# MP-Series Microwave Profilers

Rugged and portable, MP-Series Microwave Profilers provide proven, reliable and accurate web-based atmospheric remote-sensing capability. These hyper-spectral radiometers deliver continuous temperature, humidity and liquid soundings to 10 km height that are crucial for high-accuracy Nowcasting and short-term weather forecasting.

Reliability and accuracy of Radiometrics radiometers has been proven during more than 4 million hours of tropical, polar and mid-latitude operations. The MP-Series radiometers combine patented frequency agility and state-of-the-art microwave technology for optimum, cost-effective performance at any site location in all weather conditions.


*Figure 1. MP-3000A Hyper-Spectral Temperature, Humidity and Liquid Water Profiler.*

The MP-Series size, beamwidth and accuracy provide optimum cost-effective performance for Nowcast and weather forecast applications, as demonstrated by the U.K. Met Office. The Met Office operated a previous-generation (TP/WVP-3000) radiometer at its harsh environment Camborne test facility for five years with optimum reliability (trouble-free).

The Met Office demonstrated that TP/WVP-3000 measurement error is much smaller than natural uncertainty inherent in use of radiometer or radiosonde soundings for numerical weather forecast applications (Figure 2).

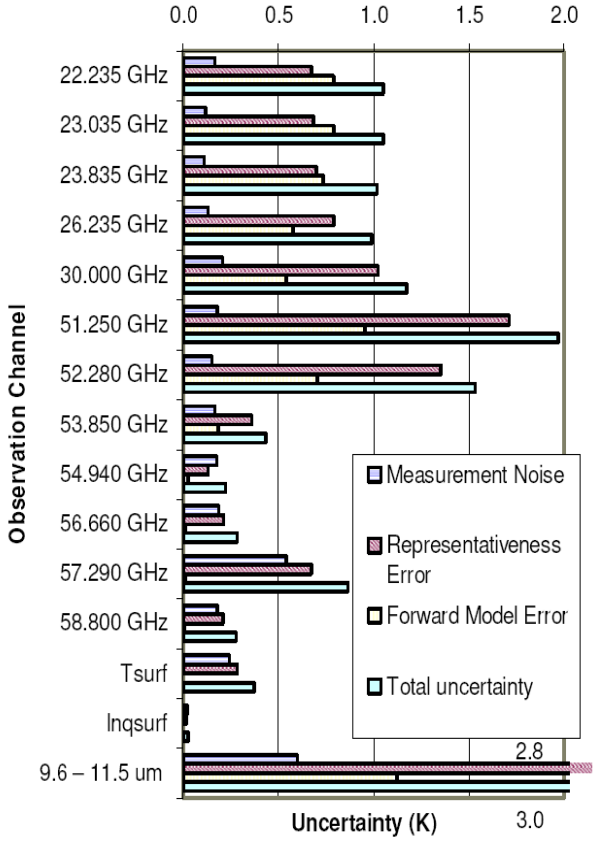


*Figure 2. TP/WVP-3000 measurement noise is much smaller than natural representativeness error inherent in the ingestion of radiometer or radiosonde soundings in numerical weather models (Hewison and Gaffard, 2006).*

The MP-3000A is the instrument of choice for Nowcast and short-term forecast applications, with proven reliability, accuracy and cost-effective performance.

# MP-Series (*Advanced*) Specifications

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|---|---|
| Calibrated Brightness Temperature Accuracy[1] | 0.2 + 0.002*\|TkBB-Tsky\| [2] |
| Long Term Stability | <1.0 K / yr typical |
| Resolution (depends on integration time)[3] | 0.1 to 1 K |
| Brightness Temperature Range[4] | 0-400 K |
| Antenna System Optical Resolution and Side Lobes<br>• 22-30 GHz (for MP-3000A & MP 1500A)<br>• 51-59 GHz (for MP-3000A & MP 2500A)<br>• 170-183.31 GHz (for MP-183A) | <br>4.9 - 6.3° -24 dB<br>2.4 - 2.5° -27 dB<br>1.0 - 1.1° -30 dB |
| Integration Time (user selectable in 10 msec increments) | 0.01 to 2.5 seconds |
| Frequency Agile Tuning Range<br>• Water Vapor Bands<br><br>• Oxygen Band<br>• Minimum Frequency step size | <br>22-30 GHz<br>170-183.3 GHz<br>51-59 GHz<br>2.0 MHz @ 30 GHz<br>4.0 MHz @ 60 GHz<br>12.0 MHz @ 180 GHz |
| Standard Factory-Calibrated Channels<br>• 22-30 GHz Band<br>• 51-59 GHz Band<br>• 170-183.3 GHz Band | <br>21 channels<br>14 channels<br>15 channels |
| Pre-detection channel bandwidth (effective double-sided)<br>• 22-30 and 51-59 GHz Bands<br>• 170-183.3 GHz Band | <br>300 MHz<br>1000 MHz |
| Surface Sensor Accuracy<br>• Temperature (-50° to +50° C)<br>• Relative Humidity (0-100%)<br>• Barometric Pressure (800 to 1060 mb) | <br>0.5° C @ 25° C<br>2 %<br>0.3 mb (5) |

[1] Specified accuracy for instrument calibrated with an external target with no error.
[2] Absolute accuracy is best for sky brightness temperatures close to ambient, such as for the highest V band channels, and degrades as the absolute difference between the black body reference and sky temperatures increases.
[3] Typical resolution for 250 msec integration time is 0.25 K for MP-3000A, 2500A, 1500A, and 1 K for MP-183A.
[4] Wider ranges are available. 0-400K is optimum for meteorological applications.
[5] Optional extended range barometer: 600 to 1060 mb, +/- 2 mb.

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| Infrared Temperature Sensor Assembly[6] (optional)<br>Internally mounted, with window reflectance and temperature corrections for optimal accuracy | (0.5 + .007*ΔT)° C<br>ΔT = Tambient - Tcloud |
| Azimuth Positioner (optional):<br>Computer controlled automated full sky observations.<br>• Slew Rate<br>• Wind Speed/Operate<br>• Wind Speed/Survive | <br><br>15°/sec<br>30 m/sec<br>60 m/sec |
| Brightness Temperature algorithm for *level1* products | 4 point nonlinear model |
| Retrieval method for *level2* products | Neural Network |
| Calibration Systems<br>Primary standards<br>Operational standards | LN2 and TIP methods<br>LN2 & Ambient Targets<br>Black Body & Noise Diode |
| Environmental Operating Range<br>• Temperature<br>• Relative Humidity<br>• Altitude<br>• Wind (operational / survival) | <br>-50° to +35° C [(7)]<br>0-100 %<br>-300 to 3,000 m<br>100 km/hr / 200 km/hr |
| Physical Properties<br>• Size (height x width x length)<br>• Weight | <br>50 x 28 x 76 cm<br>29 kg |
| Power requirements<br>• Radiometer (100 to 250 VAC / 50 – 60 Hz) | <br>400 W max; 200 W typical |
| Data Interface<br>• Primary computer port<br>• Auxiliary port<br>• Standard cable length[8] | <br>RS422 57.6 Kbaud<br>RS422 57.6 Kbaud<br>30 m |
| Data File Formats | ASCII CSV<br>comma separated variables |

[6] Standard Field of View (FOV) = 5°, custom FOV available.
[7] Operating temperature can be extended to +40 C if specified at the time of order.
[8] Cable lengths up to 1,000 meters are supported by RS422.