WISE AIR 4.0
MEASURE TO MANAGE

USER MANUAL · 2026 EDITION

WAPM-401

Handheld Power Meter



Class 0.5S
Active energy

100–6000 A
Flexible coil ranges

SD card
CSV data logging

4 × AA
Approx. 7 h battery

INSTALLATION · OPERATION · CONFIGURATION · MAINTENANCE

WISEAIR TECHNOLOGIES INDIA LLP

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CONTENTS

Inside this manual

01	Safety and general information	03
02	Product overview	03
03	Measured values	04
04	What's in the box	06
05	Technical specifications	07
06	Connections	09
07	Connecting to the installation	10
08	Wiring diagrams	11
09	Display, keys and configuration	12
10	Data recording	13
11	Maintenance and calibration	13
12	Troubleshooting	14
13	Warranty and service	14
14	Measurement record	15

ABOUT WISEAIR

WiseAir Technologies India LLP designs and supplies smart measurement instruments for compressed air and industrial gases — flow, dew point, pressure and power sensors, data loggers, smart drains and leak detection tools. Every WiseAir product is built to make compressed-air energy use **visible, measurable and manageable**.

WiseAir sensors work on their own or as part of the **WiseAir WASM-604 Smart Monitoring platform**, which collects data over Modbus / 4–20 mA, analyses it and reports energy, demand and leakage in real time.

DOCUMENT

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01 Safety and general information

Read this manual fully before you use the WAPM-401 handheld power meter. Keep it with the meter and make it available to everyone who uses the instrument.

The WAPM-401 is a portable instrument for temporary measurement and recording of electrical quantities (voltage, current, power, energy, power factor, demand and harmonics) on low-voltage AC installations, within the limits given in the technical specifications. WiseAir is not liable for damage caused by failure to follow this manual. Opening or modifying the meter cancels the warranty.

ELECTRICAL HAZARD — LIVE CONDUCTORS

- Only qualified, authorised electricians may connect the meter to an installation, in line with local electrical regulations.
- Isolate and lock off the supply before you fit the current coils and voltage clips, wherever possible. Where work near live parts cannot be avoided, use insulated tools and suitable personal protective equipment.
- Never connect a conventional 1 A / 5 A current transformer to the current inputs. Use only flexible current coils or CTs with a voltage output of maximum 333 mV rms.
- Do not use the meter on systems above its overvoltage category rating: CAT III, distribution systems up to 277/480 V AC.
- Check the voltage leads, clips and coils for damage before each use. Do not use damaged accessories.

Operating limits

- Do not exceed the voltage, input signal or power-supply limits given in the specifications.
- Do not use the meter in explosive (hazardous) areas.
- Do not use the meter in wet conditions or where condensation can form. The meter has IP20 protection only.

Storage and transport

Storage temperature	−40 °C to +85 °C
Humidity	5–95 % RH at 50 °C, non-condensing
Handling	Store and transport in the original packaging. Remove the batteries before long storage. Do not kink or crush the current coils.

02 Product overview

The WiseAir WAPM-401 is a battery-powered, handheld poly-phase power meter with a 3.5" colour TFT display. It measures true-RMS voltage and current per phase, active, reactive and apparent power, power factor, frequency, energy, demand and harmonics up to the 52nd order. Currents are measured with flexible current coils or 333 mV voltage-output CTs, so the meter can be connected to existing cables without breaking the circuit.

The meter records the main values to a micro SD card in CSV format. To evaluate the data, remove the card and copy the files to a PC.

COMPRESSED-AIR ENERGY AUDITS

Use the WAPM-401 together with a WiseAir flow meter to measure the input power and energy of a compressor during an audit. This gives the specific power (kW per Nm^3/min) and the real cost of compressed air.

Measure

U, I, P, Q, S, PF, frequency, energy (kWh, kvarh, kVAh), demand, THD and selected harmonics.

Record

CSV logging to micro SD card, interval 1–9999 s (default 60 s); about 2 years of 1-minute data on 1 GB.

Portable

4 × AA batteries (approx. 7 h) or 9 V DC mains adaptor; BNC current inputs and banana-plug voltage inputs.

Supported networks

Setting	Network
3PH4W	Three-phase, four-wire (L1, L2, L3, N)
3PH3W	Three-phase, three-wire (L1, L2, L3)
1PH2W L-N	Single-phase, two-wire, line–neutral
1PH2W L-L	Single-phase, two-wire, line–line
1PH3W L-L-N	Single-phase, three-wire, line–line–neutral

03 Measured values

Real-time values

Quantity	Values provided
Current	Per phase, neutral, and average of 3 phases
Voltage	L-L, L-N, and average of 3 phases
Frequency	45–65 Hz
Active power	Total and per phase (signed)
Reactive power	Total and per phase (signed)
Apparent power	Total and per phase
Power factor (true)	Total and per phase, 0.000 to 1 (signed)
Current unbalance	Per phase; most unbalanced of 3 phases
Voltage unbalance	Most unbalanced of 3 phases

Minimum and maximum values

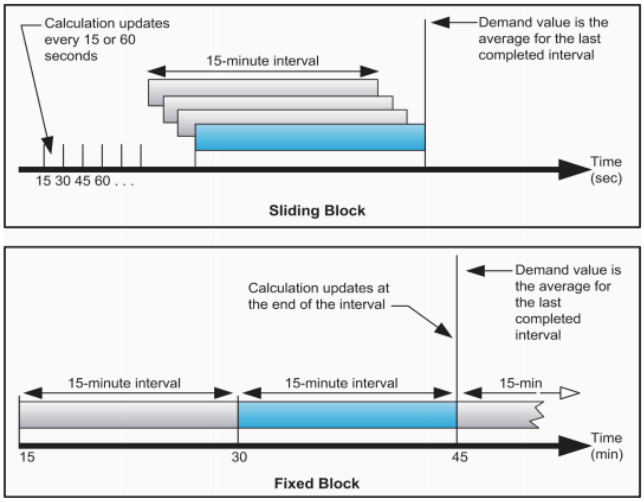
When a one-second real-time reading reaches a new highest or lowest value, the meter saves it with a time stamp in non-volatile memory. Min./max. values are kept for current and voltage (per phase and average) and for active, reactive and apparent power (per phase and total). On the display you can view all min./max. values since the last reset, with the reset date and time, and reset them.

Demand and peak demand

The meter calculates demand for current (per phase and average) and for active, reactive and apparent power (per phase and total). Power demand is the energy accumulated during an interval divided by the length of the interval. Current demand is the arithmetical integration of the RMS current over the interval, divided by its length. The meter uses block-interval calculation, as used for utility billing, in one of two modes:

- **Fixed block** — interval 1 to 60 min, in 1-minute steps. The demand is calculated and updated at the end of each interval.
- **Sliding block** — interval 1 to 60 min, in 1-minute steps. For intervals shorter than 15 min, the value is updated every 15 s; for intervals of 15 min and longer, every 60 s. The display shows the demand for the last completed interval.

Peak demand is the highest demand value (absolute value) since the last reset, kept in non-volatile memory. Reset peak demand from the display after any change to the basic setup, such as the network type.



Sliding-block and fixed-block demand, 15-minute interval

Energy

The meter calculates and stores per-phase and total values of active, reactive and apparent energy. The display unit changes automatically (kWh → MWh → GWh; kvarh → Mvarh → Gvarh; kVAh → MVAh → GVAh). Each counter runs from 0 to 999.9 GWh / Gvarh / GVAh and resets automatically to 0 when it passes this limit.

Power quality

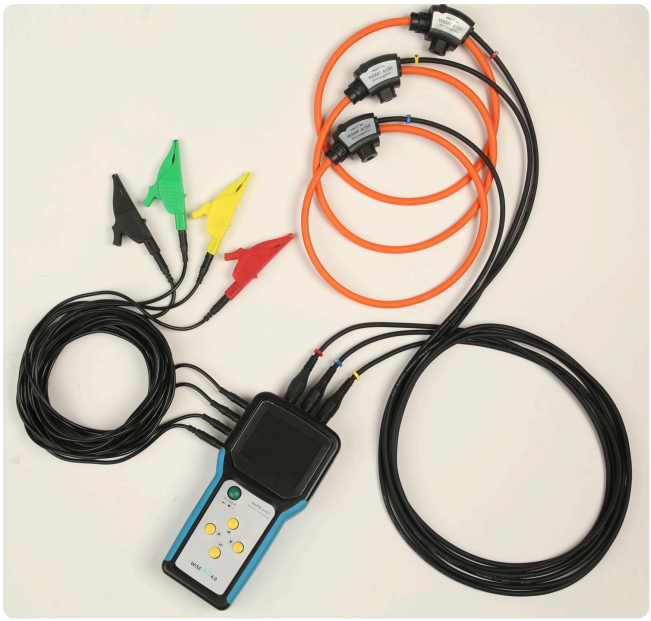
Total harmonic distortion (THD) is the ratio of the harmonic content to the fundamental. It indicates the quality of the waveform and is calculated per phase for voltage and current:

$$THD(I) = \sqrt{(I^2 - I1^2)} / I1 \qquad THD(U) = \sqrt{(U^2 - U1^2)} / U1$$

$$HD(Ix) = Ix / I1 \qquad HD(Ux) = Ux / U1 \qquad x = 2, 3 \ldots N$$

I and U are the total RMS values, I1 and U1 the fundamental RMS values, and Ix and Ux the RMS values of harmonic order x. Besides THD, the meter shows the individual harmonic content of five selectable harmonic orders (Set → Harmonic).

04 What's in the box



WAPM-401 with voltage leads and flexible current coils (coils ordered separately)

1. WAPM-401 handheld power meter
2. Voltage leads with banana plugs and clamps — 4 pcs, 2 m, 1.5 mm²
3. Mains adaptor, 85–265 V AC to 9 V DC
4. Micro SD card, 1 GB
5. User manual

NOTE

Flexible current coils and AA batteries are **not included**. Order coils with a rated current that suits your loads (100 A to 6000 A, see Technical specifications). Check the rating on the coils before use.

05 Technical specifications

MEASUREMENT

Networks	3PH4W, 3PH3W, 1PH2W (L-N), 1PH2W (L-L), 1PH3W (L-L-N)
Voltage	100–500 V AC (accuracy range)
Frequency	45–65 Hz
Current inputs	3 × flexible current coil or 333 mV voltage-output CT
Coil rated current (selectable)	100 A, 600 A, 1000 A, 3000 A, 6000 A
CT primary current	0.1–9999 A (settable)
CT secondary	Settable up to 333 mV
Maximum input signal	333 mV rms
Permissible overload	600 mV for 10 s
Sampling rate	8,000 samples/s
Harmonics	Up to 52nd order; 5 selectable orders shown

ACCURACY

Current	±0.5 % (see rated current table)
Voltage	±0.2 % from 100 V to 500 V
Frequency	±0.01 % (45–65 Hz)
Power factor	±0.005
Active / apparent power	Class 0.5
Active energy	Class 0.5S (IEC 62053-22)
Reactive power and energy	Class 2 (IEC 62053-23)

DISPLAY AND RECORDING

Display	3.5" colour TFT
Data storage	Micro SD card, 1 GB supplied
Recording interval	1–9999 s (default 60 s)
File format	CSV
Capacity	About 1 kB per record; approx. 2 years at 60 s on 1 GB

POWER SUPPLY

Batteries	4 × AA (not supplied), approx. 7 h operation
External supply	5–9 V DC; 9 V DC adaptor (85–265 V AC input) supplied
Power consumption	1.1 W with backlight on; 0.9 W with backlight off

CONNECTIONS AND MECHANICAL

Current inputs	BNC connectors
Voltage inputs	Banana sockets
DC supply	DC plug 5.5 × 2.1 mm
Dimensions (L × W × D)	215 × 100 × 35 mm
Weight	350 g

ENVIRONMENT AND SAFETY	
Operating temperature	−25 °C to +55 °C
Storage temperature	−40 °C to +85 °C
Humidity	5–95 % RH at 50 °C, non-condensing
Altitude	Max. 3000 m
Pollution degree	2
Overvoltage category	CAT III, for distribution systems up to 277/480 V AC
Insulation	Double insulated, IEC 61010-1
Protection	IP20 (IEC 60529)

EMC AND STANDARDS	
Electrostatic discharge	Level IV (IEC 61000-4-2)
Radiated immunity	Level III (IEC 61000-4-3)
Fast transients	Level IV (IEC 61000-4-4)
Surge	Level IV (IEC 61000-4-5)
Conducted immunity	Level III (IEC 61000-4-6)
Power-frequency magnetic field	0.5 mT (IEC 61000-4-8)
Emissions	Class B (EN 55022)
Product standards	EN 62052-11, EN 61557-12, EN 62053-21/-22/-23, EN 50470-1/-3, EN 61010-1, EN 61010-031

Coil rated current and ±0.5 % accuracy band

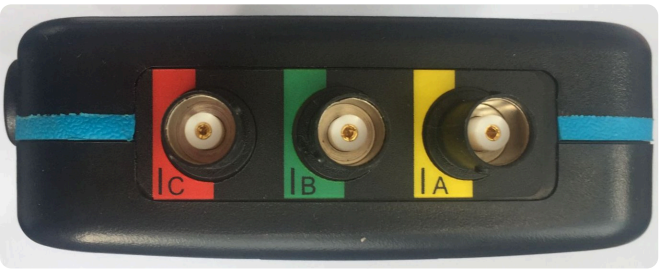
Rated current setting	±0.5 % accuracy band
100 A	10 A to 120 A
600 A	10 A to 720 A
1000 A	10 A to 1200 A
3000 A	30 A to 3600 A
6000 A	60 A to 7200 A

Set the rated current that matches the coil connected (Set → Ratio). Contact WiseAir support for the coil that suits each rating.

06 Connections

Port assignment

No.	Port	Function	Group
1	IA	Phase A current input	Current inputs (BNC)
2	IB	Phase B current input	Current inputs (BNC)
3	IC	Phase C current input	Current inputs (BNC)
4	UN	Neutral voltage input	Voltage inputs (banana)
5	UC	Phase C voltage input	Voltage inputs (banana)
6	UB	Phase B voltage input	Voltage inputs (banana)
7	UA	Phase A voltage input	Voltage inputs (banana)
8	POWER	External supply 5–9 V DC	Power
9	Micro SD	SD card slot	Data storage



Current inputs IC, IB, IA (BNC)



Voltage inputs UN, UC, UB, UA



Micro SD card slot and 5–9 V DC power socket

WARNING

- The secondary output of a flexible coil must never exceed 333 mV rms.
- A CT must have a voltage output, with a secondary output of maximum 333 mV rms. Do not connect 1 A or 5 A current transformers.

Power supply and SD card

- Fit 4 × AA batteries, or connect the supplied 9 V DC adaptor to the POWER socket. Use the adaptor for recordings longer than the battery life (approx. 7 h).
- Insert the micro SD card before you start a recording. Check that the SD card icon on the display is green.

07 Connecting to the installation

DANGER

Only qualified electricians may connect the meter. Isolate the supply before work wherever possible.

1. **Prepare the meter**
   Switch the meter on. Check the network type (Set → Wire), coil rating or CT ratio (Set → Ratio), date and time, and recording settings before you connect it.

2. **Fit the current coils**
   Wrap one coil around **one** phase conductor only and close the coupling fully. Keep the conductor near the centre of the coil. Fit every coil with its direction mark the same way relative to the energy flow. Connect the coil on L1 (A) to IA, L2 (B) to IB and L3 (C) to IC.

3. **Connect the voltage leads**
   Plug the leads into UN, UC, UB and UA, then clamp them to the conductors as shown in the diagram for your network. Each voltage lead must be on the same phase as the coil with the same letter.

4. **Check the readings**
   Check that voltage and current are plausible and that active power is positive on every phase. Negative power on one phase means that the coil is reversed or on the wrong phase.

5. **Start recording**
   Enable recording (Set → SD Card) and check that the SD card icon is green.

COMPRESSOR MEASUREMENTS

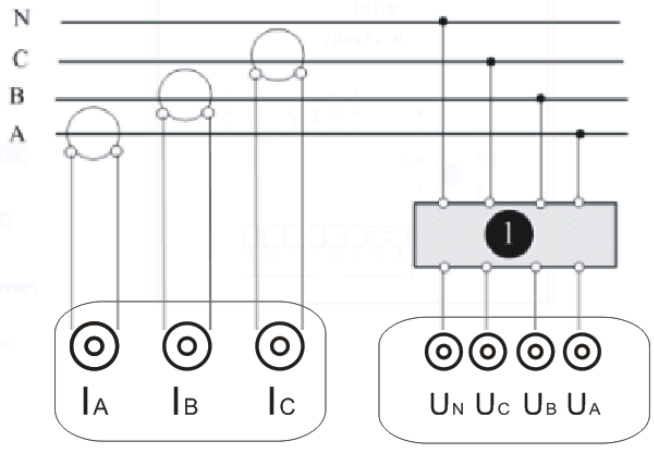
Fit the coils on the main supply cables of the compressor, downstream of its isolator, so that the meter measures the total input power of the package (main motor, fan motor and controls).

Connections per network type

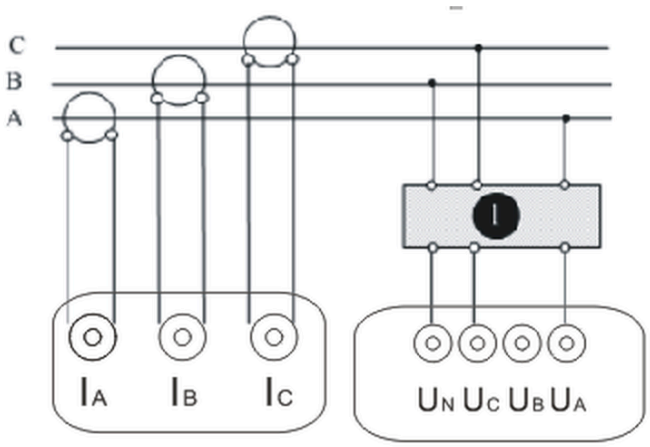
Network (Wire setting)	Current coils	Voltage leads
3PH4W	A → IA, B → IB, C → IC	A → UA, B → UB, C → UC, N → UN
3PH3W	A → IA, B → IB, C → IC	A → UA, C → UC, B → UN (reference); UB not used
1PH2W L-N	L → IA	L → UA, N → UN
1PH2W L-L	L → IA	L → UA, second line → UN
1PH3W L-L-N	L1 → IA, L2 → IB	L1 → UA, L2 → UB, N → UN

08 Wiring diagrams

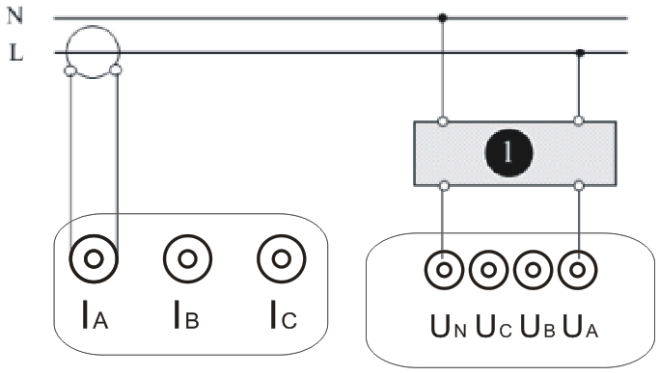
Box **1** in the diagrams marks the protection of the voltage leads (fuses), where required by local regulations.



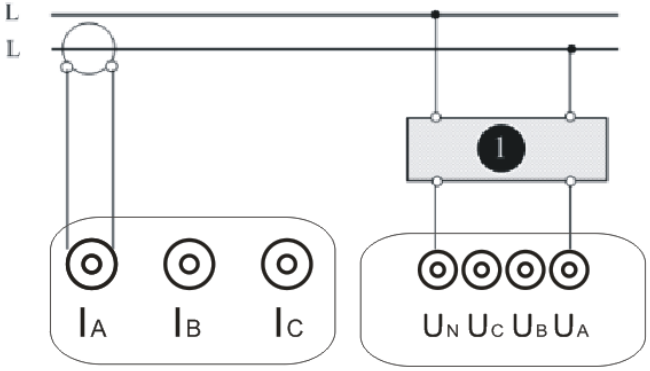
3PH4W — three-phase, four-wire



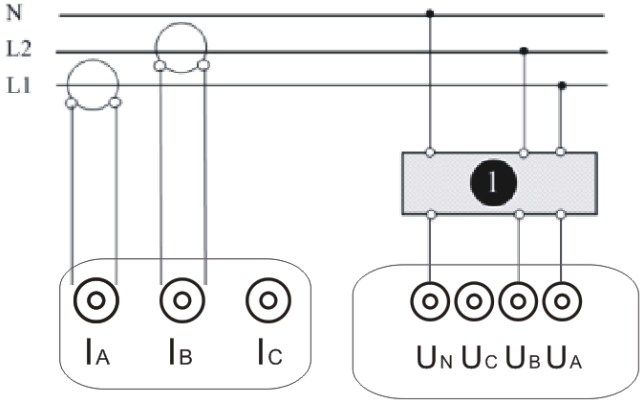
3PH3W — three-phase, three-wire



1PH2W L-N — single-phase, line–neutral



1PH2W L-L — single-phase, line–line



1PH3W L-L-N — single-phase, three-wire

09 Display, keys and configuration

Display

Area	Description
A	Header
B	Micro SD card status — green: card OK; red: no card detected; yellow: recording switched off
C	Battery capacity
D	Date and time
E	Measured values
F	Main menu (bottom line): U, I, Power, Energy, UTHD, ITHD
G	Sub menu (left column) for the selected main page

Keys

Key	Function
Menu / Quit	Open the menu; leave the menu or the current setting
Up / Left	Short press: previous sub-menu item or change value. Long press: previous main page or digit
Down / Right	Short press: next sub-menu item or change value. Long press: next main page or digit
Enter	Open the selected item; confirm a value

To change the data shown: press Up or Down once to change the sub-menu page; press and hold Up or Down to change the main page.

Configuration menu

All settings are in the **Set** menu, which is protected by a password (factory setting **1000**). Change the password after commissioning to prevent unauthorised changes.

Set menu	Factory setting
Wire	3PH4W; direct voltage connection (no VT); 3 flexible coils on IA, IB, IC; 50 Hz
Ratio	Coil rated current 1000 A; VT ratio not used
SD Card	Recording enabled; period 60 s
Harmonic	H1–H5 = 3rd, 5th, 7th, 9th, 11th
Password	1000
Date/Time	Set at commissioning
BackLight	On; period 60 s; brightness 5
Demand	Sliding block; interval 15 min
Reset	Resets min./max. values and peak demand values

Change a setting

Select from a list (for example, the current sensor type: flexible coil or CT):

1. Press Up or Down to scroll to the required value.
2. Press Enter to confirm.

Enter a number — used for VT primary and secondary, CT primary and secondary, SD card period, password, date, time and backlight period:

1. Press Up or Down to change the selected digit.
2. Press and hold Up or Down to move to the next digit.
3. Press Enter to confirm. An invalid value is not accepted; the cursor stays in the field.

10 Data recording

With recording enabled (Set → SD Card), the meter writes one CSV line to the micro SD card at each recording interval (1–9999 s, default 60 s). Each record uses about 1 kB, so a 1 GB card holds approximately 2 years of 1-minute data.

Recorded values

- Date and time
- Voltage (V) and voltage THD (%)
- Current (A) and current THD (%)
- Current harmonic content of the selected orders (% and A)
- Frequency (Hz) and power factor
- Active (W), reactive (var) and apparent (VA) power
- Active (Wh), reactive (varh) and apparent (VAh) energy

> **NOTE**
> Before you remove the SD card, switch recording off (Set → SD Card) to avoid corrupting the file. Refit the card, switch recording on again and check that the SD card icon is green.

11 Maintenance and calibration

- Clean the meter with a dry, soft cloth only. Do not use solvents.
- Before each use, check the voltage leads, clips, coils and BNC connectors for damage.
- Replace weak batteries with 4 new AA batteries of the same type. Remove the batteries if the meter will not be used for a long time.
- Copy the CSV files from the SD card after each measurement and keep a backup.
- Check the meter against a calibrated reference instrument periodically. Contact WiseAir support for calibration service.

12 Troubleshooting

Symptom	Possible cause	Action
Meter does not switch on	Batteries flat or missing; no adaptor connected	Fit new AA batteries or connect the 9 V DC adaptor
Display dark during recording	Backlight switched off after the backlight period	Press any key; check Set → BackLight
Negative power on one phase	Coil fitted in the wrong direction or on the wrong phase	Turn the coil round; check that coil phase matches voltage phase
Current wrong by a fixed factor	Wrong coil rated current or CT ratio	Check Set → Ratio against the coil or CT label
Voltage wrong or zero	Voltage lead or clip loose; wrong network setting	Check the leads; check Set → Wire
Power or PF wrong although U and I are correct	Wrong network type or phase sequence	Check Set → Wire and the connection table
SD card icon red	No card, or card not seated	Insert the card fully
SD card icon yellow	Recording switched off	Switch recording on (Set → SD Card)
Recording stops early	Batteries flat	Use the 9 V DC adaptor for long recordings

13 Warranty and service

WiseAir Technologies provides a **12-month warranty** on the WAPM-401 handheld power meter. The warranty covers defects in material and workmanship when the meter is used within the stated operating conditions. Report any fault immediately and within the warranty period.

Damage caused by incorrect connection, over-voltage, use of unsuitable current sensors, leaking batteries, opening of the meter or repairs by unauthorised persons is not covered. For service, contact WiseAir support (details on the back cover) and quote the model and serial number.

14 Measurement record

METER	
Serial number	
Coil rated current / CT ratio	
Network (Wire setting)	
Recording interval	
SITE	
Customer	
Machine / panel (e.g. compressor no.)	
Measured by	
Start date and time	
End date and time	

Checks

#	Check	Yes	N/A	No	Comments
1	Leads, clips and coils checked for damage				
2	Wire, Ratio and Date/Time settings checked				
3	Coils on the correct phases and in the correct direction				
4	Voltage leads on the correct phases				
5	Voltage, current and positive power verified on the display				
6	Adaptor connected (long recordings) or batteries new				
7	SD card recording enabled (icon green)				

WiseAir representative _____ Customer representative _____ Date _____

WISE AIR 4.0
MEASURE TO MANAGE

Need help with your WAPM-401?

Our product specialists support installation, commissioning, configuration and calibration — remotely or on site.

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> When you contact support, please keep the meter serial number, a photo of the wiring and the current coil or CT ratio settings ready.

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Specifications are subject to change without notice.