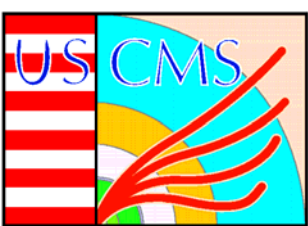




EMU CSC Low Voltage

EMU Low Voltage
for the
Front End Electronics
during the
MTCC

**Prepared for the EMU group by
Fred Borcharding**



Low Voltage for MTCC

- The CSC low voltage for the MTCC supplies the FE electronics on each chamber and the on-detector electronics in the Peripheral Crates, PC
- The LV is supplied to ALL chambers, including the ME+1/1 chambers, and all PC boards
- The MTCC has 36 chambers and 4 full PC's



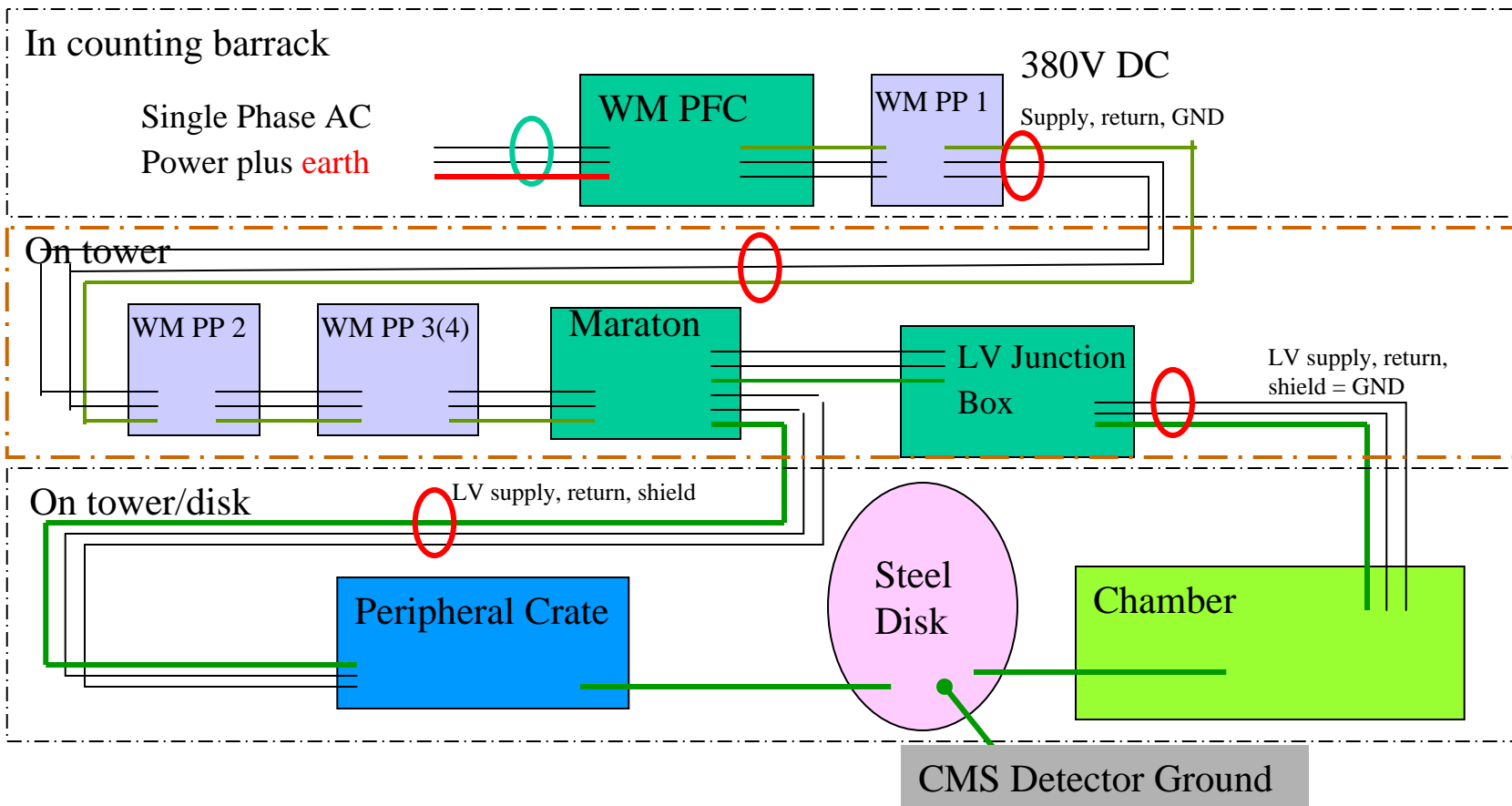
LVPS Used

- The Maraton LVPS from Wiener will be used
- Two air cooled units will be used
 - One located in the YE+1 tower, +x side, level 1
 - One located in the YE+2 tower, +x side, level 1
- Two AC/DC rectifier units will be used
 - Both mounted in a single crate in the Green Barrack



LV System

- Green Barrack > 2xMaraton AC/DC modules, Patch Panel number 1 (PP-1)
- Tower > Patch Panels 2,3&4, 2xMaraton LV distribution unit, 2xLV Junction box
- Disk > 4xPeripheral Crates, 36xChambers





Emergency Shut Down

- Green Barrack

- AC breaker to PFC
- Front panel switch to PFC

AC Breaker

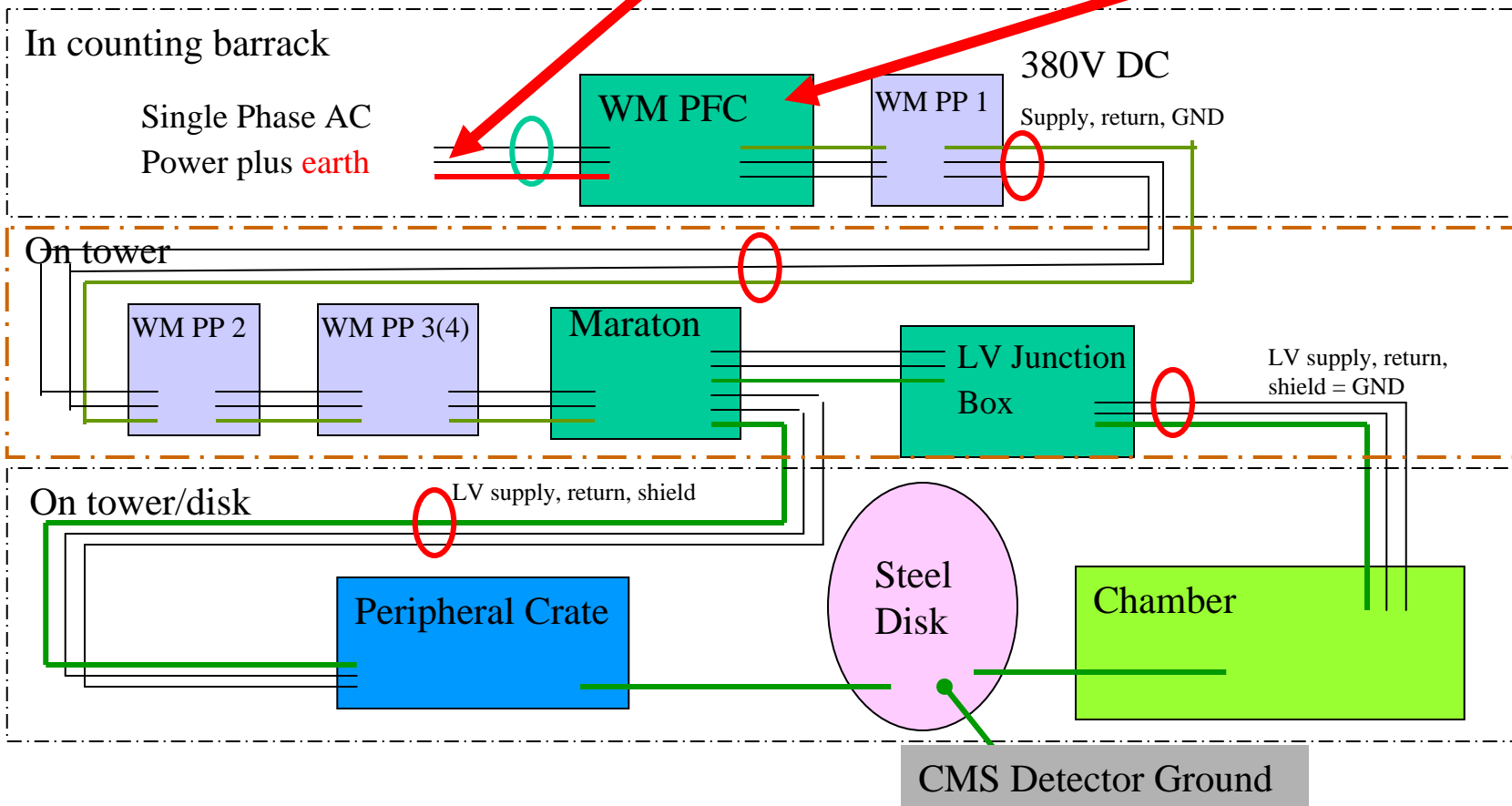
Manually switch breaker OFF

Or cut power to rack - XXXXXX

Front Panel Switch

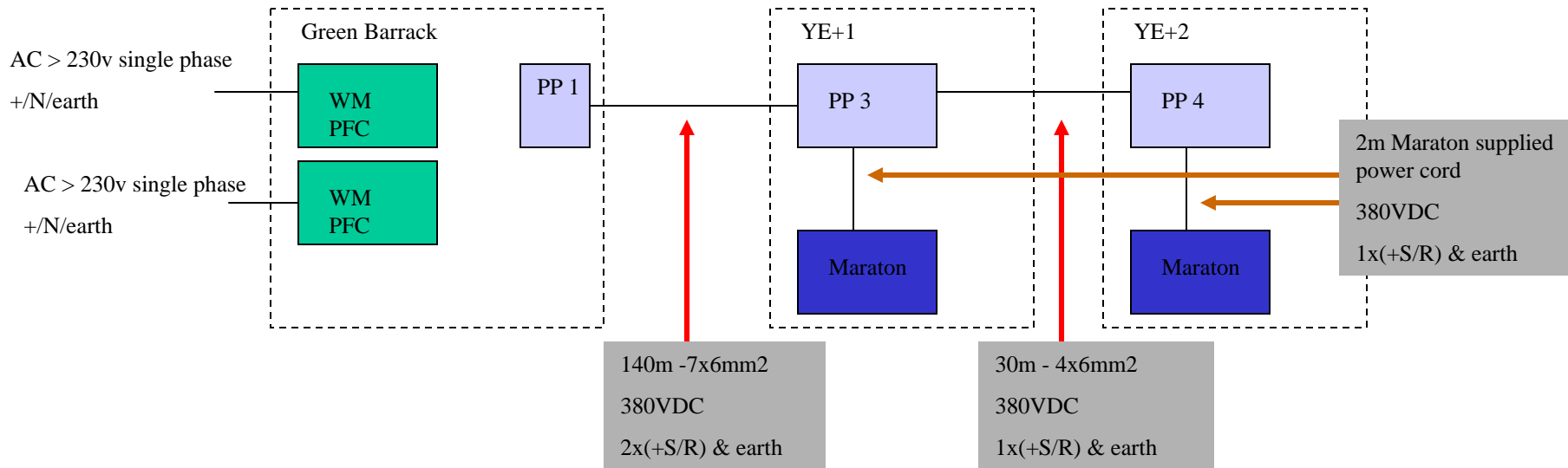
Manually turn switch OFF

Can turn off separately YE+1 or YE+2





380V DC Distribution



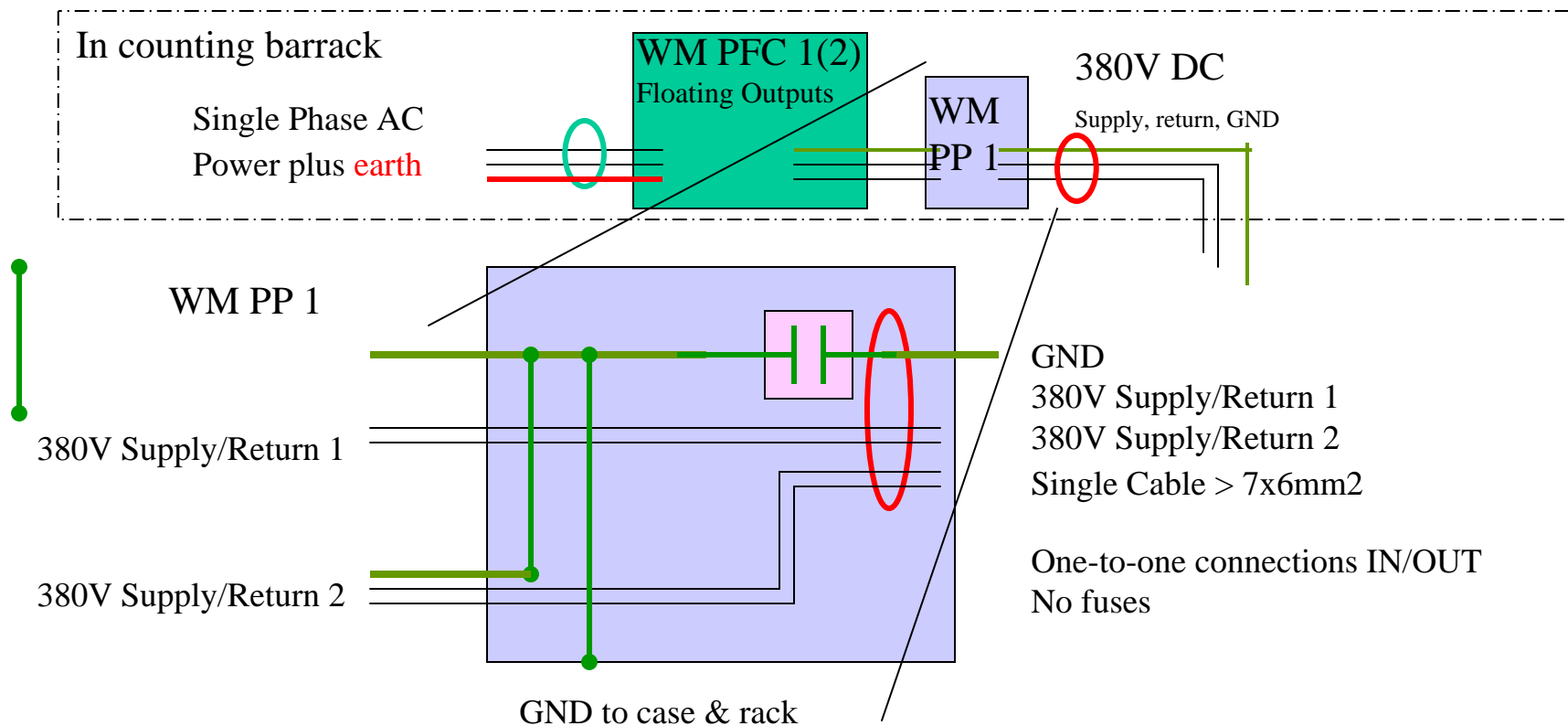
- 380V DC is routed over special cable
 - 6mm² cross section multi-strand CU
 - CMS cable for LHC installation



Green Barrack

- Green Barrack

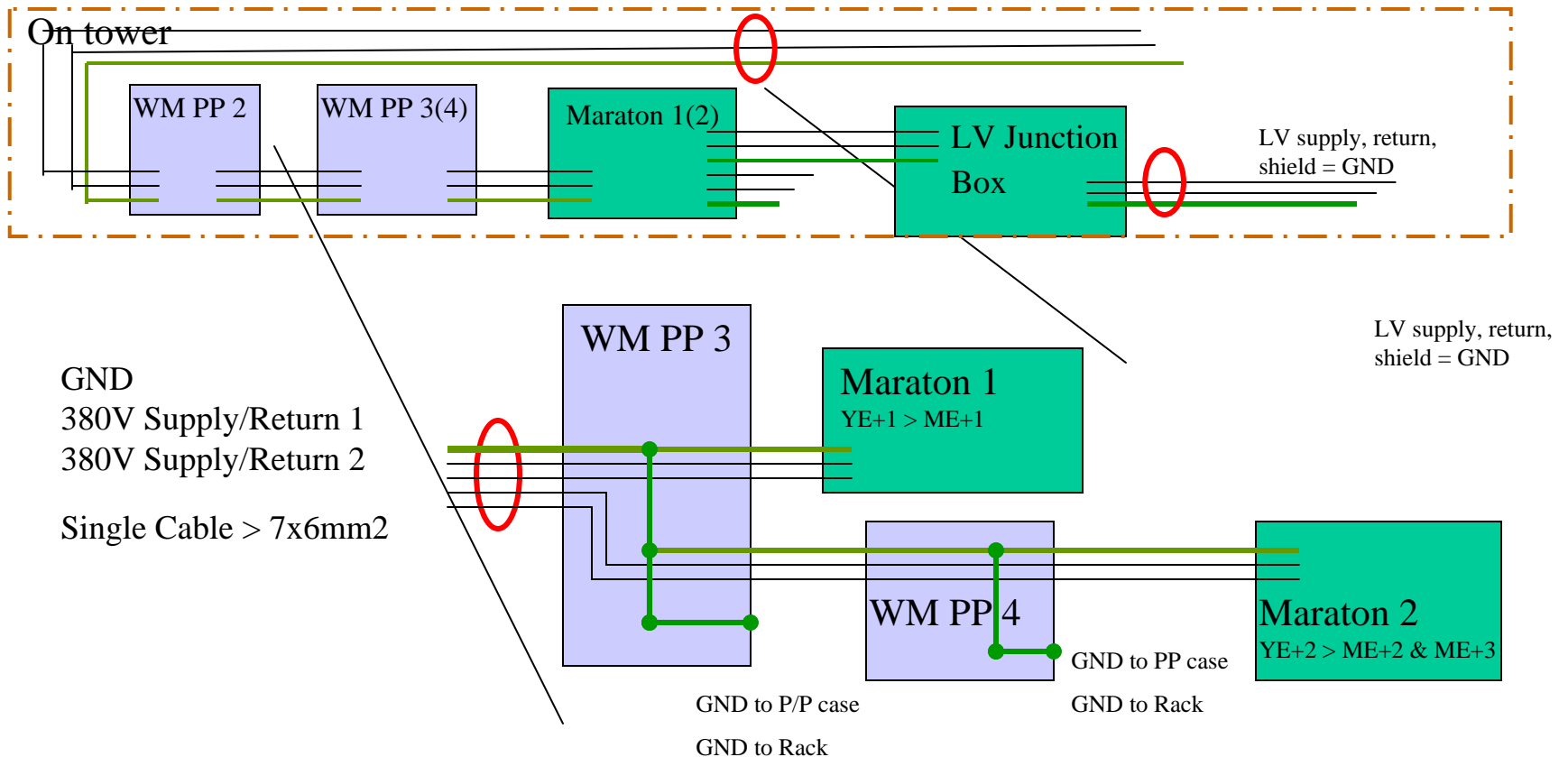
- 2xMaraton Power Factor Correction modules in single rack mount crate
- Patch Panel number 1 (WM PP 1)





Tower – P/P-2(3)

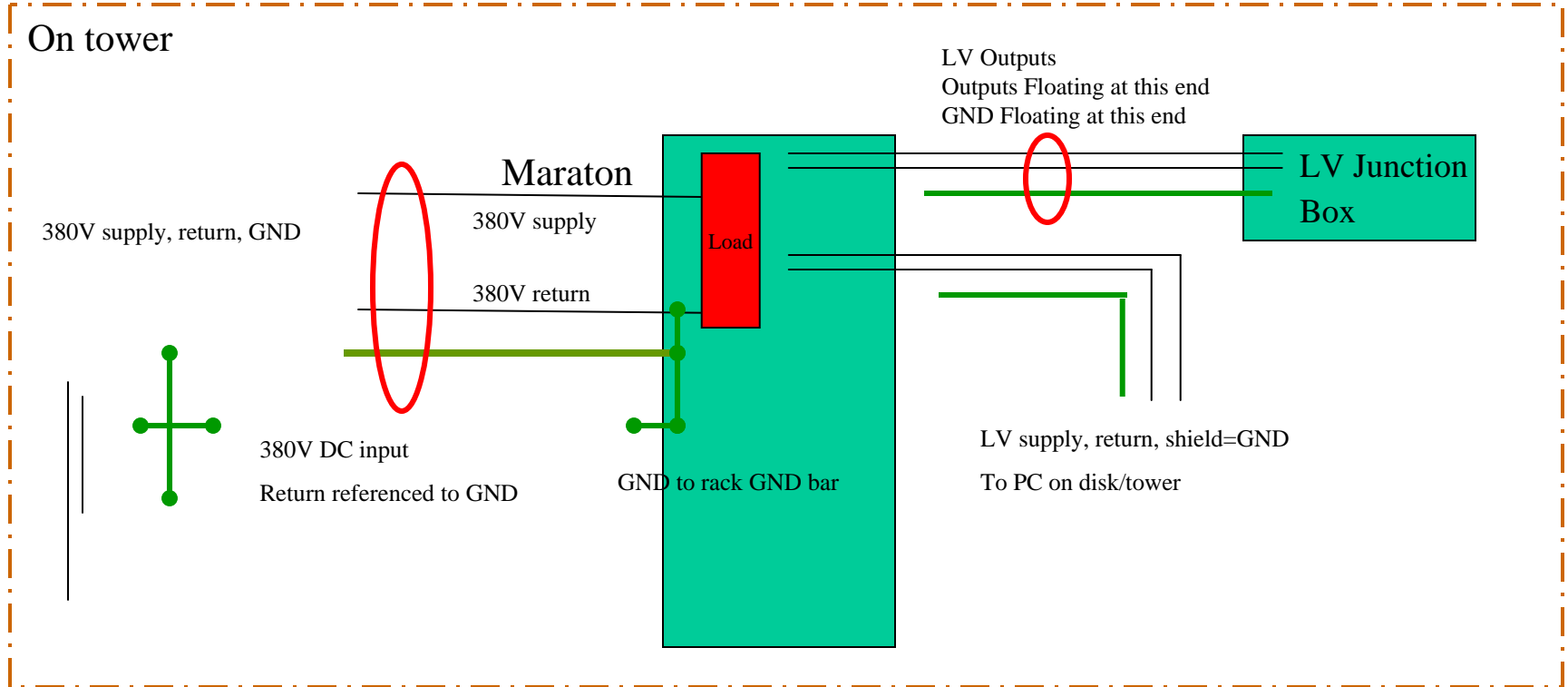
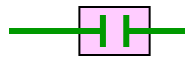
- Tower > Patch Panels 2 & 3 380V distribution

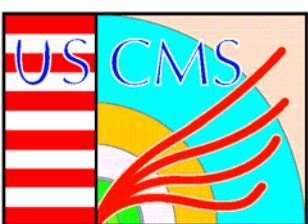




Tower - Maraton

- X

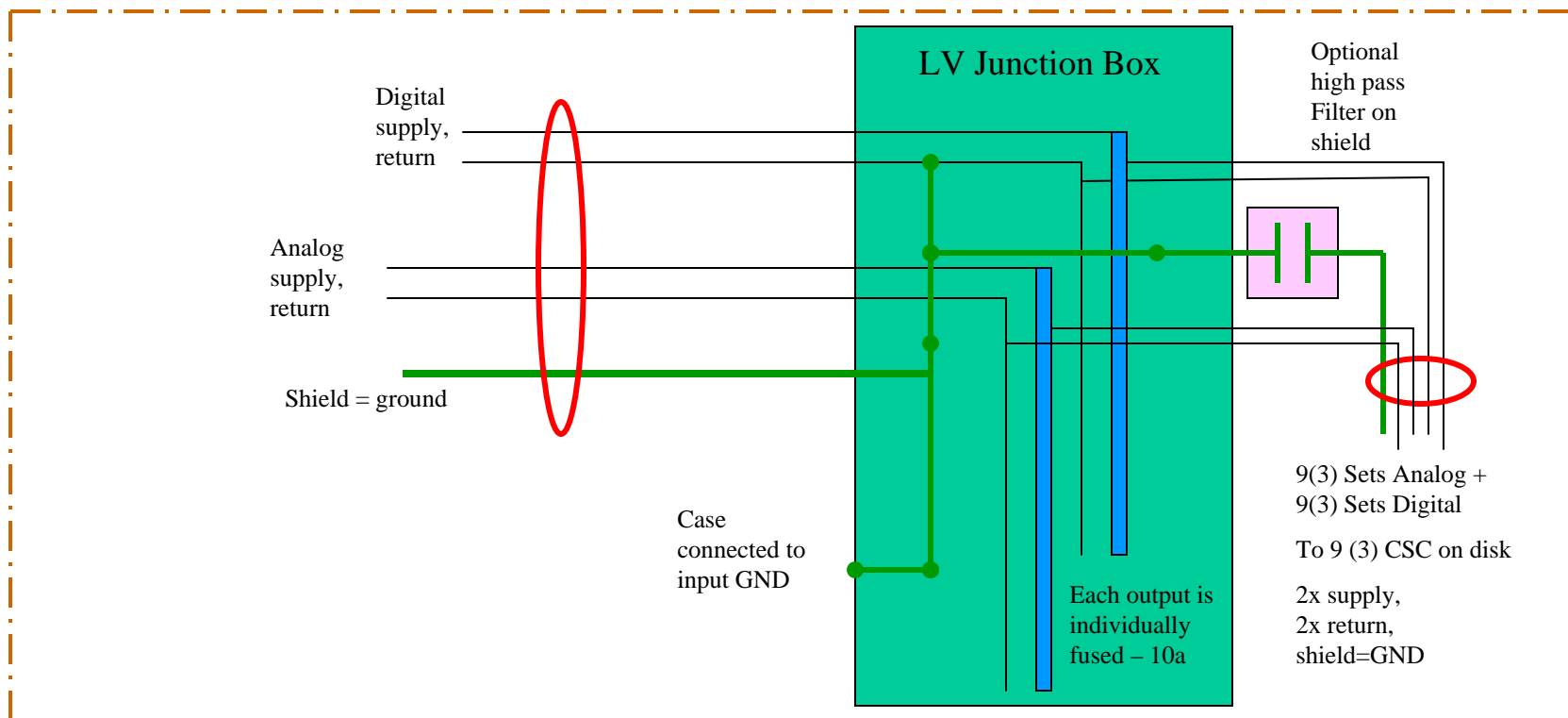




Tower – LV Junction Box

- One LV Junction Box per Trigger Sector
 - 9 sets of Analog output
 - 9 sets of Digital output

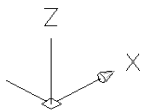
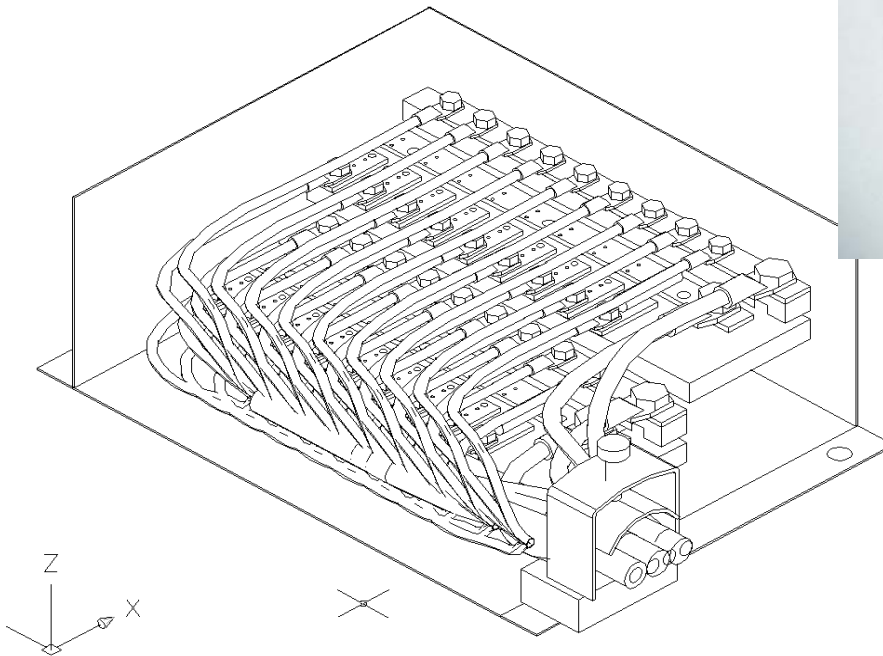
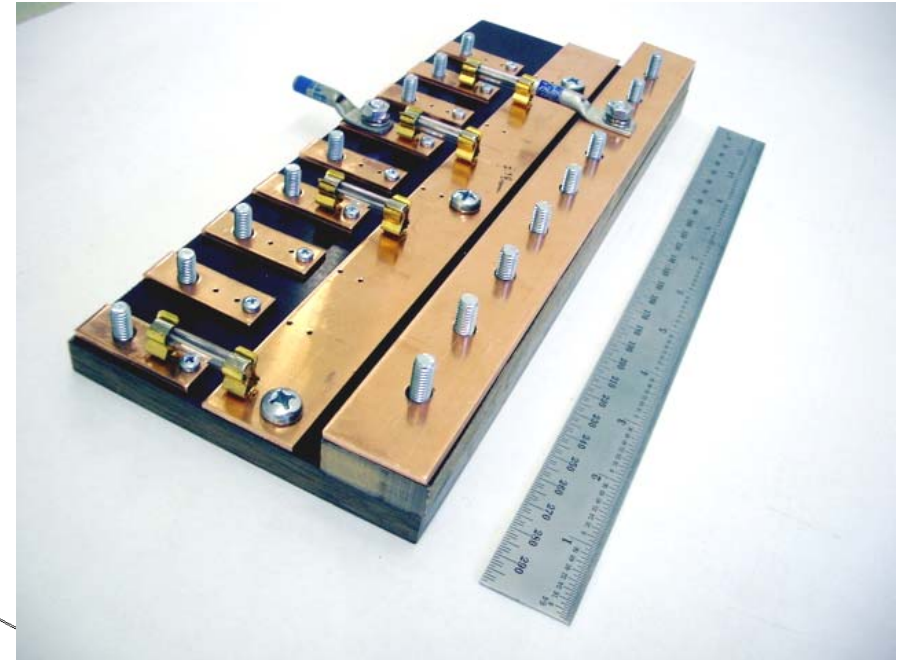
On tower





LV junction box

- **Input**
 - 1 > Digital supply/return
 - 1 > Analog supply/return
- **Output**
 - 9 > Digital supply/return to CSC
 - 9 > Analog supply/return to CSC
- **Each output supply is individually fused**



28-Nov-08

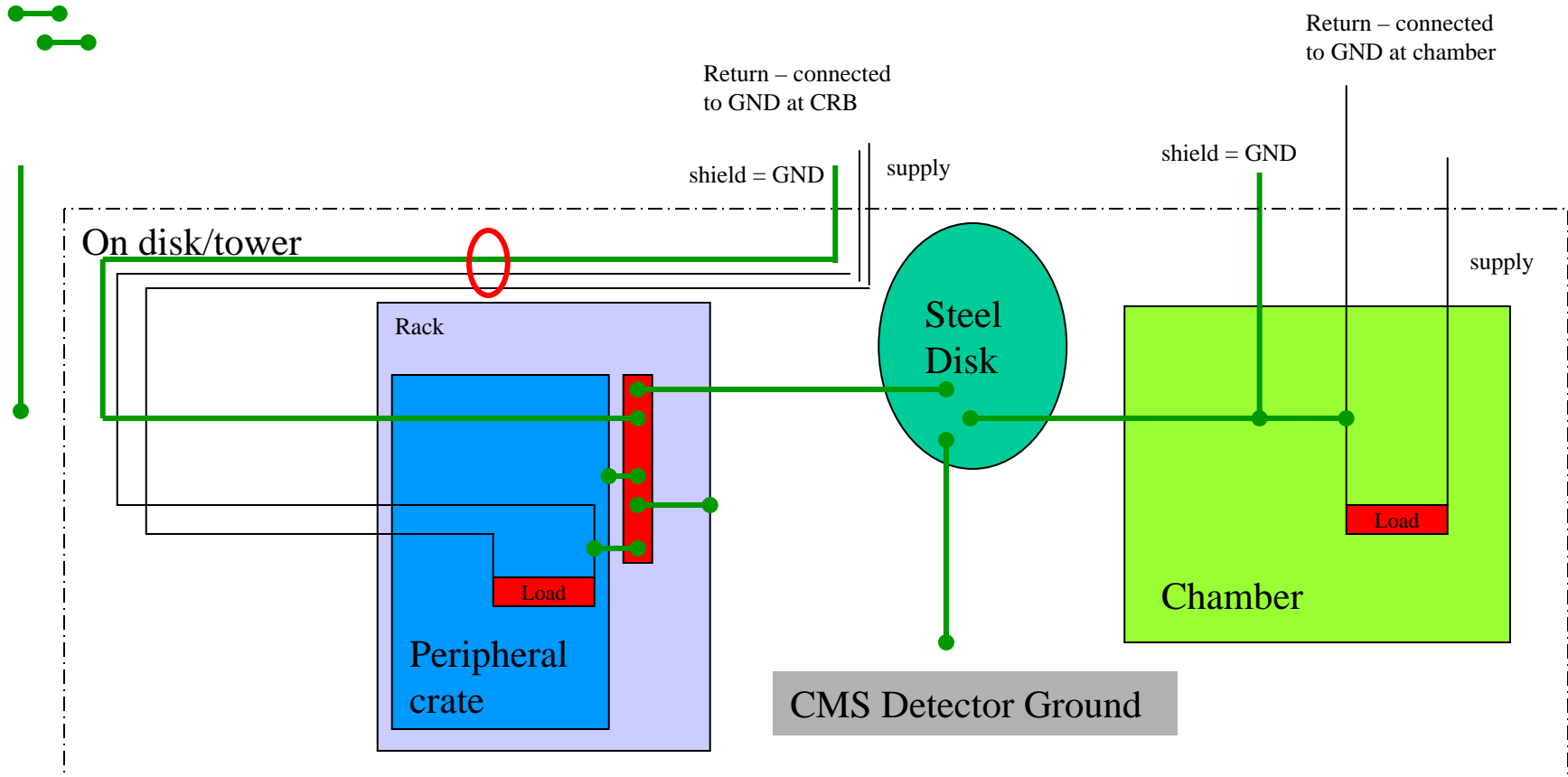
EMU FE LV for MTCC

11



Disk – PC & Chamber

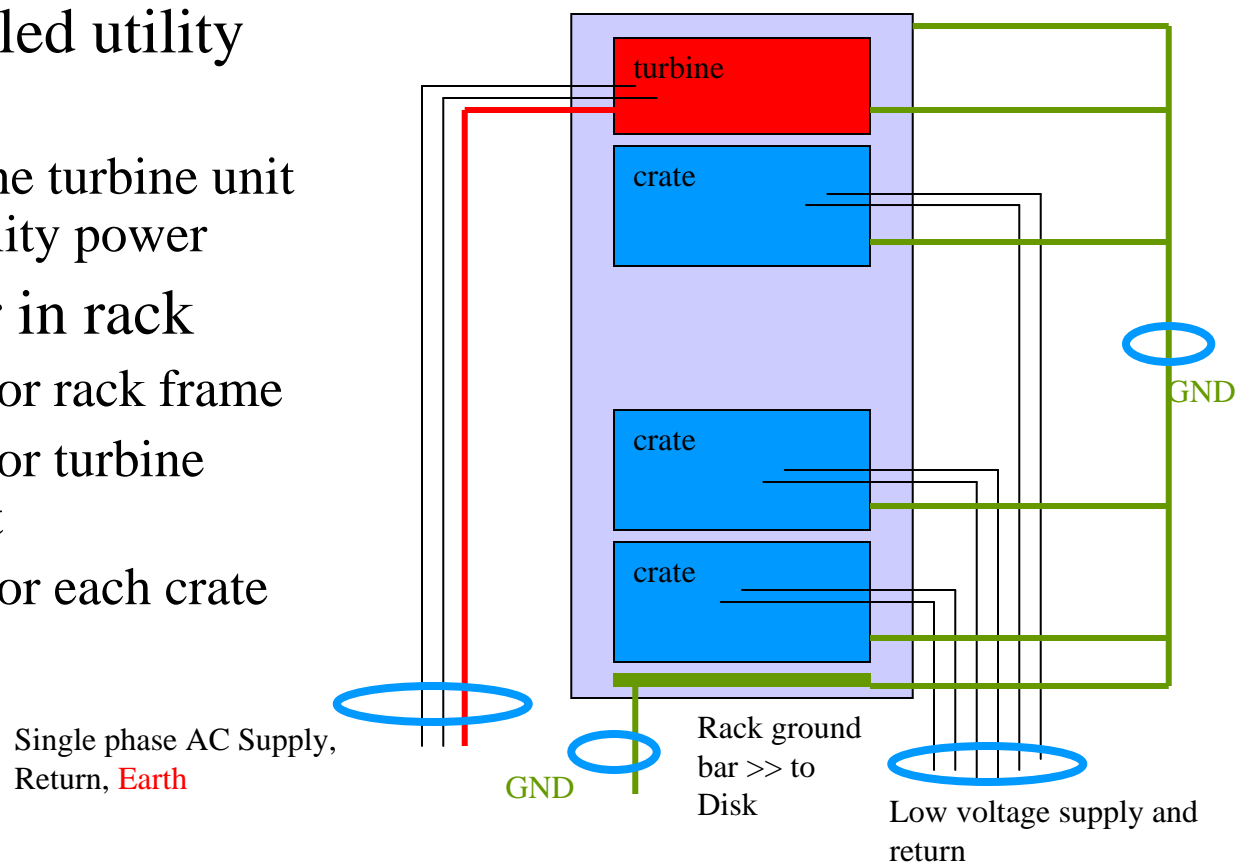
- GND – reference ground connected to disk
- LV Return – connected to GND at load





Rack

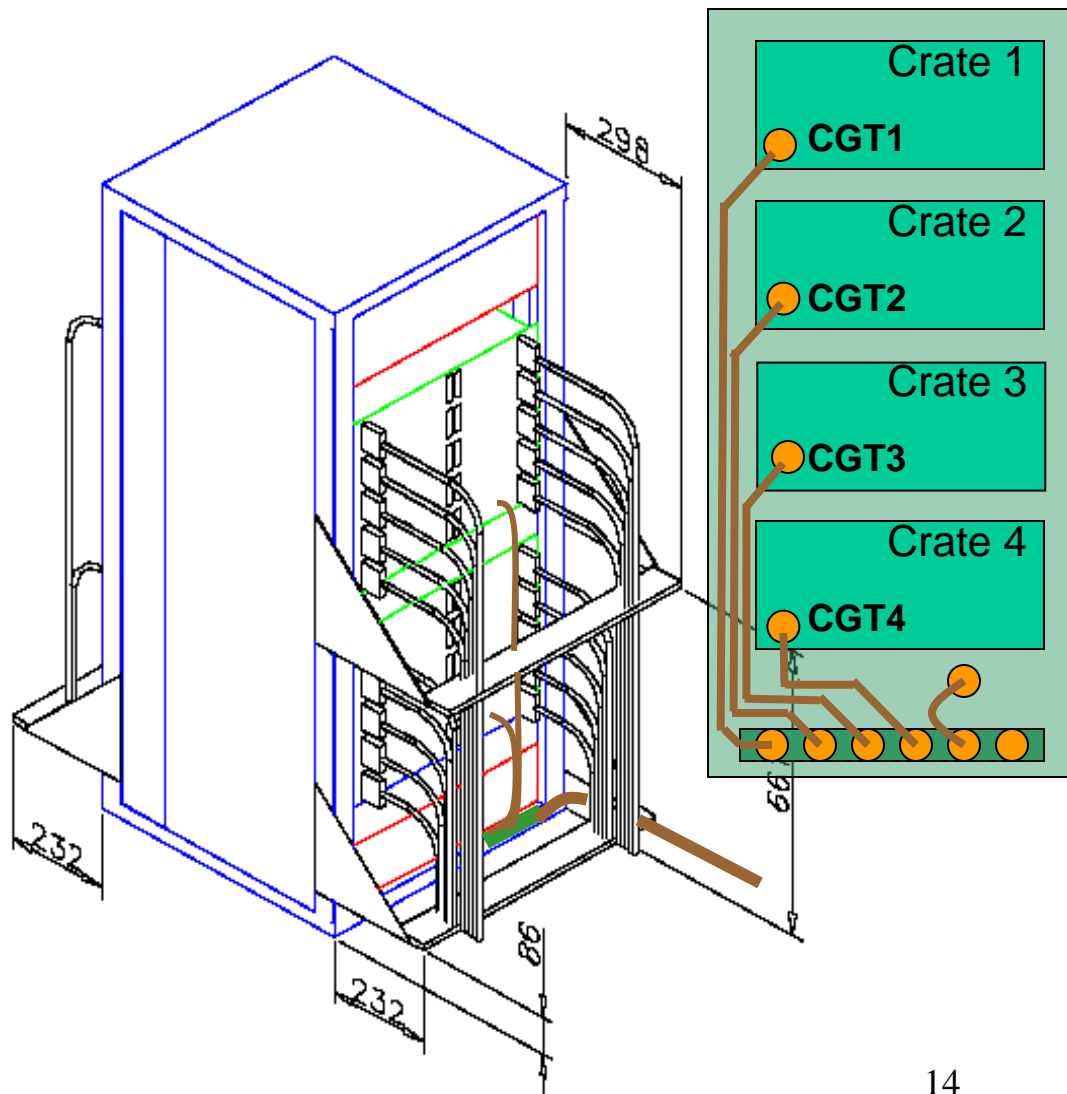
- Typical Rack
 - AC load is earthed via the installed utility power
 - Only the turbine unit has utility power
 - GND bar in rack
 - GND for rack frame
 - GND for turbine cabinet
 - GND for each crate frame





Details of Rack Grounding Bar

- Each rack has a grounding bar
 - Bar is connected to steel disk
 - Used as Reference GND for rack
 - All RG are attached to bar in a star pattern

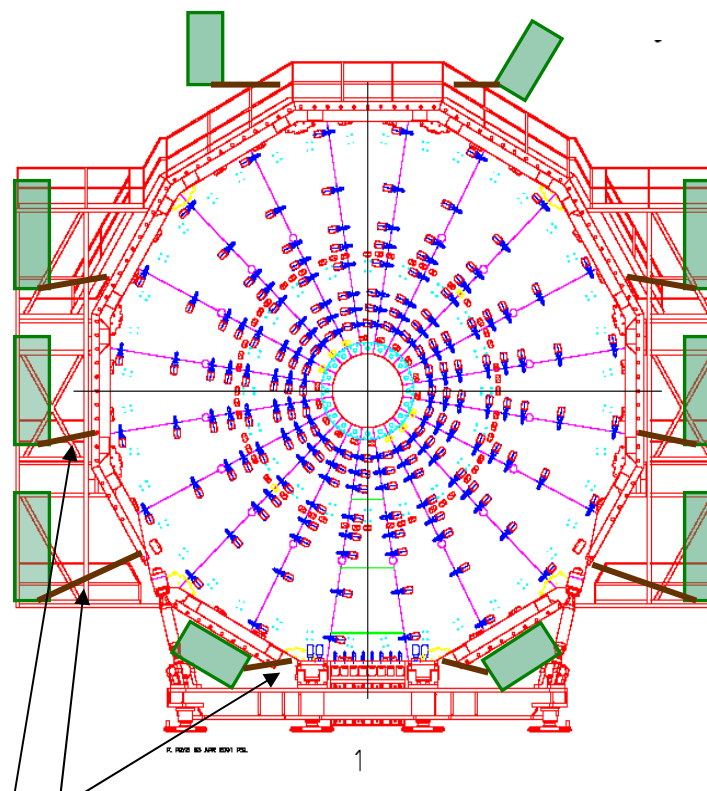




View of Disk

- Each Rack is grounded to the disk structure
- This GND is used as
 - Reference ground for DC power
 - Used as noise ground
- **This GND is NOT connected to EARTH**

GND Wire connected to grounding bar in rack at one side and to special point at the disk (DGT) at the other side.





LV Power Details

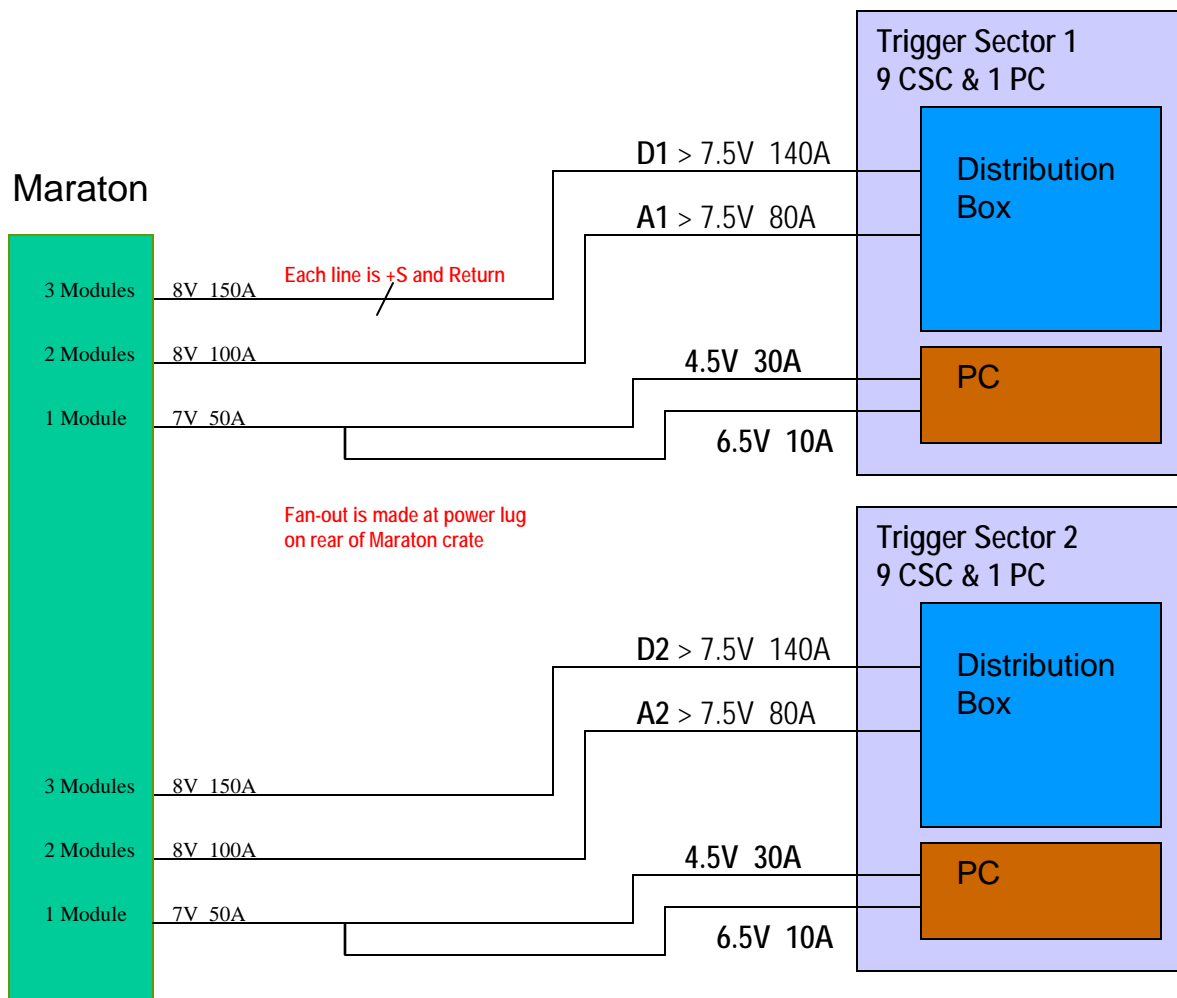


LV Power Distribution

- Maraton has
- 12 internal PS units
 - 6 independently controlled channels
 - will power 2 Trigger Sectors

The outputs will be

- 2 units of 3x50A
- 2 units of 2x50A
- 2 units of 1x50A

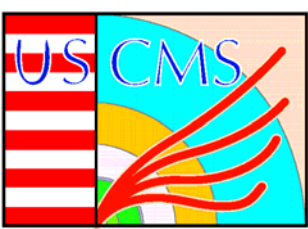




Maraton Power Table

Channel	Supply			Load			Power
	Volts	Max Amps	Max Watts	Volts	Amps	Watts	Watts
D1	8	150	1200	7.5	140	1050	1120
D2	8	150	1200	7.5	140	1050	1120
A1	8	100	800	7.5	80	600	640
A2	8	100	800	7.5	80	600	640
P1				4.5	30	135	
				6.5	10	65	
	7	50	350		40	200	280
P2				4.5	30	135	
				6.5	10	65	
	7	50	350		40	200	280
Total LV			4700			3700	4080

- The Load requires >> 3700w
- The PS must supply >> 4080w
 - 80w for each of two crates supplied over voltage
 - 120w for voltage drop in cables



Needed Contents

- As recommended by Fritz, each sub detector should submit the relevant documents on:
 -
 - List of circuits (power supplies, ratings) cable cross sections, types and lengths, protection (i.e. fusing or other), identification of cables, ways to cut the circuits in case of emergency, cooling interlocks if applicable, unifilar schematics, earthing
 - any other hazard specific to subsystem / sub det