Focus Coil Quench Detector

Trevor Hartnett
Daresbury Laboratory

How a quench is detected

Voltage Tap Input
- 3 Voltage taps
- Resistive measurement

Amplified
- Central tap amplified
- Outer voltage taps to provide reference

Isolated
- Signal is isolated from the magnet

Compared
- Window comparator used to compare signal

Relay de-energised
- If signal is outside of the specified range
- System Latched in the quenched state

Quench Triggered
- Relay chain open circuit
- Magnet Circuit breakers opened

Quench Detection

System currently has two methods of setting the trip point.

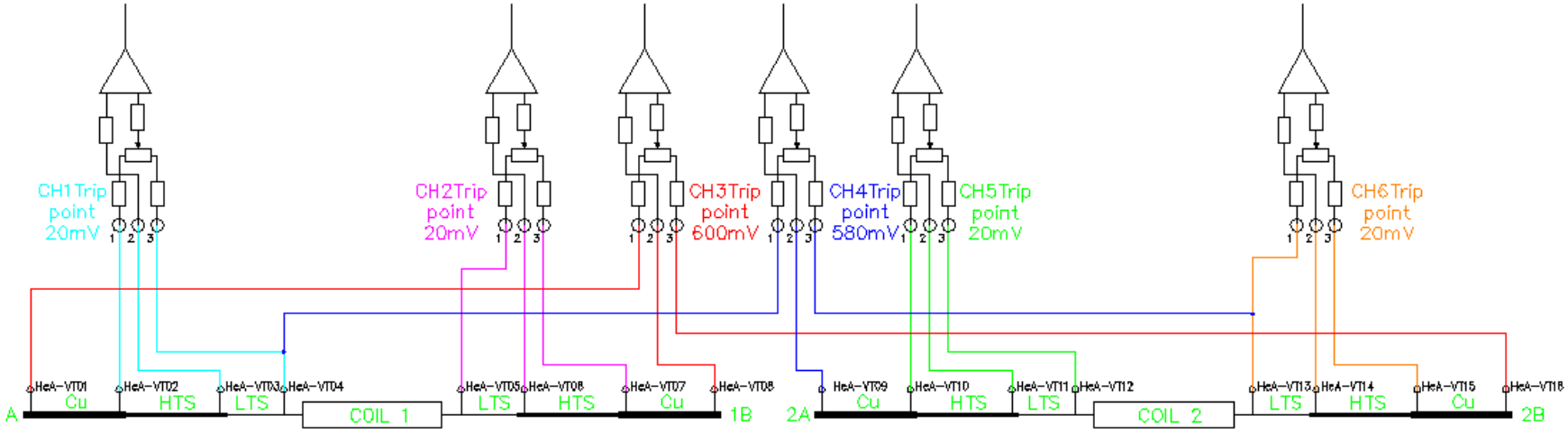
- Through a fixed resistor which currently sets the tripping threshold at 20mV for the HTS and LTS leads
- Through a variable resistor which can set the tripping threshold to 600mV for the coil sensing channels.

When a quench is detected several actions happen at once.

- A signal is sent to activate the dump circuit
- A signal is sent to control system to alert the operators
- A signal is also sent to magnet power supplies and other equipment that may be affected by the quench to power down

AFC Voltage Taps

The voltage tap tripping voltages are set to 20mV for all of the HTS and LTS comparisons and approximately 600mV for the coil comparisons.



- Four quench detection channels are connected across the HTS and LTS leads
- Two channels are connected across the two coils of the magnet as this was required to achieve an overlap

Progress

- Quench detector rack completed
- Fitted with 1 Quench detector module, PSU module, fast data logger and interface crate
- Quench unit tested in R9 with a 40m cable to voltage taps.
- Quench interface unit to allow change over between flip and solenoid mode.
- Voltage taps tested from rack room 2 to FC in the Hall.

Outstanding

- Installation of quench detector rack in rack room 2.
- Testing of fast data logger with control system and SSU/SSD quench signals.
- Commissioning of QD system with PSUs and DC contactors.

Thank you