



# UNIVERSAL ROBOTS



## CB3 parts on CB2 robot and controller

Revision 1.0.2

Important: Software update and modification of `urcontrol.conf` must be done before replacing joint

### Robot:

UR5/UR10 with CB2-controller

## **Purpose**

The main purpose of this manual is to help the user safely replace CB2 parts with CB3 parts.

Universal Robots industrial robots are designed using high quality components designed for long lifetime. However any improper use of robot can potentially cause failures. For example, the robot may have been overloaded or have been dropped on the floor when relocating or have run with a load not recommended by Universal Robots. Any improper use of the robot will invalidate the guarantee.

Universal Robots recommends that you do not attempt repair, adjustment or other intervention in the mechanical or electrical systems of the robot unless a problem has arisen. Any unauthorized intervention will invalidate the guarantee. Service related operations and troubleshooting should only be performed by qualified personnel.

Before performing service related operations, always make sure to stop the robot program and disconnect power supply to any potential dangerous tool on the robot or in the work cell.

In the event of a defect, Universal Robots recommends ordering new parts from the Universal Robot distributor from where the robot has been purchased.

Alternatively, you can order parts from your nearest distributor, whose details you can obtain from Universal Robots official website at [www.universal-robots.com](http://www.universal-robots.com)

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## 1. CB3 parts that can be used on CB2 robot and controller

Only special CB3 parts can be used on CB2. Reason is the firmware on these parts. All parts are listed below.

122031	Joint Size 3 Base kit UR5
122032	Joint Size 3 Shoulder kit UR5
122033	Joint Size 3 Elbow kit UR5
122011	Joint Size 1 Wrist 1 kit UR5
122012	Joint Size 1 Wrist 2 kit UR5
122013	Joint Size 1 Wrist 3 kit UR5
122039	Tool Mounting Bracket kit UR5
122042	Joint Size 4 Base kit UR10
122043	Joint Size 4 Shoulder kit UR10
122034	Joint Size 3 Elbow kit UR10
122021	Joint Size 2 Wrist 1 kit UR10
122022	Joint Size 2 Wrist 2 kit UR10
122023	Joint Size 2 Wrist 3 kit UR10
122059	Tool Mounting Bracket kit UR10
122092	Teach Pendant incl. Touch Screen & power cable UR5 & UR10

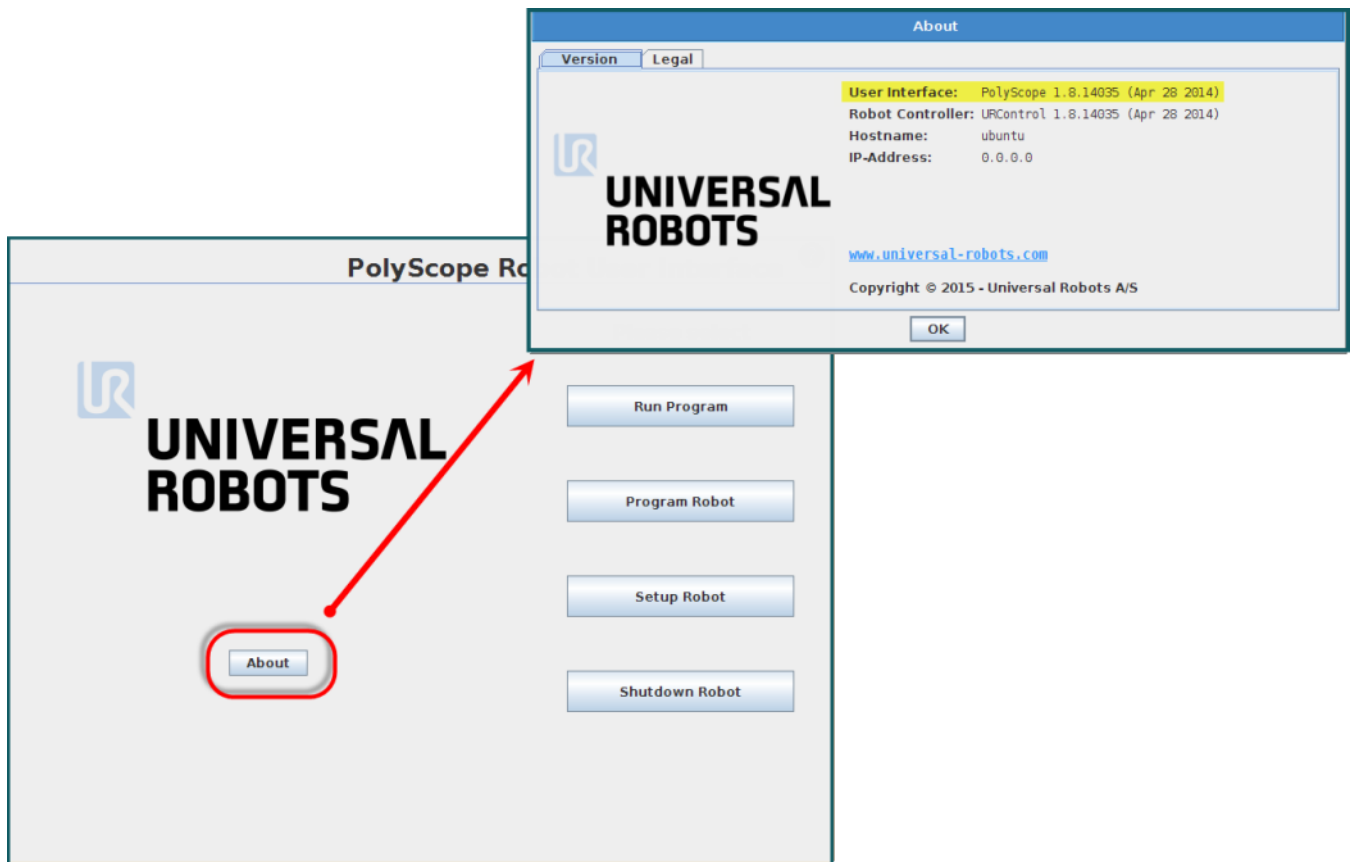
## 2. Criteria for using CB3 parts on CB2 robot and controller.

### Important

- Polyscope software must be minimum 1.8.16941
- It's not recommended to add the special CB3 joints with joints of rev10 size 1 and rev11 size 3
- urcontrol.conf must be corrected, to correct values, for the joint that is replaced
- Only the special CB3 parts listed on page 4 can be used

### 3. How to find what Polyscope software the robot is running.

Press the about button on the main Polyscope page and a popup will show the software version.



Information on how to update the Polyscope software can be found in the service manual.

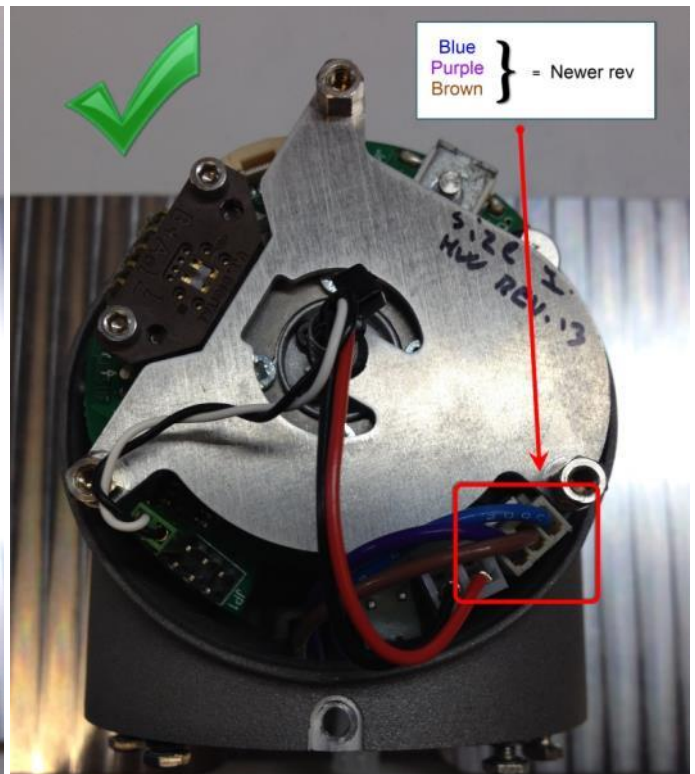
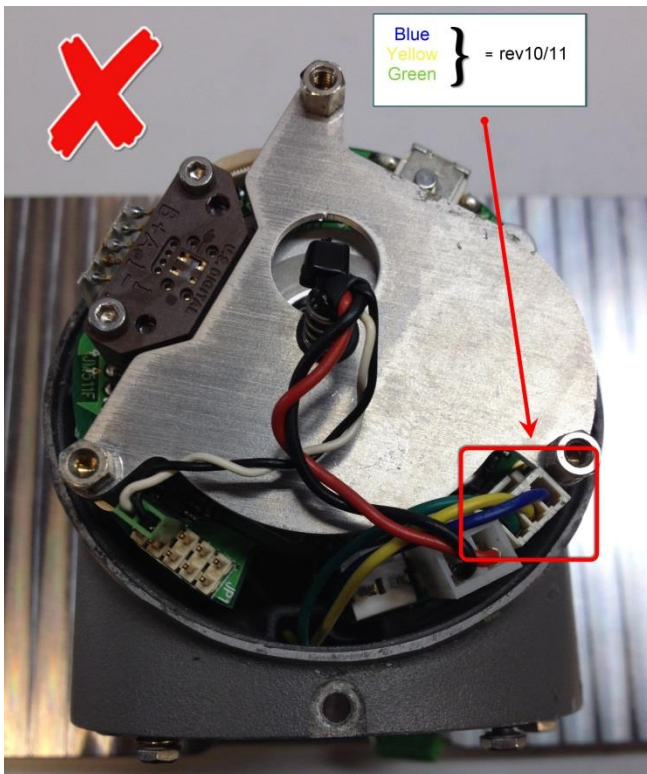
## 4. How to find the joint revision.

*Please refer to the service manual before dismounting any part of the robot.*

CB3 joints is not recommended to be installed with rev10 for size 1 and rev11 for size 3 joints.

Dismount the blue lids and check the below. Remember to use the correct torque (0.4Nm) screw driver when mounting the lid again.

rev10/11 has blue, yellow and green wires from the motor and Newer rev has blue, purple and brown.



## 5. How to update urcontrol.conf before replacing the defect joint

### **Purpose of this guide:**

When replacing a CB2 joint with a CB3 joint, it is necessary to modify the robot configuration file.

The configuration file is named urcontrol.conf

The file defines with which hardware, including joint hardware revisions, the robot is configured.

### **It is very important to follow this procedure in the correct order:**

1. Backup configuration
2. Update software on robot
  - 2.1. If the software on the robot is 1.6.x then follow the procedure:
    - Update the software from 1.6.x to 1.7.x
    - Update the firmware on the robot joints
    - Update the software from 1.7.x to 1.8.16941
    - Update the firmware on the robot joints
3. Manually update the configuration file: urcontrol.conf

### **4. Turn off the controller**

5. Replace the defect joint
6. Update firmware on the replaced joint

### **Preparations:**

- Backup configuration file using the file named *urmagic\_configuration\_files.sh*  
(file and instructions can be found under Downloads on our support site)
- Update software on controller with newest software  
(software and instructions can be found under Downloads on our support site)

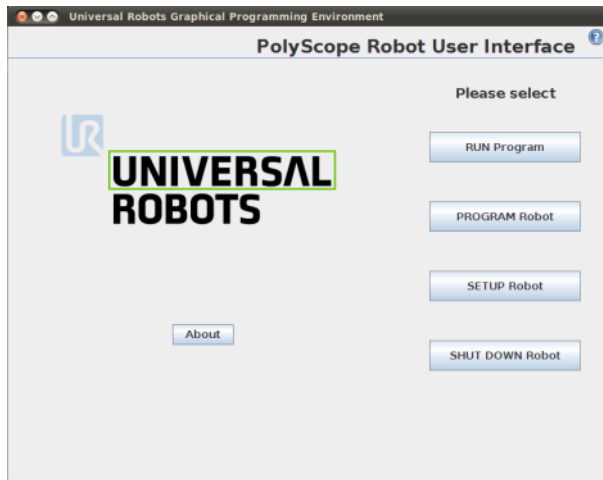
Revision of sparePart joint is: **sparePart\_rev1**



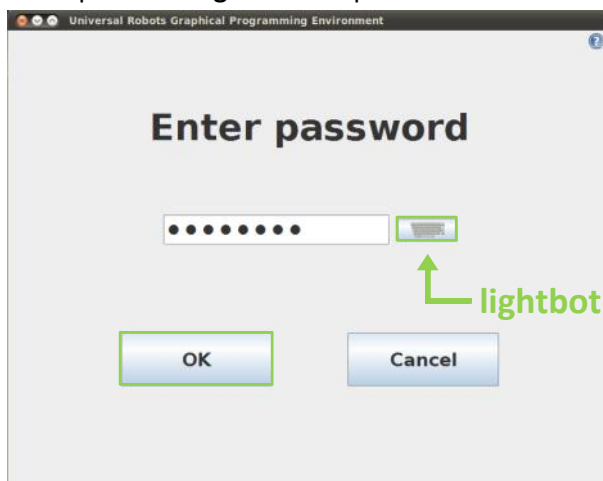


## 1. How to modify configuration file on controller - following this procedure:

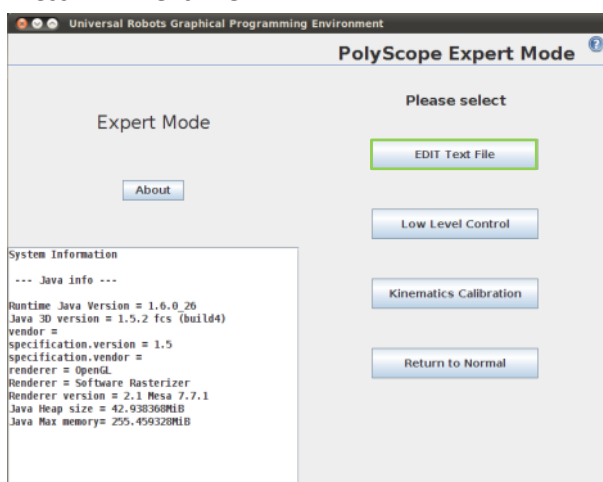
1. Drag the finger or pointer across the **UNIVERSAL** logo from left to right



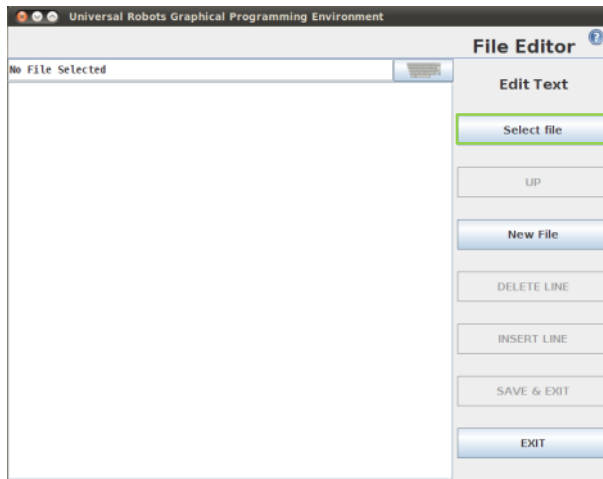
2. Enter password **lightbot** and press **OK**



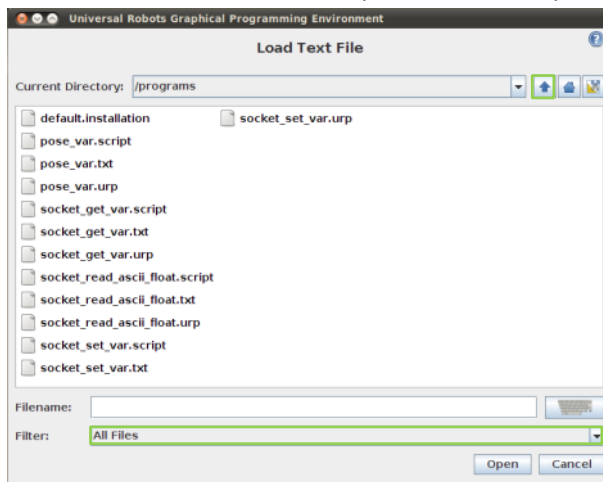
3. Press **EDIT Text File**



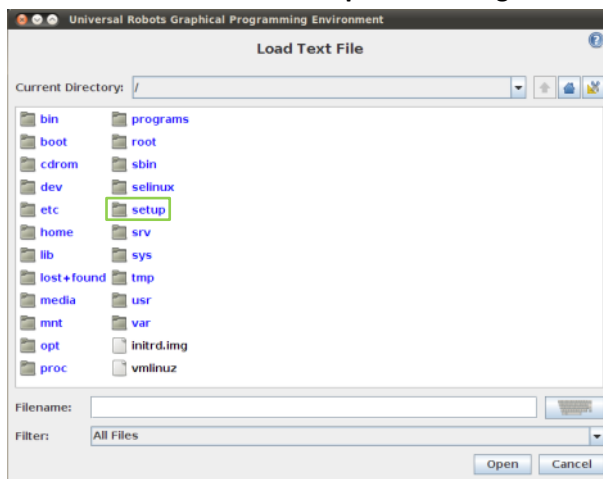
4. Press **Select File**



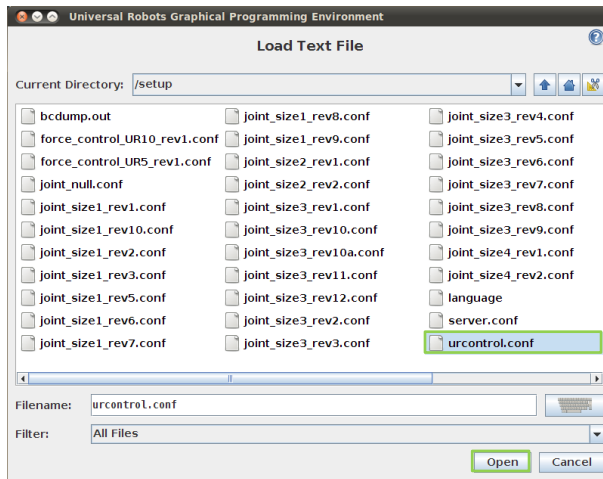
5. Mark **All Files** in the Filter dropdown box and press the arrow-up button to go one level up



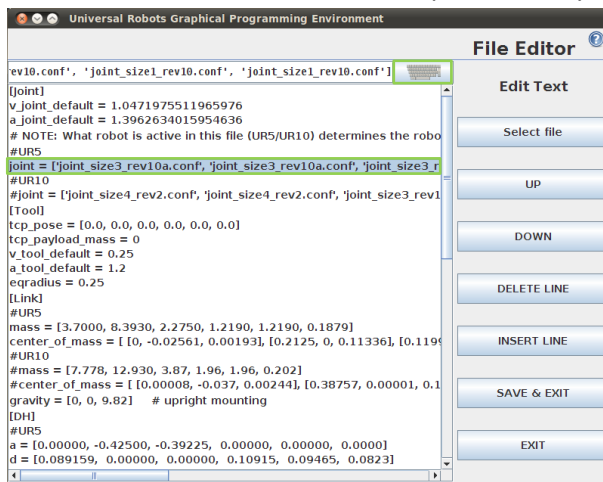
6. Press the folder named **Setup** for entering this folder



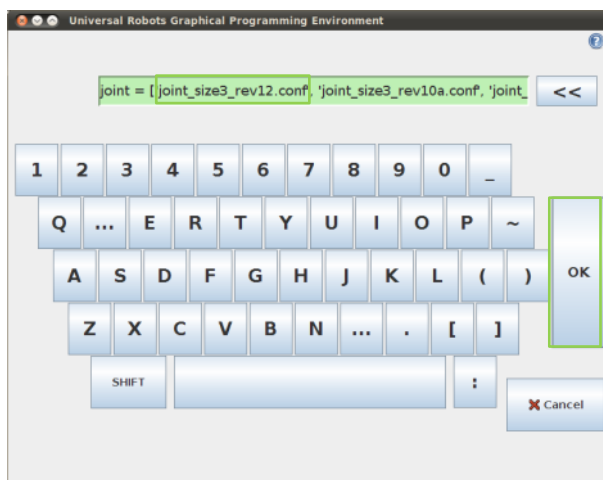
7. Select the file **urcontrol.conf** and press **Open**



8. Select the line indicated below and press the keyboard button



9. Modify the joint revision for the joint to be replaced and press **OK**



## UR5:

The new joint has always the revision name: **sparePart\_rev1**

Terminology:

```
joint = [Base, Shoulder, Elbow, Wrist 1, Wrist 2, Wrist 3]
```

This is how the line will typically look on a UR5 robot with older revision joints:

```
joint = ['joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf']
```

### UR5 -Base replacement:

```
joint = ['joint_size3_sparePart_rev1.conf', 'joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf']
```

### UR5 -Shoulder replacement:

```
joint = ['joint_size3_rev13.conf', 'joint_size3_sparePart_rev1.conf', 'joint_size3_rev13.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf']
```

### UR5 -Elbow replacement:

```
joint = ['joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size3_sparePart_rev1.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf']
```

### UR5 –Wrist 1 replacement:

```
joint = ['joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size1_sparePart_rev1.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf']
```

### UR5 –Wrist 2 replacement:

```
joint = ['joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size1_rev12.conf', 'joint_size1_sparePart_rev1.conf', 'joint_size1_rev12.conf']
```

### UR5 –Wrist 3 replacement:

```
joint = ['joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size3_rev13.conf', 'joint_size1_rev12.conf', 'joint_size1_rev12.conf', 'joint_size1_sparePart_rev1.conf']
```

### **IMPORTANT NOTICE:**

**Check that the joint revision is spelled correct with small and capital letters. The controller might go into the state "No controller" for all the joints.**

**UR10:**

The new joint has always the revision name: **sparePart\_rev1**

Terminology:

```
joint = [Base, Shoulder, Elbow, Wrist 1, Wrist 2, Wrist 3]
```

This is how the line will typically look on a UR10 robot with older revision joints:

```
joint = ['joint_size4_rev3.conf', 'joint_size4_rev3.conf', 'joint_size3_rev13.conf', 'joint_size2_rev3.conf',  
'joint_size2_rev3.conf', 'joint_size2_rev3.conf']
```

**UR10 -Base replacement:**

```
joint = ['joint_size4_sparePart_rev1.conf', 'joint_size4_rev3.conf', 'joint_size3_rev13.conf', 'joint_size2_rev3.conf',  
'joint_size2_rev3.conf', 'joint_size2_rev3.conf']
```

**UR10 -Shoulder replacement:**

```
joint = ['joint_size4_rev3.conf', 'joint_size4_sparePart_rev1.conf', 'joint_size3_rev13.conf', 'joint_size2_rev3.conf',  
'joint_size2_rev3.conf', 'joint_size2_rev3.conf']
```

**UR10 -Elbow replacement:**

```
joint = ['joint_size4_rev3.conf', 'joint_size4_rev3.conf', 'joint_size3_sparePart_rev1.conf', 'joint_size2_rev3.conf',  
'joint_size2_rev3.conf', 'joint_size2_rev3.conf']
```

**UR10 –Wrist 1 replacement:**

```
joint = ['joint_size4_rev3.conf', 'joint_size4_rev3.conf', 'joint_size3_rev13.conf', 'joint_size2_sparePart_rev1.conf',  
'joint_size2_rev3.conf', 'joint_size2_rev3.conf']
```

**UR10 –Wrist 2 replacement:**

```
joint = ['joint_size4_rev3.conf', 'joint_size4_rev3.conf', 'joint_size3_rev13.conf', 'joint_size2_rev3.conf',  
'joint_size2_sparePart_rev1.conf', 'joint_size2_rev3.conf']
```

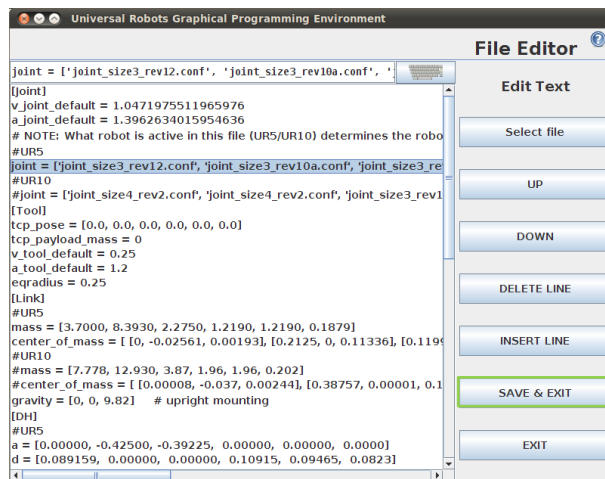
**UR10 –Wrist 3 replacement:**

```
joint = ['joint_size4_rev3.conf', 'joint_size4_rev3.conf', 'joint_size3_rev13.conf', 'joint_size2_rev3.conf',  
'joint_size2_rev3.conf', 'joint_size2_sparePart_rev1.conf']
```

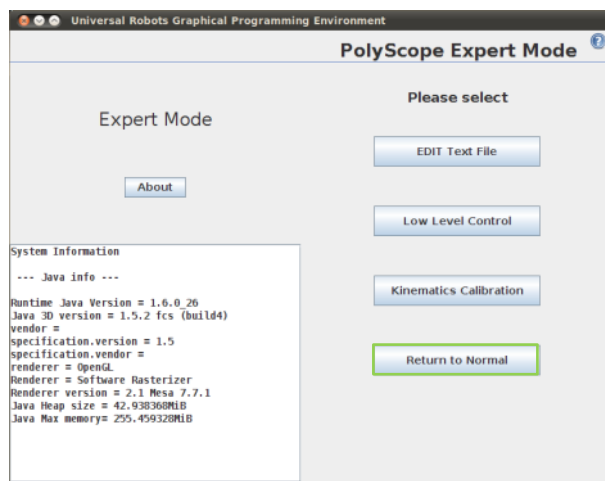
***IMPORTANT NOTICE:***

***Check that the joint revision is spelled correct with small and capital letters. The controller might go into the state “No controller” for all the joints.***

## 10. Press Save & Exit



## 11. Press Return to Normal



## 12. Turn off the controller!

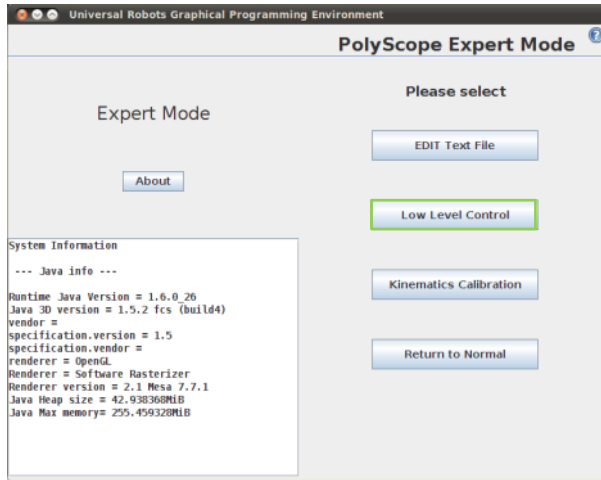
### IMPORTANT NOTICE:

**This is extremely important; otherwise the modification will not have effect.**

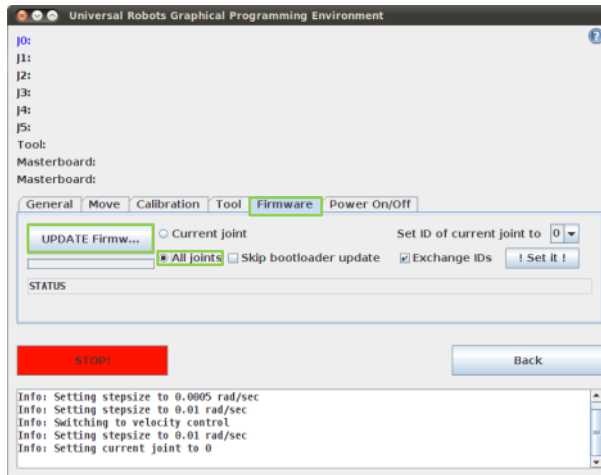
## 13. Now replace the joint.

## 2. How to update firmware - following this procedure:

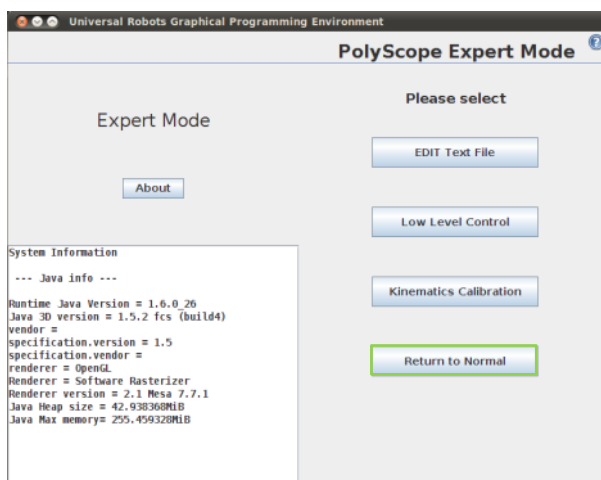
1. Follow step 1 and 2 and press **Low Level Control**



2. Select the **Firmware** tab, mark the replaced joint, select Current Joint and press **UPDATE Firmware**



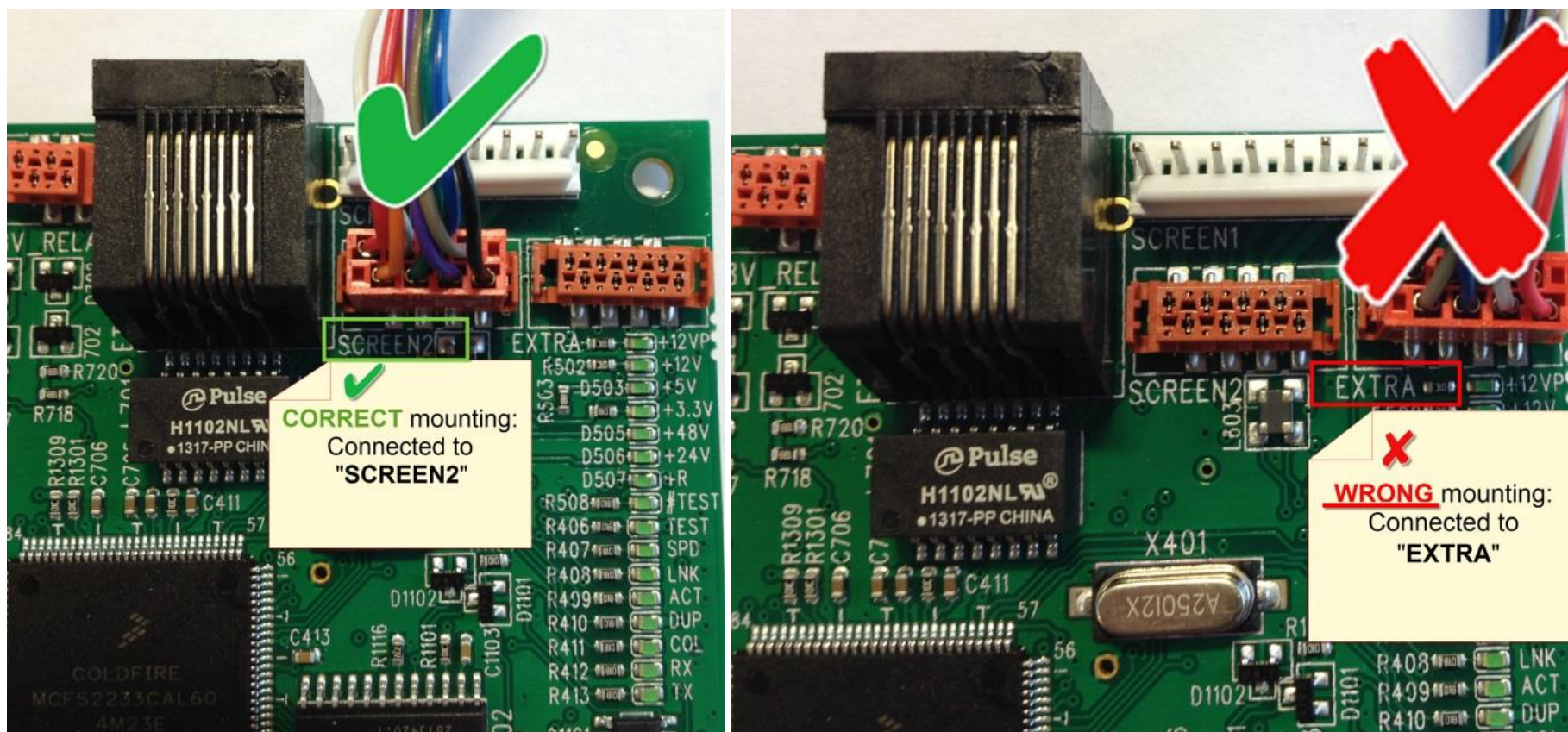
3. Verify that "Robot firmware updated successfully" is outputted in the status field, then press Back and Return to Normal





### 3. Connecting a CB3 teach pendant to CB2 masterboard

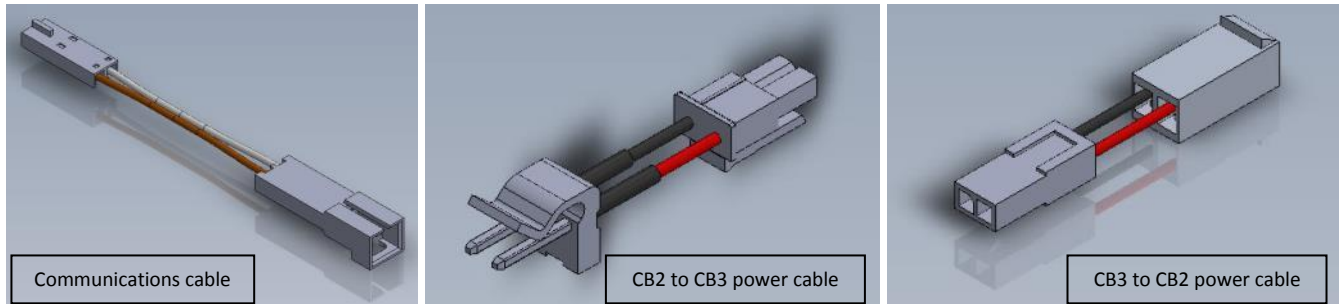
**## PLEASE NOTE: IF CONNECTED WRONG THE MASTERBOARD WILL BE PERMANENTLY DAMAGED ##**





## Adapters cables

There are used 3 different adaptor cables when mounting a CB3 joint onto a CB2 robot arm.



### Communications cable

An extension cable is needed on the communication side. This is only an extension and should be used on Size 1 and 4 joints only.

It's important that the cable connections are colour correct.

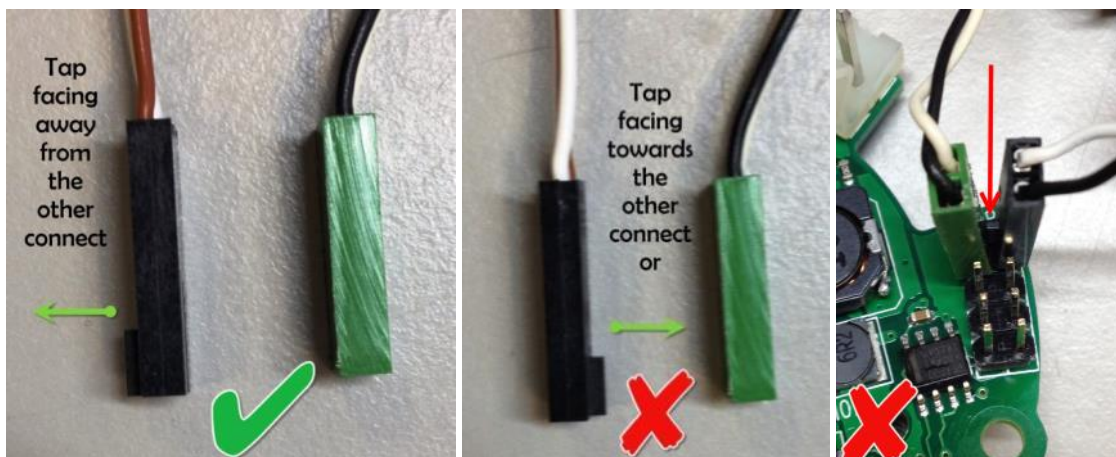
White <-> White

Brown <-> Black



When plugging in the connectors onto the printed circuit boards it's recommended to mount the plug with the tap facing out from the house. The two plugs are recommended to swap places. This is so the pins on the print board are not getting bend.

Photo below shows recommended and not recommended.

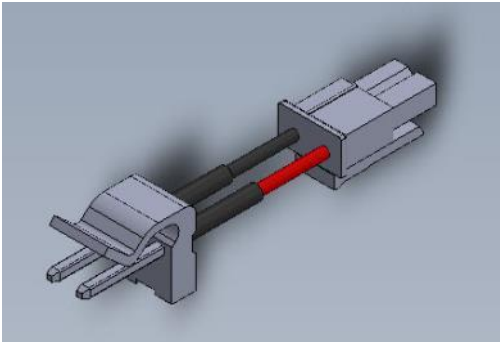


## Power cable

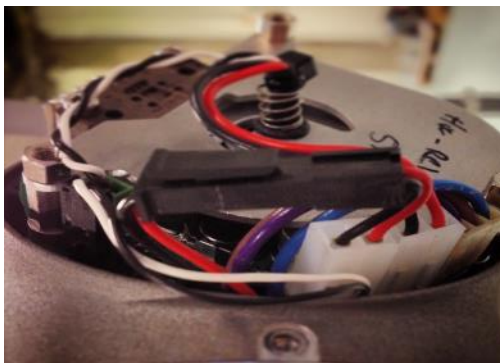
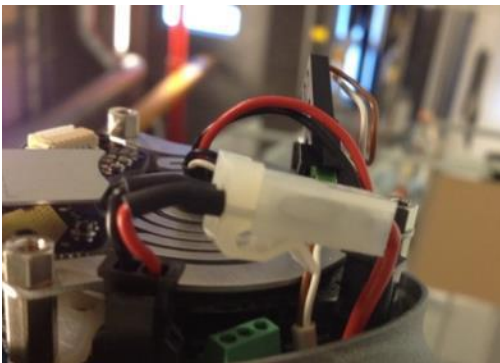
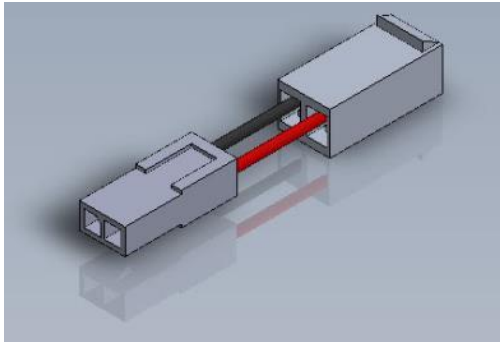
An adaptor plug is needed for the 48V power. There are two versions.

One plug is for CB2->CB3 and one for CB3->CB2.

CB2 to CB3 looks like below



CB3 to CB2 looks like below



**Important** when replacing a size 1 joint: The connectors need to lay flat, on the connectors' lowest side, when mounting the blue lid. If not, it can cause issues when mounting the lid but also effect the sensor in the size 1 joint as the plug is pushing onto the setup.

