5.4.1 Inverter

The DSTATCOM system is composed of seven (7) 2.5 MVA inverters. The individual 2.5 MVA unit is shown in the figures below for reference. The 2.5 MVA units consist of two 1.25 MVA inverters connected in parallel to the coupling transformer. These inverters convert a DC voltage into an AC voltage. The individual 1.25 MVA inverter section is constructed with 3 IGBT trays (each tray is a phase) which make up 3 phases (two IGBTs per phase – a positive and negative device). Each inverter acts as a fully independent 3 phase source. The inverters have an independent 800 volt DC bus and produce an AC voltage at a nominal value of 480 Vac and up to 1500 Arms at the continuously rated output. The modulation frequency of the inverters is approximately 5000 Hz. This modulation frequency produces a high quality sine wave, with a fast response time, and a high bandwidth at the output of the DSTATCOM with very low harmonics.

The primary components in this section include:

- IGBT trays
- DC Bus
- Cooling Fan
- DC Capacitors
- LEM Current Sensors
- Inverter Control Boxes

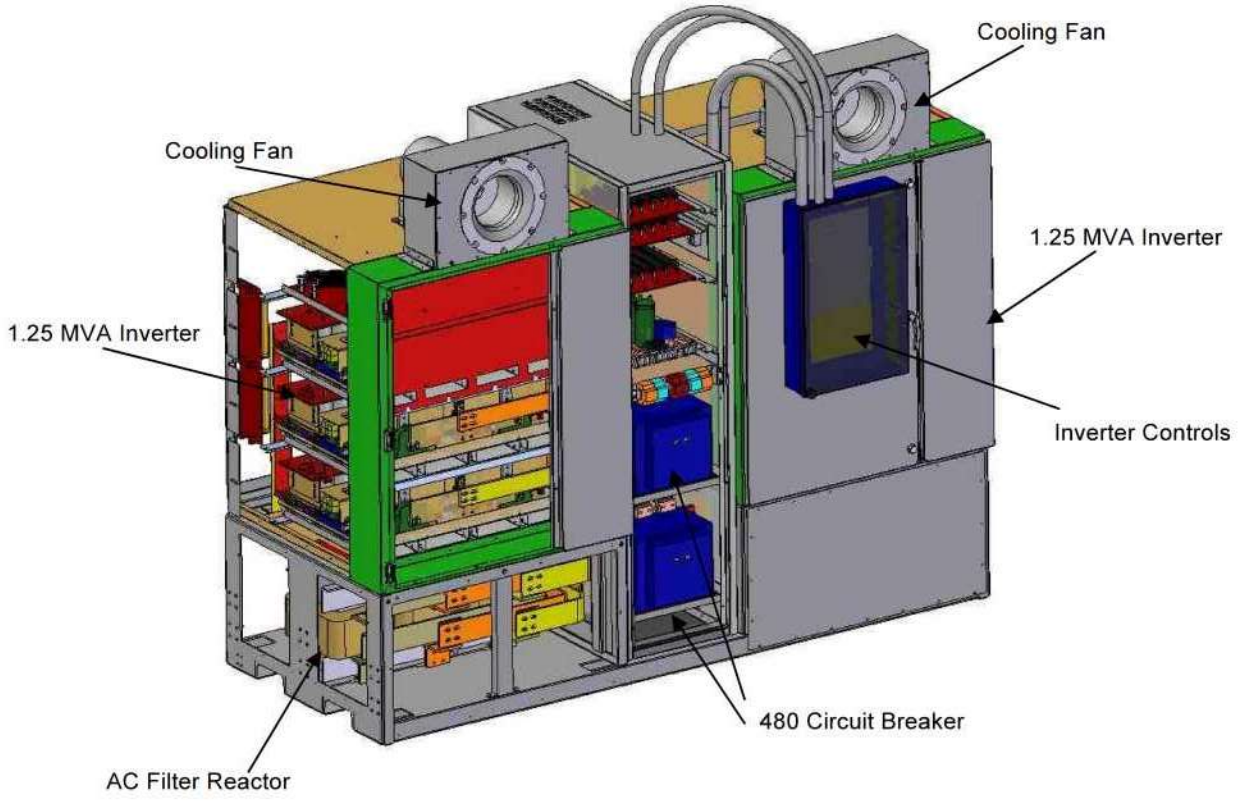


Figure 5.4.1a Front View – 2.5 MVA Inverter

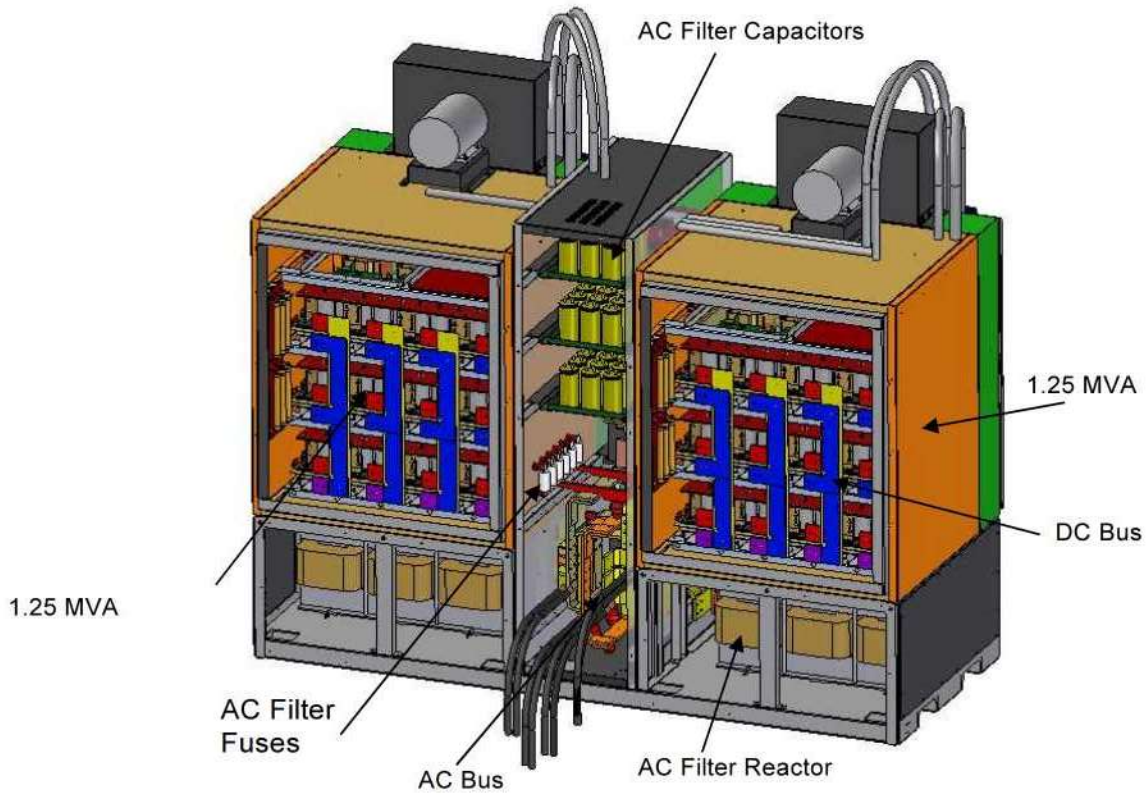


Figure 5.4.1b Rear View – 2.5 MVA Inverter

5.4.1.1 IGBT Tray

The IGBT Tray is the basic building block for the Inverter. Each tray is one phase of a three phase inverter. Groups of 3 trays are assembled to create a 1.25 MVA inverter. The tray contains 4 IGBT modules connected in parallel with separate heatsinks. There is one gate drive board that receives firing commands and generates the voltages and currents necessary to control the IGBTs. The tray also includes DC capacitors and LEM current sensors. The IGBT Trays slide into position on guide rails and weigh approximately 100 lbs each.

The AC output of the tray is connected to the AC filter reactor located below the inverter. The gate drive is connected to the 1.25 MVA inverter controls mounted on the front door of the inverter section.

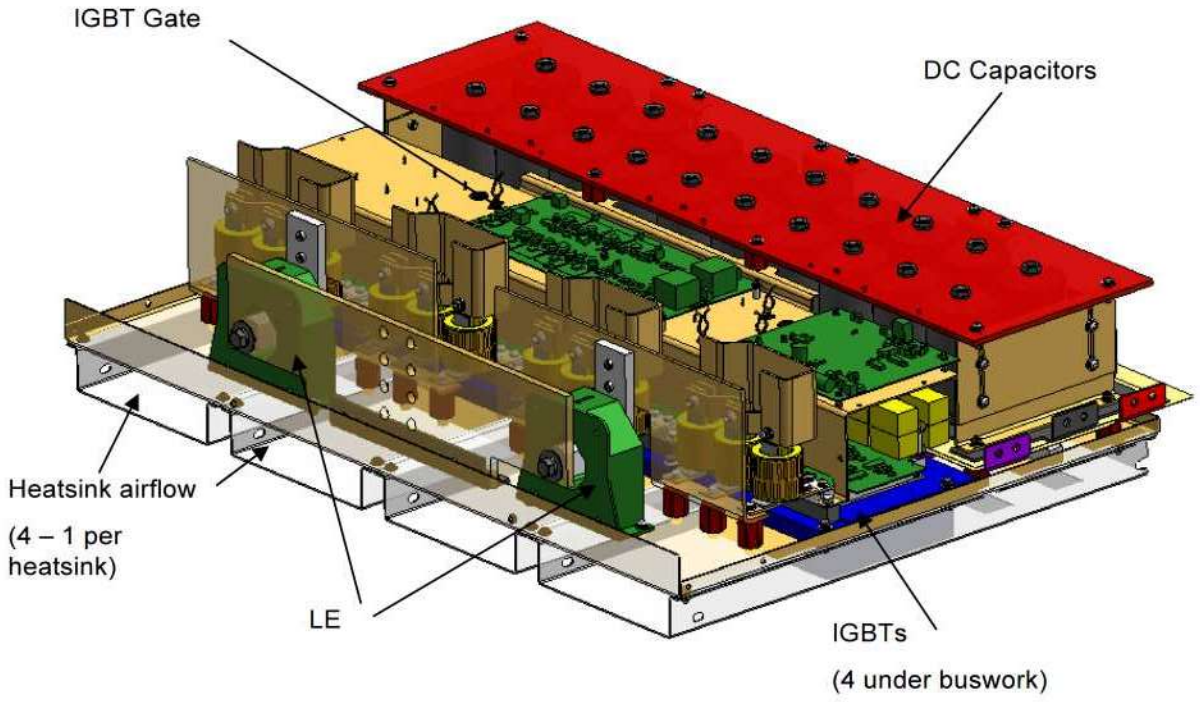
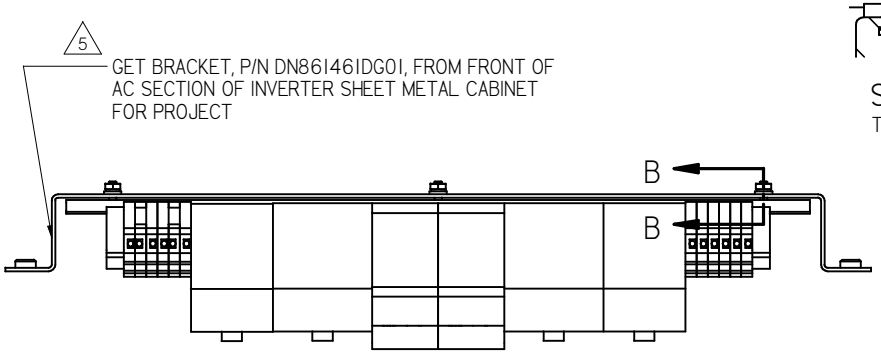
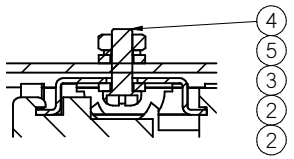


Figure 5.4.1.1 IGBT Tray

UNLESS OTHERWISE SPECIFIED:

DECIMAL DIMS TO BE: ±	.03
ANGLES TO BE: ±	1°
WHEN CHECKED, BREAK ALL CORNERS	☒
WHEN CHECKED, REMOVE ALL BURRS	☒

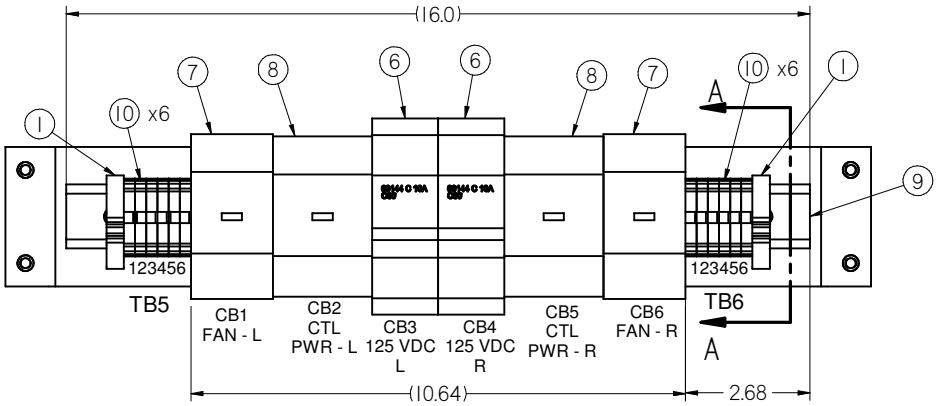


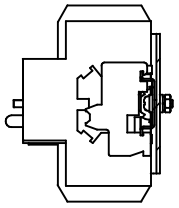


SECTION B-B
TYPICAL 3-PLACES

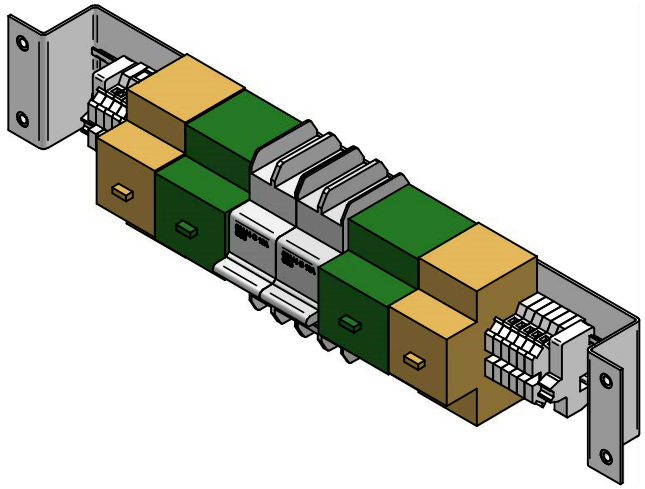
BILL OF MATERIAL

ITEM	No Req'd	PART NUMBER	DESCRIPTION
1	2	6810-002	SHORT END BRACKET
2	6	6910-009	WASHER #8 FLAT ROUND REGULAR
3	3	6910-047	8 LOCKWASHER SPLIT REG.SPRING 18-8 SS
4	3	6911-245	SCREW 8-32 X 1/2 PAN PHILLIPS HEAD
5	3	6912-014	NUT, 8-32 HEX, MACHINE SCREW
6	2	CEKZZZ000039	MERLIN GERIN 60144; MINI CIRCUIT BREAKER, 10A, DBL POLE, MULTI 9 C90N
7	2	6246-028	ABB MS116 - 16.0 MANUAL MOTOR STARTER 10-16A 480V
8	2	CELAMN000018	MOTOR STARTER, MANUAL, 480V 3PH, 15HP, 20-25A
9	1	CMSTRC000003	DIN RAIL 16" LONG
10	12	6810-001	TERMINAL BLOCK





SECTION A-A



REVISIONS			
NO.	NOTICE NO.	DATE	REV. BY
000		6/2/2006	
001		3/29/2007	
002		6/15/2007	
003	SF501204	4/24/2008	
004	SF501265	5/30/2008	
005	SF502112	3/31/2010	JHG

MATERIAL:

FINISH:

DRAWING SIZE	B
DRAWN BY	GORECKIJ
SCALE	NONE
ORIGINATION DATE	1/26/2007
USED ON	
NEXT ASSEMBLY	
PRODUCT DESCRIPTION	DSTATCOM

DRAWING NO. DA260200BG01 SE

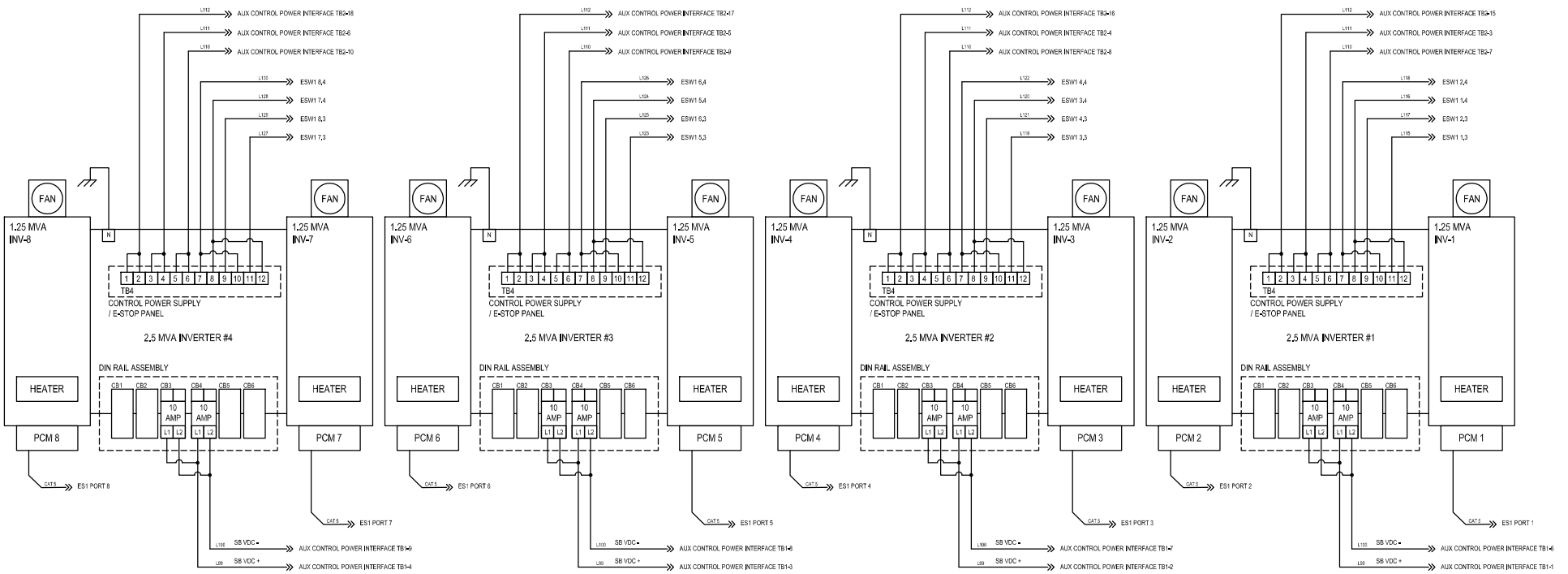
S&C ELECTRIC COMPANY
Excellence Through Innovation

DESCRIPTION

DIN RAIL ASSY - INVERTER 125VDC CONTROLS

SHEET 1 OF 1

DRAWING NO. DA260200BG01 SE



REVISIONS			
NO.	NOTICE NO.	DATE	REV BY

CAUTION

ANY INSTALLATION OPERATION, INSPECTION OR MAINTENANCE OF THE EQUIPMENT COVERED BY THIS DOCUMENT MUST BE PERFORMED BY QUALIFIED PERSONS WHO ARE THOROUGHLY TRAINED AND WHO UNDERSTAND ANY HAZARDS THAT MAY BE INVOLVED. THIS DOCUMENT HAS BEEN PREPARED ONLY FOR SUCH QUALIFIED PERSONS AND NOT INTENDED TO BE A SUBSTITUTE FOR ADEQUATE TRAINING AND EXPERIENCE IN SAFETY PROCEDURES FOR THIS TYPE OF EQUIPMENT. BEFORE PERFORMING THE OPERATIONS DESCRIBED IN THIS DOCUMENT THE NECESSARY PROCEDURES RELATIVE TO THIS TYPE OF EQUIPMENT MUST BE CARRIED OUT.

SCALE	NTS
DR BY	J. KOLLER
APP BY	M. GRIFFIN
DATE	08/26/2011

S&C ELECTRIC COMPANY
Excellence Through Innovation
Power Quality Products Division

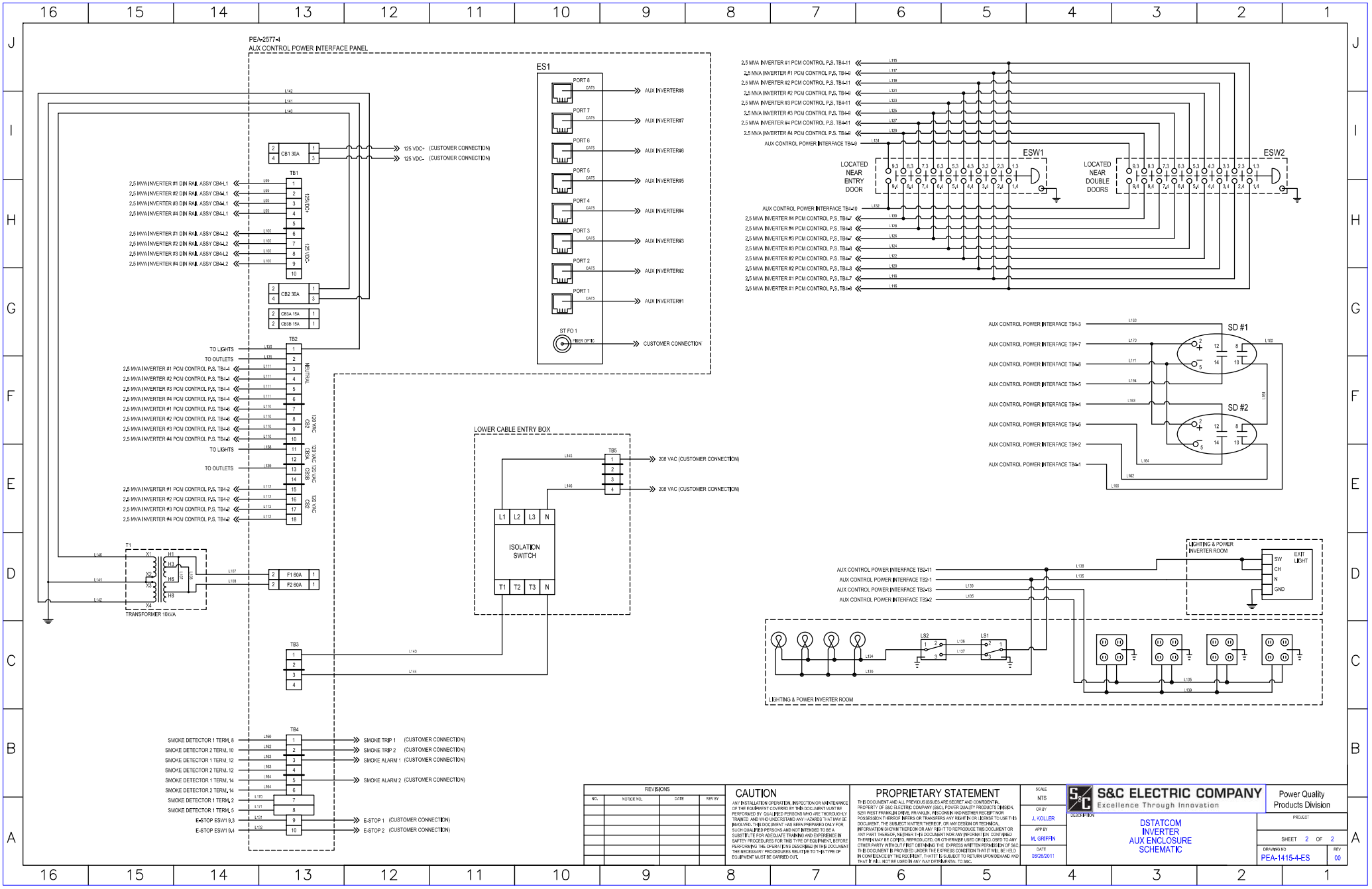
DESCRIPTION
DSTATCOM
INVERTER
AUX ENCLOSURE
SCHEMATIC

PROJECT

SHEET 1 OF 2

DRAWING NO. PEA-1415-4-ES

REV 00



REVISIONS			
NO.	NOTICE NO.	DATE	REV BY

CAUTION

ANY INSTALLATION OPERATION, INSPECTION OR MAINTENANCE OF THE EQUIPMENT COVERED BY THIS DOCUMENT MUST BE PERFORMED BY QUALIFIED PERSONS WHO ARE THOROUGHLY TRAINED AND WHO UNDERSTAND ANY HAZARDS THAT MAY BE INVOLVED. THIS DOCUMENT HAS BEEN PREPARED ONLY FOR SUCH QUALIFIED PERSONS AND IS NOT INTENDED TO BE A SUBSTITUTE FOR ADEQUATE TRAINING AND EXPERIENCE IN SAFETY PROCEDURES FOR THIS TYPE OF EQUIPMENT. BEFORE PERFORMING THE OPERATIONS DESCRIBED IN THIS DOCUMENT THE NECESSARY PROCEDURES RELATIVE TO THIS TYPE OF EQUIPMENT MUST BE CARRIED OUT.

SCALE	NTS
DR BY	J. KOLLER
APP BY	M. GRIFFIN
DATE	08/26/2011

S&C ELECTRIC COMPANY
Excellence Through Innovation
Power Quality Products Division

DESCRIPTION
DSTATCOM
INVERTER
AUX ENCLOSURE
SCHEMATIC

PROJECT

SHEET 2 OF 2

DRAWING NO. PEA-1415-4-ES

REV 00