SIL3
IEC 61508

K系列
检测端电流输入隔离式安全栅

➔ 简介

将来自危险区的电流信号隔离输出到安全区，同时信号上可叠加双向传输的HART数字信号。本产品也适用于二线制、三线制变送器或电流源信号的传输。

输入端、输出端及电源端三端隔离。本产品为模拟化设计，具有精度高、可靠性高、响应快等诸多优点，同时具有温度特性好，可与各类仪表及DCS、PLC配套使用。

➔ 技术参数

防爆等级:

Ex	I (M1) [Ex ia Ma] I	IECEx	[Ex ia Ma] I
	II (1) G [Ex ia Ga] IIC		[Ex ia Ga] IIC
	II (1) D [Ex ia Da] IIIC		[Ex ia Da] IIIC
	II 3(1) G Ex ec [ia Ga] IIC T4 Gc		Ex ec [ia Ga] IIC T4 Gc

供电电源:

供电方式：端子供电(9+，10-)或总线供电
额定工作电压：20V DC ~ 30V DC

输入 (1，2，3):

信号类型： 4 mA ~ 20 mA
连接类型：二/三线制变送器或电流源
输入阻抗：约75 Ω
配电电压：20 mA输出时，电压≥15.5V
过流、过压保护：具有

输出 (5，6，7，8):

信号类型：无源电流:4 mA ~ 20 mA
有源电流:4 mA ~ 20 mA
直流电压:1 V ~ 5 V
负载能力：无源电流:$R_L \le [(U-3)/0.02]\Omega$；U为回路供电电压
有源电流:≤ 550 Ω
直流电压:≥ 1 MΩ
最大输出电流：≤ 32 mA

传输特性:

隔离传输准确度：± 0.1% F.S. (25℃ ± 2℃)
最小可控电流：10 μA
温度漂移：< 30 ppm/℃
响应时间：≤ 2 ms
稳定时间：≤ 20 ms

电磁兼容: EMC符合IEC 61326-3-1

介电强度 (漏电流1mA，测试时间1分钟):

≥ 3000V AC(本安侧/非本安侧之间)
≥ 1500V AC(非本安侧/非本安侧之间)

绝缘电阻: ≥ 100 MΩ(输入/输出/电源)

防爆证号: TUV 15 ATEX 7628 X
IECEx TUR 16.0004X

安全相关参数:

U_m: 250 V
1、2端子间:
U_i: 30 V I_i: 85 mA
U_o: 5 V I_o、P_o: 忽略 C_o: 99.9 μF L_o: 1 H
1/2、3端子间:
U_o: 27.3 V I_o: 91.9 mA P_o: 627.2 mW

IIC	IIIC(IIB)	IIA	I
C_o: 0.088 μF	0.683 μF	2.28 μF	4.0 μF
L_o: 4.2 mH	16.4 mH	32.9 mH	53.9 mH

环境条件:

工作温度：-40 ℃ ~ +70 ℃
相对湿度：10 %RH ~ 90 %RH(40 ℃)
大气压力：80 kPa ~ 106 kPa
储运温度：-40 ℃ ~ +85 ℃

外形规格: 12.8mm×110mm×117mm

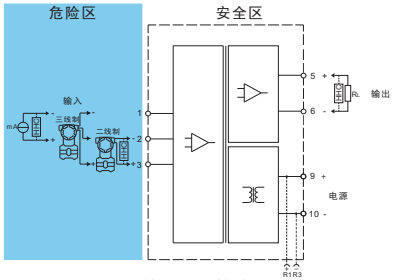
功耗: 24V DC供电，单路满载输出时1.5W
24V DC供电，双路满载输出时2.0W

➔ 适用型号

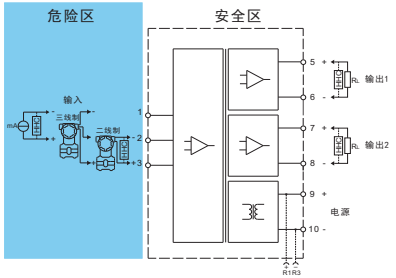
产品型号		输入	输出1	输出2
单入单出	NPEXA-KM31	4~20mA	4~20mA	
	NPEXA-KM32	4~20mA	1~5V	
	NPEXA-KM31S	4~20mA	无源4~20mA	
单入双出	NPEXA-KM311	4~20mA	4~20mA	
	NPEXA-KM322	4~20mA	1~5V	
	NPEXA-KM31S1S	4~20mA	无源4~20mA	

➔ 接线图

单入单出接线图



单入双出接线图



*注：无源输出、电压输出接线参照电流接线5+，6−；7+，8−。

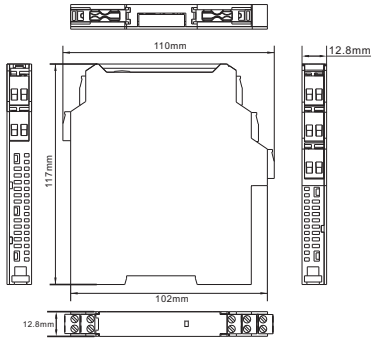
- 在危险区和安全区不能同时使用HHC(HART手操器)；
- 在危险区使用的HHC(HART手操器)必须经过防爆认证；
- 总线供电功能为可选功能，如需要请在订货时指定。

➔ 输入故障时的输出方式

- 安全栅输入断线时，输出为0mA；
- 安全栅输入信号上限超量程时，输出最大限制在32mA左右；输入信号下限超量程时，输出跟随输入。

➔ 外形结构

宽×高×深: 12.8mm×110mm×117mm

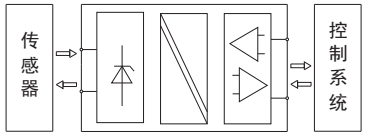


➔ 应用

本设备适用于现场设备与过程控制系统/控制系统之间的信号变送传输。可用于连接安装在潜在爆炸性环境中的现场设备，通过限流和限压来保护危险区的本安电路，实现了系统中的潜在爆炸性环境与安全区之间的电磁隔离。

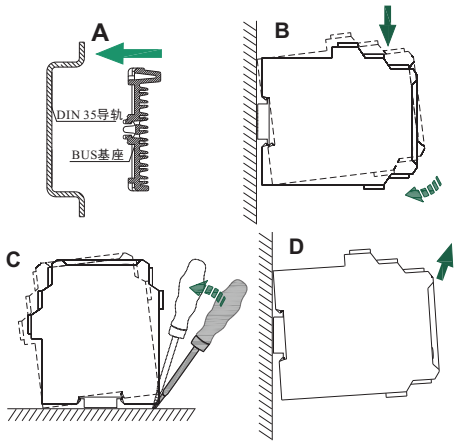
本设备可将输入的电流信号转换成电流/电压信号输出，再将输出信号传输到所连接的过程控制系统/控制系统输入端。

用户如需设置所连接现场设备的参数，须通过现场电缆将HART手操器连接到现场。



➔ 安装

- 本设备可安装在符合DIN IEC 60715的35mm标准导轨上，设备须卡装在导轨上，不得倾斜或翻倒。
- 安装步骤如下图所示：



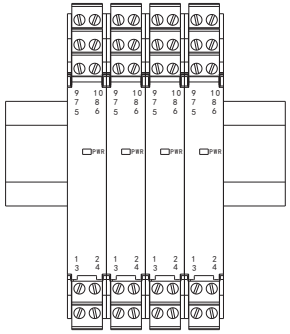
A. 将BUS基座卡装到DIN 35导轨上；

B. 仪表一端的卡扣套在安装导轨上，按图中箭头方向旋转仪表，将仪表卡在DIN导轨端子上，使其底部BUS连接器端子与导轨上的BUS基座紧密接触；

C. 用螺丝刀在仪表任一端的卡扣处按箭头所示方向稍微撬起仪表，从而向外牵动卡扣，旋转仪表。

D. 按箭头指示方向取下仪表即可。

- 请尽可能垂直安装，以利于仪表内部热量散发。



垂直安装示意图

➔ 面板显示

- **PWR:** 电源指示灯(绿色)，设备得电时长亮。

➔ 注意事项

- 当设备安装在2区时，应具备不低于标准GB/T 3836.1-2021、GB/T 3836.3-2021的IP 54防护等级的外壳；外壳表面需设置警告：**危险场所，严禁带电开盖**；使用安全特低电压/保护特低电压电源；应提供不超过119V峰值电压的瞬态保护；本设备仅适用于符合GB/T 16935.1标准中规定的不低于污染等级2场所。
- 本安型应用时安装在安全区，III类过电压等级环境。
- 本设备适用于GB/T 16935.1所确定的2级污染等级，如需在更高的污染等级区域使用，需对本设备增加相应的保护，设备符合GB/T 3836.1-2021的IP 20防护等级。
- 安装位置不得有强烈振动，以及来自信号端、输出端及空间的超过IEC 61000-4系列中第三类工业现场电磁干扰的强度，并使用环境中不得有对金属、塑料件起严重腐蚀作用的有害物质。
- 本设备仅能由专业受训人员按规定方式操作、维护和报废。在非危险区安装、接线和校准。
- 若发生无法解决的故障，须立即停止运行设备，并在不影响使用的前提下更换本设备；设备的维修只能由本公司完成，禁止私自篡改设备。
- 用户在使用过程中须严格遵守当地的相关安全标准。

➔ 补充说明

- 本公司保留更改产品而不事先通知用户的权利，若使用说明书中的内容如与网站、样本等资料有不符之处，以本说明书为准。

SIL3
IEC 61508

K Series
Current Input Isolated Safety Barrier

➔ Introductions

This isolated safety barrier converts transmitter current signals from hazardous area into safe area. It allows transmission of HART communication signals. It can also be used with 2-wire, 3-wire transmitters or current sources.
The input, output, and power supply are galvanically isolated from each other. This apparatus was designed to be analogue circuits with various kinds of advantages, for instance, high accuracy, high reliability and quick step response etc. It can be interfaced with all kinds of instruments and DCS, PLC and other equipment.

➔ Parameters

Explosive-proof grade:

Ex	I (M1) [Ex ia Ma] I	IECEx	[Ex ia Ma] I
	II (1) G [Ex ia Ga] IIC		[Ex ia Ga] IIC
	II (1) D [Ex ia Da] IIIC		[Ex ia Da] IIIC
	II 3(1)G Ex ec [ia Ga] IIC T4 Gc		Ex ec [ia Ga] IIC T4 Gc

Power supply:
Connection type: Terminals (9+, 10-) or DIN rail connector
Rated operational voltage: 20 V DC ~ 30 V DC
Input (1, 2, 3):
Signal type: 4 mA ~ 20 mA
Connected device: 2-wire/3-wire transmitter
Current source
Input resistance: approx. 75 Ω
Available voltage: ≥15.5V at 20mA output
Over-current/voltage protection: yes
Output (5, 6; 7, 8):
Signal type: Sink mode: 4 ~ 20 mA
Output current: 4 ~ 20 mA
Output voltage: 1 ~ 5 V
Load resistance: Sink mode: $R_L \le [(U-3)/0.02]\ \Omega$; U: Loop power supply
Current: ≤ 550 Ω
Voltage: ≥ 1 MΩ
Maximum output current: ≤ 32 mA
Transmission characteristics:
Accuracy: ± 0.1% F.S. (25℃±2℃)
Min. controllable current: 10μA
Temperature drift: < 30 ppm/℃
Response time: ≤ 2 ms
Settling time: ≤ 20 ms
Electromagnetic compatibility: Accordance to IEC 61326-3-1
Dielectric strength (1 mA leakage current, 1 minute test time):
≥ 3000V AC(Intrinsically safe side/Non-intrinsically safe side)
≥ 1500V AC(Non-intrinsically safe side/Non-intrinsically safe side)
Insulation coordination: ≥100 MΩ (Input /Output/Power supply)
Explosive-proof number: TUV 15 ATEX 7628 X
IECEx TUR 16.0004X
Certified Ex parameters:
U_m: 250 V
Terminals 1, 2:
U_i: 30V I_i: 85mA
U_o: 5V I_o, P_o: negligible C_o: 99.9μF L_o: 1H
Terminals ½, 3:
U_o: 27.3V I_o: 91.9mA P_o: 627.2mW

	IIC	IIIC(IIB)	IIA	I
C_o:	0.088 μF	0.683 μF	2.28 μF	4.0 μF
L_o:	4.2 mH	16.4 mH	32.9 mH	53.9 mH

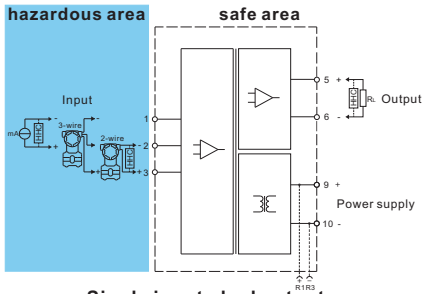
Ambient conditions:
Operation temperature: −40℃ ~ +70℃
Relative humidity: 10% RH ~ 90% RH (40℃)
Atmosphere pressure: 80kPa ~ 106kPa
Storage temperature: −40℃ ~ +85℃
Dimension: 12.8 mm × 110 mm × 117 mm
Power dissipation: ≤1.5 W (24 V DC, single output)
≤2.0 W (24 V DC, dual output)

➔ Support model type

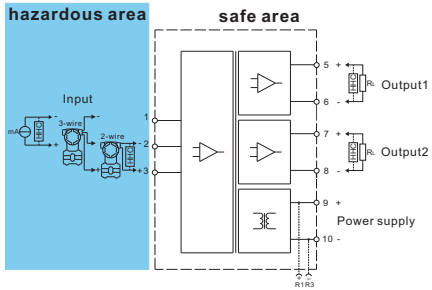
Model number		Input	Output 1	Output 2
single input, single output	NPEXA-KM31	4~20mA	4~20mA	
	NPEXA-KM32	4~20mA	1~5V	
	NPEXA-KM31S	4~20mA	sink model 4~20mA	
single input, dual output	NPEXA-KM311	4~20mA	4~20mA	
	NPEXA-KM322	4~20mA	1~5V	
	NPEXA-KM31S1S	4~20mA	sink model 4~20mA	

➔ Wiring diagram

Single input, single output



Single input, dual output



*Note: Sink mode and voltage output wiring refer to current wiring 5+,6-;7+,8-.

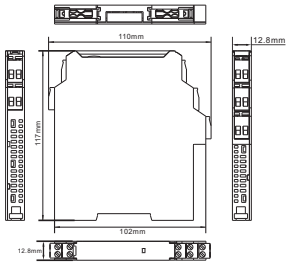
- Handheld HART communicator (HHC) can not be used in both hazardous area and safe area at the same time;
- Handheld HART communicator used in hazardous area must be authorized by explosion-proof certification body.
- DIN rail power supply function is selectable at ordering.

➔ Output mode of the input fault

- If the input circuit is broken, the apparatus output value would be at 0 mA;
- If the input signal is over range, the apparatus output value would be at approx.32 mA .

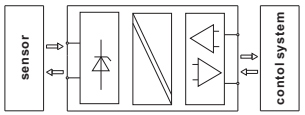
➔ Dimension

Width × Height × Depth: 12.8 mm × 110 mm × 117 mm



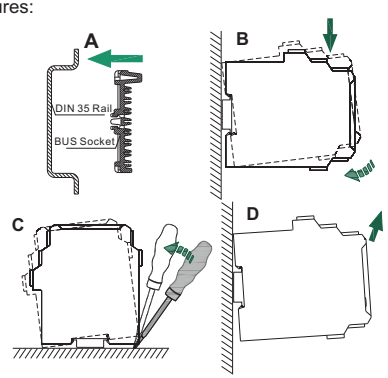
➔ Applications

This apparatus is used for transmitting signals between field devices and a process control system/control system. It is suitable for the connection of field devices used in potentially explosive atmospheres to protect intrinsically safe circuits of hazardous area by current and voltage limitation, and established an electromagnetic separation between the potentially explosive atmospheres and the safe areas in a system.
The apparatus can convert the current signal into a current / voltage signal, and then transmit the output signal to the connected process control system.
If parameters of connected field device need to be set, a handheld HART communicator connected to field cable is necessary.



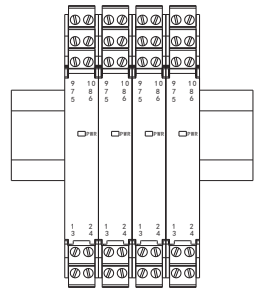
➔ Installation

- The apparatus can be installed on the DIN 35 mm standard rail which is corresponding to DIN IEC 60715. The must be snapped onto the rail, and never slanted or tipped to the side.
- Installation and disassembly steps are shown in following figures:



A. Snap the BUS socket on the DIN 35 rail, as figure A;
B. Snap lock onto mounting rail, then rotate the device, as figure B, press down the device onto mounting rail, make sure that the BUS connector pins of device and BUS socket are in close contact.
C. Pry the lock off the rail with screwdriver as arrow shown, pull downward the lock, and rotate the device.
D. Remove the device as arrow shows.

- In order to facilitate the heat of the apparatus, Please mounted it vertically if possible.



Vertically installation

➔ Light indication

- **PWR**: Green power indicator, it remains on at the presence of the supply voltage.

➔ Attention

- Device is used in Zone 2: The device shall be installed in an enclosure with minimum IP54 fulfilling all relevant clause of standard EN 60079-0, EN 60079-7; and the warming marking is required on the enclosure: “DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT”. The device only can be connected to a SELV/PELV power supply, and the transient protection shall be provided that is set at a level not exceeding 119 V peak value. The device only must be installed and used in an area of at least pollution degree 2 as defined in IEC 60664-1.
- Intrinsically safety can only be installed in safe area, and overvoltage category III.
- The devices were designed for use in pollution degree 2 as per IEC/EN 60664-1. If used in areas with higher pollution degree, the devices need to be protected accordingly. The device fulfill a protection degree IP 20 as per EN 60079-0.
- Installation position shall not be affected by strong mechanical vibration; impact and electromagnetic induction from signal terminal and power supply, should conformity with the requirements on electromagnetic interference resistance of products in Class 3 industrial field atmosphere stipulated in IEC 61000-4; and the atmosphere shall be free from gases that are corrosive to metal and plastic components.
- The apparatus may only be operated, maintained and decommissioned by competent according with the instruction manual, and it must be installed, connected and adjusted in non-hazardous area.
- If faults cannot be eliminated, the apparatus must be taken out of operation and protected from being placed in service again inadvertently. Devices must only be repaired directly by the manufacturer. Tampering with the apparatus is dangerous and therefore forbidden.
- The operator must strictly comply with the relevant local safety standards and guidelines.

➔ Supplementary instructions

- If there is any content difference between the specification and the website or sample, the instructions shall prevail. We reserve the rights to change or update the product information without prior noticing the users.