

Laboratory Capillary Rheometer

LCR7000/7001/7002 Series



Stocked, Distributed, and Supported by

SENSORS
INCORPORATED

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Features

- All digital calibration
- Increased speed and force range
- Advanced electronics and software enable up to 45 shear stress or shear rate data points per test
- Unique algorithms for polymer melt stability
- Bi-directional communications enable test parameters to be downloaded from the PC
- Multiple barrel heating zones and adaptive PID temperature control algorithm provide precise and uniform heat up to 430°C (500°C optional for Model 7000 and 7001 only)
- Precision servo-drive motor and transducers enable tight control of stress and rate mode tests
- Tungsten carbide dies and a hardened and honed tool steel barrel ensure long years of service
- LAB KARS, advanced rheology software

LAB KARS Features

- Bagley and Rabinowitsch Corrections
- Carreau, Modified Cross, Power Law and Polynomial curve fits
- Arrhenius Temperature fit
- Statistical error estimation
- Shear rate dependence
- Time at temperature relationship
- Critical shear stress
- Zero shear viscosity
- Intrinsic viscosity correlation

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Description

VERSATILE

The new LCR7000 Series Capillary Rheometers offer many new features and will meet the demands of a 24-hour-a-day shop floor operation while maintaining the highest possible level of accuracy, repeatability and sensitivity. The LCR series rheometers are versatile and easy to use yet they offer the most sophisticated materials characterization, data analysis, and reporting capabilities. The LCR series can be used with a standard load cell and a barrel mounted pressure transducer.

SOPHISTICATED SOFTWARE

LAB KARS ("Kayeness Advanced Rheology Software") is the most powerful and easy to use rheological Windows™-based software package available. Just a few of its easily useable features include: Bagley and Rabinowitsch Corrections plus power law, Carreau, Modified Cross and polynomial viscosity models. With this software users can merge multiple data files from shear stress, shear rate, or thermal stability tests. The resident KARS SQC module can be used to quickly identify viscosity variations in different lots of material. A program for the correlation of melt viscosity to intrinsic viscosity, for PET and Nylon, is also included.

REAL-TIME DISPLAY

In addition to all of its other powerful features LAB KARS for Windows™ provides a real time display of force or pressure versus time as a test progresses. This feature allows the operator to identify the steady state flow condition for the material. In addition, the presence of contamination, unmelted resin, or bubbles in the material may be identified from spikes in the force versus time curve.

Specifications

MODEL

LCR7000 LCR7000 capillary rheometer with load cell, with cleaning and operating tools and one tungsten carbide orifice

OPTIONS FOR SPECIAL REQUIREMENTS

A comprehensive list of optional features provides for the testing of a wide range of materials. These include:

Corrosion resistant alloy barrel for testing corrosive materials such as PVC
Tungsten carbide dies with a broad range of diameters and L/D ratios provide a wide range of measurement capability
Laser micrometer for accurate measurements of die swell as the extrudate exits the die

PHYSICAL SPECIFICATIONS

Standards DIN ISO 11433, DIN 53014, DIN 54811, ASTM D3835
Barrel $l = 7.0''$ (162mm)
 $\phi = 0.376'' \pm 0.0002''$ (9.55mm \pm 0.005mm)
Drive System DC Servomotor
Piston Speed 0.03 to 600mm/min
Dynamic Range 20,000:1
Testing Force 10 kN standard (resolution 0.2N), 15 kN (optional)
Force Measurement Load cell, barrel mounted pressure transducer (optional)
Dies Tungsten carbide capillary, many L/D ratios available
Die Swell Measurement Laser-Micrometer (optional)
Temperature Range up to 430°C Standard

Temperature Control 4-zone electric heater
Temperature Sensor 4-wire Platinum RTD
Temperature Control Adaptive PID-temperature-control-algorithm with 0.1°C resolution
Temperature Accuracy $\pm 0.2^\circ\text{C}$ at 0.50" (13mm)
Ambient Temperature 20 to 30°C
Relative Humidity 20% to 80%
Voltage 10% of Nominal Voltage
Power Supply 115/230Vac, 50/60Hz
Power Consumption 750W max, 200W typical
Data Processing System PC-based
System Software LAB KARS for Windows™ (Kayeness Advanced Rheology Software)

OPTIONS AND ACCESSORIES

D7052DS2 Laser micrometer die swell measuring system
GP8000C Personal computer with LAB KARS for Windows™ software installed
GP7984C Color printer
8052-155 Pressure transducer port cleaning kit
8052-97K Barrel cleaning kit – 110V
8052-97KE Barrel cleaning kit – 230V
GRAN High speed mini granulator
BTP1000A Barrel temperature calibration kit – 110V
BTP100AHV Barrel temperature calibration kit – 230V
8052-65BG Barrel bore verification kit
D7992 Electronic load cell calibration kit

Specifications

MODEL

LCR7001 LCR7001 capillary rheometer with load cell, barrel mounted pressure transducer and long barrel, includes cleaning and operating tools and three tungsten carbide orifices.

OPTIONS FOR SPECIAL REQUIREMENTS

A comprehensive list of optional features provides for the testing of a wide range of materials. These include:

Corrosion resistant alloy barrel for testing corrosive materials such as PVC

Tungsten carbide dies with a broad range of diameters and L/D ratios provide a wide range of measurement capability

Melt pressure transducer mounted just above the die, eliminates frictional and barrel pressure effects

Laser micrometer for accurate measurements of die swell as the extrudate exits the die

PHYSICAL SPECIFICATIONS

Standards DIN ISO 11433, DIN 53014, DIN 54811, ASTM D3835

Barrel $l = 7.88''$ (200mm)
 $\varnothing = 0.376'' \pm 0.0002''$ (9.55mm \pm 0.005mm)

Drive System DC Servomotor

Piston Speed 0.03 to 600mm/min

Dynamic Range 20,000:1

Testing Force 10 kN standard (resolution 0.2N), 15 kN (optional)

Force Measurement Load cell, barrel mounted pressure transducer (optional)

Dies Tungsten carbide capillary, many L/D ratios available

Die Swell Measurement Laser-Micrometer (optional)

Temperature Range up to 430°C Standard

Temperature Control 4-zone electric heater

Temperature Sensor 4-wire Platinum RTD

Temperature Control Adaptive PID-temperature-control-algorithm with 0.1°C resolution

Temperature Accuracy $\pm 0.2^\circ\text{C}$ at 0.50" (13mm)

Ambient Temperature 20 to 30°C

Relative Humidity 20% to 80%

Voltage 10% of Nominal Voltage

Power Supply 115/230Vac, 50/60Hz

Power Consumption 750W max, 200W typical

Data Processing System PC based

System Software LAB KARS for Windows™ (Kayeness Advanced Rheology Software)

OPTIONS AND ACCESSORIES

D7052DS2 Laser micrometer die swell measuring system

GP8000C Personal computer with LAB KARS for Windows™ software installed

GP7984C Color printer

8052-155 Pressure transducer port cleaning kit

8052-97K Barrel cleaning kit – 110V

8052-97KE Barrel cleaning kit – 230V

GRAN High speed mini granulator

BTP1000A Barrel temperature calibration kit – 110V

BTP100AHV Barrel temperature calibration kit – 230V

8052-65BG Barrel bore verification kit

D7992 Electronic load cell calibration kit

Specifications

MODEL

LCR7002 LCR7002 dual bore capillary rheometer with barrel mounted pressure transducers, cleaning and operating tools and four tungsten carbide dies

PHYSICAL SPECIFICATIONS

Standards DIN ISO 11433, DIN 53014, DIN 54811, ASTM D3835

Barrel Bores (2) $l = 7.88''$ (200mm)
 $\varnothing = 0.376'' \pm 0.0002''$ (9.55mm \pm 0.005mm)

Drive System DC Servomotor

Piston Speed 0.03 to 600mm/min

Dynamic Range 20,000:1

Testing Force 10 kN standard (resolution 0.2N) per bore

Force Measurement Barrel mounted pressure transducers (2)

Dies Tungsten carbide capillary, many L/D ratios available

Temperature Range up to 430°C Standard

Temperature Control 4-zone electric heater

Temperature Sensor 4-wire Platinum RTD

Temperature Control Adaptive PID-temperature-control-algorithm with 0.1°C resolution

Temperature Accuracy $\pm 0.2^\circ\text{C}$ at 13mm (0.50")

Ambient Temperature 20 to 30°C

Relative Humidity 20% to 80%

Voltage 10% of Nominal Voltage

Power Supply 115/230Vac, 50/60Hz

Power Consumption 750W max, 200W typical

Data Processing System PC-based

System Software LAB KARS for Windows™
 (Kayeness Advanced Rheology Software)

OPTIONS AND ACCESSORIES

GP8000C Personal computer with LAB KARS for Windows™ software installed

GP7984C Color printer

8052-155 Pressure transducer port cleaning kit

8052-97K Barrel cleaning kit – 110V

8052-97KE Barrel cleaning kit – 230V

GRAN High speed mini granulator

BTP1000A Barrel temperature calibration kit – 110V

BTP100AHV Barrel temperature calibration kit – 230V

8052-65BG Barrel bore verification kit

D7992 Electronic load cell calibration kit