

# POWERSWITCH

**A NMC AFFILIATE**

**Modern Rapid Transit Systems Require  
Durable, Up-to-Date, Interchangeable  
Traction Power Disconnect Switches.  
The Kind Made At **NMC-POWERSWITCH****



**TYPICAL POWERSWITCH FIBERGLASS ENCLOSED DISCONNECT  
SWITCHES CONNECTING CABLES TO OVERHEAD CONTACT  
SYSTEM SUPPLYING TRACTION POWER TO THIS MODERN TRAIN.  
EACH ENCLOSURE HOUSES TWO 2000 AMP, 1000 VDC FEEDER  
SWITCHES AND ONE 2000 AMP TIE SWITCH.**

**POWERSWITCH, Inc.**

815 E. CHERRY ST. • TROY, MO. 63379 • 1-800-526-6740

[WWW.NORMANDYMACHINE.COM](http://WWW.NORMANDYMACHINE.COM)



[30A FUSIBLE NO-LOAD BREAK SWITCH](#)



[200A NO-LOAD BREAK SWITCH](#)



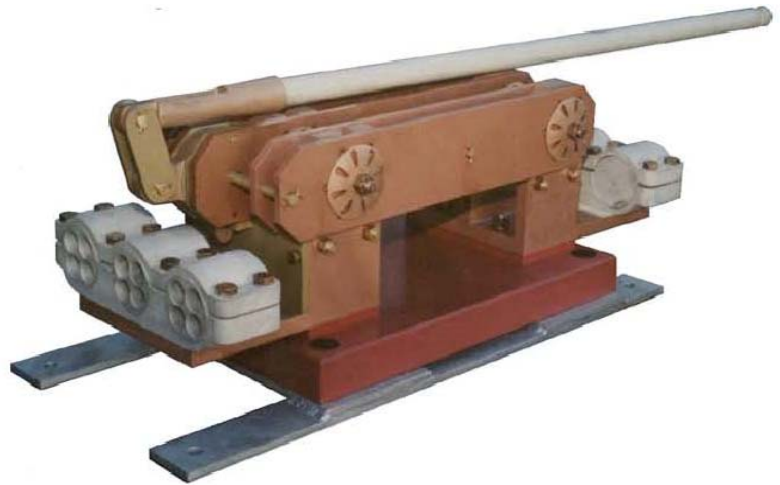
[35A LOAD BREAK SWITCH](#)

At our Modern Factory we integrate quality materials with our experience and know how to produce durable switches like these 1000 volt DC fusible and non-fusible disconnects.

---

**POWERSWITCH, INC** was established by Normandy Machine Co., **NMC**

to manufacture high quality manually and motor operated DC Disconnect Switches, Fiberglass Enclosures, and related 1000 VDC components for Transit Power distribution systems. For more than 60 years, **NMC** has been a trusted supplier to the Electric Power Distribution Industry serving most Transformer Manufacturers nearly all U.S. Electric Utilities and a score of large Industrial Plants. **NMC** repairs and manufactures parts for power transformers and circuit breakers, including bushings, tap changers, and switchgear.



**NMC's** long term experience as a manufacturer of AC Transformer and Switchgear Parts assures our ability to manufacture the durable DC Switches required for dependable transit power distribution systems. Materials, production skills, and facilities needed to manufacture components for both product lines are the same.

Widespread acceptance of our Disconnect Switches and repeat orders from previous users assures our reputation for fast response, economical solutions, design flexibility, and consistent high quality.

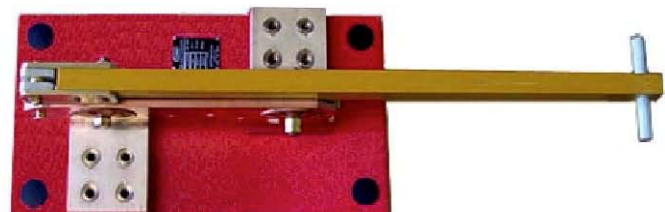
**NMC-POWERSWITCH** can meet your new or replacement DC disconnects switch needs.

Call Toll-free 1-800-526-6740 or e-mail [pssales@normandymachine.com](mailto:pssales@normandymachine.com)

---



[1200 A 1000 VDC SWITCH](#)



[2000 A 1000 VDC SWITCH](#)

Tests prove that the double blade knife switch with bolted high pressure silver contacts like the above have lower temperature rise and are easier to open after years of operation.

---

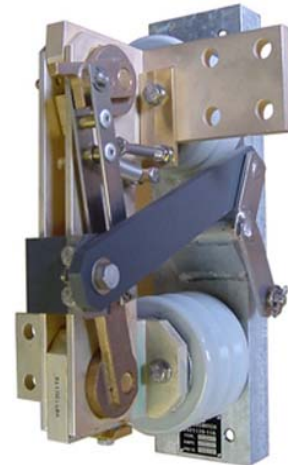
# 600-1000 VOLT DC TRACTION POWER DISCONNECTS



1000 AMP 1000 VDC DISCONNECT  
FOR ENCLOSED EXTERNAL HANDLE  
OR HOOKSTICK OPERATION



200 AMP 1000 VDC  
FUSED DISCONNECT



1200 AMP 1000 VDC REMOTE  
HANDLE OPERATED DISCONNECT  
FOR POLE MOUNTING



4500 AMP 1000 VDC TRACTION POWER  
DISCONNECT WITH PULL STICK HANDLE  
FOR HORIZONTAL TRACKSIDE  
MOUNTING



600 AMP 1000 VDC DISCONNECT WITH  
AUXILIARY BLADE TO GROUND LOAD  
TERMINAL IN THE OPEN POSITION FOR  
ENCLOSED EXTERNAL HANDLE OR  
HOOKSTICK OPERATION



1200 AMP, 750 VDC, SPDT  
BAT HANDLE OPERATED TRACTION POWER  
DISCONNECT



4000 AMP 1000 VDC TRACTION POWER  
DISCONNECT WITH WAGON HANDLE FOR  
ENCLOSED VERTICAL MOUNTING

**POWERSWITCH** Craftsmen combine many years experience machining and fabrication non-ferrous metals (bus-bar copper, silver, brass, bronze, aluminum and insulating materials, (porcelain, fiberglass, plastic) together with the most modern machinery to make the quality assemblies pictured here and on the following pages

**POWERSWITCH, INC.**

815 E. CHERRY ST.

TROY, MO 63379

PH 1-800-526-6740

FAX 636-528-8937

EMAIL: [pssales@normandymachine.com](mailto:pssales@normandymachine.com)

# CUSTOM MADE FIBERGLASS ENCLOSURES



22"H X 10"W X 12"D  
ENCLOSURE FOR EXTERNALLY  
OPERATED WALL OR POLE  
MOUNTED SWITCH



CUSTOM MADE DOUBLE DOOR  
ENCLOSURE WITH SPECIAL MOUNTING  
FLANGE PER CTA SPECIFICATIONS



CUSTOM MADE ENCLOSURE WITH  
3" WIDE MOUNTING FLANGE PER  
CTA SPECIFICATIONS



SPECIAL SWITCHBOX FOR  
POLE OR HORIZONTAL  
TRACK-SIDE MOUNTED  
FUSED DISCONNECT



CUSTOM MADE ENCLOSURE FOR TRACK SIDE  
MOUNTED TRACTION POWER DISCONNECTS PER  
LIRR SPECIFICATIONS



CUSTOM MADE SINGLE  
DOOR ENCLOSURE PER  
MBTA SPECIFICATIONS

**POWERSWITCH** Fiberglass Enclosures are non-conductive, fire retardant, UV resistant, and are fabricated to meet customer specifications, all meet or exceed type NEMA 3R classification. They are available in your choice of colors with single or double doors and are supplied separately or as part of a complete **POWERSWITCH** enclosed switch assembly

## **POWERSWITCH, INC.**

815 E. CHERRY ST.

TROY, MO 63379

PH 1-800-526-6740

FAX 636-528-8937

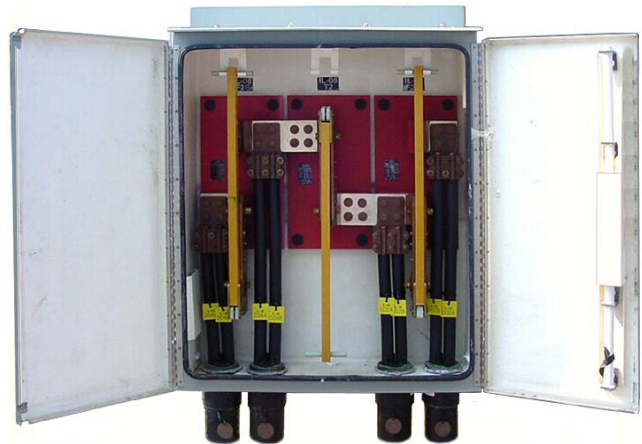
EMAIL: [pssales@normandymachine.com](mailto:pssales@normandymachine.com)



# FIBERGLASS ENCLOSED TRACTION POWER DISCONNECT



1200 AMP 750 VDC TRACTION POWER DISCONNECTS WITH SUPPLY BUS FOR CONNECTION TO ADJACENT SWITCH BOX



THREE 2000 AMP 1000 VDC WAGON HANDLE OPERATED TRACTION POWER DISCONNECTS. OUTSIDE SWITCHES FEED TWO SEPARATE TRACK SECTIONS. MIDDLE SWITCH TIES THE TWO SECTIONS ALLOWING SUBSTATION ISOLATION WITHOUT STOPPING TRAINS.



TWO 4000 AMP 1000 VDC PULL STICK OPERATED TRACTION POWER DISCONNECT WITH COMMON FEED



4500 AMP 750 VOLT PULLSTICK OPERATED TRACTION POWER DISCONNECT FOR HORIZONTAL TRACK SIDE MOUNTING

**POWERSWITCH** Fiberglass Enclosed 600-1000 volt DC Traction Power Disconnect Switches are made in accordance with specific contract specifications. Shown here are some examples of assemblies supplied for new and revamped facilities at MBTA, ST. LOUIS METROLINK, LIRR, SALT LAKE CITY, AND MINNESOTA HIAWATHA LRT

**POWERSWITCH, INC.**

815 E. CHERRY ST.

TROY, MO 63379

PH 1-800-526-6740

FAX 636-528-8937

EMAIL: [pssales@normandymachine.com](mailto:pssales@normandymachine.com)

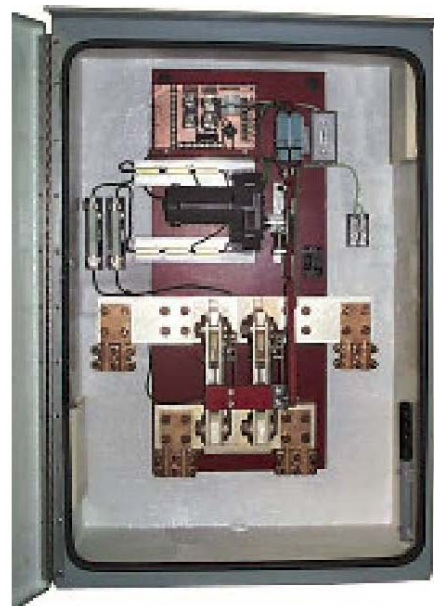
# MOTOR OPERATED TRACTION POWER DISCONNECTS



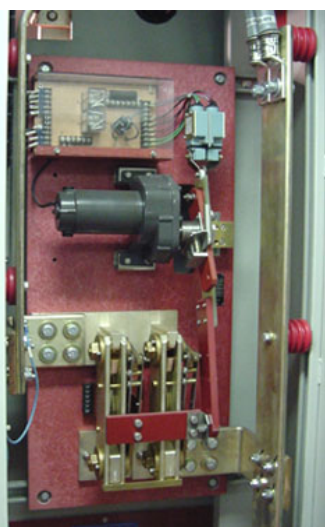
4000 AMP 1000 VDC MOTOR OPERATED TRACTION POWER DISCONNECT FOR MOUNTING IN POWERSWITCH ENCLOSURE OR CUSTOMERS SWITCHGEAR



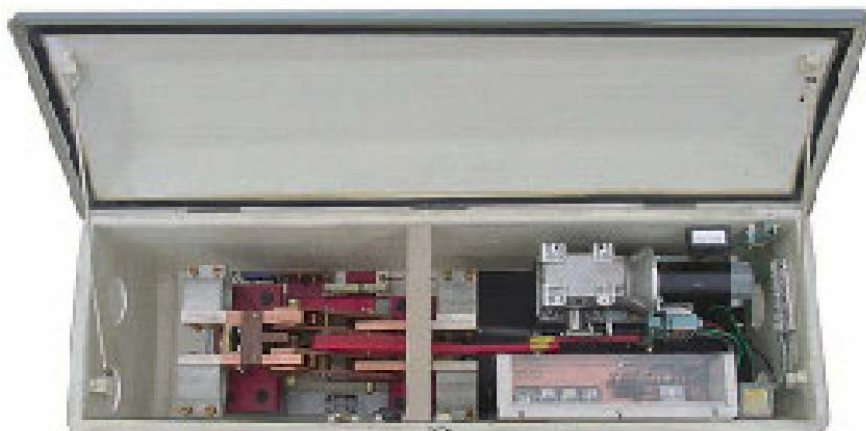
2000 AMP 1000 VDC MOTOR OPERATED TRACTION POWER DISCONNECT FOR MOUNTING IN POWERSWITCH ENCLOSURE OR CUSTOMERS SWITCHGEAR



4000 AMP 1000 VDC MOTOR OPERATED TRACTION POWER DISCONNECT FOR STANCHION OR WALL MOUNTING



4000 AMP 1000 VDC MOTOR OPERATED TRACTION POWER DISCONNECT AS MOUNTED IN CUSTOMER'S SWITCHGEAR



4500 AMP 750 VOLT DC MOTOR OPERATED TRACTION POWER DISCONNECT FOR HORIZONTAL TRACK SIDE MOUNTING

**POWERSWITCH Motor Operated Traction Power Disconnect**  
Switches are made in accordance with specific contract specifications. Shown here are some examples of assemblies similar to as supplied for new facilities at DALLAS AREA RAPID TRANSIT, JFK AIRPORT, ST. LOUIS METROLINK, LIRR, PATCO and METRO-NORTH COMMUTER RAILROAD

**POWERSWITCH, INC.**

815 E. CHERRY ST.

TROY, MO 63379

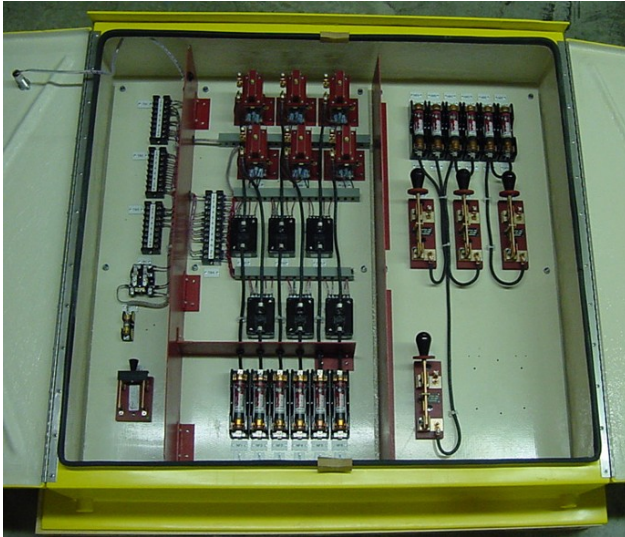
PH 1-800-526-6740

FAX 636-528-8937

EMAIL: [pssales@normandymachine.com](mailto:pssales@normandymachine.com)



# SWITCH AND RAIL HEATER CABINETS



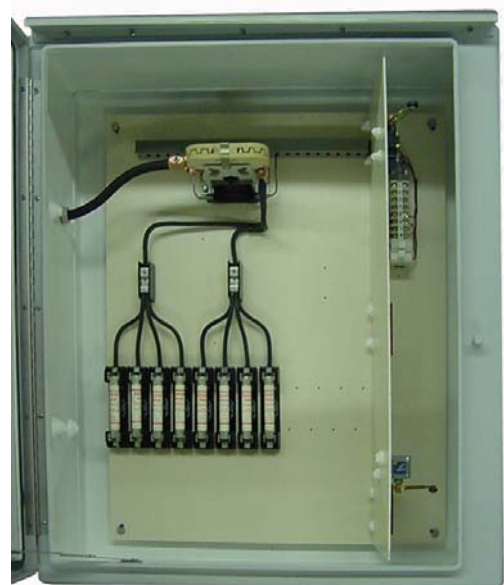
**Contact Rail Heater Control Cabinet with (6) Contactors,  
(6) sets of Load Fuses, W/ Provisions for Repeater Case  
Used by CTA**



**#050528 600 VDC Switch Heater Control Unit  
With 12 Load Fuses  
Also available #050529 9 Load Fuses; #050527  
6 Load Fuses  
Used By CTA**



**#050526 600 VDC Switch Heater Control Unit  
With 3 Load Fuses  
Used by CTA**



**#050108 8 Circuit, 1000 VDC Switch Heater  
Control Unit for  
St. Louis Metro  
Also available #050112 12 Load Fuses; and  
#050104 4 Load Fuses**

**POWERSWITCH Switch and Rail Heater Control Units  
are made in accordance with specific contract  
specifications. Shown here are some examples of  
assemblies similar to as supplied at Chicago Transit  
Authority, and St. Louis Metro.**

**POWERSWITCH, INC.**

815 E. CHERRY ST.

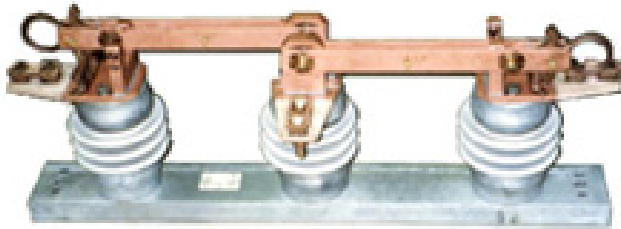
TROY, MO 63379

PH 1-800-526-6740

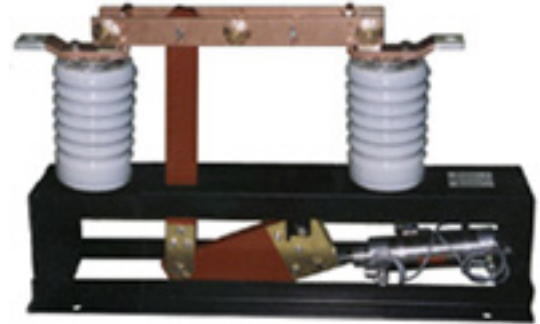
FAX 636-528-8937

EMAIL: [pssales@normandymachine.com](mailto:pssales@normandymachine.com)

## HIGH VOLTAGE DISCONNECTS SWITCHES



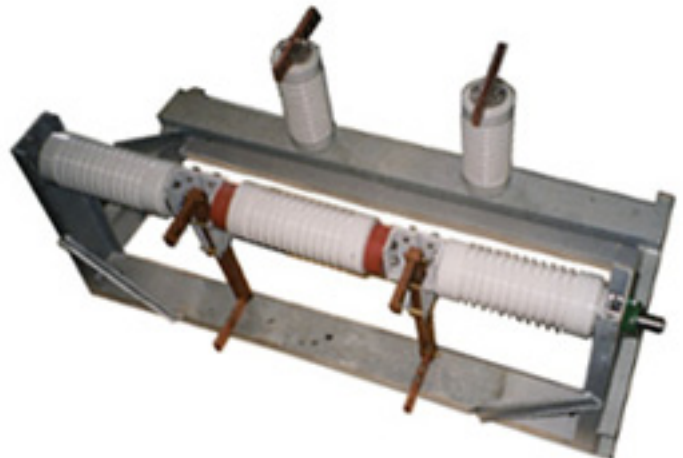
600 AMP 7.5 KV DOUBLE THROW OUTDOOR DISCONNECT SWITCH FOR A SPECIAL ASSEMBLY BY A MANUFACTURER NO LONGER IN BUSINESS



ONE OF HUNDREDS OF 15 KV SHORT TIME RATE (50,000 AMPS FOR 150 MILLI-SECONDS), COMPRESSED AIR OPERATED DISCONNECT SWITCHES TO CHANGE REACTOR TAPS AT A NEW UNIQUE HV TEST LABORATORY



600 AMP 1000VDC FUSED DISCONNECT AND CONTACTOR ASSEMBLY INTERCHANGEABLE WITH A SPECIAL CONFIGURATION BY A MANUFACTURER NO LONGER IN BUSINESS



600 AMP 34.5 KV 2 POLE ROTARY GROUNDING SWITCH UP-GRADE REPLACEMENT FOR A SPECIAL ASSEMBLY BY A MANUFACTURER NO LONGER IN BUSINESS

Shown here are some examples of special disconnect switches made for unique applications or to replace special assemblies no longer available from the original manufacturer. POWERSWITCH has modern production facilities and know-how to repair, duplicate, or make new replacement parts for most older style disconnect switches that are no longer commercially available. Providing fast response, economical solutions, and consistent high quality products is the only way we do business at NMC-POWERSWITCH.

### **POWERSWITCH, INC.**

815 E. CHERRY ST.

TROY, MO 63379

PH 1-800-526-6740

FAX 636-528-8937

EMAIL: [pssales@normandymachine.com](mailto:pssales@normandymachine.com)



# TRACTION POWER CABLE CONNECTORS



CABLE ADAPTER TO CONNECT  
(4) 500 MCM CABLES TO ONE 2000 MCM  
TRACTION POWER CABLE FOR LIRR



TERMINAL LUG FOR (4) 500 MCM  
CABLES FOR 4500 AMP LIRR  
TRACTION POWER DISCONNECT



500 MCM

750 MCM

SOLDER CONNECTORS FOR CTA  
TRACTION POWER DISCONNECTS



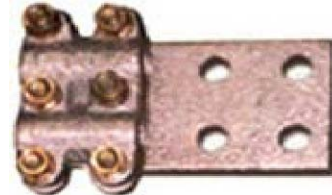
500 MCM

750 MCM

SOLDER CONNECTORS FOR CTA  
TRACTION POWER DISCONNECTS



CLAMP TYPE CONNECTOR WITH SPECIAL  
1.5 INCH 2 HOLE SPACING FOR ONE  
500 MCM CABLE. ALSO AVAILABLE WITH  
1.75 INCH NEMA 2 HOLE SPACING



CLAMP TYPE CONNECTOR WITH SPECIAL  
1.5 INCH 4 HOLE SPACING FOR TWO  
500 MCM CABLES. ALSO AVAILABLE WITH  
1.75 INCH NEMA 2 HOLE SPACING



TERMINAL LUG FOR (12) 500 MCM CABLES  
FOR 6000 AMP LIRR TRACTION POWER  
DISCONNECT SWITCH



CLAMP TYPE CONNECTOR FOR (3) 500  
MCM CABLES WITH 1.75 INCH NEMA 4  
HOLE SPACING

Shown here are some of the cable connectors made to be interchangeable with special shapes that are available from POWERSWITCH in small or large quantities

**POWERSWITCH, INC.**

815 E. CHERRY ST.

TROY, MO 63379

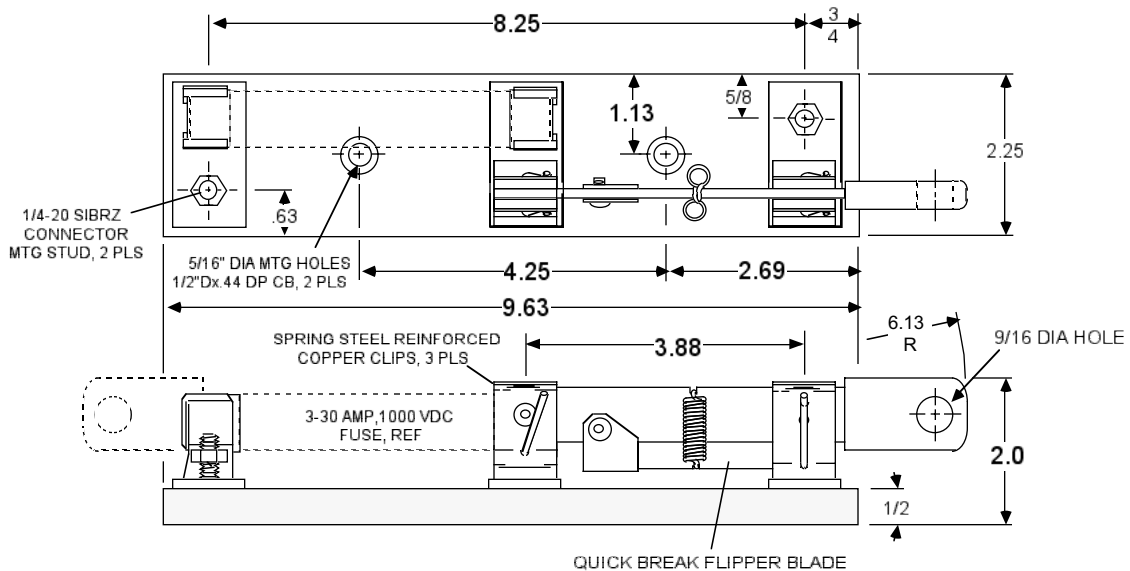
PH 1-800-526-6740

FAX 636-528-8937

EMAIL: [pssales@normandymachine.com](mailto:pssales@normandymachine.com)

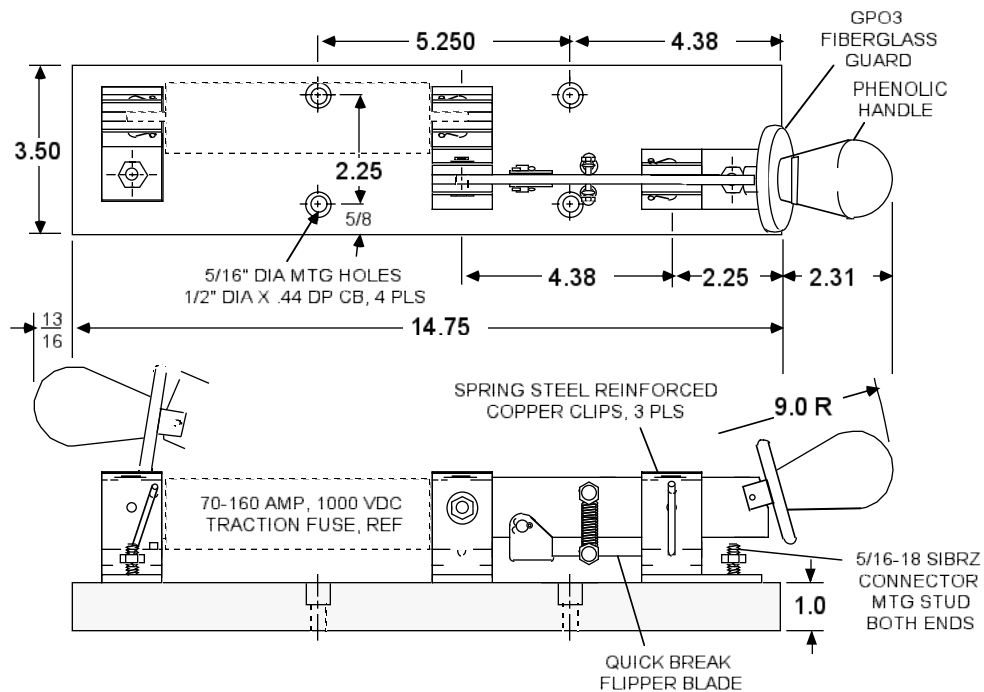
# 30-200 AMP 1000 VOLT DC FUSIBLE KNIFE SWITCHES

## DIMENSIONS IN INCHES



### 30 AMP 1000 VDC FUSIBLE KNIFE SWITCH

**ASSY NO. 890395**



### 200 AMP 1000 VDC FUSIBLE KNIFE SWITCH

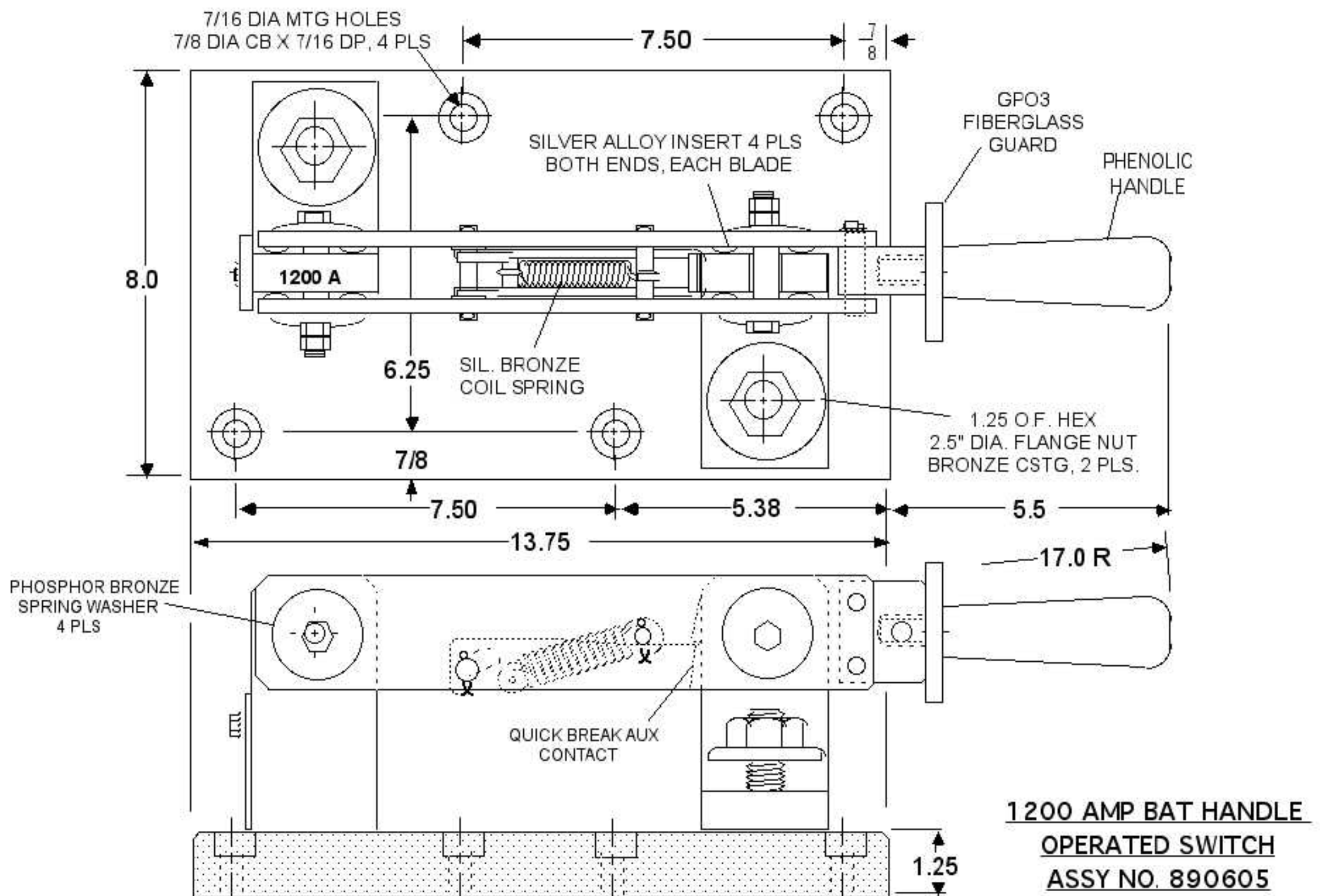
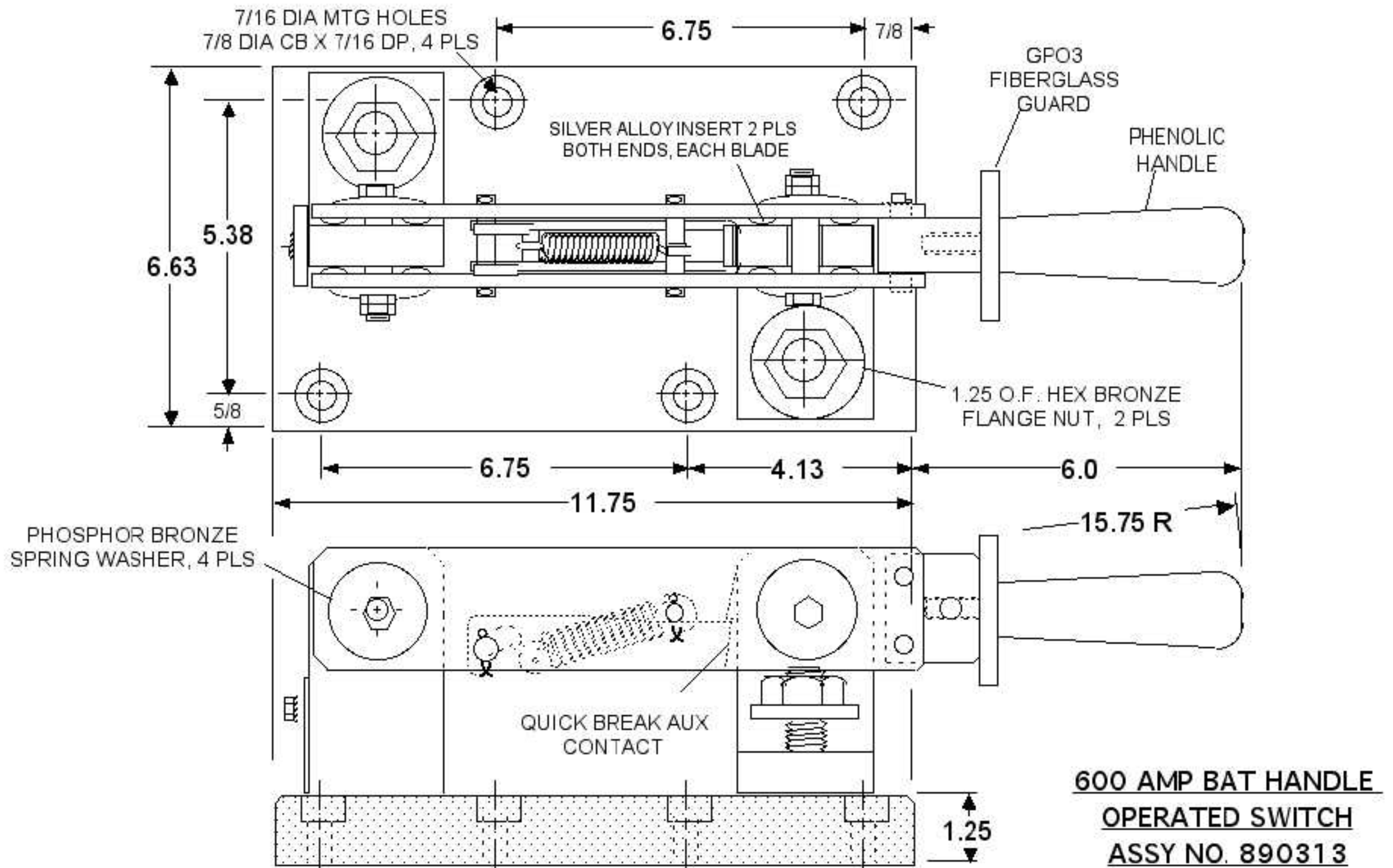
**ASSY NO. 890402**

**POWERSWITCH, INC**

TROY, MO 63379, 1-800-526-6740

# TYPE SB 1000 VDC TRACTION POWER DISCONNECTS

## DIMENSIONS IN INCHES



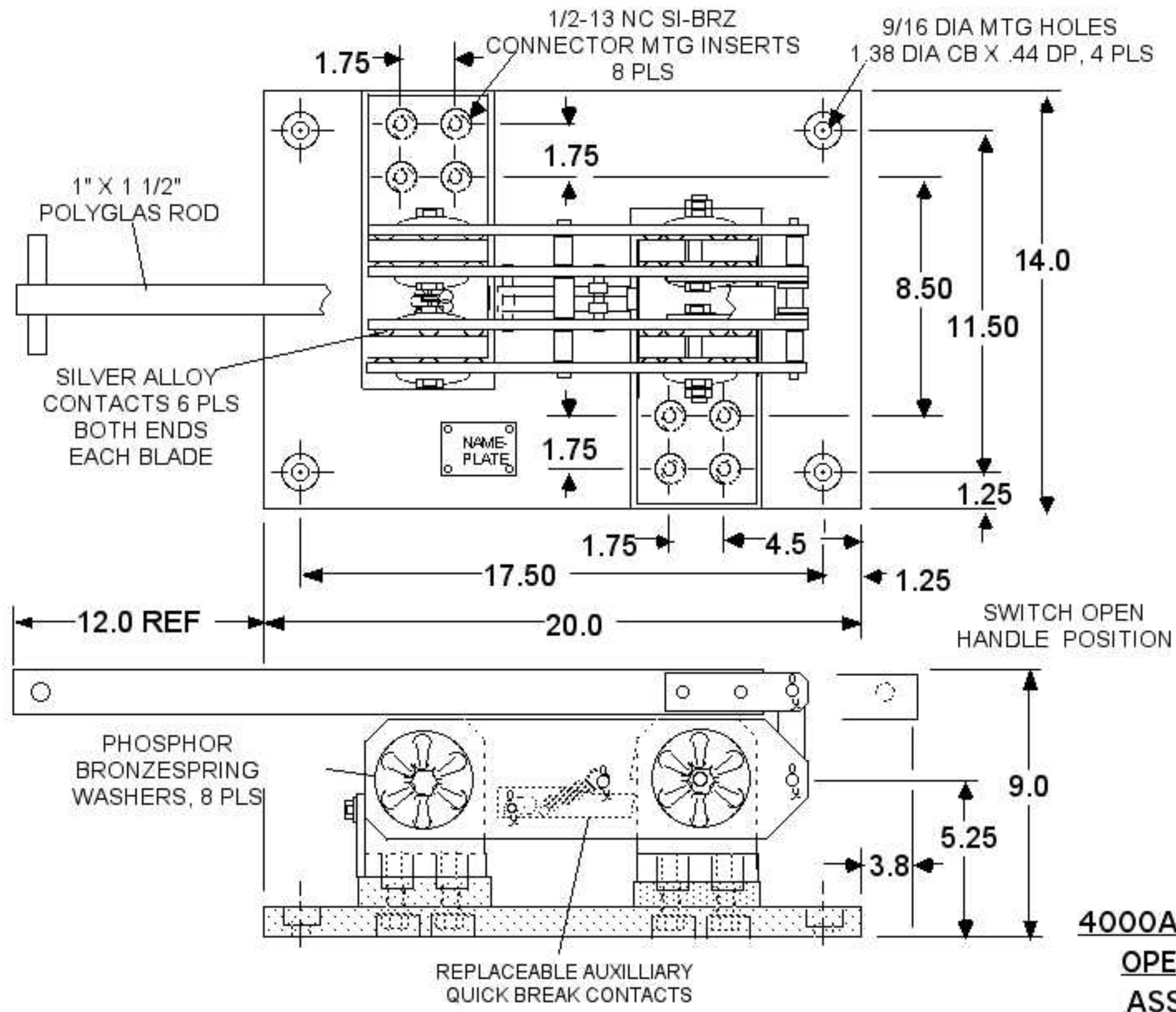
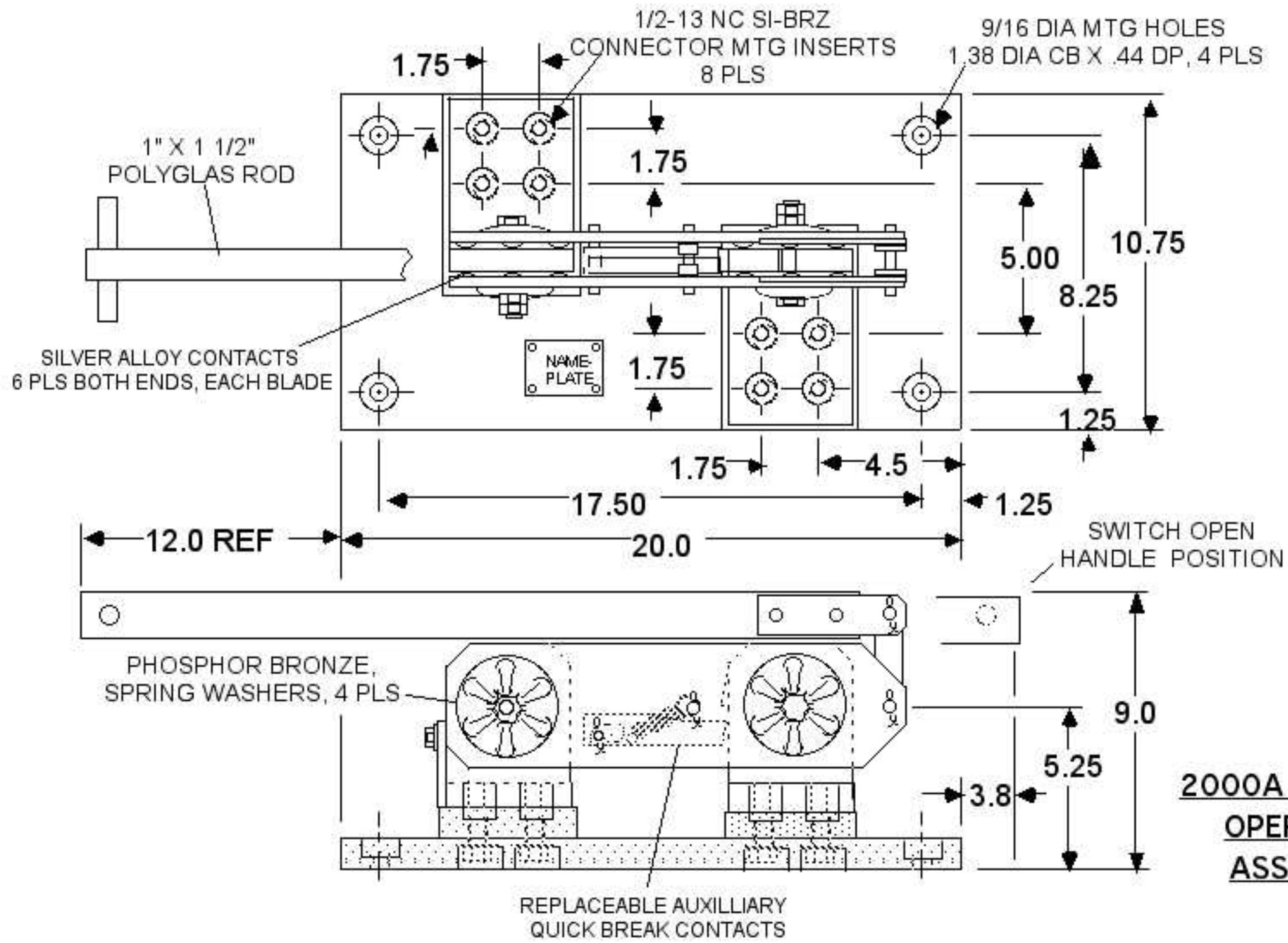
**POWERSWITCH, INC**

TROY, MO 63379, 1-800-526-6740



# TYPE SB 1000 VDC TRACTION POWER DISCONNECTS

## DIMENSIONS IN INCHES

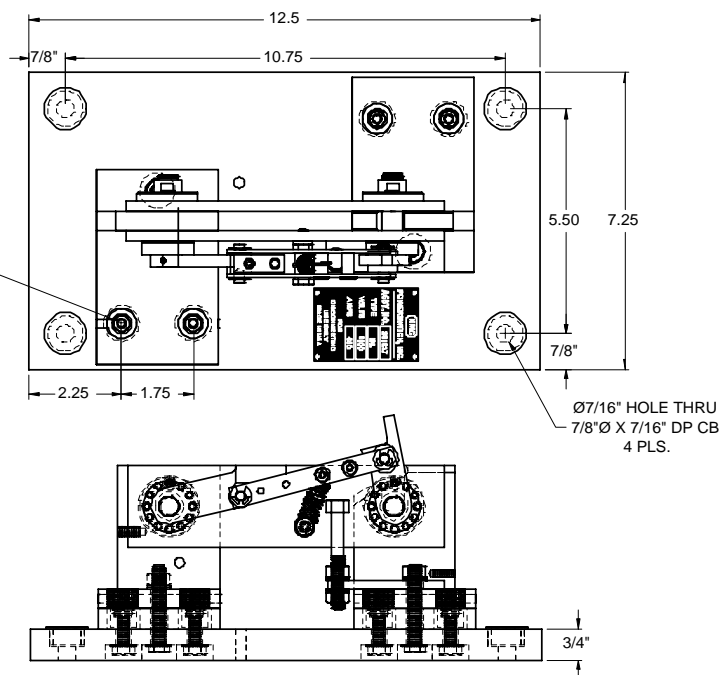
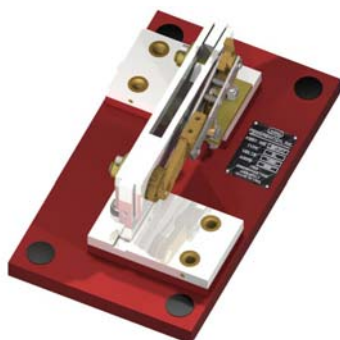


**POWERSWITCH, INC**

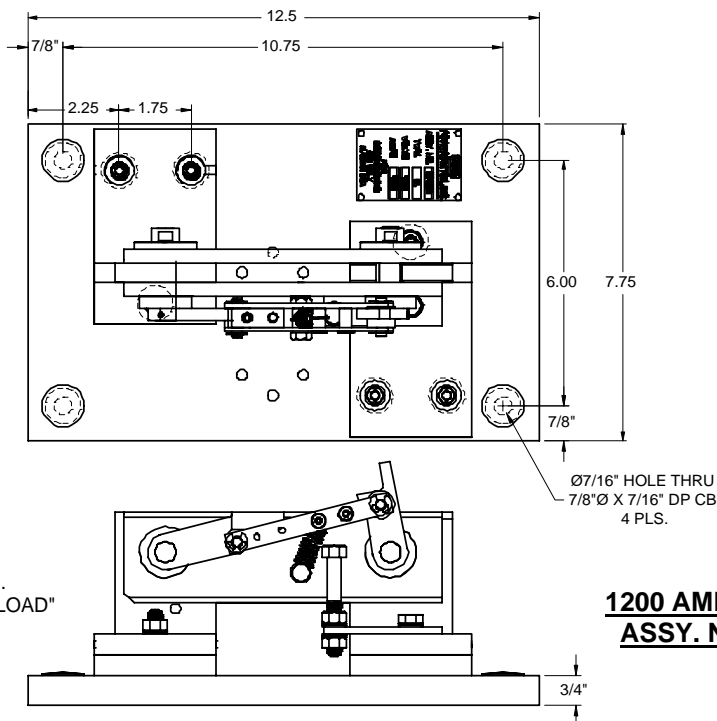
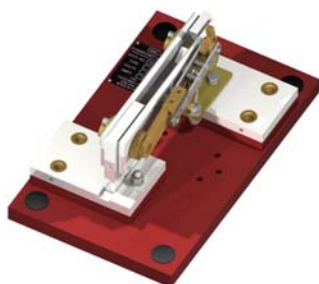
TROY, MO 63379, 1-800-526-6740

## TYPE BL 1000VDC SWITCHES

1/2"-13 TAPPED HOLE X 5/8" DP  
SILICONE-BRONZE INSERT. 4 PLS.



**600 AMP SWITCH**  
**ASSY. NO. 991217**



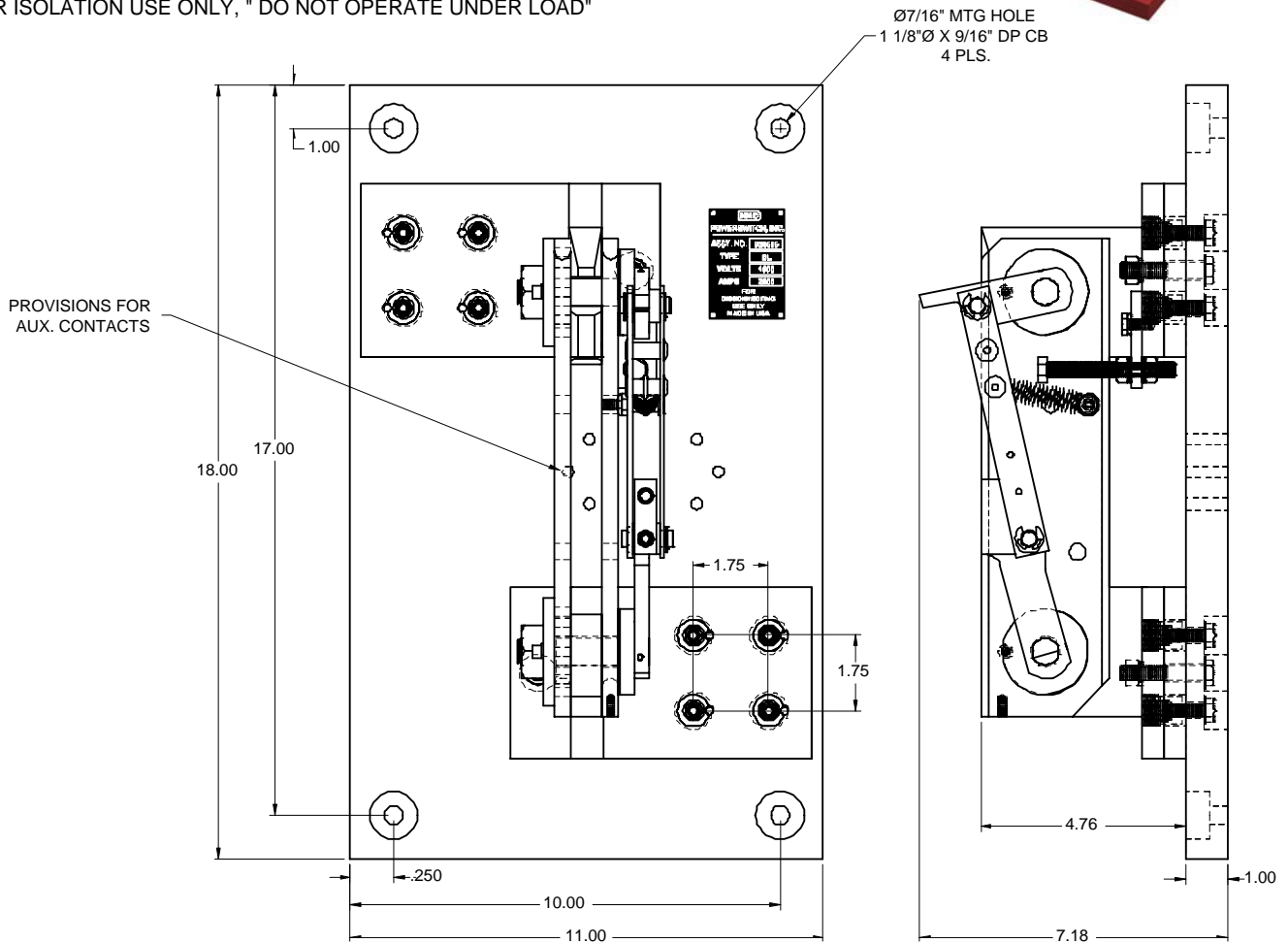
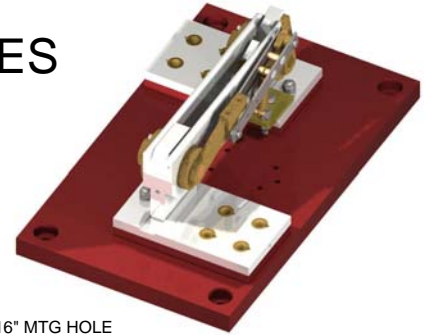
**1200 AMP SWITCH**  
**ASSY. NO. 991221**

1. ALL CURRENT CARRYING PARTS ARE MADE FROM 98% CONDUCTIVITY BUS BAR COPPER.
2. ALL HARDWARE IS CORROSION RESISTANT BRASS, SILICONE BRONZE, AND STAINLESS STEEL.
3. BASE IS FIBERGLASS REINFORCED POLYESTER NEMA GRADE GPO-3.
4. CONNECTOR CONTACT SURFACES ARE SILVER PLATED.
5. FOR ISOLATION USE ONLY, " DO NOT OPERATE UNDER LOAD"



## TYPE BL 1000VDC SWITCHES

1. ALL CURRENT CARRYING PARTS ARE MADE FROM 98% CONDUCTIVITY BUS BAR COPPER.
2. ALL HARDWARE IS CORROSION RESISTANT BRASS, SILICONE BRONZE, AND STAINLESS STEEL.
3. BASE IS FIBERGLASS REINFORCED POLYESTER NEMA GRADE GPO-3.
4. CONNECTOR CONTACT SURFACES ARE SILVER PLATED.
5. FOR ISOLATION USE ONLY, " DO NOT OPERATE UNDER LOAD"





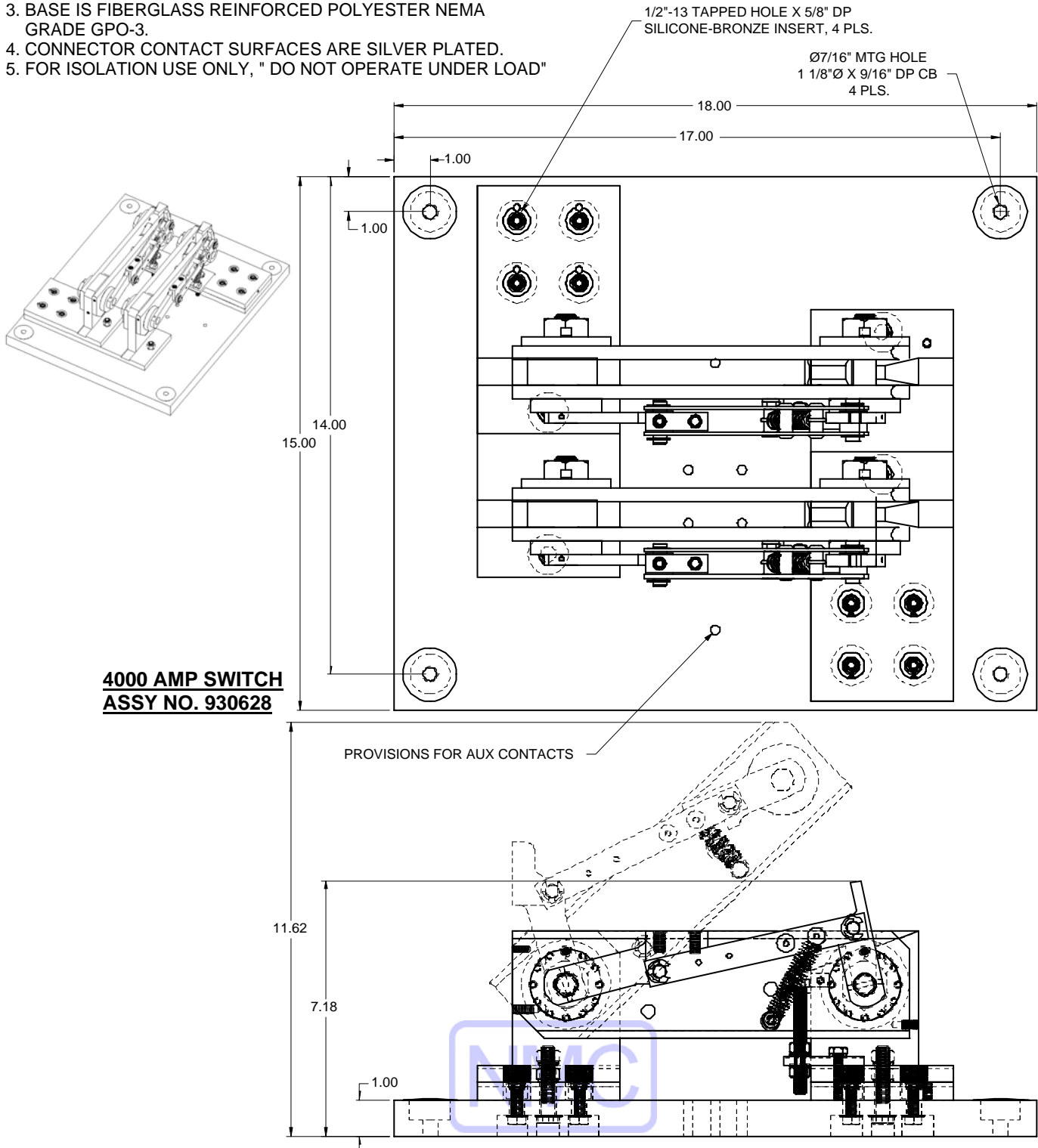
# POWERSWITCH, INC.



250 Industrial Drive, Troy, MO 63379  
Phone 1-800-526-6740 Fax: (636) 528-8937  
[www.normandymachine.com](http://www.normandymachine.com)

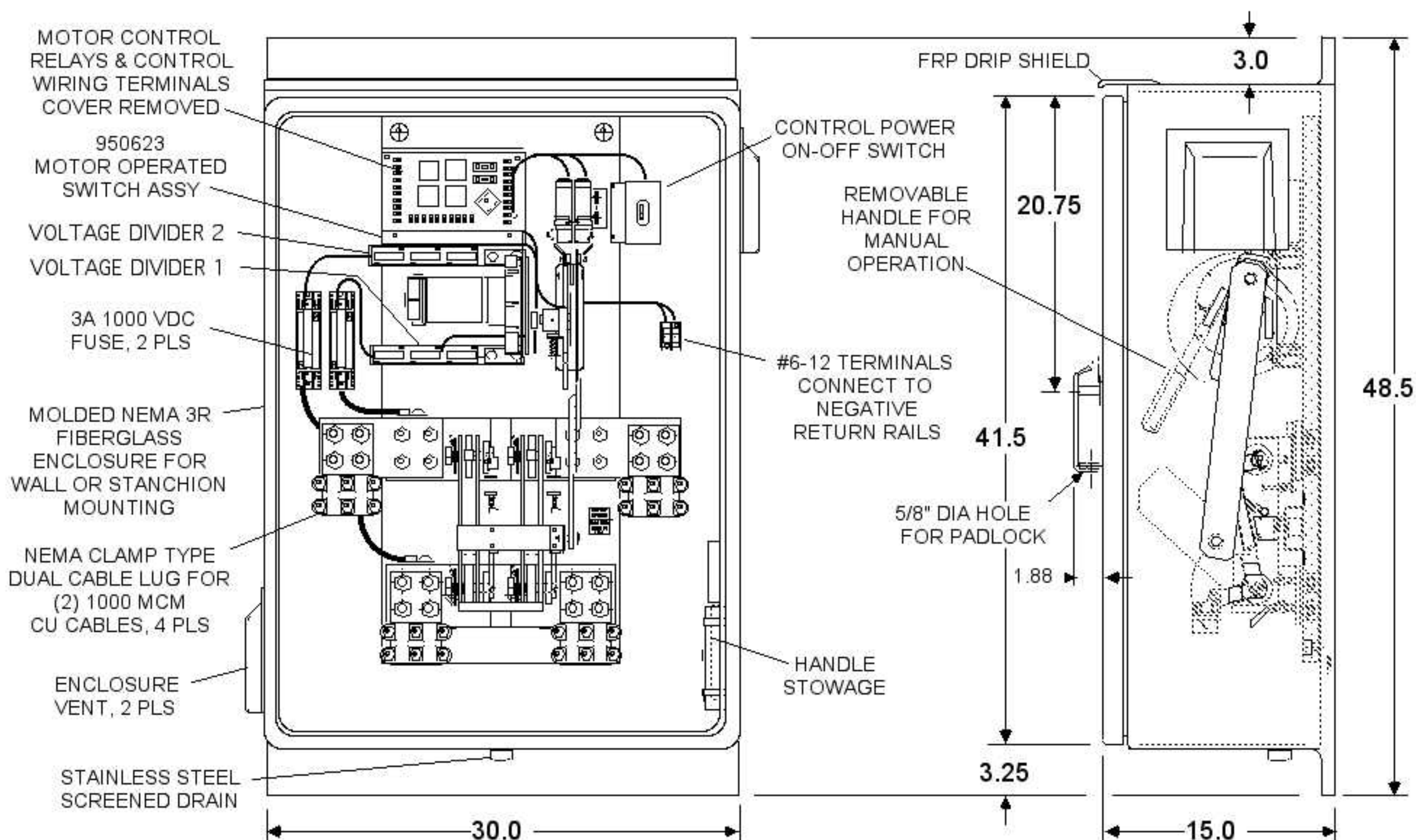
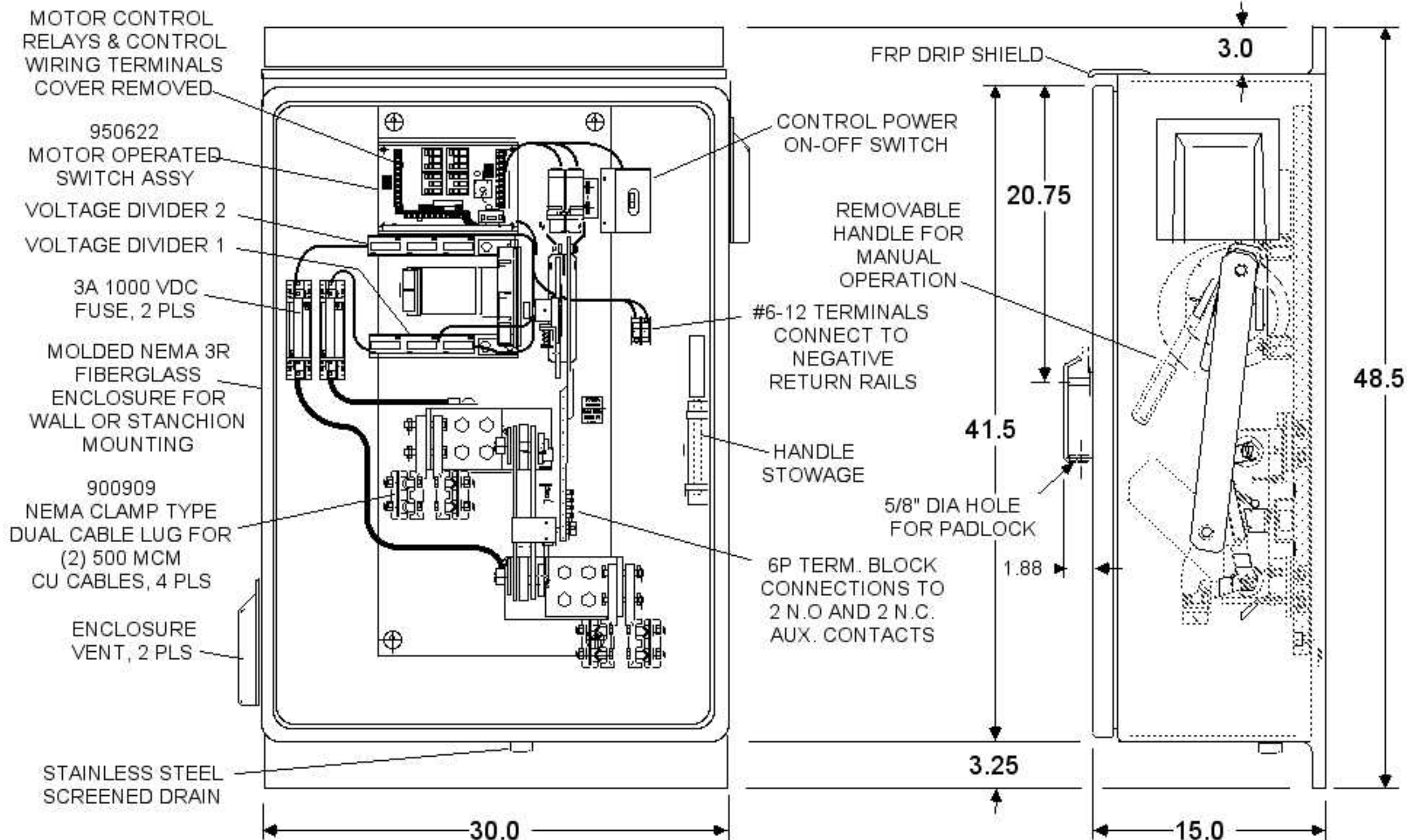
## TYPE BL 1000VDC SWITCHES

1. ALL CURRENT CARRYING PARTS ARE MADE FROM 98% CONDUCTIVITY BUS BAR COPPER.
2. ALL HARDWARE IS CORROSION RESISTANT BRASS, SILICONE BRONZE, AND STAINLESS STEEL.
3. BASE IS FIBERGLASS REINFORCED POLYESTER NEMA GRADE GPO-3.
4. CONNECTOR CONTACT SURFACES ARE SILVER PLATED.
5. FOR ISOLATION USE ONLY, "DO NOT OPERATE UNDER LOAD"



# MOTOR OPERATED TRACTION POWER DISCONNECTS

## DIMENSIONS IN INCHES

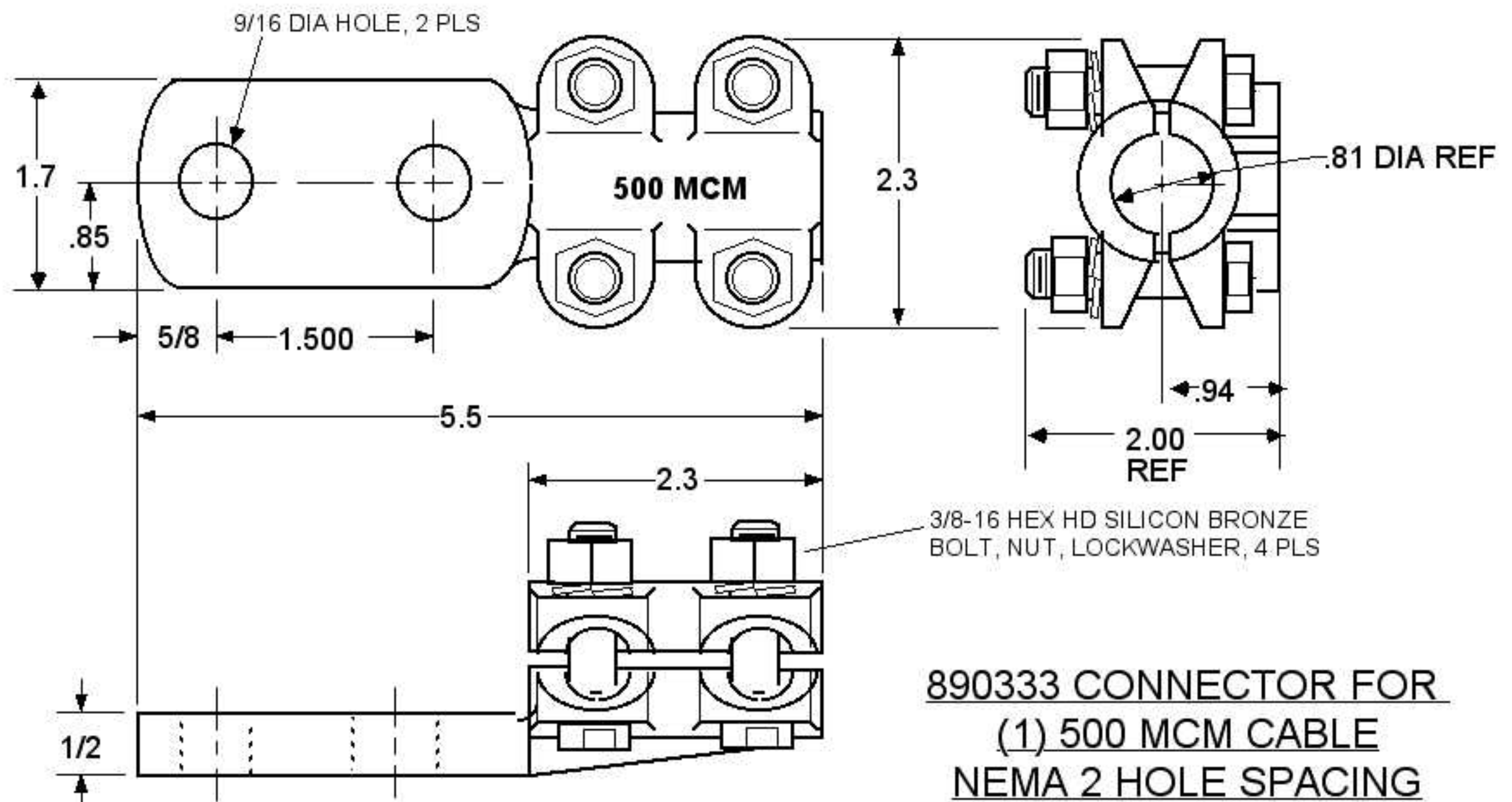
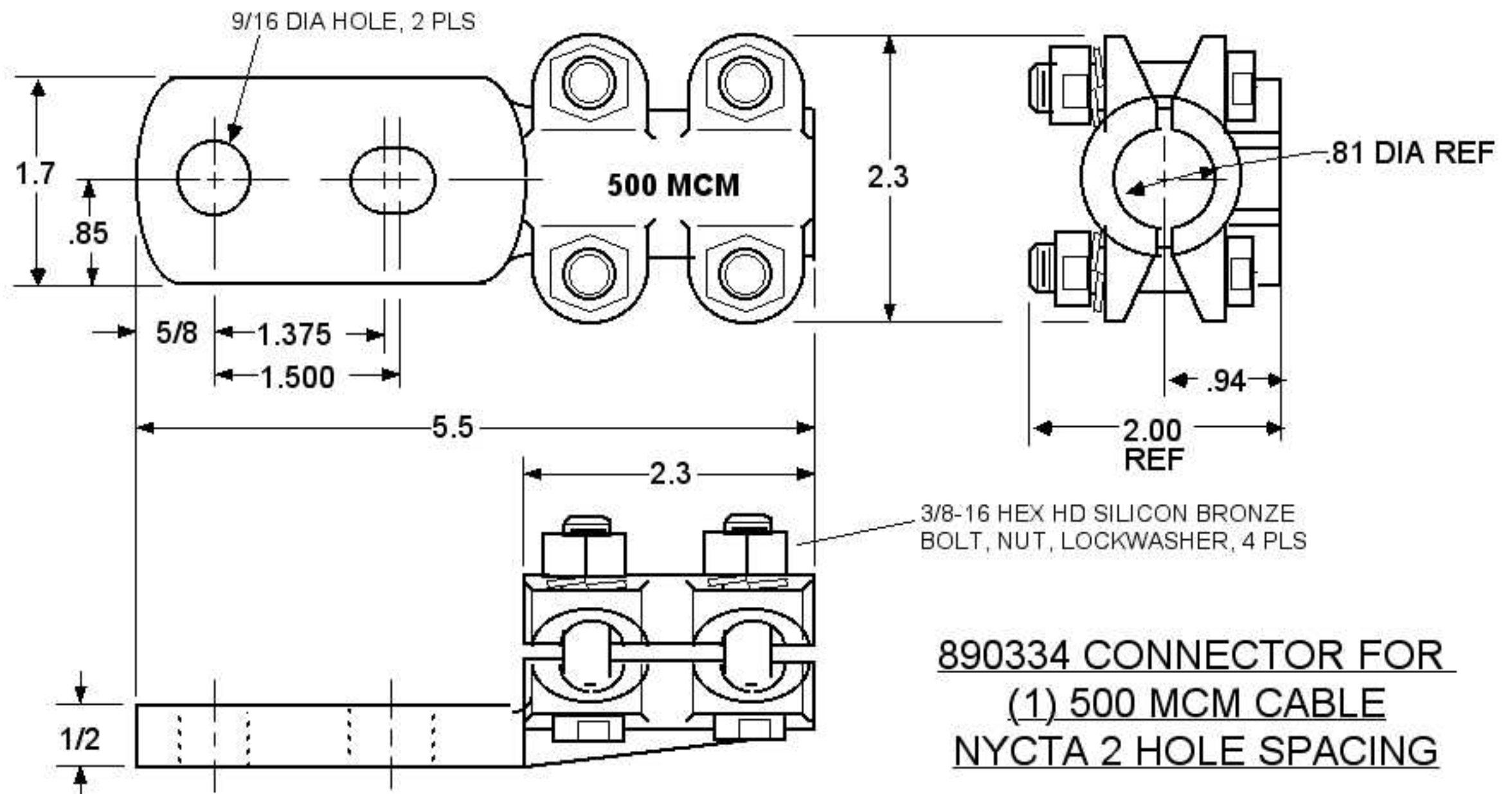


**POWERSWITCH, INC**

TROY, MO 63379, 1-800-526-6740

# CLAMP TYPE CABLE CONNECTORS

MATERIAL: COPPER ALLOY SAND CASTING  
DIMENSIONS ARE IN INCHES



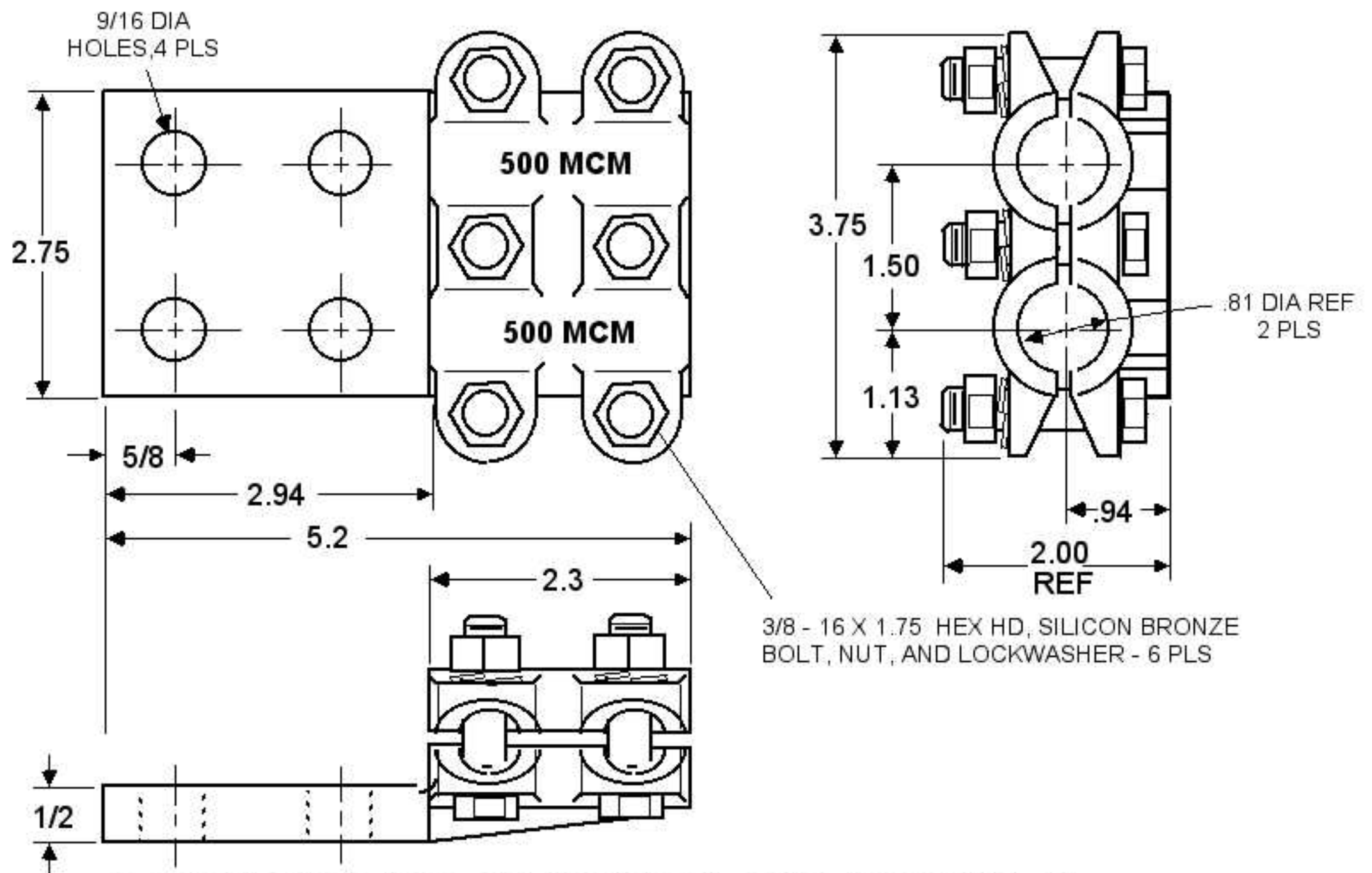
**POWERSWITCH, INC**

TROY, MO 63379, 1-800-526-6740

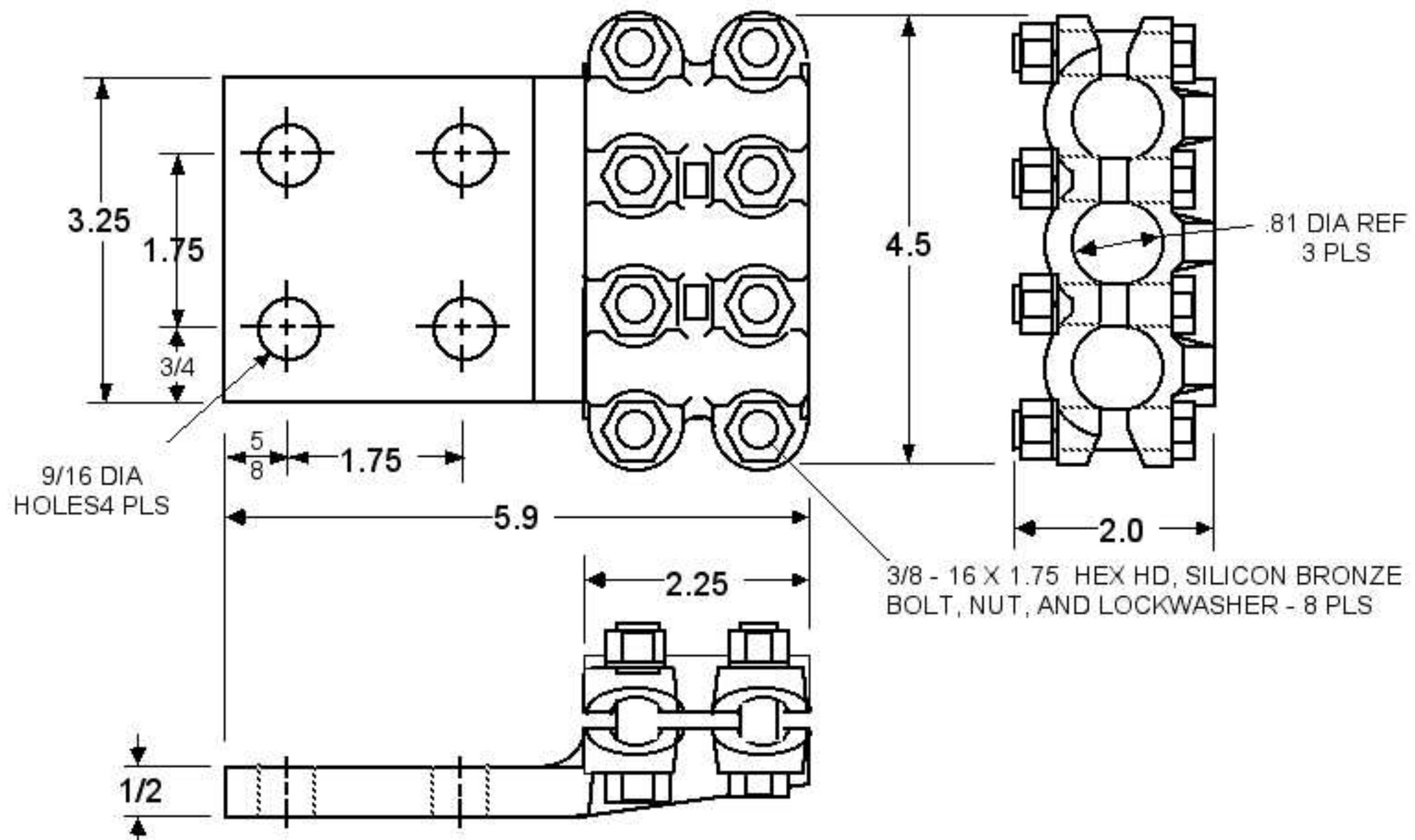


# CLAMP TYPE CABLE CONNECTORS

MATERIAL: COPPER ALLOY SAND  
CASTINGDIMENSIONS ARE IN INCHES



**CONNECTOR FOR (2) 500 MCM CABLES 1.5"X1.5"**  
**4 HOLE SPACING -- NO. 900908 1.75"X1.75" NEMA**  
**4 HOLE SPACING -- NO. 900909**



**CONNECTOR FOR (3) 500 MCM**  
**CABLES ASSY NO. 900930**

**POWERSWITCH, INC**

TROY, MO 63379, 1-800-526-6740

# POWERSWITCH

**1000 VDC TRACTION POWER  
CONTROL COMPONENTS**

## **1000 VDC LOAD BREAK SWITCH**

POWERSWITCH LOAD BREAK SWITCHES ARE ESPECIALLY MANUFACTURED TO SWITCH HIGH VOLTAGE DC AUXILIARY CIRCUITS ON AND OFF WHEN LOW VOLTAGE CONTROL POWER IS UNAVAILABLE AND WHEN REMOTE CONTROL IS UNNECESSARY. THESE SWITCHES HAVE THE SAME PERMANENT MAGNET BLOWOUTS AND DOUBLE BREAK CONTACTS THAT HAVE PROVEN SUITABLE TO INTERRUPT 35 AMPS AT 1000 VOLTS DC AND 50 AMPS AT 750 VOLTS DC WITH LITTLE OR NO CONTACT DAMAGE AFTER THOUSANDS OF ON-OFF CYCLES.

MADE FOR CONTINUOUS DUTY APPLICATIONS, THESE SWITCHES HAVE HIGH CONDUCTIVITY COPPER LIVE PARTS AND LARGE SILVER ALLOY CONTACTS PROVIDING COOL OPERATION AND UNMATCHED LIFE EXPECTANCY. THE DOUBLE BREAK CONTACTS AND PERMANENT MAGNET BLOWOUTS INCLUDED STRETCH THE ARC ON OPENING TO LIMIT ARCING TIME TO LESS THAN FIVE MILLISECONDS.



## **RATINGS**

**50 AMPS @ 750 VOLTS DC**  
**35 AMPS @ 1000 VOLTS DC**

SHOWN HERE IS A SINGLE POLE SINGLE THROW ASSEMBLY. TWO AND THREE POLE CONFIGURATIONS WHICH CAN BE CONNECTED IN PARALLEL FOR HIGHER CURRENT APPLICATIONS AND DOUBLE THROW ASSEMBLIES ARE ALSO AVAILABLE.

## **FEATURES**

### **PRECISE CONTACT GAP ADJUSTMENT**

CONSISTENT LOW CONTACT RESISTANCE IS ACHIEVED BY PRECISE ADJUSTMENT OF THE PUSH ROD TRAVEL DURING PRODUCTION.

### **PERMANENT MAGNET BLOWOUTS**

PERMANENT MAGNETS STRETCH THE ARC ON OPENING TO PROTECT THE SILVER ALLOY CONTACTS INDEPENDENT OF LOAD CURRENT.

### **FAST OPENING ACTUATOR**

OVER CENTER QUICK BREAK SPRING ACTUATOR, SHORT STROKE, AND LOW MASS MOVING PARTS ASSURE FAST OPENING AND CLOSING.

### **LONG LIFE EXPECTANCY**

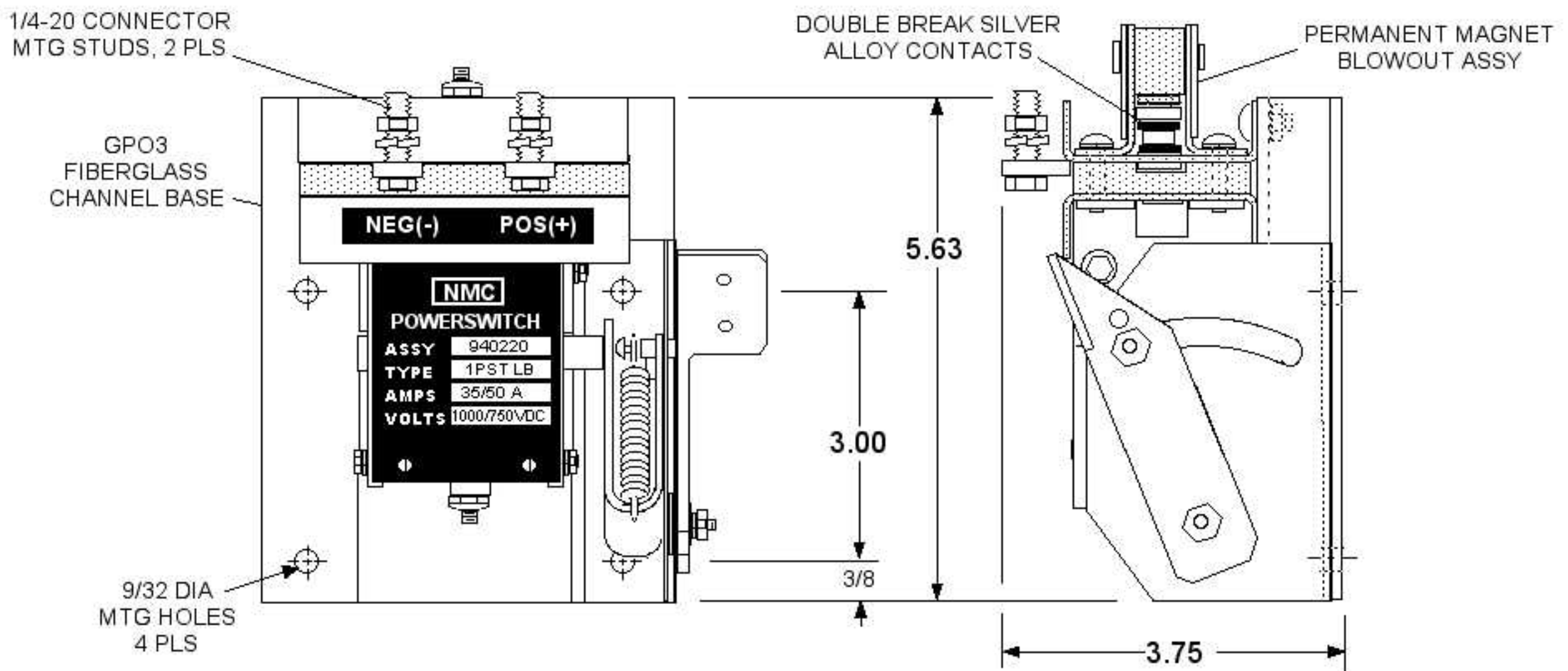
QUALIFICATION TESTS USING THE SAME CONTACTS AND BLOWOUTS INDICATE NO CONTACT DAMAGE AFTER MANY CYCLES INTERRUPTING 50 AMPS AT 750 VDC.

**POWERSWITCH, Inc.**

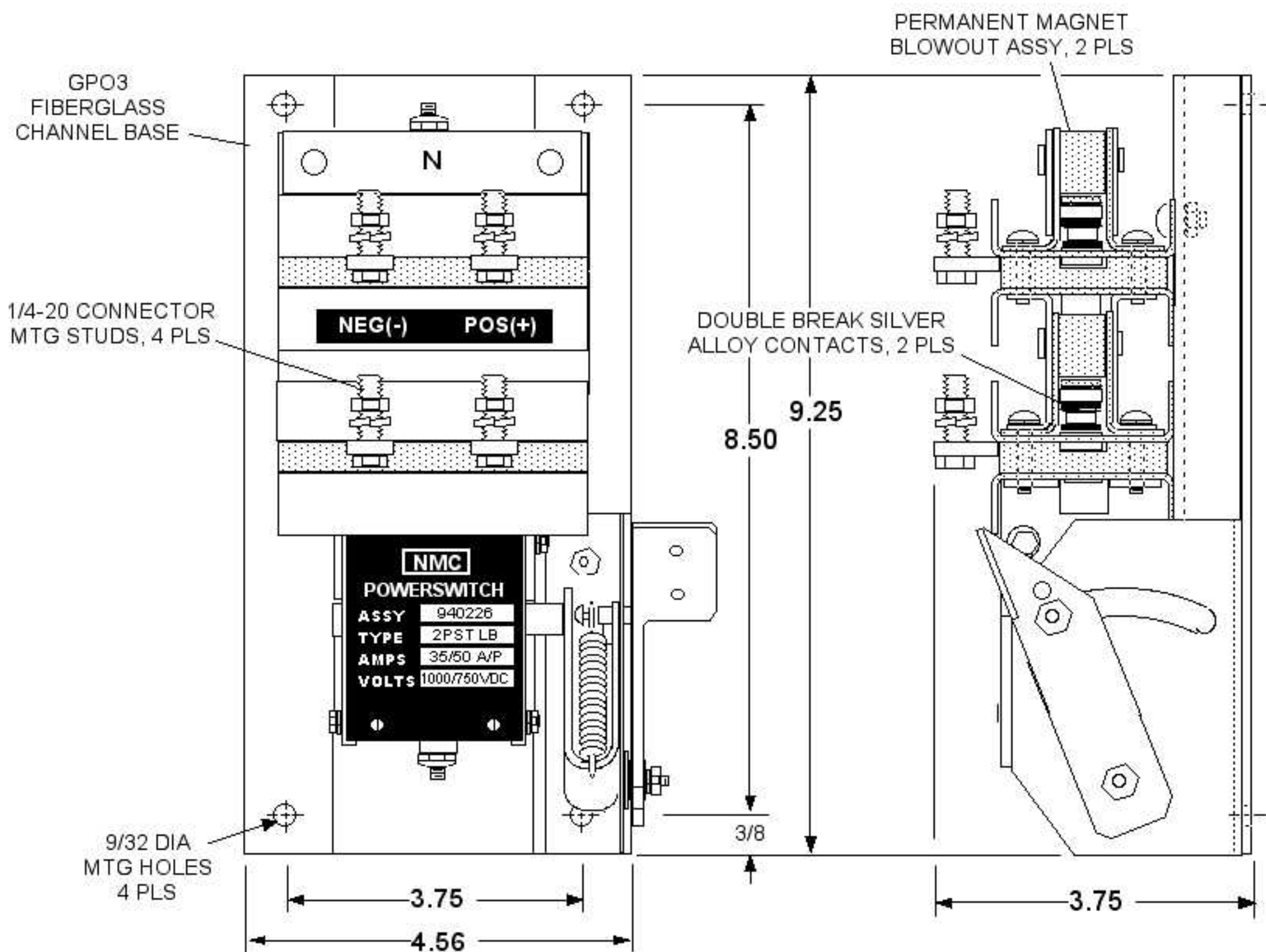
**815 E. CHERRY ST. <> TROY, MO 63379 <> 1-800-526-6740 [www.normandymachine.com](http://www.normandymachine.com)**

# 1000 VOLT DC LOAD BREAK SWITCHES

## DIMENSIONS IN INCHES



SINGLE POLE NORMALLY OPEN LOAD BREAK SWITCH,  
35/50 AMP, 1000/750 VDC, ASSY NO. 940220



TWO POLE NORMALLY OPEN LOAD BREAK SWITCH,  
35/50 AMPS/POLE, 1000/750 VDC, ASSY NO. 940226

**POWERSWITCH, INC**

TROY, MO 63379, 1-800-526-6740



# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## 1000 VDC FUSED DISCONNECT

POWERSWITCH HAS A NEW MOLDED FIBERGLASS ENCLOSED FUSED DISCONNECT TO PROVIDE A MORE DURABLE REPLACEMENT FOR THE FABRICATED ASSEMBLY USED FOR MANY YEARS TO CONNECT SNOW MELTER CONTROLS TO TYPICAL 600-1000 VDC TRACTION POWER SYSTEMS. SHOWN HERE IS A CONFIGURATION WITH THRU BOLTS FOR HORIZONTAL TRACK-SIDE MOUNTING OR FOR VERTICAL MOUNTING ON THE SIDE OF TYPICAL SWITCH HEATER CONTROL CABINETS. ALTERNATE ASSEMBLIES ARE AVAILABLE WITH A FIBERGLASS CHANNEL BRACKET FOR POLE OR WALL MOUNTING.



### FEATURES

ENCLOSURE BODY AND COVER ARE MADE FROM MOLDED, UV PROTECTED, FIRE RETARDANT, FIBERGLASS REINFORCED POLYESTER

HANDLE IS STEEL REINFORCED VULCANIZED RUBBER WITH PROVEN DURABILITY IN OUTDOOR HOSTILE ENVIRONMENTS.

LINK-LOCK COVER LATCHES ARE CORROSION RESISTANT STAINLESS STEEL WITH NO LOOSE PARTS TO FALL OFF OR GET LOST.

DURABLE UV RESISTANT GEL COAT EXTERIOR FINISH IS AVAILABLE IN A WIDE CHOICE OF COLORS.

CURRENT CARRYING PARTS OF POWERSWITCH FUSED DISCONNECTS ARE HIGH CONDUCTIVITY COPPER WITH SILVER PLATED CONTACT SURFACES. ALL LIVE PARTS ARE MOUNTED ON NEMA GPO3 FIBERGLASS. FUSES ARE FASTENED TO THE INSIDE OF THE COVER SUCH THAT THE FUSE IS DISCONNECTED WHEN THE ENCLOSURE COVER IS REMOVED. COVER GUIDES ENSURE PROPER BLADE ENGAGEMENT WHEN THE COVER IS REINSTALLED.

SHOWN HERE IS THE POPULAR ASSEMBLY WITH A TYPICAL 60 AMP CARTRIDGE FUSE. OTHER ASSEMBLIES ARE AVAILABLE WHICH ACCOMMODATE 10-100 AMP FERRAZ-SHAWMUT FUSES OR BUSSMANN (FUSETEK), BLADE TYPE TRACTION FUSES.

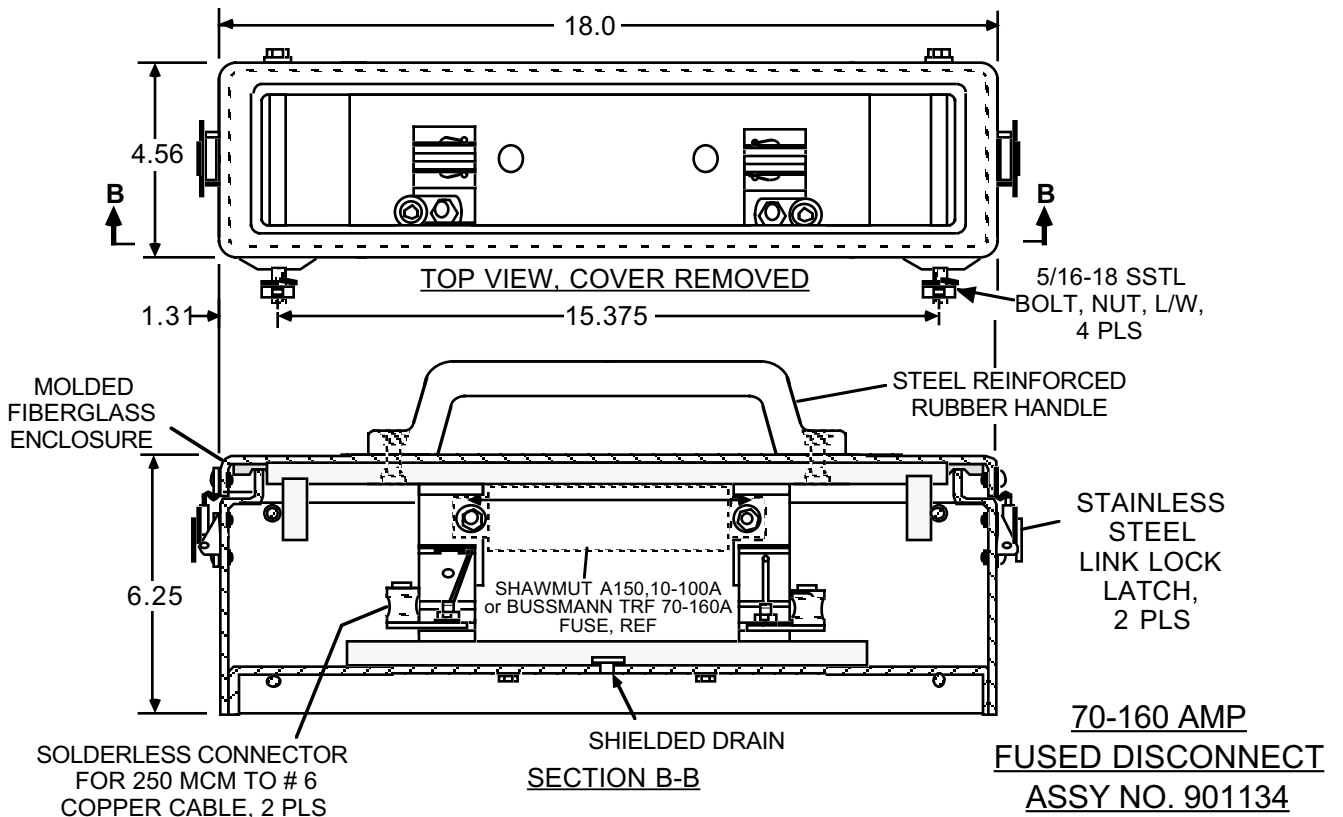
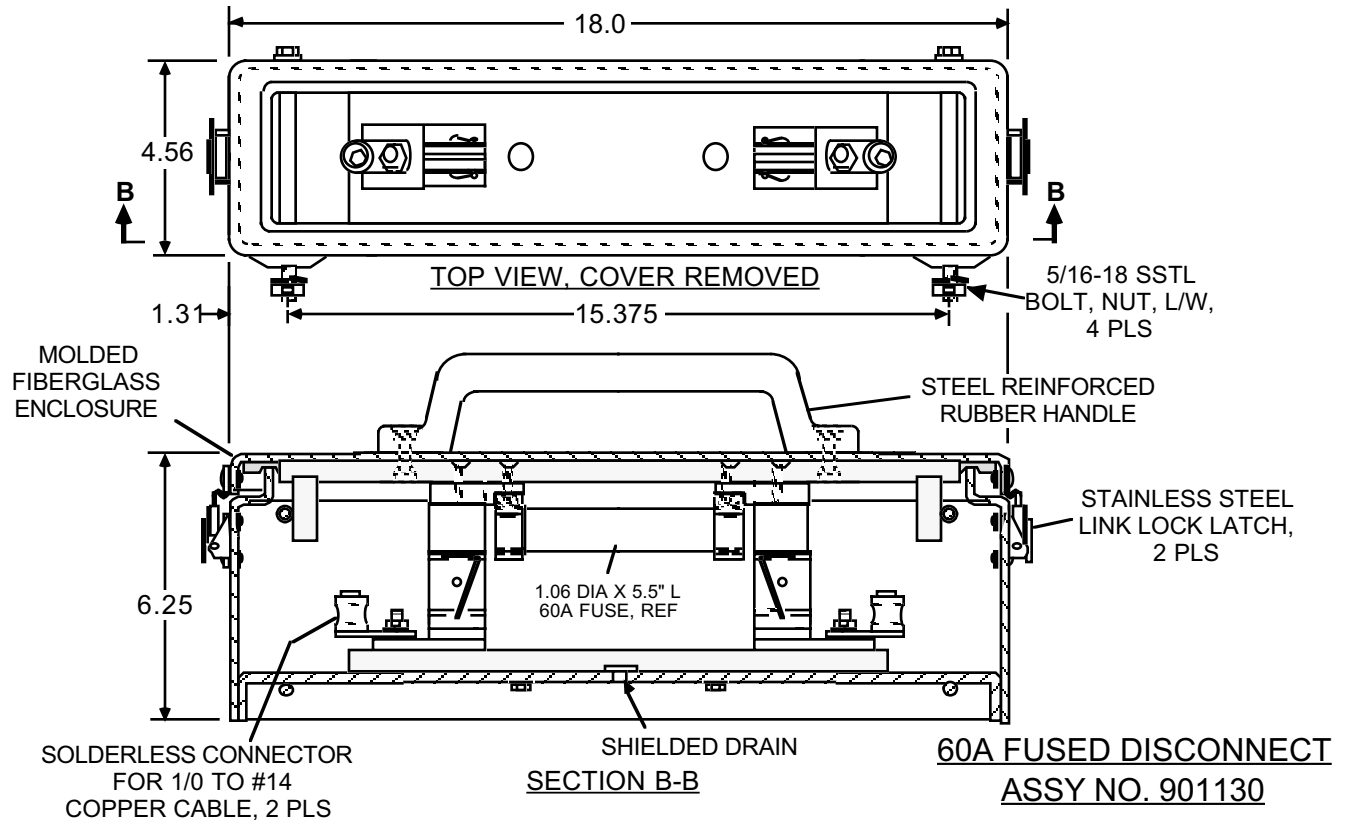


**POWERSWITCH, Inc.**

815 E. CHERRY ST. <> TROY, MO 63379 <> 1-800-526-6740 [www.normandymachine.com](http://www.normandymachine.com)

## 1000 VDC FUSED DISCONNECTS

DIMENSIONS IN INCHES



**POWERSWITCH, INC**

TROY, MO 63379, 1-800-526-6740

# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## 1000 VDC QUICK BREAK FUSED DISCONNECTS

POWERSWITCH HAS CREATED AN IMPROVEMENT OPTION WHICH ADDS QUICK BREAK FUNCTION TO OUR 1000 VOLT DC FUSED DISCONNECTS. THIS ADDED FEATURE QUICKLY INTERRUPTS ANY ARCING WHICH CAN OCCUR WHEN THE COVER OF THE FUSED DISCONNECT IS OPENED WHILE ENERGIZED. THIS NEW ASSEMBLY COMBINES THE FUNCTIONS OF A SEPARATE SUPPLY SWITCH WITH QUICK BREAK CONTACTS AND THE ADVANTAGES OF THE FUSED DISCONNECT INTO ONE ENCLOSURE. THE QUICK BREAK FEATURE REDUCES THE RISK OF OPERATOR INJURY AND REDUCES THE FIRE HAZARD POTENTIAL WHEN THE COVER IS REMOVED WHILE THE FUSED DISCONNECT IS ENERGIZED. CURRENT CARRYING PARTS OF POWERSWITCH FUSED DISCONNECTS ARE HIGH CONDUCTIVITY COPPER WITH SILVER PLATED CONTACT SURFACES. ALL LIVE PARTS ARE MOUNTED ON NEMA GPO3 FIBERGLASS. FUSES ARE FASTENED TO THE INSIDE OF THE COVER SUCH THAT THE FUSE IS DISCONNECTED WHEN THE ENCLOSURE COVER IS REMOVED. COVER GUIDES INSURE PROPER BLADE ENGAGEMENT WHEN THE COVER IS REINSTALLED. SHOWN HERE IS THE POPULAR ASSEMBLY WITH A TYPICAL 60 AMP CARTRIDGE FUSE. OTHER ASSEMBLIES ARE AVAILABLE WHICH ACCOMMODATE 10-100 AMP MERSEN FUSES OR BUSSMANN BLADE TYPE TRACTION FUSES.



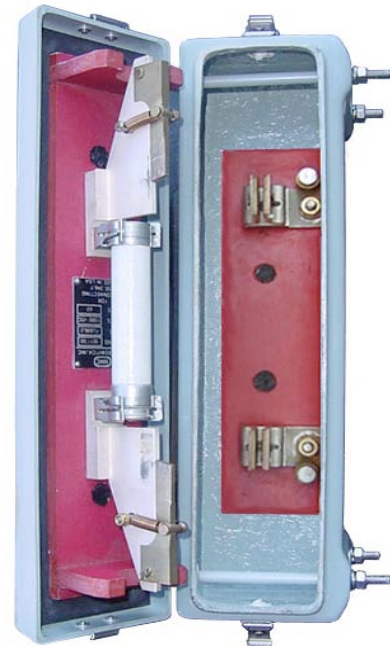
## FEATURES

ENCLOSURE BODY AND COVER ARE MADE FROM MOLDED, UV PROTECTED, FIRE RETARDANT, FIBERGLASS REINFORCED POLYESTER

HANDLE IS STEEL REINFORCED VULCANIZED RUBBER WITH PROVEN DURABILITY IN OUTDOOR HOSTILE ENVIRONMENTS.

LINK-LOCK COVER LATCHES ARE CORROSION RESISTANT STAINLESS STEEL WITH NO LOOSE PARTS TO FALL OFF OR GET LOST.

DURABLE UV RESISTANT GEL COAT EXTERIOR FINISH IS AVAILABLE IN A WIDE CHOICE OF COLORS.



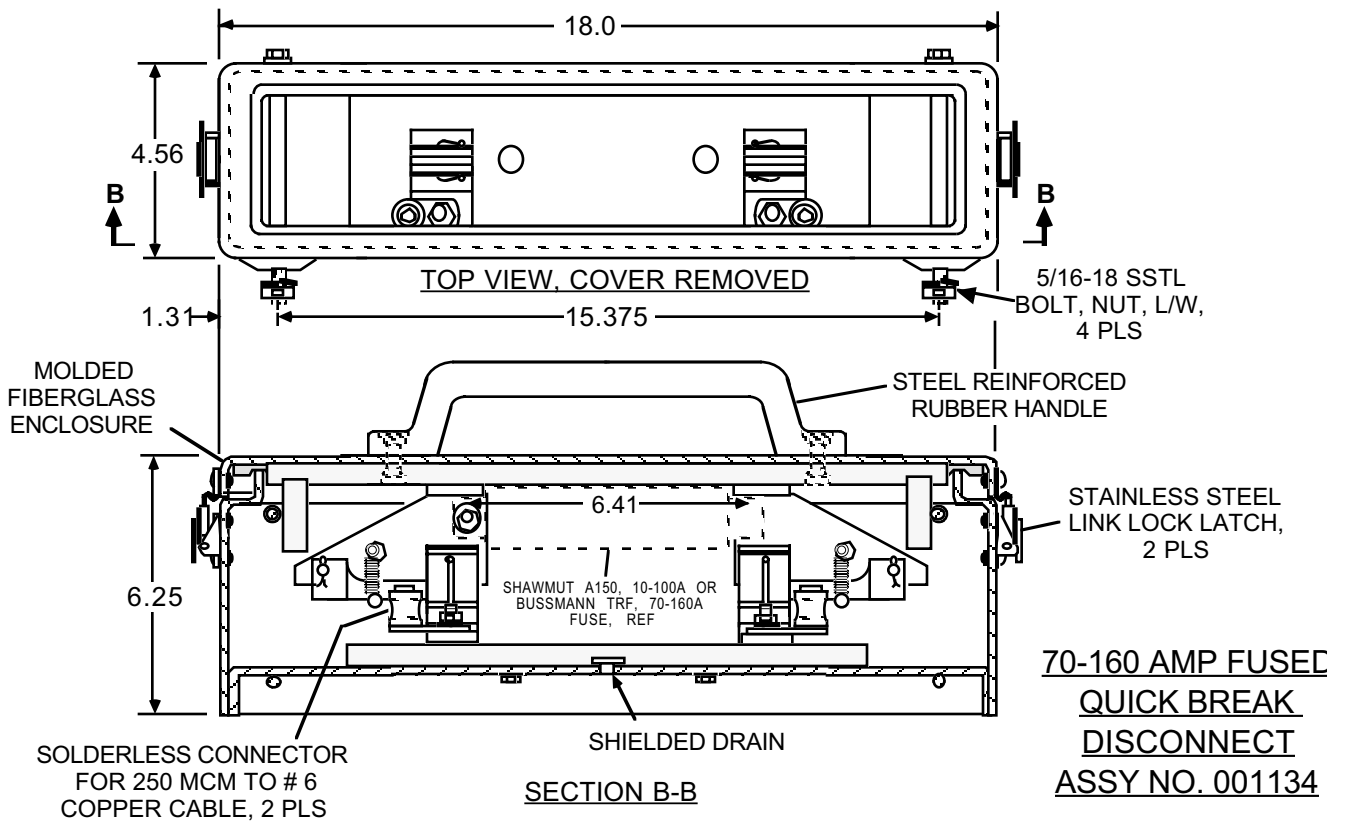
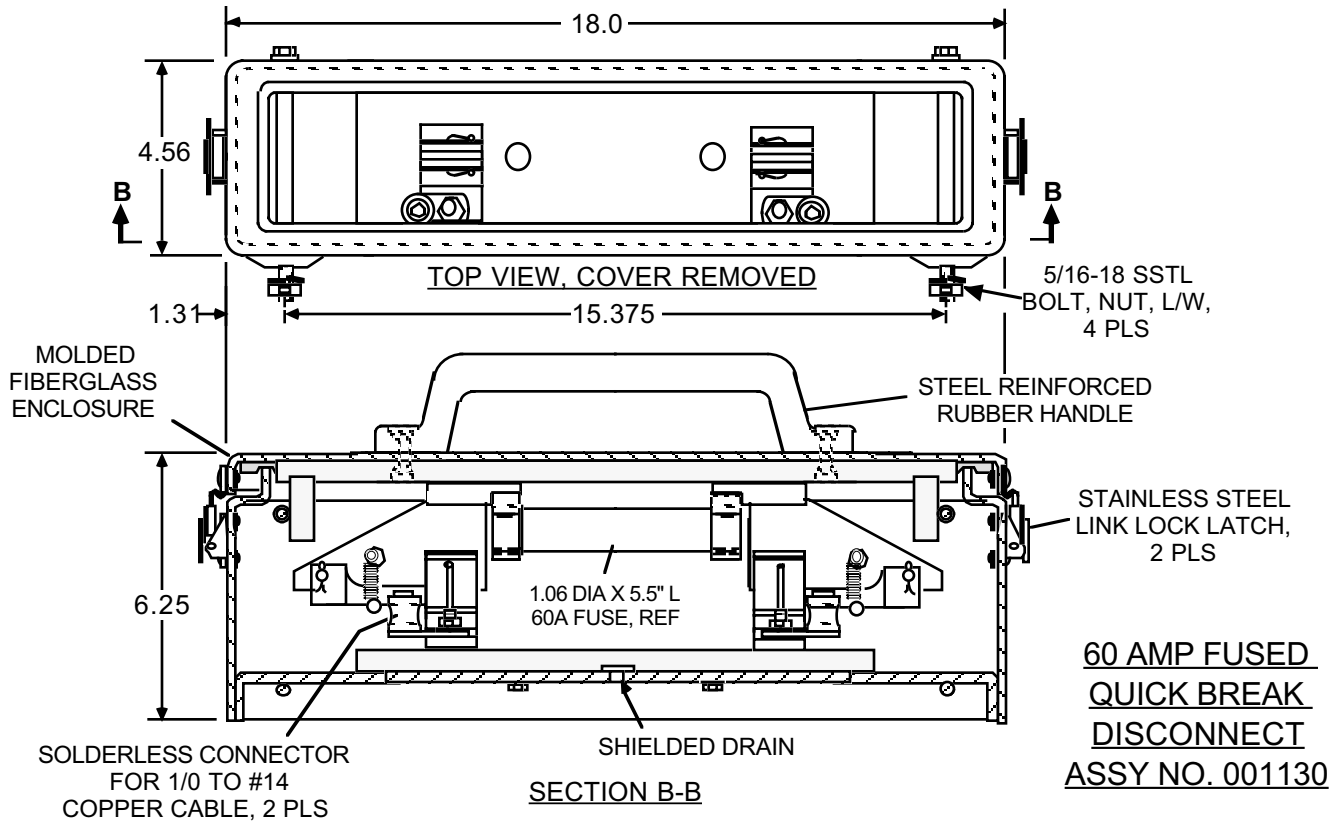
## POWERSWITCH, Inc.

813 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)

# 1000 VDC FUSED DISCONNECTS

DIMENSIONS IN INCHES



## POWERSWITCH, INC

TROY, MO 63379, 1-800-526-6740





**RITTER**  
Starkstromtechnik

**MOTOR OPERATED  
LOAD BREAK  
DC DISCONNECTS  
AVAILABLE NOW IN USA  
From NMC Powerswitch**

**CONTACT**



**POWERSWITCH, INC.**

Gerald F. Woodruff  
250 Industrial Dr.  
Troy, MO 63379  
800-526-6740  
Ph. (636) 528-8913  
Fax (636) 528-8937  
[www.normandymachine.com](http://www.normandymachine.com)  
[jerry@normandymachine.com](mailto:jerry@normandymachine.com)

***for direct current  
up to 6000 Amps  
and 1500 V DC***

- *Small space requirements*
- *High switching capacity*
- *Safe switch disconnecting  
of low current*
- *Long lifetime  
stainless steel, no corrosion*
- *Small maintenance effort*

# **RITTER MOTOR OPERATED LOAD BREAK DC DISCONNECTS**

## ***Features and Application***

RITTER Type RGL DC SWITCH-DISCONNECTORS which are designed and tested in accord with European Standards EN 50123 have been used for many successful railway traction power applications in Europe and around the World. These standards define a SWITCH-DISCONNECTOR as a mechanical switching device capable of making, carrying, and breaking currents in normal circuit conditions and when specified in given overload conditions. RITTER Type RGL Disconnects rated 3150 amps and 4000 amps are available for both 750 VDC and 1500 VDC Railway applications. A new 6000 amp 750 VDC Load Break Disconnect is also available.

These Load Break Disconnects have equal breaking capacity ratings in both directions of current flow thru the switch. This is accomplished by a two-step contact system consisting of a main contact and arcing contact in combination with an electromagnetic blow-out coil and an arc chute. The arcing contacts are connected to the blow-out coil in such a way that the breaking current flows for a short time thru the coil after the main contacts open. This arrangement guarantees a high breaking capacity as well as safe interruption of low current in both directions of current flow.

RITTER Type RGL DC Load Break Disconnect features include:

- > *compact construction*
- > *high breaking capacity*
- > *short circuit making capacity*
- > *reliable breaking of low current*
- > *long lifetime due to the use  
of corrosion-resistant materials*
- > *small maintenance effort due to  
simple and robust construction*

These disconnects are suitable for all kinds of indoor application. They are used in substations or besides the track in outdoor enclosures.

## ***Configuration and Operation***

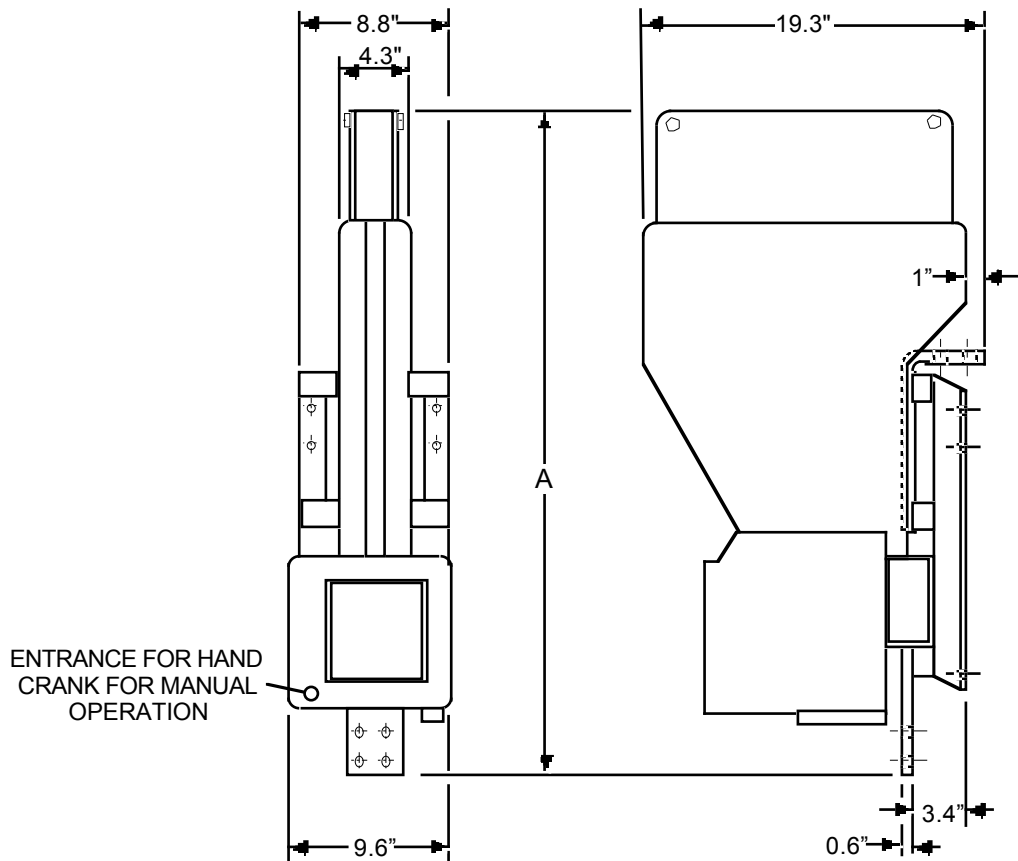
The basic frame is composed of two heavy stainless steel cross braced channels and four insulating bars which support the connecting copper busbars. The busbar on top supports the fixed arcing contact and the electromagnetic blowout. The movable main contact which is seated by a heavy compression spring and movable arcing contact are above the lower busbar. Main contacts are high pressure silver to silver on high strength copper supports. The non metallic arcing chamber is secured with a retaining spring requiring no special tools for installation and removable.

The RITTER Type RGL Disconnect is operated either locally or by remote control by a strong, over center, switching spring. When energized an electric gear motor winds the spring to top dead center position. After passing top dead center the switching spring opens the main contacts. This causes breaking current to flow for a short time thru the arcing contact into the blow-out coil. The magnetic field created by the breaking current is reinforced by a blowout insert in the arc chute. After the arcing contacts are opened the arc which forms is expanded by the residual magnetic field away from the contacts into the arc chute where it is extinguished. Arcing time between the formation of the arc until its extinction in the arc chute is 25 milliseconds. Total operating time is less than 3 seconds.

The RITTER Type RGL Disconnect can be operated manually by a removable crank in case of control power failure or during maintenance. A integral mechanical indicator provides a direct indication of the drive shaft position. These indicator flags are as shown thru the viewing window on the photo on the preceding page.

Two integrated auxiliary contacts provide direct indication of the drive shaft position to stop the motor. The Ritter disconnect can be equipped with up to 8 additional auxiliary switches (1 N.C + 1 N.O.) operated by the drive shaft to provide electrical signal indication of switch position. Another optional auxiliary contact signals when the arc chute is attached.

# RITTER **MOTOR OPERATED LOAD BREAK DC DISCONNECTS**



***Dimensions in Inches***

<b><i>Ratings and Specifications</i></b>					
<b>TYPE</b>	RGL-6	RGL-7	RGL-9	RGL-8	RGL-10
THERMAL CURRENT RATING	3150 A	4000 A	3150 A	4000 A	6000 A
NOMINAL VOLTAGE RATING	750 VDC	750 VDC	1500 VDC	1500 VDC	1000 VDC
RATED INSULATION VOLTAGE	1200 VDC	1200 VDC	3000 VDC	3000 VDC	2300 VDC
BREAKING CAPACITY	10 KA	10 KA	4.8 KA	4.8 KA	10 KA +
MAKING CAPACITY	31.5 KA	31.5 KA	31.5 KA	31.5 KA	31.5 KA
250 ms WITHSTAND CURRENT	50KA	50KA	16KA	16KA	31.5 KA
HEIGHT (A) INCHES	32.9 IN.	32.9 IN.	41.7 IN.	41.7 IN.	32.9 IN.
WEIGHT	110 Lb	110 Lb	132 Lb	132 Lb	151 Lb



# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## 1000 VDC CURRENT MONITORS

GORT ELECTRONIC SERIES 930400 CURRENT MONITORS WERE DEVELOPED BY A POWERSWITCH AFFILIATE TO MEET THE NEED FOR A DC RELAY DESIGNED SPECIFICALLY TO INDICATE WHEN 600-1000VDC POWERED ELECTRIFIED RAIL SNOW-MELTERS ARE ON OR OFF. THESE NORMALLY OPEN RELAYS CLOSE WHEN MONITORED CURRENT EXCEEDS A PRESELECTED VALUE. ELECTROMAGNETIC ISOLATED INPUT CURRENT MORE THAN THE PRESET VALUE CAUSES TWO SETS OF ISOLATED CONTACTS TO CLOSE TO PROVIDE LOCAL OR REMOTE INDICATION THAT CURRENT IS FLOWING TO THE MONITORED LOAD. EACH ASSEMBLY INCLUDE RING TYPE COMPRESSION LUGS AND RUBBER BOOTS FOR #6 AWG 2 KV CABLE. FOR SMALLER SIZE CABLE USE LUGS WHICH FIT 1/4" STUD TERMINALS. UNITS SET TO CLOSE AT CURRENTS BETWEEN 2 AND 40 AMPS ARE AVAILABLE, FOR EXAMPLE:

PART # **930402** IS SET TO CLOSE AT 2 AMPS,

PART # **930405** IS SET TO CLOSE AT 5 AMPS,

PART # **930407** IS SET TO CLOSE AT 7 AMPS.

## FEATURES

HEAT RESISTANT PHENOLIC CASE ISOLATES HV AND LOW VOLTAGE CONNECTIONS.

ELECTROMAGNETIC ISOLATION BETWEEN CURRENT SENSING, CONTROL POWER AND OUTPUT CIRCUITS.

NEGLIGIBLE INSERTION LOSS.

PROVIDES POSITIVE INDICATION THAT POWER IS ON.

## SPECIFICATIONS

HV TO LV INSULATION: 5 KVDC For 1 Min. With No Leakage

INPUT CIRCUIT AMPACITY: 40 AMPS

LINE VOLTAGE DROP: 0.3 VOLTS @ 40 AMPS

INSERTION LOSS: LESS THAN 1/2 WATT

CONTACT RATING:

10 Amp @ 250 VAC or 30 VDC

POWER REQUIREMENT:

1.3 VA @ 115 VAC or 1.5 Watts @ 125 VDC

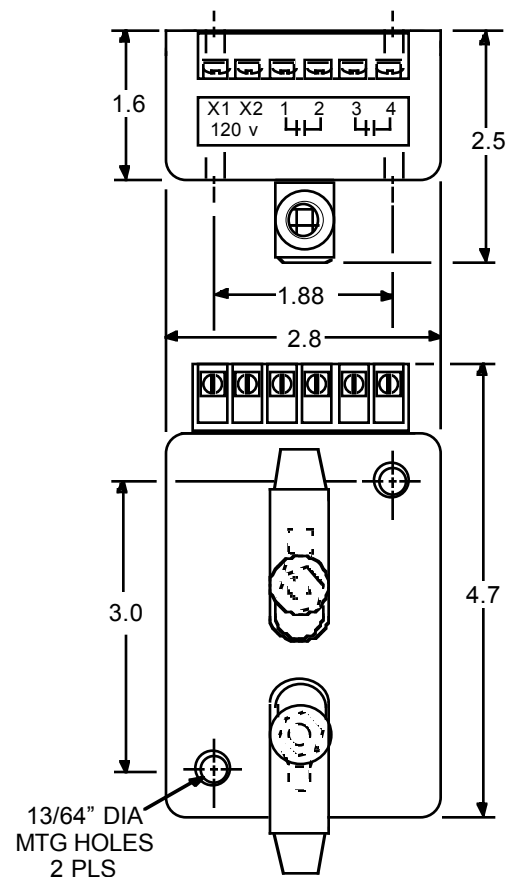
TERMINALS:

HV - 1/4-20 Brass Studs.

LV - #6 Screws with Wire Clamps.

Mounting:

(2) #10 x 2" Long Machine Screw



DIMENSIONS IN INCHES

# POWERSWITCH, Inc.

813 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)



# POWERSWITCH

## DC TRACTION POWER CONTROL COMPONENTS

### **CURRENT SENSING ELECTRONIC SWITCH COPPER RIDGE SYSTEMS - 31103 SERIES**

COPPER RIDGE SERIES 31103 ELECTRONIC SWITCHES WERE DEVELOPED BY A POWERSWITCH AFFILIATE TO MONITOR THE LOAD CURRENT ON 600-1500VDC NO-LOAD BREAK MOTOR OPERATED DISCONNECTS. THESE NORMALLY OPEN SOLID STATE SWITCHES CLOSE WHEN THE FLUX AROUND THE DISCONNECT SWITCH BLADES IS LESS THAN THAT DEVELOPED BY A SMALL AMOUNT OF LOAD CURRENT FLOWING IN EITHER DIRECTION. WHEN CONNECTED TO POWER A STANDARD 110 VDC CONTROL RELAY AN EFFECTIVE INTERLOCK IS PROVIDED TO PREVENT OPENING THE HV DISCONNECT WHEN LOAD CURRENT IS MORE THAN CAN BE SAFELY INTERRUPTED BY THE QUICK BREAK CONTACTS. THE ELECTRONIC SWITCH OPENS TO DE-ENERGIZE THE INTERLOCK RELAY WHEN THE LOAD CURRENT FLOWING THRU THE BLADES IS HIGHER THAN A SET AMOUNT. BECAUSE THE CONTROL RELAY USED IS NORMALLY OPEN AS COMPARED TO THE NORMALLY CLOSED TYPE REQUIRED FOR TYPICAL VOLTAGE SENSOR INTERLOCKS, THE NO-LOAD BREAK SWITCH CANNOT BE OPENED UNDER HEAVY LOAD EVEN WITH A FAILED INTERLOCK RELAY.

### **FEATURES**

HEAT RESISTANT PHENOLIC CASE ISOLATES SENSOR AND LOW VOLTAGE CONTROL CIRCUIT CONNECTIONS FROM HIGH VOLTAGE LIVE PARTS.

USES HIGH SENSITIVITY HALL SENSOR WITH INTEGRATED MAGNETIC CONCENTRATORS WHICH CANNOT BE DESTROYED BY A STRONG MAGNETIC FIELD.

LATEST VERSION HAS TEST JACKS TO ALLOW MEASURING STRAY MAGNETISM TO FACILITATE FINE TUNING FIELD ADJUSTMENT AS INSTALLED.

MONITORS CURRENT FLOW IN EITHER DIRECTION.

NO HIGH VOLTAGE OR NEGATIVE RETURN CONNECTION REQUIRED.

NO HIGH VOLTAGE DC FUSES REQUIRED.

### **SPECIFICATIONS**

#### SENSOR CHARACTERISTICS:

Can be set to measure currents as low as 50 amps flowing in either direction.

#### LOAD CIRCUIT:

Output Voltage: 100-108 VDC.

Output Current: 100 milliamps maximum.

#### POWER INPUT:

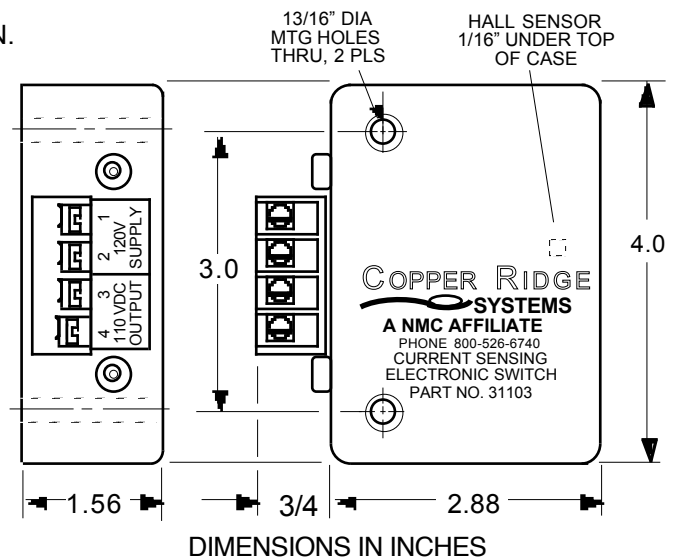
80-130 Volts AC/DC, 10 Watts Maximum.

#### TERMINALS:

#6 Screws with Wire Clamps.

#### MOUNTING:

(2) #10 x 2 inch long machine screws.



## POWERSWITCH, Inc.

815 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)

# POWERSWITCH

## DC TRACTION POWER CONTROL COMPONENTS

### DC CURRENT SENSING RELAY

#### COPPER RIDGE SYSTEMS - PART NO. 40932

PART NUMBER 40932 DC CURRENT SENSING RELAYS WERE CREATED TO PROVIDE A FAIL-SAFE INTERLOCK FOR HORIZONTAL MOUNTED NO-LOAD BREAK MOTOR OPERATED DISCONNECTS. THIS RELAY USES THE COPPER RIDGE CURRENT SENSING ELECTRONIC SWITCH THAT CLOSSES WHEN THE CURRENT FLOWING IN EITHER DIRECTION THRU THE DISCONNECT IS LESS THAN A SET AMOUNT. WHEN CLOSED THE ELECTRONIC SWITCH ENERGIZES AN INTERNAL MAGNETIC RELAY WHICH IS CONNECTED TO PREVENT OPERATION UNLESS LOAD CURRENT IS LESS THAN THE AMOUNT THAT CAN BE SAFELY INTERRUPTED BY QUICK BREAK CONTACTS. THIS RELAY HAS ONLY FAILSAFE N.O. CONTACTS THAT WILL NOT CLOSE UNLESS THE DEVICE IS FULLY FUNCTIONAL AND THE SENSED CURRENT IS BELOW THE SET AMOUNT.

### FEATURES

HEAT RESISTANT PHENOLIC CASE ISOLATES SENSOR AND LOW VOLTAGE CONTROL CIRCUIT CONNECTIONS FROM HIGH VOLTAGE LIVE PARTS.

USES HIGH SENSITIVITY HALL SENSOR WITH INTEGRATED MAGNETIC CONCENTRATORS WHICH CANNOT BE DESTROYED BY A STRONG MAGNETIC FIELD.

LATEST VERSION HAS TEST JACKS TO ALLOW MEASURING STRAY MAGNETISM TO FACILITATE FINE TUNING FIELD ADJUSTMENT AS INSTALLED.

MONITORS CURRENT FLOW IN EITHER DIRECTION.

NO HIGH VOLTAGE OR NEGATIVE RETURN CONNECTION REQUIRED.

NO HIGH VOLTAGE DC FUSES REQUIRED.

### SPECIFICATIONS

#### SENSOR CHARACTERISTICS:

Factory set to measure currents as low as 50 amps DC flowing in either direction.

#### OUTPUT RELAY:

Two isolated Normally Open Dry Contacts.  
Max Switching Voltage = 220 VDC, 250 VAC  
Rated Current = 3 Amps

#### POWER INPUT:

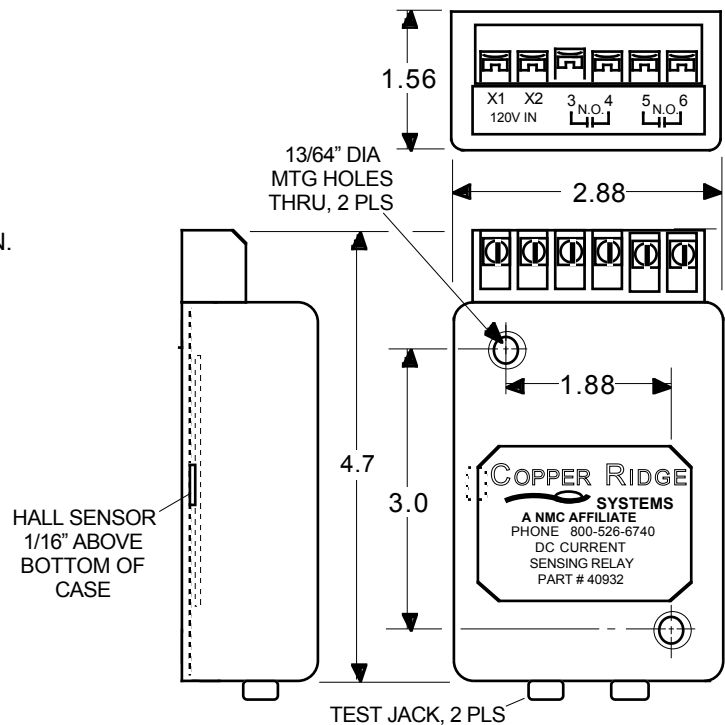
90-130 Volts AC/DC, 5 Watts Maximum.

#### TERMINALS:

#6 Screws with Wire Clamps.

#### MOUNTING:

(2) #10 x 2 inch long machine screws.



## POWERSWITCH, Inc.

815 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)

# POWERSWITCH

## DC TRACTION POWER CONTROL COMPONENTS

### DC CURRENT SENSING RELAY COPPER RIDGE SYSTEMS - 71200 SERIES

COPPER RIDGE SERIES 71200 DC CURRENT SENSING RELAY USES THE ELECTRONIC CURRENT SENSOR DEVELOPED BY OUR POWERSWITCH AFFILIATE TO MONITOR THE LOAD CURRENT ON 600-1500VDC NO-LOAD BREAK MOTOR OPERATED DISCONNECTS. THIS NORMALLY OPEN SOLID STATE SWITCH CLOSSES WHEN THE FLUX AROUND THE DISCONNECT SWITCH BLADES IS LESS THAN THAT DEVELOPED BY A SMALL AMOUNT OF LOAD CURRENT FLOWING IN EITHER DIRECTION. THE SOLID STATE SWITCH POWERS AN INTERNAL ICE CUBE

RELAY. THE RELAY CAN BE CONNECTED TO PROVIDE A FAIL SAFE INTERLOCK TO PREVENT OPENING THE HV DC DISCONNECT WHEN LOAD CURRENT IS MORE THAN THE AMOUNT THAT CAN BE SAFELY INTERRUPTED BY THE QUICK BREAK CONTACTS.

### FEATURES

USES HIGH SENSITIVITY HALL SENSOR WITH INTEGRATED MAGNETIC CONCENTRATORS WHICH CANNOT BE DESTROYED BY A STRONG MAGNETIC FIELD.

HEAT RESISTANT PHENOLIC CASE ISOLATES SENSOR AND LOW VOLTAGE CONTROL CIRCUIT CONNECTIONS FROM HIGH VOLTAGE LIVE PARTS.

MONITORS CURRENT FLOW IN EITHER DIRECTION.

NO HIGH VOLTAGE OR NEGATIVE RETURN CONNECTION REQUIRED.

NO HIGH VOLTAGE DC FUSES REQUIRED.

### SPECIFICATIONS

#### SENSOR CHARACTERISTICS:

Factory set to measure currents as low as 50 amps DC flowing in either direction.

#### OUTPUT RELAY:

Two isolated Normally Open Dry Contacts.

Max Switching Voltage = 220 VDC, 250 VAC

Rated Current = 3 Amps

#### POWER INPUT:

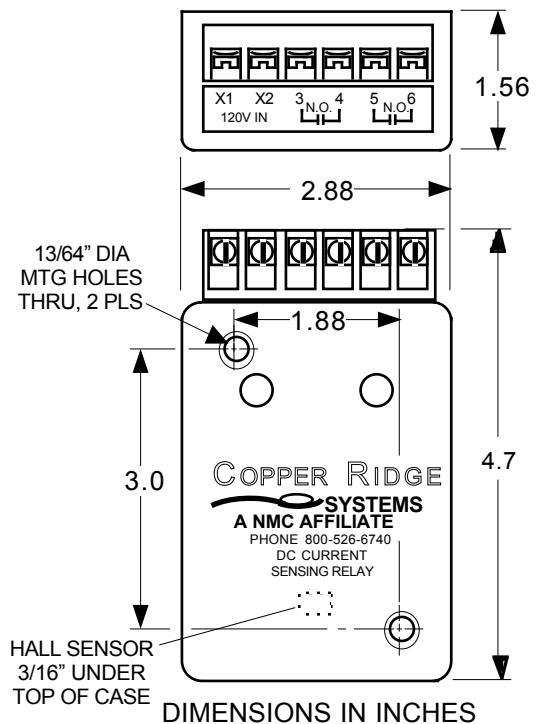
90-130 Volts AC/DC, 5 Watts Maximum.

#### TERMINALS:

#6 Screws with Wire Clamps.

#### MOUNTING:

(2) #10 x 2 inch long machine screws.



## POWERSWITCH, Inc.

815 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740  
[www.normandymachine.com](http://www.normandymachine.com)



# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## 1000 VDC VOLTAGE SENSING ELECTRONIC SWITCH

### COPPER RIDGE SYSTEMS - 940100 SERIES

PART NUMBER 940100 ELECTRONIC SWITCH WAS DEVELOPED BY A POWERSWITCH AFFILIATE TO MONITOR THE VOLTAGE ON 1000VDC NO-LOAD BREAK MOTOR OPERATED TRACTION POWER DISCONNECTS. THEY HAVE PROVEN TO BE RELIABLE TO CONTROL ELECTRICAL INTERLOCK RELAYS TO PREVENT OPERATION WHEN NO-LOAD BREAK DISCONNECTS ARE ENERGIZED. OPTICALLY ISOLATED VOLTAGES MORE THAN PLUS OR MINUS 50 VOLTS APPLIED TO THE SENSE TERMINALS CAUSE THE NORMALLY OPEN SOLID STATE SWITCH TO CLOSE. WHEN CONNECTED TO A STANDARD 110 VDC INTERLOCK RELAY THE ELECTRONIC SWITCH OPENS TO DE-ENERGIZE THE RELAY WHEN TRACTION POWER VOLTAGE IS LOWER THAN PLUS OR MINUS 50 VOLTS.



## FEATURES

ALL SOLID STATE, NO MOVING PARTS, NO CONTACT BOUNCE

OPTICALLY COUPLED ISOLATION BETWEEN HIGH VOLTAGE SENSE AND LOW VOLTAGE CONTROL CIRCUITS

HIGH SENSE VOLTAGE INPUT IMPEDANCE

OPERATES WITH EITHER AC OR DC CONTROL VOLTAGE.

## SPECIFICATIONS

#### SENSING INPUT CHARACTERISTICS:

Maximum Forward Voltage: +1000 VDC.

Maximum Reverse Voltage: -1000 VDC.

Minimum Input Impedance: 500,000 ohms.

Maximum Current Draw: 2 mA @ 1000 VDC.

#### LOAD CIRCUIT: (One 110-120 VDC Relay Coil)

Output Voltage: 100-108 VDC.

Output Current: 1A Maximum.

Reverse EMF Protection: 1000 volts.

#### POWER INPUT:

120 Volts AC/DC, 10 Watts Maximum.

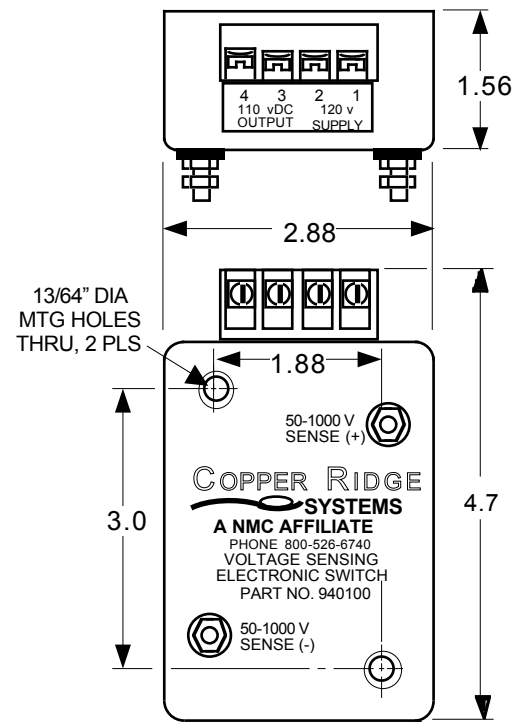
#### TERMINALS:

HV - #8-32 Brass Studs.

LV - #6 Screws with Wire Clamps.

#### MOUNTING:

(2) #10 x 2 inch long machine screws.



DIMENSIONS IN INCHES

# POWERSWITCH, Inc.

815 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)

# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## 1000 VDC VOLTAGE SENSING RELAYS

COPPER RIDGE VOLTAGE SENSING RELAYS WERE DEVELOPED BY AN NMC AFFILIATE TO MONITOR THE VOLTAGE ON 1000VDC NO-LOAD BREAK TRACTION POWER DISCONNECTS. OPTICALLY ISOLATED VOLTAGE OF SPECIFIED VALUE APPLIED TO THE SENSE TERMINALS ENERGIZE INTERNAL RELAYS TO CLOSE TWO SETS OF NORMALLY OPEN DRY CONTACTS. THESE ISOLATED CONTACTS CAN BE CONNECTED TO TURN ON LOCAL OR REMOTE SIGNAL LIGHTS OR SCADA RELAYS TO INDICATE WHEN THE OCS OR THIRD RAIL VOLTAGE IS MORE THAN THE SET VALUE.

PART NUMBER **940150** CLOSSES BOTH N.O. RELAY CONTACTS WHEN THE SENSE VOLTAGE IS BETWEEN 50 AND 1000 VOLTS.

PART NUMBER **940190** IS SIMILAR EXCEPT THE N.O. CONTACT AT TERMINALS 3 & 4 IS CLOSED WHEN THE SENSE VOLTAGE IS BETWEEN 50 AND 1000 VOLTS AND THE OTHER INDEPENDENT N.O. CONTACT AT TERMINALS 5 & 6 IS CLOSED WHEN THE VOLTAGE IS LESS THAN 50 VOLTS. THIS VARIATION WAS CREATED TO PROVIDE FAIL-SAFE CONTROL OF VOLTAGE PRESENCE DETECTORS THAT HAVE A GREEN LIGHT TO INDICATE THE OCS POWER IS OFF IN ADDITION TO THE NORMAL RED LIGHT TO INDICATE WHEN HV POWER IS ON. OTHER FAILSAFE VERSIONS ARE AVAILABLE AS SHOWN ON NEXT PAGE.

## FEATURES

DUAL OPTO-COUPLED AND ELECTROMAGNETIC ISOLATION BETWEEN HV AND INDEPENDENT OUTPUT CONTACTS.

HIGH SENSE VOLTAGE INPUT IMPEDANCE, NO FUSES NEEDED.

ISOLATED DRY CONTACTS ARE NORMALLY OPEN FAIL SAFE.

OPERATES WITH EITHER AC OR DC CONTROL POWER.

## SPECIFICATIONS

INSULATION: HV TO OUTPUT, and HV TO INPUT

5 kV DC For 1 Minute With No Leakage

SENSING INPUT CHARACTERISTICS:

Maximum Forward Voltage: +1000 VDC.

Maximum Reverse Voltage: -1000 VDC.

Minimum Input Impedance: 480,000 ohms.

Maximum Current Draw: 2 mA @ 1000 VDC.

OUTPUT RELAY:

Two Isolated Normally Open Dry Contacts

Max Switching Voltage = 220 VDC, 250 VAC

Rated Current = 3 Amps

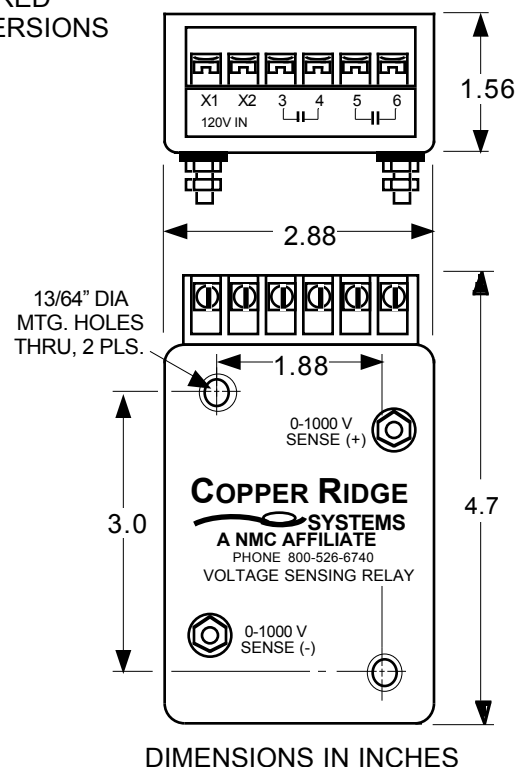
POWER INPUT:

120 Volts AC/DC, 10 Watts Maximum.

TERMINALS: HV - #8-32 Brass Studs.

LV - #6 Screws with Wire Clamps.

MOUNTING: (2) #10 x 2 inch long machine screws.



DIMENSIONS IN INCHES

REV 07-25-13

**POWERSWITCH, Inc.**

815 E. CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)

# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## 1000 VDC FAILSAFE VOLTAGE SENSING RELAYS

COPPER RIDGE FAILSAFE VOLTAGE SENSING RELAYS WERE CREATED TO PROVIDE A MORE RELIABLE INTERLOCK TO ENABLE OPERATION OF A NO-LOAD BREAK MOTOR OPERATED SWITCH ONLY WHEN THE SWITCH IS DE-ENERGIZED. THIS RELAY IS SIMILAR TO THE 940150 DEVICE EXCEPT THE NORMALLY OPEN INTERNAL CONTACTS ARE HELD CLOSED ONLY WHEN THE SENSE VOLTAGE IS LESS THAN THE FACTORY SET VALUE. THE ISOLATED, FAILSAFE, N.O.. CONTACTS WILL NOT CLOSE IF CONTROL POWER IS INTERRUPTED OR AN INTERNAL FAILURE OCCURS PROVIDED THAT THE SENSE CONNECTION IS MAINTAINED.

PART NUMBER **940170** N.O.. CONTACTS ARE HELD CLOSED WHEN THE SENSE VOLTAGE IS LESS THAN 50 VOLTS.

PART NUMBER **940171** IS SIMILAR TO 940170 EXCEPT THE CONTACTS ARE HELD CLOSED WHEN THE VOLTAGE IS LESS THAN 150 VOLTS.

PART NUMBER **940470** IS SIMILAR TO 940170 EXCEPT THE CONTACTS ARE OPEN WHEN THE SENSED VOLTAGE IS MORE THAN 100V AND DO NOT RE-CLOSE UNTIL SENSE VOLTAGE IS LESS THAN 40 V. THIS SIMULATES THE RANGE OF VOLTAGE INDICATION OBTAINED WHEN MAGNETIC RELAYS WERE USED FOR THIS APPLICATION.

## FEATURES

DUAL OPTO-COUPLED AND ELECTROMAGNETIC ISOLATION BETWEEN HV AND INDEPENDENT OUTPUT CONTACTS.

HIGH SENSE VOLTAGE INPUT IMPEDANCE, NO FUSES NEEDED.

ISOLATED DRY CONTACTS ARE NORMALLY OPEN FAIL SAFE.

OPERATES WITH EITHER AC OR DC CONTROL POWER.

## SPECIFICATIONS

INSULATION: HV TO OUTPUT, and HV TO INPUT

5 kV DC For 1 Minute With No Leakage

SENSING INPUT CHARACTERISTICS:

Maximum Forward Voltage: +1000 VDC.

Maximum Reverse Voltage: -1000 VDC.

Minimum Input Impedance: 480,000 ohms.

Maximum Current Draw: 2 mA @ 1000 VDC.

OUTPUT RELAY:

Two Isolated Normally Open Dry Contacts

Max Switching Voltage = 220 VDC, 250 VAC

Rated Current = 3 Amps

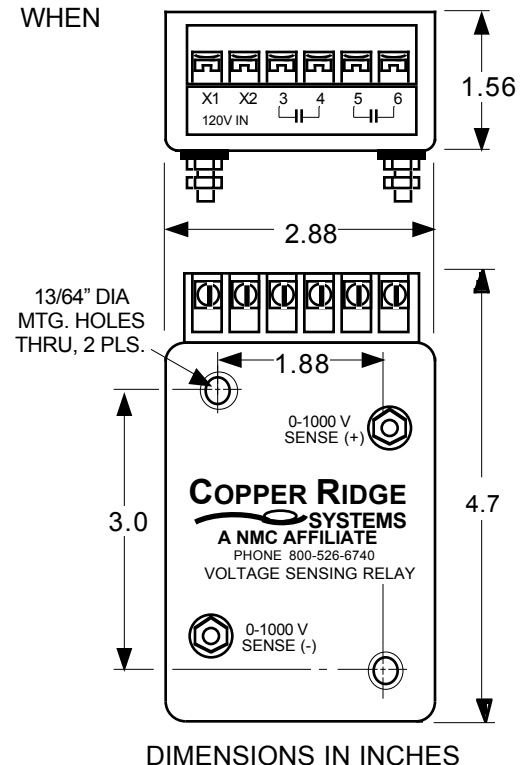
POWER INPUT:

120 Volts AC/DC, 10 Watts Maximum.

TERMINALS: HV - #8-32 Brass Studs.

LV - #6 Screws with Wire Clamps.

MOUNTING: (2) #10 x 2 inch long machine screws.



DIMENSIONS IN INCHES

REV 11-16-11

**POWERSWITCH, Inc.**

815 E. CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)



# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## SHUNT MONITOR RELAY

COPPER RIDGE SYSTEMS - 90400 SERIES

COPPER RIDGE 90400 SHUNT MONITOR RELAYS WERE DEVELOPED TO MONITOR THE CURRENT ON LOAD-BREAK DISCONNECTS TO PREVENT OPENING THE MOTOR OPERATED SWITCH WHEN LOAD CURRENT EXCEEDS SPECIFIED VALUES. THESE BI-DIRECTIONAL FAILSAFE RELAYS MEASURE OUTPUT FROM A 50 MILLIVOLT SHUNT SELECTED TO MATCH THE FULL LOAD RATING OF THE LOAD-BREAK DISCONNECT. SHUNT VOLTAGE EQUAL TO SPECIFIED LOAD CURRENT APPLIED TO THE SHUNT INPUT TERMINALS CAUSE NORMALLY OPEN CONTACTS ON AN INTERNAL MAGNETIC RELAY TO CLOSE IF ALL COMPONENTS ARE FULLY FUNCTIONAL AND SHUNT CONNECTIONS ARE MAINTAINED. THE FACTORY SETTING IS INDICATED BY THE DASH NUMBER ON THE RELAY LABEL. FOR EXAMPLE, PART # **90410-15** CLOSING WHEN 50MV 6000A SHUNT CURRENT IS LESS THAN 1800 AMPS. ALTERNATE PART # **90400-25** CLOSING WHEN LOAD CURRENT IS MORE THAN 50% OF 50MV SHUNT FULL LOAD RATING.

## FEATURES

DUAL DC-DC CONVERTER AND ELECTRO-MAGNETIC ISOLATION BETWEEN HV AND INDEPENDENT OUTPUT CONTACTS.

MEASURES CURRENT FLOWING IN EITHER DIRECTION THRU SHUNT.

FAILSAFE NORMALLY OPEN CONTACTS WILL NOT CLOSE UNLESS ALL COMPONENTS ARE WORKING, SHUNT CONNECTIONS ARE MAINTAINED, AND CONTROL POWER IS MAINTAINED.

OPERATES WITH EITHER AC OR DC CONTROL POWER.

## SPECIFICATIONS

DIELECTRIC WITHSTAND:

Between Shunt Terminals and Relay Output Contacts:  
3KV DC For 1 Minute With No Leakage

SHUNT INPUT:

Factory Set Between 15 and 50 millivolts.

OUTPUT RELAY:

Two Isolated Normally Open Contacts

Inductive Load Rating:

10 amps at 250 VAC

10 amps at 30 VDC

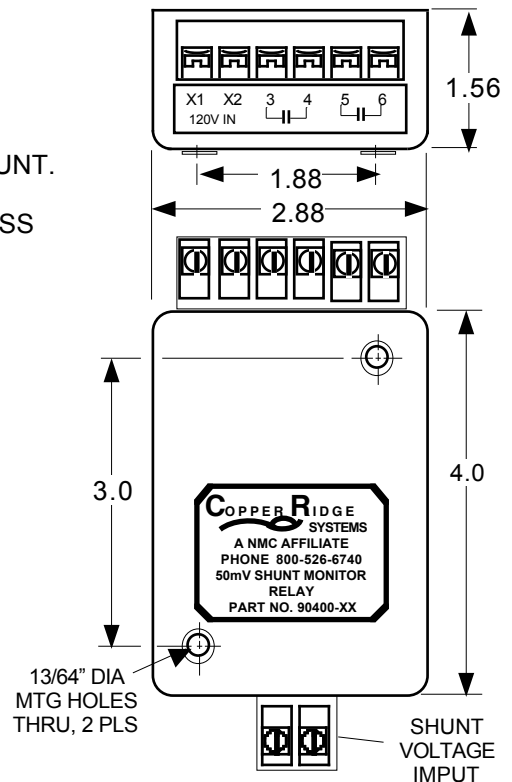
POWER INPUT:

120 Volts AC/DC, 10 Watts Maximum.

TERMINALS: HV - #8-32 Brass Studs.

LV - #6 Screws with Wire Clamps.

MOUNTING: (2) #10 x 2 inch long machine screws.



DIMENSIONS IN INCHES

REV JULY 2012

# POWERSWITCH, Inc.

815 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)

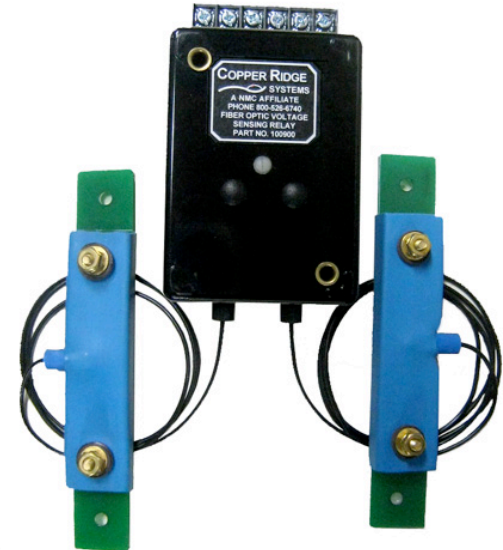
# POWERSWITCH

1000 VDC TRACTION POWER  
CONTROL COMPONENTS

## 2000 VDC FIBER OPTIC VOLTAGE SENSING RELAY

### COPPER RIDGE SYSTEMS - 100900 SERIES

COPPER RIDGE SERIES 100900 FIBER OPTIC VOLTAGE SENSING RELAYS ARE A VARIATION OF THE POPULAR 940150-70 SERIES TO MEET SPECIFICATIONS CALLING FOR HV CONNECTIONS TO BE SEPARATE FROM THE LV CONNECTIONS. THE FIBER CABLE PROVIDES COMPLETE ELECTRICAL ISOLATION AND SURGE PROTECTION BETWEEN HIGH AND LOW VOLTAGE WIRING. A TYPICAL APPLICATION WOULD MOUNT THE SELF POWERED HV SENSORS ON OR NEAR THE HV TERMINALS OF A MOTOR OPERATED SWITCH AND CONNECT THE SENSORS BY FIBER OPTIC CABLES TO THE RELAY MODULE IN THE LV CONTROL ENCLOSURE. SHOWN HERE IS PART **#100910** WHICH IS ARRANGED TO CLOSE TWO SETS OF N.O. CONTACTS WHEN VOLTAGE ON THE SENSOR TERMINALS IS LESS THAN  $\pm 50$  VOLTS. THIS IS NORMALLY USED AS AN INTERLOCK TO ENABLE OPERATION OF A MOTOR OPERATED SWITCH ONLY WHEN THE VOLTAGE ON THE SWITCH TERMINALS IS LESS THAN 50 VOLTS. ALTERNATE PART **#100900** IS USED TO TURN ON LOCAL OR REMOTE SIGNAL LIGHTS OR SCADA RELAYS TO INDICATE WHEN THE OCS OR THIRD RAIL VOLTAGE IS 50 VOLTS OR MORE.



## FEATURES

DUAL OPTIC AND ELECTROMAGNETIC ISOLATION BETWEEN HV AND INDEPENDENT OUTPUT CONTACTS.

ALLOWS SEPARATING HV SENSORS AND LV RELAY MODULE WITH OVER 150 FEET OF FIBER CABLE.

USES LOWEST COST EASY TO INSTALL FIBER OPTIC CABLE REQUIRING NO SPECIAL TOOLS.

OPERATES WITH EITHER AC OR DC CONTROL POWER.

## SPECIFICATIONS

#### INSULATION:

5 KV DC For 1 Minute With No Leakage

#### SENSING INPUT CHARACTERISTICS:

Minimum Input Impedance: 960,000 ohms.

Maximum Current Draw: 2 ma @ 2000 VDC.

#### OUTPUT RELAYS:

Isolated Normally Open Dry Contacts.

Max Switching Voltage = 220 VDC, 250 VAC

Rated Current = 3 Amps

#### POWER INPUT:

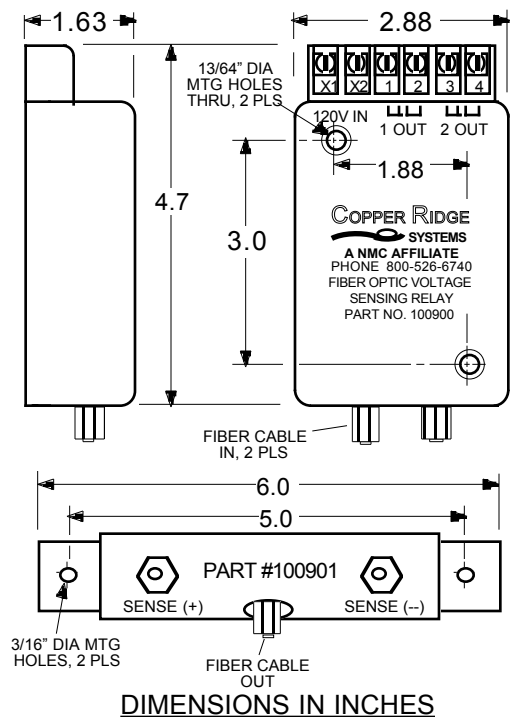
120 Volts AC/DC, 10 Watts Maximum.

#### TERMINALS:

#6 Screws with Wire Clamps.

#### RELAY MOUNTING:

(2) #10 x 2 inch long machine screws.



**POWERSWITCH, Inc.**

REV MARCH 2014

815 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740  
[www.normandymachine.com](http://www.normandymachine.com)

# POWERSWITCH

## DC TRACTION POWER COMPONENTS

### HV DC LED TOWER LIGHTS

POWERSWITCH SERIES 70100 LED TOWER LIGHTS WERE DEVELOPED TO MEET DEMANDS FOR A RELIABLE, EFFICIENT, DURABLE WAY TO INDICATE WHEN HIGH VOLTAGE DC IS PRESENT ON THE OVERHEAD CENTENARY OR THIRD RAIL TRACTION POWER SYSTEMS. SUITABLE FOR NEMA TYPE 1, 3R, AND 12 APPLICATIONS THESE TOWER LIGHTS ARE USUALLY MOUNTED ON TOP OF OUR POWERSWITCH FIBERGLASS ENCLOSED DISCONNECT SWITCHES OR ON SEPARATE ENCLOSURES EITHER INDOORS OR OUT. ALL ASSEMBLIES USE THE SAME CLEAR POLYCARBONATE GLOBES WHICH PRODUCES 360 DEGREES OF BRIGHT, SHADOW-FREE, LIGHT FOR MAXIMUM VISIBILITY FROM A DISTANCE. 70100 SERIES TOWER LIGHTS ARE SUPPLIED COMPLETE WITH 120 VOLT AC/DC LAMPS CONSISTING OF MULTIPLE SUPER BRIGHT LEDS WITH WATER CLEAR LENSES. THE NUMBER OF LEDS USED IS SELECTED TO PROVIDE THE MAXIMUM ILLUMINATION AT THE RATED VOLTAGE WITH A MINIMUM AMOUNT OF HEAT PRODUCING VOLTAGE DROPPING RESISTANCE. ALL LED STRINGS ARE CONNECTED TO ALLOW MOST TO REMAIN ON EVEN IF ONE OR SEVERAL INDIVIDUAL LEDS SHOULD FAIL.

### FEATURES

GLOBE, CAP, AND BASE ARE SHOCK AND CORROSION RESISTANT POLYCARBONATE.

360° OF BRIGHT COLORED LIGHT FOR MAXIMUM VISIBILITY FROM A DISTANCE.

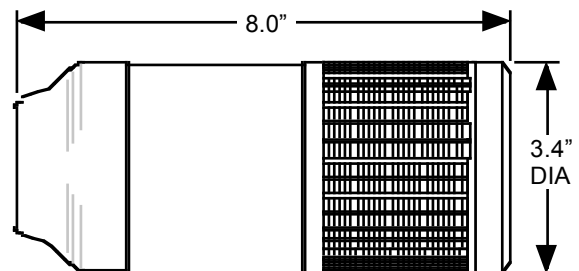
NEMA 1, 12, 3R RATED FOR INDOOR OR OUTDOOR LONG LIFE APPLICATION.

MULTIPLE SUPER BRIGHT LED STRINGS CONNECTED TO PROVIDE MAXIMUM BRIGHTNESS AND REDUNDANCY.

### SPECIFICATIONS

Rated Voltage = 120v AC or DC  
Current = 15 ma or less

Color Options:  
Globes and LED lens are Clear.  
Part # 070110 has RED LED Lamp.  
Part # 070120 has GREEN LED Lamp.



DIMENSIONS IN INCHES

## POWERSWITCH, Inc.

815 E CHERRY STREET <> TROY, MO 63379 <> 1-800-526-6740

[www.normandymachine.com](http://www.normandymachine.com)