



**OBSERVATOR**  
instruments

## RWS-30 Road Tunnel Visibility Sensor

The RWS-30 is designed for use in road and tunnel applications where accurate and reliable visibility measurements are required. The forward scatter measurement principle provides a compact design with measurements that are both accurate and reliable in all weather conditions. The RWS-30 outputs have been chosen to match those recommended for use in tunnel systems.

### Applications

As road networks become more congested those tasked with the management of traffic flow and road user safety are turning to Road Weather Information Systems (RWIS) to collect the meteorological data they need to keep the traffic moving. Road tunnels pose a unique set of problems to highways engineers and management personnel as they are affected by the weather at either end and can have their own internal microclimates. Couple this to the added risk of pollution from stationary vehicles or fire after a crash and the need for a sensitive and accurate sensor to measure visibility and the causes of reduced visibility becomes absolute. The RWS-30 has been developed to meet the specific needs created by the tunnel environment and complies with current international guidelines as defined by the PIARC Technical Committee. The sensor is simple and quick to install reducing lane closure requirements whilst design features such as window contamination monitoring with automatic measurement adjustment allow maintenance to be undertaken only when needed.

### Features

- 200m to 99.99km measurement range
- Compact forward scatter design
- Monitors obstruction to vision caused by fog, smoke and exhaust fumes
- Not affected by lights
- Easily installed by one person
- Window heating and contamination monitoring
- EXCO and MOR Outputs
- Analogue voltage and current outputs
- Serial data output (RS232, RS422 or RS485)
- Easily integrated with systems in road and tunnel applications
- 2 Years warranty
- Significant advantages over more traditional techniques such as the use of backscatter sensors



# RWS-30 Road Tunnel Weather Sensor

In situations where visibility is reduced due to pollution from stationary, or slow moving vehicles or smoke from a fire the relay outputs from the sensor can be used to trigger alarms and/or initiate signs at the tunnel entrances to prevent further vehicles from entering.

The safe operation of road tunnels present a unique challenge as whilst fog and certainly rain are unlikely the air quality can quickly deteriorate if the flow of air through the tunnel reduces due to changes in the weather outside. Visibility sensors, especially those with an extended visibility range, can act as sensitive pollution monitors allowing the ventilation systems to be activated before pollution increases to dangerous levels. Visibility sensors can also form part of a fire detection system by detecting a sudden and isolated visibility decrease. The RWS-30 has a measurement range of 200m to 99.99km (with a resolution of 1m) making it a very sensitive sensor for both air quality and fire detection. To ease integration the sensor has the ability to report EXCO or MOR as a 4-20mA current output as favoured in tunnel systems, alternatively either the serial data output or optional relays can be used.

## Visibility Measurement

The measurement of visibility by forward scatter as used by the RWS-30 is now widely accepted and seen as having significant advantages over more traditional techniques such as the use of backscatter sensors or transmissometers. Backscatter sensors share the RWS-30'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. More importantly due to the problem of reflections backscatter sensors require a large open area in front of the sensor to operate correctly. Transmissometer based sensors can produce accurate visibility measurements but the upper visibility limit is set by the sample path length which is always limited for reasons of practicality. The RWS-30 by contrast remains accurate to a range of 99.99km and is not significantly influenced by objects around the sensor. To ensure the best possible results the calibration of the RWS sensor family is traceable to a national weather service reference transmissometer.



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## DATA SUMMARY

<b>Detects</b>	Visibility (MOR & EXCO)
<b>Measurement Principle</b>	Forward scatter meter with 39 to 51° angle
<b>Output</b>	RS232/422/485, 0-10V/4-20mA, 1 fault and 2 threshold relays (option)
<b>Range</b>	MOR 200m to 100km EXCO 0.03 to 15 km-1
<b>Resolution</b>	1m or 10m
<b>Error</b>	≤10% at 0,2-10km, ≤20% at 10-30km
<b>Sensor Power</b>	9-36 VDC (3.5W basic sensor and 1.7W window heaters)
<b>Operating Temperature</b>	-40°C to 60°C
<b>Operating Humidity</b>	0–100% RH
<b>Protection rating</b>	IP66/67
<b>Weight</b>	4,3kg (including mounting kit)
<b>Material</b>	Powder paint coated aluminium
<b>Colour</b>	Gray—RAL 7045
<b>Warranty</b>	2 years
<b>Certification&amp;Compliance</b>	CE Certified, EMC compliance with EN61326-1997,1998,2001, RoHS and WEEE compliant.

