



ATCA Rack Integration and Power Connection in CMS

20220509

M. Hansen, CERN

for

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Introduction



- **First of all: CMS will install one ELTEK PS per ATCA shelf and locate it in the back of the rack**
- **Agenda**
 - **Standard and Alternative rack layout**
 - **Heat exchangers and Manifolds**
 - **380VAC connection**
 - **48VDC connection**



Standard and Alternative Rack Layout



➤ 56U racks

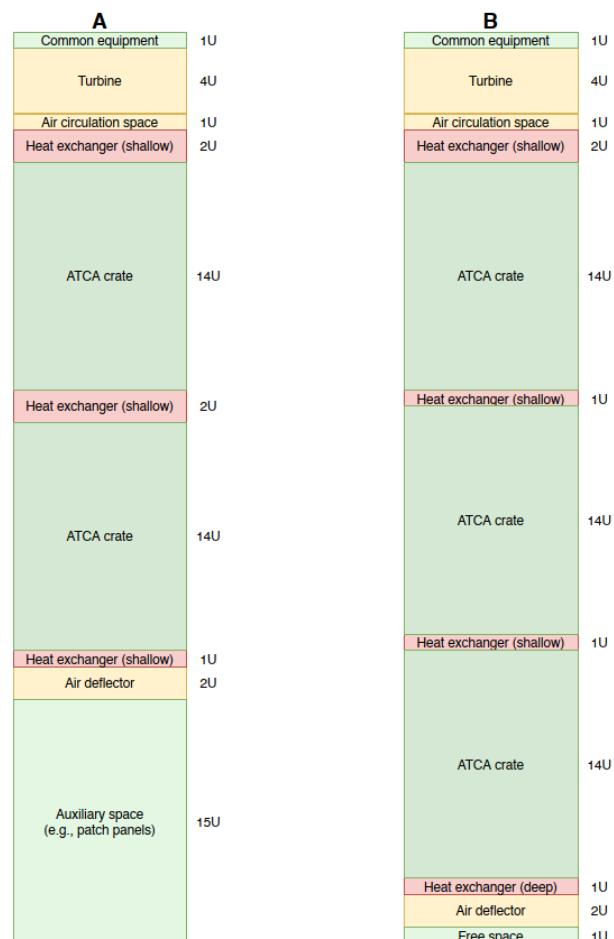
- Layout EDMS 2429324

➤ Standard

- 2 crates
- 2 ELTEK PS
 - Located behind PEM

➤ Alternative

- 3 crates
- 3 ELTEK PS
 - Located behind PEM

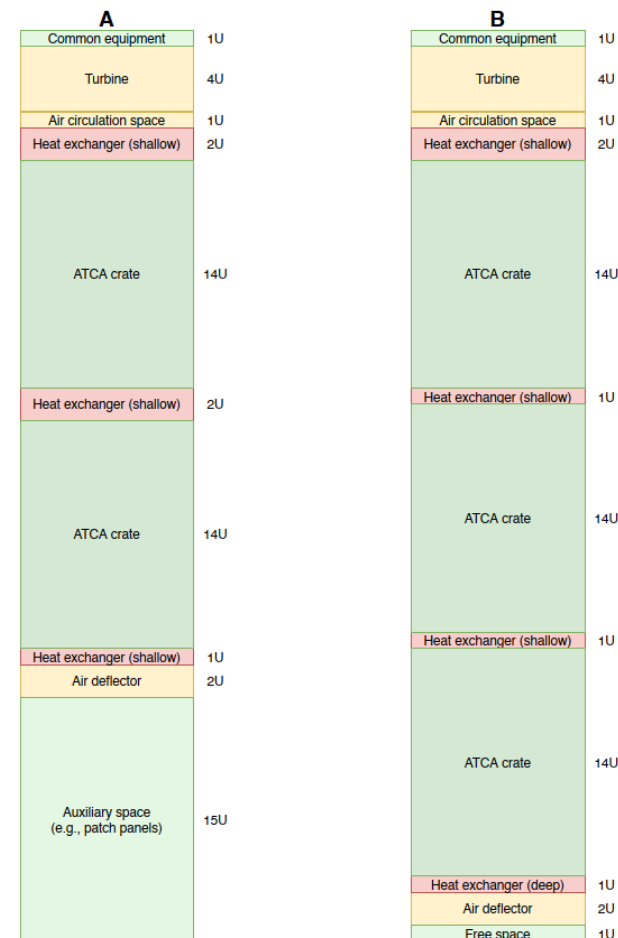




Standard and Alternative Rack Layout



- **10kW Power and Cooling**
- **Standard layout**
 - Two 2U HX and
 - one 1U HX
- **Alternative layout**
 - Four 1U HX
- **Physical protection of cooling fittings**
 - Aluminum plates
- **Stainless manifolds**





Standard and Alternative In the flesh...



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- **Top HX**
 - **2U**
- **A 1U blank panel to be added**



- **Middle HX**
 - **2U**
- **Folded aluminum protection for the cooling connections**



- **Bottom HX**
 - **1U**
- **Folded aluminum protection for the cooling connections**

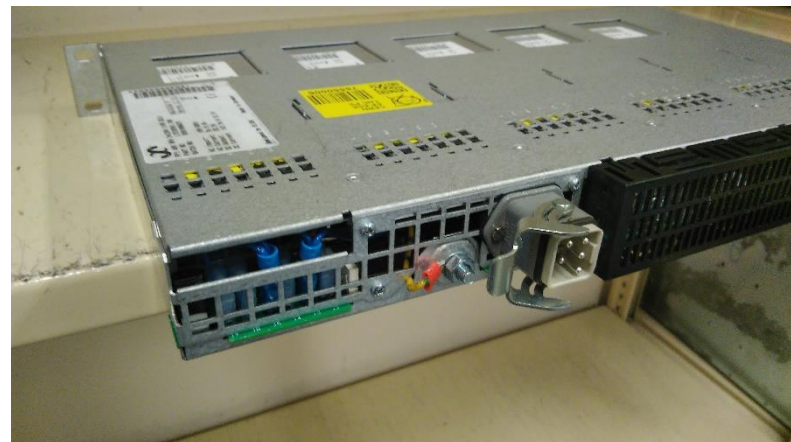


380VAC connection

- **Power distribution box modified to provide 3 phases and neutral**
- **HARTING connector fixed to ELTEK**
- **cable between power distribution box and ELTEK**

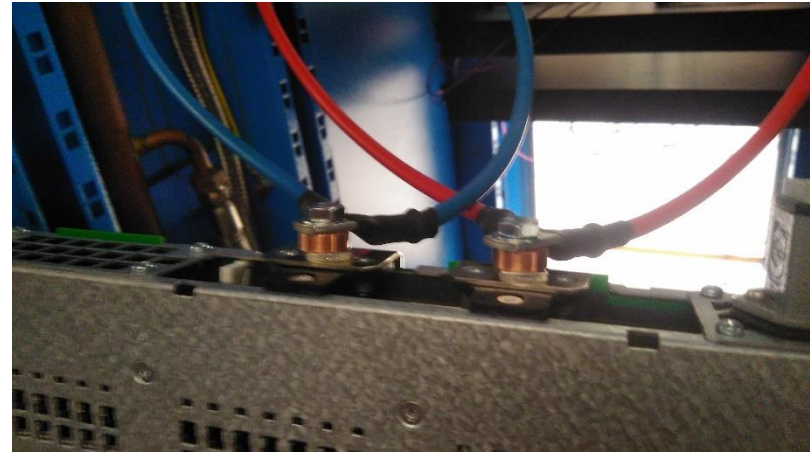


- **Behind the ELTEK**

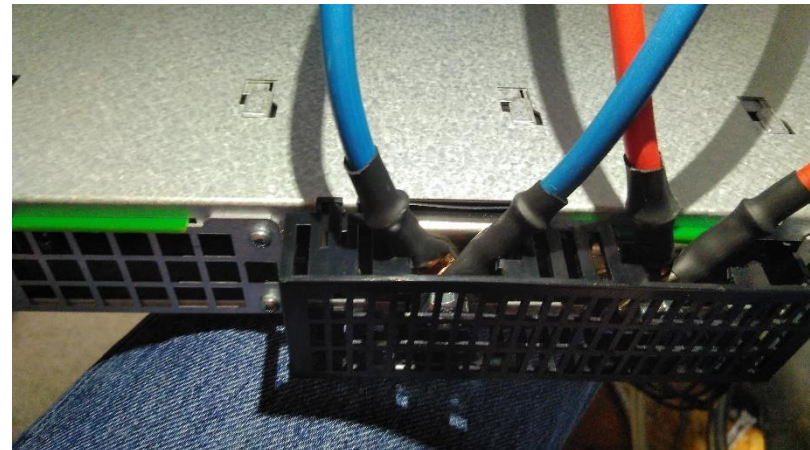


-48VDC connection

- **ELTEK can supply 200 odd amps**
 - 60cm connection
 - 16mm² sufficient
- **Apply two 16mm² in parallel**
 - Custom made copper spacer between lugs on ELTEK
 - Connect as per spec on PEM



➤ Behind the ELTEK





Custom material list



➤ Per shelf

- **HARTING jumper cable 5x1.5mm²**
 - Length customized with two standard lengths for CMS
- **2+2 16mm² cables with 6mm lug in one end and 8mm lug in the other end**
 - Length 60cm or customized
- **two 4mm thick 7mm id 16mm od copper spacers**



Outlook



- **Install a rack in USC55 and operate long term at full power in order to confirm the standard rack layout and electrical connections**

- **Bottom line**
 - **The content of one full ATCA rack, even if considered replaceable, approaches $\frac{1}{2}$ MCHF – All efforts have to be made to prevent a 300CHF HX, a 20CHF cooling hose, or a 10 cents gasket to ruin even one of these racks even once.**