The Bourns® 1840 Series Signal and Dataline Protectors are designed to protect sensitive electronic circuits and components from damaging surge voltages and currents. Their extremely fast response and low clamping voltages make them particularly suitable for the protection of sensitive signal and datalines associated with computer, data communication, instrumentation, broadcasting and industrial controls. They may be used directly with EIA standard interfaces RS-232, RS-422, RS-423, RS-485 and with 4-20 mA and 50 mA instrumentation loops. The Model 1840 Series Signal and Dataline Protectors are fast, rugged and capable of protecting against fast rising voltage transients as well as the severe current surges associated with lightning discharges, in each case up to rated limits.

Method of Operation
The Bourns® 1840 Series are heavy-duty, multi-staged protectors. A solid-state 3rd stage protection component intercepts the leading edge of the surge within sub-nanosecond response time. Within microseconds, a primary stage 3-electrode common chambered heavy-duty gas discharge tube capable of handling 20,000 ampere lightning currents operates and crowbars the majority of the surge energy to ground. The Model 1840 also utilizes Bourns TBU® High-Speed Protector (HSP) technology as a key 2nd stage. Any current through the protector exceeding 300 mA will cause the TBU® HSP to quickly transition into a high impedance state, thus isolating any harmful voltage and/or current from damaging the protected equipment. The gas discharge tube protector remains in the crowbar state until the surge has passed and line voltages return to safe levels. The TBU® HSP then automatically restores the line to normal operation by resetting to a low impedance state. There is no need for resetting a breaker or replacing a fuse to address a transient surge event.

Application
Protectors are generally placed at each end of a signal, dataline or current loop. In the case of daisy-chain configurations (such as RS-485), protectors are placed at each node.

Related Bourns® Protectors
For outdoor applications with 1/2-inch NPT ports (such as field-mounted 4-20 mA transmitters), please refer to the Bourns® Model 1669 Series Protector. In this application, the mixed use of a Model 1840 Series Protector at the controller and a Model 1669 Series Protector at the field is recommended.

Characteristics @ 25 °C

<table>
<thead>
<tr>
<th>Standard Model</th>
<th>1840-05</th>
<th>1840-12</th>
<th>1840-24 (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Operating Voltage (L-L) and (L-G)</td>
<td>6 Vdc</td>
<td>13 Vdc</td>
<td>26 Vdc</td>
</tr>
<tr>
<td>Maximum Breakdown Voltage</td>
<td>8 Vdc</td>
<td>15 Vdc</td>
<td>30 Vdc</td>
</tr>
</tbody>
</table>

(1) Systems operating at 18 V or above and experiencing current above 500 mA (including short-term inrush current at start-up) may latch the overcurrent protection feature in blocking mode. This will prevent system operation until the power is removed.

Surge Life
- 100 Amps 10 x 1000 μsec: 300 operations min.
- 100 Amps 10 x 1000 μsec: 300 operations min.
- 500 Amps 10 x 1000 μsec: 50 operations min.
- 1000 Amps 10 x 1000 μsec: 10 operations min.
- 3 kA, 6 kV / 8 x 20 μsec Combination Wave: 100 operations min.
- 10 kA / 8 x 20 μsec: 10 operations min.
- 20 kA / 8 x 20 μsec: 5 operations min.

Breakdown Voltage
- See table*
- ESD @ 8 kV: 10 operations min.
- Shield ARC Protection 6 kV / 3 kA: 5 operations min.
- Capacitance @ 1 MHz: L/G: 45 pF, L/L: 35 pF
- Series Resistance: 12 Ω typical
- Maximum Load Continuous Current: 220 mA
- DC Leakage Current at Rated L/G Voltage: < 10 μA
- Blocking Current: 300 mA; typical 450 mA
- Signal/Data Attenuation: 3 db @ 30 MHz with 50 Ω termination
- Operating Temperature: -40 °C to +80 °C
- Response Time: < 1 μsec
- Wire Size: 20 AWG

* Custom voltages are available upon request. Please visit www.bourns.com/docs/Product-Datasheets/SMBJ.pdf for custom allowable voltages. Lead-time may be extended for some custom voltages.

WARNING
Cancer and Reproductive Harm
www.P65Warnings.ca.gov

Specifications are subject to change without notice. Users should verify actual device performance in their specific applications. The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.
Typical Connections

Unbalanced Interface, Two Individual Circuits, Such as RS-232

Balanced or Differential Interface, Such as RS-422

Current Loop, 4-20 mA

Grounding: The 8-32 mounting screw and attached clamp, and hence the DIN-1 (TS-32) or DIN-3 (TS-35) rail, serve as the protector ground. The rail (or 8-32 mounting screw if the clamp is not used) should be connected to the facility ground via an AWG #6 or larger copper wire. This wire should be as short and straight as possible. Single point grounding will provide better protection and will permit the protector to be located a distance from the equipment.

How To Order

1840 - nn - An

Model No. Designator

Voltage
05 = 5 Vdc
12 = 12 Vdc
24 = 24 Vdc

Clamp
A1 = DIN-1
A3 = DIN-3

How To Order (Clamp)

Add -A1 to base model number for DIN-1 clamp.
(Example: 1840-12-A1)

Add -A3 to base model number for DIN-3 clamp.
(Example: 1840-12-A3)

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