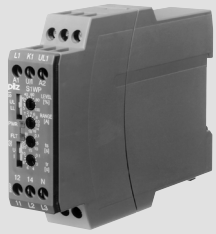
True power monitoring
S1WP



True power monitor for single and 3-phase networks used to measure and monitor therated power and true power on electrical machines

Features

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

Approvals

	S1WP
c UL us LISTED	●
CCC	●

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
Switching capability to EN 60947-4-1, 10/91 EN 60947-5-1, 10/91	 AC 1: 240 V/0.1 ... 5 A/1200 VA DC1: 24 V/0.1 ... 5 A/120 W 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 µm gold plating for low-load range 1-50 V/1-100 mA
Contact fuse protection to EN 60947-5-1, 10/91	6 A quick or 4 A slow
Analogue measuring output	Voltage: 0 ... ±10 V Current: +4 ... + 20 mA
Analogue reaction time	60 ms
Linearity/switching accuracy	< ±2 %
Measuring circuit	
Measuring voltage	3AC/1AC/DC: 0 ... 120, 0 ... 240, 0 ... 415, 0 ... 550 V
Frequency range	0 ... 1000 Hz
Adjustable measuring range limits	See table
Max. measuring current	22 A with 100 % continuous duty
Max. overload	45 A/max. 3 s
Reaction time for monitoring	UL: 0.1 ... 20 s (adjustable)
Start-up suppression time	0.1 ... 30 s (adjustable)
Requirements for current transformer	I = 1 A: 1,5 ... 7.5 VA, Class 3 I = 5 A: 2,5 ... 15 VA, Class 3
Environmental data	
Ambient temperature	0 ... +55 °C
Mechanical data	
Max. cross section of external conductor	1 x 4 mm² or 2 x 1.5 mm² Single-core or multi-core with crimp connector
Dimensions (H x W x D)	87 x 22.5 x 122 mm
Weight	DC: 130 g, AC: 150 g

Description

The true power monitor is enclosed in an S-95 22.5 mm slimline housing. There are 4 voltage measuring ranges. For each measuring range there are 4 versions available, determined by measuring current and control voltage.

Features:
- Relay output: 1 auxiliary contact (C/O)
- Versions for 9 A and 18 A current measuring ranges
- Fast analogue reaction time
- Adjustable switching threshold for underload or overload from 5 to 100 % of the measuring range limit

(Continued on next page)

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

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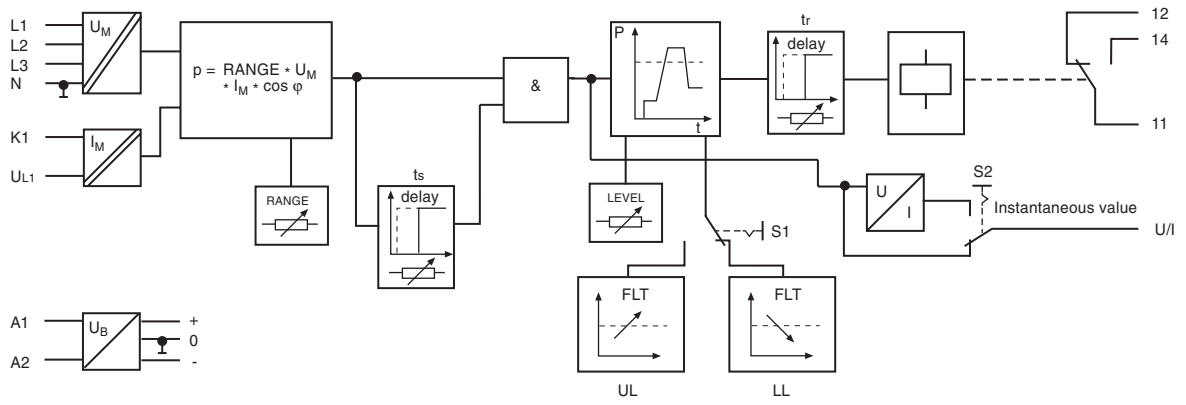
- Switching hysteresis of 15 %
- Adjustable monitoring reaction time
- Adjustable start-up suppression time
- LEDs for supply voltage and switching status of underload and overload auxiliary contacts

The S1WP monitors the set upper and lower true power threshold levels in a single or 3-phase network. It converts the true power or rated power on a motor or generator into an analogue signal output, which is proportional to true power. The status of threshold monitoring, together with the analogue signal output, is indicated by a relay output.

The S1WP operates in normally energised mode, which means in its initial state the contact 11-14 is closed and 11-12 is open. If normally de-energised mode is required, the function of the upper and lower threshold is inverted.
If the measured true power exceeds the switching threshold when set to overload (UL), the auxiliary contact switches position and the LED “FLT” LED is lit. If the measured true power falls below the switching threshold when set to underload (LL), the auxiliary contact switches position and the LED “FLT” LED is lit.
To avoid spurious output signals during the start-up phase, measurement is suppressed.
Start-up suppression time t_s can be set. Transient load fluctuations which exceed the switching threshold can be suppressed and the reaction time t_r can be set.

Block diagram



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

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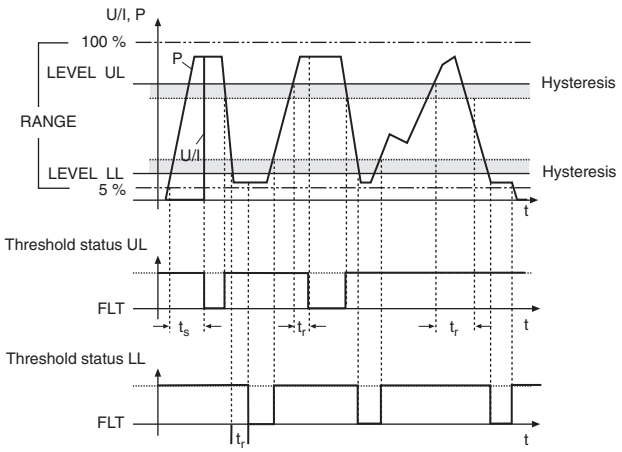
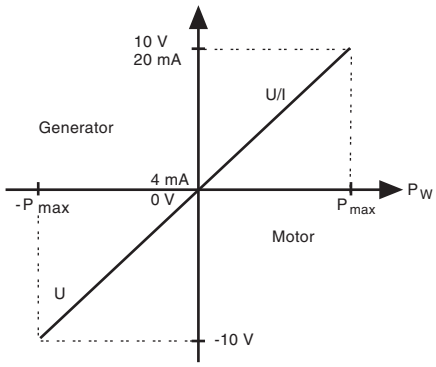
Pulse diagram





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

Adjustable measuring range limits P
if used in three-phase network

Meas. range [V] \ RANGE		T	1	2	3	4	5	6	7	8	9	Version	
1 AC/DC	3 AC		P [kW]									I_M [A]	U_M [V]
0 ... 70	0 ... 120	TEST (reserved function)	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	

The variable U_M refers to the phase-to-phase voltage in the three-phase network (3AC).
With single-phase networks (1 AC), the voltage measuring range drops to

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

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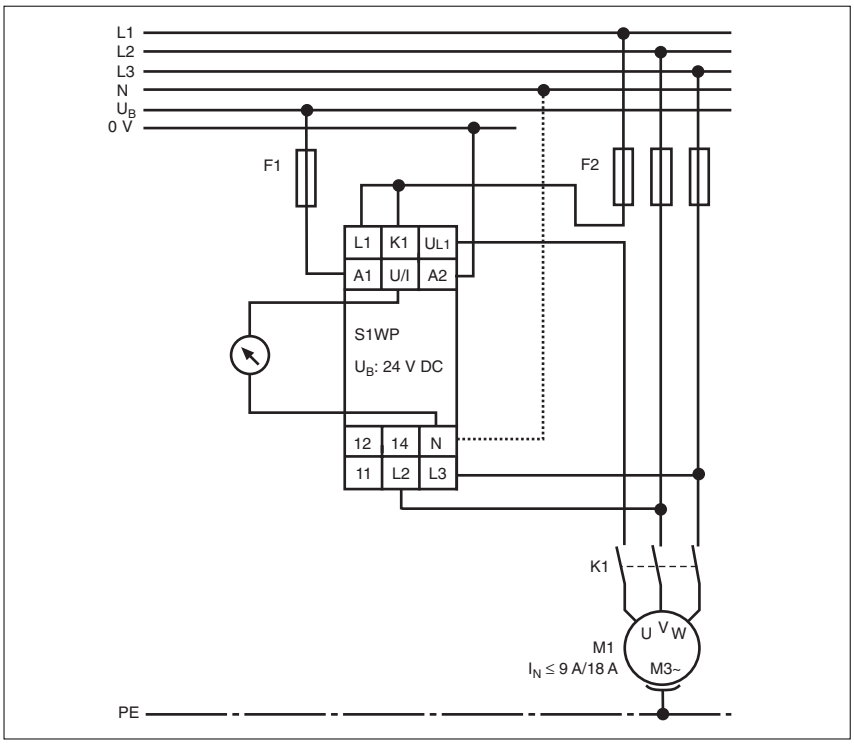
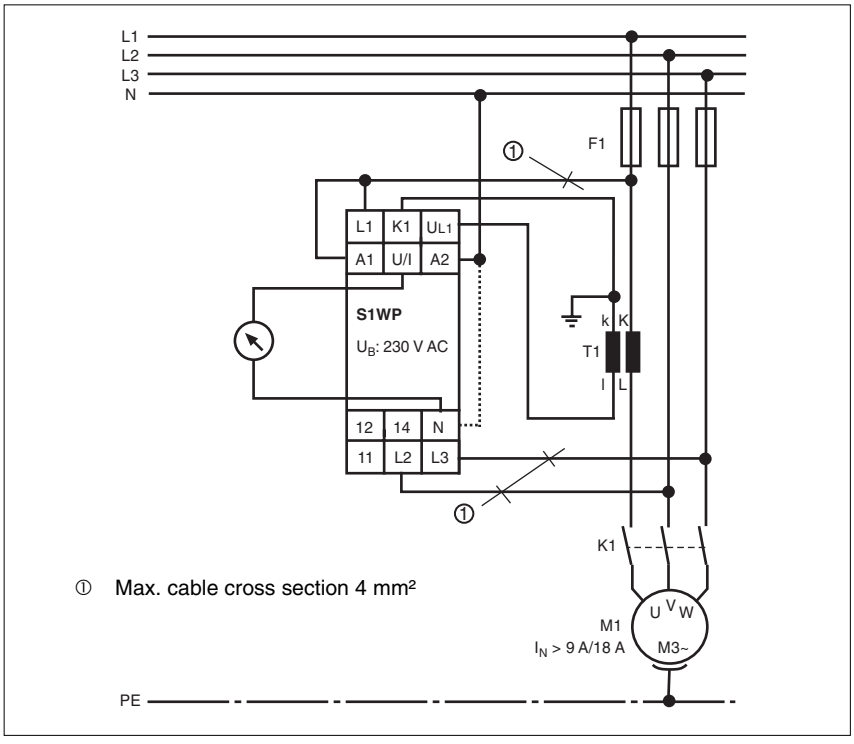
Connection examples

● Example 1
Monitoring a three-phase AC motor, $I_N \leq 9$ A/18 A



● Example 2
Monitoring a three-phase AC motor; $I_N > 9$ A/18 A



① Max. cable cross section 4 mm²

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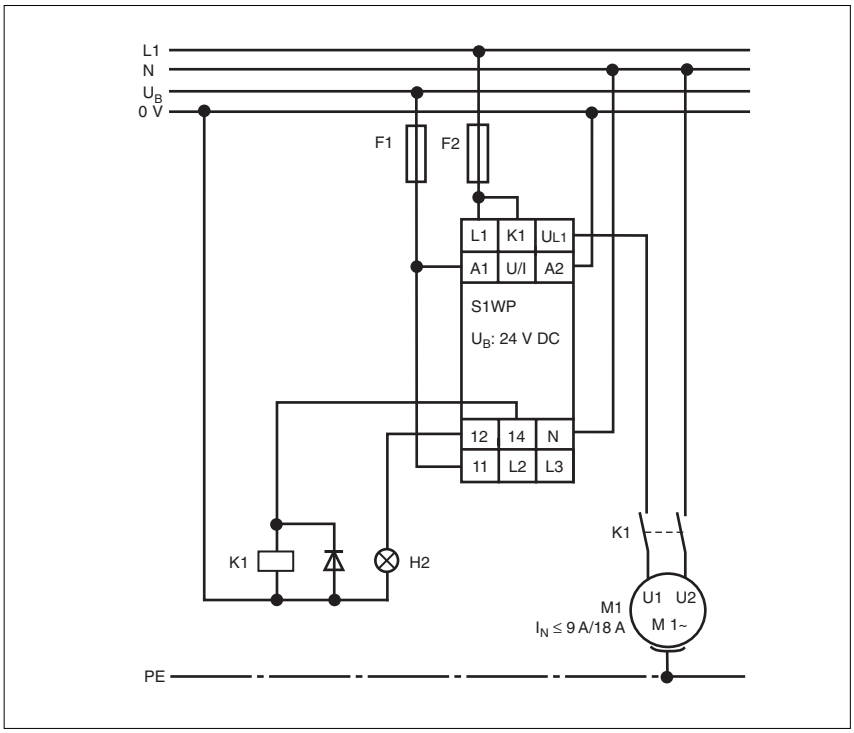
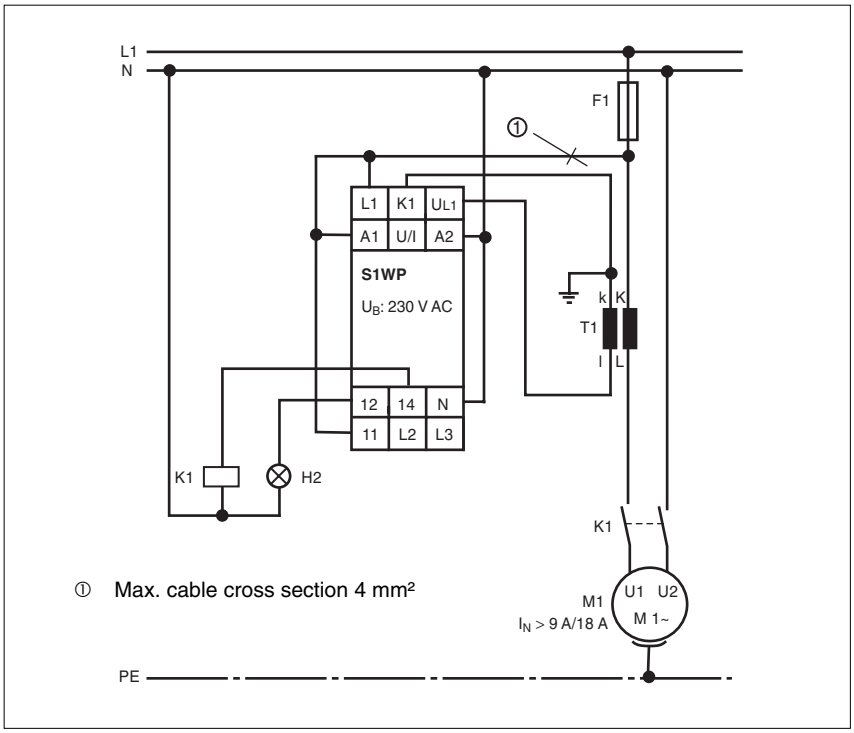
● Example 3
Monitoring a single-phase motor, $I_N \leq 9$ A/18 A



● Example 4
Monitoring a single-phase motor; $I_N > 9$ A/18 A



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more than automation
safe automation

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General technical details

Unless stated otherwise in the technical details for the specific unit.

Electrical data	
Frequency range AC	50 ... 60 Hz
Residual ripple DC	160 %
Contact material	AgCdO
Continuous duty	100 %
Environmental data	
EMC	EN 50081-1, 01/92; EN 50082-2, 03/95
Vibration in accordance with EN 60068-2-6, 04/95	Frequency: 10 ... 55 Hz, Amplitude: 0.35 mm
Climatic suitability	IEC 60068-2-3, 1969
Airgap creepage	DIN VDE 0110-1, 04/97
Ambient temperature	-10 ... +55 °C
Storage temperature	-40 ... +85 °C
Mechanical data	
Torque setting for connection terminals	0.6 Nm (screws)
Mounting position	Any
Housing material	Thermoplastic Noryl SE 100
Protection types	Mounting: IP 54 Housing: IP 40 Terminals: IP 20

Order references key

I_M Measuring current
U_B Control voltage
U_M Measuring voltage

Order references

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

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