

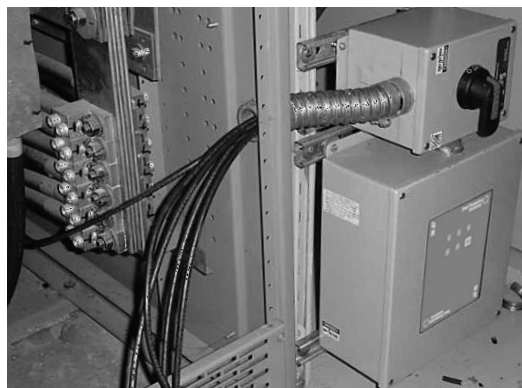
Surge Protective Devices

ServiceTrack® ST Disconnect Switches

Installation,
Operation and
Maintenance
Manual

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Sample Installations

NOTE: Do not use conduit in-between disconnect and SPD.
Keep lead length as short as possible to ensure optimum SPD performance.

BEFORE INSTALLATION



WARNING: HAZARDOUS VOLTAGES PRESENT Improper installation or misapplication may result in serious personnel injury and/or damage to electrical system. Read the complete installation instructions before proceeding with installation. Remove all power to the electrical panel before installing or servicing the suppressor.

IMPORTANT SAFETY INSTRUCTIONS All work must be performed by licensed and qualified personnel. The electrical system must be properly grounded in accordance with the U.S. National Electrical Code, state and local codes or other applicable codes for this suppressor to function properly.

1. System Configuration Verification

The disconnect switches are companion devices to the base ServiceTrack ST Surge Protective Devices (SPDs). Please refer to the ServiceTrack ST SPD Installation and Operation Manual for system configuration verification.

There are two types of disconnect switches: fused or non-fused. See table below for model number descriptions:

Example of a Disconnect Switch model number: DN-200KAIC-60A-3/4

MODEL NUMBER	DESCRIPTION	ENCLOSURE TYPE	SUITABLE FOR
DN-200KAIC-60A-3/4	Non-fused disconnect switch, 60A, 200KAIC, 3/4" mounting kit included	NEMA 4 steel	ServiceTrack ST CLF 80kA
DN-200KAIC-60A-3/4-XX	Non-fused disconnect switch, 60A, 200KAIC, 3/4" mounting kit included	NEMA 4X stainless steel	ServiceTrack ST CLF 80kA
DN-200KAIC-60A-1	Non-fused disconnect switch, 60A, 200KAIC, 1" mounting kit included	NEMA 4 steel	ServiceTrack ST CLF 120 – 160kA
DN-200KAIC-60A-1-XX	Non-fused disconnect switch, 60A, 200KAIC, 1" mounting kit included	NEMA 4X stainless steel	ServiceTrack ST CLF 120 – 160kA
DN-200KAIC-60A-1.25	Non-fused disconnect switch, 60A, 200KAIC, 1.25" mounting kit included	NEMA 4 steel	ServiceTrack ST CLF 200 – 400kA
DN-200KAIC-60A-1.25-XX	Non-fused disconnect switch, 60A, 200KAIC, 1.25" mounting kit included	NEMA 4X stainless steel	ServiceTrack ST CLF 200 – 400kA
DF-200KAIC-60A-3/4	Fused-disconnect switch, 60A, 200KAIC, 3/4" mounting kit included	NEMA 4 steel	ServiceTrack ST standard 80kA
DF-200KAIC-60A-3/4-XX	Fused-disconnect switch, 60A, 200KAIC, 3/4" mounting kit included	NEMA 4X stainless steel	ServiceTrack ST standard 80kA
DF-200KAIC-60A-1	Fused-disconnect switch, 60A, 200KAIC, 1" mounting kit included	NEMA 4 steel	ServiceTrack ST CLF 120 – 160kA
DF-200KAIC-60A-1-XX	Fused-disconnect switch, 60A, 200KAIC, 1" mounting kit included	NEMA 4X stainless steel	ServiceTrack ST CLF 120 – 160kA
DF-200KAIC-60A-1.25	Fused disconnect switch, 60A, 200KAIC, 1.25" mounting kit included	NEMA 4 steel	ServiceTrack ST CLF 200 – 400kA
DF-200KAIC-60A-1.25-XX	Fused disconnect switch, 60A, 200KAIC, 1.25" mounting kit included	NEMA 4X stainless steel	ServiceTrack ST CLF 200 – 400kA

2. Wiring Connection Diagrams

Figures 1-10 show the electrical relationship between the ServiceTrack ST SPD, the disconnect switch and these five basic service configurations: Single phase, 2 wire; Split phase, 3 wire; Three phase, 4 wire WYE; Three phase, 3 wire DELTA and Three phase, 4 wire high leg DELTA. See figures 1-5 for Non-Fused Disconnect Switch wire connection diagrams. See figures 6-10 for Fused-Disconnect Switch wire connection diagrams.

Fig. 1: Single Phase, 2-Wire, with Non-Fused Disconnect Switch

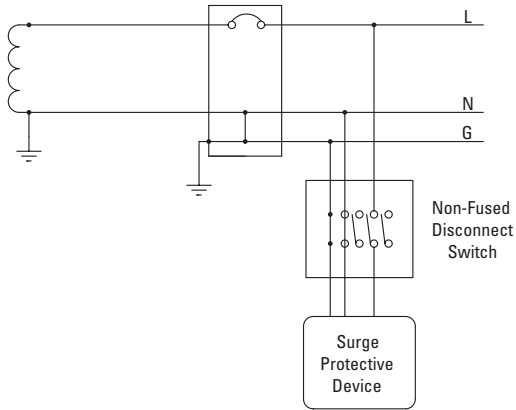


Fig.2: Split Phase, 3-Wire, with Non-Fused Disconnect Switch

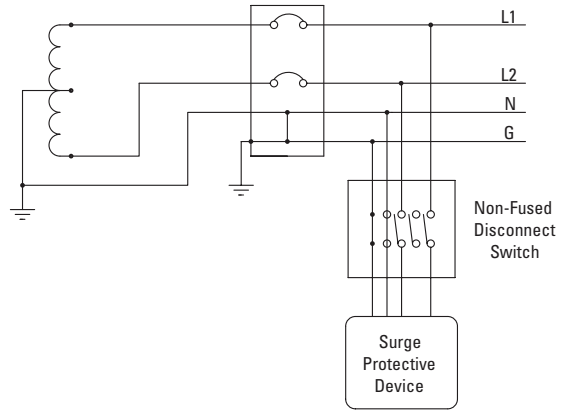


Fig. 3: 3-Phase, 4-Wire WYE, with Non-Fused Disconnect Switch

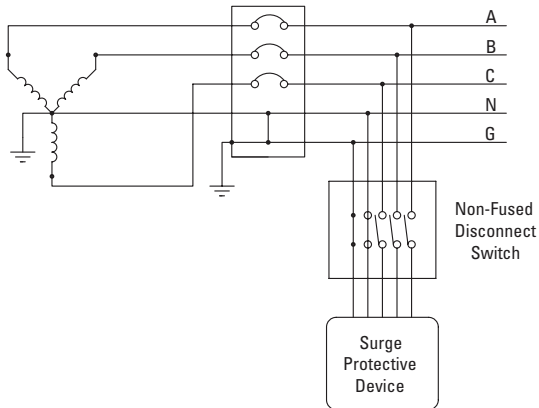


Fig. 4: 3-Phase, 3-Wire DELTA, with Non-Fused Disconnect Switch

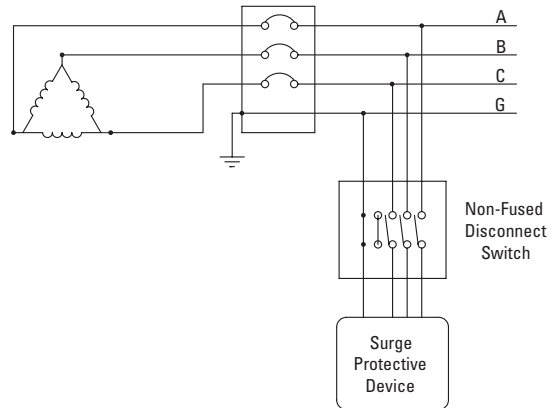


Fig.5: 3-Phase, 4-Wire High-Leg DELTA, with Non-Fused Disconnect Switch

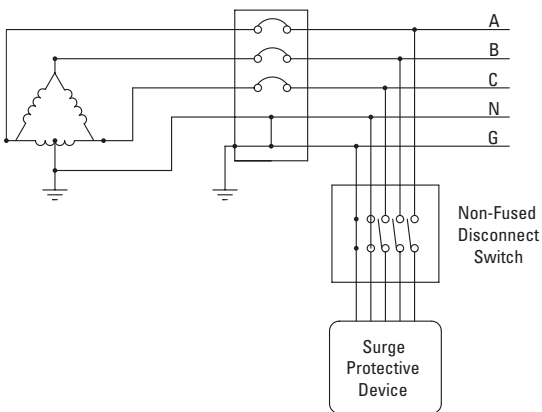


Fig. 6: Single Phase, 2-Wire, with Fused-Disconnect Switch

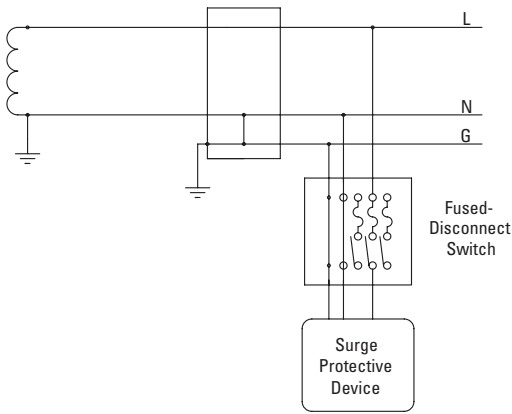


Fig.7: Split Phase, 3-Wire, with Fused-Disconnect Switch

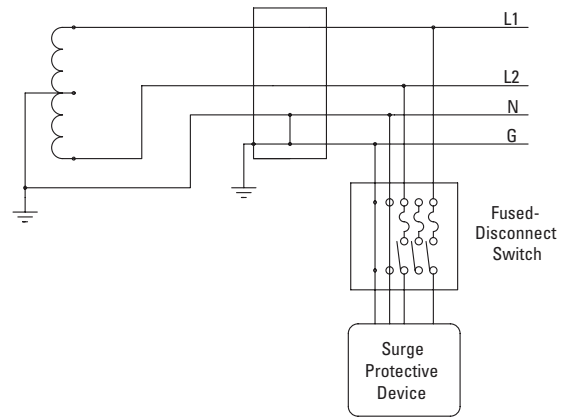


Fig.8: 3-Phase, 4-Wire WYE, with Fused-Disconnect Switch

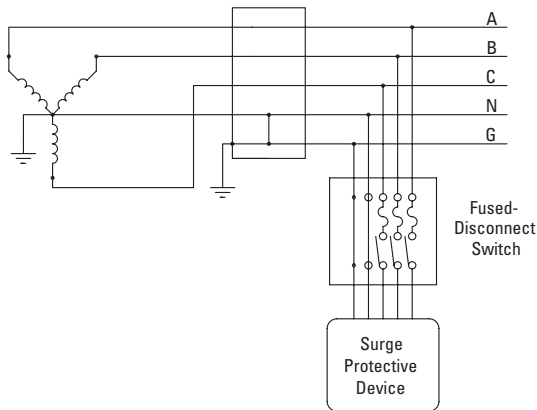


Fig.9: 3-Phase, 3-Wire DELTA, with Fused-Disconnect Switch

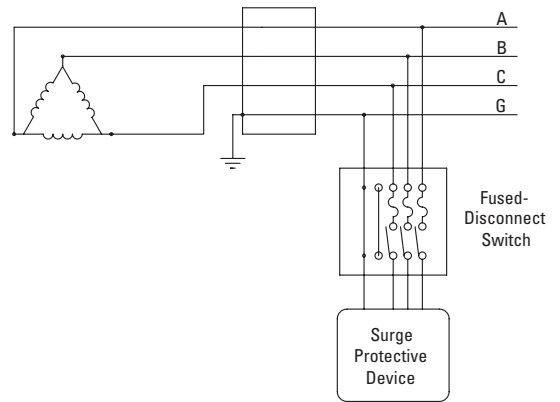
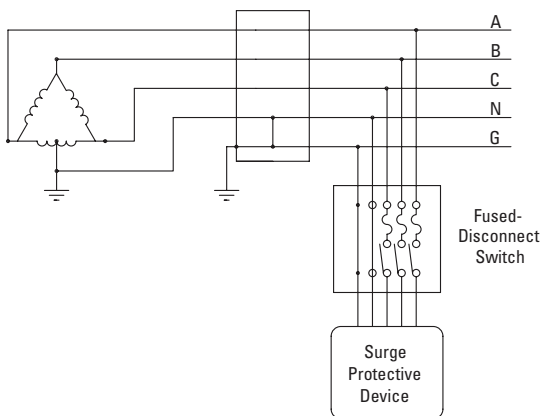


Fig.10: 3-Phase, 4-Wire High-Leg DELTA, with Fused-Disconnect Switch



Connection between ServiceTrack ST SPD and disconnect switch:

For 80kA and units with -R suffix, connections are made via pigtail leads supplied with the unit. For 3-phase units phases A, B and C are black wires, which are marked “PHASE A”, “PHASE B” and “PHASE C” respectively. For split phase units, the phase connections are marked “PHASE A” and “PHASE B”. For single-phase units, the phase connection is marked “PHASE A”. The neutral (when applicable) is a white wire and the ground is a green wire.

For 120–400kA SPD models, connections are made to terminals inside the suppressor enclosure. These terminals are marked with labels. For 3-phase units phase A is marked as “PHASE A”, phase B is marked as “PHASE B” and phase C is marked as “PHASE C”. For split phase units, the phase connections are marked “PHASE A” and “PHASE B”. For single-phase units, the phase connection is marked “PHASE A”. Neutral (if applicable) is marked as “N” and ground is marked as “GND”.

Connections between disconnect switch and facility electrical system

All disconnect switches are equipped for three phase applications. For single phase applications the outer two phase connections will not be used. For split phase applications the inner phase connection will not be used. The phase terminals are marked “A”, “B”, and “C”. The neutral is marked “N”. The ground is marked “G”. Neutral connections are passed through the switch via a non-switched terminal pole. Ground connections are passed through the switch via ground lugs which are also electrically connected to the enclosure.

3. Upstream Over-Current Protection Device

All disconnect switches must be connected in parallel with the electrical system.

When a non-fused disconnect switch (model number starts with “DN” prefix) is used with an internally-fused ServiceTrack ST CLF (component-level fusing) SPD unit, it can be connected directly to the facility electrical system where the available short circuit current is 200,000 rms symmetrical amperes at 600V AC or less. However, if the disconnect switch is used with a standard SurgeTrack SPD unit, it must be connected to an upstream over-current protective device (Class J or equivalent fuse or breaker) rated at 60 amperes/600 volts AC maximum.

Fused-disconnect switches (model numbers start with “DF”) come standard with Class J fuses rated at 60 amperes/600 volts AC, and therefore do not require an upstream over-current protection device.



WARNING TO REDUCE THE RISK OF FIRE REPLACE FUSE WITH SAME TYPE AND RATING.

4. Conductor Routing



CAUTION: Do not splice ServiceTrack ST conductors within the unit’s enclosure or Manufacturer’s warranty will be void. ServiceTrack ST’s performance will be limited severely if the conductors are (a) too long, (b) are of too small a wire gauge, (c) have too many bends or (d) have sharp bends.

The factors listed above should be addressed during the design of an installation to reserve a suitable place for ServiceTrack ST and disconnect switch next to its point of connection to the electrical system. The selected mounting location should allow for the shortest possible conductor runs and a direct route with a minimum of bends. If bends are required, they should be *sweeping* bends. Do not make sharp 90° bends for appearance purposes because they will severely decrease the effectiveness of SurgeTrack. Braiding or twisting conductors together (two twists per foot) using tie-wraps or electrical tape increases the protection performance of the device.

5. Conductor Sizing

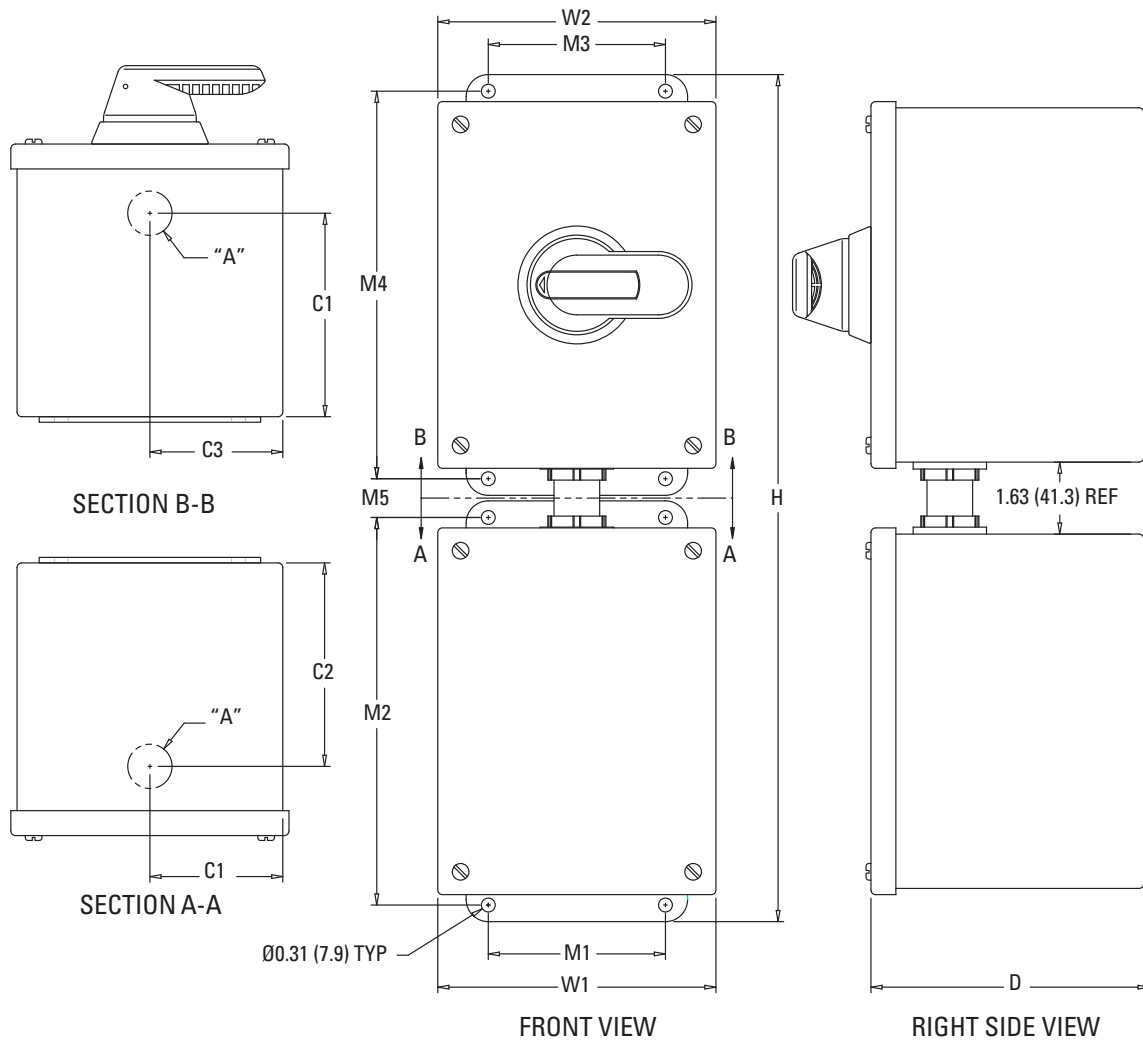
Consult the ServiceTrack ST SPD Installation and Operation manual for the proper conductor sizing.

6. Conduit Openings

Each disconnect switch is shipped with either 3/4, 1 or 1.25 inch mounting kit based on the surge rating of the ServiceTrack ST SPD. Consult the ServiceTrack ST SPD Installation and Operation manual for proper conduit sizing. ServiceTrack ST SPD using #10AWG wire should use a 3/4" conduit system. SurgeTrack SPD using wires larger than #10AWG should use the 1" conduit system. Use the supplied hubs and mounting hardware to couple the disconnect switch to ServiceTrack ST SPD. Use care to maintain the NEMA 4 rating of the coupled devices.

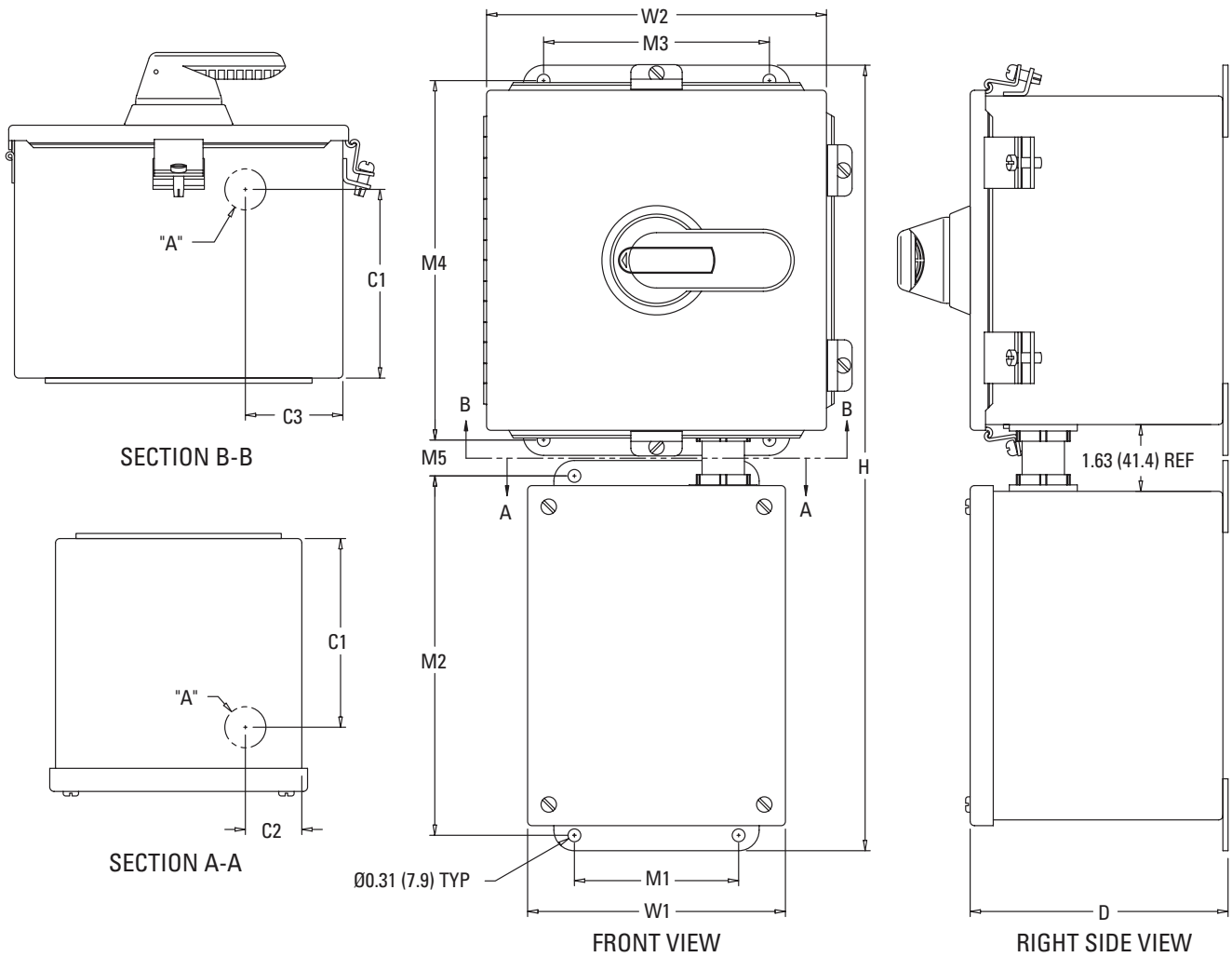
Punch holes in locations indicated in Figure 11 and 12.

Fig. 11 Non-fused Disconnect Enclosure Coupling Method and Mounting Dimensions



SPD SURGE RATING	OVERALL DIMENSIONS – INCH (mm)				MOUNTING HOLES					CONDUIT FITTING (SUPPLIED)			
	H	W1	W2	D	M1	M2	M3	M4	M5	TRADE SIZE "A"	PUNCH LOCATIONS C1 C2 C3		
80kA	19.13 (485.9)	6.28 (159.5)	8.28 (210.3)	6.28 (159.5)	4.00 (101.6)	8.75 (222.3)	5.50 (139.7)	8.75 (222.3)	0.88 (22.4)	0.75 (19.1)	4.38 (111.3)	1.38 (35.1)	2.38 (60.3)
120, 160kA	21.13 (536.7)	8.28 (210.3)	8.28 (210.3)	6.28 (159.5)	6.00 (152.4)	10.75 (273.1)	5.50 (139.7)	8.75 (222.3)	0.88 (22.4)	1.00 (25.4)	4.38 (111.3)	2.38 (60.5)	2.38 (60.5)
240, 300, 400kA	25.13 (638.3)	12.28 (311.9)	8.28 (210.3)	6.28 (159.5)	10.00 (254.0)	14.75 (374.6)	5.50 (139.7)	8.75 (222.3)	0.88 (22.4)	1.00 (25.4)	4.38 (111.3)	2.38 (60.5)	2.38 (60.5)

Fig. 12 Fused-Disconnect Enclosure Coupling Method and Mounting Dimensions



SPD SURGE RATING	OVERALL DIMENSIONS – INCH (mm)				MOUNTING HOLES					CONDUIT FITTING (SUPPLIED)			
	H	W1	W2	D	M1	M2	M3	M4	M5	“A”	C1	C2	C3
80kA	19.13 (485.8)	6.28 (159.5)	8.28 (210.3)	6.28 (159.5)	4.00 (101.6)	8.75 (222.3)	5.50 (139.7)	8.75 (222.3)	0.88 (22.3)	0.75 (19.0)	4.38 (111.2)	1.38 (34.9)	2.38 (60.3)
120, 160kA	21.13 (536.6)	8.28 (210.31)	8.28 (210.3)	6.28 (159.5)	6.00 (152.4)	10.75 (273.1)	5.50 (139.7)	8.75 (222.3)	0.88 (22.3)	1 (25.4)	4.38 (111.2)	2.38 (60.3)	2.38 (60.3)
240, 300, 400kA	25.13 (638.3)	12.28 (311.9)	8.28 (210.3)	6.28 (159.5)	10.00 (254.0)	14.75 (374.7)	5.50 (139.7)	8.75 (222.3)	0.88 (22.3)	1 (25.4)	4.38 (111.2)	4.38 (111.3)	2.38 (60.3)

7. Mounting

As shown in figures 11 and 12, the disconnect switch must be mounted on top of or on the side of the ServiceTrack ST SPD. Mount the enclosures using construction methods and hardware appropriate for your site. Use the conduit hub and chase nipple to connect the disconnect to the SPD. Do not use conduit in between the disconnect and SPD, this ensures a minimal conductor length and optimizes surge performance of the SPD.

CONNECTION AND WIRING INSTRUCTIONS

1. Phase, Neutral, and Ground Connections

NOTE: In order to connect the ServiceTrack ST devices, the covers of the units must be removed. Use care when removing the SPD cover, as there are wires, which run from components on the cover to inside the enclosure of the suppressor. The monitor board (located on the backside of the SPD cover) has a cable harness which routes into the enclosure. Additionally there are ground jumpers between the enclosure and the cover. SPD units supplied with a surge counter have a harness, which runs from the surge counter display to a core inside the unit.



CAUTION: Prior to installation ensure the system configuration and voltage is equivalent to the voltage rating of the ServiceTrack ST unit being installed. Do not splice ServiceTrack ST conductors within the unit's enclosure or Manufacturer's warranty will be void.

Following all applicable National Electrical Code standards as well as state and local codes, connect phase, neutral* and ground to the disconnect switch and to the SPD. The 80kA and units with -R suffix, are supplied with #10 AWG conductors permanently attached. Should mounting conditions require extension of the supplied conductor(s), installation electrician may use a butt-splice or parallel solder with shrink-tube installation. In no event shall the electrician use a wire nut to make the extension as this will result in loss of suppressor's performance. Ensure that the conductor lengths are kept as short and straight as possible. Tighten all lugs to 20 in-lb (2.2Nm). For high leg delta systems, the Phase B (color-coded orange according to NEC) conductor must be connected to the Phase B terminal of the suppressor.

* 3-wire plus ground DELTA ServiceTrack ST does not have a neutral conductor.

2. Verification and Power Up

Consult the ServiceTrack ST SPD Installation and Operation manual for Verification and Power up sequence.

TECHNICAL ASSISTANCE

Your ServiceTrack ST Disconnect Switch does not require scheduled maintenance. The unit's heavy-duty construction is designed to provide years of uninterrupted service. Fused-Disconnect switches contain fuses which may need to be replaced.

Our staff is ready to support you and answer any questions.

Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST) at 800-647-1911

RETURNS AND WARRANTY PROCEDURES

ServiceTrack ST products are warranted for a period of 30 years from date of purchase. In the event that any module or subassembly fails to perform as specified during the warranty period, call our Technical Support at 800-647-1911 to obtain a Return Material Authorization number. We will immediately ship a replacement for the defective parts free of charge (installation labor and site preparation excluded). Return the defective parts to TPS within 30 days of receiving the replacement. Failure to return the defective parts will result in billing for the replacement parts. To help expedite the return procedures, please have the following information at hand when you contact TPS:

INFORMATION	EXAMPLE
Model Number	DN-200KAIC-60A-3/4
Serial Number	15478-0104-001
Date of Purchase	January 2, 2004 (1st week)
Sales Order Number	15478
Description of Failure	Cannot close the disconnect switch
Desired Action	Replace

WARRANTY STATEMENT

During the applicable warranty period, any Total Protection Solutions® surge protector device which fails due to defect in materials, workmanship, or any transient surge event to include lightning, shall be repaired or replaced at the expense of the manufacturer.

Prior to shipment of any suspect or known defective product a Return Material Authorization (RMA) number must be obtained. An official RMA number and shipping instructions can be obtained from the distributor where the product was originally purchased. Distributors can obtain the official RMA number by contacting the Total Protection Solutions Customer Service Department at 800-647-1911. Products arriving without an official RMA number will not be accepted and will be returned freight collect to the original point of shipment.

Products being returned with an official RMA number should be shipped by prepaid freight to the nominated point of return as shown on the RMA documentation.

Total Protection Solutions shall have no liability under this warranty for problems or defects directly or indirectly caused by misuse of the Product, alteration of the Product (including removal of any warning labels), accidents, improper installation, application, operation or improper repair of the Product.

THIS WARRANTY REPRESENTS THE ENTIRE WARRANTY OF TOTAL PROTECTION SOLUTIONS. ALL OTHER WARRANTIES EXPRESS OR IMPLIED, ORAL OR WRITTEN, INCLUDING, BUT NOT LIMITED TO, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. THE LIABILITY OF TOTAL PROTECTION SOLUTIONS, AT ITS SOLE OPTION, UNDER THIS WARRANTY IS EXPRESSLY LIMITED TO THE REPLACEMENT OR REPAIR OF THE DEFECTIVE PART THEREOF. IN NO EVENT SHALL TOTAL PROTECTION SOLUTIONS BE LIABLE OR RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND OR CHARACTER, NOR SHALL ITS LIABILITY EVER EXCEED THE PURCHASE PRICE PAID FOR SUCH DEFECTIVE PRODUCT.

This warranty is not transferable and may only be enforced by the original purchaser. Claims under this warranty must be submitted to Total Protection Solutions within thirty (30) days of discovery of any suspected product defect.

Warranty Period

ServiceTrack® ST Fused / Non-Fused Disconnect Switch 30 Years





TEL: 800-853-8265 www.InnosysPower.com

