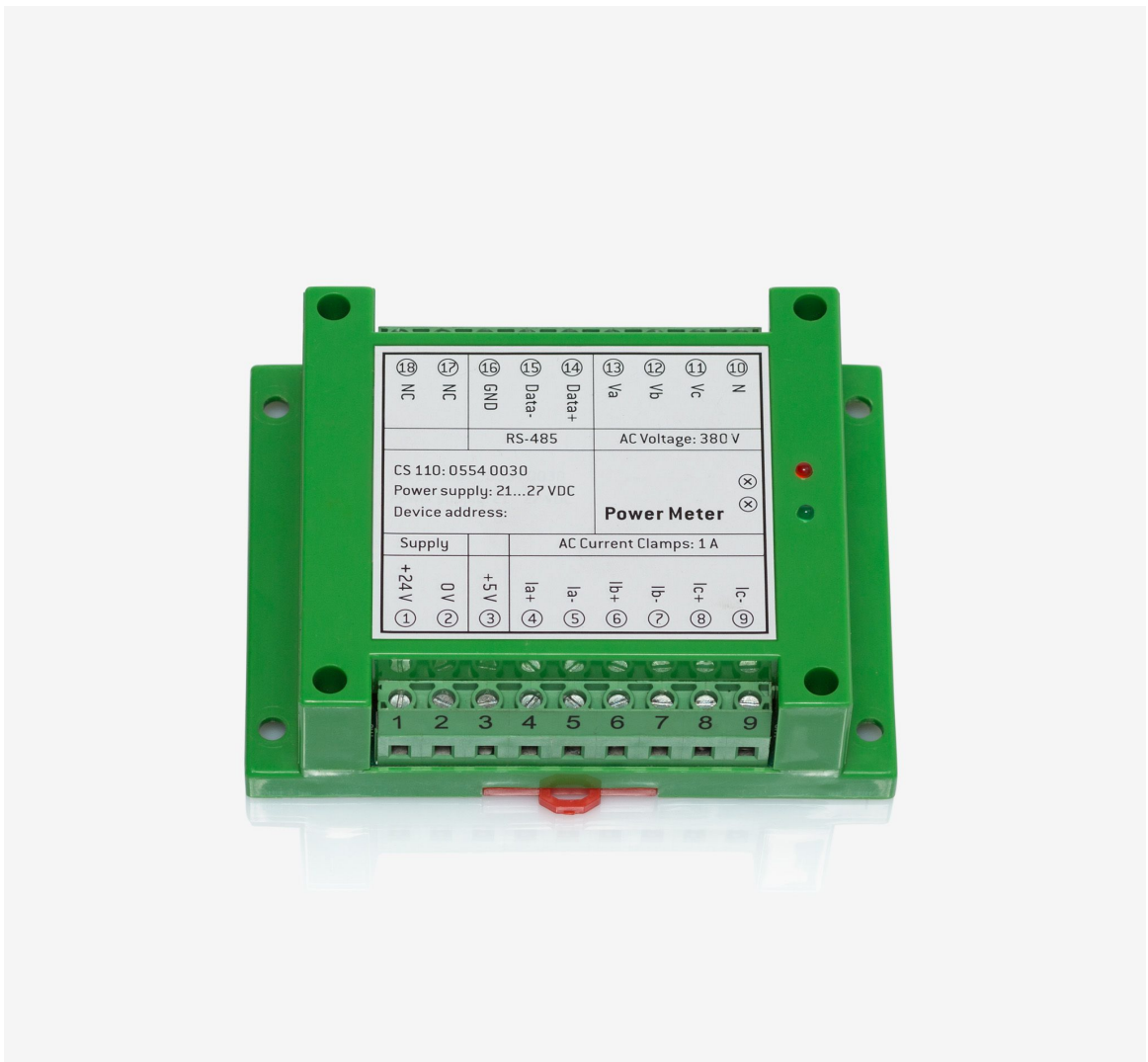


Instruction and operation manual

S 110

Power Meter



Dear Customer,
thank you for choosing our product.

The operating instructions must be read in full and carefully observed before starting up the device. The manufacturer cannot be held liable for any damage which occurs as a result of non-observance or non-compliance with this manual.

Should the device be tampered with in any manner other than a procedure which is described and specified in the manual, the warranty is cancelled and the manufacturer is exempt from liability.

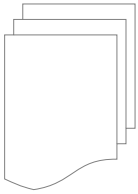
The device is destined exclusively for the described application.

SUTO offers no guarantee for the suitability for any other purpose. SUTO is also not liable for consequential damage resulting from the delivery, capability or use of this device.

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1. Safety instructions



Please check if this instruction manual accords to the product type.

Please observe all notes and instructions indicated in this manual. It contains essential information which have to be observed before and during installation, operation and maintenance. Therefore this instruction manual has to be read carefully by the technician as well as by the responsible user / qualified personnel.

This instruction manual has to be available at the operation site of the power meter at any time. In case of any obscurities or questions, regarding this manual or the product, please contact the manufacturer.

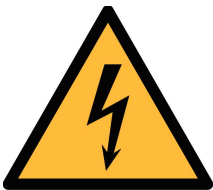


WARNING!

Compressed air!

Any contact with quickly escaping air or bursting parts of the compressed air system can lead to serious injuries or even death!

- Only use pressure tight installation material.
- Avoid that persons get hit escaping air or bursting parts of the instrument.
- The system must be pressureless during maintenance work.



WARNING!

Voltage used for supply!

Any contact with energized parts of the product, may lead to a electrical shock which can lead to serious injuries or even death!

- Consider all regulations for electrical installations.
- The system must be disconnected from any power supply during maintenance work.
- Any electrical work on the system is only allowed by authorized qualified personal.

**WARNING!****Permitted operating parameters!**

Observe the permitted operating parameters, any operation exceeding this parameters can lead to malfunctions and may lead to damage on the instrument or the system.

- Do not exceed the permitted operating parameters.
- Make sure the product is operated in its permitted limitations.
- Do not exceed or undercut the permitted storage and operation temperature and pressure.
- The product should be maintained frequently, at least annually.

General safety instructions

- It is not allowed to use the product in explosive areas.
- Please observe the national regulations before/during installation and operation.

Remarks

- It is not allowed to disassemble the product.
- Always use spanner to mount the product properly.

**ATTENTION!**

Measurement values can be affected by malfunction!

The product must be installed properly and frequently maintained, otherwise it may lead to wrong measurement values, which can lead to wrong results.

Storage and transportation

- Make sure that the transportation temperature of device is between -30°C... 70°C.
- For transportation it is recommended to use the packaging which comes with the device.
- Please make sure that the storage temperature of the device is between -10°C... 50°C.
- Avoid direct UV and solar radiation during storage.
- For the storage the humidity has to be <90%, no condensation.

2. Application

The power meter is designed to measure the actual power consumption in kW and accumulates the energy consumption in kWh of a 3-phase load. Additionally other measured parameters such as current, voltage, cos phi etc. are available as well.

3. Features

- Measures active and reactive power, frequency, voltage currents power factor.
- Accumulates active energy [kWh].
- 3 phases 3-wire measurement as well as 3 phase 4- wire.
- Modbus / RTU output to other sensors.

4. Technical Data

4.1 General

CE	
Parameters	Standard unit consumption: kWh other parameters:
Nominal voltage (L-N, L-L)	277 VAC / 480 VAC
Power range	Up to 690 kW (depending on the current clamp)
Frequency range	45 Hz... 65 Hz
Available clamp sensors	200 A, 500 A, 1000 A
Operating temperature	-5°C... 55°C
Housing material	PC + ABS
Protection class	IP65 (wall casing)
Dimensions	Hat rail version: 110 mm x 90 mm x 31mm Wall version: 190 mm x 155 mm x 85 mm Portable: 177 mm x 177 mm x 60 mm
Weight	0,8 kg (with wall casing)

4.2 Electrical Data

Power supply	24 VDC / 0.5 W
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4.3 Input-Signals

Clamp sensor	0... 100 mA
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4.4 Output-Signals

Modbus output	See chapter
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4.5 Accuracy

Accuracy	Voltage: 0.2 % Current: 0.5 % Clamp: class 1 Energy: class 0.5
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5. Dimensional drawing

Please insert the drawing.

6. Determination of the installation point

It is possible to install the power meter directly into the connection box on the compressor or into the connection cabinet where the power supply for the compressor is coming from. If no hat rail mounting is available, there is also a wall mountable version of the power meter.

7. Installation

Please make sure that all components listed below are included in your package.

Qty	Description
1	Power meter
1	Instruction manual

7.1 Installation Requirements

There are three types of power meters:

- S 110 hat rail mountable

- S 110-W in wall mountable casing
- S 110-P Portable power meter, for this please see instruction manual S 110-P

**ATTENTION!**

Wrong measurement is possible, if the device is not installed correctly.

- The device is for indoor use only! At an outdoor installation, the device must be protected from solar radiation and rain.
- It is strongly recommend not to install S 110 permanently in wet environment as it exists usually right after a compressor outlet.

7.2 Installation Procedure

Installation of the S 110 hat rail mountable

The S 110 hat rail mountable is installed directly into the connection box of the compressor. For the electrical connection please see chapter 7.3

Installation of the S 110-W in wall mountable casing

The S 110-W has a wall mountable casing. The housing of the S 110-W must be fixed on the wall using suitable dowels and screws.

7.3 Electrical connection

The portable power meter S 110 is connected to the S 330 / 331. For the electrical installation please observe the following instructions.

⑮	⑰	⑯	⑱	⑲	⑳	㉑	㉒	㉓	㉔
NC	NC	GND	Data-	Data+	Va	Vb	Vc	N	
		RS-485			AC Voltage: 380 V				
S 110: 0554 0030					 Power Meter				
Power supply: 21...27 VDC									
Device address:									
Supply		AC Current Clamps: 1 A							
+24 V	0 V	+5 V	Ia+	Ia-	Ib+	Ib-	Ic+	Ic-	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	

On the left side the connecting diagram of the S 110 is shown. Please observe the instructions in the following chapter for an adequate installation.

7.3.1 Connection to S 330 / 331

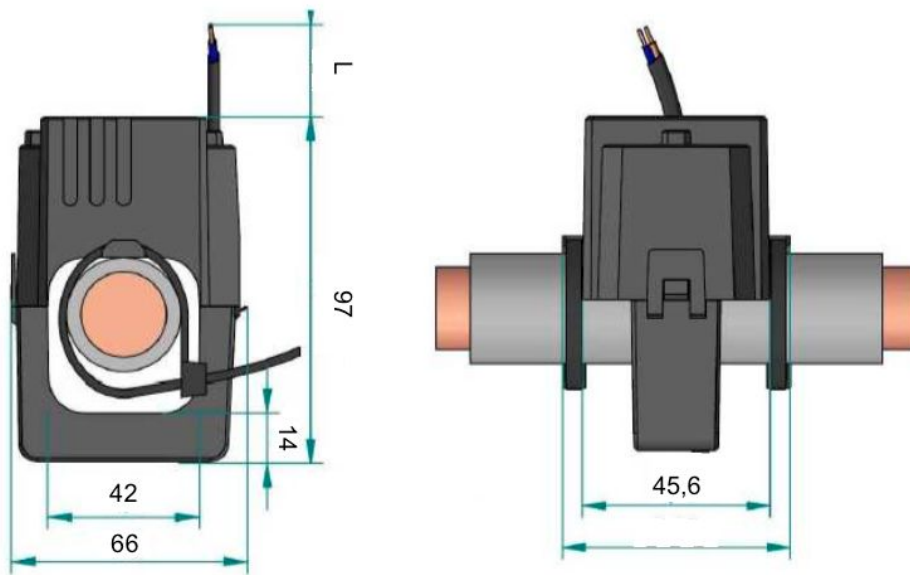
S 330 / 331			S 110	
Terminal	Pin	Signal	Signal	Pin
A	3	+ Vb	+ 24 V	1
	2	- Vb	0 V	2
	4	+ D	+ Data	14
	5	- D	- Data	15
	6	GND	GND	16

S 330 / 331			S 110	
Terminal	Pin	Signal	Signal	Pin
B	3	+ Vb	+ 24 V	1
	2	- Vb	0 V	2
	4	+ D	+ Data	14
	5	- D	- Data	15
	6	GND	GND	16

7.3.2 Connection to the current clamps (CT)

Please observe the following steps to connect the CT.

1. Place the CT's around the isolated conductor. If the conductor is too small, use a fastener to fix the Ct as indicated in the picture below.



2. Observe the right orientation on the Ct (current flow arrow on CT points to the consumer load side).
3. Connect the red colour wire to the (+I) terminal and the blue colour on the (-I) terminal.

CT		S 110	
Conductor	Colour	Signal	Pin
L1	red	+ I _a	4
	blue	- I _a	5
L2	red	+ I _b	6
	blue	- I _b	7
L3	red	+ I _c	8
	blue	- I _c	9

18	17	16	15	14	13	12	11	10
NC	NC	GND	Data-	Data+	V _a	V _b	V _c	N
RS-485					AC Voltage: 380 V			
S 110: 0554 0030					<div style="text-align: right;"> ⊗ ⊗ </div> Power Meter			
Power supply: 21...27 VDC								
Device address:								
Supply		AC Current Clamps: 1 A						
+24 V	0 V	+5 V	I _a +	I _a -	I _b +	I _b -	I _c +	I _c -
1	2	3	4	5	6	7	8	9

7.3.3 Connection to the Voltage leads

Connect the voltage leads (L1, L2, L3 and N) to the 3 phase conductors. Connect N if a 4-wire connection is required.

CT	S 110	
Conductor	Signal	Pin
L1	V _a	13
L2	V _b	12

L3	V _c	11
N	N	10

8. Signal outputs

The S 110 has a modbus / RTU output to S 330 / 331 for this please see chapter 7.3.1 Connection to S 330 / 331.

9. Optional extra accessories

The following extra accessories are available:

- Current clamp sensor, 1.8 m cable, 200 / 1 A, for consumption up to 138 kW*
- Current clamp sensor, 1.8 m cable, 500 / 1 A, for consumption up to 346 kW*
- Current clamp sensor, 1.8 m cable, 1000 / 1 A, for consumption up to 693 kW*

* Note: For 3 phases power supply 3 current clamp sensors are needed (at 400 VAC).

10. Maintenance

To clean the service kit it is recommended to use moist cloth only.



ATTENTION!

Do not use isopropyl alcohol to clean the power meter!

11. Disposal or waste

Electronic devices are recyclable material and do not belong in the household waste.

The power meter, the accessories and its packings must be disposed according to your local statutory requirements. The dispose can also be carried by the manufacturer of the product, for this please contact the manufacturer.

12. Warranty

SUTO provides a warranty for this product of 24 months covering the material and workmanship under the stated operating conditions from

the date of delivery. Please report any findings immediately and within the warranty time. If faults occurring during the warranty time SUTO will repair or replace the defective unit, without charge for labour and material costs but there is a charge for other service such as transport and packing costs.

Excluded from this warranty is:

- Damage caused by:
 - Improper use and non-adherence to the instruction manual.
 - Use of unsuitable accessories.
 - External influences (e.g. damage caused by vibration, damage during transportation, excess heat or moisture).

The warranty is cancelled:

- If the user opens the measurement instrument without a direct request written in this instruction manual.
- If repairs or modifications are undertaken by third parties or unauthorised persons.
- If the serial number has been changed, damaged or removed.

Other claims, especially those for damage occurring outside the instrument are not included unless responsibility is legally binding.

Warranty repairs do not extend the period of warranty.



ATTENTION!

Batteries have a reduced warranty time of 12 month.

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