



*Highly robust fog sensor
optimised for use in harsh
environments such as lighthouses*

*Serial, analogue and relay outputs
allows easy integration with both new and
legacy systems*

KEY FEATURES & BENEFITS

- MOR or EXCO output
- Highly corrosion resistant hard coat anodised finish
- Window contamination monitoring and compensation
- Serial digital and analogue outputs
- Visibility threshold switching relays
- 6m flying lead connections
- VPF-500 replacement
- 5 Years Warranty

The VPF-510 Visibility sensor offers reliable visibility measurement in a robust and highly corrosion resistant package. The sensor has a serial data interface, analogue outputs and three sets of volt free relay contacts for visibility warnings and status. The sensor can be configured to report either Meteorological Optical Range (MOR) or extinction coefficient (EXCO) in the serial data interface and on the voltage or current outputs. The combination of features make the VPF-510 easy to integrate in to both new and legacy systems.

Rugged and Reliable

Our sensors are often installed in the most challenging locations, such as lighthouses, where reliable operation and long life are essential for operational safety and cost control. The sensor's physical design is optimised to ensure accurate measurement and reliable operation even where driving rain and salt spray is a common occurrence and where access for maintenance is difficult and costly. Low power heaters keep the windows free from dew whilst high power heaters are optionally available to keep the optics free of blowing snow.

The operational life of a typical VPF series sensor is well in excess of ten years, even in a marine environment due to the hard coat anodise finish applied to the aluminium enclosure. The calculated Mean Time Between Failure (MTBF) is over 6 years, however field return data gives a figure in excess of 35 years.

Visibility Measurement

The measurement of visibility by forward scatter as used by the VPF-510 is now widely accepted and seen as having significant

advantages over more traditional techniques such as the use of backscatter sensors. Backscatter sensors share the VPF-510's advantage of being compact however the backscatter signal is strongly dependent on the type of obstruction to vision resulting in poor accuracy and limited upper range which can result in unnecessary activation of fog horns. The VPF-510 by contrast remains accurate in all weather conditions and has a visibility range of 10m to 75km, whilst its measurement performance is of a standard required for aviation applications. The calibration of the VPF sensor family was undertaken in accordance with the recommendations of International Civil Aviation Organisation and is traceable to a national weather service transmissometer.

Visibility measurements are reported as forward scatter Extinction Coefficient (EXCO) or Meteorological Optical Range (MOR) in the range of 10m to 75km.



Applications

In many applications and especially those connected with offshore and marine use the costs of servicing or replacing a sensor can be significant and there can be significant safety implications when equipment is not operational. VPF Series sensors are well suited to such applications and have been used on many of the lighthouses and lightships around the coast of the UK due to their reputation for reliability and long life. The VPF-510 is also perfectly suited for use on offshore wind farms for control of marine navigation lights and fog horns.

The features which make the VPF-510 suitable for marine use also make it suited to other applications which require a long lasting, reliable sensor with minimal maintenance requirements. The inclusion of relays which switch at user defined visibilities and analogue voltage or current outputs make the sensor simple to interface to local sounders and lights or to replace obsolete sensors in legacy applications.

Interfacing and Connectivity

The VPF-510 is a modern digital sensor with a serial data interface providing both visibility and comprehensive selftest information in ASCII text format. The user can select between visibility expressed as Meteorological Optical Range (MOR) or atmospheric extinction coefficient (EXCO) in either polled or automatic output modes. Where connection to a computer

system is not necessary the voltage or optional current output can be used to report visibility, again with user configuration for either MOR or EXCO.

The VPF-510 is fitted with three volt free contact relays as standard for direct control of local warning lights or sounders. Two relays may be configured to switch at user defined visibility thresholds whilst the third is dedicated to selftest monitoring. One threshold relay can be configured to report window contamination if required. For ease of installation the sensor is fitted with 6m cables.

Cost of Ownership

Even the most reliable sensor can have a high cost of ownership if it requires constant maintenance. The VPF-510 has a series of features that reduce maintenance requirements to a minimum whilst ensuring accurate and reliable operation. These features include window contamination monitoring which automatically corrects the output data and provides two stage warnings allowing maintenance to be performed as efficiently as possible. Calibration checks and recalibration are simple and quickly accomplished in the field by a single person. The need for such procedures is limited however as the stability of the light source and receiver circuitry is such that recalibration intervals are typically measured in years.

The VPF-510 is either mains or DC powered. Hood heaters are available for use in areas prone to snow.

Advanced Functional Test Mode

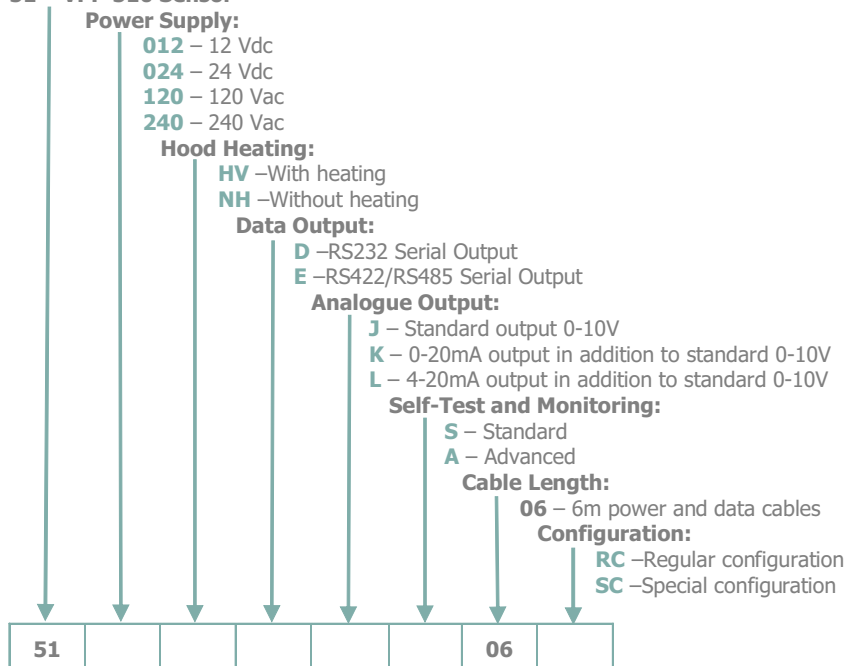
All Biral visibility and present weather sensors have the capability to temporarily output specific data via a test mode. In this mode the user can define visibility, window contamination and fault conditions for a pre-determined time period. This functionality is useful during Factory or Site Acceptance Testing (FAT or SAT), or system integration to test downstream processing of the output data.



Sensor Configuration Information

For a detailed explanation of the configuration options please refer to the table below.

51 – VPF-510 Sensor



Example: 51.024.HV.D.J.A.06.RC (Please use this code when ordering your sensor).

Configuration Options Explained

Option	Description
Power Options	The sensor is available with a range of power supply options. Option 012 : 12 Vdc supply Option 024 : 24 Vdc supply Option 120 : 120 Vac supply Option 240 : 240 Vac supply
Heating Options	Heated hoods are available to stop snow from accumulating around the optical windows. The hood heating option is only required in regions where snow is experienced. 12 Vdc sensors are supplied with lower power hood heaters. Option HV : Hood heating included Option NH : No hood heating
Data Output	The sensor is available with either RS232 or RS422/RS485 serial communications. Option D : RS232 Serial communication Option E : RS422/RS485 Serial communication
Analogue Output	The sensor is provides with a 0-10V output representing either MOR or EXCO as standard. Optional current outputs are available. Option J : Standard output Option K : Standard output plus 0-20mA Option L : Standard output plus 4-20mA
Self-Test	The sensor may be configured for either Standard or Advanced Self-Test. The standard self-test option provides monitoring of all the essential sensor functions and contamination of the transmitter window. The advanced self-test option adds receiver window contamination monitoring and receiver sensitivity monitoring. Monitoring of receiver contamination is useful in applications where different levels of contamination may occur on the sensor windows, for example where strong gusty winds are experienced. Option S : Standard Self-Test Option A : Advanced Self-Test
Cable Length	The sensor is fitted with fixed power and signal cables. The standard length is 6m; other lengths are available in multiples of 1m. Option 06 : Standard 6m cable
Configuration	Reserved for customer specific configurations. Option RC : No customer specific configuration. Option SC : Special customer specific configuration.

VPF-510

Visibility Sensor

Specifications



Visibility Measurement

Measures	Visibility (MOR or EXCO)
Output	Serial data, Voltage (Optional current)
Range (visibility)	Serial output: 10m to 75km Analogue: Configurable MOR 10m to 2km, 10m to 20km, 10m to 32km, 20m to 50km EXCO 0.04 to 150m-1, 0.04 to 300m-1
Measurement Error	≤2.0% at 2km, ≤6.0% at 15km ≤10.0% at 20km
Measurement principle	Forward scatter meter with 39° to 51° angle, centred at 45°

Outputs and Reports

Output rate (seconds)	10 to 300 (selectable)
Serial outputs	RS232 as standard RS422/RS485 as an option
Analogue outputs	0-10V as standard 0-20mA or 4-20mA additionally as an option
Threshold Relays	2 SPDT type relays. Volt free contacts configurable as 2 thresholds, or 1 threshold and 1 window contamination warning.
Fault Relay	1 SPNC relay. Volt free contacts

Power Requirements

Sensor Power	12Vdc 24Vdc 120Vac 240Vac
Hood heating power	As sensor supply
Basic sensor	6W
Hood heaters	30W

Additional Features

Window heaters	Fitted as standard
Window contamination monitoring	Fitted as standard on the transmitter window. Optional on the receiver window
Hood heaters	Optional

Environmental

Operating temperature	-50°C to +60°C
Operating humidity	0 – 100% RH
Protection rating	IP66

Certification & Compliance

CE Certified
EMC compliance with EN61326-1997, 1998, 2001
RoHS and WEEE compliant

Physical

Material	Hard coat anodised aluminium
Weight - Sensor head Integrated cables	4.9kg DC: 6.1kg AC Approx. 3kg
Length	751mm
Warranty	5 years
Lifetime	>10 years

Maintenance

Self-test capability	As standard
User confidence check	6 months recommended
Window Cleaning	Automatic compensation and warnings
Field calibration	With optional calibration kit

Included with Sensor

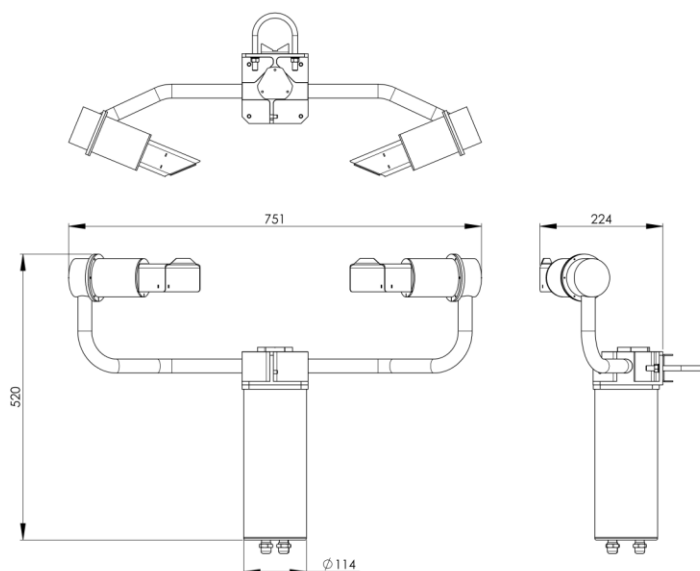
The sensor is delivered in sturdy recyclable foam filled packaging with:

- Pole mounting kit (2 x U-bolt)
- User manual and calibration certificates

Accessories – Optional

70.CAL	VPF Series Calibrator
70.SK	VPF Series Spares Kit
51.WTY	1 Year extended warranty

Specifications are subject to review and change without notice. E&OE.



Dimensions in mm