Final internship presentation

Dawid Tetłak
EP-ADO-PO
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Supervisor:
Claudio Bortolin

in cooperation
with:
Łukasz Zwaliński,
Piotr Dziurdzia.
Projects in which I participated

- SR1 CO2 Cooling for prototype detector structure
- Baby DEMO Monoblock valve and HGCAL cooling loops test box

Other tasks:

- Preparing TRT Chillers
- Searching parts for balancing valves (MUON)
- Looking for alternative valves for Tile Calorimeter

08/08/19

Final presentation – Dawid Tetłak
SR1 CO\textsubscript{2} Cooling for prototype detector structure

**Tasks**
- Connect CO\textsubscript{2} plant to local box
- Perform Leak test and check for leaks
- Insulate installed tubes
- Help with I/O check

**Results**
Leak test revealed that all old relief valves (5) are leaking.

- Replace old leaking pressure valves

Old valves

New valves

Insulation before

Insulation after

Connection between CO\textsubscript{2} plant and local box

Connection from the main CO\textsubscript{2} plant - building 6115
Baby DEMO Monoblock valve and HGCAL cooling loops test box

Tasks
- Connect Monoblock and TEST BOX to Baby Demo
- Perform Leak test and check for leaks
- Insulate installed tubes
- Prepare mount for temperature sensor (Pt 100)

Results
At first leak test revealed that some connections are leaking, therefore they were re-soldered. After replacing the connectors some leaks were discovered on the Monoblock valve.

Insulation cannot be installed until the leak on the Monoblock valve is removed.

Installation of the temperature sensor requires further consultation to reduce distance between sensor and center of the Monoblock valve to minimum.
New valve for TILECal - Test in magnetic field

Tasks
- Prepare necessary parts to test the valve
- Assembly a test setup in building 168
- Carry out tests in different orientations, rotations and magnetic fields
- Disassembly the test setup

Results
There was a total of 32 tests carried out:
- 4 different rotations
- 4 different orientation per rotation
- 2 different set of tests
  1. Closing pressure
  2. Working stability

In 3 different magnetic fields: ~7 mT, ~260 mT, ~510 mT.

Tasks
- There was a total of 32 tests carried out:
  - 4 different rotations
  - 4 different orientation per rotation
  - 2 different set of tests
    1. Closing pressure
    2. Working stability

In 3 different magnetic fields: ~7 mT, ~260 mT, ~510 mT.
Tasks

- Prepare EDMS document about the results of the tests:
  - Describe current drawers cooling system
  - Include hydraulic tests of the valve
  - Add calculations of the magnetic field

Results

The document containing description, results and conclusions of the valve’s hydraulic tests, magnetic field tests, and valve tests in the magnetic field was created.

Both valve hydraulic tests and valve magnetic field tests have proven that the valve can be used in Tile Calorimeter cooling circuit to cut water flow for individual drawer when a significant leak is detected.
Chiller for New Small Wheel low voltage crates test

Tasks
- Prepare bypass parts for chiller
- Order and prepare parts for chiller connection to test crates
- Connect chiller to test crates in BB5

Results
Tests of the crates will be held in BB5

Chiller after unpacking
Chiller with bypass and level indicator
Low voltage test crate
Placement of the low voltage crates on the New Small Wheel Total of 16 crates 2 on each side of the supports
Filtering and cleaning Chillers circuits

Tasks

- Manual cleaning of the chiller cooling circuit
- Apply a new filtering method
- Evaluate the effect of glycol on the filter cartridge
- Inquiry to the manufacturer regarding our problem

Results

Manual cleaning of the chiller cooling circuit was not effective.

After filtering chiller using filter and cartridges visible improvement can be seen, but black and green/orange residue is coming back when the chiller is not working for more than 2 days.

Solution suggested by the manufacturer is to convert chiller into closed water type. (purchasing additional parts)
Tasks

- Arrange parts for bypasses
- Prepare parts for filter setup
- Inspect the connections to cooling station
- Check cooling circuits (2) for leaks

Results

Bypasses installed on the cooling circuit in the New Small Wheel alongside with filtering setup on the inlet.

Flow in the cooling circuits is not equal, even after opening one circuit at the time. Only after the lower pressure was created on the station the air was removed from the circuits.

No leaks detected.
Other tasks

Preparing TRT Chillers
- Prepare parts for chiller connection
- Write inquiry to company selling the pumps and order the same pump.
- Replace leaking pump

Searching parts for balancing valves (MUON)
- Create list of needed parts
- Inquiry to supplier (Geberit)
- DAI order the required parts

Look for alternative valves for Tile Calorimeter
- Search for valves similar to SMC valve with the same properties
- Write Inquiries to manufactures
- Prepare DAI order for the valves
- Test valves

Leaking Lowara pump

Images of valves: SMC Valve, Bürkert Valve, ASCO Valve, Danfoss Valve
Thank you for your attention