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Installation, Operation and Maintenance Instructions

COMPOSITE REPAIR KIT

**MODELS: 70-700-CRK-041
SK2000CRK**

NSN 4920-01-556-2562



ECCN EAR99

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Shipping Parts list

All items shipping with the kit are identified in the kit on the inventory placards

WARNING !



IN VARIOUS LOCATIONS THROUGHOUT THE TEXT, THIS INSTRUCTION MANUAL CONTAINS INSERTS ENTITLED, "WARNING", "CAUTION", AND "NOTE". THESE ARE INSERTED FOR THE BENEFIT OF THE INSTALLATION, OPERATION, AND MAINTENANCE PERSONNEL. THEIR PURPOSE IS TO ALERT PERSONNEL ASSOCIATED WITH THIS TEST TOOL TO PROCEDURES OR PRACTICES THAT, IF FOLLOWED, WILL PREVENT INJURY TO PERSONNEL OR DAMAGE TO THE TEST TOOL OR AIRCRAFT. ADHERENCE TO THESE PROCEDURES IS REQUIRED TO INSURE SAFE OPERATION AND SERVICE.

WARNING



The misuse of this equipment or operation of the unit not in the manner for which it is intended is dangerous and may void its warranty.

PUBLICATION HISTORY

<u>DESCRIPTION</u>	<u>DATE</u>
Original Publication	03/27/2011
Added Acc'y to Vac. Module, Heater Controller & Scale	05/03/2011
Format Correction	12/09/2011
REV- Changed to revision letter format and added shipping parts list to page 2 of the manual.....	12/09/2015

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1. ABOUT THE CRK

Through the advancements in light weight composite materials, military airframe manufacturers are able to create weapon systems that are more agile and can carry larger payloads. Due to the extensive usage of composite materials within panel and rotor systems in the military helicopter arena, a need for a comprehensive modern composite repair kit was formed. The new Composite Repair Kit must be able to satisfy a number of repair requirements on multiple platforms and be easily transportable. HABCO once again saw an opportunity to support the military maintainer with an improved tool. Initially, HABCO focused on designing an inclusive composite repair kit that would support the contemporary war fighter while making it lighter and more transportable. With industry support, and through the efforts of our engineering team, HABCO's SK2000CRK is that new comprehensive composite repair maintenance tool.

HABCO's SK2000CRK provides all of the tools necessary to prepare adhesives as well as patch or plug skins, panels, and rotors which include routers, sanders, and temperature controllers. Additionally, as an added benefit, HABCO's SK2000CRK provides the user with both a heat gun and heat blanket that will support most minor repairs. The SK2000CRK allows the war fighter to make quick repairs to the aircraft and complete the mission.

HABCO's SK2000CRK is the only kit designed to the Sikorsky Composite Repair Training Manual and training course and is the only approved and recognized kit by the US Army and US Navy.

2. INSIDE THE CRK

2.1 ROUTER ASSEMBLY P/N SK2000CRK S1-1 CODE LETTER A



Function: Removal and trimming of damaged area for composite repair, such as plug patches or skin patches.

Specs: Straight, pneumatic, 0.6 hp, button throttle, 25,000 RPM @ 90 PSIG Max, 1/4" series 200 collets

Includes:

2.1.1 CUTTER – P/N 450511 TUNGSTEN CARBIDE CUTTER 1/4" SHANK 3/4" FLUTE NON-END CUTTING 25,000 RPM (QTY 3) CODE LETTER P



2.1.2 CUTTER – P/N 450541 TUNGSTEN CARBIDE CUTTER 1/4" SHANK 3/4" FLUTE END CUTTING 25,000 RPM (QTY 3) CODE LETTER T



WARNING – Use only the recommended cutting tools as supplied with the SK2000CRK. These tools are rated for high RPM operation. Tools may shatter or break during use. Always wear recommended personal protection equipment during cutting, milling and grinding

2.2 SPANNER BAR P/N SK2000CRK S1-4 CODE LETTER C



Function: Extended router base attached to provide stability when bridging larger diameter cavities during trimming or cutting operations.

Specs: 18" overall length, aluminum construction.

2.3 DIE GRINDER P/N 10L1000-36 CODE LETTER K



Function: Removal and trimming of damaged area for composite repair, such as plug patches or skin patches.

Specs: Straight, pneumatic, 1/4" collet, lever throttle, 30,000 RPM @ 90 PSIG Max, front exhaust

Includes:

2.3.1 MANDREL – P/N 1342 STAINLESS STEEL 1/4" SHANK 30,000 RPM (QTY 4) CODE LETTER H



2.3.2 GRINDER WHEEL – P/N GC101 TUNGSTEN CARBIDE 44 MM DIAMETER. FINE GRIT 30,000 RPM (QTY 3) CODE LETTER J



WARNING – Use only the recommended cutting tools as supplied with the SK2000CRK. These tools are rated for high RPM operation. Tools may shatter or break during use. Always wear recommended personal protection equipment during cutting, milling and grinding

2.4 RIGHT ANGLE SANDER P/N 21HR-550 CODE LETTER G



Function: Trimming and or clean-up of repairs.

Specs: 1/4" collet, 20,000 RPM @ 90 PSIG, lever throttle, "buckeye" model

Includes:

2.4.1 SANDING ARBOR – P/N 540013 STAINLESS STEEL 1/4" SHANK 25,000 RPM (QTY 2) CODE LETTER B



2.4.2 SANDING PAD – P/N 541007 (QTY 2) CODE LETTER C



2.4.3 ABRASIVE DISK – P/N 522406 ALUMINUM OXIDE, 2 PLY, 25,000 RPM (QTY 10) CODE LETTER D



WARNING – Use only the recommended cutting tools as supplied with the SK2000CRK. These tools are rated for high RPM operation. Tools may shatter or break during use. Always wear recommended personal protection equipment during cutting, milling and grinding

2.5 HEATER BLANKET –P/N SK2000CRK S1-5 CODE LETTER H



Function: Accelerated curing of localized flat or mildly contoured sections, with integral thermocouple.

Specs: 12" Diameter, 120 VAC/565W, Type J integral thermocouple.

Optional Sizes Available:

- P/N SK2000CRK S1-5A – 8" x 12"
- P/N SK2000CRK S1-5B – 8" x 18"
- P/N SK2000CRK S1-5C – 16" x 24"

2.6 HEAT GUN P/N 3149K11 CODE LETTER I



Function: Accelerated curing of small repairs over a great range of structures.

Specs: 300 deg F maximum output, 23 CFM @ 3000 FPM, 120 VAC/ 60 Hz/ 5A/ 600 W, 6 ft. 3-wire plug

2.7 TEMPERATURE CONTROLLER P/N SK2000CRK S1-2 CODE LETTER C



Function: Closed-loop PID controller of Heat Gun or Heat Blanket

Includes:

(3) Type J, T/C assemblies, approx. 6.5 FT in length.

Specs: Front panel connections for 10 Amp, 120 VAC fused output for heat gun or blanket, and Type-J Thermocouple assemblies, ON-OFF switch with pilot lamp.

Accuracy: 0 – 275 °F ± 2°F

Calibration Interval: 12 Months

2.8 TC ASSY. P/N 5LRTC-TT-J-20-180 QTY. (3) CODE LETTER F



Function: Used in conjunction with SK2000CRK S1-2 temperature controller to measure heat applied to repair area.

2.9 SCALE, LCD P/N SK2000CRK-024 CODE LETTER A



Function: Accurately measures adhesives, resin, and epoxy mixtures.

Specs: LCD display, 9VDC operation.

Accuracy: 0.1 grams

Calibration Interval: 12 Months

2.10 VACUUM PUMP ASSY. P/N SIK-116MP (QTY:1) CODE LETTER B



Function: Applies vacuum to repair areas.

Specs: Requires compressed air (70-80 PSI, minimum 4.0 CFM).

Accuracy: Approx. 29 "Hg (-100 kPa) \pm 1.0 "Hg

Includes:

- Vacuum Valve (aluminum construction) holds up 29 inches (Hg)/-100 kPa.
- Two way shut-off fitting, maintains vacuum after source is removed
- Works with standard vacuum bagging.

Calibration Interval: 12 Months

2.11 VACUUM VALVE - P/N VV401 (QTY:1) VACUUM VALVE, ALUMINUM HOUSING WITH QUICK DISCONNECT AIR FITTING. CODE LETTER A



2.1 HOSE ASSY SK2000CRK S1-6 (QTY: 1) CODE LETTER D



Function: Connects vacuum outlet of SIK-116MP Vacuum Generator to inlet of 401 Vacuum Valve.

Specs: 44 "Overall Length with female stainless steel quick disconnect fittings on both ends.

2.2 HOSE ASSY SK2000CRK S1-7 (QTY 2) CODE LETTER E



Function: Connects shop air to SIK-116MP Vacuum Generator

Specs: 44 "Overall Length with Hansen™ style brass female quick disconnect fittings on both ends.

2.3 HOSE ASSY SK2000CRK S1-8 (QTY: 2)CODE LETTER F



Function: Shop air connection to various air operated tools.

Specs: 72 "Overall Length with Hansen™ style brass female quick disconnect fitting on one end and male quick disconnect socket on other end.

2.4 TRANSPORT CASE

Key Features	
Feature	Specifications
Case Material	HPX® High Performance Resin
Latches	Press and Pull Operation (designed not to open on impact)
Purge Valve	Vortex valve (designed not to fall out on impact)
Transport Option	Telescoping handle with durable in-line wheels makes for fast and comfortable transport.
Weight	Approx. 70 lbs (loaded)
Dimensions	33.3" L x 24.4" W x 19.3" H (handle collapsed)



Qualifications		
Test	Specifications Met	Description
Drop Test	FED-STD-101C, Method 5007.1, Paragraph 6.3, Procedure A, Level A. Tests are superseded and concurrent with ASTM B 4169, DC-18, Assurance Level 1, Schedule A	A series of 26 drops, one on each corner, edge, and face, from 19" to 30", depending on the gross weight of the case, with loads of 15 lbs to 70 lbs (depending on case size)
Falling Dart Impact	ATA 300, Category I, "General Requirements for Category I and II Reusable Containers"	A dart weighing 13.22 lbs with a 1.25" hemispherical end was dropped on each case from 19.68"
Vibration (loose cargo)	FED-STD-101C, Method 5019 Tests are superseded and concurrent with ASTM B 4169, DC-18, Assurance Level 1, Schedule F	Each case was vibrated for 20 minutes per axis. 1-inch peak to peak at around 4.75 Hz.
Vibration (sweep)	ATA 300 (Jan 15/96) states in Appendix II, B.4, This test also exceeds the specifications listed in MIL-STD-648C and may also fulfill ISO 8318 and ISO 2247	Vibration Test for Category I containers-Vibration tests shall be conducted on Category I containers in accordance with ASTM Designation D-999, Procedure B, within range of 5 to 50 cycles per second for a period of not less than two (2) hours.
Simulated Rainfall	MIL-STD-810F, Method 506.4, Procedure II of 4.1.2, FED-STD-101C Method 5009.1, Sec 6.7.1, Tests are superseded and concurrent with ASTM B 4169, DC-18, Assurance Level 1, Schedule H	Four inches of rain per hour for 20 minutes each side. This was followed by a 4-hour test at 4" per hour on the top. Both tests saw the case heated to 18 degrees F higher than the water temp.
Immersion	MIL-STD-810F, Method 512.4	A 1-meter (3.281 feet) immersion for 1 hour with the case being heated to 40 degrees higher than the water temperature.

3. RECOMMENDED SPARE PARTS LIST

HABCO P/N	Package Qty.	Part Description
10L1000A-36	1	Straight, Pneumatic, 1/4"Collet, Lever Throttle, 30,000 RPM @ 90 PSIG Max, Front Exhaust
1342	1	Stainless Steel 1/4" Shank 30,000 RPM
14-0811	1	Wrench, 11/16", Single End, Provided With Det. 001A Dotco Grinder
21HR-550	1	1/4"Collet, 20,000 RPM @ 90 PSIG, Lever Throttle, "Buckeye" Model
3149K11	1	300 Deg. F Maximum Output, 23 CFM @ 3000 Fpm, 120 VAC/ 60 Hz/ 5A/ 600 W, 6 Ft. 3-Wire Plug
450511	1	Tungsten Carbide Cutter 1/4" Shank 3/4" Flute Non-End Cutting 25,000 RPM
450541	1	Tungsten Carbide Cutter 1/4" Shank 3/4" Flute End Cutting 25,000 RPM
522406	10	Aluminum Oxide, 2 Ply. 25,000 RPM
540013	10	Stainless Steel 1/4" Shank 25,000 RPM
541007	1	Holder, Pad, 1/4" Arbor, 2" (51Mm) Socatt, Medium, 25,000 RPM Max, Steel
5LRTC-TT-J-20-180	1	Thermocouple Assembly, Type J, 80".
CRK S1-4		Router Spanner Bar, 18 X 5 X 3/8, 6061-T6 Aluminum
GC101	5	Saw, Circular, 'Pemgrit', Tungsten-Carbide, 1-3/4" Dia. (44Mm), Fine Grit, 1/4" Arbor Size, 26,200 RPM Max.
SK2000CRK-024	1	Scale, LCD +/- 0.1 Gram Accuracy, LCD Display, 9VDC Operation.
SK2000CRK S1-1	1	Router Assembly
SK2000CRK S1-2	1	Temperature Controller
SK2000CRK S1-4	1	Spanner Bar
SK2000CRK S1-5	1	Heater Blanket - 12" Round
SK2000CRK S1-6	1	Hose Assembly
SK2000CRK S1-7	2	Hose Assembly
SK2000CRK S1-8	2	Hose Assembly
VV401	1	Vacuum Valve
SIK-116MP	1	Vacuum Generator

4. CALIBRATION

The CRK Test Instrument's are highly accurate and maintain their accuracy for long periods under normal conditions. To ensure their accuracy, and to meet ATA

requirements for accuracy confirmation, the instruments calibration should be verified every 12 months in accordance with HABCO's calibration procedure.

The following parts require calibration:

1. **Digital Scale, SK2000CRK-024** – The Digital scale is used to insure that the repair materials are mixed in proper proportions. Accuracy of the scale needs to be checked annually against a known standard.
2. **Temperature Controller, SK2000CRK S1-2** – The temperature controller insures that the proper thermal conditions are maintained to achieve the correct bond. Temperature measurement accuracy needs to be checked annually against a known temperature standard.
3. **Vacuum Generator, SIK-116MP** – Vacuum generator gauge must be checked against a known pressure standard on an annual basis. In addition, the vacuum module requires cleaning to maintain maximum efficiency.

HABCO offers a full service, certified Calibration Lab capable of certifying this instrument to original factory specifications.