Dold UG6980 Series Safety Relay With Selectable Function

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

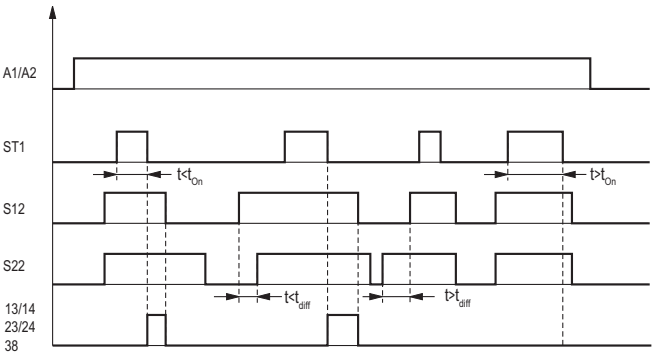
- Adjustable safety functions (power off before selecting the desired function):
  - E-Stop
  - Safety gate
  - Two-hand control
  - Safety mat / Safety edge
  - Exclusive XOR contacts
  - Light curtain
- According to:
  - Performance Level (PL) e and category 4 to EN ISO 13849-1: 2008
  - SIL Claimed 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
- ine 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
- One 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
$MTTF_d$	>100 years
DCavg	99%
Safety Data – Values per IEC/EN 62061 /IEC/EN 61508	
SIL CL	3
SIL	3
HFT (Hardware Failure Tolerance)	1
DC_{avg}	99%
SFF	99.7%
PFH_D	$1.88E^{-10}$ h^{-1}

Safety Relays Selection Chart

Part Number	*Price*	*Marking Type*	*Voltage*	*Outputs*
UG6980-02PS-61-24	$252.00	Safety relay module	24 VDC	2 N.O. positive guided safety contacts, 1 N.O. monitoring contact

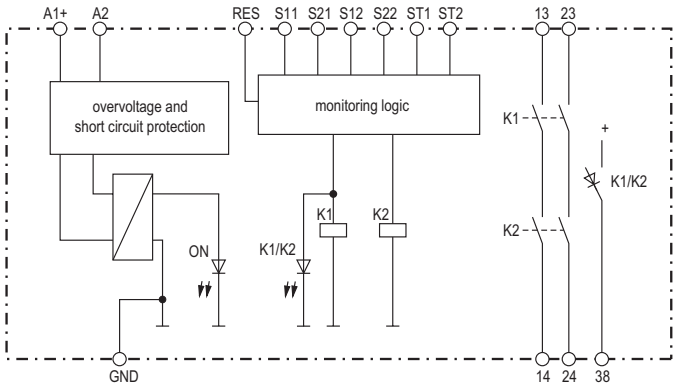
Function Diagram



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	
Temperature	Storage: -25 to +85 °C [-13 to +185 °F] – Operating: -15 to +55 °C [+5 to +131 °F]
Altitude	< 2000m [6562ft]
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 35mm x 7.5mm
Weight	210g (7.41 oz.)
Terminal Designation per EN 50 005 Wire Connections	1x4 mm^2 solid or 1 x 2.5 mm^2 stranded ferruled (isolated) or 2 x 1.5 mm^2 stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm^2 solid DIN 46 228-1/-2/-3/-4
Wire Fixing	Terminal screws M3.5 box terminals with wire protection.
Wire Connection	60 °C/75 °C Copper conductors only; AWG20-12 Sol/Str Torque 0.5 N•m
Input Specifications	
Nominal Voltage	24 VDC
Voltage Range	At 10% residual ripple: 0.8 to 1.1 U_N
Maximum Consumption	DC approx. 1.9W
Nominal Frequency	Not applicable
Minimum Off-time	250 ms
Control Voltage on S11, S21, S31, S41 At UN	20 VDC pulsed, 10 ms ON, 10 ms OFF
Control Current Over S12, S22, S32, S42	Typ. 8 mA at UN; Safety mats: Typ. 15 mA at U_N
Min. Voltage on S12, S22, S32, S42 (relay activated)	10 VDC
Short Circuit Protection	Internal with PTC (Positive Temperature Coefficient resistor)
Overvoltage Protection	Internal VDR (Voltage Dependent Resistor)
Output Specifications	
Electrical Contact Life	AC 15 at 5A, 230 VAC: > $2.2x10^5$ switching cycles
Mechanical Life	> $20x10^6$ switching cycles
Contact Type	2 positive guided N.O. safety contacts
Operate Delay	Manual start: 30 ms; automatic start: 350 ms
Release Delay	Disconnecting the supply: AC units:150 ms; DC units: 50 ms Disconnecting S12, S22: AC units: 130 ms. DC units: 50 ms
Nominal Output Voltage	AC: 250 V; DC: See continuous current limit curve in installation manual.
Thermal Current (I_{th})	Max. 8A. See quadratic total current limit curve in installation manual.
Short Circuit Strength	Max. fuse rating: 6A gL (IEC/EN 60 947-5-1); Line circuit breaker: B 6A
Switching Capacity (IEC/EN 60 947-5-1)	AC 15: N.O. contacts: 3A / 230 V; N.C. contacts: 2A / 230V DC 13: N.O. contacts: 4A / DC 24V. 0.5A / 110V; N.C. contacts: 4A / 24V; DC 13: N.O. contacts: 8A / 24V >25x103. ON: 0.4 s, OFF: 9.6s
Switching Frequency	Max. 1200 switching cycles/hr
Agency Approvals and Standards	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

Settings

Setting
On the variant /0_ _ 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	

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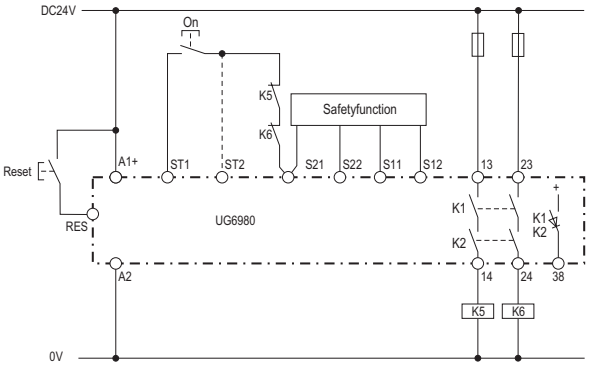
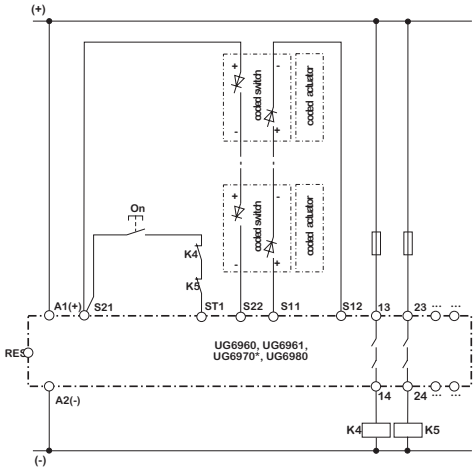
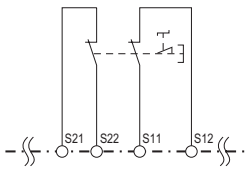
Applications



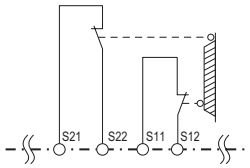
Safety function: see below, Manual-Start (for automatic start make a bridge to ST2 instead of ON button).



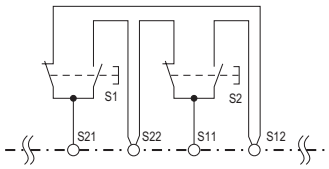
*UG6970: The safety function 2 is connected as well as safety function 1, but S11 = S31, S12 = S32, S21 = S41, S22 = S42 and ST1 = ST2



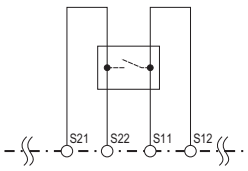
Fct.: E-stop (1),
with cross fault detection
3, PL e, Cat. 4



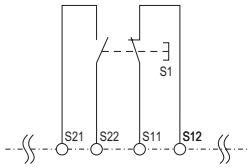
Fct.: Safety gate (2),
with cross fault detection
SIL 3, PL e, Cat. 4



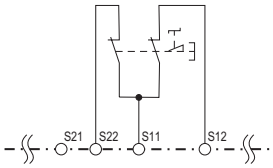
Fct.: Two-hand control (3),
with cross fault detection
SIL 3, PL e, Cat. 4
Type III C to EN 574



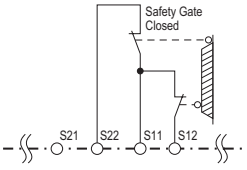
Fct.: Safety mat / Safety edge (4),
with cross fault detection
SIL 3, PL e, Cat. 4



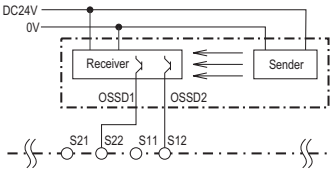
Fct.: Exclusive XOR contacts (5),
with cross fault detection
SIL 3, PL e, Kat. 4



Fct.: E-Stop (6),
without cross fault detection
SIL 3, PL e, Cat. 4 [1]



Fct.: Safety gate (7),
without cross fault detection
SIL 3, PL e, Cat. 4 [1]



Fct.: Light curtain (8),
without cross fault detection
SIL 3, PL e, Cat. 4 [2]

[1] To achieve the stated safety classification the wiring has to be done with crossfault monitoring.
[2] To achieve the stated safety classification light curtains with selftest (type 4) according to IEC/EN 61496-1 have to be used.

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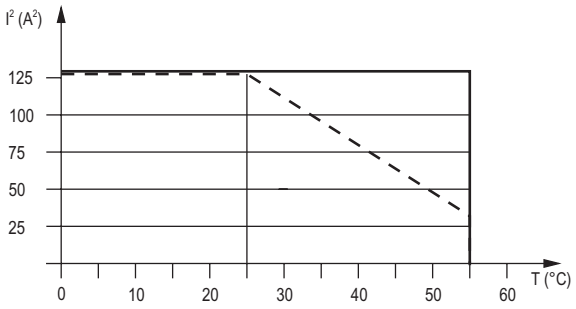
Characteristic Curves



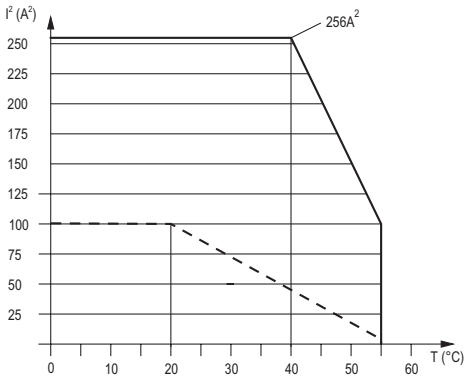
device free-standing
max. current at 55°C over
2 contact path = 8A ≙ 2x8²A² = 128A²

device mounted without distance heated by devices with same load,
max. current at 55°C over
2 contact path = 4A ≙ 2x4²A² = 32A²

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

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 ≙ 4x5²A² = 100A²

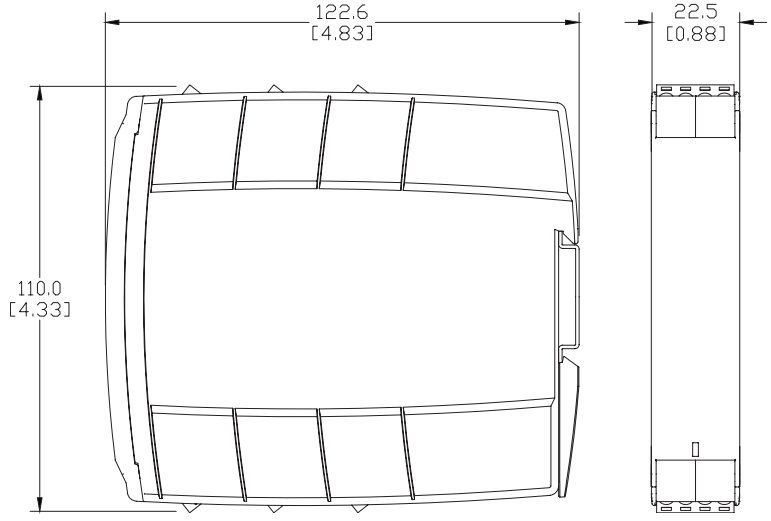
device mounted without distance heated by devices with same load,
max. current at 55°C over
4 contact path = 1A ≙ 4x1²A² = 4A²

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

I_1, I_2, I_3 - 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

See our website: www.AutomationDirect.com for complete Engineering Drawings.

Safety Products

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