

The background of the entire page is a photograph of a black Ford Mustang driving through a tunnel. The car is centered, moving towards the viewer, with its headlights on, illuminating the tunnel walls. The tunnel has a series of windows or openings in the distance, creating a sense of depth.

MaxxECU

Be a tuning mastermind. Like us.

GEN2

MaxxECU GEN2 RACE Quickstart guide & wiring

Online help!
maxxecu.com/support

(2025-11-10)



maxxecu.com/support



Wirings | Documentation | Guidance | Support

Legal disclaimer

All performance modifications and installations are at the customer's own risk. MaxxECU or associates disclaim any liability, either implied or otherwise, for mechanical, electrical or other failure when using any of our aftermarket performance products. Products are sold for off-road use only and may be illegal in many countries, states and provinces. They are intended solely for racing vehicles and should never be used on public roads. By purchasing any MaxxECU aftermarket performance product, the customer assumes full liability for any use, and/or misuse of the product, and agrees that MaxxECU holds no responsibility for any consequences, legal, otherwise, of such use and/or misuse.

Limited Warranty

- MaxxECU products are warranted against defects in material or workmanship for 12 months from the purchase date. Proof of purchase is required.
- Defective units will be repaired or replaced if returned with proof of purchase.
- To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations, either expressed or implied, including any implied warranty of merchantability or fitness.
- MaxxECU or associates shall never be liable for special or consequential damages.
- This warranty excludes damage from incorrect setup, faulty installation, misuse, or any special/consequential damages. No other warranties, expressed or implied, apply.

Warnings

- Damage to the engine or components may occur if an ignition or fuel system is incorrectly configured and the ECU is powered up.
- Always disconnect all the outputs when updating firmware.
- Failure to follow all of the warnings and precautions in this manual or online help system can lead to engine or component damage.
- Avoid open flames, sparks or electrical devices near flammable substances.
- Always disconnect the battery cables when carrying out electrical work or welding on your vehicle.
- Do not disconnect the vehicle battery while the engine is running.
- Fuel system components and wiring should always be mounted far away from heat sources.
- Make sure there are no fuel leaks, and no wiring is left uninsulated.
- Be sure to follow all proper workshop safety procedures when working on your vehicle.
- Check for fuel leaks and insulate all wiring.
- Avoid flames, sparks, or electrical devices near flammable substances.
- Always follow proper workshop safety procedures.

All MaxxECU products are for off-road use only. They are not intended for use on the highways or streets.



Software installation

1. Download MTune PC-software from maxxecu.com/mtune
2. Run the downloaded installer and follow the on-screen instructions.

Help system

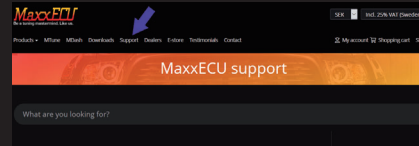
MaxxECU documentation is always available from maxxecu.com/support and is also integrated into MTune PC software.



Access to integrated help is available within MTune PC software by pressing the help button shown above, or by pressing the F1 key.



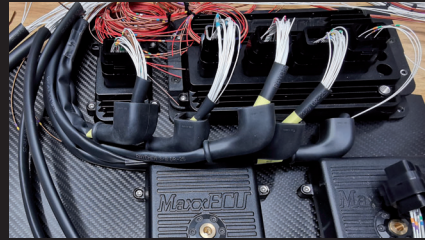
Integrated help is also available within MTune PC software after each input/output to get fast help.



Support page and documentation available on maxxecu.com/support.

ECU installation

GEN2 RACE units are waterproof and can be mounted in the engine bay, provided they are kept away from excessive heat sources. However, for maximum reliability and protection from vibration, moisture, and temperature extremes, installation inside the vehicle cabin is recommended.



Wiring - A proper wiring job is important to get a reliable vehicle.



Example of a finished engine harness.



Use a firewall bushing to prevent damage to the cables.



Use shrink tubing with adhesive when splicing cables.

Engine ground wire - **Very important!**

- The ECU Engine ground wire must ALWAYS be connected to cylinder head
- Engine must ALWAYS be grounded to the chassis
- Battery negative (-) must ALWAYS be connected to chassis



Inputs

AIN (Analog Input)

- Accepts 0–5 V analog or digital signals, max 24 V.
 - Digital threshold: 3 V. Selectable 2.5 k Ω 5 V pull-up.
 - Analog update rate: 2 kHz. Input resistance: 200 k Ω .
 - Switches/buttons and other slow signals in digital mode.
- Note: Ethanol sensors, BSD, SENT, etc. are not supported here - use PULSE inputs instead.

Digital/VR (PULSE)

- Accepts digital or VR signals, max 200 V, up to 30 kHz.
 - Selectable internal ground or floating (set in MTune).
 - Input resistance: 62 k Ω .
- Note: Floating mode is only for piggyback use when sharing trigger/ABS sensors.

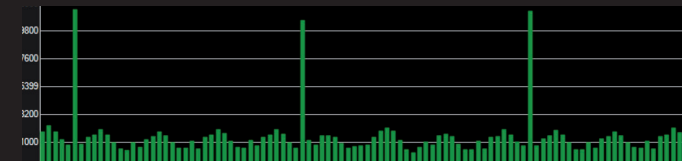
RPM requirements:

- Trigger sensor: wired to any PULSE input
- Home/CAM sensor: required for sequential operation, and in some trigger systems also for RPM detection.



Built-in trigger oscilloscope for diagnosing signals. Screenshot shows a crank VR sensor on PULSE1 (yellow), a VVTi cam signal (blue), and digital VVTi position signals (green, purple, red).

[Diagnostics --> Trigger oscilloscope](#)



Using the built-in trigger logger, connected signals can be examined and sent to us for implementations of new trigger types.

[Diagnostics --> Trigger logger](#)



Wiring or trigger problem? --> Contact local MaxxECU dealer, or go maxxecu.com/support

Outputs

GPO (Low)

- Ground-switching (sinking) output for general loads.
- Connect load between output and +12 V (switched) source.
- Active = ground, off = floating.
- Max 3 A continuous. Protected against overload, short circuit, and flyback up to 30 V.

12 V GPO

- 12 V sourcing output for general loads.
 - Active = 12 V, off = floating.
 - Max 5 A continuous. Protected against overload, short circuit, and 30 V flyback.
- Note: For >10 A combined load, use both ECU Supply 1 & 2. Total max 30 A to prevent wiring/connector overheating.

Injector (Peak/Hold)

- Ground-switching output for injectors (also usable for general loads).
- Connect load between output and +12 V (switched) source.
- Active = ground, off = floating.
- Max 10 A peak / 5 A continuous. Selectable peak/hold currents.
- Flyback protection 30 V with automatic regulation for fast, precise injector control.

Ignition

- 5 V or 12 V push-pull, or ground-switching output (set in MTune).
- Drives external ignition modules/smart coils or general loads.
- Push-pull: 5/12 V when active, ground when off. 100 mA limit.
- Ground-switch: ground when active, floating when off. 1 A limit.
- Flyback protection up to 30 V.

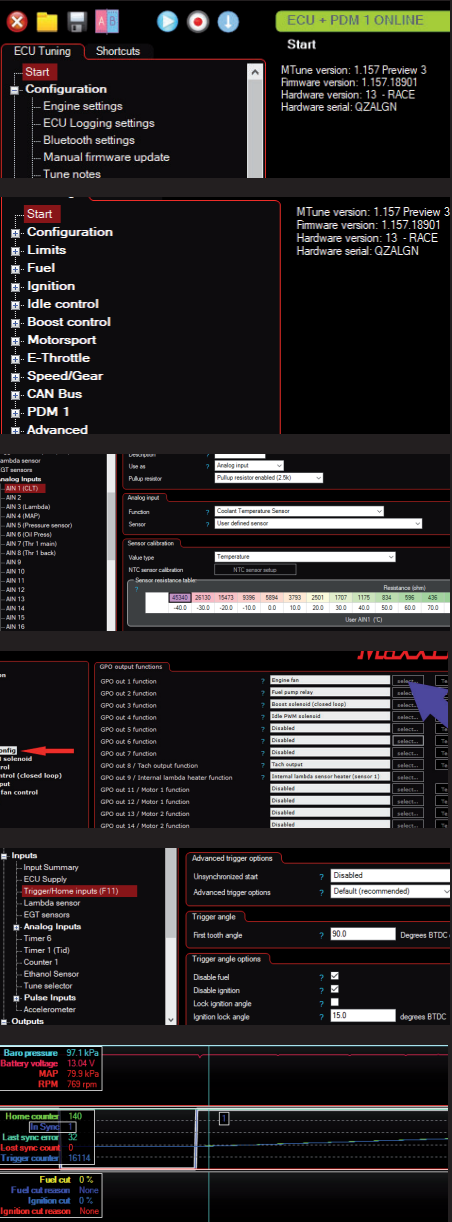
H-Bridge

- 12 V push-pull (half-bridge) output for motors or loads.
- Active = 12 V, off = ground.
- For bidirectional motors (e.g., throttles): connect the load between two H-bridge outputs.
- For general loads: connect the load between one H-bridge output and ground.
- Protected against PWM over-current, overload, and short circuit.
- Max 5–25 A (selectable), 12 A continuous.



Wiring problem? --> Contact local MaxxECU dealer, or go maxxecu.com/support

Engine start



After installing MTune, connect the included USB cable and power up the ECU. To get started quickly, load a suitable base-tune directly from within MTune (no download needed) using the yellow “Open” icon and follow the on-screen instructions.

In MTune, go through the tabs and make a basic engine setup. Key settings include:

- Cylinders, firing order, engine volume. [Configuration --> Engine settings](#)
 - Ignition coil dwell and system type- [Ignition --> Ignition settings](#)
 - Injector type and fuel type. [Fuel --> Fuel Inj General](#)
 - Trigger system and correct decoder. [Inputs --> Trigger / Home inputs](#)
- Tip: Use the built-in oscilloscope, trigger logger, and other tools to verify trigger setup.

Throttle / CLT / IAT Calibration

Regular throttle: Calibrate TPS at 0% and 100% using the 2-point buttons in the analog input settings.
E-throttle: TPS shows pedal position; calibrate sensors in E-throttle settings.
CLT & IAT: Select correct sensors and verify values in RealTime Data.

Please note that TPS value is pedal position when using E-Throttle.

Configure all outputs according to your wiring. [Outputs --> Output config](#)
Use [Diagnostics --> Output test](#) test to check injectors and coils without cranking.
Note: Outputs must be assigned as injector/coil to use the test feature.

To crank without starting, disable fuel/ignition under [Inputs --> Trigger/HOME inputs](#), [Trigger angle options](#). Remember to re-enable before starting the engine.

Start cranking, check trigger polarity, and adjust timing with a timing lamp.

[Diagnostics --> Trigger oscilloscope](#) - View live trigger inputs.
[Diagnostics --> Trigger logger](#) - View timing between trigger events.
[Inputs --> Trigger, Trigger angle options](#) - Use lock ignition advance to sync timing.

When all inputs/outputs are configured and engine settings, trigger systems and ignition are synced, it is time to try to start the engine.

Engine start problems? --> Contact local MaxxECU dealer, or go maxxecu.com/support

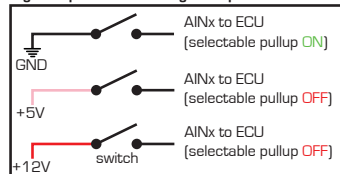
All AIN have selectable pullups.

MaxxECU

Ignition output examples (5V/12V or ground).

Example wiring. All AIN functions are assigned in MTune.

Digital input switch wiring examples



Sensor or Shield GND must **NEVER** be connected to chassis OR engine!

VR-sensor (analog) signal

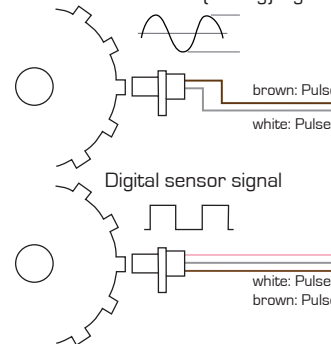
Switch, speed input, ethanol sensor / BSD / ABS / cam.

Digital sensor signal

Example wiring for trigger signals.

All Pulse Input functions are assigned in MTune. Any Pulse inputs may be used for trigger signals. All Pulse inputs support both VR and digital signals.

VR-sensor (analog) signal



Digital supply selectable 5V or 12V
Always verify sensor specifications with the manufacturer before connection.

Engine cylinder head

Engine

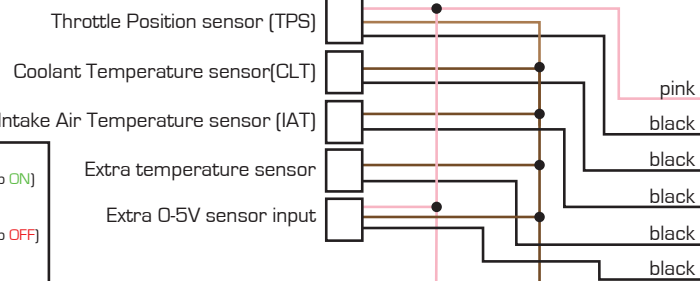
Battery

IGN switch

Available connector kit

Supersal 1.0, key MX1

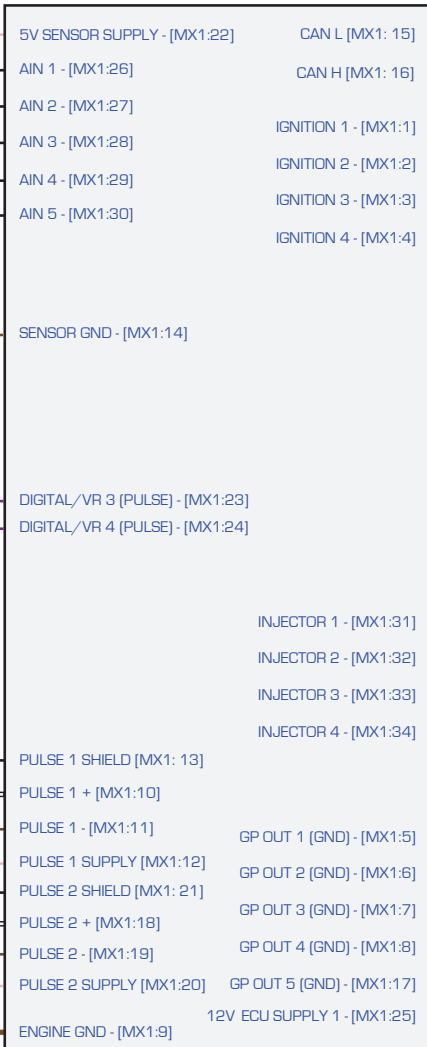
Product ID: [2416](#)



Sensor GND
(splice to other sensors)

Shielded wires may be needed to block VR sensor interference.

Cable shields should only be grounded **through the ECU** (which is prewired).



CAN-bus 1. 120Ω termination resistor built-in.

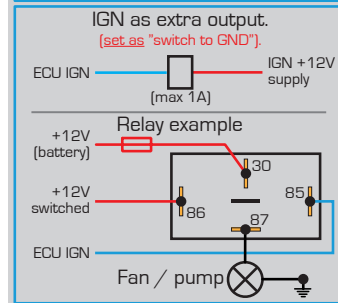
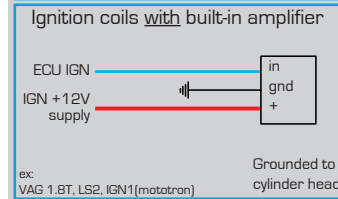
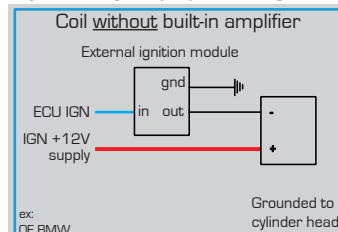
Ignition coil 1
Ignition coil 2
Ignition coil 3
Ignition coil 4

+12v power supply for ignition coils

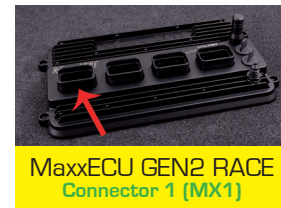
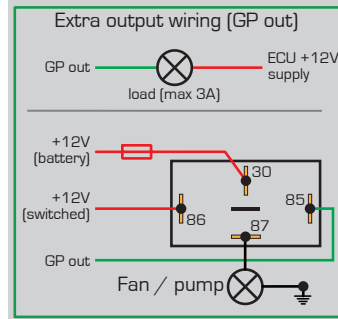
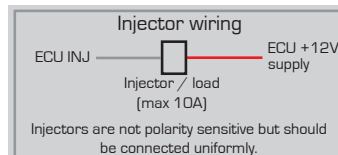
+12v power supply relays, solenoids etc.

Injector 1
Injector 2
Injector 3
Injector 4

Extra output 1
Extra output 2
Extra output 3
Extra output 4
Extra output 5 / TACHO



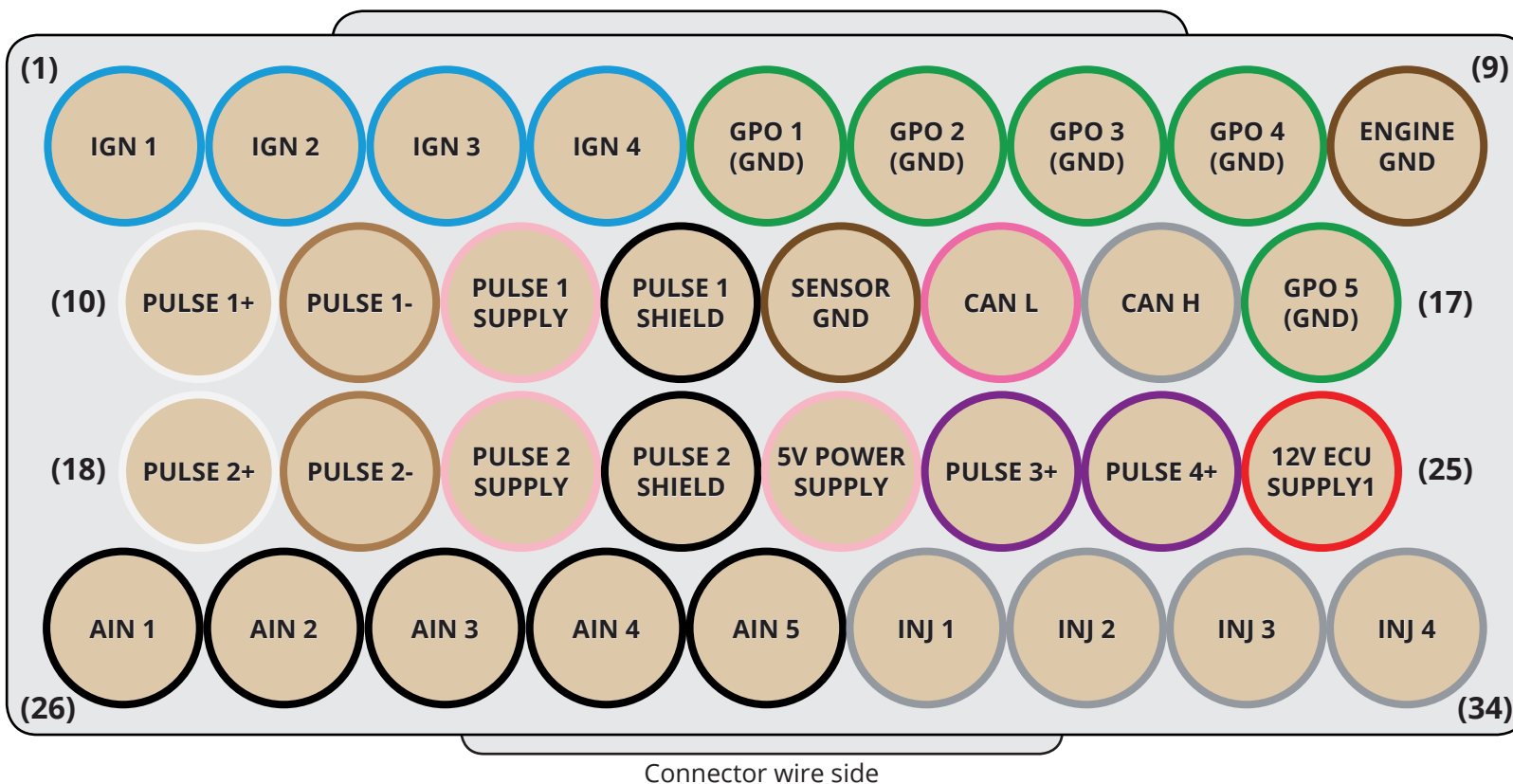
INJ and GP ground output examples.



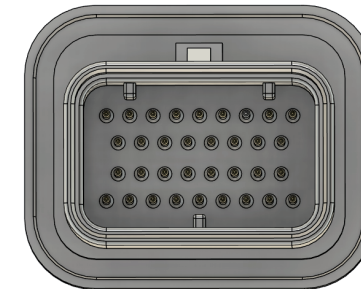
MaxxECU GEN2 RACE (MX1)

2025-10-23

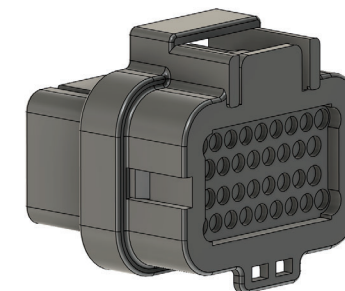
maxxecu.com/support



MX1 keying



ECU side



Wire side

Pin	Function	Note
1	IGNITION 1	
2	IGNITION 2	
3	IGNITION 3	
4	IGNITION 4	
5	GP OUT 1 (GND)	
6	GP OUT 2 (GND)	
7	GP OUT 3 (GND)	
8	GP OUT 4 (GND)	
9	ENGINE GND	
10	DIGITAL/VR 1 (PULSE) SIGNAL +	
11	DIGITAL/VR 1 (PULSE) SIGNAL -	
12	DIGITAL/VR 1 (PULSE) POWER SUPPLY	
13	DIGITAL/VR 1 (PULSE) SHIELD	
14	SENSOR GND	
15	CAN L	
16	CAN H	
17	GP OUT 5 / TACHO (GND)	

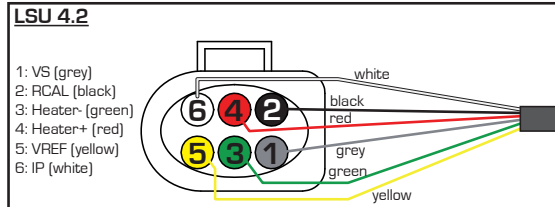
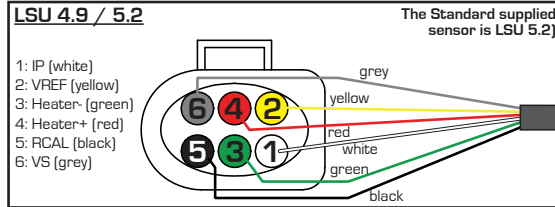
Pin	Function	Note
18	DIGITAL/VR 2 (PULSE) SIGNAL +	
19	DIGITAL/VR 2 (PULSE) SIGNAL -	
20	DIGITAL/VR 2 (PULSE) POWER SUPPLY	
21	DIGITAL/VR 2 (PULSE) SHIELD	
22	5V POWER SUPPLY	
23	DIGITAL/VR 3 (PULSE) SIGNAL +	
24	DIGITAL/VR 4 (PULSE) SIGNAL +	
25	12V ECU SUPPLY 1	
26	AIN 1	
27	AIN 2	
28	AIN 3	
29	AIN 4	
30	AIN 5	
31	INJECTOR 1	
32	INJECTOR 2	
33	INJECTOR 3	
34	INJECTOR 4	

Sensor or Shield GND must **NEVER** be connected to chassis OR engine!

Sensor GND (from connector 1)
5V SUPPLY (from connector 1)

MaxxECU

Extra temperature / 0-5V sensor inputs
- All AIN have selectable pullups.
- Functions are assigned in MTune.



Use only recommended sensors:
LSU 5.2: Bosch 0258 037 010 / 0258 037 022
LSU 4.9: Bosch 0281 004 191 / 0258 017 025
LSU 4.2: Bosch 0258 007 057

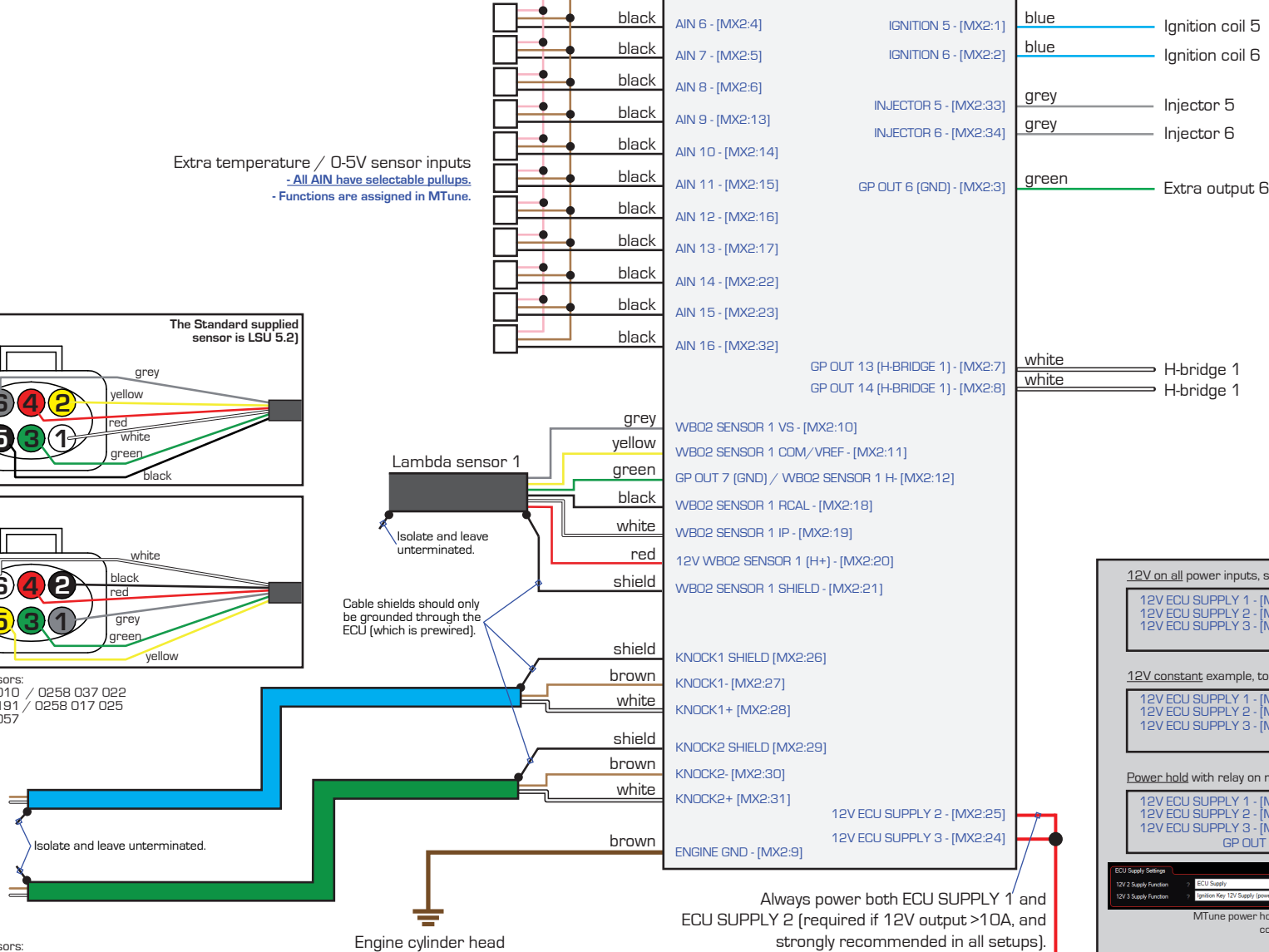
Knock sensor #1



Knock sensor #2



Use only recommended sensors:
Bosch 0261 231 046
(Knock sensor[s] are not polarity sensitive)



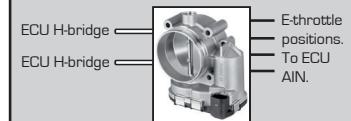
Refer to the wiring diagram for GEN2 connector 1 (MX1) for Ignition, Injector, and GP output connections.

H-bridge output examples

General purpose load

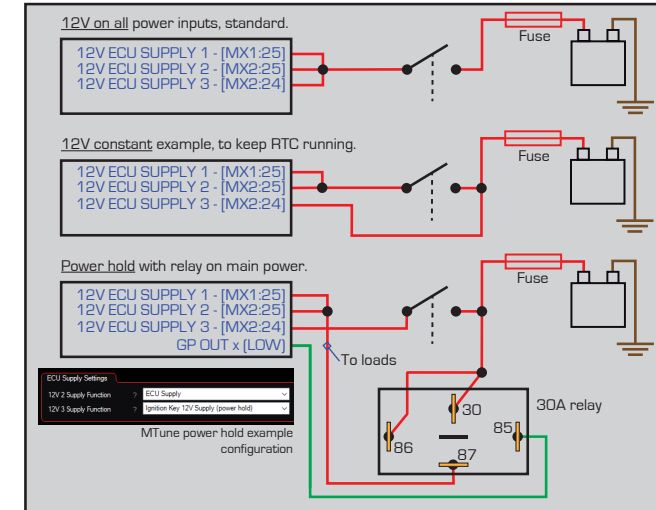


Bidirectional motor control



Outputs 12V when active, and switches to ground when not active.

Power wiring examples



Optional constant 12V SUPPLY 3 (0.6mA) extends clock runtime beyond 2 weeks with ECU off.

Always power both ECU SUPPLY 1 and ECU SUPPLY 2 (required if 12V output >10A, and strongly recommended in all setups).

Use the same power source as connector 1 (MX1).



MaxxECU GEN2 RACE
Connector 2 (MX2)

MaxxECU GEN2 RACE (MX2)

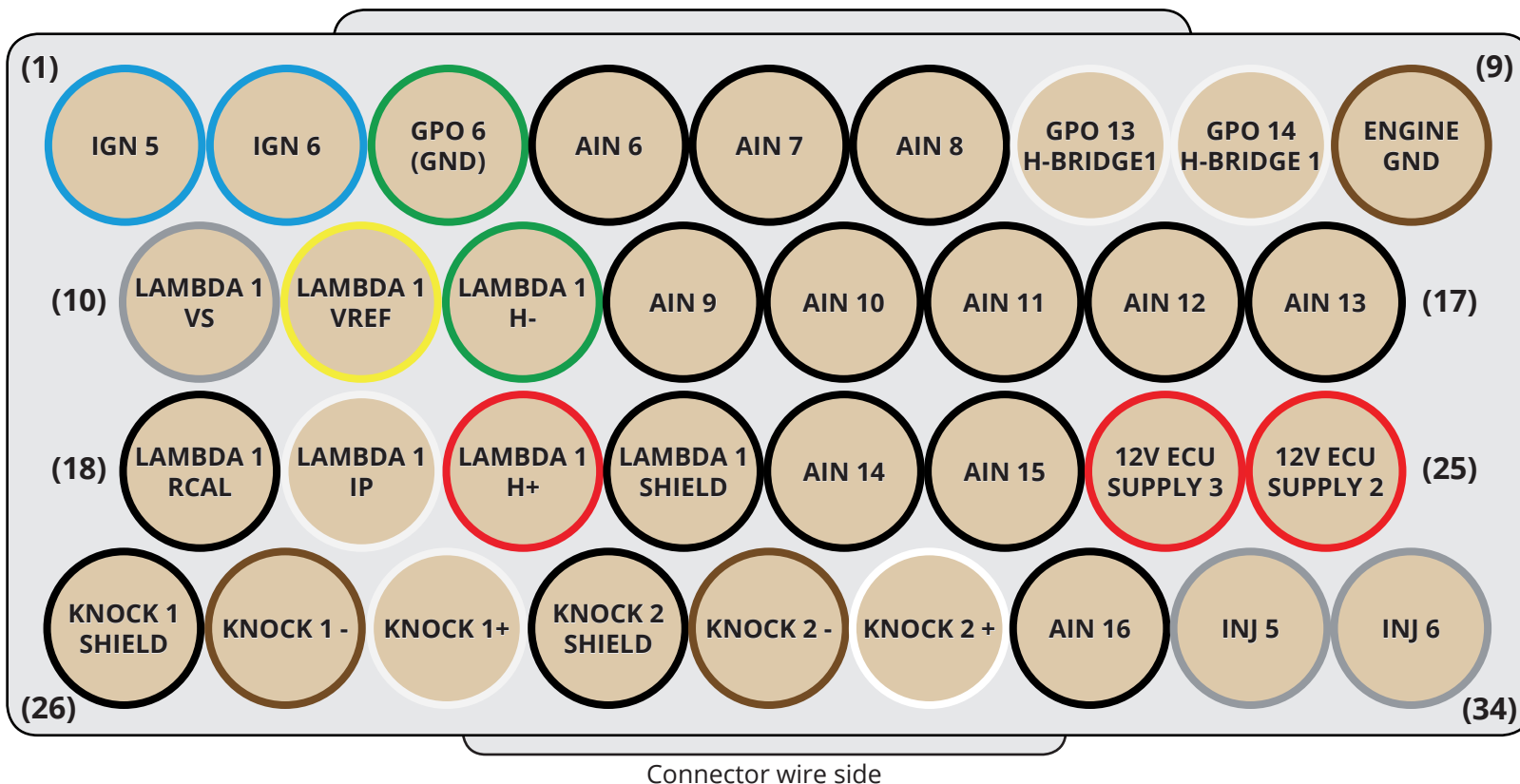
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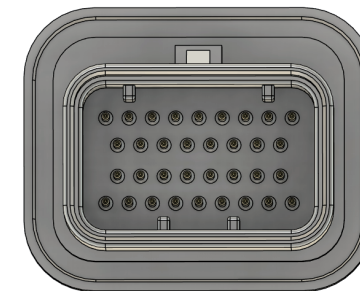
Available connector kit

Superseal 1.0, key MX2

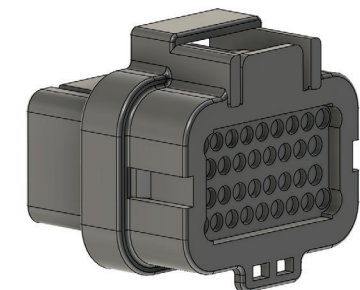
Product ID: [2417](#)



MX2 keying



ECU side



Wire side

Pin	Function	Note
1	IGNITION 5	
2	IGNITION 6	
3	GP OUT 6 (GND)	
4	AIN 6	
5	AIN 7	
6	AIN 8	
7	GP OUT 13 (H-BRIDGE 1)	
8	GP OUT 14 (H-BRIDGE 1)	
9	ENGINE GND	
10	WBO2 SENSOR 1 VS	
11	WBO2 SENSOR 1 COM/VREF	
12	GP OUT 7 (GND) / WBO2 SENSOR 1 H-	
13	AIN 9	
14	AIN 10	
15	AIN 11	
16	AIN 12	
17	AIN 13	

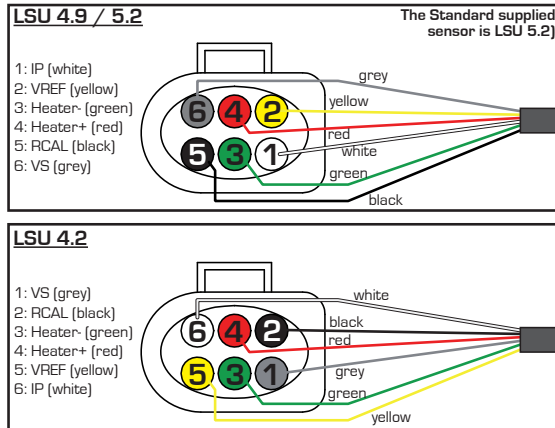
Pin	Function	Note
18	WBO2 SENSOR 1 RCAL	
19	WBO2 SENSOR 1 IP	
20	12V WBO2 SENSOR 1 H+	
21	WBO2 SENSOR 1 SHIELD	
22	AIN 14	
23	AIN 15	
24	12V ECU SUPPLY 3	
25	12V ECU SUPPLY 2	
26	KNOCK 1 SHIELD	
27	KNOCK 1-	
28	KNOCK 1+	
29	KNOCK 2 SHIELD	
30	KNOCK 2-	
31	KNOCK 2+	
32	AIN 16	
33	INJECTOR 5	
34	INJECTOR 6	

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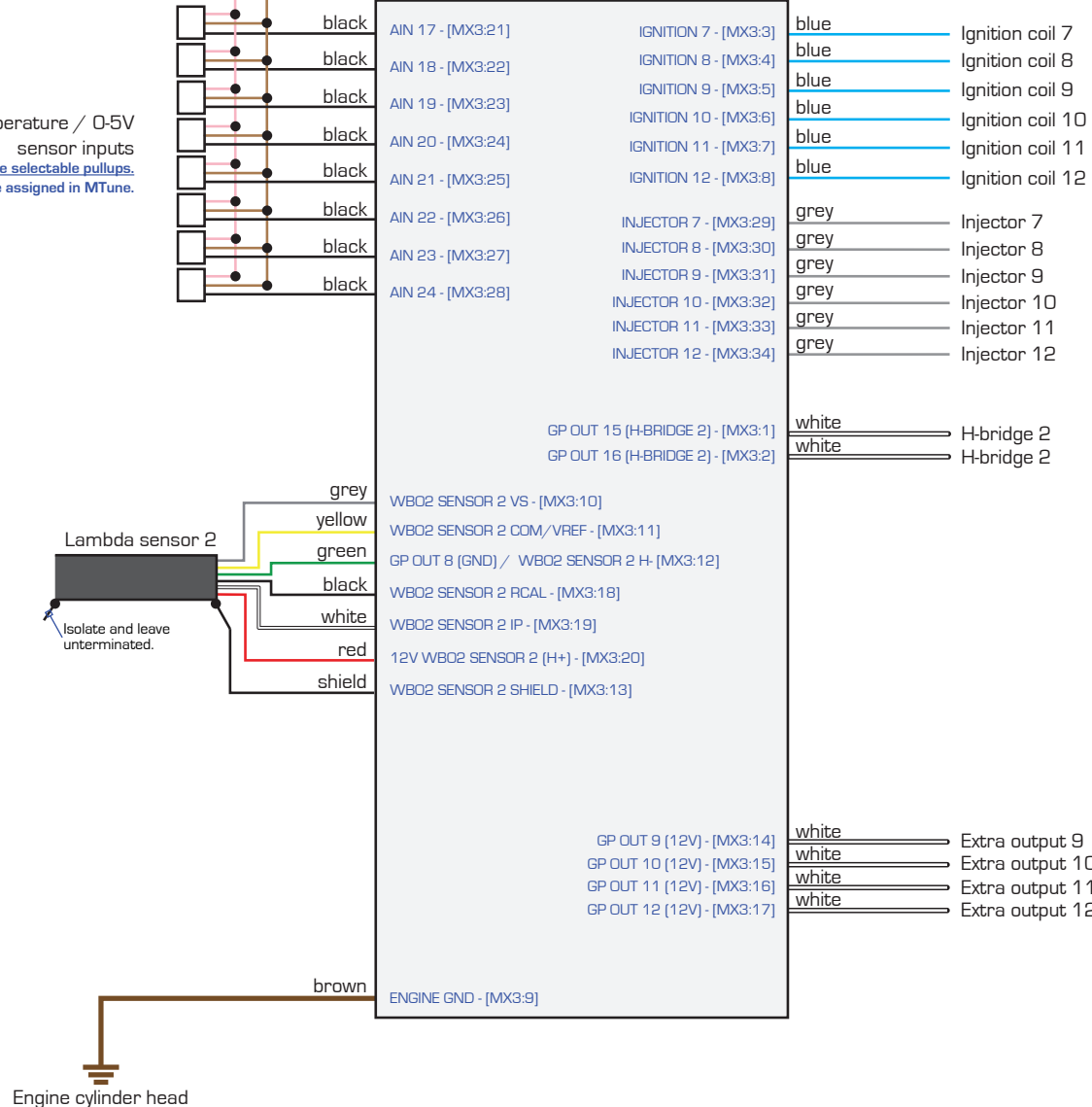
Sensor GND (from connector 1)
5V SUPPLY (from connector 1)

MaxxECU

Extra temperature / 0-5V
sensor inputs
- All AIN have selectable pullups.
- Functions are assigned in MTune.



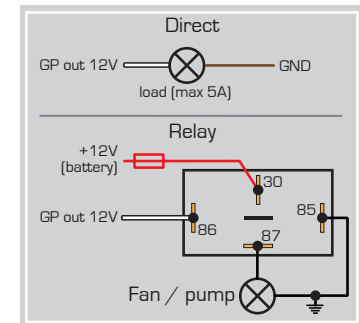
Use only recommended sensors:
LSU 5.2: Bosch 0258 037 010 / 0258 037 022
LSU 4.9: Bosch 0281 004 191 / 0258 017 025
LSU 4.2: Bosch 0258 007 057



Refer to the wiring diagram for GEN2 connector 1 (MX1) for Ignition and Injector connections.

Refer to the wiring diagram for GEN2 connector 2 (MX2) for H-bridge connections.

GP 12V output examples.



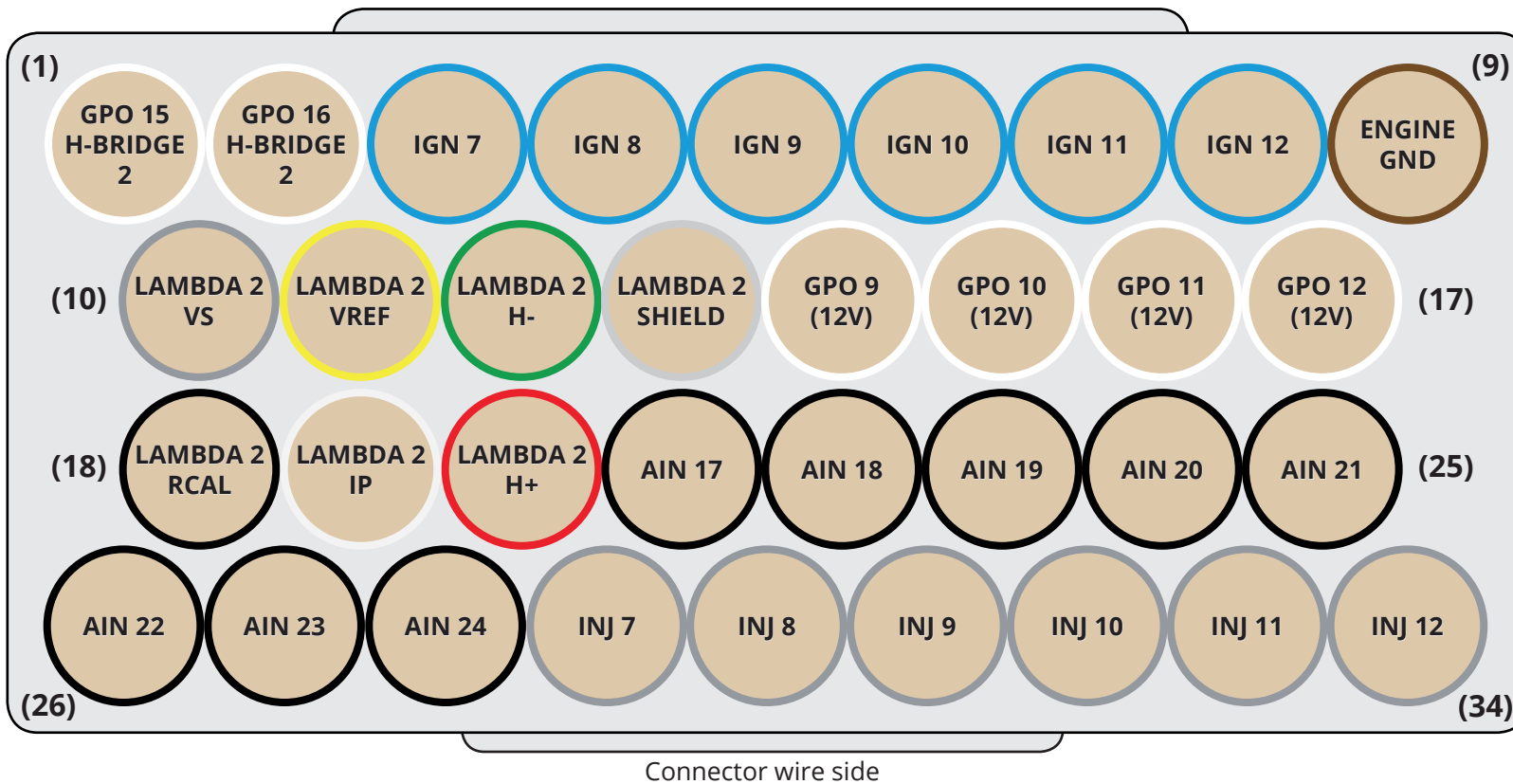
12V1 and 12V2 power inputs required if 12V TOTAL output exceeds 10A. See GEN2 connector 2 (MX2) wiring diagram.



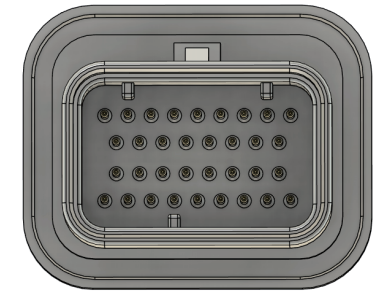
MaxxECU GEN2 RACE
Connector 3 (MX3)

Available connector kit
Superseal 1.0, key MX3
Product ID: [2418](#)

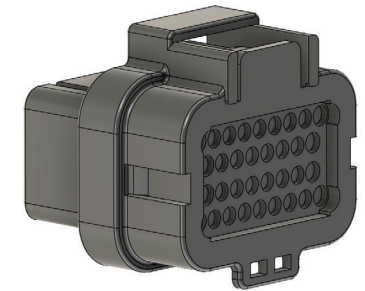
MaxxECU GEN2 RACE (MX3)
2025-10-23
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MX3 keying



ECU side



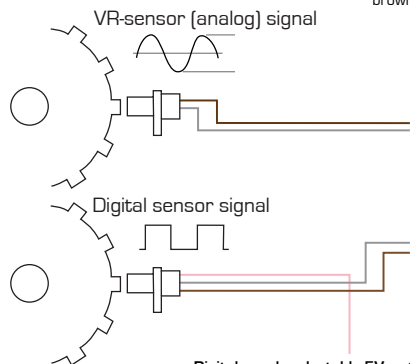
Wire side

Pin	Function	Note
1	GP OUT 15 (H-BRIDGE 2)	
2	GP OUT 16 (H-BRIDGE 2)	
3	IGNITION 7	
4	IGNITION 8	
5	IGNITION 9	
6	IGNITION 10	
7	IGNITION 11	
8	IGNITION 12	
9	ENGINE GND	
10	WBO2 SENSOR 2 VS	
11	WBO2 SENSOR 2 VREF	
12	GP OUT 8 (GND) / WBO2 SENSOR 2 H-	
13	WBO2 SENSOR 2 SHIELD	
14	GP OUT 9 (12V)	
15	GP OUT 10 (12V)	
16	GP OUT 11 (12V)	
17	GP OUT 12 (12V)	

Pin	Function	Note
18	WBO2 SENSOR 2 RCAL	
19	WBO2 SENSOR 2 IP	
20	12V WBO2 SENSOR 2 (H+)	
21	AIN 17	
22	AIN 18	
23	AIN 19	
24	AIN 20	
25	AIN 21	
26	AIN 22	
27	AIN 23	
28	AIN 24	
29	INJECTOR 7	
30	INJECTOR 8	
31	INJECTOR 9	
32	INJECTOR 10	
33	INJECTOR 11	
34	INJECTOR 12	

Sensor or Shield GND must **NEVER** be connected to chassis OR engine!

Example wiring for trigger signals.
All Pulse Input functions are assigned in MTune.
Any Pulse inputs may be used for trigger signals.
All Pulse inputs support both VR and digital signals.

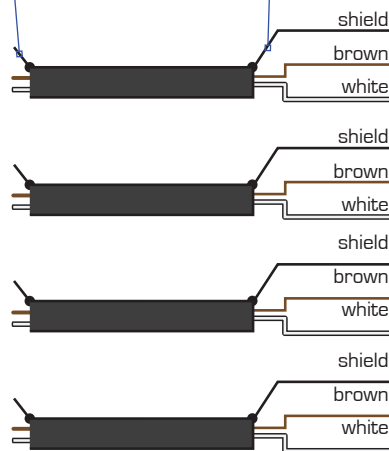


Digital supply selectable 5V or 12V
Always verify sensor specifications with the manufacturer before connection. For powered digital sensors, use a switched 12V source or the 5V sensor supply from connector 1 (MX1), according to the sensor's requirements.

brown = signal ground
white = signal

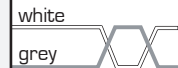
Isolate and leave unterminated if the sensor lacks a shield.

Cable shields should only be grounded **through the ECU** (which is prewired).

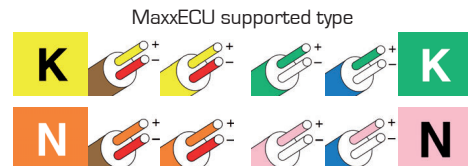


MaxxECU

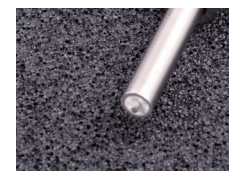
CAN 2 L [MX4: 29]	white
CAN 2 H [MX4: 30]	grey
PULSE 5 SHIELD - [MX4:1]	
PULSE 5 - [MX4:2]	
PULSE 5 + [MX4:3]	
PULSE 6 SHIELD - [MX4:4]	
PULSE 6 - [MX4:5]	
PULSE 6 + [MX4:6]	
PULSE 7 SHIELD - [MX4:7]	
PULSE 7 - [MX4:8]	
PULSE 7+ [MX4:9]	
PULSE 8 SHIELD - [MX4:26]	
PULSE 8 - [MX4:27]	
PULSE 8+ [MX4:28]	
EGT1 + [MX4:10]	yellow
EGT1 - [MX4:18]	red
EGT2 + [MX4:11]	yellow
EGT2 - [MX4:19]	red
EGT3 + [MX4:12]	yellow
EGT3 - [MX4:20]	red
EGT4 + [MX4:13]	yellow
EGT4 - [MX4:21]	red
EGT5 + [MX4:14]	yellow
EGT5 - [MX4:22]	red
EGT6 + [MX4:15]	yellow
EGT6 - [MX4:23]	red
EGT7 + [MX4:16]	yellow
EGT7 - [MX4:24]	red
EGT8 + [MX4:17]	yellow
EGT8 - [MX4:25]	red
INJECTOR 13 - [MX4:31]	grey
INJECTOR 14 - [MX4:32]	grey
INJECTOR 15 - [MX4:33]	grey
INJECTOR 16 - [MX4:34]	grey



CAN-bus 2.
Selectable 120Ω termination resistor built-in.

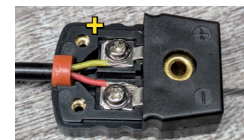


Use only Type K/N cables and connectors.



The tip of the sensor must be isolated from ground.

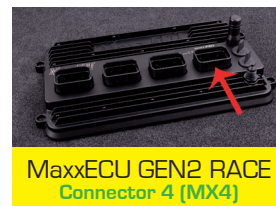
Mini-K connector



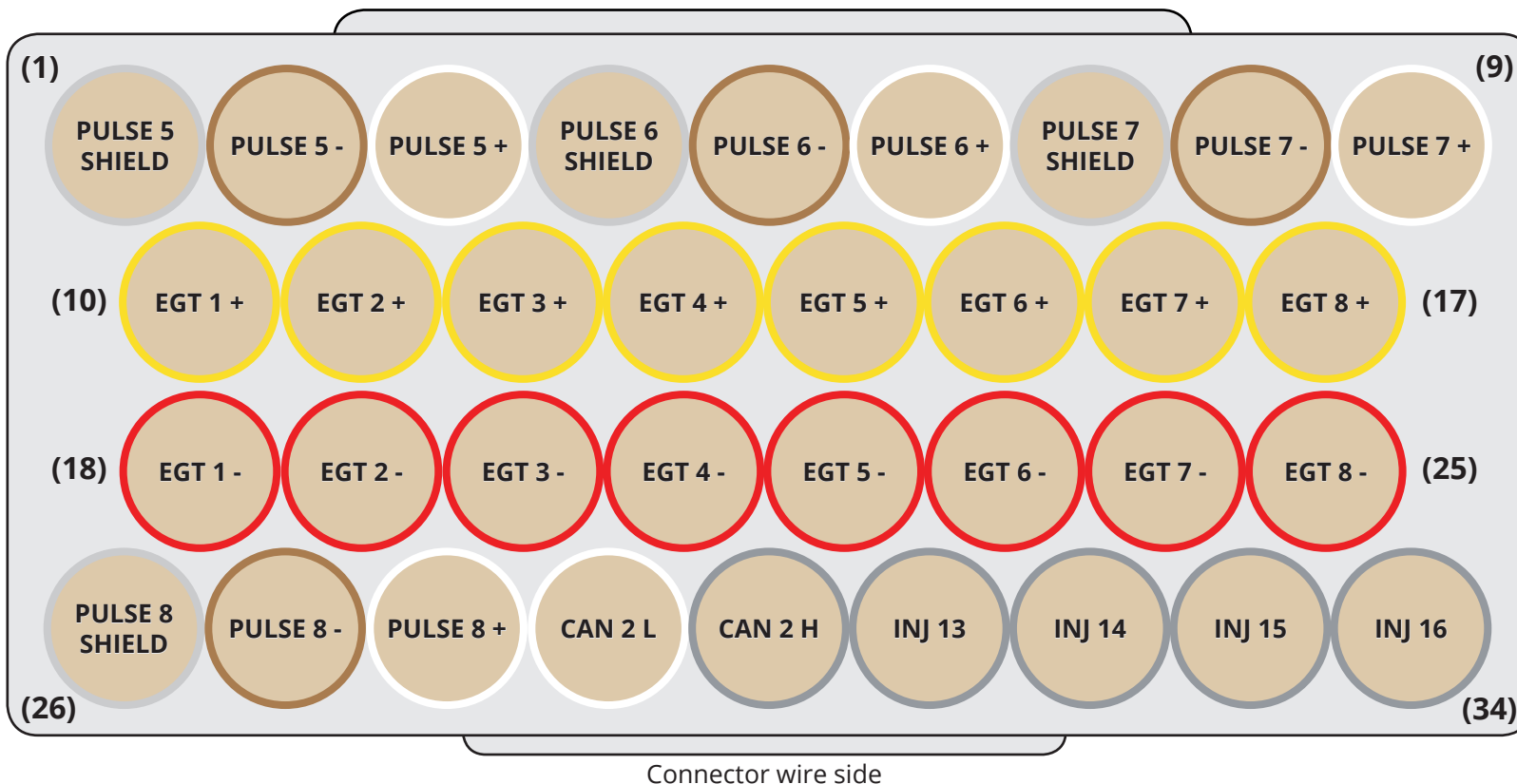
Properly installed Mini-K connector.
Note: Yellow is +, Red is -

Only use thermocouple wire, not regular copper wires.

Use the same power source as connector 1 (MX1).



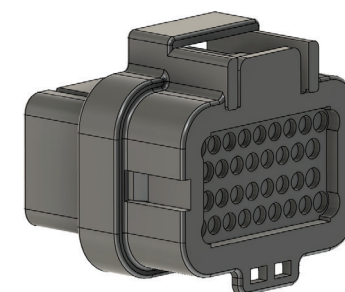
Refer to the wiring diagram for GEN2 connector 1 (MX1) for Injector connections.



MX4 keying



ECU side



Wire side

Pin	Function	Note
1	DIGITAL/VR 5 (PULSE) SHIELD	
2	DIGITAL/VR 5 (PULSE) SIGNAL -	
3	DIGITAL/VR 5 (PULSE) SIGNAL +	
4	DIGITAL/VR 6 (PULSE) SHIELD	
5	DIGITAL/VR 6 (PULSE) SIGNAL -	
6	DIGITAL/VR 6 (PULSE) SIGNAL +	
7	DIGITAL/VR 7 (PULSE) SHIELD	
8	DIGITAL/VR 7 (PULSE) SIGNAL -	
9	DIGITAL/VR 7 (PULSE) SIGNAL +	
10	EGT 1 +	
11	EGT 2 +	
12	EGT 3 +	
13	EGT 4 +	
14	EGT 5 +	
15	EGT 6 +	
16	EGT 7 +	
17	EGT 8 +	

Pin	Function	Note
18	EGT 1 -	
19	EGT 2 -	
20	EGT 3 -	
21	EGT 4 -	
22	EGT 5 -	
23	EGT 6 -	
24	EGT 7 -	
25	EGT 8 -	
26	DIGITAL/VR 8 (PULSE) SHIELD	
27	DIGITAL/VR 8 (PULSE) SIGNAL -	
28	DIGITAL/VR 8 (PULSE) SIGNAL +	
29	CAN 2 L	
30	CAN 2 H	
31	INJECTOR 13	
32	INJECTOR 14	
33	INJECTOR 15	
34	INJECTOR 16	

Thank you for using MaxxECU!
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