ESTERLINE-MASON AND WESTERN INDICATOR LAMP SOCKETS AND CONNECTORS

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ESTERLINE-MASON AND WESTERN INDICATOR LAMP SOCKETS AND CONNECTORS

1. PART NUMBERS AND DESCRIPTION

A. Lamp Socket and Connector Part Numbers

Table 1
LAMP SOCKET AND CONNECTOR PART NUMBERS

Part Number	Description	Supplier
502-70T-02	Lamp Socket	Esterline-Mason
502-70T-02	Lamp Socket	Western Indicator
514-74-13-02	Connector	Esterline-Mason
514-74-13-02	Connector	Western Indicator

Table 2
ALTERNATIVE LAMP SOCKET AND CONNECTOR PART NUMBERS

Specified Component		Alternative Component	
Part Number	**Supplier**	**Part Number**	**Supplier**
502-70T-02	Western Indicator	502-70T-02	Esterline-Mason
514-74-13-02	Western Indicator	514-74-13-02	Esterline-Mason

2. CONNECTOR DISASSEMBLY

A. Connector Removal

Table 3
CONNECTOR INSTALLATION AND REMOVAL TOOLS

Installation and Removal Tool	Supplier
ST2342L	Boeing
ST2342LA	Boeing

(1) Make a selection of the connector removal tool. Refer to Table 3.

(2) Disconnect the connector from the lamp socket.

ESTERLINE-MASON AND WESTERN INDICATOR LAMP SOCKETS AND CONNECTORS

3. CONNECTOR ASSEMBLY

A. Wire Preparation

Table 4
INSULATION REMOVAL LENGTH

Number of Wires	Wire Size (AWG)	Length (inch)		Special Instructions
		Target	Tolerance	
1	20	0.56	±0.03	Fold the conductor back
	22	0.25	±0.03	Fold the wire to make a loop
	24	0.25	±0.03	Fold the wire to make a loop
2	24	0.25	±0.03	Fold the wires to make a loop

(1) Remove the necessary length of insulation from the end of the wire. Refer to Table 4.

(2) If it is specified, fold the conductor back.

(3) If a loop is specified:

(a) Remove the same length of insulation from the other end of the wire.

(b) Fold the wire or wires to make a loop.

B. Contact Assembly

Table 5
CONTACT CRIMP TOOLS

Basic Unit	Supplier
CT514	Western Indicator
614464	Astro
614464	Buchanan

Table 6
ALTERNATIVE CONTACT CRIMP TOOLS

Specified Crimp Tool		Alternative Crimp Tool	
Basic Unit	Supplier	Basic Unit	Supplier
CT514	Western Indicator	614464	Astro
614464	Buchanan	614464	Astro

(1) Make a selection of the contact crimp tool. Refer to Table 5.

(2) Put the conductor or conductors into the contact crimp barrel.

(3) To adjust the crimp tool crimp depth, set the indentor opening of the crimp tool so that a Number 51 drill (0.067 inch) is lightly gripped by the indentors at the point of the ratchet release.

(4) Crimp the contact.

ESTERLINE-MASON AND WESTERN INDICATOR LAMP SOCKETS AND CONNECTORS

C. Connector Installation

(1) Make a selection of the connector installation tool from Table 3.

(2) Press the connector assembly onto the lamp socket until the internal ridge of the connector snaps over the lamp socket.

Make sure that the connector plastic hood has covered three threads on the lamp socket.

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

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ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

1. ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

NOTE: Refer to Subject 20-40-12 for the procedures to assemble the Grimes-Honeywell A-4135 Map Light.

A. Assembly of the Grimes-Honeywell A-8985 Flood Light

Table 1
A-8985 FLOOD LIGHT PART NUMBERS

Flood Light Part Number	Supplier
A-8985-1	Grimes-Honeywell
A-8985-10	Grimes-Honeywell
A-8985-15	Grimes-Honeywell
A-8985-16	Grimes-Honeywell
A-8985-17	Grimes-Honeywell
A-8985-2	Grimes-Honeywell
A-8985-3	Grimes-Honeywell
A-8985-4	Grimes-Honeywell
A-8985-5	Grimes-Honeywell
A-8985-6	Grimes-Honeywell
A-8985-7	Grimes-Honeywell
A-8985-8	Grimes-Honeywell
A-8985-9	Grimes-Honeywell

Table 2
LAMP BULBS FOR THE A-8985 FLOOD LIGHT

Flood Light Part Number	Lamp Bulb			
	Part Number	Voltage (Volts)	Current (Amps)	Supplier
A-8985-1	MS35478-307	28.0	0.67	QPL
A-8985-10	GE-1665	28.0	0.80	GE
A-8985-15	MS35478-307	28.0	0.67	QPL
A-8985-16	GE-1665	28.0	0.80	GE
A-8985-17	GE-1665	28.0	0.80	GE
A-8985-2	MS35478-307	28.0	0.67	QPL
A-8985-3	MS35478-307	28.0	0.67	QPL
A-8985-4	MS35478-307	28.0	0.67	QPL
A-8985-5	GE-1665	28.0	0.80	GE
A-8985-6	GE-1665	28.0	0.80	GE
A-8985-7	MS35478-1691	28.0	0.59	QPL
A-8985-8	MS35478-1691	28.0	0.59	QPL

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

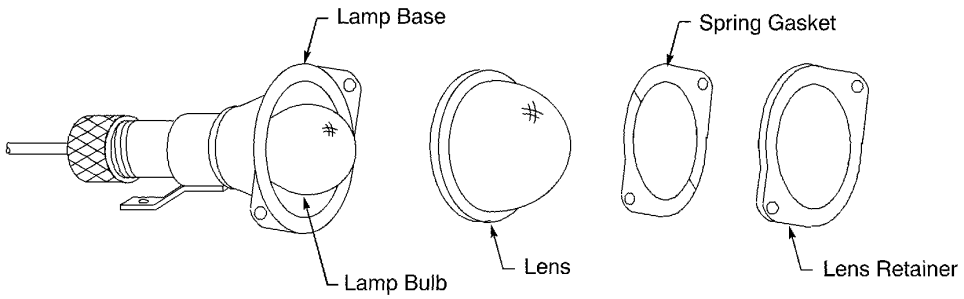
Table 2 LAMP BULBS FOR THE A-8985 FLOOD LIGHT (Continued)

Flood Light Part Number	Lamp Bulb			
	Part Number	Voltage (Volts)	Current (Amps)	Supplier
A-8985-9	GE-1665	28.0	0.80	GE

Table 3
CONTACTS FOR THE A-8985 FLOOD LIGHT

Flood Light Part Number	Contact	
	Part Number	Supplier
A-8985-1	A-8331-1	Grimes-Honeywell
A-8985-10	60-1541-1	Grimes-Honeywell
A-8985-103	A-8331-1	Grimes-Honeywell
A-8985-11	A-8331-1	Grimes-Honeywell
A-8985-12	A-8331-1	Grimes-Honeywell
A-8985-13	A-8331-1	Grimes-Honeywell
A-8985-14	A-8331-1	Grimes-Honeywell
A-8985-15	A-8331-1	Grimes-Honeywell
A-8985-16	60-1541-1	Grimes-Honeywell
A-8985-17	60-1541-1	Grimes-Honeywell
A-8985-2	A-8331-1	Grimes-Honeywell
A-8985-3	A-8331-1	Grimes-Honeywell
A-8985-4	A-8331-1	Grimes-Honeywell
A-8985-5	A-8331-1	Grimes-Honeywell
A-8985-6	A-8331-1	Grimes-Honeywell
A-8985-7	A-8331-1	Grimes-Honeywell
A-8985-8	A-8331-1	Grimes-Honeywell
A-8985-9	60-1541-1	Grimes-Honeywell

(1) Lamp Bulb Replacement:



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GRIMES-HONEYWELL A-8985 FLOOD LIGHT - LAMP BASE AND LENS
Figure 1

Refer to Figure 1:

(a) Remove the screws and nuts that hold the lens to the front of the lamp base.

(b) Remove the lens retainer, the spring gasket, and the lens from the lamp base.

(c) Push the old lamp bulb into the bulb socket until it stops.

(d) While you hold the old lamp bulb in, turn it counterclockwise until it stops.

(e) Remove the old lamp bulb from the lamp bulb socket.

(f) Make a selection of a lamp bulb from Table 2.

(g) Push the new lamp bulb into the lamp bulb socket until it stops.

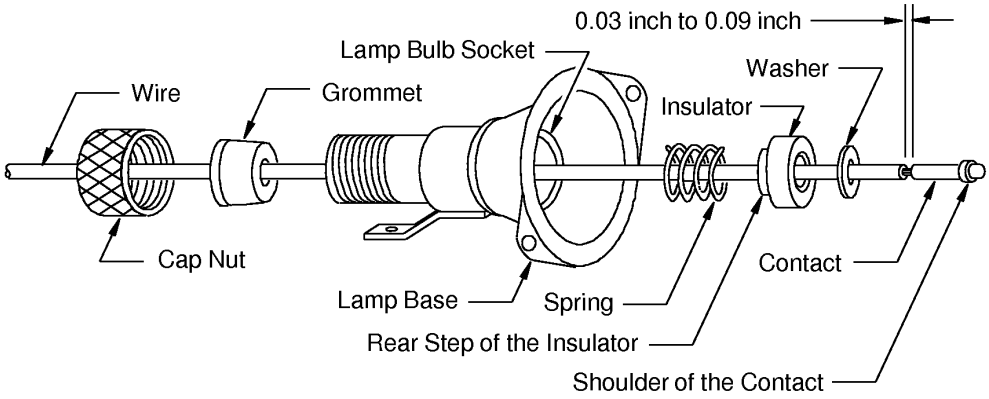
(h) While you hold the lamp bulb in, turn it clockwise until it stops.

Make sure that the new lamp bulb is locked it in its position.

(i) Put the lens, the spring gasket, and the lens retainer on the lamp base.

(j) Install the screws and nuts that hold the lens retainer, the lens, and the spring gasket to the front of the lamp base.

(2) Flood Light Disassembly:



GRIMES-HONEYWELL A-8985 FLOOD LIGHT
Figure 2

Refer to Figure 2.

(a) Remove the lamp bulb. Refer to Step 1.A.(1).

(b) At the rear of the lamp base, disengage the threads of the cap nut and the threads of the lamp base.

(c) Remove the cap nut from rear of the lamp base.

(d) Pull the grommet from the rear end of the lamp base.

(e) From the rear of the floodlight, push the wire forward into the lamp base.

(f) From the front of the lamp base, remove:

- The contact and wire assembly
- The washer
- The insulator
- The spring.

(3) Flood Light Assembly

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

Table 4
INSULATION REMOVAL LENGTH FOR THE A-8985 FLOOD LIGHT

Wire Size	Insulation Removal Length		Special Instructions
	Target (inch)	Tolerance (inch)	
20	0.50	± 0.02	Fold back the conductor
18	0.25	± 0.02	-

Table 5
CRIMP TOOLS FOR THE A-8985 FLOOD LIGHT CONTACT

Wire Size	Crimp Tool			
	Basic Unit	Locator	Setting	Supplier
20	M22520/1-01	M22520/1-02	5	QPL
18	M22520/1-01	M22520/1-02	5	QPL

Refer to Figure 2.

(a) Put the cap nut on the wire.

Make sure that the end of the cap nut that has the threads points forward to the end of the wire.

(b) Put the grommet on the wire.

Make sure that the smaller diameter end of the grommet points forward to the end of the wire.

(c) Put the lamp base on the wire.

Make sure that the threaded end of the lamp base points rearward, away from the end of the wire.

(d) Put the spring on the wire.

(e) Put the insulator on the wire.

Make sure that the large end of the insulator points forward to the end of the wire.

(f) Put the washer on the wire.

(g) Remove the correct length of insulation from the end of the wire. Refer to Table 4.

(h) Make a selection of a crimp tool from Table 5.

(i) Put the end of the wire into the contact.

Make sure that:

- The washer, the insulator, the spring, the lamp base, the grommet and the cap nut are on the wire. Refer to Figure 2.
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

(j) Crimp the contact.

(k) Put the washer against the shoulder of the contact.

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

(l) Put the spring, the insulator, the washer and the contact and wire assembly into the front of the lamp bulb socket.

Make sure that:

- The shoulder of the contact is against the washer
- The washer is in the counterbore of the insulator.

(m) Install the lamp bulb. Refer to Step 1.A.(1).

(n) Push the grommet into the end of the lamp base until it stops.

(o) Engage the threads of the cap nut and the threads of the lamp base.

(p) Tighten the cap nut.

(q) Install the lens, the spring gasket, and the lens retainer. Refer to Step 1.A.(1).

B. Assembly of the Grimes-Honeywell B-9845 Dome Light

Table 6
B-8945 DOME LIGHT PART NUMBERS

Part Number	Supplier
B-9845-()-1665	Grimes-Honeywell
B-9845-()-1691	Grimes-Honeywell
B-9845-()-303	Grimes-Honeywell
B-9845-()-305	Grimes-Honeywell
B-9845-()-307	Grimes-Honeywell

Table 7
LAMP BULBS FOR THE B-8945 DOME LIGHT

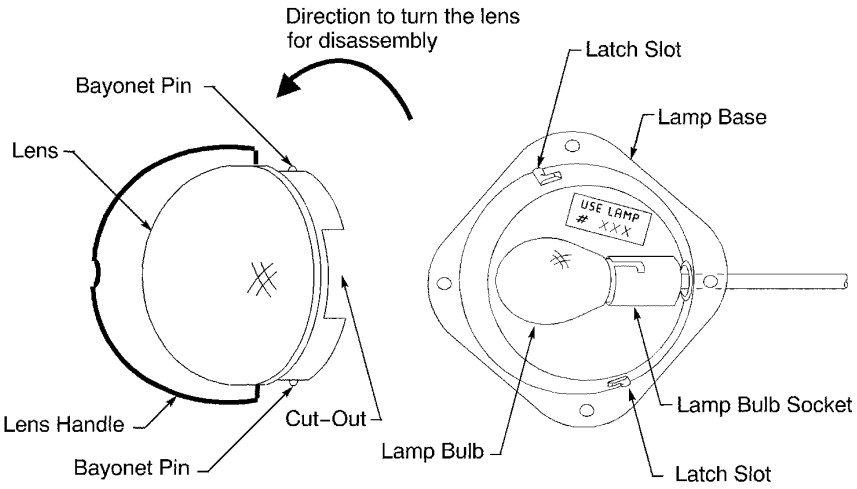
Dome Light Part Number	Lamp Bulb				
	Part Number	Voltage	Brightness (Candle Power)	Current (Amps)	Supplier
B-9845-()-1665	1665	28V	-	0.80	GE
B-9845-()-1691	1691	28V	-	0.61	GE
B-9845-()-303	303	28V	-	0.30	GE
B-9845-()-305	305	28V	15	0.51	GE
B-9845-()-307	307	28V	21	0.67	GE

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

Table 8
CONTACTS FOR THE B-9845 DOME LIGHT

Part Number	Supplier
TE-096	Grimes-Honeywell

(1) Lamp Bulb Replacement



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GRIMES-HONEYWELL B-8945 DOME LIGHT - LAMP BASE AND LENS
Figure 3

Refer to Figure 3.

(a) Pull the middle of the lens handle away from the lens.

(b) Use the lens handle to turn the lens in the counterclockwise direction until it stops.

(c) Use the lens handle to pull the lens from the lamp base.

(d) Push the old lamp bulb into the bulb socket until it stops.

(e) While you hold the old lamp bulb in, turn it counterclockwise until it stops.

(f) Remove the old lamp bulb from the lamp bulb socket.

(g) Make a selection of a lamp bulb from Table 7.

(h) Push the new lamp bulb into the lamp bulb socket until it stops.

(i) While you hold the new lamp bulb in, turn it clockwise until it stops.

Make sure that the new lamp bulb is locked it in its position

(j) Align the bayonet pins on the lens and the latch slots on the lamp base.

Make sure that the cut-out is aligned with the lamp bulb socket.

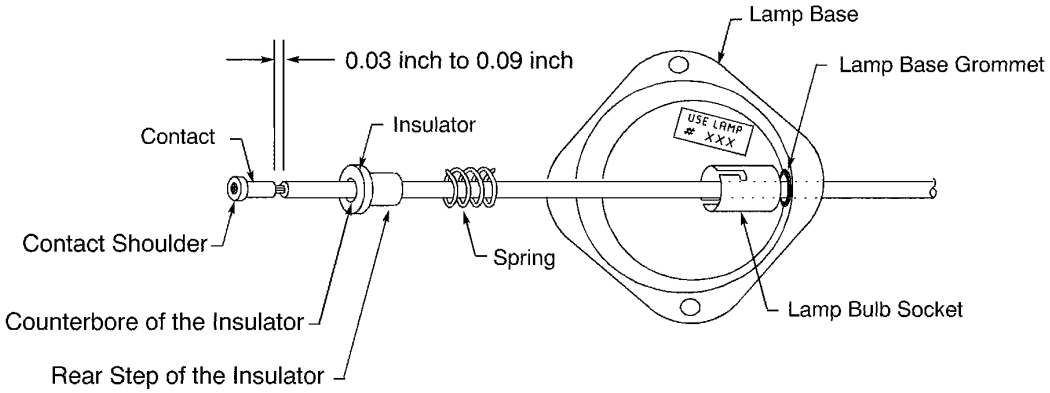
ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

(k) Push the lens into the lamp base until it stops.

(l) Use the lens handle to turn the lens in the clockwise direction until it stops. Make sure that the lens is locked to the lamp base.

(m) Push the middle of the lens cover handle against the lamp base.

(2) Dome Light Disassembly



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GRIMES-HONEYWELL B-9845 DOME LIGHT
Figure 4

Refer to Figure 4.

(a) Remove the lamp bulb. Refer to Step 1.B.(1).

(b) From the rear of the domelight, push the wire forward into the assembly.

(c) From the front of the lamp bulb socket, remove:

- The contact and wire assembly
- The insulator
- The spring.

(3) Dome Light Assembly

ASSEMBLY OF GRIMES-HONEYWELL ELECTRIC LIGHTS

Table 9
INSULATION REMOVAL LENGTH FOR THE B-9845 DOME LIGHT

Wire Size (AWG)	Insulation Removal Length		Special Instructions
	Target (inch)	Tolerance (inch)	
20	0.69	± 0.03	Fold back the conductor
16	0.34	± 0.03	-

Table 10
CRIMP TOOLS FOR THE B-9845 DOME LIGHT CONTACT

Basic Unit		Die		
Part Number	Supplier	Part Number	Position	Supplier
WT-400	Thomas and Betts	M22520/5-35	B	QPL
M22520/5-01	QPL	M22520/5-35	B	QPL

Refer to Figure 4.

(a) From the outer side of the lamp base, put the end of the wire through the lamp base grommet and through the lamp bulb socket.

(b) Put the spring on the wire.

(c) Put the insulator on the wire.

Make sure that the larger diameter end of the insulator points to the end of the wire.

(d) Remove the correct length of insulation from the end of the wire. Refer to Table 9.

(e) Make a selection of a crimp tool from Table 10.

(f) Put the end of the wire into the contact.

Make sure that:

- The wire goes through the lamp base grommet, the lamp bulb socket, the spring, and the insulator. Refer to Figure 4.
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

(g) Crimp the contact.

Make sure that the flash on the contact crimp barrel does not touch the insulator when the contact is installed in the insulator.

(h) Put the contact and wire assembly in the insulator.

Make sure that the contact shoulder is in the counterbore of the insulator.

(i) Put the spring, the insulator, and the contact and wire assembly into the front of the lamp bulb socket.

Make sure that:

- The spring is in the lamp bulb socket
- The rear step of the insulator is in the spring

- The contact shoulder is in the counterbore of the insulator.

(j) Install the lamp bulb. Refer to Step 1.B.(1).

(k) Install the lens. Refer to Step 1.B.(1).

ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

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ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

1. PART NUMBERS AND DESCRIPTION

NOTE: Refer to Subject 20-84-10 for the procedures to assemble other Grimes-Honeywell lights.

A. Map Light Part Numbers

Table 1
A-4135 MAP LIGHT PART NUMBERS

Map Light Part Number	Supplier
A-4135()-13()	Grimes-Honeywell
A-4135()-1810()	Grimes-Honeywell
A-4135()-1820()	Grimes-Honeywell
A-4135()-1864()	Grimes-Honeywell
A-4135()-24()	Grimes-Honeywell
A-4135()-6()	Grimes-Honeywell

Table 2
LAMP BULBS FOR THE A-4135 MAP LIGHT

Map Light Part Number	Lamp Bulb		
	Part Number	Voltage	Supplier
A-4135()-13()	1816	13V	GE
A-4135()-1810()	MS15571-9	6.3V	QPL
A-4135()-1820()	1820	28V	GE
A-4135()-1864()	1864	28V	GE
A-4135()-24()	MS25231-313	28V	QPL
A-4135()-6()	MS25231-316	6V	QPL

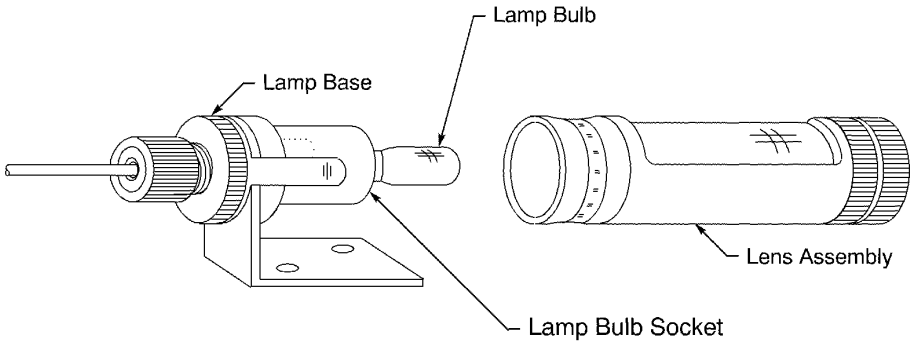
Table 3
CENTER CONTACT FOR THE A-4135 MAP LIGHT

Part Number	Supplier
A-2351-1	Grimes-Honeywell

ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

2. LAMP BULB REPLACEMENT

A. Lamp Bulb Replacement



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GRIMES-HONEYWELL A-4135 MAP LIGHT - LAMP BASE AND LENS ASSEMBLY
Figure 1

Refer to Figure 1.

(1) Pull the lens assembly away from the lamp base.
Make sure to keep the lens assembly aligned with the lamp base.

(2) Remove the lamp bulb:

(a) Push the old lamp bulb into the lamp bulb socket until it stops.

(b) While you hold the lamp bulb in, turn it counterclockwise until it stops.

(c) Remove the old lamp bulb from the lamp bulb socket.

(3) Make a selection of a lamp bulb from Table 2.

(4) Install the lamp bulb:

(a) Push the new lamp bulb into the lamp bulb socket until it stops.

(b) While you hold the lamp bulb in, turn it clockwise until it stops.
Make sure that the new lamp bulb is locked it in its position.

(5) Align the lens assembly and the lamp base.

(6) Push the lens assembly on the lamp base until it stops.

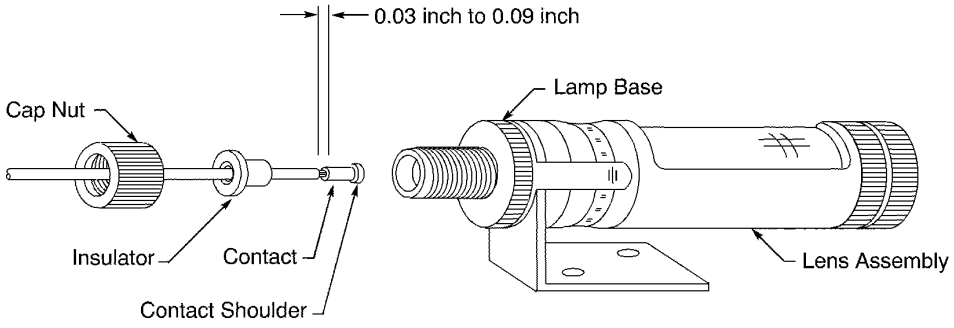
ASSEMBLY OF THE GRIMES-HONEYWELL A-4135 MAP LIGHT

3. MAP LIGHT ASSEMBLY

A. Wire Preparation

Table 4
INSULATION REMOVAL LENGTH FOR THE A-4135 MAP LIGHT

Contact Assembly Procedure	Wire Size	Insulation Removal Length		Special Instructions
		Target (inch)	Tolerance (inch)	
Crimp Paragraph 3.B..	22	0.69	± 0.03	Fold back the conductor
	20	0.69	± 0.03	Fold back the conductor
	16	0.34	± 0.03	-
Solder Paragraph 3.C..	22	0.47	± 0.03	-
	16			-
	12			-



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GRIMES-HONEYWELL A-4135 MAP LIGHT
Figure 2

Refer to Figure 2.

(1) Put the cap nut on the wire.
Make sure that the threads of the cap nut point forward to the end of the wire.

(2) Put the insulator on the wire.
Make sure that the smaller diameter end of the insulator points forward to the end of the wire.

(3) Remove the correct length of insulation from the end of the wire. Refer to Table 4.

B. Contact Assembly - Crimp Procedure

NOTE: The contact can be assembled by this crimp procedure, or by the solder procedure in Paragraph 3.C.

Table 5
CRIMP TOOLS FOR THE A-4135 MAP LIGHT

Basic Unit	Die	Position	Supplier
WT-400	-	-	Thomas and Betts
WT-400	WT-4400	-	Thomas and Betts
M22520/5-01	M22520/5-35	B	QPL

Refer to Figure 2.

(1) Make a selection of a crimp tool from Table 5.

(2) Put the end of the wire into the contact.

Make sure that:

- The cap nut and the insulator are on the wire.
- The larger diameter end of the contact points forward to the end of the wire.
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

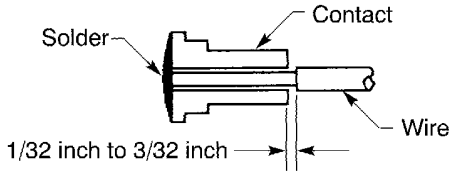
(3) Crimp the contact.

Make sure that:

- The flash on the contact crimp barrel does not touch the side of the insulator when the contact is installed in the insulator.

C. Contact Assembly - Solder Procedure

NOTE: The contact can be assembled by this solder procedure, or by the crimp procedure in Paragraph 3.B..



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POSITION OF THE WIRE IN THE CONTACT
Figure 3

Refer to Figure 3.

(1) Put the end of the wire into the contact.

Make sure that:

- The cap nut and the insulator are on the wire. Refer to Figure 2.
- The larger diameter end of the contact points forward to the end of the wire.
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

(2) Put the ends of the conductor strands evenly around the large end of the contact.

(3) Make a selection of one of these. Refer to Subject 20-00-11.

- A solder and a flux
- A flux cored solder.

(4) Solder the conductor strands to the front surface of the large end of the contact.

Make sure that:

- A sufficient amount of solder is applied for a satisfactory lamp contact surface.
- Solder is not on the side of the contact
- The distance between the end of the wire insulation and the contact is between 0.03 inch and 0.09 inch.

D. Map Light Assembly

Refer to Figure 2.

(1) Put the insulator against the shoulder of the assembled contact.

(2) Push the insulator and the contact into the rear of the lamp base.

(3) Engage the threads of the cap nut and the threads on the rear of the lamp base.

(4) Tighten the cap nut.

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

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EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

This subject gives these procedures for the Eaton lighted push button switches:

- Disassembly and assembly
- Removal and installation
- Replacement of contacts and lamps.

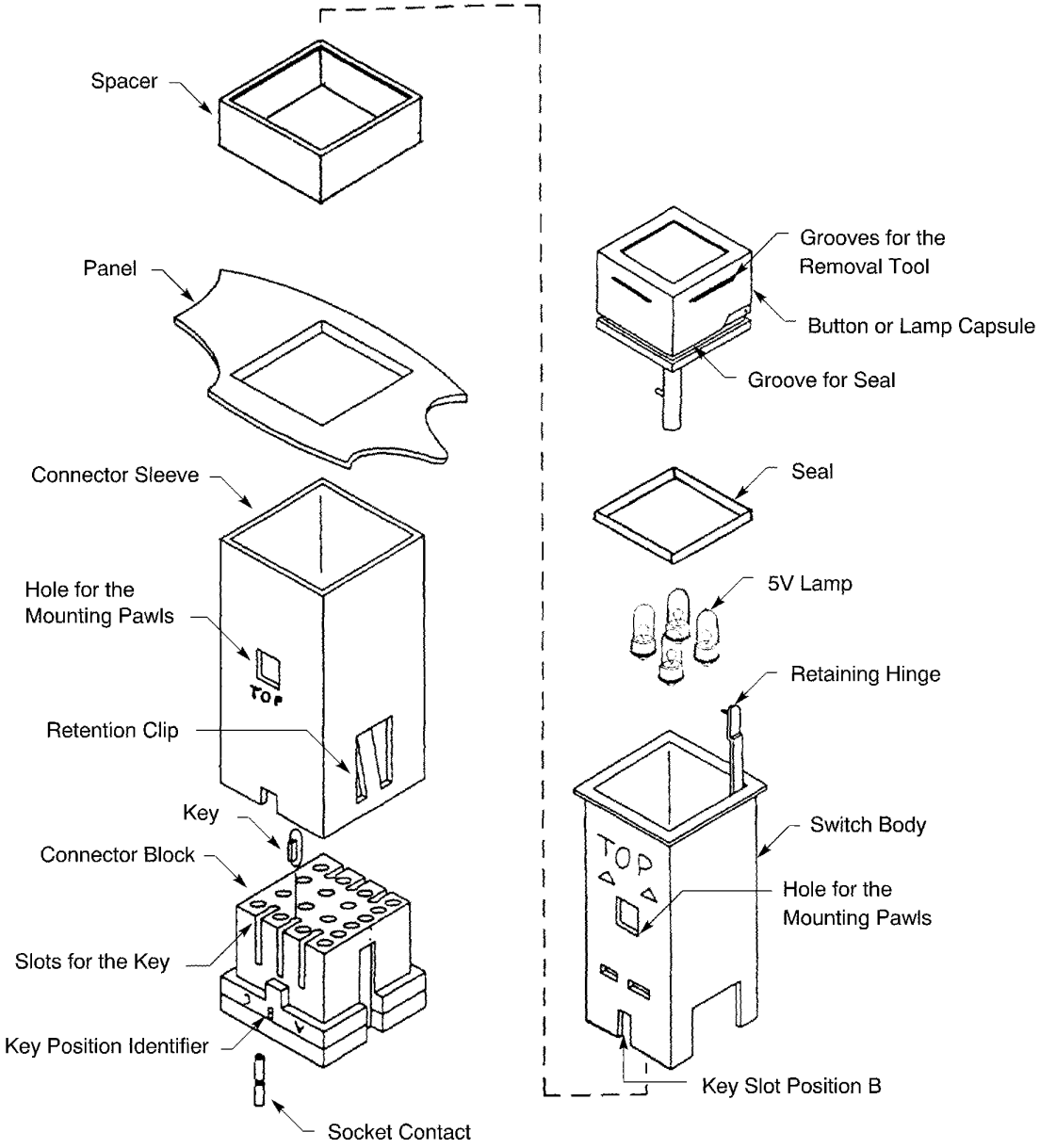
1. PART NUMBERS AND DESCRIPTION

A. Lighted Push Button Switch Part Numbers

Table 1
LIGHTED PUSH BUTTON SWITCH PART NUMBERS

Part Number	Type	Button Sign Label		Supplier
		Contents	Color	
851-37167-()-001	Momentary	ACPT	Greenish Yellow	Eaton
851-37167-()-002	Momentary	RJCT	Greenish Yellow	Eaton
851-37167-()-003	Momentary	CANC	Greenish Yellow	Eaton
851-37167-()-004	Momentary	ACPT	White	Eaton
851-37167-()-005	Momentary	RJCT	White	Eaton
851-37167-()-006	Momentary	CANC	White	Eaton
851-37962-()-001	Indicator	-	Red	Eaton
851-37962-()-002	Indicator	-	Green	Eaton
851-37962-()-003	Indicator	-	White	Eaton
851-37962-()-004	Indicator	-	Yellow	Eaton
851-37962-()-005	Indicator	EVAC	Yellow	Eaton
851-37962-()-006	Indicator	AUTO	Cyan	Eaton
		MANUAL	White	
851-37962-()-101	Momentary	-	Red	Eaton
851-37962-()-102	Momentary	-	Green	Eaton
851-37962-()-103	Momentary	-	White	Eaton
851-37962-()-104	Momentary	-	Yellow	Eaton
851-37962-()-201	Alternate Action	-	Red	Eaton
851-37962-()-202	Alternate Action	-	Green	Eaton
851-37962-()-203	Alternate Action	-	White	Eaton
851-37962-()-204	Alternate Action	-	Yellow	Eaton

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES



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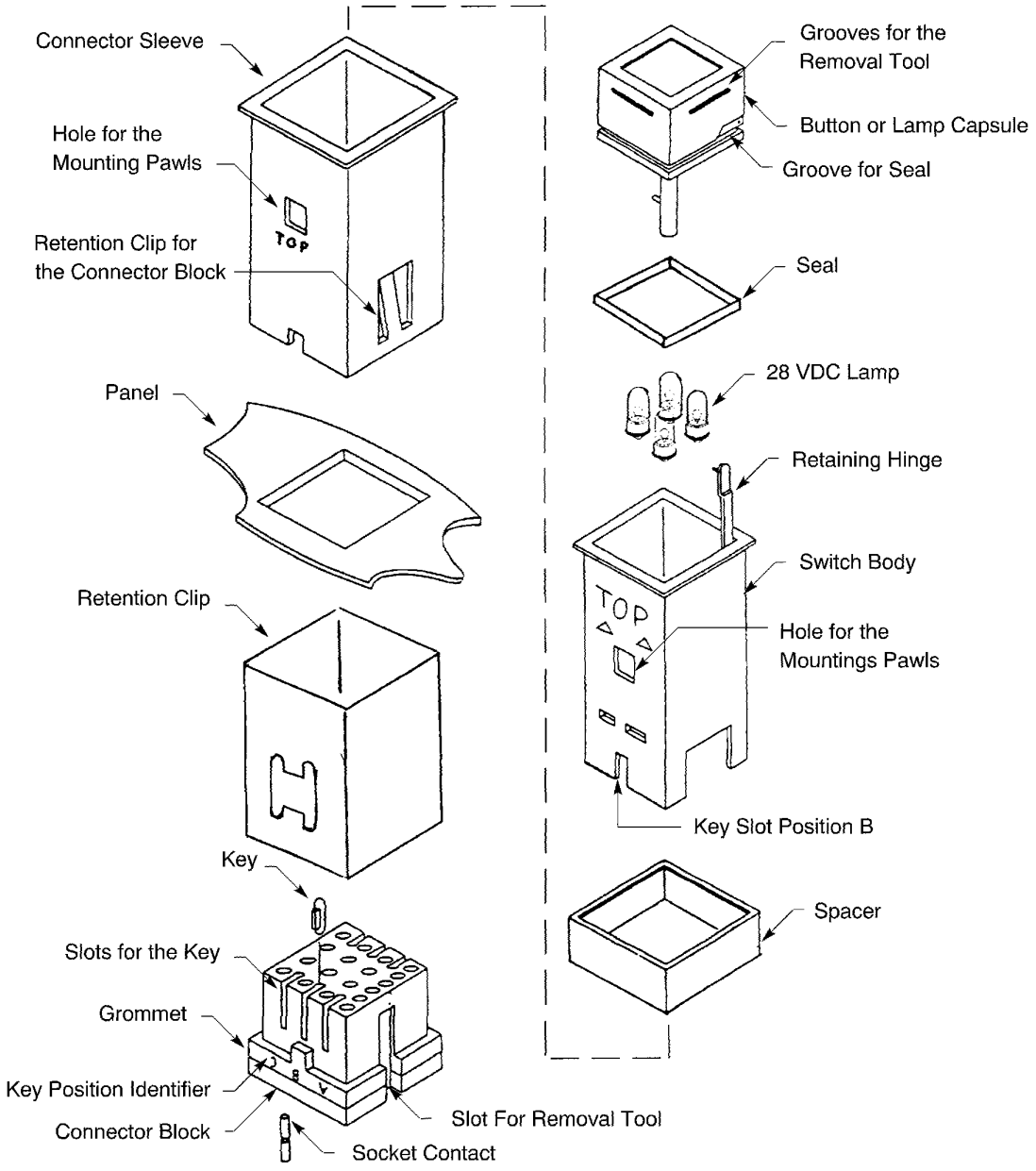
EATON 851-37167-() LIGHTED PUSH BUTTON SWITCH
Figure 1

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES



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EATON 851-37962-() LIGHTED PUSH BUTTON SWITCH
Figure 2

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

B. Switch Assembly Component Part Numbers

Table 2
SWITCH ASSEMBLY COMPONENT PART NUMBERS

Part Number	Description	Supplier
851-37167-()-301	Connector Sleeve, Connector Block with Grommet and Key	Eaton
851-37167-()-801	Extended Switch Guard	Eaton
851-37962-()-301	Connector Sleeve, Retainer Clip, Connector Block with Grommet and Key	Eaton
851-37962-()-302	Switch Guard	Eaton
851-37962-()-303	Button Guard	Eaton
851-37962-()-304	Spacer	Eaton
851-37962-()-305	Connector Block Assembly and Key	Eaton

C. Contact Part Numbers

The contacts for the Eaton lighted push button switches are:

- Released from the rear
- Removed from the rear.

Table 3
CONTACT PART NUMBERS

Switch	Contact		Part Number	Supplier
	Engaging End Size	Crimp Barrel Size		
851-37167-()	22	22	M39029/57-354	QPL
851-37962-()	20	20	M39029/22-192	QPL

D. Replacement Lamps

Table 4
REPLACEMENT LAMPS

Switch	Replacement Lamp		
	Decription	Part Number	Supplier
851-37167-()	T-1 midget, flange base, 5VAC	OL-685	Oshino
		OL-685AS15	Oshino
851-37962-()	T-1 midget, flange base, 28VDC	92490516-020	Eaton
		LTX-6859	Lamptronix
		OL-3335	Oshino

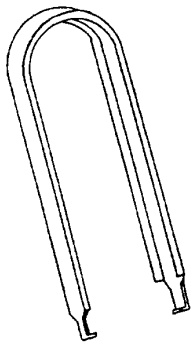
EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

2. SWITCH DISASSEMBLY

A. Lamp Capsule Removal

Table 5
LAMP CAPSULE EXTRACTION TOOLS

Part Number	Supplier
584-901	Eaton



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LAMP CAPSULE EXTRACTION TOOL
Figure 3

WARNING: OPEN CIRCUIT BREAKERS AND SWITCHES TO MAKE SURE THAT POWER HAS BEEN CUT OFF FROM SYSTEM COMPONENTS. INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT CAN RESULT FROM INADVERTANT USE OF PUSH BUTTON DURING DISASSEMBLY.

(1) Press and release the button or the lamp capsule of the switch so that the button or the lamp capsule is in the OFF position.

Make sure that the outer edge of the button or lamp capsule is out from or beyond the edge of the switch body.

NOTE: The button or lamp capsule of an alternate action switch is:

- Pressed in when the switch is on
- Is out when the switch is off.

CAUTION: REMOVAL OF THE BUTTON OR THE LAMP CAPSULE FROM THE SWITCH WHEN THE BUTTON IS IN THE ON POSITION CAUSES DAMAGE TO THE SWITCH.

(2) Make a selection of a lamp capsule extraction tool from Table 5.

NOTE: The fingernails are a satisfactory alternative to the extraction tool.

(3) Put the ends of the tool or the fingernails into the grooves on the opposite sides of the button or the lamp capsule. Refer to Figure 1 or Figure 2.

CAUTION: ONLY THE TOOLS SPECIFIED IN TABLE 5 OR THE FINGERNAILS CAN BE USED TO REMOVE THE CAPSULE. IF DIFFERENT TOOLS ARE USED, DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

(4) Pull the lamp capsule approximately 0.25 inch out of the switch body until the button or lamp capsule stops against the retaining hinge.

CAUTION: DO NOT USE MORE THAN THE NECESSARY FORCE TO PULL THE BUTTON OR LAMP CAPSULE AGAINST THE RETAINING HINGE. DAMAGE TO THE CAPSULE, THE HINGE, OR THE SWITCH BODY CAN OCCUR.

B. Switch Removal From The Panel

Access to the back of the panel:

- Is necessary to remove the 851-37167-() switch body from the front of the panel
- Is not necessary to remove the 851-37962-() switch body from the front of the panel.

NOTE: The 851-37962-() switch has a retainer clip that is held loosely in the panel by spring clips. The retainer clip holds the connector sleeve on the panel so that the switch body can be removed from the front of the panel. It is not necessary to remove the connector sleeve and the connector block from the back of the panel.

Table 6
SWITCH INSTALLATION AND REMOVAL TORQUE TOOLS

Description	Part Number	Torque Limit (inch-ounce)	Supplier
Torque Screwdriver	584-510	18	Eaton
Torque Screwdriver	TS-100	18	U TI CA

For this procedure, the lamp capsule must be removed from the switch body. Refer to Paragraph 2.A.

(1) Make a selection of a switch removal tool from Table 6.

NOTE: A small screwdriver is a sattisfactory alternative.

(2) Turn the power to the switch off.

(3) Extend the retaining hinges of the lamp capsule.

(4) Find the heads of the two lug screws that tighten the mounting pawls at the bottom of the switch body.

(5) With the screwdriver, turn each of the lug screws counterclockwise approximately two to four turns loosen the switch body.

CAUTION: DO NOT CONTINUE TO TURN THE SCREWS AFTER THE SWITCH IS LOOSE. DAMAGE TO THE SWITCH CAN OCCUR.

(6) Pull the switch body from the connector sleeve.

The connector sleeve and connector block of:

- The 851-37167-() switch disengages from the panel
- The 851-37962-() switch stays attached to the panel.

C. Switch Connector Block Removal

Table 7
CONNECTOR BLOCK REMOVAL TOOLS

Removal Tool	Supplier
RRX-367	Russtech

(1) Make a selection of a removal tool from Table 7.

(2) Put the two round ends of the tool into each slot on both sides of the connector block at the same time.

(3) Push the tool into the slots until it stops.

(4) Pull the tool and the connector block out of the connector sleeve.

(5) Remove the tool from the connector block.

D. Contact Removal

Table 8
CONTACT REMOVAL TOOLS

Contact Crimp Barrel Size	Removal Tool	
	Part Number	Supplier
22	M81969/14-01	QPL
	MS27495A22M	QPL
20	M82969/14-10	QPL

(1) Make a selection of a contact removal tool from Table 8.

(2) Put the tip of the contact removal tool on the wire near the rear grommet.

(3) Carefully push the contact removal tool in the contact cavity until it stops.

(4) Pull the wire and the removal tool out of the contact cavity at the same time.

(5) If the contact does not release:

(a) Carefully pull the removal tool out of the contact cavity.

(b) Turn the removal tool a small amount.

(c) Do Step 2.D.(2) through Step 2.D.(4) again.

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

E. Lamp Replacement

For this procedure, the lamp capsule must be removed from the switch body. Refer to Paragraph 2.A.

(1) Make a selection of a replacement lamp from Table 4.

CAUTION: THE SELECTION AND INSTALLATION OF AN INCORRECT REPLACEMENT LAMP FOR THE SPECIFIED SWITCH CAN CAUSE ANY OF THESE CONDITIONS:

- DAMAGE TO THE LAMP GROUND CONTACT
- DAMAGE TO THE SWITCH MECHANISM
- INTERMITTENT OPERATION OF THE LAMP
- SHORT LAMP LIFE
- TOO MUCH ILLUMINATION OF THE LAMP
- ILLUMINATION OF THE LAMP THAT IS NOT SUFFICIENT.

(2) Examine the bottom of the lamp capsule.

In the bottom of the lamp capsule can be:

- As many as four lamp bases
- As many as two plastic plugs in the lamp sockets.

NOTE: A plastic plug prevents the installation of a lamp in the socket.

(3) Pull each lamp out with the fingernails.

NOTE: Each lamp base has an edge around it.

CAUTION: DO NOT REMOVE ANY PLASTIC PLUG THAT IS IN A LAMP SOCKET. A LAMP SOCKET WITH A PLUG CANNOT HAVE A LAMP BECAUSE THERE IS NOT A LIGHTED SIGN FOR THAT AREA OF THE LAMP CAPSULE.

(4) Install the necessary number of new lamps.

Make sure that Step (a) through Step (c) are done in order.

CAUTION: IF THE STEPS ARE NOT DONE IN ORDER, ANY OF THESE CONDITIONS CAN OCCUR:

- DAMAGE TO THE LAMP GROUND CONTACT
- DAMAGE TO THE SWITCH MECHANISM
- INTERMITTENT OPERATION OF THE LAMP

(a) Put each new lamp in an empty lamp socket, but do not push them in.

(b) Push the two lamps near the top of the lamp capsule in at the same time until they stop.

(c) Push the other two lamps near the bottom of the lamp capsule in at the same time until they stop.

(5) Align the corners of the lamp capsule with the corners of the switch body.

(6) Push the lamp capsule into the switch body.

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF FORCE ON THE LAMP CAPSULE. DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

(7) To help prevent intermittent operation of the lamp, press the button or lamp capsule two times with the finger so that the switch is operated one full ON and OFF cycle.

3. SWITCH ASSEMBLY

A. Contact Assembly

Table 9
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Contact Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
26	22	0.14	±0.02
24	22	0.14	±0.02
	20	0.20	±0.02
22	22	0.14	±0.02
	20	0.20	±0.02
20	20	0.20	±0.02

Table 10
CONTACT CRIMP TOOLS

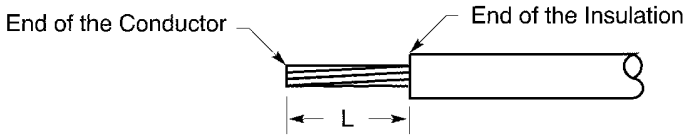
Wire Size (AWG)	Crimp Barrel Size	Crimp Tool				
		Basic Unit			Locator	
		Part Number	Setting	Supplier	Part Number	Supplier
26	22	M22520/2-01	2	QPL	M22520/2-06	QPL
		ST2220-10	-	Boeing	M22520/10-1	QPL
		WA22	2	Daniels	M22520/2-06	QPL
24	22	M22520/2-01	3	QPL	M22520/2-06	QPL
		ST2220-10	-	Boeing	M22520/10-1	QPL
		WA22	3	Daniels	M22520/2-06	QPL
	20	M22520/7-01	4	QPL	M22520/7-12	QPL
22	22	M22520/2-01	4	QPL	M22520/2-06	QPL
		ST2220-10	-	Boeing	M22520/10-1	QPL
		WA22	4	Daniels	M22520/2-06	QPL
	20	M22520/7-01	5	QPL	M22520/7-12	QPL
20	20	M22520/7-01	6	QPL	M22520/7-12	QPL

(1) Make a selection of the correct contact from Table 3.

(2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Table 9
- Figure 4
- Subject 20-00-15.



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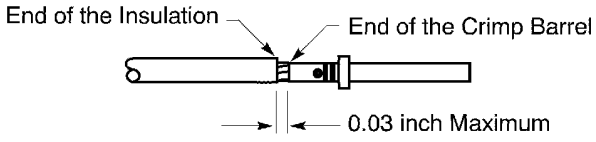
INSULATION REMOVAL
Figure 4

(3) Make a selection of a crimp tool from Table 9.

(4) Push the conductor into the contact crimp barrel until the end of the conductor is against the bottom of the crimp barrel. Refer to Figure 5.

Make sure that:

- All of the strands of the conductor are in the crimp barrel
- The conductor can be seen in the inspection hole
- The distance from the end of the insulation to the end of the crimp barrel is less than or equal to 0.03 inch.



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POSITION OF THE WIRE IN THE CRIMP BARREL OF THE CONTACT
Figure 5

(5) Crimp the contact.

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

B. Contact Insertion

Table 11
CONTACT INSERTION TOOLS

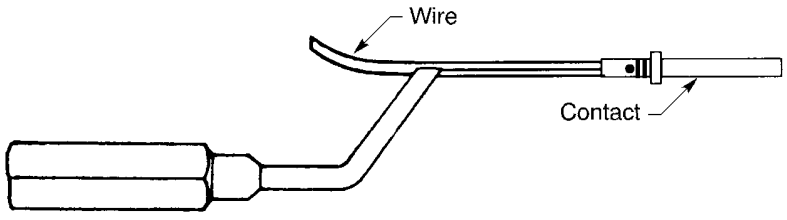
Contact Crimp Barrel Size	Insertion Tool	
	Part Number	Supplier
22	M81969/14-01	QPL
	MS27495A22M	QPL
20	M81969/14-10	QPL

(1) Make a selection of an insertion tool from Table 11.

CAUTION: DO NOT USE AN INSERTION TOOL THAT HAS:
- A BENT TIP
- A BENT BIT
- A FLARED TIP
- A BROKEN TIP
- A TIP WITH A CRACK.

CAUTION: IF A DEFECTIVE INSERTION TOOL IS USED, IT CAN CAUSE:
- INJURY TO THE OPERATOR
- DAMAGE TO THE CONTACT RETENTION CLIPS
- DAMAGE TO THE REAR GROMMET OF THE CONNECTOR BLOCK.

(2) Put the wired contact in the insertion tool. Refer to Figure 6.



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POSITION OF THE WIRED CONTACT IN THE INSERTION TOOL
Figure 6

(3) Push the wired contact and the tool into the contact cavity from the rear of the connector so that the contact is fully inserted.

C. Connector Block Polarization

Table 12
SWITCH KEY POSITIONS

Switch	Key Position
851-37167-()-001	A
851-37167-()-002	C
851-37167-()-003	B
851-37167-()-004	A
851-37167-()-005	C
851-37167-()-006	B

(1) Find the correct key position. Refer to Table 12.

(2) Push the plastic key into the correct slot of the connector block.

(3) Find the key slot on the end of the switch body.

(4) Align the key in the connector block with the key slot in the switch body.

CAUTION: IF THE KEY IN THE CONNECTOR BLOCK IS NOT ALIGNED WITH THE KEY SLOT IN THE SWITCH BODY, THE SWITCH BODY CANNOT BE INSTALLED ON THE CONNECTOR BLOCK.

4. SWITCH INSTALLATION

A. Installation of the 851-37167-() Switch in a Panel

For this procedure, the lamp capsule must be removed from the switch body. Refer to Paragraph 2.A.

(1) Make a selection of a switch removal tool from Table 6.

NOTE: A small screwdriver is a satisfactory alternative.

(2) If a spacer is used, put the spacer on the switch body from the bottom.

(3) Turn the connector block so that the side of the connector block with the key position identifiers A B C is on the same side as the TOP mark on the connector sleeve.

(4) Push the connector block into the end of the connector sleeve until it makes a click.

(5) Hold the connector sleeve with the connector block behind the panel so that:

- The connector block is pointed out from the panel
- The side of the connector sleeve with the TOP mark is pointed up.

(6) Turn the switch body so that the side with the TOP mark is pointed up.

(7) From the front of the panel, push the switch body into the connector sleeve.

(8) To tighten the mounting pawls, turn the lug screws at the bottom of the switch body with the screwdriver in the clockwise direction until the torque screwdriver does not turn the screws.

EATON 851-37()-() SERIES LIGHTED PUSH BUTTON SWITCHES

CAUTION: IF THE LUG SCREWS ARE TIGHTENED MORE THAN 18 INCH-OUNCES:

- DAMAGE TO THE SWITCH CAN OCCUR
- DAMAGE TO THE LAMP CAPSULE CAN OCCUR
- THE LAMP CAPSULE DOES NOT MOVE FREELY.

(9) Push the lamp capsule into the switch body.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF FORCE ON THE LAMP CAPSULE. DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

(10) To help prevent intermittent operation of the lamp, press the button or lamp capsule two times with the finger so that the switch is operated one full ON and OFF cycle.

B. Installation of the 851-37962-() Switch in a Panel

(1) Make a selection of a switch removal tool from Table 6.

NOTE: A small screwdriver is a satisfactory alternative.

(2) Turn the connector sleeve so that the TOP mark is pointed up.

(3) From the front of the panel, push the bottom of the connector sleeve through the hole in the panel until the flange is against the panel.

(4) Align the holes in the retainer clip with the holes for the mounting pawls on the connector sleeve.

(5) From the back of the panel, push the connector sleeve into the retainer clip until the clip is locked in the sleeve.

(6) Turn the connector block so that the side with the key position identifiers A B C is on the same side as:

- The TOP mark on the connector sleeve
- The TOP mark on the retainer clip.

(7) Push the connector block into the connector sleeve until it makes a click.

(8) Remove the lamp capsule from the switch body. Refer to Paragraph 2.A.

(9) If a button guard is used, put the guard over the switch body from the rear of the switch body.

(10) If a switch guard is used, put the switch guard over the switch body from the rear of the switch body.

(11) If a spacer is used, put the spacer over the switch body from the rear of the switch body.

(12) Turn the switch body so that the side with the TOP mark is pointed up.

(13) From the front of the panel, push the switch body into the connector sleeve.

(14) To tighten the mounting pawls, turn the lug screws at the bottom of the switch body with the screwdriver in the clockwise direction until the torque screwdriver does not turn the screws.

CAUTION: IF THE LUG SCREWS ARE TIGHTENED MORE THAN 18 INCH-OUNCES:

- DAMAGE TO THE SWITCH CAN OCCUR
- DAMAGE TO THE LAMP CAPSULE CAN OCCUR
- THE LAMP CAPSULE DOES NOT MOVE FREELY.

(15) Push the lamp capsule into the switch body.

CAUTION: DO NOT APPLY MORE THAN THE NECESSARY AMOUNT OF FORCE ON THE LAMP CAPSULE. DAMAGE TO THE LAMP CAPSULE OR THE SWITCH BODY, OR BOTH CAN OCCUR.

(16) To help prevent intermittent operation of the lamp, press the button or lamp capsule two times with the finger so that the switch is operated one full ON and OFF cycle.

BOEING S231W240-() AND ESTERLINE (KORRY) 09-530-() AND 32500-2() LIGHTED PUSHBUTTON SWITCHES

TABLE OF CONTENTS

BOEING S231W240-() AND ESTERLINE (KORRY) 09-530-() AND 32500-2() LIGHTED PUSHBUTTON SWITCHES

1. PART NUMBERS AND DESCRIPTION

A. Switch Part Numbers

Table 1
SWITCH PART NUMBERS

Part Number	Description	Supplier
09-530-()	Switch, Lighted Pushbutton	ITW Switches
09-530-()	Switch, Lighted Pushbutton	Esterline/Korry
32500-2()	Switch, Lighted Pushbutton	Esterline/Korry
S231W240-()	Switch, Lighted Pushbutton	Boeing

Table 2
SWITCH COMPONENT PART NUMBERS

Component	Part Number	Supplier
Connector Block	09-530-9501	Esterline/Korry
	S231W240-301	Boeing
Fuse	R271.125	Littelfuse
Switch Guard	09-530-9601	Esterline/Korry
	S231W240-351	Boeing

Table 3
ALTERNATIVE SWITCH PART NUMBERS

Specified Switch		Alternative Switch		Notes
Part Number	Supplier	Part Number	Supplier	
09-530-()	ITW Switches	09-530-()	Esterline/Korry	-
S231W240-1()	Boeing	S231W240-2()	Boeing	Refer to Table 5
		32500-2()	Esterline/Korry	Refer to Table 5
09-530-01()	Esterline/Korry	S231W240-2()	Boeing	Refer to Table 5
		32500-2()	Esterline/Korry	Refer to Table 5
S231W240-2()	Boeing	S231W240-1()	Boeing	-
		09-530-01()	Esterline/Korry	-
32500-2()	Esterline/Korry	S231W240-1()	Boeing	-
		09-530-01()	Esterline/Korry	-

BOEING S231W240-() AND ESTERLINE (KORRY) 09-530-() AND 32500-2() LIGHTED PUSHBUTTON SWITCHES

Table 4
SUPPLIER PART NUMBERS FOR BOEING STANDARDS

Boeing Standard	Part Number	Supplier
S231W240-()	09-530-()	Esterline/Korry

These notes are applicable to Table 5:

NOTE: In the Boeing S231W240-1() switch and in the Esterline/Korry 09-530-01() switch, the cap module has Esterline/Korry part number 09-531-00(), and the switch module has Esterline/Korry part number 09-532-01().

NOTE: In the Boeing S231W240-2() switch, and in the Esterline/Korry 32500-2() switch, the cap and switch module is a one piece assembly that has Esterline/Korry part number 32500-7().

NOTE: The 32500-7() cap and switch module is a satisfactory alternative to the assembly of a 09-531-00() cap module and a 09-532-01() switch module.

NOTE: These switches use the same mounting hardware:

- Boeing S231W240-1()
- Boeing S231W240-2()
- Esterline/Korry 09-530-01()
- Esterline/Korry 32500-2().

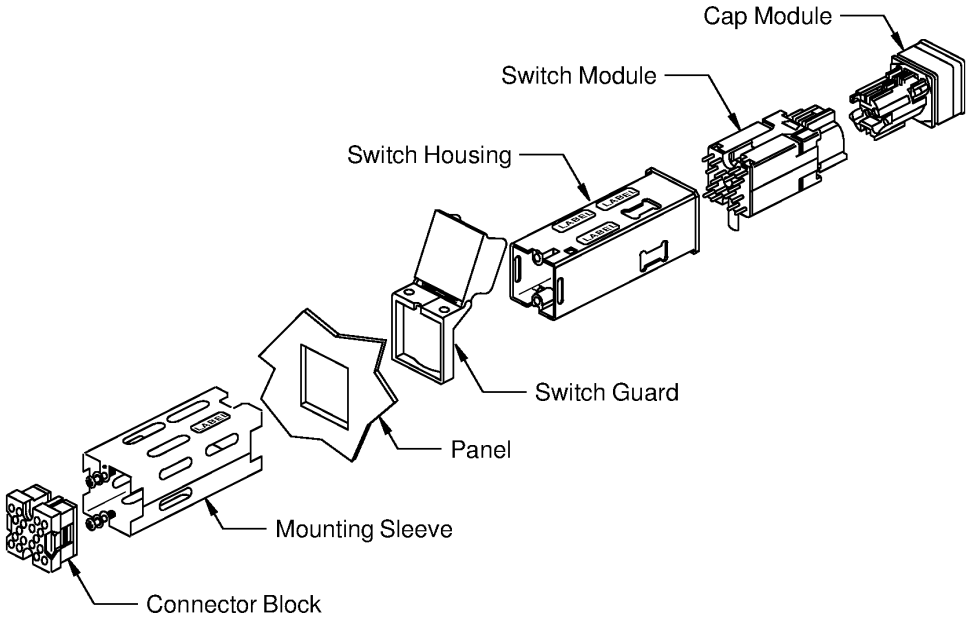
Table 5
ALTERNATIVE PART NUMBERS

Specified Part Numbers				Alternative Part Numbers		
Boeing	Esterline / Korry			Boeing	Esterline / Korry	
Switch	Switch	Cap Module	Switch Module	Switch	Switch	Cap and Switch Module
S231W240-101	09-530-0101	09-531-0001	09-532-0103	S231W240-201	32500-201	32500-701
S231W240-102	09-530-0102	09-531-0002	09-532-0103	S231W240-202	32500-202	32500-702
S231W240-103	09-530-0103	09-531-0003	09-532-0103	S231W240-203	32500-203	32500-703
S231W240-104	09-530-0104	09-531-0004	09-532-0103	S231W240-204	32500-204	32500-704
S231W240-105	09-530-0105	09-531-0005	09-532-0104	S231W240-205	32500-205	32500-705
S231W240-106	09-530-0106	09-531-0006	09-532-0103	S231W240-206	32500-206	32500-706
S231W240-107	09-530-0107	09-531-0007	09-532-0104	S231W240-207	32500-207	32500-707
S231W240-108	09-530-0108	09-531-0008	09-532-0103	S231W240-208	32500-208	32500-708
S231W240-109	09-530-0109	09-531-0009	09-532-0103	S231W240-209	32500-209	32500-709
S231W240-110	09-530-0110	09-531-0010	09-532-0105	S231W240-210	32500-210	32500-710
S231W240-111	09-530-0111	09-531-0011	09-532-0105	S231W240-211	32500-211	32500-711
S231W240-112	09-530-0112	09-531-0012	09-532-0103	S231W240-212	32500-212	32500-712
S231W240-113	09-530-0113	09-531-0013	09-532-0103	S231W240-213	32500-213	32500-713
S231W240-114	09-530-0114	09-531-0014	09-532-0104	S231W240-214	32500-214	32500-714

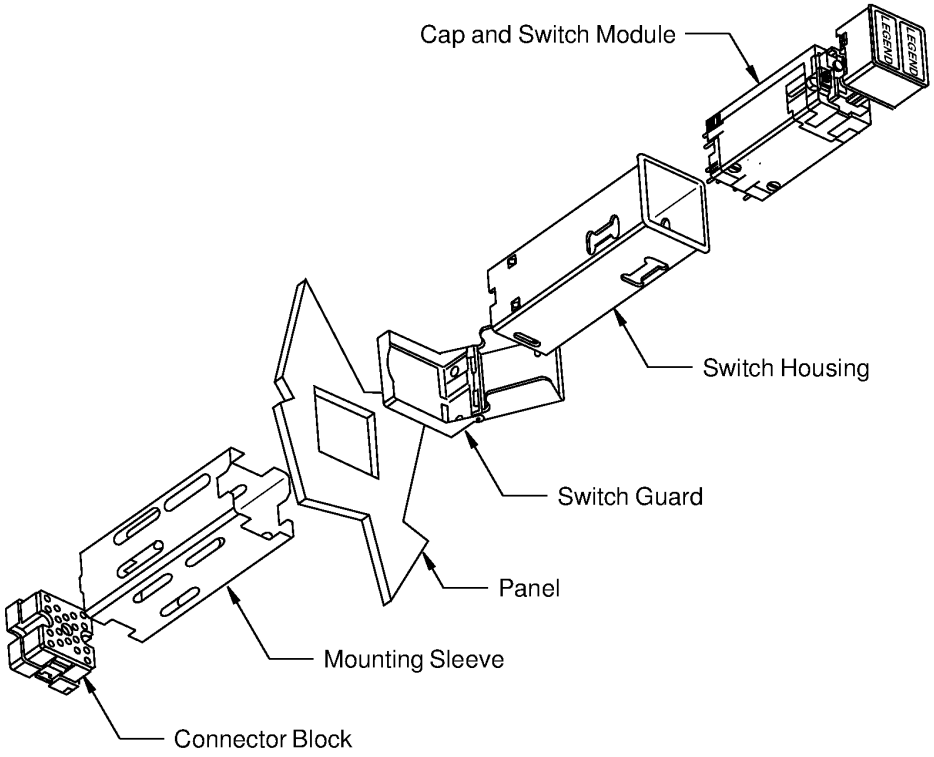
BOEING S231W240-() AND ESTERLINE (KORRY) 09-530-() AND 32500-2() LIGHTED PUSHBUTTON SWITCHES

Table 5 ALTERNATIVE PART NUMBERS (Continued)

Specified Part Numbers				Alternative Part Numbers		
Boeing	Esterline / Korry			Boeing	Esterline / Korry	
Switch	Switch	Cap Module	Switch Module	Switch	Switch	Cap and Switch Module
S231W240-115	09-530-0115	09-531-0015	09-532-0104	S231W240-215	32500-215	32500-715
S231W240-116	09-530-0116	09-531-0016	09-532-0104	S231W240-216	32500-216	32500-716
S231W240-117	09-530-0117	09-531-0017	09-532-0104	S231W240-217	32500-217	32500-717
S231W240-118	09-530-0118	09-531-0018	09-532-0103	S231W240-218	32500-218	32500-718
S231W240-119	09-530-0119	09-531-0019	09-532-0103	S231W240-219	32500-219	32500-719
S231W240-121	09-530-0121	09-531-0021	09-532-0105	S231W240-221	32500-221	32500-721
S231W240-123	09-530-0123	09-531-0023	09-532-0103	S231W240-223	32500-223	32500-723
S231W240-124	09-530-0124	09-531-0024	09-532-0104	S231W240-224	32500-224	32500-724
S231W240-125	09-530-0125	09-531-0025	09-532-0104	S231W240-225	32500-225	32500-725
S231W240-126	09-530-0126	09-531-0026	09-532-0103	S231W240-226	32500-226	32500-726
S231W240-127	09-530-0127	09-531-0027	09-532-0104	S231W240-227	32500-227	32500-727
S231W240-128	09-530-0128	09-531-0028	09-532-0103	S231W240-228	32500-228	32500-728
S231W240-130	09-530-0130	09-531-0030	09-532-0105	S231W240-230	32500-230	32500-730
S231W240-131	09-530-0131	09-531-0031	09-532-0103	S231W240-231	32500-231	32500-731
S231W240-132	09-530-0132	09-531-0032	09-532-0103	S231W240-232	32500-232	32500-732
S231W240-133	09-530-0133	09-531-0033	09-532-0103	S231W240-233	32500-233	32500-733
S231W240-134	09-530-0134	09-531-0034	09-532-0103	S231W240-234	32500-234	32500-734
S231W240-135	09-530-0135	09-531-0035	09-532-0103	S231W240-235	32500-235	32500-735
S231W240-136	09-530-0136	09-531-0036	09-532-0103	S231W240-236	32500-236	32500-736
S231W240-137	09-530-0137	09-531-0037	09-532-0103	S231W240-237	32500-237	32500-737
S231W240-138	09-530-0138	09-531-0038	09-532-0104	S231W240-238	32500-238	32500-738
S231W240-139	09-530-0139	09-531-0039	09-532-0103	S231W240-239	32500-239	32500-739



BOEING S231W240-1() AND AND ESTERLINE/KORRY 09-530-01() SWITCH
Figure 1



2449756 S00061548877_V1

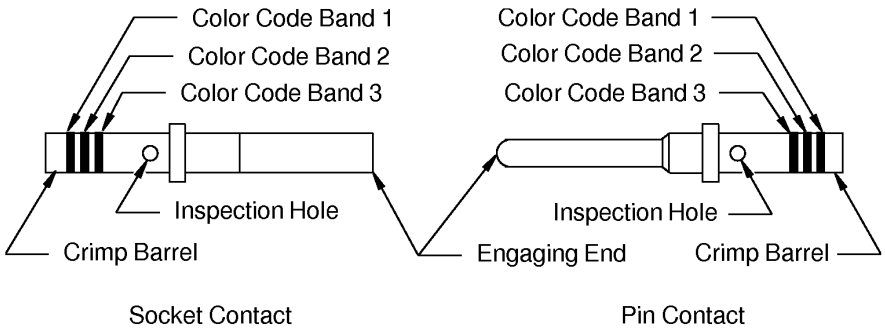
BOEING S231W240-2() AND ESTERLINE/KORRY 32500-2() SWITCH
Figure 2

B. Contact Part Numbers

Table 6
CONTACT PART NUMBERS

Contact		Contact Type	Color Code		Part Number	Supplier
Engaging End Size	Crimp Barrel Size		Band	Color		
20	20	Socket	1	Brown	M39029/22-192	QPL
			2	White		
			3	Red		

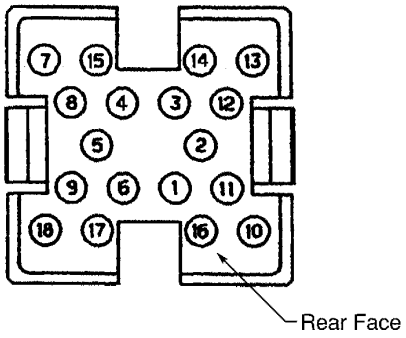
NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 3.



2448999 S00061545899_V1

LOCATION OF CONTACT COLOR CODES
Figure 3

C. Connector Block Insert Configuration



2448042 S00061548878_V1

INSERT CONFIGURATION
Figure 4

2. SWITCH DISASSEMBLY

A. Contact Removal

Table 7
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool		
	Part Number	Color	Supplier
20	M81969/14-10	Orange	QPL

NOTE: For plastic tools, the color given in Table 7 is the color of the removal end of the combination tools that are both insertion and removal tools.

(1) Make a selection of a contact removal tool from Table 7.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

(2) At the rear of the connector block, put the removal tool on the wire.

(3) Axially align the removal tool and the contact cavity.

(4) Carefully push the removal tool into the contact cavity until it stops.

CAUTION: DO NOT ROTATE THE TOOL OR SPREAD THE TOOL TIPS WHILE THE TOOL IS IN THE CONTACT CAVITY.

(5) Carefully pull the wire and the removal tool from the contact cavity at the same time.

Make sure that the removal tool and the contact cavity stay axially aligned.

(6) If the contact does not release:

(a) Pull the removal tool out of the contact cavity.

(b) Turn the removal tool approximately 90 degrees.

(c) Do Step 2.A.(2) through Step 2.A.(5) again.

B. Lamp Replacement

The lamps are Light Emitting Diodes (LED) and are soldered into the cap module assembly. It is not possible to replace an LED. The cap module must be replaced. Refer to Paragraph 2.H. for the procedure to remove the cap module from the switch module.

C. Removal of the Connector Block from the Switch Housing

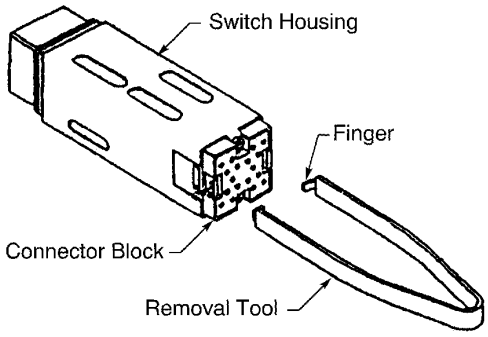
Table 8
CONNECTOR BLOCK REMOVAL TOOLS

Removal Tool	Supplier
09-530-9605	Esterline/Korry

(1) Make a selection of a connector block removal tool from Table 8.

NOTE: A satisfactory alternative is to use the fingers to disengage the tabs.

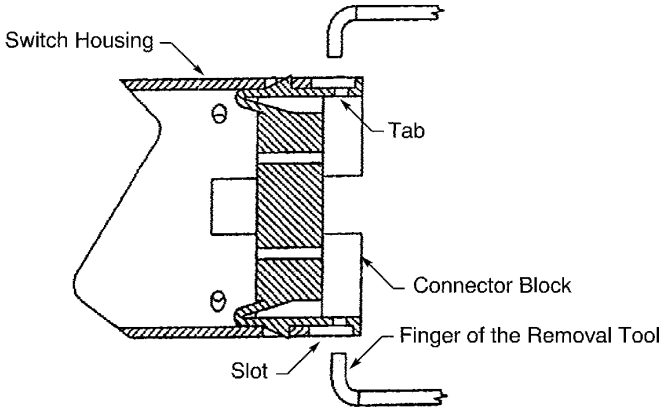
(2) Align the fingers of the removal tool with the slot on each side of the switch housing. Refer to Figure 5.



2448038 S00061548880_V1

POSITION OF THE REMOVAL TOOL
Figure 5

(3) Push the tool together to press against the tabs on the connector block and at the same time pull the connector block rearward. Refer to Figure 6.

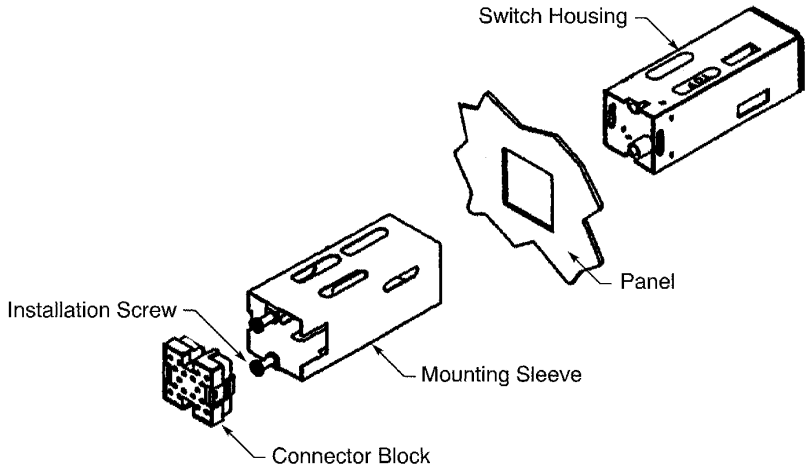


2448039 S00061548881_V1

REMOVAL OF THE CONNECTOR BLOCK
Figure 6

D. Removal of the Switch from the Panel

(1) From the rear of the mounting sleeve, disengage each installation screw from the threads in the switch housing. Refer to Figure 7.



2448040 S00061548882_V1

SWITCH REMOVAL
Figure 7

(2) From the rear of the panel, pull the mounting sleeve rearward off the switch housing. Refer to Figure 7.

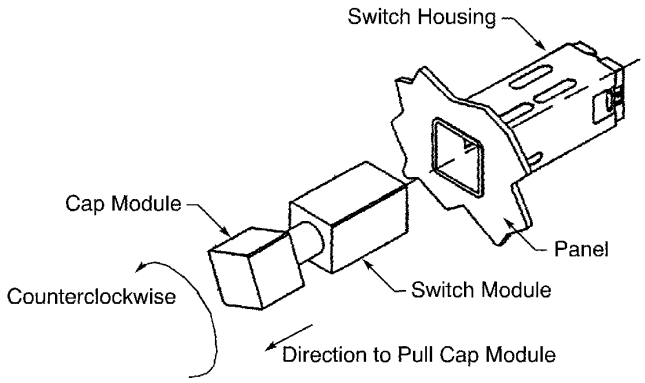
(3) From the front of the panel, pull the switch housing out from the panel. Refer to Figure 7.

E. Switch Guard Removal

(1) Remove the switch from the panel. Refer to Paragraph 2.D.

(2) Pull the switch guard to the rear of the switch housing from the switch housing until it is free.

F. Removal of the Switch Module from the Switch Housing



2448041 S00061548883_V1

REMOVAL OF THE SWITCH MODULE
Figure 8

Refer to Figure 8.

(1) If a switch guard is installed, open the cover more than 154 degrees.

(2) If the cap is in the pushed in position, push the cap in to make it go to the out position.

(3) Gently hold the sides of the cap module and at the same time, pull the cap module out of the switch module until it stops.

(4) Turn the cap module counterclockwise 22 degrees or until it stops.

(5) Pull the switch module out from the switch housing.

G. Fuse Removal

Table 9
FUSE REMOVAL TOOLS

Part Number	Supplier
09-530-9604	Esterline/Korry

(1) Make a selection of a fuse removal tool from Table 9.

(2) Remove the switch module from the switch housing. Refer to Paragraph 2.F.

(3) Open the fuse cover.

(4) Turn the switch module to make the fuse pointed up.

(5) With the removal tool, gently hold the fuse by the ceramic area of the fuse.

(6) Pull the fuse out of the clips in the switch module.

H. Separation of the Cap Module from the Switch Module

NOTE: This procedure is applicable to Boeing S231W240-1() and Esterline/Korry 09-530-01() switches only.

(1) Hold the switch module assembly with the rear of the switch module pointed up.

(2) With a flat blade screwdriver, turn the inner shaft approximately 90 degrees until the slot in the shaft is aligned with the lines that have the mark "UNL".

(3) Pull the cap module from the switch module.

3. SWITCH ASSEMBLY

A. Contact Assembly

Table 10
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
24	20	0.18	±0.03
22	20	0.18	±0.03
20	20	0.18	±0.03

Table 11
CONTACT CRIMP TOOLS

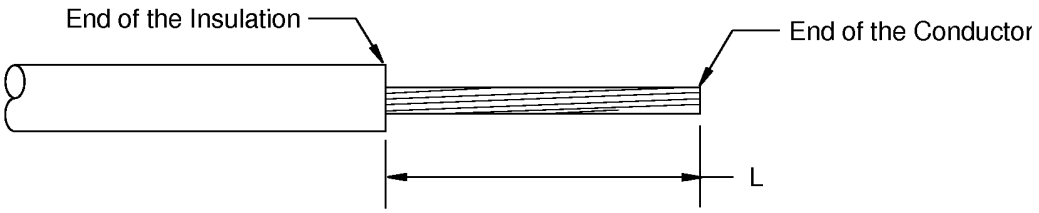
Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Part Number
		Part Number	Setting	
24	20	M22520/7-01	3	M22520/7-12
22	20	M22520/7-01	4	M22520/7-12
20	20	M22520/7-01	5	M22520/7-12

(1) Make a selection of a crimp tool from Table 11.

(2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 9
- Table 10 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.

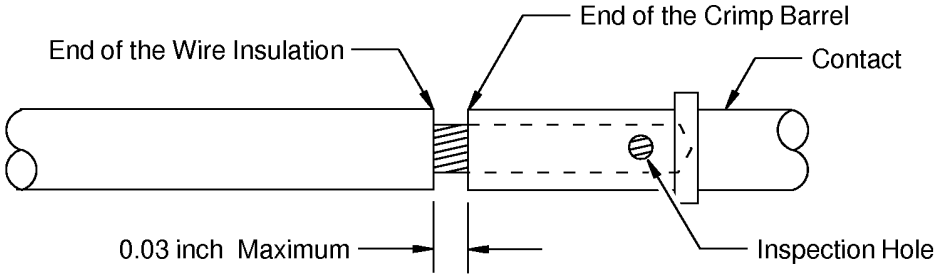


2446140 S00061544325_V1

INSULATION REMOVAL LENGTH
Figure 9

(3) Put the end of the conductor in the crimp barrel of the contact. Refer to Figure 10.
Make sure that:

- All the conductor strands are in the crimp barrel
- The conductor strands are visible in the inspection hole of the contact
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



2446968 S00061546268_V1

POSITION OF THE CONDUCTOR IN THE CRIMP BARREL OF THE CONTACT
Figure 10

(4) Crimp the contact.

B. Contact Insertion

Table 12
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool		
	Part Number	Color	Supplier
20	M81969/14-10	Red	QPL

(1) Make a selection of an insertion tool from Table 12.

CAUTION: DO NOT USE DAMAGED TOOLS.

(2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

(3) Put the contact assembly in the insertion tool.

(4) Axially align the insertion tool and the contact cavity at the rear of the connector block.

(5) Carefully push the contact assembly into the contact cavity until it stops.

Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(6) Carefully pull the tool out of the contact cavity.

Make sure that the tool and the contact cavity stay axially aligned.

(7) Lightly pull the wire to make sure that the contact is locked in the connector block.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

(8) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly out of the contact cavity.

(b) Do Step 3.B.(3) through Step 3.B.(7) again.

C. Fuse Installation

Table 13
FUSE INSTALLATION TOOLS

Part Number	Supplier
09-530-9604	Esterline/Korry

(1) Remove the fuse that has damage. Refer to Paragraph 2.G.

(2) Make a selection of a fuse installation tool from Table 13.

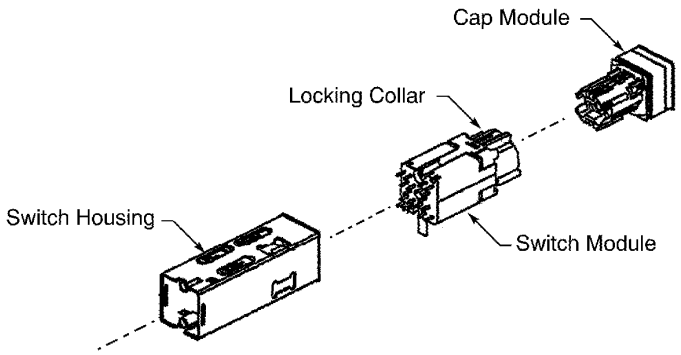
(3) Put the fuse between the fingers of the fuse installation tool at the ceramic area of the fuse.

(4) Gently push the fuse into the clips on the switch module.

(5) Close the fuse cover.

D. Connection of the Cap Module and the Switch Module

NOTE: This procedure is applicable to Boeing S231W240-1() and Esterline/Korry 09-530-01() switches only.



2448057 S00061548884_V1

CONNECTION OF THE CAP MODULE AND THE SWITCH MODULE
Figure 11

Refer to Figure 11.

(1) Hold the switch module with the rear of the module pointed up.

(2) With a flat blade screwdriver, turn the inner shaft on the rear of the module until the slot in the shaft is aligned with the lines that have the mark "UNL".

(3) Turn the locking collar on the front of the switch module until the label on the module is aligned with the center of the top of the module.

(4) Turn the cap module until the top of the cap module is aligned with the top of the switch module

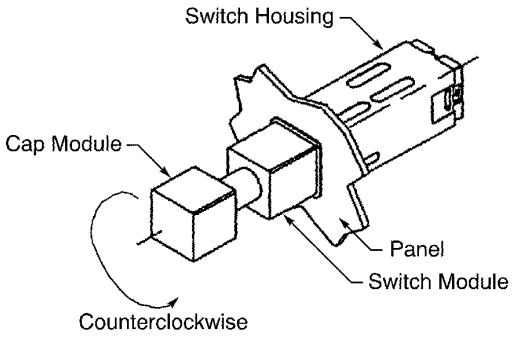
(5) Push the cap module into the switch module until it stops.

(6) Lightly push the cap module into the switch module and at the same time, use a flat blade screwdriver to turn the inner shaft 90 degrees until the slot is aligned with the lines that have the mark "LKD".

E. Installation of the Switch Module into the Switch Housing

(1) Hold the switch module with the hand and pull the cap module out from the switch module until it stops.

(2) Turn the cap module 22 degrees counterclockwise until it stops. Refer to Figure 12.

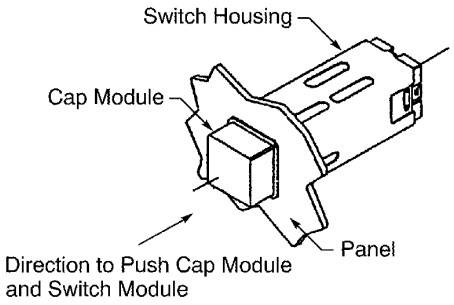


2448047 S00061548885_V1

POSITION OF THE CAP MODULE
Figure 12

(3) Align the top of the switch module with the top of the switch housing.

(4) Push the switch module into the switch housing until it stops. Refer to Figure 13.
Make sure that the cap is in the out position.



2448048 S00061548886_V1

INSTALLATION OF THE SWITCH MODULE
Figure 13

(5) Pull gently on the cap module, and at the same time, rotate the cap module clockwise until the top of the cap module is aligned with the switch housing.

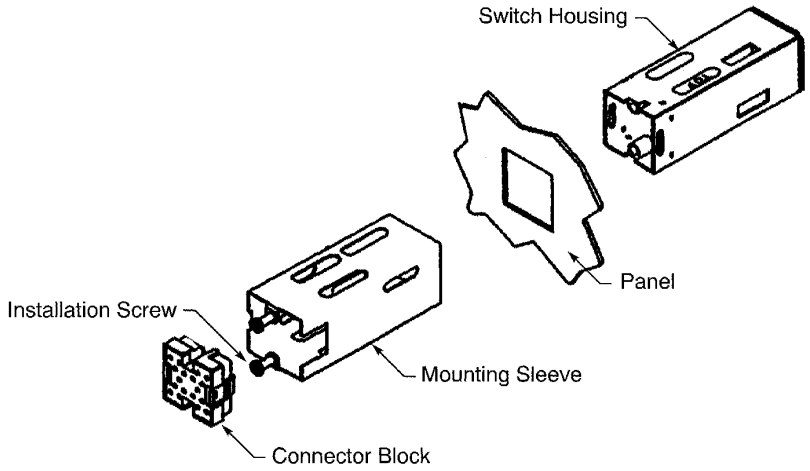
(6) Release the cap module.

F. Installation of the Switch Guard

(1) Put the switch guard on the switch housing.

(2) Install the switch in the panel. Refer to Paragraph 3.G.

G. Installation of the Switch in the Panel



2448040 S00061548882_V1

INSTALLATION OF THE SWITCH IN THE PANEL
Figure 14

(1) From the front of the panel, put the switch housing through the mounting hole.
Make sure that the side of the housing that has the word "TOP" is up.

(2) From the rear of the panel, align the mounting sleeve with the switch housing.
Make sure that the installation screws are aligned with the threaded holes in the switch housing.

(3) Push the mounting sleeve on the switch housing.

(4) Tighten the installation screws.

(5) Torque each installation screw 30 inch-ounces ±2 inch-ounces.

H. Installation of the Connector Block in the Switch Housing

(1) Align the polarization key on the connector block with the polarization keyway on the switch housing.

(2) Push the connector block into the switch assembly until the tabs on the connector block engage with the slots in the housing.

4. APPROVED TOOL SUPPLIERS

A. Tool Suppliers

Table 14
APPROVED TOOL SUPPLIERS

Tool	Supplier
M22520/7-01	QPL
M22520/7-12	QPL
M81969/14-10	QPL
09-530-9604	Esterline/Korry
09-530-9605	Esterline/Korry

KORRY ELECTRONICS 18539-() LIGHTED PUSHBUTTON SWITCHES

TABLE OF CONTENTS

KORRY ELECTRONICS 18539-() LIGHTED PUSHBUTTON SWITCHES

1. PART NUMBERS AND DESCRIPTION

A. Switch Part Numbers

Table 1
SWITCH PART NUMBERS

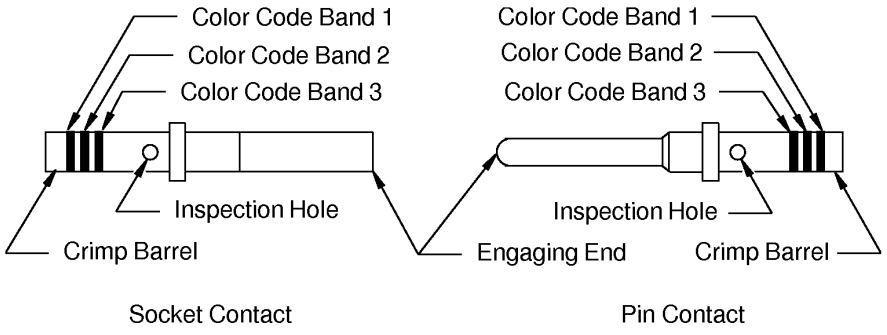
Part Number	Description	Supplier
18539-()	Switch, Lighted Pushbutton	Korry Electronics

B. Contact Part Numbers

Table 2
CONTACT PART NUMBERS

Contact		Contact Type	Color Code		Part Number	Supplier
Engaging End Size	Crimp Barrel Size		Band	Color		
20	20	Socket	1	Brown	M39029/22-192	QPL
			2	White		
			3	Red		

NOTE: Color codes start at the crimp barrel end of the contact. Refer to Figure 1.

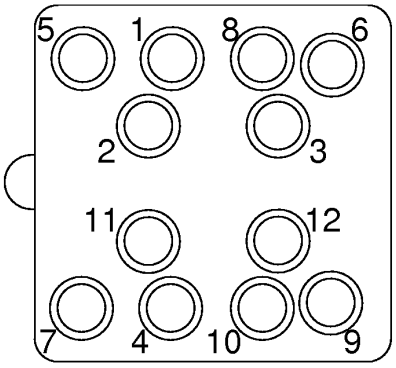


2448999 S00061545899_V1

LOCATION OF CONTACT COLOR CODES
Figure 1

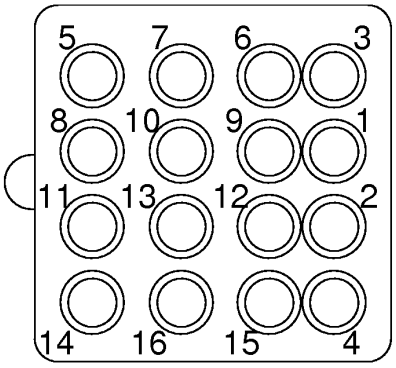
KORRY ELECTRONICS 18539-() LIGHTED PUSHBUTTON SWITCHES

C. Connector Contact Cavity Configurations



2449528 S00061548888_V1

427 CONFIGURATION - 2PDT
Figure 2



2449529 S00061548889_V1

428 CONFIGURATION - 4PDT
Figure 3

KORRY ELECTRONICS 18539-() LIGHTED PUSHBUTTON SWITCHES

2. SWITCH DISASSEMBLY

A. Contact Removal

Table 3
CONTACT REMOVAL TOOLS

Crimp Barrel Size	Removal Tool		
	Part Number	Color	Supplier
20	M81969/14-10	Orange	QPL

NOTE: For plastic tools, the color given in Table 3 is the color of the removal end of the combination tools that are both insertion and removal tools.

(1) Make a selection of a contact removal tool from Table 3.

CAUTION: DO NOT USE A REMOVAL TOOL THAT HAS A DEFECT. A REMOVAL TOOL THAT HAS A DEFECT CAN CAUSE DAMAGE TO THE GROMMET OR THE RETENTION CLIP.

(2) At the rear of the connector block, put the removal tool on the wire.

(3) Axially align the removal tool and the contact cavity.

(4) Carefully push the removal tool into the contact cavity until it stops.

CAUTION: DO NOT ROTATE THE TOOL OR SPREAD THE TOOL TIPS WHILE THE TOOL IS IN THE CONTACT CAVITY.

(5) Carefully pull the wire and the removal tool from the contact cavity at the same time.
Make sure that the removal tool and the contact cavity stay axially aligned.

(6) If the contact does not release:

(a) Pull the removal tool out of the contact cavity.

(b) Turn the removal tool approximately 90 degrees.

(c) Do Step 2.A.(2) through Step 2.A.(5) again.

3. SWITCH ASSEMBLY

A. Contact Assembly

Table 4
INSULATION REMOVAL LENGTH

Wire Size (AWG)	Crimp Barrel Size	Removal Length L (inch)	
		Target	Tolerance
24	20	0.18	±0.03
22	20	0.18	±0.03
20	20	0.18	±0.03

KORRY ELECTRONICS 18539-() LIGHTED PUSHBUTTON SWITCHES

Table 5
CONTACT CRIMP TOOLS

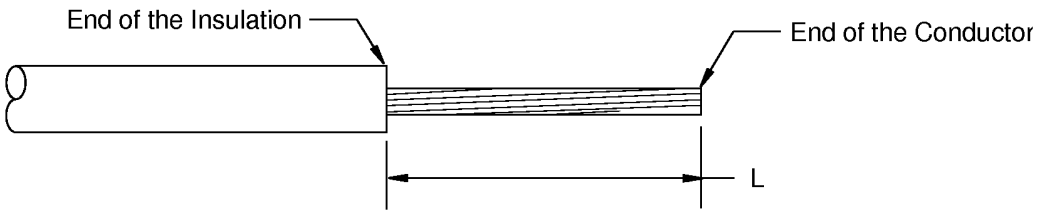
Wire Size (AWG)	Crimp Barrel Size	Crimp Tool		
		Basic Unit		Locator Part Number
		Part Number	Setting	
24	20	M22520/7-01	3	M22520/7-12
22	20	M22520/7-01	4	M22520/7-12
20	20	M22520/7-01	5	M22520/7-12

(1) Make a selection of a crimp tool from Table 5.

(2) Remove the necessary length of insulation from the end of the wire.

Refer to:

- Figure 4
- Table 4 for the insulation removal length
- Subject 20-00-15 for the insulation removal procedures.



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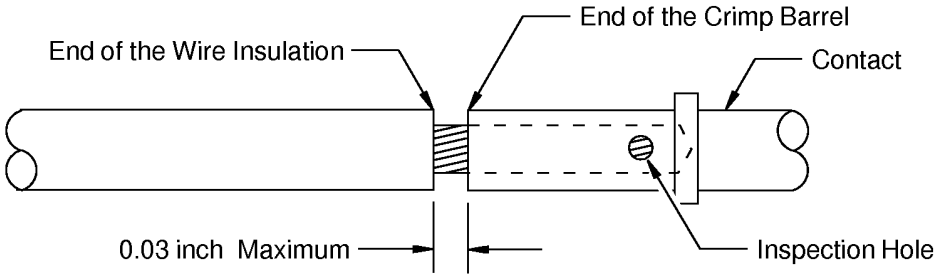
INSULATION REMOVAL LENGTH
Figure 4

(3) Put the end of the conductor in the crimp barrel of the contact. Refer to Figure 5.

Make sure that:

- All the conductor strands are in the crimp barrel
- The conductor strands are visible in the inspection hole of the contact
- The distance from the end of the insulation to the crimp barrel is not more than 0.03 inch.



POSITION OF THE CONDUCTOR IN THE CRIMP BARREL OF THE CONTACT
Figure 5

(4) Crimp the contact.

B. Contact Insertion

Table 6
CONTACT INSERTION TOOLS

Crimp Barrel Size	Insertion Tool		
	Part Number	Color	Supplier
20	M81969/14-10	Red	QPL

(1) Make a selection of an insertion tool from Table 6.

CAUTION: DO NOT USE DAMAGED TOOLS.

(2) Lubricate the rear grommet of the connector with isopropyl alcohol.

CAUTION: DO NOT PUT THE CONNECTOR GROMMET OR CONTACT ASSEMBLY FULLY INTO THE ALCOHOL. TOO MUCH LUBRICANT CAN CAUSE DAMAGE TO THE CONNECTOR.

(3) Put the contact assembly in the insertion tool.

(4) Axially align the insertion tool and the contact cavity at the rear of the connector block.

(5) Carefully push the contact assembly into the contact cavity until it stops.

Make sure that the insertion tool stays axially aligned with the contact cavity.

CAUTION: DO NOT USE MORE THAN THE NECESSARY AMOUNT OF FORCE TO PUSH THE TOOL INTO THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

CAUTION: DO NOT TURN THE TOOL CLOCKWISE OR COUNTERCLOCKWISE WHEN IT IS IN THE CONTACT CAVITY. DAMAGE TO THE CONTACT RETENTION CLIPS CAN OCCUR.

(6) Carefully pull the tool out of the contact cavity.

Make sure that the tool and the contact cavity stay axially aligned.

(7) Lightly pull the wire to make sure that the contact is locked in the connector block.

CAUTION: DO NOT PULL THE WIRE WITH A STRONG OR SUDDEN FORCE. THE FORCE CAN CAUSE DAMAGE TO THE CONNECTOR OR THE CONTACT.

CAUTION: DO NOT MAKE A DENT IN THE WIRE INSULATION WITH THE FINGERNAILS. DAMAGE TO THE WIRE INSULATION CAN CAUSE UNSATISFACTORY PERFORMANCE OF THE WIRE.

(8) If the contact is not locked in the contact cavity:

(a) Pull the contact assembly out of the contact cavity.

(b) Do Step 3.B.(3) through Step 3.B.(7) again.

4. APPROVED TOOL SUPPLIERS

A. Tool Suppliers

Table 7
APPROVED TOOL SUPPLIERS

Tool	Supplier
M22520/7-01	QPL
M22520/7-12	QPL
M81969/14-10	QPL

JANCO AD45-() SWITCHES

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JANCO AD45-() SWITCHES

1. PART NUMBERS AND DESCRIPTION

A. Switch Part Numbers

Janco AD45-() switches have these technical features:

- Cory or Tri-Star CSLT2-21R() receptacle connectors mounted on the rear
- Connect to Cory or Tri-Star CSLT2-21P() plug connectors.

Refer to Subject 20-63-22 for assembly of Cory and Tri-Star CSLT2-21P() connectors.

Table 1
SWITCH PART NUMBERS

Part Number	Description	Supplier
AD45-()	Switch, Rotary	Janco

2. SWITCH DISASSEMBLY

A. Connector Separation

Refer to Subject 20-63-22.

3. SWITCH ASSEMBLY

A. Plug and the Receptacle Connection

Refer to Subject 20-63-22.

BOEING S231T290 LIGHTED PUSHBUTTON SWITCHES AND S231T300 AND S231T301 INDICATORS

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BOEING S231T290 LIGHTED PUSHBUTTON SWITCHES AND S231T300 AND S231T301 INDICATORS

This Subject is relocated from:

- 20-91-00 "Fuse Diode Module and Lamp Replacement"

to:

- 20-84-18 "Boeing S231T290 Lighted Pushbutton Switches and S231T300 and S231T301 Indicators"

This Subject gives the procedures to remove and replace lamps and fuse diode modules in Boeing S231T290 lighted pushbutton switches and S231T300 and S231T301 Indicators.

1. PART NUMBERS AND DESCRIPTION

A. Part Numbers of Assemblies that Require Fuse Module and Lamp Replacement

Table 1
ASSEMBLY PART NUMBERS

Part Number	Description	Supplier
S231T290	Lighted Pushbutton Switch	Boeing
S231T300	Lighted Indicator	Boeing
S231T301	Lighted Indicator	Boeing

B. Lamp Part Numbers

Table 2
LAMP PART NUMBERS

Boeing Specification	Voltage	Military Part Number	Supplier
S231T290	28	MS25237-387 AS15	QPL
	5	MS24515-685 AS15	QPL
S231T300	28	MS25237-387 AS15	QPL
S231T301	28	MS25237-387 AS15	QPL

Table 3
SUPPLIER PART NUMBERS FOR MILITARY PART NUMBERS

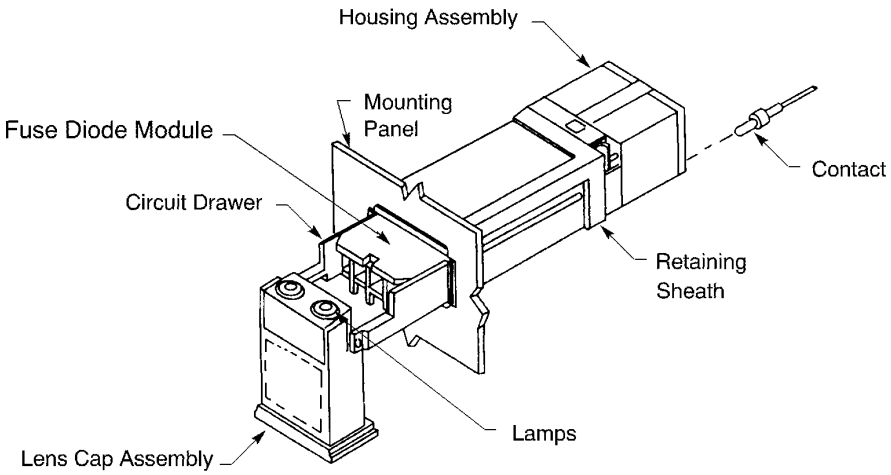
Military Part Number	Supplier Part Number	Supplier
MS25237-387 AS15	000-0040-0053	Korry Electronics

2. LAMP AND FUSE DIODE MODULE DISASSEMBLY

A. Lamp and Fuse Diode Module Removal

(1) Pull the lens cap assembly out of the mounting panel as far as it will go.

(2) Turn the lens cap assembly to make it point down. Refer to Figure 1.



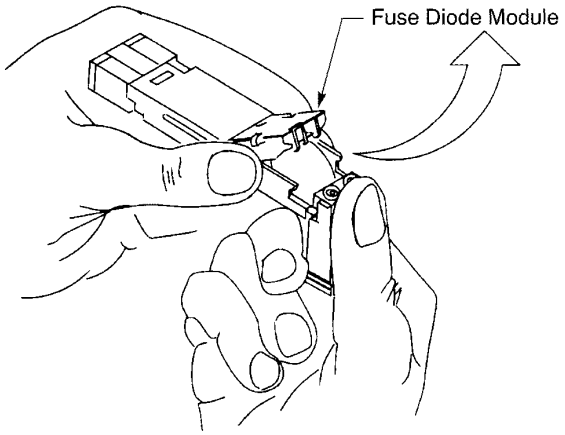
LIGHTED PUSHBUTTON SWITCH INDICATOR
Figure 1

(3) If it is necessary to replace the lamp, hold the circuit drawer and at the same time, pull the lamps out of the lens cap assembly.

(4) If it is necessary to replace the fuse diode module:

(a) Pull the fuse module straight back out of the drawer, until it stops.

(b) Hold the drawer with the index finger, and at the same time, turn the fuse diode module up. Refer to Figure 2.



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FUSE DIODE MODULE REMOVAL
Figure 2

3. LAMP AND FUSE DIODE MODULE ASSEMBLY

A. Lamp and Fuse Diode Module Installation

(1) If it is necessary to install a new lamp:

(a) Make a selection of a lamp from Table 2.

(b) Remove the broken lamp. Refer to Paragraph 2.A.

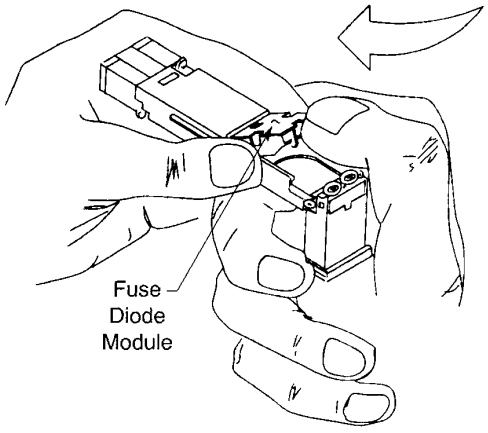
(c) Insert the new lamp into the lens cap assembly cavity.

(2) If it is necessary to install a new fuse diode module:

(a) Remove the broken fuse diode module. Refer to Paragraph 2.A.

(b) Support the bottom of the drawer with the index finger and push the new fuse diode module into the drawer with the thumb.

Refer to Figure 3.



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FUSE DIODE MODULE INSTALLATION
Figure 3

(3) Rotate the lens cap assembly up.

(4) Push the lens cap assembly into the housing assembly until it clicks.

TERMINATION OF WIRE IN MS25257 TYPE INDICATOR LIGHTS

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TERMINATION OF WIRE IN MS25257 TYPE INDICATOR LIGHTS

This Subject gives the procedure to attach AWG 20 and larger wire to the terminals of MS25257 type indicator lights.

1. WIRE TERMINATION

A. Terminal Preparation

(1) Apply the sufficient amount of Kester 1544 flux to both sides of each terminal on the indicator light.

(2) Put a heat sink on each terminal so that each heat sink is adjacent to the light base.

(3) Lightly tin each terminal.

Make sure that the hole in each terminal is open.

(4) Remove the heat sinks.

B. Installation of the Wire

(1) Put the conductor strands of each wire into 2 groups.

(2) For each terminal:

(a) Put one group of strands through the hole of the terminal.

(b) Put the other group of strands over the terminal near the hole.

(3) Apply the sufficient amount of Kester 1544 flux to the strands that are against the terminal.

(4) Put a heat sink on each terminal so that each heat sink is adjacent to the light base.

(5) Solder each wire to the terminals.

CAUTION: DO NOT APPLY MORE HEAT THAN IS NECESSARY FOR THE SOLDER TO FLOW. DAMAGE CAN OCCUR TO THE WIRE OR THE INDICATOR LIGHT OR BOTH.

(6) Remove the heat sinks.