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PRODUCT SPECIFICATION

TR Series 500A Battery Disconnect Switch

Rev. 1.2

March 21, 2013



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Revision History

Revision	Date	Description of Change
1.0	10/20/11	Initial Release
1.2	3/21/2013	Final Review and Update

A – Product Requirements, Performance Requirements, & Quality Objectives

Product Variations

Part Number	Description
880175	TR Series Master Disconnect Switch, Dual Pole

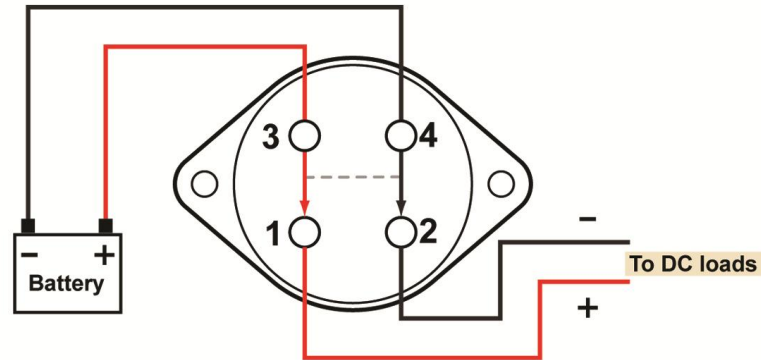
Product Description

This 500 A Dual Pole Master Battery Disconnect Switch is ideal for cutting all battery power from the vehicle electrical system or for other applications needing switching of two circuits or switching of both positive and negative.

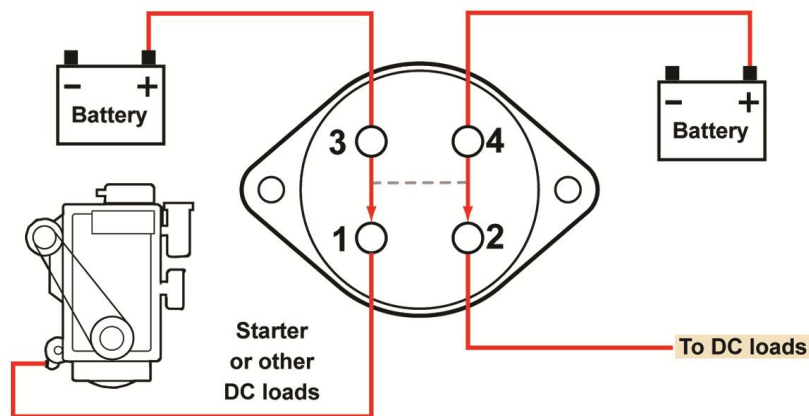
- Can be used to switch two vehicle voltage circuits simultaneously (24V and 12V)
- Direct lockout/tag out capability in the on or off position (padlock or hasp)
- With an ingress protection to IP67 and IP69K, this switch can mounted in exposed locations on the vehicle
- Drop in replacement to existing competitive Master Disconnect Switches
- Ignition protected to SAE J1171 and ISO 8846 for installation in a battery box or on vehicles carrying hazardous loads.

Application Schematic

The TR Dual Pole Switch connects and disconnects a battery or multiple batteries, in either the positive line or the negative line (as shown below).



**Master Battery Disconnect Dual Pole
Switching One Battery, Positive and Negative
(shown in ON state)**



**Master Battery Disconnect Dual Pole
Switching Two Batteries
(shown in ON state)**

Module Operation

This mechanical disconnect switch is locally operated by turning a knob. Turning the knob/key to the right 90° will turn ON the switch, turning the knob/key to the left 90° will turn OFF the switch. Turning the knob will simultaneously turn on or off both poles of the switch.

The TR series disconnect switch has a flag type actuator similar to competitive solutions. The flag is pressed into the assembly at product installation and is removable with significant effort.

Unit Connections

High power connections are made via ring terminals on cables to the device's terminal studs. Markings are adjacent to terminal studs for circuit "1," "2," "3," and "4."

The contact pad of the terminal stud matches the existing competitive solution terminal studs and is available in M12, and includes the mating nut hardware. A serrated hex flange nut is included in the standard offering. Alternative studs sizes available, please inquire with Littelfuse.

Local & Remote Indicators

The switch provides local indication of switch state through the knob position and an associated marking on the product to indicate what switch state corresponds to the particular knob position.

Delivery Requirements

Bulk-pack product in standard pack quantities will be the normal delivery method, less than bulk pack quantities will be shipped in non-standard packages and will result in increased part pricing.

Post-Delivery Requirements

These products will be warrantied from manufacturing or design defect for 2 years from date of purchase unless other provisions are agreed to by Littelfuse and its customer. Misuse or improper installation of product will not be warrantied.

Product Identification and Marking

Product is labeled or otherwise marked with the serial number and company logo. See final outline drawing for locations and definitions of final marking.

Traceability Requirements

All products will include a label with a serial number after final assembly and functional test.

Packaging Requirements

Package contains 12 units per box.

Targets for Life, Reliability, Durability

10 years, 1,000,000 miles

Maintainability Requirements

The product is designed to accept regular high pressure, high temperature pressure washing (IP69K) without collecting water inside or electrically shorting. No maintenance of the product is required during its service life. Regular inspection of terminal nut torque is recommended to ensure optimal system up-time.

Electrical Description

The switches employ 2 sets of high power terminals with threads made of a copper alloy. A movable copper bus bar internal to the device acts to connect and disconnect with the two fixed contacts per pole, providing double electrical breaks.

Mechanical Specifications (TR Series)

Parameter	Value
Recommended Cable Terminal Nut Torque	20 N-m
Maximum Cable Terminal Nut Torque	30 N-m
Overall Product Size (see outline drawings)	N/A
Mounting Hole Pattern (see outline drawings)	N/A
Mounting Hardware (see outline drawings)	N/A
Recommended Mounting Bolt Torque	15 N-m
Maximum Mounting Bolt Torque	20 N-m
High-Amp Terminal Hardware	M12 Standard

Material Specifications

Parameter	Value
Base, TR Series	25% GF Nylon 6/6
Back Plate	25% GF Nylon 6/6
Internal / External Electrical Conductors	C11000 Oxygen Free ETP Copper 99% IACS, Bright Tin Plate
Base/Top Seal	Molded Silicone
Hardware Fasteners (Nuts, Studs, Screws, etc.)	M12 x 1.5 Stainless Steel for Use M19 Sockets
Internal Electrical Power Contacts	Copper
Product Labels	Thermal Metallic

Electrical Environmental Specifications

Parameter	Standard(s) Met
Steady State - Normal Operation	SAE J1455, Sec 4.11.1
Steady State - Reverse Polarity -24V	SAE J1455, Sec 4.11.1
Steady State - Jump Start +24V	SAE J1455, Sec 4.11.1
Steady State - Cold Cranking 0-6V	SAE J1455, Sec 4.11.1
Steady State - Series Charging +48V	SAE J1455, Sec 4.11.1
Transients: Load Dump	SAE J1455, Sec 4.11.2
Transients: +600V Inductive Sw	SAE J1455, Sec 4.11.2
Transients: -600V Inductive Sw	SAE J1455, Sec 4.11.2
Transients: +300V Mutual Coupling	SAE J1455, Sec 4.11.2
Transients: -300V Mutual Coupling ()	SAE J1455, Sec 4.11.2
Electrostatic Discharge	SAE J1455, Sec 4.11.2.2.5.1, SAE J1113-13
Short to Gnd on all Ctrl Lines	Pass
Short to Vcc on all Ctrl Lines	Pass
EMI Susceptibility	SAE J1812, J1113-21
EMI Emissions	SAE J1113-41

Environmental Specifications

Parameter (Reference Standards)	Value
Temperature, Operational (SAE J1455, Sec 4.1.3.1)	-50 C to 85 C
Temperature, Non-Operational (SAE J1455, Sec 4.1.3.1)	-55 C to 105 C
Temperature Shock (SAE J1455, Sec 4.1.3.2)	-50 C to 85 C
Humidity Cycle (SAE J1455, Sec 4.2.3, Fig 4a)	0 – 95% RH
Dust Bombardment (SAE J1455, Sec 4.7.3)	Pass
Salt Spray (SAE J1455, Sec 4.3)	1,000 Hours
Operational Shock - Operational (MIL-STD-202-F, Method 213B, Condition J)	30 G's
Handling Shock – (SAE J1455, Sec 4.10.3.1)	See Spec
Transit Drop (SAE J1455, Sec 4.10.3.2.2)	See Spec
Operational Vibration, 3 Axis, Power Density Level of 0.2535 G ² /Hz @ 5-100 Hz, 3db per octave roll-off to 500 Hz	8 G's
Steam Cleaning & Pressure Wash (SAE J1455, Sec 4.5)	Pass
Minimum Insulation Resistance	100 M-Ohm
Minimum Insulation Resistance after Live Switching Endurance or Full Environmental Testing	50 M-Ohm
Dielectric Withstand Voltage	1200 Vac / 2 min
Max Contact Voltage Drop (Initial)	150 mV
Max Contact Voltage Drop (after life testing)	175 mV
Ingress Protection (DIN 40050-9)	IP 67 & IP69K
Chemicals and Oils Withstand, Immersion and Splash (SAE J1455, Sec 4.4, all listed elements)	Pass
UV Exposure (ASTM G155)	50 days

Electrical Environmental Specifications

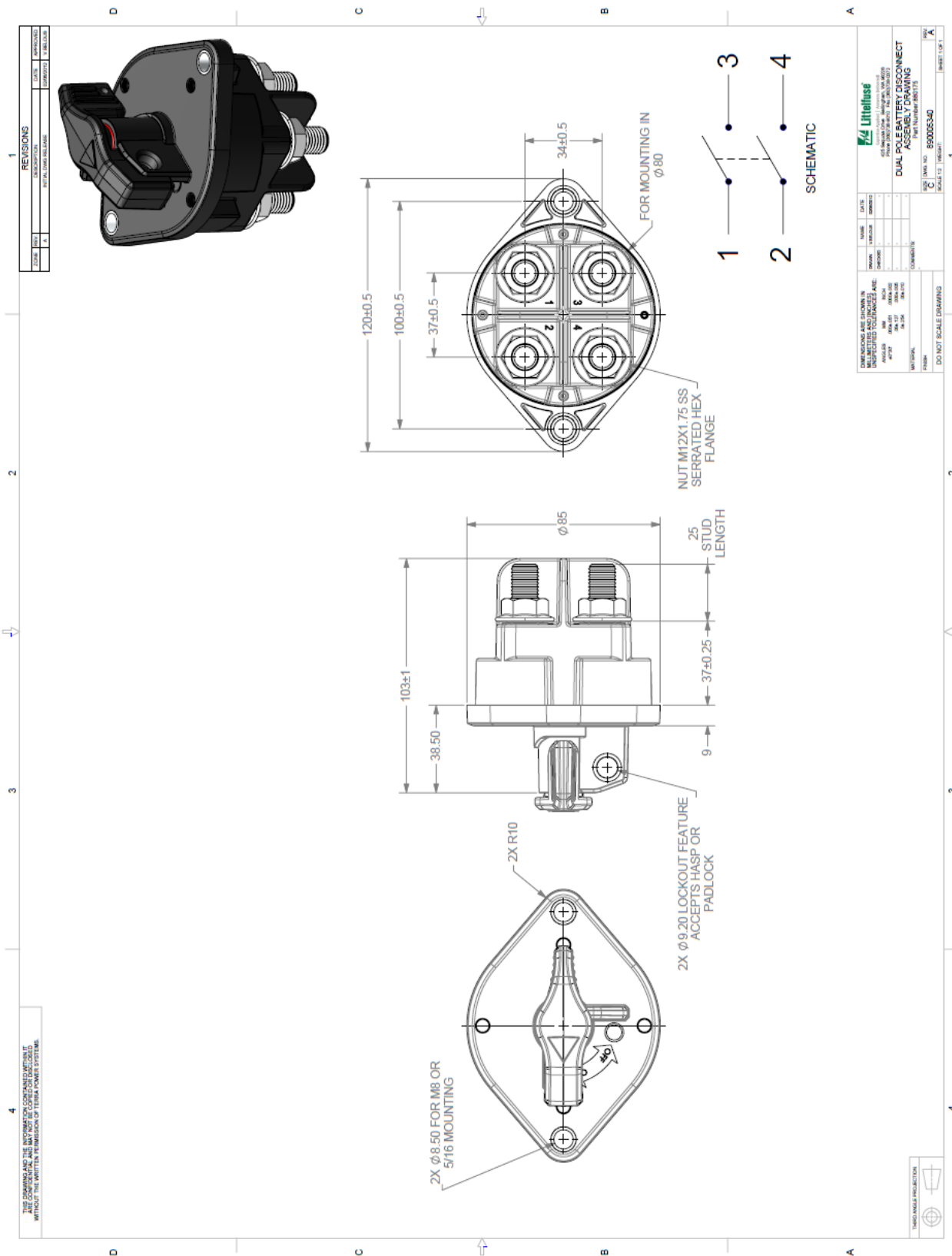
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Transients: +600V Inductive Sw	SAE J1455, Sec 4.11.2
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Transients: +300V Mutual Coupling	SAE J1455, Sec 4.11.2
Transients: -300V Mutual Coupling ()	SAE J1455, Sec 4.11.2

Electrical Environmental Specifications (cont'd)

Electrostatic Discharge	SAE J1455, Sec 4.11.2.2.5.1, SAE J1113-13
Short to Gnd on all Ctrl Lines	Pass
Short to Vcc on all Ctrl Lines	Pass
EMI Susceptibility	SAE J1812, J1113-21
EMI Emissions	SAE J1113-41

Parameter	Conditions	Min	Max
Supply Voltage		-	48V DC
Mechanical Operations		10,000	-
Dielectric Breakdown Withstand	2 minutes	-	1100 VAC
Emergency break current	10 cycles	-	1500 A
Storage temperature		-55	105 °C
Maximum Continuous Current, Per Pole	4/0 input and 4/0 output cables	-	350 A
	2x 4/0 input and 2x 4/0 output cables	-	500 A
	Min. 250 mm wire section	-	500 A
Maximum Starting Current (30 Sec), Per Pole	4/0 input and 4/0 output Cables	-	1,750 A
	2x 4/0 input and 2x 4/0 output Cables	-	2,250 A
Maximum Inrush Current (240 sec), Per Pole	Min. 250 mm wire section	-	1500 A
Maximum Inrush Current (90 sec), Per Pole	Min. 250 mm wire section	-	2000 A
Maximum Inrush Current (10 sec), Per Pole	Min. 250 mm wire section	-	2500 A
Maximum Inrush Current (1 Sec), Per Pole	Min. 250 mm wire section	-	3,000 A

Module Outline Drawing



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