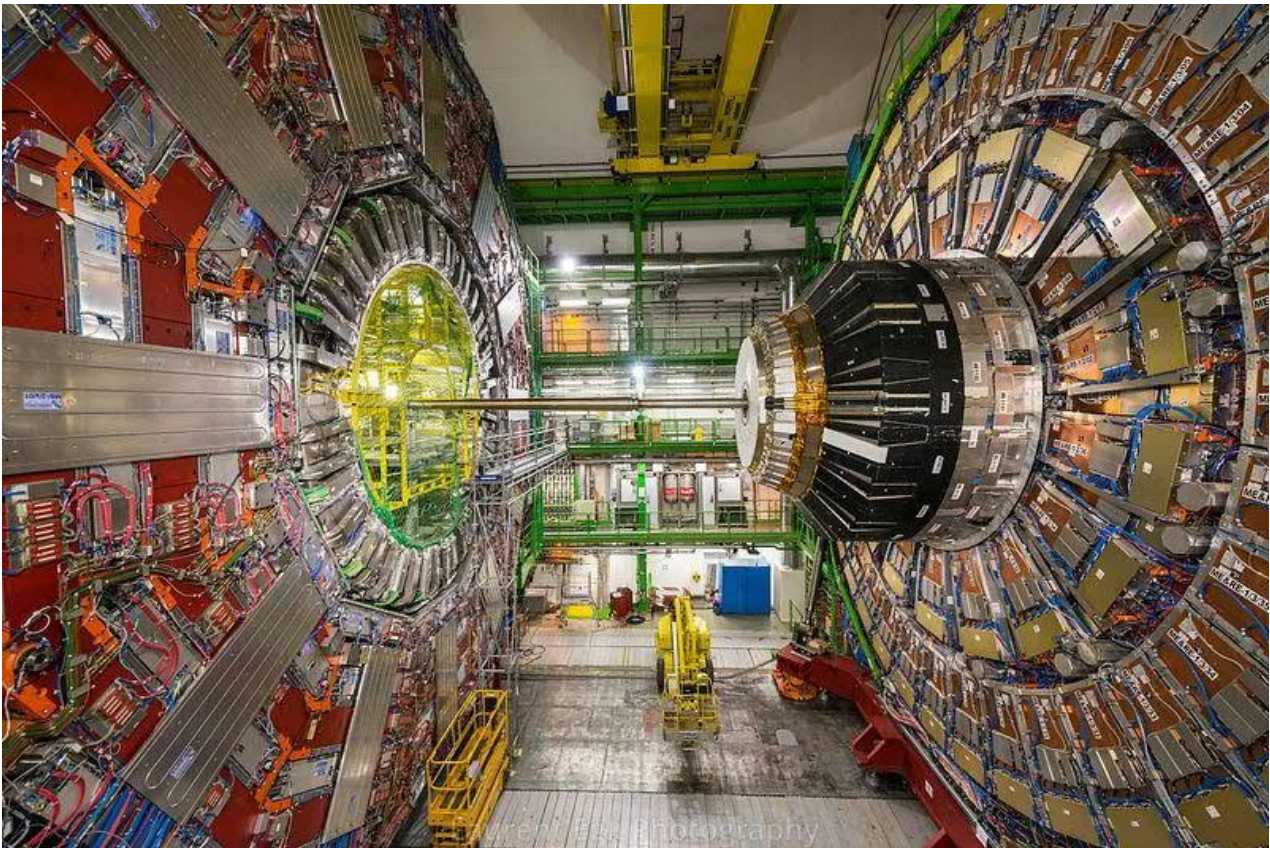




# CMS 2019

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## **GAS SYSTEM IMPROVEMENT & MAINTENANCE DURING LS2**

## IMPROVEMENT 2019

### ❖ GEM GAS SYSTEM:

#### ➤ Predistribution and pump

- Construction of 2 new standard predistributions racks.
- Construction of 1 pump rack with a new arrangement setup to optimize the place in USC.
- Predistribution racks are configured also for ME0, and the options to run in close loop.



## ➤ Distribution

- **Modification RPC distributions racks for GEM insertion:**

**Concerning GE 1/1 and GE 2/1 both sides (4 racks).**

### ➤ Sequences:

- **1:** disconnect the rack on the balcony, extraction of the rack with the crane, transport to the workshop.(Fig1)
- **2:** new drawings in 2D, integration of new front panel for purge and backup.(Fig2)

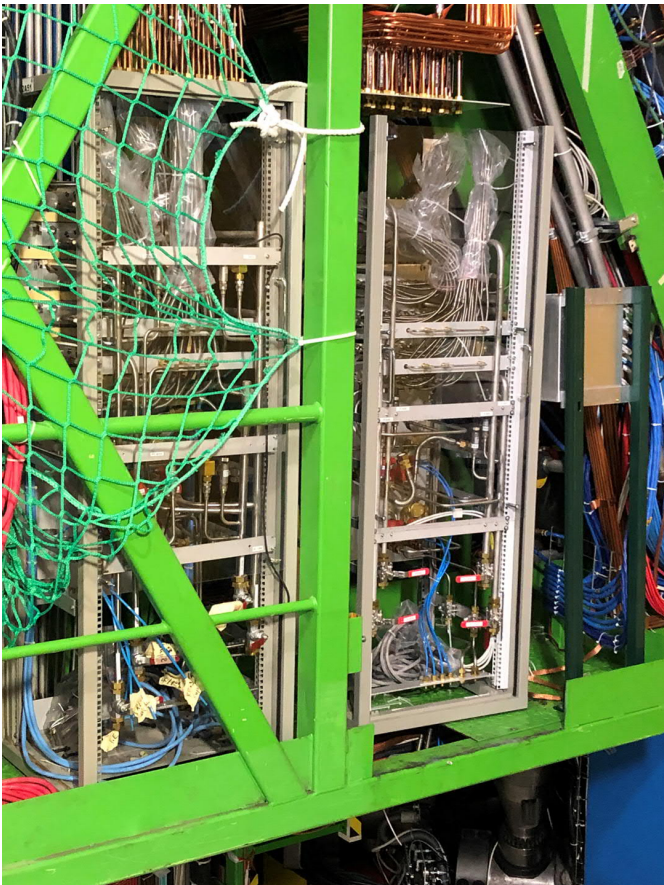


Fig1

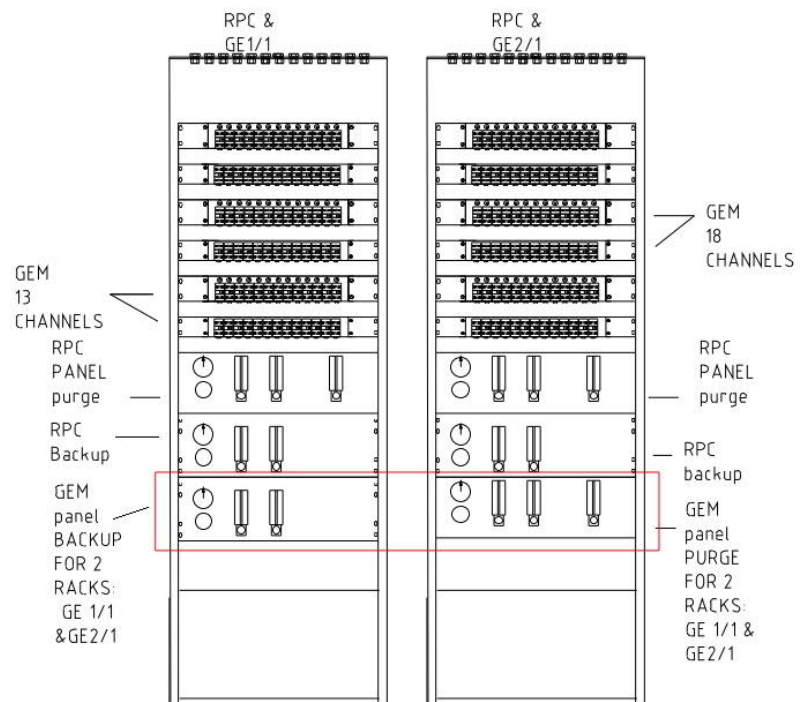
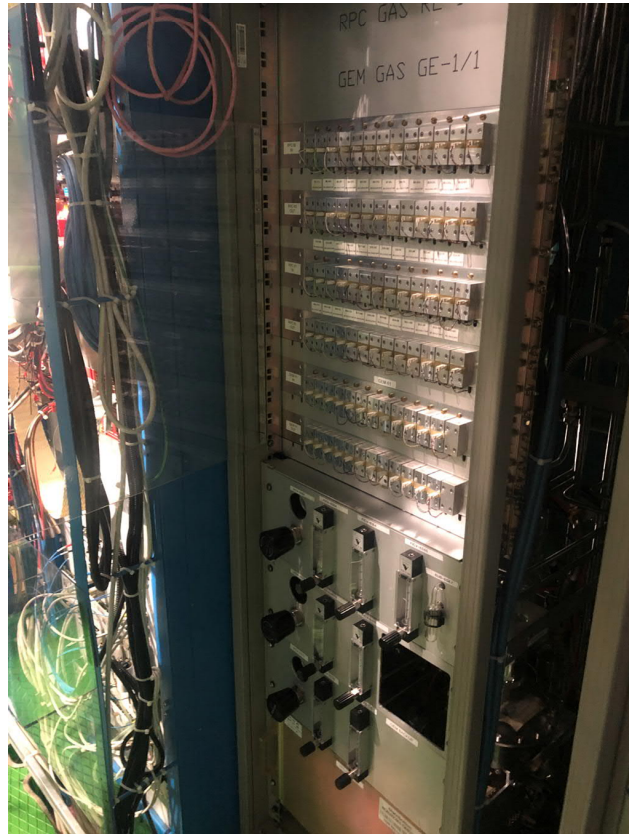
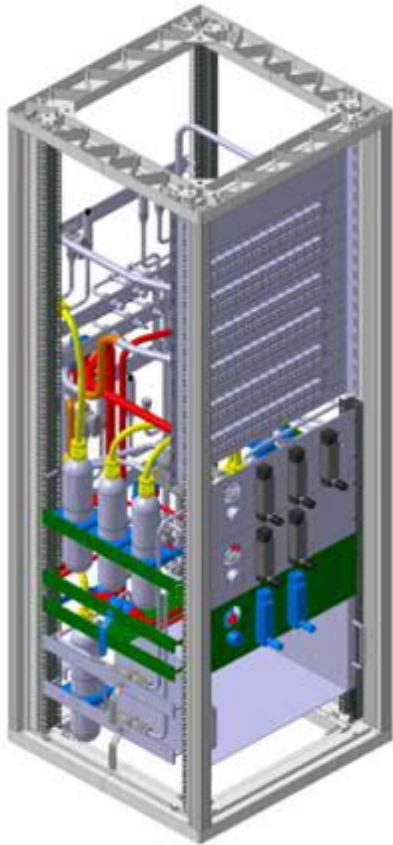







Fig2

- **3:** new integration for new pipes and element in 3D models , all the free space have been used and optimise for intervention.



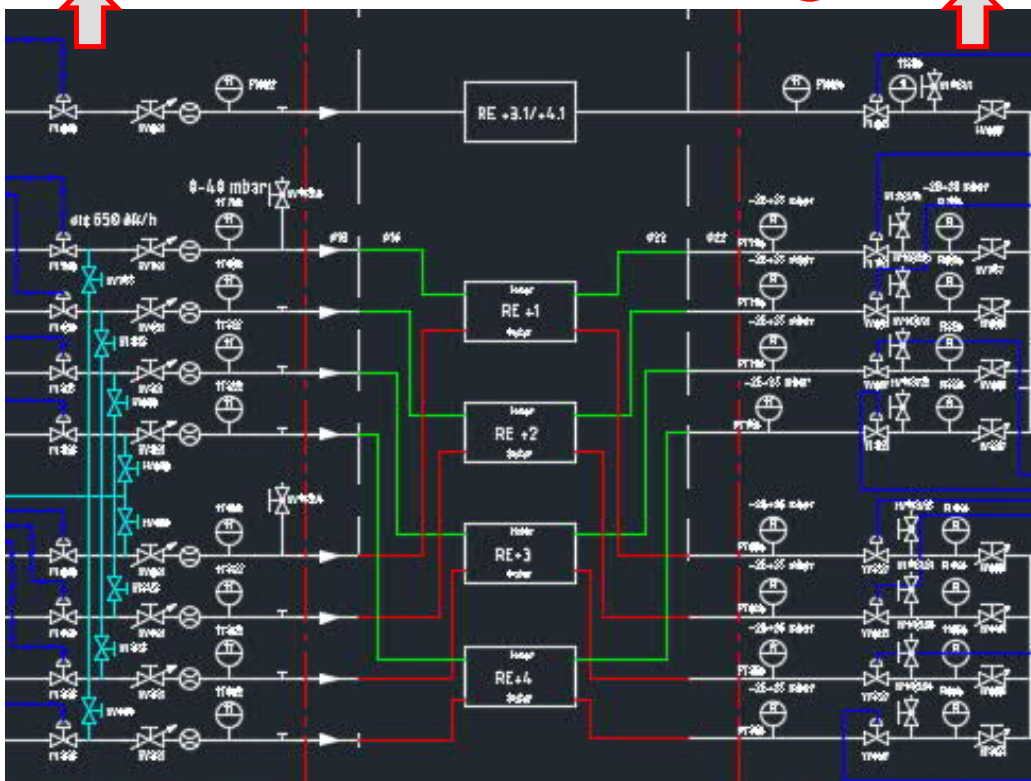
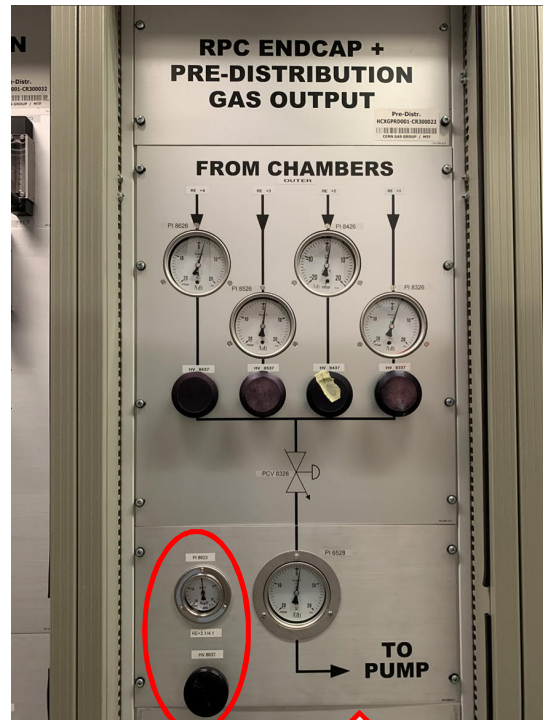
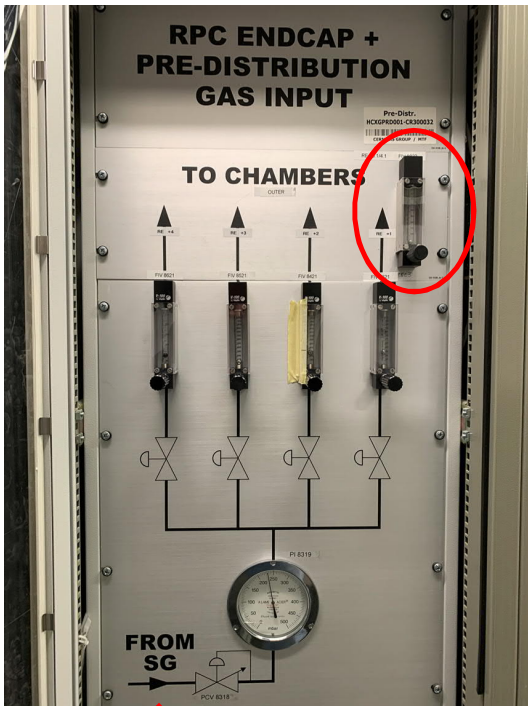
	New Components
	New Frame Components
	New Pipes
	Modifications on existing pipes
	Bubblers Flexible Pipes

- **4:** leak test in the workshop
- **5:** Re-installation of the racks on the balcony
- **6:** pipes reconnections,
- **7:** bubblers insertion, and filling
- **8:** commissioning

## ❖ RPC 3.1 GAS SYSTEM:

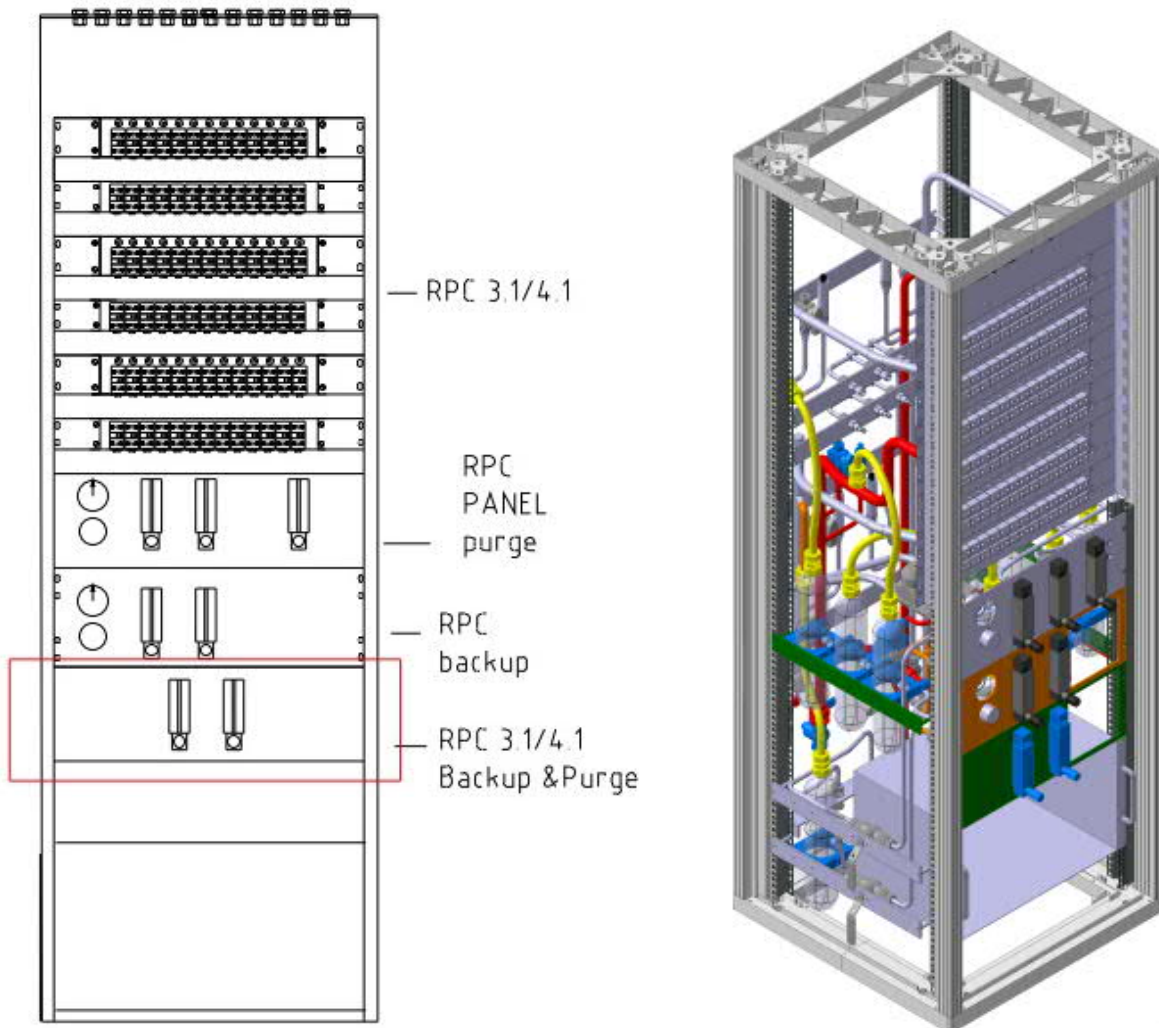
### ➤ Predistribution

- Modification existing pipes, new component installed, on old panel



## ➤ Distribution

- Modification RPC distributions racks, same process of GEM, 2D drawings, and 3D, leak test etc...



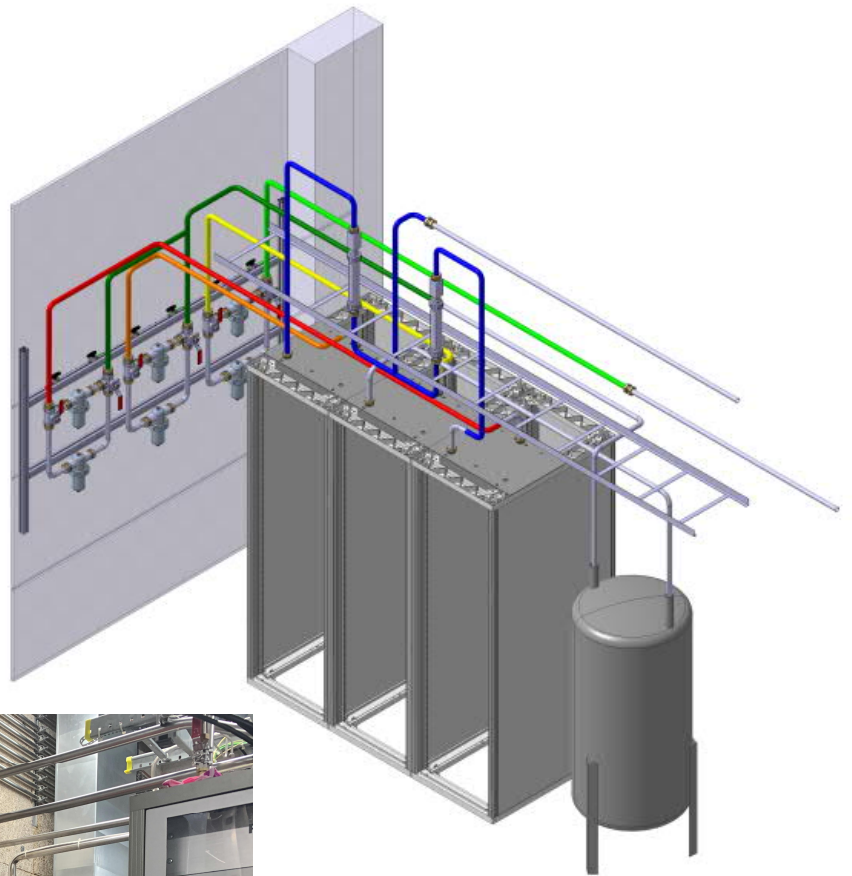
- New electrical cables between USC and UX have been installed by Russian team and connected for both system GEM and RPC
- New pneumatics valve island rack built and installed in USC
- Commissioning

## ❖ RPC NEW PURIFIERS FILTERS SETUP

- Modification and installation of new filters for the 3 purifiers, we use the same strategy as for the distributions racks of GEM: 2D and 3D drawings, with a colour code for the pipes to be modified

### The Goal of this changes:

- Better access for maintenance, filters placed on the wall.
- Control of the impedance for each filters
- Stop gas s



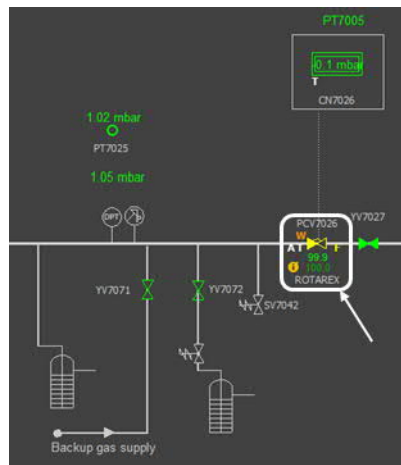
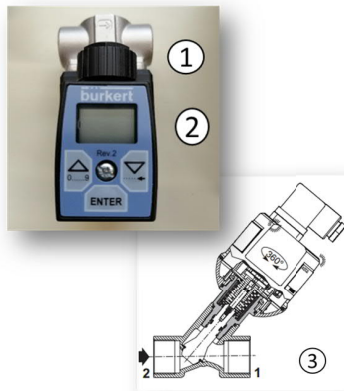
Filters on the wall

## ❖ RPC DUMMY CHAMBERS AND REGULATIONS

- 28 volumes ordered and assembled with connectors and sensors (picture), leak test done for all.



- All distributions racks modified for the 13 dummy chamber pipe.
- Installation of 4 different regulations valves in the predistribution. Test on system on going, decision of wich valve we'll going to use, as soon as we get the result.



## ❖ RPC MIXER SX5 HUMIDIFIER

- Construction of a new humidifier for SX5 mixer and modifications

## ❖ CSC and DT GAS SYSTEM

- Installation of filters on the pump module with PDT sensors.
- In the exhaust we installed also a sensor for the impedance.
- New pneumatics valve island rack built and installed in USC.
- Commisioning



## ❖ ALL SYSTEM

- Replacement all pneumatics pipe for analysis, predistribution and distributions racks: total 2600 m of pipes.
- Commissioning, and re-connections on the new valves island racks in USC.
  - Results: total consumption of N2 around 2200l/h instead up than 9000 l/h
- New PLC with new software implemented in all systems:

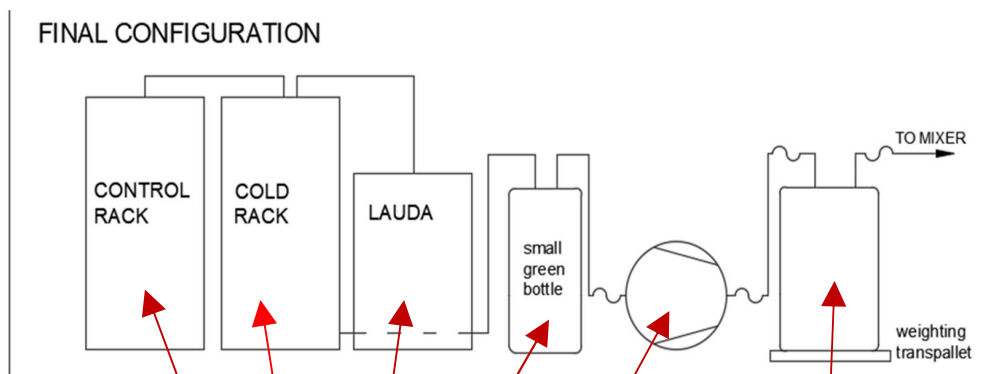


- New power supply 24/18 VDC changed



## ❖ RPC 134a RECUPERATION

- Installation setup of recuperation Freon used in ATLAS for CMS RPC.
- Integration in the SG5 building, modifications pipes on RPC system, new exhaust line built for flammable gas (heated and isolated on the roof)



Exhaust installation



## STANDARD MAINTENANCE

### ❖ Distribution racks

- **RPC**
  - Safety valves on supply line recalibrated
  - Control bubblers
  - Calibration flowcells
  
- **CSC**
  - Control bubblers
  - Adjust backup
  
- **DT**
  - New flowcells calibration ?
  - Control bubblers in single line
  - Safety valves

### ❖ Mixers, exhausts, purifiers, humidifier.

- **RPC, CSC,DT,GEM**
  - Change filters purifiers & exhaust
  - Clean pneumatics valve on bottom purifiers
  - Calibration mixer MFC
  - Change water pump humidifier (RPC)
  - Clean pressure regulator
  - Check status purifier pump
  
- **ID FLUSHING**
  - Recalibration safety valves
  - Modification power supply