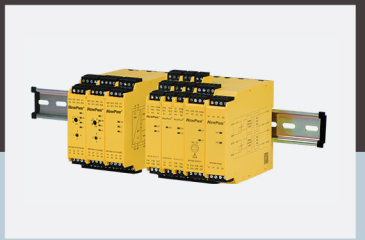
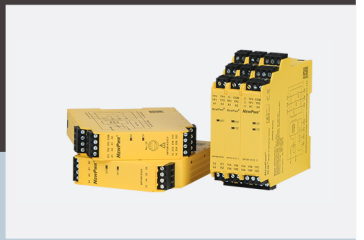
NEWPWR
优 倍 电 气

Safety Relay

Product Catalogue & Technical Brochure (2022)





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The latest technology

Functional safety safety relay

Core Technology

SIL
TüVRheinland
SIL3 PLe Cat.4

Compliance with EU directives
Remove EU trade barriers

Safe Start
Safe start
Unit is active once the input circuit has been closed
Prevention of unexpected start-up

Safety Sensor
Several safe inputs
E-stop button, safety gates input
safe light curtain input
Two-hand control button input
Safety mats input
Safety switch or DO signal input

Multiple redundant architecture
DC ≥ 99%
Environmental, mechanical and EMC Type tests in accordance with IEC standards

According to IEC 60204-1
Stop Category 0/1
Adjustable d-delay time

AUTO-RESET
RESET RESET
Several reset
Automatic Reset, Manual Reset
Monitored Manual Reset

CH1 tsync CH2
Synchronous Actuation of
Two-hand control
According to EN 574

Wide range of applications
Machinery manufacturing, process control, food processing, etc

国家专利 TÜVRheinland CE SIL3 IEC 61508 PLe ISO 13849 Cat.4 ISO 13849

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- Intrinsic Safety barrier National Standard Editor in chief
- SINOPEC Intrinsic Safety Barriers Framework Agreement Unit
- Integration of industrialization and informatization unit of MIIT
- Standardization demonstration intelligent factory of MIIT
- Jiangsu Province Surge Protective Device Engineering and Technology Research Center

SIL
IEC 61508

About NewPwr

Nanjing New Power Electric Co.,Ltd. was founded in 2002, is the high-tech enterprise in Jiangsu Province. Our company is specialized in R&D, manufacturing intrinsic safety barrier, surge protective device etc, and is a member of the national industrial process measurement and automation Standardization Technical Committee (TC124), national industrial explosion-proof electrical equipment standardization technical committee (TC9). The company has more than 160 employees, 33000 square meters of two industrial parks. It is one of the main suppliers of technology and market in the field of industrial explosion-proof instrumentation in China, and enjoys a high reputation.

The company is the executive director unit of Chinese Instrument Association, the integration of industrialization and informatization unit of the MIIT, the standardization demonstration intelligent factory of MIIT, is the Jiangsu Province and Nanjing first demonstration of intelligent workshop. Due to the outstanding achievements of the company in recent years, since 2016, it has been awarded by Jiangsu provincial government as one of the "100 outstanding enterprise in Jiangsu Province", "50 outstanding Jiangsu Manufacturing Contributions Outstanding Enterprises", and "Jiangsu Science and Technology Little Giant Enterprise" honor.

Catalogue

K series safety relays

EC Type-Examination Certificate

Product Safety
Functional
Safety

TÜVRheinland®
CERTIFIED

www.tuv.com
ID 0600000000

Reg.-No.: 01/205/5807.00/21

Product tested	Safety relay unit for emergency stop applications	**Certificate holder**	Nanjing New Power Electric Co., Ltd. Liuhe Economic Development Zone Nanjing, Jiangsu Province 211500 P.R. China
Type designation	NPFSR-K131AMD, NPFSR-K131MD, NPFSR-K122AMD, NPFSR-K122MD, NPFSR-K122YAMD, NPFSR-K122YMD, NPFSR-K2P31AMD, NPFSR-K2N31AMD, NPFSR-K2P22AMD, NPFSR-K2N22AMD		
Codes and standards	EN ISO 13849-1:2015 EN ISO 13849-2:2012 EN 62061:2005 + AC:2010 + A1:2013 + A2:2015		IEC 61508 Parts 1-7:2010 EN 60947-1:2007 + A1:2011 + A2:2014 (in extracts)
Intended application	The direct acting switch-off contacts of NPFSR-K1 and NPFSR-K2 series safety relay unit meet the requirements of PL e / Cat. 4 according to EN ISO 13849-1 and SIL CL 3 according to EN 62061, as well as for SIL 3 / SC 3 according to IEC 61508. The time-delayed acting switch-off contacts of NPFSR-K122YAMD / NPFSR-K122YMD meet the requirements of PL d / Cat. 3 according to EN ISO 13849-1 and SIL CL 3 according to EN 62061, as well as for SIL 3 / SC 3 according to IEC 61508. They can therefore be used in applications up to these levels.		
Specific requirements	The instructions of User Safety Manual shall be considered.		

It is confirmed, that the product under test complies with the requirements for machines defined in Annex I of the EC Directive 2006/42/EC.

Valid until 2026-03-15

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/FSP 2143.00/21 dated 2021-02-08.
This certificate is valid only for products which are identical with the product tested.

TÜVRheinland 0035 Notified Body

Köln, 2021-03-15

Notified Body for Machinery, NB 0035

Jelena Stenzel

Dipl.-Ing. Jelena Stenzel

TÜV Rheinland Industrie Service GmbH, Am Grauen Stein, 51105 Köln / Germany
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TÜVRheinland®
Precisely Right.

TÜVRheinland®

CERTIFICATE

of Conformity
EC Council Directive 2014/30/EU
Electromagnetic Compatibility

Registration No.: AE 50476049 0002

Report No.: 60392498 001

Holder:
Nanjing New Power Electric Co., Ltd.
6Floor, Building 1, New Space
Development Center, No.126 Tianyuan Middle Road,
Jiangning District, Nanjing
Jiangsu
P.R. China

Product:
Relay
(Safety Relay Unit)

Identification:

Type Designation :

NPFSR-K322D	NPFSR-K4F31MD	NPFSR-K4F31AMD
NPFSR-K4F22MD	NPFSR-K4F22AMD	NPFSR-K4C31AD
NPFSR-K4C22AD	NPFSR-K51D	NPFSR-K52D

(NEWPWR)

Tested acc. to:
EN 60947-1:2007+A1+A2
EN 60947-5-1:2017
EN IEC 61000-6-2:2019
EN IEC 61000-6-4:2019

This certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical Report and documentation are at the Licence Holder's disposal. This is to certify that the tested sample is in conformity with all provisions of Annex I of Council Directive 2014/30/EU. This certificate does not imply assessment of the production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to the a.m. Directive.

TÜV Rheinland LGA Products GmbH Zertifizierungsstelle TÜV Rheinland

Certification Body

Date 07.08.2020

Ying Xie

TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

CE The CE marking may only be used if all relevant and effective EC Directives are complied with. CE

Machinery industry

Model	Application					Power Supply	Reset	Output contact			Safety certificate				Page
								Safety related		Non-safety related	SIL acc. to IEC 61508	SIL CL acc. to IEC 62061	PL acc. to ISO 13849-1	CAT acc. to ISO 13849-1	
NPFSR-K131AMD	√	√	√[b]	-	-	24V DC/AC	AM	3	-	1	3	3	e	4	04
NPFSR-K131MD	√	√	-	-	-	24V DC/AC	M	3	-	1	3	3	e	4	05
NPFSR-K122AMD	√	√	√[b]	-	-	24V DC/AC	AM	2	-	2	3	3	e	4	06
NPFSR-K122MD	√	√	-	-	-	24V DC/AC	M	2	-	2	3	3	e	4	07
NPFSR-K122YAMD	√	√	-	-	-	24V DC	AM	2	2	-	3	3	e(d)[a]	4(3)[a]	08
NPFSR-K122YMD	√	√	-	-	-	24V DC	M	2	2	-	3	3	e(d)[a]	4(3)[a]	09
NPFSR-K331D	-	-	-	√[c]	-	24V DC/AC	-	3	-	1	3	3	e	4	10
NPFSR-K322D	-	-	-	√[c]	-	24V DC/AC	-	2	-	2	3	3	e	4	11
NPFSR-K4C31AD	-	-	-	-	√[d]	24V DC/AC	A	3	-	1	2	2	d	3	12
NPFSR-K4C22AD	-	-	-	-	√[d]	24V DC/AC	A	2	-	2	2	2	d	3	13
NPFSR-K4F31AMD	-	-	-	-	√[e]	24V DC/AC	AM	3	-	1	2	2	d	3	14
NPFSR-K4F31MD	-	-	-	-	√[e]	24V DC/AC	M	3	-	1	2	2	d	3	15
NPFSR-K4F22AMD	-	-	-	-	√[e]	24V DC/AC	AM	2	-	2	2	2	d	3	16
NPFSR-K4F22MD	-	-	-	-	√[e]	24V DC/AC	M	2	-	2	2	2	d	3	17
NPFSR-K642D	√	√	-	-	-	24V DC	-	4	-	2	3	3	e	4	22

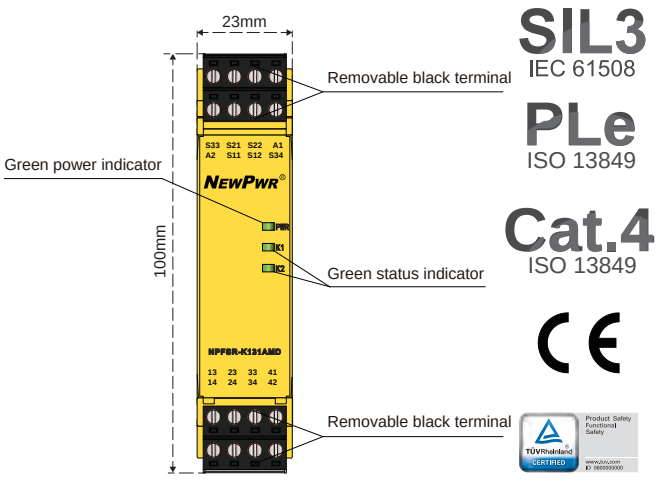
a) For non-delay (delay) contacts
b) For PNP safety light curtain
c) Acc. to EN 574, Tpye IIIC
d) For 2/4-wire safety mats
e) For 2/4-wire safety mat
AM=automatic reset/manual reset
M=monitored manual reset
A=automatic reset/manual reset/monitored manual reset

Process Control Industry

Model	Applica-tion	Power Supply	Output contact			Contact rating	Feed-back	Fuse replace	LFT	Proof test	Safety certificate			Page
			Safety related		Non-safety related						SIL acc. to IEC 61508	PL acc. to ISO 13849-1	CAT acc. to ISO 13849-1	
NPFSR-K2P31AMD	SIS/ESD	24V DC	3	1	-	5A	-	-	-	√	3	e	4	18
NPFSR-K2P22AMD	SIS/ESD	24V DC	2	1	1	5A	-	-	-	√	3	e	4	19
NPFSR-K51D	SIS/ESD	24V DC	1	-	-	5A	-	-	-	√	3	-	-	20
NPFSR-K52D	SIS/ESD	24V DC	2	-	-	5A	-	-	-	-	3	-	-	21
NPFSR-K51D.S	SIS/ESD	24V DC	-	1	-	5A	-	-	-	√	2	-	-	22
NPFSR-K51D.C	SIS/ESD	24V DC	-	1	-	5A	-	-	-	√	3	-	-	23
NPFSR-K51D.F	SIS/ESD	24V DC	1	1	-	5A	-	√	-	√	3	-	-	24
NPFSR-K51D.T	SIS/ESD	24V DC	1	-	1	5A	√	-	√	√	3	-	-	-
NPFSR-K51D.E	FGS	24V DC	1	-	1	5A	√	-	√	√	2	-	-	-

NPFSR-K131AMD

Input: E-STOP, Safety gate, PNP safety light curtain
Output: 3NO+1NC



SIL3 IEC 61508

PLe ISO 13849

Cat.4 ISO 13849

CE

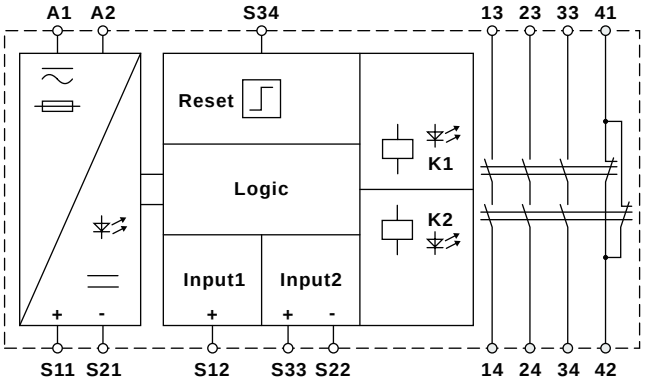
The inputs of K series E-STOP, safety gate, safety light curtain input safety relays are normally closed contact signals, which are used for emergency braking or the protection of people entering dangerous areas, and widely used in machining and other industries.

- 1oo2 architecture
- With detection of shorts across contacts
- With auto reset and manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	E-STOP button, Safety gate, PNP safety light curtain
Signal type	3NO+1NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	Auto: ≤ 300ms, Manual: ≤ 150ms
Release	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram

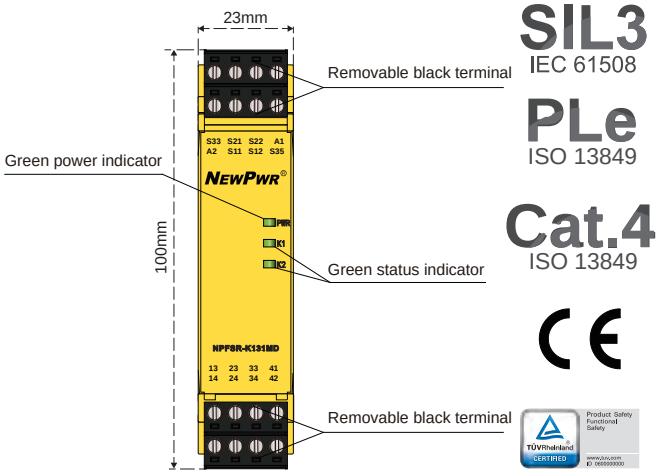


Safety Values

Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.29×10^{-5}, according to IEC 62061
PFH	1.49×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K131MD

Input: E-STOP, Safety gate
Output: 3NO+1NC



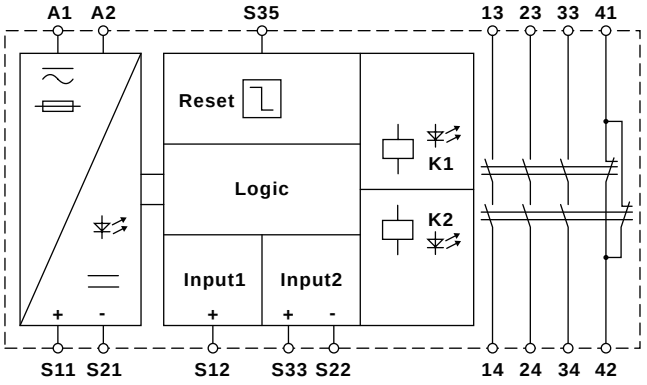
The inputs of K series E-STOP, safety gate input safety relays are normally closed contact signals, which are used for emergency braking or the protection of people entering dangerous areas, and widely used in machining and other industries.

- 1oo2 architecture
- With detection of shorts across contacts
- With monitored manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	E-STOP button, Safety gate
Signal type	3NO+1NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 150ms
Release	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram

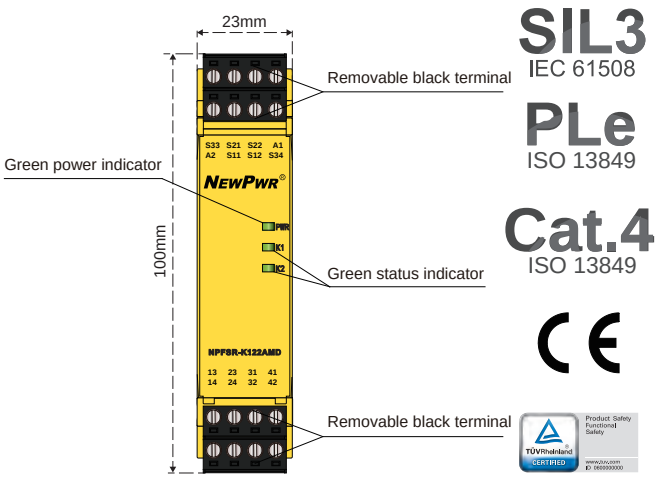


Safety Values

Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.29×10^{-5}, according to IEC 62061
PFH	1.49×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K122AMD

Input: E-STOP, Safety gate,PNP safety light curtain
Output: 2NO+2NC



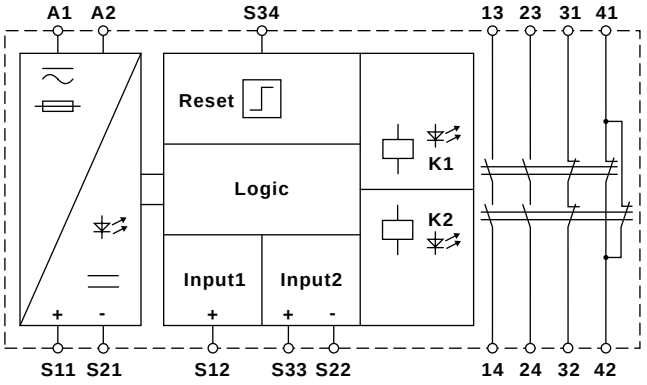
The inputs of K series E-STOP, safety gate, safety light curtain input safety relays are normally closed contact signals, which are used for emergency braking or the protection of people entering dangerous areas, and widely used in machining and other industries.

- 1oo2 architecture
- With detection of shorts across contacts
- With auto reset and manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	E-STOP button, Safety gate, PNP safety light curtain
Signal type	2NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	Auto: ≤ 300ms, Manual: ≤ 150ms
Release	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	$10×10^6$ cycles

Functional Block Diagram

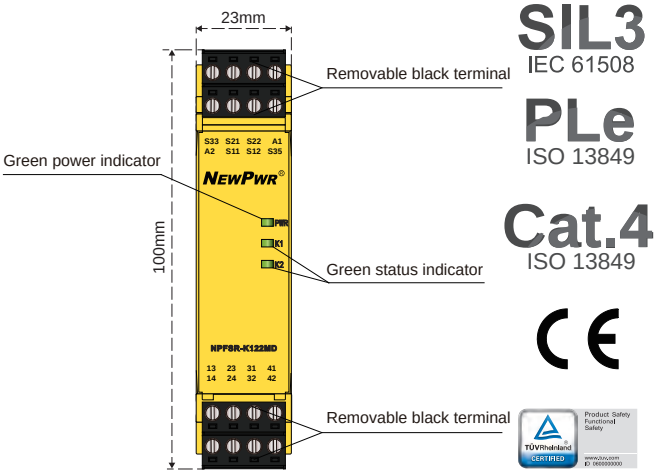


Safety Values

Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	$1.29×10^{-5}$, according to IEC 62061
PFH	$1.49×10^{-10}$ 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K122MD

Input: E-STOP, Safety gate
Output: 2NO+2NC



SIL3 IEC 61508

PLe ISO 13849

Cat.4 ISO 13849

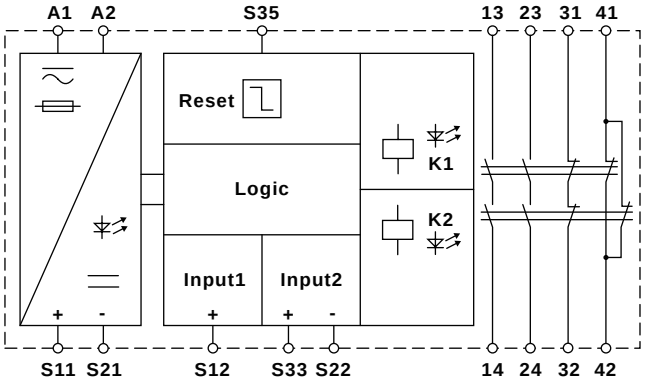
The inputs of K series E-STOP, safety gate input safety relays are normally closed contact signals, which are used for emergency braking or the protection of people entering dangerous areas, and widely used in machining and other industries.

- 1oo2 architecture
- With detection of shorts across contacts
- With monitored manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	E-STOP button, Safety gate
Signal type	2NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 150ms
Release	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

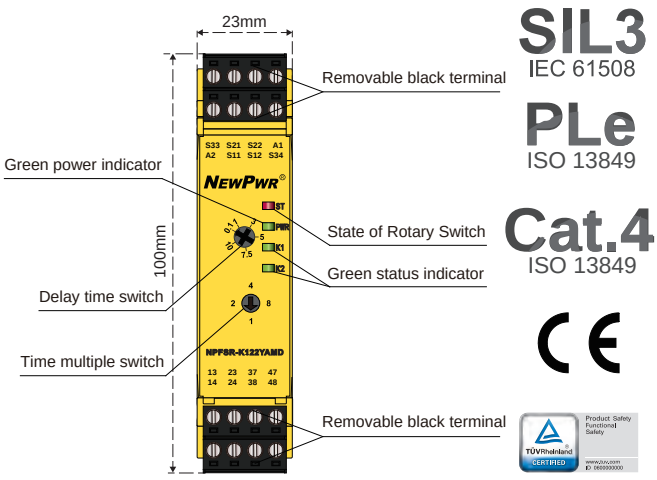
Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.29×10^{-5}, according to IEC 62061
PFH	1.49×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K122YAMD

Input: E-STOP, Safety gate
Output: 2NO, non-delay + 2NO, d-delay

The inputs of K series E-STOP, safety gate input safety relays are normally closed contact signals, which are used for emergency braking or the protection of people entering dangerous areas, and widely used in machining and other industries.

- 1oo2 architecture
- With detection of shorts across contacts
- With auto reset and manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

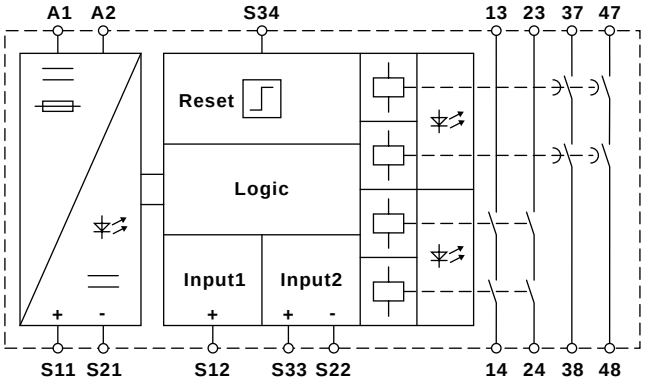


SIL3 IEC 61508
PLe ISO 13849
Cat.4 ISO 13849

Parameters

Voltage range	24V DC
Voltage tolerance	0.85 ~ 1.1
Power dissipation	≤ 3.8W/24V DC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	E-STOP button, Safety gate
Signal type	2NO, non-delay + 2NO, d-delay
Contact type	Forced guided
Contact material	$AgSnO_2$
Contact loading	AC-15: 3A/230V, DC-13: 3A/24V
Contact fuse protection	10A gL/gG(NO)
Delay time T_{set}	0.1~80s, default 10s
Delay time accuracy	±15%
Switch-on	Auto: ≤ 300ms, Manual: ≤ 150ms
Release	E-stop: ≤ 30ms; Power failure: ≤ 100ms
Recovery time	E-stop: ≤ 30ms+T_{set}, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

Performance level	PLe, according to ISO 13849[1)] PLd, according to ISO 13849[2)]
Category	Cat.4, according to ISO 13849[1)] Cat.3, according to ISO 13849[2)]
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849[1)] 90%, according to ISO 13849[2)]
$MTTF_D$	164 years, according to ISO 13849[1)] 161 years, according to ISO 13849[2)]
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.53×10^{-5}, according to IEC 62061[1)] 1.59×10^{-5}, according to IEC 62061[2)]
PFH	1.77×10^{-10} 1/h, according to IEC 62061[1)] 1.85×10^{-10} 1/h, according to IEC 62061[2)]
Stop Category	0, according to IEC 60204[1)] 1, according to 60204[2)]

NOTE: [1)]For non-delay contacts: 13/14 , 23/24

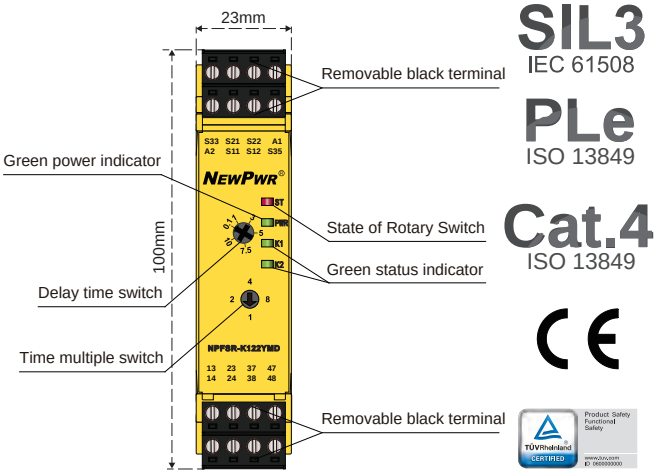
[2)]For de-delay contacts: 37/38 , 47/48

NPFSR-K122YMD

Input: E-STOP, Safety gate
Output: 2NO, non-delay + 2NO, d-delay

The inputs of K series E-STOP, safety gate input safety relays are normally closed contact signals, which are used for emergency braking or the protection of people entering dangerous areas, and widely used in machining and other industries.

- 1oo2 architecture
- With detection of shorts across contacts
- With monitored manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle



SIL3 IEC 61508

PLe ISO 13849

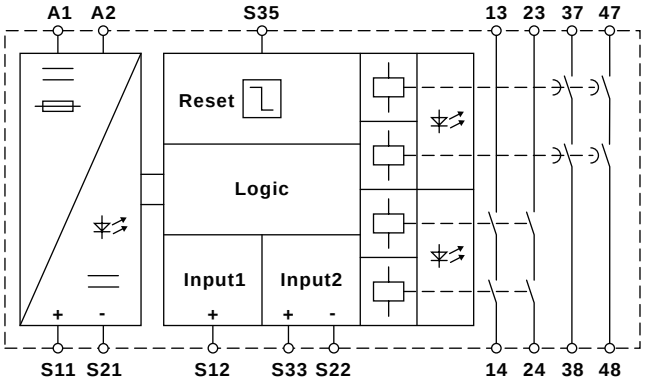
Cat.4 ISO 13849

CE

Parameters

Voltage range	24V DC
Voltage tolerance	0.85 ~ 1.1
Power dissipation	≤ 3.8W/24V DC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	E-STOP button, Safety gate
Signal type	2 NO, non-delay + 2 NO, d-delay
Contact type	Forced guided
Contact material	$AgSnO_2$
Contact loading	AC-15: 3A/230V, DC-13: 3A/24V
Contact fuse protection	10A gL/gG(NO)
Delay time T_{set}	0.1~80s, default 10s
Delay time accuracy	±15%
Switch-on	≤ 150ms
Release	E-stop: ≤ 30ms; Power failure: ≤ 100ms
Recovery time	E-stop: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

Performance level	PLe, according to ISO 13849[1)] PLd, according to ISO 13849[2)]
Category	Cat.4, according to ISO 13849[1)] Cat.3, according to ISO 13849[2)]
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849[1)] 90%, according to ISO 13849[2)]
$MTTF_D$	164 years, according to ISO 13849[1)] 161 years, according to ISO 13849[2)]
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.53×10^{-5}, according to IEC 62061[1)] 1.59×10^{-5}, according to IEC 62061[2)]
PFH	1.77×10^{-10} 1/h, according to IEC 62061[1)] 1.85×10^{-10} 1/h, according to IEC 62061[2)]
Stop Category	0, according to IEC 60204[1)] 1, according to 60204[2)]

NOTE: [1)]For non-delay contacts: 13/14 , 23/24

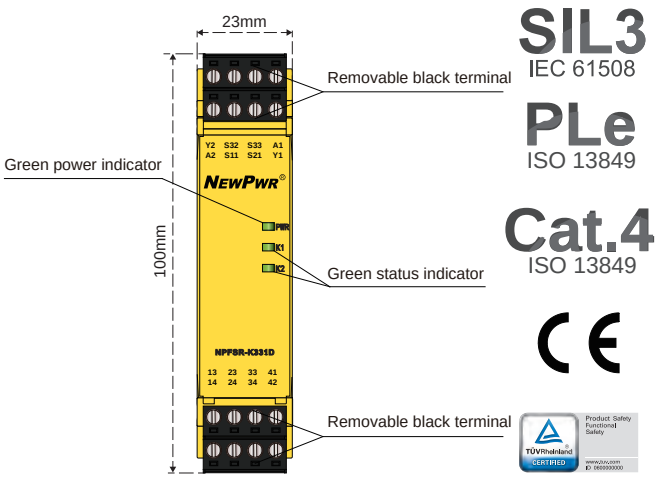
[2)]For de-delay contacts: 37/38 , 47/48

NPFSR-K331D

Input: Two-hand modules
Output: 3NO+1NC

K series two-hand control safety relays are used to ensure that the operator's hands are kept away from the dangerous area and avoid injury during the hazardous movement. Used in mechanical presses or safety circuits with safety requirements.

- Support two-hand module (according to EN 574, Type III C)
- With detection across contacts
- Synchronous detection function less than 0.5s
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

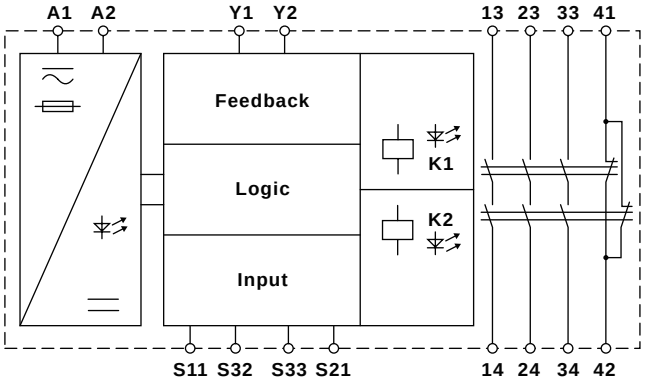


SIL3 IEC 61508
PLe ISO 13849
Cat.4 ISO 13849

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 4.8VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	Two-hand module (according to EN574, Type IIIC)
Signal type	3NO+1NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 30ms
Release	≤ 15ms
Recovery time	≤ 250ms
Simultaneity	≤ 500ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	$10×10^6$ cycles

Functional Block Diagram



Safety Values

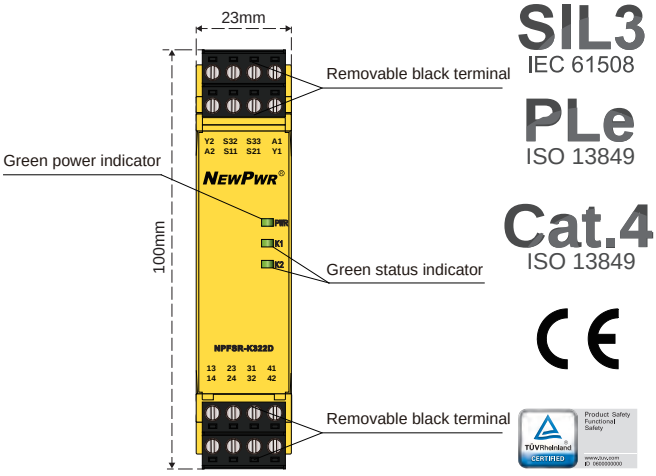
Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	$1.35×10^{-5}$, according to IEC 62061
PFH	$1.57×10^{-10}$ 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K322D

Input: Two-hand modules
Output: 2NO+2NC

K series two-hand control safety relays are used to ensure that the operator's hands are kept away from the dangerous area and avoid injury during the hazardous movement. Used in mechanical presses or safety circuits with safety requirements.

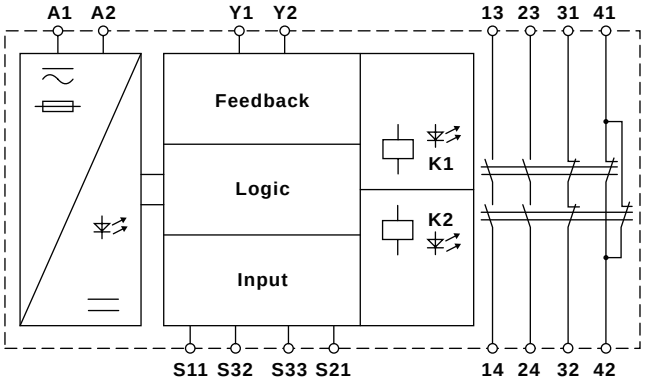
- Support two-hand module (according to EN 574, Type III C)
- With detection across contacts
- Synchronous detection function less than 0.5s
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle



Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 4.8VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	Two-hand module (according to EN574, Type IIIC)
Signal type	2NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 30ms
Release	≤ 15ms
Recovery time	≤ 250ms
Simultaneity	≤ 500ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	$10×10^6$ cycles

Functional Block Diagram

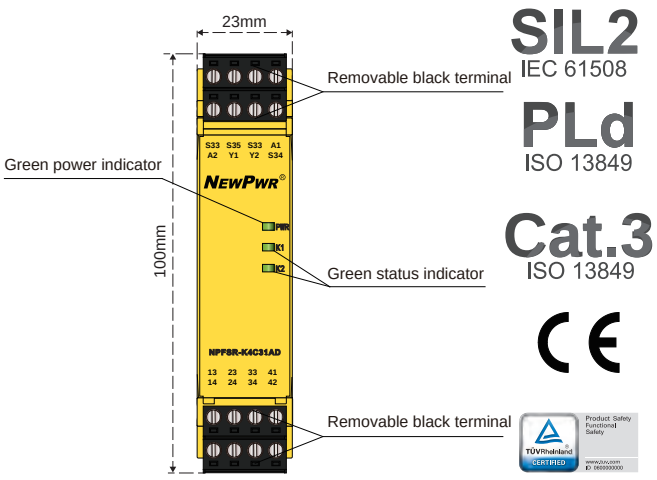


Safety Values

Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	$1.35×10^{-5}$, according to IEC 62061
PFH	$1.57×10^{-10}$ 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K4C31AD

Input: 2-wire NO contact safety mat
Output: 3NO+1NC



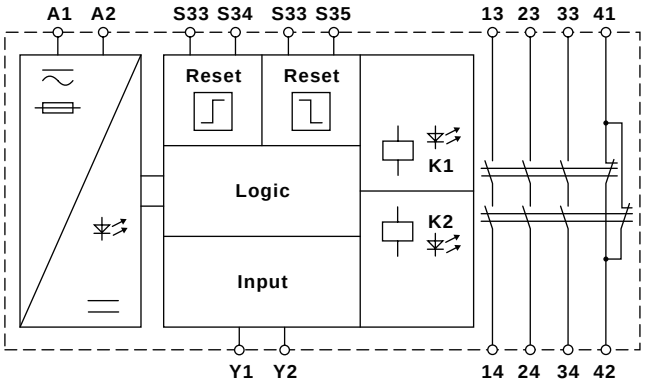
K series safety mat input safety relay is applicable to 2-wire NO contact safety mat input. When a certain weight is applied to the safety mat, the NO contact of the safety mat is closed, and the safety output contact of the control safety relay is open, so as to protect the operators in the dangerous area.

- 1oo2 architecture
- With detection of input breakage
- With auto reset and manual reset or monitored manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	2-wire NO contact safety mat
Terminal resistance	2 ~ 20kΩ
Signal type	3NO+1NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 100ms
Release	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram

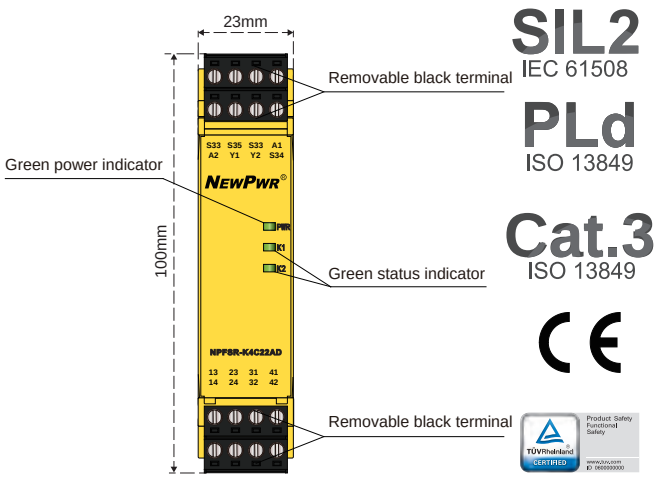


Safety Values

Performance level	PLd, according to ISO 13849
Category	Cat.3, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	162 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL2, according to IEC 61508
SIL CL	SIL CL2, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.65×10^{-5}, according to IEC 62061
PFH	1.91×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K4C22AD

Input: 2-wire NO contact safety mat
Output: 2NO+2NC



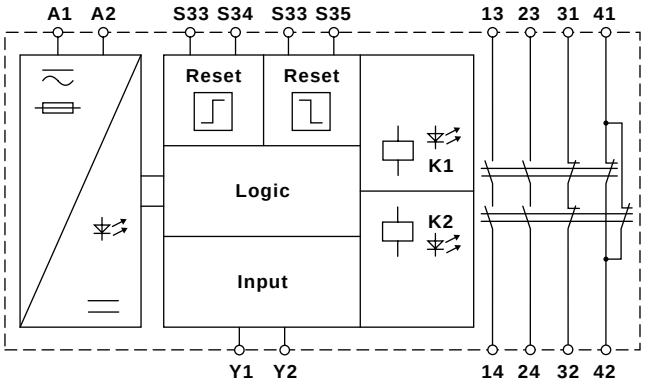
K series safety mat input safety relay is applicable to 2-wire NO contact safety mat input. When a certain weight is applied to the safety mat, the NO contact of the safety mat is closed, and the safety output contact of the control safety relay is open, so as to protect the operators in the dangerous area.

- 1oo2 architecture
- With detection of input breakage
- With auto reset and manual reset or monitored manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	2-wire NO contact safety mat
Terminal resistance	2 ~ 20kΩ
Signal type	2NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 100ms
Release	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram

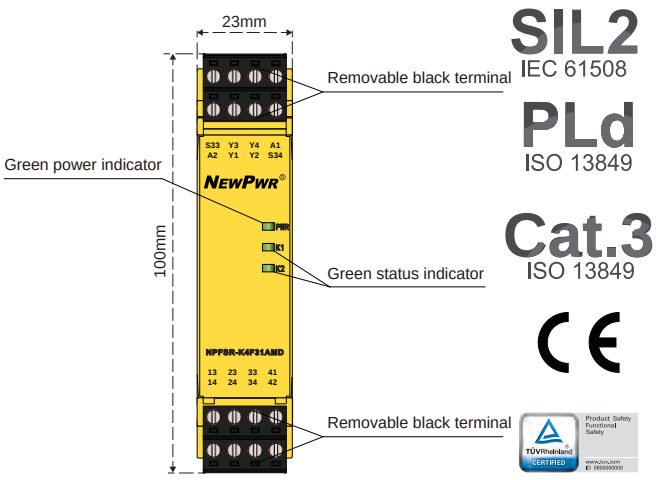


Safety Values

Performance level	PLd, according to ISO 13849
Category	Cat.3, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	162 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL2, according to IEC 61508
SIL CL	SIL CL2, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.65×10^{-5}, according to IEC 62061
PFH	1.91×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K4F31AMD

Input: 4-wire NO contact safety mat
Output: 3NO+1NC



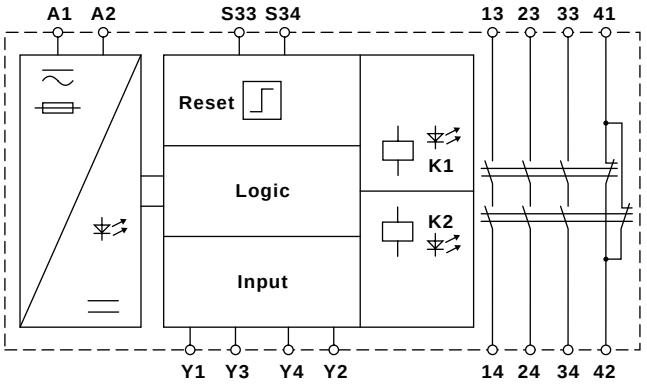
K series safety mat input safety relay is applicable to 4-wire NO contact safety mat input. When a certain weight is applied to the safety mat, the NO contact of the safety mat is closed, and the safety output contact of the control safety relay is open, so as to protect the operators in the dangerous area.

- 1oo2 architecture
- With detection of input breakage
- With auto reset and manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	4-wire NO contact safety mat
Signal type	3NO+1NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 100ms
Release	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

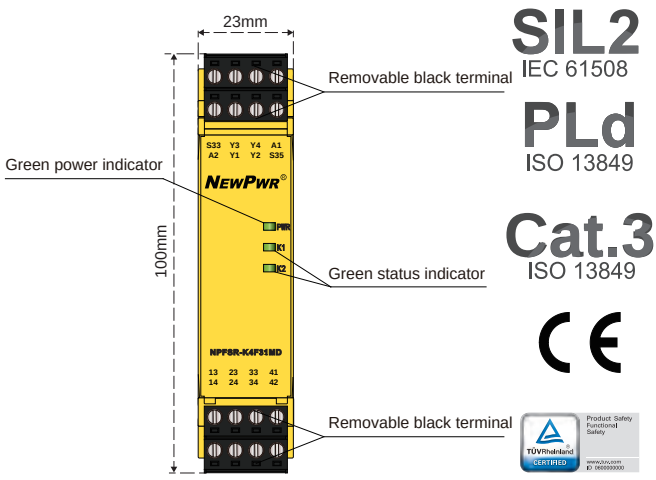
Performance level	PLd, according to ISO 13849
Category	Cat.3, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	162 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL2, according to IEC 61508
SIL CL	SIL CL2, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.65×10^{-5}, according to IEC 62061
PFH	1.91×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K4F31MD

Input: 4-wire NO contact safety mat
Output: 3NO+1NC

K series safety mat input safety relay is applicable to 4-wire NO contact safety mat input. When a certain weight is applied to the safety mat, the NO contact of the safety mat is closed, and the safety output contact of the control safety relay is open, so as to protect the operators in the dangerous area.

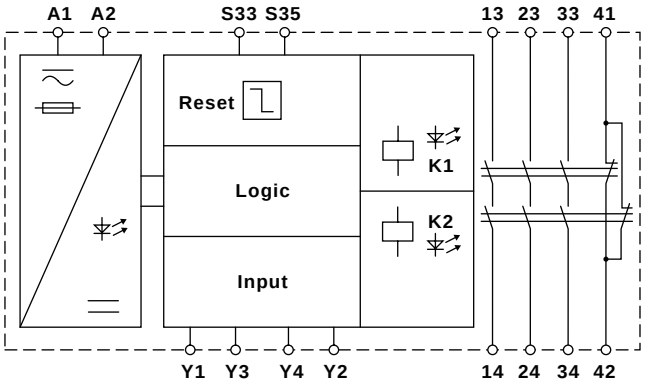
- 1oo2 architecture
- With detection of input breakage
- With monitored manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle



Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	4-wire NO contact safety mat
Signal type	3NO+1NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 100ms
Release	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram

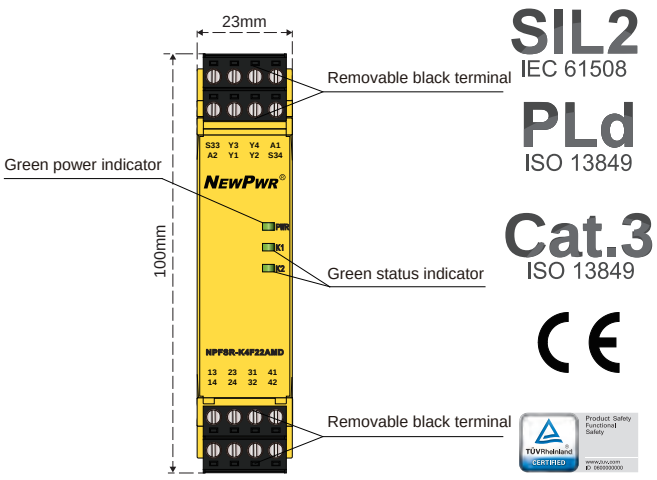


Safety Values

Performance level	PLd, according to ISO 13849
Category	Cat.3, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	162 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL2, according to IEC 61508
SIL CL	SIL CL2, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.65×10^{-5}, according to IEC 62061
PFH	1.91×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K4F22AMD

Input: 4-wire NO contact safety mat
Output: 2NO+2NC



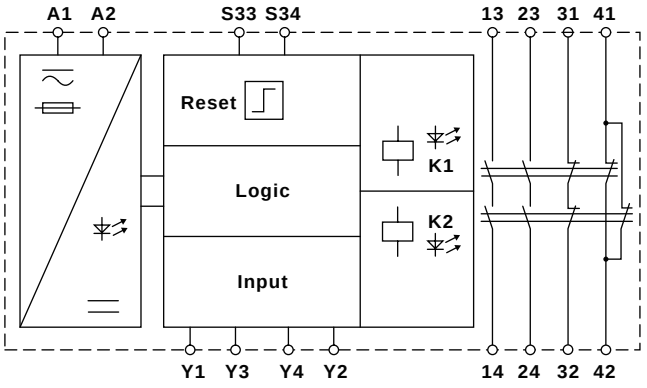
K series safety mat input safety relay is applicable to 4-wire NO contact safety mat input. When a certain weight is applied to the safety mat, the NO contact of the safety mat is closed, and the safety output contact of the control safety relay is open, so as to protect the operators in the dangerous area.

- 1oo2 architecture
- With detection of input breakage
- With auto reset and manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle

Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	4-wire NO contact safety mat
Signal type	2NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 100ms
Release	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

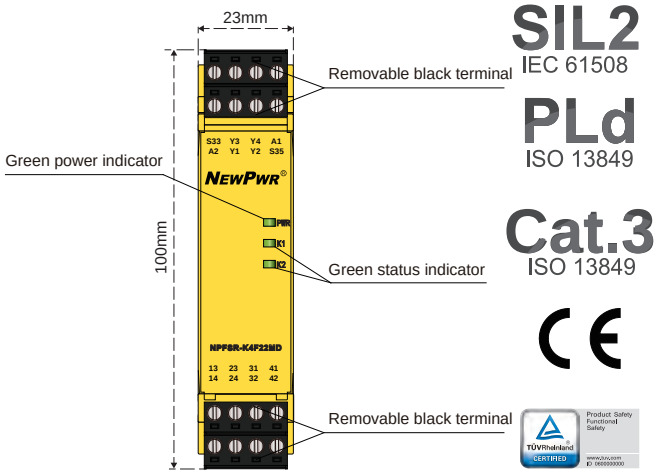
Performance level	PLd, according to ISO 13849
Category	Cat.3, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	162 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL2, according to IEC 61508
SIL CL	SIL CL2, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.65×10^{-5}, according to IEC 62061
PFH	1.91×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K4F22MD

Input: 4-wire NO contact safety mat
Output: 2NO+2NC

K series safety mat input safety relay is applicable to 4-wire NO contact safety mat input. When a certain weight is applied to the safety mat, the NO contact of the safety mat is closed, and the safety output contact of the control safety relay is open, so as to protect the operators in the dangerous area.

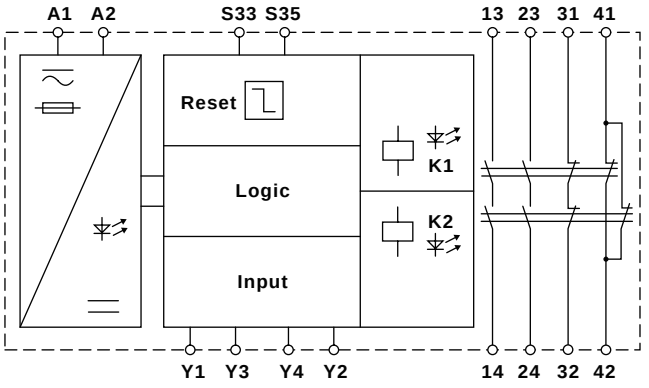
- 1oo2 architecture
- With detection of input breakage
- With monitored manual reset function
- The safety function remains effective in the case of a component failure
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle



Parameters

Voltage range	24V AC/DC
Voltage tolerance	0.85 ~ 1.1
AC frequency	50Hz ~ 60Hz
Power dissipation	≤ 2.2W/24V DC, ≤ 5.4VA/24V AC
Current consumption	≤ 50mA/24V DC
Cable resistance	≤ 15Ω
Input devices	4-wire NO contact safety mat
Signal type	2NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 100ms
Release	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Recovery time	Mat action: ≤ 30ms, Power failure: ≤ 100ms
Supply short interruption	20ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

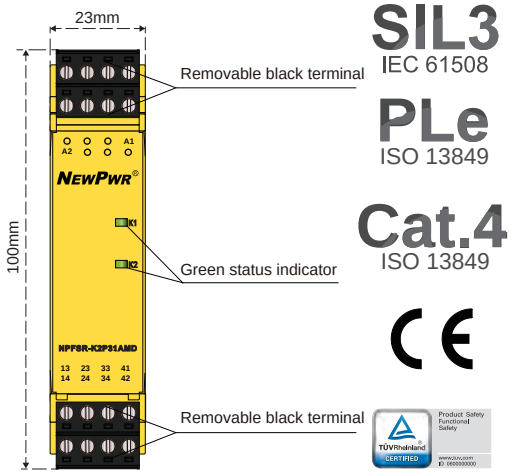
Performance level	PLd, according to ISO 13849
Category	Cat.3, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	162 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL2, according to IEC 61508
SIL CL	SIL CL2, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.65×10^{-5}, according to IEC 62061
PFH	1.91×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K2P31AMD

Input: DO signal
Output: 3NO+1NC

K series DO signal input safety relay applies mechanical interlock conforming to EN 50205 standard to realize multiple safety outputs. Up to 5A functional current and reliable diagnosis. It can be used for safety related applications of SIL3 and SC3 in accordance with IEC 61508 standard, and ESD in SIS.

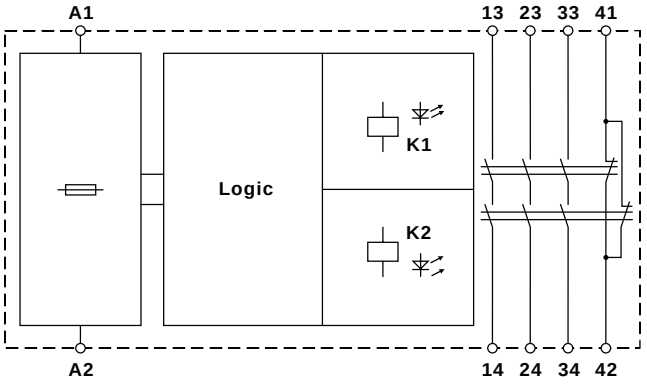
- 1oo2 architecture
- Relay contact output for de-energized to safe function
- System loop detection support
- Built-in test pulse filter function
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle



Parameters

Power supply type	Loop supply
Voltage range	20 ~ 32V DC(Typ.24V)
Power dissipation	≤ 2.2W/24V DC
Current consumption	≤ 90mA
Test pulse width	≤ 3ms
Cable resistance	≤ 15Ω
Input devices	Safety switch, DO signal
Signal type	3NO+1NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Energized	≤ 200ms
De-energized delay	≤ 50ms
Switching frequency	≤ 4Hz
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

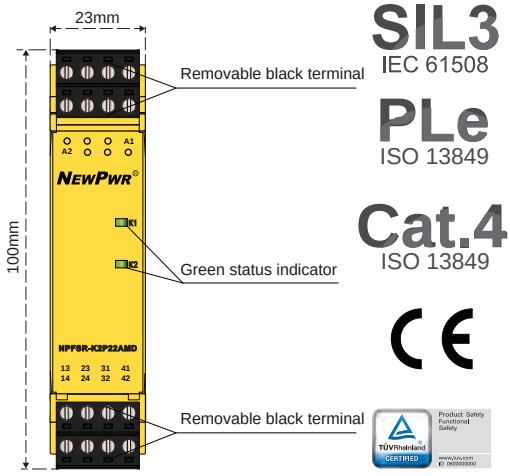
Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.29×10^{-5}, according to IEC 62061
PFH	1.49×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K2P22AMD

Input: DO signal
Output: 2NO+2NC

K series DO signal input safety relay applies mechanical interlock conforming to EN 50205 standard to realize multiple safety outputs. Up to 5A functional current and reliable diagnosis. It can be used for safety related applications of SIL3 and SC3 in accordance with IEC 61508 standard, and ESD in SIS.

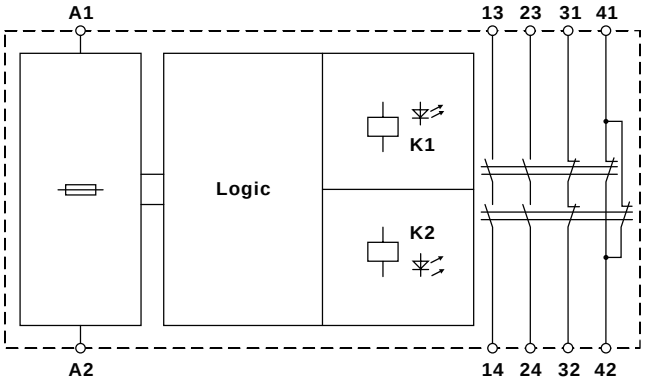
- 1oo2 architecture
- Relay contact output for de-energized to safe function
- System loop detection support
- Built-in test pulse filter function
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle



Parameters

Power supply type	Loop supply
Voltage range	20 ~ 32V DC(Typ.24V)
Power dissipation	≤ 2.2W/24V DC
Current consumption	≤ 90mA
Test pulse width	≤ 3ms
Cable resistance	≤ 15Ω
Input devices	Safety switch, DO signal
Signal type	2NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Energized	≤ 200ms
De-energized delay	≤ 50ms
Switching frequency	≤ 4Hz
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

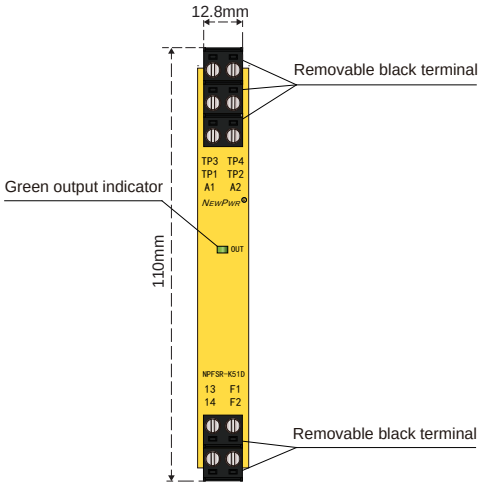
Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	1.29×10^{-5}, according to IEC 62061
PFH	1.49×10^{-10} 1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

NPFSR-K51D

Input: DO signal
Output: 1 NO

NPFSR-K51D is 1NO output safety relay, receiving DO signal, realizing reliable isolation control, and the field side supports up to 250V AC load circuit. It can be used for safety related applications of SIL3 and SC3 in accordance with IEC 61508 standard, and ESD in SIS.

- System loop detection support
- Proof Test
- Fail-safe technique
- Triple redundancy
- Contact welding protection
- Relay contact output for de-energized to safe function

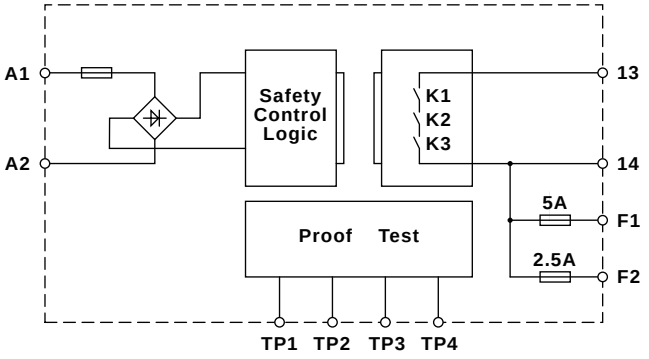


SIL3
IEC 61508

Parameters

Power supply type	Loop supply
Voltage range	18 V ~ 32 V DC, Typical 24V DC
Power dissipation	≤ 1.4W/24 V DC
Current consumption	≤ 55mA/24 V DC
Test pulse width	≤ 4ms
Cable resistance	≤ 15Ω
Input devices	Safety switch, DO signal
Number of contacts	1 NO
Contact material	$AgSnO_2$+Au plating
Maximum Contact loading	5A/250V AC, 5A/24V DC
Fuse rating	2.5A/5A (Internal protection)
Proof test	Refer to safety manual
Energized	≤ 25ms
De-energized delay	≤ 25ms
Switching frequency	≤ 10Hz
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

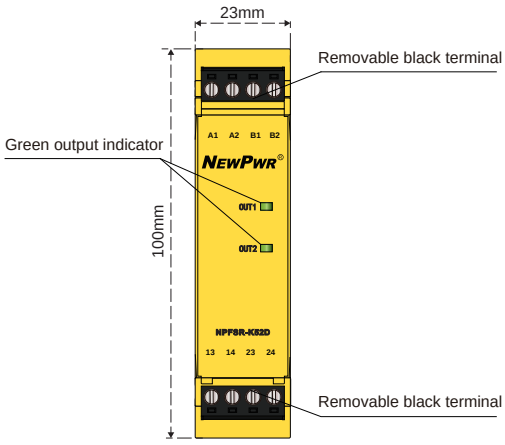
Proof-test interval	20 years, according to IEC 61508
DC_{avg}	60%, according to IEC 61508
SIL	SIL3, according to IEC 61508
HFT	0, according to IEC 61508
SFF	≥ 90%, according to IEC 61508
PFD_{avg}/PTI = 20 years	3.02×10^{-5}, according to IEC 61508
PFH	3.45×10^{-10} 1/h, according to IEC 61508

NPFSR-K52D

Input: DO signal
Output: 2 NO

NPFSR-K52D is 2NO output safety relay, receiving DO signal, realizing reliable isolation control, and the field side supports up to 230V AC load circuit. It can be used for safety related applications of SIL3 and SC3 in accordance with IEC 61508 standard, and ESD in SIS.

- Support dual channel operation
- System loop detection support
- Fail-safe technique
- Triple redundancy
- Contact welding protection
- Relay contact output for de-energized to safe function

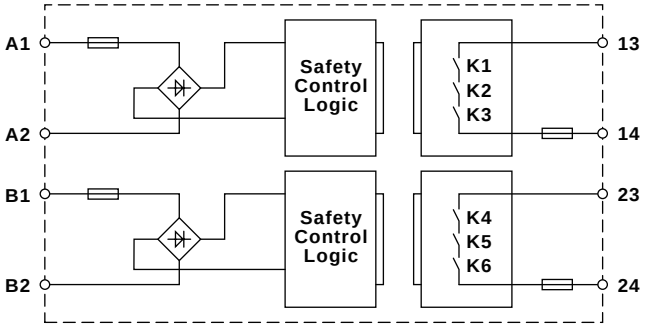


SIL3
IEC 61508

Parameters

Power supply type	Loop supply
Voltage range	16 V ~ 32 V DC, Typical 24V DC
Power dissipation	≤ 1.4W/24 V DC/Channel
Current consumption	≤ 55mA/24 V DC/Channel
Test pulse width	≤ 4ms
Cable resistance	≤ 15Ω
Input devices	Safety switch, DO signal
Number of contacts	2 NO
Contact material	$AgSnO_2$+0.3μmAu
Contact loading	5A/ 24V DC, 5A/250V AC
Fuse rating	5A (Internal protection)
Energized	≤ 20ms
De-energized delay	≤ 20ms
Switching frequency	≤ 10Hz
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	20×10^6 cycles

Functional Block Diagram



Safety Values

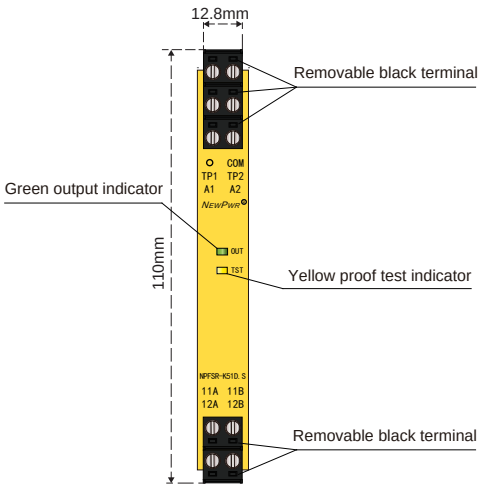
Proof-test interval	20 years, according to IEC 61508
DC_{avg}	60%, according to IEC 61508
SIL	SIL3, according to IEC 61508
HFT	0, according to IEC 61508
SFF	≥ 90%, according to IEC 61508
PFD_{avg}/PTI = 20 years	6.03×10^{-5}, according to IEC 61508
PFH	6.90×10^{-10} 1/h, according to IEC 61508

NPFSR-K51D.S

Input: DO signal
Output: 1 NC

NPFSR-K51D.S is 1NC output safety relay, receiving DO signal, realizing reliable isolation control, and the field side supports up to 250V AC load circuit. It can be used for safety related applications of SIL2 and SC2 in accordance with IEC 61508 standard, and ESD in SIS.

- System loop detection support
- Proof Test
- Fail-safe technique
- Double redundancy

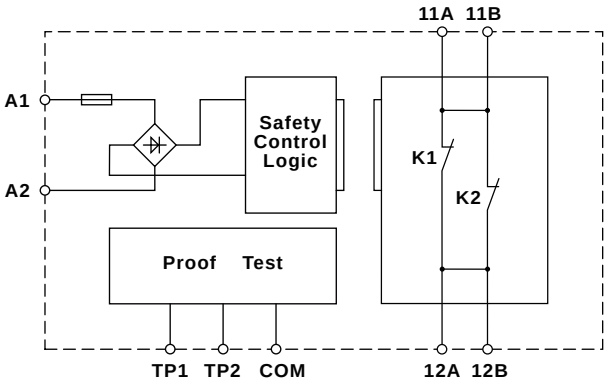


SIL2
IEC 61508

Parameters

Power supply type	Loop supply
Voltage range	18 V ~ 32 V DC, Typical 24V DC
Power dissipation	≤ 1.4W/24 V DC
Current consumption	≤ 35mA/24 V DC
Test pulse width	≤ 4ms
Cable resistance	≤ 15Ω
Input devices	Safety switch, DO signal
Number of contacts	1 NC
Contact material	$AgSnO_2$+Au plating
Maximum Contact loading	5A/250V AC, 5A/24V DC
Proof test	Refer to safety manual
Energized	≤ 50ms
De-energized delay	≤ 50ms
Switching frequency	≤ 10Hz
EMC	According to IEC 61298-3, IEC/EN 61000-6-2, IEC 61326-3-1
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60664-1
Vibration	10Hz ~ 150Hz, 0.75mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

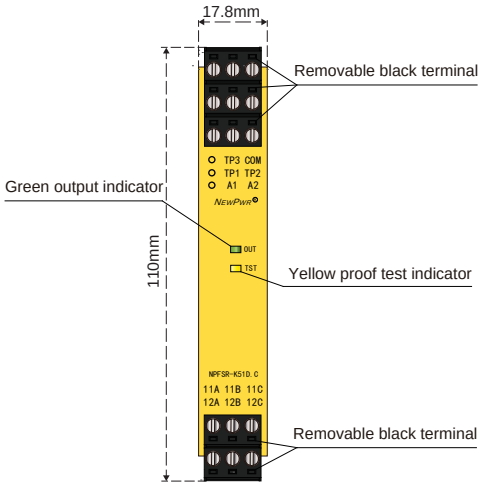
Proof-test interval	15 years, according to IEC 61508
DC_{avg}	60%, according to IEC 61508
SIL	SIL2, according to IEC 61508
HFT	0, according to IEC 61508
SFF	≥ 90%, according to IEC 61508
PFD_{avg}/PTI = 15 years	1.064×10^{-4}, according to IEC 61508
PFH	1.069×10^{-8} 1/h, according to IEC 61508

NPFSR-K51D.C

Input: DO signal
Output: 1 NC

NPFSR-K52D.C is 1NC output safety relay, receiving DO signal, realizing reliable isolation control, and the field side supports up to 250VA load circuit. It can be used for safety related applications of SIL3 and SC3 in accordance with IEC 61508 standard, and ESD in SIS.

- Support dual channel operation
- System loop detection support
- Fail-safe technique
- Triple redundancy

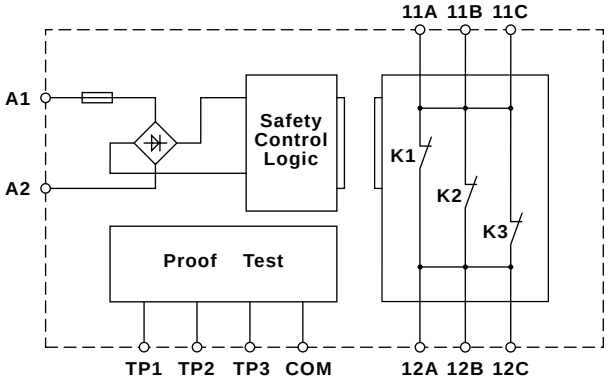


SIL3
IEC 61508

Parameters

Power supply type	Loop supply
Voltage range	18 V ~ 32 V DC, Typical 24V DC
Power dissipation	≤ 1.4W/24 V DC/Channel
Current consumption	≤ 45mA/24 V DC/Channel
Test pulse width	≤ 4ms
Cable resistance	≤ 15Ω
Input devices	Safety switch, DO signal
Number of contacts	1 NC
Contact material	$AgSnO_2$+Au plating
Contact loading	5A/250V AC, 5A/24V DC
Proof test	Refer to safety manual
Energized	≤ 50ms
De-energized delay	≤ 50ms
Switching frequency	≤ 10Hz
EMC	According to IEC 61298-3, IEC/EN 61000-6-2, IEC 61326-3-1
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60664-1
Vibration	10Hz ~ 150Hz, 0.75mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

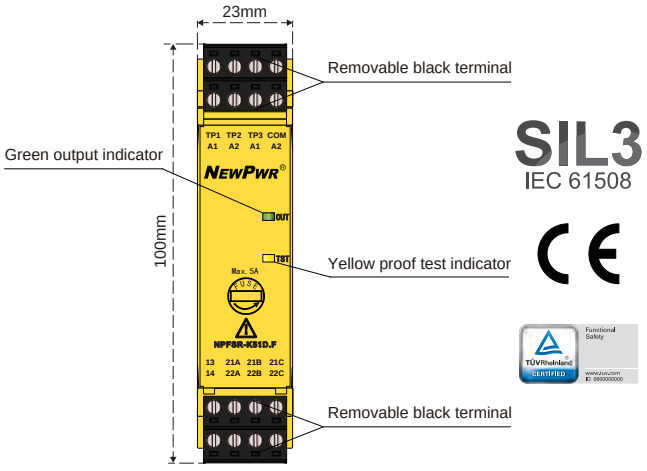
Proof-test interval	15 years, according to IEC 61508
DC_{avg}	60%, according to IEC 61508
SIL	SIL3, according to IEC 61508
HFT	0, according to IEC 61508
SFF	≥ 90%, according to IEC 61508
PFD_{avg}/PTI = 15 years	8.46×10^{-5}, according to IEC 61508
PFH	1.205×10^{-8} 1/h, according to IEC 61508

NPFSR-K51D.F

Input: DO signal
Output: 1NC+1NO

NPFSR-K51D.F is 1NC and 1NO output safety relay, receiving DO signal, realizing reliable isolation control, and the field side supports up to 250V AC load circuit. It can be used for safety related applications of SIL3 and SC3 in accordance with IEC 61508 standard, and ESD in SIS.

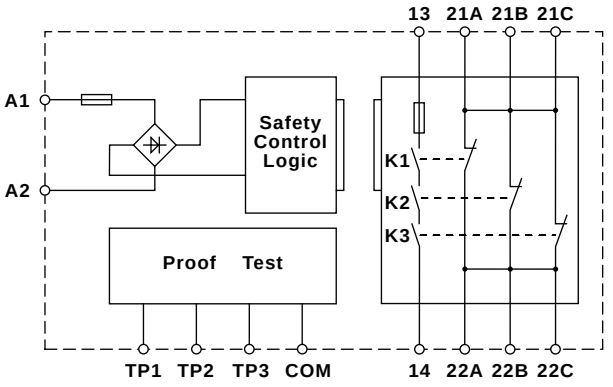
- System loop detection support
- Proof Test
- Fail-safe technique
- Triple redundancy
- Replaceable fuse



Parameters

Power supply type	Loop supply
Voltage range	18 V ~ 32 V DC, Typical 24V DC
Power dissipation	≤ 1.4W/24 V DC
Current consumption	≤ 60mA/24 V DC
Test pulse width	≤ 4ms
Cable resistance	≤ 15Ω
Input devices	Safety switch, DO signal
Number of contacts	1 NC+1 NO
Contact material	$AgSnO_2$
Maximum Contact loading	5A/250V AC, 5A/24V DC
Fuse rating	Replaced fuse, ≤ 5A
Proof test	Refer to safety manual
Energized	≤ 50ms
De-energized delay	≤ 50ms
Switching frequency	≤ 10Hz
EMC	According to IEC 61298-3, IEC/EN 61000-6-2, IEC 61326-3-1
Rated insulation voltage	250V AC
Rated impulse voltage	Input to output: 6000V(1.2/50us) Output to input: 4000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60664-1
Vibration	10Hz ~ 150Hz, 0.75mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	10×10^6 cycles

Functional Block Diagram



Safety Values

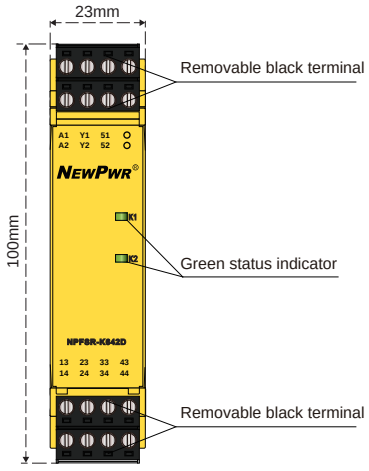
Proof-test interval	15 years, according to IEC 61508
DC_{avg}	60%, according to IEC 61508
SIL	SIL3, according to IEC 61508
HFT	0, according to IEC 61508
SFF	≥ 90%, according to IEC 61508
PFD_{avg}/PTI = 15 years	NC: 8.46×10^{-5}, according to IEC 61508 NO: 1.32×10^{-4}, according to IEC 61508
PFH	NC: 7.72×10^{-9} 1/h, according to IEC 61508 NO: 1.37×10^{-8} 1/h, according to IEC 61508

NPFSR-K642D

Input: Safety contact
Output: 4NO+2NC

The K series contact expansion can expand a group of safety contact signal into multiple safety contact signals, and widely used in machining and other industries.

- Single channel
- With feedback loop
- The safety function remains effective in the case of a component failure



SIL3 IEC 61508

PLe ISO 13849

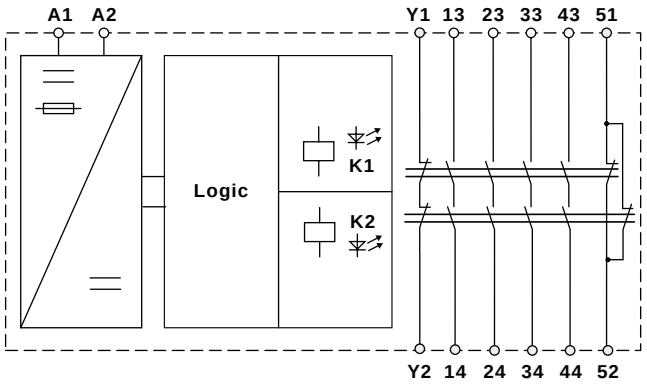
Cat.4 ISO 13849

CE

Parameters

Voltage range	24V DC
Voltage tolerance	0.85 ~ 1.1
Power dissipation	≤ 2W/24V DC
Current consumption	≤ 80mA/24V DC
Test pulse width	≤ 4ms
Cable resistance	≤ 15Ω
Input devices	Safety contact
Signal type	4NO+2NC
Contact type	Forced guided
Contact material	$AgSnO_2$+0.2μmAu
Contact loading	AC-15: 5A/230V, DC-13: 5A/24V
Contact fuse protection	10A gL/gG(NO), 6A gL/gG(NC)
Switch-on	≤ 30ms
Release	≤ 20ms
Recovery time	≤ 100ms
EMC	According to IEC/EN 60947, IEC 61326-3-1, IEC/EN 61000-6-2, IEC/EN 61000-6-4
Rated insulation voltage	250V AC
Rated impulse voltage	6000V(1.2/50us)
Dielectric strength	1500V AC, 1 min
Clearance and creepage	According to IEC 60947-1
Vibration	10Hz ~ 55Hz, 0.35mm
Overvoltage category	III
Pollution degree	2
Protection type	IP20
Ambient temperature	-20°C ~ +60°C
Storage temperature	-40°C ~ +80°C
Operating altitude	≤2000m
Mechanical life	$10×10^6$ cycles

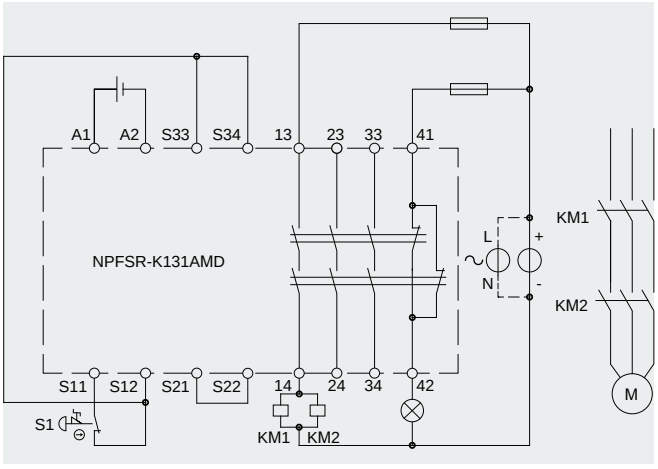
Functional Block Diagram



Safety Values

Performance level	PLe, according to ISO 13849
Category	Cat.4, according to ISO 13849
PTI (T_M)	20 years, according to ISO 13849
DC_{avg}	99%, according to ISO 13849
$MTTF_D$	164 years, according to ISO 13849
CCF	68, according to ISO 13849
SIL	SIL3, according to IEC 61508
SIL CL	SIL CL3, according to IEC 62061
HFT	1, according to IEC 62061
SFF	≥ 99%, according to IEC 62061
PFD_{avg}/PTI = 20 years	$2.03×10^{-6}$, according to IEC 62061
PFH	$2.31×10^{-9}$1/h, according to IEC 62061
Stop Category	0, according to IEC 60204

Typic application wiring



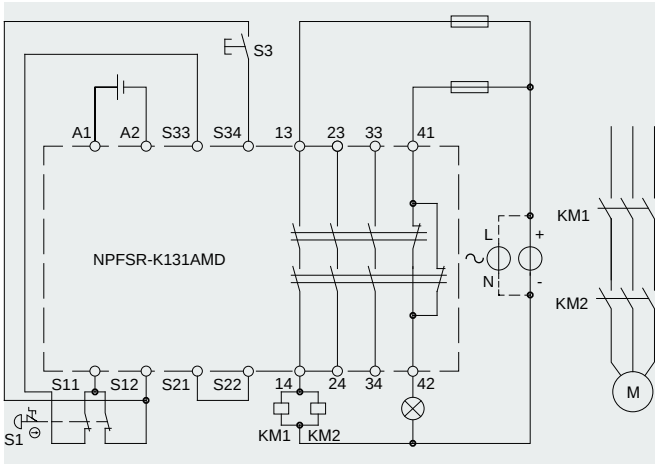
NPFSR-K131AMD

E-Stop input, single channel

Without detection of shorts across contacts

Automatic reset

3 safety contacts (NO), 1 auxiliary contact (NC)



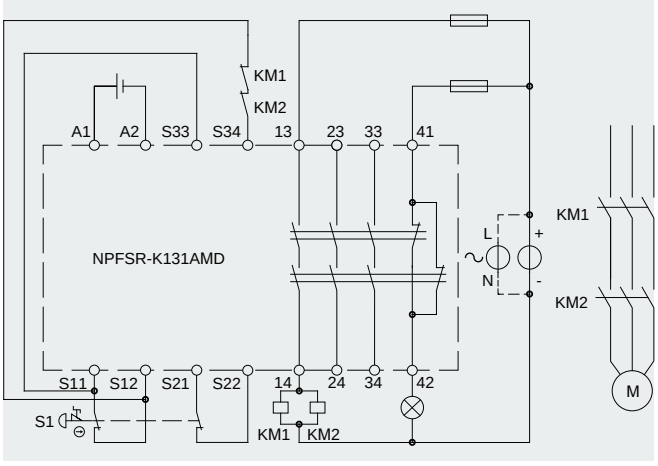
NPFSR-K131AMD

E-Stop input, Dual channel

Without detection of shorts across contacts

Manual reset

3 safety contacts (NO), 1 auxiliary contact (NC)



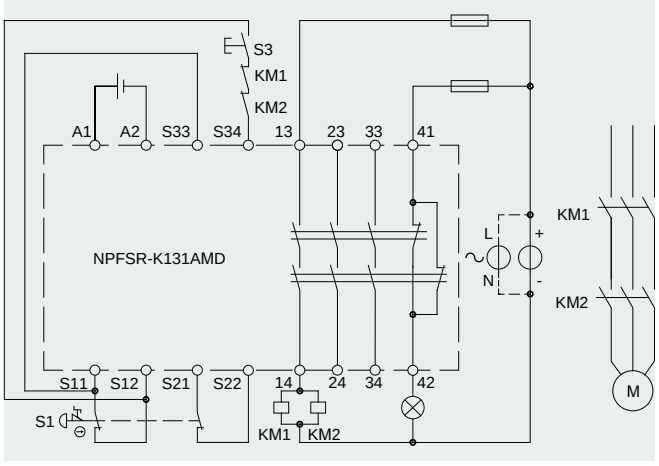
NPFSR-K131AMD

E-Stop input, Dual channel

With detection of shorts across contacts

Automatic reset, with EDM function

3 safety contacts (NO), 1 auxiliary contact (NC)



NPFSR-K131AMD

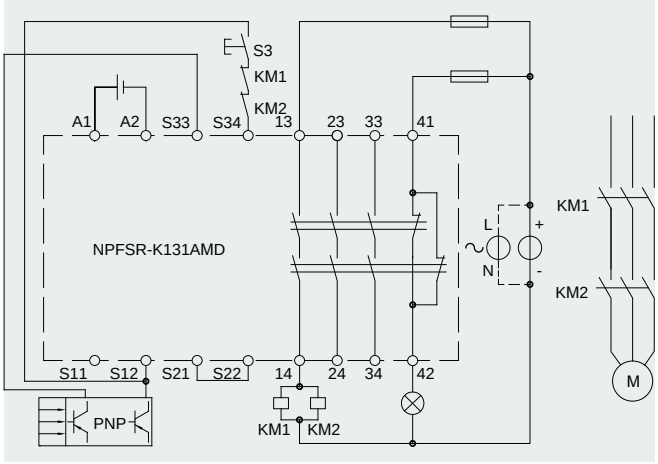
E-Stop input, Dual channel

With detection of shorts across contacts

Manual reset, with EDM function

3 safety contacts (NO), 1 auxiliary contact (NC)

Typic application wiring



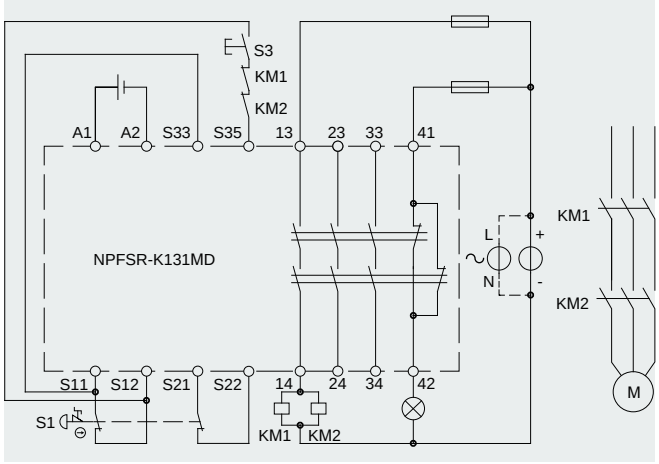
NPFSR-K131AMD

PNP safety light curtain input

With detection of shorts via ESPE

Manual reset, with EDM function

3 safety contacts (NO), 1 auxiliary contact (NC)



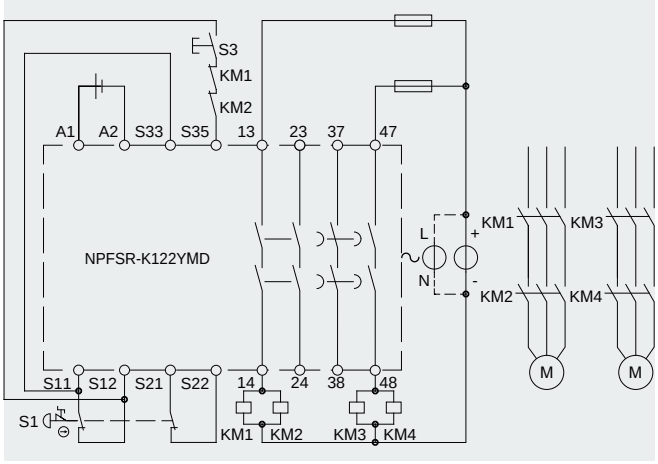
NPFSR-K131MD

E-Stop input, Dual channel

With detection of shorts across contacts

Monitored manual reset

3 safety contacts (NO), 1 auxiliary contact (NC)



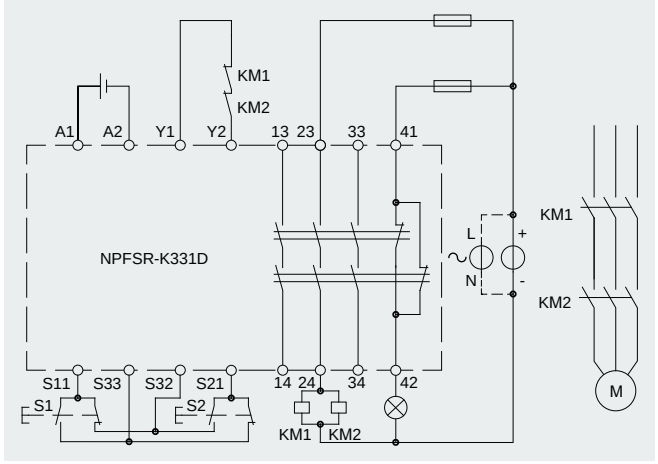
NPFSR-K122YMD

E-Stop input, Dual channel

With detection of shorts across contacts

Monitored manual reset

2 safety contacts (NO), non-delay; 2 auxiliary contact (NC), d-delay



NPFSR-K331D

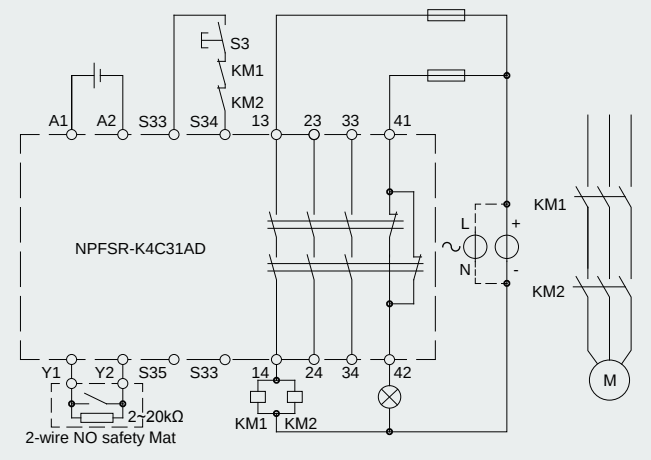
Two-hand control button input, EN 574 Type IIIC

With detection of shorts across contacts

With EDM function

3 safety contacts (NO), 1 auxiliary contact (NC)

Typic application wiring

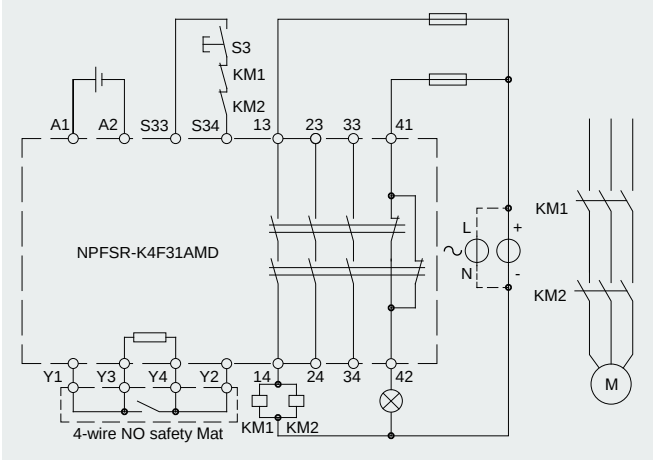


NPFSR-K4C31AMD

2-wire NO contact safety mats input

Manual reset, with EDM function

3 safety contacts (NO), 1 auxiliary contact (NC)

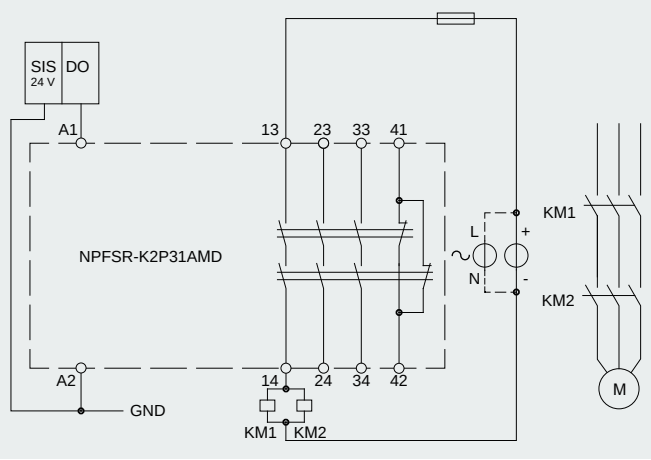


NPFSR-K4F31AMD

4-wire NO contact safety mats input

Manual reset, with EDM function

3 safety contacts (NO), 1 auxiliary contact (NC)

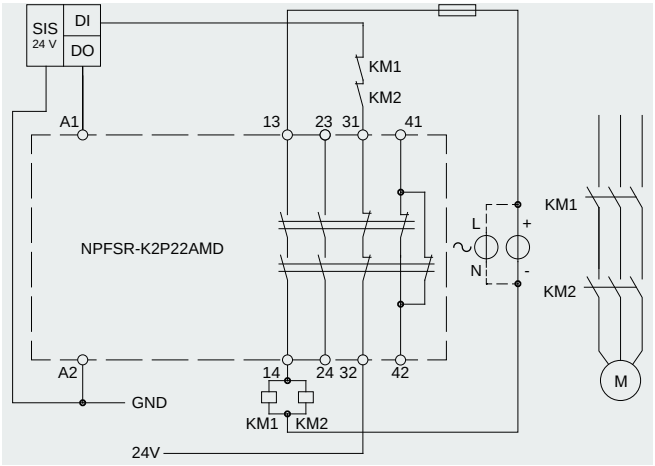


NPFSR-K2P31AMD

Single channel, connect to the fail-safe controller

System loop detection support

Low demand mode application



NPFSR-K2P22AMD

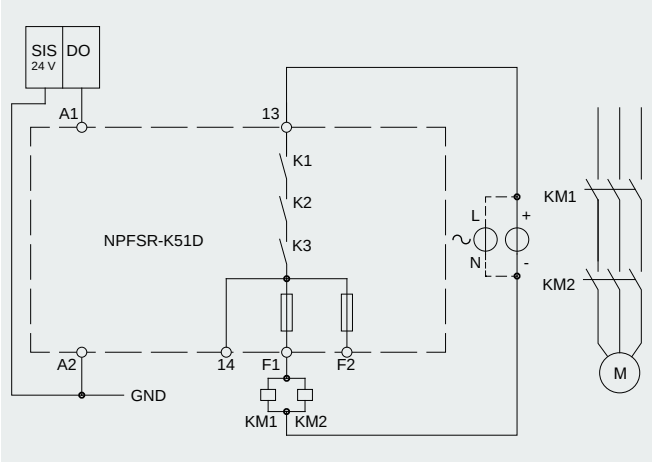
Single channel, connect to the fail-safe controller

System loop detection support

Feedback loop

High demand mode application

Typic application wiring



NPFSR-K51D

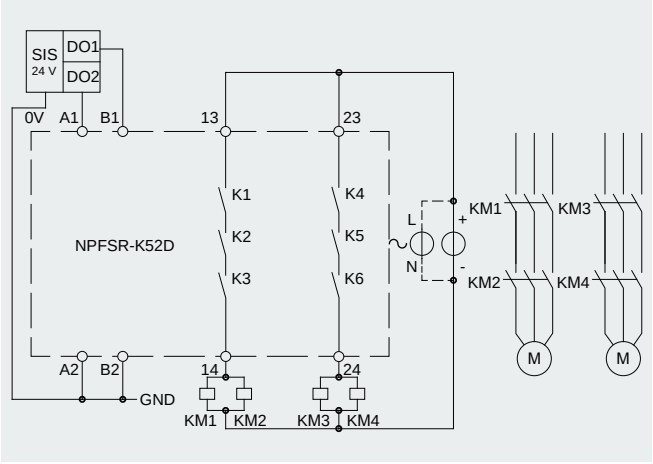
DO input, single channel

System loop detection support

Proof test

Fail-safe

Low demand mode application



NPFSR-K52D

DO input, Dual channel

System loop detection support

Fail-safe

Low demand mode application

Application

For more application solutions, please contact our FAE.