Hall A SoLID Solenoid Flow Controls and Monitoring of Current Leads

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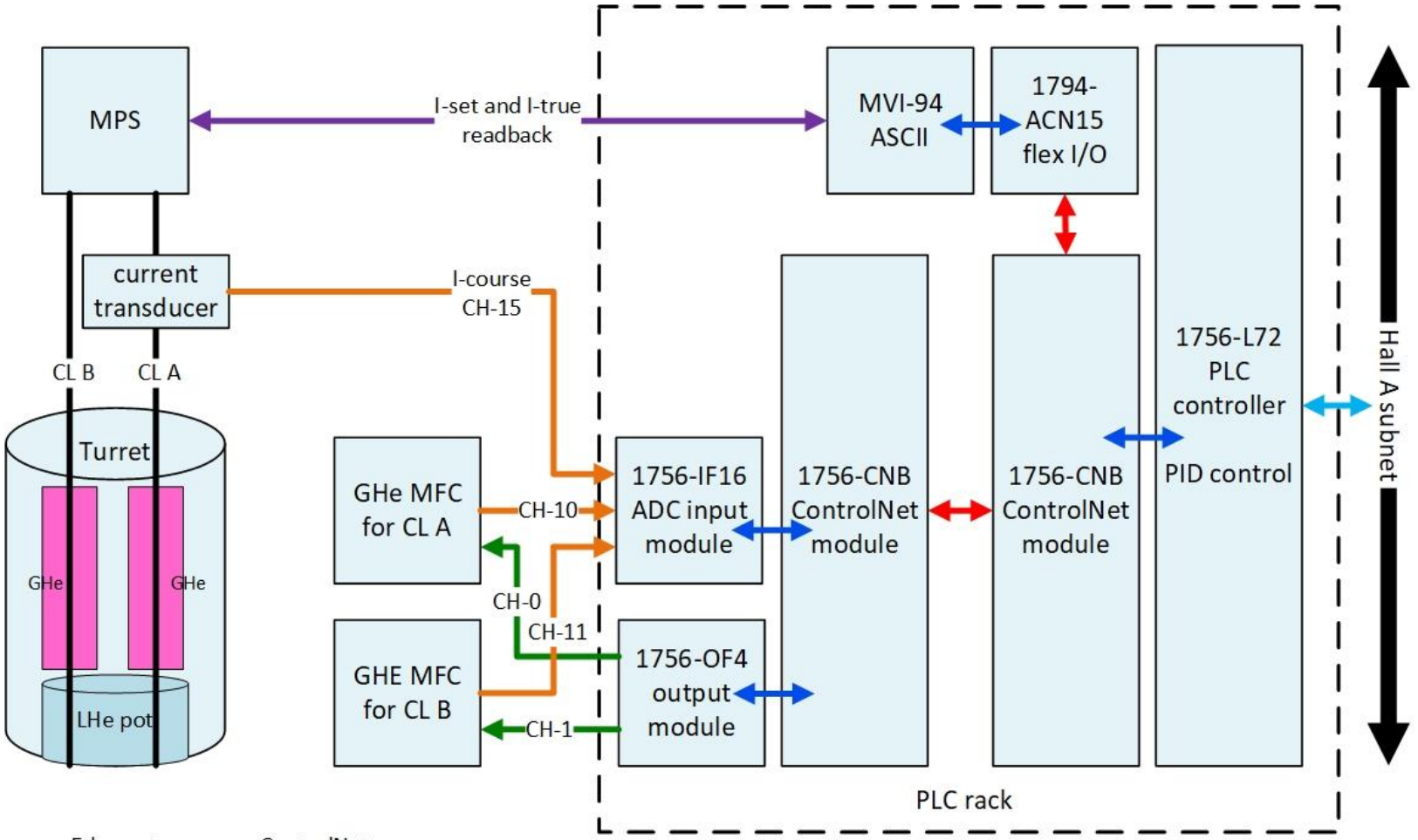
Schematic of Controls Overview Instrumentation for Leads Flow – Proposed

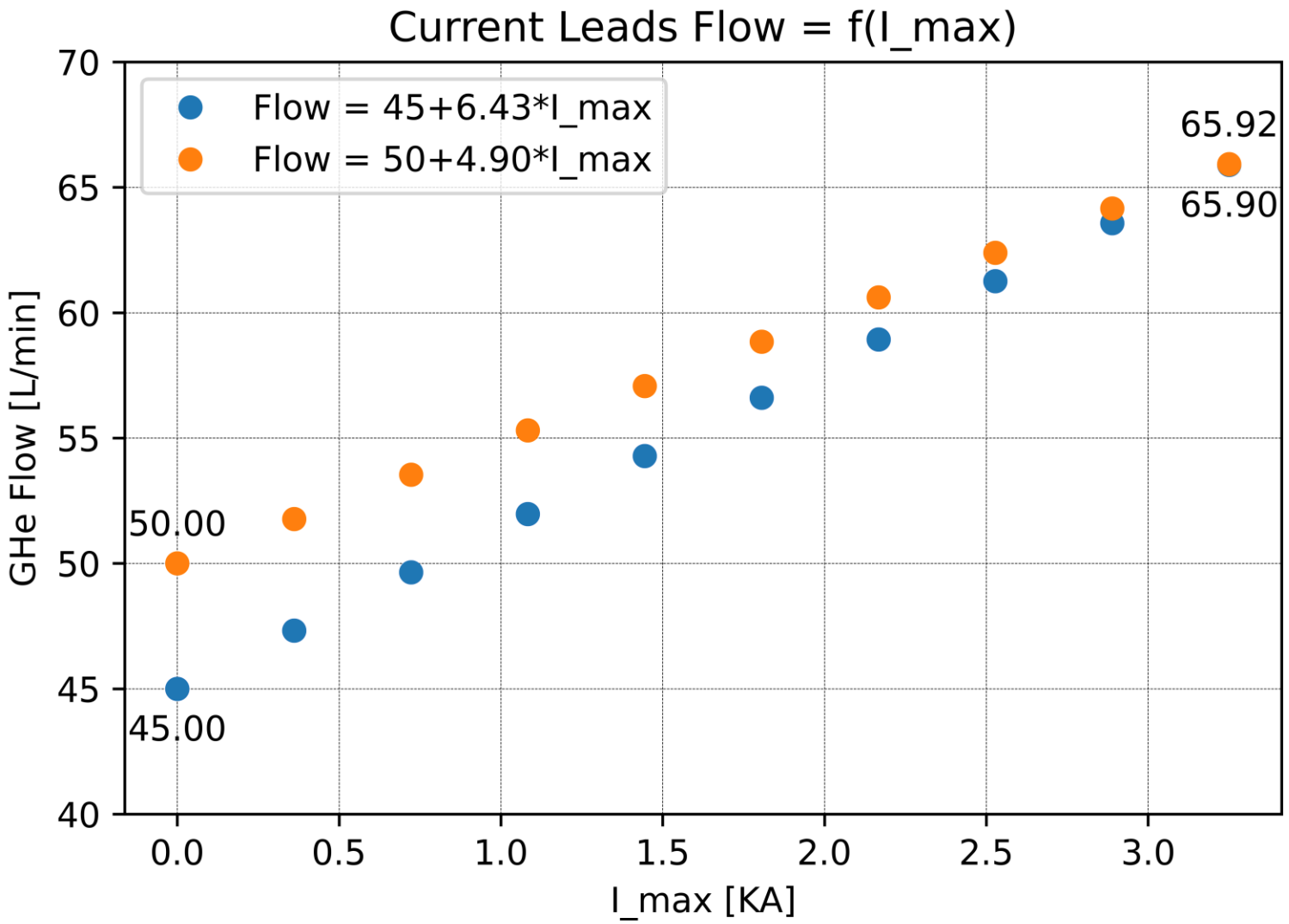


Current Leads GHe Flow Calculation

- Reference parameters from Oxford Operations Manual
  - Lead flow range is 45–50 L/min at no current
  - Lead flow 66 L/min at 3266 A

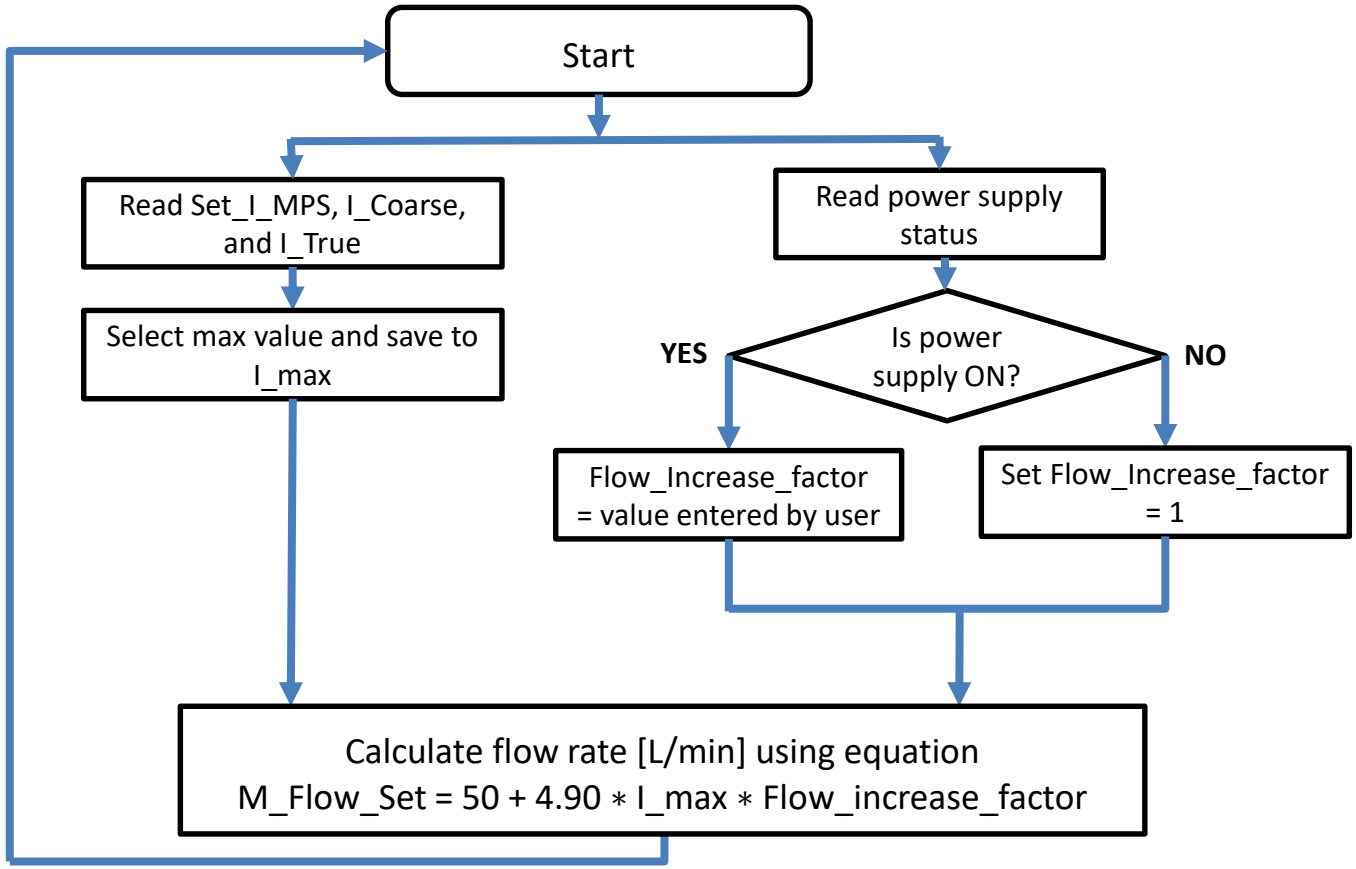
- Current lead flow range as a function of current is calculated from the formulas below:
  - $Flow = 45 + 6.43 * I_{max}$ to $50 + 4.9 * I_{max}$ L/min
    - Units for coefficients shown in F=f(I_{max}) relations are L/min*KA
    - Normal expected current through the leads is I_{max} = 3.250 KA
    - Flow range required is 65.8–65.9 L/min
  - Final value will be determined after testing

Current Leads GHe Flow Calculation – Cont.



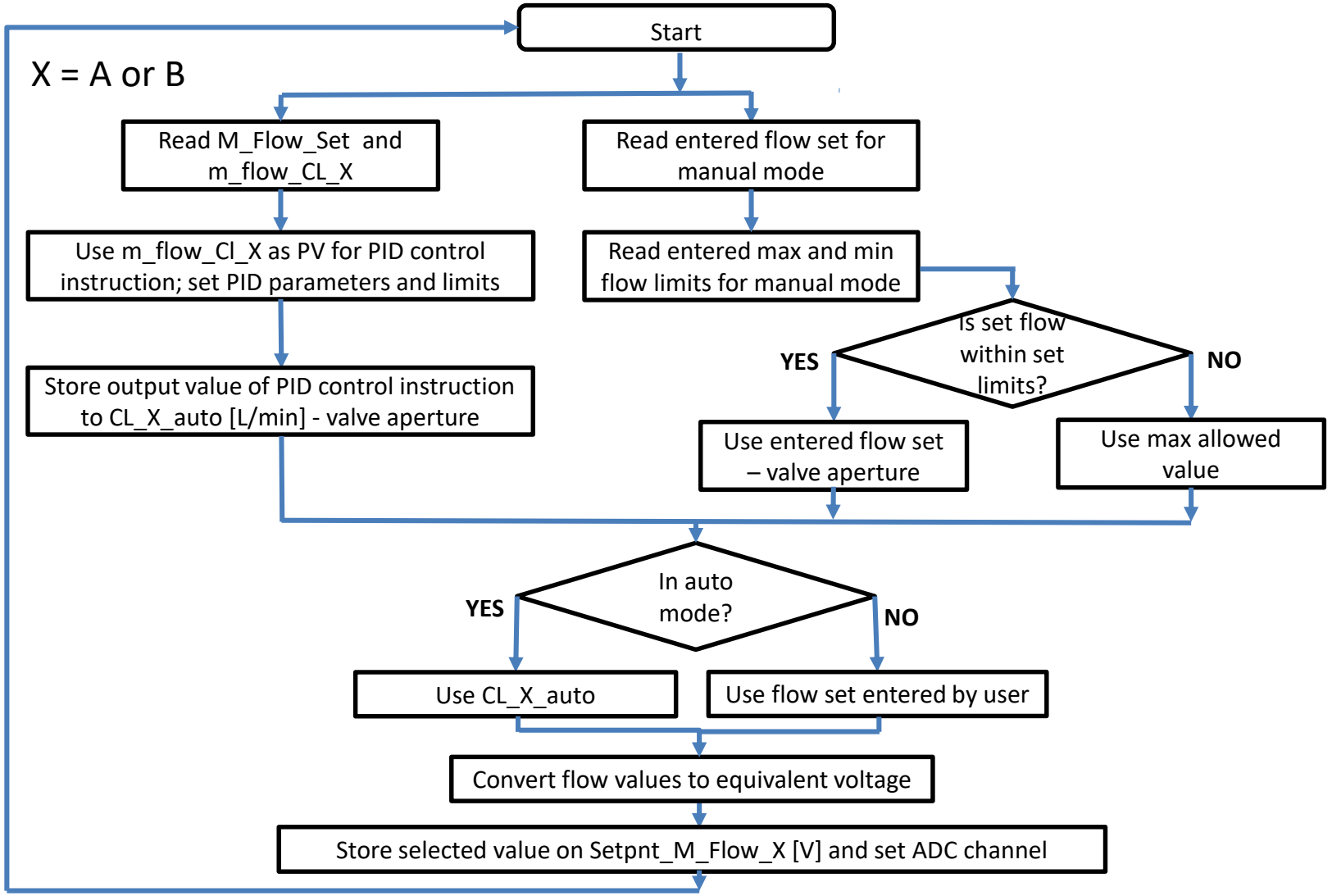
PLC Controls

- Calculation of flow set value based on current through leads



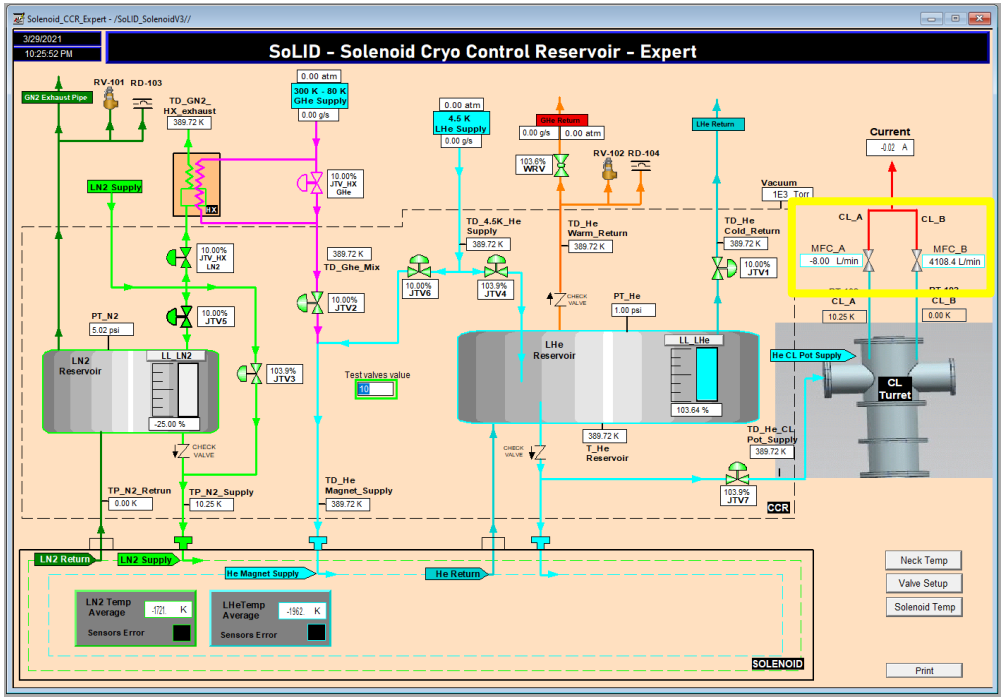
PLC Controls

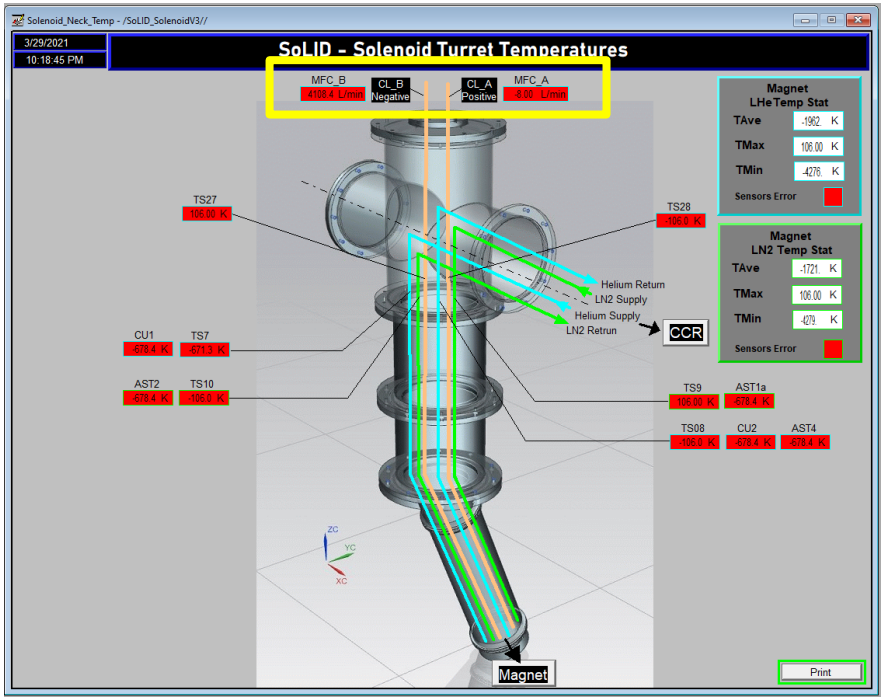
- Conversion of flow set value to voltage for valve actuators of current leads A and B



Monitoring – HMI Screens

- Current leads flow will be monitored on CCR Expert and Turret Temperature screens





- Expert control will be performed on a third screen

Tasks Status

- PLC Programming
  - Modified PLC program
  - Final tuning of PLC ADC modules to be done during testing

- HMI and CSS monitoring
  - Flow indicators added to Turret and CCR HMI screens
  - Lead Flow Controls Expert screen – **In progress**
  - CSS BOY screens – **In progress**

Tasks Status

- Instrumentation
  - New mass flow controllers not acquired
- Documentation
  - A00000-16-03-0221 electrical drawing – **In progress**

Conclusion

- Development of flow controls and monitoring of current leads is progressing smoothly

Thank You