

FTS series passive nuclear material location  
Installation and operation instruction

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## 1. Product Principle

FTS series without nuclear material place plan radioactive sources themselves have no radioactive sources, with just nuclear method

### 1. 1 The characteristics of gamma rays

(Gamma rays is the nucleus of a with some energy gamma photons. Nature in the widespread can emit gamma rays of the natural and artificial of radioactive nuclides. For example, traditional nuclear material a plan of the use of radioactive sources 137 Cs, 60 Co, etc. The widespread use of cement, ceramic tile, marble, etc building materials have different strength of radioactive)

(Gamma rays have very strong penetration, in through the material, strength and the density of material related to abate, accord with index rule. Main mechanism is a bundle of energy gamma rays of the  $\gamma$  photon and material produce photoelectric effect, Compton effect and electronic after the energy loss to effect, from the original rays in the beam disappear)

Strength for  $I_0$  gamma rays through the thickness of  $t$ , density of  $\rho$  tested after things, reduced intensity for  $I$ , when  $I_0$  and  $t$  must,  $I$  and  $\rho$  related.

$$I = I_0 e^{-\rho t}$$

One  $k$  for quality absorption coefficient

### 1. 2 (The traditional nuclear material location principle)

The traditional nuclear material place plan ignored the natural environment

Widespread trace amounts of natural radioactive isotopes, use

The strength of the radioactive sources) issued far outweigh the environmental gamma rays. When the material position change, higher or lower

In the probe and the source of the container installation position, detection

Device detected radioactive sources of a gamma rays intensity

Different. This material to judge whether installation

Position.

### 1. 3 No nuclear material location principle radioactive sources

Do not need artificial sources, make use of the nature

The environment in the widespread trace natural radioactive isotopes.

When the material position change, material number of how many,

With the detector distance change, detection

To measure the materials own gamma rays are different;

Because the material shield effect, when the material location

Change, through the vessel gamma rays strength will also send

Life changes.

FTS series without nuclear material place meter is radioactive sources roots

According to the probe to measure the change of gamma rays, the.....

Random small signal recognition technology and special signal processing process

Sequence, effectively a signal from the noise that was extracted out, to determine the position of the material

## 2. Product features

### 2. 1 The absolute non-contact measurement

With the traditional nuclear material location, non-contact measurement, good reliability

Don't open hole in ontology, and even in the measuring insulation layer outside

Maintenance easy to change, do not affect ontology operation

(Won't be dropping material broken

Don't be measured by the temperature of the material influence

And tested medium not contact, and not wearing, and no probe hang material problem

### 2. 2 No radioactive sources

### 2. 3 Installation simple

The equipment is installed in the ontology outside, even in the thermal insulation layer outside. So installation, maintenance is very convenient. And even in the ontology runtime installation.

### 2. 4 Wireless remote debugging

Fission products without probe place debugging. Debugging, use the debugger in instrument Settings parameters. Debuggers can be charged inserted

The products can be integrated in the probe in commissioning, also can use remote wireless debugging, still can remote debugging.

### 2. 5 long-life

No loss components, no service life limits, no maintenance, lower cost.

There is no traditional nuclear material location service life restrictions

### 2. 6 Of container wall hanging material

Measurement is the total amount of the ashes of the installation position, the vessel wall hanging ash with the real material is full after all, in total have very big difference, so can distinguish exactly is to hang a material or material place really arrived

### 2. 7 Resistance to dust

Measurement is the total amount of the ashes of the installation position, container of fly ash and the real situation of the material in total full state after all have very big difference, so can tell is fly ash, or really material is full.

### 2. 8 Resistance to bad environment

Environmental temperature: -45 °C—75 °C

Protection: detector stainless steel, fully closed structure, IP66 protection grade

Power supply: wide voltage input, strong adaptability.

### 2. 9 Wide application

Radioactive materials (material radioactivity level higher than the environment radioactive).

Such as: coal ash and slag heap, asphalt, cement.

Not radioactive materials (material radioactivity level below the environment radioactive). Such as: water.

Weak radioactive materials (material radioactivity level and environmental radioactive rather). Such as: some stone, ore.

Ash and water as the boundary plane (radioactive materials and without the boundary of radioactive materials face)

## 2. 10 The analogue

Analog output ash the percentage of the amount, or gray a height, intuitive and clear.

Digital display reflects the changing process of a grey, is very helpful in the operation of the personnel remove of the status of the ash system;

## 2. 11 selfchecking function

Can real-time inspect internal high voltage power supply is normal, check the environmental temperature is overrun, check grounding are good, check the 24 V power supply provided external is normal or not (4 ~ 20 mA output of analogue products), check the probe output is normal (fission products)

## 3. Technology parameters

### 3. 1 power

(1) AC 120V/60Hz, 50mA;

### 3. 2 output

Passive contacts: DPST contact capacity for 120 VAC, 5 A

Analogue for 4 ~ 20 mA signal.

RS-485 output

Wireless communication output;

### 3. 3 OLED display

128 X64 all the dot matrix, and gray OLED graphic display interface

### 3. 4 Response time

Response time: 1 ~ 1800 seconds, in a display panel Settings, or set up with the remote control

### 3. 5 Material with empty material

1 ~ 9999 CPS, in the display panel Settings, or with the remote control Settings;

### 3. 6 self-checking

Online self-check internal high voltage power supply is normal, check the environmental temperature is overrun, check grounding are good, check the 24 V power supply provided external is normal or not (4 ~ 20 mA output of analogue products), indicator shows fault state;

## 4. installation

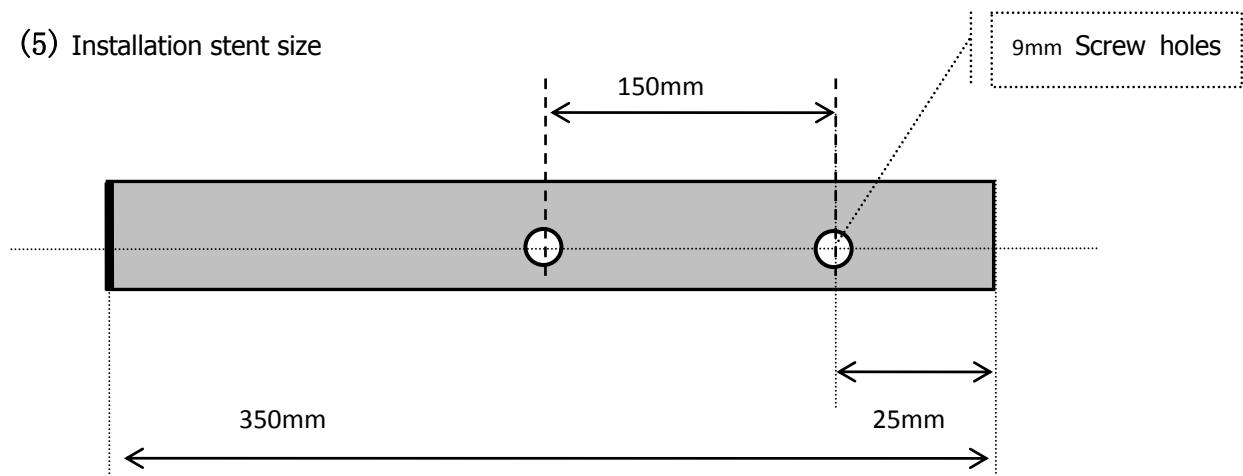
Angle through the thermal insulation layer, welding in ash hopper wall of the reinforcing, or welding in the original material left over from a project installation head;

Restore thermal insulation layer

Card o-ring in stretch out on the thermal insulation layer Angle;

A plan for fixed in the loop

(5) Installation stent size



Note: materials for bars, Angle or U shaped steel

(6) terminals

L	N	ground	OP1	CLOSE1	COM1	OP2	CLOSE2	COM2
○	○	○	○	○	○	○	○	○

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.