VAISALA

Weather Radar WRS300



Features

- Fully solid-state transmitter
- Compact, modular design
- Low life-cycle costs
- Fast installation and easy maintenance
- High resolution, accuracy, and sensitivity
- Software-tunable transmit frequency
- Continuous runtime calibration
- Graceful degradation
- Remote control and monitoring
- Built on proven Vaisala signal processing technology

Vaisala Weather Radar WRS300 is a high-performance dual-polarization C-band radar that uses solid-state technology.

Solid-state transmitters

Solid-state power amplifier (SSPA) transmitters provide increased observation accuracy, sensitivity, and tracking quality. The software-tunable transmit frequency and frequency modulation make it easy to avoid frequency interference.

The life-cycle costs of the SSPA transmitters are low because they do not require replacement of expensive consumable parts, in contrast to tube-based transmitters.

Compact design

The compact weather radar is designed for fast installation and easy maintenance. The transceiver is located at the back of the antenna, so the site only needs a short waveguide structure with fewer components subject to mechanical stress. The simplified signal path provides improved sensitivity.

Because there is no need for a large equipment room, the site construction work is less extensive, and maintenance costs lower.

Graceful degradation

WRS300 has independent SSPA transmitters for H channel and V channel. The transmitter design combines reliable and redundant SSPA modules; even if one of the key components fails, the system will still maintain limited functionality.

Enhanced reflectivity

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

The technique uses echo power estimation to improve the detectivity of weak signals over a long range. Enhanced reflectivity is exclusive to

Vaisala dual-polarization radars.

PRELIMINARY | All information and technical specifications are subject to change

Technical Data

Operating environment for units in the radome

Operating temperature	-40 +55 °C
Operating humidity	0 100 %RH, condensing
Operating altitude/Ambient pressure	Up to 3000 m Down to 700 hPA
IP class for pedestal and transceiver	IP54

Transmitter

Туре	Fully solid-state, SSPA-based transmitters. Transmitters for H and V channels are separate and independently modulated.
Peak power (H + V)	4 kW + 4 kW or 2 kW + 2 kW
Pulse widths	0.5 90 µs
Duty cycle	max. 10%
Max. pulse repetition frequency	2500 Hz
Cooling	Forced air
Polarization	Simultaneous Transmit and Receive (= STAR), H-only, V-only

Receiver

Туре	Dual-conversion, dual-channel IF downconverter and digitizer
Noise figure	< 2 dB
Linear dynamic range	> 99 dB
Image rejection	> 80 dB > 100 dB with waveguide filters

Radar controller

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

Antenna

Туре	Center-fed parabolic reflector
Reflector diameter	4.5 m
Gain	> 45 dBi
Beam width	< 1.0°
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	< -35 dB
Cross-pol isolation at main polarization planes	< -36 dB
H/V alignment (squint angle)	< 0.1°
Weight	260 kg

Pedestal

Туре	Semi-yoke elevation over azimuth
Angle span software limits	-2 108°
Scanning rates (azimuth and elevation)	up to 40°/s (6.67 rpm)
Acceleration	20 °/s ²
Position accuracy	< 0.1°
Motors	Brushless AC servo
Weight	910 kg

Radar cabinet

Dimensions (w x h x d)	600 × 1300 × 1000 mm
Weight (without UPS and server)	100 kg
Operating temperature	+10 + 40 °C
Recommended operating temperature	+15 + 25 °C
Operating humidity	0 95 % RH, non-condensing
Operating altitude/ Ambient pressure	Up to 3000 m Down to 700 hPA

System

Frequency range	5500 MHz 5700 MHz Selectable in 50 MHz bands and tunable within the range.
Phase stability	< 0.1° rms
Input power	Voltage: 230 ± 10 %, 50 60 Hz ± 3 Hz 32 A, single-phase
Power consumption	Max. 4000 W Typical: 2000 W
Weight of the transmitter-receiver assembly	340 kg

Signal processing

Signal processor	RVP900
Azimuth averaging	2 1024 pulses
Clutter filters	IIR, fixed, and adaptive width GMAP
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
Dual PRF velocity de-aliasing	2:3, 3:4, or 4:5 for 2X, 3X, or 4X de-aliasing
High sensitivity Zhv STAR mode processing	> 3 dB improvement detection gain
IF digitizing	16 bits, up to 5 channels, up to 100 MHz sampling
Number of range bins	Up to 8168 per channel
Optional data outputs	HCLASS, I/Q
Processing modes	PPP, FFT/DFT, Random Phase 2nd trip filtering/ recovery
Range resolution	Down to 22 m



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