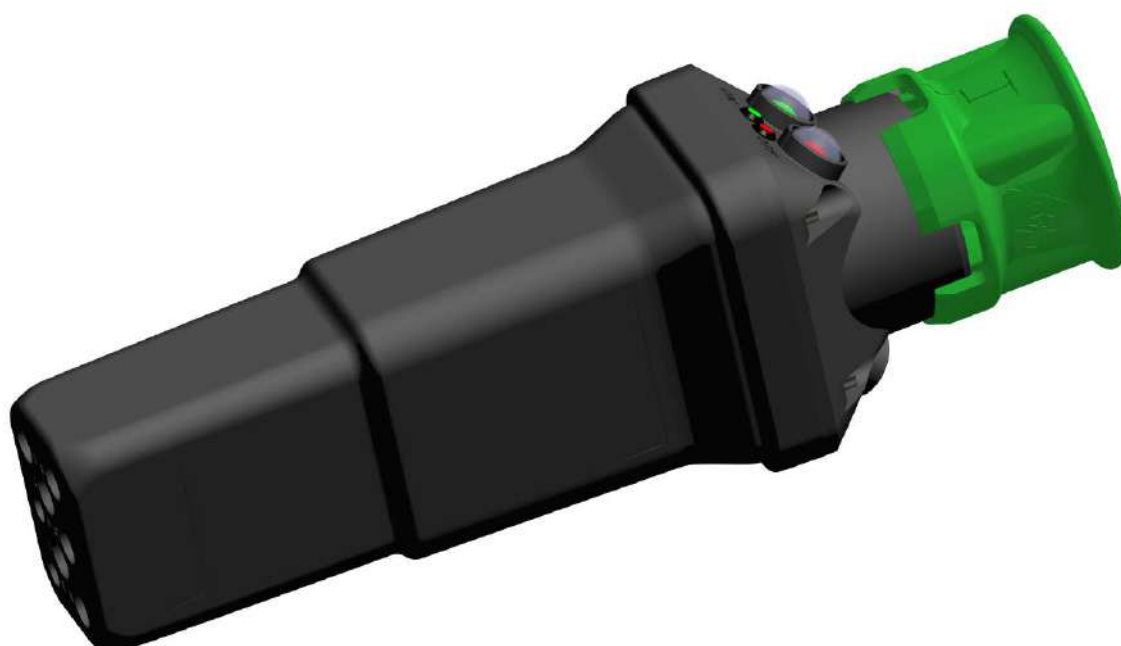


Assembly Instructions

PDS400 Aircraft Connector



LPA Connection Systems

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Change Record



Issue Number	Description of Change	Date
1	First Issue	22/07/20
2	PAGE 3: CHANGE RECORD ADDED PAGE 6: CONNECT CONFIGURATION UPDATED WAS /222432 PAGES 24 & 25: INNER BLOCK DIAGRAM AND PICTURES CORRECTED WAS SHOWING N27 INNER BLOCK. PAGE 29: SCREW TORQUE VALUE 2.0Nm WAS 2.5Nm. PAGE 34: SCREW TORQUE VALUE 4Nm WAS 5Nm.	18/10/22

1. Safety Instructions

This Document covers the necessary information in order to correctly assemble the PDS400 aircraft connector.

It is recommended that the instructions are followed closely.
For more information, please contact LPA Connection Systems.

If the manual is damaged or lost, please contact the supplier for a new copy.

	If the assembly of the connector does not follow the steps outlined in the document the manufacturer accepts no responsibility in resulting accidents, damages or mechanical failures.
	This equipment was developed for professional users and operators who must be aware of all technical instructions. The operator must also have read and understood all the assembly instructions.

The equipment is to be used only by skilled and trained personnel. The personnel must be informed of the correct use and the observance of the safety directions before they are allowed to use the equipment. The personnel using the equipment must have read and understood this Instruction Manual.

The safety, protection and control equipment must be in correct operating condition.



2. Scope

The purpose of this document is to provide instructions on how to correctly assemble the LPA PDS400 Aircraft connector onto a cable harness. For the purposes of these instructions a composite cable has been used as a demonstrative aid; however, the process will remain largely the same when using other cable variations (e.g., 3 or 4 core cable).

The document is limited entirely to the LPA PDS400 aircraft connector and any of the data contained within is not provided for, or to be used for any other purpose.

Observe and conform to all applicable national and international laws. Observe and implement all precautions, particularly with regard to the safety datasheets for the substances used, including use of personal protective equipment (PPE), environmental conditions and all other applicable safety and environmental precautions.

3. Configuration

The PDS400 connector can be offered in a number of different configurations. As such, LPA cannot define to the end user the way in which the connector should be wired. However, LPA consider there to be several standard procedures and working practices that should be used on all cable harness assemblies. For the purposes of these instructions, a common configuration of connector, PDS400/2243B0, has been used as a demonstrative aid.

Referring to the PDS400 configurator within the LPA Aviation brochure, the example connector has the following features:

- Cable size: 2 – 70 mm² power contacts, 35 mm² neutral contacts
- Control tube: 2 – Replaceable 'F' contact with 90% insertion switch
- Quantity of push buttons: 4 – Red/Green (ON/OFF), Black/Black (IN/OUT) switches
- Quantity of LEDs: 3 – Red/Green + Yellow LEDs
- Bung size: B – To suit 1 x Ø36.00-37.99 mm cable
- Temperature Sensors 0 – No Sensors

The following additional points should be noted as industry recognised practices that will be followed within these assembly instructions but are not deemed to be mandatory by LPA.

LED usages – typically the LEDs are used for the following purposes:

- Green: Presence of 28 V
- Red: 400 Hz On
- Yellow: 90% microswitch activated

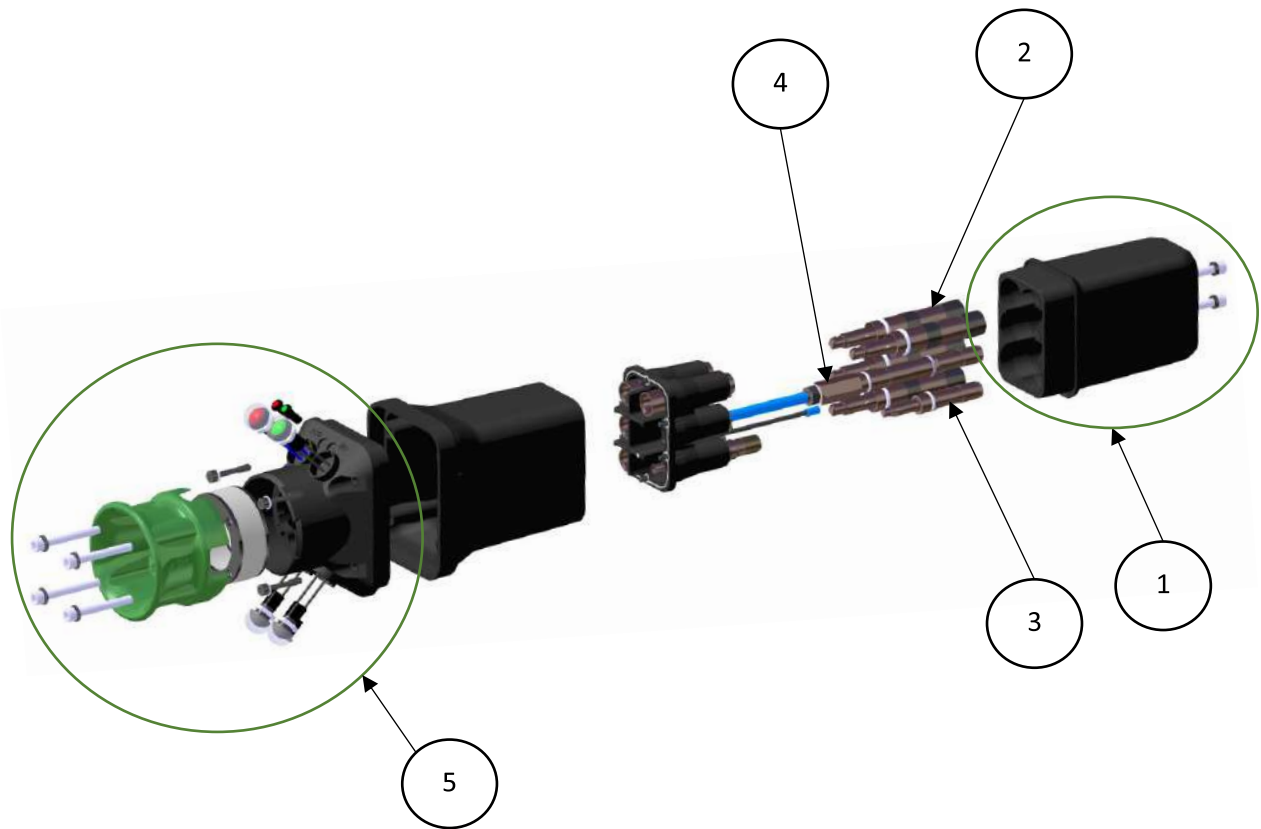
Daisy chaining of components – the output terminals of a number of components (e.g., 2 switches and 2 LEDs) are 'spliced' together and connected to one of the cable control wires to minimise the number of wires used; this approach is often referred to as "daisy chaining".

Connection of components to control wires – the terminal wires included as part of the switch assemblies will be attached to the cable control wires via crimped terminal lugs (soldering is also acceptable).

Neutral rupture – often a control wire will be connected to the neutral contact such that a rupture or breakage of the 'N' phase can be detected.



4. Description of Connector Components

Exploded diagram of the PDS400 Aircraft Connector.




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Position	Image	Item number	Description	Contains
1		54357	Removable nose assembly	1 x REMOVABLE NOSE MOULDING 4 x END CAP 2 x M6 x SKT HD NOSE SCREW 2 x M6 S/COIL LOCK WASHER 2 x M6 X SEALING WASHER SS 1 x O RING 82MM ID 2MM SECTION
2		54355	Front power contact assemblies ('A', 'B', 'C' and 'N')	4 x POWER TUBE FRONT ASSY 4 x END CAP 4 x CIRCLIP CONTACT 450 AMP 4 x SUPPORT COLLAR 4 x O RING 13.6MM ID 3MM SECTION
3		54354	'E' Front control contact assembly	1 x CONTROL TUBE FRONT 1 x CIRCLIP CONTACT 50 AMP 1 x O RING 11MM ID 2.2MM SECTION
4		54316	'F' Control contact assembly (containing 90% insertion switch)	N/A
5		54332 54333 54334 53765 43028 43029 43030 51617 54342 19059ST50SS 19132SS 18848A4SS	1 x RED PUSH BUTTON SWITCH WIRED 1 x GREEN PUSH BUTTON SWITCH WIRED 2 x BLACK PUSH BUTTON SWITCH WIRED 4 x OTTO SWITCH COVER 1 x RED LED INDICATOR (28V DC) 1 x GREEN LED INDICATOR (28V DC) 1 x YELLOW LED INDICATOR (28V DC) 3 x O-RING DIA 6 X 1.0 SEC 2 x HANDLE MOULDING 4 x M6 X 50MM LG SKT HD CAP SCREW 4 x M6 PLAIN WASHER 4 x M6 S/COIL LOCK WASHER	N/A

5. Assembly tools and Auxiliary Materials

5.1 Specific Tools

Position	Image	Description	Manufacture/Supplier Details
1		Aircraft socket assembly kit	LPA ref: 51722

5.2 Standard Tools

Position	Image	Description	Manufacture/Supplier Details
1		Desk Clamp/Vice	Non-specific
2		Cable cutters	Non-specific
3		C head hydraulic crimp tool and dies	Manufacturer ref: BPP1302 No. 30732 and No. 32054 from Dubuis





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Position	Image	Description	Manufacture/Supplier Details
4		File	Non-specific
5		Heat gun	Non-specific
6		Torque wrench 1-20 Nm	Non-specific
7		Hex bit socket	Non-specific
8		Circlip pliers	Non-specific
9		2.5 mm Hex bit (long)	Non-specific
10		4 mm Hex bit	Non-specific
11		5 mm Hex bit	Non-specific

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Position	Image	Description	Manufacture/Supplier Details
12		Hand crimp tool	LPA ref: 47387C
13		Hand crimp tool	LPA ref: 49935-1
14		Crimp die tool	LPA ref: 30732
15		Crimp die tool	LPA ref: 32054

5.3 Auxiliary Materials

Position	Image	Item number	Description
1		Manufacturer ref: ERSGB20SR LPA ref: 40406	Electrolube contact grease
2		LPA ref: 51720/1	Marker
4		Manufacturer ref: 6110002500 LPA ref: 40403	Ambersil Silicone release agent

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Position	Image	Item number	Description
5		Manufacture ref: 1335885	Loctite 243 Thread sealant
6		Manufacture ref: 142379	Loctite SF 7649 with Extension nozzle
7		Manufacture ref: 231501	Loctite 222 Thread locking adhesive
8		LPA ref: 28187	4 x Heat-shrink pre-cut to length
9		LPA ref: 19833	10 x Crimp cap
10		LPA ref: 19313	3 x Splice
11		LPA ref: 42336	3 x Marker sleeve

6. Assembly Instructions

6.1 Preparing the cable

1. Note the composition of the cable (9).
2. Slide the rear body assembly (8) over the cable (9). A clamp/vice can be used to stop the cable from moving.



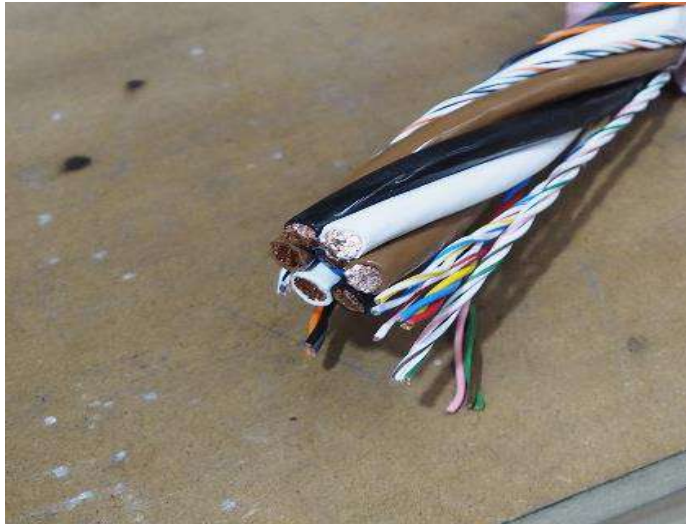
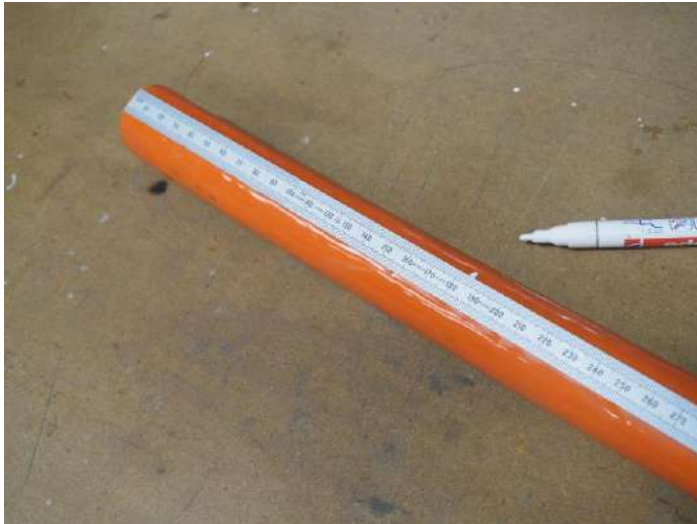
3. After sliding the rear body assembly (8) onto the cable (9), slide the main body assembly (7) over the cable so that it sits in front of the rear body assembly.



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4. Cut out the outer jacket of cable by 180-190mm and remove completely.



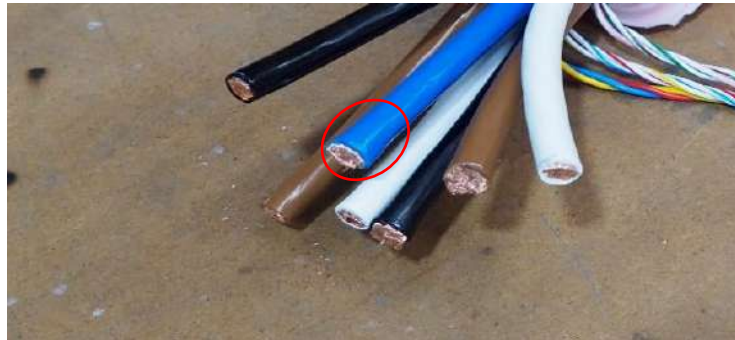
5. Gather the power cables by forming them with the correct colours/letters i.e., brown/brown, black/black, white/white or 1/1, 2/2 and 3/3 and cut 50mm from each end. Make sure cables are formed before being cut to required lengths.



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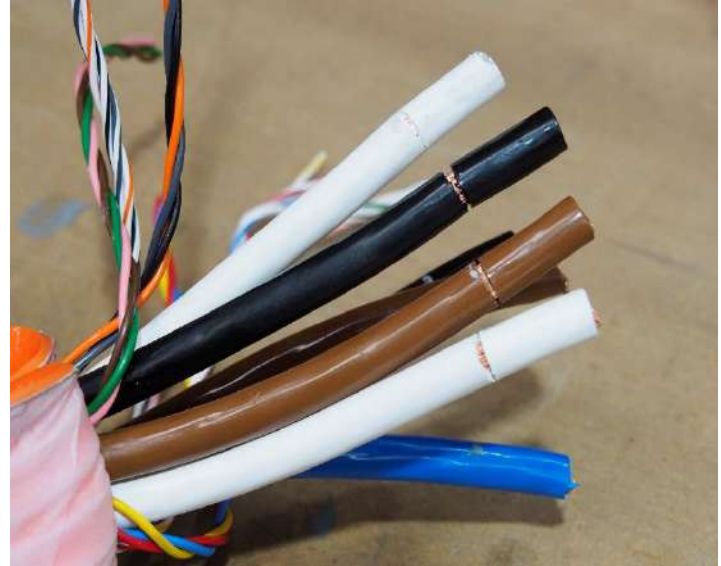
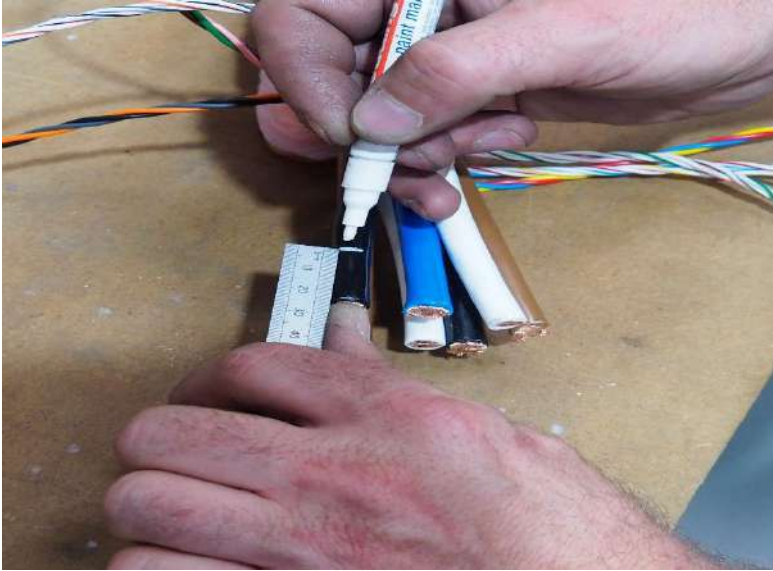
6. For the neutral cable also cut 50mm from the end.



7. Now the power and neutral cables should measure 130-140mm from where the jacket was originally cut. Also, the control cables should still measure 180-190mm from the jacket cut.

6.2 Crimping the cables

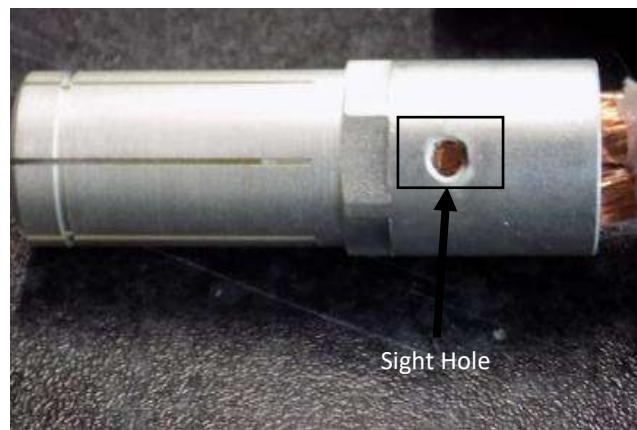
1. Strip 23-25mm of insulation from the power cables and remove to expose the cable if ready for crimping process.



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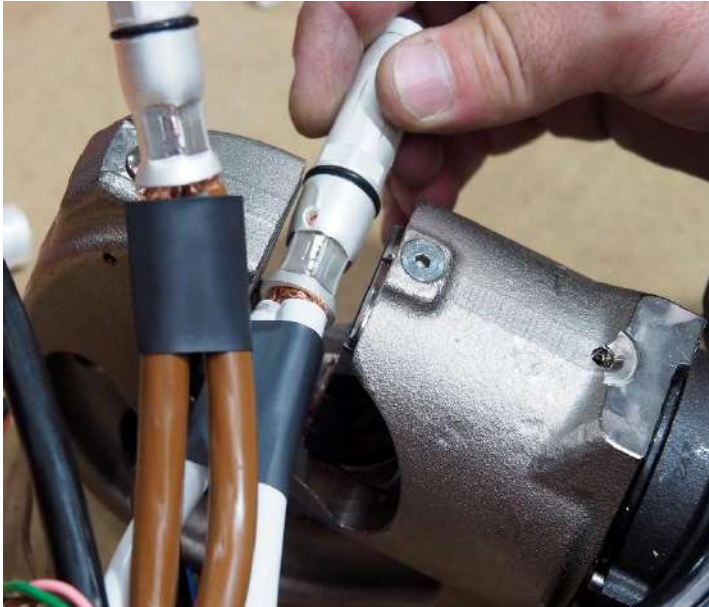
2. Slide the rear contact (2) over the exposed cable, ensuring that the entire cable is inserted in the crimp bucket and fully covers the sight hole on the side of the contact. Ensure there are no loose strands of cable outside of the contact.



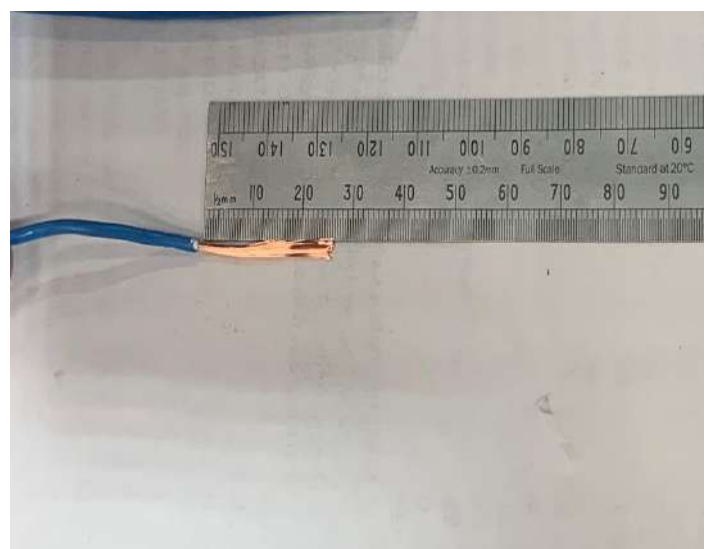
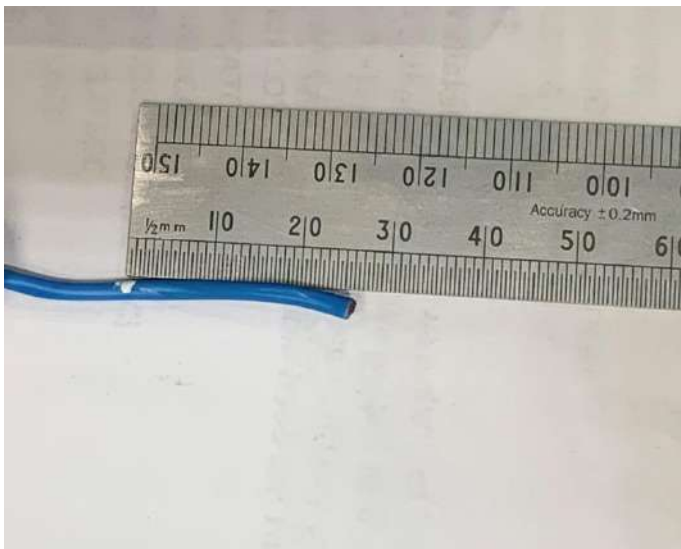
3. Using a crimp tool, crimp the rear contact to the cable. LPA recommends using a C head hydraulic crimp tool and die No. 30732 from Dubuis for the power cables. Repeat steps 2 and 3 for the A, B and C power phases.



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4. Strip the insulation from the neutral cable(s) and control cable No. 1 (neutral rupture wire) to 23-25mm measured from the end to expose the cables.



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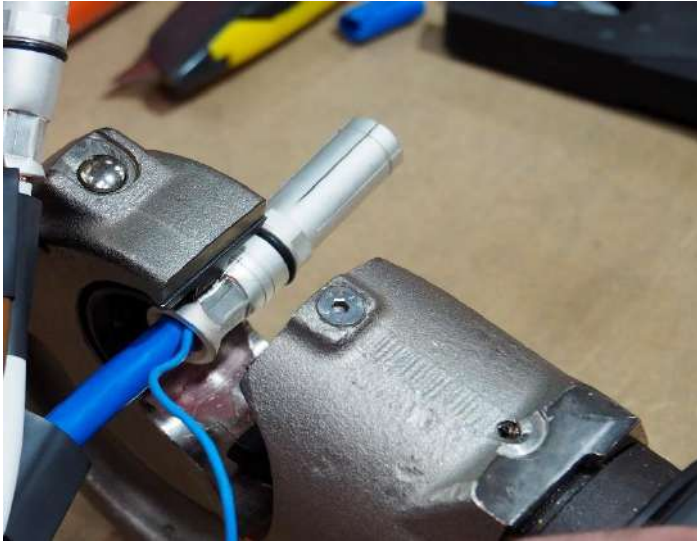
5. Slide the rear contact (5) over neutral cable(s) and control cable No. 1 (neutral rupture wire), ensuring all are completely inserted and visible from the sight hole.



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6. Crimp the rear contact. LPA recommends using a C head hydraulic crimp tool and die No. 30732 from Dubuis for the neutral cables.



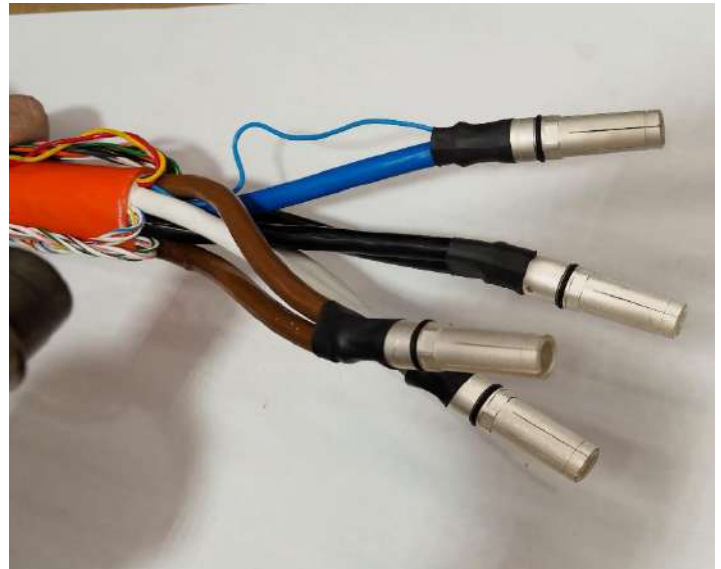
7. Once all four power phase contacts (A, B, C and N) have been crimped, remove any sharp edges on the contacts that are left by the crimp tool. This can be done using a hand file.



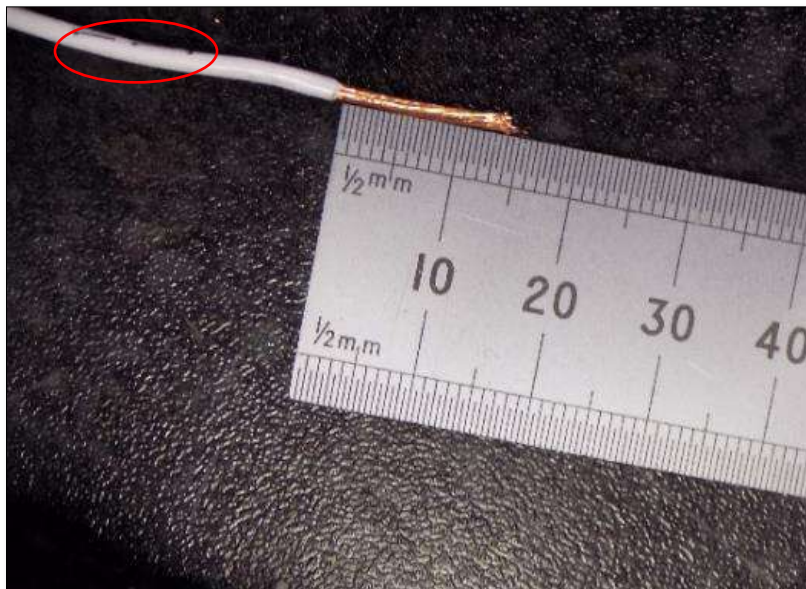
LPA Connection Systems



8. Cover all 4 cables at the crimp joint using supplied heat-shrink (10) by using hot air gun.



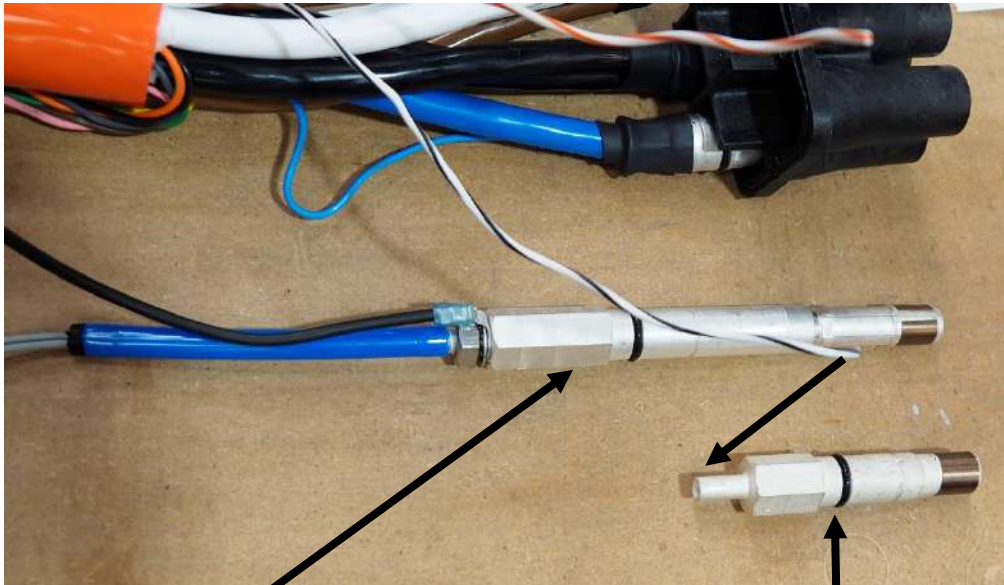
9. According to the wiring diagram, strip control cables No. 12 and No. 2 by 15-16mm.



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10. Insert control cable No. 12 into the rear of the 'E' control contact (3) ensuring that the cable is fully inserted and control cable No. 2 to be crimped with the black control cable at the rear of the 'F' control contact (4 – contact containing the 90% insertion switch).



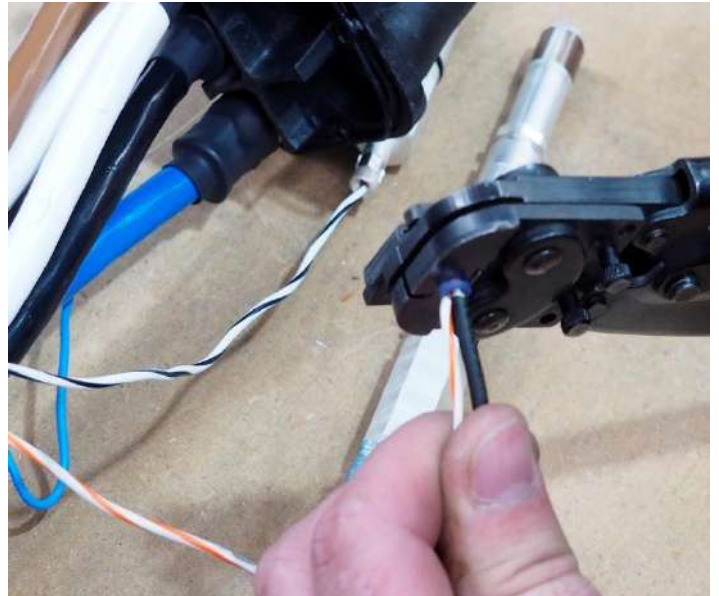
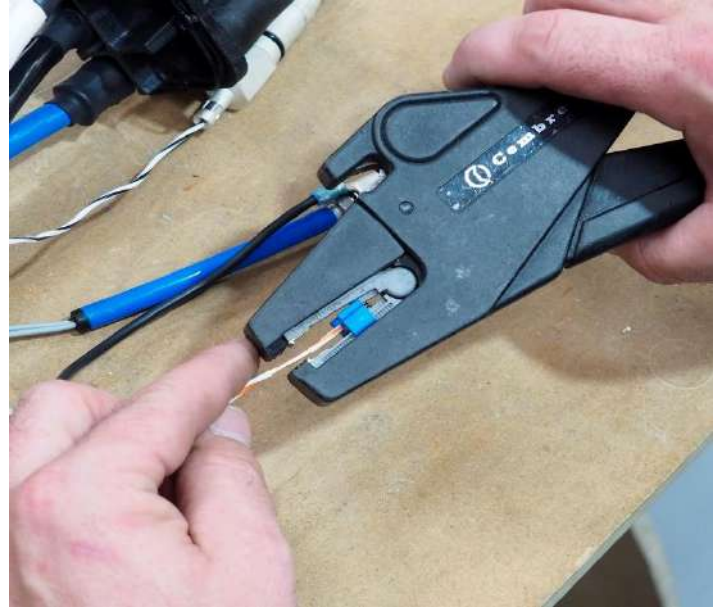
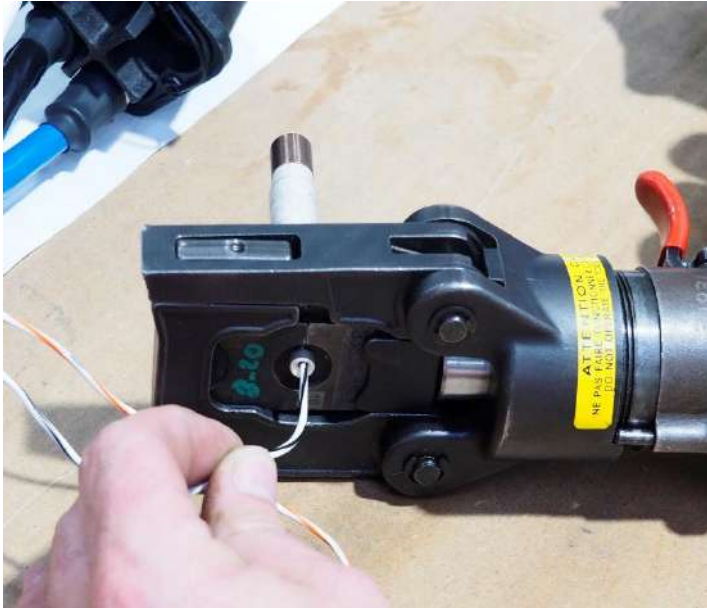
90% insertion contact (4)

'E' control contact (3)

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11. Crimp the connection joints of both control contacts. LPA recommends using a C head hydraulic crimp tool and dies No. 32054 from Dubuis for the control cables into contact E, 90% insertion crimp control and black cable into end cap using Tool Ref 47387 C.



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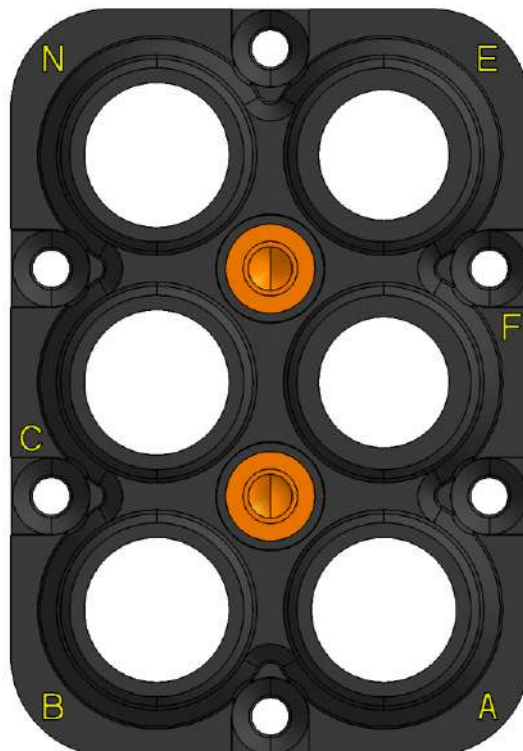


12. Insert the power and neutral contacts (2 and 5) into their respective cavities of the inner block assembly (6) and place a large circlip in the grooves using circlip pliers.

Care Point – Do not over stretch circlips.



Large circlips

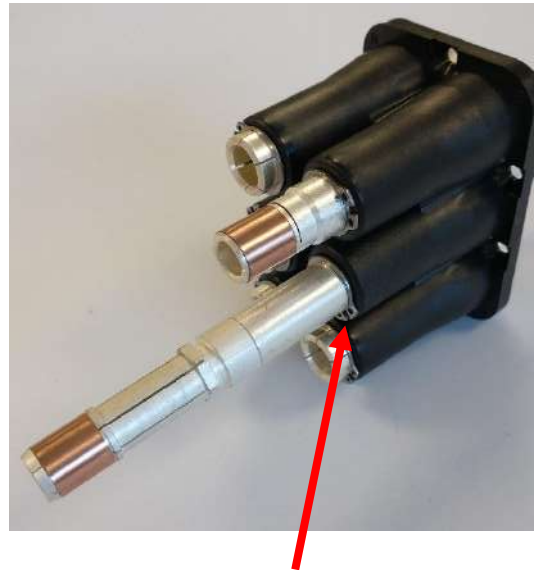


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13. Insert the control contacts (3 and 4) into their respective cavities of the inner block assembly (6). Place a small circlip in the grooves.

Care Point – Do not over stretch circlips.



Small circlips



'O' ring

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14. Procedure for assembling contacts

- I. Ensure that the mating threaded surfaces on the power contacts are clean and free from contamination prior to application of adhesive. Attach the nozzle to the spray head of the Loctite 7649 Activator (can be used without nozzle) and position the extension nozzle into the centre of the female portion of the thread, located on the rear half contact.
 - II. Apply the activator to the female portion of the thread and clean any excess activator using a suitable, dry, lint free cloth. Apply two small beads (approximately 1mm diameter) of Loctite 243 to the male portion of the thread located on the front half of the connector. *Ensure that the beads run parallel to the depth of the thread and that each bead is located opposite one another around the circumference of the thread.*
 - III. Mate the front half of the power contact to the rear half of the contact and engage threads by hand, by at least two turns. Mate the remainder of the thread using the dedicated tightening tools provided and tighten to the prescribed torque of 5Nm. Allow parts to cure for at least 6 hours (24 hours recommended) prior to first use. Add a torque mark with a paint marker.
- Note: LPA recommends using contact grease Electrolube (**not on the threads**) (manufacturers No. ERSGB20SR) and LPA dedicated tool 50871 and 50872.



Electrolube



LPA part 50871 and 50872



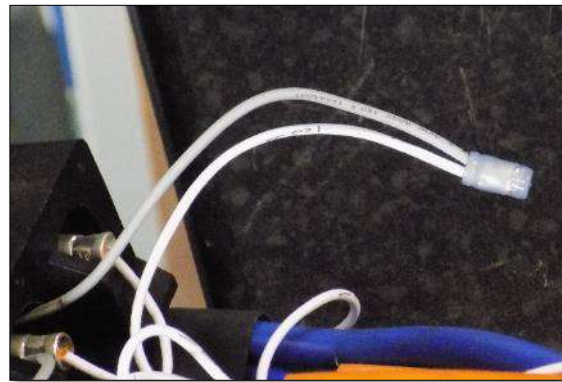
Torque mark



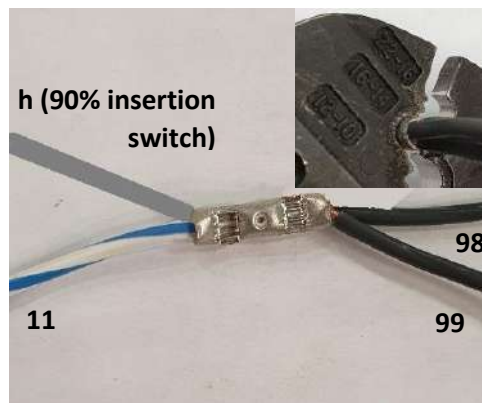
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- 15. One of the cables from the 90% insertion contact switch (Grey Wire) (5) is to be crimped to control wire No. 10 with an end cap. LPA recommend using Crimp tool 47387C.



- 16. The remaining cable from the 90% insertion contact is to be crimped with control cable No. 11 using a splice. LPA recommend using Crimp tool 49935-1.



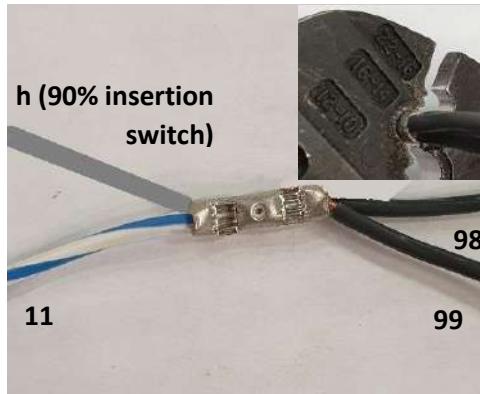
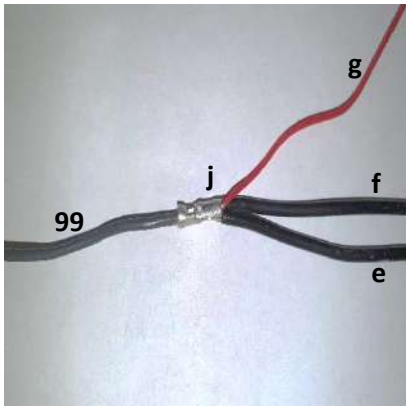
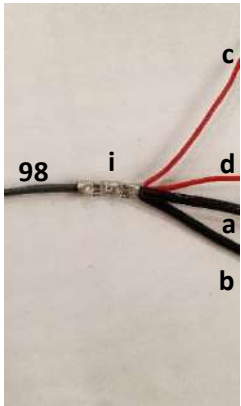
LPA Connection Systems



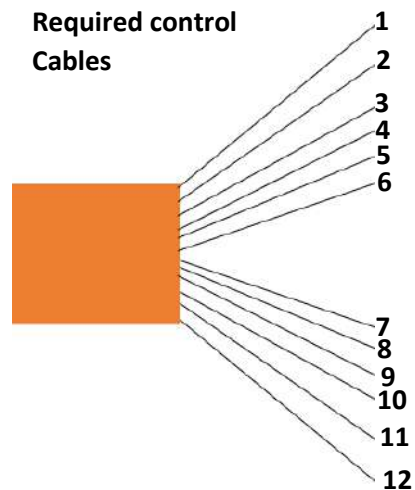
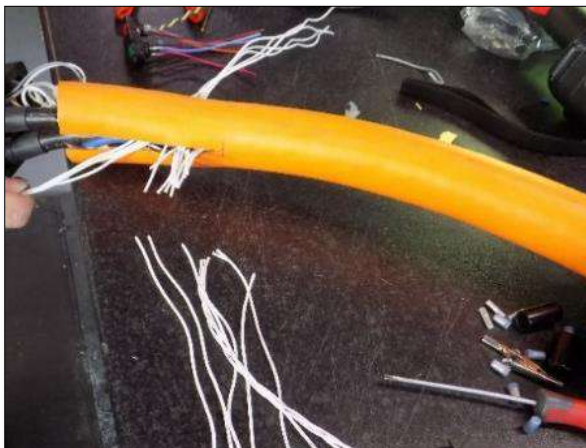
- 17. Cut 100 mm lengths from the end of two unused control cables and keep the cut lengths.



These lengths shall be referred to as link cables 98 and 99 respectively. The cut lengths will be utilised to create a crimp connection on the opposite end on the splice that was created in step 16. Crimp link cables No. 98 and No. 99 into the opposite side of the splice. Place a marker sleeve over the splice to add insulation with the hot air gun. LPA recommend using Crimp tool 49935-1.



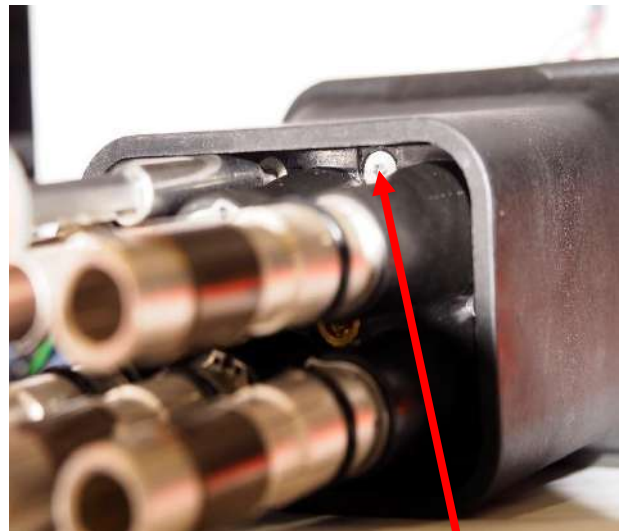
- 18. The control cables that are required for wiring of the switches and LEDs are shown on the diagram below. Cut off the remaining cables that are not highlighted below as much as possible.



6.3 Assembly of the Connector

1. Slide the main body assembly (7) up the cable and onto the rear of the inner connection block assembly (6). Tighten the 6 x M4 countersunk screws to a torque of 2.0Nm using a 3 mm Torque Wrench with Loctite 222.

Care point – ensure the inner block seal is engaged correctly within the channel on the bottom of the inner block assembly prior to fastening the 6 x M4 countersunk screws.



6 X M4 Screws

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2. Slide the removable nose assembly (1) over the front contacts (2, 3, 4 and 5) and fasten the 2 x M6 cap head screws to a torque of 5 Nm using a 5 mm Torque Wrench with Loctite 222.



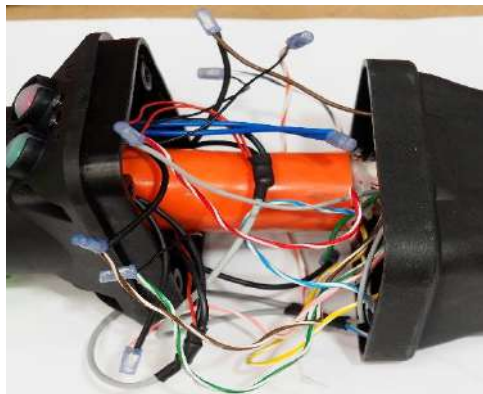
5mm Torque Wrench

3. Slide the rear body assembly (8) close to the main body assembly (7) in preparation for the termination of the switches and LEDs. A silicone spray can be applied to the cable jacket to ease the movement of the rear body assembly along the cable.

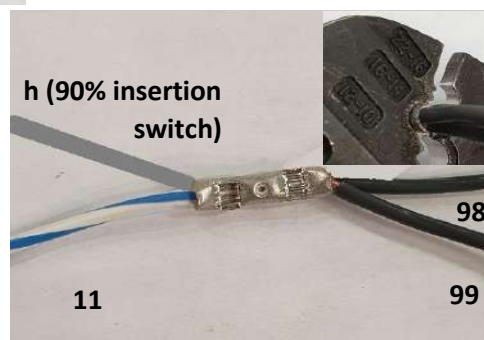
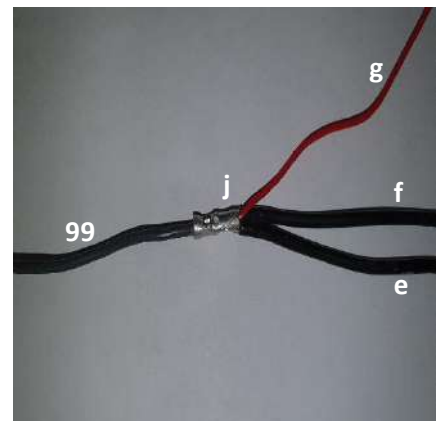
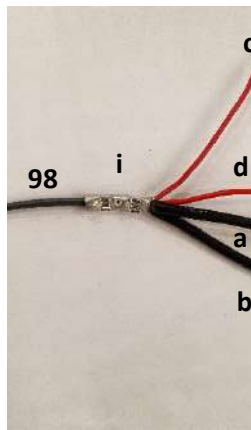


6.4 Termination of switches and LEDs

1. Strip 5-6 mm of insulation from the end of each of the component wires and control wires.
2. Form crimp joints at locations a, b, c, d, e, f, g and h using supplied crimp caps (19833) and an appropriate crimp tool (e.g., LPA Crimp Tool 47387C).



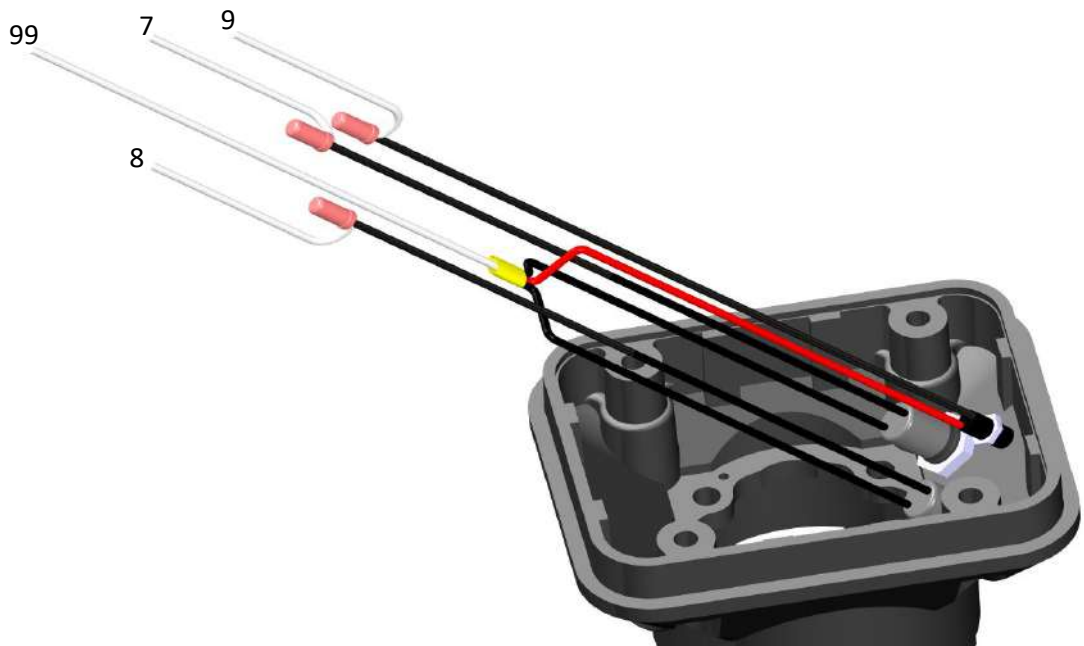
3. Form splice joints at locations i, j and k using suitable cable splices and an appropriate crimp tool.



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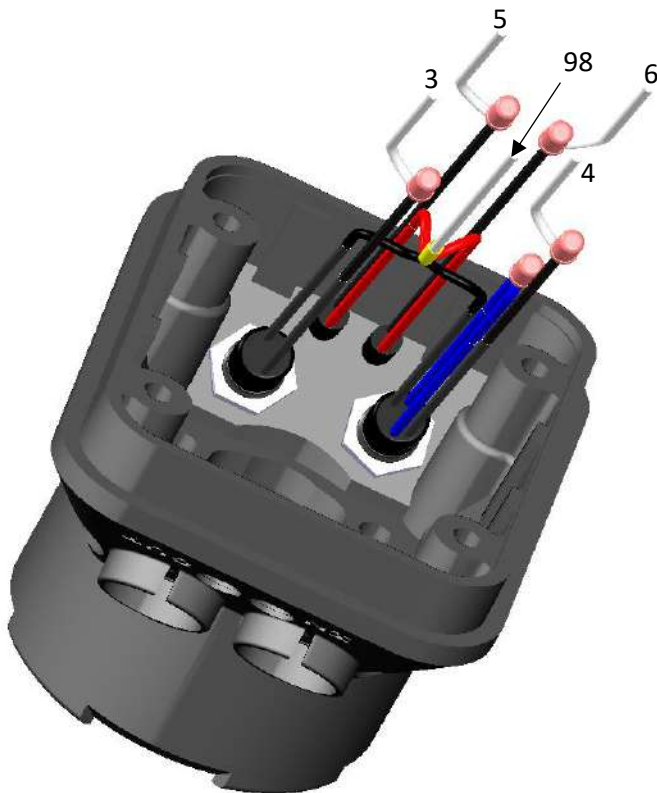
IN/OUT SWITCH PLATE WIRING	
Control cable	Wires to crimp to control cable
Control cable 99	Black wire from both switches and the red wire from the LED.
Control cable 7	Black wire from the switch next to the LED
Control cable 8	Black wire from the switch furthest away from the LED
Control cable 9	Black wire from LED



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ON/OFF SWITCH PLATE WIRING	
Control cable	Wires to crimp to control cable
Control cable 98	Black wire from both switches and both red wire from the two LED's.
Control cable 3	Black wire from the green switch
Control cable 4	Black wire from the red switch
Control cable 5	Black wire from red LED
Control cable 6	Black wire from the green LED



6.5 Rear Body Assembly

1. Tuck the cables from rear body assembly (8) into the main body assembly (7) and slide the rear body assembly along the cable such that it loosely mates with the main body assembly.

Care point – Ensure that the O-ring seal within the main body is seated within the retaining channel and that no control cables are trapped between the mating surfaces of the two assemblies.



2. Tighten the 4 x M5 captive screws on the rear body assembly to a torque of 4 Nm.



3. Tighten the 4 x M6 screws on the gland assembly by hand in a uniform manner. Once 'hand tight', torque each fastener uniformly to a torque of 5 Nm.



7. Quality Control Checks

1. After completing the assembly of the harness, check for electrical continuity across all contact assemblies and associated cables/wires.
2. Conduct an insulation resistance test at 500V DC between the A, B, C and N contacts and the external casing, during which the insulation resistance shall not be less than 100 M Ω .

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8. Appendices

8.1 Appendix A - Example wiring diagram

