

ND280 TPC Status

Weekly review: Going from Stand-by to normal operation mode

Initial TPC Status - (27 Feb, 2018)

- During the Stand-by mode the TPC electronics and HV supplies are switched off and only a small flow of Argon is provided both to the TPC gap and its inner volume.
- To prevent system failures most of the items (alarms, analyzers, pressurized air, heaters, etc) are also switched off.

For preparing the system on its normal operation state a large amount of gas is necessary. On 27 Feb, 2018, a full set of bottles was ready for being mounted on the system. The Isobutane heaters were ON.

Since then, John Walker and myself, followed the instructions in: <https://www.t2k.org/nd280/tpc/operation/gas/switch-from-standby-to-purging/switching-from-standby-to-purging-tpcs>

Mixing Room's Computers

The Gas system is adjusted through manual valves, and automatic valves that can be remotely controlled using a software known as EPICS.

Problems

- EPICS was installed in TPCGHSPC, a computer in the Gas Mixing Room. However, it was found faulty in 28 Feb, 2018.
- There was a warm spare computer TPCGHSPC2 in the mixing room. However, EPICS was not properly working on TPCGHSPC2.

Solutions

- The Hard drivers from TPCGHSPC were mounted on TPCGHSPC2.
- A new warm spare TPCGHSPC3 was prepared, from which is possible to run EPICS.

Gas Banks

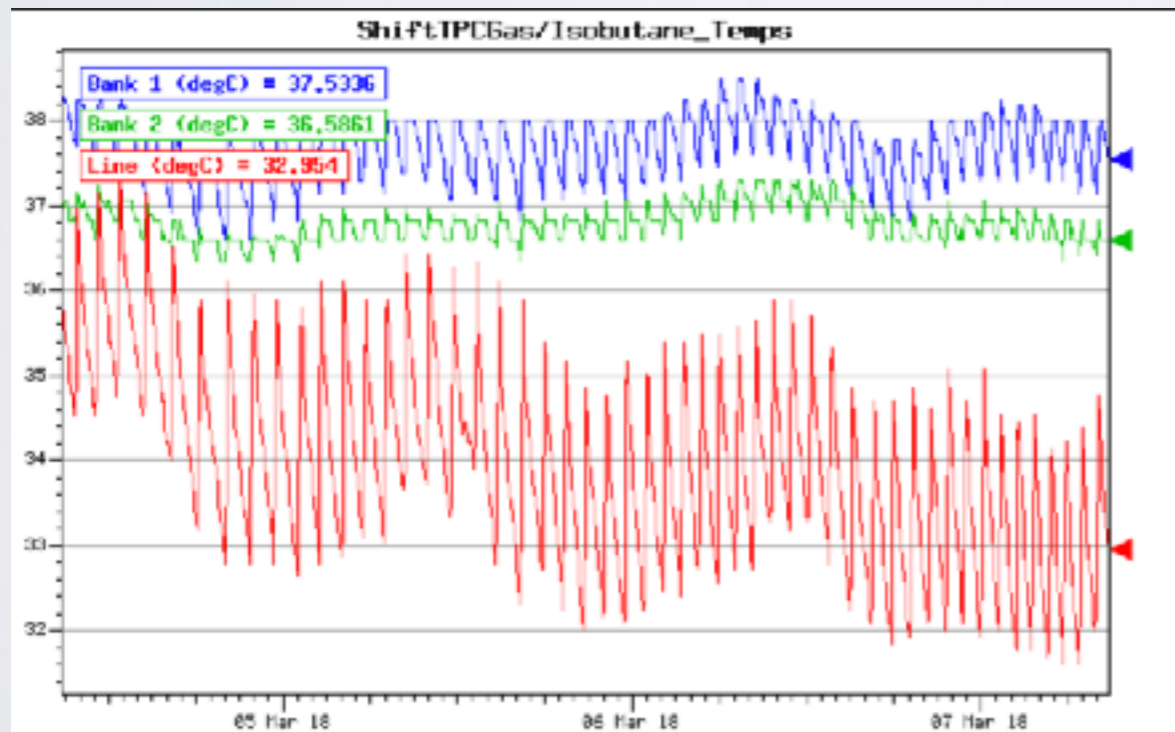
New bottles of Ar, CO₂, CF₄ and C₄H₁₀ were connected.

Problems / Solutions

- C₄H₁₀ pressure was too high. / Bottle reinstallation.

Observations

- No gas leaks were found.
- The pressurized air gas was installed (+spare).



Alarms

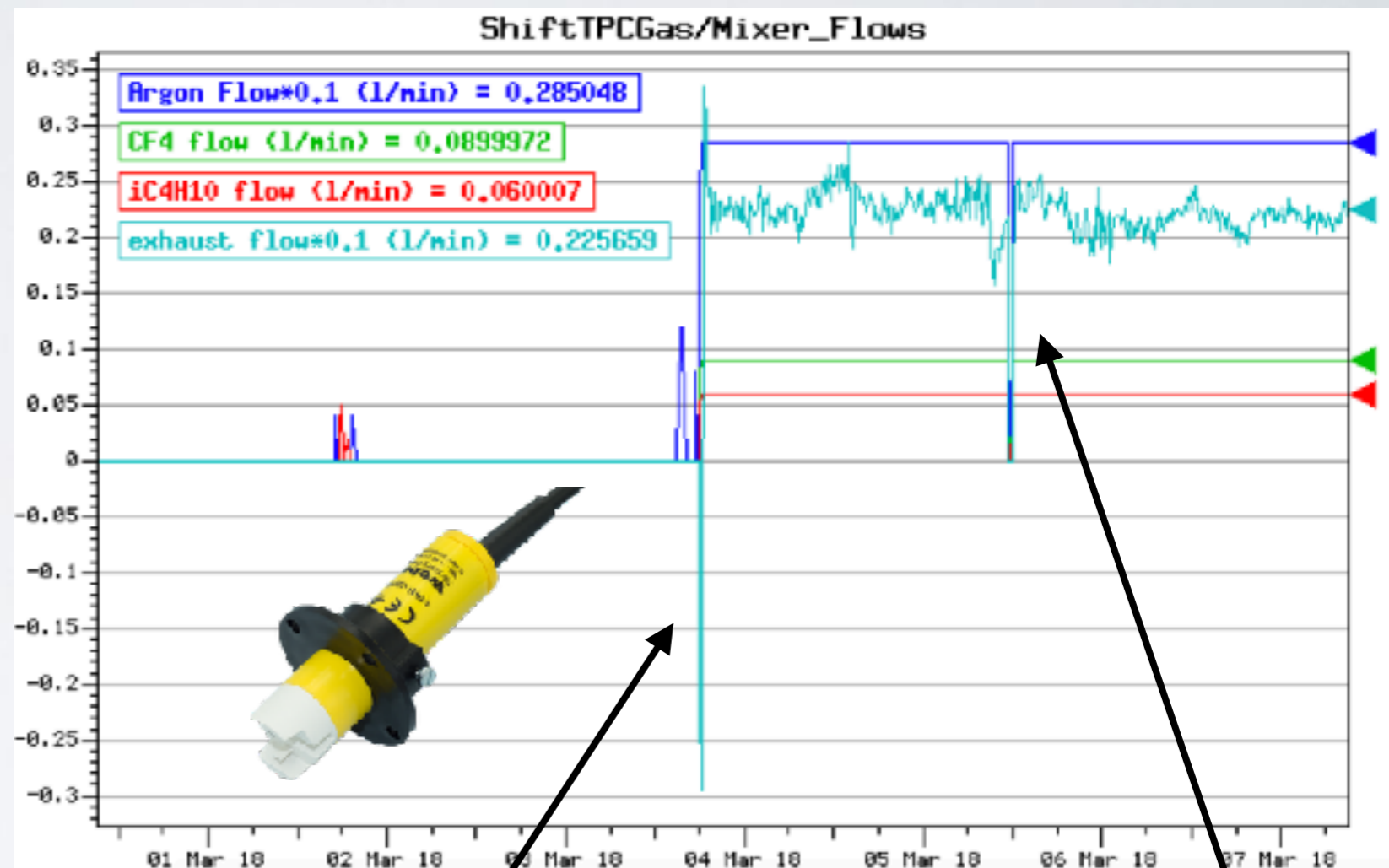
There are many gas system alarms that ensure the secure and normal operation of the system. All of them have been successfully tested.

Problems / Solutions

- During the testing a *Vent Captor* was found to be faulty. / Replaced.

Observations

- All the tests provided numbers in a very good agreement with previous tests. Currently the TPC Gas alarms Status is 'ON'.



Normal operation mode starts

Vent Captor replacement

Gas Purge

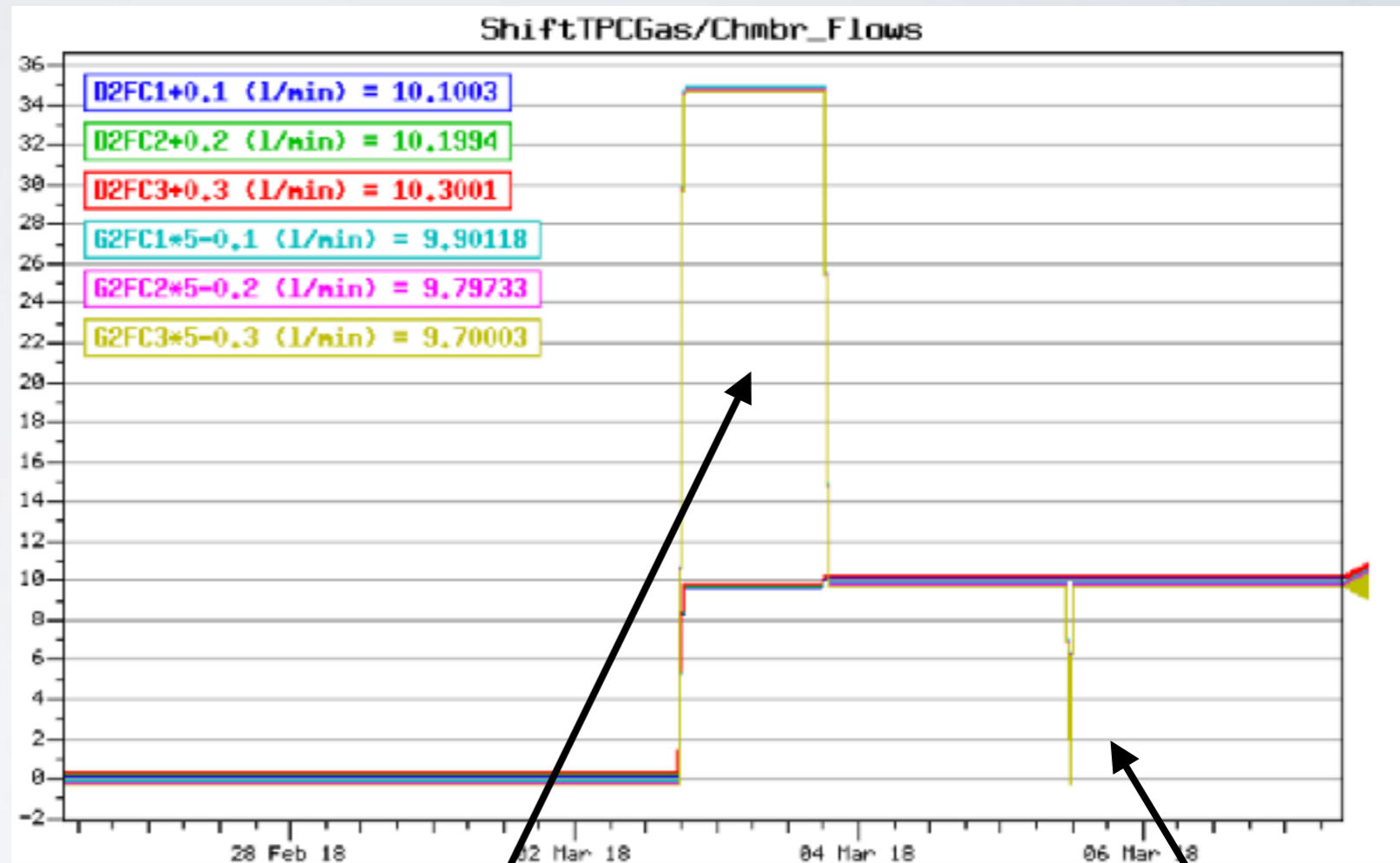
To recover the normal mode it is fundamental to fill the volumes with the proper mixture of gases. After 24h of purge, approx. 5 full volumes of gas were replaced.

Problems / Solutions

- The purge worked fine. There weren't unexpected events.

Observations

- The *Vent Captor* replacement triggered most of the gas system alarms.
- Currently the system is stably supplying 3L/min of fresh gas.



Purge

Vent Captor replacement

Gas Mixing

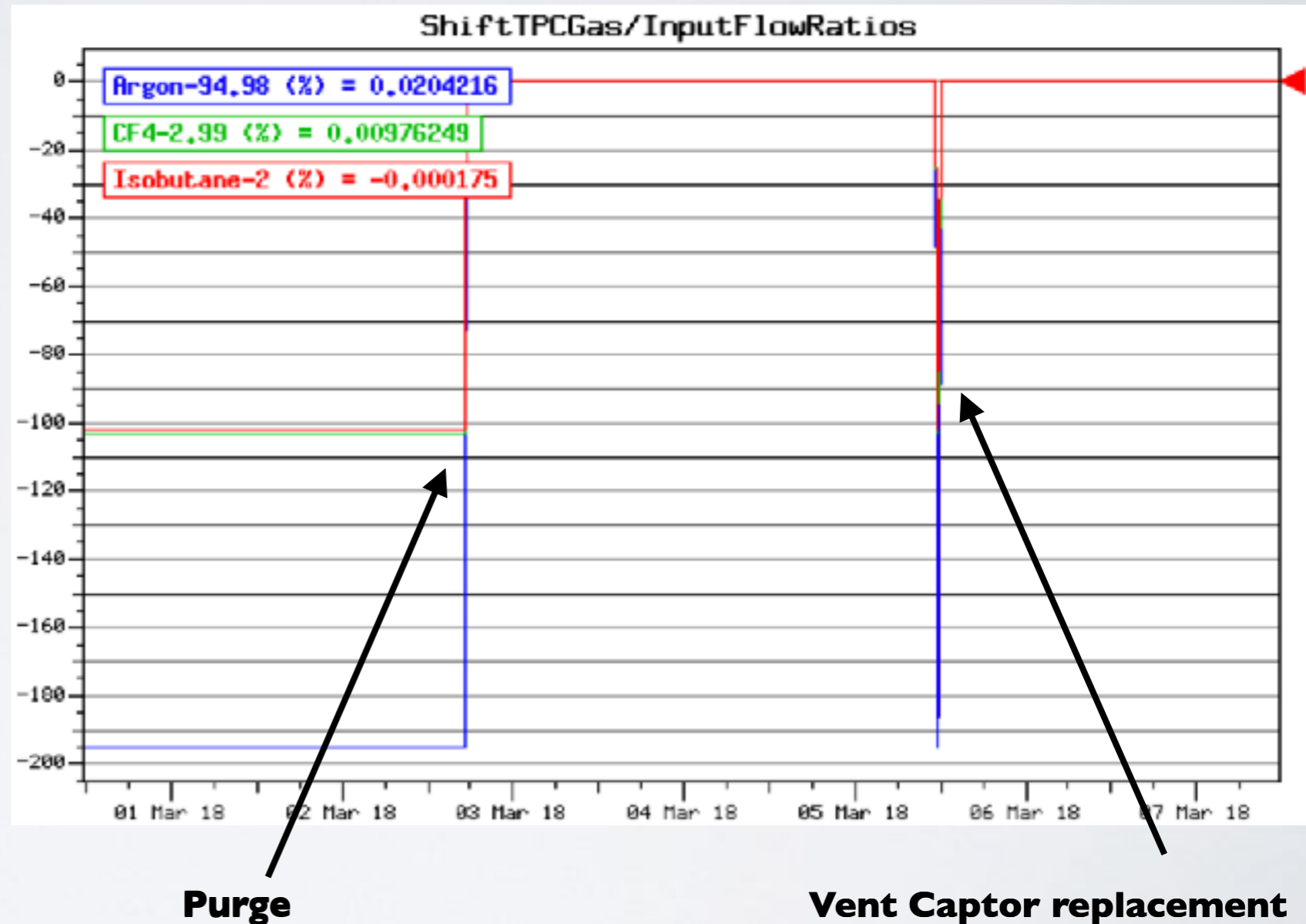
After the purge is completed a 95% Ar, 3% CF₄, 2% C₄H₁₀ is expected in the sensitive volume of the TPC. After the purge we completed the procedures to turn on the analyzers.

Problems / Solutions

- MGA-3000 multi-gas analyzer has a very bad precision measuring C₄H₁₀. / There is a different and independent C₄H₁₀ analyzer.

Observations

- The calibration C₄H₁₀ bottle is almost empty.
- The gas mixture is correct.



TPC's HV

The TPC's works using a HV supply for the central cathode, that has to be settled at 25kV for drifting the electrons into the readout planes. The MM also use 350V power supplies.

Observations

- The HV turn on was completed successfully. We had to reboot the ISEG.
- TPC alarms are ON
- After applying the HV the first tracks appeared on the TPCs.

Most Recent Activities

- An Argon Bank was fully consumed during the purge. It has been already replaced.
- The laser system is now working. A 30min run has been done daily.
- The purifier POPFI has begun the process of regeneration
- The daily checks have not revealed signs of abnormal activity, including leaks.