ScandiNova

EXCELLENCE IN SOLID STATE PULSED POWER

BY SCANDINOVA SYSTEMS AB

SCANDINOVA IN UPPSALA, SWEDEN

DESIGN, ASSEMBLY & TESTING

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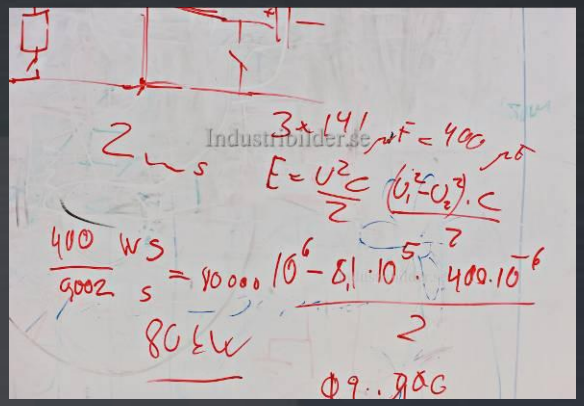

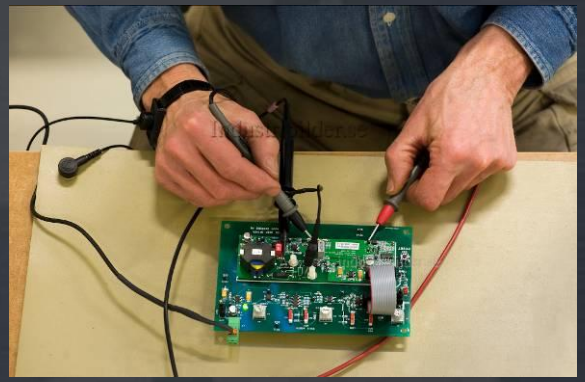

ASSEMBLY AREA

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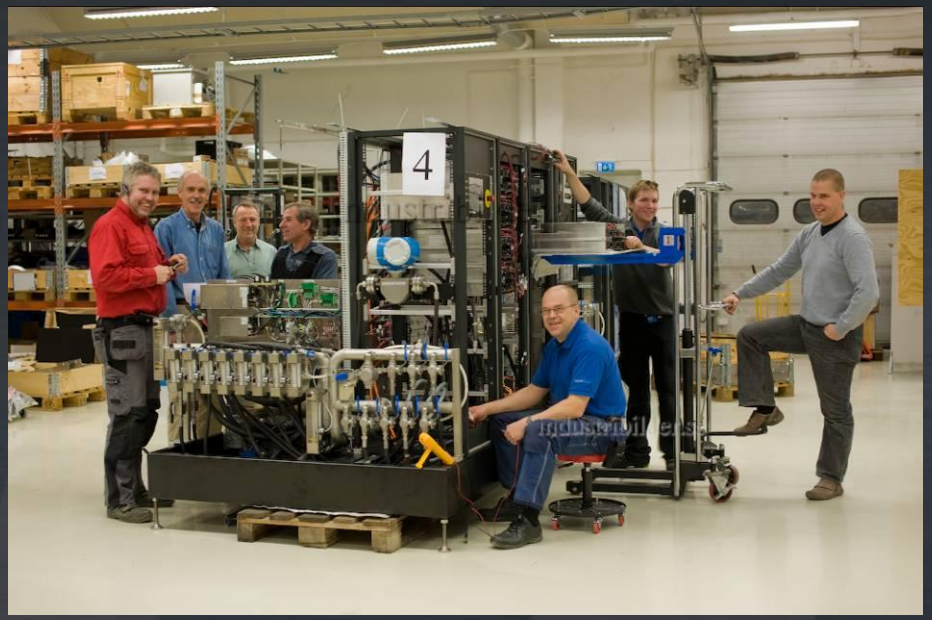

TESTING AND PACKAGING

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DELIVERY

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SUMMARY

- Established in 2001
- Unique reliable solid state technology invented 1995
- Uppsala based. Close to the University.
- 1500 m2 production space.
- Focus on Klystron and Magnetron modulators
- Most customers in the scientific community.

NEXT

ESTABLISHED APPLICATIONS

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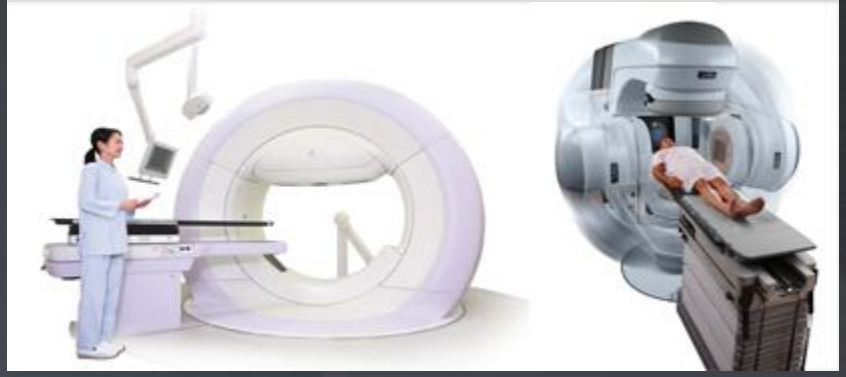
MEDICAL



- RADIOTHERAPY

DEFENSE

- RADAR

INDUSTRIAL

- E-BEAM PROCESSING
- CARGO INSPECTION
- PEF PROCESSING
- CALIBRATION

RESEARCH

- SYNCHROTRON LIGHT SOURCE
- FREE ELECTRON LASER
- CRYSTALOGRAPHY

SOME ON-GOING PROJECTS

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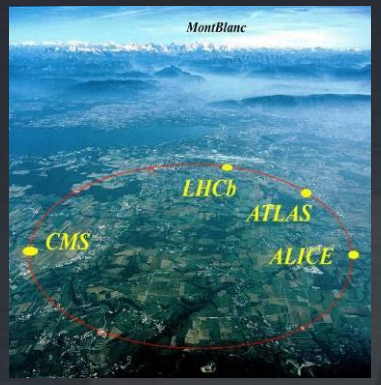
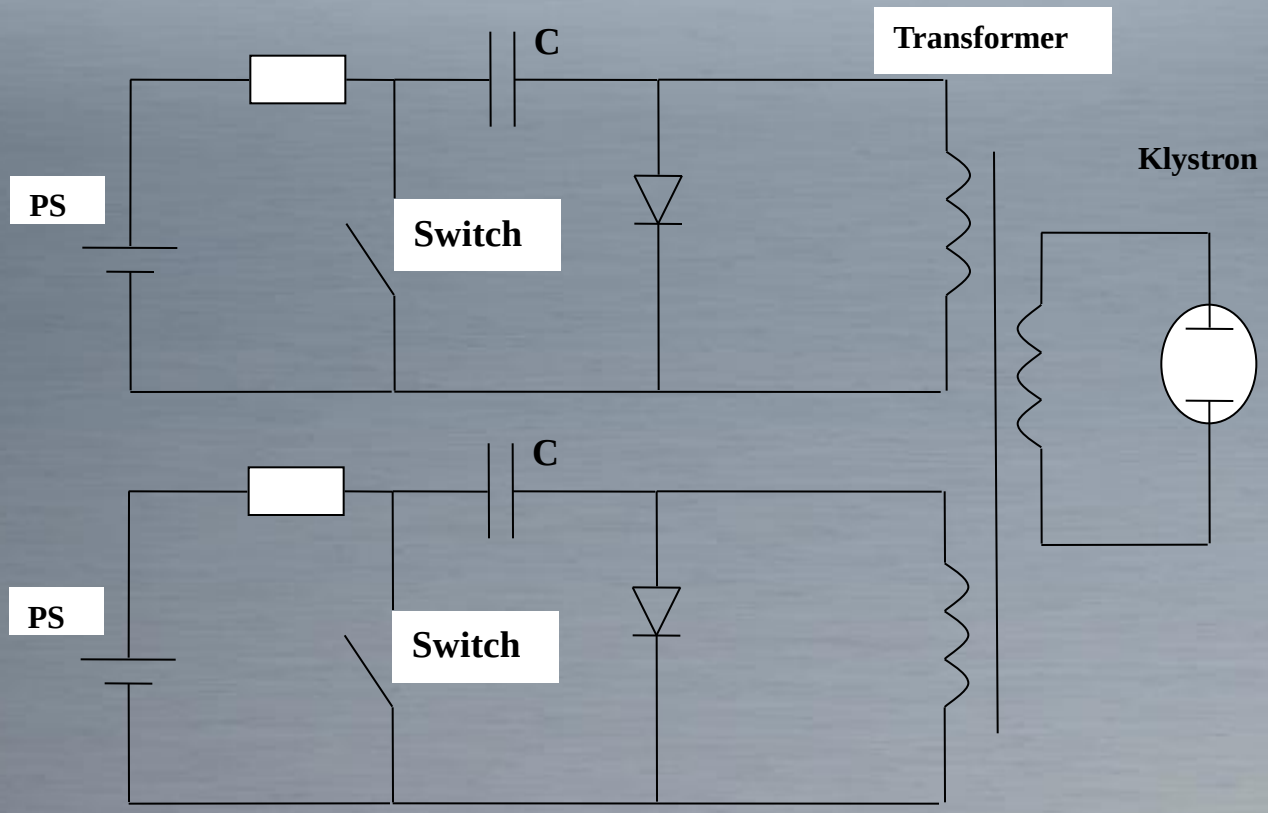
- 6 x K2-system 262-410kV / 270-330A to PSI
- K2-system 450kV/330A to CERN / CEA-Saclay
- K2-system 420kV/320A to Lawrence Livermore NL
- 7x K2-system 250kV/250A to Canadian Light Source
- 2x K2-system 240kV/215A to AES
- K2-system 265kV / 265A to DESY
- K2-system 370kV / 380A to INFN Frascati
- 2x K1-system 195kV/148A to AES
- K1-system 125kV/80A to MIT
- M1-system 45kV / 111A to ADAM
- M1-system 38kV / 90A to IntraOp
- M2-system 65kV /110A to Singapore
- E1-system 90kV / 1A to Helmholtz Zentrum



Basic schematic of the Scandinova modulator

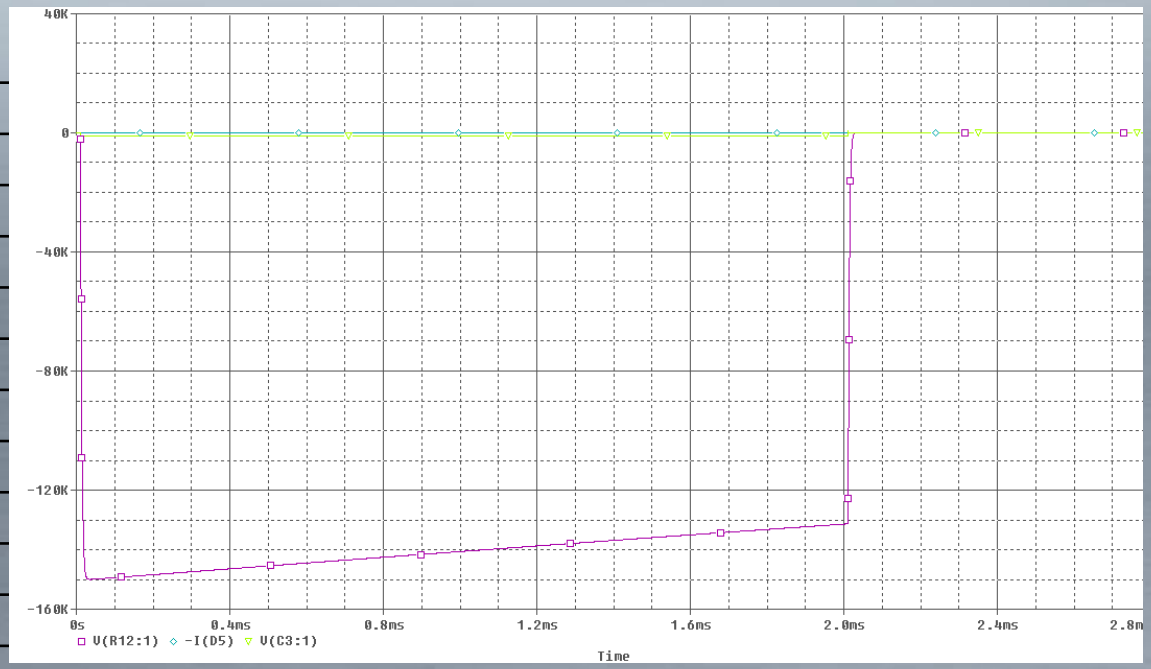
N = number of primary circuits
R = Klystron Resistance
$\mathbf{N_T}$= Transformer ratio (Has to be compensated for with **N**)



Droop

ESS preliminary parameters

Parameter	Value
P peak	6,2 MW
P mean	248 kW
t pulse	2,0 ms
T period	50 ms
t rise	50 us
t fall	50 us
Klystron voltage	135 kV
Klystron current	46 A
Pulse droop	3%
Overshooot	2%

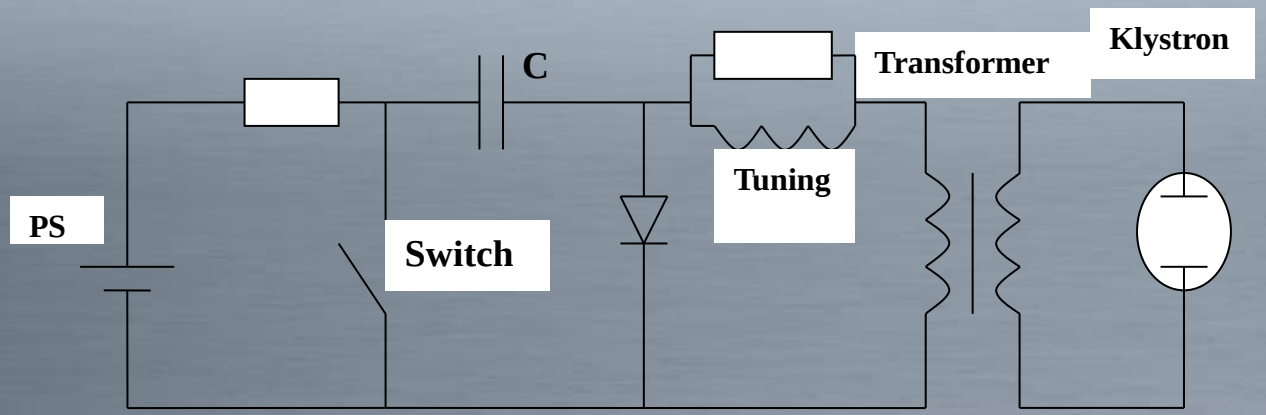


N=42 Ecap=1,4 kJ

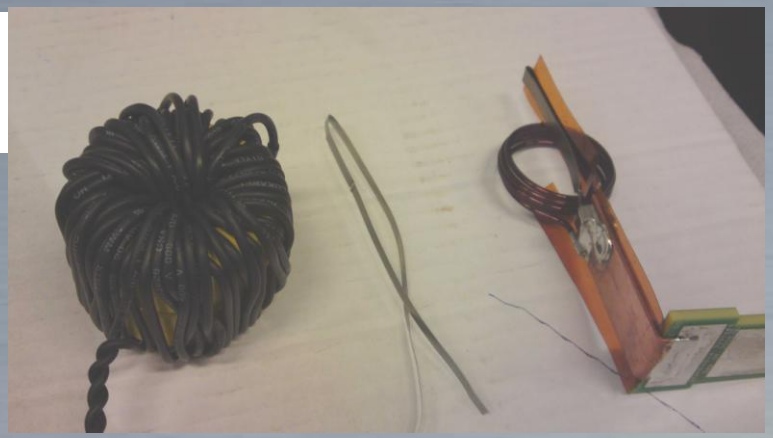
C= 2000uF Etot= 60,5 kJ

NT=130 Vdc= 1200V

Tuning

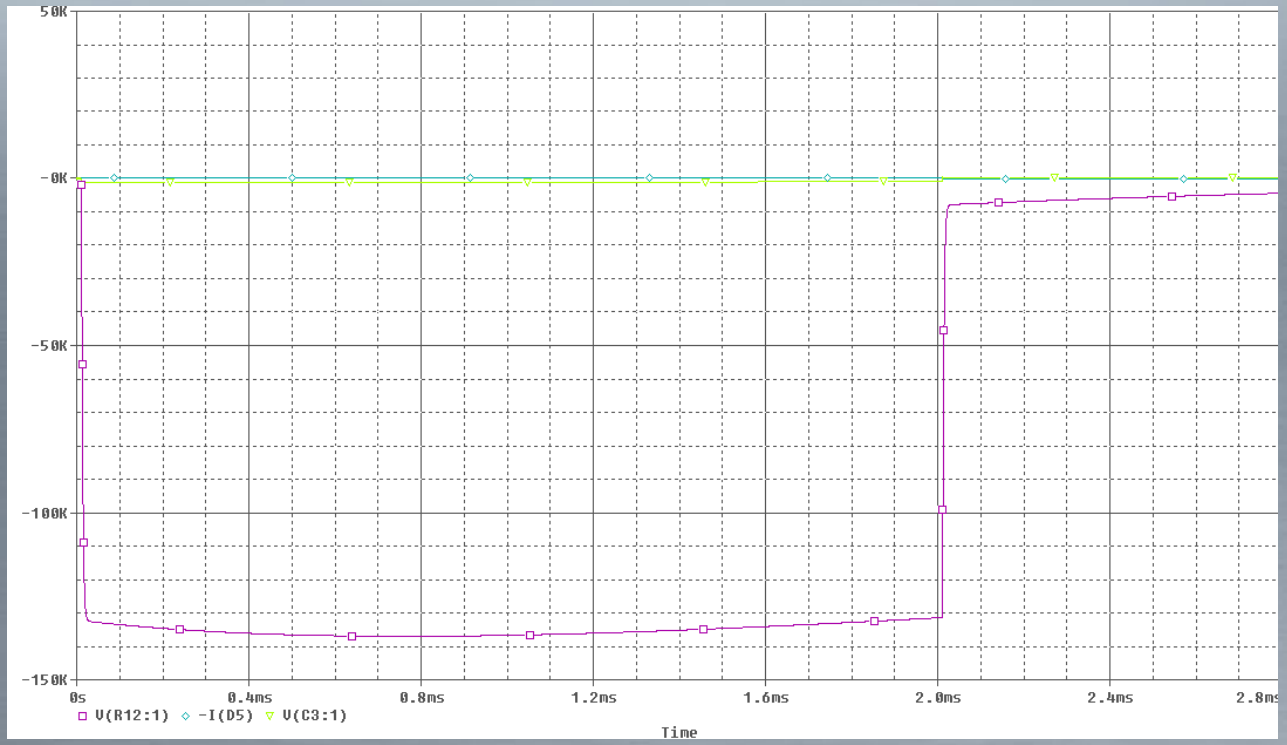


Rt = Tuning resistance
Lt= Tuning inductance



Tuning on PSB

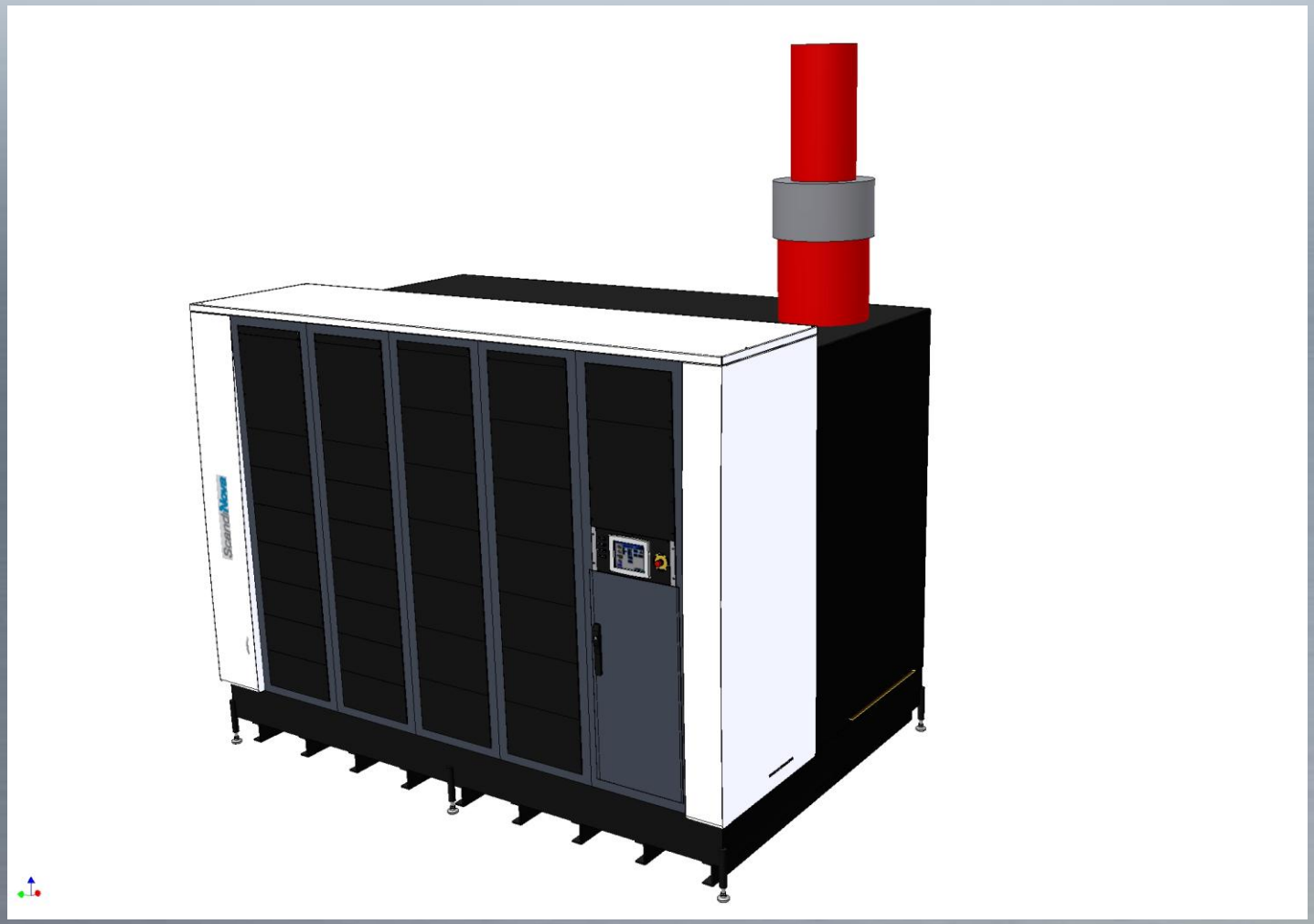
When applying
To ESS
Rt = 1 ohm
Lt = 0.7 mH



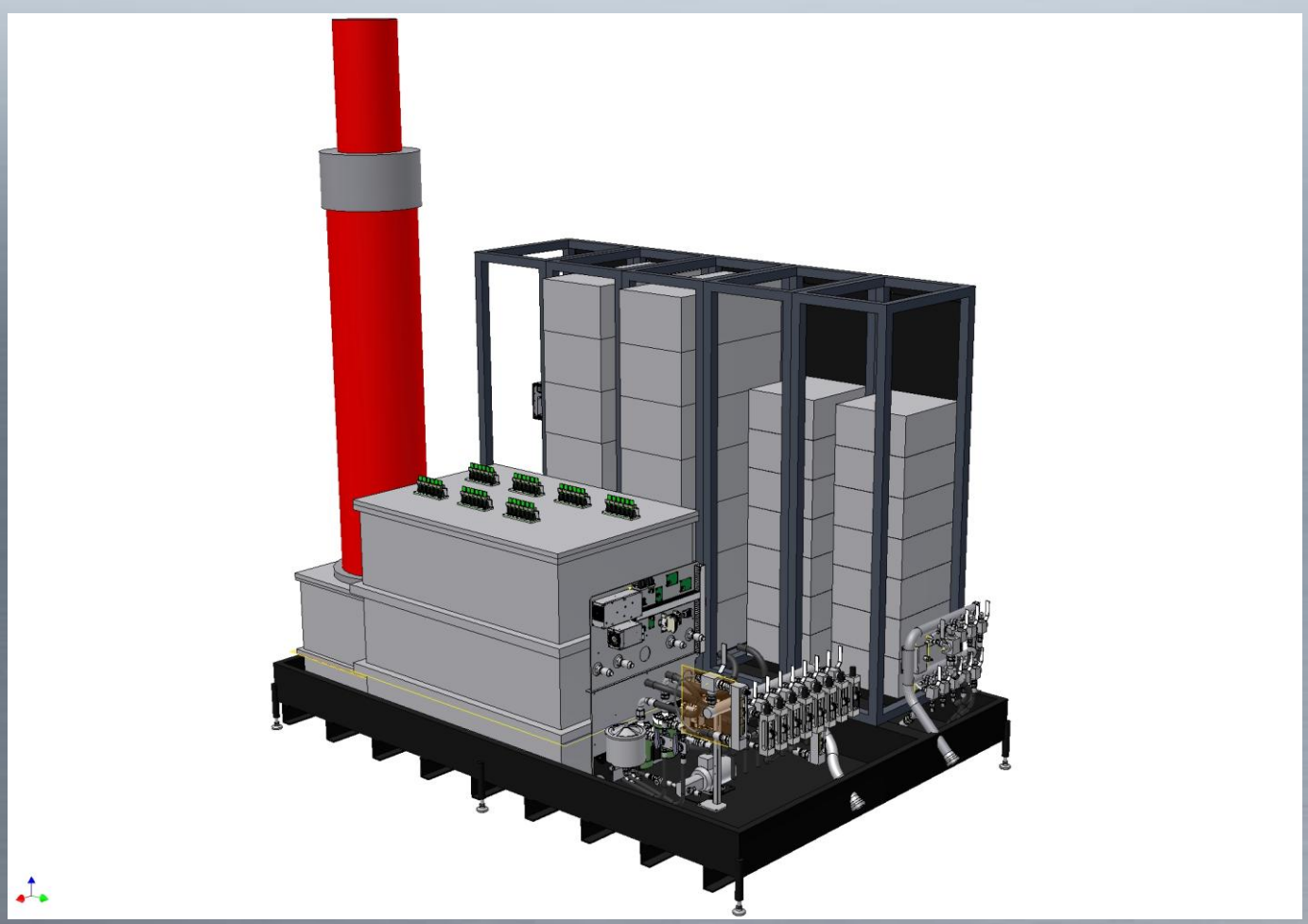
Safety aspects

- Paralell operation
  - A switch failure will only dump one 42th of the total stored energy.
  - Off the shelf capacitors will be used.
  - A failed module could be deconnected and the loss is 1/42 of the total power capacity
- All High voltage inside the tank
- Primary circuit <1400V
- Pulse over current respond time 2us.
- DC-Voltage discharge time within 10sec

Front view



Rear view



Tehnology advantage

- Very small footprint
- Reliable operation
- Pulse width possible to change.
- Limited impact at failures
- Solid state technology. Low maintenance cost.
- Short installation time.
- High personal safety.

THANK YOU!