Vaisala Weather Radar WRK100 is a single polarization radar that uses a coherent klystron transmitter.

**Modular System Design**
The modular system design consists of a high performance antenna/pedestal and a double cabinet that contains the transmitter, receiver, power supplies, dehydrator, processor and polarization waveguide assembly.

The components have been engineered and tested for long life and low maintenance in even the most harsh environments.

**Remote Operation**
Comprehensive remote control, BITE and active monitoring features allow radar maintenance to be coordinated from a central facility to reduce repair time and ensure data availability.

The detailed level of fault reporting allows maintenance personnel to accurately assess any problem before traveling to radar sites.

**Upgrade Options**
WRK100 can be upgraded to dual polarization. The upgrade options are:

* Dual polarization waveguide structures installed in the factory but taken into use later with software installations carried out at the site.
* On-site upgrade, including software upgrades and the installing dual polarization waveguide structures.

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**Features**

- 250 kW klystron transmitter with low-maintenance solidstate modulator
- Vaisala lightweight, semi-yoke style pedestal
- 1° beamwidth low side lobe antenna
- Built around RVP900™ and IRIS™ software
- Image rejection > 80 dB (> 100dB with Vaisala waveguide filters)
- Built-in automatic calibration (optional)
- Feed forward control loop to allow extremely fast and precise antenna movement
- Fully programmable scanning
- Dynamic range >99 dB (2μs pulse)
- Wide dynamic range digital IF receiver (optional)
## Technical Data

### Transmitter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter tube</td>
<td>Klystron VKC8387</td>
</tr>
<tr>
<td>Frequency range</td>
<td>5.6 ... 5.65 GHz</td>
</tr>
<tr>
<td>Peak power</td>
<td>250 kW</td>
</tr>
<tr>
<td>Average power</td>
<td>max 550 W</td>
</tr>
<tr>
<td>Duty cycle</td>
<td>0.0022</td>
</tr>
<tr>
<td>Pulse widths</td>
<td>Typical 0.5, 0.8, 1.0, 2.0, max 5.0 μs</td>
</tr>
<tr>
<td>Pulse repetition frequency</td>
<td>250 ... 2125 Hz</td>
</tr>
<tr>
<td>Modulator</td>
<td>Solid state</td>
</tr>
<tr>
<td>Phase stability</td>
<td>&lt;0.1 degms</td>
</tr>
</tbody>
</table>

### Antenna and Pedestal

- **Operating temperature**: -40 ... +55 °C
- **Operating humidity**: 0 ... 95 % non-condensing
- **Storage temperature**: -50 ... +60 °C
- **Total weight (4.5 m antenna and pedestal)**: 1520 kg
- **Operating altitude/Ambient pressure**: Up to 3000 m / Up to 700 hPA

### Antenna

- **Type**: Center-fed parabolic reflector
- **Reflector diameter**: 4.5 m
- **Gain (typical)**: 45 dB
- **Beam width**: < 1.0°
- **Peak side lobes at main polarization planes**: < -28 dB
- **Weight (4.5 m reflector)**: 620 kg

### Pedestal

- **Type**: Semi-yoke elevation over azimuth
- **Angle span software limits**: -2 ... 108°
- **Maximum scan rate**: 40 degrees/second
- **Acceleration**: 20 degrees/second²
- **Position accuracy**: < 0.1°
- **Motors**: Brushless AC servo
- **Weight**: 900 kg

### Signal Processing

- **Signal processor**: Vaisala RVP900
- **Azimuth averaging**: 2 ... 1024 pulses
- **Clutter filters**: IIR, fixed, and adaptive width GMAP >55 dB rejection
- **Data outputs**:
  - (8 and 16 bit): $\text{Ah/v, Azdr, CCOR, CSP, CSR, dBZ, dBZt, LOG, R, SNR, SQI, T, V, W, Z, ZC, Zh, Zv}$
- **Dual PRF velocity de-aliasing**: 2:3, 3:4, or 4:5 for 2X, 3X, or 4X de-aliasing
- **High sensitivity Rhv STARmode processing**: > 3 dB improvement detection gain
- **IF digitizing**: 16 bits, 100 MHz in 5 channels
- **Number of range bins**: Up to 4200
- **Optional data outputs**: I/Q
- **Processing modes**: PPP, FFT/DFT, Random Phase 2nd trip filtering/recovery
- **Range resolution**: N*15 m
- **Range de-aliasing by random phase**

### System Specifications

- **Input power**: Voltage: 1-phase 230/400 VAC ±10 % 50–60 Hz ± 5 %
- **Site mains supply fuses**: min 25 A
- **Pedestal**: 1050 W (max.) / 200 W (typical)
- **Radar cabinet**: Max. 8720 W with UPS
  - Max. 7850 without UPS
- **Phase stability**: < 0.1° rms
- **Maximum RhoHV**: > 0.99

### Options

- **Radome**: Typical 6.7 m, foam core sandwich, random panel
- **Dual pol ready**: Factory prepared antenna and pedestal for dual polarization
- **Automatic calibration**
- **Forward and reverse transmitted power monitoring**
- **Wide dynamic range receiver**: > 115 dB
### Radar Receiver

<table>
<thead>
<tr>
<th>Type</th>
<th>Dual stage downconverter and digitizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise figure</td>
<td>&lt; 2 dB</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>&gt; 99 dB (2 microsecond pulse), (option &gt; 115 dB)</td>
</tr>
<tr>
<td>Image rejection</td>
<td>&gt; 80 dB</td>
</tr>
<tr>
<td>Tuning range</td>
<td>5.5 ... 5.7 GHz</td>
</tr>
<tr>
<td>1st intermediate frequency</td>
<td>442 MHz</td>
</tr>
<tr>
<td>2nd intermediate frequency</td>
<td>60 MHz</td>
</tr>
</tbody>
</table>

### Radar Controller

<table>
<thead>
<tr>
<th>Type</th>
<th>Vaisala RCP8 with IRIS Radar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan modes</td>
<td>PPI, RHI, Volume, Sector, Manual, Rapid Scan</td>
</tr>
<tr>
<td>Local display</td>
<td>Real time, Ascope, BITE, products</td>
</tr>
</tbody>
</table>

### Radar Cabinet

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (w x h x d) 1400 x 1800 x 1300 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total height</td>
<td>1890 mm(^1)</td>
</tr>
<tr>
<td>Weight</td>
<td>977 kg</td>
</tr>
<tr>
<td>Cooling</td>
<td>Equipment rack: air-conditioned, Transmitter: forced air</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>+5 ... +40 °C, +15 ... +25 °C recommended</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>0 ... 95 % RH, non-condensing</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-50 °C ... +50 °C without oil, -10 ... +50 °C with oil</td>
</tr>
<tr>
<td>Operating altitude/ Ambient pressure</td>
<td>Up to 3000 m, Up to 700 hPA</td>
</tr>
</tbody>
</table>

\(^1\) The total height includes the pedestal protection unit and cabinet legs.