



# Detector Support Group

## Weekly Report, 2017-05-31

### Status

#### Solenoid

- PLC code edited to add temperature sensor that will be used for the new relief valve.
- Read out of temperature sensor on the EPICS SST- Helium screen verified.
- Data types for temperature, load cell, and hall sensors changed to match data type assigned for EPICS screens.
- Noted pneumatic valve has different process variable names in the Solenoid Vacuum P&I diagram (PV8600TB) and, for the same valve, in Cryogenic P&I diagram (PV8600).
  - \* George Biallas informed to make the names the same.
  - \* PLC code changed to handle correct process variable name.
- Fixed voltage excitation calculation for Cernox sensors added in “LV chassis to LV cRIO” program.
  - \* Solenoid version uses 5 mV as target voltage instead of 15 mV as with Torus.

#### RICH

- Hardware interlock’s LabVIEW code debugged.
- Error indicators for each of the 37 interlock statuses generated.
- Different appearance of text and interface to display errors and normal operations for interlocks status configured.
- Event handling loop completed.
- Code to control humidity, temperature, N<sub>2</sub> flow, airflow, and air pressure interlock thresholds developed.
- Front panel control view to enable and disable the interlocks generated.
- Initial testing and debug of Hardware Interlock EPICS CSS screen completed.

#### FT

- Raw Data Monitoring tab on GUI for EPICS based hardware monitoring system created.
- EPICS names for signals read on tab created.
- Signal names assigned to CS Studio objects.
- Test procedures for interlock system’s humidity sensors (already installed in detector) of the calorimeter developed.
- Humidity sensor’s interconnects on detector did not match documentation.
- Humidity sensors’ output voltage matched expected results.
- Interlock override for LV and HV, with keyed switches on cRIO chassis allowing program updates and system rebooting without interrupting operation of detector designed and implemented.
- Gas flow cable modified.
- Cables for interlock system fabricated.

#### Hall D

- Solenoid NBX communication module lost contact with Lakeshore temperature and mass flow sensors. Resetting module restored communications.
- BCAL chiller set points lowered to 40°F on 05/30/17.



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### Antonioli, Mary Ann

- Using CS Studio, created Raw Data Monitoring tab on GUI for **FT** EPICS hardware monitoring system.
  - \* Created EPICS names for signals read on tab.
  - \* Assigned signal names to CS Studio objects.

### Arslan, Sahin

Absent

### Bonneau, Peter

- Met with Wesley Moore and Nathan Baltzell regarding EPICS programming status for all interlock systems.
  - \* FT and RICH will have EPICS interface completed when installed.
  - \* SVT system will be upgraded with EPICS interface during summer.
  - \* Discussed interlock status signals needed for CLAS12 alarm handler and CS-Studio GUIs for each system.
- Worked with Amanda, Tyler, and Pablo on initial EPICS interface integration into **RICH** LabVIEW real-time program.
  - \* Real time system debugging has started, using EPICS interface.

### FT

- Worked with Amanda on system integration testing in preparation for installation of hardware interlock electronics in EEL.
  - \* Developed test procedure for FT interlock system calorimeter humidity sensors already installed in detector.
  - \* Humidity interconnects on detector did not match documentation.
  - \* Humidity sensors' output voltage matched expected results.
- Designed and implemented interlock LV and HV override, with keyed switches on cRIO chassis allowing program updates and system rebooting without interrupting operation of detector. Started modifying program for integration of overrides.
- Worked with Mindy on cRIO cables.
- Held daily meeting on Hall D status and EPICS controls monitoring.
  - \* Solenoid NBX communication module lost contact with Lakeshore temperature and mass flow sensors. Resetting module restored communications.

### Campero, Pablo

#### Solenoid

- Wrote PLC code to add temperature sensor that will be used for new relief valve.
  - \* Verified that temperature sensor is currently read on EPICS SST- Helium screen.
- Reassigned different data types for temperature, load cell, and hall sensors to match current data assigned on EPICS screens.
- Noticed discrepancies of the Solenoid vacuum signal name.



## Detector Support Group

### Weekly Report, 2017-05-31

- \* Informed George Biallas of needed changes to pump diagram.
- \* Changed PLC code to accept correct signal name.

#### RICH

- Debugged hardware interlock LabVIEW code.
  - \* Generated error indicators for each of 37 interlock statuses.
  - \* Configured different appearance in text and interface to display errors and normal operations for interlocks status.
- Completed event handling loop.
  - \* Generated code to control humidity, temperature, N<sub>2</sub> flow, airflow, and air pressure interlock thresholds.
  - \* Generated panel control view to enable and disable the interlocks.

#### Eng. Brian

- Still no errors on Torus cernox sensor since last start-up; will continue to run/monitor values.
- Met with Stefan Aune about MVT gas setup in EEL. Matt/Bob approved running Ar only in EEL/125.

#### Gas System

- Installed spare TCU with Marc and zero/spanned with Ar and CO<sub>2</sub>:  
<https://logbooks.jlab.org/entry/3473866>
- Changed full scale for DC region MFCs: <https://logbooks.jlab.org/entry/3473958>
- Met with Marc, Bob, Denny, and Morgan on possible safety system changes. Bob will follow-up with Mac on need for pressure controls. Two leading solutions are to remove pressure controls and get rid of safety system (only use bubblers) or more major modifications (adding PLC, MFM, moving pressure sensors).

#### Hoebel, Amanda

- Analyzed LTCC leakage rates.
  - \* Started Python code to determine number of fillings over specific period of time.

#### FT

- Tested humidity sensors.
  - \* Used multimeter to check wire resistance.
  - \* Colors of wires are incorrect compared to sheet given by FT group.
  - \* Voltage readback was ~2.5 V (30% humidity).
- Started learning hardware interlock LabVIEW program.
- Monitored EPICS and logbook.
  - \* BCAL chiller set points lowered to 40°F on 05/30/17.



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## Weekly Report, 2017-05-31

### Jacobs, George

#### GAS Systems

- Completed pressure and leak testing of MVT EEL test setup; final inspections and paperwork are still required
- Performed detailed analysis of DC PID and safety solenoid valve interlock operation.
- Discussed eCAL N<sub>2</sub> purge supply work with Doug Tilles.
- Met with MVT EEL Test Setup gas system DA multiple times.

### Leffel, Mindy

- Discussed with Youri repair of HTCC BNC cable.

#### FT

- Discussed more cables with Peter.
- Modified gas flow cable.
- Fabricated cables.
  - \* 12 interlock override, two with 20 ohm resistor.
  - \* 26 jumpers: 8 power and 18 ground.
- Hooked up new computer and continue to work out issues with computer center.
- Set up old computer for use with microscope.

### Lemon, Tyler

- Completed initial testing and debug of RICH Hardware Interlock CSS screen.
  - \* All basic functions work correctly.
- Added Brian's fixed voltage excitation calculation for Cernox sensors in LV chassis to Solenoid LV cRIO program.
  - \* Solenoid version uses 5 mV as target voltage instead of 15 mV as with Torus.
  - \* Wrote log entry 3473922 (<https://logbooks.jlab.org/entry/3473922>).

#### LTCC

- Wrote Python program that calculates leak rate based on pressure drop in sectors.
  - \* Results do not match Brian's mass flow readings.
  - \* Refining and debugging of code in progress to ensure correct algorithms.
- Monitored flow and differential pressure for each sector on a daily basis with Amanda, Pablo, Peter, and Amrit.
- Wrote RICH exit window assembly presentation for DSG meeting of 2017-05-30.
  - \* Researched calculation of radiation length for compounds and composite materials to determine radiation length of Mylar/Tedlar sheet used for exit window.



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## Weekly Report, 2017-05-31

### McMullen, Marc

- Changed **SVT** N<sub>2</sub> gas bottle.

#### DC

- Tested both mix system TCUs with Brian. Mix 1 output (100 mA out of 4-20 mA) was off-scale and Mix 2 had no output.
- Replaced both TCUs with spares and calibrated by switching between 100% CO<sub>2</sub> and 100% Ar, and adjusting zero and span.
- Attended DC gas safety system planning with Hall B Engineering/Mechanical and Brian.
  - \* They are finalizing changes to alarms and safety solenoid system locations and deployment.
  - \* They are considering relocating gas quality sensor to Hall, which may eliminate need for safety system. Bubblers alone would be used for pressure protection.

#### LTCC

- Continued leak/usage study (units are L/day)

S1 = 96.24      S2 = 39.83      S3 = 125.54      S4 = 52.66      S5 = 37.92      S6 = 124.55