falling.

10.4 Do not damage or modify the label or logo of the module, do not disassemble or modify the module, otherwise the company will no longer provide the "three guarantees" (replacement, return, repair) service for the module.

© Version: V1.0 Version 20200821