

Date : \_\_\_\_\_ Produced by : \_\_\_\_\_

Approvals: \_\_\_\_\_

### **Procedure for Installation of the Pipe side and Feed through side CRT modules in LArTF**

This document will define the steps we will take to install the CRT modules on the sides of the detector. This will not supersede the HA written for this process.

The term “hidden module” refers to any module that has a final position that is out of easy reach. These modules are the ones that will be between the hall walls and the MicroBooNE tank and the innermost layer on the pipe side.

The material requirements for this work to be executed are:

- All modules and FEBs are available.
- Load bearing channels and hangers are installed.
- Vacuum lifting fixture is available, tested and cleared for operation. Incl. safety straps.
- Hardware and clips for panel securing are available.
- Temporary powering and readout laptop are ready for tests at LArTF.
- CAT5 cables for hidden modules are available. Labeled.
- LEMO cables for hidden modules are available. Labeled.
- FEB-ended power cables for hidden modules are available. Labeled.

#### Procedure

1. Bring the proper panels into LArTF. Identify the next proper panel. Mark position of vacuum fixture attachment points and clean pads and associated area on panel.
2. Attach vacuum fixture to panel. Secure safety straps
3. Clear lower area of personnel and using taglines lower panel to bottom of LArTF. Panel needs to be in horizontal position to clear railing.
4. Once panel is within reach personnel take control and rotate to needed installation orientation.
5. Reposition safety straps if panel was rotated.
6. Two personnel in separate lifts follow panel back up to installation height.
7. Guide panel into lower “H” clips.
8. Rotate panel so it is parallel to vertical brace.
9. Install top “H” clips.
10. Release vacuum allowing safety straps to control separation.
11. Remove safety straps.
12. Return vacuum fixture to loading area.
13. Install FEB.
14. Temporary connection to laptop and power source.
15. Perform panel viability test.

16. If panel is hidden, connect data, timing and unpowered production power cables. These cables will be led away from the hidden area and tied off safely to the nearest visible vertical hanger with a zip-tie for later connection.
17. Roll panel to its final resting position.
18. Repeat until layer is fully occupied.
19. Install locking nuts to prevent panel movement.
20. Repeat process until each layer is complete according to attached timescale. A given layer is expected to be completed in a day. But layers are not necessarily installed on consecutive days.

Related Documents:

[Connection mapping](#)

[Timeline](#)

[Testing Procedure](#)