Measuring Relay M420

Motor Standstill Monitor

Features

- Standstill detection through motor voltage feedback: rotation sensor not required
- Voltage feedback input safe up to 700V$_{AC}$
- High accuracy through innovative microprocessor technology
- Adjustable relay delay up to 24.9 seconds per limit point
- Easy to read LCD display
- Password protected programming access

*T*he Model **M420** is used for to detect standstill of AC motor driven machines. By accurately measuring the remanent voltage which the motor generates while running down, the **M420** is able to discriminate between motor running and stop conditions. The use of a rotation sensor is therefore not required.

Independently programmable time delays for relay energisation / de-energisation upon threshold detection prevent unwanted responses to transient motor voltage and load variations or offer an additional deceleration time.

For additional safety, the voltage feedback input and motor winding circuit is continuously monitored. In case of break in this circuit, another set of contacts opens, and the symbol ⬇ appears on the LCD display.

Mode of Operation

The **M420** 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 is prompted through the programming sequence by parameter symbols on the LCD display.
Through these steps the high and low voltage threshold points and relay delay times upto 24.9 seconds may be programmed.

Effects of voltage transients in the feedback sensing circuit can be suppressed by setting a higher voltage threshold level (max. 24.9V), and an according relay delay time.
The **M420** can thus be programmed to operate according to the user's specific application requirements.
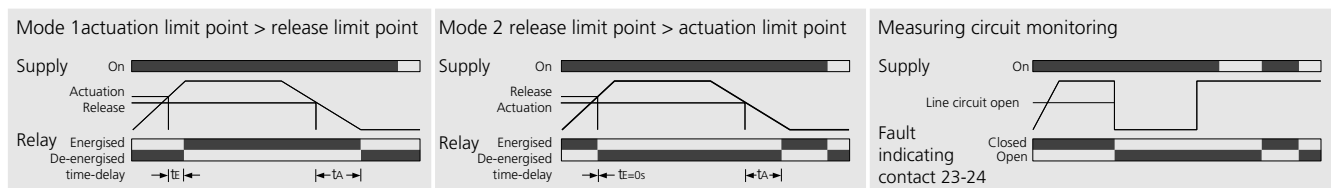After completing the programming sequence, the settings are stored in the unit's non-volatile memory, unaffected by power supply interruptions. Because the limit points can be independently programmed at any value within the selected monitoring range, the relay energisation point can be higher or lower than the de-energisation point, as illustrated in the diagrams below.

Models and Ordering Data

Contacts	1 change-over: standstill detection 1 normally open: feedback circuit fault
Type M420	**Order No.**
230 V$_{AC}$	072 00032
115 V$_{AC}$	072 00033
24 V$_{AC}$	072 00034

Function diagrams

Mode 1 actuation limit point > release limit point

Mode 2 release limit point > actuation limit point

Measuring circuit monitoring

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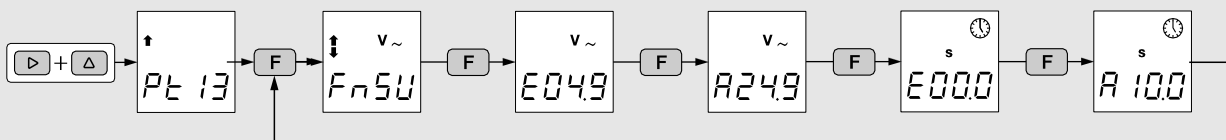
Automation Control Components

Configuration Describtion

The M420 is programmed by a sequence of operations of its front membrane keys. To put the unit into programming mode, the keys [△] and [▷] 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 [Pt13], after which programming can proceed by sequentially selecting the parameters, using the [F] key. After entering the password, the next operation of the [F] key confirms the M420's stoppage detection function. Pressing the [F] key again enables setting of the sensing voltage threshold 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 M420 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 is indicated by the ⬆ symbol on the LCD display. A feedback circuit fault is indicated by the ⬇ key and opening of contacts 21-24.

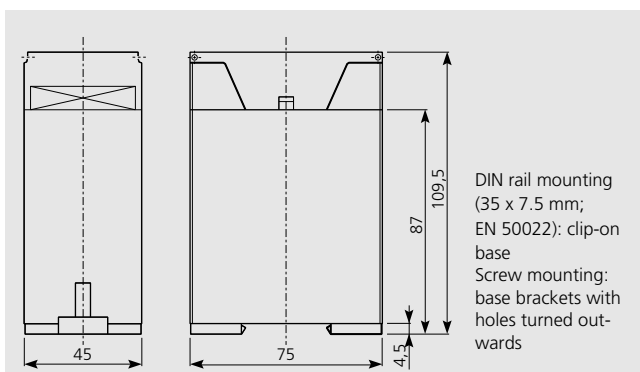|	
Pt 13	Password 13
Fn5U	Standstill detection function
E	Actuation value
A	Release value
E24.9 s	Time delay, relay energise
A24.9 s	Time delay, relay de-energise
⬆	Monitoring relay energised
⬇	Fault indication relay de-energised

Technical Data

Voltage range	0.8 (0.85 / 24 V) to 1.1x rated voltage.	Creep and air paths	Group III per VDE 0110; Pollution Level 2
Frequency range	50 / 60 Hz	Maximum input voltage	700 V~
Power consumption	Approx. 2 VA	Test voltage	2000 V per VDE 0435
Relay mechanical life	10^7 switching cycles	Protection class	Terminals: IP 20, Enclosure: IP 40 per DIN VDE 0470-1 (11 / 92)
Voltage threshold accuracy	±2%		
Timing accuracy	<±0.5% under const. conditions	Connecting terminals	Terminal box with wire protection
Response time	<250 mSec	Line cross section	Flexible 2.5 mm², connecting lead to be stripped up to max. 7 mm
Timing effect	<0.01% / K		
Ambient temperature	-5 °C to 60 °C, no condensation	Switching capacity	AC1: 250 V 5 A, DC1: 30 V 4 A
Rated insulation voltage	250 V	Weight	Approx. 260 g
Measuring range	0.2 - 24.9 Vᴀᴄ; 0.2 V resolution		

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

11-12/14 Standstill detection
21-24 Fault indication contact

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