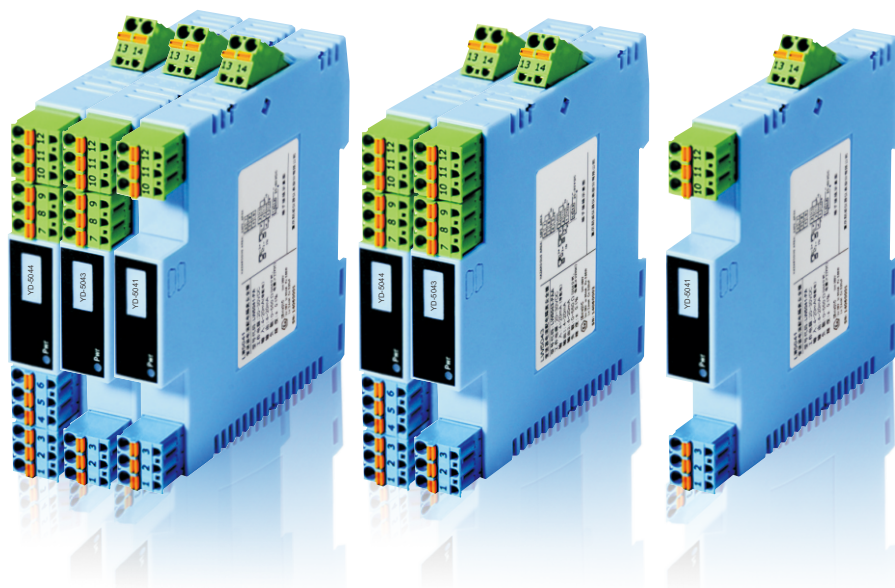


PRODUCT CATALOGUE & TECHNICAL BROCHURE

Safety Barrier



YD 5000 Series

Basic Knowledge of Safety Barrier			01~03
General Specifications of YD 5000 Series Safety Barrier			04~05
Transmitter Current Signal Safety Barrier (With Power Supply)	YD 5041 (Single-channel) YD 5043 (Single-channel, dual-output) YD 5044 (Two-channel)	Supply power for the site 2 wire or 3 wire transmitter; isolate and transfer 4~20mA signal from the transmitter; Conditioning the output direct current/voltage signal.	06
	YD 5900 (Support HART, single-channel)	Supply power for the site 2 wire transmitter.	07
DC Signal Safety Barrier	YD 5051 (Single-channel) YD 5053 (Single-channel, dual-output) YD 5054 (Two -channel)	4~20mA, 1-5V or other specified DC signal input, Output 4~20mA, 1-5V or other DC signals required.	08
mV Signal Safety Barrier	YD 5059-11 (Single-channel) YD 5059-12 (Single-channel,dual-output)	DC millivolt signal input/output,	09
Thermocouple Input Safety Barrier	YD 5914(Single-channel) YD 5915 (Single-channel, dual-output)	Smart thermocouple input available. Thermocouple input. Isolated direct current/ voltage signal output.	10
RTD Input Safety Barrier	YD 5917(single-channel) YD 5918(single-channel, dual-output)	Selectable smart RTD/THC input. Isolated direct current/ voltage signal output.	11
Resistance Input Safety Barrier	YD 5083 (Single-channel) YD 5084 (Single-channel, dual-output)	Resistance value input. DC signal output with linear relation of isolated transfer and input. Independent DC power supply.	12
Frequency Signal Input Safety Barrier	YD 5021 (Single-channel) YD 5022 (Two-channel)	Convert Frequency input signal into DC output signal Independent DC power supply.	13
Switch Signal Input Safety Barrier	YD 5011 (S ingle-channel) YD 5018 (Two -channel)	Input through switch or switch-like equipment according to NAMUR/DIN19234 standard. After isolation, output equipment can be relay contact, Voltage level	14
DC Signal Output Safety Barrier	YD 5045 (Single-channel) YD 5049 (Two-channel) YD 5905 (Support HART, single-channel)	4~20mA input, 4~20mA output. 4~20mA input,1~5V output. 4~20mA input, 4~20 output.	15 16
Switch Signal Output Safety Barrier	YD 5024 (S ingle-channel) YD 5930 (Two -channel)	output precision is not influenced by load change. Relay contact, voltage level signal or transistor input. Isolated logical voltage output. Applicable to site equipment like driving circuit for electromagnetic valve and alarm. Independent DC power supply.	17

Basic Knowledge of Safety Barrier

Instruction to intrinsic safety barrier:

The intrinsic safety barrier, including intrinsic circuit and non-intrinsic circuit, is equipment installed in safe-area and applied in intrinsic explosion-proof system. By limiting the energy transferred to site intrinsic loop through the current limited and voltage limited circuit, intrinsic barrier prevents dangerous energy from getting into intrinsic circuit. In intrinsic explosion-proof system, it is called “associated equipment” (see term explanation) as an important part of intrinsic system.

Designed as an energy limit connector between site equipment and control-room equipment, the safety barrier can ensure the energy transmitted through it to the site is naturally safe no matter the control equipment is normal or in fault condition. As an authority to inspect manufacture of explosion-proof products in PRC, National Electrical Products Quality Supervision and Inspection Center of China has strict, scientific and detailed rules upon intrinsic barrier products. Only enterprises and their products approved by this center have the performance up to the standard; otherwise, inestimable loss may be caused to the user, equipment and manufacture.

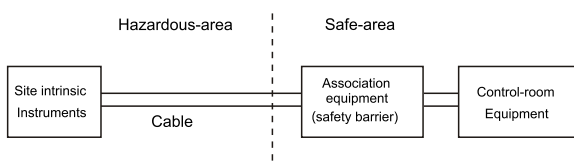
Term explanation:

Associated Equipment:

An electrical equipment installed in safe-area and connecting the intrinsic and non- intrinsic equipment.

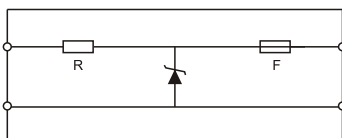
Installation position:

Safety barrier, installed in safe-area, receives signals from hazardous-area and outputs safe signals to safe-area, or receives signals from safe-area and outputs them to intrinsic equipments of hazardous-area after isolation.



Structure of safety barrier:

Common styles of safety barrier are Zener Style and Isolation Style. Zener safety barrier:



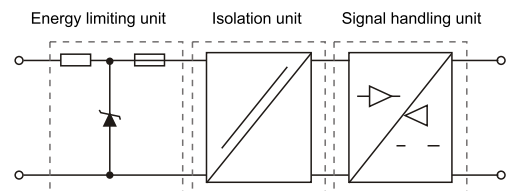
Fast fuse and current limiting resistor/voltage limiting diode are used in circuit to control input electrical energy to ensure output of hazardous-area energy.

Although Zener safety barrier has simple principle, easily-implemented circuit and low price, its application reliability is badly affected and thus limits its application scope for the deficiency of its working principle.

Causes of the deficiency are as follows:

1. The Zener safety barrier requires a reliable earthing system at the installation point and an earthing resistance lower than 1Ω , or it will lose the explosion-proof safety protection capability. These requirements are too hard to be ensured in the actual engineering application.
2. Site equipment of the hazardous-area must be isolated type, or signal cannot be transferred correctly after the connection of the terminal passing Zener safety barrier to the earth, and because of earthing of signal, its anti-jamming ability is decreased as well as the system stability.
3. Zener safety barrier has considerable influence on power resource, and meanwhile it's easy to be damaged for the change of power resource.
4. Principle of Zener safety barrier requires input loop energy, and thus might very well lead to output instability.

Safety barrier:



Circuit system, with input, output and power resource isolated, is used in the isolated safety barrier; it thus copes with energy limiting requirement of intrinsic barrier. Compared with Zener style, although with higher price, outstanding advantages of this barrier in other aspects can bring more profits to users:

1. Isolation way of input, output and power resource, with no need of system earthing circuit, will bring great convenience to site operation.
2. With lower requirement for hazardous-area instruments, site isolated instruments are not necessary.
3. Without signal circuit earthing together, stability and anti-jamming capability of test and control loop signal are enhanced, leading to a reliability of the whole system.
4. With stronger input signal handling ability, safety barrier can receive signals like thermocouple, RTD and frequency signals, which exceeds Zener style.
5. Isolated safety barrier can output two isolated signals for two devices with the same signal source, ensure non-interference of the two equipments, and enhance the electrical safety insulating property between the connected equipment.

So, after comparison of the features and performances between Zener and isolated safety barrier, the outstanding advantages and general usage of the isolated type are obvious. Although with higher price, concerning cost for design, installation, adjustment and maintenance, its total cost is possibly lower than that of the Zener type. Isolated safety barrier is used in all high-required project sites as major intrinsic explosion-proof instrument. It has gradually taken the place of Zener type, and is widely used in intrinsic explosion-proof field.

Basic Knowledge of Safety Barrier

Intrinsic safety equipment mark definition:

Including: Ex --- explosion-proof mark
ia --- explosion-proof grade
II C --- gas composition
Explosion-proof grade of the Company product: [Exia]IIC

Explosion-proof grade:

ia: Under the normal operating condition, hazardous gas can not be ignited because of one or two faults. The loop should ensure the safety when two faults appear at the same time.

"ia" type of electrical equipment must adopt the triplication design to deal with the components easily affected.

"ib" type of electrical equipment can only make sure hazardous gas is not ignited in the event of one fault.

Gas class:

Class I electrical equipment: applicable to coal mine environment easily affected by methane.

Class II electrical equipment: applicable to explosion hazard environment except coal mine.

Class II electrical equipment is further divided in accordance with different ignition energy of flammable materials. All subdivisions are distinguished by capitalized letters. From the following table, II C equipment has the universal speciality with II A and II B.

Classes of common flammable materials

Typical gas	Classification standard		Igniting speciality
	China, IFC, Europe	North America	
Methane	I		Easy burning point ↑ Hard burning point
Acetylene	IIC	A	
Hydrogen	IIC	B	
Ethylene	IIB	C	
Propane	IIA	D	

Classification of explosive hazardous-areas:

During the design of explosion-proof system and the modeling of explosion-proof products, the explosive gas hazardous-areas should be classified in accordance with the frequency and duration of explosive gases, as well as the division of gases existing in the explosive environment.

Area 0	Area in which the mixture of explosive gases exists continuously or for a long time	Easy burning point ↑ Hard burning point
Area 1	Area in which the mixture of explosive gases appears probably	
Area 2	Area in which the mixture of explosive gases can not appear, or exists temporarily if appearing	

The safety barrier of the Company is available for Area 0, as well as Area 1 and Area 2.

Intrinsic safety equipment performance authentication parameters:

Maximum voltage (Um):

Maximum voltage which is applied to non-limit connecting devices of associated equipment, and do not make its explosion-proof invalid (effective value of account current or direct voltage)

Maximum input voltage (Ui):

Maximum voltage which is applied to connecting devices of intrinsically safe circuit, and do not make intrinsically safe performance invalid (maximum value of AC or DC)

Maximum output voltage (Uo):

Maximum output voltage (maximum value of AC or DC) of the intrinsically safe circuit when the voltage of the connecting devices reaches the maximum voltage (including Um and Ui) in an open circuit.

Maximum input current (Ii):

Maximum input current which is applied to connecting devices of the intrinsically safe circuit, and do not make intrinsically safe performance invalid (maximum value of AC or DC).

Maximum output current (Io):

Maximum current from the intrinsically safe circuit of electronic equipment connecting device (maximum value of AC or DC).

Maximum input power (Pi):

Maximum input power of the intrinsically safe circuit probably consumed inside of electrical equipment when the connection of electrical equipment and external power supply do not make the intrinsically safe performance invalid.

Maximum output power (Po):

Maximum output power of the intrinsically safe circuit received from electrical equipment.

Maximum internal capacitance (Ci):

Total equivalent internal capacitance appearing through the connecting devices of electric equipment.

Maximum external capacitance (Co):

Maximum capacitance of the intrinsically safe circuit which can be applied to electrical equipment connecting devices, and do not make intrinsically safe performance invalid. Maximum

internal inductance (Li) :

Total equivalent internal inductance appearing through the connecting devices of electrical equipment.

Maximum external inductance (Lo):

Maximum inductance of the intrinsically safe circuit which can be applied to electrical equipment connecting devices, and do not make intrinsically safe performance invalid.

Maximum cable capacitance (Cc):

The difference between maximum external capacitance (Co) allowed by associated equipment and maximum internal capacitance (Ci) of intrinsic safety equipment.

Maximum cable inductance (Lc):

The difference between maximum external inductance (Lo) allowed by associated equipment and the maximum internal inductance (Li) of intrinsic safety equipment.

Ratio of maximum external inductance to resistance (Lo/ Ro):

The ratio of inductance to resistance in external circuit which can be applied to electrical equipment connecting device, and do not make intrinsically safe performance invalid. Power voltage:

Power voltage for intrinsic safety equipment (e.g. 2 wire equipment)

Selection principles of safety barrier:

- Making sure the explosion-proof grade of the required safety barrier in accordance with the type of hazardous-area and the site explosion-proof requirement;
- Equipping the corresponding type of safety barrier in accordance with the type of site equipment;
- Making sure the maximum voltage of safety barrier in accordance with the maximum voltage probably existed in or generated from instruments in control room;
- Making sure the polarity of safety barrier in accordance with the signal of site equipment and the polarity of the power-to-ground;
- Considering the influence of resistance voltage drop, make sure the maximum short circuit current of safety barrier and the normal state of the system;
- Whether the distribution parameters allowed by safety barrier meet the requirement.

Basic Knowledge of Safety Barrier

Matching principle of explosion-proof parameters:

The following conditions should be met by all configurations of the intrinsically safe loop in order to guarantee the safe and normal use of the equipment.

Table 1 Matching principle of explosion-proof parameters

Safety barrier parameters	Matching conditions of Safety parameters	Intrinsic safety meter Parameters + cable parameters
U_o	$\leq$	U_i
I_o	$\leq$	I_i
P_o	$\leq$	P_i
C_o	$\geq$	$C_i + C_c$
L_o	$\geq$	$L_i + L_c$

Making sure ratio of maximum external inductance to resistance

(L_o/R_o) when the resistance is used to limit the power:

L_o/R_o can be used to choose cable's distribution parameters. When using the formula (1), the output end capacitance C_s should not exceed 1% C_o . The formula (1) is as follows:

$$L_o/R_o = \frac{8eRs + (64e^2Rs^2 - 72U_o^2eLs)^{\frac{1}{2}}}{4.5U_o^2} H/\Omega \quad (\text{Formula 1})$$

In the formula: e symbolizes the minimum ignition energy of the spark test apparatus (electric potential J), others are as follows:

Type I equipment: 525 μ J; Type

II A equipment: 320 μ J;

Type II B equipment: 160 μ J ;

Type II C equipment: 40 μ J;

R_s minimum output resistance of the power, Ω ;

U_o maximum output voltage, V;

L_s maximum inductance at ends of the power, H;

C_s maximum capacitance at ends of the power, F.

$L_s=0$, $C_s < 1\%C_o$ should be met when using the formula (2)

$$L_o/R_o = \frac{32eRs}{9U_o^2} H/\Omega \quad (\text{Formula 2})$$

L_o/R_o should multiply by 2.25 when the required safety factor is 1.0.

Note: For non-linear power, L_o/R_o can test and confirm the analog circuit which is composed of many discrete components and meet the value of L_o and R_o through the 10.1 spark ignition test in GB 3836.4-2000.

Selection principles of connecting cable:

The connecting cable has distributed capacitance and distributed inductance, which makes it become the energy storage element. The basic parameters of its intrinsically safe performance are as follows:

Maximum cable capacitance $C_c = C_p \times L$

Maximum cable inductance $L_c = C_p \times L$

In this formula:

C_p ----- Distributed capacitance per unit length cable (μ F/km)

L_p ----- Distributed inductance per unit length cable (mH/km)

L ----- The actual length of wiring (km).

Note: Recommend the maximum parameter of the cable in line with the intrinsically safe performance

$$C_p = 0.2 \mu F / km, L_p = 1 mH / km.$$

Safety barrier installation:

Use of cable:

Adopt single core cable or multicore cable whose section shall not exceed 0.5~2.5 mm².

Wire connecting terminal color code:

Green wiring (Hazardous-area side) to safe-area

Blue wiring (intrinsically safe side) to hazardous-area

Installation:

Refer to following model selection information

《LW 5000 Series General Technical Specification》

《LW Series Installation Specification》

Notice:

1. The safety barrier should be installed in safe-area, and the environment condition shall meet with the requirement of "operating conditions" in General Technical Index.

2. The wiring leads of safety barrier intrinsically safe terminal (blue mark) and non-intrinsically safe circuit should be laid separately in wire trunking, and each adopts independent protection tube. Other power cables should not be allowed in the wiring tube of the intrinsically safe side, including the power cable of its intrinsically safe circuit.

3. The lead to hazardous-area should be the intrinsically safe lead marked by blue color, with its copper area of more than 0.5 mm² and insulating strength of more than 500V.

4. Before switching and debugging the safety barrier, the model, wiring method, and the polarity of safety barrier should correspond with the specifications, otherwise personal and equipment are likely to be injured.

5. The megohmmeter should not be used for testing the insulating strength among the terminals of safety barrier. All wirings should be cut to check the insulating strength of the system; otherwise the internal circuit of safety barrier could be damaged.

6. Before programming the safety barrier on the spot, cut all wirings first, connect with the programming device and supply power and program, otherwise adverse consequences may be caused.

7. The site instrument connecting with the safety barrier should pass the explosion-proof test by the explosion-proof inspection department and get the Anti-explosive Conformity Certificate. Using our safety barrier does not need combined authentication.

8. When designing, installing, using and maintaining the safety barrier, the descriptions in this handbook should be followed, as well as the standards like GB3836.15-2000 Electrical Instrument in Explosive Gas Environment Chapter 15: Electric Installation in Hazardous-area (except coal mine), GB3836.15-2000 Electrical Instrument in Explosive Gas Environment Chapter 14: Hazardous-area Classification, and GB50058-1992 Instructions for Electrical Planning in Explosion and Fire.

YD 5000 Series Safety Barrier General Technical Specifications

Introduction

YD 5000 Series Safety Barrier, the intrinsically safe associated equipment connecting industrial site instruments and instruments in control room, is designed in accordance with the national standards GB3836.1-2000 Electrical Instrument in Explosive Gas Environment Chapter 1: General Requirement and GB3836.4-2000 Electrical Instrument in Explosive Gas Environment Chapter 4: Intrinsically Safe Type i. With many types, YD 500 series are available for the isolation, power supply, transmission, distribution and alarm setting of all signals, widely used to control industrial process and the conditions requiring intrinsically safe explosion-proof.

Feature

- Function: Power supply for site instruments; isolated signal transmission; signal transfer; signal multi-channel distribution; alarm setting.
- Channels: Single-channel; dual-channel, single-channel, dual-output.
- Power supply: Independent DC power supply; 2-wire loop power supply.
- Matching signal and site instruments:
 - Switch, NAMUR switch input
 - Power output for driving site equipment like valve and indicator
 - Current input of 2-wire and 3-wire transmitter
 - Current input of 2-wire transmitter supporting ART protocol
 - Direct current/voltage signal input and output
 - Temperature signal input of thermocouple and RTD

Main General Technical Parameters

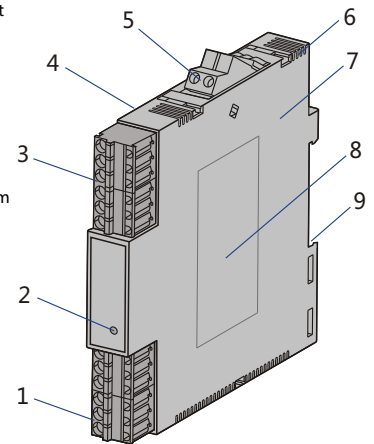
- Power requirement: 20~30VDC
- Power with general rated value: 24VDC
- Transmission precision: Grade 0.1; Grade 0.2 (temperature transmitter)
- Temperature drift: Superior to 0.1%FS/10 °C(allowed temperature scope)
- Response time: < 1s (10~90%)
- Stabilizing time: about 3~5s
- Isolation strength (input/ output/ power/ between housing and wire connecting terminal): 1,500V~2,500V AC/1 min 50Hz
- Insulation impedance (power-input-output): $\geq 100M\Omega$
- Operating temperature range: -20~+60 °C
- Transmission and storage temperature range: -40~+80°C
- Allowed relative humidity in operating: 5~95%RH (no condensation)
- Allowed aYDospheric pressure in operating: 80~106KPa
- Electromagnetic compatibility: in line with related anti-electromagnetic compatibility orders like 89 / 336 / EEC and IEC/EN 61000
- Protection grade: IP 20
- Housing material: PC (polycarbonate) + ABS
- Explosion-proof grade mark: [Exia]IIC
- Maximum explosion-proof voltage: 250V
- Connection to the site equipment in hazardous-areas of: Area 0, Area 1, Area 2; Area II A, Area II B, Area II C.
- Installation: 35mm standard DIN guidance rail clamping installation
- Use of cable: Several or single cable with section of 0.5~2.5 mm²
- Dimension: Width 16 × height 116 × length 110 (mm)
- Weight: About 110g~120g

- Building block design, integrated hybrid circuits.
- Clamping installation, flame resistance material housing, with the thickness of 16mm, intensive installation, easily to install, assemble and remove.
- Plug-in wire terminal, independent power wire connecting terminal, with power plug, easily to install, wire and maintain.
- The whole series has passed the CE authentication.
- Approved by National Electronical Products Quality Supervision and Inspection Center of China



Product Structure

1. Safe-area side wire connecting terminal
Blue terminal, connecting to the site equipment in hazardous-area
2. Power indicator:
Light is on when the instruments is supplied with power or is in normal operating condition
3. Hazardous-area side wire connecting terminal
Green terminal, connecting to the control system and other unit intelligent instruments
4. Left side housing cover
Fastened with right housing cover, which can be opened by proper tools
5. Power wire connecting terminal
Power supply wire with 2 holes (13-/14+)
6. Bleeder vent and thermal relief hole
Concentrated thermal relief holes, with the design of cross ventilation
7. Product label
PET heat resistance material label which marks the product code and relevant important parameters
8. Right side housing
The main housing components which are fastened with the left housing cover.
9. Bayonet installation
35mm standard DIN guidance rail clamping installation

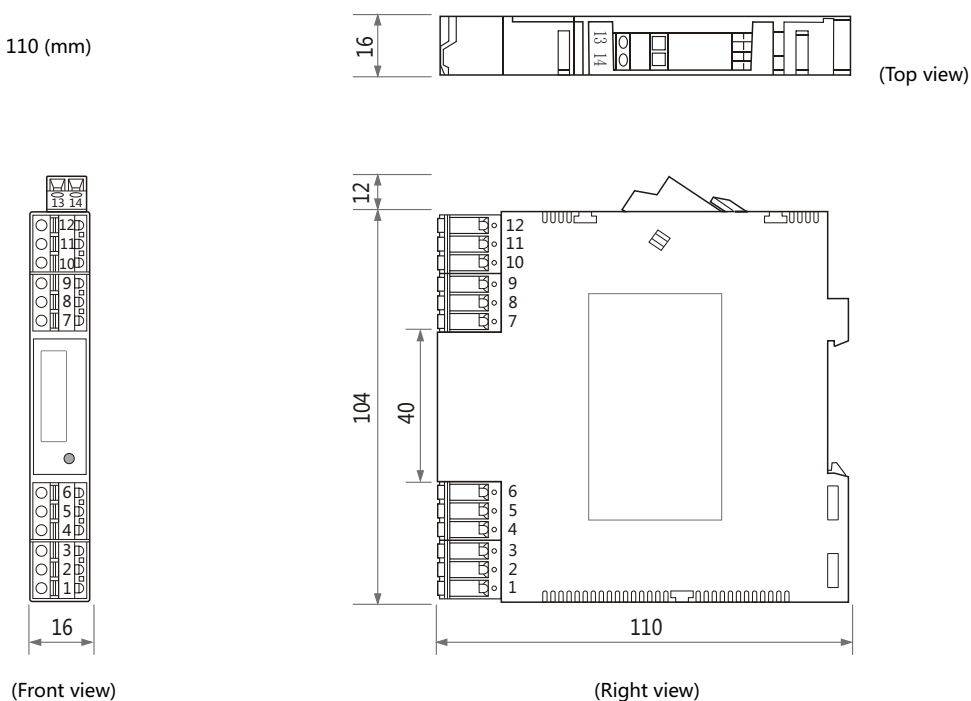


Pictorial drawing of product structure

Dimension Diagram

◆ Dimension

Width× height × length = 16 × 116 × 110 (mm)



Dimension diagram

Instrument Installation and Terminals Wiring

◆ Installation environment requirement:

Installation in safe-area.

1. Environment temperature scope and environment humidity scope required by the technical specifications.
2. Electromagnetic induction phenomenon like strong vibration, strike, heavy current and spark should be avoided in surroundings.
3. The air around should not include inflammable and explosive materials and mediums which corrode chromium, nickel, silvering, nonferrous metal and their alloy.

◆ Installation:

Adopting 35mm standard DIN guidance rail clamping installation

1. The user can adopt vertical installation shown in Fig. 1 or horizontal installation shown in Figure 2.
2. Assure tightly clamping when installing, and install intensively.

◆ Wiring

1. Adopt several or single cable with soft copper section of 0.5~2.5mm².
2. Terminal wiring adopts reed-style compacting connection.

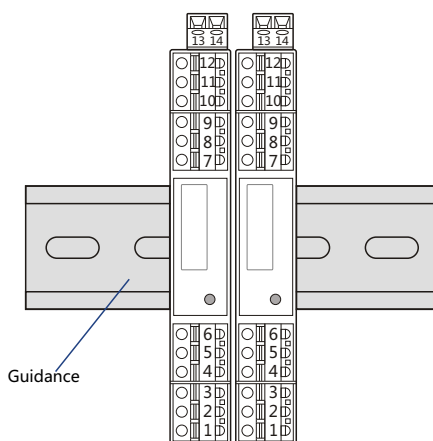


Figure 1 Vertical installation diagram

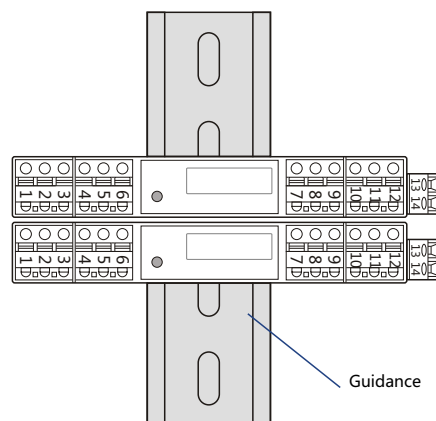
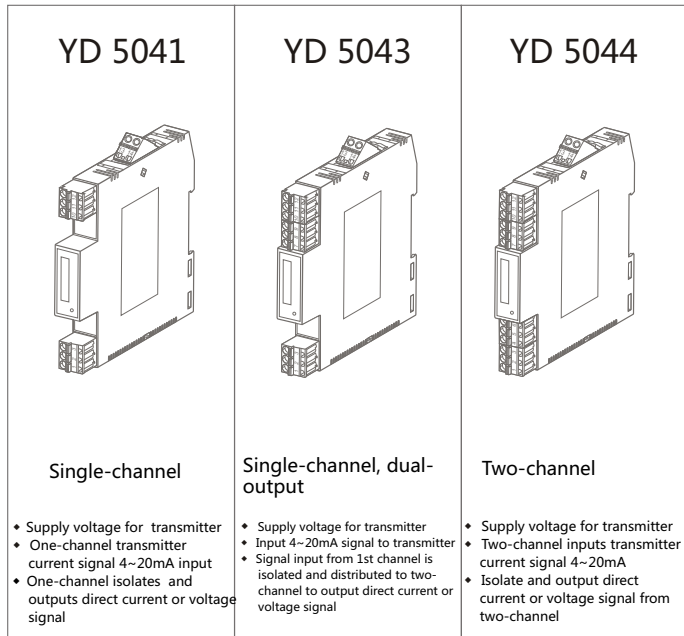


Figure 2 Horizontal installation diagram

- ◆ Please refer to detailed installation specification and wiring method in [Appendix: YD Series Installation Specification](#).

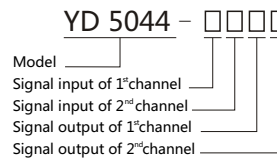
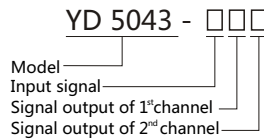
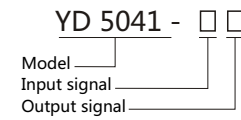
YD 5000 SERIES

Transmitter Power Supply Safety Barrier



Model Code · Model Selection

• Model and code description



• Input/ output and code

Input			
Transmitter current signal		Voltage signal	Code
4 ~ 20mA(with power supply)			P

Output			
Current signal	Code	Voltage signal	Code
4 ~ 20mA	A	1 ~ 5V	1
0 ~ 20mA	B	0 ~ 5V	2
0 ~ 10mA	Z	0 ~ 10V	3
Specified current	C	Specified voltage	9

• Order instructions

Refer to the Model Selection Sample, correctly list out the code.

Sample 1: Require single-channel power supply safety barrier

Input: 4~20mA (with power supply)
Output: 4~20mA

Order code: YD5041-PA

Introduction · Main Technical Specifications

Transmitter power supply safety barrier

Supplies isolated DC power for transmitter in hazardous-area, input 4~20mA current signal from the transmitter, and outputs it to the control system and other instruments on the safety-side after isolation and anti-interference.

The safety barrier adopts independent DC power supply, power-input-output isolated.

• Power supply

Power supply: 20~30VDC

Power indicator: Power LED lights on: Green

Current consumption (when 24VDC is supplying):

< 50mA (single-channel)

< 60mA (single-channel, dual-output)

< 110mA (dual-channel, dual-output)

• Input from hazardous-area

Input signal: 4~20mA direct current signal of transmitter

Input impedance: 50Ω (single-channel; single-channel, dual-output);
100Ω (dual-channel, dual-output)

Supply voltage for transmitter: ≥16VDC (Power≥22VDC)

Maximum input current: About 24mA

• Output to safe-area

Output current: 4~20mA; 0~20mA; 0~10mA; other specified current

Output voltage: 1~5V; 0~5V; 0~10V; other specified voltage

Allowed output load: 0~550 Ω (Power ≥22VDC at full load of 550Ω)

Voltage output impedance: ≤500Ω

Output ripple: < 10mVp-p

• General technical parameters

Transmission error: ± 0.1%

Temperature drift: ± 0.015% / °C

Startup response time: < 1s (10~90%)

Power change error: ±0.1% (voltage scope 20~30VDC)

Dielectric strength: 2.5KV, 1 min, 50Hz among input-output-power

Insulation resistance: ≥ 100MΩ / 500VDC among input-output-power

Operating temperature range: -20~+ 60 °C

Dimension: Width× height × length = 16× 116 × 110 (mm)

• Safe explosion-proof parameters

Explosion-proof grade mark: [Exia]IIC

Safety parameters: Um = 250V Uo = 28V Io = 93mA
Po = 0.65W Lo = 2.4 mH Co = 0.05μF

Application · Terminals Wiring

Applied with such control systems as DCS/PLC or other units.

• Connecting to control system: AI unit of various DCS/PLC, receiving current or voltage

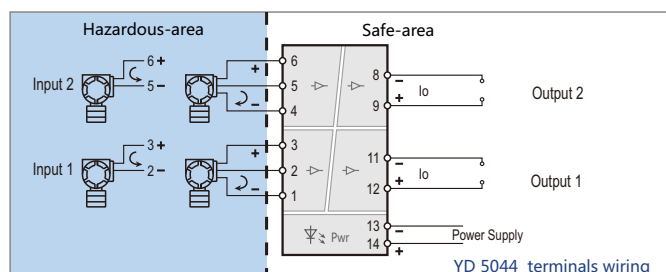
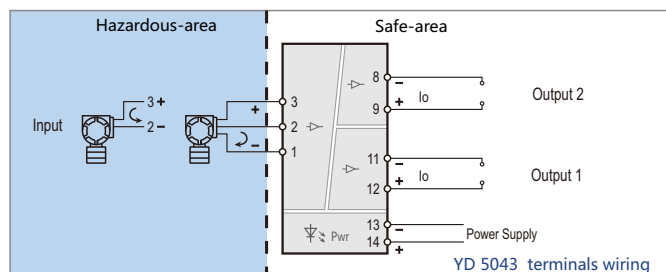
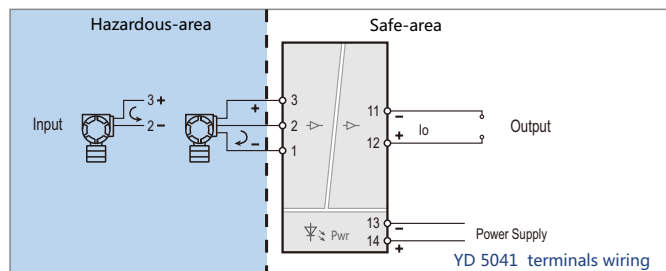
• Connect to site equipment: 2 wire or 3 wire transmitter.

• Allowed hazardous-areas for equipment: Area 0, Area 1, Area 2; Area II A, Area II B, Area II C.

• Installation and terminals wiring: 35mm standard DIN guidance rail clamping installation; terminal wiring adopts reed-style compacting connection.

Please refer to detailed installation specification and wiring method in

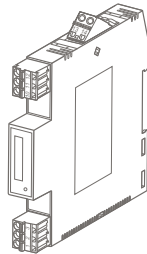
Appendix: YD Series Installation Specification.



YD 5000 SERIES

2-Wire Transmitter Power Supply Safety Barrier (supporting HART protocol)

YD 5900

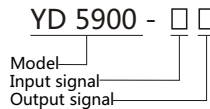


Single channel

- Supply power for site 2-wire transmitter
- 2-wire transmitter signal 4~20mA isolated transfer, single-channel input and single-channel output
- Supporting HART protocol

Model Code · Model Selection

• Model and code description



• Input/Output and Code

Input	
Transmitter current signal	Code
4 ~ 20mA (HART digital signal)	P

Output	
Current signal	Code
4 ~ 20mA (HART digital signal)	A

• Order instructions

Refer to the Model Selection Sample, correctly list out the model and code.

Sample: Require single-channel safety barrier
2-wire supporting HART protocol for isolated transfer
Current signal of smart transmitter
Selecting YD5900 safety barrier
Input: Transmitter current signal 4~20mA (HART signal)
Output: 4~20mA (HART signal)

Order model and code: YD5900-PA

Introduction. Main Technical Specifications

2-wire transmitter power supply safety barrier

Provides power for 2-wire transmitter in the hazardous areas and transfers isolated signal 4~20mA to control system or other instruments in the safe area.

YD 5900 supports HART communication.

The safety barrier adopts independent DC power supply, power supply-input-output isolated.

• Power supply

Power voltage: 20 ~ 30VDC

Power indicator: Power LED lights on: Green

Current loss (24VDC power supply): <65mA (Single-channel)

• Input from hazardous-area

Input signal: Transmitter DC current signal 4~20mA; HART digital signal
Input impedance: 50Ω (Single-channel);

100Ω (Dual-channel, dual-output)

Power supply for transmitter: ≥16VDC (Power supply ≥22VDC)

Allowed maximum current input: About 24mA

• Output to safe-area

Output signal: 4~20mA; HART digital signal

Allowed output load: 0~55Ω (Power ≥22VDC at full load of 550Ω)

Output ripple: < 10mVp-p

• General technical parameters

Transmission error: ±0.1%

Temperature drift: ±0.015% / °C

Startup response time: < 1s (10~90%)

Power change error: ±0.1% (allowed voltage scope 20~30VDC)

Dielectric strength: Input-output-power 2.5KV, 1min, 50Hz

Insulation resistance: Input-output-power ≥100MΩ / 500VDC

Operating temperature range: -20 ~ + 60°C

Dimension: Width * Height * Depth = 16×116×110 (mm)

• Safe explosion-proof parameters

Explosion-proof grade mark: [Exia] IIC

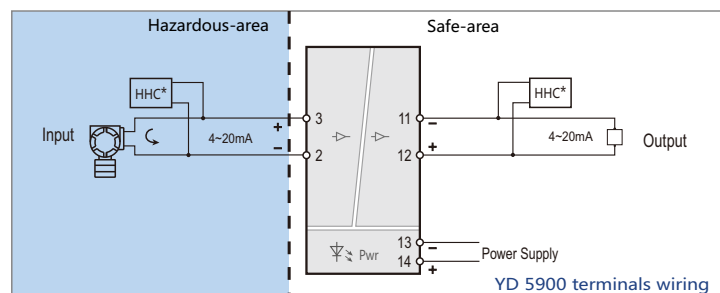
Safety parameters: Um = 250V Uo = 28V Io = 93mA

Po = 0.65W Lo = 2.4 mH Co = 0.05μF

Application. Terminals Wiring

Applied with such control systems as DCS/PLC or other units.

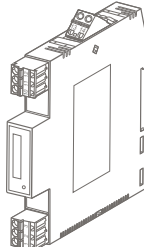
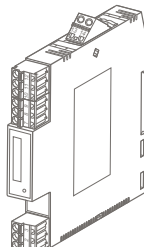
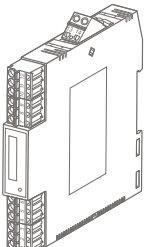
- Connection with the control system: AI unit of various DCS/PLC, 4~20mA source signal receiving.
- Connect to site equipment: 2-wire smart (HART) transmitter
- Hazardous areas allowing equipment: Area 0, Area 1, Area 2; Area IIA, Area IIB, Area IIC.
- Installation and terminals wiring: 35 mm standard DIN guidance rail clamping installation; terminals wiring adopts reed-style compacting connection. Please refer to detailed installation specification and wiring method in [Appendix: YD Series Installation Specification](#)



YD 5900 terminals wiring

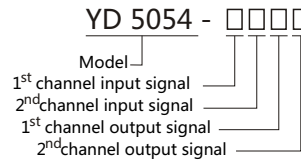
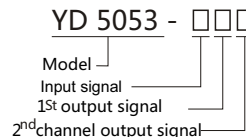
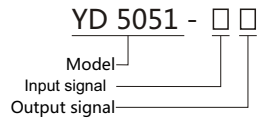
YD 5000 SERIES

DC Signal Converter Safety Barrier

YD 5051	YD 5053	YD 5054
 Single-channel - DC signal one-channel output, one-channel isolating output - DC signal source used to connect various site intrinsic safety equipments	 Single-channel, dual-output - DC signal one-channel input, DC signal isolating output through assigning to two-channel - DC signal source used to connect various intrinsic safety equipments	 Two-channel - DC signal two-channel input, two-channel isolating output - DC signal source used to connect various intrinsic safety equipments

Model Code · Model Selection

Model and code description



Input/output code

Input			
Current signal	Code	Voltage	Code
4 ~ 20mA	A	1 ~ 5V	1
0 ~ 20mA	B	0 ~ 5V	2
0 ~ 10mA	Z	0 ~ 10V	3
Specified current	C	Specified voltage	9

Output			
Current signal	Code	Voltage	Code
4 ~ 20mA	A	1 ~ 5V	1
0 ~ 20mA	B	0 ~ 5V	2
0 ~ 10mA	Z	0 ~ 10V	3
Specified current	C	Specified voltage	9

Order instructions

Refer to the Model Selection Sample, correctly list out the model and code.

Introduction · Main Technical Specifications

DC signal converter safety barrier

DC signal converter safety barrier input DC signal from the hazardous areas, and outputs DC current or voltage signal to control system or other instruments in safe-area after isolation and interference suppression. The safety barrier adopts independent DC power supply, power supply-input-output isolated.

Power supply

Power voltage: 20 ~ 30VDC

Power indicator: Power LED lights on: Green

Current consumption

(when 24VDC is supplying):

- < 25mA(single-channel)
- < 40mA (single-channel, dual-output)
- < 50mA (dual-channel, dual-output)

Input form hazardous-area

Input current: 4~20mA; 0~20mA; 0~10mA; other specified current

Input voltage: 1~5V; 0~5V; 0~10V; other specified voltage

Input impedance: Current input 50Ω; Voltage input ≥500KΩ

Output to safe-area

Output current: 4~20mA; 0~20mA; 0~10mA; other specified current

Output voltage: 1~5V; 0~5V; 0~10V; other specified voltage

Allowed output load: 0 ~ 550Ω (Power ≥ 22VDC at full load of 550Ω)

Voltage output impedance: ≤ 500Ω

Output ripple < 10mVp-p

General technical parameters

Transmission error: ±0.1%

Temperature drift: ±0.015% / °C

Startup response time: < 1s (10 ~ 90%)

Power change error: ±0.1% (allowed voltage scope 20~30VDC)

Dielectric strength: Input-output-power 2.5KV,1min, 50Hz

Insulation resistance: Input-output-power ≥100MΩ / 500VDC

Operating temperature: -20 ~ +60°C

Dimension: Width × height × length = 16×116×110 (mm)

Safe explosion-proof parameters

Explosion-proof grade mark: [Exia]IIC

Safety parameters: $U_m = 250VAC/DC$ $U_o = 4VDC$ $I_o = 90mA$

$P_o = 0.09mW$ $L_o = 24mH$ $C_o = 10\mu F$

Application · Terminals Wiring

Applied with such control systems as DCS/PLC or other units.

● Connecting to the control system: AI unit of various DCS/PLC, receiving current or voltage signal.

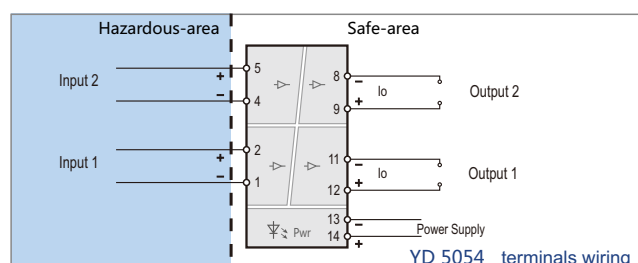
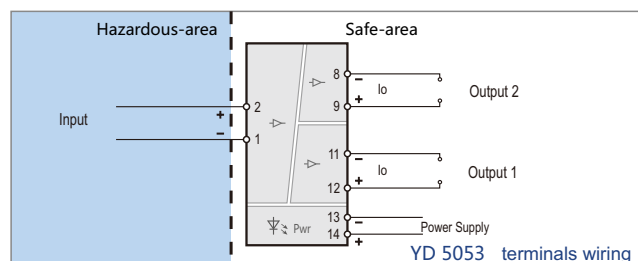
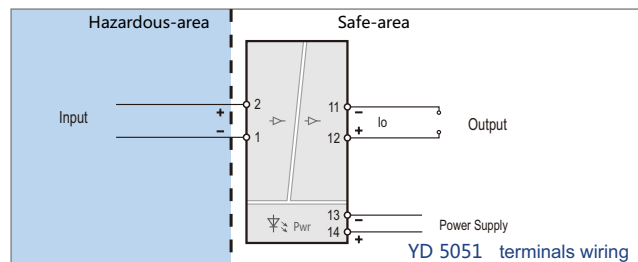
● Connect to site equipment: DC current or voltage signal of various equipments.

● Allowed hazardous areas of equipment: Area 0, Area 1, Area 2, Area IIA, Area IIB, and Area IIC.

● Installation and terminals wiring: 35mm standard DIN rail clamping installation; terminal wiring adopts reed-style compacting connection.

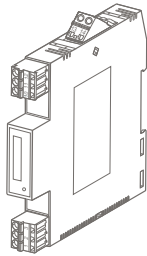
Please refer to detailed installation specification and wiring method in

Appendix: YD Series Installation Specification.



DC mV Signal Converter Safety Barrier

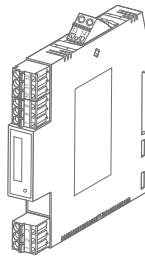
YD 5059-11



Single-channel

- One-channel DC mV signal
- One-channel isolated DC mV signal

YD 5059-12

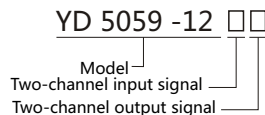
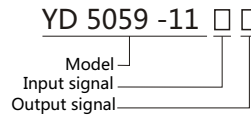


Single-channel, dual-output

- One-channel DC mV signal
- Two-channel isolated DC mV signal

Model Code · Model Selection

Model and code description



Input/output and code

Input	
mV signal	Code
0 ~ 5mV	1
0 ~ 10mV	2
0 ~ 50mV	3
Other specified mV signal: Optional from -5 ~ +60mV	
	9

Output	
mV signal	Code
0 ~ 5mV	1
0 ~ 10mV	2
0 ~ 50mV	3
Other specified mV signal: Optional from -5 ~ +60mV	
	9

Order instructions

Refer to the following Model Selection Sample, correctly list out the model and code
Sample: DC mV signal safety barrier requiring one-channel input and two-channel output

One-channel input: 0~10mV

Two-channel output: 0~10mV

Order model and code: YD5059-1222

Introduction · Main Technical Specifications

DC mV signal safety barrier

The DC mV signal safety barrier inputs low level DC mV signal from hazardous-area and output it after isolation to various site DC mV signals receiving instruments in the safe-area.

The safety barrier adopts independent DC power supply, power supply-input-output isolated.

Power supply

Voltage: 20 ~ 30VDC

Power indicator: Power LED lights on: Green

Current consumption (when 24VDC is supplied): <20mA (Single-channel)
< 30mA (Single-channel, dual-output)

Input from hazardous-area

Input signal: DC mV signal from -5 ~ +60mV

Minimum range: 3mV

Input impedance: >20MΩ

Output to safe-area

Output signal: DC mV signal from -5 ~ +60mV

Output impedance: <10Ω

Output ripple: < 5mVp-p

General technical parameters

Transmission error: ±0.2%

Temperature drift: ±0.015% / °C

Startup response time: < 1s (10 ~ 90%)

Stabilizing time: < 5min

Dielectric strength: Input-output-power 2.5KV, 1min, 50Hz

Insulation resistance: Input-output-power ≥100MΩ / 500VDC

Operating temperature range: -20 ~ +60°C

Dimension: Width × height × length = 16×116×110 (mm)

Safe explosion-proof parameters

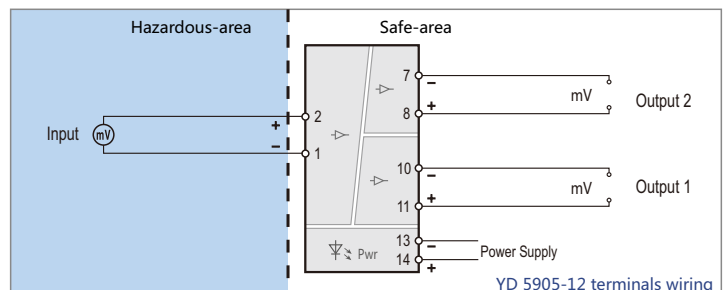
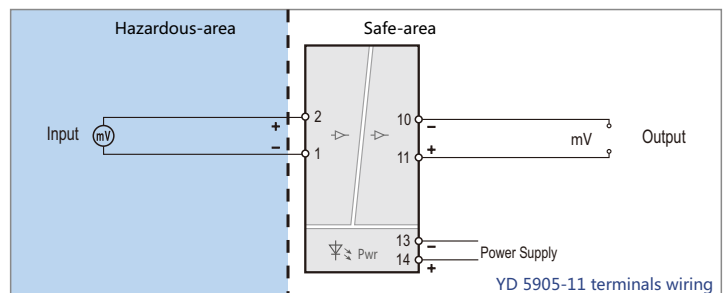
Explosion-proof grade mark: [Exia]IIC

Safety parameters: $U_m = 250VAC/DC$ $U_o = 10.5V$ $I_o = 5mA$
 $P_o = 13.2mW$ $L_o = 100mH$ $C_o = 1.7\mu F$

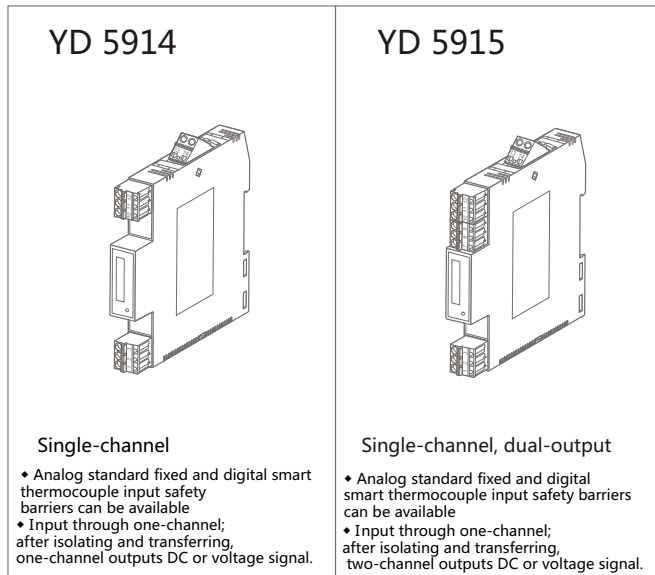
Application · Terminals Wiring

Applied with such control systems as DCS/PLC or other units.

- Connection with the control system: AI unit of various DCS/PLC, receiving DC mV signal.
- Connect to site equipment: DC mV signals of various equipment, thermocouples with outer cold junction compensation or other receiving instruments.
- Hazardous areas allowing equipment: Area 0, Area 1, Area 2; Area IIA, Area IIB, Area IIC.
- Installation and terminals wiring: 35 mm standard DIN rail clamping installation; terminals Wiring adopts reed-style compacting connection. Please refer to detailed installation specification and wiring method in [Appendix: YD Series Installation Specification](#).



Thermocouple Input Safety Barrier



Introduction · Main Technical Specifications

Thermocouple input safety barrier

Receives thermocouple signals from the site hazardous-area transfers it after isolation and outputs to control system or other instruments at the safe-area .
Customers may choose the digital thermocouple input safety barrier. The temperature range can be set by PC and software. This safety barrier adopts independent DC power supply, isolating power-input-output.

• Power supply

Voltage: 20 ~ 30VDC
Power indicator: Power LED lights on: Green
Current consumption
(when 24VDC is supplied): <30mA (single-channel)
45mA (single-channel, dual-output)

• Input from hazardous-area

Input thermocouple: various thermocouples such as K; E; S; B; R; T; N; W; J
Optional mV signal input: -5 ~ 60mV; minimum mV range: 3mV
(Choosing digital thermocouple input safety barrier requires external cold junction resistance, with terminals 5 and 6 connected to temperature compensation.)

• Output to safe-area

Output current: 4 ~ 20mA; 0 ~ 20mA; 0 ~ 10mA; other specified current
Output voltage: 1 ~ 5V; 0 ~ 5V; 0 ~ 10V; other specified voltage
Allowed output load: 0 ~ 550Ω (Power ≥ 22VDC at full load of 550Ω)
(Choosing the digital smart type, with load of 0 ~ 350Ω during output of 4 ~ 20mA)
Voltage output impedance: ≤ 500Ω
Output ripple: < 10mVp-p

• General technical parameters

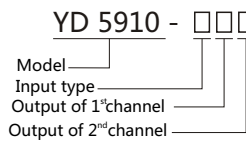
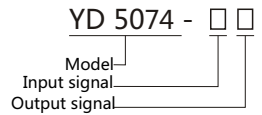
Transmission error: ±0.3% for analog standard fixed type; ±0.2% for digital smart type
Temperature drift: Intrinsic error /10°C
Temperature compensation scope: -5~60°C
Temperature error of cold junction: ±1°C
Startup response time: < 1s (10 ~ 90%)
Stabilizing time: < 5min
Power change error: ±0.1% (voltage scope 20~30VDC)
Dielectric strength: Input-output-power 2.5KV, 1min, 50Hz
Insulation resistance: Input-output-power ≥ 100MΩ / 500VDC
Operating temperature range: -20 ~ + 60°C
Dimension: Width × height × length = 16×116×110 (mm)

• Safe explosion-proof parameters

Explosion-proof grade mark: [Exia]IIC
Safety parameters: $U_m = 250VAC/DC$ $U_o = 10.5VDC$ $I_o = 5mA$
 $P_o = 13.2mW$ $L_o = 100mH$ $C_o = 1.7\mu F$

Model Code · Model Selection

• Model and code description



• Input/output and code

Input	
Type	Code
The analog standard fixed type K; E; S; B; R; T; N; W; J (temperature range scope)	F
The digital smart type K; E; S; B (temperature range scope)	I
mV signal (Optional from -5~+60mV)	5

Output			
Current signal	Code	Voltage signal	Code
4 ~ 20mA	A	1 ~ 5V	1
0 ~ 20mA	B	0 ~ 5V	2
0 ~ 10mA	Z	0 ~ 10V	3
Specified current	C	Specified voltage	9

Sample:

Require single-channel thermocouple input safety barrier
Input K type thermocouple
Range 0~1,000°C
Output 4~20mA
Order code: YD5074-FA

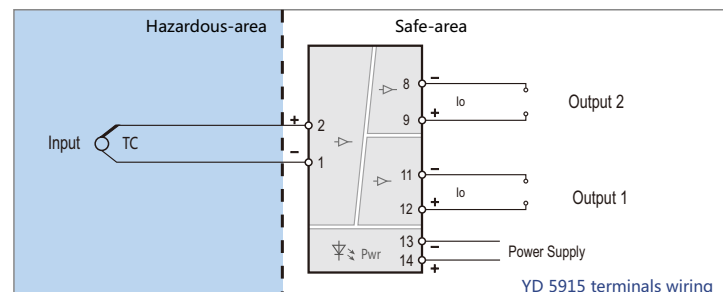
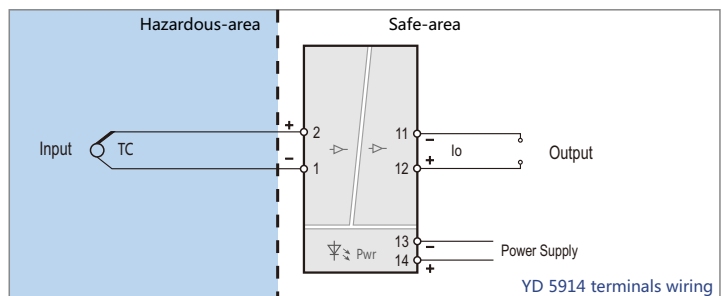
Thermocouple type and range table:

Thermocouple type	Temperature scope (°C)	Minimum range (°C)	Intrinsic error
K	0 ~ 1300	120	1°C/0.3%
E	0 ~ 1000	80	1°C/0.3%
S	0 ~ 1600	580	3°C/0.3%
B	400 ~ 1800	1000	3°C/0.3%
R	0 ~ 1600	850	3°C/0.3%
T	-200 ~ 400	120	1°C/0.3%
N	0 ~ 1200	180	1°C/0.3%
W	0 ~ 2300	340	3°C/0.3%
J	0 ~ 1200	100	1°C/0.3%
mV signal	- 5 ~ 60 mV	5 mV	40μ V/0.3%

Note: The “%” of intrinsic error is for the fixed range scope. In application, choose the larger value of range error and absolute error.

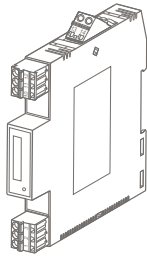
Application · Terminals Wiring

- Site equipment applicable to connection: Thermocouple or mV signal sensor
- Allowed hazardous areas for equipment: Area 0, Area 1, Area 2; Area IIA, Area IIB, Area IIC.
- Installation and terminals wiring: 35 mm standard DIN rail clamping installation; terminals wiring adopts reed-style compacting connection. Please refer to detailed Installation specification and wiring method in [Appendix: YD Series Installation Specification](#).



RTD Input Safety Barrier

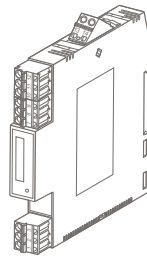
YD 5917



Single-channel

- Analog standard fixed type or smart RTD input safety barriers can be selected
- One-channel input, and DC or voltage signals output by one-channel through isolated transfer.

YD 5918

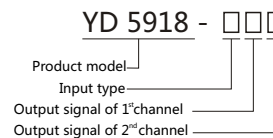
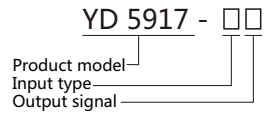


Single-channel, dual-output

- Analog standard fixed type or smart RTD input safety barriers can be selected
- One-channel input, and two-channel output of DC current or voltage signals through isolated transfer

Model Code · Model Selection

• Model and code description



• Input/output and code

Input	
Type	Code
Analog standard fixed type Pt100; Pt10; Cu50; Cu100 (temperature range scope)	F
Digital smart type Pt100 ; Cu50 (signal range scope)	I

Output			
Current signal	Code	Voltage signal	Code
4 ~ 20mA	A	1 ~ 5V	1
0 ~ 20mA	B	0 ~ 5V	2
0 ~ 10mA	Z	0 ~ 10V	3
Specified current	C	Specified voltage	9

RTD type and range:

RTD type	Temperature scope (°C)	Minimum range (°C)	Intrinsic error
Pt100	-200 ~ 800	50	0.4°C/0.2%
Pt10	-200 ~ 800	200	0.4°C/0.2%
Cu50	-50 ~ 150	50	0.4°C/0.2%
Cu100	-50 ~ 150	50	0.4°C/0.2%

Note: The “%” of intrinsic errors is relative to the set range scope and please take the larger value when applying.

Sample:

Require single-channel RTD input safety barrier
Input Pt100 RTD
Range: 0~300°C
Output 4~20mA

Order code: YD5917-FA
YD5918-FAA

Introduction · Main Technical Specifications

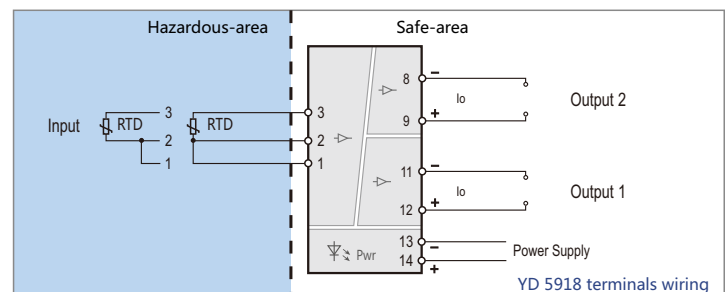
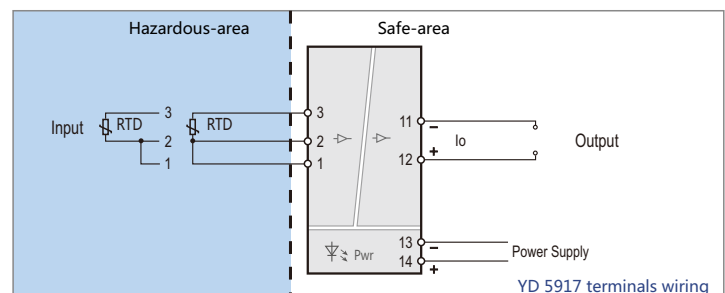
RTD Input safety barrier

Receive the RTD signals from hazardous areas, transferred into DC signals and output to the control system or other instruments in the safe areas after isolation and linearization processing. Users can select digital RTD input safety barrier. The signal range scope can be set by PC and software. This safety barrier adopts independent DC power supply with power-input-output isolated.

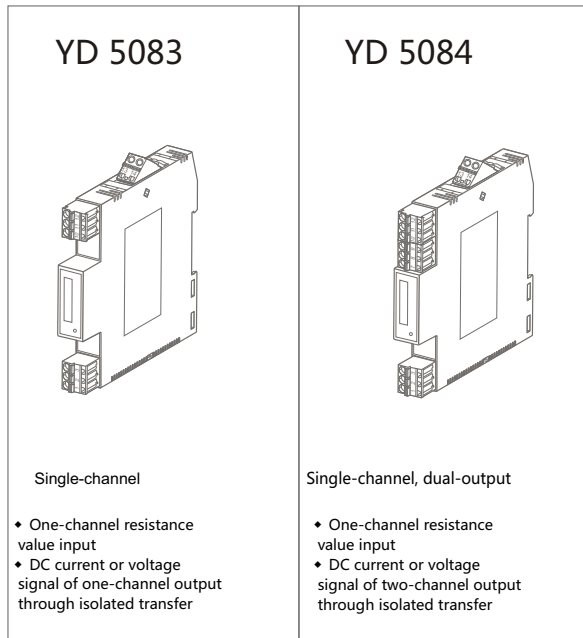
- Power supply
Power voltage: 20 ~ 30VDC
Power indicator: Power LED lights on: green
Current consumption (24VDC power supply): <25mA (single channel); <40mA (single-channel, dual-output)
- Input from hazardous-area
Input RTD: Various RTD including Pt100 ; Pt10 ; Cu50 ; Cu100
Allowed wire resistance: ≤5Ω each wire
- Output to safe-area
Output current: 4 ~ 20mA ; 0 ~ 20mA ; 0 ~ 10mA; other specified current
output voltage: 1 ~ 5V ; 0 ~ 5V ; 0 ~ 10V; allowed output load for other specified voltage: 0 ~ 550Ω (Power ≥ 22VDC at full load of 550Ω)
(If the digital smart one is selected, the load is 0 ~ 350Ω when the output is 4 ~ 20mA)
Voltage output impedance: ≤500Ω
Output ripple: < 10mVp-p
- General technical parameters
Transmission error: ±0.2% (please refer to Model Selection Table)
Temperature drift: Intrinsic error / 10°C
Startup response time: <1s (10 ~ 90%)
Stabilizing time: About 5 min
Power change error: ±0.1% (voltage scope 20~30VDC)
Dielectric strength: Input-output-power 2.5KV, 1 min, 50Hz
Insulation resistance: Input-output-power ≥100MΩ / 500VDC
Operating temperature range: -20 ~ +60°C
Dimension: Width × height × length=16×116×110 (mm)
- Safe explosion-proof parameters
Explosion-proof grade mark : [Exia]IIC
Safety parameters: Um = 250VAC/DC Uo = 10.5VDC Io = 10mA
Po = 26.3mW Lo = 100 mH Co = 1.7μF

Application · Terminals Wiring

- Connect to site equipment: Thermocouple or mV signal transmitter
- Allowed hazardous areas for equipment: Area 0, Area 1 and Area 2; Area IIA, Area IIB and Area IIC.
- Installation and terminal wiring: 35mm standard DIN rail clamping installation; terminal wiring adopts reed-style compacting connection. Please refer to detailed installation specification and wiring method in [Appendix: YD Series Installation Specification](#).



Resistance Input Safety Barrier



Model code · Model selection

Model and code description

YD 5083 - □ □

Model
Input signal
Output signal

YD 5084 - □ □ □

Model
Input signal
Output signal of 1st channel
Output signal of 2nd channel

Input/output and code

Input			
Resistance value	Code	Resistance value	Code
0 ~ 100Ω	1	0 ~ 5KΩ	4
0 ~ 300Ω	2	0 ~ 10KΩ	5
0 ~ 1KΩ	3	Specified resistance value	9

Output			
Current signal	Code	Current signal	Code
4 ~ 20mA	A	1 ~ 5V	1
0 ~ 20mA	B	0 ~ 5V	2
0 ~ 10mA	Z	0 ~ 10V	3
Specified current	C	Specified voltage	9

Introduction . Main Technical Specifications

Resistance input safety barrier

Input resistance of site 2, 3 wire resistor from hazardous area separately output DC signal separately to the control system or other instruments in safety area.

This safety barrier adopts independent DC power supply with power-input-output isolated.

Power supply

Power voltage: 20~30VDC

Power indicator: Power LED lights on: green

Current consumption (24VDC supplying power): <30mA (single-channel); <45mA (single-channel, dual-output)

Input from hazardous-area

Input resistor type: 2, 3 wire resistor

Resistance value scope: 0~10KΩ

(As for the potentiometer with special resistance value, users should specify when ordering)

Output to safe-area

Output current: 4~20mA ; 0~20mA; or specified current range

Allowed load for current output: 0~550Ω (4~20mA and 0~20mA for output)

Allowed load for YD 5085 current: 0~350Ω (4~20mA for output)

Output voltage: 1~5V; 0~5V; 0~10V; or specified voltage range

Voltage output impedance: <500Ω

Output ripple: < 10mVp-p

General technical parameters

Transmission error: ±0.2%

Temperature drift: ±0.015%/°C

Startup response time: <1s (10~90%)

Power change error: ±0.1% (voltage scope 20~30VDC)

Dielectric strength: Input-output-power 2.5KV, 1 min, 50Hz

Insulation resistance: Input-output-power ≥100MΩ/500VDC

Operating temperature range: -20~+60°C

Dimension: Width× height × length=16×116×110 (mm)

Safe explosion-proof parameters

Explosion-proof grade mark: [Exia]IIC

Safety parameters Um=250VAC/DC Uo=10.5VDC Io=10mA
Po=26.3mW Lo=100 mH Co=1.7μF

Application . Terminals Wiring

Applied with such control systems as DCS/PLC or other units.

• Connect to control system: AI unit of various DCS/PLC and current or voltage signal receiving.

• Connect to site equipment: 2, 3 wire resistor.

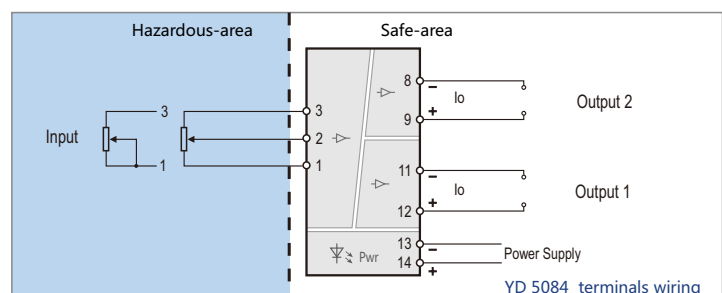
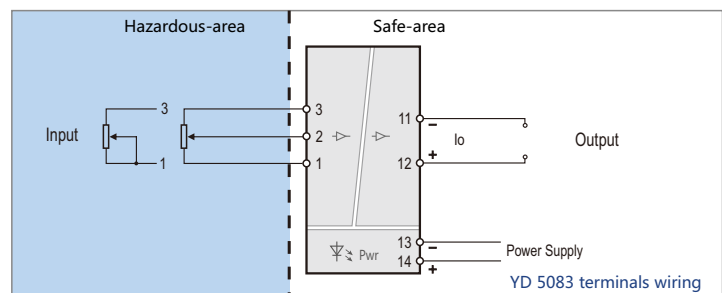
• Allowed hazardous areas of equipment: Area 0, Area 1 and Area 2; Area IIA, Area IIB and Area IIC.

• Installation and terminal wiring: 35mm standard DIN rail clamping installation;

terminal wiring adopts reed-style compacting connection.

Please refer to detailed installation specification and wiring method in

Appendix: YD Series Installation Specification.



Frequency Signal Input Safety Barrier

Introduction . Main Technical Specifications

Frequency signal input safety barrier

Convert input frequency signal and change the input and output frequencies.

electromagnetically isolation design provides best input-output-power electric isolation performance with wider range and various frequencies signal input capabilities, which for conversion of frequency signal outputs to control system, flow/rotation speed, test of motor speed and accumulation of pulse.

The frequency signal input safety barrier adopts independent DC power supply.

• Power supply

Power voltage: 20~30VDC
Power indicator: Power LED lights on: Green
Current consumption (power of 24VDC): <30mA

• Input from hazardous-area

With optional input methods:

A. Open collector

Input frequency range: 0~0.01Hz to 0~100 KHz
Minimum pulse width: Above 4μs (high voltage/low voltage)
Detection voltage/current: 5V DC/2mA DC
Detection threshold value: Below 350Ω when open; above 10KΩ when closed

B. Dry contact switch

Input frequency range: 0~0.01Hz to 0~30Hz
Minimum pulse width: Above 10ms (ON/OFF)
Detection voltage/current: 5V DC/2mA DC
Detection threshold value: Below 350Ω when open; above 10KΩ when closed

C. Voltage pulse

Input frequency range: 0~0.01Hz to 0~100 KHz
Minimum pulse width: Above 4μs (high voltage/low voltage)
Waveform: Rectangular wave, sine wave and similar waves
Input impedance: Above 10KΩ
Maximum input voltage between terminals: ±50V
Detection threshold value (refer to following table):

Input signal	5V voltage pulse	12V, 24 voltage pulse
V H	3V Above	6V Above
V L	1V Below	4V Below

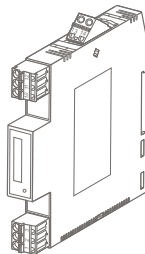
• Output to safe-area

Output current: 4~20mA; 0~20mA; 0~10mA; specified current
Allowed current output load: 0~350Ω (4~20mA)
Output voltage: 1~5V; 0~5V; 0~10V; other specified voltage
Voltage output impedance: ≤500Ω
Output ripple: <10mVp-p

• General technical parameters

Transmission error: ±0.2%
Temperature drift: Intrinsic error/10°C
Startup response time: < 1s (10~90%)
Dielectric strength: Input-output-power 1.5KV, 1min, 50Hz
Insulation resistance: ≥Input-output-power 100MΩ/500VDC
Operating temperature range: -20~+60°C
Dimension: Width × height × length = 16×116×110 (mm)

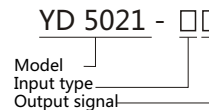
YD 5021



Single-channel

Model Code · Model Selection

• Model and code description



• Input/output and code

Input	
Type	Code
Open collector Frequency range: 0~0.01Hz to 0~100KHz (Detection threshold value: Above 350Ω when open/10KΩ when closed)	A
Dry contact switch Frequency range: 0~0.01Hz to 0~30Hz (Detection threshold value: Above 350Ω when open/10KΩ when closed)	B
5V voltage pulse Frequency range: 0~0.01Hz to 0~100 KHz (Detection threshold value: About 2V)	C
12V, 24V voltage pulse Frequency range: 0~0.01Hz to 0~100 KHz (Detection threshold value: About 5V)	E
Other specified voltage pulse	F

Output			
Current signal	Code	Voltage signal	Code
4 ~ 20mA	A	1 ~ 5V	1
0 ~ 20mA	B	0 ~ 5V	2
0 ~ 10mA	Z	0 ~ 10V	3
Specified current	C	Specified voltage	9

Sample:

Require single-channel frequency signal input safety barrier

Input: 5V voltage pulse signal
Output: 4~20mA

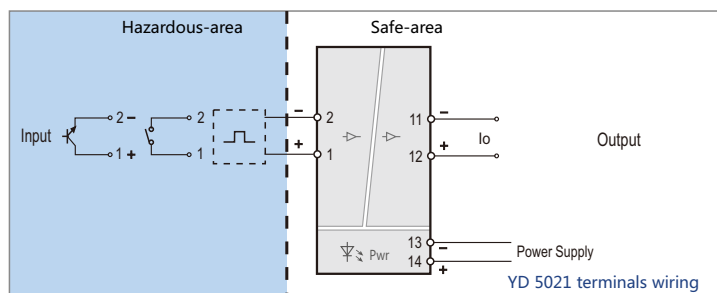
Order code: YD5021-CA

Application . Terminals Wiring

Apply with control systems like DCS/PLC or other units.

- Connect to control system: AI unit of various DCS/PLC
- Connect to site equipment or signal type: Open collector, dry contact switch, voltage pulse.
- Allowed hazardous-areas for equipment: Area 0, Area 1, Area 2, Area IIA, Area IIB, Area IIC.
- Installation and terminals wiring: 35mm standard DIN rail clamping installation; terminal wiring adopts reed-style compacting connection.

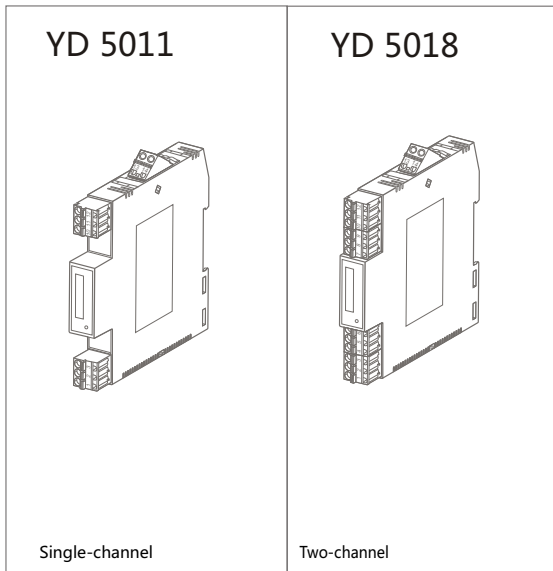
Please refer to detailed installation specification and wiring method in [Appendix: YD Series Installation Specification](#).



YD 5000 SERIES

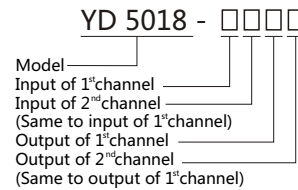
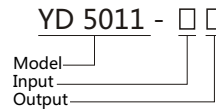
Switch Signal Input Safety Barrier

Switch contact or NAMUR sensor input
Output relay contact (voltage level signal or transistor output is available)



Model Code · Model Selection

Model and code description



• Input/output and code

Input	Code
Switch contact/NAMUR sensor	C

Output	Code
Relay contact	S
Voltage level signal	P
Transistor	T

• Order instructions

Refer to the following Model Selection Sample, correctly list out the model and code.

Sample: Require two-channel switch input safety barrier

Switch input
Relay contact output

Order code: YD5018-CCSS

Introduction . Main Technical Specifications

Switch signal input safety barrier

Input switch signal from hazardous-area, output to control system or other instruments in safe-area (voltage level signal or transistor). This safety barrier adopts independent DC power supply, with power supply-input-output isolation.

• Power supply

Power voltage: 20~30VDC

Power indicator: Power LED lights on: Green

Current consumption (24VDC): <25mA (single-channel)
<40mA (single-channel, dual-output);
<50mA (dual-channel, dual-output)

• Input from hazardous-area

Input switch type: Switch contact

NAMUR sensor meeting DIN19234 standard

Open circuit voltage: 8V±0.5V Short circuit current: About 4mA

Switch threshold value: About 1.55mA Hysteresis: 0.2~0.4mA

• Output to safe-area

Output type:

A. Relay contact: Single knife switching relay

Contact specialty: 24VDC, 2A; Load type: Resistive load
Response time: ≤ 10ms

B. Voltage level signal: High voltage 4.5V~5.5V; low voltage ≤ 0.5V;
High voltage driving force ≤ 20mA

C. Transistor: Exterior voltage ≤ 40V; Drive output current ≤ 40mA
Transistor collector output high voltage: VCC; low voltage: ≤ 2.5V
Transistor emitter output high voltage: VCC-2.5V; low voltage: ≤ 0.5V

• Output specialty of switch NAMUR sensor

When the site NAMUR sensor is on, the output current < 1.2mA;
when off, the output current > 2.1mA.

• General technical parameters

Dielectric strength: Input-output-power 2.5KV, 1min, 50Hz

Insulation resistance: Input-output-power ≥ 100MΩ/500VDC

Operating temperature range: -20~+60°C

Dimension: Width × height × length = 16×116×110 (mm)

• Safe explosion-proof parameters

Explosion-proof grade mark: [Exia]IIC

Safety parameters: Um = 250VAC/DC Uo = 10.5V

Po = 57.8mW Lo = 3 mH Co = 1.7μF

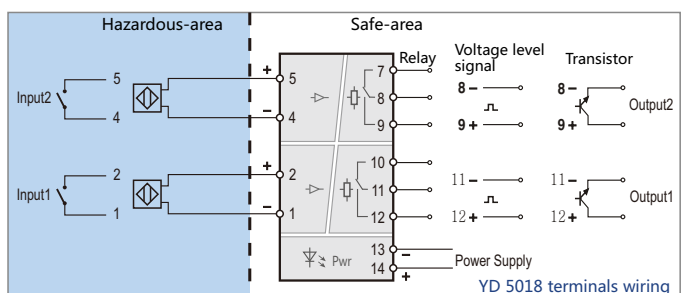
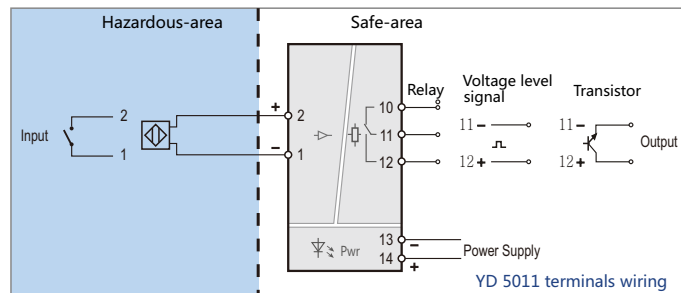
Application . Terminals Wiring

Use with control systems like DCS/PLC or other units.

- Connect to control system: DI unit of various DCS/PLC
- Connect to site equipment: Switch contact; NAMUR sensor meeting DIN19234 standard
- Allowed hazardous-areas for equipment: Area 0, Area 1, Area 2, Area IIA, Area IIB, Area IIC.
- Installation and terminals wiring: 35mm standard DIN rail clamping installation; terminal wiring adopts reed-style compacting connection

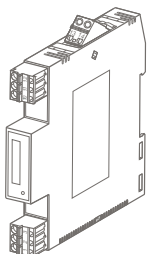
Please refer to detailed installation specification and wiring method in

Appendix: YD Series Installation Specification.



DC Signal Output Operating Safety Barrier

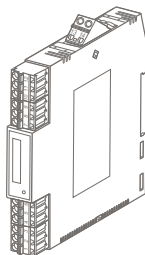
YD 5045



Single-channel

- 4~20mA (or 1~5V) isolated signal output, drive site intrinsic safety equipment.

YD 5049

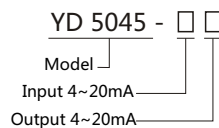


Two-channel

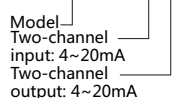
- 4~20mA (or 1~5V) isolated signal output, drive site intrinsic safety equipment.

Model Code · Model Selection

• Model and code description



YD 5049 - □ □



• Input/output code

Input	
Current signal	Code
4 ~ 20mA	A

Output	
Current signal	Code
4 ~ 20mA	A
1 ~ 5V	
Output signal of 1~5V, exclusive to YD5045T	1

• Order instructions

Refer to the following Model Selection Sample, correctly list out the model and code.

Sample: Require dual-channel DC signal isolation safety barrier for isolated output of analog signal and drive site electropneumatic transducer of 4~20mA.

Dual-channel input: 4~20mA
Dual-channel output: 4~20mA
Order code: YD5049-AA

Introduction · Main Technical Specifications

DC signal converter operating safety barrier

DC signal converter operating safety barrier inputs DC 4~20mA signal of DCS/PLC system in safe area, outputs DC 4~20mA (or 1~5V) after isolated to drives intrinsic safety instruments such as electropneumatic transducer, valve position driver and display device in hazardous area.

The safety barrier adopts independent DC power supply, power supply-input-output isolated.

• Power supply

Voltage: 20 ~ 30VDC

Power indicator: Power LED lights on: Green

Current consumption

(when 24VDC is supplying): <30mA (single-channel)
<65mA (dual-channel, dual-output)

• Input from hazardous-area

Input signal: 4 ~ 20mA

Input impedance: 50Ω (single-channel); 100Ω (dual-channel, dual-output)

Input voltage drop: <4V when 20mA

• Output to safe-area

Output current signal: 4 ~ 20mA

Allowed maximum load: 750Ω

Output impedance: >2MΩ

Output ripple: < 10mVp-p

Note: Choose YD5045T, YD5049T products,

Output signal: 1~5VDC

Inner impedance during voltage output: ≤500Ω

• General technical parameters

Transmission error: ±0.1%

Temperature drift: ±0.015% / °C

Startup response time: < 1s (10 ~ 90%)

Power change error: ±0.1% (voltage scope 20~30VDC)

Dielectric strength: Input-output-power 2.5KV, 1min, 50Hz

Insulation resistance: Input-output-power ≥100MΩ / 500VDC

Operating temperature range: -20 ~ +60°C

Dimension: Width × height × length = 16×116×110 (mm)

• Safe explosion-proof parameters

Explosion-proof grade mark: [Exia]IIC

Safety parameters: $U_m = 250VAC/DC$ $U_o = 28VDC$ $I_o = 93mA$

$P_o = 0.65W$ $L_o = 2.4 mH$ $C_o = 0.05\mu F$

Application · Terminals Wiring

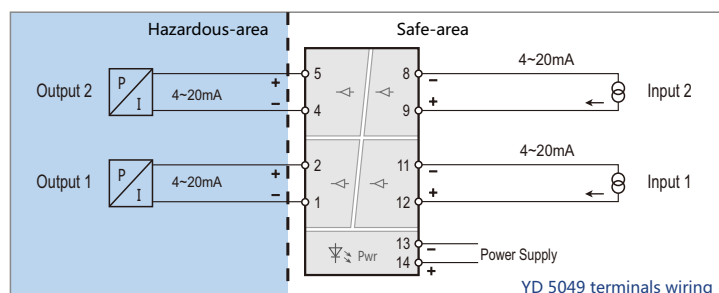
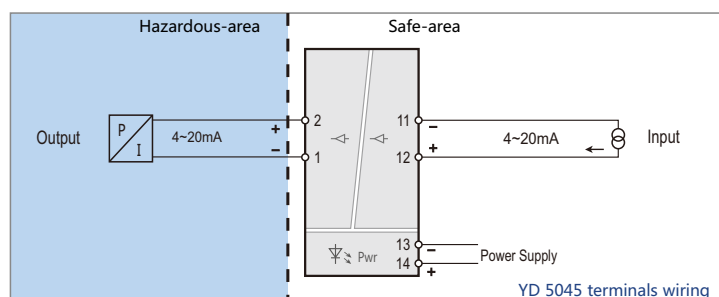
Applied with such control systems as DCS/PLC or other units.

- Connection with the control system: AO unit of various DCS/PLC, current signal output.

- Connect to site equipment: Valve position driver, electropneumatic transducer and other intrinsic safety display devices.

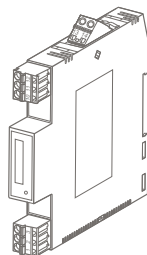
- Hazardous areas allowing equipment: Area 0, Area 1, Area 2; Area IIA, Area IIB, Area IIC.

- Installation and terminals wiring: 35 mm standard DIN rail clamping installation; terminals wiring adopts plug-in terminals. Please refer to detailed installation specification and wiring method in [Appendix: YD Series Installation Specification](#).



DC Current Converter Operating Safety Barrier (Supporting HART protocol)

YD 5905



Single-channel

- One-channel input 4~20mA, One-channel output 4~20mA,
- Support passage of HART protocol

Introduction · Main Technical Specifications

DC current converter operating safety barrier

Input DC 4~20mA signal from DCS/PLC system in safe area, outputs DC 4~20mA after isolated transfer to drives intrinsic safety instruments such as electropneumatic transducer, valve position driver and display device in hazardous area.

This product supports HART digital signal two-way communication.

The safety barrier adopts independent DC power supply, power supply-input-output isolated.

• Power supply

Voltage: 20~30VDC

Power indicator: Power LED lights on: Green

Current consumption

(when 24VDC is supplying): <50mA (Single-channel)

• Input from safe-area

Input signal: 4~20mA

Input impedance: 50Ω (Single-channel); 100Ω (Dual-channel, dual-output)

Input voltage drop: <4V when 20mA

• Output to hazardous-area

Output current signal: 4~20mA

Allowed maximum load: 750Ω

Output impedance: >2MΩ

Output ripple: <10mVp-p

• General technical parameters

Transmission error: ±0.1%

Temperature drift: ±0.015% / °C

Startup response time: <1s (10~90%)

Power change error: ±0.1% (voltage scope 20~30VDC)

Dielectric strength: Input-output-power 2.5KV, 1min, 50Hz

Insulation resistance: Input-output-power ≥100MΩ / 500VDC

Operating temperature range: -20~+60°C

Dimension: Width × height × length = 16×116×110 (mm)

• Safe explosion-proof parameters

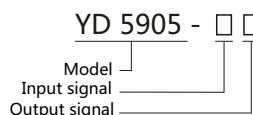
Explosion-proof grade mark: [Exia]IIC

Safety parameters: $U_m = 250VAC/DC$ $U_o = 28VDC$ $I_o = 93mA$

$P_o = 0.65W$ $L_o = 2.4mH$ $C_o = 0.05\mu F$

Model Code · Model Selection

• Model and code description



• Input/output and code

Input	
Current signal	Code
4~20mA (HART digital signal)	A

Output	
Current signal	Code
4~20mA (HART digital signal)	A

• Order instructions

Refer to the following Model Selection Sample, correctly list out the model and code

Sample: The operating isolation safety barrier requiring single-channel is applied to isolate and transfer DC 4~20mA signal of HART protocol.

Choose YD5905 safety barrier

Input: Current signal 4~20mA (HART signal)

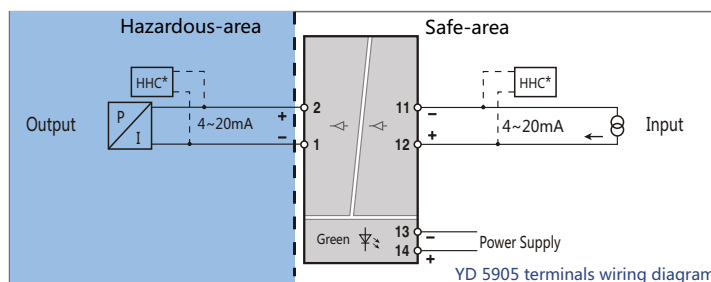
Output: 4~20mA (HART signal)

Order code: YD5905-AA

Application · Terminals Wiring

Applied with such control systems as DCS/PLC or other units.

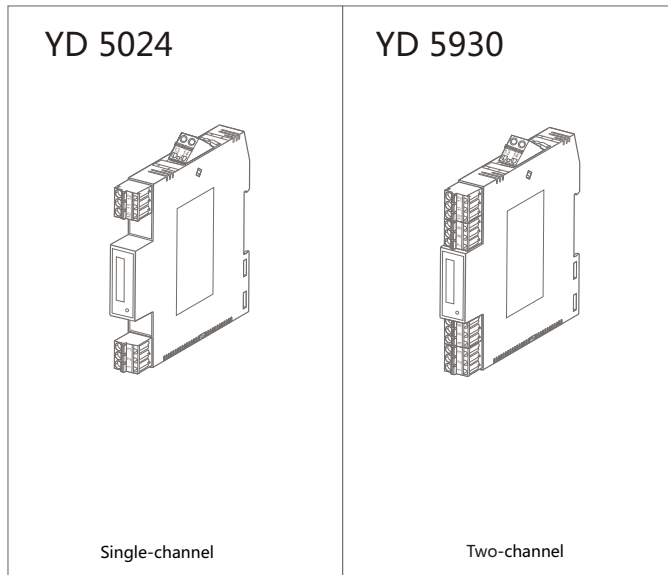
- Connection with the control system: AO unit of various DCS/PLC, current signal output.
- Connect to site equipment: Valve position driver, electropneumatic transducer and other intrinsic safety display devices.
- Hazardous areas allowing equipment: Area 0, Area 1, Area 2; Area IIA, Area IIB, Area IIC.
- Installation and terminals wiring: 35 mm standard DIN rail clamping installation; terminals wiring adopts reed-style compacting connection. Please refer to detailed Installation specification and wiring method in [Appendix: YD Series Installation Specification](#).



YD 5000 SERIES

Switch Output Safety Barrier

Input: Dry contact switch; voltage level signal; transistor
Output: Logical voltage signal.
Site intrinsic safety equipments like drive electromagnetic valve.



Model Code · Model Selection

• Model and code description

YD 5024 - □ □

Model □
Input □
Output □

YD 5930 - □ □ □ □

Model □
Input of 1st channel □
Input of 2nd channel □
(Same to input of 1st channel)
Output of 1st channel □
Output of 2nd channel □
(Same to output of 1st channel)

• Input/output and code

Input	Code
Dry contact switch	1
Transistor	2
Voltage level signal	3

Output	Code
Logical voltage: 12V < V _o < 24V Maximum output current: 45mA	3

• Order instructions

Refer to the following Model Selection Sample, correctly list out the model and code.

Sample: Require dual-channel switch output safety barrier

Dry contact switch input

Logical voltage output

Order code: YD5930-1133

Introduction . Main Technical Specifications

Switch signal output safety barrier

Input switch, transistor or Voltage level signal in safe-area, output control signal to power the equipments in hazardous-area. it is apply for intrinsic safety equipments such as drive electromagnetic valve, alarm or other equipments without energy storage.
The safety barrier adopts independent DC power supply, with power-input-output are isolation.

• Power supply

Power voltage: 20~30VDC;

Power indicator: Power LED lights on: Green

Current consumption (24VDC): Single-channel <75mA (output current 45mA); Dual-channel <110mA (output current 45mA)

• Input from safe-area

Input type

- Select dry contact switch: Input current ≤ 3mA/24V; switch delay ≤ 2s
- Select voltage level signal: High voltage 4~24V; low voltage ≤ 1V
- Select transistor: Electric capacity 30VDC, 100mA

• Output to hazardous-area

Output signal: Logical voltage signal

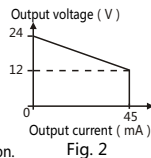
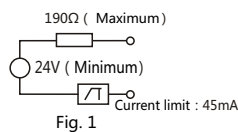
Output equivalent circuit (Fig. 1):

Output specialty curve (Fig. 2):

Minimum output voltage: 12V at 45mA

Maximum output voltage: 24V

Maximum output current: 45mA



• Input/output specialty

Normal position

(*Note: Description in parenthesis is for reversed position.)

- Select dry contact switch: If the input switch is on, the output is conductive, and the output yellow indicator is on.
 - Select voltage level signal: If input high voltage is 4~24V, the output is conductive, and the output yellow indicator is on.
 - Select transistor: If the input transistor is conductive, the output is conductive, and the output yellow indicator is on.
- (When in reversed position, it is not conductive, and output yellow indicator is off.)

- If the input switch is off, the output is not conductive, and the output yellow indicator is off.
 - If the input low voltage is less than 1V, the output is not conductive, and the output yellow indicator is off.
 - If the input of transistor is not conductive, the output is not conductive, and output yellow indicator is off.
- (When in reversed position, it is conductive, and the output yellow indicator is on.)
- *Note: If reversed position is needed, it can be set by the micro switch inside the product. The user should specify when ordering.

• General technical parameters

Dielectric strength: Input-output-power 2.5KV, 1min, 50Hz

Insulation resistance: Input-output-power ≥100MΩ/500VDC

Operating temperature range: -20~+60°C

Dimension: Width × height × length = 16×116×110 (mm)

• Safe explosion-proof parameters

Explosion-proof grade mark: [Exia]IIC

Safety parameters: U_m = 250VAV/DC U_o = 25VDC I_o = 140mA

P_o = 0.88W L_o = 1.32 mH C_o = 0.11μF

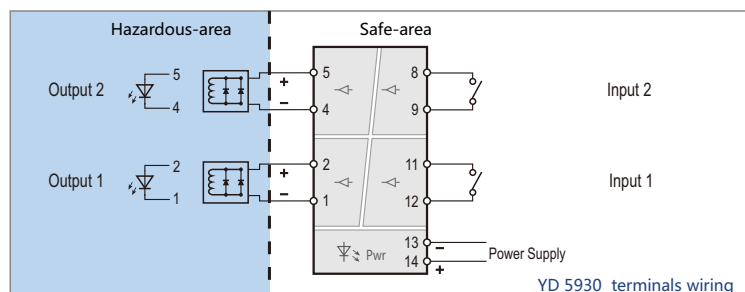
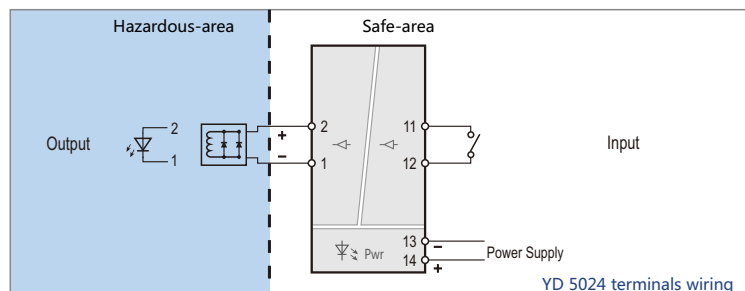
Application . Terminals Wiring

Use with control systems like DCS/PLC or other units.

- Connect to control system: DO unit of various DCS/PLC
- Connect to site equipment: Solenoid valve, alarm, LED or other intrinsic safety equipments.
- Allowed hazardous-areas for equipment: Area 0, Area 1, Area 2, Area IIA, Area IIB, Area IIC.
- Installation and terminals wiring: 35mm standard DIN rail clamping installation; terminal wiring adopts reed-style compacting connection.

Please refer to detailed installation specification and wiring method in

Appendix: YD Series Installation Specification.



YD5000 Series Safety Barrier

Special agent