

Solid-state Switching Devices

3RF29..-0FA08 Load Monitoring Basic Function Module

Main Characteristics:

Applicable on 3RF21 and 3RF23 devices
 No additional space requirements
 Partial load monitoring for up to 6 loads
 Network and thyristor monitoring
 Plug-in control terminal
 Degree of protection IP 20



Standards / Approvals:

DIN EN 60947-4-3
 UL 508 / CSA
 CE
 C-Tick

Product Description:

Operation and monitoring of up to 6 heating elements with constant resistance at a 3RF21 solid state relay or a 3RF23 solid state contactor.

This module permanently measures the current strength. This value is then continuously compared to a reference value (TEACH) which has once been stored during commissioning. If the current drops by 1/6 of the reference value, however, by at least the value of the min. partial load current, the module detects a partial load fault.

Moreover, the function module monitors thyristor faults and network failures.

In cases of failure, the failure is signaled to the control via the OUT contact (NO contact) after a delay time of 100 msec and indicated via the FAULT LED at the function module.

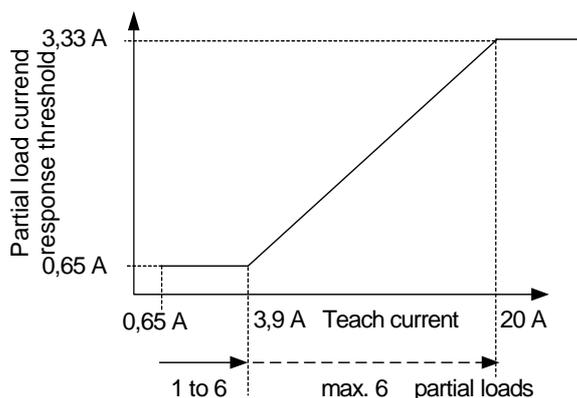
Ordering Key:

3RF29	06	- 0	F	A	0	8
Function module for 3RF21 and 3RF23	Max. load current 06 = 6 A 20 = 22 A	Connection technology 0 = Not relevant	Switching function F = Load monitoring Basic	Controlled phases A = Single-phase	Control voltage 0 = 24 V DC	Operating voltage 8 = Not relevant

Main Circuit:

Type		3RF2906-0FA08	3RF2920-0FA08	3RF2920-0FA08
Current detection				
Product version¹			to *E02*	ex *E03*
Rated operating current I _e	A	6	20	20
• TEACH range	A	0,25 ... 6	4 ... 22	0,65 ... 22
• Measuring range	A	0 ... 6,6	0 ... 22	0 ... 22
• Min. partial load current	A	0,25	0,65	0,65
Number of partial loads		1 ... 6	1 ... 6	1 ... 6

Partial load monitoring response threshold in dependence of the sum current



For example: 3RF2920-0FA08 ex *E03*

The characteristic curve shows the load change (Y axis) required for a partial load fault in dependence of the teach current (X axis).

¹ The product version are on the package on the label and at the top of the device.

Control Circuit A1-A2:

Type		3RF29...0FA08
Rated control supply voltage U_s	V	24 DC
<ul style="list-style-type: none"> Current input 	mA	< 25
<ul style="list-style-type: none"> Max. control supply voltage 	V	30 DC
<ul style="list-style-type: none"> Min. control supply voltage 	V	18 DC

Control Input IN:

Type		3RF29...0FA08
Max. rated operating voltage U_c	V	30 DC
<ul style="list-style-type: none"> Operating current 	mA	< 15
Response voltage U_c	V	12
<ul style="list-style-type: none"> Pickup current 	mA	> 2
Drop-out voltage	V	5

Fault Signaling Output OUT:

Type		3RF29...0FA08
Output voltage	V	15 ...30 DC
<ul style="list-style-type: none"> Max. output current 	mA	50

General Data:

Ambient temperature		
During operation	°C	-25 ... 60
During storage	°C	-55 ... 80
Mounting altitude	m	0 ... 1000; at > 1000 m, please contact our Technical Assistance
Impact resistance acc. to DIN IEC 68	g/ms	15/11
Vibration resistance	g	2
Degree of protection		IP20
Electromagnetic compatibility (EMC)		
Interference emission		
<ul style="list-style-type: none"> Conducted interference voltage IEC 60 947-4-3 		Class A for industrial applications ²
<ul style="list-style-type: none"> Radiated, high-frequency interference voltage IEC 60 947-4-3 		Class A for industrial applications
Interference resistance		
<ul style="list-style-type: none"> Electrostatic discharge acc. to IEC 61 000-4-2 (corresponds to severity 3) 	kV	Contact discharge 4; air discharge 8; performance criterion 2
<ul style="list-style-type: none"> Induced HF fields acc. to IEC 61 000-4-6 	MHz	0.15 ... 80; 140 dB μ V; performance criterion 1
<ul style="list-style-type: none"> Burst acc. to IEC 61 000-4-4 	kV	2/5.0 kHz; performance criterion 1
<ul style="list-style-type: none"> Surge acc. to IEC 61 000-4-5 	kV	Phase-to-ground 2; phase-to-phase 1; performance criterion 2

Type		Screw connection
Connection, auxiliary/control contacts		
Conductor cross-section with or without end sleeve	mm ² mm ² AWG	1 x (0.5 ... 2.5) 2 x (0.5 ... 1.0) 20 ... 12
Stripping length	mm	7
Terminal screw		M 3
<ul style="list-style-type: none"> Tightening torque 	Nm	0.5 ... 0.6
<ul style="list-style-type: none"> D 3.5 / PZ 1 	lb.in	4.5 ... 5.3
Current transformer hole diameter	mm	7

² **Attention!**

This product was constructed as a EMC Class A device. The use of this product in residential applications could lead to radio interferences. In such an application, additional filtering may be required.

Allocation to the Solid State Switching Devices:

Applicable for the following types	Order No.	Control voltage	Connection technology
Solid state relays	3RF21...-1.A0. 3RF21...-1.A4.	Us = 24 V DC Us = 4...30 V DC	Screw connection
Solid state contactors	3RF23...-1.A0. 3RF23...-1.A4.	Us = 24 V DC Us = 4...30 V DC	Screw connection
Accessories	Order No.		
Sealable caps	3RF2900-0RA88		

Mounting:

The module can be mounted onto all 3RF21 solid state relays and 3RF23 solid state contactors with a control voltage of 24 V DC. After disconnection of the control terminal from the solid state switching device and disconnection of the line to the load from the 2T terminal, the Basic load monitoring can be snapped on. All connections to the basic device are realized thereby. Caution: The guide at the transformer must be inserted into the groove of the solid state switching device! The control terminal of the solid state relay or contactor is plugged into the function module's A1-A2 terminal. The line to the load must be routed through the transformer (D 7.0 mm) and reconnected to the solid state switching device.

For dismounting, the load monitoring must be manually withdrawn from the basic device in vertical direction.

Commissioning:

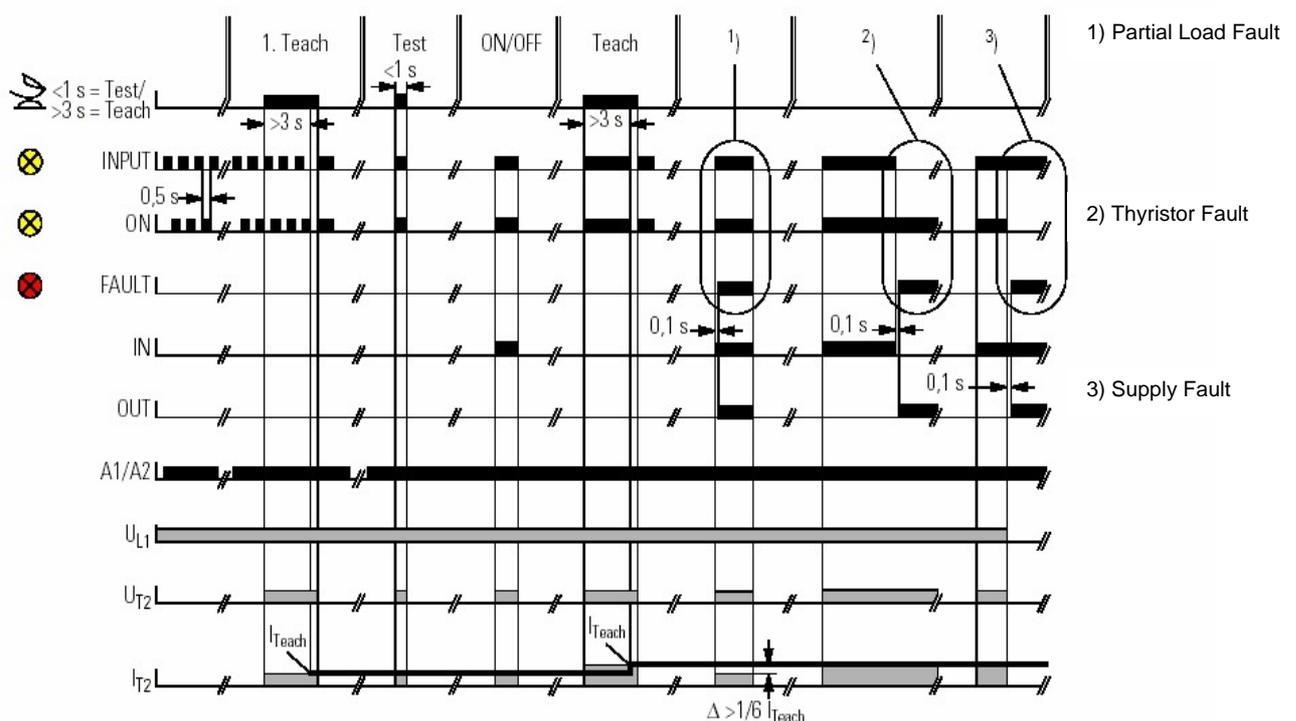
When the supply voltage (A1-A2) is first applied, the two INPUT and ON LEDs flash alternately as no TEACH process has yet been carried out. The fault signal output is not set thereby. The function module can be taught in the controlled or uncontrolled state.

Press the TEACH pushbutton for at least 3 seconds. After this time, the load monitoring detects the current flowing through the solid state relay or contactor and stores it as a set point value. The correct completion of the TEACH process is indicated by a simultaneous continuous illumination of the two LEDs.

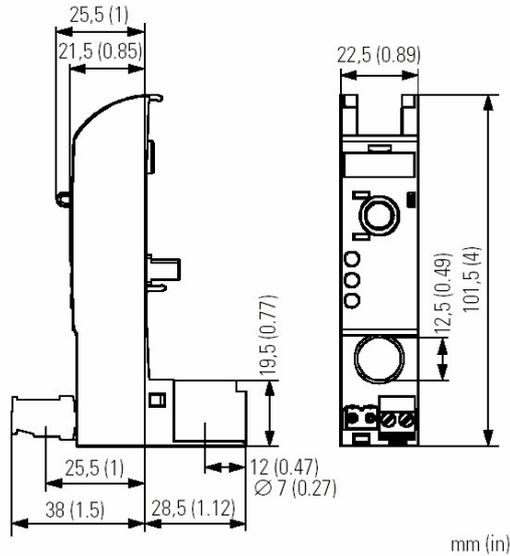
The TEACH process can be repeated at any time.

With the supply voltage applied, the TEACH button can be pressed shortly, maximally 1 second, for test purposes. For this time, the solid state switching device switches through and you can thereby test the arrangement.

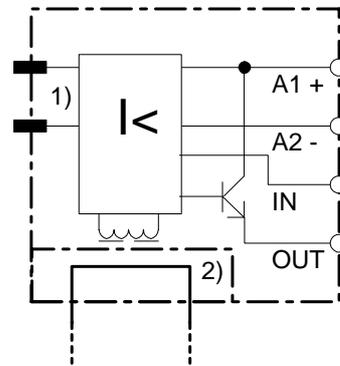
Function Diagram:



Dimension Drawing:



Device Circuit Diagram:



3RF29..-0FA08
 $U_s = 24 \text{ V DC}$

Example Circuit Diagram:

- A1 Control (PLC)
- F1 Miniature circuit-breaker main circuit
- K1 3RF23 solid state contactor with plugged-on load monitoring module
- R1-6 Load resistances
- 1) Internal connection to the solid state relay or contactor
- 2) Straight-through transformer

