

Operation & Installation Manual

200 Amp ProDySC[®]

Models **DS30200A... 2000C**
with Manual Bypass Switchboard

Options include:

- 200, 208, 220, 230, 240,
380, 400, 415, 440, 460, or 480 Volts,
- 3-Wire or 4-Wire, 3-Phase
- Standard (SR) or Extended (ER) Runtime



SoftSwitching[®]
TECHNOLOGIES

Revolutionizing Power Protection

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IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS

DANGER – To reduce the risk of fire, shock or serious injury, read and understand all installation and safety information in this manual.

There are **no user-serviceable parts** within the ProDySC system. Service must only be performed by trained and authorized factory service personnel.

WARNING: Equipment must be earth grounded according to local and national electric codes. Failure to supply proper equipment grounding may result in electrical shock or death.

WARNING: VOLTAGE

Dangerous voltages are exposed within the ProDySC System. The system should never be operated with the enclosure doors open except by qualified and authorized personnel who are trained and familiar with system operation and the location of components and voltages. Failure to comply with this warning could result in injury or death.

Refer servicing to qualified and factory-authorized personnel. Opening ProDySC doors while the system is in operation will result in loss of power to protected loads. The system must be placed in bypass prior to opening the ProDySC doors to insure continuous power to protected loads.

The ProDySC enclosure contains energy storage devices. **Dangerous voltages may exist within this enclosure after AC power has been removed.** Do not touch any components within the enclosure if red LEDs located above capacitor banks are lighted. If red LEDs do not extinguish within 5 minutes, close the enclosure door and contact the factory for assistance.

Dangerous voltages can still exist within the ProDySC enclosure even if the system is in bypass mode. Refer servicing to qualified personnel.

WARNING : This system is interlocked: Opening ProDySC doors while the system is in operation will result in loss of power to protected loads. The system must be placed in bypass prior to opening the ProDySC doors to insure continuous power to protected loads. (Refer to section 2.3 for manual bypass operation)

Read this entire manual prior to the installation and operation of the ProDySC system.

NOTE: There are at least 3 WARNING or CAUTION statements within this manual that pertain to operator safety and equipment usage.

1. INSTALLATION

1.1 COMPONENTS

The ProDySC system consists of two enclosures: a ProDySC enclosure and a Manual Bypass Switchboard enclosure which must be mechanically and electrically connected at the time of installation. The ProDySC enclosure houses the power-conditioning component. The Bypass Switchboard enclosure houses the input circuit breaker (CBI), output circuit breaker (CBO), bypass circuit breaker (CBB), control power fuses and voltage and current monitoring circuits if included.

1.2 ORIENTATION AND LAYOUT

The required layout places the ProDySC on the right side and the Bypass Switchboard on the left side when viewed from the front. The enclosures must be mounted so that they abut tightly with no gap between the enclosures.

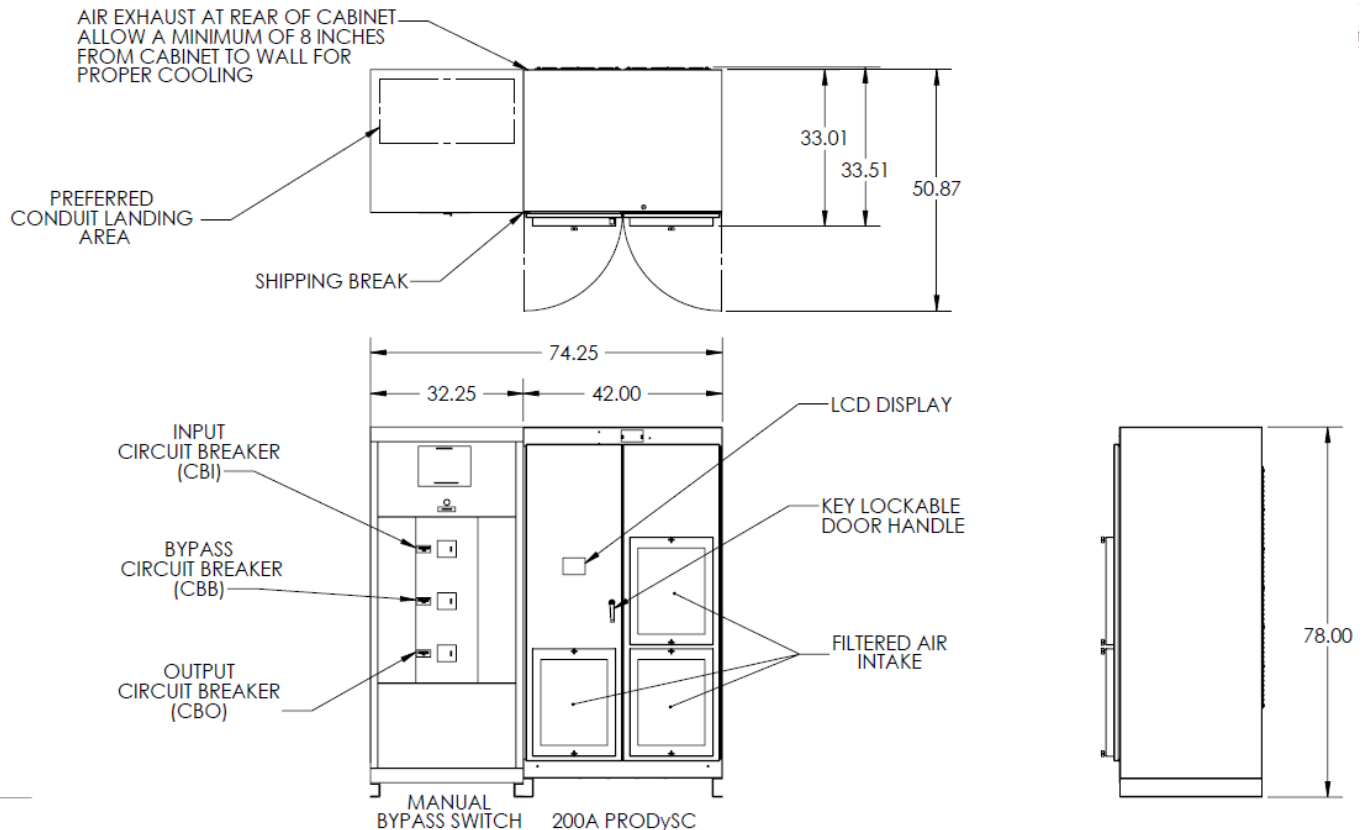


FIGURE 1: ProDySC System Layout [inches]

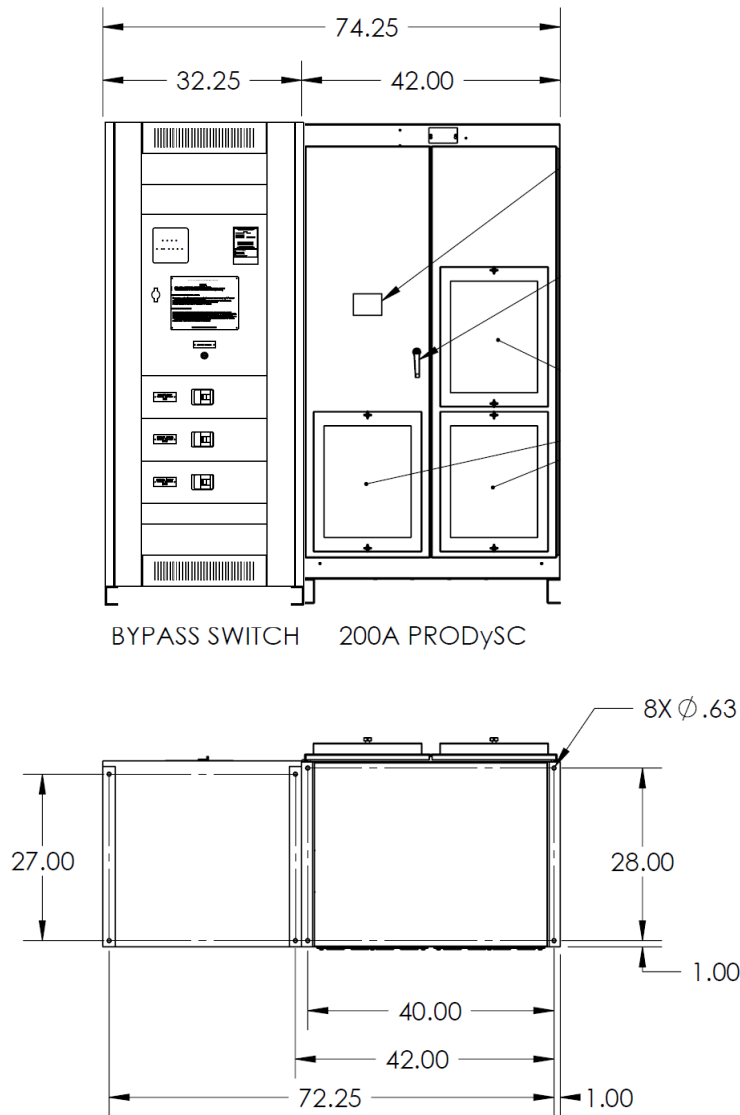


FIGURE 2: ProDySC System and anchoring hole locations [inches]

1.3 CLEARANCE

The ProDySC door hinges on both the left and right, and a door swing clearance must be given, as shown in Figure 1, to allow the doors to swing open 90 degrees. This will also provide proper clearance for the fan/filter mounted on the doors. A minimum of 8" (200mm) clearance should be allowed on the rear of the ProDySC enclosure to allow for proper air circulation; 4" (100mm) clearance should be allowed on the right side for the door filter frames when the enclosure door is fully open.

Clearance for the Bypass Switchboard enclosure should allow the door to swing (right side hinged) open 90 degrees to the front of its enclosure. Minimum front side door swing clearance for the Bypass Switchboard enclosure is 20" (510mm).

1.4 PRODySC ANCHORING

The ProDySC is floor mounted, and is to be anchored using the four 5/8" (16mm) mounting hole locations provided at the bottom corners of the unit, as shown in Figure 2.

1.5 BYPASS SWITCHBOARD ANCHORING

The Bypass Switchboard enclosure is floor mounted and is to be secured using the four 5/8" (16mm) mounting hole locations provided at the corners of the unit, as shown in Figure 2.

1.6 MECHANICAL INTERCONNECTION

The two enclosures should be bolted together for maximum stability. Six 3/8" x 1" bolts with 1" flat washer and lock washer are provided for this purpose. The bolts pass through the right side of the Bypass Switchboard and screw into the ProDySC enclosure. There are three holes vertically aligned along the front edge and another three holes along the rear edge. The three rear bolts are optional and installation will require access from the rear or left side of the switchboard.

1.7 BYPASS SWITCHBOARD WIRING ACCESS

All electrical wiring can be accomplished with front access only. However, wiring will be simplified with rear or left-side switchboard access

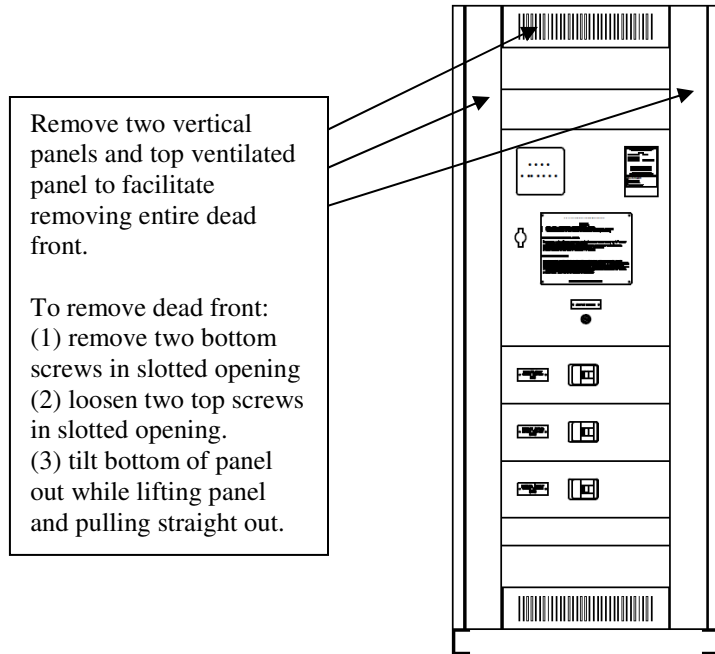


Figure 3: Switchboard front access

1.8 ELECTRICAL INTERCONNECTIONS

The two system enclosures must be electrically interconnected before utility input and load connections are made. Interconnection cables are provided and are pre-terminated on the Bypass Switchboard side. These cables can be found within the switchboard enclosure.

The ProDySC enclosure is provided with power terminals on the left side panel for electrical interconnections to the Bypass Switchboard enclosure, as shown in Figure 4. If only front access is possible, system interconnect wiring should be performed only by SoftSwitching Technologies technicians.

See the interconnection procedure on the next page.

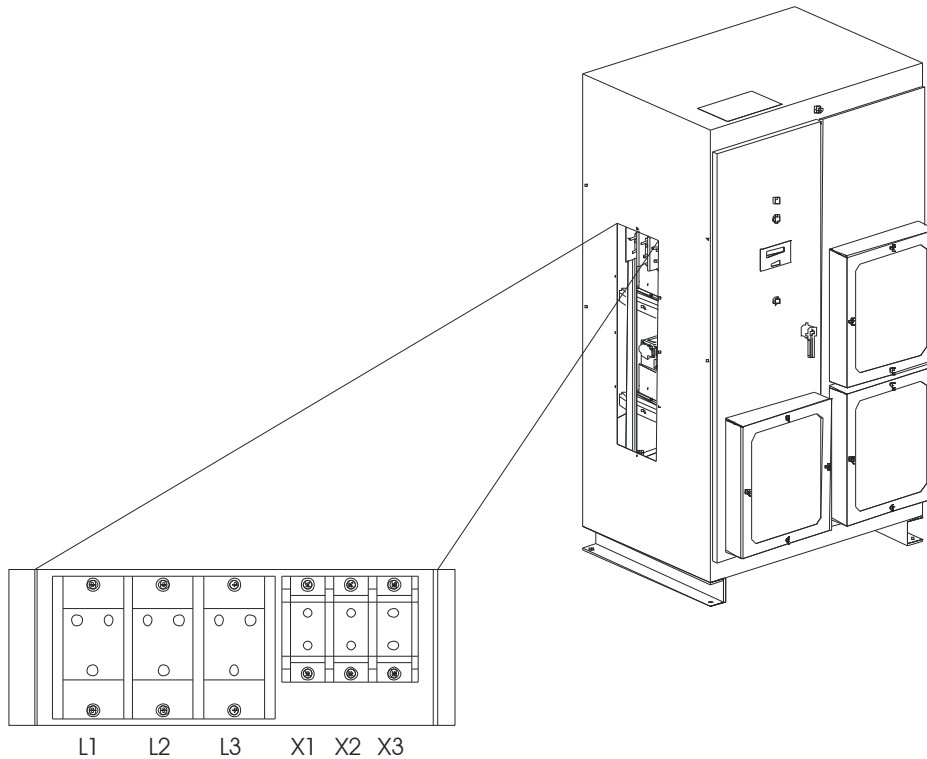


FIGURE 4: System Interconnection Terminals

Note: The 3-wire PRODySCs models rated greater than 240V have not been evaluated by Underwriter's Laboratories, Inc.® for connection to a corner-grounded delta power source. Contact the factory for assistance.

NOTE: A qualified electrician must install all interconnection wiring in compliance with local Electrical Codes. The grounding connections between enclosures must be maintained at all times; the ground bus bar in the Bypass Switchboard enclosure must be connected to an earth ground electrode according to the National Electrical Code.

ProDySC System Interconnections

The following steps refer to the schematic diagram in Figure 6. Note that the entire dead front panel of the switchboard can be removed; as shown in Figure 3.

- ❑ Locate the Bypass Control Harness within the Bypass Switchboard enclosure. Remove the shipping wire tie. Feed the harness and termination header through the panel opening provided in the ProDySC enclosure's left side. Connect the harness to terminal block **TB3** located just above the large rectangular opening on the ProDySC's left inside wall (See Figure 10). Re-anchor the harness using wire tie anchors.
- ❑ Connect the ProDySC enclosure to earth ground using the ground cable supplied within the Bypass Switchboard enclosure. A bus bar (labeled **GND**) is provided for this purpose on the left interior of the ProDySC enclosure.
- ❑ Connect Bypass Switchboard enclosure cables labeled **X1, X2, X3** to the ProDySC enclosure on terminals labeled **X1, X2, X3** see Figure 4. Torque these connections to 200 LB.IN. These cables are supplied, and are located within the rear of the Bypass Switchboard enclosure.
- ❑ Connect Bypass Switchboard enclosure cables labeled **L1, L2, L3** to the ProDySC enclosure on the terminals labeled **L1, L2, L3**. Torque these connections to 200 LB.IN. These cables are supplied, and are located within the rear of the Bypass Switchboard enclosure.

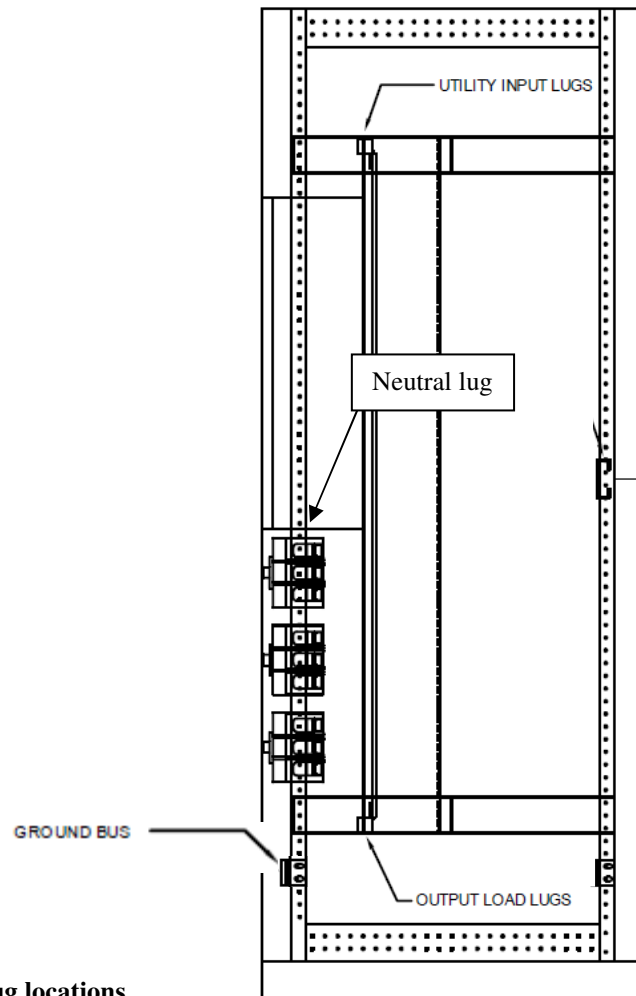


Figure 5: Bypass Switchboard input/output lug locations

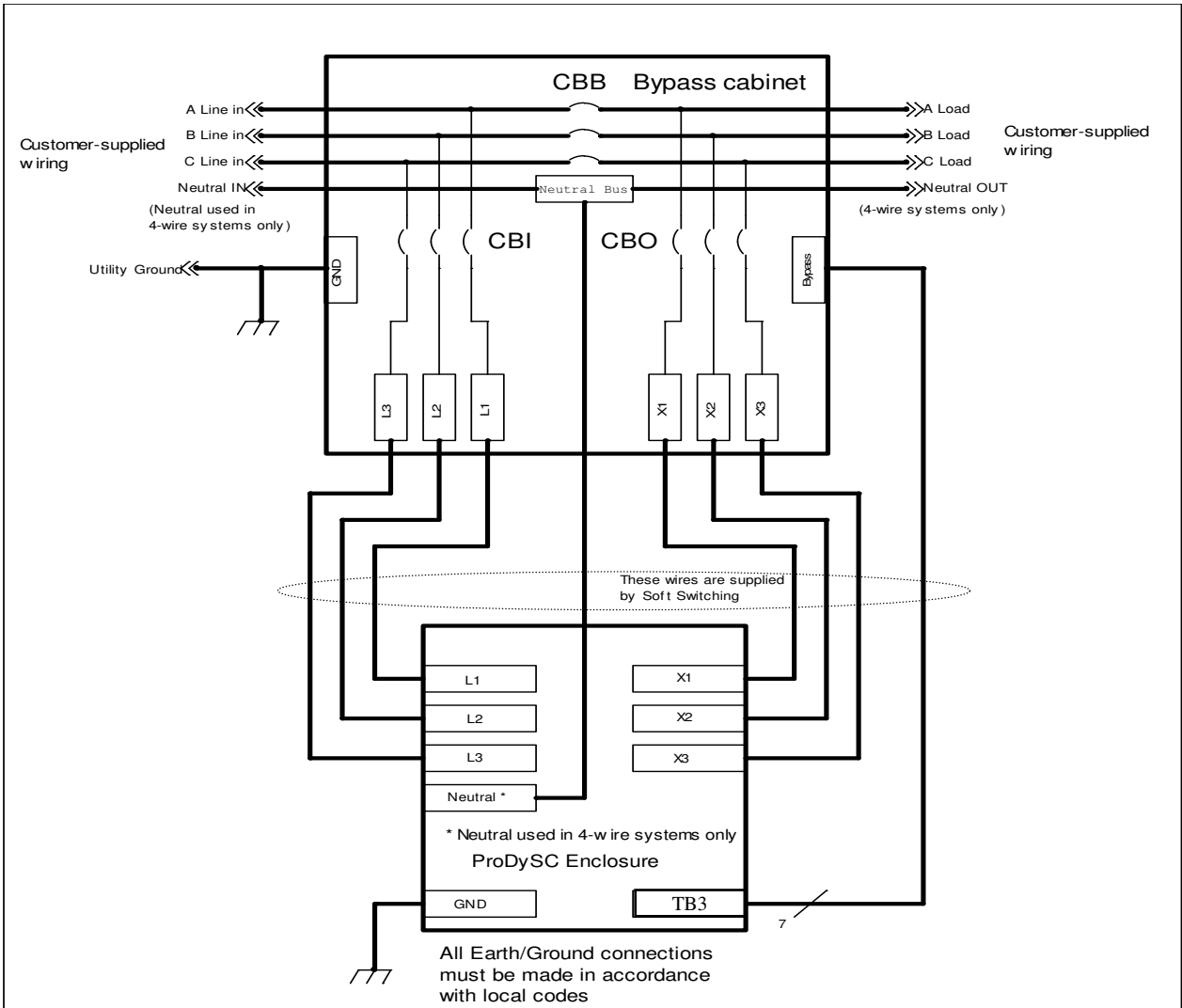


FIGURE 6: Wiring diagram for 200 amp ProDySC with Bypass Switchboard

Note: The 3-wire PRODySCs models rated greater than 240V have not been evaluated by Underwriter’s Laboratories, Inc.® for connection to a corner-grounded delta power source. Contact the factory for assistance.

1.9 UTILITY INPUT AND LOAD WIRING

Customer power cables (3-phase input, 3-phase output to protected loads) may enter from the top, bottom, rear, or left side of the Bypass Switchboard enclosure. Top entry is preferred, as shown in Figure 1. The top panel can be removed to punch conduit holes. Note that the entire front panel of the switchboard can be removed, as shown in Figure 3. Electrical terminals are located as shown in Figure 5.

UTILITY INPUT AND LOAD WIRING

Connect the **ground** bus bar in the Bypass Switchboard to an earth ground electrode.

Utility input cables are terminated directly above the compartment, at lugs labeled

- **UTILITY INPUT A**
- **UTILITY INPUT B**
- **UTILITY INPUT C**

The Neutral busbar (if present) is oriented vertically along the left side, near the front.

- **NEUTRAL** (For 4-wire systems only: Neutral connection is required)

Output to protected loads is located directly below the circuit breakers, at lugs labeled

- **OUTPUT TO PROTECTED LOAD A**
- **OUTPUT TO PROTECTED LOAD B**
- **OUTPUT TO PROTECTED LOAD C**

Put Bypass Switchboard circuit breakers in these positions before energizing the system:

- CBI = OFF (open)
- CBB = ON (closed)
- CBO = OFF (open)

1.10 INSTALLATION CHECKLIST

- Check all wiring for correct source and destination locations.
- Check that all electrical terminations are tightened to the proper torque.
- Replace all Switchboard covers
- Close and lock ProDySC enclosure door.

1.11 BYPASS STATUS RELAY CONTACTS

Customer-accessible contact-closures are available for remote monitoring of the state of the Bypass Circuit Breaker CBB and the DySC Input Circuit Breaker CBI shunt-trip condition. These functions are available from terminal block TB1 located in the compartment of the Bypass Switchboard. See Section 3.1 for details.

1.12 PRODySC STATUS RELAY CONTACTS

The ProDySC remote interface port is located behind a small metal cover, above the door hinge of the ProDySC section. The location is labeled “I/O Port” in Figure 10. Three sets of customer-accessible relay contacts are provided. See Section 3.2 for details.

2. OPERATION

WARNING : Opening ProDySC doors while the system is in operation will result in loss of power to protected loads. The system must be placed in bypass prior to opening the ProDySC doors to insure continuous power to protected loads (refer to section 2.3 for Bypass Switchboard operation).

2.1 SYSTEM DESCRIPTION

Raw utility power enters and routes through the Bypass Switchboard to the load. In *maintenance bypass mode* the power bypasses the ProDySC and passes directly to the load. In this bypass mode the load is unprotected from voltage sags. In the *Normal operation mode* the ProDySC is energized and the power is directed through the ProDySC, protecting the load. See the following sections for ProDySC and Bypass operation details.

Note: Operation in Normal Mode requires that the maintenance bypass circuit breaker (CBB) be open (OFF)—otherwise the bypass breaker will short out the sag correction inverter and prevent sag correction.

WARNING: VOLTAGE

Dangerous voltages are exposed within the ProDySC System. The system should never be operated with the enclosure doors open, except by qualified and authorized personnel who are trained in and familiar with the operation of the system and the location of components and voltages. Failure to comply with this warning could result in injury or death.

2.2 ProDySC OPERATION

The ProDySC section contains three modules (one module per phase). Each module independently monitors the line voltage and corrects the output voltage in the event of a voltage sag. Each module consists of a static switch and the sag-correcting electronics. The modules are series-connected to the input line, and operate by adding the compensating voltage needed to restore the line to its nominal voltage value. When the utility line voltage is adequate (specified nominal voltage), the static switch will remain closed and no compensating voltage is added. When an insufficient line voltage event occurs, the static switch opens and the sag-correcting electronics quickly add the balance of voltage necessary to regulate the load voltage.

The ProDySC accepts line input power over 3 wires into terminals L1, L2, L3 and provides sag compensated three-phase output power at terminals X1, X2, and X3 when not in the Maintenance Bypass mode. On 4-wire models, the Neutral connection is required as a voltage reference point for line-neutral control voltage.

Thermal switches are included to activate fans if the cabinet temperature or other internal temperatures exceed set limits.

A touchscreen display provides indication of the status of the ProDySC operation. After power is switched on, the green “OK” box will be displayed in the upper left hand corner of the display, indicating that the output voltage is within a normal range of -11% to +10% of nominal.

A red “FAULT” box is displayed in the upper left hand corner of the display when a fault condition is present on the ProDySC. During this period sag correction is inhibited and the ProDySC will continue to bypass the utility voltage directly to the load through the static bypass path.

An orange “FAULT OVER” box is displayed when the previous fault condition has cleared. Sag correction will remain inhibited until the reset period expires (approximately 1 minute).

A blue “SYSTEM OFFLINE” box is displayed whenever the ProDySC system is in the manual bypass mode (CBB closed and CBI open).

A list of conditions and indications is given in Table 1 and displayed error code descriptions are given in the touchscreen display manual addendum, SST PN 94-00106.

Table 1. Operational States, Conditions, and Faults

CONDITION	DEFINITION	Touchscreen Display STATUS text*	INVERTER OPERATION	BYPASS MODE
Normal:	$88.5\% < V_{LINE} < 110\%$	Green “OK”	Off	Static
Sag Event:	$V_{LINE} < 88.5\%$ for less than 2 seconds cumulative over a 60 second period.	Green “OK”	Running	Inverter
Runtime Exceeded:	Cumulative runtime exceeded	Red during voltage event, Orange for 1 min. after event end	Inhibited	Static
Normal Mode, Overload:	Load current $> 110\%$	Red during OL condition, Orange for 1 min. after OL ends	Inhibited	Static
Inverter Run Mode, Output Overcurrent: (I ² t)	Load current $> 150\%$ for 3 cycles	Blinks Red, then Orange for 1 min. Repeats if condition persists	Inhibited	Static
Inverter Module Over-temperature	Module temperature limit exceeded	Red during OT condition, Orange for 1 min. after OT ends	Inhibited	Static
ProDySC Over-temperature	Internal temperature limit exceeded	Blue, ProDySC offline	Disconnected	CBI & CBO open
Static Switch Failure	Open SCR(s)	Blue, ProDySC offline	Disconnected	CBI & CBO open
Main Fuse Open	Open Fuse(s)	Blue, ProDySC offline	Disconnected	CBI & CBO open
Enclosure Door Open	Door Open	Blue, ProDySC offline	Disconnected	CBI & CBO open

* The touchscreen will power down if both input and output voltages fall below approx. 75% of nominal

**An error message will be displayed while the red or orange text box is displayed. Refer to the touchscreen manual addendum for further information on accessing fault codes and status history.

WARNING

The ProDySC enclosure contains energy storage devices. **Dangerous voltages will exist within this enclosure for a time after AC power has been removed.** Wait at least 15 minutes after AC power is removed before opening enclosure doors to allow energy to dissipate.

Refer servicing to qualified personnel. Refer to manual input breaker instructions to perform a seamless transfer of power before opening the enclosure door for servicing.

2.3 BYPASS SWITCHBOARD OPERATION

The Bypass Switchboard consists of a bypass circuit breaker (CBB), an input circuit breaker (CBI), and an output circuit breaker (CBO). Under “Normal” operating conditions power from the utility is routed through CBI to the input of the ProDySC. The output of the ProDySC is routed to the load through CBO. CBB remains open in normal mode. CBB connects main power to the load (bypassing the ProDySC) when operating in the bypass mode.

WARNING: VOLTAGE

Dangerous voltages can still exist within the ProDySC enclosure even if the system is in bypass mode. Refer servicing to qualified personnel.

WARNING: OPERATIONAL

- Follow these instructions to avoid interrupting load power!
- Contact the factory immediately if the system fails to operate as outlined below.
- Voltage sag protection is not available whenever CBB is closed (red lamp lit)

WARNING: VOLTAGE

Dangerous voltages can still exist within the ProDySC enclosure even if the system is in maintenance bypass mode. Refer servicing to qualified personnel.

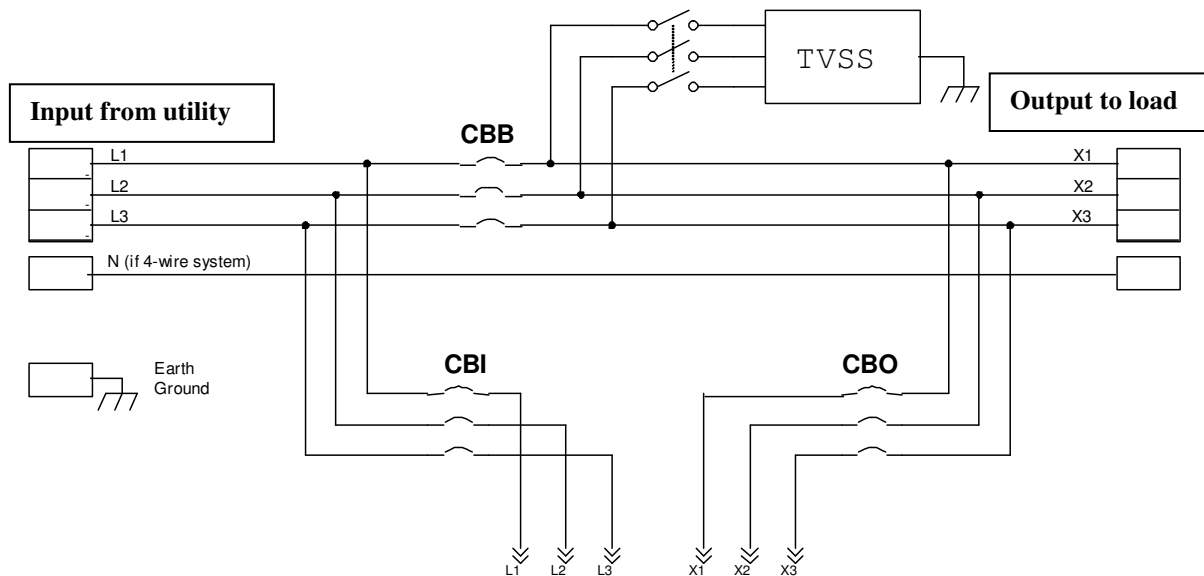


Figure 7: Schematic Drawing of Bypass Switchboard

WARNING: OPERATIONAL

Do not attempt to change the position of any of the circuit breakers without becoming familiar with the operation of the ProDySC system. Loss of power to equipment can occur if these instructions are not followed. To avoid the ProDySC inverter operation during the transfer, do not attempt a manual transfer if the green “NORMAL” lamp on the ProDySC unit is not lit.

MANUAL TRANSFER TO MAINTENANCE BYPASS

1. Close the Maintenance Bypass Circuit Breaker (CBB) by switching its handle directly to the ON position.
2. Open the ProDySC Input Circuit Breaker (CBI) by switching its handle directly to the OFF position.
3. The ProDySC Output Circuit Breaker (CBO) should open automatically.
4. The ProDySC is now isolated from the utility and the load.

MANUAL TRANSFER TO ProDySC

1. Close the ProDySC Input Circuit Breaker (CBI) by switching its handle directly to the ON position.
2. When the green “OK” box is displayed on the ProDySC TouchScreen, close the ProDySC Output Circuit Breaker (CBO) by switching its handle to the ON position.
3. Confirm that the green “OK” box is displayed on the ProDySC TouchScreen. Open the Maintenance Bypass Circuit Breaker (CBB) by switching its handle directly to the OFF position.
4. The ProDySC is now providing power to the load.

3. DIAGNOSTICS & CUSTOMER CONTACTS

These diagnostic indicators are available on the ProDySC system:

- Touchscreen display on the door of the ProDySC enclosure.
- Red lamp on Bypass Switchboard indicates mechanical bypass is closed when lit.
- Circuit breaker status (OPEN or CLOSED)
- Remote status contacts and RS-232 port

3.1 BYPASS STATUS CUSTOMER CONTACTS

Customer-accessible contact-closures are available for remote monitoring of the state of the Bypass Circuit Breaker CBB and the DySC Input Circuit Breaker CBI shunt-trip condition (See Figure 8). These functions are available from terminal block TB1 located in the compartment of the Bypass Switchboard.

3.11 CBB contacts (Bypass Circuit Breaker)

“Normal” position for the Bypass Breaker is defined as the breaker being OFF, or Open. As such, the Normally-Open contacts are open when the Breaker is open; the Normally-Closed contacts will open when the breaker is closed.

Example: Normal run: CBB will be Open; therefore TB1/11B will be electrically connected to TB1/10B.

3.12 CBI contacts (Input Circuit Breaker)

Relay K1 activates on any input circuit breaker shunt-trip signal (“CBI-ST”). Heatsink over-temperature, cabinet over-temperature, SCR Failure, Blown-Fuse or Open-Door indicators will all assert the CBI ST signal which will open the input circuit breaker CBI, removing power from the DySC and the load. When this signal is present, Relay K1 is activated and its Normally-Open contacts close. Please note that this is not a position indicator for the Input Breaker in that the CBI ST signal is not necessarily “latching”, but may disappear when the condition resolves. For example after an over-heated heatsink cools down the CBI ST signal will de-assert. Note, however that the Input breaker will not automatically reclose under such conditions; user-intervention is required to either reset the system to operational status or close the bypass breaker CBB.

3.13 Contact Ratings

The CBB aux. contacts (Terminals 10B-12B of TB1) are rated at 6A @ 600VAC, 0.5A @ 125VDC or 0.25A @ 250VDC. The DC ratings are for non-inductive loads only. The K1 contacts (Terminals 1B – 6B of TB1) are rated at 10A @ 110VAC Resistive, 7.5A @ 110VAC Inductive, 10A @ 24VDC resistive and 5A @ 24VDC inductive.

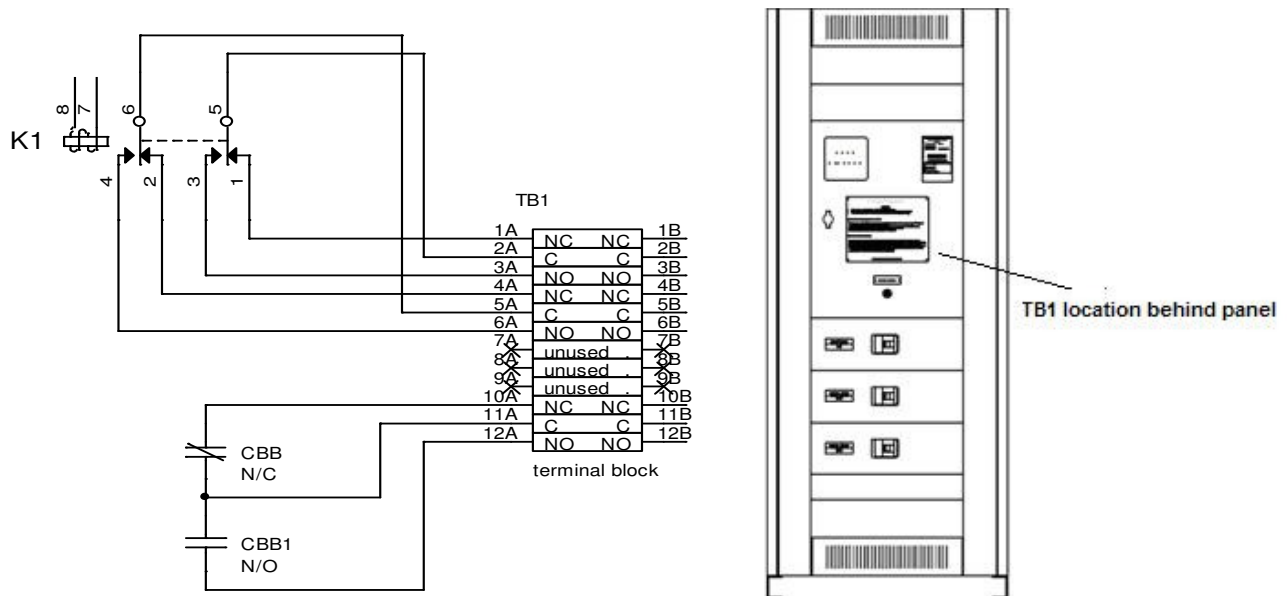


Figure 8: Customer Contacts (located in Bypass Switchboard compartment)

3.2 PRODySC USER CONTACTS AND RS-232 PORT

The ProDySC remote interface port is located behind a small metal cover, above the door hinge of the ProDySC section. Three sets of customer-accessible relay contacts are provided. The contacts are form 1A, and close upon occurrence of the named event. Connector positions 1 and 2 will close upon any sag event condition. Connector positions 3 and 4 close under normal operation conditions, and are useful to indicate fully functional status. Connector positions 5 and 6 close when an alarm event occurs. The relays are rated at 24VDC @ 1A.

All wiring is to be class 2, limited to 24 Volts, AC or DC. Acceptable wire gauges range from 24AWG to 12AWG (0.205 – 2.5 mm²). Torque connections to 5lb-in (0.6 N-m)

A DE-9 male connector is provided for remote communications. A separate addendum describes the communications port protocol.

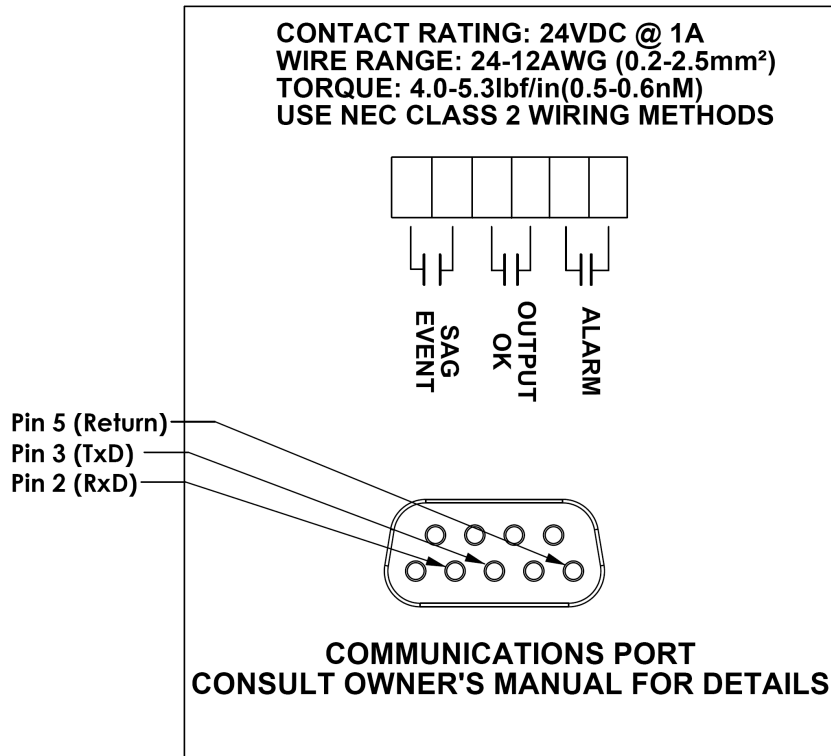


Figure 9: PRODySC Communications Port and Status Contacts (located above ProDySC door)

4. MAINTENANCE AND SERVICING

3.1 FAN FILTER MEDIA

The ProDySC system requires only periodic inspection of the cooling fan filter media and filter replacement or cleaning if it is contaminated so as to reduce airflow. Replacement ProDySC filters may be obtained from SoftSwitching by referencing the part number shown in Table 2 below; these filters are washable. Filter media can be safely changed while the system is running normally; the filters should be put back in place as quickly as possible to avoid contamination. Any abnormal fan noise should be discussed with SoftSwitching Technologies technical support.

Table 2: Air Filters

PART	DESCRIPTION	SST PART NUMBER
Air filter	16 in x 20 in x 0.8 in, 25 FPI, black, (Quantity 3)	26-00037

4.2 SERVICING

NOTE: In the event of the operation of any over current protection function, check the touchscreen display on the ProDySC for error codes that may indicate the type of over current condition. It is important to record any fault messages.

Lock-out all power sources prior to servicing. Fast-acting fuses are included to protect the ProDySC in the event of a load short-circuit. If power is applied, in normal mode, and the blue “System Offline” box is displayed on the TouchScreen, this may indicate a blown fuse(s). See Figure 10 for fuse locations and part references. See below for fuse descriptions and replacement part numbers.

IMPORTANT: Before replacing a fuse in the Prods, be sure the power to the Prods enclosure is removed, by placing the system in MAINTENANCE BYPASS mode, as described above.

IMPORTANT: Before replacing a fuse in the Bypass Switchboard, be sure the power to the ProDySC is removed, by turning off the unit power and opening the upstream branch circuit breaker. Only a qualified electrician or service person is to replace fuses.

Only a qualified electrician or service technician is to replace fuses.

4.3 FUSE PART NUMBERS

To maintain protection of the Bypass Switchboard, be sure to replace the fuse with the same or exact replacement type. These fuses are available from the factory.

TABLE 3: Bypass Switchboard Fuses

FUSE	DESCRIPTION	SST PART NUMBER	MANUFACTURER	MANUFACTURERS PART NUMBER
F1, F2 (380-480V systems)	Fuse, 3A, 600 VAC Time Delay	43-00134	Ferraz-Shawmut	TRS3R
F1, F2 (200-240V systems)	Fuse, 7A, 250 VAC Time Delay	43-00135	Ferraz-Shawmut	TR7R
F6	Fuse, 12A, 600 VAC Time Delay	43-00136	Ferraz-Shawmut	ATQR12
F12	Fuse, 6A, 600 VAC Time Delay	43-00116	Ferraz-Shawmut	ATQR6
F25, F26, F27	Fuse, 6A, 600 VAC Class J	43-00071	Ferraz-Shawmut	A4J6

All switchboard fuses are located in the hinged compartment. All fuse holders and terminal blocks behind the door are finger-safe designed. Disconnect upstream power sources before replacing F1 or F2.

To maintain protection of the ProDySC unit, be sure to replace the fuse with the same or exact replacement type. These fuses are available from the factory. Put the system into bypass mode, with CBI and CBO locked open, before changing any ProDySC fuses.

TABLE 4: ProDySC Enclosure Fuses

FUSE	DESCRIPTION	SST PART NUMBER	MANUFACTURER	MANUFACTURERS PART NUMBER
F1, F2, F3	Fuse, 600A, 500Vac, Semi w/indicator	43-00070	Ferraz-Shawmut	A50QS600-4IL
F4, F5, F6	Fuse, 100A, 600Vac, Time Delay	43-00129R	Ferraz-Shawmut	AJT100
F7, F8, F9 (3-wire systems only)	Fuse, 15A, 600Vac, Time Delay	43-00029	Ferraz-Shawmut	TRS15R
F12, F13	Fuse, 5A, 600 VAC Time Delay	43-00133	Ferraz-Shawmut	ATQR5
F14, F15 (380-480V systems)	Fuse, 5A, 600 VAC Time Delay	43-00131	Ferraz-Shawmut	TRS5R
F14, F15 (200-240V systems)	Fuse, 10A, 600 VAC Time Delay	43-00132	Ferraz-Shawmut	TRS10R

TABLE 5: ProDySC Power Module Fuses

FUSE	DESCRIPTION	SST PART NUMBER	MANUFACTURER	MANUFACTURERS PART NUMBER
F1, F2	Fuse, 2A, 600 VAC Time Delay	43-00030	Bussmann	FNQ-R-2
F3	Fuse, 200A, 500Vac, Semi w/indicator	43-00106	-	(not accessible)
F4, F5, F6, F7 (ER models only)	Fuse, 25A, 600Vac, Fast-acting	43-00094	Ferraz-Shawmut	ATM25
F4, F5, F6, F7 (SR models only)	Fuse, 20A, 600Vac, Fast-acting	43-00093	Ferraz-Shawmut	ATM20

Refer to figure 10 for location of the fuses in the ProDySC enclosure. Figure 10 is also posted inside the ProDySC door.

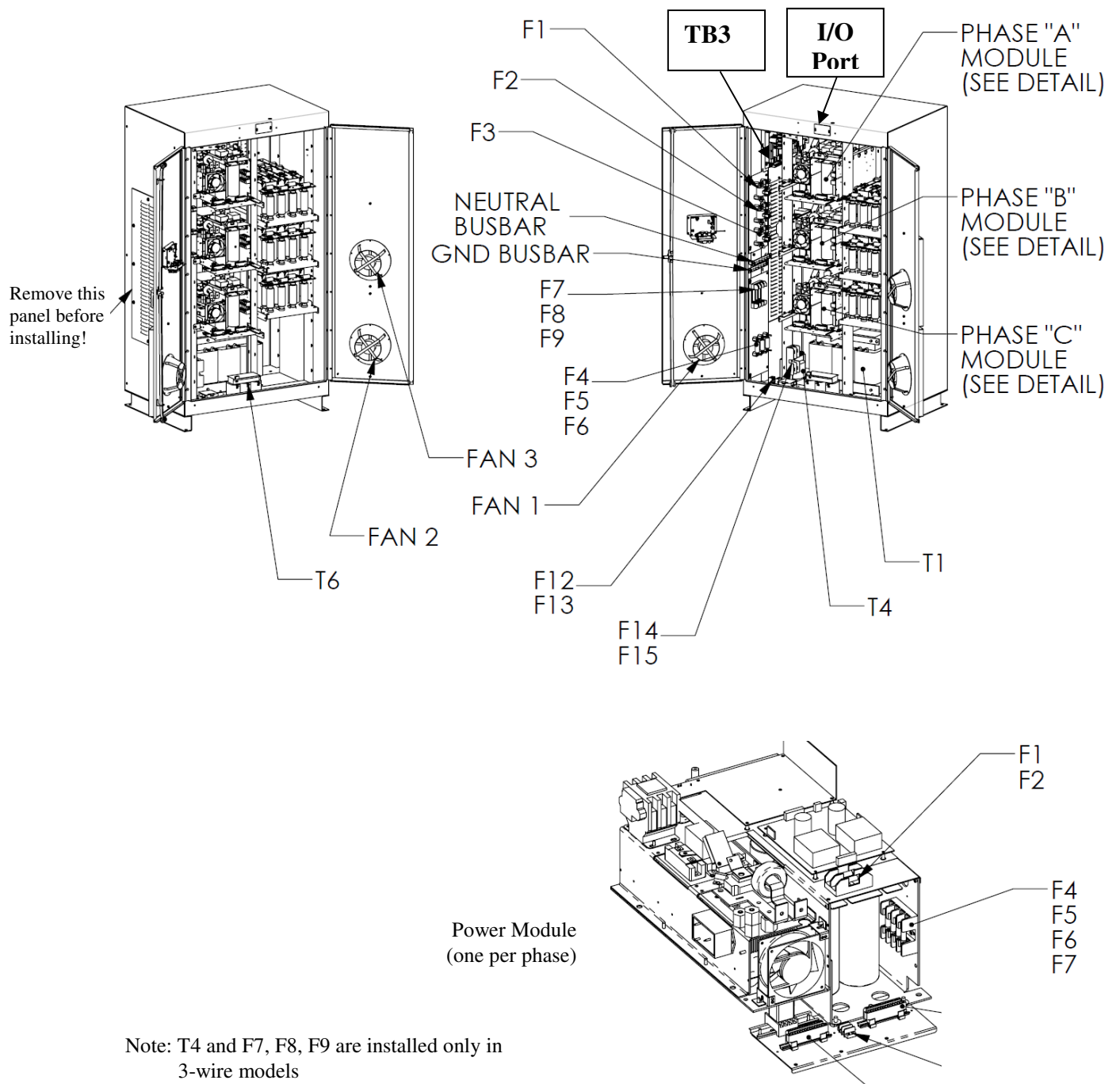


Figure 10. ProDySC Enclosure Components

5. SPECIFICATIONS

The three-phase Dynamic voltage Sag Corrector (ProDySC) protects equipment against voltage sags down to 50% for up to 5 seconds, voltage outages for 3 (12) cycles or longer, and transient voltage surges. The DySC is a device that operates in series with the utility supply; it is not designed or intended to operate with an open circuit at its input terminals. The following are typical specifications for the standard SR models (and the extended run-time ER models).

System Ratings

Voltage 480/277Y V(rms) (typical), 3-phase, $\pm 10\%$ (up to 125% for 30 seconds, non-repetitive)

Frequency 50/60 Hz, auto-sensing

Wiring 3-wire or 4-wire and ground (model-dependent)

Current 200 A(rms), continuous (167 kVA at 480 Vac)

Mechanical Bypass Switchboard Ratings

Available short circuit current 65 kA

Bypass breaker 200 A, 3-pole, 100% rated

Input and Output breakers 200 A, 3-pole, 100% rated

Transient Surge Suppression (TVSS) 25 kA per mode

Switching manual

Static Bypass Mode

Input Voltage 90% to 110% of nominal

Output Current 200 A(rms), continuous

Output Current Overload 150% for 30 s, 400% for 5 s, 600% for 0.5 s

Current Distortion Unchanged, determined by the load

Efficiency >99%

Voltage Sag Correction Mode

Detection Voltage 88.5% of rated input voltage (rms voltage trigger)

Output Current 200 A(rms)

Output Current Overload voltage sag correction disabled (remains in static bypass mode) if output current $\geq 110\%$

Peak Output Current 300 A (Crest Factor 1.5), current limited

Response Time <2 ms

Output Voltage 87% to 105%, 90% to 100% typical

Output Frequency matches the pre-sag frequency

Sag Correction Duration 5 s / 2 s* cumulative every minute for

3 phase sags (50% to 87% voltage remaining)

2 phase sags (30% to 87% voltage remaining)

1 phase sags (0% to 87% voltage remaining)

*5 s Cumulative (e.g., 1s + 2s + 2s) in first 60 s window, 2 s cumulative in each subsequent 60 s window.

Reset to 5s capability after 5 minutes idle.

Deeper Sags or Zero Volts Correction Duration

50 ms (200 ms) at rated load with 0.7 power factor, longer at reduced load levels in inverse proportion to load (zero volts, 3 phases)

Approximately $[1 + (\%sag / 50\%)] * (\text{rated milliseconds})$ for three phase sags lower than 50% (e.g., 300 ms for 3 phase sags to 25% voltage remaining with ER models)

Output Voltage Waveform True sine wave

Mechanical

Enclosure NEMA 1 (IP20), see outline drawings for dimensions

Accessibility (For Wiring) Access to front of switchboard terminations, top or bottom of switchboard entry.

Environmental

Ambient Temperature 0°– 40°C (32°– 104°F)

Storage Temperature -40°– 75°C (-40°– 167°F)

Relative Humidity 0 to 95%, non-condensing

Heat Dissipation 5677 Btu per hour, maximum (167kVA model).

Cooling controlled forced air

Altitude 1000 m (3300 ft) without derating

Audible Noise <55 dBA at 1 m

Specifications (continued)

Transient Voltage Surge Suppression (TVSS)

A TVSS module is incorporated into the Bypass Switchboard to provide additional transient over voltage protection for protected loads. The module has a 25kA surge current rating. The module is located behind the hinged Bypass Switchboard door. Power to the TVSS module may be removed by opening fuse block F25-F26-F27. An indicator lights on the TVSS module shows if surge protection is active. Fuses F25, F26 and F27 provide short circuit protection in the event of a failure within the TVSS module.

Communications/User Interface

Display 5.7 inch Touchscreen LCD

Connectivity RS232, dry contacts

Compliance

DySC System UL and cUL 1012 listed

TVSS IEEE Std C62.41.1 and UL 1449

Switchboard UL listed

Soft Switching Technologies Corporation Standard Limited Warranty

1. Soft Switching Technologies Corporation ("Seller") warrants that its product conforms to Seller's published specifications and is free from defects in material or workmanship.
2. The duration of the warranty is 12 months from the date the product ships from Seller's Middleton facilities to Buyer (the "Warranty Period").
3. The warranty is applicable only to Buyer, or to the end-user if Buyer is an authorized reseller, for whom the SoftSwitching product is originally installed for use. This warranty is not transferable or assignable.
4. If Buyer discovers within the Warranty Period a failure of the product to conform to specifications or a defect in material or workmanship, Buyer must promptly notify Seller in writing with 10 days after it discovers such failure and before the expiration of the Warranty Period. Any such notification received by Seller after the expiration of the Warranty Period shall be null, void and ineffective. Within a reasonable time after Buyer's notification, Seller will confirm whether a breach of warranty has occurred, and if so will repair the product to correct any failure of the product to conform to specifications or any defect in material or workmanship.
5. Buyer shall ship at Buyer's cost the defective product to Seller for repair. Buyer assumes the risk of loss while product is in transit. Upon repair of the product, shipment back to Buyer shall be at Buyer's sole expense. Seller will arrange with Buyer shipment of the repaired product back to Buyer. If Buyer requires warranty service on-site and Seller agrees, in its sole discretion, to provide such service, then labor costs for on-site field repair and all associated travel and living expenses, shall be the responsibility of Buyer. If Buyer requests expedited warranty service and Seller can accommodate such request as determined in Seller's sole discretion, such service shall be at Buyer's expense.
6. If Seller is unable to repair the product Seller will provide to Buyer, at Seller's sole option, one of the following: (1) a replacement product, or (2) a full refund of the purchase price. These remedies are Buyer's exclusive remedies for breach of warranty.
7. Replacement parts shall be warranted for 90 days or for the remainder of the original Warranty Period, whichever is longer.
8. Seller does not warrant (1) defects caused by failure to provide a suitable installation environment for the product, (2) damage caused by use of the product in applications or for purposes other than it was designed for, (3) damage caused by wrong or inadequate electrical connections of field wiring, (4) damage caused by weather or other natural causes, (5) damage caused by unauthorized attachment or modification, (6) damage during shipment, (7) damage due to ordinary wear and tear, or (8) any other abuse, misapplication, neglect or misuse by Buyer.
9. **DISCLAIMER OF WARRANTY:** THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER ARISING UNDER ANY STATUTE OR LAW, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
10. **Limitation of Liability.** SELLER DOES NOT ACCEPT LIABILITY BEYOND THE REMEDIES SET FORTH HEREIN, INCLUDING BUT NOT LIMITED TO ANY LIABILITY FOR PRODUCT NOT BEING AVAILABLE FOR USE, LOST PROFITS, OR LOSS OF BUSINESS. EXCEPT AS EXPRESSLY PROVIDED HEREIN, SELLER WILL NOT BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INDIRECT, OR PUNITIVE DAMAGES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY THIRD PARTY. BUYER AGREES THAT FOR ANY LIABILITY RELATED TO THE PURCHASE OF PRODUCT, SELLER IS NOT LIABLE OR RESPONSIBLE FOR ANY AMOUNT OF DAMAGES ABOVE THE AMOUNT INVOICED FOR THE APPLICABLE PRODUCT. THE REMEDIES SET FORTH IN THIS WARRANTY SHALL APPLY EVEN IF SUCH REMEDIES FAIL THEIR ESSENTIAL PURPOSE
11. Any action by Seller against Buyer for Buyer's breach of the terms and conditions of this warranty must be commenced within 12 months following the date of such breach.
12. **WARRANTY OF TITLE, PATENTS, AND COPYRIGHTS:** In addition to the warranty set forth in Paragraph 1 above, Seller warrants that it has good title to its products free of any encumbrance, and that the product shall be delivered free from the rightful claim of any third person for infringement of patent or copyright. Seller will defend Buyer against any claim of infringement and will pay resulting costs, damages, and attorney fees finally awarded, provided that, (1) Buyer promptly notifies Seller in writing of any claim within 10 days after Buyer becomes aware of any such claim or potential claim, and (2) Seller has sole control of the defense and all related settlement negotiations. If a claim arises, Buyer will allow Seller, at Seller's option and expense, to procure the right for Buyer to continue using the product, to replace or modify it so that it becomes non-infringing, or to grant Buyer a refund of the purchase price in exchange for return of the infringing product

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