LH5946 speed monitoring safety relay modules provide safe standstill detection on 3-phase and single-phase motors by monitoring remanence voltage.
- Can monitor motor voltages up to 690 VAC or VDC
- No external sensors necessary
- Independent of direction
- Broken wire detection
- Monitors rotation and linear movement
- 2-channel operation for standstill and over-speed monitoring
- 3 N.O. and 1 N.C. positive-guided safety contacts
- LED status indicator
- Adjustable voltage setting
- Adjustable standstill time delay
- Semiconductor outputs for monitoring

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Price</th>
<th>Marking Type</th>
<th>Voltage Monitor Range</th>
<th>Voltage</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>LH5946-48-24-04</td>
<td>$349.00</td>
<td>Standstill-monitoring</td>
<td>20mV to 400mV</td>
<td>24 VDC</td>
<td>3 N.O./1 N.C.</td>
</tr>
<tr>
<td>LH5946-48-115-04</td>
<td>$349.00</td>
<td>safety relay module</td>
<td></td>
<td>115 VAC</td>
<td></td>
</tr>
<tr>
<td>LH5946-48-230-04</td>
<td>$349.00</td>
<td></td>
<td></td>
<td>230 VAC</td>
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</tr>
<tr>
<td>LH5946-48-24-40</td>
<td>$349.00</td>
<td></td>
<td></td>
<td>24 VDC</td>
<td></td>
</tr>
<tr>
<td>LH5946-48-115-40</td>
<td>$349.00</td>
<td></td>
<td></td>
<td>115 VAC</td>
<td></td>
</tr>
<tr>
<td>LH5946-48-230-40</td>
<td>$349.00</td>
<td></td>
<td></td>
<td>230 VAC</td>
<td></td>
</tr>
</tbody>
</table>

Note: The -04 models are recommended for applications where motors are controlled directly from contactors. The -40 models are recommended for applications involving VFDs or soft starters where OFF-state leakage is present and higher voltage settings are required.

**Safety Standstill Monitor Relays Specification Table**

**General Specifications**
- **Temperature**
  - Storage: -40°C to 75°C (-40°F to 167°F)
  - Operating: -25°C to 60°C (-13°F to 140°F)
- **Altitude**
  - < 2,000 meters
- **Vibration Resistance**
  - Amplitude: 0.35mm, Frequency: 10 to 55 Hz (IEC/EN 60-068-2-6)
- **Degree of Protection**
  - Per IEC/EN 60 529. Housing: IP40; Terminals IP20
- **Housing**
  - UL 94V-0 Thermoplastic; Din mount 35 mm x 7.5 mm
- **Weight**
  - 400g (14.11 oz.)
- **Agency Approvals and Standards**
  - cULus file E107778, CE, RoHS, TUV
- **Terminal Designation per EN 50 005 Wire Connections**
  - 1x4 mm² solid or 1 x 2.5 mm² stranded ferruled (isolated) or 2 x 1.5 mm² stranded ferruled (isolated)
  - DIN 46 228-1/-2/-3/-4
- **Wire Fixing**
  - Plus-minus terminal screws M3.5 box terminals with wire protection. Torque 0.8 Nm (7 lb-in)

**Input Specifications**
- **Nominal Voltage**
  - 24 VDC, 115 V AC, 230 V AC
- **Measuring/Motor Voltage**
  - 690 V
- **Input Resistance**
  - 500 k ohms
- **Response Value \( U_{an} \)**
  - 20 mV to 400 mV, adjustable or 0.2 to 4V adjustable
- **Response Value Dependent on Frequency**
  - Input Frequency (Hz)
    - 50, 100, 200, 400, 600, 1k, 1.5k, 2k
  - Response Value \( U_{an} \)
    - 1.0, 1.1, 1.2, 1.5, 2.0, 2.8, 5, 8
- **Voltage Range**
  - AC: 0.8 to 1.1 \( U_{in} \) At 10% residual ripple: 0.9 to 1.1 \( U_{in} \) At 48% residual ripple: 0.85 to 1.1 \( U_{in} \)
  - DC: 0.9 to 1.2 \( U_{in} \) At 10% residual ripple: 0.9 to 1.1 \( U_{in} \) At 48% residual ripple: 0.85 to 1.1 \( U_{in} \)
- **Nominal Consumption**
  - ca. 5 VA, 3W
- **Nominal Frequency**
  - 50 to 60 Hz, Frequency range: 45 to 65 Hz
- **Control Current**
  - Control current typ. at 24V over 2 relays: 75 mA
- **Overvoltage Protection**
  - Internal VDR (Voltage Dependent Resistor)

**Output Specifications**
- **Electrical Contact Life**
  - To AC15 at 2 A, 230V: 2x10⁶ switching cycles IEC/EN 60 947-5-1
- **Mechanical Life**
  - ≥50 x 10⁶ switching cycles
- **Contact Type**
  - 3 N.O. positively driven and 1 N.C. relay contacts (N.O. contacts are safety contacts)
- **Operate Delay on Standstill**
  - Depends on setting; adjust by potentiometer
- **Release Delay on Overspeed**
  - \( t_{off} = \text{typ.} 700 \text{ ms} \)
- **Nominal Output Voltage**
  - 250VAC
- **Thermal Current (\( I_{th} \))**
  - Max. 5A per contact. See continuous current limit curve in installation manual.
- **Short Circuit Strength**
  - Max fuse rating: 4A gl (IEC/EN 60 947D-5-1), line circuit breaker C6A
- **Switching Capacity IEC/EN 60 947-5-1**
- **Switching Frequency**
  - Max. 1,200 switching cycles/hr
- **Semi-conductor Monitoring**
  - 100 mA DC 24V, supply via A3+/A4

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Dold LH5946 Standstill Monitor Relays

Dimensions mm [in]

<table>
<thead>
<tr>
<th>Safety Data – Values per EN ISO 13849-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Performance level</td>
</tr>
<tr>
<td>MTTFd</td>
</tr>
<tr>
<td>DCavg</td>
</tr>
</tbody>
</table>

| Safety Data – Values per IEC/EN 62061 /IEC/EN 61508 |
|------------------|------------------|
| SIL CL | 3 per IEC/EN 62061 |
| SIL | 3 per IEC/EN 61508 |
| HFT (Hardware Failure Tolerance) | 1 |
| DCavg | 99% |
| SF | 99.7% |
| PFHD | 4.10E-10 h^-1 |

Function diagram

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Applications

Connection terminals

<table>
<thead>
<tr>
<th>Terminal designation</th>
<th>Signal designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1 - L2 - L3</td>
<td>Connection to monitored motor</td>
</tr>
<tr>
<td>11 - 12</td>
<td>Safety contacts (NC)</td>
</tr>
<tr>
<td>23 - 24, 33 - 34, 43 - 44</td>
<td>Safety contacts (NO)</td>
</tr>
<tr>
<td>53 - 54</td>
<td>Monitoring contact (NO)</td>
</tr>
<tr>
<td>X1 - X2</td>
<td>Connection of feedback circuit (for external contactors)</td>
</tr>
<tr>
<td>X2 - X3</td>
<td>Manual reset for external faults</td>
</tr>
<tr>
<td>A1 - A2</td>
<td>Auxiliary supply (U)H</td>
</tr>
<tr>
<td>A3(+) - A4</td>
<td>Supply for semiconductor outputs</td>
</tr>
<tr>
<td>ON:</td>
<td>Semiconductor output indicates state of safety contacts</td>
</tr>
<tr>
<td>ERR:</td>
<td>Semiconductor output indicates failures</td>
</tr>
</tbody>
</table>

Attention: The outputs 53-54, ON and ERR are only monitoring outputs and must not be used in safety circuits.

Setting

<table>
<thead>
<tr>
<th>Poti „Uan“:</th>
<th>Adjustment of voltage level for standstill detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poti „ts“:</td>
<td>Adjustment of time delay before activation of safety contacts</td>
</tr>
</tbody>
</table>

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