Keypad Replacement Kit for
Model 491-204 Mine Dial Page Telephone

Model 12504-012

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General Information

The Model 12504-012 Keypad Replacement Kit for the Model 491-204 Mine Dial Page Telephone includes the following components:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Keypad assembly</td>
</tr>
<tr>
<td>1</td>
<td>Keypad seal</td>
</tr>
<tr>
<td>1</td>
<td>Resistor, 100-ohm, 3-watt, wire wound or metal film</td>
</tr>
<tr>
<td>3</td>
<td>Cable tie-wraps</td>
</tr>
</tbody>
</table>

Installation

Tools Required

- 5/16-inch nut driver
- 1/4-inch nut driver
- Phillips screwdriver
- Wire cutter
- Razor knife

⚠️ CAUTION ⚠️ This upgrade replacement kit may only be installed by a GAI-Tronics technician or by a GAI-Tronics authorized service center. Installation by any other service center or personnel will void MSHA approval.

⚠️ WARNING ⚠️ Substitution of components may impair intrinsic safety.
R104 located on No. 69491-002 Amplifier PCBA must be a 3-watt wire wound or metal film resistor to maintain MSHA approval. See Figures 1, 2, 3 and 4 to give a visual aid to identify and determine if the PCB assemblies were modified.

Figure 1. Keypad PCB Assembly 69615-001 BEFORE Modifications

Figure 2. Keypad PCB Assembly 69615-001 AFTER Modifications

Figure 3. Amplifier PCB Assembly 69491-002 BEFORE R104 Modification

Figure 4. Amplifier PCB Assembly 69491-002 AFTER R104 Modification
Procedure

1. Disconnect the mine dial page phone’s telephone line connection from the communication system.

2. Open the enclosure and disconnect both wires from the positive terminal of the battery.

3. Take note of the positioning of the tie-wraps securing the keypad and wires of the No. 69491-002 Amplifier PCB assemblies. Wires MUST be routed and secured to prevent contact with uninsulated conductors. Securing the wiring in the same fashion will be required at completion.

4. Cut each tie-wrap that is holding the keypad wires and the No. 69491-002 Amplifier wires to the enclosure wiring harness. Using a Phillips screwdriver, loosen all of the screws to remove the keypad wires from terminal block TB2 and terminal E1 on the No. 69491-002. Re-tighten all loosened screws to ensure that all other wires remain connected to the appropriate locations. See Figure 5.

![Figure 5. Keypad Removal](image)

69491-002 Modification for Maintaining Intrinsic Safety
(Used in conjunction with keypad PCBA modification)

5. Remove the two 4-40 screws securing the No. 69491-002 Amplifier PCBA. Save the screws for re-assembly.

6. On the No. 69491-002 Amplifier PCBA, locate R104, which is adjacent to C101 and E2. Refer to Figure 3.

7. De-solder and remove resistor R104 (100-ohm resistor, ½-watt).

8. Install the new resistor R104 (100-ohm resistor, 3-watt). Re-solder and trim the leads.

9. Re-coat the PCBA around R104’s soldered connections with an approved moisture resistant film. Table 1 lists the approved coatings.

10. Swing the amplifier PCBA out of the way for access to the keypad assembly.
### Table 1. Approved Moisture Resistant Films

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Part Number and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>John C. Dolph Co.</td>
<td>AC-46 Polyurethane Varnish</td>
</tr>
<tr>
<td></td>
<td>T-200 Thinner</td>
</tr>
<tr>
<td></td>
<td>T-200X Thinner</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Part Number and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humiseal</td>
<td>1B73-LOC Acrylic Resin</td>
</tr>
<tr>
<td></td>
<td>701 Thinner</td>
</tr>
</tbody>
</table>

**Keypad Assembly Replacement**

11. Remove the four hex nuts on the rear keypad mounting bracket using a 5/16-inch nut driver. Save the hex nuts for re-assembly.

12. Lift the rear keypad mounting bracket to expose the keypad assembly. Remove the four 1/4-inch hex standoffs using a 1/4-nut driver. Save the hex standoffs for re-assembly.

13. The front keypad mounting panel can now be pulled away from the keypad assembly from the front of the enclosure.

14. Lift the aluminum keypad spacer off of the front keypad mounting panel to expose the keypad seal. See Figure 6. Save the keypad spacer for re-assembly.

15. Pull the keypad seal off of the front keypad mounting panel and dispose of the old seal.

16. Press the new keypad seal into the front keypad mounting panel as shown in Figure 6. Make sure that each key extrusion of the seal is seated fully into the front keypad mounting panel.

**Figure 6. Keypad Assembly**

17. Place the aluminum keypad spacer onto the front keypad mounting panel to cover the keypad seal.
18. Place the front keypad panel back into the front of the enclosure making sure that the keypad spacer seats in the opening of the enclosure. Hold the front keypad mounting panel in place and from the inside of the enclosure, place the new keypad, four spacers, and PCBA over the front keypad mounting panel studs. Use the four \( \frac{1}{4} \)-inch hex standoffs to secure the keypad assembly to the studs. Tighten the hex standoffs.

19. While holding the front keypad panel and keypad assembly in place, put the rear keypad mounting bracket over the hex standoffs. Ensure that the four wires from the keypad assembly exit out of the top (speaker side) of the rear keypad mounting bracket. See Figure 5. Use the four 5/16-inch hex nuts to secure the rear keypad mounting bracket. Tighten the nuts by using an “x” pattern to ensure uniform compression of the front keypad panel.

20. Re-install the No. 69491-002 Amplifier PCBA using the two Phillips head screws.

21. Reconnect the four wires from the keypad assembly as follows:
   - Connect white wire to terminal three of TB2.
   - Connect green wire to terminal four of TB2.
   - Connect red wire to terminal five of TB2.
   - Connect slate wire to terminal screw E1 on the No. 69491-002 Amplifier PCBA.

22. Re-secure the wiring as noted in Step 3 using the supplied tie-wraps. Wires MUST be routed and secured to prevent contact with uninsulated conductors. Refer to Figure 7 as an example.

23. Check all work, then reconnect both wires to the internal battery’s positive terminal. Test the keypad for proper operation.

24. Using a razor blade knife, trim the excess gasket material along the top and bottom edges of the front keypad mounting panel.
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