Safety Control Unit F28

Safety Module with delayed Solid-State Outputs

Characteristics

- Stop category 0 / 1
- Safety category 4
- 2 Solid-state safety outputs with adjustable off-delay
- 1 Solid-state auxiliary output
- Cyclical self-test
- Monitored or automatic start
- 27 time ranges up to 300 seconds
- Configurable by terminal jumpers
- LEDs indicate switching status and timing
- Optional plug-in terminal block
- Compact 22.5mm wide housing

Description

Electrical systems of industrial machines must have safety monitoring and control features in accordance with Clause 9.4 of DIN EN 60204 Part 1/ VDE 0113 Part 1.
The **F28**, with its delayed re-set action, electronic monitoring functions, and solid-state safety switch outputs, ensures that the machine on which it is used complies with these requirements.
The **F28** conforms to Category 4 of the EN954-1 specifications because it has diverse safety functions, dynamically monitors inputs and outputs, and does not use electromechanical relays.

The inputs can be connected for 1- or 2-channel operation, with or without cross-fault safety monitoring.

The **F28** is compatible with inputs from emergency stop switches, safety foot switch mats and strips, as well as safety switches installed on protective doors.

Self-generated test pulses are used to dynamically check the input circuits.
All solid-state safety switching and pulse train outputs are short-circuit protected.

Diagnostic LED lamps indicate the status of the power input and the switching outputs of both channels.

The unit is available with plug-in terminal blocks, with which delay settings remain un-changed even if the control unit is changed.

Mode of Operation

The safety control cycle starts either automatically when an emergency-stop circuit, or by closing a start switch connected across terminals A1-S34.
For this, the edges of the switching pulses are detected.

Depending on the configuration, a one-time interruption of the emergency-stop circuits (start-up test) can be required after the unit has been powered up.

On interruption of the emergency-stop circuits, the status output switches off immediately, while the safety outputs switch off when the pre-set delay ends. The time delay function of the **F28** is protected against time extension.

While the delay period is active, it is not possible to interrupt the delay, re-start or re-trigger the system.

The desired off-delay value is set by shorting terminals Y11/12/13 with S11/12, in combinations given in the delay settings table. The delay time has a direct effect on the response time of the system. A change in the delay setting becomes effective only after the power supply to the unit has been turned off and then on again. After any change in the delay setting, the new delay time should be verified.

If both channels are to be controlled with the same signal (single channel operation or without cross-fault detection), terminals Y41 and A1 must be shorted.

For feedback circuit monitoring, terminals A1 (+24V) and Y2 must be shorted, either through N/C contacts of a contactor, or by a jumper.

By continuously scanning all inputs, faults or configuration changes during operation are detected, resulting in immediate tripping action.

LED PWR / Diagnostics

Initialization:	Blinks - 3 secs
Normal operation:	Continuously on
During delay time period:	Rapid blinking
Internal fault:	Continuous blinking
Configuration change during operation:	2 blinks
Solid-state switch output fault:	4 blinks

Models and Ordering Data

Outputs	2 safety outputs off delayed 1 auxiliary output instant
Model F28 24VDC	**Ordering code:**
Std. terminals	074 00280
Plug-in terminals	074 00284

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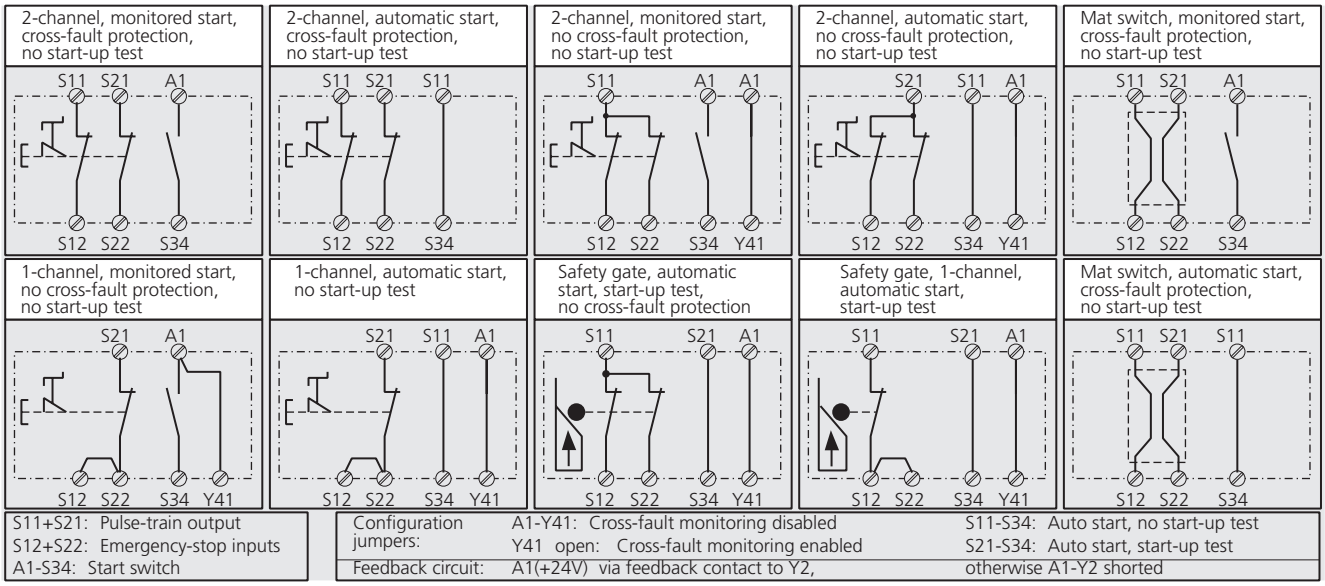
Safety Control Unit F28 - with delayed Solid-State Outputs

The right to make changes is reserved

Control Modes



S11+S21: Pulse-train output
S12+S22: Emergency-stop inputs
A1-S34: Start switch

Configuration jumpers:	A1-Y41: Cross-fault monitoring disabled	S11-S34: Auto start, no start-up test
	Y41 open: Cross-fault monitoring enabled	S21-S34: Auto start, start-up test
Feedback circuit:	A1(+24V) via feedback contact to Y2,	otherwise A1-Y2 shorted

Technical Data

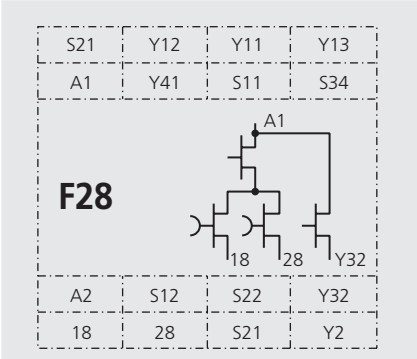
Rated voltage	24VDC SELV (per IEC 61496-1)
Voltage range	0.8 to 1.1 x rated voltage
Power consumption	Without output loads: 3W
Operating temperature	-5°C to +55°C
Storage temperature	-20°C to +70°C
Protection class	Terminals IP 20; housing IP 40 (per DIN VDE 0470-1)
Mounting	In panel enclosure (IP 54)
In panel enclosure (IP 54)	24VDC, 2A per safety output; Y32 signal output: 50mA; all short-circuit protected
Timing accuracy	± 0.03%
Response time	< 15ms
Recovery time	< 20ms
Start-up time	3 sec system check, after applying power
Outputs	2 solid-state safety outputs (terminals 18 and 28) 1 solid-state auxiliary output (Y32)
Terminals	Terminal box with wire protection
Wire size	2.5mm²
Control circuit	Approx. 24VDC, 8.5mA, dynamic
Weight	Approx. 130g

Delay Time Setting

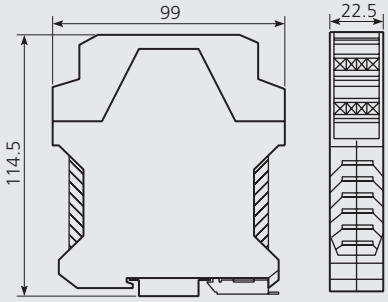
Reset delay time is selected by one of the following combination of jumpers between terminals Y11/12/13 and S11/12:

Sec.	Y11	Y12	Y13
0	-	-	-
0.5	S11	-	-
1	-	S11	-
1.5	-	-	S11
2	S21	-	-
3	-	S21	-
4	-	-	S21-
5	S11	S21	-
6	S11	-	S21
8	S21	S11	-
10	-	S11	S21
12	S21	-	S11
15	-	S21	S11
18	S11	S11	-
21	S11	-	S11
26	-	S11	S11
30	S21	S21	-
40	S21	-	S21
50	-	S21	S21
60	S11	S11	S11
80	S11	S11	S21
100	S11	S21	S11
120	S11	S21	S21
160	S21	S11	S11
200	S21	S11	S21
250	S21	S21	S11
300	S21	S21	S21

Wiring Diagram



Dimensional Diagram



DIN rail mounting (EN 50022 - 35 x 7.5)
(all dimensions in mm)

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