# HR1S-AC Safety Relay Modules

# Transistor output provided.

- Removable terminal block (HR1S-AC5121P) allows for easy module replacement.
- Fault diagnosis function with dual safety circuits.
- Internal relay operations can be monitored with LED indicator.
- Finger-safe protection
- 35-mm-wide DIN rail mounting
- EN, IEC compliant.
- TÜV NORD approved.
- UL listed, CSA approved.

Part No.	Voltage	Terminal Style
HR1S-AC5121	24V AC, -20 to +10% 50/60 Hz 24V DC, ±20%	Integrated Terminal Block
HR1S-AC5121P		Removable Terminal Block

# Specifications

Operating Temperature		perature	-10 to +55°C (no freezing)		
Degree of Protection		ection	Terminal: IP20, Housing: IP40		
Rated Voltage			24V AC (-20 to +10%) 50/60 Hz 24V DC (±20%)		
Powe	er Consum	ption	AC: 2.2 VA (24V AC) maximum DC: 1.2W (24V DC) maximum		
Over	current Pro	otection	Electronic		
Cont	rol Circuit	Voltage	24V		
Applicable Performance Level (PL)		ormance	e (EN ISO 13849-1)		
Safet	y Categor	y	3 (EN 954-1)		
Safety Integrity Level (SIL)		Level (SIL)	3 (EN 62061)		
Resp	onse Time	•	100 ms maximum		
Input Synchronization Time		ization	Unlimited		
Overvoltage Category		tegory	Ш		
Pollu	tion Degre	е	2		
Rated Insulation Voltage		n Voltage	300V		
0	Safety Ci	rcuit	3NO		
. of	Time-dela	ay Circuit	-		
ort N	Auxiliary	Contact	-		
	Circuit	Transistor	1NO (transistor)		
	Safety Circuit	AC-15	C300: Ue = 230V AC / Ie = 0.75A		
		DC-13	24V/2A: Ue = 24V DC / Ie = 2A		
act	Time-	AC-15	-		
Output Conta Ratings	delay Circuit	DC-13	-		
	Auxiliary Circuit	AC-15	-		
		DC-13	_		
	Transistor Circuit		24V/20mA		
	Minimum Applicable Load		17V/10 mA (initial value)		
Operating Frequency		uency	1200 operations/h maximum		
Mechanical Durability		rability	10,000,000 operations minimum		
Rated Current			Safety circuit output total: 10.5A maximum		
Wire Size			HR1S-AC5121: 1 × 2.5mm <sup>2</sup> , 2 × 0.75mm <sup>2</sup> maximum HR1S-AC5121P: 1 × 2.5mm <sup>2</sup> , 2 × 1.5mm <sup>2</sup> maximum		
Weight (approx.)		.)	160g		

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

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

#### **LED** Indicator

#### • 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.



# Dimensions



#### HR1S-AC5121P Removable Terminal



00000 00000 A111323133 14224 Y11 Y2

A1 14 24 34 A2 Y43Y44

0000

0000 HR1S-AC5121P

# **Terminal Arrangement**

-	A1 13 23 33 14 24 Y1 Y2	
	0000	j
[		]
	$\begin{array}{c c} & & & & \\ \hline A1 & 14 & 24 & 34 \\ \hline A2 & & & \\ \hline & & & & \\ \hline & & & & \\ \hline & & & &$	
	IB1S-AC512	21

 The terminal block of the HR1S-AC5121P can be removed and installed as shown below, allowing for easy installation and replacement of modules.



## Wiring Diagram

Safety Category 3 Circuit (using an emergency stop switch with 2NC contacts)



#### Safety Category 1 Circuit (using an emergency stop switch with 1NC contact)



#### **Output Contact Electrical Life**



# **Operation Chart**

#### When Using a Start Switch



#### When not Using the Start Switch

	Power ON	Emergency Stop not Operated	OFF	Emergency Stop Operated
Emergency Stop Switch A1 — (NC1)				
Emergency Stop Switch A2 — (NC2)				
Y1-Y2 Jumper			L	
Output 13-14 (NO Contact)				
Output 23-24 (NO Contact)				
Output 33-34 (NO Contact)				
Transistor Output Y43-Y44 (NO Contact)				
C	Contact ON	OFF		

### Semiconductor Manufacturing Equipment Example

When using HR1S-AC (safety relay module) and HS5E (solenoid type interlock switch) + XW1E (emergency stop switch)



Note: Safety category is determined for the entire system. Take safety equipment and wiring into consideration.

7