

Getting Motor Stages Aligned at MFD 4/12/2019

Make sure the timeline is not too rushed when the alignment team comes to align motor stages to specifications on hard limit switches.

I spent a week ahead of time inspecting Test absorber and getting pictures of how to connect and disconnect the cables. Metal housing has a 12 pin Burndy connector attached.

Pictures of test absorber.

The day before the meeting, I went through the pinout of all my motors and stages to figure out which wire went to which pin. I would double check what type of limit switch your stage has and adjust accordingly. I had Baumer limit switches (please read about the Bane of Baumer). They do not use the standard 24V supply because the specs say it has a 15VDC limit. After talking with Zach, I learned that the two input terminals on the EL7041 have a digital input of '1' at anything higher than 2.5V. Therefore, I used a 5V supply for the Baumer switches. I tested them out with circuit breakers to make sure the LEDs would light up on the EL7041, thereby registering that the 5V switches worked correctly.

I spent time thinking about how to disconnect the cable within the metal housing for future repairs. Directly pinning out onto the housing would require the technician to unscrew 6 screws and rotate a metal panel through the metal housing and rest it somewhere below. I emailed and called Lupe to get some technician help with terminating the test absorber. I had a drawing of my wire and what color wires would go with what pin on the housing. We walked over to inspect the test absorber. Our collective decision with the Tyson, the cable tech, and Peter, the vacuum tech, was to create a straight through dongle that would allow easier connecting and disconnecting of the motor cable. Tyson took the metal housing to his workshop and started working. I made the mistake of waiting for him to come back. I should have scheduled with him to call me back when he was done. When I went back to go eat lunch, he was waiting for me. We went through the termination process together. I initially explained it and he said that I could leave and he could do it on his own. I wasn't sure and stuck around. After a while, I asked him which pair of wires was for the positive and negative limit switches. He asked me, "There are two?" I was glad to have stayed and made sure the cable termination was done properly. I think this step help me establish rapport with Tyson. When we terminated the cable, and stuck on the metal housing, the connector heads did not match so Tyson went back and re-terminated the metal housing. It was the wrong cable to re-terminate.

I had ordered a din rail with parts from Jing's development Beckhoff components for this XTES project. They did not turn it around in half a day. I only ordered the parts and did not have any wiring on it. I also ordered the +24V and +48V Phoenix Contact power supply plugs. When I received the plugs, they were in the reverse order and the +48V connector did not have all 4 pins. I later made the mistake of turning plugging into the wrong two pins on the +48V supply. I went back and got it remade soon after with all 4 pins even though two of them were not connected to anything.

Using the supplies outside of the office bullpen, I was able to cable up the power supplies and some extra circuit breakers to make the test absorber motor controller with Beckhoff parts. I asked to borrow one of Ernesto's Laptop's and installed Twincat on it. I asked Zach, Maggie, Rajan, and Jackson on how to create a motor PLC to move a motor. They graciously took the time to go over every step and help me debug some issues. In two days, I had learned enough to move a motor with the PLC and connected all the virtual wires to make the limit switches and brakes work correctly. One thing I am proud of is creating a switch (by using the circuit breaker) to turn on the motor axis in Twincat and disable the brake. It proved useful in teaching Peter and also was a good safety check to disable the motor when not in use.

I called Peter and let him know when I was coming in so he could help me with finding

I brought all of the equipment

When I needed

Lesson's learned:

Observe for mechanical clues on where to strain relief and run wires that don't collide with moving parts or get wires pinched. <- most work was here!

Establish rapport with your techs. They will make your life much easier! The more they can do the less you have to do.

Make sure to double check their work. It saves time in the long run.

Don't take shortcuts and let Lupe's shop know when the cables are not working. The quick and dirty method can have consequences.

Using the wires and ferrules in the office is much faster and easier than asking lupe's shop if the drawing has not been made.

Having 48V circuit breakers would be much safer when turning things on and off when redoing EL terminals connections on the fly.

Can never have too many rail mountable relays. I like to click buttons instead of clicking keys. I like having master power switches for both 24V and 48V.

Bringing some zip ties and EL terminal drivers would help. I should get a fanny pack for this purpose.

I would like Tyson to reterminate the dongle connector and the Motor cable on the test absorber so each direction has the same connector. I had to order a special cable for testing the test absorber motor with the metal housing off. the metal housing needs to be off in order for people to access the limit switches and measure the travel distance.