

### Description

The SKDG Cable Repair Kit is intended to be used to repair GMat and HMat cables damaged either during installation or subsequent operation. This kit contains all the materials needed to replace 2 short—up to 4”(101.60mm)—sections of damaged heating cable, or repair/replace 2 heating cable-to-cold lead splices. Use of this kit may require up to 16” (35.56cm) of the cable to be exposed.

### Warnings!

- Shortening of the heater cable will result in the cable running hotter. Excessive shortening may result in a risk of personal injury and/or fire. Do not install more than two SKDG kits on any cable. Contact Easy Heat for additional information.
- Turn breaker off at the panel and tag the panel to ensure that no one turns the breaker on. Disconnect the heater wires from the connection box as an added safety step and to conduct testing during and after repairs.

### Directions

#### Heating cable to heating cable splice

1. Carefully expose the damaged heating cable by removing any material (concrete, asphalt) in which the heating cable is embedded. Remove the damaged section of the heating cable by cutting it off with sidecutters.
2. Carefully expose about 8” (20.32cm) of heating cable on either side of the damaged area by removing any material (concrete, asphalt) covering the cable in this area.
3. Remove 2.5” (63.50mm) of outer jacket from each side of the heating cable. Be careful not to damage ground braid beneath the jacket.
4. Unbraid the ground braid back to the outer jacket and twist it to one side to form a pigtail on each cable. (see Figure 1)

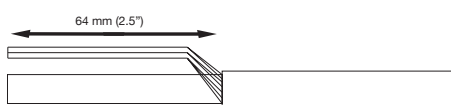


Figure 1

### Kit Contents

- 5 Butt crimp connectors (large)
- 9 Parallel Crimp Connector (small)
- 2 Shrink tubes (small)
- 4 Shrink tubes (large)
- 4 Fiberglass tapes
- 2 AWG 10 Jumper wire (large diameter)
- 4 AWG 14 Jumper wire (small diameter)

### Tools Required

- Side cutters
- Crimping pliers
- Cable strippers
- Heat gun
- Ohmmeter
- Insulation resistance tester (megger)

### CAUTIONS

- Heat guns, if not handled carefully, can result in burns. Heat shrink tubing and the sealant retain heat. Be careful in handling them before they have cooled completely.
- Excessive heat can damage shrink tubing and cable materials. Use care not to overheat materials. Damage from heat may not be visible.
- No wires should protrude past the ends of the connectors. Carefully trim wires flush as needed. Sharp wires and loose wire strands can pierce through the heat shrink and may result in shorting.
- Allow the inner heat shrink to cool before applying the outer heat shrink. Failure to do this may leave the inner tube too soft and result in damage as the outer tube is installed and shrunk.

5. Trim the primary conductor of one of the heating cables 0.5” (12.70mm) back from the braid pigtail, (see Figure 2a) and trim the braid pigtail on the other heating cable 0.5” (12.70mm) back from the primary conductor on that connection cable (see Figure 2b) . This allows the ground braid connection to be offset from the primary conductor connection, which minimizes both the size of the repaired area and the potential for the ground connection to penetrate the primary connection.

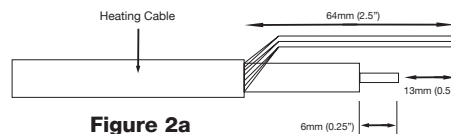


Figure 2a

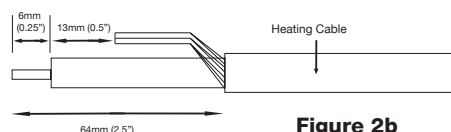


Figure 2b

6. Cut the small diameter jumper wire to the required length and strip .25” (6.35mm) of insulation from the ends of each primary conductor and the jumper wire (4 stripping in total).
7. Cut the smaller diameter heat shrink to a 1.75” (44.45mm) length.
8. Slide one small 1.75” (44.45mm) and one large (full length) shrink tube over each portion of the cable. The large shrink tube may be shortened however, keep in mind at least 1” (25.40mm) of overlap on each side of the splice and 1” (25.40mm) in the middle is required for sealing purposes.
9. Insert the conductor of each cable into the small connector and crimp securely to the jumper wire.
10. Position the small shrink tube over each connector, ensuring that all bare conductor/connector parts are under the shrink tube. Starting at the center of the shrink tube, heat with heat gun until completely shrunk.

11. Wrap entire shrink tube areas with fiberglass tape. (see Figure 3)

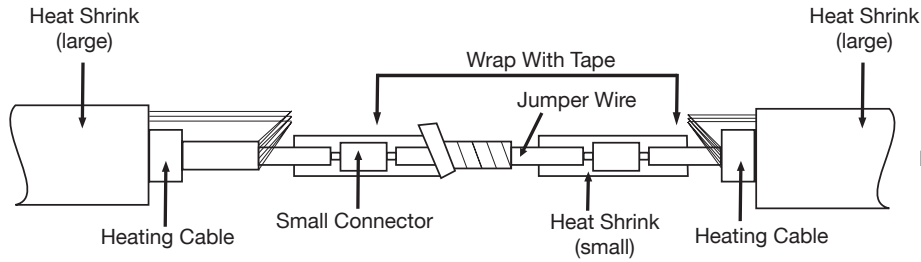


Figure 3

12. Connect braids using AWG 14 jumper wire to extend ground braid and crimp securely.

13. Position large shrink tube over entire splice area and shrink with heat gun. The shrink tubes must overlap at least 1" (25.40mm) of overlap on each side of the splice and 1" (25.40mm) in the middle for sealing purposes. (see Figure 4)

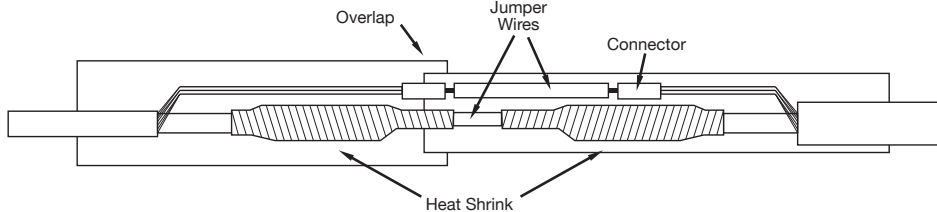


Figure 4

### AWG 14 cold lead to heating cable splice

- Carefully expose the original factory splice by removing any material (concrete, asphalt) in which the heating cable is embedded. Remove the splice by cutting it off with sidecutters.
- Carefully expose about 8" (20.32cm) of heating cable and about 8" (20.32cm) of cold lead by removing any material (concrete, asphalt) covering it.
- Remove 2.5" (63.50mm) of outer jacket from heating cable and cold lead. Be careful not to damage ground braid beneath the jacket.
- Unbraid the ground braid back to the outer jacket and twist it to one side to form a pigtail on each cable. (see Figure 5)

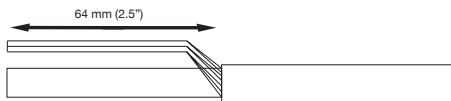


Figure 5

5. Trim the primary conductor of the heating cable 0.5" (12.70mm) back from the braid pigtail, and trim the braid pigtail on the cold lead 0.5" (12.70mm) back from the primary conductor on the cold lead (see Figure 6). This allows the ground braid connection to be offset from the primary conductor connection, which minimizes both the size of the repaired area and the potential for the ground connection to penetrate the primary connection.

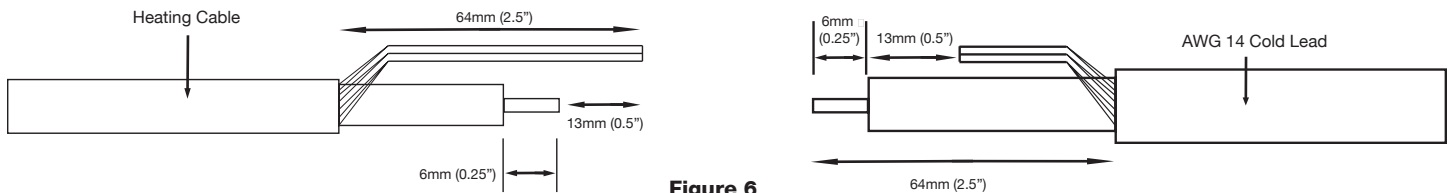


Figure 6

- Cut the small diameter jumper wire to the required length and strip .25" (6.35mm) of insulation from the ends of each primary conductor and the jumper wire (4 stripping in total).
- Cut the smaller diameter heat shrink to a 1.75" (44.45mm) length.
- Slide one small 1.75" (44.45mm) and one large (full length) shrink tube over both, heating cable and cold lead. The large shrink tube may be shortened however, keep in mind at least 1" (25.40mm) of overlap on each side of the splice and 1" (25.40mm) in the middle is required for sealing purposes.
- Insert the conductor of the cold lead into the small connector and crimp securely to the jumper wire. Insert the conductor of the heating cable into the small connector and crimp securely to the jumper wire. (see Figure 7)
- Position the small shrink tube over each connector, ensuring that all bare conductor/connector parts are under the shrink tube. Starting at the center of the shrink tube, heat with heat gun until completely shrunk.

11. Wrap entire shrink tube areas with fiberglass tape.

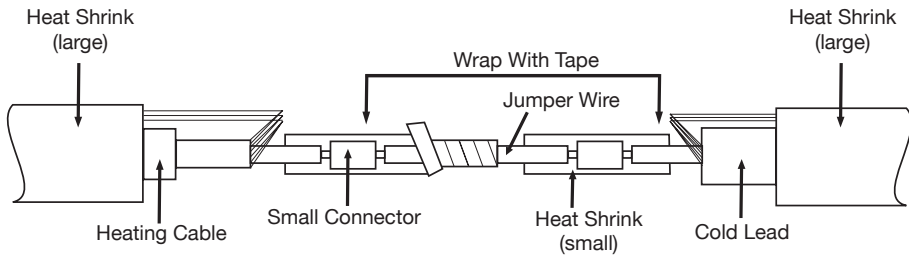


Figure 7

12. Connect braids using AWG 14 jumper wire to extend ground braid and crimp securely.

13. Position large shrink tube over entire splice area and shrink with heat gun. The shrink tubes must overlap at least 1" (25.40mm) of overlap on each side of the splice and 1" (25.40mm) in the middle for sealing purposes. (see Figure 8)

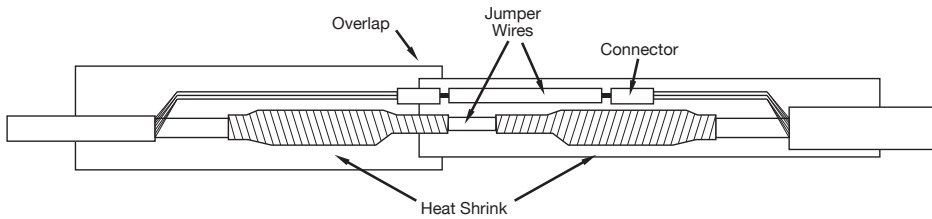


Figure 8

### AWG 10 Cold lead to heating cable splice

Follow the same steps as for the AWG 14 cold lead to cable splice. Strip conductor on the heating cable at 0.63" (16.00mm). Use the larger diameter (AWG 10) jumper wire and butt (large) connectors for conductor connections (see Figure 9). Use smaller diameter (AWG 14) jumper wire and parallel (small) crimp connectors for braid connections.

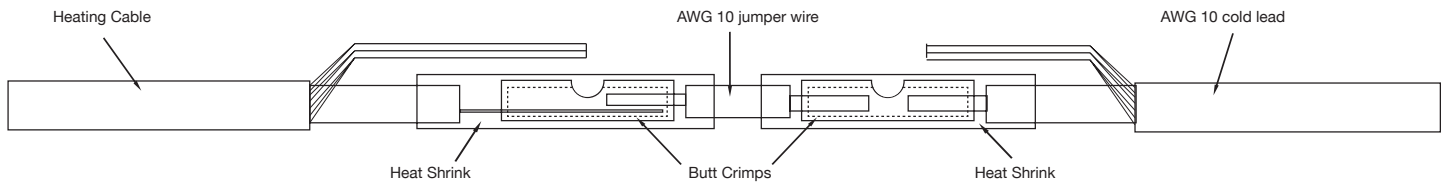


Figure 9

### Testing

1. Test the resistance between the primary conductors of both cold leads with an ohmmeter. Record the resistance in the Repair and Test Record.
2. Test the resistance between the ground braids of the cold leads with an ohm meter. Record the resistance in the Repair and Test Record.
3. Test the insulation resistance of the cable between the primary conductor and the ground braid with a 500 VDC megger. The resistance should be greater than 20 Megohms. Record the resistance in the Repair and Test Record.

#### Repair and test record

Repair Address \_\_\_\_\_

Repair Date \_\_\_\_\_

Repair Location (Drive way) \_\_\_\_\_ (Side walk) \_\_\_\_\_ (Stairs) \_\_\_\_\_ (others) \_\_\_\_\_

Cause of Damage \_\_\_\_\_ Repair Completed by \_\_\_\_\_

Original Cable Length \_\_\_\_\_

Heater Resistance ( $\Omega$ ) \_\_\_\_\_ Ground Continuity ( \_ Yes)

Insulation Resistance ( $M\Omega$ ) \_\_\_\_\_ (> 20  $M\Omega$ @ 500 VDC)

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