

True power monitoring S1WP



True power converter for single and three-phase supplies, used to measure and monitor the rated power or true power on electrical machines.

Approvals

	S1WP
	◆
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Unit features

- ▶ 9 different measuring ranges
- ▶ Large voltage measuring range
- ▶ Analogue output can be switched for current and voltage
- ▶ Relay output for monitoring underload or overload
- ▶ Suitable for use with frequency-controlled motors
- ▶ Suitable for current transformers

Description

The true power converter is enclosed in a 22.5 mm S-95 housing. 4 versions are available for different voltage measuring ranges, 2 versions are available for different current measuring ranges and 2 versions are available for a separate supply voltage.

Features:

- ▶ Relay output:
 - 1 auxiliary contact (C/O)
- ▶ Versions with 9 A and 18 A current measuring range
- ▶ Fast, analogue reaction time
- ▶ Adjustable switching threshold for underload or overload, from 5 to 100 % of the measuring range limit value
- ▶ Switching hysteresis of 15 %
- ▶ Adjustable monitoring reaction time
- ▶ Adjustable start-up suppression time
- ▶ LEDs for supply voltage and status of auxiliary contacts, underload or overload

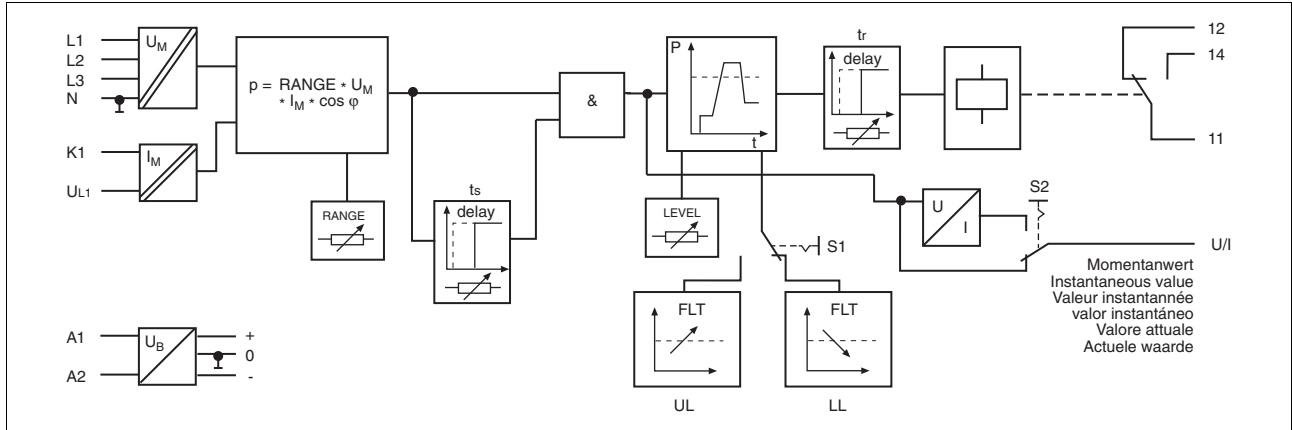
The S1WP monitors the set upper and lower true power limit on a single or three phase supply. It converts the true power or rated power into an analogue output signal, which is proportional to the true power. The analogue output signal and the status of threshold monitoring are displayed at a relay output.

The S1WP operates in normally energised mode, so in its default state contact 11-14 is closed and contact 11-12 open. If normally de-energised mode is required, the functions of the upper and lower threshold are transposed. In overload (UL) mode, if the measured true power exceeds the switching threshold, the auxiliary contact switches and the "FLT" LED is lit. In underload (LL) mode, if the measured true power drops below the switching threshold, the auxiliary contact switches and the "FLT" LED is lit.

The measurement is suppressed during the machine's start-up phase, in order to avoid spurious output signals. The start-up suppression time t_s is adjustable. In the case of transient load fluctuations, the switching threshold can be suppressed. The reaction time t_r is adjustable.

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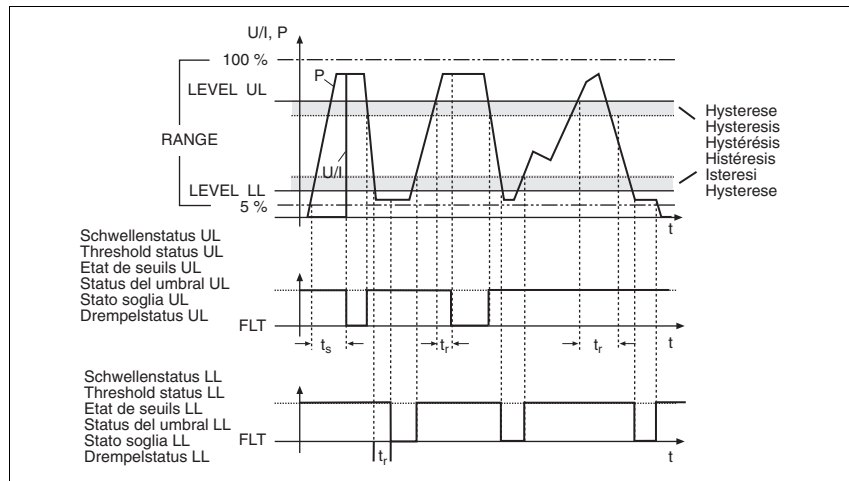
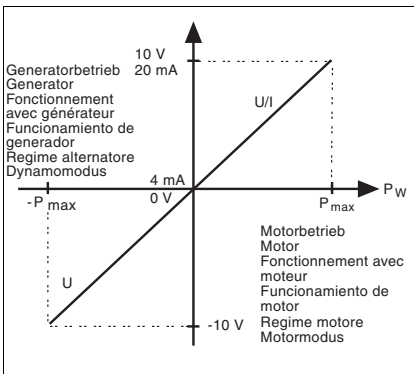
Internal wiring diagram



Legend

- ▶ U_M Measuring voltage
- ▶ I_M Measuring current
- ▶ U_B Supply voltage
- ▶ $\cos\phi$ Power factor
- ▶ RANGE Measuring range
- ▶ t_s Start-up suppression time
- ▶ t_r Reaction time
- ▶ LEVEL Switching threshold
- ▶ UL Overload threshold
- ▶ LL Underload threshold

Function diagram



- ▶ P Actual true power
- ▶ U/I Analogue output signal, voltage or current

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Adjustable limit values for measuring ranges

Measuring range / RANGE		T	1 ^{*2}	2 ^{*2}	3 ^{*2}	4 ^{*2}	5	6	7	8	9	Type	
1 AC/DC	3 AC		P [kW]									I _M [A]	U _M [V]
0 ... 70	0 ... 120	*1	0,208	0,415	0,623	0,83	1,04	1,25	1,45	1,66	1,87	9	120
			0,415	0,83	1,25	1,66	2,08	2,5	2,91	3,32	3,74	18	
0 ... 140	0 ... 240		0,415	0,83	1,25	1,66	2,08	2,5	2,91	3,32	3,74	9	240
			0,83	1,66	2,5	3,32	4,15	4,5	5,8	6,65	7,5	18	
0 ... 240	0 ... 415		0,72	1,44	2,15	2,88	3,6	4,3	5,03	5,75	6,5	9	415
			1,44	2,87	4,3	5,75	7,19	8,6	10,0	11,5	13,0	18	
0 ... 320	0 ... 550		0,95	1,9	2,85	3,8	4,76	5,7	6,7	7,6	8,6	9	550
			1,9	3,8	5,7	7,6	9,5	11,4	13,34	15,24	17,15	18	

*1 Test: Function reserved

*2 Not suitable for DC measurements

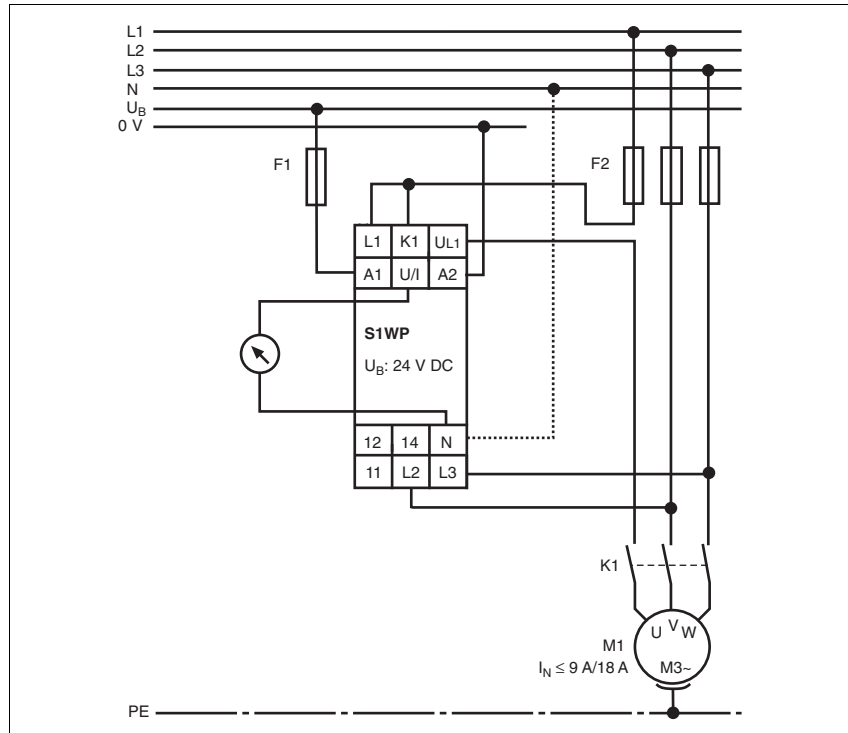
The information on U_M refers to the phase-to-phase voltage on the three phase supply (3AC). Where a single phase supply is used (1 AC), the voltage measuring range is reduced to:

$$U_{M(1AC)} = \frac{U_{M(3AC)}}{\sqrt{3}}$$

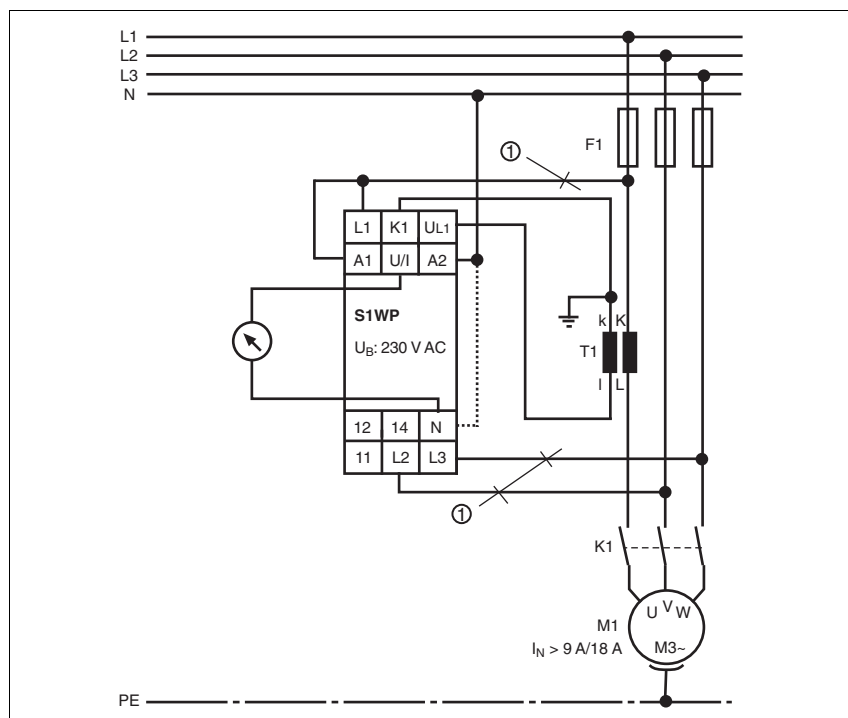
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Connection examples

- ▶ Example 1
Monitoring a three-phase motor, I_N
< 9 A/18 A

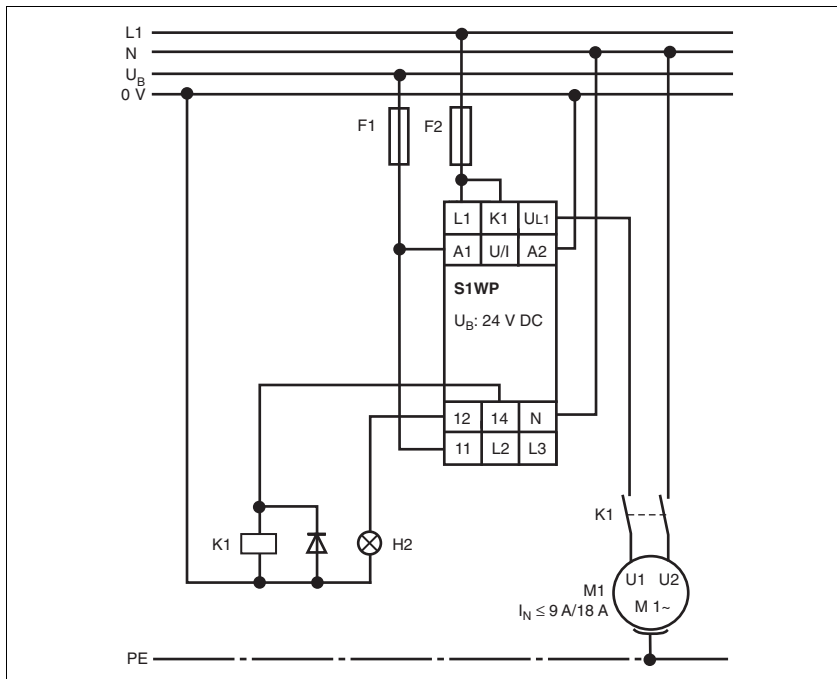


- ▶ Example 2
Monitoring a three-phase motor; I_N
> 9 A/18 A
1: Cable cross section max. 4 mm²

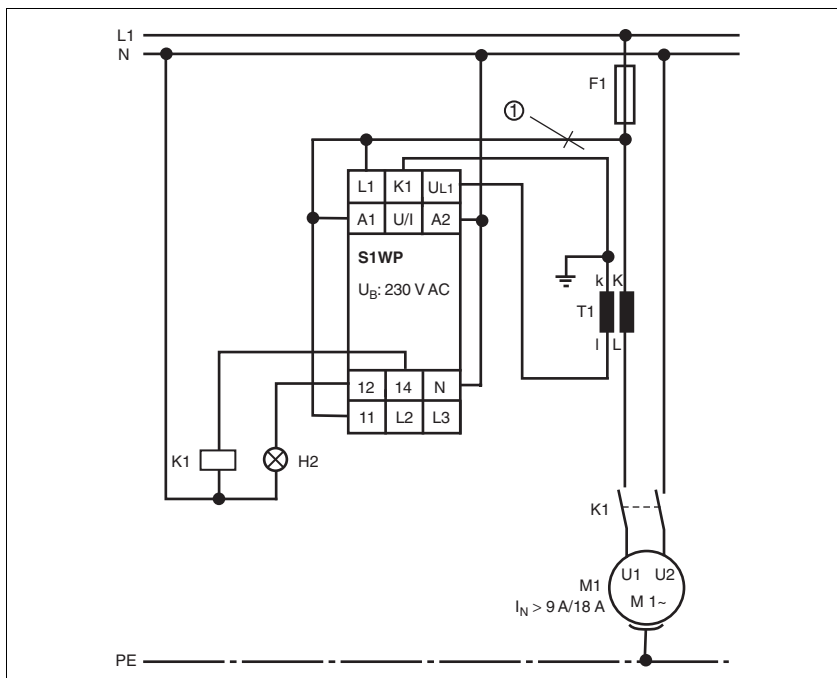


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- ▶ Example 3
Monitoring a single-phase motor,
 $I_N < 9\text{ A}/18\text{ A}$



- ▶ Example 4
Monitoring a single-phase motor; $I_N > 9\text{ A}/18\text{ A}$
1: Cable cross section max. 4 mm^2



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Technical details	S1WP
Electrical data	
Supply voltage	DC: 24 V AC/DC: 230 V
Tolerance	DC: 85 ... 125 % AC/DC: 25 ... 115 %
Frequency range	30 ... 400 Hz
Power consumption	DC: 2 W at U_B : 24 V AC: 5 VA at U_B : 230 V
Utilisation category in accordance with EN 60947-4-1	AC1: 240 V/0.1 ... 5 A/1200 VA DC1: 24 V/0.1 ... 5 A/120 W
EN 60947-5-1	AC15: 230 V/0.1 ... 1.8 A DC13: 24 V/0.1 ... 1.5 A
Output contacts	1 auxiliary contact (C/O)
Contact material	AgCdO, 3 μ m gold plating for low load range 1-50 V/1-100 mA
Contact fuse protection in accordance with EN 60947-5-1	Max. 6 A quick or max. 4 A slow
Analogue measuring output	Voltage: 0 ... \pm 10 V Current: +4 ... +20 mA
Analogue reaction time	60 ms
Linearity/switching accuracy	< \pm 2 %
Measuring circuit	
Measuring voltage	3 AC/DC: 0 ... 120, 0 ... 240, 0 ... 415, 0 ... 550 V 1 AC/DC: 0 ... 70, 0 ... 140, 0 ... 240, 0 ... 320 V
Frequency range	0 ... 1000 Hz
Adjustable limit values for measuring ranges	See table
Max. measuring current	22 A at 100 % duty cycle
Max. overload	45 A/max. 3 s
Response time	0,1 ... 20 s selectable
Start-up suppression time	0,1 ... 30 s selectable
Current transformer requirements	I = 1 A: 1,5 ... 7.5 VA, Class 3 I = 5 A: 2,5 ... 15 VA, Class 3
Environmental data	
EMC	EN 61000-6-2, EN 61000-6-4
Vibration in accordance with EN 60068-2-6	Frequency: 10 ... 55 Hz Amplitude: 0.35 mm
Climatic suitability	EN 60068-2-78
Airgap creepage in accordance with EN 60947-1	EN 60947-1
Pollution degree	2
Overvoltage category	III
Rated insulation voltage	300 V
Rated impulse withstand voltage	
Measuring circuit to remaining circuits	6.00 kV
Auxiliary contact to remaining circuits	4.00 kV
Ambient temperature	0 ... +55 °C
Storage temperature	-40 ... +85 °C
Mechanical data	
Cross section of external conductors	
1 core flexible	0.20 – 4.00 mm ² , 24 – 10 AWG
2 core with the same cross section, flexible with crimp connectors, no plastic sleeve	0.20 – 2.50 mm ² , 24 – 14 AWG
without crimp connectors or with TWIN crimp connectors	0.20 – 2.50 mm ² , 24 – 14 AWG
Torque setting for connection terminals	0.60 Nm (screws)
Mounting position	Any
Housing material	
Housing	PPO UL 94 V0
Front	ABS UL 94 V0

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Mechanical data	
Protection types	Mounting: IP54 Housing: IP40 Terminals: IP20
Dimensions (H x W x D)	87 x 22.5 x 121 mm
Weight	150 g

Order reference				
Type	U_B	U_M	I_M	Order no.
S1WP	24 VDC	0 - 120 VAC/DC	9 A	890 000
S1WP	24 VDC	0 - 240 VAC/DC	9 A	890 010
S1WP	24 VDC	0 - 415 VAC/DC	9 A	890 020
S1WP	24 VDC	0 - 550 VAC/DC	9 A	890 030
S1WP	230 VAC/DC	0 - 120 VAC/DC	9 A	890 040
S1WP	230 VAC/DC	0 - 240 VAC/DC	9 A	890 050
S1WP	230 VAC/DC	0 - 415 VAC/DC	9 A	890 060
S1WP	230 VAC/DC	0 - 550 VAC/DC	9 A	890 070
S1WP	24 VDC	0 - 120 VAC/DC	18 A	890 100
S1WP	24 VDC	0 - 240 VAC/DC	18 A	890 110
S1WP	24 VDC	0 - 415 VAC/DC	18 A	890 120
S1WP	24 VDC	0 - 550 VAC/DC	18 A	890 130
S1WP	230 VAC/DC	0 - 120 VAC/DC	18 A	890 140
S1WP	230 VAC/DC	0 - 240 VAC/DC	18 A	890 150
S1WP	230 VAC/DC	0 - 415 VAC/DC	18 A	890 160
S1WP	230 VAC/DC	0 - 550 VAC/DC	18 A	890 170

U_B : Supply voltage

U_M : Measuring voltage

I_M : Measuring current