DATASHEET

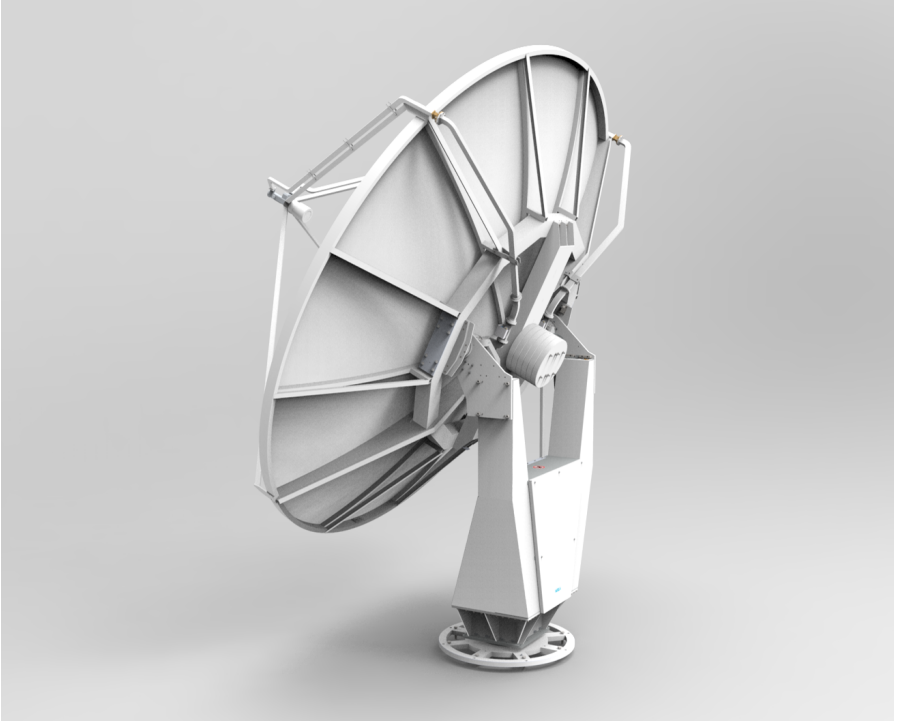
WRM200

Vaisala · Authorized Partner

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VAISALA

Weather Radar WRM200



Features

- 250 kW magnetron transmitter with low-maintenance solid-state modulator
- Vaisala lightweight, semi-yoke style pedestal
- < 1° beamwidth low side lobe antenna
- Modular single cabinet design containing transmitter, receiver, radar server, dehydrator, and waveguide assembly
- Built around RVP10™ and IRIS™ software
- Remote control and monitoring
- Image rejection > 80 dB (> 100 dB with Vaisala waveguide filters)
- Optional built-in automatic dual-channel calibration

Vaisala Weather Radar WRM200 is a dual-polarization C-band radar that uses a magnetron transmitter.

Dual-polarization

- Precision horizontal and vertical beam matching
- > 36 dB cross-polarization isolation
- Enhanced reflectivity processing in STAR mode

Dual-polarization

Dual-polarization radars send vertically and horizontally polarized microwaves to measure the parameters needed for analyzing the target shape and improving data quality.

Targets are identified as, for example, rain, hail, or snow using sophisticated data processing techniques.

HydroClass™

Vaisala Hydrometeor Classification (HydroClass) software makes optimal use of dual-channel measurements to detect the types of scatterers present in the atmosphere, such as rain, hail, snow, and even non-meteorological targets such as insects and sea clutter.

The benefit is improved data quality and more accurate warnings for hazardous weather, such as hail.

Enhanced reflectivity

Enhanced reflectivity is a signal processing technique that improves the detection capabilities of a dual-polarization radar.

The technique combines measurement data from both polarization channels for echo power estimation to improve the detectivity of weak signals over a long range.

Enhanced reflectivity is exclusive to Vaisala dual-polarization radars.

Attenuation correction

Attenuation by intervening heavy precipitation has been a long-standing concern with weather radars, especially in tropical environments where heavy rain is common.

Dual-polarization radars meet this challenge by performing accurate, real-time attenuation corrections.

Technical Data

Operating environment

Operating temperature	-40 ... +55 °C
Operating humidity	0 – 95 %RH non-condensing
Operating altitude / ambient pressure	Up to 3000 m Down to 700 hPA

Transmitter

Transmitter model	WRX122
Transmitter tube	Magnetron
Peak power	250 kW
Pulse widths	Configurable in 10 ns steps Default values: 0.5, 1.0, 2.0, and 3.0 µs
Duty cycle	0.12 %
Pulse repetition frequency (PRF)	50 – 2400 Hz
Average power	300 W, 0.0012 duty cycle
Modes	STAR or LDR

Receiver

Type	Dual-stage, dual-channel IF downconverter and digitizer
Noise figure	< 2 dB
Dynamic range	> 100 dB (3 µs pulse, 0.4 MHz NEBW)
Image rejection	> 80 dB > 100 dB with waveguide filters

Antenna

Type	Center-fed parabolic reflector
Reflector diameter	4.5 m
Gain	≥ 45 dBi
Beam width	< 1.0° (typically 0.95°)
Difference between H and V beam widths	< 0.1° (< 0.2 dB difference in gain)
Peak sidelobes at main polarization planes	< -29 dB
Integrated cross-pol isolation	< -36 dB
Cross-pol isolation at main polarization planes	< -36 dB
H/V alignment (squint angle)	< 0.1°

Pedestal

Type	Semi-yoke elevation over azimuth
Angle span software limits	-2 ... 108°
Maximum scan rate (azimuth and elevation)	40°/s (6.67 rpm)
Acceleration	20°/s^2
Position accuracy	Better than ±0.05°
Motors	Brushless AC servo

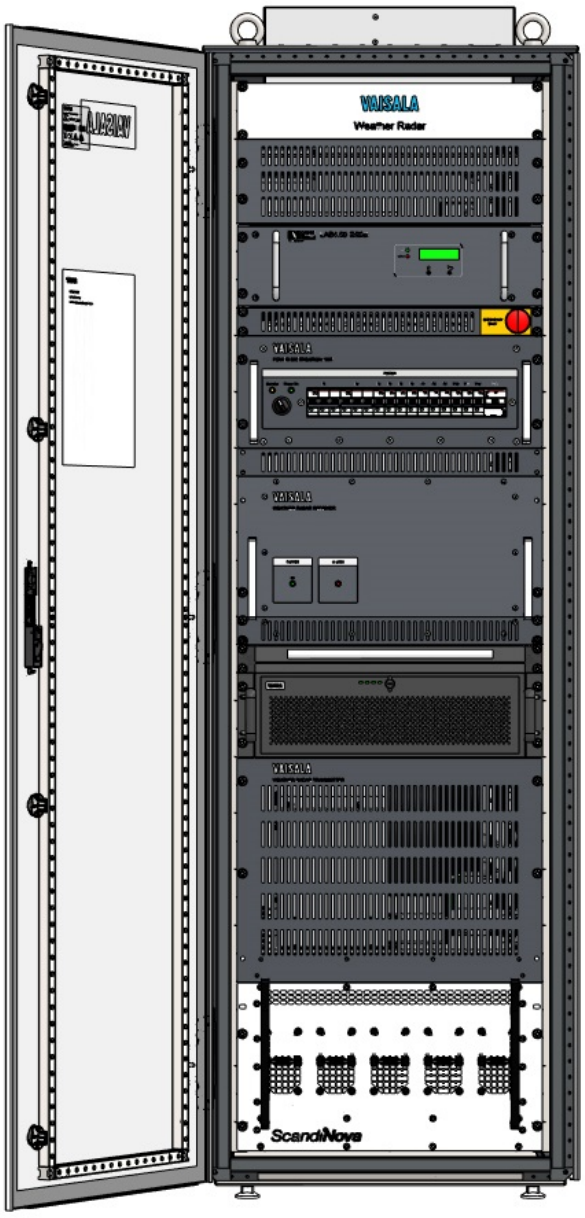
System

Frequency range	Frequency tuning range 5350 MHz – 5700 MHz, divided to subbands: • 5410-5470 MHz • 5600-5650 MHz Other subbands on request.	
Input power	1-phase / 3-phase Voltage: 230/400 V AC ±10 %, 50-60 Hz ±5 % Site mains supply fuses: 1-phase: min 32 A / 3-phase: min 16 A	
Power consumption	Pedestal	Max: 1050 W Typical: 200 W
Power consumption	Radar cabinet [1]	Max: 3000 W Typical: 2000 W[2]
Phase stability	< 0.5° rms	
Maximum RhoHV	> 0.99	
Total weight (antenna and pedestal)	1530 kg	

1) Includes cabinet cooler power consumption.
2) Ambient temperature +22 °C, 50 %RH.

Signal processing

Signal processor	Vaisala RVP10
Azimuth averaging	2–1024 pulses
IF digitizing	16 bits
Clutter filters	Fixed/Adaptive GMAP in frequency domain
Data outputs (8 and 16 bit)	`Ah/v`, `Azdr`, `CCOR`, `CSP`, `CSR`, `dBT`, `dBZ`, `dBZt`, `KDP`, `LDR`, `LOG`, `PHIH/V`, `PHIDP`, `PMI`, `R`, `RHOHV`, `SNR`, `SQI`, `T`, `V`, `VC`, `W`, `Z`, `ZC`, `ZDR`, `ZDRC`, `Zh`, `Zv`, `Zhv`
Optional data outputs	`HCLASS`, `I/Q`
Dual-polarization	Simultaneous (STAR), H only
Dual PRF velocity de-aliasing	2:3, 3:4, or 4:5 for 2X, 3X, or 4X velocity unfolding
Enhanced reflectivity processing (Zhv)	> 3 dB improvement detection gain
Processing modes	PPP, FFT/DFT, Random phase coding / SZ 8/64 phase coding for 2nd trip filtering and recovery
Maximum number of range bins	15,000
Minimum range resolution	Down to 15 m (accuracy of ±1.0 m)
Maximum range	Up to 1024 km
Range de-aliasing by random phase	



Radar controller

Type	Vaisala RCP8 with IRIS Radar
Scan modes	PPI, RHI, Volume, Sector, Manual, Rapid Scan
Local display	Real time, Ascope, BITE, products

Radar cabinet

Dimensions (w × h × d)	600 × 1890 × 1320 mm[1)]
Weight	Fully equipped: 510 kg
Cooling	Air-conditioned
Operating temperature	+10 … +40 °C
Recommended operating temperature	+15 … +25 °C
Operating humidity	0 – 95 %RH, non-condensing

1) The total height includes the cabinet protection unit and cabinet legs.

Options

Radome	Typical 6.7 m, foam core sandwich, random panel
Wide dynamic range receiver	> 125 dB (3 µs pulse, 0.4 MHz NEBW)
Automatic calibration	
Forward and reverse transmitted power monitoring	

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