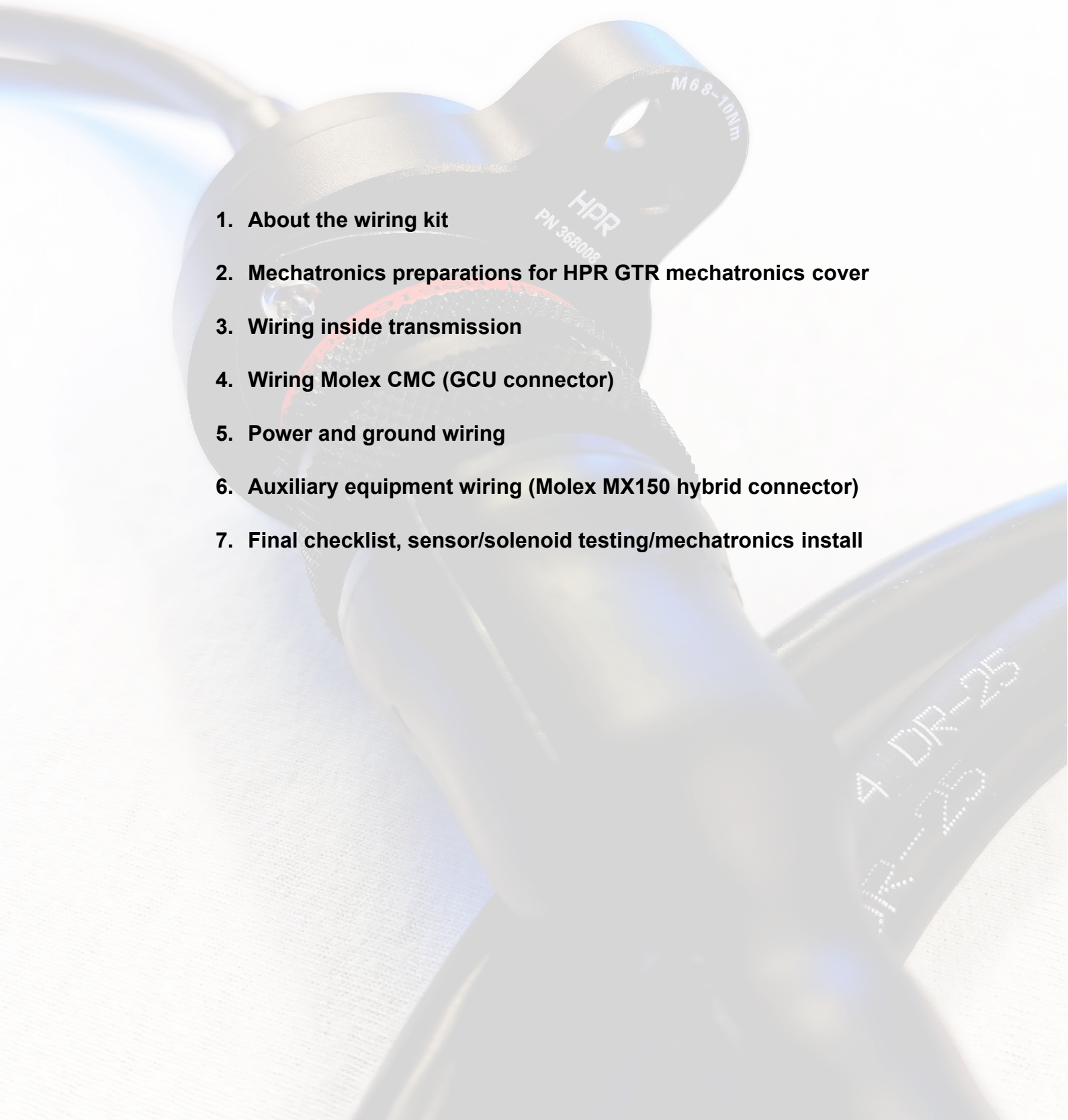
HPR GS7 DCT wiring guidelines for HTG Tuning GCU



1. About the wiring kit

The wiring kit uses two separate cables for connection between the HTG Tuning GCU and mechatronics. One for sensors, and one for power/solenoids.

The kit can be used to run the bulkhead connector directly through the **HPR GTR mechatronics cover,** Or you can use it for the original DCT wiring passage, using the **HPR billet DCT bulkhead adaptor.**

Using the GTR mechatronics cover will get you less connection points, and the ability to quickly remove the mechatronics module without doing any re-wiring.

If you are using the wiring kit through casing with the **HPR billet DCT bulkhead adaptor**, we recommend to follow the HTG tuning instructions for wiring connections throughout the main connector found on HTG Tuning Wiki.

No matter what option you go for, you will have a high quality wiring kit, designed to last the car's lifetime.

Our kit uses higher current rated cables and the motorsport connector has a higher amperage rating compared to other kits on the market.

The kit has a pre-wired 2 pin DTM connector integrated into the harness

Suggested usage:

- Reverse light output
- Oil pan temp sensor
- External speed sensor

Please read through the entire document before starting the job.
We recommend printing out the document and tick each box down the line.

Kit specifications

- Spec 55 motorsport wires
- Concentric twist (done in a custom cable machine)
- Kevlar laced
- Raychem Dr25 sleeving
- 1626 Motorsport connector with gold plated pins
- Sealed boots for connector

Sensor cable 22AWG

1x Red -5v supply

1x Black -Sensor ground

3x Green -Freq_inputs (speed signals)

9x Purple -Analog inputs

Solenoid cable 18AWG

2x Red -12v power supply

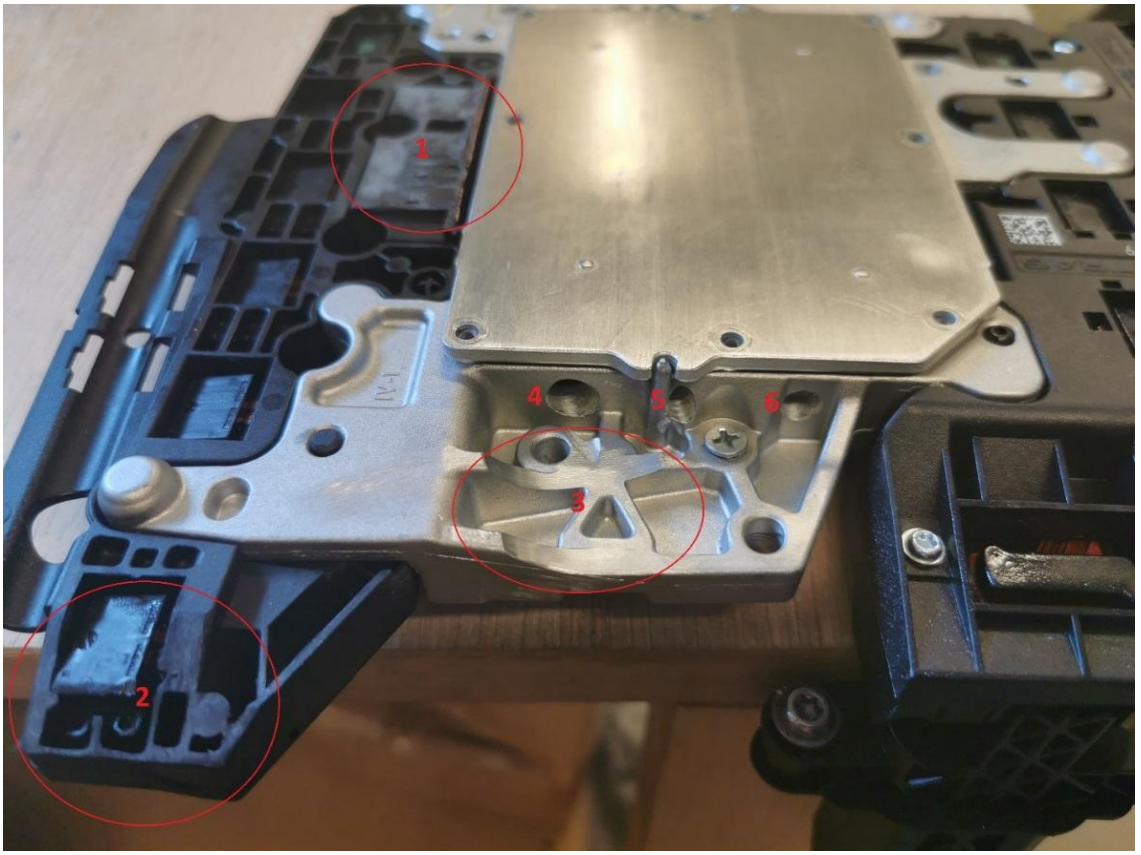
10x White -Solenoid outputs

Additionally there are two wires (green/white) for the external 2-pin DTM connector.

Mechatronics preparations for HPR GTR mechatronics cover

Place the mechatronics module on the corner of a wooden bench with the sensors sticking out to the side and bolt it down. This will keep the unit stable during work.

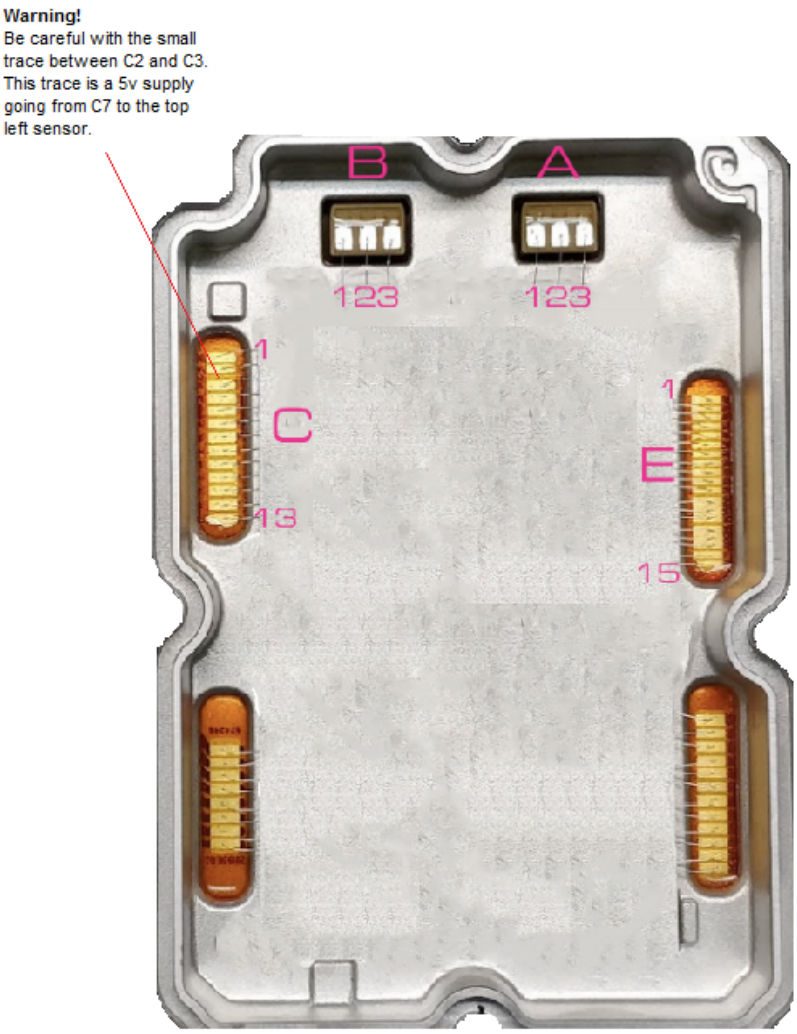
External preparations:



- ☐ **1** Cut away the Main connector, we recommend using a multi cut tool for the job. Smooth off surfaces and remove leftovers. Alternatively, the connector can be entirely removed by disassembling the plastic surroundings.
- ☐ **2** Trim down the top corner by solenoid 6 to get added clearance for the cover.
- ☐ **3** Grind down marked area for added cable clearance, make sure its smooth when finished.
- ☐ **4** Drill an 8mm hole for the Solenoid/Pwr cable. Make sure it's as close to the bottom structure as possible. There is very little height to work with here.
- ☐ **5** Drill a 4mm hole for the Front speed/temp sensor cable.
- ☐ **6** Drill a 6mm hole for the Sensor cable

Wiring inside transmission

Please note:
This section of the instructions are for use with the GTR mechatronics cover only. We recommend using the mechatronics main connector when running the wires through the stock cavity.



Oem TCM removal and pad cleaning

- ☐ Start by removing the small legs going to the pads with a small screwdriver. Make sure you remove it entirely from the pad. Do not remove the gel at this stage.
- ☐ With the mechatronics module securely fastened, chisel away the TCM board off. A small chisel/large screwdriver will do the job in 10-15 minutes.
- ☐ Scrape it all away and throw it in the bin.
- ☐ Using a dremel, carefully remove the silver coating on Pads A and B.

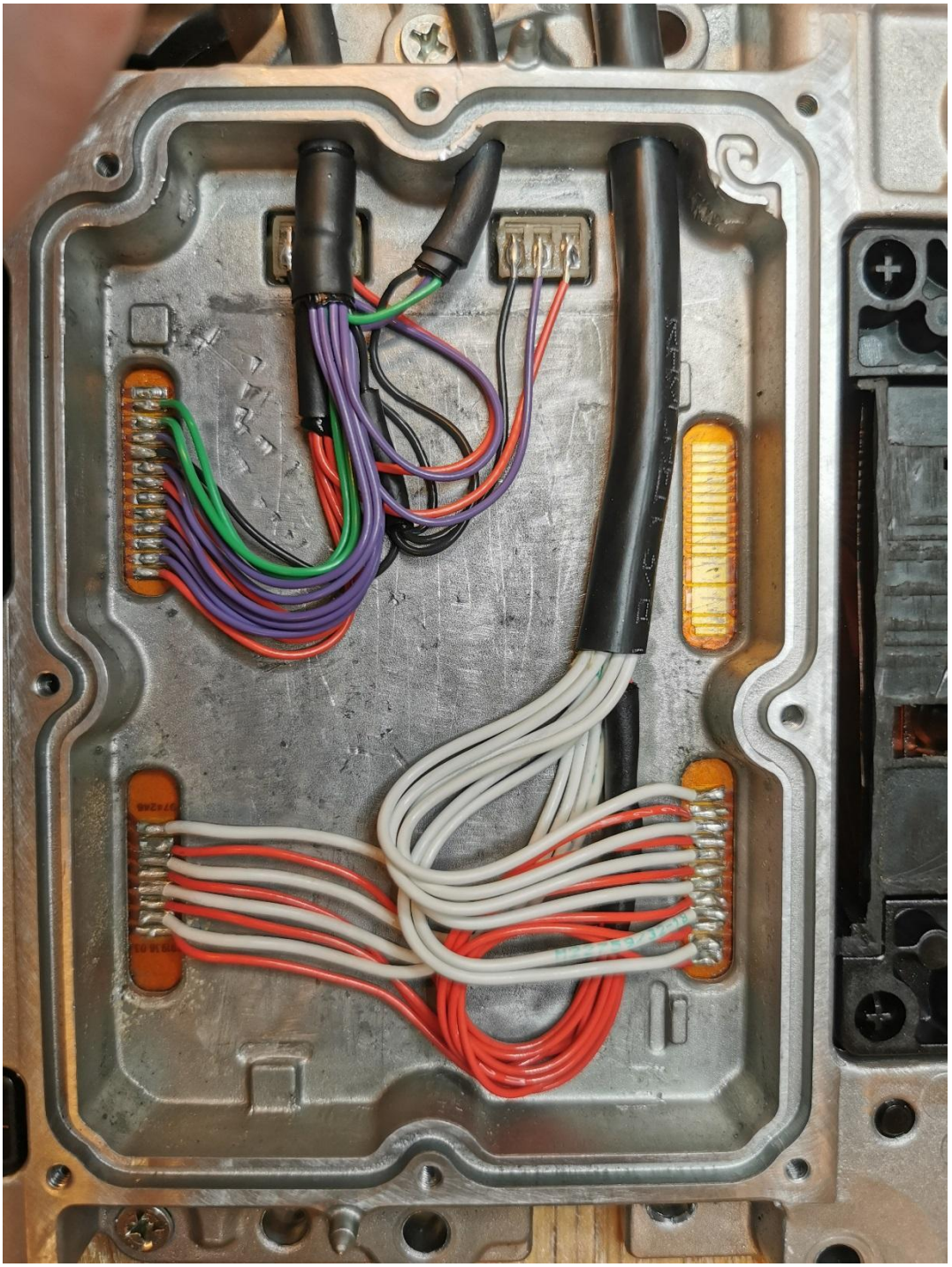
- ☐ Carefully remove the gel on all remaining pads using a cotton pin. Do a final clean with a Scotch Brite pad and brake clean.
- ☐ Drill a hole for the connector in the mechatronics cover. It should be placed between the two flange holes on the top left corner, facing backwards.
- ☐ Drill and tap 2xM3 threads for the flange, and use the supplied gasket. Use Loctite on the threads when you install it later on. The flange should be placed on the inside of the cover. You can also use nuts with the bolts. Remember sealant for the bolts.

Internal cable preparation

- ☐ Route the two cables in the drilled holes and position the connector where it should be relative to the mechatronics position. (The flange should be 5-10mm away from plastic surroundings of the mechatronics)
- ☐ Mark off the sensor cable 15mm past the hole inside the mechatronics. Remove cable and cut away the DR-25 sleeving, using a sharp razor blade. Be careful not to damage the conductors of the cable.
- ☐ **Cut one green and one purple wire 150mm** from the end of the sleeving, these cables should go out the 4mm hole to the front sensor. **Cut the rest of the cables to 90mm**
- ☐ Cut down the red 5v wire to 40mm and crimp 5x 80mm wires for the 5v supply to the sensors
- ☐ Cut down the black s_gnd wire to 60mm and crimp 4 wires for signal ground supply. (3x80mm and 1x180mm length)

- ☐ Route the cable inside the mechatronics. The 3 longer wires should go out the 4mm hole and connect to the front Temp/speed sensor using the supplied 3 pin connector.

Wiring layout for GTR mechatronics cover.
The E pads from the main connector will not be used.



Solenoid/power cable

- ☐ Route the cable inside the housing and carefully cut away the DR-25 sleeving.
- ☐ There are one or two filler (unused) wires in the cable. Cut the wire as close to the end of the sleeving as possible. (one green and one white longer wire)
- ☐ Cut the two red wires to 40mm and join them together with 10x80mm AWG22 cables for power feed to the solenoids.
- ☐ Cut the rest of the wires for solenoids to 90-100mm.

Soldering

This job requires soldering experience, proper tools and a steady hand.

Some tips before you start the job
If it's your first time soldering the mechatronics, we recommend testing yourself (and your equipment/solder) on the unused E pads.

This will give you a good pointer if you should proceed or get it done by a specialist.

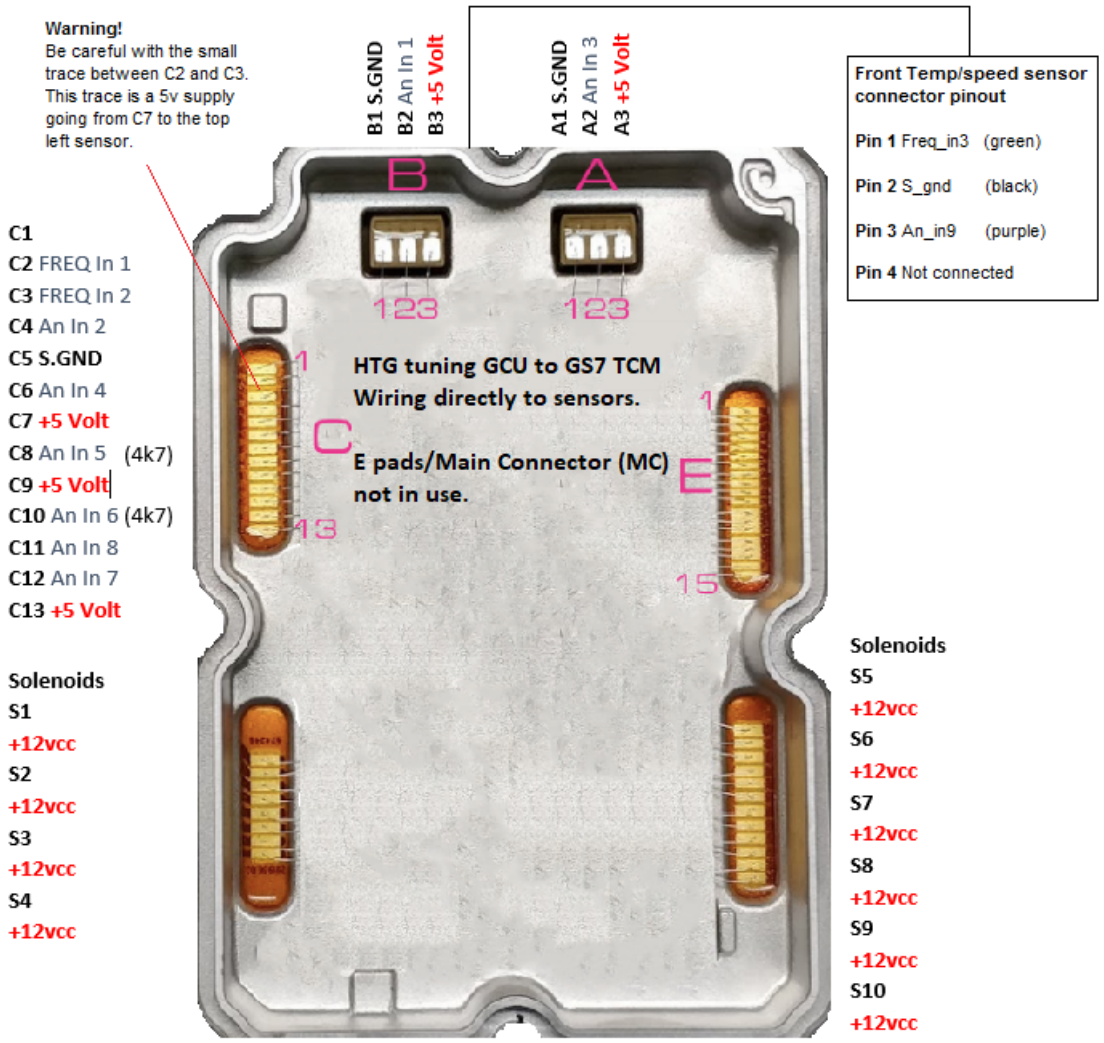
With the prepped sensor cable, you will have the following wires to connect

- 5x Red wires for **5v supply**
- 3xblack wires for **S_gnd**
- 8X purple wires for **An_in**
- 2x green for **Freq_in**
- 1 black/Green/purple for the front temp/speed sensor

With the prepped solenoid/power cable, you will have the following wires to connect

- 10x Red wires for 12v supply to solenoids
- 10x white wires for solenoid PWM output

Tin pads and wires (use flux) and then solder the wires to the pads. Do not exceed 360C on your soldering iron, and don't spend too much time with the soldering iron on the pads. If it does not fuse in a few seconds, something is dirty/corroded. The pads can easily separate from the board with too much heat.



Continuity checks after soldering

- ☐ Verify no contact between soldered points using a DMM
- ☐ Verify no contact between chassis and soldered points using a DMM

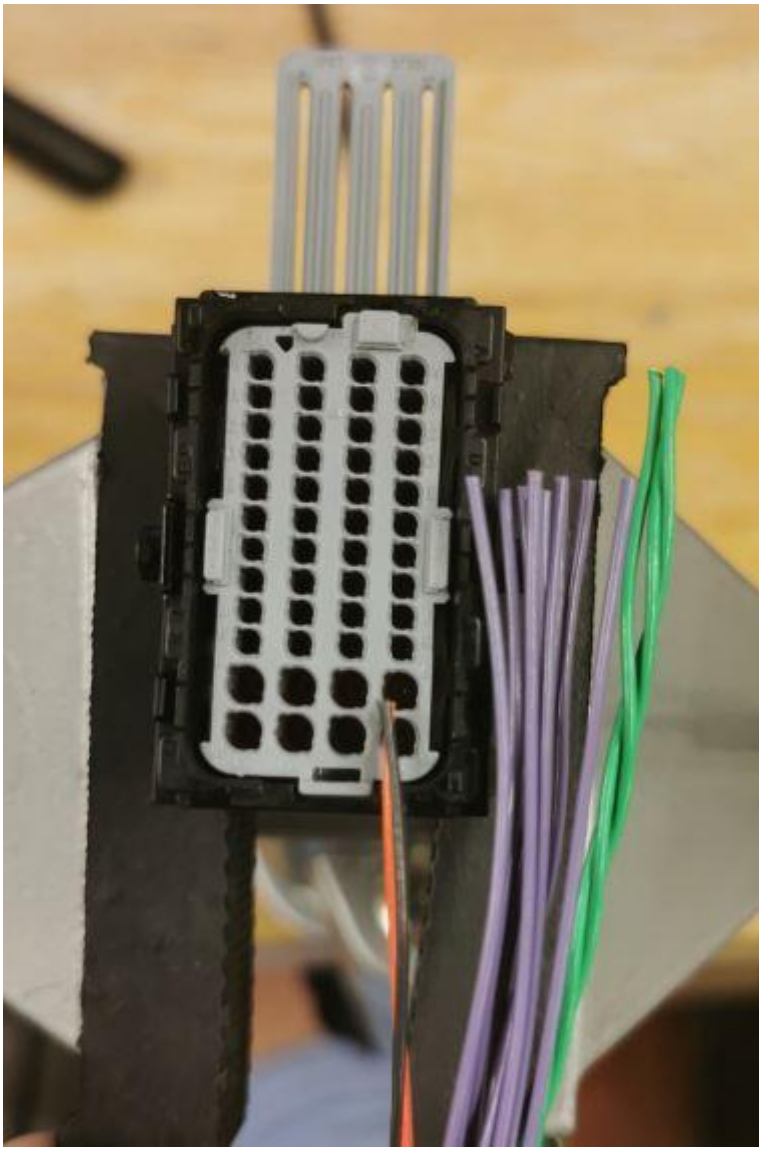
Wiring Molex CMC (GCU connector)

The Molex CMC connector can be challenging to wire. Using Spec 55 wires will get the job done a lot easier as it is harder than automotive spec wire, and has thin insulation.

We recommend using the Sargent 1026 CT crimper for the pins.
It's cheap to purchase and crimps both the copper and insulation properly without bending the pins.

Note the small positioners on the pins.
The pins should slide into the cavity relatively easily by hand.
If there is resistance, stop and pull it out again and rectify the issue. (The pins bend easily)

Identify the columns and rows on the connector. Note that the pinout sheet is mirrored looking at the backend of the connector.



- ☐ Prep the cable and cut the wires to length so they match where they should go into the connector.
- ☐ We recommend joining the resistors with extra wires joined to the Molex pins, with the resistors placed just outside the connector.
- ☐ Join the supplied resistors on one side and crimp/solder a short red wire for 5v. Crimp/solder 2xwhite wires to the 4k7 resistors and another color for the 2k2 resistor.
- ☐ Protect the resistors with heat shrink sleeving and place the resistors just below the connector. cut the wires so they match where they should go into the connector.
- ☐ Identify the correct cables by measuring continuity from the mechatronics pads.
- ☐ Join the An_in 5/6/9 cables to its respective resistor wire.
- ☐ Crimp and connect the rest of the wires to its position. Remember that you will most likely need extra **5v** and **S_gnd** for accessories.

Power and ground wiring

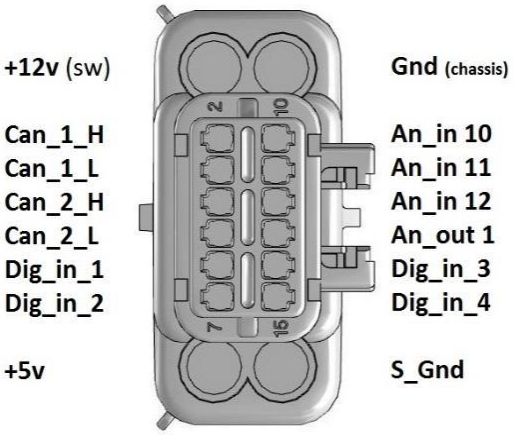
The **solenoids, M3, M4 and L1** need a switched 12v power source, protected with a 25A fuse.

Join M3/M4/L1 together with the 2xred wires (solenoid supply) from the wiring kit, and run them to a switched power source.

We recommend using minimum AWG 14 for the supply to minimize voltage drop.

Connect L3 and L4 to chassis ground. Make sure it's a good and clean connection, preferably at a threaded boss welded to the chassis. Use minimum 2xAWG 16 wires for ground.

Auxiliary equipment wiring (Molex MX150 hybrid connector)



This 16 pin connector will soon be available at our shop. (12x22A plus 4x25A current rating)

A great and cost effective connector that can be used for a quick disconnect of all the wiring inside the car.

Suggested wiring pinout will suit most applications. Can 2 wires can be changed in the CMC connector for other inputs/outputs available.

Final check list, sensor/solenoid testing

Connect the wiring kit to the mechatronics module and commence the following tests using a DMM:

- ☐ Verify all connected positions are correct between mechatronics pads and GCU connector
- ☐ Verify all connected positions Front Speed/temp sensor connector and GCU connector
- ☐ Check for continuity between Sensor pads and GCU connector
- ☐ Verify no shortage between all conductors
- ☐ Verify no shortage to mechatronics chassis and all conductors
- ☐ Measure continuity between GCU connector and all solenoid connectors (PWR and PWM)
- ☐ Measure 4K7 resistance between An_5 and 5v
- ☐ Measure 4K7 resistance between An_6 and 5v
- ☐ Measure 2K2 resistance between An_9 and 5v

Mechatronics sensor test

You will need a Power supply for this job. Connect a 5v DC supply between 5v and S_gnd. It should not pull more than approx. 0,2 amps connected to the mechatronics module.

- ☐ Verify variable voltage on analog inputs using a magnet positioned close to sensors. It's normal to see some variance between the different sensors.

- ☐ Check for resistance for the two speed sensors between **s_gnd** and **Freq in**. Both sensors should read around 420K ohm. If you don't get the correct resistance, try measuring it the other way around by swapping the DMM probes. There is a zener diode in the circuit of these sensors stopping you getting the correct measurements, therefore it can only be measured one way.
  Alternatively you can measure the speed-sensors functionality with a suited trigger wheel close to the sensor and an oscilloscope.

Mechatronics installation

Install your mechatronics module into the transmission.
Make sure that it is clean, and that the O-rings for pressure sensors and position sensors are installed.

- ☐ Torque down the module to 2Nm, and do a final torque to 5Nm.

Solenoid valve test

Now it's time to test the valves with the valve tester firmware from HTG Tuning.

Connect the GCU to the gearbox, connect 12V, ground and +12V ignition.
Use a proper power source for the job.

Make sure drivers are installed on your computer, otherwise it's not possible to connect or change firmware.

http://update.htg-tuning.com/htg-driver.zip

Download **HTG Tuning Loader**

https://update.htg-tuning.com/loader-latest.zip

Download **DataLogger**

Connect the GCU to your computer and open the Loader software.

You should see your GCU serial number in the drop down menu, select it and click connect.

Select valve-tester in the second drop down menu.

You should now hear clicking from the valves, you should hear 10 clicks and a pause.
(This will continue as long as you are connected with the valve tester)

Open the Data Logger, press Refresh and connect.

You should now see different coloured lines which represent the current draw to each solenoid.

The maximum level should be fairly the same and only one line should go high at the time, and current should also be the same for all solenoids.

Correct behaviour is that you should see 10 independent lines with individual actuation.

Once done with the test, re-flash the latest firmware available in the Loader software.

More details about valve testing can be found on the HTG Tuning Wiki page.

- ☐ Seal off all the soldered pads and cable passages with a good quality sealant (Epoxy based or high temp RTV) and install the cover on the mechatronics module.
- ☐ After all accessories are wired up in the car, verify no continuity between S_gnd and chassis Gnd.

Need any help or assistance with the kit?

Don’t hesitate to contact us on social media or send us an email

info@hpr-tuning.com