

# 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

### Safety Standstill Monitor Relays Selection Chart

Part Number	Price	Marking Type	Voltage Monitor Range	Voltage	Outputs
LH5946-48-24-04	\$349.00	Standstill-monitoring safety relay module	20mV to 400mV	24 VDC	3 N.O./1 N.C.
LH5946-48-115-04	\$349.00			115 VAC	
LH5946-48-230-04	\$349.00			230 VAC	
LH5946-48-24-40	\$349.00		200mV to 4V	24 VDC	
LH5946-48-115-40	\$349.00			115 VAC	
LH5946-48-230-40	\$349.00			230 VAC	

**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																			
<b>Temperature</b>	Storage: -40°C to 75°C (-40°F to 167°F) Operating: -25°C to 60°C (-13°F to 140°F)																		
<b>Altitude</b>	< 2,000 meters																		
<b>Vibration Resistance</b>	Amplitude: 0.35mm, Frequency: 10 to 55 Hz (IEC/EN 60-068-2-6)																		
<b>Degree of Protection</b>	Per IEC/EN 60 529. Housing: IP40; Terminals IP20																		
<b>Housing</b>	UL 94V-0 Thermoplastic; Din mount 35 mm x 7.5 mm																		
<b>Weight</b>	400g (14.11 oz.)																		
<b>Agency Approvals and Standards</b>	cULus file E107778, CE, RoHS, TUV																		
<b>Terminal Designation per EN 50 005 Wire Connections</b>	1x4 mm <sup>2</sup> solid or 1 x 2.5 mm <sup>2</sup> stranded ferruled (isolated) or 2 x 1.5 mm <sup>2</sup> stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm <sup>2</sup> solid per DIN 46 228-1/-2/-3 /-4																		
<b>Wire Fixing</b>	Plus-minus terminal screws M3.5 box terminals with wire protection. Torque 0.8 Nm (7 lb-in)																		
Input Specifications																			
<b>Nominal Voltage</b>	24V DC, 115 V AC, 230V AC																		
<b>Measuring/Motor Voltage</b>	690 V																		
<b>Input Resistance</b>	500 k ohms																		
<b>Response Value <math>U_{an}</math></b>	20 mV to 400 mV, adjustable or 0.2 to 4V adjustable																		
<b>Response Value Dependent on Frequency</b>	<table border="1"> <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 <math>U_{an}</math></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>	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
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											
<b>Voltage Range</b>	AC: 0.8 to 1.1 $U_N$ . At 10% residual ripple: 0.9 to 1.1 $U_N$ . At 48% residual ripple: 0.85 to 1.1 $U_N$ DC: 0.9 to 1.2 $U_N$ . At 10% residual ripple: 0.9 to 1.1 $U_N$ . At 48% residual ripple: 0.85 to 1.1 $U_N$																		
<b>Nominal Consumption</b>	ca. 5 VA, 3W																		
<b>Nominal Frequency</b>	50 to 60 Hz. Frequency range: 45 to 65 Hz																		
<b>Control Current</b>	Control current typ. at 24V over 2 relays: 75 mA																		
<b>Overvoltage Protection</b>	Internal VDR (Voltage Dependent Resistor)																		
Output Specifications																			
<b>Electrical Contact Life</b>	To AC15 at 2 A, 230V: 2x10 <sup>5</sup> switching cycles IEC/EN 60 947-5-1																		
<b>Mechanical Life</b>	≥50 x 10 <sup>6</sup> switching cycles																		
<b>Contact Type</b>	3 N.O. positively driven and 1 N.C. relay contacts (N.O. contacts are safety contacts)																		
<b>Operate Delay on Standstill</b>	Depends on setting; adjust by potentiometer																		
<b>Release Delay on Overspeed</b>	$t_{off}$ = typ. 700 ms																		
<b>Nominal Output Voltage</b>	250VAC																		
<b>Thermal Current (<math>I_{th}</math>)</b>	Max. 5A per contact. See continuous current limit curve in installation manual.																		
<b>Short Circuit Strength</b>	Max fuse rating: 4A gl (IEC/EN 60 9470-5-1), line circuit breaker C6A																		
<b>Switching Capacity IEC/EN 60 947-5-1</b>	AC 15: N.O. contacts: 3A/230V; N.C. contacts: 2A/230VAC. DC13: 2A/24V																		
<b>Switching Frequency</b>	Max. 1,200 switching cycles/hr																		
<b>Semi-conductor Monitoring</b>	100 mA DC 24V; supply via A3+/A4																		

# Dold LH5946 Standstill Monitor Relays

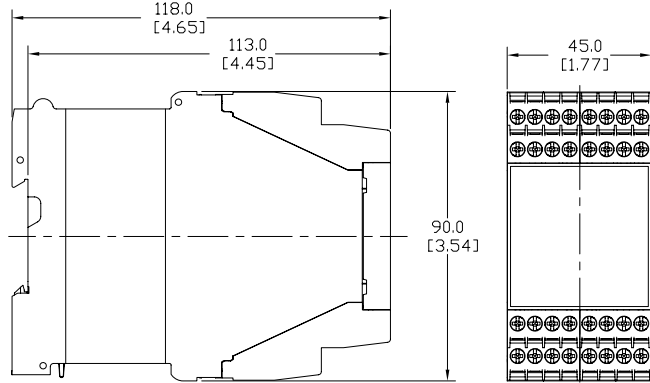
## Dimensions mm [in]

### Safety Data – Values per EN ISO 13849-1

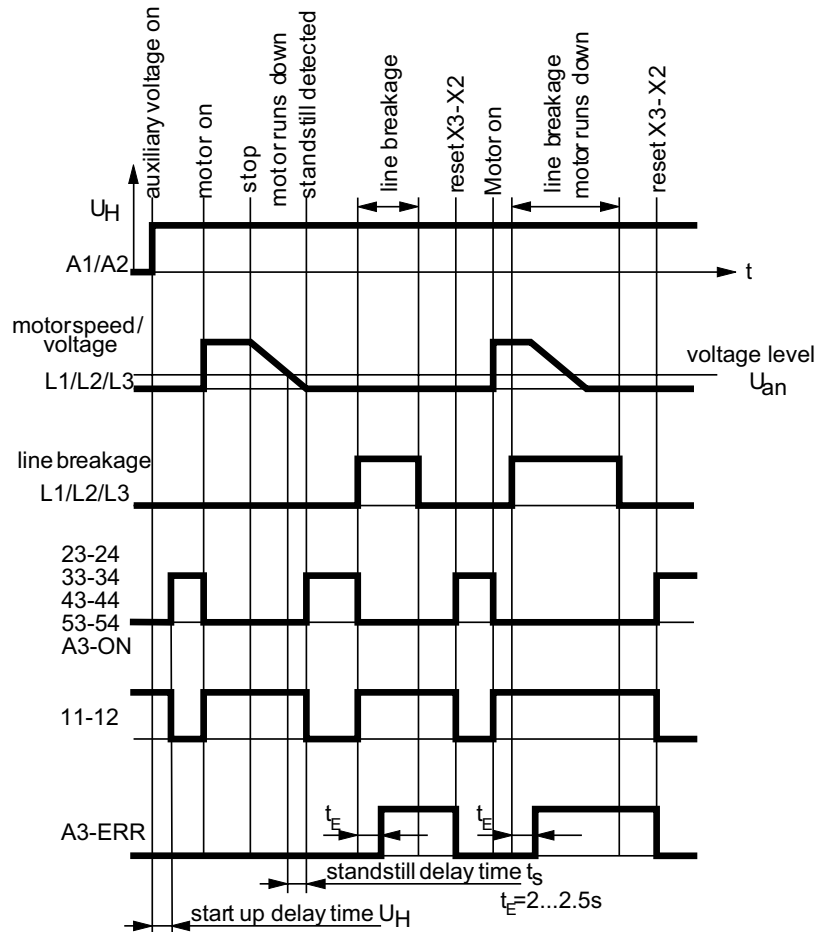
Category	4 according to EN 954-1
Performance level	PLe according to EN 13849-1
MTTF <sub>d</sub>	>93 years
DC <sub>avg</sub>	99%

### 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
DC <sub>avg</sub>	99%
SFF	99.7%
PFH <sub>D</sub>	4.10E-10 h <sup>-1</sup>

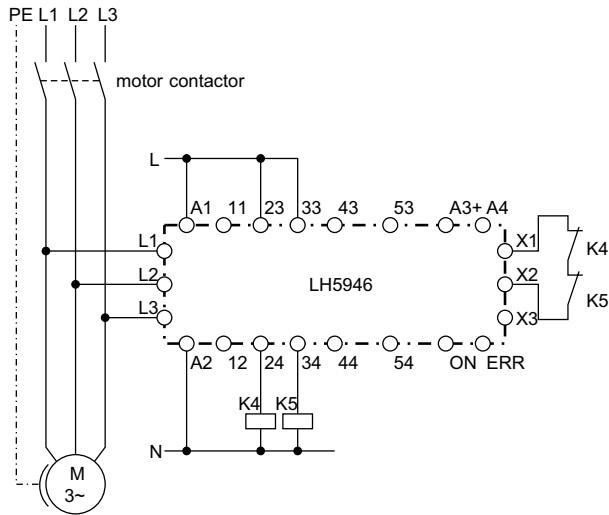


## Function diagram

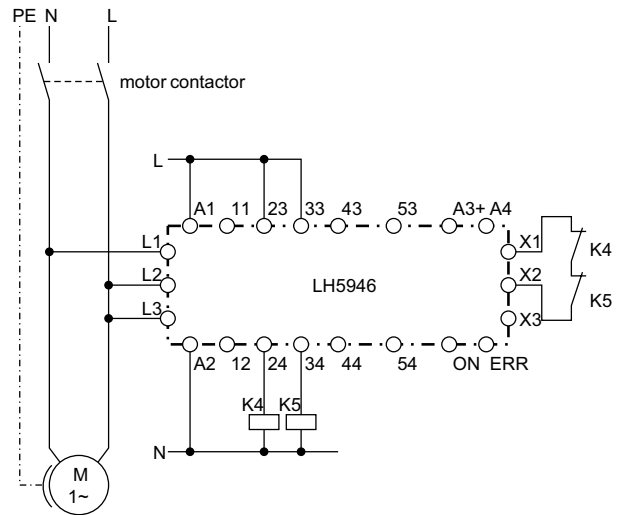


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## Applications



With 3-phase motor



With single-phase motor

## Connection terminals

Terminal designation	Signal designation
L1 - L2 - L3	Connection to monitored motor
11 - 12	Safety contacts (NC)
23 - 24, 33 - 34, 43 - 44	Safety contacts (NO)
53 - 54	Monitoring contact (NO)
X1 - X2	Connection of feedback circuit (for external contactors)
X2 - X3	Manual reset for external faults
A1 - A2	Auxiliary supply (U) <sub>H</sub>
A3(+)- A4	Supply for semiconductor outputs
ON:	Semiconductor output indicates state of safety contacts
ERR:	Semiconductor output indicates failures
Attention: The outputs 53-54, ON and ERR are only monitoring outputs and must not be used in safety circuits	

## Setting

Poti „U <sub>an</sub> “:	Adjustment of voltage level for standstill detection
Poti „t <sub>s</sub> “:	Adjustment of time delay before activation of safety contacts

# Safety Products



***Warning: Safety products sold by AutomationDirect are Safety components only. The purchaser/installer is solely responsible for the application of these components and ensuring all necessary steps have been taken to assure each application and use meets all performance and applicable safety requirements and/or local, national and/or international safety codes as required by the application. AutomationDirect cannot certify that our products, used solely or in conjunction with other AutomationDirect or other vendors' products, will assure safety for any application. Any person using or applying any products sold by AutomationDirect is responsible for learning the safety requirements for their individual application and applying them, and therefore assumes all risks, and accepts full and complete responsibility, for the selection and suitability of the product for their respective application. AutomationDirect does not provide design or consulting services, and cannot advise whether any specific application or use of our products would ensure compliance with the safety requirements for any application.***