3RF29..-0GA. Extended Load Monitoring

Main Characteristics:

Applicable on 3RF21 and 3RF23 devices
Partial load monitoring for up to 12 loads
Integrated voltage compensation
Network and thyristor monitoring
Selectable fault memory
Plug-in control terminal
Degree of protection IP 20
Adjustable delay time

Standards / Approvals:

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

Product Description:

Operation and monitoring of up to 12 heating elements with constant resistance at a 3RF21 solid state relay or 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 1/12 of the reference value, however, by at least the value of the min. partial load current, the module detects a partial load fault. If the current exceeds the maximum measuring range a fault will be detected too.
Voltage fluctuations within the load circuit are compensated and do not result in a fault message.
The delay time in fault cases is adjustable to a value between 100 msec and 3 sec via a potentiometer at the module. The setting whether the module is to store the fault message or not is also made via this potentiometer. If fault messages are to be stored, the fault output remains set after fault rectification until the voltage supply is shortly disconnected from A1-A2 for reset. If fault messages are not to be stored, the output is automatically reset upon fault rectification.
Moreover, the function module monitors thyristor faults and network failures.

Ordering Key:

3RF29	**20**	**- 0**	**G**	**A**	**1**	**3**
Function module for 3RF21 and 3RF23	Max. load current 20 = 20 A 50 = 50 A 90 = 90 A	Connection technology 0 = Not relevant	Switching function G = Load monitoring Extended	Controlled phases A = Single-phase	Control voltage 1 = 24 V AC/DC 3 = 110 V AC	Operating voltage 3 = 110 ... 230 V 6 = 400 ... 600 V

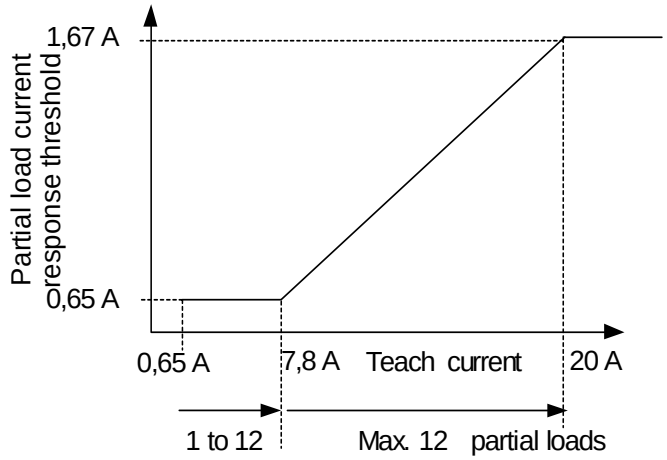
Main Circuit:

Type		3RF29**20**-0GA**.**	3RF29**50**-0GA**.**	3RF29**90**-0GA**.**
Current detection				
Product version to *E03* 1)				
Rated operating current I_e	A	20	50	90
• TEACH range	A	4 ... 20	10 ... 50	18 ... 90
• Measuring range	A	0 ... 22	0 ... 55	0 ... 99
• Min. partial load current	A	0,65	1,6	2,9
Number of partial loads		1 ...12		
Product version ex *E04*				
Rated operating current I_e	A	20	50	90
• TEACH range	A	0,65 ... 20	1,62 ... 50	2,93 ... 90
• Measuring range	A	0 ... 22	0 ... 55	0 ... 99
• Min. partial load current	A	0,65	1,6	2,9
Number of partial loads		1 ...12		

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

Type		3RF29..-0GA.3	3RF29..-0GA.6
Rated operating voltage U_e	V	110 ... 230	400 ... 600
• Tolerance	%	-15/+10	
• Rated frequency	Hz	50/60 ± 2	
Rated insulation voltage U_i	V	600	
Voltage detection			
• Measuring / TEACH range	V	93.5 ... 253	340 ... 660
Compensation Network voltage fluctuation	%	20 (only within the measuring range)	

Partial load monitoring response threshold in dependence of the sum current



E.g. 3RF2920-0GA.. *ex *E04**

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

Control Circuit A1-A2:

Type		3RF29..-0GA1.		3RF29..-0GA3.
Rated control supply voltage U_s	V	24 AC/DC		110 V AC
• Current input	mA	< 40		< 20
• Max. control supply voltage	V	26.5 AC	30 DC	121
• Min. control supply voltage	V	20.5 AC	18 DC	90

Control Input IN:

Type		3RF29..-0GA1.		3RF29..-0GA3.
Rated operating voltage U_c	V	24 AC/DC		110 AC
• With operating current	mA	< 15		< 15
• Max. operating voltage	V	26.5 AC	30 DC	121
Response voltage	V	14 AC	15 DC	79
• With pickup current	mA	> 2	> 2	> 2
Drop-out voltage	V	5	5	15
Rated frequency of the control supply voltage	Hz	50/60 ± 10 %	--	50/60 ± 10 %

Auxiliary Circuit 14-11-12:

Type		3RF29..-0GA1.	3RF29..-0GA3.
Switching voltage	V	24 AC/DC	110 AC
• Operating current (utilization category)	A	0.5 (DC-12)	0.5 (AC-12)
• Max. switching voltage	V	30	121
• Min. switching voltage	V	15	90
Max. thermal current I_{th}	A	1	1

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		
o Conducted interference voltage IEC 60 947-4-3		Class A for industrial applications[1]
o Radiated, high-frequency interference voltage IEC 60 947-4-3		Class A for industrial applications
Interference resistance		
o Electrostatic discharge acc. to IEC 61 000-4-2 (corresponds to severity 3)	kV	Contact discharge 4; air discharge 8; performance criterion 2
o Induced HF fields acc. to IEC 61 000-4-6	MHz	0.15 ... 80; 140 dBµV; performance criterion 1
o Burst acc. to IEC 61 000-4-4	kV	2/5.0 kHz; performance criterion 1
o Surge acc. to IEC 61 000-4-5	kV	Phase-to-ground 2; phase-to-phase 1; performance criterion 2
Isolation resistance	MOhm	1,5 (between Main- and Control circuit)

Type		**Screw connection**
Connection, auxiliary/control contacts		
Conductor cross-section with or without end sleeve	mm² mm² AWG	1 x (0.5 ... 2.5) 2 x (0.5 ... 1.0) 20 ... 12
Stripping length	mm	7
Terminal screw		M 3
o Tightening torque D 3.5 / PZ 1	Nm lb.in	0.5 ... 0.6 4.5 ... 5.3
Current transformer hole diameter	mm	17

Allocation to the Solid State Switching Devices:

Applicable for the following types	**Order No.**		**Control voltage**	**Connection technology**
Solid state relays	3RF21..-**1.**A**0.**	3RF21..-**3.**A**0.**	Us = 24 V DC	Screw and ring cable connection
	3RF21..-**1.**A**1.**	3RF21..-**3.**A**1.**	Us = 24 V AC/DC	
	3RF21..-**1.**A**2.**	3RF21..-**3.**A**2.**	Us = 110...230 V AC	
	3RF21..-**1.**A**4.**	3RF21..-**3.**A**4.**	Us = 4...30 V DC	
Solid state contactors	3RF23..-**1.**A**0.**	3RF23..-**3.**A**0.**	Us = 24 V DC	Screw and ring cable connection
	3RF23..-**1.**A**1.**	3RF23..-**3.**A**1.**	Us = 24 V AC/DC	
	3RF23..-**1.**A**2.**	3RF23..-**3.**A**2.**	Us = 110...230 V AC	
	3RF23..-**1.**A**4.**	3RF23..-**3.**A**4.**	Us = 4...30 V DC	
Accessories	**Order No.**			
Sealable caps	3RF2900-0RA88			

[1] **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.

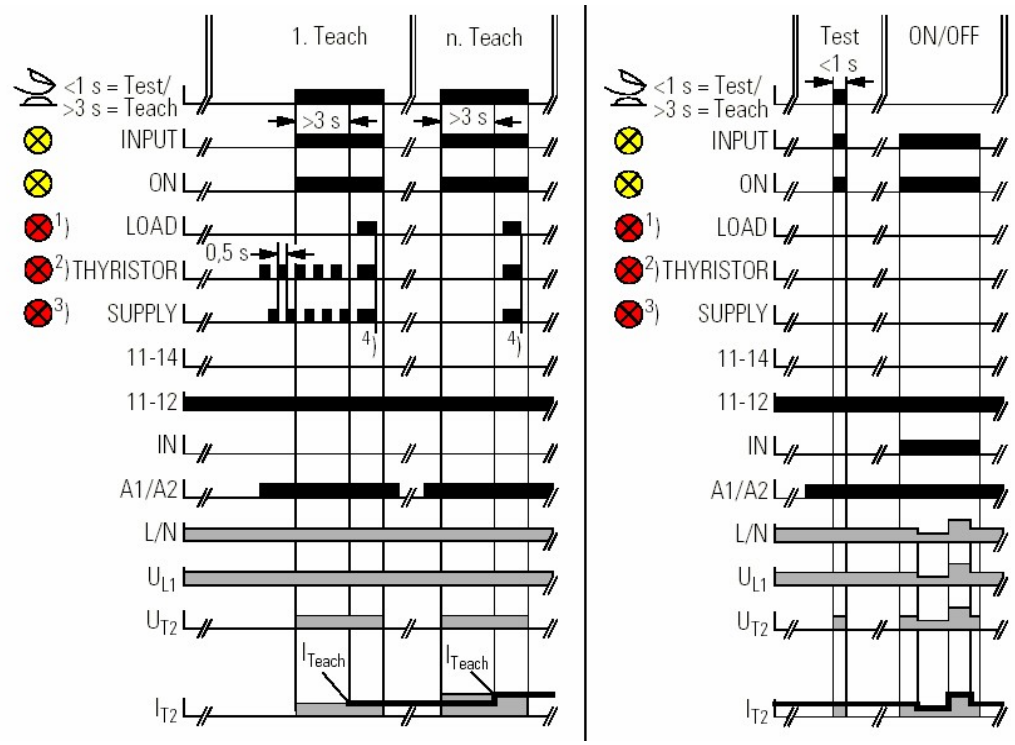
Mounting:

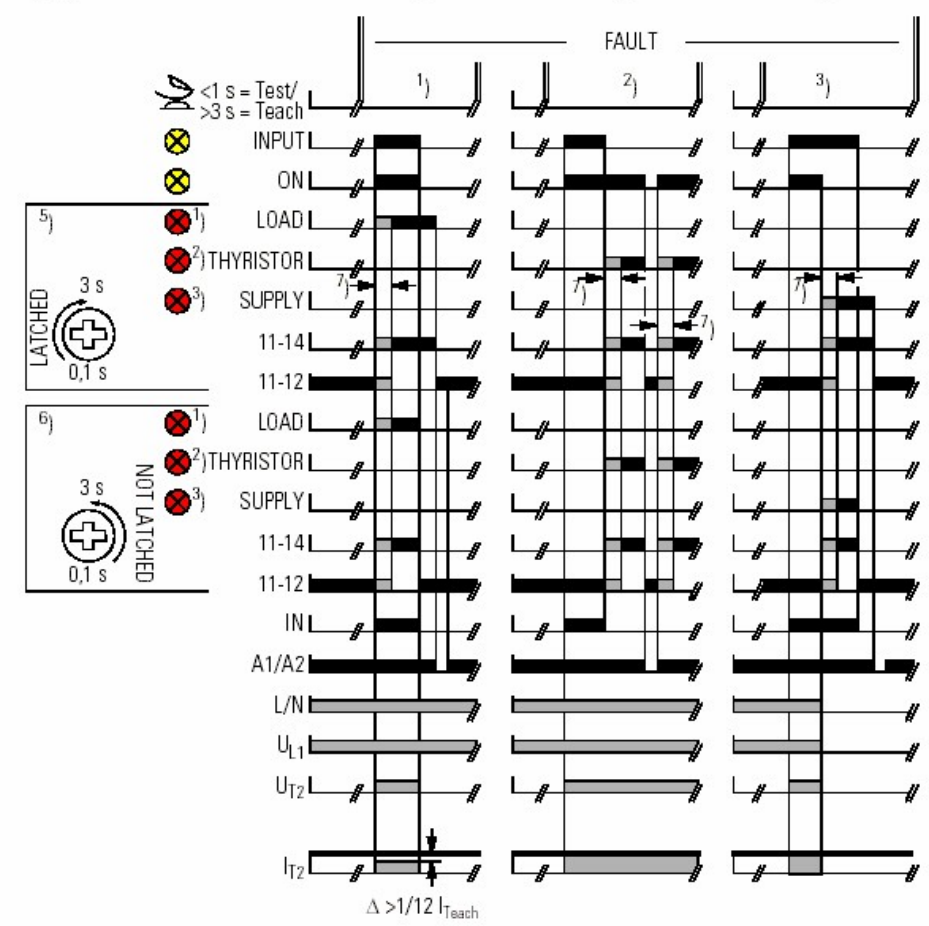
The module can be mounted onto all solid state switching device listed before. After disconnection of the control terminal from the solid state switching device and disconnection of the line to the load from the 2T terminal, the Extended load monitoring can be snapped on. All connections to the basic 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 17.0 mm) and reconnected to the solid state switching device.
For dismounting, the two clips affixed to the top of the load monitoring must be lifted by means of a small screwdriver. The module must then be manually withdrawn from the basic device in vertical direction.

Commissioning:

When the supply voltage (terminal A1-A2) is first applied, the two THYRISTOR and SUPPLY 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 button 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 setpoint value. The correct completion of the TEACH process is indicated by a simultaneous continuous illumination of the three right LEDs.
The TEACH process can be repeated at any time.
With the supply voltage applied, the TEACH button can be shortly pressed – maximally for one second – for test purposes. For this time, the solid state switching devices switches through and you can thereby test the arrangement.

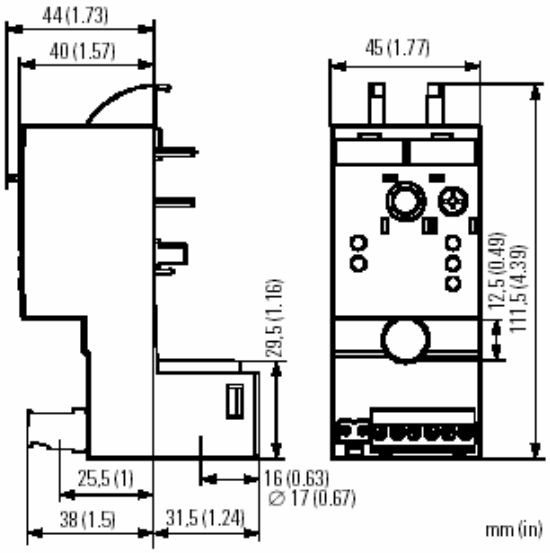
Function Diagram:



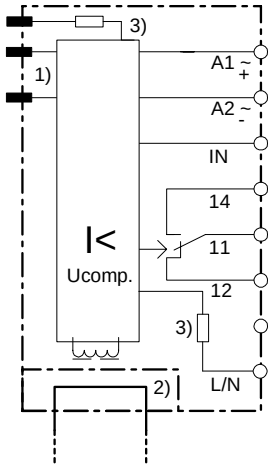


1) Partial load fault
2) Thyristor fault
3) Network failure
4) Current value stored
5) Storing
6) Non-storing
7) 0.1 – 3 sec

Dimension Drawing:



Device Circuit Diagram:



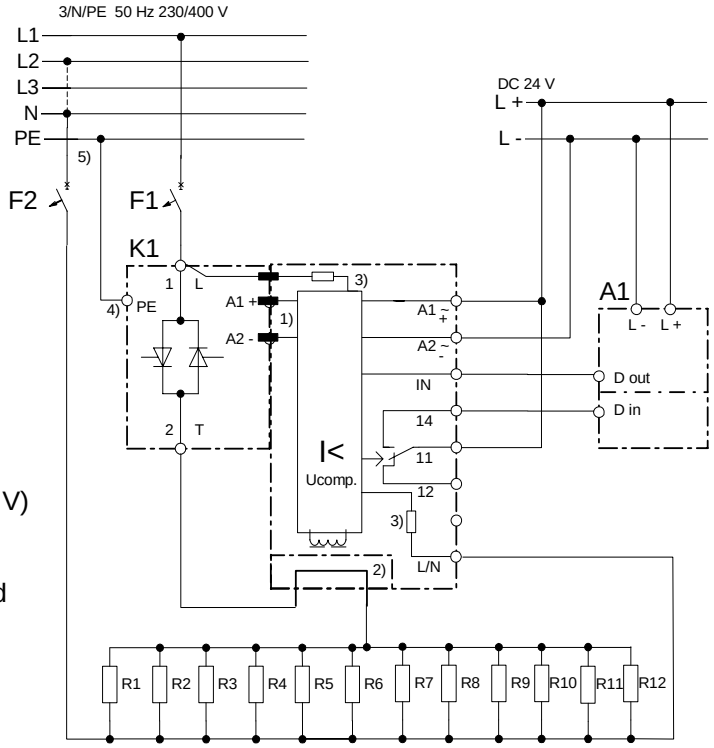
3RF29**..**-0GA**1.**
U_s = AC/DC 24 V

Example Circuit Diagram:

A1	Control (PLC)
F1, 2	Miniature circuit-breaker main circuit
K1	3RF23 solid state contactor with plugged-on load monitoring module
R1-12	Load resistance

1) Internal connection to the solid state relay/contactor
2) Straight-through transformer
3) Voltage detection not galvanic separated (3 MOhm each path)
4) Earthing according local standards
5) Connection contact L/N with
   - Load monitoring 3RF29**..**-0GA**.3** at the neutral conductor N (e.g. 230 V)
   - Load monitoring 3RF29**..**-0GA**.6** at a second phase (e.g. 400 V)

   use of a second m.c.b. recommended



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