High Voltage Power Supply Unit

| Part Number:    | 700009806 | Where Used: | ACQUITY QDa Detector |

Functional description

- The HVPSU provides the phosphor and dynode detector voltages.

**WARNING:** Do not disconnect or reconnect any of the input/output HVPSU cables when the instrument is in Operate.

**CAUTION:** The HVPSU is not serviceable and must be replaced if it fails.

Location

For the component location, refer to the [Graphical Parts Locator](#) in Service Assist for the appropriate mass spectrometer.
**Inputs/outputs**

**Operate Voltages**
24 V input from detector control card J1-8 (via cable 441001316).
24 V input signal only present when turbo speed >80%.

**Output Voltages**
- **Phosphor Voltage:**
  - Positive and negative ion modes = +9 kV (±10%)
- **Dynode voltage:**
  - Positive ion mode = -8 kV (±10%)
  - Negative ion mode = +8 kV (±10%)

**Readback Voltages**
- Dynode Voltage
- Phosphor Voltage

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**J18 (DCC) to HVPSU cable - 441001316 (700009735)**

<table>
<thead>
<tr>
<th>DCC J18 Pin No.</th>
<th>Color</th>
<th>Description</th>
<th>HVPSU Pin No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White/Orange</td>
<td>24 V interlock</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>24 V return</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>White/Green</td>
<td>No connection</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
<td>RS485-</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>White/Blue</td>
<td>RS485+</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Green</td>
<td>No connection</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>White/Brown</td>
<td>24 V return</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Brown</td>
<td>24 V interlock</td>
<td>8</td>
</tr>
</tbody>
</table>
Diagnostic procedures

Readbacks

Diagnostics tab:

![Detector Readbacks](image)

*Figure 1 - Detector readbacks*

The dynode and phosphor readbacks are displayed in the detector field of the diagnostics tab (Figure 1).

*NOTE:* In Positive and Negative mode the readbacks must be ±10% of 8.0 kV (dynode) and 9.0 kV (phosphor). The dynode voltage will change polarity depending on the ESI mode.

*NOTE:* Only the input voltage from the detector control card can be measured, there are no other directly measurable voltages from this unit and there are no replaceable parts. If the HVPSU fails, it must be replaced.

Status LEDs

The Status tab gives an indication of the operational status of components within the QDa instrument. It can be used to quickly determine where an issue may have occurred. An example status tab is shown in Figure 2.

*NOTE:* Hovering the mouse cursor over a status will present a message box which contains the status description and state.
Table 1 lists the operating status LEDs as displayed in the external HV PSU status section of the Status tab and their indications.

### Table 1: Operating status LEDs

<table>
<thead>
<tr>
<th>Bit No. (from left to right)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Unset: HVSU disabled</td>
</tr>
<tr>
<td></td>
<td>Set: HVSU enabled</td>
</tr>
<tr>
<td>1</td>
<td>Unset: HVSU output disabled</td>
</tr>
<tr>
<td></td>
<td>Set: HVSU output enabled</td>
</tr>
<tr>
<td>2</td>
<td>Unset: HVSU polarity mode 1</td>
</tr>
<tr>
<td></td>
<td>Set: HVSU polarity mode 2</td>
</tr>
<tr>
<td>3</td>
<td>Unused</td>
</tr>
<tr>
<td>4</td>
<td>Unused</td>
</tr>
<tr>
<td>5</td>
<td>Unset: HVSU get operating status hardware OK</td>
</tr>
<tr>
<td></td>
<td>Set: HVSU get operating status hardware fault</td>
</tr>
<tr>
<td>6</td>
<td>Unset: HVSU get operating status software OK</td>
</tr>
<tr>
<td></td>
<td>Set: HVSU get operating status software fault</td>
</tr>
<tr>
<td>7</td>
<td>Unset: HVSU get operating status comms OK</td>
</tr>
<tr>
<td></td>
<td>Set: HVSU get operating status comms fault</td>
</tr>
</tbody>
</table>
Other relevant information

**CAUTION:** Service personnel must follow appropriate antistatic procedures at all times.

*Do not plug or unplug the connectors when the instrument is switched on.*

Removing the HVPSU

1. Close the software.
2. Switch the instrument out of Operate.
3. Allow the instrument to vent (approximately 5 min).
4. Disconnect the mains power cable.
5. Remove the door and cover.
6. Remove the detector control card (DCC). See [Detector Control Card Technical Reference](715004349) for instructions.

**CAUTION:** All DCC screws must be retained and correctly installed to ensure correct operation of the ACQUITY QDa.

**NOTE:** All cables connected to the DCC must be disconnected.

7. If servicing a Standard option instrument, remove the diaphragm pump.
8. Disconnect the internal backing line assembly tube from the bulkhead connector.

*Figure 3 - Backing line assembly*
9. Turn off the API gas supply and disconnect the API gas solenoid tubing.
10. Remove the rear fan assembly on the left (viewed from the front of the unit).

![Figure 4 - Location of fan](image)

11. Disconnect the 24 V cable from the low voltage PSU assembly.

![Figure 5 - Low voltage PSU connections](image)

12. Remove the 5 screws at the rear, attaching the low voltage PSU assembly, to the chassis.

13. Remove the low voltage PSU assembly in one piece, inclusive of the API gas solenoid, cables, and connections.

14. Disconnect the HT PSU cable from the HVPSU.
15. Remove and retain the 2 screws from the brushed aluminum panel on the HVPSU.
16. Remove the brushed aluminum panel.

**CAUTION:** *The connectors should not be exposed to the atmosphere for prolonged periods of time. Caps are provided to protect the contacts from exposure to moisture and these must be installed.*

17. Disconnect the phosphor and dynode HV cables.
18. Remove and retain the 3 screws holding the HVPSU in position.
19. Remove the HVPSU, pulling it towards the back of the chassis to disconnect it from the detector assembly.
Installing the HVPSU

1. Place the HVPSU in position by pushing towards the rear of the detector assembly.
2. Attach the HVPSU to the chassis and detector using the 2 screws removed previously.
3. Reconnect the electrical connections to the rear of the detector assembly.
4. Refit the brushed aluminum panel onto the HVPSU, using the two screws removed previously.
5. Reconnect the HT PSU cable to the HVPSU.
6. Refit the low voltage PSU assembly, securing with screws into the back panel of the chassis.
7. Remake the electrical connections.
8. Refit the rear fan assembly.
9. Reconnect the tubing to the API gas solenoid and switch the API gas on.
10. Reconnect the internal backing line assembly tube to the bulkhead connector.
11. If servicing a Standard option instrument, reattach the diaphragm pump.
12. Refit the detector control card, ensuring the grounding screws in the center are secure (as described in the Detector Control Card Technical Reference 715004349).

**CAUTION:** All DCC screws must be retained and correctly installed to ensure operation of the ACQUITY QDa.

**NOTE:** All cables connected to the DCC must be reconnected.

13. Refit the door and cover.
14. Reconnect the mains cable.
15. Switch the instrument power on.
16. Wait for the instrument boot-up sequence to complete, open the software and wait for turbo speed to reach >95%.

**NOTE:** After replacing an HVPSU, ensure that the readbacks are correct for the dynode and phosphor voltages.