

# Safety Control Relay HR1S-AF

- 2NC safety input type, such as E-Stops or Interlock Switches
- EN ISO 13849-1 PL<sub>e</sub>, Safety Cat 4 compliant, and EN 62061 SIL 3
- Welding detection of start switch
- Fault diagnosis function with dual safety circuits.
- Internal relay operations can be monitored with LED Indicator.
- Finger-safe protection
- 22.5mm wide, 35mm DIN rail mounting
- UL listed, CSA certified, TÜV NORD approved



## Part Numbers

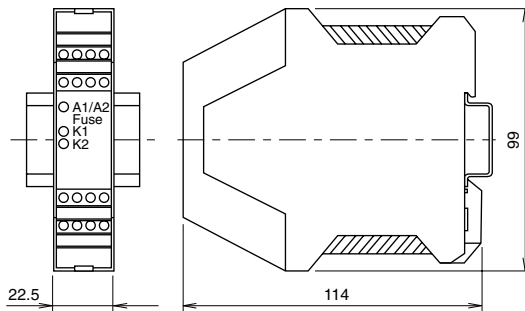
| Part Numbers  | Terminal Style            |
|---------------|---------------------------|
| HR1S-AF5130B  | Integrated Terminal Block |
| HR1S-AF5130PB | Removable Terminal Block  |

## Specifications

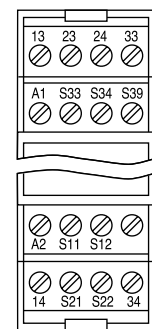
|                              |  |  |
|------------------------------|--|--|
| Operating Temperature        | -25 to +55°C (no freezing)   |  |
| Degree of Protection         | Terminal: IP20, Housing: IP40  |  |
| Rated Power Voltage          | 24V AC (-15 to +10%) 50/60 Hz<br>24V DC (-15 to +10%)  |  |
| Power Consumption            | 5 VA maximum (24V AC)<br>2.5W maximum (24V DC)   |  |
| Overcurrent Protection       | Electronic (Note)  |  |
| Control Circuit Voltage      | 24V  |  |
| Performance Level (PL)       | e (EN ISO 13849-1)   |  |
| Safety Category              | 4 (EN ISO 13849-1)   |  |
| Safety Integrity Level (SIL) | 3 (EN 62061)   |  |
| Response Time                | When S11-S12, S21-S22 are interrupted:<br>20 ms maximum<br>When power is interrupted: 60 ms maximum  |  |
| Input Synchronization Time   | Unlimited  |  |
| Overvoltage Category         | III  |  |
| Pollution Degree             | 2  |  |
| Rated Insulation Voltage     | 300V   |  |
| Maximum Input Resistance     | 90Ω  |  |
| Safety Outputs               | Instantaneous (Stop Cat 0)   | 3NO  |
| Output Contact Ratings       | Safety Circuit   | AC-15 C300: U <sub>e</sub> = 240VAC, I <sub>e</sub> =0.75A |
|                              |  | DC-13 U <sub>e</sub> =24VDC, I <sub>e</sub> =2A            |
|                              | Minimum Applicable Load  | 17V/10mA (initial value)                                   |
| Operation Frequency          | 1200 operations/h maximum  |  |
| Rated Current                | Safety circuit output total: 18A maximum<br>Each safety circuit output: 6A maximum   |  |
| Wire Size                    | HR1S-AF5130B:<br>1 × 2.5 mm <sup>2</sup> , 2 × 0.75 mm <sup>2</sup> maximum<br>HR1S-AF5130PB:<br>1 × 2.5 mm <sup>2</sup> , 2 × 1.5 mm <sup>2</sup> 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 line protection.  
Use a 4A fuse (Type gL) or a 6A fast blow fuse for output line protection.

## Dimensions (mm)

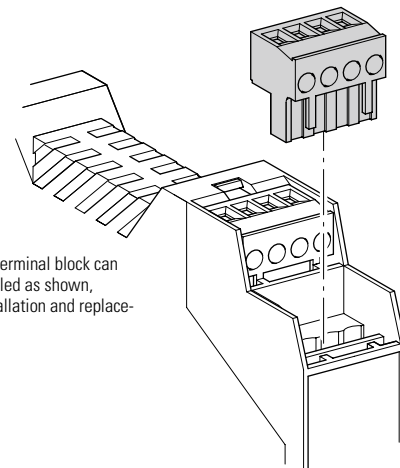


## Terminal Arrangement



## 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.



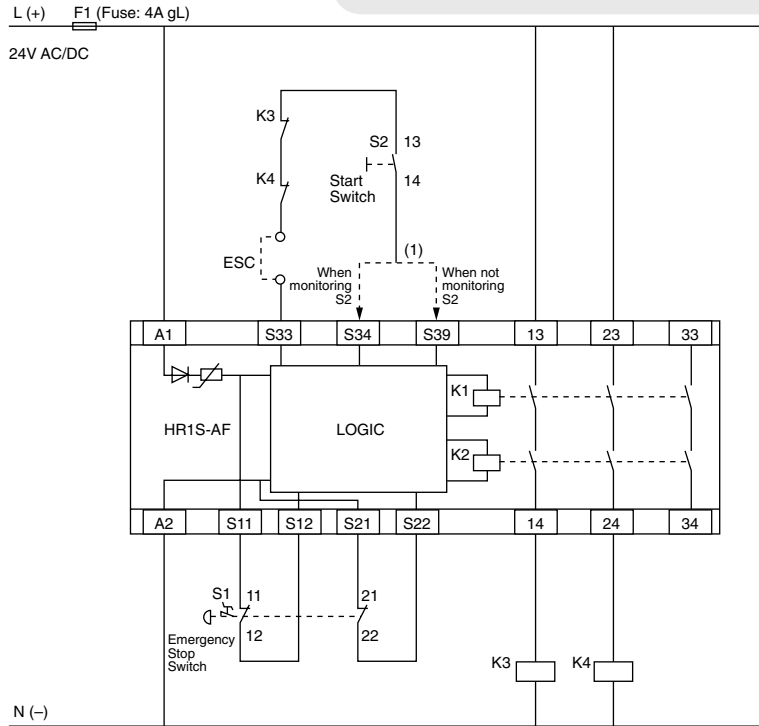
The HR1S-AF5130PB terminal block can be removed and installed as shown, allowing for easy installation and replacement of modules.

# HR1S-AF Wiring Diagram

## Safety Category 4 Example Circuit (using an emergency stop switch)

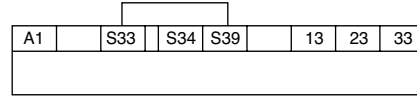


The Safety Category is achieved by the entire control system. Take any connected safety equipment and wiring into consideration.

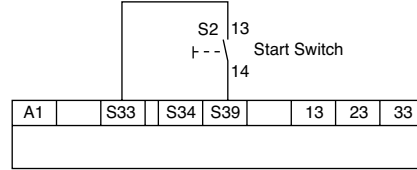


(1) = Start Switch Monitor  
 ESC: External Start Condition  
 F1: Protection fuse for the power of safety relay module  
 K3, 4: Safety contactor  
 Safety Output 3 Circuits

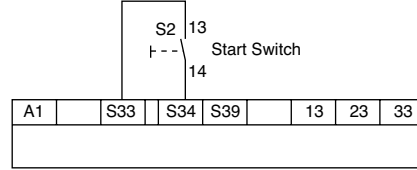
### When not using a start switch (automatic start)



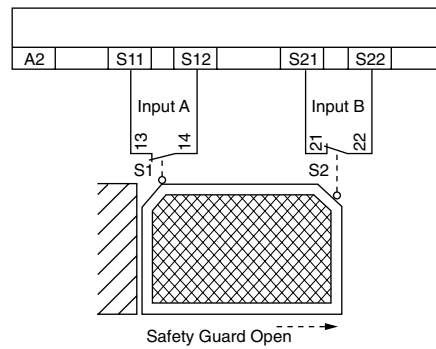
### When not monitoring the start switch (welding of start switch cannot be detected)



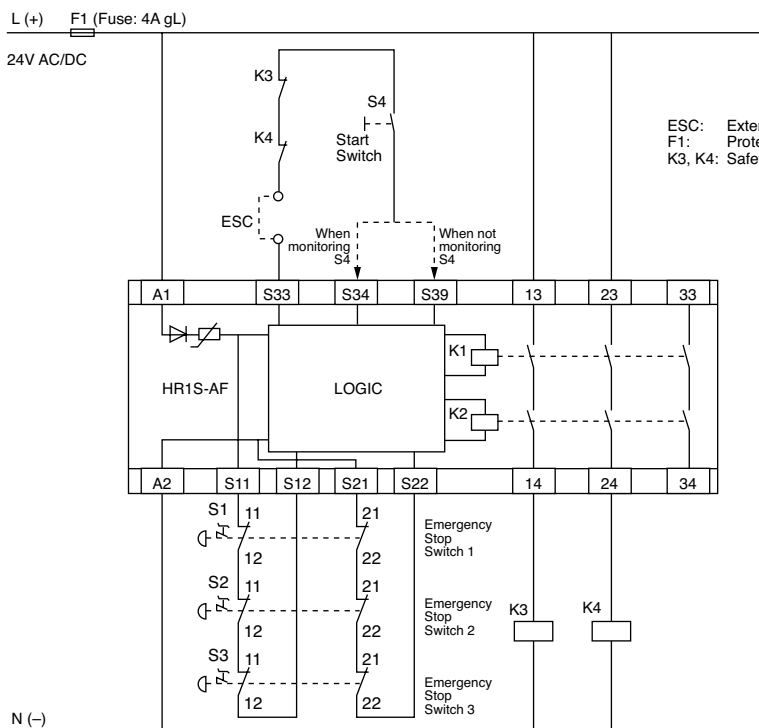
### When monitoring the start switch (detecting the OFF status of start switch)



### Limit switch or interlock switch for guard opening/closing



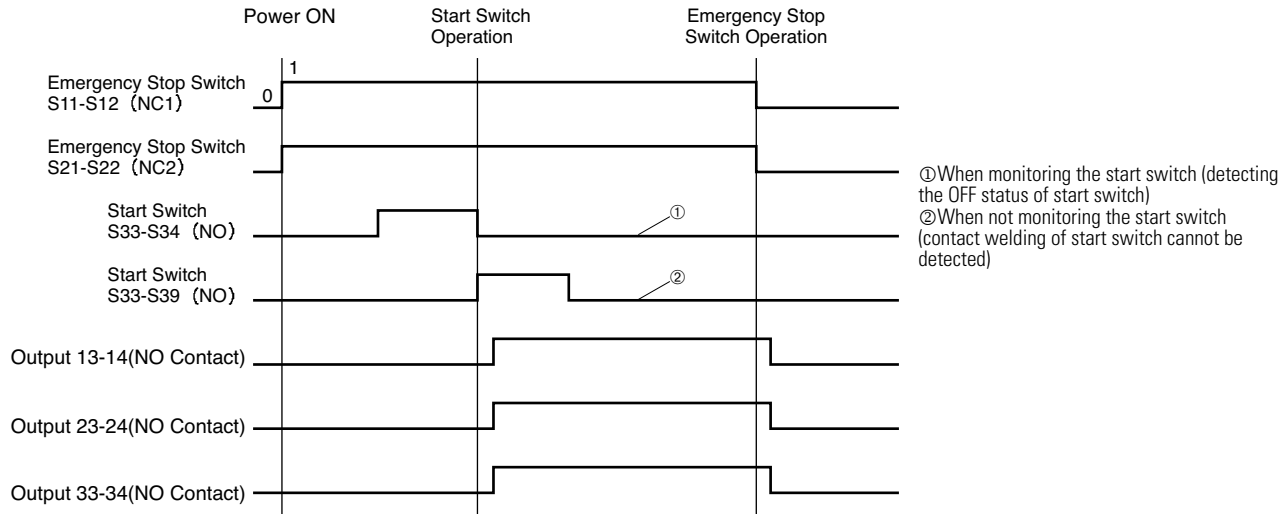
## Safety Category 3 Example Circuit (using multiple emergency stop switches)



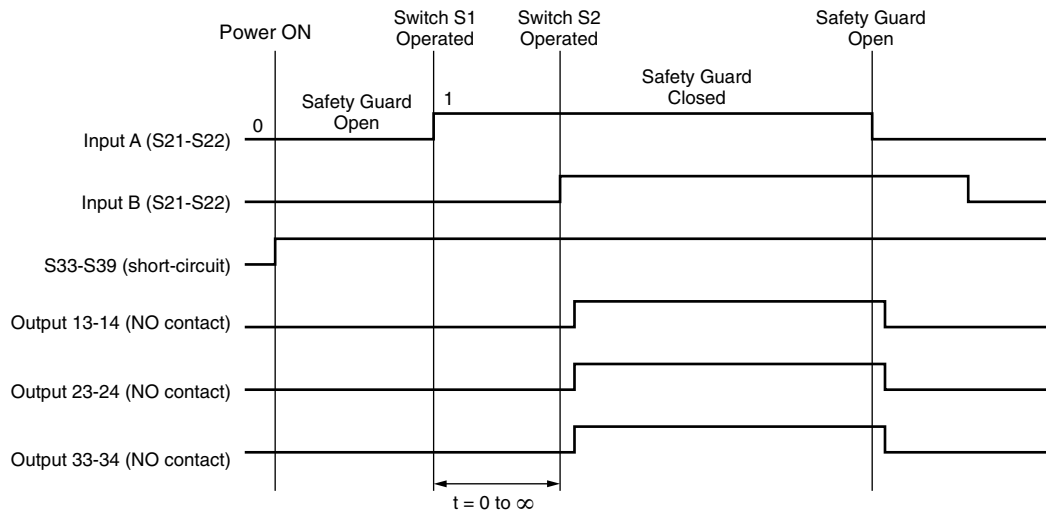
ESC: External Start Condition  
 F1: Protection fuse for the power of safety relay moc  
 K3, K4: Safety contactor

# HR1S-AF Operation Chart

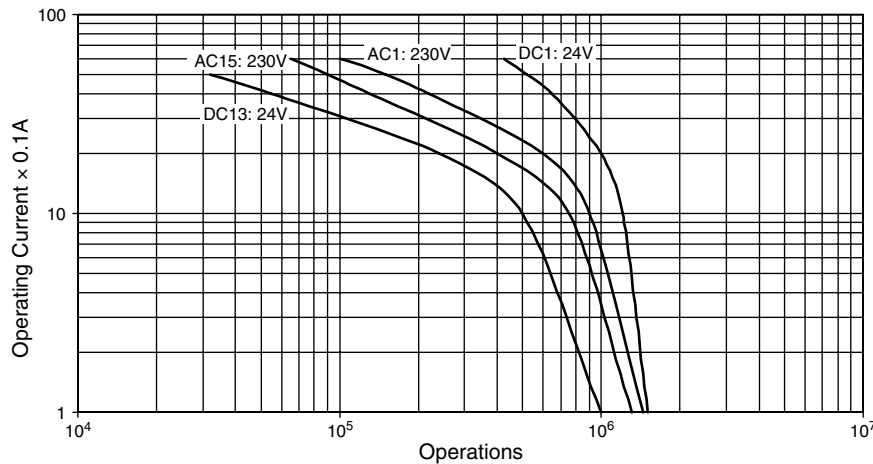
## When Using the Emergency Stop Switch



## When not Using the Safety Guard (Automatic Start)



## Output Contact Electrical Life



Specifications and other descriptions in this document are subject to change without notice.

