

# SYRUP CONCENTRATION MONITOR

## MODEL 971-C



### PRODUCT DESCRIPTION

The Syrup Concentration Monitor Model 971-C is designed to measure syrup concentration up to 95% in tanks or pipelines. The instrument operates under pressure or vacuum and is unaffected by direction or velocity of syrup flow. The probe can be installed directly in equipment at a favorable point to minimize measurement lag, improve control of concentration and eliminate troublesome sample withdrawal problems.

### FEATURES

- Simple installation
- Wide dynamic range
- Linear isolated output
- High accuracy and reliability
- Stainless steel sensor
- Designed for durability
- Low maintenance
- Field serviceable
- One-year limited warranty

### PRINCIPLE OF OPERATION

This instrument employs a measuring element consisting of a stainless steel probe terminating in a disc-type rotor. The 3" diameter stainless steel rotor (for the 45 to 95% range), immersed in the syrup, is rotated by a small DC motor at approximately 1500 RPM. Since armature current is proportional to viscous drag, the monitor measures the armature current and converts it to syrup concentration.

Temperature has quite an effect on most syrup properties and viscosity is no exception. In the 45 to 95% range, the temperature effect is about 0.25 Brix/ $^{\circ}$ C. However in factory processing operations, temperatures are generally quite constant so infrequent manual adjustment by means of a calibrated dial on the monitor is adequate. However, automatic compensation for wide variations in temperature can be supplied in the form of a thermal element mounted in the syrup near the viscosity probe and electrically connected to the monitor.

Viscosity is a syrup property rarely used industrially for determining solids content, primarily because it is such a non-linear relationship. But the 971-C takes advantage of a unique principle used in our Model 970-C -- the probe gives an output that varies as the logarithm of viscosity over a range in excess of 100 to 1. The 971-C extracts a second logarithmic function to produce the linear concentration scale.

Viscosity has several advantages over other methods of measuring syrup concentration. To eliminate excessive errors, density methods require that material is thoroughly de-aerated before measurement. This can create intolerable time lag in control circuits. By contrast, the Model 971-C is hardly affected by the presence of entrained air bubbles and the high peripheral velocity of its rotor discourages scale accumulation.

The 971-C is only sensitive to a relatively thin syrup film in contact with the disc and is not affected by the direction or velocity of flow past it. In stagnant syrups, its rotation provides considerable agitation to mix stratified streams as found in syrups leaving evaporator bodies. Thus, it can be installed directly under an evaporator body and provide good average readings even under very low flow conditions with minimum measurement lag.

## SPECIFICATIONS

### SENSOR

Type	Insertion Probe
Rotor Size	3"
Wetted Parts	316 stainless steel, high temperature plastic
Process Temp.	32°F to 250°F (0°C to 125°C)
Pressure	0 to 30 psia
Water Supply	Less than 0.5 gallons/hour at 10 psi above process
Mounting	2" NPT male
Wiring	#22 AWG or larger 2-conductor
Dimensions	
Probe Diameter	1.75"
Probe Length	24"
Junction Box	6" x 6" x 6"

### TRANSMITTER

Display	3.5 digit LCD indicator (45.0 to 95.0 scale)
Range	45% to 95% sugar by weight (Brix)
Input	Model 971-C Sensor
Output	4 to 20 mA into 600 ohms max., other outputs available
Resolution	0.2% of full scale
Repeatability	1.0 % of full scale
Accuracy	2.0% of full scale
Ambient Temperature	32°F to 120°F (0°C to 50°C)
Enclosure	NEMA 1 or NEMA 4X
Dimensions	
NEMA 1	11" wide x 6" high x 4" deep
NEMA 4X	11.875" wide x 7.25" high x 6.75" deep
Mounting	
NEMA 1	Panel or wall mount
NEMA 4X	Wall or pipe mount
Power	115 or 230 VAC @ 50/60 Hz, 25 Watts
Shipping Weight	20 to 29 lbs. depending on options

## ZIEGLER & ASSOCIATES

11180 Ranchette Dr.  
Jackson CA 95642  
USA

Phone : 209-223-1090

Fax : 209-223-1090

Email: [info@zieglerassociates.com](mailto:info@zieglerassociates.com)

Web: [www.zieglerassociates.com](http://www.zieglerassociates.com)