

Thermoelectrically Cooled Cold-Cranking Simulators

CCS-2050



CCS-2100



 **CANNON**
INSTRUMENT COMPANY®

CANNON®



SAE J300 Test Equipment **CANNON® CCS-2100** Automatic Thermoelectrically-Cooled Cold-Cranking Simulator

ASTM D 5293, SAE J300



CANNON Thermoelectrically-Cooled Cold-Cranking Simulator

- **Cooled by Built-in Solid-State Thermoelectric Modules**
- **Powerful VISCPRO® for Windows® Software**
- **Fully Automatic Operation**
- **Improved Precision Over Earlier Models**

CANNON Thermoelectrically-Cooled Cold-Cranking Simulators measure the apparent viscosity of oils at temperatures from -35°C to -5°C within a viscosity range of 1500 mPa·s to 27,000 mPa·s. The CCS-2100 combines automatic sample loading, computer-controlled operation, and solvent-free cleaning to permit completely unattended operation. No further operator involvement is required after initial loading of the sample table and identification of samples. The CCS-2100 will automatically test up to 30 samples at one time, calculate their viscosities, and record the results, freeing the operator for other tasks. Improved temperature management of the rotor/stator eliminates the need for grouping the samples by temperature of analysis, as was necessary in older CCS models. In addition, a thermoelectric sample warming cycle greatly improves the sample flushing process. The CCS-2100 meets all the requirements of ASTM D 5293 and SAE J300.

The CCS-2100 consists of a patented thermoelectrically-cooled rotor/stator, a Sample Table with capacity for 30 oil samples, and an integral CCS Series II Controller. The rotor/stator cell is attached to a vacuum system and a metering constant-displacement injection pump. The rotor/stator cell is cleaned by purging the previously measured sample with a portion of new sample prior to measuring its viscosity. Purged sample is drawn into a waste receiver by the vacuum system. Rotor speed is measured by a high resolution digital encoder. A proprietary software program then converts this data to sample viscosity. Viscosity calculations are based on test data and rotor/stator

calibration information stored by the software. User interface options include an instrument calibration routine, configuration of test cycles, and multiple means of processing test data including save, print, and export via the RS-232 serial port for LIMS capture.

Required Accessories

A chiller capable of cooling water to 5°C is required. Supplied with the CCS-2100 is a Julabo FE500 Recirculating Cooler. The CCS requires a computer (not supplied) with the Windows XP or VISTA operating system. CANNON CL Standards (see table on page 4) provide certified dynamic viscosity data (in cP or mPa·s) at temperatures from -5°C to -35°C . These standards are used to calibrate the CANNON Cold-Cranking Simulator (CCS). See ASTM D 5293 and SAE Specification J300.

CCS-2100 Specifications (except for Waste Receiver)

Dimensions:	711 mm (28 inches) high x 333 mm (13-1/8 inches) wide x 645 mm (25-3/8 inches) deep (add at least 100 mm (4 inches) to depth for installation)
Weight:	46 kg (102 lbs.)
Shipping Weight:	Approximately 136 kg (300 lbs)
Electrical:	CCS-2100: 115 volts AC $\pm 10\%$, 60 Hz, 1000W CCS-2100F: 230 volts AC $\pm 10\%$, 50 Hz, 1000W
Operating Conditions:	15-30°C, 10%-90% RH non-condensing, Installation Category II, Pollution degree 2
Computer:	Computer not included. Please contact CANNON for specifications.
Compliance:	CE Mark: EMC directive(89/336/EEC); Low voltage directive (73/23/EEC); HI-POT (1900 VDC, 60 sec.)
Sample Volume:	40-50 mL required

Waste Receiver Specifications

Dimensions:	216 mm (8.5 inches) high x 267 mm (10.5 inches) x 305 mm (12 inches) deep
Weight:	8.2 kg (18 lbs)

Julabo® FE500 Recirculating Cooler Specifications

Dimensions:	572 mm (22.5 inches) high x 305 mm (14 inches) wide x 457 mm (18 inches) deep
Weight:	38.2 kg (84 lbs)
Working Temperature Range:	-20 to $+40^{\circ}\text{C}$
Display:	LED, actual/setpoint values
Display Resolution:	0.1°C
Temperature Setting:	Keypad
Safety:	Audible high/low temperature warning, freezing protection
Temperature Stability:	$\pm 0.5^{\circ}\text{C}$
Cooling Capability:	450 Watts @ 5°C

Order Information

Catalog #	Item Description
9728-E46	CCS-2100 Automatic CCS, 115V, 60Hz, 1000W
9728-E47	CCS-2100F Automatic CCS, 230V, 50/60Hz, 1000W

SAE J300 Test Equipment

CANNON® CCS-2050

Semi-Automatic Thermoelectrically-Cooled Cold-Cranking Simulator

ASTM D 5293, SAE J300



**CANNON Thermoelectrically-Cooled
Cold-Cranking Simulator**

- Cooled by Built-in Solid-State Thermoelectric Modules
- Improved Precision Over Earlier Models
- Semi-Automatic Operation (After Sample is Loaded No Further Operator Interaction Required)
- Extended Range – 1500 to 27,000 mPa·s (cP)
- Needs No Solvent Cleaning

CANNON Thermoelectrically-Cooled Cold-Cranking Simulators measure the apparent viscosity of oils at temperatures from -35°C to -5°C within a viscosity range of 1500 mPa·s to 27,000 mPa·s. The CCS-2050 speeds up a traditionally labor-intensive test procedure by computer control of instrument calibration, rotor speed sensing, test cycles, data calculation, and report generation. However, unlike the fully-automatic CCS-2100, the CCS-2050 requires that an operator be present to load each sample individually. Improved temperature management of the rotor/stator eliminates the need for grouping the samples by temperature of analysis, as was necessary in older CCS models. In addition, a thermoelectric sample warming cycle greatly improves the sample flushing process. A new type of sample holder eliminates the risk of spillage found in older models of the semi-automatic CCS. The CCS-2050 meets all the requirements of ASTM D 5293 and SAE J300.

The CCS-2050 consists of a patented thermoelectrically-cooled rotor/stator and an integral CCS Series II Controller. The rotor/stator cell is attached to a vacuum system and a metering constant-displacement injection pump. The rotor/stator cell is cleaned by purging the previously measured sample with a portion of new sample prior to measuring its viscosity. Purged sample is drawn

into a waste receiver by the vacuum system. Rotor speed is measured by a high resolution digital encoder. A proprietary software program then converts this data to sample viscosity. Viscosity calculations are based on test data and rotor/stator calibration information stored by the software. User interface options include an instrument calibration routine, configuration of test cycles, and multiple means of processing test data including save, print, and export via the RS-232 serial port for LIMS capture.

Required Accessories

A chiller capable of cooling water to 5°C is required. Supplied with the CCS-2050 is a Julabo FE500 Recirculating Cooler (see specifications on page 2). The CCS requires a computer (not supplied) with the Windows XP or VISTA operating system.

Mini-Volume Sample Injection Kit for the CCS-2050

While CCS instruments normally require 40-50 mL of sample for a test, this kit allows a CCS measurement to be made on as little as 5 to 10 mL of sample. A Luer-Lok® adapter and syringe (and associated fittings) enable users of the CCS-2050 to manually inject a small amount of sample. A switch allows the injection pump to be temporarily bypassed while the manual injection is made.

CCS-2050 Specifications (except for Waste Receiver)

Dimensions:	711 mm (28 inches) high x 333 mm (13-1/8 inches) wide x 645 mm (25-3/8 inches) deep (add at least 100 mm (4 inches) to depth for installation)
Weight:	40 kg (88 lbs.)
Shipping Weight:	Approximately 120.5 kg (265 lbs)
Electrical:	CCS-2050: 115 volts AC $\pm 10\%$, 60 Hz, 1000W CCS-2050F: 230 volts AC $\pm 10\%$, 50 Hz, 1000W
Operating Conditions:	15-30°C, 10%-90% RH non-condensing, Installation Category II, Pollution degree 2
Computer:	Computer not included. Please contact CANNON for specifications.
Compliance:	CE Mark: EMC directive(89/336/EEC); Low voltage directive (73/23/EEC); HI-POT (1900 VDC, 60 sec.)

Waste Receiver Specifications

Dimensions:	216 mm (8.5 inches) high x 267 mm (10.5 inches) x 305 mm (12 inches) deep
Weight:	8.2 kg (18 lbs)

Order Information

Catalog #	Item Description
9728-E42	CCS-2050 Semi-Automatic CCS, 115V, 60Hz, 1000W
9728-E43	CCS-2050F Semi-Automatic CCS, 230V, 50/60Hz, 1000W



SAE J300 Test Equipment
CANNON® CCS Viscosity Standards

Dynamic Viscosity in mPas (Centipoise)								
Catalog Number	Viscosity Standard*	-5°C	-10°C	-15°C	-20°C	-25°C	-30°C	-35°C
9727-N02	CL080	—	—	—	—	—	—	800
9727-N04	CL090	—	—	—	—	—	—	1200
9727-N06	CL100 (CL10)	—	—	—	—	—	900	1700
9727-N07	CL110	—	—	—	—	—	1400	2500
9727-N08	CL120 (CL12)	—	—	—	—	800	1600	3200
9727-N09	CL130	—	—	—	—	1500	2700	4800
9727-N10	CL140 (CL14)	—	—	—	800	1600	3300	7000
9727-N11	CL150	—	—	—	1200	2500	4500	8000
9727-N12	CL160 (CL16)	—	—	—	1200	2500	5500	11000
9727-N13	CL170	—	—	1100	1800	3500	6200	11000
9727-N14	CL190 (CL19)	—	—	900	1800	3500	7400	17200
9727-N16	CL200	—	—	1200	2400	4300	7400	13000
9727-N18	CL220 (CL22)	—	—	1300	2500	5000	11000	25000
9727-N20	CL240	—	—	1700	3400	6000	10000	20000
9727-N22	CL250 (CL25)	—	900	1800	3500	7300	15900	33000
9727-N24	CL260	—	1200	2500	4400	7200	14000	—
9727-N26	CL280 (CL28)	—	1300	2500	5000	9300	21000	50000
9727-N28	CL300	—	1700	3500	6000	11000	18000	—
9727-N30	CL320 (CL32)	—	1800	3500	7300	15900	32000	—
9727-N31	CL340	—	2500	4200	7000	12000	—	—
9727-N32	CL380 (CL38)	1600	2900	5800	13000	26000	—	—
9727-N33	CL420	—	5000	8500	15000	—	—	—
9727-N34	CL480 (CL48)	2300	4500	9500	21000	—	—	—
9727-N35	CL530	—	5900	10000	18000	—	—	—
9727-N36	CL600 (CL60)	3700	7300	15600	—	—	—	—
9727-N37	CL680	—	9500	—	—	—	—	—
9727-N38	CL740 (CL74)	6000	12000	—	—	—	—	—
9727-N43	Set of 14	Set of CCS-2050/2100 Low Temp Standards (includes CL10, CL12, CL14, CL16, CL19, CL22, CL25(2), CL28, CL32, CL38, CL48, CL60, & CL74)						
9727-N42	Set of 8	Set of CCS Low Temp Standards (includes CL14, CL19, CL22, CL25, CL28, CL32, CL48, & CL74)						

CL Standards nomenclature has changed. The previous standard names are indicated in parentheses.



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