Troubleshooting Guide
General information

Product Overview
The Parker Smart Suspension is an electronically controlled air suspension system designed to work in conjunction with the bus suspension air springs, air spring height sensors, and wheelchair ramp sensor to provide the following functions:

- Improve ride control – As the bus maneuvers through corners, the system will minimize roll movement, potentially eliminating the need for a sway bar.
- Kneeling (full, front and right side) – Upon reaching a stop, the bus driver can lower the bus to the curb make entry and exit through the door easier.
- Over-raise - Raise ride height at all air spring positions (adjustable per customer spec) to allow for increased approach, break-over and departure angles for road conditions.
- Low-ride – Lower the ride height position based on vehicle speed.
- Wheelchair ramp system integration – The ride height will be adjusted (kneel) if the wheelchair ramp exceeds a predetermined angle.
- Custom height settings – Two additional height settings are also available based on end-customer needs.

System Components:
At the core of the Parker Smart Suspension is a pneumatic control unit (PCU) and an electronic control unit (ECU).

- Pneumatic Control Unit (PCU) – The PCU provides independent control of the air springs’ pressure based on the ride height sensor feedback. Incorporating Parker’s proprietary direct acting proportional valve (DAV) design, the PCU offers high and low flow deflation/inflation performance.
- Electronic Control Unit (ECU) – The Smart Suspension incorporates the CMR-0711 platform ECU from Parker’s Electronic Controls Division (ECD). Embedded software is developed in the MATLAB environment.

System Configuration:
The Parker Smart Suspension System is designed to be modular meaning that a “system” (ECU and PCU) can be installed to manage air spring height and pressure at just one axle position (i.e. front axle) or be installed on all axle positions for full vehicle suspension control.

The Appendix contains additional information associated with a multiple system configuration as well as electrical interconnects and pinouts.
Safety Precautions

**WARNING:** This product uses compressed air and is a type of potential (stored) energy. User training and caution should be used when operating or servicing systems that contain compressed air.

Before starting a vehicle:
- Ensure vehicle has adequate fuel level.
- Sit in the driver’s seat.
- Confirm vehicle parking brake is set.
- Confirm Neutral is selected on the dash
- Do not operate the vehicle if Alternator light is lit or if gauges indicate low voltage.

Before working on a vehicle or leaving the vehicle with engine running:
1. Safely come to a complete stop.
2. Continue to depress and hold the service brake.
3. Select Neutral on the dash.
4. Set vehicle parking brake and chock wheels.

When parking the vehicle:
- Select Neutral on the dash
- Set vehicle parking brake.

Required Tools

The Parker Smart Suspension™ provides for easy troubleshooting utilizing PC-based software and industry standard tools. Computer-supported diagnostics improve troubleshooting and reduce maintenance time. The diagnostics provide for manual control of suspension test sequences and displays active and historic service codes.

**Tools:**
- Volt / Ohm meter
- PC-Based Suspension service tool
- RP1210B compatible interface box
- 9-Pin Deutsch diagnostic adapter

Dash Display Descriptions

The Parker Smart Suspension™ utilizes the OEM dash display to indicate the current state of the suspension. Either an amber or red service lamp will be illuminated in cases where the suspension system issues are present. The electronic control unit (ECU) will communicate status and service codes via the J1939 Data Link. Service lamps are displayed at the discretion of the customer.

Service Lamps

Per SAE J1939 definition, Red and Amber service lamps indicate:

Amber Lamp - This lamp is used to relay trouble code information that is reporting a problem with the vehicle system, but the vehicle need not be immediately stopped

Red Lamp - This lamp is used to relay trouble code information that is of a severe enough condition that it warrants stopping the vehicle.

Parker Smart Suspension™ Diagnostics

**PC-Based Diagnostic Tool**

A free download of the diagnostic tool is available via the web. The tool, once installed and running on a PC can be used to:

1. View current system status
2. Display system service codes
3. Calibrate the system
4. Manually raise/lower the suspension
5. View configurable parameters
6. Flash (re-flash) software to ECU’s

Contact your Parker representative to gain access to the tool. To install the tool on a computer, administrative rights are typically required.

**Using the Parker Diagnostic Tool**

**WARNING:** The diagnostic tool can be used to access suspension variables when the vehicle is moving or is stationary. If the vehicle is stationary, it's important to take the necessary safety precautions to protect individuals that may be working on or near the vehicle when commanding changes to suspension height.

Once the diagnostic tool software has been successfully downloaded onto a computer, connect to the vehicle using a RP1210B compliant communication box equipped with a 9-pin diagnostic adapter.
With the ignition on, select the Parker diagnostic tool icon on the computer screen. Once the program is running, five (5) tabs in the upper left-hand side of the screen will be available to click on. Information on each page is as described below.

**Info Page**

This is the first page displayed when starting the diagnostic tool program. Under Adapter Selection pull-down, select the RP1210B adapter tool, baud rate (500k) and select the CONNECT button on the left.

The systems that are on the link will be displayed under System Selection. Other useful information, such as software version, ECU hardware serial number, and component serial number, will be shown for each system selected.

To change unit system settings, the Settings provides a method to update units on the other tabs.
**Help Page**

The help page has been constructed to provide the user with links to support the Parker Smart Suspension.
Monitor Page
The monitoring page displays air spring information as well as gauges for supply pressure, battery voltage and vehicle and engine speed. In the lower, right corner, both active (current) and historical (inactive) service codes are displayed. The historical service codes can be cleared by the “Clear Codes” button at the bottom of the page. Please note that historical codes will automatically clear after 25 power cycles.
Setup Page
The Setup page will be used when either a calibration, height configuration, or a software update is needed.

To update (reflash) the software to the suspension controllers, select the controllers to program and select the Select File button. Navigate to the *.rpg file needed and then the Flash button. NOTE: More than one controller can be selected to flash. The diagnostic tool will flash controllers one at a time.

On the Setup tab, found on the Setup page (on the left), there is a single-click button to calibrate all the systems found on the vehicle.

NOTE:
Calibration is necessary at the time of installation on the vehicle OR when a height sensor is replaced.

Prior to calibration, consider the following:

1. Initiating a calibration should only be carried out if the vehicle is on level ground. Calibration on unlevel ground can generate a calibration service code.
2. Once the calibration process has completed, a power cycle is required to save the default calibration values.
3. If the calibration fails, the vehicle can still be driven as default values will be used. A suspension service message will be displayed until the source of the issue is resolved (i.e. suspect height sensor or unlevel ground calibration) and successful calibration is completed.
On the Setup tab, found on the Configure page, the user can actively change the target heights for each mode and velocity rate limit for each of the available axles. Once the new values are entered and updated, a power cycle will store the values in the ECU. Note: Depending on the customer, after a power cycle, new target heights or velocity rate limits may be overwritten back to values requested by customer J1939 messaging.
Diagnostic Page
In some scenarios, it may be necessary to use the Diagnostic page to manually adjust the suspension heights up or down. Prior to using this tool, consider the following:

1. Only use this test mode if authorized to do so.
2. To manually adjust heights, first check the Enable Test Mode box. Once checked, either an individual air spring or axle can be raised or lowered by selecting the associated button.
3. To stop movement, the same button needs to be pressed again to stop filling or exhausting.
4. Checking the Adjustments Fast box ahead of raising or lowering will more quickly fill or exhaust.
5. A STOP button is provided on the right side of the screen to cease any suspension movement.
6. Uncheck the Enable Test Mode when testing is complete.
Wire Inspection and Troubleshooting

General
This is a general guide for how to troubleshoot potential wiring issues on a vehicle. Wiring issues may reside in the OEM harness or ancillary wiring, depending on the service code detected. When troubleshooting wiring, keep in mind that wiring failures can be continuous, intermittent or no wiring failure at all.

Possible Causes for Wiring Issues
- Wiring shorted go ground, shorted to power or open
- Bent, corroded or loose terminals
- Missing or failed connector seals
- Wire damage – pinched or rubbed

Visual Inspection
1. Make sure all connectors are clean and tight.
2. Inspect the length of wiring between connections looking for damaged wires.
3. Inspect the connector for loose terminals, corrosion or bent pins.
4. Clean connectors with debris or contamination. Use OEM approved contact and connector cleaning products.

Volt/Ohm Meter Use
1. Use a quality digital auto-ranging volt/ohm meter.
2. Verify the battery and fuse are in good working condition.
3. When using a meter without the auto-range functionality, ensure the proper range is set for the measurement you are taking.
4. Reset the meter to zero before testing by holding the leads together to verify the scale shows zero ohms.
5. Use the correct pin adapter for the connector being tested to ensure connector pin damage does not occur.
6. When measuring resistance, ensure the ignition is off and the circuit is unpowered.

Service Code Identification and Mitigation

Connector mating
The service code summary table and details below are provided to aid in troubleshooting Smart Suspension related issues. In the troubleshooting process, there may be occasions where several unrelated service codes are present at the same time, leaving little to no suspension functionality. In this circumstance, there is a high likelihood the source of all the service is a connector that is not seated correctly with its mate.

Degraded Modes
When the Parker system encounters an active service code condition on a given axle, the suspension system will adjust suspension control on that axle to accommodate a reduced level of functionality. The possible levels of functionality, or degraded modes, are as follows:

- **No degraded mode** – The suspension system will continue to operate with no functional degradation.
- **Suspension system to remain in place** – The suspension system will remain at its current height on the axle where the active service code was detected. If two or more service codes are active on the same axle, the system will remain in place until cleared.
- **Suspension to return and remain at ride height** – The suspension system located on the axle where the active service code detected will only allow driver-requested height adjustment requests that result in movement to the default ride height. Once at ride height, the suspension system will remain in place.
- **Adjust suspension height using height sensors only** – The suspension system located on the axle where the active service code detected will allow height adjustment using the height sensors only.
- **Adjust suspension height using pressure balancing** - The suspension system located on the axle where the active service code detected will allow height adjustment using pressure balancing and the one remaining functional height sensor.
Service Codes
This product uses a Suspect Parameter Number (SPN) and Failure Mode Identifier (FMI) to identify service issues. Refer to the SPN Summary for more detailed information on troubleshooting.

There may be a point in the troubleshooting process where all reasonable attempts to resolve the service code are unsuccessful. In that case, replacement of the ECU or PCU may be necessary. Contact your OEM representative for information and warranty coverage details where appropriate.
## SPN Summary

<table>
<thead>
<tr>
<th>SPN</th>
<th>FMI</th>
<th>Position</th>
<th>Focus Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>516096</td>
<td>1</td>
<td>N/A</td>
<td>Controller</td>
<td>Battery voltage low - under 18V</td>
</tr>
<tr>
<td>516096</td>
<td>0</td>
<td>N/A</td>
<td>Controller</td>
<td>Battery voltage high - over 32V</td>
</tr>
<tr>
<td>516099</td>
<td>2</td>
<td>N/A</td>
<td>Controller</td>
<td>ECU ID tag error - incorrect / wrong tag</td>
</tr>
<tr>
<td>516097</td>
<td>3</td>
<td>N/A</td>
<td>Sensors</td>
<td>5V sensor supply high (5V reference)</td>
</tr>
<tr>
<td>516097</td>
<td>4</td>
<td>N/A</td>
<td>Sensors</td>
<td>5V sensor supply low (5V reference)</td>
</tr>
<tr>
<td>516097</td>
<td>5</td>
<td>N/A</td>
<td>Sensors</td>
<td>5V sensor common to PCU</td>
</tr>
<tr>
<td>516100</td>
<td>3</td>
<td>Supply</td>
<td>Pressure</td>
<td>Sensor input high: Sensor signal shorted above Ref Voltage</td>
</tr>
<tr>
<td>516100</td>
<td>4</td>
<td>Supply</td>
<td>Pressure</td>
<td>Sensor input low: Sensor signal open/shorted to ground: Ref voltage open</td>
</tr>
<tr>
<td>516101</td>
<td>3</td>
<td>CH 1</td>
<td>Pressure</td>
<td>Sensor signal shorted above Ref Voltage</td>
</tr>
<tr>
<td>516101</td>
<td>4</td>
<td>CH 1</td>
<td>Pressure</td>
<td>Sensor signal open/shorted to ground: Ref voltage open</td>
</tr>
<tr>
<td>516102</td>
<td>3</td>
<td>CH 2</td>
<td>Pressure</td>
<td>Sensor signal shorted above Ref Voltage</td>
</tr>
<tr>
<td>516102</td>
<td>4</td>
<td>CH 2</td>
<td>Pressure</td>
<td>Sensor signal open/shorted to ground: Ref voltage open</td>
</tr>
<tr>
<td>516109</td>
<td>3</td>
<td>LH</td>
<td>Height</td>
<td>Sensor signal shorted above Ref Voltage</td>
</tr>
<tr>
<td>516109</td>
<td>4</td>
<td>LH</td>
<td>Height</td>
<td>Sensor signal open/shorted to ground: Ref voltage open</td>
</tr>
<tr>
<td>516110</td>
<td>3</td>
<td>RH</td>
<td>Height</td>
<td>Sensor signal shorted above Ref Voltage</td>
</tr>
<tr>
<td>516110</td>
<td>4</td>
<td>RH</td>
<td>Height</td>
<td>Sensor signal open/shorted to ground: Ref voltage open</td>
</tr>
<tr>
<td>516111</td>
<td>19</td>
<td>N/A</td>
<td>Controller</td>
<td>No J1939 vehicle speed message</td>
</tr>
<tr>
<td>516113</td>
<td>19</td>
<td>N/A</td>
<td>Controller</td>
<td>No J1939 user interface message</td>
</tr>
<tr>
<td>516114</td>
<td>19</td>
<td>N/A</td>
<td>Controller</td>
<td>J1939 Bus Offline</td>
</tr>
<tr>
<td>516120</td>
<td>3</td>
<td>N/A</td>
<td>Controller</td>
<td>Tow Mode voltage high – over 15V</td>
</tr>
<tr>
<td>516121</td>
<td>2</td>
<td>CH1 Fill HSD</td>
<td>Flow</td>
<td>Fill valve open/shorted circuit or valve will not open</td>
</tr>
<tr>
<td>516122</td>
<td>2</td>
<td>CH2 Fill HSD</td>
<td>Flow</td>
<td>Fill valve open/shorted circuit or valve will not open</td>
</tr>
<tr>
<td>516131</td>
<td>2</td>
<td>CH1 Exh HSD</td>
<td>Flow</td>
<td>Exhaust valve open/shorted circuit or valve will not open</td>
</tr>
<tr>
<td>516132</td>
<td>2</td>
<td>CH2 Exh HSD</td>
<td>Flow</td>
<td>Exhaust valve open/shorted circuit or valve will not open</td>
</tr>
<tr>
<td>516151</td>
<td>10</td>
<td>CH1</td>
<td>System</td>
<td>Air spring / line open (during operation)</td>
</tr>
<tr>
<td>516152</td>
<td>10</td>
<td>CH2</td>
<td>System</td>
<td>Air spring / line open (during operation)</td>
</tr>
<tr>
<td>516151</td>
<td>7</td>
<td>CH1</td>
<td>System</td>
<td>Air spring / line open (at startup)</td>
</tr>
<tr>
<td>516152</td>
<td>7</td>
<td>CH2</td>
<td>System</td>
<td>Air spring / line open (at startup)</td>
</tr>
<tr>
<td>516300</td>
<td>13</td>
<td>LH/RH</td>
<td>System</td>
<td>Bump stop calibration error</td>
</tr>
<tr>
<td>516147</td>
<td>1</td>
<td>Supply</td>
<td>System</td>
<td>Low Air Supply – Waiting too long</td>
</tr>
<tr>
<td>516147</td>
<td>10</td>
<td>Supply</td>
<td>System</td>
<td>Low Air Supply – Line open</td>
</tr>
<tr>
<td>516211</td>
<td>20</td>
<td>CH1</td>
<td>System</td>
<td>Channel leak up - minor</td>
</tr>
<tr>
<td>516212</td>
<td>20</td>
<td>CH2</td>
<td>System</td>
<td>Channel leak up - minor</td>
</tr>
<tr>
<td>516211</td>
<td>17</td>
<td>CH1</td>
<td>System</td>
<td>Channel leak down - minor</td>
</tr>
<tr>
<td>516212</td>
<td>17</td>
<td>CH2</td>
<td>System</td>
<td>Channel leak down - minor</td>
</tr>
</tbody>
</table>
**SPN: 516096  FMI: 0,1**

**Service Code: High or Low Battery Voltage**

**Description:**
The system monitors the battery voltage at the suspension ECU. If the system detects voltage out of range, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
FMI 0: During operating state, the battery voltage is greater than 32V.
FMI 1: During operating state, the battery voltage is less than 18V.

**Degraded Modes:**
FMI 0,1: Suspension system to remain in place (Unlatched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

**Clearing the Service Code:**
FMI 0: The service code will clear when the battery voltage in range.
FMI 1: The service code will clear when the battery voltage in range for a minimum of 5 sec.

**Possible Causes:**
FMI 0: Vehicle jump-started or charging failure
FMI 1: Power shorted to ground or open
  Weak or dead battery

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**SPN: 516099  FMI: 2**

**Service Code: ECU ID Tag**

**Description:**
Each suspension ECU on the J1939 datalink is identified by a resistor found in the harness supplied by the vehicle manufacturer. If the system detects resistance out of range, the service code and degraded mode is set for the affected axle(s).

**Conditions:**
FMI 2: At power up, resistive tag voltage is out of range.

**Degraded Modes:**
FMI 2: Suspension system to remain in place (Unlatched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

**Clearing the Service Code:**
FMI 2: Repair harness ID tag resistor and then ignition cycle (system only detects ID tag during start-up routine).
Possible Causes:
FMI 2: ECU connector not seated properly.
  Pin corrosion
  Incorrect or missing address ID tag resistor on ECU harness connector C1; pins 13 and 14.

<table>
<thead>
<tr>
<th>SPN: 516097</th>
<th>FMI: 3,4,5</th>
</tr>
</thead>
</table>

Service Code: Sensor Voltage (All sensors)

Description:
The ECU supplies power to both the height sensors and PCU pressure sensors. If the power supplied to the sensors is interrupted, shorted or grounded, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 3: During operating state, sensor reference voltage is greater than 5.25V for 50% of 500 msec.
FMI 4: During operating state, sensor reference voltage is less than 4.75V for 50% of 500 msec.
FMI 5: During operating state, sensor common ground open for greater than four (4) seconds.

Degraded Modes:
FMI 3,4: Suspension system to remain in place (Unlatched, Latched after 5 counts per drive cycle).
FMI 5: Suspension system to remain in place (Latched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Latched Degraded Mode:
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

Clearing the Service Code:
FMI 3,4,5: Repair and complete a power cycle. Check diagnostic tool for service code after power returns.

Possible Causes:
FMI 3: 5V sensor supply shorted to ground at ECU connector C1, pin 6
FMI 4: 5V sensor supply open at ECU connector C1, pin 6
FMI 5: 5V sensor supply ground wire open at ECU connector C1, pin 11

<table>
<thead>
<tr>
<th>SPN: 516100</th>
<th>FMI: 3,4,5</th>
</tr>
</thead>
</table>

Service Code: Supply Pressure Sensor

Description:
The system incorporates a pressure sensor in the PCU to measure supply pressure. If the sensor input to ECU is shorted or open, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 3: During operating state, sensor input voltage is greater than 5.25V for 50% of 500 msec.
FMI 4: During operating state, sensor input voltage is less than 0.25V for 50% of 500 msec.
FMI 5: During operating state, sensor common ground open for greater than four (4) seconds.
Degraded Modes:
FMI 3,4: Suspension system to return and remain at ride height (Unlatched).
FMI 5: Suspension system to remain in place until a driver-initiated recovery is requested. Upon request, the suspension system shall return and remain at ride height using height leveling only (Latched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Latched Degraded Mode:
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

Clearing the Service Code:
FMI 3,4: The service code will clear when the voltage returns to normal operating levels.
FMI 5: Repair and complete a power cycle. Check diagnostic tool for service code after power returns.

Possible Causes:
FMI 3: Pressure sensor signal shorted to power between ECU connector C2, pin 8 and PCU connector pin 5.
FMI 4: Pressure sensor power open / signal open or short to ground between ECU connector C2, pin 8 and PCU connector pin 5.
FMI 5: PCU ground wire open on PCU connector pin 2.

<table>
<thead>
<tr>
<th>SPN: 516101</th>
<th>FMI: 3,4</th>
</tr>
</thead>
</table>

Service Code: Street Side Pressure Sensor

Description:
The system incorporates a pressure sensor in the PCU to measure street side (Ch 1) pressure. If the sensor input to ECU is shorted or open, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 3: During operating state, sensor input voltage is greater than 5.25V for 50% of 500 msec.
FMI 4: During operating state, sensor input voltage is less than 0.25V for 50% of 500 msec.

Degraded Modes:
FMI 3,4: Suspension system to remain in place until a driver-initiated recovery is requested. Upon request, the suspension system shall level axle heights only (Unlatched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Clearing the Service Code:
FMI 3,4: The service code will clear when the voltage returns to normal operating levels.
Possible Causes:
FMI 3: Pressure sensor signal shorted to power between ECU connector C2, pin 12 and PCU connector pin 4.
FMI 4: Pressure sensor power open / signal open or shorted to ground between ECU connector C2, pin 12 and PCU connector pin 4.

<table>
<thead>
<tr>
<th>SPN: 516102</th>
<th>FMI: 3,4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Code: Curb Side (Ch 2) Pressure Sensor</td>
<td></td>
</tr>
<tr>
<td>Description: The system incorporates a pressure sensor in the PCU to measure curb side (Ch 2) pressure. If the sensor input to ECU is shorted or open, a service code and degraded mode is set for the affected axle(s).</td>
<td></td>
</tr>
</tbody>
</table>
| Conditions:
  FMI 3: During operating state, sensor input voltage is greater than 5.25V for 50% of 500 msec.
  FMI 4: During operating state, sensor input voltage is less than 0.25V for 50% of 500 msec. |
| Degraded Modes: FMI 3,4: Suspension system to remain in place until a driver-initiated recovery is requested. Upon request, the suspension system shall level axle heights only (Unlatched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Clearing the Service Code:
FMI 3,4: The service code will clear when the voltage returns to normal operating levels.

Possible Causes:
FMI 3: Pressure sensor signal shorted to power between ECU connector C2, pin 4 and PCU connector pin 3.
FMI 4: Pressure sensor power open / signal open or shorted to ground between ECU connector C2, pin 4 and PCU connector pin 3.

<table>
<thead>
<tr>
<th>SPN: 516109</th>
<th>FMI: 1,3,4,5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Code: Street Side (Ch 1) Height Sensor</td>
<td></td>
</tr>
<tr>
<td>Description: The system receives a street side (Ch 1) height sensor input to the ECU. If the sensor input to ECU is shorted, open or below limit, a service code and degraded mode is set for the affected axle(s).</td>
<td></td>
</tr>
</tbody>
</table>
| Conditions:
  FMI 1: During operating state, sensor input is reading less than 22mm for 66% of 3 sec.
  FMI 3: During operating state, sensor input voltage is greater than 4.9V for 50% of 500 msec.
  FMI 4: During operating state, sensor input voltage is less than 0.1V for 50% of 500 msec.
  FMI 5: During operating state, sensor input ground open ground for 50% of 4 sec. |
| Degraded Modes: |
FMI 1,3,4,5: Suspension system to remain in place until a driver-initiated recovery is requested. Upon request, the suspension system shall adjust suspension height using pressure balancing in conjunction with the remaining functional height sensor (Unlatched).

**Unlatched Degraded Mode:**
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

**Clearing the Service Code:**
FMI 1: The service code will clear when the height value of service coded sensor returns to a value greater than 22 mm.
FMI 3,4: The service code will clear when the voltage returns to normal operating levels.
FMI 5: The service code will clear when the suspect height sensor is communicating changing values.

**Possible Causes:**
FMI 1: Height sensor broken or out of position relative to its magnet.
FMI 3: Height sensor signal shorted to power between ECU connector C2, pin 3 and height sensor.
FMI 4: Height sensor power open / signal open or shorted to ground between ECU connector C2, pin 3 and height sensor.
FMI 5: Height sensor ground open along sensor wire between the ECU connector C1, pin 11 and sensor.

**Note:** In the event the height sensor is replaced, a system calibration is required.

<table>
<thead>
<tr>
<th>SPN: 516110</th>
<th>FMI: 1,3,4,5</th>
</tr>
</thead>
</table>

**Service Code: Curb Side (Ch 2) Height Sensor**

**Description:**
The system receives a curb side (Ch 2) height sensor input to the ECU. If the sensor input to ECU is shorted, open or below limit, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
FMI 1: During operating state, sensor input is reading less than 22mm for 66% of 3 sec.
FMI 3: During operating state, sensor input voltage is greater than 4.9V for 50% of 500 msec.
FMI 4: During operating state, sensor input voltage is less than 0.1V for 50% of 500 msec.
FMI 5: During operating state, sensor input ground open ground for 50% of 4 sec.

**Degraded Modes:**
FMI 1,3,4,5: Suspension system to remain in place until a driver-initiated recovery is requested. Upon request, the suspension system shall adjust suspension height using pressure balancing in conjunction with the remaining functional height sensor (Unlatched).

**Unlatched Degraded Mode:**
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.
Clearing the Service Code:
FMI 1: The service code will clear when the height value of service coded sensor returns to a value greater than 22 mm.
FMI 3,4: The service code will clear when the voltage returns to normal operating levels.
FMI 5: The service code will clear when the suspect height sensor is communicating changing values.

Possible Causes:
FMI 1: Height sensor broken or out of position relative to its magnet.
FMI 3: Height sensor signal shorted to power between ECU connector C2, pin 11 and height sensor.
FMI 4: Height sensor power open / signal open or shorted to ground between ECU connector C2, pin 11 and height sensor.
FMI 5: Height sensor ground open along sensor wire between the ECU connector C1, pin 11 and sensor.

Note: In the event the height sensor is replaced, a system calibration is required.

SPN: 516111 FMI: 19
Service Code: J1939 Vehicle Speed Message Error

Description:
The system receives vehicle speed via the J1939 data link. If the ECU does not receive vehicle speed, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 19: During operating state, no vehicle speed message received, or if an invalid message received for 50% of 4 sec.

Degraded Modes:
FMI 19: Suspension system to remain in place (Unlatched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Clearing the Service Code:
FMI 19: The service code will be cleared when valid speed data is communicated to the ECU.

Possible Causes:
FMI 19: J1939 is not available or signal from the designated source address is not transmitting.

SPN: 516112 FMI: 19
Service Code: J1939 Engine RPM Message Error

Description:
The system receives engine RPM via the J1939 data link. If the ECU does not receive engine RPM, a service code and degraded mode is set for the affected axle(s).
Conditions:
FMI 19: During operating state, no engine RPM received, or if an invalid message received for 50% of 4 sec.

Degraded Modes:
FMI 19: No degraded mode (Unlatched).

Clearing the Service Code:
FMI 19: The service code will be cleared when valid engine RPM data is communicated to the ECU.

Possible Causes:
FMI 19: J1939 is not available or signal from the designated source address is not transmitting.

<table>
<thead>
<tr>
<th>SPN: 516113</th>
<th>FMI: 19</th>
</tr>
</thead>
</table>

Service Code: J1939 User Interface Message Error

Description:
The system continuously receives commands via the J1939 data link. If the ECU does not receive any commands, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 19: During operating state, no ASC2 message received, or if an invalid message received for 2.5 sec.

Degraded Modes:
FMI 19: Suspension system to remain in place (Unlatched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Clearing the Service Code:
FMI 19: The service code will be cleared when valid ASC2 message is communicated to the ECU.

Possible Causes:
FMI 19: Customer command messages not addressed to ECUs.

<table>
<thead>
<tr>
<th>SPN: 516114</th>
<th>FMI: 19</th>
</tr>
</thead>
</table>

Service Code: J1939 Bus Offline

Description:
The system continuously receives commands via the J1939 data link. If the ECU does not see any activity on the J1939 data link, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 19: During operating state, no ASC2 message received, or if an invalid message received for 1.5 sec.
Degraded Modes:
FMI 19: Suspension system to remain in place (Unlatched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Clearing the Service Code:
FMI 19: The service code will be cleared when the J1939 link is restored.

Possible Causes:
FMI 19: J1939 bus is offline or disconnected.

---

**SPN: 516120 FMI: 3**

Service Code: Tow Mode voltage high

Description:
The system continuously checks for 12V on a dedicated input to determine if tow truck is connected. If the ECU sees voltage greater than 15V, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 3: During operating state, a shorted circuit is detected on the Tow mode pin with a voltage greater than 15V for 50% of 500 msec.

Degraded Modes:
None

Clearing the Service Code:
FMI 3: Repair and complete a power cycle. Check diagnostic tool for service code after power returns.

Possible Causes:
FMI 3: Tow mode pin shorted to supply at ECU connector C2, pin 9

---

**SPN: 516121 FMI: 2**

Service Code: Street Side (Ch1) Fill Solenoid - Battery Supply

Description:
The system commands both fill and exhaust valves in the PCU. If an open or shorted circuit is detected, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 2: At power up, short or open line is detected for 50% of 500 msec.
Degraded Modes:
FMI 2 (below ride height): Suspension system to remain in place (Latched).

FMI 2: (above ride height): Suspension system to remain in place until vehicle is stopped. Once stopped and ride height requested, system with service code will allow exhausting to ride height, then remain at ride height (Latched).

Latched Degraded Mode:
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

Clearing the Service Code:
FMI 2: Cycle switched ignition OFF then ON to clear the service code.

Possible Causes:
FMI 2: Circuit shorted to ground, shorted to battery, or open between PCU connector, pin 8 and ECU connector C2, pin 6.

SPN: 516122  FMI: 2
Service Code: Curb Side (Ch2) Fill Solenoid - Battery Supply

Description:
The system commands both fill and exhaust values in the PCU. If an open or shorted circuit is detected, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 2: At power up, short or open line is detected for 50% of 500 msec.

Degraded Modes:
FMI 2 (below ride height): Suspension system to remain in place (Latched).

FMI 2: (above ride height): Suspension system to remain in place until vehicle is stopped. Once stopped and ride height requested, system with service code will allow exhausting to ride height, then remain at ride height (Latched).

Latched Degraded Mode:
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

Clearing the Service Code:
FMI 2: Cycle switched ignition OFF then ON to clear the service code.

Possible Causes:
FMI 2: Circuit shorted to ground, shorted to battery, or open between PCU connector, pin 9 and ECU connector C2, pin 17.
### SPN: 516131  FMI: 2
**Service Code: Street Side (Ch1) Exhaust Solenoid - Battery Supply**

**Description:**
The system commands both fill and exhaust values in the PCU. If an open or shorted circuit is detected, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
FMI 2: At power up, short or open line is detected for 50% of 500 msec.

**Degraded Modes:**
FMI 2 (above ride height): Suspension system to remain in place (Latched).

FMI 2: (below ride height): Suspension system to remain in place until vehicle is stopped. Once stopped and ride height requested, system with service code will allow exhausting to ride height, then remain at ride height (Latched).

**Latched Degraded Mode:**
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

**Clearing the Service Code:**
FMI 2: Cycle switched ignition OFF then ON to clear the service code.

**Possible Causes:**
FMI 2: Circuit shorted to ground, shorted to battery, or open between PCU connector, pin 7 and ECU connector C2, pin 5.

FMI 2: Circuit open between PCU connector, pin 11 and ECU connector C2, pin 1.

---

### SPN: 516132  FMI: 2
**Service Code: Curb Side (Ch2) Exhaust Solenoid - Battery Supply**

**Description:**
The system commands both fill and exhaust values in the PCU. If an open or shorted circuit is detected, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
FMI 2: At power up, short or open line is detected for 50% of 500 msec.

**Degraded Modes:**
FMI 2 (above ride height): Suspension system to remain in place (Latched).

FMI 2: (below ride height): Suspension system to remain in place until vehicle is stopped. Once stopped and ride height requested, system with service code will allow exhausting to ride height, then remain at ride height (Latched).

**Latched Degraded Mode:**
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.
Clearing the Service Code:
FMI 2: Cycle switched ignition OFF then ON to clear the service code.

Possible Causes:
FMI 2: Circuit shorted to ground, shorted to battery, or open between PCU connector, pin 6 and ECU connector C2, pin 18.

---

**Service Code: **Street Side (Ch1) Solenoids – Common Ground

Description:
The system commands both fill and exhaust values in the PCU. If an open or shorted circuit is detected or the valve is non-responsive, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 2: At power up and valve monitoring service code state is true for 50% of 2 seconds.

Degraded Modes:
FMI 2: Suspension system to remain in place (Latched).

Latch Degraded Mode:
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

Clearing the Service Code:
FMI 2: Cycle switched ignition OFF then ON to clear the service code.

Possible Causes:
FMI 2: Circuit shorted to ground, shorted to battery, or open between PCU connector, pin 11 and ECU connector C2, pin 1.

FMI 2: Circuit open between PCU connector, pin 7 and ECU connector C2, pin 5.

FMI 2: Circuit open between PCU connector, pin 8 and ECU connector C2, pin 6

---

**Service Code: **Curb Side (Ch2) Solenoids – Common Ground

Description:
The system commands both fill and exhaust values in the PCU. If an open or shorted circuit is detected or the valve is non-responsive, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 2: At power up and valve monitoring service code state is true for 50% of 2 seconds.

Degraded Modes:
FMI 2: Suspension system to remain in place (Latched).

Latch Degraded Mode:
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.
Clearing the Service Code:
FMI 2: Cycle switched ignition OFF then ON to clear the service code.

Possible Causes:
FMI 2: Circuit shorted to ground, shorted to battery, or open between PCU connector, pin 10 and ECU connector C2, pin 2.

FMI 2: Circuit open between PCU connector, pin 6 and ECU connector C2, pin 18.

FMI 2: Circuit open between PCU connector, pin 9 and ECU connector C2, pin 17.

```
SPN: 516147   FMI: 1,10
Service Code: Low Supply Pressure

Description:
The system uses the supply pressure measurement to determine if adequate air is available to achieve some system functions. If adequate supply pressure is not achieved for a prescribed amount of time, or if the supply line becomes open, a service code and degraded mode is set for the affected axle(s).

Conditions:
FMI 1: At power up, engine speed greater than 300 rpm and pressure less than 20 psi for greater than 5 minutes.

FMI 10: At power up and PCU supply pressure is greater than 20 psi then drops below 5 psi for 5 seconds.

Degraded Modes:
FMI 1: Suspension system to remain in place (Not Latched).

Unlatched Degraded Mode:
When the vehicle is stationary and service code has cleared, the operator must select the recovery switch before the Degraded Mode is cleared.
When the vehicle moving, and the service code has cleared, the Degraded Mode will automatically clear if the vehicle is at ride height. Otherwise, the operator must select the recovery switch to clear the Degraded Mode.

Clearing the Service Code:
FMI 1,10: The service code will clear when the PCU supply pressure exceeds 20 psi.

Possible Causes:
FMI 1: Check the PCU supply line for leaks, breaks or blockage and/or non-functional compressor.

FMI 10: Check the PCU supply line for a severe leak, break or air spring failure.
### Service Code: Street Side (Ch1) Air Line Open

**Description:**
The system manages air pressure in each channel. In the event a channel line cannot retain pressure, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
- **FMI 7:** At power up, while commanding a fill operation, channel pressure does not achieve greater than 15 psi for more than 80% of 5 seconds.
- **FMI 10:** At power up, with no exhaust commanded, channel pressure drops from above 15 psi to below 5 psi for more than 40% of 5 seconds.

**Degraded Modes:**
- **FMI 7,10:** Suspension system to remain in place (Latched).

**Latched Degraded Mode:**
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

**Clearing the Service Code:**
- **FMI 7,10:** After air line repair and ignition cycling, channel must retain constant pressure for more than 5 seconds.

**Possible Causes:**
- **FMI 7:** Check the channel air line for leaks, breaks or blockage. This can include connections to the air spring or the PCU.
- **FMI 10:** Check the channel air line or air spring for a severe leak, break or air spring failure.

### Service Code: Curb Side (Ch2) Air Line Open

**Description:**
The system manages air pressure in each channel. In the event a channel line cannot retain pressure, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
- **FMI 7:** At power up, while commanding a fill operation, channel pressure does not achieve greater than 15 psi for more than 80% of 5 seconds.
- **FMI 10:** At power up, with no exhaust commanded, channel pressure drops from above 15 psi to below 5 psi for more than 40% of 5 seconds.

**Degraded Modes:**
- **FMI 7,10:** Suspension system to remain in place (Latched).

**Latched Degraded Mode:**
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

**Clearing the Service Code:**
- **FMI 7,10:** After air line repair and ignition cycling, channel must retain constant pressure for more than 5 seconds.
Possible Causes:
FMI 7: Check the channel air line for leaks, breaks or blockage. This can include connections to the air spring or the PCU.

FMI 10: Check the channel air line or air spring for a severe leak or break.

SPN: 516211  FMI: 17,20
Service Code: Street Side (Ch1) Minor Leak

Description:
The system can detect minor channel leaks during non-operational activity. In the event a channel line leak has been detected, a service code is set momentarily at startup for the affected axle(s).

Conditions:
FMI 17: After the ignition is turned off, channel pressure decreases by more than a predetermined height and pressure differential for more than 25% of 3 sec.
FMI 20: After the ignition is turned off, channel pressure increases by more than a predetermined height and pressure differential for more than 25% of 3 sec.

Degraded Modes:
FMI 17, 20: No degraded mode.

Clearing the Service Code:
FMI 17,20: The service code indicator will be cleared 3 seconds after the vehicle is powered up. The Parker diagnostic tool must be used to view these historical service codes.

Possible Causes:
FMI 17: Check the channel air line for minor leaks. This can include connections to the air spring or the PCU.

FMI 20: Check for channel line pressure increases over long-duration power cycles (i.e. 30 minutes) using the Parker diagnostic tool to verify leaking channel fill valve.

SPN: 516212  FMI: 17,20
Service Code: Curb Side (Ch2) Minor Leak

Description:
The system can detect minor channel leaks during non-operational activity. In the event a channel line leak has been detected, a service code is set momentarily at startup for the affected axle(s).

Conditions:
FMI 17: After the ignition is turned off, channel pressure decreases by more than a predetermined height and pressure differential for more than 25% of 3 sec.
FMI 20: After the ignition is turned off, channel pressure increases by more than a predetermined height and pressure differential for more than 25% of 3 sec.

Degraded Modes:
FMI 17, 20: No degraded mode.

Clearing the Service Code:
FMI 17,20: The service code indicator will be cleared 3 seconds after the vehicle is powered up. The Parker diagnostic tool must be used to view these historical service codes.
**Possible Causes:**
FMI 17: Check the channel air line for minor leaks. This can include connections to the air spring or the PCU.

FMI 20: Check for channel line pressure increases over long-duration power cycles (i.e. 30 minutes) using the Parker diagnostic tool to verify leaking channel fill valve.

<table>
<thead>
<tr>
<th>SPN: 516235</th>
<th>FMI: 7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Code:</strong> PCU Manifold Pressurized</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
The pressure sensors within the PCU manifold reference atmosphere for pressure measurements. If the manifold cavity builds pressure and does not properly vent, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
FMI 7: At power up and one of the pressure sensors is reading negative for 50% of 500 msec.

**Degraded Modes:**
FMI 7: Suspension system to remain in place (Latched).

**Latched Degraded Mode:**
Once the service code has cleared, the vehicle must be stationary, and the operator must select the recovery switch before the Degraded Mode is cleared.

**Clearing the Service Code:**
FMI 7: To remove the service code, blockage at the back of the PCU must be removed and a power cycle completed.

**Possible Causes:**
FMI 7: Check for vent blockage on the back side of the PCU.

<table>
<thead>
<tr>
<th>SPN: 516300</th>
<th>FMI: 7,13</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service Code:</strong> Height Calibration Error</td>
<td></td>
</tr>
</tbody>
</table>

**Description:**
The system features a height calibration procedure. If the calibration procedure does not complete or detects unexpected heights, a service code and degraded mode is set for the affected axle(s).

**Conditions:**
FMI 7: Height calibration timeout occurs or sensor service code becomes active.
FMI 13: Axle bump stop height values vary by more than 8 mm during calibration.

**Degraded Modes:**
FMI 7,13: No degraded mode.

**Clearing the Service Code:**
FMI 7,13: To clear the service code, a re-calibration is required after other codes are corrected or hardware issued identified below are corrected.
Possible Causes:
FMI 7: Calibration occurred on un-level ground.
FMI 13: Check for missing bump stop pad.
FMI 7,13: Height sensor or magnet assembly is not mounted correctly or has been damaged.
## Appendix

### Electronic Control Unit (ECU) Pinout

<table>
<thead>
<tr>
<th>Connector</th>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>1</td>
<td>Ignition Input - System Enable</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>CAN1 Low - Bus Interface / Programming</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>CAN Shield</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>5V sensor supply</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Bootmode</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>CAN1 High - Bus Interface / Programming</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Sensor Ground</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Vbatt (24V Nominal)</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Address High</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Address Low</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Vbatt (GND)</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Vbatt (GND)</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Vbatt (24V Nominal)</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Vbatt (24V Nominal)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Connector</th>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>1</td>
<td>CH1 (LEFT) Current Feedback</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>CH2 (RIGHT) Current Feedback</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>CH1 (LEFT) Height Sensor</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>CH2 (RIGHT) Bag Pressure Sensor</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>CH1 (LEFT) Valve Vent</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>CH1 (LEFT) Fill Valve</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>PCU Air Supply Pressure Sensor</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>CH2 (RIGHT) Height Sensor</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>CH1 (LEFT) Bag Pressure Sensor</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>15</td>
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<tr>
<td></td>
<td>16</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>CH2 (RIGHT) Fill Valve</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>CH2 (RIGHT) Valve Vent</td>
</tr>
</tbody>
</table>
Pneumatic Control Unit (PCU) Pinout

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5V Sensor Supply</td>
</tr>
<tr>
<td>2</td>
<td>Sensor Ground</td>
</tr>
<tr>
<td>3</td>
<td>CH 2 (Right) Bag Pressure Sensor</td>
</tr>
<tr>
<td>4</td>
<td>CH 1 (Left) Bag Pressure Sensor</td>
</tr>
<tr>
<td>5</td>
<td>Local Air Supply Pressure Sensor</td>
</tr>
<tr>
<td>6</td>
<td>CH 2 (Right) Exhaust Valve</td>
</tr>
<tr>
<td>7</td>
<td>CH 1 (Left) Exhaust Valve</td>
</tr>
<tr>
<td>8</td>
<td>CH 1 (Left) Fill Valve</td>
</tr>
<tr>
<td>9</td>
<td>CH 2 (Right) Fill Valve</td>
</tr>
<tr>
<td>10</td>
<td>CH 2 (Right) Current Feedback</td>
</tr>
<tr>
<td>11</td>
<td>CH 1 (Left) Current Feedback</td>
</tr>
<tr>
<td>12</td>
<td>Ground</td>
</tr>
<tr>
<td>13</td>
<td>N/C</td>
</tr>
<tr>
<td>14</td>
<td>N/C</td>
</tr>
</tbody>
</table>

Wiring Interconnect

![Wiring Diagram]
Simplified System Schematic