

visibility



Model 73000

Sentry™ Visibility Sensor

The YOUNG Sentry™ Visibility Sensor measures atmospheric visibility (meteorological optical range) by determining the amount of light scattered by particles in the air (smoke, dust, haze, fog, rain, & snow).

Performance in all weather conditions is achieved with an integrated design that keeps all cabling internal to the sensor for complete protection from hazards. The sensor is made from anodized aluminum and rugged, UV-resistant fiberglass enclosures. Based on the proven field experience of the NWS and FAA, the sensor uses a “look down” geometry to reduce window contamination and clogging from blowing snow. The optical windows have continuous duty anti-dew heaters. Optional thermostatically controlled external hood heaters are available for additional protection in extreme environments. All power and signal lines to the Sentry™ are protected with surge and EMI filtering to ensure uninterrupted service for the life of the sensor.

Installation and maintenance are simple with the Sentry™. A sturdy mounting flange located on the bottom of the main enclosure mates with a user-supplied 1-1/2 inch IPS mounting pipe. Power and signal cables are installed through waterproof cable glands on the bottom of the main enclosure to terminal boards for simple but reliable connections.

Calibration of the Sentry™ in the field is as simple as attaching a factory supplied calibration fixture and following a procedure that takes less than 30 minutes.

Specifications

Visibility Range:	30 m – 16 km
Accuracy:	+/- 10% RMSE
Time Constant:	60 sec
Scatter Angle:	42 deg nominal
Output Options:	0-10 VDC 0-5 VDC 4-20 mA 4-20 mA Isolated RS-232, RS-422 or RS-485
Relay Options:	2 Control 1 Diagnostic

Power: AC Version:	100-240 VAC, 24 VA Nominal 75 VA w/ hood heating
DC Version:	10-36 VDC, 6 VA Nominal 18 VA w/ hood heating

Operating Temperature:	-40 to +60 C
Humidity:	0 to 100% RH
Protection:	IP66 (NEMA-4X)

Weight:	8 kg (18 lb)
Dimensions:	889 mm x 292 mm x 305 mm (W x H x D)
	35" x 11.5" x 12"

Mounting:	48 mm (1.9 inch) diameter (standard 1.5 inch IPS pipe)
Optional:	34 mm (1.3 inch) diameter (standard 1 inch IPS pipe)

Construction:	Frame: Anodized Aluminum Enclosures: Fiberglass, UV Resistant
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Certifications:	This equipment is in compliance with the essential requirements and other provisions of Low Voltage Directives 73/23/EEC and 89/336/EEC as amended by Directive 93/68/EEC.
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CE Complies with applicable CE directives.

Ordering Information

73000 Sentry™ Visibility Sensor

73004 Sentry™ Visibility Sensor with Hood Heating

Power – select one:

- A** AC Power, 200-240 VAC, 50/60 Hz
- D** DC Power, 10-36 VDC

Signal Output – select one:

- V** 0-5 VDC (no control relays)
- W** 0-10 VDC
- L** 4-20 mA
- M** 4-20 mA isolated
- S** RS-232
- T** RS-422
- U** RS-485

Control Output – optional

- C** Single Control Relay (NA w/ output option V)
- D** Diagnostic Relay
- E** 2 Control Relays (NA w/ output option V)
- F** Control Relay and Diagnostic Relay (NA w/ output option V)
- G** 2 Control Relays, Diagnostic Relay (NA w/ output option V)**

** NOTE: Option G not available with Options S, T or U



EXAMPLE: 73004-DWF = Sentry™ Visibility Sensor with hood heating, DC power, 0-10 VDC output, single control relay and single diagnostic relay

Accessories

73062 Calibration Fixture – recommended

74050 Mounting Bracket – for vertical surfaces including walls, traffic poles and Rohn-type towers

73038 Hood Extensions



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visibility

Tunnel Visibility Sensor



Model 73100
Sentry™ T

The YOUNG Sentry™ Tunnel Visibility Sensor measures atmospheric visibility (meteorological optical range) by determining the amount of light scattered by particles in the air.



The Sentry™ Tunnel Visibility Sensor's sensitivity is optimized for reduced visibility in automobile and rail tunnels typically caused by vehicle emissions.

The sensor is made from anodized aluminum and rugged, UV-resistant fiberglass enclosures. Based on the proven field experience of the NWS and FAA, the sensor uses a “look down” geometry to reduce window contamination. The optical windows have continuous duty anti-dew heaters. All power and signal lines to the Sentry™ are protected with surge and EMI filtering to ensure uninterrupted service for the life of the sensor. Installation and maintenance are simple with the Sentry™. A sturdy mounting flange located on the bottom of the main enclosure mates with a user – supplied 1-1/2 inch IPS mounting pipe. Power and signal cables are installed through waterproof cable glands on the bottom of the main enclosure to terminal boards for simple but reliable connections. Calibration of the Sentry™ in the field is as simple as attaching a factory supplied calibration fixture and following a procedure that takes less than 30 minutes.

Specifications

Visibility Range:	200 m – 100 km
Accuracy:	+/- 10% RMSE
Time Constant:	60 sec
Scatter Angle:	42 deg nominal
Output Options:	4-20 mA 4-20 mA Isolated
Relay Options:	1 Diagnostic
Power: AC Version:	100-240 VAC, 24 VA Nominal
DC Version:	10-36 VDC, 6 VA Nominal
Operating Temperature:	-40 to +60 C
Humidity:	0 to 100% RH
Protection:	IP66 (NEMA-4X)
Weight:	8 kg (18 lb)
Dimensions:	889 mm x 292 mm x 305 mm (W x H x D) 35" x 11.5" x 12"
Mounting:	48 mm (1.9 inch) diameter (standard 1.5 inch IPS pipe)
Optional:	34 mm (1.3 inch) diameter (standard 1 inch IPS pipe)
Construction:	Frame: Anodized Aluminum Enclosures: Fiberglass, UV Resistant
Certifications:	This equipment is in compliance with the essential requirements and other provisions of Low Voltage Directives 73/23/EEC and 89/336/ EEC as amended by Directive 93/68/EEC.

Ordering Information

73100 Sentry™ Tunnel Visibility Sensor

Power – select one:

- A** AC Power, 200-240 VAC, 50/60 Hz
- D** DC Power, 10-36 VDC

Signal Output – select one:

- L** 4-20 mA
- M** 4-20 mA isolated

Control Output – optional

- D** Diagnostic Relay



EXAMPLE: 73100-AMD = Sentry™ Visibility Sensor with AC power, 4-20mA isolated output and a single diagnostic relay

Accessories

73062 Calibration Fixture – recommended

74050 Mounting Bracket – for vertical surfaces including walls, traffic poles and Rohn-type towers

73038 Hood Extensions



CE Complies with applicable CE directives.



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visibility

Explosion Proof Visibility Sensor



Model 73200
Sentry™ EX


The YOUNG Sentry™ EX Explosion Proof Visibility Sensor measures atmospheric visibility (meteorological optical range) by determining the amount of light scattered by particles in the air. The Sentry™ EX Explosion Proof Visibility Sensor is designed for high performance in hazardous environments at petrochemical production sites, refining facilities and transportation terminals. The ATEX Zone 1 rated housing and offshore marine-grade sheathed cables ensure all-weather IP66 performance to monitor changes in visibility due to rain, snow, fog, smoke, and dust.


A sturdy aluminum frame with durable powder-coat finish supports the housings and provides for mounting to a customer supplied pipe. Power and signal lines to the Sentry™ EX are protected with surge and EMI filtering to help guarantee uninterrupted service for the life of the sensor. Installation and maintenance are simple with the Sentry™ EX. A sturdy mounting flange located on the bottom of the main enclosure mates with a user-supplied 4.5 inch (4 inch IPS) mounting pipe. Power and signal cables are installed through waterproof cable glands on the bottom of the main enclosure to terminal boards for simple but reliable connections.

Calibration of the Sentry™ EX Explosion Proof Visibility Sensor in the field is as simple as attaching the standard calibration fixture and following a procedure that can be completed in less than 30 minutes.

Specifications

Visibility Range:	15 m – 8 km
Accuracy:	+/- 10% RMSE
Time Constant:	60 sec
Scatter Angle:	42 deg nominal
Output Options:	0-10 VDC 0-5 VDC 4-20 mA 4-20 mA Isolated RS-232, RS-422 or RS-485
Relay Options:	2 Control 1 Diagnostic
Sensor Power:	12 or 24 VDC, 10 VA Nominal
Heating Power:	230 VAC, 500 VA (model 73204)
Operating Temperature:	-20 to +60 C
Humidity:	0 to 100% RH
Protection:	IP66 (NEMA-4X)
Weight:	40 kg (88 lb)
Dimensions:	1170 mm x 915 mm x 560 mm (W x H x D) 46" x 36" x 22"
Mounting:	114.3 mm (4.5 inch) diameter (standard 4 inch IPS pipe)
Construction:	Frame: Aluminum with exterior powdercoat paint Hardware: 316 grade stainless steel

 This equipment is in compliance with ATEX Ex II 2GD EEx d IIB T5/ T6 for use in areas of potentially explosive atmospheres. Applicable EC Examination Certificates include CESI 01 ATEX 036 and CESI 01 ATEX 027.

 This equipment is in compliance with the essential requirements and other provisions of Low Voltage Directives 73/23/EEC and 89/336/EEC as amended by Directive 93/68/EEC.



Ordering Information

73200 Sentry™ EX Explosion Proof Visibility Sensor

73204 Sentry™ EX Explosion Proof Visibility Sensor with Hood Heating

Power – select one:

- E** AC Power, 200-240 VAC, 50/60 Hz
- F** DC Power, 10-36 VDC

Signal Output – select one:

- P** 0-5 VDC (no control relays)
- W** 0-10 VDC
- L** 4-20 mA
- M** 4-20 mA isolated
- S** RS-232 (includes option P)
- T** RS-422 (includes option P)
- U** RS-485 (includes option P)

Control Output – optional

- C** Single Control Relay
- D** Diagnostic Relay
- E** 2 Control Relays (NA w/ output option P)
- F** Control Relay and Diagnostic Relay
- G** 2 Control Relays, Diagnostic Relay (NA w/ output option P)**

** NOTE: Option G not available with Options S, T, U or P



EXAMPLE: 73204-ESC Sentry™ EX Explosion Proof Visibility Sensor with 12 VDC power, RS-232 output and one control relay

Accessories

74058 Serial Test Cable (option S, T or U)



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SENTRY™ VISIBILITY SENSOR

SALES SOLUTION GUIDE

Background: YOUNG purchased EnviroTech Sensors of Columbia, Maryland, USA in May of 2016.

EnviroTech was founded by John Crosby in 2001. EnviroTech enjoyed comparable sales in its two largest sales regions which were North American and Europe. Asia and the Middle East have also been significant regional markets.

EnviroTech had two principle product lines: The Sentry™ SVS1 visibility sensor and the Sentry™ SVSEEx visibility sensor. The SVS1 is the “workhorse” unit that is appropriate for most applications. The SVSEEx is designed for ATEX Zone 1 hazardous environment applications such as petro-chemical plants and oil/gas terminals. The Sentry™ is now manufactured at YOUNG’s headquarters in Traverse City, Michigan, USA.

Visibility Sensor Operation: A LED emitter with 850 nm wavelength focuses on a measurement volume that intersects with the observation zone of an IR receiver. The IR receiver measures the amount of ‘light’ that is ‘forward-scattered’ by airborne particles. The IR energy measured at the IR receiver is proportional to the ‘extinction coefficient’ which is inversely proportional to visibility. The airborne particles can be fog, rain, snow, smoke and/or dust.

Visibility Units: Standard visibility units are either kilometers or miles. Forward scatter type sensors like the Sentry™ measure a sample volume of air close to the sensor, and using the assumption of air homogeneity, calculate the visibility which could be as far as 16 km depending on the clarity of the air. Visibility sensors cannot measure what is happening 16 km away but must assume that if the atmosphere between the sensor and distance is uniform, than an observer at the sensor can see a range of 16 km.

Other Measurement Techniques: The Sentry™ uses the “forward scatter” technique to measure visibility. Some sensors use the “back-scatter” technique (eg. Orga VDX05EX) which allows for a smaller overall sensor. However, the smaller size is outweighed by the fact that they severely underestimate visibility in snow and are prone to false scattering due to bright light and clogging from blowing snow.

“Transmissiometers” measure visibility by projecting collimated light from an emitter to a receiver and measuring the energy lost in the atmosphere. Transmissiometers are typically used to measure Runway Visual Range at airports.

Downward Facing Lens: To reduce dust/ice/snow collection on the lens as well as reflection from other objects, the Sentry™’s emitter and receiver lens face downward. With the exception of Biral, all competitive units from Vaisala, Belfort and others face downward.

Maintenance Requirements: The lens must be kept clean for an accurate measurement and a quick wipe with window cleaner is all that is required. The frequency of cleaning varies depending on proximity to dust, salt or other contamination sources.

The typical service life of an LED emitter is 5 to 7 years.

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Lens and Hood Heating: Every Sentry™ has a *lens* heater within the emitter and receiver housings to prevent condensation. This is a standard feature.

As an option at the time of purchase, hood heaters may be installed by YOUNG to help prevent snow accumulation and icing on the housings. Hood heating is recommended for all applications in colder environments.

For the Sentry™ EX, hood heating requires 230 VAC power (500 W). Note that the sensor is only available with 12 or 24 VDC power. Consequently, Sentry™ EX installations require both DC power for the sensor and 230 VAC for hood heating.

Model Numbers: Since the acquisition of EnviroTech by YOUNG, new model numbers have been assigned per the following table:

Description	Previous Envirotech Model	YOUNG Model No.
Sentry™ Visibility Sensor	SVS1	73000
Sentry™ - Tunnel Version	SVS1-T	73100
Sentry™ - EX Version	SVSEEx	73200

Order to Shipping Time: The Sentry™ Visibility Sensor (73000, 73004, and 73100) ships in 2 weeks. The Sentry™ EX ships in 3-4 weeks.

What is the Schedule B number for EnviroTech Sensors: 9015.80.8040

Country of Origin: USA

What is the warranty: The Model 73000 Visibility sensors carry a 2 year limited warranty.

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Applications: Sentry™ visibility sensors are used in a variety of typical applications, including:



Road Weather Information Systems
& Fog Warning Light Control



Bridge Visibility & Fog Warning Light Control



Navigation Lighting and Fog Horn Control



Tunnel Visibility Monitoring



Visibility Monitoring within ATEX Zone 1
Hazardous Environments



Urban Visibility and Smog Monitoring

Installed Base: Thousands of Sentry™ Visibility Sensors have been installed worldwide. They offer proven reliability and excellent value compared to competitive sensors. Additional application photos are available. Please contact YOUNG sales at met.sales@youngusa.com

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CONFIGURATION NOTES:

Power: The Model 73000, 73004 and 73100 Sentry™ Visibility sensors are available to operate on either AC or DC power. Cabling for power and signal transmission may be purchased with the Model 73000 sensor.

The Model 73200 Sentry™ EX Visibility sensor operates on either 12 VDC or 24 VDC power only Since ATEX-compliant installations are site-specific completed with customer-supplied materials, YOUNG does not provide cable purchase options for the Model 73200 Sentry™ EX. The Model 73204 Sentry™ EX with hood heating, requires a separate 230 VAC power source for the heating system.

Calibration: Unless a customer has multiple visibility sensors in the same general location, it is recommended that calibration fixture be sold with each Model 73000, 73004 and 73100 sensor. If multiple sensors are installed in the same general location, a single calibration fixture may be used.

NOTE: A calibration fixture is included in the price of the Model 73200 EX version of the Sentry™.

Dual Calibration Fixture: The Model 73000 sensors (previously the EnviroTech SVS1) were produced with 880nm emitters and later were changed to 850nm emitters. The dual calibration fixture can calibrate previous sensors with a 880 nm emitter and more recent sensors with 850 nm emitters.

Control Relays: Control relays enable the Sentry™ to actuate a switching circuit to control external devices such as foghorns and roadside fog warning signs. The threshold visibility value that activates the control relay(s) is user-programmed in the instrument setup procedures. One or two control relays may be ordered with the Model 73000, 73004, 73200 and 73204 Sentry™ units.

Diagnostic Relay: All Sentry™ models may be optionally configured with a diagnostic relay that monitors internal voltages and the transmitter synch pulse.

Surge Protection: All Sentry™ units include EMI and surge protection on both the power and signal circuits. It is recommended that the housing be grounded to a low resistance earth ground rod. It is not necessary to configure additional external surge protection.

Mounting: The Sentry™ (73000, 73004, 73100) mounts on readily available 1 ½" IPS (48mm actual diameter) schedule 40 pipe. A flange adapter is available that allows mounting to 1" IPS (34mm actual diameter) schedule 40 pipe.

An optional mounting bracket is available for the Model 73000, 73004 and 73100 to enable the Sentry™ to be attached to vertical surfaces such as walls or Rohn-type towers.

The Sentry™ EX (73200, 73204) mounts on 4" (114mm actual diameter) pipe.

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Primary Competitive Sensors:

There are 3 readily available competitive sensors that fall into the same general price range as the Model 73000 that utilize the forward scatter technique and 850 nm IR emitters to assess atmospheric visibility. Below is a summary of notable features.

Biral SWS-100 (UK): 10m to 75km standard range with other ranges available. Equipped with standard analog output (0-10 VDC), serial outputs (RS-232C, RS-422/RS-485), self-test/monitoring, 2 control relays, 1 fault relay, selectable output rates and IP66/67 enclosures. Biral claims accuracy of <4.5% @ 60m, <5% @ 1.5km, <5.1% @ 2km, <12.5% @ 15km and <20% @ 30km.

Biral is the only competitive sensor with a *horizontally*-oriented emitter and receiver. Biral claims this feature reduces measurement of extraneous reflected energy from the ground or other surfaces below the sensor. However, a design tradeoff is additional accumulation of dirt/precipitation on the optics of the sensor. The SWS-100 uses a 45 degree scatter angle..

The sensor requires 5.2W of power with a 9-36 VDC supply. Optional hood heating requires an additional 24W with either 24 VAC or 24 VDC supply.

The list price of the SWS-100 is 3,317 EUR and the optional calibration kit is 400 EUR. Options include hood heating, advanced self-test, 4-20 mA output and an ambient light sensor interface for AWOS applications.

Vaisala PWD-10/20 (Finland): 10m to 2km (PWD-10) and 10m to 20km (PWD-20) visibility ranges. Equipped with standard analog output (4-20 mA), serial outputs (RS-232 and RS-485), 3 programmable control relays, 1 fault relay, and IP66 enclosures. Vaisala claims accuracy of +/-10% @ ranges less than 10km and +/- 15% at ranges >10km.

The sensor requires 3W of power with a 12-50 VDC supply. Optional hood heating requires an additional 65W with either 24 VAC or 24 VDC supply.

Options include hood heaters, a calibration kit and an ambient light sensor for AWOS applications.

Campbell Scientific CS-120A (UK): 10m to 75km range. Equipped with standard serial outputs (RS-232 or RS-485), 2 control relays and IP66 enclosures. Campbell claims accuracy of +/- 10% <10km, +/- 15% @ 10km-15km and +/- 20% > 20km.

The sensor requires 3W of power with a 12 VDC supply during normal operation. Optional hood heating requires an additional 60W of power with a 23 VDC or 23 VAC supply.

The list price of the CS-120A is \$4,450 USD and the optional calibration device is \$350 USD.

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Present Weather Detection (PWD): PWD is a feature that is available in several, more expensive competitive sensors. The Sentry™ product line does **not** offer PWD. PWD capability can identify the *likely* form of the precipitation particles it is detecting. PWD sensors output WMO 4680 codes that correspond to rain, drizzle, rain/snow mix, freezing rain, freezing drizzle, etc. Competitive models with PWD include the Vaisala PWD12 (\$6,400), the Vaisala PWD22 (\$8,810) and the Biral VPF-750.

ATEX Zone 1 Hazardous Environments: The Model 73200 Sentry™ EX was designed for demanding applications in hazardous environments where explosion risk must be minimized. The Model 73200 uses ATEX rated housings and offshore marine grade sheathed cables to provide all-weather, Zone 1, IP66 performance. The Model 73200 is unique to the market as there are no other competitive sensors that use forward scatter. Applications include oil/gas production platforms, oil/gas transportation terminals, and petro-chemical processing facilities.

ADDITIONAL AVAILABLE SALES SUPPORT DOCUMENTATION

JUNE 2016 Sentry™ VISIBILITY SENSOR PRICE LIST

SPEC SHEET - Sentry™ VISIBILITY SENSOR – MODEL 73000

SPEC SHEET - Sentry™ TUNNEL VISIBILITY SENSOR – MODEL 73100

SPEC SHEET - Sentry™ HAZARDOUS ENVIRONMENT VISIBILITY SENSOR – MODEL 73200

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FOR IMMEDIATE RELEASE: May 16, 2016

R. M. Young Company to Acquire Envirotech Sensors, Inc.

TRAVERSE CITY, MICHIGAN, USA – The R. M. Young Company has acquired Envirotech Sensors, Inc. of Columbia, Maryland. Founded in 2001, Envirotech designs and manufactures sensors used for measuring atmospheric visibility. Envirotech Sentry™ visibility sensors are used in more than 30 countries for applications that include fog detection in Road Weather Information Systems (RWIS), in Airport Weather Observation Systems (AWOS) and coastal monitoring systems for waterways and offshore foghorn control.

Tom Young, President of the R. M. Young Company stated, “Envirotech shares our reputation for producing high performance, reliable instrumentation. The Sentry visibility sensors are an excellent addition to our existing products for surface weather observation.”

“We are excited to become a part of the Young family,” said John Crosby, President and Founder of Envirotech. “Young has worked hard for over 50 years to establish itself as a leader in meteorological instruments. The Sentry sensors are a natural fit.”

The current Sentry™ product line includes visibility sensors for road weather or waterway monitoring, tunnel visibility monitoring and ATEX Zone 1 hazardous area monitoring applications.

For product pricing and availability, interested parties may contact Young sales at met.sales@youngusa.com.

About the R. M. Young Company: The R. M. Young Company has been designing and manufacturing meteorological instruments since 1964. From their headquarters in Traverse City, Michigan, USA, the company produces sensors that measure wind, temperature, humidity, barometric pressure, precipitation and visibility. The company’s reliable products are installed on every continent and in every ocean and are used for marine navigation, transportation safety, agriculture, climate studies and meteorological stations. Young products are available worldwide via a network of over 100 resellers and systems integrators. www.youngusa.com

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