

Rota-Sonde

TS 2006



Infrared - high sensitivity 480 °F or 750 °F

Quick and easy commissioning

Self-monitoring and alarm functions



Rota-Sonde TS 2006 – Features

The Rota-Sonde TS 2006 measures the position of a hot product (steel, copper, brass, alloys, glass, etc.) within its field of view and provides an output which is proportional to the angular position of the product within that field.

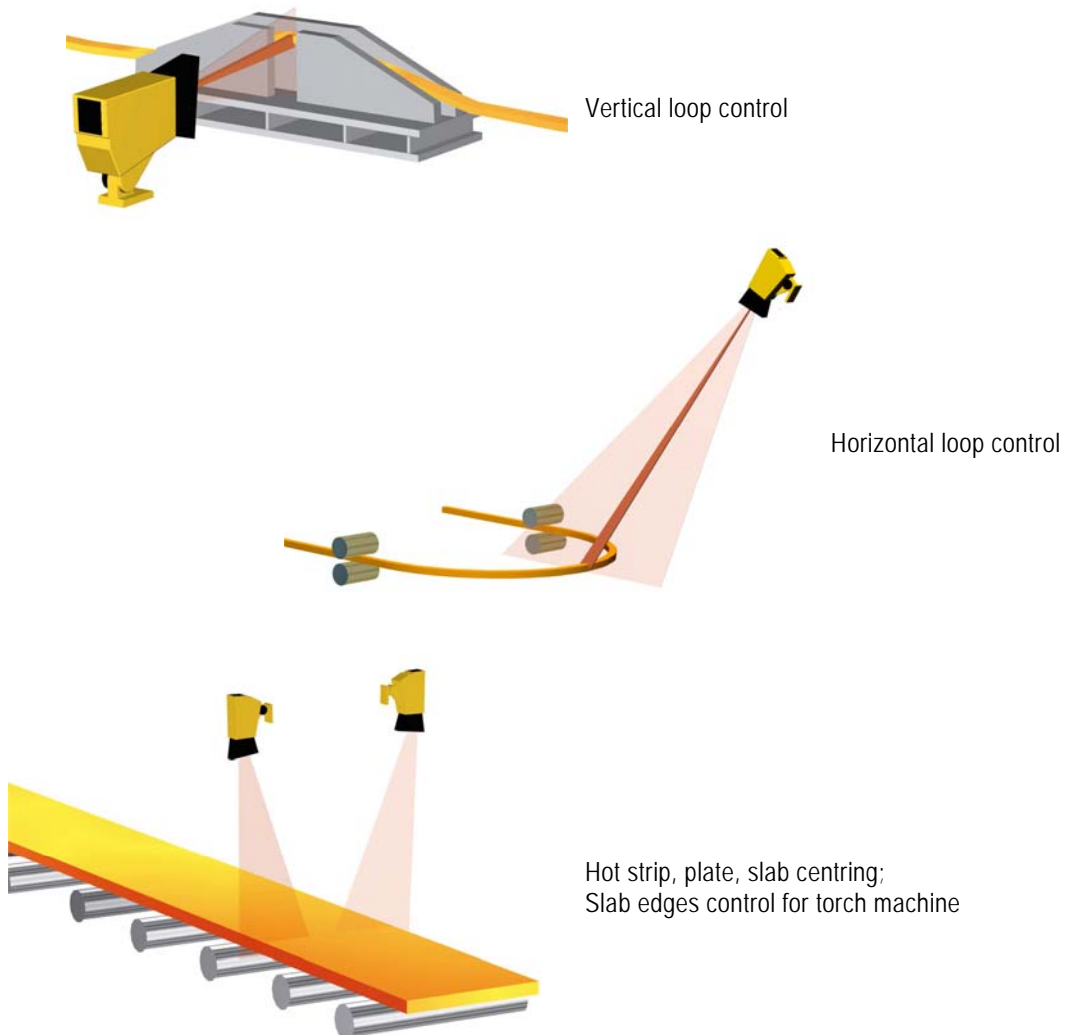
The Rota-Sonde TS 2006 is a scanning measuring sensor, sensitive to infrared radiation emitted by hot products with temperature as low as 250 °C (480 °F).

Main features:

- High sensitivity: 400 °C / 750 °F or 250 °C / 480 °F .
- Infrared spectrum: 1 to 3 μm.
- Digitally controlled with self diagnostic functions.
- No optical adjustment.
- Easy commissioning.
- Optoelectronic circuit enclosed in a heavy duty housing (IP66), designed to work in the harsh environment of the steel industry.
- Air purged and water cooled.
- Connector and cable with stainless steel protective braid.

Rota-Sonde TS 2006 – Applications

Examples of application





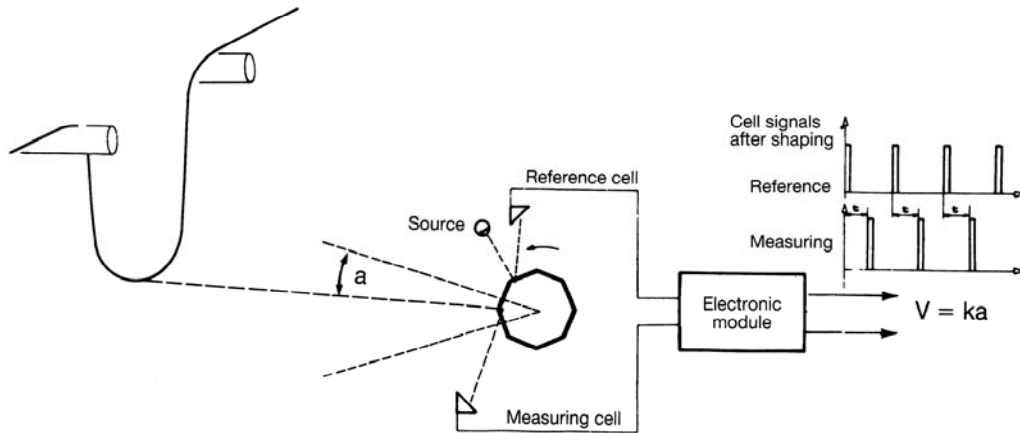
Principle of operation: Infrared scanning

A rotating mirrored drum scans the field of view.

When the analytical beam of the sensor detects infrared radiation from the leading edge of a hot product within the scanned field, the reflection of that radiation by the mirrored drum onto the measuring cell provides a signal which is converted into a "measuring" pulse.

In addition, the sensor generates a reference pulse, which corresponds to the beginning of the scanned field.

The time "t" between the reference pulse and the measuring pulse is equivalent to the angle "a" between the beginning of the scanned field and the position of the leading edge of the hot product. The sensor converts the time "t" into an analogue voltage, which is proportional to the angle "a", and independent of the scanning motor speed.



Sensor features:

1. Mechanical Features

- Adjustable mounting stand.
- Cooling plate with stainless steel pipe to permit use of industrial cooling water. This cooling plate is independent of the sensor body and includes all connections (air and water). This configuration permits quick substitution of the sensor without disconnection of the cooling water or purging air and also eliminates the need for the realignment of the sensor.
- Hinged protective hood to permit easy cleaning of the window glass of the sensor.
- Easy adjustment by use of the viewing port located at the back of the sensor.

2. Electronic Features:

- The photocell is sensitive to infrared radiation and is optimized for detection even at low temperature and in the presence of steam.
- All electronics are mounted on a plug-in PC board.
- Control panel beneath hinged cover at rear, including through viewing port, test push-button for product simulation, potentiometer for sensitivity adjustment and product presence LED.
- Automatic monitoring system with the following features:
 - Diagnostic alarm circuit to monitor the sensitivity of the sensor and to indicate the need for the operator to clean the window glass or to increase the sensitivity.
 - Diagnostic alarm circuit to monitor the internal temperature of the sensor and to indicate any fault in the cooling system.
 - Monitoring of the scanning motor speed.
 - Indication of power supply fault.





Optics

Model	TS 2•16	TS 2•36	TS 2•56
Scanning angle	10°	30°	50°
Response time	2 ms	2 ms	4 ms
Horizontal angle	3°		
Spectrum sensitivity	1 to 3 μm with maximum sensitivity at 2.2 μm		
Temperature range	> 400 °C (750 °F) for normal sensitivity TS 2••6 > 250 °C (480 °F) for high sensitivity model TS 2••6 H		

NOTE: When the temperature of the product is expected to always exceed 400 °C (750 °F) it is note advisable to use the high sensitivity model, as it might detect scale or reflections. For other materials such as copper, brass, alloys, glass, etc., the temperature range is dependant on the product infrared emissivity. Consult the DELTA for these products.

• Optimum distance between the sensor and various products (depending on the temperature):

Wire 5 to 12 mm	0.20 to 3 m
Bars 10 to 40 mm	0.20 to 4 m
Billet and small beam	0.50 to 6 m
Bloom	Over 2 m

Strip	0.60 to 2 m
Sheet	1.00 to 6 m
Heavy plate	1.00 to 8 m
Slab	Over 2 m

The scanning angle is determined according to the field of detection required for the application.

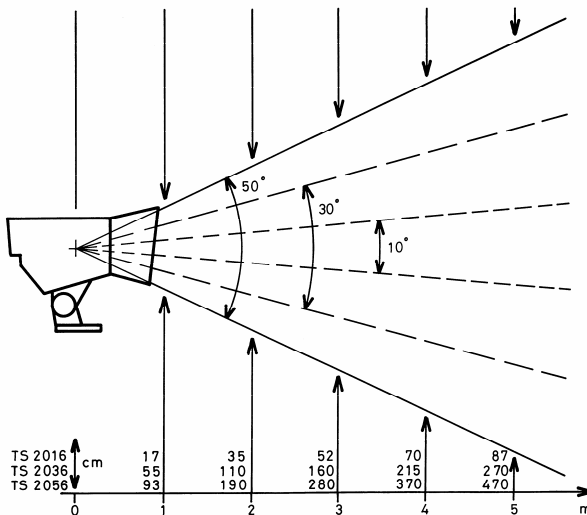


Fig.: 1 Measurement field as a function of the distance between the product and the Rota-Sonde TS2006.

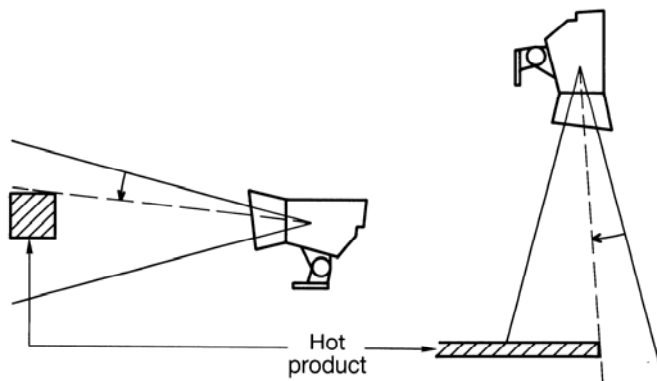
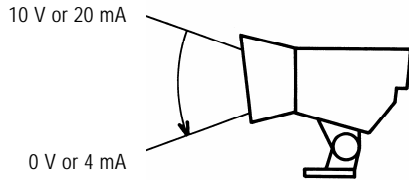
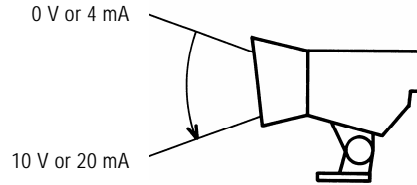


Fig. 2: Scanning direction

The sensor detects the first edge of the product within the scanned field, i.e. the first transition "no radiation-presence of radiation", direction of scanning being from the top to the bottom of sensor.



TS2-06 (Product absence: 0 V or 4 mA)
 TS2-06 U (Product absence: 10 V or 20 mA)



TS2-06 V (Product absence: 0 V or 4 mA-)
 TS2-06 W (Product absence: 10 V or 20 mA)

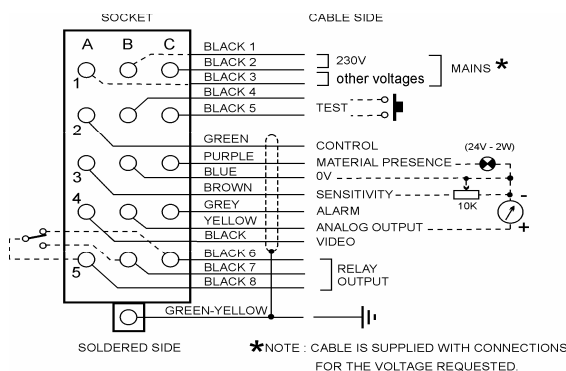
Fig. 3: Analog output for different versions

Characteristics

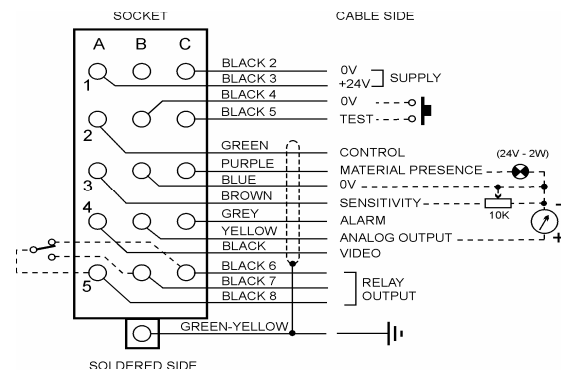


Model	TS 20•6	TS 22•6
Analog output	0 to 10 V (10 mA max)	4-20 mA (load 500 Ω max)
Video output	10 V max to observe the measuring cell on an oscilloscope	
Product presence - Relay output	Single pole changeover Switching capacity: 550VA - 250 V - 5 A max Closing time : 7.5 ms; Opening time : 3 ms	
Product presence -Static output	For indicating lamp: 24 VDC - 2 W max	
Alarm output	0/24 V DC on transistor collector with a 1.1 kΩ internal load. 0 V: when the diagnostic system detects a defect in the power supply, internal temperature, or scanning motor speed. 24 V: when none of these defects occurs.	
Control output	0/24 V dc on transistor collector with a 1.1 kΩ internal load 0 V: when the product detection begins to become difficult due to an accumulation of dirt on the viewing glass window (signal on the measuring cell, near to the sensitivity threshold). 24 V: when the viewing window glass is clean.	
Operating voltage	230 VAC, 115 VAC, 48 VAC or 24 VAC	50 or 60 Hz 24 VDC
Power consumption	30 VA AC version < 500 mA 24 VDC version	
Connection - Cable	Connector fitted with a multicore silicone cable with stainless steel braid for protection Standard 2 m (other length on request)	
Protecting rating	IP 66 (cast aluminum case)	
Operating ambient temperature	-20°C to 60 °C (0°F to 140 °F) without water-cooling. Over 50 °C (122 °F), the sensor must be cooled with industrial quality water at about 25 °C (77 °F), 1-2 bar and 1-2 liter/mn	
Weight	9 kg	

Connection



AC supply



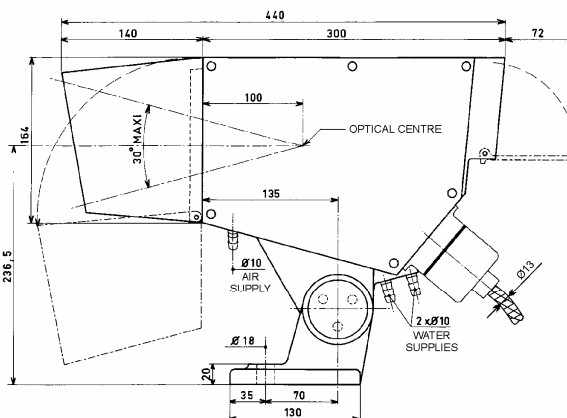
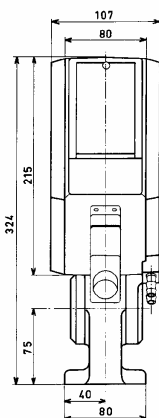
DC supply

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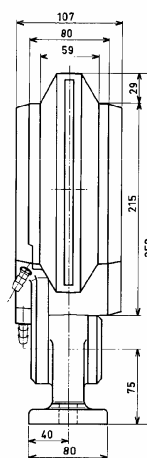
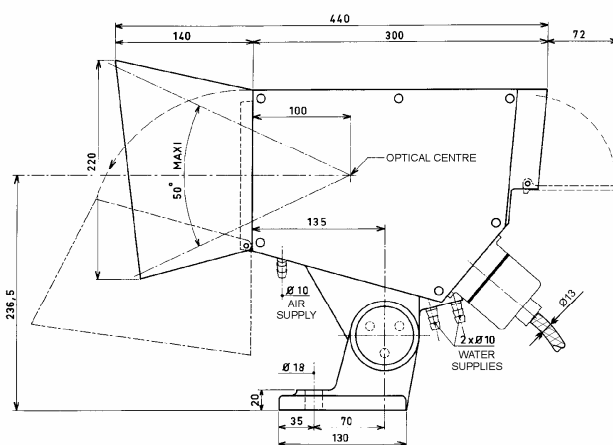


Dimensions

TS2•16
TS2•36



TS2•56



Reference for order

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Analog output
0 : 0 to 10 V
2 : 4 to 20 mA

Field angle
1 : 10° angle
3 : 30° angle
5 : 50° angle

Sensitivity
: Normal
H : High

Scanning direction
Output voltage / Output current
: 10V top – 0V product absence
U: 10V top – 10V product absence
V: 0V top – 0 V product absence
W: 0V top – 10V product absence

: 20 mA top – 4 mA product absence
U: 20 mA top – 20 mA product absence
V: 4 mA top – 4 mA product absence
W: 4 mA top – 20 mA product absence

Supply voltage:
115 V 50 Hz
115 V 60 Hz
230 V 50 Hz
230 V 60 Hz
24 V 50 Hz
24 V 60 Hz
24 VDC

E.g. : TS 2036 230 V 50Hz

Accessories

- Radiant bar BR 3000 for simulation of hot product and to check the scanned field.
- Junction box CR 2006TS including: pre-wired terminal block for connections to the control room, product presence signal lamp, test button and sensitivity potentiometer.

DELTA S.A.

Tel. +33 388 78 21 01 - Fax : +33 388 76 02 29
info@delta-sa.fr - www.delta-sa.fr

DELTA Sensor (China)

Tel: +86 519-5068855 - Fax: +86 519-5068865 - info.cn@deltasensor.com

DELTA Vertriebsgesellschaft mbH (Germany)

Tel: +49 700 3358 2736 - Fax: +49 700 3358 2835 - info.de@deltasensor.com

DELTA Sensor (Russia)

Tel: +7 495 792 3037 - Fax: +7 495 792 3039 - deltasensor@sovintel.ru

DELTA USA INC. (North America)

CARNEGIE OFFICE PARC - BUILDING 2, SUITE 180
600 NORTH BELL AVENUE, CARNEGIE, PA 15160

Tel: (412) 429 3574 Fax: (412) 429 3348
info@delta-usa.com www.delta-usa.com

Subject to change without prior notice

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