



Vaisala radiosondes are known for their accuracy, reliability, and ease of use.

Independent and passive windfinding

Vaisala Radiosonde RS41-D is the radiosonde model for Vaisala Radiotheodolite RT20 systems. RS41-D measures pressure, temperature and humidity, and RT20 provides a passive and independent windfinding solution.

RS41-D PTU sensors

Vaisala Radiosonde RS41 temperature sensor uses linear resistive platinum technology and is stable. The small size of the sensor results in low solar radiation error and guarantees fast response. It also incorporates effective protection against evaporating cooling, a phenomenon occasionally encountered when a radiosonde emerges from a cloud top.

The humidity sensor integrates humidity and temperature sensing elements. Preflight automatic reconditioning of the humidity sensor effectively removes chemical contaminants and ensures excellent humidity measurement accuracy. The integrated temperature sensor compensates the effects of solar radiation in real time. The sensor heating function enables an active and effective

deicing method at freezing conditions during the flight. The humidity sensor also responds quickly to detect fine structures of the atmosphere.

The pressure sensor is a high-quality, shock-resistant capacitive silicon sensor. All RS41 sensors are calibrated against references that are traceable to international standards (SI units) and measurement uncertainties are estimated according to recommendations of the Joint Committee for Guides in Metrology, 100:2008.

RS41 ground checks

Automated ground check before flight includes temperature check, humidity sensor recondition, humidity check, and setting radiosonde parameters.

Short range wireless communication link with range around 4 cm is used in ground check devices for data transfer during the ground check.

Pressure measurement ground check is done by comparing and adjusting the pressure reading either against an optional barometer module installed inside the ground check device, or against an external precision barometer.

Features

- Independent and passive windfinding with Vaisala Radiotheodolite RT20 systems
- Superior PTU measurement performance
- Automated ground check
- Robust and easy-to-use design with informative LEDs
- Stable narrow-band transmission complies with ETSI standard EN 302 454
- Unwinder for consistent sensor boom positioning

Technical data

Measurements

Measurement cycle	1 s
Temperature sensor	Type: Platinum resistor
Measurement range	+60 °C to –95 °C
Resolution	0.01 °C
Response time (63.2%, 6 m/s flow, 1000 hPa) ¹⁾	0.5 s
Stability 1 year / 3 years	< 0.05 °C / < 0.1 °C
Accuracy:	
Repeatability in calibration	0.1 °C
Combined uncertainty after ground preparation	0.2 °C
Combined uncertainty in sounding < 16 km	0.3 °C
Combined uncertainty in sounding > 16 km	0.5 °C
Reproducibility in sounding ²⁾	
> 100 hPa	0.15 °C
< 100 hPa	0.30 °C
Humidity sensor	Type: Thin-film capacitor
Measurement range	0 to 100 %RH
Resolution	0.1 %RH
Response time	
6 m/s, 1000 hPa, +20 °C	< 0.3 s
6 m/s, 1000 hPa, –40 °C	< 10 s
Accuracy:	
Repeatability in calibration	2 %RH
Combined uncertainty after ground preparation	3 %RH
Combined uncertainty in sounding	4 %RH
Reproducibility in sounding ²⁾	2 %RH
Pressure	Type: Silicon capacitor
Measurement range	From surface pressure to 3 hPa
Resolution	0.01 hPa
Accuracy:	
Repeatability in calibration	
> 100 hPa	0.4 hPa
100 - 3 hPa	0.3 hPa
Combined uncertainty in sounding	
> 100 hPa	1.0 hPa
100 - 3 hPa	0.6 hPa
Reproducibility in sounding ²⁾	
> 100 hPa	0.5 hPa
100 - 3 hPa	0.3 hPa

1) After applying time-lag correction, the effect to measurement uncertainty is negligible.
2) Standard deviation of differences in twin soundings, ascent rate above 3 m/s for temperature and humidity

Telemetry

Compatibility	With Vaisala Radiotheodolite RT20 systems
Transmitter type	Synthesized
Frequency band	1668.4 - 1690 MHz
Tuning range	1668.6 - 1689.8 MHz
Maximum transmitting range	Up to 160 km
RF compatibility	According to EN 302 454
Output power	200 mW, typical
Modulation	GFSK
Frequency setting	Wireless with ground check device

Operational data

Power-up	Wireless or with switch
Factory calibration	Stored on Flash memory
Battery	2 pcs AA-size Lithium cells
Operating time	> 135 min
Weight	84 g
Dimensions (for cover, without wire antenna)	Body (L × W × H): 155 × 63 × 46 mm Sensor boom bent (L × W × H): 282 × 63 × 104 mm
Environmental tests (transit drop, vibration)	MIL-STD-810G

Unwinder

Material of the string	Non-UV treated polypropylene
Strength (pull)	< 115 N
Length of the string	55 m
Unwinding speed	0.35 m/s
Weight	25 g

Measurement performance data is expressed with 2-sigma confidence level (k=2), unless otherwise explicitly specified.
For humidity, the performance data is valid T > –60 °C