Measuring Relay M460

3-Phase AC Current Monitor

Features

- Programmable measuring ranges from 0.03 to 5.00 A$_{AC}$, through 1 - 5 A current transformers
- Also includes temperature monitoring for total motor protection
- High accuracy through innovative microprocessor technology
- Current monitoring based on RMS measurement
- Adjustable relay delay up to 24.9 seconds per limit point
- Easy to read LCD display
- Password protected programming access

*T*he Model **M460** is used for current limit monitoring of 3-phase AC motors and systems. It is compatible with standard, readily available current transformers, and has an operating range of 0.03 to 5.00 A$_{AC}$.

For optimum motor protection, the **M460** also monitors motor winding temperatures: up to 6 PTC resistor type temperature sensors (per DIN 44081) can be connected for this purpose. The second relay contact (normally open type) is used for over-temperature signalling.

Independently programmable time delays for relay energisation / de-energisation upon threshold detection prevent unwanted responses to transient motor current variations. Microprocessor based operation and digital programming ensure quick and precise set-up and adjustment of limit values.

Mode of Operation

The **M460** can be programmed via its front membrane keypad, while its supply voltage is switched on. To prevent unintended changes in the settings, programming is possible only through password access. After entering the password, the user first enables / disables the temperature monitoring function, as required.

The user is prompted through the programming sequence by parameter symbols on the LCD display. Through these steps the high and low current limit points and relay delay times upto 24.9 seconds may be programmed. Effects of current transients can be suppressed by setting a suitable relay delay time.

The **M460** can thus be programmed to operate according to the user's specific application requirements. The current limit points can be converted corresponding to the current transformer ratio. After completing 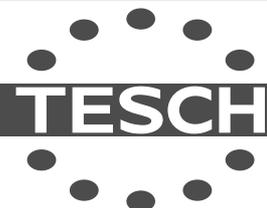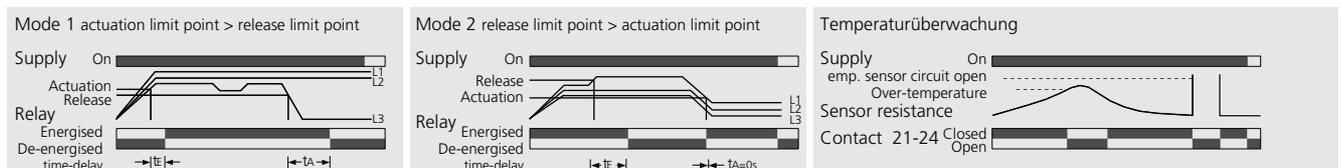the programming sequence, the settings are stored in the unit's non-volatile memory, unaffected by power supply interruptions. Because the limit points can be independently programmed at any value within the selected monitoring range, the relay energisation point can be higher or lower than the de-energisation point, as illustrated in the diagrams below.

Models and Ordering Data

Contacts	1 change-over contact
	1 normally open contact
Measuring range	0.03 to 5.00 A$_{AC}$

Type M460	Order No.
230 V$_{AC}$	072 00038
115 V$_{AC}$	072 00039
24 V$_{AC}$	072 00040

Function diagrams

Mode 1 actuation limit point > release limit point

Mode 2 release limit point > actuation limit point

Temperaturüberwachung

TESCH

Automation Control Components

Configuration Describtion

The M460 is programmed by a sequence of operations of its front membrane keys. To put the unit into programming mode, the keys [▷] + [△] are pressed simultaneously, upon which `Pt00` appears on the display. The [▷] key is used to select one of the two numeric digits, causing it to blink. The [△] key is used to change the value of the blinking digit. The value of a digit can be changed only when it is in the blinking mode. In this way, the password is set to `Pt 13`, after which programming can proceed by sequentially selecting the parameters, using the [F] key.

After entering the password, the first operation of the [F] key enables the M460 to be set up either for current limit monitoring, or for current limit plus over-temperature monitoring, using the [△] key. If a high temperature or sensor open circuit condition occurs, relay contacts 21-24 open, and the symbol ⬇ appears on the LCD display. If the temperature monitoring function has been disabled, contacts 21-24 operate the same way as contacts 11-14.

The next operation of the [F] key enables setting of the currrent limit point for relay energisation, by adjusting digit values one at a time as described earlier. Similarly, relay de-energisation threshold point, relay energisation time delay, and relay de-energisation time delay may be adjusted by the user.

After all programming steps are finished, the M460 reverts to its normal operation mode. Thereafter, to change any parameter, the password must be first entered, the [F] key repeatedly pressed until the desired parameter step is reached, upon which the digit values are adjusted. The relay energisation state (contacts 11-14 closed) is indicated by the ⬆ symbol on the LCD display.

Display Parameters:

`FnL 1` (A~) Current monitoring

`FnL 1` (kΩ A~) Current + temperature monitoring

`E24.9` (s ⏱) Time delay, relay energise

`A24.9` (s ⏱) Time delay, relay de-energise (max. 24.9 seconds, each)

`Pt 13` Password: 13

`E` Actuation value

`A` Release value

⬆ Current limit relay energised

⬇ Over-temperature relay de-energised
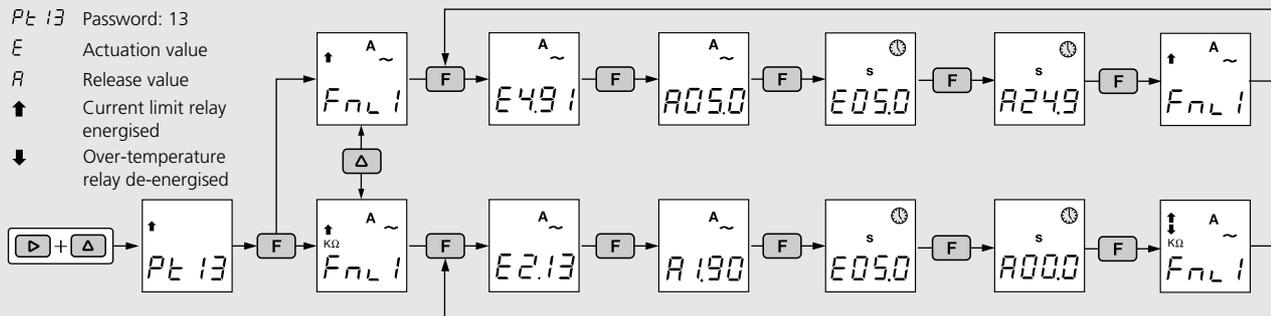
Technical Data
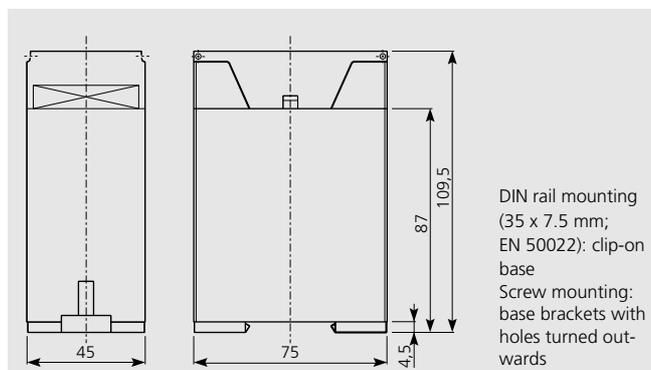
Voltage range	0.8 (0.85 / 24 V) to 1.1x rated voltage
Frequency range	50 / 60 Hz
Power consumption	Approx. 2 VA
Relay mechanical life	10^7 switching cycles
Current threshold accuracy	±2%
Timing accuracy	<±0.5% under const. conditions
Temperature influence	<0.01% / K
Ambient temperature	-5 °C to 60 °C, no condensation
Rated insulation voltage	250 V
Creep and air paths	Group III per VDE 0110; Pollution Level 2

Test voltage	2000 V per VDE 0435
Current measuring range	0.03–5.00 A_{AC}; 0.03 A resolution
Protection class	Terminals: IP 20, Enclosure: IP 40 per DIN VDE 0470-1 (11 / 92)
Connecting terminals	Terminal box with wire protection
Conductor size	Flexible 2.5 mm², connecting lead to be stripped up to max. 7 mm
Relay contacts rating	AC1: 250 V 5 A, DC1: 30 V 4 A
Weight	Approx. 260 g
Temperature sensor threshold values	Relay de-energised: 2500 - 3600 Ω Relay energised: 1500 - 2300 Ω

Dimensional Diagram (all dimensions in mm)

DIN rail mounting (35 x 7.5 mm; EN 50022): clip-on base
Screw mounting: base brackets with holes turned outwards

Circuit Diagram