

Online Process Refractometer

- **ONLINE REFRACTIVE INDEX OR BRIX** measurement to monitor and control the concentration of dissolved solids or water soluble liquids in your process.
- **LOW COST OF OWNERSHIP.** One sensing head with integral electronics can be used to cover your entire measuring range from 1.33-1.53 RI (0-95 Brix).
- **RELIABLE MEASURING HEADS** featuring a sapphire, YAG prism, CIP capability, and photo diode array for resolution down to 0.0001 RI (.1 Brix).
- **REAL TIME PROCESS CONTROL** with digital, RS232 or RS485, and dual analog outputs, two alarms, and diagnostic/temperature correction.
- **NO CALIBRATION REQUIRED.**



SUPERIOR BENEFITS

Continuous, light-protected, drift-free measurement for tighter process control. The process refractometer continuously measures the refractive index (RI), and, thus, the concentration, of a binary or quasi-binary liquid mixture. This is an automatic, absolute measurement of the critical angle. It is independent of light intensity from the light emitting diode (LED) and is free of signal drift, granting critical precision and greater process control.

Measurement is not affected by color, turbidity, clouding, suspended solids, or flow rate.

Construction and materials minimize service and maximize reliability. The 316L SST sensing head features a sapphire or YAG prism which is both chemically and mechanically resistant to acids, slurries, and etchants. For processes where 316L is not appropriate (such as HCl), a teflon flow-through adapter is available to enable the refractometer to be applied to almost all processes. The Model Refrac A1 is compatible with both air and water cooling.

Super-sensitive light detector and temperature compensation boost resolution and accuracy. Reflected light is detected with a charged couple device (CCD) with 2048 elements, which allows for precise detection of the light/dark border region used to determine the RI of the solution. Three temperature-measuring elements are embedded in the sensor head and are used to compensate the RI measurement and convert the measurement to a scaled measurement such as Brix.

Versatile, unique design. The sensing head includes integral electronics that provides 0.1 BRIX resolution over the full 0-95 BRIX range. The signal from the measuring head is analyzed and processed by the electronics to provide both 4-20mA analog outputs and a digital output for recorders, printers, programmable logic controllers (PLC), and distributed control systems (DCS). The output can also be used for remote communication links and limit comparators for alarms, valves, and pumps. The 4-20mA signal and the measuring equation's slope and offset can be calibrated for specific applications.

THEORY OF OPERATION

Refractometer measurements are based on the physical properties of bent (refracted) light. When incident light is refracted from an optically thicker medium into a thinner one, the angle of refraction is determined by the refractive index. Comparison of the refractive indices of both mediums reveals the concentration of dissolved solids in the liquid, expressed as RI (Refractive Index). RI is used to correlate to the concentration of quasi or quasi-binary solutions such as $\text{HCl} + \text{H}_2\text{O}$ and $\text{H}_2\text{O}_2 + \text{H}_2\text{O}$.

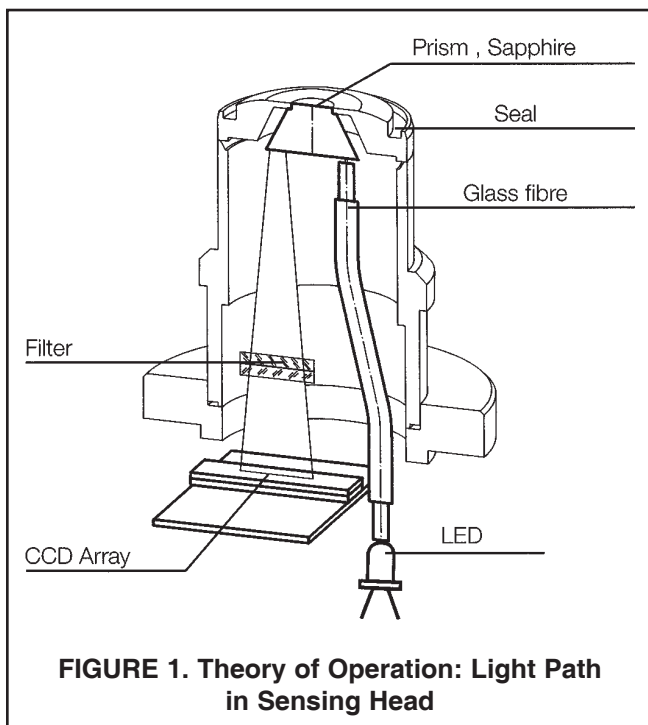
LIGHT PATH

The glass fiber transmits light from an LED into one side of the sapphire prism (see Figure 1). This is reflected through the sample to the other side of the prism, through a filter to the CCD array where the position of the incident light is determined. This angle depends on the amount of dissolved solids in the sample.

CONFIGURATION

The Model Refrac A1 can be used as a factory-configured simple RI (or BRIX) transmitter for simple applications where a single online parameter is desired. However, it also includes a powerful Windows-based configuration program that can be used when more data is needed. This program allows the user to do the following:

- Set 4 and 20 mA output values
- Calibrate and automatically clean the head
- Configure special as needed for applications
- Customize temperature compensation
- Test outputs and switches
- And much, much more



SPECIFICATIONS

REFRAC A1 STREAM VARIABLES:

Measuring Ranges:

BRIX: 0-95

RI: 1.33-1.53

Resolution: 0.1 BRIX, 0.0001 RI

Pressure: 145 psig

Temperature: up to 120°C with water cooling.
Compatible with both air and water cooling.

Current Outputs: two (2) galvanically isolated
4-20 mA outputs

Alarm Relays: Two open collector; max. 30V, 100mA

PHYSICAL CONFIGURATION:

Power Supply: 100-240 VAC; 47-63 Hz

Power Consumption: 0.11A

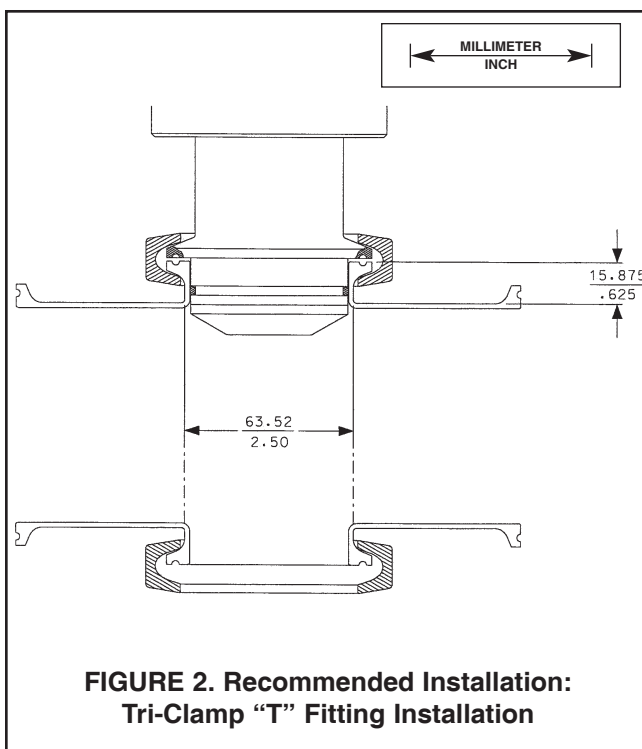
Wetted Part: Sapphire, optional 316L SST or Teflon

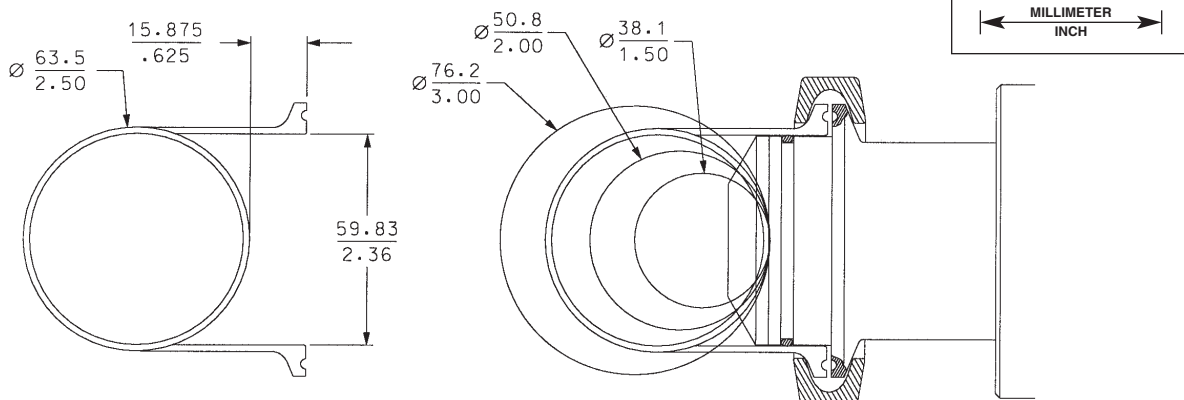
Cable: 15 ft (5 m) standard, other lengths available
on request

Insertion/Mounting: Standard 2.5 in. triclamp

Flow-Through: Teflon tee with ¼ in. NPT connection
(optional)

Environment: NEMA 4X (IP65)





STANDARD SHORT T FLANGE: FLANGE FACE IS 5/8 " AWAY FROM TUBE OD FOR MOST SIZES OF TUBING. 2 1/2 " FLANGE REQUIRED, 2 1/2 " TUBING SHOWN. OTHER TUBING SIZES INDICATED.

FIGURE 3. Tri-Clamp Sensor Dimensions

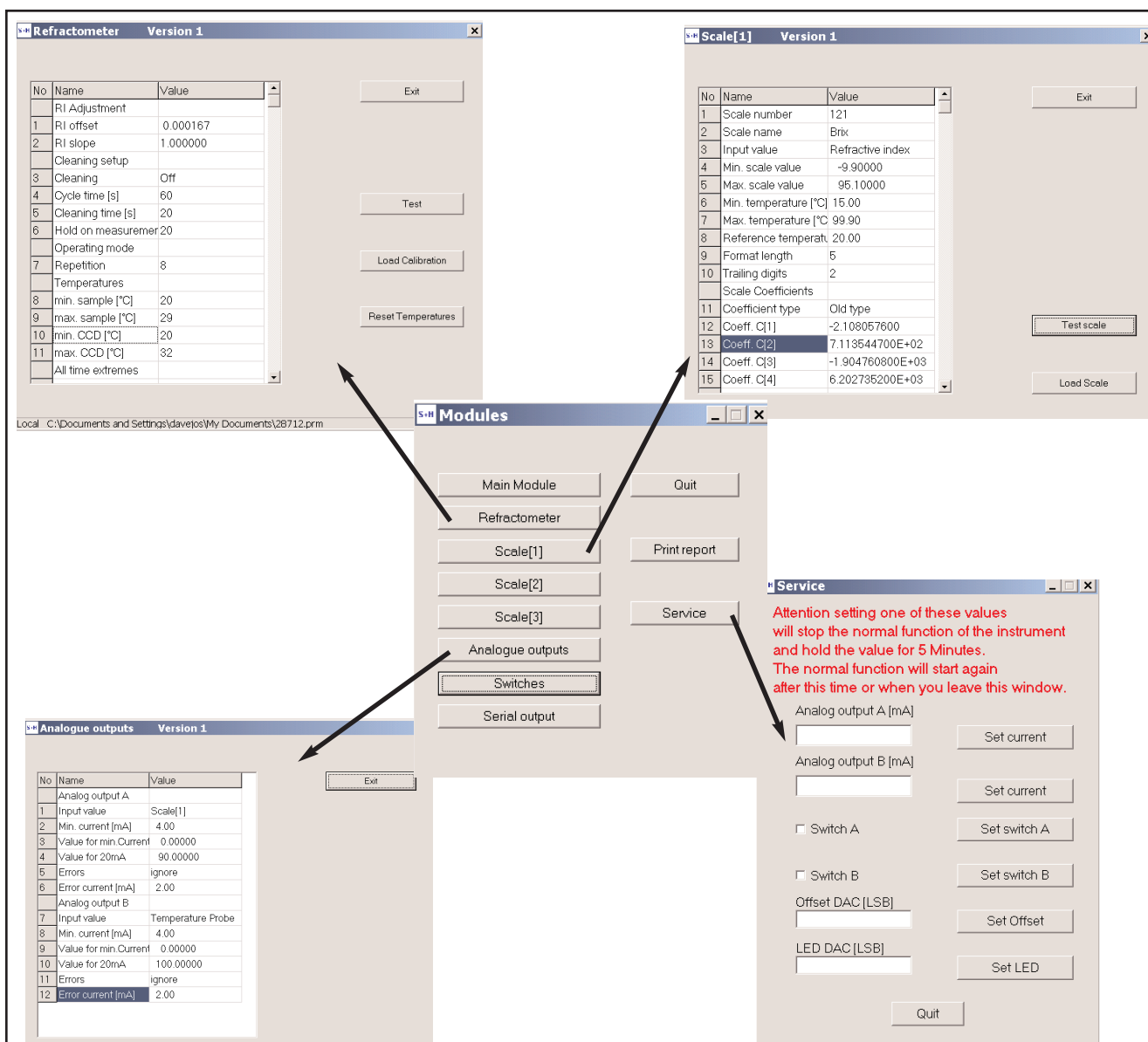
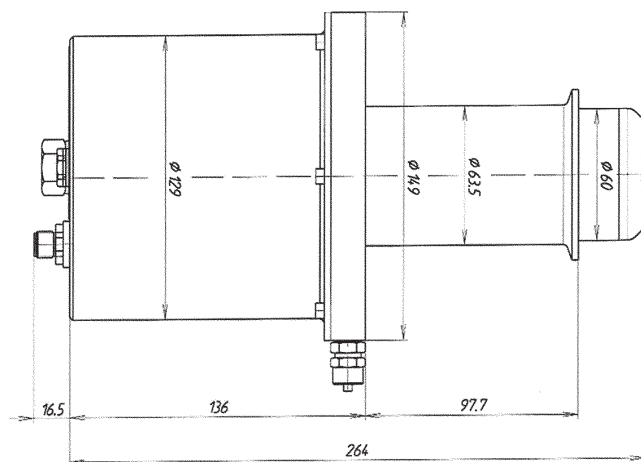


FIGURE 4. Configuration screens for the Model Refrac A1.



NOTE: Dimensions in mm.

FIGURE 5. Dimensional Drawing of Refrac A1

Model Refrac A1 measures BRIX and Refractive Index (RI) over the wide range of 0 - 95 BRIX (1.33 - 1.53 RI). The Refrac A1 features electronics integral to the sensing head to ease installation requirements and is compatible with both air and water cooling to meet your temperature requirements up to 120°C. The Refrac A1 includes a switching power supply for use in 100-240 VAC power. Configuration of the refractometer is performed via RS232 or RS485 communication to a PC.

MODEL	DESCRIPTION
Refrac A1	All-in-one refractometer with electronics integral to sensing head
CODE	MOUNTING (Required Selection)
01	316L SST 2-1/2 inch Triclamp

ACCESSORIES AND SPARE PARTS FOR REFRAC A1

PN	DESCRIPTION
9200292	5 meter, IP 67 Cable with connector for power supply, analog output or RS 232
9200293	2 meter, RS 232 Cable with 9 pol D-sub-connector to PC



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