

CMS Gas System Status meeting – LS3 planning

EP-DT-GD Gas Team

Gas system general maintenance

Standard maintenance procedure

It will be performed along the 3.5 years, some activities at the beginning, others at the end. Some transparent for gas system operation, other will require the stop.

- MFC verification and recalibration
- Pump maintenance
- Filters maintenance
- Purifiers maintenance
- Safety valve verification + recalibration
- Pressure volume to re-qualify
- Leak tests of all modules
- Check/calibration of flowcells

The idea is to do as LS2: for some activities we will coordinate centrally, for other activities the technician responsible of the experiment will decide when to do

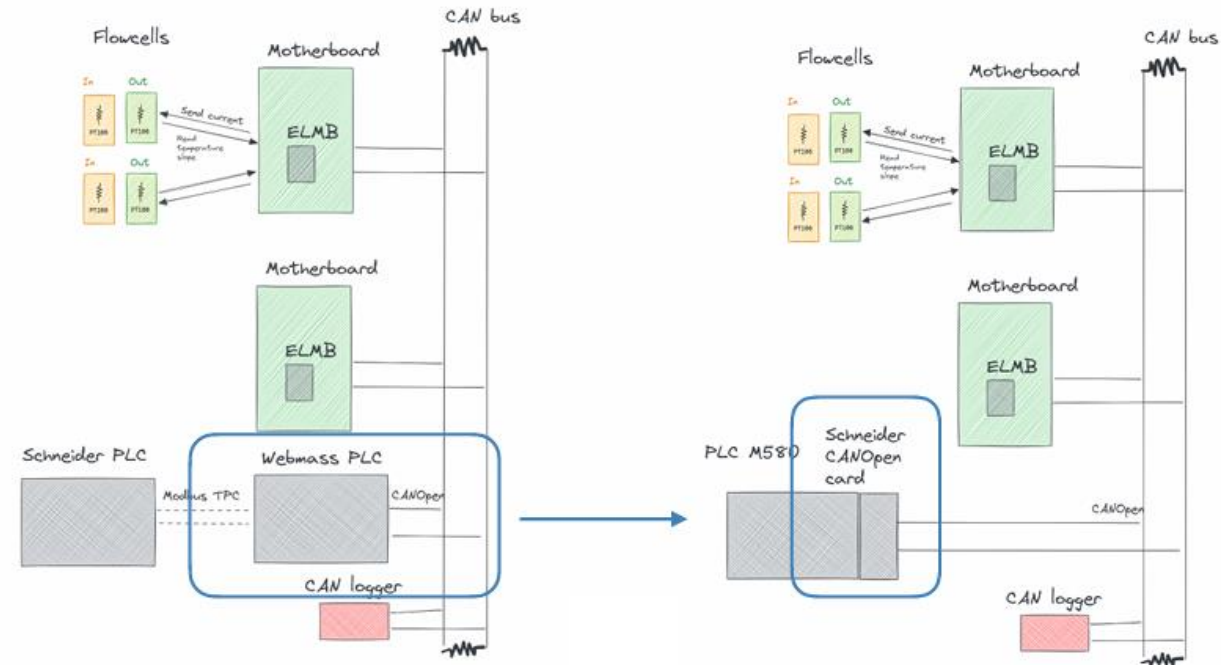
General upgrades: new flowcells readout system

New readout will be installed in all gas systems with flowcells reading

- Required due to obsolete PLC used (no stock available and not manufactured anymore)
- MDT was used as a pilot system, new readout is validated

For each gas system

- Time required: ~couple of days + commissioning
- Stop system required- Schedule will be organised based on all experiments and resources
- Date of intervention for each system will be agreed with each sub-detector system team



CMS: preliminary schedule overview

CMS Gas System Activities for LS2																		
Activities	FSU (week)	FTE (week)	System stop (week)	2026			2027				2028				2029			
				T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
USC55 Network blackout					x	x	x	x										
Upgrade gas infrastrcutre in 3570 (D. Jaillet)							x	x										
Undergorund ODH/gas detection degraded								x										
AUG test									x									
Standard M&O																		
Generic M&O for all systems for each system	30	40	-		x	x	x	x	x	x	x	x	x	x	x	x	x	
	-	-	3															
	30	40	-															
RPC																		
Gas system status				ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	
High flow test	0	1			x	x												
Econon in distribution input	3								x									
Regulation valve pump upgrade	1	1							x									
Humidifier refurbishment	1								x									
Check/modification flowcells																		
GEM																		
Gas system status				ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	
ME0 construction	8						x	x										
ME0 installation	1								x									
O2/H2O analysis station	1						x	x										
DT																		
Gas system status				ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	
CSC																		
Gas system status				ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	
Dismounting and mounting of of station 1					x							x						
Flushing system																		
Refurbishment of USC55				ON														
					x	x	x	x	x									

CSC

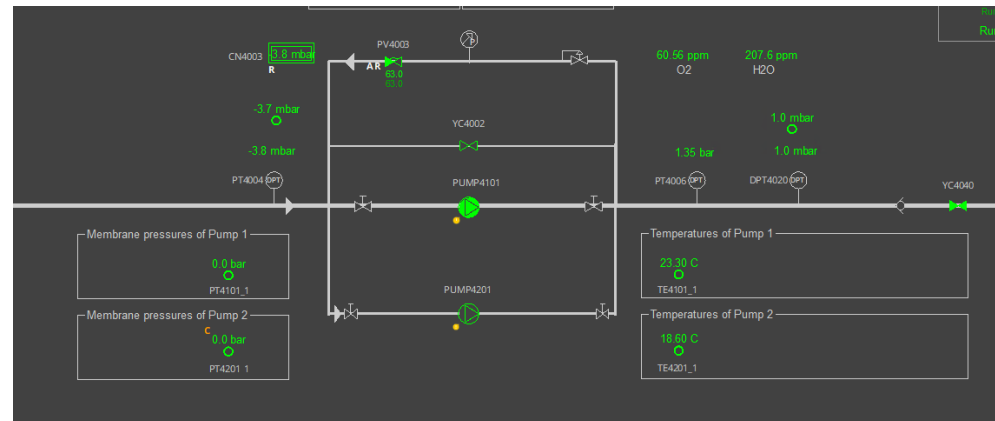
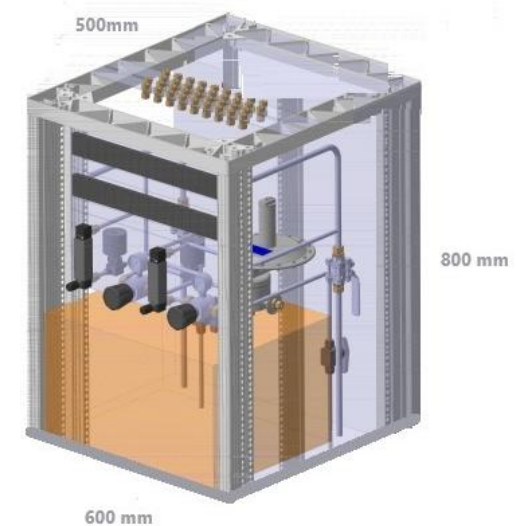
- Gas system needed for station 2, 3 and 4 with Ar/CO₂
- Station 1 will be dismantled beginning of LS3 (T3 2026) and remounted in T2-T3 2028
- New PLC for CF₄ recovery system

DT

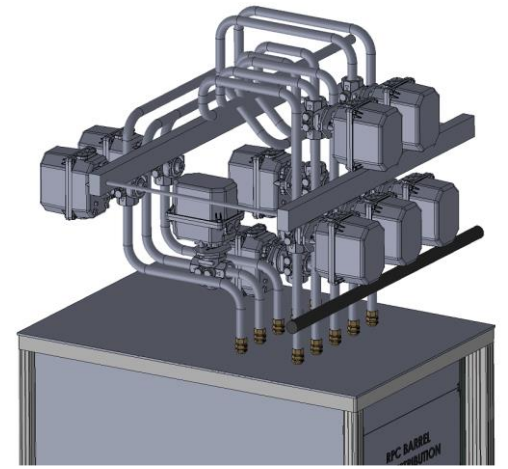
- During LS3 Ar/CO₂ 85/15 in closed loop with 2000 l/h
- For maintenance, stop allowed <2 days

GEM

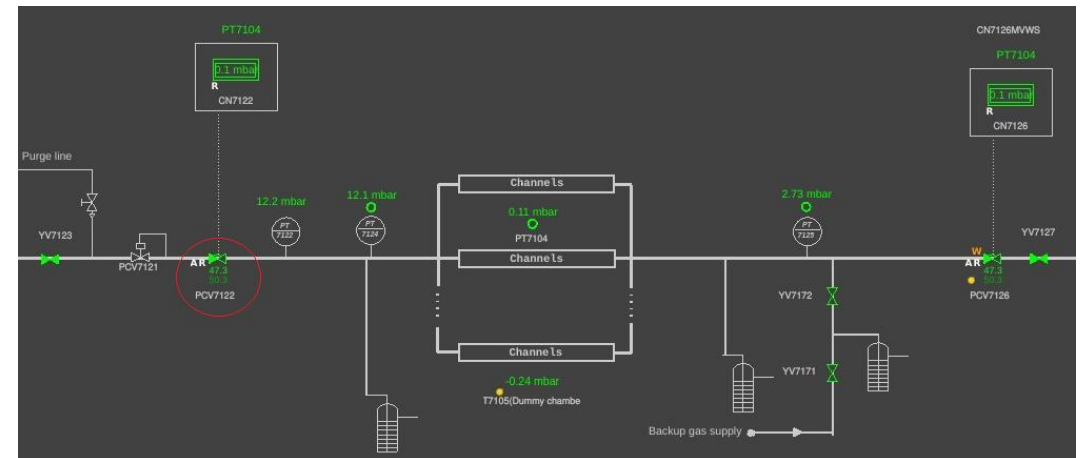
- **T3 2026** → installation ME0 distribution racks
- **T1 2027** → SX5 ME0 flushing with 200 l/h. We could use the RPC mixer following a recalibration of MFCs.
- GE2/1 will stay in place
- **T1 2028** → flowcells
- **T2-T3 2028** → installation of ME0 chambers
- **2027** → New O₂/H₂O station + possible integration of GC analysis



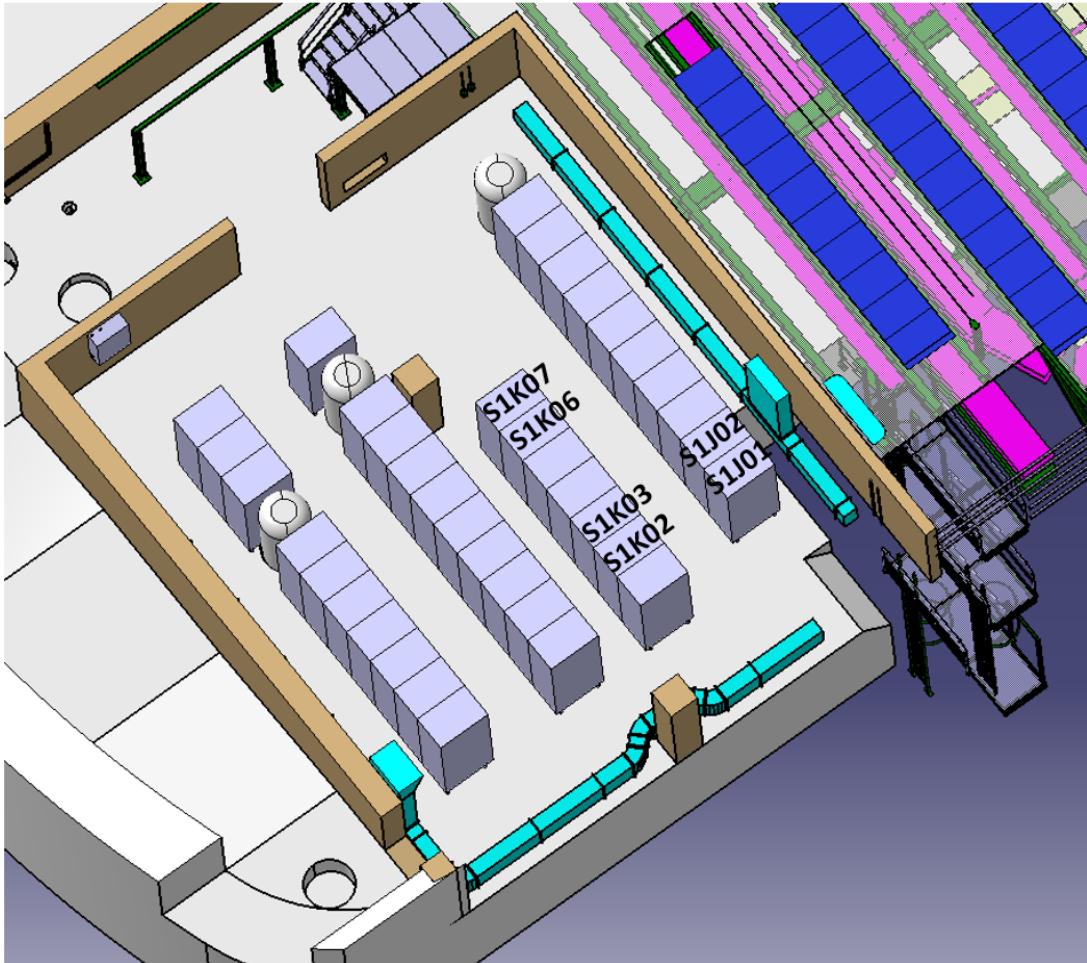
RPC



- **From T3 2026 to T4 2027** → flushing with R134a only
- **T4 2027 and on** → Gas mixture needed
- **T3 2027** → Econex installation (AUG) for each supply line of the Barrel in the pre-distribution racks USC gas room
 - Pipes modifications needed, and special mechanical support.
 - Software modification and commissioning
- Double flow in one rack test
- Regulation valve pump from manual to automatic



Flushing



- **T3 2026** → Disconnection and removal of flushing equipment
- **T4 2026** → Refurbishment and installation Phase 2 gas room flushing racks and electrical cabinet
- **T1 2027** → Piping and cabling between racks
- **T1 2027** → Commissioning gas room and mezzanine racks