

Load guard for 3-phase motors
Power factor metering ($\cos \Phi$)
Adjustable time delay 0 - 20 sec. at motor start
Selectable release of relay at max. or min. load
1 – pole relay output



C-mac RP81 is used for load monitoring of 3-phase motors, as the phase angle ($\cos \Phi$) between motor current and-voltage changes in proportion to the mechanical load of the motor.

You will see the biggest change in phase angle, if the motor is loaded between 0 and 60% of nominal load, which makes the RP81 suitable for monitoring of V-belts, pumps running dry, etc.

RP81 can be connected directly to motors with nominal current up to 6 A. If the current is bigger, you use a standard current transformer.

The unit is supplied with an adjustable start-up delay, which keeps the output relay activated independant of the power consumption, when the motor is starting. By connection of pins 7 and 2 you can select if the relay releases at over- or underload

Technical data		
Supply voltage:	3 x 230 V +/- 10 % 3 x 400 V +/- 10 % 3 x 415 V +/- 10 %	
Supply frequency:	40-70 Hz	
Power consumption:	2,5 VA	
Operation temp.:	-20°C til +60°C	
Humidity:	0 - 90% RH, non condensing	
Monitoring current:	min. 0,5 A, max. 6 A At bigger currents use a standard current transformer.	
Internal shunt:	33 mΩ at max.current 6 A the voltage across the shunt is 0,2 V	
Hysteresis:	5% factory-set	
Adjustment:	Start delay:	Potentiometer, 0 - 20 sec.
	Level:	Potentiometer, $\cos \Phi$. 0 - 0,9
Accuracy, scale:	Start delay:	20 %
	Power factor	5 %
Indications:	Green LED:	Supply voltage connected
	Red LED	Output relay activated
Max. load, relay:	1-polet 8A- 250 VAC	
	Ohmic load	

Start-up:

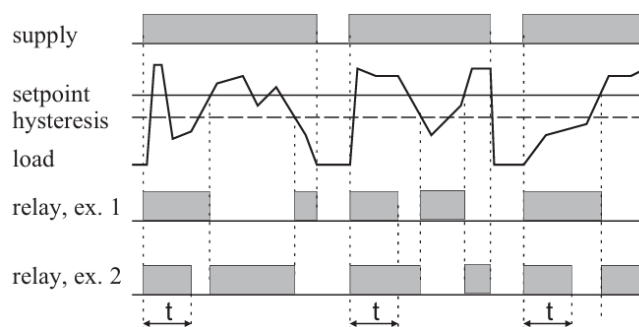
When the supply voltage is connected, the output relay activates, and the start-delay will start, independant of the selected relay function.

Relay function:

If pin 2 is not connected, the output relay releases immediatly, if the power factor exceeds the set level, provided that the set start-delay has run out.

If pin 2 is connected to pin 7, the relay releases, if the power factor is lower than the set level, and the timer has run out.

Funktionsdiagram:

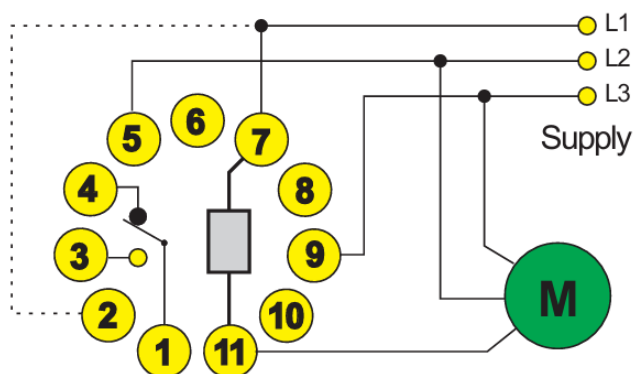


t = selected start - up delay

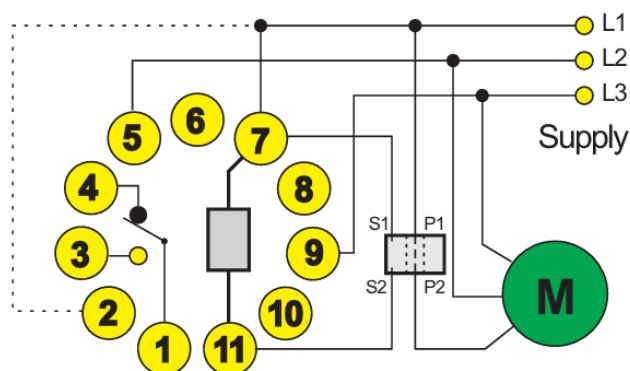
ex. 1: overload, pins 2 - 7 open

ex. 2: underload, pins 2 - 7 connected

Connections:



Example 1: without current transformer.
(motor current smaller than 6 A)

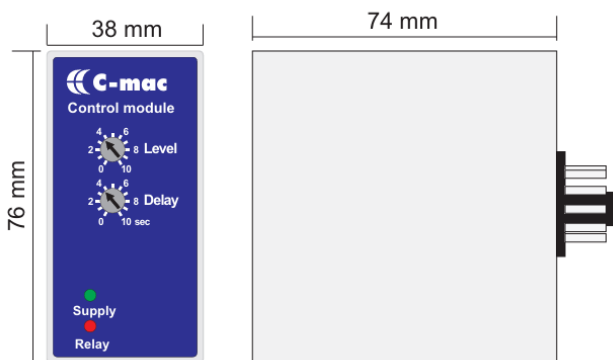


Example 2: With current transformer.
(motor current bigger than 6 A)

Note: the current transformer must be connected as shown (P1 / P2 and S1 / S2)

Ordering guide		
Type	Relay	Supply
RP81	1= 1 pole	3-230 = 230 VAC
		3-380 = 380 VAC
		3-415 = 415 VAC
Example:	RP81-1-3-400	

Mekaniske mål:



EMC and safety regulations

Emmision: EN50081-1
Immunity: EN50082-2
Safety: EN60730



Materials and weight:

Housing: NORYL-SE-1, grey, self-extinguishing
Housing bottom: NORYL SE-1, GFN-2, black self-extinguishing
Terminals: Nickel-plated brass
Weight: 110 g

Monitoring and protection of motors and machinery.

Protection of motors and machinery are normally made by means of motor switches or the like, but in many applications, f.inst. if you need a quick reaction in connection with overload, or an alarm in case of underload, it is an advantage to use a monitoring relay.

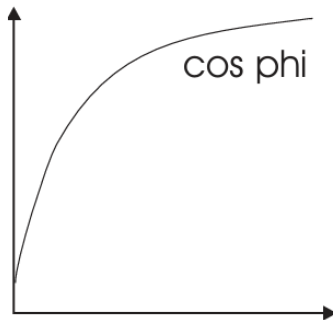
Please note, that the monitoring relay cannot replace the mandatory motor switch, which is used for safety reasons.

On the figures below you can see, how the different parameters are influenced by the motor load, and which C-mac® relays to use for various applications.

The descriptions must be understood as rules of thumb and they are not necessarily correct in all applications as well as the curves are only intended as guide and not covering all motor types.

There are C-mac® relays that can be used if you want an interruption, or converters that can be used if you want an analog signal, possibly in connection with PLC or PC controls.

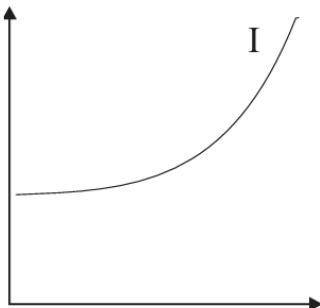
Fasevinkel ($\cos \phi$)



The phase angle between current and voltage ($\cos \phi$) is changing a lot between 0 and 60% load, therefore it is an advantage to monitor the phase angle if you want an alarm in connection with underload, f.inst. breakage of belts, pumps running dry, blocking of filters, etc.

Recommended relay type:
RP81 (only 3-phase loads)

Motorstrøm

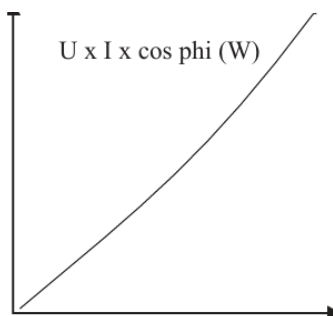


The current consumption of a motor is almost the same from 0 to 50% load, and after that it will increase with increasing load.

Current monitoring is used, if you want to protect the motor against blocking, f.inst. grinding mills, screw conveyors, etc.

Recommended relay types:
RC15, RC30 or LC10-R
Recommended converter:
LC10-0, KC62

Motoreffekt



With power monitoring you can monitor all variables (supply voltage, current and phase angle), ensuring a very high sensitivity to even very small load changes, making this principle preferable for both over- and underload monitoring.

Recommended relay type:
RP91
Recommended converter:
FPA38