

# Dold UG6980 Series Safety Relay with Selectable Function



Designed to protect people and machines in applications with various safety devices.

- Adjustable safety functions (power off before selecting the desired function):
  - E-Stop
  - Safety gate
  - Two-hand control
  - Safety mat / Safety edge
  - Exclusive XOR contacts
  - Light curtain

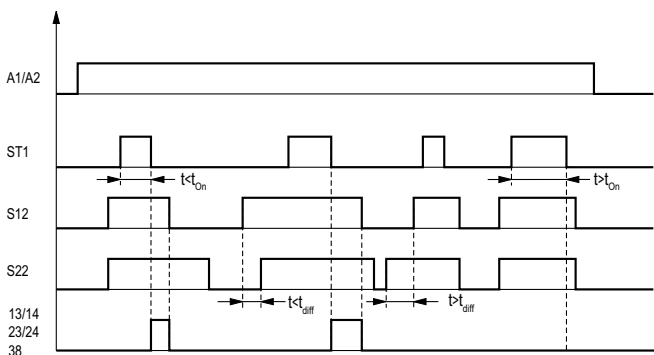
• According to:

- Performance Level (PL) e and category 4 to EN ISO 13849-1: 2008
- SIL Claimed Level (SIL CL) 3 to IEC/EN 62061
- Safety Integrity Level (SIL) 3 to IEC/EN 61508 and IEC/EN 61511
- Acc. to EN 50156-1 for furnaces
- Line fault detection on pushbutton:
- Manual restart or automatic restart
- With or without cross fault monitoring
- 2-channel
- Forcibly guided output contacts
- Output: 2 N.O. contacts per safety function
- 1 semiconductor output per safety function
- LED indicator for operation, safety function 1, 2 and failure
- Pluggable terminal blocks for easy exchange of devices
- Two PNP sensor inputs only

Safety Data – Values per EN ISO 13849-1	
Category	4
Performance level	PLe
MTTF <sub>d</sub>	>100 years
DC <sub>avg</sub>	99%
Safety Data – Values per IEC/EN 62061 / IEC/EN 61508	
SIL CL	3
SIL	3
HFT (Hardware Failure Tolerance)	1
DC <sub>avg</sub>	99%
SFF	99.7%
PFH <sub>D</sub>	1.88E-10 h <sup>-1</sup>

Safety Relays Selection Chart				
Part Number	Price	Marking Type	Voltage	Outputs
UG6980-02PS-61-24	\$155.00	Safety relay module	24 VDC	2 N.O. positive guided safety contact(s), 1 N.O. monitoring contact(s)

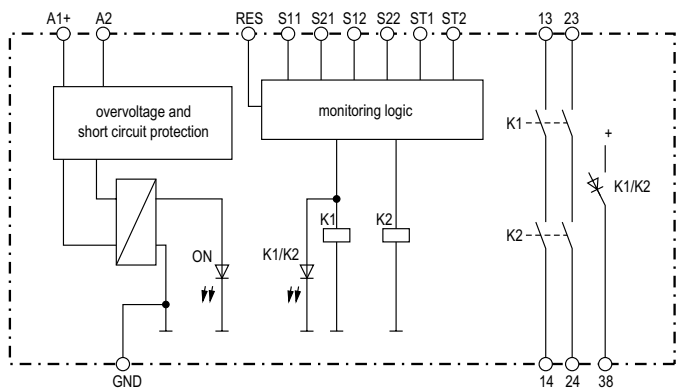
## Function Diagram



$t_{diff}$ : max. time delay for simultaneity demand dependent on selected safety function  
 E-Stop, safety gate, safety mat  $t_{diff}$ : max. 3s  
 Light curtains  $t_{diff}$ : max. 1s  
 Two-hand control  $t_{diff}$ : max. 0,5s  
 other times on request

$t_{On}$ : max. actuation time of start button  
 Standard  $t_{On}$ : max. 3s  
 other times on request

## Block Diagram



# Dold UG6980 Series Safety Relay with Selectable Function

**Dold UG6980 Series Safety Relay with Selectable Function Specification Table**

General Specifications	
<b>Temperature</b>	Storage: -25°C to 85°C (-13°F to 185°F) Operating: -15°C to 55°C (5°F to 131°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>	210 g (7.40 oz.)
<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 DIN 46 228-1/-2/-3/-4
<b>Wire Fixing</b>	Terminal screws M3.5 box terminals with wire protection.
<b>Wire Connection</b>	60degC/75degC Copper conductors only; AWG20-12 Sol/Str Torque 0.5NM
Input Specifications	
<b>Nominal Voltage</b>	24VDC
<b>Voltage Range</b>	At 10% residual ripple: 0.8 to 1.1 U <sub>N</sub>
<b>Maximum Consumption</b>	DC approx. 1.9W
<b>Nominal Frequency</b>	Not applicable
<b>Minimum Off-time</b>	250 ms
<b>Control Voltage on S11, S21, S31, S41 At U<sub>N</sub></b>	20VDC pulsed, 10 ms ON, 10 ms OFF
<b>Control Current Over S12, S22, S32, S42</b>	Typ. 8 mA at U <sub>N</sub> ; Safety mats: Typ. 15 mA at U <sub>N</sub>
<b>Min. Voltage on S12, S22, S32, S42 (relay activated)</b>	10VDC
<b>Short Circuit Protection</b>	Internal with PTC (Positive Temperature Coefficient resistor)
<b>Overvoltage Protection</b>	Internal VDR (Voltage Dependent Resistor)
Output Specifications	
<b>Electrical Contact Life</b>	AC 15 at 5A, 230VAC: > 2.2x10 <sup>6</sup> switching cycles
<b>Mechanical Life</b>	> 20x10 <sup>6</sup> switching cycles
<b>Contact Type</b>	2 positive guided N.O. safety contacts
<b>Operate Delay</b>	Manual start: 30 ms; automatic start: 350 ms.
<b>Release Delay</b>	Disconnecting the supply: AC units:150 ms; DC units: 50 ms Disconnecting S12, S22: AC units: 130 ms. DC units: 50 ms
<b>Nominal Output Voltage</b>	AC: 250V; DC: See continuous current limit curve in installation manual.
<b>Thermal Current (I<sub>th</sub>)</b>	Max. 8A. See quadratic total current limit curve in installation manual.
<b>Short Circuit Strength</b>	Max. fuse rating: 6A gL (IEC/EN 60 947-5-1); Line circuit breaker: B 6A
<b>Switching Capacity (IEC/EN 60 947-5-1)</b>	AC 15: N.O. contacts: 3A/230V; N.C. contacts: 2A/230V DC 13: N.O. contacts: 4A/DC24V 0.5A/110V; N.C. contacts: 4A/24V; DC 13: N.O. contacts: 8A/24V >25x10 <sup>3</sup> . ON: 0.4 s, OFF: 9.6 s
<b>Switching Frequency</b>	Max. 1200 switching cycles/hr
<b>Agency Approvals and Standards</b>	CSA, cULus file E107778, CE, RoHS, TUV

To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at [www.automationdirect.com](http://www.automationdirect.com)

## Settings

### Setting

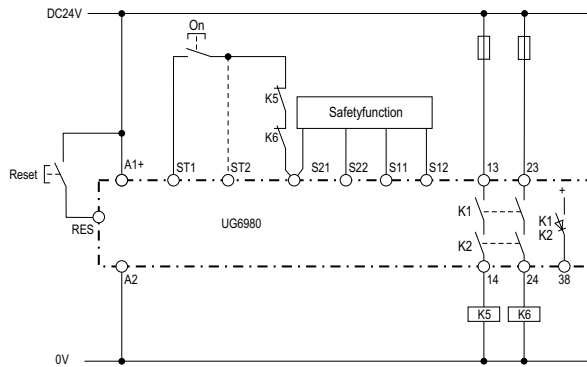
On the variant /O\_ \_ the safety function can be set via rotary switch.

Possible functions:

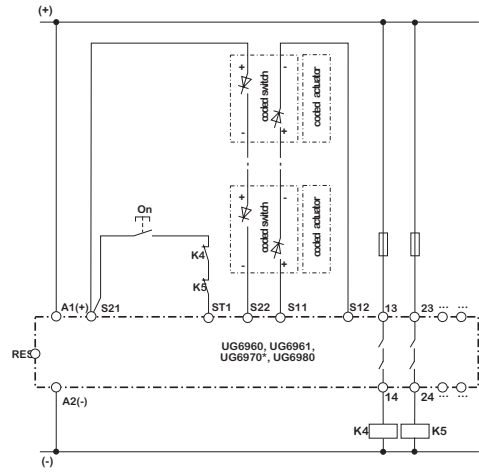
Fct.	Safety function	
1	E-Stop	cross fault detection
2	Safety gate	
3	Two-hand control	
4	Safety mat / Safety edge	
5	Exclusive or contacts	
6	E-Stop	without cross fault detection
7	Safety gate	
8	Light curtain	

# Dold UG6980 Series Safety Relay with Selectable Function

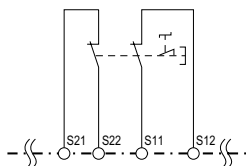
## Applications



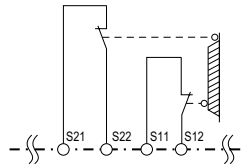
Safety function: see below, Manual-Start (for automatic start make a bridge to ST2 instead of ON button).



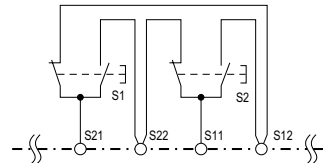
\*UG6970: The safety function 2 is connected as well as safety function 1, but S11 = S31, S12 = S32, S21 = S41, S22 = S42 and ST1 = ST2



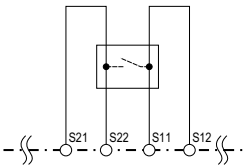
Fct.: E-stop (1),  
with cross fault detection  
3, PL e, Cat. 4



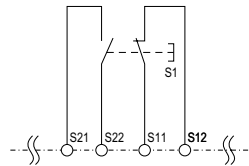
Fct.: Safety gate (2),  
with cross fault detection  
SIL 3, PL e, Cat. 4



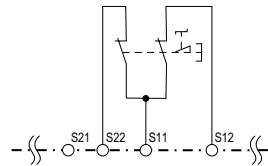
Fct.: Two-hand control (3),  
with cross fault detection  
SIL 3, PL e, Cat. 4  
Type III C to EN 574



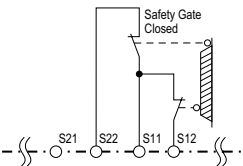
Fct.: Safety mat / Safety edge (4),  
with cross fault detection  
SIL 3, PL e, Cat. 4



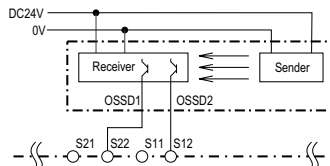
Fct.: Exclusive XOR contacts (5),  
with cross fault detection  
SIL 3, PL e, Cat. 4



Fct.: E-Stop (6),  
without cross fault detection  
SIL 3, PL e, Cat. 4<sup>1)</sup>



Fct.: Safety gate (7),  
without cross fault detection  
SIL 3, PL e, Cat. 4<sup>1)</sup>



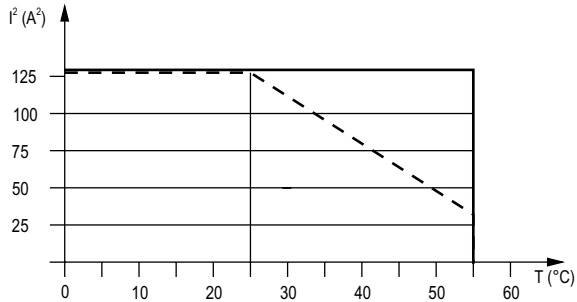
Fct.: Light curtain (8),  
without cross fault detection  
SIL 3, PL e, Cat. 4<sup>2)</sup>

<sup>1)</sup> To achieve the stated safety classification the wiring has to be done with crossfault monitoring.

<sup>2)</sup> To achieve the stated safety classification light curtains with selftest (type 4) according to IEC/EN 61496-1 have to be used.

# Dold UG6980 Series Safety Relay with Selectable Function

## Characteristic Curves



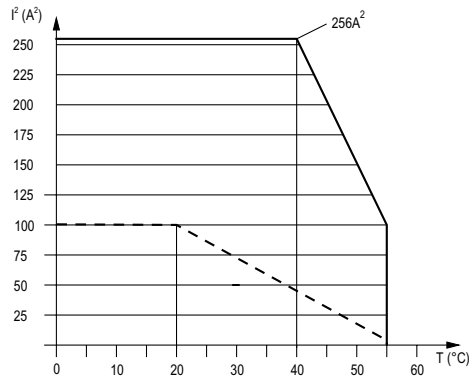
— device free-standing  
max. current at 55°C over  
2 contact path =  $8A \triangleq 2 \times 8^2 A^2 = 128A^2$

- - - device mounted without distance heated by  
devices with same load,  
max. current at 55°C over  
2 contact path =  $4A \triangleq 2 \times 4^2 A^2 = 32A^2$

$$\sum I^2 = I_1^2 + I_2^2$$

$I_1, I_2$  - current in contact paths

UG 6980.02  
Quadratic total current limit curve



— device free-standing  
max. current at 55°C over  
4 contact path =  $5A \triangleq 4 \times 5^2 A^2 = 100A^2$

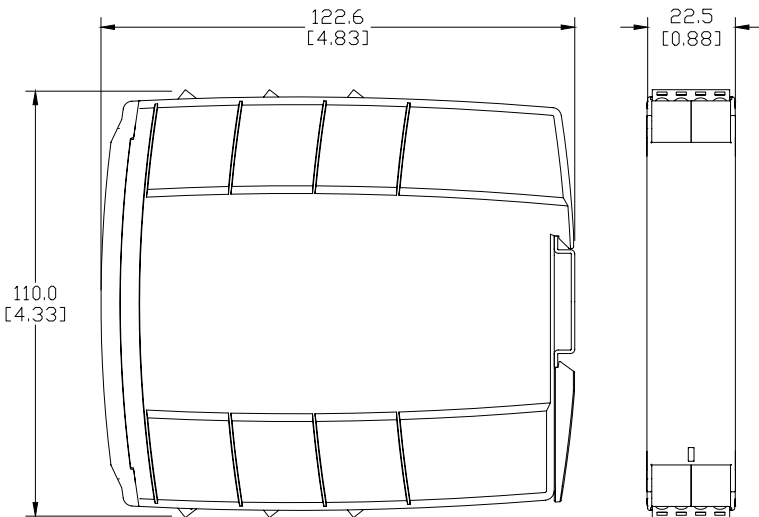
- - - device mounted without distance heated by  
devices with same load,  
max. current at 55°C over  
4 contact path =  $1A \triangleq 4 \times 1^2 A^2 = 4A^2$

$$\sum I^2 = I_1^2 + I_2^2 + I_3^2 + I_4^2$$

$I_1, I_2, I_3, I_4$  - current in contact paths

Quadratic total current limit curve output contacts

## Dimensions mm(in)



## Connection Terminals

Terminal designation	Signal designation
A1 +	DC 24 V
A2	0 V
13, 14, 23, 24, 43, 44, 53, 54	Forcibly guided NO contacts for release circuit
38	Semiconductor monitoring output
GND	Reference potential for Semiconductor monitoring output
S11, S21	control output
S12, S22, ST1, ST2, RES	control input

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# Safety Products



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