Current and Voltage Controls 3-Phase AC Max. Current Control Type S 178





Measuring ranges: 0.5-500 A

- 3-phase current metering relay for current metering transformers, type MP 3...
- Knob-adjustable current level
- · Built-in adjustable timer function
- Latching at set level possible
- Output: 10 A SPDT relay
- Plug-in type module
- S-housing
- LED-indication for output ON
- AC or DC power supply

Product Description

3-phase current metering plug-in relay with adjustable current value measured with current transformer type MP... Often used to prevent a motor from overloading or from causing damage to equipment working with a certain kind of granulate. The S 178 features built-in time delay.

Ordering Key	S 178 156 024 4V
Housing —	
Туре	
Output —	
Power supply —	
Measuring range ———	

Type Selection

Plug	Output	Measuring range	Supply: 24 VAC	Supply: 115 VAC	Supply: 230 VAC	Supply: 24 VDC
Circular	r SPDT	0.5 - 500 AAC	S 178 156 024 4V	S 178 156 115 4V	S 178 156 230 4V	S 178 156 724 4

Input Specifications

Input Pins 5 & 7	0.4 - 4V _p , through current transformer 9.9 kO	
Moasuring ranges	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Tupoc	Dangas	Max ourront
Types	Ranges	Max. current
	AAC rms	rms
MP 3005	0.5 - 5	20 AAC
MP 3020	2 - 20	50 AAC
MP 3100	10 - 100	150 AAC
MP 3500	50 - 500	500 AAC
Latching	Interconnect pins 8 & 9	

Output Specifications

Output Rated insulation voltage	SPDT relay 250 VAC (rms) (cont./elect.)
Contact ratings (AgCdO) Resistive loads AC 1 DC 1 or Small inductive loads AC 15	μ (micro gap) 10 A/250 VAC (2500 VA) 1 A/250 VDC (250 W) 10 A/25 VDC (250 W) 2.5 A/230 VAC 5 A/230 VAC
Mechanical life	$\geq 30 \times 10^6$ operations
Electrical life AC 1	\geq 2.5 x 10 ⁵ operations (at max. load)
Operating frequency	≤ 7200 operations/h
Dielectric strength Dielectric voltage Rated impulse withstand volt.	≥ 2 kVAC (rms) (cont./elect.) 4 kV (1.2/50 µs) (cont./elect.) (IEC 60664)



Supply Specifications

Power supply AC types Rated operational voltage through pins 2 & 10 024 115 230	Overvoltage cat. III (IEC 60664) (IEC 60038) 24 VAC ± 15%, 45 to 65 Hz 115 VAC ± 15%, 45 to 65 Hz 230 VAC ± 15%, 45 to 65 Hz
Voltage interruption Dielectric voltage Rated impulse withstand volt.	≤ 40 ms 2 kVAC (rms) (supply/elect.) 4 kV (1.2/50 µs) (line/neutral, line/line), no direct connec- tion to electronics
Power supply DC types Rated operational voltage through pins 2 & 10	Overvoltage cat. III (IEC 60664) (IEC 60038)
724 Dielectric voltage Rated impulse withstand volt.	24 VDC ± 15% None (supply/elect.) 800 V (1.2/50 µs)
Rated operational power AC supply DC supply	2.5 VA 1.5 W

General Specifications

Hysteresis		10% ± 6%		
Reaction time		Relay operates: $\tau = 20$ ms Relay releases: $\tau = 300$ ms worst case reaction time may be up to 5 x τ Adjustable delay on operate built-in (0.2s - 10s)		
Accuracy ON delay		10 s, -1/+3 s on max. < 0,1 s on min.		
Indication for Power supply Output ON	ON	LED, green LED, red		
Environment Degree of protection Pollution degree Operating temperature Storage temperature		(IEC 60947-1) IP 20 B (IEC 60529) 2 (IEC 60664) -20° to +50°C (-4° to +122°F) -50° to +85°C (-58° to +185°F		
Weight	AC supply DC supply	200 g 125 g		
Approvals		UL, CSA		

Mode of Operation

AC current metering (example 1)

Carried out with the 3-phase current metering transformer type MP This transformer supplies an output voltage between 0.4 and 4 V_{p_r} proportional to the current flow in a cable passing through the holes in the transformer.

The relay operates when the current in any of the phases causes the input voltage on pins 5 and 7 to reach set value. The relay releases immediately when the current in all 3 phases has dropped below set value (see hysteresis) or when power supply is interrupted.

Latching (example 2)

The relay operates and latches in operating position when the current in any of the phases causes the input voltage on pins 5 and 7 to reach set value. The relay releases immediately by removing the latch, i.e. by opening the contact between pins 8 and 9, provided that the current in all 3 phases has dropped below set value (see hysteresis), or by interrupting power supply.

AC current metering Hysteresis adjustment (example 3)

As normal AC current metering except that the hysteresis can be increased by an external resistor mounted between pins 8 and 9 (see Hysteresis under Time/Range Setting).

Note:

At DC supply, do not connect pins 7 and 10 as these pins are internally connected by a resistor of 3.9 k Ω . No current must pass through this internal connection.

Wiring Diagram



S 178

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Time/Range Setting		Accessories	
Time setting	Hysteresis	Sockets◊	S 411
Upper potentiometer:	10% ± 6%	Hold down spring◊	HF
Time setting on scale in sec-	The hysteresis may be ex-	Mounting rack	SM 13
onds.	tended to 75% by connect-	Socket covers	BB 4
	ing a resistor between pins	Front mounting bezel	FRS 2
Time range:	8 and 9. Resistor limits are	Potentiometer lock	PL 2
Delay on operate: 0.2 - 10s.	1 M Ω and 15 k Ω . The hystere-	ere- Current metering transformers	MP 3005, MP 3020
5	sis is increased by decreasing	5	MP 3100, MP 3500
Range setting:	resistance.		
Lower potentiometer: Adjustment of set point in percent.		For further information refer to "Current Metering Transfor- mers" and "Accessories".	

Operation Diagrams

Example 2 Examples 1 og 3 Power supply Power supply Latching Set value Input voltage pins 5 & 7 Set value Input voltage pins 5 & 7 Relay ON Hysteresis 🖊 Hysteresis ; Relay ON Ηſ ۲٦ ۲T-۲ł