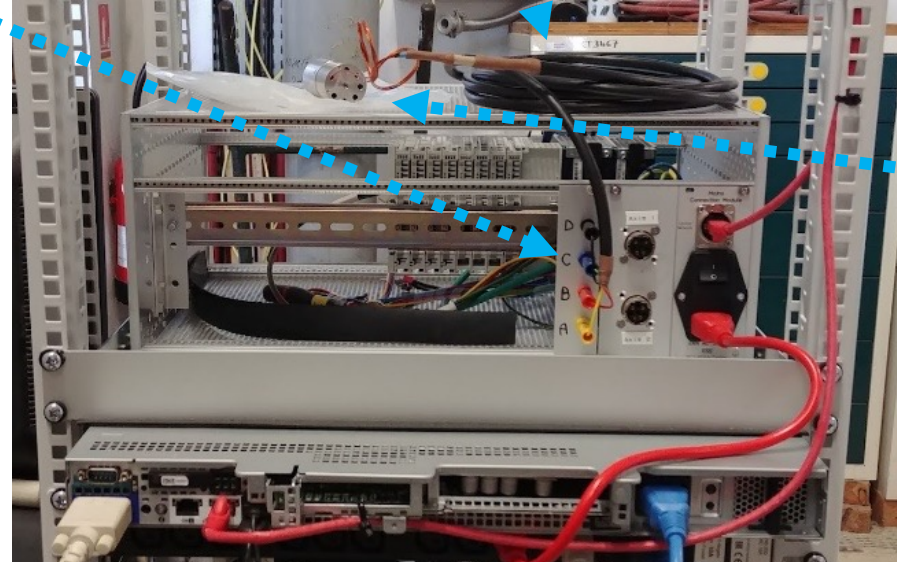
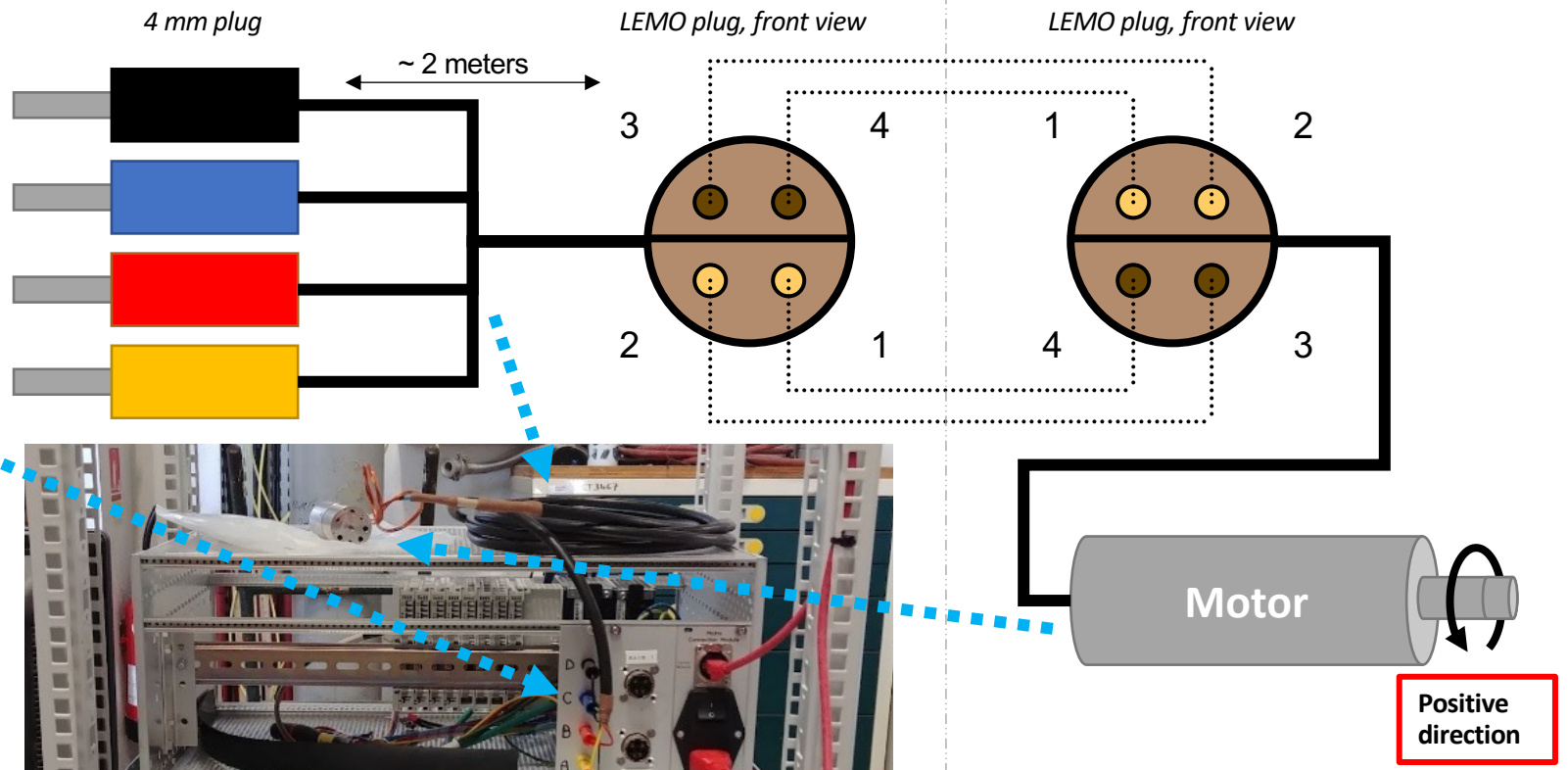
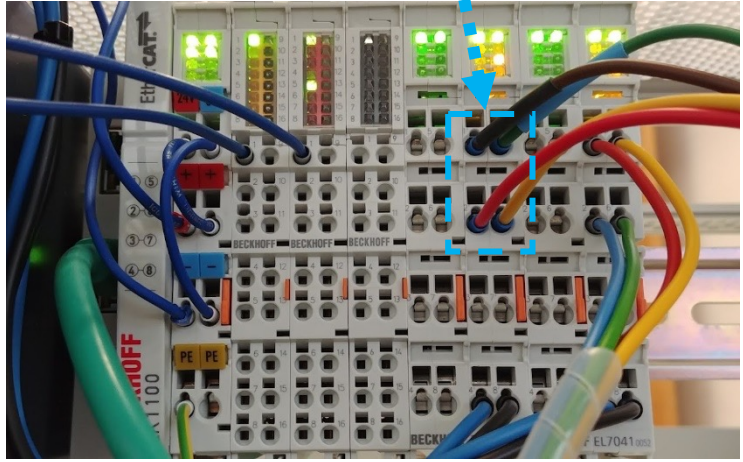
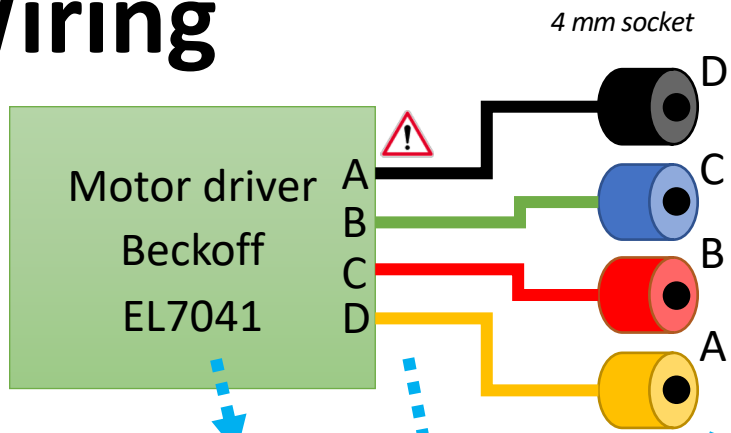


Motor test bench instructions

Wiring



! ABCD wiring is reversed because EL7041 driver make the motor turning in a reverse way in regard to EL7037 (and Phytron MCC2)

Beckoff EL7041	4 mm socket
A	Black (D)
B	Blue (C)
C	Red (B)
D	Yellow (A)

Adapter 4 mm plug side	Adapter LEMO side
Black	4
Blue	3
Red	2
Yellow	1

Motor LEMO pins	Motor phases
1	D (green ring)
2	C (blue ring)
3	B (red ring)
4	A (yellow ring)

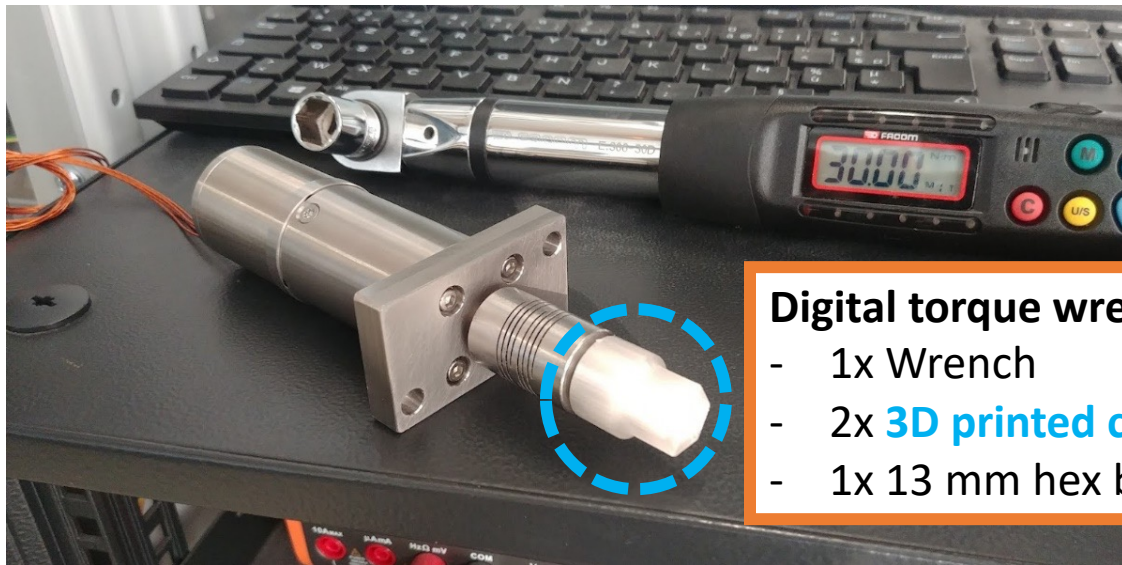
Packaging

Wood box

- Weight : 135 kg
- HxLxD : 205x107x88 cm

Box containing :

- 1x Phytron VSS motor (please handle with care : Nitrile gloves, low dust environnement, no liquid around)
- 1x Cable Lemo to 4 mm cable
- Power cables



Digital torque wrench :

- 1x Wrench
- 2x **3D printed coupler**
- 1x 13 mm hex bit socket



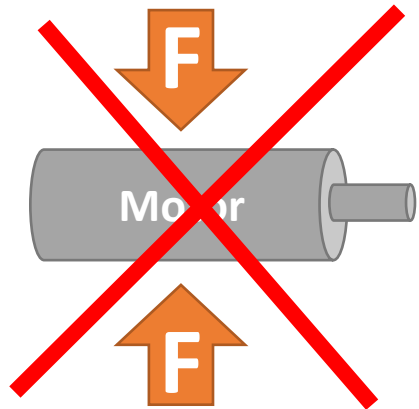
2x EL7041

IPC

2x EL7037

Mounting

Clamp the motor rigidly at the **level of its flange** (not the motor body) to a **strong flat support**



Logging

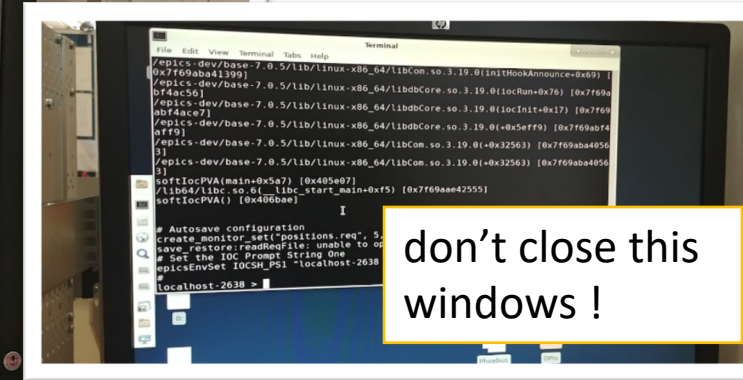
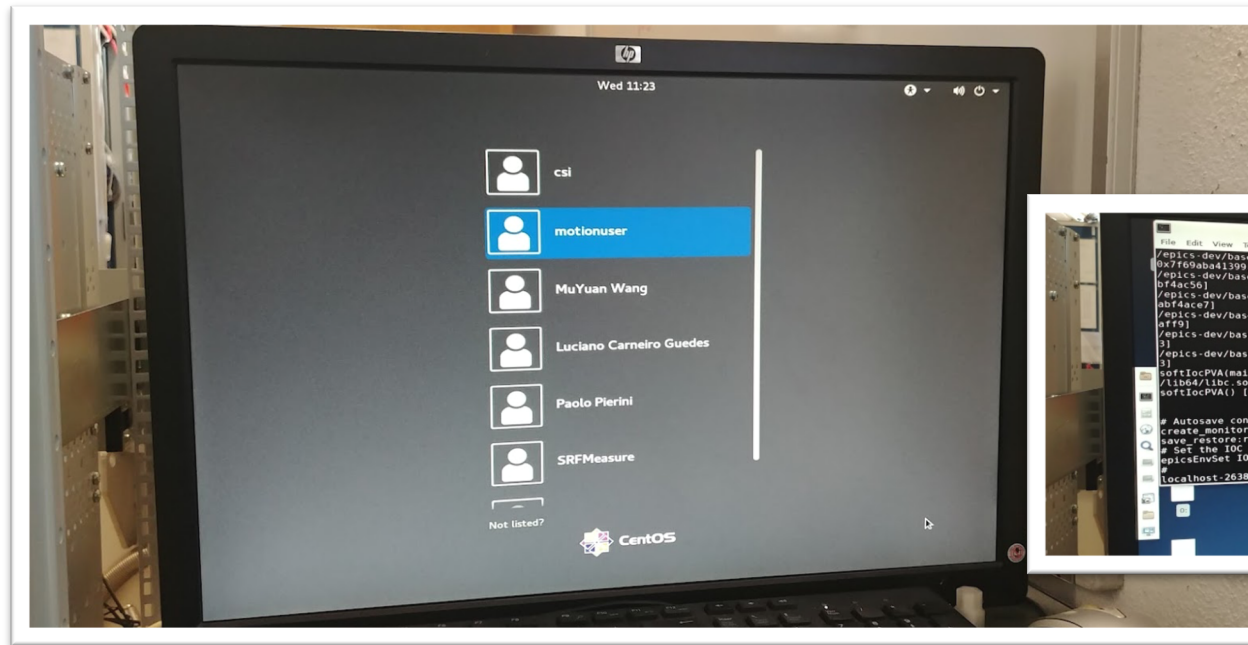
Login : motionuser
Password : motionuser
(Keyboard configuration : QWERTY)

Power up order :

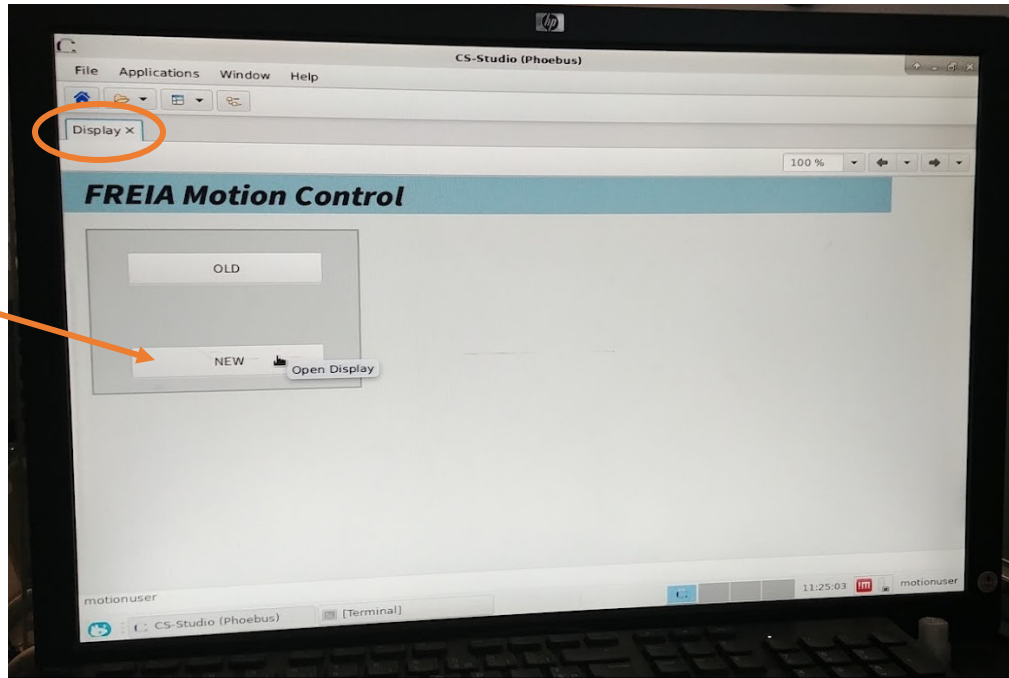
1. Plug everything
2. Powerup EL7041
3. Powerup IPC
4. Wait for logging screen
5. Start motionuser session
6. Execute **newIOC** (on desktop)
7. (don't close the windows !)
8. Execute **Phoebus**

If anything goes wrong, simple steps to reset quickly :

- close everything
- eventually power off then on EL7041
- go back to Step 6

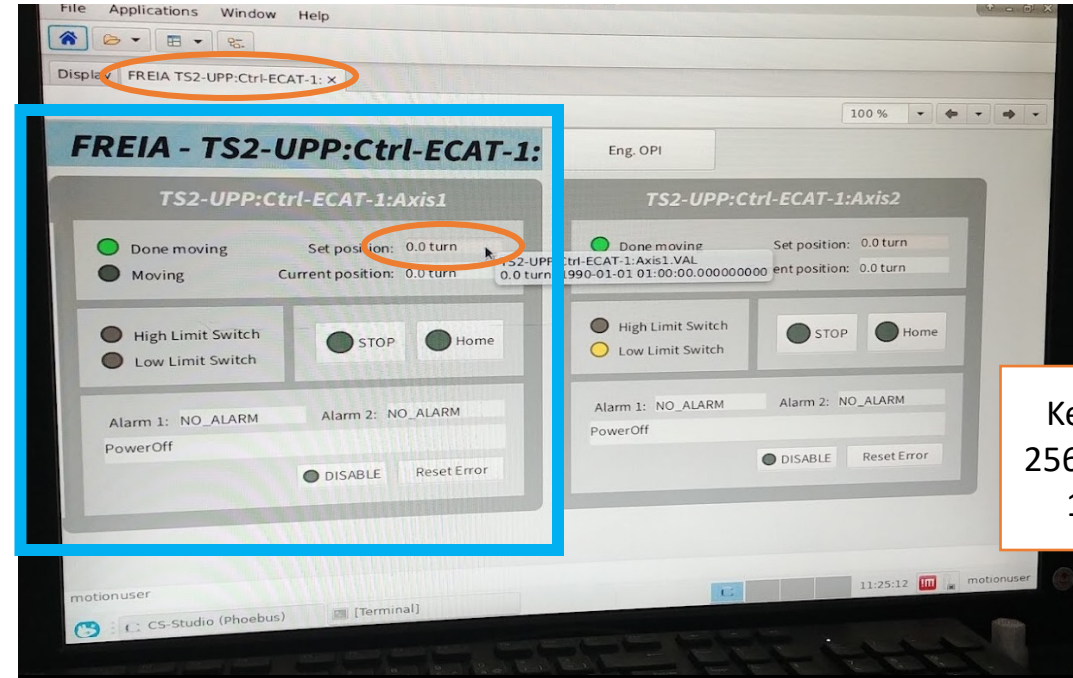


Software



On the main menu « Display » :

- « NEW » corresponds to EL7041 configuration
- « OLD » corresponds to EL7037 configuration



Keep in mind :
256 motor turns =
1 shaft turn

To move the motor :

Put a number into Set position value then presse Enter. Sometimes it generates an error, click on Reset Error, then click again, et retry.

It looks like the driver behaves better when the axe is homed. To home the axis, click Home button, wait the motor run, active the switch (open circuit), the motor should run in the other direction, disactive the switch (close circuit), the motor should still run for 25.6 turns and then stops. The axis is then Homed.

Configuration file

```
#-d /**#-d \brief hardware script for EL7041-Motor-Phytron-VSS-32.200.1.2
#-d \details Parametrization of EL7041 for motor Phytron VSS 32.200.1.2
#-d \author Julen Etxeberria
#-d \file
#-d */

#- Set max current to 600mA (actually max current is 1.2A for this motor)
ecmcConfigOrDie "Cfg.EcAddSdo(${ECMC_EC_SLAVE_NUM},0x8010,0x1,600,2)"

#- Reduced current 0mA
ecmcConfigOrDie "Cfg.EcAddSdo(${ECMC_EC_SLAVE_NUM},0x8010,0x2,0,2)"

#- Nominal voltage 48V (unit 1mV)
ecmcConfigOrDie "Cfg.EcAddSdo(${ECMC_EC_SLAVE_NUM},0x8010,0x3,48000,2)"

#- Coil resistance 1.3 Ohm (unit 10mOhm)
ecmcConfigOrDie "Cfg.EcAddSdo(${ECMC_EC_SLAVE_NUM},0x8010,0x4,130,2)"

#- Motor full steps count 200
ecmcConfigOrDie "Cfg.EcAddSdo(${ECMC_EC_SLAVE_NUM},0x8010,0x6,200,2)"

#- Kp factor current controller 4000 (unit 0.001)
ecmcConfigOrDie "Cfg.EcAddSdo(${ECMC_EC_SLAVE_NUM},0x8011,0x1,4000,2)"

#- Ki factor current controller 40 (unit 0.001)
ecmcConfigOrDie "Cfg.EcAddSdo(${ECMC_EC_SLAVE_NUM},0x8011,0x2,40,2)"
```

Here is the most critical part that was initially left at default value

Tricky point :

Remember before the 77K test, I put 900 mA in order to get 0.6 A measured and 4 to 5 N.m output torque.

But now when I measure torque it exceed 6 N.m ... 🤔
So I put back 600 mA, and here are the values obtained lastly :

- Current : 0.38 A
- Torque : 4.3 N.m

So current measurement is a bit low, but torque is satisfying and vibration are OK as well.

I would recommend to stay on these value for the cryomodule test and not be overconfident on the current measurement.



Running



1. Start the motor, mind to switch the pawl in the correct direction.
From neutral position (relax state) it takes around 30 turns to go to max torque value.
2. The torque should rise progressively until reaching the maximum value.
3. Then, the motor will loose steps and the torque value should be stable in the +/- 0.2 N.m range.
4. Record the value, and run the motor in the opposite direction to relax the wrench.
5. Torque value can be slightly different from on direction to the other, to both direction and get a mean value.

Instructions

1. First, requalify the motor in the same way I have described
2. Compare results of current but especially torque. Also pay attention to the vibration of the motor, it must “not vibrate excessively”. At least, you can make a video with sound.
3. Put the 19” cabinet into the control room, and cable the motor directly in the bunker, through the cryomodule LC03 connector
4. Retest current, torque and vibration, compare with the first setup, it should match
5. If not, this mean K_p and K_i coefficient should be adjusted to fit with the cable length (probably), we will see !

Thank you and good luck