

# Surge Protection Type Digital Input Isolated Safety Barrier

PHD-11TF-28+

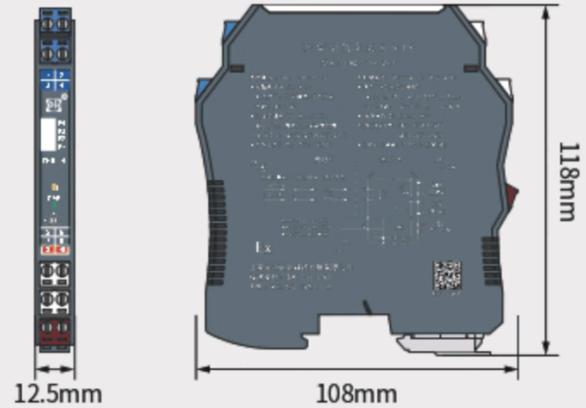
1 input 1 output

Input: Switch contacts/proximity switches

Output: Transistor



國家防檢



## Overview

The isolated safety barrier with surge protection function of switch input transistor output, which isolates and transmits input signals from switch contacts or proximity switches in hazardous areas to the safety zone with output transistor through the safety barrier. Line fault detection is achieved through LED on the top of the module. The dial switch of the module is used to set input and output in-phase or reverse control, as well as to enable or disable the line fault detection alarm indication function.

This product requires independent power supply, with isolated power supply, input, and output terminals.

## Specifications

### Input in hazardous area:

Input signal: Switch contacts/proximity switches

The supply voltage of the sensor: About 8V

Input frequency range:  $\leq 5\text{kHz}$

### Input/output characteristics:

On site input current:  $> 2.1\text{mA}$ , the output is closed, indicating ON;  
When  $< 1.2\text{mA}$ , the output is open circuit, indicating OFF

Switched control between inverted phase and normal phase of outputs e-c: When the dial switch K1 is at "ON", the transistor output e-c are in inverted phase

When the dial switch K1 is at "OFF", the transistor output e-c are in normal phase

When the K2 is at "ON", the circuit will select the red light LFD indication alarm function

### Output in safe area:

Output signal: Transistor and alarm relay (optional)

Output characteristic: NPN type transistor emitter or collector open circuit output

Drive capability: Output current  $\leq 20\text{mA}$  ( $1.2\text{k}\Omega$ ), maximum internal current  $100\text{mA}$ , equipped with short-circuit current protection

### Surge protection features:

Nominal discharge current  $I_n(8/20\mu\text{s})$ :  $5\text{kA}$

Voltage protection level  $U_p(8/20\mu\text{s})$ :  $60\text{V}$ (line to line)

Voltage protection level  $U_p(8/20\mu\text{s})$ :  $600\text{V}$ (line to ground)

According to standards: GB/T18802.21-2016  
(equivalent to IEC61643-21:2012)

### Basic parameters:

Supply voltage:  $20\sim 35\text{V DC}$

Power consumption:  $< 40\text{mA}$ ( $24\text{V}$  power supply, when the transistor is conducting)

LED indicator: Green: Power indicator

Yellow: Output relay in normal working state

Red: LFD indication, line fault alarm

Temperature parameters: Working temperature:  $-20^\circ\text{C} \sim +60^\circ\text{C}$ ,  
Storage temperature:  $-40^\circ\text{C} \sim +80^\circ\text{C}$

Relative humidity:  $10\% \sim 95\%$  RH no condensation

Insulation strength: Between intrinsically safe side and non-intrinsically safe side ( $\geq 3000\text{VAC/min}$ ); between power supply and non-intrinsically safe side ( $\geq 1500\text{VAC/min}$ )

Insulation resistance:  $\geq 100\text{M}\Omega$  (between input/output/power supply)

EMC: According to IEC 61326-1(GB/T 18268), IEC 61326-3-1

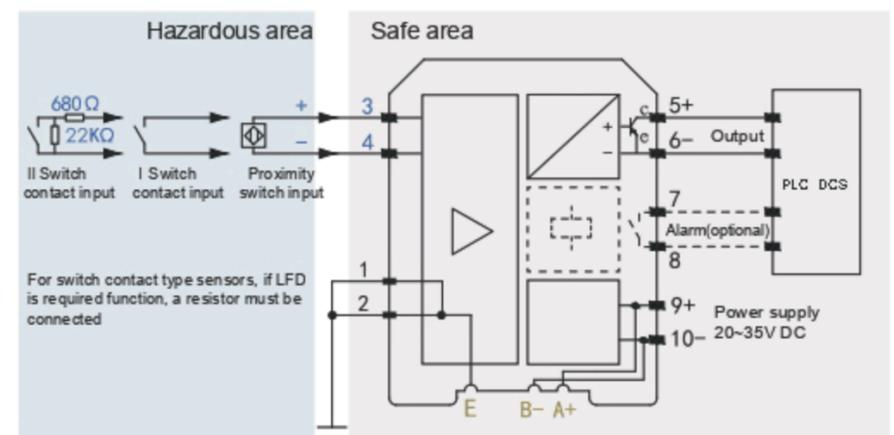
MTBF:  $100000\text{h}$

Wire requirements: Horizontal cutting surface  $\geq 0.5\text{mm}^2$ ,  
Insulation strength  $\geq 500\text{W}$

Applicable field equipments: Field equipment such as dry contacts or NAMUR type proximity switch inputs that comply with DIN19234 standard

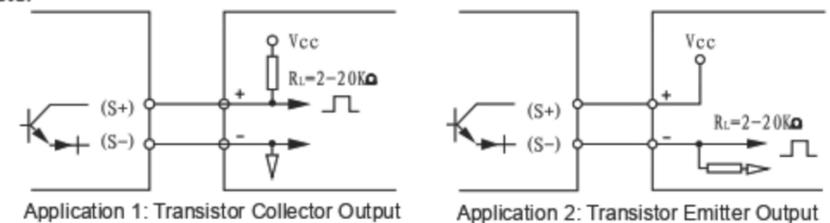
Installation place: Installed in a safe zone, it can be connected to intrinsic safety instruments in hazardous areas up to Zone 0, IIC, Zone 20, and IIIC

## Schematic diagram



Note: The power supply of the power rail is an optional function. Users need to specify the power supply mode when ordering.  
Please refer to attachment on page 89.

Note:



## Line Fault Detection (LFD)

Users can select the "ON" side of the switch at the top of the module to enable fault detection function and indicate an alarm through the red LED light. On site input current  $> 7\text{mA}$ , short circuit alarm (SC); On site input current  $< 0.1\text{mA}$ , open circuit alarm (LB). If the switch contact input requires fault detection function (wire breakage, short circuit), a  $22\text{k}\Omega$  resistor should be connected in parallel at both ends of the switch, and a  $680\Omega$  resistor should be connected in series (as shown in the wiring diagram for switch contact II).

## Intrinsically safe certification

Explosion proof mark: [Ex ia Ga] IIC [Ex ia Da] IIIC

Explosion-proof standard: GB/T 3836.1-2021 GB/T 3836.4-2021

Terminals 3-4  $U_m$ :  $250\text{V AC/DC}$   $U_o$ :  $10.5\text{V DC}$   $I_o$ :  $15\text{mA}$

$P_o$ :  $39.4\text{mW}$   $C_o$ :  $1.7\mu\text{F}$   $L_o$ :  $165\text{mH}$

Certification body: CQST(China National Quality Supervision and Test Centre for Explosion Protected Electrical Products)  
Shanghai lightning protection products testing center