18SP649 – EPA07 Series 60® Intake Throttle Valve with Bracket Kit (P/N: 23538241)

KIT DESCRIPTION

Service kit (P/N: 23538241) contains all the parts required to install a new intake throttle valve with harness clip bracket to an EPA07 Series 60 engine.

KIT CONTENTS

Service kit part number 23538241 contains the parts listed in Table 1:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Qty.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A460 098 01 10</td>
<td>1</td>
<td>Intake Air Throttle Valve</td>
</tr>
<tr>
<td>23535507</td>
<td>2</td>
<td>Seal Ring, Throttle-to-Inlet Adaptor &amp; Throttle to EGR Mixer</td>
</tr>
<tr>
<td>23538139</td>
<td>1</td>
<td>Connector Repair Kit, Throttle Pigtail, 18-27 in., includes Crimp Connectors</td>
</tr>
<tr>
<td>23522464</td>
<td>2</td>
<td>Bolt, Upper and Inboard Throttle, M8-1.25 x 95 mm</td>
</tr>
<tr>
<td>X23538235</td>
<td>1</td>
<td>Bracket, Throttle to Intake, Horiz. Mixer, 3D Services, revised A/C tube clearance</td>
</tr>
<tr>
<td>23536819</td>
<td>1</td>
<td>Stud Bolt, Lower, Bracket to Intake Manifold, M10-1.5 x 30 mm x 19 mm</td>
</tr>
<tr>
<td>23511786</td>
<td>1</td>
<td>Bolt, Upper, Bracket to Intake Manifold, M10-1.5 x 25 mm</td>
</tr>
<tr>
<td>11506101</td>
<td>1</td>
<td>Nut, Stud Bolt, M10-1.5</td>
</tr>
<tr>
<td>00120393</td>
<td>1</td>
<td>Washer, Zinc-plated, 11/32 x 11/16 x .065 in.</td>
</tr>
<tr>
<td>00120376</td>
<td>1</td>
<td>Nut, Standard Hex, zinc-plated, 5/16-18</td>
</tr>
<tr>
<td>23504750</td>
<td>2</td>
<td>Cable Tie, High-temp, black, 0.19 x 11 in.</td>
</tr>
<tr>
<td>02419766</td>
<td>2</td>
<td>P-Clip, Zinc-plated, vinyl-dipped, 1 in. Cable OD, 3/8 mtg. hole</td>
</tr>
<tr>
<td>X23538274</td>
<td>1</td>
<td>Clip, Connector, Air Intake Throttle Valve</td>
</tr>
<tr>
<td>X23538277</td>
<td>1</td>
<td>O-ring, Connector, Air Intake Throttle Valve</td>
</tr>
<tr>
<td>X23538278</td>
<td>1</td>
<td>Terminal Lubricant, Nyogel, 760g 0.5 cc pipette</td>
</tr>
<tr>
<td>X23538396</td>
<td>1</td>
<td>Shrink Tube, 18 mm, 14 in. long</td>
</tr>
<tr>
<td>X23538279</td>
<td>1</td>
<td>Conduit</td>
</tr>
<tr>
<td>X23538397</td>
<td>1</td>
<td>“Solder Sleeve” butt splice</td>
</tr>
<tr>
<td>18SP649</td>
<td>1</td>
<td>Installation Instructions</td>
</tr>
</tbody>
</table>

Table 1 S60 Intake Throttle Valve with Bracket Installation Kit (P/N: 23538241)
INTAKE THROTTLE VALVE REPLACEMENT PROCEDURE

Replace the new intake throttle valve with harness clip bracket as follows:

REMOVAL

1. Remove charge air cooler (CAC) tubes going to the intake throttle.

2. Unplug electrical connection from throttle body.

3. Remove four bolts attaching intake throttle to the mixer. Discard two of the bolts; set throttle body aside.

4. Cut tie straps holding battery cables to the bracket. Discard plastic cable holder. See Figure 1.

Figure 1  Power and Ground Wire

INSTALLATION

5. Install O-ring (P/N: X23538277) on throttle body connector. See Figure 2.

6. Install new Intake Throttle (P/N: A460 098 01 10) along with new seals (P/N: 23535507). Use two of the original bolts in lower mounting holes of the throttle body. Using new bolts from kit (P/N: 23522464), install them with bracket (P/N: X23538235) in upper throttle body mounting holes. Finger tighten bolts. See Figure 3.
7. Install new bolt (P/N: 23511786) into upper hole of bracket, connecting it to the intake manifold. Loosen air discharge tube from air compressor. Install new stud (P/N: 23536819) into lower hole of the bracket. Finger tighten bolts.

8. Torque all four intake throttle bolts to 27 N·m (20 lb·ft). Tighten bolts in a cross pattern.
9. Torque bracket manifold mounting bolts to 51 N·m (38 lb·ft), verifying bracket does not come in contact with the air compressor discharge tube.

10. Attach brace holding positive and ground wire to stud (P/N: 23536819) using nut (P/N: 11506101). Torque nut to 48 N·m (35 lb·ft).

11. Install two new P-clips (P/N: 02419766) to battery cables. Using nut (P/N: 00120376) and washer (P/N: 00120393), attach the P-clips to stud on the mounting bracket and torque nut to 27 N·m (20 lb·ft). See Figure 4.

12. Torque air compressor discharge tube to 50 N·m (37 lb·ft).

13. Move air compressor inlet air line to slotted hole in mounting bracket. See Figure 5.
14. Remove fur clip (christmas tree) from the mixer assembly.

**NOTE:**
The easiest way to remove the fur clip is to unscrew it.

15. Mark the end of the wires with the correct pin location on the connector.

16. Assemble the conduit (P/N: X23538279) over the wires of pigtail (P/N: 23538139). Attach the new back shell to the connector and around the conduit. See Figure 6.
17. Slide heat shrink (P/N: X23538396) over the conduit just attached to the pigtail.

18. Starting with the engine harness, cut one of the wires approximately nine inches from connector. Connect the cut wire to the new pigtail verifying wire is at the same pin location as original connector. See Figure 7. Continue splicing remaining wires, verifying all pin locations match original connector. Stagger wire connectors to prevent a large bulge in wire harness. See Figure 8.

**NOTE:**
See Attachment 1 for instruction on using solder sleeve connectors. See Attachment 2 for instruction on using heat shrink crimp connectors.
NOTICE:

You must stagger the positions of each splice to prevent a large bulge in the harness and prevent wires from chafing against each other.

19. Apply a small amount of terminal lubricant (P/N: X23538278) to all five female terminals. Connect electrical connection to throttle body and install new clip (P/N: X23538274) to hold electrical connection to the throttle body. See Figure 9.
20. Slide heat shrink (P/N: X23538296) installed in Step 16 over exposed wires, overlapping the conduit on both sides. Apply heat to shrink tube until it seals the wires. Maintain the harness curve until heat shrink cools to maintain the shape. See Figure 10.
21. Install new fur clip 7.5 inches from the connector. See Figure 11.

![Figure 11 Installing Fur Clip](image)

22. Install fur clip to mixer assembly by screwing it into threaded hole. Attach wire harness to the fur clip mounted under mixer. See Figure 12.

![Figure 12 Intake Throttle Wire Mounting](image)
23. Install tie strap (P/N: 23404750) around air compressor inlet hose and attach it to oil filler P-clip. See Figure 13.

![TIE STRAP LOCATION](image)

**Figure 13**   Attaching Air Compressor Inlet Hose to Oil Filler P-Clip

24. Verify that no wires are in contact with new metal bracket or air compressor air suction line.

25. Reinstall Charge Air Cooler tubes going to intake throttle and torque clamps to 5 N·m (45 in·lbs).
Attachment #1
How to Use the Solder Sleeve Butt Connectors

Wire Preparation:

1. Pre-strip the wires to a length of 0.50 +/- 0.040 mm. Remove insulation just before installation, in order to avoid damage or conductor oxidation:

Wire positioning:

1. Slide Solder Sleeve device onto one wire, in a stand-by position.

2. Align wires that are to be spliced with an overlap of 10 to 12 mm.

3. For small gauge wires, (up to 1mm), and when a mechanical attachment is required, secure the two wire ends, by twisting them together. Carefully align the strands in order to avoid any poke-through of the sleeve. In other cases, align wires in such a manner that all strands are parallel. Then, slide the sleeve over the splice area and center the solder ring over the splice.
Heating:

WARNING:

BURNS
To avoid injury from burning, use lifting tools and heat-resistant gloves when handling heated components.

WARNING
The heating tool and the assembly become hot during the installation of the Solder Sleeve Wire Splice. To prevent burns, allow tool and the assembly to cool down before handling.

1. Pre-heat the hot air gun or flameless torch equipped with the appropriate reflector, until operating temperature is achieved.

2. Center the reflector at the solder location.

3. Heat the Solder Sleeve device until solder has completely melted through the wire strands. Stop heating when a solder fillet can be seen between the conductors.

NOTE:
The deformation of the solder is not enough to insure soldering has been done efficiently.

4. Finish by completely shrinking both ends of the sleeve, to complete the melting of the sealing rings.

5. Allow the assembly to cool down before handling.

Guide for Visual Inspection:

• The solder must be completely melted along the conductors to create a solder fillet.
• A solder fillet must be visible between conductors. Visible remains of solder indicate that the joint has been under-heated.
• A lack of solder indicates that the joint has been over-heated (the solder may have disappeared in the strands by capillary effect).
• The sleeve must be completely shrunk.
Unacceptable Installation – Under-heated

- Contour of solder is visible in joint area.
- Contour of wires, in joint area, is obscured by solder.

Acceptable Installation

- Joint area is clearly visible through the sleeve.
- Solder has lost all appearance of ring shape.
- Contour of wires is visible through the solder.
- Fillet is clearly visible along the wires interface.
- Inserts have melted along the wires.

Unacceptable Installation - Over-Heated

- Joint area is not visible because of severe darkening.
- Solder fillet is not visible along the wires interface.
- Wire insulation is damaged outside the sleeve.

Unacceptable
Attachment #2
How to Use Crimpable Heat Shrink Butt Connectors

1. Pre-strip the wires to a length of approximately 7 +/- 0.040 mm. (.275 +/- .012 inches) Remove insulation just before installation, in order to avoid damage or conductor oxidation.

2. Install heat shrink butt connector on stripped wire using a ratcheting-type crimping tool; crimp the wire connector and verify insulation is not damaged by the tool.

3. Insert other wire into the heat shrink connector and crimp using ratcheting type crimping tool. Verify insulation is not damaged by the tool.

4. Using a heat gun or a flameless torch, shrink the tube around wires until glue starts to come out the ends.