



# VGS BRIDGE

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Signal Converter  
7G-Tronic · VGS / NAG2

## User manual

Document version: 1.0 · August 2026  
Applies to firmware 1.2 and application 1.0

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# 1. Before you start

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## 1.1 Intended use

VGS-Bridge is a bridge controller that lets you run the Mercedes 7G-Tronic (VGS/NAG2) automatic gearbox outside its original vehicle. The module generates the complete set of CAN bus frames the gearbox controller expects, and takes its input data from analog signals, from the base vehicle's CAN bus, or from both at once.

Configuration, diagnostics and firmware updates are handled by the included Windows application, which connects to the controller through a CANable adapter.

### Field of use

The device is intended exclusively for motorsport, closed circuits, off-road use, research and development work, and as a workshop tool. It has no road type-approval. Installing it in a vehicle registered for public roads may violate applicable regulations and void the vehicle's type-approval.

## 1.2 Safety rules

The CAN bus controls safety-critical systems. Incorrect configuration may cause unexpected vehicle behaviour.

- Carry out all work on the electrical system with the battery disconnected.
- Perform the first start-up and every parameter change with the vehicle raised or on a workshop bench, away from bystanders.
- A firmware update interrupts the controller's operation. Perform it only with the vehicle stationary.
- Do not disconnect power or the adapter while the firmware is being written.

## 1.3 Who this document is for

This manual assumes practical experience with automotive wiring and a basic understanding of the CAN bus. It does not cover the design of the 7G-Tronic gearbox or the internal operation of the VGS controller.

# 2. Package contents and requirements

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## 2.1 In the box

**VGS-Bridge device**

electronic module in an enclosure

|                        |                                                 |
|------------------------|-------------------------------------------------|
| <b>Connector</b>       | mating connector for the module                 |
| <b>Pins</b>            | for crimping wires as the installation requires |
| <b>Pinout leaflet</b>  | connector pin assignment                        |
| <b>CANable adapter</b> | connects the module to a computer               |

## 2.2 What you need in addition

|                     |                                                                                      |
|---------------------|--------------------------------------------------------------------------------------|
| <b>Computer</b>     | Windows 10 or 11, one free USB port                                                  |
| <b>CAN adapter</b>  | CANable (gs_usb), bus speed 500 kbit/s                                               |
| <b>Power supply</b> | 12 V from the vehicle or a bench power supply                                        |
| <b>Internet</b>     | only for downloading the application and updates — everyday work does not require it |

## 3. Mounting and wiring

The controller connector is 3-row, with pins numbered in each row from right (1) to left (8). The drawing and tables below show the full pin assignment — the same data is given in the leaflet included in the box.

**MERCEDES 7G-TRONIC (722.9)**  
**STANDALONE KONTROLER**  
 PINOUT – 3-RZĘDOWE ZŁĄCZE

NUMERACJA PINÓW  
 8 7 6 5 4 3 2 1  
 8 = LEWA STRONA 1 = PRAWA STRONA

A B C

| RZĄD A (GÓRNY) |     |                        |        |        |     |                      |              |
|----------------|-----|------------------------|--------|--------|-----|----------------------|--------------|
| 8              | 7   | 6                      | 5      | 4      | 3   | 2                    | 1            |
| HC2            | HC1 | +5V (OUT)<br>MAX 500mA | CAN2-L | CAN2-H | GND | KICKDOWN<br>(do GND) | V-IN<br>+12V |

| RZĄD B (ŚRODKOWY) |             |      |                       |                   |                                        |               |               |
|-------------------|-------------|------|-----------------------|-------------------|----------------------------------------|---------------|---------------|
| 8                 | 7           | 6    | 5                     | 4                 | 3                                      | 2             | 1             |
| CAN-H             | TPS<br>0-5V | N.C. | MAP<br>SENSOR<br>0-5V | BRAKE<br>(do GND) | HALL/<br>SPEED<br>(czujnik<br>cyfrowy) | VR+/<br>CRANK | VR-/<br>SPEED |

| RZĄD C (DOLNY) |              |      |     |                       |                                        |               |               |
|----------------|--------------|------|-----|-----------------------|----------------------------------------|---------------|---------------|
| 8              | 7            | 6    | 5   | 4                     | 3                                      | 2             | 1             |
| CAN-L          | COOLANT<br>* | N.C. | IAT | MAF<br>SENSOR<br>0-5V | HALL/<br>CRANK<br>(czujnik<br>cyfrowy) | VR-/<br>CRANK | VR+/<br>SPEED |

**+12V** V-IN +12V  
Zasilanie sterownika  
**WYMAGANY BEZPIECZNIK 2A**  
na linii zasilania +12V

**+5V** +5V (OUT)  
Wyjście 5V (max 500mA)

**GND** GND  
Masa sterownika i sygnałów

**BRAKE**  
Zwierany do GND (hamulec aktywny)

**KICKDOWN**  
Zwierany do GND (kickdown aktywny)

**HALL**  
Wejście cyfrowe (czujnik HALL)

**VR** (czujnik indukcyjny)  
Wejścia czujników VR (indukcyjnych)

**MAP** MAP SENSOR  
Sygnał analogowy 0-5V

**MAF** MAF SENSOR  
Sygnał analogowy 0-5V

**TPS** TPS  
Sygnał analogowy 0-5V

**COOLANT**  
Czujnik temperatury  
(drugi bieg do GND)

**DO KOMUNIKACJI CAN**

**CAN-H** Linia CAN High

**CAN-L** Linia CAN Low

**CAN2-H** Linia CAN2 High

**CAN2-L** Linia CAN2 Low

**UWAGA:**

- Nie podłączaj ani nie zwieraj pinów do +12V, jeśli nie jest to wyraźnie opisane.
- Niewłaściwe podłączenie może spowodować uszkodzenie sterownika.

N.C. – nie podłączony  
 Wszystkie sygnały odniesione do GND sterownika.

v1.0

### Connector pin assignment of the 7G-Tronic (722.9) standalone controller

Pin numbering in each row: from right (1) to left (8). All signals are referenced to the controller ground (GND).

#### Row A (top)

| 8   | 7   | 6                                   | 5             | 4             | 3          | 2                                     | 1                            |
|-----|-----|-------------------------------------|---------------|---------------|------------|---------------------------------------|------------------------------|
| HC2 | HC1 | <b>+5V</b><br>output, max<br>500 mA | <b>CAN2-L</b> | <b>CAN2-H</b> | <b>GND</b> | <b>KICKDOWN</b><br>switched to<br>GND | <b>V-IN +12V</b><br>2 A fuse |

#### Row B (middle)

| 8            | 7                   | 6           | 5                          | 4                                  | 3                                         | 2                      | 1                      |
|--------------|---------------------|-------------|----------------------------|------------------------------------|-------------------------------------------|------------------------|------------------------|
| <b>CAN-H</b> | <b>TPS</b><br>0-5 V | <b>N.C.</b> | <b>MAP</b><br>sensor 0-5 V | <b>BRAKE</b><br>switched to<br>GND | <b>HALL /<br/>SPEED</b><br>digital sensor | <b>VR+ /<br/>CRANK</b> | <b>VR- /<br/>SPEED</b> |

#### Row C (bottom)

| 8            | 7                                      | 6           | 5                                       | 4                          | 3                                         | 2                      | 1                      |
|--------------|----------------------------------------|-------------|-----------------------------------------|----------------------------|-------------------------------------------|------------------------|------------------------|
| <b>CAN-L</b> | <b>COOLANT</b><br>other pole to<br>GND | <b>N.C.</b> | <b>IAT</b><br>temp., to GND<br>· unused | <b>MAF</b><br>sensor 0-5 V | <b>HALL /<br/>CRANK</b><br>digital sensor | <b>VR- /<br/>CRANK</b> | <b>VR+ /<br/>SPEED</b> |

## 3.1 Pin descriptions

|                                       |                                                                     |
|---------------------------------------|---------------------------------------------------------------------|
| <b>V-IN +12V</b>                      | controller power supply; a 2 A fuse is required on the +12 V line   |
| <b>+5V (OUT)</b>                      | 5 V reference output for sensors, load capacity up to 500 mA        |
| <b>GND</b>                            | controller and signal ground — common reference point               |
| <b>CAN-H / CAN-L</b>                  | CAN bus to the gearbox controller (500 kbit/s)                      |
| <b>CAN2-H / CAN2-L</b>                | second CAN bus                                                      |
| <b>TPS / MAP / MAF</b>                | analog sensor signals 0-5 V (throttle, pressure, air mass flow)     |
| <b>IAT</b>                            | intake air temperature sensor; other pole to GND — currently unused |
| <b>COOLANT</b>                        | coolant temperature sensor; other pole to GND                       |
| <b>BRAKE / KICKDOWN</b>               | inputs switched to GND — brake and kickdown active when shorted     |
| <b>HALL / SPEED, HALL /<br/>CRANK</b> | digital inputs for Hall sensors (speed, shaft position)             |
| <b>VR+ / VR-</b>                      | inputs for inductive (VR) sensors — RPM and speed                   |
| <b>N.C.</b>                           | pin not connected                                                   |

### Caution

Do not connect or short pins to +12 V unless explicitly described. Incorrect wiring may damage the controller.

## 3.2 Wiring order

1. Disconnect the vehicle battery.
2. Mount the module in a dry place, shielded from heat sources and vibration.
3. Connect the CAN bus to the gearbox controller.
4. Connect the input signals — analog, or the base vehicle's CAN bus.
5. Connect power and ground.
6. Connect the CANable adapter to the bus and to the computer.
7. Reconnect the battery.
8. Start the application and check that the module reports in — see chapter 5.

## 3.3 Connecting the CANable adapter

The adapter connects to the same bus the module works on. A single connection is enough for configuration, diagnostics and firmware updates — no separate diagnostic interface is required.

# 4. Installing the application

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## 4.1 Download

The installer is available on the product page: [canbridge.pl](#) → VGS-Bridge → Download app (Windows). The page always points to the latest release.

## 4.2 Installation

1. Run the downloaded EngineSignalConverter\_Setup\_x\_y.exe file.
2. Follow the installer steps. The default location is fine.
3. Tick the desktop shortcut option if you want one.

### Adapter driver

CANable is recognised by the system as a gs\_usb device. If the application does not see the adapter, install the WinUSB driver with the Zadig tool and then restart the program.

### 4.3 First start and activation

On the first start a combined licence agreement and activation window appears. Scroll the agreement to the end — only then does the acceptance box unlock. Below it you will find **this computer's ID**; copy it with the COPY button and send it to [garage@seasidecustoms.com](mailto:garage@seasidecustoms.com) to receive your licence key.

Enter the key you received into the LICENCE KEY field. Dashes are inserted automatically and letter case does not matter. The ACTIVATE button turns on once the text is scrolled, the box is ticked and the key is complete.

#### Computer ID

The identifier is derived from the motherboard firmware UUID, so it survives Windows updates and reinstalls. Replacing the motherboard requires a new key.

The window will not appear again as long as the key remains valid and the terms are unchanged.

## 5. First run

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### 5.1 Establishing a connection

1. Connect the CANable adapter to the computer and to the bus.
2. Switch on the controller's power supply.
3. In the top bar of the application, select the adapter from the CANABLE list. The refresh button next to the list rescans the ports.
4. Make sure the bus speed is set to 500 kbps.
5. Click CONNECT.

Once connected, the status indicator changes to CONNECTED and the event log shows the controller's greeting together with its firmware version number. The application then reads all stored settings automatically.

#### Versions in plain sight

The application version is shown in the top right corner, next to the language switch. The controller firmware version is shown in the update window. Quote both numbers when contacting support.

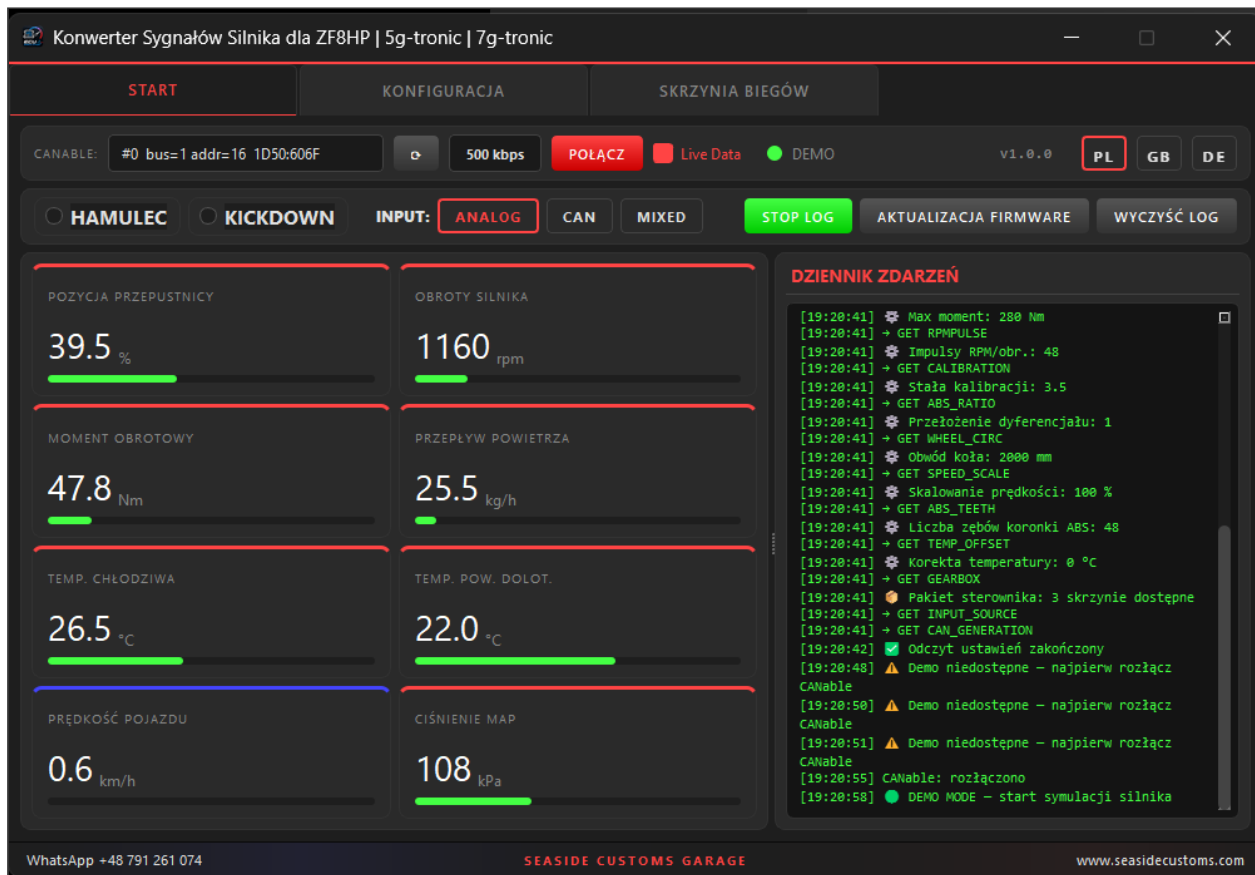
### 5.2 Language

The PL, GB and DE buttons in the top right corner switch the language of the whole interface. The choice is remembered between sessions.

### **5.3 Demo mode**

With the adapter disconnected the application can run in demo mode, simulating engine operation. It exists purely to explore the interface — nothing is sent to the bus.

## 6. START tab — everyday operation



Main window — live data gauges and the event log

### 6.1 Gauges

Eight gauges show the values passed to the gearbox controller in real time:

|                               |                                                                    |
|-------------------------------|--------------------------------------------------------------------|
| <b>Throttle position</b>      | opening in percent                                                 |
| <b>Engine RPM</b>             | rev/min                                                            |
| <b>Torque</b>                 | Nm — calculated from load and engine parameters                    |
| <b>Air flow</b>               | kg/h                                                               |
| <b>Coolant temperature</b>    | °C                                                                 |
| <b>Intake air temperature</b> | °C                                                                 |
| <b>Vehicle speed</b>          | km/h — from the ABS sensor, according to the configured parameters |
| <b>MAP pressure</b>           | kPa                                                                |

## 6.2 Status indicators

BRAKE and KICKDOWN light up when the controller detects the brake pedal being pressed and the accelerator being fully depressed. They give you a quick way to check that these inputs are wired correctly.

## 6.3 Signal source

The INPUT selector decides where the controller takes its input data from:

|               |                                                                      |
|---------------|----------------------------------------------------------------------|
| <b>ANALOG</b> | from the donor vehicle's sensors and potentiometers                  |
| <b>CAN</b>    | from the base vehicle's bus                                          |
| <b>MIXED</b>  | mixed mode — some values from the bus, others from the analog inputs |

The selected source is stored in the controller's memory and remains in effect after the power is switched off.

## 6.4 Event log

The right-hand column shows the course of communication: commands sent, replies received, warnings and errors. STOP LOG pauses new entries, CLEAR LOG empties the window. When reporting a problem, it is worth pasting in the contents of the log.

## 7. CONFIGURATION tab — vehicle parameters



Engine, differential and speed parameters plus the live data chart

### 7.1 How to save settings

Every field has its own SET button. Enter a value and confirm it with that button — only then does it reach the controller. Confirmation of the write appears in the event log. Settings survive a power cut as well as a firmware update.

### 7.2 Engine parameters

| Parameter           | Meaning                                           |
|---------------------|---------------------------------------------------|
| Engine type         | petrol or diesel — affects the torque map         |
| Engine capacity     | in cm <sup>3</sup>                                |
| Number of cylinders | needed to convert the RPM signal                  |
| Maximum RPM         | upper rev range passed to the gearbox             |
| Maximum torque      | in Nm — reference point for the calculated torque |

| Parameter                        | Meaning                                               |
|----------------------------------|-------------------------------------------------------|
| <b>RPM pulses per revolution</b> | number of pickup pulses per one crankshaft revolution |
| <b>Calibration constant</b>      | coefficient correcting the torque calculation         |
| <b>Temperature offset</b>        | reading shift in °C                                   |

### 7.3 Speed and differential parameters

| Parameter                     | Meaning                                       |
|-------------------------------|-----------------------------------------------|
| <b>ABS differential ratio</b> | final drive ratio                             |
| <b>Wheel circumference</b>    | in mm — rolling circumference of the tyre     |
| <b>ABS ring pulse count</b>   | number of teeth on the speed sensor ring      |
| <b>Speed scaling</b>          | percentage correction of the calculated speed |

#### Order of adjustment

Set the wheel circumference, the ABS ring pulse count and the ratio first — these bring the result into the right order of magnitude. Use speed scaling only at the end, to trim the residual error against a reference reading.

### 7.4 Live data chart

The chart at the bottom of the tab plots RPM, speed and torque. The check boxes above it switch individual traces on and off. PAUSE/RESUME stops plotting without losing data, CLEAR discards the history, and EXPORT saves the collected samples to a file — useful when tuning and when reporting problems.

## 8. GEARBOX tab — VGS functions

This tab gives access to the gearbox controller through the same adapter you use to configure the module. Select the gearbox from the list on the left first — the function panel appears only then.

#### Supported gearbox

The current release supports 7G-Tronic (VGS / NAG2) only. The remaining entries visible in the list are prepared for future firmware versions.

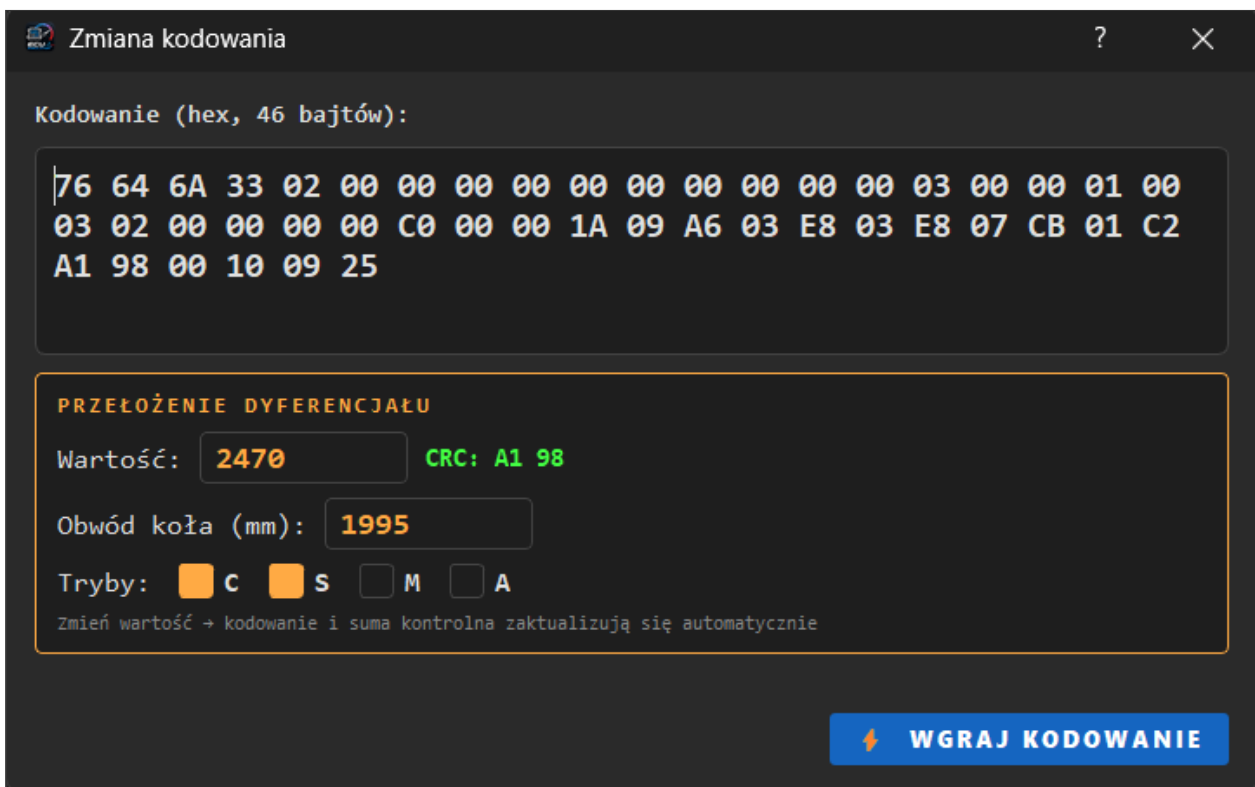
## 8.1 Identification

The Identification button reads the VGS controller's data: part number, variant, software version and current coding. Start every job with it — without a read, the remaining functions have no reference point. The Save to file button stores the full read as a JSON file, which is worth doing before making any change.

### Back up before changing

Save the read to a file before you change the coding. It is the only way back to the original state.

## 8.2 Coding change



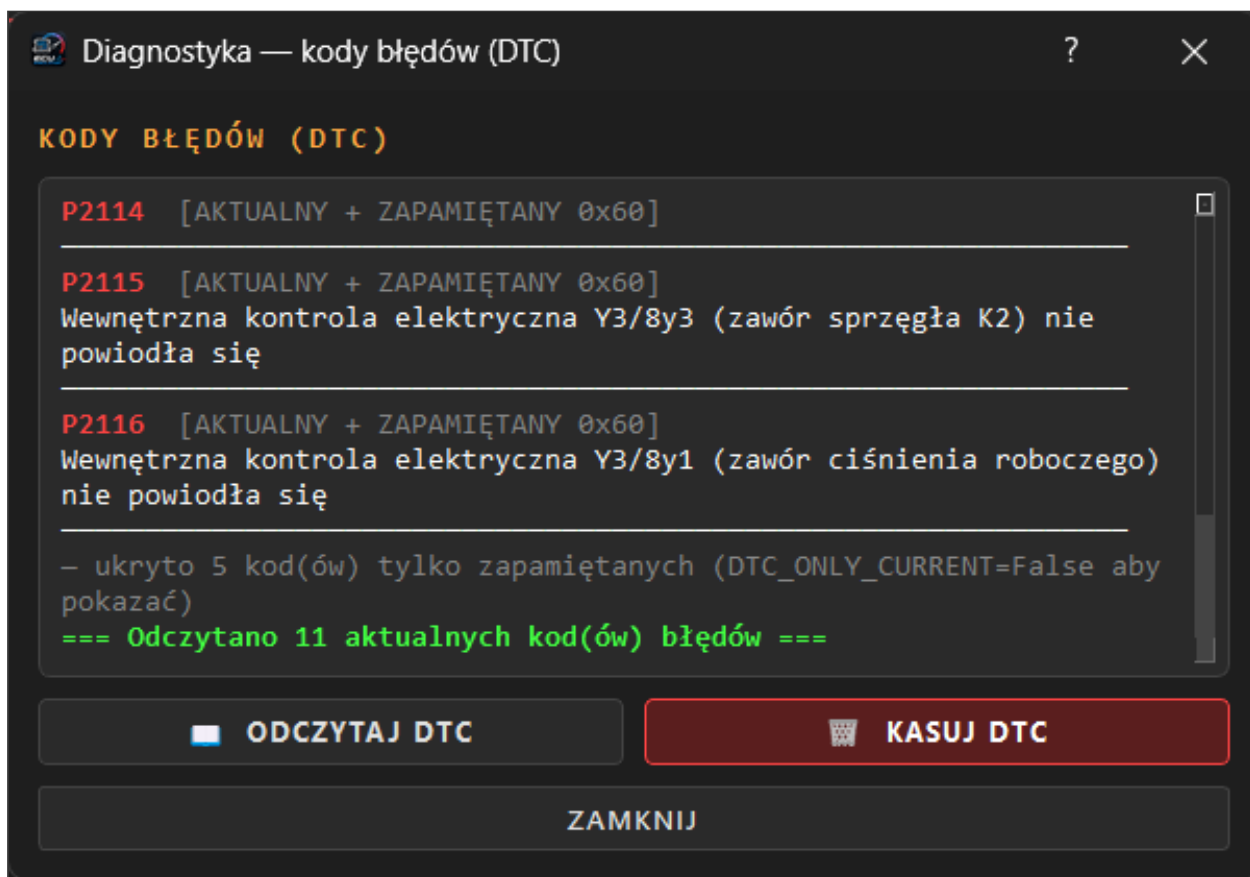
*Coding window — editable values and an automatically calculated checksum*

The window shows the complete coding in hexadecimal form along with individual editable fields:

- **Differential ratio** — the numeric final drive ratio.
- **Wheel circumference** — in millimetres.
- **Modes** — check boxes corresponding to the gearbox operating modes.

After any value is changed, the coding string and its checksum are recalculated automatically. The write takes place when you click WRITE CODING.

### 8.3 Diagnostics (DTC)



*Fault codes with descriptions, distinguishing current from stored codes*

READ DTC retrieves the VGS controller's fault memory. Each code comes with a description in the interface language and a status marker — CURRENT means a fault present right now, STORED an event from the past.

CLEAR DTC erases the fault memory. Current codes reappear on the next read if their cause has not been removed — which is why clearing is mainly a way of seeing what comes back.

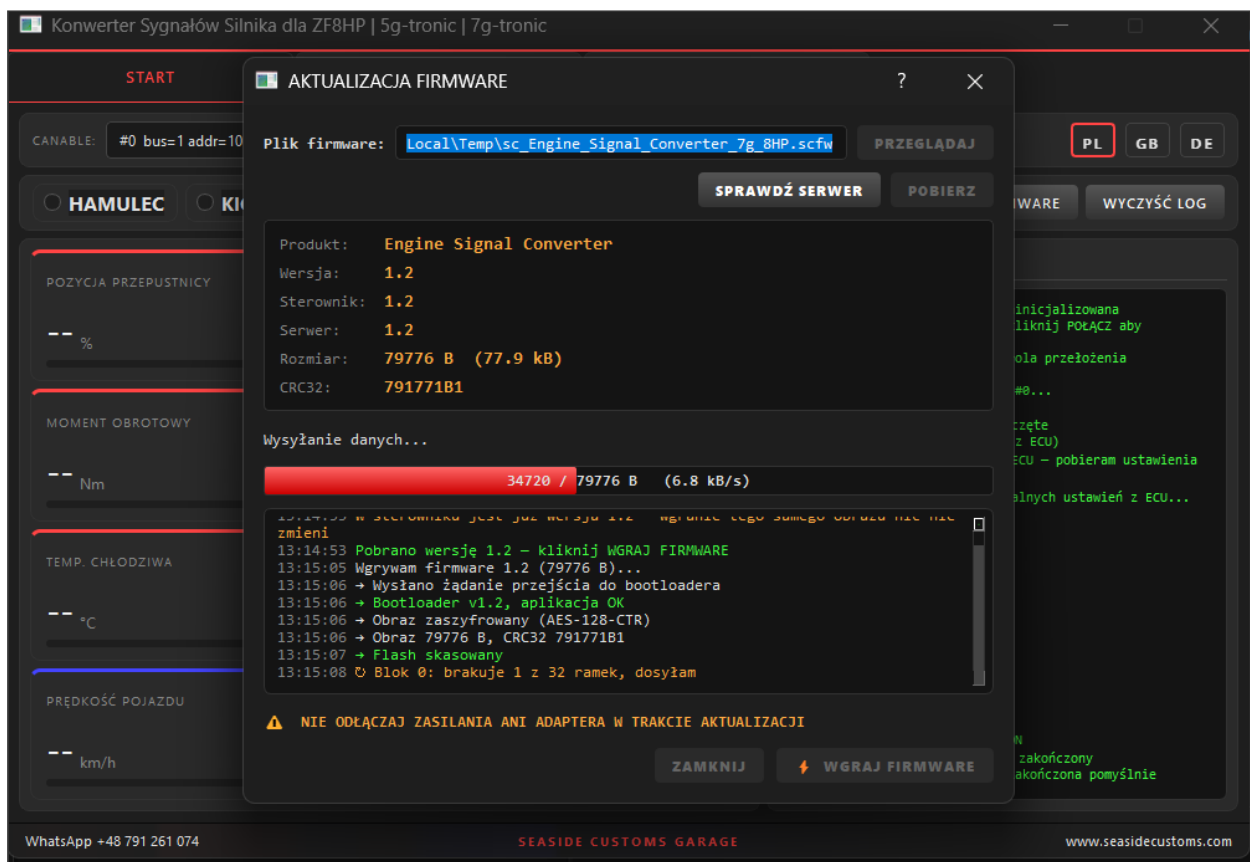
### 8.4 HW reset

Forces a restart of the gearbox controller. Useful after a coding change, when the new settings should take effect without an ignition cycle.

### 8.5 Write VIN

Writes the VIN to the module and compares it with the number stored in the VGS controller. The indicator next to the button shows whether both numbers match.

## 9. Updating the controller firmware



Update window — versions side by side, write progress and the course of the operation

### 9.1 When to update

New firmware releases bring fixes and support for further gearbox variants. Updating is not mandatory — if your setup works correctly, you may stay on the current version.

### 9.2 Update procedure

1. Connect to the controller as you would for normal work.
2. On the START tab click FIRMWARE UPDATE.
3. The window checks the server on its own and shows three numbers: the version in the file, the version in the controller and the version available on the server.
4. If something newer is on the server, click DOWNLOAD.
5. Click FLASH FIRMWARE and wait. The transfer takes a dozen or so seconds.
6. When it finishes, a window asks you to cycle the power — disconnect and reconnect the controller's supply.

#### While writing

Do not disconnect the controller's power or the adapter. Perform the update with the vehicle stationary or on a bench.

### 9.3 What happens if the transfer is interrupted

The controller stays in update mode and waits for another attempt. The vehicle configuration is not affected. Simply click FLASH FIRMWARE again.

### 9.4 Updating without internet access

The firmware file can be downloaded in advance from the product page (Download controller firmware) and selected in the update window with the BROWSE button.

## 10. Updating the application

After start-up the application checks in the background whether a newer version of itself is available on the server. If so, it shows a window with the version number and a description of the changes. The DOWNLOAD AND INSTALL button fetches the installer, after which the application closes and launches it automatically.

No internet connection does not interfere with work — the check simply fails and nothing is displayed.

## 11. Troubleshooting

| Symptom                             | Possible cause and remedy                                                                                                                                                |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>The CANABLE list is empty</b>    | The adapter is not recognised by the system. Check the USB cable, click the refresh button, and if necessary install the WinUSB driver with the Zadig tool.              |
| <b>Connected, but no live data</b>  | The controller is not responding. Check the module's power supply, the bus wiring and the terminating resistors. The log then shows commands being sent with no replies. |
| <b>No controller greeting</b>       | The module did not report in time, or it is running in bootloader mode after a failed update. Open the update window and check what the Device field shows.              |
| <b>Speed does not match reality</b> |                                                                                                                                                                          |

| Symptom                                          | Possible cause and remedy                                                                                               |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
|                                                  | Verify the wheel circumference, the ABS ring pulse count and the differential ratio. Use speed scaling only at the end. |
| <b>RPM does not match reality</b>                | Check the RPM pulses per revolution — the most common cause of a proportional error.                                    |
| <b>Update: "bootloader not responding"</b>       | The controller did not enter update mode. Check the connection and retry. If the symptom persists, contact support.     |
| <b>Update: "checksum mismatch"</b>               | The firmware file does not match this particular controller, or it was corrupted during download. Download it again.    |
| <b>Update: "file belongs to another product"</b> | The selected file belongs to a different device. Use the file from the product page.                                    |

#### Reporting a problem

Have ready: the application version (top right corner), the firmware version (update window), the contents of the event log and a short description of the installation — gearbox model, signal source and base vehicle.

## 12. Technical data

|                          |                                                |
|--------------------------|------------------------------------------------|
| <b>Supported gearbox</b> | 7G-Tronic (VGS / NAG2)                         |
| <b>Bus</b>               | CAN, 500 kbit/s                                |
| <b>Signal sources</b>    | analog, CAN, mixed mode                        |
| <b>Supply voltage</b>    | 12 V                                           |
| <b>Configuration</b>     | Windows 10 / 11 application                    |
| <b>Adapter</b>           | CANable (gs_usb)                               |
| <b>Firmware update</b>   | over the CAN bus, from within the application  |
| <b>Settings memory</b>   | non-volatile, retained across firmware updates |

#### To be completed

Module dimensions and weight, operating temperature range, current draw, enclosure protection rating, connector type.

## 13. Legal notice and warranty

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VGS-Bridge is an electronic device intended solely for motorsport, closed-circuit, off-road, research and development purposes, and as a diagnostic tool and bench tester for components. The product has no road type-approval and is not intended for installation or use in vehicles operated on public roads. Installing or using the device in a road-registered vehicle may violate applicable regulations and void the vehicle's type-approval.

Controlling a gearbox and modifying CAN bus frames concerns safety-critical systems. Incorrect configuration may cause unexpected vehicle behaviour, loss of vehicle control, equipment damage, personal injury or death.

The user is solely responsible for the manner of use, installation and compliance with local regulations. The manufacturer accepts no liability for any damage, loss or legal consequences arising from misuse or use other than as intended.

### Warranty

|               |                                                                                                                          |
|---------------|--------------------------------------------------------------------------------------------------------------------------|
| <b>Period</b> | 24 months from the date of purchase                                                                                      |
| <b>Scope</b>  | the VGS-Bridge electronic device; the warranty does not cover the remaining items in the box or any vehicle components   |
| <b>Claims</b> | by e-mail to <a href="mailto:garage@seasidecustoms.com">garage@seasidecustoms.com</a> or via WhatsApp at +48 791 261 074 |

Include the firmware and application version numbers, a description of the symptoms and the circumstances in which they occur. This shortens the path to a solution and often makes remote help possible without returning the device.

### Contact

|                               |                                                                          |
|-------------------------------|--------------------------------------------------------------------------|
| <b>Seaside Customs Garage</b> | <a href="mailto:garage@seasidecustoms.com">garage@seasidecustoms.com</a> |
| <b>Product page</b>           | <a href="http://canbridge.pl">canbridge.pl</a>                           |
| <b>WhatsApp</b>               | +48 791 261 074                                                          |