

HR6S-AK Safety Relay Module

Connects to pressure-sensitive switches such as mat switches

- Protects both the operator and the machine by immediately stopping dangerous movements when instructed to stop by the operator or when a failure in the safety circuit is detected.
- Connects to pressure-sensitive switches such as mat switches or edge switches.
- NC contact is available for output.



• See website for details on approvals and standards.

HR6S-AK

Package Quantity: 1

Terminal	Part No.	Supply Voltage
Push-in terminal	HR6S-AK1C	24V AC/DC
Screw terminal	HR6S-AK1P	24V AC/DC

- One sealing strip (see page 26) is included with each product.



Output expansion possible

*Available in February 2021.

Overview of Application Functions



Monitoring of Emergency Stop circuits as per ISO 13850 and IEC 60204-1, stop category 0



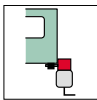
Monitoring of guards as per ISO 14119/14120 with coded magnetic switches



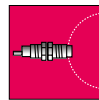
Monitoring of electro-sensitive protective equipment such as type 4 light curtains as per IEC 61496-1



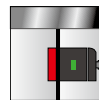
Monitoring of pressure-sensitive 4-wire protective devices such as mats or edges as per ISO 13856



Monitoring of guards as per ISO 14119/14120 with interlock switches



Monitoring of proximity switches



Monitoring of RFID sensors

Safety-Related Outputs

Number of relay contacts, Normally Open, instantaneous	2
Number of relay contacts, Normally Closed, instantaneous	1
Maximum short circuit current IK	1 kA
Maximum continuous current, Normally Open relay contacts	6 A
Maximum continuous current, Normally Closed relay contacts	3 A
Maximum total thermal current ΣI_{THERM}	12 A
Minimum current	10 mA
Utilization category as per UL 60947-5-1	B300 and R300 for Normally Open contacts D300 and R300 for Normally Closed contacts
Utilization category as per IEC 60947-4-1 and IEC 60947-5-1	AC-1: 250 V AC-15: 250 V DC-1: 24 V DC-13: 24 V
Maximum current, normally open relay contacts	AC-1: 5 A AC-15: 3 A DC-1: 5 A DC-13: 3 A
Maximum current, normally closed relay contacts	AC-1: 3 A AC-15: 1 A DC-1: 3 A DC-13: 1 A
External fusing	10 A, category gG, for Normally Open 4 A, category gG, for Normally Closed

Additional Non-Safety-Related Outputs

Output voltage	24V DC
Maximum current	20 mA

Synchronization Times

The synchronization times for the synchronization of safety-related inputs depend on the application function. (See page 13 Function Mode Selector and Input Device Connection Example.)

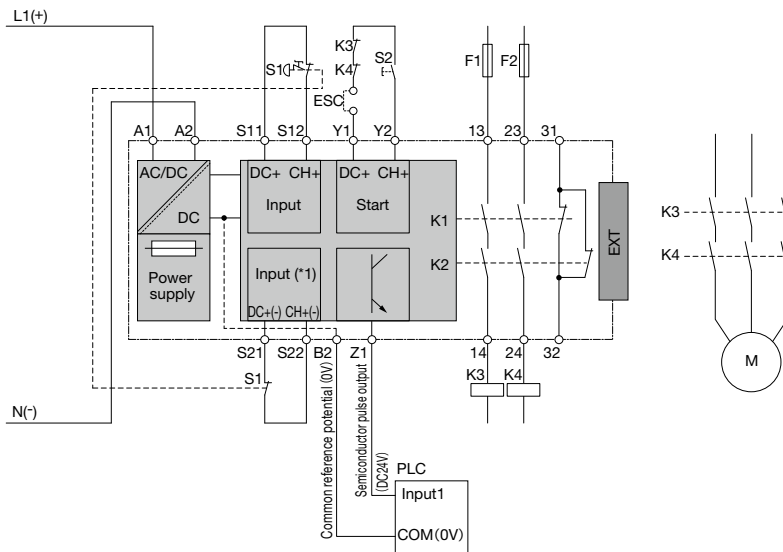
Data Functional Safety

Defined safe state	Safety-related outputs are de-energized Normally Open: open Normally Closed: closed	
Maximum Performance Level (PL), Category (as per ISO 13849-1:2015)	Normally Open: PL e, Category 4 Normally Closed: PLc, Category 1	
Maximum Safety Integrity Level (SIL) (as per IEC 61508-1:2010)	Normally Open: 3 Normally Closed: 1	
Safety Integrity Level Claim Limit (SILCL) (as per IEC 62061:2005+AMD1:2012+AMD2:2015)	Normally Open: 3 Normally Closed: 1	
Type (as per IEC 61508-2)	B	
Hardware Fault Tolerance (HFT) (as per IEC 61508 and IEC 62061)	1	
Stop Category for Emergency Stops (as per ISO 13850 and IEC 60204-1)	0	
Lifetime in years at an ambient temperature of 55 °C (131 °F)	20	
Safe Failure Fraction (SFF) (as per IEC 61508 and IEC 62061)	>99 %	
Probability of Dangerous Failure per hour (PFH _D) in 1/h (as per IEC 61508 and ISO 13849-1)	1.13 x 10 ⁻⁹	
Mean Time To Dangerous Failure (MTTF _D) in years (as per ISO 13849-1)	2,000	
Average Diagnostic Coverage (DC _{avg}) (as per ISO 13849-1)	≥99 %	
Maximum number of cycles over lifetime	DC-13	24V DC 1 A: 1,200,000 24V DC 3 A: 180,000
	AC-1	250V AC 4 A: 180,000 250V AC 1 A: 70,000
		AC-15

For other specifications (common to all models), see page 25.

HR6S-AK

Wiring



Designation	Explanation
EXT	Connector for optional expansion module
S1	Emergency stop switch
S2	Start switch
K3, K4	Contactors
PLC	Programmable controller
F1, F2	Fuse

*1: The application function sets the negative safe-related input according to the input device.

Function Mode Selector and Input Device Connection Example

Dial 1	Dial 2	Dial 3	
<p>Synchronous monitoring: No Dynamization: Yes Signal interlock monitoring: Yes</p>	<p>Synchronous monitoring: 2 s / 4 s (S12 first / S22 first) Dynamization: Yes Signal interlock monitoring: Yes</p>	<p>Synchronous monitoring: 0.5 s Dynamization: Yes Signal interlock monitoring: No</p>	
<p> Emergency stop switches</p>	<p> Interlock switch</p>	<p> Interlock switch (1 NO, 1 NC) Coded magnetic switch (1 NO, 1 NC) (*2) Proximity switch (1 NO, 1 NC)</p>	
Dial 4	Dial 6	Dial 5	Dial 7
<p>Synchronous monitoring: No Dynamization: No Signal interlock monitoring: Yes</p>	<p>Synchronous monitoring: 0.5 s Dynamization: No Signal interlock monitoring: Yes</p>	<p>Synchronous monitoring: No Dynamization: No Signal interlock monitoring: Yes</p>	<p>Synchronous monitoring: 0.5 s Dynamization: No Signal interlock monitoring: Yes</p>
<p> 2 PNP</p>	<p> 2 PNP</p>	<p> 1 PNP + 1 NPN</p>	<p> 1 PNP + 1 NPN</p>
Dial 8	Dial 9	Dial 10	
<p>Synchronous monitoring: No Dynamization: No Signal interlock monitoring: Yes</p>	<p>Synchronous monitoring: No Dynamization: No Signal interlock monitoring: Yes</p>	<p>Synchronous monitoring: 0.5 s Dynamization: No Signal interlock monitoring: Yes</p>	
<p> Pressure-sensitive switch</p>	<p> OSSD</p>	<p> OSSD</p>	

*2: Connection examples for coded magnetic switches such as HS7A (IDEC) are also included on the instruction sheet, but certifications are not available.