Dold LH5946 Standstill Monitor Relays

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 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>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>3 N.O. / 1 N.C.</td>
</tr>
<tr>
<td>LH5946-48-115-04</td>
<td>$349.00</td>
<td></td>
<td>115 VAC</td>
<td></td>
</tr>
<tr>
<td>LH5946-48-230-04</td>
<td>$349.00</td>
<td></td>
<td>230 VAC</td>
<td></td>
</tr>
<tr>
<td>LH5946-48-24-40</td>
<td>$349.00</td>
<td></td>
<td>200mV to 4V</td>
<td></td>
</tr>
<tr>
<td>LH5946-48-115-40</td>
<td>$349.00</td>
<td></td>
<td>115 VAC</td>
<td></td>
</tr>
<tr>
<td>LH5946-48-230-40</td>
<td>$349.00</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.

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**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**
- UL 94V-0 Thermoplastic; Din mount 35 mm x 7.5 mm
- IP40 Housing; IP20 Terminals

**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 or 2 x 2.5 mm² solid per DIN 46 228-1/-2/-3 /-4
- Plus-minus terminal screws M3.5 box terminals with wire protection. Torque 0.8 Nm (7 lb-in)

**Input Specifications**

**Nominal Voltage**
- 24V DC, 115 V AC, 230V 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**

<table>
<thead>
<tr>
<th>Input Frequency (Hz)</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>400</th>
<th>600</th>
<th>1k</th>
<th>1.5k</th>
<th>2k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Value U_{an}</td>
<td>1.0</td>
<td>1.1</td>
<td>1.2</td>
<td>1.5</td>
<td>2.0</td>
<td>2.8</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

**Voltage Range**
- AC: 0.8 to 1.1 U_{an} At 10% residual ripple; 0.9 to 1.1 U_{an} At 48% residual ripple: 0.85 to 1.1 U_{an}
- DC: 0.9 to 1.2 U_{an} At 10% residual ripple; 0.9 to 1.1 U_{an} At 48% residual ripple: 0.85 to 1.1 U_{an}

**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, 2x10⁵ switching cycles IEC/EN 60 947-5-1

**Mechanical Life**
- ≥50 x 10⁷ 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} = typ. 700 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 60 947-5-1), 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

For the latest prices, please check AutomationDirect.com.
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Dimensions mm [in]

Safety Data – Values per EN ISO 13849-1

<table>
<thead>
<tr>
<th>Category</th>
<th>4 according to EN 954-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>PLe according to EN 13849-1</td>
</tr>
<tr>
<td>MTTF_d</td>
<td>&gt;93 years</td>
</tr>
<tr>
<td>DC_avg</td>
<td>99%</td>
</tr>
</tbody>
</table>

Safety Data – Values per IEC/EN 62061 / IEC/EN 61508

<table>
<thead>
<tr>
<th>SIL CL</th>
<th>3 per IEC/EN 62061</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIL 3</td>
<td>3 per IEC/EN 61508</td>
</tr>
<tr>
<td>HFT (Hardware Failure Tolerance)</td>
<td>1</td>
</tr>
<tr>
<td>DC_avg</td>
<td>99%</td>
</tr>
<tr>
<td>SFF</td>
<td>99.7%</td>
</tr>
<tr>
<td>PFH_D</td>
<td>4.10E-10 h^-1</td>
</tr>
</tbody>
</table>

Function diagram
Dold LH5946 Standstill Monitor Relays

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