

R44-series Governor & Engine RPM Sensor Connector Upgrade Kit Instructions
To comply with R44 Service Bulletin SB-111.

NOTE

Visit 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-287Instr.	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	D845-1	Harness Assembly Includes: B274-22 Wire, 22-gage, unshielded (marked “-572”) B274-322 Wire, 22-gage, shielded & jacketed, multi-conductor (marked “-2886”)	1
11	D845-2	Harness Assembly – Tool (labeled “HIGH DENSITY PIN TOOL”)	1
12	61183	Gasket (Lycoming part number)	1
13	STD-160	Lockwasher (Lycoming part number)	4
14	91067-1	Extraction, Removal & Insertion Tool (high density contact)	1
15	305183	Pin & Socket Extractor – Amp	1
16	MS3367-5-9+	Ty-rap (Note: “+” in part number indicates 20-qty pack)	1
17	MS3367-7-9+	Ty-rap (Note: “+” in part number indicates 10-qty pack)	1
18	NAS557-14A	Grommet	1

Special Tools

- 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)
- PIDG crimping tool (AMP 59824-1, 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. Remove engine LH, RH, and belly cowlings, aft tunnel covers, and LH aft seat back.
2. Ensure battery and avionics switches are off. Disconnect negative (ground) cable from battery R44 Maintenance Manual (MM) § 37-10.
3. Refer to R44 Illustrated Parts Catalog (IPC) Figure 96-63B, item 24. Locate C143-2 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. Remove all ty-raps securing wire (-2886) aft of vertical firewall. Cut wire (-2886) just aft of firewall.

NOTE

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

6. Refer to Figure 2. Remove C143-2 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.

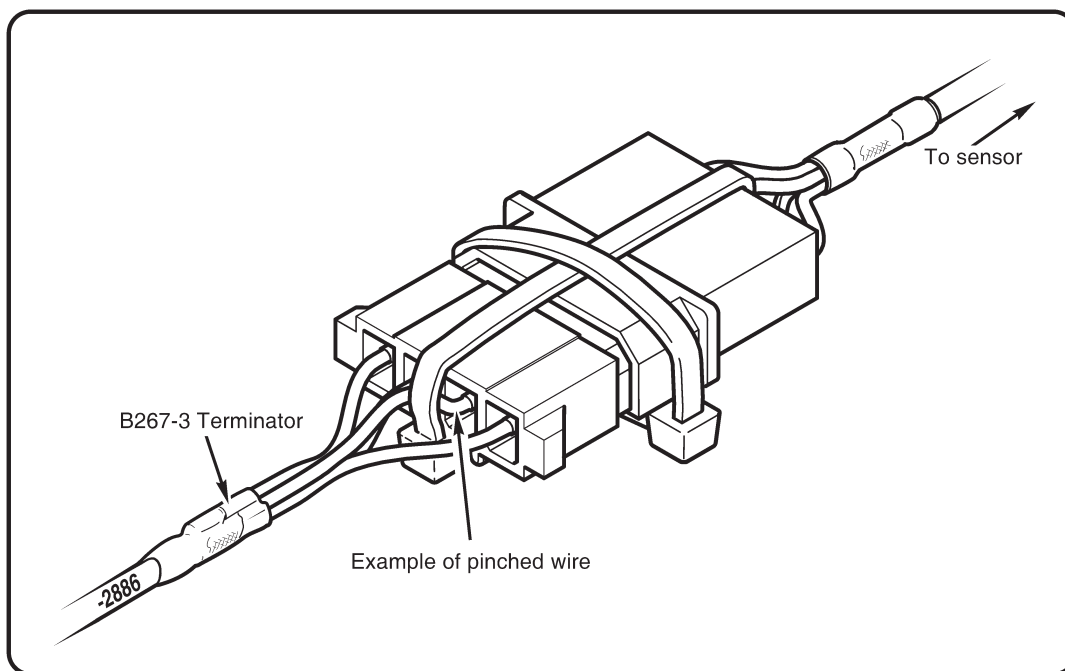


FIGURE 1 Inspect existing C143 sensor connection
(example of potential damage, location typical)

Kit Instructions (continued)

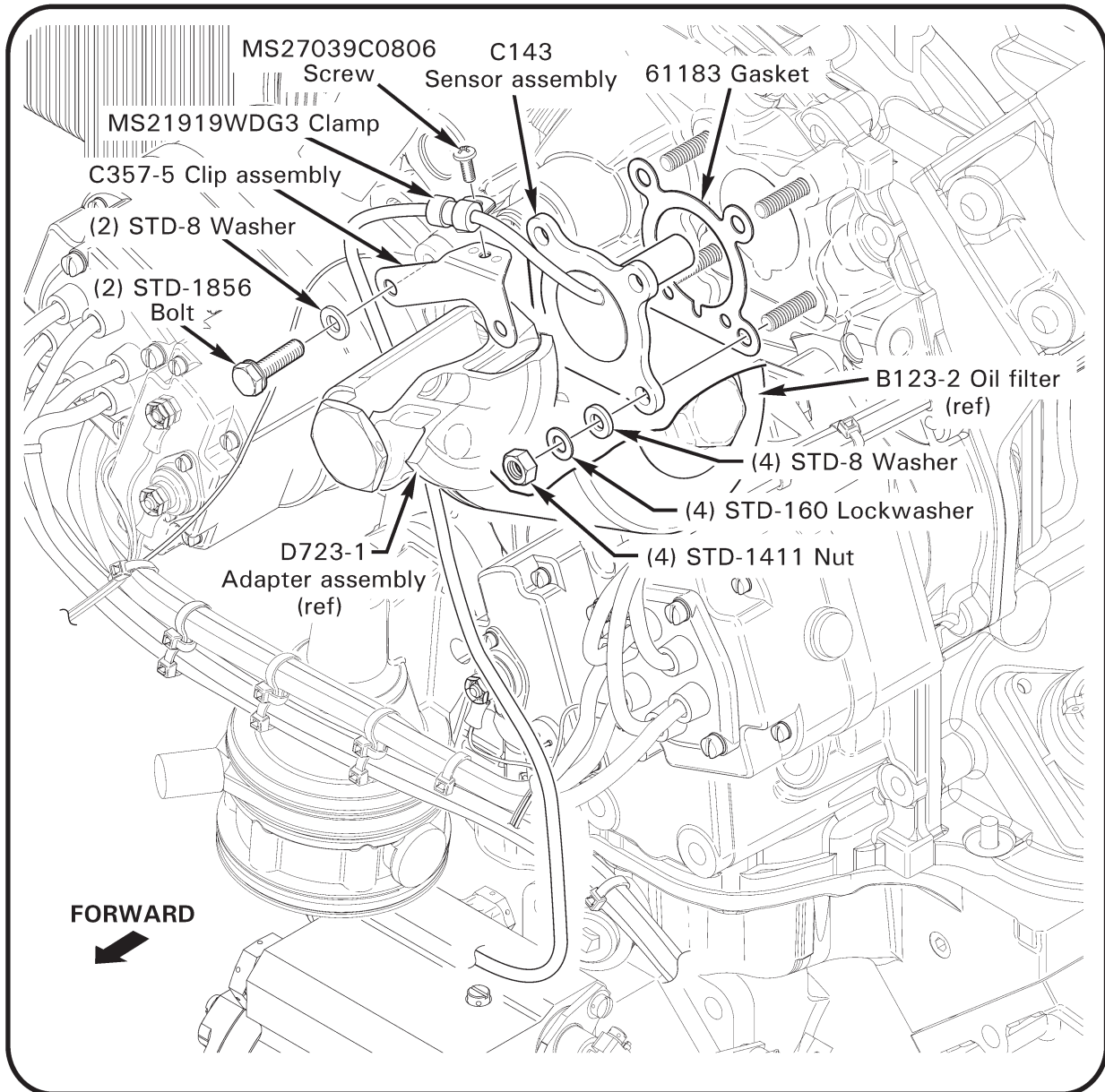


FIGURE 2 Sensor assembly installed on engine
(newer helicopter configuration shown)

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, C143-2 sensor may be returned to RHC for repair. Proceed to step 13 if sensor wiring is undamaged.

Kit Instructions (continued)

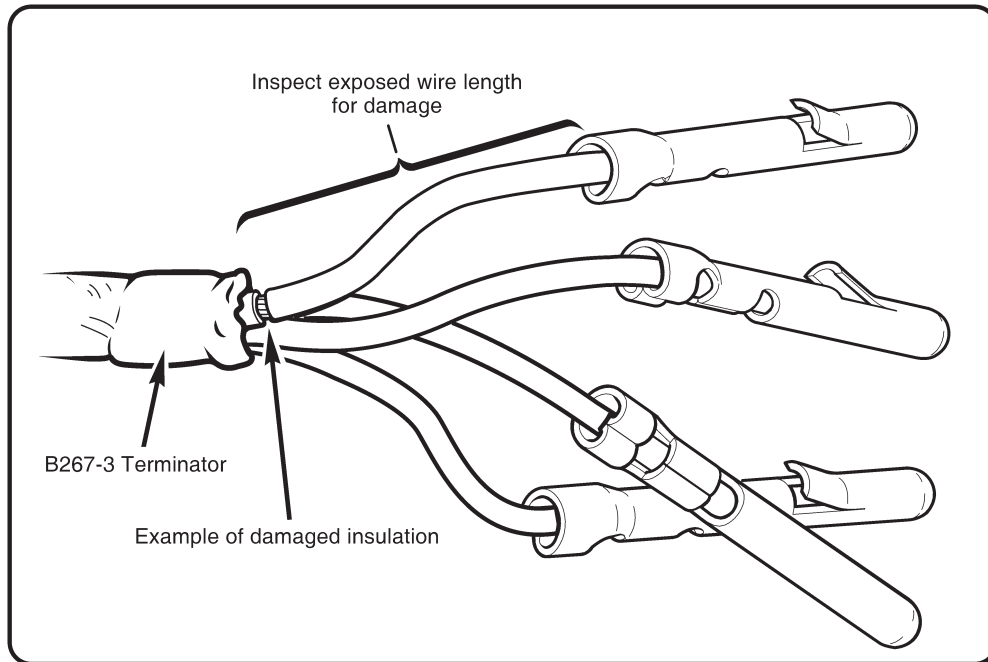


FIGURE 3 Inspect C143 sensor connector wires
(example of potential damage, location typical)

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.

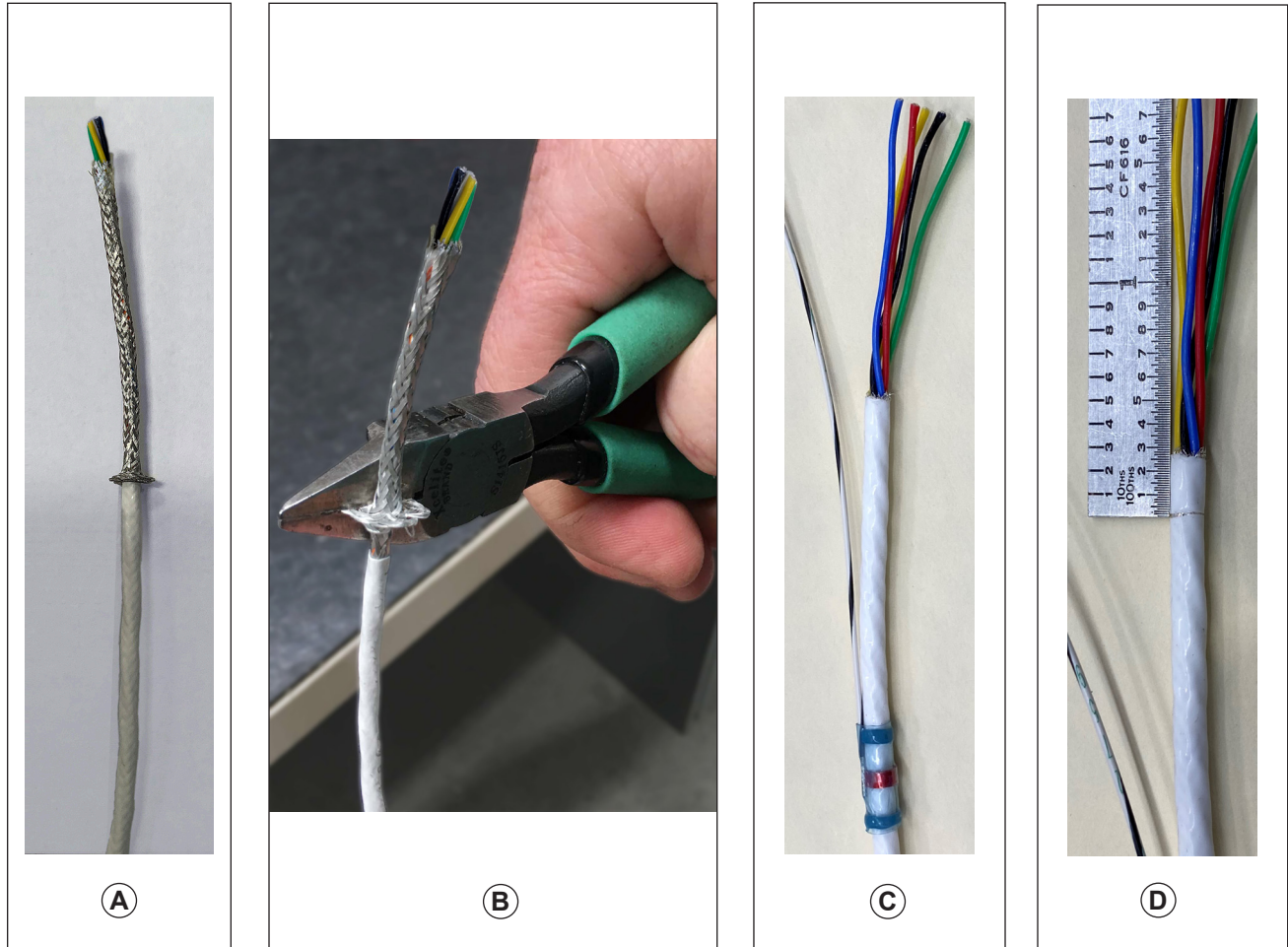


FIGURE 4 Removing outer jacket & braided shielding
(wiring shown is typical)



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 C143-2 sensor on engine with engraved “UP” at top. Torque nuts to 96 inch-pounds. As applicable, attach clamp to sensor harness. Secure clamp to clip with screw. Install oil filter.
16. Refer to Figure 7. In aft tunnel, approximately 3 inches forward of vertical firewall, locate MS21919WDG22 clamp around longitudinal (fore-aft) harness. Carefully remove ty-raps from longitudinal harness aft of clamp and 3 inches forward of clamp. Remove & retain clamp and hardware.

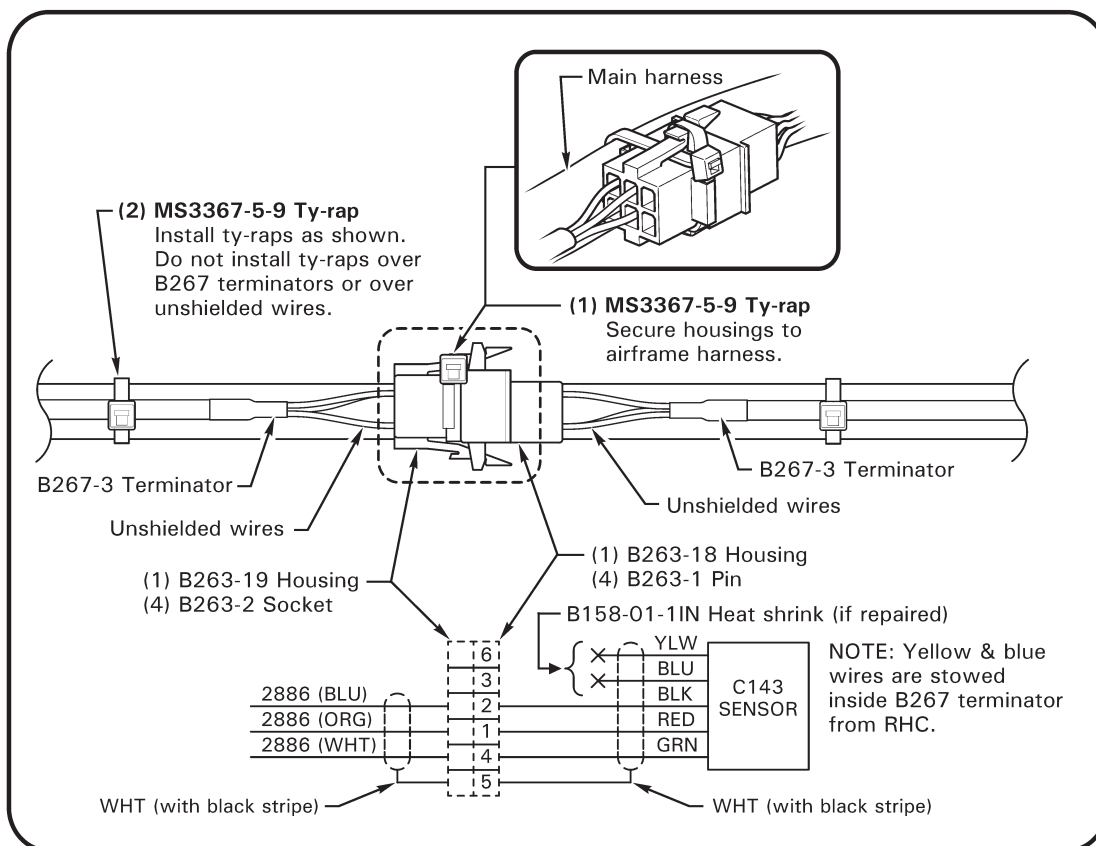


FIGURE 6 Schematic & sensor 6-pin connector
(connector position typical)

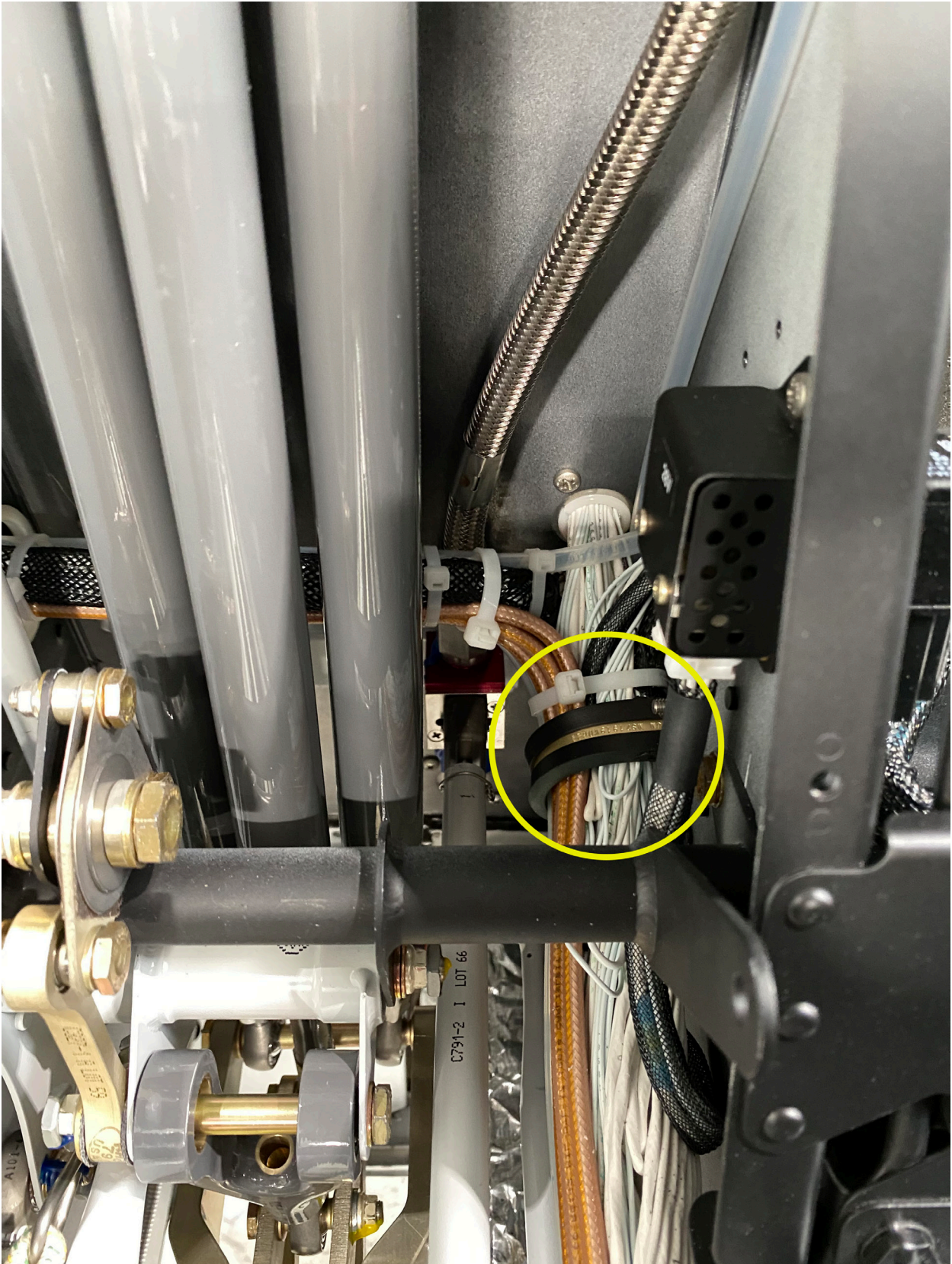
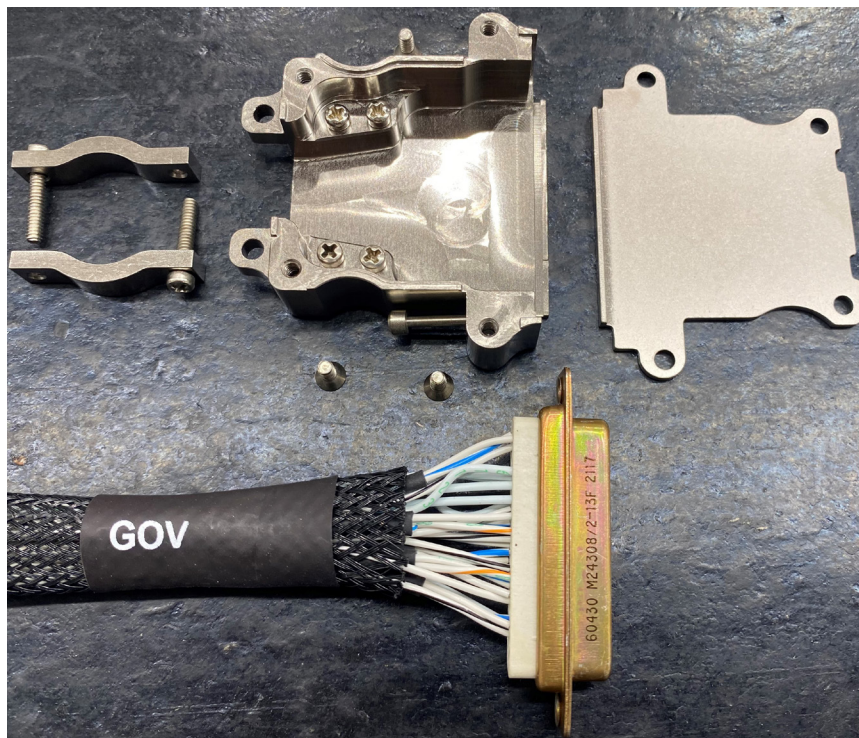


FIGURE 7 Location of clamp, ty-rap location typical
(fwd of firewall; view looking aft)

Kit Instructions (continued)

17. Refer to Figure 8. Disconnect large silver backshell & connector from D270 controller. Remove (4) screws securing cover and (2) screws securing clamp; remove backshell from connector.
18. 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.
19. Refer to Figure 9. 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 (-572) to connector location 3; cut wire 0.5-inch from connector.
 - c. Locate black-striped wire to connector location 21; cut wire 0.5-inch from connector.

**FIGURE 8 D270 controller connector**

Kit Instructions (continued)



FIGURE 9 Governor wires

20. Refer to Figure 10. 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).
21. On C351-1 brace (ref IPC Figure 25-1-4), locate ground stud inboard of D270-1 controller. Locate wire (-572) attached to ground stud and cut wire adjacent to ring terminal. Remove all ty-raps securing wire (-572).
22. On aft side of vertical firewall, remove & retain white B270-5 sealant surrounding longitudinal harness.

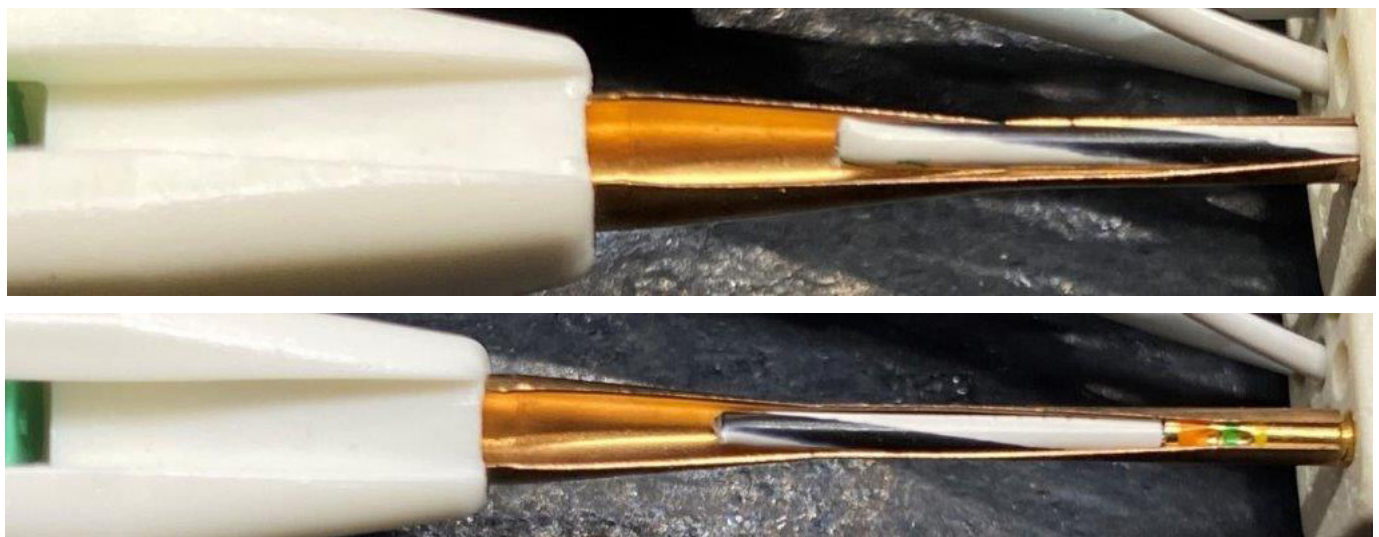


FIGURE 10 Socket extraction

Kit Instructions (continued)

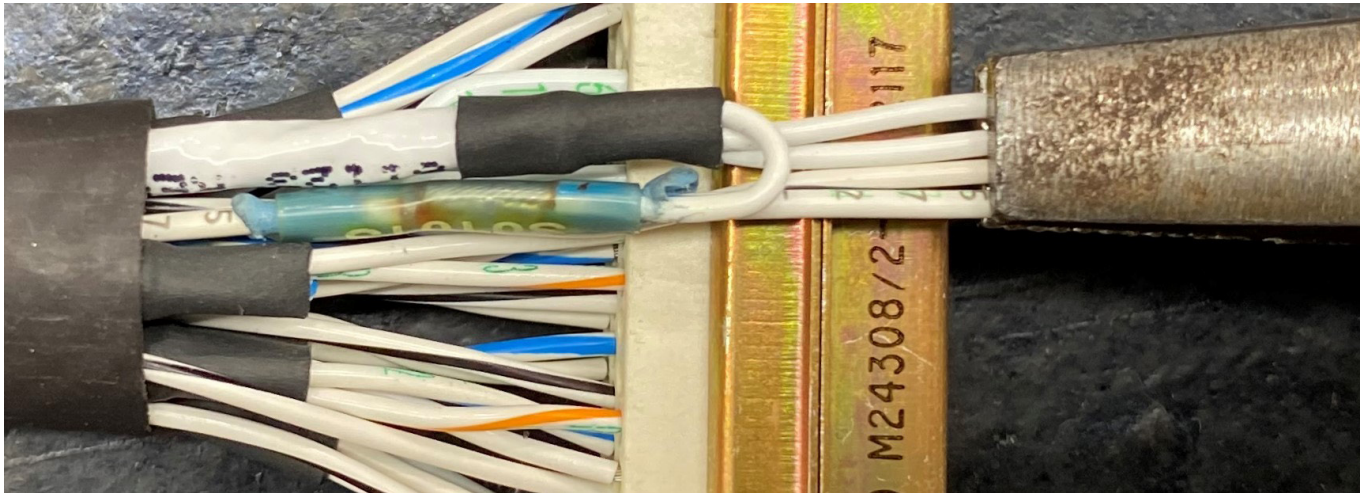


FIGURE 11 Remove wires (-572) & (-2886)

- 23. Refer to Figure 11. Using pliers, *slowly* pull & remove 4 previously cut wires and discard.
- 24. Refer to Figure 12. At connector, insert bare ends of wires (-572) & (-2886) on new D845-1 harness assembly thru GOV heat shrink and black expansion sleeve, and:
 - a. Route bare end of wire (-572) to ground stud on C351-1 brace, along adjacent wires.
 - b. Route bare end of wire (-2886) along longitudinal harness thru vertical firewall into engine compartment.

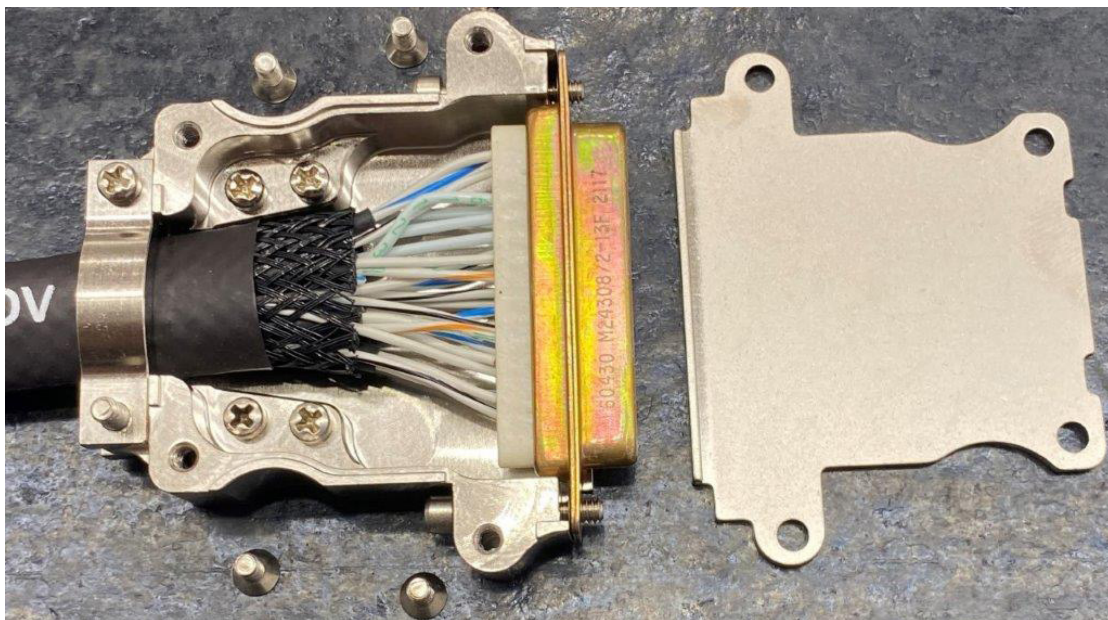
NOTE

If pushing wire (-2886) thru vertical firewall is difficult: temporarily remove sheet-metal clamps & existing nylon grommet where longitudinal harness penetrates firewall, then install supplied NAS557-14A grommet in firewall hole (to protect harness). After inserting (-2886) wire, remove NAS557-14A grommet then reinstall sheet metal clamps & existing grommet on harness.

- c. Insert socket on black-striped wire into governor connector location 21; verify security.
- d. Insert socket on wire (-572) into governor connector location 3; verify security.
- e. Insert socket on orange-striped wire into governor connector location 7; verify security.
- f. Insert socket on white wire into governor connector location 6; verify security.

Kit Instructions (continued)**FIGURE 12 Wire installation**

25. Refer to Figure 13. Slide black expansion sleeve under GOV heat shrink to within 1-inch of connector. Assemble backshell on connector. Ensure GOV heat shrink is clamped. Ensure both backshell flange & cover flange retains connector.

**FIGURE 13 Proper wire installation
(before installing backshell)**

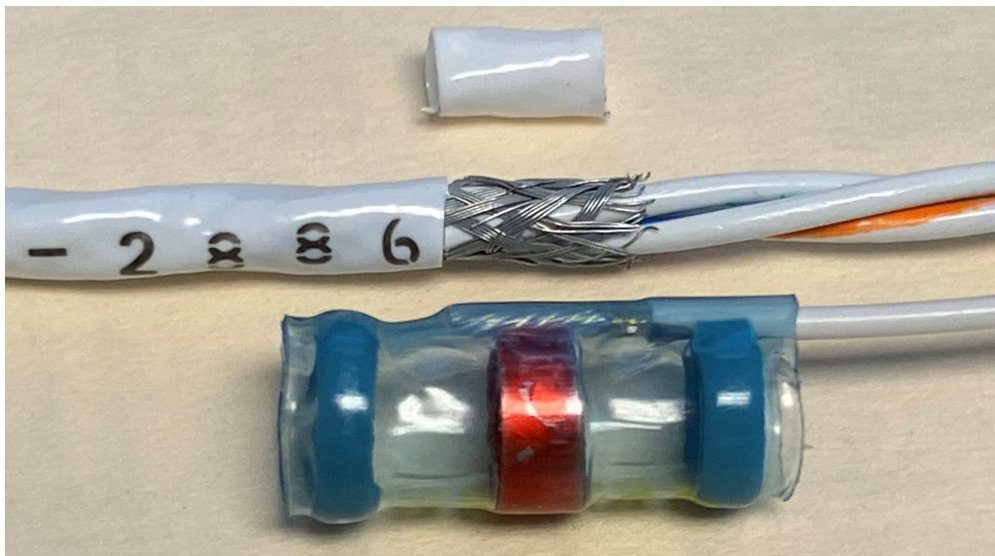
Kit Instructions (continued)

26. In aft tunnel, install & secure MS21919WDG22 clamp around longitudinal (fore-aft) harness approximately 3 inches forward of vertical firewall. As required, install MS3367-7-9 ty-raps around longitudinal harness forward & aft of clamp. Cinch ty-raps until snug without over-tightening, and trim tips flush with heads.
27. At ground stud on C351-1 brace, trim wire (-572) to allow slack, strip 0.25-inch insulation from end, and crimp on B260-3 ring terminal. Install & secure ring terminal to ground stud. As required, install MS3367-4-9 ty-raps to position wire (-572). Cinch ty-raps until snug without over-tightening, and trim tips flush with heads.
28. Locate bare end of wire (-2886) in engine compartment. Temporarily route wire to a location allowing convenient access. Cut wire (-2886), leaving a minimum of 12 inches aft of firewall to allow for jacket stripping, terminal installation & crimping, inspection, connection, routing & securing.

CAUTION

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

29. 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, and no insulation damage, by inspection using 10X magnification.
30. Refer to Figure 14. 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. Using 10X magnification, verify no insulation damage.

**FIGURE 14 Prepare wire (-2886)**

Kit Instructions (continued)

31. Refer to Figure 15. 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.

32. Strip 0.18-inch insulation from 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. As required, gently pry locking lance with fingernail so lance protrudes (lance will not lock in housing unless it protrudes).
33. Refer to Figure 6. Insert 4 wires & sockets into B263-19 housing. Verify security.
34. 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.
35. Secure silver connector to D270-1 governor controller.
36. 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.
37. 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).
38. Apply retained B270-5 sealant around harness exit on aft side of vertical firewall.
39. With second person manipulating flight controls thru range of travel, verify clearance between harnesses and controls. Correct discrepancy(s).
40. Connect negative (ground) cable from battery per MM § 37-10.
41. Install engine LH, RH, and belly cowlings, aft tunnel covers, and LH aft seat back.
42. Make appropriate maintenance record entries. Weight and Balance change is negligible.

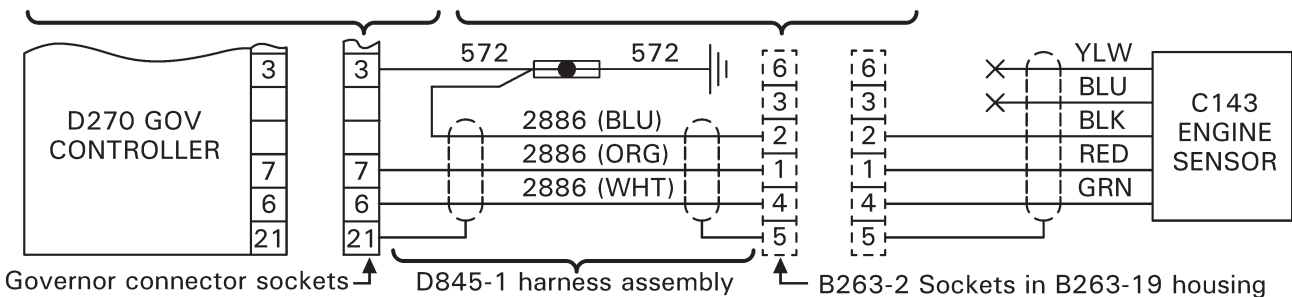


FIGURE 15 Proper installation of terminator

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 on C351-1 brace

Insert pin of D845-2 harness assembly tool into socket at governor connector location:	Touch ohmmeter 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



APPENDIX A