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**THIS DATA SHEET CONTAINS AN INSTALLATION CHECKLIST THAT MUST BE
COMPLETED AND RETURNED TO INFO@AVIDCONTROLSINC.COM
SEE APPENDIX A**

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Avid Extreme Inverter – Turbine Upgrade Installation Instructions, SWP 3.6MW, APU-E/F

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1. Introduction

- The following procedures are specific to the installation of the AVID AEI1000L liquid-cooled inverter module.

- These procedures detail how to upgrade a Siemens Wind Power 3.6MW turbine from Original Delta modules to AEI (Avid Extreme Inverter) modules and associated installation kit.
- For reference, see the following AVID documents which are supplied alongside this Installation Instruction:
 - DTS-MID0012 for additional specifications related specifically to the AEI1000L.
 - DTS-01944-ASY-A for additional specifications related to the enclosed Control Power Transformer.
 - DTS-MID0124 for additional specifications related to the Auxiliary Power Units

2. WARNINGS

- Always refer to the Cautions and Warnings in the associated MV DELTA and MV3000 manuals when installing / commissioning / fault-finding any system containing an AEI1000L module.
- This equipment may be connected to more than one live circuit.
- **Disconnect all power sources before working on the equipment.**
- **Wait at least 8 minutes after isolating all power sources and check that the voltage between DC+ and DC- has reduced to a safe level before working on the equipment.**
- Surfaces on the coolant pipes can reach high temperatures and remain hot for some time after power is switched off.
- Ensure that all coolant has cooled to a safe temperature, and the equipment is suitably drained and isolated before disconnecting the external pipework from the equipment.
- Figures are for reference only.
- It is recommended that all DC fuses are replaced during this upgrade – see section 6 for further details.

- Appendix A contains an installation checklist for the turbine upgrade. This must be completed and returned to info@avidcontrolsinc.com to activate the individual product warranties for the Avid equipment.
Each field in the checklist requires either initials, the recording of specific information (such as parameter values) or “N/A” if not applicable.
- This symbol  indicates that something is to be recorded in the Installation Record (Appendix A)
- This symbol  indicates that correct fastener torque must be carefully used.

3. Tools and Supplies Required

Wire Cutters	5mm Socket, 3/8” Drive
TORX T25 Driver	8mm Socket, 3/8” Drive
Phillips #2 x 4” Screwdriver	10mm Socket 3/8” Drive
3/16" x 4" Slotted Screwdriver	17mm Socket 3/8” Drive
#3 Pozi-drive Screwdriver	Hydrometer kit
1/2” Drill bit	8mm Crescent Wrench
8mm Socket, 3/8” Drive	<hr/> Required Tools (Supplied by Avid)
MV3000 Keypad with cable	Sheetmetal / Lexan cutting tool (Dicfeos REX003 Double Head Sheet Nibbler or similar)
5/16” Drill bit	4Nm Torque Handle
Digital Voltmeter (DVM)	<hr/> Socket Extension 10” Long, 3/8” Drive
Adjustable Crescent Wrench, 1” Jaw Capacity	Center Punch
Suitable tool (screwdriver) for wire release/insertion on spring clamp terminals	Shop Vacuum
AEI/Delta installation lift table (if needed and available – Contact Avid for more details)	4.5mm Drill Bit
AEI/Delta Lift Hoist - (if needed and available - Contact Avid for more details)	9mm Drill Bit
Power Impact Tools (DeWalt or similar)	1/2” Geenlee Hole Punch For 7/8” Hole
	1” Flat file

4. Necessary Avid Supplied Bill of Materials

AVID Model Number	Qty.	Description
AEI1000L-412103-00-[N]/[S]	8	Avid Extreme Inverter, 1000A 690V, Plumbing Option B, without capacitor fans, Special Option 3*, [N]=New, [S]=Enhanced Reman.
AEI-UPGR-KIT-07	1	AEI1000L Upgrade Kit. For SWP 3.6MW Turbines. With Control Power Transformer. Generator Converter.
AEI-UPGR-KIT-08	1	AEI1000L Upgrade Kit. For SWP 3.6MW Turbines. With Control Power Transformer. Network Converter.

***Special Option 3** indicates the fitting of:

Additional DC Connections (Fish Plates, See below)
DC Transient Voltage Suppressor
Enhanced Vibration Mitigation

Note: These options may be required for enhanced AEI warranty.

5. Optional GRID DC Fishplate and Generator Fan Upgrade Kits

AVID Model Number	Qty.	Description
AEC-UPGR-KIT-01	1	Assy, Wind Turbine Upgrade kit, Avid Extreme cable connection for 3.6MW Class Turbines. Network Converter.
AEF-UPGR-KIT-01	1	Assy, Wind Turbine Upgrade kit, Avid Extreme cooling fans, set of 3 for 3.6MW Class Turbines. Generator Converter.

See separate product datasheets for item installation instructions.

Note: These options may be required for enhanced AEI warranty.

6. DC Fuses for Inter-Module Connection

- All Siemens Wind Power (and Siemens Gamesa Renewable Energy) 2.3MW and 3.6MW turbines configure the Delta/AEI modules in hard-paralleled “sister” units, with relatively small rating DC fuses to interconnect the “sisters”.
- Experience has shown that these fuses age with time, and that faults in the Delta modules can accelerate this aging – often leading to premature failure.
- It is therefore strongly recommended that these fuses always be replaced when this upgrade is performed.
- Failure to do so may result in failure of the fuses shortly after re-starting the turbine.
- These fuses are standard spares for all wind sites, so are not provided as part of the upgrade kit.

7. Network Upgrade Kit Parts List (AEI-UPGR-KIT-08)

Item Reference	Qty.	Description
1	1	Master Auxiliary Power Unit, Avid Model Number AEI-APU-E-00
2	3	Slave Auxiliary Power Unit, Avid Model Number AEI-APU-F-00
3	1	Control Power Transformer, Single Phase, 480/600/690V to 175V, 50/60HZ, 2000VA, Enclosed, Avid Model Number AEI-UPGR-CPT-01
4	1	Grounding Bracket, Grid side, 02384-FAB-A
5	4	Hose, Bottom barb of DELTA/AEI to inlet manifold, 183.5mm, 01811-CUS-A
6	4	Hose, Bottom barb of DELTA/AEI to outlet manifold, 275mm, 01812-CUS-A
7	16	Hose clamps
8	1	Fuse Holder, 2-Pole Ultra-safe ,690V, 125A, for 22mm x 58mm Fuse Links, with Indicator and Auxiliary Microswitch. MERSEN part number US222M2I.
9	1	Fuse Holder, Single-Pole Ultra-safe, 750V, 50A, for 14mm x 51mm Fuse Links, with Indicator and Auxiliary Microswitch. MERSEN part number US141MI
10	1	Fuse, 20A, 500VAC, 14mm x 51mm, with blown-fuse indicator striker. MERSEN part number FR14GG50V20P.
11	2	Fuse, 10A, 690VAC, 22mm x 58mm, with blown-fuse indicator striker. MERSEN part number FR22GG69V10P.
12	1	Label, Red, “Caution External Control Voltage”
13	1	Label, Black, “Converter Control Power”
14	2	Bolt, M8 x 20mm, Hex, Steel, Zinc Plated
15	2	Washer, Spring-Lock, M8, Steel, Zinc Plated
16	4	Washer, Flat, M8, Steel, Zinc Plated
17	2	Nut, M8, Steel, Zinc Plated
18	10	Bolt, M5 x 10mm, Taptite, Pozi-pan, Steel, Zinc Plated
19	20 ft	PVC BRAIDED TUBING, 0.25in ID

Item Reference	Qty.	Description
20	1	splicing connector; with operating levers; 12 AWG; transparent housing
21	1	DIN Rail, 35mm X 7.5mm 300mm (12”) Long
22	1	Contactora, NEMA, 3 Pole, 230-240V @60Hz, 220-230Vac @50Hz Coil DIN/PANEL Mount, ABB
23	1	Suppressor, Varistor, 110-250V AC/DC, ABB, FOR A9-A110/AE9-AE110/AL9-AL40 Contactora
24	2	Cable Gland, 0.276 – 0.512 Polyamide, M20, Skintop SLM
25	1	ASSY, Connectors, Wire/Cable & Misc Commodities for Wind Turbine Upgrade Kit, Four-for-Four, for Type 3.6MW Turbines, GRID, APU VER E & F
26	1	Bag, Document Envelope, Magnetic, Clear Plastic, 9" X 11.5"
27	1	Label, Upgraded Turbine Identification, AEI Upgrade, APU-D/E/F Turbines

7.1 Items Contained in Grid Cable Set (*Item 25 in above Table*)

Reference	Qty.	Description	Notes
1	2	HARDWARE, CABLE GLAND, 0.31 - 0.50 in CORD RANGE, LQ-TITE STRAIN RELIEF (CGB)	USED FOR FITTING CONTROL POWER TRANSFORMER
2	2	NUT, ½" SEAL NUT (STEEL SEALING LOCK NUT)	USED FOR FITTING CONTROL POWER TRANSFORMER
3	2	HARDWARE, CABLE GLAND, 0.276 - 0.512 POLYAMIDE, M20, SKINTOP SLM	USED FOR FEEDING 175V CABLE THROUGH BASE OF CUBICLE
4	3	CONNECTOR, RING LUG 16-14 AWG, FOR ¼" STUD	USE TO TERMINATE CUT WIRES
5	12	CONNECTOR, FERRULE, 14AWG/2.5MM ² , UNINSULATED, 12mm LONG	USE TO TERMINATE CUT WIRES
6	20	HARDWARE, CABLE TIE MOUNT, ADHESIVE 1" SQ	USE TO FIX CABLES AT SUITABLE LOCATIONS
7	20	HARDWARE, CABLE TIE, TIE WRAP, UV, 10" LONG X .14 WIDE BLACK	CABLE TIES USED TO FIX CABLES AND RIBBONS AT VARIOUS LOCATIONS
8	50	HARDWARE, CABLE TIE, TIE WRAP, 7", NATURAL, 50LB	
9	1	CONNECTOR, TERMINAL BLOCK, - FEED-THROUGH - GREY	SEE SECTION 15.2
10	2	CONNECTOR, TERMINAL BLOCK, GROUND – GRN/YEL	SEE SECTION 15.2
11	3	CONNECTOR, TERMINAL, BLOCK, END SECTION COVER, DARK GREY	SEE SECTION 15.2
12	6	CONNECTOR, TERMINAL BLOCK, END STOP, DARK GREY	SEE SECTION 15.2
13	40-in	CABLE, 2.5MM, 2 CONDUCTOR, BLACK & WHITE CONDUCTORS, 1000V, BLACK JACKET	CABLES READY CUT TO LENGTH, LABELLED AND TERMINATED
14	36	LABEL, .5W X 1.437L SELF LAM WIRE LABEL	USE TO LABEL CUT WIRES AS PER THIS DRAWING
15	29 ft	CABLE, 2.5MM, 3 CONDUCTOR, BROWN, BLUE & GREEN W/YELLOW CONDUCTORS, 300/500V, BLACK JACKET	CABLES READY CUT TO LENGTH, LABELLED AND TERMINATED
16	18	LABEL, 1.0W X 3.75L SELF LAM WIRE LABEL	USE TO LABEL CUT WIRES
17	66 in	CABLE, JACKETED BLACK, 600V, 14 AWG102 COND, RED/BLK	CABLES READY CUT TO LENGTH, LABELLED AND TERMINATED
18	2	CONNECTOR, FORK CRIMP, #6 BLUE, 16-14AWG	USE TO TERMINATE CUT WIRES
19	16	CONNECTOR, FLAT BLADE 16-14AWG BLUE, PRE-INSULATED	USE TO TERMINATE CUT WIRES
20	6	CONNECTOR, FERRULE, 14AWG/2.5MM ² , UNINSULATED, 18mm LONG	USE TO TERMINATE CUT WIRES

8. Generator Upgrade Parts List (AEI -UPGR-KIT-07)

Item Reference	Qty.	Description
1	1	Master Auxiliary Power Unit, Avid Model Number AEI-APU-E-00
2	3	Slave Auxiliary Power Unit, Avid Model Number AEI-APU-F-00
3	1	Control Power Transformer, Single Phase, 480/600/690V to 175V, 50/60HZ, 2000VA, Enclosed, Avid Model Number AEI-UPGR-CPT-01
4	1	Grounding Bracket, Gen side, 02385-AFB-A
5	4	Hose, Bottom barb of DELTA/AEI to inlet manifold, 183.5mm, 01811-CUS-A
6	4	Hose, Bottom barb of DELTA/AEI to outlet manifold, 275mm, 01812-CUS-A
7	16	Hose clamps, 01482-OTS-A
8	1	Fuse Holder, 2-Pole Ultra-safe ,690V, 125A, for 22mm x 58mm Fuse Links, with Indicator and Auxiliary Microswitch. MERSEN part number US222M2I.
9	1	Fuse Holder, Single-Pole Ultra-safe, 750V, 50A, for 14mm x 51mm Fuse Links, with Indicator and Auxiliary Microswitch. MERSEN part number US141MI
10	1	Fuse, 20A, 500VAC, 14mm x 51mm, with blown-fuse indicator striker. MERSEN part number FR14GG50V20P.
11	2	Fuse, 10A, 690VAC, 22mm x 58mm, with blown-fuse indicator striker. MERSEN part number FR22GG69V10P.
12	1	Label, Red, “Caution External Control Voltage”
13	1	Label, Black, “Converter Control Power”
14	4	Bolt, M8 x 20mm, Hex, Steel, Zinc Plated
15	4	Washer, Spring-Lock, M8, Steel, Zinc Plated
16	8	Washer, Flat, M8, Steel, Zinc Plated
17	4	Nut, M8, Steel, Zinc Plated
18	10	Bolt, M5 x 10mm, Taptite, Pozi-pan, Steel, Zinc Plated

Item Reference	Qty.	Description
19	1	PVC BRAIDED TUBING, 0.25in ID
20	1	splicing connector; with operating levers; 12 AWG; transparent housing
21	1	DIN Rail, 35mm X 7.5mm 300mm (12”) Long
22	1	Contactor, NEMA, 3 Pole, 230-240V @60Hz, 220-230Vac @50Hz Coil DIN/PANEL Mount, ABB
23	1	Suppressor, Varistor, 110-250V AC/DC, ABB, FOR A9-A110/AE9-AE110/AL9-AL40 Contactor
24	2	Cable Gland, 0.276 – 0.512 Polyamide, M20, Skintop SLM
25	1	ASSY, Connectors, Wire/Cable & Misc Commodities for Wind Turbine Upgrade Kit, Four-for-Four, for Type 3.6MW Turbines, GEN, APU VER E & F (See List Below)
26	1	Bag, Document Envelope, Magnetic, Clear Plastic, 9" X 11.5"
27	1	Label, Upgraded Turbine Identification, AEI Upgrade, APU-D/E/F Turbines

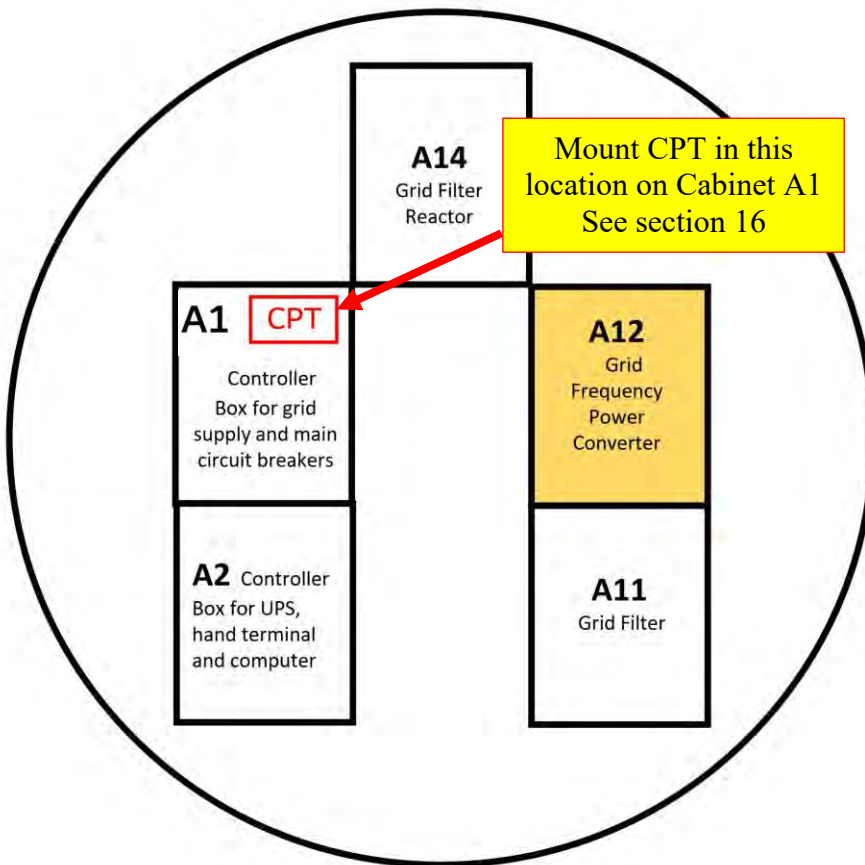
8.1 Items Contained in GEN Cable Set (*Item 25 in above Table*)

Reference	Qty.	Description	Notes
1	2	HARDWARE, CABLE GLAND, 0.31 - 0.50 in CORD RANGE, LQ-TITE STRAIN RELIEF (CGB)	USED FOR FITTING CONTROL POWER TRANSFORMER
2	2	NUT, ½" SEAL NUT (STEEL SEALING LOCK NUT)	USED FOR FITTING CONTROL POWER TRANSFORMER
3	2	HARDWARE, CABLE GLAND, 0.276 - 0.512 POLYAMIDE, M20, SKINTOP SLM	USED FOR FEEDING 175V CABLE THROUGH BASE OF CUBICLE
4	3	CONNECTOR, RING LUG 16-14 AWG, FOR ¼" STUD	USE TO TERMINATE CUT WIRES
5	12	CONNECTOR, FERRULE, 14AWG/2.5MM^2, UNINSULATED, 12mm LONG	USE TO TERMINATE CUT WIRES
6	20	HARDWARE, CABLE TIE, MOUNT, ADHESIVE 1" SQ	USE TO FIX CABLES AT SUITABLE LOCATIONS
7	20	HARDWARE, CABLE TIE, TIE WRAP, UV, 10" LONG X .14 WIDE BLACK	CABLE TIES USED TO FIX CABLES AND RIBBONS AT SUITABLE LOCATIONS
8	60	HARDWARE, CABLE TIE, TIE WRAP, 7", NATURAL, 50LB	
9	1	CONNECTOR, TERMINAL BLOCK, - FEED-THROUGH - GREY	SEE SECTION 24.1
10	2	CONNECTOR, TERMINAL BLOCK, GROUND – GRN/YEL	SEE SECTION 24.1
11	3	CONNECTOR, TERMINAL, BLOCK, END SECTION COVER, DARK GREY	SEE SECTION 24.1
12	6	CONNECTOR, TERMINAL BLOCK, END STOP, DARK GREY	SEE SECTION 24.1
13	9ft	CABLE, 2.5MM, 2 CONDUCTOR, BLACK & WHITE CONDUCTORS, 1000V, BLACK JACKET	CABLES READY CUT TO LENGTH, LABELLED AND TERMINATED
14	36	LABEL, .5W X 1.437L SELF LAM WIRE LABEL	USE TO LABEL CUT WIRES AS PER THIS DRAWING
15	34 ft	CABLE, 2.5MM, 3 CONDUCTOR, BROWN, BLUE & GREEN W/YELLOW CONDUCTORS, 300/500V, BLACK JACKET	CABLES READY CUT TO LENGTH, LABELLED AND TERMINATED
16	18	LABEL, 1.0W X 3.75L SELF LAM WIRE LABEL	USE TO LABEL CUT WIRES
17	66 in	CABLE, JACKETED BLACK, 600V, 14 AWG102 COND, RED/BLK	CABLES READY CUT TO LENGTH, LABELLED AND TERMINATED
18	2	CONNECTOR, FORK CRIMP, #6 BLUE, 16-14AWG	USE TO TERMINATE CUT WIRES
19	16	CONNECTOR, FLAT BLADE 16-14AWG BLUE, PRE-INSULATED	USE TO TERMINATE CUT WIRES
20	6	CONNECTOR, FERRULE, 14AWG/2.5MM^2, UNINSULATED, 18mm LONG	USE TO TERMINATE CUT WIRES

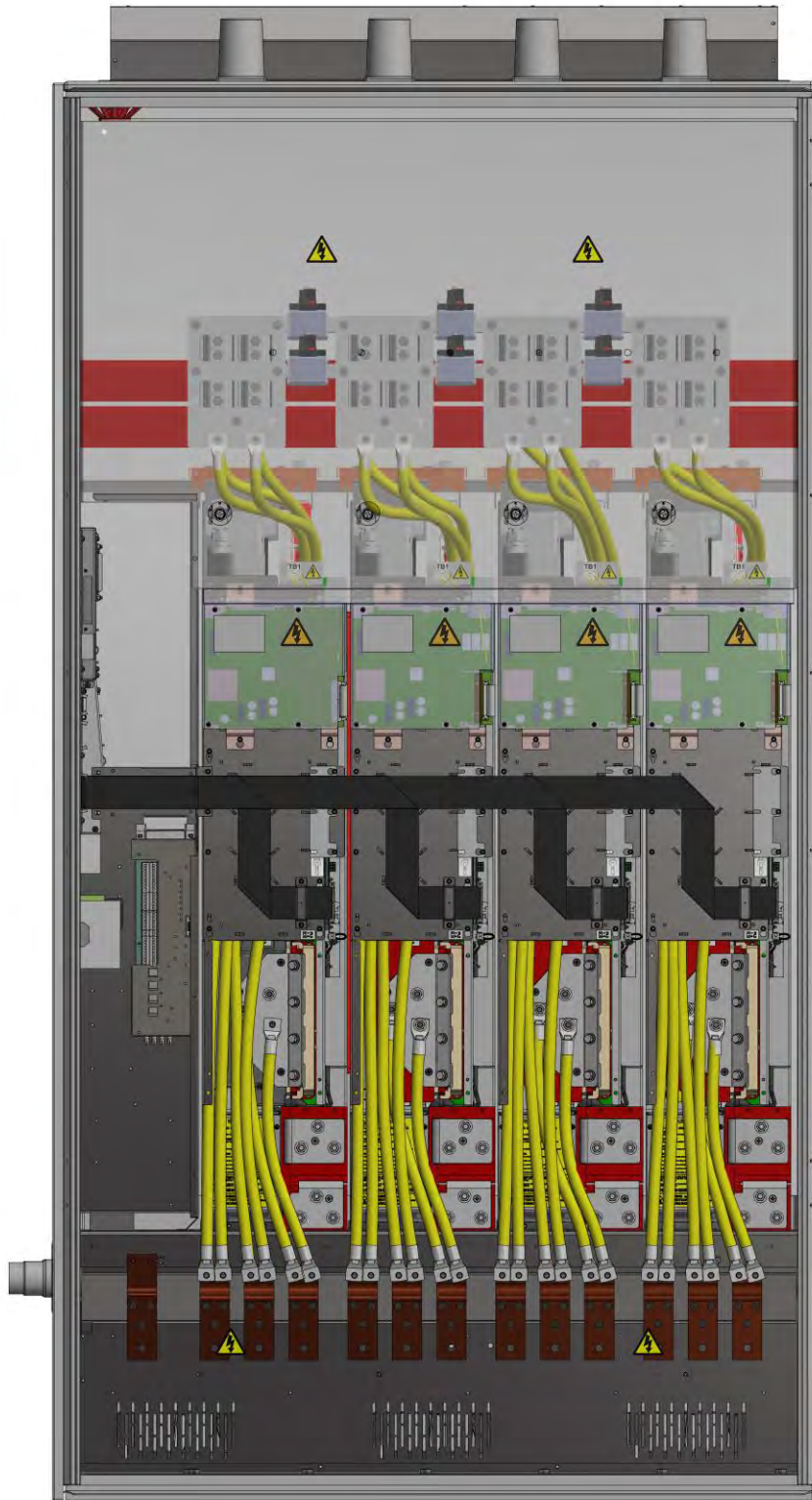
9. Overview of SWP 3.6MW Cabinet Layout

9.1 Tower Base Layout

<i>Ref</i>	<i>Contains</i>
A14	Main Grid Filter Reactor
A1	Controller Box for grid supply and main circuit breakers
A2	Controller Box for UPS, hand terminal and computer
A11	Grid Filter
A12	Grid Frequency Power Converter



Plan View

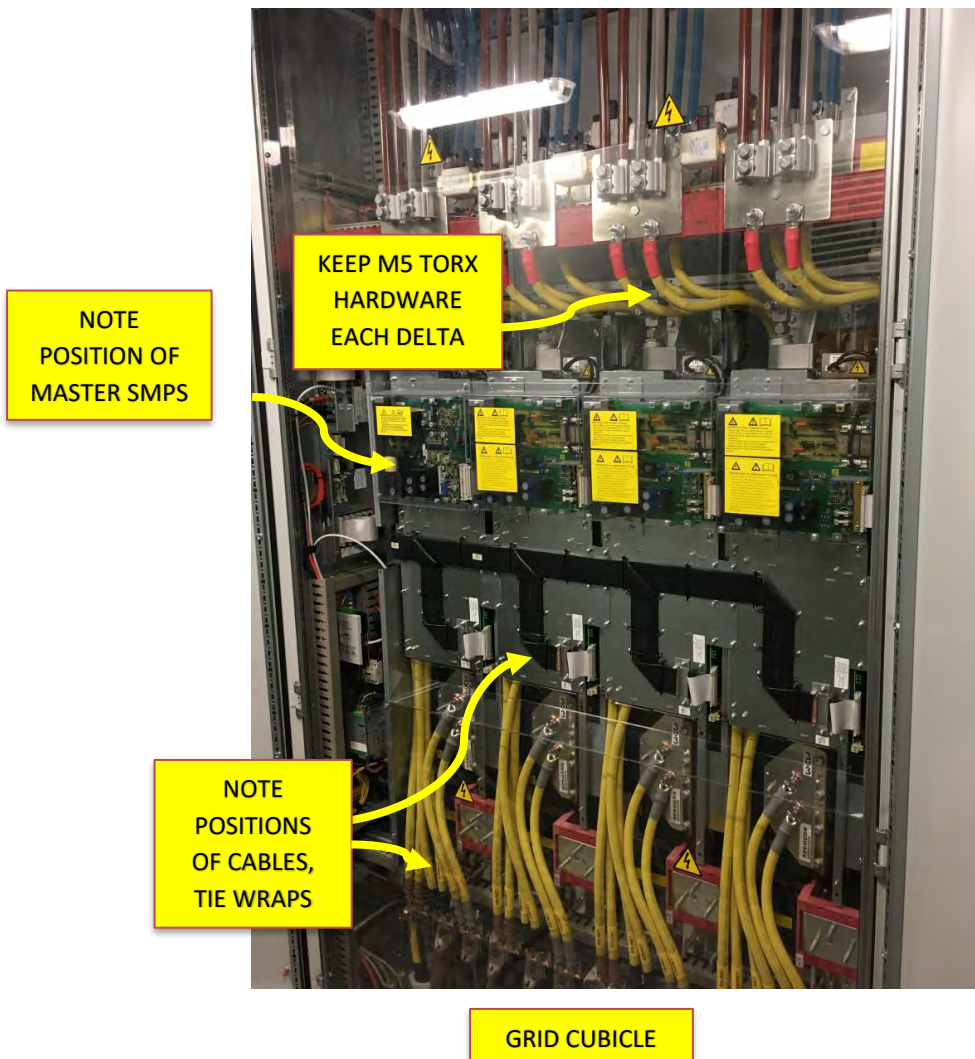


Cabinet Grid A12 Frequency Converter

9.2 Prior to Removal of MVDL1000 DELTA Modules

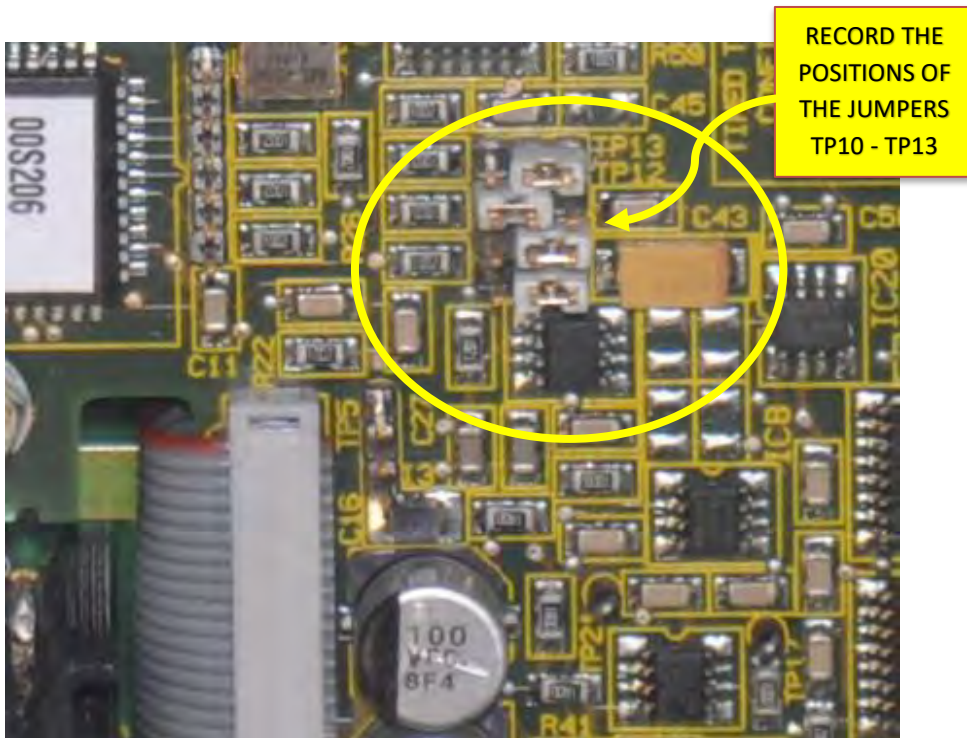
- The removal process of the MVDL1000 Delta modules should follow standard on-site processes, including:
 - Power shutdown
 - Draining of liquid coolant
 - Disconnecting of all electrical power sources
 - Removal of SMPS
 - Removal of the MVDL1000 Deltas

- Before removal of any connections or components, record the positions of the following.
 - All existing cables
 - Note the position of any relevant tie wraps.
 - Identify the master SMPS for the grid and generator system. The master SMPS is mounted on the Delta module connected to PL2 of the associated CDC.
 - Keep all hardware, nuts, bolts, washers, thread protectors, etc.



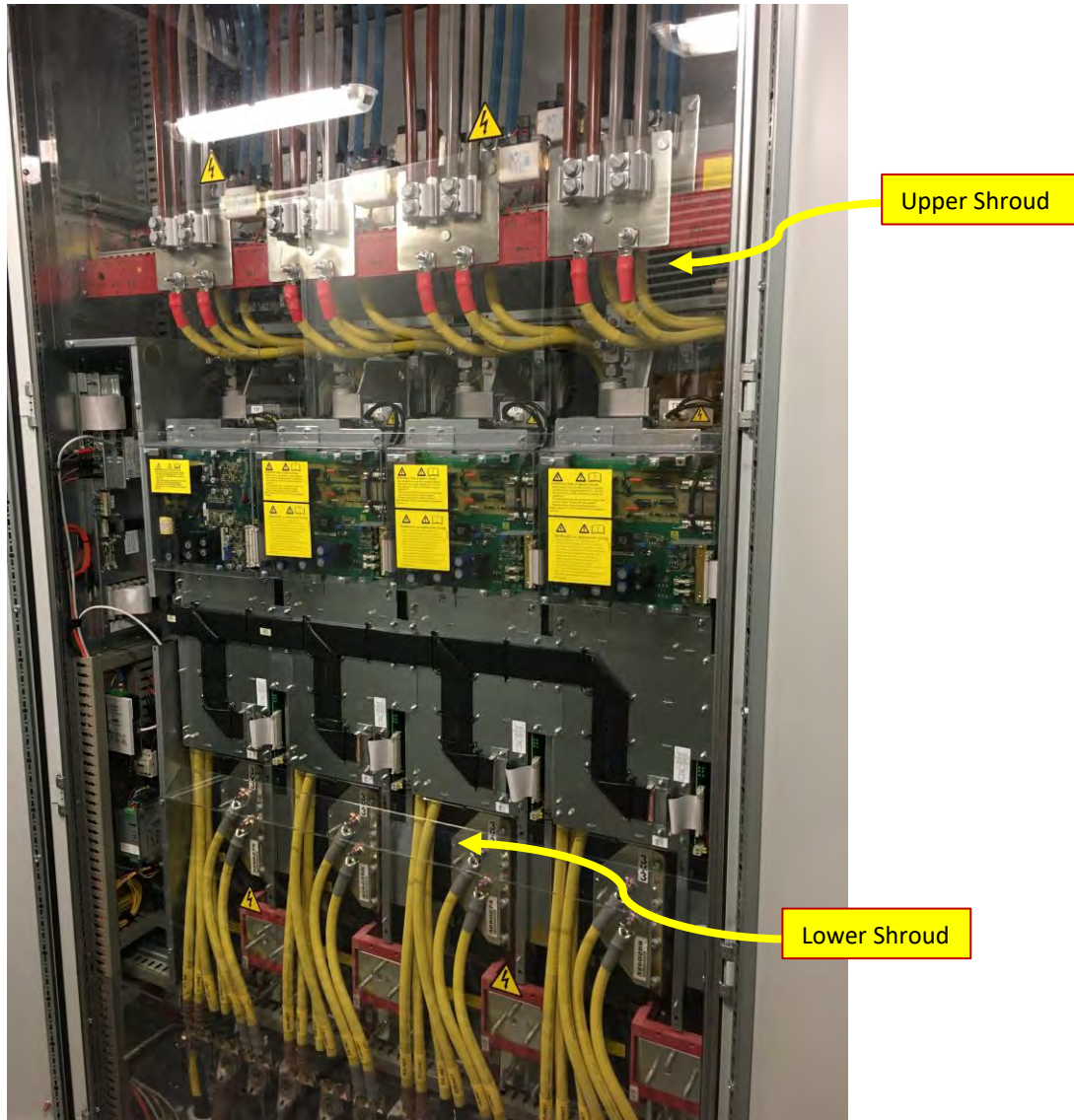
9.3 Record jumper settings

When removing the Master SMPS(s) record the positions of jumpers TP10 to TP13. These jumpers configure the over-voltage trip behavior. The AEI1000L modules use this information for proper setup.



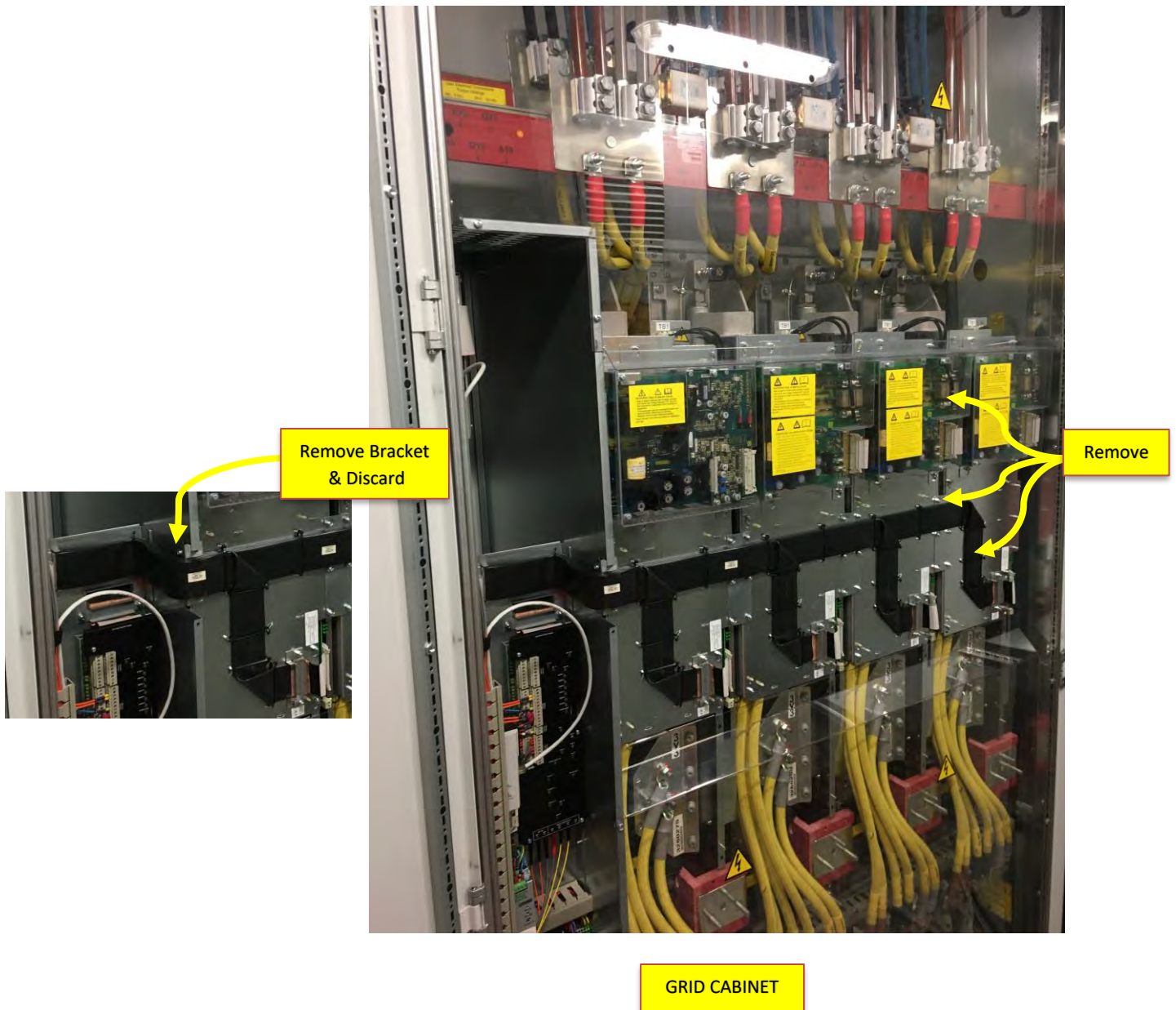
9.4 Remove Cabinet Shrouds - GRID

- Remove the upper and lower shrouds from the GRID cabinet.
- Retain all Shrouds for re-fitting after AEI installation. Note - lower shroud for GRID cabinet will require modification before re-fitting. See Section19 for modification instructions.
- Retain the fixing screws.



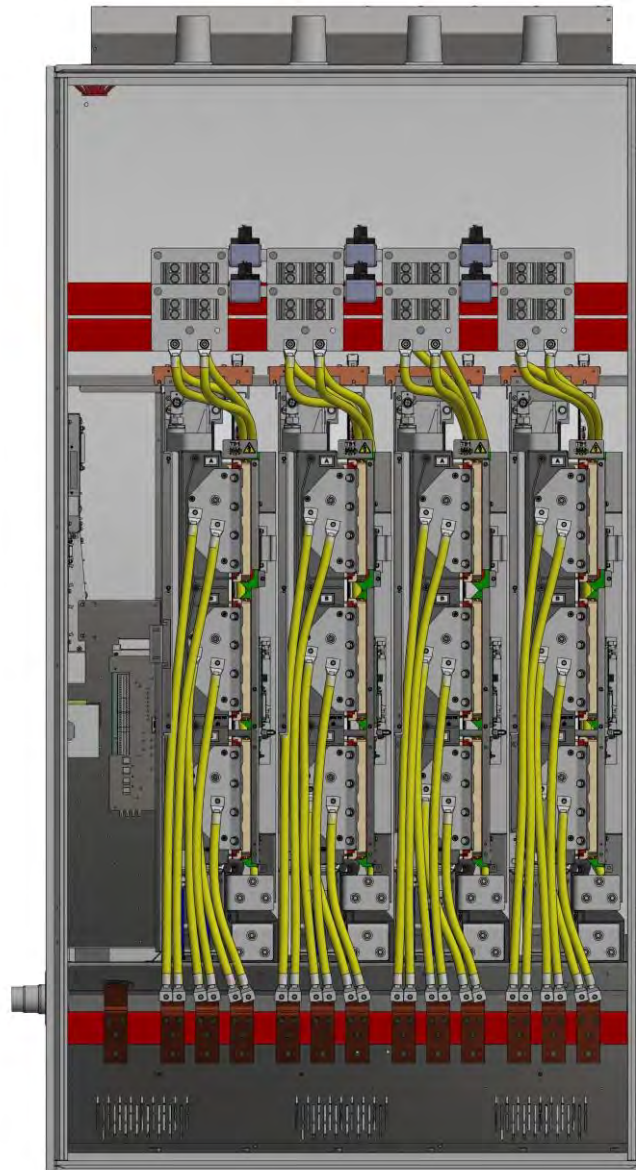
9.5 Remove SMPS & Ribbons from MVDL1000 DELTA Modules

- Disconnect and remove all ribbon cables and secure safely in control section using a Cable-tie. Ribbons will need to be refitted after installation of AEI units.
- Remove LH Bonding bracket and discard but retain M4 Taptite screws which will be needed for replacement bracket.
- Remove all SMPS Modules and SMPS mounting plates.



9.6 Disconnect MVDL1000 DELTA Modules

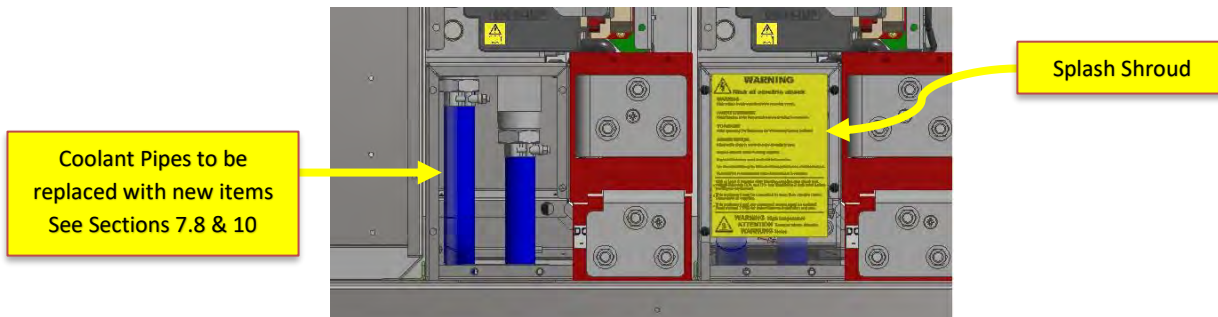
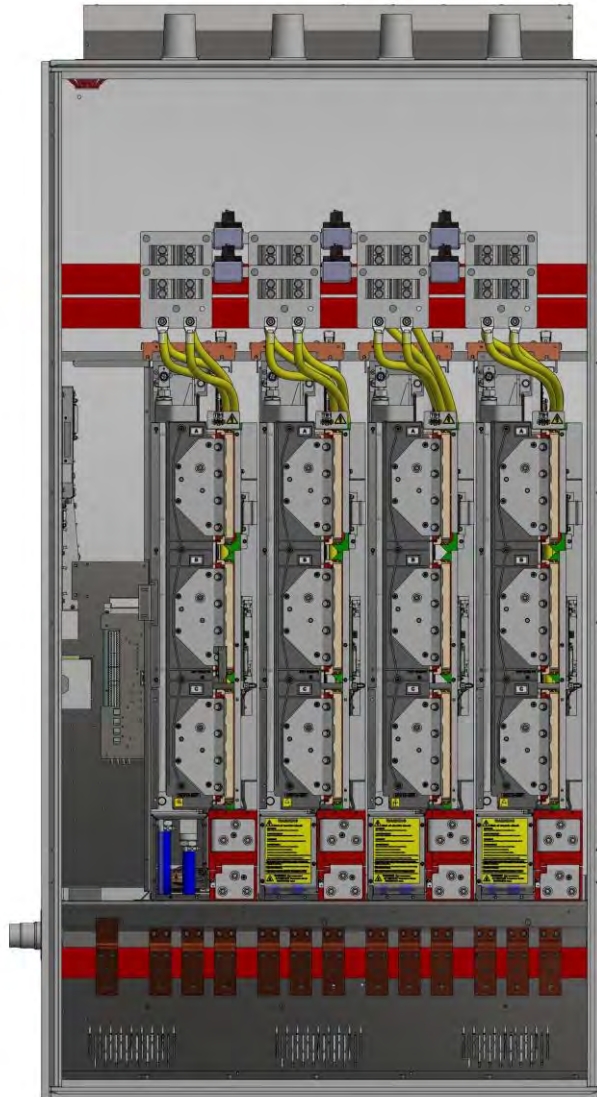
- Carefully note all power cable positions, then remove them:
- Disconnect DC cables from upper fishplates but leave cables attached to Delta module.



GRID CABINET

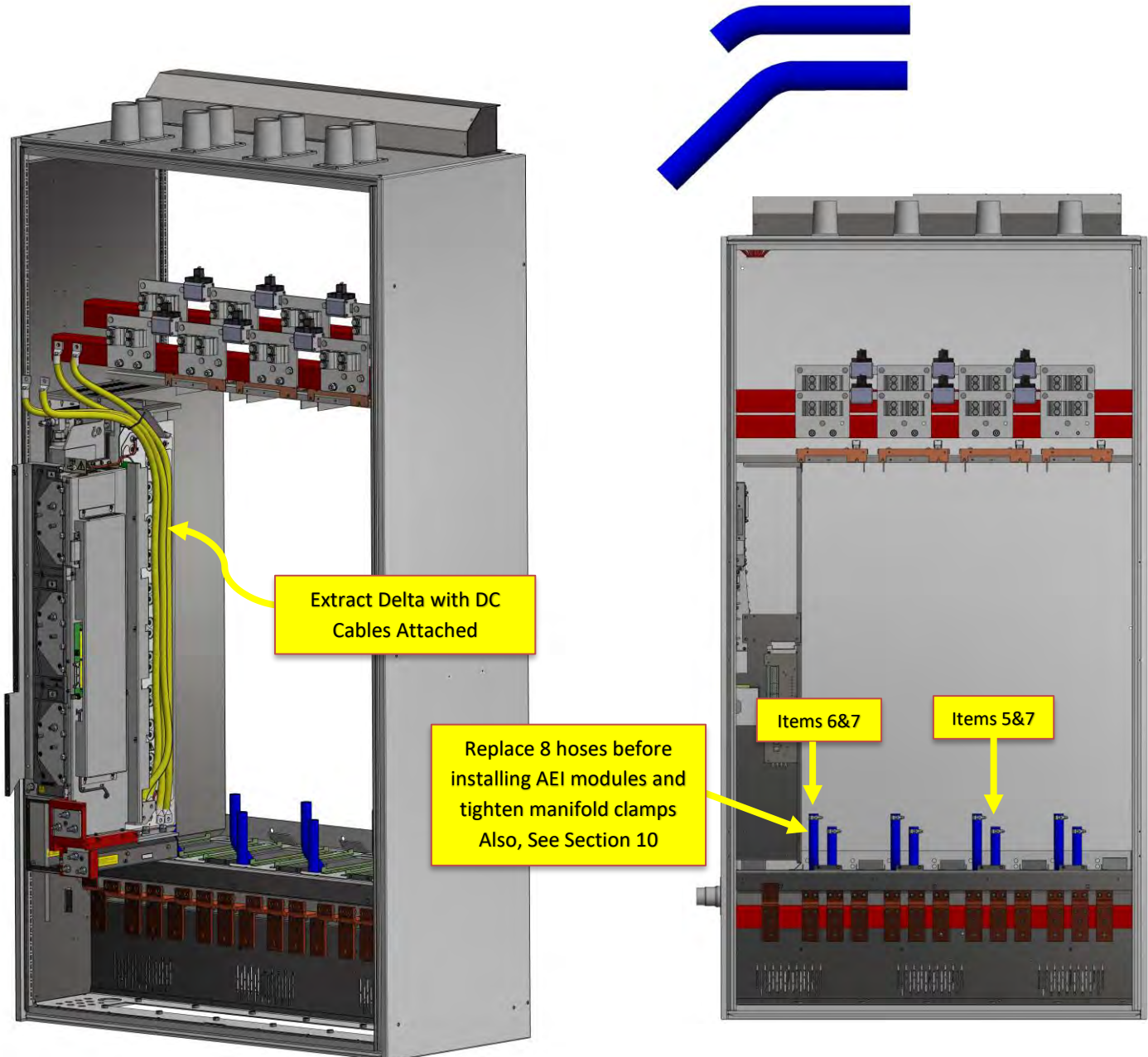
9.7 Remove covers to access coolant pipes.

- Remove Splash Shroud from Delta to expose coolant pipes
- Loosen clamps and disconnect coolant pipes from Delta



9.8 Remove Grid MVDL1000 DELTA Modules, Replace Hoses

- Remove all DELTA modules as shown, this will allow access to the lower hoses, shown below.
- Replace all 8 hoses & clips using those provided in the AEI upgrade kit.

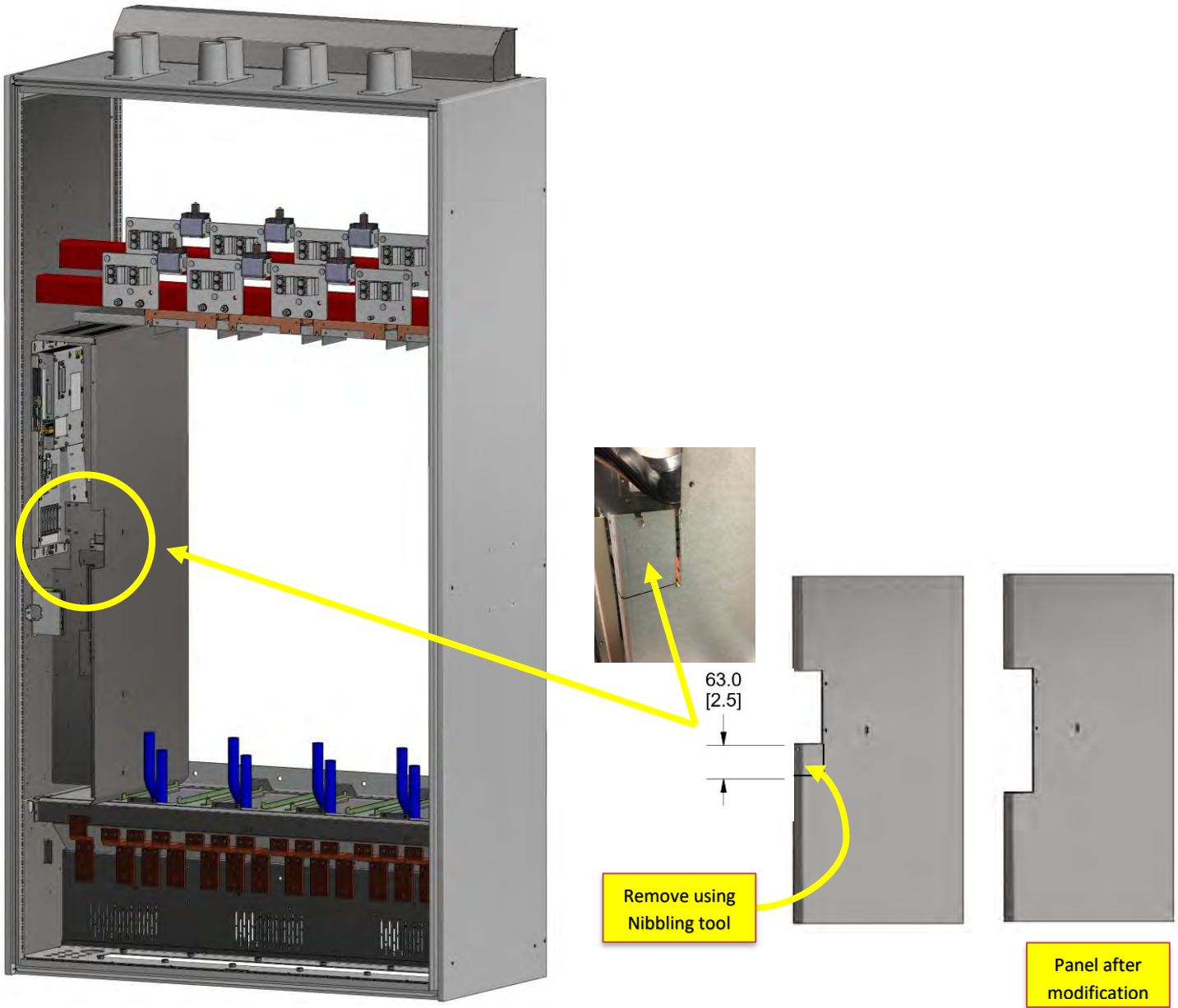


- **IT IS CRITICAL THAT THE HOSES ARE SECURELY INSTALLED AND THE CLAMPS TIGHTENED CORRECTLY. COOLANT LEAKAGE WILL IRREPARABLY DAMAGE THE INVERTER UNITS. TIGHTEN CLAMPS TO 4Nm - DO NOT OVERTIGHTEN**



10. Modify Side Panel, Grid Cabinet

- In order to allow new grounding bracket and Ribbons to fit, remove metal section from LH shielding Panel as shown below.
DO NOT remove panel from cabinet, implement modification with panel in situ
Ensure suitable precautions are taken to prevent metal particles (swarf) from contaminating cabinet.

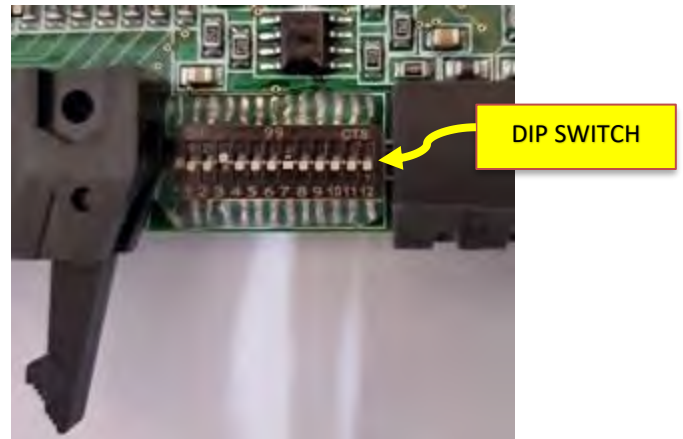
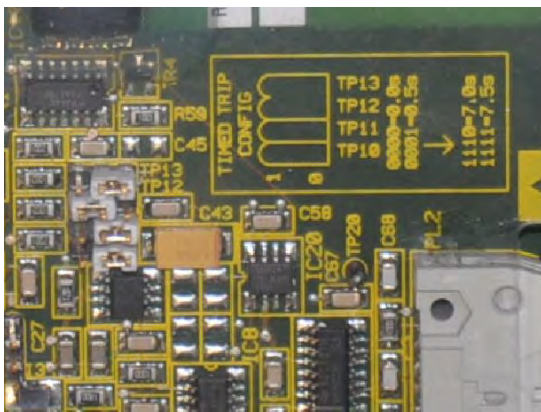


11. Install AEI 1000L Modules Grid Cabinet

11.1 Set AEI DIP Switches

- Before the Installation of each AEI verify that DIP switches 1-4 (which configure the overvoltage behavior) on each AEI are set to the equivalent time setting as recorded in Step 8.3 - Master SMPS Jumpers TP10 to TP13

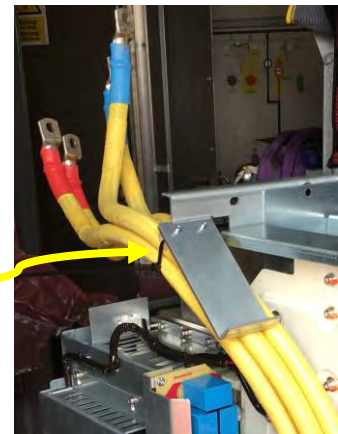
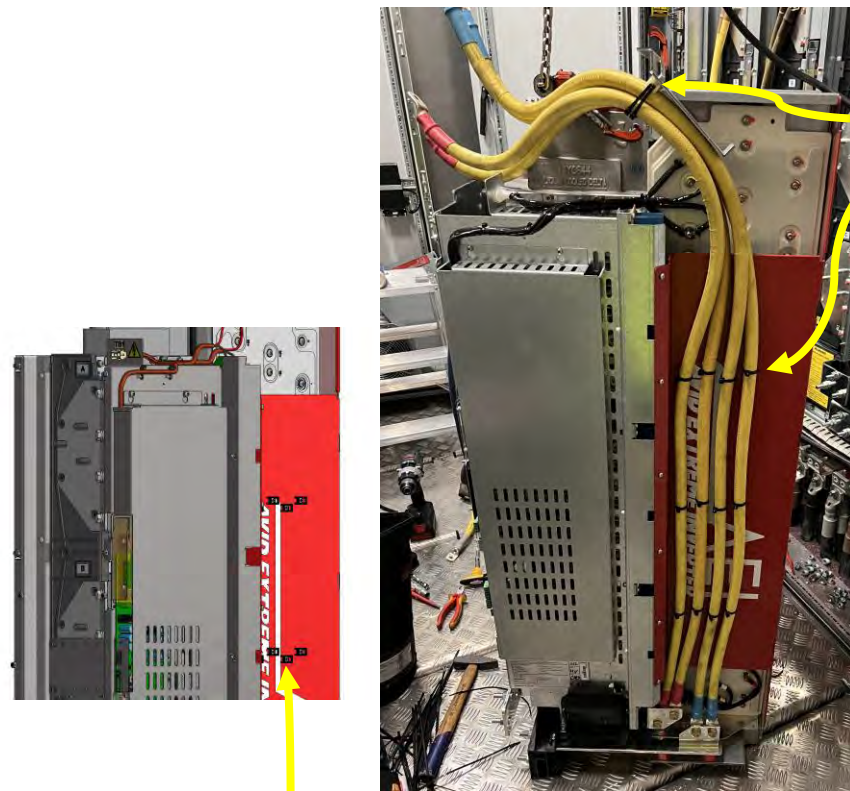
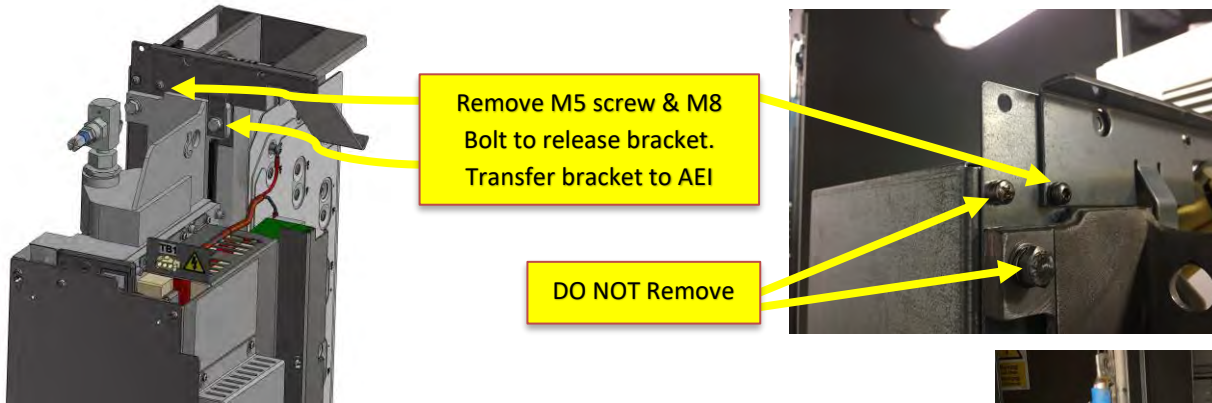
SMPS Jumpers	AEI Switch
TP10	SW1
TP11	SW2
TP12	SW3
TP13	SW4



- Before the Installation of each AEI ensure that *Compatibility Rating Mode* is disabled by setting DIP switch SW7 to the **OFF** position.
- *Refer to AVID Document DTS-MID0012 section on User Selectable Options for complete information about these settings.*

THESE SETTINGS ARE IMPORTANT, THE TURBINE WILL NOT RUN CORRECTLY UNLESS THEY ARE MADE

11.2 Prepare 4 x AEI 1000L Modules for Installation into Grid Cabinet



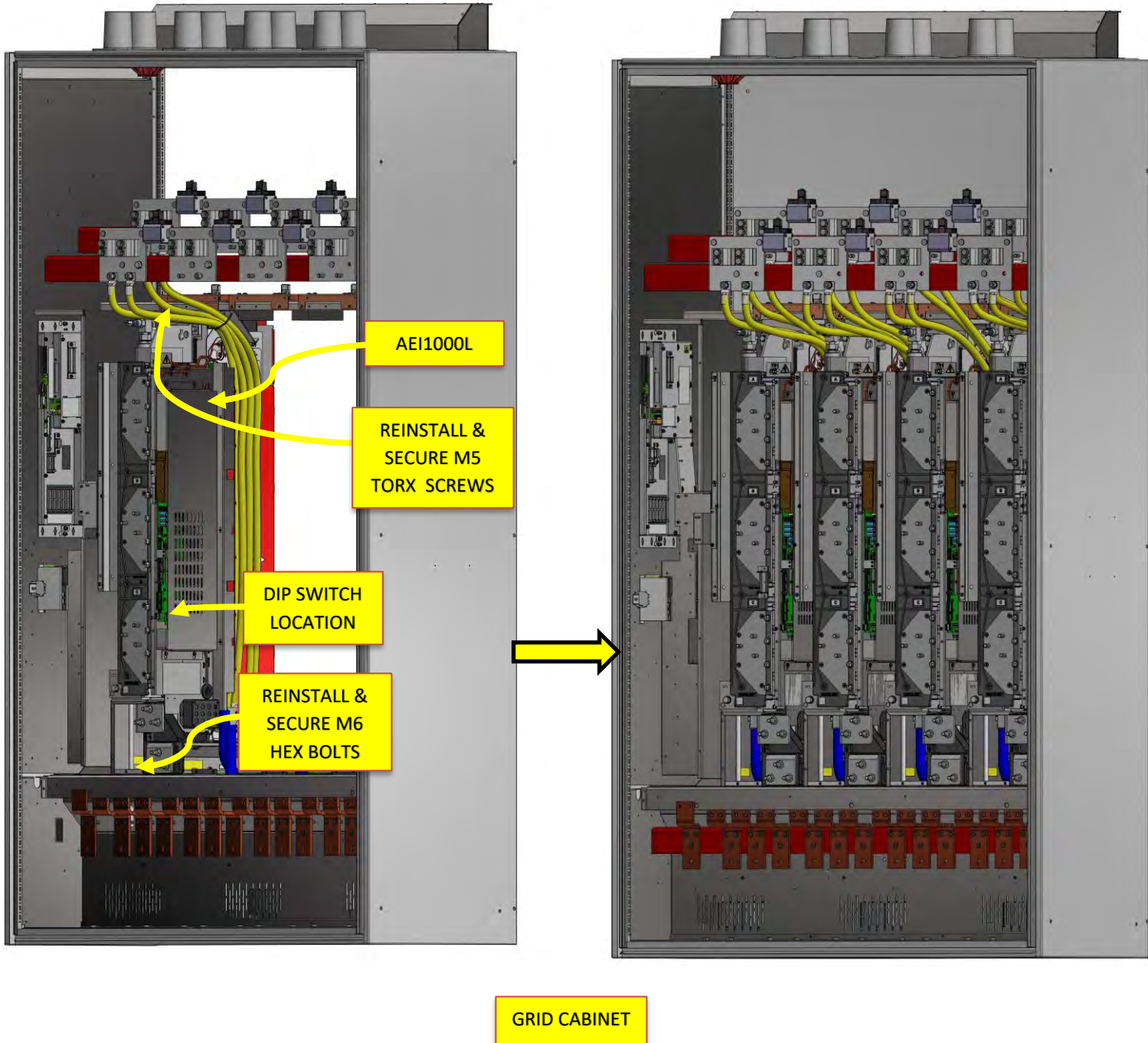
Reattach DC cables using M10 bolts & SEMS Nuts as shown. Secure cables to upper bracket using cable tie supplied with Kit. Ensure cables are tied to Cable-tie bases on red cover using Cable ties.

M10x25 Bolt, M10 SEMS Nut
Torque to 33.5N/m (297lb.in)



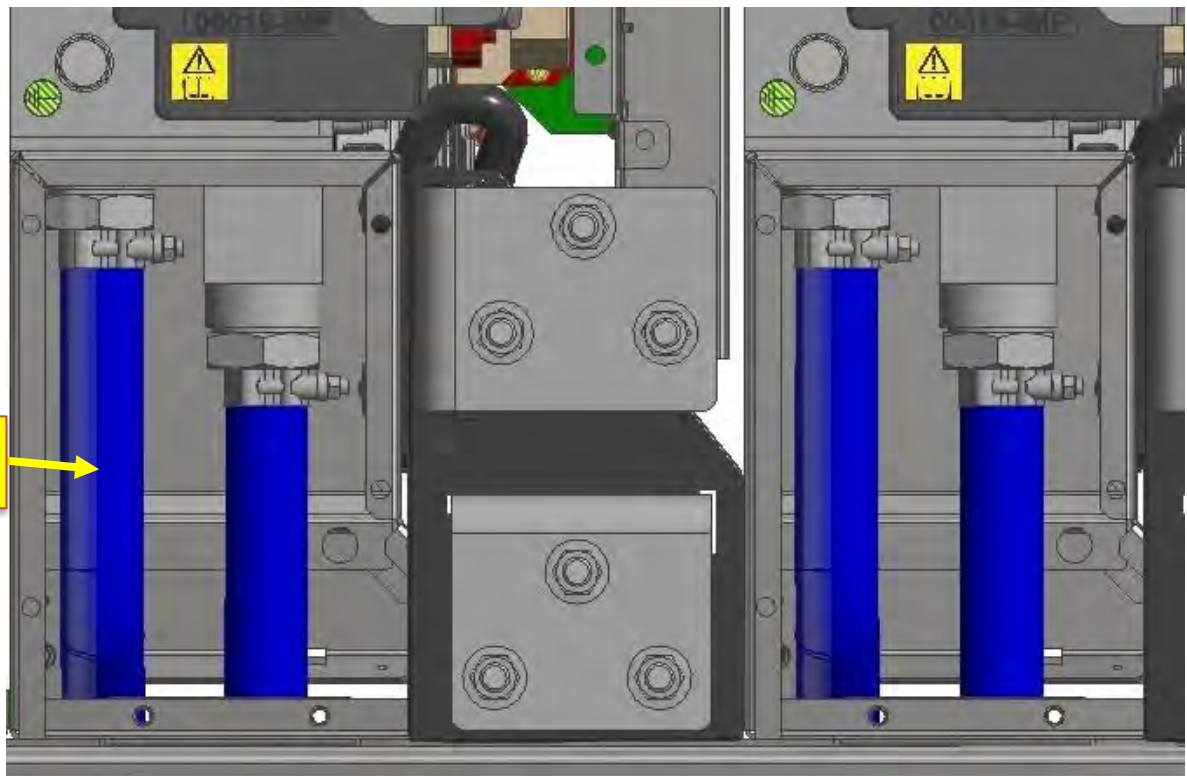
11.3 Install 4 AEI 1000L Modules into the GRID Cabinet.

- Align with the M5 and M6 mounting locations used by the DELTA modules, firmly secure the AEI units with the M5 Torx screws and M6 bolts/washers retained when the DELTA modules were removed.
- Remove cover plates in preparation for power cabling



12. Connect Coolant Hoses

- Connect and secure each hose from the inlet manifold to the bottom barbs on all the AEI units.



- **IT IS CRITICAL THAT THE HOSES ARE SECURELY INSTALLED AND THE CLAMPS TIGHTENED CORRECTLY. COOLANT LEAKAGE WILL IRREPARABLY DAMAGE THE INVERTER UNITS.**
TIGHTEN CLAMPS TO 4Nm - DO NOT OVERTIGHTEN

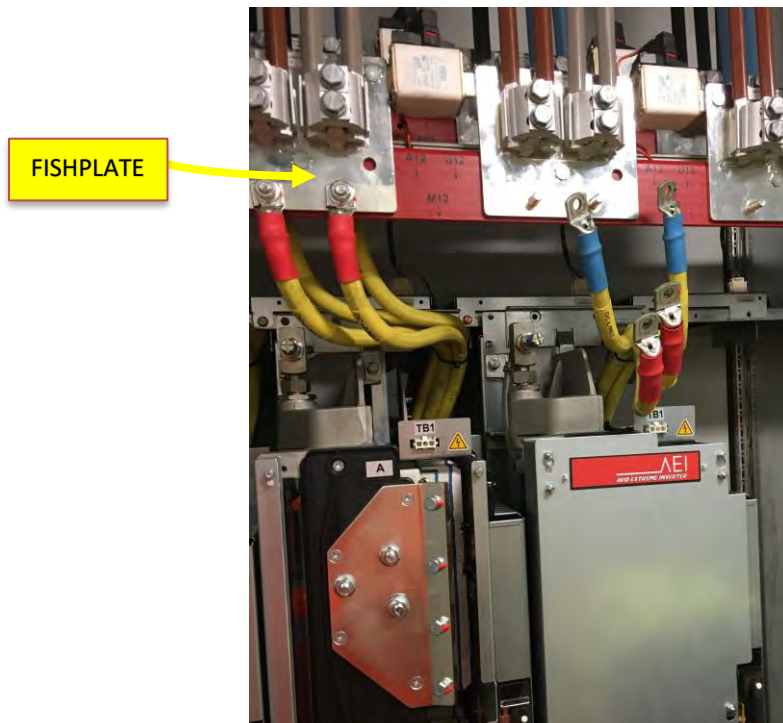


- Replace the splash shroud on each AEI



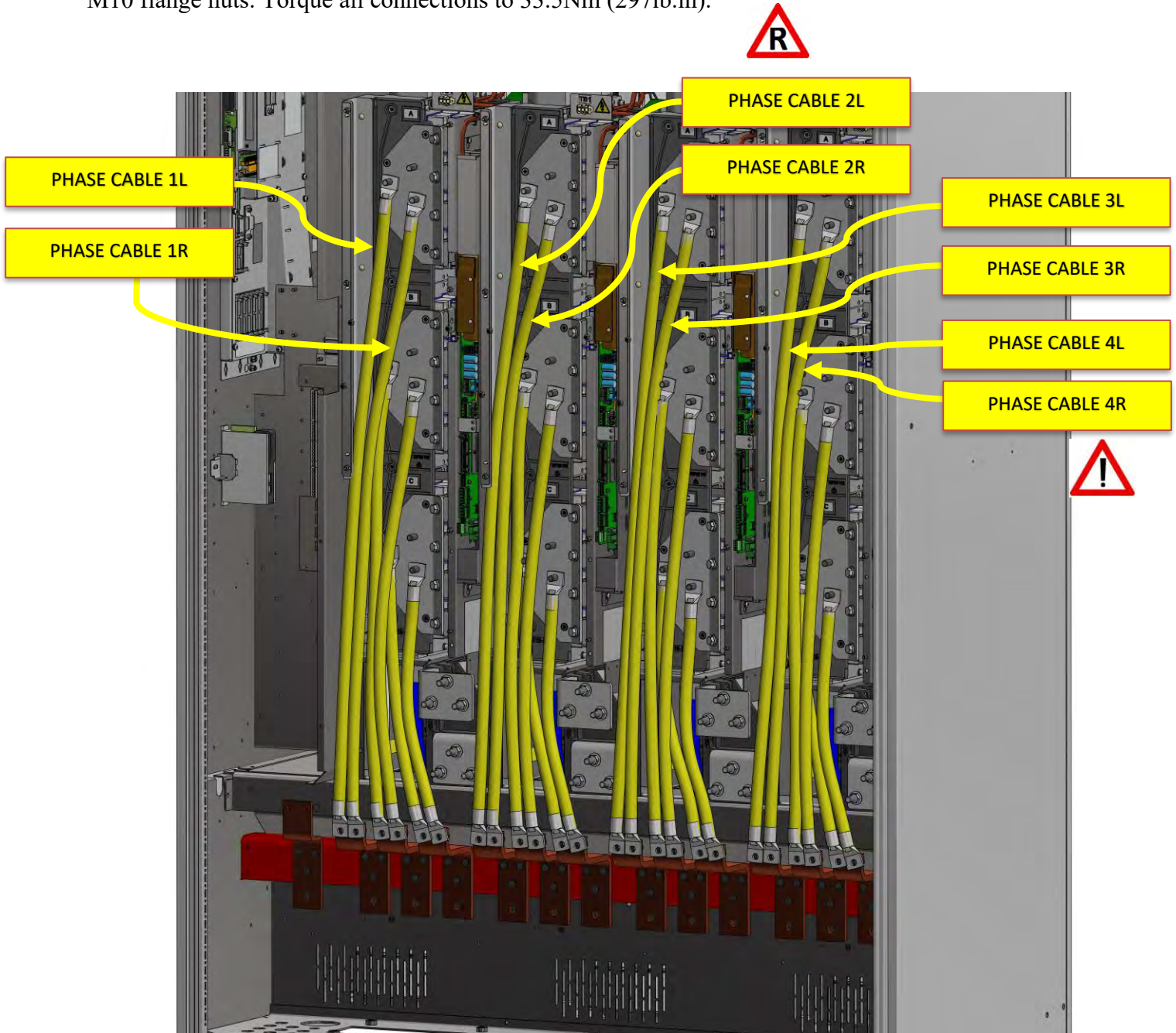
13. Reconnect DC Cables

- Reconnect all the DC negative and DC positive front and rear cables to UPPER Fishplates using the supplied M10 flange nuts. Torque down all connections to 33.5Nm (297lb.in)



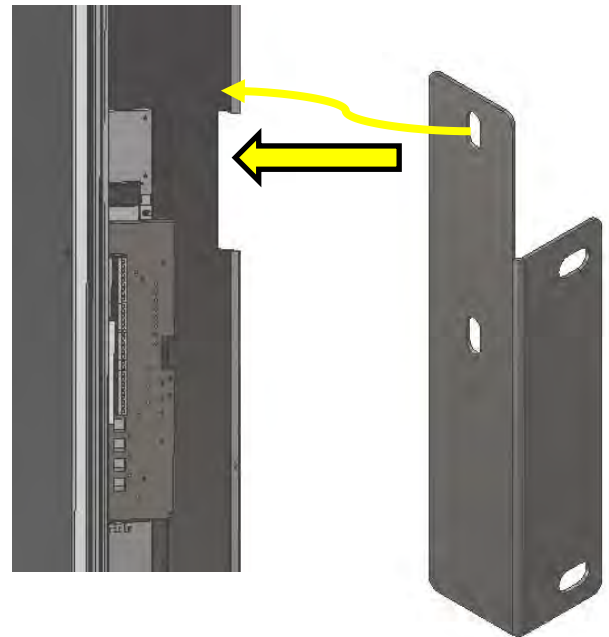
14. Reinstall Grid Cubicle AC Cables

- Reinstall the GRID cubicle AC cables in the same locations identified on removal, using the supplied M10 flange nuts. Torque all connections to 33.5Nm (297lb.in).



15. Install Ground Bonding Brackets and Ribbon Cables

- Install the offset ground bracket (*Item 4*) using original M4 x 6 screws, to allow the routing of the ribbon cables from the AEI1000 modules into the control Section
- Take care to use the correct bracket for the Grid cubicle.



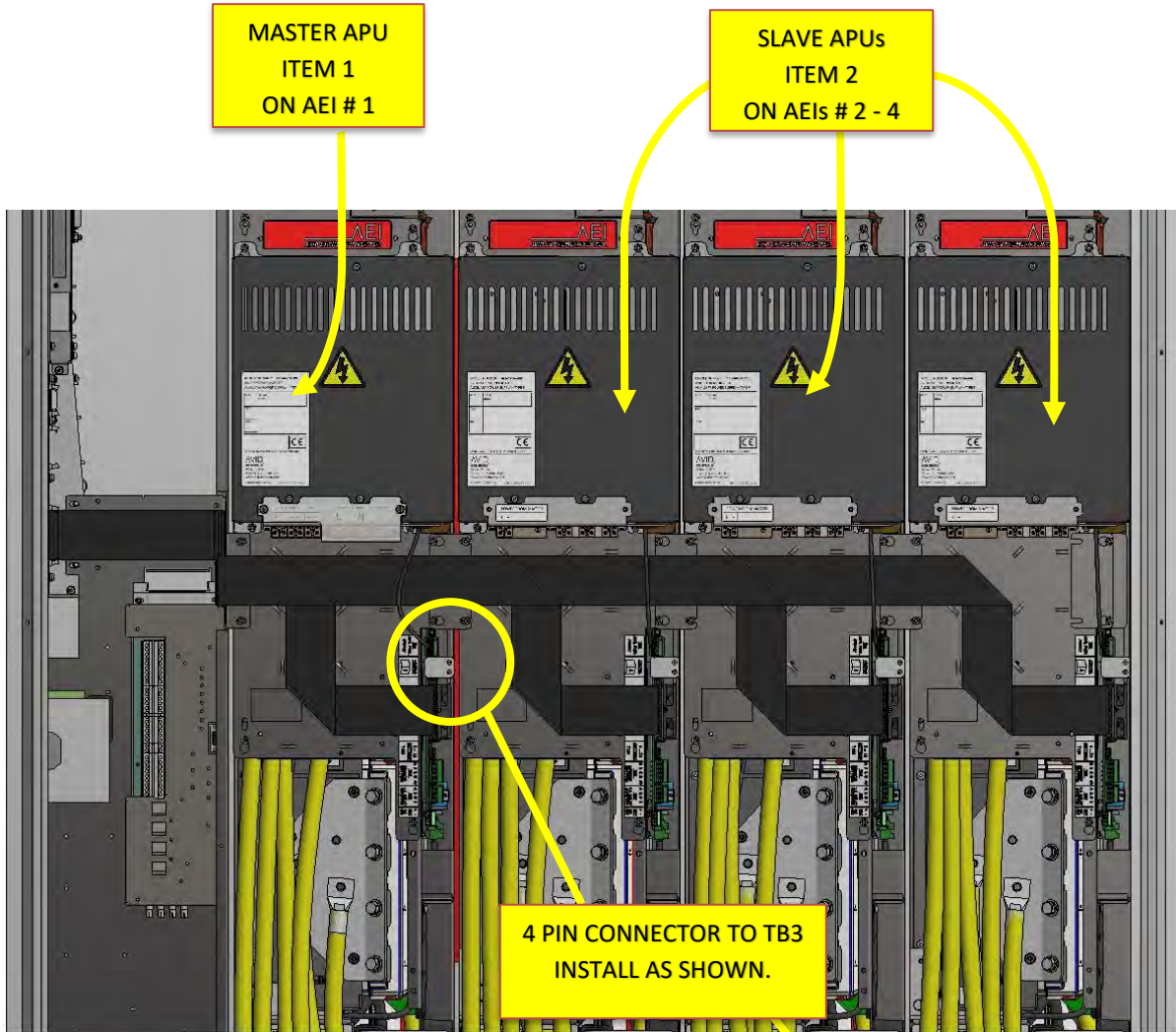
ITEM 4 – GRID SIDE



2 OFF M4x6 TAPTITE (RETAINED FROM ORIGINAL)

ITEM 4 – GRID SIDE

16. Install Auxiliary Power Units, Grid Cabinet

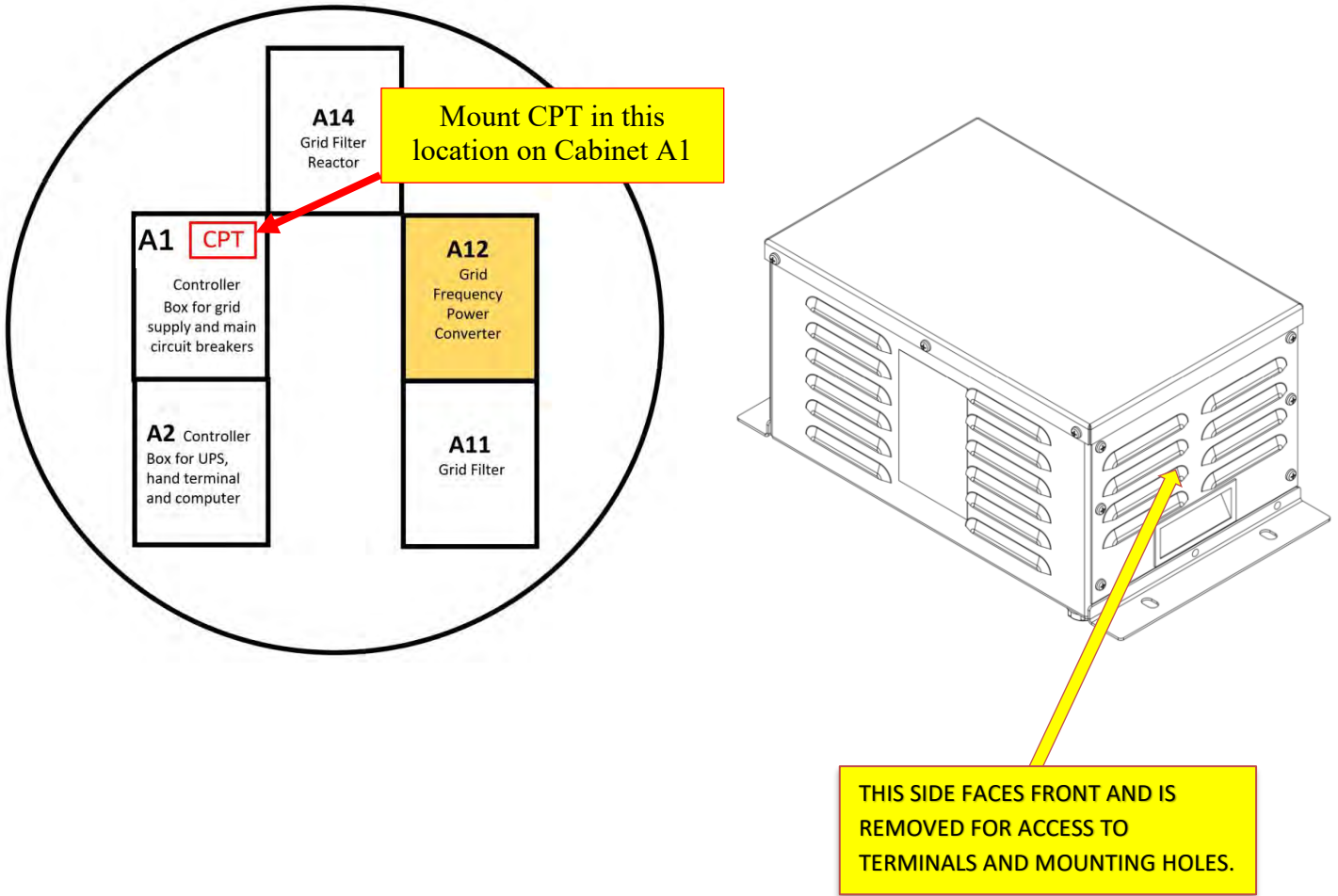


17. Install Control Power Transformer (CPT), Grid

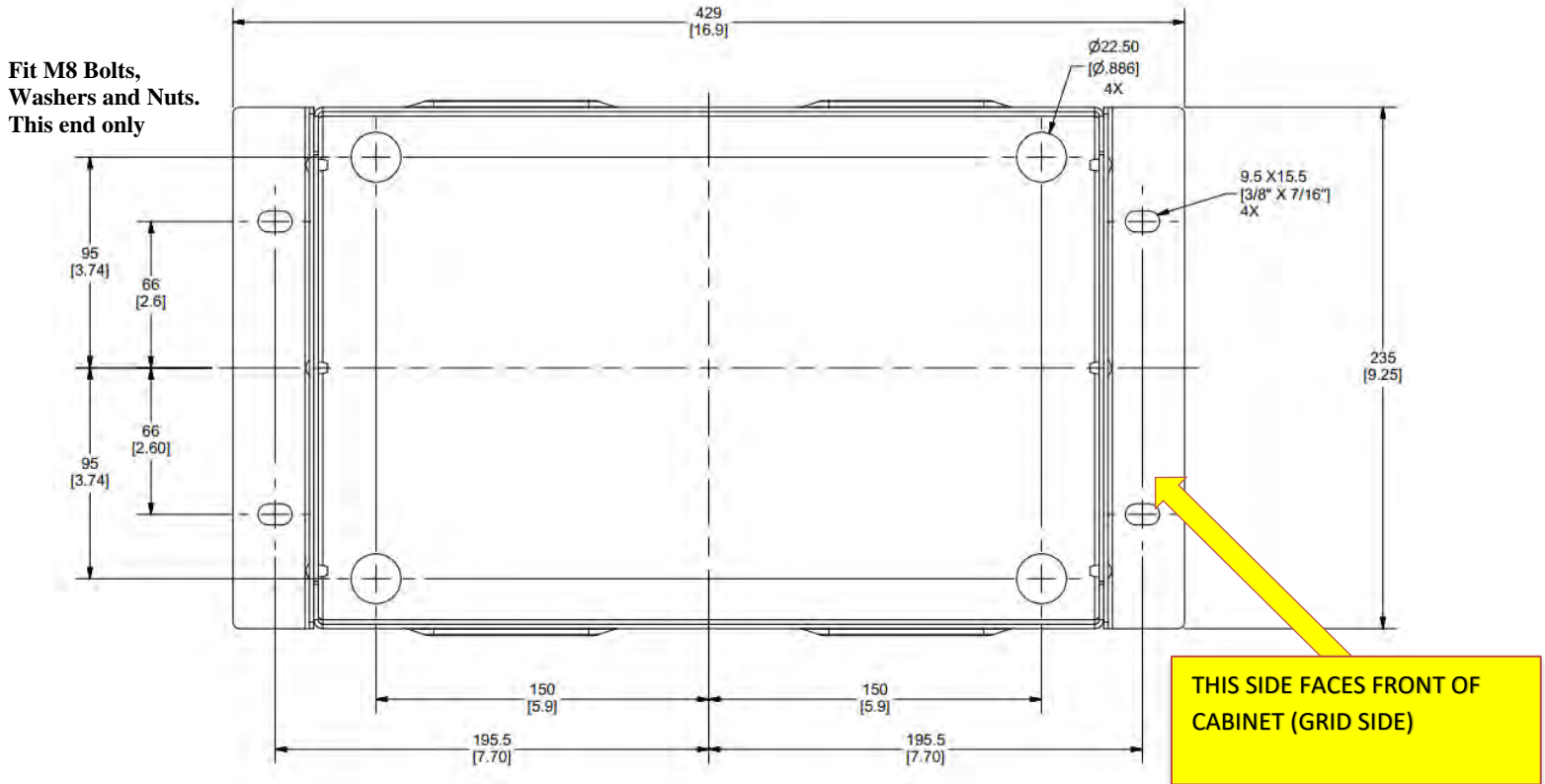


CAUTION: Note this stage will require the drilling and punching of holes to mount the transformer and cable fittings. Keep metal shavings from contaminating any internal electrical components using a drop cloth or similar.

- The Control Power Transformers (CPT) (*Item 3*) is to be mounted on the top of the A1 cabinet for Grid. Mount at least 70mm from the front. **Take care not to drill into cubicle frame.** See below.



- Identify exactly where the CPT will be mounted on the top of the cabinet, and referring to the following drawing (full size version is in DTS-01944-ASY-A), use a ½” drill and the Greenlee Hole Punch to make two 7/8” holes to line-up with the highlighted holes in the base of the CPT:



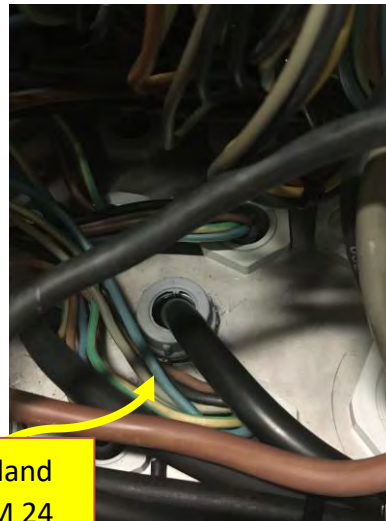
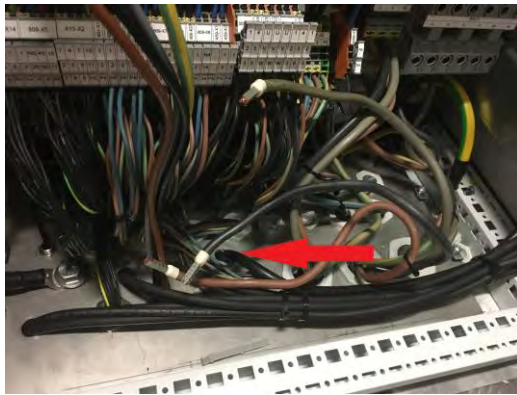
- Mount the CPT on the top of cabinet, lining up the holes
- Install two sets of cable gland hardware (Included in *Item 25*) to secure the CPT to the cabinet and provide access for cables:
- Drill 2 off 9mm Diameter holes through slots in mounting bracket at opposite end to cable gland fixing, and fit M8 Bolts, Flat + Spring Washers + Nuts and securely fix CPT to cabinet to guard against potential vibration problems.



22mm HOLE PUNCH

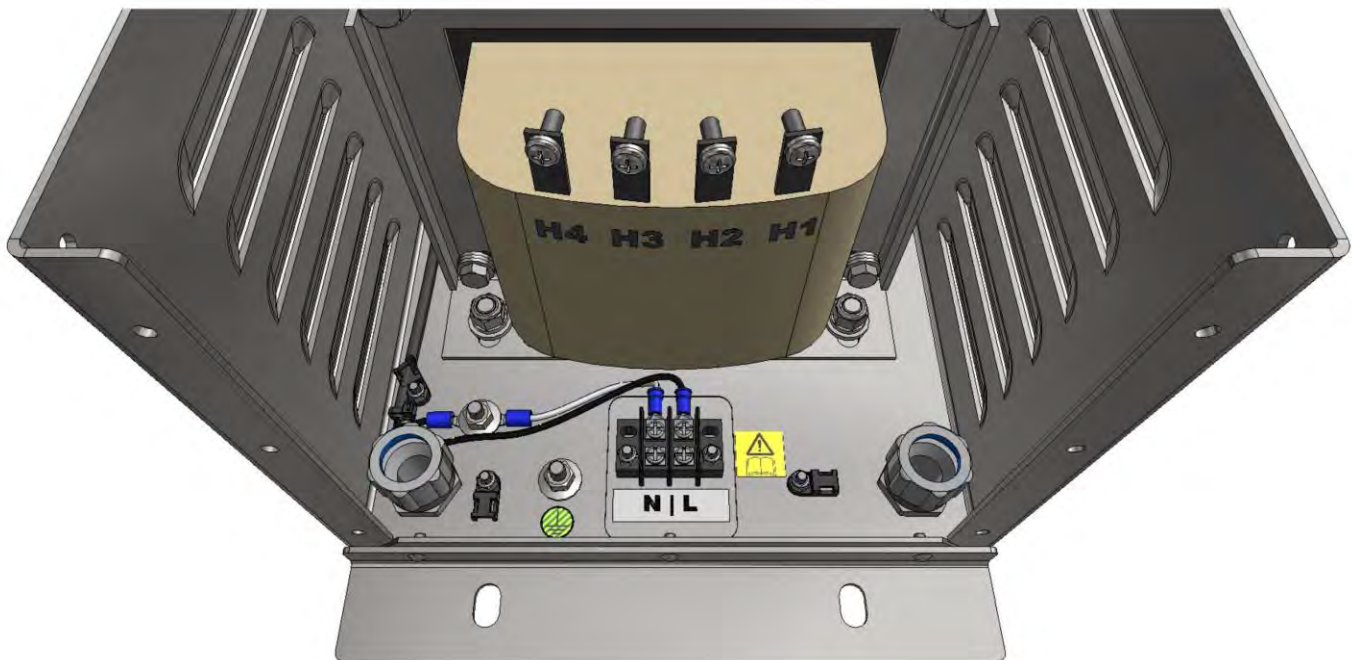
17.1 Install Cable Gland, Cubicle A1

- Remove spare gland blanking plug from base panel and install cable gland hardware (*item 24*) in hole shown below.

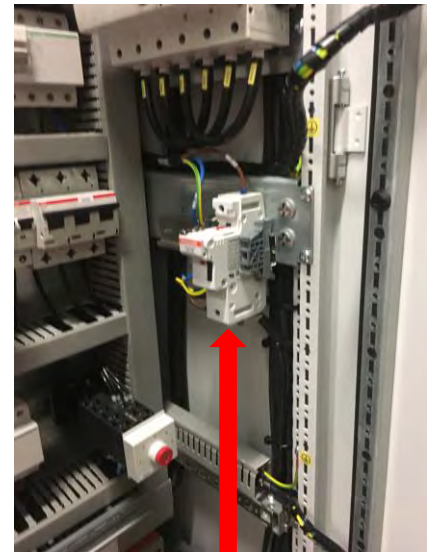
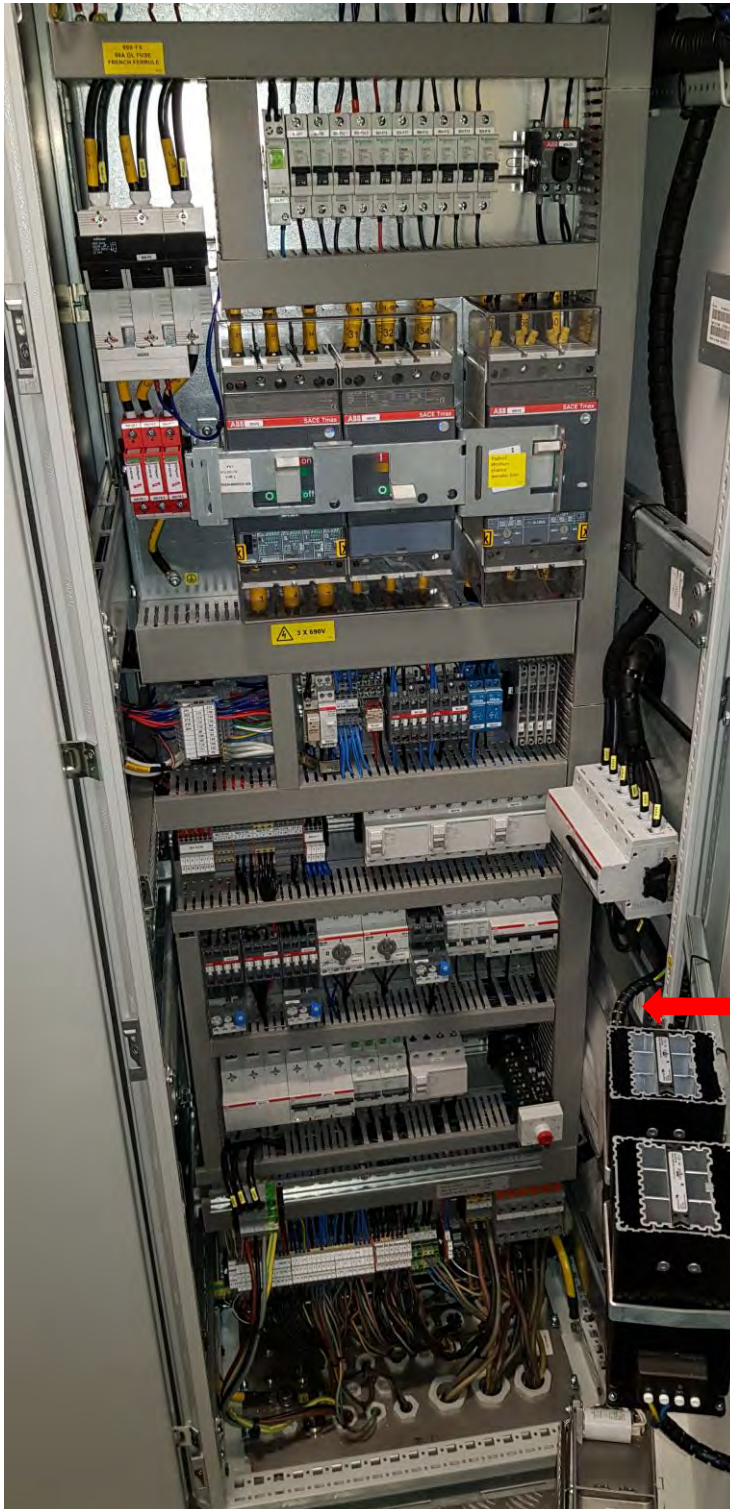


Install Cable Gland
Hardware ITEM 24

- The following figure (from DTS-01944-ASY-A) shows the mountings and connections for the CPT:



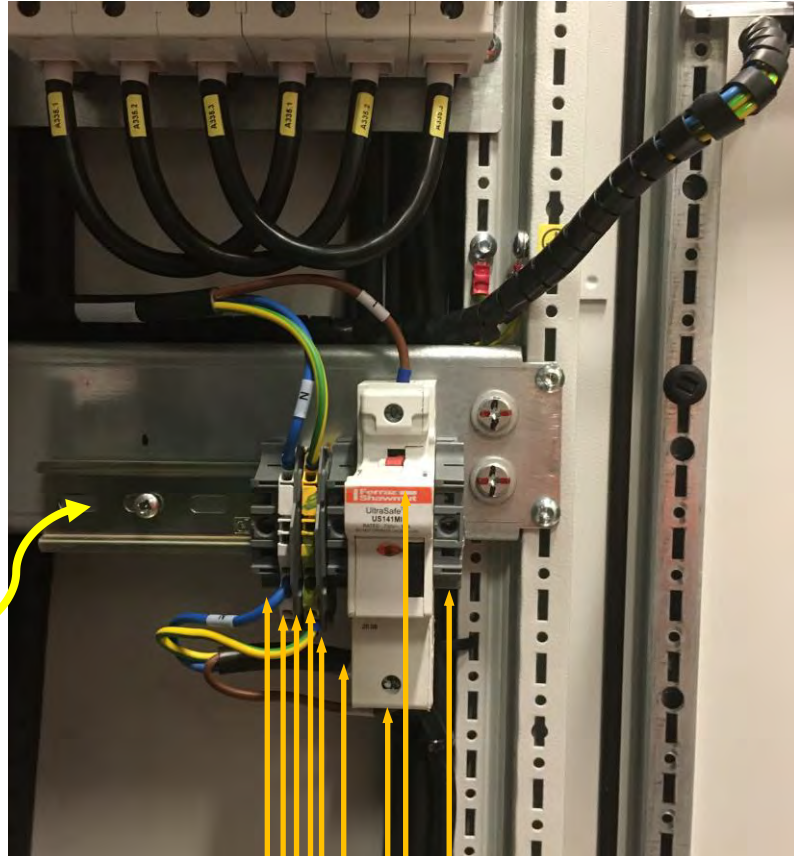
17.2 Fuse holder locations in Cabinet A1



175V Fuse holder and
Terminal block (See
next sheet)

17.3 Install 175V Terminal Block and Fuse Holder, Grid

- Fit a 100mm (4-in) length of DIN-rail onto side rail in lower RH side of cabinet A12 using 2x M5x10 Taptite screws supplied. Install the Fuse Holder, Fuse, and terminal block components as shown:



Drill 2x 4.5mm holes and fit 100mm DIN RAIL using 2 off M5x10 Taptite screws.

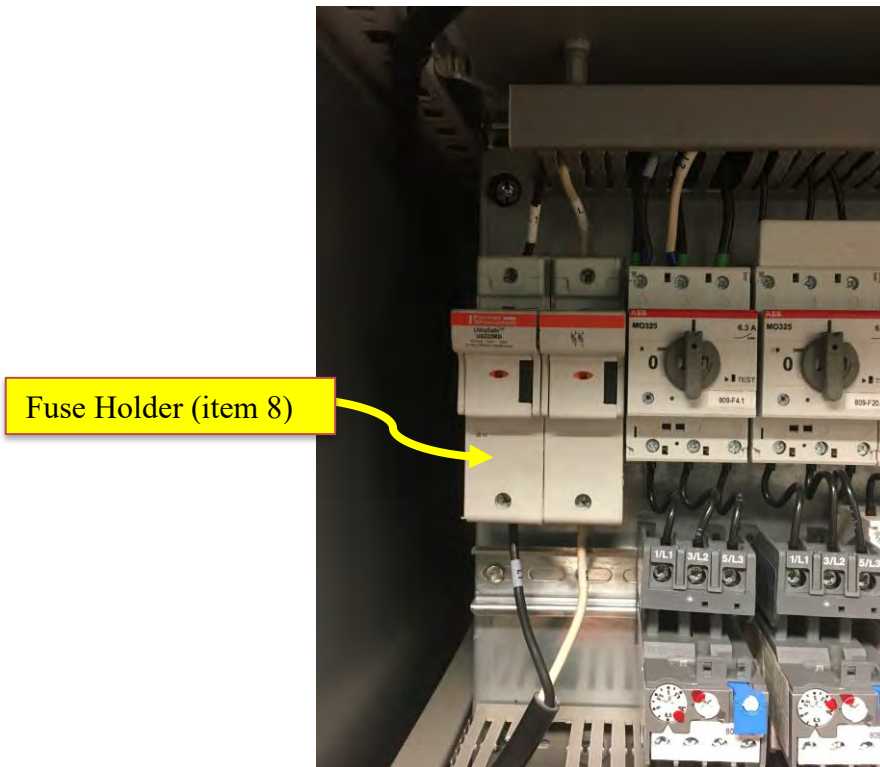
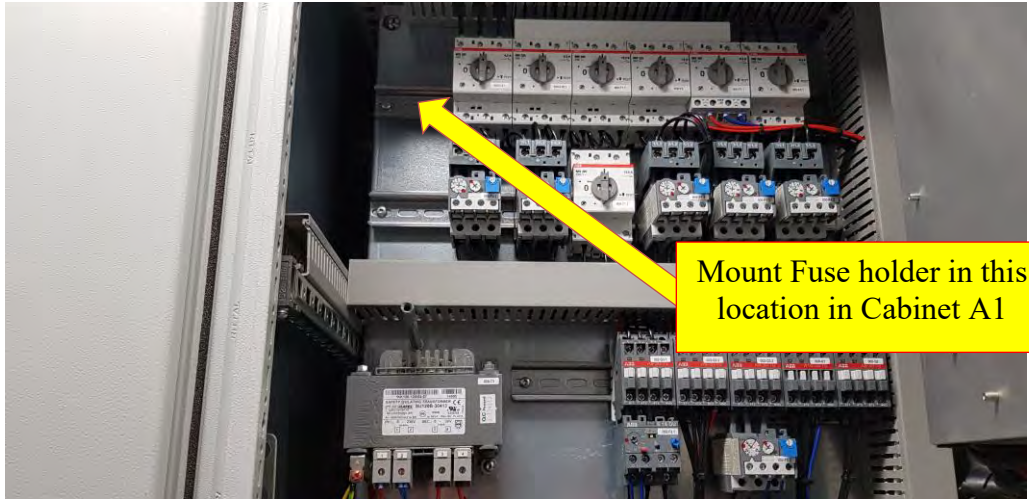
Take care when drilling not to damage cables running behind rail and in surrounding area

- End Stop
- Feedthrough Terminal
- End Section Cover
- Ground Terminal
- End Section Cover
- End Stop
- Fuse Holder (*Item 9*)
- Fuse (*Item 10*)
- End Stop

The components shown in the table below are included in BOM Item 25. (See Section 5)

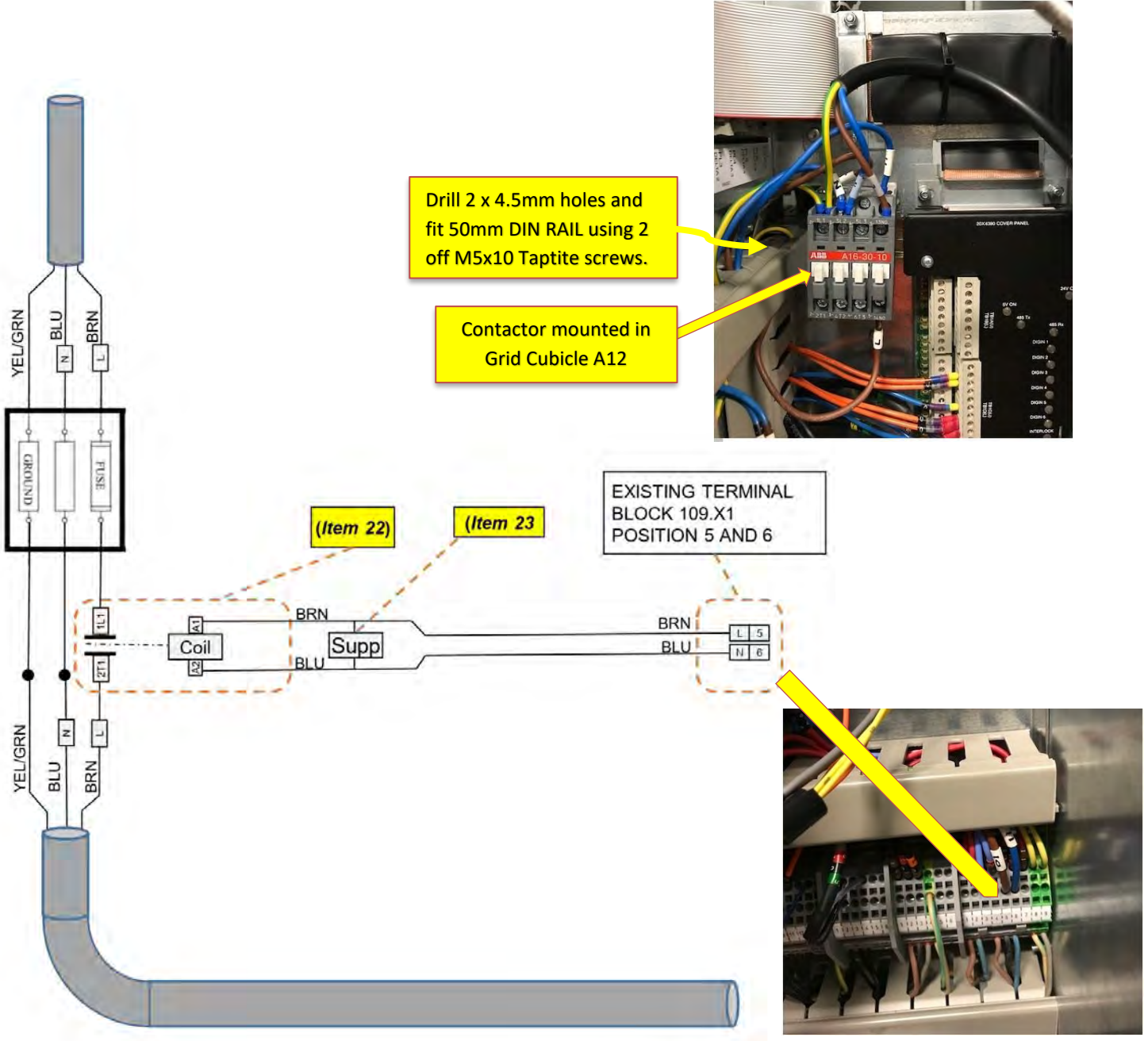
Reference	Avid Item Number	Description
9	00663-OTS-A	TERMINAL BLOCK, FEED-THROUGH - GREY
10	00666-OTS-A	TERMINAL BLOCK, GROUND – GRN/YEL
11	00664-OTS-A	TERMINAL, BLOCK, END SECTION COVER, DARK GREY
12	00665-OTS-A	TERMINAL BLOCK, END STOP, DARK GREY

17.4 Install 690V Fuse in Cabinet A1

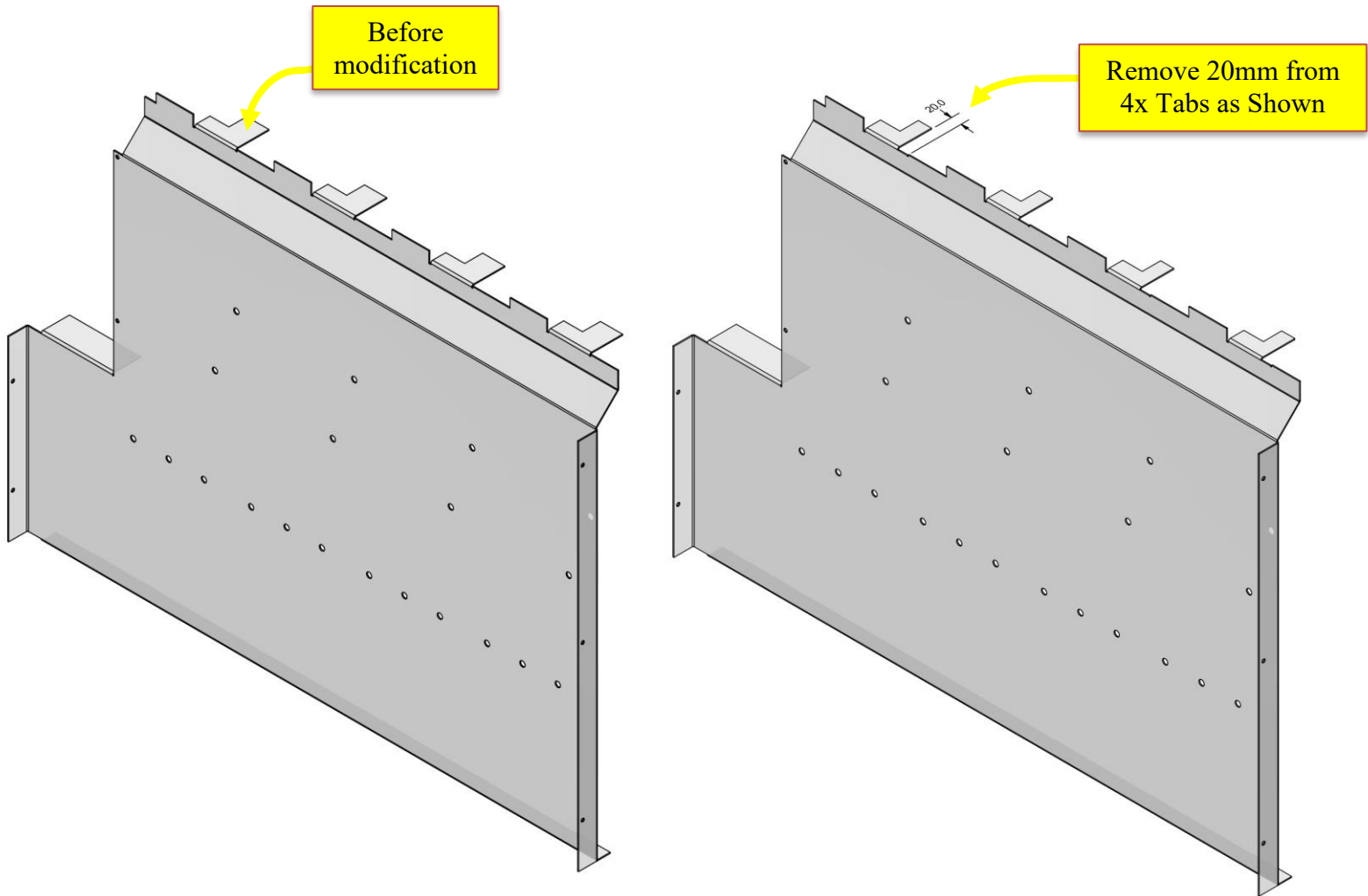


18. Install Auxiliary Contactor

The following schematic shows after the Contactor has been fitted:



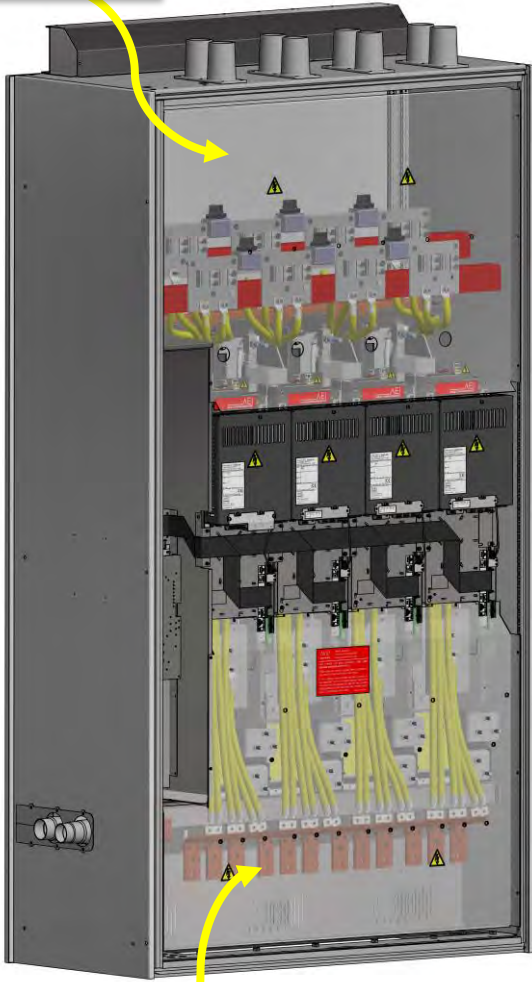
19. Modify GRID Shroud



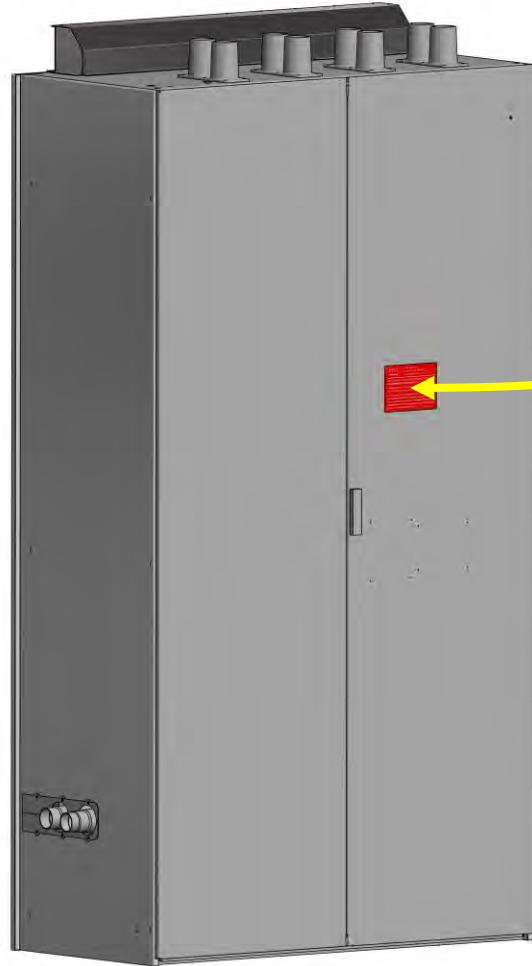
20. Refit Cubicle shroud

Before Re-Fitting Cubicle Shrouds, CDC I/O Board Power Modification must be done as described in Section 29

**RE-INSTALL
UPPER SHROUD**



**RE-INSTALL
LOWER SHROUD**



AVID Waller, Texas USA
CONTROLS Phone: (+1) 281-640-8600
www.avidcontrolsinc.com

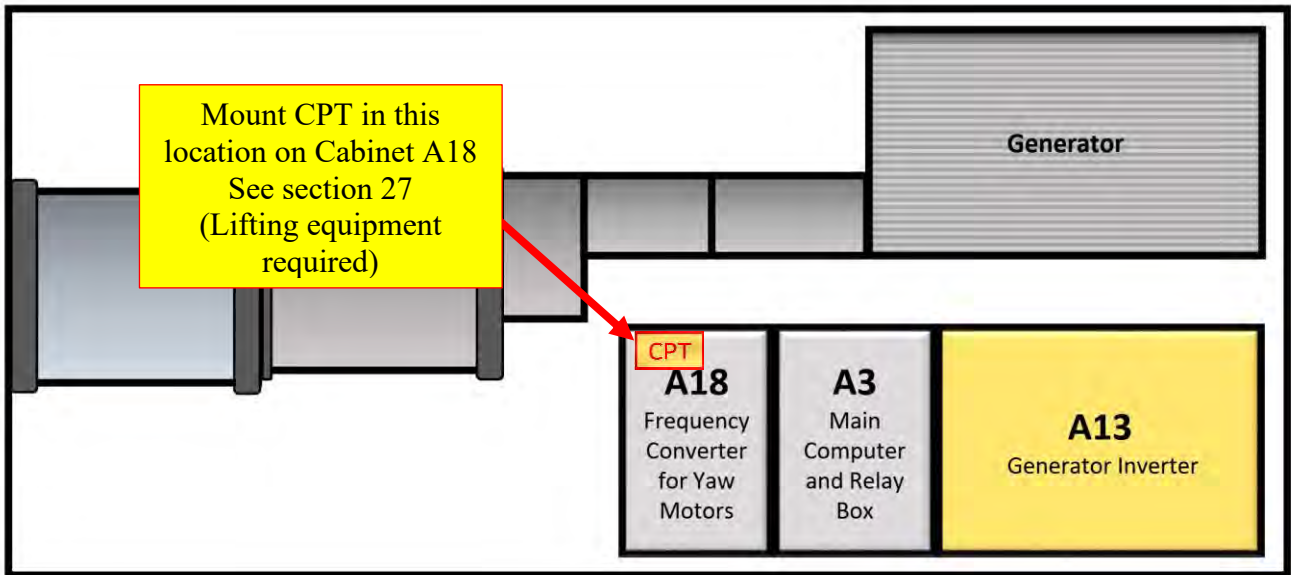
THIS TURBINE HAS BEEN UPGRADED USING **AVID EXTREME INVERTER (AEI)** MODULES.
THESE MODULES DO NOT REQUIRE DRY-OUT PRIOR TO OPERATION AFTER PROLONGED SHUT-DOWN.
IF THE TURBINE TRANSFORMER PRIMARY VOLTAGE IS DE-ENERGIZED FOR AN EXTENDED PERIOD THEN OPEN THE FUSE BLOCK POWERING THE **AEI** CONTROL POWER TRANSFORMER. DO NOT RECLOSE UNTIL TURBINE 690V INPUT IS ESTABLISHED AND STABLE.

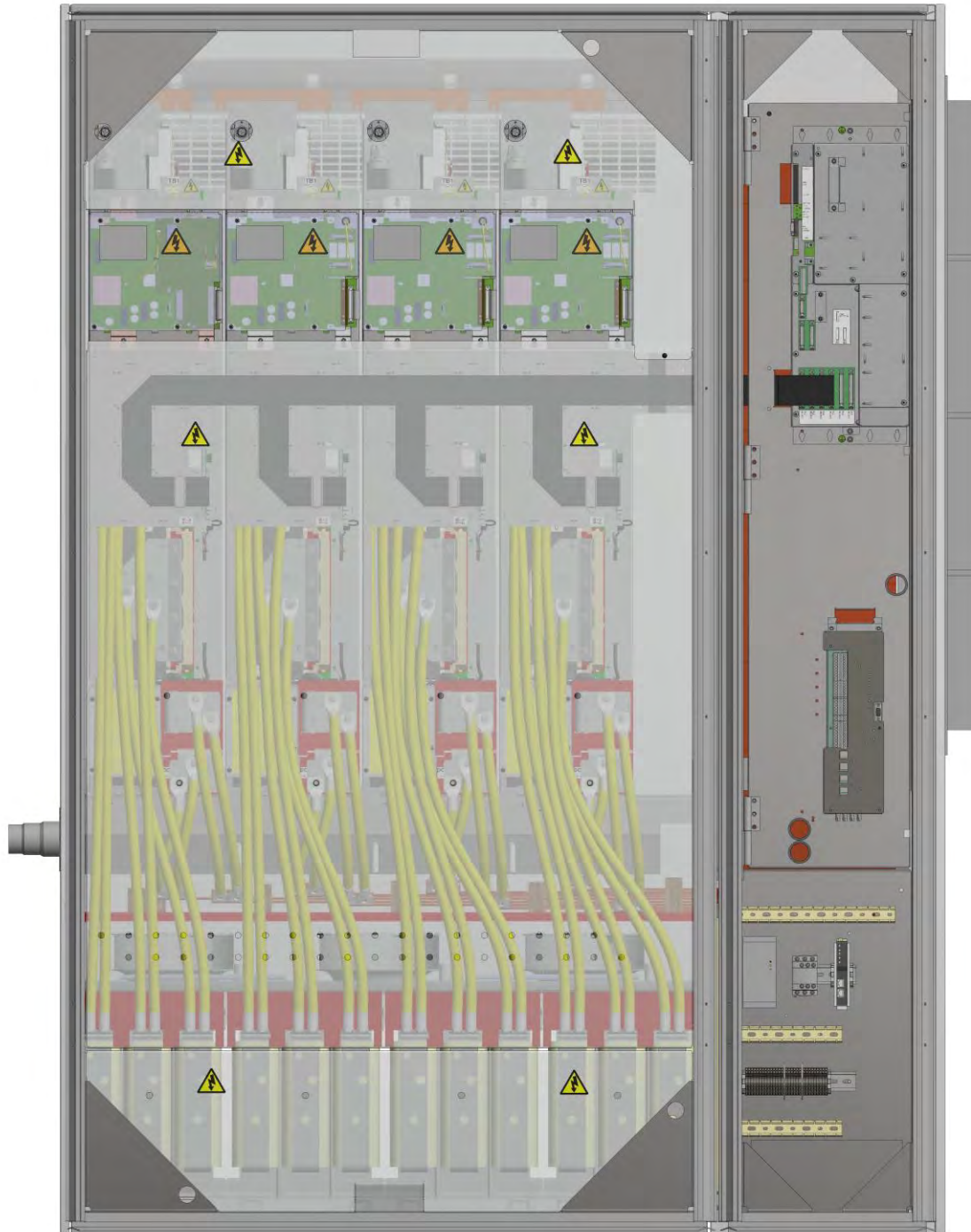
0100-840-4-001_01

**FIT LABEL (Item 27)
TO FRONT DOOR**

21. Nacelle Layout

<i>Ref</i>	<i>Contains</i>
A13	Generator Inverter
A3	Main Computer and Relay Box
A18	Frequency Converter for Yaw Motors



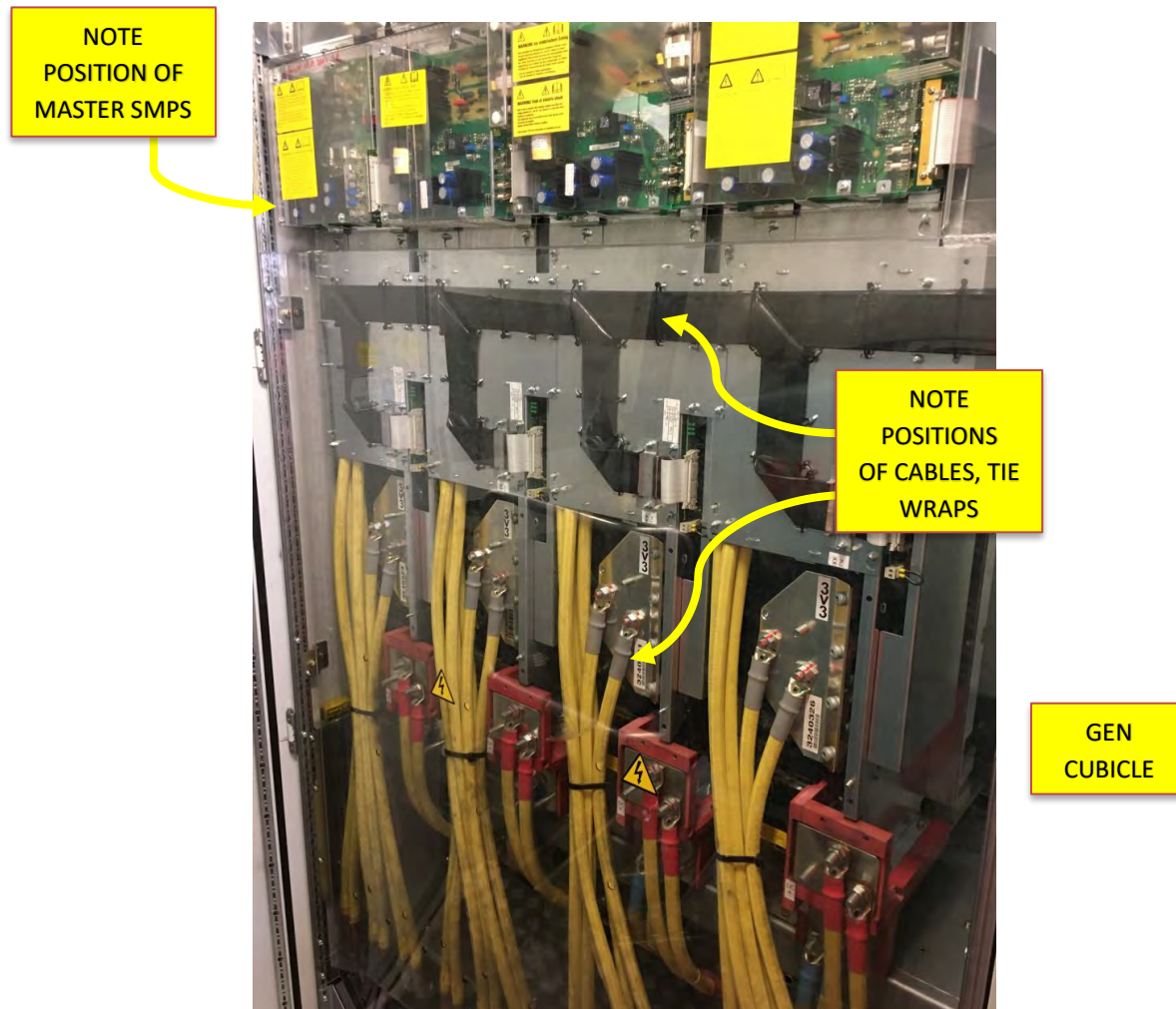


Cabinet A13 Gen Frequency Converter

21.1 Prior to Removal of MVDL1000 DELTA Modules

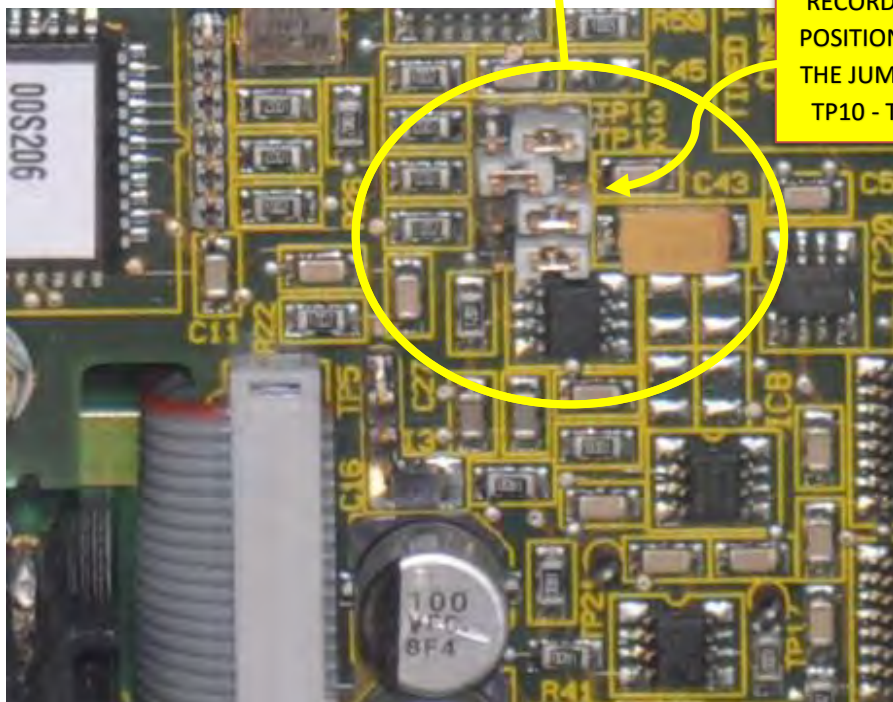
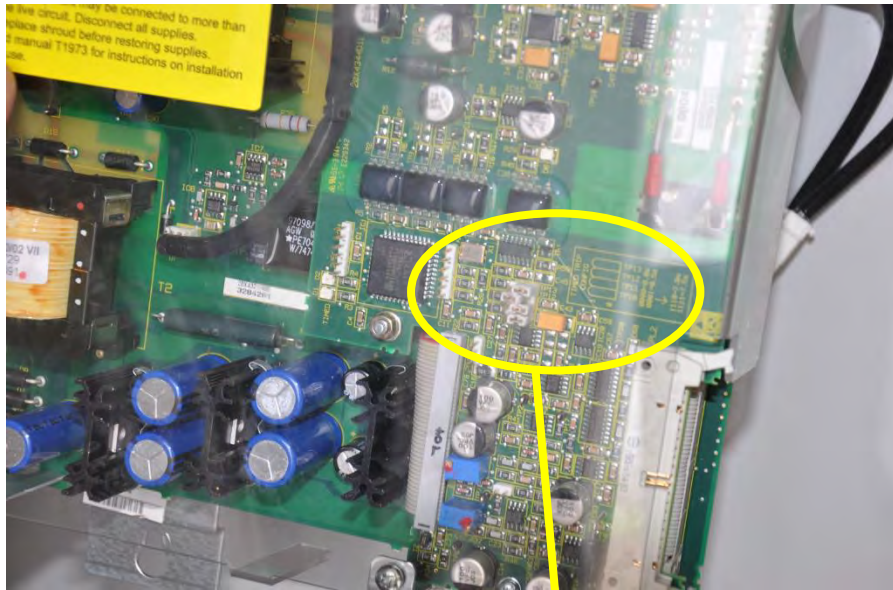
- The removal process of the MVDL1000 Delta modules should follow standard on-site processes, including:
 - Power shutdown
 - Draining of liquid coolant
 - Disconnecting of all electrical power sources
 - Removal of SMPS
 - Removal of the MVDL1000 Deltas

- Before removal of any connections or components, record the positions of the following.
 - All existing cables
 - Note the position of any relevant tie wraps.
 - Identify the master SMPS for the grid and generator system. The master SMPS is mounted on the Delta module connected to PL2 of the associated CDC.
 - Keep all hardware, nuts, bolts, washers, thread protectors, etc.



21.2 Record jumper settings

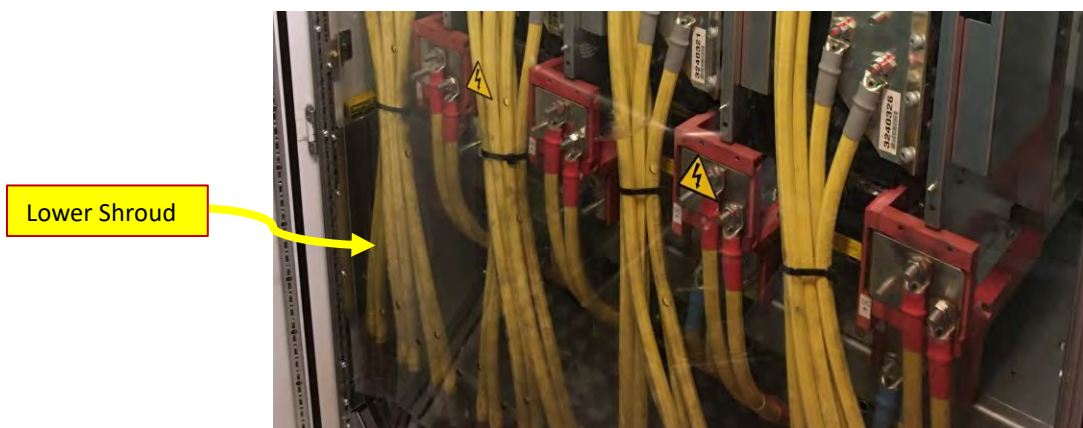
When removing the Master SMPS(s) record the positions of jumpers TP10 to TP13. These jumpers configure the over-voltage trip behavior. The AEI1000L modules use this information for proper setup.



RECORD THE
POSITIONS OF
THE JUMPERS
TP10 - TP13

21.3 Remove Cabinet Shrouds, GEN

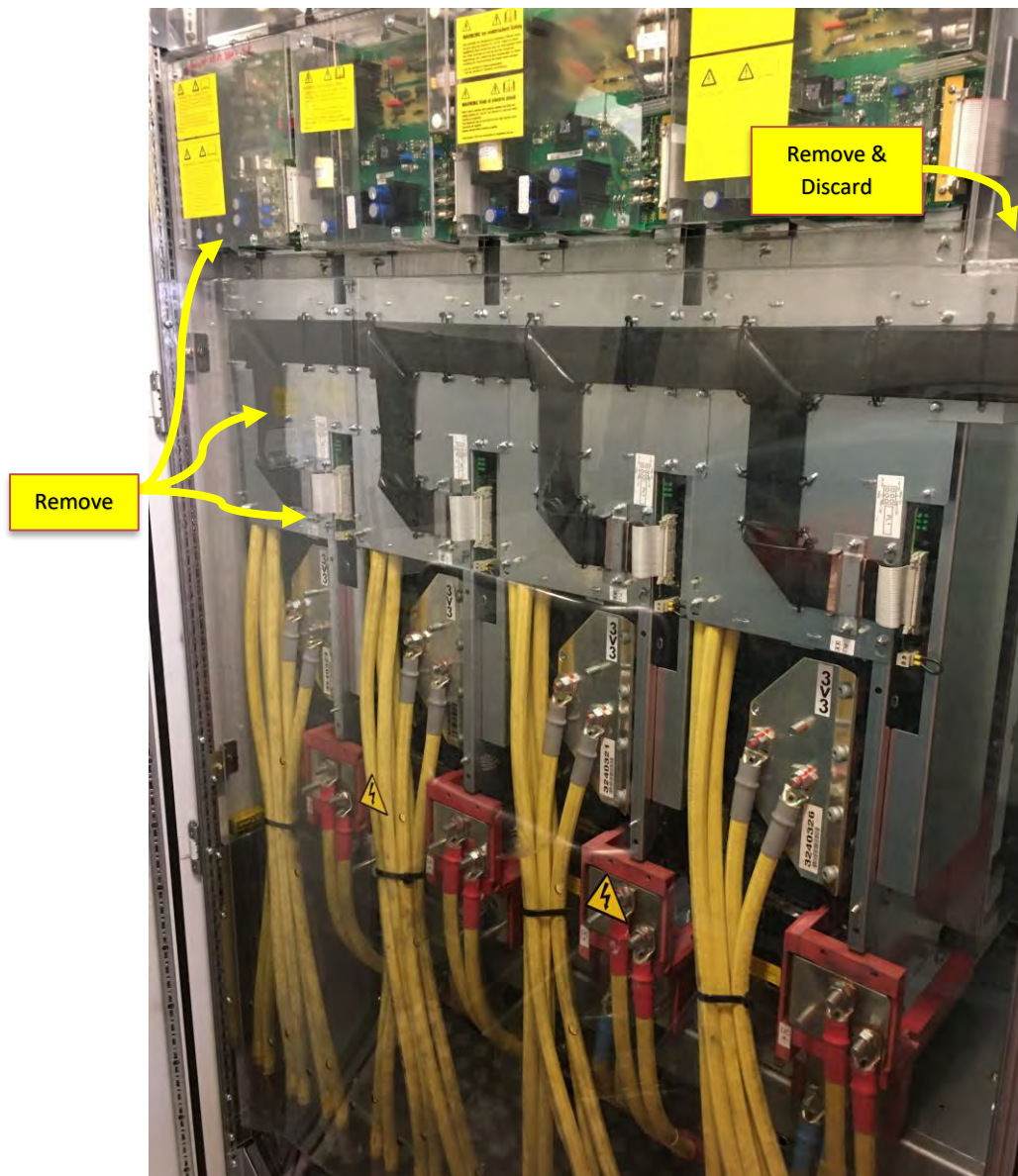
- Remove the upper, middle and lower polycarbonate shrouds from the front of the GEN cabinet.
- Remove upper left corner bracket from GEN cabinet
- Retain all Shrouds for re-fitting after AEI installation. Note - middle shroud for GEN cabinet will require modification before re-fitting. See section 31 for modification instructions.
- Retain the fixing screws and corner bracket.



GEN CABINET

21.4 Remove SMPS & Ribbons from MVDL1000 DELTA Modules

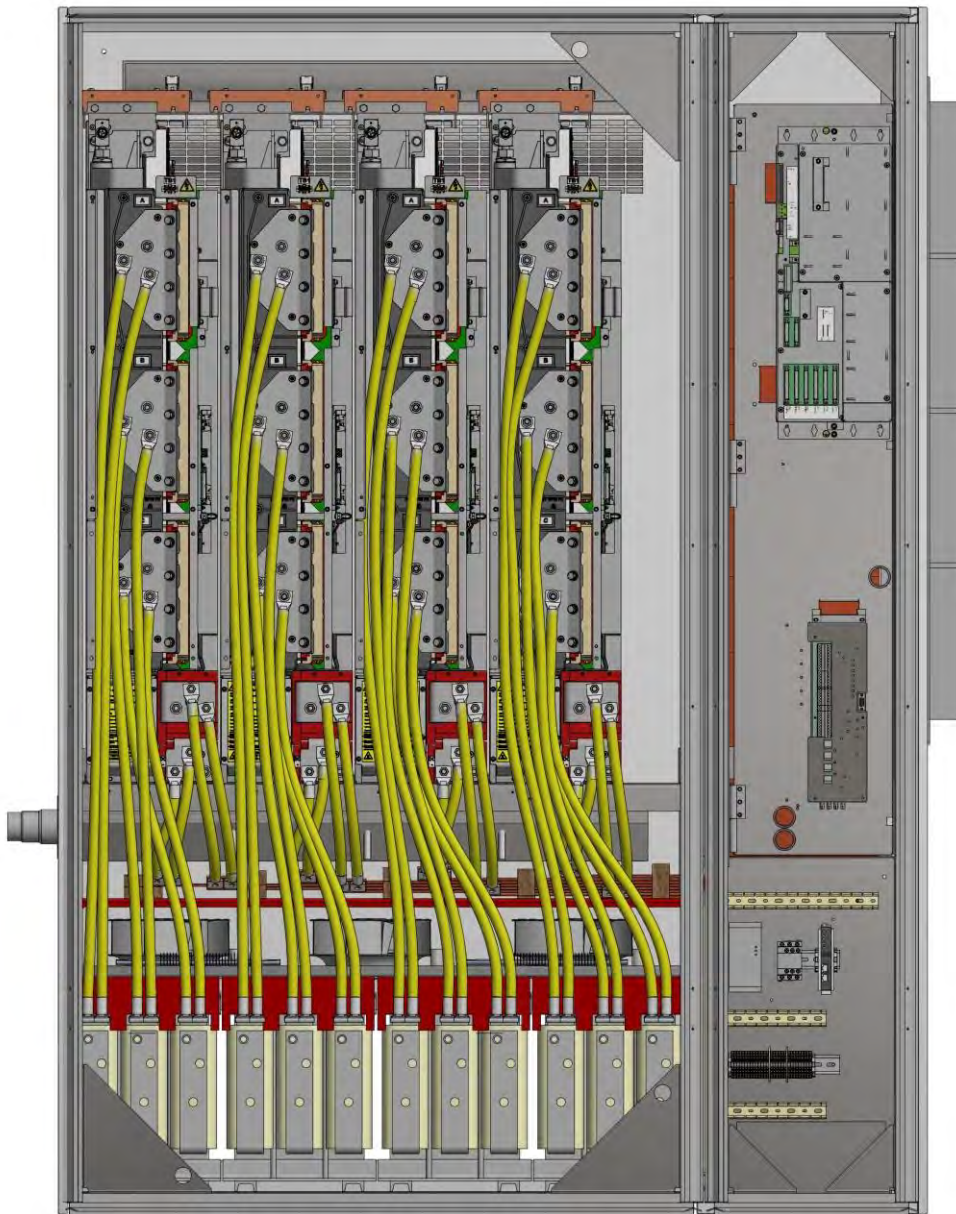
- Disconnect and remove all ribbon cables, these will need to be replaced after installation of AEI units.
- Remove all SMPS Modules and SMPS mounting plates.
- Remove Delta GROUNDING Bracket, (screws behind hinged gate in GEN control cabinet), Retain Screws for re-use.



GEN CABINET

21.5 Disconnect MVDL1000 DELTA Modules

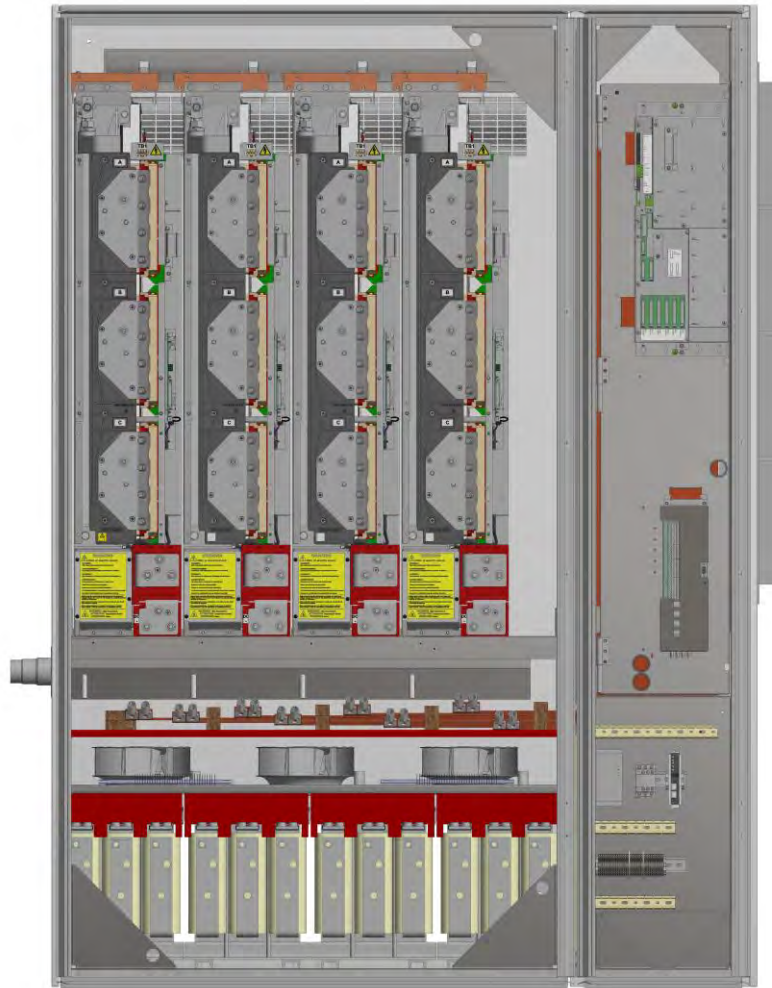
- Carefully note all power cable positions then remove them:



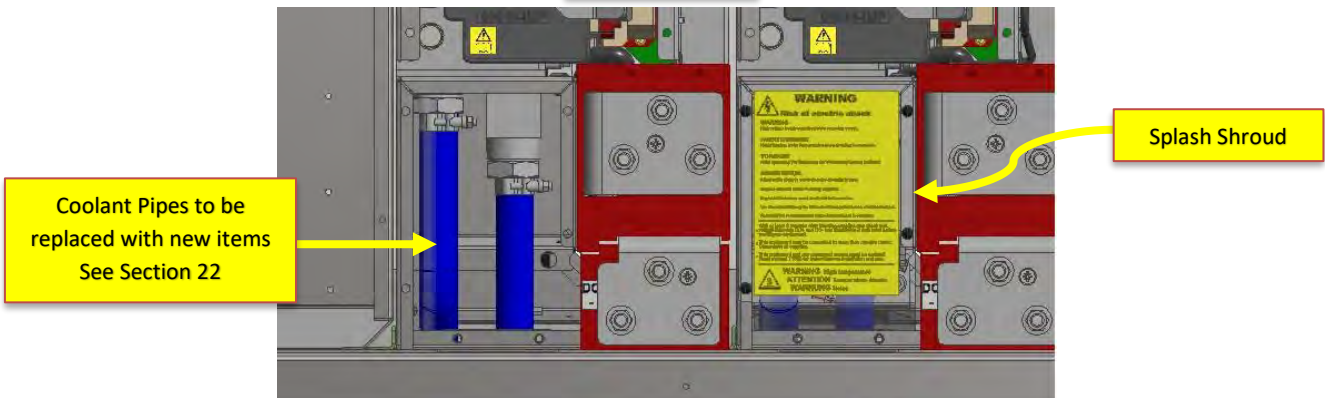
GEN CABINET

21.6 Remove covers to access coolant pipes.

- Remove Splash Shroud from Delta to expose coolant pipes
- Loosen clamps and disconnect coolant pipes from Delta



GEN CABINET

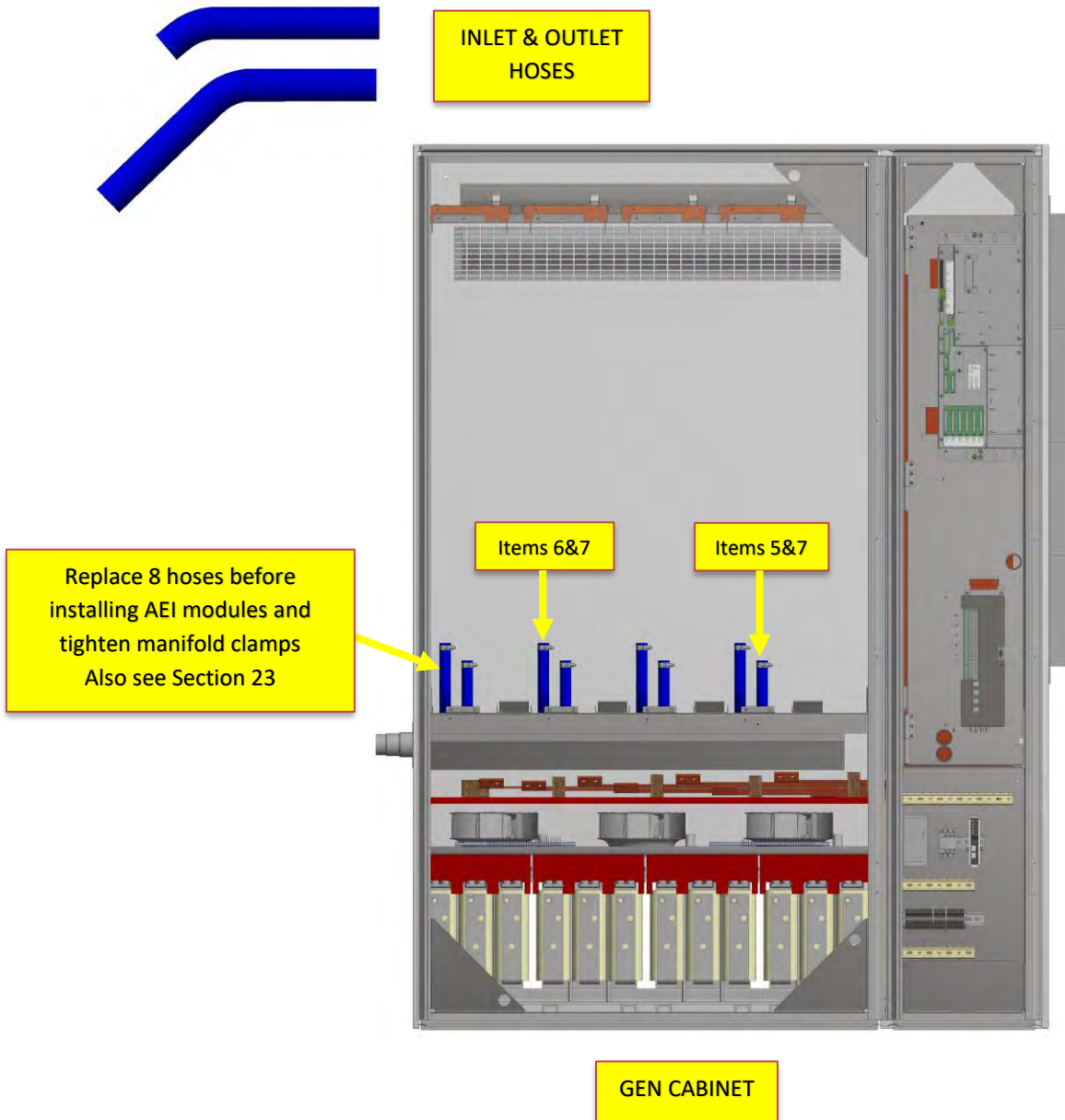


Coolant Pipes to be replaced with new items
See Section 22

Splash Shroud

21.7 Remove MVDL1000 DELTA Modules, Replace Hoses, Gen

- Remove all DELTA modules as shown, this will allow access to the lower hoses, as shown below.
- Replace all 8 hoses in each cabinet using those provided in the AEI upgrade kit.



- **IT IS CRITICAL THAT THE HOSES ARE SECURELY INSTALLED AND THE CLAMPS TIGHTENED CORRECTLY. COOLANT LEAKAGE WILL IRREPARABLY DAMAGE THE INVERTER UNITS.**
TIGHTEN CLAMPS TO 4Nm - DO NOT OVERTIGHTEN

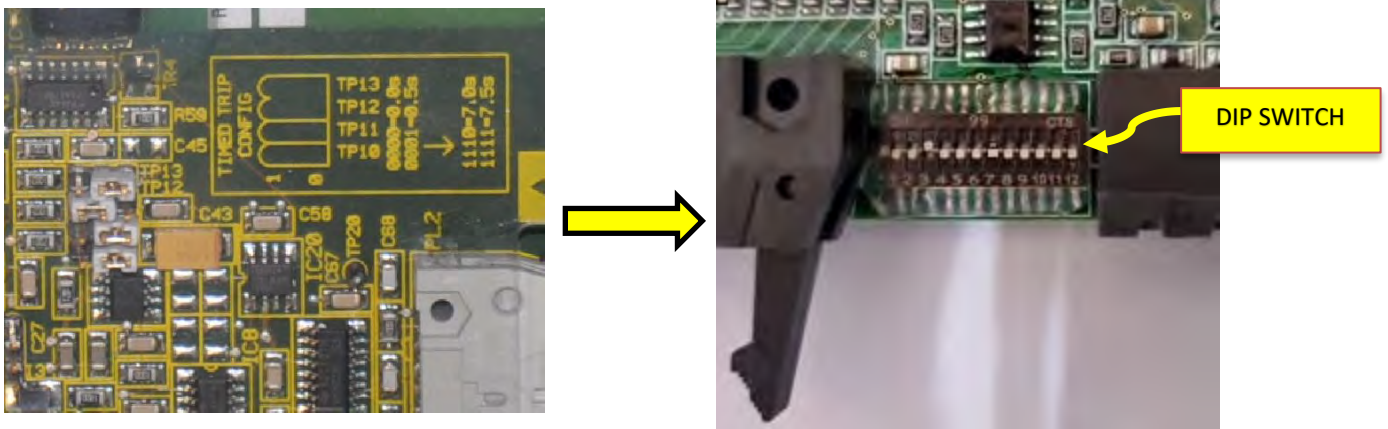


22. Install AEI 1000L Modules Gen Cabinet

22.1 Set AEI DIP Switches

- Before the Installation of each AEI verify that DIP switches 1-4 (which configure the overvoltage behavior) on each AEI are set to the equivalent time setting as recorded in Step 9.1 - Master SMPS Jumpers TP10 to TP13

SMPS Jumpers	AEI Switch
TP10	SW1
TP11	SW2
TP12	SW3
TP13	SW4

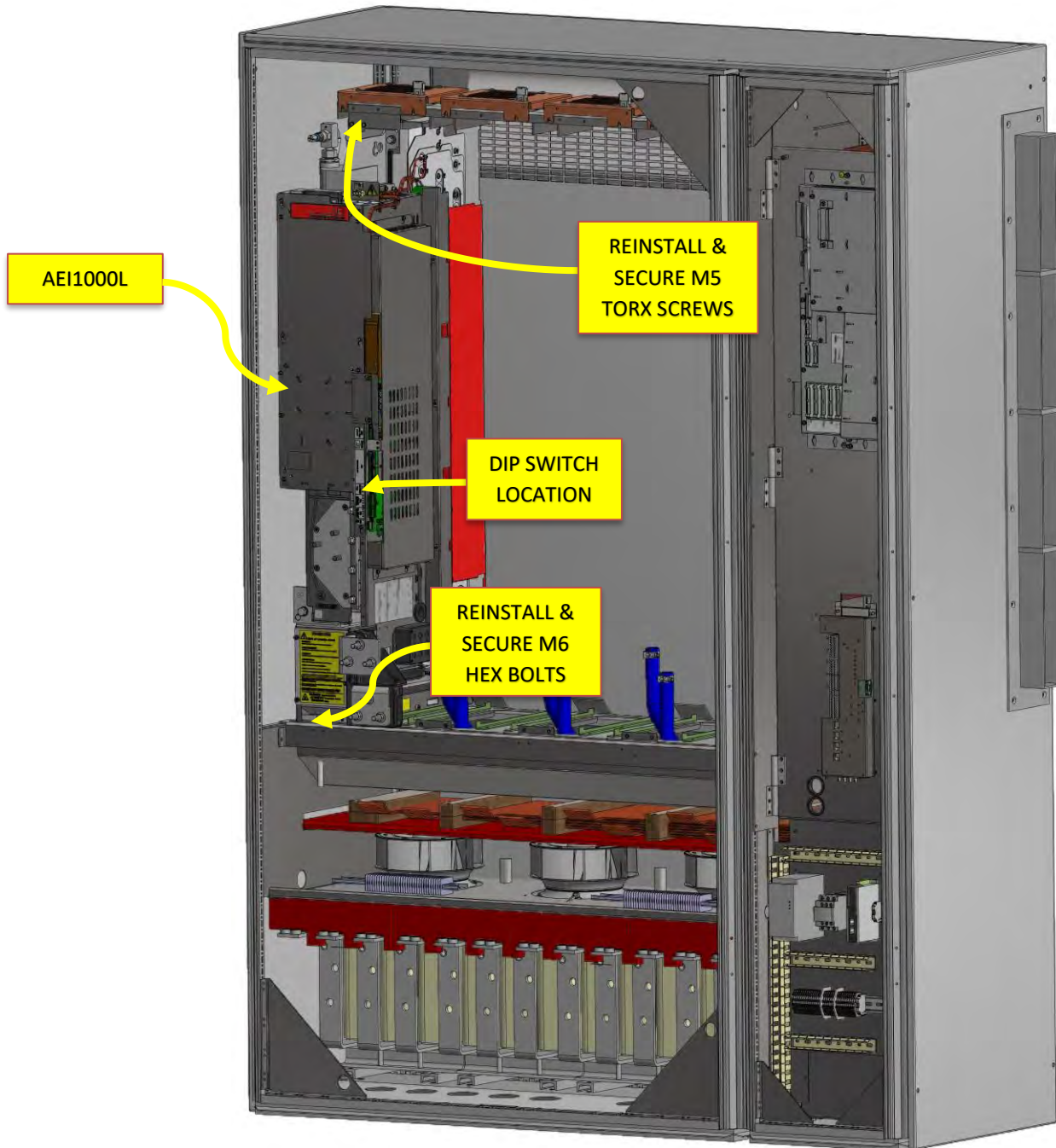


- Before the Installation of each AEI ensure that **Compatibility Rating Mode** is disabled by setting DIP switch SW7 to the **OFF** position.
- **Refer to AVID Document DTS-MID0012 section on User Selectable Options for complete information about these settings.**

THESE SETTINGS ARE IMPORTANT, THE TURBINE WILL NOT RUN CORRECTLY UNLESS THEY ARE MADE.

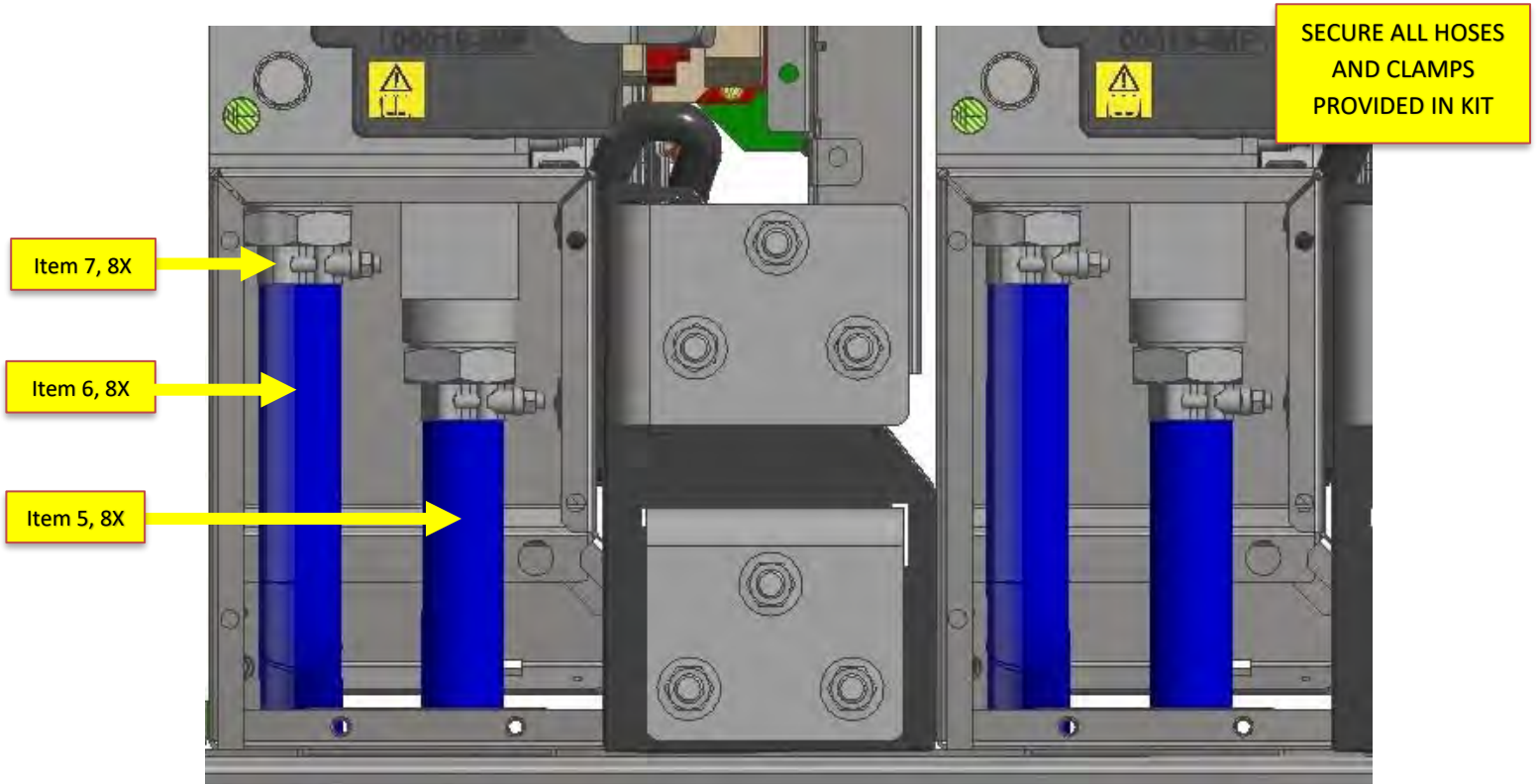
22.2 Install 4 x AEI 1000L Modules into Generator Cabinet

- GENERATOR side: Fit 4 AEI1000 Modules and secure using fixings shown. Ensure hoses and clamps are installed correctly as detailed in section 23



23. Connect Coolant Hoses

- Connect and secure each hose from the inlet manifold to the bottom barbs on all the AEI units.



- **IT IS CRITICAL THAT THE HOSES ARE SECURELY INSTALLED AND THE CLAMPS TIGHTENED CORRECTLY. COOLANT LEAKAGE WILL IRREPARABLY DAMAGE THE INVERTER UNITS.**
TIGHTEN CLAMPS TO 4Nm - DO NOT OVERTIGHTEN



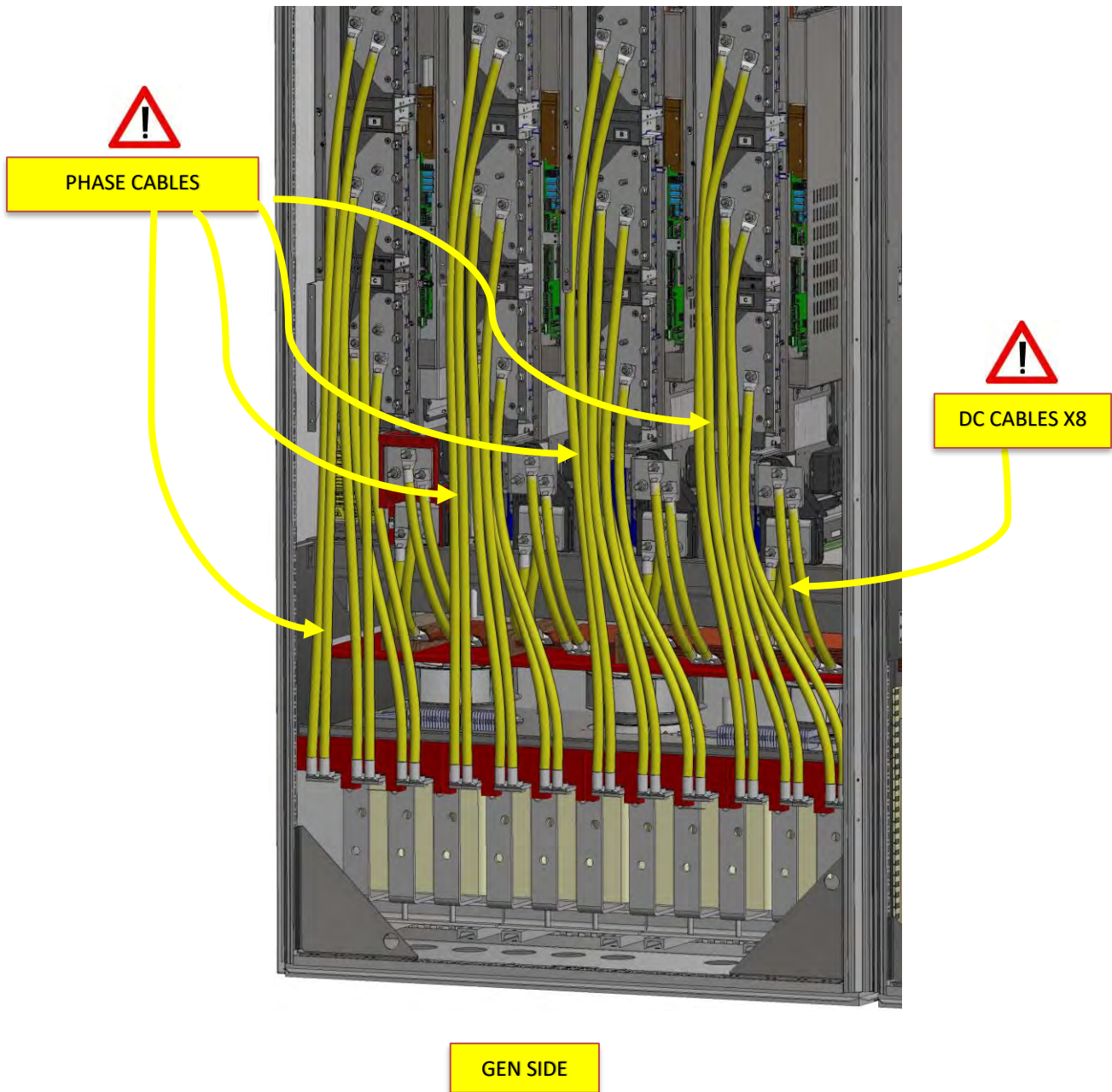
- Replace the splash shroud on each AEI



SPLASH
SHROUD

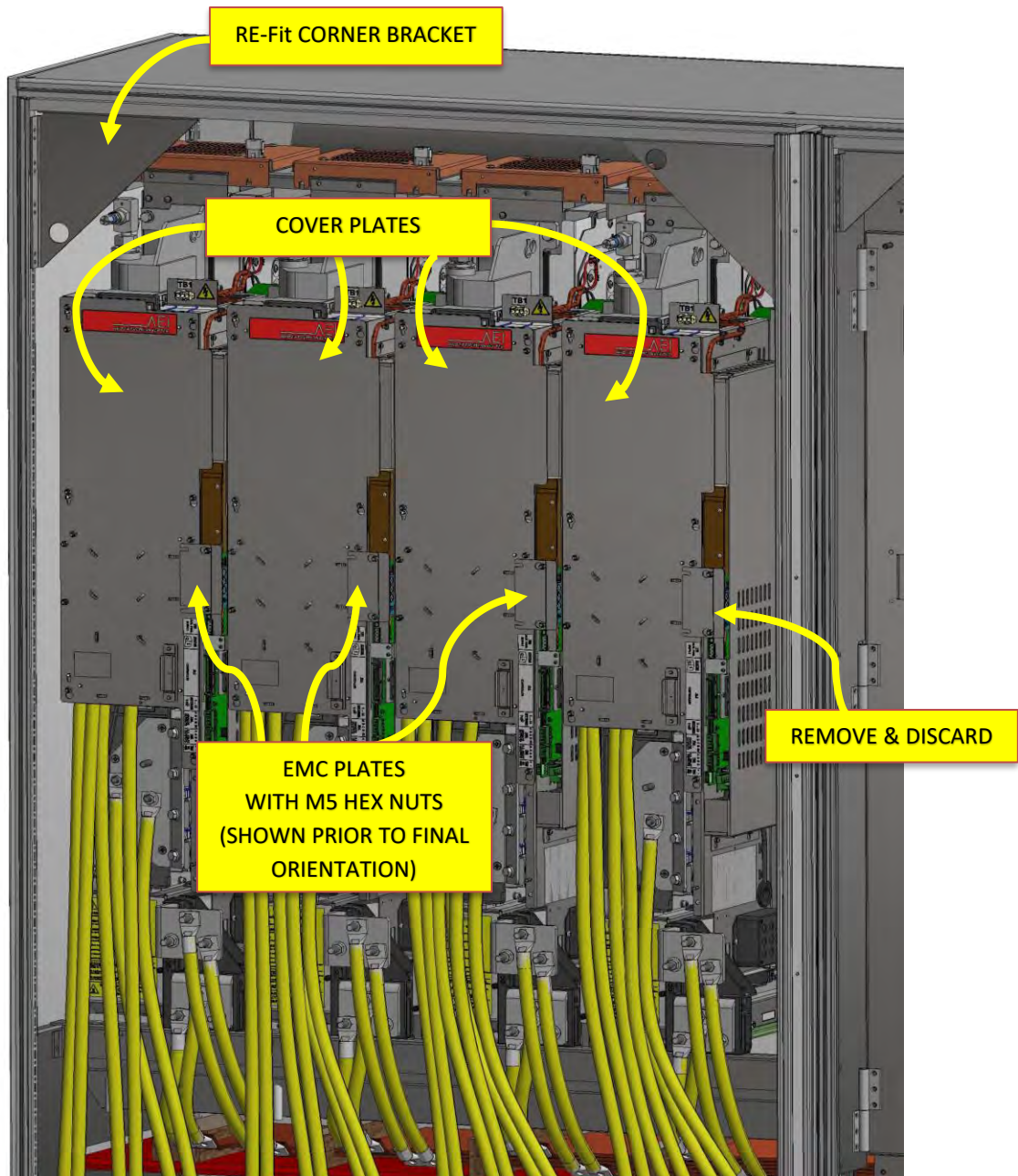
24. Reinstall Generator Cubicle AC & DC Cables

- Remove the cover plates from each GEN cubicle AEI.
- Reinstall the GEN cubicle AC & DC cables as identified on removal, using the supplied M10 flange nuts. Torque all connections to 33.5Nm (297lb.in).



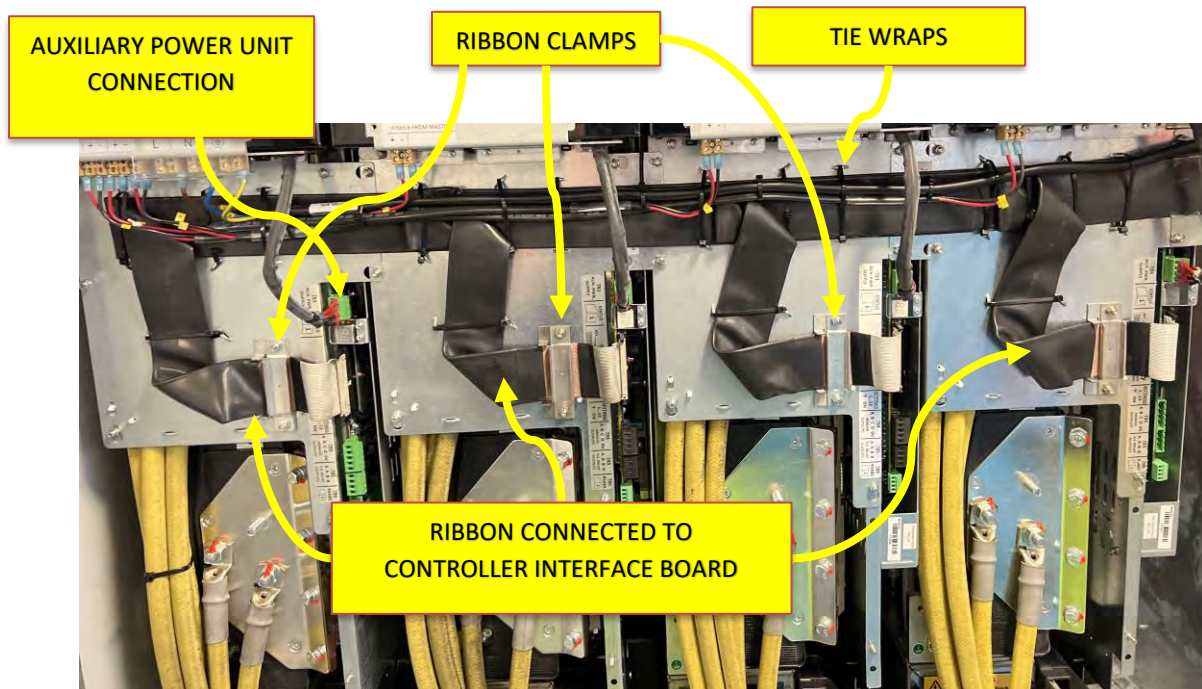
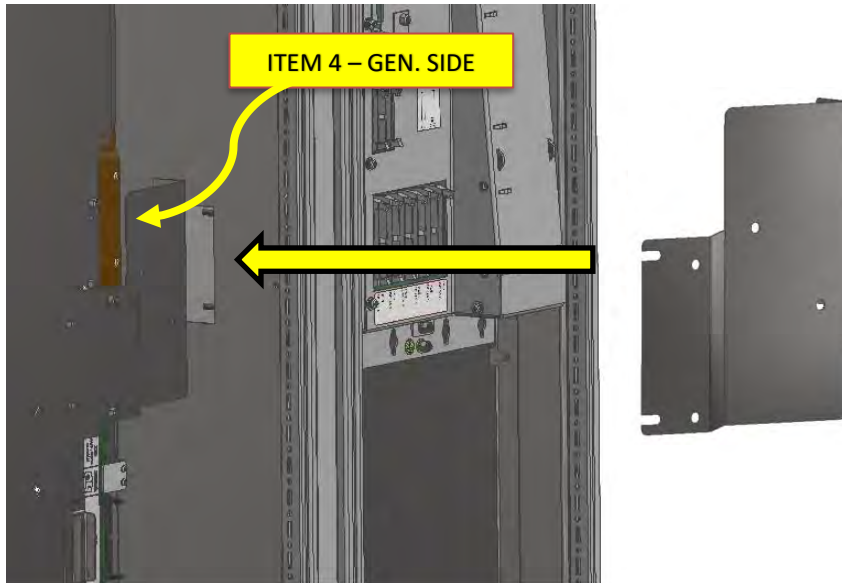
24.1 Reinstall AEI Cover Plates

- Remount the cover plates to each AEI, as shown. Tighten down all M5 Hex Nuts firmly to secure to the AEI
- Remove, flip, and attach the EMC plates to join each adjacent AEI unit, and tighten down firmly with the provided M5 Hex Nuts
- Fit new Bonding bracket (item 4) to side panel and attached to RH Delta in place of EMC plate
- Refit upper left corner strengthening bracket.

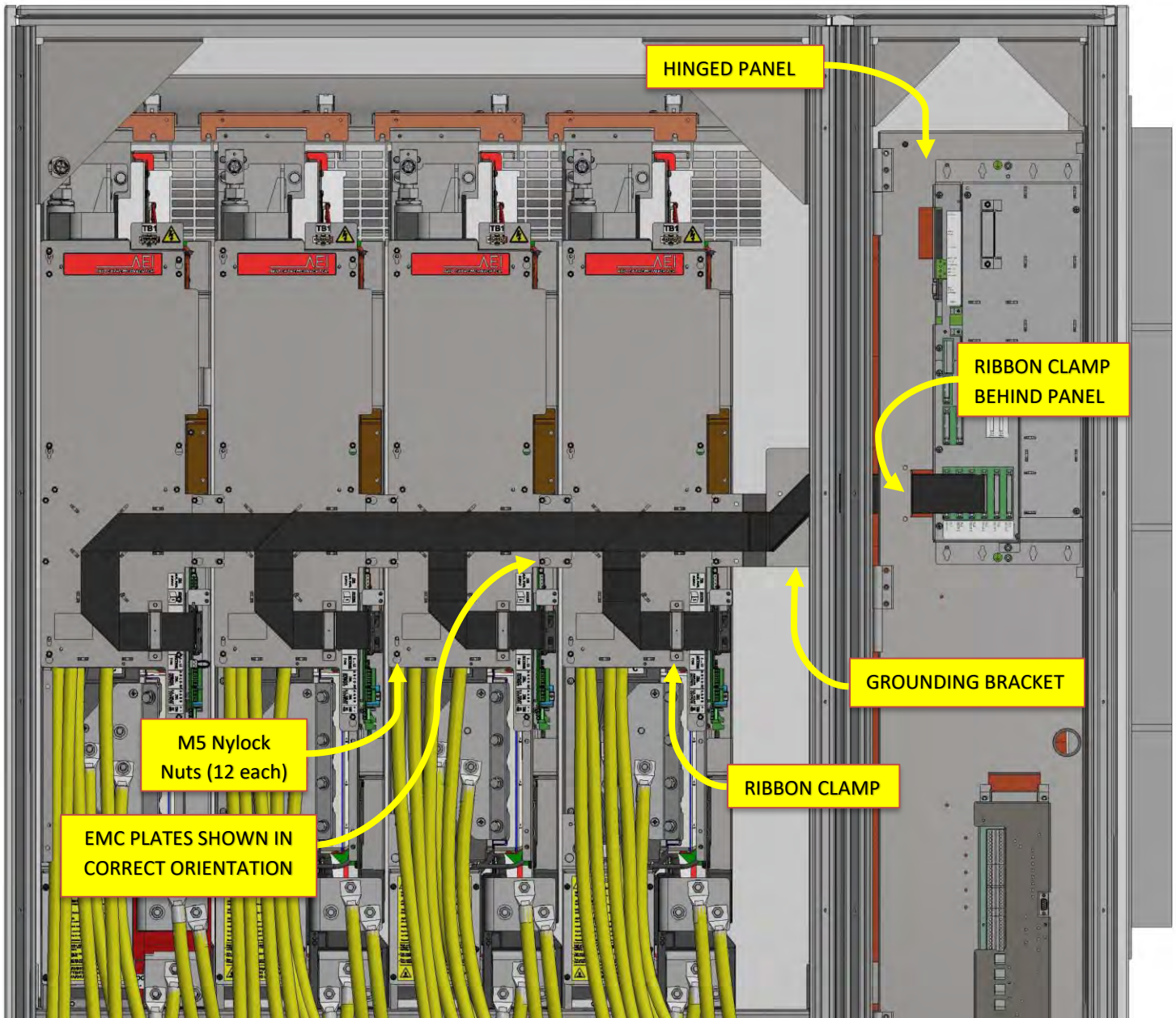


25. Install Ground Brackets and Ribbon Cables

- Install the offset ground bracket (**GEN Item 4**) to allow the routing of the ribbon cables from the GEN control section
- Take care to use the correct bracket for the correct cubicle, this bracket is unique and cannot be interchanged with the bracket for the GRID cubicle.



- Feed Ribbon cables through side panel and aperture in hinged gate
- Attach Ribbons to each Delta using cable ties supplied with kit
- Clamp Ribbons using Ribbon cable clamps on each AEI, Side Panel and Hinged Gate
-

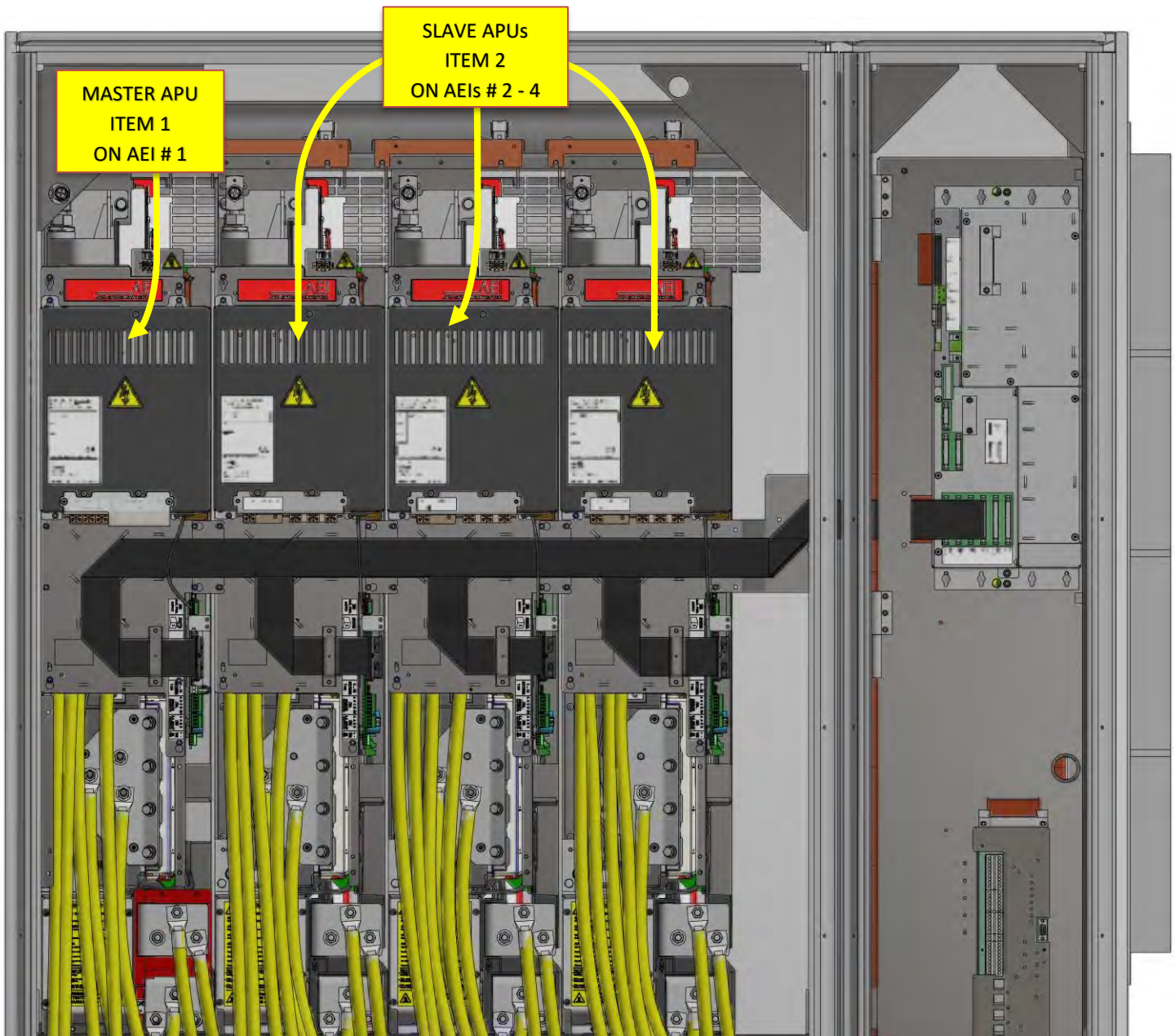


- Connect and clamp down all ribbon cables to each AEI unit and tie wrap into place:

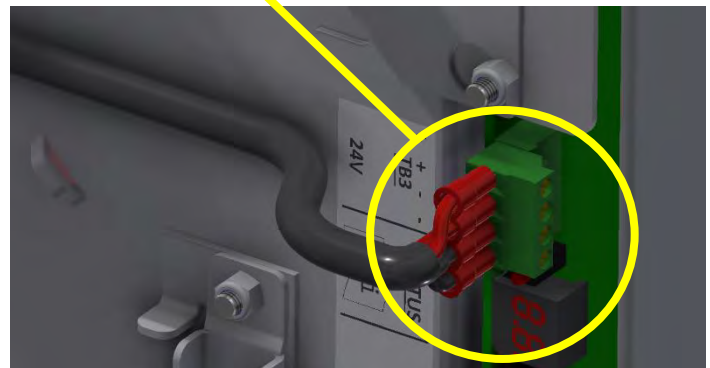
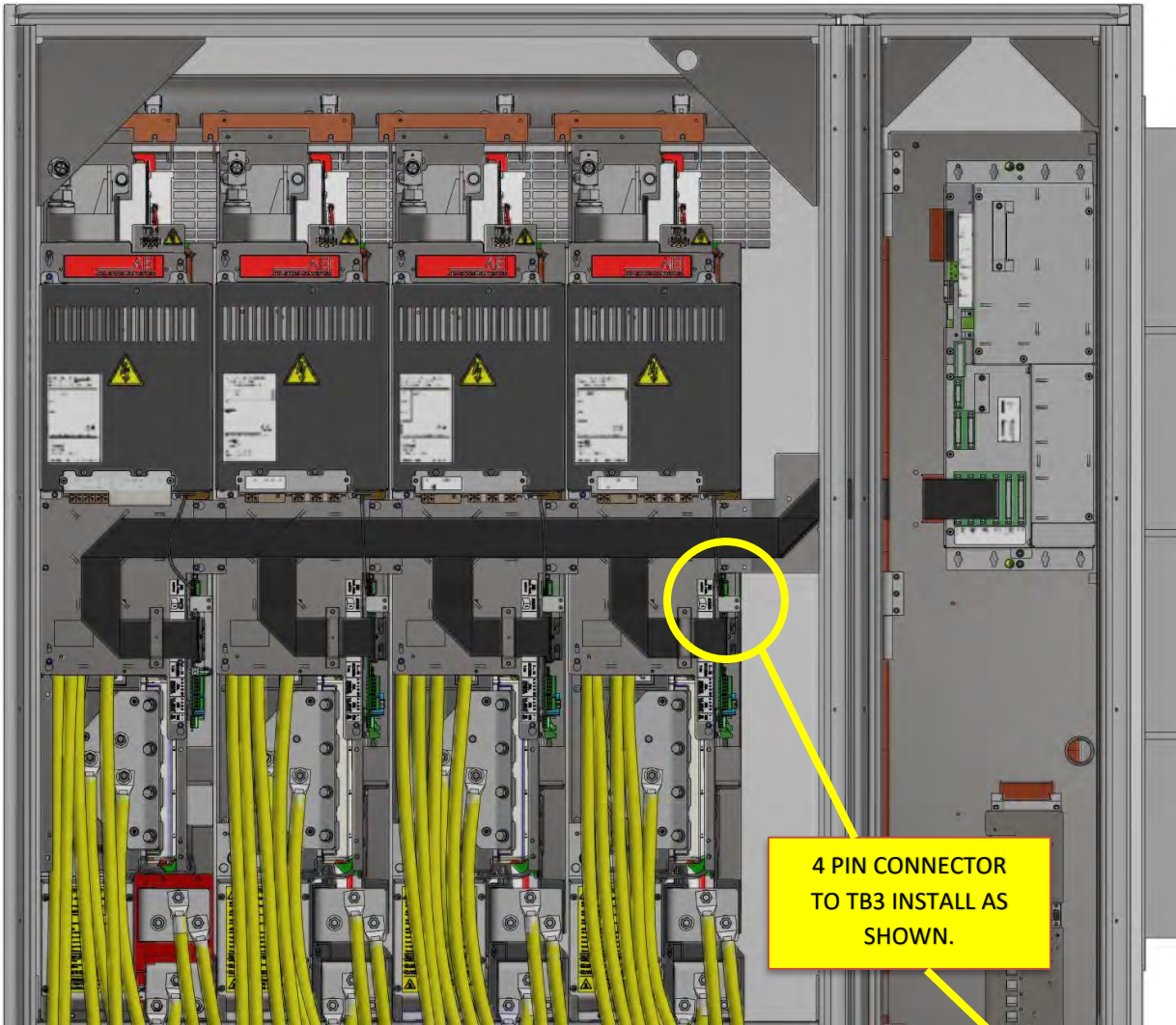
GEN SIDE

26. Install Auxiliary Power Units, Generator Cabinet

- Mount the Auxiliary Power units onto the AEI Cover Plates.
- Mount the Master APU units (**Item 1**) onto AEIs GEN 1 (The left-hand unit)
- Mount the Slave APU units (**Item 2**) onto other AEIs
- Tighten the M5 Nylock nuts securely.



- For each APU, plug the 4-pin connector into the corresponding AEI module:



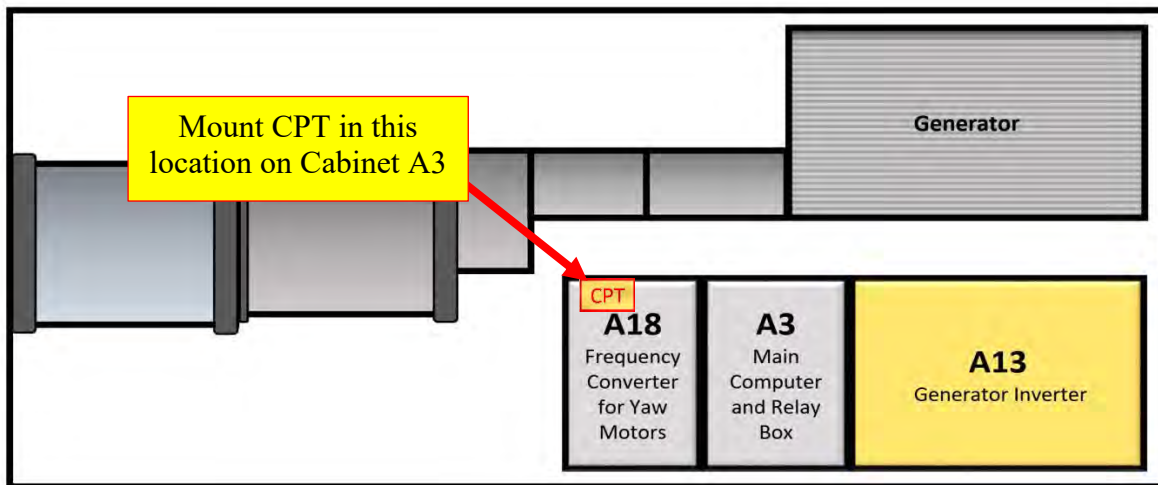


27. Install Control Power Transformer (CPT), Gen

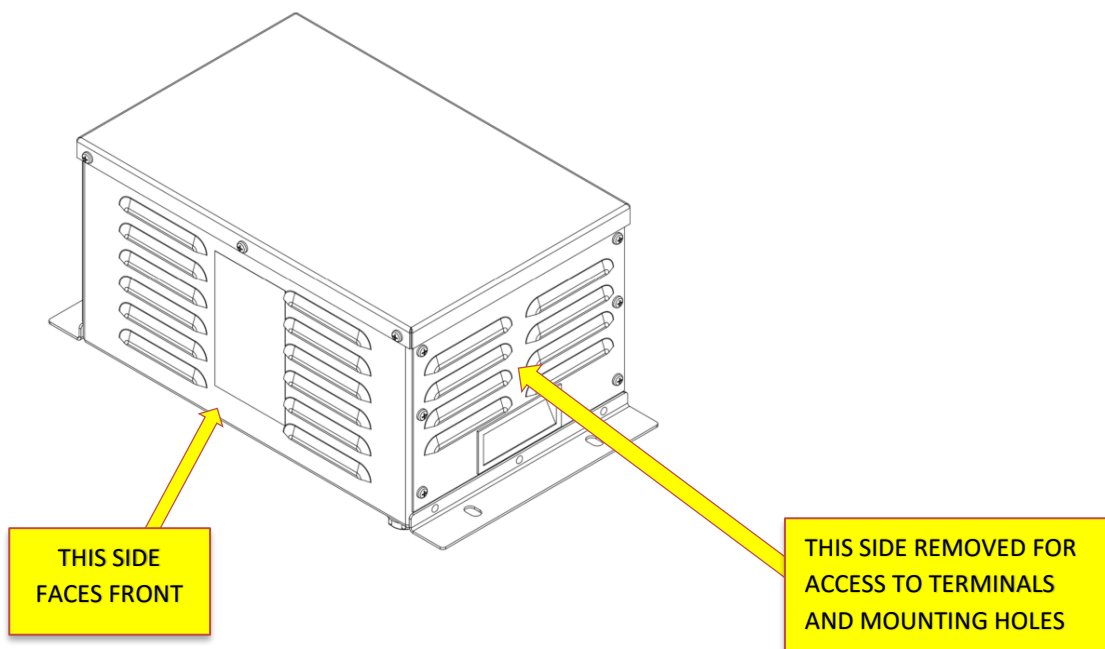


CAUTION: Note this stage will require the drilling and punching of holes to mount the transformer and cable fittings. Keep metal shavings from contaminating any internal electrical components using a drop cloth or similar.

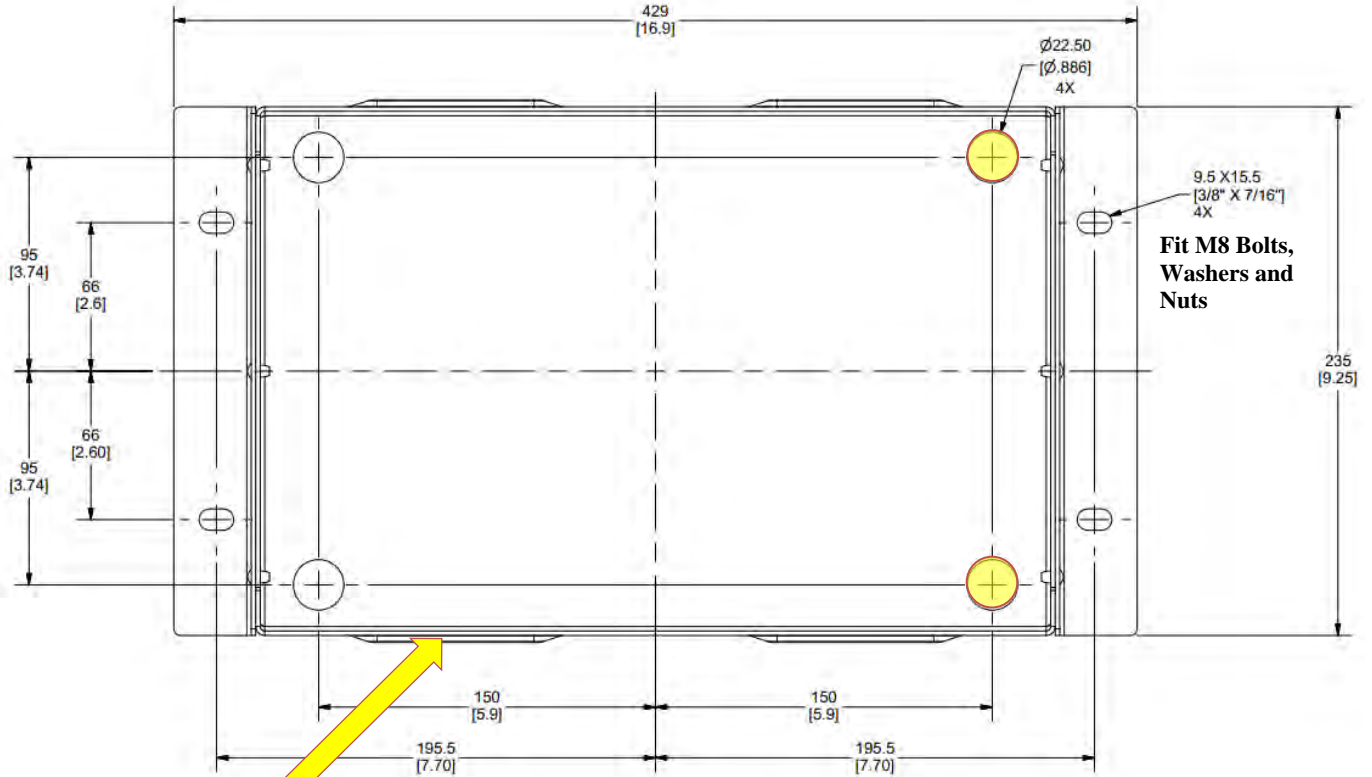
- The Control Power Transformers (CPT) (*Item 3*) is to be mounted on the top of the A18 cabinet for Generator. Mount 70mm from the front and slightly right of center of the cabinet. **Take care not to drill into cubicle frame.** See below.



- Remove the indicated panel from the CPT to provide access for mounting and wiring. Carefully retain the cover and fasteners.



- Identify exactly where the CPT will be mounted on the top of the cabinet, and referring to the following drawing (full size version is in DTS-01944-ASY-A), use a ½” drill and the Greenlee Hole Punch to make two 7/8” holes to line-up with the highlighted holes in the base of the CPT:



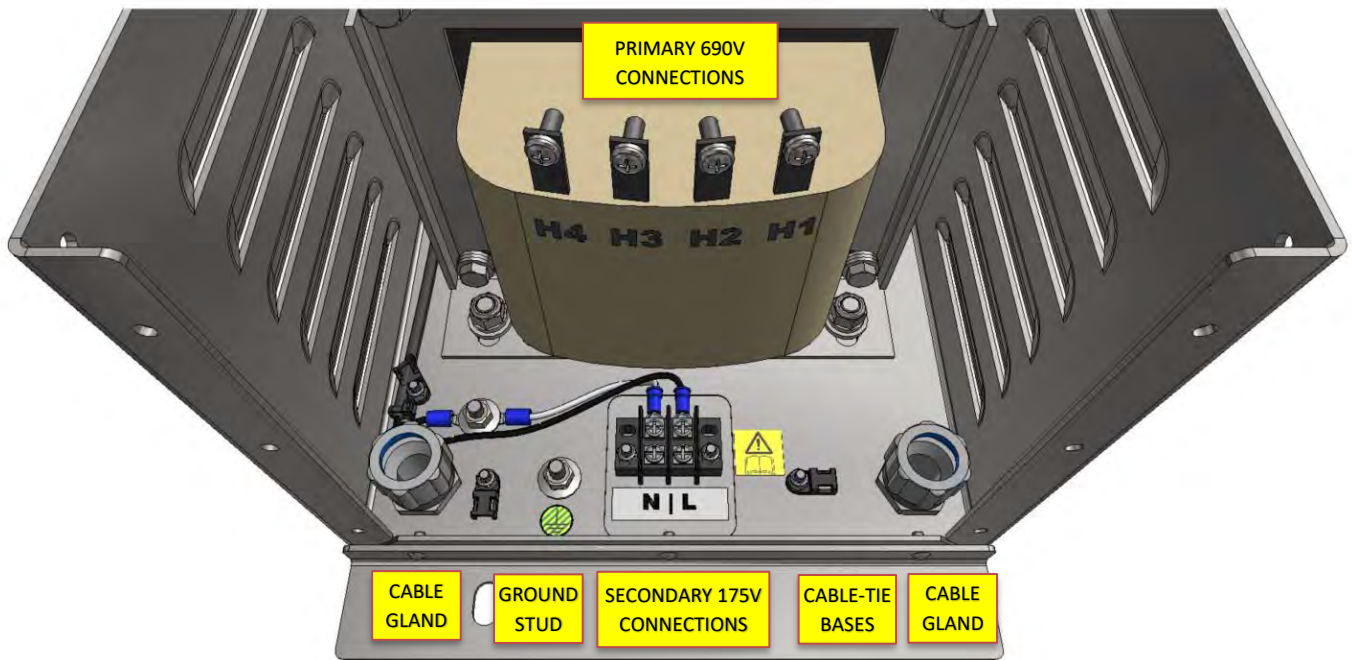
THIS SIDE FACES FRONT OF CABINET (GEN SIDE)

- Mount the CPT on the top of cabinet, lining up the holes
- Install two sets of cable gland hardware (Included in *Item 25*) to secure the CPT to the cabinet and provide access for cables:
- Drill 4 off 9mm Diameter holes through slots in both mounting brackets and fit M8 Bolts, Flat + Spring Washers + Nuts and securely fix CPT to cabinet to guard against vibration issues.



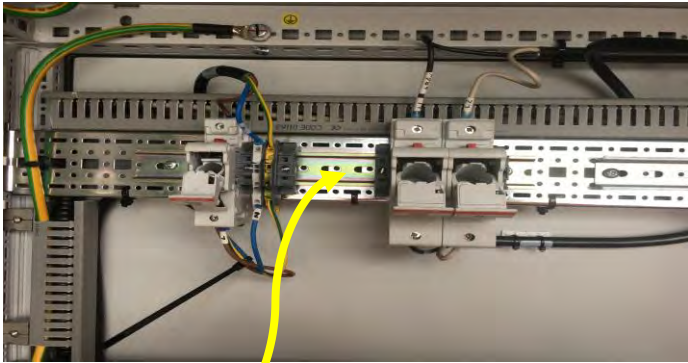
HOLE PUNCH

- The following figure (from DTS-01944-ASY-A) shows the mountings and connections for the CPT:

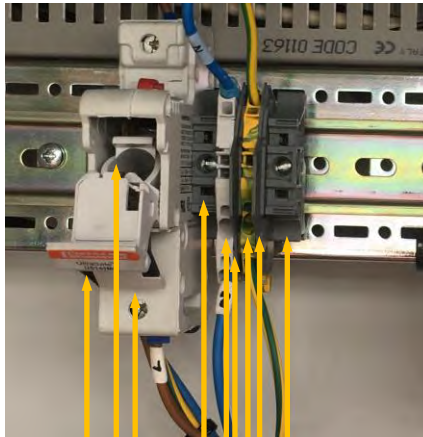


27.1 Install Primary & Secondary Fuse Holders Gen Cabinet

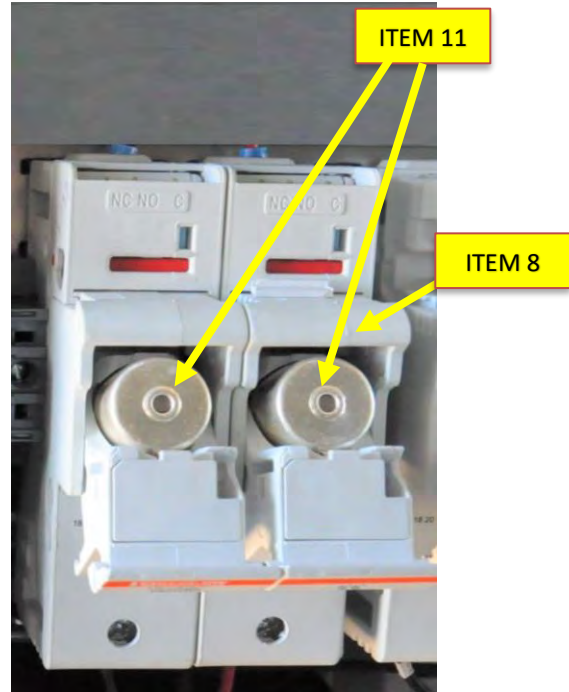
- Using 2 off M5x10 Taptite screws, fix a 300mm (12-in) section of DIN-rail to the upper rear Rittal rail as shown below
- Install the 2-pole 690V ultra-safe fuse holder (**Item 8**) and Fuses (**Item 11**).
- Install the single pole 750V ultra-safe fuse holder (**Item 9**) and Fuses (**Item 10**) and associated terminals



Fix 300mm (12-in) DIN RAIL using 2 off M5x10 Taptite screws



- End Stop
- Fuse (not shown) (**Item 10**)
- Fuse Holder (**Item 9**)
- End Stop
- Feedthrough Terminal
- End Section Cover
- Ground Terminal
- End Section Cover
- End Stop

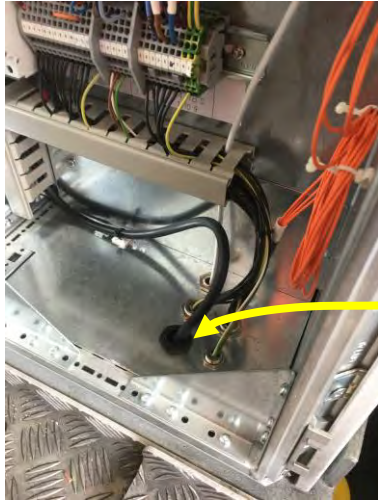


The components shown in the table below are included in BOM Item 25. (See Section 6)

Reference	Avid Item Number	Description
9	00663-OTS-A	TERMINAL BLOCK, FEED-THROUGH - GREY
10	00666-OTS-A	TERMINAL BLOCK, GROUND – GRN/YEL
11	00664-OTS-A	TERMINAL, BLOCK, END SECTION COVER, DARK GREY
12	00665-OTS-A	TERMINAL BLOCK, END STOP, DARK GREY

27.2 Install Cable Glands in GEN Control Cubicle

- Remove gland blanking plug and install cable gland hardware in location shown below for GEN cabinet:

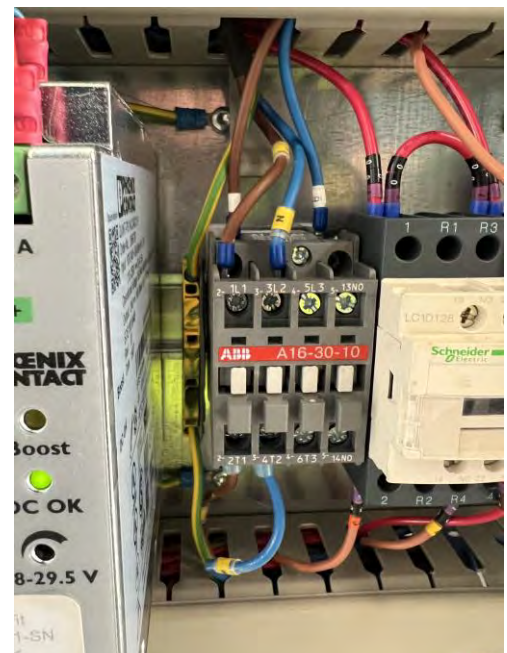


Install Cable Gland Hardware (*item 24*)



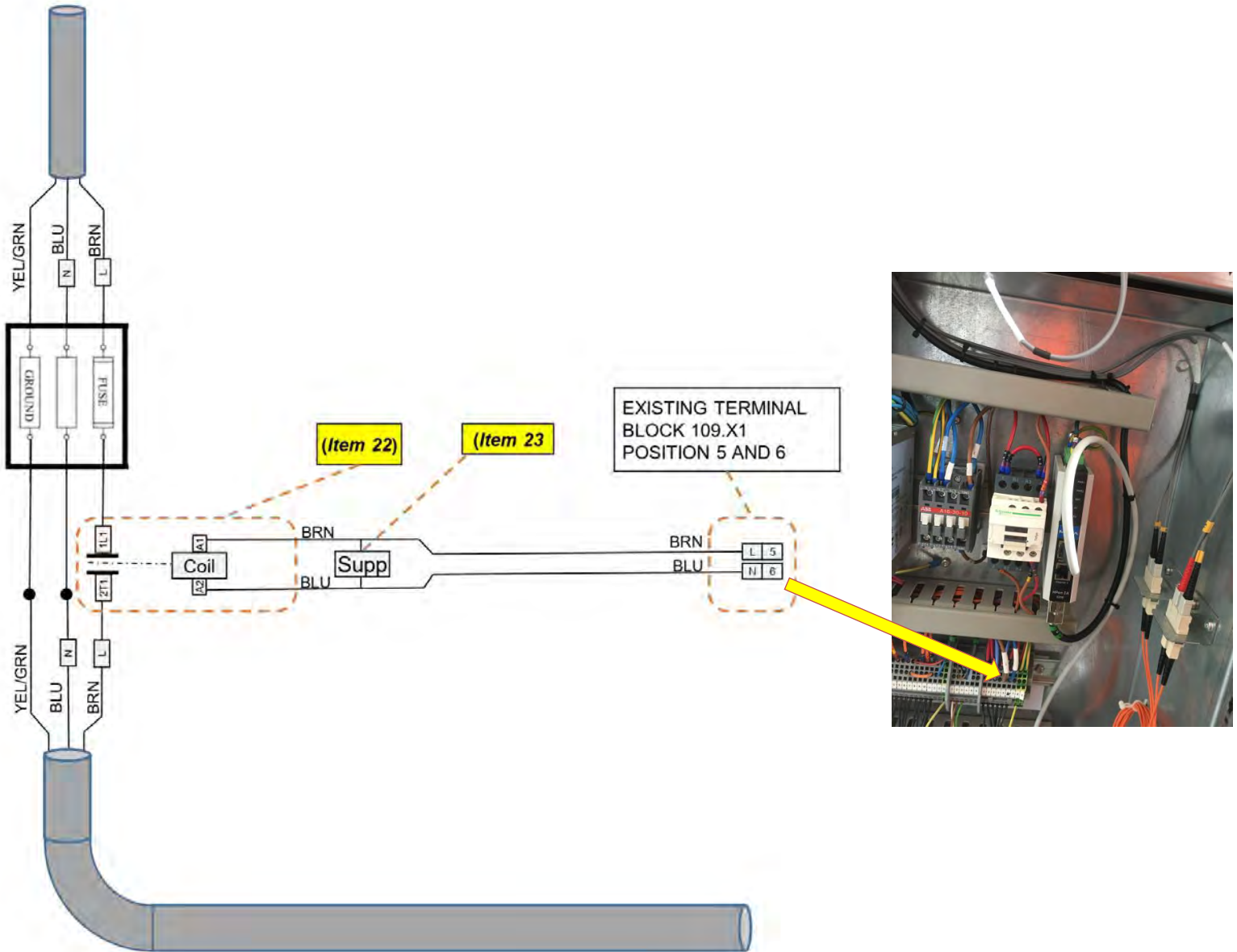
- Carefully vacuum all metal shavings
- This cable gland will be used to run the 175VAC supply from the Control Power Transformer secondary fuse mounted in cubicle A18 to the Master Auxiliary Power Units Contactor – See below

Contactor mounted on existing DIN rail in GEN Cubicle A13



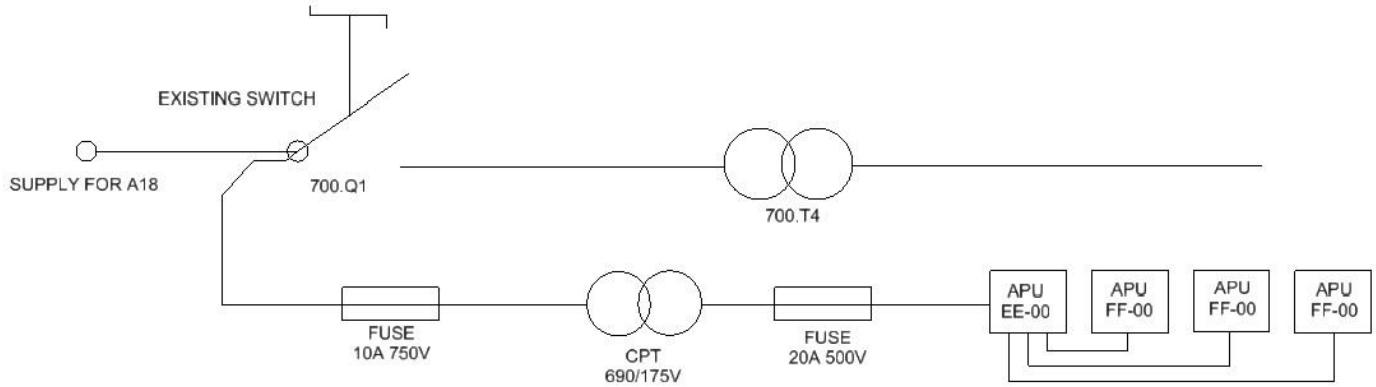
27.3 Contactor Wiring

- The following schematic shows after the Contactor has been fitted:

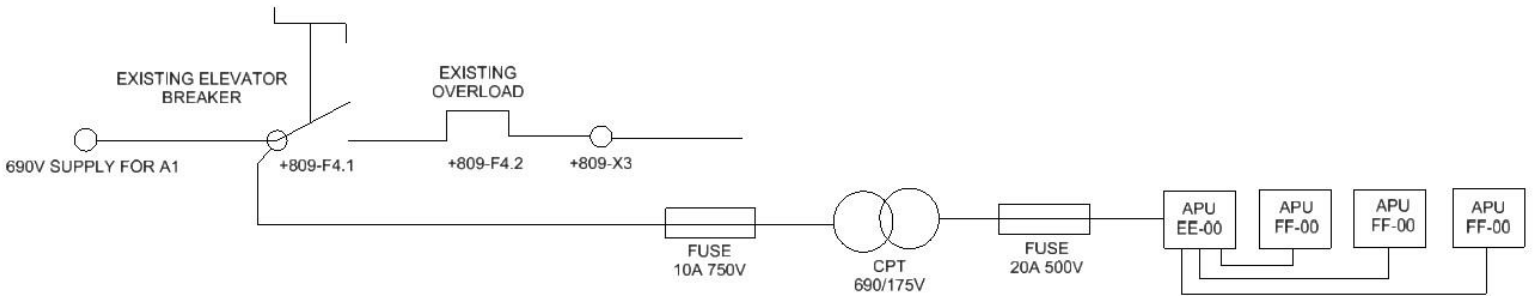


29. Schematic Diagrams

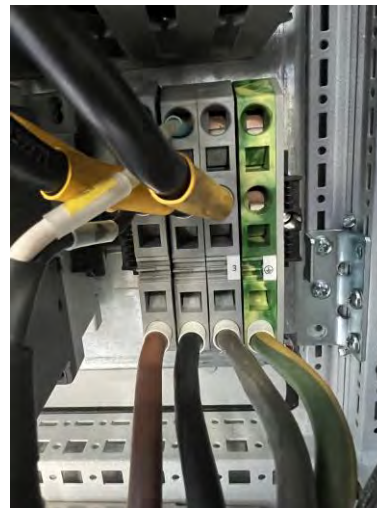
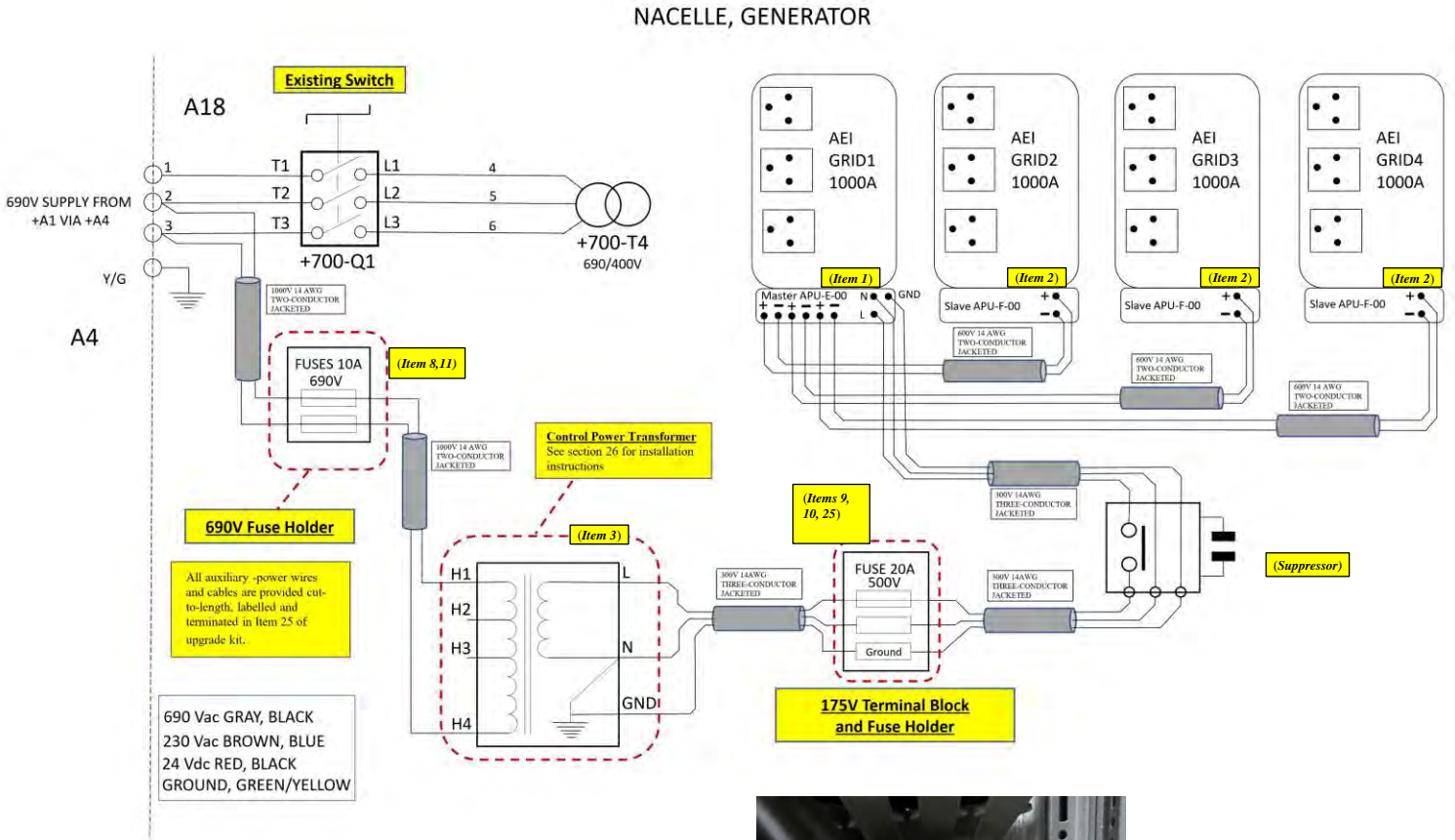
- The following single line diagram shows the auxiliary power circuit for the Nacelle-Gen.



- The following single line diagram shows the auxiliary power circuit for the Tower-Grid.

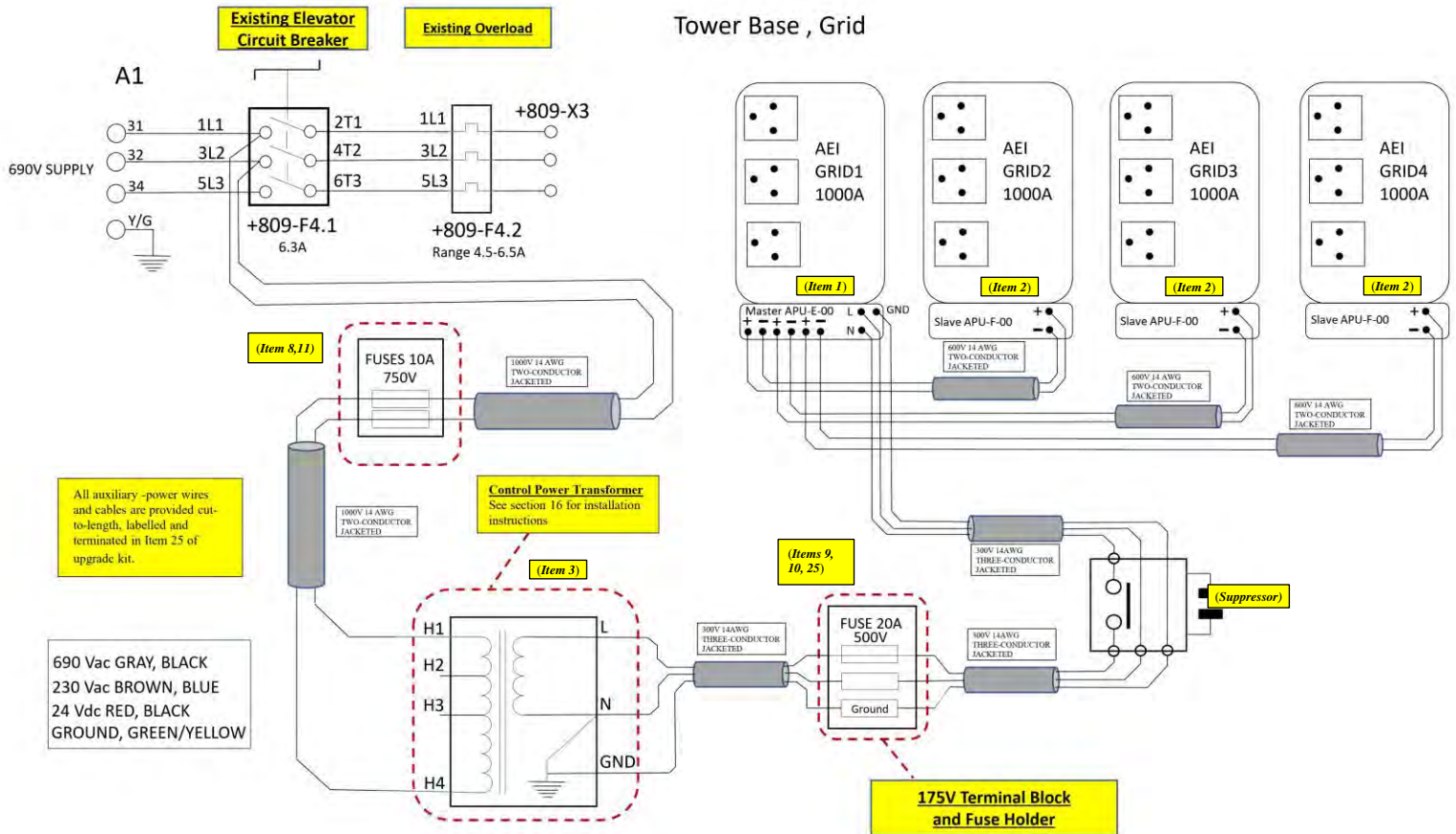


- The following schematic shows the wiring of auxiliary power (Generator)



690V Connector Block

- The following schematic shows the wiring of auxiliary power option in the Tower base (Grid Converter)



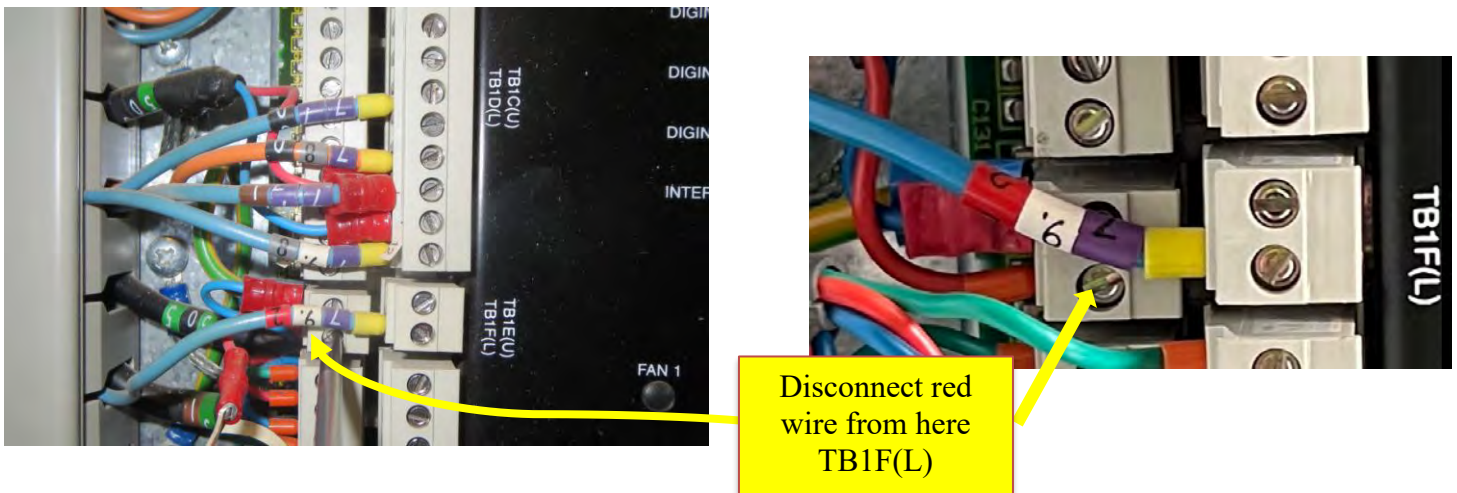
30. CDC I/O Board Power Modification

30.1 Background

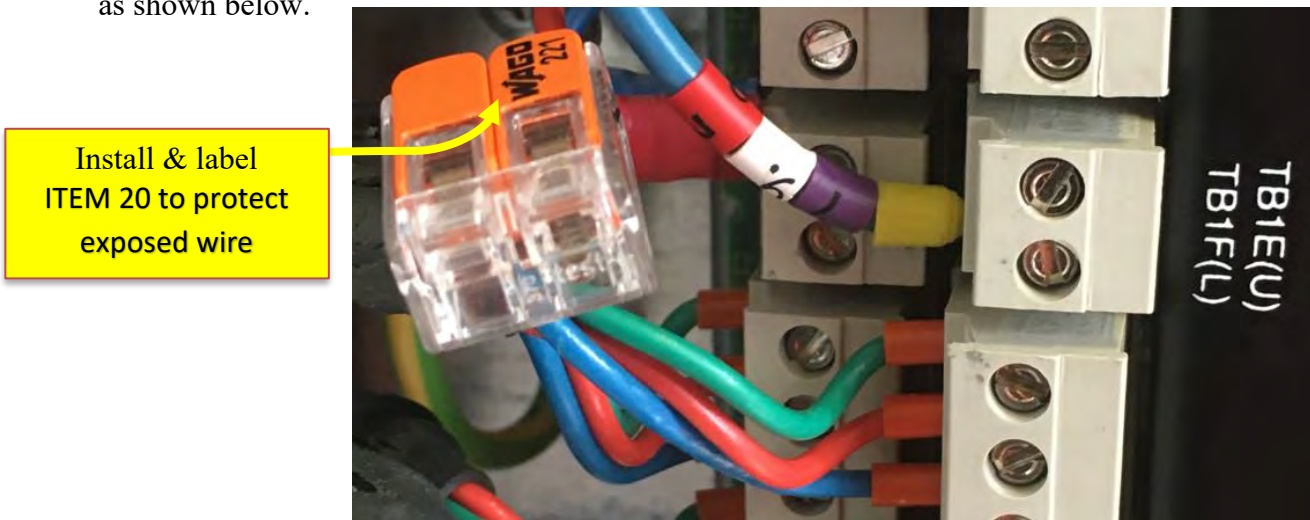
- When operating with original MVDL1000 units, the CDC controllers are powered by the auxiliary 24V supply before the main DC link is energized (hence the Delta modules are not powered).
- This must be changed to power the CDC from a single source, the AEI1000L units. Since the AEI's are always powered when the main 690V incoming supply is connected, there is no need for an auxiliary supply to the CDCs.

30.2 Procedure – This Must be Done on Generator and Network I/O Boards

- Locate the CDC I/O boards and disconnect red wire from TB1F(L) Pin 2.

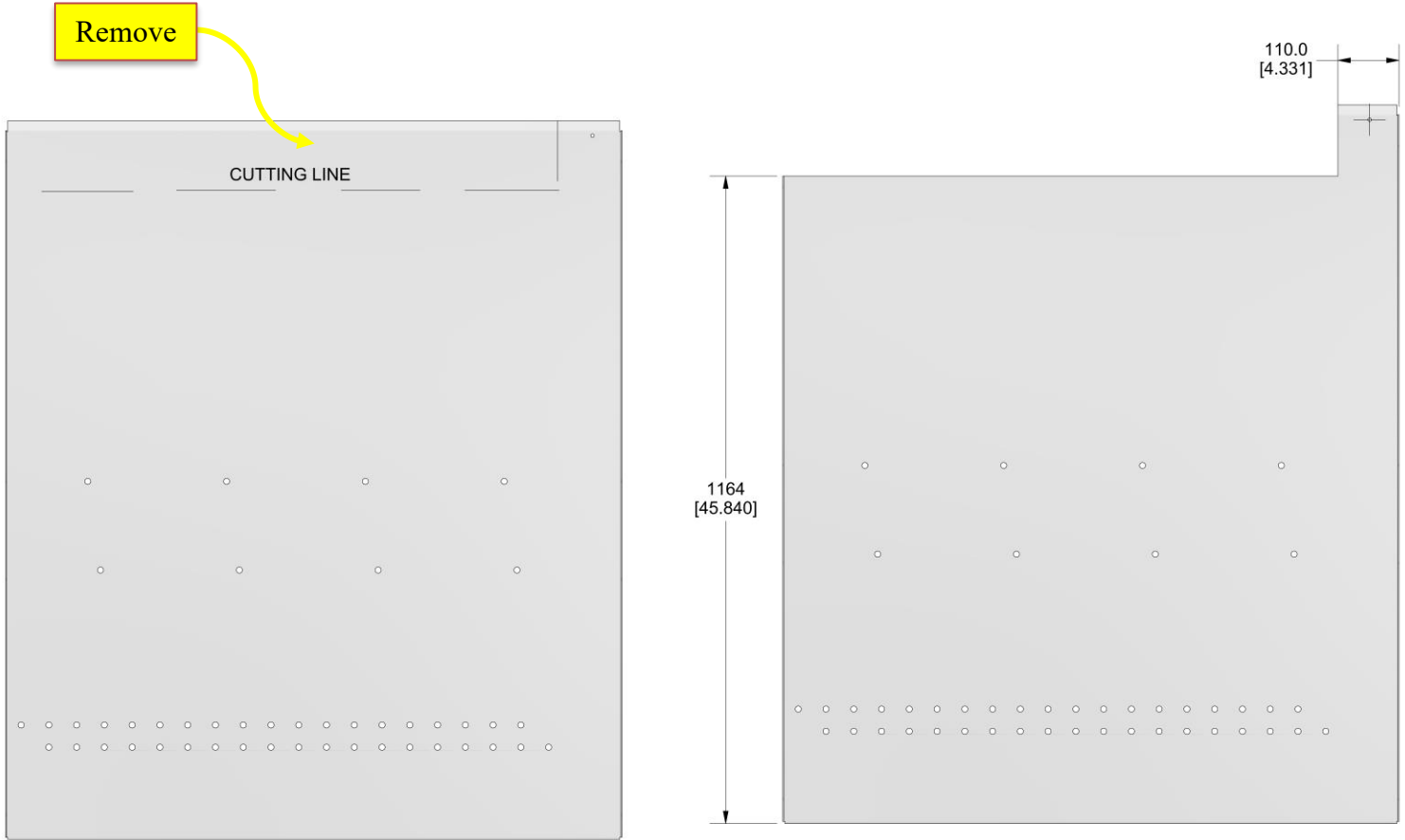


- To protect the exposed termination on the disconnected wire, fit the splicing connector (Item 20) and label as shown below.



31. Modify GEN Cabinet Middle Shroud

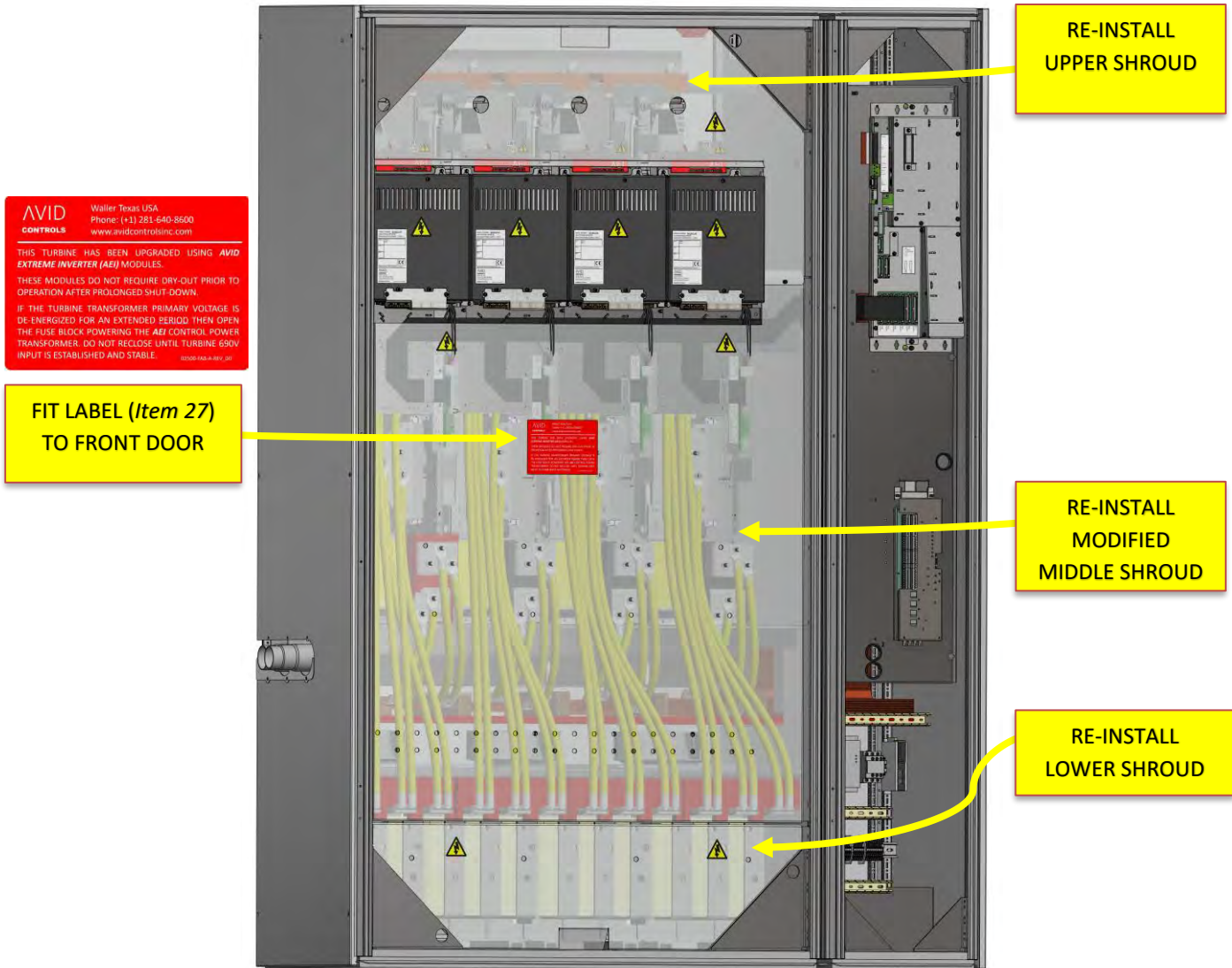
- The Generator cabinet middle shroud requires modification for it to clear the APU modules.
Cut carefully along the cutting lines shown below.



Shroud after modification, ready for installation.

32. Install cubicle shrouds

- Referring to the figure below, re-install the polycarbonate upper & lower cubicle shrouds into the GEN cubicle.
- Re-install modified middle shroud into GEN cubicle.



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THIS TURBINE HAS BEEN UPGRADED USING AVID EXTREME INVERTER (AEI) MODULES. THESE MODULES DO NOT REQUIRE DRY-OUT PRIOR TO OPERATION AFTER PROLONGED SHUT-DOWN.

IF THE TURBINE TRANSFORMER PRIMARY VOLTAGE IS DE-ENERGIZED FOR AN EXTENDED PERIOD THEN OPEN THE FUSE BLOCK POWERING THE AEI CONTROL POWER TRANSFORMER. DO NOT RECLOSE UNTIL TURBINE 690V INPUT IS ESTABLISHED AND STABLE.

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FIT LABEL (Item 27) TO FRONT DOOR

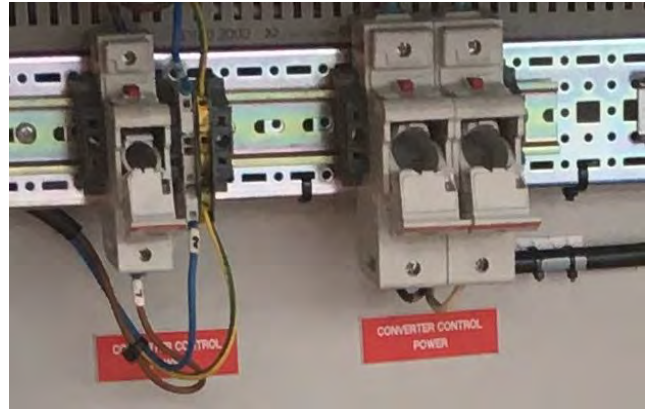
RE-INSTALL UPPER SHROUD

RE-INSTALL MODIFIED MIDDLE SHROUD

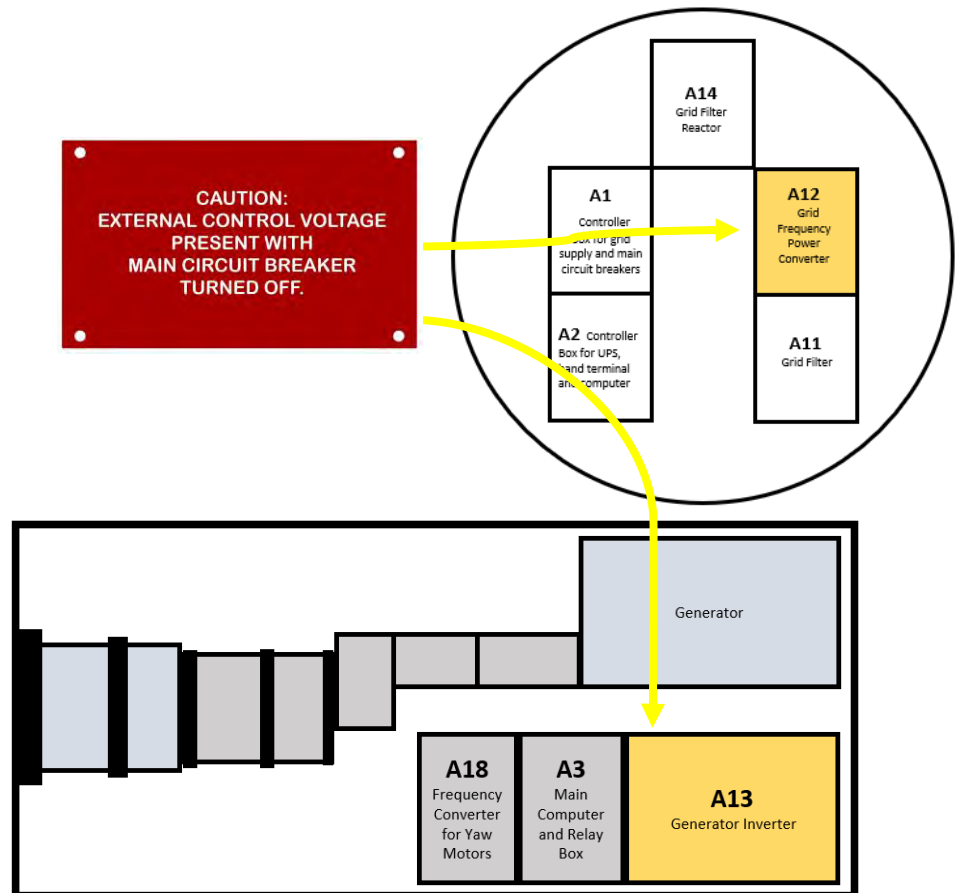
RE-INSTALL LOWER SHROUD

33. Install Labels

- Install “**CONVERTER CONTROL POWER**” labels close to the 690V & 175V fuse holders in cubicle A1 (GRID) and A18 (GEN).



- Install “**CAUTION: EXTERNAL CONTROL VOLTAGE PRESENT WITH MAIN CIRCUIT BREAKER TURNED OFF**” labels on the doors of the GEN and GRID converter cubicles:



34. Restart Turbine

34.1 Set CDC Parameter P10.36

34.1.1 Background

- When operating with original MVDL1000 units, the CDC controllers are powered by the auxiliary 24V supply before the main DC link is energized (hence the Delta modules are not powered). This means that the CDC cannot identify the Delta modules, leading to faults that interfere with the Siemens control system. To avoid these faults, P10.36 instructs the CDC not to read data from the Deltas but to remember the previously identified values.
- This must be changed to allow the CDC to read data from the AEI1000L units. Since the AEI's are always powered when the main 690V incoming supply is connected, there is no need for an auxiliary supply to the CDC's and the CDC should ALWAYS read the AEI module data.

34.2 Procedure

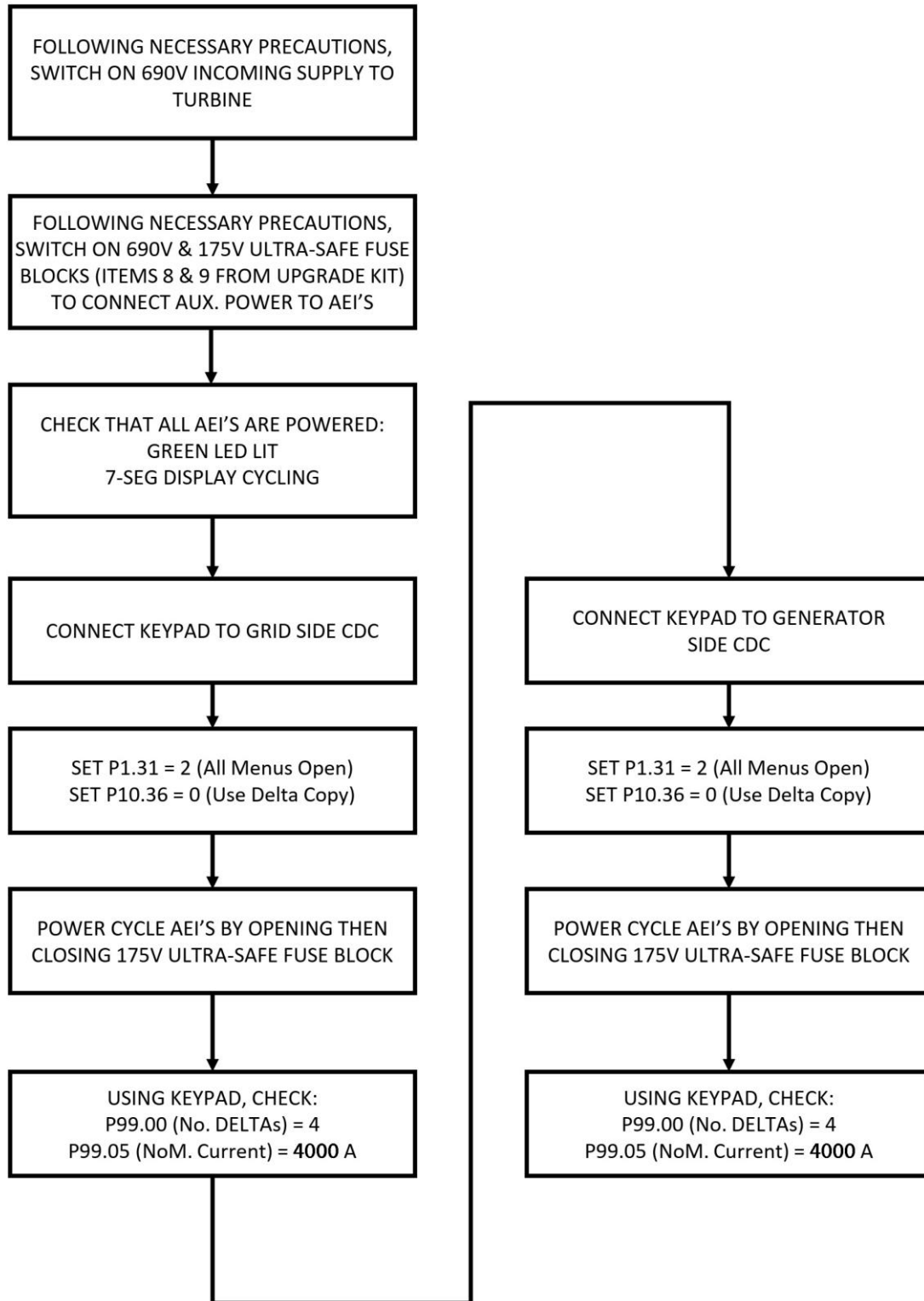
34.2.1 Grid Side

1. Observing all necessary precautions, energize the 690V incoming supply to the turbine.
2. Observing all necessary precautions, energize 690V circuit breaker (Lift) and 175V ultra-safe fuse blocks providing the auxiliary power to the AEI modules – Items 9 in the upgrade kit.
3. Connect a Keypad to the GRID side CDC.
4. Using the Keypad, set P1.31 = 2 (Open All Menus).
5. Using the Keypad, set P10.36 = 0 (Use Delta Copy).
6. Power cycle the AEI auxiliary power by opening then closing the 175V ultra-safe fuse block.
7. Check that P99.00 = 4 (Number of Delta Modules) and P99.05 = 4000A (Drive Nom. Current).
8. Using the Keypad, set P10.36 = 1 (Use Delta Copy).

34.2.2 Generator Side

1. Observing all necessary precautions, energize the 690V incoming supply to the turbine.
2. Observing all necessary precautions, energize 690V and 175V ultra-safe fuse blocks providing the auxiliary power to the AEI modules – Items 8 & 9 in the upgrade kit.
3. Connect a Keypad to the GEN side CDC.
4. Using the Keypad, set P1.31 = 2 (Open All Menus).
5. Using the Keypad, set P10.36 = 0 (Use Delta Copy).
6. Power cycle the AEI auxiliary power by opening then closing the 175V ultra-safe fuse block.
7. Check that P99.00 = 4 (Number of Delta Modules) and P99.05 = 4000A (Drive Nom. Current).
8. Using the Keypad, set P10.36 = 1 (Use Delta Copy).

34.2.3 Flowchart

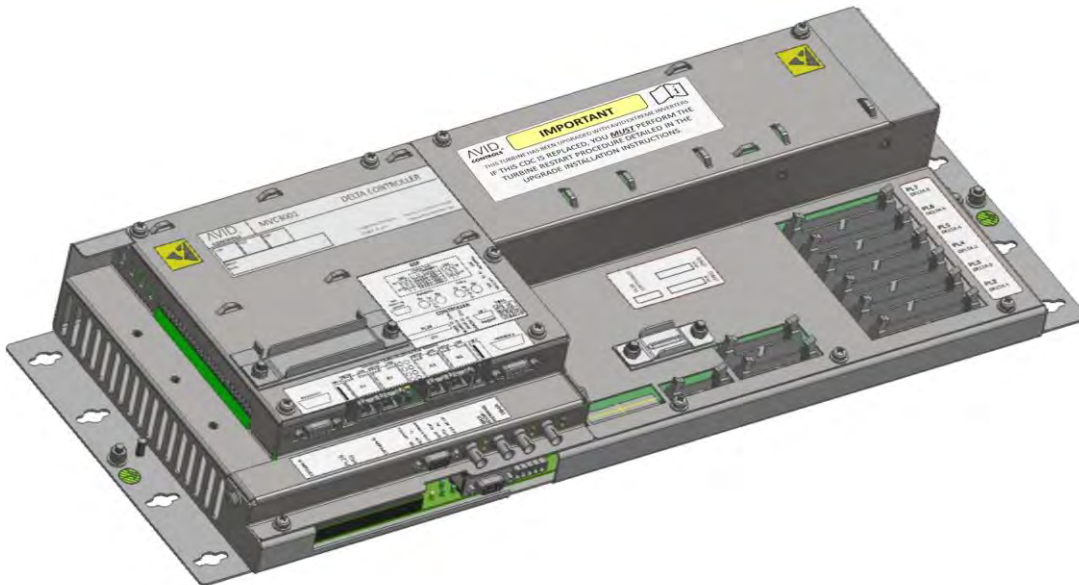


35. Label CDCs

- If at any time a CDC module needs to be replaced with either a brand-new unit, or one that has previously operated with Delta modules, ***IT IS CRITICAL THAT THE ABOVE PROCEDURE IS FOLLOWED FOR THE REPLACEMENT CDC.***
- To help ensure this happens the upgrade kit includes several copies of this label:



- Which should be attached to BOTH CDCs as shown:



- **Also, temporarily remove the CDCs and attach another copy of this label to the cabinet back-panel underneath the CDC so that it will be visible whenever the CDC is removed.**
- A total of eight copies of this label are provided in the upgrade kit (peelable from a single sheet). Place the sheet with the spare labels into the magnetic envelope provided so that they are available if the CDCs are replaced in the future.

36. Document Revision History

Rev.	Date	Author	Changes
01	May 06 2021	M. Cooper	Initial Release
02	Mar 31 2022	M. Cooper	Post Beta Install Updates
03	April 7 2022	G. Pace	AEI Model Number corrected
04	July 14 2022	M. Cooper	Section 32.13, 32.14 & 32.1.5 was 3600A. Installation checklist added. M8 bolts to further secure generator CPT specified
05	April 03 2023	M. Cooper	Instructions for optional Fishplate Upgrade moved to AEC-UPGR-KIT-01, See 02374-ASY-A. Replacement of DC fuses recommended. Previous Appendix A deleted.
06	April 14 2023	M. Cooper	Tables in sections 7.1 and 8.1 corrected
07	Dec 12 2023	G. Pace	Instructions to label CDC added

37. Appendix A – Installation Checklist

Before Going to Turbine

CUSTOMER:		SITE NAME:	
TURBINE NUMBER:		AVID TECHNICIAN (or N/A):	
CUSTOMER LEAD TECHNICIAN:		DATE:	

All Tools Available:

Item	Initial
MV3000 Keypad with Cable	
Torx T25 Driver	
#3 Pozi-drive Screwdriver	
5mm Socket, 3/8” Drive	
17mm Socket, 3/8” Drive	
Laptop with Drive Coach and RS232	
8mm ¼” Drive Socket [*1]	
Hydrometer Kit	
AEI/Delta Lift Hoist (if available)	

Item	Initial
Diagonal wire cutters	
Phillips #2 x 4” Screwdriver	
Socket Wrench, 3/8” Drive	
8mm Socket, 3/8” Drive	
Socket Extension 10” Long, 3/8” Drive	
10” ¼” Drive Extension [*1]	
Digital Voltmeter (DVM)	
AEI/Delta Installation Dolly (if available)	

Item	Initial
8mm crescent wrench	
3/16” x 4” Slotted Screwdriver	
Torque Wrench, 3/8” Drive	
10mm Socket, 3/8” Drive	
Adjustable Crescent Wrench, 1” Jaw Capacity	
¼” Hex to ¼” Drive Socket Adapter [*1]	
4 NM Torque Key [*1]	
Torque Seal [*1]	

[*1] : These items are provided as part of the AEI upgrade kit

AEI Upgrade Kit Complete

Refer to the upgrade kit parts lists in Sections 0 & 8 of this Data Sheet.

UPGRADE KIT SERIAL NUMBER: _____

Item	Initials
All items in parts list correctly received	

Item	Initials
All documents in document list correctly received	

Turbine History

Was turbine in running condition before AEI upgrade?: _____

If turbine was not in running condition, please attach all available fault history (from SCADA or Drive Coach) and describe all known details of the fault / problem.

Description of attachments:



At Turbine, Before Removing Deltas

CUSTOMER:		SITE NAME:	
TURBINE NUMBER:		AVID TECHNICIAN (or N/A):	
CUSTOMER LEAD TECHNICIAN:		DATE:	

Status of Turbine:

Turbine Faults (if applicable)
(blown fuses, tripped breakers, system fault codes etc.):

Visible Damage (Before Removing Deltas)
(Damaged cables or ribbons, missing hardware, coolant leaks etc.) :

Check coolant with hydrometer and record result
If out of specification, coolant must be replaced before installation of AEI units:

Hydrometer Reading: _____ Units: _____ In Spec ? : _____

Customer Lock-out Tag-Out Procedures complete: _____ System safe voltage checks AC & DC complete: _____

Position of all cables, ribbons, tie-wraps etc. recorded: _____

Identify and record GEN side master SMPS jumper settings (jumper 10-13) and record below:

Jumper 10: _____ Jumper 11: _____ Jumper 12: _____ Jumper 13: _____

Identify and record GRID side master SMPS jumper settings (jumper 10-13) and record below:

Jumper 10: _____ Jumper 11: _____ Jumper 12: _____ Jumper 13: _____



Avid Extreme Inverter – Turbine Upgrade Installation Instructions, SWP 3.6MW, APU-E/F

After Installation, Before Power-On

CUSTOMER:		SITE NAME:	
TURBINE NUMBER:		AVID TECHNICIAN (or N/A):	
CUSTOMER LEAD TECHNICIAN:		DATE:	

CHECK ITEM	Grid Position 1	Grid Position 2	Grid Position 3	Grid Position 4
AEI Serial #				
APU Serial #				
DIP Switches ON (circle those that are ON)	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
Power Terminal Torque set to 35Nm and sealed	Aph #1			
	Aph #2			
	Bph #1			
	Bph #2			
	Cph #1			
	Cph #2			
	DC+ #1			
	DC+ #2			
	DC- #1			
DC- #2				
Pull-test control wires				
Ribbon clamps secure and not damaging insulation				
DC fuses replaced				
Coolant hoses torqued to 4 Nm using torque-key				
All wires/cables correctly tie-wrapped				



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CUSTOMER:		SITE NAME:	
TURBINE NUMBER:		AVID TECHNICIAN (or N/A):	
CUSTOMER LEAD TECHNICIAN:		DATE:	

CHECK ITEM	Gen Position 1	Gen Position 2	Gen Position 3	Gen Position 4
AEI Serial #				
APU Serial #				
DIP Switches ON (circle those that are ON)	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
Power Terminal Torque set to 35Nm and sealed	Aph #1			
	Aph #2			
	Bph #1			
	Bph #2			
	Cph #1			
	Cph #2			
	DC+ #1			
	DC+ #2			
	DC- #1			
DC- #2				
Pull-test control wires				
DC fuses replaced				
Ribbon clamps secure and not damaging insulation				
Coolant hoses torqued to 4 Nm using torque-key				
All wires/cables correctly tie-wrapped				

Turbine Restart Checklist

CUSTOMER:		SITE NAME:	
TURBINE NUMBER:		AVID TECHNICIAN (or N/A):	
CUSTOMER LEAD TECHNICIAN:		DATE:	

All air purged from cooling system: _____ No coolant leaks detected: _____

Check and record the final values of the following parameters etc. for both GEN and GRID CDC:

Parameter Etc.	Expected Value	GEN Value	GRID Value	Notes
P99.00	4			
P99.05	4000			
P10.36	1			
P35.18	1			
P99.09	0			Return to zero <i>after</i> restart procedure
P1.32	Customer Preference			Return to its original value <i>after</i> restart procedure
CDC Part Number				
CDC LED Shape	Round or Square [R/S]			
CDC Firmware Version				
Parameter Set File				



Avid Extreme Inverter – Turbine Upgrade Installation Instructions, SWP 3.6MW, APU-E/F

List and Describe any Faults During Re-Start:

Confirm document envelope and all contents (see section 33) installed in cabinet : _____

Record the 2-digit display readouts on each AEI:

GEN #1: _____ GEN #2: _____

GEN #3: _____ GEN #4: _____

GRID #1: _____ GRID #2: _____

GRID #3: _____ GRID #4: _____

Additional Information:

Torque Records

Installation Date: _____

Turbine Identifier: _____

Technicians: _____

Fastener Torques:

Item	Fastener Type	Number Fasteners	Set Torque	Tool Used Identifier	Tech. Initials
AEI Module DC Fishplate (Section 16.1)	M10	4	35Nm		
Hose Clips GRID (Section 17)	M5	8	4Nm		
Hose Clips GENERATOR (Section 17)	M5	8	4Nm		
DC Cables to Upper Fishplate (section 18)	M10	16	35Nm		
Grid AC Cables (section 20)	M10	48	35Nm		
Gen AC & DC cables (Section 21)	M10	80	35Nm		

Additional Notes: