

# Visibility and present weather sensors

you can trust . . .



***Biral***  
***HSS sensors***

visibly better

***Biral***



## HSS Application Examples

**HIGHWAY** – HSS sensors can improve highway safety by providing immediate and accurate knowledge of roadside weather and visibility conditions.

- continuously monitor roadside visibility
- easy to site and install
- not prone to interference or false alarms common to back scatter sensors.
- operate reliably for many years
- have the lowest running costs on the market.
- provide an accurate, low powered, standalone operation requiring no human intervention.
- improve fire safety in tunnels by providing a back up to smoke detection systems.

**SUITABLE MODELS:**

**VF-500**

- automatically switches hazard or speed restriction signs.

**VPF-710**

- collects visibility data for adjustment of Intelligent Traffic Systems and alerting traffic control centres

**VPF-730**

- collects visibility AND present weather data for a complete weather picture for traffic control centres and national weather services

**RESEARCH** – the HSS sensor is also a powerful research instrument for meteorological data collection.

- proven accuracy, reliability and repeatability
- used by national weather services and research organisations
- suitable for all climates from the Tropics to the Antarctic.

**SUITABLE MODELS:**

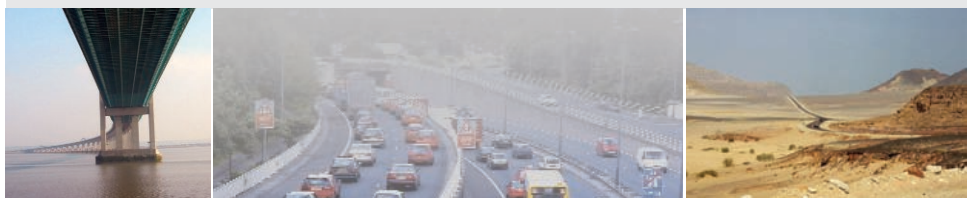
**VPF-710**

- measures visibility (EXCO, MOR) for example
- used in a network of maritime monitoring stations and platforms
- used for research into hygroscopicity and optical properties of dust particles in mineral dust

**VPF-730**

- measures visibility AND present weather including:
  - atmospheric extinction
  - horizontal visibility
  - rain rate and type
  - particle number
  - droplet spectra
- for example
- characterisation of cloud and precipitation.
- analysis of precipitation in tropical mountain forests
- fog physics and prediction

To see more research projects please visit: [www.biral.com/research](http://www.biral.com/research)



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## Proven track record

The HSS sensors are used by national weather services, defence organisations, aviation authorities, off-shore platforms, lighthouse authorities and meteorological research institutes.

Biral have an extensive library of independent test results showing the sensors' excellent performance and consistency since their conception in 1984.

*References and test reports are available on request.*

## 2 year warranty

Once the sensors leave Biral fully tested and calibrated, we do not expect to see them again for a very long time . . . which is why we give a 2 year warranty instead of the standard one year.

email: [hss@biral.com](mailto:hss@biral.com)

more applications on next page . . .



## HSS Application Examples

**MARINE** – HSS visibility sensors are extensively used in marine environments, particularly for the automatic activation of fog horns, warning lights and alarms when fog, rain, haze, sea-spray or smoke lowers the visibility.

- over 20 years use world-wide
- unaffected by harsh salt water environments.
- reliable and accurate
- cost-effective automated system
- suitable for solar power applications

### SUITABLE MODELS:

#### VF-500

- analogue output
- optional fog warning system for switching external equipment:
  - with user selectable settings for warning distance and time delays
  - fully automated, once set no user intervention required
- sensors for hazardous Zone I and II areas available from specialist distributors (contact us for details)

#### VPF-710

- digital output (RS-232 or RS-422)
- integrates into control systems and weather stations that require low power equipment

**WIND ENERGY** – HSS sensors are used by renewable energy companies to increase both air and sea navigational safety and to reduce noise and light pollution.

- unparalleled performance
- withstand high vibration environments
- unaffected by nearby light sources and reflections
- switch and adjust warnings ONLY when necessary
- used offshore and onshore

The HSS sensors are installed on the rear of the nacelle facing away from the blades. A single sensor is normally sufficient on small wind farms. In larger installations one in each corner usually suffices.

### SUITABLE MODELS:

#### VF-500

- automatically switches warning lights and / or foghorns in poor visibility to alert passing aircraft and shipping

#### VPF-710

- intelligently adjusts the intensity levels of navigational warning lights in line with the current level of visibility to minimise light pollution and help flash synchronisation

**AVIATION** – supplying HSS visibility and present weather sensors to the aviation industry is a key part of our business.

- proven accuracy, reliability and repeatability
- suitable for use on CAT I, II and III airports and helipads
- used in FAA, CAA and other similarly approved systems

### SUITABLE MODELS:

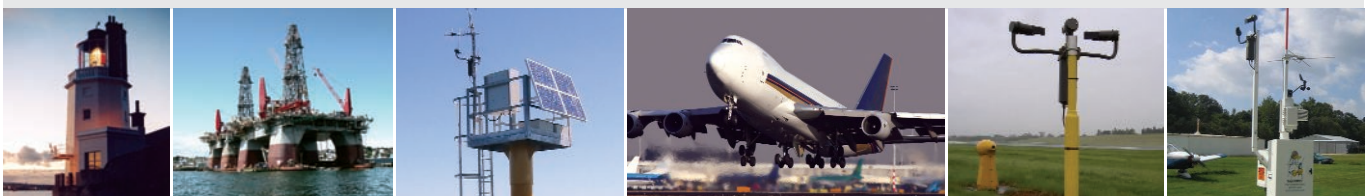
#### VPF-710

- visibility output MOR, EXCO
- can be integrated into airfield weather information and monitoring systems
- used in the FAA approved SuperAWOS system in the USA

#### VPF-730

- visibility and present weather measurements
- can be integrated into Runway Visual Range (RVR) systems
- used in the AGVIS RVR system on CAT I and II airports around the world

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AGVIS RVR system

SuperAWOS system

# . . . why choose an HSS visibility sensor?

Biral HSS sensors are used to automate visibility and present weather measurements in a wide range of critical applications, providing improved safety and reduced costs.

They are well known for their durability, reliability and accuracy. An HSS sensor will provide many years of problem-free operation requiring minimal attention.

The sensors use Forward Scatter Meter (FSM) technology to calculate the Meteorological Optical Range (MOR).

## Built to last

### ● Reliability

The Biral HSS sensors are designed to withstand years of abuse, many sensors have been operating for two decades without interruption.

### ● Corrosion-Free

Corrosion is not an issue with HSS sensors as they are manufactured from hard-anodised aluminium which is salt-dip brazed. The dip brazing ensures that the sensors are strong and leak-free whilst the military standard anodising provides unrivalled corrosion resistance. This process guarantees the long-term durability of the sensors and ensures that the metalwork is totally maintenance free.

## Unmatched accuracy

The combination of design, light-source, wavelength and undisturbed sample volume give Biral HSS sensors unbeatable accuracy. The patented design of the HSS sensors means that no other sensor can match their performance.

### ● Optimum design

The HSS range is considered to provide the best correlation of Extinction Coefficient (EXCO) to observed visibility. In reduced visibility conditions, where other sensors report only precipitation, Biral HSS present weather sensors provide accurate visibility AND precipitation data.

### ● Accuracy

The HSS sensors use an infrared diode light source which is proven to provide higher accuracy, longer life and more consistent readings than sensors which use visible light sources.

### ● Consistency in all weather

The unique design of Biral HSS sensors ensures that the measurements are the best possible regardless of wind direction and precipitation conditions. They do not suffer from turbulence effects or from precipitation splashing off the instrument enclosure.

The "no-dew heaters" on the viewing windows and optional hood heaters ensure that the heads remain free from mist and obstruction even in the most challenging blowing snow conditions.

### ● Unaffected by reflections

Reflections from snow and surface water can cause measurement errors, so the sensor heads of all Biral HSS sensors are positioned in the horizontal plane to ensure that the measurements are not influenced by surface reflections.

### ● High measuring ranges

The choice of wavelength and light source is considered to be the best for accuracy where it counts most - around the 1 mile range. The wavelength is critical when deciding how the sensor performs in terms of accuracy and shifts in light spectra.

The wavelength of the HSS sensors is perfect for the shift in light from white (visibility below 1 mile) to blue (visibility from 1 mile to several miles). Almost all FSM sensors can detect the white spectrum well, but HSS Sensors also detect the shift from the white to blue spectrum and so maintain accuracy values to much higher visibility ranges.

## Low running costs

With negligible maintenance requirements (periodic wiping of the viewing windows) and years of operation without the need for regular servicing the HSS sensors give long-term value for money.

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## ... selecting the right model

### VPF-710



#### Visibility sensor (digital)

The VPF-710 provides a **digital** output and sophisticated levels of self test functions for remote monitoring of the sensor status. It is a compact system with all electronics contained in the sensor head.

The VPF-710 is used in many applications such as:

- National weather networks
- Marine weather stations
- Airports and helipads
- Wind farms
- Offshore platforms
- Meteorological data networks
- Roadside weather stations
- Research applications

The measuring range of both the VPF-710 and VPF-730 sensors is 10 m - 75,000 m (33 ft - 47 miles)

#### Options for the VPF-710 and the VPF-730

- Extended self-test functions (giving even more self-test functionality)
- Hood heaters (for use in cold or arctic climates)
- Weather station module (for operating the sensor as a complete weather station)
- Ambient light sensor (for background luminance measurements)

### VPF-730



#### Visibility AND present weather sensor

The VPF-730 is the **BEST** combined visibility **AND** present weather sensor on the market today.

It is the **ONLY** sensor to provide true criteria for visibility and state of the ground according to World Meteorological Organisations (WMO) table 4680.

Present weather data includes precipitation type and rate and can be calibrated to local and national standards.

The VPF-730 is used in similar applications as the VPF-710 but especially for:

- Runway Visual Range (RVR),
- Automatic weather stations
- RADAR / instrument calibration
- Atmospheric research
- Roadside weather stations

### VF-500



#### Visibility sensor (analogue)

The VF-500 provides an **analogue** output and is available with an optional fog warning system for automatic switching of external equipment.

The VF-500 sensor consists of a measuring head and a control box. These can be sited up to 20 m apart for safe and convenient access.

The VF-500 is extensively used for fog signal switching on:

- Lighthouses and harbours
- Offshore platforms
- Roadsides
- Road and rail tunnels

Optional - Fog warning system

The VF-500 sensor measures visibility from: 3 m - 300,000 m (10 ft - 186 miles)

*NB mounting pole not included*

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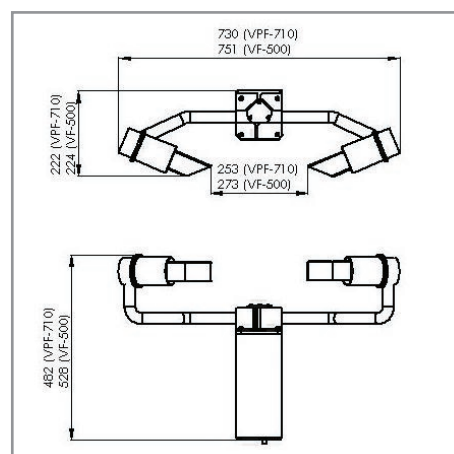
● **NO spare parts**

● **Simple to install**

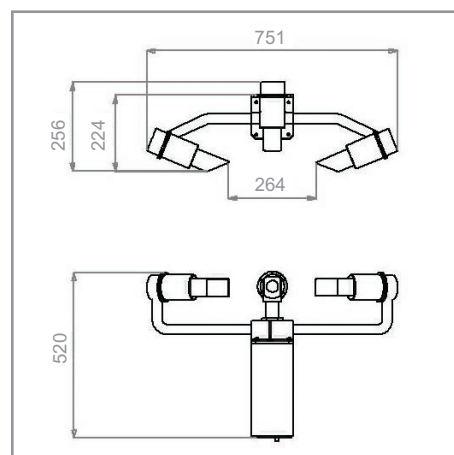
● **Low powered**

# ... specifications

	VF-500	VPF-710	VPF-730
Measures	visibility	visibility	visibility and present weather
Output	analogue	digital	digital
Range	3 m to 300 km	10 m to 75 km	10 m to 75 km
Accuracy	+/- 5 %	+/- 2 %	+/- 2 %
Light-source used	infra-red	infra-red	infra-red
Light- source wavelength	880 nm	880 nm	880 nm
*FSM angle used	45°	45°	45°
Measurement geometry	horizontal	horizontal	horizontal
Sample volume size (com <sup>3</sup> )	400	400	400
Power requirements - sensor head	2.9 W	2.0 W	2.0 W
- window heaters	1.7 W	1.7 W	2.5 W
- **PSU	5.0 W	N/ A	N/ A
Hood heating option available	yes	yes	yes
Hood heater power requirements	30 W	30 W	45 W
Suitable for mains, battery, solar power	yes	yes	yes
Operating temperature range (°C)	-50 to +60	-50 to +60	-50 to +60
Weight: sensor head	7 kg	7 kg	7 kg
**PSU	6 kg	-	-
Output rate (seconds)	continuous	10 to 300 (selectable)	10 to 300 (selectable)
Method of construction	salt-dip brazing	salt-dip brazing	salt-dip brazing
Materials	hard-anodised aluminium	hard-anodised aluminium	hard-anodised aluminium
Reliability	> 8 years (**MTBF)	> 8 years (**MTBF)	> 8 years (**MTBF)
Undisturbed sample volume	yes	yes	yes
Detection threshold: rain	-	-	0.015 mm / hr
snow	-	-	0.0015 mm / hr
Maximum rain rate	-	-	250 mm / hr



VF-500 and VPF-710



VPF-730

All dimensions in mm

\*FSM = Forward Scatter meter    \*\*PSU = Power Supply Unit    \*\*\*MTBF = Mean Time Between Failure

All power requirements are based on DC models, AC models are slightly higher.

The HSS range is in continuous development and specifications may be subject to change without prior notice.

E & OE.

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