

## Emergency-Stop and Safety Gate Module with Solid-State Outputs

## Characteristics

- Stop category 0
- Safety category 4
- 2 Solid-state safety outputs
- 1 Solid-state auxiliary output
- Cyclical self-test
- Cross-fault and ground fault monitoring
- Monitored or automatic start
- Configurable by terminal jumpers
- LEDs with diagnostic functions
- 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 **F20**, with its electronic monitoring functions and solid-state safety switch outputs, ensures that the machine on which it is used complies with these requirements. The **F20** conforms to Category 4 of the EN954-1 specifications because it has diverse safety functions and dynamically monitors inputs and outputs. It does not use electromechanical relays.

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

The **F20** is compatible with inputs from emergency stop switches, safety foot switch mats and safety edges, as well as safety switches installed on protective doors.

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

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

## Mode of Operation

The safety control cycle starts either automatically as soon as the emergency-stop circuits are closed, or by the operation of the monitored 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.

Both safety outputs and the status-signaling output switch off if there is an interruption of the emergency-stop circuits.

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 occurring during operation are detected, resulting in immediate tripping action.

The **F20** is optionally available with coded plug-in terminal blocks, to reduce installation and servicing time.

## LED PWR / Diagnostics

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

## Models and Ordering Data

Outputs	2 safety outputs 1 auxiliary output
<b>Model F20 24Vdc</b>	<b>Ordering code:</b>
Standard terminals	074 00277
Plug-in terminals	074 00281


**TESCH**

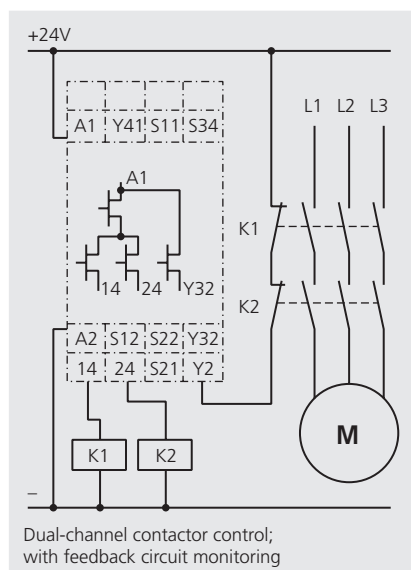
## Control Modes

<p>2-channel, monitored start, cross-fault protection</p>	<p>2-channel, automatic start, cross-fault protection, no start-up test</p>	<p>2-channel, monitored start, no cross-fault protection</p>	<p>2-channel, automatic start, no cross-fault protection, no start-up test</p>	<p>Mat switch, monitored start, cross-fault protection</p>
<p>1-channel, monitored start, no cross-fault protection</p>	<p>1-channel, automatic start, no start-up test</p>	<p>Protective door, automatic start, start-up test, no cross-fault protection</p>	<p>Protective door, 1-channel, automatic start, start-up test</p>	<p>Mat switch, automatic start, cross-fault protection, no start-up test</p>
<p>S11+S21: Pulse-train output S12+S22: Emergency stop Inputs A1-S34: Reset button</p>	<p>Configuration A1-Y41: Cross-fault monitoring disabled Y41 open: Cross-fault monitoring enabled</p>		<p>S11-S34: Auto start, start-up test disabled S21-S34: Auto start, start-up test enabled</p>	
<p>Feedback circuit: A1 (+24V) via feedback contacts to Y2;</p>			<p>otherwise A1-Y2 shorted</p>	

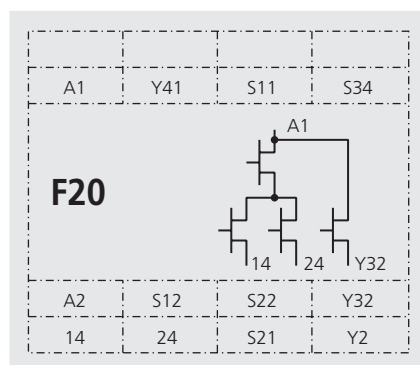
## Technical Data

Rated voltage	24Vdc SELV (per IEC 61496-1)
Voltage range	0.8 to 1.1 x rated voltage
Power consumption	Without output loads: approx. 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)
Switching output load	24Vdc, 2A per safety output; Y32 signal output: 50 mA; all short-circuit protected
Response time	< 15ms
Recovery time	< 20ms
Start-up time	3 sec system check, after applying power
Outputs	2 solid-state safety outputs (terminals 14 and 24) 1 solid-state auxiliary output (Y32)
Terminals	Terminal box with wire protection
Wire size	2.5mm <sup>2</sup>
Control circuit	Approx. 24Vdc, 8.5 mA, dynamic
Weight	Approx. 130g

## Wiring Example



## Wiring Diagram



## Dimensional Diagram

