

MEGADySC®
400 Amp,
380-480V models
3-wire & 4-wire

DS30400A... 2000C

Options include:

- 380, 400, 460, or 480 Volts,
- 3-Wire or 4-Wire, 3-Phase
- Standard (SR) or Extended (ER) Runtime



Operation & Instruction Manual

PN# 94-00100, Rev K



Save these instructions.
This guide contains important
information to be followed
during installation, and for
maintenance of your product.

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Model number: _____ **Serial number:** _____

Purchased from: _____ **Date installed:** _____

Please take a moment and fill in the information regarding your DySC product. This provides a documented reference for any future communications if service or support is required

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

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

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 MegaDySC[®] 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 MegaDySC 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 the MegaDySC door will shut down the MegaDySC system and force an automatic mechanical bypass operation. Refer to automatic bypass switchboard instructions to perform a seamless transfer of power before opening the enclosure door for servicing.

The MegaDySC enclosure(s) 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 MegaDySC enclosure even if the system is in bypass mode. Refer servicing to qualified personnel.

WARNING: OPERATIONAL

Do not attempt to change the position of any Automatic Bypass Switchboard circuit breakers without becoming familiar with the operation of the MegaDySC system. Loss of power to equipment can occur if these instructions are not followed. To avoid MegaDySC inverter operation during a transfer, do not attempt a manual transfer if the green "OK" box is not displayed in the upper left hand corner of the MegaDySC touch-screen display. Opening enclosure doors while in "normal mode" will cause immediate automatic bypass operation and subsequent loss of voltage sags protection.

CAUTION:

SERVICE MUST BE PERFORMED ONLY BY QUALIFIED AND AUTHORIZED SERVICE PERSONNEL.

NOTE: all dimensions and bolt sizes are in inches (")

1. INSTALLATION

1.1 SYSTEM COMPONENTS

The MegaDySC system consists of two enclosures including one 400A MegaDySC section and one Automatic Bypass Switchboard, which are shipped separately and must be mechanically and electrically interconnected at the time of installation. The MegaDySC section houses the static bypass and voltage sag-correction electronics as well as the optional extended-run (ER) module. The Automatic Bypass Switchboard houses the maintenance bypass circuit breaker (CBB), the MegaDySC input (CBI) and output (CBO) circuit breakers, automatic controls, and the I-Sense® voltage-monitoring sensor.

This document applies to the following MegaDySC system models.

Current Rating	Voltage Rating	System Model Number	Extended-Run
400 A	480 V	DS30400A480V3SH2000C	-
400 A	480 V	DS30400A480V3EH2000C	Yes
400 A	480 V	DS30400A480V4SH2000C	-
400 A	480 V	DS30400A480V4EH2000C	Yes
400 A	460 V	DS30400A460V3SH2000C	-
400 A	460 V	DS30400A460V3EH2000C	Yes
400A	460 V	DS30400A460V4SH2000C	-
400A	460 V	DS30400A460V4EH2000C	Yes
400 A	400 V	DS30400A400V3SH2000C	-
400 A	400 V	DS30400A400V3EH2000C	Yes
400 A	400 V	DS30400A400V4SH2000C	-
400 A	400 V	DS30400A400V4EH2000C	Yes
400 A	380 V	DS30400A380V3SH2000C	-
400 A	380 V	DS30400A380V3EH2000C	Yes
400 A	380 V	DS30400A380V4SH2000C	-
400 A	380 V	DS30400A380V4EH2000C	Yes

1.2 SYSTEM LAYOUT

Figure 1a shows the standard run (SR) SH model layout. Figure 1b shows the extended run (ER) EH model layout.

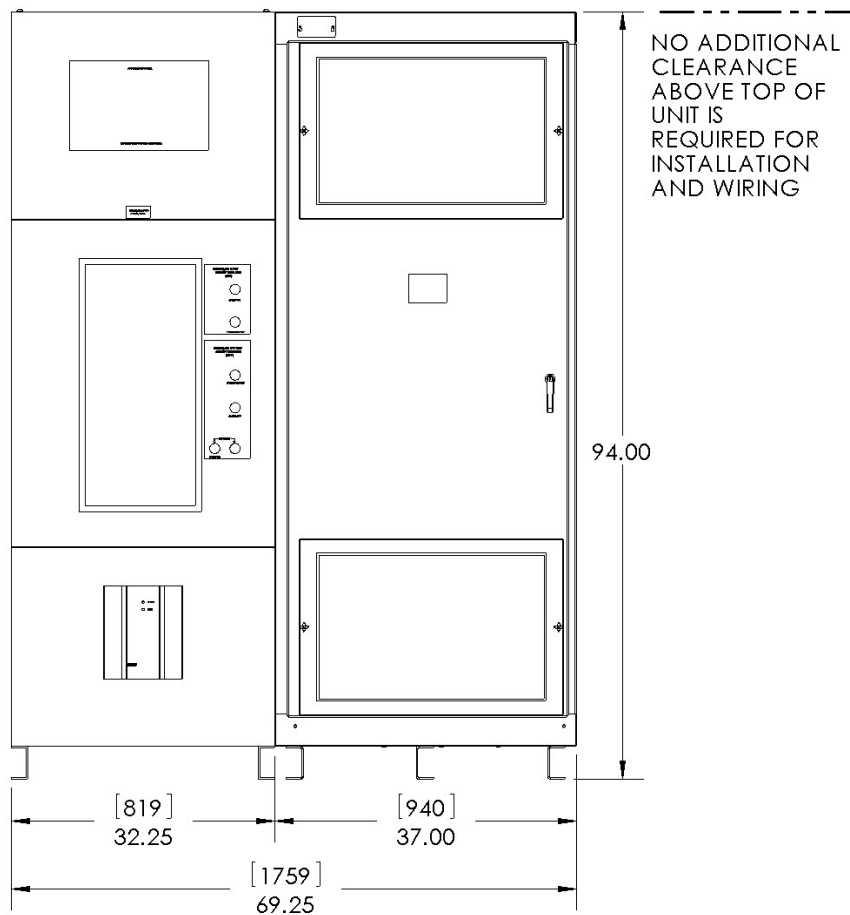
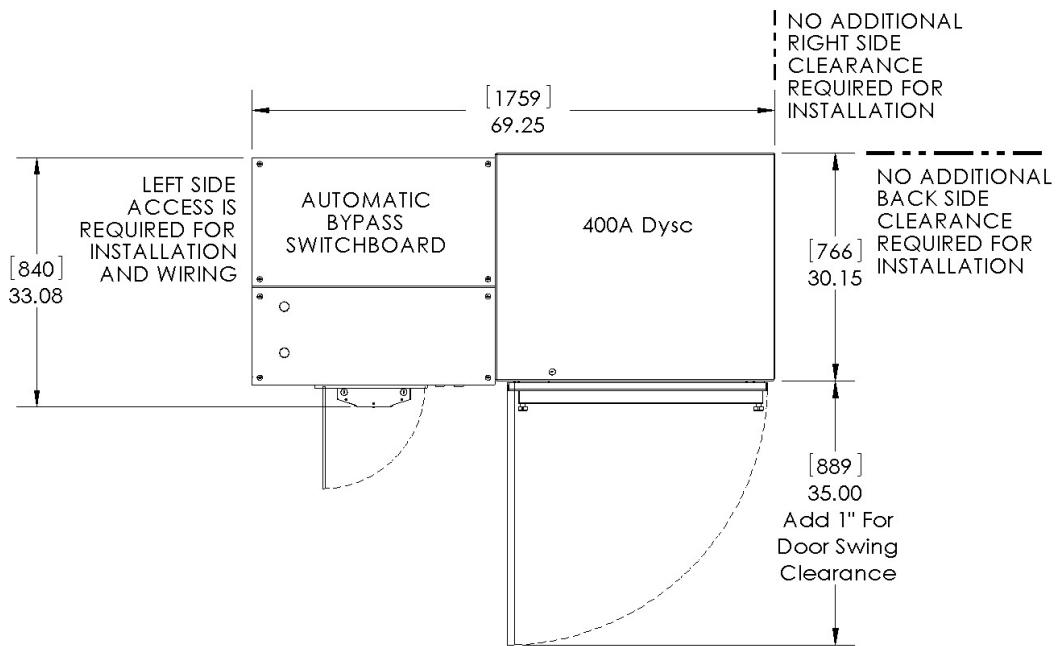


Figure 1a. Standard Models

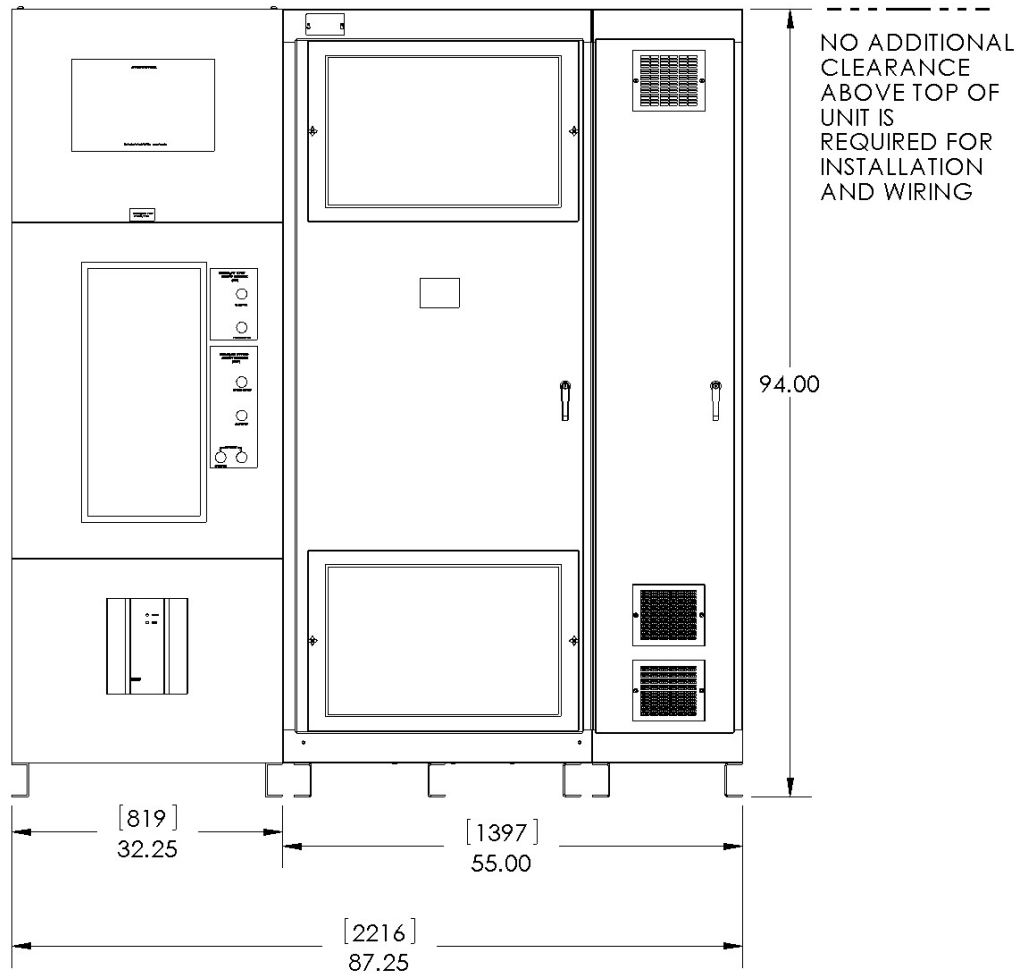
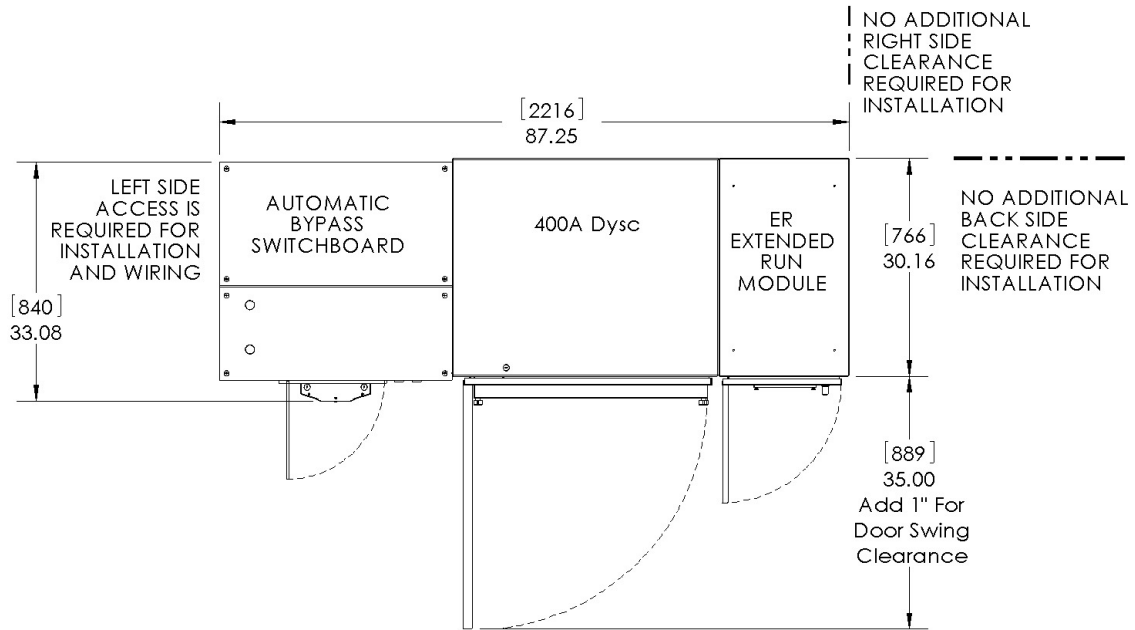


Figure 1b. With Extended Run (ER) Option

1.3 SYSTEM CLEARANCE

The MegaDySC doors are hinged on the left, and clearance must be given to allow the door to swing open 90 degrees to the front of the enclosure.

Clearance for the Automatic Bypass must allow the front panels to swing (left side hinged) open 90 degrees to the front of its enclosure.

Either rear (preferred) or left side access to the Bypass switchboard will be required during installation wiring and cabinet interconnect wiring.

1.4 SYSTEM MOUNTING

The MegaDySC section is floor-mounted, and should be secured using the 0.63" diameter mounting holes provided along the bottom channels. The MegaDySC section is provided with interconnect wiring to the automatic bypass section; proper line-up is critical: The MegaDySC section must be located to the right of the automatic bypass when viewed from the front of the system.

The MegaDySC section is shipped separately from the automatic bypass switchboard. The MegaDySC section must be secured to the automatic bypass enclosure with the 3/8" hardware supplied. See Figure 2 for fastening locations and hardware arrangement. The optional ER enclosure is permanently connected to the MegaDySC section prior to shipment.

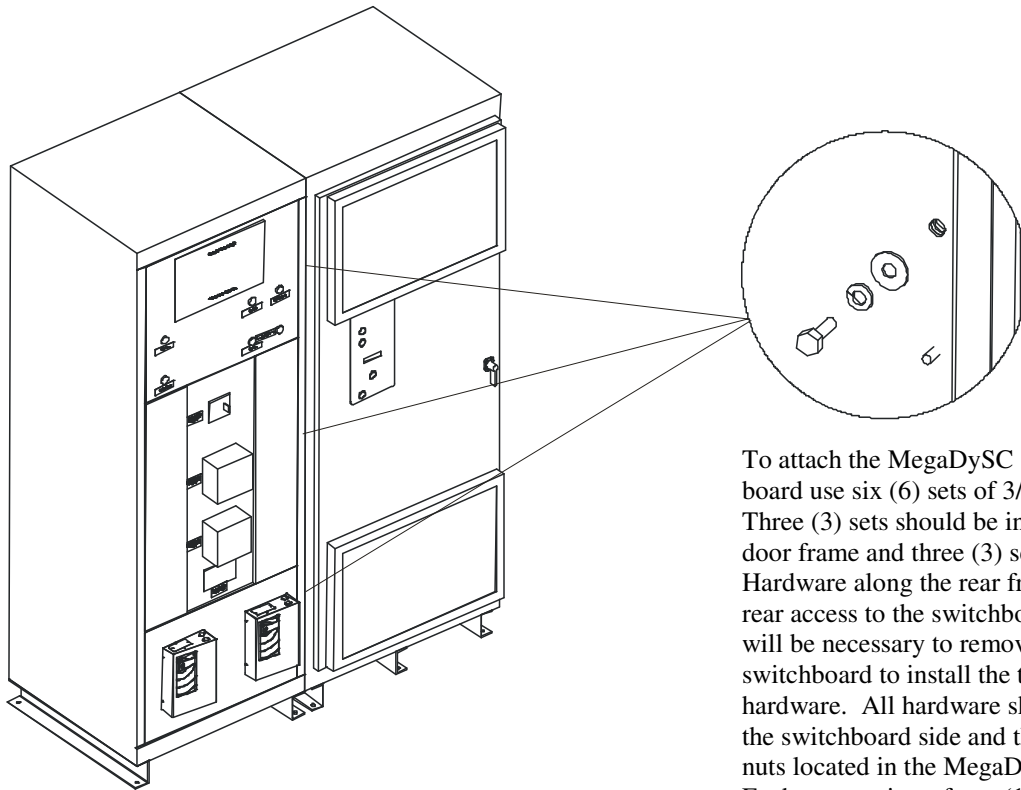


Figure 2a

To attach the MegaDySC section to the switchboard use six (6) sets of 3/8" hardware supplied. Three (3) sets should be installed along the front door frame and three (3) sets along the rear frame. Hardware along the rear frame may be omitted if rear access to the switchboard is not available. It will be necessary to remove the rear panel of the switchboard to install the three (3) rear sets of hardware. All hardware should be installed from the switchboard side and threaded into the weld nuts located in the MegaDySC section enclosure. Each set consists of one (1) 3/8-16 X 1.0 bolt, one (1) 3/8 split lock washer and one (1) 3/8" flat washer assembled as shown.

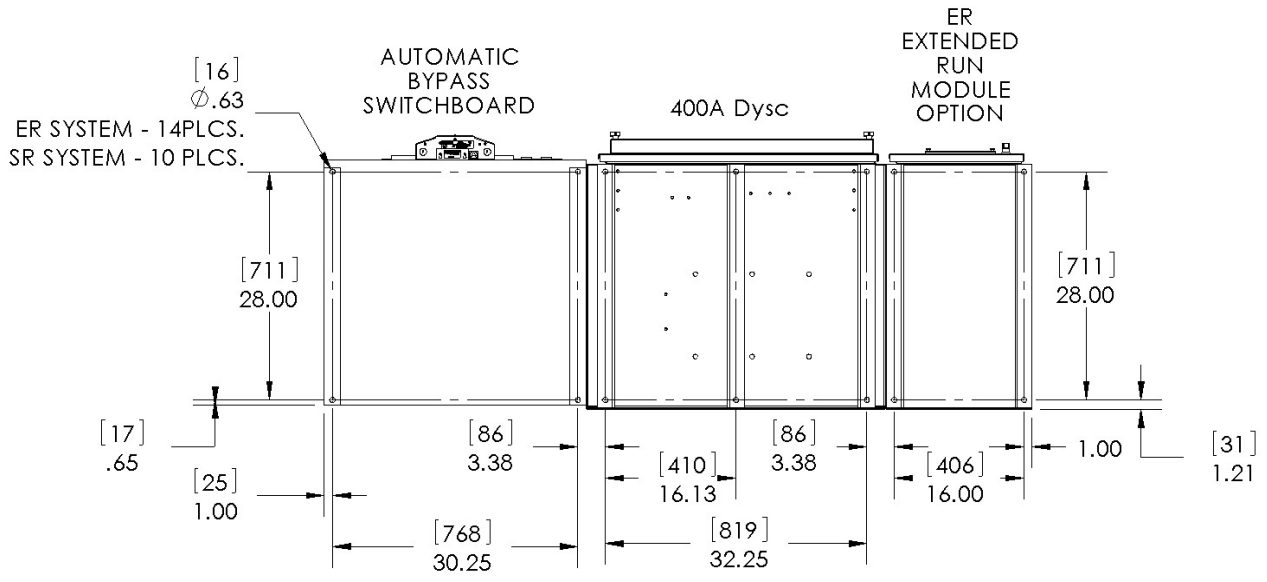


Figure 2b. Floor Mounting Detail

1.5 ELECTRICAL INTERCONNECTIONS

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. **All interconnection wiring will be installed by a SoftSwitching Technologies technician during system commissioning.**

The MegaDySC enclosure and bypass enclosure are shipped separately. The customer is responsible for system mounting. All interconnecting power cables are provided (shipped inside the bypass switchboard) and will be connected by a SoftSwitching Technologies technician during commissioning. At installation the loose ends of the main cables will be routed through the bushings in the side of the bypass enclosure and connected inside the MegaDySC to the appropriately labeled terminals. A control wiring cable is also provided in the bypass enclosure and must be connected to the MegaDySC enclosure. This control cable is routed through two large holes, one in the bypass enclosure and one in the MegaDySC enclosure, located at the bottom front of the enclosures. The cable is plugged into the associated terminal block located in the lower, left corner of the MegaDySC enclosure. Finally, the incoming electrical service and outgoing load cables are brought in through the top (or bottom) of the bypass switchboard enclosure and connected to the appropriate bus locations. Utility input is connected to the bus bar terminals labeled L1, L2, L3 and the protected load is connected to the bus bar terminals labeled X1, X2, X3.

If the MegaDySC system must be installed and put into maintenance bypass mode before commissioning, the installers should put the system enclosures in place as described in 1.4, then:

Route the loose ends of the main inter-cabinet wires and ground wire through the bushings in the right-side wall of the switchboard and into the MegaDySC section, as described above.

Route the control wiring cable from the lower switchboard pan into the MegaDySC section.

120VAC is present at several pins of the header when the switchboard is energized.

Lockout or tagout circuit breakers CBI and CBO in the Automatic Bypass Switchboard.

Install utility input and load output conductors
Energize the switchboard. The MegaDySC touchscreen display be active only if the control cable has been plugged in on the MegaDySC side. If the screen is active then 120VAC is present at several points within the MegaDySC enclosure. Push the green CLOSE CBB button to energize loads.

The remaining interconnections and commissioning will be completed by SoftSwitching Technologies technicians.



FIGURE 3 Rear-left view of Bypass Switchboard

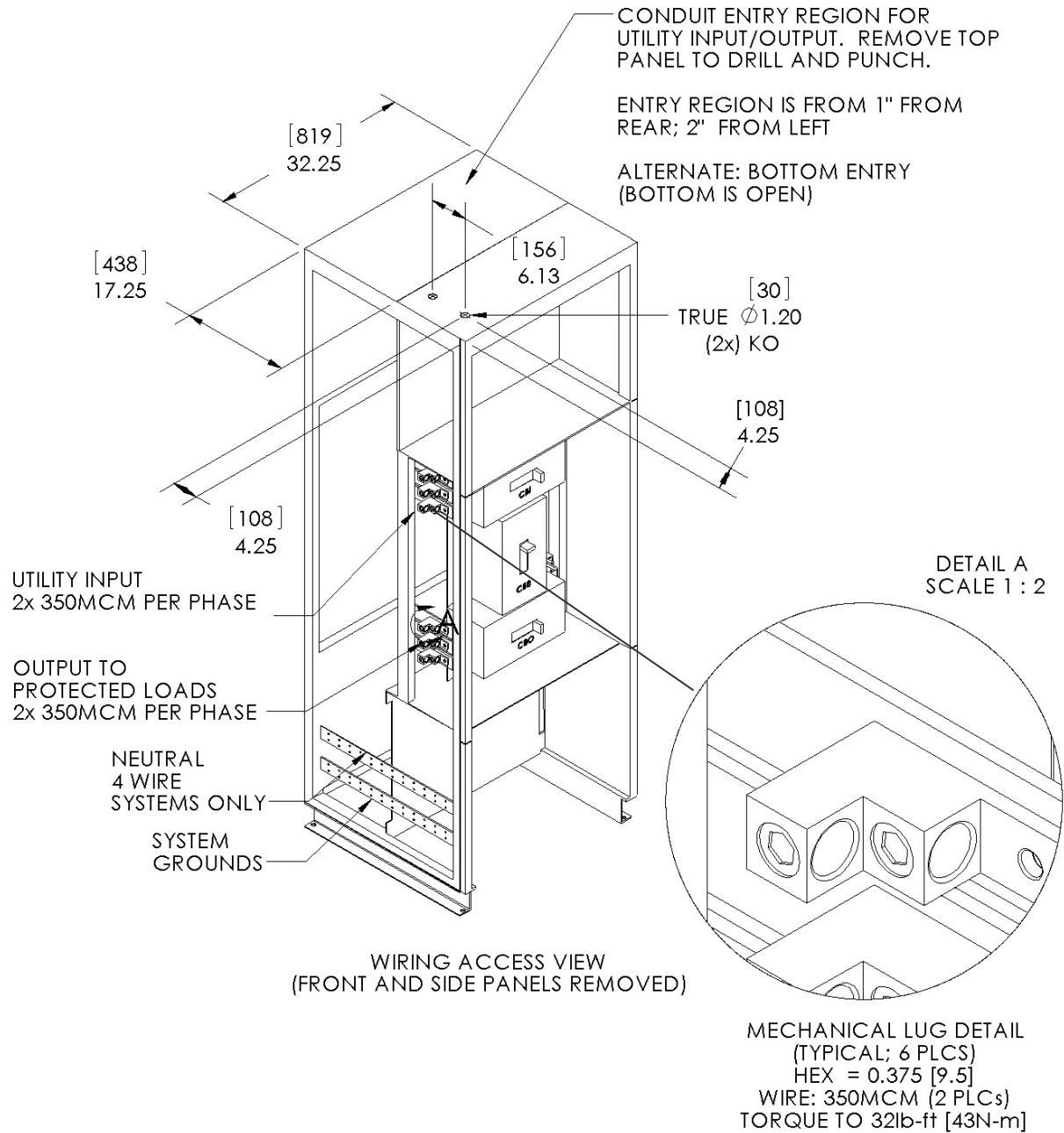


Figure 4 Switchboard Terminations and Conduit landing areas

MegaDySC System Installation Connections Checklist

- ❑ Connect the Bypass Switchboard ground bus to an earth ground per NEC and local codes.
- ❑ Connect the utility input conductors to the terminals labeled “L1”, “L2” and “L3”. The set is labeled “UTILITY INPUT”. These terminals are located in the left-rear of the switchboard. See Figure 4, above.
- ❑ Connect the load output conductors to the terminals labeled “X1”, “X2” and “X3”. The set is labeled “OUTPUT TO LOAD”. See Figure 4, above.
- ❑ Check all electrical terminations for properly torqued connections. See (box above) for specifications.
- ❑ Connect analog telephone line to RJ11 jack or Ethernet cable to RJ45 jack. The RJ11 and RJ45 jacks are located in the upper left front corner of the switchboard. They can be accessed through the knockout in the top of the cabinet.

MegaDySC System Interconnections Checklist (To be completed by SoftSwitching Technologies)

- ❑ Connect the Bypass Switchboard-to-MegaDySC ground cable to the ground bus in the MegaDySC.
- ❑ Connect line side cables from input circuit breaker (CBI) located in the Bypass Switchboard to the MegaDySC section bus bars labeled RH1-L1, RH1-L2 and RH1-L3 respectively.
- ❑ Connect load side cables from the output circuit breaker (CBO) located in the Bypass Switchboard to the MegaDySC section bus bars labeled RH1-X1, RH1-X2 and RH1-X3 respectively.
- ❑ Plug the control cable, from the Bypass Switchboard into the MegaDySC.

2. MegaDySC SYSTEM 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 MegaDySC and passes directly to the load. In this bypass mode the load is unprotected from voltage sags. In the *Normal operation mode* the MegaDySC is energized and the power is directed through the MegaDySC, protecting the load. See the following sections for MegaDySC and Bypass operation details.

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

WARNING: VOLTAGE

Dangerous voltages are exposed within the MegaDySC System. The system should never be operated with the enclosure door 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 MegaDySC OPERATION

The MegaDySC 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 output. 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 MegaDySC 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.

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.

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 MegaDySC 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 -13% 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 MegaDySC. During this period sag correction is inhibited and the MegaDySC will continue 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 expired (approximately 1 minute). A blue "SYSTEM OFFLINE" box is displayed whenever the MegaDySC 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.

CONDITION	DEFINITION	Touchscreen Display STATUS text*	INVERTER OPERATION	BYPASS MODE
Normal:	$87\% < V_{LINE} < 110\%$	Green "OK"	Off	Static
Sag Event:	$V_{LINE} < 87\%$ 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^2t)	Load current $> 150\%$ for 3 cycles	Blinks Red, then Orange for 1 min. Repeats is 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
MegaDySC Over-temperature	Internal temperature limit exceeded	Blue, MegaDySC offline	Disconnected	Mech. Bypass
Static Switch Failure	Open SCR(s)	Blue, MegaDySC offline	Disconnected	Mech. Bypass
Main Fuse Open	Open Fuse(s)	Blue, MegaDySC offline	Disconnected	Mech. Bypass
Enclosure Door Open	Door Open	Blue, MegaDySC offline	Disconnected	Mech. Bypass

* 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.

Table 1 Operational Conditions and Indications

Touch-screen Display: Fault conditions

Refer to the Touchscreen Display manual addendum for further information on system faults and status display

2.3 BYPASS SWITCHBOARD OPERATION (see Figure 3; 4)

The Automatic 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 MegaDySC. The output of the MegaDySC is routed to the load through CBO. CBB is normally open. CBB connects utility power to the load (bypassing the MegaDySC) when operating in the bypass mode.

WARNING: VOLTAGE

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

WARNING: OPERATIONAL

WARNINGS:

- 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)

AUTOMATIC SYSTEM:

In the event of a fault in the MegaDySC system, bypass (CBB) will close. The system will remain in bypass until manually transferred back to the MegaDySC

MANUAL TRANSFER TO MAINTENANCE BYPASS:

- 1) If CBB is tripped, Press both “CBB reset” pushbuttons
- 2) Press green “close CBB” pushbutton
- 3) Confirm that red “bypass closed” lamp is lit
- 4) Press red “open/reset CBI” pushbutton. Output breaker (CBO) will open automatically.
- 5) Confirm that both CBI and CBO are open
- 6) The MegaDySC is now bypassed and isolated for maintenance

MANUAL TRANSFER TO MEGADYSC:

- 1) Press red “open/reset CBI” pushbutton then press green “close CBI” pushbutton.
Note: “close CBI” is inhibited for one minute after power cycling.
- 2) Confirm that the MegaDySC screen is lit, is green and displays “ok” in the upper-left corner.
- 3) Close CBO by manually moving the handle to the “off” (O) position and then to the “on” (I) position.
- 4) Confirm that the screen on the MegaDySC displays “OK”.
- 5) Press red “open CBB” pushbutton
- 6) The MegaDySC system is now providing power to the load.

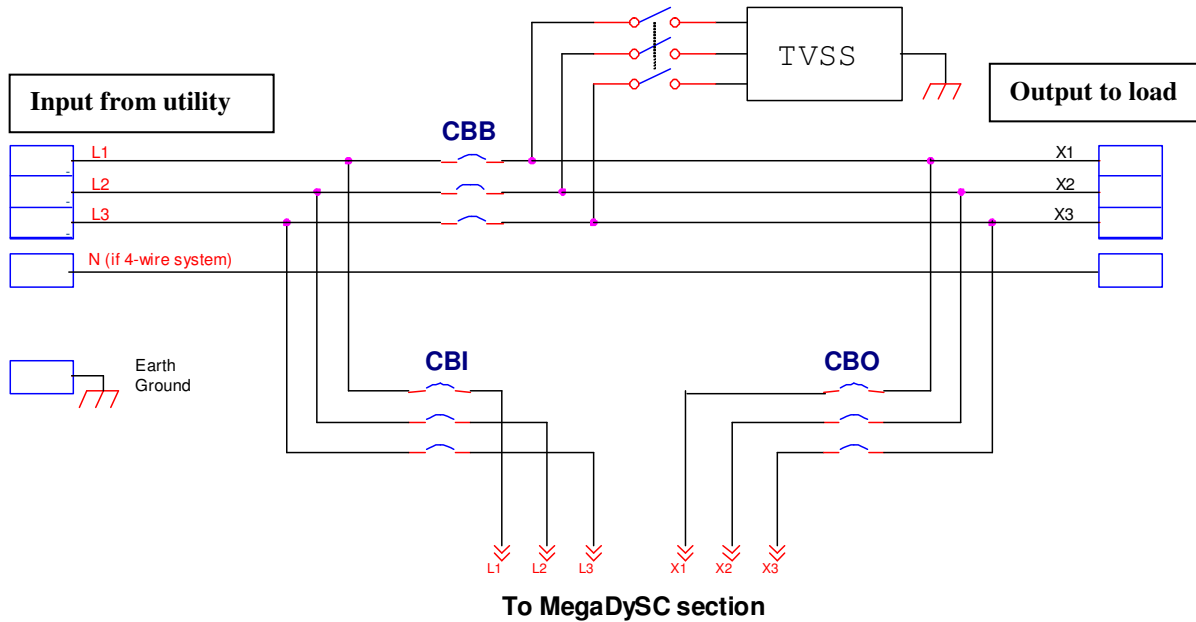


Figure 5, Schematic Diagram of Automatic Bypass Switchboard Power Circuit

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.

2.4 TRANSIENT PROTECTION (see Figure 5)

Over voltage transient protection is provided on the output of the MegaDySC to limit the potential for transient over-voltage being passed to the load. Indicator lights for each phase on the front of the TVSS panel (behind Bypass cabinet top front panel) should be illuminated under normal operation. Should a severe over-voltage occur, internal fuses in the TVSS module may open. If TVSS operation is compromised, one or more of the indicator lights will be extinguished. A form C contact is provided on the right side of the TVSS module for remote fault indication, if desired. If a fault is indicated, switch S1 may be opened to allow servicing of the TVSS module. Refer servicing to qualified personnel.

TROUBLESHOOTING NOTES

Refer servicing to qualified and factory authorized personnel. Opening this enclosure door will shut down the MegaDySC system and force an automatic mechanical bypass. Refer to manual bypass instructions to perform a seamless transfer of power before opening the enclosure door for servicing.

WARNING-VOLTAGE

This 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 the red LEDs located above capacitor banks are lit. If the red LEDs do not extinguish within 5 minutes, close the enclosure door and contact the factory for assistance.

2.5.1 The **NORMAL mode** for the MegaDySC is Input Breaker (CBI) and Output Breaker (CBO) closed. **The bypass breaker (CBB) must be open** or the MegaDySC will not be able to correct voltage sags. There is a red indicator light on the bypass enclosure that is lit when the bypass is closed. The green “OK” status box should be shown on the touchscreen display. The green “OK” box indicates that the voltage at the output of the MegaDySC is within the +10%, -13% normal window. Refer to Table 1 for conditions.

2.5.2 The **BYPASS mode** for the MegaDySC is for Input Breaker (CBI) and Output Breaker (CBO) to be open. **The bypass breaker (CBB) must be closed** to provide power to the load while the *MegaDySC* is being serviced.

Refer to section 2.3 or the placard on the bypass for instructions on transferring the system into and out of bypass.

Caution: Servicing must only be performed by factory authorized and qualified personnel.

2.5.3 The **TEST mode** for the MegaDySC is for Input Breaker (CBI) to be closed and Output Breaker (CBO) to be open. **The bypass breaker (CBB) must be closed** to provide power to the load while the MegaDySC is being tested off-line.

Caution: Testing must only be performed by factory authorized and qualified personnel.

2.5.4 **Fault protection** is provided by a variety of protection devices including electronic, circuit breakers and fuses.

CBI and CBO are set to protect the MegaDySC conductors. If an upstream circuit breaker is present, CBB is typically coordinated to allow the upstream breaker to be the primary protection for the branch circuit.

The MegaDySC section contains semiconductor fuses rated $800 A_{RMS}$. These fuses provide short circuit protection for the MegaDySC modules. In the event of an internal short circuit, this fuse will clear and trigger an automatic transfer to mechanical bypass mode.

In addition, each module has an electronic current limit function that will protect the inverter module from peak over currents during sag protection operation.

NOTE: In the event of the operation of any over current protection function, check the touchscreen display on the MegaDySC for error codes that may indicate the type of over current condition.

Circuit breaker settings information:

NOTE: Breaker settings must not be changed without consulting SoftSwitching.

Each of CBB, CBI, CBO contains an electronic trip unit with adjustable “Short Delay Pickup.” These should be set:

CBB: 8 (max.)

CBI: 7

CBO: 8 (max.)

2.5.5 Diagnostic indicators available on the MegaDySC system:

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

Operation and usage of these indicators to diagnose application or system problems is described below. See the touchscreen display manual addendum for display features and operation.

NOTE: It is important to record any fault messages.

Open circuit faults:

- 1) Open static switch (failure)
- 2) Open inverter module (semiconductor) input fuse
- 3) Over temperature of static switch heatsink
- 4) Over temperature of cross-coupling transformer
- 5) Over temperature of enclosure ambient
- 6) Open enclosure door
- 7) Overload of static switch (see section 5)

NOTE: Fault types 1) and 2) may result in momentary interruption of power to the load before transferring to mechanical bypass. Types 3) through 7) will result in a seamless transfer to mechanical bypass, without interruption.

3.0 Remote Diagnostics and Remote Bypass

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 6). In addition, a customer-supplied relay may be used to remotely command a Seamless Bypass operation, as described in 3.3. These functions are available from terminal block TB1 located in the upper compartment of the bypass switchboard. See Figure 8 for recommended conduit entry location.

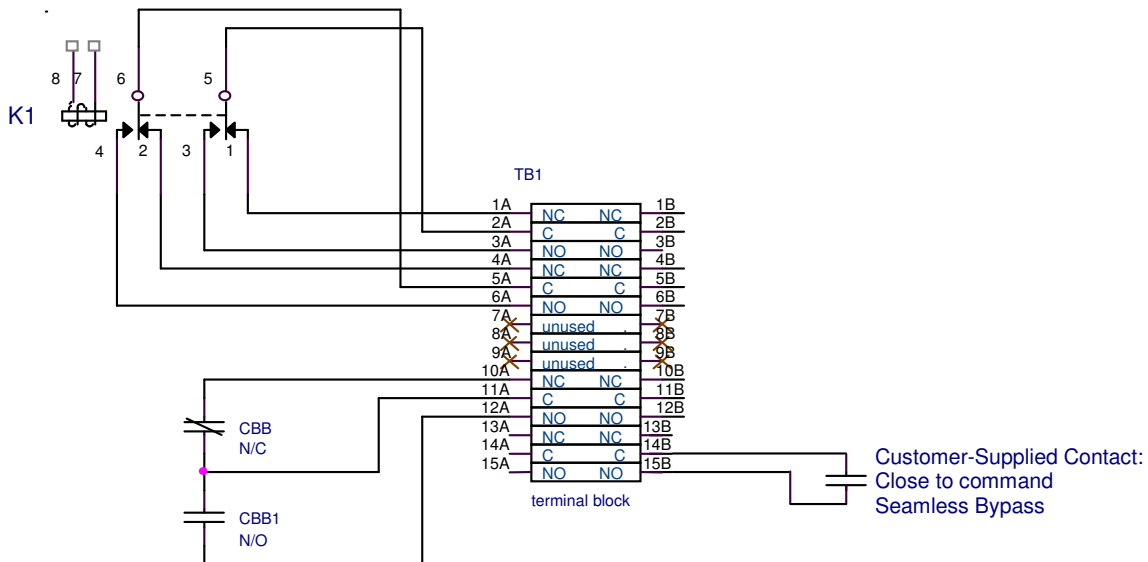


Figure 6 Relay contacts Schematic TB1 is located in bypass switchboard enclosure

3.1 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.

3.2 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, removing power from the DySC. 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 reset the system to operational status.



3.3 Remote Seamless Bypass Command—EPO

A normally-open PLC contact, relay contact, or push-button contact may be connected between TB1/14 and TB1/15. Close the contact to initiate an automatic seamless bypass operation: CBB will close, then CBI and CBO will open, removing power from the MegaDySC cabinet; voltage sag correction will then be disabled.

This feature may be utilized as an Emergency Power Off (EPO) function for the MegaDySC cabinet. Power to the output loads or output distribution panel, if present, will not be interrupted. Note that the automatic bypass functionality requires that nominal AC power is present at the switchboard input terminals.

3.4 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.

	WARNING	
<p>Remove power from the DySC system prior to connecting any alarm notification device. Access the terminal contacts risks exposure to a potential arc flash and/or electrocution hazard unless power to the switchboard is removed.</p>		

3.5 Additional User Contacts and RS-232 port

The MegaDySC remote interface port is located behind a small metal cover, above the door hinge of the MegaDySC 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. Lastly, connector positions 5 and 6 close when an alarm event occurs. The relays are rated at 24VDC @ 1A.

A removable connector (plug) is provided to facilitate wiring. 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)

RS-232 Serial communications

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

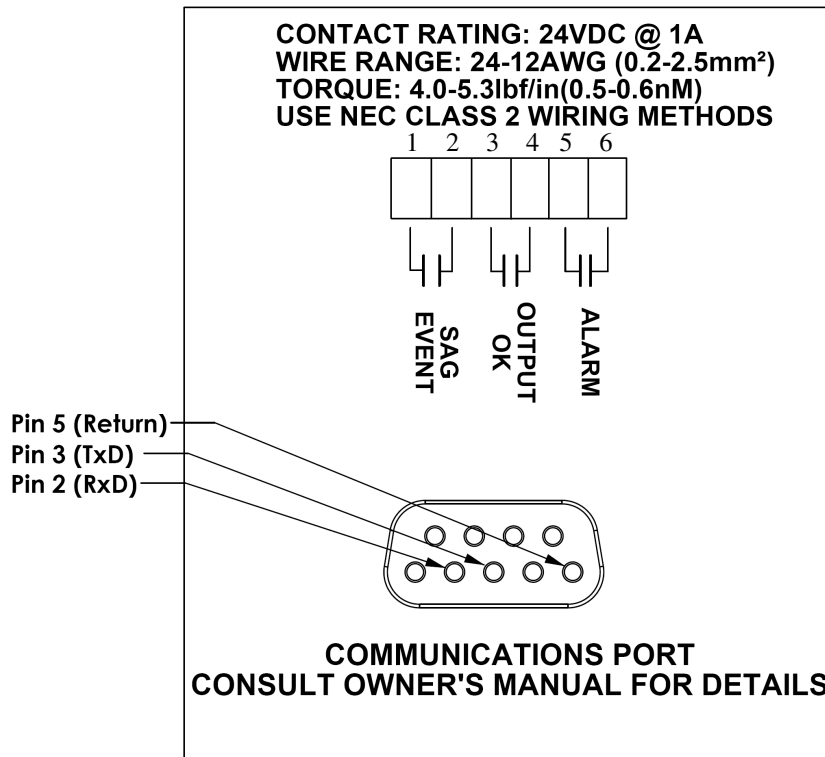


Figure 7 – RS232 Com Port and Relay Contacts

3.6 I-Sense Voltage Monitor Communications

The I-Sense voltage monitor is located on the bottom front of the bypass switchboard and is pre-wired to monitor the MegaDySC input and output voltages. The I-Sense Ethernet and Modem communications ports are internally connected to the RJ45 and RJ11 jacks, respectively, located in the upper compartment of the bypass switchboard. See Figures 4 and 8 for conduit entry locations. A communications connection is required to enable I-Sense monitoring. See the I-Sense Operators Guide for further instructions.

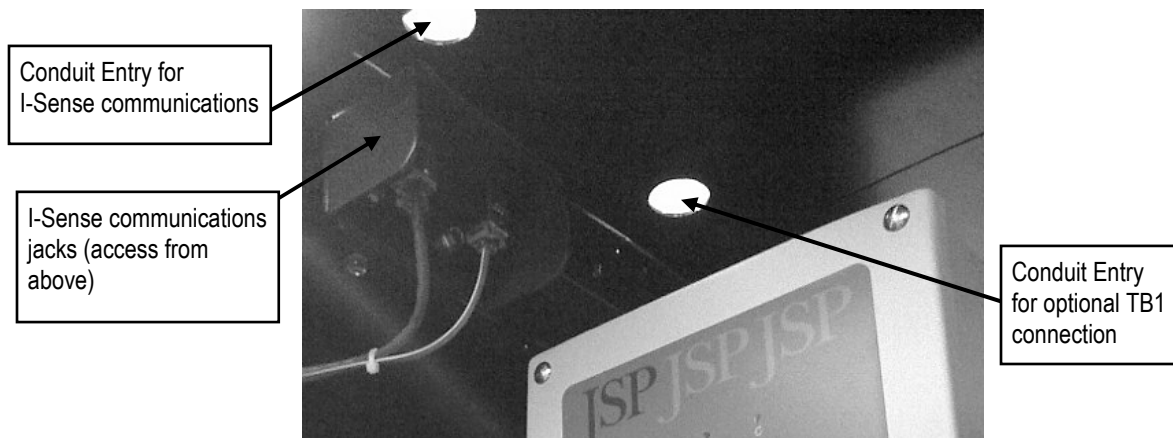


Figure 8 – Communications Wiring view from within upper switchboard compartment

4. MAINTENANCE AND SERVICING

4.1 FAN FILTER MEDIA

The MegaDySC 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 MegaDySC section filters may be obtained from SoftSwitching by referencing part number 26-00036; these filters are washable. Replacement filters for the optional ER section of the MegaDySC may be obtained from SoftSwitching by referencing part number 90-00432. 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.

4.2 SERVICING

CAUTION: SERVICE MUST BE PERFORMED ONLY BY QUALIFIED AND FACTORY AUTHORIZED SERVICE PERSONNEL.

Fast-acting fuses are included to protect the MegaDySC in the event of a load-short circuit. If power is applied, CBI is closed, and the blue “SYSTEM OFFLINE” status box is displayed on the touchscreen, this may indicate blown fuse(s).

4.3 FUSE PART NUMBERS

To maintain protection of the Bypass Switchboard, fuses must be replaced with the same or exact replacement type. These fuses are available from the factory and should only be replaced by qualified and factory authorized service personnel.

IMPORTANT: Before replacing a fuse, authorized and qualified service personnel will require removal of power to the Bypass Switchboard by opening and locking out the appropriate upstream branch circuit breaker according to local plant lockout-tag-out protocol.

FUSE	DESCRIPTION	MANUFACTURER	MANUFACTURERS PART NUMBER
F1, F2	Fuse, 3A, 600V	Ferraz-Shawmut	TRS3R
F3, F4, F5, F8, F9, F10	Fuse, 2A, 600V	Ferraz-Shawmut	ATQR2
F6	Fuse, 12A, 250V	Ferraz-Shawmut	ATQR12
F12	Fuse, 6A, 600V	Ferraz-Shawmut	ATQR6
F13, F14, F15	Fuse, 15A, 600V	Ferraz-Shawmut	TRS15R
F25, F26, F27	Fuse, 6A, 600V	Ferraz-Shawmut	A4J6

Table 3, Switchboard Fuse Schedule

To maintain protection of the MegaDySC, fuses must be replaced with the same or exact replacement type. These fuses are available from the factory and should only be replaced by qualified and factory authorized service personnel.

IMPORTANT: Before replacing a fuse, qualified and factory authorized service personnel must transfer the MegaDySC system to maintenance bypass mode. No attempt should be made to service the MegaDySC if red LEDs located above the DC bus capacitors are lit. See the drawing 92-00245 inside the MegaDySC door for fuse locations.

FUSE	DESCRIPTION	SST PART NUMBER	MANUFACTURER	MANUFACTURERS PART NUMBER
F1, F2, F3	Fuse, 800A, 500Vac	43-00042	Ferraz Shawmut	A50QS800-4IL
F4, F5, F6	Fuse, 200A, 600Vac, Time Delay	43-00017	Ferraz Shawmut	AJT200
F10, F11	Fuse, 4A	43-00110	Ferraz Shawmut	TRS4R
F12	Fuse, 2A	43-00109	Ferraz Shawmut	TRS2R
F13 to F24	Fuse, 20A (SR) Fuse 25A (ER) 600V	43-00093 (SR) 43-00094 (ER)	Ferraz Shawmut	ATM20 (SR) ATM25 (ER)
F1, F2 (on Inverter module)	Fuse, 2A	43-00030	Bussmann	FNQ-R-2
F1, F2, F3, F4 (on optional ER modules)	Fuse, 70A, 500Vac	43-00041	Ferraz Shawmut	A50QS70
F3 (on Inverter Modules)	Fuse, 400A, 500Vac	43-00062	Ferraz Shawmut	A50QS400-4IL

Table 4, MegaDySC Fuse Schedule

5. SPECIFICATIONS

The three-phase Dynamic Sag Corrector[®] (MegaDySC) protects equipment against voltage sags down to 50% for 5 seconds, and down to zero for up to 3 cycles (ER models up to 12 cycles) @ 0.7PF, and transient voltage surges. The MegaDySC is a device that operates in series with the utility power supply. It is not designed or intended to operate with an open circuit at its input terminals.

MegaDySC System Ratings:

Nominal Input Voltage:	380, 400, 460, or 480 VAC, 3 Phase, 3-wire or 4-wire, 50/60 Hz (depending on model)
Static Bypass Current:	100% Rated A_{RMS} continuous 150%-400% for 5 seconds 400%-600% for 0.5 second Above 600% for 0.1 second
Static Bypass Fuse Rating:	800 A_{RMS} continuous 200kA interrupt rating 340kA ² s (I^2t rating)
Maximum Sag Correction Current:	400 A_{RMS} for 5 seconds (SR and ER model) Current peak limited to 600 A_{PK} (Crest Factor: 1.5)
Typical Sag Detection Time:	Approx: 1 ms for 10% drop in voltage or 1 ms for less than 87% of nominal voltage
Typical Transfer Time:	1 ms to transfer to MegaDySC operation
Output During Sag Correction:	Corrects to within SEMI F47 and ITIC (CBEMA) voltage tolerance envelopes.
Sag Correction Time Limits:	
Three Phase Symmetrical to 50% remaining voltage:	5 seconds* every minute **
Two Phase to 30% remaining voltage:	5 seconds* every minute **
Three Phase Symmetrical to 0% remaining voltage:	3 cycles, (12 cycles for ER) per event†
Single Line to 0% remaining voltage:	5 seconds* every minute * Cumulative ** 5 min. rest before next 5s correction, otherwise 2s every minute for subsequent events † 0.7 Load P.F. (Function of load)
Operating Efficiency:	>99% (in static bypass condition)
Relative Humidity:	0 to 95% Non-condensing
Operating Ambient Temp. Range:	0° to 40°C (104°F)
Dimensions and Weight:	see section 1.2

**SOFT SWITCHING TECHNOLOGIES CORPORATION
STANDARD 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.
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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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