



Features

- Low peak clamping voltage even during severe current surges
- Ability to repeatedly protect against surge currents in excess of 10,000 amperes
- 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 not grounded at the protector
- Vibration-proof screw-type clamp terminals
- Flame-resistant epoxy-filled housing

1800 Series – Signal and Dataline Protector

Bourns 1800 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 signal and data lines 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 20 mA and 50 mA instrumentation loops. Model 1800 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.

Method of Operation

Bourns 1800 Series are heavy-duty, multi-staged protectors. A solid-state section intercepts the leading edge of the surge with sub-nanosecond response time. Within microseconds a 3-pole common chambered Gas Tube capable of handling 200,000 ampere lightning currents operates and crowbars the surge to ground. The protector remains in the crowbar state until the surge has passed and line voltages return to safe levels, then automatically restores the line to normal operation. There is no need for resetting a breaker or replacing a fuse.

Application

Protectors are generally placed at each end of a signal or data line or current loop. In the case of daisy-chain configurations (such as RS-485), protectors are placed at each node. 1820 models provide both line-to-ground and line-to-line protection and are designed to use on differential signals (such as RS-422 or RS-485) and 4-20 mA current loops. 1810 models provide line-to-ground protection for two separate circuits and are designed for use on ground referenced signals (such as RS-232) where the return wire is grounded at the protector. The 1811 and 1821 models provide the same protection modes for high frequency applications.

Related Bourns Protectors

For outdoor applications with 1/2 inch NPT ports (such as field-mounted 4-20 mA transmitters), please refer to Bourns 1669 Series Protector. In this application, the mixed use of an 1800 Series Protector at the controller and a 1669 Series Protector at the field is recommended.

Characteristics @ 25 °C

| | | |
|--|---------------------------------------|------------------------------------|
| Surge Life | >100 operations with 200 Amps | 10 x 1000 μ sec |
| | >10 operations with 10,000 Amps | 8 x 20 μ sec |
| DC Leakage Current at Rated L/G Voltage | | >10 μ Amps |
| Signal/Data Attenuation at Maximum Data Rate | | 3 db with 600 Ω termination |
| Operating Temperature | | -40 °C to + 60 °C |
| Response Time | | 50 pico-seconds |
| Wire Size | | 22-14 AWG |

| INTERFACE OPERATING CHARACTERISTICS | | | BASE MODEL NUMBER (see below for Clamp designation) | PROTECTIVE CHARACTERISTICS Peak Clamping Voltages | | | | LOAD CURRENT | TYPICAL CAPACITANCE | | SERIES RESISTANCE |
|-------------------------------------|---------------|-------|--|--|-------------|---|-------------|--------------|---------------------|------|-------------------|
| Peak Signal Voltage | Max Data Rate | | | @ 5000 Amps, 8x20 μ sec Surge and Voltage Rate-of-Rise of 100 kV / μ sec | | @ 1000 Amps, 8x20 μ sec Surge and Voltage Rate-of-Rise of 500 V / μ sec | | | L/G | L/L | |
| L/L (Volts) | L/G (Volts) | (MHz) | | L/L (Volts) | L/G (Volts) | L/L (Volts) | L/G (Volts) | (mA) | (pF) | (pF) | (Ohms) |
| 20 | 10 | 10 | 1810-10-XX | 50 | 25 | 42 | 21 | 220 | 2200 | 1200 | 10 |
| 10 | 10 | 4 | 1820-10-XX | 25 | 25 | 21 | 21 | 220 | 3300 | 3300 | 10 |
| 20 | 10 | 50 | 1811-10-XX | 60 | 30 | 52 | 26 | 350 | 45 | 45 | 10 |
| 10 | 10 | 50 | 1821-10-XX | 30 | 30 | 26 | 26 | 350 | 65 | 65 | 10 |
| 30 | 15 | 8 | 1810-15-XX | 70 | 35 | 56 | 28 | 180 | 1500 | 750 | 15 |
| 15 | 15 | 3 | 1820-15-XX | 35 | 35 | 28 | 28 | 180 | 2300 | 2300 | 15 |
| 30 | 15 | 45 | 1811-15-XX | 80 | 40 | 64 | 32 | 300 | 45 | 45 | 15 |
| 15 | 15 | 45 | 1821-15-XX | 40 | 40 | 64 | 32 | 300 | 65 | 65 | 15 |
| 56 | 28 | 9 | 1810-28-XX | 110 | 55 | 90 | 45 | 150 | 1100 | 600 | 22 |
| 28 | 28 | 4 | 1820-28-XX | 55 | 55 | 45 | 45 | 150 | 1800 | 1800 | 22 |
| 56 | 28 | 40 | 1811-28-XX | 120 | 60 | 45 | 45 | 250 | 45 | 45 | 22 |
| 28 | 28 | 40 | 1821-28-XX | 60 | 60 | 45 | 45 | 250 | 65 | 65 | 22 |
| 100 | 50 | 10 | 1810-50-XX | 178 | 89 | 156 | 89 | 100 | 500 | 300 | 51 |
| 50 | 50 | 4 | 1820-50-XX | 89 | 89 | 45 | 45 | 100 | 800 | 800 | 51 |

REV. E

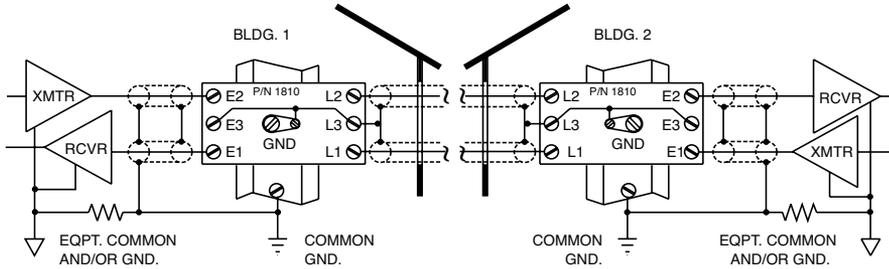
Specifications are subject to change without notice.

1800 Series – Signal and Dataline Protector

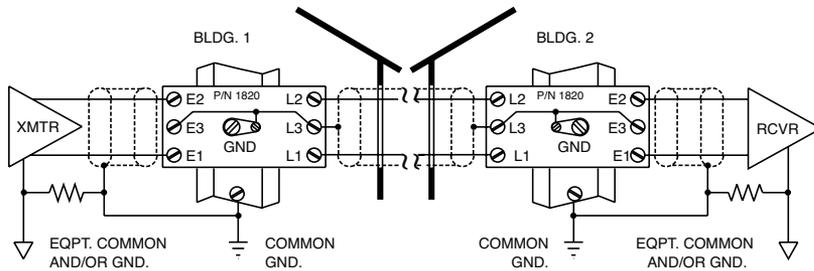
BOURNS®

Typical Connections

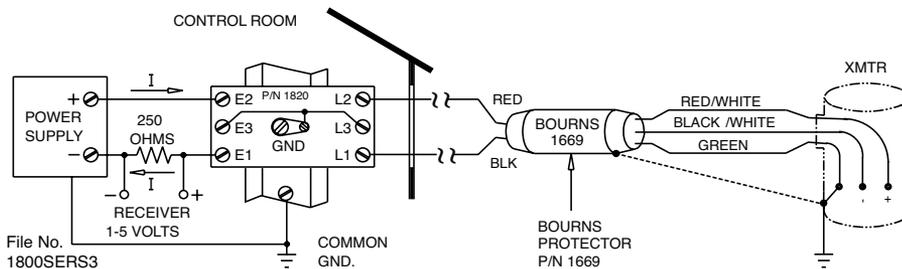
Unbalanced Interface, Two Individual Circuits, Such as RS-233



Balanced or Differential Interface, Such as RS-422

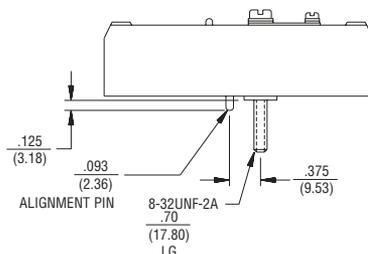
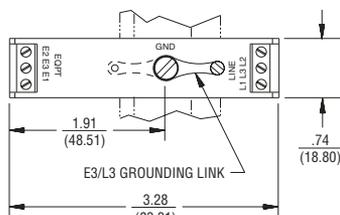


Current Loop, 4-20 mA



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.

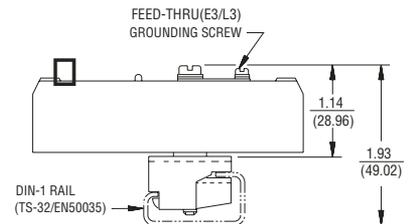
Product Dimensions



How To Order (Clamp)

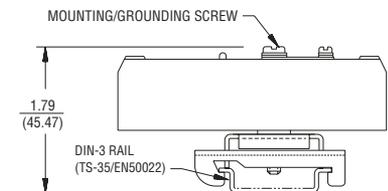
Add -A1 to base model number for DIN-1 clamp.

(Example: 1810-10-A1)



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

(Example: 1810-10-A3)



DIMENSIONS: $\frac{\text{MILLIMETERS}}{\text{(INCHES)}}$



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