

# Vaisala HydroMet Automatic Weather Stations MAWS101 and MAWS201



Mobile surface weather observation

# Small Package. Outsized Performance.

In over 70 countries around the world, more than 200 organizations are using Vaisala HydroMet Automatic Weather Stations to measure surface weather over a diverse range of applications, in both temporary and fixed installations.



*Vaisala Data Logger QML201 with compact flash memory card.*

Vaisala HydroMet Automatic Weather Stations MAWS101 and MAWS201 are built to last in the field. They offer high performance in a very compact design.

- Compact, robust and lightweight
- Easy to install, configure and maintain
- Field-proven reliability and accuracy
- Low power consumption
- Wide selection of sensors and options
- Extensive calculation and data logging capacity
- User-friendly set-up and graphical display software

## Easy to set up and configure

The MAWS101 and MAWS201 are easy to set up. Every sensor is supplied with a cable and connectors for easy installation. All components fit together easily and no special tools are required. The Vaisala Set-up Software Lizard is provided to simplify the work of configuring the sensor measurements, calculations, data logging schedules and data transmissions. Set-up templates walk you through the initial set-up routines, and a large number of set-up options are available if you want to customize the settings further.

## Accurate sensors

The basic sensor suite measures wind speed/direction, atmospheric pressure, air temperature, relative humidity and precipitation. Optional sensors can be added to measure e.g. soil/water temperature, global and net solar radiation, soil moisture, and water level.



*Photo courtesy of Isabelle Hat-Morris.*

*The tripod feet are adjustable and can be anchored to the ground with metal stakes. Seen here, the Vaisala HydroMet Automatic Weather Station MAWS201 on Mount Everest at an altitude of 4,300 meters.*



### Reliable in all weather

Vaisala HydroMet Automatic Weather Stations MAWS101 and MAWS201 operate reliably in all weather: their corrosion-resistant anodized aluminum construction is rugged and weatherproof. Double O-ring seals are used on the enclosure. The cables are made of high-quality polyurethane with molded watertight connectors that fulfill the requirements of the IP68 standard. All the inputs have transient protection. The quality control software checks the sensor data against the user-set climatological limits, as well as the step changes between successive measurements. Each statistical calculation has its own validation routine: all can be configured by the user.

### Statistical calculations

The statistical calculations include minimum, maximum, average, standard deviation and cumulative values. All are calculated over user-defined intervals. All extreme values can be time-stamped. In addition, a library of calculations is available including unit conversions, dewpoint, frost point, QNH, QFF, QFE, evapotranspiration, sunshine duration, forest fire index, wind chill, heat stress etc.

### Versatile data outputs

The user can freely configure the data output formats — several ready-made templates are provided to make this easy. The alarm module notifies the user when a measured or calculated value exceeds the threshold values that the user has set. The alarm module can be configured e.g. to send an alarm message, to change timing interval(s), to log data and/or to set an excitation voltage for controlling an external device.

*The UHF radio modem is a small and versatile data transmission option.*



### Extensive data logging

Data logging is easy with the MAWS101 and MAWS201: 1.7 MB of secure flash memory is available for logging measured and calculated data and complete reports. An optional compact flash memory card provides an additional 200+ MB of memory. Data can be logged permanently or semi-permanently as a backup for periods defined by the user. The logging parameters and schedules are all user-configurable. A large number of statistical calculations can be made at the AWS site to reduce the volume of data to be transmitted or logged.

### Power supply options

The MAWS101 and MAWS201 use extremely little power. With a small solar panel and internal battery, a weather station with the standard sensor suite can operate independently for an extended time. To lengthen the operating time an extra back-up battery, larger solar power system or mains power are available as options.

*The Vaisala Solar/Mains Power Supply QMP201C option provides extra power for sites where there is insufficient solar energy or where e.g. a UHF modem is required.*



### Communication options

Up to 8 serial ports are available for interfacing with telemetry, terminals, sensors and displays. One RS-232 and one RS-485 port are provided as standard. Two plug-in module places are available for enhancing performance:

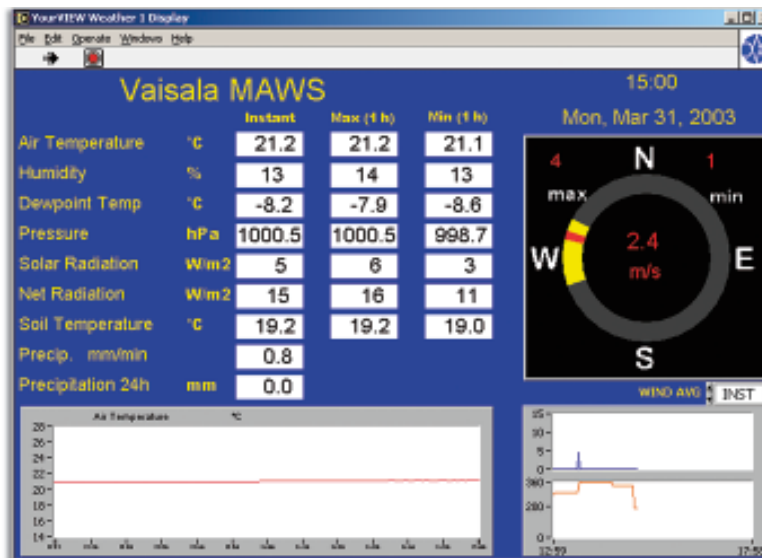
- isolated RS-485 modules for connections up to 1,500 meters away
- dual isolated RS-485 module with SDI-12 interface; can also be used as 1 x RS485 and 1 x RS232
- dual RS-232 module providing two additional RS-232 channels
- fixed line modem forconnecting other Vaisala devices with a similar interface up to 10 km max.

A laptop PC can be used to issue commands, access data and update software and configuration set-ups on-site. The UHF radio modem option can be used to access the weather station configuration when the 12 V power supply option is used.



### Upgrading

Your MAWS101 and/or MAWS201 are easily and economically upgraded with new sensors, calculations, output formats and logging schedules to accommodate your evolving requirements. The necessary modifications are carried out using the set-up program: just connect the new sensors to the available connectors.



### Vaisala Real-time Display Software YourView

The MAWS101 and MAWS201 weather stations include the basic Vaisala Real-Time Display Software YourView. It offers a graphical presentation of real-time and logged data and allows you to log data onto your PC hard drive.

### Three modules

The Receiver module is used to set the communication and data logging parameters for receiving data via the PC serial port.

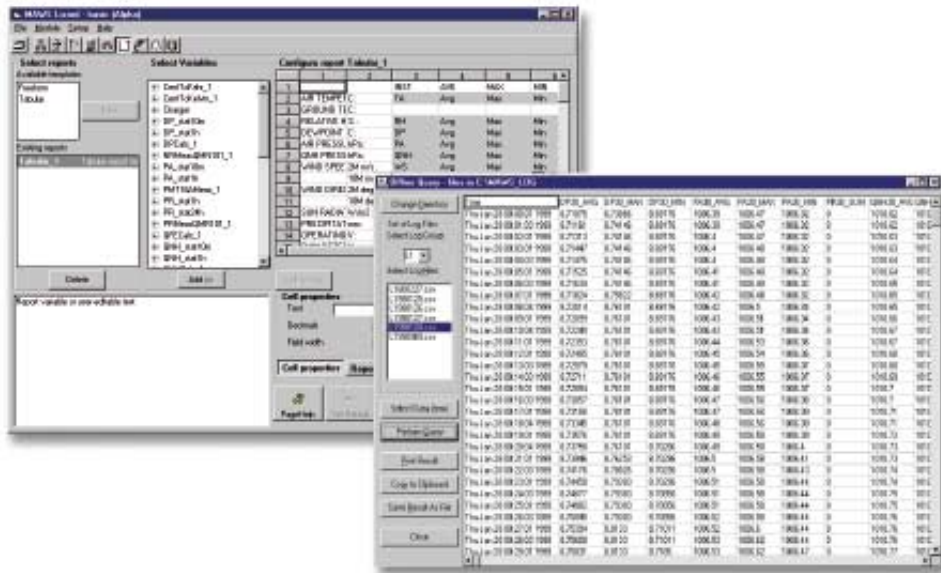
The Weather Display module is used for the real-time monitoring of measured and calculated data. The user can also configure the language and display parameters, if required.

The Browser module is used to study the logs of historical data in both graphical and tabular format.

The optional Network module includes a TCP/IP server that transmits data to slave workstations in a PC network. The user can purchase individual PC licenses or a network license that sets no limit on the number of PCs.



The Vaisala Digital Displays DD50 and WIND30.



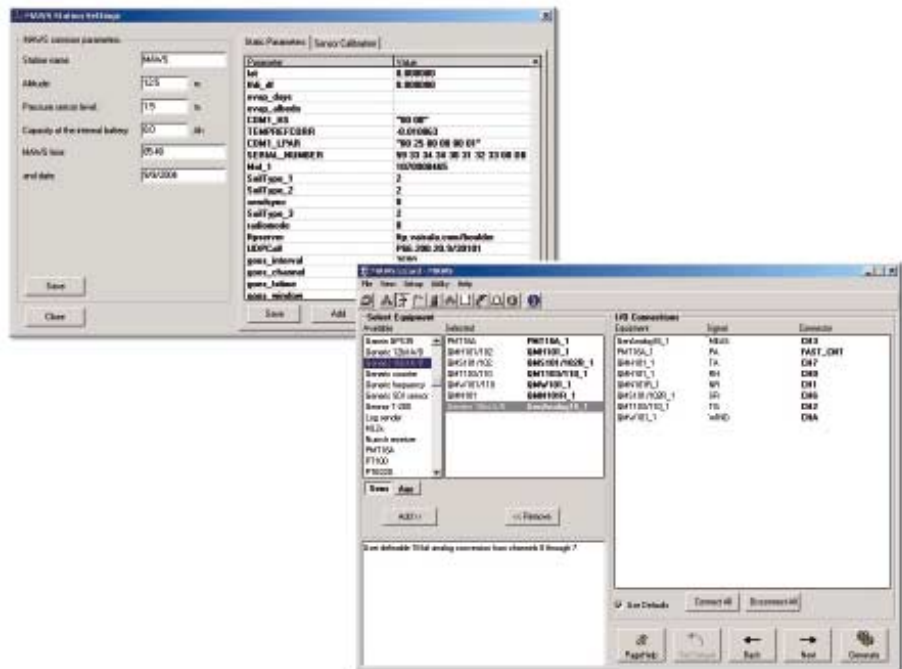
All the selected log files can be downloaded and viewed with Offline Enquiry.

### Vaisala Set-Up Software Lizard

The set-up software is provided free-of-charge with each MAWS101 and MAWS201. It guides the user through all the basic set-up procedures. The software has a graphical user interface with icons, pop-up menus, pull-down menus, and dialog boxes. No programming knowledge is required of the user. The set-up software makes it easy to:

- Select the sensors and measurement sequences
- Set up the data validation parameters
- Select calculation formulae from the library
- Set statistical calculations
- Organize multiple data logging schedules
- Define data formats for data output
- Set up multiple alarms if needed
- Define the serial port parameters including handshake and checksum methods
- Define communication events: polled, self-timed or alarm-activated

The context-sensitive help provides the user with additional guidance.



### Terminal software

The terminal software automates many routine AWS operations such as:

- Scheduled downloading of logged data files to PC
- Converting log files to CSV (comma separated value) format, e.g. for Microsoft® Excel and other standard software

- Uploading new station set-up files to MAWS stations, which can also be done remotely via modem
- Setting station parameters, also remotely
- Offline log file enquiries, e.g. a request to merge values from several daily log files

*The Vaisala Carry Case QMM120 provides excellent protection for the MAWS201 during transport.*



**Vaisala HydroMet Automatic Weather Station MAWS201**

The MAWS201, a portable AWS for temporary installations, features the same design as the Vaisala TacMet Tactical Meteorological Observation

System MAWS201M for demanding tactical meteorological applications. Its lightweight aluminium tripod and easy-to-use connectors make it fast to set up. Each leg is adjustable for use on uneven terrain. The MAWS201 is already used in a wide range of applications:

- Meteorological research
- Civil defense
- Environmental impact studies
- Emergency response
- Waste management

With 5 basic sensors, a solar panel and an internal battery the MAWS201 weighs just 15 kg. It can be transported in two lightweight carry cases made of cellular polypropylene (EPP), a lightweight and very rugged material that provides excellent protection. The cases are equipped with handles, hinges, wheels and latches for padlocks.



**Vaisala HydroMet Automatic Weather Station MAWS101**

The MAWS101 is a low-maintenance AWS meant for permanent or semi-permanent installations: no concrete foundation is required. The MAWS101 can be delivered either on its own, with a compact enclosure, or with a 2-, 3-, 4-, 6-, and 10-meter mast. On its own, it is ideal for locations where the standard tripod or mast installations are impractical. The MAWS101 systems are widely used in:

- Climatological measurements
- Nowcasting networks
- Hydrological networks
- Energy production and management
- Building automation
- Environmental research
- Sport and recreational activities

The basic sensor suite, optional sensors and communication options are the same as with the MAWS201.





**Basic sensors for Vaisala  
HydroMet Automatic Weather  
Stations MAWS101 and MAWS201**

- Compact wind sensor QMW101 with 1 m cable and connector
- Compact wind sensor QMW110 with 10 m cable and connector
- Relative humidity & temperature probe QHM101 with HMP45D sensor, cable, and connector
- Pressure sensor PMT16A (capacitive silicon)
- Global solar radiation detector QMS101 (silicon pyranometer) with cable and connector
- Global solar radiation detector QMS102 (Second Class pyranometer) with cable and connector
- Net solar radiation detector QMN101 (radiometer) with cable and connector
- Precipitation sensor QMR101 (0.2 mm resolution), aperture 200 cm<sup>2</sup>, attached to the sensor arm)
- Tipping bucket rain gauge QMR102 (0.2 mm resolution), aperture 500 cm<sup>2</sup>
- Soil/water/air temperature sensor QMT103 with 2 m cable (model QMT110 with 10 m cable)
- Multi-level soil temperature sensor QMT107 with cable and connector
- Volumetric soil moisture sensor ML2x with cable and connector

For additional sensors and options please visit [www.vaisala.com](http://www.vaisala.com)

# Technical Information

## Vaisala Data Logger QML201

Processor	32-bit Motorola
A/D conversion	16 bit
Data logging memory	
Internal	1.7 MB internal flash memory
Optional	>200 MB on compact flash memory card
Sensor inputs	
Analog	10 analog inputs (20 single-ended inputs)
Frequency	2 counter/frequency inputs
Internal channel for PMT16A pressure transducer	
Accuracy over operating temperature range	-40 °C ... +60 °C
Temperature (Pt-100) measurements	Range -50 °C ... +80 °C
Uncertainty across measured temperature	Better than ± 0.06 °C
Voltage measurement	
±2.5 V range	Better than 0.04 % reading ± 150 µV
±250 mV range	Better than 0.04 % reading ± 20 µV
±25 mV range	Better than 0.04 % reading ± 6 µV
±6.5 mV range	Better than 0.12 % reading ± 6 µV
Frequency measurements	0.003 % + resolution 241 nsec. (up to 4 kHz)
Common mode range	+5 V / -4 V
Real-time clock	Accuracy better than 20 sec/month
Serial communication	
Standard	RS-232 and RS-485
Optional	Two (2) optional plug-in slots for communication modules for increasing the number of serial I/O channels up to 8 pcs
Speed	300 ... 19,200 bps
Parameters	Configurable speed, start bits, data bits, stop bits, parity, XON/XOFF and check-sum
External powering	
Voltage	8 ... 14 VDC recommended (30 V max.)
Internal battery	1.3 Ah/6 V
Power consumption	< 10 mA/6 V (typically with 5 basic sensors)
Solar panel/batteries	
Panel options	6 W/6 V and 12 W/12 V
Extra back-up battery	QMB102 Sealed lead acid, maintenance-free
Mains power QMP213	85 ... 264 VAC
Mains power QMP201C	85 ... 264 VAC
with 12 W solar panel and 7 Ah back-up battery	

## Environmental

Temperature	
Operating	-40 ... +60 °C
Storage	-50 ... +70 °C
Humidity	0 ... 100 % RH
Emissions	CISPR 22 class B (EN55022)
Immunity	
ESD immunity	IEC 61000-4-2
RF field immunity	IEC 61000-4-3
EFT immunity	IEC 61000-4-4
Surge (lightning pulse)	IEC 61000-4-5
Conducted RF immunity	IEC 61000-4-6

## Sensors

Wind	QMW101/110
Pressure	PMT16A
Temperature, relative humidity	QMH101
Solar radiation	QMS101, QMS102, QMN101
Precipitation	QMR101/102
Soil/water temperature	QMT103, QMT110, QMT107
Soil moisture	ML2x
Water level	PR36W, PAA36, QSE102
Physical	
Weight example:	
Portable system with 3 m tripod (pressure, temperature/humidity and wind sensors; 6 W solar panel)	15 kg
Basic enclosure	
Material	Anodized aluminum
Ingress protection	NEMA 4X, IP66
Dimensions	Diameter 120 mm, height 420 mm
Weight	3 kg

## Options and accessories

Communication modules	DSU232, DSI485A, DSI486, DMX501
Mains power supply	QMP213
Solar/mains power supply	QMP201C
Carry cases for MAWS201	QMM110, QMM120
UHF radio modem set	SATEL3ASET-M2



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