

# TELEDYNE ANALYTICAL INSTRUMENTS

## Scale Sentry

Teledyne has produced a versatile scale deposition transmitter and probe for monitoring the onset of scale deposition in processing plants that use large amounts of water. The system incorporates state of the art electronics and a retractable, fiber optic based insitu probe that senses the earliest formation of scale development. The transmitter can then send a signal to a pump that automatically controls the dosing of inhibitor used to combat scale deposits significantly reducing energy consumption and chemical cleaning.

### Defining the Problem

Detection of scale formation in process boilers, cooling towers, nanofiltration and reverse osmosis membrane systems is an important measurement in combating the economic consequences of scale buildup. Crystallization of inorganic salts having inverse solubility is one of the most common reasons for scale. High levels of calcium and other salts in water can precipitate and form an insulating layer on pipes or progressively narrow their internal diameter, impeding flow and increasing plant energy expenditure. Other problems associated with scale formation are:

- Increased operating costs caused by running at higher chemical inhibitor levels to remove scale
- Cost of repair, and returning equipment to operating condition because of too low a chemical inhibitor level
- Increased energy consumption and chemical cleaning frequency
- Environmental "Green Affect" because of overfeeding chemical inhibitor
- Reduced permeability of filter membrane filters

### Economics

Scaling can increase cost in production plants dramatically if it is not monitored and controlled properly. In boilers, the fuel cost increase for 0.1" of scale can be as high as 20%, and if the scale thickness increases to 0.3", energy costs can escalate to 50%. As the scale continues to build on the surface, it can eventually reach a point at which the heat transfer is inadequate and the boiler is shut down.

### Where the unit can be used

- Chemical plants
- Petrochemical plants
- Pharmaceutical plants
- Food & Beverage facilities
- Pulp & Paper plants
- Electric power plants

### Photo-X Scale Sentry Transmitter

Teledyne offers a low cost Photonic Transmitter that measures the signal from our scale probe and uses it to control the amount of scale inhibitor delivery. This reading is based on the amount of optical attenuation from the fiber optic scale probe.

The transmitter is compact and is designed to connect to the scale probe via two fiber optic cables. A local digital display is provided and the transmitter offers a 4-20mA output signal to other devices. In addition, the transmitter is supplied with a means of automatically checking the calibration. A reference filter is inserted into the measuring beam either locally or remotely to verify the transmitter is working properly.



Model 58T Scale Sentry Transmitter

### Scale Sentry Probe

The Scale Sentry Probe is a fiber optic based insitu probe that monitors the scale deposition on an optical crystal. In addition to monitoring the optical deposition on the probe surface, the probe can be supplied with an automatic retractor for cleaning the probe.



## PRODUCT SPECIFICATIONS

### 58T Series Photo-X Transmitter

#### Transmitter

Measured parameter:	Scale Deposition
Resolution:	0.01AU
Temperature Range:	-40 to +50° C
Response time:	< 1 sec
Maximum Zero shift:	0.005AU (over +20 to +40° C)
Long term output drift:	<2% signal loss/year
Repeatability:	1% of range
Output linearity:	Linear for given Scale Indexes
Lamp:	LED (10 year minimum life guarantee)

#### User Display & Control

Type of display:	LED display
Display:	3-1/2 digits in user defined engineering units

#### Electrical

Power requirement:	24 VDC (9-32 VDC); If 110/220 VAC is available, Teledyne can supply an (optional) AC/DC power supply
Power consumption:	0.48 Watts
Analog outputs:	4-20mA isolated
Analog loop resistance:	500 Ohms, nominally @ 24V
Alarms:	Optional
Certification:	Available upon request

#### Mechanical

Analyzer weight:	1.5 lbs
Enclosure:	Extruded aluminum, NEMA 4X optional 8" H x 3-7/8" W x 1-1/2" D

#### Probe

Materials:	316 SS or Hastelloy C
Temperature rating:	315.5° C (600° F)
Pressure rating:	10,000 psig

### Probe Options

- 6, 12, or 24" length
- Temperature controlled
- Temperature thermistor
- Pressure strain gauge

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### Warranty

Instrument is warranted for 1 year against defects in material or workmanship. NOTE: Specifications and features will vary with application. The above are established and validated during design, but are not to be construed as test criteria for every product. All specifications and features are subject to change without notice.

