



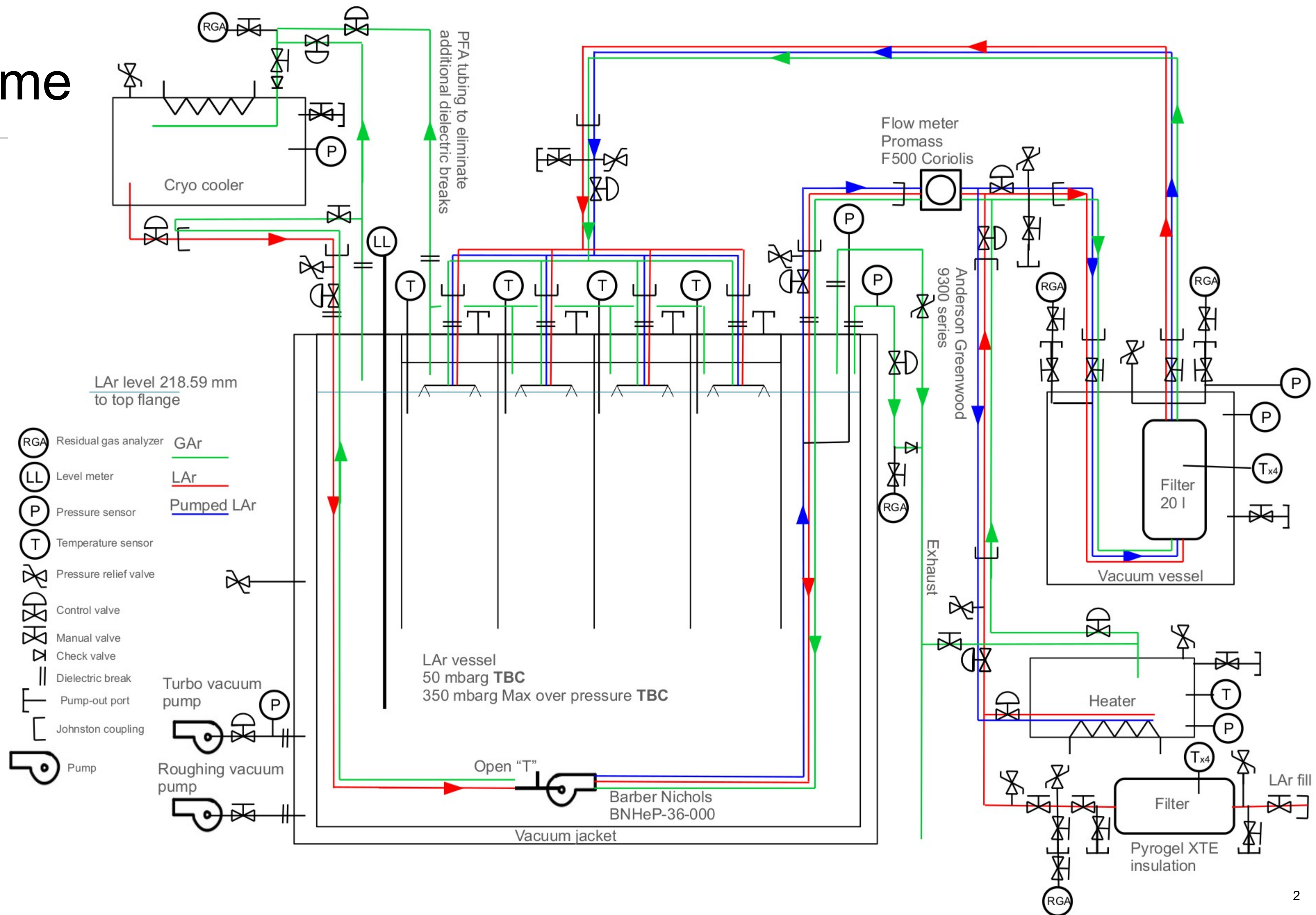
Cubism - Braque's Bottle and Fishes, Paris c.1910-12

2x2 Updates

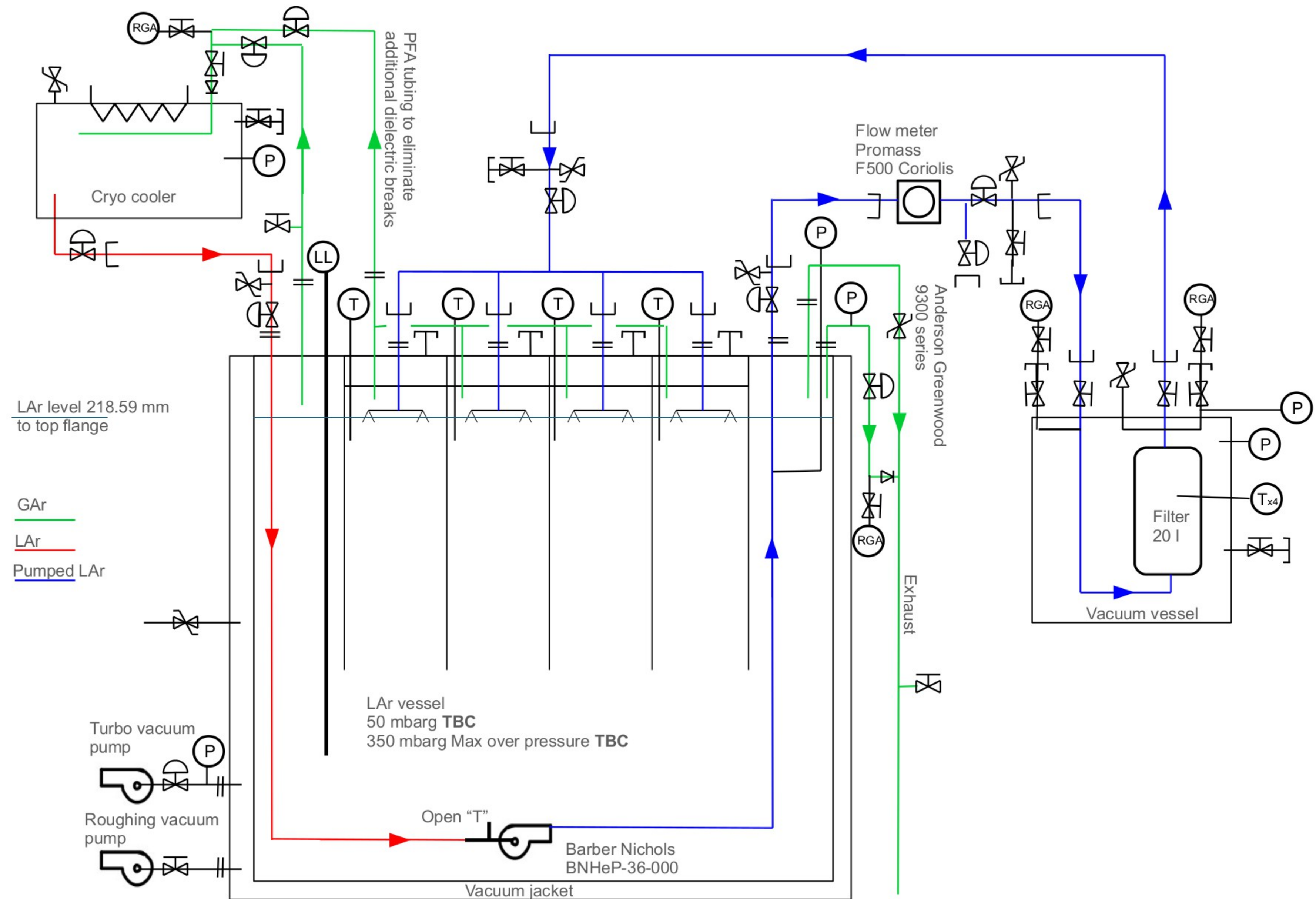


Cryo meeting
April 5th 2021
James Sinclair, LHEP

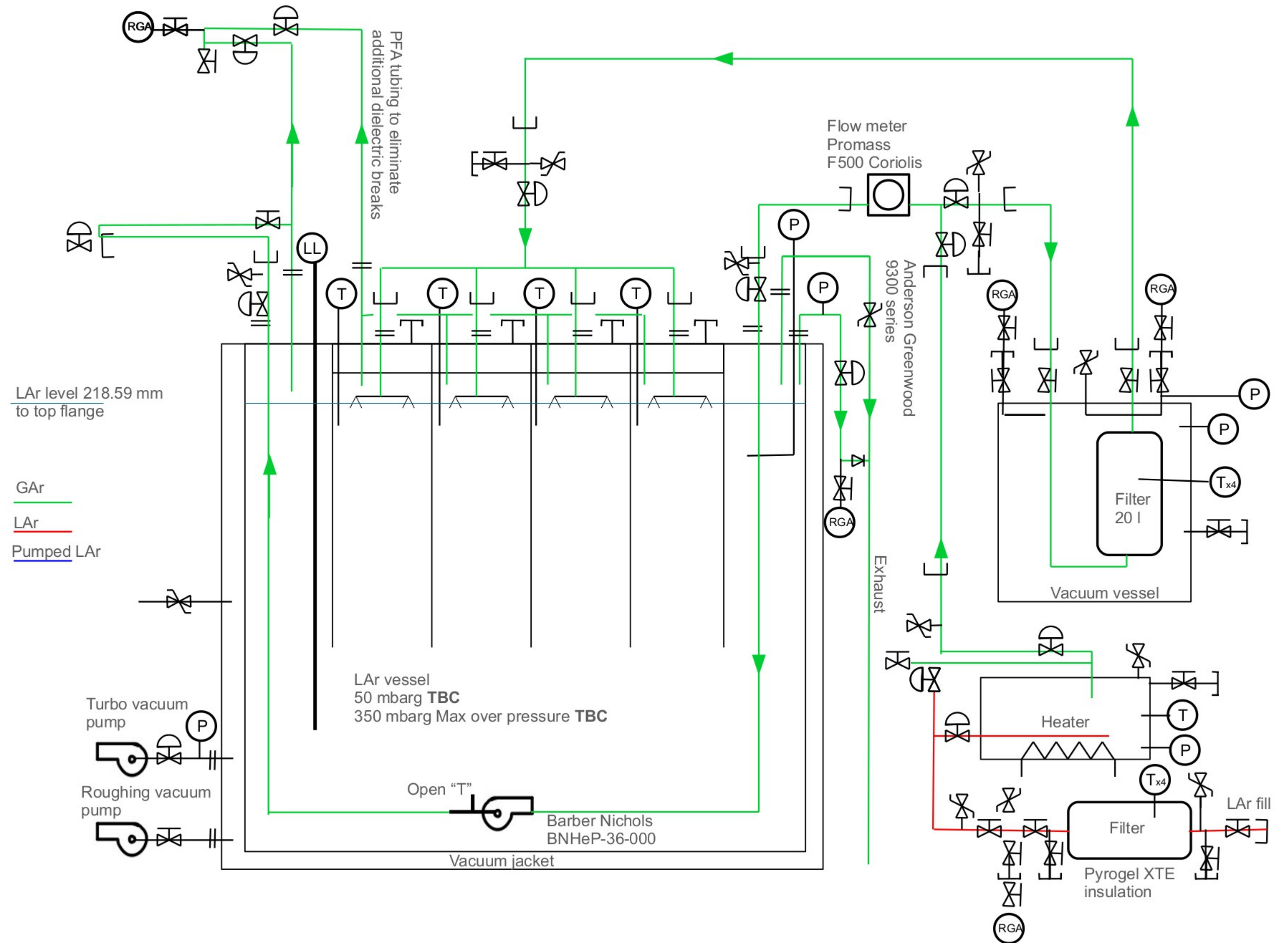
2x2 P&ID scheme



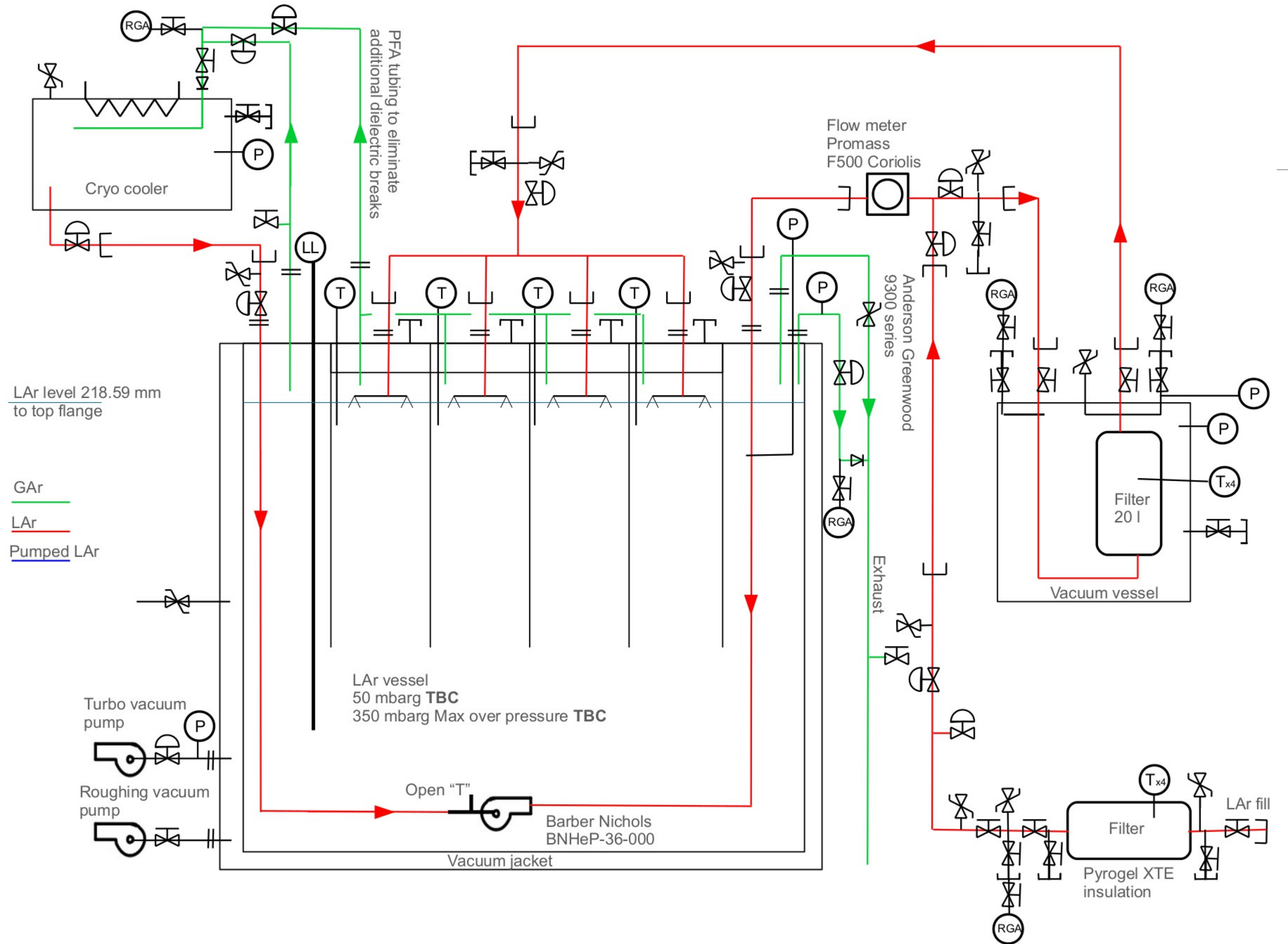
Normal operation



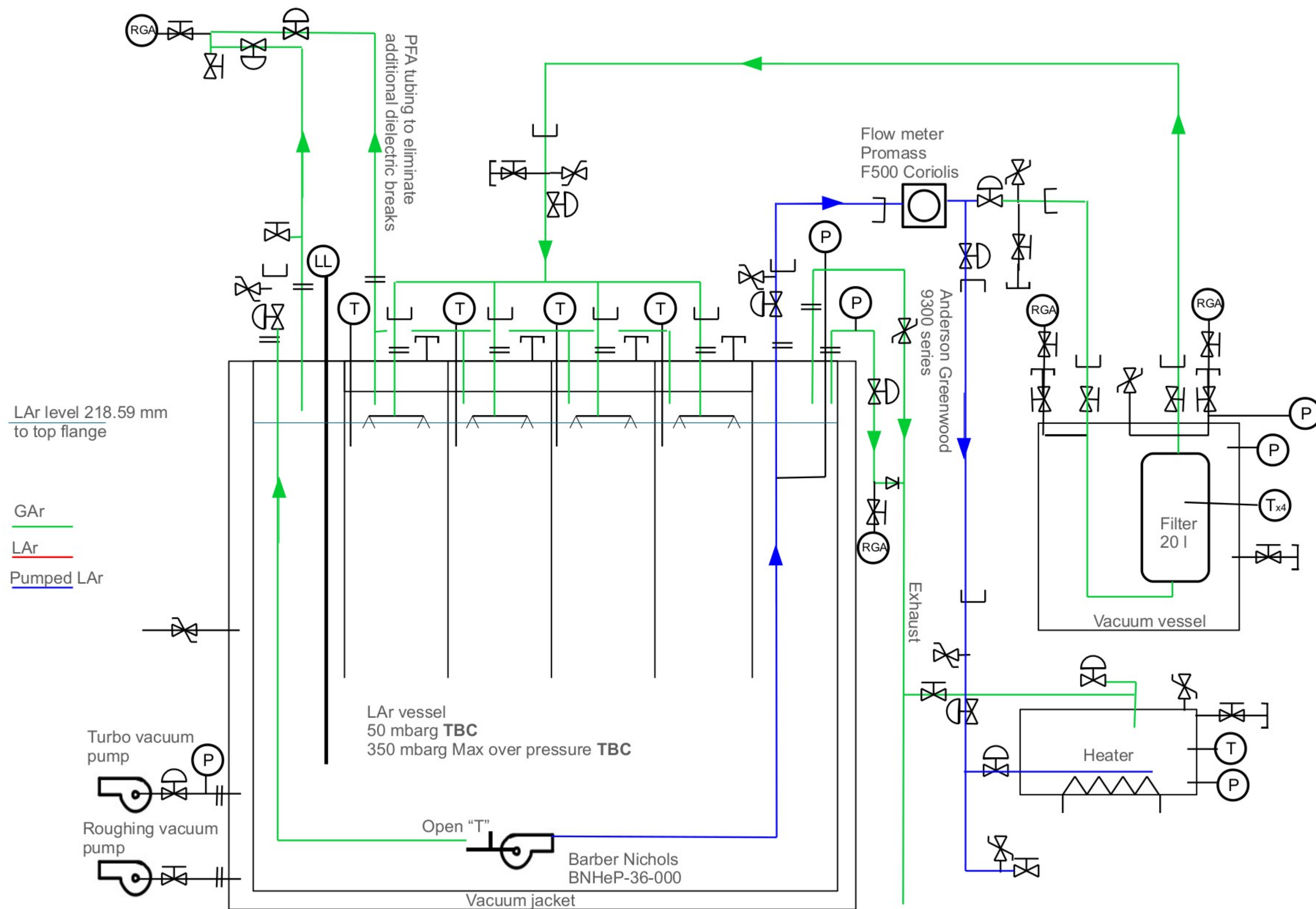
Piston purge



Fill



Drain



To do – Module P&ID

I need to produce a P&ID for the modules detailing: temp sensors, gas return, and LAr supply



Bern deliverables

Inlet manifold

Rigid VJ manifold that distributes the filtered supply to the four modules.

Inlet 1" ID Johnston female coupling.

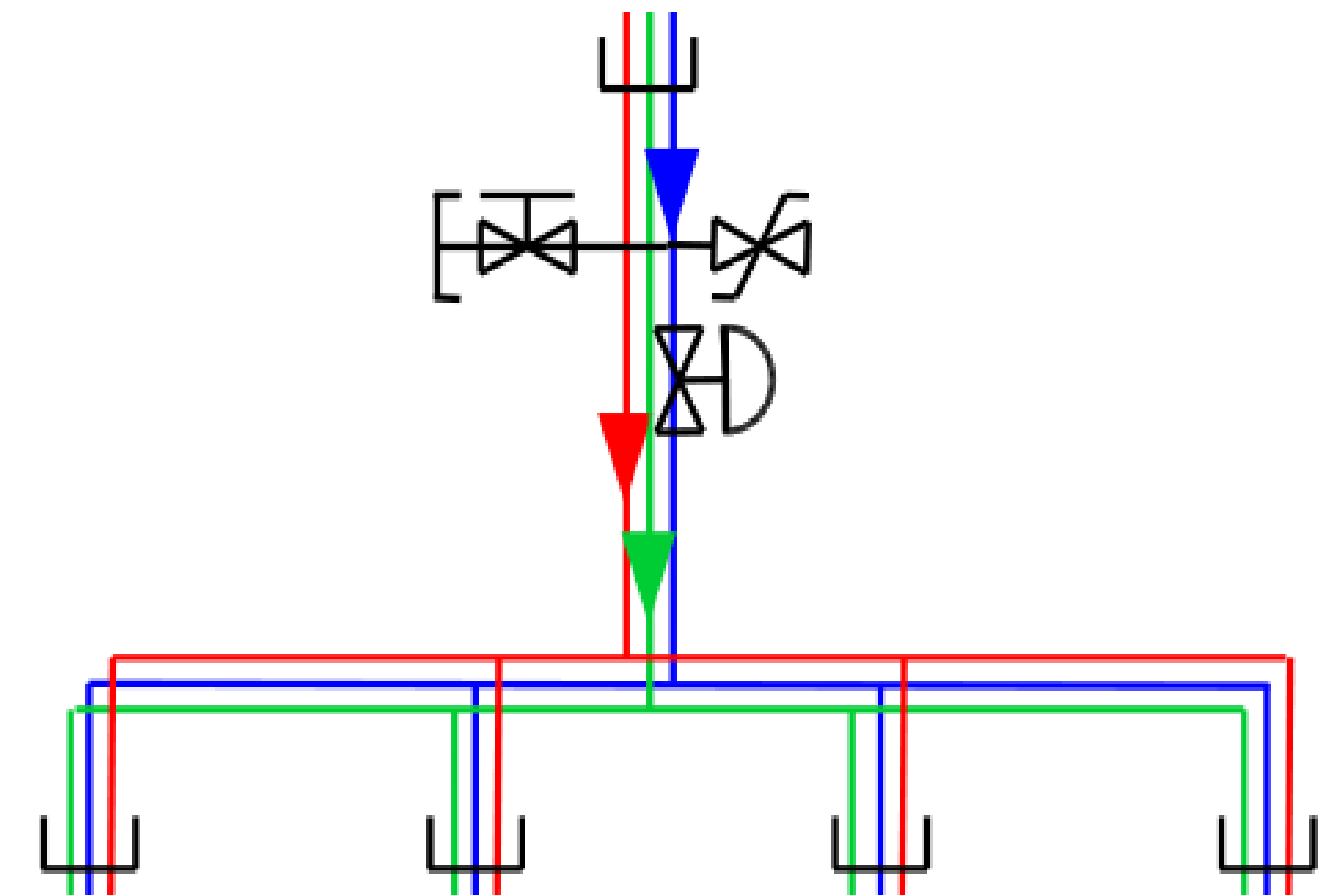
4x Outlets 1/2" ID Johnston male coupling.

Control valve.

Over pressure valve, for line relief.

Pump-out port, for line purge.

Shut off valve for port.



Bern deliverables

Flow metre and fill assembly

Foam insulated junction box housing flow meter and control valves

3 x female Johnston couplings (1 x line from pump, 1 x line to filter, 1 x fill/drain line).

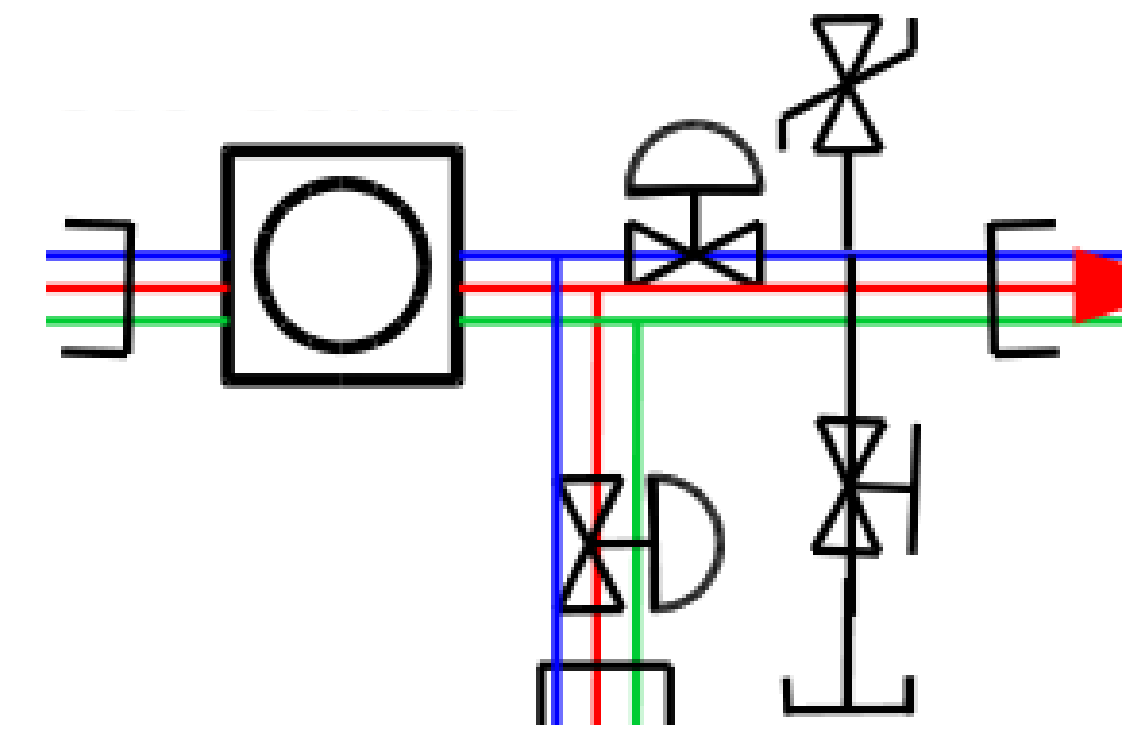
Flow metre Promass F500 (Coriolis).

2 x control valves (1 x fill/drain line, 1 x filter line)

Over pressure valve, for filter line relief.

Pump-out port, for line purge.

Shut off valve for port.



Bern deliverables

Filter and vacuum vessel

Vacuum vessels do not have to adhere to pressure vessel code, and can be built in house.

Filter must be less than 6" ID.

10 l mol sieve + 10 l getter.

Particulate filter at inlet and outlet.

2 x female Johnston couplings (inlet + outlet).

2 x pump-out ports for argon volume.

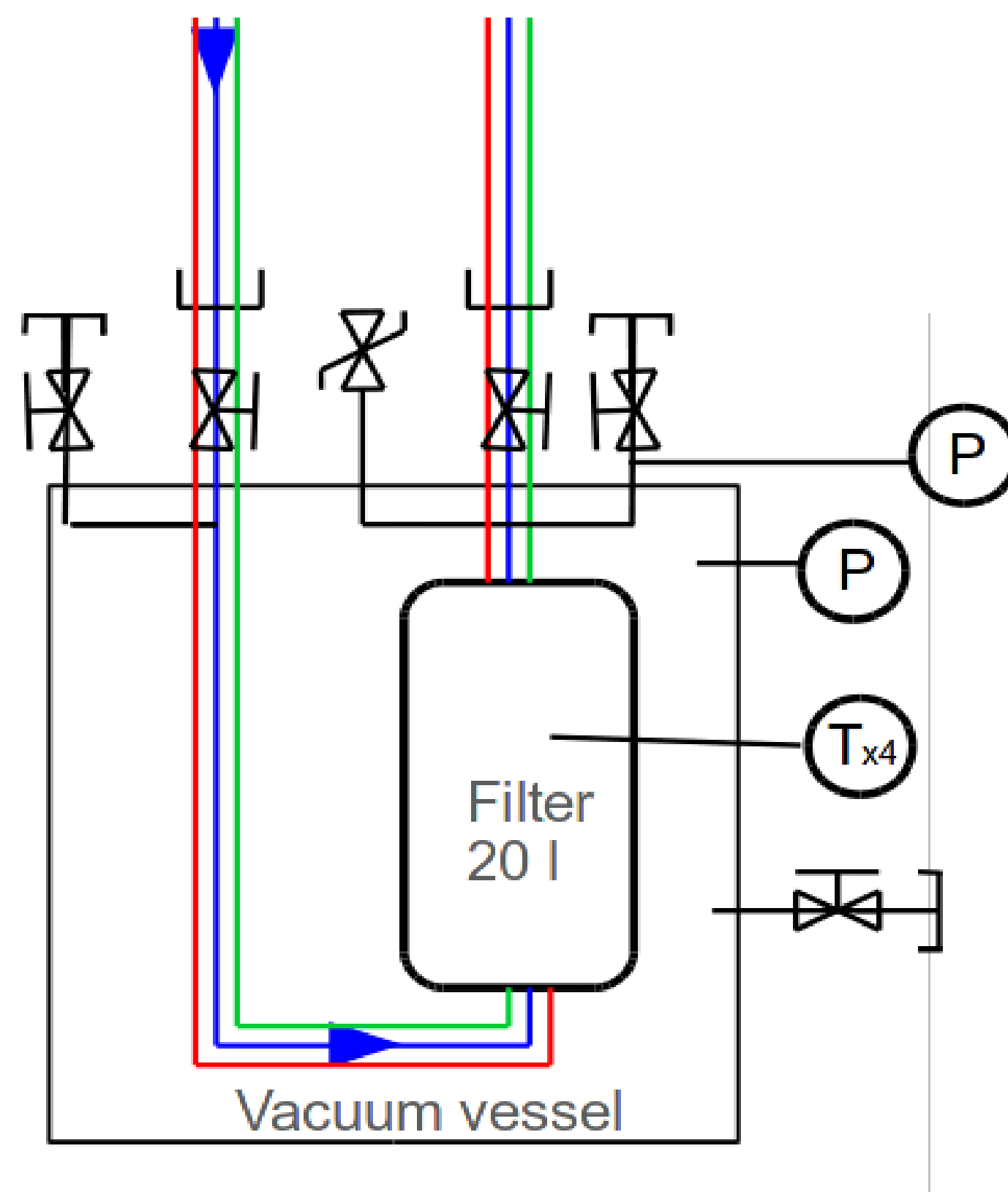
2 x shut-off valves for ports.

1 x pressure relief for argon volume.

1 x port and shut off for vacuum insulation.

2 x pressure sensors (argon + vacuum).

4 x temperature sensors for filter material.



Bern deliverables

Cryostat liquid inlet/outlet

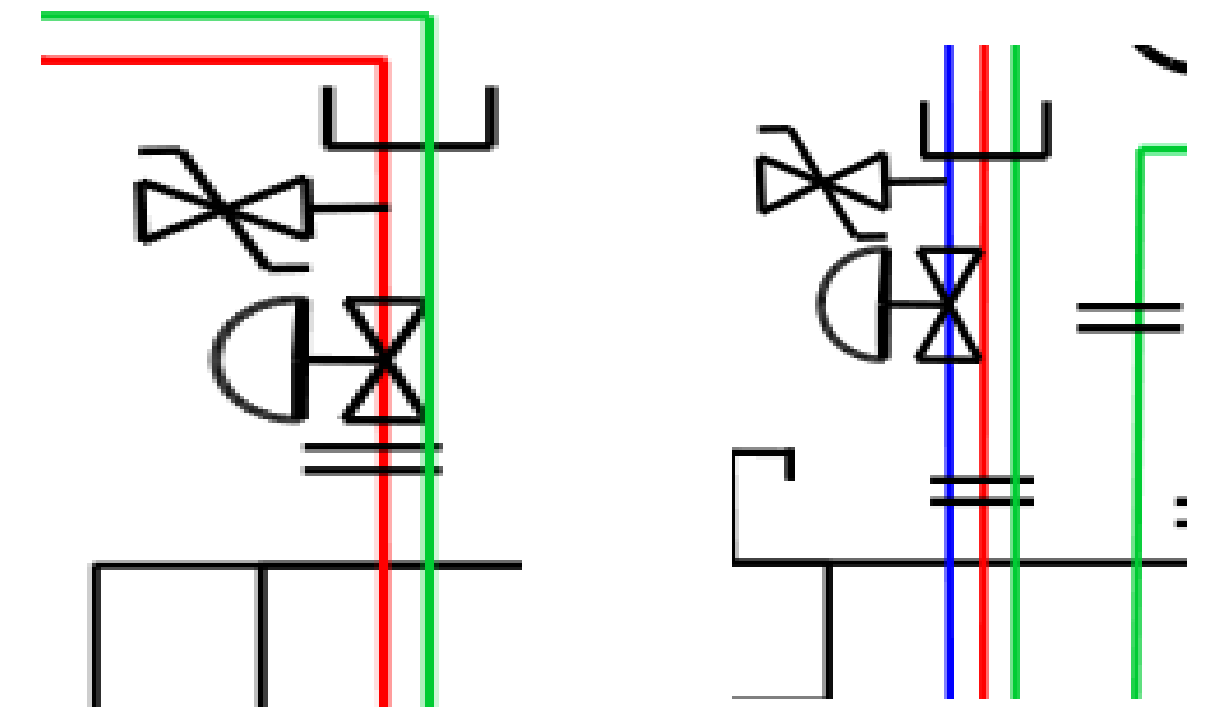
Connection for inlet from cryocooler and pump outlet, including internal lines.

2 x female Johnstons couplings.

2 x relief valves for lines.

2 x control valves.

2 x dielectric breaks.



Bern deliverables

Cryostat exhaust

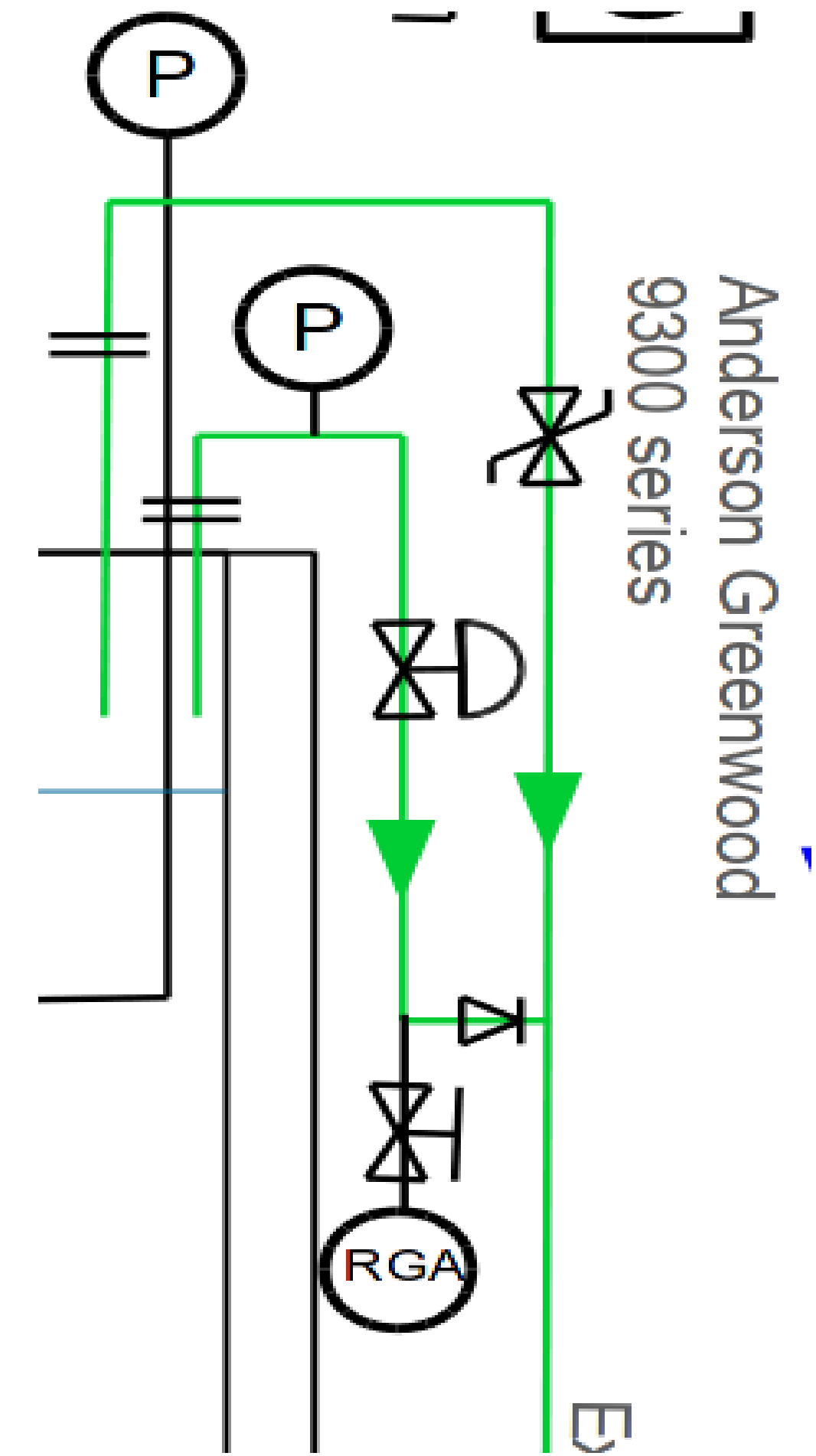
Pressure relief valve and working pressure control valve

1 x Anderson Greenwood 9300 series relief valve (350 mbar)

1 x control valve for maintaining working pressure (50 mbar)

1 x check valve on exhaust

1 x RGA connection with shut off valve.



Bern deliverables

Cryostat and modules.

3 x VJ lines (cryostat>flow meter, flow meter>filter, filter>cryostat)

Cryostat vacuum isolation valves.

LAr pump and pipe work.

Level meter.



FNAL deliverables

Vacuum pumps (turbo and roughing) for cryostat jacket.

Cryocooler including lines and connections

Residual gas analyser(s)

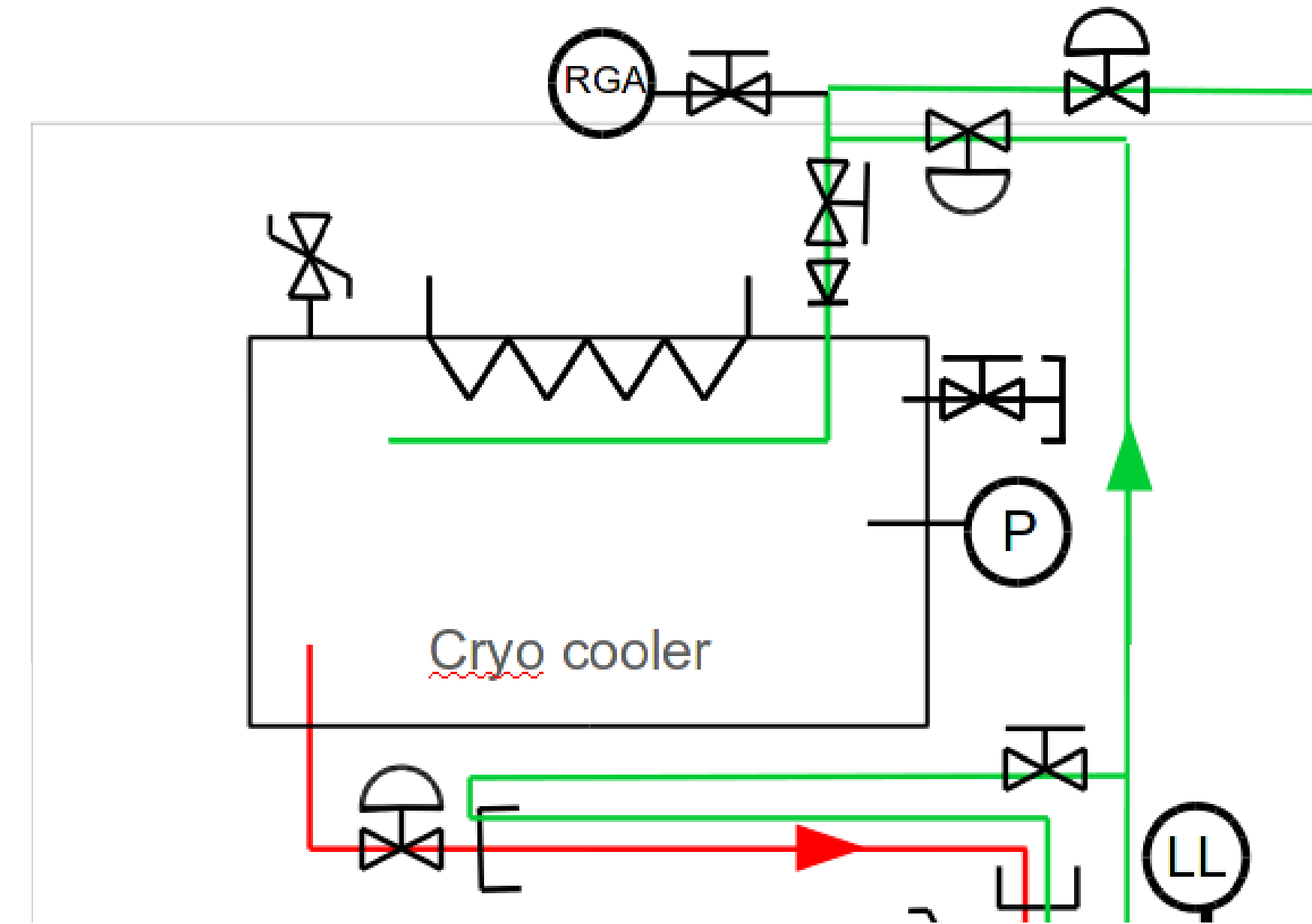
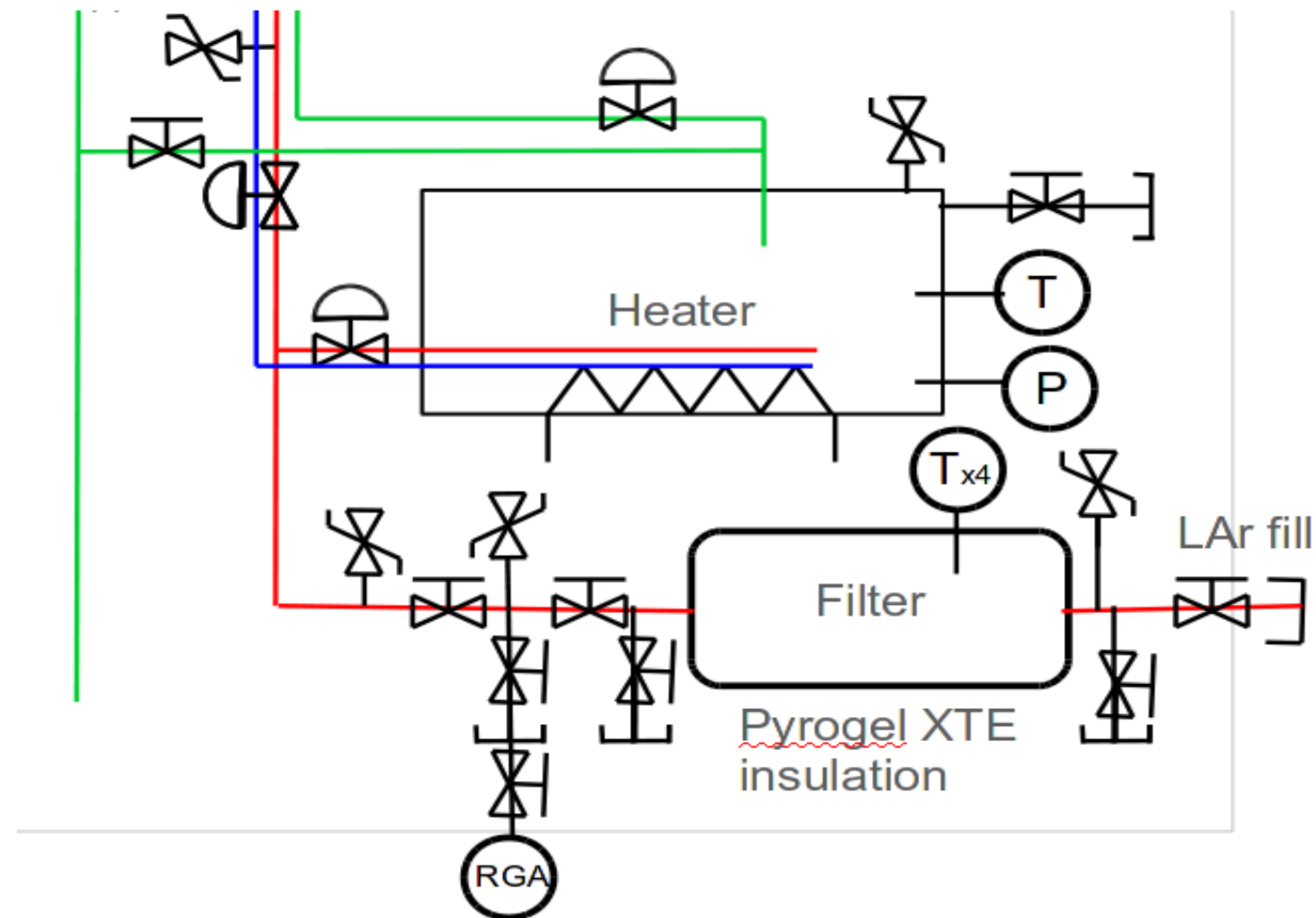
Heater

Filling filter(?)

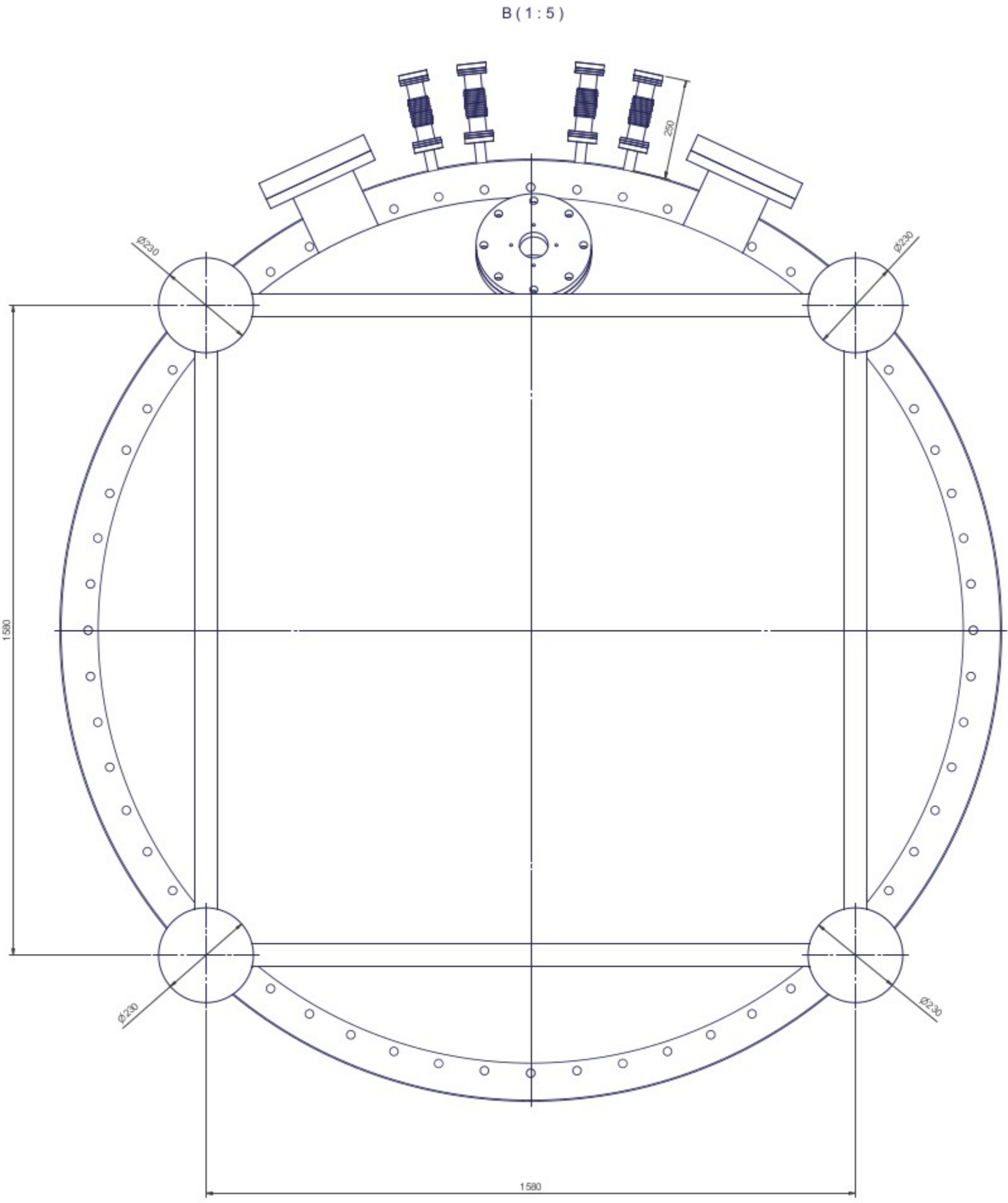
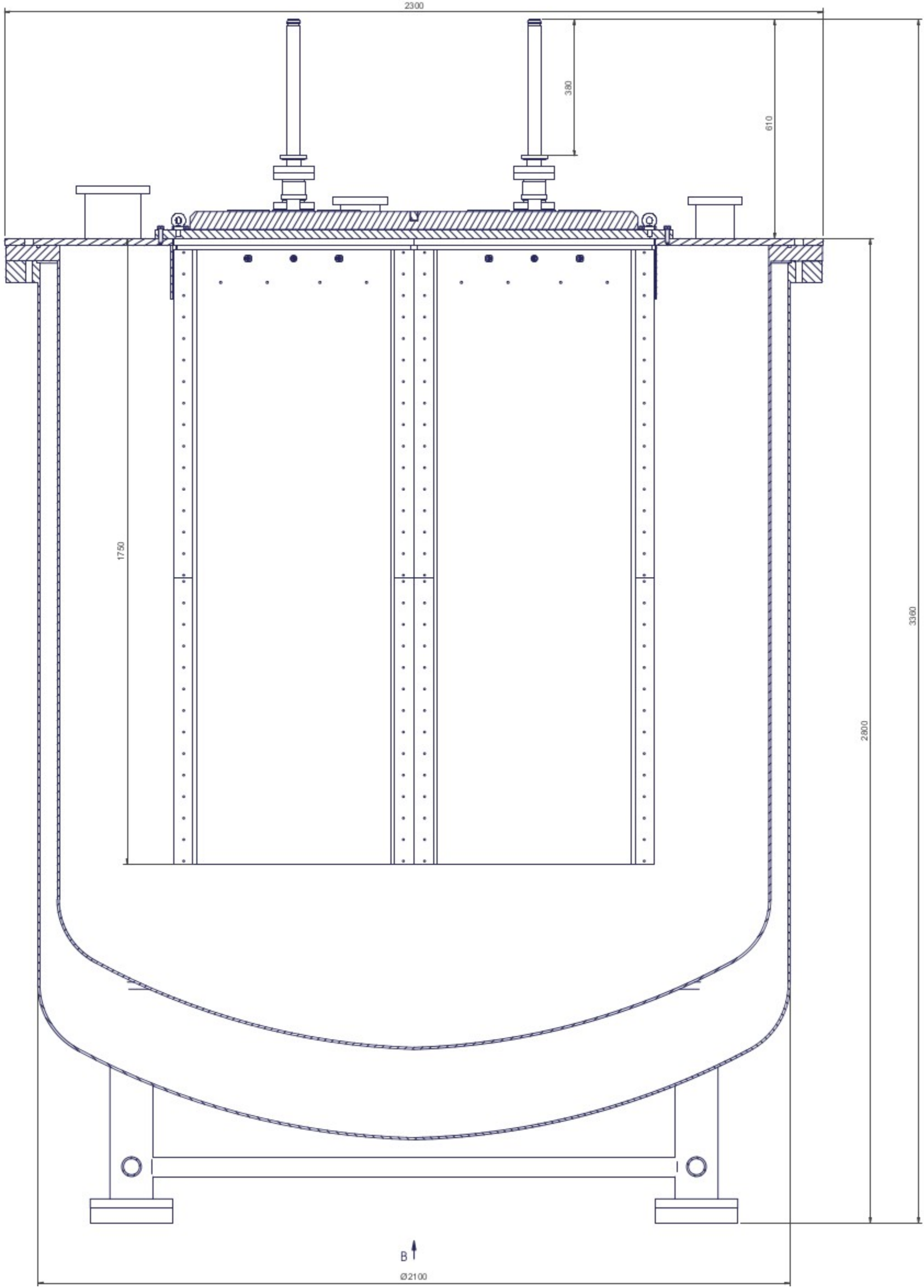
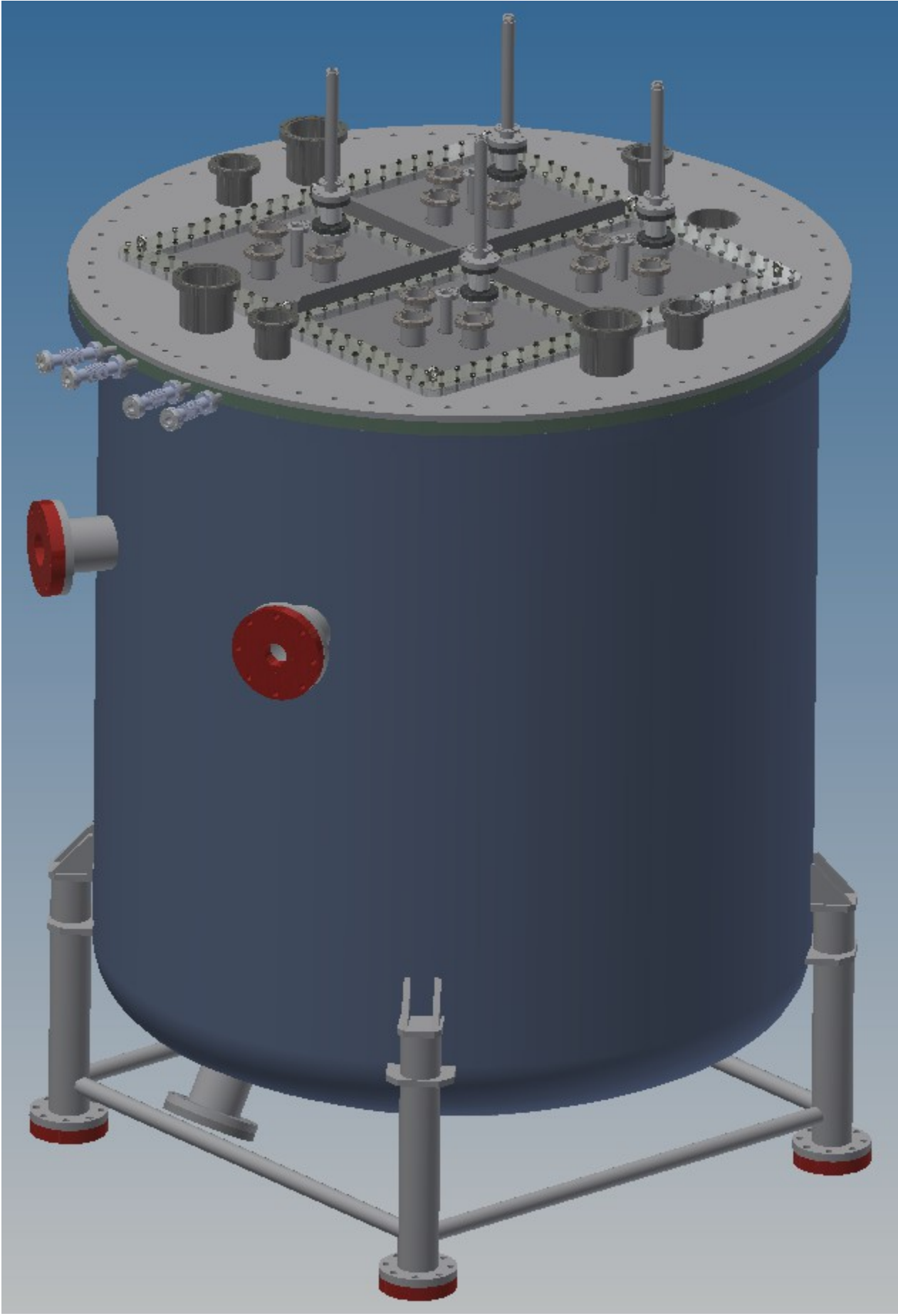
ODH line

Exhaust line

PLC

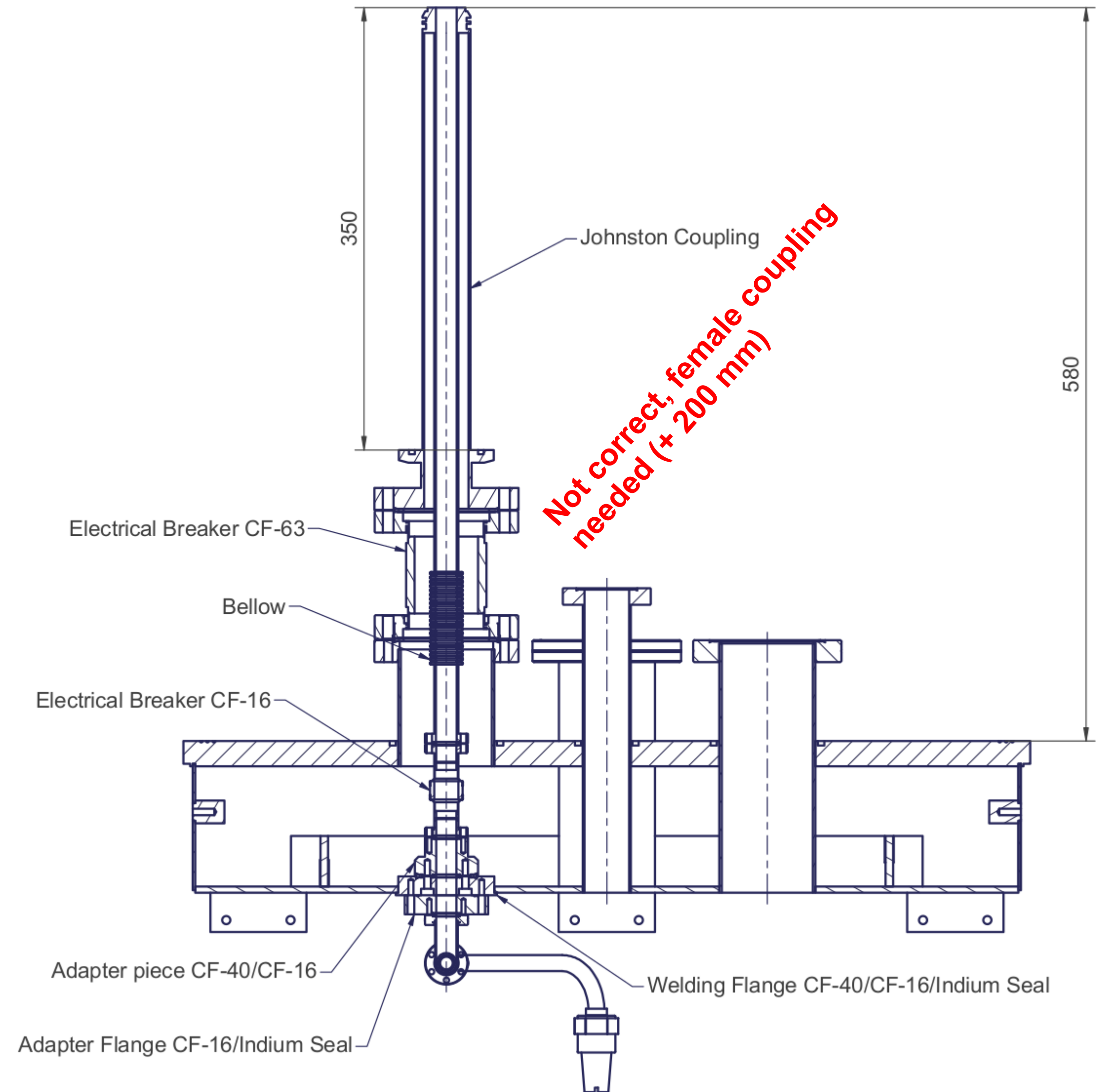
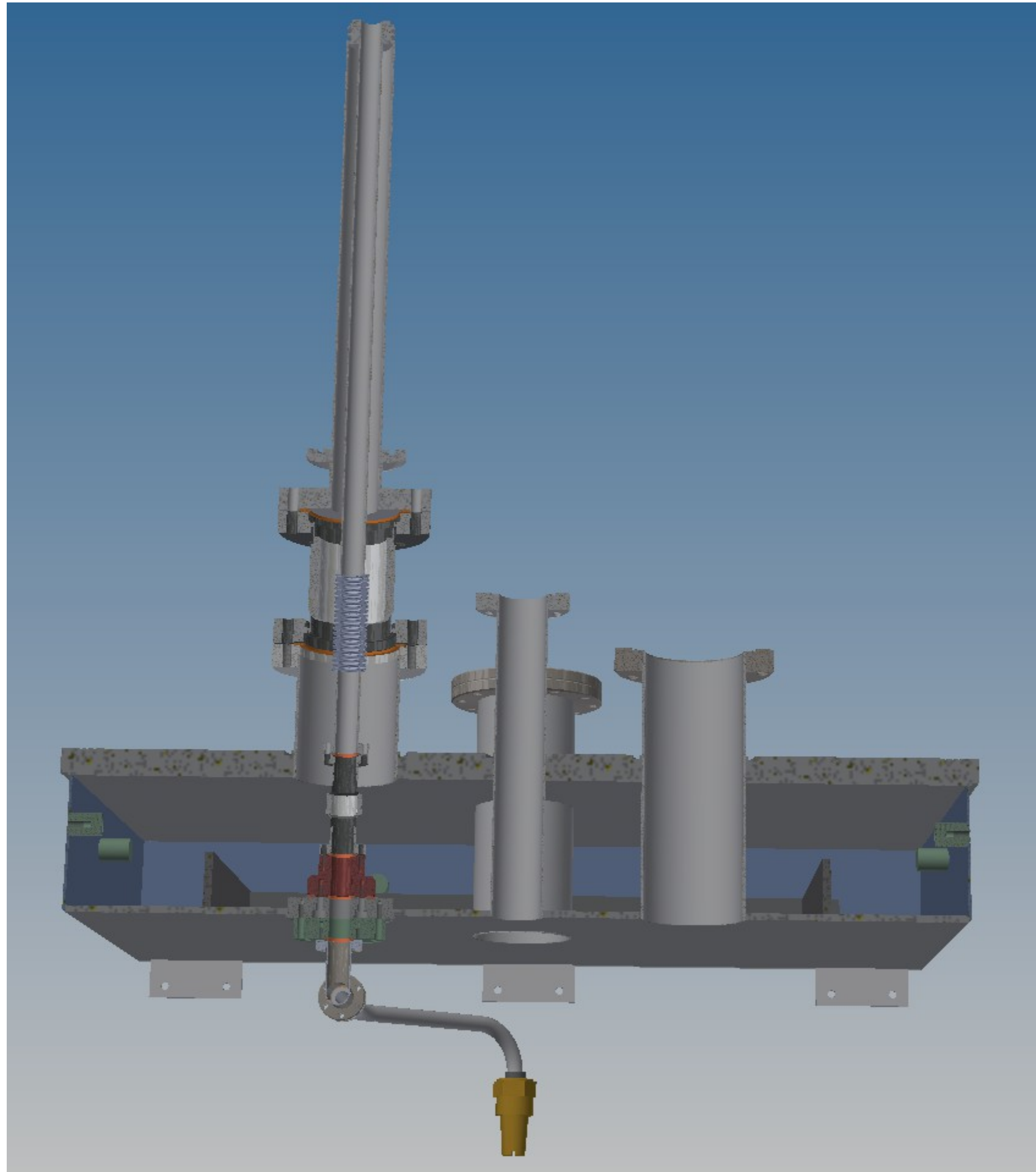


Integrated CAD



No.	Size	Number	Quantity	Material	Notes
	A3				

Integrated CAD



Roger has been working on an integrated model but we need to make some corrections and are waiting on some analysis input.