

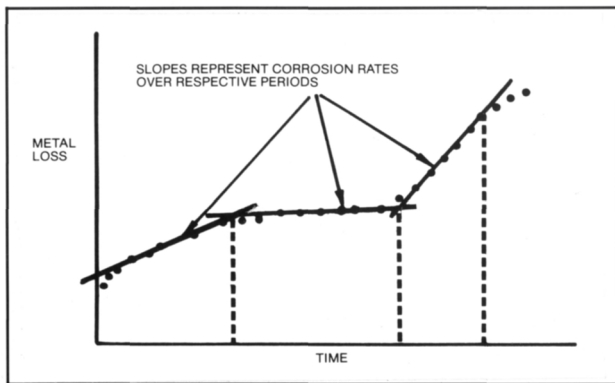
# **(ER) Electrical Resistance Probes**

# Electrical Resistance (ER) Probe Selection Guide

## GENERAL APPLICATIONS

Electrical Resistance (ER) probes and instruments determine metal loss from corrosion or erosion by the electrical resistance method. This method may be used in virtually any environment except liquid metals or some conductive molten salts.

ER instruments directly measure the **metal loss** on ER probes. Plotting metal loss as a function of time permits **corrosion rate** to be determined. The slope of the curve represents the



average **corrosion rate** over the selected interval.

## PRINCIPLE OF OPERATION

The electrical resistance of a section of electrically conductive material such as a metal may be expressed by the formula.

$$R = \rho \frac{L}{A}$$

Where:  $\rho$  is the intrinsic electrical resistivity of the material.

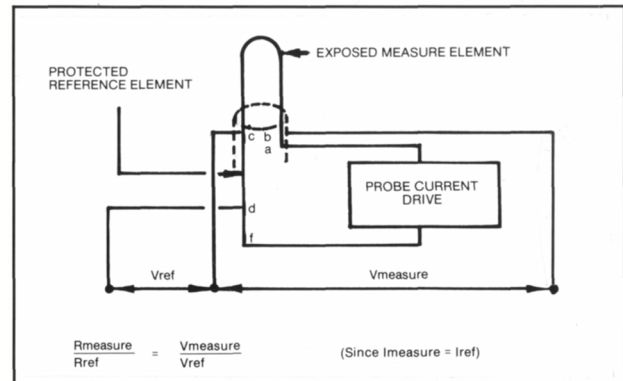
L is the length of the section

A is the cross-sectional area of the section

The intrinsic resistivity,  $\rho$ , varies from alloy to alloy and is temperature dependent.

For a given alloy at constant temperature, the electrical resistance of a fixed-length specimen increases as the cross-sectional area decreases. Consequently, the measurement of electrical resistance may be used to determine metal loss.

Compensation for change of resistivity  $\rho$  with temperature is achieved by the use of a reference element protected from the



corrosion process. As the electrical resistance of the measurement element increases with temperature, so does the electrical resistance of the reference element. However, the resistance ratio of the two elements remains unchanged, thereby providing automatic compensation for temperature changes.

Since ER probes have a lower electrical resistance than the connecting cables and connectors, separate electrical current and voltage monitoring wires must be used. By energizing the probe elements with the same electrical current, the resistance ratio of the elements is determined by measuring the voltage ratio of the elements.

## PROBE MOUNTING CONFIGURATIONS

There are a wide variety of ER probes to match various applications. The major probe categories are as follows.

1. Internal process monitoring probes
  - a. Removable under system pressure
  - b. Non-removable under system pressure
2. Laboratory probes
3. External and structural monitoring probes
4. Environmental monitoring probes

In general the ER probes have sensing elements made of the metal or alloy for which corrosion data is required. The probe bodies may be of the same alloy, but thicker, or of a higher, less corrosive alloy. Details are given on the data sheet for each model probe.

**Internal Process Monitoring Probes Removable Under System Pressure**

Probes that are removable under system pressure are particularly useful to enable inspection or change out of probes without shutting down or isolating the system. Two systems are available depending on the pressure.

- a. RETRACTABLE SYSTEM for pressures up to 1,500 psi.
- b. RETRIEVABLE SYSTEM for pressures up to 3,600 psi and 6,000 psi.

RETRACTABLE process probes are introduced into the system through a stuffing box mounted external to a valve. A specially-designed retracting device is available for insertion or removal of probes at pressures too high to permit safe operation by hand (above 150 psi requires over 50 lb. Insertion force).

RETRIEVABLE process probes are sealed into the system in a access fitting. A separate service valve and retriever is used for insertion and removal of the probes under system pressures.

**Internal Process Monitoring Probes Fixed Type (Non-removable under system pressure)**

Probes which are not removable under system pressure are sometimes used for reasons of economy or special process limitations. These may be mounted with a flange or NPT threaded connection. NPT connections are available with fixed or adjustable length.

**CORROSION MEASUREMENT ELEMENTS**

Several ER element forms are available.

Selection of the most suitable element form and specially the correct probe sensitivity is important to obtaining good quality corrosion data.

Elements are available in a wide variety of alloys; consult the probe data sheets for those available in each type.

**Strip, Tube, & Wire Loop Elements**

These elements are generally more economical and available in a wider range of alloys than for other element forms. Two forms of element seals are available to protect the reference element within the probe body.

Glass-to-metal seals provide the highest seal integrity and are generally suitable for process fluid in the range of 0-9 pH and temperatures up to 500 degrees F. They are not suitable for fluids containing fluoride ions which attack glass, ceramics and epoxies.

Teflon® coating and ceramic fill provide the alternative seal of the reference element in loop elements.

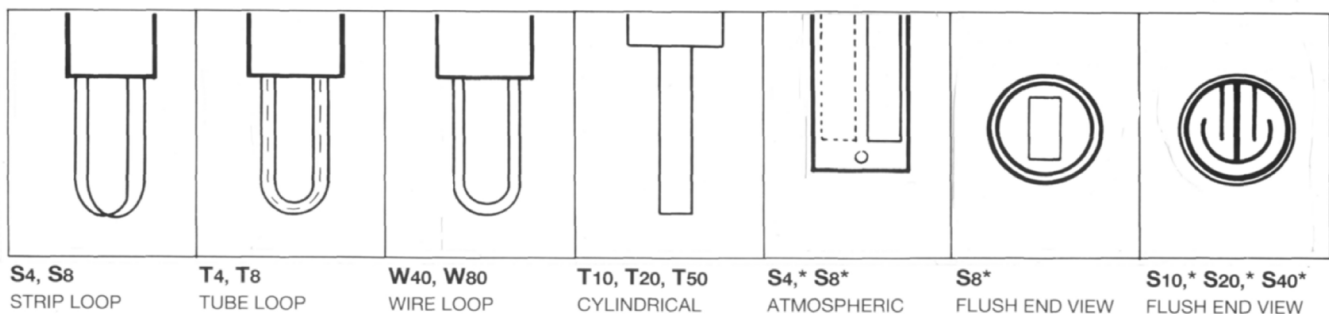
**Cylindrical Elements**

These probes have the element directly welded to the probe body to provide the highest integrity seal for aggressive environments. They provide a large surface area for measurement, have the fastest dynamic response to temperature transients, and are the least susceptible to the effect of any conductive deposits (such as Iron Sulfide) where present. The construction enables these probes to be used in environments in pH range 0-14, at temperatures up to 500 degrees F (260 degrees C). A high temperature model is also available for temperatures above 50 degrees F.

The body of the cylindrical element probe is normally supplied in the same alloy as the element to prevent the effects of possible galvanic corrosion between the probe body and probe element.

**Flush Elements**

Flush element probes are available where it is particularly necessary to monitor localized wall effects, or where protrusion into the line would cause damage to the probe; for example, during pigging operations.



\* CORROSION ON ONE SIDE ONLY

**PROBE MATERIALS**

Care should be taken to check that the wetted probe components are compatible with the process fluid. Pressure ratings are specified on this basis. ER probes are designed with pressure retaining capability beyond the probe element. However, the pressure rating may be impaired if the probe is not removed within a reasonable period of time after expiration of the probe element.

**Probe Body and Wetted Parts**

For loop element and flush element probes, the standard body materials are 304 and 316 stainless steel. Cylindrical element probes generally have wetted parts of the same alloy as the probe element.

**Probe Element Seals**

Telfon® is rated to 500 degrees F (260 degrees C) maximum. Glass seals are rated to 500 degrees F (260 degrees C) maximum in a pH range of less than 9. For standard cylindrical probes, the process operating temperature is limited to 500 degrees F (260 degrees C)

by internal Teflon insulators. For high temperature cylindrical element probes, internal insulation is ceramic.

**Probe Fill Material**

Standard probe fill materials are ceramic or epoxy. In non-glass sealed loop element probes, this material may be wetter by process fluid. In glass sealed loop probes and cylindrical element probes, this fill material will only be wetted on penetration of the corrosion element.

**PRESSURE CONTAINMENT**

All ER process probes incorporate a hermetically sealed electrical connector designed to hold full rated pressure. This connector should be considered as the primary seal. ER probe elements are designed for maximum operational integrity but by their very nature these elements are sacrificial. For this reason, element seals are not considered in terms of process containment. Specialized probe designs are available which incorporate 100% Teflon® seals (for hydrofluoric acid applications, for example) and additional secondary seals are available for the most severe duty.

**PROBE SPAN SELECTION CHART**

STANDARD PROBE ELEMENT TYPE	LOW CORROSION RATES	MEDIUM CORROSION RATES	HIGH CORROSION RATES	PROBE SPAN MILS (mm)
	MILS PER YEAR (0.001")			
	.4 .6 .8 1 2	4 6 8 10 20	40 60 80 100 200	
TF50*	200 TIMES AS SENSITIVE AS S4*			0.01 (.00025)
S4	[Hatched area from .4 to 10]			1.0 (0.025)
S4,* S8, T4	[Hatched area from .8 to 20]			2.0 (0.050)
S8,* T8	[Hatched area from 1 to 100]			4.0 (0.100)
S10,* T10	[Hatched area from 2 to 200]			5.0 (0.125)
S20,* T20, W40	[Hatched area from 4 to 100]			10.0 (0.250)
S40,* W80	[Hatched area from 8 to 200]			20.0 (0.500)
T50	[Hatched area from 10 to 200]			25.0 (0.625)
	.025	.25 mm PER YEAR	2.5	
	25	250 MICRONS PER YEAR	2,500	

**KEY**

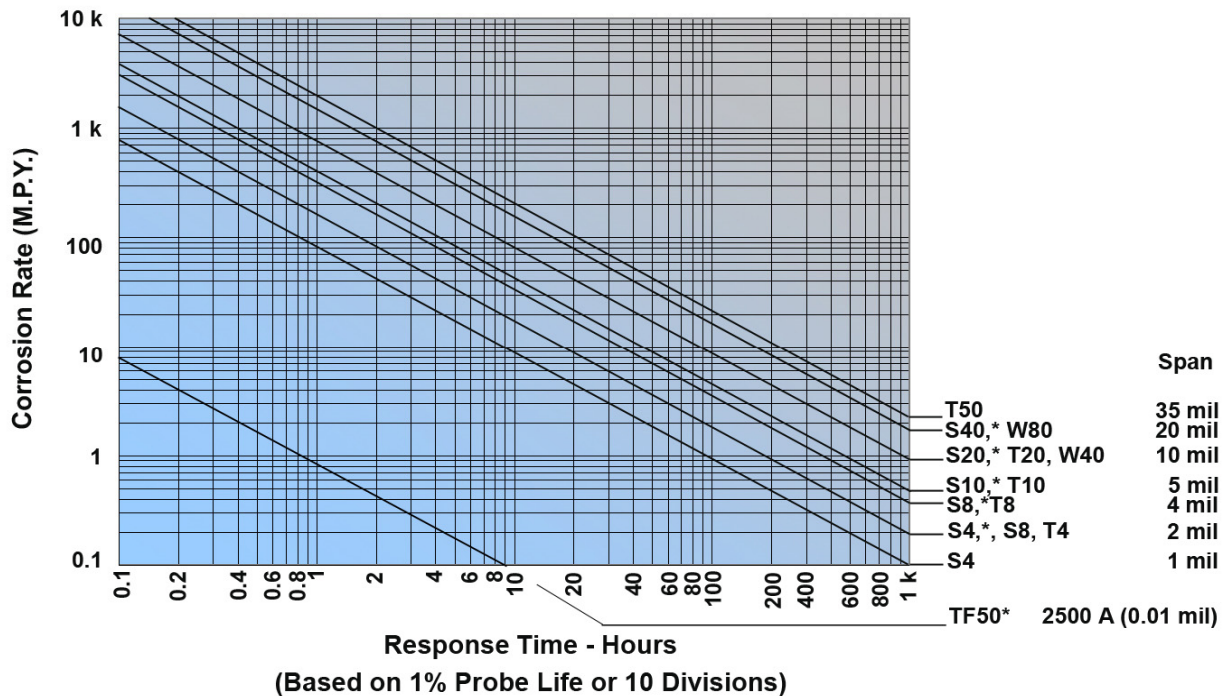
[Hatched pattern A]	[Hatched pattern B]	[Hatched pattern C]	[Hatched pattern D]	A: 2 YEAR REPLACEMENT	C: 3 MONTH REPLACEMENT
				B: 1 YEAR REPLACEMENT	D: 6 WEEK REPLACEMENT

## PROBE SENSITIVITY SELECTION

Selecting the correct probe sensitivity is the key to getting the best results from your corrosion monitoring program in the most cost-effective manner possible. A sensitive probe will respond more quickly to process upsets than one with a greater span, but the element will corrode away and require replacement more quickly. Sensitive elements (T4, for example) are the best choice when anticipated general corrosion rates are low or when it is desired to obtain rapid response to changes, such as in a short-term test. Less sensitive, longer life elements are recommended when corrosion rates are medium to high and the objective of the program is to ensure that corrosion stays within acceptable limits rather than to rapidly

detect process upsets. In general we recommend that elements be selected to be replaced every 9-12 months to give the optimum combination of sensitivity and responsiveness. When responsiveness is the primary consideration consult the PROBE RESPONSE TIME CHART. As an example, if a response within a maximum of 12 hours is required to a corrosion rate of 25 mpy. A T4 (or more sensitive) element must be used. A T8 element would respond in approximately 18 hours. This chart is based upon the practical level of detection for a ER probe; 1% of probe life or 10 divisions out of the entire 1000 division probe span.

### Probe Response Time Chart



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ISO 9001:2008  
 Certificate No. FM 10884

ER-Probe-SG-DS rev-  
 Rev. Date: 05/10/2016

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# ER DUAL SENSOR TEMPERATURE PROBES

ER with Temperature



## Features

- **Simplifies Corrosion/Temperature Correlation**
- **Utilizes Standard 6 PIN Connector/No Adaptors Required**
- **Provides Stable and Accurate measurements**
- **Suitable for Local and Remote Monitoring**
- **Available in Several Probe Models**
- **Newer Instruments Measure Both Parameters**
- **Operating Range -40°F to +500°F (-40°C to +260°C)**

Temperature is one of the most important controllable factors affecting corrosion rate, particularly in refineries, chemical and petrochemical process plants. A rule of thumb is that corrosion rates double for each 10 degrees C temperature rise. The ability to track temperature and corrosion rate simultaneously is a powerful tool in the corrosion management of such plants.

The Dual Sensor patented measurement electrical resistance (ER) Temperature probe series allows metal loss and temperature information to be collected simply at the corrosion monitoring location where it is important. By using a ER Dual Sensor Temperature Probe, you won't have to spend time searching for a separate temperature measurement that may not even exist for the area you want to monitor.

The temperature measurement has been incorporated into the probes using the same standard 6 pin connectors of the standard ER probe range - no external separate connectors or special adaptors with additional pins are required. The originality of the design permits both local and remote monitoring to be accomplished with accuracy.

# ER DUAL SENSOR TEMPERATURE PROBES

The Dual Sensor combination models are distinguished from the standard ER probes by adding a "T" after the series number. Apart from adding a "T" to the series number, the remainder of the model number is exactly the same as the standard ER probe (refer to applicable data sheets for ordering by model number).

Cosasco has the three instruments which read Dual Sensor ER Temperature probes, the Model CK-4, Corrdata Mate II, Corrdata Remote Data Collectors (RDC's).

With an adaptor, (Cosasco Part No. 748071), Dual Sensor ER Temperature Probes may be read with any 100 ohm Platinum RTD Thermometer ( $\alpha = 0.00385$ ), such as the Omega Model 868, 869 or equivalent.

Temperature Sensor Specification:

- 100 ohm platinum resistance temperature sensor (RTD).

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Certificate No. FM 10694

# SMART TEST STATION



The Test Station with a Built-in Electrical Resistance (ER) Probe  
Designed to be Buried for Underground CP Monitoring

## Features

- **Test Head Terminations for Measuring:**
  - **Metal loss of the Electrical Resistance Element**
  - **Structure to Soil and Probe to Soil Potentials**
  - **“Instant off” Measurements of the Probe**
  - **Depolarization Rates of the Probe**
  - **Ring Coupon Measurements**
- **Foot with:**
  - **ER Probe with 50 Mil Thickness (25 Mil Useful Life) and 3.85 sq. inch Exposed Surface Area**
  - **Pipe Grade Carbon Steel Ring with 3.85 sq. inch Exposed Surface Area**

The Smart Test Station™ is designed to be a comprehensive tool to facilitate cathodic protection monitoring. It is recommended that the foot of the station be buried in the same backfill as the structure.

The Electrical Resistance (ER) probe is electrically connected to the CP System and is cathodically protected. It is recommended that the pipe be filled with the backfill material during Smart Test Station™ installation. The Test Head and Foot are connected by a 3" inner diameter PE, PVC or polycarbonate pipe.

Probe to soil measurements are taken with the reference cell placed inside the 3" diameter pipe to reduce IR drop errors. A permanent reference cell can be ordered as an option to minimize IR drop errors and eliminate the need for the tube.

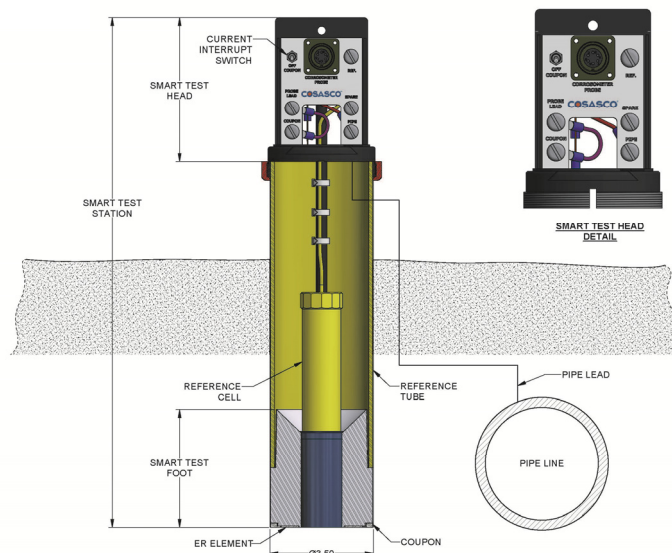
With the use of any ER instrument, the effectiveness of the CP system for the period between visits to the location can be easily monitored.

A switch located in the test head facilitates “instant off” measurements of the probe. The ring coupon can be cathodically protected and used as a secondary source for measurements. Or, it may be left unconnected for “native” corrosion potential measurements.

The station may be installed during an excavation, or an auger may be used for post excavation installations.



## Typical Installations



## Ordering Information

Model	Description
STS	Smart Test Station
STH	Smart Test Head
STF	Smart Test Foot
	<b>Code</b> (Reserved)
	0
	<b>Code</b> <b>Reference Electrode Option</b>
	0 With Stationary Reference Electrode
	1 Without Stationary Reference Electrode
	<b>Code</b> <b>Body Material</b>
	0 Polyethylene
	1 Polycarbonate
	2 PVC
	<b>Code</b> <b>Length</b>
	LL Length in Feet
STS	— 0 — 1 — 0 — 20 <span style="float: right;">Example</span>
STH	— 0 <span style="float: right;">Example</span>
STF	— 1 — 20 <span style="float: right;">Example</span>

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Smart-Test-Station-D5 rev-  
 Rev. Date: 05/18/2016

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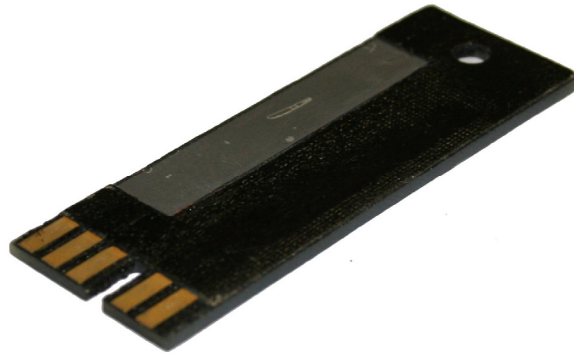


ISO 9001:2008  
 Certificate No. PB 10004

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# Electrical Resistance (ER) Probe

## MODEL 600 Atmospheric



## Features

- **Mounting — 3/16" Mounting Hole**
- **Temp. Rating — -40°F to +250°F / -40°C to +121°C**
- **Probe Body Material — G -10 Glass Epoxy**

The Cosasco Model 600 Atmospheric electrical resistance probes are designed to monitor corrosion of a gaseous environment. A thin strip, typically of Pipe Grade Carbon Steel is laminated to a glass epoxy board and attaches at one end to a special electrical resistance cable. The cable must be ordered separately. One half of the metal is exposed to the corrosive environment to obtain the

measurement; the other half is coated and acts as a reference element. Elements are normally 4 or 8 mils thick with a useful measuring range equal to half the original thickness. The probe may be grounded to an exposed metallic structure to monitor the effectiveness of cathodic protection being applied to the structure.

# MODEL 600 Atmospheric

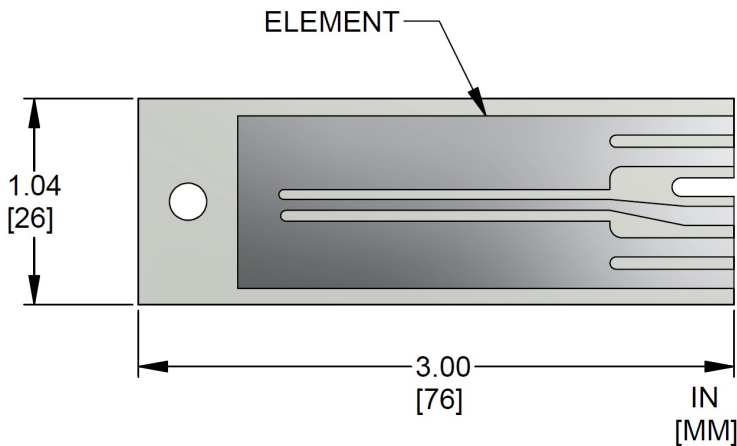
## Element Availability

UNS Number	Alloy	S4	S8
K03005	Pipe Grade Carbon Steel	-	•
	Inches	.002	.004
	Useful Range (mm)	.051	.100

**Table 1**

Other element alloy may be supplied subject to material availability.

## Dimensions



## Ordering Information

Model	Description		
600	Atmospheric ER Probe		
	<b>Code</b>	<b>Element Style</b>	
	S4	4 mils thickness (2 mils useful life)	
	S8	8 mils thickness (4 mils useful life)	
	<b>Code</b>	<b>Element Alloy: See Table 1 for Availability</b>	
	XXXXXX	Enter UNS Number	
600	- S4 -	K03005	← Example

### Accessories:

Model No. CBL1 - 1 - B - 0 - 0 - LL Interface Cable for Model Checkmate™ Instrument  
(LL: Specify desired cable length in feet)

**UNIT WEIGHT:** .5 lb. / .23 kg

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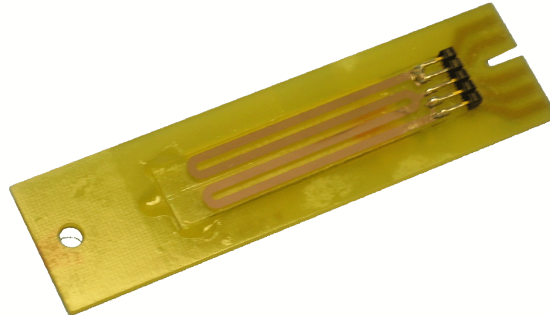
ISO 9001:2008  
Certificate No. FM 10604

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Rev. Date: 05/03/2016

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# HIGH SENSITIVITY ATMOSPHERIC CORROSION ELECTRICAL RESISTANCE (ER) SENSOR

MODEL 610



## Features

- **Accurately Measure Metal Loss of Less Than 10 Angstroms (Å)\***
- **Quickly Detects Degradation of Air Filtration Systems**
- **Low Cost**
- **Compatible with Standard Corrosion Monitoring Instruments**
- **Available in Copper, Silver and Other Metals**

### INTRODUCTION

The Model 610 Atmospheric Corrosion Electrical Resistance Sensor monitors the corrosivity of the air in plant control rooms, in motor control centers, near exhaust stacks and in other environmental monitoring applications. Since an accurate corrosion rate measurement can be obtained after loss of less than one percent of the total sensor span, day-to-day measurements can be made even in mild to moderately corrosive environments.

The Instrument Society of America (ISA) has classified reactive environments by the corrosion rate of copper as follows:

- G1 Mild.....less than 300 Å/mo.
- G2 Moderate.....less than 1000 Å/mo.
- G3 Harsh.....less than 2000 Å/mo.
- G4 Severe.....greater than 2000 Å/mo.

### APPLICATION

The increasing use of electronic and computer equipment in the heart of industrial process plants necessitates the use of environmental systems to control atmospheres and protect sensitive equipment. These

environmental systems regulate temperature and humidity and remove corrosive contaminants by the use of activated carbon filters. Loss of control of these parameters can cause corrosive deterioration of equipment.

The compact, lightweight Model 610 Atmospheric Corrosion ER Sensor can be mounted in equipment racks, ventilation ducts or in other desired locations. Connection to monitoring instruments is through a separate adaptor cable (see Accessories).

Activated carbon filters have a finite life for absorbing contaminants, depending on the quantity and frequency of contaminate exposure, which can vary greatly by location. In most operations, filters are routinely replaced once a year and replacement costs can vary from \$5000 to \$50,000. The Model 610 gives early indication of filter replacement without jeopardizing the safety of costly, sensitive equipment. Filter replacement is expensive and may be done prematurely without the use of a corrosion sensor.

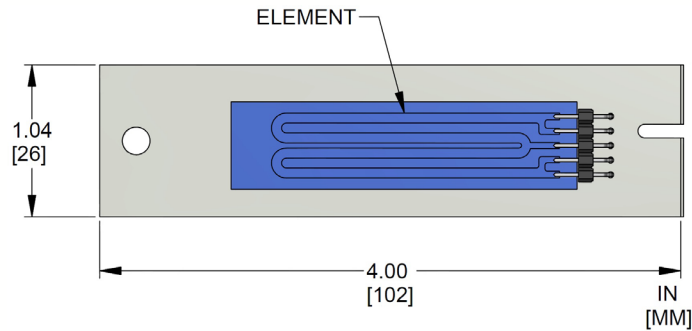
\*1 Angstrom (Å) - 0.000,000,01 cm or 0.000,000,0004 Inch.

# MODEL 610

## Specifications

Span	Nominal = 2500 Angstroms (0.01 mil) (Each Probe will be tested and labeled with its actual span)
Span Accuracy	(vs. Nominal) + / - 25% (vs. Label) + / - 10%
Unit Weight	0.1 lb / 0.05 kg

## Dimensions



## Ordering Information

Model	Description		
610	Atmospheric ER Probe		
	<b>Code</b>	<b>Sensor Span/Life</b>	
	TF50	2,500 Angstroms	
	<b>Code</b>	<b>Sensor Materials</b>	
	C11000	Copper	
	P07010	Silver	
	N02200	Nickel	
	K00095	Iron	
610	TF50	C11000	← Example

## Accessories

Adaptor Cables for use with electronic measurement instruments:

Instrument	Cable Model No.
4020LT	CBL1-2-B-0-0-LL
Checkmate/Checkmate Plus	CBL1-3-B-0-0-LL

LL = Length of cable in feet

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Certificate No. FB 10094

610-DS rev-  
Rev. Date: 05/03/2016

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# UNDERGROUND ELECTRICAL RESISTANCE (ER) PROBES

## MODEL 620HD/650



## Features

- **Service Conditions – Heavy Duty**
- **Operation – Grounding Lead Option for Use with Cathodically Protected Structures**
- **Probe Construction – Injection Molded/Epoxy (620HD) Measure/Reference & Check Element (620HD) All Welded Elements: Measure, Reference and Check (650)**
- **Cable Connection – Heavy Duty Length as Required (620HD) Heavy Duty Length and Bonded Heat Shrink Sleeving Onto Element (650)**

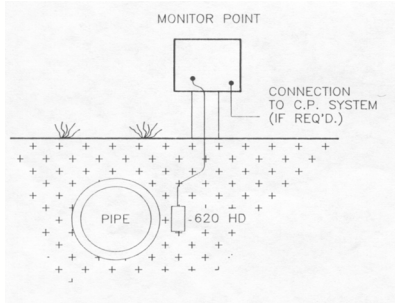
The Cosasco Model 620HD and 650 Electrical Resistance (ER) probes are designed for underground and structural monitoring of pipelines, vessels, above and below ground storage tanks and structures — whether cathodically protected or not. The Model 620HD ER probe is a heavy duty assembly with a check element which is suited to the “construction site” environment. The Model 650 ER probe is economical and durable. Its slim profile is convenient for locations with restricted access such as concrete bridge structures and other infrastructure applications. Both probes provide good sealing to the reference element, and the check element provides confidence in the continued performance of the corrosion sensor. Either probe can be connected (or not connected) to a cathodically protected structure. When electrically connected, the probe provides a continuous record on the

effectiveness of the Cathodic Protection (C.P.) system under all the operating conditions.

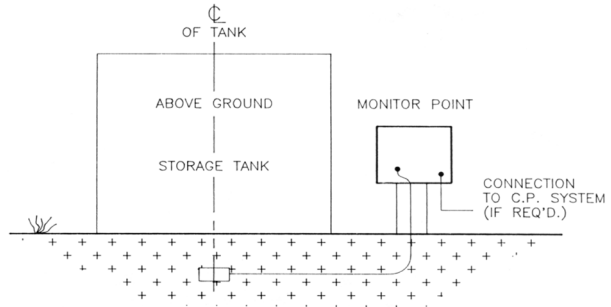
When the probe is not connected to the structure, it monitors the corrosivity of the soil or environment around the structure. In some cases, it may be beneficial to monitor both the C.P. system and the environment, which would entail the use of two probes. The probes may be ordered with or without a grounding lead for C.P. System. The lead may be installed at the probe or connector end, whichever is most convenient. In most cases, a lead at the monitoring connector end is preferred, with a separate lead running to the structure or C.P. System. This enables connection to the C.P. System to be made as required, even after probe installation.

## Typical Installations

**Underground Pipeline Monitoring**



**Above Ground Storage Tank Monitoring**



\*It is recommended that the probe be bonded (electrically connected) directly to the protected structure, not at the rectifier or galvanic anode.

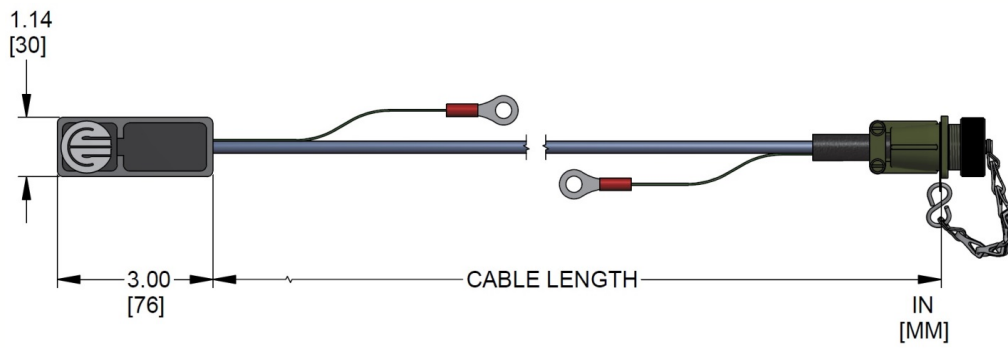
## Element Availability

UNS Number	ALLOY	S10	S20	S40	T10	T20	T50
K03005	Pipe Grade Carbon Steel	☐	☐	☐	●	●	●
	Inches	.005	.010	.020	.055	.010	.025
	Useful Range (mm)	.127	.254	.508	.127	.254	.635

620HD Probe Type: Flush (B)  
650 Probe Type: Special (D)

**Note:**  
☐ Denotes availability for Model 620HD  
● Denotes availability for Model 650

## Dimensions



# MODEL 620HD/650

## Ordering Information

Model	Underground Corrosometer ER Probes				
620HD	Heavy Duty, Service ER Probe Assembly				
650	Heavy Duty, Slim Profile Service ER Probe Assembly				
	Code	Grounding Connection			
	1	Grounding Lead at Connector End			
	2	Grounding Lead at Probe End			
	Code	Cable Order Length			
	S10	Model 620HD Only- Flush Strip Element, 10 mil thickness (5 mil useful probe life)			
	S20	Model 620HD Only – Flush Strip Element, 20 mil thickness (10 mil useful probe life)			
	S40	Model 620HD Only - Flush Strip Element, 40 mil thickness (20 mil useful probe life)			
	T10	Model 650 Only - 10 mil thickness (5 mil useful probe life)			
	T20	Model 650 Only - 20 mil thickness (10 mil useful probe life)			
	T50	Model 650 Only – 50 mil thickness (25 mil useful probe life)			
	Code	Element Alloy			
	K03005	Carbon Steel			
	YYYYYY	Other UNS Number (Specify)			
	Code	Cable Order Length			
	LL	Cable Length in Feet			
620HD	2	S10	K03005	100	← Example

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ISO 9001:2008  
 Certificate No. FM 10064

620HD-DS rev-  
 Rev. Date: 05/03/2016

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# ELECTRICAL RESISTANCE (ER) PROBES

Model 650

## Corrosion Monitoring in Concrete

### Features

- **Detects when Chloride ingress is nearing the Rebar**
- **Measures and Records Metal Loss Directly**
- **Measures the Corrosion Rate with CP connected**
- **Records Cumulative Metal Loss without an Instrument**
- **By-passes the Unknowns of Electrochemical Methods**

To prevent deterioration of the reinforced concrete infrastructure, many new structures are installed with Cathodic Protection. Electrical resistance (ER) probes evaluate the effectiveness of the Cathodic Protection system, as well as provide a test piece that can be electrically isolated to facilitate Cathodic Protection measurements such as de-polarization rates. In some cases, the cathodic protection may not be installed, or switched on, until corrosion is likely to commence as a result of chloride penetration into the concrete. When the initiation of the Cathodic Protection is delayed after the initial construction, it is critically important to know the timing for applying the Cathodic Protection. Subsequently, it is important to control the Cathodic Protection and ensure that the steel is being fully protected. This is where the ER probe is especially helpful. First of all the ER probe measures physical metal loss on the probe before and after addition of the Cathodic Protection without the need to know the exact electrochemistry governing the corrosion. Even when the electrochemical parameters are well known and measured accurately, the conversion of these measurements into actual metal loss is difficult due to inaccurate assessment of measured

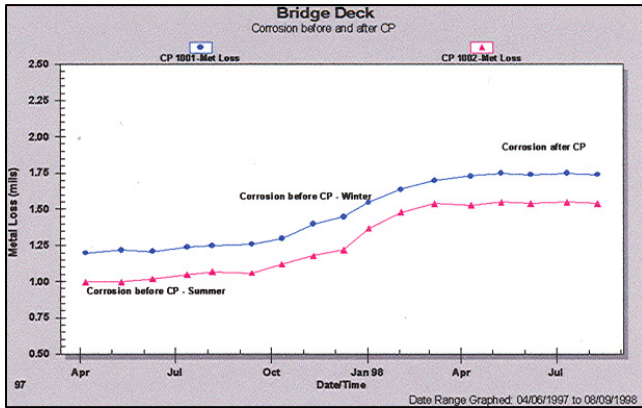


areas, or variability in the conversion constants. Even more important may be the fact that all electrochemical measurements only record the corrosiveness of the environment at the time of taking the reading. Hence without continuous monitoring the ongoing corrosion or metal loss cannot be accurately assessed. The ER probe measures cumulative metal loss, so that any corrosion problems that have occurred between probe measurements will NOT be lost, but instead will have been “recorded” by the probe. By positioning probes in critical areas just above the Rebar, the increasing corrosion rate due to penetration of chlorides may be detected before reaching the Rebar, to allow timely initiation of the Cathodic Protection. Once the Cathodic Protection is operational the ER probe is externally connected to the Rebar and hence the Cathodic Protection potential, to ensure that the applied protection potential is actually preventing corrosion. Some of the probes may be left disconnected from the Cathodic Protection at intervals to confirm the background corrosion rate without the Cathodic Protection.

# Model 650

To monitor these concrete probes, the simplest method is to use a portable electrical resistance instrument such as the Checkmate.

**CORRDATA Plus Graph of Metal Loss v. Time**



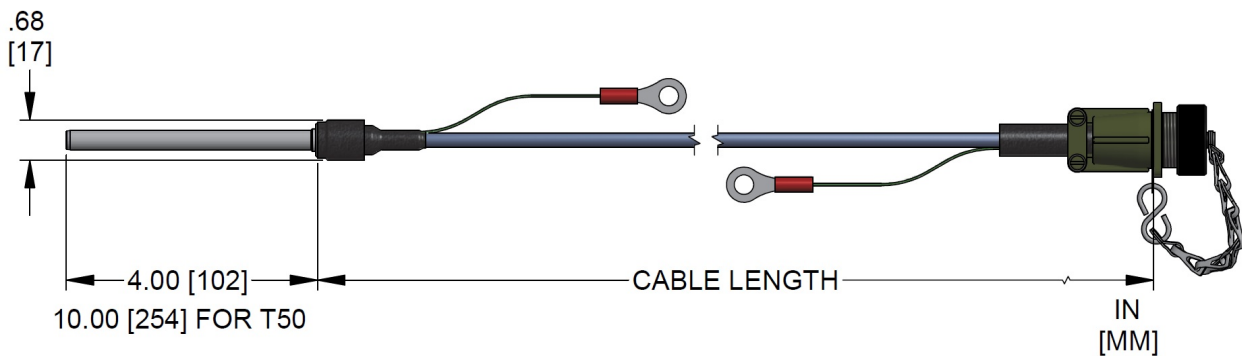
The slope of this graph at any time is corrosion rate. For more sophisticated systems, other electronic monitoring schemes are available such as data logging, or remote monitoring.

**Checkmate Portable Instrument**



Readings are taken at intervals and the metal loss recorded. These values are plotted in a spreadsheet or in Corrdata Plus spreadsheet or software to show metal loss over time.

## Dimensions



# MODEL 650

## Ordering Information

Model 650	Concrete Monitoring ER Probe	
	<b>Code</b>	<b>Grounding Connection</b>
	0	No Grounding Lead
	1	Grounding Lead at Connector End
	2	Grounding Lead at Probe End
	<b>Code</b>	<b>Cable Order Length</b>
	T10	10 mils Thickness – 5 mils Useful Probe Life
	T20	20 mils Thickness – 10 mils Useful Probe Life
	T50	50 mils Thickness – 25 mils Useful Probe Life
	<b>Code</b>	<b>Element Alloy</b>
	K03005	Carbon Steel
	YYYYYY	Other Alloy (specify UNS Code)
	<b>Code</b>	<b>Cable Length</b>
	LL	Cable Length in Feet

650	—	1	—	T20	—	K03005	—	20	← Typical Order Number
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ISO 9001:2008  
 Certificate No. FM 10064

650C-DS rev-  
 Rev. Date: 05/03/2016

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# ELECTRICAL RESISTANCE (ER) PROBES

## MODEL 620DI



## Features

- **Ductile Iron Measure Element**
- **Designed for 20 Years Life**
- **Service Conditions – Direct Burial**
- **Operation – Grounding Lead Option for Use with Cathodically Protected Pipelines**
- **Probe Construction – Polyurethane Encapsulation and Cable Sheath**

The Cosasco Model 620DI (Ductile Iron) electrical resistance (ER) probe is designed for underground and structural monitoring of pipelines, vessels, above and below ground storage tanks and structures — whether cathodically protected or not. The Model 620DI ER probe is a heavy duty assembly with a check element which is suited to the “construction site” environment. The 620DI ER probe has a flush strip element, 125 mil thickness (62.5 mil useful probe life) and the element alloy is ductile iron. This probe can be connected (or not connected) to a cathodically protected structure. When electrically connected, the probe provides a continuous record on the effectiveness of the Cathodic Protection (C.P.) system under all the operating conditions. When the probe is not connected to

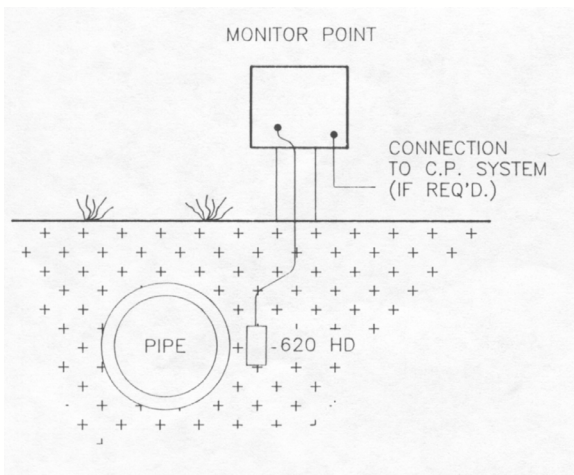
the structure, it monitors the corrosivity of the soil or environment around the structure. In some cases, it may be beneficial to monitor both the C.P. system and the environment, which would entail the use of two probes. The probes may be ordered with or without a grounding lead for C.P. System. The lead may be installed at the probe or connector end, whichever is most convenient. In most cases, a lead at the monitoring connector end is preferred, with a separate lead running to the structure or C.P. System. This enables connection to the C.P. System to be made as required, — even after probe installation.

# MODEL 620DI

## Specifications

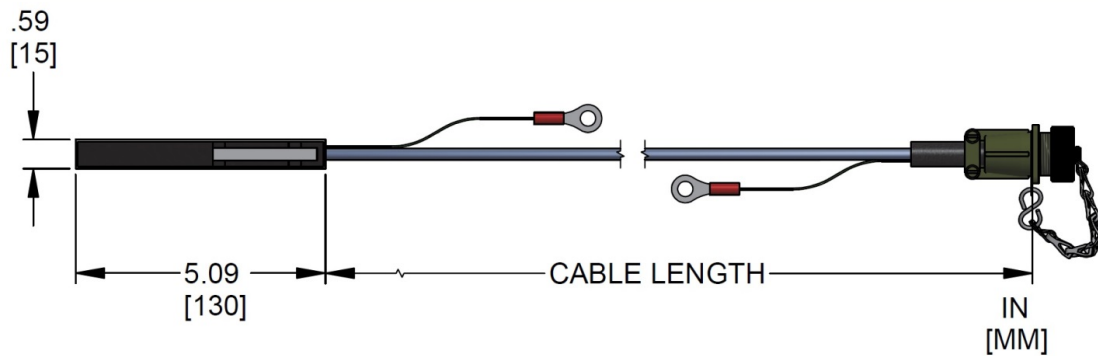
Probe Type	Special (D)
Span	62.5 mils
Maximum Cable Length	100 feet (30 meters)

### Typical Installations: Underground Pipeline Monitoring



\*It is recommended that the probe be bonded (electrically connected) directly to the protected structure, not at the rectifier or galvanic anode.

## Dimensions



# MODEL 620DI

## Ordering Information

Model	Underground ER Probes	
620DI	Heavy Duty, Service ER Probe Assembly	
	Code	Grounding Connection
	1	Grounding Lead at Connector End
	2	Grounding Lead at Probe End
	Code	Cable Order Length
	LL	Cable Length in Feet

620DI	—	0	—	10	←	Example
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**Unit Weight:** Model 620DI: 5 lbs. /2.3 kg (w/10 Feet Cable)

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 Certificate No. FM 10004

620DI-DS rev-  
 Rev. Date: 05/03/2016

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# Electrical Resistance (ER) Probes

**MODEL 2500/2500HT**



## Features

- **Cylindrical Element**
- **Mounting -  $\frac{3}{4}$ " NPT Fixed**
- **Temperature Rating - +500°F / +260° C Standard Model 2500**  
- +1000°F / +540° C High Temp. Model 2500HT
- **Pressure Rating - 4000 PSI / 27.6 MPa**
- **Element Seal Material - All Welded**
- **Fill Material - Ceramic**
- **Body Material - Same as element**

Model 2500 fixed electrical resistance probes have a thin walled cylindrical sensing element which is welded onto a body of the same material. No other materials are in contact with the corrosive medium. Welds are vacuum annealed during assembly to avoid preferential corrosion

effects. They may be used in aggressive organic or inorganic fluids over the entire pH range. These probes are standard in mild steel, 304 S.S. and 316 S.S. but can be supplied in other materials. These probes cannot be removed while system is under pressure.

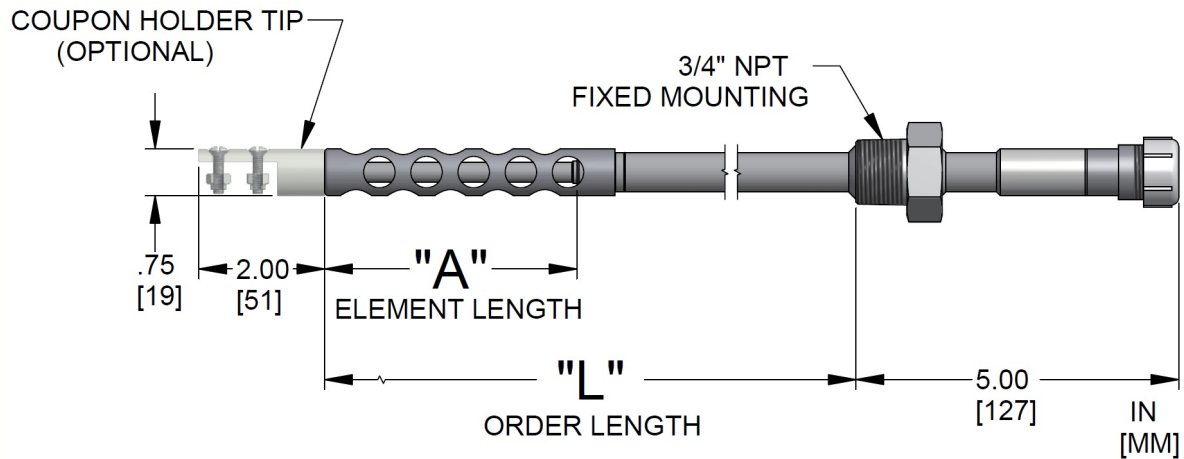
## Element Availability

UNS Number	Alloy	T10	T20	T50	UNS Number	Alloy	T10	T20	T50
K03005	Pipe Grade Carbon Steel	•	•	•	N08020	CARP 20-Cb3	•	•	
K03006	A106 Gr.B/A333 Gr.6	•	•		S50400	9% Cr 1% Mo	•	•	
S30400	304 S.S.	•	•	•	N04400	Monel 400	•	•	
S30403	304L S.S.	•	•		N06600	Inconel 600	•	•	
S31600	316 S.S.	•	•		N06625	Inconel 625	•	•	
S31603	316L S.S.	•	•		N08825	Incoloy 825	•	•	
S31703	317 S.S.	•	•	•	N10276	Hastelloy C-276	•	•	
S31803	2205 Duplex S.S.	•	•						
S32100	321 S.S.	•	•						
S41000	410 Stainless Steel	•	•						
S50200	502 S.S. (5% Cr 1/2% Mo)	•	•						
N08904	904L S.S.	•	•						
	<b>Inches</b>	.005	.010	.025		<b>Inches</b>	.005	.010	.025
	<b>Useful Range (mm)</b>	.127	.254	.635		<b>Useful Range (mm)</b>	.127	.254	.635

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



Element Type	"A" Dimension Element Length	"L" Dimension Order Length
T10	2.25 (57mm)	5.00 (127 mm)
T20	4.00 (102mm)	5.00 (127mm)
T50	10.00 (254 mm)	12.00 (305 mm)



# MODEL 2500/2500HT

## Ordering Information

Model	Fixed NPT Mounting Probes – Cylindrical Element									
2500	Complete Probe Assembly									
2500HT	Complete Probe Assembly – High Temperature									
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>								
	<b>T10</b>	10 mil thickness (5 mil useful probe life)								
	<b>T20</b>	20 mil thickness (10 mil useful probe life)								
	<b>T50</b>	50 mil thickness (25 mil useful probe life)								
		<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>							
		XXXXXX	Enter UNS Number							
			<b>Code</b>	<b>Order Length</b>						
			0	Standard Length – 5.00 inches for T10 or T20, 12.00 inches for T50						
				<b>Code</b>	<b>Shield</b>					
				0	Not Included (max liquid velocity 8 ft./sec, gases 25 ft./sec)					
				1	Element Support (max liquid 25 ft./sec, gases 75 ft./sec)					
				2	High Velocity (max liquid 50 ft./sec, gases 150 ft./sec)					
				3*	Coupon Holding (max liquid 25 ft./sec, gases 75 ft./sec)					
<b>2500</b>	<b>—</b>	<b>T20</b>	<b>—</b>	<b>K03005</b>	<b>—</b>	<b>0</b>	<b>—</b>	<b>1</b>	<b>←</b>	<b>Example</b>
<b>2500HT</b>	<b>—</b>	<b>T20</b>	<b>—</b>	<b>K03005</b>	<b>—</b>	<b>0</b>	<b>—</b>	<b>1</b>	<b>←</b>	<b>Example</b>

Unit Weight: 3 lbs./1.36 kg

\*Coupon holding tip will extend 2" beyond order length coupon holding shields, use CI-RS strip coupons.

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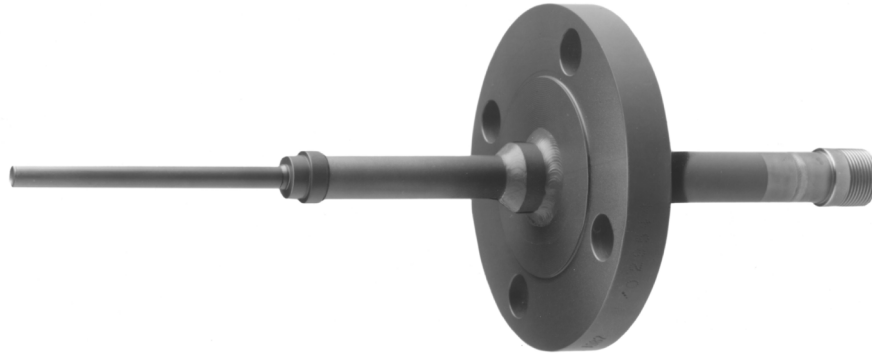
ISO 9001:2008  
 Certificate No. FM 10694

2500-DS rev-  
 Rev. Date: 05/03/2016

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# Electrical Resistance (ER) Probes

MODEL 2520/2520HT



## Features

- **Cylindrical Element**
- **Mounting - Standard ANSI and API RJ and RF Flanges**
- **Temp. Rating - +500° F (+260° C) Standard, +1000° F (+520° C)**  
**High Temperature, subject to flange rating**
- **Pressure Rating - 4000 PSI (27.6 MPa) subject to flange rating**
- **Seal Material - Element seal all welded**
- **Process Containment Seal - High pressure glass-metal seal connector**  
**(Additional/Alternate seals available for special service conditions)**
- **Fill Material - Ceramic**
- **Body Material - Same as element**

Model 2520 fixed electrical resistance probes are designed for particularly severe or toxic duty service, where retractable or fixed thread probes are not permitted by plant or other regulations. The all welded construction of the cylindrical probe element provides the highest integrity for a corrosion measurement element. Only the material under evaluation is exposed to the process fluid. Even with any localized attack or physical damage to the element, the back of the probe provides process containment with high pressure glass-to-metal seals. For special service such as hydrofluoric acid (HF), which would attack glass seals, alternate/additional metal/Teflon mechanical seals are available to ensure process containment. For other toxic processes, double rear seals are available with capability

for monitoring for leakage between seals. ER Probes are available in a wide range of alloys and are custom made to the flange size and probe length required. Special seals are added if process conditions warrant. High temperature versions of the probes are available. Maximum pressure and temperature conditions are frequently limited by the standard flange rating rather than the ER probe construction. In the case of the more exotic alloys such as titanium, Hastelloy, Monel, Incolloy or other alloys where materials and flanges are relatively expensive, refurbishing of the process side of the probe may be possible at the end of probe element life, subject to the condition of the other parts of the probes.

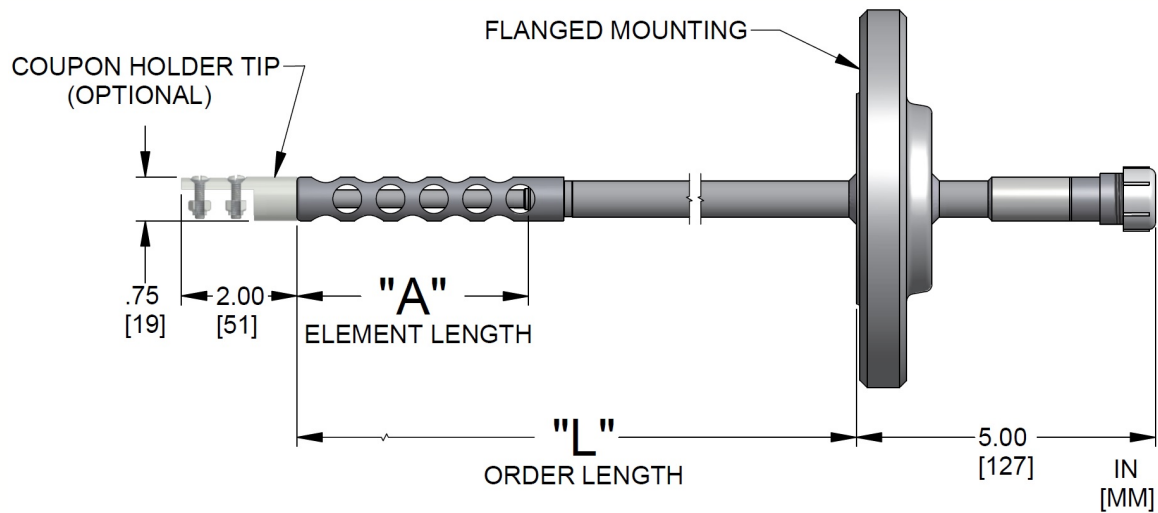
## Element Availability

UNS Number	Alloy	T10	T20	T50	UNS Number	Alloy	T10	T20	T50
K03005	Pipe Grade Carbon Steel	•	•	•	N08020	CARP 20-Cb3	•	•	
K03006	A106 Gr.B/A333 Gr.6	•	•		S50400	9% Cr 1% Mo	•	•	
S30400	304 S.S.	•	•	•	N04400	Monel 400	•	•	
S30403	304L S.S.	•	•		N06600	Inconel 600	•	•	
S31600	316 S.S.	•	•		N06625	Inconel 625	•	•	
S31603	316L S.S.	•	•		N08825	Incoloy 825	•	•	
S31703	317 S.S.	•	•	•	N10276	Hastelloy C-276	•	•	
S31803	2205 Duplex S.S.	•	•						
S32100	321 S.S.	•	•						
S41000	410 Stainless Steel	•	•						
S50200	502 S.S. (5% Cr 1/2% Mo)	•	•						
N08904	904L S.S.	•	•						
	<b>Inches</b>	.005	.010	.025		<b>Inches</b>	.005	.010	.025
	<b>Useful Range (mm)</b>	.127	.254	.635		<b>Useful Range (mm)</b>	.127	.254	.635

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



Element Type	"A" Dimension Element Length	"L" Dimension Order Length
T10	2.25 (57mm)	5.00 (127 mm)
T20	4.00 (102mm)	5.00 (127mm)
T50	10.00 (254 mm)	12.00 (305 mm)

# MODEL 2520/2520HT

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Fixed Flanged Mounting ER Probe Assembly							
2520	Complete Probe Assembly							
2520HT	High Temperature Probe Assembly up to 1000° F (520° C) subject to flange rating							
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>						
	T10	10 mil thickness (5 mil useful probe life)						
	T20	20 mil thickness (10 mil useful probe life)						
	T50	50 mil thickness (25 mil useful probe life)						
	<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>						
	YYYYYY	Enter UNS number						
	<b>Code</b>	<b>Probe Length: Probe tip to flange face (inches)</b>						
	ZZ.ZZ	From 3.25 inches (T10), 5.00 (T20), 11.00 inches (T50), to 36.00 inches						
	<b>Code</b>	<b>Flange Size</b>						
	1.5	Nominal 1.5 inch						
	2.0	Nominal 2.0 inch						
	S.S.	Other Size (Specify)						
	<b>Code</b>	<b>Flange/Rating Type</b>						
	71	ANSI 150# RF						
	72	ANSI 300# RF						
	73	ANSI 4/600# RF						
	42	ANSI 4/600# RJ						
	43	ANSI 9/1500# RJ						
	UU	Other (Specify)						
	<b>Code</b>	<b>Flange Material</b>						
	K03504	ASTM A105 Carbon Steel for Carbon Steel Element						
	K03011	ASTM A350LF2 for Carbon Steel Element in Low Temp. Service						
	FFFFFF	Other material normally as YYYYYY						
	<b>Code</b>	<b>Shield Options</b>						
	0	Not Included*						
	1	Element Support*						
	2	High Velocity*						
	3	Coupon Holding*						
<b>2520</b>	<b>T10</b>	<b>K03005</b>	<b>16.00</b>	<b>1.5</b>	<b>71</b>	<b>K03504</b>	<b>0</b>	<b>Example</b>

Unit Weight: 3 lbs./1.36 kg

- \* 0 – (Max Liquid Velocity 8 ft. /sec, Gases 25 ft. /sec)
- \* 1 – (Max Liquid 25 ft. /sec, Gases 75 ft. /sec)
- \* 2 – (Max Liquid 50 ft. /sec, Gases 150 ft. /sec)
- \* 3 – (Max Liquid 25 ft. /sec, Gases, 75 ft. /sec)

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ISO 9001:2008  
 Certificate No. FM 10694

# Electrical Resistance (ER) Probes

## MODEL 2600/2600G



### Features

- **Loop Element**
- **Mounting - 3/4" NPT Fixed or 1" NPT Fixed**
- **Temp. Rating - +500° F / +260° C**
- **Pressure Rating - 3000 PSI / 20.7 MPa**
- **Element Seal Material - Teflon® (Model 2600)  
- Glass (Model 2600G)**
- **Fill Material - Ceramic**
- **Probe Body Material - Stainless Steel or Hastelloy C-276**

The Model 2600/2600G wire-loop strip-loop or ER electric resistance probes provide higher pressure ratings for fixed probes than the Model 2000/2000G. A glass sealed element provides the Model 2600G with increased protection for the reference element. Designed with rugged fixed bodies, these probes are an excellent choice when optimizing your corrosion monitoring/control program. Like the Model 2000, and Model 3000 loop-element Electrical Resistance ER

probes; the Model 2600/2600G process monitoring ER probes employ a wire or thin wall tube as a sensing element. These elements are formed into a hairpin loop and sealed into the probe body. Model 2600/2600G probes are designed for organic or inorganic fluids of all types in the pH range from 0 to 9. The Model 2500 probes are recommended for the more aggressive environments. The Model 2600/2600G probe cannot be removed while the system is under pressure.

# MODEL 2600/2600G

## Element Availability

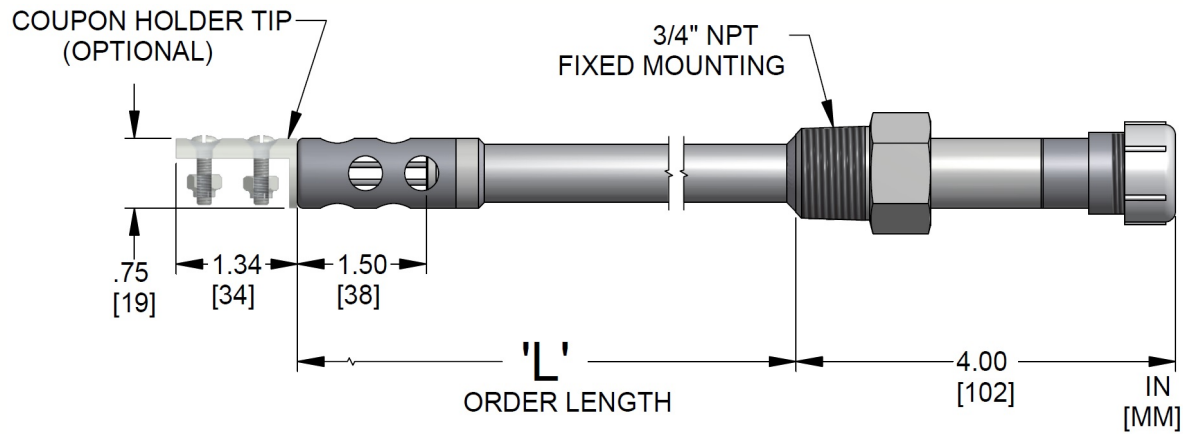
UNS Number	Alloy	S4	S8	T4	T8	W40	W80	UNS Number	Alloy	S4	S8	T4	T8	W40	W80
K03005	Pipe Grade Carbon Steel	•□	•□	•□	•□	•□	•□	S50200	502 S.S. (5% cR ½% Mo)				•□	•□	
S30400	304 S.S.	•□	•□	•□	•□	•□	•□	C11000	Copper 110 ETP					•	•
S30403	304L S.S.	•□	•□	•□	•□	•□	•□	C70610	CuNi 90/10 CDA #706					•	
S31000	310 S.S.			•□	•□			C44300	Ars. Adm. Brass CDA #443					•	
S31600	316 S.S.	•□	•□	•□	•□	•□	•□	A95154	Aluminum 5154				•	•	
S31603	316L S.S.	•□	•□	•□	•□	•□	•□	A96061	Aluminum 6061				•	•	
S41000	410 S.S.					•	•	A91100	Aluminum 1100				•	•	
S31703	317 S.S.					•□	•□	K03101	ASTM A515 Grade 70					•	
N04400	Monel 400			•□	•□	•□	•□	C68700	Alum.Brass Ars. #687					•	
N06600	Inconel 600			•□	•□			N10276	Hastelloy C-276					•□	•□
N06625	Inconel 625					•□	•□	S31703	317 S.S.					•□	•□
N08020	Carpenter 20-Cb3					•□	•□								
	Inches	.001	.002	.002	.004	.010	.020		Inches	.001	.002	.002	.004	.010	.020
	Useful Range (mm)	.025	.051	.051	.100	.250	.510		Useful Range (mm)	.025	.051	.051	.100	.250	.510

- Model 2600
- Model 2600G

Table 1

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



# MODEL 2600/2600G

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Fixed NPT Mounting ER Probe							
2600	Complete Probe Assembly							
2600G	Complete Probe Assembly							
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>						
	S4	Strip Loop Element, 4 mil thickness (1 mil useful probe life) Model 2600 only						
	S8	Strip Loop Element, 8 mil thickness (2 mil useful probe life) Model 2600 only						
	T4	Tube Loop Element, 4 mil thickness (2 mil useful probe life)						
	T8	Tube Loop Element, 8 mil thickness (4 mil useful probe life)						
	W40	Wire Loop Element, 40 mil diameter (10 mil useful probe life)						
	W80	Wire Loop Element, 80 mil diameter (20 mil useful probe life)						
	<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>						
	XXXXXX	Enter UNS number						
	<b>Code</b>	<b>Order Length</b>						
	0	Standard Length – 5.0 inches						
	<b>Code</b>	<b>Shield</b>						
	1	Standard (as shown) (Liquids to 20 ft/sec, Gases 60 ft/sec)						
	2	High Velocity (Liquids to 50 ft/sec, Gases 150 ft/sec)						
	3	Coupon Holding (Liquids to 20 ft/sec, Gases 60 ft/sec)						
	<b>Code</b>	<b>Mounting Nut Thread Size</b>						
	0	Standard 3/4 inch NPT						
	1	1 inch NPT						
	<b>Code</b>	<b>Body Material</b>						
	0	Standard Stainless Steel						
	1	Hastelloy C-276						
<b>2600</b>	<b>W40</b>	<b>K03005</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>← Example</b>
<b>2600G</b>	<b>W40</b>	<b>K03005</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>← Example</b>

Unit Weight: 3 lbs./1.36 kg

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ISO 9001:2008  
 Certificate No. FM 10694

2600-DS rev-  
 Rev. Date: 05/03/2016

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# Electrical Resistance (ER) Probes

**MODEL 2610/2610G**



## Features

- **Loop Element**
- **Mounting - 3/4" NPT Fixed Adjustable**
- **Temp. Rating - +500° F / +260° C**
- **Pressure Rating - 500 PSI / 3.4 MPa**
- **Element Seal Material - Teflon® (Model 2610)  
- Glass (Model 2610G)**
- **Fill Material - Ceramic**
- **Probe Body Material - Stainless Steel**

The Model 2610/2610G wire-loop, strip-loop or tube-loop electrical resistance probes are designed with adjustable insertion length, fixed bodies. These probes are an excellent choice when optimizing your corrosion monitoring/control program. Like the Model 2000, and Model 3000 loop-element ER probes; the Model 2610/2610G ER probes employ a wire or thin wall tube as a sensing element. These elements are formed into a

hairpin loop and sealed into the probe body. A glass-sealed element provides the Model 2610G with increased protection for the reference element. Model 2610/2610G probes are designed for organic or inorganic fluids of all types in pH ranges from 0 to 9. The Model 2500 probes are recommended in the more aggressive environments. These probes cannot be removed while the system is under pressure.



# MODEL 2610/2610G

## Element Availability

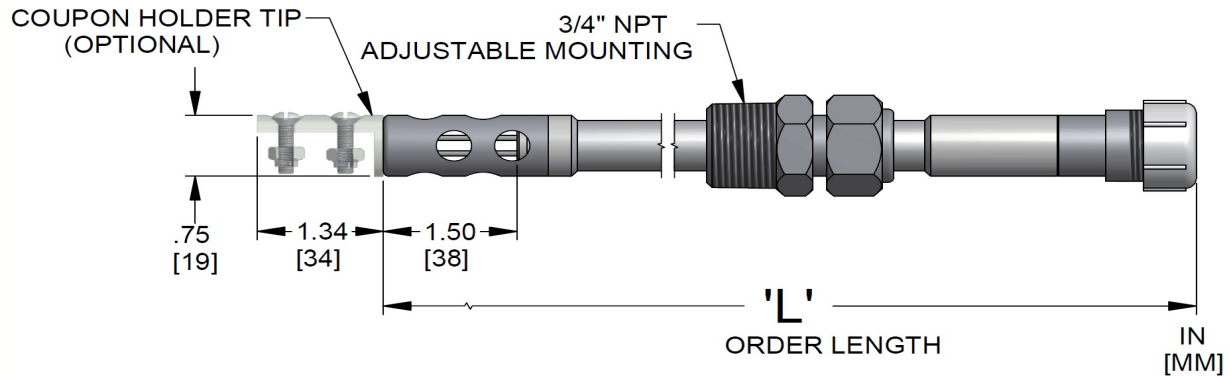
UNS Number	Alloy	S4	S8	T4	T8	W40	W80	UNS Number	Alloy	S4	S8	T4	T8	W40	W80
K03005	Pipe Grade Carbon Steel	•□	•□	•□	•□	•□	•□	S50200	502SS (5% Cr 1/2% Mo)				•□	•□	
S30400	304 S.S.	•□	•□	•□	•□	•□	•□	C11000	Copper 110 ETP					•	•
S30403	304L S.S.	•□	•□	•□	•□	•□	•□	C70610	CuNi 90/10 CDA #706					•	
S31000	310 S.S.			•□	•□			C44300	Ars. Adm. Brass CDA #443					•	
S31600	316 S.S.	•□	•□	•□	•□	•□	•□	A95154	Aluminum 5154					•	
S31603	316L S.S.	•□	•□	•□	•□	•□	•□	A96061	Aluminum 6061				•	•	
S41000	410 S.S.						•	A91100	Aluminum 1100				•	•	
S31703	317L S.S.					•□	•□	K03101	ASTM A515 Grade 70					•	
N04400	Monel 400			•□	•□	•□	•□	C68700	Alum. Brass Ars. #687					•	
N06600	Inconel 600			•□	•□			N10276	Hastelloy C0276					•□	•□
N06625	Inconel 625					•□	•□	S31703	317L S.S.					•□	•□
N08020	Carp 20 – Cb3					•□	•□								
Inches		.001	.002	.002	.004	.010	.020	Inches		.001	.002	.002	.004	.010	.020
Useful Range (mm)		.025	.051	.051	.100	.250	.510	Useful Range (mm)		.025	.051	.051	.100	.250	.510

- Model 2600
- Model 2600G

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



# MODEL 2610/2610G

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Adjustable NPT Mounting ER Probe				
2610	Complete Probe Assembly				
2610G	Complete Probe Assembly				
↓	<b>Code</b>	<b>Element Form: See Table 1 for Availability</b>			
	S4	Strip Loop Element, 4 mil thickness (1 mil useful probe life) (Model 2610 only)			
	S8	Strip Loop Element, 8 mil thickness (2 mil useful probe life) (Model 2610 only)			
	T4	Tube Loop Element, 4 mil thickness (2 mil useful probe life)			
	T8	Tube Loop Element, 8 mil thickness (4 mil useful probe life)			
	W40	Wire Loop Element, 40 mil diameter (10 mil useful probe life)			
	W80	Wire Loop Element, 80 mil diameter (20 mil useful probe life)			
		<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>		
		XXXXXX	Enter UNS number		
		<b>Code</b>	<b>Order Length</b>		
	0	Standard Length – 7.50 inches (190 mm) maximum			
		<b>Code</b>	<b>Shield</b>		
		1	Standard (as shown) (Liquids to 20 ft/sec. Gases 60 ft/sec)		
		2	High Velocity (Liquids to 50 ft/sec, Gases 150 ft/sec)		
		3	Coupon Holding (Liquids to 20 ft/sec, Gases 60 ft/sec)		
2610	W40	K03005	0	1	← Example
2610G	W40	K03005	0	1	← Example

Unit Weight: 3 lbs./1.36 kg

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 Certificate No. FM 10694

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 Rev. Date: 05/03/2016

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# Electrical Resistance (ER) Probes

## MODEL 2620/2620G



## Features

- **Loop Element**
- **Mounting - Standard ASME (ANSI) B16.5, API RJ or RF Flanges**
- **Temp. Rating - +500°F (+260°C) subject to flange rating**
- **Pressure Rating - 4000 PSI (27.6 MPa) subject to flange rating**
- **Probe Element Seal — Teflon® coating, epoxy encapsulation (2620) Glass/Metal seal, epoxy encapsulation (2620G)**
- **Process Containment Seal — High pressure glass-metal seal connector (Additional/Alternate seals available for special service conditions)**
- **Fill Material-Epoxy**
- **Body Material - 316 S.S.**

Model 2620/2620G fixed flanged process electrical resistance probes are designed for severe duty service, where retractable or fixed threaded probes are not permitted by plant or other regulations.

The Model 2620 is available in a wide range of alloys since glass/metal seals are not used on the element. The Model 2620G provides a higher integrity element seal but is available in a more limited range of alloys (see Table 1). For some of the higher alloys such as titanium, inconel, monel etc., the Model 2620/2620G can be more economical than the severest duty

Model 2520 since the body material does not have to be of the same alloy as the element. Bodies made from 316 SS are used for the low alloys and bodies made from Hastelloy C-276 for the high alloys. Probes are available in a wide range of alloys, flange sizes, and probe lengths. Additional special process containment seals are available where process conditions warrant.

Maximum pressure and temperature conditions are frequently limited by the standard flange rating rather than the ER probe construction.

# MODEL 2620/2620G

## Element Availability

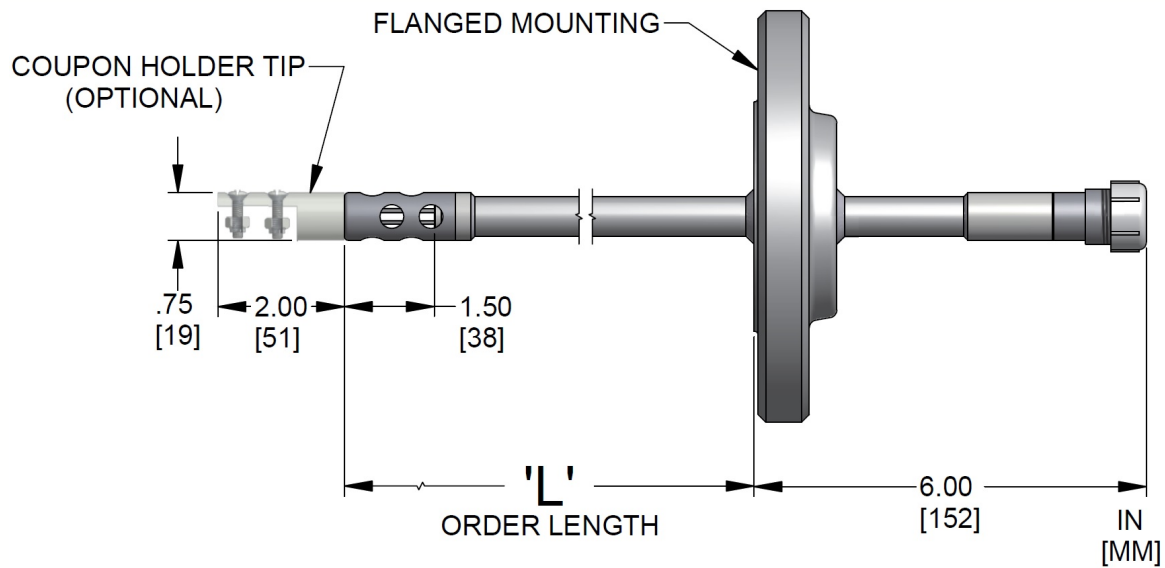
UNS Number	Alloy	S4	S8	T4	T8	W40	W80	UNS Number	Alloy	S4	S8	T4	T8	W40	W80
K03005	Pipe Grade Carbon Steel	•□	•□	•□	•□	•□	•□	S50200	502SS (5% Cr 1/2% Mo)				•□	•□	
S30400	304 S.S.	•□	•□	•□	•□	•□	•□	C11000	Copper 110 ETP						•
S30403	304L S.S.	•□	•□	•□	•□	•□	•□	C70610	CuNi 90/10 CDA #706						•
S31000	310 S.S.			•□	•□			C44300	Ars. Adm. Brass CDA #443						•
S31600	316 S.S.	•□	•□	•□	•□	•□	•□	A95154	Aluminum 5154						•
S31603	316L S.S.	•□	•□	•□	•□	•□	•□	A96061	Aluminum 6061				•	•	
S41000	410 S.S.							A91100	Aluminum 1100				•	•	
S31703	317L S.S.					•□	•□	K03101	ASTM A515 Grade 70						•
N04400	Monel 400			•□	•□	•□	•□	C68700	Alum. Brass Ars. #687						•
N06600	Inconel 600			•□	•□			N10276	Hastelloy C0276					•□	•□
N06625	Inconel 625					•□	•□	S31703	317L S.S.					•□	•□
N08020	Carp 20 – Cb3					•□	•□								
Inches Useful Range (mm)		.001 .025	.002 .051	.002 .051	.004 .100	.010 .250	.020 .510	Inches Useful Range (mm)		.001 .025	.002 .051	.002 .051	.004 .100	.010 .250	.020 .510

- Model 2600
- Model 2600G

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



# MODEL 2620/2620G

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Fixed Flanged Mounting Probe Assembly							
2620	Complete Probe Assembly (non-glass-sealed elements)							
2620G	Complete Probe Assembly (glass-sealed elements)							
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>						
	S4	(2620 only) Strip Loop, 4 mil thickness (1 mil useful probe life)						
	S8	(2620 only) Strip Loop, 8 mil thickness (2 mil useful probe life)						
	T4	Tube Loop, 4 mil thickness (2 mil useful probe life)						
	T8	Tube Loop, 8 mil thickness (4 mil useful probe life)						
	W40	Wire Loop, 40 mil diameter (10 mil useful probe)						
	W80	Wire Loop, 80 mil diameter (20 mil useful probe)						
	<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>						
	YYYYYY	Enter UNS number						
	<b>Code</b>	<b>Probe Length: Probe tip to flange face</b>						
	ZZ.ZZ	From 2.5 to 36.00 inches in 0.5 inch increments						
	<b>Code</b>	<b>Flange Size</b>						
	1.5	Nominal 1.5 inch						
	2.0	Nominal 2.0 inch						
	S.S.	Other Size (Specify)						
	<b>Code</b>	<b>Flange/Rating Type</b>						
	71	ANSI 150# RF						
	72	ANSI 300# RF						
	73	ANSI 4/600# RF						
	42	ANSI 4/600# RJ						
	43	ANSI 9/1500# RJ						
	UU	Other (Specify)						
	<b>Code</b>	<b>Flange Material</b>						
	S31600	316 SS for low alloy elements						
	N10276	Hastelloy C-276 for high alloy elements						
	<b>Code</b>	<b>Shield Options</b>						
	1	Standard*						
	2	High Velocity*						
	3	Coupon Holding*						
2620	T4	K03005	16.00	1.5	71	S31600	1	<b>Example</b>

Unit Weight: 3 lbs./1.36 kg

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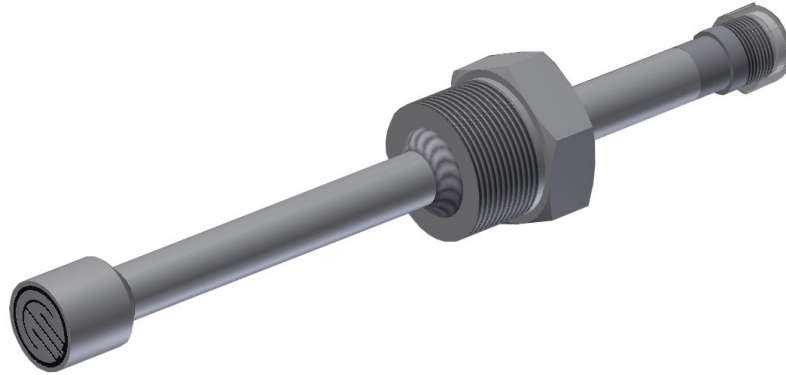
ISO 9001:2008  
 Certificate No. FM 10694

2620-DS rev-  
 Rev. Date: 05/03/2016

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# Electrical Resistance (ER) Probes

**MODEL 2700/2705**



## Features

- **Flush Element**
- **Mounting - 1 1/2" NPT Fixed (2700)**  
- 3/4" NPT Fixed (2705)
- **Temp. Rating - +500° F / +260° C**
- **Pressure Rating - 4000 PSI 27.6 MPa**
- **Element Seal Material — Ryton (Model 2700)**  
— Glass (Model 2705)
- **Fill Material - Ceramic**
- **Probe Body Material - Stainless Steel**

Model 2700 and 2705 fixed process electrical resistance probes have a flat strip measuring element sealed and mounted at the end of a heavy walled stainless steel tube. The measuring element can be positioned flush with the inner surface of the pipe or vessel. Corrosion or erosion can then be measured right at this surface, and the lines may be pigged without moving the probes.

The Model 2705 is smaller in size but limited to a sensitive S8 element. For higher corrosion rate, the larger Model 2700 provides for thicker elements. These probes may be used in any organic or inorganic environment up to a pH of 9.

# MODEL 2700/2705

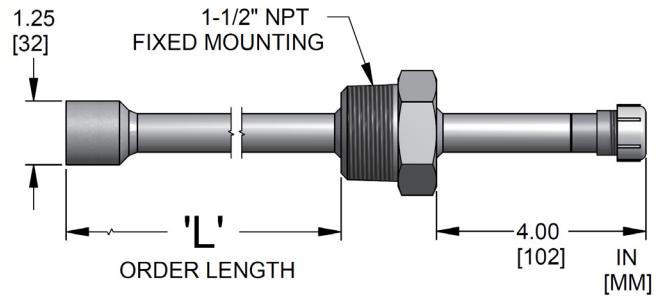
## Element Availability

UNS Number	Alloy	S8	S10	S20	S40	UNS Number	Alloy	S8	S10	S20	S40
C70610	CuNi 90/10 CDA #706		•	•	•	N10276	Hastelloy C-276		•	•	•
K03005	Pipe Grade Carbon Steel	•	•	•	•	S31600	316 S.S.		•	•	•
K03006	A106 Gr. B/A33 Gr. 6		•	•	•	S31603	316L S.S.		•	•	•
N06625	Inconel 625		•	•	•	S31703	AISI 317L Stainless Steel		•	•	•
N08367	Incoloy 25-6HN		•	•	•	S31803	2205 Duplex Stainless Steel		•	•	•
S30400	304 S.S.		•	•	•	S50200	502 SS (5% Cr ½% Mo) (UNS K41545)		•	•	•
S30403	304L S.S.		•	•	•						
	<b>Inches</b>	.004	.005	.010	.020		<b>Inches</b>	.004	.005	.010	.020
	<b>Useful Range (mm)</b>	.100	.175	.250	.510		<b>Useful Range (mm)</b>	.100	.175	.250	.510

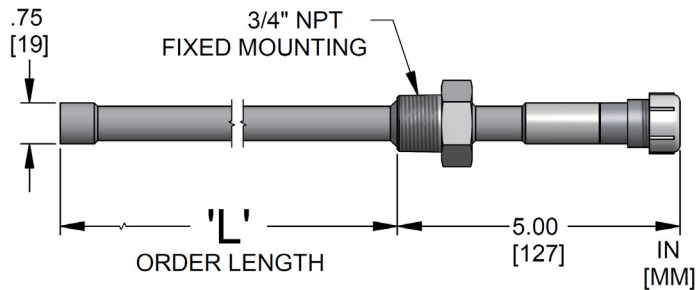
Table 1

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



2700 Flush



2705 Flush

# MODEL 2700/2705

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retractable ER Probe	
2700	Complete Probe Assembly	
2705	Complete Probe Assembly	
↓	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>
	S8	Strip, Flush (4 mil useful probe life: 2705 only)
	S10	Flush Strip Element, 10 mil thickness (5 mil useful probe life: 2700 only)
	S20	Flush Strip Element, 20 mil thickness (10 mil useful probe life: 2700 only)
	S40	Flush Strip Element, 40 mil thickness (20 mil useful probe life: 2700 only)
	↓	<b>Code</b>
↓	XXXXXX	Enter UNS number
↓	<b>Code</b>	<b>Order Length</b>
↓	XX.XX	Order length in 0.125" increments (1.50" minimum)
	<b>2700 — S10 — K03005 — 1.50</b>	← <b>Example</b>
	<b>2705 — S8 — K03005 — 1.50</b>	← <b>Example</b>

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 Rev. Date: 05/03/2016

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# Electrical Resistance (ER) Probes

## MODEL 3000/3000G



## Features

- **Loop Element**
- **Mounting - 1" Full Port Valve Minimum**
- **Temp. Rating - +500° F / +260° C**
- **Pressure Rating - 1000 PSI / 6.9 MPa**
- **Element Seal Material** — **Teflon (Model 3000)**  
— **Glass (Model 3000G)**
- **Fill Material - Ceramic**
- **Probe Body Material - Stainless Steel**

Model 3000/3000G retractable process electrical resistance probes provide flexibility and economic replacement via probe inserts. The Model 3000G also provides the added durability of a glass-sealed element. Both models employ sensing elements made from wire, strip, or small diameter tubing, formed into a hairpin loop. Alloys and element styles normally available are listed in Table 1. Other alloys or element styles may be subject to material availability.

These probes may be used up to their design temperatures and pressures in organic or inorganic fluids

of all types, in the pH range 0-9. Above pH 9 or for other extremely aggressive service, Model 3500 ER Probes are recommended. In applications where stainless steel bodies would be subject to failure due to stress cracking or severe pitting, or for probes made of special materials, contact the factory for specific information before ordering. Probes specified by a complete probe order number include both a housing body for mounting and a replacement measuring element insert. The insert may be ordered separately as needed.

# MODEL 3000/3000G

## Element Availability

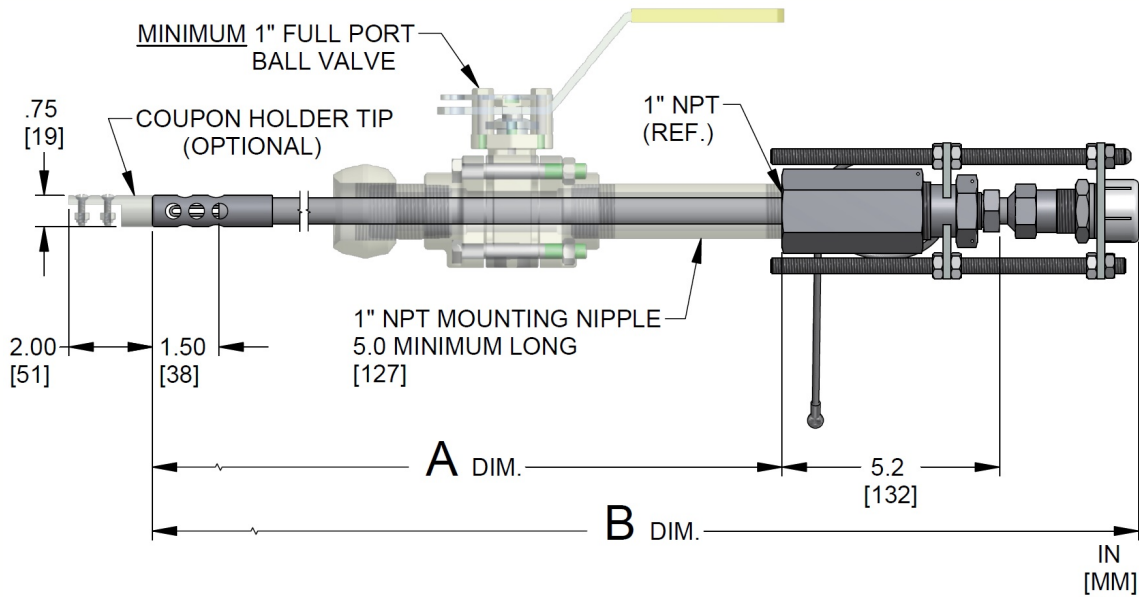
UNS Number	Alloy	S4	S8	T4	T8	W40	W80	UNS Number	Alloy	S4	S8	T4	T8	W40	W80
K03005	Pipe Grade Carbon Steel	•□	•□	•□	•□	•□	•□	S50200	502 S.S. (5% cR 1/2% Mo)				•□	•□	
S30400	304 S.S.	•□	•□	•□	•□	•□	•□	C11000	Copper 110 ETP					•	•
S30403	304L S.S.	•□	•□	•□	•□	•□	•□	C70610	CuNi 90/10 CDA #706			•		•	
S31000	310 S.S.			•□	•□			A95154	Aluminum 5154					•	
S31600	316 S.S.	•□	•□	•□	•□	•□	•□	C44300	Ars. Adm. Brass CDA #443					•	
								A96061	Aluminum 6061				•	•	
S31603	316L S.S.	•		•□	•□	•□	•□	A91100	Aluminum 1100				•	•	
S31700	317 S.S.					•□		Z21220	Zinc 1A, 1, 2, 3, 4, 5		•				
S32100	321 S.S.			•□	•□	•□	•□								
S41000	410 S.S.					•□									
	Inches Useful Range (mm)	.001 .025	.002 .051	.002 .051	.004 .100	.010 .250	.020 .510		Inches Useful Range (mm)	.001 .025	.002 .051	.002 .051	.004 .100	.010 .250	.020 .510

- Model 3000
- Model 3000G

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	15.2	386	23.4	595
24	21.2	538	29.4	752
30	27.2	690	35.4	900
36	33.2	843	41.4	1052

# MODEL 3000/3000G

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retractable ER Probes – Teflon/Ceramic and 304 Wetted Parts					
3000	Complete Probe Assembly					
3001	Model 3000 Replacement Insert					
3000G	Complete Probe Assembly					
3001G	Model 3000G Replacement Insert					
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>				
	S4	Strip Loop, 4 mil thickness (1 mil useful probe life) (Model 3000/3001 only)				
	S8	Strip Loop, 8 mil thickness (2 mil useful probe life) (Model 3000/3001 only)				
	T4	Tube Loop, 4 mil thickness (2 mil useful probe life)				
	T8	Tube Loop, 8 mil thickness (4 mil useful probe life)				
	W40	Wire Loop, 40 mil diameter (10 mil useful probe life)				
	W80	Wire Loop, 80 mil diameter (20 mil useful probe life)				
	<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>				
	XXXXXX	Enter UNS number				
	<b>Code</b>	<b>Order Length</b>				
	18	18 Inches				
	24	24 Inches				
	30	30 Inches				
	36	36 Inches				
	<b>Code</b>	<b>Safety Clamp (Not an option for 3001/3001G)</b>				
	0	Not Included				
	1	Safety Clamp Installed				
	<b>Code</b>	<b>Shield (Not an option for Model 3001/3001G)</b>				
	1	Standard Shield (liquids to 20 ft/sec, gases to 60ft/sec)				
	2	High Velocity/Erosion Shield (liquids to 50 ft/sec, gases to 150 ft/sec)				
	3	Coupon Holding Shield (liquids to 20 ft/sec, gases to 60 ft/sec)				
<b>3000</b>	<b>W40</b>	<b>K03005</b>	<b>18</b>	<b>1</b>	<b>1</b>	<b>Example</b>
<b>3001</b>	<b>W40</b>	<b>K03005</b>	<b>18</b>			<b>Example</b>

**Unit Weight:** Probe assembly with Safety Clamp - 7 lbs. / 3.18 kg      Insert only: 1 lb. / .45 kg

**Accessories:** Part Number if ordering Shield separately:  
 Standard Shield #030919 — High Velocity / Erosion Shield # 030930  
 Coupon Holding Shield #623001

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**COSASCO**



ISO 9001:2008  
 Certificate No. FM 10694

3000-DS rev-  
 Rev. Date: 05/05/2016

[www.cosasco.com](http://www.cosasco.com)

# Electrical Resistance (ER) Probes

**MODEL 3004/3006**  
Small Diameter



Model 3006 Replacement Insert

## Features

- **Loop Element**
- **Mounting - 3/4" Valve w/ 1/2" ID Minimum**
- **Temp. Rating - +500° F / +260° C**
- **Pressure Rating - 1000 PSI / 6.9 MPa**
- **Element Seal Material — Teflon®**
- **Fill Material - Ceramic**
- **Probe Body Material - Stainless Steel**

Model 3004 retractable process electrical resistance probes provide flexibility and economic replacement via probe inserts. They employ sensing elements made from wire, strip, or small diameter tubing, formed into a hairpin loop. Alloys and element styles normally available are listed in Table 1. Other alloys or element styles may be subject to material availability.

These probes may be used up to their design temperatures and pressures in organic or inorganic fluids of all types, in the pH range 0-9. Above pH 9 or for other

extremely aggressive service, Model 3504 ER probes are recommended. In applications where stainless steel bodies would be subject to failure due to stress cracking or severe pitting, or for probes made of special materials, contact the factory for specific information before ordering. Probes specified by a complete probe order number include both a housing body for mounting and a replacement measuring element insert. The insert may be ordered separately as needed.

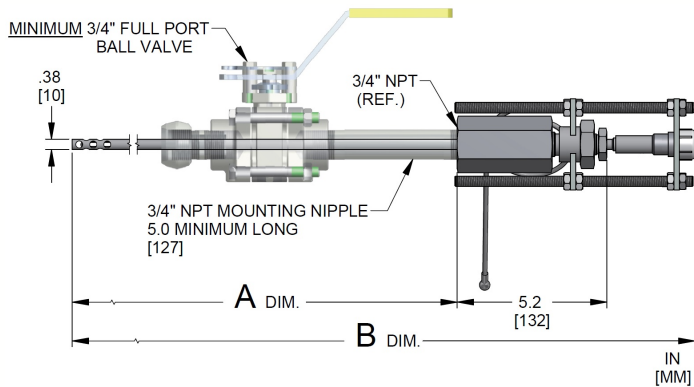
## Element Availability

UNS Number	Alloy	S4	S8	T4	T8	W40	W80	UNS Number	Alloy	S4	S8	T4	T8	W40	W80
K03005	Pipe Grade Carbon Steel	•	•	•	•	•	•	S50200	502 S.S. (5% cR 1/2% Mo)				•	•	
S30400	304 S.S.	•	•	•	•	•	•	C11000	Copper 110 ETP					•	•
S30403	304L S.S.	•	•	•	•	•	•	C70610	CuNi 90/10 CDA #706					•	
S31000	310 S.S.			•	•			C68700	Alum. Brass CDA #687					•	
S31600	316 S.S.	•	•	•	•	•	•	A95154	Aluminum 5154					•	
S31603	316L S.S.	•		•	•	•	•	A96061	Aluminum 6061				•	•	
S41000	410 S.S.						•	A91100	Aluminum 1100				•	•	
S31703	317L S.S.					•	•	K03101	ASTM A515 Gr. 70					•	
N04400	Monel 400	•	•	•	•	•	•	C44300	Ars. Adm. Brass CDA #443					•	
N06600	Inconel 600			•	•			C68700	Alum. Brass Ars. #687					•	
N06625	Inconel 625					•	•	N10276	Hastelloy C-276					•□	•□
N08020	Carp 20 – Cb3					•	•								
	<b>Inches Useful Range (mm)</b>	.001 .025	.002 .051	.002 .051	.004 .100	.010 .250	.020 .510		<b>Inches Useful Range (mm)</b>	.001 .025	.002 .051	.002 .051	.004 .100	.010 .250	.020 .510

**Table 1**

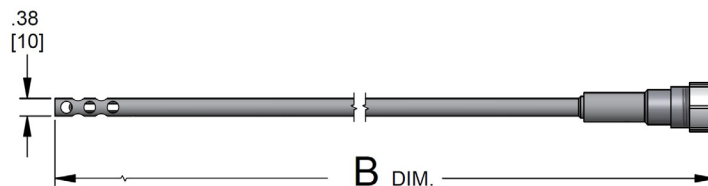
Other element alloys or styles may be supplied subject to material availability.

## Dimensions



**3004 Small Diameter**

Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	16.09	409	24.00	595
24	22.09	561	30.00	762
30	28.09	713	36.00	914
36	34.09	866	42.00	1067



**3006 Small Diameter**

# MODEL 3004/3006

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retractable ER Probes – Teflon/Ceramic and 304 Wetted Parts				
3004	Complete Probe Assembly				
3006	Model 3004 Replacement Insert				
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>			
	S4	Strip Loop, 4 mil thickness (1 mil useful probe life)			
	S8	Strip Loop, 8 mil thickness (2 mil useful probe life)			
	T4	Tube Loop, 4 mil thickness (2 mil useful probe life)			
	T8	Tube Loop, 8 mil thickness (4 mil useful probe life)			
	W40	Wire Loop, 40 mil diameter (10 mil useful probe life)			
	W80	Wire Loop, 80 mil diameter (20 mil useful probe life)			
		<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>		
		XXXXXX	Enter UNS number		
			<b>Code</b>	<b>Order Length</b>	
			18	18 Inches	
			24	24 Inches	
			30	30 Inches	
			36	36 Inches	
				<b>Code</b>	<b>Safety Clamp (Not an option for 3006)</b>
				1	Safety Clamp Installed
	<b>3004</b>	<b>W40</b>	<b>K03005</b>	<b>18</b>	<b>1</b>
	<b>3006</b>	<b>W40</b>	<b>K03005</b>	<b>18</b>	
					<b>Example</b>
					<b>Example</b>

**Unit Weight:** Probe assembly with Safety Clamp - 7 lbs. / 3.18 kg

Insert only: 1 lb. / .45 kg

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ISO 9001:2008  
 Certificate No. FM 10694

3004-DS rev-  
 Rev. Date: 05/03/2016

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# Electrical Resistance (ER) Probes

**MODEL 3500/3500HT**



Model 3501/3501HT  
Replacement Insert

## Features

- **Cylindrical Element**
- **Mounting - 1" Full Port Valve Minimum**
- **Temp. Rating for Model 3500 - +425° F / + 218° C**
- **Temp. Rating for Model 3500HT - +1000° F / +520° C**
- **Pressure Rating for Model 3500 - 1500 PSI / 10.3 MPa**
- **Pressure Rating for Model 3500HT - 1000 PSI / 6.9 MPa**
- **Element Seal Material — All Welded**
- **Fill Material - Ceramic**
- **Probe Body Material – Carbon Steel, 316SS or Hastelloy C276\*\*\***

Model 3500 Retractable Process electrical resistance probes have a thin walled tubular sensing element made from the alloy of interest welded onto a body of the same material. Mild Steel bodies are Teflon coated. No other materials contact the corrosive process fluid. Materials of construction are carefully matched and welds are vacuum annealed during assembly to avoid preferential corrosion effects.

Model 3500 ER probes provide a large test surface, excellent dynamic temperature response and protection

of reference element. They are ideally suited to the more aggressive plant conditions and may be used in very aggressive organic or inorganic fluids over the entire pH range 0-14, subject to process containment requirements.

These probes are standard in mild steel, 304 S.S. and 316 S.S. Certain other alloys can be provided on special order; please contact the factory for information. The useful measuring lives of the T-10 and T-20 probe elements are 5 mils (0.13mm) and 10 mils (0.25mm) respectively.

# MODEL 3500/3500HT

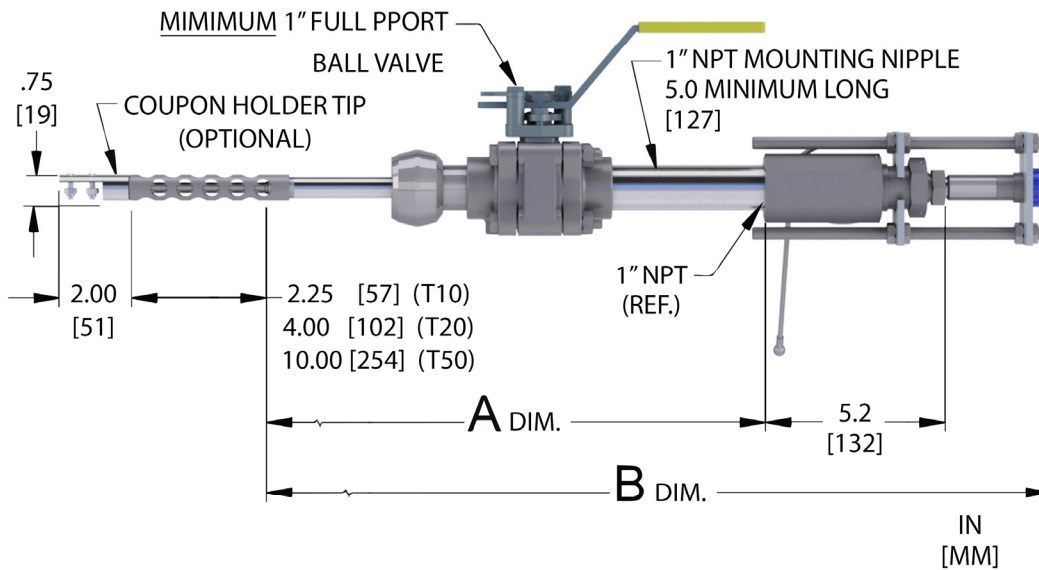
## Element Availability

UNS Number	Alloy	T10	T20	T50	UNS Number	Alloy	T10	T20	T50
K03005	Pipe Grade Carbon Steel	•	•	•	N08020	CARP 20-Cb3	•	•	
K03006	A106 Gr. B/A333 Gr. 6	•	•		S50400	9% Cr 1% Mo	•	•	
S30400	304 S.S.	•	•	•	N04400	Monel 400	•	•	
S30403	304L S.S.	•	•		N06600	Inconel 600	•	•	
S31600	316 S.S.	•	•		N06625	Inconel 625	•	•	
S31603	316L S.S.	•	•		N08825	Incoloy 825	•	•	
S31703	317 S.S.	•	•	•	N10276	Hastelloy C-276	•	•	
S31803	2205 Duplex S.S.	•	•						
S32100	321 S.S.	•	•						
S41000	410 Stainless Steel	•	•						
S50200	502 S.S. (5% Cr 1/2% Mo)	•	•						
N08904	904L S.S.	•							
	<b>Inches</b>	.005	.010	.025		<b>Inches</b>	.005	.010	.010
	<b>Useful Range (mm)</b>	.127	.254	.635		<b>Useful Range (mm)</b>	.127	.254	.635

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



"A" Dimension is with probe fully inserted into packing gland

Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	14.4	366	22.25	565
24	20.4	518	28.25	718
30	26.4	670	34.25	870
36	32.4	823	40.25	1022



# MODEL 3500/3500HT

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retractable ER Probes – Cylindrical Element Assembly						
3500	Complete Probe Assembly With Stuffing Box						
3500HT	Complete High Temperature Assembly ***						
3501	Model 3500 Replacement Insert						
3501HT	High Temperature Replacement Insert ***						
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>					
	T10	10 mil thickness (5 mil useful probe life)					
	T20	20 mil thickness (10 mil useful probe life)					
	T50	50 mil thickness (25 mil useful probe life)					
	<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>					
	XXXXXX	Enter UNS number					
	<b>Code</b>	<b>Order Length</b>					
	18	18 Inches					
	24	24 Inches					
	30	30 Inches					
	36	36 Inches					
	<b>Code</b>	<b>Safety Clamp (Not an option for 3501 and 3501HT)</b>					
	0	Not Included					
	1	Safety Clamp Installed					
	<b>Code</b>	<b>Shield</b>					
	0	Not included (liquids 8 ft./sec, gases 25 ft./sec)					
	1	Standard (liquids 25 ft./sec, gases 75 ft./sec)					
	2	High Velocity/Erosion (liquids 50 ft./sec, gases 150 ft./sec)					
	3**	Coupon Holding (liquids 25 ft./sec, gases 75 ft./sec)					
	<b>Code</b>	<b>Stuffing Box Material (Not an option for 3501 or 3501HT)</b>					
	0	Stainless Steel/Carbon Steel*					
	1	Hastelloy C-276					
	2	Same as element material					
<b>3500</b>	<b>T10</b>	<b>K03005</b>	<b>18</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>Example</b>
<b>3501</b>	<b>T10</b>	<b>K03005</b>	<b>18</b>		<b>1</b>		<b>Example</b>
<b>3500HT</b>	<b>T20</b>	<b>K03005</b>	<b>18</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>Example</b>
<b>3501HT</b>	<b>T20</b>	<b>K03005</b>	<b>18</b>		<b>1</b>		<b>Example</b>

\*Carbon Steel for Carbon Steel Elements, Stainless Steel for all others.

\*\*Coupon holding tip will extend 2" beyond order length coupon holding shields use CI-RS strip coupons.

\*\*\*For High-Temp Carbon Steel Element Probes, the Probe Body will be 316L S.S. For other alloys the body will be Hastelloy C276. The Stuffing Box and shields will be 316 S.S.

## Accessories

Part Numbers if Ordering Shield Separately:	
Model 3500 & 3501	Model 3500HT & 3501HT
Standard Shield #745006-TXX-XXXXXX	Standard Shield #745054-XXXXXX
High Velocity/Erosion Shield #745017-TXX-XXXXXX	High Velocity Shield #745017-XXXXXX
Coupon Holding Shield #745060-XXXXXX	Coupon Holding Shield #745058-XXXXXX
"XXXXXX" is the UNS alloy number	"XXXXXX" is the UNS alloy number

**Unit Weight:** Probe Assembly with Safety Clamp – 7 lbs. /3.18 kg  
Insert Only – 2.5 lbs./1.13 kg

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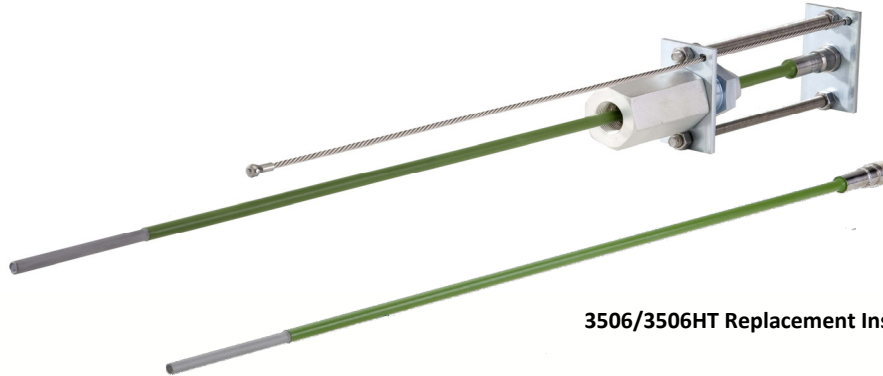
ISO 9001:2008  
Certificate No. FM 10694

3500-DS rev-  
Rev. Date: 05/04/2016

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# Electrical Resistance (ER) Probes

**MODEL 3504/3504HT**  
Small Diameter



3506/3506HT Replacement Insert

## Features

- **Cylindrical Element**
- **Mounting - 3/4" Full Port Valve w/1/2" ID Minimum**
- **Temp. Rating for Model 3504 - +500° F / + 260° C**
- **Temp. Rating for Model 3504HT - +850° F / +454° C**
- **Pressure Rating - 1000 PSI / 6.9 MPa**
- **Element Seal Material — All Welded**
- **Fill Material - Ceramic**
- **Probe Body Material - As Element**

Model 3504 Retractable Process Electrical resistance Probes have a thin walled tubular sensing element made from the alloy of interest welded onto a body of the same material. Mild Steel bodies are Teflon coated. No other materials contact the corrosive process fluid. Materials of construction are carefully matched and welds are vacuum annealed during assembly to avoid preferential corrosion effects.

Model 3504 ER probes provide a large test surface, excellent dynamic temperature response and protection

of reference element. They are ideally suited to the more aggressive plant conditions and may be used in very aggressive organic or inorganic fluids over the entire pH range 0-14, subject to process containment requirements

These probes are standard in mild steel, 304 S.S. and 316 S.S. Certain other alloys can be provided on special order; please contact the factory for information. The useful measuring lives of the T-10 and T-20 probe elements are 5 mils (0.13mm) and 10 mils (0.25mm) respectively.

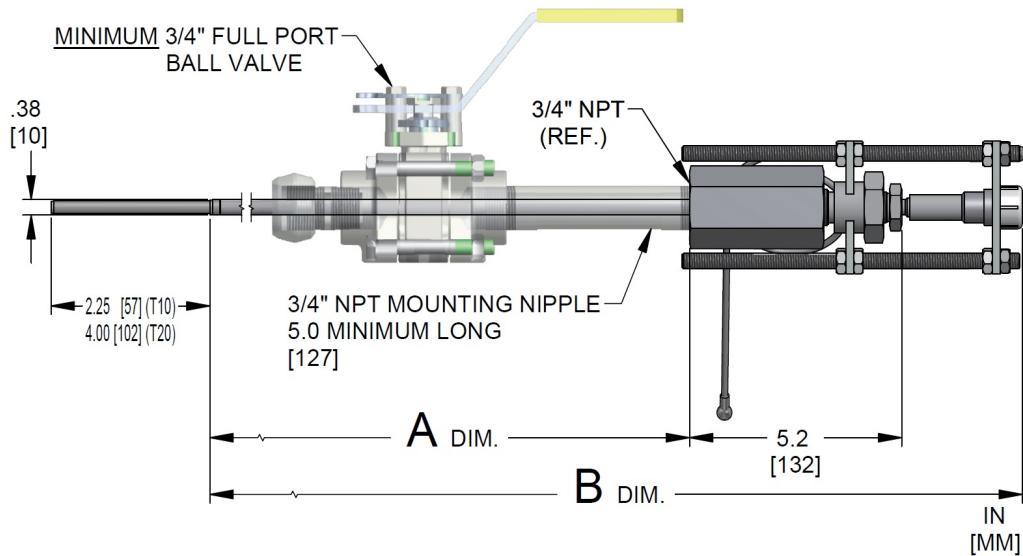
## Element Availability

UNS Number	Alloy	T10	T20	T50	UNS Number	Alloy	T10	T20	T50
K03005	Pipe Grade Carbon Steel	•	•	•	N08020	CARP 20-Cb3	•	•	
K03006	A106 Gr.B/A333 Gr. 6	•	•		S50400	9% Cr 1% Mo	•	•	
S30400	304 S.S.	•	•	•	N04400	Monel 400	•	•	
S30403	304L S.S.	•	•		N06600	Inconel 600	•	•	
S31600	316 S.S.	•	•		N06625	Inconel 625	•	•	
S31603	316L S.S.	•	•		N08825	Incoloy 825	•	•	
S31803	317 S.S.	•	•	•	N10276	Hastelloy C-276	•	•	
S31700	2205 Duplex S.S.	•	•						
S32100	321 S.S.	•	•						
S41000	410 Stainless Steel	•	•						
S50200	502 S.S. (5% Cr ½% Mo)	•	•						
N08904	904L S.S.	•	•						
	<b>Inches Useful Range (mm)</b>	.005 .127	.010 .254	.025 .635		<b>Inches Useful Range (mm)</b>	.005 .127	.010 .254	.010 .635

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	14.34	364	22.25	565
24	20.34	517	28.25	717
30	26.34	805	34.25	869
36	32.34	821	40.25	1022

"A" Dimension is with probe fully inserted into packing gland

# MODEL 3504/3504HT

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Drag Force Calculations be performed – please contact a Cosasco representative for further details.

Model	Retractable ER Probes – Cylindrical Element Assembly				
3504	Complete Probe Assembly With Stuffing Box				
3504HT	Complete High Temperature Assembly				
3506	Model 3504 Replacement Insert				
3506HT	High Temperature Replacement Insert				
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>			
	T10	10 mil thickness (5 mil useful probe life)			
	T20	20 mil thickness (10 mil useful probe life)			
	<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>			
	XXXXXX	Enter UNS number			
		<b>Code</b>	<b>Order Length</b>		
		18	18 Inches		
		24	24 Inches		
		30	30 Inches		
		36	36 Inches		
		<b>Code</b>	<b>Safety Clamp (Not an option for 3506 and 3506HT)</b>		
		1	Safety Clamp Installed		
<b>3504</b>	<b>— T10</b>	<b>— K03005</b>	<b>— 18</b>	<b>— 1</b>	<b>Example</b>
<b>3506</b>	<b>— T10</b>	<b>— K03005</b>	<b>— 18</b>		<b>Example</b>
<b>3504HT</b>	<b>— T20</b>	<b>— K03005</b>	<b>— 18</b>	<b>— 1</b>	<b>Example</b>
<b>3506HT</b>	<b>— T20</b>	<b>— K03005</b>	<b>— 18</b>		<b>Example</b>
<b>3506HT</b>	<b>— T20</b>	<b>— K03005</b>	<b>— 18</b>		<b>Example</b>

\*Carbon Steel for Carbon Steel Elements, Stainless Steel for all others.

**Unit Weight:** Probe Assembly with Safety Clamp – 7 lbs/3.18  
Insert Only – 2.5 lbs/1.13 kg

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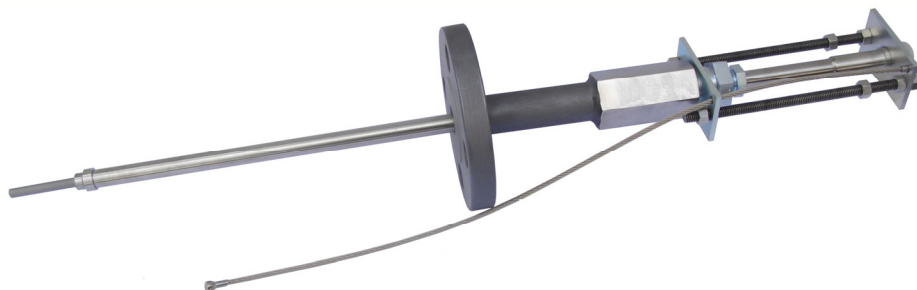
**ISO 9001:2008**  
Certificate No. FM 10684

3504-DS rev-  
Rev. Date: 05/04/2016

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# Electrical Resistance (ER) Probes

## MODEL 3520/3520HT



## Features

- **Cylindrical Element**
- **Mounting – 1” Full Port Valve Minimum**
- **Temperature Rating**
  - **Model 3520 - +500° F (+ 260° C)**
  - **Model 3520HT - +1000° F (+520° C)**
- **Pressure Rating**
  - **Model 3520 - 1500 PSI (10.3 MPa) subject to flange rating**
  - **Model 3520HT - 1000 PSI (6.9 MPa) subject to flange rating**
- **Seal Material — Element Seal all Welded**
- **Process Containment Seal - High pressure glass-metal seal  
Connector and Teflon packing**
- **Fill Material - Ceramic**
- **Body Material - 316SS or Hastelloy C276\*\*\***

Model 3520 retractable process electrical resistance probes are designed for particularly severe or toxic duty service, where fixed thread probes are not permitted by plant or other regulations. The all-welded construction of the cylindrical probe element provides the highest integrity for a corrosion measurement element. Only the material under evaluation is exposed to the process fluid. Even with any localized attack or physical damage to the

element, the back of the probe provides process containment with high pressure glass-to-metal seals. Probes are available in a wide range of alloys and are custom made to the flange size. Maximum pressure and temperature conditions are frequently limited by the standard flange rating rather than the ER probe construction.

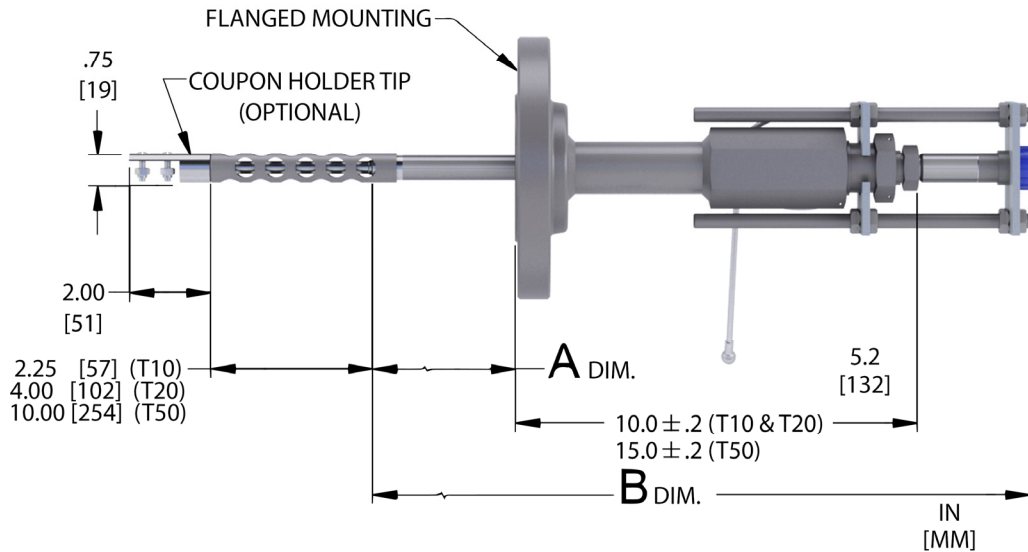
## Element Availability

UNS Number	Alloy	T10	T20	T50	UNS Number	Alloy	T10	T20	T50
K03005	Pipe Grade Carbon Steel	•	•	•	N08020	CARP 20-Cb3	•	•	
K03006	A106 Gr. B/A33 Gr. 6	•	•		S50400	9% Cr 1% Mo	•	•	
S30400	304 S.S.	•	•	•	N04400	Monel 400	•	•	
S30403	304L S.S.	•	•		N06600	Inconel 600	•	•	
S31600	316 S.S.	•	•		N06625	Inconel 625	•	•	
S31603	316L S.S.	•	•		N08825	Incoloy 825	•	•	
S31703	317 S.S.	•	•	•	N10276	Hastelloy C-276	•	•	
S31803	2205 Duplex S.S.	•	•						
S32100	321 S.S.	•	•						
S41000	410 Stainless Steel	•	•						
S50200	502 S.S. (5% Cr ½% Mo)	•	•						
N08904	904L S.S.	•	•						
	<b>Inches Useful Range (mm)</b>	.005 .127	.010 .254	.025 .635		<b>Inches Useful Range (mm)</b>	.005 .127	.010 .254	.025 .635

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	9.6	227	22.25	565
24	15.6	429	28.25	718
30	21.6	582	34.25	870
36	27.6	734	40.25	1022

# MODEL 3520/3520HT

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Drag Force Calculations be performed – please contact a Cosasco representative for further details.

Model	Fixed Flanged Mounting ER Probe Assembly
3520	Complete Probe Assembly with Stuffing Box
3520HT	High Temperature Probe Assembly up to 1000° F (520° C) ***
3501	Model 3520 Replacement Insert
3501HT	High Temperature Replacement Insert***
	<b>Code</b> <b>Element Form: See Table 1 for availability</b>
	T10    10 mil thickness (5 mil useful probe life)
	T20    20 mil thickness (10 mil useful probe life)
	T50    50 mil thickness (25 mil useful probe life)
	<b>Code</b> <b>Element Alloy: See Table 1 for availability</b>
	YYYYYY    Enter UNS number
	<b>Code</b> <b>Probe Length</b>
	18    18 Inches
	24    24 Inches
	30    30 Inches
	36    36 Inches
	<b>Code</b> <b>Flange Size</b>
	1.5    Nominal 1.5 inch
	2.0    Nominal 2.0 inch
	S.S.    Other Size (Specify)
	<b>Code</b> <b>Flange/Rating Type</b>
	71    ANSI 150# RF
	72    ANSI 300# RF
	73    ANSI 4/600# RF
	42    ANSI 4/600# RJ
	UU    Other (Specify)
	<b>Code</b> <b>Safety Clamp Option</b>
	0    Not Included
	1    Safety Clamp Installed
	<b>Code</b> <b>Shield Options</b>
	0    Not included (liquids 8 ft/sec, gases 25 ft/sec)
	1    Standard (liquids 25 ft/sec, gases 75 ft/sec)
	2    High Velocity/Erosion (liquids 50 ft/sec, gases 150 ft/sec)
	3**    Coupon Holding (liquids 25 ft/sec, gases 75 ft/sec)
	<b>Code</b> <b>Stuffing Box Material (Not an Option for 3501 or 3501HT)</b>
	0    Stainless Steel/Carbon Steel*
	1    Hastelloy C-276
	2    Same as element material
<p>3520 — T10 — K03005 — 18 — 1.5 — 71 — 1 — 0 — 0 ← Example</p>	

\*Carbon Steel for Carbon Steel Elements, Stainless Steel for all others.

\*\*Coupon holding tip will extend 2" beyond order length coupon holding shields use CI-RS strip coupons.

\*\*\*For High-Temp Carbon Steel Element Probes, the Probe Body will be 316L S.S. For other alloys the body will be Hastelloy C276. The stuffing box and shield will be 316SS

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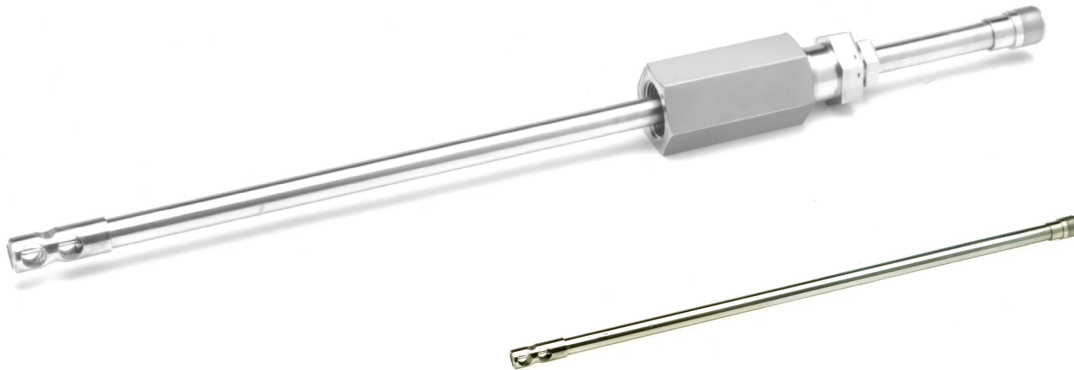
ISO 9001:2008  
 Certificate No. FM 10694

3520-DS rev-  
 Rev. Date: 05/05/2016

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# Electrical Resistance (ER) Probes

## MODEL 3600/3600G



Model 3601/3601G Replacement Insert

## Features

- **Loop Element**
- **Mounting – 1” Full Port Valve Minimum**
- **Temperature Rating - 500° F / 260° C**
- **Pressure Rating - 1500 PSI / 10.3 MPa**
- **Element Seal Material - Teflon (Model 3600)  
- Glass (Model 3600G)**
- **Fill Material - Ceramic**
- **Probe Body Material - 316 S.S. or Hastelloy C276**

Model 3600 retractable process electrical resistance probes employ sensing elements made from wire, strip, or small diameter tubing, formed into a small loop. Alloys and element styles normally available are listed in Table 1. Other alloys or element styles may be available subject to material availability.

These probes may be used up to their design temperatures and pressures in organic or inorganic fluids of all types, in the pH range 0-9. Above pH 9 or for other

extremely aggressive service, Model 3500 ER probes are recommended. In applications where stainless steel bodies would be subject to failure due to stress cracking or severe pitting, or for probes made of specific materials, contact the factory for specific information before ordering. Probes specified by a complete probe order number include both a stuffing box for mounting and a replaceable measuring element insert. The insert may be ordered separately as needed.



## Element Availability

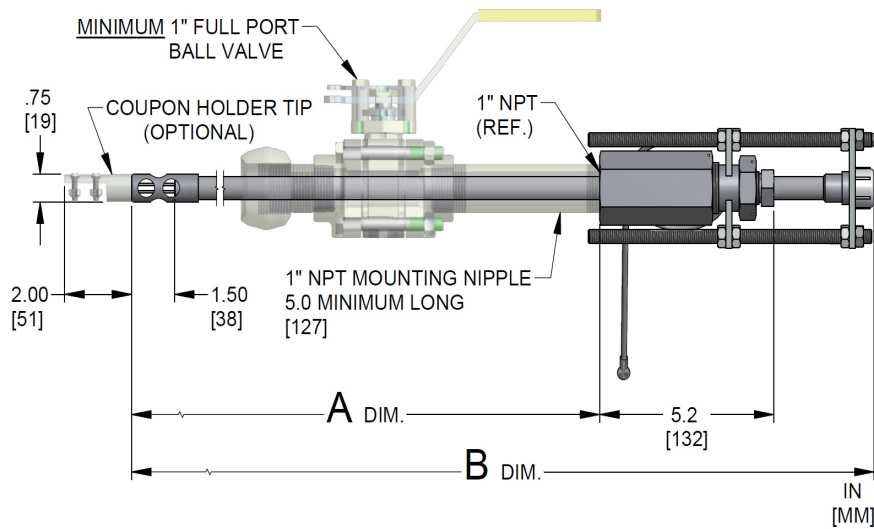
UNS NUMBER	ALLOY	S4	S8	T4	T8	W40	W80	UNS NUMBER	ALLOY	S4	S8	T4	T8	W40	W80
K03005	PIPE GRADE CARBON	•□	•□	•□	•□	•□	•□	S50200	502 S.S. (5% cR ½% Mo)				•□	•□	
S30400	304 S.S.	•□	•□	•□	•□	•□	•□	C11000	Copper 110 ETP					•	•
S30403	304L S.S.	•□	•□	•□	•□	•□	•□	C70610	CuNi 90/10 CDA #706					•	
S31000	310 S.S.			•□	•□			A95154	ALUMINUM 5154					•	
S31600	316 S.S.	•□	•□	•□	•□	•□	•□	A96061	ALUMINUM 6061				•	•	
S31603	316L S.S.	•□	•□	•□	•□	•□	•□	A91100	ALUMINUM 1100				•	•	
S41000	410 S.S.						•□	K03101	ASTM A515 Gr. 70					•	
S31703	317L S.S.					•□	•□	C44300	Ars. Adm. Brass CDA	•	•			•	
N04400	Monel 400			•□	•□	•□	•□	C68700	Alum. Brass Ars. #687					•	
N06600	Inconel 600			•□	•□			N10276	Hastelloy C-276					•□	•□
N06625	Inconel 625					•□	•□	S31703	317L S.S.					•□	•□
N08020	Carp 20 – Cb3					•□	•□								
INCHES		.001	.002	.002	.004	.010	.020	INCHES		.001	.002	.002	.004	.010	.020
USEFUL RANGE (mm)		.025	.051	.051	.100	.250	.510	USEFUL RANGE (mm)		.025	.051	.051	.100	.250	.510

- Model 3600
- Model 3600G

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	16.94	430	23.44	595
24	22.94	583	29.44	748
30	28.94	735	35.44	900
36	34.94	887	41.44	1053

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retractable ER Probes						
3600	Complete Probe Assembly – Teflon/Ceramic						
3601	Model 3600 Replacement Insert – Teflon/Ceramic						
3600G	Complete Probe Assembly – Glass Seal						
3601G	Model 3600G Replacement Insert – Glass Seal						
	<b>Code</b>	<b>Element Form: See Table 1 for Availability</b>					
	S4	Strip Loop, 4 mil thickness (1 mil useful probe life) (Model 3600/3601 only)					
	S8	Strip Loop, 8 mil thickness (2 mil useful probe life) (Model 3600/3601 only)					
	T4	Tube Loop, 4 mil thickness (2 mil useful probe life)					
	T8	Tube Loop, 8 mil thickness (4 mil useful probe life)					
	W40	Wire Loop, 40 diameter (10 mil useful probe life)					
	W80	Wire Loop, 80 mil diameter (20 mil useful probe life)					
	<b>Code</b>	<b>Element Alloy: See Table 1 for Availability</b>					
	XXXXXX	Enter UNS Number					
	<b>Code</b>	<b>Order Length</b>					
	18	18 inches					
	24	24 inches					
	30	30 inches					
	36	36 inches					
	<b>Code</b>	<b>Safety Clamp (Not an option for Model 3601 &amp; 3601G)</b>					
	0	Not Included					
	1	Safety Clamp Installed					
	<b>Code</b>	<b>Shield</b>					
	1	Standard (Liquids to 20 ft/sec, Gases to 60 ft/sec)					
	2	High Velocity/Erosion (Liquids to 50 ft/sec, Gases to 150 ft/sec)					
	3	Coupon Holding (Liquids to 20 ft/sec, Gases to 60 ft/sec)					
	<b>Code</b>	<b>Body and Stuffing Box Material</b>					
	0	316 Stainless Steel					
	1	Hastelloy C-276					
<b>3600G</b>	<b>W40</b>	<b>K03005</b>	<b>18</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>Example</b>
<b>3601G</b>	<b>W40</b>	<b>K03005</b>	<b>18</b>		<b>1</b>	<b>0</b>	<b>Example</b>

**Unit Weight: Probe Assembly with Safety Clamp – 7lbs./3.18 kg.**

**Insert only: 2.5 lbs./1.13kg.**

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 Certificate No. FM 10694

# Electrical Resistance (ER) Probes

**MODEL 3700/3705**



## Features

- **Flush Element**
- **Mounting - 1" Full Port Valve Minimum (Model 3705)**
- **Mounting - 1½" Valve Minimum (Model 3700)**
- **Temperature Rating - +500° F / 260° C**
- **Pressure Rating - 1500 PSI / 10.3 MPa**
- **Element Seal Material - Glass (Model 3705)**  
- Ryton (Model 3700)
- **Fill Material - Ceramic**
- **Probe Body Material - Stainless Steel**

Model 3700 and 3705 retractable process electrical resistance probes have a flat strip measuring element sealed and mounted at the end of a heavy walled stainless steel tube. By adjusting the position of the probe or proper selection of the physical dimensions of the coupling system, the measuring element can be positioned flush with the inner surface of the pipe or vessel. Corrosion or erosion can then be measured right

at this surface, and the lines may be pigged without moving the probes. The Model 3705 is smaller in size but limited to a sensitive S8 element. For higher corrosion rate, the larger Model 3700 provides for thicker elements. These probes may be used in any organic or inorganic environment up to a pH of 9. No replacement insert is available for the Model 3705, but is available on the Model 3700.

# MODEL 3700/3705

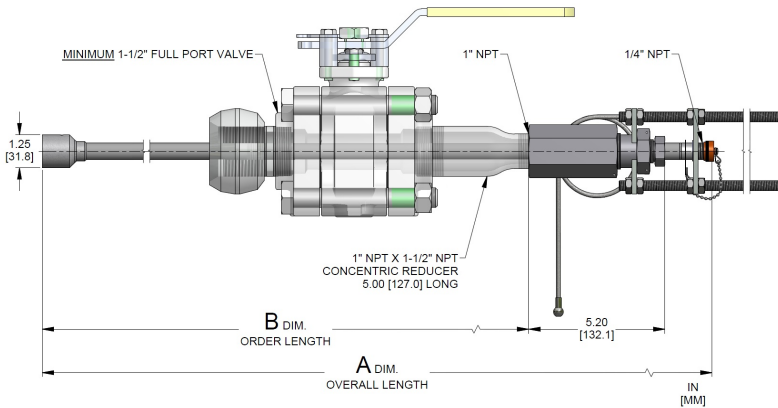
## Element Availability

UNS Number	Alloy	S8	S10	S20	S40	UNS Number	Alloy	S8	S10	S20	S40
C70610	CuNi 90/10 CDA #706		•	•	•	N10276	Hastelloy C-276		•	•	•
K03005	Pipe Grade Carbon Steel	•	•	•	•	S31600	316 S.S.		•	•	•
K03006	A106 Gr. B/A33 Gr. 6		•	•	•	S31603	316L S.S.		•	•	•
N06625	Inconel 625		•	•	•	S31703	AISI 317L S.S.		•	•	•
N08367	Incoloy 25-6HN		•	•	•	S31803	2205 Duplex S.S.		•	•	•
S30400	304 S.S.		•	•	•	S50200	502 S.S. (5% Cr ½% Mo) (UNS K41545)		•	•	•
S30403	304L S.S.		•	•	•						
<b>Inches</b>		.004	.005	.010	.020	<b>Inches</b>		.004	.005	.010	.020
<b>Useful Range (mm)</b>		.100	.175	.250	.510	<b>Useful Range (mm)</b>		.100	.175	.250	.510

**Table 1**

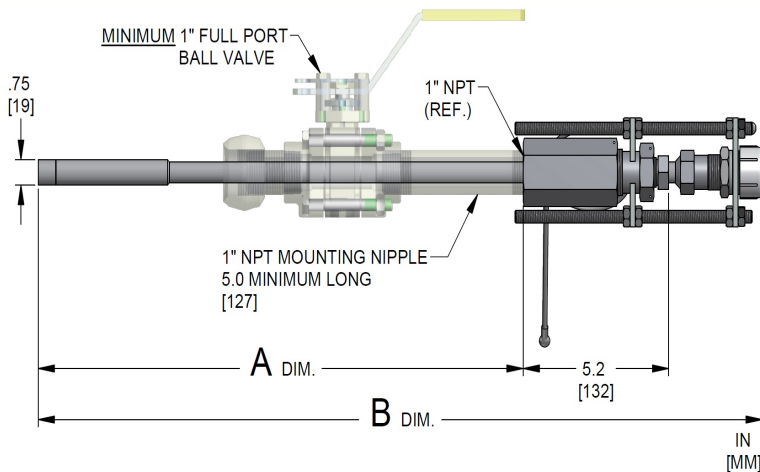
Other element alloys or styles may be supplied subject to material availability.

## Dimensions



**Model 3700**

Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	19.0	483	25.0	635
24	25.0	635	31.0	787
30	31.0	787	37.0	940
36	37.0	940	43.0	1092



**Model 3705**

Order Length	"A" Dimension		"B" Dimension	
	Inches	mm	Inches	mm
18	16.9	429	24.75	628
24	22.9	582	30.75	781
30	28.9	734	36.75	933
36	34.9	886	42.75	1086

# MODEL 3700/3705

## Ordering Information

**Note:** For flush devices which are protruding into the line that may experience high velocity process conditions it is recommended that Drag Force Calculations be performed – please contact a Cosasco representative for further details.

Model	Retractable ER Probe				
3700	Complete Probe Assembly				
3701	Replacement Probe Insert for Model 3700				
3705	Complete Probe Assembly <sup>1</sup>				
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>			
	S8	Strip, Flush (4 mil useful probe life:3705 only)			
	S10	Flush Strip Element, 10 mil thickness (5 mil useful probe life: 3700 only)			
	S20	Flush Strip Element, 20 mil thickness (10 mil useful probe life: 3700 only)			
	S40	Flush Strip Element, 40 mil thickness (20 mil useful probe life: 3700 only)			
		<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>		
		XXXXXX	Enter UNS number		
		<b>Code</b>	<b>Order Length</b>		
		18	18 inches		
		24	24 inches		
		30	30 inches		
		36	36 inches		
		<b>Code</b>	<b>Safety Clamp</b>		
		0	Not Included		
		1	Safety Clamp Installed		
<b>3700</b>	<b>S10</b>	<b>K03005</b>	<b>24</b>	<b>1</b>	<b>← Example</b>
<b>3701</b>	<b>S10</b>	<b>K03005</b>	<b>24</b>		<b>← Example</b>
<b>3705</b>	<b>S8</b>	<b>K03005</b>	<b>18</b>	<b>1</b>	<b>← Example</b>

**Note 1:** A replacement insert is not available for this model since the stuffing box is trapped between the probe header and the A type connector.

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 Certificate No. FM 10086

3700-DS rev-  
 Rev. Date: 05/04/2016

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# Electrical Resistance (ER) Probes

**MODEL 4500**



## Features

- **High Pressure Cylindrical Element**
- **Mounting – Electrical Resistance (ER) 2" System**
- **Temperature Rating - +500° F / +260° C**
- **Pressure Rating - 6000 PSI / 41.3 MPa ("S" Type Connector)  
- 3600 PSI / 24.8 MPa ("C" Type Connector)**
- **Element Seal Material - All Welded**
- **Fill Material - Ceramic**
- **Probe Body Material - Same as Element**

A new style of the Model 4500 electrical resistance probe is now available with an even more durable construction and incorporating a connector with shrouded pins to prevent accidental damage. It is recommended for all new installations. This new style incorporates welded shields where required and requires a different probe connecting adaptor (see order details). The Model 4500 ER probe is the most rugged mechanically and the least affected by temperature fluctuations. Shields are recommended for high velocity situations. Welds are vacuum annealed during assembly to avoid preferential corrosion. Probe adapters are required to make the cable connection to the probe.

**Ordering Length** = P + T + 1.25"

Where: P = Penetration required into pipe or vessel.

T = Wall Thickness of pipe or vessel.

**NOTE:** Formula is based upon standard access fitting height of 5.25 inches and 1/16" weld gap per ANSI B31.1.

**Example:** 6" Sch. 80 pipe\* with 3" penetration required; 3" + .432"\* + 1.25 = 4.682". Round 4.682" down to next 1/4" for an ordering length of 4.5".

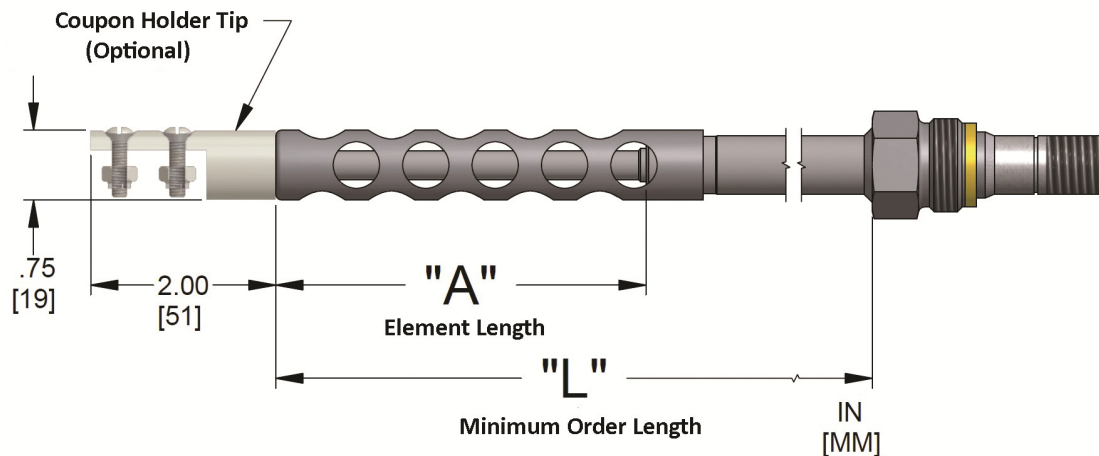
## Element Availability

UNS NUMBER	ALLOY	T10	T20	T50	UNS NUMBER	ALLOY	T10	T20	T50		
K03005	Pipe Grade Carbon Steel	■	■	■	N08020	CARP 20-Cb3	■	■			
K03006	A106 Gr. B/A333 Gr.6	■	■		S50400	9% Cr 1% Mo	■	■			
S30400	304 S.S.	■	■	■	N04400	Monel 400	■	■			
S30403	304L S.S.	■	■		N06600	Inconel 600	■	■			
S31600	316 S.S.	■	■		N06625	Inconel 625	■	■			
S31603	316L S.S.	■	■		N08825	Inconel 825	■	■			
S31703	317 S.S.	■	■	■	N10276	Hastelloy C-276	■	■			
S31803	2205 Duplex S.S.	■	■								
S32100	321 S.S.	■	■								
S41000	410 Stainless Steel	■	■								
S50200	502 S.S.(5% Cr ½% Mo)	■	■								
N08904	904L S.S.	■	■								
		Inches	.005	.010	.025			Inches	.005	.010	.025
		Useful Range (mm)	.127	.254	.635			Useful Range (mm)	.127	.254	.635

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



Element Type	"A" Dimension		"L" Dimension	
	Inches	mm	Inches	mm
T10	2.25	57	3.25	83
T20	4.00	102	5.00	127
T50	10.00	254	11.00	279

# MODEL 4500

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retrievable ER Probe-Cylindrical Element					
4500	Complete Probe Assembly					
	<b>Code</b>	<b>Element Form: See Table 1 for Availability</b>				
	T10	Cylindrical, 10 mil thickness (5 mil useful probe life)				
	T20	Cylindrical, 20 mil thickness (10 mil useful probe life)				
	T50	Cylindrical, 50 mil thickness (25 mil useful probe life)				
	<b>Code</b>	<b>Element Alloy: See Table 1 for Availability</b>				
	XXXXXX	Enter UNS Number				
	<b>Code</b>	<b>Order Length</b>				
	XX.XXX	Inch Order Length in 1/4" Increments From 2.75" (3.25" w/shield) TO 36.00" for T10 Elements From 4.50" (5.00" w/shield) TO 36.00" for T20 Elements From 10.50" (11.00" w/shield) TO 36.00" for T50 Elements				
	<b>Code</b>	<b>Shield</b>				
	0	Not Included (Liquids to 8 ft/sec, gases to 25 ft/sec)				
	1	Standard (Liquids to 25 ft/sec, gases to 75 ft/sec)				
	2	High Velocity/Erosion (Liquids to 50 ft/sec, gases to 150 ft/sec)				
	3*	Coupon Holding (Liquids to 25 ft/sec, gases to 75 ft/sec)				
	<b>Code</b>	<b>Connector</b>				
	0	"S" Type With Shrouded Pins (New Type) <sup>(1)</sup>				
<b>4500</b>	<b>T20</b>	<b>K03005</b>	<b>5.25</b>	<b>0</b>	<b>0</b>	<b>EXAMPLE</b>

**Note:** <sup>(1)</sup> Probe connection adapters as follows:  
for portable instrument 028043, for  
permanent connection 028068

\*Coupon holding tip will extend 2"  
beyond order length coupon holding  
shields use CI-RS strip coupons.

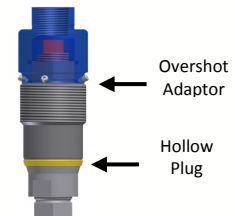
**Unit Weight:** Probe length 3.25" - 12", 3 lbs. / 1.36 kg.  
Probe length 12.25" - 24", 4.5 lbs. / 2.04 kg.  
Probe length 24.25" - 36", 6 lbs. / 2.72 kg.

**Probe Adapters:**  
028043 – For use with portable instruments.  
028068 – For permanent connection at 2500 psi max.  
745113 – For permanent connection at 10,000 psi max.,  
when used with Pressure retaining cover P/N 740095

**RECOMMENDED:**

**Overshot Adapter:** P/N 126292

An overshoot adapter is not required, but is recommended for use with the 4500 probe. It permits removal and installation of hollow plug with probe and a steel pipe plug in place (keeps inside of probe area clean and dry).



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**COSASCO**



ISO 9001:2008  
Certificate No. FM 10694

4500-DS rev-  
Rev. Date: 05/04/2016

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# Electrical Resistance (ER) Probes

## MODEL 4605



## Features

- **High Pressure Loop Element**
- **Mounting – Electrical Resistance (ER) 2" System**
- **Temperature Rating - +500° F / +260° C**
- **Pressure Rating - 6000 PSI / 41.3 MPa (Wire Loops)  
- 3600 PSI / 24.8 MPa (Tube Loops)**
- **Element Seal Material - Glass**
- **Fill Material - Ceramic**
- **Probe Body Material - 316L S.S. or Hastelloy C-276**

A new style of the Model 4605 electrical resistance probe is now available with an even more durable construction and incorporating a connector with shrouded pins to prevent accidental damage. It is recommended for all new installations. This new style incorporates welded shields where required and requires a different probe connecting adaptor (see order details).

This high pressure probe can be read by any corrosion monitoring ER instrument. The rugged probe body is 316L Stainless Steel or Hastelloy C-276 that, when used as part of a High Pressure Access System withstands working pressures to 6000 PSI (41.3 MPa) and temperatures to +500°F (+260°C). Wire Loop probes should not be used where pitting corrosion is severe.

Probe adaptors are required to make the cable connection to the probe.

**Ordering Length** =  $P + T + 1.25"$

Where: P = Penetration required into pipe or vessel.  
T = Wall Thickness of pipe or vessel.

**NOTE:** Formula is based upon standard access fitting height of 5.25 inches and 1/16" weld gap per ANSI B31.1.

Example: 6" Sch. 80 pipe with 3" penetration required;  $3" + .432" + 1.25 = 4.682"$ . Round 4.682" down to next 1/4" for an ordering length of 4.5".

# MODEL 4605

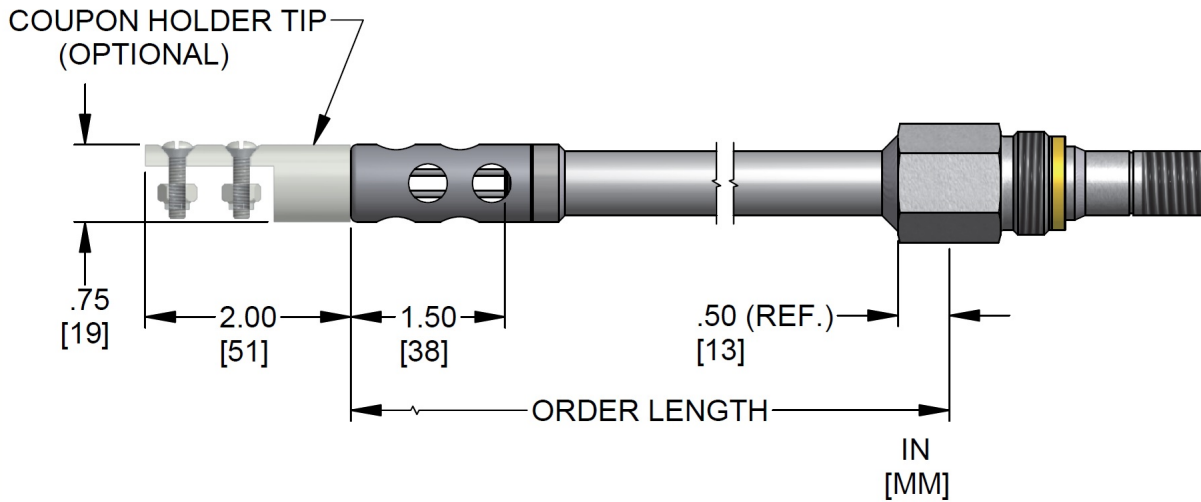
## Element Availability

UNS NUMBER	ALLOY	T4	T8	W40	W80	UNS NUMBER	ALLOY	T4	T8	W40	W80
K03005	PIPE GRADE CARBON STEEL	■	■	■	■	S50200	502 S.S. (5% cR ½% Mo)		■	■	
S30400	304 S.S.	■	■	■	■	C11000	Copper 110 ETP			■	■
S30403	304L S.S.	■	■	■	■	C70610	CuNi 90/10 CDA #706			■	
S31000	310 S.S.	■	■			A95154	Aluminum 5154			■	
S31600	316 S.S.	■	■	■	■	A96061	Aluminum 6061		■	■	
S31603	316L S.S.	■	■	■	■	A91100	Aluminum 1100		■	■	
S41000	410 S.S.					K03101	ASTM A515 Gr. 70			■	
S31703	317L S.S.			■	■	C44300	Ars. Adm. Brass CDA #443	■	■		
N04400	Monel 400	■	■	■	■	C68700	Alum. Brass Ars. #687			■	
N06600	Inconel 600		■	■	■	N10276	Hastelloy C-276			■	■
N06625	Inconel 625			■	■						
N08020	Carp 20 – Cb3			■	■						
	INCHES	.002	.004	.010	.020		INCHES	.002	.004	.010	.020
	USEFUL RANGE (mm)	.051	.100	.250	.510		USEFUL RANGE (mm)	.051	.100	.250	.510

**Table 1**

Other element alloys or styles may be supplied subject to material availability.

## Dimensions



# MODEL 4605

## Ordering Information

**Note:** For high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retrievable ER Probe, Glass Sealed and Tube Loop Element	
4605	Complete Assembly	
↓	<b>Code</b>	<b>Element Form: See Table 1 for Availability</b>
	T4	Tube Loop, 4 mil thickness (2 mil useful probe life) (up to 3600 PSI / 24.8 MPa)
	T8	Tube Loop, 8 mil thickness (4 mil useful probe life) (up to 3600 PSI / 24.8 MPa)
	W40	Wire Loop, 40 mil diameter (10 mil useful probe life) (up to 6000 PSI / 41.3 MPa)
	W80	Wire Loop, 80 mil diameter (20 mil useful probe life) (up to 6000 PSI / 41.3 MPa)
	<b>Code</b>	<b>Element Alloy: See Table 1 for Availability</b>
	XXXXXX	Enter UNS Number See Table 1 for Availability
	<b>Code</b>	<b>Order Length</b>
	XX.XXX	Inch Order Length in 1/4" increments from 2.50" to 36.00"
	<b>Code</b>	<b>Shield</b>
1	Standard (liquids to 20 ft/sec, gases to 60 ft/sec)	
2	High Velocity (liquids to 50 ft/sec, gases to 150 ft/sec)	
3	Coupon Holding (liquids to 20 ft/sec, gases to 60 ft/sec)	
<b>Code</b>	<b>Connector</b>	
0	"S" Type With Shrouded Pins (New Type) (1)	
1	"C" Type (Old Style) (1)	
<b>Code</b>	<b>Body Material</b>	
0	316 Stainless Steel	
1	Hastelloy C-276	
<p>4605 — W40 — K03005 — 6.00 — 1 — 0 — 0 ← Example</p>		

**NOTE:** New style probe with shrouded pins has probe connecting adaptors as follows: for portable instrument 028043, for permanent connection 028068. Old style probe used connecting adaptors: for portable instrument 060913, for permanent connector 745046.

**UNIT WEIGHT:**

Probe length 3.25" - 12", 3 lbs. / 1.36 kg.  
 Probe length 12.25" - 24", 4.5 lbs. / 2.04 kg.  
 Probe length 24.25" - 36", 6 lbs. / 2.72 kg.

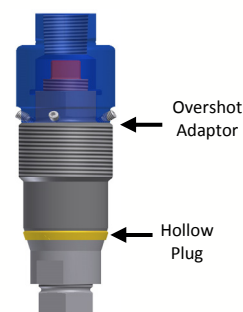
**Probe Adapters:**

028043 – For use with portable instruments.  
 028068 – For permanent connection at 2500 psi max.  
 745113 – For permanent connection at 10,000 psi max., when used with Pressure retaining cover P/N 740095

**RECOMMENDED:**

**Overshot Adapter:** P/N 126292

An overshot adapter is not required, but is recommended for use with the 4605 probe. It permits removal and installation of hollow plug with probe and a steel pipe plug in place (keeps probe pins clean and dry for immediate connection to instruments).



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**COSASCO**



4605-DS rev-  
 Rev. Date: 05/04/16

# Electrical Resistance (ER) Probes

4700/4700 ADJ



**4700 FIXED**



**4700-ADJ**

## Features

- **High Pressure Fixed and Adjustable Flush**
- **Electrical Resistance (ER) 2" System**
- **Temperature Rating - 500°F / +260° C**
- **Pressure Rating - 3600 PSI / 24.8 MPa (Model 4700-ADJ)  
-6000 PSI / 42.3 MPa (Model 4700)**
- **Element Seal Material - Ryton**
- **Fill Material - Ceramic**
- **Probe Body Material – 316 L S.S.**

The Model 4700 electrical resistance probe is now available with an even more durable construction incorporating a connector with shrouded pins to prevent accidental damage.

This high pressure probe with element thicknesses up to 40 mils, can be read by any corrosion monitoring ER instrument. The rugged probe body is 316L Stainless Steel. It may be used at operating pressures to 6000 PSI/42.3 MPa (Model 4700) or 3600 PSI/24.8 MPa (Model 4700-ADJ) and temperatures to 500° F (260° C). These probes are for use in bottom of the line applications

where corrosive fluids may accumulate or in lines which are subject to pigging.

The Model 4700-ADJ adds the flexibility to adjust the length of the probe, thus minimizing the inventory of replacement probes. The probe is readily available in two adjustment ranges 1.25" - 2.25" and 2.00" - 3.00". Larger sizes are available as a specialty item.

Probe adapters are required to make the cable connection to the probe. Use the following order numbers for adapters: 028068 for permanent instrumentation, 028043 for portable instruments.

## Element Availability

UNS Number	Alloy	S10	S20	S40	UNS Number	Alloy	S10	S20	S40
C70610	CuNi 90/10 CDA #706	•	•	•	N10276	Hastelloy C-276	•	•	•
K03005	Pipe Grade Carbon Steel	•	•	•	S31600	316 S.S.	•	•	•
K03006	A106 Gr. B/A33 Gr. 6	•	•	•	S31603	316L S.S.	•	•	•
N06625	Inconel 625	•	•	•	S31703	AISI 317L Stainless Steel	•	•	•
N08367	Incoloy 25-6HN	•	•	•	S31803	2205 Duplex S.S.	•	•	•
S30400	304 S.S.	•	•	•	S50200	502 S.S. (5% Cr ½% Mo) (UNS K41545)	•	•	•
S30403	304L S.S.	•	•	•					
<b>Inches</b>		.005	.010	.020	<b>Inches</b>		.005	.010	.020
<b>Useful Range (mm)</b>		.175	.250	.510	<b>Useful Range (mm)</b>		.175	.250	.510

Based upon a standard access fitting height of 5.25" and a 1/16" weld gap per ANSI B31.1, the following equation may be used to determine the order length:

**Fixed Flush Formula:**

Order Length = T + 1.25"

Where: T = Wall Thickness of the pipe or vessel.

The order length should be rounded down to the nearest 1/8".

**ADJ Flush:**

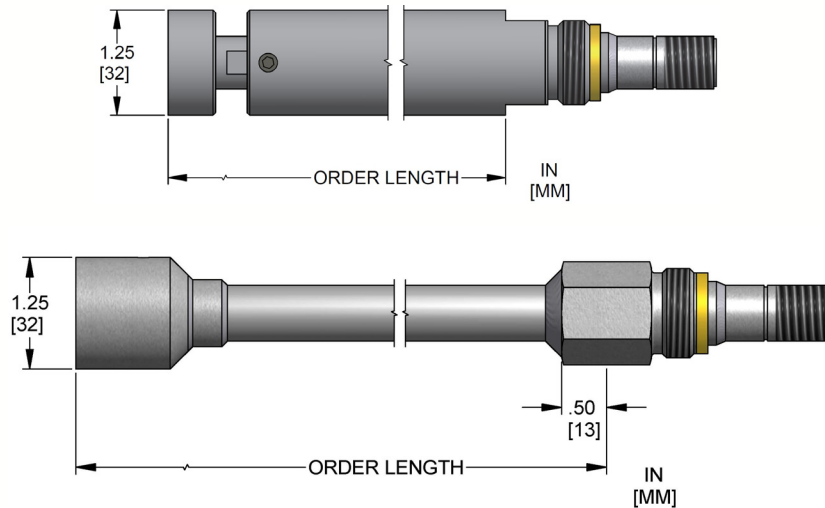
For 5.25" Access Fittings welded directly to the line with standard 1/16" weld gap, the following pipe size and schedules are covered with just the two sizes shown.

**Notes:**

- 1. Based on 5.25" access fitting height
- 2. Schedule pipe not listed above this size

Probe Size	1.25"	2.00"
<b>Adjustment</b>	1.25" – 2.25"	2.00" – 3.00"
<b>Pipe Thickness Ranges<sup>(1)</sup></b>	0" – 1.00"	.75" – 1.75"
<b>Sch. 40 Pipe<sup>(1)</sup></b>	Up to 24" <sup>(2)</sup>	-----
<b>Sch. 80 Pipe<sup>(1)</sup></b>	Up to 18"	14" – 24" <sup>(2)</sup>
<b>Sch. 160 Pipe<sup>(1)</sup></b>	Up to 8"	8" – 16"
<b>Sch. XXS Pipe<sup>(1)</sup></b>	Up to 12"	5" – 12" <sup>(2)</sup>

## Dimensions



## Ordering Information

**Note:** For flush devices which are protruding into the line that may experience high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retrievable ER Probes – Large Flush Element			
4700	Complete Probe Assembly - Fixed			
4700-ADJ	Complete Probe Assembly - Adjustable			
	<b>Code</b>	<b>Element Form: See Table 1 for availability</b>		
	S10	Flush Element, 10 mil thickness (5 mil span)		
	S20	Flush Element, 20 mil thickness (10 mil span)		
	S40	Flush Element, 40 mil thickness (20 mil span)		
	<b>Code</b>	<b>Element Alloy: See Table 1 for availability</b>		
	XXXXXX	Enter UNS number		
	<b>Code</b>	<b>Order Length</b>		
	XX.XX	Inch order length in 1/8" "increments from 1.25" to 36.00" (fixed only)		
	YY.YY	Inch order length 1.25" or 2.00" (adjustable only)		
	<b>Code</b>	<b>Connector</b>		
	0	"S" type with shrouded pins (new type) <sup>(1)</sup>		
<b>4700</b>	<b>S20</b>	<b>K03005</b>	<b>5.00</b>	<b>0</b>
<b>4700-ADJ</b>	<b>S10</b>	<b>K03005</b>	<b>1.25</b>	<b>0</b>

**Note:** The probe with shrouded pins has probe connection adapters as follows: for portable instrument 028043, for permanent connection 028068.

### Weight:

Fixed Unit		Adjustable Unit	
Probe Length	Weight	Probe Length	Weight
3.25" – 12"	3 lbs/1.36 kg	1.25"	0.8 lbs/0.36 kg
12.25" – 24"	4.5 lbs/2.04 kg	2.00"	1.0 lbs/0.45 kg
24.25" – 36"	6 lbs/2.72 kg		

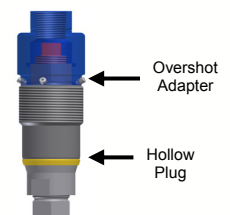
### Probe Adapters:

- 028043 – For use with portable instruments.
- 028068 – For permanent connection at 2500 psi max.
- 745113 – For permanent connection at 10,000 psi max.  
when used with Pressure retaining cover P/N 740095

### RECOMMENDED:

#### Overshot Adapter: P/N 126292

An overshoot adapter is not required, but is recommended for use with the 4700 probe. It permits removal and installation of hollow plug with probe and a steel pipe plug in place (keeps probe pins clean and dry for immediate connection to instruments).



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4700-DS rev-  
 Rev. Date: 05/04/2016

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**COSASCO**



ISO 9001:2008  
 Certificate No. FM 10694

# Electrical Resistance (ER) Probes

MODEL 4705



## Features

- **High Pressure Flush**
- **Mounting - 2" System**
- **Temperature Rating - +500°F / +260° C**
- **Pressure Rating - 6000 PSI / 41.3 MPa**
- **Element Seal Material - Class**
- **Fill Material - Ceramic**
- **Probe Body Material – 316 L S.S.**

A new style of the Model 4705 electrical resistance probe is now available with an even more durable construction and incorporating a connector with shrouded pins to prevent accident damage. It is recommended for all new installations. This new style incorporates welded shields where required and requires a different probe connecting adaptor (see order details).

This high pressure probe can be read by any corrosion monitoring Electrical Resistance (ER) instrument. The rugged probe body is 316L Stainless Steel. It may be used at operating pressures to 6000 PSI (41.3 MPa) and temperatures to +500° F (+260° C).

Probe adapters are required to make the cable connection to the probe. Use the following order numbers for adapters: 028068 for permanent instrumentation and 028043 for portable instrumentation (new style connector only). Based upon a standard access fitting height of 5.25" and a 1/16" weld gap per ANSI B31.1, the following equation may be used to determine the order length.

$$\text{Ordering Length} = T + 1.25''$$

Where: T = Wall thickness of pipe or vessel. The order length should be rounded down to the nearest 1/8".

# MODEL 4705

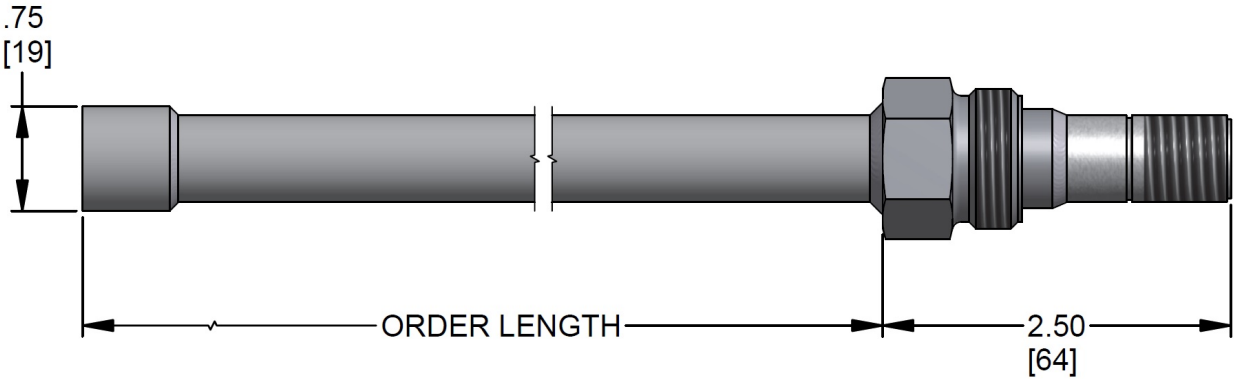
## Element Availability

UNS Number	Alloy	S8
K03005	Pipe Grade Carbon Steel	■
	Inches	.004
	Useful Range (mm)	.100

Table 1

Other element alloys may be supplied subject to material availability

## Dimensions





# MODEL 4705

## Ordering Information

**Note:** For flush devices which are protruding into the line that may experience high velocity process conditions it is recommended that Wake Frequency Calculations be performed – please contact a Cosasco representative for further details.

Model	Retrievable ER Probe – High Pressure Flush			
4705	Complete Probe Assembly			
	<b>Code</b>	<b>Element Form: See Table 1 for Availability</b>		
	S8	Flush Strip Element, 8 mil thickness (4 mil useful probe life)		
		<b>Code</b>	<b>Element Alloy: See Table 1 for Availability</b>	
		XXXXXX	Enter UNS Number	
			<b>Code</b>	<b>Order Length</b>
			XX.XXX	Inch Order Length in "Increments from 2.00" to 36.00"
				<b>Code</b> <b>Connector</b>
			0	"S" Type With Shrouded Pins <sup>(1)</sup>
			1	"C" Type (Old Style) <sup>(1)</sup>
<b>4705</b>	<b>S8</b>	<b>K03005</b>	<b>2.00</b>	<b>0</b> ← <b>Example</b>

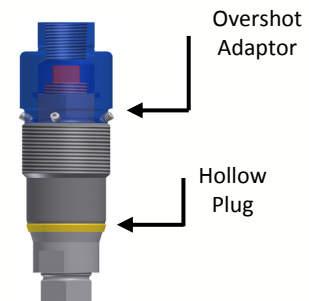
**Note:** <sup>(1)</sup> New style probe with shrouded pins has probe connecting adapters as follows – for portable instrument 028043, for permanent connection 028068. Old style probe uses connecting adapters – for portable instrument 060913, for permanent connector 745046.

**Unit Weight:** Probe length 3.25" - 12", 3 lbs. / 1.36 kg.  
 Probe length 12.25" - 24", 4.5 lbs. / 2.04 kg.  
 Probe length 24.25" - 36", 6 lbs. / 2.72 kg.

**RECOMMENDED:**

**Overshot Adapter: P/N 126292**

An overshoot adapter is not required, but is recommended for use with the 4700 probe. It permits removal and installation of hollow plug with probe and a steel pipe plug in place (keeps probe pins clean and dry).



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 Rev. Date: 05/04/2016

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# Electrical Resistance (ER) Probe Accessories

## PROBE ELEMENT SHIELDS

All loop element Electrical Resistance (ER) and ER Temperature process probes (Models 2600\*\*, 2610\*\*, 3000\*\*, and 4605) require shields to prevent damage to the exposed measuring element. Standard shields may be used in liquid flow rates up to approximately twenty feet per second\*, depending on viscosity, particulate matter, element configuration and other factors.

Cylindrical element ER and ER Temperature process probes (Models 2500, 3500, and 4500) may be used without shields in liquid flows up to approximately eight feet per second. However, standard shields are recommended at any velocity up to approximately 25 feet per second, to assure adequate protection of the element. All cylindrical element shields incorporate an element tip support to reduce the possibility of element failure from flow or fatigue.

Retractable ER and ER Temperature probes (Models 3000\*\* and 3500) use removable shields so that the stuffing box may be accessed for maintenance. Since these shields also act as the mechanical stop for the probe in the retracted position, they must be periodically inspected (and replaced if required) to maintain their mechanical integrity. HIGH VELOCITY shields reduce the fluid velocity past the element and allow the probe to be used in more severe environments. Loop element and cylindrical element probes may be used in liquid flows up to approximately 50 feet per second.

COUPON HOLDING shields allow an electrically isolated blade type coupon to be mounted on the end of a loop or cylindrical element probe. This permits simultaneous coupon and ER data accumulation at a single probe location. The velocity limitation for coupon holding shields is the same as for standard shields.

\*Velocity limitations for probes in gases are approximately three times the velocities listed for liquids. \*\*Also "G" versions.

## PROBE ELEMENT SHIELDS ORDER INFORMATION

Shield Type	Probe Model	Shield
Standard	3000** 3500 3500HT	030919 745006-Alloy 745054-Alloy
High Velocity	3000** 3500 3500HT	030930-8020 745017-Alloy 745057-Alloy
Coupon Holding	3000** 3500 3500HT	623001 745060-Alloy 745058-Alloy

**NOTE** Shields for Models 3000 and 3500 can be ordered separately. Shields for other Models are an integral part of the probe (usually welded and cannot be ordered separately.)



Typical Probe Element Shields. Coupon holding on the left, High Velocity in the Middle, Standard on the right.

# ER Probe Accessories

## RETRACTABLE PROBE SAFETY CLAMPS

ER and ER Temperature probes are designed for safe installation and operation in various environments. Where danger of fire, explosion or blowout exists, use of an appropriate safety device should be considered mandatory. This equipment is designed and tested for reliability, using established principles of operation.



*Model 3000 probe with Safety Clamp and Safety Clamp by itself.*

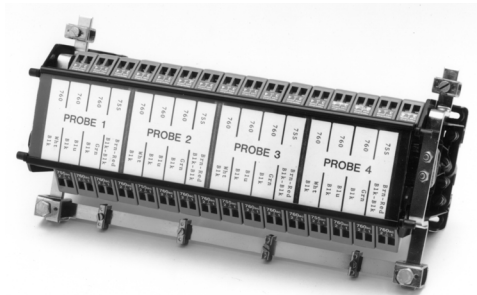
Safety Clamps are **required** at pressures of 100 psi or greater and at temperatures of +150°F or greater. The clamp provides a secondary back-up lock on retractable probes in the fully-inserted position, even during pressure transients. The attached cable gauges the extent to which a probe may be retracted and, if necessary, holds the probe in that position under rated operating pressures. The chart below gives the part number of the clamp assembly according to the probe model number. The length should be the same as the retractable probe length, which increase in 6" increments. Safety clamp threaded rods allow 0-8" of adjustment. Probe safety clamps are reusable and may be retrofitted to a probe in the field if required after retraction of the probe from the system.

### SAFETY CLAMP ORDERING INFORMATION

Probe	Safety Clamp Ordering Information
3000, 3000G, 3705	061430 - Length
3500	061431 - Length
3700	061450 - Length

## INTRINSIC SAFETY BARRIERS

Electrical Resistance (ER) and ER Temperature instruments and probes are commonly used in areas where there is a risk of the presence of potentially explosive gaseous mixtures. Many of the instruments such as the portable and single channel instruments are designed to be intrinsically safe (i.e. unable to generate a spark or an excessive temperature even under fault conditions). For line powered instruments and probes in an electrically hazardous process environment, it is generally necessary to install INTRINSIC SAFETY BARRIERS to prevent any high energy levels being transferred under fault conditions from the standard ER and ER Temperature electronics to the standard ER or ER Temperature probe. These barriers are available as separate assemblies, or as part of an automated system. For various options to meet appropriate Certifying Authority standards, contact the factory.



Intrinsic Safety Barrier Assembly for four ER or ER Temperature ER probes used in ICMS™ ERSystem.

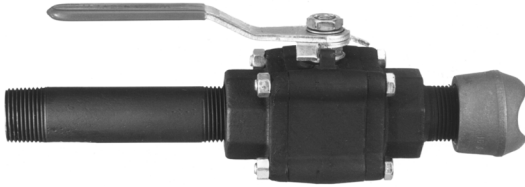
Automatic instruments and safety barriers (such as ICMS™ Probe Interface Modules) may be installed in Division II (Zone 2 areas) or Division 1 (Zone 0 and Zone 1) in an explosive-proof enclosure with safety barrier sets. Contact the factory for further details.

NOTE: The Barrier set for ER Probes has BASEEFA Certification Numbers: System Cert. No. Ex 90C2389X, EExia IIC T4 Probe Cert. No. Ex 90C2388X, EExia IIC T4

# ER Probe Accessories

## MODEL 60 ACCESS VALVE ASSEMBLY

The Cosasco Model 60 Access Valve Assemblies are designed to allow access to pressurized areas without process shut down.

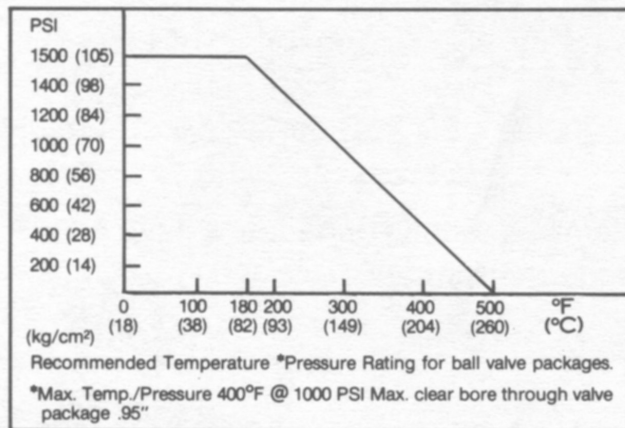


The assembly consists of a Thredolet®, all thread nipple, ball valve and a 5"(\*) nipple. The full port ball valve is provided in either a carbon steel or 316 Stainless Steel body, with Polyfill™ seats and Viton™ body seals. All items comply with NACE standard MR0175, for materials resistance to sulfide stress cracking.

The Model 60 Access Valve Assembly accommodates all Cosasco retractable probes. This includes the Standard ER, ER Temperature, LPR, Coupon Holder, Injection Tubes and Hydrogen Probes.

**\*Note:** A 5" nipple is used as standard and is suitable for all probe elements except coupon holding shields which require a 9" nipple. (For loop element probes a minimum nipple of 3" length may be used. T50 elements require an 11" long nipple [15" long with coupon holder]).

**Temperature/Pressure Rating Chart**



## MODEL 60 ACCESS VALVE ASSEMBLY ORDERING INFORMATION

Order Number	Access Valve Assy.
061500-LL	Carbon Steel with S.S. Trim – 1"
061560-LL	316 Stainless Steel – 1"
061501-LL	Carbon Steel with S.S. Trim – 1 ½"
061551-LL	316 Stainless Steel – 1 ½"

LL= Line Size

## HIGH PRESSURE PROBE CONNECTING ADAPTORS

The 4000 Series of ER probes which are installed in the high pressure access fittings require probe connecting adaptors to allow connection to the cables listed below (connecting adaptor has a probe type B connector for cable attachment).

## PROBE ADAPTOR ORDERING INFORMATION

Probe Connector Type	Portable Probe Adaptor for use with Handheld Units	Fixed Probe Adaptor for Instruments (2500 psi max.)	Fixed Probe Adaptor for Instruments (10,000 psi max.)
S	028043	028068	745113
C	060913	745046	--

## PROBE TO INSTRUMENT CABLES

ER and ER Temperature probe to instrument cables are of vital importance to system performance because of the particularly low level signals inherent in these corrosion measurements. Both the correct cable and careful connection are required for successful operation. These cables are available in a variety of duties, suitable for different service conditions.

**STANDARD DUTY CABLE** is generally suitable for plant applications and for running through conduit, with a rugged polyurethane outer sheath suitable for temperatures in the range -50°C to +70°C.

**LIGHT DUTY CABLE** is recommended only for light duty service such as laboratory or similar use.

**HEAVY DUTY FIRE-RESISTANT TRAY CABLES** are available on a special order basis for plant applications specifying these requirements. Cables and connectors are available separately for site installation as necessary; however, care is required to ensure correct connections.

# ER Probe Accessories

## Ordering Information

Code	Complete Cable Assemblies																		
CBL 1	ER Probe and ER Temperature Probe Cable																		
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### NOTE

- Minimum order quantity of 1000 ft. applies.
- Standard duty and heavy duty cable is available with blue or black color outer jacket. The Company reserves the right to use either color cable on a particular order depending upon availability. Colors will not be mixed on any order. If a particular color is required please specify the appropriate dash number as follows:
  - 1 Black Jacket
  - 2 Blue Jackets (Identification of Intrinsic Safety Circuits)
 If you specify a color as above, pricing is unchanged but delivery may be longer. Contact factory for details.
- Connections must be made in the factory because additional components are required for connection of Model 610 probes to automatic instruments.
- Also suitable for use as an extension cable for connection the Model 610 probe to the Model CK-3 portable instrument only.
- Color option is not available for limited duty cable. It is furnished as grey only.
- Extension cables are not recommended for use with ICMS™ and Corrdata <sup>®</sup> Systems because connections have only 6 pins. The cable requires 8 conductors from the probes all the way to the instrument for proper performance.

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**COSASCO**



ISO 9001:2008  
 Certificate No. FM 10884

# **(LPR) Linear Polarization Resistance**