Non-contact Interlock Switches

HS7A Series



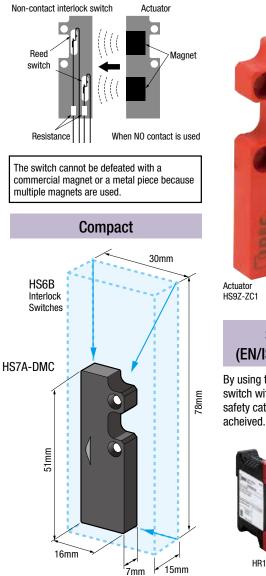
Compact and easy positioning.

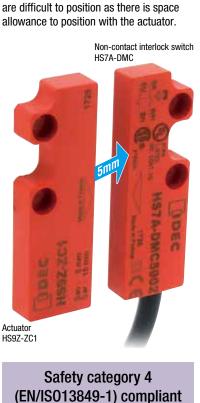
- See website for details on approvals and standards.
- * Non-contact interlock switches can be used as a interlock switch only when used with a safety relay module designated by IDEC.

	Model	Features	Page	
	HS7A-DMC	2-contact	E-095	
-	HS7A-DMP	3-contact	E-099	
	HR1S-DMB/-DME HR1S-AF	Safety Relay Modules for Non-contact Interlock Switches	E-102	

Operating principle (Reed switch)

The reed switch inside the non-contact interlock switch turns ON (NO contact) or OFF (NC contact) when the magnet of the actuator comes close to the non-contact interlock switch.





Easy positioning

Non-contact interlock switches are ideal

for mounting on protective doors that

By using the HS7A non-contact interlock switch with HR1S safety module, up to safety category 4 (EN/ISO13849-1) can be



HR1S-DMB



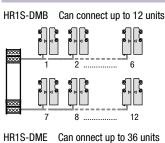
HR1S-DME

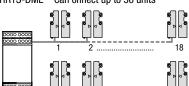
IP67

Because the reed switch is filled with plastic, the switches have strong dust and waterproof characteristics and can be washed with water.



Connects up to 36 units





20 Safety category 3 can be achieved when connecting two or more non-contact interlock switches per one input.

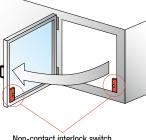
19

- · Safety category 4 can be achieved when connecting one non-contact interlock switches per one input.
- The maximum number of units that can be connected differs depending on the existence of LEDs. See E-095, E-099.

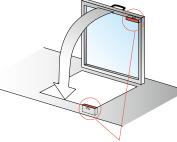
Requirements for using the non-contact interlock switches correctly

Non-contact interlock switches do not have a direct opening function where a circuit is always shut off when the guard is opened. Therefore, a non-contact interlock switch must be used in combination with an exlusive safety relay module.

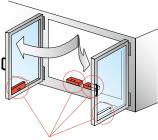
Installation example



Non-contact interlock switch



Non-contact interlock switch



Non-contact interlock switch

APEM

Switches &

Pilot Lights Control Boxes Emergency Stop Switches Enabling Switches

Safety Product

Explosion Proof

Terminal Blocks Relays & Sockets

Circuit

Protectors

Power Supplies

LED Illumination

Controllers Operator

Interfaces

Sensors

AUTO-ID

Interlock Switches

Safety Laser

Safety Light Curtains

Safety Modules

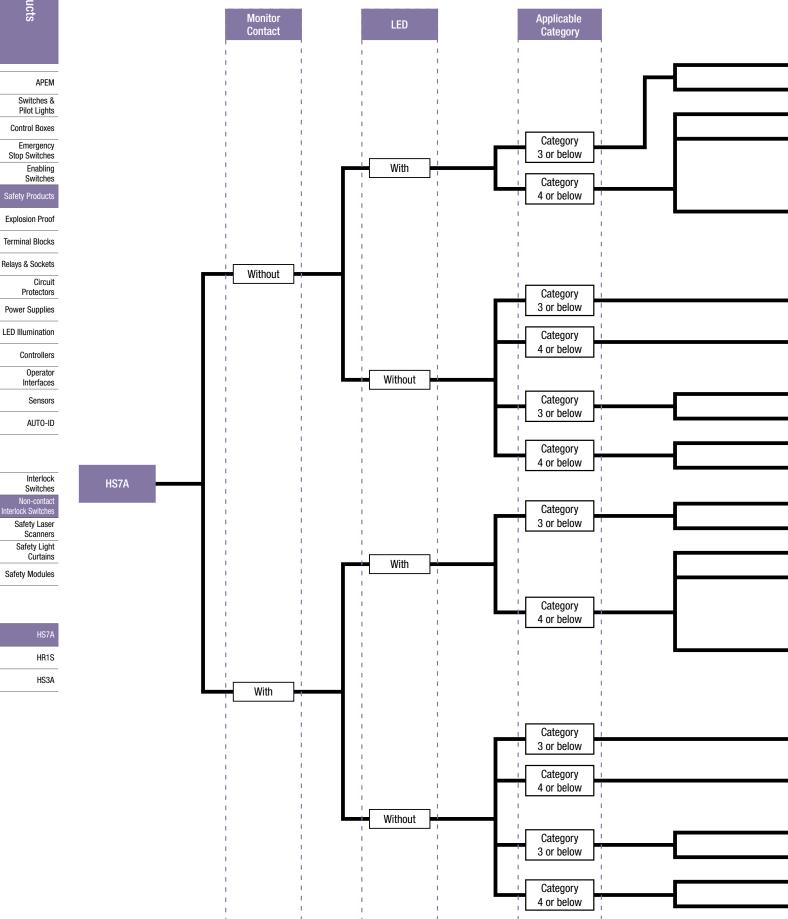
Scanners

HR1S

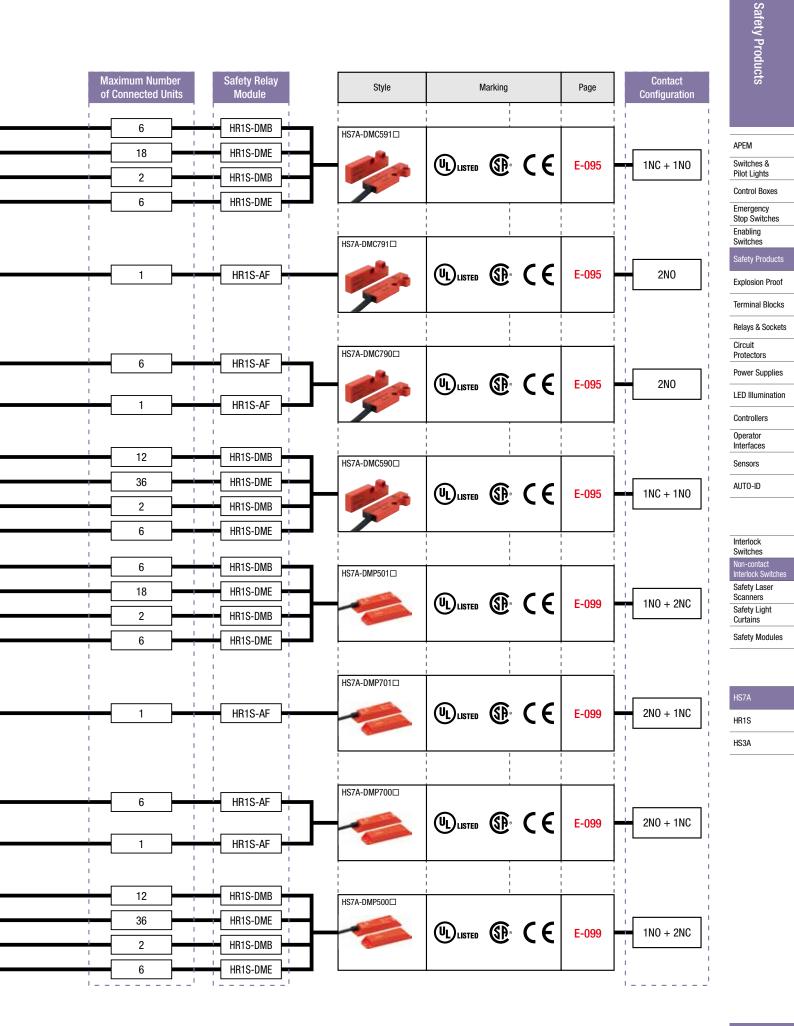
HS3A

36

HS7A Non-contact Interlock Switches



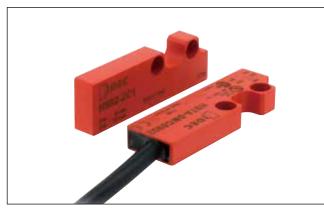
HS7A Non-contact Interlock Switches



Download catalogs and CAD from http://eu.idec.com/downloads

Compact size and easy positioning.

Combination with proprietary relay modules achieves safety category 4 (EN ISO 13849-1).



Relays & Sockets HS7A Non-contact Interlock Switches

Circuit Protectors	Contact Configuration	Cable Length	LED	Part No.	Applicable Safety Relay Module
Power Supplies		0	Without	HS7A-DMC5902	
LED Illumination		2m	With	HS7A-DMC5912	HB1S-DMB1132
	1N0+1NC	5m	Without	HS7A-DMC5905	HR1S-DMB1132
Controllers	TNU+TNC	SIII	With	HS7A-DMC5915	HR1S-DME1132
Operator Interfaces		10m	Without	HS7A-DMC59010	HR1S-DME1132P
		1011	With	HS7A-DMC59110	
Sensors		2m	Without	HS7A-DMC7902	
AUTO-ID		2111	With	HS7A-DMC7912	
	2N0	Fm	Without	HS7A-DMC7905	HR1S-AF5130B
	2N0	5m -	With	HS7A-DMC7915	HR1S-AF5130PB
		10m	Without	HS7A-DMC79010	
Interlock Switches		TOM	With	HS7A-DMC79110	

Package quantity: 1

. The contact configuration in the table above shows the contact status when the non-contact interlock switch is not activated.

HR1S Safety Relay Modules for Non-contact Interlock Switches

Safety Relay Module	Voltage	Number of Inputs	Max. Number of Connectable Non-contact Interlock Switches
HR1S-DMB1132		2	12
HR1S-DMB1132P	24V DC -20 to +20%	2	12
HR1S-DME1132	240 00 -20 10 +20%	6	36
HR1S-DME1132P		ю	30
HR1S-AF5130B	24V AC -15 to +10% 50/60 Hz	-	c
HR1S-AF5130PB	24V DC -15 to +10%	1	6

· Safety category 3 can be achieved when connecting two or more non-contact interlock switches per one input.

• When connecting multiple non-contact interlock switches (HS7A-DMC790), use HR1S-AF5130B/AF5130PB. (HS7A-DMC791 cannot be connected in multiple numbers.)

Maximum Number of Connectable Non-contact Interlock Switches per Input of Safety Relay Module

	HS7A-DMC59		HS7A-DMC79□□	
Non-contact Interlock Switch	Without LED	With LED	Without LED	With LED
HR1S-DMB/DME	6	3	—	_
HR1S-AF5130B/AF5130PB	—	—	6	1

Accessory

Name	Part No.
Actuator	HS9Z-ZC1

• One HS9Z-ZC1 is supplied with each HS7A-DMC non-contact interlock switch.

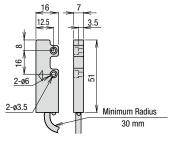
Specifications

-		
Applicable Standards		IEC/EN 60947-5-1 UL508 (UL listed) CSA C22.2, No. 14
Operating Temperatu	re	–25 to +85°C (no freezing)
Relative Humidity		30 to 85% RH (no condensation)
Storage Temperature		-40 to +85°C (no freezing)
Pollution Degree		3
Electric Shock Protec	tion	Class II (IEC 60536)
Degree of Protection		IP67 (IEC 60529)
Shock Resistance		300 m/s ² (11 ms) (IEC 60068-2-7)
Vibration Resistance		100 m/s ² (10 to 150 Hz) (IEC 60068-2-6)
Rated Voltage (Ue)		24V DC
Rated Current (le)		100 mA
Repeat Accuracy		10% maximum
Maximum Operating Frequency		150 Hz
Vallana Draz	I = 10 mA	0.1V (without LED) / 2.4V (with LED)
Voltage Drop	I = 100 mA	1V (without LED) / 4.2V (with LED)
Housing Material		РВТ
Housing Color		Red
Cable		AWG23 (0.25 mm²) × 4 Cable length: 2m, 5m, 10m
Weight (approx.)		HS7A-DMC: 100g (cable length: 2m) HS9Z-ZC1: 9g

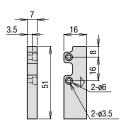
• See E-105 for specifications on HR1S-AF safety relay modules

Dimensions HS7A-DMC (Non-contact

Interlock Switch)



HS9Z-ZC1 (Actuator)



All dimensions in mm.

APEM Switches & Pilot Lights Control Boxes Emergency Stop Switches Enabling Switches Safety Products Explosion Proof Terminal Blocks

lon-cor

Safety Laser

Safety Light

Safety Modules

Scanners

Curtains

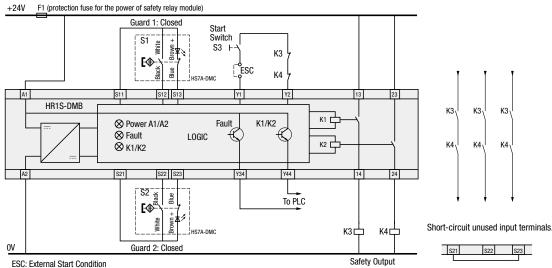
HR1S HS3A

[•] The HS7A-DMC non-contact interlock switch is supplied with an HS9Z-ZC1 actuator.

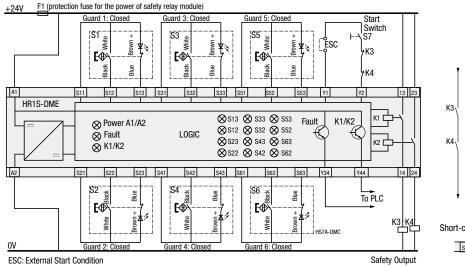
Wiring Diagram

 Δ The following diagrams show the contact statuses when the non-contact interlock switches are activated by the actuators. Below are examples of wiring diagrams.

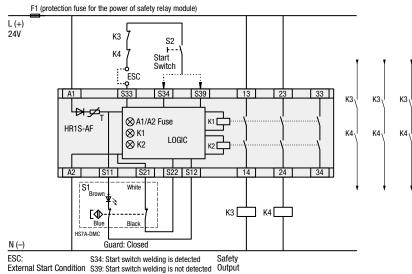
When using HR1S-DMB + HS7A-DMC591 (1N0+1NC) + HS9Z-ZC1



When using HR1S-DME + HS7A-DMC591□ (1N0+1NC) + HS9Z-ZC1



When using HR1S-AF5130B/AF5130PB + HS7A-DMC791 (2N0) + HS9Z-ZC1 (Note)





Short-circuit unused input terminals.

S21	S22	S23

Interlock Switches Non-contact Interlock Switch Safety Laser Scanners

Safety Light Curtains

Safety Modules

HS7A	
HR1S	
HS3A	

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APEM

Switches &

Pilot Lights

Emergency

Enabling

Switches

Control Boxes

Stop Switches

Explosion Proof

Terminal Blocks

Relays & Sockets

Power Supplies

Circuit

Protectors

Controllers

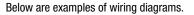
Operator

Interfaces

Sensors

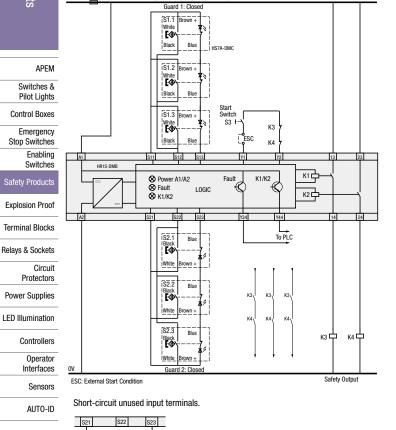
AUTO-ID

Safety Products

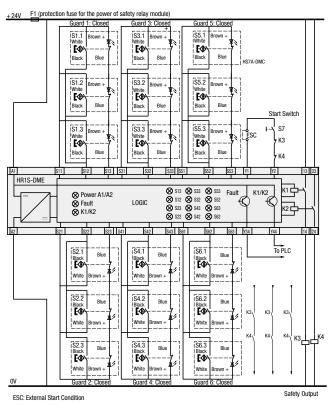


When using HR1S-DMB + HS7A-DMC591 (1N0+1NC) + HS9Z-ZC1

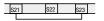




When using HR1S-DME + HS7A-DMC591 (1N0+1NC) + HS9Z-ZC1



Short-circuit unused input terminals.



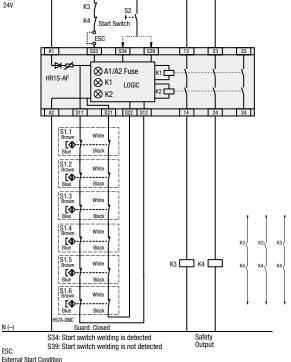
Non-contact Safety Laser Scanners Safety Light Curtains Safety Modules

Interlock

Switches



When using HR1S-AF5130B/AF5130PB + HS7A-DMC790□ (2N0) + HS9Z-ZC1 F1 (protection fuse for the power of safety relay module) L (+) 24V



N (-)

ESC:

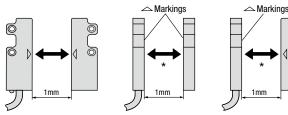
<u> A</u>Safety Precautions

 In order to avoid electric shock or fire, turn power off before installation, removal, wire connection, maintenance, or inspection of the non-contact interlock switch.

Instructions

- Safety category 4 (EN ISO 13849-1) can be achieved by combining the HS7A non-contact interlock switch and HR1S safety relay module (monitor the dual contacts using the safety relay module).
- When using non-contact interlock switches, combine with a proprietary safety relay module and confirm that the conformable safety category and the safety category (EN ISO 13849-1) required to the machinery have been achieved.
- Be sure to use the HS7A non-contact interlock switch in combination with the proprietary actuator HS9Z-ZC1. Do not use other actuators.
- Regardless of door types, do not use the non-contact interlock switch as a door stop. Install a mechanical door stop on the edge of the door to protect the interlock switch against excessive force.
- A shock to the door exceeding 300 m/s² (approx. 30G) may cause a failure to the switch.
- Do not store the non-contact interlock switches in a dusty, humid, organic-gas atmosphere, or areas subject to direct sunlight.

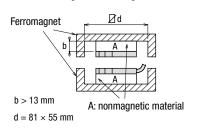
Operating Direction

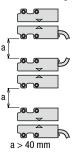


* Safety output ON distance (Sao): 4 mm

Precautions for Installation

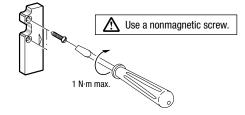
When installing on a ferromagnet





Close mounting

Tightening Torque



• Do not install the actuator in the location where the human body may come in contact. Otherwise injury may occur.

Precaution for Cable Wiring

switches.

A Tensile force on the cable may cause

disconnection. Be sure to secure the

cable near the non-contact interlock

Do not use the non-contact interlock switch as a mechanical stop for movable guard.

🕂 Do not use a hammer to adjust a position of the

non-contact interlock switch.

interlock switch in a magnetic

HS7A-DMC59 (1N0+1NC)

5 (Sao)

15 (Sar

Do not use the non-contact

field of 0.3 mT or over.

Operation Chart

(Minimum Distance)

Brown/Blue

Black/White

Precautions for Mounting the Actuator

100 mm Switches & Pilot Lights Control Boxes

Enabling Switches

Emergency

Stop Switches

Explosion Proof

Terminal Blocks

Relays & Sockets

Protectors

Circuit

Power Supplies

- LED Illumination
- Controllers

Operator Interfaces

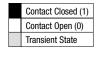
Sensors

AUTO-ID

Interlock Switches Non-contact Interlock Switch Safety Laser Scanners Safety Light Curtains

Safety Modules

HS7A HR1S HS3A



Contact Status

Sao: Assured operating distance where the safety output is sure to turn on. Sar: Assured release distance where the safety output is sure to turn off.

(Minimum Distance)

Brown/Blue

Black/White

HS7A-DMC79 [](2N0)

5 (Sao)

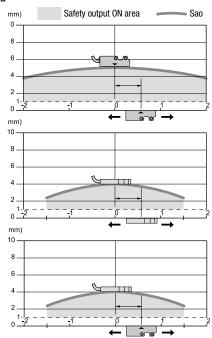
14

15 (Sar

Dimensions: mm

Note: When the transfer time between the actuator's Sao-Sar is 500 ms or longer, the time lag is detected as an error.

Operation Area



APEM Switches & Pilot Lights Control Boxes Emergency Stop Switches

Enabling

Switches Safety Products Explosion Proof Terminal Blocks

Relays & Sockets Circuit Protectors

Power Supplies
LED Illumination
Controllers
Operator
Interfaces
Sensors
AIITO-ID

Interlock Switches

lon-contact

Safety Laser

Safety Light Curtains

Safety Modules

Scanners

HR1S HS3A

HS7A-DMP Non-contact Interlock Switches (3-contact)



HS7A Non-contact Interlock Switches

Contact Configura- tion	Cable Length	LED	Part No.	Applicable Safety Relay Module
	2m	Without	HS7A-DMP5002	HR1S-DMB1132
1N0+2NC	2111	With	HS7A-DMP5012	HR1S-DMB1132P
	5m	Without	HS7A-DMP5005	HR1S-DME1132
		With	HS7A-DMP5015	HR1S-DME1132P
	0	Without	HS7A-DMP7002	
2N0+1NC	2m	With	HS7A-DMP7012	HR1S-AF5130B
	5m	Without	HS7A-DMP7005	HR1S-AF5130PB
	JIII	With	HS7A-DMP7015	

Package quantity: 1

- The HS7A-DMP non-contact interlock switch is supplied with an HS9Z-ZP1 actuator.
- The contact configuration in the table shows the contact status when the noncontact interlock switch is not activated.
- For details on relay modules for HS7A, see HR1S-DMB/DME (E-102) and HR1S-AF (E-105) of the catalog.

HR1S Safety Relay Module for Non-contact Interlock Switches

Safety Relay Module	Number of Inputs	Max. Number of Connectable Non-contact Interlock Switches	
HR1S-DMB1132	0	10	
HR1S-DMB1132P	2	12	
HR1S-DME1132	6	36	
HR1S-DME1132P	0		
HR1S-AF5130B	1	6	
HR1S-AF5130PB	I	0	

 When connecting multiple non-contact interlock switches (HS7A-DMP700[□]), use HR1S-AF5130B/AF5130PB. (HS7A-DMP701[□] cannot be connected in multiple numbers.)

Maximum Number of Connectable Non-contact Interlock Switches per Input of Safety Relay Module

HS7A-DMP50□□		HS7A-DMP70□□	
Without	With	Without	With
LED	LED	LED	LED
6	3	—	—
_	_	6	1
	Without LED 6	WithoutWithLEDLED63	Without LEDWith LEDWithout LED63—

Accessory

Name	Part No.
Actuator	HS9Z-ZP1

• One HS9Z-ZP1 is supplied with the HS7A-DMP non-contact interlock switch.

Specifications

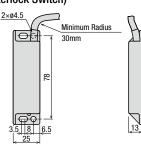
Applicable Standa	rds	IEC/EN 60947-5-1 UL508 (UL listed) CSA C22.2, No. 14
Operating Tempera	ature	-25 to 85°C (no freezing)
Relative Humidity		35 to 85% RH (no condensation)
Storage Temperate	ure	-40 to +85°C (no freezing)
Pollution Degree		3
Electric Shock Pro	tection	Class II (IEC 60536)
Degree of Protection		IP67 (IEC 60529)
Shock Resistance		300 m/s ² (11 ms) (IEC 60068-2-7)
Vibration Resistan	се	100 m/s ² (10 to 150 Hz) (IEC 60068-2-6)
Rated Voltage (Ue)		24V DC
Rated Current (le)		100 mA
Repeat Accuracy		10% maximum
Maximum Operating Frequency		150 Hz
Voltage Drop	I = 10 mA	0.1V (without LED), 2.4V (with LED)
Voltage Drop	I = 100 mA	1V (without LED), 4.2V (with LED)
Electrical Durabilit	Ту	1,200,000 operations minimum
Housing Material		PBT
Housing Color		Red
Cable		AWG23 (0.25 mm²) × 6 Cable length: 2m, 5m
Weight (approx.)		HS7A-DMP: 180g (cable length: 2 m) HS9Z-ZP1: 50g

 \bullet For specifications on safety relay modules, see HR1S-DMB/DME (E-102) and HR1S-AF (E-105) of the catalog.

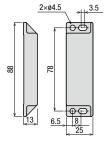
80

Dimensions

HS7A-DMP



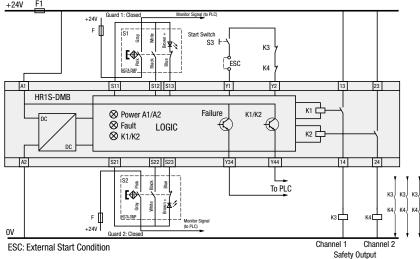
HS9Z-ZP1 (Actuator)



All dimensions in mm.

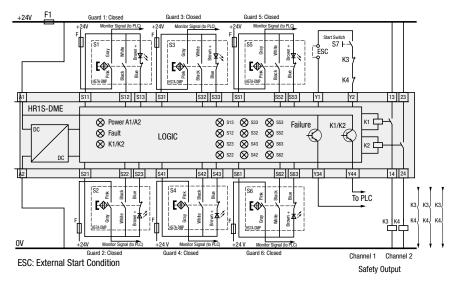
Wiring Diagram

 \triangle The following diagrams show the contact statuses when the non-contact interlock switches are activated by the actuators. Below are examples of wiring diagrams.

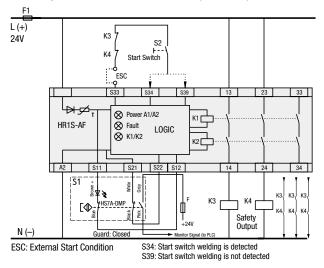


When using HR1S-DMB + HS7A-DMP50 \square (1N0+2NC) + HS9Z-ZP1 +24V F1

When using HR1S-DME + HS7A-DMP50 (1N0+2NC) + HS9Z-ZP1



When using HR1S-AF + HS7A-DMP70 (2N0+1NC) + HS9Z-ZP1



- F1: Protection fuse for the power of safety relay module
- F: Protection fuse for monitor signal contacts (max. 500mA gG (gL))



APEM

Switches & Pilot Lights

Control Boxes Emergency Stop Switches

Enabling Switches

ely Produci

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

Switches Non-contact Interlock Switche Safety Laser Scanners Safety Light Curtains Safety Modules

Interlock

HS7A
HR1S
HS3A

Safety Precautions

. In order to avoid electric shock or fire, turn the power off before installation, removal, wire connection, maintenance, or inspection of the non-contact interlock switch.

etary safety relay module and confirm that the conformable safety

category and the safety category (EN ISO 13849-1) required to the

• Be sure to use the HS7A non-contact interlock switch in combination

with the proprietary actuator HS9Z-ZP1. Do not use other actuators.

· Regardless of door types, do not use the non-contact interlock switch as a door stop. Install a mechanical door stop on the edge of the door

• A shock to the door exceeding 300 m/s² (approx. 30G) may cause a

• Do not store the switches in a dusty, humid, organic-gas atmosphere,

▲ Markings

1mm

to protect the interlock switch against excessive force.

failure to the non-contact interlock switches.

 \bigcirc

or areas subject to direct sunlight.

Operating Direction

0.0

Instructions

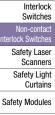
machinery have been achieved.

 Safety category 4 (EN ISO 13849-1) can be achieved by combining Switches & the HS7A non-contact interlock switch and HR1S safety relay module Pilot Lights (monitor the dual contacts using the safety relay module). Control Boxes When using non-contact interlock switches, combine with a propri-

APEM

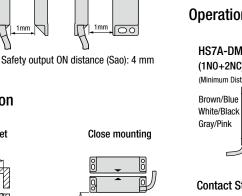
Safety Products

- Emergency Stop Switches Enabling Switches
- Safety Products
- Explosion Proof
- Terminal Blocks
- Relavs & Sockets
- Circuit Protectors
- Power Supplies
- LED Illumination
- Controllers Operator Interfaces
- Sensors AUTO-ID





E-101

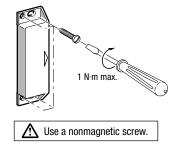




a > 100 mm

Tightening Torgue

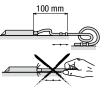
Ferromagnet



 Do not install the actuator in the location where the human body may come in contact. Otherwise injury may occur.

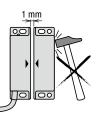
Precaution for Cable Wiring

▲ Tensile force on the cable may cause disconnection. Be sure to secure the cable near the non-contact interlock switch.



Precautions for Mounting Actuator

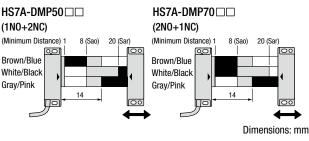
- Do not use the non-contact interlock switch as a A mechanical stop for the movable guard.
- Do not use a hammer to adjust the position of ⚠ non-contact interlock switch.



 $\geq 0.3 \text{mT}$

Do not use the non-contact interlock switch in a magnetic field of 0.3 mT or over.

Operation Chart



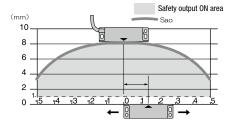
Contact Status



Sao: Assured operating distance where the safety output is sure to turn on. Sar: Assured release distance when the safety output is sure to turn off.

Note: When the transfer time between the actuator's Sao-Sar is 500 ms or longer, the time lag is detected as an error.

Operation Area



Markings

Precautions for Installation

When installing on a ferromagnet

Йd

b > 10mm A: nonmagnetic material d > 118 × 55 mm

HR1S series Safety Relay Modules for Non-contact Interlock Switches

Safety Lase

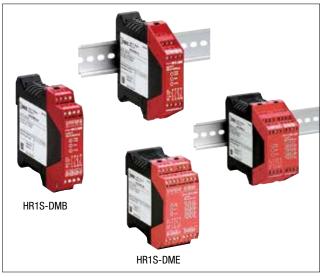
Safety Modules

Scanners Safety Light Curtains

HS7A

HS3A

HR1S-DMB/HR1S-DME



Part No.	Voltage	Terminal Style	Input
HR1S-DMB1132		Integrated terminal block	2
HR1S-DMB1132P	24V DC -20 to +20%	Removable terminal block	2
HR1S-DME1132		Integrated terminal block	6
HR1S-DME1132P		Removable terminal block	0

· Package quantity: 1

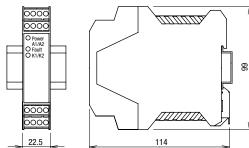
. For the maximum number of connectable non-contact interlock switches, see HS7A-DMC (E-095) and HS7A-DMP (E-099) pages of the catalog.

Applicable Performance Level (PL) e (EN ISO 13849-1) Emergency Safety Category 4 (EN ISO 13849-1) Stop Switch Safety Integrity Level (SIL) 3 (EN 62061) Enabling Response Time 20 ms maximum Enabling Input Synchronization Time 500 ms (between two non-contact interlock switches) Safety Prod Overvoltage Category III Explosion P Rated Insulation Voltage 300V Terminal Bil No. of Time Delay Circuit — Auxiliary Contact — Circuit Contact — Auxiliary Contact — Circuit DC-15 Contool (Jee 230V AC / Ie = 0.75A) LED Illumin Circuit DC-13 Ue 24V DC / Ie = 1.5A LED Illumin Time Delay AC-15 — Controllers Output Ac.15 — Controllers Circuit DC-13 — Controllers Output Ac.15 — Controllers Output Circuit DC-13 — Transistor Circuit 24V/20 mA Sensors Minimum Applicable Load 17V/10 mA (initial value) AUTO-ID Rated Current Output total 12A maximum <	Specifi	ications				
Rated Power Voltage 24V DC (-20 to +20%) APEM Power Consumption HR1S-DMB: 2.5W maximum (24V DC) HR1S-DME: 3.5W maximum (24V DC) Switches & Power Consumption Switches & Power Consumption Overcurrent Protection Electronic Control Circuit Voltage 24V DC Control Circuit Voltage 24V DC Control Box Emergency Safety Category 4 (EN ISO 13849-1) Stop Switch Energency Safety Integrity Level (SIL) 3 (EN 62061) Enabling Switches Safety Integrity Level (SIL) 3 (EN 62061) Enabling Switches Nervoltage Category III Solo Subteween two non-contact interlock switches) Safety Prod Overvoltage Category III Pollution Degree 2 Relays & So Rated Insulation Voltage 300V Relays & So Circuit Terminal BI No. of Outputs Time Delay Circuit Power Supp Archistor Control Control Circuit Controllers Overstortage AC-15 C300 (Ue = 230V AC / Ie = 0.75A) ED ED Illumin Time Delay Circuit Controllers Operator Operator Auxiliary AC-15 Controllers Operator Operator </td <td>Operating ⁻</td> <td>Temperature</td> <td></td> <td>-10 to +55°C (no freezing)</td> <td></td>	Operating ⁻	Temperature		-10 to +55°C (no freezing)		
Power Consumption HR1S-DMB: 2.5W maximum (24V DC) HR1S-DME: 3.5W maximum (24V DC) File tube Overcurrent Protection Electronic Switches & Pilot Lights Control Circuit Voltage 24V DC Control Box Applicable Performance Level (PL) e (EN ISO 13849-1) Emergency Safety Category 4 (EN ISO 13849-1) Stop Switches Safety Integrity Level (SIL) 3 (EN 62061) Enabling Response Time 20 ms maximum Safety Network Input Synchronization Time 500 ms (between two non-contact interlock switches) Safety Prod Overvoltage Category III Explosion P Rated Insulation Voltage 300V Relays & So No. of Time Delay Circuit 2NO Relays & So Output Contract Control Circuit Auxiliary Contact — Control Quiput Circuit AC-15 — Output Circuit DC-13 — Circuit DC-13 — Controllers Operator Interfaces Time Delay Circuit 24V/20 mA Sensors Minimum Applicable Load 17V/10 mA (initial value) Operator Operator Operator Frequency 1200 operations/hour maximum AUT0-ID </td <td colspan="2">•</td> <td></td> <td>Terminal: IP20, Housing: IP40</td> <td></td>	•			Terminal: IP20, Housing: IP40		
Power Consumption HR1S-DME: 3.5W maximum (24V DC) Switches & Pilot Lights Overcurrent Protection Electronic Control Circuit Voltage 24V DC Applicable Performance Level (PL) e (EN ISO 13849-1) Emergency Safety Category 4 (EN ISO 13849-1) Stop Switch Safety Integrity Level (SIL) 3 (EN 62061) Enabling Response Time 20 ms maximum Switches & Input Synchronization Time 500 ms (between two non-contact interlock switches) Safety Prod Pollution Degree 2 Safety Circuit Explosion P Pollution Degree 2 Safety Circuit Protectors No. of Time Delay Circuit — — Output Safety Circuit Contact — Auxiliary Contact — Control Circuit Circuit Transistor 200 (ue = 230V AC / le = 0.75A) Even Support Output Safety Circuit AC-15 — Controllers Operation Transistor 200 operations/hour maximum Even Support Auxiliary AC-15 — — Controllers Circuit DC-13 — Controllers Operator Auxiliary Circuit 24V/20 mA Senso	Rated Power Voltage				APEM	
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Safety Category 4 (EN ISO 13849-1) Stop Šwitch Safety Integrity Level (SIL) 3 (EN 62061) Enabling Response Time 20 ms maximum Stop Šwitch Input Synchronization Time 500 ms (between two non-contact interlock switches) Safety Prod Overvoltage Category III Explosion P Pollution Degree 2 Explosion P Rated Insulation Voltage 300V Explosion P No. of Time Delay Circuit Auxiliary Contact Auxiliary Contact Circuit Transistor 2NO Auxiliary AC-15 C300 (Ue = 230V AC / Ie = 0.75A) Power Supp Output Time Delay Circuit DC-13 Auxiliary AC-15 Controllers Output Dc-13 Controllers Auxiliary AC-15 Controllers Operator Dc-13 Controllers Operator Dc-13 Controllers Operator Dc-13 Controllers Minimum Applicable Load 17V/10 mA (initial value) AUTO-ID Rated Current Output total 12A maximum AUTO-ID	Applicable	Performance I	Level (PL)	e (EN ISO 13849-1)	Emergency	
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Pollution Degree 2 Rated Insulation Voltage 300V Maximum Input Resistance 100Ω (per input point) Maximum Input Resistance 100Ω (per input point) Safety Circuit 2NO Auxiliary Circuit Contact Auxiliary Circuit Contact Safety Circuit Contact Auxiliary Circuit Contact Time Delay Circuit AC-15 Circuit Contact Time Delay AC-15 Circuit DC-13 Time Delay AC-15 Circuit DC-13 Auxiliary Circuit DC-13 Minimum Applicable Load 17V/10 mA (initial value) Operation Frequency 1200 operations/hour maximum Rated Current Output total 12A maximum Wire Size HR1S-DME1132: 0.21 to 2.5mm ² HR1S-DME1132P. 0.2 to 2.5mm ² Wire Size HR1S-DME1132P. 0.2 to 2.5mm ² HR1S-DME1132P. 0.2	Input Sync	hronization Tir	ne	500 ms (between two non-contact interlock switches)	Safety Products	
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Maximum Input Resistance 100Ω (per input point) Iterminal Bit No. of Outputs Safety Circuit 2NO Relays & So Auxiliary Circuit Contact Circuit Auxiliary Circuit Contact Circuit Safety Circuit Contact Circuit Safety Circuit Contact Circuit Safety Circuit AC-15 C300 (Ue = 230V AC / Ie = 0.75A) Power Supp Time Delay Circuit AC-15 Controllers Time Delay Circuit AC-15 Controllers Auxiliary Circuit DC-13 Controllers Operation DC-13 Controllers Operation Frequency 1200 operations/hour maximum AUTO-ID Rated Current Output total 12A maximum AUTO-ID Wire Size HR1S-DME1132: 0.2 to 2.5mm ² HR1S-DME1132P. 0.2 to 2.5mm ² HR1S-DME1132P. 0.2 to 2.5mm ² Interlock <t< td=""><td>Pollution D</td><td>egree</td><td></td><td>2</td><td>Explosion Proof</td></t<>	Pollution D	egree		2	Explosion Proof	
	Rated Insu	lation Voltage		300V	Terminal Disaka	
No. of Outputs Time Delay Circuit	Maximum	Input Resistan	се	100Ω (per input point)	Terminal Blocks	
Auxiliary Circuit Contact Transistor	Safety Circuit			2N0	Relays & Sockets	
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Void Instruction Instruction Instruction Power Supplication Power Supplication AC-15 C300 (Ue = 230V AC / Ie = 0.75A) Power Supplication Time Delay AC-15 — DC-13 Ue = 24V DC / Ie = 1.5A LED Illumin Time Delay AC-15 — Controllers Operation Controllers Auxiliary AC-15 — Controllers Operation Interfaces Transistor Circuit 24V/20 mA Sensors Sensors Operation Frequency 1200 operations/hour maximum AUTO-ID Rated Current Output total 12A maximum AUTO-ID Wire Size HR1S-DMB1132: 0.14 to 2.5mm ² HR1S-DME1132P: 0.2 to 2.5mm ² Interlock Wireht HR1S-DME1132P: 0.2 to 2.5mm ²	Outputs	Auxiliary	Contact	—		
Safety Circuit AC-15 C300 (0e = 230V AC / Ie = 0.7SA) LED Illumina Output Contact Ratings AC-15 —		Circuit	Transistor	2N0		
Output Contact Ratings AC-15 Controllers Time Delay Circuit AC-15 Controllers Auxiliary Circuit AC-15 Controllers Auxiliary Circuit AC-15 Controllers Transistor Circuit 24V/20 mA Operation Interfaces Sensors Minimum Applicable Load 17V/10 mA (initial value) AUTO-ID Rated Current Output total 12A maximum AUTO-ID Wire Size HR1S-DMB1132: 0.2 to 2.5mm ² HR1S-DMB1132P: 0.2 to 2.5mm ² HR1S-DMB1132P: 0.2 to 2.5mm ² Interlock Switches		Cofoty Circuit	AC-15	C300 (Ue = 230V AC / Ie = 0.75A)	Power Supplies	
Time Delay Circuit AC-15 — Circuit DC-13 — Controllers Auxiliary Circuit AC-15 — Operator Auxiliary Circuit AC-15 — Operator Transistor Circuit 24V/20 mA Sensors Minimum Applicable Load 17V/10 mA (initial value) AUTO-ID Rated Current Output total 12A maximum AUTO-ID Wire Size HR1S-DMB11322: 0.14 to 2.5mm ² HR1S-DMB1132P: 0.2 to 2.5mm ² Interlock Switches	1	Salety Circuit	DC-13	Ue = 24V DC / Ie = 1.5A	LED Illumination	
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Minimum Applicable Load 17V/10 mA (initial value) Sensors Operation Frequency 1200 operations/hour maximum AUTO-ID Rated Current Output total 12A maximum HR1S-DMB1132: 0.14 to 2.5mm ² Wire Size HR1S-DME1132: 0.2 to 2.5mm ² Interlock Waight HR1S-DMB: 180g Switches	latingo	Circuit	DC-13	—		
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Rated Current Output total 12A maximum Wire Size HR1S-DMB1132: 0.14 to 2.5mm² HR1S-DME1132D: 0.2 to 2.5mm² HR1S-DME1132D: 0.2 to 2.5mm² HR1S-DME1132D: 0.2 to 2.5mm² Weight HR1S-DMB1132D: 0.2 to 2.5mm² HR1S-DME1132D: 0.2 to 2.5mm²	1	Minimum Appl	icable Load	17V/10 mA (initial value)	Sensors	
Wire Size HR1S-DMB1132: 0.14 to 2.5mm² HR1S-DME1132: 0.2 to 2.5mm² HR1S-DME1132P: 0.2 to 2.5mm² HR1S-DME1132P: 0.2 to 2.5mm² Interlock Switches	Operation Frequency			1200 operations/hour maximum	AUTO-ID	
Wire Size HR1S-DME1132: 0.2 to 2.5mm² HR1S-DMB1132P: 0.2 to 2.5mm² HR1S-DME1132P: 0.2 to 2.5mm² Interlock Switches Weight HR1S-DMB: 180g	Rated Current			Output total 12A maximum		
Weight RRTS-DWB: Toog	Wire Size			HR1S-DME1132: 0.2 to 2.5mm ² HR1S-DMB1132P: 0.2 to 2.5mm ²	Interlock	
Incio-Divie. 2009	Weight				Switches Non-contact	

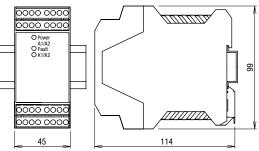
• Use a 4A fuse (Type gL) for power fuse protection.

• Use a 4A (Type gL) or a 6A fast blow fuse for output fuse protection.

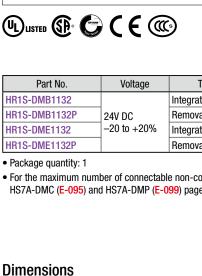
HR1S-DMB1132P



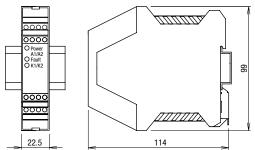
HR1S-DME1132P



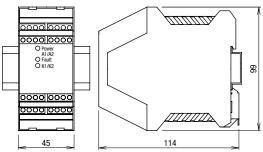
All dimensions in mm.



HR1S-DMB1132



HR1S-DME1132



bownload catalogs and CAD from http://eu.idec.com/downloads

HR1S Series Safety Relay Modules for Non-contact Interlock Switches

LED Indication

HR1S-DMB

- Power A1/A2: Turns on when power circuit is normal. Turns off when power is interrupted or the electronic fuse blows.
- Fault:
- Turns on when the HR1S fails
 - (see Causes of Fault LED Indication on E-104).

• K1/K2: Switches & Pilot Lights

APEM

Control Boxes

Emergency Stop Switches

Enabling

Switches

Safety Product

Explosion Proof

Terminal Blocks

Relavs & Sockets

Power Supplies LED Illumination

Circuit

Protectors

Controllers

Operator Interfaces Sensors

AUTO-ID

Interlock Switches

Safety Laser Scanners

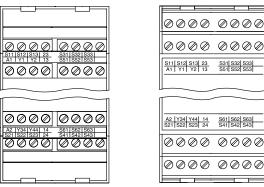
Safety Light

Turns on when K1/K2 relays operate.

HR1S-DME

- Power A1/A2:
 - Turns on when power circuit is normal.
 - Turns off when power is interrupted or the electronic fuse blows.
- Fault:
 - Turns on when the HR1S fails
 - (see Causes of Fault LED Indication on E-104)
- K1/K2:
 - Turns on when K1/K2 relays operate.
- S13: N0 contact of non-contact interlock switch 1
- S12: NC contact of non-contact interlock switch 1
- S23: NO contact of non-contact interlock switch 2
- S22: NC contact of non-contact interlock switch 2
- S33: NO contact of non-contact interlock switch 3
- S32: NC contact of non-contact interlock switch 3
- S43: NO contact of non-contact interlock switch 4 S42: NC contact of non-contact interlock switch 4
- S53: NO contact of non-contact interlock switch 5
- S52: NC contact of non-contact interlock switch 5
- S63: NO contact of non-contact interlock switch 6
- S62: NC contact of non-contact interlock switch 6

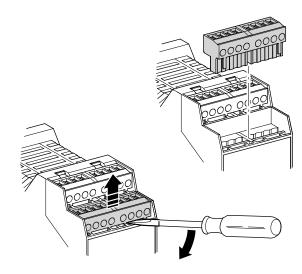
HR1S-DME



HR1S-DME1132

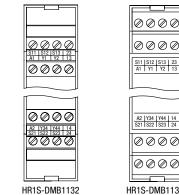
HR1S-DME1132P

• The terminal block of the HR1S-DME as shown below, allowing for easy installation and replacement of modules.



Terminal Arrangement

HR1S-DMB



Curtains Safety Modules

HS7A

HS3A



- The terminal block of the HR1S-DMB as shown below, allowing for easy installation and replacement of modules.

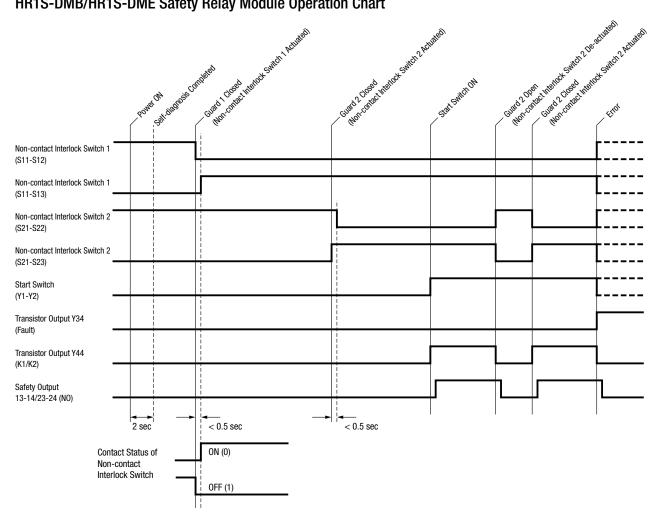
Causes of Fault LED Indication

LED2: Fault	Fault Type	Fault Cause	Measures	rod
l ↑	Internal Fault	Fault of the internal circuit	Replace the safety relay module.	ucts
	External Fault	Short circuit of the +24V power supply and input terminal	Remove the short circuit and reboot.	
	External Fault	Short-circuit of the non-contact interlock switch wiring	Correct the wiring of the non-contact interlock switch and reboot.	APEM
	Synchronization time excess of switch contact	Synchronization for the NO contact and NC contact of the non-contact interlock switch (HS7A) is 0.5 seconds or longer.	Open and close the door again.	Switches & Pilot Lights Control Boxes
	input	Fault of the non-contact interlock switch (HS7A)	Replace the non-contact interlock switch.	Emergency

• External fault: 1-sec ON, 1-sec OFF

• Synchronization time excess: 30-sec ON, 30-sec OFF

HR1S-DMB/HR1S-DME Safety Relay Module Operation Chart



Control Boxes Emergency

Stop Switches Enabling Switches

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers Operator

Interfaces

Sensors AUTO-ID

Interlock

Switches Non-co Safety Laser Scanners Safety Light Curtains Safety Modules

HS7A	
HR1S	
HS3A	

APEM Switches &

Pilot Lights Control Boxes Emergency Stop Switches

Enabling Switches

Explosion Proof

Terminal Blocks
Relays & Sockets
Circuit
Protectors
Power Supplies
LED Illumination
Controllers
Operator
Interfaces
Sensors

AUTO-ID

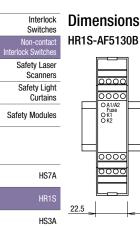
HR1S Series Safety Relay Modules for Non-contact Interlock Switches

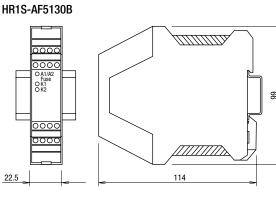
HR1S-AF

Number **Terminal Style** Part No. Voltage of Input Integrated HR1S-AF5130B 24V AC -15 to +10% terminal block 50/60Hz 1 Removable 24V DC -15 to +10% HR1S-AF5130PB terminal block

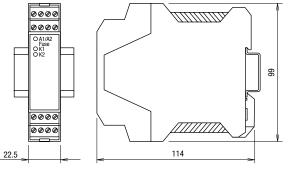
Package quantity: 1

· For the maximum number of connectable non-contact interlock switches, see HS7A-DMC (E-095) and HS7A-DMP (E-099) pages of the catalog.





HR1S-AF5130PB Detachable Terminal



All dimensions in mm.

Specifications

Operating	Temperature		-25 to +55°C (no freezing)
Degree of Protection			Terminal: IP20, Housing: IP40
Rated Voltage			24V AC (-15 to +10%) 50/60 Hz 24V DC (-15 to +10%)
			5VA maximum
Overcurre	nt Protection		Electronic (Note)
Control Ci	rcuit Voltage		24V DC
Applicable	e Performance	Level (PL)	e (EN ISO 13849-1)
Safety Cat	tegory		4 (EN ISO 13849-1)
Safety Inte	egrity Level (SI	L)	3 (EN 62061)
Response	Time		S11-S12, S21-S22 interrupted: 20 ms Power interrupted: 60 ms
Input Syno	chronization Ti	me	Unlimited
Overvolta	ge Category		Ш
Pollution [Degree		2
Rated Insu	ulation Voltage		300V
Maximum	Input Resistar	ice	90Ω
	Safety Circu	it	3N0
No. of	Time Delay	Circuit	-
Outputs	Auxiliary	Contact	-
	Circuit	Transistor	-
	Safety	AC-15	C300 (1800VA/180VA)
	Circuit	DC-13	24V/1.5A, L/R = 50 ms
	Time Delay	AC-15	-
Output	Circuit	DC-13	-
Contact	Auxiliary	AC-15	-
Ratings	Circuit	DC-13	-
	Transistor C	rcuit	-
	Minimum Applicable L	oad	17V/10 mA (initial value)
Operation	Frequency		1200 operations/hour maximum
Rated Current			Safety circuit output total: 18A maximum Each safety circuit output: 6A maximum
Wire Size			HR1S-AF5130B: 1 × 2.5mm, 2 × 0.75mm maximum HR1S-AF5130PB: 1 × 2.5mm, 2 × 1.5mm maximum
Weight			250g

Note: Short-circuit of S11 and S21 activates the overcurrent protection circuit, interrupting the power supply. The safety output turns off. Normal status is restored when the short-circuit is removed.

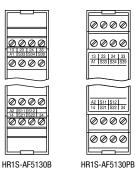
• Use a 4A fuse (Type gL) for power fuse protection.

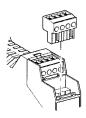
• Use a 4A fuse (Type gL) or a 6A fast blow fuse for output fuse protection.

LED Indication

- A1/A2 Fuse:
- Turns on when power circuit is normal. Turns off when power is interrupted or the electronic fuse blows.
- K1: Turns on when K1 relay operates.
- K2: Turns on when K2 relay operates.

Terminal Arrangement





 The terminal block of the HR1S-AF5130PB can be removed and installed as shown above, allowing for easy installation and replacement of modules.

🗥 Residual Risk (EN292-1, 5.5)

The wiring diagrams in this catalog have been tested under actual operating conditions. The HR1S safety relay module can be used in a safety circuit by connecting to the safety equipment compliant to applicable standards. Consider residual risk in the following circumstances.

1. When circuits other than described in this catalog are used.

Instructions

HR1S Safety Relay Modules

- . Do not disassemble the safety relay modules. Do not damage the seal.
- Negligence to observe the following instructions may cause accidents that result in death or serious injuries.
 - · Connect the wires according to the wiring diagrams shown in this catalog.
 - · Connect the wires according to the applicable standards.
 - . The contacts of relays and contactors to connect with safety outputs must be of the forced guided type compliant with EN 50205.
- · When maintaining or adjusting the machines, observe the maintenance schedule.
- Turn the power off before installation, removal, wire connection, maintenance, or inspection of the safety relay module in order to avoid electric shock or fire. Otherwise death or serious injury may be caused.

HR1S-DMB/HR1S-DME

- Use 13-14 and 23-24 safety outputs for the safety equipment which constitutes the safety circuit compliant with EN 60204-4/EN418.
- Connect the 13-14 and 23-24 safety outputs in series when turning on/off the hazard source directly in the circuit of safety category 4.
- The safety relay module will perform self diagnosis for two seconds after powering on A1-A2 terminals. During self diagnosis, all LEDs will turn on, and Y34/Y44 outputs turn on.
- · Safety outputs turn on when the non-contact interlock switch has been activated and the start input turns on. The safety outputs turn on only when the NO contact of the non-contact interlock switch turns on within 0.5 seconds after the NC contact has turned off.
- Short-circuit the unused inputs according to the wiring diagram.
- Connect a surge absorbing element to the input coil of the relay connected to the safety output.
- Use a 4A fuse (Type gL) or a 6A fast blow fuse for power and output fuse protection.

observed. Or, when machine is not adjusted or maintained properly (observe the maintenance schedule strictly). 3. When the contacts of relays and contactors for connecting with

2. When the applicable standards of machine operation are not

safety outputs are not of the forced guide type compliant with EN 50205.

HR1S-AF

- For stop category 0 compliant with EN 60204-1/EN418, use the outputs of 13-14, 23-24, and 33-34.
- · Connect a start switch to S33-S34 to detect contact welding and other failures. Contact welding cannot be detected if the start switch is connected to S33-S39, because the output circuit closes when the start switch closes.

APEM

Safety Products

Control Boxes Emergency Stop Switches

Enabling Switches

Explosion Proof

Terminal Blocks

Relavs & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

AUTO-ID

Sensors

Interlock Switches

Safety Laser Scanners Safety Light Curtains

Safety Modules

HS7A	
HR1S	
HS3A	