- Industrial design
- Width 55mm
- True power monitoring
- Temperature monitoring of the motor winding (max. 6 PTC)
- Fault latch
- Position of output relay presettable
- 1 change over contact and 1 normally open contact
- Analogue output 0 to 10V

Technical data

1. Functions

True power monitoring (overload or underload) of 1- and 3-phase motors with adjustable threshold, temperature monitoring of the motor winding (max. 6 PTC), timing for start-up suppression and tripping delay separately adjustable

The following functions can be selected by means of DIP-switches:

DIP-Switch 1	underload monitoring (ON) or overload monitoring (OFF)
DIP-Switch 2	relay in on-position if fault occurs - n.o. (OFF) or relay in off-position if fault occurs - n.c. (ON)
DIP-Switch 3	alarm for disconnected consumer (I = 0)
DIP-Switch 4	fault latch of true power monitoring (P-MEM)
DIP-Switch 5	fault latch of motor temperature (θ-MEM)
DIP-Switch 6	fault simulation
DIP-Switch 7	time range of start-up suppression time
DIP-Switch 8,9	time range of tripping delay

2. Time ranges

	Adjustment range	
Start-up suppression time:	1s	20s
	5s	100s
Tripping delay:	0.1s	5s
	1s	50s

3. Indicators

Green LED ON:	indication of supply voltage
Green LED flashes:	indication of start-up suppression time
Red LED flashes:	indication of tripping delay
Red LED ON:	indication of fault
All LEDs flashing:	indication of disconnected consumer (if I = 0)

4. Mechanical design

Self-extinguishing plastic housing, IP rating IP40
Mounted on DIN-Rail TS 35 according to EN 50022
Mounting position: any
Shockproof terminal connection according to VBG 4 (PZ1 required), IP rating IP20
Initial torque: max. 1Nm
Terminal capacity:
1 x 0.5 to 2.5mm² with/without multicore cable end
1 x 4mm² without multicore cable end
2 x 0.5 to 1.5mm² with/without multicore cable end
2 x 2.5mm² flexible without multicore cable end

5. Input circuit

Supply voltage:

12 to 440V AC	terminals A1-A2	(BUT400V5X)
12 to 500V AC	terminals A1-A2	(BUT500V5X)
	(galvanically separated)	
	selectable via transformer modules TR3	

Tolerance:	-15% to +10%
Rated frequency:	48 to 63Hz
Rated consumption:	4VA (3W)
Duration of operation:	100%
Reset time:	<1s
Residual ripple for DC:	-
Drop-out voltage:	>30% of the supply voltage

6. Output circuit

1 analog output:	0 to10V DC / 1mA, terminals U1-U2
1 potential free change over contact and 1 potential free normally open contact	
Switching capacity :	1200VA (5A / 250V AC)
Fusing:	5A fast acting
Mechanical life:	20 x 10^6 operations
Electrical life:	2 x 10^5 operations at 1000VA resistive load
Switching frequency:	max. 60/min at 100VA resistive load max. 6/min at 1000VA resistive load (according to IEC 947-5-1)
Insulation voltage:	250V AC (according to IEC 664-1)
Surge voltage:	4kV, overvoltage category III (according to IEC 664-1)

7. Measuring circuit

Input:	1-phase mains:	voltage:	terminals L1i-B1
		current:	terminals L1i-L1k
	3-phase mains:	voltage:	terminals L1i-L2-L3
		current:	terminals L1i-L1k
	Thermistor:		terminals T1-T2
Voltage range:			
	1-phase mains:	100 to 230V AC	(BUT400V5X)
		120 to 289V AC	(BUT500V5X)
	3-phase mains:	3~ 100/58 to 400/230V	(BUT400V5X)
		3~ 120/69 to 500/288V	(BUT500V5X)
Overload capacity:			
	1-phase mains:	256V AC	(BUT400V5X)
		320V AC	(BUT500V5X)
	3-phase mains:	3~ 450/259V	(BUT400V5X)
		3~ 550/316V	(BUT500V5X)
Current range:		1 to 10A	
Overload capacity:		12A	
Input resistance:		<20mΩ	
Switching threshold P_S:		0% to 100%	
Initial resistance:			<1.5kΩ
Response value (relay in off-position):			≥3.6kΩ
Release value (relay in on-position):			≤1.8kΩ
Disconnection (short circuit thermistor):			No
Terminal voltage T1-T2:			max. 6V DC

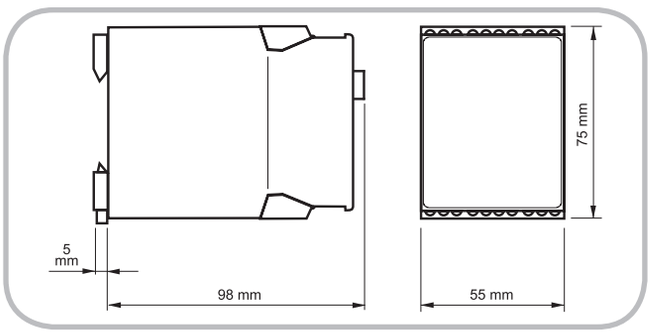
8. Accuracy

Base accuracy:	±5% (of maximum scale value)
Adjustment accuracy:	±5% (of maximum scale value)
Repetition accuracy:	±2%
Voltage influence:	-
Temperature influence:	≤0.03% / °C

9. Ambient conditions

Ambient temperature:	-25 to +55°C (according to IEC 68-1)
Storage temperature:	-25 to +70°C
Transport temperature:	-25 to +70°C
Relative humidity:	15% to 85% (according to IEC 721-3-3 class 3K3)
Pollution degree:	3 (according to IEC 664-1)

10. Dimensions



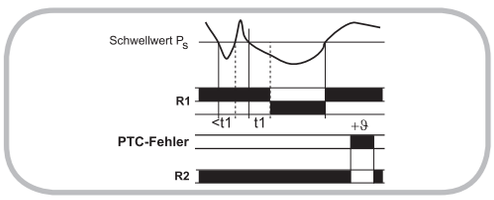
Functions

True power monitoring (overload or underload) of 1- and 3-phase motors with adjustable threshold, temperature monitoring of the motor winding (maximum 6 PTC), timing for start-up suppression and tripping delay separately adjustable

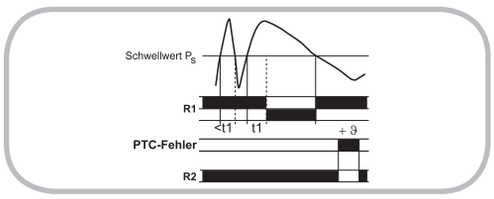
When the supply voltage U is applied, the set interval of the start-up suppression (t_2) begins (green LED flashes). Changes of the true power during this period do not affect the state of the output relay R. After the interval has expired the green LED is illuminated steadily.

The following functions can be selected by means of DIP-switches:

Underload monitoring (DIP-switch 1 MIN in position ON)
When the measured value for the true power falls below the value adjusted at the P_S-regulator, the set interval of the tripping delay (t_1) begins (red LED FAILURE flashes). After the interval has expired and if the DIP-switch RELAY (2) is in the position ON (n.c.), the output relay R1 (terminals 15-16-18) switches into off-position (red LED illuminated). When the measured value for the true power again exceeds the set value, the output relay switches into on-position (red LED not illuminated).
When the DIP-switch RELAY (2) is in the position OFF (n.o.), the mode of operation of the device remains unchanged, but the operation of the output relay is inverted.



Overload monitoring (DIP-switch 1 MIN in position OFF)
When measured value for the true power exceeds the value adjusted at the P_S-regulator, the set interval tripping delay (t_1) begins (red LED FAILURE flashes). After the interval has expired and if the DIP-switch RELAY (2) is in the position ON (n.c.), the output relay R1 (terminals 15-16-18) switches into off-position (red LED illuminated). When the measured value for the true power again falls below the set value, the output relay switches into on-position (red LED not illuminated).
When the DIP-switch RELAY (2) is in the position OFF (n.o.), the mode of operation of the device remains unchanged, but the operation of the output relay is inverted.



Temperature monitoring of the motor winding
If the cumulative resistance of the PTC-circuit is less than 1.8kΩ (standard temperature of the motor) and the DIP-switch RELAY in the position ON (n.c.) when the supply voltage U is applied (green LED illuminated), the output relay R2 (terminals 23-24) switches into on-position.
When the cumulative resistance of the PTC-circuit exceeds 3.3kΩ (at least one of the PTCs has reached the nominal cut-off temperature), the output relay switches into off-position (red LED SPTC illuminated). The output relay again switches into on-position (red LED not illuminated), if the cumulative resistance drops below 1.8kΩ by cooling down of the PTC.
When the DIP-switch RELAY (2) is in the position OFF (n.o.), the mode of operation of the device remains unchanged, but the operation of the output relay is inverted.

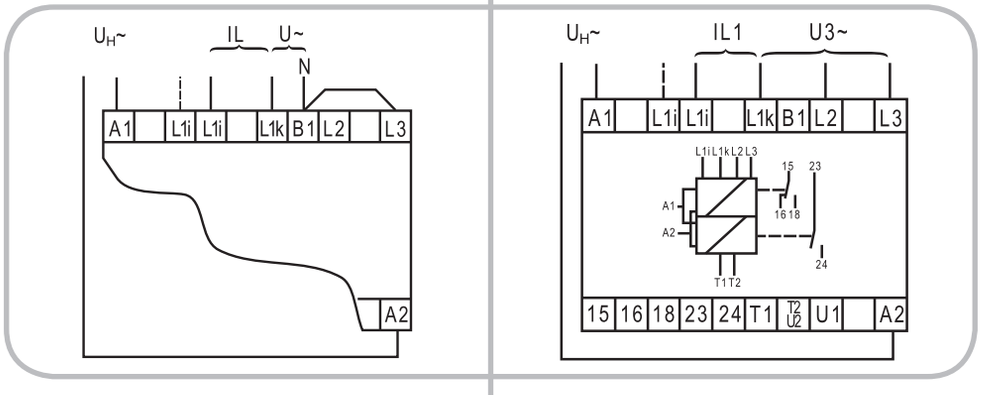
Disconnected consumer (DIP-switch I=0 in position ON)
When the current in the phase L1 is less than 5% of the nominal value of the selected current range and the DIP-switch RELAY (2) is in the position ON (n.c.), the output relay R switches into off-position (irrespective of the actual position) and both LEDs flash.
When the current flow is restored, the measuring cycle is restarted with the set interval of the start-up suppression (t_2) (green LED flashes).
When the DIP-switch RELAY (2) is in the position OFF (n.o.), the mode of operation of the device remains unchanged, but the operation of the output relay is inverted.

Fault latch true power monitoring (DIP-switch P-MEM in position ON)
For both functions (overload as well as underload monitoring) it is possible to activate a fault latch.
When the DIP-switch P-MEM is in the position ON, a short-term error will be stored after the expiration of the tripping delay (t_1). The measuring cycle is restarted with the set interval of the start-up suppression (t_2) (green LED flashes) after activating the internal reset key or after disconnecting and re-applying the supply voltage.

Fault latch motor temperature (DIP-switch ϑ-MEM in position ON)
When the DIP-switch ϑ-MEM is in the position ON, a thermistor fault will be stored. The measuring cycle is restarted with the set interval of the start-up suppression (t_2) (green LED flashes) after activating the internal reset key or after disconnecting and re-applying the supply voltage.

Test function (DIP-switch TEST in position ON)
Pressing the internal test key forces the output relay R to switches into off-position, if the measured value of the true power is within the admissible range and if the DIP-switch RELAY (2) is in the position ON (n.c.).
When the DIP-switch RELAY (2) is in the position OFF (n.o.), the mode of operation of the device remains unchanged, but the operation of the output relay is inverted.

Connections



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