Sevcon Motor Controller for All Twizy models:
(Including models produced after July 2016)

Created by Kenneth Nilsen
Email: Kennethnilsen69@gmail.com
Made in Norway

This is a modified Sevcon Gen4-48V-500A motor controller which is the same controller that was originally supplied on the Twizy 80. This will fit on all Twizy models like the Twizy 80 and Twizy 45 from 2012 to the present day. The controller has a built-in Powerbox Mini so here you get much more than a standard controller.

With this controller you will get 3 tuning options:

1. Light Tuning: (80Nm)
2. Medium Tuning: (90Nm)
3. MaxPower Tuning: (100Nm)

As standard, the Sevcon controller will be delivered with Medium Tuning and is ready for driving. Just mount the controller and have fun.

In addition you will also get 5 regeneration levers which you can choose easily while driving via the DNR buttons.
The controller has also got a USB cable that is for updating the internal Power Box with future updates

How to change the Tuning level:

Tuning level is selected with the D.N.R buttons.
D button = MaxPower Tuning (up to 100Nm torque)
D&R button = Medium Tuning (up to 90Nm torque)
R button = Light Tuning (up to 80Nm torque)

to select the tuning level do the following:
1. Start the car
2. Hold for an example D button for more than 5 seconds. The car will now beep and the SERV lamp will come on. It will now start the tuning process and when done the SERV lamp will disappear.
3. Turn the ignition OFF and ON and you are ready.

It is the same procedure on all 3 tuning choices. D&R means you must hold both D and R at the same time

Change the Regeneration level:

This is also done with the DNR buttons.
This only works when the car is driving. You cannot change the regeneration level when the car is stationary.

D = More regeneration
N (D&R) = return to the standard regeneration value
R = Less regeneration

There are 5 predefined levels
Level 1 = 8% neutral regeneration and 10% foot brake regeneration.
Level 2 = 13% neutral regeneration and 15% foot brake regeneration.
Level 3 = 18% neutral regeneration and 23% foot brake regeneration.
Level 4 = 23% neutral regeneration and 25% foot brake regeneration.
Level 5 = 25% neutral regeneration and 28% foot brake regeneration.

You will hear a PIP and R will flash on the screen when you change regeneration.

To increase the level, briefly press the D button and you will hear a PIP signal. if you do not hear PIP it means you are in level 5
Same for level down, briefly press the R button and you will hear a PIP signal. if you do not hear PIP it means you are in level 1

Pressing both will reset to the standard level which is the same as Level 2

Firmware update:

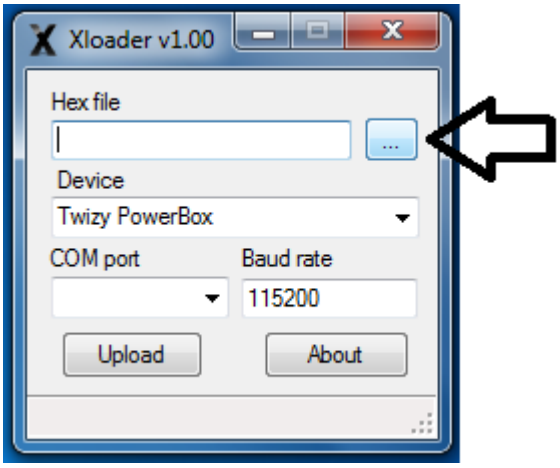
To update the Internal Powerbox Mini you need to install a driver that you can download here or here

You must also install XLoader Software that you can download here or here

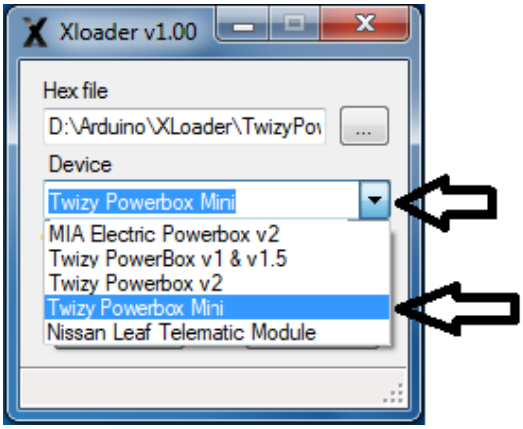
Before going any further it may be wise to take a restart of your computer.

Afterwards you can connect the PowerBox to your computer with a Mini USB cable. Your computer will search and install it automatically and assign it a COM port number. Once the installations completes, start the X-Loader application.

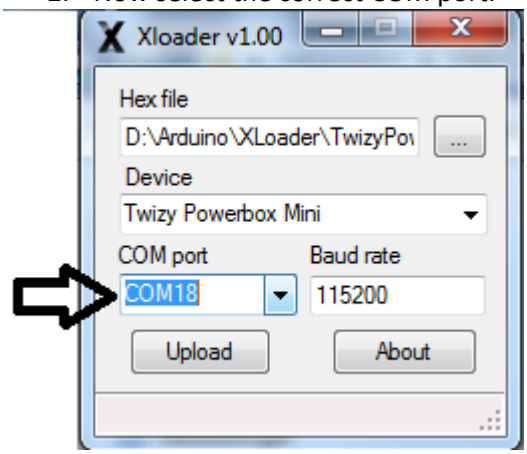
1. Select the firmware hex file.



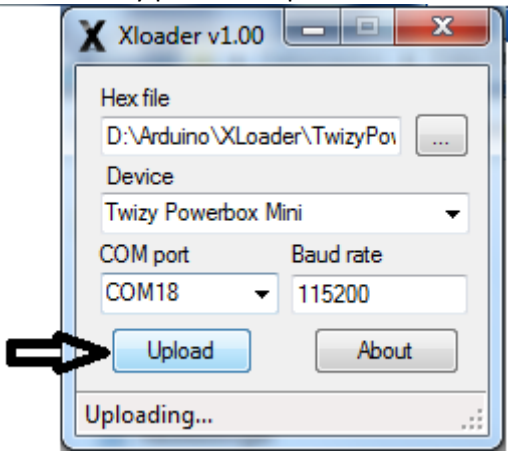
1. Next select Twizy PowerBox Mini in the device field.



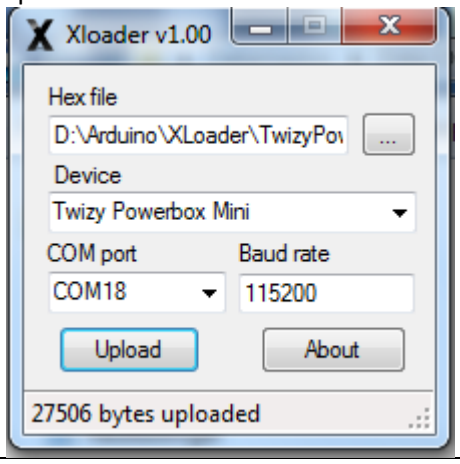
2. Now select the correct COM port.



3. Finally press the upload button.



5. After a few seconds, your PowerBox is updated to the new firmware.

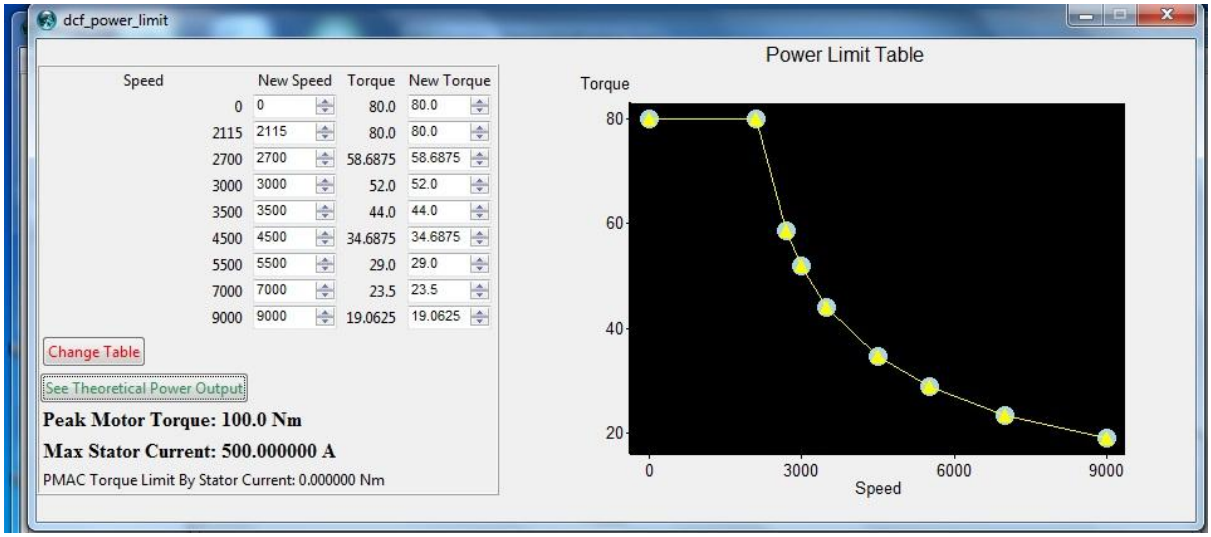


6. You can now disconnect your PowerBox from your computer.

So what is the difference between the three tuning options Light, Medium and Max Power tuning?
The biggest difference between the three tuning options is the torque (Nm) from 0-70 km/h. Above 70 km/h they are all the same and they all have a top speed of max 115 km/h. On flat roads, a realistic speed is between 95 to 105km/h depending on the wind force and direction.

Light Tuning Power Map:

In Light tuning mode the maximum torque set to 80Nm.



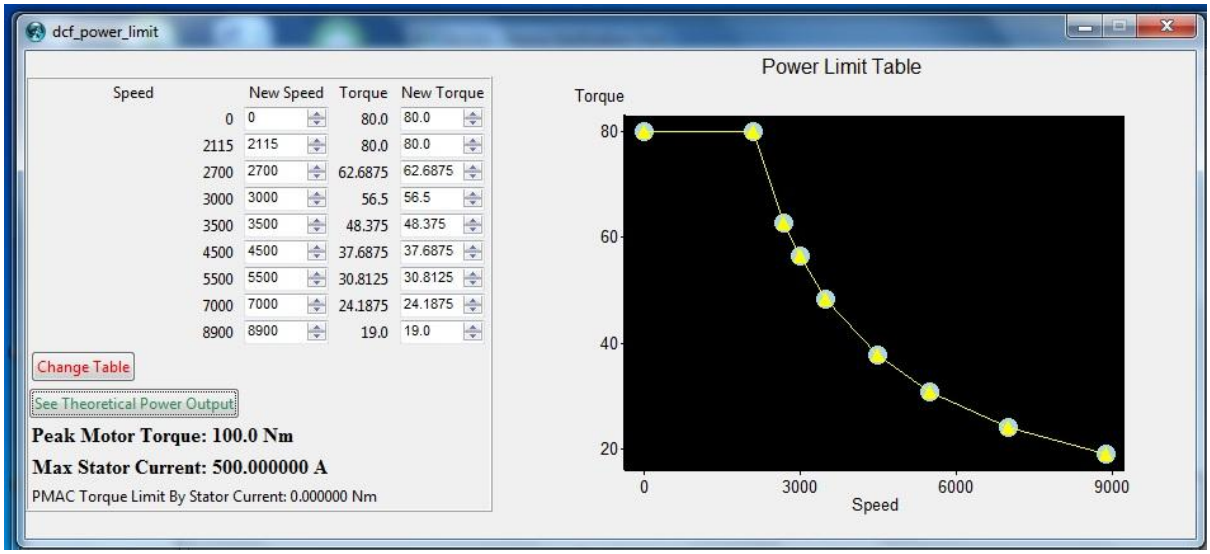
Medium Tuning Power Map:

In Medium tuning mode the maximum torque set to 90Nm.

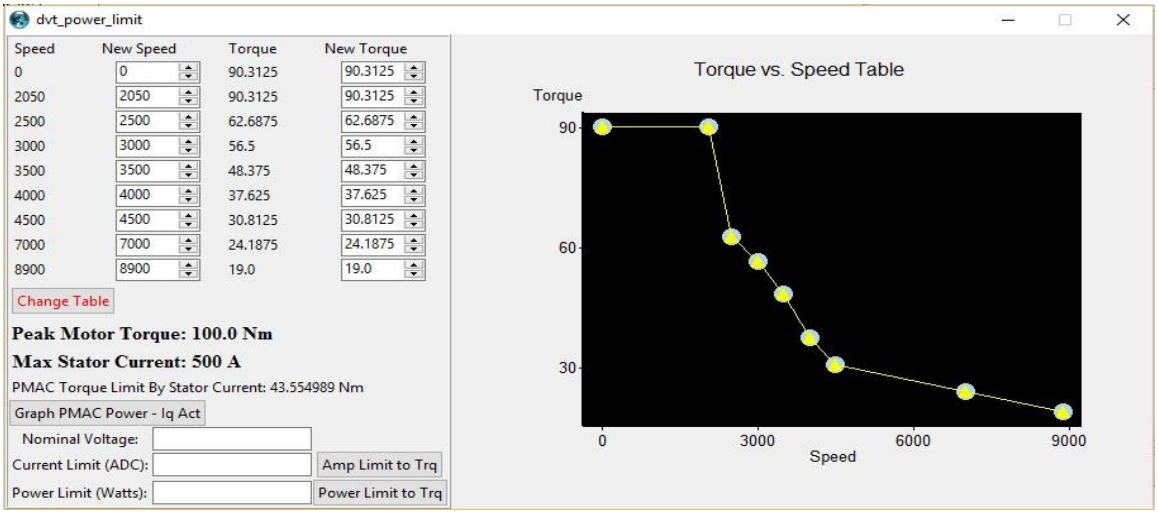
With this setup you may occasionally get a STOP notification on your Twizy screen from the BMS controller included in the battery pack. This will happen when the engine starts to get a little warm, but not dangerously warm.

When the motor temperature rises above 70 degrees, you will be able to draw almost 500 Amp in this tuning mode and because the battery has to deliver more than 450 Amp, it sends out a STOP alert. You can safely ignore this warning.

This graph shows the 80Nm power map in Medium tuning:



This graph shows the 90Nm power map in Medium tuning:

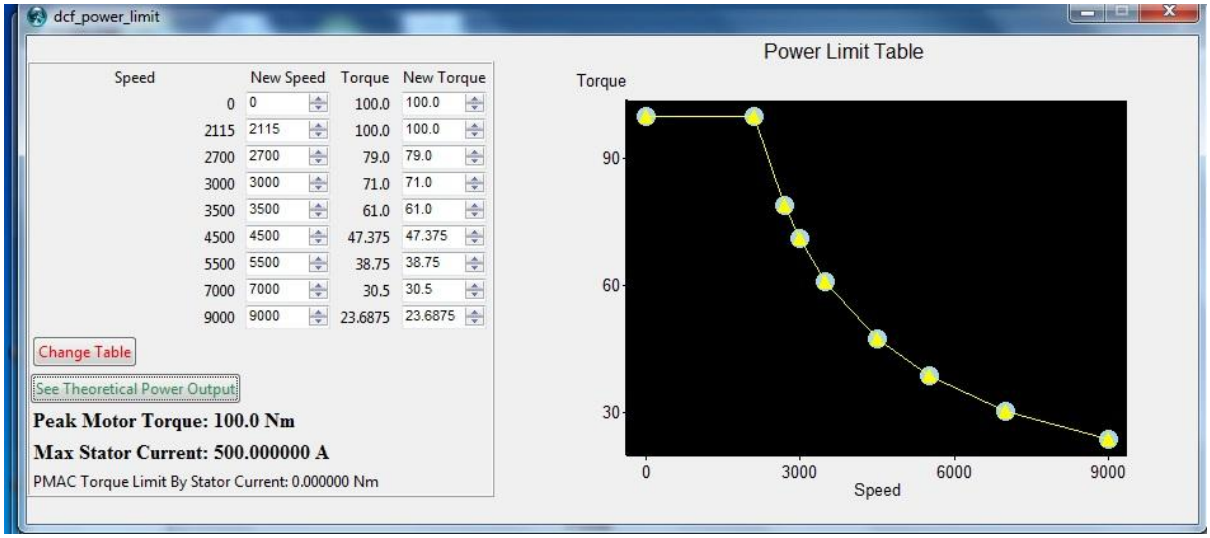


Max Power Tuning Power Map:

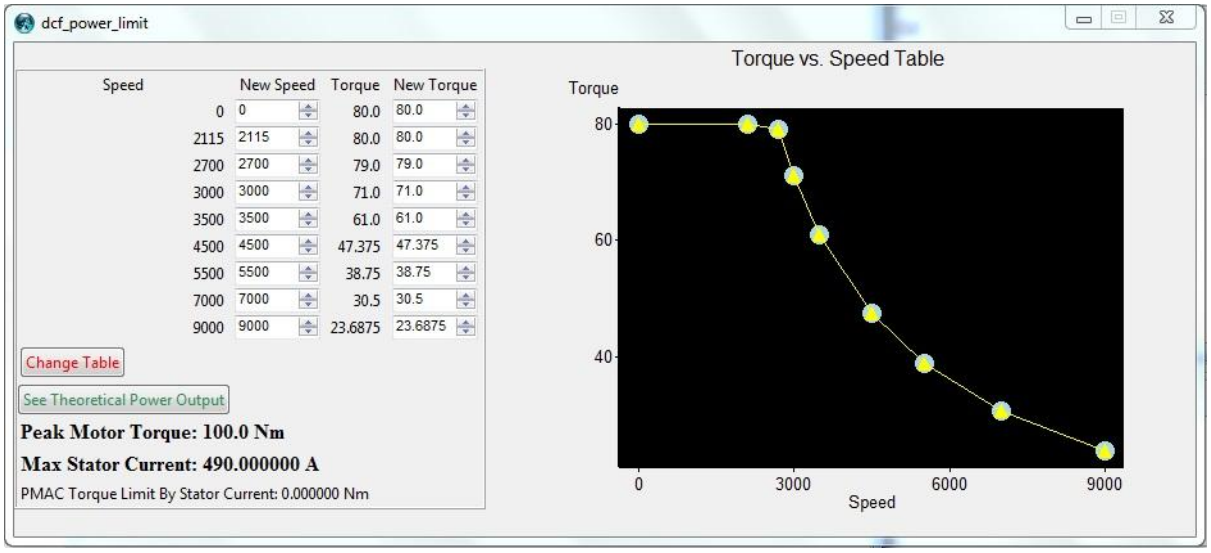
In the Max Power tuning mode the maximum torque is 100Nm, so you will always get a STOP alert when you give full throttle from standstill or low rpm. The Twizy uses all the power it has got and the motor can easily reach 90 degrees. Watch the temperature and drive carefully when it switches down to the Normal profile.

The Normal profile in this tuning mode is more powerful than the one in the Medium and Light mode, so you can easily drive the motor up to 100 degrees, in which case the PowerBox will switch back to the ECO profile.

This graph shows the Sport power map in Max Power tuning.



This graph shows the Normal power map in Max Power Tuning.

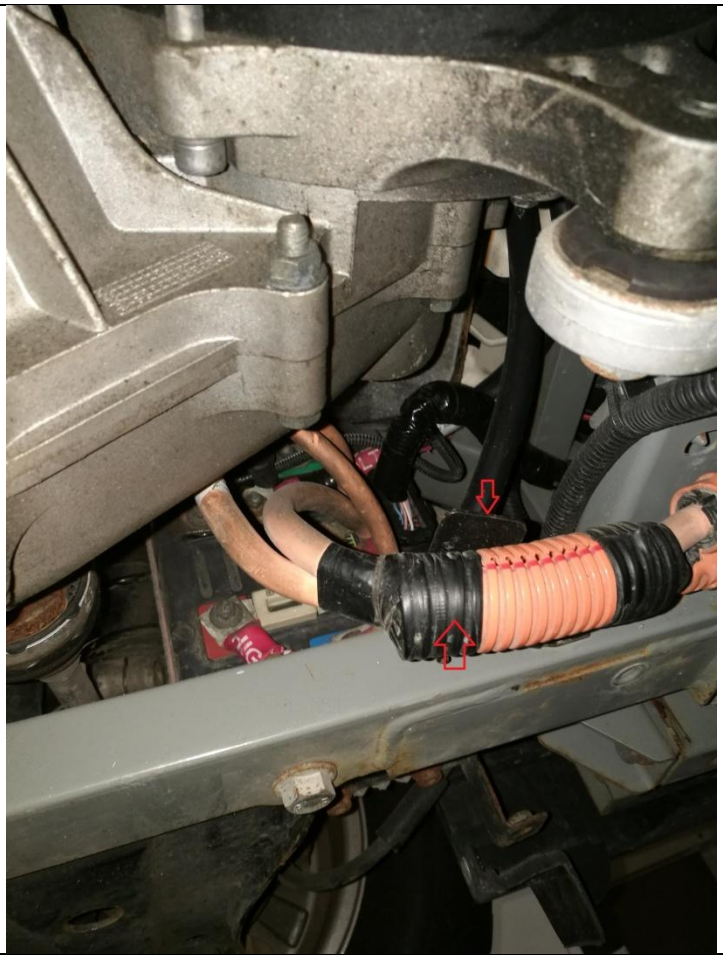


What is ECO, Normal and Sport profiles?

These are driving profiles that are automatically selected by the Internal PowerBox based on the temperature of the motor and battery. With a Powerbox Mini you have no way to choose these driving profiles yourself. Powerbox Mini always chooses the best profile for you :-))))

How to remove the Sevcon controller on a Twizy

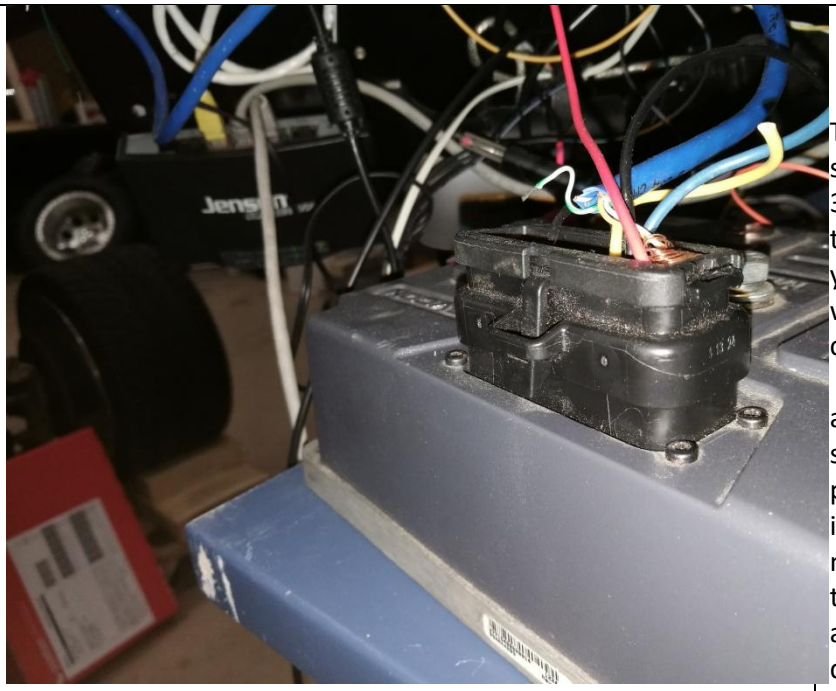
The first thing to do is to jack up the vehicle so that the rear wheels in the air.
Then unscrew the protective plate that is under the motor (4 screws)
Unscrew the left rear wheel and remove also the left rear fender



You can now disconnect all wiring to the controller. (With a 10mm wrench)

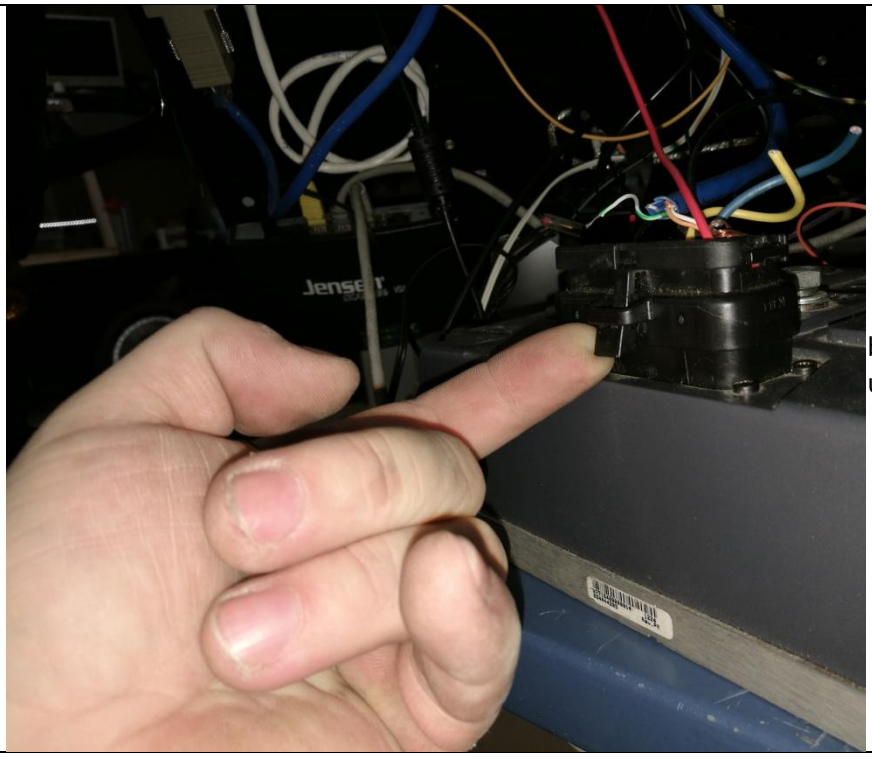
it's a little cramped to get access but it's okay if you stick your hand under the car. To get some more space you can cut the strips that are around the power cable from the main battery. You can also remove the steel angle that this strip is attached to. see arrows on image

You do not need disconnect the battery cable from the Main Battery. there is no power in them so there is no danger of short circuit ☺

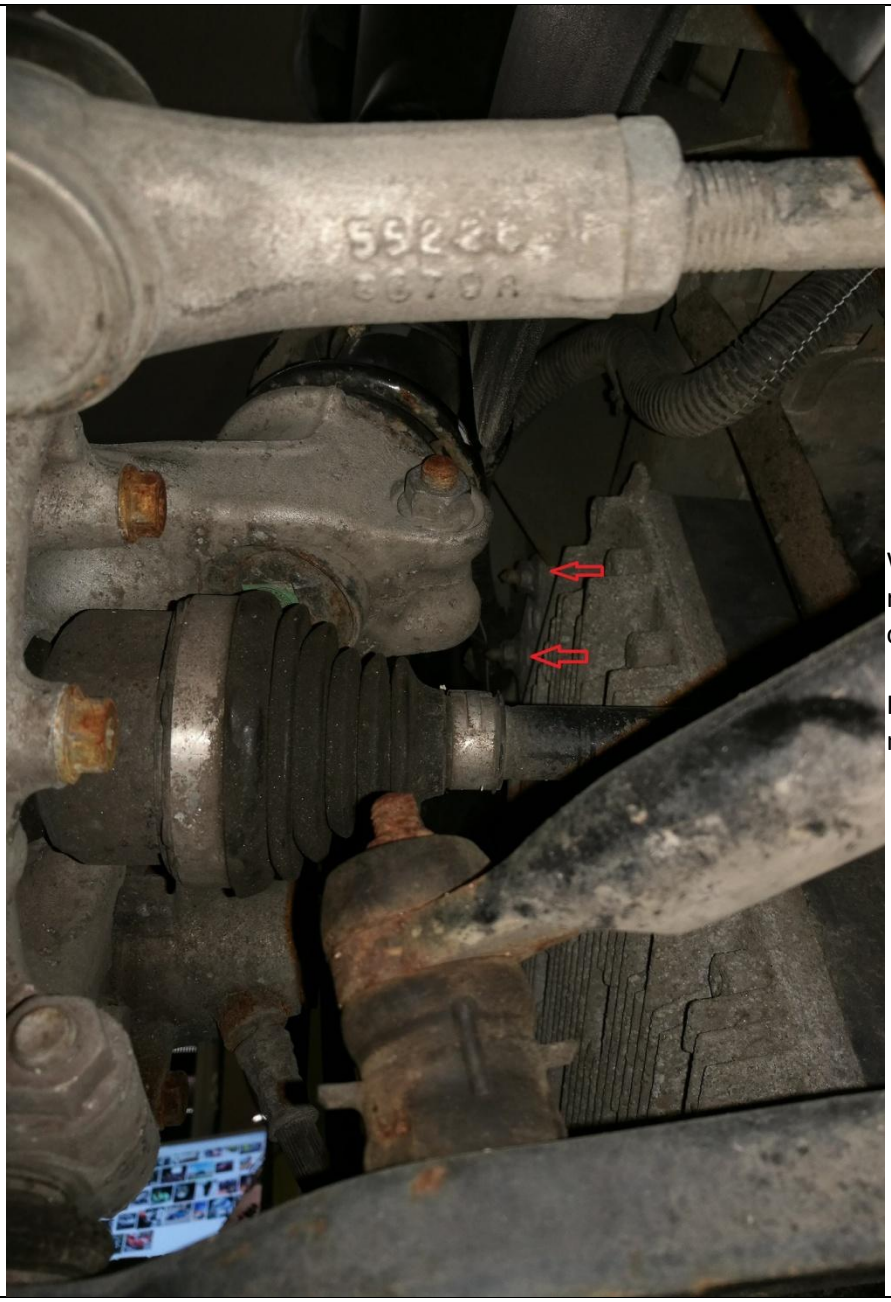


There are 8 wires, which are screwed with a 10mm and 1 35pin main connector.
to get off the main connector, you need to bend out a stud which is the middle of the connector

all the cables are color-coded so it's easy to find the right place for them later when you install the new controller. The new controller does not have the color codes but by looking at the original controller you quickly understand where the cables should be on the new controller

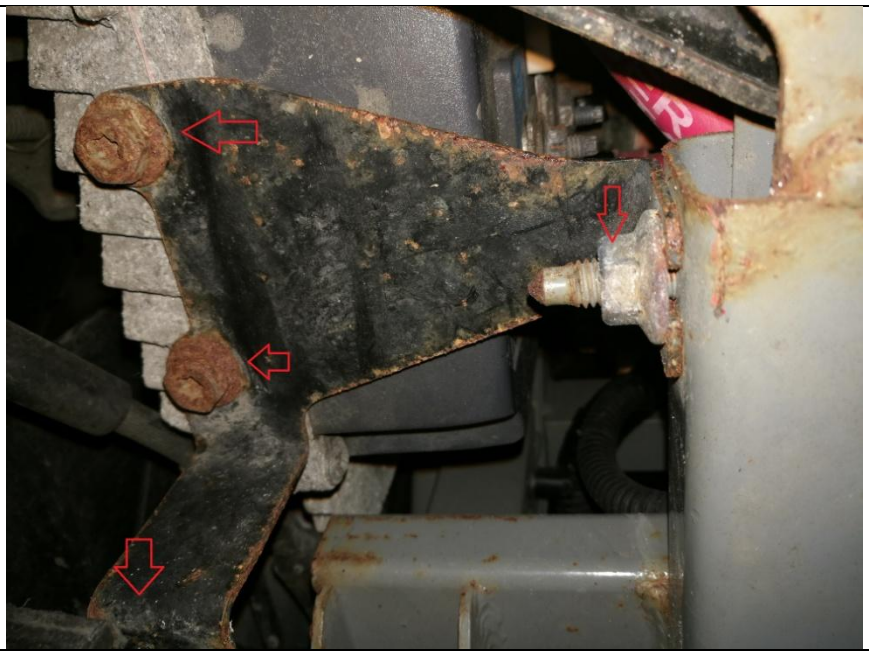


bend it gently out and pull up the connector



When all cables are removed you can loosen the controller.

It attached with 2 nuts (13 mm) to the top.



and a steel fastening to the bottom (4 nuts)

	To gain access to the 2 screws at the top then slide your hand up on the outside of the controller heat sinks

You can now remove the controller with sliding it downwards and slightly forward. bend away this plastic tap so you can get out the controller this way

Now remove the heat sink and mount it on the new controller. Be a little careful about the orange gasket between the controller and the heat sink. If this gasket is bad you should buy a new one or use regular cooling paste. Cooling paste is the cheapest choice. (usually it goes without problems using the original gasket)

The screws for the cable shoes on the new controller are not the same as on the original. Just move over the screws to the new controller. (They can be removed :-). the screws are special changeover screws from M8 to M6 screws.

The screws on a T45 controller cannot be used because they are too thin (M6). If you have a T45 then you have 2 choices. Go to the Renault dealership and purchased 6 screws for a T80 controller or drill up the cable shoes to m8 size so you can use the screws that are on the new controller. If you

drill them up to m8 then they can still be used on the m6 screws if you one day need to reinstall the original controller.

Once the heat sink and screws have been moved over, simply mount the controller in the same way as you removed it.

It really is not as complicated as it may seem from this PDF file. Anyone who has worked a little more than just changing the wheels on cars before will get this done :-) the job takes about 1 hour.
(Maybe a little longer the first time)