The C13654-01 is a high voltage power socket assembly for 28 mm (1-1/8 inch) diameter side-on photomultiplier tubes (PMT), incorporating a regulated high voltage power supply, an active voltage divider, and a transimpedance amplifier. It enables simple yet stable PMT operations with extended DC output linearity by only supplying +15 V and connecting to a potentiometer or a 0 to +5 V for high voltage adjustment.

**FEATURES**

- Superior DC output linearity
- Low ripple / noise
- Fast high voltage programming response
- High transimpedance amplifier

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description / Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable photomultiplier tubes</td>
<td>28 mm (1-1/8 inch) side-on type</td>
<td>—</td>
</tr>
<tr>
<td>Input voltage</td>
<td>+15 ±1</td>
<td>V</td>
</tr>
<tr>
<td>Maximum input voltage</td>
<td>+18</td>
<td>V</td>
</tr>
<tr>
<td>Maximum input current</td>
<td>55</td>
<td>mA</td>
</tr>
<tr>
<td>Linear DC output current of PMT (1,2)</td>
<td>43</td>
<td>μA</td>
</tr>
<tr>
<td>Amplifier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency bandwidth (-3 dB)</td>
<td>DC to 10 kHz</td>
<td>—</td>
</tr>
<tr>
<td>Current to voltage conversion factor</td>
<td>0.3 (load resistance 10 kΩ)</td>
<td>V/μA</td>
</tr>
<tr>
<td>Maximum output signal voltage</td>
<td>+13 (load resistance 10 kΩ)</td>
<td>V</td>
</tr>
<tr>
<td>Output signal offset voltage</td>
<td>Typ. ±0.3</td>
<td>mV</td>
</tr>
<tr>
<td>Output signal ripple / noise (p-p) (3)</td>
<td>Max.</td>
<td>—</td>
</tr>
<tr>
<td>Output voltage range</td>
<td>0 to -1250</td>
<td>V</td>
</tr>
<tr>
<td>High voltage power supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line regulation against ±1 V input change (2)</td>
<td>Typ. ±0.01 %</td>
<td></td>
</tr>
<tr>
<td>Output voltage control</td>
<td>Control voltage (0 V to +5 V) or potentiometer (50 kΩ)</td>
<td>—</td>
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<tr>
<td>Control voltage input impedance</td>
<td>100</td>
<td>kΩ</td>
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<tr>
<td>Output voltage programming response (5)</td>
<td>Typ. 80</td>
<td>ms</td>
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<tr>
<td>Temperature coefficient (2)</td>
<td>Typ. ±0.01 %/°C</td>
<td></td>
</tr>
<tr>
<td>Operating ambient temperature / humidity (6)</td>
<td>0 °C to +50 °C / Below 85 %</td>
<td>—</td>
</tr>
<tr>
<td>Storage temperature / humidity (6)</td>
<td>-15 °C to +60 °C / Below 90 %</td>
<td>—</td>
</tr>
<tr>
<td>Weight</td>
<td>47</td>
<td>g</td>
</tr>
</tbody>
</table>

**NOTE:**

1. Without PMT
2. Input voltage = +15 V, Control voltage = +4 V
3. Line regulation against ±2 % linearity
4. Load resistance = 1 MΩ, Load capacitance = 22 pF
5. For 0 % to 99 % high voltage change
6. No condensation

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Figure 1: DC linearity characteristics

![DC linearity characteristics](image1.png)

Figure 2: Practical PMT DC output limits

![Practical PMT DC output limits](image2.png)
Figure 3: High voltage controlling characteristics

![Graph showing high voltage controlling characteristics](image1)

Figure 4: Frequency bandwidth

![Graph showing frequency bandwidth](image2)

Figure 5: Adjustment method of high voltage

- **VOLTAGE PROGRAMMING**
  - SOCKET ASSEMBLY
    - SIGNAL OUTPUT
    - LOW VOLTAGE INPUT (RED)
    - GND (BLACK)
    - GND (BLACK)
    - Vref OUTPUT (BLUE)
    - HV CONTROL INPUT (WHITE)
  - POWER SUPPLY
    - +15 V
    - GND
    - +0 V to +5 V
    - GND
  - *Adjust the control voltage to adjust the sensitivity.
  - Electrically insulate the reference voltage output.

- **RESISTANCE PROGRAMMING**
  - SOCKET ASSEMBLY
    - SIGNAL OUTPUT
    - LOW VOLTAGE INPUT (RED)
    - GND (BLACK)
    - GND (BLACK)
    - Vref OUTPUT (BLUE)
    - HV CONTROL INPUT (WHITE)
  - POWER SUPPLY
    - +15 V
    - GND
    - POTENTIOMETER (50 kΩ)
    - MONITOR
  - *Adjust the control voltage to adjust the sensitivity.
  - Electrically insulate the reference voltage output.

Figure 6: Schematic diagram

![Schematic diagram of high voltage power supply](image3)

Figure 7: Dimensional outline (Unit: mm)

![Dimensional outline](image4)