Safety Technique

SAFEMASTER PRO Configurable Safety System
Control Unit
UG 6911.10

DOLD

0266140

Circuit Diagram

M10540

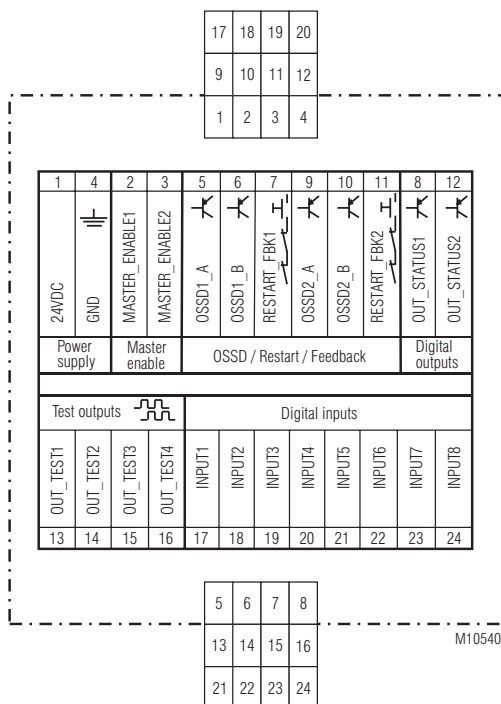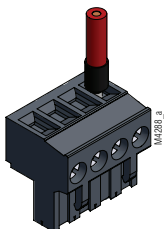### Pluggable Terminal Block

Terminal block
with screw terminals
(PS / plug in screw)

Advantages of SAFEMASTER PRO

- For safety applications up to PLe, Cat. 4 and SIL 3
- Less wiring because of configuration software SAFEMASTER PRO Designer
- Easy planning because of Drag & Drop via graphic configuration software
- Time and cost saving installation
- Reduced wiring and space saving in cabinets
- Flexible extension with safety input and output modules
- Easy extendable via BUS-Rail
- Comprehensive fault localisation and diagnostic
- Memory card as option for simple maintenance
- Compact design: Base- and extension modules with only 22.5 mm width

Features

- Monitoring of opto electronical sensors, light curtains, magnetic actuated sensors, E-stop buttons, safety mats, mechanical switches, two-hand control
- 8 safety, single-channel inputs, dual-channel connection in pairs
- 2 safety, dual-channel outputs (OSSD)
- 4 separate test outputs for sensor monitoring
- 1 Feedback circuit each für every safety output with individual configurable reset
- Configuration by PC via Mini USB Port
- Using as stand alone unit possible
- Indicator output, status-LEDs and bus connection via field bus modules for comprehensive diagnostics
- With pluggable terminal block for easy exchange of devices

More system components for SAFEMASTER PRO

- Input /Output module UG 6916.10
- Input module UG 6913.08, UG 6913.12 and UG 6913.16
- Output module OSSD UG 6912.02 and UG 6912.04
- Output module Relay with 1 e.g. 2 safety relay outputs for volt free contact multiplication of the OSSDs UG 6912.14 and UG 6912.28
- Bus Extender UG 6918
- Field bus modules for diagnostic-connetcion on field bus systems UG 6952 (PROFIBUS DP), UG 6951 (CANopen), UG 6954 (PROFINET)

Approvals and Marking

Canada / USA

Additional Information about this topic

- A short description of SAFEMASTER PRO can be found in system overview SAFEMASTER PRO.

- Information about the single modules of SAFEMASTER PRO can be found in the separate data sheets.

Applications

With larger installations and more complex solutions the number of safety related functions is increasing. Also often logic interconnections, e. g. to connect or disconnect parts of a larger system are required. The modular configurable safety system SAFEMASTER PRO monitors all safety related parts of a machine or plant, simple, flexible and safe.

Function

The UG 6911.10 can be used as stand alone safety monitor without extensions or as control unit for the flexible system SAFEMASTER PRO. The highly integrated flexibility allows nearly any combination between control unit and extension modules. Up to 128 safety inputs and 16 safety outputs (OSSD) are available. Field bus modules as option offer extensive diagnostic functions and simple integration to the conventional control.
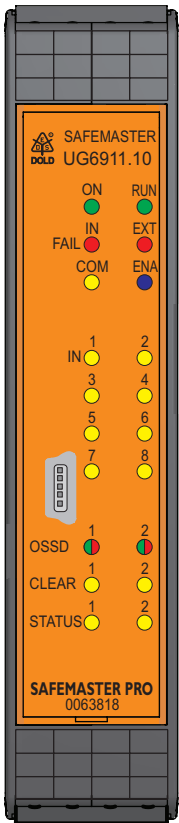
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Configuration

Using the software SAFEMASTER PRO DESIGNER complex logic circuits can be designed with logic operators and safety functions like muting, timer, counter etc. This is handled by a simple graphic configuration tool. The configuration designed on the PC is transferred via USB connection to the control unit UG 6911. Using the optional memory card OA 6911 (accessory) easy transfer of the configuration to a replacement unit is possible.

Connection Terminals Control Unit UG 6911.10

Terminal	SIGNAL	TYPE	DESCRIPTION	OPERATION
1	24VDC	-	24V DC power supply	-
2	MASTER_ENABLE1	Input	Master Enable 1	I_N: 7...10 mA at DC 24 V*)
3	MASTER_ENABLE2	Input	Master Enable 2	I_N: 7...10 mA at DC 24 V*)
4	GND	-	0V DC power supply	-
5	OSSD1_A	Output	Static output 1	PNP active high
6	OSSD1_B	Output		PNP active high
7	RESTART_FBK1	Input	Feedback/Restart 1	I_N: 7...10 mA bei DC 24 V*)
8	OUT_STATUS1	Output	Programmable digital output 1	PNP active high
9	OSSD2_A	Output	Static output 2	PNP active high
10	OSSD2_B	Output		PNP active high
11	RESTART_FBK2	Input	Feedback/Restart 2	I_N: 7...10 mA at DC 24 V*)
12	OUT_STATUS2	Output	Programmable digital output 2	PNP active high
13	OUT_TEST1	Output	Short circuit detection output	PNP active high
14	OUT_TEST2	Output	Short circuit detection output	PNP active high
15	OUT_TEST3	Output	Short circuit detection output	PNP active high
16	OUT_TEST4	Output	Short circuit detection output	PNP active high
17	INPUT1	Input	Digital input 1	I_N: 7...10 mA at DC 24 V*)
18	INPUT2	Input	Digital input 2	I_N: 7...10 mA at DC 24 V*)
19	INPUT3	Input	Digital input 3	I_N: 7...10 mA at DC 24 V*)
20	INPUT4	Input	Digital input 4	I_N: 7...10 mA at DC 24 V*)
21	INPUT5	Input	Digital input 5	I_N: 7...10 mA at DC 24 V*)
22	INPUT6	Input	Digital input 6	I_N: 7...10 mA at DC 24 V*)
23	INPUT7	Input	Digital input 7	I_N: 7...10 mA at DC 24 V*)
24	INPUT8	Input	Digital input 8	I_N: 7...10 mA at DC 24 V*)

*) Input ("Type B" according to EN 61131-2)

DESCRIPTION	LED								
	RUN	**IN FAIL**	**EXT FAIL**	**COM**	**ENA**	**IN1 ... 8**	**OSSD1/2**	**CLEAR1/2**	**STATUS1/2**
	GREEN	**RED**	**RED**	**ORANGE**	**BLUE**	**YELLOW**	**RED/ GREEN**	**YELLOW**	**YELLOW**
Power ON - initial TEST	ON	ON	ON	ON	ON	ON	Red	ON	ON
Memory chip OA 6911 recognised	OFF	OFF	OFF	ON (max 1s)	ON (max 1s)	OFF	Red	OFF	OFF
Loading diagram Memory chip OA 6911	OFF	OFF	OFF	5 x flashing	5 x flashing	OFF	Red	OFF	OFF
SAFEMASTER PRO error: internal configuration not valid or not present	OFF	OFF	OFF	slow flashing	OFF	OFF	Red	OFF	OFF
SAFEMASTER PRO error: Memory chip OA 6911 not valid	OFF	OFF	OFF	fast flashing	OFF	OFF	Red	OFF	OFF
SAFEMASTER PRO DESIGNER connected, control unit UG 6911.10 stopped	OFF	OFF	OFF	ON	OFF	OFF	Red	OFF	OFF

Indication at start-up and test mode

DESCRIP- TION	LED								
	RUN	**IN FAIL**	**EXT FAIL**	**COM**	**IN1 ... 8**	**ENA**	**OSSD1/2**	**CLEAR1/2**	**STATUS1/2**
	GREEN	**RED**	**RED**	**ORANGE**	**YELLOW**	**BLUE**	**RED/GREEN**	**YELLOW**	**YELLOW**
Normal operation	**ON**	**OFF**	**OFF** operation OK	**ON** = UG 6911.10 connected to PC **OFF** = not connected	INPUT state	**ON** MASTER_ENABLE1 and MASTER_ENABLE2 active	**RED** with output OFF **GREEN** with output ON	**ON** waiting for RESTART	OUTPUT state
External fault detected	**ON**	**OFF**	**ON** incorrect external connec- tion detected	**ON** = UG 6911.10 connected to PC **OFF** = not connected	only the LED of the INPUT with the incorrect connection flashes	**OFF** MASTER_ENABLE1 or MASTER_ENABLE2 inactive		**Flashing** NO Feedback	

Indication during normal operation

Troubleshooting

DESCRIPTION	LED									REMEDY
	RUN GREEN	IN FAIL RED	EXT FAIL RED	COM ORANGE	ENA BLUE	IN1 ... 8 YELLOW	OSSD1/2 RED/GREEN	CLEAR1/2 YELLOW	STATUS1/2 YELLOW	
Internal fault	OFF	2 x or 3 x flashing	OFF	OFF	OFF	OFF	Rot	OFF	OFF	The modul has to be repaired Return the unit to DOLD
Configuration error	OFF	5 x flashing	OFF	OFF	OFF	5 x flashing	5 x flashing	5 x flashing	5 x flashing	• Upload the project to the SAFEMASTER PRO again. • If the problem persists return the UG 6911 to DOLD. The modul has to be repaired
OSSD output error	OFF	4 x flashing	OFF	OFF	OFF	OFF	4 x flashing (only the LED corresponding to the output in FAIL mode)	OFF	OFF	• Check the OSSD1/2 connections • If the problem persists return the UG 6911.10 to DOLD. The modul has to be repaired
Error in communication with expansion units	OFF	5 x flashing	OFF	OFF	OFF	OFF	OFF	OFF	OFF	• Restart the system. • If the problem persists return the UG 6911.10 to DOLD. The modul has to be repaired
Expansion unit error	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	• Restart the system. • Check which unit is in FAIL mode
Memory chip OA 6911 error	OFF	6 x flashing	OFF	6 x flashing	OFF	OFF	OFF	OFF	OFF	Replace the memory chip OA 6911

Troubleshooting

Nominal voltage: DC 24V $\pm$ 20%
Nominal consumption: max. 3 W

Inputs

**Enabling inputs for
complete system
MASTER_ENABLE 1/2*):** 2
Digital Inputs*): 8
**Inputs for feedback circuit
FBK/RESTART*):** 2

operation EDM / Auto or manual
operation with RESTART-button possible

*) "Type B" according to EN 61131-2 I_N: 7...10 mA at DC 24 V

Outputs

OSSD: 2 pairs
static outputs
PNP active high
max. 400 mA at DC 24V

Reaction time of OSSD:

UG 6911.10:	10.6 ms ... 12.6 ms + T_{Filter}_Input
UG 6911.10 + 1 extension:	11.8 ms ... 26.5 ms + T_{Filter}_Input
UG 6911.10 + 2 extensions:	12.8 ms ... 28.7 ms + T_{Filter}_Input
UG 6911.10 + 3 extensions:	13.9 ms ... 30.8 ms + T_{Filter}_Input
UG 6911.10 + 4 extensions:	15.0 ms ... 33.0 ms + T_{Filter}_Input
UG 6911.10 + 5 extensions:	16.0 ms ... 35.0 ms + T_{Filter}_Input
UG 6911.10 + 6 extensions:	17.0 ms ... 37.3 ms + T_{Filter}_Input
UG 6911.10 + 7 extensions:	18.2 ms ... 39.5 ms + T_{Filter}_Input
UG 6911.10 + 8 extensions:	19.3 ms ... 41.7 ms + T_{Filter}_Input
UG 6911.10 + 9 extensions:	20.4 ms ... 43.8 ms + T_{Filter}_Input
UG 6911.10 + 10 extensions:	21.5 ms ... 46.0 ms + T_{Filter}_Input
UG 6911.10 + 11 extensions:	22.5 ms ... 48.1 ms + T_{Filter}_Input
UG 6911.10 + 12 extensions:	23.6 ms ... 50.3 ms + T_{Filter}_Input
UG 6911.10 + 13 extensions:	24.7 ms ... 52.5 ms + T_{Filter}_Input
UG 6911.10 + 14 extensions:	25.8 ms ... 54.6 ms + T_{Filter}_Input

Digital Outputs: 2
programmable - PNP active high
max. 100 mA at DC 24 V
Test outputs: 4
for check of von short circuits -
overloads
**Slot for
Memory chip OA 6911:** available
PC connection: USB 2.0 (Hi Speed)
Max. cable lengh: 3m

General Data

**Connection to
extension modules:** proprietary 5-pole bus
(DOLD IN-RAIL-BUS)
Nominal operating mode: continuous operation
Temperature range
Operation temperature: -10 ... + 55 °C
Storange temperature: -20 ... + 85 °C
Relative humidit: 10 % ... 95 %
Degree of protection:
Housing: IP 40 IEC/EN 60 529
Terminals: IP 20 IEC/EN 60 529
Plug in with screw terminals
max. cross section
for connection: 1 x 0,25 ... 2,5 mm^2 solid or
stranded ferruled (isolated) or
2 x 0,25 ... 1,0 mm^2 solid or
stranded ferruled (isolated)
Insulation of wires
or sleeve length: 7 mm
Wire fixing: captive slotted screw M3
Tightening torque: 0.5 ... 0.6 Nm
Max. cable lengh: 100 m
Mounting: DIN-Rail IEC/EN 60 715
Weight: approx. 190 g

Dimension

Width x height x depth: 22.5 x 109 x 120.3 mm

Safety Related Data
(only in comination with SAFEMASTER PRO)

Values according to EN ISO 13849-1:
Category: 4
PL: e
$MTTF_d$: 30 ... 100 a
DC_{avg}: high

Values according to IEC EN 62061 / IEC EN 61508:
SIL CL: 3 IEC EN 62061
SIL 3 IEC EN 61508
DC_{avg}: high
PFH_D: 10E-8 ... 10E-7 h^{-1}

info The evalutation of the max. possible values is made according to the system configuration by the SAFEMASTER PRO DESIGNER software.

The safety relevant data of the complete system has to be determined by the manufacturer of the system.

UL-Data

The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508, "general use applications"

Nominal voltage U_N: DC 24 V
$\pm$ 20 % / current supply class II or
voltage and current limits.

Nominal consumption: max. 3 W

Switching capacity:
OSSD semiconductor outputs: 24Vdc, 400mA
Status output: 24Vdc, 100 mA

Wire connection: 60°C / 75°C copper conductors only
AWG 30 - 12 Sol/Str Torque 5-7 lb-in

Note: For use in pollution degree 2
overvoltage category II environment only

info **Technical data that is not stated in the UL-Data, can be found in the technical data section.**

UG 6911.10   DC 24 V
Article number: 0063818
- Nominal voltage: DC 24 V
- Width: 22.5 mm

System Components for SAFEMASTER PRO and Accessories

TYPE	DESCRIPTION	Article number
UG 6911.10	Control unit (8 inputs / 2 dual-channel OSSDs with SAFEMASTER PRO DESIGNER Software	0063818
UG 6916.10	Input / Output module (8 inputs / 2 dual-channel OSSDs)	0063819
UG 6913.08	Input module (8 inputs)	0063820
UG 6913.12	Input module (12 inputs)	0064865
UG 6913.16	Input module (16 inputs)	0063821
UG 6912.02	Output module OSSD (2 dual-channel OSSD)	0063822
UG 6912.04	Output module OSSD (4 dual-channel OSSD)	0063823
UG 6912.14	Output module Relay (1 safety relay output)	0063824
UG 6912.28	Output module Relay (2 safety relay outputs)	0063825
UG 6918	Bus Extender	0064866
UG 6951	Fieldbus module (CANopen)	0063828
UG 6952	Fieldbus module (Profibus DP)	0063826
UG 6954	Fieldbus module (PROFINET)	0064861
OA 6911	Memory chip (external memory)	0063829
OA 6920	USB-cable for PC connection	0064160
BU 6921	Mounting kit IN-RAIL-Bus 250 mm for DIN-rail 7.5 mm	0064244
BU 6922	Mounting kit IN-RAIL-Bus 250 mm for DIN-rail 15 mm	0064245