This application note is designed to help you understand the various module types that Lutron has to offer. It will assist you in selecting the proper module for your application and also act as a troubleshooting guide in the field.

### Module Overview and Ratings

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Incandescent</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Magnetic Low-Voltage (MLV)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Electronic Low-Voltage (ELV)</td>
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<tr>
<td>Neon/Cold-Cathode</td>
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<td>✓</td>
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<tr>
<td>Ceiling Paddle Fan</td>
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<td></td>
<td></td>
<td>✓</td>
<td></td>
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<tr>
<td>Switched Fluorescent</td>
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<td>✓</td>
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<td></td>
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<tr>
<td>Lutron® Tu-Wire® Fluorescent</td>
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<td></td>
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<tr>
<td>Motor Loads</td>
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<tr>
<td>AC Shade/Projector Screen Motors</td>
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<td></td>
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<td>✓</td>
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</tr>
<tr>
<td>Non-Dim Lighting loads</td>
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<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>Compact Fluorescent Lamp (CFL)*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td></td>
</tr>
<tr>
<td>Light Emitting Diode (LED)*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<td></td>
</tr>
</tbody>
</table>

- **Frequency (Hz)**: 50 / 60, 50 / 60, 50 / 60, 50 / 60, 50 / 60, 50 / 60, 50 / 60, 50 / 60, 50 / 60
- **Minimum Load**: 10 W, 10 W, 25 W, 40 W, 40 W, 10 W, —, 0.25 A, —
- **Maximum Load Per Output**: 10 A, 8 A, 16 A, 16 A, 10 A, 10 A, 5 A, 2 A, 16 A, 1/3 HP
- **Maximum Load Per Module**: 16 A, 13 A, 16 A, 16 A, 13 A, 16 A, 16 A, 8 A, 16 A / circuit
- **Technology (see key below)**: FP, RP, FP, RP, FP, FP, FP, RP, RS, SC, RSS

* Minimum and maximum load specifications for Lutron® dimming controls apply to traditional loads (e.g., incandescent and halogen) and do not apply to LED and CFL loads. Minimum and maximum loads for LEDs and CFLs are expressed in number of lamps and may vary, depending on the type of lamp and the model number being used. Only testing can determine the actual minimum and maximum load needed for a particular lamp and control.

**Key:**

- FP: Forward-phase control with RTISS® line noise filtering
- RP: Reverse-phase control with RTISS® line noise filtering
- RS: Relay switching; mechanical-interlocked relays guarantee motor protection
- SC: Switched capacitor quiet control circuitry
- RSS: Relay switching with Softswitch® patented triac arc suppression technology utilized for million-cycle relay life
Ten-Volt Module (TVM) Specifications (0–10 V)

- Each GRX-TVM2 interface controls two consecutive circuits of lighting.
- Controls 0–10 V, Digital Serial Interface (DSI), Broadcast DALI®, and Pulse Width Modulated (PWM).
- 50 mA maximum low-voltage ballast control current per circuit for each GRX-TVM2 output.
- 750 mA maximum low-voltage ballast control current per panel.

Load Type Settings for Circuit Selector

GRX-TVM2 circuits are the first circuits in the panel. If a 0–10 V, PWM, or DSI circuit is required, one of the load types shown below must be used when setting the load type (at the circuit selector) for these circuits. Failure to correctly assign load type may damage loads, especially certain electronic transformers and electronic ballasts and motors.

- Load Type 2–3  Fluorescent: 0–10 V, with TVM
- Load Type 2–4  Fluorescent: PWM, with TVM
- Load Type 2–5  Fluorescent: TVM (used with switched hot ballasts)
- Load Type 2–6  Fluorescent: DSI with TVM (electronic off ballast)

DALI® intensity broadcast is available with particular load types. This function is the same as DSI; the ballasts are not addressable.

- Load Type 2–7  DALI® with TVM
- Load Type 2–8  DSI Logarithmic dimming curve with TVM (used with switched hot ballasts)
- Load Type 2–9  DALI® Logarithmic dimming curve with TVM
- Load Type 2–A  10–0 V with TVM (10 V low end; 0 V high end)

Load Type Settings for Light Control Panel (LCP) Controller

On the LCP controller it will directly call out the load type by name. For further information, please refer to the LCP128™ Setup and Operation Manual.

Troubleshooting

Table 1: Address Switch Operation

<table>
<thead>
<tr>
<th>Position</th>
<th>Proper Module Output/Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Internal relay ON, no output to load/used to check for shorted output device</td>
</tr>
<tr>
<td>1–6</td>
<td>Address for normal operation</td>
</tr>
<tr>
<td>A</td>
<td>Not used — All outputs OFF (internal relay open)</td>
</tr>
<tr>
<td>B</td>
<td>RED 1 output ON Full/Use to check wiring</td>
</tr>
<tr>
<td>C</td>
<td>RED 2 output ON Full/Use to check wiring</td>
</tr>
<tr>
<td>D</td>
<td>RED 3 output ON Full/Use to check wiring</td>
</tr>
<tr>
<td>E</td>
<td>RED 4 output ON Full/Use to check wiring</td>
</tr>
<tr>
<td>F</td>
<td>All outputs ON Full</td>
</tr>
</tbody>
</table>
Table 2: Unit Diagnostic LED Status

<table>
<thead>
<tr>
<th>Unit LED Status</th>
<th>Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No power or defective module</td>
</tr>
<tr>
<td>1 blink per second “Heartbeat”</td>
<td>Normal operation</td>
</tr>
<tr>
<td>1 blink per 7 seconds “Lighthouse”</td>
<td>Not communicating with processor: open control harness; module set on invalid or diagnostic address; system not properly configured or addressed in HomeWorks® software</td>
</tr>
<tr>
<td>4 blinks; pause; repeat</td>
<td>Module in manual override</td>
</tr>
<tr>
<td>10 blinks per second “Heart attack”</td>
<td>Zone error active on one or more of the outputs (occurs with 4A modules only)</td>
</tr>
</tbody>
</table>

Table 3: Zone Diagnostic LED Status (if present)

<table>
<thead>
<tr>
<th>Zone LED Status</th>
<th>Load Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>OFF</td>
<td>Normal; Load off</td>
</tr>
<tr>
<td>Continuously On</td>
<td>ON</td>
<td>Incandescent / Electronic Dimming</td>
</tr>
<tr>
<td>1 blink per second</td>
<td>ON</td>
<td>Magnetic Dimming</td>
</tr>
</tbody>
</table>

Error Codes

1 blink; pause; repeat
- OFF: Load short circuit

2 blinks; pause; repeat
- OFF: Inductive load

3 blinks; pause; repeat
- ON Full: Shorted component

4 blinks; pause; repeat
- OFF: Overload

10 blinks per second
- OFF: Multiple errors

Error code descriptions:

2. Check software configuration. MLV load detected with ELV software setting.
3. Replace RPM. Internal device Field Effect Transistor (FET) shorted.
4. Multiple errors exist on this output. The relay has opened to protect the module and all four outputs will be off.

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