

R22-series C143 Sensor Assembly Retrofit Kit Instructions

Kit replaces C143-1 or -3 engine-RPM sensor assembly with C143-5 engine-RPM sensor assembly and modifies airframe harness with a 90-degree engine-RPM sensor connector. Installation of kit improves security, clearance, and provides wiring strain relief. Eligible for installation on R22 S/N 2425 thru 4897.

NOTE

Visit <https://robinsonheli.com/> to verify kit instructions are current revision. Review instructions before installation; contact RHC Technical Support with questions. Verify kit contents match list; contact RHC Customer Service if parts are missing or damaged.

ITEM	PART NUMBER	KIT CONTENTS	QTY
1	KI-288-1Instr.	Kit Instructions	1
2	B267-3	Solder Sleeve – Terminator (includes [1] spare)	2
3	B269-66	Connector – Socket (HD)	4
4	C143-5	Sensor Assembly	1
5	C357-7	Clip Assembly	1
6	D845-2	Harness Assembly – Tool (labeled “HIGH DENSITY PIN TOOL”)	1
7	D845-3	Harness Assembly	1
8	61183	Gasket (Lycoming part number)	1
9	STD-8	Washer (Lycoming part number)	6
10	STD-160	Lockwasher (Lycoming part number)	4
11	STD-1411	Nut (Lycoming part number)	4
12	STD-1856	Bolt (Lycoming part number, includes lockwasher)	2
13	91067-1	Extraction, Removal & Insertion Tool (high density contact)	1
14	MS3367-5-9+	Ty-rap (Note: “+” in part number indicates 20-qty pack)	1
15	MS3367-7-9+	Ty-rap (Note: “+” in part number indicates 10-qty pack)	1
16	MS35206-214+	Screw (Note: “+” in part number indicates 10-qty pack)	2
17	NAS557-14A	Grommet	1

Consumables

Refer to R22 Maintenance Manual (MM) § 23-70 for approved materials list.

- B270-5 Sealant

Special Tools

- Wire stripping tools
- Drilling and deburring tools
- Hand crimping tool for high density circular signal contacts (AMP P/N 601966-1 or equivalent)
- Crimp die F (DMC P/N M22520/2-09 or equivalent)
- 10X magnifier (RHC P/N 10XMAG, or equivalent)
- Adjustable heat gun with reflector [nozzle] capable of 400°F-700°F
- MT700-1 cup assembly - oil drain (optional; available for purchase from RHC)

Kit Instructions

1. Ensure battery and avionics switches are off. Disconnect negative (ground) cable from battery R22 Maintenance Manual (MM) § 33-10.
2. Refer to R22 Illustrated Parts Catalog (IPC) Figures 25-1 & 53-1. Remove A378 LH & RH skirts & panels. Remove A465-4 vertical panel between seat backs and remove RH seat back.
3. Remove and retain B123-2 filter. Exercise care when removing filter to avoid oil spillage. MT700-1 cup assembly may be used to catch & divert oil. Cover filter adapter.
4. Refer to Figure 1. Disconnect C143 sensor assembly from airframe harness, cutting ty-raps as required. Remove & retain hardware securing C357-5 clip assembly. Remove sensor assembly and gasket; retain hardware. Temporarily cover engine openings. Discard (4) internal teeth lockwashers, MS21919WDG3 clamp & attaching screw, and clip assembly.
5. Refer to Figure 2. Remove temporary covers from engine openings. Using new 61183 gasket and (4) new STD-160 lockwashers, install C143-5 sensor on engine with engraved "UP" at top. Torque nuts to 96 in-lb.
6. Secure C143-5 sensor connector to clip using (2) MS35206-214 screws. Remove upper bolts & associated washers securing D723-1 adapter assembly. Install C357-7 clip assembly using supplied STD-1856 bolts as shown in Figure 2, Detail A. Torque bolts to 96 in-lb.
7. Install retained B123-2 filter per instructions on filter housing, or replace with new filter, as required.

NOTE

Parenthetic dash numbers, such as (-2886), indicate number marked on wiring insulation (if single conductor), or jacket (if multi-conductor and/or shielded).

8. On aft side of vertical firewall, remove all ty-raps securing wire (-2886) to firewall. Cut wire (-2886) just aft of firewall.
9. Refer to Figure 3. Disconnect large silver backshell & connector from D270 controller. Remove (4) screws securing cover and (2) screws securing clamp; remove backshell from connector.
10. Hold black heat shrink (marked "GOV") and slide black expansion sleeve away from both connector & heat shrink, then gently slide heat shrink away from connector. Using 10X magnification, examine connector's insulation block and note embossed location numbers.
11. Refer to Figure 4. Locate wires attached to connector locations 3, 6, 7, & 21, and segregate with ty-raps.
 - a. Locate wires to connector locations 6 & 7; cut both wires 0.5-inch from connector.
 - b. Locate wire (2886) spliced on wire (-572); cut wire (-2886) as close to splice as possible.
 - c. Locate black-striped wire to connector location 21; cut wire 0.5-inch from connector.

Kit Instructions (continued)

12. Refer to Figure 5. Using white extraction-side of 91067-1 tool, remove and discard 4 cut wires & attached sockets (gently squeeze copper extractor or press fingertip against wire remnant to assist removal).
13. Refer to Figure 6. Using pliers, *slowly* pull & remove previously cut wires (-2886) and discard.
14. Refer to Figure 2. Connect D845-3 harness assembly to C143-5 sensor. Route bare end of D845-3 harness assembly wire (-2886) forward along airframe harness and thru vertical firewall moving B270-5 sealant as required. Secure harness assembly to airframe harness (engine-compartment side) using appropriately-sized ty-raps as required. Ensure harness has sufficient slack and does not preload wires. Cinch ty-raps until snug without over-tightening, and trim tips flush with heads.
15. Route wires (-2886) of D845-3 harness assembly along airframe harness to governor, cutting ty-raps as required. Ensure D845-3 harness has sufficient slack and does not preload wires. Cinch ty-raps until snug without over-tightening, and trim tips flush with heads. Using large silver connector from D270 controller wire harness as a guide, trim wire (-2886) of D845-3 harness slightly longer than length of connector.

CAUTION

Trimmed shielding strands are conductive. Prevent contaminating connectors or wiring by holding a vacuum hose adjacent to wire to capture debris during cutting.

16. Refer to Figure 7. On bare end of D845-3 harness assembly wire (-2886), lightly score (cut without fully penetrating) white outer jacket approximately 1.75 inches from end. Twist scored jacket until score opens, then remove jacket to expose underlying, braided shielding. Push shielding toward remaining jacket to create flange in shielding (A). Using cutters as shown in (B), remove shielding flange then slide off loose shielding to expose inner, insulated wires. Verify complete removal of shielding by inspection using 10X magnification.
17. Remove outer reinforcing fibers, spread inner wires, and remove inner reinforcing fibers. Slide a B267-3 terminator a few inches over remaining jacket so attached black-striped shield drain wire points toward exposed inner wires (C). Score jacket ¼ inch from stripped jacket end, being careful not to damage shielding or internal wires (D). Remove scored ¼ inch jacket piece, exposing shielding ¼ inch beyond outer jacket.
18. Refer to Figure 8. Slide terminator into position, so inner solder sleeve is centered on exposed shielding. Using heat gun, apply 700°F heat to terminator until both solder sleeve & indicator ring are completely melted (or until solder sleeve melts & red color disappears, as applicable). Allow to cool. Trim black-striped wire to same length as adjacent wires (-2886).
19. Strip 0.18-inch insulation from (-2886) wires. Crimp (1) B269-66 HD socket onto orange-striped, blue-striped & white wires. Using 10X magnification, inspect crimps per MM § 23-84. Verify no nicked or broken conductors (wire strands), and no insulation damage.

Kit Instructions (continued)

20. At connector, insert ends of D845-3 harness assembly wire (-2886) thru GOV heat shrink and black expansion sleeve, and:
 - a. Insert socket on black-striped wire into governor connector location 20; verify security.
 - b. Insert socket on orange-striped wire into governor connector location 7; verify security.
 - c. Insert socket on white wire into governor connector location 6; verify security.
 - d. Insert socket on shield wire (black-stripped) into governor connector location 21; verify security.
21. Refer to Figure 9. Slide black expansion sleeve under heat shrink to within 1-inch of connector and apply 400°F heat using heat gun. Assemble backshell on connector. Ensure GOV heat shrink is clamped. Ensure both backshell flange & cover flange retains connector.
22. Connect ohmmeter positive lead to ring terminal of D845-2 tool. Touch ohmmeter's negative lead to pin on D845-2 tool and verify continuity ("CLOSED" circuit); remove ohmmeter's negative lead from pin and verify infinite resistance ("open" circuit) Refer to Appendix A to complete continuity check.
23. Secure silver connector to D270-1 governor controller.
24. Install appropriately-sized ty-raps as required to secure installation to airframe harness. Cinch ty-raps until snug without over-tightening, and trim tips flush with heads.
25. Restore retained B270-5 sealant around harness exit on aft side of vertical firewall, adding additional sealant as required.
26. With second person manipulating flight controls thru range of travel, verify clearance between harnesses and controls. Correct discrepancy(s).
27. Connect negative (ground) cable to battery per MM § 33-10.
28. Install A378 LH & RH skirts and panels. Install RH seat back and A465-4 vertical panel between seat backs.
29. Functional test governor controller by having appropriately rated person run-up helicopter in accordance with POH. Upon successful ground check, a rated pilot may optionally evaluate governor performance in flight.
30. Make appropriate maintenance record entries. Weight and Balance change is negligible.

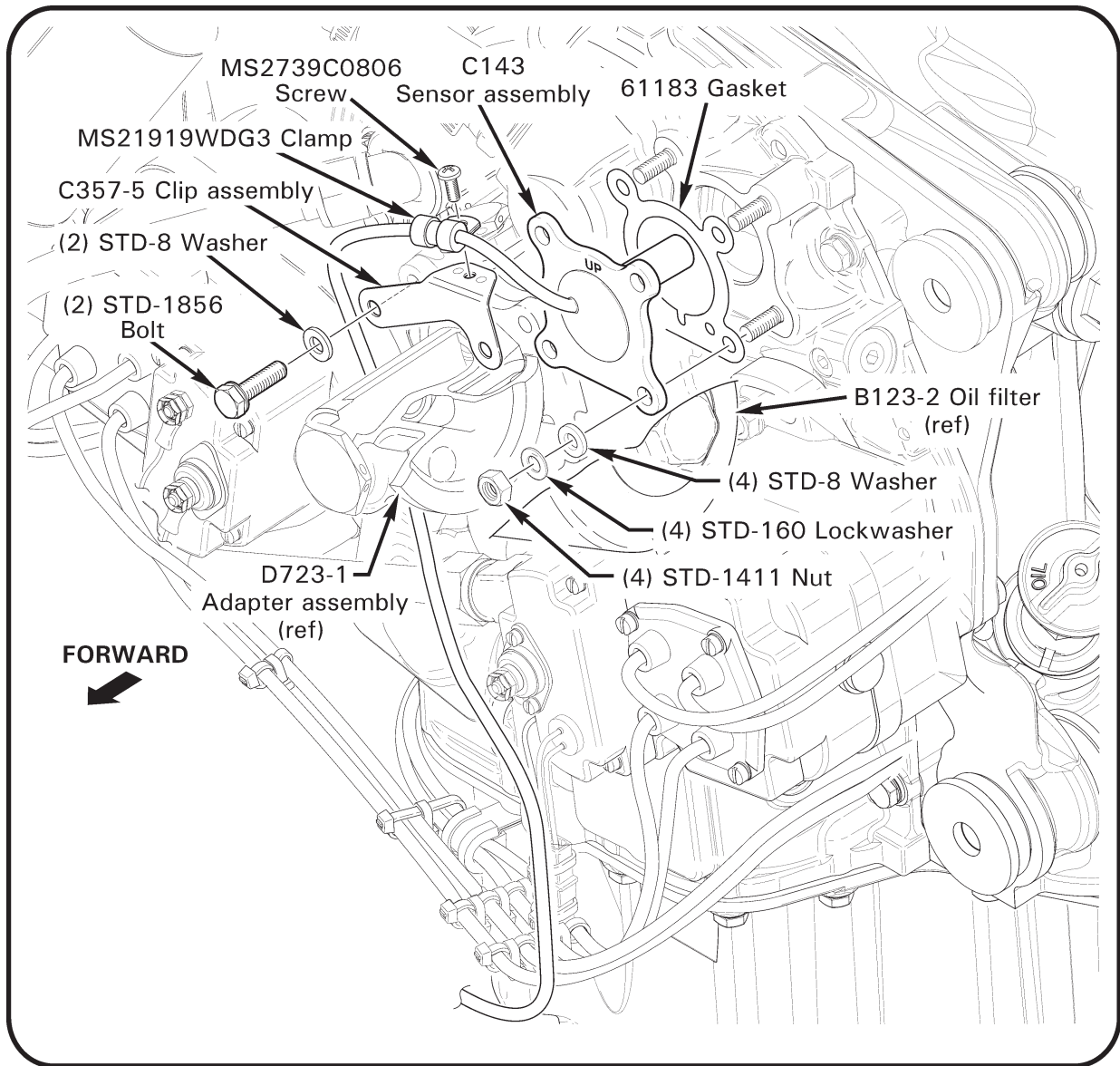


FIGURE 1 Location of sensor & bracket
(view looking aft; oil filter removed for clarity)

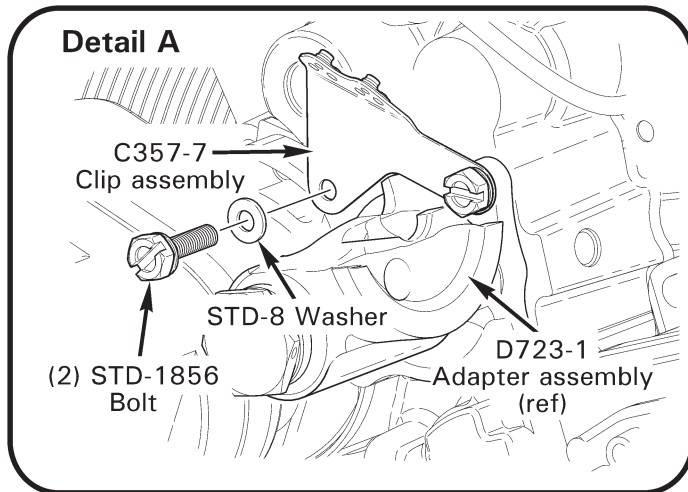
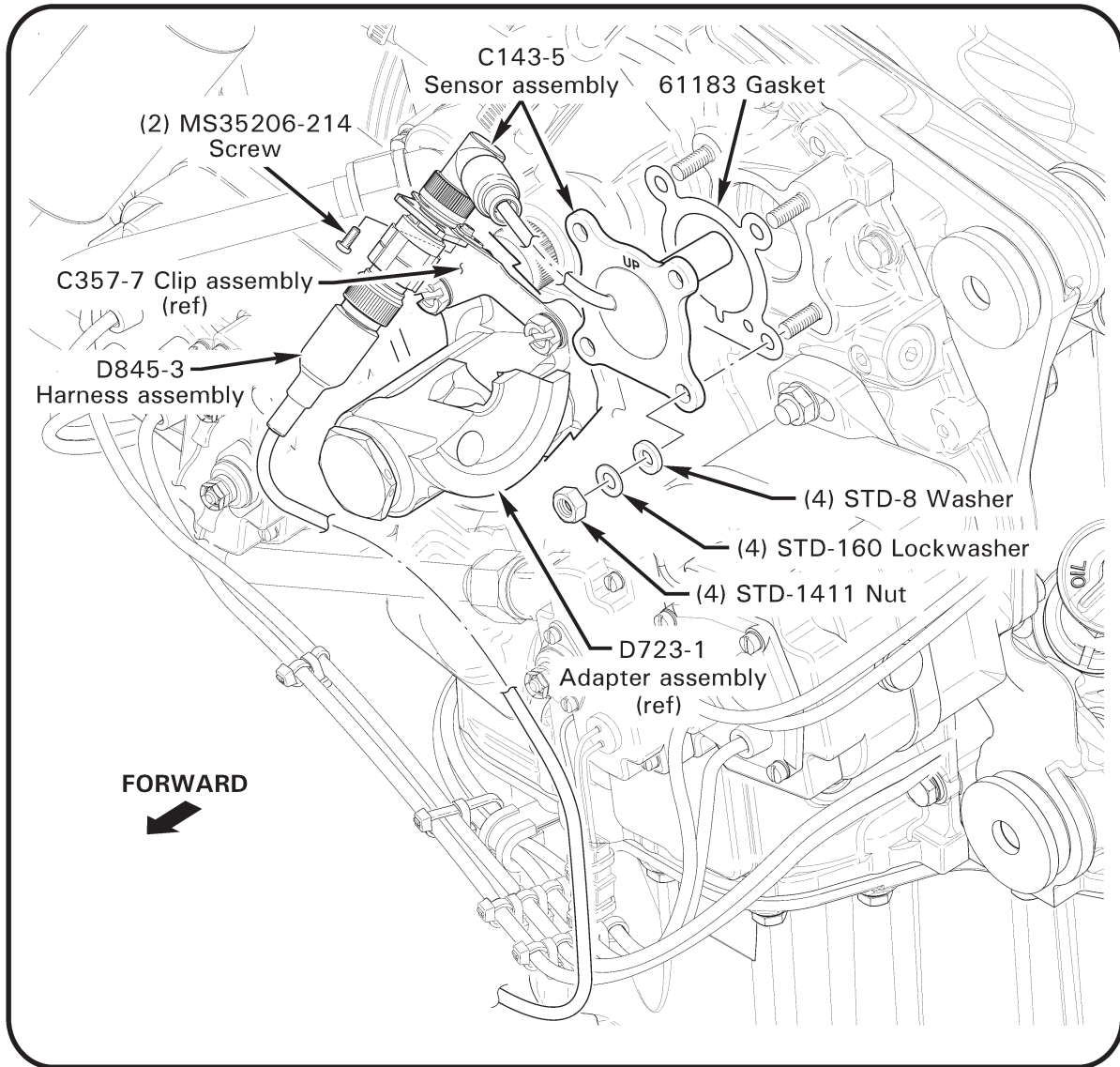


FIGURE 2 C143-5 sensor & C357-7 clip assemblies installed
(with D845-3 harness assembly shown; view looking aft)

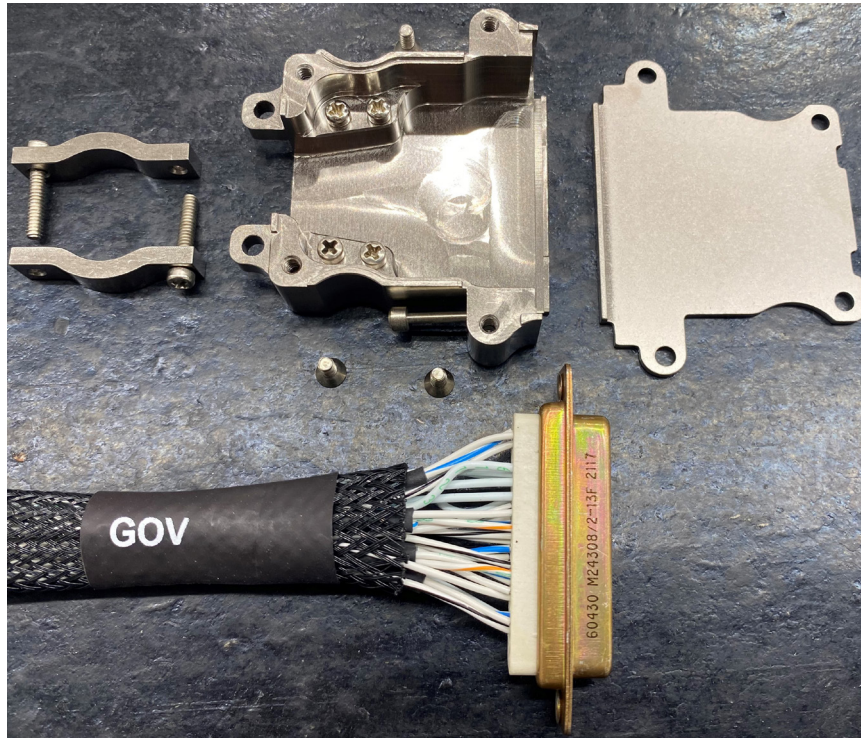


FIGURE 3 D270 controller connector



FIGURE 4 Governor wires

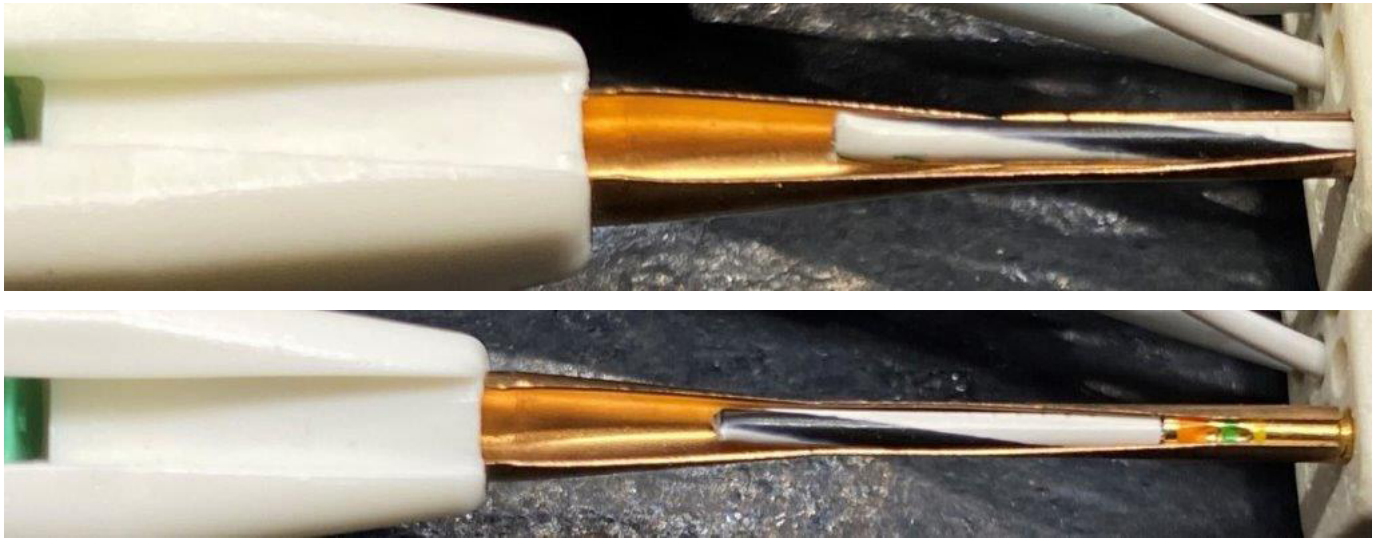


FIGURE 5 Socket extraction



FIGURE 6 Remove wires (-572) & (-2886)

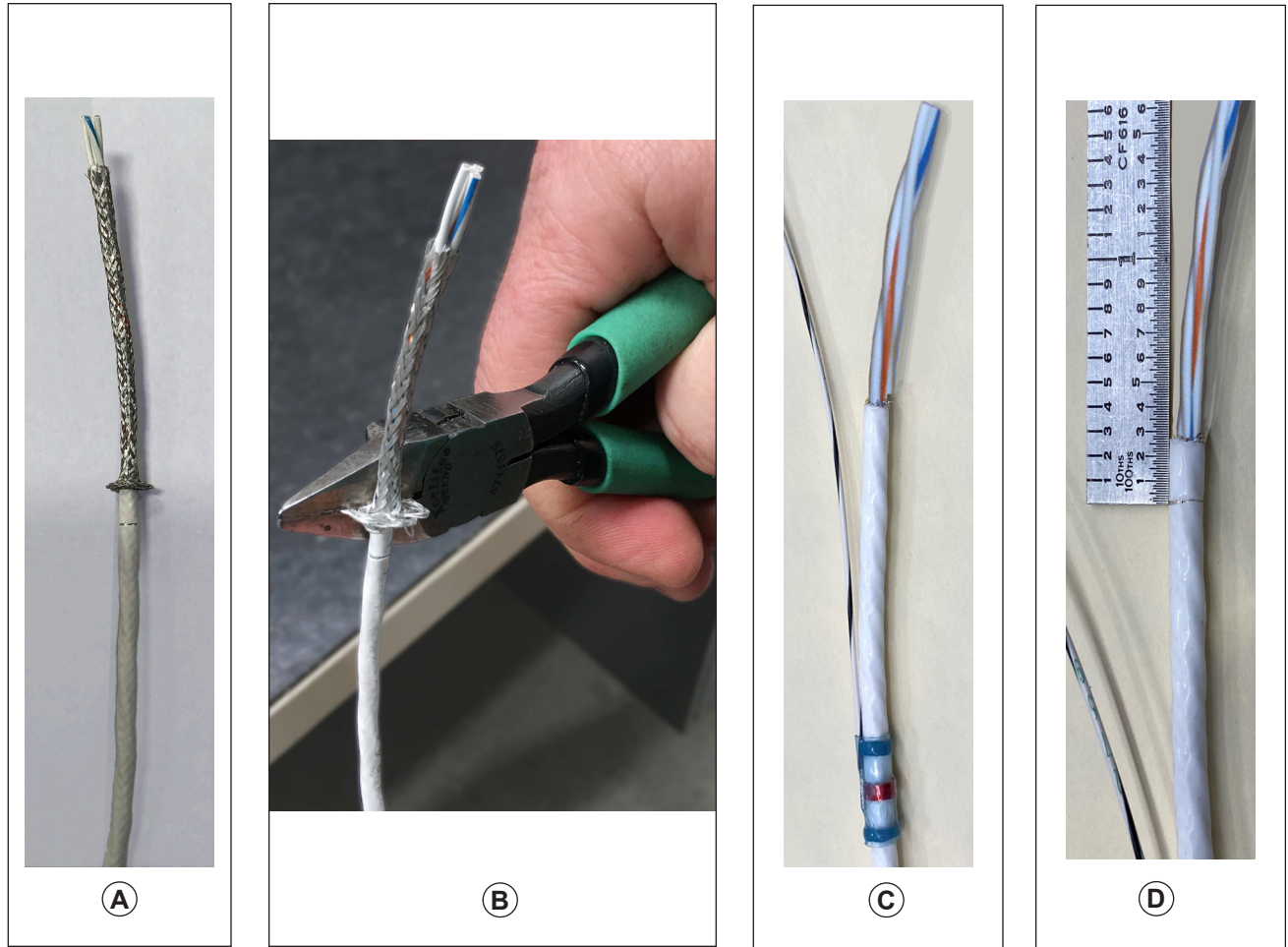


FIGURE 7 Removing outer jacket & braided shielding
(wiring shown is typical)



FIGURE 8 B267-3 terminator
(positioned for installation; wiring shown is typical)

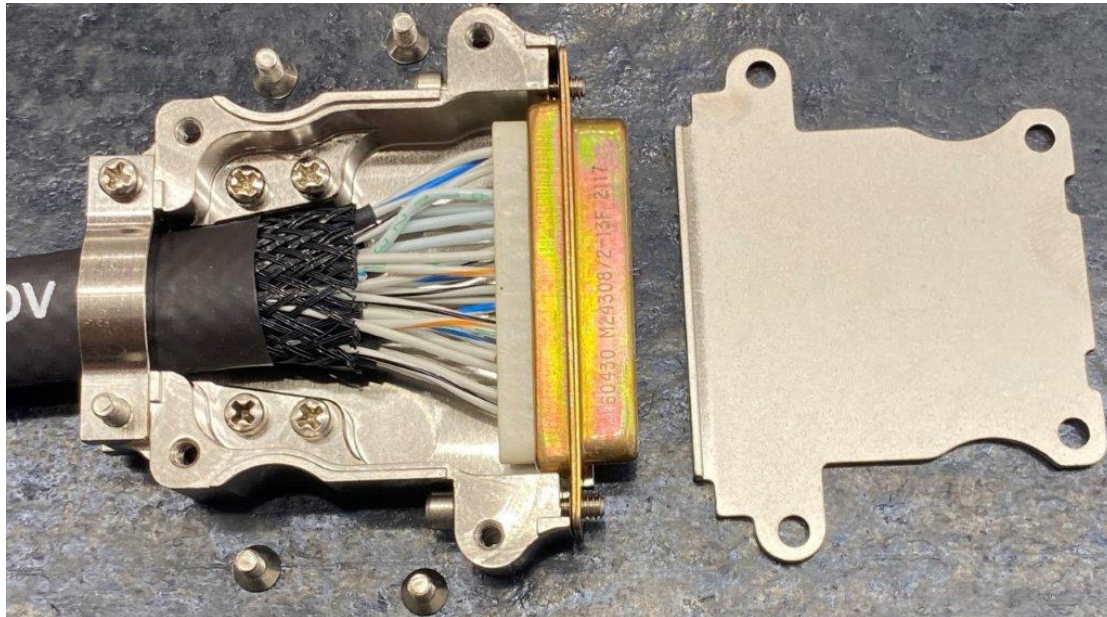
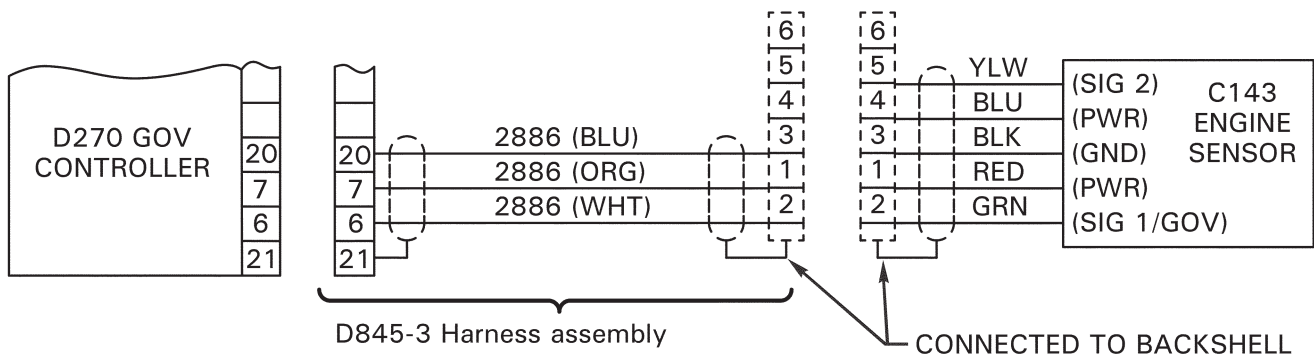


FIGURE 9 Proper wire installation
(before installing backshell)

CONDITIONS:		
1. Ohmmeter positive lead connected to ring terminal of D845-2 harness assembly tool 2. Governor controller connector disconnected 3. D845-3 harness and C143-5 sensor disconnected		
Insert pin of D845-2 harness assembly tool into socket at governor connector location:	Touch ohmmeter negative probe to:	Required result:
20	Location 3	CLOSED
20	Location 1	open
20	Location 2	open
20	Metal Backshell	open
7	Location 3	open
7	Location 1	CLOSED
7	Location 2	open
7	Metal Backshell	open
6	Location 3	open
6	Location 1	open
6	Location 2	CLOSED
6	Metal Backshell	open
21	Location 3	open
21	Location 1	open
21	Location 2	open
21	Metal Backshell	CLOSED



APPENDIX A