Medium Voltage Trigger Boards

Overview
The MVTB family of medium voltage trigger boards offers engineers a turnkey solution for medium voltage SCR systems requiring hard-firing dc gate drive with excellent control electronics isolation. Stringent power quality regulations frequently necessitate power conversion and control at medium voltages. Examples include sub-cycle transfer switches, motor soft-starters and MVDC power distribution associated with distributed generation. The MVTB family of boards fulfills this need, reducing design cycle time and increasing system reliability.

Features
The MVTB family incorporates several key features of particular concern with medium voltage systems:

- Fiber optic gate logic inputs provide enhanced safety, noise immunity, and electrical isolation between the trigger board and external gate logic.
- Proprietary pulse modules ensure excellent isolation between the trigger board common and the ac mains and are guaranteed for 12.0 kVac minimum corona inception voltage (for 7.2 kVac service grade).
- Hard-firing DC gate pulses with fast initial rate of rise (4 A/μs) reduce variance in turn-on time for parallel or series devices and provide immunity against gate inversion.
- The MVTB family accepts the gate pulses produced by all standard Enerpro firing boards to create a completely integrated firing package.

Applications
High isolation voltage and fast, high current gate drive makes the MVTB trigger board especially suitable for high power rectifiers, inverters and ac controllers utilizing:

- Advanced design SCR's with up to 12 kV blocking voltage per device.
- Series connected SCR's for increased voltage standoff.

Applications
Sub-Cycle AC Transfer Switches
1.2 to 12.0 kVac Motor Starters
Plasma Arc Rectifiers
Pulse Power Systems

Parallel connected SCR's for increased current capability.

Circuit Board Operation
A fiber optic receiver (FOR) converts the optical gate command signal into a voltage logic signal. This signal is a 120-degree wide burst of phase-locked, 50% duty cycle pulses operating at 384 times the mains frequency (23 kHz for 60 Hz mains).

Fiber optic transmitter (FOT) modules installed in lieu of pulse modules on Enerpro firing boards (sold separately) provide the optical gate signals. The required phase-locked gate drive pulse train is standard output on all Enerpro phase angle control firing boards.

Key Specifications:
- 4 A/μs initial gate current rate of rise (short circuit)
- 3.0 A peak initial gate current, 500 mA sustaining (short circuit)
- 30 V initial open circuit gate voltage, 15 V sustaining
- 12 kVac minimum corona inception voltage (7.2 kVac service grade)
- Gate signal readback via fiber optic connection
- Power supply fault monitoring

All circuit boards are assembled at the Enerpro plant in Goleta, California and are manufactured by a UL-approved fabricator from 0.093-inch thick FR4 fire resistant fiberglass epoxy laminate. All boards are conformal coated (MIL-1-46058, Type UR).
**Medium Voltage Trigger Board - Product Datasheet**

### Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC mains voltage</td>
<td>7.2 kVac (maximum)</td>
</tr>
<tr>
<td>Pulse transformer corona inception</td>
<td>12 kVac (minimum)</td>
</tr>
<tr>
<td>Pulse transformer corona extinction</td>
<td>11 kVac (minimum)</td>
</tr>
<tr>
<td>Pulse transformer hipot</td>
<td>25 kVDC (60 seconds, &gt; 2 µA leakage)</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>0 °C to 65 °C</td>
</tr>
<tr>
<td>Board ac supply voltage</td>
<td>28 Vac (24 Vac nominal)</td>
</tr>
</tbody>
</table>

### Electrical Characteristics

**Initial open circuit gate voltage**

- 30 Vdc peak for first 20 µs of gating

**Sustaining open circuit gate voltage**

- 15 Vdc

**Output pulse dead time**

- < 200 ns

**Initial short circuit gate current**

- 3.0 A for first 20 µs of gating

**Sustaining short circuit gate current**

- 500 mA

**Diagnostic LEDs**

- POWER ON: Indicates board power active.
- GATE ON: Indicates gate activity.
- FAULT: Indicates bias supply out of range.

### MVTB Ordering Guide

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model (Note 1)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-2</td>
<td>2 outputs, 2 inputs</td>
<td></td>
</tr>
<tr>
<td>4-1</td>
<td>4 outputs, 1-input</td>
<td></td>
</tr>
<tr>
<td>4-2</td>
<td>4-outputs, 2-inputs</td>
<td></td>
</tr>
<tr>
<td>4-4</td>
<td>4-outputs, 4-inputs</td>
<td></td>
</tr>
<tr>
<td>6-1</td>
<td>6-outputs, 1-input</td>
<td></td>
</tr>
<tr>
<td>6-2</td>
<td>6-outputs, 2-inputs</td>
<td></td>
</tr>
<tr>
<td>6-6</td>
<td>6-outputs, 6-inputs</td>
<td></td>
</tr>
<tr>
<td><strong>Interface for Gate Signal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ST</td>
<td>ST Connector for 62.5/125um</td>
<td>ST</td>
</tr>
<tr>
<td></td>
<td>Multimode (Standard)</td>
<td></td>
</tr>
<tr>
<td>VL</td>
<td>Versatile Link (VersaLink)</td>
<td>VL</td>
</tr>
<tr>
<td></td>
<td>1.0 mm plastic optical fiber</td>
<td>POF</td>
</tr>
<tr>
<td></td>
<td>(POF)</td>
<td></td>
</tr>
<tr>
<td>OP</td>
<td>Mate-n-Lok connector for</td>
<td>OP</td>
</tr>
<tr>
<td></td>
<td>opto-relay gating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(may not be available on all</td>
<td></td>
</tr>
<tr>
<td></td>
<td>models)</td>
<td></td>
</tr>
<tr>
<td><strong>Pulse Module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Physical Configuration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Front mounted pulse modules</td>
<td>F</td>
</tr>
<tr>
<td>R</td>
<td>Reverse mounted pulse modules</td>
<td>R</td>
</tr>
<tr>
<td><strong>Maximum Line-To-Line Voltage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>1.2 kVac</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>2.4 kVac</td>
<td></td>
</tr>
<tr>
<td>4.8</td>
<td>4.8 kVac</td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>7.2 kVac</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1. Custom configurations available upon request.

**Enerpro** applications engineers are available by e-mail or fax for applications assistance.

---

**Enerpro, Inc.**  
5780 Thornwood Drive  
Goleta, CA 93117 (USA)  
Telephone:  (805) 683-2114  
(800) 576-2114  
Fax: (805) 964-0798  
[info@enerpro-inc.com](mailto:info@enerpro-inc.com)  
[www.enerpro-inc.com](http://www.enerpro-inc.com)