


HPR GS7 DCT wiring guidelines for HTG Tuning GCU

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- A background image showing a close-up of a motorcycle engine with a black wiring harness. The harness has several components with labels: 'M6 8-10Nm' on a bolt, 'HPR PN 3680' on a component, and '4 DR-25' on a cable. The image is semi-transparent, allowing the text to be overlaid.
1. About the wiring kit
 2. Mechatronics preparations for HPR GTR mechatronics cover
 3. Wiring inside transmission
 4. Wiring Molex CMC (GCU connector)
 5. Power and ground wiring
 6. Final checklist, sensor/solenoid testing/mechatronics install

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 adapter**.

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

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 connector integrated into the harness

Examples of 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.

Important

**Complete both the transmission end wiring and controller wiring all at once.
Verify all wiring positions, sensors test and valve test before you seal off anything.**

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 18/20AWG

2x Red	+12v power supply 18AWG
10x White	Solenoid outputs 20AWG

Additionally there are extra filler wires in the Solenoid cable, some of them are connected to the pre-wired extra connector.

Verify positions by measuring continuity from the connector pins and connect to its intended usage.

Motorsport connector pinout 1626 series

Pos	Usage		Color/size
a	Freq_in	(1)	Green 22
b	Freq_in	(2)	Green 22
c	Freq_in	(3)	Green 22
d	Analog_in	(1)	Purple 22
e	Analog_in	(2)	Purple 22
f	Analog_in	(3)	Purple 22
g	Analog_in	(4)	Purple 22
h	Analog_in	(5)	Purple 22
c	S_gnd		Black 22
j	PWR_out	(1)	White 20
k	PWR_out	(2)	White 20
l	PWR_out	(3)	White 20
m	PWR_out	(4)	White 20
n	PWR_out	(5)	White 20
p	+5V		Red 22
p	PWR_out	(6)	White 20
q	PWR_out	(7)	White 20
r	+12V power		Red 18
s	+12V power		Red 18
t	Analog_in	(6)	Purple 22
u	Analog_in	(7)	Purple 22
v	Analog_in	(8)	Purple 22
w	Analog_in	(9)	Purple 22
x	PWR_out	(8)	White 20
y	PWR_out	(9)	White 20
z	PWR_out	(10)	White 20

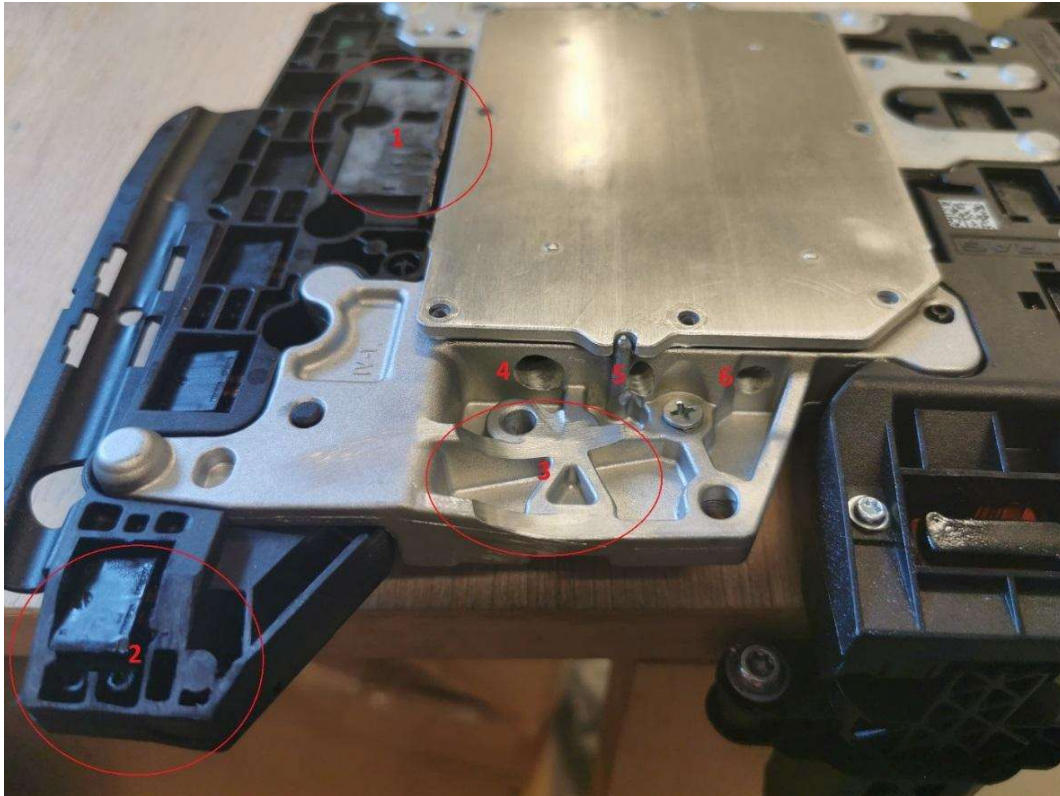
(...) Suggested usage, may also be wired differently

Special characters in red

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 (Fein Multimaster or similar) for the job. Smooth off surfaces and remove leftovers. Alternatively, the connector can be entirely removed by disassembling the plastic surroundings.
- **2** Not needed, First Rev cover only.
- **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

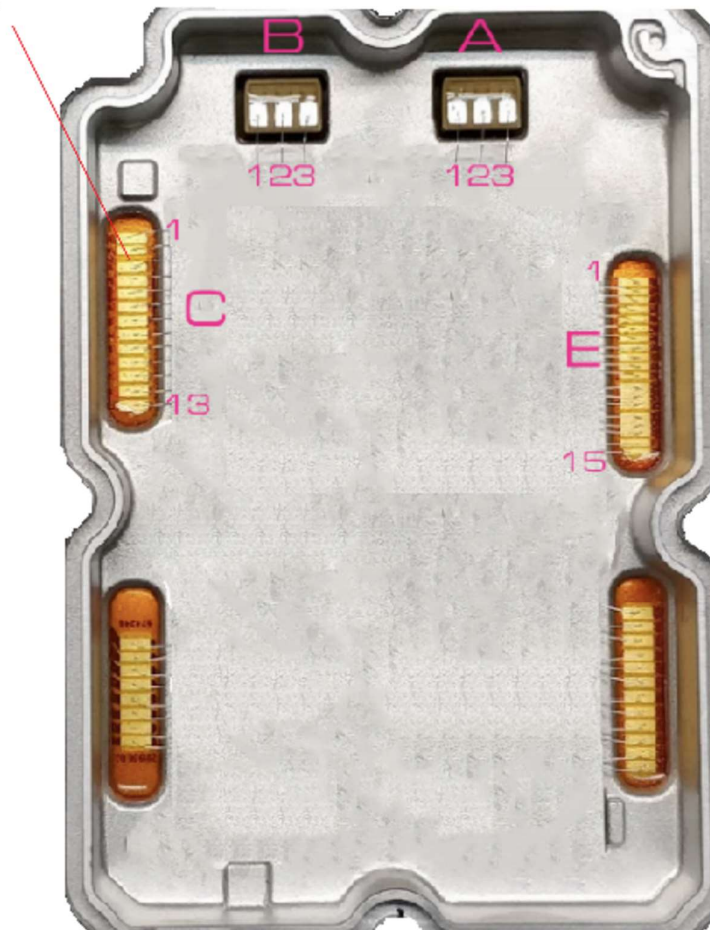
Wiring inside transmission

Oem TCM removal and pad cleaning

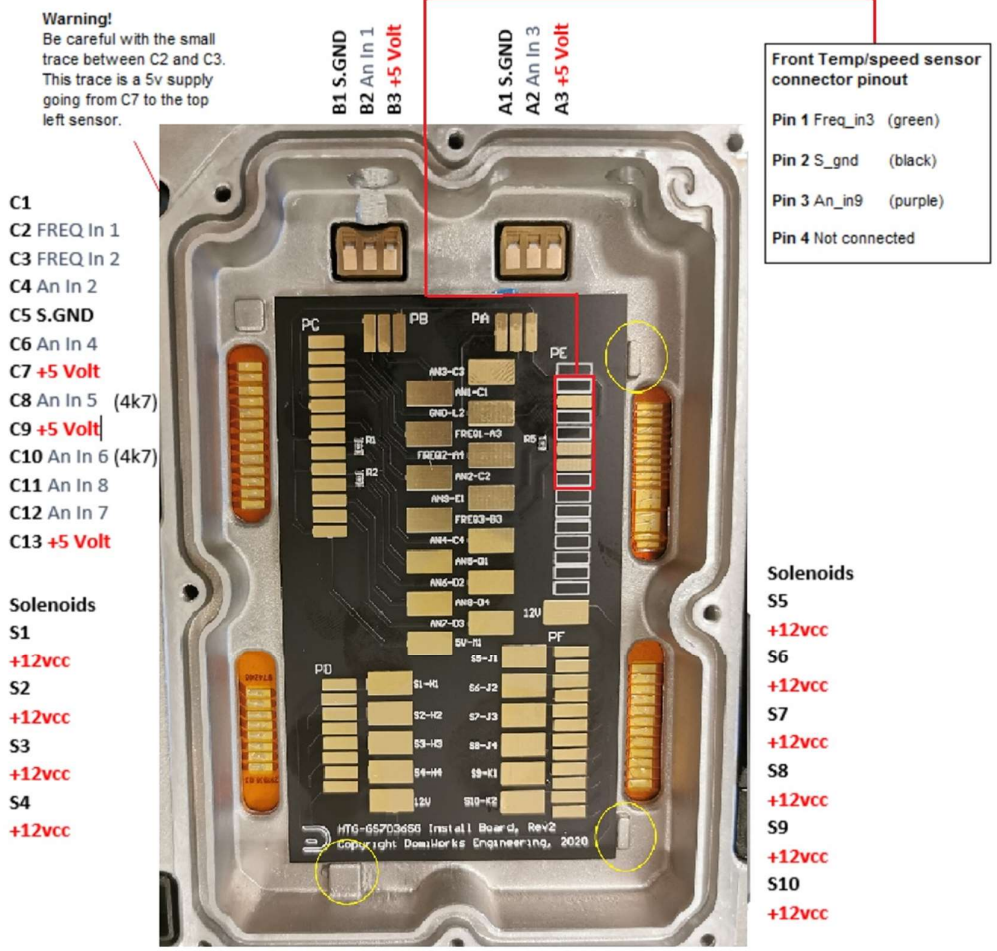
- Start by removing the small legs going to the pads with a small screwdriver. Make sure you remove it entirely from the pad. **Do not remove the gel at this stage**
- With the mechatronics module securely fastened, chisel away the TCM board off. A small chisel/large screwdriver will do the job in 10-15 minutes.
- Scrape it all away and throw it in the bin.
- Using a dremel, carefully remove the silver coating on Pads A and B. (the two top positions in the above picture)
- Carefully remove the gel on all remaining pads using a cotton pin and alcohol. Rotating a small paint brush towards the pads effectively removes the gel. Do a final clean with a Scotch Brite pad and brake clean

Warning!

Be careful with the small trace between C2 and C3. This trace is a 5v supply going from C7 to the top left sensor.



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



- Install the PCB inside the mechatronics module using high temp RTV. Place the PCB against the 3x tabs and let cure (yellow circle)

Soldering

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

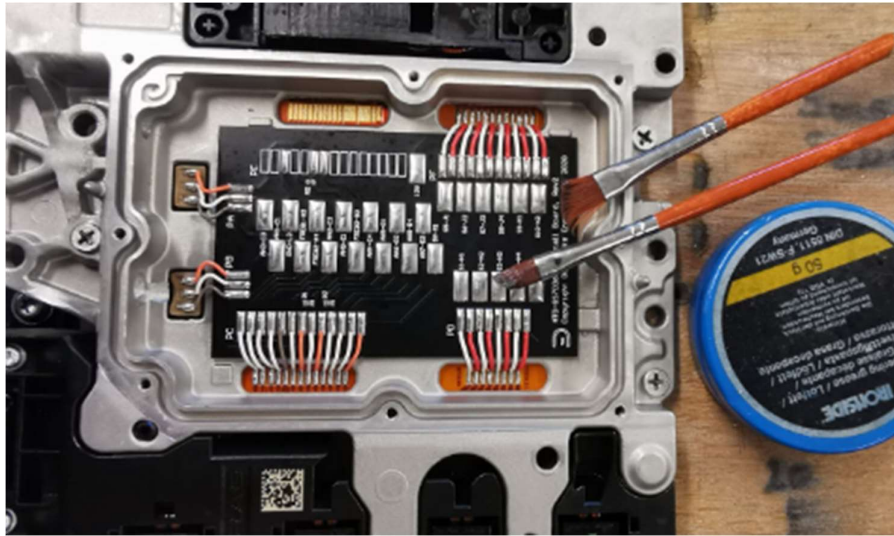
Some tips before you start the job

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

We have tested a lot of solder types for this work, and the best solder we have found this far is the Stannol HS10. It contains lead, so be careful with the fumes.

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

Jumper wire install



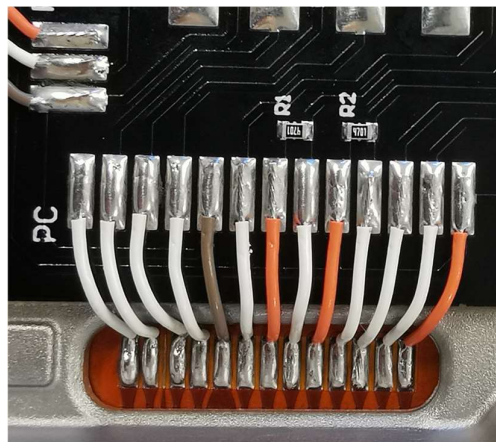
Tin pads and wires (use flux paste) and then solder the wires to the pads.

Bend the end that goes to the wafer pad about 80 degrees before tinning.

Do not exceed 380C 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.

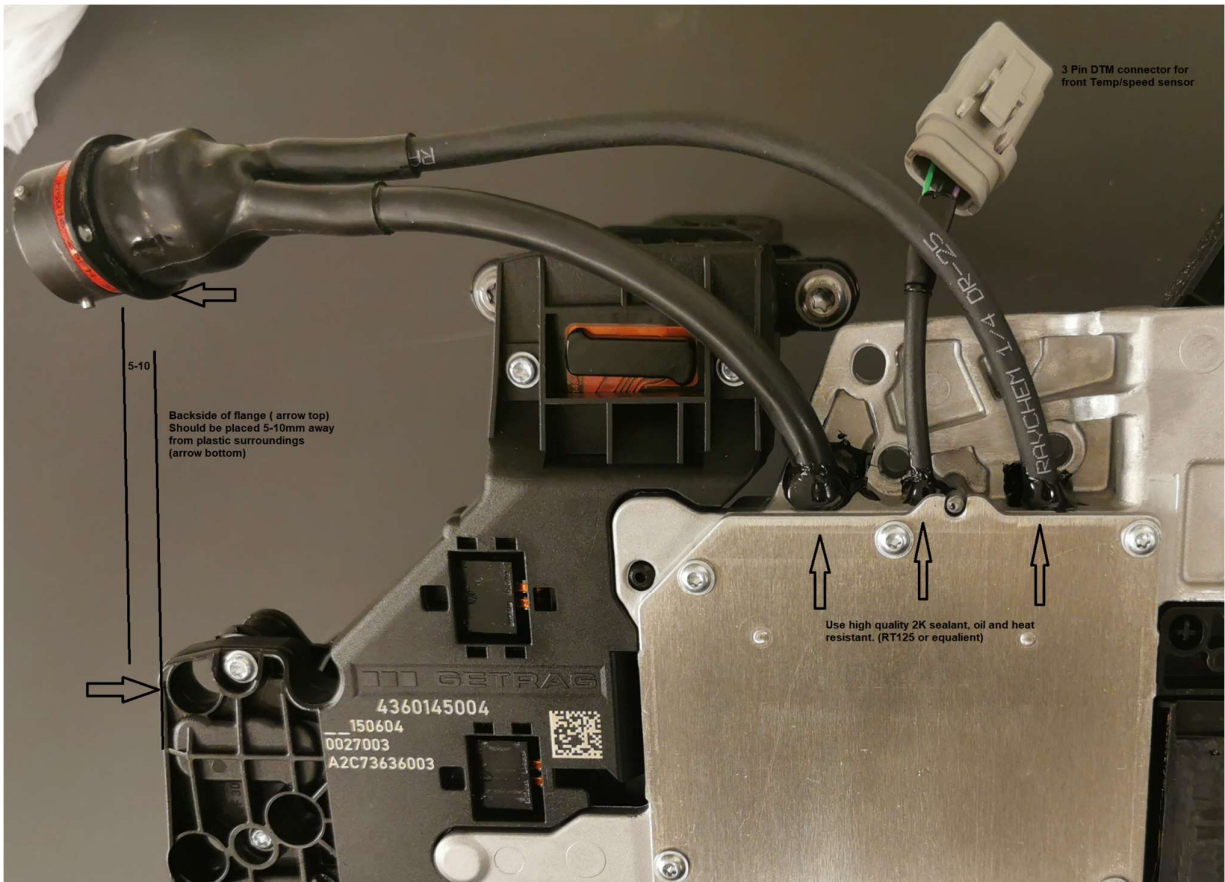
Make sure that you have a visible clearance between the pads:



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)

- Cut off the Sleeving around 20 mm past the hole, and pre-solder all wires before proceeding with joining them to the board.



Note that the cables are not marked, but have color coding to identify its usage.
Positions of **solenoid 1-10**, **An_in 1-9**, and **Freq_in 1-3** are set by the end user.

We recommend soldering the wires to its locations on the PCB first, and then measuring continuity to determine the positions in the GCU connector later on.

Alternatively you can measure from the Motorsport connectors positions acc to the schematic on page 4.

Soldering cables to PCB

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

- Red wire for **5v supply**
- Black wire for **S_gnd**
- 9 purple wires for **An_in**
- 3x green for **Freq_in**

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

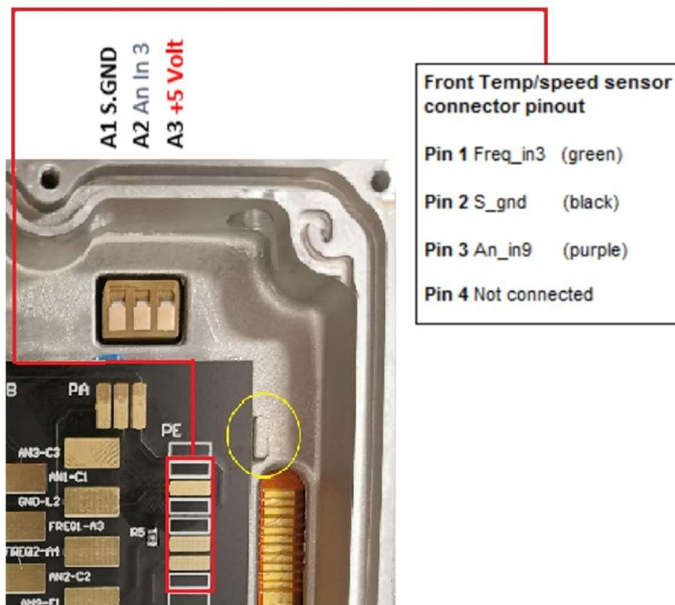
- 2x Red wires for 12v supply to solenoids
 - 10x white wires for solenoid PWM output
- Note that all **Pre R2-B2-22** wiring kits have filler wires that needs to be removed.

Removing oem harness inside transmission

Follow this guide in order to remove stock wiring and prepare for the Front temp speed sensor wiring.

[How to remove your DCT mechatronics \(TCM removal and pre-wire guide\)](#)

Front temp speed sensor wiring



- Start by connecting the supplied 3 pin DTM to the 3 wires marked with 4, 5 and 6. Use protective sleeving around the wires. Note that pin 1,2,3 on the DTM connector has the same positions as the stock

connector located by the sensor.

- DTM Pin 1 to MC 6 (Freq_in3)
- DTM Pin 2 to MC 5 (S_gnd)
- DTM Pin 3 to MC4 (An_in9)

Run the 3 supplied wires through the 4mm hole and solder them to the board



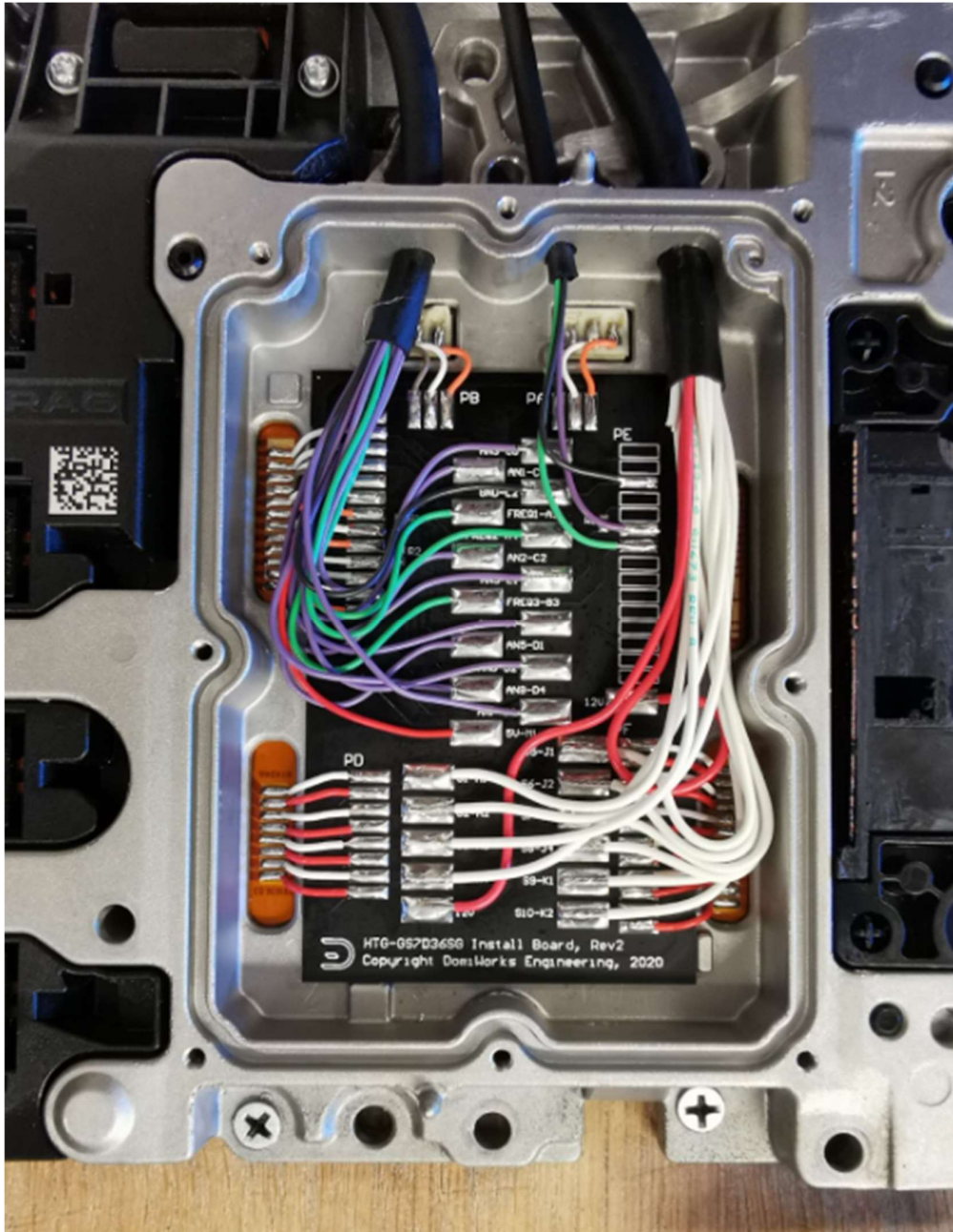
- Connect the mating 3 pin DTM to the 3 wires you just soldered to the board. Use protective sleeving around the wires. Note that pin 1,2,3 on the DTM connector has the same positions as the stock connector located by the sensor.
- DTM Pin 1 to Green wire (Freq_in3)
- DTM Pin 2 to Black wire (S_gnd)
- DTM Pin 3 to Purple wire (An_in9)

Cleaning after soldering

Make sure to clean all solder joints thoroughly before proceeding.

We use Citrus cleaner and a paint brush with good effect.

Repeat the process 2-3 times until good, and do a final clean with degreaser.



Continuity checks after soldering and cleaning

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

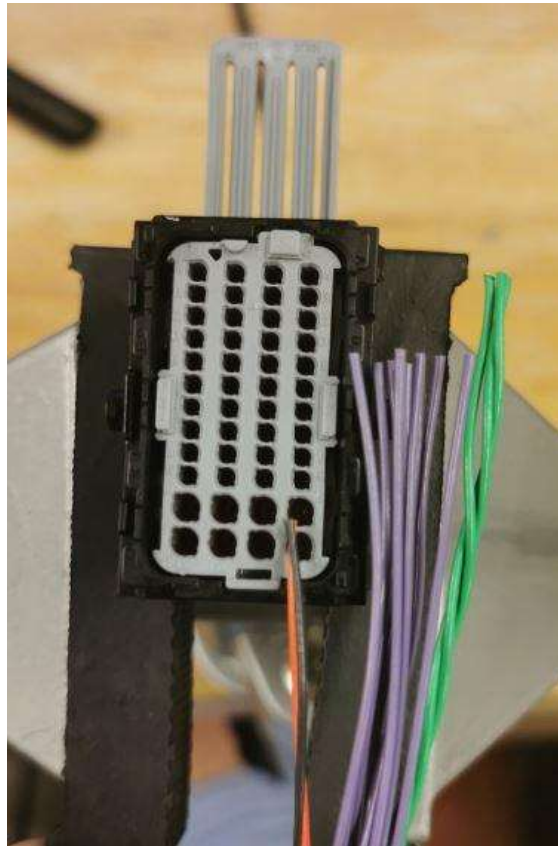
Wiring Molex CMC (GCU connector)

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 Can resistors with extra wires joined to the Molex pins, with the resistors placed just outside the connector.
- 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
- 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.

**Do not press in the grey locking spade with excessive force, it should slide in easily. If resistance is found, rectify the issue.
You have been warned.**

	1	2	3	4
A	AN_out1	AN_out2	FREQ_in1	FREQ_in2
B	AN_out3	AN_out4	FREQ_in3	FREQ_in4
C	AN_in1	AN_in2	AN_in3	AN_in4
D	AN_in5	AN_in6	AN_in7	AN_in8
E	AN_in9	AN_in10	AN_in11	AN_in12
F	DIG_in1	DIG_in2	DIG_in3	DIG_in4
G	CAN_1_Hi	CAN_1_Lo	CAN_2_Hi	CAN_2_Lo
H	PWR_out1	PWR_out2	PWR_out3	PWR_out4
J	PWR_out5	PWR_out6	PWR_out7	PWR_out8
K	PWR_out9	PWR_out10	PWR_out11	PWR_out12
L	+12_IGN	s_GND	GND	GND
M	+5_out	+12_out	+12_const	+12_const

Power and ground wiring

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

L1 is recommended to fuse with 5A in order to protect the unit.

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 18 wires for ground.

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. Make sure it's fused.
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.

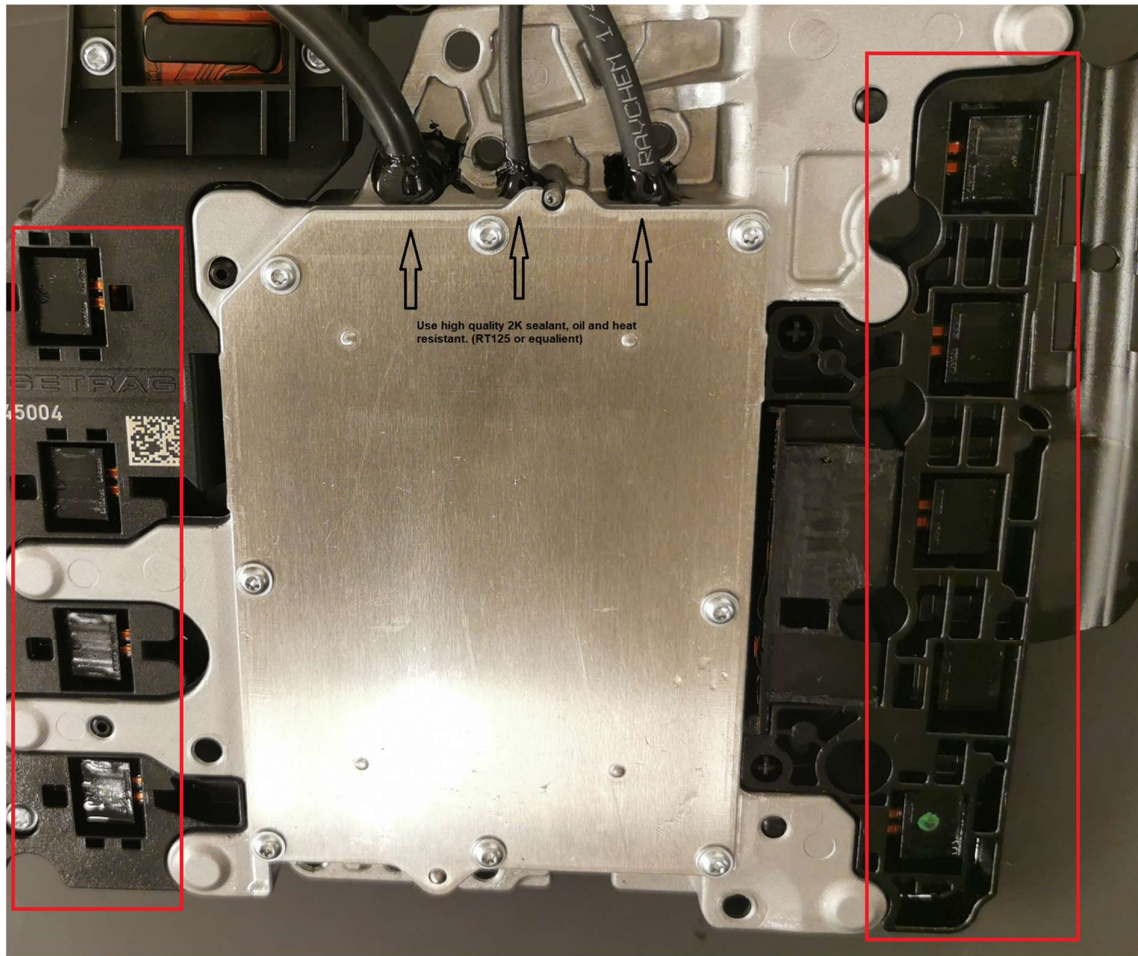
- Verify voltage feedback on all inputs. (An in and Freq in)
It's normal to see some variance between the different sensors.
If no voltage is found, it's likely that you have a wiring issue.

The above test ensures that your wiring is good all the way through the sensors.
If you want to test the sensors function further, follow the two steps below:

- Measure variable voltage readings for the analog sensors using a magnet to verify function.
- 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.

Solenoid loop test

Before installing the mechatronics module to the transmission, it's recommended to do a full loop test between **+12v** and all **PWR out**. You need to loop the 2 pin solenoid connector on the backside of the mechatronics module, and measure at the GCU connector using a DMM.



- Measure continuity between M3/4 (+12v) and all 10 PWR outs. You should have sub 0.1ohm readings.

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 behavior 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.

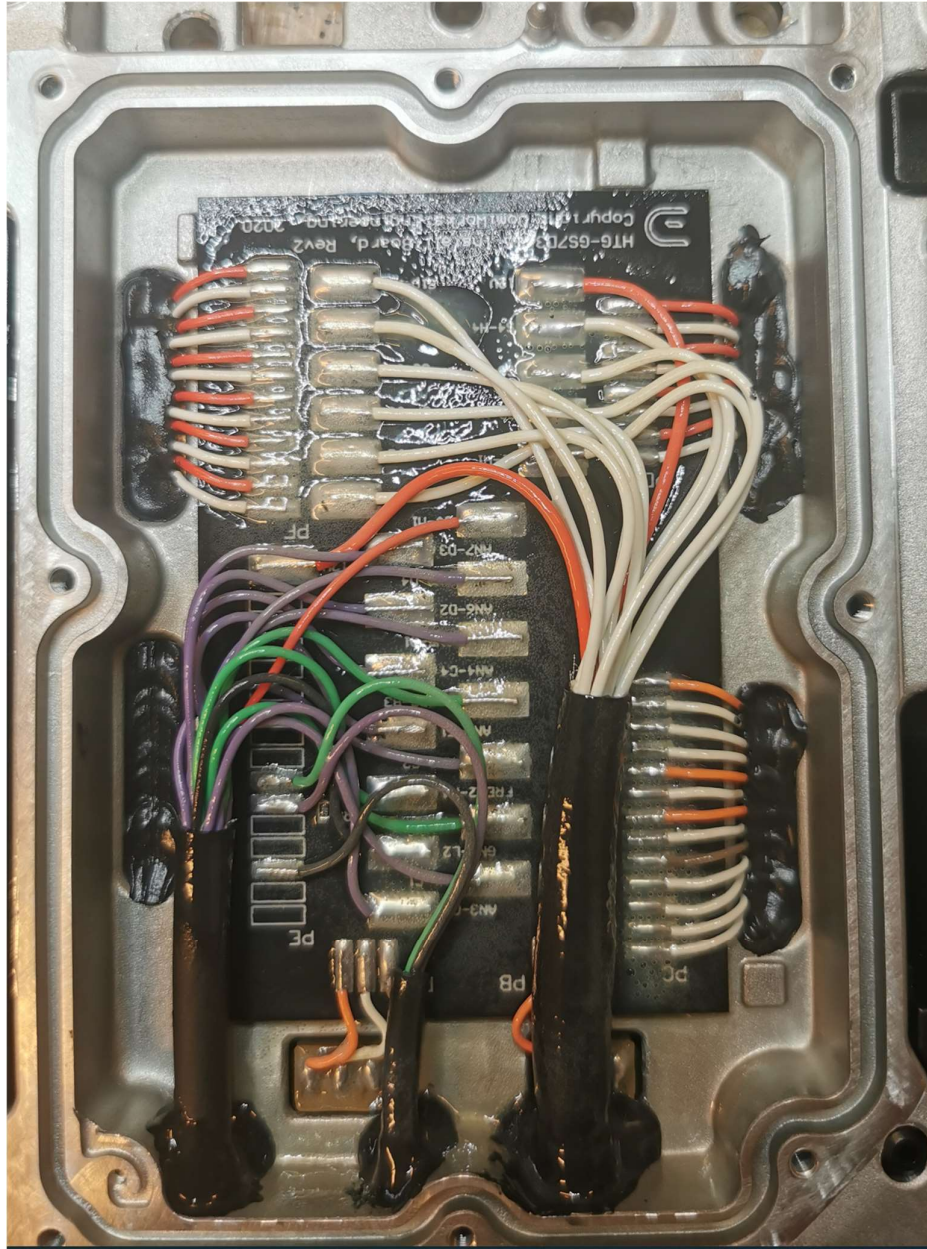
More details about valve testing can be found on the HTG Tuning Wiki page.

Final testing and seal of mechatronics module

- Seal off all the soldered wafer pads with a good quality sealant (High temp RTV)

Keep in mind that this is a low voltage system in a sealed environment, therefore we don't find it deemed necessary to seal the mechatronics completely with a Epoxy resin. If you for some reason should encounter any issues with the wiring, it will be impossible to rectify with it completely sealed.

We use Dinitrol 4010 Corroheat spray, as this is also possible to clean away if any issues should come down the road.



- 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.

- Always double check Power and Ground positions, and verify all inputs and outputs to be safely connected to its respective location.

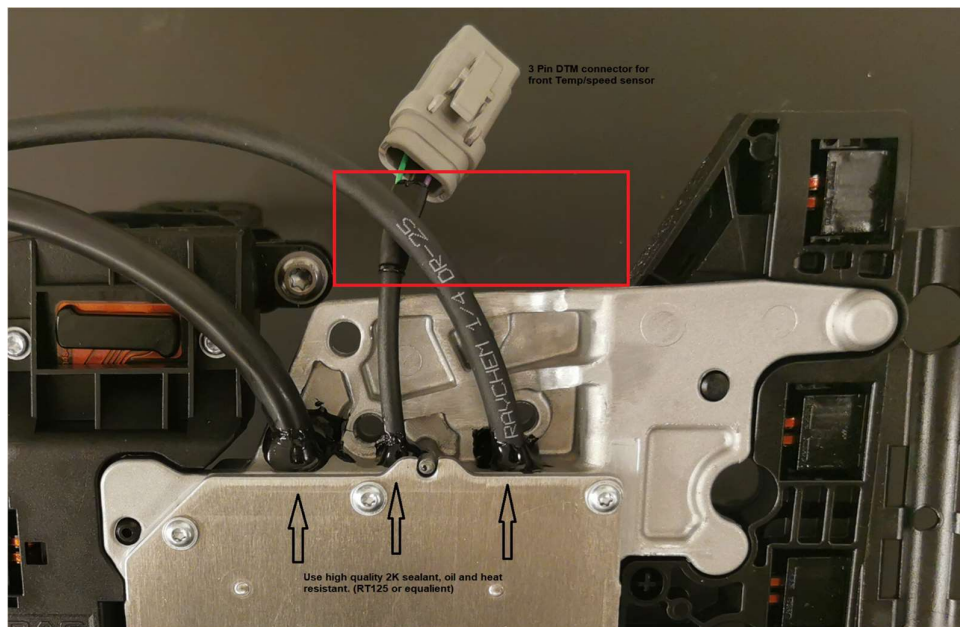
Mechatronics cover installation

- **Rev 1 and 2 Covers:** 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 or RTV for the flange. Use Loctite on the threads when you install it later on.



- Note that the O-ring groove is larger than the O-ring in order for it to expand.
- Apply a generous amount of Vaseline to the O-ring so it "sticks" in the groove in order to ease the installation. The groove is machined to specifications to allow expansion.

- The flange should be placed on the inside of the cover. Use long nuts on the inside with the bolts. Remember sealant for the bolts. Hand tight only. Do not over torque the nuts, or the gasket may squeeze out.
- Mate the 3 Pin DTM connector and position it in the red square area:



- Install the cover onto the transmission.
With the 3-pin DTM placed as per above, the cover flange should easily mate the transmission flange by hand.
- Hand tighten all bolts, and then do a final torque to 10 Nm.

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

www.hpr-tuning.com