ViscoSensor

(patent pending)

Series ViscoSensor

Multiple Possibilities

DYNISCO Polymer Test On-line is a world leader in the field of on-line rheological measurements for the plastics industry. Specifically designed for the thermoplastics resin industry, the ViscoSensor provides continuous measurements of the melt flow rate or apparent viscosity directly on the manufacturing process. The ViscoSensor system consists of two parts: a viscosensor, connected directly to the process, which samples, conditions, and measures the melt flow of the resin, and a VCU (ViscoSensor Control Unit) that controls the viscosensor test parameters (temperature, pressure, rate), provides outputs of computed results, and provides communications to an external distributed control system when required.

The ViscoSensor

The ViscoSensor employs a stacked



pair of metering pumps to isolate it from the process, to direct the molten polymer across a removable capillary, and to pump the molten polymer back into the process. A three wire platinum RTD is used to control and measure the temperature of the molten polymer. Two pressure transducers, mounted directly before and after the die, are used to capture the pressure drop across the capillary. A variable speed servomotor controls polymer flow rate. All sensor signals are collected and transmitted to the VCU. A unique (patent pending) annular transfer line conveys the test sample to and from the instrument.. This transfer design enables the ViscoSensor to be mounted to an existing single pressure port (M18 or equivalent) to simplify the installation process.

ViscoSensor Control Unit

The ViscoSensor Control Unit consists of a CPU, display with keypad, motor speed controller, power supplies and isolated I/O required to control all functions of the ViscoSensor. These electronics are housed in a NEMA 12 enclosure.

Features of the system

- Attaches to process using a single M18 or 3/4-24 pressure port
- Cost effective solution for on-line viscosity or melt index monitoring
- No waste stream, tested sample is returned to process
- On-line ASTM D1238 melt flow rate
- On-line apparent viscosities
- Replacable capillary
- Compact measuring head for close extruder connection: 8“ diameter by 17“ length
- Robust and precise pressure transducer for high accuracy
- Simple “in the field“ calibration
- Platinum RTD melt temperature sensor immersed in molten stream for accurate test temperature measurement

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Specifications ViscoSensor and VCU

Performance Specifications:

Melt Flow Index	0.1 – 1500 g/10 min
Viscosity Range	10 – 10^5 Pa s
Shear stress	3 – 800 KPa
Shear rate	0.1 – 4000 s^{-1} (standard die)
Dies	1 - 11mm 10 to 40:1 L/D
Temp. range	40 – 350°C
Pressure range	2 x 10^5 – 3.5 x 10^7 Pa
Metering pump	0.30 cm^3/rpm (standard)
Pump speed	3 – 75 rpm, servo motor, vector controlled

Measurement and Control Functions:

Test Modes

- Shear Stress Mode:
  - Setpoint: Pressure
  - Measurement: Melt Flow Index
- Shear Rate Mode:
  - Set point: Pump speed
  - Measurement: Apparent viscosity

Specifications:

Electr. Cabinet	NEMA 12 (IP 54)
CPU 80188	E-PROM Embedded Applications Program
Operator Interface	LCD display

Analog Outputs: (4-20mA standard)

Optional (any two)

- Melt Temperature
- Delta-Pressure
- Melt Flow Index
- Apparent Viscosity

Interface Requirements

- Single standard M18 pressure port required
- Other configurations possible
- Minimum polymer supply pressure of 1000 psi

Electrical Specification:

System voltage	230 VAC 50/60 HZ
Power	1500 W

Mechanical Specification:

Weight	35lbs
Height	17“
Diameter	8“
Mtg. configuration	Vertical (Stand for Horizontal)

Options

- Encoder for increased resolution
- RS232 / RS485 output
- 4 - 20 mA output (up to two, customer specified)
- Hook-up cables
- VCU stand
- ViscoSensor stand (for horizontal mounting only)

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