**Vacuum Test Plate Kit**

**Part No.**

77754-VTP

- Plate
- Seal
- Push Pins (10)
- Alignment Pins (2)
- Bolts (3)
- Washers (3)
- Wing Nuts (3)

**Vacuum Test Stand Kit**

**Part No.**

VACTEST-01K

- Vacuum Test Stand
- Test Plate
- Vacuum Plate Sealing Pad
- Vacuum Test Foam Pad
- Push-to-Connect Fitting
- Assorted Testing Tips (6)
- Testing Tip Adapter Tube
- Flexible Tubing
- Flared Tubing with Flared Nut

### Instructions

#### 1. Assembly

a. Ensure vacuum test plate and seal are both clean and free of debris.

b. Install two alignment pins into plate at indicated threaded holes. Thread into non-engraved side of plate (Figure 1).

c. Place seal onto non-engraved side of plate, aligning orifice holes. Remove any entrapped air between plate and seal by peeling seal up at plate edge. Gradually place seal back on plate from center toward edge.

d. Push plastic push pins into seal and plate from seal side, just far enough for head to lightly contact seal.

**NOTE:** Sonnax recommends starting with only four corner locations. If seal sags away from plate, other push pin locations should also be used.

#### 2. Testing

a. Place assembled vacuum test plate over casting, using engraved casting outline as guide. Alignment pins should enter casting bolt holes.

b. Using VACTEST-01K (sold separately, Figure 2) and small vacuum tip, vacuum test at numbered orifices on plate. These numbers correspond to the bore numbers called out in the exploded view of the valve body on page 6. The chart on page 8 provides descriptions of individual circuit checked and space to document actual vacuum readings and minimum vacuum standards.

**NOTE:** Vacuum test data sheet on page 7 can be used to establish minimum vacuum standards at individual bore locations.

c. Light finger-tip pressure may need to be applied on plate during testing. Included bolts, washers and wing nuts can be used at indicated bolt locations for firmer seal, but are not required. If used, place bolts through casting, seal and plate from the back of casting. Tighten wing-nut against plate, finger-tight only.

#### 3. Cleaning

Seal and plate can be cleaned as needed with mild soap and water to remove debris.

#### 4. What should my vacuum test results be?

While a properly calibrated and maintained test stand will give consistent vacuum reading results for a specific circuit and amount of wear, evaluating these results requires establishing your own pass/fail criteria. Variables which influence vacuum readings are the number of spools tested in a captive circuit, spool diameter size and contact length of the spool within the bore.

Pass/Fail standards are specific to your setup and process, but they also must be based on your experience, quality sensitivity, warranty concerns and cost/pricing structure. Sonnax recommends that you keep a record of vacuum results for each valve body at each tested circuit/port location. This lets you compare results over time to help determine for your shop what an acceptable vacuum reading is for each circuit/port location.

A chart specific to this application is provided in this booklet indicating valve and circuit checked at each orifice location. Room is provided to record results and compare to your minimum vacuum standard. A generic vacuum test data sheet also is provided that can be used to evaluate multiple cores to establish your minimum vacuum standard. If you need fresh documents, you can print or download these pages from this instruction booklet by visiting this vacuum test plate kit product page at www.sonnax.com.
Figure 1

Vacuum Test Plate Kit
Part No. 77754-VTP

Alignment Hole Key
- Red • = Alignment Pins
- Black • = Push Pin Locations
- Blue • = Optional Bolt Locations

Figure 2

Vacuum Test Stand Kit
Part No. VACTEST-01

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Critical Wear Areas & Vacuum Test Locations

NOTE: OE valves are shown in rest position and should be tested in rest position unless otherwise indicated. Test locations are pointed to with an arrow. Springs are not shown for visual clarity. Low vacuum reading indicates wear.

4L60-E - Valve Body

3-4 Shift Valve
- 2nd Gear starts
- 3rd Clutch failure
- 3-4 Shift complaints
- Loss of AFL pressure
Replace with Sonnax Part No. 77754-42K
Requires F-77754-TL42 & VB-FIX

4-3 Sequence Valve & 3-4 Relay Valve
- No 4th gear
- Low 4th gear pressure
- Burnt 2-4 band
Replace with Sonnax Part No. 77964-04K
Requires 77964-RM2

End Plugs
- No 4th gear • Converter issues
- Loss of manual 3rd
- Burnt overrun clutch
Replace with Sonnax Part No. 77964-08K
NOTE: Check for visual wear on plugs.

Reverse Abuse Valve
- Delayed Reverse
- Burnt Reverse input clutch
Replace with Sonnax Part No. 77754-35K, 77754-58K
77754-58K Requires F-77754-TL42 & VB-FIX

Reverse Abuse Bore Plug
- Delayed Reverse
- Burnt 3-4 clutch
- 3-2 Downshift tie-up
Replace with Sonnax Part No. 77754-21, 77754-58K
77754-58K Requires F-77754-TL42 & VB-FIX

3-2 Control Valve
- 3-2 Concerns

Forward Abuse Valve
- Delayed Forward
- Low line pressure upon engagement
Replace with Sonnax Part No. 77754-35K, 77754-58K
77754-58K Requires F-77754-TL42 & VB-FIX
NOTE: Check for visual bore wear.

Forward Abuse Bore Plug
- Delayed Forward
- Burnt Forward clutch
Replace with Sonnax Part No. 77754-21, 77754-58K
77754-58K Requires F-77754-TL42 & VB-FIX

Low Overrun Valve
- No engine braking in manual low
- Burnt Low/Reverse clutch

1-2 Shift Valve
- Wrong gear starts
- Gear ratio codes

2-3 Shift & 2-3 Shuttle Valves
- Wrong gear starts
- Gear ratio codes

3-4 Shift Valve
• 2nd Gear starts
• 3rd Clutch failure
• 3-4 Shift complaints
• Loss of AFL pressure
Replace with Sonnax Part No. 77754-42K
Requires F-77754-TL42 & VB-FIX

TCC Regulator Valve
• 1870 Slip code • Harsh 1-2 shifts
• Low TCC apply pressure
• Overheated converter
• Burnt 3-4 clutch
Replace with Sonnax Part No.
77754-03K Non EC3 '97-Earlier
77754-04K EC3 '98-Later
77754-ISO
Requires varying combinations of tools**

Actuator Feed Limit Valve
• Wrong gear starts • No 4th gear
• Solenoid codes • Harsh shifts
• Clutch/Band failure • 2nd Gear starts
Replace with Sonnax Part No.
77754-09K
Requires F-77754-TL42 & VB-FIX

Accumulator Valve & Sleeve
• 1-2 Bang shift
• Shortened 2-4 band life
Replace with Sonnax Part No.
77777L-K, 77777M-K
NOTE: Check for visual wear in sleeve.

2-3 Shift Valve
• Wrong gear starts
• Gear ratio codes

NOTE: Valve designs vary by year, however all port locations for vacuum testing are the same.

**Tool Combinations Required for TCC Regulator Valve: F-77754-TL4, F-77754-SERV, 77754-R2, 77754-SERV, & VB-FIX depending on particular valve body; SEE INSTRUCTIONS TO DETERMINE.
Critical Wear Areas & Vacuum Test Locations

NOTE: Worm tracks will vary slightly on non-PWM pump covers, but locations for vacuum testing are identical.

4L60-E - PWM Pump Cover

**Pressure Regulator Valve**
- 3-4 Clutch failure
- Excessive pump noise
- Low line pressure during boost
- Reverse chatter

*Replace with Sonnax Part No. 77917-07*

Requires 77917-TL or 77917-TLC

**Boost Valve Assembly**
- Insufficient line rise
- 3-4 Clutch failure
- Poor shift quality

*Replace with Sonnax Part No.*

- Early Pump Design w/ 1.907" Long Sleeve:
  - 77898E-K Increased Ratio, O-Rings
  - 77898E-4K Large OE Ratio, O-Rings
  - 77898E-3K Increased Ratio, Factory Style
  - 77898E-6K Large OE Ratio, Factory Style

- Late Pump Design w/ 1.890" Long Sleeve:
  - 77898E-14K Standard OE Ratio, O-Rings
  - 77898E-16K Large OE Ratio, O-Rings

**TCC Apply Valve**
- No lockup • Code 1870
- Falls out of lockup hot
- Lockup immediately after 2nd gear

*Replace with Sonnax Part No.*

- 77805-K Non-PWM
- 77805E-K PWM

**Pump Cover (Front)**

- Test this location with valve stroked outboard, as shown.
- Must seal orifice on back when testing here.

**Pump Cover (Back)**

- Seal valve orifice with pencil eraser.
- Test this port with valve blocked inboard.
- Seal bore opening with thumb.
- Must seal orifice on back when testing here.

**Vacuum Test Plate Kit Instructions**

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Page 5
GM 4L60-E, 4L65-E, 4L70-E

OE Exploded View

4L60-E • Valve Body Shown

NOTE: Solenoids not shown.

PWM Pump Cover Descriptions

<table>
<thead>
<tr>
<th>I.D. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Pressure Regulator Valve &amp; Boost Valve Assembly</td>
</tr>
<tr>
<td>102</td>
<td>TCC Apply Valve</td>
</tr>
<tr>
<td>103</td>
<td>Pressure Relief Ball &amp; Spring</td>
</tr>
</tbody>
</table>

4L60-E • PWM Pump Cover Shown

Valve Body Descriptions

<table>
<thead>
<tr>
<th>I.D. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Manual Valve</td>
</tr>
<tr>
<td>202</td>
<td>3-2 Control Valve</td>
</tr>
<tr>
<td>203</td>
<td>Reverse Abuse Valve (Inboard), 3-2 Downshift Valve (Outboard)</td>
</tr>
<tr>
<td>204</td>
<td>3-4 Shift Valve</td>
</tr>
<tr>
<td>205</td>
<td>4-3 Sequence Valve (Inboard), 3-4 Relay Valve (Outboard)</td>
</tr>
<tr>
<td>206</td>
<td>TCC Regulator Valve</td>
</tr>
<tr>
<td>207</td>
<td>Actuator Feed Limit Valve</td>
</tr>
<tr>
<td>208</td>
<td>Accumulator Valve &amp; Sleeve</td>
</tr>
<tr>
<td>209</td>
<td>2-3 Shift Valve (Inboard), 2-3 Shuttle Valve (Outboard)</td>
</tr>
<tr>
<td>210</td>
<td>1-2 Shift Valve</td>
</tr>
<tr>
<td>211</td>
<td>Forward Abuse Valve (Inboard), Low Overrun Valve (Outboard)</td>
</tr>
<tr>
<td>212</td>
<td>Forward Accumulator Piston</td>
</tr>
</tbody>
</table>
The Sonnax vacuum test data sheet is a document that can be printed or downloaded and stored on your computer. This test data sheet helps to track vacuum readings in critical wear areas from up to 10 cores of the same type. Comparing results from 10 cores aids in wear pattern identification. Recording results allows an average vacuum reading for each bore to be calculated. Your minimum vacuum standard for each bore can be established from this data. These standards should reflect your warranty requirements and customer needs.

<table>
<thead>
<tr>
<th>Application: Vacuum Test Data Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vacuum Readings, in-HG</strong></td>
</tr>
<tr>
<td><strong>Average Vacuum</strong></td>
</tr>
<tr>
<td><strong>Minimum Vacuum Standard</strong></td>
</tr>
<tr>
<td>Bore Locations</td>
</tr>
<tr>
<td>Core 1</td>
</tr>
<tr>
<td>Core 2</td>
</tr>
<tr>
<td>Core 3</td>
</tr>
<tr>
<td>Core 4</td>
</tr>
<tr>
<td>Core 5</td>
</tr>
<tr>
<td>Core 6</td>
</tr>
<tr>
<td>Core 7</td>
</tr>
<tr>
<td>Core 8</td>
</tr>
<tr>
<td>Core 9</td>
</tr>
<tr>
<td>Core 10</td>
</tr>
</tbody>
</table>
### Orifice Legend

<table>
<thead>
<tr>
<th>Orifice Location</th>
<th>Valve / Circuit Checked</th>
<th>Sonnax Part Number</th>
<th>Actual Vacuum Reading</th>
<th>Minimum Vacuum Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>202A SI*</td>
<td>3-2 Control Valve, Balance Spool / 3-4 Clutch</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>202B SI*</td>
<td>3-2 Control Valve, 1st &amp; 2nd Spools / 3-2 Signal SI*: For PWM 3-2 Control Valve, '94-earlier</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>202C</td>
<td>3-2 Control Valve, Outboard Spool / 3-2 Signal</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>203A</td>
<td>Reverse Abuse Valve, Inboard Spool / Reverse (Line)</td>
<td>77754-35K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>203B</td>
<td>Reverse Abuse Bore Plug / 3-4 Clutch</td>
<td>77754-21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>204A</td>
<td>3-4 Shift Valve, Inboard Spool / Signal A</td>
<td>77754-42K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>204B</td>
<td>3-4 Shift Valve, Outboard Spool / D3 (Line)</td>
<td>77754-42K</td>
<td>77754-08K</td>
<td></td>
</tr>
<tr>
<td>205A</td>
<td>4-3 Sequence Valve, Inboard Spool / Servo Feed (Line)</td>
<td>77964-04K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>205B</td>
<td>3-4 Relay Valve, Inboard Spool / Servo Feed (Line)</td>
<td>77964-04K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>205C</td>
<td>3-4 Relay Valve / 2nd (Line)</td>
<td>77964-04K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>205D</td>
<td>3-4 Relay Valve, Outboard Spool / 4th Signal</td>
<td>77964-04K</td>
<td>77754-08K</td>
<td></td>
</tr>
<tr>
<td>206A</td>
<td>TCC Regulator Valve, Isolator Valve / 2nd Clutch, CC Signal</td>
<td>77754-03K, 77754-04K, 77754-ISO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>206B SI*</td>
<td>TCC Regulator Valve, Balance Spool / Regulated Apply SI*: Visually check for bore plug wear, which can also cause TCC related complaints.</td>
<td>77754-03K, 77754-04K, 77754-ISO, 77754-08K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>207A SI*</td>
<td>Actuator Feed Limit Valve, Balance Spool / AFL SI*: Test with valve propped open .125&quot; on balance end.</td>
<td>77754-09K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>208A</td>
<td>Accumulator Valve / Accumulator</td>
<td>77777L-K, 77777M-K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>209A</td>
<td>2-3 Shift Valve, Inboard Spool / AFL</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>209B</td>
<td>2-3 Shift Valve, 2-3 Shuttle Valve / D2 (Line)</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>209C SI*</td>
<td>2-3 Shuttle Valve, Outboard Spool / AFL, Signal B SI*: Solenoid must be installed</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>210A</td>
<td>1-2 Shift Valve, Inboard Spool / AFL</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>210B SI*</td>
<td>1-2 Shift Valve, Outboard Spool / D2, 2nd (Line) SI*: Solenoid must be installed</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>211A</td>
<td>Forward Abuse Bore Plug / PR (Line)</td>
<td>77754-21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>211B</td>
<td>Lo Overrun Valve / Lo/Reverse (Line)</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** “X” orifice locations on plate are for air inlet and do not require testing.

*SI = Special Instructions*