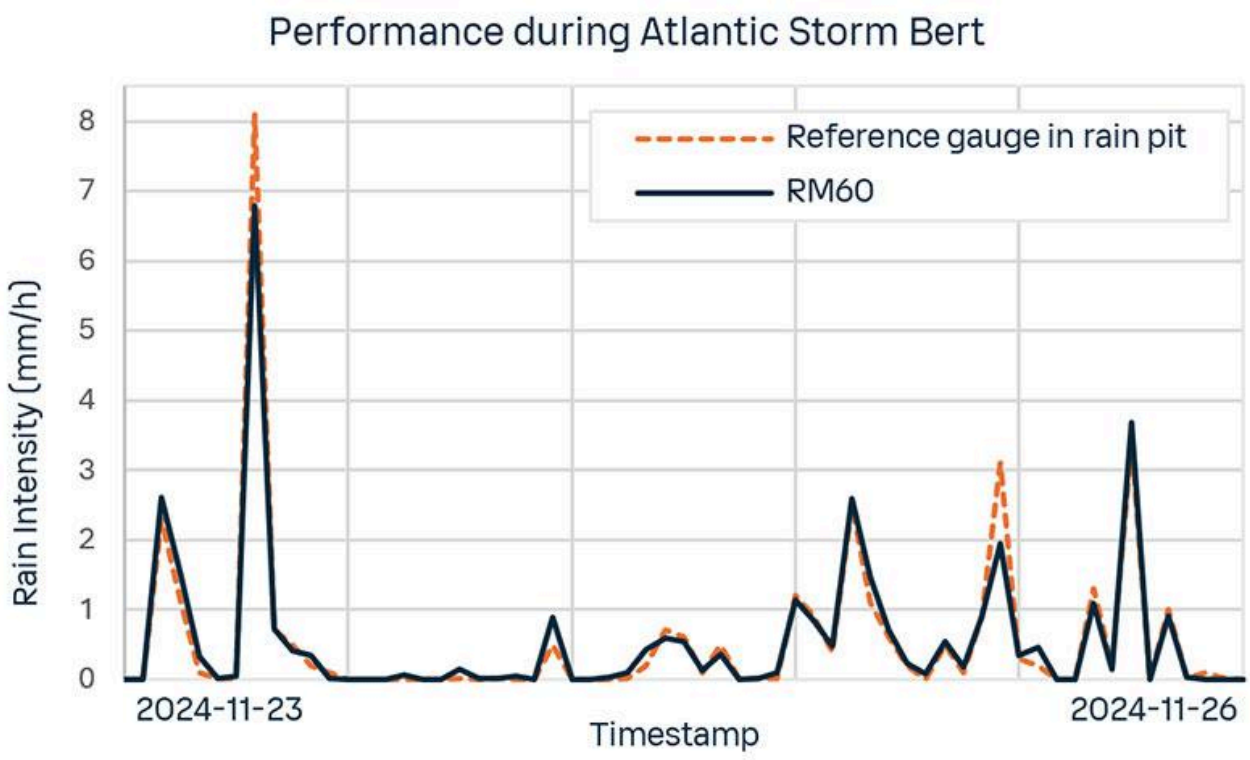
DATASHEET

RM60

Vaisala · Authorized Partner

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VAISALA

PRECICAP® Radar Precipitation Sensor RM60



Vaisala PRECICAP® Radar Precipitation Sensor RM60 reports precipitation intensity, accumulation, and precipitation type by measuring individual hydrometeors using 61 GHz Doppler radar. This patented breakthrough technology allows accurate measurements in all weather conditions without requiring heating or maintenance.

Features

- Full operating life without scheduled maintenance
- Insensitive to wind, dirt accumulation, and freezing
- Autocalibration based on physical properties of raindrops
- Low-power operation without heating in all conditions
- Measures precipitation accumulation, intensity, precipitation type, drop size distribution, and reflectivity factor
- Patented PRECICAP radar technology measuring individual hydrometeors

Breakthrough technology

The PRECICAP radar technology developed at Vaisala showcases our commitment to innovation and ingenuity. RM60 uses patented radar technology that builds on several unique features.

The narrow beam technology allows reliable measurements in windy conditions without requiring fencing structures or wind shields. Unlike conventional sensors, RM60 measures in the near field, strengthening the returning radar signals while eliminating typical disturbances caused by moving objects, such as tree branches moving in the wind. This near-field technology combined with the 61 GHz radar frequency provide RM60 with the unique capability to detect and identify individual hydrometeors, and to report even the lightest drizzle.

Accuracy without routine maintenance

RM60 is built to deliver reliable precipitation data for its full operating life without scheduled maintenance. This non-catchment type of instrument has multiple advantages over conventional rain gauges: no moving parts that would get jammed or break, no container to empty or fill with anti-icing fluid, and no openings that would get clogged.

During normal operation, RM60 autocalibrates the signals based on the physical properties of raindrops and performs adjustments if necessary. RM60 verifies that it performs as intended during precipitation with the device status reported as part of the device diagnostics. Together with the optimized design and surface material, RM60 is insensitive to wetting, and snow and ice buildup. This ensures measurement quality and reliable operation without the need for heating and cleaning.

By design, the measurement is inherently free from widely recognized catching errors, such as in-and-out splashing, wetting losses, and evaporation.[1)]

Detailed event data

RM60 detects and analyzes individual hydrometeors, providing a detailed profile of each event.

In addition to precipitation accumulation and intensity, RM60 reports precipitation type and provides data for identifying phase transitions and the peak intensity without mechanical loss. The continuous automatic measurement captures the precise start and end of precipitation.

Additionally information about the drop size distribution and reflectivity factor is reported.

Low power consumption

RM60 is a good fit for systems where the power budget is tight. Because it does not require heating, the power consumption remains low in all conditions. This makes RM60 suitable for solar or battery-powered systems at off-grid locations.

1) *World Meteorological Organization (WMO), Guide to Instruments and Methods of Observation (WMO-No. 8), Volume 1*

Technical data

Precipitation measurement performance

Precipitation intensity	
Reporting range	0.00–999.99 mm/h (0.00–40 in/h) liquid water equivalent (LWE)
Reporting resolution	0.01 mm/h (0.0004 in/h)
Minimum intensity	0.02 mm/h (0.0008 in/h)
Precipitation accumulation	
Reporting range	0–999.99 mm (0–40 in) liquid water accumulation (LWA)
Reporting resolution	0.01 mm (0.0004 in)
Accuracy [1]	2 %
Precipitation type [2]	
Type identification	Precipitation, drizzle, rain, snow, hail Light, moderate, and heavy intensities 19 different SYNOP codes reported
Additional precipitation reporting	
Drop size distribution	22 size classes
Drop size measuring range	From Ø 0.2 to > 5.5 mm (from Ø 0.008 to 0.22 in)
Reflectivity factor	Reported in units of dBZ

1) *In laboratory conditions.*
2) *Based on WMO 4680 (SYNOP) codes.*

Air pressure measurement performance

Reporting range	500–1100 hPa
Uncertainty	±0.5 hPa at adjustment point (NTP) [1]
Resolution	0.1 hPa

1) *Normal temperature and pressure*

Precipitation measurement specifications

Operating principle	Doppler radar
Operating frequency	61.0–61.5 GHz
Mean equivalent isotropic radiated power (EIRP)	< 20 dBm
Measurement area	700 cm^2
Precipitation measurement interval	User configurable

Data communication

Serial communication	RS-485
Communication protocols	• Data messages (ASCII) • Modbus RTU
Data output interval	User configurable
Configuration interface	Vaisala Insight PC software

Operating environment

Operating environment	Outdoor use
Use in wet location	Yes
Operating temperature	–40 … +60 °C (–40 … +140 °F)
Operating humidity	0–100 %RH
Maximum operating wind speed	75 m/s (168 mph)
Maximum operating altitude	5600 m (approx. 18 300 ft)
Pollution degree	4
IP rating	IP66
Storage temperature	–60 … +70 °C (–76 … +158 °F)
Storage humidity	0–100 %RH, non-condensing

Powering

Operating voltage	24 V DC nominal 9–32 V DC absolute range
Power consumption, maximum	2.9 W
Power consumption, average [1]	0.5–1.3 W
Overvoltage category	CAT I

1) *Depending on the measurement interval.*

Compliance

EU directives and regulations	RED, RoHS
Electromagnetic compatibility (EMC)	IEC/EN 61326-1, industrial environment EN 301 489-1, EN 301 489-3
Radio compatibility	ETSI EN 305 550-1 ETSI EN 305 550-2
Radio acceptance	FCC ID: 2AO39-RM60 IC: 23830-RM60
Safety	IEC/EN/AS/UL/CSA-C22.2 61010-1
Compliance marks	CE, FCC, ICES, RCM, R-NZ

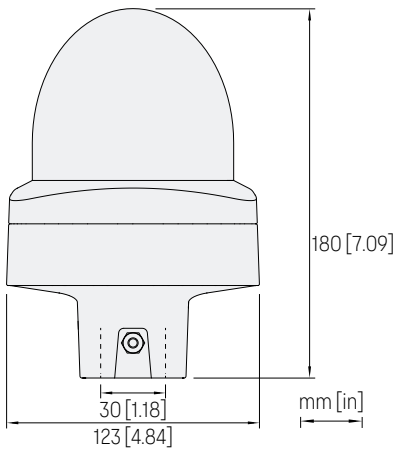
Mechanical specifications

Weight	0.9 kg (2 lb)
Connector	M12 8-pin male
Materials	Polycarbonate + glass fiber, polyethylene

Options and accessories

Mounting adapter for 30-mm pole mast	ASM216503
Mounting adapter for 60-mm pole mast	ASM216504
Mounting adapter for 40 × 40 mm support arm	SENSORARMFIX30
2-m device cable [1]	CBL211623-2M
3.5-m device cable [1]	220496
5-m device cable [1]	223283
10-m device cable [1]	220497
30-m device cable [1]	220498
USB configuration cable set [2]	USBCONFSET
Surge protector QSP431	QSP431 [3]
Surge protector WSP150	WSP150

1) *M12 8-pin connector on one end.*
2) *For use with Vaisala Insight PC software.*
3) *Contact Vaisala sales.*



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