

- Configurable, modular safety system with field bus

Advantages of SAFEMASTER PRO

- For safety applications 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
- Safe speed monitoring
- 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
- Coded connecting blocks for non-interchangeable connection increase assembly reliability.
- Compact design: Base- and extension modules with only 22.5 mm width

Short Description

SAFEMASTER PRO is a configurable, modular safety system consisting of a controller and 0-14 extension modules. To optimise the system according to the application input modules, output modules and combination input/output modules are available. These can be used in various combination with max. 4 units of the same type. In addition diagnostic modules allow to connect the system to a fieldbus. The communication between the modules is done via a 5 pole bus in the DIN rail (DOLD IN-RAIL-BUS). To extend the system, the extension modules are just clipped on the DIN rail.

In addition to the mentioned components relay extension modules UG 6912.14 and UG 6912.28 are available with 1 or 2 safety related relay outputs to extend the OSSDs with voltfree contacts. These extension modules are wired to the OSSDs of the output modules (take care of the total current).

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.

Additional Information about this topic

- Information about the single modules of the SAFEMASTER PRO series (see „System Components“) can be found in the User Manual.
- Information about the fieldbus modules of the SAFEMASTER PRO series (see „System Components“) can be found in the User Manual Fieldbus modules.

Features

- Monitoring of opto electronical sensors, light curtains, magnetic actuated sensors, E-stop buttons, safety mats, mechanical switches, two-hand control
- Up to 128 safety, single-channel inputs, dual-channel connection in pairs
- Up to 32 separate safety, dual-channel outputs (OSSD),
- 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 of control unit UG 6911 as stand alone unit possible
- Flexible safety logic to create and amend the safety functions
- Safe integrated logic testing
- Communication of the modules via 5 pole DIN-rail bus at the back of the units (In-Rail Bus)
- Indicator outputs, status-LEDs and bus connection via field bus modules for comprehensive diagnostics
- With pluggable terminal block for easy exchange of device

Approvals and Markings



*) see separate User Manual



DOLD In-Rail-Bus
replaces individual wiring

Control Unit
UG 6911.10,
UG 6911.12/080
8 safety inputs and
2 safety dual-channel or
4 safety single-channel OSSD outputs

- Up to 14 extension module, possible:
- Input /Output module UG 6916.10 and UG 6916.12/080
 - Input module UG 6913.08, .12 and .16
 - Output module OSSD UG 6912.02, UG 6912.04 und UG 6912.04/100
 - Field bus modules for diagnostic-connection on field bus systems
UG 6951 (CANopen), UG 6952 (PROFIBUS DP),
UG 6954 (PROFINET), UG 6955 (Ethernet/IP), UG 6956 (EtherCAT),
UG 6957 (USB), UG 6958 (MODBUS TCP/IP), UG 6959 (MODBUS RTU)
 - Output module relay UG 6914.04
 - Output module signal UG 6915
 - Speed monitor module UG 6917
 - Bus extender module UG 6918
 - with up to 128 safety inputs and 32 safety outputs



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

The Control Unit

The UG 6911 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 32 safety outputs (OSSD) are available. Field bus modules as option offer extensive diagnostic functions and simple integration to the conventional control.

The Input Modules

If the 8 inputs of the control unit are not sufficient an extension with input modules of 8, 12 or 16 inputs can be made. as alternative to only input modules a module with 8 inputs and 2 or 4 OSSD outputs is available. Depending on the input configuration all sorts of safety actuators can be connected. These could be optoelectronic safety scanners, light curtains, magnetic coded sensors, e-stop buttons, safety mats, mechanical switches, 2-hand controls etc.

The Output Modules OSSD

To extend the 2 safety outputs of the controller output modules with 2 or 4 dual channel semiconductor outputs (also available as high current outputs) are available. Also the combination input/output module with 8 safety inputs and 2 or 4 OSSD outputs can extend the number of outputs. The output modules also provide a feed back circuit input per safety output. This allows to monitor external contacts e.g. of relay modules UG 6912.14 or UG 6912.28.

The Output Modules Relay

For simple realization of relay outputs and for potential-free contact multiplication of the OSSDs, output module relays UG 6912.14 and UG 6912.28 are available. These optionally provide 1 or 2 relay outputs, each with 2 safety-related NO contacts and one NC contact as an indicator output.

The inputs of the output module relays are wired to the OSSDs of SAFEMASTER PRO. In order to monitor the relay contacts, these are bridged across into the feedback circuits of the relevant OSSD output module.

If more relay outputs are needed, output module relays UG 6914.04 are available. These have 4 independent safe relay outputs, each of which has an NO contact.

Each of the 4 safety relays is also equipped with an input for the external feedback contacts (EDM). Depending on the version, up to 8 programmable non-safe semiconductor outputs can also be used for status indication.

The Output Modules Signal

The signal output modules UG 6915 are safety modules with 8 or 16 programmable digital signal outputs.

The Speed Monitoring Modules

The speed monitoring modules UG 6917 are available for speed and standstill monitoring as well as direction of rotation monitoring of rotary axes or linear axes. Each module has 2 configurable outputs and can thus control up to 2 independent axes. 2 proximity sensors can be connected to each module. In addition, depending on the version, up to 2 encoders with TTL, HTL or sin/cos signals can be connected via RJ45 connectors.

The Bus Extender Module

The UG 6918 is an extension module with which a SAFEMASTER PRO system consisting of the UG 6911.10 control unit and its extension modules, can be divided up into several module groups over longer distances (up to 50m between 2 groups).

The individual groups are each connected via 2 UG 6918 bus extender modules and a shielded cable (with 4 twisted-pair lines).

Each bus extender module has 2 independent connecting channels Ch1 and Ch2.

2 bus extender modules are connected using either of these 2 channels.

The Diagnostic Modules

3 different field bus modules for diagnostic-connection on field bus systems are available:

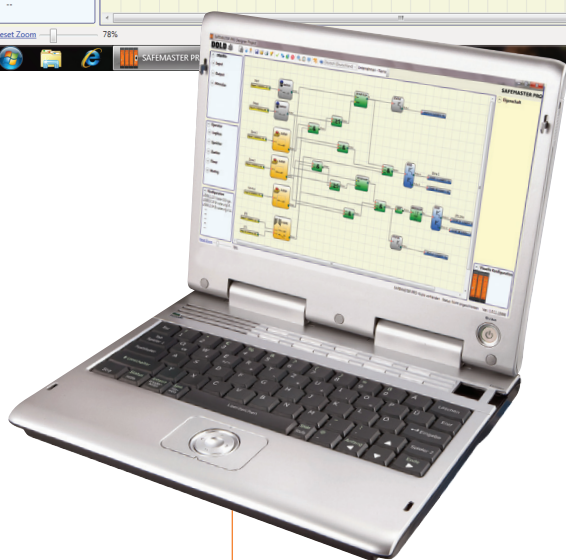
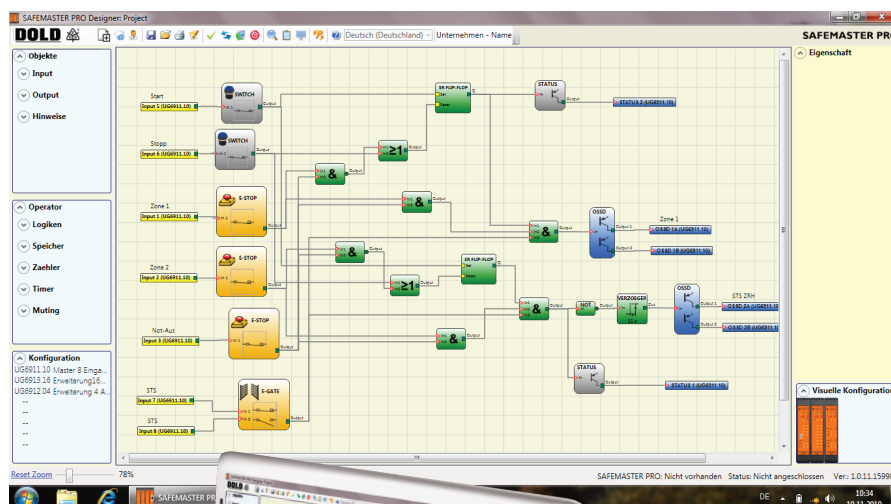
UG 6951 (CANopen), UG 6952 (PROFIBUS DP), UG 6954 (PROFINET), UG 6955 (Ethernet/IP) and UG 6956 (EtherCAT), UG 6957 (USB), UG 6958 (MODBUS TCP/IP) and UG 6959 (MODBUS RTU).

The connection between the modules is done by snapping the units on the DIN rail bus of SAFEMASTER PRO.

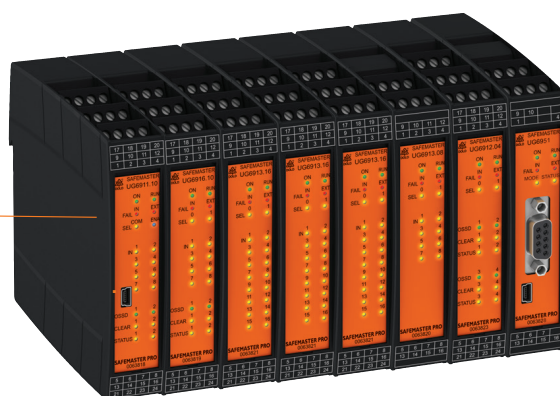
System Configuration

The configuration of the TUEV approved system is done very simple on a PC with the free configuration software SAFEMASTER PRO Designer. Using 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.



Mini USB-Port



Simple configuration in only 3 steps:

- 1 Select and configure safety functions
- 2 Assign in- and outputs and connect them comfortably on the PC
- 3 Test safety logic and transfer it via USB cable to the safety module - ready!

General Technical Data

Max number of inputs:	128		
Max number of OSSD outputs:	16 (UG 6911.10) 32 (UG 6911.12/080)		
Max. number of status outputs:	32 (UG 6911.10) 48 (UG 6911.12/080)		
Max number of slave units (excluding UG 6912.14 - UG 6912.28):	14		
Max number of slave units of the same type (excluding UG 6912.14 - UG 6912.28):	4		
Max. number of operator function blocs:	64		
Max. number of timer functions:	16		
Max. number of counter functions:	16		
Max. number of memory functions:	16		
Max. number of muting functions:	4		
Nominal voltage:	24 V DC \pm 20 % / PELV, PREdetective Class III; UL: Supply from class 2 (LVLE)		
Digital Inputs:	„Type 2“ according to EN 61131-2 IN: 7 to 10 mA at DC 24 V		
Digital Outputs (UG 6911.10, UG 6911.12/080, UG 6916.10, UG 6916.12/080, UG 6912.02, UG 6912.04, UG 6912.04/100, UG 6914.04, UG 6915):	PNP plus switching – max. 100 mA at 24 V DC		
OSSD (UG 6911.10, UG 6911.12/080, UG 6916.10, UG 6916.12/080, UG 6912.02, UG 6912.04):	PNP plus switching – max. 400 mA at 24 V DC		
OSSD High current outputs (UG 6912.04/100)	PNP active high – max. 2 A per channel at 24 V DC		
Relay outputs (UG 6912.14, UG 6912.28, UG 6914.04)	50 V, 6 A, resistive (ohmsch)		
Response time UG 6911.10 This response times depends on the following Parameters: 1) Number of slave modules installed 2) Number of operators 3) Number of OSSD outputs For the right response time refer to the one calculated by the SAFEMASTER PRO DESIGNER software (Project report)	UG 6911.10	10,6 ms \div 12,6 ms	+ TFilter_Input
	UG 6911.10 + 1 Slave	11,8 ms \div 26,5 ms	+ TFilter_Input
	UG 6911.10 + 2 Slaves	12,8 ms \div 28,7 ms	+ TFilter_Input
	UG 6911.10 + 3 Slaves	13,9 ms \div 30,8 ms	+ TFilter_Input
	UG 6911.10 + 4 Slaves	15 ms \div 33 ms	+ TFilter_Input
	UG 6911.10 + 5 Slaves	16 ms \div 35 ms	+ TFilter_Input
	UG 6911.10 + 6 Slaves	17 ms \div 37,3 ms	+ TFilter_Input
	UG 6911.10 + 7 Slaves	18,2 ms \div 39,5 ms	+ TFilter_Input
	UG 6911.10 + 8 Slaves	19,3 ms \div 41,7 ms	+ TFilter_Input
	UG 6911.10 + 9 Slaves	20,4 ms \div 43,8 ms	+ TFilter_Input
	UG 6911.10 + 10 Slaves	21,5 ms \div 46 ms	+ TFilter_Input
	UG 6911.10 + 11 Slaves	22,5 ms \div 48,1 ms	+ TFilter_Input
	UG 6911.10 + 12 Slaves	23,6 ms \div 50,3 ms	+ TFilter_Input
	UG 6911.10 + 13 Slaves	24,7 ms \div 52,5 ms	+ TFilter_Input
	UG 6911.10 + 14 Slaves	25,8 ms \div 54,6 ms	+ TFilter_Input
Response time UG 6911.12/080 This response times depends on the following Parameters: 1) Number of slave modules installed 2) Number of operators 3) Number of OSSD outputs For the right response time refer to the one calculated by the SAFEMASTER PRO DESIGNER software (Project report)	UG 6911.12/080	12,75 ms \div 14,75 ms	+ TFilter_Input
	UG 6911.12/080 + 1 Slave	13,83 ms \div 37,84 ms	+ TFilter_Input
	UG 6911.12/080 + 2 Slaves	14,91 ms \div 40,00 ms	+ TFilter_Input
	UG 6911.12/080 + 3 Slaves	15,99 ms \div 42,16 ms	+ TFilter_Input
	UG 6911.12/080 + 4 Slaves	17,07 ms \div 44,32 ms	+ TFilter_Input
	UG 6911.12/080 + 5 Slaves	18,15 ms \div 46,48 ms	+ TFilter_Input
	UG 6911.12/080 + 6 Slaves	19,23 ms \div 48,64 ms	+ TFilter_Input
	UG 6911.12/080 + 7 Slaves	20,31 ms \div 50,80 ms	+ TFilter_Input
	UG 6911.12/080 + 8 Slaves	21,39 ms \div 52,96 ms	+ TFilter_Input
	UG 6911.12/080 + 9 Slaves	22,47 ms \div 55,12 ms	+ TFilter_Input
	UG 6911.12/080+ 10 Slaves	23,55 ms \div 57,28 ms	+ TFilter_Input
	UG 6911.12/080+ 11 Slaves	24,63 ms \div 59,44 ms	+ TFilter_Input
	UG 6911.12/080+ 12 Slaves	25,71 ms \div 61,60 ms	+ TFilter_Input
	UG 6911.12/080+ 13 Slaves	26,79 ms \div 63,76 ms	+ TFilter_Input
	UG 6911.12/080+ 14 Slaves	27,87 ms \div 65,92 ms	+ TFilter_Input
Unit connection UG 6911.10, UG 6911.12/080	Proprietary 5-pole DOLD IN-RAIL-BUS		
Plug in terminal blocks 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 mm ² solid or stranded ferruled (isolated)		
Insulation of wires or sleeve length:	7 mm		
Wire fixing	Captive slotted screw M3		
Fixing torque:	0,5 ... 0,6 Nm		
Max length of connections:	100 m		
Operating temperature:	-10 \div 55 °C		
Storage temperature:	-20 \div 85 °C		
Relative humidity:	10 % \div 95 %		
Altitude:	2,000 m		
UL-Data:	The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508, “general use applications”		
UL-Notes:	For use in Pollution degree 2, overvoltage category II environment only		
Max. ambient temperatur:	55 °C		
Wire connection:	60 °C / 75 °C copper conductors on! AWG 30 \div 12 (solid / stranded) Torque 5-7 lb-in		

Safety Related Data

Values according to EN ISO 13849-1:

Category:	4	
PL:	e	
MTTF _d :	30 ... 100	a
DC _{avg} :	high	
Service life:	20	a (year)

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 :	10 ⁻⁸ ... 10 ⁻⁷	h ⁻¹

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
± 20 % / current supply class II or
voltage and current limits.

Nominal consumption: max. 3 W

Switching capacity:

OSSD semiconductor outputs: 24Vdc, 400mA
OSSD relay output: 6A 250Vac, resistive
Status output: 24Vdc, 100 mA

Wire connection: 60°C / 75°C copper conductors only
0,5 ... 2,5 mm²
AWG 12 - 30 Sol/Str Torque 5-7 lb-in

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



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

System Components for SAFEMASTER PRO and Accessories

Type	Description	Art.-number
UG 6911.10	Control unit (8 Input / 2 dual channel OSSD), with software SAFEMASTER PRO DESIGNER	0063818
UG 6911.12/080	Control unit (8 Input / 4 single channel OSSD), with software SAFEMASTER PRO DESIGNER	0068574
UG 6916.10	Input/Output module (8 Input / 2 dual channel OSSD)	0063819
UG 6916.12/080	Input/Output module (8 Input / 4 single channel OSSD)	0068590
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 6912.04/100	Output module OSSD (4 high current safety outputs)	0068286
UG 6912.14	Output module relay (1 safety relay output)	0063824
UG 6912.28	Output module relay (2 safety relay output)	0063825
UG 6914.04/000	Output module relay (4 safety relay output)	0066057
UG 6914.04/008	Output module relay (4 safety relay output + 8 status outputs)	0065990
UG 6915/008	Output module signal (8 signal outputs)	0068282
UG 6915/016	Output module signal (16 signal outputs)	0068284
UG 6917/002	Speed monitoring module (for 2 proximity switches)	0066059
UG 6917/102	Speed monitoring module (for 2 proximity switches + 1 TTL encoder)	0066060
UG 6917/112	Speed monitoring module (for 2 proximity switches + 2 TTL encoder)	0066061
UG 6917/202	Speed monitoring module (for 2 proximity switches + 1 HTL encoder)	0066062
UG 6917/222	Speed monitoring module (for 2 proximity switches + 2 HTL encoder)	0066063
UG 6917/302	Speed monitoring module (for 2 proximity switches + 1 Sin/Cos encoder)	0066064
UG 6917/332	Speed monitoring module (for 2 proximity switches + 2 Sin/Cos encoder)	0065992
UG 6918	BusExtender	0064866
UG 6951	Fieldbus module CANopen	0063828
UG 6952	Fieldbus module PROFIBUS DP	0063826
UG 6954	Fieldbus module PROFINET	0064861
UG 6955	Fieldbus module Ethernet IP	0064862
UG 6956	Fieldbus module EtherCAT	0064863
UG 6957	Fieldbus module Universal Serial Bus (USB)	0064864
UG 6958	Fieldbus module MODBUS TCP/IP	0068268
UG 6959	Fieldbus module MODBUS RTU	0068270
OA 6911	Memory chip	0063829
OA 6920	USB-connection cable for PC	0064160
BU 6921	Mounting set IN-RAIL-Bus 250 mm for DIN 7.5 mm Rail	0064244
BU 6922	Mounting set IN-RAIL-Bus 250 mm for DIN 15 mm Rail	0064245
PN 6919	Software SAFEMASTER PRO DESIGNER	0064246

