

Features

- Low peak clamping voltage even during severe current surges
- Ability to repeatedly protect against high surge currents up to rated limits
- Convenient mounting and grounding to any flat surface or to DIN-1 (TS-32) or DIN-3 (TS-35) rail
- Cable shields are passed through and may be either grounded or arc-protected to ground
- Vibration-resistant screw-type clamp terminals
- Flame-resistant epoxy-filled housing

1840 Series – Signal and Dataline Protector

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

Standard Model	1840-05	1840-12	1840-24 (1)
Maximum Operating Voltage	6 V _{dc}	13 V _{dc}	26 V _{dc}
Maximum Breakdown Voltage (L-L) and (L-G)	8 V _{dc}	15 V _{dc}	30 V _{dc}

(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 μ sec	300 operations min.
100 Amps 10 x 1000 μ sec	300 operations min.
500 Amps 10 x 1000 μ sec	50 operations min.
1000 Amps 10 x 1000 μ sec	10 operations min.
3 kA, 6 kV / 8 x 20 μ sec Combination Wave	100 operations min.
10 kA / 8 x 20 μ sec	10 operations min.
20 kA / 8 x 20 μ sec	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 μ A
Blocking Current.....	300 mA; typical 450 mA
Signal/Data Attenuation	3 db @ 30 MHz with 50 Ω termination
Operating Temperature.....	-40 °C to +60 °C
Response Time.....	< 1 μ sec
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.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

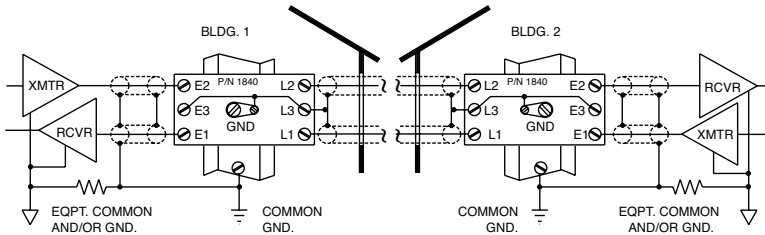
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

1840 Series – Signal and Dataline Protector

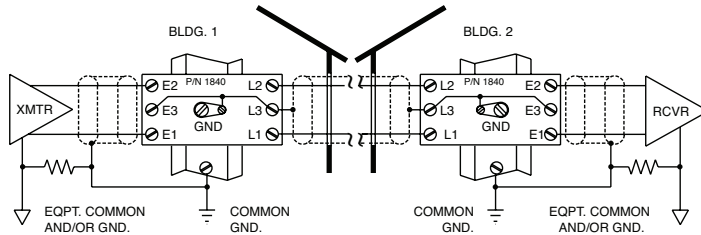
BOURNS®

Typical Connections

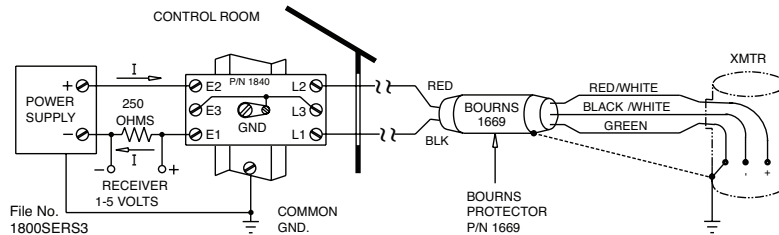
Unbalanced Interface, Two Individual Circuits, Such as RS-232



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

Model No. Designator **1840 - nn - An**

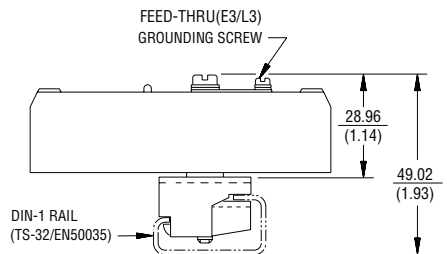
Voltage _____
 05 = 5 V_{dc}
 12 = 12 V_{dc}
 24 = 24 V_{dc}

Clamp _____
 A1 = DIN-1
 A3 = DIN-3

How To Order (Clamp)

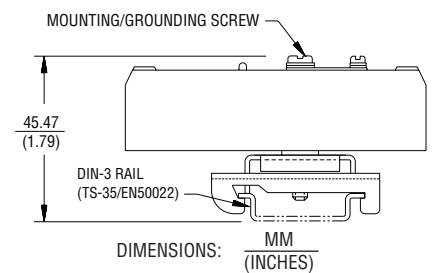
Add -A1 to base model number for DIN-1 clamp.

(Example: 1840-12-A1)

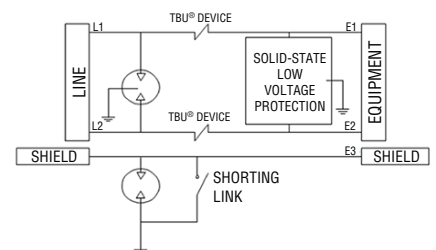


Add -A3 to base model number for DIN-3 clamp.

(Example: 1840-12-A3)



Circuit Diagram



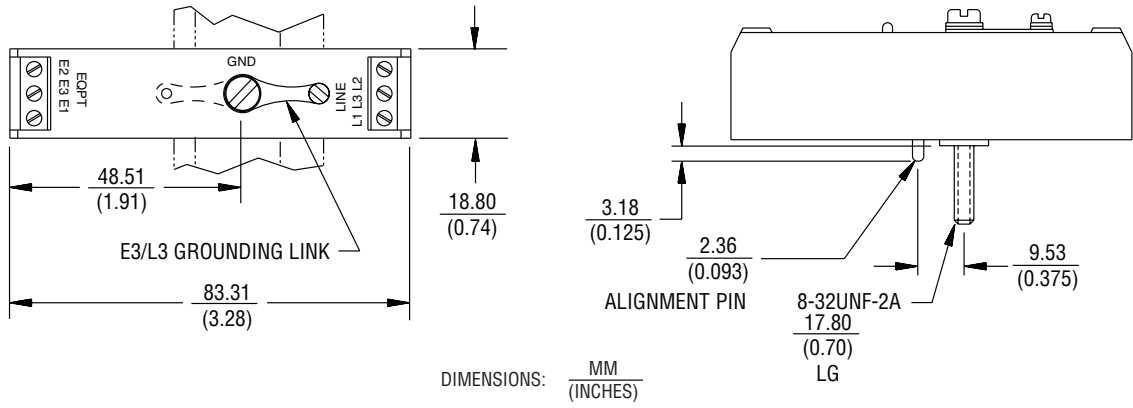
Specifications are subject to change without notice.

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.

1840 Series – Signal and Dataline Protector

Product Dimensions



BOURNS®

Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

EMEA: Tel: +36 88 520 390 • Email: eurocus@bourns.com

The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com

www.bourns.com

REV. C 07/18

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.

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, “Bourns”).

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain types of applications are based on Bourns’ knowledge of typical requirements in generic applications. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user’s application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Users should always verify the actual performance of the Bourns® product in their specific devices and applications, and make their own independent judgments regarding the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., ISO/TS 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification. Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in nuclear, lifesaving, life-critical or life-sustaining applications, nor in any other applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage. Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any Bourns® products in such unauthorized applications might not be safe and thus is at the user’s sole risk. Life-critical applications include devices identified by the U.S. Food and Drug Administration as Class III devices and generally equivalent classifications outside of the United States.

Bourns expressly identifies those Bourns® standard products that are suitable for use in automotive applications on such products’ data sheets in the section entitled “Applications.” Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard products in an automotive application might not be safe and thus is not recommended, authorized or intended and is at the user’s sole risk. If Bourns expressly identifies a sub-category of automotive application in the data sheet for its standard products (such as infotainment or lighting), such identification means that Bourns has reviewed its standard product and has determined that if such Bourns® standard product is considered for potential use in automotive applications, it should only be used in such sub-category of automotive applications. Any reference to Bourns® standard product in the data sheet as compliant with the AEC-Q standard or “automotive grade” does not by itself mean that Bourns has approved such product for use in an automotive application. Bourns® standard products are not tested to comply with United States Federal Aviation Administration standards generally or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aircraft or space applications.

Bourns expressly identifies Bourns® standard products that are suitable for use in aircraft or space applications on such products’ data sheets in the section entitled “Applications.” Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard product in an aircraft or space application might not be safe and thus is not recommended, authorized or intended and is at the user’s sole risk.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

Users shall not sell, transfer, export or re-export any Bourns® products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology in any facility which engages in activities relating to such devices. The foregoing restrictions apply to all uses and applications that violate national or international prohibitions, including embargos or international regulations. Further, Bourns® products and Bourns technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products may not, without prior authorization from Bourns and/or the U.S. Government, be resold, transferred, or re-exported to any party not eligible to receive U.S. commodities, software, and technical data.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties, including implied warranties of fitness for particular purpose, non-infringement and merchantability.

For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:

Web Page: <http://www.bourns.com/legal/disclaimers-terms-and-policies>

PDF: <http://www.bourns.com/docs/Legal/disclaimer.pdf>