

**R22-series Governor & Engine RPM Sensor Connector Upgrade Kit Instructions**  
*To comply with R22 Service Bulletin SB-119.*

**NOTE**

Visit [www.robinsonheli.com](http://www.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-288Instr.	Kit Instructions . . . . .	1
2	B158-01-1IN	Heat Shrink – 1/16-inch diameter, 1 inch length . . . . .	2
3	B158-406-KI-287	Heat Shrink – 3/8-inch diameter (marked “R44 SB-111 R22 SB-119”) . . . . .	1
4	B260-3	Terminal – Ring (includes [1] spare) . . . . .	2
5	B263-1	Pin (includes [2] spares) . . . . .	6
6	B263-2	Socket (includes [2] spares) . . . . .	6
7	B263-18	Housing – 6-Pin . . . . .	1
8	B263-19	Housing – 6-Socket . . . . .	1
9	B267-3	Solder Sleeve – Terminator (includes [1] spare) . . . . .	3
10	D845-2	Harness Assembly – Tool (labeled “HIGH DENSITY PIN TOOL”) . . . . .	1
11	61183	Gasket (Lycoming part number) . . . . .	1
12	STD-160	Lockwasher (Lycoming part number) . . . . .	4
13	305183	Pin & Socket Extractor – Amp . . . . .	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

**Special Tools**

- Flush wire cutters, new or newly sharpened, for 20-24 AWG
- Wire strippers, 20 & 22 AWG
- Type-F crimping tool for 20 & 22 AWG (Tyco 91528-1, or equivalent)
- 10X magnifier (RHC P/N 10XMAG, or equivalent)
- Adjustable heat gun with reflector [nozzle] capable of 400°F-700°F

**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). Remove A378 LH & RH skirts and panels (ref IPC Figure 53-1). Remove A465-4 vertical panel between seat backs, and remove RH seat back (ref IPC Figure 25-1).

**Kit Instructions (continued)**

- 3. Refer to IPC Figure 96-23B, item 43. Locate C143-1 sensor wiring connection to airframe harness. Do not remove ty-raps until step 5.
- 4. Refer to Figure 1. Examine sensor-to-airframe connection. Determine if ty-rap securing sensor 4-pin housing to airframe 4-socket housing is pinching any wire(s); record damage.

**NOTE**

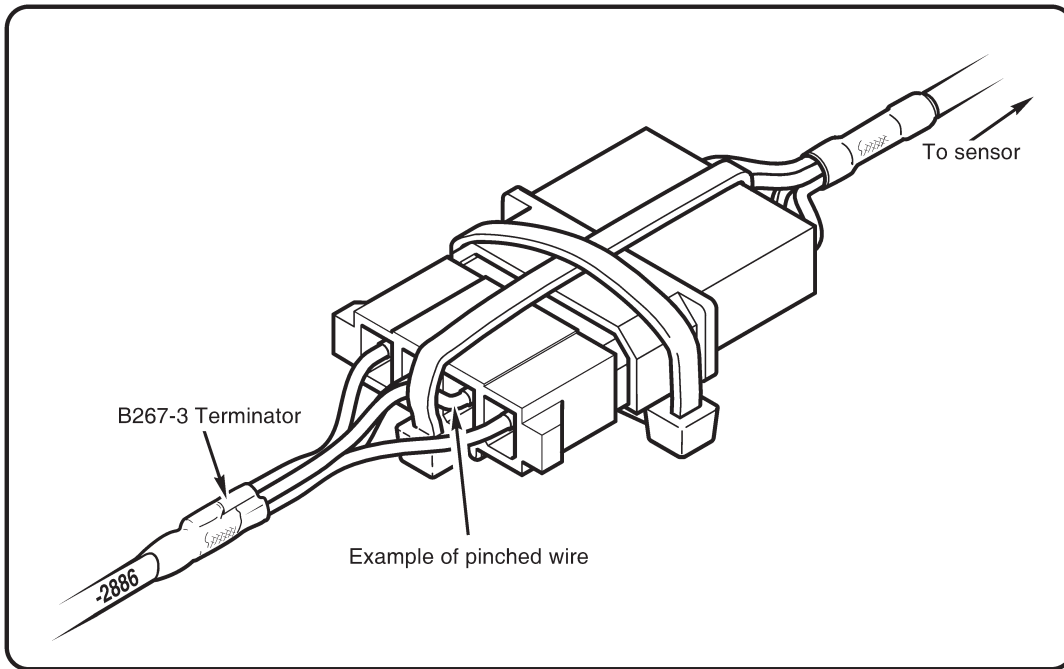
Parenthetic dash numbers, such as (-2886), indicate number marked on wiring insulation (if single conductor), or jacket (if multi-conductor and/or shielded).

- 5. Carefully remove both ty-raps from sensor-to-airframe connection. Disconnect the housings.

**NOTE**

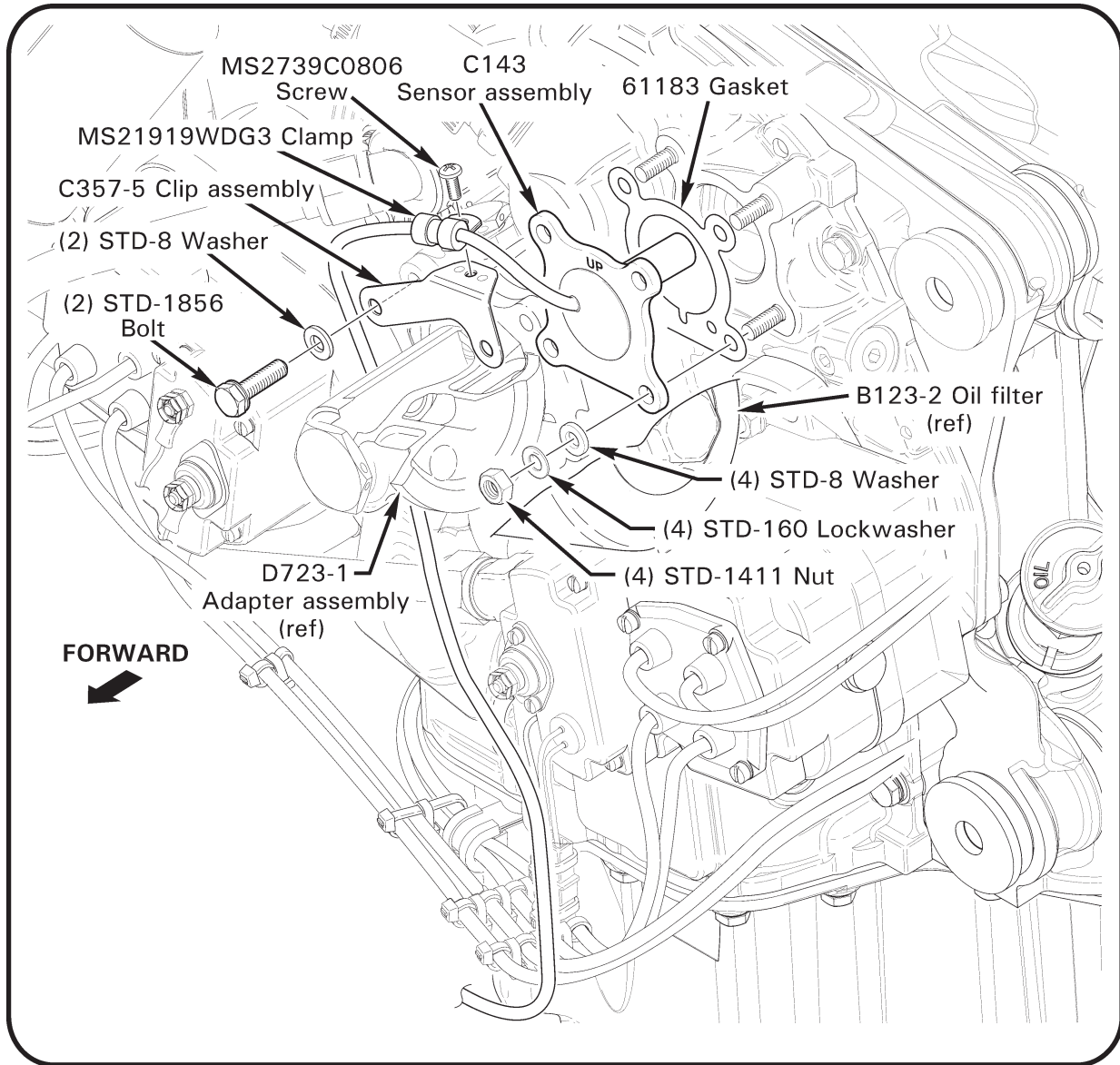
As required, remove adjacent ty-raps to complete following steps.

- 6. Refer to Figure 2. Remove C143-1 sensor from engine. Recent helicopters have an MS21919WDG3 clamp securing sensor harness to oil filter housing; as required, remove oil filter and disconnect clamp. Remove gasket. Temporarily cover engine openings. Discard (4) internal teeth lockwashers.



**FIGURE 1 Inspect existing C143 sensor connection**  
(example of potential damage, location typical)

**Kit Instructions (continued)**

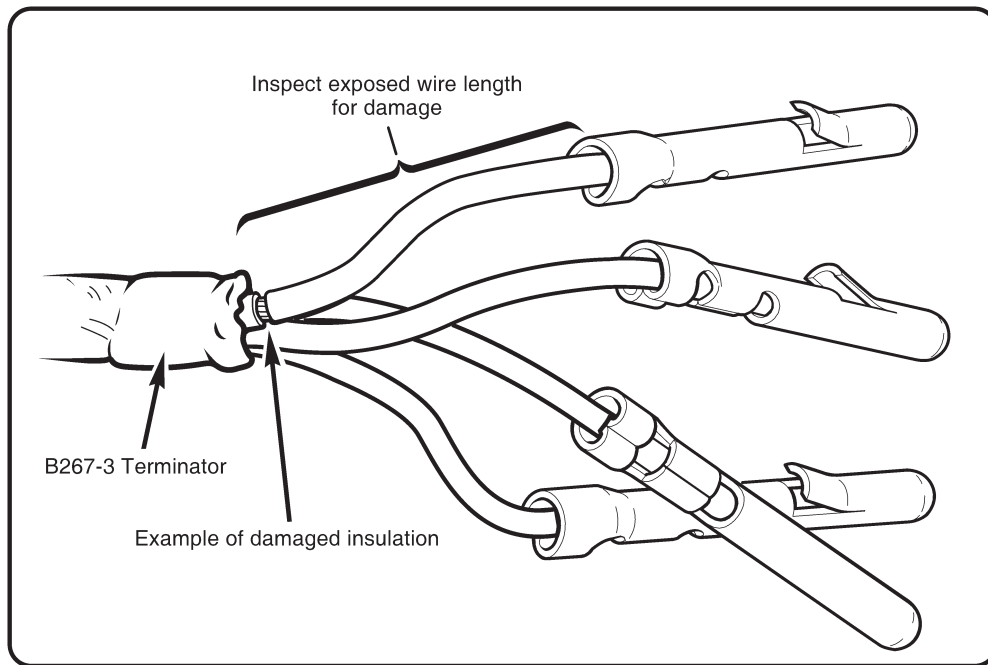


**FIGURE 2 Sensor assembly installed on engine**  
(newer helicopter configuration shown)

7. Using Amp p/n 305183 pin extractor (or similar), extract pins from sensor harness' 4-pin housing. Using 10X magnification:
  - a. Refer to Figure 3. Determine if wire insulation between pins and shielding terminator is damaged; record any damage.
  - b. Inspect crimps on four pins per MM § 23-84. Verify no broken or nicked conductors (wire strands). Record damage.

If sensor wiring is damaged, cut off blue B267 terminator and repair per steps 8 thru 12. Optionally, C143-1 sensor may be returned to RHC for repair. Proceed to step 13 if sensor wiring is undamaged.

**Kit Instructions (continued)**



**FIGURE 3 Inspect C143 sensor connector wires**  
(example of potential damage, location typical)

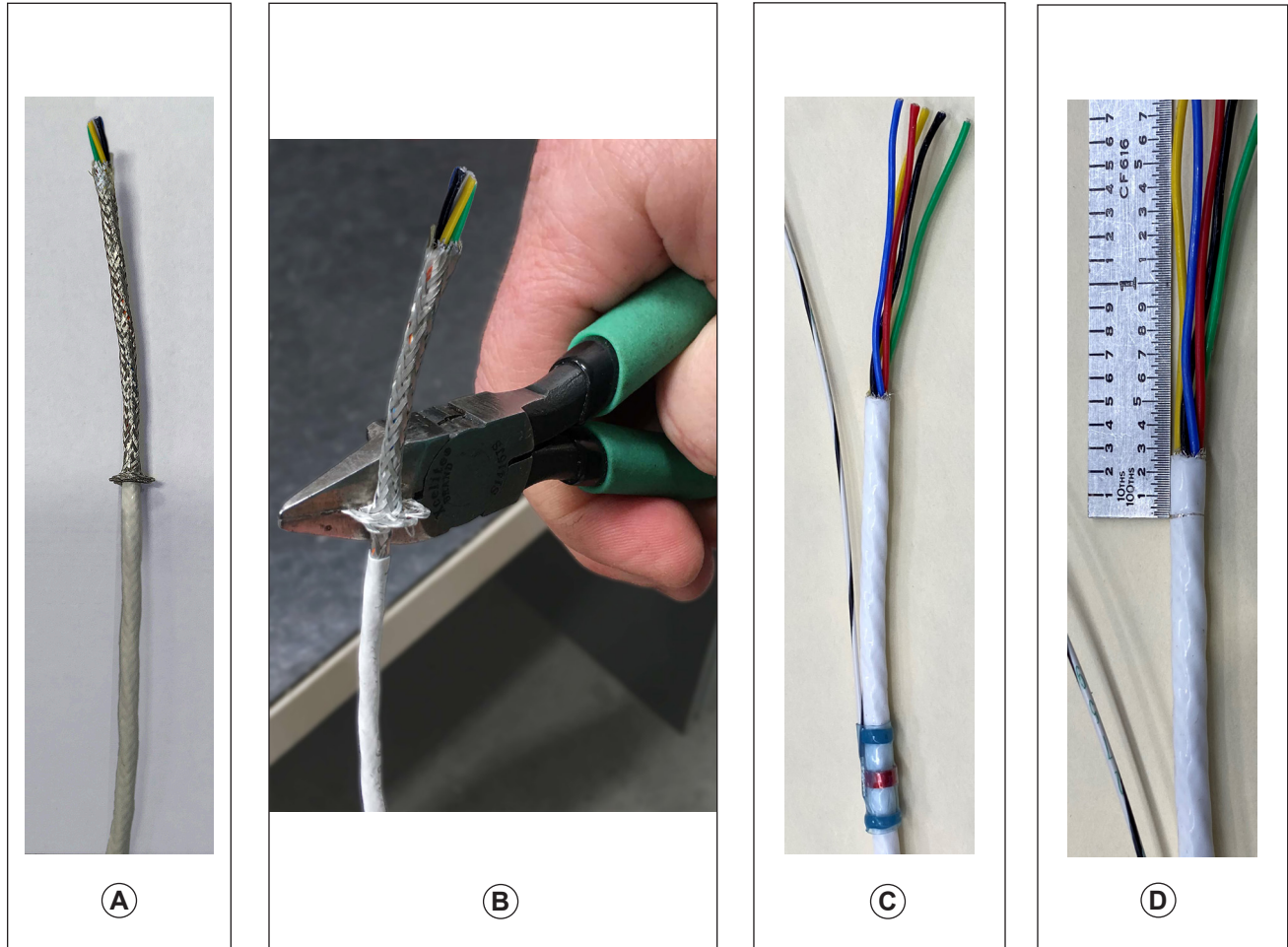
**CAUTION**

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

8. Refer to Figure 4. 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.
9. 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 1/4 inch from stripped jacket end, being careful not to damage shielding or internal wires (D). Remove scored 1/4 inch jacket piece, exposing shielding 1/4 inch beyond outer jacket.
10. Refer to Figure 5. 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 inner wires.

**CAUTION**

Do not trim blue adhesive squeeze-out from terminator.



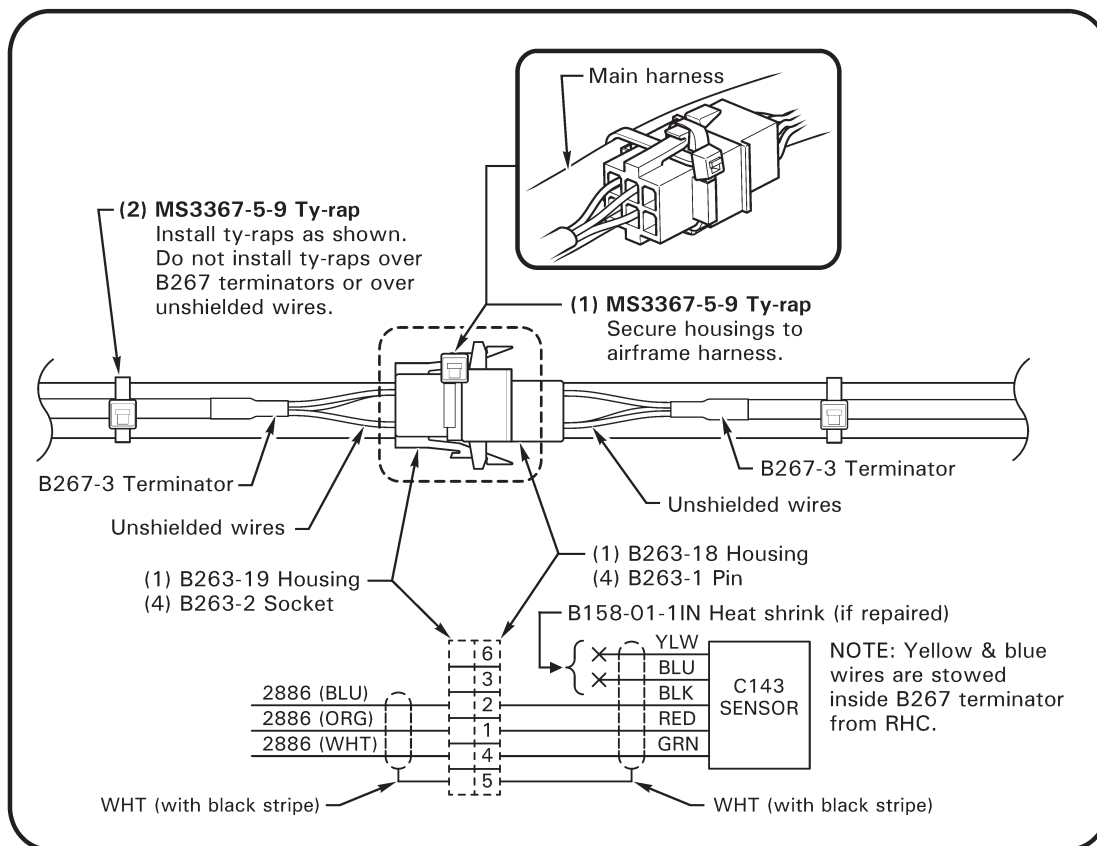
**FIGURE 4 Removing outer jacket & braided shielding**  
(wiring shown is typical)



**FIGURE 5 B267-3 terminator**  
(positioned for installation; wiring shown is typical)

**Kit Instructions (continued)**

11. Center B158-01-1IN heat shrink on end of yellow (YLW) wire. Apply 400°F heat using heat gun. While heat shrink is hot, pinch and close the open end using smooth jaw pliers. Allow to cool. Repeat procedure for blue (BLU) wire.
12. Strip 0.18-inch insulation from red, green, black, and black-striped wires. Crimp B263-1 pin onto each wire. Using 10X magnification, inspect crimps per MM § 23-84. Verify no nicked or broken conductors (wire strands), and no insulation damage. As required, gently pry locking lance with fingernail so lance protrudes (lance will not lock in housing unless it protrudes).
13. Slide B158-406-KI-287 blue heat shrink onto sensor harness; position heat shrink on jacketing approximately 3 inches from terminator and apply 400°F heat using heat gun.
14. Refer to Figure 6. Insert 4 wires & pins into B263-18 housing. Verify security.
15. Refer to Figure 2. Remove temporary covers from engine openings. Using new 61183 gasket and (4) new STD-160 lockwashers, install C143-1 sensor on engine with engraved “UP” at top. Torque nuts to 96 inch-pounds. As applicable, attach clamp to sensor harness and secure clamp to clip with screw. Install oil filter.
16. On bottom, aft side of vertical firewall tunnel, remove & retain white B270-5 sealant surrounding airframe harness.



**FIGURE 6 Schematic & sensor 6-pin connector**  
(connector position typical)

**Kit Instructions (continued)****NOTE**

Aft of firewall, recent helicopters have a shielded multi-conductor wire (-2886), while earlier helicopters have separate wires (-2886), (-2887), & shielded (-2888); refer to Appendix A schematic.

17. Remove all ty-raps securing airframe wire (-2886), or wires (-2886), (-2887), & (-2888) aft of vertical firewall. Remove 4-socket housing by removing sockets & attached wires using 305183 extractor.
18. Using 10X magnification, visually inspect airframe wire (-2886), or wires (-2886), (-2887), & (-2888) at & aft of vertical firewall tunnel, and inspect attached sockets per MM § 23-84. Verify no nicked or broken conductors (wire strands), and no insulation damage; record damage. If there is any recorded damage to unshielded wires (-2887) and/or (-2888) then, leaving as much wire as possible, cut socket off wire(s) and repair per step 23.
19. If there is any recorded damage to airframe shielded wire (-2886) or (-2888) between terminator and socket(s) then, leaving as much wire as possible, cut terminator off airframe wire and repair wire per steps 20 thru 23. If there is no recorded damage to airframe shielded wire (-2886) or (-2888), proceed to step 24.

**CAUTION**

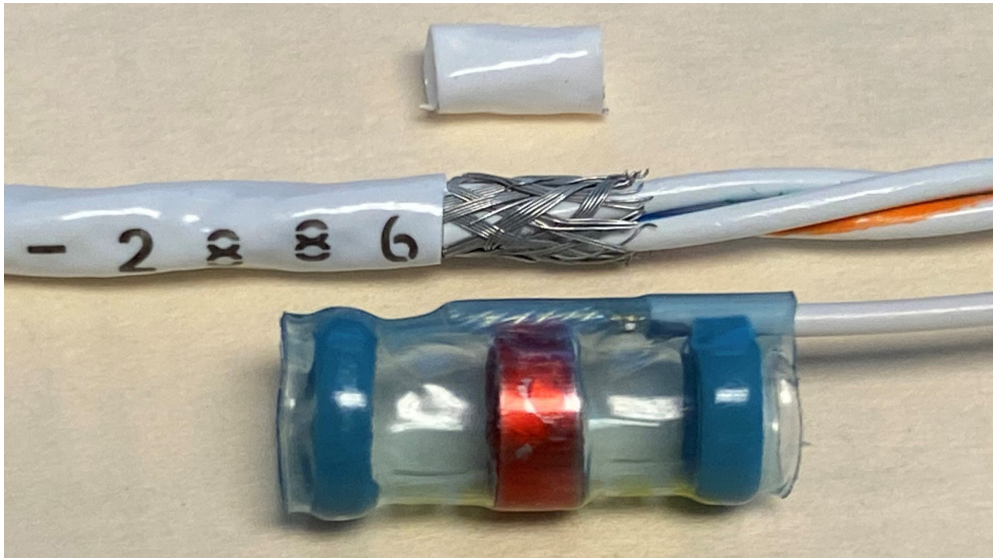
Trimmed shielding strands are conductive. Prevent contaminating connectors or wiring by holding a vacuum hose adjacent to wire to capture debris during cutting.

20. Refer to Figure 4. Lightly score (cut without fully penetrating) white outer jacket of airframe wire (-2886) approximately 1.75 inches from cut-off 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.
21. Refer to Figure 7. Score jacket ¼ inch from stripped jacket end, being careful not to damage shielding or internal wires. Remove scored ¼ inch jacket piece, exposing shielding ¼ inch beyond outer jacket.
22. Refer to Figure 8. With attached black-striped wire pointing toward inner wires, slide B267-3 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 inner wires.

**CAUTION**

Do not trim blue adhesive squeeze-out from terminator.

23. Strip 0.18-inch insulation from cut wires. Crimp B263-2 socket onto each wire. Using 10X magnification, inspect crimps per MM § 23-84. Verify no nicked or broken conductors (wire strands), and no insulation damage.

**Kit Instructions (continued)****FIGURE 7 Prepare wire (-2886)****FIGURE 8 Proper installation of terminator**

24. Refer to applicable schematic in Appendix A. As required, gently pry locking lance on B263-2 socket with fingernail so lance protrudes (socket will not lock in housing unless lance protrudes). Insert 4 wires & sockets into B263-19 housing. Verify security.
25. 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.
26. Secure connector to D270-1 governor controller.
27. Connect 6-pin & 6-socket housings and secure to airframe harness with MS3367-5-9 ty-rap per Figure 6. Ensure harness has sufficient slack and does not preload wires.



**Kit Instructions (continued)**

28. Install additional MS3367-4-9 & MS3367-5-9 ty-raps as required to secure remainder of sensor and airframe wiring; do not install ty-raps over B267 terminators or over unshielded portion of multi-conductor wires (refer to Figure 6).
29. With second person manipulating flight controls thru range of travel, verify clearance between harnesses and controls. Correct discrepancy(s).
30. Connect negative (ground) cable from battery per MM § 33-10.
31. Install A378 LH & RH skirts and panels. Install RH seat back and A465-4 vertical panel between seat backs.
32. Make appropriate maintenance record entries. Weight and Balance change is negligible.

**APPENDIX A**

CONDITIONS:		
1. Ohmmeter positive lead connected to ring terminal of D845-2 harness assembly tool		
2. Governor controller connector disconnected		
3. B263-19 housing disconnected		
4. Wire (-572) connected to ground stud		
Insert pin of D845-2 harness assembly tool into socket at governor connector location:	Touch ohmeter negative probe to	Required result:
3	Socket at B263-19 location 1	open
3	Socket at B263-19 location 2	CLOSED
3	Socket at B263-19 location 4	open
3	Socket at B263-19 location 5	open
3	Ground stud	CLOSED
6	Socket at B263-19 location 1	open
6	Socket at B263-19 location 2	open
6	Socket at B263-19 location 4	CLOSED
6	Socket at B263-19 location 5	open
6	Ground stud	open
7	Socket at B263-19 location 1	CLOSED
7	Socket at B263-19 location 2	open
7	Socket at B263-19 location 4	open
7	Socket at B263-19 location 5	open
7	Ground stud	open
21	Socket at B263-19 location 1	open
21	Socket at B263-19 location 2	open
21	Socket at B263-19 location 4	open
21	Socket at B263-19 location 5	CLOSED
21	Ground stud	open

