Isolated Barrier

HD5500 Series

Data Sheet

HD5500 series isolated barriers are designed explicitly according to latest national standard for protection of electrical signals located in hazardous areas.

Installed in safe areas, HD5500 series Isolated barriers work in company with intrinsically safe instruments located in hazardous areas to guarantee a totally IS explosion protection system. With the inside signal transfer module, HD5500 series isolated barriers can also play the roles of RTD temperature transmitter, thermocouple temperature transmitter and mV transmitter, as well as repeater power supply, solenoid driver and so on.

With whole series carrying approval mark of the National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation(NEPSI), HD5500 series Isolated barriers are suitable for interfacing solution between safe and hazardous areas ranking [Ex ia Ga]ⅡC, [Ex iaD].

Safety

All units with IP20 degree of mechanical protection are compliant to GB3836.1-2010 (IEC60079-0: 2007, MOD) and GB3836.4-2010 (IEC60079-11: 2006, MOD), and certified for connection into Zone0, Zone1, Zone2, Zone10, Zone11, ⅡC, ⅡB, ⅡA, T1-T6 hazardous areas worldwide.

No high-integrity earth needed

HD5500 series Isolated barriers need no dedicated ground and consequently eliminate the inherent interference of ground loop.

Full input/output/power supply isolation

Full 3-port isolation between the input, output and power supply circuits achieves highly floating systems for the pursuit of extraordinary resistibility to complicated electromagnetic interference from industrial environment.

High performance components

High performance components are widely adopted for optimal signal integrity, taking into account both high accuracy and low drift of full range.

Compact modular design

With compact modular design, HD5500 series isolated barriers provide wide application range in the minimum space.

Standard DIN-rail mounting and PLUG & PLAY terminals

Standard DIN rail mounting format ensures convenient and steady in

APPROVALS

One of two methods can certify intrinsically safety equipment: systems or parameters. With a systems approval, approvers specify every component and evaluate the entire system. A variance to any of those components voids the approval.

By contrast, a parametric approval is one in which approvers evaluate each device separately and assign it a set of safety or approval parameters. With entity approval, you can connect a field device to any isolated barrier with compatible safety parameters.

During the design of an intrinsically safe system meeting parametric approval, parameters of intrinsically safe instruments and isolated barriers must fulfill the requests demonstrated in the following table.

Table 1 IS System Restrictions under Parametric Approval

Hazardous Area Intrinsically Safe Instruments	Must be	Safe Area Intrinsically Safe Barriers
U_i	≥	U_o
I_i	≥	I_o
P_i	≥	P_o
C_i+C_c	≤	C_o
L_i+L_c	≤	L_o

Where:

The hazardous area instrument is given the following approval parameters:

U_i: Maximum allowed input voltage under fault conditions;
I_i: Maximum allowed input current under fault conditions;
P_i: Maximum allowed input power under fault conditions;
C_i: Internal equivalent capacitance;
L_i: Internal equivalent inductance.

The intrinsically safe barrier is given the following approval parameters:

U_m: Maximum allowed input voltage from safe area;
U_o: Open circuit voltage - maximum voltage that could be transferred to hazardous area instrument;
I_o: Short circuit current - maximum current that could be transferred to hazardous area instrument;
P_o: Maximum output power;
C_o: Maximum allowed hazardous area loop capacitance;
L_o: Maximum allowed hazardous area loop inductance;
C_c: Maximum allowed cable distributed capacitance;
L_c: Maximum allowed cable distributed inductance.

Table 2 HD5500 series isolated barrier parameters

Model	Certificate	Terminal	U_O (V)	I_O (mA)	C_O (μF)	L_O (mH)	P_O (mW)	Ci(μF)	Li(mH)
HD5516	GYB18.1862	3-4；1-2	10.5	14	2.41	165	37	0	0
HD5526	GYB18.1863	3-4	25.4	143	0.105	1.5	910	0	0
HD5532	GYB18.1864	1-3-4；1-4	28	93	0.083	4.2	660	≈0	≈0
		3-4	5.9	0.3	43	/	35	≈0	≈0
HD5542	GYB18.1865	3-1(4), 3-1(4)-2	28	93	0.083	4.2	660	0	≈0
		2-1(4)	5.4	/	65	/	/	0	≈0
HD5543	GYB18.1866	3-1(4), 3-1(4)-2	28	93	0.083	4.2	660	0	≈0
		2-1(4)	5.4	/	65	/	/	0	≈0
HD5544	GYB18.1867	3-4；1-2	28	93	0.083	4.2	660	0	≈0
HD5546	GYB18.1868	3-4	28	93	0.083	4.2	660	0	≈0
HD5549	GYB18.1869	3-4；1-2	28	93	0.083	4.2	660	0	≈0
HD5573	GYB18.1870	1~4	7.1	16	13.88	100	29	0.72	≈0
HD5575	GYB18.1871	1~4	7.1	16	13.88	100	29	0.72	≈0
HD5581	GYB19.1195	3-4	8.5	4	6.5	100	8.5	0	≈0
HD5584	GYB18.1872	1-2-3-4	7.1	16	13.88	100	29	0.72	≈0

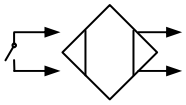
■ Ordering Code

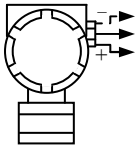
HD55	HD5500 series isolated barrier						
Code		Chan	Function	Input		Output
16	-	2	Switch Input	Contact switch, NAMUR proximity switch, etc.		Normal open contacts，or close contacts (Optional).
	.PB	2				
	.12	1 input 2 outputs				
	.OC	2	Switch Input	Contact switch, NAMUR proximity switch, etc.		Two NPN transistor open collector outputs
26	-	1	Solenoid / Alarm Driver	Contact or logic signal input (Default)		12.5V<V_o<22.5V,I_{max}=45mA Solenoid valve, Alarm etc.
	.PB			Contact or logic signal input (Default)		
	.HI			24V input (Optional)		
32	-	1	Frequency conversion	(0.1~50k)Hz frequency input		(4~20)mA output proportional to frequency, alarm output. (1~5)V output (Optional).
42	-	1	Repeater power supply, supporting bi-directional HART communication	2/3-wire transmitter (4~20)mA, or (4~20)mA current direct input		(4~20)mA output. Passive (4~20)mA or (1~5)V output (Optional).
	.PB					
43	-	1 input 2 outputs	Repeater power supply, supporting bi-directional HART communication	2/3-wire transmitter (4~20)mA, or (4~20)mA current direct input		(4~20)mA output. Passive (4~20)mA or (1~5)V output (Optional).
	.PB					
44	-	2	Repeater power supply, supporting bi-directional HART communication	2/3-wire transmitter (4~20)mA		(4~20)mA output. Passive (4~20)mA or (1~5)V output (Optional).
	.PB					
46	-	1	Isolating driver supporting bi-directional HART communication	(4~20)mA input		(4~20)mA output. (1~5)V output (Optional)
	.PB					
49	-	2	Isolating driver supporting bi-directional HART communication	(4~20)mA input		(4~20)mA output. (1~5)V output (Optional).
	.PB					
73	-	1	Temperature Converter	TC	R (-20~1750)℃(Optional)	(4~20)mA output. Passive(4~20)mA or (1~5)V output (Optional)
					J (-200~1200)℃(Optional)	
					K (-200~1370)℃(Optional)	
					B (600~1800)℃(Optional)	
					C (0~2300)℃(Optional)	
					D (0~2300)℃(Optional)	
					E (-200~950)℃(Optional)	
					N (-200~1300)℃(Optional)	
					S (-20~1750)℃(Optional)	
					T (-200~400)℃(Optional)	
	.PB			mV	(-75~75)mV(Optional)	
				RTD	Pt100(-200~800)℃(Optional)	
					Cu50 (-50~150)℃(Optional)	
					Pt1000(-50~300)℃(Optional)	
				Res.	(0~2200)Ω(Optional)	
75	-	1 input 2 outputs	Temperature Converter	TC	R (-20~1750)℃(Optional)	(4~20)mA output. Passive(4~20)mA or (1~5)V output (Optional)
					J (-200~1200)℃(Optional)	
					K (-200~1370)℃(Optional)	
					B (600~1800)℃(Optional)	
					C (0~2300)℃(Optional)	
					D (0~2300)℃(Optional)	
					E (-200~950)℃(Optional)	
					N (-200~1300)℃(Optional)	
					S (-20~1750)℃(Optional)	
					T (-200~400)℃(Optional)	
	.PB			mV	(-75~75)mV(Optional)	
				RTD	Pt100(-200~800)℃(Optional)	
					Cu50 (-50~150)℃(Optional)	
					Pt1000(-50~300)℃(Optional)	
				Res.	(0~2200)Ω(Optional)	

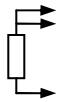
HD55		HD5500 series isolated barrier						
		Code		Chan	Function	Input		Output
		81	-	1	mV Transmission	mV	(-20~100) mV	1:1 mV signal transmission
			.12	1 input 2 outputs				
		84	-	1	Resistance Transmission	Res.	(18~400) Ω (Optional) (180~2200) Ω (Optional)	1:1 resistance signal transmission
HD55	□							

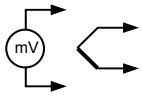
**Note:*
**1: The signal type and measurement range must be given when ordering HD5573/HD5575. HD55-CJC should be ordered for the type of thermocouple.*
**2: A PC running Inscan HDC software, HD55-BT (wireless bluetooth) should be ordered for configuration of HD5573/HD5575.*
**3: The type of 24V input must be given when ordering HD5526.*
**4: The type of 1 input must be given when ordering HD5516.*
**5: The type of frequency signal range can be configurable when ordering HD5532.*
**6: The type of 1 input 2 outputs must be given when ordering HD5581.*

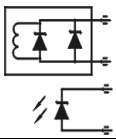
ORDERING and TABLES

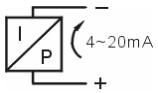
Switch Input	Model	Chan.	Input	Output	Note
	HD5516	2 1 input 2 outputs	Contact switch, NAMUR proximity switch, etc.	Normal open contacts	(0~100)Hz
	HD5516OC	2	Contact switch, NAMUR proximity switch, etc.	NPN transistor open collector outputs	(0~5k)Hz

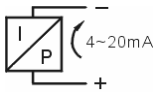
2/3- wire Transmitter	Model	Chan.	Input	Output	Note
	HD5542	2	2/3-wire transmitter (4~20)mA, or (4~20)mA current direct input CXT, CJT, EJA, 1151, 3051, XYC341,ST3000/S900,VFM1091, H27,ST3000/900, BM26	(4~20)mA, passive (4~20)mA or (1~5)V output (Optional).	Including isolated transmitter power supply. HD5544 supports 2-wire transmitter only. All Model supports bi-directional HART communication.
	HD5543	1 input 2 outputs			
	HD5544	2			

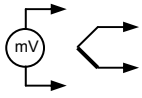
RTD Input	Model	Chan.	Input	Output	Note
	HD5573	1	3-Wire Pt100, Pt1000, Cu50 etc. Measure Range: (0~2200)Ω Pt100: (-200~800)℃ Pt100: (-50~300)℃ Cu50: (-50~150)℃	(4~20)mA, passive (4~20)mA or (1~5)V output (Optional).	The type of RTD and measurement range must be given when ordering. Special type can be customized.
	HD5575	1 input 2 outputs			

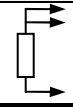
mV/TC Input	Model	Chan.	Input	Output	Note
	HD5573	1	mV: (-75~75)mV TC: J, K, T, E, R, S, N, B,C,D	(4~20)mA, Passive (4~20)mA or (1~5)V output (Optional).	The type of thermocouple and measurement range must be given when ordering. Special type can be customized.
	HD5575	1 input 2 outputs			

Solenoid Driver	Model	Chan.	Output	Input	Note
	HD5526	1	12.5V<V_o<22.5V I_{max}=45mA Solenoid valve, Alarm etc.	Contact or logic signal input(Default) 24V input (Optional)	The type of 24V input must be given when ordering.

Solenoid Driver	Model	Chan.	Output	Input	Note
	HD5532	1	2/3 line pulse signal, logic level	(0.1~50K)Hz	Range can be configurable.

Isolating Driver	Model	Chan.	Output	Input	Note
	HD5546	1	(4~20)mA Electric transducer/valve positioner etc. SVP3000, AVP300/301, IPH, IPF, IPX, 646, DVC5000, TZIM, NE72, E69, etc.	(4~20)mA	All model supports bi-directional HART communication.
	HD5549	2			

mV/TC Transmitter	Model	Chan.	Input	Output	Note
	HD5581	1	mV: (-20~100)mV	(-20~100)mV	The type of thermocouple and measurement range must be given when ordering. Special type can be customized.
	HD5581.12	1 input 2 outputs			

RTD Transmitter	Model	Chan.	Input	Output	Note
	HD5584	1	(18~2200)Ω, 3-Wire Pt100, etc.	(18~400)Ω (180~2200)Ω	/

MOUNTING

Environmental Limits

Operation temperature: (-20~60) ℃

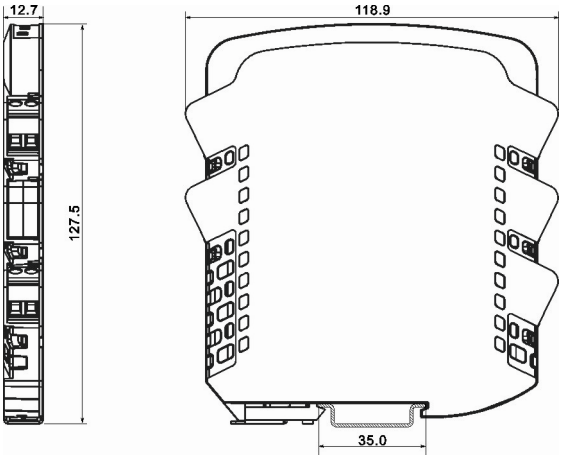
Storage temperature: (-40~80) ℃

Relative humidity: (5~95) % RH

Overall Dimensions

Weight: 110g approx.

Dimension: 127.5mm×118.9mm×12.7mm;



Mounting Notes

1. Air ambient: where has no excessive amount of corrosive gases to the chrome-plate, nickel-plate or silver-plate.
2. The leads of hazardous area and safe area must be separated in cable duct. It is not allowed to mix other power supply into the field part of the isolated barrier, including that of other IS circuits.
3. All of the isolated barriers' hazardous-area terminals must be at the same side to avoid confusion during installation.
4. Pay attention to type, power supply polarity, voltage and terminal tags, when isolated barrier is respectively powered for debugging.
5. Before using the insulation resistance meter to check insulation between terminals, disconnect all of the isolated barriers. If not, the internal fast acting fuse would be fused.
6. Isolated barriers are damageable. Replace the damaged barriers to ensure intrinsic safety and solve the fault together with our company. It is forbidden to replace components of the isolated barriers without SUPCON's permission.
7. When mounting, operating and maintaining the units, users should comply with the relevant requirements of the user's manual; Explosive atmosphere-Part 13:Equipment repair, overhaul and reclamation; Explosive atmosphere-Part 15:Electrical installations design, selection and erection; Explosive atmosphere-Part 16:Electrical installations inspection and maintenance; Explosive atmosphere-Part 18:Intrinsically safe electrical systems; Safety regulations for dust explosion prevention and protection; Electrical apparatus for use in the presence of combustible dust-Part 2:Selection and installation; Code for construction and acceptance of electric equipment on fire and explosion hazard electric equipment installation engineering.
8. When mounting, operating and maintaining the units, the maximum external capacitance Co and maximum external inductance Lo should be confirmed according to the the max approval parameters from NEPSI.
9. The max allowed voltage Um on the safe area side is 250V.

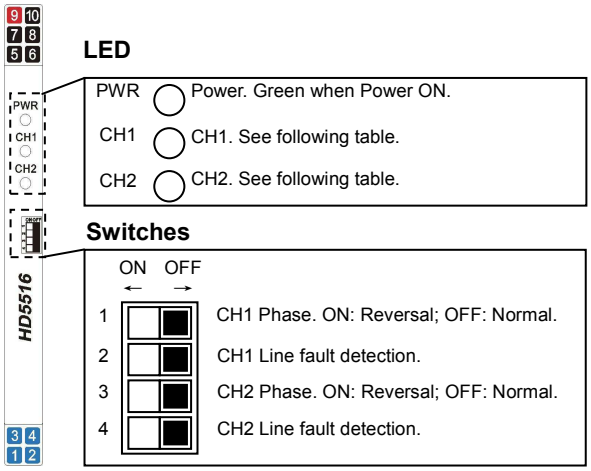
PRODUCTS

HD5516 SWITCH /PROXIMITY DETECTOR INTERFACE

The HD5516 enables two safe-area loads to be controlled independently by two proximity detectors or switches located in hazardous areas. Two relay outputs are provided. Switches are provided to select phase reversal and to enable the line fault detection. The status of each channel is indicated by LED on top of the unit.

- **Number of channels**
  2(Default)
  1 input with dual output (Optional)
- **Location of switches**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  35mA at 24VDC
- **Relay characteristics**
  Contact output: normally open
  Contact rating: 2A, 30VDC/250VAC
- **Response time**
  10ms maximum
- **Voltage applied to sensor**
  (7~9)V dc from 1kΩ
- **Input/output characteristics**
  Normal phase
  Output energized if Iin > 2.1mA
  Output de-energized if Iin < 1.2mA
- **Isolation**
  Better than 2500V AC between input/ output terminals.
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=83.105, λ_{DD}=65.450, λ_{DU}=17.655, λ_S=159.320
  DC=78.8%, SFF=72.7%, PFD=1.55×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] ⅡC, [Ex iaD], GYB18.1862
  Terminals 3-4 and terminals 1-2:
  U_o=10.5V, I_o=14mA, C_o=2.41μF, L_o=165mH, P_o=37mW,
  C_i=0μF，L_i=0mH
- **Application**
  Switch/Proximity detector(NAMUR)

Switches (On next page)
LED indicators (On next page)



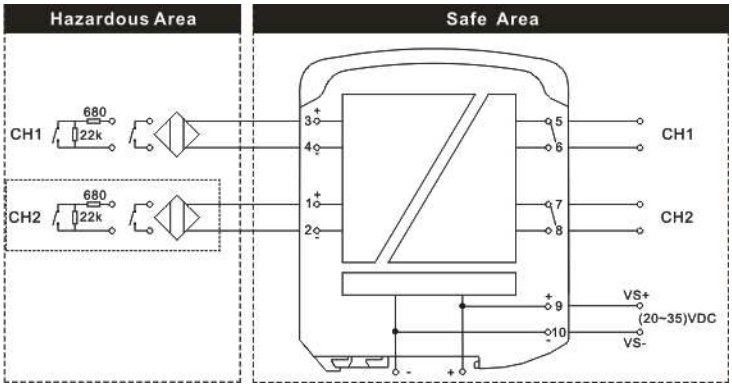
Switch status		LED status			
		Output energized	Output de-energized	short circuit*	open circuit*
1 ON	2 ON	CH1 off	CH1 green	CH1 red	CH1 red
1 OFF	2 ON	CH1 green	CH1 off	CH1 red	CH1 red
1 ON	2 OFF	CH1 off	CH1 green	CH1 off	CH1green
1 OFF	2 OFF	CH1 green	CH1 off	CH1 green	CH1 off
3 ON	4 ON	CH2 off	CH2 green	CH2 red	CH2 red
3 OFF	4 ON	CH2 green	CH2 off	CH2 red	CH2 red
3 ON	4 OFF	CH2 off	CH2 green	CH2 off	CH2 green
3 OFF	4 OFF	CH2 green	CH2 off	CH2 green	CH2 off

*Note1：Resistors must be fitted when using the Line fault detection facility with a contact input, about 680Ω in series with switch, about 22kΩ in parallel with switch.

*Note2：Line fault detection conditions:

R line	Short circuit
<100Ω	Alarm on
>360Ω	Alarm off

I line	Open circuit
<100μA	Alarm on
>250μA	Alarm off



SIL3
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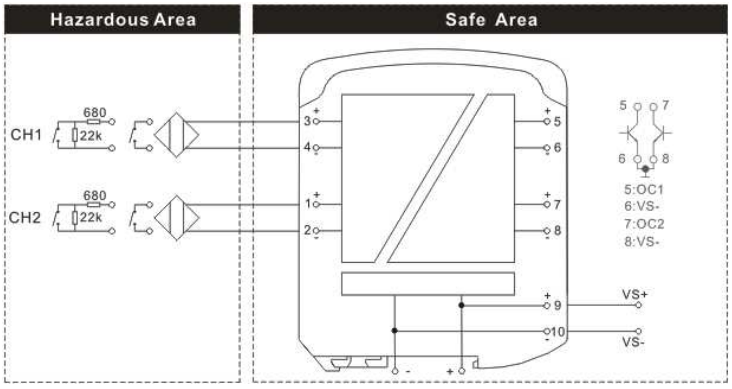
HD5516.OC NPN Transistor Open Collector Output

The HD5516.OC enables two safe-area loads to be controlled independently by two proximity detectors or switches located in hazardous areas. Two NPN transistor open collector outputs are provided. The status of each channel is indicated by LED on top of the unit.

- **Number of channels**
  2(Default)
- **Location of switches**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Power supply**
  (20~35)VDC(DIN Rail Bus power)
- **Max current consumption**
  35mA at 24VDC
- **Output characteristics**
  Operating frequency: 0 to 5kHz
  Max. off-state voltage: 35V
  Max. on-state current: 35mA
- **Response time**
  0.5ms maximum
- **Voltage applied to sensor**
  (7~9)V DC from 1kΩ
- **Input characteristics**
  Normal phase
  Output energized if Iin > 2.1mA
  Output de-energized if Iin < 1.2mA
- **LED indicators**
  Power and status indication.
- **Isolation**
  Better than 2500V AC between input/ output terminals.
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=83.105, λ_{DD}=65.450, λ_{DU}=17.655, λ_S=159.320
  DC=78.8%, SFF=72.7%, PFD=1.55×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] ⅡC, [Ex ia D], GYB18.1862
  Terminals 3-4 and terminals 1-2:
  U_o=10.5V, I_o=14mA, C_o=2.41μF, L_o=165mH, P_o=37mW，C_i=0μF, L_i=0mH
- **Application**
  Switch/Proximity detector (NAMUR)

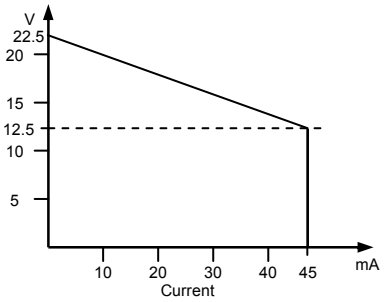


SIL3
IEC 61508

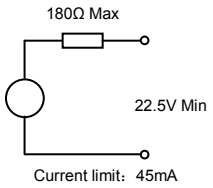
HD5526 SOLENOID/ALARM DRIVERS

The HD5526 enables an intrinsically safe device located in the hazardous area to be controlled by a volt-free contact or logic signal in the safe area. It is suitable for driving loads such as solenoids, alarms and other low-powered devices. A line fault is signalled in the safe area by a solid-state switch which de-energizes if a field loop line is open- or short-circuited.

- **Number of channels**
  1
- **Location of solenoid valves**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Minimum output voltage**



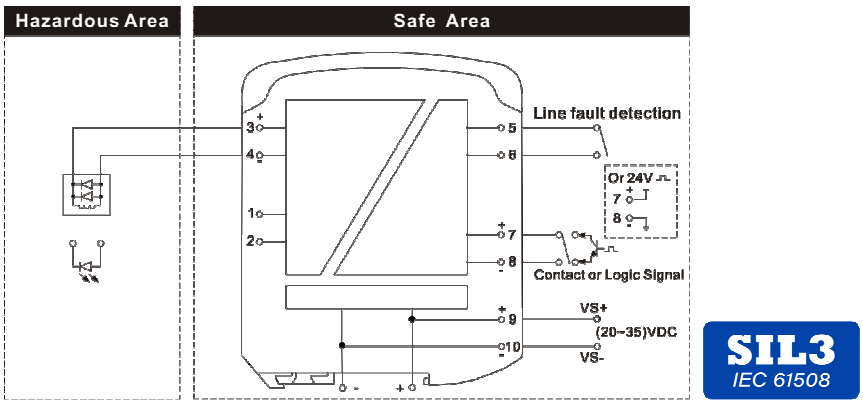
- **Equivalent output circuit**



Control input

- **Contact or logic signal input (Default)**
  Suitable for switch contacts, an open collector transistor or logic drive
  Output turns on if input switch closed, transistor on or < 1.4V applied across terminals 7 & 8
  Output turns off if input switch open, transistor off or > 4.5V applied across terminals 7 & 8
- **24V input (Optional)**
  Output turns on if input > 16.8V applied across terminals 7 & 8
  Output turns off if input < 8V applied across terminals 7 & 8

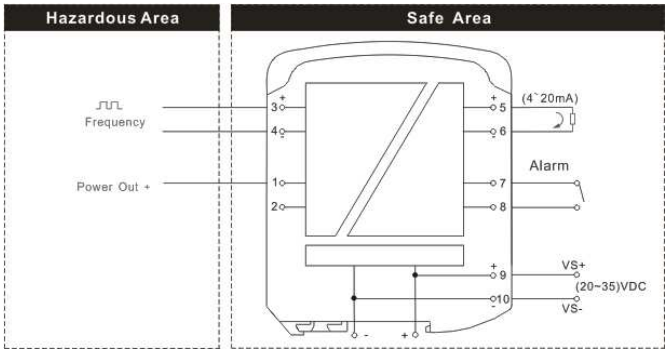
- **Response time**
  Output within 10% of final value within 100ms
- **Line fault detection**
  Open or short circuit in field cabling de-energizes solid state line-fault signal.
  LFD transistor is switched on, provided that the field circuit impedance is > 55Ω and < 6.5kΩ.
- **Line fault signal characteristics**
  Maximum off-state voltage: 35V
  Maximum off-state leakage current: 5μA
  Maximum on-state voltage drop: 2V
  Maximum on-state current: 50mA
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  90mA at 24VDC
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=136.982, λ_{DD}=131.103, λ_{DU}=5.879, λ_S=137.500
  DC=95.7%, SFF=97.9%, PFD=5.26×10^{-5}
- **NEPSI max approval parameters**
  [Ex ia Ga] Ⅱ C, [Ex iaD], GYB18.1863
  Terminals 3-4:
  U_o=25.4V, I_o=143mA, C_o=0.105μF, L_o=1.5mH, P_o=910mW, C_i=0μF, L_i=0mH
- **LED indicators**
  PWR: green for power on indication
  STS: green when output turns on
  LFD: red for line fault detection indication
- **Application**
  Intrinsically safe solenoid driver, audible and visual alarm.



HD5532 Frequency Conversion

The HD5532 isolates pulses from a switch, proximity detector, current pulse transmitter or voltage pulse transmitter located in a hazardous area. It is ideal for applications involving high pulse rates and fast response times. An analogue output proportional to frequency is also provided, together with a alarm output.

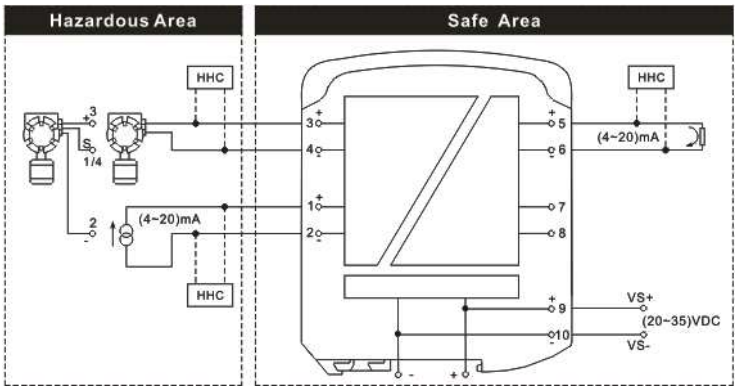
- **Number of channels**
  1(4~20)mA output
  1 alarm output
- **Location of switches**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Power supply**
  (20~35)VDC(DIN Rail Bus power)
- **Max current consumption**
  35mA at 24VDC
- **Working range**
  (4~20)mA
- **Input characteristics**
  VH: (4~30)V, VL: (0~1)V
  Frequency: (0.1~50k)Hz
  Input resistance>3kΩ
  **Note: Range can be configurable.*
- **Output characteristics**
  20mA (load<350Ω)
  Output resistance>1MΩ
- **Response time**
  Better than 500ms
- **Transfer accuracy**
  Better than 15μA
- **Temperature drift**
  Better than 0.8μA/℃
- **LED indicators**
  Power and status indication.
- **Isolation**
  Better than 2500V AC between input/ output terminals.
- **Functional safety**
- **NEPSI max approval parameters**
  [Ex ia Ga] ⅡC, [Ex iaD], GYB18.1864
  Terminals 3-4 (1):
  U_o=28V, I_o=93mA, C_o=0.083μF, L_o=4.2mH, P_o=660mW,
  C_i≈0μF, L_i≈0mH
- **Application**
  2/3 line pulse signal, logic level



HD5542 REPEATER POWER SUPPLY

The HD5542 provides a fully floating dc supply for energizing an intrinsically safe 2- or 3-wire 4/20mA transmitter located in a hazardous area and repeats the current in another floating circuit to drive a safe-area load. For smart transmitters, the HD5542 allows bi-directional HART communications signals superimposed on the 4/20mA signal.

- **Number of channels**
  1
- **Location of transmitters or signal sources**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  51mA at 24VDC
- **Safe-area output**
  Signal range: 4 to 20mA
  Under/over-range: 0 to 24mA
  Safe-area load: 0 to 360Ω @24mA
  0 to 450Ω @20mA
  Safe-area circuit output resistance: > 1MΩ
- **Hazardous-area input**
  Signal range: 0 to 24mA
  Transmitter voltage: 15V at 20mA
- **Response time**
  Settles to within 10% of final value within 750μs (In case of 250Ω typical safe-area load)
- **Transfer accuracy**
  Better than 15μA
- **Temperature drift**
  Better than 0.8μA/℃
- **Communications supported**
  Bi-directional HART communications
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=101.783, λ_{DD}=84.366, λ_{DU}=17.417, λ_S=150.634
  DC=82.9%, SFF=93.1%, PFD=1.53×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] ⅡC, [Ex iaD], GYB18.1865
  Terminals 3-1(4) or 3-1(4)-2:
  U_o=28V, I_o=93mA, C_o=0.083μF, L_o=4.2mH, P_o=660mW, C_i=0μF, L_i≈0mH
- **LED indicators**
  PWR：green for power on indication
  LFD：red for open circuit or output overload indication
- **Application**
  Intrinsically safe 2/3-wire transmitter, current source.

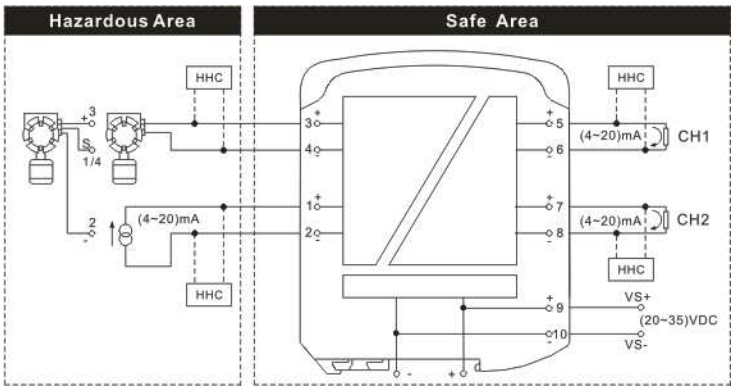


SIL3
IEC 61508

HD5543 REPEATER POWER SUPPLY

The HD5543 provides a fully floating dc supply for energizing an intrinsically safe 2- or 3-wire 4/20mA transmitter located in a hazardous area and repeats the current in two floating circuits to drive different safe-area loads. The HD5543 provides dual outputs and allows bi-directional HART communications between input and first output channel.

- **Number of channels**
  1 input with dual outputs
- **Location of transmitters or signal sources**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Safe-area output**
  Signal range: 4 to 20mA
  Under/over-range: 0 to 24mA
  Safe-area load: 0 to 360Ω @24mA
  0 to 450Ω @20mA
  Safe-area circuit output resistance: > 1MΩ
- **Hazardous-area input**
  Signal range: 0 to 24mA
  Transmitter voltage: 15V at 20mA
- **Transfer accuracy**
  Better than 15μA
- **Temperature drift**
  Better than 0.8μA/℃
- **Response time**
  Settles to within 10% of final value within 750μs
  (In case of 250Ω typical safe-area load)
- **Communications supported**
  Bi-directional HART communications are allowed between input and first output channel
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  75mA at 24VDC
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=146.889, λ_{DD}=113.137, λ_{DU}=33.752, λ_S=238.655
  DC=77.0%, SFF=91.2%, PFD=2.97×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] Ⅱ C, [Ex iaD], GYB18.1866
  Terminals 3-1(4) or 3-1(4)-2:
  U_o=28V, I_o=93mA, C_o=0.083μF, L_o=4.2mH, P_o=660mW, C_i=0μF, L_i≈0mH
- **LED indicators**
  PWR：green for power on indication
  CH1：red for open circuit or output overload indication for CH1
  CH2：red for open circuit or output overload indication for CH2

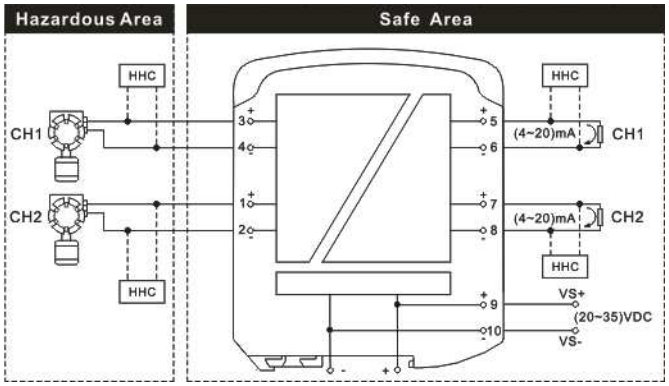


SIL3
IEC 61508

HD5544 REPEATER POWER SUPPLY

The HD5544 provides 2 fully floating dc supply for energizing 2 intrinsically safe 2-wire 4/20mA transmitters located in a hazardous area and repeats the current in another 2 floating circuit to drive 2 safe-area loads. For smart transmitters, the HD5544 allows bi-directional HART communications signals superimposed on the 4/20mA signal.

- **Number of channels**
  2
- **Location of transmitters**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Safe-area output**
  Signal range: 4 to 20mA
  Under/over-range: 0 to 24mA
  Safe-area load: 0 to 360Ω @24mA
  0 to 450Ω @20mA
  Safe-area circuit output resistance: > 1MΩ
- **Hazardous-area input**
  Signal range: 0 to 24mA
  Transmitter voltage: 15V at 20mA
- **Transfer accuracy**
  Better than 15μA
- **Temperature drift**
  Better than 1μA/℃
- **Response time**
  Settles to within 10% of final value within 750μs
  (In case of 250Ω typical safe-area load)
- **Communications supported**
  Bi-directional HART communications
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  96mA at 24VDC
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=172.741, λ_{DD}=138.830, λ_{DU}=33.911, λ_S=268.498
  DC=80.4%, SFF=92.3%, PFD=2.98×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] ⅡC, [Ex iaD], GYB18.1867
  Terminals 3-4 or 1-2:
  U_o=28V, I_o=93mA, C_o=0.083μF, L_o=4.2mH, P_o=660mW, C_i=0μF, L_i≈0mH
- **LED indicators**
  PWR：green for power on indication
  CH1：red for open circuit or output overload indication for CH1
  CH2：red for open circuit or output overload indication for CH2
- **Application**
  Intrinsically safe 2-wire transmitter

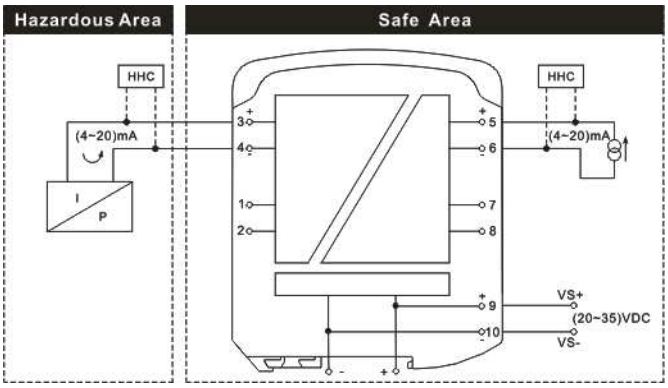


SIL3
IEC 61508

HD5546 ISOLATING DRIVER

The HD5546 accepts a 4/20mA signal from a controller located in the safe area to drive an intrinsically safe current/pressure converter (or any other load up to 750Ω) in the hazardous area. It permits bi-directional transmission of HART signals to and from an operator station or hand-held communicator. A line fault detection facility is also provided. Process controllers with a readback facility can detect open circuits in the field wiring: if these occur, the current taken into the terminals drops to a preset level.

- **Number of channels**
  1
- **Location of actuators**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Working range**
  4 to 20mA
- **Maximum load resistance**
  750Ω (15V at 20mA)
- **Output resistance**
  > 1MΩ
- **Over range capability**
  Over range = 24mA (load ≤ 520Ω)
- **Transfer accuracy**
  Better than 16μA
- **Temperature drift**
  Better than 1μA/℃
- **Input characteristics**
  < 2mA with the field wiring open circuit
- **Response time**
  Settles within 200μA of final value within 10ms
- **Communications supported**
  Bi-directional HART communications
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  35mA at 24VDC (with 20mA signals into 250Ω load)
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=105.897, λ_{DD}=86.916, λ_{DU}=18.981, λ_S=141.772
  DC=82.1%, SFF=92.3%, PFD=1.67×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] Ⅱ C, [Ex iaD], GYB18.1868
  Terminals 3-4 :
  U_o=28V, I_o=93mA, C_o=0.083μF, L_o=4.2mH, P_o=660mW, C_i=0μF, L_i≈0mH
- **LED indicators**
  PWR：green for power on indication
  LFD： red for line fault detection indication.
- **Application**
  Intrinsically safe converter, valve positioner.

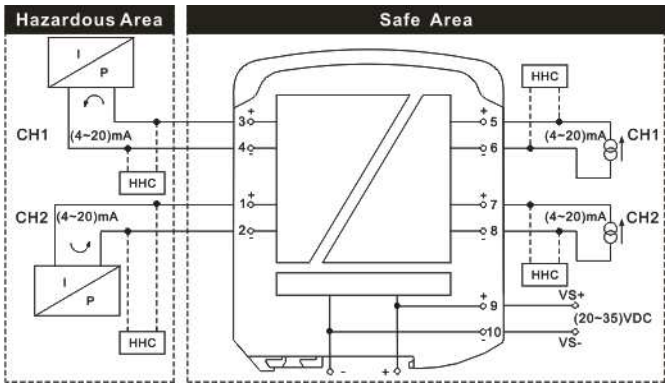


SIL3
IEC 61508

HD5549 ISOLATING DRIVER

The HD5549 accepts 2 different 4/20mA signal from controller located in the safe area to drive 2 intrinsically safe current/pressure converter (or any other load up to 750Ω) in the hazardous area. It permits bi-directional transmission of HART signals to and from an operator station or hand-held communicator. A line fault detection facility is also provided. Process controllers with a readback facility can detect open circuits in the field wiring: if these occur, the current taken into the terminals drops to a preset level.

- **Number of channels**
  2
- **Location of actuators**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Working range**
  4 to 20mA
- **Maximum load resistance**
  750Ω (15V at 20mA)
- **Output resistance**
  > 1MΩ
- **Over range capability**
  Over range = 24mA (load ≤ 520Ω)
- **Transfer accuracy**
  Better than 16μA
- **Temperature drift**
  Better than 1μA/℃
- **Input characteristics**
  < 2mA with the field wiring open circuit
- **Response time**
  Settles within 200μA of final value within 10ms
- **Communications supported**
  Bi-directional HART communications
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  70mA at 24VDC
  (with 20mA signals into 250Ω load)
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 3 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=187.140, λ_{DD}=146.509, λ_{DU}=40.631, λ_S=281.748
  DC=78.3%, SFF=91.3%, PFD=3.57×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] ⅡC, [Ex iaD], GYB18.1869
  Terminals 3-4 or 1-2:
  U_o=28V, I_o=93mA, C_o=0.083μF, L_o=4.2mH, P_o=660mW, C_i=0μF, L_i≈0mH
- **LED indicators**
  PWR：green for power on indication
  CH1：red for open circuit or output overload indication for CH1
  CH2：red for open circuit or output overload indication for CH2
- **Application**
  Intrinsically safe current/pressure converter, valve positioner.

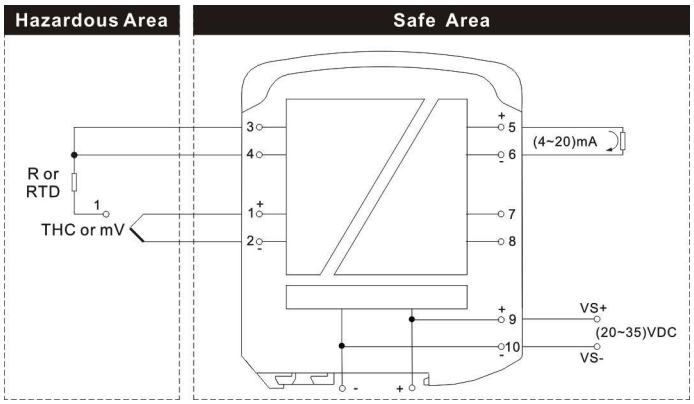


SIL3
IEC 61508

HD5573 TEMPERATURE CONVERTER

The HD5573 converts a low-level dc signal from a temperature sensor mounted in a hazardous area into a 4/20mA current for driving a safe-area load. Software-selectable features include configuration, ranging, monitoring and testing for eight thermocouple types, or three kinds of 3-wire RTDs. Each thermocouple model converter has an integral sensor for the purpose of cold-junction compensation. Configuration is carried out through a port inside of the module using and a personal computer.

- **Number of channels**
  1
- **Location of temperature sensors**
  Zone0, IIC, T4-T6 hazardous area
  Div. 1, Group A, hazardous location
- **Signal source**
  Types J, K, T, E, R, S, B, C, D or N THCs to IEC584
  3-wire Pt100, Pt1000 or Cu50 RTDs to BS1904/DIN 43760
- **Input signal range**
  (-75~75)mV, or(0~2200)Ω
- **RTD excitation current**
  500μA nominal
- **Cold junction compensation**
  Automatic, with error of ≤ 1.0℃
- **Common mode rejection**
  120dB for 240V at 50Hz
- **Series mode rejection**
  40dB for 50Hz
- **Calibration accuracy**
  Inputs:
  mV/THC: ± 15μV or ± 0.05% of input value (whichever is greater)
  Cu50/Pt100: ± 80mΩ
  Pt1000: ± 400mΩ
  Output: ± 11μA
- **Temperature drift**
  Inputs:
  mV/THC: ± 0.003% of input value/℃
  Cu50/Pt100: ± 7mΩ/℃
  Pt1000: ± 40mΩ/℃
  Output: ± 0.6μA/℃
- **Output range**
  4 to 20mA nominal into 450Ω max
- **Over range output**
  Bottom limit: 3.6mA
  Top limit: 21.6mA
- **Sensor burnout indication**
  Upscale default, Downscale selectable
  Upscale valve: 22mA
  Downscale valve:3.2mA
- **Response time**
  About 500ms
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  40mA at 24VDC
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 2 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=129.291, λ_{DD}=116.104, λ_{DU}=13.186, λ_S=168.162
  DC=89.8%, SFF=95.6%, PFD=1.17×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] II C, [Ex iaD], GYB18.1870
  Terminals 1~4:
  U_o=7.1V, I_o=16mA, C_o=13.88μF, L_o=100mH, P_o=29mW, C_i=0.72μF, L_i≈0mH
- **LED indicators**
  PWR：green for power on indication
  STS：green for normal working indication, blinking green for over range indication, red for error indication
- **Application**
  Pt100, Pt1000 or Cu50 RTDs; Types J, K, T, E, R, S, B, C, D or N THCs.

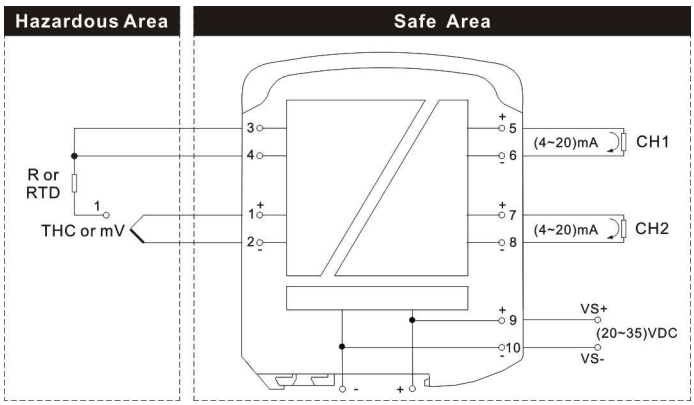


SIL2 IEC 61508

HD5575 TEMPERATURE CONVERTER

The HD5575 converts a low-level dc signal from a temperature sensor mounted in a hazardous area into 2 4/20mA current for driving 2 different safe-area load. Software-selectable features include configuration, ranging, monitoring and testing for eight thermocouple types, or three kinds of 3-wire RTDs. Each thermocouple model converter has an integral sensor for the purpose of cold-junction compensation. Configuration is carried out through a port inside of the module using and a personal computer. The HD5575 provides dual outputs.

- **Number of channels**
  1 input with dual outputs
- **Location of temperature sensors**
  Zone0, IIC, T4-T6 hazardous area
  Div. 1, Group A, hazardous location
- **Signal source**
  Types J, K, T, E, R, S, B,C,D or N THCs to IEC584
  3-wire Pt100, Pt1000 or Cu50 RTDs to BS1904/DIN 43760
- **Input signal range**
  (-75~75)mV, or(0~2200)Ω
- **RTD excitation current**
  500μA nominal
- **Cold junction compensation**
  Automatic, with error of ≤ 1.0℃
- **Common mode rejection**
  120dB for 240V at 50Hz
- **Series mode rejection**
  40dB for 50Hz
- **Calibration accuracy**
  Inputs:
  mV/THC: ± 15μV or ± 0.05% of input value (whichever is greater)
  Cu50/Pt100: ± 80mΩ
  Pt1000: ± 400mΩ
  Output: ± 11μA
- **Temperature drift**
  Inputs:
  mV/THC: ± 0.003% of input value/℃
  Cu50/Pt100: ± 7mΩ/℃
  Pt1000: ± 40mΩ/℃
  Output: ± 0.6μA/℃
- **Output range**
  4 to 20mA nominal into 450Ω max
- **Over range output**
  Bottom limit: 3.6mA
  Top limit: 21.6mA
- **Sensor burnout indication**
  Upscale default, downscale selectable
  Upscale valve: 22mA
  Downscale valve: 3.2mA
- **Response time**
  About 500ms
- **Power supply**
  (20~35)VDC
- **Max current consumption**
  80mA at 24VDC, 20mA output
- **Isolation**
  Better than 2500V AC between input/output terminals
- **Functional safety**
  This model has been assessed for use in a SIL 2 safety function according to IEC 61508 by BUREAU VERITAS. Contact us to find the safety manual for reference if needed.
  λ_D=187.268, λ_{DD}=167.107, λ_{DU}=20.162, λ_S=209.196
  DC=89.2%, SFF=94.9%, PFD=1.78×10^{-4}
- **NEPSI max approval parameters**
  [Ex ia Ga] Ⅱ C, [Ex iaD], GYB18.1871
  Terminals 1~4:
  U_o=7.1V, I_o=16mA, C_o=13.88μF, L_o=100mH, P_o=29mW, C_i=0.72μF, L_i≈0mH
- **LED indicators**
  PWR：green for power on indication
  STS：green for normal working indication, blinking green for over range indication, red for error indication
- **Application**
  Pt100, Pt1000 or Cu50 RTDs; Types J, K, T, E, R, S, B, C, D or N THCs.

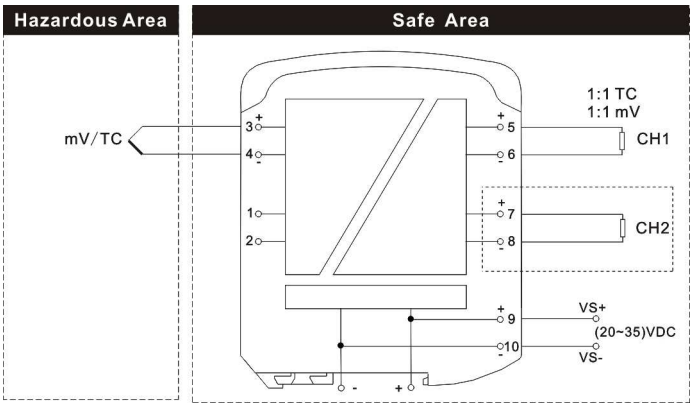


SIL2
IEC 61508

HD5581 MV TRANSMISSION

The HD5581 isolates transmitted the low-level signals of the hazardous area to the safe area with a ratio of 1:1. The power supply indicator light is on top. It's used for isolated transmission of TC comply with ITS-90(external cold junction compensation) or mV signals.

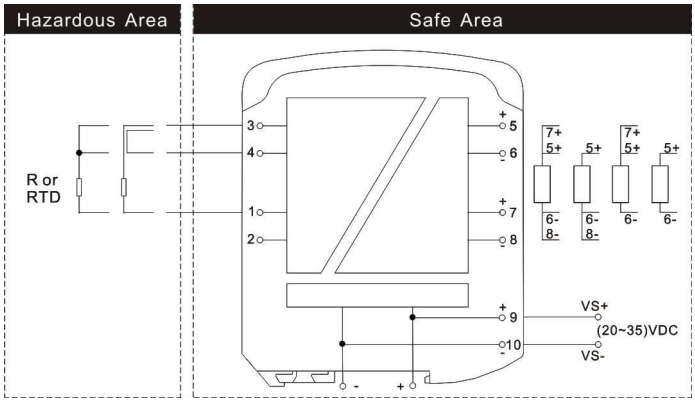
- **Number of channels**
  1 (Default)
  1 input with dual output (Optional)
- **Location of temperature sensors**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Power supply**
  (20~35)VDC
  20mA at 24VDC
- **Signal source**
  (-20~100)mV
- **Output range**
  (-20~100)mV (equal to input)
  Load≥100kΩ
- **Response time**
  Better than 500ms
- **Calibration accuracy**
  Better than ±0.1%F·S
- **Temperature drift**
  Better than ±0.05%F.S./10℃
- **Isolation**
  Better than 2500V AC between input/ output terminals.
- **LED indicators**
  PWR: green for power on indication
  STS: green for normal working indication, blinking green for over range indication, red for error indication.
- **Functional safety**
  NEPSI max approval parameters
  [Ex ia Ga] ⅡC, [Ex iaD]
  Terminals 3~4:
  U_o=8.5V, I_o=4mA, C_o=6.5μF, L_o=100mH, P_o=8.5mW,
  C_i=0 μF, L_i≈0mH
- **Application**
  TC comply with ITS-90(external cold junction compensation)or mV signals.



HD5584 RESISTANCE TRANSMISSION

HD5584 resistance transmission safety barrier transfers 2/3-wire thermal resistance signal or other resistance signals from the hazardous area to the safe area with a ratio of 1:1. It has two indicator lights on top, power-supply light and channel status light. The typical application is to cooperate with Pt100 3-wire thermal resistance.

- **Number of channels**
  1
- **Location of temperature sensors**
  Zone0, IIC, T4-T6 hazardous area
  Div 1, Group A, hazardous location
- **Power supply**
  (20~35)VDC
  20mA@24V
- **Signal source**
  3-wire Pt100, Pt1000, Cu50 RTDs, (18~2200)Ω
  (18~400)Ω (Default)
  (180~2200)Ω (Optional)
- **Output range**
  (18~400)Ω (Default)
  (180~2200)Ω (Optional)
  Load capacity
  (18~400)Ω：0.1mA≦I≦10mA
  (180~2200)Ω：0.1mA≦I≦1.5mA
- **Response time**
  Better than 500ms
- **Transfer accuracy**
  Better than ±0.1%F.S.
- **Temperature drift**
  Better than ±0.05%F.S./℃
- **Isolation**
  Better than 2500V AC between input/output terminals.
- **LED indicators**
  PWR: green for power on indication
  STS: green for normal working indication, blinking green for over range indication or open circuit, red for error indication.
- **Functional safety**
  NEPSI max approval parameters
  [Ex ia Ga] ⅡC, [Ex iaD], GYB18.1872
  Terminals 1~4:
  U_o=7.1V, I_o=16mA, C_o=13.88μF, L_o=100mH, P_o=29mW, C_i=0.72μF, L_i≈0mH
- **Application**
  Typical application: 3-wire of Pt100



HD5590 POWER SUPPLY

HD5590 must be selected when ordering guide rail power supply.

Input voltage: (20~35) VDC Maximum current: 8A Operation temperature: (-20~60)℃

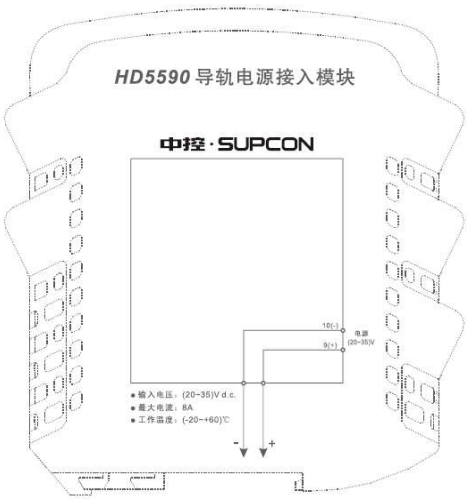


Figure Power-supply module

HD55-BT Isolated Barrier Config

HD55-BT supports configuration of the isolated barrier. It implements wireless configuration by Bluetooth connection and android app. It has many useful tools, like real-time monitoring, Index table query, and etc. HD55-BT is a portable configuration tool for field implementation and debugging.

- **Communication distance**
  5m
- **Power supply**
  (2.0~3.6) VDC
- **Frequency band**
  (2400~2483.5)MHz
- **Maximum Emission frequency**
  +4dBm
- **Receive sensitivity**
  -93dBm
- **Frequency error**
  ±20kHz
- **Receive current (RX)**
  19.6mA
- **Transmit current (TX)**
  24 mA
- **Power mode**
  235 μA
- **Environmental Limits**
  Operation temperature: (-20~60) ℃
  Storage temperature: (-20~85) ℃

Figure HD55-BT Isolated Barrier Config module and app

Mounting

HD5500 series isolated barrier is mounted on DIN Standard 35mm(symmetric) Mounting Rail. You can choose power-supply rail and the corresponding terminal. The way of mounting is shown in the Figure 1.

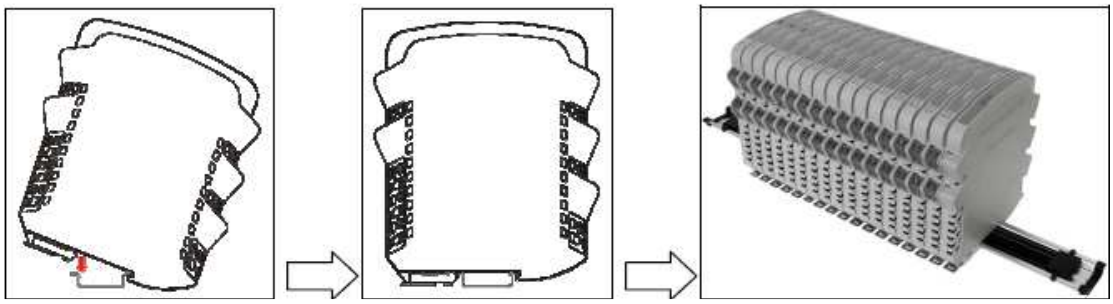


Figure 1 Mounting

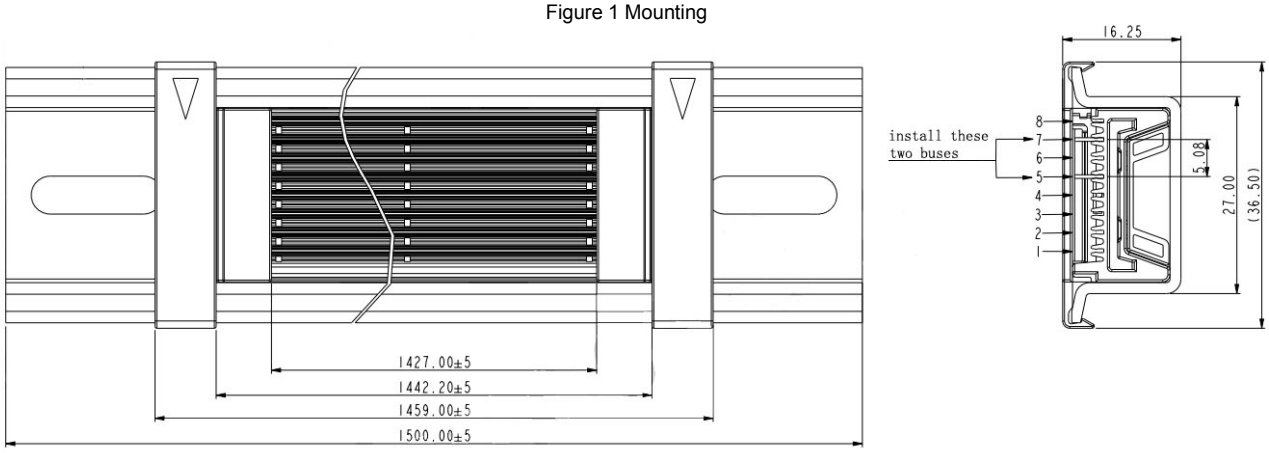


Figure 2 PBUS-1500mm power supply guide rail (truncable)

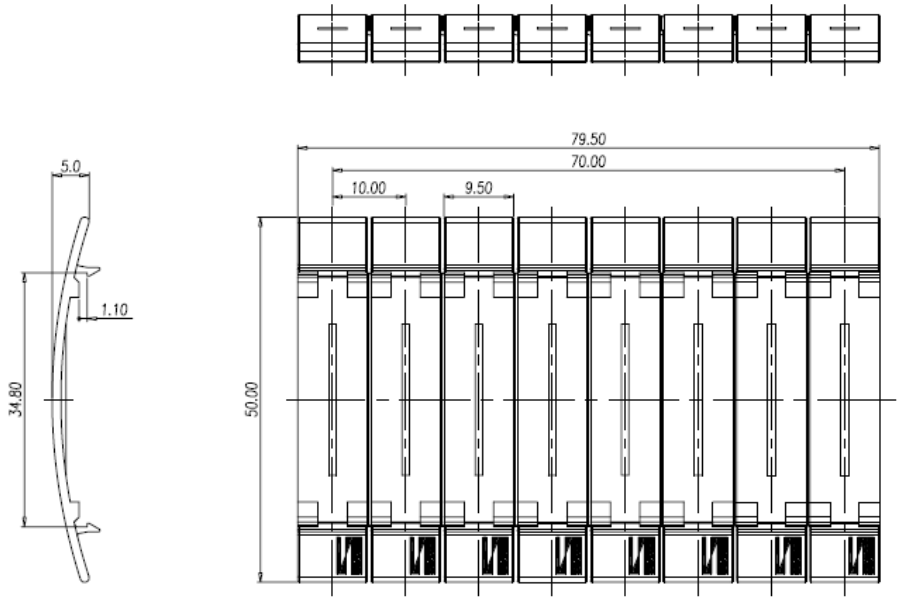
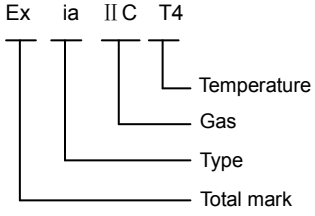


Figure 3 Dust cover of power supply guide rail

**Note: Suggest to installing 2 power supply modules and 80 signal modules on the single guide rail.*

Explosion-proof term and Standard

Electrical explosion proof standards based on IEC regulate that Ex mark should be marked in an obvious position of the nameplate. Besides it, the complete marks must exist. For example:



The explosion hazard area is zoned in mines (Class Ⅰ) and factories (Class Ⅱ). It based on the time period of explosive gas existence As shown in Table 3.

Table 3 Explosion area division

Explosives	Area defintion	GB	NEC
Gas Class Ⅰ	Normally, explosive gases can exist continuously or for a long time.	Zone0	Div. 1
	Normally, explosive gases maybe exist.	Zone1	
	Normally, explosive gases cannot appear; Only in special, it can appear accidentally or for a little time.	Zone2	Div. 2
Dust Class Ⅱ Class Ⅲ	Normally, explosive dust or fiber can exist continuously or for a long time.	Zone10	Div. 1
	Normally, explosive dust or fiber cannot appear; Only in special, it can appear accidentally or for a little time.	Zone11	Div. 2

It can be divide into 3(IEC or GB) or 4(NEC) levels, according to the minimum ignition of explosive gases. As shown in Table 4.

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Table 4 Explosive gas grouping comparison table

Typical gas	GB	NEC	Minimum ignition energy (μJ)
C3H8	ⅡA	D	180
C2H4	ⅡB	C	60
H2	ⅡC	B	20
C2H2	ⅡC	A	20

The surface temperature of explosive-proof electrical equipment package is divided into 6 groups, as shown in Table 5

Table 5 Temperature classes comparison table

Maximum surface temperature℃	450	300	200	135	100	85
Rank	T1	T2	T3	T4	T5	T6

Three elements of combustion and explosion: combustible medium; air or oxygen; temperature. Types of explosion-proof equipments and their permitted station are based on the explosion theory, as shown in Table 6.

Table 6 Explosion-proof type selection table

Type	Mark	Permitted station	GB	IEC	Typical application
Flame proof	d	1or2	GB3836.2	IEC79-1	Electric switch, motor, pump
Increased safety	e	1 or 2	GB3836.3	IEC79-7	Motor, illuminator, junctionbox
Intrinsic safety	**ia or ib	0,1 or 2	GB3836.4	IEC79-11	instrument, control valve
Position pressure	p	1 or 2	GB3836.5	IEC79-2	Control room, instrument board, motor, instrument
Oil	o	2	GB3836.6	IEC79-6	Electric switch, transformer
Sand	q	2	GB3836.7	IEC79-5	instrument
Non-spark	n	2	GB3836.8	IEC79-15	Motor, illuminator, junctionbox
Encapsulation	m	1 or 2	GB3836.9	IEC79-18	instrument
Special	s	1 or 2	/	/	Gas transducer

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