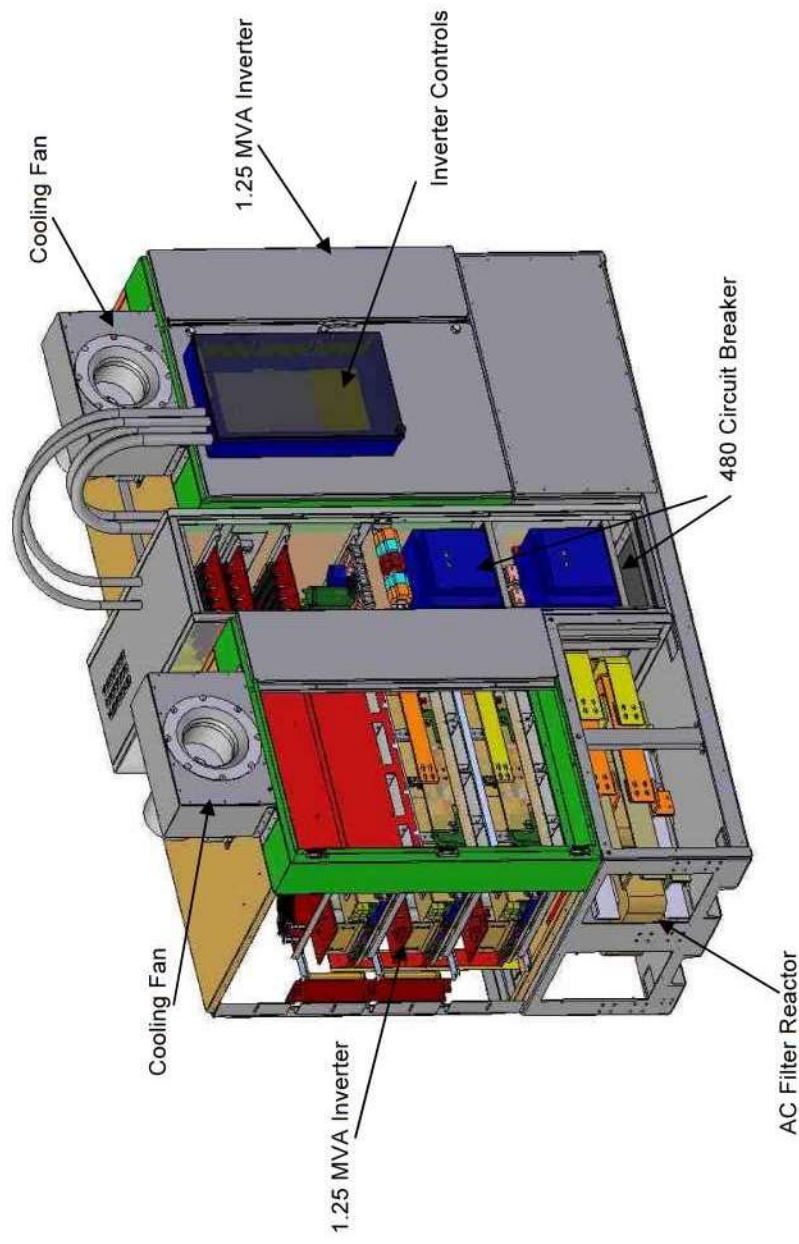


#### **5.4.1 Inverter**

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**

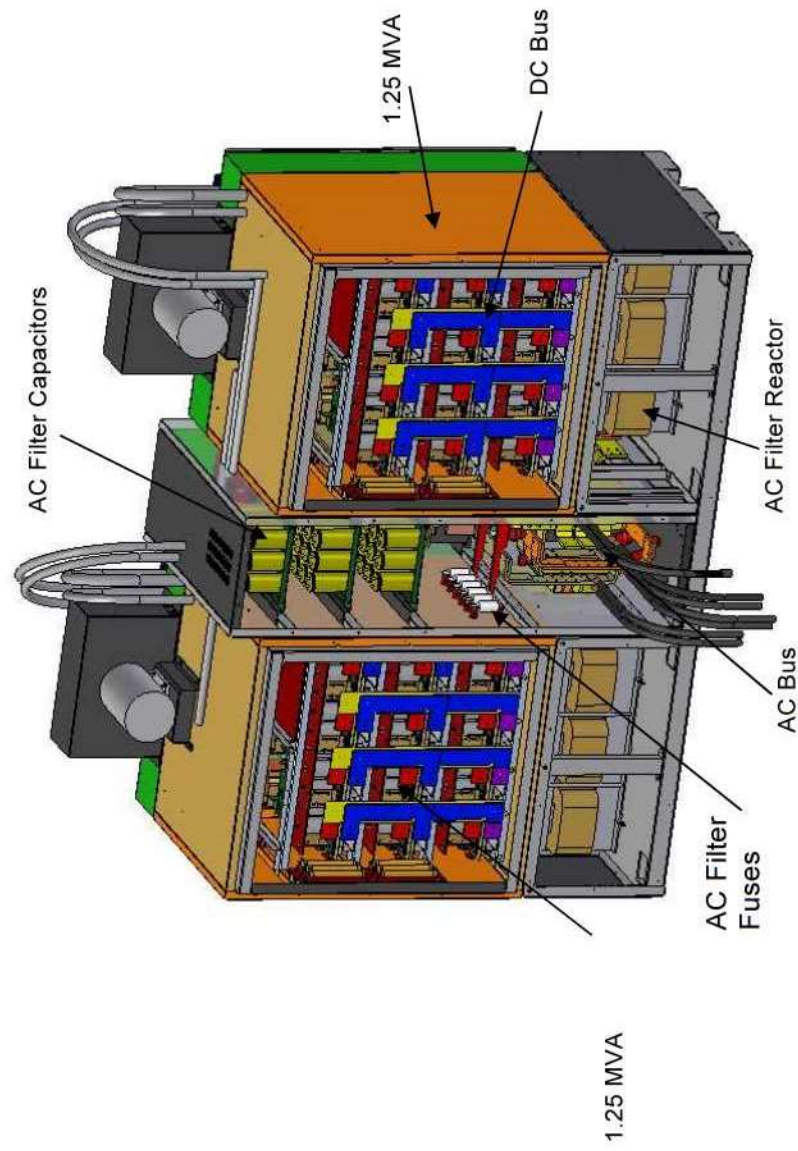


Figure 5.4.1b Rear View – 2.5 MVA Inverter

#### 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.

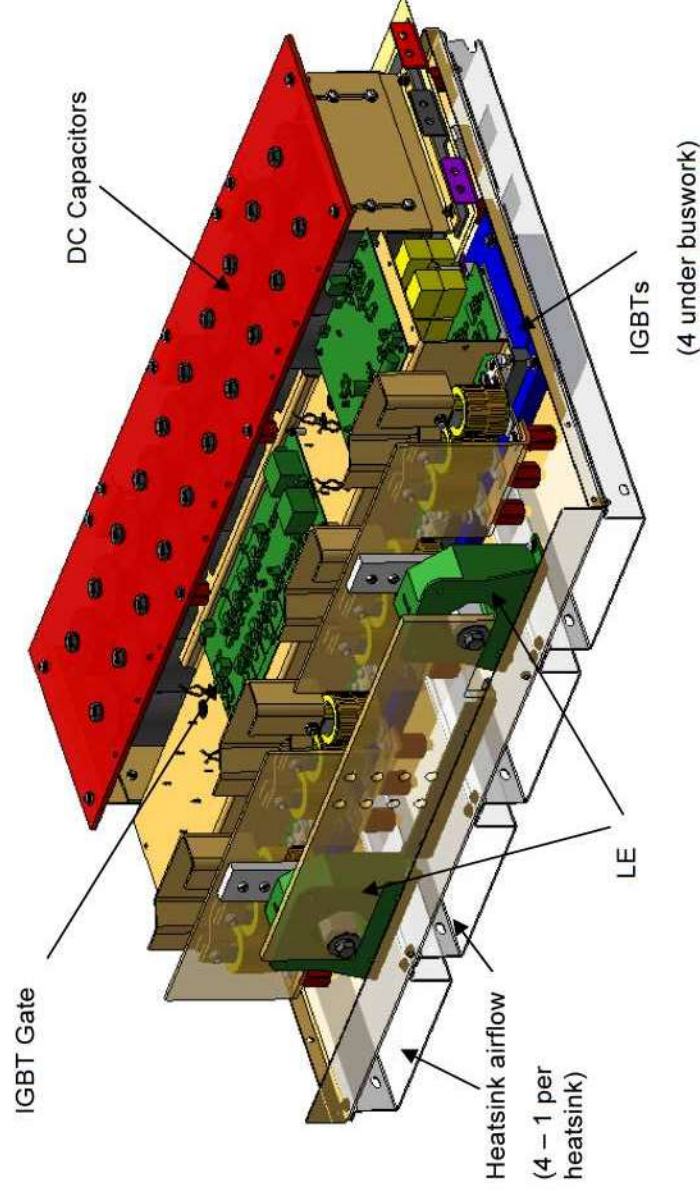


Figure 5.4.1.1 IGBT Tray

UNLESS OTHERWISE SPECIFIED:

DECIMAL DIMS TO BE: ± .03

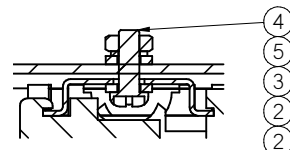
ANGLES TO BE: ± 1°

WHEN CHECKED, BREAK ALL CORNERS

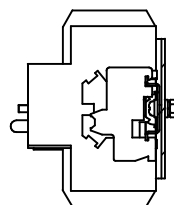
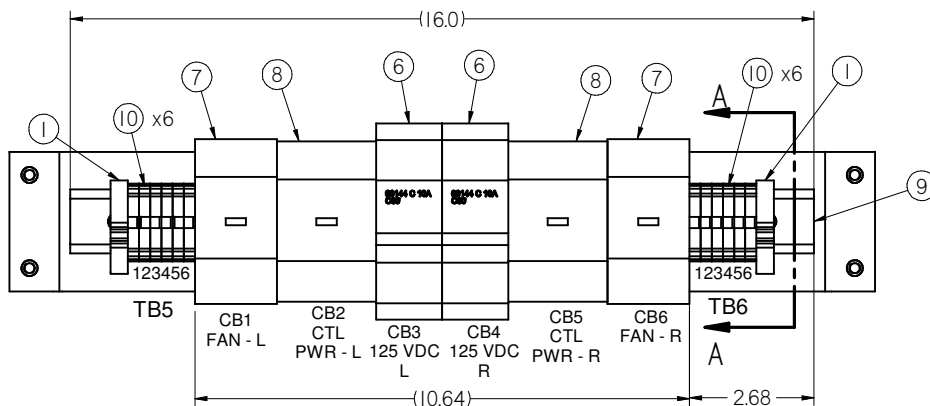
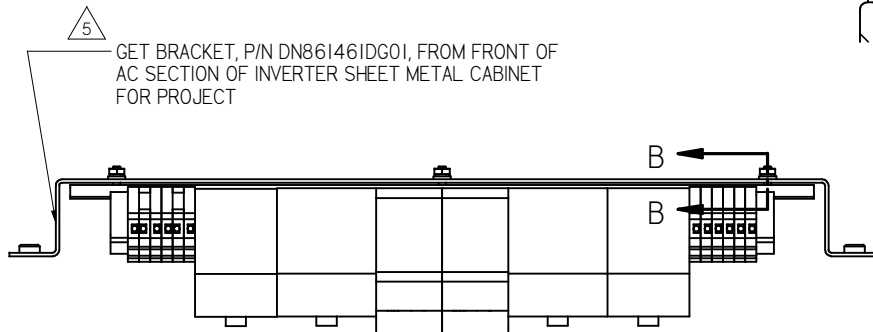
☑

WHEN CHECKED, REMOVE ALL BURRS

☑

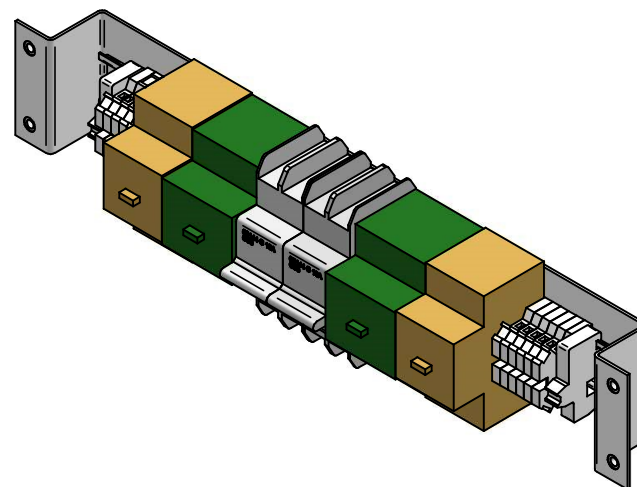


SECTION B-B  
TYPICAL 3-PLACES



SECTION A-A

| 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 MSI16 - 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                                                        |



| REVISIONS |            |           |         | MATERIAL | FINISH | DRAWING SIZE | DRAWN BY         | DIN RAIL ASSY - INVERTER 125VDC<br>CONTROLS | S&C ELECTRIC COMPANY<br>Excellence Through Innovation | DESCRIPTION | SHEET 1 OF 1 |
|-----------|------------|-----------|---------|----------|--------|--------------|------------------|---------------------------------------------|-------------------------------------------------------|-------------|--------------|
| NO.       | NOTICE NO. | DATE      | REV. BY |          |        | B            | GORECKIJ         |                                             |                                                       |             |              |
| 000       |            | 6/2/2006  |         |          |        | SCALE        | ORIGINATION DATE |                                             |                                                       |             |              |
| 001       |            | 3/29/2007 |         |          |        | NONE         | 1/26/2007        |                                             |                                                       |             |              |
| 002       |            | 6/15/2007 |         |          |        |              |                  |                                             |                                                       |             |              |
| 003       | SF501204   | 4/24/2008 |         |          |        |              |                  |                                             |                                                       |             |              |
| 004       | SF501265   | 5/30/2008 |         |          |        |              |                  |                                             |                                                       |             |              |
| 005       | SF502112   | 3/31/2010 | JHG     |          |        |              |                  |                                             |                                                       |             |              |

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NEXT ASSEMBLY

PRODUCT DESCRIPTION

DSTATCOM

DRAWING NO.  
DA260200BG01  
SE

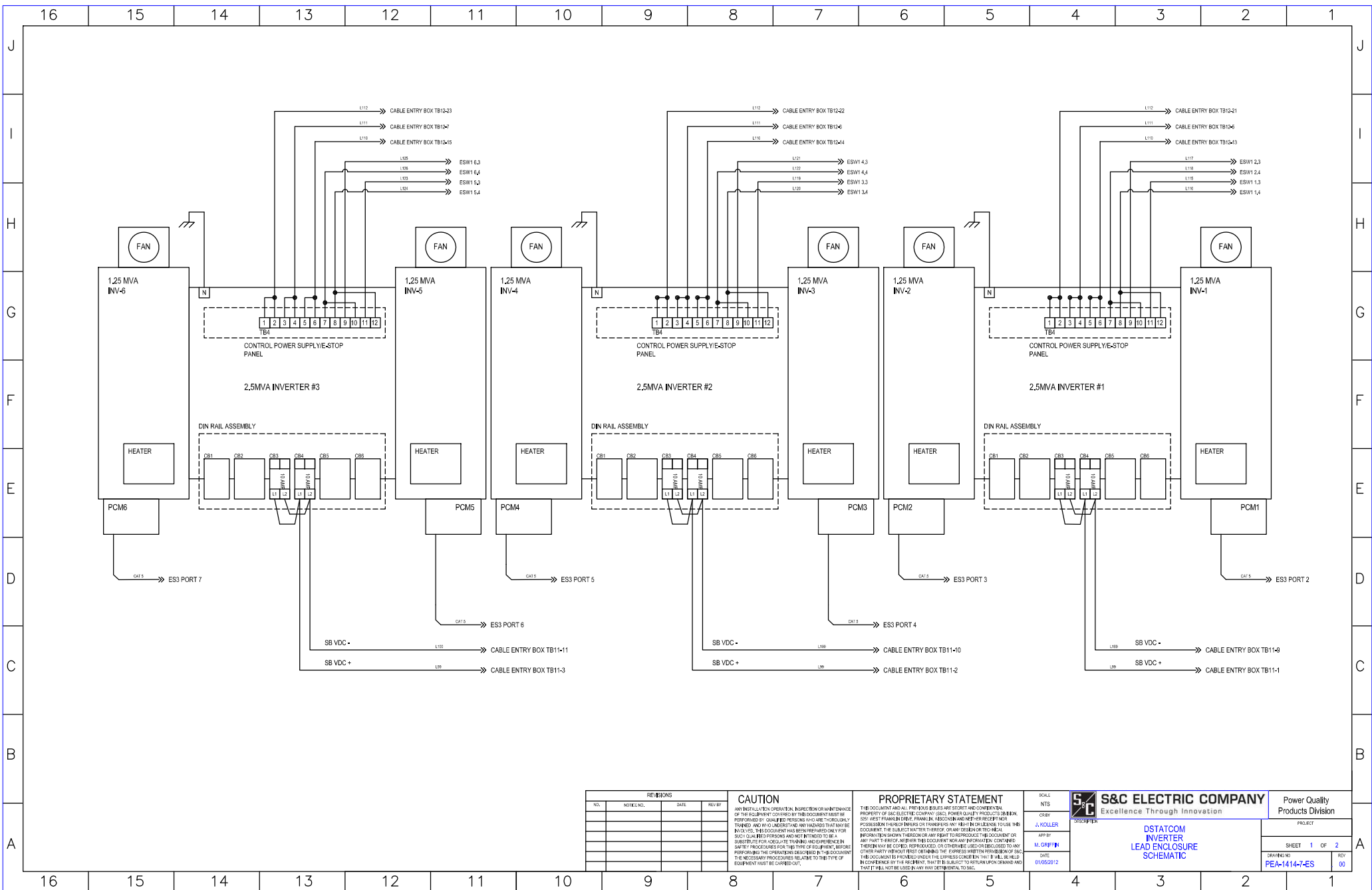


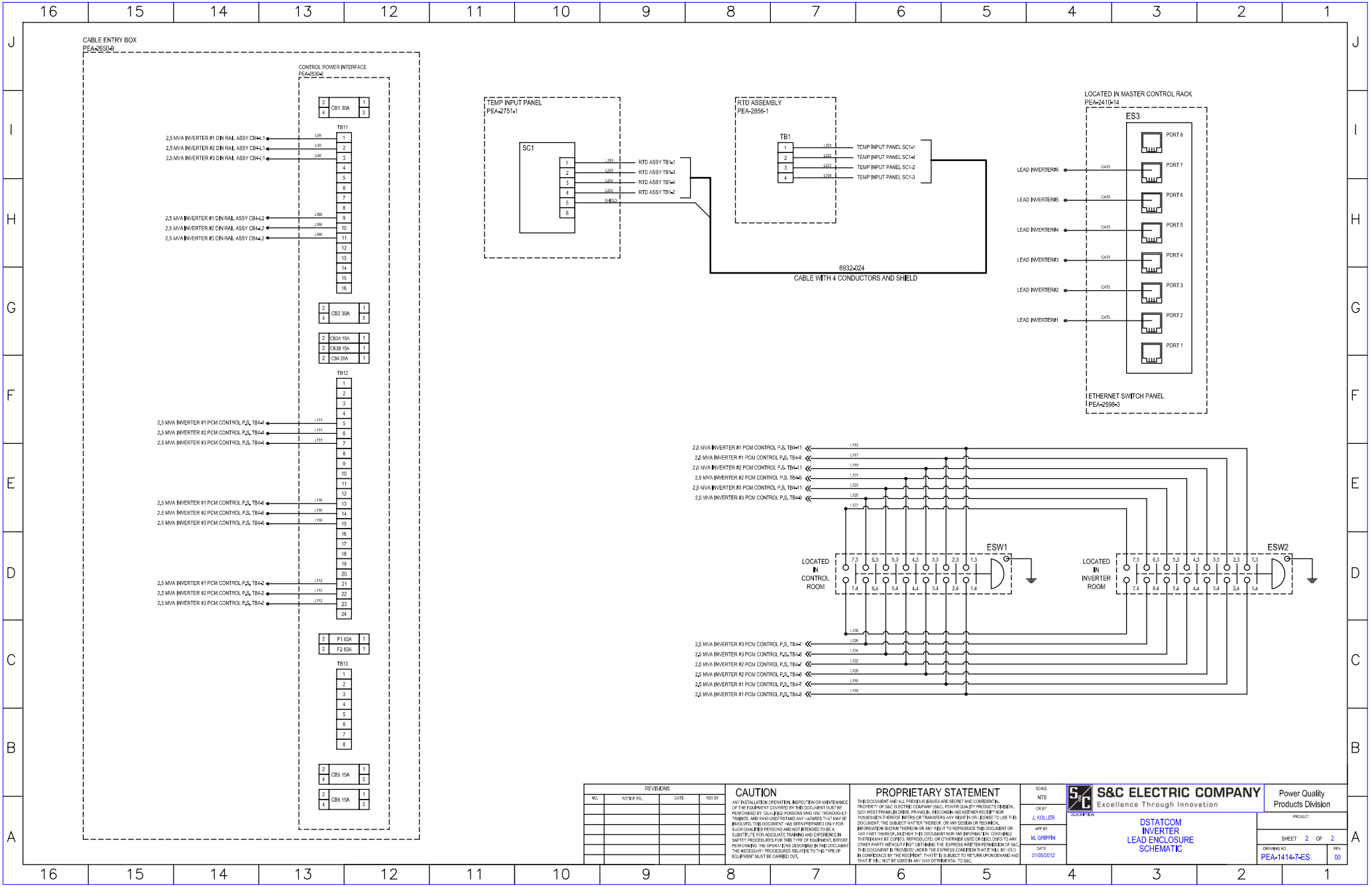
**S&C ELECTRIC COMPANY**

Excellence Through Innovation

DRAWING NO.

DA260200BG01





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| DATE<br>01/03/2012 |                                                                                                                                                        |                                                                |                                    |
| PROJECT            |                                                                                                                                                        | SHEET 2 OF 2                                                   | REV 00                             |