

Current monitoring relay, overcurrent, under-current and current window. MCU024R2, MCU230R2



Current monitoring relay; in DIN rail box with 22,5 mm width, especially designed for monitoring the current in AC circuits (20-100Hz) and in DC circuits



» Easily manual operation by control selectors for setting current threshold and "lock" time. Monitoring alarm status indicated by LED.

» Powerful and precise programming mode by USB port and PC software (15 different functions) with safety lock selectors to avoiding misuse.

» Programmable reset mode according to the selected function. Delay the start of 200ms to avoid "startup" errors and delay time to operation adjustable up to 30s.

» Two relay outputs, one NO, and the other NC; with switching power 250VAC/30VDC 6A. (Possibility working in separate outputs for the functions Overcurrent, Undercurrent and Current Window).

» Multivoltage supply AC / DC in the same unit and in different ranges, 12/24VAC/DC and 110/230VAC/DC.

» A large range of current measurement from 0.5 to 10A without auxiliary transformer, compatible with process control signals (4 to 20mA, on request) and commercial CT input for monitoring large currents.

» Wiring with ferrules 2 × 2.5mm² solid or 2 × 1.5mm² standard.

» Compliance with the CE Marking.
UL required.

MODEL NUMBER STRUCTURE

MCU - XXX - R2

MCU
Current monitoring relay

Supply Voltage
024: Nominal voltage 12/24VAC/DC
230: Nominal voltage 110/230VAC/DC

Output Relays
Two relay outputs (all models):
• Relay 1: 11-12 Normally Close.
• Relay 2: 21-24 Normally Open.
with switching power 250VAC/30VDC
6A. Hermetic and low Power.

MODELS AVAILABLE

Reference	Supply	Output
MCU024R2	12/24VAC/DC	2 relays 6A (250VAC/30VDC)
MCU230R2	110/230VAC /DC	2 relays 6A (250VAC/30VDC)

ACCESORIES

Reference	type	description
CPCD01	special cable USB<-->mini-USB	Communication cable module- computer
DEVICES PROGRAMMER	Software	Software to program the 15 functions.

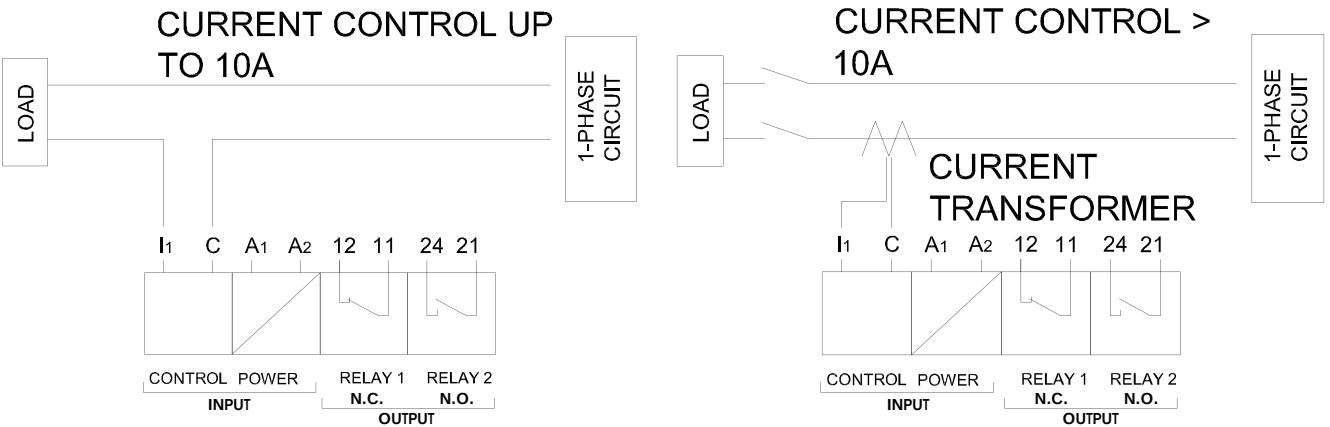
NOMINAL VALUES

Rated input voltage	12 – 24 VAC/VDC 50/60Hz ±5Hz (ac supply)	
	110 – 230 VAC/VDC 50/60Hz ±5Hz (ac supply)	
Operating value setting range	85% to 110% of rated voltage	
Power consumption	12 – 24 VAC/VDC (1W; 3 VA) 110 – 230 VAC/VDC (4W; 5 VA)	
Current reading range	0.5 – 10 A (AC/DC no transformer) 20- 200 A with commercial CT	
Current input frequency	Input DC. 20 to 100 Hz (Input AC)	
Current input voltage	Max. 300 V (AC/DC)	
Precision current configuration for AC / DC	±5% of full scale	
Time of activation of the relays	AC	0.02s
	DC	0.2s
Range programming time	0.1s – 999hours	
Accuracy programmed time	±1% of full scale error	
Repeatability	±0.01%	
indicator lights	Red led	Alarm
	Green led	Module operating

SPECIFICATIONS

Temperature Ranges	Operating Temperature	-10 °C – 60 °C
	Storage Temperature	-40 °C – 70 °C
Operating Humidity	5% - 85%	
Maximum Operating Altitude	2000 m	
Burst current 100 ms.	400 A, 100 ms max.	
Output Relays	Resistive load	6A - 250VAC (cosΦ = 1)
		6A - 30VDC (L/R = 0ms)
	Inductive load	1A - 250VAC (cosΦ=0.4)
		1A - 30VDC (L/R = 7ms)
	mechanical life	10 ⁷ Cycles
	electrical life	3x10 ⁴ Cycles
Terminal blocks	2 × 2,5 mm ² solid or 2 × 1,5 mm ² standard.	
Terminal screw tightening torque	0.8Nm (Max.)	
Mounting	DIN-rail (35mm)	
Dimensions	22.5x76x105mm	
Weight	150gr (5.29 Oz)	
Protection degree	IP20	
Casing color	RAL 7035 Grey	
Casing material	thermoplastic PC-ABS (self-extinguishing UL94-V0)	
Installation Environment	Overvoltage category III, Degree of pollution 2	
Conforming standards	EN60255-5/-6	
Safety Standards	EN60664-1	
EMC	EMI: EN61326 Industrial applications	

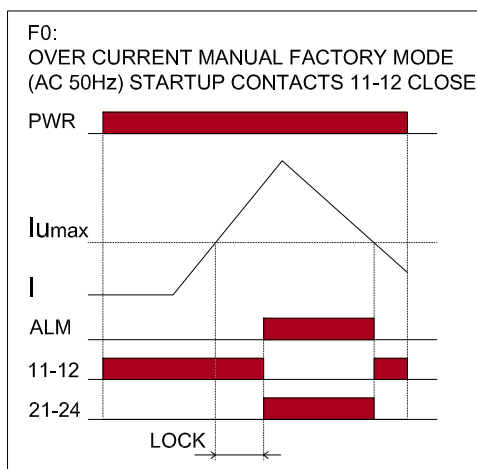
WIRING DIAGRAMS



OPERATING MODES

• MANUAL FUNCTION (FUNCTION 0)

This operating mode is programmed in the factory. You can also access to it from the PC software "Devices Programmer"; (Function 0). It allows programming the unit by adjusting the selectors "Iu max" and "t(s)" in the front of the module. The current monitoring module will work in this mode studying a Overcurrent threshold and working exclusively in monitoring current mode AC-50Hz.



The "Iu max" selector will determine the amp overcurrent threshold in the range of 0.5A-10A study.

The "t(s)" selector will determine LOCK time in seconds in the study range 0.1s-30s. This LOCK time is the delay time of alarm activation after current exceeded the set threshold.

After connecting the power supply through the terminals A1-A2, and in normal operating conditions, the contacts 11-12 remain active; (closed), while contacts 21-24 remain off (open).

When it is detected that current exceeds the threshold, a time delay "LOCK" will start and it will activate, upon completion, the device red alarm. At that time the contacts 21-24 will be closed and 11-12 contacts will be opened.

When the current value "I" monitored returns to be under the "Iu max" threshold, determined by the potentiometer "Iu", the device red alarm will be deactivated. At that time the contacts 21-24 will be opened and contacts 11-12 will be closed.

OPERATING MODE USING PROGRAMMING SOFTWARE

The current monitoring module can be programmed using the PC software "Devices Programmer" of Relequick SA. It Will be necessary a special mini-USB cable provided by Relequick (view accessories section). That software allows you to choose between 14 different operating functions plus a function 0 (Manual function) that will solve the most sophisticated needs of the customer.

Programming in the MCU module a function other than the manual (function 0) causes disabling module selectors, which will imply that the unit works with the values provided by the software.

FUNCTION 0

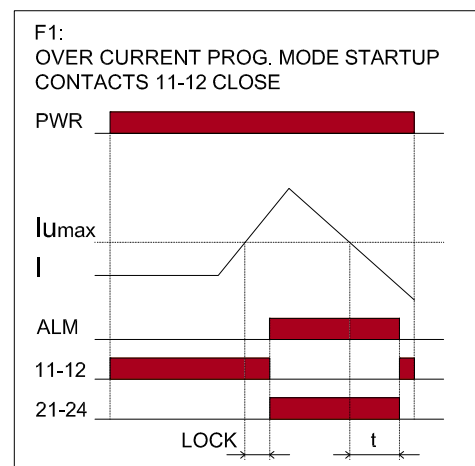
Manual function.

Manual operating mode, explained in the previous section. This function will be also selectable from the software after having programmed any other function.

FUNCTION 1

Overcurrent alarm (contacts 11-12 initially closed)

This mode of operation allows the study of an overcurrent threshold.



Once detected that current conditions are above a defined threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 21-24 will be activated and the contacts 11-12 deactivated.

When this current situation return to be under the threshold determined in Programming, one second delay time "t" will start that at the end will deactivate the device red alarm. At that time the contacts 21-24 are deactivated and the contacts 11-12 will be activated.

OPERATING MODES

Programmable values

- » The current threshold will be established within the range of 0.5A-10A.
- » The delay time "LOCK" will be established in a range of 99.9s-0.1s.
- » The delay time "t" can be established between a range of 0.1s - 999hours.

It is possible to choose between two modes of current study, AC or DC. When selecting the AC we must additionally establish a frequency range of 20Hz-100Hz.

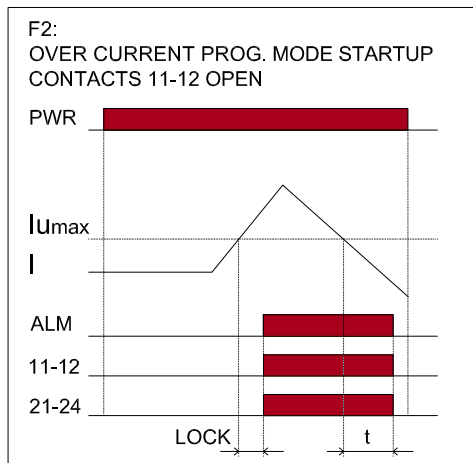
Programming that function on the device, means that the selectors of the devices will be deactivated.

Programmable values are similar in all functions from F1 to F14.

FUNCTION 2

Overcurrent alarm (contacts 11-12 initially opened)

This mode of operation allows the study of an overcurrent threshold.



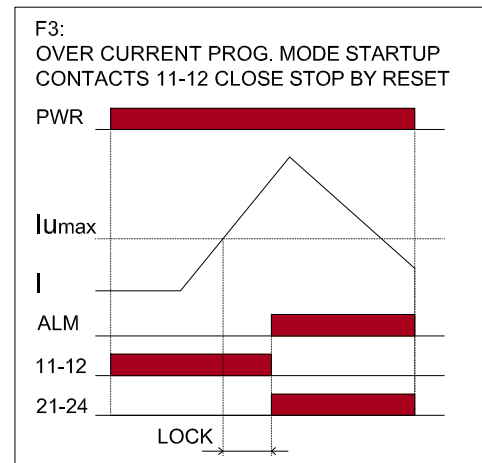
Once detected that current conditions are above a defined threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 11-12 and 21-24 will be activated.

When this current situation returns to under the threshold determined in the program, one second delay time "t" will start that at the end will deactivate the device red alarm. At that time the contacts 11-12 and 21-24 will be deactivated.

FUNCTION 3

Overcurrent alarm (contacts 11-12 initially closed, canceling the alarm only by disconnection of the MCU, "Reset").

This mode of operation allows the study of an overcurrent threshold.



Once powered the device, while the monitored current is below a threshold determined by the program contacts 11-12 will remain active, while contacts 21-24 will be without continuity (open).

When it is detected that current exceeds the threshold, a time delay "LOCK" will start to activate, upon completion, the device red alarm. At that time the contacts 21-24 will be closed and 11-12 contacts will be opened.

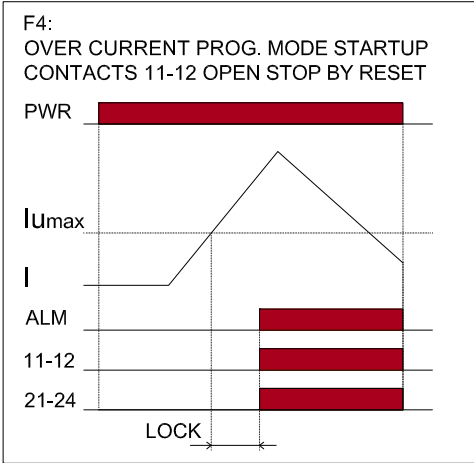
The module will remain in this state, even if the current returns to be below the threshold determined by program, while the unit is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

FUNCTION 4

Overcurrent alarm (contacts 11-12 initially opened, canceling the alarm only by disconnection of the MCU, "Reset").

This mode of operation allows the study of an overcurrent threshold.

OPERATING MODES



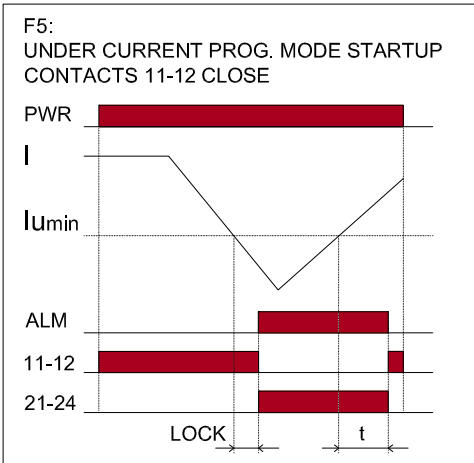
Once powered the device, while the monitored current is below a threshold determined by the program contacts 11-12, and 21-24 will remain deactivate.

When it is detected that current exceeds the threshold, a time delay "LOCK" will start to activate, upon completion, the device red alarm. At that time the contacts 11-12 and 21-24 will be closed.

The module will remain in this state, even if the current returns to be below the threshold determined by program, while the device is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

FUNCTION 5
Undercurrent Alarm (contacts 11-12 initially closed)

This mode of operation allows the study of a Undercurrent threshold.

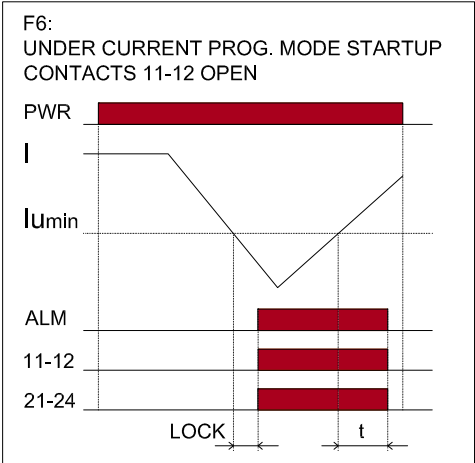


When it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 21-24 will be activated and the contacts 11-12 deactivated.

When this current situation return to below the threshold determined in the program, one second delay time "t" will start that at the end will deactivate the device red alarm. At that time the contacts 21-24 will be deactivated and the contacts will be activated 11-12.

FUNCTION 6
Undercurrent Alarm (contacts 11-12 initially opened)

This mode of operation allows the study of a Undercurrent threshold.



When it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time the contacts 11-12 and 21-24 will be closed.

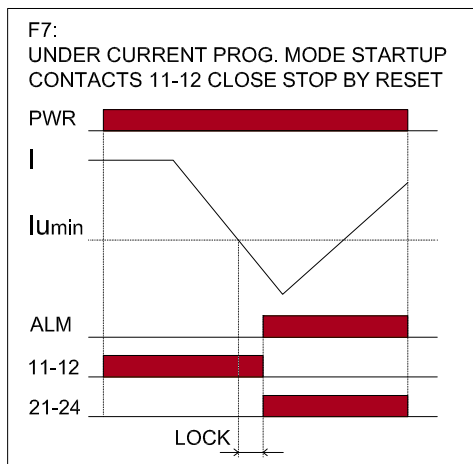
When this current situation return to be under the threshold determined in the program, one second delay time "t" will start that at the end will deactivate the device red alarm. At that time the contacts 11-12 and 21-24 will be deactivated.

OPERATING MODES

FUNCTION 7

Undercurrent alarm (contacts 11-12 initially closed, canceling the alarm only by disconnection of the MCU, "Reset").

This mode of operation allows the study of a Undercurrent threshold.



Once powered the device, while the monitored current is above the threshold determined by the program, contacts 11-12 will remain active, while contacts 21-24 will be without continuity (open).

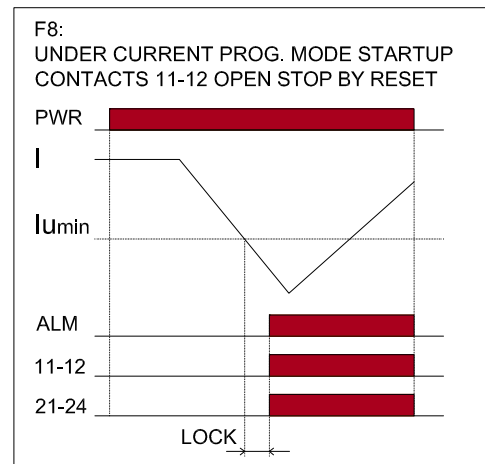
When it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 21-24 will be activated and the contacts 11-12 deactivated.

The module will remain in this state, even if the current returns to be above the threshold determined by the program, while the device is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

FUNCTION 8

Undercurrent alarm (contacts 11-12 initially opened, canceling the alarm only by disconnection of the MCU, "Reset").

This mode of operation allows the study of a Undercurrent threshold.



Once powered the device, while the monitored current is above the threshold determined by the program, contacts 11-12 and 21-24 will remain opened.

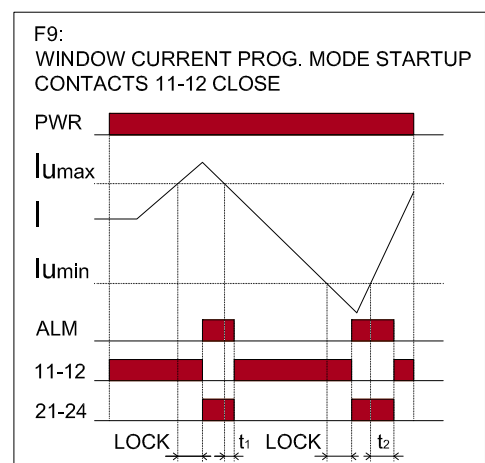
when it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contact 11-12 and 21-24 will be activated.

The module will remain in this state, even if the current returns to be above the threshold determined by program, while the device is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

FUNCTION 9

Over and Undercurrent Alarm (Window), contacts 11-12 initially closed.

This operating mode allows the study of a current working window, which establishes an upper threshold and a lower threshold.



OPERATING MODES

When it is detected that current conditions "I" is above the upper threshold established by program, a delay time "LOCK" starts after which the device red alarm will be activated. At this time contacts 21-24 will be activated and contacts 11-12 will be deactivated.

When the value of the monitored current "I" is once again less than the upper threshold and upper than the lower threshold (current working window), a delay time "t1" will start and at the end, the device red alarm and contacts 21-24 will be deactivated simultaneously activating the contacts 11-12.

When it is detected that current condition "I" is below to the lower threshold established by the program, a delay time "LOCK" starts after which the device red alarm will be activated. At this time contacts 21-24 will be activated and contacts 11-12 will be disabled.

When the value of the monitored current "I" is once again greater than the lower threshold and lower than the upper threshold (current working window), a delay time "t2" will start and at the end, the device red alarm and contacts 21-24 will be deactivated, simultaneously activating the contacts 11-12.

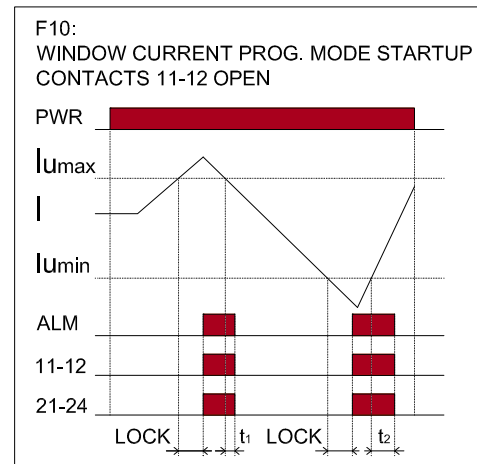
- » The upper current threshold will be established within the range of 0.5A-10A.
- » The lower current threshold will be established within the range of 0.5A-10A. This threshold will be always lower than the upper threshold, obligatory condition by the program.
- » The delay time "LOCK" will be established in a range of 0.1s-99.9s.
- » The delay time "t1" and "t2" can be established between a range of 0.1s - 999hours.

It's possible to choose between two modes of current study, AC or DC. When selecting the AC we must additionally establish a frequency range of 20Hz-100Hz.

FUNCTION 10

Over and Undercurrent Alarm (Window), contacts 11-12 initially opened.

This operating mode allows the study of a current working window, which establishes an upper threshold and a lower threshold.



When it is detected that current conditions "I" is above the upper threshold established by the program, a delay time "LOCK" starts after which the device red alarm will be activated. At this time contacts 11-12 and 21-24 will be activated.

When the value of the monitored current "I" is once again less than the upper threshold and upper than the lower threshold (current working window), a delay time "t1" will start and at the end, the device red alarm and contacts 11-12 and 21-24 will be deactivated.

When it is detected that current condition "I" is below to the lower threshold established by program, a delay time "LOCK" starts after which the device red alarm will be activated. At this time contacts 11-12 and 21-24 will be activated.

When the value of the monitored current "I" is once again greater than the lower threshold and lower than the upper threshold (current working window), a delay time "t2" will start and at the end, the device red alarm and contacts 11-12 and 21-24 will be deactivated.

- » The upper current threshold will be established within the range of 0.5A-10A.
- » The lower current threshold will be established within the range of 0.5A-10A. This threshold will be always lower than the upper threshold, obligatory condition by the program.
- » The delay time "LOCK" will be established in a range of 0.1s-99.9s.
- » The delay time "t1" and "t2" can be established between a range of 0.1s - 999hours.

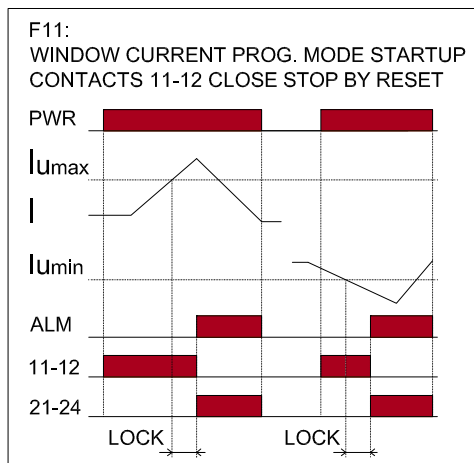
Is possible to choose between two modes of current study, AC or DC. When selecting the AC we must additionally establish a frequency range of 20Hz-100Hz.

OPERATING MODES

FUNCTION 11

Over and Undercurrent Alarm (Window), contacts 11-12 initially closed, canceling the alarm only by disconnection of the MCU, "Reset").

This operating mode allows the study of a current working window, which establishes an upper threshold and a lower threshold.



Once powered the device, while the monitored current is within an operating window determined by the program, contacts 11-12 will remain active, while contacts 21-24 will be without continuity (open).

When it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 21-24 will be activated and the contacts 11-12 deactivated.

The module will remain in this state, even if the current returns to be below the threshold determined by the program, while the device is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

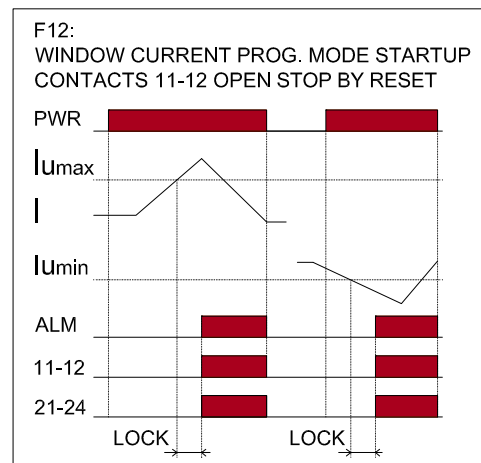
When it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. In that time contacts 21-24 will be activated and the contacts 11-12 deactivated.

The module will remain in this state, even the current returns to be above the threshold determined by program, while the device is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

FUNCTION 12

Over and Undercurrent Alarm (Window), contacts 11-12 initially opened, canceling the alarm only by disconnection of the MCU, "Reset").

This operating mode allows the study of a current working window, which establishes an upper threshold and a lower threshold.



Once powered the device, while the monitored current is within an operating window determined by the program, contacts 11-12 and 21-24 will remain deactivated.

When it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 11-12 and 21-24 will be activated.

The module will remain in this state, even if the current returns to be below the threshold determined by the program, while the device is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

When it is detected that current conditions are below a certain threshold, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 11-12 and 21-24 will be activated.

The module will remain in this state, even if the current returns to be above the threshold determined by the program, while the device is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

» The upper current threshold will be established within the range of 0.5A-10A.

» The lower current threshold will be established within the range of 0.5A-10A. This threshold will be always lower than the upper threshold, obligatory condition by the program.

» The delay time "LOCK" will be established in a range of 0.1s-99.9s.

OPERATING MODES

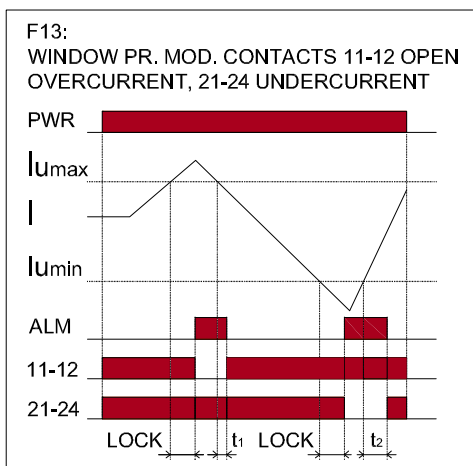
» The delay time "t1" and "t2" can be established between a range of 0.1s - 999hours.

It is possible to choose between two modes of current study, AC or DC. When selecting the AC we must additionally establish a frequency range of 20Hz-100Hz.

FUNCTION 13

Over and Undercurrent Alarm (Window) Contacts 11-12 Opened by Overcurrent and Contacts 21-24 Opened by undercurrent.

This operating mode allows the study of a current working window, which establishes an upper threshold and a lower threshold.



When it is detected that current condition is above to the upper threshold established by the program, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 11-12 will be deactivated.

When the value of the monitored current "I" is once again less than the upper threshold and upper than the lower threshold (current working window), a delay time "t1" will start and at the end, the device red alarm and contacts 11-12 will be activated.

When it is detected that current condition "I" is below to the lower threshold established by the program, starts a delay time "LOCK" after which the device red alarm will be activated. At this time contacts 21-24 will be deactivated.

When the value of the monitored current "I" is once again greater than the lower threshold and lower than the upper threshold (current working window), a delay time "t2" will start and at the end, the device red alarm will be deactivated and contacts 21-24 will be activated.

» The upper current threshold will be established within the range of 0.5A-10A.

» The lower current threshold will be established within the range of 0.5A-10A. This threshold will be always lower than the upper threshold, obligatory condition by the program.

» The delay time "LOCK" will be established in a range of 0.1s-99.9s.

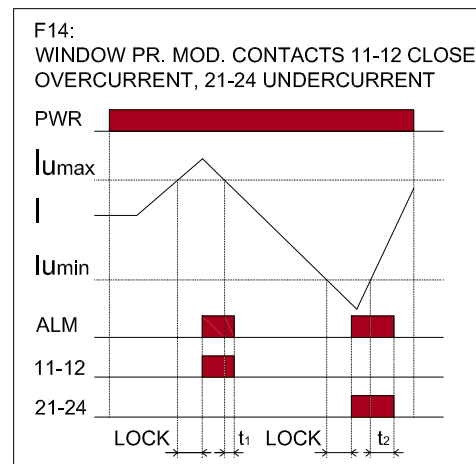
» The delay time "t1" and "t2" can be established between a range of 0.1s - 999hours.

It is possible to choose between two modes of current study, AC or DC. When selecting the AC we must additionally establish a frequency range of 20Hz-100Hz.

FUNCTION 14

Over and Undercurrent Alarm (Window) Contacts 11-12 closed by Overcurrent and Contacts 21-24 closed by undercurrent.

This operating mode allows the study of a current working window, which establishes an upper threshold and a lower threshold.



When it is detected that current condition is above to the upper threshold established by the program, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 11-12 will be activated.

OPERATING MODES

When the value of the monitored current "I" is once again less than the upper threshold and upper than the lower threshold (current working window), a delay time "t1" will start and at the end, the device red alarm and contacts 11-12 will be deactivated.

When it is detected that current condition "I" is below to the lower threshold established by the program, a delay time "LOCK" starts after which the device red alarm will be activated. At this time contacts 21-24 will be activated.

When the value of the monitored current "I" is once again greater than the lower threshold and lower than the upper threshold (current working window), a delay time "t2" will start and at the end, the device red alarm will be deactivated and contacts 21-24 will be deactivated.

» The upper current threshold will be established within the range of 0.5A-10A.

» The lower current threshold will be established within the range of 0.5A-10A. This threshold will be always lower than the upper threshold, obligatory condition by the program.

» The delay time "LOCK" will be established in a range of 99.9 s-0.1s.

» The delay time "t1" and "t2" can be established between a range of 0.1 s - 999 hours.

It is possible to choose between two modes of current study, AC or DC. When selecting the AC we must additionally establish a frequency range of 20Hz-100Hz.

Setting this function will involve the deactivation of device selectors.

CONSIDERATIONS

» Please read the data sheet carefully before using the Current Monitoring Module.

Please read carefully the Help of "Devices Programmer" Software of Relequick. Also read the "Quick start Guide" of Devices Programmer. It's freely available from the website www.relequick.com. These documents are an essential reading before programming the Current Monitoring Module.

» Contact your distributor or Relequick if you have questions or any comments.

SAFETY CAUTIONS

A) Precautions for a proper functioning.

» Make sure you use the settings required to reach the desired objective.

» Make sure the device is not in inappropriate environments:

- Environments with temperatures higher than the working temperature of Unity.
- Environments exposed to high degrees of stress waves or high frequency.
- Environments subject to shock or vibrations.
- environments with humidity higher than allowed by the device.

» Do not use solvents to clean this product.

» Be sure to perform wiring correctly.

» Do not block the air heat dissipation device located in the bottom and top.

» Make sure the correct supply device and the environments to which it is prepared

» The maintenance and handling of the device must be done only by qualified persons.

» Make sure the device is not supplied just when it comes to programming it through the USB communication cable. The USB cable will provide the necessary power during programming. the communication cable is not optoisolated and can cause serious damage to your computer.

» Discard the product as industrial waste.

» Use in extinguishing involute

» Make sure the device monitors environments where maximum current is 10A. (if not used with CT. External).

B) Safety Precautions.

» Do not power the device while proceeding to the wiring of it, to avoid personal electric shocks.

» Make sure the installation of the device is the correct..

» Make sure the device is not keeping weight over it.

» The temperature and humidity of the environment must be within the range that allows the device for correct operation.

» Make sure the device screws to the recommended torque for it (0.6Nm).

WARRANTY AND GENERAL APPLICATION

WARRANTIES AND LIMITATION OF LIABILITY

WARARANTY

RELEQUICK exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from the date of sale by RELEQUICK. RELEQUICK OFFERS NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. RELEQUICK DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

RELEQUICK SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of RELEQUICK for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL RELEQUICK BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS RELEQUICK ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

APPLICATION CONSIDERATIONS

SUITABILITY FOR USE

RELEQUICK shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

» Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.

» Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.

» Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE RELEQUICK PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

RELEQUICK shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

DISCLAIMERS

PERFORMANCE DATA

Performance data given in this catalog are provided as a guide for the user in determining suitability and does not constitute a warranty. They represent the result of RELEQUICK test conditions, and the users must correlate them to actual application requirements. Actual performance is subject to the RELEQUICK Warranty and Limitations of Liability.

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. Consult with your RELEQUICK representative at any time to confirm actual specifications of purchased product.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

In the interest of product improvement, specifications are subject to change without notice.

PC PROGRAMMING EXAMPLES

The current monitoring module is ideal for tracking the current value of a single phase system on AC/DC and surveillance of working conditions depending on the current value set for the different systems.

This module MCU allows to detect overcurrent and / or under-current conditions or surveillance single-phase circuits to produce alarm if exceeded the power range determined.

The two output relays available to the device (R1: 11-12 and R2: 21-24), allow the performance on two different output circuits, or on the same system, acting as a safety circuit court and alarm output, in the different situations that can be programmed through the Software "Devices Programmer"

A) Monitoring System that will work in current range between 1 A and 3 A AC (50Hz)

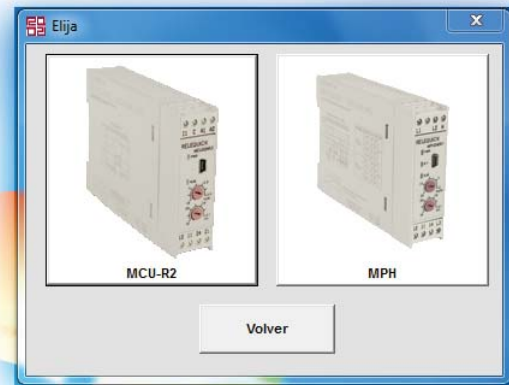
First, you must program the Current Monitoring Module using "Devices Programmer" (Downloadable free from the website www.relequick.com) using for this the MCU communication cable to the PC (CPCD01 reference).

After selecting the desired device in the software, in this case the "MCU-R2", located in the Control category. We select the Program function that we want, in this case the function 13. After configuring the function we will load on the device and we will proceed to connect the current monitoring module on the circuit to be monitored.

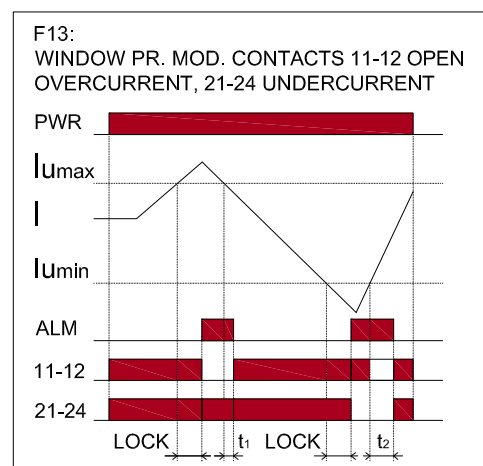
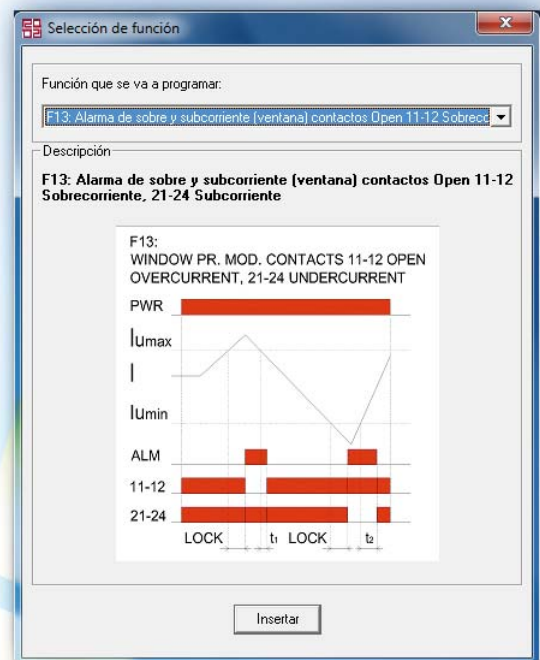
Next we will see the steps for programming and using your device with the data needed, in addition to its connectivity with the system to be monitored:

» Model Type Selection Relequick:

» Relequick Module Selection:

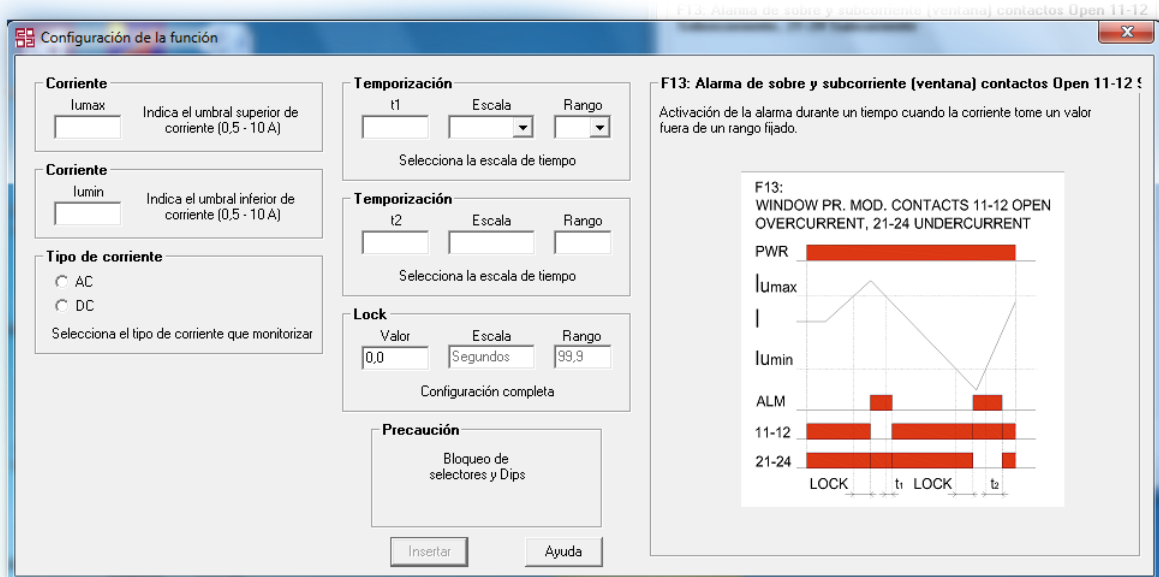


» Selecting Function 13:

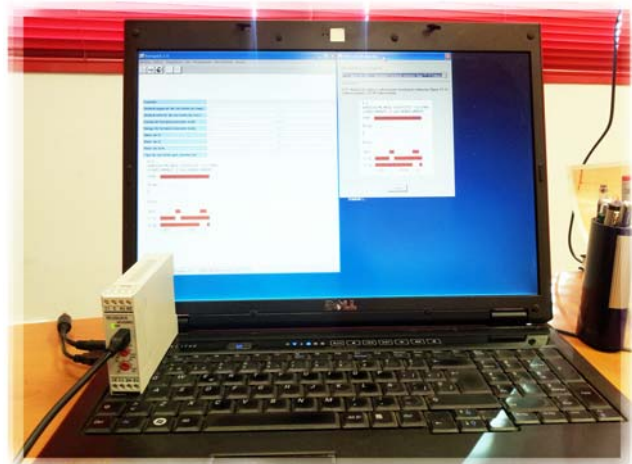


PC PROGRAMMING EXAMPLES

» Programming Function 13:



» Programming the MCU by cable:



Connecting the device to the system to be monitored:
Se deberá utilizar el conexionado correcto. En el ejemplo a seguir:

» **A1 / A2:** Module supply current monitoring.

MCU024R2: nominal voltage 12/24VAC/DC

MCU230R2: nominal voltage 110/230VAC/DC

» **I1:** Current input to monitor

» **C:** Output current to monitor

» **12 / 11:** Relay outputs 1. The contacts 11-12 will be opened when the current exceeds the upper current threshold programmed and as long as lock time has passed. The contacts will remain opened after the end of the alarm condition during a time "t1".

» **24 / 21:** Relay outputs 2. The contacts 21-24 will be opened when the current falls below the lower current threshold programmed and as long as lock time has passed. The contacts will remain opened after the end of the alarm condition during a time "t1".

» Interaction of the device with the system being monitored:



PC PROGRAMMING EXAMPLES

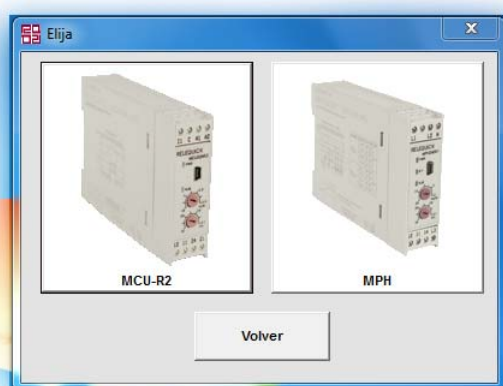
B) Overcurrent Monitoring 5A DC and times "LOCK" and "t1"

The steps are similar to those described in the previous example, except the function to program, in this case the function is 1, and the monitoring of system that will be developed on the relay output 1 (contacts 11-12).

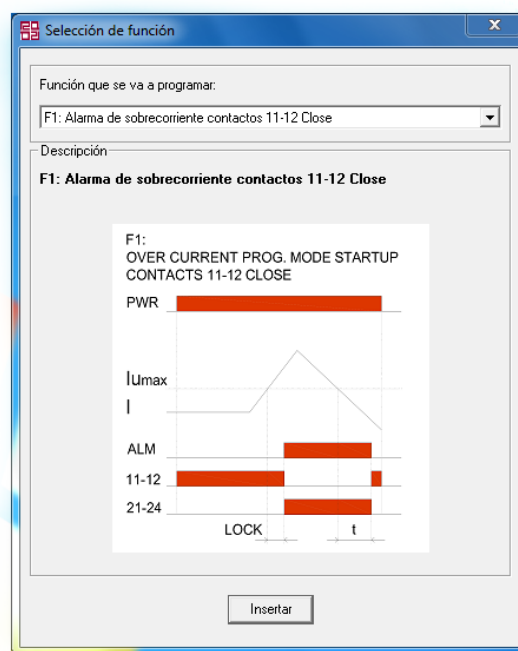
» Model Type Selection Relequick:



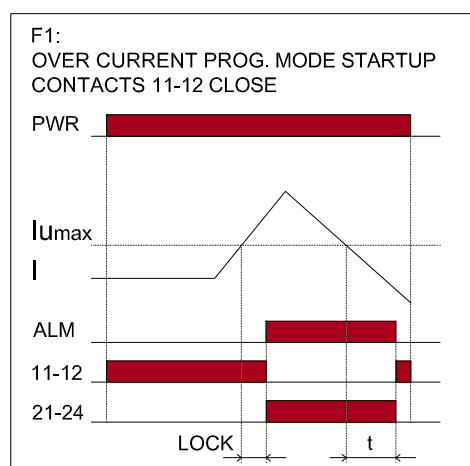
» Relequick Module Selection:



» Selecting Function 1:

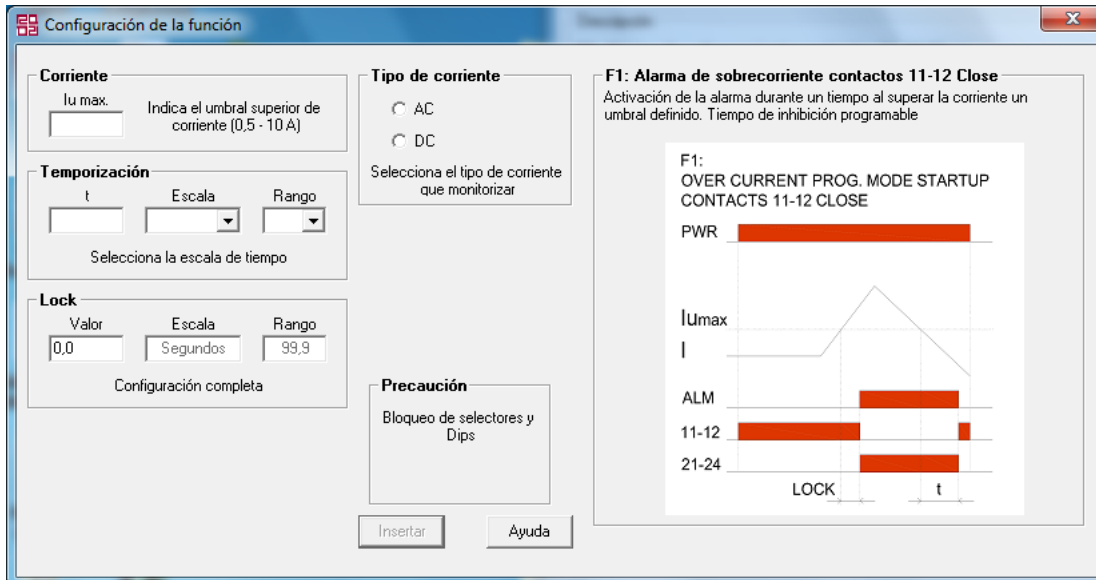


» Graphic description of the function 1:

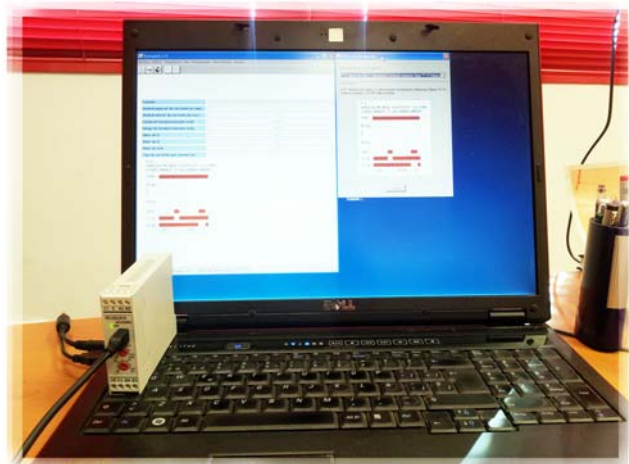


PC PROGRAMMING EXAMPLES

» Programming Function 1:



» Programming the MCU by cable:



Connecting the device to the system to be monitored:

Se deberá utilizar el conexionado correcto. En el ejemplo a seguir:

» **A1 / A2:** Module supply current monitoring.

MCU024R2: nominal voltage 12/24VAC/DC

MCU230R2: nominal voltage 110/230VAC/DC

» **I1:** Current input to monitor

» **C:** Output current to monitor

» **12 / 11:** Relay outputs 1. The contacts 11-12 will be opened when the current exceeds the upper current threshold programmed and as long as lock time has passed. The contacts will remain opened after the end of the alarm condition during a time "t".

» **24 / 21:** Relay outputs 2. The contacts 21-24 will be closed when the current exceeds the upper current threshold programmed and as long as lock time has passed. The contacts will remain closed after the end of the alarm condition during a time "t".



ACCESSORIES

The accessories needed and dispensable for programming the MCU are:

1) SPECIAL COMMUNICATION CABLE USB(TTL-232) TO MINI-USB. CPCD01.

With mini-USB and USB connectors. Can be purchased upon request to Relequick SA

By being a special cable ensures that only someone with this type of cable can change the programming of the device.



IMPORTANT: Despite the appearance, the cable is not the standard USB <-> mini-USB, please request the cable to Relequick or your nearest distributor.

2) SOFTWARE "DEVICES PROGRAMMER" OF RELEQUICK S.A.

Free and downloadable from the website of Relequick SA www.relequick.com

Without this software and communication cable, the Power Monitoring Module can only work in manual mode (Function 0), which is the default operating mode from the factory default. The unit shall be adjusted by the selectors "lu max" and "t (s)" in the front of the module. The MCU module will work in this mode studying an overcurrent threshold and working exclusively for monitoring current mode AC-50Hz.

3) EXTERNAL TRANSFORMER FOR CURRENTS ABOVE 10A

The equation applicable to the current transformers is:

$$I_1 * N_1 = I_2 * N_2$$

I1 is the current through the transformer primary.

N1 is the number of turns of the transformer primary.

I2 is the current through the transformer secondary.

N2 is the number of turns of the transformer secondary.

In practice, the winding wire 1 is the circuit to be measured.

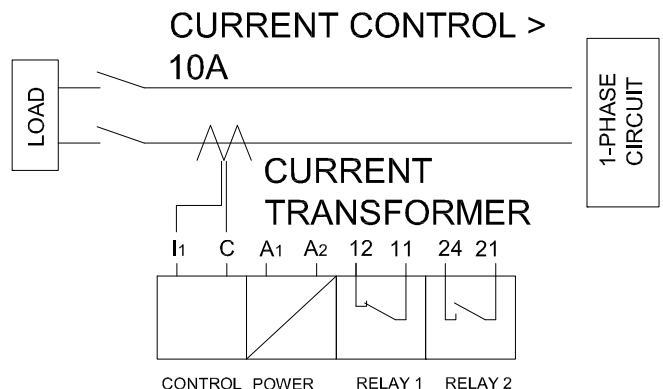
Therefore the formula changes as follows:

$$I_1 = I_2 * N_2 \text{ and then}$$

$$I_1 = 1/N_2 * I_1.$$

The transformation relation is the relationship between the current of the circuit to be monitored and the output current of the current transformer.

If by the circuit to be monitored are circulating currents over 10 A, we will need to use a current transformer so that the line to monitor acts as primary and the transformer output we connect to terminals "I1" and "C" of our MCU. Once we know the ratio, we must use a proper current transformer as that within the range of intensity that can fluctuate in the primary circuit, the secondary has an output of 0.5 to 10 A.



Example:

We want to monitor indirectly the maximum intensity that must flow through a circuit of low voltage, rated current of 40A, by using an MCU.

As the maximum current that can flow through the terminals "I1" and "C" of our MCU is 10 A, we must use an external current transformer (CT).

This CT is installed so that the driver on which to perform current measurement is your Primary, Secondary connects to terminals "I1" and "C" of the MCU module by connecting wire of 2.5 mm2 covering the distance of about 14 meters to the box where the MCU is.

We can install a commercial CT with a primary of "Ipn = 50A" with 5A output. We must consider the losses in the wires of 14 meters and the geometry of the CT, so that it accept as primary the conductor section to be measured.

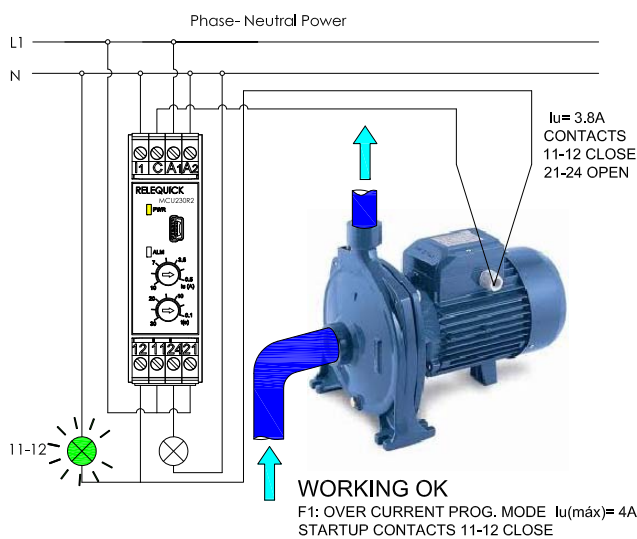


In the interest of product improvement, specifications are subject to change without notice.

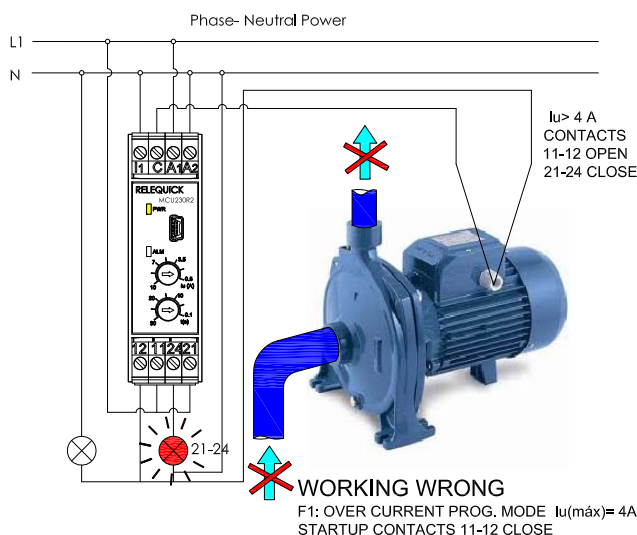
INSTALLER GUIDE: CASE STUDIES OF USE MCU

1) SECURITY SYSTEM PROTECTION FOR SINGLE PHASE CIRCUIT OVERCURRENT PUMP INSTALLATION.

We have a pumping unit driven by a monophasic motor which we want to protect from over-currents caused by solid jams in the pump rotor, which could produce a deterioration of the engine or even an overheating which could disable it. According to the specifications of the equipment, it should not work with higher supply current than 4A.

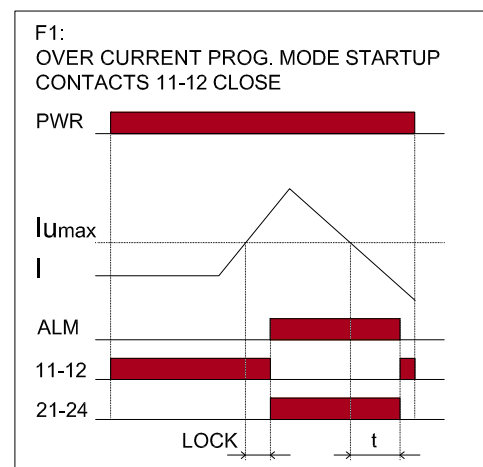


The MCU is able to monitor the input current to the motor, through the circuit terminals "I1" and "C". In addition, as in this case, nominal current in normal operation is less than 6A, the circuit can be passed through the contacts 11-12, (we can also excite with these contacts an intermediate contact coil with more cutting power, that will close the motor circuit).



So if a jam occurs in the rotor of the pump and the motor shaft is locked causing an overcurrent in the circuit, the contacts 11-12 will be opened and the motor stops receiving current before it can be damaged. For this application we must set the F1 function with a short time "LOCK", about 5s. and a time t sufficiently long, for example $t = 90s$, if we want to make further startup attempts.

»Function 1: Overcurrent alarm (contacts 11-12 initially closed)



This operation mode allows the study of an overcurrent threshold.

Once detected that current conditions are above a defined threshold, in this case $I > 4A$, a time delay "LOCK" starts after which the device red alarm will be activated. At that time contacts 21-24 will be activated and the contacts 11-12 deactivated.

When this current situation returns to be under the threshold determined by the program, a second delay time "t" (in this case 90s) will start and at its end, will deactivate the device red alarm. At that time the contacts 21-24 are deactivated and the contacts 11-12 will be activated trying to restart motor.

If the cause of the block is gone, then it can return to normal operation. If the blockage persists the motor will not start to prevent damage.

» The upper current threshold can be established within the range of 0.5A-10A.

» The delay time "LOCK" will be established in a range of 0.1s-99.9s.

» The delay time "t" can be established between a range of 0.1s - 999hours.

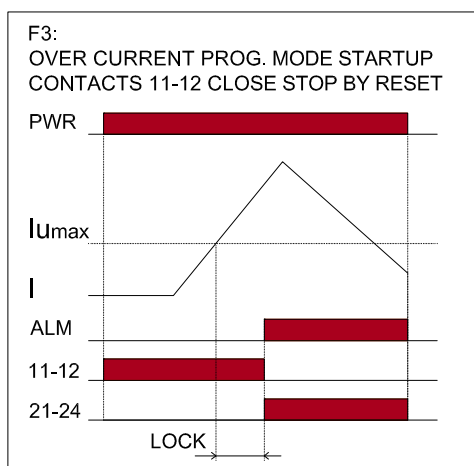
INSTALLER GUIDE: CASE STUDIES OF USE MCU

It's possible to choose between two modes of current study, AC or DC. When selecting the AC you can additionally establish a frequency range of 20Hz-100Hz.

Remember that when programming this function on the device the front panel selectors will be blocked.

If on the contrary what we want is that, in case of a blockage of the motor shaft, the current is cut and there are no attempts to start. We must set the F3 function with a short time "lock", about 5s, so if there is an over-current alarm, we must cut the power to the MCU by external switch, "reset", removing the cause of the mechanical shaft lock, and re-energize the MCU.

» Function 3: Overcurrent alarm (contacts 11-12 initially closed, canceling the alarm only by disconnection of the MCU, "Reset").



This operation mode allows the study of an overcurrent threshold.

Once powered the device, while the monitored current is below a threshold determined by the program (in this case $I < 4A$) contacts 11-12 will remain active, while contacts 21-24 will be without continuity (open).

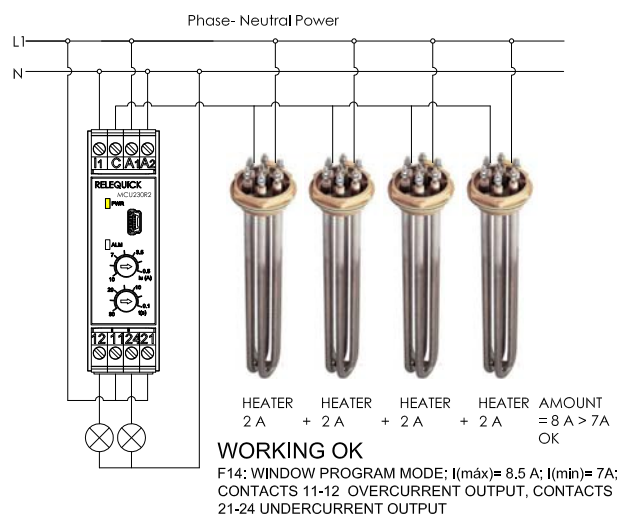
When it is detected that current exceeds the threshold, a time delay (5s) "LOCK" will start to activate, upon completion, the device red alarm. At that time the contacts 21-24 will be closed and 11-12 contacts will be opened, stopping the motor

The module will remain in this state, even if the current returns to be below the threshold determined by program, while the unit is not disconnected. Recalling thus the detection of an alarm condition and forcing external intervention.

2) MONITORING OF HEATING SYSTEM BY BLOCK OF FOUR SINGLE PHASE ELECTRICAL RESISTANCE. ALARM WITH LIGHT OUTPUT FOR DIFFERENT SITUATIONS OVERCURRENT AND UNDERCURRENT. (WORKING WINDOW "I").

We have a heating system by block of four single phase electrical resistance. We want to protect the system from undercurrents caused by breakage of one or more of the heating equipment by activating an alarm output by light beacon, preventing that an uncontrolled decrease of the heating power can happen. In addition we also want to prevent possible breakage of the solid state relay that activates the resistor block which is commanded by PID control, because as you know, breaking that SSR makes this be shorted, so that we would lose the control over the power supplied to the resistors, producing an overcurrent that would melt the resistance, and would produce serious damage to the equipment.

According to the specifications of the equipment, the circuit must work with an intensity of 8A, which is the sum of the rated currents demanded by the resistor assembly within the temperature range for use by the set power demand not exceeding 60% of the maximum.



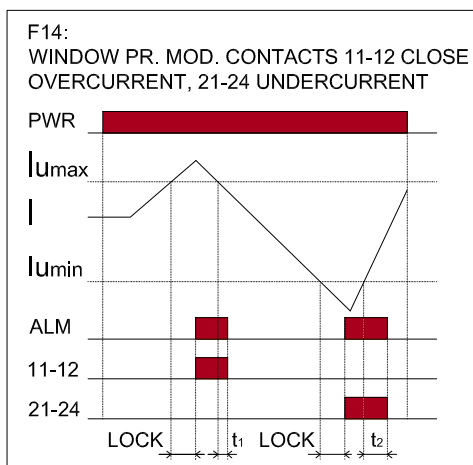
INSTALLER GUIDE: CASE STUDIES OF USE MCU

The MCU module is prepared for monitoring the input current block of resistors, passing the circuit for the terminals "I1" and "C".

For this application we must program the function F14, with a medium time "lock", for example 30s, to avoid transients of PID control, and some times t_1 and t_2 long enough, for example $t_1 = 60s$. and $t_2 = 100s$, to detect the operating of the alarm beacon, whether this is luminous or sonorous.

We must set an $I_{max} = 8.5A$ and $I_{min} = 7A$, to work with sufficient margin and not give unwanted alarm outputs if, for example, one of the resistors is replaced by another similar model from another manufacturer with slightly different values in any maintenance of the equipment.

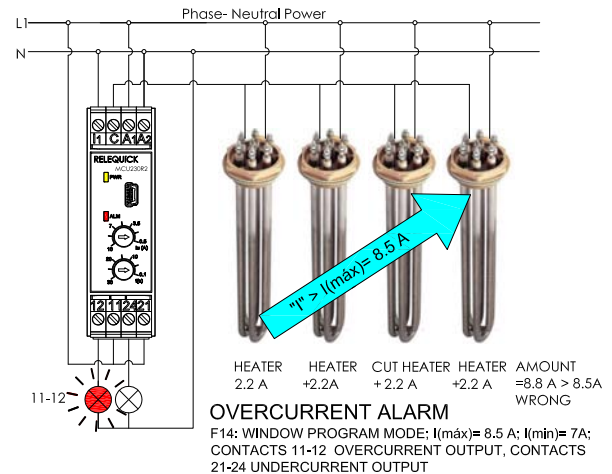
» Over and Undercurrent Alarm (Window) Contacts 11-12 closed by Overcurrent and Contacts 21-24 closed by undercurrent.



This operating mode allows the study of a current working window, which establishes an upper threshold and a lower threshold.

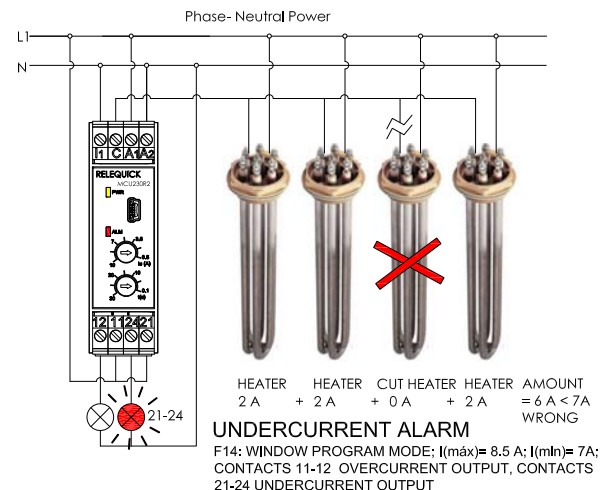
When it is detected that current condition is above the upper threshold established by the program (in this case $I_{max} = 8.5A$), a delay time (90s) "LOCK" starts after which the device red alarm will be activated. At that time contacts 11-12 will be activated, and with them the beacon that indicates overcurrent.

When the value of the monitored current "I" is once again less than the upper threshold and upper than the lower threshold (current working window), a delay time (60s) " t_1 " will start and at the end, the device red alarm and contacts 11-12 will be deactivated, and with them the beacon that indicates overcurrent.



When it is detected that current condition "I" is below to the lower threshold established by the program (in this case $I_{min} = 7A$), a delay time (90s) "LOCK" starts after which the device red alarma will be activated. At this time contacts 21-24 will be activated, and with them the beacon that indicates undercurrent.

When the value of the monitored current "I" is once again upper than the lower threshold and lower than the upper threshold (current working window), a delay time (100s) " t_2 " will start and at the end, the device red alarm will be deactivated and contacts 21-24 will be deactivated, and with them the beacon that indicates undercurrent.



» The upper current threshold can be established within the range of 0.5A-10A.

» The lower current threshold can be established within the range of 0.5A-10A. This threshold will be always lower than the upper threshold, obligatory condition by the program.

» The delay time "LOCK" can be established in a range of 99.9 s-0.1s. The delay time " t_1 " and " t_2 " can be established between a range of 0.1 s - 999 hours.

» It is possible to choose between two modes of current study, AC or DC. When selecting the AC we must additionally establish a frequency range of 20Hz-100Hz.

COMPARATIVE WITH COMPETITORS

COMPARATIVE TABLE COMPETITORS VERSUS RELEQUICK MCU		
OPERATING CHARACTERISTICS	COMPETITORS	RELEQUICK
Current Monitoring	Different models for monitoring AC and DC	One model can monitor AC and DC networks
AC Frequency study	50/60Hz	20Hz-100Hz
Current Control	-Overcurrent -Undercurrent -Working window only on certain models	-Overcurrent -Undercurrent -Working window in all models
Functions	A unique function that can work in mode: Overcurrent, undercurrent or window	15 different Working functions configurable by software
Programming	Manual setting with selectors	-Manual setting for selectors -Programmable by software
Current threshold adjustment	$\pm(\%)$ on the nominal value	Programmable by software 0.5A-10A
Accuracy in adjusting the intensity and timing	inaccurate adjustment by selectors	Exact adjustment by software
Detection Delay Time	Manual: 0s-30s (Only some models)	-Manual: 0.1s-30s -Software: 0.1s-99.9s
Delay Time after alarm recovery	Manual: 0s-30s (Only some models)	-Manual: 0s -Software: 0.1s-999hours
Hysteresis	Yes, some models	Yes
Blocking selectors	No	Yes, by software
Manual reset alarm	No	Yes, by software

In the interest of product improvement, specifications are subject to change without notice.