

## Emergency Stop Safety Control Unit

## Characteristics

- 2 safety contacts
- 1 auxiliary contact (N/C)
- 2 semiconductor outputs, short circuit protected
- 2 input circuits, each with 1, 2, or 3 channels
- 10 diagnostic LED's
- 45 mm housing (DIN rail compatible)
- Monitored or automatic start
- Crossfault monitoring
- Feedback circuit
- Self diagnostics

The Model **F210** is designed for safety control in Emergency Stop applications, per DIN EN 60204, Part 1 / VDE 0113, Part 1 (11/98), Section 9.4. It conforms to EN 954-1, Category 4, for the highest safety level.

The **F210** can be combined with other modules of the F200 Series to configure safety control systems with numbers of inputs and outputs, as well as diagnostic and networking capabilities, matching users' specific application requirements.

## Description

The **F210** Basic Module has 2 inputs, each of which can be controlled through 1, 2, or 3 channels, independently of one another. Therefore, for example, an emergency stop switch and a safety gate with an additionally monitored door-fastening device can be connected, so that each contact can be monitored independently. Also 4-pole foot-switch mats and safety light curtains with relay outputs can be used as initiating devices. Light curtains having solid-state switch outputs should be used with Input Expansion Module F221 or Basic Module F211 with appropriate inputs.

An F200 system, consisting of one Basic Module connected to a combination of Input and Output Expansion Modules, can have up to 22 inputs and up to 10 output contacts.

Three signal outputs feed all connected contact-equipped protective devices. For dual- or single-channel activation terminals on the appropriate input have to be linked according connection table over-leaf. For connection of limit switches with NO and NC contacts, see List F220.

The **F210** monitors the individual channels constantly to check their connection to one another, and to check for interruptions. It opens the safety contacts if



either an appropriate E-stop or fault condition occurs. The status of inputs/outputs and diagnostic information are indicated by LED lamps, signalled by relay contacts and semiconductor outputs, and also transmitted through a serial data interface on the front of the Module.

## Mode of Operation

The status LED's on the front of the Module light up to indicate:

- Input: Green: emergency stop circuit closed  
 Red: emergency stop circuit open
- PWR: Supply voltage on
- RUN: System on
- STOP: System off
- READY: System ready to start, emergency stop circuits closed
- 1-2 CH: Channel 1 / Channel 2 relay energized

The **F210** can be put into operation either manually by pressing the start pushbutton, or automatically as soon as the supply voltage is switched on. When operated in "monitored start" mode, the start switch is checked for every switch-on occurrence. Starting is not possible if the start switch is closed before the emergency stop switch is closed again, or before supply voltage has been applied.

In the "auto-start" mode (terminals Y40 and Y41 shorted), the Module starts automatically as soon as the supply voltage is switched on, provided the emergency stop and feedback circuits are closed.

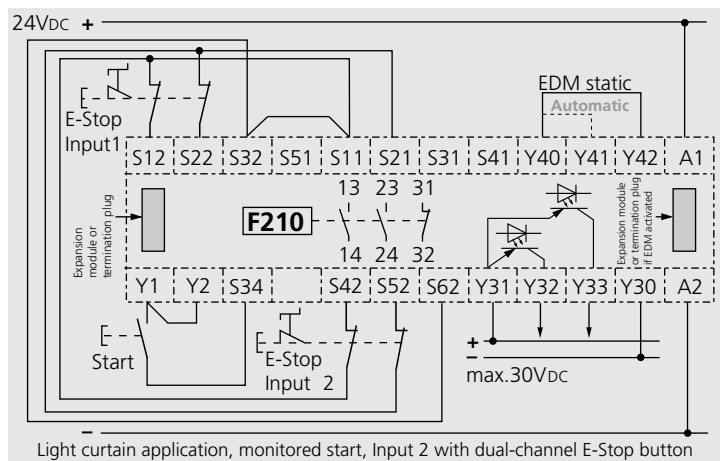
The solid-state switch outputs (Y33 and Y32) can be used to transfer status information of the **F210** to a PLC. Output Y33 is on when the Module is in READY condition (both emergency stop circuits closed). Output Y32 is on when the output relay is energized.

If N/C contacts of external contactors or Expansion Modules are to be monitored, switching them between Y1 and Y2 is necessary. This feedback loop is adjustable for dynamic (**E**lectronic **D**evice **M**onitoring) or static monitoring.

Narrow Expansion Modules for increasing input channels and output contacts can be connected directly to the Basic Module through a front panel system bus interface connector. A serial data interface port allows operating status and diagnostic information to be transmitted to a supervisory computer station or diagnostic display.

All the Modules in this Series are fitted with plug-in coded terminal blocks, for easy installation, removal, or replacement.

## External Circuit Example



### Error indications by the red STOP LED:

Blinks twice at intervals: changes in Y40/Y41/Y42 external circuits during operation  
 Blinks 3 times at intervals: fault in external feedback circuit Y1-Y2.  
 After the fault has been cleared, the Module is re-set by interruption of supply voltage.  
 Continuous blinking : internal fault in Basic or Expansion Module

## F210 Input Connections

Each input can be used for single- dual- or triple channel activation. Open inputs have to be linked e.g. as if single channel activated.

The terminals have to be linked and connected to the safety switches according the following scheme:

- Singel-channel: Input 1: S11 — S12 & S11 — S22  
 Input 2: S11 — S42 & S11 — S52
- Dual-channel: Input 1: S11 — S12 & S21 — S22 & S11 — S32  
 Input 2: S11 — S42 & S21 — S52 & S11 — S62
- Triple-channel: Input 1: S11 — S12 & S21 — S22 & S31 — S32  
 Input 2: S11 — S42 & S21 — S52 & S31 — S62
- Safety-mat One surface side connected between S41 and connection: S12, the other between S51 and S22, with S41 and S32 linked

Reset and monitoring functions can be set by terminal connections according the following table:

- Start button (monitored reset): Y1 — S34  
 or automatic reset: link between Y40 - Y41
- External Device Monitoring dynamic: Y1 — Y2  
 EDM static: Y1 — Y2 (or linked) & Y40 - Y42

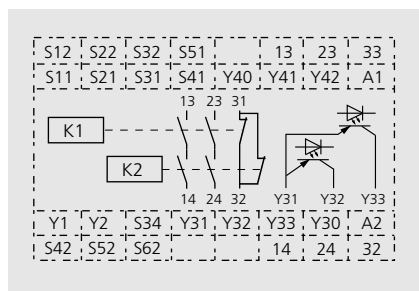
Termination plugs must be installed in unused expansion interface connectors.

## Technical Data

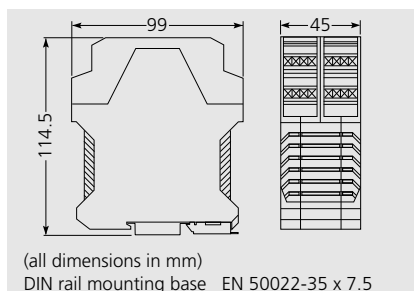
Rated voltage	24 V <sub>DC</sub> (SELV per IEC 61496-1)
Voltage range	0.8 x to 1.1x rated voltage
Power consumption	Approx. 8 W; plus approx. 2 W per Expansion Module
Rated insulation voltage	250 V
Creep and air paths	Overvoltage Category III, Pollution Level 2 per VDE 0110 (04/97)
Test voltage	2.5 kV
Ambient temperature	-5 °C to +55 °C
Protection class	IP 20
Installation	in a cabinet: IP 54
Switching capacity	AC: 250 V, 1250 VA. DC: 24 V, 120 W Preferably with spark suppression
Current rating (resistive)	2 x 4 A or 1 x 6 A
Utilisation category	AC-15: 240 V 3A. DC-13: 24 V 2.5 A
Start-up time	Approx. 3 seconds from switching on power supply

Re-set time at 1.1x rated voltage	F210: < 29 ms, F210+Extension: <34 ms plus approx. 6 ms per Input Expansion Module
Recovery time	40 to 145 ms, depending on Expansion Modules used
Contacts configuration	2 N/O (safety contacts). 1 N/C (auxiliary contact)
Semiconductor outputs	2 x PNP; 30 V <sub>DC</sub> 20 mA max.; short-circuit protected (SELV)
Mechanical lifetime	10 <sup>7</sup> switching cycles
Contacts material	AgSnO <sub>2</sub> , with 2 micron gold plating
Terminals	Terminal box with wire protection
Wire cross section	2.5 mm <sup>2</sup>
Control circuit	24 V <sub>DC</sub> nominal
Contact protection	Fuse: max.6A slow blow Circuit breaker: max. C10A quick break
Weight	Approx. 280g

## Connection Diagram

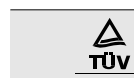


## Dimensional Diagram



## Models and Ordering Data

Contacts	2 N/O Safety contacts 1 N/C Auxiliary contact 2 Semiconductor outputs
Type F 210 24 V <sub>DC</sub>	<b>Order No.</b> 074 00179



\* = Approval expected

