WISE AIR 4.0
MEASURE TO MANAGE

USER MANUAL · 2026 EDITION

WAPM-402

Multifunction Power Meter

Models covered: WAPM-402 and WAPM-403



Class 0.5S
Active energy

3-ph / 1-ph
4-wire and 3-wire

RS485
Modbus RTU

SD card
CSV data logging

INSTALLATION · OPERATION · CONFIGURATION · MAINTENANCE

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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 install, operate or maintain the WAPM-402 / WAPM-403 power meter. Keep it with the meter and make it available to everyone who works on the installation.

The meter is designed to measure and record electrical quantities (voltage, current, power, energy, power factor, harmonics and demand) of 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

- Installation, wiring and maintenance must be carried out only by qualified, authorised electricians, in line with local electrical regulations.
- Isolate and lock off the supply before you connect voltage leads or fit current coils, wherever possible. Where work near live parts cannot be avoided, use suitable insulated tools and personal protective equipment.
- Never connect a conventional 1 A / 5 A current transformer to the current inputs. Use only WiseAir flexible current coils or CTs with a voltage output of maximum 333 mV.
- The meter has IP20 protection. Install it in a closed panel or enclosure, out of reach of unauthorised persons.

Operating limits

- Do not exceed the rated measuring voltage, control-power voltage or input signal levels given in the specifications.
- Do not use the meter in explosive (hazardous) areas.
- Do not use the meter where condensation can form, or outside its operating temperature range.

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. Do not kink or crush the current coils.

02 Product overview

The WiseAir WAPM-402 / WAPM-403 is a panel-mounted multifunction 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 (supplied) or 333 mV voltage-output CTs, so the meter can be fitted to existing cables without breaking the circuit.

The meter records all key values to a micro SD card in CSV format and provides an RS485 Modbus RTU interface for the WiseAir WADL-301 data logger, the WiseAir WASM-604 Smart Monitoring platform, a PLC or a SCADA

system.

RECOMMENDED FOR AIR COMPRESSORS

The WAPM-402 is the WiseAir model proposed for monitoring compressors. Combined with a WiseAir flow meter, it gives the compressor's input power and energy, so you can calculate specific power (kW per Nm^3/min) and track the real cost of compressed air.

Measure

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

Record

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

Connect

RS485 Modbus RTU, pulse output and alarm relay.

Supported networks

Setting	Network
3PH4W	Three-phase, four-wire (L1, L2, L3, N)
3PH3W	Three-phase, three-wire (L1, L2, L3), with or without voltage transformers
1PH2W_LN	Single-phase, two-wire, line–neutral
1PH2W_LL	Single-phase, two-wire, line–line
1PH3W_LLN	Single-phase, three-wire, line–line–neutral

03 What's in the box



WAPM-402 kit

1. WAPM-402 or WAPM-403 power meter (as ordered)
2. Flexible current coils — 3 pcs
3. User manual
4. Power cable (2 m) and voltage measurement cables

NOTE

Check the model and the rated current printed on the current coils against your order before installation. Optional accessories, such as the WiseAir WADL-301 data logger, are available from WiseAir or your local dealer.

04 Technical specifications

MEASUREMENT

Measured voltage	80–400 V AC (or 100–500 V AC, version-dependent)
Frequency	50 / 60 Hz (measured 45–65 Hz)
Current input	Flexible current coil (direct, no integrator) or 333 mV voltage-output CT
Input signal range	0.3–333 mV
Input overload	400 mV continuous; 1.2 V for 1 s
Primary current setting	0.1–9999 A
Sampling rate	8,000 samples/s
Harmonics	Up to 52nd order; 5 selectable orders shown
Data acquisition / display update	400 ms / 0.5 s

ACCURACY

Current	±0.5 % from 1 % to 120 % of rated current (not guaranteed below 10 A)
Voltage	±0.2 % over the measuring range
Frequency	±0.01 % (45–65 Hz)
Power factor	±0.005 (10 % to 120 % of rated current)
Active / apparent power	Class 0.5
Active energy	Class 0.5S (IEC 62053-22)
Reactive power and energy	Class 2 (IEC 62053-21)

INPUTS AND OUTPUTS

Communication	RS485, Modbus RTU, half duplex, 3-wire (A, B, GND)
Pulse output	1 × energy pulse output (P+, P−)
Relay output	1 × relay, controlled by alarm or Modbus; switching 0.5 A at 125 V AC, 1 A at 30 V DC; 2.5 kV rms insulation
Data storage	Micro SD card, 1 GB supplied (max. 4 GB), CSV format

POWER SUPPLY AND MECHANICAL

Control power	85–265 V AC/DC, 3.5 W
Display	3.5" colour TFT, 320 × 480 pixels
Mounting	Panel mounting
Dimensions (L × W × D)	96 × 96 × 99 mm
Weight	350 g
Terminals	Screw terminals, 2.5 mm², 5.08 mm pitch

ENVIRONMENT

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	III, for distribution systems up to 277/480 V AC
Protection	IP20 (IEC 60529); double-insulated front panel

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	0.6 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

Current measuring ranges and accuracy band

Rated current	±0.5 % accuracy band
500 A	10 A to 600 A
3000 A	30 A to 3600 A
10 kA	100 A to 12 kA

Select the rated current that matches the coil supplied and the expected load (see Ratio setting, section 07).

Display range and resolution

Quantity	Maximum displayed value (auto-ranging)	Resolution
Voltage	999.9 kV	0.1
Current	999.9 kA	0.1
Power	999.9 MW	0.1
Power factor	0.999	0.001
THD	99.9 %	0.1 %
Energy	999.9 GWh	0.1

Pulse output constant

Rated current	100 A	500 A	1000 A	5000 A
Pulses per kWh	300	60	30	6

Pulse constant as stated for each rated current; confirm the value for your coil with WiseAir support.

05 Installation

DANGER

Isolate the supply before work. Only qualified electricians may install the meter.

Mount the meter

1. **Select the location**
   Install the meter in a dry, closed electrical panel, away from strong heat sources, with the display at a comfortable reading height. Leave space behind the meter for the cables and the SD card.

2. **Cut the panel opening**
   Make a square cut-out in the panel door for the 96 × 96 mm front frame (see the dimension data supplied with the meter).

3. **Fit the meter**
   Push the meter into the cut-out from the front and secure it from behind with the mounting clamps.

Fit the current coils

1. **One coil per phase**
   Open the coil, wrap it around **one** phase conductor only and close the coupling fully. Keep the conductor near the centre of the coil and the coupling away from other conductors.

2. **Observe the direction**
   Fit every coil with its direction mark the same way relative to the energy flow (normally pointing towards the load). A reversed coil gives negative power on that phase.

3. **Keep the phases in order**
   The coil on phase L1 (A) must go to input IA, L2 (B) to IB and L3 (C) to IC — the same phase as the voltage lead connected to V1, V2 and V3.

COMPRESSOR INSTALLATIONS

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).

WARNING

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

06 Electrical connection

Terminal assignment

No.	Terminal	Function	Group
1	A	RS485 A	RS485 communication
2	B	RS485 B	RS485 communication
3	GND	RS485 ground	RS485 communication
4	P+	Pulse output +	Pulse output
5	P−	Pulse output −	Pulse output
6	RO	Relay contact	Relay output
7	RI	Relay contact	Relay output
8	L	Control power L (+)	Power 85–265 V AC/DC
9	NC	Not connected	—
10	N	Control power N (−)	Power 85–265 V AC/DC
11 / 12	IA1 / IA2	Phase A current input + / −	Current inputs
13 / 14	IB1 / IB2	Phase B current input + / −	Current inputs
15 / 16	IC1 / IC2	Phase C current input + / −	Current inputs
17	Vn	Neutral voltage input	Voltage inputs
18	V3	Phase C voltage input	Voltage inputs
19	V2	Phase B voltage input	Voltage inputs
20	V1	Phase A voltage input	Voltage inputs

Always check the terminal names printed on the rear label of the meter before wiring.

Voltage and current connections per network type

Network (Wire setting)	Current coils	Voltage leads
3PH4W	L1 → IA, L2 → IB, L3 → IC	L1 → V1, L2 → V2, L3 → V3, N → Vn
3PH3W (no VT)	L1 → IA, L2 → IB, L3 → IC	L1 → V1, L3 → V3, L2 → Vn (reference)
3PH3W with VT	L1 → IA, L2 → IB, L3 → IC	Through voltage transformers; set Von = 3VT and the VT ratio
1PH2W_LN	L → IA	L → V1, N → Vn
1PH2W_LL	L → IA	L → V1, second line → Vn
1PH3W_LLN	L1 → IA, L2 → IB	L1 → V1, L2 → V2, N → Vn

- Protect the voltage leads with fuses or a fused isolating terminal block, according to local regulations.
- Connect the control power (85–265 V AC/DC) to terminals L and N.
- Connect the RS485 bus to A, B and GND with screened twisted-pair cable. In a multi-drop bus, connect A to A and B to B on every device, and give each device a unique Modbus address.
- The pulse output (P+, P−) and relay contacts (RO, RI) are optional connections.

07 Display, keys and configuration

Keys

Key	Short press	Long press
Menu / Quit	Open the menu; press again to leave the menu	—
Up / Left	Move up / change value up	Move left (previous main page or digit position)
Down / Right	Move down / change value down	Move right (next main page or digit position)
Enter	Open the selected item; confirm; go to the next line	—

Measurement pages

The home screen shows the WiseAir name, the SD card status, the date and time, and tabs for the six main pages: **Voltage, Current, Power, Energy, Voltage harmonics, Current harmonics**. Long-press Left or Right to change the main page. Short-press Up or Down to move between lines. On a line marked ">", press Enter to open its secondary page (and, where available, a third page).

SD card icon — Green — SD card recording; Red — no SD card found; Yellow — SD card not working

Page	Values shown	Secondary / third page
Voltage	U (RMS, per phase and average); RMS of the 5 selected voltage harmonics (default 3rd, 5th, 7th, 11th, 13th)	Max., Min., voltage unbalance, line voltage UL
Current	I (RMS, per phase and average); RMS of the 5 selected current harmonics	Demand (DMD), maximum demand (DPK), Max., Min., current unbalance, angle. Third page: maximum demand IA, IB, IC and average
Power	Active power P, reactive power Q, apparent power S, power factor PF (per phase and total)	Demand (DMD), maximum demand (DPK), Max., Min. Third page: maximum demand per phase and total
Energy	Active energy EP, reactive energy EQ, apparent energy ES, frequency	—
Voltage harmonics	Total voltage THD (%) and the 5 selected harmonics (%)	—
Current harmonics	Total current THD (%) and the 5 selected harmonics (%)	—

Menu and password

Press **Menu/Quit** to open the menu and choose **Data**, **Set** or **Info** with Up/Down and Enter. The Set menu is protected by a password; the **default password is 1000**. Change it after commissioning (Set → Password).

In every setting page: press Enter to go to the next line, Up/Down to change the value, and long-press Up/Down to move the digit position. When you leave a setting page the meter asks "Save changes": press **Enter** to save. If you press Menu/Quit (Return) instead, the changes are lost.

Set menu

Item	Settings
Wire	**Mode**: 3PH4W, 3PH3W, 1PH2W_LL, 1PH2W_LN, 1PH3W_LLN. **Von**: DirectCon (voltage connected directly, no VT) or 3VT (voltage transformers). **Icon**: CTCon (333 mV CT) or RcoilCon (flexible coil connected directly). **Freq**: 50 Hz or 60 Hz.
Ratio	With RcoilCon: **Rcoil FSA** — coil rated current (100 A, 600 A, 1 kA, 3 kA, 6 kA) and **Rcoil value** — coil sensitivity in mV/kA at 50 Hz (enter the value on the coil label). With CTCon: CT primary and secondary values. With 3VT: **VT PRI** (primary) and **VT SEC** (secondary) voltage. VT settings are hidden with DirectCon.
Comm	Modbus address 1–247; baud rate 1200–57600; parity Even, Odd or None.
SD Card	**Switch**: Enable / Disable recording. **Period**: recording interval in seconds.
Harmonic	Select the 5 harmonic orders to display, each from 2 to 52.
Password	Change the Set password (default 1000). The new password is needed the next time you enter Set.
Date/Time	Set the date and time used for display and data records.
Threshold	Set Umax, Umin and Imin; enable the alarm (relay); enable the buzzer.
Backlight	**Switch**: ON (always on) or KEY (switches off after the set Period without a key press; any key switches it on). **Backlight**: brightness 1–9.
Demand	**Method**: Sliding (sliding window) or Fixed (fixed window). **Interval**: 1–60 min.
Reset	**MnMx**: reset minimum/maximum values. **DMDPk**: reset maximum demand values. **Energy**: reset energy counters.

Default flexible-coil sensitivity per rated current (Ratio setting)

Rated current	100 A	600 A	1 kA	3 kA	6 kA
Rcoil value (at 50 Hz)	50 mV/kA	50 mV/kA	85 mV/kA	85 mV/kA	50 mV/kA

Always enter the sensitivity printed on the coil supplied.

08 Data recording

With recording enabled (Set → SD Card), the meter writes one CSV line to the micro SD card at each recording interval.

Recording interval	1–9999 s (default 1 min)
File format	CSV
Card	Micro SD, 1 GB supplied (max. 4 GB)
Capacity	About 1 kB per record — approximately 2 years at 1-minute interval on 1 GB

Recorded values

- Date and time
- Voltage (V) and voltage THD (%)
- Current (A) and current THD (%)
- Current harmonics 3rd, 5th, 7th, 11th, 13th (% and A)
- Frequency (Hz) and power factor
- Active (W), reactive (var) and apparent (VA) power
- Active (Wh), reactive (varh) and apparent (VAh) energy
- Current demand and peak current demand with date (A)
- Total active power demand and peak with date (W)

- Total reactive power demand and peak with date (var)
- Total apparent power demand and peak with date (VA)

NOTE

Before you remove the SD card, disable recording (Set → SD Card → Switch → Disable) to avoid corrupting the file. Re-enable it after you refit the card and check that the SD card icon is green.

09 Modbus communication

Interface	RS485, half duplex, 3-wire (A, B, GND)
Protocol	Modbus RTU
Address	1–247 (default 1)
Baud rate	1200–57600 baud (default 9600)
Data format	8 data bits, parity Even (default) / Odd / None, 1 stop bit

REGISTER MAP

The Modbus register map of the WAPM-402 / WAPM-403 is supplied as a separate WiseAir document. Contact WiseAir support (details on the back cover). When the meter is connected to a WiseAir WADL-301 data logger or WASM-604 Smart Monitoring, WiseAir configures the registers during commissioning.

10 Maintenance and calibration

- The meter needs no routine maintenance. Clean the front with a dry, soft cloth only — no solvents.
- At each service visit, check that the terminal screws are tight, that the coils are closed and undamaged, and that the SD card icon is green.
- Copy the CSV files from the SD card regularly and keep a backup.
- Check the meter readings against a calibrated reference instrument periodically, and after any change to the wiring or settings. Contact WiseAir support for calibration service.

11 Troubleshooting

Symptom	Possible cause	Action
Display dark	No control power; backlight in KEY mode	Check 85–265 V AC/DC at L and N; press any key
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 reads wrong by a fixed factor	Wrong rated current, Rcoil value or CT ratio	Check Set → Wire (Icon) and Set → Ratio against the coil or CT label
Voltage wrong or zero	Voltage lead or fuse open; wrong Von setting or VT ratio	Check fuses and wiring; check Set → Wire (Von) and Set → Ratio
Power/PF wrong although U and I are correct	Wrong wiring mode or phase sequence	Check Set → Wire (Mode) and the connection table in section 06
SD card icon red or yellow	Card missing, not seated, full or faulty	Refit or replace the card (max. 4 GB); check Set → SD Card
No Modbus communication	Wrong address, baud rate or parity; A/B swapped	Check Set → Comm and the master settings; swap A and B
Settings not kept	Changes not confirmed	Press Enter at the “Save changes” prompt

12 Warranty and service

WiseAir Technologies provides a **12-month warranty** from the date of delivery on the WAPM-402 / WAPM-403 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 installation or wiring, over-voltage, use of unsuitable current sensors, 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.

13 Commissioning report

METER	
Model (WAPM-402 / WAPM-403)	
Serial number	
Coil rated current / sensitivity	
Wiring mode / VT ratio	
Modbus address / baud rate / parity	
Warranty valid until	
SITE	
Customer	
Machine / panel (e.g. compressor no.)	
Installed by	
Installation date	

Installation checks

#	Check	Yes	N/A	No	Comments
1	Meter mounted correctly; control power connected and correct				
2	Current coils on the correct phases and in the correct direction				
3	Voltage leads wired correctly and fused				
4	Wire, Ratio and Date/Time settings checked				
5	RS485 / Modbus settings checked; communication confirmed				
6	Current (A) and power (kW) readings verified on the display				
7	SD card recording enabled (icon green)				

WiseAir representative _____ Customer representative _____ Date _____

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Need help with your WAPM-402?

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

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> When you contact support, please keep the sensor serial number, firmware version and a photo of the installation ready.

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Specifications are subject to change without notice.