

Diagnostic Tools

Electrical Tools	1-3
Tools for Electronic Engines.....	1-61
Engine Tools	1-93
Flow Tools	1-118
Measuring Tools	1-127
Paving Products.....	1-143
Power Train Tools.....	1-145
Speed Measuring Tools.....	1-155
Temperature Measuring Tools	1-164
General Diagnostic Tools.....	1-177

Electrical Tools

368-9910 Multi-Tool Group, Phase 3

Model: All

Warranty: One Year

European Union compliant, CE marked

Step 1. Order the basic multi-tool group

- Replaces 9 separate diagnostic tools in 1 multi-function unit (8T-1000 Position Indicator Group, discontinued 8T-2700 Blowby/Air Flow Indicator Group, discontinued 8T-5200 Signal Generator/Counter Group, 8T-5300 Engine Timing Indicator Group, 9U-7400, 9U-7401, 9U-7402 Multitach II, pressure, and burn rate computer)
- Reduces dealer cost by combining 9 tools into one; also provides greater convenience for technician
- Used as a blowby/airflow indicator, signal generator and counter, electronic position indicator, engine timing indicator, multi-tachometer, thermometer, fuel monitor, pressure gage, and flow computer
- Provides technician with a hand-held unit with multiple diagnostic tools using a menu-driven display
- Ergonomic design has large, dual control buttons for ease of use even with gloved hands
- Large, color display is easily readable even in bright sunlight conditions
- Diagnostic Interface Module (DIM) plugs into multi-tool to adapt existing diagnostic sensors and cables
- Multi-tool uses many of the same cables and adapters used by existing tools (for this reason, purchase of new cables and adapters may not be required)
- Once a Diagnostic Interface Module (DIM) is used with a multi-tool, it should remain in use with only that multi-tool (interchanging DIM units and multi-tool units is not recommended without sending both units to the factory for calibration)
- For identification purposes, corresponding serial numbers are printed on the back of each DIM
- Modular design allows additional functions to be added as new software becomes available
- All applications are activated and ready to use
- An internal battery, universal AC power supply, and DC cable for vehicle battery power provides 3 options for supplying power
- 4 AC power cords are included for worldwide use

368-9910 Multi-Tool Group, Phase 3 Includes:
Carrying Case
NEHS1087 Tool Operating Manual

368-9910 Multi-Tool Group, Phase 3	
Part Number	Description
285-0896	5 Pin DIN Adapter (gender changer)
285-0903	Cable Assembly with Ground Clip (used with 285-0900 Small Blowby Tool Group)
285-0904	Battery DC Power Cable Assembly (9-32 VDC)
285-0905	Battery Pack (NiMH, 9.6 VDC)
285-0906	Universal AC/DC Power Supply with 4 International Power Cords (90 - 240 VAC)
285-0907	Diagnostic Interface Module (DIM)
285-0908	Multi-Tool
368-9910	Multi-tool Group

Step 2. Order the sensors for the desired tool functionalities

Blowby/Airflow Indicator

- Allows technician to measure volume of blowby gases released through crankcase breather or air velocity through a component, such as a radiator core
- Blowby measurements provide helpful information when planning engine repairs
- Airflow measurements identify plugged or partially restricted areas
- Large blowby group checks blowby on 3500 Series and 3600 Series Engines, including ACERT™ models as well as on larger 300 Series Engines

(Continued)

Step 2. Order the sensors for the desired tool functionalities (Continued)

- Small blowby group works on engines smaller than 3500 Series Engines and smaller 300 Series Engines
- Displays blowby and airflow, strip charts, and maximum and minimum values with differences
- Sample rate is adjustable
- Select SAE or metric units
- Print screen capability
- Six language support: English, French, German, Italian, Portuguese, Spanish

Signal Generator Group with Counter

- Used to simulate signal from a magnetic speed pickup for troubleshooting electronic controls for transmissions, as a frequency counter for pulsating AC or DC input, and for calibration of a number of electronic diagnostic tools
- Allows technician to make frequency and amplitude adjustments simply by pushing a button
- 285-0896 Five-Pin DIN Adapter, part of basic group, must be used to connect generator group cables to diagnostic interface module
- Print screen capability
- Six language support: English, French, German, Italian, Portuguese, Spanish

Engine Timing Indicator

- Allows technician to measure an engines fuel injection timing
- During timing test, multi-tool will chart engine RPMs vs degrees on built-in display
- For diesel engines, multi-tool must be used with existing 8T-5301 Engine Timing Diesel Group and 285-0897 Engine Timing Pickup Group
- Checks engine timing on natural gas engines using 6V-9060 Engine Timing Gas Group and 285-0897 Engine Timing Pickup Group
- Also checks automatic timing advance unit on engines so equipped
- Print screen capability
- Six language support: English, French, German, Italian, Portuguese, Spanish

Electronic Position Indicator (Upgraded)

- Replaces mechanical dial indicators in applications where they cannot be used, such as rack measurements on an operating engine or any other rapidly changing dynamic reading
- Simultaneously displays displacement, a strip chart, and maximum and minimum values with differences
- Select SAE or metric units
- Sample rate is adjustable
- Print screen capability
- Six language support: English, French, German, Italian, Portuguese, Spanish
- 4 Channels
- Record and Playback

Multitach II

- Simultaneously displays 4 channels, strip charts, minimum and maximum values at once
- Analog gauge or digital display graphic
- Set point indicator measurement
- Print screen capability
- Create channel labels
- Six language support: English, French, German, Italian, Portuguese, Spanish

Digital Thermometer

- Simultaneously displays 4 channels, strip charts, minimum and maximum values at once
- Analog gauge or digital display graphic
- Two differential measurements
- Bias out small differences between channels
- Print screen capability
- Create channel labels
- Select SAE or metric units
- Six language support: English, French, German, Italian, Portuguese, Spanish

Fuel Flow Monitor

- Simultaneously displays 2 engines (4 flow meters), burn rate, supply flow, return flow, total, grand total, time, average, windowed average, burn rate, and strip chart
- Sample rate is adjustable: slow, medium, normal
- Print screen capability

(Continued)

Step 2. Order the sensors for the desired tool functionalities (Continued)

- Create channel labels
- Select SAE or metric units
- Run time, elapsed time mode
- Works with new 308-7271 Dual Turbine Flow Meter Group
- Works with 179-0710 Burn Rate Group (6V-2198 Cable required)
- Works with discontinued 154-8103, 154-8104, 168-7735, and 168-7745 Gear Meters (FT3098 Cable required)
- Six language support: English, French, German, Italian, Portuguese, Spanish

Burn Rate Computer

- Replaces 179-0701 Burn Computer
- Replaces 154-8106 Display
- Print Screen
- Create channel label
- SAE or metric
- Six languages

Pressure

- 3 pressure pickups with couplers 500; 6,000; 10,000 PSI
- Analog/Digital Display
- Two differential measurements
- Print screen
- Create channel labels
- Select SAE or metric
- Six languages

Sensor and Cable Groups Used with Multi-Tool	
Part Number	Description
285-0897 Engine Timing Pickup Group	
5P-7362	Cable Assembly - Signal TDC
6V-2197	Transducer - Magnetic TDC Pickup 114 mm (4.5 in) long
6V-2199	Adapter - Transducer, 1/8 in NPTF
6V-3093	Adapter - Transducer, 1/4 in NPTF
8T-5184	Transducer - Magnetic TDC Pickup 8.9 cm (3.5 in) long
8T-5185	Transducer - Magnetic 17.8 cm (7.0 in) long
6V-9060 Gas Engine Timing Adapter Group¹	
1U-5524	Cable As. - Spark Timing Adapter
8T-5258	Cable - Coil Adapter
8T-5301 Diesel Engine Timing Adapter Group²	
5P-7435	Adapter Group - Tee
5P-7436	Adapter
5P-7437	Adapter
6V-2198	Extension Cable (X8)
6V-3016	Washer
285-0898 Electronic Position Indicator Group (also part of 8T-1000 Electronic Position Indicator Group)	
6V-6042	Point Group - Contact
8T-1002	Position Probe (X4)
6V-2198	Extension Cable (X8)

Sensor and Cable Groups Used with Multi-Tool	
Part Number	Description
285-0899 Signal Generator Cable Group (also part of discontinued 8T-5200 Signal Generator/Counter Group)	
8T-5112	Signal Input Cable
8T-5197	Calibrator Cable and Adapters
8T-5198	Transmission Adapter Cable
6V-2198	Extension Cable (X8)
285-0900 Blowby Tool Group (Small Engine) (also part of discontinued 8T-2700 Blowby/Airflow Group)³	
285-0903	Cable Assembly with Ground Clip (used with 285-0900 Small Blowby Tool Group)
8T-2685	Pickup - Blowby (1,000 CFH)
285-0901 Blowby Tool Group (Large Engine)⁴	
9M-0164	Clamps - Nose
368-9911 Burn Rate Group	
4C-9660	Carry Case
179-0706	Foam Insert
154-8099	Lid Foam Insert
179-0705	Hose Group
362-9907	Optional 12 to 24 VDC Invertor
362-9913	Meter Cable
368-9914 Pressure Group	
6V-2198	Extension Cable (X8)
376-4170	500 PSI (X1)
376-4171	6,000 PSI (X2)
376-4172	10,000 PSI (X1)

Diagnostic Tools

(Continued)

Step 2. Order the sensors for the desired tool functionalities (Continued)

Sensor and Cable Groups Used with Multi-Tool	
Part Number	Description
390-7879 Ball Stud Measurement Group	
4C-9656	Pelican Case™
067-6809	Hex Bolt 3/8 x 5/8 (X4)
8T-1002	Position Probe (X4)
5P-4162	Contact Point (X4)
6V-2198	Extension Cable (X8)
390-7875	Magnetic Squaring Wedge
390-7876	Magnetic Base (X4)
390-7877	Probe Bracket (X4)
390-7878	Foam
5P-7590	Socket Screws 6-32 (X4)
308-7265 Multitach 2 Photo Group	
1U-6605	Retro-Reflective Tape, 12.5 mm (0.5 in) x 1.5 m (5.0 ft) long
6V-3137	Magnetic Mounting Base for 9U-5140
6V-3138	Extension Rod for 6V-3137
9U-5140	Pickup - LED Photo
6V-2198	Extension Cable (X8)
308-7264 Multitach 2 Group	
9U-5140	Pickup - LED Photo
1U-6605	Retro-Reflective Tape, 12.5 mm (0.5 in) x 1.5 m (5.0 ft) long
6V-3138	Extension Rod for 6V-3137
9U-7506	Magnetic Adapter Cable (required for TDC Sensors)
1P-7446	Rack Cable
5P-1759	Tachometer Drive Group (additional parts in accessory case)

Sensor and Cable Groups Used with Multi-Tool	
Part Number	Description
308-7264 Multitach 2 Group (Continued)	
5P-7360	Tach Generator (20-tooth internal gear)
8T-5111	Cable As. - Rack Adapter
6V-2198	Extension Cable (X8)
6V-3137	Magnetic Mounting Base for 9U-5140
308-7267 Digital Thermometer Group	
6V-2198	Extension Cable (X8)
4C-4545	Adapter Group , 3/4 in O-ring
4C-4547	Adapter Group , 1/2 in O-ring
4C-6264	Probe - RTD 25.4 mm (1 in) long, 3.2 mm (0.125 in) diameter
4C-6265	Probe - RTD 38.1 mm (1.5 in) long, 3.2 mm (0.125 in) diameter
4C-6266	Probe - RTD 63.5 mm (2.5 in) long, 3.2 mm (0.125 in) diameter
4C-6268	Exhaust Probe RTD
5P-2720	Adapter Group - Probe, 1/8 in NPT
5P-2725	Adapter Group - Probe, 1/4 in NPT
5P-3591	Adapter Group - Probe, 9/16 in O-ring
308-7275 Hose Group (optional)	
285-0902	Accessory Case (for cables and sensors [not included])
308-7269 Accessory Case	
308-7269	Accessory Case (not included)

Diagnostic Tools

¹ Includes: Fiber Optic Receiver (not serviced), Fiber Optic Transmitter (not serviced), Fiber Optic Cable (not serviced)

² Includes: Injection Timing Transducer Assembly(not serviced)

³ Includes: Bushing and Hose Group

⁴ Includes: Blowby Probe (4,000 Cf/h maximum) and Blowby Hose (large engine)

308-7271 Fuel Flow Group



308-7271 Fuel Flow Group

(Continued)

308-7271 Fuel Flow Group (Continued)

Part Number	Description
308-7271	Fuel Flow Group
308-7273	Dual Turbine Mtr (2 meters)
308-7274	Cable din to Mtr (2 cables)
6V-3073	Case - Plastic

Step 3. Order the accessory case

- 285-0902 Accessory Case holds and protects all cables and sensors that are required for all blowby/airflow indicator, signal generator group, engine timing indicator, and electronic position indicator only
- 308-7269 Accessory Case offers convenience of storing all cables, probes, and adapters for all seven applications at a lower cost



285-0902 Accessory Case



308-7269 Accessory Case

References

NEHS1087, Tool Operating Manual, 348-5430 Multi-Tool Group
 NEHS0605, Tool Operating Manual, 9U-7400, 9U-7401, and 9U-7402 Multitach II
 SEHS8580, Special Instruction, Information and Use of 8T-5300 Engine Timing Group
 SEHS8579, Special Instruction, Use of 8T-5200 Signal Generator/Counter Group
 SEHS8623, Special Instruction, Using the 8T-1000 Position Indicator Group
 NEHS0776, 179-0710 Burn Rate Group

Repair Information

SPX Service Repair
 755 Eisenhower Drive
 Owatonna, MN 55060
 Attn: Repair Department
 Phone: 800-344-4013

Visit the SPX Repair Track web link to complete and submit the form for proper authorization: <https://repairtrack.spx.com>

The 308-7271 Fuel Flow Meter should have the calibration checked annually. ATS (Advanced Technology Service) can provide this service. If recalibration is required, the fuel flow meters should be returned to Flow Dynamics, the supplier. Recalibration is required if the flow meter has been physically damaged. Improper storage and contamination in the fuel can lead to physical damage to the flow meter.

Step 5. Memory Card

- Multi-tool software upgrades are available by ordering compact flash memory cards preloaded with software
- The flash memory cards are available by ordering the appropriate part number
- The card is permanently inserted into the multi-tool CF slot
- Phase I, 285-0910 Multi-Tool requires factory calibration before upgrade



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Step 5. Memory Card (Continued)

Multi-Tool Specifications with DIM (Diagnostic Interface Module)	
Global AC input voltage	90 to 240 VAC (50 to 60 Hz)
Vehicle DC input voltage	9 to 36 VDC (must use 285-0904) ¹
Internal battery voltage	9.6 V (2300 mA hr)
Battery operating time	Approximately 2 hours (dependent on sensor current draw)
Output voltages (sensor power)	5 VDC @ 140 mA (total current 4 channels)
	8 VDC @ 160 mA
	12 VDC @ 500 mA
Operating temperature	0° to 50° C (32° to 122° F)
Storage temperature	-20° to 70° C (-4° to 158° F)
Analog voltage	± 100 V maximum input
Signal frequency	10 Hz - 100 kHz maximum input, 0.1 to 50 V, Sine Wave
Input impedance	> 500k ohms
Display	320 x 240 LCD, color
Output frequency	1Hz to 100 kHz
Frequency outputs	0 - 8 V, ± 4 V, ± 1.5 V
Frequency output current	10 mA sink and source
¹ 285-0904 DC Cable has a switching power supply to isolate and protect the multi-tool from harmful voltage transients	
Part No.	Tool Function Description
386-5908	CF Memory Card upgrade for phase 3
	Multi-language (English, Spanish, French, German, Italian, and Portuguese) for blowby/airflow, signal enerator/counter, position indicator, upgrade engine timing indicator
	Multitach 2, Digital Thermometer, Fuel Monitor (Phase 2), Burn rate computer, Pressure

Memory Card Usage

Instructions for returning the multi-tool for re-calibration to the supplier:

1. Wrap the Multi-Tool and DIM in a cushion-type packaging material, such as Bubble Wrap®.
2. Include the following information with the Multi-tool and DIM:

- Company Name
- Contact Name
- Return Address
- Service Description (Calibrate for Digital Thermometer Application)
- E-mail Address
- Telephone Number
- Dealer Name

3. Properly package the Multi-Tool, DIM, and information and send to:

SPX Service Repair
 755 Eisenhower Drive
 Owatonna, MN 55060 USA
 Phone: 800-344-4013

Visit the SPX Repair Track web link to complete and submit the form for proper authorization: <https://repairtrack.spx.com>

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Memory Card Usage (Continued)

Upon receipt, Recalibration Service will contact you for credit card payment information. Caterpillar® will pay for the calibration. The dealer is responsible for shipping and handling fees. Allow about three weeks for calibration service and shipping. For status requests, contact Teleperformance at USA 1-800-344-4013. This program will end June 1, 2010.

225-8266 Clamp On Ammeter

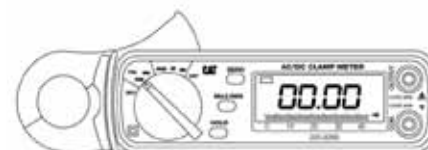
SMCS Code: 1400-038, 1400-081, 1450-038

Model: All

Warranty: Manufacturer's One Year

European Union compliant, CE marked

- Used to measure AC or DC current
- Compact size and low cost make this unit indispensable
- Clamp-on probe replaces standard test leads (allows current measurements without breaking circuit)
- Measures current in cables up to 23 mm (0.9 in) diameter
- User selectable 400 amp and 1200 amp scales for both AC and DC
- Powered by two 1U-9533 AA Alkaline Batteries
- Designed with a built-in display, push button zero control for DC operation, "display hold" to freeze display, "max/min recording" to display highest and lowest readings, auto power-off (unit turns off automatically after 30 minutes), and low battery indicator
- Shipped with batteries, carrying case, and users guide



Repair Information

Extech Instruments

9 Townsend West

Nashua, NH 03061

Phone: (781) 890-7440, ext: 220

Fax: (781) 890-7864

Email: repair@extech.com

Weight	190 g (6.7 oz)
Overall size	183 x 61 x 36 mm (7.2 x 2.5 x 1.4 in)
Resolution	1 A

Part Number	Description
225-8266	Clamp On Ammeter (400, 1200 A ranges)
Service/Repair Parts	
1U-9533	AA Alkaline Battery , non-rechargeable, package qty 96 (5 required to power Indicator III)
6V-6014	Cable

349-4205 Voltage Detector

SMCS Code: 1400-038, 1400-081

Model: All

Warranty: Manufacturers Two Year



European Union compliant, CE marked

- Used to quickly test for energized circuits (just touch tip to a terminal strip, outlet, or supply cord)
- Senses steady state electrostatic field produced by AC Voltage even through wire insulation (does not require contact with bare conductor)
- Tip will glow red if voltage is detected (high intensity red LED)
- An optional beeping noise also indicates presence of voltage (feature can be switched OFF)
- Safety rating of CAT IV, 1000 V for added protection
- Requires two AAA alkaline batteries (included)
- Press "Battery Check Button" to determine if batteries are good (if tip glows, batteries are good)
- Each unit is supplied with a manufacturers operating instruction sheet

Operating range	90 V AC to 1000 V AC
Operating temperature	-10 to 50° C (14 to 122° F)
Operating altitude	3000 M (9850 ft)
Voltage sensing range	90 to 1000 V AC; 45 to 405 Hz

Part Number	Description
349-4205	Voltage Detector

349-4199 AC/DC Probe (1000 Amp)

SMCS Code: 1400-038, 1400-081

Model: All

Warranty: Manufacturers One Year



European Union compliant, CE marked

- Used to measure AC or DC current
- Used with standard digital multimeter, recorders, digital or analog meters, data loggers/DAS, oscilloscopes, or other test and measurement instruments
- Converts high-current to a low level millivolt signal for input directly into a test instrument
- On/Off switch with red LED is illuminated when in On position
- Low battery voltage indicated by flashing LED
- Zero adjustment knob (adjust output voltage to zero by depressing thumbwheel and rotating)
- Current range selection switch for 200A or 1000A
- Includes carrying case, attached leads, and users manual

Maximum conductor size	31 mm (1.2 in)
Lead length	1.5 m (59 in)
Meter input impedance	10 k Ohms minimum and 100 pF maximum
Current ranges	200A and 1000A DC and AC peak
Overall accuracy	±1% of reading ± 0.5A
Operating temperature	0 to 50° C (32 to 122° F)
Power	9 V battery, NEDA 1604, JIS 006P, IEC 6F22
Battery life	50 hours (alkaline)
Weight	295 g (10 oz)
Size	55 x 220 x 30 mm (2.2 x 8.6 x 1.2 in)

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349-4199 AC/DC Probe (1000 Amp) (Continued)

SMCS Code: 1400-038, 1400-081

Model: All

Warranty: Manufacturers One Year

Part Number	Description
349-4199	AC/DC Probe (1000 Amp)

271-8590 24-Volt Analyzer Group

Model: All

Warranty: Manufacturer's

European Union compliant, CE marked

- Used to perform battery, electrical system, and diode tests
- Used with 225-8266 Amp Probe and 271-8585 Printer
- Used on 12 and 24 volt electrical systems (digital circuitry accurately controls testing — requires minimal interaction)
- Hand-held
- Large, backlit display requires less scrolling, provides more information
- Long 4.6 m (15.0 ft) cables allow operator to perform tests from cab of machine
- Step-by-step instructions quickly and easily guide technician through tests
- Tests flooded lead acid and absorbed glass mat (AGM) batteries with 50 to 4000 Cold Cranking Amp (CCA), Cranking Amp (CA), Amp Hours (A-HR), Japanese Industrial Standard (JIS), or German-Deutsche Industry Norm (DIN) capacity ratings
- Tests battery pack configurations, through algorithm design:
 - single battery, 6- or 12-volt
 - 2 batteries in series, 24-volt
 - 2, 3, or 4 batteries in parallel, 12-volt
 - 2 banks in parallel, each bank with batteries in series, 24-volt
- Internal resistance loads are applied for all configurations
- Amp clamp connections allow use of optional amp clamp cables for current drain and starting/charging tests
- Features infrared communications compatibility for optional wireless printer with user defined header and footer for custom printouts
- PC interface port allows unit updates as new software is released — download software for new battery types, system updates, and features
- Ergonomically designed over-molded surround with soft-touch keys for easy operation while wearing gloves during cold weather
- Security cable connection tethers tool in order to prevent drops or for security purposes
- Includes 24-volt analyzer, test cables, battery terminal adapters, manual, and case with foam insert



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271-8590 24-Volt Analyzer Group (Continued)

Model: All

Warranty: Manufacturer's

Repair Information

The unit is warranted by the manufacturer for 3 years from the date of receipt. Cables are warranted for 90 days from the date of receipt. If the unit needs servicing, contact the manufacturer's repair facility.

SPX Service Repair

755 Eisenhower Drive

Owatonna, MN 55060

Attn: Repair Department

Phone: 800-344-4013

Visit the SPX Repair Track web link to complete and submit the form for proper authorization: <https://repairtrack.spx.com>

Reference

NEHS0973, Tool Operating Manual, 271-8590 Analyzer Group (24 Volt)

Item	Description
Battery tests	Flooded lead acid (FLA) absorbed glass mat (AGM)
Cold cranking amp range	50 - 4000 CCA / 24 V
Battery voltage	Single, series, or parallel to 24 V
Electrical system tests	12 and 24 V, starting/charging/diode test
Scales	CCA, CA, AHR, MCA, JIS, DIN
PC interface	For field software updates
IR compatible	For optional infrared wireless printer
Amp clamp ports	For optional amp clamp connections
Display	Backlit 4 x 20 character display

Part Number	Description
271-8590	24-Volt Analyzer Group
Replacement Parts	
271-8587	Test cables, 4.6 m (15 ft)
281-1947	Rechargeable Battery
281-1950	Carrying Case with Foam Insert
271-8589	Analyzer Only

Part Number	Description
Optional Accessories	
225-8266	Clamp On Ammeter (400, 1200 A ranges)
271-8585	Optional Printer Group
281-1948	Printer Serial Cable
184-7679	Paper - Roll

177-2330 Digital Battery Analyzer

SMCS Code: 1401-081, 0785

Model: All

Warranty: One Year

- Replaces 127-8078 Battery Analyzer
- Used to quickly and accurately test condition of 6 and 12 volt batteries (even discharged to as low as 4 volt)
- Check for full state charge, condition of battery, and battery voltage in 20 seconds
- Test batteries in machine or vehicle without disconnecting battery cables
- Battery does not have to be fully charged at time of testing
- Saves time and money by allowing dealers to test condition of a battery while customer is present (works great for warranty claims)
- Eliminates need to charge and discharge a battery to test its condition
- Compensates for cold temperatures when testing batteries in extreme conditions
- Power-down feature prolongs battery life in analyzer
- Analyzer has reverse polarity and is protected to 17 volts maximum



References

NEHS0764, Tool Operating Manual, Using the 177-2330 Battery Analyzer

Battery rating range:	
Cold cranking amps (CCA)	50 - 4000
Cranking amps (CA)	65 - 5000
Ampere hours (A h)	6 - 500
DC voltmeter range	1.0 - 14 V
Voltmeter accuracy	±0.1 V
Power source	9 V battery or test battery
Test time	20 seconds
Analyzer cable length	815 mm (32 in)
Overall size	210 x 140 x 38 mm (8.25 x 5.5 x 1.5 in)
Weight	0.68 kg (1.5 lb)
Operating temperature range	0° to 50° C (32° to 120° F)
Storage temperature range	-20° to 70° C (0° to 160° F)
Over voltage protection	Up to 18 V

Part Number	Description
177-2330	Digital Battery Analyzer

4C-4911 Battery Load Tester

SMCS Code: 1401-081, 0785

Model: All Models

Warranty: One Year

- Used to test 6, 8 and 12 volt heavy equipment and automotive batteries
- Has built-in LCD digital voltmeter and ammeter
- Load adjustment knob for current drawn from battery to be adjusted up to maximum of 1000 amperes
- Cooled by internal fan automatically activated when load applied to prevent carbon pile overheating
- Large, 15 mm (0.59 in) high display digits are easier to read



Reference

SEHS9249, Special Instruction

(Continued)

4C-4911 Battery Load Tester (Continued)

SMCS Code: 1401-081, 0785

Model: All Models

Warranty: One Year

Load test	6, 8 and 12 V batteries
Load current	0 - 1000 A (carbon pile)
Duty cycle	Continuous, limited only by cable and clamp heating
Operating temperature	0° - 50° C (32° ± 122° F)
Voltmeter accuracy	0.1% of full scale ± 1 digit
Ammeter accuracy	±3% of reading ± 1 digit
Size	33 x 33 x 30 cm (13 x 13 x 12 in)
Weight	12.428 kg (27.375 lb)

Part Number	Description
4C-4911	Battery Load Tester

372-5253 Battery Tester with Expansion Capabilities

Model Usage: CT660 Truck

Warranty: Manufacturer's

- Used to test batteries in multi-battery vehicles
- Test up to 6 batteries in parallel without disconnecting
- Test 6 and 12V batteries, group 31 and commercial batteries, AGM and Gel, test 12 and 24V starting and charging systems
- Cable-drop test simultaneously calculates voltage drop across positive and negative sides of any circuit and total circuit drop without running engine
- Digital multi-meter capabilities with scope and infrared temperature readings
- Displays voltage, measured CCA, battery, starting and charging system condition, SD memory card capable for record keeping, data transfer, and software upgrades.
- Recall last test on screen or print to optional printer

Specifications	
Dimensions	9.5 x 4 x 2.5 in
Weight	0.43 kg

Part Number	Description
372-5253	Battery Tester with Expansion Capabilities



8T-0500 Continuity Testing Light

SMCS Code: 1000-017, 1000-025, 1250-025, 1250-036, 1355-081, 1400-038, 3071-017, 3100-017, 3156-010, 3156-012, 3200-038, 3224-025, 4208-010, 5050-038, 7400-036, 7451-038, 7401-045

Model: All Models

Warranty: One Year

- Used to test non-energized circuits; lamp comes on brightly when connected across low resistance circuit; no light appears if resistance of circuit exceeds 10 ohms
- Designed for rugged field use
- Comes with light bulb and 2 "N" size batteries (1.5 volts) and instruction decals

Reference

NEHS0543, Special Instruction, Checking Diodes



Part Number	Description
8T-0500	Light - Continuity Testing
Service/Repair Parts	
4C-8363	Battery, Size N, 1.5 V
6V-3061	Bulb

5P-7277 Voltage Tester

SMCS Code: 1400-038, 1400-081, 1450-081, 1700-081, 1800-081, 3168-035, 5050-081, 7300-081, 7400-081, 7451-038

Model: 215, 428, 621E, 627E, 768C, 769C, 793 All models

Warranty: One Year

- Used to make quick checks for presence of voltage
- Indispensable for checking out circuits, relays, bulbs, wires, and switches
- Designed for voltage range from 12 to 36 volts
- Bulb lights brightly when connected to 36 volts and gets progressively dimmer with lower voltages
- Encased in rugged, high-impact plastic housing which is grease and chemical resistant
- Standard 8D-1429 Bulb required for replacement



Part Number	Description
5P-7277	Voltage Tester

197-7875 Lock Removal Tool

197-7876 Connector Removal Tool

SMCS Code: 1800-0776

Model: All

Warranty: Six Months

- Used to service Cat® fuse blocks using mini-fuses (GM style)
- 197-7875 used to remove fuse block terminal locks
- 197-7876 used to remove wire and terminal from RTA, if replacement is necessary

Instructions for use of 197-7875

- From rear side of RTA, insert tool fingers into slots on outboard side of wires.
- With tool handle parallel to wires, press down on locking tabs of terminal locks.
- Pull out terminal locks by hand or with a small, flat blade screw driver.

Instructions for use of 197-7876

- Remove fuse from top of RTA.
- Locate wire terminal on outboard sides of RTA.
- Place long square fingers into square holes above and below slot for fuse blade.
- Press removal tool fingers completely into connector to compress terminal locking tabs.
- Remove wire and terminal.



(Continued)

197-7875 Lock Removal Tool (Continued)

197-7876 Connector Removal Tool

SMCS Code: 1800-0776

Model: All

Warranty: Six Months

Part Number	Description
197-7875	Lock Removal Tool
197-7876	Connector Removal Tool

140-9944 Terminal Kit

SMCS Code: 1400-023, 0700

Model: All Cat® Engines

Warranty: Six Months



- Replaces discontinued 1P-2305 Terminal Kit
- Used to repair wiring harness terminal ends which have become damaged or unserviceable
- Hand crimping tool has built-in dies for crimping insulated and non-insulated terminals, cutting edges for cutting wire, notches for stripping 10 to 22 gauge wire, shears for cutting up to 4.7 mm (0.18 in) diameter bolts, 2-thread chasers for screws with 24 and 32 threads-per-inch screws, and a scale for measuring screw length
- Splice connectors have hot-melt adhesive and shrink ends that when heated will provide an environmental seal around wire

Qty. Shipped	Part No.	Description	Replacement Qty.
1	140-9944	Terminal Kit	1
Terminal and Wire Splice Service/Repair Parts			
1	9S-9150	Terminal Crimp Tool	1
10	2L-8058	Terminal (8 Gauge 1/4 in Stud)	10
10	2L-8066	Terminal (12 - 10 Gauge No. 10 Stud)	10
10	2L-8067	Terminal (12 - 10 Gauge 1/4 in Stud)	10
10	2L-8069	Terminal (12 - 10 Gauge 3/8 in Stud)	10
10	2L-8071	Terminal (12 - 10 Gauge 1/2 in Stud)	10
20	2L-8075	Terminal (16 - 14 Gauge No. 8 Stud)	20
20	2L-8076	Terminal (16 - 14 Gauge No. 10 Stud)	20
15	2L-8077	Terminal (16 - 14 Gauge 1/4 in Stud)	15
15	2L-8079	Terminal (16 - 14 Gauge 3/8 in Stud)	15
30	5P-4571	Terminal (16 - 14 Gauge)	20
10	4S-1988	Terminal (Blade, Crimp Type)	50
15	136-4876	Wire Splice (12 - 10 Gauge)	1
15	136-4877	Wire Splice (16 - 14 Gauge)	1
15	136-4878	Wire Splice (22 - 18 Gauge)	1

8T-5319 CE/VE Connector Tool Group

SMCS Code: 1400-023

Model: All Models with CE/VE Connectors

Warranty: Six Months

- Used to service all CE/VE Connectors
- Contacts can be removed, installed or rearranged within connector

Reference

SEHS8038, Special Instruction



Item	Tool Part No.	Description	Color	Wire Gauge
—	8T-5319	Connector Tool Group	—	—
Connectors				
1	4C-4074	Removal Tool, 16 - 18 Gauge	Black	16, 18
2	4C-4073	Removal Tool, 12 - 14 Gauge	Yellow	12, 14
3	4C-4072	Removal Tool, 8 - 10 Gauge	Green	8, 10
4	4C-4071	Removal Tool, 4 - 6 Gauge	Grey	4, 6

6V-4148 Electrical Connector Repair Kit

Model: Some models with electronic controls

Warranty: Six Months

- Used to repair electrical connectors made by Amp Special Industries that are used in electrical controls and harnesses



Part Number	Description
9G-5859 Includes:	301741 Terminal (8)
	384841 Contact (18)
	384843 Plug (12)
	309491 Housing (16)
	309492 Housing (16)
	301782 Housing (10)
	301531 Housing (4)
	344953 Housing (4)
	301739 Socket (8)
	301740 Housing (10)
	301781 Housing (10)
9G-6790 Includes:	399860 Contact (22)
	368748 Connector
	368747 Connector
	389688 Connector (2)

Diagnostic Tools

(Continued)

6V-4148 Electrical Connector Repair Kit (Continued)

Model: Some models with electronic controls

Warranty: Six Months

Part Number	Description
6V-3001	Sure Seal Crimping Tool
6V-4145	Extraction Tool
6V-4146	Extraction Tool - 301530 Terminal (8)
6V-4147	Extraction Tool - 399862 Housing (4)
6V-4148	Electrical Connector Repair Kit
7N-6545	Terminal (32)

Part Number	Description
7N-6546	Terminal (32)
9G-5859	Pin (8)
9G-6789	Connector (2), 387062 Connector (2)
9G-6790	Socket (37)
9G-6791	Pin (32)
9G-6793	Terminal (9), 384842 Connector (6)

300-8648 Insulation Tester Group

SMCS Code: 4450-082, 0785

Model: General and Generator Sets

Warranty: Manufacturers One Year OEM



Diagnostic Tools

European Union compliant, CE marked

- Replaces discontinued 243-3134 1KV Insulation Tester
- Used to test insulation on generator sets, cables, motors, insulators, and wiring installations
- Test voltages of 50, 100, 250, 500, and 1000 volts
- Automatic calculation of Dielectric Absorption Ratio (DAR) and Polarization Index (PI)
- Repetitive or hard-to-reach testing is made easier with 300-9489 Remote Test Probe
- Make repetitive tests simple and easy with Compare (Pass/Fail) function
- Live circuit detection prevents insulation test if voltage of 30 volts or greater is detected
- Auto-discharge of capacitive voltage for added user protection
- Auto power off extends battery life
- CAT IV 600 volt overvoltage
- Read measurements easily with large, backlit display
- 4 AA alkaline batteries provide at least 1000 insulation tests

Part Number	Description
300-8648	Insulation Tester Group
Service/Repair Parts	
300-8649	Test Leads
300-8650	Test Probes
300-9487	Alligator Clips

Part Number	Description
Service/Repair Parts (Continued)	
300-9488	Case
300-9489	Remote Test Probe

AC/DC Voltage Measurement

AC/DC Voltage Measurement	
Accuracy	50 Hz to 400 Hz \pm (% of reading + digits): \pm (2% of reading + 3 digits)
Range	0.1 V to 600.0 V
Resolution	0.1 V
Input impedance	3 M Ω (nominal), < 100 pF
Common mode rejection ratio (1 k Ω unbalanced)	> 60 dB at DC, 50 or 60 Hz
Overload protection	600 V RMS or DC
Earth Bond Resistance Measurement Specifications	
Range/Resolution	20.00 Ω / 0.01 Ω
	200.00 Ω / 0.1 Ω
	2000 Ω / 1.0 Ω
	20.00 k Ω / 0.01 k Ω
Accuracy	\pm (1.5% of reading + 3 digits)
Overload protection	2 V RMS or DC
Open circuit test voltage	> 4.0 V, < 8 V
Short circuit current	> 200.0 mA
Insulation Specifications	
Measurement range	0.01 M Ω to 10 G Ω
Test voltages	50 V, 100 V, 250 V, 500 V, and 1000 V
Test voltage accuracy	+ 20%, - 0 %
Short-circuit current	1 mA nominal
Auto discharge	Discharge time < 0.5 second for C = 1 μ F or less
Live circuit indicator	Inhibit test if terminal voltage > 30 V prior to initialization of test
Maximum capacitive load	Operable with up to 1 μ F load
Measure accuracy	50 V: \pm (3% + 5)
	100 V: \pm (3% + 5)
	250 V: \pm (1.5% + 5)
	500 V: \pm (1.5% + 5)
	1000 V: \pm (1.5% + 5) to 2000 M Ω , \pm (10% + 3) above 2000 M Ω

Environmental Specifications

Environmental Specifications	
Maximum voltage applied to any terminal	600 VAC RMS or DC
Storage temperature	-40° to 60° C (-40° to 140° F)
Operating temperature	-20° to 55° C (-4° to 131° F)
Temperature coefficient	0.05 x (specified accuracy) per °C for temperatures < 18 or > 28 °C (< 64 or > 82 °F)
Relative humidity	0% to 95% at 10° to 30° C (50° to 86° F)
	0% to 75% at 30° to 40° C (86° to 104° F)
	0% to 40% at 40° to 55° C (104° to 131° F)
Vibration	Random, 2 g, 5 - 500 Hz per MIL-PRF-28800F, Class 2 instrument
Shock	1 meter drop per IEC 61010-1 2nd Edition (1 meter drop test, 6 sides, oak floor)
Electromagnetic accuracy (EN 61326-1:1997) compatibility	In an RF field of 3 V/M, accuracy = specified
Compliance to Standards	
Complies with	ANSI/ISA 82.02.01 (61010-1) 2004, CAN/CSA-C22.2 NO. 61010-1-04, and IEC/EN 61010-1 2nd Edition for measurement category IV 600 V (CAT IV)
Certifications	CSA per standard CSA/CAN C22.2 No. 61010.1-04; TUV per standard IEC/EN 61010-1 2nd Edition
Power Specifications	
Batteries	4 AA batteries (NEDA 15A or IEC LR6)
Battery Life	
Insulation test use	Tester can perform at least 1000 insulation tests with fresh alkaline batteries at room temperature.
	These are standard tests of 1000 V into 1 MΩ with a duty cycle of 5 seconds on and 25 seconds off.
Resistance measurements	Tester can perform at least 2500 earth bond resistance measurements with fresh alkaline batteries at room temperature.
	These are standard tests of 1Ω with a duty cycle of 5 seconds on and 25 seconds off.
General Specifications	
Size (H x W x L)	5.0 x 10.0 x 20.3 cm (1.97 x 3.94 x 8.0 in)
Weight	550 g (1.2 lb)
IP Rating	IP40
Operating altitude	2000 m CAT IV 600 V, 3000 m CAT III 600 V
Non-operating (storage altitude)	12,000 m
Over-range capability	110% of range

Diagnostic Tools