

T&SPG 2000

Electrical Tools 28-1

6V-4960 Probe, AC Current	28-1
155-5175 AC Current Probe	28-1
8T-0900 Ammeter, AC/DC Clamp-On	28-2
9U-5222 Voltage Detector Arrangement, AC	28-2
9U-5795 Probe, AC/DC Current	28-3
155-5176 AC/DC Current Probe	28-4
177-2330 Digital Battery Analyzer	28-4
4C-4911 Battery Load Tester	28-5
4C-6600 Battery Voltmeter	28-5
8T-0500 Light, Continuity Testing	28-6
5P-7277 Tester, Voltage	28-6
1U-7318 Continuity Tester/Flashlight	28-6
6V-3000 Repair Kit, Sure Seal	28-7
140-9944 Terminal Kit	28-7
1P-2305 Terminal and Connector Assortment	28-8
8T-5319 Tool Group, CE/VE Connector	28-9
6V-4148 Electrical Connector Repair Kit	28-9
142-5055 Insulation Tester Group	28-10
9U-6003 Insulation Tester	28-11
146-4080 Multimeter Group, Digital (RS-232)	28-11
6V-7070 Digital Multimeter	28-13
152-7213 Scopemeter 123, 120 VAC	28-14
220 Volt Power Adapter for Fluke 123 Scopemeter	28-15
9U-7330 Multimeter, Fluke 87	28-16
163-0096 Process Calibrator	28-17
163-0097 Spare Battery	28-17
1U-8115 Test Lead Set, Insulated Tip	28-19
4C-5521 Phase Sequence Meter	28-19
152-7143 Cable Assembly (GSC Data Cable)	28-20
4C-4500 Power Factor Meter Group	28-20
4C-9073 Cable Assembly	28-21
6V-2150 Analyzer Group, Starting/Charging	28-22
110-4645 Cable Assembly, Adapter (Starting/Charging analyzer)	28-22
4C-4029 Trimmer Adjustment Tool	28-23
4C-4693 Tester Group, VR3 and VR4 Regulator ..	28-23
154-9740 Kit, Housing	28-23
FT1488 Tester Group, Exciter	28-24
5P-6590 Tester Group, Wiring	28-24

Tools for Electronic Engines 28-27

4C-3406 Connector Repair Kit, Deutsch	28-27
4C-3501 Connector Upgrade Kit	28-27
175-3700 DT Connector Service Kit	28-28
147-6456 Wedge Removal Tool	28-28
121-9588 Removal Tool, 16 gauge TXL	28-28
151-6320 Tool, Removal, 14, 16, 18 gauge SXL/GXL	28-28
7X-6400 Digital Diagnostic Tool (DDT)	28-29
NEXG4508 Service Program Module, 3406 B/C Truck Engine	28-29
NEXG4509 Service Program Module, 3176/3406E Truck Engine	28-29
NEXG4519 Service Program Module, Challenger 65/75/85	28-29
7X-1400 Digital Diagnostic Tool Group	28-30
123-6471 Diagnostic Tool Group	28-30
NEXG4511 Service Program Module, Industrial Engines	28-31
NEXG4526 Service Program Module, EIS Monitor	28-31
FT2360 Cable	28-31
FT2361 Cable	28-31
9X-9647 Throttle Position Sensor	28-31

JERD2124, Caterpillar Electronic Technician (CAT ET)	28-33
JERD2125, Truck Engine Only	28-33
JERD2129, All Engines and Machines Combined	28-33
Caterpillar Electronic Technician (Customer Version)	28-34
8T-8697 Electronic Control Analyzer Programmer (ECAP)	28-36
7X-1412 Adapter Cable Assembly (T-Harness)	28-36
7X-1180 Internal Expansion Board	28-36
8C-9801 Signal Adapter Group, Pulse Width Modulated (PWM)	28-37
8C-9995 Mounting Bracket Group	28-37
7X-1854 Cable	28-38
7X-1855 Cable	28-38
7X-1856 Cable	28-38
7X-1200 Timing Interface Group	28-38
7X-1170 Timing Adapter Cable	28-38
8C-9705 Converter, 12-Volt	28-39
NEXG4514 Service Program Module, ECAP Executive/Utility	28-39
NEXG4522 Truck Service Program Module, All Highway Truck Engines	28-39
NEXG4506 Service Program Module, 3406B PEEC Truck Engine	28-39
NEXG4507 Service Program Module, 3176 Truck Engine	28-39
NEXG4516 Service Program Module, Marine/Industrial Engines	28-40
NEXG4518 Service Program Module, Challenger 75	28-40
NEXG4512 Service Program Module, Configuration Aid	28-40
7X-6370 Adapter Cable Assembly, 3-Pin DT Breakout	28-41
8T-8726 Adapter Cable Assembly, 3-Pin Breakout	28-41
8T-8694 Adapter Cable Assembly, 5-Pin Breakout	28-41
8T-8695 Adapter Cable Assembly, 9-Pin Breakout	28-41
9X-0248 Adapter Cable Assembly, Transducer Breakout	28-41
9X-1160 Adapter Cable Assembly, 40-Pin Breakout	28-41
7X-1715 Cable Assembly, Small, 40 Pin Breakout	28-42
140-2266 Harness Assembly, 70-Pin Breakout "T"	28-42
167-9225 Harness Assembly	28-42
134-5195 Cable Assembly, Adapter, 40-pin T-harness large engine	28-43
127-6359 Cable Assembly, Adapter HEUI Injector Test	28-43
7X-1710 Probe Group	28-43
7X-1695 Cable, TDC	28-44
7X-1395 Adapter, SI TDC	28-44
7X-1403 Adapter Cable	28-44
7X-1686 Adapter Cable	28-44
7X-1873 Connector	28-44
3E-5226 Socket	28-44
7X-1714 Cable, 3116 Engine Adapter Cable	28-45
157-4829 Cable Assembly, Adapter (SAE to CAT® CAN/ATA)	28-45

Table of Contents

Diagnostic Tools

T&SPG 2000

136-7205 Cable Assembly, Extension (Monitor) ...	28-45
124-5643 Three-Pin Packard Break-Out Cable	28-46
125-3662 Cable, Sensor Bypass	28-46
126-7877 M300 to PC RS-232 Cable	28-46
Service Parts for All DDT's and 8T-8697 ECAP	28-47
4C-4704 Insertion/Removal Tool	28-47
8C-4145 Connector, T-Harness	28-47
8C-4146 Connector, ECAP/DDT	28-47
8C-4147 Endbell	28-47
8C-4148 Strain Relief	28-47
8C-4797 Socket	28-47
7T-4577 Pin	28-47
7X-1700 Communication Adapter Group	28-48
7X-1701 Communication Adapter	28-48
7X-1412 Cable	28-48
7X-1414 Cable	28-48
7X-1415 Cable	28-48
7X-1420 Cable	28-48
7X-1570 Cable	28-48
7X-1688 Cable Group	28-48
NEXG4523 Communication Adapter	
Service Program Module	28-48
7X-1703 Adapter Plate Group	28-49
139-4166 (CAT/ATA) Universal Cable	28-49
129-2018 Cable Assembly, Power	28-49
7X-1425 RS-232 Cable	28-50
3E-3423 Connector	28-50
7X-1412 Adapter Cable Assembly, T-Harness	28-50
7X-1851 Cable	28-51
7X-1713 Cable, EIS Loopback	28-51

Engine Tools 28-53

142-5865 Calibrator, Remote	28-53
142-5866 Cable, Extension	28-53
125-2580 Tool Group, HEUI Engine	28-53
1U-5470 Engine Pressure Group	28-54
8T-5300 Indicator Group, Timing	28-55
8T-5184 Transducer, 1/4 inch Dia. Magnetic,	
3.5 inch long	28-56
8T-5185 Transducer, 1/4 inch Dia. Magnetic,	
7.0 inch long	28-56
4C-6710 Governor Test Unit Group	28-56
4C-6711 Cable, Frequency Measurement	28-56
4C-6712 Cable, Governor Test	28-56
8T-5301 Adapter Group, Diesel Timing	28-57
6V-9060 Adapter Group, Spark Timing	28-57
163-5443 Harness, Detonation Sensor	28-58
1U-5524 Adapter Cable	28-58
143-4508 Cable, Timing (G3408C)	28-58
143-4509 Cable, Timing (G3412C)	28-58
FT1814 Cable	28-59
6V-3072 Case, Carrying	28-59
9U-6005 Gauge, Spark Plug Gap	28-59
9U-6695 Indicator, Electronic Spark Plug Firing ...	28-59
8T-5100 Smoke Meter Group	28-60
FT2397 Cable, Extension, 3600 SI	28-60
9U-6958 Module, Magneto Peak Detect	28-60

Flow Tools 28-61

8T-2700 Blowby/Air Flow Indicator Group	28-61
1U-8860 Large Engine Blowby Pickup Group	28-62
154-8100 Fuel System Arrangement	28-63
154-8101 Fuel Flowmeter Group	28-63
Caterpillar Fuel Flow Monitor System	28-64
168-7740 Fuel Flow Measurement	
System Group	28-65

168-7730 Fuel Flowmeter Group	28-65
1U-9500 Fuel Flow Communicator	28-67
FT2320 De-Aerator Group	28-67
FT2309 De-Aerator Tank	28-67

Measuring Tools 28-69

8T-1000 Electronic Position Indicator Group	28-69
4C-8753 Collet, Extended	28-70
8T-5096 Dial Indicator Test Group	28-70
6V-7926 Dial Indicator Group	28-71
165-8958 Indicator Base	28-71
9U-6175 Case, Tool, Soft	28-71
168-7720 Ultrasonic Wear Indicator III Group	28-72
168-7721 Ultrasonic Wear Indicator III	28-72
9U-6700 Ultrasonic Wear Indicator II Group	28-73
135-3156 Battery Pack	28-75
9U-7370 Tester, Belt Tension	28-76
6V-7059 Multiple Anvil Micrometer	28-76
6V-2034 Adapter	28-76
6V-2012 Gauge Group, Micrometer Depth (in)	28-77
6V-7030 Gauge Group, Micrometer Depth (mm) ..	28-77
6V-6042 Point Group	28-77
5P-2170 Dial Bore Gauge Group	28-78
1P-3537 Dial Bore Gauge Group	
for Inch Measurements	28-78
6V-7898 Dial Bore Gauge, Metric	28-78
6V-7899 Size Setting Fixture, Metric	28-78
6V-7897 Dial Indicator Available for Converting	
1P-3535 Dial Bore Gauge to Metric	28-78
147-8860 Master Ring (diesel 280.025 mm)	28-79
147-8861 Master Ring (gas 300.00 mm)	28-79
147-8862 Gauge, Dial Bore	28-79
6V-6000 Dial Bore Gauge for	
Metric Measurements	28-80
6V-6030 Size Setting Fixture	28-80
8T-0450 Thread Identification Kit	28-80
7B-0337 Surface Plate	28-80

Paving Products 28-81

FT2373 Test Box,	
Electrical Displacement Control	28-81
4C-5558 Auto Vibration Bypass Control	28-82
178-3832 Valve, Tank	28-82
4C-8758 Test Harness	28-82
990048 Extension Harness	28-82
990049 Test Harness	28-82
990050 Test Harness	28-82

Power Train Tools 28-83

9U-7500 Transmission Analyzer II Group	28-83
Various Cables and Adapters	28-83
FT2640 Test Cable	28-84
1U-7446 Transmission Shift Analyzer Group	28-84
1U-7447 Transmission Shift Analyzer	28-84
1U-9100 Cable, Adapter (Challenger to PC)	28-85
4C-4068 Extension Cable	28-85
139-5210 Cable Assembly,	
Extension (ARC/EPTC II)	28-85
4C-5974 Adapter Cable	28-86

Speed Measuring Tools 28-87

9U-7400 Multitach II Group	28-87
9U-7401 Multitach II	28-87
9U-7402 Multitach II Photo Group	28-87
9U-5140 Pickup, LED Photo	28-89
5P-1759 Drive Group, Tachometer	28-89

Diagnostic Tools

Table of Contents

T&SPG 2000

4C-9179 Cable	28-90
FT1808 Cable, Magnetic Input Adapter	28-90
7M-6001 Drive Adapter Group	28-90
5P-0935 Adapter Group, Tachometer Drive	28-91
8N-5945 Adapter Assembly	28-91
5P-6560 Adapter, Tachometer	28-92
6N-1345 Adapter, Tachometer Drive	28-92
1P-5500 Phototach Group, Portable	28-92
7N-8929 Connector, Cable	28-93
1U-5550 Adapter Group, Oil Pressure	28-93
FT0907 Adapter	28-93
6V-4190 Auto Programmer Group	28-94
6V-4865 Connector	28-94
6V-4950 Pickup Group, Injection Line Speed	28-94
4C-6821 Pickup Group, Injection Line Speed for Data Logger	28-95
1U-9139 Universal Fuel Line Pickup	28-95
1U-9710 Adapter Cable	28-96
1U-6602 Photo-Tach Group	28-96
161-8384 Battery Charger	28-97
1P-3500 Timing Group, Injection	28-97

Temperature Measuring Tools 28-99

4C-6500 Digital Thermometer Group	28-99
123-6700 Thermometer II, Infrared (with laser targeting feature)	28-100
148-2400 Infrared Temperature Tool with Pointing Laser and Hardware	28-101
148-2388 Infrared Temperature Tool with Hardcase	28-101
148-2398 Soft Carry Pouch	28-101
1U-6236 Non-Contact Temperature Probe	28-102
4C-6090 Multichannel Temperature Selector	28-102
4C-9030 Jack, Mini TC-K	28-103
6V-9130 Temperature Adapter Group	28-103
8T-2844 Recorder Group	28-104
9U-7043 Temperature Recorder Group	28-104
Thermometers	28-105
5P-2720 Adapter Group, Probe, Self-Sealing	28-105
5P-2725 Adapter Group, Probe, Self-Sealing	28-105
5P-3591 Adapter Group, Probe, Self-Sealing	28-105
4C-4545 Adapter Group, Probe, Self-Sealing	28-106
4C-4547 Adapter Group, Probe, Self-Sealing	28-106

General Diagnostic Tools 28-107

4C-8195 Control Service Tool, CMS II	28-107
148-9610 PC Cart, 110-125 VAC, 60 Hz	28-107
150-8756 PC Cart, 220-250 VAC, 50-60 Hz	28-107
1U-5268 Inspection Borescope	28-109
146-1738 Borescope, Precision (12 inch Hawkeye)	28-109
9U-6940 Borescope, Right-angle View	28-110
131-5050 DataView Group	28-111
131-5051 DataView Portable TechStation Group	28-111
153-9630 Test Group-Sensor	28-115
143-4062 Sensor, Pressure (100 psi)	28-116
143-4065 Sensor, Pressure (1000 psi)	28-116
143-4066 Sensor, Pressure (7500 psi)	28-116
8T-9290 Borescope Group, Inspection	28-116
4C-9024 Battery Pack Group	28-117
4C-9031 Cable, Battery	28-117
9U-7560 Field Soldering Iron Group	28-118
9U-7561 Field Soldering Iron	28-118
4C-5607 Detector, Combustible Gas	28-118
4C-5608 Detector/Transmitter, Vacuum Leak	28-119

8T-9295 Holder, Diagnostic Tool	28-119
9U-5215 Case, Tool, Soft	28-120
156-1060 Analyzer Group, Emission (Gas Engines Only)	28-120
156-1070 Analyzer Group, Emission (Gas and Diesel Engines)	28-120
8T-0910 Analyzer, Fuel Sulfur	28-122
9U-7554 Printer Group, Portable, 110 VAC	28-123
121-0276 Printer Group, Portable, 220 VAC	28-123
147-1924 Portable Printer	28-124
147-1925 Printer Mount Kit (Includes Printer Power Supply)	28-124
147-1928 Payload Control System Interface Cable	28-124
8T-5200 Signal Generator/Counter Group	28-125
4C-6534 Harness	28-125
Hook and Loop Fastener	28-126
6V-2196 Microscope	28-126
6V-6059 Microlite	28-126
Dual Scale Pressure Gauges	28-127
8T-0820 Pressure Gauge	28-127
8T-5342 and 8T-5343 Pressure Gauge	28-127
1U-5809 Grommet	28-127
5P-8558 Calibrating Group Pressure Gauge	28-128
8T-5135 Gauge Mounting Group	28-128
6V-7830 Tetragauge	28-129
Diagnostic Hose	28-129
1U-5754, 1U-5755, 1U-5756, 1U-5757	28-129
Hose Assemblies	28-129
4C-5623 Smoke Candle	28-130
9X-3075 Cable Assembly	28-130
127-9797 Cable, TPMS, VIMS, WLP to PC	28-131
9U-6386 Cable, Extension	28-131
8T-9170 Training Aid, Electrical Components	28-131
8T-9171 Training Aid, EMS System	28-131
114-0904 Electronic Engine Training Aid without PC	28-132
114-0905 Electronic Engine Training Aid	28-132
118-3381 Electronic Transmission Training Aid ..	28-132
129-3906 VIMS Training Aid	28-132
4C-3030 Vibration Analyzer Group (Not Available)	28-132
4C-3041 Modem Group	28-134
4C-9806 Cable Assembly, Modem	28-134
4C-6920 Field Balance Group	28-135
4C-6729 Battery Pack	28-135
4C-9021 Torsional Vibration Measure. Group	28-135
Accessories for 4C-3030 Vibration Analyzer Group	28-136
4C-3032 Accelerometer	28-136
9U-6955 Adapter, Charger to Analyzer	28-136
9U-5606 Battery Charger	28-137
4C-9023 Adapter, Volts	28-137
9U-5616 Cable, Adapter	28-137
9U-5836 Adapter Cable	28-137
9U-5960 Trending Group	28-137
TechStation	28-138
TechStation Accessories	28-138
138-9656 Contamination Group, Particle Counter	28-140
9U-6662 Single Point Sampler	28-140
170-8505 Quick Disconnect S.O.S	28-141
188-0645 Portable S2 Particle Analyzer	28-142
169-4371 Portable Contamination Instructional Kit	28-142

Table of Contents

Diagnostic Tools

T&SPG 2000

9U-6745 Board Group	28-143
8C-8456 Sealed Cap	28-143
9U-5155 O-Ring Measuring Cone	28-144
Leak Detection -	28-145
1U-5566 (110 Volts) Black Light	28-145
1U-6444 (220 Volts) Black Light	28-145
Fluid Sampling Supplies	28-146
Fluid Sampling Extraction Tools for Pressurized Compartments	28-146
Fluid Sampling Extraction Tools for Non-Pressurized Compartments	28-148
Protector Cases	28-149
Plastic Storage Cases with Hinged Lids	28-151
Foam Block for Plastic Storage Cases	28-152
Plastic Divided Utility Boxes with Hinged Lids	28-153

T&SPG 2000

Electrical Tools

6V-4960 Probe, AC Current

SMCS Code: 1400-038, 4450-038

Model: All Generator Sets

Warranty: Y

Features/Benefits

- **CANCELED** measuring any other (ATIONS)
- Clamp-on probe that replaces standard test leads of multimeter allowing current measurements to be made without breaking circuit being measured
- Extends AC current measuring ability of multimeter up to 1000 Amperes rms by use of 1000:1 current transformer
- Measures conductors up to 54 mm (2.125 inch) diameter
- Includes 6V-6014 Cable
- Optional items: 6V-3072 Carrying Case, 6V-6040 Foam Insert and Decal ("Electrical Test Kit," SEHS8026); convenient carrying case holds 6V-4960 Current Probe in addition to Caterpillar Digital Multimeters and 8T-0900 Clamp-On Ammeter (Refer to a following article.)

Specifications/Technical Information

Current range	10A to 1000A rms
Temperature range	-10°C to +55°C (+14°F to +131°F)
Maximum conductor size	54 mm (2.125 inch)
Dimensions	39mm x 104 mm x 205 mm (1.54 inch x 4.09 inch x 8.07 inch)
Cable length	0.9 m (3 ft)
Frequency range	30 Hz to 1000 Hz
Temperature coefficient	less than 0.010% per °C (0.006% per °F)
Circuit-to-ground voltage	650V rms maximum
Accuracy at	
23°C ± 5°C (73°F ± 9°F)	60 Hz ± 1% of input 30 Hz to 1 kHz ± 2% of input



1. 6V-6014 Cable

Reference

SEHS8011 Special Instruction

155-5175 AC Current Probe

SMCS Code: 1400-038, 4450-038

Model: All Generator Sets

Warranty: Y

Features/Benefits

- Used to measure AC current on Caterpillar® Generator Sets and any other application within its capability (see specifications)
- Used with Caterpillar® 6V-7070 Digital Multimeter, 9U-7330 Digital Multimeter, or 146-4080 Digital Multimeter
- Replaces 6V-4960 AC Current Probe
- Clamp-on probe replaces standard test leads (allows current measurements without breaking circuit)
- Extends AC current measuring ability of multimeter up to 1000 Amperes rms by use of 1000:1 current transformer
- Measures conductors up to 54.1 mm (2.13 in) diameter
- CE compliant

Specifications/Technical Information

Current range	0.1 to 1000A rms
Temperature range	
Operating	-10 to 50°C (14 to 122°F)
Storage	-20 to 70°C (-4 to 158°F)
Frequency range	30 Hz to 5 kHz
Temperature coefficient	<.01% per 10K
Accuracy	
0.1 to 10A	3% ±0.1A
10 to 50A	1.5%
50 to 200A	0.75%
200 to 1200A	0.5%



155-5175 AC Current Probe

8T-0900 Ammeter, AC/DC Clamp-On

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

Model: All Models

Warranty: Y

Features/Benefits

- Measures AC or DC current in cables up to 19 mm (.75 inch) diameter without breaking circuit
- Advantages — smaller size and lower cost
- Built-in digital display
- Power source — four 1U-9533 Batteries, alkaline AA-size, inside ammeter handle; low battery indicator appears on digital display
- Reads current to 1200 Amperes, within 2% of reading, directly on display; current less than one Ampere and measurements with 0.1 Ampere resolutions between 0.1 and 199 Amperes can be measured using 6V-6014 Cable to connect ammeter output to Caterpillar Digital Multimeter; current is then read on multimeter display
- Ammeter jaws opened with a lever and close around conductor to measure current; trigger switch turns ammeter on and off; when switch is released, readout held for 5 seconds; this feature is important in limited access areas where display can't be seen
- Has zero control for DC operation
- 6V-3072 Carrying Case, 6V-6040 Foam Insert and Decal ("Electrical Test Kit," SEHS8026) available; carrying case holds 8T-0900 Ammeter in addition to Digital Multimeter and 6V-4960 AC Current Probe

Specifications/Technical Information

Weight 450 gm (1 lb.) with batteries
Size 230 mm x 115 mm x 23 mm
(9 inch x 4.5 inch x 1.44 inch)



8T-0900 Ammeter, AC/DC Clamp-On

Reference

SEHS8420 Special Instruction

9U-5222 Voltage Detector Arrangement, AC

SMCS Code: 4450-035; 0781

Model: All EPG Sets

Warranty: Y

Return to CST for repair.

Features/Benefits

- Safe, quick and easy way to locate energized circuits
- Good tool choice when looking for open fuses or circuit breakers or even broken wires
- Both audio and visual indicators

Specifications/Technical Information

Voltage detection range:

Low 30 to 1,500 VAC
High 1,500 to 122,000 VAC

(Use only with 9U-5224 Safety Extension Handle.)

Power 1U-9534 Battery, 9V transistor battery
Battery life approx. 2000 hrs.
Weight, 9U-5223 AC Voltage Detector 141.5 g (5 oz)
Weight, 9U-5224 Safety Ext. Handle454 kg (1 lb)



9U-5222 Voltage Detector Arrangement, AC

Service Parts:

9U-5223 Voltage Detector, AC
9U-5224 Handle, Safety Extension
1U-9534 Battery, 9V Alkaline

Reference

NEHS0564, Tool Operating Manual

Instrumentation Corporation
Bellamy Industrial Park
Faraday drive
Dover, NH 03820
Tel. (603) 749-7366
Fax. (603) 742-2346

155-5176 AC/DC Current Probe

SMCS Code: 1400-082, 1450-082, 1600-082, 4450-082

Model: All Models

Warranty: Y

Features/Benefits

- Used to measure AC/DC currents
- Used with 6V-7070 Digital Multimeter, 9U-7330 Digital Multimeter, or 146-4080 Digital Multimeter
- Replaces 9U-5795 AC/DC Current Probe
- Compatible with most voltmeters, multimeters, or other voltage measuring instruments
- Larger jaw opening fits diameters as large as 42 mm (1.6 in)
- Compact size fits in tight places
- Extra-long cord allows positioning of meter for easy viewing
- CE compliant

Specifications/Technical Information

Current range 1 to 1000A AC (1400A peak)
1 to 1400A DC

Frequency range DC to 10kHz at -3db

Output 1mV/A

Accuracy

1 to 100A 1.5% reading $\pm 1A$

100 to 800A 2.5% reading

800 to 1000A 4% reading

1000 to 1400A DC only 4% reading

Working voltage 600V rms

Maximum conductor diameter 42 mm (1.7 in)

Load impedance >100K/100pF

Batteries 9V alkaline (NEDA 1604A, IEC 6LR61)

Battery life approximately 120 hours
with alkaline battery

Low battery indication green LED on when battery
is at 6.5V or below

Influence of adjacent conductor 0.01A typical

Influence of conductor position in opening 0.5%

Temperature range

Operating -10 to 55°C (14 to 131°F)

Storage -40 to 80°C (-40 to 176°F)

Relative humidity 10 to 90%

Dimensions 236.5 x 97.0 x 44.0 mm
(9.31 x 3.82 x 1.73 in)

Weight 480 g (1.06 lb)

Cord length 1.27 M (5 ft)



155-5176 AC/DC Current Probe

177-2330 Digital Battery Analyzer

SMCS Code: 1401-081, 0785

Model: All

Warranty: Y

See Third Supplement

Features/Benefits

- Replaces 127-8078 Battery Analyzer
- Used to quickly and accurately test condition of 6 and 12 Volt batteries (even discharged to as low as one 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 over voltage protection

Specifications/Technical Information

Battery rating range:

Cold cranking amps (CCA) 50 to 4000

Cranking amps (CA) 65 to 5000

Amp hours (A-Hr) 6 to 500

DC voltmeter range 1.0 to 14 Volt

Voltmeter accuracy ± 0.1 Volt

Power source 9 Volt 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 lbs)

Operating temperature range 0 to 50°C (32 to 120°F)

Storage temperature range -20 to 70°C (0 to 160°F)



177-2330 Battery Analyzer

Reference

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

T&SPG 2000

4C-4911 Battery Load Tester

SMCS Code: 1401-081, 0785

Model: All Models

Warranty: Y

Features/Benefits

- Used to test 6, 8 and 12 Volt heavy equipment and automotive batteries
- Replaces 3 tools — just 1 tool to carry and connect
- 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, 15mm high display digits are easier to read

Specifications/Technical Information

Load test 6, 8 and 12 Volt batteries
 Load current 0 to 1000 Amps (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 $\pm$ 1 digit
 Ammeter accuracy $\pm$ 3% of reading $\pm$ 1 digit
 Size 33 cm x 33 cm x 30 cm (13 in x 13 in x 12 in)
 Weight 12.428 kg (27.375 lbs)



4C-4911 Battery Load Tester

Reference

SEHS9249 Special Instruction

4C-6600 Battery Voltmeter

SMCS Code: 1401-081

Model: All Models

Warranty: Y (4C-6600 Battery Voltmeter: not repairable)

Features/Benefits

- Small digital Voltmeter designed to quickly determine state of charge of 6 to 60 Volt batteries on or off the machine
- Easier and faster than using a hydrometer to measure specific gravity

- Works on all batteries including sealed maintenance free batteries
- Bright, red LED display easy to read outdoors and in low light conditions
- Chart on rear of meter shows battery approximate percent of charge based on battery voltage for 12-Volt batteries (Chart in Operating Manual includes 6, 8, and 12-Volt Batteries)
- No internal batteries to wear out
- Small enough to carry in pocket or toolbox
- 4C-6777 Test Lead Kit included with 4C-6600 Voltmeter

Specifications/Technical Information

Range 6.0 to 60.0 VDC
 Operating temperature range -30°C to +70°C
 (-22°F to +158°F)

Accuracy:

0°C to 70°C (32°F to 158°F) +.2 VDC
 -30°C to 0°C (-22°F to 32°F) +.23 VDC
 Input Voltage protection +100 VDC max.
 Power powered by battery being tested
 Current requirement 0.18 Amp
 Settling time 3 seconds
 Weight113 Kg (4 oz.)
 Size 76mm x 84mm x 20mm (3.0 in x 3.3 in x .8 in)



4C-6600 Battery Voltmeter



Service Part: 4C-6777 Test Lead Kit

Reference

NEHS0538 Operating Instruction

8T-0500 Light, Continuity Testing

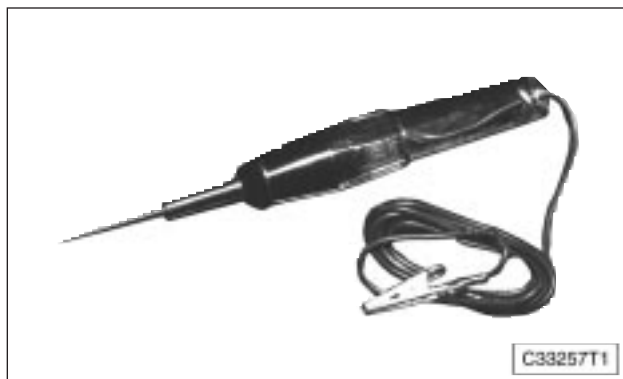
SMCS Code: 1000-017, 1000-025, 1250-025, 1250-036, 1355-081, 1400-038, 3071-017, 3100-017, 3156-010, 3156-012, 3200-038, 3224-025, 4208-010, 5050-038, 7400-036, 7451-038, 7401-045

Model: All Models

Warranty: Y

Features/Benefits

- Replaces canceled 8S-4627 Circuit Continuity Tester
- 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 two "N" size batteries (1.5 Volts) and instruction decals



8T-0500 Light, Continuity Testing
4C-8363 Battery
6V-3061 Bulb

Reference

NEHS0543 Special Instruction (Checking Diodes)

- Encased in rugged, hi-impact plastic housing which is grease and chemical resistant
- Standard 8D-1429 Bulb required for replacement



5P-7277 Tester, Voltage

1U-7318 Continuity Tester/Flashlight

Warranty: M

Features/Benefits

- Made of high impact plastic.
- Can be used as a flashlight or continuity tester.
- Yellow w/black cap.
- 209.6 mm (8 1/4 inch) long, uses 2 D cell batteries (1U-9532) (not included).
- Continuity wires shipped inside flashlight.



1U-7318 Continuity Tester/Flashlight

Replacement Part

1U-9532 D-Cell Battery

5P-7277 Tester, Voltage

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: Y

Features/Benefits

- 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.

T&SPG 2000

6V-3000 Repair Kit, Sure Seal

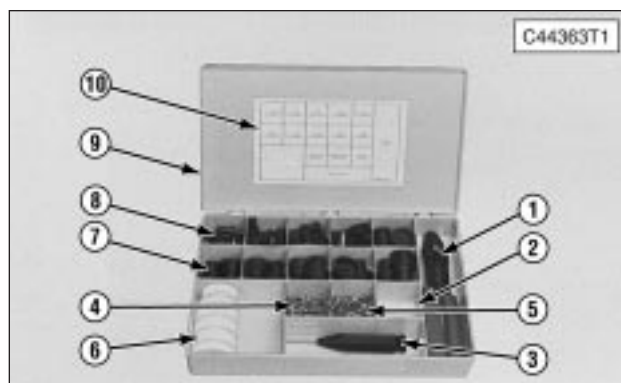
SMCS Code: 1400-023

Model: All models with Sure Seal connectors

Warranty: G

Features/Benefits

- Used to repair any wiring harness which has Sure Seal Connectors
- Used to make new wiring harnesses for attachments or modifications to vehicles



1. 6V-3001 Crimping Tool
2. 9G-3695 Sealing Plug (50)
3. 6V-3008 Insertion Tool (Not included with early kits)
4. 7N-7779 Socket (100)
5. 7N-7780 Pin (100)
6. Oil sample bottle used as container for alcohol lubricant (not part of 6V-3000 Repair Kit)
7. Receptacles:
 - 7N-7777 Receptacle, 1 pin (3)
 - 7N-9738 Receptacle, 2 pin (3)
 - 7N-7781 Receptacle, 3 pin (3)
 - 7N-8204 Receptacle, 4 pin (3)
 - 9G-3678 Receptacle, 5 pin
 - 9G-3677 Receptacle, 6 pin
 - 9G-3676 Receptacle, 7 pin
 - 9G-3675 Receptacle, 8 pin
 - 9G-3674 Receptacle, 9 pin
 - 9G-3673 Receptacle, 10 pin
8. Plugs:
 - 7N-7778 Plug, 1 pin (3)
 - 7N-9737 Plug, 2 pin (3)
 - 7N-7782 Plug, 3 pin (3)
 - 7N-8205 Plug, 4 pin (3)
 - 9G-3672 Plug, 5 pin
 - 9G-3671 Plug, 6 pin
 - 9G-3670 Plug, 7 pin
 - 9G-3669 Plug, 8 pin
 - 9G-3668 Plug, 9 pin
 - 9G-3667 Plug, 10 pin
9. 6V-3007 Box Assembly
10. NEEG 2032 Insert

Reference

SMHS7531-01 Special Instruction

140-9944 Terminal Kit

SMCS Code: 1400-023, 0700

Model: All Caterpillar Engines

Warranty: S

See Fourth Supplement

- 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 (.18 in) diameter bolts, two 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

Service Parts

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



140-9944 Terminal Kit

1P-2305 Terminal and Connector Assortment

Canceled

SMCS Code: 1400-036
Model: All Caterpillar Engines
Warranty:

Features/Benefits

- Replaced by 140-9944 Terminal Kit
- Contains 12 different types and sizes of most commonly used color-coded solderless terminals
- Hand tool features crimping dies for installing self-insulated and non-insulated terminals and splices, cutting edge for cutting wire, notches for stripping insulation from No. 10-22 wire, provisions for cutting up to 3/16 inch diameter bolts, two thread chasers for 24 and 32 threads-per-inch bolts, and a scale for measuring bolt length
- Decal inside cover of box has information about terminals and complete instructions for proper hand tool usage



1P-2305 Terminal and Connector Assortment

Quantity Supplied	Part No.	Description	Replacement Quantity
1	9S-9150 ¹	Tool Assembly	1
10	2L-8058	Terminal (8 Ga. 1/4 inch Screw)	10
10	2L-8066	Terminal (12-10 Ga. No. 10 Stud)	10
10	2L-8067	Terminal (12-10 Ga. 1/4 inch Stud)	10
10	2L-8069	Terminal (12-10 Ga. 3/8 inch Stud)	20
10	2L-8071	Terminal (12-10 Ga. 1/2 inch Stud)	10
20	2L-8075	Terminal (16-14 Ga. No. 8 Stud)	20
20	2L-8076	Terminal (16-14 Ga. No. 10 Stud)	20
15	2L-8077	Terminal (16-14 Ga. 1/4 inch Stud)	15
15	2L-8079	Terminal (16-14 Ga. 3/8 inch Stud)	15
30	5P-4571	Terminal (16-14 Ga.)	30
10	4SD1988	Terminal (Blade, Crimp Type)	50
15	2S-1043	Wire Splice (12-10 Ga.)	20
15	8S-1043	Wire Splice (16-14 Ga.)	1

¹ Optional Tool: 8S-1075 Crimping and Stripping Tool, Heavy-Duty

T&SPG 2000

8T-5319 Tool Group, CE/VE Connector

SMCS Code: 1400-023

Model: All Models with CE/VE Connectors

Warranty: G

See Fourth Supplement



Item	Tool Part No	Wire Gauge	Pin Contact	Socket Contact	Seal Plug
1	4C-4074	16, 18	8N-1538	8N-1539	7G-7917
2	4C-4073	12 14	3T-7260	3T-7261	7G-7918
3	4C-4072	10 8	3T-7262 3T-7264	3T-7263 3T-7265	7G-7919 7G-7919
4	4C-7071	6 4	8N-1546 8N-1548	8N-1547 8N-1549	7G-7920 7G-7920

Reference

SEHS8038 Special Instruction

6V-4148 Electrical Connector Repair Kit

SMCS Code: 1408-023

Model: Some models with electronic controls

Features/Benefits

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



6V-4148 Electrical Connector Repair Kit

- 6V-3001 Crimping Tool
- 6V-4147 Extraction Tool
- 399862 Housing (4)
- 6V-4145 Extraction Tool
- 6V-4146 Extraction Tool
- 301530 Terminal (8)
- 9G-5859 Pin (8)
- 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-6793 Terminal (9)
- 384842 Connector (6)
- 7N-6546 Terminal (32)
- 7N-6545 Terminal (32)
- 9G-6791 Pin (32)
- 9G-6790 Socket (37)
- 399860 Contact (22)
- 368748 Connector
- 368747 Connector
- 389688 Connector (2)
- 9G-6789 Connector (2)
- 387062 Connector (2)

T&SPG 2000

9U-6003 Insulation Tester

Canceled

Features/Benefits

- Replaced by 142-5055 Insulation Tester Group



9U-6003 Insulation Tester

Service Parts (and included with 9U-6003):

- 9U-6004 Test Lead Set
- 4C-4214 Case
- 1U-9533 Battery, AA Alkaline (not shown)
- 4C-5535 Fuse, 500 mA (not shown)

Reference

NEHS0575 Tool Operating Manual

146-4080 Multimeter Group, Digital (RS-232)

SMCS Code: 0115-036

Model: All Models

Warranty: M

Features/Benefits

- Used to measure duty cycle, frequency, resistance, AC/DC voltages, AC/DC currents, temperature, continuity, diode test and total harmonic distortion in percentage of line voltage or current at 50/60 Hz or as a percent of fundamental frequency
- Features RS-232 output which can be used to connect meter to 131-5050 DataView using a 146-8488 Cable Assembly
- Measures true RMS on AC voltage and current ranges
- Has auto/manual ranging features
- Can be programed to compare measurements to a desired reference value without an external reference source
- Has safety shutter to protect meter in the event of incorrect connections to current terminals
- 600 V fuse protected on both 10 amp and 400 milliamp range

- Ohm meter protected to 600 volts
- Automatic reading hold
- Digital display backlighting can be turned ON or OFF
- Small enough to be hand held and is protected by a rubber boot
- Battery powered
- CE certified



146-4080 Multimeter

Specifications/Technical Information

Electrical Specifications				
Function	Range	Resolution	Accuracy	Maximum Input
DC V	400mV	0.1mV	0.3% + 2d	1000V
	4V	1mV	0.3% + 2d	
	40V	10mV	0.3% + 2d	
	400V	0.1V	0.3% + 2d	
	1000V	1V	0.75% + 3d	
DC A	400μA	0.1μA	0.5% + 1d	μA - 400mA/600V mA - 400mA/600V mA - 400mA/600V mA - 400mA/600V A - 10A/600V A - 10A/600V
	4000μA	1μA	0.5% + 1d	
	40mA	0.01mA	0.5% + 1d	
	400mA	0.1mA	0.5% + 1d	
	4A	0.001A	1.0% + 5d	
	10A	0.01A	1.0% + 5d	
AC V	4V	1mV	0.75% + 3d	750V
	40V	10mV	0.75% + 3d	
	400V	0.1V	0.75% + 3d	
	750V	1V	0.75% + 5d	
AC A	400μA	0.1μA	1.0% + 5d (45Hz to 1KHz)	μA - 400mA/600V μA - 400mA/600V mA - 400mA/600V mA - 400mA/600V A - 10A/600V A - 10A/600V
	4000μA	1μA		
	40mA	0.01mA		
	400mA	0.1mA		
	4A	0.001A		
	10A	0.01A		
Ohms	400Ω	0.1Ω	0.5% + 10d	600V
	4KΩ	1Ω	0.5% + 3d	
	40KΩ	10Ω	0.5% + 3d	
	400KΩ	0.1KΩ	0.5% + 3d	
	4MΩ	1KΩ	0.5% + 3d	
	40MΩ	10KΩ	1.01% + 10d	
Hz	200Hz	0.01 Hz	0.05%	
	(1.5Hz to 2KHz)	0.1 Hz	+2 digits	
200KHz)	20KHz	1 Hz	(20,000 Counts)	
	200KHz	10 Hz		
	7200KHz	100Hz		

Temperature Specifications

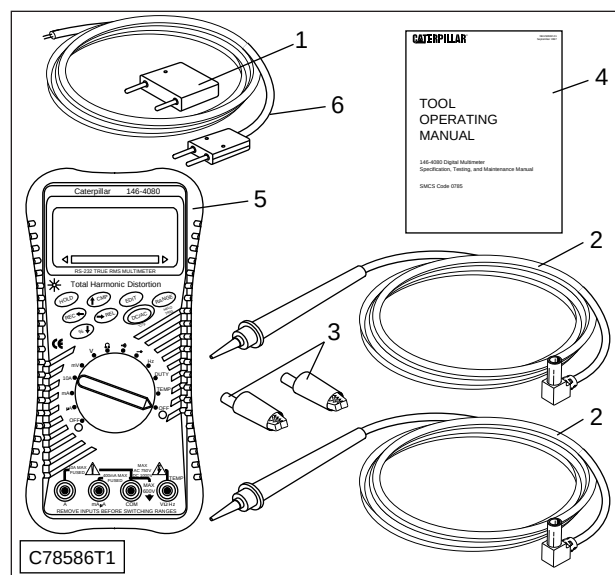
Range	Resolution	Accuracy	Maximum Input
-40 to 0°C	0.1°C	±3.0°C + 1 digit	60V DC or
(-40 to 32°F)	(0.1°F)	(±5.4°F + 1 digit)	24V AC RMS
0 to 400°C	0.1°C	±1% + 1°C	60V DC or
(32 to 752°F)	(0.1°F)	(±1% + 1.8°F)	24V AC RMS
401 to 1,370°C	(1°C)	±3.0% of reading	60V DC or
(753 to 2,498°F)	1°F		24V AC RMS

General Specifications

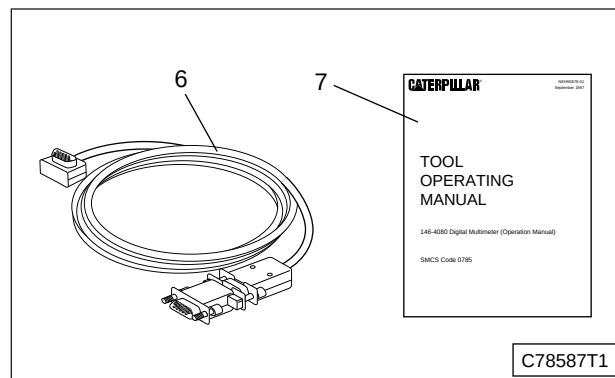
Function	Description
Continuity	Open circuit test Voltage: 1.2V THRESHOLD: Approximately <100Ω
Diode Check	Open circuit test Voltage: 3V MAXIMUM TEST CURRENT: 25mA
Duty Cycle (1.5Hz to 20KHz)	0.0 - 99.9% Accuracy: within ± (0.2% per KHz + 0.1%)
THD Measurement (50/60Hz) (Total Harmonic Distortion)	Voltage ± (2% + 2 digits) Current ± (2% + 2 digits)
DC V	Normal Mode Rejection Ratio: >20dB at 50Hz or 60Hz Common Mode Rejection Ratio: >100dB at DC, 50Hz or 60Hz
AC V	Common Mode Rejection Ratio: 85dB at dc to 60Hz
Crest Factor	1:1 through 3:1. For non-sinusoidal waveforms (45Hz to 1KHz), add ±(2% of reading) to the accuracy
FUSE Protection	μA or mA: 1A 600V FAST fuse A: 15A 600V FAST fuse with >10,000A interrupt rating

Units

Exponents	Description
%	Percentage Annunciation in the Percentage (%) mode, the THD @ 50/60Hz mode, and Duty Cycle mode.
mV	Millivolts (1 x 10 ⁻³ Volts)
A	Amperes (Amps)
mA	Milliamperes (1 x 10 ⁻³ Amps)
μA	Microamperes (1 x 10 ⁻⁶ Amps)
Ω	Ohms
KΩ	Kilohm (1 x 10 ³ Ohms)
MΩ	Megohm (1 x 10 ⁶ Ohms)
Hz	Hertz (1 cycle/sec)
KHz	Kilohertz (1 x 10 ³ cycles/sec)

**146-4080 Digital Multimeter Group**

1. Thermocouple Adapter and Thermocouple
2. Test Leads
3. Clip Adapter
4. NEHS0678-01 Operation Manual
5. 146-4080 RS-232 Digital Multimeter
6. 8T-0458 Thermocouple Probe

**Optional Equipment for 146-4080 RS-232 Digital Multimeter Group**

6. 146-8488 Cable Assembly (RS-232 for use with CAT 131-5050 Data View)
7. NEHS0682-01 Specification, Testing, and Maintenance Manual

Reference

NEHS0678 Tool Operating Manual, Operation
NEHS0682 Tool Operating Manual, Specification, Testing, and Maintenance

T&SPG 2000

6V-7070 Digital Multimeter

SMCS Code: 1000-038, 1050-038, 1400-038, 1400-081,
1450-038, 3000-038, 3168-038, 4450-038,
5700-038

Model: All Models

Warranty: Y

Features/Benefits

- Replacement for canceled 6V-3030 Multimeter
- Made for use in Caterpillar field service environment; case has extra thick walls and O-ring seals which keep out moisture; internal components are shock mounted; 10 Amp current range has 10 Amp 600 Volt fuse to protect multimeter against current overloads; will measure currents up to 20 Amps.
- Every function and range computer tested at factory; each meter has 100% burn-in test
- Improved reference element and voltage divider networks keep meters accurate for at least a year without calibration
- 1U-9534 Battery, 9-Volt, will run meter for 2000 hours; some multimeters have battery life of 200 hours; means 10 less battery replacements needed with Caterpillar meter



6V-7070 Heavy-Duty Digital Multimeter



6V-7072 Lead Kit, Deluxe for all meters



6V-3031 Case, Carrying for 6V-7070 Multimeter

Replacement items for use with Caterpillar Multimeters

- 6V-7803 Fuse, 2 Amp, 600V, for all Caterpillar Multimeters (Do not replace with 250 Volt fuse.)
- 6V-7802 Fuse, 10 Amp, 600V, for 6V-7801 or 6V-7804 lead (6V-7070 Multimeter) (Buss Part No. KTK10.)
- 9U-6398 Fuse, 15 Amp, 600 V used in newer meters



8T-3224 Tip Group, Needle

- Tips slip over standard or deluxe test lead tips to provide long, smaller diameter tip for inserting into connectors and other tight areas
- Required when using multimeters with Caterpillar Electrical Training Aids 8T-9170, 8T-9171 and 8T-9172 (no longer available as form numbers SEKV1700, SEKV1500, and SEKV2100, respectively)
- Insulated with teflon sleeving which may be cut back to expose more metal or to shorten metal tip

Reference

SEHS7734-01 Special Instruction

152-7213 Scopemeter 123, 120 VAC

SMCS Code: 0115-036

Model: All Models

Warranty: M

Features/Benefits

- Used to test and adjust electronic circuits
- Dual channel digital scope and dual channel true-RMS DMM
- Fully integrated — always displays scope waveforms and meter readings
- Battery life of up to five hours
- AUTO key for fast, rock stable waveform display of signals down to 1 Hz
- Save and recall feature for screen setups
- Integral holster stands up to rough treatment
- User assistance in English and Spanish
- Brilliant high contrast backlit LCD
- Hardened scratch-resistant lens protects LCD from damage
- Unique shielded test lead for all measurements
- All measurement terminals are isolated from earth ground
- Used to record trends and find intermittents using dual-channel TrendPlot

Specifications/Technical Information

Fluke 123 Industrial Scopemeter comes fully equipped with:

- BP 120 Rechargeable battery pack (installed)
- PM 8907 line voltage adapter/charger — 120 VAC, 50/60 Hz only
- Two STL 120 shielded test leads (one red, one gray; which includes two ground leads)
- One black TL75 test lead
- Two HC 120 Hook Clips
- Three AC 120 Alligator clips
- One BB 120 Shielded Banana to BNC adapter
- User's Manual

Dual Input Oscilloscope

Vertical

Bandwidth 20 MHz at inputs
with STL120 1:1 leads: 12.5 MHz
with PM 8918 10:1 optional probes 20 MHz

Coupling AC, DC
Sensitivity 5mV/div to 500 V/div
Vertical Resolution 8 bit
Accuracy $\pm(2\% \text{ of reading} + 0.05 \times \text{range/div})$

Horizontal

Range 20 ns/div to 60 s/div
Acquisition modes normal, single, roll, envelope, smooth
Max. sample rate 1.25 GS/s for repetitive signals
25 MS/s for single shot

Record length 512 samples per channel
Accuracy $\pm(0.1\% \text{ of reading} + 0.04 \times \text{time/div})$
Glitch capture 40 ns or longer

Trigger

Source A or B. External via optional ITP120
Modes auto, triggered, single
Video NTSC, PAL, PAL+, SECAM
random lines or user selectable Line
Pre-trigger up to 10 division of pre-trigger view

Measurements

VDC, VAC, VAC+DC, Vpeak, Vpeak-peak, Frequency, Duty Cycle, Pulse Width and Phase. Measurements can be scaled to Amps.

Memory

Type of memory 2 screens, 10 user setups

Dual Input 5000 Count Autoranging Meter

DC Voltage VDC

Ranges 500 mV, 5V, 50V, 500V, 1250V
Accuracy $\pm(0.5\% + 5 \text{ counts})$

True RMS Voltage VAC and VAC+DC

Ranges 500 mV, 5V, 50V, 500V, 1250V
Accuracy $\pm(1\% + 10 \text{ counts})$

Additional Measurements and Functions

Ohms, Continuity, Diode Test, Amps, °C or °F, Capacitance, dBV, dBm, Crest Factor, Touch Hold, and Zero Set. (Amps, °C or °F with optional probes)

TrendPlot™

Graphs meter readings of the MIN and MAX values from 120 seconds to 16 days. Automatic vertical scaling and time compression. Displays the actual and MIN, MAX or AVG reading.

T&SPG 2000

General Specifications**Display**

Cold cathode fluorescent backlit LCD. Contrast and brightness user adjustable. Wide viewing angle.

Size 72 x 72 mm (2.8 x 2.8 in)

Power

Line voltage adapter/battery charger included (120 VAC, 50/60 Hz)

For 220 VAC operation, order optional 138-1154 Battery Charger.

Installed battery rechargeable NiCd pack

Operating time up to 5 hours

Charging time 4 hours

Environmental

Temperature 0°C to 50°C

Environmental MIL-T-28800E, Type III, Class 3, Style B

Electro-Magnetic Compatibility

Emmission ... EN50081-1 (1992): EN55022 and EN60555-2

Immunity EN50082-2 (1992): IEC1000-4-2, -3, -5

Enclosure protection IP51, IEC529 (dust, drip proof)

Mechanical Data

Size 50 x 115 x 232 mm (2 x 4.5 x 9.1 in)

Weight 1.2 kg (2.5 lb.)

Safety

Designed for measurements on 600V Overvoltage Category III Installations, Pollution Degree 2, per:

ANSI/ISA S82.01-1994, EN61010.1 (1993) (IEC1010-1), CAN/CSA-C22.2 No. 1010.1-92, UL3111-1

Surge protection 6kV on input A and B

Floating measurements 600 Vrms
from any terminal to ground

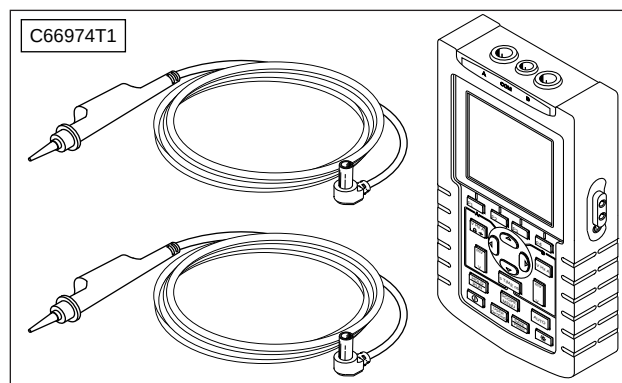
Optically Isolated RS-232 Interface

To printer supports HP LaserJet®, DeskJet®, Epson FX/LQ, and Postscript

To PC Dump and load settings and data, compatible with FlukeView® Software SW90W/012E for Windows

Warranty

Description 3 years parts and labor



152-7213 Scopemeter 123

Reference

User's Manual (supplied by OEM)

The following sub-article is part of the main article.

220 Volt Power Adapter for Fluke 123 Scopemeter**Features/Benefits****138-1154 Power Adapter, 220 Volt**

- Used to connect 152-7213 Fluke 123 Scopemeter to a 220 VAC utility power supply

Specifications/Technical Information

Input volts 115 VAC $\pm$ 10% or 230 VAC $\pm$ 15%

Line frequency 50, 60, 400 Hz $\pm$ 10%

Output voltage 15 VDC

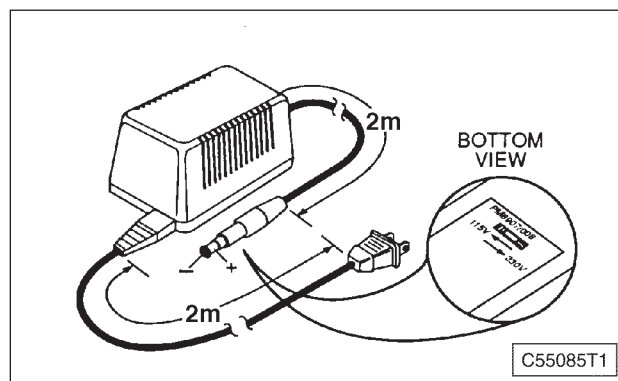
Output current 300 milliamps maximum

Power consumption 7 watt maximum

Output plug 5 mm power jack per DIN 45232

Operating temperature 0 to 40°C (104°F)

Input plug standard 110V



138-1154 Power Adapter, 220 Volt

9U-7330 Multimeter, Fluke 87

SMCS Code: 0115-036

Model: All Models

Warranty: M

See Second Supplement

Features/Benefits

9U-7330 Multimeter

- Used to test and adjust electronic circuits
- Min/Max/Average recording mode with Min/Max Alert™
- Measures frequency, duty cycle, and capacitance
- Built-in protection against 1000V rms input
- Input Alert™ detects incorrect input jack connections
- Three 3/4-digit, 4000 count display, updates 4 times a second — analog display updates 40 times a second
- Four 1/2-digit mode has 1 ms peak hold, backlit display, and true rms measurements
- Touch hold and relative modes
- Case is splash and dust proof — also EMI shielded

Specifications/Technical Information

General Specifications

Size 52 x 98 x 201.0 mm (2.06 x 3.86 x 7.93 inch)
 Weight 0.62 kg (22.0 oz)
 Battery life 500 hrs. typical using 1U-9534 Alkaline 9V
 Display update rate 3 times/sec in Hz and
 1.5/sec in duty cycle for inputs > 10 Hz

Environmental:

Operation temperature -18 to 50°C (0 to 122°F)
 Storage temperature -20 to 70°C (-4 to 158°F)

9U-7330 Multimeter

Voltage:

AC and DC 0mV - 1000V
 Accuracy $\pm(0.1\% + 1 \text{ digit})$ DC
 $\pm(0.7\% + 2 \text{ digits})$ AC

Input impedance 10 M Ω
 Overload protection 1000V rms

Current:

AC and DC 0 μ A - 10A
 Accuracy $\pm(0.2\% + 2 \text{ digits})$ DC
 $\pm(1.0\% + 2 \text{ digits})$ AC

Input protection 3N-5612 Fuse, 1A 600V,
 for mA μ A range
 9U-6398 Fuse, 15A 600V, for A range

3N-5612 Fuse:

Voltage rating 600 Volt
 Current rating 1 Amp
 Size 10.3 mm dia. X 34.9 mm
 (13/32 inch dia. X 1 3/8 inch)

Load carrying capacity 110% load indefinitely,
 opens at 135% load within 1 hour

9U-6398 Fuse

Voltage rating 600 Volt
 Current rating 15 Amp
 Size 10.3 mm dia. X 38.1 mm
 (13/32 inch dia. X 1 1/2 inch)

Load carrying capacity 110% load 4 hours,
 opens at 135% load within 1 hour

171-5207 Fuse (11A)

Voltage rating 1000 Volt
 Current rating 440 mAmp
 Size 10.3 mm dia. X 38.1 mm
 (13/32 inch dia. X 1 1/2 inch)

Load carrying capacity 110% load 4 hours,
 opens at 135% load within 1 hour

121-5209 Fuse (440 mAmp)

Voltage rating 1000 Volt
 Current rating 15 Amp
 Size 10.3 mm dia. X 34.9 mm
 (13/32 inch dia. X 1 3/8 inch)

Load carrying capacity 110% load 4 hours,
 opens at 135% load within 1 hour

Short circuit interruption 100,000 Amps at 600 Volts AC

Ohms and Diode Test:

Ohms 0 - 400.00 M Ω
 Accuracy $\pm 0.2\% + 1 \text{ digit}$
 Open circuit voltage < 1.3 in ohms and
 < 3.9V in diode test

Short circuit current < 500 μ A in ohms and
 < 1 mA in diode test

Diode test displays voltage drop to 3.000V
 Accuracy $\pm 2.0\% + 1 \text{ digit}$
 Continuity continuous tone 2731 Hz for
 resistance < 20

Capacitance:

Range 0 nF - 5.00 μ F
 Accuracy $\pm 1.0\% + 2 \text{ digits}$

Frequency and Duty Cycle:

Input range 0.5Hz to > 200 kHz frequency
 > 2 μ s pulse width

Hz range 0 - > 200 kHz

Duty cycle range 0.1% to 99.9%

Accuracy $\pm(0.005\% + 1 \text{ digit})$ frequency
 $\pm(0.05\% \text{ per kHz} + 0.1\%)$ for a 5V logic signal

Sensitivity - 150 mV

Trigger level approx. 0V AC and 10% of range DC



9U-7330 Fluke 87 Multimeter

T&SPG 2000

163-0096 Process Calibrator**163-0097 Spare Battery**

SMCS Code: 7002-038, 0778-035

Model: 3600 Series Generator Set

Warranty: M

Features/Benefits

- Used to source/measure temperature and electrical signals with precise accuracy, all in one rugged, hand-held device
- Automatically captures calibration results
- Measures/simulates eleven different types of thermocouples and eight different RTD's
- Stores up to 8,000 readings
- Unit is protected against dirt, dust, vibration, and moisture
- Operates in English, French, German, Italian, or Spanish
- Equipped with a built-in calculator
- CE compliant (For European use)
- Comes with three-year warranty
- Comes with ISO9001 Calibration Certificate
- Used to calibrate 3600 Protection Systems, Marine Monitoring Systems, 3600 Engine Management Systems, 3600 Electronic Unit Injection Systems and 3600 Custom PLC Systems
- AC power cable must be ordered to operate battery charger

131-5047 110 VAC USA Plug

or

133-6975 220 VAC European Plug

RTD's and Thermocouples

Device	Measure Accuracy	Source Accuracy
10Ω Cu (427)	3°C	1°C
100Ω Pt (3916)	0.3°C	0.1°C
100Ω Pt (3926)	0.3°C	0.1°C
100Ω Pt (385)	0.3°C	0.1°C
200Ω Pt (385)	0.3°C	0.1°C
500Ω Pt (385)	0.3°C	0.1°C
1000Ω Pt (385)	0.3°C	0.1°C
120Ω Ni (672)	0.3°C	0.1°C
E	0.3°C	0.2°C
N	0.5°C	0.3°C
J	0.3°C	0.2°C
L	0.3°C	0.2°C
K	0.3°C	0.3°C
T	0.3°C	0.3°C
U	0.3°C	0.3°C
B	0.9°C	0.8°C
R	1.0°C	0.9°C
S	0.9°C	0.9°C
C	0.6°C	0.6°C

Resolution: 0.1°C, except 1°C for 10Ω Cu. Best case, mid-range accuracies. Sensor inaccuracies not included. For 2-wire and 3-wire RTD measurements, add 0.4°C. Thermocouple accuracies with external cold junction. For internal add 0.2°C.

Specifications/Technical Information

Dimensions (W x D x H) 130 mm x 61 mm x 236 mm
(5.1 in x 2.4 in x 9.3 in)

Weight 1.4 kg (3 lb 1 oz)

Display 240 by 200 pixel graphic LCD

Memory Backup Lithium battery, 5 years typical lifetime

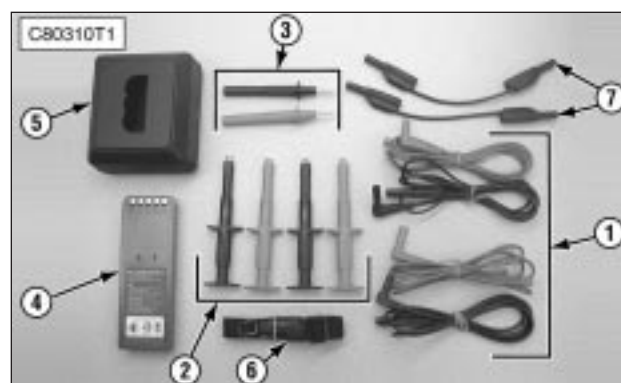
Operating temperature -10°C to 50°C (14°F to 122°F)

Storage temperature -20°C to 60°C (-4°F to 140°F)

Electrical Specifications			
Measure Range (full scale)	Measure Accuracy (% of reading + % of full scale)	Source Range (full scale)	Source Accuracy (% of reading + % of full scale)
110.000 mV DC	0.025% + 0.015%	110.000 mV	0.01% + 0.005%
1.10000V DC	0.025% + 0.005%	1.10000V	0.01% + 0.005%
11.0000V DC	0.025% + 0.005%	15.0000V	0.01% + 0.005%
110.000V DC	0.05% + 0.005%		
300.00V DC	0.05% + 0.005%		
V AC, 20 TO 40 Hz	2% + 10 Counts		
V AC, 40 TO 500 Hz	0.5% + 5		
V AC, 500 TO 1 kHz	2% + 10		
V AC, 1 kHz to 5 kHz	10% + 20		
30.000 mA DC	0.01% + 0.015%	Source 22.000 mA	0.01% + 0.015%
110.00mA DC	0.01% + 0.15%	Simulate 22.000 mA	0.02% + 0.03%
11.000Ω	0.05% + 50Ω	11.000Ω	0.01% + 20 mΩ
110.00Ω	0.05% + 50Ω	110.00Ω	0.01% + 40 mΩ
1.1000 kΩ	0.05% + 0.5Ω	1.1000 kΩ	0.02% + 0.5Ω
11.000 kΩ	0.1% + 10Ω	11.000 kΩ	0.03% + 5Ω
1.00 to 109.99 Hz	0.05 Hz	0.00 to 10.99 Hz	0.01 Hz
110.0 to 1099.9 Hz	0.5 Hz	11.00 to 109.99 Hz	0.1 Hz
1.100 to 10.999 kHz	5 Hz	110.0 to 1099.9 Hz	0.1 Hz
11.00 to 50.00 kHz	50 Hz	1.100 to 21.999 kHz	2 Hz
		22.000 to 50.000 kHz	5 Hz



163-0096 Process Calibrator



163-0096 Process Calibrator includes:

1. 2 sets of test leads
2. 2 sets of alligator clips
3. 1 set of probe leads
4. 1 Nickel-Cadmium 7.2 V battery
5. 1 battery charger
6. 1 carrying strap
7. 2 jumper leads

Also available:

- Spare 163-0097 Battery
- 8T-0458 Type K Thermocouple

T&SPG 2000

1U-8115 Test Lead Set, Insulated Tip

SMCS Code: 1400-081
Model: All Models
Warranty: Y

Features/Benefits

- Optional accessory lead set 6V-7070 Multimeters which have 9.5 mm (.375 in.) diameter input connectors; older meters have larger diameter connectors
- Spring loaded insulators over metal probe tips to prevent tips from making accidental electrical contact with wires and terminals during testing; accidental electrical contact can be a problem when reaching into electrical circuitry with normal test leads which have as much as 19 mm (.75 in.) of bare probe exposed; on 1U-8115 Test Lead probes, only very tip of probe normally exposed
- However, since insulating sleeves are spring loaded, they can be pushed back at any time to expose more of metal tip; allows metal probe tip to enter small diameter holes when testing connectors; insulators can be pushed back and locked in position to uncover approximately 6.3 mm (.25 in.) of bare probe

Specifications/Technical Information

Lead length	1378 mm (54 in.)
Connectors	9.5 mm (.375 in.)
	diameter shielded bannana plug
Maximum voltage rating	700 Volts AC or DC
Color	1 red and 1 black lead
Probe tip diameter	1.77 mm (.070 in.)
Probe tip length	15 mm (.6 in.) maximum



1U-8115 Test Lead Set

4C-5521 Phase Sequence Meter

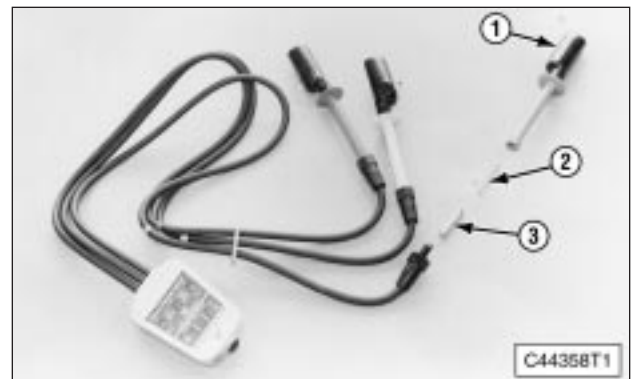
SMCS Code: 1400-081, 0785
Model: All Generator Sets
Warranty: Y

Features/Benefits

- Provides positive identification of phase sequence of energized 3-phase, 40-60 Hz AC power lines from 100 to 600 Volts
- Gives user indication that all phases have continuity or will indicate phase that has a fault
- Has heavily insulated fused leads for users protection
- Enhanced durability because there are no moving parts such as 3-phase motor which is used in some meters; in this meter, a single PC board is housed in durable molded plastic case; wearing parts in Caterpillar part system

Specifications/Technical Information

Voltage 100-600 VAC (3 phase), 40-60 Hz
Dimensions 8.9 cm x 6.3 cm x 1.9 cm
(3 1/2 inch x 2 1/2 inch x 3/4 inch)
Weight 0.38kg (13.5 oz.)



1. 4C-5531 Clip, Boot (red)
4C-5532 Clip, Boot (Yellow)
4C-5533 Clip, Boot (Blue)
2. 4C-5534 Spring
3. 4C-5535 Fuse (500mA)

Reference

NEHS0533 Special Instruction

152-7143 Cable Assembly (GSC Data Cable)

SMCS Code: 4450-038
Model: Generator Sets
Warranty: Y

Features/Benefits

- Used to flash-program EMCP2+ Generator Status Control (GSC) module
- Used with universal communications adapter cable (139-4166)
- Requires Caterpillar ET and communication adapter (7X-1701)
- Flash-programming only used for field updates



152-7143 Cable Assembly (GSC Data Cable)

4C-4500 Power Factor Meter Group

Canceled



4C-4500 Power Factor Meter Group

Includes:

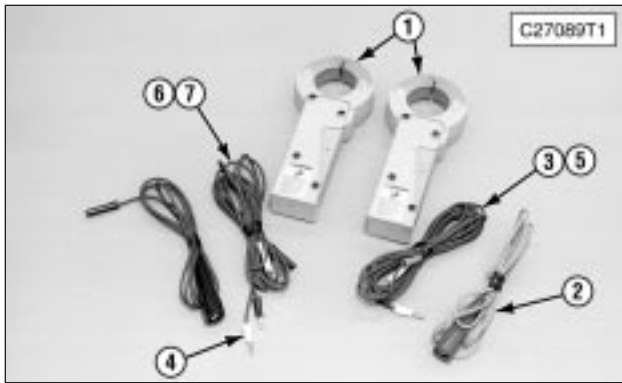
1. 4C-4521 Multimeter, Basic (PMIIB)
2. 4C-4522 Printer (PRM2)
3. 4C-4523 Three Phase Kit, 2-1/4 inch I.D.
4. 4C-4534 Lead, Voltage, Red
5. 4C-4535 Lead, Voltage, Blue
6. 4C-4536 Lead, Voltage, Black
7. 4C-4537 Lead, Voltage, White
8. 4C-4538 Lead, Red (for 4C-4532 Standard CT)
9. 4C-4539 Lead, White (for 4C-4532 Standard CT)
10. 4C-4540 Lead, Blue (for 4C-4533 Auxiliary CT)
11. 4C-4541 Lead, White (for 4C-4533 Auxiliary CT)
12. 4C-4542 Lead, Black (for 4C-4533 Auxiliary CT)
13. 4C-4529 Cord, AC Power
14. 4C-4543 Cable, Interconnect



4C-4521 PMIIB Basic Multimeter (Included in 4C-4500)

1. 4C-4532 Standard Current Transformer
2. 4C-4534 Lead, Voltage, Red
3. 4C-4537 Lead, Voltage, White
4. 4C-4538 Lead, Red (for 4C-4532 Standard CT)
5. 4C-4539 Lead, White (for 4C-4532 Standard CT)

T&SPG 2000



- 4C-4523 Three Phase Kit (Included in 4C-4500)
- 1. 4C-4533 Auxiliary Current Transformer
 - 2. 4C-4535 Lead, Voltage, Blue
 - 3. 4C-4536 Lead, Voltage, Black
 - 4. 4C-4537 Lead, Voltage, White
 - 5. 4C-4540 Lead, Blue (for 4C-4533 Auxiliary CT)
 - 6. 4C-4541 Lead, White (for 4C-4533 Auxiliary CT)
 - 7. 4C-4542 Lead, Black (for 4C-4533 Auxiliary CT)



- 4C-4522 PRM2 (Printer) (Included in 4C-4500)
- 4C-4530 Power Cord, 12 VDC, 1.83 m (6 ft.) long
- 4C-4531 Paper, Thermal, for 4C-4522 Printer (box of 12 rolls)

Caterpillar/Esterline Part Number Reference Chart		
Cat Part No.	Esterline Part No.	Description
4C-4500 ¹	S23290	Power Factor Meter Group
4C-4521 ¹	S23171	Multimeter, Basic (PM11B)
4C-4522 ¹	S23175	Printer (PRM2)
4C-4523 ¹	S22976	Three Phase Kit
4C-4524	812D901	Transformer, Large Current (1000/2000/3000 amps)
4C-4525	812A902	Transformer, Small Current (100 amps)
4C-4526	S23068	Power Supply, AC (for 4C-4521)
4C-4527	723B87	Battery, 12 VDC
4C-4528	723A131	Battery Charger, 12 VDC
4C-4529	853B200	Cord, AC Power
4C-4530	853B201	Power Cord, 12 VDC 1.83 m (6 ft. long)
4C-4531	853A900	Paper, Thermal
4C-4532	812D12-1	Standard Current Transformer
4C-4533	812D12-2	Auxiliary Current Transformer
4C-4534	812B413-2	Lead, Voltage, Red
4C-4535	812B413-3	Lead, Voltage, Black
4C-4537	812B413-4	Lead, Voltage, White
4C-4538	812B414-1	Lead, Red (for 4C-4532)
4C-4539	812B414-2	Lead, White (for 4C-4532)
4C-4540	812B414-3	Lead, Blue (for 4C-4533)
4C-4541	812B414-4	Lead, White (for 4C-4533)
4C-4542	812B414-5	Lead, Black (for 4C-4533)
4C-4543 ¹	85C506-080	Cable, Interconnect
4C-9073	853B202	Cable, Assembly

¹Included in 4C-4500 Power Factor Meter Group

Reference

- NEHS0529 Special Instruction
- NEHS0531 Special Instruction

4C-9073 Cable Assembly

SMCS Code: 0785
Model: All Generator Sets

Features/Benefits

- Used in recharging battery in 4C-4500 Power Factor Meter Group
- Connects 4C-4527 Battery and 4C-4528 Battery Charger

Reference

- NEHS0529 Special Instruction

6V-2150 Analyzer Group, Starting/Charging

SMCS Code: 1000-010, 1000-038, 1400-038, 1400-081, 1450-081

Model: All Models

Warranty: Y

Features/Benefits

- Allows one man to quickly check 14 test points in starting and charging system on all 24-volt Caterpillar earthmoving machines made after July 1981, that have automotive type key start and are equipped with a diagonal connector
- Identifies deteriorated starting and charging system components before they fail.
- Checks can be made with single connection to diagnostic connector on the machine, in the field and without removal of any sheet metal
- Works as voltmeter which gives an easy-to-read "go" or "no go" indication for all 14 test points
- 5.5 m cable permits test to be made in operator's seat of vehicle
- Checks not only condition of components and circuits with more speed and accuracy, but can also be used as part of Preventive Maintenance (PM) or Technical Analysis (TA) inspection; used this way, it can decrease possibility of sudden downtime in near future

Specifications/Technical Information

Weight	3.2 kg (7 lbs)
Size	394 mm x 311 mm x 102 mm (15.5 inch x 12.25 inch x 4 inch)
Cable Length	217 inch (5500 mm)
Power required	10 to 30 Volts at 250 mA from 24-Volt vehicle electrical system
Operating temperature range	-18°C to +60°C (0°F to 140°F)
Recommended storage temperature	-40°C to 80°C (-40°F to 176°F)



1. 6V-3072 Case
 2. 6V-3112 Base — Plastic housing for test panel
 3. 6V-4174 Packing Set
 4. 6V-3178 Cable Assembly
- NEEG2036 Instruction Decal
NEEG2041 Title Decal

Reference

SEHS7768 Special Instruction (usage)
SEHS8145 Special Instruction (repair)

110-4645 Cable Assembly, Adapter (Starting/Charging analyzer)

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

Model: D5M, D6M, D6R, and D7R Track-Type Tractor

Warranty: Y

Features/Benefits

- Used to connect machine to 6V-2150 Analyzer Group (Starting/Charging)
- Used to check 24 volt starting and charging systems

Specifications/Technical Information

Overall length 3 m (18 ft)



110-4645 Adapter Cable Assembly

T&SPG 2000

4C-4029 Trimmer Adjustment Tool

SMCS Code: 0785

Model: All Models

Warranty:

Features/Benefits

- Allows easier adjustment of small screwdriver adjustments found on VR3 and VR4 Voltage Regulators and 2301 Woodward Regulator Controls
- Constructed of glass-filled, nylon body with stainless steel blades; one end has recessed blade to provide captive screwdriver for adjustments that are difficult to see; other end has exposed blade to reach adjustments that are behind panels and have small access holes
- Gain and level controls on VR3 Voltage Regulator are inside regulator case and difficult to adjust when generator set is in operation; inability to see the control and vibration of regulator make fine adjustments very difficult
- Prevents broken controls on Woodward 2301 Controls caused by improper tool usage and excessive force required for adjustment when wrong tool is used



4C-4029 Trimmer Adjustment Tool

4C-4693 Tester Group, VR3 and VR4 Regulator

SMCS Code: 1400-023, 0785

Model: All Models

Warranty: Y

Features/Benefits

- Supplies voltages necessary to check all styles of VR3 and VR4 regulators; serviceman selects correct sense voltage
- Operates from 110/220 VAC source
- Uses 100-watt light bulb as load for field current
- Has test ports to measure sense voltage and field voltage with probes supplied with Caterpillar multimeter

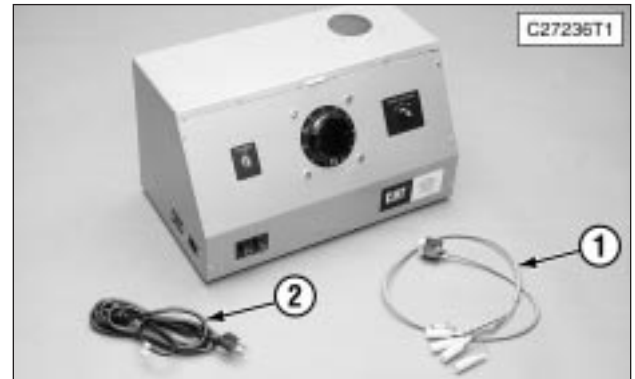
Specifications/Technical Information

Input Voltage 110/220 VAC, 50/60 Hz

Output Voltage variable from 0 VAC to 20%
over selected Sense voltage

Output Voltage 0 VAC to 80 VAC (PM supply only)

Sense Voltage 120 VAC, 240 VAC or 480 VAC



4C-4693 Tester Group, VR3 and VR4 Regulator

1. 4C-4694 Cable Assembly
2. 4C-4529 Line Cord

Reference

Instructions included with each tool or order

NEHS0535

154-9740 Kit, Housing

SMCS Code: 1408-023

Model: All Models

Warranty: Y

Features/Benefits

- Used to create a solid cable-to-component connection with an easily installed thumbscrew connector
- Works on any cable using DB-9 slotted-head, screw-type connector (similar to 7X-1425 Cable)
- No need to disconnect wires from connector (requires only cutting a slit in new grommet when spanning wire)
- No extra tools required — saves time and effort



154-9740 Housing Kit (cable not included)

FT1488 Tester Group, Exciter

SMCS Code: 1404-036

Model: SR-4 and SRCR Generators

Warranty: None

Features/Benefits

- Used to test regulator-exciter control assemblies on SR-4 and SRCR Generators
- Drawing provides complete details for assembling bench tester which will simulate generator for repairing exciter in the shop



FT1488 Tester Group, Exciter

5P-6590 Tester Group, Wiring

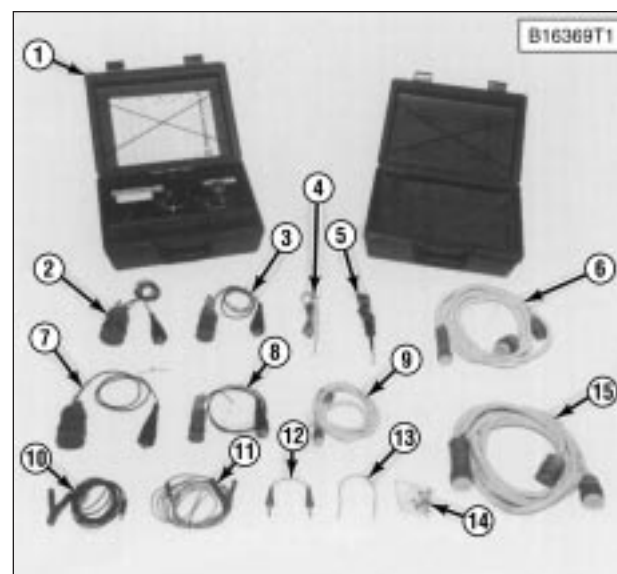
Canceled

SMCS Code: 1000-038, 1400-038, 3150-038, 3150-038, 3168-038

Model: 621E, 627E, 637D, 637E, 768C, 769C

Warranty: Y

See Fourth Supplement



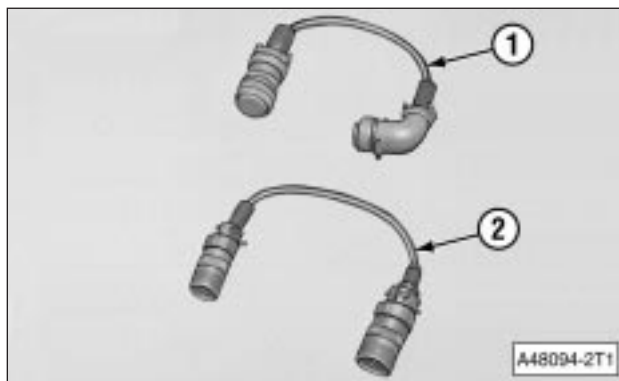
1. 4C-3975 Case (two)
SEHS7153 Test Card (not shown)
2. 6V-0189 Adapter Assembly
3. 5P-0959 Adapter Assembly, Ground (16 pin)
4. 8T-0500 Tester, Continuity
5. 5P-7277 Tester, Voltage
6. 5P-8561 Harness Assembly, Test (10 pin)
7. 5P-9719 Adapter, Ground (35 pin)
8. 5P-8562 Adapter Assembly, Ground (10 pin)
9. 5P-6597 Harness Assembly (2 pin)
10. 1P-2858 Lead Wire, Battery (black)
11. 1P-2857 Lead Wire, Battery (red)
12. 1S-9532 Wire Assembly
13. 5M-3215 Test Prod
14. 6V-6036 Lamp (five)
15. 5P-6598 Harness Assembly (16 pin)

Test Cards for 5P-6590 Wiring Tester Group

- SEHS7153, Schematic of tests using 5P-6590 (Included with 5P-6590)
- SEHS7178, Testing 657B (Effective with S/N 68K-1061, 47M250, 53K981)
- SEHS7237, Testing 637D (Effective with S/N 26W386, 27W652, 67W317, 71W433, 22W593)
- SEHS7371, Testing 777 (Effective with S/N 84A1)

T&SPG 2000

Auxiliary Equipment for Use With 5P-6590 and Canceled 1P-3550 Tester Group

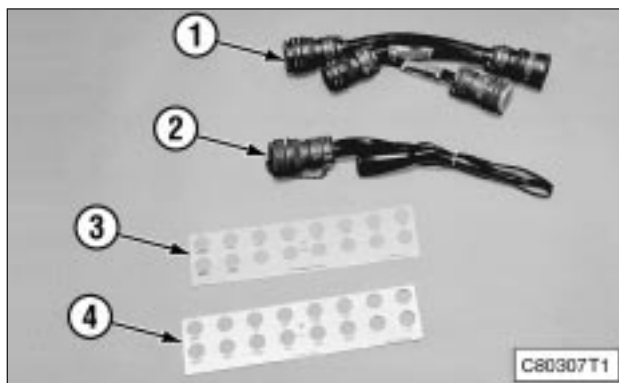


657A and 666A (with 7 pin connectors):

1. 1P-2859 Cable Assembly (7 pin to 16 pin)
2. 1P-2861 Cable Assembly (7 pin to 16 pin)
- 1P-2863 Overlay (included with 1P-3550)

773 Truck:

1. 1P-2859 Cable Assembly (7 pin to 16 pin)
2. 1P-2861 Cable Assembly (7 pin to 16 pin)
- 1P-2864 Overlay (included with 1P-3550)



627B Tractor-Scraper:

1. 5P-4192 Cable Assembly
2. 5P-5229 Adapter, Ground
3. 5P-4191 Overlay
4. 5P-4190 Overlay

Test Card Form SEHS7238 for S/N effective with 14S703, 56V453, 15S961, 34V554, 38V971

666B Rear Engine Electric Start (with 16 pin connectors):

1P-2863 Overlay (included with 1P-3550)

657A and 666A (with 16 pin connectors):

1P-2862 Overlay (included with 1P-3550)

657B and 666B (with 10 and 16 pin connectors):

1P-2862 Overlay (included with 1P-3550)

5P-8561 Cable Assembly, 10 pin to 16 pin, (included with 5P-6590); 1P-3072 and 1P-3077 Cable Assemblies (part of 1P-3550) can be used instead

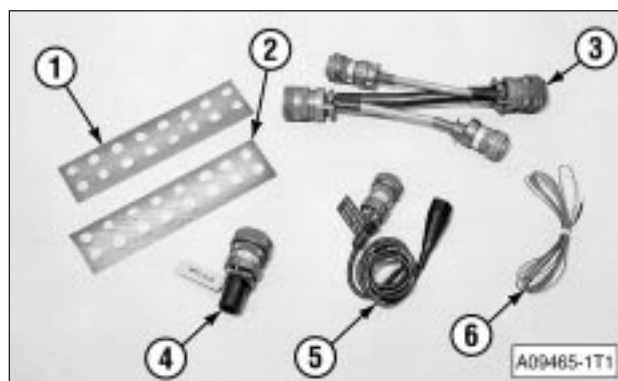
657A and 666A (with 10 pin connectors):

1P-2863 Overlay (included with 1P-3550)

5P-8561 Cable Assembly, 10 pin to 16 pin, (included with 5P-6590); 1P-3072 and 1P-3077 Cable Assemblies (part of 1P-3550) can be used instead

637D Tractor-Scraper:

6V-0189 Adapter Assembly (included with 5P-6590)

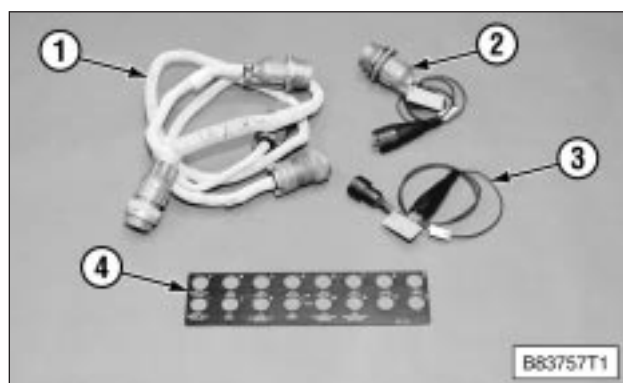


657B with Eight Speed Scraper Transmission

1. 5P-0164 Overlay (16 pin connections — engine and transmission)
2. 5P-0165 Overlay, (35 pin)
3. 5P-0163 Cable Assembly, Adapter, (35-16 pin)
4. 3P-2249 Adapter Assembly, Ground, (35 pin)
5. 5P-0959 Adapter Assembly, Ground, 16 pin, (included with 5P-6590)
6. 5P-0162 Probe Assembly, Voltmeter

657E Scraper

- 6V-7839, 6V-7844, 6V-7845 Harness Adapters and 6V-7875 Overlay available to test transmission wiring harnesses that have V.E. type connectors on 657E Scrapers; these tools can be used with 5P-6590 Wiring Harness Tester Group to test transmission harnesses for continuity, wire to wire shorts and wire to ground shorts
- 6V-7875 Overlay fits over front panel of 5P-6590 Wiring Harness Tester; can help operator quickly trace fault to correct wire in wiring harness



1. 6V-7839 Adapter, Harness
2. 6V-7844 Adapter, Harness
3. 6V-7845 Adapter, Harness
4. 6V-7875 Overlay

Reference

SMHS7418 Special Instruction (5P-6590 usage, repair)
SMHS7842 Special Instruction (testing machines with electronic switching control)
SENR2670 Testing and Adjusting Module, 657E Power Train (harness tester)

T&SPG 2000

Tools for Electronic Engines

4C-3406 Connector Repair Kit, Deutsch

SMCS Code: 1408-023
Model: Electronic Engines
Warranty: G

See Fourth Supplement

- Replaces canceled 1U-5803 Connector Repair Kit, Deutsch (4C-3501 Upgrade Kit upgrades 1U-5803 to 4C-3406 Kit)



4C-3406 Deutsch Connector Repair Kit

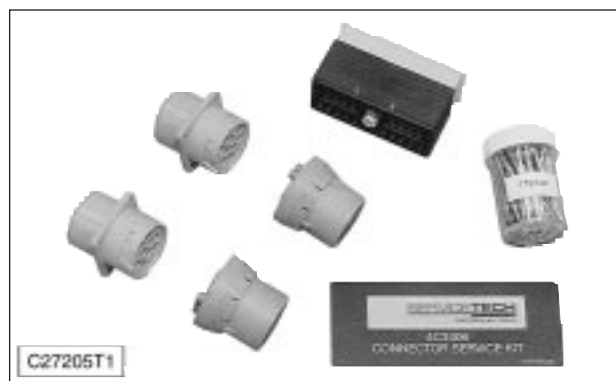
1. 1U-5804 Crimp Tool (1)
2. 1U-5805 Removal Tool #14 (5)
3. 7T-9742 Long Pin #16/18 (50)
4. 7X-6195 Receptacle, 9 Pin (2)
5. 8T-5318 Removal Tool #16/18 (10)
6. 8T-8729 Pin #16/18 (50)
7. 8T-8730 Socket #16/18 (50)
8. 8T-8731 Plug, 3 Socket (5)
9. 8T-8732 Receptacle, 3 Pin (5)
10. 8T-8733 Plug, 5 Socket (5)
11. 8T-8734 Receptacle, 5 Pin (5)
12. 8T-8735 Plug, 9 Socket (5)
13. 8T-8736 Receptacle, 9 Pin (5)
14. 8T-8737 Plug Seal (50)
15. 8T-9834 Plug, 40 Socket (1)
16. 9W-0844 Socket #14 (50)
17. 9W-0847 Plug, 9 Socket (2)
18. 9W-0852 Pin #14 (50)

4C-3501 Connector Upgrade Kit *Canceled*

SMCS Code: 1408-023
Model: 3406B PEEC, 3176
Warranty: G

Features/Benefits

- Upgrades canceled 1U-5803 Deutsch Connector Repair Kit to 4C-3406 Deutsch Connector Repair Kit (contains only items in 4C-3406 missing from 1U-5803)



4C-3501 Upgrade Kit

- 7T-9742 Long Pin #16/18 (50)
- 7X-6195 Receptacle 9 Pin (2)
- 8T-9834 Plug, 40 Socket (1)
- 9W-0847 Plug, 9 Socket (2)
- NEEG2388 Decal (1)

175-3700 DT Connector Service Kit

147-6456 Wedge Removal Tool

SMCS Code: 1408-023

Model: All Models with Electronic Controls

Warranty: Y

Features/Benefits

- Used to maintain and repair Deutsch “DT” style connectors on electronic engine control harnesses
- 175-3700 DT Connector Service Kit — connector/contact assortment for owners of 4C-3406 Connector Service Kits, which have 1U-5804 Crimp Tool
- 147-6456 Wedge Removal Tool included in kits — also available separately



1. 175-3700 DT Connector Service Kit (less crimp tool)
2. 147-6456 Wedge Removal Tool (included in kit)
3. 152-7997 Box, Utility

NOTE: 1U-5804 Crimp Tool is not included but can be ordered separately and is also part of 4C-3406 Connector Repair Kit.

Reference

SEHS9615 Special Instruction

A black plug and connector body has been released to improve sealing. Please reference SEHS9615 for a more detailed explanation of interchangeability.

121-9588 Removal Tool, 16 gauge TXL

SMCS Code: 1408-023

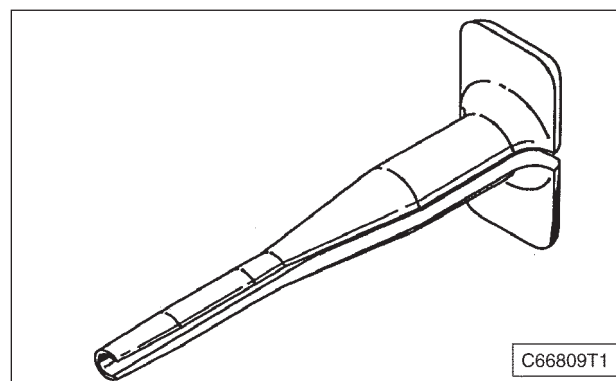
Model: 3116/3126 Engines with HEUI (Hydraulic Electronic Unit Injection)

Features/Benefits

- Used to remove wires from 40 pin connectors used on ADEM II (Advanced Diesel Engine Management) controls
- Tool slips over OD of wire and compresses wire retaining spring inside connector allowing wire to be removed
- If used improperly tool will breakaway before causing damage to connector's pin or socket

Specifications/Technical Information

Overall length 56.6 mm (2.23 inch)
 Handle size 12.7 x 25.4 (.50 x 1.00 inch)
 Material plastic



121-9588 Removal Tool

151-6320 Tool, Removal, 14, 16, 18 gauge SXL/GXL

SMCS Code: 1408-023

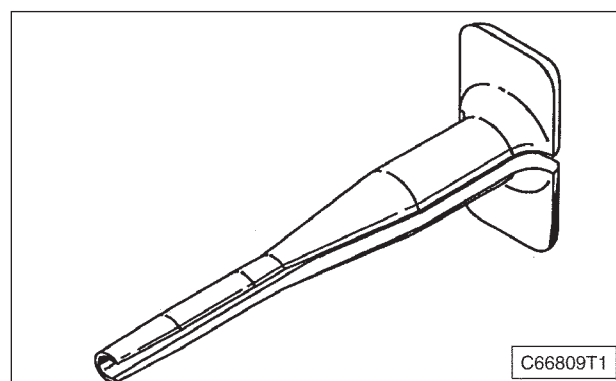
Model: All Models With Electronic Controls

Features/Benefits

- Replaces canceled 121-9587 Removal Tool (16 gauge GXL)
- Used to remove pins and sockets from Deutsch and AMP style connectors
- Versatile new design allows removal of 14, 16, and 18 gauge pins and sockets from connectors
- Made from a more durable material than former tool (reduces breakage)

Specifications/Technical Information

Overall length 57.5 mm (2.25 in)
 Handle size 12.7 x 25.4 mm (.50 x 1.00 in)
 Material plastic

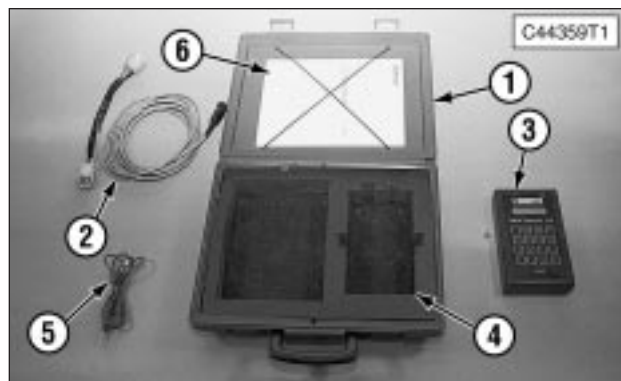


151-6320 Removal Tool

T&SPG 2000

7X-6400 Digital Diagnostic Tool (DDT)

Canceled



1. 6V-3072 Carrying Case
2. 8T-5275 T-Harness
3. DDT
4. Foam Insert
5. 8T-5277 PWM Probe
6. SEHS9076 Special Instruction

Reference

SEHS9076 Special Instruction

NEXG4508 Service Program Module, 3406 B/C Truck Engine

SMCS Code: 1900-038, 0781
Model: 3406 PEEC Truck Engine
Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip]
- Installed in 7X-6400 or 8T-5282 DDT by customer to provide all service functions for 3406 B/C Truck Engine
- Version number printed on module and can be displayed on DDT screen under Mode 00 (present version number compatible with all versions of 3406 B/C Truck Engine control personality modules)

Reference

SEHS8743 Special Instruction
NEEG2501 Diagnostic Code Card
NEEG2502 Driver's Card

NEXG4509 Service Program Module, 3176/3406E Truck Engine

SMCS Code: 1900-038, 0781
Model: 3176/3406 Truck Engine
Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip]
- Installed in 7X-6400 or 7X-1055 DDT by customer to provide all service functions for 3176 and 3406 Truck Engines
- Version number printed on module and can be displayed on DDT screen under Mode 00 (present version number compatible with all versions of 3176 and 3406E Truck Engines control personality modules)

Reference

SEHS8808 Special Instruction
NEEG2501 Pocket card
NEEG2502 Pocket card

NEXG4519 Service Program Module, Challenger 65/75/85

SMCS Code: 1900-038, 0781
Model: Challenger 65/75/85
Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip]
- Installed in 7X-6400 or 7X-1690 DDT by customer to provide all service functions for 3176 Engine in Challenger 65/75/85
- Version number printed on module and can be displayed on DDT screen under Mode 00

Reference

SEHS9203 Special Instruction

7X-1400 Digital Diagnostic Tool Group

SMCS Code: 1900-038, 0781
Model: Industrial Engine
Warranty: Y

Features/Benefits

- Basic electronics for Industrial Engine DDTs; addition of Service Program Module (SPM) allows it to function with Spark Ignited Engines
- 7X-1400 DDT can display diagnostic faults and engine RPM, display and change engine timing, and display engine detonation level on Industrial Engines; information displayed allows engine magneto to be calibrated
- Previous 8C-9904 DDT Spark Ignited Engines canceled in Morton; order 7X-1400 DDT from Morton and NEXG4511 Service Program Module (SPM) through Literature system
- 7X-1685 Cable Assembly (included in 7X-1400) needed to supply power to DDT and allow communication to engine control

Accessories Needed

- 7X-1400 DDT — S.I.
NEXG4511 SPM Subscription



1. 7X-1685 T-Harness
2. 6V-3072 Carrying Case
3. Foam Insert
4. SEHS9122 Special Instruction
5. DDT

Not shown:

- 7X-1414 Adapter, 10-Pin
- 7X-1415 Adapter, 4-Pin

Reference

SEHS9122 Special Instruction

123-6471 Diagnostic Tool Group

SMCS Code: 5450-036, 0784, 0785
Model: M312, M315, and M318 Wheeled Excavators
Warranty: Y

Features/Benefits

- Used to setup, test, calibrate, and troubleshoot M300 Series Wheeled Excavators
- Tester will display readings from both engine control and pump control systems
- This hand-held tool features a 4 line, 16 character liquid crystal display
- Power for diagnostic tool is supplied through vehicle's on-board diagnostic connectors

Specifications/Technical Information

Overall size with case 394 x 311 x 102 mm
(15.5 x 12.2 x 4.0 in)
Overall size (tester only) 205 x 106 x 31 mm
(8.05 x 4.2 x 1.2 in)
Cable length 3 m (10 ft)



123-6471 Portable Diagnostic Tool Group
Portable Diagnostic Tool (not serviced separately)
123-6475 Cable Assembly
6V-3072 Plastic Case
123-6473 Foam Block Group
NEEG2658 Decal (Outside Case)
NEEG2659 Decal (Control Panel)
SEHS9825 Special Instructions

Reference

SEHS9825 Special Instructions; SENR6261 Testing & Adjusting M300 Family Excavators Hydraulic Systems; SENR6265 Electronic Control System; SENR8931 Electronic Control System

T&SPG 2000

NEXG4511 Service Program Module, Industrial Engines

SMCS Code: 1900-038, 0781
Model: Industrial Engines
Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip] and subscription for updates
- Installed in 7X-1400 or 8C-9904 DDT by customer to provide most service functions for Industrial Engines
- Version number printed on module and can be displayed on DDT screen under Mode 00

Reference

SEHS8806 Special Instruction

NEXG4526 Service Program Module, EIS Monitor

SMCS Code: 1900-038, 0781
Model: Industrial Engines
Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip]
- Installed in 7X-1400 or 8C-9904 DDT by customer to provide most service functions for Industrial Engines
- Version number printed on module and can be displayed on DDT screen under Mode 00

Reference

NEHS0621

FT2360 Cable

FT2361 Cable

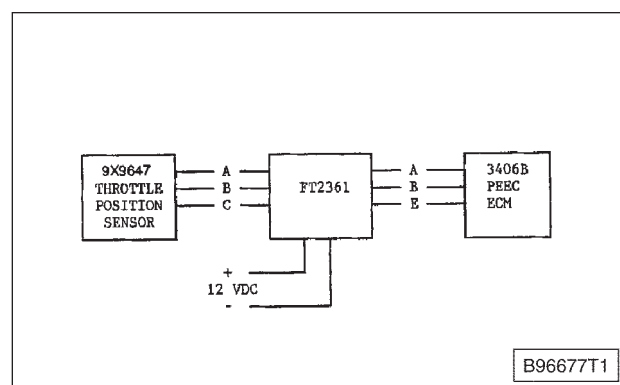
9X-9647 Throttle Position Sensor

SMCS Code: 1000-081
Model: 3176, 3406B
Warranty: None

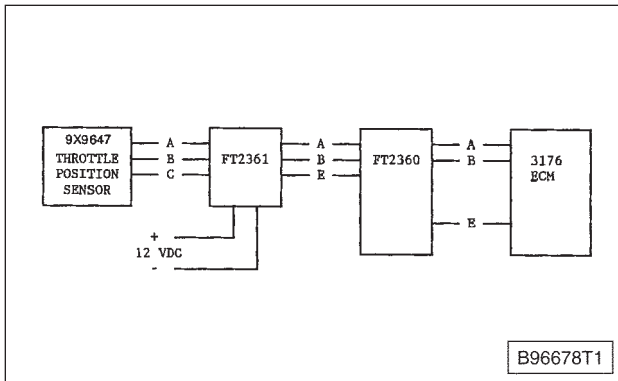
Features/Benefits

- Used for out-of-chassis testing of 3176 and 3406B PEEC Truck Engines on engine dynamometer
- Provide throttle position signal and power to ECM; allow engine to be tested on engine dynamometer like factory end-of-line test
- 9X-9647 is connected to engine's ECM (Electronic Control Module) and 12-volt power source, as shown below; 12 VDC can be supplied by 12-volt truck battery or by power supply of at least 10 amps
- FT2361 Cable is 3 meters long to easily connect ECM, Throttle Position Sensor and power source; 3176 test uses both cables; FT2360 Cable, with 3176 adapter, is just long enough to connect FT2361 Cable to 3176 ECM

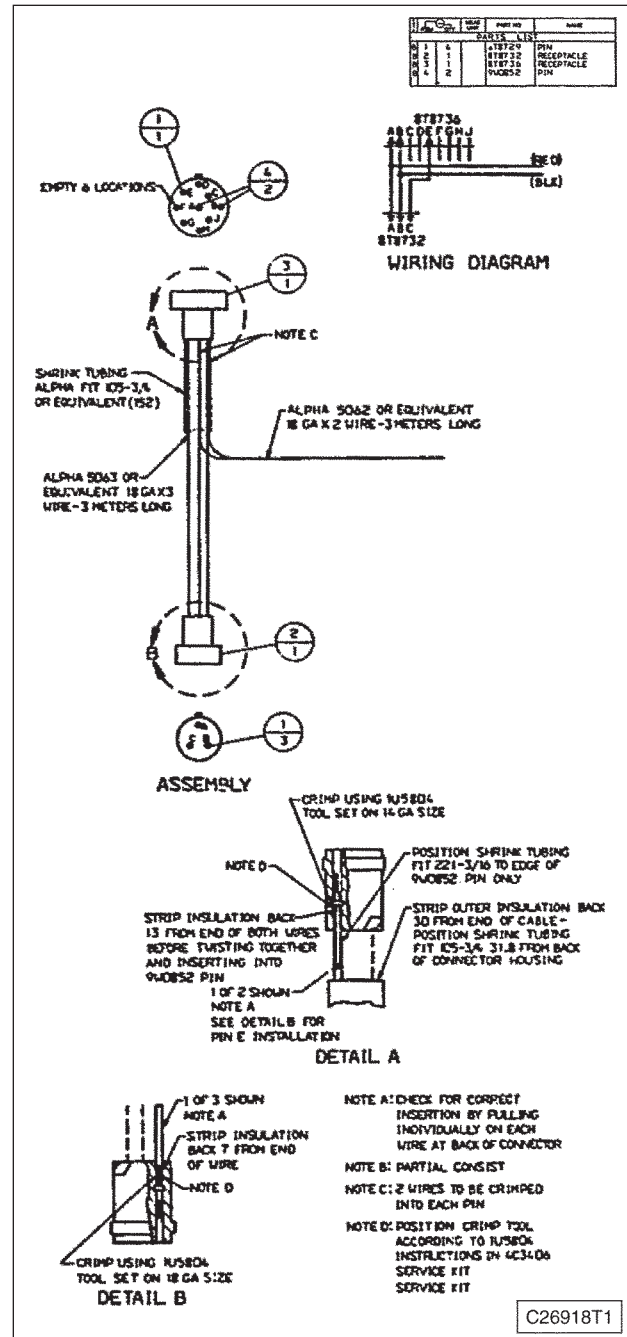
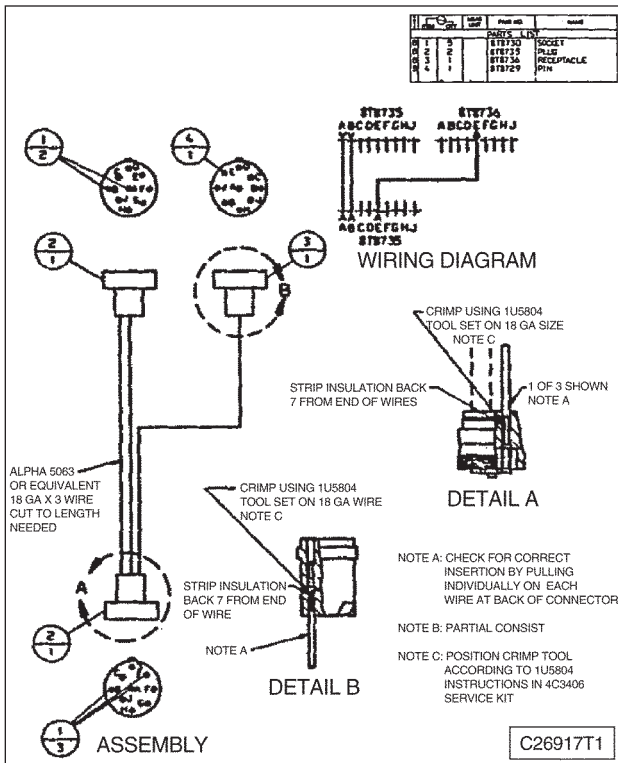
NOTE: To test an engine this way the ECM must not be programmed. If it is programmed, the customer-specified parameters must be removed before testing. An easy way to do this is to use an 8T-8697 ECAP equipped with an NEXG4512 Configuration Aid. Knowledge of the customer passwords is required. Access the ECM with the ECAP and, with the help of the Configuration Aid, store the customer-specified parameters in the ECAP. Then remove the customer-specified parameters from the ECM so the ECM is no longer programmed. After testing, the ECM can be reprogrammed to its original configuration from the data stored in the ECAP by the Configuration Aid.



Testing the 3406B PEEC Engine



Testing the 3176 Engine



T&SPG 2000

JERD2124, Caterpillar Electronic Technician (CAT ET)

JERD2125, Truck Engine Only

JERD2129, All Engines and Machines Combined

SMCS Code: 1900-038, 0781

Model: All Models with Electronic Controls

Warranty: Y

See Third Supplement

Features/Benefits

Caterpillar Electronic Technician (ET) is a service tool designed to run on a personal computer under Microsoft® Windows™. With ET you can display the status of a group of parameters (temperatures, pressures, etc.) simultaneously, view and clear active and logged diagnostics, or display the current configuration of an ECM. ET can perform these as well as many other tasks, such as:

- Display parameter status
- View and clear diagnostics
- View events where irregularities occurred and were logged by the ECM
- View and change configuration of the ECM
- Perform diagnostic tests
- Perform calibrations
- View Trip information through Trip Summary, Histograms and Custom reports
- Print reports and diagnostic results

For some subscriptions of Caterpillar Electronic Technician, additional programs have been included with the ET program.

Caterpillar Electronic Technician is designed to communicate with the ECMs through communication data link. Caterpillar Electronic Technician allows you to obtain data, analyze it, then diagnose existing and potential problems.

Software Features and Requirements

- CAT ET is designed to run as a "stand alone" Windows program or can be called from Service Information System (SIS) using OS/2 operating system
- All software subscriptions include future enhancements and data updates
- Software is provided with a single-use license (must purchase a copy of CAT ET for each computer)
- Site license is available for dealers purchasing more than 50 ETs for their main store and branches
- Software subscription includes Caterpillar Flash Memory Software (used for uploading new Personality Module data to ECM) and works with Caterpillar Common Services modules
- A 7X-1700 Communications Adapter is required, but not included, to connect personal computer to ECM — also required is NEXG4523 Service Program Module Software version 1.2
- Other required cables include: 7X-1425 Cable (RS232) and 139-4166 ATA/CAT Data Link Cable

Diagnostic Capabilities

- CAT ET software has separate pull-down menus for selecting different function screens and includes HELP Function Screen (very easy to use)
- Diagnostic software helps technicians make accurate repairs, in a short time frame, on products that are increasingly complex (finds the problem quickly and analyzes how to correct it)
- Views events where irregularities occurred and were logged by the ECM
- Views and changes configuration of ECM
- Retrieves engine totals for fuel used, miles traveled, etc.
- An ECM summary screen allows viewing of ECM version and identification — other screens allow diagnostic tests and calibrations to be performed
- Output data can be viewed in either English or metric units
- Caterpillar Electronic Technician is now fully integrated with Caterpillar Guided Diagnostics for On-Highway truck engines. This allows the service technician to effectively troubleshoot Active/Logged Diagnostic Codes, view wiring schematics, diagrams and access technical documentation. The technician can start Guided Diagnostics from the ET diagnostic code screen, from the ET Menu Bar or Icon Bar, or from the PC Desktop if the ECM cannot communicate with ET. Serial number prefixes covered by Guided Diagnostics with ET include: 9CK, 2PN, 1YN, 5EK, 6TS, 1WM, 4ES, 8WL, 7LG, 2YG, 4CK, 2EK, 5YG, 8TC.

Specifications/Technical Information

Minimum PC Configurations

- IBM® PC compatible with 486 33 MHz SL or SXL processor or greater
- 8 Mb of RAM
- 70 Mb of available hard disk drive
- CD-ROM
- 3.5 inch 1.44 Mb diskette drive
- VGA monitor or display
- Microsoft® Windows™ version 3.1 or greater, Windows NT, Windows 95 or IBM OS/2 Warp 3.0 or greater
- RS232 port with 16550AF UART
- Built in pointing device or mouse

Recommended PC Configurations

- IBM® PC compatible with Pentium 133 MHz processor
- 24 Mb of RAM
- 1 Gb of available hard disk drive
- 4X speed CD-ROM
- 3.5 inch 1.44 Mb diskette drive
- Super VGA color monitor or display
- Windows NT, Windows 95 or IBM OS/2 Warp 3.0 or greater
- RS232 port with 16550AF UART
- Built in pointing device or mouse

Other Requirements

- 7X-1700 Communications Adapter
- NEXG4523 Service Program Module Software (version 1.2 or higher) for 7X-1700 Communications Adapter
- 7X-1425 RS232 cable group
- 139-4166 Unicable (for CAT Data Link and ATA connections)
- 140-9442 T-cable (for CAT Data Link and ATA connections)

Software

- MS or PC DOS version 5.0 or greater
- Microsoft® Windows™ version 3.1 or greater
- Microsoft Windows 95

Ordering Information

CAT ET software can be ordered through the Corporate Literature Distribution System. All orders must include the media numbers for the program license and the data subscription desired. (Only one data subscription should be ordered for each CAT ET). The media numbers are as follows:

Program Single Use Licenses:

JERD2124, Program License

Annual Data Subscription (order one):

JERD2125, On-Highway Truck Engine

JERD2129, All Engines and Machines Combined

Each CAT ET software shipment includes: the CAT ET Program (single-use license) and the data subscription ordered.

Caterpillar Electronic Technician (Customer Version)

SMCS Code: 1900-038, 0781

Model: All Models with Electronic Controls

Warranty: Y

See Third Supplement

Features/Benefits

Customer Version of ET is a very valuable PC-based service and electronic information tool for obtaining information from electronic products. ET can perform tasks such as:

- Retrieve engine totals for fuel used, miles traveled, and hours operated
- Display status of all parameters, such as engine speed, throttle position, timing advance, fuel flow, etc.
- View active and logged diagnostic codes to identify faulty sensors
- Display "Logged Event Codes" to show engine overspeeds, high temperatures, fuel consumption, etc.
- View ECM's current configuration and change user settings
- Perform diagnostic tests and calibrations, and calibrate electro-mechanical and electro-hydraulic components
- Context sensitive help leads operator through every task Cat ET can perform

T&SPG 2000

The functions listed below can also provide important data to improve operation and maintenance of equipment and increase profitability.

- Cat "ET Trainer" is now included in ET Program. It allows users to train and practice using Cat ET without a communications adapter or Electronic Control Module (ECM). This is a free feature of Cat ET.
- ECM Summary screen lists every control module on equipment being tested and gives information on these modules.
- Fast hookup and real time display of systems status. Displays readings such as rpm, boost, pressures, temperatures, etc. for easy troubleshooting.
- Identifies faulty sensors, harness connectors, and system parameters which are out of specification. Allows customers to help dealer identify problems without visiting machine.
- Identifies intermittent sensors and wiring problems during machine operation and keeps a record of each one. Shows when problem occurred and how often it happened. Provides added information to allow customer to assist dealer in diagnosing and repairing problems.
- Shows all operating conditions that cause high repair costs such as: overspeeds, high temperatures, fuel consumption, and transmission shift counts. This can provide awareness to change operator techniques resulting in lower machine operating and maintenance costs.
- Tests are provided such as cylinder cutout and injector activation pressure to make problem locating easy.

Diagnostics Capabilities for Truck Engines

- Cat ET is fully integrated with Caterpillar Guided Diagnostics for On-Highway truck engines
- Allows service technician to effectively:
 - Trouble shoot Active/Logged Diagnostic Codes
 - View wiring schematic, diagrams, and access technical documentation
- Technician can start Guided Diagnostics from:
 - Cat ET diagnostic code screen
 - Cat ET Menu or Icon Bar
 - PC desktop if ECM cannot communicate with Cat ET
- Serial number prefixes covered by Guided Diagnostics with Cat ET include:
2FR, 5RM, 9CK, 2PN, 1YN, 5EK, 6TS, 1WM, 4ES, 4AS, 1LW, 84S, 2BK, 2CW, 73L, 7SF, 9GK, 8WL, 7LG, 2YG, 4CK, 2EK, 5YG, 8TC, 9NS, 5DS, 9LN, 9YN, 7AS, 5XN
- Diagnostic information for these serial numbers is available at service technician's fingertips:
 - Information currently published in Electronic Troubleshooting Guides, Testing and Adjusting Manuals, and other service manuals are placed on this CD
 - On-Highway truck information can be loaded on computer's hard disk drive for instant access

Specifications/Technical Information

In order to successfully run Cat ET, the following is required: computer hardware, communication hardware and cables, and software.

Recommended PC Configurations

- IBM PC compatible with Pentium 166 MHz processor (MMX recommended)
- 24 Mb RAM
- 1 Gb of available hard disk drive
- 12X speed CD-ROM
- 3.5 inch 1.44 Mb diskette drive
- Super VGA color monitor or display
- Microsoft Windows NT, Windows 95, or IBM OS/2 Warp 3.0 or greater
- RS232 port with 16550AF UART
- Built-in pointing device or mouse

Other Requirements

- 7X-1700 Caterpillar Communications Adapter, (with service program module, NEXG4523)
- 7X-1425 PC (RS232) Cable 356 mm (14 in)

Options (select one or more):

- 139-4166 Data Link Unicable (Cat Data Link and ATA Data Link Cable)
- 140-9442 Data Link T-Cable
- 7X-1686 In-Cab Adapter for Highway Truck Cable
- 1U-9100 Challenger 45/55 Cable
- 126-7877 M300 HEX R5232 Cable



Caterpillar Electronic Technician (Customer Version)

Ordering Information

- Cat ET Getting Started Guide and CD-ROM for installing ET software on your PC
- Full Service Cat Customer
 - Program License
 - Program Subscription
- Truck Engine Parts & Service (TEPS) Customer
 - Program License
 - Program Subscription
- Customer ET Users Manual, English version is provided with each ET Program License. This 500+ page manual has been produced to help users with Cat FT Customer service tool software.

8T-8697 Electronic Control Analyzer Programmer (ECAP) 7X-1412 Adapter Cable Assembly (T-Harness)

7X-1180 Internal Expansion Board

SMCS Code: 1900-038, 0781

Model: 3406 PEEC, 3176 Engines, 3500 EUI Engines, EPTC II
Transmission Control, Electronic Shift Control

Warranty: Y

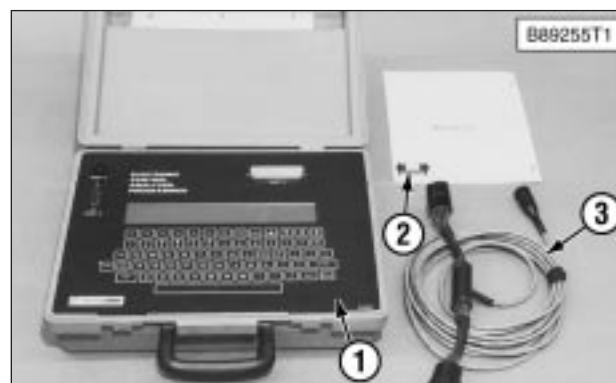
CANCELED

Service Program Module (SPM) installed, runs ECAP, selects Metric or English display units, interfaces with 8C-9801 Pulse Width Modulation Group and provides basic communication ability

- 7X-1412 Adapter Cable Assembly (T-Harness) needed to supply power to ECAP and allow communication with electronic controls
- ECAP can accept 3 additional SPM's to handle specific service needs as they are identified
- Installation of 7X-1180 Internal Expansion Board enhances use of 8T-8697 ECAP; provides additional 4 sockets to install additional 4 SPM's for total of 7 applications available at once
- Present application SPM's for use with ECAP - NEXG4522 to service all highway truck engines, NEXG4512 to aid in configuring engines, and NEXG4518 to service 3176 Engine in Challenger 65/75/85 Tractor, NEXG4516 for Marine/Industrial Engines, NEXG4521 for machines functions (including 3500 EUI)

Accessories Needed

- 8T-8697 ECAP - 3406 PEEC
8C-9801 PWM Group
7X-1412 T-Harness
8T-8694 Breakout Cable, 5-Pin
8T-8695 Breakout Cable, 9-Pin
8T-8726 Breakout Cable, 3-Pin
7X-6370 Breakout Cable, 3-Pin DT
NEXG4522 SPM Subscription
NEXG4512 SPM
- 8T-8697 ECAP — 3176
7X-1170 Cable
7X-1200 Timing Adapter
8C-9801 PWM Group
7X-1412 T-Harness
8T-8694 Breakout Cable, 5-Pin
8T-8695 Breakout Cable, 9-Pin
8T-8726 Breakout Cable, 3-Pin
9X-0248 Breakout Cable, Transducer
9X-1160 Breakout Cable, 40-Pin
NEXG4512 SPM
NEXG4522 SPM Subscription
- 8T-8697 ECAP — Challenger 75
7X-1412 T-Harness
8T-8694 Breakout Cable, 5-Pin
8T-8695 Breakout Cable, 9-Pin
8T-8726 Breakout Cable, 3-Pin
9X-0248 Breakout Cable, Transducer
9X-1160 Breakout Cable, 40-Pin
NEXG4518 SPM Subscription



1. 8T-8697 Electronic Control Analyzer Programmer (ECAP)
2. Service Program Module (Order separately; not supplied with ECAP)
3. 7X-1412 Adapter Cable Assembly (T-Harness)¹

¹ 8T-5275 T-Harness is used in place of 7X-1412 on older ECAP with plastic connector

Reference

SEHS8742 Special Instruction for ECAP
SEHS8833 Special Instruction for installing 7X-1180 in ECAP

T&SPG 2000

8C-9801 Signal Adapter Group, Pulse Width Modulated (PWM)

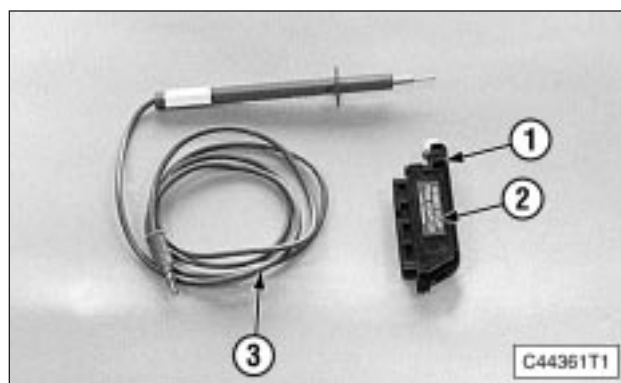
SMCS Code: 1900-038, 0781

Model: 3406 PEEC, 3176 Engines

Warranty: Y

Features/Benefits

- Enhances use of 8T-8697 ECAP
- Provides additional function to measure frequency and duty cycle of pulse width modulated (PWM) signal; this function accessed through Utility Functions menu on ECAP; can be used to verify or diagnose operation of some sensors used with electronic engines



1. Signal Adapter
2. NEEG2301 Decal
3. 8T-5277 Cable

Reference

SEHS8807 Special Instruction

8C-9995 Mounting Bracket Group

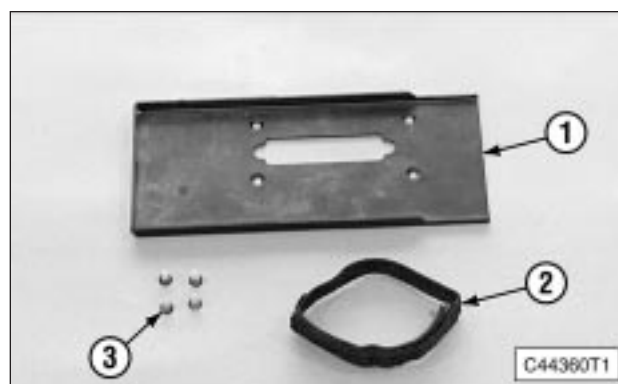
SMCS Code: 1900-038, 0781

Model: 3406 PEEC, 3176 Engines

Warranty: Y

Features/Benefits

- An upgrade to early 8T-8697 ECAP's
- Provides permanent mount on ECAP to secure external module
- Comes installed on present ECAP's when they are ordered; needs to be ordered only if you have an early ECAP that does not already have it installed



1. Mounting Bracket
2. 7X-1016 Strap
3. 7X-6213 Screw, Flat Head (4)

Reference

SEHS8889 Special Instruction

7X-1854 Cable**7X-1855 Cable****7X-1856 Cable**

SMCS Code: 1900-038, 0781

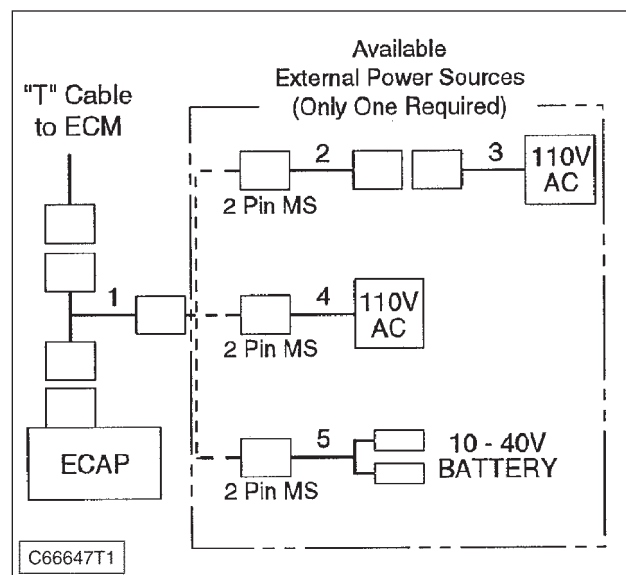
Model: All Electronic Controlled Engines Tested by ECAP

Warranty: Y

Features/Benefits

- Used to provide power to ECAP through external power source — ECAP retains power during engine cranking
- Used with 8T-8697 ECAP
- Cable assemblies can be connected to AC power adapter or battery — T-harness allows cable leading to electronic control module (ECM) to remain connected
- T-harness connects between ECAP and T-cable to ECM — 7X-1854 Cable for ECAP with metal connector, 7X-1855 Cable for older plastic connectors
- One end of 7X-1854 and 7X-1855 Cable has two-pin MS connector (allows connection to external power supply)
- Three connections for external power sources are available — 5P-7366 Cable Assembly (for connection to battery), 8T-9276 AC Power Supply, and 8C-9705 Converter (8C-9705 also requires 7X-1856)

Cables for connecting ECAP to external power supply



1. 7X-1854 Cable (metal connector) or 7X-1855 Cable (plastic connector)
2. 7X-1856 Cable
3. 8C-9705 AC Power Supply (plastic connector)
4. 8T-9276 AC Power Supply (metal connector)
5. 5P-7366 Cable Assembly

7X-1200 Timing Interface Group**7X-1170 Timing Adapter Cable**

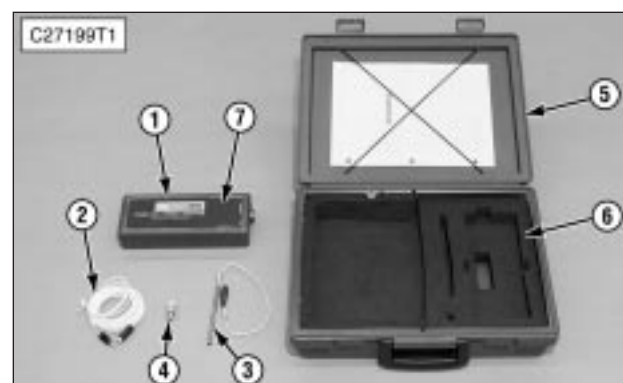
SMCS Code: 1900-038, 0781

Model: 3176 Engines

Warranty: Y

Features/Benefits

- Allows 8T-8697 ECAP to be used for monitoring and calibration of fuel injection timing on Caterpillar engines equipped with electronic unit injectors
- 7X-1170 used to connect 7X-1200 to 3176 Engine
- 8T-8697 ECAP must be equipped with 8C-9995 Mounting Plate Adapter Group before installing 7X-1201 EUI Timing Adapter



1. 7X-1201 EUI Timing Adapter
2. 5P-7362 Cable
3. 6V-2197 Transducer
4. 7X-1171 Transducer Adapter
5. 6V-3072 Carrying Case
NEEG2319 Decal, Outside Case (not shown)
6. Foam Block
7. NEEG2318 Decal, Module

Reference

SEHS8824 Special Instruction

T&SPG 2000

8C-9705 Converter, 12-Volt

SMCS Code: 1900-038, 0781
 Model: 3406 PEEC, 3176 Engines
 Warranty: Y

Features/Benefits

- Provides power to 8T-8697 ECAP when used away from engine or vehicle being serviced; plugs into Port 1 on ECAP; can be switched to provide DC power to ECAP from either 120 or 240 Volts AC sources at either 50 or 60 Hz



8C-9705 12 Volt Converter

NEXG4514 Service Program Module, ECAP Executive/Utility

SMCS Code: 1900-038, 0781
 Model: 3406 PEEC, 3176 Engines
 Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip]
- Included in 8T-8697 ECAP; does not have to be ordered separately except for very early ECAP's with V1.0 installed
- NEXG4514 runs the ECAP; selects Metric or English display units; handles interface with SPM's in ECAP and interface with adapters connected to port 3; provides basic communication abilities with ports 1 and 2
- Current SPM may be marked NEXG4514 V1.1, 7X-1350 V1.1, or 8C-5363 V1.1; all three are same current software and will do same job; version number printed on SPM; also displayed on ECAP screen during power up self test and can be displayed on screen under SPM Version Number screen

Reference

SEHS8741 Special Instruction

NEXG4522 Truck Service Program Module, All Highway Truck Engines

SMCS Code: 1900-038, 0781
 Model: All Highway Truck Engines
 Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chips] and subscription for updates
- Installed in 8T-8697 ECAP by customer to provide all service functions for all Highway Truck Engines
- Version number printed on module and can be displayed on ECAP screen under SPM Version Number screen compatible with all versions of all Highway Truck Engine control personality modules.

Reference

SEHS9349 Special Instruction
 NEEG2501 Diagnostic Code Card
 NEEG2502 Driver's Card

NEXG4506 Service Program Module, 3406B PEEC Truck Engine

Canceled

SMCS Code: 100-038
 Model: 3406B PEEC Truck Engine
 Warranty: None

Features/Benefits

- Canceled and replaced by NEXG4522 Truck Service Program Module

NEXG4507 Service Program Module, 3176 Truck Engine

Canceled

SMCS Code: 1900-038, 0781
 Model: 3176 Truck Engine
 Warranty: None

Features/Benefits

- Canceled and replaced by NEXG4522 Truck Service Program Module

NEXG4516 Service Program Module, Marine/Industrial Engines

SMCS Code: 1900-036, 0782

Model: 3408, 3412 Marine/Industrial Engines

Warranty: Y

Features/Benefits

- All Electronically Controlled Marine and Industrial Engines
- Software [in Erasable Programmable Read Only Memory (EPROM) chips] and subscription for updates
- Installed in 8T-8697 ECAP by customer to provide all service functions for all Highway Truck Engines
- Version number printed on module and can be displayed on ECAP screen under SPM Version Number screen compatible with all versions of all Highway Truck Engine control personality modules.

Reference

SEHS9199 Special Instruction, Using the ECAP NEXG4516 Marine/Industrial SPM (included with SPM)
NEEG2490 Pocket Card

NEXG4518 Service Program Module, Challenger 75

SMCS Code: 1900-038, 0781

Model: Challenger 75

Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip]
- Installed in 8T-8697 ECAP by customer to provide all service functions for 3176 Engine in Challenger 65/75/85 Tractor
- Version number printed on module and can be displayed on ECAP screen under SPM Version Number screen

Reference

SEHS9202 Special Instruction
NEEG2456 Diagnostic Code Card

NEXG4512 Service Program Module, Configuration Aid

SMCS Code: 1900-038, 0781

Model: 3406B PEEC, 3176 Engines

Warranty: Y

Features/Benefits

- Software [in Erasable Programmable Read Only Memory (EPROM) chip], installed in 8T-8697 ECAP by customer and subscription for update
- User friendly, menu driven interface to help determine values for Customer Specified Parameters; user defines configuration of truck by selecting values from lists of such items as: engine rating, axle ratio, transmission, tire size and type; custom values not in the lists can be entered by user
- Once configuration defined, program steps user through each Customer Specified Parameter; does all necessary calculations and checks values entered for validity and conflict with other parameters; also displays and defaults to typical values for each parameter
- Customer Specified Parameters, including all truck configuration information, can be saved in 8T-8697 ECAP internal memory for later use, even if power removed from ECAP; can be reviewed and changed, if necessary; program steps user through any parameters affected by change and provides same checking as when values were first entered
- List of configuration and parameter values can be printed using compatible serial interface printer; Split Chart can also be plotted; chart shows shift points for each transmission gear, along with engine RPM and vehicle speed limits
- When using NEXG4512 program, 8T-8697 ECAP can be powered by 8C-9705 12-Volt Converter or from electronic engine control using 8T-5275 T-Harness; 8C-9705 allows use of program with 8T-8697 ECAP in office or shop area; parameter values defined can then be printed or saved to 8T-8697 ECAP memory; 8T-5275 Cable allows program to read and write Customer Specified Parameters directly to and from electronic engine control
- Version number printed on module and can be displayed on ECAP screen under SPM Version Number screen (present version number V1.1)

Reference

SEHS88342 Special Instruction

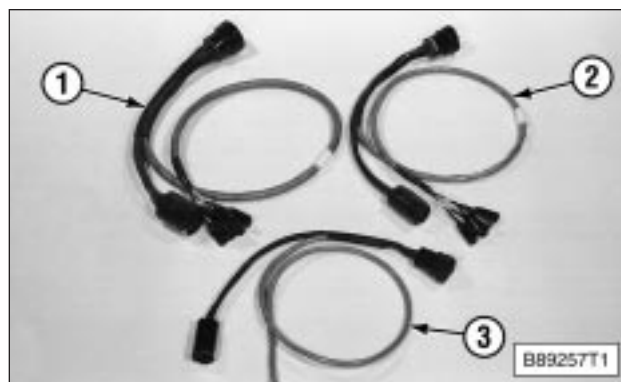
T&SPG 2000

**7X-6370 Adapter Cable Assembly,
3-Pin DT Breakout****8T-8726 Adapter Cable Assembly,
3-Pin Breakout****8T-8694 Adapter Cable Assembly,
5-Pin Breakout****8T-8695 Adapter Cable Assembly,
9-Pin Breakout**

SMCS Code: 1900-038, 0781
 Model: 3406 PEEC, 3176 Engines
 Warranty: Y

Features/Benefits

- Help service 3406 PEEC and 3176 engines
- Provide test points for individual wires in wiring harness to facilitate troubleshooting of engine control system
- "T" cables with individual tip jacks on pigtail portion of cables; can be inserted into system wiring harness at connector locations; individual tip jacks on pigtails labeled same as wire to which they are connected in harness; standard probe tips, like those on multimeter leads, can be inserted into tip jacks



1. 8T-8695 Adapter Cable Assembly (9-pin breakout)
2. 8T-8694 Adapter Cable Assembly (5-pin breakout)
3. 8T-8726 Adapter Cable Assembly (3-pin breakout)



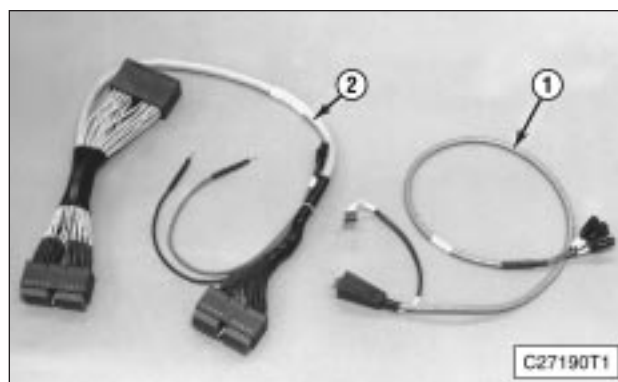
7X-6370 Adapter Cable Assembly (3-pin DT breakout)

**9X-0248 Adapter Cable Assembly,
Transducer Breakout****9X-1160 Adapter Cable Assembly,
40-Pin Breakout**

SMCS Code: 1900-038, 0781
 Model: 3176 Engines
 Warranty: Y

Features/Benefits

- Used in servicing 3176 Engine
- Provide test points for individual wires in wiring harness to facilitate troubleshooting of electronic engine control system
- "T" cables with individual tip jacks on pigtail portion of cables; may be inserted into electronic engine control system wiring harness at connector locations; individual tip jacks on pigtails of 9X-0248 Adapter Cable Assembly labeled same as wire to which they are connected in 3176 Engine system wiring harness; on 9X-1160 Adapter Cable Assembly two small probes with tip jacks can be inserted into appropriate connector socket to look at signal on any wire or between any two wires; standard probe tips, like those on multimeter leads, can be inserted into tip jacks



1. 9X-0248 Adapter Cable Assembly, Transducer Breakout
2. 9X-1160 Adapter Cable Assembly, 40-pin Breakout

7X-1715 Cable Assembly, Small, 40 Pin Breakout

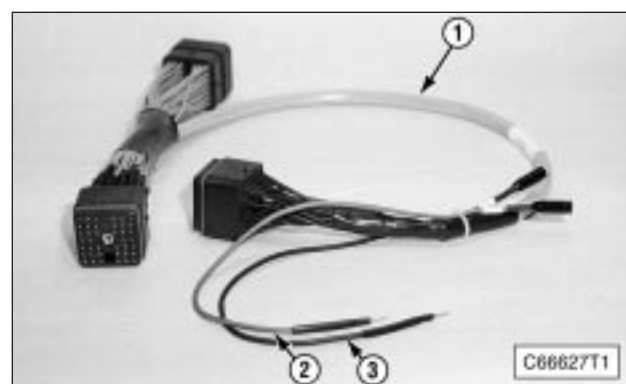
SMCS Code: 1900-038, 0781

Model: 3406E and 3176B Electronic Engines

Warranty: Y

Features/Benefits

- Used to provide test points for individual wires in wiring harness
- Makes troubleshooting of electronic engine control systems faster, easier, and more convenient
- "T" cable has two probes attached to pigtail portion of harness — 9X-1314 Wire Assembly, Red and 9X-1315 Wire Assembly, Black
- Probe tips on leads of standard multimeter can be inserted into tip jacks of pigtail — allows serviceman to check signal on any wire or between any two wires
- Connectors are A/B keyed



1. 7X-1715 Small 40-Pin Breakout Cable Assembly
2. 9X-1314 Red Wire Assembly
3. 9X-1315 Black Wire Assembly

140-2266 Harness Assembly, 70-Pin Breakout "T"

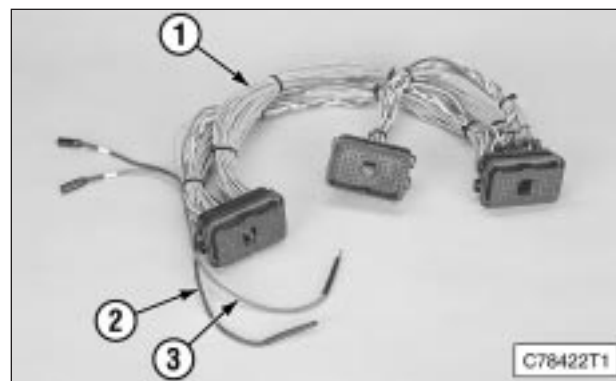
SMCS Code: 1900-038, 0781

Model: 3176B, C-10, C-12, and 3406E Engines

Warranty: Y

Features/Benefits

- Used to provide test points for individual wires in engine wiring harness of electronic engine control system (harness assembly tool connects between engine control module and engine wiring harness)
- Harness has standard probe tips (similar to multimeter leads) which allow technicians to check signal on any wire or between any two wires
- 9X-1314 Red Wire Assembly and 9X-1315 Black Wire Assembly comes with 140-2266



1. 140-2266 Harness Assembly (70-Pin Breakout "T")
2. 9X-1314 Red Wire Assembly
3. 9X-1315 Black Wire Assembly

167-9225 Harness Assembly

SMCS Code: 1900-038, 0781

Model: 3216, C-10, C-12, and 3406E Engines

Essential Tool

Warranty: Y

Features/Benefits

- Used to flash ADEM 2000 ECM engines if flashing/communication through cab connector is not possible
- Used with ECAP or ET along with 139-4166 Data Link Cable and 7X-1700 Communication Adapter
- Used on 3216 ADEM 2000 ECM engines and C-10, C-12, and 3406E 1999 model year ADEM III engines
- Attaches to engine harness ECM connection
- Requires auxiliary battery power (possibly use service truck battery)
- Improves service tool's ability to maintain communication during engine cranking
- Provides voltage to ECM allowing continuous communication to service tool
- Uses an 8M-0456 Fuse to protect against voltage spikes



167-9225 Harness Assembly

T&SPG 2000

134-5195 Cable Assembly, Adapter, 40-pin T-harness large engine

SMCS Code: 1900-038, 0781
Model: 3500 and 3600 Engines
Warranty: Y

Features/Benefits

- Used to adapt 7X-1715 Cable Assembly to 3500 and 3600 Engines
- Adapts a square 40-pin AB-keyed connector on 7X-1715 Cable Assembly (40-pin Breakout Small Engine) to a square 40-pin CD-keyed connector on 3500 and 3600 Engines

Specifications/Technical Information

Length 30 cm (12 in)



134-5195 Adapter Cable Assembly (40-pin T-harness large engine)

127-6359 Cable Assembly, Adapter HEUI Injector Test

SMCS Code: 1900-038, 0781
Model: 3116 and 3126 HEUI Engines
Warranty: Y

Features/Benefits

- Used to test injector and/or injector harness
- Allows wiring to an individual injector to be bypassed (helps to isolate problem between injector or harness)

Specifications/Technical Information

Overall Length 1500 mm (5 ft)



127-6359 Cable Assembly

7X-1710 Probe Group

SMCS Code: 1408-082, 0779
Model: All Models
Warranty: Y

Features/Benefits

- Used with 6V-7070 Digital Multimeter to measure voltages in wiring harnesses without disconnecting them
- Multimeter leads plug into probe cable jacks; probes then slide along appropriate wires into rear of connector until they contact pin or socket of interest
- Eliminates need for new breakout "T" cable for each new connector

Specifications/Technical Information

Wire 18 gauge
Length 18 inch



7X-1710 Probe Group
1. 7X-1708 Probe, Red
2. 7X-1709 Probe, Black

7X-1695 Cable, TDC**7X-1395 Adapter, SI TDC**

SMCS Code: 1905-082, 0712

Model: All Engines with Electronic Controls

Warranty: Y

Features/Benefits

7X-1695 Top Dead Center (TDC) Cable

- Used on captive engine applications
- Allows magnetic sensor to be connected to engine to input timing information to ECM (Electronic Control Module)
- Used with ECAP/DDT
- 7X-1395 Adapter allows 7X-1695 Cable to be used on industrial and spark ignited (SI) engines



1. 7X-1395 Adapter, SI TDC

2. 7X-1695 Cable, TDC

7X-1403 Adapter Cable**7X-1686 Adapter Cable****7X-1873 Connector****3E-5226 Socket**

SMCS Code: 1900-036, 0779

Model: All 3176 and 3406 Electronic Engines

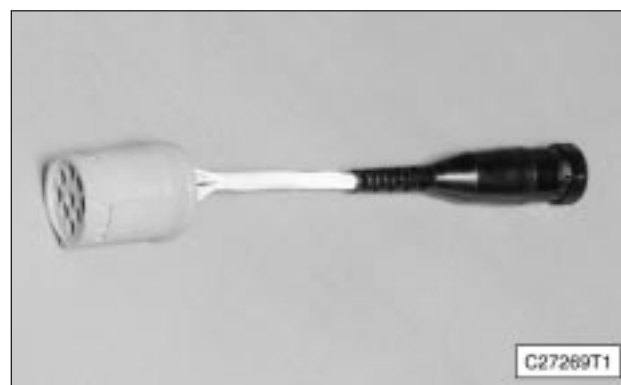
Warranty: Y

Features/Benefits

- Connect 8T-5275 or 7X-1412 T-Harness cable on ECAP or DDT to connector on dash of truck cabs
- Allow ECAP or DDT to be connected to electronic engine control from inside cab, instead of having to open engine compartment

7X-1873 Connector:

- Used to replace present six-pin Deutsch connector on older 7X-1686 Adapter Cables (present 7X-1686 Adapter Cable manufactured with 7X-1873 Connector)
- Use 1U-5805 Removal Tool (green) and 1U-5804 Crimp Tool
- Locks onto highway truck in-cab diagnostic connector



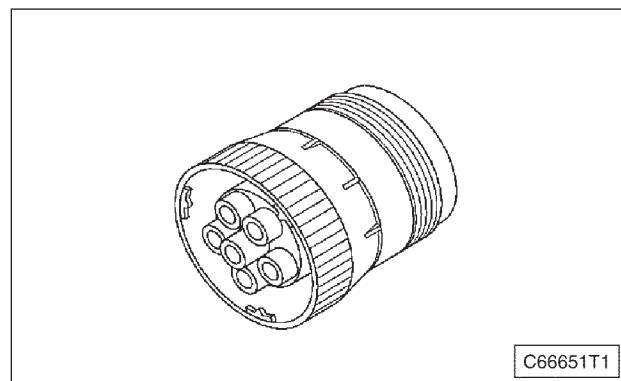
7X-1403 Adapter Cable



7X-1686 Adapter Cable

Service Part:

3E-5226 Socket



7X-1873 Connector

T&SPG 2000

7X-1714 Cable, 3116 Engine Adapter Cable

SMCS Code: 1900-038, 0781

Model: Electronically Controlled 3116 Engines

Warranty: Y

Features/Benefits

- Used to setup and test electronic engine controls on 3116 Engines in General Motors on-highway trucks
- Connects between under dash Packard connector and 8T-5275 or 7X-1412 T-Harness cable on ECAP or DDT



7X-1714 3116 Engine Adapter Cable

157-4829 Cable Assembly, Adapter (SAE to CAT® CAN/ATA)

SMCS Code: 1900-036, 0779

Model: On-Highway Trucks

Essential Tool

Warranty: Y

Features/Benefits

- Used to connect 139-4166 Diagnostic Cable to J1939 Under-Dash Diagnostic Connector



157-4829 Adapter Cable Assembly

136-7205 Cable Assembly, Extension (Monitor)

SMCS Code: 0740, 0779

Model: All B-Series Excavators (Except 307)

Warranty: Y

Features/Benefits

- Used to extend monitor's viewing position to outside of operator's compartment
- Can be used in training of technicians by allowing monitor to be viewed by more than one person at a time

Specifications/Technical Information

Overall length 6.1 m (20 ft)



136-7205 Extension Monitor Cable Assembly

Service Parts

102-7965 Terminal, Female

111-4815 Connector, Plug

121-1173 Terminal, Male

125-4838 Wedge, Plug Lock (7)

128-8951 Connector, Receptacle

124-5643 Three-Pin Packard Break-Out Cable

SMCS Code: 1900-038, 0781

Model: 3116 HEUI Engines in General Motors On-Highway Trucks

Warranty: Y

Features/Benefits

- Used to provide test points, for individual wires in wiring harness, to help troubleshoot electronic engine control system
- Sold separately and part of 125-2580 HEUI Tool Group
- Standard multimeter probe tips can be inserted into the break out cable tip jacks allowing service technician to check voltage on any one wire or between two wires of a circuit



124-5643 Three-Pin Packard Break-Out Cable

125-3662 Cable, Sensor Bypass

SMCS Code: 1900-038, 0781

Model: 3116 and 3126 HEUI Engines

Warranty: Y

Features/Benefits

- Used to isolate sensors when testing for faults
- Also used to test for bad sensor wiring in wiring harness



125-3662 Sensor Bypass Cable

126-7877 M300 to PC RS-232 Cable

SMCS Code: 1901-038, 0781

Model: M300 Excavators

Warranty: Y

Features/Benefits

- Used to setup and test electronic hydraulic controls using a personal computer
- Connects to hydraulic controls and RS-232 computer port



126-7877 M300 to PC RS-232 Cable

T&SPG 2000

Service Parts for All DDT's and 8T-8697 ECAP

SMCS Code: 1000-025, 1000-038, 1264-025, 1272-082
Model: 3176, 3406B
Warranty: Y

The following are service parts for all Digital Diagnostic Tools (DDT), 8T-8697 Electronic Control Analyzer Programmer (ECAP) and their accessories.

- **4C-3406 Connector Kit**
Provides all service parts needed for Deutsch connectors used on the cables; all parts included in 4C-3406 also available separately
- **4C-3501 Upgrade Kit**
Provides all service parts needed to upgrade canceled 1U-5803 Connector Kit to 4C-3406 Connector Kit
- **4C-4704 Removal Tool**
Insertion/removal tool used to remove contacts from 9-pin circular connectors used on ECAP, DDT's, and T-Harness
- **6V-3110 Cover, Back**
Back cover for DDT's
- **7T-4577 Pin, Connector**
Pin in 9-pin circular connector used on ECAP and DDT's
- **7X-1016 Strap**
Velcro strap used in 8C-9995 Mounting Plate Adapter Group
- **7X-1180 Adapter Group**
Internal ROM Expansion Group for use in ECAP if more than 3 SPM's needed; provides capacity for 4 additional SPM's
- **7X-6213 Screw**
Mounting screw used to hold 8C-9995 Mounting Plate Adapter Group to ECAP
- **8C-4145 Housing, Connector (plastic)**
9-pin circular connector used on T-Harness
- **8C-4146 Housing, Connector (plastic)**
9-pin circular connector used on ECAP and DDT's
- **8C-4147 Connector (plastic)**
Endbell on 9-pin circular connector used on T-Harness
- **3E-3423 Receptacle Assembly, Connector (metal)**
10-pin circular connector used on ECAP
- **8C-4148 Connector, Relief**
Strain relief on 9-pin circular connector used on T-Harness
- **8C-4797 Socket, Carriage**
Socket in 9-pin Amp connector used on T-Harness
- **8C-5543 Case, Plastic**
Case for ECAP

- **3E-0152 Plug Assembly, Connector**
Connector used for conversion of 8T-5275 T-Harness to 7X-1412
- **8C-9995 Adapter Group, Plate**
Mounting plate adapter group for Port 3 on ECAP
- **8T-5277 Cable, Probe**
PWM cable included with DDTs and 8C-9801 ECAP PWM Group
- **7X-1682 Cover, Front**
Front cover assembly for DDT's
- **9X-1314 Wire Assembly**
Red wire assembly used with 40-pin breakout cable
- **9X-1315 Wire Assembly**
Black wire assembly used with 40-pin breakout cable
- **9X-1339 Receptacle Assembly**
Used on 40-pin breakout cable

4C-4704 Insertion/Removal Tool 8C-4145 Connector, T-Harness 8C-4146 Connector, ECAP/DDT 8C-4147 Endbell 8C-4148 Strain Relief 8C-4797 Socket 7T-4577 Pin

SMCS Code: 1000-025
Model: 3176, 3406B
Warranty: Y

Features/Benefits

- Makes simple repairs possible on 9-pin Amp circular connector on 8T-5275 Adapter Cable Assembly and on port #1 of 8T-8697 Electronic Control Analyzer Programmer (ECAP)
- 4C-4704 used to insert and remove contacts from connectors when they are being replaced

7X-1701 Communication Adapter Group

CANCELED

7X-1701 Communication Adapter

7X-1412 Cable

7X-1414 Cable

7X-1415 Cable

7X-1420 Cable

7X-1570 Cable

7X-1688 Cable Group

NEXG4523 Communication Adapter Service Program Module

SMCS Code: 1900-038; 0781

Model: All Models with Electronic Controls

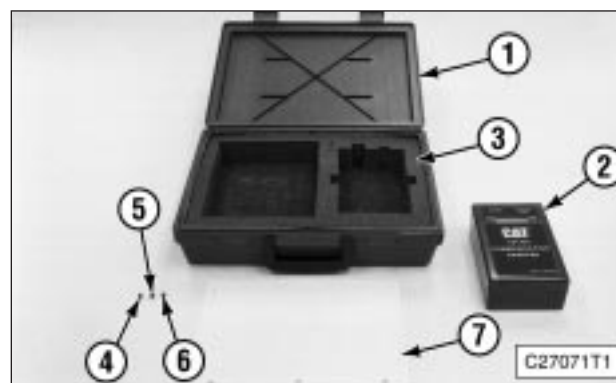
Warranty: Y

Features/Benefits

- Allows tools and controls using various data links to communicate when connected with correct cables (Cable depends on application. Order separately.)
- Displays operational error codes on liquid crystal display (LCD)
- Software in one Service Program Module (SPM) which can be replaced to update
- Will communicate with electronic control modules. Communication links available at this port are internal fuse-protected SAE J1708 protocol over an EIA RS-485 data link (ATA), and proprietary Cat data link.
- Will communicate with service tools such as ECAP, DDT or personal computer. Communication links available at this port are internal fuse-protected SAE J1708 protocol over an EIA RS-485 data link (ATA), and the RS-232 data link.
- NEXG4523 Communications Adapter SPM should be ordered separately through the Caterpillar literature system. This assures that the current software is always purchased with the communication adapter.
- The present version of NEXG4523, V1.1 adds support of Flash memory downloading to the ECMs (Electronic Control Modules) on 3176B and 3406E Electronic Engines to the original communications functions.

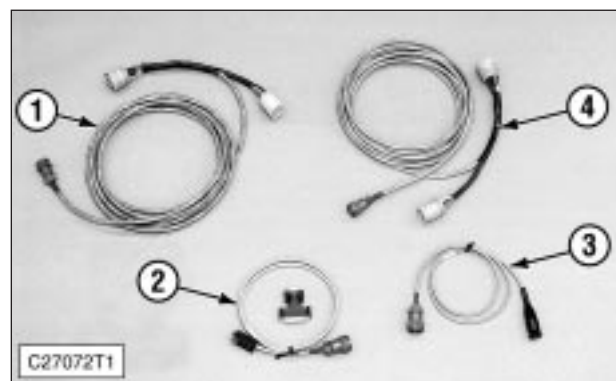
Specifications/Technical Information

Display	4y2D1/2 digit LCD
Operating temperature	-18 to 65°C (0 to 150°F)
Storage temperature	-18 to 70°C (0 to 160°F)
Power	external vehicle battery or any DC Voltage source from 11 to 45 Volts at 0.5 Amps; power input fuse-protected at 2 Amps internal to Communication Adapter
Size	395 mm x 310 mm x 100 mm (15.5 inch x 12.25 inch x 4 inch)
Weight	1.92 Kg (4.23 lbs.)



7X-1700 Communication Adapter Group

1. 6V-3072 Case, Carrying
2. 7X-1701 Communications Adapter
3. Insert, Foam
4. 7X-1571 Fuse, 1/8 A
5. 7X-1569 Fuse, 2 A
6. 7X-1705 Fuse, 2 A
7. SEHS9264 Special Instruction



1. 7X-1570 Cable
Cat Data Link control to 7X-1700
2. 7X-1688 Cable Group, 7X-1700 to RS-232 Tool
4C-6805 Adapter, 9 pin to 25 pin RS-232 Tool
3. 7X-1420 Cable
7X-1700 to ATA (RS-485) Service Tool
4. 7X-1412 Cable
ATA (RS-485) control to 7X-1700

T&SPG 2000

7X-1703 Adapter Plate Group

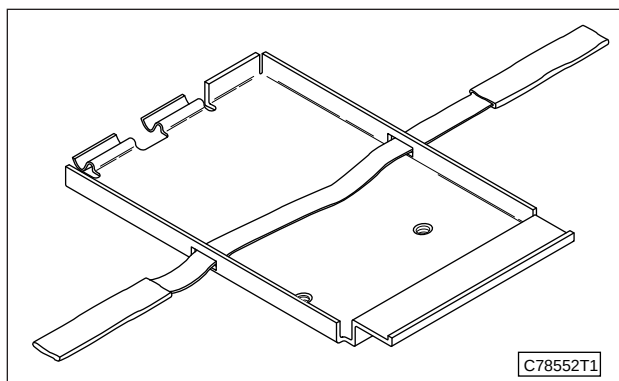
SMCS Code: 1900-038, 0781

Model: All models with electronic controls

Warranty: Diagnositic warranty

Features/Benefits

- Adapter group allows the Communication Adapter to be mounted on the ECAP over Port #3, making it an integral part of the ECAP
- Short cable [7X-1420 Cable (F/U/W Plastic Connector on Port #1); 7X-1851 Cable (F/U/W Plastic Connector on Port #1)] connects it to Port #1 of the ECAP — eliminates having a separate box to keep track of during tests requiring the Communication Adapter



7X-1703 Adapter Plate Group
7X 5373 Strap

139-4166 (CAT/ATA) Universal Cable

SMCS Code: 1900-038, 0781

Model: All Models With Electronic Controls

Warranty: Y

Features/Benefits

- Replaces canceled 7X-1412 Cable Assembly, Adapter (ATA) and 7X-1570 Cable Assembly, Adapter (CAT)
- Used to connect either the ATA data-link or the Cat data-link to the 7X-1700 Communication Adapter

Specifications/Technical Information

Overall length 3 m (18 ft)



139-4166 (CAT/ATA) Universal Cable

129-2018 Cable Assembly, Power

SMCS Code: 1900-038, 0781

Model: 3406E, 3176B, 3116HEUI, 3126HEUI, C-10, and C-12 Engines

Warranty: Y

Features/Benefits

- Used to gain access to ECM data, in event that service tool will not communicate at OEM connector
- Also provides means of powering service tool while cranking engine
- Allows service tool to be connected directly to ECM to verify ECM operation — can also isolate a communication problem due to OEM wiring harness
- Cable assembly has fuse protected power clips to allow direct hook up to battery
- Replacement fuses available (8M-8948 Fuse, 15 amp)



129-2018 Power Cable Assembly

7X-1425 RS-232 Cable

SMCS Code: 1900-038, 0781

Model: All models with electronic controls

Warranty: Y

Features/Benefits

- Replaces canceled 7X-1688 Cable Group
- Used to connect a 7X-1701 Communication Adapter to RS-232 computer port (7X-1701 Communication Adapter can now be purchased separately)
- 4C-6805 Adapter (9 to 25 pin), part of canceled group, is sold separately for use with older computers



7X-1425 RS-232 Cable

3E-3423 Connector

7X-1412 Adapter Cable Assembly, T-Harness

SMCS Code: 0785

Model: 3406 and 3176 Engines

Warranty: Y

Features/Benefits

- Used to replace ECAP's plastic Port 1 socket and mating connector with steel parts to eliminate breakage
- 3E-3423 Connector is installed into ECAP
- 7X-1412 T-Harness replaces original T-harness
- Rework can be done by dealer or sent to Caterpillar Service Technology

Return ECAP for Rework by Caterpillar Service Technology

- The connector will be replaced, and the 7X-1412 T-Harness will be provided
- Material and labor cost is \$175.00
- CSTG will diagnose the ECAP for correct operation
- If diagnostic check shows problems with the ECAP, authorization for repair will be obtained
- Repairs are made at normal labor rates plus materials
- Send returns to:

Caterpillar Service Technology
Attention: Tool Repair
100 N.E. Adams Street, AH9010
Peoria, IL 61629

Instructions for Reworking ECAP at Dealership

- Enlarge diameter of connector mounting holes by 0.41 mm (.016 inch)
- Hole enlargement can be easily completed with a file
- Move wires from plastic 8C-4146 Connector to steel 3E-3423 Connector one wire at a time
- Move wires on connector

Pin No. 8C-4146	To Pin On 3E-3423
1	A
2	B
3	K
4	H
5	(no connection)
6	G
7	J
8	C
9	F
No connection	D and E

- The other end of the wire is attached to the following locations—With Pre-Regulator Board or (Without)

Pin No. 8C-4146	
1	Input Pre-Reg (B+)
2	Gnd Pre-Reg (B-)
3	Gnd Pre-Reg (Gnd)
4	DL- (DL-)
5	(no connection)
6	RXL (RXL)
7	DL+ (DL+)
8	Tx (Tx)
9	Prog (Prog)

T&SPG 2000

7X-1851 Cable

SMCS Code: 1900-038, 0781
Model: All Engines with Electronic Controls
Warranty: Y

Features/Benefits

- Used to connect 7X-1700 Communication Adapter to 8T-8697 ECAP with new 3E-3423 Metal Connector.
- Used with 8T-8697 ECAP, 7X-1700 Communication Adapter

Previous number for Plastic Port #1	New number for Metal Port #1
ECAP	ECAP
"T-Harness" 8T-5275	7X-1412 to Controls
Short cable 7X-1420	7X-1851 to 7X-1700 Comm. Adapter



7X-1851 Cable

7X-1713 Cable, EIS Loopback

SMCS Code: 1900-038, 0781
Model: All Engines with EIS (Electronic Ignition System)
Warranty: Y

Features/Benefits

- Used to allow EIS (Electronic Ignition System) control to test itself



7X-1713 EIS Loopback Cable

Service Parts:
9W-0844 Socket
8T-8730 Socket
8T-8735 Plug
8T-8729 Pin
8T-8737 Plug
7X-6222 Plug

T&SPG 2000

Engine Tools

See First Supplement

142-5865 Calibrator, Remote

142-5866 Cable, Extension

SMCS Code: 1356-036, 0787

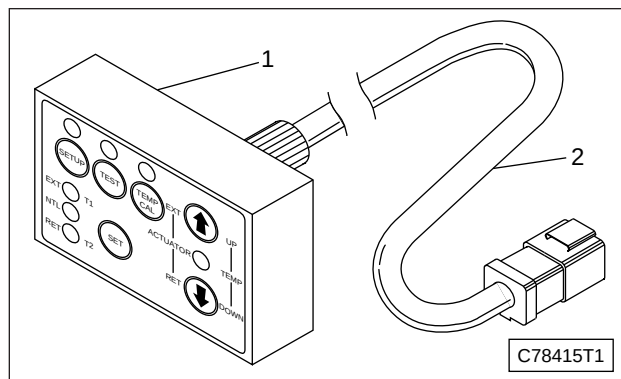
Warranty: M

Features/Benefits

- Used to calibrate Flexxaire Mark III fan controller (manual comes with controller)
- Allows technician to set pitch of fan blades, set turn-on and turn-off temperatures of fan drive, and set "purges-per-hour" of fan to control engine temperature
- As many as four extension cables can be connected, in series, for remote testing and calibration

Specifications/Technical Information

Length of cable 6.1 m (20 ft)



1. 142-5865 Remote Calibrator
2. 142-5866 Extension Cable

Reference

01503-0 Flexxaire Fan Installation and Maintenance Manual

125-2580 Tool Group, HEUI Engine

SMCS Code: 0770, 0774, 0775, 0781, 0782, 0784

Model: 3116 HEUI and 3126 HEUI Engines

Warranty: Y

Features/Benefits

- HEUI Diagnostic Tooling — includes all necessary cables, harnesses, and electrical pin removal tools to troubleshoot the electrical system, conveniently packaged in a separate plastic box within the group.
- Hydraulic Diagnostic Tooling — includes all necessary fittings, pressure gauge and hose, and a special breakout tee to troubleshoot the hydraulic system—including the injection actuation pressure sensor and control valve/pump combination.
- Injector and IAPC Valve Removal and Installation Tools
- Modified injector clamp to aid in proper assembly and tightening of the jumper tube.
- Necessary bit drivers and socket to work on hard-to-reach components.
- New double-ended offset feeler gauge for setting valves.

Parts List

- 1U-7587 Pry Bar-6 inch Long
- 3J-7352 Connector
- 3J-7354 Seal-O-Ring
- 5P-0144 Socket-Fuel Line
- 5P-0333 Wrench-Crowfoot
- 5P-5008 Reducer-Flared
- 6V-8397 Seal-O-Ring
- 6V-9508 Plug-Face Seal
- 7J-0204 Seal-O-Ring
- 8C-7310 Adapter
- 9S-4418 Plug
- 9S-8007 Plug-O-Ring
- 123-4941 Gage Assembly-Feeler Dealer Tool
- 125-2581 Tool Gp-Electronic
- 125-2583 Clamp Assembly
- 125-2584 Driver-Hex Ball
- 125-2588 Hex Wrench-7/64 inch
- 125-2589 Fitting-Diagnostic
- 125-5902 Insert GP-Foam
- 6V-7145 Case
- 1U-5757 Hose Assembly
- 3B-6768 Bushing-Reducing
- 8S-7169 Coupling-Pipe
- 8T-0852 Gage Gp-Pressure
- 1U-8015 Socket-7/32 Bit

1U-5470 Engine Pressure Group

SMCS Code: 1000-038, 1000-081, 1000-082, 1050-038,
1050-081, 1058-082, 1250-025, 1270-036,
1250-081, 1300-038

Model: All Models

Warranty: Y

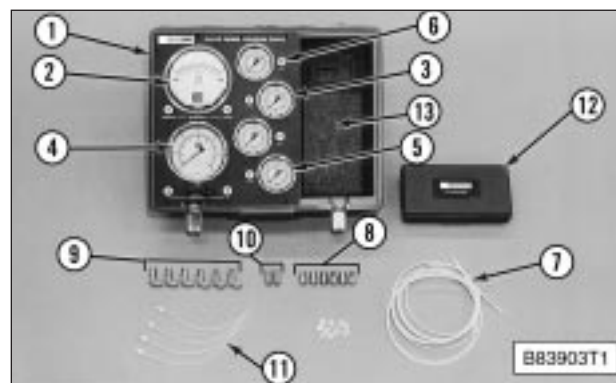
Features/Benefits

- Used to check performance of turbocharged diesel and natural gas engines and, with optional 1U-5554 Panel and 8T-0840 Pressure Gauge, to make operating adjustments to naturally aspirated gas engines
- Replaces canceled 6V-3150 Engine Pressure Groups and 4S-6553 Engine Evaluation Test Group; contents of 6V-3150 still serviced, but contents of 4S-6553 no longer serviced; 6V-3150 can be upgraded to essentially same functional specifications of 1U-5470 by installing optional 1U-5554 Panel with either 0-200 kPa [0-60 inch mercury (Hg)] 1U-5469 Pressure Gauge (0-60 inch Hg) or 100-0-100 kPa (30-0-30 inch Hg) 8T-0840 Pressure Gauge
- Equipped with 4 different pressure gauges that indicate pressure relative to ambient atmospheric pressure; require no measurement corrections due to atmospheric pressure changes
- 8T-0848 Pressure Gauges used to measure fuel pressure, intake manifold pressure on turbocharged diesel engines, cooling system pressure and to power balance diesel engines in multiple engine applications (0-58 psi)
- 8T-0846 Pressure Gauge used to measure oil pressure and air compressor cut-in and cut-out pressures (0-145 psi)
- Chart in case lid used to convert kPa or psi to inches of mercury as shown in Fuel Setting and Related Information microfiche
- 6V-6045 Accessories Case contains fittings that can be installed in all 1/8 inch NPT ports on Caterpillar Engines for setting up pressure taps for 1U-5470; 8T-0821 Tubing is easily connected to and disconnected from 1U-5470 panel and engine port fittings; internal O-ring seals tubing outer diameter and internal collet mechanism locks tubing into fitting
- Optional 8T-0840 Pressure Gauge used to measure intake manifold pressure on natural gas and gasoline engines and to power balance natural gas engines in multiple engine applications; mounts on optional 1U-5554 Panel Assembly which can be permanently installed in 1U-5470 Engine Pressure Group; 6V-4045 cannot be stored in 1U-5470 with optional gauge installed
- Optional slack tube 8T-0452 Water Manometer available for use with 1U-5470; measures static, vacuum, or differential pressure over range of 500 mm to 500 mm H₂O for total range of 1000 mm H₂O; stored in optional 8T-3153 Foam Block placed in lid of 8T-0841; optional 8T-3117 Foam Block can be used to store 8T-0452 in case lid of 6V-9450 Engine Pressure Group

Specifications/Technical Information

8T-0848 Pressure Gauges range 400 kPa (58 psi)
8T-0846 Pressure Gauge range 1000 kPa (145 psi)
1U-5469 Pressure Gauge range
of engine boost or positive intake
manifold pressure 0 to 200 kPa (0 to 60 inches Hg)
8T-0839 Differential
Pressure Gauge range up to 12 kPa
[50 inches water (H₂O)], as well as
either 12 kPa (1.74 psi) pressure or vacuum
All other gauges in group read directly in kPa and psi
8T-0840 Pressure Gauge
Range 0 to 100 kPa (0 to 30 inches Hg)
Vacuum range 0 to -100 kPa (0 to -30 inches Hg)
Operating temperature range -1°C to 60°C
(30°F to 140°F) for differential pressure gauges.
-18°C to 71°C (0°F to 160°F) for all other gauges
Gauge Accuracy ±2 percent of full scale
for differential pressure gauge. SAE Grade A
(±1.5 to 1 percent of full scale for all other gauges).
Operating Position Position has no effect on differential
pressure gauge, if gauge has been mechanically adjusted
to ZERO in the test position. On all other gauges,
position has no effect on accuracy.
Pressure Media Differential pressure gauge — clean air
and gases only (no liquids). All other gauges —
air, gases and liquids (oil, water, antifreeze, fuel, etc.).
Size 390 mm x 310 mm x 190 mm
(15.4 in X 12.2 in x 7.5 in)
Weight 6.8 kg (15 lb)

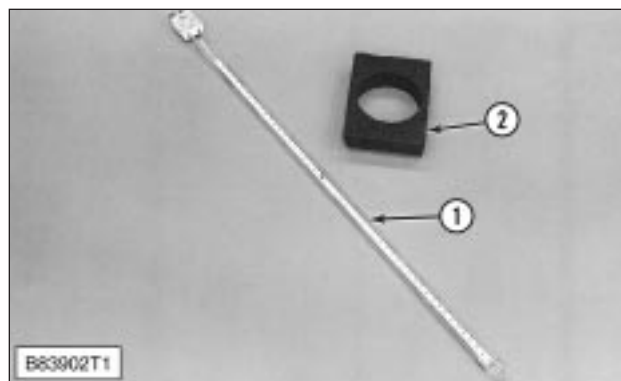
NOTE: DO NOT use any acids or other highly corrosive liquids in the gauges.



1U-5470 Engine Pressure Group

1. 8T-0841 Case
2. 8T-0839 Differential Pressure Gauge
3. 8T-0846 Pressure Gauge
4. 1U-5469 Pressure Gauge
5. 8T-0848 Pressure Gauge (3)
6. 4C-3974 Bulkhead Fitting (8)
7. 8T-0821 Tubing, 16 m (52.5 ft)
8. 4C-3973 Straight Connector (6)
9. 4C-3972 Elbow Fitting (6)
10. 4C-3971 Union (2)
11. 6V-6132 Cable Tie (4)
12. 6V-6045 Accessories Case
13. Form SEES5575 Accessories Label
14. 6V-6115 Packing Set Base
15. Form SEES5677 Conversion Chart
16. Form NEEG2187 Title Decal

T&SPG 2000



Optional 8T-0452 Water Manometer
(SEHS8907, pg. 7)

1. 8T-0452 Water Manometer
2. 8T-3153 Foam Block



Optional 8T-0840 Pressure Gauge

1. 8T-0840 Pressure Gauge
2. 1U-5554 Panel Assembly

8T-5300 Indicator Group, Timing

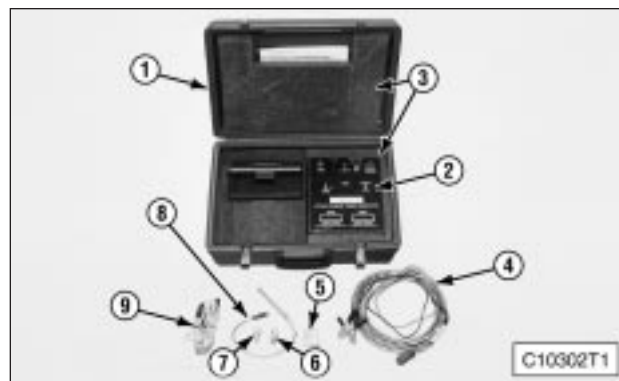
SMCS Code: 1000-025, 1000-036, 1000-038, 1250-025,
1251-082, 1272-038, 1552-036

Model: See Below

Warranty: Y

Features/Benefits

- Replaces canceled 6V-3100 Timing Indicator Group
- 6V-9060 Spark Timing Adapter Group required for 3304, 3306, 3516 Engines
- 8T-5301 Diesel Timing Adapter Group required for 300, 1100, 3200, 3300 and 3400 Series Engines
- Used to measure fuel injection timing for a diesel engine using 8T-5301 Diesel Timing Adapter Group
- Checks operation of automatic timing advance unit on engines that are so equipped, by using appropriate adapter group
- Cannot perform any function alone; needs either 8T-5301 Diesel Timing Adapter or 6V-9060 Spark Timing Adapter
- Powered from vehicle electrical system or from two 6-volt lantern-type batteries (not included)



1. 6V-7145 Case
2. 8T-5250 Indicator
3. 8T-3253 Packing Set
4. 5P-7366 Cable Assembly
5. 8K-4644 Fuse (5)
6. 6V-3093 Transducer Adapter, 1/4 inch NPTF (1U-5795 Ferrule Set)
7. 6V-2199 Transducer Adapter, 1/8 inch NPTF (1U-5795 Ferrule Set)
8. 6V-2197 Magnetic Transducer (TDC)
9. 5P-7362 Cable (TDC)
10. 6V-6045 Case

Additional accessories available separately:

8T-5184 Transducer [8.9 cm (3.5 in) long]

8T-5185 Transducer [17.8 cm (7 in) long]

Reference

SEHS8580 Special Instruction

8T-5184 Transducer, 1/4 inch Dia. Magnetic, 3.5 inch long

8T-5185 Transducer, 1/4 inch Dia. Magnetic, 7.0 inch long

SMCS Code: 1162-082

Model: 3208

Warranty: G

Features/Benefits

These transducers can be used either with 8T-5300 Engine Timing Indicator Group to indicate No. 1 Cylinder Top Dead Center to measure RPM

8T-5184 Transducer:

- Has 89 mm (3.5 in) long steel shank which is 12,7 mm (.5 in) shorter than existing 6V-2197 Transducer included in 8T-5300 Engine Timing Indicator Group
- Can be used in applications where 6V-2197 Transducer is too long, such as on some 3208 Engines where access to top center hole in front cover is limited by fan belts and fan guard

8T-5185 Transducer:

- Has 178 mm (7.0 in) long steel shank which is 63,5 mm (2.5 in) longer than 6V-2197 Transducer
- Can be used in applications where 6V-2197 Transducer is too short, such as on D7G SA Tractor

4C-6710 Governor Test Unit Group

4C-6711 Cable, Frequency Measurement

4C-6712 Cable, Governor Test

SMCS Code: 1908-036

Model: 3600 Family Engines with Heinzmann Governors

Warranty: Y

Features/Benefits

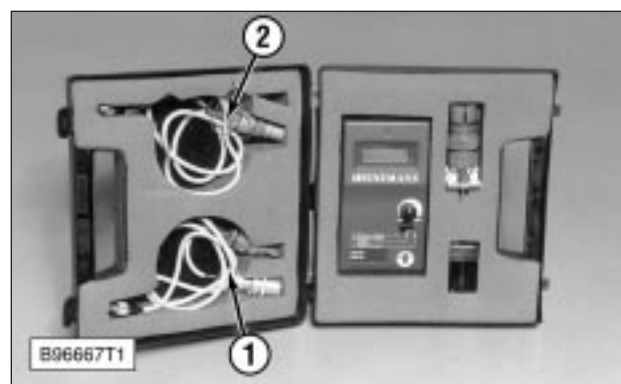
- Used to test and adjust Heinzmann Electronic Governors without running engine
- Simplifies installation and service of governor
- Measures governor frequency when engine is running and feedback voltage when engine is stopped

Simulates engine for following tests:

- Check governor frequency at different fuel levels
- Adjust and check minimum and maximum governor frequency levels
- Adjust speed droop during droop operation
- Check effect of gain, stability and derivative value settings on operation of engine

Specifications/Technical Information

Frequency range 100 - 10,000 Hz (± 5 Hz)
 Voltage range 1 - 6 Volts (± 50 mV)
 Simulator frequency 150 - 8,000 Hz
 Output voltage 8V peak-peak maximum
 Current consumption 8 mA maximum
 Battery 1U-9534 Battery, 9 Volt
 Temperature range 0-45°C (32-104°F)



4C-6710 Governor Test Unit Group

1. 4C-6711 Cable, Frequency Measurement
2. 4C-6712 Cable, Governor Test

Reference

SEHS9222 Special Instruction

SENR4661 Service Manual, Heinzmann Governor

T&SPG 2000

8T-5301 Adapter Group, Diesel Timing

SMCS Code: 1000-025, 1000-036, 1000-038, 1250-025,
1251-082, 1272-081, 1552-036

Model: 300, 1100, 3200, 3300 and 3400 Series Engines

Warranty: Y

Features/Benefits

- Used to check timing on diesel engines using 8T-5250 Timing Indicator (part of 8T-5300 Timing Indicator Group)
- Allows 8T-5250 Timing Indicator to measure engine/fuel system timing and mechanical advance
- 6V-7910 Transducer installed in No. 1 fuel line to provide RPM signal to 8T-5250 Timing Indicator



1. 6V-2198 Cable
2. 6V-7910 Transducer
3. 5P-7436 Adapter
4. 5P-7437 Adapter
5. 5P-7435 Adapter
6. 6V-3016 Washer

6V-9060 Adapter Group, Spark Timing

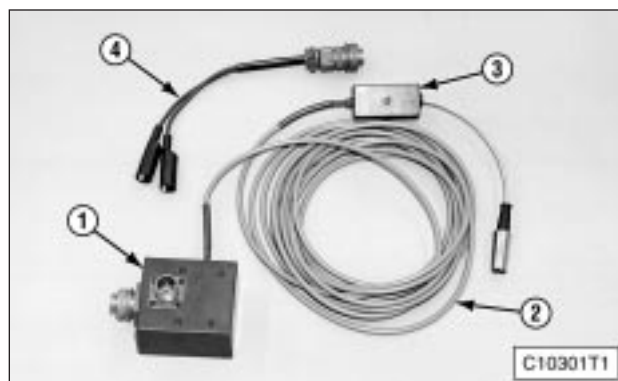
SMCS Code: 1272-038, 1552-036

Model: 3304, 3306, 3516

Warranty: Y

Features/Benefits

- Used to check timing on spark ignited engines using 8T-5250 Timing Indicator (part of 8T-5300 Timing Indicator Group)
- Fiber optic link that allows 8T-5250 Indicator to check dynamic timing on engines that have individual coils for each cylinder
- Connected to port labeled injection or spark transducer input; can also be used with canceled 6V-3100 Timing Indicator Group and connected to port labeled Diesel Injection Transducer; transmitter portion of adapter is then connected to primary (low voltage) coil terminals of No. 1 cylinder on engine (**NOTE:** 6V-9060 Spark Timing Adapter Group will be destroyed if it is connected to the secondary (high voltage) side of the coil.)



1. 8T-5259 Transmitter, Canceled
2. 8T-5260 Cable, Canceled
3. 8T-5257 Receiver, Canceled
4. 8T-5258 Cable — Coil Adapter

Not shown:

1U-5524 Cable, Adapter, Ignition Coil

1U-5524 Adapter Cable:

- Part of the 6V-9060 Spark Timing Adapter Group
- Allows dynamic timing of engines equipped with integral shielded ignition coils and Altronic magnetos to be checked; engines with Altronic magnetos have integral shielded ignition coils with 3-pin connectors for which 1U-5524 Adapter Cable is designed
- Connected at primary (low voltage) coil terminals of No. 1 cylinder; cable from magneto disconnected at primary coil connector and two 1U-5524 Adapter Cable 3-pin connectors are coupled in between the coil and cable; remaining 2-pin connector of adapter is coupled to 6V-9060 Spark Timing Adapter Group; when 6V-9060 and TDC Magnetic Transducer are connected to 8T-5250 Indicator, engine RPM and timing displayed

Reference

SEHS8580 Special Instruction

163-5443 Harness, Detonation Sensor

SMCS Code: 1559-038
Model: 3400, 3500, and 3600 Gas Engines
Warranty: Y

Features/Benefits

- Used to determine condition of detonation sensor on 3400, 3500 and 3600 gas engines



163-5443 Harness

Reference

Page 13, May 1999, Engine News, "Testing Detonation Sensor For Proper Use"

1U-5524 Adapter Cable

SMCS Code: 1272-038, 1552-036
Model: 3304, 3306, 3516
Warranty: Y

Features/Benefits

- Part of the 6V-9060 Spark Timing Adapter Group
- Allows dynamic timing of engines equipped with integral shielded ignition coils and Altronic magnetos to be checked; engines with Altronic magnetos have integral shielded ignition coils with 3-pin connectors for which 1U-5524 Adapter Cable is designed
- Connected at primary (low voltage) coil terminals of No. 1 cylinder; cable from magneto disconnected at primary coil connector and two 1U-5524 Adapter Cable 3-pin connectors are coupled in between the coil and cable; remaining 2-pin connector of adapter is coupled to 6V-9060 Spark Timing Adapter Group; when 6V-9060 and TDC Magnetic Transducer are connected to 8T-5250 Indicator, engine RPM and timing displayed

Reference

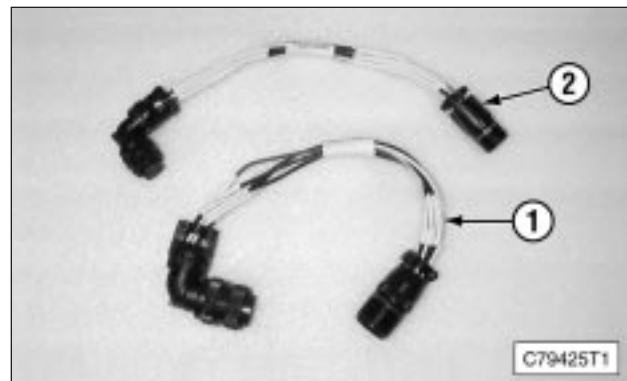
SEHS8580 Special Instruction, use and service of 8T-5300 Timing Indicator Group and 6V-9060 Spark Timing Adapter Group

143-4508 Cable, Timing (G3408C) 143-4509 Cable, Timing (G3412C)

SMCS Code: 0779, 1550
Model: G3408C and G3412C Gas Engines (EIS, Electronic Ignition System)
Warranty: Y

Features/Benefits

- Used to check ignition timing using a timing light and flywheel markings
- Used to determine if a primary signal is going to each transformer
- Cable installs between ignition wiring harness and valve cover connector
- Makes timing less difficult because ignition wiring is encased in ridge/flexible conduit or in a braided wire bundle



1. 143-4508 Timing Cable (G3408C)
2. 143-4509 Timing Cable (G3412C)

T&SPG 2000

FT1814 Cable

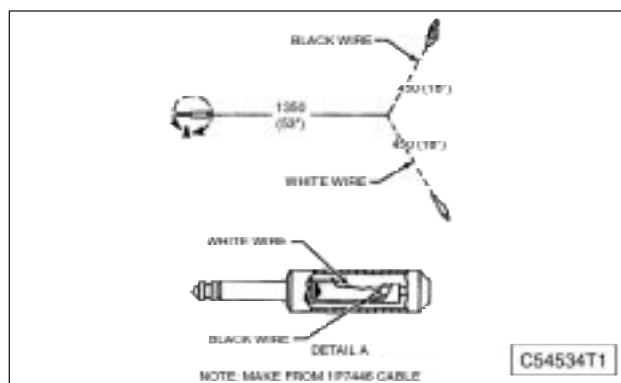
SMCS Code: 1000-025

Model: All Models with Set Points

Warranty: None

Features/Benefits

- Used with set point indicator, with 6V-7900, 6V-7091, 6V-7092, 6V-7093 and Fuel Injection Equipment Test Stands
- Fabricated by shortening 1P-7446 Cable to 1800 mm (71 in)



FT1814 Cable

6V-3072 Case, Carrying

SMCS Code: 1000-025, 1000-038, 1250-025, 5050-038

Model: 6V-4060 Indicator Group, Engine Set Point

Warranty: Y

Features/Benefits

- Depending on use, 6V-4060 Set Point Indicator can be stored with Engine Pressure Group or as individual unit in 6V-3072 Carrying Case



1. 6V-3072 Case
2. Form SEHS7920 Label for 6V-3072 Case, "6V-4060 Engine Set Point Indicator"
3. 6V-4863 Foam Insert
4. 6V-6045 Case¹
5. Form SEHS8009 Label for 6V-6045 Case, "Accessories"

9U-6005 Gauge, Spark Plug Gap

9U-6695 Indicator, Electronic Spark Plug Firing

SMCS Code: 1550-036

Model: Spark Ignited Engines

Warranty: Y

Features/Benefits

9U-6005 Spark Plug Gauge

- Designed to handle all types of plugs without damage
- Chrome plated "silver dollar" shape and continuous ramp design provide accurate and easy setting of plug gap
- English units on front and metric on back of gauge
- Used to set plug gaps quickly and easily
- Can be carried in pocket — coin shape with no sharp edges

9U-6695 Spark Plug Firing Indicator

- Greatly improved tool providing reliable way to diagnose ignition problems
- Adjustable sensitivity—user can set firing indicator to flash when placed near primary wire on exposed coils of 6.25 inch bore engines
- Flashing LED on top of indicator easily seen in daylight
- Indicator may be carried easily in shirt pocket
- Once users sets sensitivity, instrument is activated when spring clip is depressed
- Rugged plastic housing and electronic circuit board combine durability features for a dependable, durable instrument

Specifications/Technical Information

9U-6005 Spark Plug Gap Gauge

Diameter	38 mm (1.5 in)
Thickness	0.12 mm (0.110 in)
Gapping increments	every 0.054 mm (.0010 in)
	from 0.5 to 2.54 mm (0.020 in - 0.100 in)

9U-6695 Spark Plug Firing Indicator

Diameter	15.0 mm (.57 in)
Length	133.4 mm (5.25 in)
Indicator	bright red LED
Battery	3 required (147-6202 Battery)



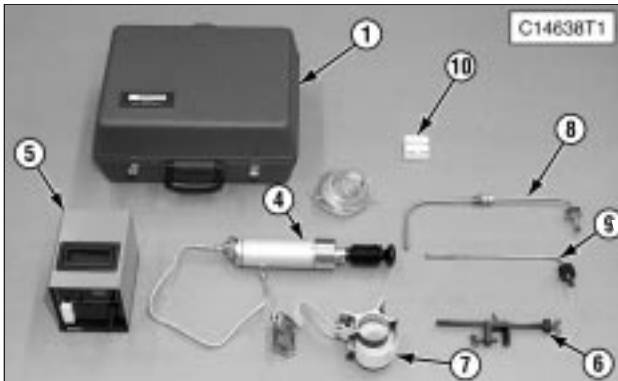
1. 9U-6005 Spark Plug Gap Gauge
2. 9U-6695 Spark Plug Firing Indicator

Not shown:

147-6202 Battery

8T-5100 Smoke Meter Group

Canceled



8T-5100 Smoke Meter Group

1. 6V-9449 Case
2. SEES 5696 Decal (8T-5100 Group)
3. 8T-5312 Block Group (foam insert with case)
4. 8T-5309 Pump Group
5. 8T-5307 Evaluator
6. 8T-5310 Clamp Assembly
7. 8T-5311 Mounting Group
8. 8T-5304 Probe
9. 8T-5305 Probe
10. 8T-5323 Filter Paper

Reference

SEHS8731 Special Instruction

FT2397 Cable, Extension, 3600 SI

SMCS Code: 1550-082; 0779

Model: 3600 SI Engine

Warranty: None

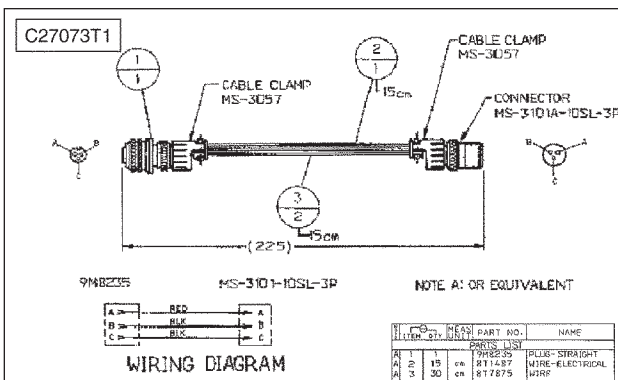
Features/Benefits

- Used when adjusting ignition timing
- Connects 5P-6584 Timing Light in ignition circuit without straining wiring harness

Specifications/Technical Information

Wire size 16 Ga.

Wire length 6 in



FT2397 Cable, Extension, 3600 SI

9U-6958 Module, Magneto Peak Detect

SMCS Code: 1552-082

Model: 3500 and 3600 Engines

Warranty: Y with CSTG Tool Repair Service

Features/Benefits

- Used to check magneto performance during actual operating conditions (problem could be spark plug or magneto related)
- When used with 6V-7070 or 9U-7330 Digital Multimeter or an equivalent, serviceman can measure magneto output DC Voltage
- Provides interface to magneto ignition system (9U-6959 T-Cable is included with the 9U-6958)
- Provides a separate voltage output for oscilloscope viewing of firing pulse train
- Does not require power to operate

Specifications/Technical Information

Input 0-200 VDC

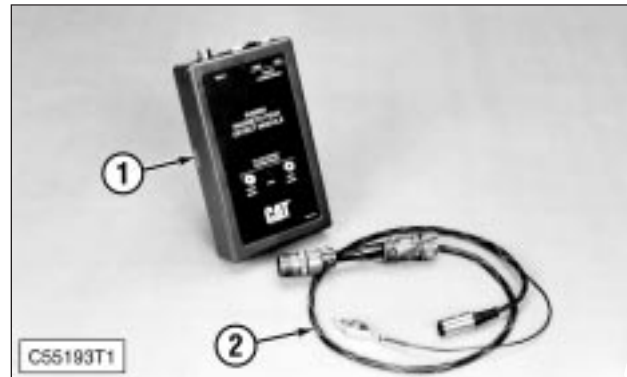
DC voltmeter connections 0-200 VDC

Scope connections 0-200 VDC

Operating temperature -40 to 60° C (-40 to 140° F)

Dimensions 168 x 190 x 41 mm (6.6 x 7.5 x 1.6 in)

Weight 0.5 kg (1 lb.)



1. 9U-6958 Magneto Peak Detect Module
2. 9U-6959 T-Cable (included with 9U-6958)

Reference

NEHS0588 Tool Operating Manual

T&SPG 2000

Flow Tools

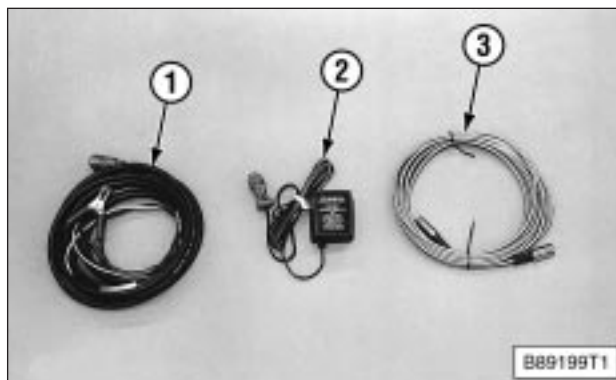
8T-2700 Blowby/Air Flow Indicator Group

SMCS Code: 1000-038, 1350-038, 1350-081, 1350-082, 1400-038

Model: 3204, 3208, 3304, 3306, 3406, 3408, 3412, 3512
Warranty: Y

Features/Benefits

- Replaces canceled 9S-7373 Air Meter Group
- Contains hand-held digital indicator, remote mounted pickup, 915 mm (3 ft) of cable, blowby hose and necessary connections
- Measures volume of blowby gases coming out of crankcase breather or air velocity through radiator (9S-7373 measures only radiator air velocity)
- Battery-powered digital indicator; can also be powered with external 11 to 40 Volts DC from machine battery, or AC powered with optional converter
- Volume of blowby gases coming out of engine breather(s) very helpful in planning engine repairs (shown in either liters/min or cubic feet per hr)
- Air velocity through radiator core helpful to quickly find plugged or partially restricted areas (shown in either meters/min or ft/min)
- Digital value appears when instrument is used

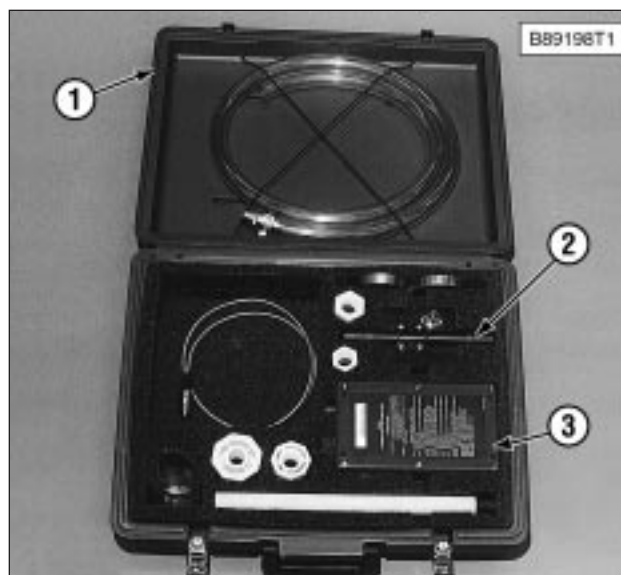


Optional items that can be ordered to use with the blowby/air flow instrument

1. 5P-7366 Cable, Power — connects machine batteries (11 to 40 Volts DC) to hand-held indicator
2. 8T-5268 Converter — converts 110/220 Volts AC, 50/60 Hz, power supply to 11 to 20 Volts DC at .3 Amp maximum for powering indicator
3. 6V-2198 Cable, Extension, 5500 mm (18 ft) long; operates indicator more than 914.4 mm (3 ft) from the pickup

Reference

SEHS8712 Special Instruction



8T-2700 Blowby/Air Flow Indicator Group

1. 6V-7145 Case
2. 8T-2685 Pickup
3. 8T-2701 Indicator

Service Parts:

- 8T-0899 Switch, Membrane
- 8T-0844 Cover, Front
- 8T-0887 Connector Assembly
- 8T-1005 Display, Liquid Crystal

1U-8860 Large Engine Blowby Pickup Group

SMCS Code: 1000-038, 1350-038, 1350-081

Model: 3500, 3600 Family Engines, Larger 300 Family Engines

Warranty: Y

Features/Benefits

- Optional pickup for use with the 8T-2701 Blowby/Air Flow Indicator
- Replaces 8T-2685 Small Pickup for measurement of 3500 Engine blowby; use 8T-2685 small pickup on these engines for short duration test only because of reduction of engine breather tube during test; use 8T-2701 Blowby/Air Flow Indicator with large probe
- Large 38mm (1.5 inch) I.D. pickup used on large engines without increasing crankcase pressure
- Checks blowby volume on Caterpillar 3500 and 3600 Engines and larger 300 Series Engines, as well as competitive large engines
- All-metal construction and large size makes tool suitable for permanent installation on engines; permanent installation allows continuous monitoring of blowby, making group useful for dynamometer rooms, marine or generator set applications
- When used with 8T-2701 Indicator, measures blowby on any engine within blowby range of 94 to 1888 liters per min. (200 to 4000 cubic feet per hour) (includes Caterpillar D397, D398, and D399 Engines, 3500 and 3600 Family Engines); smaller D300 and 3500 Engines may not have enough blowby at idle or partial load to give reading when they are in good condition; indicator display will read zero until engine is under load
- Can also measure air velocity such as radiator cooling air flow
- Connected directly to 8T-2701 Blowby/Air Flow Indicator, provides digital display of air flow or blowby value (volume of exhaust gas escaping to crankcase); blowby value helps determine engine condition; should not be used as stand-alone good/bad indicator for engine overhaul; other engine condition indicators, such as oil consumption, low power, hard starting, and excessive fuel consumption, need to be looked at also
- Large blowby meter has no moving parts because an ultrasonic sound vortex shedding principle measures the air flow. This makes the pickup reliable and virtually maintenance free.
- Large blowby pickup connected to output of crankcase breather or vent tube on engine; cable connects pickup to 8T-2701 Indicator which will give digital reading of blowby value or air flow value
- Before using 8T-2701 Indicator with large pickup, install 1U-8863 Blowby Conversion Group in indicator; makes indicator accurate for both large pickup and small pickup
- Pickup meter is sensitive to high frequency engine noise; to avoid incorrect readouts, keep pickup as far from engine as possible when making blowby measurements; do not put pickup near turbocharger or fan blades because this can cause reading error

Specifications/Technical Information

(When used with 8T-2701 Indicator)

Blowby measuring range:

Liters/minute 94 to 1888
Cubic feet/hour 200 to 4000

Air flow measuring range

(with BLOWBY V1.20 PROM installed in 8T-2700 Indicator):

Meters/minute 83 to 1656
Feet/minute 272 to 5436
Accuracy $\pm 10\%$ of reading

Resolution:

Blowby 1 liter per minute
(1 cubic foot per minute)
Air flow 1 meter per minute
(one foot per minute)

Operating temperature:

Pickup -18° to $+121^{\circ}\text{C}$ (0° to $+250^{\circ}\text{F}$)

Storage temperature:

Pickup -40° to $+232^{\circ}\text{C}$ (-40° to 450°F)

Probe Size:

Length 382 mm (15 in)
Outside Dia. 50.8 mm (2.0 in)
Inside Dia. 38.1 mm (1.5 in)
Width 113 mm (4.5 in)
Height 130 mm (5.2 in)

1U-8860 Group

Case size 432 mm W x 330 mm D x 114mm H
(17 in W x 13 in D x 4.5 in H)

Weight of 1U-8860 Group 6.1 kg (13.5 lb)

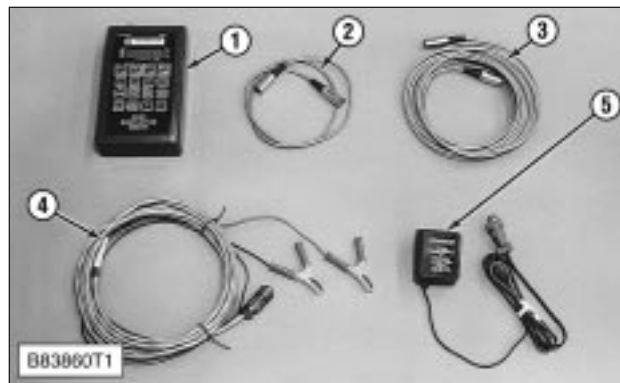
Weight of 1U-8861 Pickup only 3.0 kg (6.5 lb)

Power provided by PICKUP connector
on 8T-2701 Blowby/Air Flow Indicator



1. 6V-7145 Case
2. SEHS8984 Special Instruction
3. Large Engine Pickup (Not Serviced)
4. 9M-0164 Hose Clamps
5. 1U-8863 Conversion Group
6. 1U-8868 Hose (Pickup)

T&SPG 2000



Optional items for use with large engine pickup group (Items 3, 4, and 5 are also optional items for use with 8T-2700 Indicator Group for small engines, and may already be in your shop.)

1. 8T-2701 Blowby/Air Flow Indicator (part of 8T-2700 Indicator Group).
2. 8T-5297 Blowby Pickup Cable, 914.4 mm (3 ft)
3. 6V-2198 Blowby Pickup Cable, 5500 mm (18 ft)
4. 5P-7366 Indicator Power Cable, 5500 mm (18 ft)
5. 8T-5268 Converter; converts 110/220 Volts AC, 50/60 Hz power supply to 11 to 20 Volts DC at .3 Amp maximum for powering the indicator

Reference

SEHS8984 Special Instruction (Large Engine Blowby Pickup Group)

SEHS8712 Special Instruction (Blowby Indicator)

154-8100 Fuel System Arrangement

154-8101 Fuel Flowmeter Group

SMCS Code: 1250-036, 0782

Model: 3408 and 3412 Electronic Engines or D300 and 3500 Engines

Warranty: M

Features/Benefits

- Versatile fuel flow measurement system used to help evaluate engine performance
- 154-8101 used with existing 8T-9300 Fuel Flow Monitor Hand-Held Display
- 154-8100 includes newer style 154-8106 Hand-Held Display
- 154-8100 consists of 2 groups: 1U-5306 Hose/Adapter Group (Large) and 154-8102 Fuel Flow Measurement System Group (each group must be ordered separately)
- Meter groups are fully field tested for accuracy

Flowmeters

- State-of-art loose geometry, gear-type flowmeters
- Fail-safe design prevents engine fuel starvation even if flowmeter becomes disabled by debris
- Flowmeter can be serviced in line
- Flow straighteners designed into inlet fitting
- Accuracy of $\pm 0.5\%$ of reading per flowmeter
- Durable construction
- Non-intrusive sensor/transmitter (screws into flowmeter body)
- Transmitter contains a microprocessor that 1) linearizes output signal and 2) temperature corrects flow rates to provide accurate fuel flow and fuel temperature data

Specifications/Technical Information

Single Flowmeter

Calibration range 189 to 1895 Lph (50 to 500 gph)

Accuracy $\pm 0.5\%$ of reading

Two flowmeter system

burn rate range 0 to 1895 Lph (0 to 500 gph)

Operating Specifications

Ambient air temperature 0 to 105°C (32 to 221°F)

Fuel temperature -20 to 85°C (-4 to 185°F)

Storage temperature -40 to 100°C (-40 to 212°F)

Maximum pressure 862 kPa (125 psi)

Weights

154-8103 or 154-8104 Flowmeter 8.1 kg (6.75 lbs)

154-8101 Flowmeter Group 14.5 kg (32 lbs)

154-8102 Fuel Flow Measurement System Group .. 17.3 kg (38 lbs)

1U-5306 Hose/Adapter Group (Large) 5.5 kg (12 lbs)



154-8102 Fuel Flow Measurement System Group

1. 154-8104 Fuel Flowmeters
2. 156-1824 Sight Glasses
3. 154-8107 Junction Box
4. 8T-9280 Power Supply
5. 5P-7366 Cable Assembly, Power
6. 4C-9660 King Pelican Case (Decal NEEG2802, 154-8098 Component Foam Insert, and 154-8099 Lid Foam Insert)
7. 154-8106 Hand-Held Display
8. 154-8097 6.1 m (20 ft) Cable, 8T-9280 Power Supply to 154-8107 Junction Box
9. 154-8095 6.1 m (20 ft) Cable, Meter/Display

Not shown:

NEHS0697 Tool Operating Manual

NIST Traceable Flowmeter Calibration Certificates

1U-5306 Hose/Adapter Group (Large) (this group must be ordered separately)



154-8101 Fuel Flowmeter Group

1. 154-8103 Fuel Flowmeter
2. 156-1824 Sight Glass
3. 154-8092 6.1 m (20 ft) Cable, Flowmeters to 8T-9300 Monitor
4. 4C-9660 King Pelican Case with NEEG2803 Decal
5. 154-8098 Component Foam Insert
6. 154-8099 Lid Foam Insert
7. NEHS0697 Tool Operating Manual
8. NIST Traceable Flowmeter Calibration Certificates



Additional Components to make 154-8101 a complete test system

1. 1U-5306 Hose/Adapter Group (Large)
2. 8T-9300 Fuel Flow Monitor
3. 8T-9280 Power Supply
4. 5P-7366 Cable Assembly, Power
5. 1U-5297 Cable Assembly, 8T-9280 Power Supply to 8T-9300 Monitor

Optional Items (available separately)

- 154-8093 6.1 m (20 ft) Extension Cable, connects 154-8103 Flowmeter to 154-8092 Cable; 154-8104 Flowmeter or 154-8107 Junction Box to 154-8095 Cable
- 1P-7438 Beaker for taking fuel density tests
- 1P-7408 Thermo-Hydrometer (range 29 to 41° API)
- 5P-2712 Thermo-Hydrometer (range 39 to 51° API)
- Cable Assembly connects 154-8103 or 154-8104 Flowmeter to DataView (contact CSTG)

Optional items for 154-8102 only (available separately)

- 154-8096 AC Power Supply Group (90 to 264 VAC, 47 to 63 Hz), connects directly to the 154-8107 Junction Box
- 131-5047 AC Power Plug Cable (USA plug), connects to 154-8096 AC Power Supply Group
- 137-0171 European Power Plug Adapter, connects to 131-5047 AC Power Plug
- 133-6975 AC Power Cable, 220 VAC (European Plug), connects to 154-8096 AC Power Supply Group
- 154-8105 Panel Mount Display

Optional items for 154-8101 only (available separately)

- 8T-9276 AC Power Supply, 110/220 VAC, 50/60 Hz switchable
- 6V-2198 Extension Cable, 5.5 m (18 ft), 8T-9300 Monitor to 154-8092 Cable
- 8T-9295 Magnetic Holding Base (for 8T-9300 Monitor)

Reference

NEHS0697 Tool Operating Manual, NEHS0698 Tool Operating Manual

Caterpillar Fuel Flow Monitor System

SMCS Code: 1250-036, 0782

Model: Multiple engine models

Warranty: Y

Features/Benefits

- Caterpillar Fuel Flow Monitor System replaces canceled 5P-2149 Attachment Group
- Versatile fuel flow measurement system designed to help evaluate engine performance
- Powered by 11 to 40 Volts DC at 1.2 Amps from machine battery or other source
- Used as dual-meter system on engines with both supply and return-to-tank fuel lines or as single-meter system for engines without return line; uses 2 fuel flowmeters and handheld monitor to measure fuel flow and fuel temperature of both supply and return lines, and calculate burn rate of engine; handheld monitor displays average and total fuel burned during given period of time; monitor instantly indicates out-of-range conditions such as underflow or overflow; information displayed in English or Metric units
- Microprocessors in state-of-the-art "smart" turbine flowmeters linearize output signals of both flow and temperature to give meter accuracy of $\pm 0.5\%$ of reading; automatically compensates for fuel expansion as it changes temperature
- Meter groups fully field-tested to ensure accuracy
- Includes pulse dampeners, flow straighteners and sight glasses

T&SPG 2000

168-7740 Fuel Flow Measurement System Group

168-7730 Fuel Flowmeter Group

SMCS Code: 1250-036, 0782
 Model: 3606, 3608, 3612, and 3616 Engines
 Warranty: Y

Features/Benefits

- Used to evaluate engine performance
- State-of-the-art, gear-type flowmeters are fully tested for field accuracy
- Fail-safe design prevents engine fuel starvation, even if flowmeter becomes disabled by debris
- Durable construction — flowmeters can be serviced in line
- Accuracy of $\pm 0.5\%$ of reading per flowmeter
- Non-intrusive sensor/transmitter (screws into flowmeter)
- Transmitter contains a microprocessor that linearizes output signal and temperature-corrects flow rates to provide accurate fuel flow and fuel temperature data
- Two new flowmeters are available in separate groups:
 168-7745 Flowmeter communicates with 154-8106 Fuel Flow Display (see 168-7740 Fuel Flow Measurement System Group) and 168-7735 Flowmeter communicates with 8T-9300 Fuel Flow Monitor (see 168-7730 Flowmeter Group)

Specifications/Technical Information

Single Flowmeter

Calibration range 569 to 4740 Lph (150 to 1250 gph)
 Accuracy $\pm 0.5\%$ of reading

Two Flowmeter System

Burn rate range¹ 0 to 4740 Lph (0 to 1250 gph)
¹ Return flowmeter fuel flow must not be less than 569 Lph (150 gph)

Flowmeter Operating Specifications

Ambient air temperature 0 to 105°C (32 to 221°F)
 Fuel temperature -16 to 85°C (-3 to 185°F)
 Storage temperature -40 to 100°C (-40 to 212°F)
 Maximum pressure 1700 kPa (250 psi)

Weights

168-7735 or 168-7745 Flowmeter 5.5 kg (12.2 lbs)
 168-7735 Fuel Flowmeter Group 20 kg 44 lbs
 168-7745 Fuel Flow Measurement System Group 25 kg (55 lbs)
 168-7750 Hose/Adapter Group 7.7 kg (17 lbs)

168-7740 Fuel Flow Measurement System Group (includes the 154-8106 Fuel Flow Display)



168-7740 Fuel Flow Measurement System Group

1. 168-7745 Fuel Flowmeter
2. 168-7739 Sight Glass
3. 154-8107 Junction Box
4. 8T-9280 Power Supply
5. 5P-7366 Cable Assembly, Power
6. 4C-9660 King Pelican Case
NEEG2839 Decal
168-7742 Component Foam Insert
154-8099 Lid Foam Insert
7. 154-8106 Hand Held Display
8. 154-8097 Cable, 6.1 m (20 ft) (8T-9280 to 154-8107)
9. 154-8095 Cables, Meter/Display 6.1 m (20 ft)

Not shown:

NEHSO740 Tool Operating Manual
 NIST Traceable Flowmeter Calibration Certificates

Optional Items (sold separately)

154-8096 AC Power Supply Group, 90 to 264 VAC, 47 to 63 Hz, (connects to junction box)
 131-5047 AC Power Plug Cable (USA plug), (connects to 154-8096)
 137-0171 Power Plug Adapter 220 VAC (connects to 131-5047)
 133-6975 Power Cable 220 VAC, (connects to 154-8096)
 154-8105 Panel Mount Display

168-7730 Fuel Flowmeter Group (for use with the 8T-9300 Fuel Flow Monitor)



168-7730 Fuel Flowmeter Group

1. 168-7735 Fuel Flowmeter
2. 168-7739 Sight Glass
3. 154-8092 Cable, Flowmeter 6.1 m (20 ft)
(168-7735 to 8T-9300)
4. 4C-9660 King Pelican Case
NEEG2840 Decal
168-7742 Component Foam Insert
154-8099 Lid Foam Insert

Not shown:

NEHSO741 Tool Operating Manual
NIST Traceable Flowmeter Calibration Certificates

Additional Components to make 168-7730 a Complete Test System

8T-9300 Fuel Flow Monitor
8T-9280 Power Supply
5P-7366 Cable Assembly, Power
1U-5297 Cable Assembly (8T-9280 to 8T-9300)

Optional Items for 168-7730 (sold separately)

8T-9276 AC Power Supply, 110/220 VAC, 50/60 Hz, switchable
6V-2198 Extension Cable, 5.5 m (18 ft) (8T-9300 to 154-8092)
8T-9295 Magnetic Holding Base (for 8T-9300)

Optional Items for 168-7730 or 168-7740 (sold separately)

168-7755 Cable, (168-7745 or 168-7735 to DataView)
168-7750 Hose/Adapter Group
168-7733 Hose Assembly, size 20, 1 m (3 ft)
154-8093 Extension Cable, 6.1 m (20 ft), (168-7735 to 154-8092, 168-7745 or 154-8107 to 154-8095)
1P-7438 Beaker (for taking fuel density tests)
1P-7408 Thermo-Hydrometer (range 29 to 41° API)
5P-2712 Thermo-Hydrometer (range 39 to 51° API)

Additional Items Necessary for Testing 3612 and 3616 Engines (168-7730 and 168-7740)



1. 1U-5295 Accumulator (Qty 2)
2. 168-7736 Tee, Swivel (Qty 2)
3. NEEG2180 Decal (Qty 2)

Not shown:

3K-0360 O-Ring Seal (package of 20)
5P-2963 Charging Adapter for 1U-5295

Reference

NEHSO740 Tool Operating Manual, Using the 168-7740 Caterpillar FuelCom Fuel Flow Measurement System for 3600 Engines

NEHSO741 Tool Operating Manual, Using 168-7730 Caterpillar FuelCom Flowmeter Group with 8T-9300 Fuel Flow Monitor to Test 3600 Engines

T&SPG 2000

Measuring Tools

8T-1000 Electronic Position Indicator Group

SMCS Code: 0760

Model: All Models

Warranty: Y

Features/Benefits

- Replaces mechanical dial indicators and allows readings to be taken in applications where mechanical dial indicators cannot be accurately used such as rack position on an operating engine (rapidly changing dynamic readings)
- Digital readout precision linear measuring gauge capable of dynamic and static measurement
- Displays either millimeter or inch displacement
- Digital readout — 4-1/2 inch digit custom LCD (liquid crystal display) for digital display of measurement value with arrows to indicate functions being used; optional backlighting for use in dark locations and display heater for use in cold climates
- Touch switch — front panel touch switch controls functions of indicator; has tactile feel to allow operator to know when switch has been pressed hard enough to enter a function
- Remote readout — position probe which has same mounting stem as mechanical dial indicators is connected to indicator with a cable; allows readings to be taken from remote location such as dynamometer control room, or from operator's compartment on machine; extension cables may be used to locate probe further from indicator
- Dynamic reading — such as rack position on an operating engine can be taken as well as static measurements; filtering included in indicator to help stabilize rapidly changing readings
- Floating zero — ZERO touch switch resets display to zero at any probe position; display will then show distance probe shaft moves from this zero position and indicate which direction it had moved with a # indicator
- Storage memory — 3 separate storage memories record minimum, maximum, and difference values of measurement being taken; values can be displayed at any time, allowing total travel of probe measuring shaft to be measured and recorded
- Hold feature — value on display can be held constant for any length of time with press of front panel touch switch
- Power — 8T-1001 Indicator powered with internal 9-Volt battery; 11 to 40 Volts DC external power can be used for permanent installations or when battery is low; AC power adapter available; power-saving feature turns display off if probe not used in 10 minutes, but retains all functions and information in memories; if probe not used in 20 minutes, indicator turns itself completely off, clearing memories and zero; auto turnoff feature may be disabled if desired

Specifications/Technical Information

[with 25.4 mm (1.0 inch) probe]

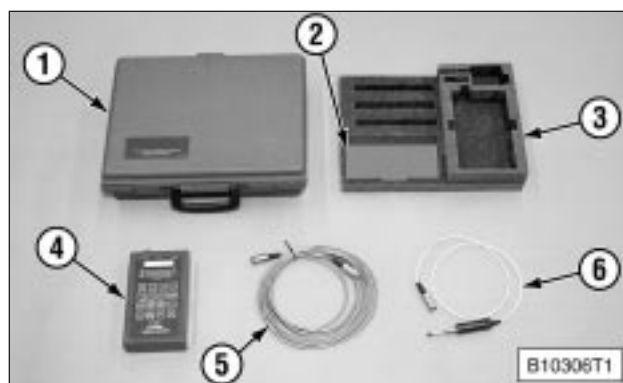
Measuring Range	0-25.4 mm (0-1.0 inch)
Resolution	.01 mm (.001 inch)
Accuracy	±.025 mm (.001 inch) accuracy in band from 5.08 mm (.200 inch) to 20.32 mm (.800 inch) starting with probe shaft in 5.08 mm (.200 inch) from fully extended position; a ±.050 mm (.002 inch) outside band of 5.08 mm (.200 inch) to 20.32 mm (.800 inch) for 25.4 mm (1.0 inch) travel starting with probe fully extended
Power	internal, standard 9-Volt Battery, NEDA 1604, or 6F22 or 006P, or external 11 to 40 Volts DC at .007 Ampere
Battery Life	alkaline battery — 100 continuous hours, nominal or up to 300 hours intermittent
Polarity indicator	can be changed to indicate either + or - as probe moves in either direction from zero point
8T-1000 Group size	394 mm x 311 mm x 101 mm (15.5 in x 12.3 in x 4 in)
8T-1001 Indicator size	190 mm x 112 mm x 40 mm (7.5 in x 4.4 in x 1.6 in)

8T-1002 Probe size:

Length (not including probe shaft)	89 mm (3.5 in)
Body diameter	19 mm (.75 in)
Mounting stem diameter	9.5 mm (.375 in)
Mounting stem length	21 mm (.85 in)
Probe shaft diameter	4.75 mm (.187 in)
Cable length	914 mm (36 in)



1. 8T-1001 Indicator, Electronic Position
2. 8T-1002 Probe, 25.4 mm (1.0 inch)



8T-1000 Electronic Position Indicator Group

1. 6V-3072 Case
2. 6V-6045 Case, Accessory
3. 8T-5295 Insert, Foam
4. 8T-1001 Indicator, Electronic Position
5. 6V-2198 Cable
6. 8T-1002 Probe, 25.4 mm (1.0 inch)

Reference

SEHS8623 Special Instruction



4C-7653 Extended Collet

Reference

SEHS9278 Special Instruction

8T-5096 Dial Indicator Test Group

Warranty: M

Features/Benefits

- Provides tooling used in taking many different service measurements such as gear backlash, end clearance, side clearance, valve movement or rack position.
- Contains all components of the 7H-1949 Dial Indicator Group, along with an 8S-2329 Base and 8S-2327 Post.
- Magnetic base provides easier and quicker mounting of the dial indicator. The former 7H-1949 Dial Indicator Test Group can be updated by adding the 8S-2329 Base and the 8S-2327 Post.

4C-8753 Collet, Extended

SMCS Code: 1250-036

Model: 3500 Family Engines

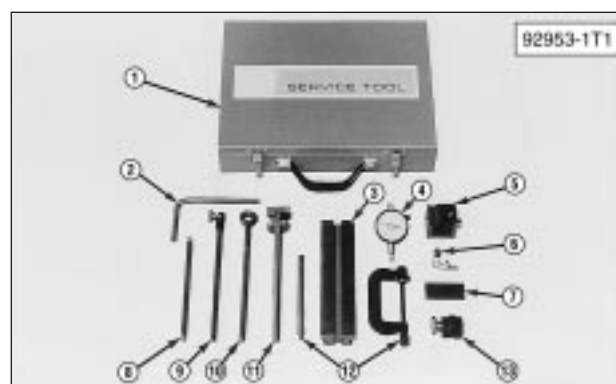
Warranty: G (Not repairable)

Features/Benefits

- Improves accuracy of fuel setting measurement and adjustment on the 3500 Engine
- Used with 8T-1002 Electronic Position Indicator Probe or dial indicator
- Prevents side loading of probe shaft by fuel stop lever in governor; side loading can cause setting errors and breakage of contact point on indicator
- Attaches to indicator probe or dial indicator; is correct length for 5P-7263 Contact Point specified in 3500 fuel testing and adjusting instructions
- 4C-8753 Extended Collet has been added to 6V-7880 Timing and Fuel Setting Tool Group

Specifications/Technical Information

- Fits all dial indicators with 9.5 mm (.375 in) mounting boss
- 82.6 mm long; 3/8-16 THD for mounting on engine
- Allows 25.4 mm (1 in) probe travel when used with 76.2 mm (3 in) shaft extension



8T-5096 Dial Indicator Test Group

1. 6V-3072 Box
- 2P-8311 Block
2. 7H-1946 Arm
3. 7H-1941 Base
4. 7H-1942 Indicator
5. 8S-2329 Base
6. 7H-1940 Universal Attachment
7. 7H-1947 Holder
8. 8S-2327 Post
9. 7H-1945 Holding Rod
10. 7H-1645 Holding Rod
11. 7H-1944 Post
12. 7H-1943 Clamp
13. 7H-1948 Snug

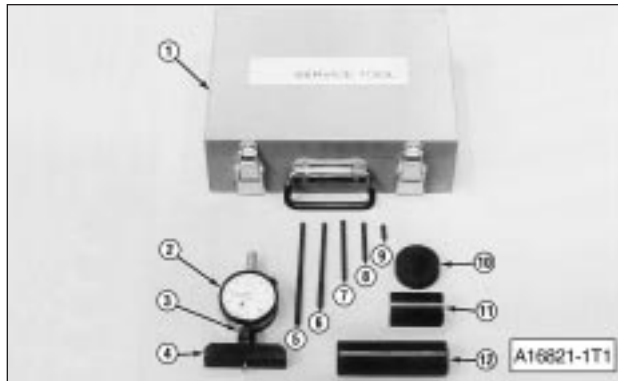
T&SPG 2000

6V-7926 Dial Indicator Group

Warranty: M

Features/Benefits

- Use primarily for measuring off-engine timing dimensions when setting fuel pump lifters.
- Measurements are made with a 25.4 mm (1.00 inch) travel indicator and 5 contact points.
- Can also be used in other applications for accurate depth measurements up to 127 mm (5.00 inch).



6V-7926 Dial Indicator Group

1. 6V-3073 Box Assembly
6V-7029 Liner Block
6V-7924 Holder Block
2. 8S-3158 Indicator
3. 3P-1565 Collet Clamp
4. 5P-4156 Base
5. 5P-4163 Point, Contact, 120.65 mm (4.75 in) long
6. 5P-4162 Point, Contact, 95.25 mm (3.75 in) long
7. 5P-4161 Point, Contact, 69.85 mm (2.75 in) long
8. 3S-3270 Point, Contact, 44.45 mm (1.75 in) long
9. 5P-4160 Point, Contact, 19.05 mm (.75 in) long
10. 5P-4159 Gauge Stand
11. 5P-4158 Gauge, 50.8 mm (2 in)
12. 5P-4157 Gauge, 101.6 mm (4 in)

165-8958 Indicator Base

SMCS Code: 7561-012

Model: All Models Containing Duo-Cone Seals

Essential Tool

Warranty: G

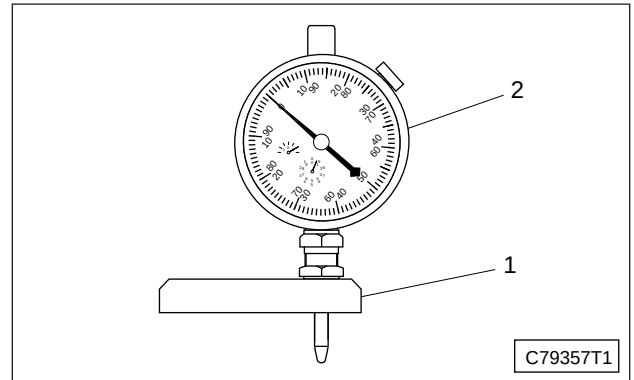
Features/Benefits

- Used to measure installation height of Duo-Cone seals
- Used with 6V-3075 Dial Indicator, 6V-6167 Contact Point, and 3P-1565 Indicator Collet
- Made of plastic to prevent damage to sealing surface of seal ring
- Extra long base provides stability when measuring installation height

Specifications/Technical Information

Overall length 127 mm (5.0 in)
 Length from centerline of indicator to outer edge ... 122 mm (4.8 in)

Width 15 mm (.6 in)
 Threaded hole 3/8-32 thread
 Material plastic



1. 165-8958 Indicator Base

Additional tooling required:

2. 6V-3075 Dial Indicator
3. 6V-6167 Contact Point
4. 3P-1565 Indicator Collet

9U-6175 Case, Tool, Soft

SMCS Code: 0787

Model: All Models (1U-9800)

Warranty: Y

Features/Benefits

- Low-cost protection for 1U-9800 Ultrasonic Wear Indicator
- Resistant to oil, fuel, and coolant
- Adjustable neck strap for hands-free operation
- Clear vinyl front allows use of encased keyboard and display
- Quick-close top uses Velcro to permit quick removal of instrument

Specifications/Technical Information

Dimensions 195 x 195 x 40 mm
 (7.25 x 7.25 x 1.75 in)
 Weight 227 g (.5 lb.)



9U-6175 Soft Tool Case

168-7720 Ultrasonic Wear Indicator III Group

168-7721 Ultrasonic Wear Indicator III

SMCS Code: 4150, 0787

Model: All

Warranty: Y

Features/Benefits

- Replaces 9U-6700 Ultrasonic Wear Indicator II. Includes many improvements
- Used to measure track bushings (before and after turning), idler center flange wear on fabricated idlers, bulldozer blades, bucket base edges, scraper bowls, truck beds, components protected by guards, or any other thickness — works quickly and easily
- New design uses state-of-the-art surface mount electronics for high reliability
- New - Easy battery access — loosen two battery cover screws on Indicator III's back side
- New - Uses five Alkaline or NiCad AA batteries (no battery pack)
- New - Liquid crystal display backlight can be turned on or off
- New - Power level monitor shows percent of estimated remaining battery power
- New - Mono-earphone connector accepts earphone to hear beeper while in a noisy environment
- Built-in multiple language capability (English, Portuguese, French, Spanish, and German) — no program modules needed to switch language
- Group includes a new probe with longer, more durable cable. This probe can also be used with the former 9U-6700 Indicator II.
- Used with Custom Track Service (CTS) inspections, which can be downloaded directly to a computer for viewing or printing
- Automatically recalls and shows last machine location display screen when turned on
- Measurements stored in non-volatile memory
- Can select where machine data is stored in Indicator III when transferring from a PC that is using CTS
- Less time cleaning parts — eliminates measurement errors due to dirt packing or differences in measurement techniques between inspectors
- Accurate to within ± 0.1 mm (.010 in) in Low Resolution Mode and ± 0.076 mm (.003 in) in High Resolution Mode
- Capable of storing 64 CTS inspections and uses direct alphanumeric entry
- 168-7721 Indicator III is CE compliant

NOTICE

If alkaline batteries are installed, do not use a 4C-3024 Battery Charger or 168-7734 Battery Charger or damage to the Indicator III may result. Place tape over the charge connector to prevent charging when alkaline batteries are installed.

Specifications/Technical Information

Operating Temperatures

Ambient air	 -18 to +60°C (0 to +140°F)
Storage (without batteries)	 -40 to +60°C (-40 to +140°F)
Storage (with NiCad batteries less than 6 months)	 -20 to +46°C (-4 to +113°F)
Storage (with alkaline batteries less than 6 months)	 -40 to +60°C (-40 to +140°F)

Weights

168-7720	 3.5 Kg (7.60 lbs)
168-7721	 0.82 Kg (1.81 lbs)
168-7722	 0.1 Kg (0.22 lbs)



168-7720 Ultrasonic Wear Indicator III Group

1. 168-7721 Ultrasonic Wear Indicator III
2. 168-7722 Ultrasonic Probe
(includes Certificate of Conformity)
3. 6V-7145 Case
4. 4C-3024 Battery Charger
5. 9U-6000 Paper Towels
(Qty 16, from 9U-6000 Paper Towel Case)
6. 9U-7981 Couplant
7. NEEG2835 Group Label

Not shown:

4C-4772 Foam Insert
Four RS232 Protective Caps (1 9/16 in)
NEHSO730 Tool Operating Manual

T&SPG 2000



168-7721 Ultrasonic Wear Indicator III

1. 9U-7981 Couplant

Not shown:

One RS232 Protective Cap (1 9/16 in) Installed
One Calibration Certificate

Service Parts

4C-5490 Couplant Holder

1U-7445 Nicad Battery, rechargeable, package qty 1
(5 required to power Indicator III)1U-9533 Alkaline Battery, non-rechargeable, package
qty 96 (5 required to power Indicator III)**NOTICE**

Do not use battery charger if original rechargeable batteries in the Ultrasonic Wear Indicator III are replaced with non-rechargeable batteries. Damage to instrument may result. Place a piece of tape over the charge connector to prevent charging.

Optional Items

9U-6175 Soft Protective Case

4C-5488 Cable Assembly RS232 - to transfer thickness
values to the CTS program in a PC AT version4C-5489 Cable Assembly RS232 - to transfer thickness
values to the CTS program in a PC XT version

4C-5897 Modem Cable

Reference

NEHS0730 Tool Operating Manual

See First Supplement**9U-6700 Ultrasonic Wear Indicator II Group**

SMCS Code: 4150-0787

Model: All Equipment with Track-Type Undercarriage

Warranty: Y

Features/Benefits

- Uses direct alphanumeric entry — no more scrolling through the alphabet
- 9600 baud rate — five times faster data transfer to CTS program
- Used to measure track bushings, idler center flange, thickness of bulldozer blades, bucket base edges, scraper bowls, truck beds, or any other component needing to be measured for thickness — works easily and quickly
- Used with Custom Track Service (CTS) inspections which can be downloaded directly to a computer for viewing or printing
- Less time cleaning parts — eliminates measurement errors due to dirt packing or differences in measurement techniques between inspectors
- Measure track bushings before and after turning
- Determine idler center flange wear on fabricated idlers
- Provides measuring accessibility to some components protected by guards
- Accurate to within ± 0.1 mm (.010 in)
- Capable of storing 64 CTS inspections

NOTICE

If alkaline batteries are installed, do not use a 4C-3024 Battery Charger or damage to Indicator II may result. Place tape over the charge connector to prevent charging.



9U-6701 Ultrasonic Wear Indicator II

Specifications/Technical Information

9U-6700 Ultrasonic Wear Indicator II Group Specifications

Internal power supply ... five internal NiCad rechargeable AA batteries (alkaline AA may also be used)

Low battery indicator liquid crystal display will flash

Usable battery life remaining
after indicator flashes approximately 1 hour

Battery life of NiCad (rechargeable) 12 hours

Battery life of alkaline (non-rechargeable) 30 hours

External power supply 4C-3024 Battery Charger
(powers Indicator II and charges batteries)

External power requirement
for charger 110/220 VAC, 50/60 Hz.

Measurement range for steel 1.3 mm (.05 in)
to 254 mm (10.0 in)

Measurement resolution ± 0.1 mm (.01 in)

Measurement accuracy ± 0.1 mm (.01 in)

Operating temperature -18 to 60° C (0 to 140° F)

RAM memory size 32,768 bytes

ROM memory size 16,384 bytes

RS232 specifications 1200 or 9600 baud rate

6V-7145 Carrying Case size 432 x 390 x 114 mm
(17.0 x 15.4 x 4.5 in)

9U-6701 Ultrasonic Wear Indicator II size 190 x 168 x 40 mm
(7.5 x 6.6 x 1.6 in)

Weight of 9U-6700 Group 3.06 kg (6.75 lbs.)

Weight of 9U-6701 Indicator II 0.907 kg (2.0 lbs.)

4C-5485 Ultrasonic Probe Specifications

Probe type dual element 8 MHz special application

Measuring surface diameter 9.5 mm (.38 in)

Length 46 mm (1.8 in)

Diameter 19 mm (.75 in)

Allowable surface temperature -18 to 150° C
(0 to 300° F)

Cable length 107 cm (42.0 in)

Weight 0.113 kg (.25 lbs.)

Service Parts

9U-7492 Front Panel Touch Switch Assembly

8T-0844 Rear Plastic Cover

4C-5490 Couplant Holder

NOTE: There are five different Program Modules available to provide different language displays for the Indicator II. The five languages are English, Spanish, French, German, and Portuguese. Use the form numbers below to order.

NEXG4525 English

NFXG4525 French

NGXG4525 German

NPXG4525 Portuguese

NSXG4525 Spanish

Attention 1U-9800 Owners

CSTG offers an upgrade kit, part number 9U-7980, to convert your existing 1U-9801 Ultrasonic Wear Indicator to the new 9U-6701 Ultrasonic Wear Indicator II. The upgrade may be performed by the user or CSTG. During 1994 only, CSTG will perform the upgrade for you with no installation charge. You may order the 9U-7980 Upgrade Kit and send it along with your 1U-9801 or CSTG will provide the upgrade kit and install it and bill you for the 9U-7980 Upgrade Kit only. It is recommended that CSTG perform the upgrade and check out your instrument before returning it to you. To provide you with the most efficient service, please call CSTG Tool Repair at 309-675-4283 between the hours of 8:00 a.m. — 12:00 p.m. CST, to schedule your upgrade.



1. 9U-6701 Ultrasonic Wear Indicator II
2. 4C-5485 Ultrasonic Probe
3. 9U-7981 Couplant (2 tubes included in each group, package quantity in parts system, 1 each)
4. 6V-7145 Carrying Case
5. 4C-4772 Foam Insert
6. 4C-3024 Battery Charger, 110/220 VAC, 50/60 Hz
7. 9U-6000 Paper Towels (16 towels included in group)

Not shown:

NEHS0606 Tool Operating Manual

NEEG2576 Carrying Case Label (9U-6700 Group)

Optional items:

4C-5488 Cable Assembly RS232 (PC AT version) 9 pin

4C-5489 Cable Assembly RS232 (PC XT version) 25 pin

1U-7445 NiCad Battery, Rechargeable, pkg qty 1

(5 required)

1U-9533 Alkaline Battery, Non-rechargeable, pkg qty 96

(5 required)

4C-5897 Modem Cable

9U-6175 Soft Case

Reference

NEHS0606, "9U-6700 Ultrasonic Wear Indicator II Tool Operating Manual"

T&SPG 2000

135-3156 Battery Pack

SMCS Code: 4150-0787

Model: 9U-6700 and 1U-9800 Ultrasonic Wear Indicators

Warranty: Y

Features/Benefits

- Used to provide nickel cadmium (NiCad) battery power to wear indicators (can be easily installed with a Phillips screw driver, in place of 4C-9417 Battery Holder)
- Used with 9U-6700 Ultrasonic Wear Indicator II Group or 1U-9800 Ultrasonic Wear Indicator Group and a 4C-3024 Battery Charger (135-3156 Battery Pack is now standard with all new wear indicators and can be retrofitted to all existing units)
- New battery pack is more resistant to corrosion, and provides better contact with battery holder terminals
- Rechargeable batteries should be replaced when not holding an adequate charge or once each year (replace all former battery holders at this time)
- Charge all new battery packs for at least 14 hours before using the wear indicator
- 4C-9417 Battery Holders are still available when using alkaline batteries

Instructions for Replacement Battery Holder

Former battery holder should be replaced with new battery pack if experiencing any problems such as lost data, turns off by itself, displayed information locks-up, not measuring properly, and/or display shows "memory failed."

If wear indicators are experiencing any of these problems then check the serial number (found on back cover).

If units have a serial numbers from 962 to 2095, fax a photocopy of back side of unit and return mailing instructions to the Caterpillar Service Technology Group and a new battery pack will be sent free of charge.

If units have a serial number below 962, a battery pack may be ordered through the Caterpillar Parts Department. If problems persist even with the new battery pack, then contact the Caterpillar Service Technology Group.

Installation Procedure

1. Remove back cover.
2. Disconnect the 2 pin connector (on battery holder wires).
3. Remove 4 screws on battery holder.
4. Install new battery pack using original screws.
5. Connect the two-pin connector
6. Replace back cover.

Specifications/Technical Information

Voltage requirement 6 VDC
Life of charge 12 hours
Battery pack five, shrink-wrapped batteries



Ultrasonic Wear Indicator Battery Pack Replacement



Battery Pack Label

Reference

NEHS0606 Tool Operating Manual, 9U-6700 Ultrasonic Wear Indicator II and SEHS9089 Special Instruction, 1U-9800 Ultrasonic Wear Indicator Operating Instructions

9U-7370 Tester, Belt Tension

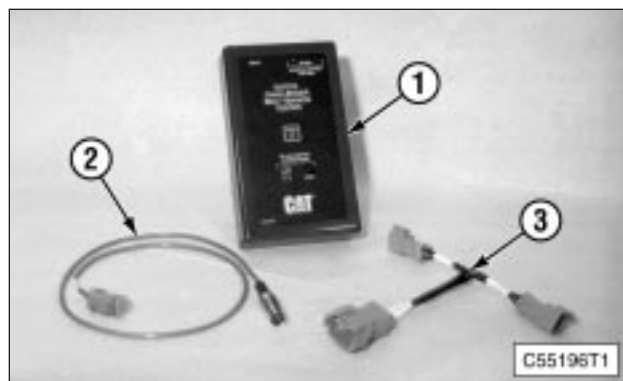
SMCS Code: 4197-036
Model: All "C" Series Challengers
Warranty: Y, CSTG Tool Repair

Features/Benefits

- Used to check pressure in belt tension cylinder — checked from wiring harness or pressure transducer
- Used with 6V-7070 Multimeter or 9U-7330 Multimeter (tester can be easily and quickly interfaced)
- Built-in voltage, temperature, and pressure chart on back of tester
- Power to transducer supplied directly from tester — no need for external power supply
- Battery saver automatically turns tester OFF after one minute

Specifications/Technical Information

Input 0 to 5 VDC
(supplied by pressure transducer)
Output 0 to 5 VDC
(measured at tip jacks on tester)
Power internal 9 VDC battery
Battery 1U-9534 Battery, Alkaline
Battery saver time limit one minute
Battery life approximately eight hours
(continuous use)



1. 9U-7370 Belt Tension Tester

Includes Service Parts:

2. 9U-7368 Cable Assembly
3. 9U-7369 T-Cable Harness

Not shown:

6V-3110 Cover, Back
8T-0844 Cover, Front
NEEG2562 Decal
NEEG2563 Decal

Reference

NEHS0600 Tool Operating Manual

6V-7059 Multiple Anvil Micrometer 6V-2034 Adapter

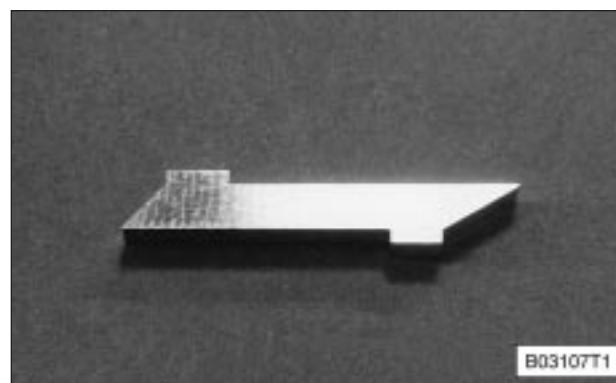
Warranty: M

Features/Benefits

- Micrometer used for measuring top flange thickness on cylinder liners, and it is used with the 6V-2034 Adapter to measure Caterpillar engine valve lip thickness.
- Furnished with two anvils — one anvil is for measuring parts which can not be measured with a standard micrometer, the other anvil permits the micrometer to be used as a general purpose 0-1 inch (0-25 mm) measuring instrument.
- When measuring engine valve lips with the 6V-2034 Adapter, refer to the valve dimensions given in the Guideline for Reusable Parts, Form SEBF8034.



6V-7059 Multiple Anvil Micrometer



6V-2034 Micrometer Adapter

NOTE: The 5P-6518 Fixture Group may also be used to measure lip thickness on engine valves.

T&SPG 2000

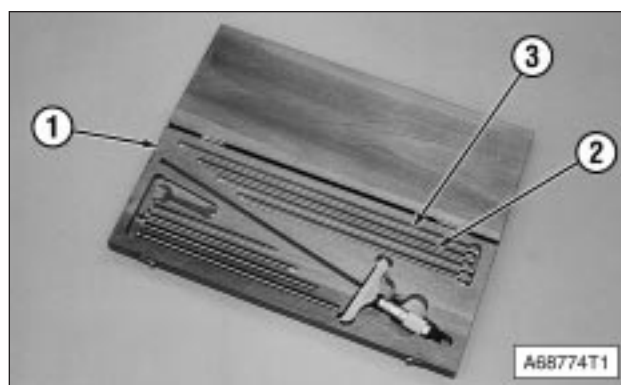
6V-2012 Gauge Group, Micrometer Depth (in)

6V-7030 Gauge Group, Micrometer Depth (mm)

Warranty: M

Features/Benefits

- Contains a complete set of measuring rods from 0-9 inch (0-228.6 mm) which are all stored in the wooden case.
- Base is 76.2 mm (3.00 inch) wide and uses 3.96 mm (5/32 inch) rods.



1. 6V-2013 Case
2. 6V-0088 Rod, 177.8-203.2 mm (7-8 in)
3. 6V-0091 Rod, 203.2-228.6 mm (8-9 in)

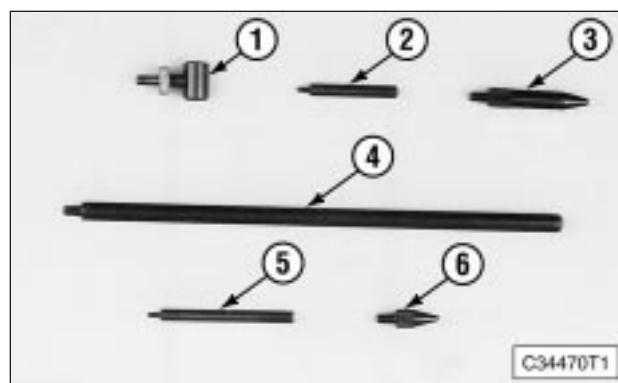
6V-6042 Point Group

Warranty: M

See Third Supplement

Features/Benefits

- Has more contact points for the dial indicators.
- Has straight contact points from 2.18 mm (.09 inch) long to 120.5 mm (4.74 inch) long. It also has three flat points and a 12.7 mm (.50 inch) extension.
- Has a plastic box with a divided tool holder, space to cut more slots for storage of special points. Part numbers and sizes are shown on a chart inside the lid of the box.
- These contact points will fit all dial indicators with 4-48 threads, but it will not fit the 1P-2103 Dial Indicator.
- Comes with 6V-2030 Indicator Extension.
- 6V-6042 Point Group is packaged in a 6V-6041 Case as part of the group.
- 6V-6043 Block Holder and 6V-6057 Block are available as replacement parts.



1. 5P-2057
2. 1P-5512
3. 6V-6167
4. 5P-4160
5. 1P-5513
6. 5P-2056

Additional Contact Points Available

Contact Points					
Part No.	mm	inch	Part No.	mm	inch
8S-3675	3.1	.12	5P-2393	38.1	1.50
3S-3268	6.4	.25	3S-3270	44.5	1.75
9S-0229	9.7	.38	5P-4809	50.8	2.00
9S-8883	12.7	.50	5P-6531	57.2	2.25
5P-4160	19.1	.75	5P-7262	63.5	2.50
3S-3269	25.4	1.00	5P-4161	69.9	2.75
5P-7261	31.8	1.25	5P-7263	76.2	3.00
5P-4162	95.3	3.75	5S-8086 ¹	2.4	.094
6V-2057 ³	3.17	.125	9S-8903 ²	2.4	.094

Part No.	Description	Part No.	Description
5P-2057	Contact Point	1P-5513	Contact Point
1P-5512	Contact Point	5P-4163	Contact Point
6V-6167	Contact Point ⁴	5P-2056	Contact Point

¹ 6.4 mm (.25 inch) diameter flat face.² 12.7 mm (.5 inch) diameter flat face with a bevel to 9.7 mm (.38 inch) diameter.³ 9.52 mm (.375 inch) diameter flat face.⁴ 30.0 mm (1.18 inch) long, AGD 4-48 Thd.

5P-2170 Dial Bore Gauge Group

Warranty: M

Features/Benefits

- This gauge and its related masters provides accuracy to .0025 mm (.0001 inch) for measuring all bores in the size range 19.05-38.10 mm (.750 inch to 1.500 inch).
- Particularly useful for measuring the relief valve spool bores in pressure control bodies on 631, 633, 637, 641, 650, 651, 657, 660, and 666 Tractors with eight speed transmissions.



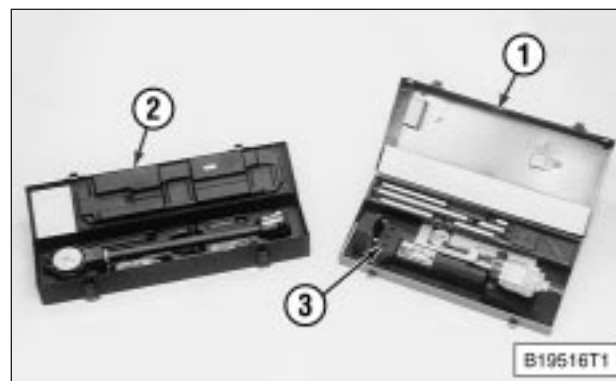
1. 5P-2170 Dial Bore Gauge Group
2. Master Gauges (available separately)
 - 5P-2043 Gauge, 19.050 mm (.7500 in)
 - 5P-2059 Gauge, 22.225 mm (.8750 in)
 - 5P-2169 Gauge, 25.400 mm (1.0000 in)
 - 5P-2171 Gauge, 27.051 mm (1.0625 in)
 - 5P-2172 Gauge, 28.575 mm (1.1250 in)
 - 5P-2173 Gauge, 31.750 mm (1.2500 in)
 - 5P-2174 Gauge, 38.100 mm (1.5000 in)

1P-3537 Dial Bore Gauge Group for Inch Measurements

Warranty: M

See Fourth Supplement

refinishing connecting rods in 137.16 mm (5.4 inch) bore V8 and V12 Engines.



1. No longer available
2. 1P-3535 Dial Bore Gauge
3. 5P-6580 Nest Kit (Early gauges require 5P-6580 Nest Kit if used on later size setting fixtures.)

Reference

GMGO0981 Special Instruction

6V-7898 Dial Bore Gauge, Metric 6V-7899 Size Setting Fixture, Metric

6V-7897 Dial Indicator Available for Converting 1P-3535 Dial Bore Gauge to Metric

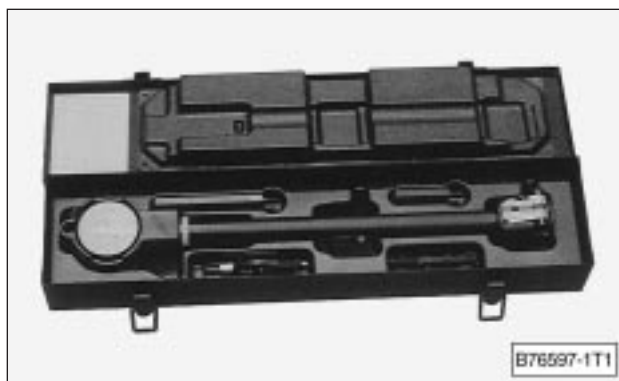
Warranty: M

Features/Benefits

- A 6V-7898 Dial Bore Gauge and 6V-7899 Size Setting Fixture are now available for precision measurements in the Metric System.
- The dial bore gauge and size setting fixture will measure all internal diameters from 1.97 inch to 7.87 inch (50 to 200 mm) and depths from 0.51 inch to 11.81 inch (13 to 300 mm) in increments of 0.00008 inch (0.002 mm).
- The increased accuracy is needed for applications such as connecting rods where the tolerances are very small.
- Use of the gauge is simplified considerably because all current specifications are given in metric dimensions.
- In addition, a 6V-7897 Dial Indicator is available to convert the current 1P-3535 Dial Bore Gauge to the 6V-7898 Dial Bore Gauge.
- All 1P-3535 Gauges can be converted except earlier gauges marked "MADE IN ENGLAND."

Special Instruction Form SMHS8253 not only provides instructions for use of the 6V-7898 Dial Bore Gauge, but also information for converting the 1P-3535 Gauge to the 6V-7898 Gauge. Special Instruction Form SMHS8254 provides instructions for use of the 6V-7899 Size Setting Fixture.

T&SPG 2000



6V-7898 Dial Bore Gauge



6V-7899 Size Setting Fixture

147-8860 Master Ring (diesel 280.025 mm)

147-8861 Master Ring (gas 300.00 mm)

147-8862 Gauge, Dial Bore

Model: 3600 Engines, Gas and Diesel

Warranty: G

Features/Benefits

147-8862 Dial Bore Gauge

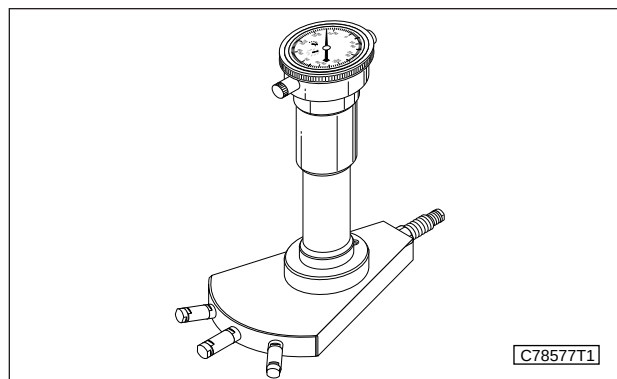
- Used to measure 3600 Engine cylinder liners
- Dial graduated to 0.002 mm
- Tool can reach up to 457 mm (18.0 in)

147-8860 Master Ring

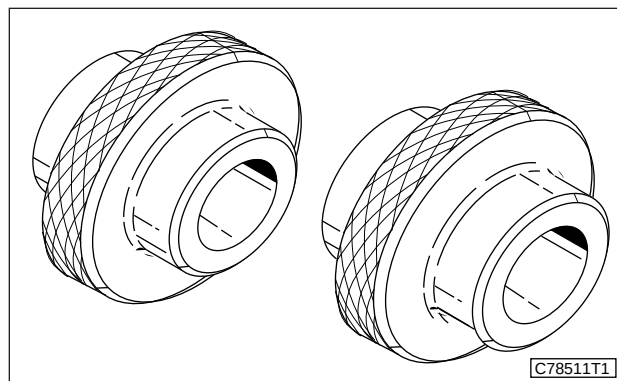
- Used to calibrate dial bore gauge to 280.025 mm (11.0246 in)
- Calibrates gauge for use on diesel engines

147-8861 Master Ring

- Used to calibrate dial bore gauge to 300.000 mm (11.811 in)
- Calibrates gauge for use on gas engines



147-8862 Dial Bore Gauge



Typical Dial Bore Gauge Calibration Rings

Reference

SEBF8109 Guideline for Reusable Parts

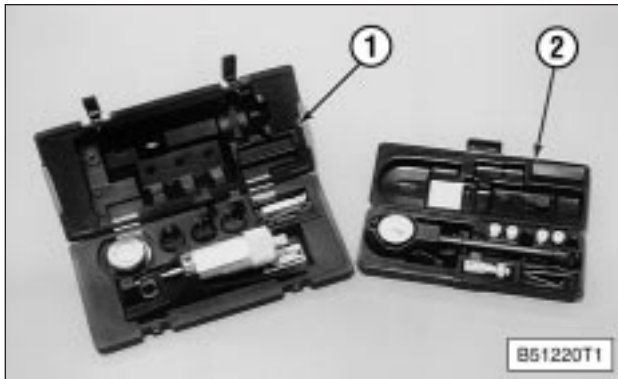
6V-6000 Dial Bore Gauge for Metric Measurements 6V-6030 Size Setting Fixture

Warranty: M

Features/Benefits

6V-6030:

- A precision measuring instrument with a diameter range of 30.0 to 50.8 mm (1.2 inch to 2 inch) graduated in 0.002 mm (.00008 inch) increments.
- The depth range is 8.5 to 150 mm (.335 inch to 5.91 inch).
- The gauge is especially useful for measuring piston pin bores for 3300 Series Engines.
- Will set or check the dial bore gauge in 0.002 mm (.00008 inch) increments within its range of 0 to 50 mm (0 to 1.97 inch).
- The fixture has a magnifying glass for easier reading.



1. 6V-6030 Size Setting Fixture
2. 6V-6000 Dial Bore Gauge

Reference

SMHS8037 Special Instruction for 6V-6000
SMHS8036 Special Instruction for 6V-6030

8T-0450 Thread Identification Kit

Warranty: M

Features/Benefits

- Available to help determine thread sizes.
- The size of internal port threads, external adapter threads and bolt threads can be measured with the tools in the kit.
- Good for Metric, BSP and US Standard Threads.

Components of the 8T-0450 Thread Identification Kit

8T-0447 Dial Caliper

- 0-152 mm (0-6 inch) capacity.
- Dial reads in .254 mm (.010 inch) and 1.58 mm (1/16 inch) graduations.
- Vernier scale reads in 1 mm and 1 inch graduations.
- 4-way measurement, inside, outside, depth and height or step.
- Made of strong super polyamid.

8T-0448 Pitch Gauge

- U.S. Standard — 6, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 14, 16, 18, 20, 24, 27, 88.
- Metric — 0.70, 1.00, 1.25, 1.50, 1.75, 2.00, 2.50, 3.00, 3.50, 4.00.
- British Standard Pipe — 10, 11, 14, 19, 28.

8T-0449 Seat Angle Gauge

- 45° and 37° Angles.

8T-0451 Seat Angle Gauge

- 30° and 12° Angles.



8T-0450 Thread Identification Kit

Reference

SEHS8429 Special Instruction

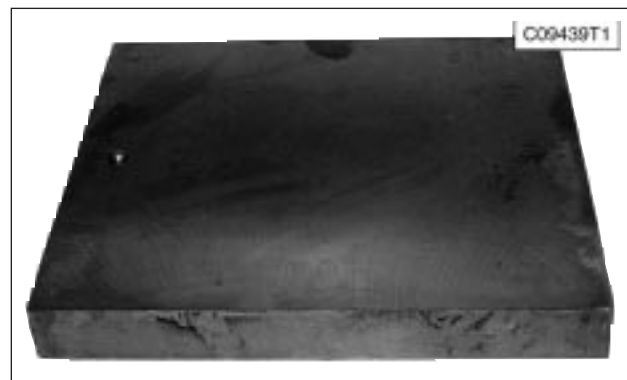
7B-0337 Surface Plate

Warranty: M

Features/Benefits

- Use for checking small shafts and bars for straightness; checking flat surfaces for warp; and trimming rings, bearing caps, etc., using fine emery cloth.
- Plate measurements are 304.8 mm (12.00 inch) x 330.2 mm (13.00 inch) x 38.1 mm (1.5 inch).

NOTE: As this plate is meant for general shop use, its surface is ground but not spot-scraped.



7B-0337 Surface Plate

1. Ensure proper polarity when connecting large battery clips (7, 8) to the battery.
2. Turn the potentiometer (1) to the maximum resistance position (250 Ohms).
3. Connect the mini-clips (9) to the EDC wiring harness.
4. Slowly turn the potentiometer (1) toward the minimum resistance position (0 Ohms) until the machine starts to move. To reverse the direction of travel reverse the switch (2).
5. If the machine does not move and/or increase in speed as the potentiometer (1) is turned toward the minimum resistance position (0 Ohms) replace the EDC.
6. If the machine moves and increases speed, as the potentiometer (1) is turned toward the minimum resistance position, the EDC is working correctly. Check for an electrical problem other than the EDC.

4C-5558 Auto Vibration Bypass Control

SMCS Code: 6606-036

Model: CB434, CB534 Vibratory Compactors

Warranty: Y

Features/Benefits

- Allows vibration mode to operate while machine is standing still for testing and adjusting
- Without this tool machine has to be in motion for vibration mode to operate
- Consists of ON/OFF switch attached to 10-foot long cable

Reference

KENR1305 Service Manual

178-3832 Valve, Tank

SMCS Code: 4200

Essential Tool

Model: PS-150B, PS-200B, PS-360B Pneumatic Compactors

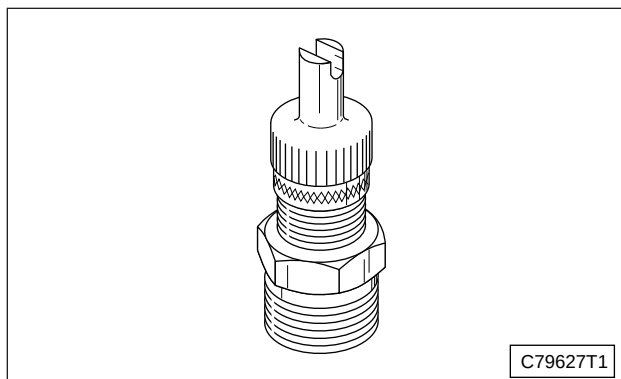
Warranty: G

Features/Benefits

- Used to check and set high and low pressure regulator settings for air-on-the-run systems
- Used with 3B-7764 Reducing Bushing
- Must be used to set high/low pressures after replacing pressure regulator switch
- Easily connects to air-on-the-run tank
- Equipped with standard valve core and sealing cap

Specifications/Technical Information

Thread 1/4 NPT
 Maximum pressure rating 1378 kPa (200 psi)
 Overall length 38 mm (1.5 in)
 Material brass



178-3832 Tank Valve

Reference

KENR2721 Service Manual; Supplement for PS-150B, PS-200B, PS-360B Pneumatic Compactors Air-on-the-Run System

4C-8758 Test Harness

990048 Extension Harness

990049 Test Harness

990050 Test Harness

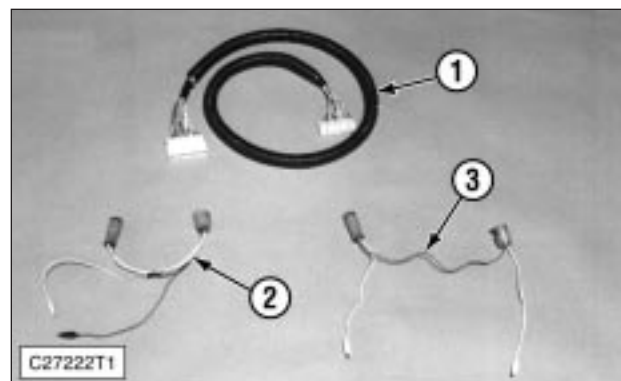
SMCS Code: 0740, 0779

Model: E(L)200B, E(L)240B, and E(L)300B Excavators

Warranty: Y (4C-8758, 990049 and 990050)

Features/Benefits

- Allows access to electrical control signals to be checked for correct operation and measurement of voltages, current, resistance and continuity



1. 990048 Extension Harness, used in electronic control circuit
2. 990049 Test Harness, used to check governor control potentiometer
3. 990050 Test Harness, used to check the Proportional Reducing Valve (PRV) on E(L)200B Excavator
4. 4C-8758 Test Harness, used to check the PRV on E(L)240B and E(L)300B (Not Shown)

Reference

SENR4527, Testing and Adjusting module for E(L)200B
 SENR4843, Electronic Power Unit module for E(L)240B
 SENR4871, Electronic Power Unit module for E(L)300B
 NEHS0546 Tool Operating Manual adjustment to electronic power unit control system

T&SPG 2000

Power Train Tools

9U-7500 Transmission Analyzer II Group Various Cables and Adapters

SMCS Code: 3000, 3150, 3418, and 4800-038
Model: Machines with Electrical Transmission Controls
Warranty: Y

Features/Benefits

- Replaces canceled 1U-7446 Transmission Shift Analyzer Group
- Used to test and adjust proportional valves which control transmission (connects directly to solenoids of transmission)
- Analyzer works on Powershift planetary, Powershift countershaft, Individual Clutch Modulation (ICM), Challenger transmissions, H-Series Motor Grader transmissions, and Electronic Clutch Pressure Control (ECPC) transmissions
- Designed and built with an Intel microprocessor with flash memory (provides dealers with capability of updating analyzer for new types of transmissions, without purchasing a new analyzer)
- Easy to read menus provide step-by-step sequence for analyzer operation
- Lighted LCD makes it easy to see readings on display screen
- Performs three basic functions: checks solenoid condition, shifts transmission, and checks shift lever operation
- Analyzer performs automatic or manual testing for shorted or open solenoid coils on one or all solenoids (can also alert mechanic to intermittent problems with solenoid coils)
- Analyzer can determine if shift lever is functioning correctly on transmissions not controlled by autoshift electronic control feature
- Software updated annually to accommodate New Product Introduction Software Subscription NETG5021.

H-Series Motor Graders

- Analyzer can turn on solenoids in a timeline sequence
- Modulates current to one or all of initialized solenoids at any point in time

Challenger and ECPC Transmissions

- Analyzer outputs pulse width modulated (PWM) current (required for this type of transmission)

Specifications/Technical Information

Size of tester	393 x 311 x 171 mm (15.5 x 12.3 x 6.8 in)
Weight	Group 6.2 kg (13.8 lbs) Tester 4.04 kg (8.9 lbs)
Operating voltage (DC power)	11 to 40 VDC
Minimum current requirements (DC power) (Challenger 35, 45, and 55)	20 amps
Minimum current requirements (all other units)	10 amps
AC power	110 or 240 VAC
Memory	one megabyte CMOS flash memory
Microprocessor	Intel 80C51FA
LCD display size	43 x 124 mm (1.7 x 4.8 in); four line x 20 characters
Operating temperature range	-18 to 60°C (0 to 140°F)
Storage temperature range	-40 to 60°C (-40 to 140°F)
Overcurrent protection	protected with a current limiting electronic circuit and against a short circuit fault by a 40 amp quick-trip circuit breaker



9U-7499 Transmission Analyzer II Controller

Not shown:

- 1U-9485 Cable, AC Power
- 1U-9486 Cable, DC Power
- 9U-7497 Cable, Test
- 9U-7496 Cable, Test

Optional Tools

- 1U-9479 Cable, Gear Shift Test Adapter
- 1U-9480 Cable, Gear Shift Test Adapter
- 9U-7498 Cable, Extension
- 9U-7495 Cable, Test (Wheel Loaders)
- 1U-9483 Cable, Test (Challenger)
- 1U-9484 Cable, Programming
- 1U-9482 Test Cable (ICM)
- FT2640 Test Cable (D6M)

Service Parts

- 1U-6141 Connector (Service Repair)
- 1U-9458 Connector (Service Repair)

Reference

- NEHS0644 Tool Operating Manual

T&SPG 2000

1U-9100 Cable, Adapter (Challenger to PC)

SMCS Code: 7490-035

Model: Challenger 35, 45, and 55

Warranty: Y

Features/Benefits

- Used to connect a personal computer into the Challenger's on-board electronic system
- Used with personal computer
- Cable connects RS232 port on computer to Diagnostic and Maintenance (D.A.M.) connector on Challenger
- Cable allows Electronic Technician (ET) software to read fault codes, delete fault codes (where allowed), and change vehicle parameters
- Cable comes complete with communication adapter which allows computer to communicate with Challenger's electronic system

Specifications/Technical Information

Cable length 2.1 m (7.00 ft)

Computer connection 9 pin serial



1U-9100 Adapter Cable (Challenger to PC)

139-5210 Cable Assembly, Extension (ARC/EPTC II)

SMCS Code: 0740, 0779

Model: See List Below

Warranty: Y

Features/Benefits

- Extension cable for Automatic Retarder Control (ARC) used on 769D, 771D, 773D, 775D, 776D, 777D, 785B, 789B, 793B, and 793C Off-Highway Trucks; and Electronically Programmable Transmission Control (EPTC II) used on 769D, 771D, 773D, 775D, 776D, 777D, 785B, 789B, 793B, and 793C Off-Highway Trucks; D250E, D300E, D350E, and D400E Articulated Trucks; and 621F, 623F, 627F, 631E, 633E, 637E, and 657E Wheel Tractor Scrapers
- Connects to 10-pin sure seal connector on ARC or EPTC II
- Two additional connectors allow 4C-8195 Control Service Tool and 7X-1700 Communication Adapter to be connected
- Allows serviceman to position ARC and EPTC II in cab while troubleshooting

Specifications/Technical Information

Overall length 4.3 m (14 ft)



139-5210 Extension Cable Assembly

4C-4068 Extension Cable

SMCS Code: 3000-035

Model: 621E, 623E, 627E, 631E, 637E, 651E, 657E

Warranty: Y

Features/Benefits

- 14-foot long extension cable that enables serviceman to position ICM control box in cab while troubleshooting transmissions
- Make troubleshooting safer and easier

4C-5974 Adapter Cable

SMCS Code: 0785

Model: Machines with military-type connectors

Warranty: Y

Features/Benefits

- Used to adapt military-type connector, previously used on majority of Caterpillar machines, to Sure Seal connector
- Standard harness with military-type connectors can now be used with the serviceable replacements that use Sure Seal connectors without any modification of wiring harness.
- Testing and analysis equipment can be used on hardware with new Sure Seal connectors.



4C-5974 Adapter Cable

T&SPG 2000

Speed Measuring Tools

9U-7400 Multitach II Group

9U-7401 Multitach II

9U-7402 Multitach II Photo Group

SMCS Code: 1250-025

Model: All Caterpillar Products

Warranty: Y

Features/Benefits

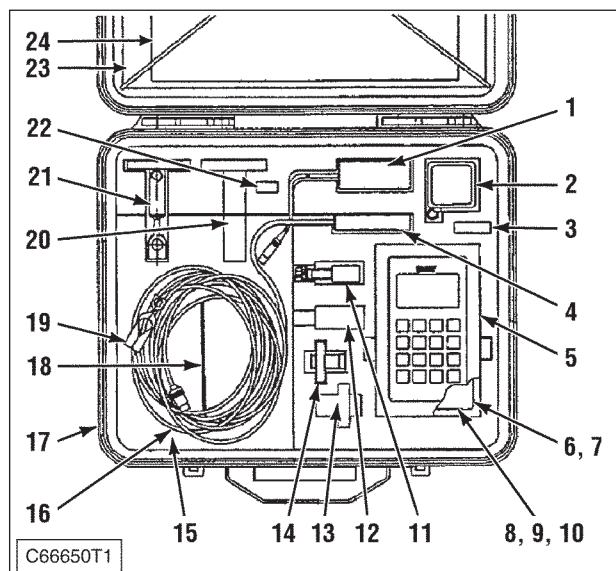
- Used to measure rpm, frequency, and engine set point — combines three instruments into one
- Engine set point indicator captures and displays set point rpm
- Hz frequency meter measures gen set or other signal frequency
- Easy to use photo pickup for fast RPM measurement
- Two digital displays show Input 1 and Input 2 values simultaneously — eliminates switching screens
- Displays minimum, maximum, and difference values of inputs
- Displays difference between Input 1 and Input 2
- Backlit display for operation in low light conditions
- Optional RS232 output available for sending data directly to printer
- Adjustable pulses per revolution
- Operated by rechargeable battery — designed with low battery indicator and internal battery voltmeter
- Accepts many different types of pickups (including most pickups used with former Multitach II)
- Program each input separately with different PPR (Pulses Per Revolution) values for each — different pickups can be used simultaneously
- Stays pre-programmed to values last used — displays values when turned on



9U-7401 Multitach II

Specifications/Technical Information

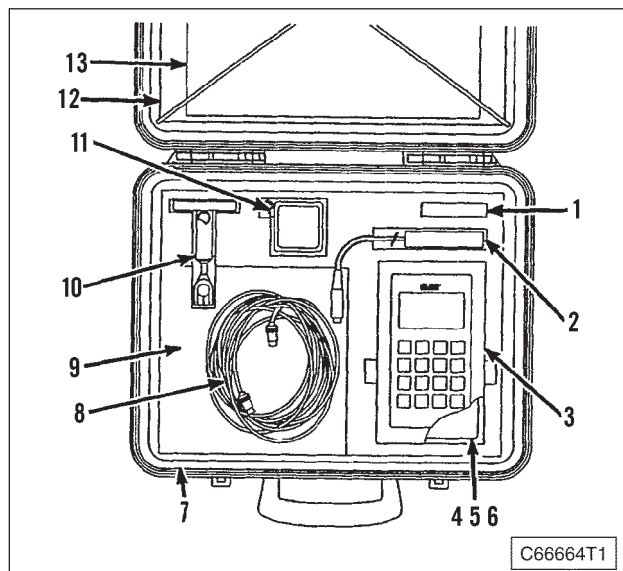
RPM measurement range	1-9999 rpm
Measurement accuracy	±1 rpm
Pulses per revolution	0.1 to 256 PPR (selectable)
Frequency measurement range	0-9999 Hz
Frequency measurement accuracy:	
(0-999.9 Hz)	±0.5 Hz
(1000-9999 Hz)	±1.0 Hz
Set point measurement	set point — 20 rpm = full load rpm
Overrun indicator	0 to 10% rack contact
Set point rpm	11% rack contact (RPM held on display)
Overrun and lug off	11 to 74% rack contact
Lug indicator	75 to 100% rack contact



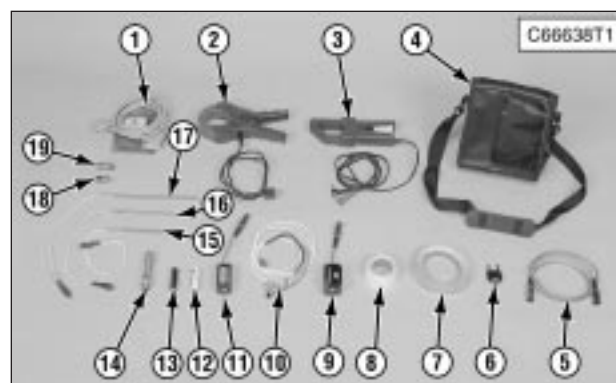
9U-7400 Multitach II Group

1. 9U-7505 High Voltage (600 Volt Max.) Input Adapter
2. 4C-3024 Battery Charger
3. Storage for three spare AA size batteries
4. 9U-5140 LED Photo Pickup (also storage for additional photo pickup)
5. 9U-7401 Multitach II
6. 6V-6045 Accessories Case
NEEG2061 Accessories Case Decal
7. 1U-6605 Retro-Reflective Tape 12 mm x 1.5 m
(.5 in x 5.0 ft) roll
8. 6V-3138 Extension Rod for Magnetic Base
9. 9U-7506 Magnetic Adapter Cable
10. 8T-5111 Rack Adapter Cable
11. 5P-7360 Tachometer Generator
12. Storage for additional Tachometer Generator
13. Storage for additional Tachometer Drive Group
14. 5P-1759 Tachometer Drive Group (additional parts in accessory case)
15. 9U-7508 Foam Insert
16. 6V-2198 Extension Cable 5.5 m (18.0 ft)

17. 6V-7145 Carrying Case
NEEG2573 Group Label on lid of 9U-7400 Group
18. 6V-7072 Test Lead Set (for use with high Voltage adapter)
19. 1P-7446 Rack Cable 5.5 m (18.0 ft)
20. Storage for additional photo pickup magnetic base
21. 6V-3137 Photo Pickup Magnetic Base
22. Storage for two spare AA size batteries
23. NEEG2593 Inside Lid Decal
24. NEHS0605 Operating Instructions

**9U-7402 Multitach II Photo Group**

1. Storage for five spare AA size batteries
2. 9U-5140 LED Photo Pickup
3. 9U-7401 Multitach II
4. 6V-6045 Accessories Case
NEEG2061 Accessories Case Decal
5. 1U-6605 Retro-Reflective Tape 12.5 mm x 1.5 m
(.5 in x 5.0 ft)
6. 6V-3138 Extension Rod for Magnetic Base
7. 6V-3072 Carrying Case
NEEG2574 Group Decal on lid (9U-7402 Group)
8. 6V-2198 Extension Cable 5.5 m (18.0 ft)
9. 9U-7507 Foam Insert
10. 6V-3137 Magnetic Base for Photo Pickup
11. 4C-3024 Battery Charger
12. NEEG2594 Inside Lid Decal
13. NEHS0605 Operating Instructions

**Optional accessories for 9U-7401 Multitach II**

1. 4C-9499 RS232 Output Adapter
2. 6V-4960 AC Clamp-on Probe (use with 9U-7505 High Voltage Adapter or 9U-5265 Banana Plug Adapter to measure Hz)
3. 9U-5795 AC/DC Clamp-on Current Probe (use with 9U-7505 High Voltage Adapter or 9U-5265 Banana Plug Adapter to measure Hz)
4. 9U-5215 Diagnostic Tool Soft Case (not as shown)
5. 8T-5297 Extension Cable 0.9 m (3.0 ft)
6. 9U-5265 Adapter (connects two banana plugs to 9U-7506 magnetic adapter cable)
7. 6V-0093 Retro Reflective Tape, 12 mm (.5 in) wide x 15 m (50.0 ft) long roll
8. 4C-6919 Retro Reflective Tape, 25 mm (1.0 in) wide x 2.5 m (100.0 in) long roll, with honeycomb pattern design
9. and 10. 4C-6821 Injection Line Speed Pickup Group (for Multitach or Data Logger)
10. and 11. 6V-4950 Injection Line Speed Pickup Group (for Multitach only)
12. 1U-7445 NiCad (Nickel Cadmium) Rechargeable Battery, AA (packaged singly)¹
13. 1U-9533 Alkaline Non-Rechargeable Battery, AA (package of 96)¹
14. 8L-4171 Magnetic Pickup (general purpose)
15. 8T-5184 Magnetic Pickup, 88.9 mm (3.50 in) long x 6.35 mm (1/4 inch)
16. 6V-2197 Magnetic Pickup, 114.3 mm (4.50 in) long x 6.35 mm (1/4 inch)
17. 8T-5185 Magnetic Pickup, 177.8 mm (7.00 in) long x 6.35 mm (1/4 inch)
18. 6V-2199 Pickup Adapter, 6.35 mm (.250 in) dia. x 1/8 inch NPT
19. 6V-3093 Pickup Adapter, 6.35 mm (.250 in) dia. x 1/4 inch NPT

¹ Five batteries are required to power Multitach II.

Reference

NEHS0605 Operating Manual

T&SPG 2000

9U-5140 Pickup, LED Photo

SMCS Code: 1250-025

Model: All Models

Warranty: Y

Features/Benefits

- Used to test/check and adjust engine RPM on all Caterpillar models.
- Used with 4C-6815 Data Logger; works with all multitachs regardless of their age
- Uses invisible beam infrared light source; provides more reliable operation, since light source does not require periodic replacement as light bulb in former pickup does, and makes it more vibration resistant
- Bright red indicator light on rear of pickup shows when proper alignment has been made with retro-reflective tape target on rotating part; wide angle beam makes alignment easy and fast
- Requires much lower supply current (.015 Ampere) than former pickup (.100 Ampere); allows future diagnostic tools using this pickup to be battery powered
- Uses standard multitach 6V-2198 Photo Extension Cable and standard 6V-3137 Magnetic Base
- Heat and oil-resistant cable
- Same size as 6V-3131 Photo Pickup.
- Reference:SEHS7807 Special Instruction.

NOTE: Will not work with 4C-3030 Vibration Analyzer Group.

Specifications/Technical Information

Operating distance up to 762 mm (30 in) from target
 Cable length 914.4 mm (36 in)
 Light source Invisible infrared LED with target indicator.



9U-5140 Pickup, LED Photo

Tape Options:

- 6V-0093 12.2 mm (1/2 in) Retro Reflective Tape, 1 - 45.7 m (50 yds) long roll.
- 1U-6605 12.2 mm (1/2 in) Retro Reflective Tape, 1 - 1524 mm (5 ft) long roll.
- 4C-6919 25.4 mm (1 in) honeycomb design Retro Reflective Tape, 2.5 m (100 in) long roll.

5P-1759 Drive Group, Tachometer

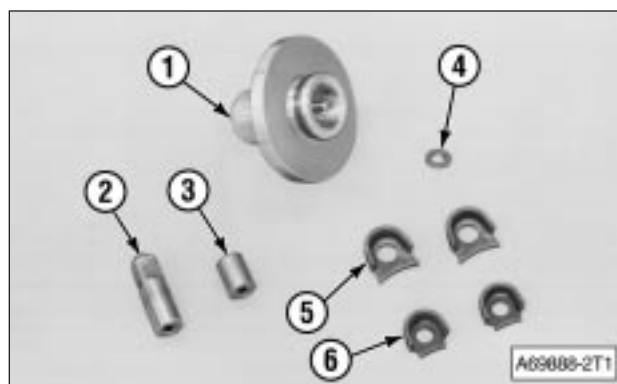
SMCS Code: 1250-25

Model: All Models

Warranty: G

Features/Benefits

- Used on engines with ENM Service Meters including engines with Sleeve Metering Fuel Systems
- Replaced 9S-5609 Drive Group
- To use 5P-1759 Drive Group, service meter is removed and drive group installed
- On 5.4 inch bore engines not equipped with tachometer drive group, 5P-1758 Shaft Assembly must be used



1. 1W-2316 Adapter Assembly (former 9N-3018) — Use for all engines with ENM Service Meters
4M-8308 Seal (outside)
2. 5P-1758 Shaft Assembly — Use with 1W-2316 or former 9N-3018 for 5.4 inch bore V—engines
3. 4N-0538 Coupling — Use with 1W-2316 or former 9N-3018 and 5P-0537 for engines with Sleeve Metering Fuel Systems
4. 5P-0537, Canceled — Use between former 9N-3018 and 4N-0538 (5P-0537 Washer, canceled, is not needed with later 1W-2316 Adapter Assembly)
5. 9S-3032 Clamp (two)
6. 9S-0211 Clamp (two)

4C-9179 Cable

SMCS Code: 7410-081
Model: D11N Track-Type Tractor
Warranty: Y

CANCELED

- System can be tested without overspeeding engine (Installed in overspeed harness, 4C-9179 causes overspeed warning light to come on at 1600 rpm and to flash at 1800 rpm.)

Specifications/Technical Information

Length 200 mm (8 in.)



4C-9179 Cable

Reference

SEHS9257 Special Instruction, Installation of Overspeed Monitoring System in D11N Tractors

FT1808 Cable, Magnetic Input Adapter

SMCS Code: 1250-025
Model: All Models
Warranty: None

Features/Benefits

- Permits easier use of 6V-2100 Multitach to check engine or alternator RPM
- Used on engines equipped with magnetic pickup which is used as RPM signal for electronic overspeed switch or electronic governor

Operating Instructions

To measure engine RPM on the multitach, connect the lug end of the cable to the magnetic pickup output signal lead for the magnetic pickup. Connect the plug end of the cable to the 5P-7362 Magnetic Input Cable on the multitach. No ground connection is needed if the engine battery is used as the power source for the multitach. Use the number of flywheel teeth as the P/REV (pulses per revolution) number on the multitach.

To measure alternator RPM, connect the lug end of the cable to the "R" terminal on the alternator. Connect the plug end of the FT1808 Cable to the 5P-7362 Mag Input Cable that is connected to the multitach mag input. This method gives the alternator RPM which is a ratio of the engine RPM. See the chart for the P/REV numbers for the specific alternator to be checked.

Alternator Type	Multitach P/Rev
Caterpillar	6
DELCO 10-20 DI	7
DELCO 25-30 SI	8

Reference

SENR2945 Electronic Monitoring System (EMS) Service Manual contains additional information to check alternator "R" terminal output.

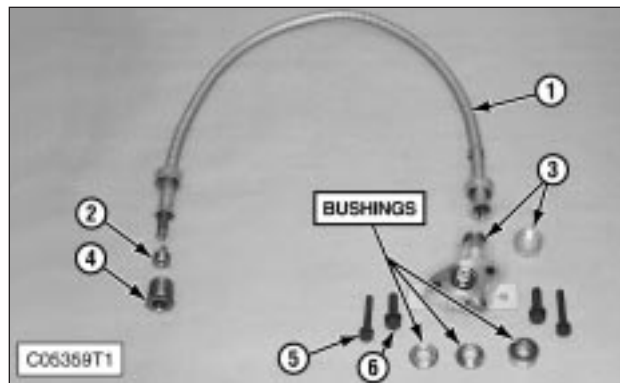
7M-6001 Drive Adapter Group

SMCS Code: 1000-025
Model: All Models
Warranty: G

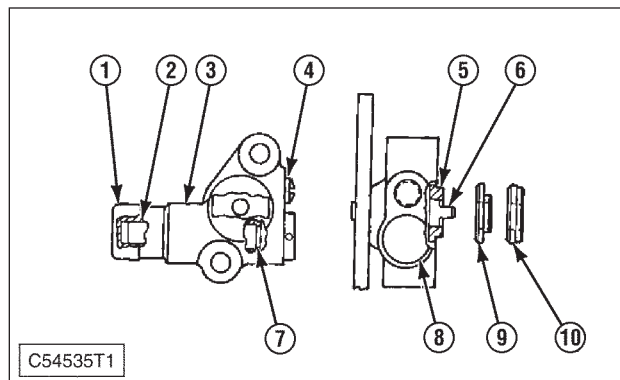
Features/Benefits

- Some engines are equipped with service meters that have no means of attaching a tachometer drive. Installation of the 7M-6001 Adapter Group is accomplished by removing the Service Meter and installing the drive assembly with the 7M-6010 Bushing using two 1B-2713 Bolts through the swivel mounting plate. On other engines, the drive assembly is installed in place of the service meter cover and the 7M-6011 Bushing is used instead of the 7M-6010 Bushing. Two 1B-7182 Bolts are used to secure the drive assembly to the service meter cover mounting boss and the swivel mounting plate is not used. D2 Tractors, early 933 Traxcavators, and D311 Engines (prior to series H) require a 4F-4246 Shaft and a 7B-1075 Spacer in addition to the 7M-6001 Tachometer Drive Adapter Group.
- On engines equipped with the ENM Service Meter (manufactured in England) either the 7M-6001 or the 5P-1759 Drive Group may be used. On engines with Sleeve Metering Fuel Systems, the 4N-0538 Coupling must be used. If the 7M-6001 Adapter Group is used, the Service Meter must also be removed. The 8S-7165 Bushings and a 5S-6106 Adapter are used for mounting the 7M-6001 Adapter Group.

T&SPG 2000

**7M-6001 Drive Adapter Group**

1. 6B-3127 Cable
2. 7M-6003 Adapter
3. Tachometer Drive Group
Includes Three Bushings:
7M-6010
7M-6011
8S-7165
4. 7M-6004 Fitting
5. 1B-2713 Bolt (two)
3B-4504 Washer (two)
6. 1B-7182 Bolt (two)
3B-4505 Washer (two)

**Service Parts for Tachometer Drive Group**

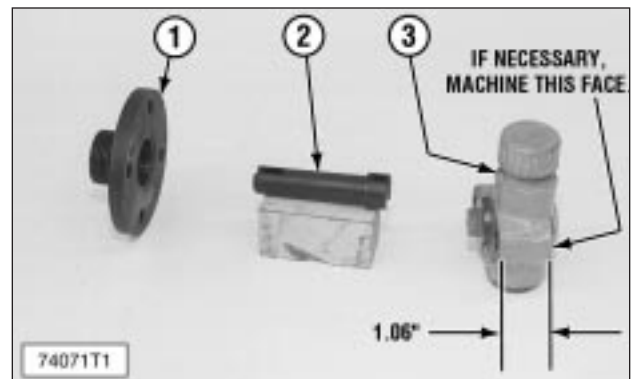
1. 9B-2232 Cap
2. 1F-3257 Shaft
3. 7M-6007 Housing Assembly
4. 2B-4602 Plug
5. 7M-6010 Bushing
6. 7M-6009 Shaft
7. 7B-9002 Washer
8. 1F-3275 Screw Assembly
9. 7M-6011 Bushing
10. 8S-7165 Bushing

5P-0935 Adapter Group, Tachometer Drive

SMCS Code: 1000-025
Model: 910, 931, D3, 3204
Warranty: Y

Features/Benefits

- Used with Tachometer Drive Group for checking engine speed on 3204 Engine in D3 Tractors, 910 Wheel Loaders, and 931 Track Loaders (7M-6006 Group must be modified by removing plate and machining housing to dimension shown)



1. 5P-0933 Adapter (Part of 5P-0935)
2. 5P-0934 Shaft (Part of 5P-0935)
3. 7M-6006 Drive Group

8N-5945 Adapter Assembly

SMCS Code: 1250-025, 3224-025, 5050-038, 7106-011
Model: 943, 953, 3204
Warranty: G

Features/Benefits

- Used for measuring engine speed on 3204 Engines, 10X1-2935, in 943 and 953 Loaders
- 90° drive adapter assembly installed on engine timing gear cover
- Used with 5P-7360 Tachometer Generator; 4M-8303 Seal and two 9S-3032 Clamps also required for installation of adapter assembly



8N-5945 Adapter Assembly

5P-6560 Adapter, Tachometer

SMCS Code: 1000-025

Model: 627B

Warranty: Y

Features/Benefits

- Used to connect tachometer drive cables (with SAE No. 12 heavy duty input fitting and SAE No. 10 Marine output fitting) to 9S-3047 Generator Assembly
- Desirable arrangement on machines, such as 627B Tractors, where engine tachometer drive is not accessible
- 5P-7360 Generator Assembly included with 5P-3600 Flowmeter, 5P-2160 Engine Horsepower Meter and 1P-5500 Phototach Group



5P-6560 Adapter, Tachometer

6N-1345 Adapter, Tachometer Drive

SMCS Code: 1000-025

Model: 943, 953, 215, 3204

Warranty: G

Features/Benefits

- Used for measuring engine speed on later 3204 Engines, 10X-2396-Up, in 943 and 953 Loaders and 215 Excavators (different adapter needed for later engines because of change to camshaft)
- Also required for adapter installation: 4M-8303 Seal, 5P-1758 Shaft Assembly, two 9S-3032 Clamps, two OS-1617 Bolts and two 9M-1974 Washers



6N-1345 Adapter, Tachometer Drive

1P-5500 Phototach Group, Portable

Canceled

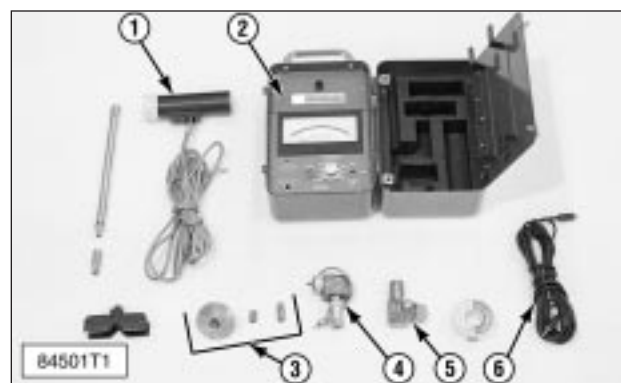
SMCS Code: 1000-025

Model: All Models

Warranty: G

Features/Benefits

- Canceled and replaced by 6V-3121 Multitach Group
- Service parts still available



1. 1P-5555 Photohead Assembly
2. 5P-1719 Meter, Instrument
3. 5P-1759 Drive Group, Tachometer
4. 5P-7360 Generator, Tachometer
5. 5S-6106 Adapter, Drive (2:1) (to be used as reducer when engine speed exceeds 2500 RPM)
6. 5P-7362 Cable, Tachometer

NOTE: 6V-0093 Tape, Reflective, in rolls 13 (.5 in) wide and 46 M (50 yards) long is available.

Reference

SMHS7015 Special Instruction in Microfilm Library

T&SPG 2000

7N-8929 Connector, Cable

SMCS Code: 1000-025

Model: All Models

Warranty: G

Features/Benefits

- Used to connect tachometer drive cable to 9S-3047 Tachometer Generator (included in 1P-5500 Phototach Group) on engine applications where access to tachometer drive is difficult; disconnect tachometer drive cable at tachometer and use this fitting



7N-8929 Connector, Cable

FT0907 Adapter

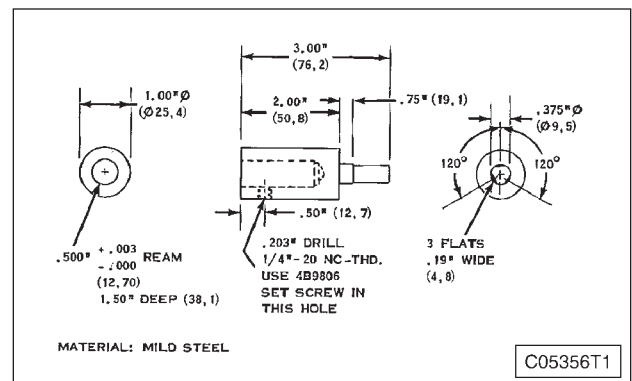
SMCS Code: 3224-081

Model: D379B, D398B, D399

Warranty: None

Features/Benefits

- Used with reversible variable speed drill and tachometer to bench set mechanical overspeed controls on D342, D343, D346, D348, D349, D353, D398 and D399 Engines



FT0907 Adapter

1U-5550 Adapter Group, Oil Pressure

SMCS Code: 1300-036

Model: XNIP Peugeot Engines

Warranty: G

Features/Benefits

- Used to measure oil pressure on XNIP Peugeot Engines. These engines are found on several models of Caterpillar lift trucks. The 1U-5550 is installed in place of the oil pressure solenoid in the oil filter base. The 1U-5550 provides a 9/16 inch 18-2B (SAE No. 6) port for pressure measurement purposes.

6V-4190 Auto Programmer Group 6V-4865 Connector

SMCS Code: 1250-025

Model: All Models

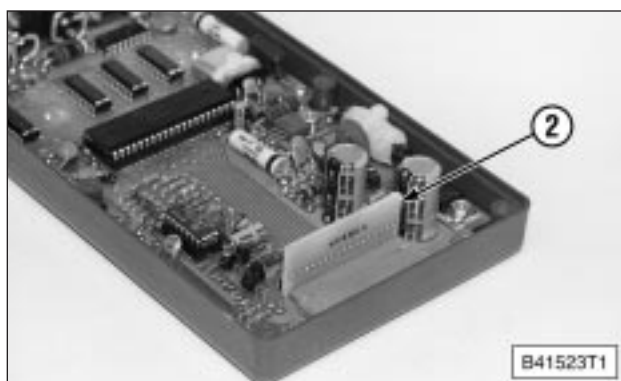
Warranty: Y

Features/Benefits

- Optional accessory that can be installed on 6V-2100 Multitach in place of original rear cover
- Provides direct R/MIN (revolutions per minute) speed readout without pressing any keys on multitach after the power is turned on
- TURN ON — SELECT switch used to select which input (either photo or magnetic) to be used first after power turned on; only one touch switch (PH or MAG) needs to be pressed to change inputs during operation of multitach
- Two P/REV (pulses per revolution) numbers, one for magnetic and one for photo, can be permanently stored in auto programmer memory by using screwdriver to adjust rotary switches on rear panel
- Touch switches on front panel can still be used in normal manner to program multitach for other P/REV numbers when auto programmer is installed
- To accommodate programmer, 6V-4865 Connector also required in 6V-2100 Multitach. (The connector must be installed in some early programmers.)



1. 6V-4190 Auto Programmer Group



2. 6V-4865 Connector (shown installed in 6V-4190 Group)

Reference

SEHS7930 Special Instruction

6V-4950 Pickup Group, Injection Line Speed

SMCS Code: 1000-025, 1000-038, 1250-025, 1264-025

Model: All non-unit-injected Caterpillar diesel engines

Warranty: Y

Features/Benefits

- Used with 6V-2100 Multitach to measure diesel engine speed
- Works on Perkins fuel lines as well as on those with remote unit pump group, on all precombustion chamber fuel systems and on some smaller direct injection fuel systems
- Not applicable to unit injected 3500 and 3600 Engines
- Adaptable to different fuel line sizes from 5.5 mm Perkins to 7.0 mm size range

The following accessory items are used with the basic 6V-4950 Injection Line Speed Pickup Group and the 6V-2100 Multitach:

- 6V-2198 Photo Input Extension Cable (Part of 6V-3121) 6 m (18 ft.) long cable used to connect pickup to multitach when shorter cable cannot be used
- 6V-6152 Adapter needed when checking operation of amplifier and pickup with 5P-9698 Calibrator



Serviced Components of 6V-4950:

1. 1U-9139 Pickup
2. 6V-6113 Amplifier

Reference

SEHS8029 Special Instruction

T&SPG 2000

4C-6821 Pickup Group, Injection Line Speed for Data Logger

SMCS Code: 1000-025, 1000-038, 1250-025, 1264-025
Model: All non-unit-injected Caterpillar diesel engines
Warranty: Y

Features/Benefits

- Used with 6V-2100 Multitach to quickly measure engine speed with accuracy of ± 1 RPM
- Can be clamped onto any accessible fuel injection line
- Differs from 6V-4950 only by inclusion of switch on 4C-6812 Amplifier and use of new 1U-9139 Universal Style Pickup. Switch adapts amplifier for use with 4C-6800 Data Logger Group. When used with 6V-2100 Multitach, switch should always be in INJ LINE position.

Specifications/Technical Information

Adaptability all non-unit-injected Caterpillar diesel engines
Engine speed range 40 to 6000 RPM
Pulses/revolution5 P/Rev for all Caterpillar 4-stroke diesel engines
Output signal amplitude75V peak minimum
Noise less than .4V peak
Operating temp. range -23°C to +70°C (-9°F to 158°F)
Storage temp. range -40°C to +100°C (-40°F to 212°F)



4C-6821 Pickup Group, Injection Line Speed

Service Parts:

1. 1U-9139 Pickup
2. 4C-6812 Amplifier

Reference

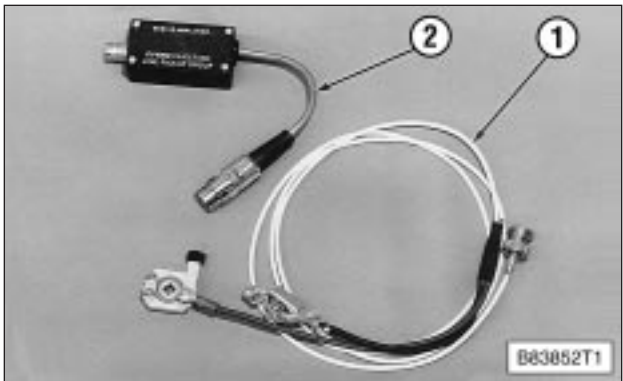
SMHS7504-01 Special Instruction
SEHS7807 Special Instruction
SEHS8224 Special Instruction

1U-9139 Universal Fuel Line Pickup

SMCS Code: 1000-025
Model: All non-unit-injected Caterpillar diesel engines
Warranty: Y

Features/Benefits

- Used with 6V-2100 Multitach (as accessory part for 6V-4950 Pickup Group) to measure diesel engine speed
- Works on Perkins fuel lines as well as on those with remote unit pump group, on all precombustion chamber fuel systems and on some smaller direct injection fuel systems
- Not applicable to unit injected 3500 and 3600 Engines
- Adaptable to different fuel line sizes from 5.5mm Perkins to 7.0mm size range



1. 1U-9139 Universal Fuel Line Pickup
2. 6V-6113 Amplifier

Reference

SEHS8029 Special Instruction
SEHS7807-03 Special Instruction

1U-9710 Adapter Cable

SMCS Code: 1250-025

Model: Most Caterpillar Spark-Ignited Engines

Warranty: Y

Features/Benefits

- Used with 6V-2100 Multitach to measure RPM on most Caterpillar spark-ignited engines
- Used with 6V-9060 Spark Timing Adapter Group and 6V-2100 Multitach or 6V-3121 Multitach Group
- Multitach owners have method of measuring RPM of spark-ignited engines
- 6V-2100 Multitach has digital LCD display



1U-9710 Adapter Cable

1U-6602 Photo-Tach Group

SMCS Code: 1000-025

Model: All Models

Warranty: Y

Features/Benefits

- Measures RPM by directing light beam onto piece of reflective tape and counting reflected light pulses; reflective tape can be affixed to any rotating component
- RPM can be measured to and is accurate within 1 RPM
- LCD viewed simultaneously while aiming the instrument
- Provides low cost tachometer for general use; does not replace 6V-3121 Multitach Group. The 1U-6602 is a phototach only and reads only the basic input frequency (1 pulse per revolution per piece of reflective tape). The more versatile 6V-3121 accommodates multiple RPM pickup devices (e.g., photo, magnetic, fuel lines) and can be programmed to divide by any number up to 256. This allows the RPM to be displayed directly.

Specifications/Technical Information

Measurement range 5 to 100,000 RPM

Accuracy ± 1 RPM

LCD size 6 digit 12.7 mm (.50 in) high

Operating envelope:

Range 0 to 92 m (0 to 3 ft) from reflective tape

Angle up to 45° from perpendicular to target
(Best results at angles from 5° to 20°)

Last measurement memory displays last measurement approximately
1 min. after trigger release

Power-on Switch pistol grip trigger;
may be locked on with latching push-button
for longer duration measurements

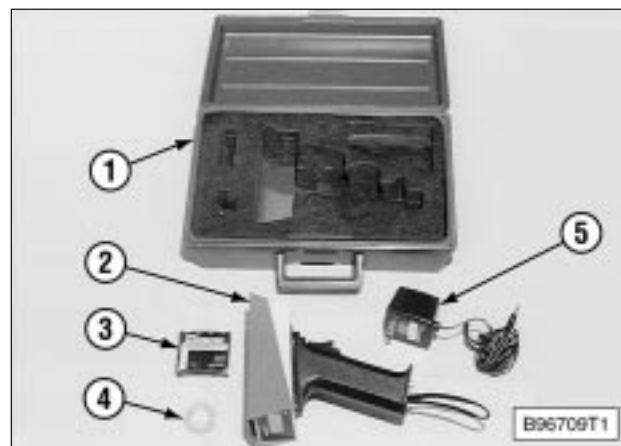
Optical System single lens reflex

Recommended size of reflective tape 13 mm
(1/2 in) square

Size 83 mm x 45 mm x 156 mm
(3.25 in x 1.75 in x 6.13 in)

Weight approx. 0.57 kg (1.25 lbs.)

Power 1U-9533 "AA" size batteries (4)
(Can operate instrument for 8 continuous hours)
or optional, rechargeable 1U-7445 Nickel
Cadium Batteries



1U-6602 Photo-Tach Group

1. 6V-3073 Case
2. 1U-7771 Tachometer
3. 1U-9533 Battery (4)
4. 1U-6605 Reflective Tape
5. 4C-3024 or 161-8384 Recharger, 110/220 VAC.
4C-3024 (older units) photo-tach has 2.54 mm (.10 in) hole for charger connection. 161-8384 (newer units) photo-tach has 6.35 mm (0.25 in) hole with center pin for charging connection.

(Optional)

6. 1U-7445 Nickel Cadmium Batteries
(4; optional but not shown)
7. 1U-7772 Foam Block

Reference

SEHS8854 Special Instruction

T&SPG 2000

161-8384 Battery Charger

SMCS Code: 1900-038, 0781

Model: All Models

Warranty: Y

Features/Benefits

- Used to recharge nickel cadmium batteries on newer hand-held Photo-Tach
- Used with 1U-7771 Photo-Tach, part of 1U-6602 Photo-Tach Group

Specifications/Technical Information

Charger connector barrel type
Connector OD 5.6 mm (.22 in)
Connector ID 2.5 mm (.10 in)
Center pin (ID) polarity negative

Reference

SEHS8854 Special Instruction, Using the 1U-6602 Photo-Tach Group

1P-3500 Timing Group, Injection

Canceled

SMCS Code: 1000-025

Model: All Models

Warranty: G

Features/Benefits

- Used to make quick, accurate check of variable timing unit
- Consists of timing light and meter, 3 transducers to adapt to various engines and inverter to provide 115 volts AC from 12- or 24-Volt battery source



1P-3498 Transducer, 2.56 inch long

1P-3497 Transducer, 2.56 inch long

1P-3496 Transducer, 3.25 inch long

NOTE: 5P-0945 Transducer Repair Kit is available

Reference

SMHS6964 Special Instruction



T&SPG 2000

Temperature Measuring Tools

4C-6500 Digital Thermometer Group

SMCS Code: 1000-082, 3000-082, 4000-082, 5000-082,
7000-082, 0776

Model: All Models

Warranty: Y

Features/Benefits

- Fast and accurate method of measuring temperature
- Backlit, digital LCD display for use in low light conditions
- Larger liquid crystal display for easier viewing
- Does not need to be calibrated every time it is used
- Provides user with differential temperature calculated from any 2 of the 5 channels
- Records minimum and maximum temperatures for each channel
- Has battery saver features
- Compatibility with probes for 4C-6800 Datalogger offers greater flexibility in solving temperature problems. Probes designed to be used with Cat's probe seal adapters
- Temperature readings can be sent to serial printer. Requires optional, user-installed adapter (4C-9499 RS-232 Adapter Group)

Specifications/Technical Information

Inputs 5, 4-wire PRTD
(Platinum Resistance Temperature Detector)

Output Optional, RS-232 level 300 or 1200 Baud rate

Power Internal rechargeable batteries
or 110/220 VAC, 50/60 Hz line power
using 4C-3024 Battery Charger

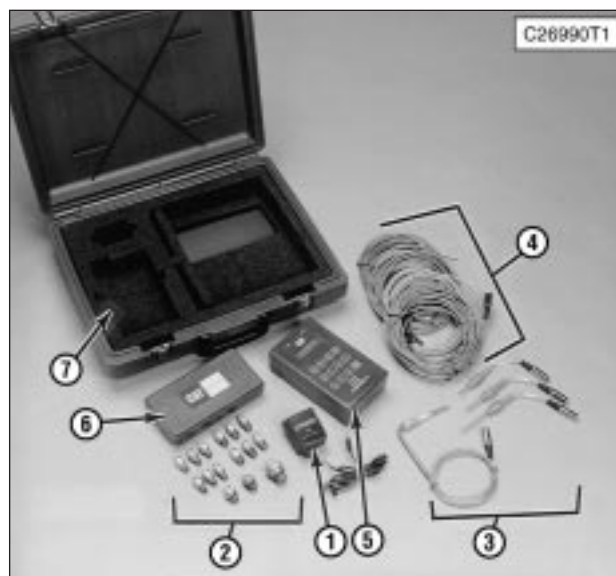
Range -50°C to 850°C (-58°F to 1582°F)

Resolution $\pm 0.1^\circ\text{C}$ or F
(-58°F to 500°F, $\pm 1^\circ\text{F}$)

Accuracy -50°C to 260°C, $\pm 0.5^\circ\text{C}$
(-58°F to 500°F, $\pm 1^\circ\text{F}$)
261°C to 850°C, $\pm 1.1^\circ\text{C}$
(501°F to 1562°F, $\pm 2^\circ\text{F}$)

Operating Temperature -18°C to 60°C
(0°F to 140°F)

Weight 4.95 kg (11 lbs.)



1. 4C-3024 Battery Charger
2. 4C-4545 Probe Seal Adapter, 3/4 inch O-ring
4C-4547 Probe Seal Adapter, 1/2 inch O-ring
5P-2720 Probe Seal Adapter, 1/8 inch NPT
5P-2725 Probe Seal Adapter, 1/4 inch NPT
5P-3591 Probe Seal Adapter, 9/16 inch O-ring
3. 4C-6264 Probe, 1 inch RTD
4C-6265 Probe, 1.5 inch RTD
4C-6266 Probe, 2.5 inch RTD
4C-6268 Probe, Exhaust RTD
4. 6V-2198 Cable, Extension, 20 ft
5. 4C-6501 Thermometer, Digital
8T-0844 Cover, Front
4C-6355 Cover, Back
4C-6499 Switch, Front Panel
4C-6356 Display, Transflective
6. 6V-6045 Case, Accessory
7. 6V-7145 Case, Carrying
4C-6498 Insert, Foam

Not shown:

- 4C-6267 Probe, 3.5 inch RTD
- 4C-6496 Probe, Immersion, Handheld
- 4C-6497 Probe, Surface, Handheld
- 4C-9499 Adapter, RS-232

Reference

Operating Manual NEHS0554

4C-6800 Datalogger Tool Operating Manual NEHS0549

T&SPG 2000

Repair and Service

United States Dealers

Raytek
1201 Shaffer Rd.
Santa Cruz, CA 95061
Attn: Instrument Repair
Phone: 800-227-8074
408-458-1110
Fax: 408-458-1239
Telex: 171890

European Dealers

Address for UPS and Normal Post:
Raytek Sensorik GmbH
Borkumstrasse 2
0 - 1100 Berlin, Germany

Address for Air Freight:
Airport Berlin Tegel (BLN TXL)
Raytek Sensorik GmbH
Borkumstrasse 2
0 - 1100 Berlin, Germany
Phone: #37-2-4725126
#49-30-4632070
Fax: 37-2-4710251

CANCELED

148-2388 Infrared Temperature Tool with Hardcase

148-2398 Soft Carry Pouch

SMCS Code: 1800-082, 0776

Model: All Models

Warranty: M

Features/Benefits

- Used to measure surface temperatures without actually having to contact surface
- Measures air stratification
- High and low alarms
- Calculates maximum, minimum and average temperatures
- Finds plugged hydraulic lines
- Performs cooling checks
- Measures cylinder temps
- Finds plugged radiators

148-2400 Infrared Temperature Tool

- Equipped with Class II laser sighting (laser is offset 1.2 cm (.47 in) above center of target spot)
- Has three digit LCD backlit display
- Reads in both Celsius and Fahrenheit
- Water resistant hard case and belt loop included

148-2388 Infrared Temperature Tool

- Has three digit LCD backlit display
- Reads in both Celsius and Fahrenheit
- Water resistant hard case and belt loop included

Specifications/Technical Information

148-2400

Temperature range -20 to 500°C (-4 to 932°F)

148-2388

Temperature range -18 to 400°C (0 to 750°F)

148-2400 and 148-2388

Accuracy $\pm 2\%$ of reading or $\pm 2^\circ\text{C}$ ($\pm 3^\circ\text{F}$)
whichever is greater, at 18 to 28°C
(64 to 82°F) ambient temperature

Repeatability $\pm 1\%$ of reading or $\pm 1^\circ\text{C}$ ($\pm 2^\circ\text{F}$)
whichever is greater

Response time 500 milliseconds

Spectral response 7 to 18 microns nominal,
thermophile detector

Display resolution 1°C or F both models

Ambient operating range 0 to 50°C (32 to 120°F)

Relative humidity 10 to 95% non condensing,
at up to 30°C (86°F)

Storage temperature -25 to 70°C (-13 to 158°F)
without battery installed

Battery 1U-9534 Battery, 9 Volt, Alkaline

Dimensions 137 x 41 x 196 mm (5.4 x 1.6 x 7.7 in)

Weight 270 gm (9.5 oz)



1. 148-2400 Infrared Thermometer with Laser Sighting or 148-2388 Infrared Thermometer
2. 148-2398 Soft Carrying Pouch
3. Hard Case (supplied with either 148-2388 or 148-2400)

Reference

NEDG6002 Product Brochure

1U-6236 Non-Contact Temperature Probe

SMCS Code: 0776
Model: All Models
Warranty: Y

Features/Benefits

- Measures surface temperatures without touching object
- Same measurement method as 1U-8865 and 9U-5828 Infrared Thermometers
- Used with 6V-7070 Digital Multimeter or 9U-7330 Digital Multimeter
- Easy to use — provides fast, accurate, and reliable measurements
- Enhances use of technician's digital multimeter — provides low cost optional attachment for measuring temperature
- Uses 1U-9534 9 Volt Battery

Specifications/Technical Information

Output 1mV DC per C or F
Temperature range -18 to 260 °C (0 to 500 °F)
Ambient operating temperature 0 to 65 °C
(32 to 150 °F)

Output accuracy
(the greater of the two) ±2% of reading or
±2 °C (±3 °F) at 23 °C (73 °F)
ambient operating temperature

Repeatability ±1% of reading or ±1 °C (±2 °F)
Typical response time 1 second
Spectral response 8 to 14 microns nominal
Emissivity 0.95 preset
Relative humidity 10 to 95% relative humidity
at up to 30 °C (86 °F) under noncondensing conditions

Storage temperature
(without battery) -25 to 70 °C (-13 to 158 °F)

Power 9 volt battery (1U-9534)

Battery life 50 hours at 23 °C (73 °F)

Low battery indication display flashes -60 °C (-76 °F)

Dimensions (LxWxH) 180 x 30 x 50 mm
(7.1 x 1.2 x 2.0 in)

Weight 180 grams (6.4 oz)



1U-6236 Non-Contact Temperature Probe

Reference

NEHS0618 Tool Operating Manual

4C-6090 Multichannel Temperature Selector

SMCS Code: 0785
Model: 3500 Captive Engines
Warranty: Y

Features/Benefits

- Saves time and money by allowing serviceman to read individual cylinder exhaust temperatures to quickly locate faulty fuel injector
- Measures 16 exhaust temperatures individually
- Supplied with 8-channel cable pack stored in lid; optional 4C-6097 Cable Pack, 8-Channel, available to provide 16 channel capability
- Uses 6V-7070 and 6V-9129 Temperature Adapter to digitally display temperatures
- Connected to thermocouples installed in engine at assembly, starting with the following engine serial number and product designation:

99W-2034 — D11N and 777

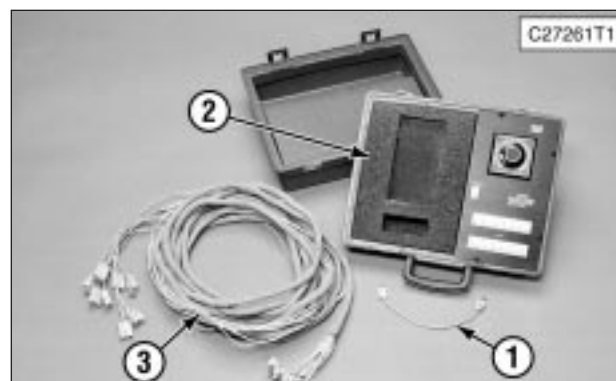
96Z552 — 785

54Z404 — 789

Specifications/Technical Information

Input 16 channels, type K
thermocouple, miniature connector

Output switch selectable, one of 16 inputs,
miniature connector



4C-6090 Multichannel Temperature Selector

Includes:

1. 4C-6096 Adapter Cable
2. 4C-6089 Foam Insert
3. 4C-6093 Cable Pack, Ch. 1 - 8

Reference

NEHS0537 Special Instruction

8T-2844 Recorder Group

SMCS Code: 1000-082
Model: All Models

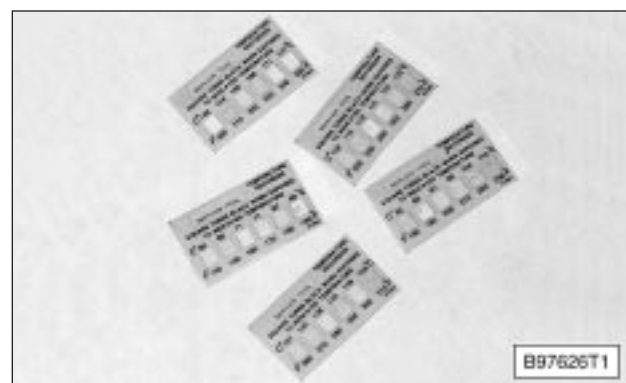
Features/Benefits

- Used for checking operating temperatures of the cooling system, engine oil system, hydraulic system and brake system
- Quick, easy, inexpensive method to determine component's surface temperature
- 6 silver-colored temperature sensitive indicator windows on each recorder; each window turns permanently black when temperature for that window is reached or exceeded
- 5 different temperature recorders for 5 different ranges
- Adhesive back — attach to any clean dry surface; remove and keep as permanent record
- Withstands repeated temperature changes, solvents and water

Specifications/Technical Information

Consist 3 each of temperature recorders listed in chart
Response time approximately 1 sec.

Part No.	Temperature Recorder (Range)					
	°C (°F)	°C (°F)	°C (°F)	°C (°F)	°C (°F)	°C (°F)
8T-2820	60 (140)	66 (150)	71 (160)	77 (170)	82 (180)	88 (190)
8T-2821	82 (180)	88 (190)	93 (200)	99 (210)	104 (220)	110 (230)
8T-2822	104 (220)	110 (230)	116 (240)	121 (250)	127 (260)	132 (270)
8T-2823	127 (260)	132 (270)	138 (280)	143 (290)	149 (300)	154 (310)
8T-2824	149 (300)	154 (310)	160 (320)	166 (330)	171 (340)	177 (350)



Temperature Recorders

9U-7043 Temperature Recorder Group

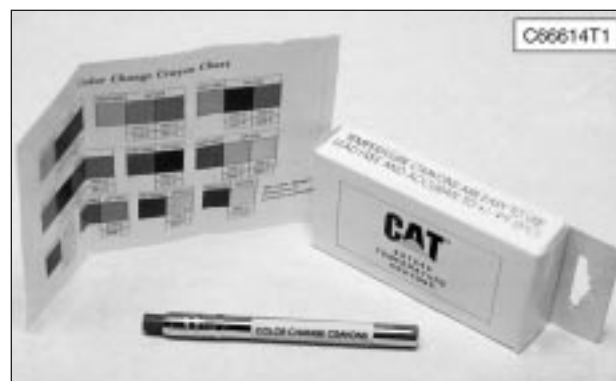
SMCS Code: 0776-082
Model: All Models

Features/Benefits

- Used to determine temperature — accurate to within $\pm 5^{\circ}\text{C}$ ($\pm 9^{\circ}\text{F}$)
- Each individual crayon in its own holder
- Color change chart included in each box
- Easy to use — draw crayon across heated surface and check color with temperature chart

Specifications/Technical Information

Packaged box of 10
Temperature range 195 to 600°C (383 to 1112°F)



9U-7043 Temperature Recorder Crayons

T&SPG 2000

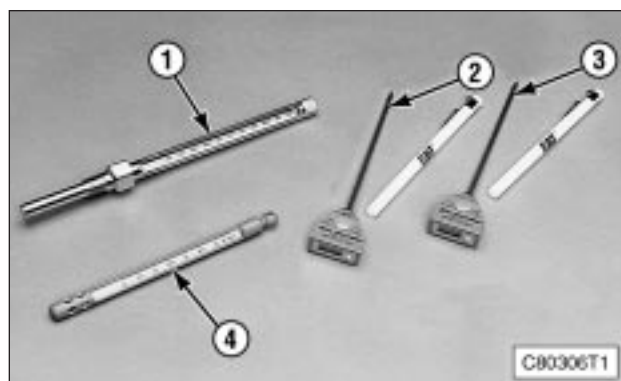
Thermometers

Warranty: Y

Features/Benefits

These thermometers are available for checking:

- General temperature measuring applications.
- Coolant temperature.
- Heat indicator accuracy.
- 9U-5324 measures in Centigrade.
- 9U-5323 measures in Fahrenheit.



1. 2F-7112
2. 6H-3050
3. 9U-5324
4. 9U-5323

Specifications/Technical Information

9U-5324 Centigrade (includes a 1.5V silver oxide battery.)

Temp. (40° to 110°C)
 Length 177.8 mm (7 in)
 Type Electronic
 Readout Digital
 Accuracy ±1%

9U-5323 Fahrenheit (includes a 1.5V silver oxide battery.)

Temp. 40° to 230°F
 Length 177.8 mm (7 in)
 Type Electronic
 Readout Digital
 Accuracy ±1%

6H-3050

Temp. 10°C to 204°C (50° to 400°F)
 Length 171.45 mm (6.75 in)
 Type Mercury
 Readout Linear
 Accuracy ±1%

2F-7112

Temp. -1.11°C to 116°C (30° to 240°F)
 Length 226.1 mm (8.9 in)
 Type Mercury with 6.4 mm (1/4 in) pipe connect
 Readout Linear
 Accuracy ±1%

5P-2720 Adapter Group, Probe, Self-Sealing

5P-2725 Adapter Group, Probe, Self-Sealing

5P-3591 Adapter Group, Probe, Self-Sealing

SMCS Code: 5050-038

Model: All Models

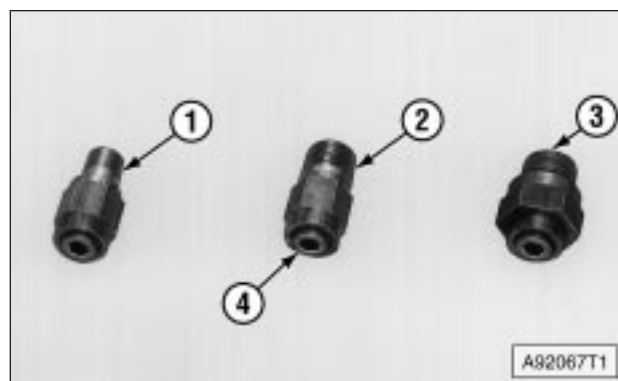
Warranty: Y

Features/Benefits

- Provide method for checking pressure or temperature in fluid-filled compartments without cooling down machine and draining fluid
- Can be installed in any prime product
- Seal permits probe insertion through center and seals automatically when the probe is removed
- All temperature probes included with thermistor thermometer and 164-2192 Pressure Probe can be used in these probe adapters.
- 9F-2247 Plug (1/8 in) installed in adapter groups to serve as protective cover when tests are concluded

Specifications/Technical Information

- Oil can be checked at temperatures less than 132°C (270°F) and pressures less than 3100 kPa (450 psi).
- Coolant and fuel can be checked at temperatures less than 121°C (250°F) and pressures less than 690 kPa (100 psi).



1. 5P-2720 Self-Sealing Probe Adapter Group (1/8 inch pipe thread)
2. 5P-2725 Self-Sealing Probe Adapter Group (1/4 inch pipe thread)
3. 5P-3591 Self-Sealing Probe Adapter Group (9/16 inch standard thread)
4. 9F-2247 Plug (Part of 5P-2720, 5P-2725 and 5P-3591)

1. 4C-4545 Adapter Group, Probe, Self-Sealing,
3/4 inch x 16 Thd
2. 3K-0360 Seal O-Ring
3. 9F-2247 Plug
4. 4C-4547 Adapter Group, Probe, Self-Sealing,
1/2 inch x 20 Thd
5. 1J-9671 Seal O-Ring

T&SPG 2000

General Diagnostic Tools

4C-8195 Control Service Tool, CMS II

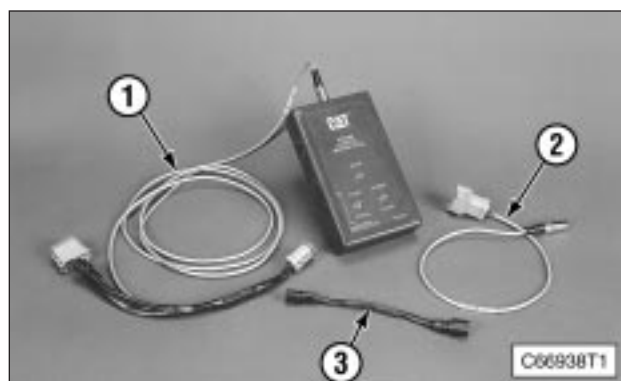
SMCS Code: 7490-038, 0785
 Model: All Models with CMS Panels
 Warranty: Y

Features/Benefits

- 4C-8195 Control Service Tool replaces canceled 9U-6665 CMS Service Tool
- Used to access diagnostic modes on CMS panels (allows service technician to easily enter diagnostic modes)
- Used with available adapter cables to diagnose Wheel Loader transmission controls — also used on countershaft transmission controls
- Allows technician to scroll through active and logged faults
- Allows logged faults to be cleared
- 138-7795 Cable Assembly Countershaft Transmission cancels and replaces 134-2576 Cable Assembly Countershaft Transmission

Specifications/Technical Information

Size 190 x 120 x 40 mm (7.5 x 4.7 x 1.5 in)
 Weight 0.2 kg (.44 lbs)
 Cable Length 2.4 m (8 ft)



4C-8195 Control Service Tool, CMS II

1. 4C-8196 Cable, CMS II
2. 4C-8197 Cable, Wheel Loader Transmission Control
3. 138-7795 Cable, Countershaft Transmission Control (for H-Series Motor Grader)

Reference

NEHS0586 Tool Operating Manual
 NEEG2741 Switch Positions for H-Series Motor Grader

148-9610 PC Cart, 110-125 VAC, 60 Hz 150-8756 PC Cart, 220-250 VAC, 50-60 Hz

SMCS Code: 7600-052
 Model: All Models
 Warranty: M

Features/Benefits

- Used to hold PC, monitor, printer and data view hardware in one portable workstation



148-9610 Personal Computer Cart

General Features

- Durable corrosion resistant baked on powder coat finish on steel body
- Protective bumper wraps around top of PC cart
- Large 127 x 50.8 mm (5 x 2 in) casters which are customer installed
- Two lower compartments for paper and supplies
- CD storage with self closing door holds up to 30 CD's
- Retractable cup holder
- Four position communication and data port blank panel
- Five cable hangers
- Care and use maintenance guide
- One year limited manufacturer's warranty

Protection Features

- Fan and filter system provides added protection for computer components
- Locking cabinet door protects computer components
- CPU securement system

Power Management Features

- Master on/off switch (lighted) that will turn on all components at one time
- 381 mm (15 ft) power cord
- NEMA power block with two outlets
- "Quick release" power cord wrap system

Printer and Monitor Features

- Accommodates most dot matrix or laser printers
- Universal printer securement strap (maximum printer weight 12.2 kg, 27 lbs)
- Universal monitor mounting system will hold diagonal screen size monitors up to 431 mm (17 in)

Specifications/Technical Information**General**

Overall dimensions (H x W x D) 1263.7 x 958.9 x 749.3 mm
(49.75 x 37.75 x 29.50 in)

Internal equipment area 546.1 x 781 x 565.2 mm
(21.5 x 30.7 x 22.25 in)

Two internal
storage compartments 235 x 381 x 546.1 mm
(9.25 x 15 x 21.5 in)

Cart weight, empty 84 kg (185 lb)
Shipping weight 104.4 kg (230 lb)
Casters (four swivel) 127 x 50.8 mm
(5 x 2 in) two with brake

Color base is dark grey; top platform is medium grey

Capacities and Other Dimensions

Largest monitor screen
(diagonal measure) 431 mm (17 in)
Largest monitor base (W x D) 317.5 x 285.7 mm
(12.5 x 11.25 in)

Maximum monitor column width 184.1 mm (7.25 in)
Maximum printer dimensions (W x D) 438.2 x 400.1 mm
(17.25 x 15.75 in)

Maximum printer weight 12.2 kg (27 lbs)
CD storage capacity (in door) 90 disks
Largest keyboard (W x D) 609.6 x 216.9 mm
(24.0 x 8.50 in)

Mouse pad

(largest recommended): (W x D) 279.4 x 215.9 mm
(11.0 x 8.50 in)

Power (148-9610)

Rated voltage 125 VAC
Rated amperage 15 Amps
Rated frequency 60 Hz
Power cord 4572 mm (15 ft)

Power (150-8756)

Rated voltage 250 VAC
Rated amperage 10 Amps
Rated frequency 50-60 Hz
Power cord 5791 mm (19 ft)

Power Strip

Electrical rating 250 VAC, 10 Amps
Outlets 4

Surge Suppressor

Electrical rating 125 VAC, 15 Amps
Maximum surge voltage 6 KV
Maximum surge dissipation 75 Joules
Maximum spike current 4500 Amps, at 25°C (77°F)
Maximum clamping ratio 1.2:1
Clamping volts 330 Volts
Clamping response time < 1 Nanosecond
Temperature range -40 to +80°C (-40 to +176°F)
Outlets 6

T&SPG 2000

See Third Supplement

1U-5268 Inspection Borescope

SMCS Code: 0777

Model: All Models

Warranty: Y

Features/Benefits

- Large inspection borescope with light source used to make visual inspection of internal surfaces of many Caterpillar products
- Inspection, in most cases, without disassembly of the product

Specifications/Technical Information

1U-5268 Borescope

Diameter 6.5 mm (.256 in)

Length 580 mm (23.0 in) 0° direction of view

1U-5269 Mirror Tube

Diameter 7.24 mm (.285 in) 90° direction of view

Light source 1U-5266-110 VAC Light Source
 or 1U-5267-220 VAC Light Source
 or 1U-5265 Light Source,
 portable (with 110 VAC battery charger)



1U-5268 Borescope

The following parts should be ordered separately. They do not come as part of the 1U-5268 Borescope.

1U-6345 Instrument Case

1U-6346 Foam Packing (Inside Case)

1U-5269 Mirror Tube — 90 degree direction of view

6V-9459 Fiber Optic Light Cable 1830 mm (72 in)

6V-9461 Right Angle Adapter (90 degree) Viewing

1U-5265 Battery Light Source

Additional parts not shown:

1U-5266 Light Source, 110 Volt (6V-9459 Fiber Optic Light Cable)

1U-5267 Light Source, 220 Volt (6V-9459 Fiber Optic Light Cable)

1U-5792 Lamp, 21 Volt

9U-5118 Lamp, 6 Volt

6V-9465 Eye Piece

6V-9468 Camera Adapter (Olympus OM1 and OM2)

Reference

NEHS0504 Operating Manual

See Third Supplement

146-1738 Borescope, Precision (12 inch Hawkeye)

SMCS Code: 0777

Model: All Models

Warranty: Y

Features/Benefits

- Used to make internal surface inspections without disassembly of component
- Light source is from Mini-Maglight (two AA batteries)
- Fits bores sizes as small as 6.35 mm (.25 in) and reaches 305 mm (12 in)
- Views surfaces straight ahead or has an adapter for 90° viewing (90° adapter rotates 360° without rotating borescope)
- Adjustable-focus eyepiece allows viewer to get as close as 1.0 mm (.040 in) to surface up to infinity
- Supplied with rugged lightweight carry case, foam insert, and Tool Operating Manual
- Service parts include: 1U-7329 Light Bulb, 1U-9538 Battery, Heavy Duty (AA size), 1U-9533 Battery, Alkaline (AA size), 1U-7323 Flashlight, Standard (2, AA batteries)

Specifications/Technical Information

Viewing depth 305 mm (12.0 in)

Overall length 355 mm (14.0 in)

Field of view 40°

Magnification 10 mm (.4 in) to 12.5

Tube diameter 6.4 mm (.25 in)



146-1738 Precision Borescope

REFERENCE

NEHS0683 Tool Operating Manual

See Second Supplement

9U-6940 Borescope, Right-angle View

SMCS Code: 0777, 0740

Model: All Models

Warranty: Y

Features/Benefits

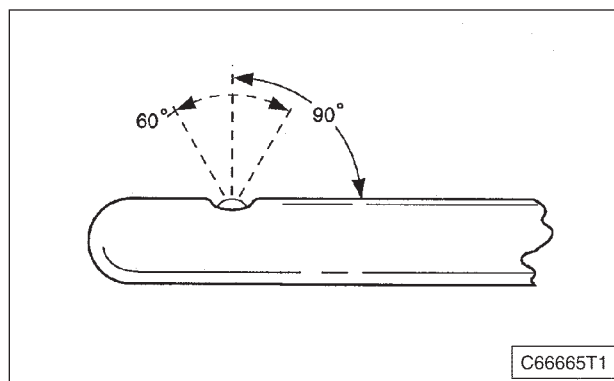
- Used to inspect internal openings and passages for damage — view internal or inaccessible areas without disassembling components
- Used with 1U-5268 Large Borescope Accessories (6V-9459 Fiber Optic Light Cable, 1U-5265 Battery Light Source, and AC light source)
- Use borescope as first means of component inspection — significantly reduces inspection time by eliminating disassembly
- Housing provides protection for borescope — eliminates surface mirror scratching problem
- Adjustable focus, under the eyepiece, allows clear viewing of internal surfaces and objects
- Stores in 1U-5268 Large Borescope carrying case
- Fits through nozzle holes on engines using a “pencil style” injector (check cylinder liner walls for scratching and scouring)
- Other applications include checking turbo for cracked or missing blades, check valve bodies for internal damage or blockage, and viewing internal areas large enough to insert borescope

Specifications/Technical Information

Diameter 6.50 mm (.256 in)
Length 57 cm (22.5 in)



9U-6940 Borescope, Right-Angle View



Right-Angle View Borescope

Reference

NEHS0504 Tool Operating Manual “Using the 1U-5268 and 8T-9290 Inspection Borescopes”

Service

Lenox Instrument Co.
Scottsville Industrial Park
265 Andrews Road
Trevose, PA 19047
800-356-1104

T&SPG 2000

131-5050 DataView Group

131-5051 DataView Portable TechStation Group

SMCS Code: 1000-038, 3000-038, 4000-038, 5000-038,
6000-038, 0788

Model: All Models
Warranty: Y



131-5050 DataView Group (PC not included)

Features/Benefits

- PC-based diagnostic tool. Accepts up to nine standard Caterpillar sensors for measurements on any engine or machine. Allows data to be displayed on a Personal Computer (PC).
- Includes Data Logger using 2 Mbyte PC Memory Card for storage. Data Logger has Auto Triggering and Pre-Trigger information settings.
- Measures pressure, temperature, blowby, position, RPM, Hz, duty cycle (PWM), hydraulic flow, and fuel flow.
- DataView hardware unit connects to standard PC parallel (printer) port. DataView software program runs on PC using Microsoft Windows™ or IBM OS/2™ operating system.
- Allows many current hand-held diagnostic tools to be replaced with a single diagnostic unit.
- Includes digital and analog measurements, bar graphs, charts, and histograms in real time or Data Logged data.
- DataView can provide test/diagnostic data for test facilities such as dynamometer rooms, transmission test centers, or any other application where diagnostic measurements are required.
- Future versions of DataView software will interface with other programs such as SIS and ET.
- Six "Analog" inputs for measuring any combination of pressure, temperature, blowby, and position.
- Three "Frequency" inputs for measuring RPM, Hz, duty cycle (PWM), hydraulic flow, and fuel flow.
- Two "Engine Set Point" inputs.
- Calculated channels for displaying sum, difference, and hydraulic horsepower.

- Automatic sensor identification of "Analog" sensors for automatic set-up using Auto ID cables (optional).
- RS232 input connector for future Digital Multimeter (DMM).
- Portable TechStation carrying case holds DataView and a portable PC.
- Internal battery operates for up to eight hours.
- Operates and charges on 110/220 VAC, 11 to 40 VDC, or 12V Automotive Cigarette Lighter.
- CE certified for European use.

Specifications/Technical Information

Minimum PC Requirements

Connection to PC standard parallel (printer) port
Computer IBM PC compatible with 486,
33 Mhz SL or SXL processor or greater
RAM 8 Mb
Available hard disc space 10 Mb
Diskette drive
(internal or external add-on) 3.5 Inch, 1.44 Mb
Monitor VGA
DOS version 5.0 or greater
Operating system Microsoft Windows™ version 3.1
or Windows 95, OS2 version 2.11, or Warp 3.0
Printer port parallel

General Hardware Specifications

Internal power source rechargeable internal nickel metal
hydride battery (Varta C526F, 7.2 Volt 2400 mAh)
AC external power 131-5052 AC Power Adapter,
90 to 264 VAC, 47 to 63 Hz
External power connector 11 to 40 VDC machine power
or cigarette lighter adapter
Power consumption 2 amp max at 15 VDC
Low battery indicator flashing ON light
Battery life 10 hours nominal
(dependent upon sensors being used)
Battery charge time 6 hours
Battery charge indicator light off - not charging, light on
solid - fast charge, light flashing - trickle charge
Operating temperature -17 to +60°C (0 to 140°F)
Storage temperature -40 to +100°C (-40 to +212°F)
Size 297 x 229 x 45.7 mm (1.7 x 9.0 x 1.8 in)
Weight DataView hardware (enclosure only)
1.8 kg (4 lbs)

Data Logger Specifications

Channels data can be logged
from all nine input channels
Memory 2 Mbyte PC PCMCIA
flash memory card is standard
Sample rate adjustable up to 1000 samples per second
Recording time varies depending on sample rate
and number of channels in use
Maximum log size At first release of software,
logs will be limited to 8000 samples. A later
software version will provide larger size logs.
Pre-trigger allows logging of events which happen
before the log trigger point
Auto trigger logging can be triggered from an event
or change in any channel
Manual trigger logging can be manually started
from the PC or from the hardware

Analog Channel Specifications

Connector type 5 pin DIN connectors (female)
 Analog channel sensor types analog inputs
 are automatically reconfigured with relays
 to accept voltage, milliamp, RTD,
 or resistance-type output sensors.
 Analog channel input ranges 0 to 5 VDC; Milliamp:
 4 to 20 mA; RTD: 100 Ohm, PRTD;
 Resistance: 15K Ohm nominal
 Sensor power supply ranges 5, 8, 12, or 15 VDC
 available, firmware selectable
 Input impedance 500K Ohms minimum
 A/D resolution 12 bit
 A/D Access time 10 microseconds
 Channel scan rate 50 microseconds per channel
 (10 channels scanned in 500 microseconds)
 Frequency response DC to 300 Hz
 (2000 samples per second)
 A/D input voltage range 0 to 5 VDC
 Max input voltage protected to 40V RMS or peak

Frequency Channel Input Specifications

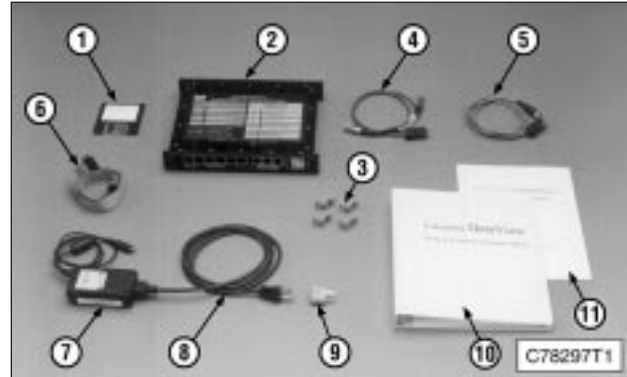
Frequency sensor types waveform or pulse inputs
 Input voltage range 0.1 to 40 VAC or VDC peak
 Allowable signal offset +0.040 VDC
 Input impedance 50K Ohms minimum
 Frequency response 3 Hz to 15K Hz
 Frequency accuracy ± 1 Hz
 RPM measurement range 1 to 9999 RPM
 RPM accuracy ± 1 RPM in selected RPM/PPR ranges
 Pulses per revolution 0.1 to 256 pulses per revolution;
 Hz fixed at 60 pulses per revolution
 Pulse width measurement 1 to 100% duty cycle
 for 40 Hz to 15K Hz
 Cat PWM sensor measurement special adapter cable
 required because of DC offset on output signal
 Pulse width accuracy $\pm 1\%$ for signals above 1V peak
 Photo pickup power provided for 9U-5140 Photo Pickup
 Photo pickup range 3 to 30 inches
 from retro-reflective tape target

Engine Set Point Specifications

Set point inputs 2 inputs provided
 for use with 2 frequency channels
 Rack contact voltage 12 VDC
 Rack contact current 5.5 mA
 Overrun indication 0 to 10% rack contact closure
 Set point indication 11% rack contact stores engine rpm
 Lug indication 75 to 100% rack contact closure

131-5050 Basic Cat DataView Group

This is a very basic group which includes only DataView hardware unit and accessories necessary to power it and connect it to the PC. No sensor or adapter cables are included. The memory card for data logging is not supplied but can be purchased separately, if desired.

**131-5050 DataView Group**

1. JERD2163 DataView Software
2. 131-5050 DataView Hardware
3. 137-0172 DataView Mounting Kit
4. 137-0169 Flash Programming Cable, DataView Front
5. 131-5059 Flash Programming Cable, DataView Rear
6. 131-5053 DataView to PC Parallel port cable (short)
7. 131-5052 AC Power Adapter, 90 to 264 VAC, 47 to 63 Hz
8. 131-5047 AC Power Cable, 110 VAC (USA Plug)
9. 137-0171 European Power Adapter
10. NEHS0662 Hardware Operating Instructions
11. JEBD3004 Software Program Operating Instructions

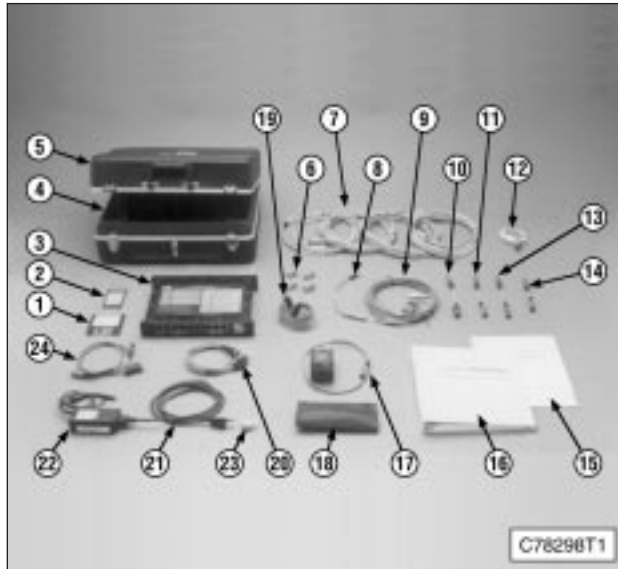
Not shown:

- 142-2415 Test Connector (for parallel port test)

T&SPG 2000

131-5051 DataView Portable TechStation Group

This group contains all accessories, excluding sensors, needed to operate DataView on a PC. A carrying case is also included which holds DataView unit and PC (not included).



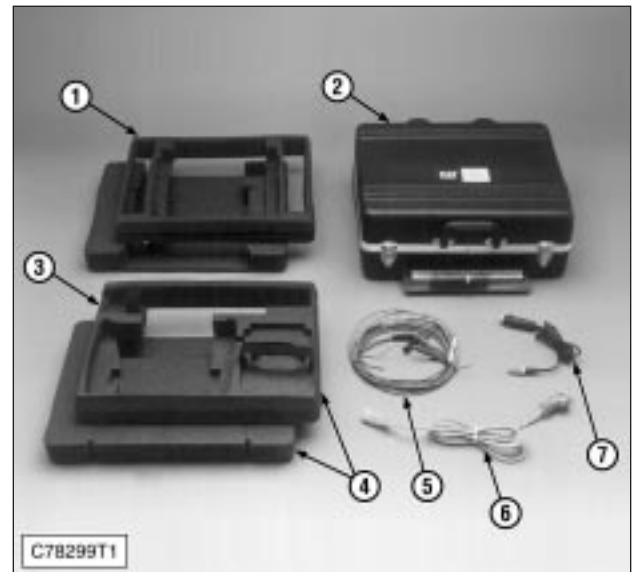
131-5051 DataView Portable TechStation Group

1. JERD2163 DataView Software
2. 133-6976 Memory Card for DataView (2 MB Capacity)
3. 131-5050 DataView Hardware
4. 137-0173 DataView Carrying Case
5. 131-5058 Foam Insert for Universal PC
6. 137-0172 DataView Mounting Kit
7. 6V-2198 Extension Cable 5.5 m (18 ft), (4 provided)
8. 8T-5111 Rack Adapter Cable
9. 1P-7446 Rack Cable
10. 131-5054 Adapter Cable for Caterpillar Pressure Sensors
11. 131-5055 Adapter Cable for Blowby/Airflow Pickups
12. 9U-7506 Magnetic Adapter Cable
13. 131-5056 Adapter Cable for Caterpillar Hydraulic Flowmeters
14. 131-5065 Auto ID Cable for Caterpillar Electronic Position Probe
15. NEHS0662 Hardware Operating Instructions
16. JEBD3004 Software Program Operating Instructions
17. 9U-7505 High Voltage Adapter
18. 6V-7072 Test Lead Set
19. 131-5053 DataView to PC Parallel port cable (short)
20. 137-0169 Flash Programming Cable, DataView Front
21. 131-5047 AC Power Cable, 110 VAC (USA Plug)
22. 131-5052 AC Power Adapter, 90 to 264 VAC, 47 to 63 Hz (NEEG2740 label)
23. 137-0171 European Power Plug Adapter
24. 131-5059 Flash Programming Cable, DataView Rear

Not shown:

- NEEG2723 Group Label on lid of 131-5051 DataView Group
- 142-2415 Test Connector (for parallel port test)

Optional Equipment



Optional Equipment

1. 131-5058 Generic Foam Insert (Fits in 137-0173 Case and has locations for DataView and a square hole for almost any laptop PC, plus a location for Caterpillar communications adapter.)
2. 137-0173 DataView Carrying Case (Has access door in front to allow DataView to be used without removing it from case. Foam inserts must be ordered separately, depending on configuration.)
3. 138-8779 Top Foam Insert (Replaces generic PC foam in DataView case to allow Cat Portable PC (Itronix) with CD ROM drive and Cat Communications adapter to be used with 131-5051 DataView Portable TechStation.)
4. 137-0174 Cat Portable PC Foam Insert (4 pcs) (Fits 137-0173 Case and has location for DataView on lower level and Cat Portable PC (Itronix) with CD ROM and Cat Communications adapter on upper level. Also includes a DataView blank foam and lid foam.)
5. 137-0168 External Power Cable 11 to 40 VDC, 5 m (18 ft) long
6. 133-6975 European DataView Power Cable (220 VAC) (European-style connector to fit 131-5052 AC Power Adapter.)
7. 137-0170 Cigarette Lighter Power Cable (12 VDC)

Not shown:

- 142-2415 Parallel Port Test Connector

Optional Cables and Sensors

The following sensors and cables are used with DataView.

Analog Channel Sensors**Pressure Sensors for Analog Channels**

A 131-5054 Adapter Cable or Auto ID Cable is always required to use these sensors

- 4C-6816 Pressure Sensor (0 to 60 psi)
- 131-5060 Auto ID Cable (for 4C-6816 Sensor)
- 4C-6817 Pressure Sensor (0 to 100 psi)
- 131-5061 Auto ID Cable (for 4C-6817 Sensor)
- 4C-6818 Pressure Sensor (0 to 500 psi)
- 131-5062 Auto ID Cable (for 4C-6818 Sensor)
- 4C-6819 Pressure Sensor (0 to 1000 psi)
- 131-5063 Auto ID Cable (for 4C-6819 Sensor)
- 4C-6820 Pressure Sensor (0 to 7500 psi)
- 131-5064 Auto ID Cable (for 4C-6820 Sensor)

Probe Type RTD Temperature Sensors

- 4C-6264 RTD Temperature Sensor, 25.4 mm (1.0 in) long, 3.2 mm (.125 in) diameter
- 4C-6265 RTD Temperature Sensor, 38.1 mm (1.5 in) long, 3.2 mm (.125 in) diameter
- 4C-6266 RTD Temperature Sensor, 63.5 mm (2.5 in) long, 3.2 mm (.125 in) diameter
- 4C-6267 RTD Temperature Sensor, 88.9 mm (3.5 in) long, 3.2 mm (.125 in) diameter

Exhaust RTD Temperature Sensor

- 4C-6268 Exhaust RTD Temperature Sensor

Hand Held RTD Temperature Probes

- 4C-6496 Immersion Hand Held RTD Temperature Probe, 3.18 mm (.125 in) diameter
- 4C-6497 Surface Hand Held RTD Temperature Probe, 6.35 mm (.25 in) diameter

Blowby Sensors for Analog Channels

- 8T-2685 Small Blowby/Air Flow Pickup (Part of 8T-2700 Blowby Group)
- 131-5066 Auto ID Cable for Small Blowby Pickup
- 1U-8860 Large Engine Blowby/Air Flow Pickup Group (For 3500 and 3600 Engines)
- 131-5067 Auto ID Cable for Small Blowby Pickup

Position Sensor for Analog Channels

- 8T-1002 Position Sensor 0 to 25 mm (0 to 1.0 in) range
- 131-5065 Auto ID Cable for 8T-1002 Position Sensor
- 6V-6042 Contact Point Group
- 5P-4814 Fuel Setting Collet
- 9U-6909 Extended Fuel Setting Collet (for 3500 engines)

Frequency Channel Sensors**Photo Pickup Speed Sensor**

- 9U-5140 LED Photo Pickup
- 6V-3137 Magnetic Mounting Base for 9U-5140
- 6V-3138 Extension Rod for 6V-3137
- 1U-6605 Retro-Reflective Tape, 12 mm (.5 in) x 15 m (5.0 ft) long
- 6V-0093 Retro-Reflective Tape, 12 mm (.5 in) x 47.5 m (50 ft) long
- 4C-6919 Retro-Reflective Tape, 25 mm (1.0 in) x 2.5 m (100 in) long

Injection Line Speed Sensor

- 6V-4950 Injection Line Pickup Group (from Multitach Group)
- 4C-6821 Injection Line Pickup Group (from Data Logger Group)

Tach Generator Speed Sensor

- 9U-7506 Magnetic Adapter Cable
- 5P-7360 Tach Generator (20 tooth internal gear)
- 5P-1759 Tachometer Drive Group

Flywheel TDC Magnetic Speed Sensors

- 9U-7506 Magnetic Adapter Cable
- 8T-5184 Magnetic TDC Pickup 89 mm (3.5 in) long
- 6V-2197 Magnetic TDC Pickup 114 mm (4.5 in) long
- 8T-5185 Magnetic TDC Pickup 178 mm (7.0 in) long
- 9U-7506 Magnetic Adapter Cable (required for TDC Sensors)
- 6V-2199 Sensor Mounting Adapter, 1/8 in NPTF
- 6V-3093 Sensor Mounting Adapter, 1/4 in NPTF
- 7X-1171 Sensor Mounting Adapter, 7/16-20 Straight Thread

Magnetic Pickup Speed Sensors

- 8L-4171 General Purpose Magnetic Speed Sensor, 91 mm (3.5 in) long, 5/8-18 Thread
- 9G-6724 Magnetic Speed Sensor, 76 mm (3.0 in) long, 3/4-16 Thread
- 6V-4156 Adapter Cable (required for above sensors), Amphenol to Phono Jack
- 9U-7506 Magnetic Adapter Cable (required for above sensors) Phono Jack to Data View

Fuel Flowmeters and Fuel Flow Communicator

- 1U-9500 Fuel Flow Communicator
- 1U-5450 Complete Engine Fuel Flow Monitor Arrangement
- 4C-9764 Fuel Flow Monitor Group
- 4C-9758 Fuel Flowmeter Group, Supply, Small
- 4C-9759 Fuel Flowmeter Group, Return, Small
- 4C-9760 Fuel Flowmeter Group, Supply, Large
- 4C-9761 Fuel Flowmeter Group, Return, Large
- 1U-5305 Adapter Group, Hose, Small
- 1U-5306 Adapter Group, Hose, Large
- 1U-5420 Adapter Group, Hose, 3600 Engine
- 1U-5299 Case Assembly
- 1U-5430 Small to Medium Engine Fuel Flow Monitor Arrangement
- 1U-5440 Medium to Large Engine Fuel Flow Monitor Arrangement

T&SPG 2000

Hydraulic Flowmeters for Frequency Channels

The 131-5056 Adapter Cable is required to use the following flowmeters.

4C-9911 Hydraulic Flowmeter, 8 to 50 Lpm (2 to 12 gpm)
 4C-9436 Hydraulic Flowmeter, 12 to 120 Lpm (3 to 25 gpm)
 4C-9912 Hydraulic Flowmeter, 20 to 220 Lpm (5 to 50 gpm)
 4C-9913 Hydraulic Flowmeter, 30 to 300 Lpm (8 to 80 gpm)
 4C-8687 Hydraulic Flowmeter, 45 to 450 Lpm (10 to 100 gpm)
 4C-9914 Hydraulic Flowmeter, 50 to 550 Lpm (12 to 150 gpm)
 4C-8686 Hydraulic Flowmeter, 60 to 700 Lpm (15 to 180 gpm)

Hydraulic Flowmeters with Load Valves for Frequency Channels

160-2513 Flowmeter, Tester, 5-50 gpm
 160-2514 Flowmeter, Tester, 4-125 gpm
 160-2515 Flowmeter, Tester, 15-180 gpm

Reference

NEHS0662 Tool Operating Manual, Using the Caterpillar Data View
 NEHP5622 Data View Marketing Brochure

153-9630 Test Group-Sensor

SMCS Code: 1000-038, 3000-038, 4000-038, 5000-038, 6000-038

Model: Electronically Controlled Cat® Equipment

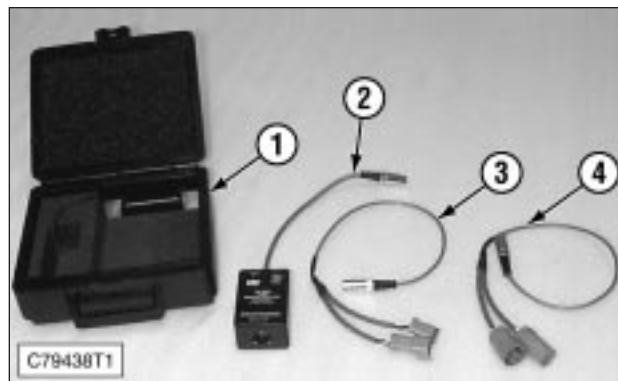
Warranty: Y

Features/Benefits

- Used to test CAT® PWM and analog sensors on or off the machine
- Used with 131-5050 DataView and DataView 2.0 software
- DataView 2.0 software lists common sensors for easy setup
- Internal power supply powers active sensors while removed from equipment
- CE certified for European use
- Recommended tool

Specifications/Technical Information

Input impedance 120 k Ω
 Input voltage 5 VDC (from DataView)
 Output voltage 9.4 VDC (sensor power)
 Maximum sensor current 40 mA maximum at 9.4 VDC
 Operating temperature -17 to 60°C (0 to 140°F)
 Size 85 x 56 x 35 mm (3.3 x 2.2 x 1.4 in)
 Weight (153-9625) 0.23 kg (.5 lb)

**153-9630 Test Group, Sensor**

1. 153-9629 Insert Foam
 148-5675 Case
 6V-6096 Foam
 NEEG2813 Decal
2. 153-9625 PWM Sensor Adapter
3. 153-9627 Cable Assembly, DT
4. 153-9626 Cable Assembly, HD

Reference

NEHS0711 Tool Operating Manual

**143-4062 Sensor,
Pressure (100 psi)****143-4065 Sensor,
Pressure (1000 psi)****143-4066 Sensor,
Pressure (7500 psi)**

SMCS Code: 1000-038, 3000-038, 4000-038, 5000-038,
6000-038, 0788

Model: All Models
Warranty: Y

Features/Benefits

- New low cost pressure sensors for use with 131-5050 DataView
- Auto ID built in — no Auto ID cable is required
- Plug directly into DataView Analog channels
- $\pm 1\%$ accuracy
- CE Certified

Specifications/Technical Information

3 Pressure ranges available 0 to 689 kPa (0 to 100 psi)
0 to 6890 kPa (0 to 1000 psi)
0 to 51 675 kPa (0 to 7500 psi)

Accuracy $\pm 1\%$ of full scale absolute
 $\pm 1\%$ of reading typical

Proof pressure 200% of Rated Range

Burst pressure 500% of Rated Range

Connection Male 1/4 - 18 NPTF Thread

Connector Male 5 pin DIN

Operating temperature range -25° to 65° C
(-13° to +150° F)

Maximum diameter 26 mm (1.02 in)

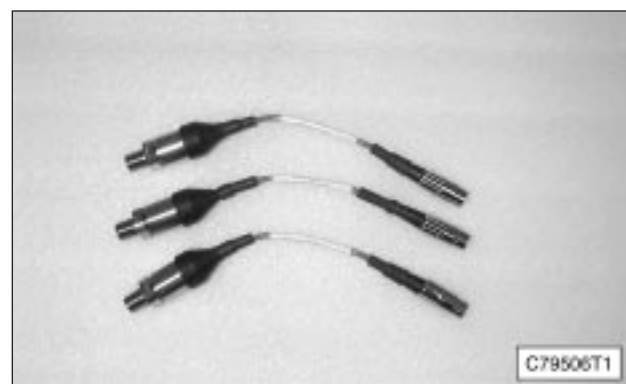
Sensor length 105 mm (4.13 in) approx.

Cable Length 150 mm (5.90 in) approx.

Weight11 kg (0.25 lb)

DataView Auto ID resistor built in

NOTE: These new sensors are not designed to be used with the 4C-6800 Caterpillar Data Logger. They will not read correct on this Data Logger.



Pressure Sensors

Reference

NEHS 0662 Tool Operating Manual — DataView

**8T-9290 Borescope Group,
Inspection**

SMCS Code: 0777
Model: All Models
Warranty: Y

See Second Supplement

Features/Benefits

- Designed to see into inaccessible areas such as combustion chambers
- Fits into bore as small as 8 mm (.32 in) and reach 240 mm (9.5 in) into the cavity
- Equipped with battery operated lamp; battery handle can be attached directly to scope or can be remotely coupled to scope by using extension cable supplied (helpful in close quarter situations)



8T-9290 Borescope Group, Inspection

1U-6862 Lamp (Service Repair, old borescope)

4C-6493 Lamp (Service Repair, new borescope 3/89 and later)

Reference

NEHS0504 Operating Manual

Power supply	2 (2.4V) Ni-Cad batteries
Battery life	4 hours
Sensitivity	50 - 1000 PPM
Warm-up time	automatic, approx. 15 sec.
Response time	instantaneous
Weight	439 grams (15.5 oz.)
Dimensions	20.32 cm x 7.62 cm x 4.57 cm (8 in x 3 in x 1.8 in)
Duty cycle	continuous, no limitations
Operating temp. range	0°C to 38°C (33°F to 100°F)
Probe length	38.1 cm (15 in.)

T&SPG 2000



4C-5607 Detector, Combustible Gas

Includes:
Flexible Probe
Sturdy Carrying Case
Rechargeable Batteries
Recharger Adapter

Service Part:
4C-5611 Sensing Tip

4C-5608 Detector/Transmitter, Vacuum Leak

SMCS Code: 7300-034
Model: All Models
Warranty: Y

Features/Benefits

- Designed to detect high pressure and/or vacuum leaks through use of ultrasonics (All pneumatic and vacuum leaks emit high-frequency sound in range far above that audible to human ear.)
- Transmitter (included in 4C-5608) to be used with Vacuum Leak Detector when checking system that does not generate a high frequency tone
- Excellent for finding door seal leaks in cabs.

Specifications/Technical Information

Power supply 1U-9534 Battery, 9V
Battery life 40 hrs for carbon-zinc,
80 hrs for alkaline
Sensitivity automatic
Response time instantaneous
Reset time 1/4 second
Set time 1 second
Warm-up time instantaneous
Weight 14.5 oz. with battery
Dimensions 20.32 cm x 7.62 cm x 4.57 cm
(8 in x 3 in x 1.8 in)
Probe length 31.75 cm (12.5 in.)



4C-5608 Detector/Transmitter, Vacuum Leak

Service Part:
4C-5609 Transmitter, Replacement, for 4C-5608

8T-9295 Holder, Diagnostic Tool

SMCS Code: 0785
Model: All Models
Warranty: Y

Features/Benefits

- Free serviceman's hands while performing critical diagnostic tests
- Magnetized, adjustable device holds multimeter, multitach, electronic position indicator or any diagnostic tool
- Especially helpful while checking or adjusting fuel systems



8T-9295 Holder, Diagnostic Tool

9U-5215 Case, Tool, Soft

SMCS Code: 0785
Model: All Models

Features/Benefits

- Universal soft case for most Caterpillar hand-held "green box" diagnostic tools
- Foam insert used to hold standard-size tool; without foam, will hold 4C-6500 Digital Thermometer
- Resistant to coolant, diesel fuel and oil
- Adjustable, removable strap
- Clear vinyl front for excellent instrument visibility; provides extra protection
- Opening in top for easy access to all connections of instrument



9U-5215 Case, Tool, Soft

156-1060 Analyzer Group, Emission (Gas Engines Only)**156-1070 Analyzer Group, Emission (Gas and Diesel Engines)**

SMCS Code: 1088-036, 0781
Model: All Models of Gas and Diesel Engines
Warranty: M

NOTE: Manufacturer's one year warranty from date of purchase on all parts except for the 156-1061 Oxygen Sensor which has a two year warranty.

Features/Benefits (156-1060 only)

- Used for fast, easy set-up and servicing of lean burn and stoichiometric engines
- Measures exhaust concentrations of oxygen (O₂), carbon monoxide (CO), low nitric oxide (NO), and nitric oxide (NO₂)

Features/Benefits (156-1070 only)

- Used for fast, easy set-up and servicing of lean burn, stoichiometric, and diesel engines
- Measures exhaust concentrations of oxygen (O₂), carbon monoxide (CO), nitric oxide (NO), nitric dioxide (NO₂), and combustibles (CxHx)

Features/Benefits (156-1060 or 156-1070)

- Also measures exhaust and ambient temperatures, stack draft, and smoke test
- Calculates carbon dioxide, excess air, efficiency, and losses
- Display shows all parameters at once and has two levels of zoom
- Housed in a durable aluminum reinforced case
- Durable pistol grip probe (one foot in length)
- Built-in thermal printer
- Automatic water dump

T&SPG 2000

Specifications/Technical Information

Input exhaust from engine under test
 156-1067 length 305 mm (12.0 in)
 156-1068 length 4572 cm (15 ft)
 Power cord length 4572 cm (15 ft)

Measurement Range

Oxygen (O₂) 0 to 21%
 Carbon monoxide (CO) low 0 to 4000 ppm
 Carbon monoxide (CO) high 0 to 40,000 ppm
 Nitric oxide (NO) 0 to 4000 ppm
 Nitrogen dioxide (NO₂) 0 to 500 ppm
 Combustibles (CxHx) 0 to 6%
 Ambient temperature -17.8 to 121.1°C (0 to 250°F)
 Exhaust temperature -17.8 to 982.2°C (0 to 1800°F)
 Stack draft 0 to 40.00 inches H₂O
 Smoke test 0 to 9 spot method

Measurement Resolution

Oxygen 0.1%
 Carbon monoxide, low 1 ppm
 Carbon monoxide, high 5 ppm
 Nitric oxide 1 ppm
 Nitrogen dioxide 1 ppm
 Combustibles 0.01%
 Ambient temperature 0.6°C (1°F)
 Exhaust temperature 1.7°C (1°F)
 Stack draft 0.01 inch H₂O

Measurement Accuracy

Oxygen ±2% of reading
 Carbon monoxide, low ±4% of reading
 Carbon monoxide, high ±4% of reading
 Nitric oxide ±4% of reading
 Nitrogen dioxide ±4% of reading
 Combustibles ±4% of reading
 Ambient temperature -16.1°C (3°F)
 Exhaust temperature -16.1°C (3°F)
 Stack draft 2% of reading

Sensor Life

Oxygen 2 years
 Carbon monoxide, low 3 years¹
 Carbon monoxide, high 3 years¹
 Nitric oxide 3 years¹
 Nitrogen dioxide 3 years¹
 Combustibles 3 years
 Ambient temperature 10 years
 Exhaust temperature 10 years
 Stack draft 10 years

¹ Depends on usage and gas concentration**Power**

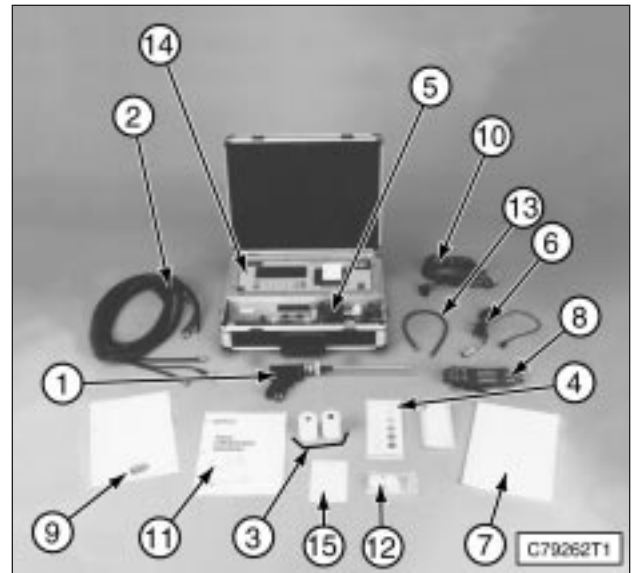
Internal sealed lead acid battery, 12VDC,
 2.2 AH rechargeable
 External selected 110/220 VAC, 50/60 Hz
 External converter 12VDC, battery cables and cigarette
 lighter plug (available separately)

Operating Temperatures

Analyzer 6.7 to 50.0°C (20 to 122°F)
 Probe -17.8 to 982.2°C (0 to 1800°F)
 Storage temperature -40.0 to 60.0°C (-40 to 140°F)

Measurements

External dimensions 48.3 x 40.6 x 16.5 cm
 (19 x 16 x 6.50 in)
 Weight 12.71 kg (28 lbs)



Components included with 156-1060 or 156-1070 Analyzer Group, Emission

1. 156-1067 Probe
2. 156-1068 Line, Sample
3. Two rolls of printer paper
4. Package of smoke test paper and comparison chart
5. Single water trap assembly
6. Ambient thermocouple with magnet
7. Note pad
8. Shoulder strap
9. Calibration certificate and magnet
10. AC power cord
11. NEHS0713 Tool Operating Manual
12. Package of water trap filters
13. Drain hose
14. Emission Analyzer
15. NEHS0714 Tool Operating Tips Pocket Card

Not shown:

Two keys for case latches

Sensors provided with 156-1060 Analyzer Group (installed in analyzer)

156-1061 Sensor, Oxygen
 156-1062 Sensor, Carbon Monoxide (CO) Low
 156-1064 Sensor, Nitric Oxide (NO)
 156-1065 Sensor, Nitric Dioxide (NO₂)

Sensors provided with 156-1070 Analyzer Group (installed in analyzer)

156-1061 Sensor, Oxygen
 156-1062 Sensor, Carbon Monoxide (CO) Low
 156-1063 Sensor, Carbon Monoxide (CO) High
 156-1064 Sensor, Nitric Oxide (NO)
 156-1065 Sensor, Nitric Dioxide (NO₂)
 156-1066 Sensor, Combustibles (CxHx)

Service Parts (available separately):

156-1078 Paper, Printer
 156-1074 Paper, Smoke Test
 156-1073 Media, Filter (purple beads)
 156-1072 Filter, Water Trap

Replacement Parts (available separately):

- 156-1069 O-Ring, Inlet (draft)
- 156-1076 O-Ring, Inlet (gas)
- 156-1071 Head, Printer
- 156-1067 Probe
- 156-1068 Line, Sample
- 156-1061 Sensor, Oxygen
- 156-1062 Sensor, Carbon Monoxide (CO) Low
- 156-1063 Sensor, Carbon Monoxide (CO) High
- 156-1064 Sensor, Nitric Oxide (NO)
- 156-1065 Sensor, Nitric Dioxide (NO₂)
- 156-1066 Sensor, Combustibles (CxHx)

Optional (available separately)

- 156-1077 Inverter, Power - 12VDC, includes battery cables and cigarette lighter adapter
- 156-1075 Display, Remote - includes a cable 76.2 cm (30 ft) in length
- Data Acquisition Software (contact CSTG)

Reference

- NEHS0713 Tool Operating Manual
- NEHS0714 Tool Operating Tips Pocket Card

8T-0910 Analyzer, Fuel Sulfur***Canceled***

SMCS Code: 1280-081
 Model: All Engines Models
 Warranty: Y

Features/Benefits

- Portable, low cost instrument used to determine sulfur concentration in diesel fuel
- Immediate results — no longer necessary to send sample to laboratory and wait for results
- Will analyze distillate diesel fuel which contains 0-1.5% of sulfur by weight, with an accuracy of $\pm 0.1\%$



8T-0910 Fuel Sulfur Analyzer
 8T-5175 Stop Watch

Reference

SEHS8545 Special Instruction

T&SPG 2000

9U-7554 Printer Group, Portable, 110 VAC

121-0276 Printer Group, Portable, 220 VAC

SMCS Code: 1000-038

Model: All Models

Warranty: Y

See Fourth Supplement

split charts using NEXG4512 Configuration Aid (SPM)],
4C-3030 Vibration Analyzer Group, @MD319U-7401
Multitach II, 4C-6501 Digital Thermometer, and Caterpillar
Electronic Technician (Cat ET) JERD2124

- Use as Epson-compatible printer with any PC
- Printer's small size, rechargeable battery, and portability is perfect for field use — print diagnostic information on-site
- Print-screen mode allows information to be printed direct from ECAP screen
- Operates using 9U-7557 110 VAC Adapter, or 9U-5939 220 VAC Adapter, or internal rechargeable battery (NiCad)
- Simple hook-up allows technician to print display-data (such as engine parameter setting screen) for customer and dealer records — helps avoid problems if questions arise
- Provides printed split charts at time of engine servicing or testing — allows both customer and technician to clearly discuss performance characteristics

Specifications/Technical Information

Printer

Dimensions (WxDxH) 29 x 9 x 5 cm
(11.7 x 3.5 x 2.0 in)

Weight 1 kg (2.5 lbs.) with battery pack

Temperature:

Printing 5 to 35°C (41 to 95°F)

Operating 5 to 40°C (41 to 104°F)

Storage -25 to 70°C (-13 to 158°F)

Humidity:

Printing 30% to 80%

Operating 10% to 90%

Storage 5% to 90%

Print head life 50 million pulses

Interface Centronics compatible, 7 or 8 bit

Print method 48 element thermal fusion

Battery

Type 7.2V, 900 mA (NiCad)

Life 400 charges minimum, 600 typical

Recharge time 6 hours

Pages per charge 20 to 25

Weight 0.2 kg (.5 lb)

AC Adapter/Battery Charger

Input voltage:

9U-7557 (110) 90-132 VAC, 50-60 Hz, Single Phase

1U-5939 (220) 200-240 VAC, 50-60 Hz, Single Phase

Output voltage 8.0 VDC

Current 0 to 3.5 A

Print Cartridge

Color black

Life 100,000 characters

Operating temperature 5 to 35°C (41 to 95°F)

Storage temperature:

96 hours -25 to 50°C (-13 to 122°F)

1 month 5 to 45°C (41 to 113°F)

1 year 5 to 35°C (41 to 95°F)

Protocol Converter

Size (LxWxH) 96 x 60 x 22 mm (3.8 x 2.4 x 0.9 in)

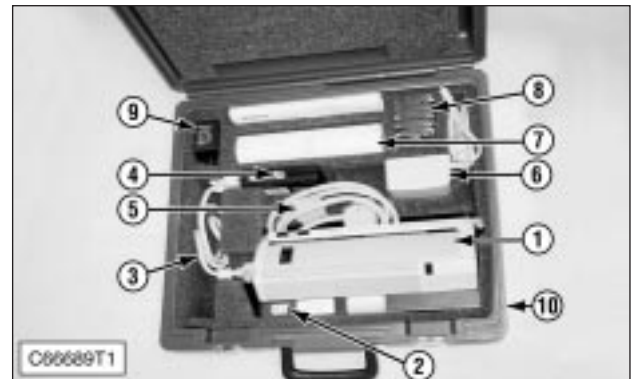
Power 10 to 18 VDC @ 80 mA

Baud rates 300 to 38.4k baud (preset to 1200)

Flow control XON/XOFF or DTR (preset to XON/XOFF)

Data bits 7 or 8 (preset to 8)

Parity even, odd, and none (preset to none)



9U-7554 Portable Printer Group, 110 VAC
121-0276 Portable Printer Group, 220 VAC

Service Parts:

1. 1U-5721 Printer
2. 1U-6239 Printer/Paper Holder
3. 9U-7556 Cable, Printer
4. 9U-7559 Converter, Serial to Parallel
5. 8C-9704 Cable, Serial
6. 9U-7557 Adapter/Charger, 110 VAC
1U-5939 Adapter/Charger, 220 VAC
7. 8C-9703 Paper, Roll
8. 9U-7558 Cartridge, Print (pkg. of 5)
9. 1U-6126 Adapter/Charger, 110 VAC, for 9U-7559
121-0277 Adapter/Charger, 220 VAC
10. 6V-7145 Case, Carrying

Not shown:

9U-7555 Battery, Rechargeable (NiCad)

147-CANCELEDPrinter**147-1925 Printer Mount Kit
(Includes Printer Power Supply)****147-1928 Payload Control System
Interface Cable**

SMCS Code: 7494-082

Model: All 938 through 994 Wheel Loaders Equipped with Payload
Control System

Warranty: Y

Features/Benefits

- Used to print tickets of payload information
- Used with Payload Control System
- Rugged printer construction works in mining/construction industry applications
- Smallest rugged printer on market today
- Prints tickets 102 mm (4.0 in) wide with variable length
- Operates on power received from Payload Control System using 147-1925 Printer Mount Kit with power supply and 147-1928 Interface Cable
- Low maintenance printer
- CE Certified
- Uses 147-1926 Standard Printer Paper or 147-1927 Extended Printer Paper (requires paper extender)
- 147-1929 Paper Extender allows printer to use extended paper rolls for less frequent paper replacement
- Also available are 159-5804 Printer Cleaning Cards

Specifications/Technical Information

Dimensions (W x D x H) 165 x 89 x 168 mm
(6.5 x 3.5 x 6.6 in)

Weight 1.5 kg (3.3 lbs)

Estimated print head life 96,560,640 mm
(3,801,600 in) nominally

Print speed up to 50.8 mm (2 in) per sec

Print head width 104 mm (4.0 in)

Print head density 8 dots/mm (203 DPI)

Number of dots 832

Standard Printer Paper 102 mm (4 in) wide
x 31,115 mm (1225 in) long

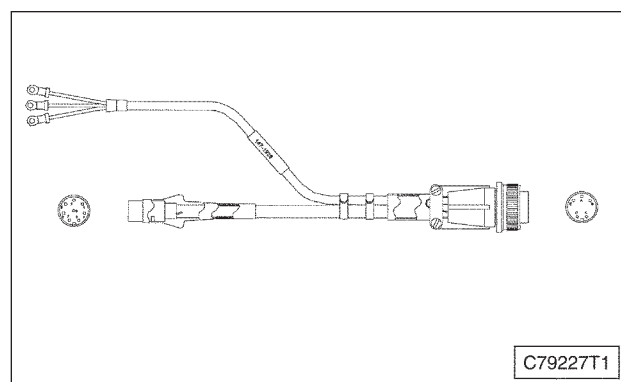
Extended Printer Paper 102 mm (4 in) wide
x 120,015 mm (4725 in) long



147-1924 Portable Printer



147-1925 Printer Mount Kit (includes printer power supply)



147-1928 Payload Control System Interface Cable

Reference

NEHS0712 Tool Operating Manual

T&SPG 2000

8T-5200 Signal Generator/Counter Group

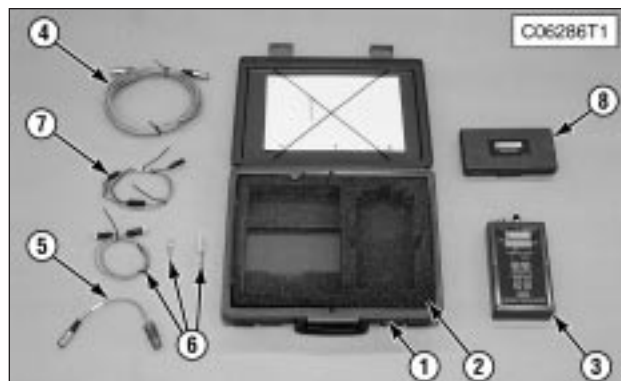
SMCS Code: 0785
Model: All Models
Warranty: Y

Features/Benefits

- Small handheld square-wave generator
- Used mainly to simulate speed in place of magnetic speed pickup for troubleshooting transmission electronic control units; 8-Volt (Peak to Peak) square wave OUT PUT provided

Other functions:

- Electronic diagnostic tool calibration in number of applications that currently use 5P-9698 Calibrator; 3-Volt (Peak to Peak) square wave CAL OUT provided; frequency (Hz) range approximately 3 Hz (cycles per second) to 7000 Hz, infinitely variable by turning Hz adjustment knob, and displayed by 4-1/2 digit LCD
- Frequency (Hz) counter when input is pulsating DC or AC signal within following parameters: 10 cycles per second (Hz) to 19,999 cycles per second (Hz) then signal level must be 0.1 to 50 Volts peak



1. 6V-3072 Case, Carrying
2. 8T-5267 Foam Block
3. 8T-5201 Signal Generator/Counter
4. 6V-2198 Cable, Extension
5. 8T-5198 Adapter Cable, Transmission
6. 8T-5197 Calibrator Cable and Adapters
7. 8T-5112 Cable, Signal Input
8. 6V-6045 Case, Accessories

Reference

SEHS8579 Special Instruction
4C-6534 Harness in Tool Guide (setting electronic speed switches)

4C-6534 Harness

SMCS Code: 7427-036
Model: All Models
Warranty: Y

Features/Benefits

- Replaces canceled 9W-6370 Harness
- Used with 8T-5201 Signal Generator/Counter to test and adjust all engine electronic speed switches, whether 2-, 3- or 4-element (9W-6370 checks only 2- and 3-element speed switches; 4C-6534 Harness provides higher voltage signal which will operate 4-element speed switches)

Specifications/Technical Information

Length 1524 mm (60 in)



4C-6534 Harness

Reference

SEHS8657 Special Instruction

Hook and Loop Fastener

Warranty: M

Features/Benefits

- Fast — lets you secure and release cables quickly and easily with the combinations of Velcro strap and nylon tie.
- Easy — mounts to cables permanently. Installs in seconds.
- Reuseable
- Tidy — keeps cables neat and safe. A great way to coil them for storage — a better way to keep harnessed cables organized.



Hook and Loop Fastener

Specifications/Technical Information

9U-5061		Closed Loop — 25.4 mm W x 177.8 mm L (1 in W x 7 in L)
9U-5062		Open loop — 25.4 mm W x 177.8 mm L (1 in W x 7 in L)
9U-5063		Open loop — 38.1 mm W x 457 mm L (1 1/2 in W x 18 in L)

6V-2196 Microscope

6V-6059 Microlite

Warranty: M

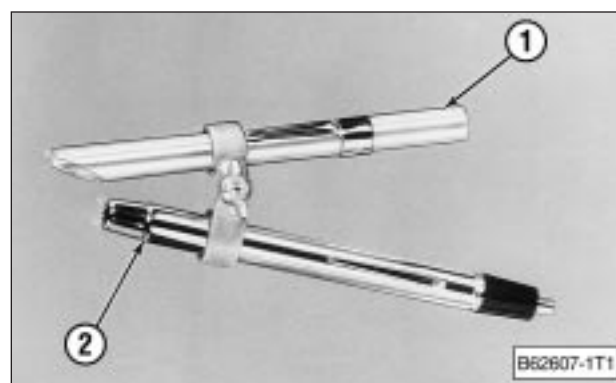
Features/Benefits

6V-2196

- This 20X microscope is a general usage instrument, but is specifically recommended for checking crankshaft bearing surfaces after magnetic inspection.
- Accurate measurement is provided by a scale reading in 0.1 mm increments.

6V-6059

- Provides a light source for the 6V-2196 Inspection Microscope. A clip is included to attach the light to the microscope.
- Uses a standard 222 bulb with a screw type base and focus lens. (Can also use 6V-3061 as replacement bulb). Also two standard 1.5 Volt "AAA" size batteries are required, but not included with the microlite.
- For longer service life alkaline batteries 1U-9535 are recommended.
- Refer below for battery manufacturer and model number
- Eveready — E92
- Duracell — MN2400
- Burgess — AL7
- Ray-O-Vac — 824



1. 6V-2196 Inspection Microscope
2. 6V-7894 Microlite

T&SPG 2000

See First Supplement

Dual Scale Pressure Gauges

Warranty: G

Features/Benefits

- Dual scale, liquid-filled pressure gauges.
- Outside scale of the dial face is pounds per square inch (psi).
- Inside scale is kilopascals (kPa). A yellow band on the dial face identifies the kPa scale.
- Gauges are 2.50 in (63.5 mm) diameter and the case is made of brass.
- 1.6% accuracy.
- 1/4-18 NPTF connections.

Specifications/Technical Information

Dual Scale Pressure Gauges			
Part No.	Connection Location	Range (psi)	Range (kPa)
8T-0846 ¹	Back	0 to 145	0 to 1000
8T-0847	Back	-15 to 0 to 72	-100 to 0 to +500
8T-0848 ¹	Back	0 to 58	0 to 400
8T-0849 ¹	Back	0 to 290	0 to 2000
8T-0850 ¹	Back	0 to 580	0 to 4000
8T-0851 ¹	Back	0 to 2300	0 to 16 000
8T-0852 ¹	Back	0 to 5800	0 to 40 000
8T-0853	Stem	0 to 58	0 to 400
8T-0854	Stem	0 to 145	0 to 1000
8T-0855	Stem	0 to 580	0 to 4000
8T-0856	Stem	0 to 870	0 to 6000
8T-0857	Stem	0 to 1450	0 to 10 000
8T-0858	Stem	0 to 2300	0 to 16 000
8T-0859	Stem	0 to 3600	0 to 25 000
8T-0860	Stem	0 to 5800	0 to 40 000
8T-0861	Stem	0 to 8700	0 to 60 000
8T-0862	Stem	-15 to 0 to 72	-100 to 0 to +500
8T-0863	Stem	0 to 36	0 to 250

¹ Can be used in 1U-5481 Transmission Test Group

8T-0820 Pressure Gauge

Warranty: G

Features/Benefits

- Grade "A" liquid filled dual scale (kPa range 0-70,000, psi range 0-10,000), 101.6 mm (4.0 in) diameter with 1/4 inch NPT thread and stem mounted.
- General purpose gauge and can be used with all Caterpillar electric hydraulic pumps.



8T-0820 Pressure Gauge

8T-5342 and 8T-5343 Pressure Gauge

Warranty: G

Features/Benefits

- Liquid filled pressure gauges designed for use with the most popular series of hydraulic pullers and rams.
 - 8T-5343 Gauge is a bottom mount pressure gauge having 1/4 inch NPT threads.
 - 8T-5342 Gauge is a lower back mounted pressure gauge
- Both gauges have a 101,6 mm (4.00 in) liquid filled housing. The gauges also provide Grade A accuracy with a pressure range of 0-70,000 kPa (0-10,000 psi). Tonnage scales are also provided for 30, 50, 70, 100 and 150 ton cylinders (27T, 45T, 63.5T, 91T and 136T).

1U-5809 Grommet

Warranty: M

Features/Benefits

- Provides protection to gauges during field operations.
- Fits stem or back mounted gauges with 63 mm (2 1/2 in) face diameters and thicknesses of 28 mm (1 1/8 in).



1U-5809 Grommet

5P-8558 Calibrating Group Pressure Gauge

Warranty: M

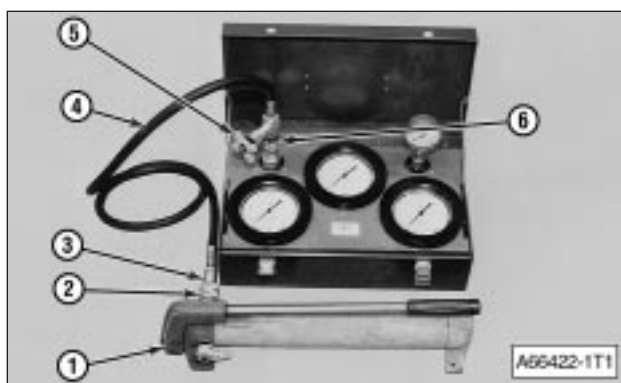
Features/Benefits

- 3 gauges of 1/2% accuracy with pressure ranges of 1100 kPa (160 psi), 4150 kPa (600 psi) and 34 500 kPa (5000 psi).
- Two lower pressure gauges protected from excessive pressure by two sensor valves which shut off the pressure signal to the gauges at a preset value.
- A separate source of pressure such as the 1U-5230 Hand Pump is required to actuate the calibrating group.



1. 5P-0946 Box
2. 1P-2375 Coupler Assembly
3. 8S-4600 Nipple (two)¹
4. 8S-4599 Coupling Assembly

¹Other nipples available for gauge attachment are: 2S-5244, 1/4 inch NPT External Thread



Components Used for Testing with the 5P-8558 Calibrating Group

1. 1U-5230 Pump Group
2. 1P-2375 Coupler Assembly
3. 1P-2376 Coupler (two)
4. 8F-0024 Hose Assembly
5. 1S-8937 Valve
6. 5P-8998 Nipple

8T-5135 Gauge Mounting Group

Warranty: M

Features/Benefits

- This group is for mounting the new fluid-filled 63.5 mm (2.50 in) diameter gauges, both kPa and psi back-mounted, in the canceled 6V-4160 Transmission Test Case. Some U-shaped mounting panels may need to be modified by brazing a piece of sheet metal to the U-shaped mounting panel to make it 4.8 mm (.188 in) deeper.
- Use for transmission test cases without a U-shaped mounting panel.



8T-5135 Gauge Mounting Group

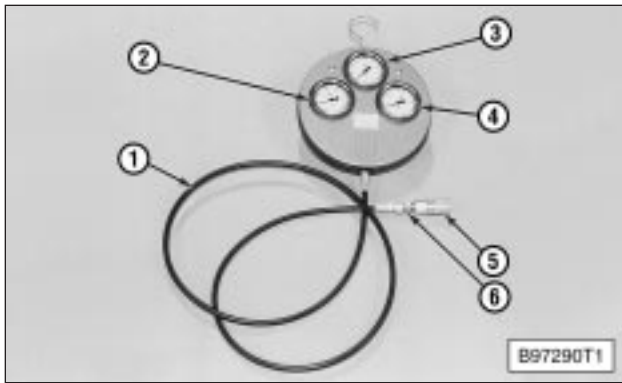
T&SPG 2000

6V-7830 Tetragauge

Warranty: G

Features/Benefits

- Functions as a general purpose pressure measuring device.
- Capable of measuring hydraulic or air pressure from -100 kPa (-14.5 psi) to 40 000 kPa (+5800 psi).
- The two lower pressure gauges are protected from over-pressurization by two sensor valves which shift and prevent pressure from increasing past a pre-set value which is less than the full-scale range of the gauges. The highest pressure gauge is not protected by a shutoff valve.
- Background of the kPa scale is highlighted in yellow to indicate metric units.



1. 6V-3081 Hose Assembly
2. 8T-0862 Gauge, -100 kPa (-14.5 psi) to +500 kPa (+72.5 psi)
3. 8T-0860 Gauge, 40 000 kPa (0 kPa to 5800 psi)
4. 8T-0855 Gauge, 4000 kPa (0 kPa to 580 psi)
5. 6V-4144 Coupler Assembly
6. 4S-6399 Connector

6V-7830 Repair Kit

8T-5324 Repair Kit

Diagnostic Hose

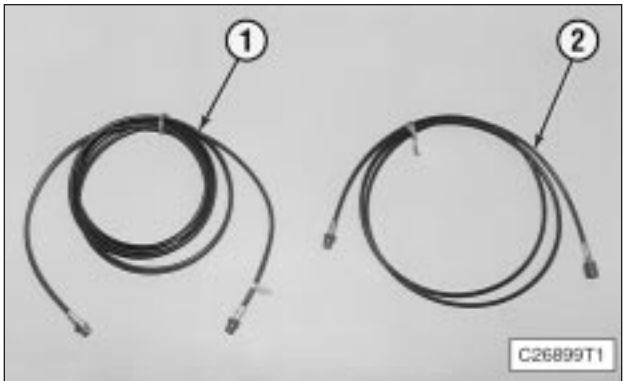
1U-5754, 1U-5755, 1U-5756, 1U-5757

Hose Assemblies

Warranty: G

Features/Benefits

- Can be used when pressure testing hydraulic systems with pressures up to 41,500 kPa (6,000 psi).
- The new hose assemblies have the same end connections and hose lengths as the existing hoses, but have a smaller inside diameter, 2 mm (.080 in) verses 3.18 mm (.125 in).
- The smaller inside (and outside) diameter makes the hose lighter, more flexible, able to be bundled in a tighter coil, stored in a smaller area, and easier to handle.
- The end connections allow the hose to be used with various existing adapters, fittings, and quick disconnects.



1. 1U-5754ST, 1U-5755, 1U-5756 Hose Assemblies
2. 1U-5757 Hose Assembly

Part No.	Desc.	I.D.	Length	End Connections
177-7860	Hose Assembly	2 mm .080 in	3050 mm 10 ft	1/8 NPT Both Ends
177-7861	Hose Assembly	2 mm .080 in	4270 mm 14 ft	1/8 NPT Both Ends
177-7862	Hose Assembly	2 mm .080 in	5486 mm 18 ft	1/8 NPT Both Ends
1U-5757	Hose Assembly	2 mm .080 in	1830 mm 6 ft	1/8 NPT By 7/16—20 X 37° JIC

4C-5623 Smoke Candle

SMCS Code: 7301-034, 7325-034
Model: All Models

Features/Benefits

- Easy, inexpensive way to find air leaks in vehicle cabs by pressurizing cab and watching for leaks identified by escaping white smoke
- Does not leave residue
- Contains no explosive materials
- Blends readily with air; stays in suspension for 10-15 minutes
- Smoke is generated as a mist that contains a large amount of atmospheric moisture as opposed to solids being generated as a by-product of burning. These smoke candles have a rating of 2100 total obscuring power (T.O.P.), compared to 200 T.O.P. for crude oil. T.O.P. is the scientific method of determining the quantity of smoke generated by a given unit of smoke composition.

Specifications/Technical Information

Smoke duration 30 seconds
Smoke Color white to gray
depending upon density and lighting
Volume generated 4000 cubic feet
Quantity 12 candles per box



4C-5623 Smoke Candle

Ordering Information

U.S. and Canadian dealers — This product is a direct shipped item from our supplier to anywhere in the U.S. and Canada. Order this part number on the DTS (Dealer Terminal System) as a class 3A order. (There is no emergency charge for this product.)

Do not order this product on a stock order. The system will not accept it. This direct shipped product is not stocked in Caterpillar Parts Departments. The stock check procedure always shows “no stock” and therefore will reject the order.

All dealers outside the U.S. and Canada — Order as a class 3A order with your subsidiary parts department. (There is no emergency charge for this product.) After placement of your order you should notify your subsidiary parts department that this is a direct shipped item from the U.S. (Do not order this product on a stock order. The system will not accept it.) Your order will be direct shipped from the supplier through a freight forwarder in the U.S. to your subsidiary parts department.

Reference

Material Safety Data Sheets (MSDS) for all chemical products are required by law. All of Caterpillar Material Safety Data Sheets are on file at the Rocky Mountain Poison Center in Denver, Colorado. In addition, Caterpillar now has a dedicated “Safety Hotline” to the Center. This toll free number (1-800-458-5924) is staffed by trauma specialists 24 hours per day all year round and is available to U.S. and Canadian dealers.

9X-3075 Cable Assembly

SMCS Code: 0781
Model: Off-Highway Trucks
Warranty: Y

Features/Benefits

- Used to download information from TPMS (Truck Payload Measurement System) to a user's laptop computer
- Setup functions, diagnostics, and productivity reports are available using TPMS, this cable, and TPM software package (available separately)

Specifications/Technical Information

Truck cab connector 5 pin MS
Computer connector 9 pin serial port



9X-3075 Cable Assembly

T&SPG 2000

127-9797 Cable, TPMS, VIMS, WLP to PC

SMCS Code: 7494-038, 0779

Model: All Off-Highway Trucks

Warranty: Y

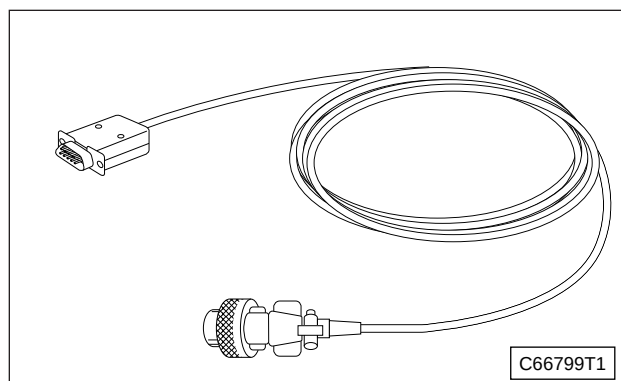
Features/Benefits

- Replaces canceled 9X-3393 Cable Group
- Used to download data from off-highway trucks
- Used with Truck Payload Measurement System (TPMS) software package and IBM compatible personal computer
- Cable connects to 5-pin circular connector on TPMS and 9-pin "D" connector on computer
- New cable allows data to be downloaded from ground level (eliminates need to turn keyswitch inside cab)

Specifications/Technical Information

Connector (replacement) 8C-6313

Socket (replacement) 8C-4797



127-9797 Cable

9U-6386 Cable, Extension

SMCS Code: 5050-082, 5050-036

Model: 320, 330, and 325 Hydraulic Excavators

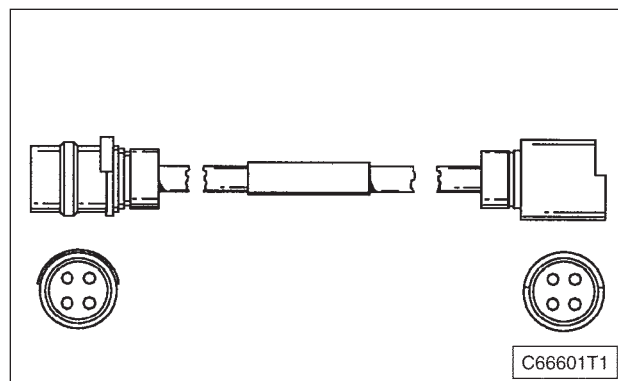
Warranty: Y

Features/Benefits

- Used to extend reach of 7Y-5500 Control Group into cab — allows technician to adjust hydraulic system from inside cab
- Efficient and cost effective way to diagnose hydraulic system problems

Specifications/Technical Information

Length 6 meter (20 feet)



9U-6386 Extension Cable

Service parts:

7N-8204 Plug, Housing

7N-8205 Housing, Receptacle

7N-7779 Socket, Connector

7N-7780 Pin, Connector

8T-9170 Training Aid, Electrical Components

Canceled

8T-9171 Training Aid, EMS System

Canceled

SMCS Code: 0115

Model: All Models

Warranty: G

Features/Benefits

- Training aids for identifying problem component within electrical system
- 8T-9170 provides basics: how to wire circuits, make multimeter measurements, test diodes, test transistor switches, test SCR switches and test magnetic switches
- 8T-9171 simulates Electronic Monitoring System of 824C Wheel Tractor; has 20 problems for troubleshooting practice; each problem installed with push of button
- No longer available as form numbers (SEKV1700 - 8T-9170, SEKV1500 - 8T-9171)
- Used with Training Manual SEBV0525

114-0904 Electronic Engine Training Aid without PC

114-0905 Electronic Engine Training Aid

118-3381 Electronic Transmission Training Aid

129-3906 VIMS Training Aid

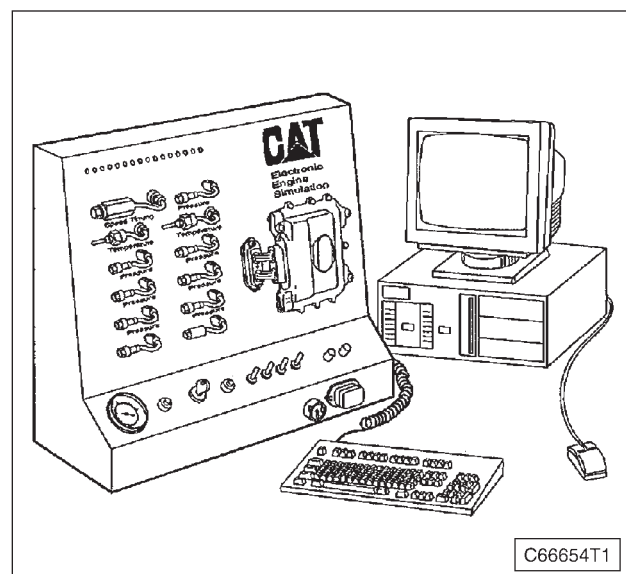
SMCS Code: 0315

Model: D11 and Off-Highway Trucks with 3500 Electronic Engines, 3176 Marine Engines, 3500B Engines, EPTC II Transmission Control

Warranty: Y

Features/Benefits

- Used to train personnel in diagnosing problems with electronic control systems
- Reduces or replaces the need for a machine to be present during the training course
- Facilitates electronic unit injector (EUI) training in classroom environment
- Allows ECAP screen projection without an engine or machine
- Provides realistic pre-programmed diagnostic training with faults
- 114-0905 includes Engine Component Panel, Simulation Computer and reusable shipping crate
- 114-0904 includes Engine Component Panel, I/O boards for use in existing simulation computer and reusable shipping crate
- 117-5280 allows simulation of 777C Tractor
- 124-2451 allows simulation of D11N Track-Type Tractor
- 125-4326 allows simulation of large off-highway trucks
- 126-7437 allows simulation of marine engine applications
- 128-1171 allows simulation of 3500B Engines



Electronic Control System Simulator

Service Parts

109-9842 Electronic Control Sys. Simulator
 109-9843 Parallel Expansion Board
 109-9844 Analog to Digital Module
 109-9845 Digital to Analog Module
 109-9846 Timer/Counter Module
 110-0313 Harness, EPTC II Panel to Simulator
 110-0314 Engine Component Panel
 110-0315 Harness, Engine Panel to Simulator
 110-4541 Harness, Engine Panel to 9X-9972 ECM
 110-4542 Engine Care Simulation Software
 110-4543 TTT Application Software
 111-7842 Shipping Crate
 112-6225 Parallel Expansion Board
 125-4326 Harness, Engine Panel to 9X-9971 ECM

4C-3030 Vibration Analyzer Group (Not Available)

SMCS Code: 0781, 0783

Model: All Models

Warranty: Y

The 4C-3030 Vibration Analyzer Group is the prime tool for the vibration measurement system for Caterpillar products. It is used to record all vibration magnitudes and frequencies. The 4C-6920 Field Balance Group adds the required capabilities to balance engines and driven equipment. A 4C-3041 Modem enables the Analyzer to communicate with host computers containing the appropriate software.

Features/Benefits

- Provides quick, complete identification of all vibration frequencies present in a constant speed measurement. With this capability, dealer personnel can troubleshoot a customer vibration complaint or document the vibration character of equipment for various purposes.
- 400-point resolution defining vibration spectra
- Captures all vibration magnitude and frequency information present at one instant in time at any measurement location
- Memory capable of storing over 400 full spectra vibration measurements
- Lightweight with rechargeable battery makes it portable
- Heavy fabric carrying case with waist belt and shoulder straps free users hands during vibration measurement
- Programmable; comes with software (9U-5834 Loader, Linear Routes) which defines series of measurements called a route for various locations on Caterpillar equipment
- Route automatically programs all settings required to take vibration measurements and sets alarm limits to aid in diagnosing problems
- Route software can be loaded into vibration analyzer memory via any IBM compatible personal computer; data can be stored on disk for analysis with 9U-5960 Group
- Each measurement only takes a few seconds and magnitude versus frequency plot is stored in memory and is available for viewing on analyzer LCD screen

T&SPG 2000

- Compact magnetic base sensor allows moving quickly to next measurement location
- Sensor is a velometer permitting vibration displacement or velocity measurements without changing sensors
- User can determine magnitude and frequency of any peak on screen by using a cursor function; with cursor in place on a peak, analyzer will place markers at all higher harmonics of frequency as well; particularly useful in identifying engine related harmonics and other vibration sources
- Easy to use; field mechanics need limited training
- With data in analyzer memory, spectra can be printed using parallel port personal computer printer (computer is not required for this printing)
- Analyzer has port to monitor speed during vibration measurement or receive a trigger to start data-taking; speed/trigger port enables analyzer to be used in balancing operation (4C-6920 Field Balance Group also required)
- Space for attachments in case
- Heavy fabric carrying case with waist belt and shoulder straps to free user's hands during data-taking
- 4C-3032 Accelerometer available for acceleration measurements to 15,000 Hz
- Since all frequencies measured at one time, better quality information provided
- Complete spectral plots can be printed from memory, making interpretation easier
- With analyze functions, problem solving quicker with considerably less manpower invested
- Analyzer performs "speed sweeps" (vibration vs. speed); use photohead input contained in 4C-6920 Group and 4C-9021 Group; aids in identifying system resonances

Specifications/Technical Information

Memory	320 K memory (400 or more full spectra)
Frequency range (Analyzer)	DC to 20,000 Hz
Screen	Back-lit, wide-angle LCD 70 mm x 38 mm (2.75 in x 1.5 in) contrast adjustable to 15 levels
Port	RS232 Port with communication rate of 9600 Baud to and from the PC computer for loading software
Weight	2.043 kg (4.5 lbs.)
Size	254mm H x 152mm W x 38mm D (10 in H x 6 in W x 1.5 in D)
Measurement time	15 seconds for one measurement (typical)
Frequency resolution	400 lines
Signal input	+0.01 to 10.0 Volts AC, ± 10 Volts DC
Power Supply	up to 8-hour operation on 3-hour charged Nickel-Cadmium battery 24-Volt Nickel-Cadmium battery pack capacity .6 Amp hours
Velometer sensitivity	0.10 Volts/(in/sec)
Velometer frequency range	2.5 to 3500 Hz
Operating temperature	-18° to 49°C (0° to 120°F)
RPM port/trigger signals	0 to +5 Volts range with +0.6 Volt minimum change, frequency range 30 rpm to 30,000 rpm (transistor, transistor, logic pulse)



4C-3030 Vibration Analyzer Group (not available)

1. 4C-3026 Sheath, Plastic
2. 4C-3027 Connector, Barrel
3. 4C-3031 Vibration Analyzer (not available)
4. 4C-3035 Case, Cloth Carry
5. 4C-3036 Cable, Extension
6. 4C-3037 Cable, Communication
7. 4C-3038 Cable, Adapter (not shown)
8. 4C-3039 Adapter, Acc./Vel.
9. 4C-3042 Base, Magnetic
10. 4C-3040 Printer Adapter
11. 4C-4085 Slide Rule
12. 4C-5629 Velometer
13. 4C-9658 Case (not shown)
14. 9T-5505 Plate
15. 9U-5087 Cable, Velometer
16. 9U-5090 Block, Foam (not shown)
17. 9U-5605 Charger, Battery
18. 9U-5834 Software Disk, Linear Routes Loader
19. 9U-5835 Software Disk, Analyzer Functions Loader
20. 9U-5933 Probe
21. NEHS0568 Operating Manual, 4C-3030 Vibration Analyzer
22. NEHS0569 Operating Manual, Route Documentation
23. NEHS0570 Operating Manual, Balancing, Application Guide

Not shown:
Battery

Reference

NEEG2536, 4C-3030 Quick Reference Guide

4C-3041 Modem Group
4C-9806 Cable Assembly, Modem

SMCS Code: 0781, 0783
 Model: All Models
 Warranty: Y

Features/Benefits

- Allows 4C-3031 Vibration Analyzer to communicate with host PC through ordinary telephone systems
- Can download programs or additional routes while away from host computer (host computer must be equipped with Hayes-compatible modem, connected to appropriate serial communication port, usually COM1)
- No need for additional software — modem commands or functions for use with the 4C-3031 Vibration Analyzer are contained in the same Caterpillar software used to load routes/downloadable programs from host PC to analyzer
- Communicating through modem almost as easy as communicating directly with host PC
- 4C-9806 Cable used to connect 4C-3041 Modem (or any Hayes-compatible modem with DB25F serial connector) to 4C-3031 Vibration Analyzer

Specifications/Technical Information

4C-3041 Modem Group
 300/1200/2400 baud
 Bell 103 and 212A compatible
 CCITT V.21, V.22 and V.22 bis compatible
 Hayes "AT" command set compatible
 Battery powered
 Internal speaker
 Auto-dial and auto-answer
 Tone and pulse dialing
 LED status display
 DB25F RS232 connector
 Modular phone connector
 Weight 6 oz.
 Size 4 in x 2.5 in x 1 in

4C-9806 Cable Assembly, Modem
 RS232 Cable, DB25M - DB25M
 Length 12.4 in
 Weight 3 oz.



- 4C-3041 Modem Group
1. 4C-9806 Cable Assembly, Modem
 2. Modem
 3. T-adaptor, Modular — Telephone
 4. Cable, Modular — Phone
 5. Modem Manual
 6. NEHS0557 Operating Manual

Reference

NEHS0557 Operating Manual, 4C-3041 Modem Group

T&SPG 2000

4C-6920 Field Balance Group

Canceled

SMCS Code: 0781, 0783

Model: All Models with rotating parts

Warranty: Y

Features/Benefits

- Used with 4C-3030 Vibration Analyzer Group to balance all models with rotating parts
- Can balance engine in less than 2 hours
- Improved reliability; eliminates need for battery pack and charger
- Determines weight to be added and angular location in each plane; splits weight to next closest bolts available
- Provides speed sensing capability for 4C-3031 Vibration Analyzer for "speed sweeps" to determine resonances

Specifications/Technical Information

Photo head pulsed red beam,
operates 30 to over 5000 rpm

Power supply Vibration Analyzer

Software 5.25 in 360K DD and 3.5 in DD diskettes



4C-6920 Field Balance Group

1. 4C-3021 Balance Software Disks (2) (not serviced)
2. 4C-6918 Photo Head
NEEG2455 Decal
3. 4C-6921 Cable Assembly, Adapter
4. 6V-2198 Cable Assembly
5. 4C-6916 Base Group, Magnetic
8D-6894 Washer
6V-3137 Base, Magnetic
4C-6917 Adapter Assembly, Photo Head
2S-6251 Screw, Machine
6. 4C-6919 Tape, Reflective
7. NEHS0539 Operating Manual
8. 6V-3072 Case, Plastic (not shown)
NEEG2381 Decal (not shown)
9. 4C-6915 Foam Insert (not shown)

Reference

NEHS0539 Operating Manual, 4C-6920 Field Balance Group

NEHS0570 Operating Manual, 4C-3030 Vibration Analyzer Group, Application Guide

4C-6729 Battery Pack

SMCS Code: 0781, 0783

Model: All Models

Warranty: Y (not repairable)

Features/Benefits

- Replacement battery for 4C-3031 Vibration Analyzer

Specifications/Technical Information

Dimensions 146 mm x 51 mm x 32 mm
(5.75 in x 2 in x 1.25 in)

Weight 1 lb.

Voltage $\pm 12/24$ Volt, 600 mAh

Reference

NEHG3405 Tool Announcement

NEHS0568 Operating Manual

4C-9021 Torsional Vibration Measure. Group

SMCS Code: 0781, 0783

Model: 3600 Family Engines

Warranty: Y

Features/Benefits

- Used with 4C-3030 Vibration Analyzer Group to measure torsional vibration at front and rear of crankshaft of 3600 Family Engines
- Permits torsional vibration audits of new installation, evaluation of engine damper condition and diagnosis of torsional vibration problems
- Case has space for 4C-3030 Vibration Analyzer Group and 4C-6920 Field Balance Group
- 4C-9021 Group includes photo head pickup for monitoring RPM
- With proper gear and magnetic pickup, can measure torsional vibration of other engines and driven equipment

Specifications/Technical Information

4C-9022 Conditioner, Torsional Vibration Signal

Weight 15.5 oz.

Dimensions 1.6 x 4.4 x 8.0 in.

Input ± 30 MV to ± 100 V magnetic pickup

Torsional amplitude range 0.1-10°

Power requirement 12 VDC
(4C-9024 battery gp. included)

Temperature 32-140°F

T&SPG 2000

The following sub-article is part of the main article.

9U-5606 Battery Charger

Features/Benefits

- Same as 9U-5605 except it is for 220-240 VAC
- Has U.S. 110-120 VAC household-type plug



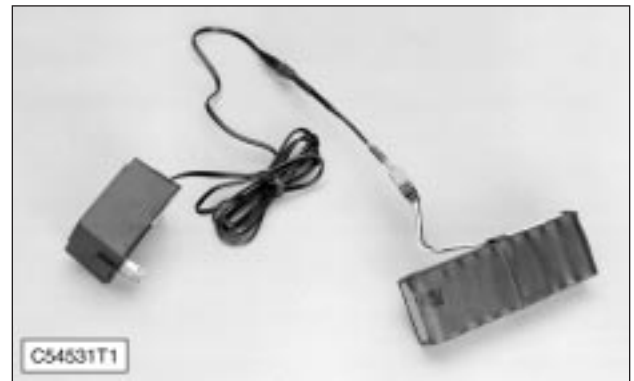
9U-5606 Battery Charger

The following sub-article is part of the main article.

9U-5616 Cable, Adapter

Features/Benefits

- Permits charging spare 4C-6729 Battery Pack outside of 4C-3031 Analyzer



9U-5616 Cable, Adapter

The following sub-article is part of the main article.

4C-9023 Adapter, Volts

Features/Benefits

- Used with 4C-3031 Vibration Analyzer to perform frequency analysis of any voltage signal (± 10 Volts)
- Used to calibrate 4C-3031 Analyzer (signal generator required for calibration)

The following sub-article is part of the main article.

9U-5836 Adapter Cable

Features/Benefits

- Permits connecting 4C-3031 Analyzer to battery charger while using speed pickup in 4C-6920 Balance Group



9U-5836 Adapter Cable

The following sub-article is part of the main article.

9U-5960 Trending Group

Features/Benefits

- Provides for extensive analysis and plotting of data that has been "dumped" from 4C-3031 Analyzer to disk
- Contains software and manual

TechStation **See Second Supplement** TechStation Accessories

SMCS Code: 7569-030, 035, 036, 038, 081, 082

Model: All Models

Warranty: Y except PC which has manufacturer's warranty M
(three-year on-site for IBM 7585 PC)

Features/Benefits

- Used to make service technicians more productive by delivering PC-based diagnostic tools and other PC information to the shop floor
- The TechStation fulfills the need for a durable PC in the shop, as more and more service tools become PC based.
- The TechStation provides a durable, cooled enclosure which is necessary for proper PC operation when used in a shop environment.

Software intended for TechStation use:

- Caterpillar's Service Information System (SIS) — all parts and service publications on CD-ROM
- Caterpillar Electronic Technician (ET)
- CDIS Parts Integrator and ANTARES System
- Dealer mainframe terminal mode, through emulation card
- Caterpillar Data Link and ATA Data Link through Caterpillar's 7X-1701 Communications Adapter
- Caterpillar's future Data View Software

TechStation Features

- Unit is packaged in an attractive, long-lasting, water-resistant enclosure with chip-proof color to create a positive shop image
- Fan, filter, and louver provided for internal cooling
- Ergonomically designed for a standing mechanic — writing area for routine job and shop paper work
- Large caster wheels for easy shop mobility — all components are securely fastened and chosen for shock resistance
- One-year warranty on all components, except IBM Industrial PC which has a 3-year on-site warranty.

Computer and Monitor Features

- Internal IBM Industrial 7585 PC provided with Windows or OS/2 Warp Software with three-year on-site warranty
- 17 inch SVGA monitor
- Optional printer, so information can be quickly generated in paper form, when desired
- Uninterruptable power supply provides power protection against surges, brown-outs, and total power loss for up to 10 minutes

Optional Cables

- 128-3247 Token Ring Network Cable Assembly provides a female DB9 connector for external network connection.
- 128-3251 Ethernet AUI Network Cable Assembly provides a female DB15 connector for external network connection.
- 128-3255 Token Ring and Ten Base T Network Cable Assembly provides a female RJ-45 connector for external network connection.
- 129-3259 5250 Emulation Cable Assembly provides a male DB15 connector for external connection to an AS/400

Optional Cup Holder/Ash Tray

- To be available for order in first quarter 1996, contact CSTG for information

NOTE: Caterpillar software such as ET, SIS, ANTARES IWS, and Parts Integrator must be purchased separately by the end user through the Caterpillar Literature System.

Specifications/Technical Information

128-3235 Basic TechStation

Package Includes: molded polyethylene enclosure; steel frame with a built in 19 inch computer mounting rack; 17 inch SVGA monitor; IBM Trackpoint II keyboard; built in drive bay with hinged door; large hinged front access door with a built in printer access panel; large hinged rear access door with a built in cooling fan, filter and louver; built in rear connector panel with internal interfaces provided; 10 inch rear wheels; 6 inch front swivel casters; storage drawer (located in the bottom of the card); sliding shelf (located above the storage drawer); and a 15 ft. retractable power cord

128-3236 CAT ET TechStation (115 VAC) or 128-3237 CAT ET TechStation (220 VAC)

Complete TechStation ready for running Cat Electronic Technician (ET) program (ET software not included)

Package Includes: 128-3235 Basic TechStation, Cirque GlidePoint pointing device, IBM industrial computer, ten minute uninterruptable power supply, 7X-1701 Communications Adapter with software installed

Computer Hardware Includes:

Input power	100 VAC, 50 hz or 240 VAC, 60 hz
Computer	rack mountable IBM 7585 industrial computer 486DX2 66 Mhz
RAM	8 MB
Expansion	provisions for expanding RAM to 128 MB
Video ram	1 MB
Hard disk drive	527 MB IDE
Floppy disk drive	2.88 MB 3.5 inch
Additional drives	provisions for a NEC 6X Caddy CD ROM drive
Cache	128 KB level-two write back
Serial ports	two high-speed 16550 UART
Parallel port	for printer
Data/fax modem	provisions for an ISA 14.4
Cards	provision for network and sound
Adapter	provisions for a PCMCIA
Controller	provisions for a SCSI-2 DASD controller
Slots	multiple ISA/VESA

T&SPG 2000

Computer Software Includes:

MS DOS version 6.22 or greater
Microsoft Windows for Work Groups version 3.11

128-3238 CAT ET TechStation (115 VAC) with
Printer

Package Includes: 128-3236 CAT ET TechStation and a Hewlett Packard 600 Deskjet Printer

128-3240 Deluxe CAT ET TechStation (115 VAC) or
128-3241 Deluxe CAT ET TechStation (220 VAC)

Package Includes: CAT ET TechStation, ISA 14.4 Data/Fax modem (14.4 Kbps), PCMCIA Adapter (two slots), additional 8 MB RAM

128-3242 Deluxe CAT ET TechStation with Printer
(115 VAC)

Package Includes: 128-3240 Deluxe CAT ET TechStation
and a Hewlett Packard 600 Deskjet Printer

128-3244 Deluxe CAT ET TechStation Multimedia
(115 VAC) or 128-3245 Deluxe CAT ET TechStation
Multimedia (220 VAC)

Package Includes: Deluxe CAT ET TechStation with a multimedia kit, consisting of SCSI-2 DASD Controller, an external NEC 6X Caddy CD ROM drive, a storage drawer insert for CD ROM storage, dual speakers, an additional 1 MB video RAM, and a 16 Bit sound blaster sound card with software volume control

128-3246 Deluxe CAT ET TechStation Multimedia
(115 VAC) with Printer

Package Includes: 128-3244 Deluxe CAT ET/Multimedia TechStation and a Hewlett Packard 600 Deskjet Printer

128-3248 SIS TechStation (115 VAC) or 128-3249
SIS TechStation (220 VAC)

Complete TechStation ready for running the Service Information System (SIS) program and the CAT Electronic Technician (ET) program (SIS and ET software not included).

Package Includes: 128-3235 Basic TechStation, Cirque
GlidePoint pointing device, IBM industrial computer, ten
minute uninterruptable power supply, 7X-1701
Communications Adapter with software installed

Computer Hardware Includes:

Input power 100 VAC, 50 hz or 240 VAC, 60 hz
Computer rack mountable IBM 7585
Industrial Computer 486DX2 66 Mhz

RAM	16 MB
Expansion	provisions for expanding RAM to 128 MB
Video ram	1 MB
Hard disk drive	527 MB IDE
Floppy disk drive	2.88 MB 3.5 inch
Additional drives	external NEC 6X Caddy CD ROM drive
Cache	128 KB level-two write back
Serial ports	two high-speed 16550 UART
Parallel port	for printer
Controller	SCSI-2 DASD controller
Data/fax modem	provisions for an ISA 14.4
Cards	provision for network and sound
Adapter	provisions for a PCMCIA
Slots	multiple ISA/VESA

Computer Software Includes:

OS/2 V3.0 Warp with OS/2 Win

128-3850 SIS TechStation with Printer (115 VAC)

Package Includes: 128-3248 SIS TechStation and a Hewlett Packard 600 Deskjet Printer

128-3252 Deluxe SIS TechStation (115 VAC) or
128-3253 Deluxe SIS TechStation (220 VAC)

Package Includes: 128-3248 SIS TechStation, ISA 14.4 Data/Fax modem (14.4 Kbps), PCMCIA Adapter (two slots), and an additional 8 MB RAM

128-3254 Deluxe SIS TechStation (115 VAC) with
Printer

Package Includes: 128-3252 Deluxe SIS TechStation and a Hewlett Packard 600 Deskjet Printer

128-3256 Deluxe SIS TechStation Multimedia
(115 VAC) or 128-3257 Deluxe SIS TechStation
Multimedia (220 VAC)

Package Includes: Deluxe SIS TechStation, dual speakers, an additional 1 MB video RAM, and a 16 Bit sound blaster sound card with software volume control

128-3258 Deluxe SIS TechStation Multimedia
(115 VAC) with Printer

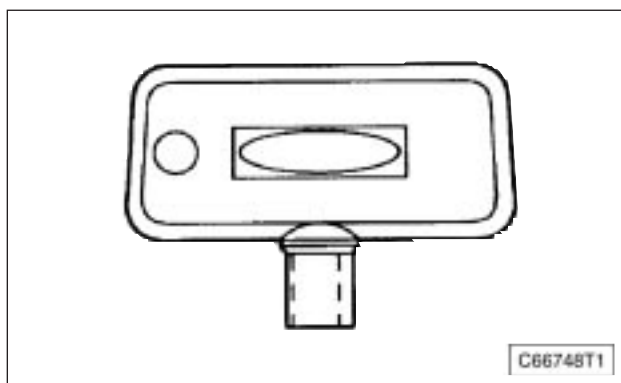
Package Includes: 128-3256 Deluxe SIS TechStation
Multimedia and a Hewlett Packard 600 Deskjet Printer



Typical PC Workstation

Parts Reference List**Packages**

128-3235 Basic TechStation
 128-3236 CAT ET TechStation (115 VAC)
 128-3237 CAT ET TechStation (220 VAC)
 128-3238 CAT ET TechStation with printer (115 VAC)
 128-3240 Deluxe CAT ET TechStation (115 VAC)
 128-3241 Deluxe CAT ET TechStation (220 VAC)
 128-3242 Deluxe CAT ET TechStation with printer (115 VAC)
 128-3244 Deluxe CAT ET TechStation Multimedia (115 VAC)
 128-3245 Deluxe CAT ET TechStation Multimedia (220 VAC)
 128-3246 Deluxe CAT ET TechStation Multimedia with printer (115 VAC)
 128-3248 SIS TechStation (115 VAC)
 128-3249 SIS TechStation (220 VAC)
 128-3250 SIS TechStation with printer (115 VAC)
 128-3252 Deluxe SIS TechStation (115 VAC)
 128-3253 Deluxe SIS TechStation (220 VAC)
 128-3254 Deluxe SIS TechStation with printer (115 VAC)
 128-3256 Deluxe SIS TechStation Multimedia (115 VAC)
 128-3257 Deluxe SIS TechStation Multimedia (220 VAC)
 128-3258 Deluxe SIS TechStation Multimedia with printer (115 VAC)

Serviceable Parts

128-3243 Key (TechStation Accessory)

Reference

NEHS0645 Tool Operating Manual

13 **CANCELED** up,

9U-6662 Single Point Sampler

SMCS Code: 5050-082

Model: All Models

Warranty: Y

Features/Benefits

- 6 channels for counting particle sizes of microns: 2, 5, 15, 25, 50 and 100 (or larger)
- Used to sample oil for cleanliness; complements Caterpillar's S-O-S program
- Allows real-time testing of repaired unit before it is shipped or returned to the production environment
- Test results displayed in ISO or NAS format
- 32-character, 2-line dot matrix LCD and full alpha-numeric entry facility from keypad
- Used with 9U-6794 Adapter, 9U-6795 Hose Assembly, and 6V-4144 Adapter, Quick Disconnect
- Can easily be taken to machine for on-site testing; reduces delay between actual sampling and test results
- Greatest benefit to dealers when used regularly as a trending tool (instrument is reliable and easy to use)
- Operated from internal batteries or external 12 VDC power source
- Test results can be obtained every four minutes and are printed on built-in printer or can be stored in memory for later examination (RS232 port allows downloading of information to a computer)
- Digital readout displays test results in ISO and NAS numbers
- Meets CE requirements

9U-6662 Single Point Sampler

- Oil can be sampled at any point on the hydraulic system [pressure at sampling ports cannot exceed 42 000 kPa (6000 psi)]

T&SPG 2000

Specifications/Technical Information

138-9656 Particle Counter Contamination Group

Fluid compatibility	Mineral oil or petroleum based fluids
Power	Internal 12 VDC batteries or external 12 VDC source
Particle size	2+, 5+, 15+, 25+, 50+, 100+ (or larger) micron
Analysis range	ISO 7 to 24 inclusive (NAS 0 to 12 inclusive)
Calibration	ISO 4402 procedure
Accuracy/repeatability	±5%
Viscosity range	2 - 100 centistokes
Operating temperature	5 to 80°C (41 to 176°F)
Test completion time	4 minutes
Battery life	150 tests (typical)
Computer interface	RS232
Weight	10 kg (22 lbs.)

9U-6662 Single Point Sampler

Fluid compatibility	Mineral oil or petroleum based fluids
Maximum working pressure	42 000 kPa (6000 psi)
Viscosity range	2 - 500 centistokes
Operating temperature	5 to 80°C (41 to 176°F)
Inlet/outlet ports	M16 Minimesse self-sealing



138-9656 Particle Counter Contamination Group

Service Parts:

- 9U-6669 Lamp
- 9U-6689 Paper, Printer
- 9U-6690 Ribbon, Printer
- 9U-6794 Adapter, Minimesse to 1/4 inch NPTF
- 9U-6795 Hose Assembly, 9 m (3 ft) Minimesse
- 6V-7932 Screwdriver
- 9U-7228 Fuse, 1 Amp (5 x 20 mm)
- 1U-9532 Battery, 1.5 Volt "D" Alkaline (6 required)

Reference

NEHS0580 Tool Operating Manual
NEHP5584 Sales Brochure

170-8505 Quick Disconnect S·O·S

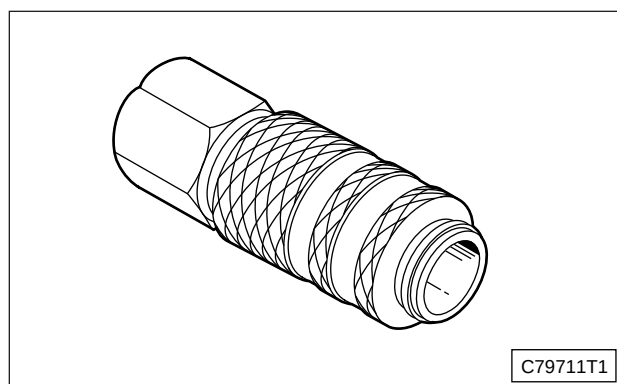
SMCS Code: 5050-036

Model: All

Warranty: Y

Features/Benefits

- Used to quickly take fluid samples for testing
- Used with 8C-3446 S·O·S Sampling Valve
- Small coupling has excellent seating capability
- Works with pressures up to 3500 kPa (500 psi)
- Can be used with 138-9656 Contamination Group



170-8505 Quick Disconnect S·O·S

See Second Supplement

188-0645 Portable S2 Particle Analyzer

SMCS Code: 5050-082

Model: All models with hydraulic systems

Warranty: Y

Features/Benefits

- Used to analyze particle contamination on pressurized and non-pressurized hydraulic systems
- Analyzer is manufactured for Caterpillar® by PAMAS
- Portable self-contained system uses red laser sensor technology to count and size particles in fluids (same sensor technology as particle analyzers used in S-O-S lab and other Caterpillar® factory applications)
- Performs fluid analysis in 90 seconds
- Internal nickel cadmium battery pack capable of performing 60 tests per charge
- Self-contained digital display and printer shows test results
- Meets CE requirements

NOTE: This analyzer compliments S-O-S lab to detect contamination problems, but may not determine the source of the problem. If a problem is detected, fluid can be sent to the S-O-S lab for further analysis to determine if the debris is the result of leaking cylinder wipers, pump debris, or airborne particles leaking through the reservoir breather. Particle analyzers, such as the S2, play just one role in the overall contamination assessment process.

Specifications/Technical Information

Measurement capability pressurized and non-pressurized systems

Flow regulation automatic 25 ml flow

Viscosity capability up to 300 centistokes

Packaging self-contained

On-board data storage 555 tests

Software (for PC viewing of test results) included



188-0645 Caterpillar S2 Particle Analyzer

Service Parts:

170-8505 Connector, S-O-S

184-7679 Paper, Printer

188-0638 Hose Assembly

9U-6794 Adapter, Minimes to 1/4 in NPTF

9U-6795 Hose Assembly, 914 mm (3 ft) Minimes

6V-4144 Connector, Pressure Tap

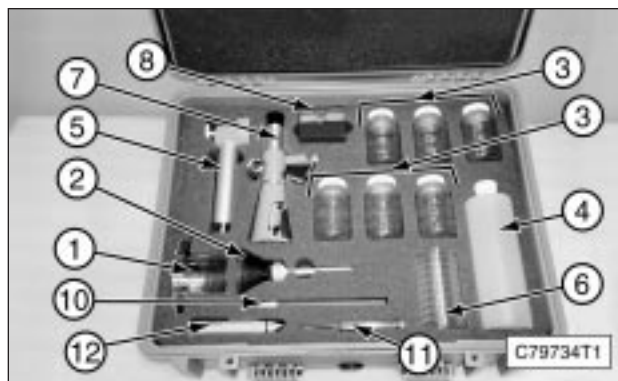
See Second Supplement

169-4371 Portable Contamination Instructional Kit

Warranty: G

Features/Benefits

- Used to estimate amount and type of solid contamination in hydraulic fluid or lubrication oil (cannot determine exact particle counts)
- Conduct on-the-spot visual field evaluations of system fluid contamination
- Can be used by trained technicians to compare actual patches (25 ml fluid volume) to examples shown in NEHS0729 to generally class amount and type of contamination in a fluid sample
- All items are serviced separately (some items must be obtained from OEM)



169-4371 Portable Contamination Instructional Kit

1. HPCA 2-Bolt, Stand (Pall)
2. 4204-PCA, Filter Base and Funnel (Pall)
3. 169-5738, Sample Bottles (qty 6) (Cat)
4. MXA 339945, Rinse Bottle (Whatman)
5. 1U-5718, Vacuum Pump (Cat)
6. 08-757-20A, Petri Dishes (qty 10) (Fisher Scientific)
7. 03894-00, Microscope (Cole-Farmer)
8. Contm Kit Sum, Sum Nylon Membranes (Pall)
9. 10-280, Forceps/Tweezers (Fisher Scientific)
10. 141-1655, Penlight (Cat)
11. 13-380-15A, Grease Pencil (Fisher Scientific)
12. 4C-9658, Carrying Case¹ (Cat)

¹Replacement cases will have pick and pluck foam inserts

Reference

NEHS0729 Portable Contamination Instructional Kit (The examples shown in this brochure are typical of the type of contamination found using the portable contamination instructional kit. The examples are shown for reference only. Instructions on obtaining, preparing and viewing samples are also provided in this brochure.)

T&SPG 2000

9U-6745 Board Group

SMCS Code: 0781

Model: All Models

Warranty: Y

Features/Benefits

- Used for upgrading previous analyzers to current standards
- Used with 4C-3030 Vibration Analyzer Group
- Over three times more memory for data storage
- Upgrades storage memory for routes and programs from 128k to 320k

Specifications/Technical Information

9U-6699 Memory Board 256 KB of DRAM
 Vibration Analyzer 320K



9U-6745 Board Group
 9U-6699 Memory Board
 6V-6045 Case
 NEHS0583 Tool Operating Manual

Reference

NEHS0568 Tool Operating Manual

8C-8456 Sealed Cap

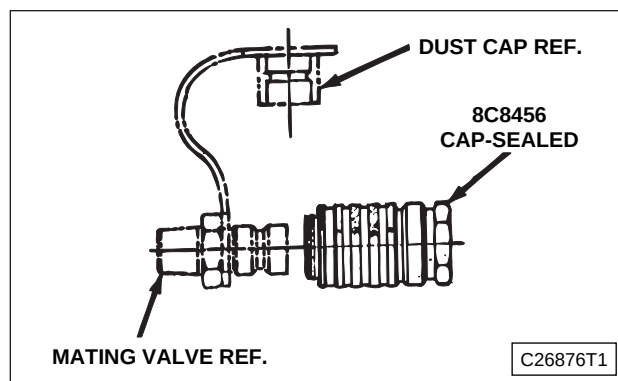
Warranty: M

Features/Benefits

- Used to seal the valved and non-valved nipples listed below. The nipples are used on machines, tool groups and dealer shop equipment.
- A heavy-duty, pressure-tight cap that provides both positive sealing and added protection for the nipples.

Adaptable to these Pressure Diagnostic Quick Disconnect Nipples:

- 6V-3965 Nipple, 9/16 inch-18 thd. SAE external (for #6 Port) Buna-N® Seal: color — zinc chromate.
- 6V-3966 Nipple, 1/4 inch-NPTF external thd. Buna-N® Seal: color — zinc chromate.
- 6V-3989 Nipple, 1/4 inch-NPTF internal thd. non-valved: color — zinc chromate.
- 6V-4142 Nipple, 1/8 inch-NPTF internal thd. non-valved: color — zinc chromate.
- 6V-4433 Nipple, 9/16 inch-18 thd. external (for #6 Port) Viton Seal: color — green chromate.
- 6V-7691 Nipple, 1/4 inch-NPTF external thd. Ethylene Propylene Seal: color — red chromate.
- 8T-3613 Nipple, 1/8 inch-NPTF external thd. Buna-N® Seal: color — zinc chromate.
- 8T-3614 Nipple, 1/8 inch-NPTF external thd. Ethylene Propylene Seal: color — red chromate.



8C-8456 Sealed Cap

Specifications/Technical Information

Operating Press 42,000 kPa (6100 psi)
 Minimum Burst Press 168,000 kPa (24,000 psi)
 Operating Temp. -34° - 107°C (-29° - 225°F)
 Seal Material High Temp. (Buna-N®)

9U-5155 O-Ring Measuring Cone

Warranty: M

Features/Benefits

Finding the correct O-ring replacement is faster and easier with the 9U-5155 O-Ring Measuring Cone.

- An O-Ring Measuring Cone designed to measure SAE industry standard O-ring dimensions (cross section and dash size). These dimensions are published by the Society of Automotive Engineers (SAE).
- 457.2 mm (18 in) tall, cone shaped, made of high-impact, yellow plastic.
- Round base with five industry standard O-ring cross section diameters (widths) cut into the edge.
- Cone has 65 steps indicating varying inside diameters.

The dash size consists of a three-digit number in which the first digit indicates the dash series. These SAE industry standard O-ring dash series are: -0, -1, -2, -3 and -4. Every O-ring in a dash series has the same cross section diameter (width).

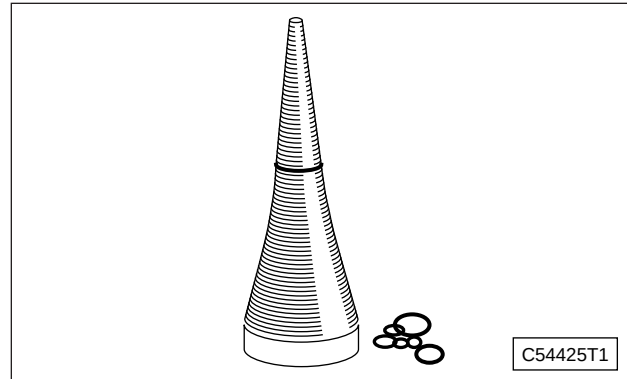
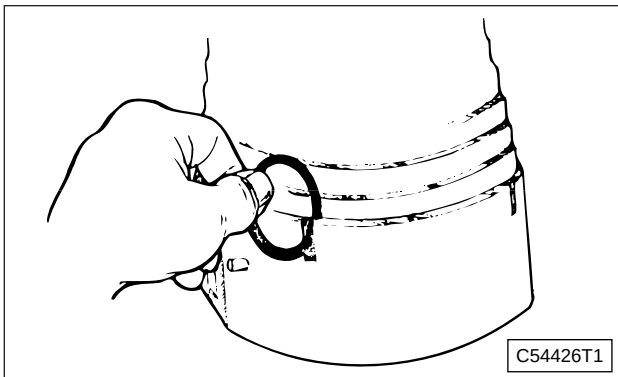
Cross Section Diameter or Width
Dash Series -0 — 1.78 mm (0.070 in)
Dash Series -1 — 2.62 mm (0.103 in)
Dash Series -2 — 3.53 mm (0.139 in)
Dash Series -3 — 5.33 mm (0.210 in)
Dash Series -4 — 6.99 mm (0.275 in)

The second two digits of the dash size give an indication of the size of the O-ring's inside diameter, but do not give the exact dimensions. As the inside diameter of the O-ring becomes larger, so do these two digits.

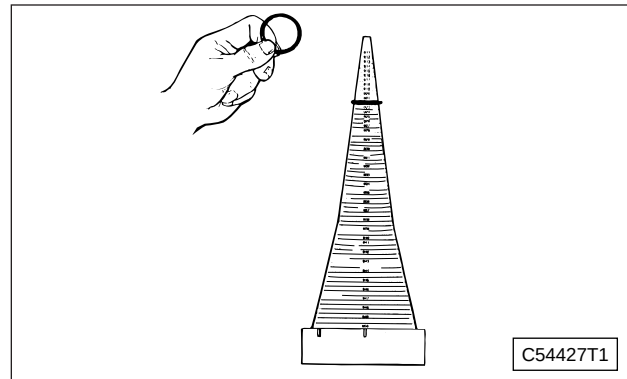
To determine the cross section diameter (width) of an O-ring:

Insert the O-ring into the slots located around the base of the cone

The O-ring will fit snugly into one of the five slots, and its dash series can be identified by looking at the first digit of the numbers imprinted on the cone directly above the slot in which the O-ring fits.

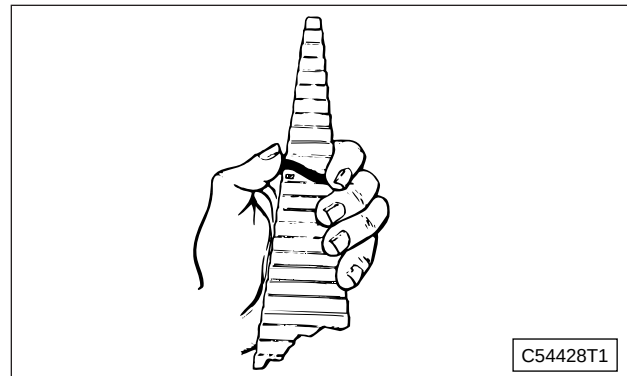


Drop the O-ring over the peak of the cone, ensuring that it sits level on one of the cone's steps. The O-ring should not overlap any part of the step's edge; a snug fit is required.



Determine the dash size by:

Reading the dash size column located above the slot identifying the O-ring's cross section dia. or width. The number imprinted on the face of the step on which the O-ring rests identifies the three-digit dash size (you may have to move the O-ring to read the number).



Determine the Cat O-ring part number by:

Referring to the Special Instruction NEHS0571 Cross-Reference List. This list will identify the proper Caterpillar O-ring part number.

T&SPG 2000

Leak Detection —**1U-5566 (110 Volts) Black Light****1U-6444 (220 Volts) Black Light**

Ordering: 3A or E (Antares)

Features/Benefits

- Hand held.
- An anodized aluminum lamp housing.
- Makes it easier and quicker to detect leaks in oil, fuel and cooling systems.
- Additives, available separately, can be put in the suspect system and the leak point will show in the black light (ultraviolet light).
- Instructions come with the kit.
- Also works with fluorescent penetrant kit. More information is available in Chemicals, Lubricants and Adhesives section.

Applications

- To detect oil leaks in engines, transmission, hydraulic systems, etc, use:
1U-5572 Additive, Oil Glo 22; 28.4 g (1 oz) bottle
1U-5573 Additive, Oil Glo 22; .47 L (1 pt) bottle
Recommended Dosage: 28.4 g (1 oz) per 7.58 L (2 gal) of oil.
- To detect fuel leaks or suspected fuel dilution, use:
1U-5574 Additive, Gas Glo 32; 28.4 g (1 oz) bottle
1U-5575 Additive, Gas Glo 22; .47 L (1 pt) bottle
Recommended Dosage: 28.4 g (1 oz) per 37.9 L (10 gal) of gasoline or diesel fuel.
- To detect cooling system leaks, use:
1U-5576 Additive, Water Glo 23; 28.4 g (1 oz) bottle
1U-5577 Additive, Water Glo 23; .47 L (1 pt) bottle
Recommended Dosage: 28.4 g (1 oz) per 151.6 L (40 gal) of water



1U-5566 (110 Volts) and 1U-6444 (220 Volts) Black Light

Replacement parts for Black Lights

1U-5567 Filter, Black Light

1U-5568 110V, 100 Watt Spot Bulb

Optional Items:

1U-5571 Spectacles, Ultraviolet Light Absorbing

1U-5570 Case, Storage (Heat Resistant)

1U-5569 Cover, Ultraviolet Light

The cover is made of heat-resistant neoprene rubber. It helps protect the user from possible burn injury, and also provides protection against mechanical shock damage.

Fluid Sampling Supplies

We offer a complete assortment of fluid extraction tools to service pressurized vehicle compartments such as engine, transmission, and hydraulic systems, as well as non-pressurized vehicle compartments such as final drives, differential, transfer case, and axle housings. Get extra protection and maximum performance by using Cat fluids, filters, and regular oil analysis through scheduled oil sampling (S.O.S).

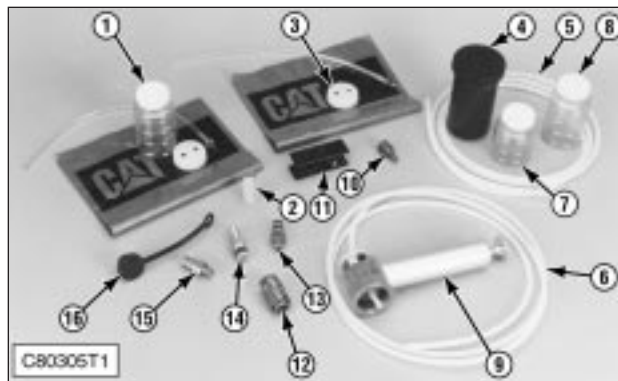
See Third Supplement

Fluid Sampling Extraction Tools for Pressurized Compartments

Warranty: M

Features/Benefits

- Valve locations provide oil sample confidence and continuity — Comparative data of pressurized oil samples is more reliable because the sample is taken from a continuous flow of oil at a known location.
- A probe is provided that allows the valve to be quickly flushed prior to taking the oil sample.
- The sample bottle group is packaged, and sealed in a plastic bag to insure cleanliness.
- Pressurized oil sampling is a fast, economical and clean method of obtaining oil samples from pressurized systems.
- Better represents oil condition because the oil is continually mixed and circulated.
- 10 to 20 times faster than sampling oil from non-pressurized systems.
- Mailing container is available so the oil sample can be conveniently mailed to the testing laboratory.



Fluid Sampling Extraction Tools for Pressurized Compartments

Item	Part No.	Description
1.	177-8373	Bottle Group, 300 per box
2.	162-8873	Probe, Holder
3.	177-9343	Cap and Probe Group, 500 per box
4.	4C-4600	Mailer Container — reusable
5.	1U-8757	Tube — 30.5 m rolls (100 ft) 6.35 mm O.D. x 30.5 m rolls (1/4 in x 100 ft) (5 rolls per box)
6.	4C-4056	7.9 mm O.D. x 30.5 m rolls (5/16 in x 100 ft) (5 rolls per box) (not pictured)
7.	169-7373	Clear Bottle, 71g (2 1/2oz), 200 per box
8.	169-7372	Clear Bottle, 114g (4 oz), 200 per box
9.	1U-5718 1U-5719	Vacuum Pump Seal Kit for 1U-5718 Pump (not pictured)
10.	8T-9208	Probe, purging
11.	1U-7648 1U-8589	Tube Cutter Replacement Blades (not pictured)
12.	8C-8456	Sealed Cap
13.	8C-3446 3J-7354	Oil Sampling Valve (7/16 inch-20 — ext. thread) O-Ring Seal for 8C-3446 (not pictured)
14.	7X-3387	Oil Sampling Valve (1/4 inch-18 NPTF— ext. thread)
15.	8C-3345 8T-7876	Oil Sampling Valve (M10 x 1 — ext thread) O-Ring Seal for 8C-3345 (not pictured)
16.	8C-3445 8C-3447 8C-3451 6V-0852	Dust Cap (Engine) Dust Cap (Transmission) (not pictured) Dust Cap (not pictured) Dust Cap (Blank) (not pictured)

Not shown: Tube, 2.1 m (7 ft) pieces
4C-4055, 6.35 mm O.D. x 2.1 m (1/4 in x 7 ft),
250 pieces per box
4C-4057, 7.9 mm O.D. X 2.1 m (5/16 in x 7 ft),
240 pieces per box

177-8373 Bottle Group (Package Qty. — 300)

T&SPG 2000

This bottle group is sealed in a plastic bag with sampling instructions included. The bottle group is ready to use when it is removed from the bag after the valve has been purged and the sample is ready to be taken. The bottle included in this group (169-7372) has the capacity to provide a 114 g (4 oz) sample. The 169-7372 can also be ordered by itself, 200 per case.

After the sample is obtained, the probe and tube are removed from the bottle cap and holder, and discarded, and the cap-cover seals the bottle. Labels for identifying the sample (obtained locally) can then be attached to the bottle for identification purposes. The 4C-4600 mail tube is available to send the oil sample to the laboratory. The laboratory also provides the mailing label.

177-9343 Probe and Cap Group (Package Qty. — 500)

The probe and cap group provides the same probe and cap that are used in the 177-8373 Bottle Group, however, without the bottle. This group is also sealed in a plastic bag with sampling instructions included. This group allows the dealer the flexibility to use other bottles such as the smaller 71 g (2 1/2 oz) 169-7373 bottle assembly (which must be ordered separately). (The cap requires that the bottles have a 38 M thread.)

169-7373 Bottle Assembly (Package Qty. — 200)

This smaller bottle assembly (169-7373) can be used with the 177-9343 Probe and Cap Group and reduces mailing expense by approximately one-half for dealers whose oil sample labs can provide effective full service analysis with 71 g (2 1/2 oz) or less of oil. These bottles can be used for engine samples since particle count is not used for engine samples. This bottle can also be used with the 1U-5718 Vacuum Pump used for non-pressurized oil sampling.

8T-9208 Probe Assembly (Package Qty. — 1)

The 8T-9208 Probe Assembly can be attached to a 6.35 mm (1/4 in) I.D. rubber hose (6K-0713 Hose — 228.6 mm (9 in) long or any desired length cut from bulk 5P-6442 Hose or equivalent 100R6 type high temperature — low pressure hose). The 8T-9208 Probe and hose connected to a locally obtained waste container provide a method to purge or flush the 8C-3446, 8C-3345, or 7X-3387 sample valves prior to obtaining the desired oil sample using either the 177-8373 Bottle Group or 177-9343 Probe and Cap Group with the desired bottle. Approximately 14.8 cm³ to 29.6 cm³ (1/2 to 1 ounce) of expelled fluid purges the valves.

Pressurized systems on many Caterpillar products are factory equipped with sampling valves to quickly extract oil samples with the above tools. Special Instruction SEHS9043 details retrofitting some earlier models with oil sampling valves, as well as pointing out the respective valve locations on models currently factory equipped with the oil sample valves

The following valves, fittings and adapters are required or are commonly used for retrofitting the sampling valves to pressurized systems:

Oil Sampling Valves and O-Ring Seals

8C-3446 Oil Sampling Valve (7/16 inch-20 ext. thread)

3J-7354 O-Ring Seal for 8C-3446

8C-3345 Oil Sampling Valve (Mid X1 ext. thread)

8T-7876 O-Ring Seal Form 8C-3345

7X-3387 Oil Sampling Valve (1/4 inch-18 NPTF ext. thread)

Protective Dust Caps for Oil Sampling Valves:

(These are rubber caps with embossed symbols to indicate system being sampled.)

8C-3445 Dust Cap (Engine)

8C-3447 Dust Cap (Transmission)

8C-3451 Dust Cap (Hydraulic)

6V-0852 Dust Cap (Blank)

8C-8456 Sealed Cap

The 8C-8456 Sealed Cap can be applied to the valves with the valve dust cap retention ring left in place. This cap enables the user to quickly seal a leaking valve and prevents the need to immediately deadline (or stop) the machine or compartment. The leaking valve can then be repaired (flushed) or replaced during the scheduled maintenance period.

Some retrofit applications of the various valves may require the 8C-8456 Sealed Cap to provide maximum protection for both sealing and environmental contamination, such a brake and hydraulic system exposed to severe elements. This cap serves ONLY as a temporary solution to a leaking sampling valve.

Miscellaneous fittings and adapters commonly used for oil sampling valve retrofit installations:

3B-7722 Reducer 3/8 inch-18 NPTF to 1/4 inch-18 NPTF

8C-6427 Adapter 1/4 inch-18 NPTF external to

7/16 inch-20 SAE internal

6V-7529 Adapter 1/8 inch-27 NPTF external to

7/16 inch-20 SAE internal

7J-8611 Adapter 90° street elbow 1/4 inch-18 NPTF

5P-9617 Adapter Reducer 9/16 inch-18 SAE external to 7/16 inch-20 SAE internal

3J-1907 O-Ring Seal for 5P-9617 Adapter

3J-5390 Adapter Reducer 3/8 inch-18 NPTF external to 1/8 inch-27 NPTF internal

9T-6865 Adapter Plug 5/8 inch-12 SAE external to

7/16 inch-20 SAE internal

2S-4078 O-Ring Seal for 9T-6865 Adapter Plug

5P-3501 Adapter 9/16 inch-18 SAE external to

1/4 inch-18 NPTF internal

3J-1907 O-Ring Seal for 5P-3501 Adapter

3L-6521 Adapter Tee 1/4 inch-18 NPT (two internal and one external)

1P-9369 Adapter Tee 1/8 inch-27 NPT (two internal and one external)

6V-3966 Pressure Test Valve 1/4 inch-18 NPTF external

7M-8489 Adapter 90° elbow 9/16 inch-18 SAE external to 1/4 inch-18 internal

5P-3413 Pipe Sealant 12/3 oz (85 g) tube.

Fluid Sampling Extraction Tools for Non-Pressurized Compartments

Warranty: M

Fluid sampling extraction tools are used to obtain fluid samples from non-pressurized vehicle compartments such as final drives, differential compartments, transfer cases, axle housings, etc. The tools that are available from Caterpillar Service Technology, through Caterpillar Parts Distribution are:

1U-5718 Vacuum Pump

1U-5719 Pump Kit

169-7372 Bottle Assembly, 114 g (4 oz)

169-7373 Bottle Assembly, 71 g (2 1/2 oz)

1U-8757 Tube

4C-4056 Tube

4C-4055 Tube

4C-4057 Tube

1U-7648 Tube Cutter

1U-8589 Blade

The 1U-5718 vacuum pump is capable of pulling 25 inch (7.62 mm) Mercury (vacuum). The pump is compact and accepts the 169-7372, 114 g (4 oz), and 169-7373 Bottle Assembly, 71 g (2 1/2 oz), bottles, or any 38 M threaded plastic bottle, and 6.35 mm (1/4 inch) O.D. and/or 7.9 mm (5/16 inch) O.D. plastic tube.

The 1U-5719 kit provides replacement seals for the vacuum pump.

The 169-7372 bottle has 4 oz (114 g) capacity. The bottle is marked showing fluid fill range at 3/4 capacity. The fill range provides a reminder to not overfill the bottle. Partially filling the bottle satisfies both mailing and lab requirements. Full bottles expand because of temperature changes that can possibly rupture within the mailing container. The partially filled bottle also allows the lab to shake the fluid sample prior to extracting fluid for testing. Labels identifying the fluid are obtained locally. The label is processed locally and attached to the sample bottle.

The 169-7373 bottle is the same as the 169-7372 bottle except the capacity is 71 g (2 1/2 oz) rather than 114 g (4 oz). Both are clear high performance plastic rated at 91°C (195°F).

The 1U-8757 tubing consists of five 30.5 m (100 ft) rolls of 6.35 mm (1/4 inch) O.D. plastic tubing. Random lengths of tubing can be easily dispensed from the tubing package. The tubing connects the vacuum pump to the fluid in the compartment. The tubing is discarded after each sample extracted.

The 4C-4056 tubing consists of five 30.5 m (100 ft) rolls of 7.9 mm (5/16 inch) O.D. plastic tubing. Again, random lengths of tubing can be easily dispensed from the tubing package. This tubing permits extraction of heavier oils when using the vacuum pump.

Both tubing sizes are also available in pre-cut 2.1 m (7 ft) lengths that are packaged 250 pieces per box. This eliminates cutting the tube for each sample.

The 4C-4055 tubing contains 250 pieces of 6.35 mm (1/4 inch) O.D. tubing each 2.1 m (7 ft) long.

The 1U-7648 tube cutter is a convenient tool that easily cuts the desirable length of either 6.35 mm (1/4 inch) or 7.9 mm (5/16 inch) plastic tubing. The cutter can cut the tubing at 90° or at a bias. The 1U-8589 blades are available as replacement blades for the cutter.

The following summarizes various sampling tools available through the Caterpillar Parts Distribution System:

4C-4056 Tube, 7.9 mm (5/16 inch) O.D. by 30.5 m (100 ft) lengths (5 rolls per box)

4C-4057 Tube, 7.9 mm (5/16 inch) O.D. by 2.1 m (7 ft) length (250 per box)

4C-4055 Tube, 6.35 mm (1/4 inch) O.D. by 2.1 m (7 ft) length (250 per box)

177-9343 Probe and Cap Group

8C-3345 Oil Sampling Valve

8C-3446 Oil Sampling Valve

8C-3445 Dust Cap (Engine)

8C-3447 Dust Cap (Transmission)

8C-3451 Dust Cap (Hydraulic)

8C-8456 Sealed Cap

3J-7354 O-Ring Seal for 8C-3446 Valve

8T-7876 O-Ring Seal for 8C-3345 Valve

177-8373 Bottle Group

8T-9208 Purging Probe, brass

1U-5718 Vacuum Pump

1U-5719 Seal Kit for 1U-5718 Vacuum Pump

169-7372 Bottle, 114 g (4 oz)

169-7373 Bottle, 71 g (2 1/2 oz)

4C-4600 Mail Tube

1U-7648 Tube Cutter

1U-8589 Replacement Blades

1U-8757 Tube, 6.35 mm (1/4 inch) O.D. by 30.5 m (100 ft) length (5 rolls per box)

6V-0852 Dust Cap (Blank)

7X-3387 Oil Sampling Valve

See Third Supplement

T&SPG 2000

Protector Cases

Warranty: M

For the ultimate in protection, CSTG is now offering the Pelican line of Protective Cases. When Equipment is not in use, the storage case also makes an excellent lockable storage vault. Just apply a lock.

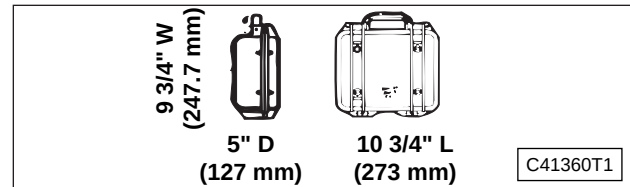
Features/Benefits

- Watertight, airtight, dustproof — Pelican cases feature an exclusive 6.5 mm (1/4 inch) neoprene “O” ring, to guarantee a perfect seal. Neither dust nor water can penetrate this barrier to harm your equipment. These cases are so airtight and watertight they float even when loaded. The “O” ring is easily replaced if damaged.
- Purge Valve — The exclusive built-in “O” ring purge valve is sealed for pressure allowing for quick equalization after changes in altitude or temperature.
- Dentproof — The tough, cushioned, protective shell eliminates damage from bumping, jarring and even airline shipments.
- Protects contents inside — Multiple layers of industrial grade photographic foam secure and cushion equipment.
- Custom fit for tooling — The “Pick-N’Pluck” center foam section is prescored for quick and clean custom fitting. The case lid is lined with the same convoluted foam for maximum shock protection.
- Lightweight — Easy to carry by using the comfortable, molded handle.
- All cases are gray.

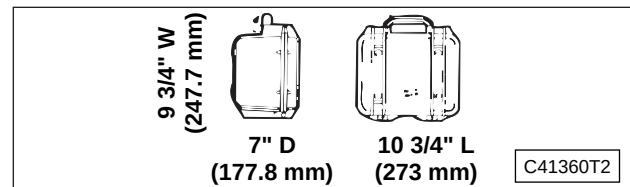


Protector Case

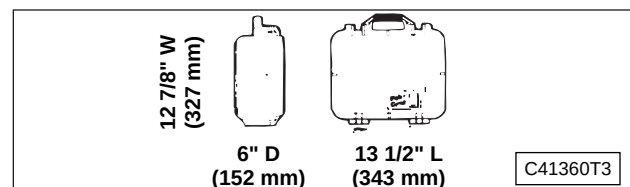
Pelican Protector® Equipment Cases



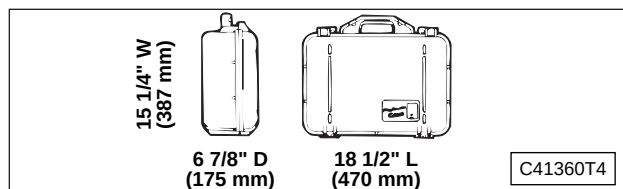
1. 4C-9650 Pelican Mini “S” Case™
Outside Dimensions:
273 mm L x 247.7 mm W x 127 mm D
(10 3/4 in L x 9 3/4 in W x 5 in D)
Inside Dimensions:
241 mm L x 191 mm W x 114 mm D
(9 1/2 in L x 7 1/2 in W x 4 1/2 in D)
New fold down handle.
Weight: .91 kg (2 lbs)
Shipping Weight: 1.36 kg (3 lbs)
2. 4C-9651 Replacement Foam Set, 3 Pc.
3. 4C-9739 Replacement O-Ring



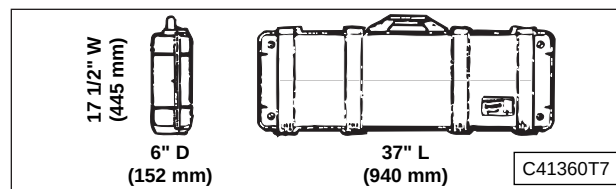
1. 4C-9652 Pelican Mini “D” Case™
Outside Dimensions:
273 mm L x 247 mm W x 177.8 mm D
(10 3/4 in L x 9 3/4 in W x 7 in D)
Inside Dimensions:
241 mm L x 191 mm W x 165 mm D
(9 1/2 in L x 7 1/2 in W x 6 1/2 in D)
Weight: 1.13 kg (2 1/2 lbs)
Shipping Weight: 1.59 kg (3 1/2 lbs)
2. 4C-9653 Replacement Foam Set, 3 Pc.



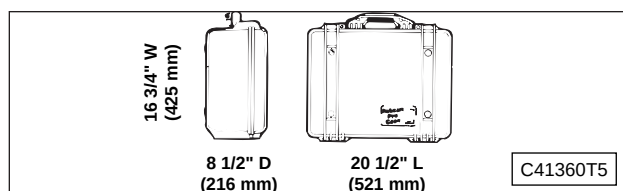
1. 4C-9654 Pelicase®
Outside Dimensions:
343 mm L x 327 mm W x 152 mm D
(13 1/2 in L x 12 7/8 in W x 6 in D)
Inside Dimensions:
311 mm L x 235 mm W x 133 mm D
(12 1/4 in L x 9 1/4 in W x 5 1/4 in D)
Weight: 1.8 kg (4 lbs)
Shipping Weight: 2.5 kg (5 1/2 lbs)
2. 4C-9655 Replacement Foam Set, 3 Pc.
3. 4C-9741 Replacement O-Ring



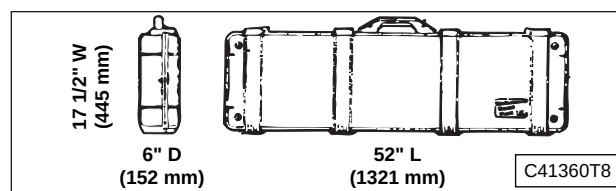
1. 4C-9656 Pelican Case™
Outside Dimensions:
470 mm L x 387 mm W x 175 mm D
(18 1/2 in L x 15 1/4 in W x 6 7/8 in D)
Inside Dimensions:
432 mm L x 299 mm W x 152 mm D
(17 in L x 11 3/4 in W x 6 in D)
Weight: 3.2 kg (7 lbs)
Shipping Weight: 3.9 kg (8 1/2 lbs)
2. 4C-9657 Replacement Foam Set, 3 Pc.
3. 4C-9742 Replacement O-Ring



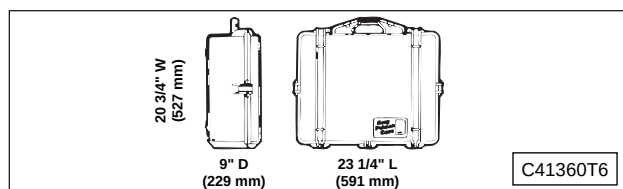
1. 4C-9662 Pelican Travel Vault II®
Outside Dimensions:
940 mm L x 445 mm W x 152 mm D
(37 in L x 17 1/2 in W x 6 in D)
Inside Dimensions:
914 mm L x 343 mm W x 127 mm D
(36 in L x 13 1/2 in W x 5 in D)
Weight: 6.8 kg (15 lbs)
Shipping Weight: 7.7 kg (17 lbs)
2. 4C-9663 Replacement Foam Set, 3 Pc.
3. 4C-9745 Replacement O-Ring



1. 4C-9658 Pelican Pro Case™
Outside Dimensions:
521 mm L x 425 mm W x 216 mm D
(20 1/2 in L x 16 3/4 in W x 8 1/2 in D)
Inside Dimensions:
483 mm L x 356 mm W x 197 mm D
(19 in L x 14 in W x 7 3/4 in D)
New fold down handle
Weight: 4.5 kg (10 lbs)
Shipping Weight: 6.2 kg (14 lbs)
2. 4C-9659 Replacement Foam Set, 4 Pc.
3. 4C-9743 Replacement O-Ring



1. 4C-9664 Pelican Travel Vault®
Outside Dimensions:
1321 mm L x 445 mm W x 152 mm D
(52 in L x 17 1/2 in W x 6 in D)
Inside Dimensions:
1289 mm L x 323 mm W x 127 mm D
(50 3/4 in L x 13 1/2 in W x 5 in D)
Weight: 11.8 kg (26 lbs)
Shipping Weight: 13 kg (29 lbs)
4C-9664 supplied with regular foam; Pick-N'Pluck is not available.
2. 4C-9665 Replacement Foam Set, 3 Pc.
3. 4C-9746 Replacement O-Ring



1. 4C-9660 King Pelican Case®
Outside Dimensions:
23 1/4 in L x 20 3/4 in W x 9 in D
(591 mm L x 527 mm W x 229 mm D)
Inside Dimensions:
22 in L x 17 in W x 8 in D
(559 mm L x 432 mm W x 203 mm D)
Weight: 13 lbs. (6 kg)
Shipping Weight: 17 lbs. (11.5 kg)
2. 4C-9661 Replacement Foam Set, 4 Pc.
3. 4C-9744 Replacement O-Ring

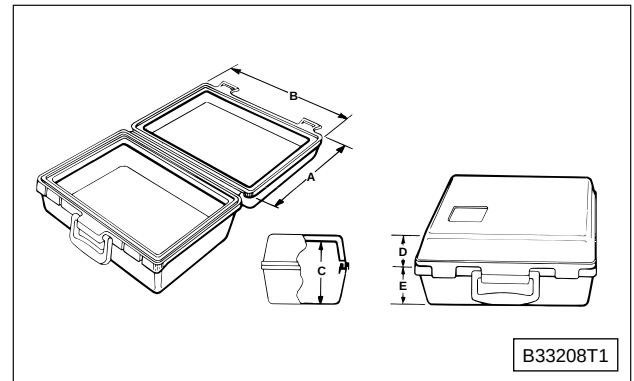
T&SPG 2000

Plastic Storage Cases with Hinged Lids

Warranty: G

Features/Benefits

- Cases are impact-resistant.
- Textured surface to prevent scratches.



Plastic Storage Cases with Hinged Lids

Part No.	Width A	Length B	Overall C	Lid Depth D	Base E	Handle	No. of Latches	Color
4C-4730	660.4 mm (26.0 in)	393.70 mm (15.5 in)	106.68 mm (4.2 in)	22.86 mm (.9 in)	83.82 mm (3.3 in)	Yes	2	Gray
4C-3975	363.22 mm (14.3 in)	274.32 mm (10.8 in)	121.92 mm (4.8 in)	30.48 mm (1.2 in)	91.44 mm (3.6 in)	Yes	2 (metal)	Green
6V-9449	431.8 mm (17.0 in)	330.20 mm (13.0 in)	187.96 mm (7.4 in)	88.90 mm (3.5 in)	99.06 mm (3.9 in)	Yes	2	Green
6V-7145	431.8 mm (17.0 in)	330.20 mm (13.0 in)	114.30 mm (4.5 in)	35.56 mm (1.4 in)	78.74 mm (3.1 in)	Yes	2	Green
6V-9125	431.8 mm (17.0 in)	330.20 mm (13.0 in)	81.28 mm (3.2 in)	22.86 mm (0.9 in)	60.96 mm (2.4 in)	Yes	2	Green
8T-0841	355.6 mm (14.0 in)	274.32 mm (10.8 in)	175.26 mm (6.9 in)	83.82 mm (3.3 in)	91.44 mm (3.6 in)	Yes	2	Green
6V-3072 ¹	355.6 mm (14.0 in)	274.32 mm (10.8 in)	88.90 mm (3.5 in)	15.24 mm (0.6 in)	73.66 mm (2.9 in)	Yes	2	Green
6V-3073	289.56 mm (11.4 in)	177.80 mm (7.0 in)	91.44 mm (3.6 in)	22.86 mm (0.9 in)	66.04 mm (2.6 in)	Yes	1	Green
6V-6071	193.04 mm (7.6 in)	149.86 mm (5.9 in)	45.72 mm (1.8 in)	15.24 mm (0.6 in)	27.94 mm (1.1 in)	No	1	Green
6V-6045	172.72 mm (6.8 in)	81.28 mm (3.2 in)	33.02 mm (1.3 in)	2.54 mm (0.1 in)	30.48 mm (1.2 in)	No	1	Green
6V-6041	172.72 mm (6.8 in)	81.28 mm (3.2 in)	22.86 mm (0.9 in)	2.54 mm (0.1 in)	20.32 mm (0.8 in)	No	1	Green
6V-3112 ²	238.76 mm (9.4 in)	170.18 mm (6.7 in)	—	15.24 mm (0.6 in)	—	No	—	Green
6V-3080 ³	231.14 mm (9.1 in)	165.10 mm (6.5 in)	—	—	55.88 mm (2.2 in)	Yes	—	Green

¹Elastic lid cords²Consists of lid only³Consists of base only

Foam Block for Plastic Storage Cases

Warranty: G

Part No.	Length	Width	Thickness	Material	Color	Convolute
6V-6105	350.52 mm (13.8 in)	254 mm (10.0 in)	12.7 mm (0.5 in)	Etherfoam ¹	Charcoal	No
8S-5128	520.7 mm (20.5 in)	223.52 mm (8.8 in)	50.8 mm (2.0 in)	Esterfoam ²	Charcoal	Yes
2P-8289	457.2 mm (18.0 in)	254 mm (10.0 in)	50.8 mm (2.0 in)	Esterfoam ²	Charcoal	Yes
6V-4094	279.4 mm (11.0 in)	170.18 mm (6.7 in)	38.1 mm (1.5 in)	Esterfoam ²	Charcoal	Yes
9S-8105	482.6 mm (19.0 in)	431.8 mm (14.0 in)	38.1 mm (1.5 in)	Ethafoam ³	Charcoal	Yes
3P-1549	386.08 mm (15.2 in)	279.4 mm (11.0 in)	12.7 mm (0.5 in)	Ethafoam ³	Black	No
6V-6126	365.76 mm (14.4 in)	276.86 mm (10.9 in)	73.66 mm (2.9 in)	Ethafoam ³	Black	No
6V-4873	360.68 mm (14.2 in)	279.4 mm (11.0 in)	12.7 mm (0.5 in)	Ethafoam ³	Black	No
6V-6044	353.06 mm (13.9 in)	264.16 mm (10.4 in)	25.4 mm (1.0 in)	Ethafoam ³	Black	No
8T-3153	322.58 mm (12.7 in)	238.76 mm (9.4 in)	10.16 mm (0.4 in)	Ethafoam ³	Black	No
6V-6107	190.5 mm (7.5 in)	149.86 mm (5.9 in)	27.94 mm (1.1 in)	Ethafoam ³	Black	No
6V-6096	190.5 mm (7.5 in)	149.86 mm (5.9 in)	12.7 mm (0.5 in)	Ethafoam ³	Black	No
6V-6057	175.26 mm (6.9 in)	83.82 mm (3.3 in)	22.86 mm (0.9 in)	Ethafoam ³	Black	No

¹ Lightweight

² General Purpose

³ Dense

T&SPG 2000

Plastic Divided Utility Boxes with Hinged Lids

Warranty: G

Features/Benefits

- Heavy-duty plastic boxes for organizing, storing, and protecting small parts.
- Yellow polypropylene material is resistant to oils, solvents and common chemicals.
- Boxes are rustproof, dentproof, spark proof and non-conductive.

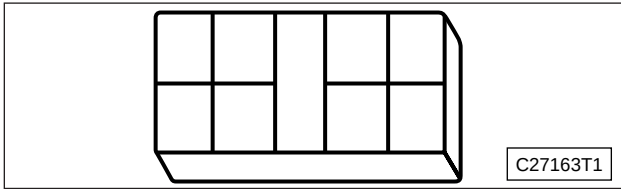


1. 4C-4783

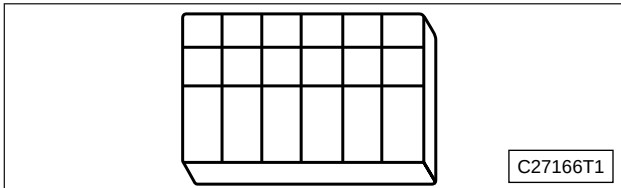
2. 4C-3722

Part No.	Length	Width	Thickness	Color	Compartments Number	Size
4C-3722	332.74 mm (13.10 in)	228.6 mm (9.0 in)	58.42 mm (2.30 in)	Yellow	12	50.8 x 104.14 mm (2.00 in x 4.10 in)
4C-3723	332.74 mm (13.10 in)	228.6 mm (9.0 in)	58.42 mm (2.30 in)	Yellow	6	50.8 x 50.8 mm (2.00 in x 4.10 in)
					12	50.8 x 50.8 mm (2.00 in x 2.00 in)
4C-3724	332.74 mm (13.10 in)	228.6 mm (9.0 in)	58.42 mm (2.30 in)	Yellow	24	50.8 x 50.8 mm (2.00 in x 2.00 in)
4C-3725	332.74 mm (13.10 in)	228.6 mm (9.0 in)	58.42 mm (2.30 in)	Yellow	3	104.14 x 104.14 mm (4.10 in x 4.10 in)
					6	50.8 x 104.14 mm (2.00 in x 4.10 in)
4C-4463	332.74 mm (13.10 in)	228.6 mm (9.0 in)	58.42 mm (2.30 in)	Yellow	4	50.8 x 104.14 mm (2.00 in x 4.10 in)
					1	104.14 x 104.14 mm (4.10 in x 4.10 in)
					1	104.14 x 317.5 mm (4.10 in x 12.50 in)
4C-4783	381 mm (15.00 in)	228.6 mm (9.0 in)	63.50 mm (2.50 in)	Gray/See-through Smoke Gray	9-24	(15 Removable Dividers)
4C-4787	177.8 mm (7.00 in)	228.6 mm (9.0 in)	31.75 mm (1.25 in)	Opaque	8	35.05 x 41.15 mm (1.38 in x 1.62 in)
					1	28.45 x 82.55 mm (1.12 in x 3.25 in)
4C-4789	209.55 mm (8.25 in)	228.6 mm (9.0 in)	35.05 mm (1.38 in)	Opaque	12	31.75 x 50.8 mm (1.25 in x 2.00 in)
6V-3007	332.74 mm (13.10 in)	228.6 mm (9.0 in)	58.42 mm (2.30 in)	Opaque	13	50.8 x 50.8 mm (2.00 in x 2.00 in)
					1	50.8 x 158.75 mm (2.00 in x 6.25 in)
					1	50.8 x 212.85 mm (2.00 in x 8.38 in)
					1	104.65 x 104.65 mm (4.12 in x 4.12 in)

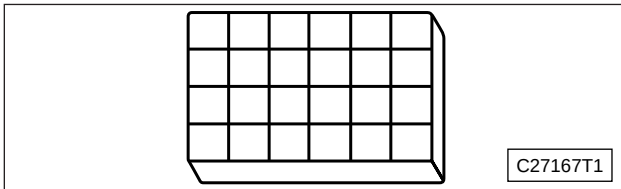
Sample configurations for the Plastic Divided Utility Boxes with Hinged Lids are shown below:



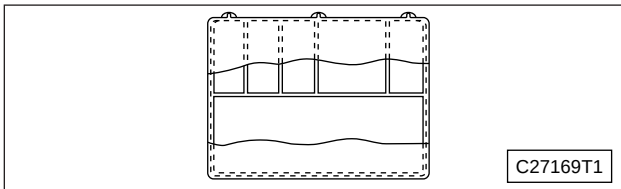
4C-4787



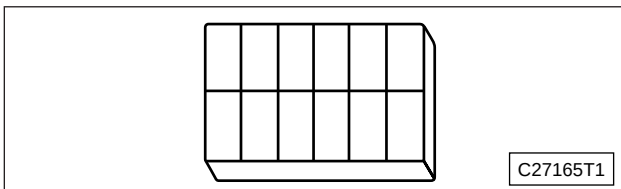
4C-3723



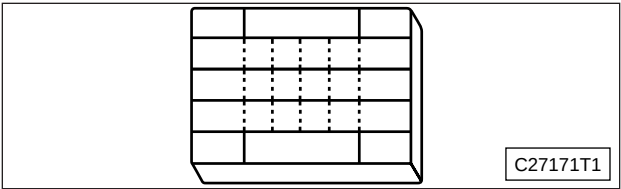
4C-3724



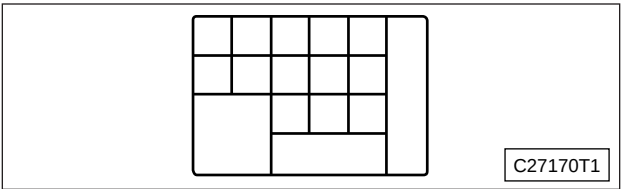
4C-4463



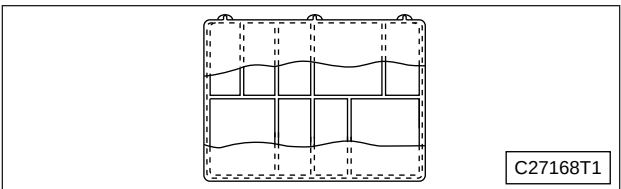
4C-3722



4C-4783



6V-3007



4C-3725