

Solid-state, Plug-in Current Sensor

- Applicable to motor overcurrent protection and 3-phase AC current detection.
- Inverse-type, start-up lock type, and instantaneous type overcurrent sensors available.
- Instantaneous type under current sensor available.
- Plug-in design simplifies installation, removal, and wiring.
- DIN sized (48 mm x 96 mm)



The SAO cannot be used in circuits with waveform distortion, inverter circuits, or with capacitor loads.



Model Number Structure

Model Number Legend

SAO-□□□□

1 2 3 4 5

1. Basic model name

SAO: Current Sensor

2. Operating time characteristics

R: Inverse type: inverse time both at starting and during operation

Q: Instantaneous type with start-up lock

S: Regular instantaneous type

3. Detection function

U: Undercurrent detection

None: Overcurrent detection

4. Control voltage

1: 100/110/120 VAC

2: 200/220/240 VAC

5: 24 VDC

6: 48 VDC

7: 100/110 VDC

5. Product history

N: New version

Ordering Information

Terminal/ mounting	Control voltage	Overcurrent detection			Under current detection
		Inverse type	Instantaneous type		Instantaneous type
			W/start-up lock*	W/o start-up lock	
Plug-in/DIN rail via socket	100/110/120 VAC	SAO-R1N	SAO-Q1N	SAO-S1N	SAO-SU1N
	200/220/240 VAC	SAO-R2N	SAO-Q2N	SAO-S2N	SAO-SU2N
	24 VDC	SAO-R5N	SAO-Q5N	SAO-S5N	SAO-SU5N
	48 VDC	SAO-R6N	SAO-Q6N	SAO-S6N	SAO-SU6N
	100/110 VDC	SAO-R7N	SAO-Q7N	SAO-S7N	SAO-SU7N

* Fixed time-limit at start-up, instantaneous thereafter.

Accessories (Order Separately)

Current Converters

Model	Current range
SET-3A	1 to 80 A
SET-3B	64 to 160 A

DIN rail socket
8PFA1

Socket

Type	Model
Front connecting socket	8PFA1

Specifications

■ Ratings

Motor circuit	Voltage: 500 VAC max. 3-phase (primary voltage at SET Current Converter) Current: 1 to 80 A or 64 to 160 A 3-phase (primary current at SET Current Converter)
Power supply circuit	Voltage: 100/110/120 VAC, 200/220/240 VAC, 24, 48 VDC, or 100/110 VDC (leveled DC) Voltage fluctuation: $+10/-15\%$ max. of the rated voltage Frequency: 50/60 Hz $\pm 5\%$
Current SV range	See table of <i>Current Converter</i> .
Output contact	Configuration: SPDT Capacity: 3 A ($\cos\phi = 1.0$)/2 A ($\cos\phi = 0.4$) at 240 VAC; 3 A (resistive load)/2 A (L/R = 7 ms) at 24 VDC; 0.2 A (resistive load)/0.1 A (L/R = 7 ms) at 110 VDC
Power consumption	100/110/120 VAC: approx. 3.5 VA; 200/220/240 VAC: approx. 7 VA; 24 VDC: approx. 0.3 W; 48 VDC: approx. 0.5 W; 100/110 VDC: approx. 1.2 W
Case color	Munsell 5Y7/1

■ Characteristics

Item	SAO-R□N	SAO-Q□N	SAO-S□N	SAO-SU□N
Operating current	100% of the current SV (current when the relay is OFF for the SAO-SU□N)			
Operating time characteristics	Inverse type	Fixed time at start-up and instantaneous thereafter	Instantaneous type	
Operating time	For a 600% overcurrent: Time scale x 1: 1 to 10 s Time scale x 4: 4 to 40 s For a 200% overcurrent: $2.8 \times t \pm 30\%$, where t is the operating time at 600% overcurrent. (time SV at max.)	In start-up lock mode with a 600% overcurrent: Time scale x 1: 1 to 10 s Time scale x 4: 4 to 40 s In instantaneous mode: 0.3 s max. at 120% overcurrent	0.3 s max. with an overcurrent of 120% the current SV	0.3 s max. when 120% the current SV drops below 80%
Initial current in start-up mode	---	Approx. 30% of the current SV	---	---
Inertial characteristics	Will not operate for 80% of operating time for a 600% overcurrent. (at min. current and max. time SV)	---		
Reset value	More than 95% of the operating current			Less than 105% of the operating current
Operating current accuracy	$\pm 10\%$ of the current SV			
Operating time accuracy	$+10/-5\%$ of maximum time SV (at a time SV: 1) $\pm 10\%$ of maximum time SV (at a time SV: 2 to 10)		0.3 s max.	
Influence of temperature on operating current	$\pm 5\%$ for 0 to 40°C; $\pm 10\%$ for -10 to 50°C			
Influence of temperature on operating time	$\pm 10\%$ for 0 to 40°C; $\pm 20\%$ for -10 to 50°C (start-up mode)		0.3 s max. for -10 to 50°C	
Influence of frequency on operating current	$\pm 3\%$ for a frequency fluctuation of $\pm 5\%$			
Influence of frequency on operating time	$\pm 5\%$ for a frequency fluctuation of $\pm 5\%$ (start-up mode)		0.3 s max. for a frequency fluctuation of $\pm 5\%$	
Influence of voltage on operating current	$\pm 3\%$ for a voltage fluctuation of $+10/-15\%$			
Influence of voltage on operating time	$\pm 5\%$ for a voltage fluctuation of $+10/-15\%$ (start-up mode)		0.3 s max. for a voltage fluctuation of $+10/-15\%$ (start-up mode)	