



The MetSpy MP7 is the next model up from the MP6. Sophisticated ultrasonic (sensors have no moving parts) technology provides the most accurate weather measurements. A Photosynthetically Active Radiation sensor (PAR) is included to facilitate ETo calculations. This digital sensor can connect to a range of AquaSpy telemetry solutions, fully complementing soil moisture monitoring and making it the ultimate climate monitoring solution.

Automatic Weather Station

Wind

Wind speed	
Range	0...60 m/s
Response time	0.25 s
Available variables	average, maximum and minimum
Accuracy	± 0.3 m/s or ±2% whichever is greater
Output resolution	0.1 m/s (km/h, mph, knots)
Units available	m/s, km/h, mph, knots

Wind direction

Azimuth	0...360°
Response time	250 ms
Available variables	Average, maximum and minimum
Accuracy	± 2°
Output resolution	1°

Measurement frame

Averaging time	1...600 s (= 10 min), at one second steps on the basis of 0.25 second samples
Update interval	1...3 600 s (= 60 min), at one second steps

Liquid Precipitation

Rainfall	
	cumulative accumulation after latest automatic or manual reset
Collecting area	60 cm ²
Output resolution	0.01 mm (0.001 in)
Accuracy	5%*
Units available	mm, in
Rain duration	
	counting each ten second increment whenever droplet detected
Output resolution	10 s
Rain intensity	
	one minute running average in ten second steps
Range	0...200 mm/h (broader range with reduced accuracy)
Output resolution	0.1 mm/h (0.01 in/h)
Units available	mm/h, in/h
Hail	
	cumulative amount of hits against collecting surface
Output resolution	0.1 hits/cm ² (1 hits/in ²)
Units available	hits/cm ² , hits/in ² , hits
Hail duration	
	counting each ten second increment whenever hailstone detected
Output resolution	10 s
Hail intensity	
	one minute running average in ten second steps
Output resolution	0.1 hits/cm ² h (1 hits/in ² h)
Units available	hits/cm ² h, hits/in ² h, hits/h

* Due to the nature of the phenomenon, deviations caused by spatial variations may exist in precipitation readings, especially in short time scale. The accuracy specification does not include possible wind induced error.

WINDCAP[®] Sensor

For static speed of sound V_s : $\frac{1}{t_1} = \frac{V_s + V_w}{L}$ and $\frac{1}{t_2} = \frac{V_s - V_w}{L}$

Combine to remove V_s : $V_w = \frac{L}{2} \left(\frac{1}{t_1} - \frac{1}{t_2} \right)$

Solve for V_w

Time-of-flight for a sonic impulse from the transmit transducer to the receive transducer is determined for both directions. Simple algebra allows solving for the parallel component of wind velocity independently of the static speed of sound.

The equilateral triangle configuration of the three transducers provides three possible sets of basis vectors. The combinations yield bi-directional measurements on the paths labeled A, B and C. These measurements are used to determine the wind velocity components parallel to each of the three paths.

RAINCAP[®] Sensor

$U_j \propto V_j$
 $\rightarrow P = f(U)$

TOP The precipitation sensor detects the impact of individual raindrops. The voltage signals U_j resulting from the impacts are proportional to the volume of the drops V_j and therefore, the signal of each drop can be directly converted to accumulated precipitation P .

PTU module = Barometric Pressure, Air Temperature and Relative Humidity

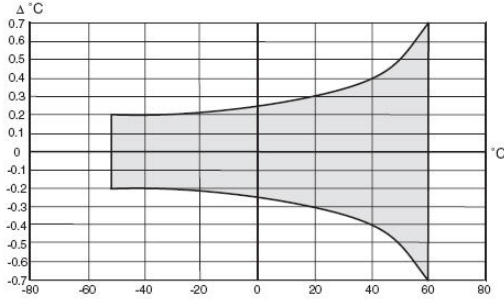
Barometric Pressure

Range	600...1 100 hPa
Accuracy	±0.5 hPa at 0...+30 °C (+32...+86 °F) ±1 hPa at -52...+60 °C (-60...+140 °F)

Output resolution	0.1 hPa, 10 Pa, 0.0001 bar, 0.1 mmHg, 0.01 inHg
Units available	hPa, Pa, bar, mmHg, inHg

Air Temperature

Range	-52...+60 °C (-60...+140 °F)
Accuracy (for sensor element) at +20 °C (+68 °F)	±0.3 °C (±0.5 °F)
Accuracy over temperature range (see graph)	



Output resolution	0.1 °C (0.1 °F)
Units available	°C, °F

Relative Humidity

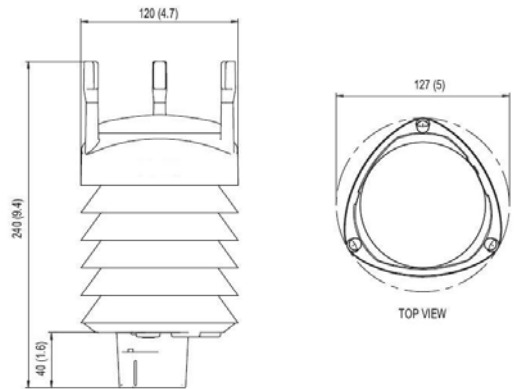
Range	0...100%RH
Accuracy	±3 %RH within 0...90 %RH ±5 %RH within 90...100 %RH
Output resolution	0.1 %RH

PTU Update Interval

Update interval	3...3 600 s (= 60 min), at one second steps
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Power Supply

Input Voltage	5...30 VDC
Power consumption on average	
minimum	0.07 mA @ 12 VDC (in SDI-12 mode)
maximum	13 mA @ 30 VDC (with continuous measurement of all parameters)
typical	3 mA @ 12 VDC (with default measuring intervals)
Heating voltage	options: DC, AC, full wave rectified AC
recommended ranges	12 VDC ±20%, 1.1 A max. 24 VDC ±20%, 0.6 A max. 68 V _{P-P} ±20% (AC), 0.6 A _{max} max. 34 V _P ±20% (f/w rect. AC), 0.6 A _{max} max.
absolute max	30 VDC 84 V _{P-P} (AC) 42 V _P (f/w rect. AC)



General

Self-diagnostic	separate supervision message, unit/status fields to validate measurement quality
Start-up	automatic, <10 seconds from power on to the first valid output
Communication protocols	SDI-12 v1.3, ASCII automatic & polled, NMEA-0183 v3.0 with query option
Port H/W	SDI-12, RS-232, RS-485, RS-422
Baud rate	1 200, 2 400...115 200
Operating temperature	-52...+60 °C (-60...+140 °F)
Storage temperature	-60...+70 °C (-76...+158 °F)
Operating humidity	0...100 %RH
Dimensions	
Height	240 mm (9.4 in)
Diameter	120 mm (4.7 in)
Weight	650 g (1.43 lbs)

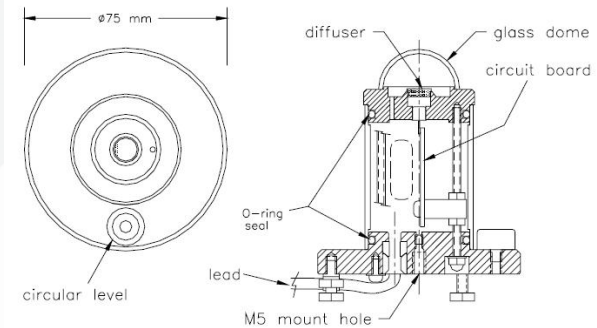
MetSpy® PAR Sensor

Performance Specification

Response time (to 95%)	30ms
Non-stability (per year)	< ± 2%
Non-linearity	< 1%
Directional response (30°-80° zenith)	< ± 30 W.m ⁻² (ISO9060 second class)
Spectral response (w.r.t clear sun)	SK01-D2: -6% (heavy haze) to +4% (bright cloud)
Temperature response	< ± 0.15% per °C
Tilt response	no tilt error

General Specification

viewing angle	2π steradians
spectral range (nominal)	SK01-D2: 300-1150nm SK01-DP2: 400-700nm
irradiance	SK01-D2: 0-2000 W.m ⁻² SK01-DP2: 0-2000 μmol.s ⁻¹ .m ⁻²
sensitivity	SK01-D2: 1mV/W.m ⁻² SK01-DP2: 0.5mV/μmol.s ⁻¹ .m ⁻²
calibration accuracy	± 3%
operating temperature	-35 °C to +60 °C
power requirement	5.5V to 14.5VDC, 3mA
sensor type	silicon photodiode
lead	3m
mounting	central M5 hole; adjustable feet
shipping size & weight; net weight	150 x 150 x 150mm, 0.5kg, 0.3kg



Note: A Solar Radiation sensor (pyranometer) can be supplied instead of the PAR sensor.