VAISALA

Present Weather and Visibility Sensors PWD10, PWD12, PWD20, and PWD22

Features

All models:

- Accurate and traceable measurement of prevailing visibility
- Compact and lightweight
- Easy to install

Additionally PWD12 and PWD22 models:

- Indicate the cause of reduced visibility
- Identify precipitation type
- Measure the intensity and accumulation of precipitation
- Estimate snow accumulation

Vaisala PWD series of present weather detectors and visibility sensors provide you off-the-shelf accuracy and reliability. They are a sensor family that grows with your needs.

Tens of thousands of Vaisala present weather and visibility sensors are installed around the world, working reliably and accurately in diverse applications and climates. In Vaisala PWD series, you find the mix you require of visibility measurement range (MOR), characterization of reduced visibility, precipitation type identification, precipitation accumulation/intensity measurement, and report formats (WMO, NWS code tables).

Proven measurement principles for present weather

PWD12 and PWD22 identify the precipitation type by accurately estimating the water content of precipitation with a capacitive device (Vaisala RAINCAP® sensor element) and combining this information with optical forward scatter and temperature measurements. These 3 independent measurements are processed through sophisticated algorithms to produce an accurate evaluation of the weather type according to the WMO and NWS code tables.

Accurate visibility measurement

Calibrated with reference to a highly accurate transmissometer, Vaisala PWD series sensors use the proven forward-scatter measurement principle to report meteorological optical range (MOR). The visibility sensor is well-protected against contamination: the optical components point downward and hoods protect the lenses against precipitation, spray, and dust. This weatherproof design of PWD sensors provides accurate measurement results and reduces the need for maintenance. The optional hood heaters are recommended for wintry conditions to prevent ice and snow accumulation.

Easy installation

PWD sensors are less than 1 meter long. All are compact, light-weight, come with a cable and connector for easy installation, and can be mounted in many ways on any existing mast.

PWD sensor applications

Vaisala Present Weather Detector PWD22

Economical visibility measurement for road weather applications

With a measurement range of 10–2000 meters, PWD10 offers economical and reliable visibility measurement for road weather applications. PWD10 is recommended for road weather systems that alert drivers to, for example, reduced visibility.

PWD12 is ideal for road weather applications.

For sophisticated road weather applications

Vaisala Present Weather Detector PWD12 provides accurate visibility and present weather measurement in the road environment, where low visibility is a serious safety hazard and significantly reduces traffic flow rates. With a visibility measurement range of 10–2000 meters, PWD12 is ideal for road weather applications. PWD12 also indicates the cause of reduced visibility to give you a full picture of weather conditions. Its ability to detect precipitation and identify precipitation type gives the road authority valuable information for the short-range planning of road maintenance operations.

Wherever visibility measurement is needed

With a measurement range of 10–20 000 meters, PWD20 offers long-range visibility measurement for diverse applications covering harbors, coastal areas, heliports, windmill parks – indeed, any locations or areas where visibility measurement is necessary.

PWD sensors can be used in planning road maintenance.

For meteorological and aviation applications

With a visibility measurement range of 10–20 000 meters, PWD22 is a two-in-one forward scatter visibility and present weather sensor. PWD22 is recommended for automatic weather stations, especially low-power ones that are used for general meteorological and aviation applications.

PWD22's ability to detect freezing precipitation makes it possible to issue warnings when the weather presents safety hazards for road and air traffic.

PWD22 is equipped with 2 Vaisala RAINCAP® sensor elements to improve detection sensitivity during light precipitation events – even light drizzle is detected. PWD22 also reports present weather in WMO METAR code format so it is easily integrated with AWOS systems.

PWD22 is recommended for automatic weather observation systems (AWOS).

Technical data

PWD10 measurement performance

Operating principle	Forward scatter measurement with 45° scattering angle
Measurement interval	15 s
Reporting range of MOR (visibility)	10–2000 m (32–6500 ft)
Reporting resolution	1 m (3 ft)
Reporting uncertainty in operational conditions	±10 % at 10–2000 m (32–6500 ft)[1)]
Measurement error (instrument consistency)	±2.5 %

1) Fulfills ICAO Annex 3: ±50 m (164 ft) up to 600 m (1968 ft)

PWD12 measurement performance

Operating principle	Forward scatter measurement with 45° scattering angle
Measurement interval	15 s
Reporting range of MOR (visibility)	10–2000 m (32–6500 ft)
Reporting resolution	1 m (3 ft)
Reporting uncertainty in operational conditions	±10 % at 10–2000 m (32–6500 ft) [1)]
Measurement error (instrument consistency)	±2.5 %
Weather type identification	4 different types of precipitation (rain, drizzle, mixed rain/snow, snow) Precipitation (unknown type) Fog (mist), haze (smoke, sand) or clear
Weather type reporting	WMO 4680 (SYNOP) and NWS code tables:39 different codes supported from WMO 4680 code table
Precipitation detection sensitivity (threshold)	0.05 mm/h (0.0020 in/h) or less, within 10 minutes
Precipitation reporting resolution	Intensity 0.01 mm/h Accumulation 0.01 mm
Precipitation intensity measurement	0.00–999.99 mm/h (0.00–39.37 in/h)
Precipitation amount measurement	0.00–99.99 mm (0.00–3.94 in)
Amount of new snow	0.00–999 mm (0.00–39.33 in)

1) Fulfills ICAO Annex 3: ±50 m (164 ft) up to 600 m (1968 ft)

PWD20 measurement performance

Operating principle	Forward scatter measurement with 45° scattering angle
Measurement interval	15 s
Reporting range of MOR (visibility)	10–20 000 m (32–65 600 ft)
Reporting resolution	1 m (3 ft)
Reporting uncertainty in operational conditions	±10 % at 10–10 000 m (32–32 800 ft)[1)] ±15 % at 10–20 km (2.6–12 mi)
Measurement error (instrument consistency)	±2.5 %

1) Fulfills ICAO Annex 3: ±50 m (164 ft) up to 600 m (1968 ft)

PWD22 measurement performance

Operating principle	Forward scatter measurement with 45° scattering angle
Measurement interval	15 s
Reporting range of MOR (visibility)	10–20 000 m (32–65 600 ft)
Reporting resolution	1 m (3 ft)
Reporting uncertainty in operational conditions	±10 % at 10–10 000 m (32–32 800 ft)[1)] ±15 % at 10–20 km (2.6–12 mi)
Measurement error (instrument consistency)	+2.5 %
Weather type identification	7 different types of precipitation (rain, freezing rain, drizzle, freezing drizzle, mixed rain/snow, snow, ice pellets) Precipitation (unknown type) Fog (mist), haze (smoke, sand) or clear
Weather type reporting	WMO 4680 (SYNOP), 4678 (METAR) and NWS code tables: 49 different codes supported from WMO 4680 code table
Precipitation detection sensitivity (threshold)	0.05 mm/h (0.0020 in/h) or less, within 10 minutes
Precipitation reporting resolution	Intensity 0.01 mm/h Accumulation 0.01 mm
Precipitation intensity measurement	0.00–999.99 mm/h (0.00–39.37 in/h)
Precipitation amount measurement	0.00–99.99 mm (0.00–3.94 in)
Amount of new snow	0.00–999 mm (0.00–39.33 in)

1) Fulfills ICAO Annex 3: ±50 m (164 ft) up to 600 m (1968 ft)

Inputs and outputs

Power supply	12–50 V DC (electronics) 24 V AC or 24 V DC for heater option
Average power consumption	3 W (peak 10 W) With optional luminance sensor: 5 W With optional hood heaters: 65 W
Outputs	Serial line RS-232 or RS-485 (2-wire) 3 relay controls (open collector) Analog output current: 0–1 mA or 4–20 mA 8-m power/data cable (standard) with connector at PWD end
Auxiliary data in data messages	Low visibility alarms. 3 adjustable alarm limits to set the 3 relay controls. Hardware status (fail/warning). 3rd relay control output can also be driven by hardware status.

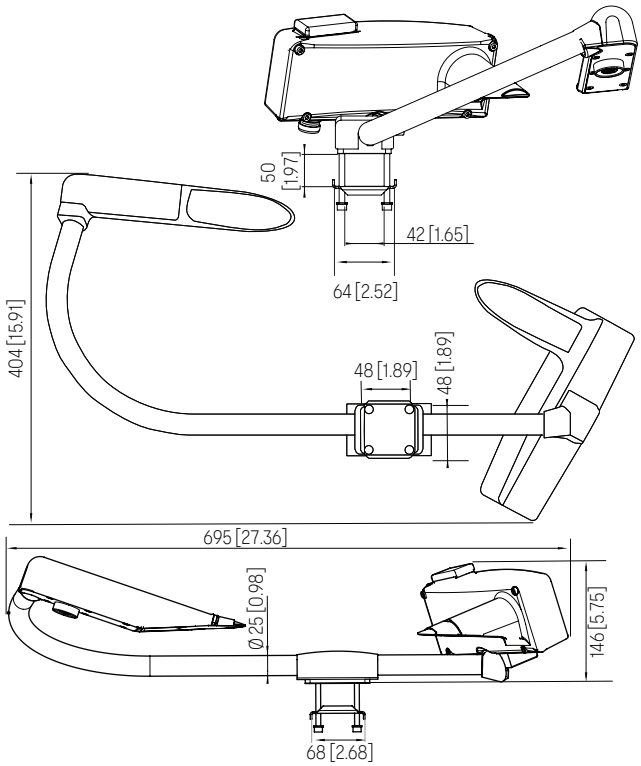
Operating environment

Operating temperature	−40 ... +60 °C (−40 ... +140 °F)
Storage temperature	−40 ... +60 °C (−40 ... +140 °F)
Operating humidity	0–100 %RH
Maximum operating wind speed	60 m/s (134 mph)
Sensor orientation	Align receiver to look away from bright lights (sun or flashing beacons)
IP rating	IP66

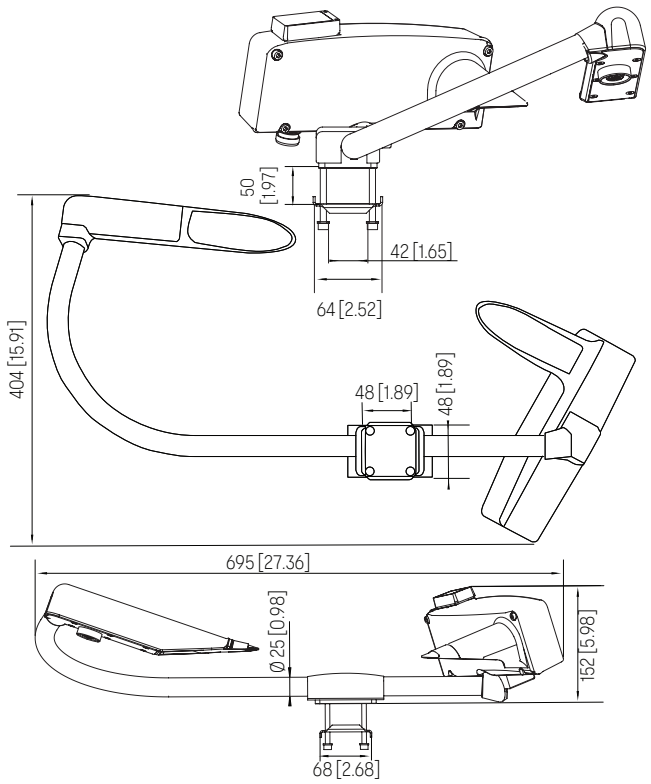
Technical data

Mechanical specifications

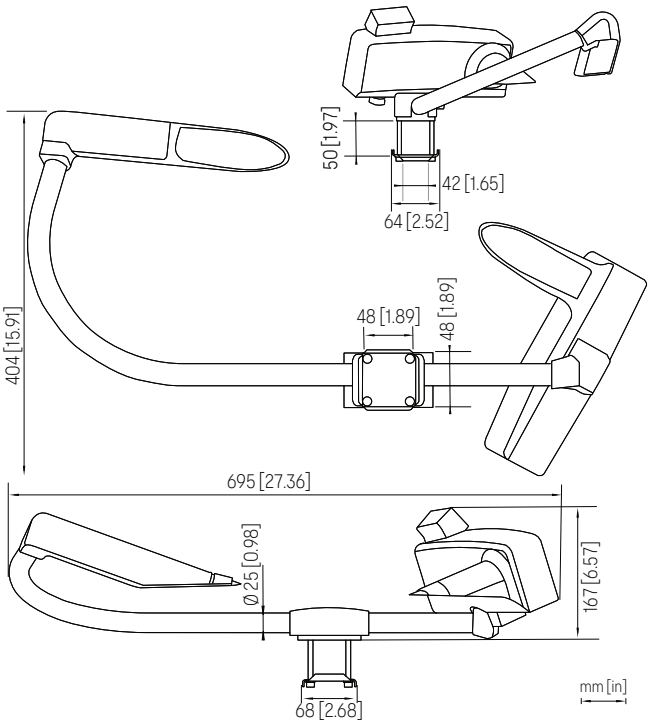
Weight	3 kg (6.61 lb)
Material	Aluminum
Dimensions (H × W × L)	PWD10 and PWD20: 146 × 404 × 695 mm (5.75 × 15.91 × 27.36 in) PWD12: 152 × 404 × 695 mm (5.98 × 15.91 × 27.36 in) PWD22: 167 × 404 × 695 mm (6.57 × 15.91 × 27.36 in)



PWD10/20 dimensions



PWD12 dimensions



PWD22 dimensions

Compliance

Compliance marks	CE
EU directives and regulations	EMC Directive (2014/30/EU) RoHS Directive (2011/65/EU) as amended by 2015/863
Electromagnetic compatibility (EMC)	IEC 61326-1, industrial environment CISPR 32 / EN 55032, Class B
Corrosion and salt mist	VDA 621-415

Options and accessories

Fiberglass mast, 2.1 m (6 ft 11 in), Ø 60–86 mm (2.36–3.39 in), frangible, white	PWFM210
Aluminum mast, 3 m (9 ft 10 in), Ø 60 mm (2.36 in), white	DKP203W
Aluminum mast, 2 m (6 ft 7 in), Ø 60 mm (2.36 in), white	DKP202W
Interface unit for powering	BOX221/BOX222
Luminance sensor	PWL111
Hood heaters for harsh winter conditions	PWH111
Support arms for mast installations	Various [1)]
Mounting clamps for mast top installations	Various [1)]
Calibration set (2-point calibration)	PWA12
Calibration set (3-point calibration)	PWA13
Maintenance cable (USB) for BOX221 and BOX222	219688

1) For the options, contact Vaisala sales.

Spare parts

Transmitter circuit board	PWT11
Transmitter optics module (includes PWT11 and lens)	DRW214776
Controller/Receiver for PWD10 Controller/Receiver for PWD12 Controller/Receiver for PWD20 Controller/Receiver for PWD22	PWC10 PWC12 PWC20 PWC22
RAINCAP (single plate) (PWD12)	PWR111
RAINCAP (double plate) (PWD22, PWD52)	PWR211SP

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