Twin Hydraulic Booster Assembly

NOTE: This instruction describes the replacement procedures for the Carlisle Twin Hydraulic Booster Assembly. Information contained in this publication is subject to change without notice or liability.

WARNING: For optimum results and safety, Carlisle recommends that all work should be carried out by a suitably trained fitter/mechanic. If it is decided to replace used components or assemblies, always use genuine Carlisle replacement parts. If in doubt seek professional help.

WARNING: Do not attempt to dismantle the hydraulic booster assembly. The Internal components are not serviceable. Any defective booster assembly must be replaced with a new genuine Carlisle assembly. Any attempt to remove internal components will void all warranty terms.

WARNING: This unit contains special synthetic rubber components. Use only Mineral Brake Oil recommended by the vehicle manufacturer. Failure to use the correct brake oil can lead to premature failure of components.

CAUTION: Always ensure appropriate safety glasses and gloves are worn when carrying out the procedures detailed below.

Typical Assembly

[Diagram of Twin Hydraulic Booster Assembly with labels for Left Hand Brake, Right Hand Brake, Tank, Hydraulic Supply, and Booster Assembly]
Park the vehicle on hard ground and chock the wheels. Follow the vehicle manufacturers recommendations to gain access to the hydraulic booster. Ensure the parking brake is applied and no hydraulic pressure is held in the system.

**Cleaning and Inspection**

Clean any dirt or debris from the booster assembly paying particular attention to the areas around the hydraulic connections.

![Image](image.png)

**WARNING:** If the areas around the hydraulic connections are not cleaned before the connections are removed there is a possibility that debris can enter the booster hydraulic ports during the connection removal process. Any debris entering the hydraulic ports will compromise the booster function and could lead to premature failure.

**WARNING:** Do not tamper with the screws ‘A’ (Fig. 2). Any interference with the screws will compromise the integrity of the booster assembly and could lead to premature failure.

Check the rubber dust excluders. They should be soft and flexible and fit tightly in the locating grooves on the booster and around the push rods. Dust excluders which show signs of cracking, embrittlement, swelling or any other damage must be replaced.

Peel back the dust excluders from the location on the booster. If the internal surfaces of the dust excluders contain brake oil that has emulsified into a grease consistency, this is a normal condition and acceptable.

**NOTE:** If, when the dust excluders are detached from the booster assembly, brake oil runs from the excluders this may indicate the failure of the booster's internal sealing arrangement and the booster assembly must be replaced using a new genuine Carlisle assembly.

**Booster Assembly Removal**

**NOTE:** The orientation of the brake ports and method of securing the booster unit to the vehicle may vary due to different vehicle installations. Before removal note the orientation of the booster assembly and position of the hydraulic pipework connections (Fig. 1) to aid re-assembly.

![Image](image.png)

**CAUTION:** Ensure any residue brake oil from the disconnected hydraulic pipes or booster assembly is caught in a suitable container and/or wiped clean with a suitable cloth. Dispose of any residue brake oil or contaminated cloth in accordance with local environmental regulations.

Drain the braking system of brake oil by attaching a rubber tube to a bleed screw, unscrew the bleed screw half a turn and pump out the brake oil into a suitable container by operating the foot pedals.

Remove the hydraulic pipe connections from the booster and carefully ease the hydraulic pipes clear of the booster hydraulic ports.

Disconnect both push rods from the foot pedal linkages.

Remove the nuts, or where applicable bolts, securing the booster assembly to the vehicle bulkhead.

Carefully remove the booster assembly from the vehicle taking care to avoid spillage of any residual brake oil from the hydraulic supply and tank ports.

**Booster Assembly Fitment**

Fit the new booster assembly to the vehicle bulkhead, in the correct orientation and secure with the retaining nuts/bolts.

**NOTE:** The brake pedals must be in the at rest position, held against the pedal backstop by the pedal return springs during pushrod connection/adjustment.

Connect the push rods to the brake pedal linkages.
Pushrod adjustment
Adjust the push rods at the pedal linkage until the push rod heads just contact the internal backstoppers in the booster assembly. This will automatically set the correct push rod head clearance and enable effective functioning of the booster assembly.

NOTE: Ensure the brake pedals remain held against the pedal backstop when pushrod adjustment has been completed.

Refit the hydraulic pipework connections to the appropriate hydraulic ports on the booster assembly (Fig. 1). Refer to the note made at booster removal if necessary.

Reference should be made to the following table for the correct tightening torque for each of the various hydraulic fittings, booster retaining bolts or nuts and push rod connections.

NOTE: There are variations in hydraulic connection specification, depending upon the vehicle installation. Ensure the correct thread form/size is identified and appropriate torque value applied.

<table>
<thead>
<tr>
<th>Description</th>
<th>Thread Specification</th>
<th>Tightening Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booster Retaining Bolt/Nut</td>
<td>M8 x 1.25 - 6g/H</td>
<td>22 – 28 Nm</td>
</tr>
<tr>
<td>Pushrod Connection</td>
<td>M10 x 1.5 – 5-6g</td>
<td>22 – 27 Nm</td>
</tr>
<tr>
<td>Right &amp; Left Brake Ports (M14 Metric Thread)</td>
<td>M14 x 1.5 – 6H</td>
<td>23 – 27 Nm</td>
</tr>
<tr>
<td>Right &amp; Left Brake Ports (M16 Metric Thread)</td>
<td>M16 x 1.5 – 6H</td>
<td>41 – 47 Nm</td>
</tr>
<tr>
<td>Right &amp; Left Brake Ports (M18 Metric Thread)</td>
<td>M18 x 1.5 – 6H</td>
<td>70 Nm MAX</td>
</tr>
<tr>
<td>Right &amp; Left Brake Ports (9/16 Imperial Thread)</td>
<td>9/16 - 18UNF – 2B</td>
<td>23 – 27 Nm</td>
</tr>
<tr>
<td>Right &amp; Left Brake Ports (3/4 Imperial Thread)</td>
<td>3/4 - 16UNF – 2B</td>
<td>70 Nm MAX</td>
</tr>
<tr>
<td>Hydraulic Supply Port (M14 Metric Thread)</td>
<td>M14 x 1.5 – 6H</td>
<td>23 – 27 Nm</td>
</tr>
<tr>
<td>Hydraulic Supply Port (M18 Metric Thread)</td>
<td>M18 x 1.5 – 6H</td>
<td>70 Nm MAX</td>
</tr>
<tr>
<td>Hydraulic Supply Port (9/16 Imperial Thread)</td>
<td>9/16 - 18UNF – 2B</td>
<td>23 – 27 Nm</td>
</tr>
<tr>
<td>Tank Port (M16 Metric Thread)</td>
<td>M16 x 1.5 – 6H</td>
<td>41 – 47 Nm</td>
</tr>
<tr>
<td>Tank Port (M18 Metric Thread)</td>
<td>M18 x 1.5 – 6H</td>
<td>70 Nm MAX</td>
</tr>
<tr>
<td>Tank Port (3/4 Imperial Thread)</td>
<td>3/4 - 16UNF – 2B</td>
<td>70 Nm MAX</td>
</tr>
<tr>
<td>Hydraulic Outlet Port (where applicable)</td>
<td>M14 x 1.5 – 6H</td>
<td>23 – 27 Nm</td>
</tr>
</tbody>
</table>

When the new booster assembly has been secured to the vehicle and all hydraulic connections made it is important to remove any air in the hydraulic system. Follow the bleeding procedure details below.

Bleeding Procedure
Turn on the hydraulic supply by starting the engine and latch the brake pedals together. Attach a rubber tube to one of the bleed screws, unscrew the bleed screw half a turn.

Apply the latched pedals and fully stroke the booster push rods approximately twenty times to expel aerated brake oil from the booster unit into a suitable container. Tighten the bleed screw.

Repeat the procedure for the second bleed screw.
Depending on the type of installation, the bleeding procedure, detailed above, may need to be repeated until all air has been expelled from the hydraulic system.

CAUTION: Ensure any residue brake oil from the booster assembly is caught in a suitable container and/or wiped clean with a suitable cloth. Dispose of any residue brake oil or contaminated cloth in accordance with local environmental regulations.

Check for fluid leaks at all disturbed hydraulic connections and rectify as necessary.