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# Vaisala Weather Radar WRK100


## High-Performance and Reliability

The WRK100 is Vaisala's single polarization C-band klystron Doppler Weather Radar. The modular system design consists of a high-performance antenna and pedestal and a double cabinet that contains the transmitter, receiver, power supplies, dehydrator and processor. The various components have been engineered and tested for long-life and low-maintenance in even the harshest environments. The benefit is high-data quality and availability for critical weather service operation.

Like all Vaisala Weather Radars, the WRK100 incorporates the advanced Vaisala Sigmet family of signal and data processing products. Vaisala Sigmet processors are the world standard, used in radar networks such as the US NEXRAD, Environment Canada, Spanish INM and at various international airports for TDWR wind shear detection applications. Vaisala Sigmet software provides comprehensive radar product generation, display and forecasting features. Integration to other Vaisala systems such as lightning detection networks, rain gauge, LLWAS and surface weather is available.

## Engineered for Remote Operation

For most customers, unattended remote operation is essential. The WRK100's comprehensive remote control, BITE and active monitoring features allow radar maintenance to be coordinated from a central facility. The detailed level of fault reporting allows maintenance personnel to accurately assess any problem before traveling to the radar site. The benefit is reduced MTTR and higher data availability.

## Features/Benefits

- 250 kW Klystron transmitter with low-maintenance solid-state modulator
- Vaisala's light-weight, semi-yoke-style pedestal
- 1 degree beamwidth low side lobe antenna
- Modular double-cabinet design
- Built around Vaisala Sigmet RVP900 signal processor
- Wide dynamic range digital IF receiver
- Dynamic range >99 dB (2 µs pulse). Optional wide dynamic range >115 dB
- Image rejection >80 dB (>100dB with Vaisala WG filters).
- Integral flat screen display for local maintenance
- Remote control/monitoring
- Improved interference filtering
- Feed forward control loop to allow extremely fast and precise antenna movement
- Options:
  - Built-in automatic calibration
  - Dual polarization upgrade ready

## Investment Protection for the Future

The service life of a modern weather radar system can be over 15 years, during which time there will be major technology advances. Vaisala's modular approach and use of accepted open interface standards is designed to make the WRK100 upgradeable in the future. For example, the system can be purchased as dual-pol ready, or upgraded in the field to dual polarization.

# Technical Data

## Transmitter

| | |
|---|---|
| Type | Klystron VKC8387 |
| Operating frequency range | 5.6 - 5.65 GHz |
| Peak power | 250 kW |
| Average power | max 550 W |
| Duty cycle | 0.0022 |
| Pulse widths | Typical 0.5, 1.0, 2.0, max 5.0 µs |
| PRF | 250 to 2125 Hz |
| Modulator | Solid State |
| Phase stability | ≤0.1 deg rms |

## Antenna

| | |
|---|---|
| Type | Center-fed parabolic reflector |
| Diameter | 4.5 m |
| Gain (typical) | 45 dB |
| Beam width | <1 degree |
| Peak side lobe (typical) | -28 dB |
| Peak on horizontal axis (typical) | -33 dB |
| Polarization | Linear horizontal |
| Weight | 620 kg |

## Pedestal

| | |
|---|---|
| Type | Semi yoke elevation over azimuth |
| Elevation range | -2 to 108 degrees |
| Maximum scan rate | 40 deg/sec |
| Acceleration | 20 deg/sec$^2$ |
| Position accuracy | 0.1 deg |
| Weight | 900 kg (total with antenna 1520 kg) |
| Motors | Brushless AC servo |

## RF-to-IF Receiver

| | |
|---|---|
| Type | Dual stage IF downconverter |
| Dynamic range | >99 dB ( 2 µs pulse ) |
| Optional wide dynamic range | >115 dB |
| IF frequency | 442/60 MHz |
| Image rejection | >80 dB (>100dB with Vaisala WG filters) |
| Phase stability | 0.1 deg rms |
| Tuning range | 5.5 - 5.7 GHz |
| Noise figure | < 2 dB |

## Radar Controller

| | |
|---|---|
| Type | Vaisala SIGMET RCP8 with IRIS/Radar |
| Scan modes | PPI, RHI, Volume, Sector, Manual |
| Local display | Real time, ascope, BITE, products |

## Digital IF Receiver and Signal Processor RVP900

| | |
|---|---|
| Type | Vaisala Sigmet RVP900 |
| IF digitizing | 16 bits, 100 MHz in 5 channels |
| Range resolution | N*15 m |
| Number of range bins | Up to 4050 |
| Velocity dealiasing | Dual PRF 2x, 3x, 4x |
| Range dealiasing | by phase coding |
| Clutter filters | fixed, adaptive or GMAP to >55 dB clutter cancellation |

## System Specifications

| | |
|---|---|
| PHYSICAL DIMENSIONS | |
| Cabinet (w x h x d) | 1400 x 1800 x 1300 mm |
| Cooling | Air-conditioned and forced air |
| Weight | 977 kg |
| Total height | 1890 mm |
| CABINET ENVIRONMENT | |
| Operating | +5 °C to +40 °C, 0 to 95 %RH, non-condensing |
| Recommended | +15 °C to +25 °C |
| Storage | -50 °C to +50 °C without oil<br>-10 °C to +50 °C with oil |
| ANTENNA/PEDESTAL ENVIRONMENT | |
| Operating | -40 °C to +55 °C, 0 to 95 %RH, non-condensing |
| Storage | -50 °C to +50 °C |
| INPUT POWER | |
| Voltage | 230/400 VAC +10 %, 50-60 Hz ±5 % |
| POWER CONSUMPTION | |
| Cabinet | max. 8720 W with UPS<br>max. 7850 W without UPS |
| Antenna/pedestal | 1050 W (max.), 200 W (typical) |

## Options

| | |
|---|---|
| Dual pol ready | Factory prepared antenna and pedestal for dual pol |
| Radome | 6.7 m, foam core sandwich, random panel |
| Automatic calibration | |
| Forward and reverse transmitted power monitoring | |

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