V3MS DASH7

for VEMS ECUs

Digital Dashboard for standalone ECUs VEMS V3.x

INSTALLATION AND USER MANUAL

For model: HW22/12560N7P

5th revision 5/2023

Content

Introduction

Main parts of display unit:

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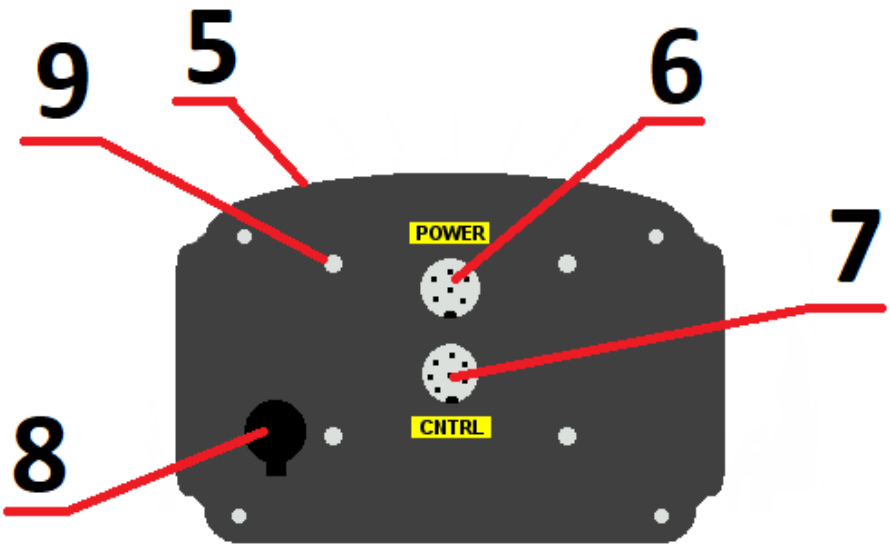
7. Control buttons connector
8. CR1220 Clock Battery cover
9. Mounting terminals 4x M5



Electrical connection

Display unit

PWR connector (6 pins)

This connector is for power supply and communication between main unit and display unit. Without this connector connected, Dash7 won‘t work. This connector is wired from factory and this pinout is only for troubleshoting purposes. Do not modify factory wiring harness! Modifying factory harness can cause damage of your Dash7 and will void a factory warranty!

Power connector pinout:

Pin 1: to main unit connector pin A8

Pin 2: to main unit connector pin A2

Pin 3: to main unit connector pin B7

Pin 4: to main unit connector pin A7

Pin 5: to main unit connector pin A6

Pin 6: to main unit connector pin C7

CNTRL connector (7 pins)

This connector is used to control the main functions of display, switching screens, adjusting brightness, hide warnings, change settings, etc... .

Without this connector connected, the Dash7 will work normally (show data), but you will be unable to control it’s functions, switch between pages or change settings in menu. Control buttons or cable for control buttons was delivered with your Dash7. Depends on your order specifications, you can buy only cable, or cable with separate buttons, buttons on PCB or buttons in plastic case. If you order only a cable or separate buttons, or you want to connect another button to control the Dash7, use this diagram to wire the connector. All buttons are switched to Ground.

Control connector pinout and wiring diagram:

Pin 1: push button RIGHT (pink wire)

Pin 2: push button LEFT (blue wire)

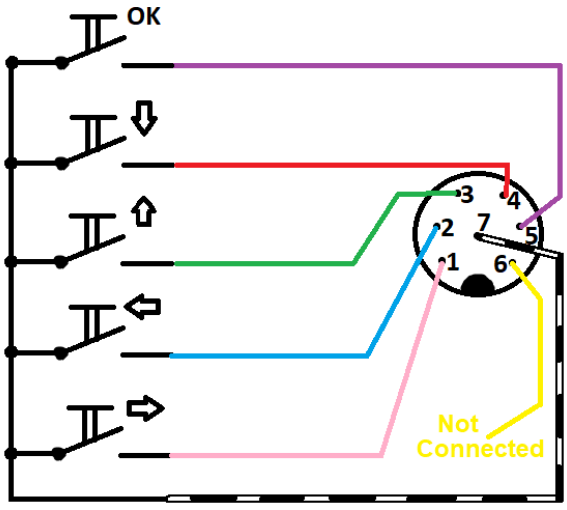
Pin 3: push button UP (green wire)

Pin 4: push button DOWN (red wire)

Pin 5: push button OK/ENTER (violet wire)

Pin 6: Not In Use (yellow wire)

Pin 7: buttons supply GND - GROUND (white wire + black wire + shielding wire twisted together)



WARNING:

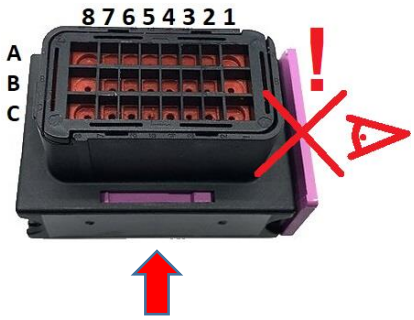
Wire colors are for informational purposes only and may change at any time without notice! Always use a multimeter and pin numbers on the connector to verify the wiring.

NEVER APPLY ANY EXTERNAL VOLTAGE TO THE CNTRL CONNECTOR! Otherwise, you can damage your Dash7!

Main Unit

Main unit connector

Main unit connector is used for Dash7 power supply, ECU communication and for connecting analog and digital inputs to the Dash7. To disconnect main unit connector pull the violet plastic part to the side and at the same time pull the connector out from the socket. Connector consists of 3 rows of pins (A, B, C), 8 pins in a row (total of 24 pins). Pinout of main unit connector is on the picture beow. ALWAYS READ A PIN NUMBERS ON THE CONNECTOR!



WARNING: WHEN INSTALLING THE PINS, DO NOT FOLLOW THE VIOLET PLASTIC OF THE CONNECTOR AT THE PICTURE ABOVE, BUT THE PIN NUMBERS! THIS PLASTIC CAN BE MOUNTED IN BOTH DIRECTIONS!

Row A

Pin A1: Sensors +5V supply (load max. 700mA) (NOTE: Pin not connected for Sn2106 or less)
Pin A2: PWR connector of display unit - Pin 2
Pin A3: Sensors GND - Ground supply for sensors (NOTE: Pin not connected for Sn2106 or less)
Pin A4: Input 9 (Handbrake - GND) – switch ONLY to GND ! (not protected input)
Pin A5: Input 10 (Oil Press Switch - GND) – switch ONLY to GND ! (not protected input)
Pin A6: PWR connector of display unit - Pin 5
Pin A7: PWR connector of display unit - Pin 4
Pin A8: PWR connector of display unit – Pin 1 (+5V display unit power supply)

Row B

Pin B1: Input 4 (Low Beam Lights +12V) – connect to the +12V of low beam light bulb
Pin B2: Input 5 (High Beam Lights +12V) – connect to the +12V of high beam light bulb
Pin B3: Input 6 (Turn Indicator LEFT +12V) – connect to the +12V of left turn ind. bulb
Pin B4: Input 7 (Turn Indicator RIGHT +12V) – connect to the +12V of right turn ind. bulb
Pin B5: Input 8 (Reverse Gear +12V) – connect to the +12V of reverse light bulb
Pin B6: VEMS Serial RS232 (GND)
Pin B7: PWR connector of display unit - Pin 3
Pin B8: Main Power Supply +12V – connect this pin to the main switch or ignition switch in your car

Row C

Pin C1: Analog Input 0 (Fuel Level Sensor) – 0-5V, no internal pullup (if necessary, use external)
Pin C2: Analog Input 1 (Pressure Sensor) – 0-5V, (since Sn2113 2k7 internal pullup is installed)
Pin C3: Analog Input 2 (Temperature Sensor) – NTC (or PTC), 0-5V, (since Sn2113 2k7 internal pullup is installed)
Pin C4: Analog Input 3 (Configurable Input/Neutral/Drum sensor) – 0-5V, Since firmware V7.3.3 input can be used for Neutral switch. Since firmware V7.3.6 input can be used for gear position sensor (Drum sensor). Since Sn2113 2k7 internal pullup resistor is installed.
Pin C5: VEMS Serial RS232 data (ECU pin 14 of EC18 connector)
Pin C6: VEMS Serial RS232 data (ECU pin 15 of EC18 connector)
Pin C7: PWR connector of display unit – Pin 6 (GND of display unit power supply)
Pin C8: Main Power Supply GND – connect to the battery negative terminal or vehicle ground

WARNING! Never apply power to any input (analog or digital) when the Dash7 is turned off. The best way to prevent this is to connect the Dash7 power supply from the kill switch or any main switch in your car that also turns off the lights, ECU and other components (eg. sensors) connected to the Dash7 inputs.

NOTE: When installing pins into the connector, always read the numbers and letters on the connector carefully and double check that all pins are installed in the correct slot, as the incorrect wiring can damage your Dash7 ! When installing the pins to the main connector, it is necessary to slightly pull out the orange cover of the connector (first you need to loosen the locks on the sides). Insert the crimped pin into the slot until you hear a click. After installing all the necessary pins, push the orange cover back to its original position.

Base connection of the DASH7

Base connection is used when customer want only to visualise data from VEMS ECU without any additional analog or digital inputs connected to the Dash7.

For base connection follow these steps:

1. **Turn OFF power supply (turn off battery kill switch, main switch,etc...)**
2. **connect 24pin connector to the Main unit of Dash7,**
3. **connect 6pin connector from Main unit to the Display unit.**
4. **plug in Dash7 RS232 cable to the RS232 connector of your VEMS ECU (NOT THE CONNECTOR NAMED LCD!)**
5. **connect BLACK WIRE from pin C8 of main connector to the vehicle GROUND or battery NEGATIVE terminal**
6. **connect RED WIRE from pin B8 (through 3A fuse) to the main switch or ignition switch of +12V battery voltage**

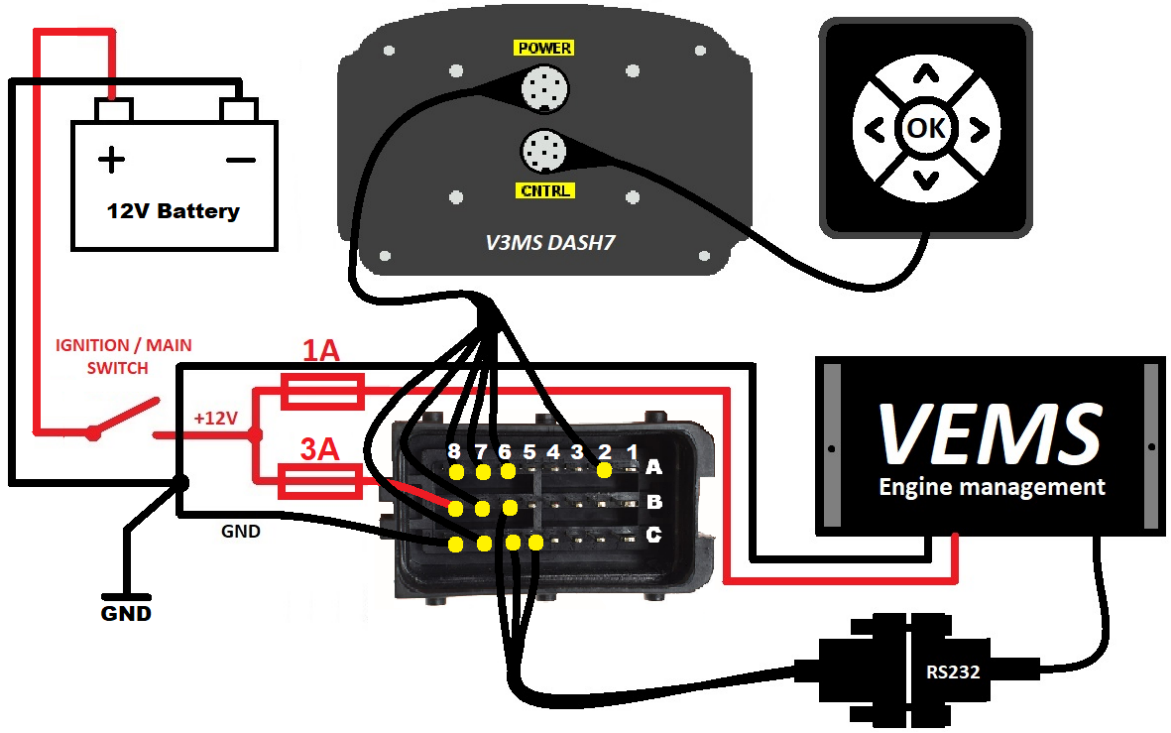
If all connections are proper, turn on the power supply. The Dash7 opening ceremony should begin.

Opening ceremony means that the screen of Dash7 will show you Startup screen with “your logo“ (or short video), then you will see a Connect screen for the moment and all LEDs gradually lights up in Red, Green and Blue color. At the end of the opening ceremony, all the LEDs will go out and the first data page will be displayed with the data from the ECU.

You can switch between data pages and control the Dash7 by using buttons connected to the CNTRL connector on the back of the display unit.

The wiring diagram of BASE CONNECTION is on the picture below.

BASE CONNECTION WIRING DIAGRAM OF DASH7



WARNINGS AND NOTES:

- **NEVER DISCONNECT ANY CONNECTOR FROM DASH7 WHEN POWER SUPPLY IS ON !**
- **ALWAYS USE 3 Amp (max 5 Amp) fuse for +12V power supply of Dash7 !**
- **Locate fuse as close as possible to the main switch (or ignition switch).**
- **As power supply switch use only a kill switch or any main switch in your car and avoid the voltage on Dash7 input pins while Dash7 is turned off.**
- **MAKE SURE THAT YOUR GROUNDING IS PROPERLY CONNECTED !**
- **MAKE SURE ALL CONNECTORS ARE CONNECTED PROPERLY AND LOCKED.**
- **If possible, always use screws to lock RS232 connector.**
- **Make sure, your ECU is not „password protected“. If yes, it does not send any data through the serial connector (RS232). Your ECU must be „not password protected“ for working with Dash7**
- **Make sure that the Dash7 RS232 connector is connected to the right serial connector of your Vems ECU. Always use the first serial connector which are usually used for tuning with Laptop. As some Vems ECUs may have multiple serial (DSUB9) connectors and the second serial connector or LCD connector will not work with Dash7.**
- **Power supply pins are overvoltage and polarity protected, but we strongly recommend to check all connections and pinout before turning the power supply ON.**
- **When performing any bodywork repairs such as welding or painting, the Dash7 and other ECUs should be removed from the vehicle to protect them from static electricity or high voltage discharges that may occur during this work. Simply disconnecting the battery ground wire may not be sufficient protection in some cases.**

Full connection of the DASH7

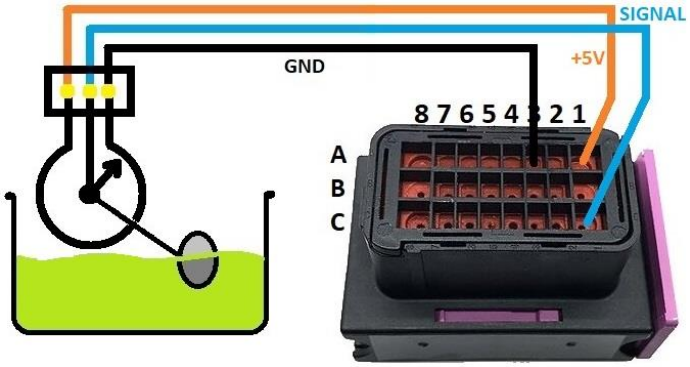
Full connection means a base connection of the Dash7 and a connection of an additional sensors or devices to the inputs of Dash7.

Inputs

Dash7 can not only visualize data from ECU, but also from its own analog and digital inputs. 0-5V inputs are unprotected and they tolerate **MAXIMUM OF 5 VOLTS !** Higher voltage can in some cases damage input or main processor of Dash7, so be very careful when connecting there inputs. Always use 5V supply from Dash7 if possible. Overvoltage damage is not covered by factory warranty!

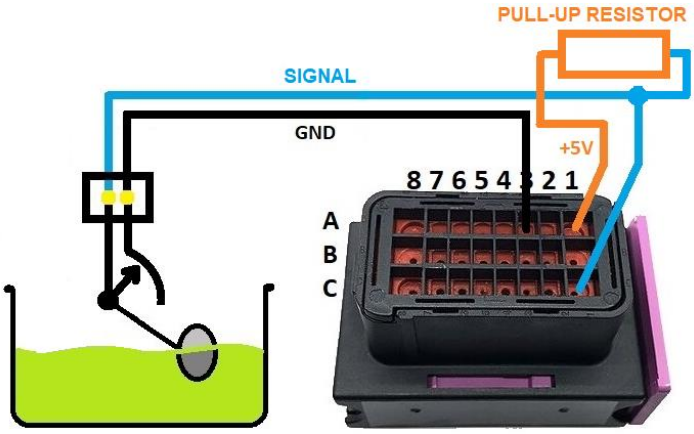
ANALOG INPUTS (FOR 0-5V SENSORS):

Fuel level sensor (3 wires version - potentiometer):



Pin C1: Input signal from Fuel Level Sensor (use 5V and GND supply from Dash7)
Pin A1: +5V sensors power supply (use Pin A8 for Sn2106 or older)
Pin A3: Sensors GND

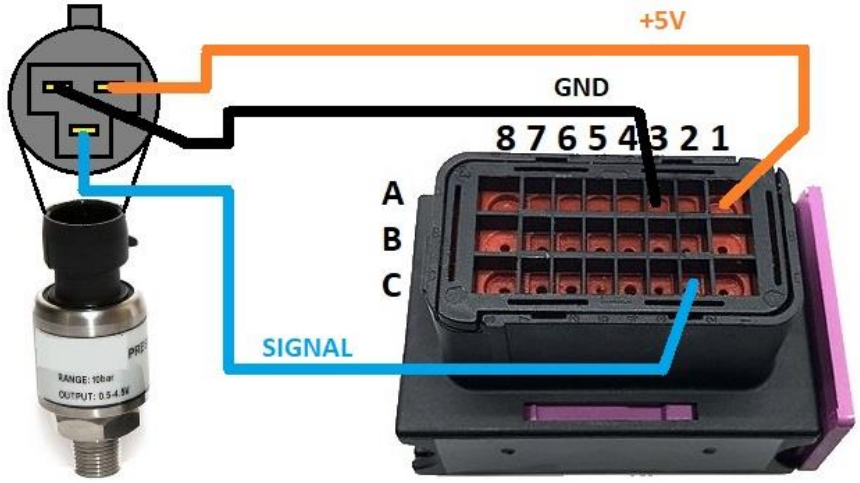
Fuel level sensor (2 wires version):



Pin C1: Input signal from Fuel Level Sensor (use 5V and GND supply from Dash7)
Pin A1: +5V sensors power supply (use Pin A8 for Sn2106 or older)
Pin A3: Sensors GND

NOTE: If your sensor has only 2 wires, connect one wire to the Sensors GND (pin A3), another wire to the analog input (pin C1) and use pull-up resistor between +5V (pin A1) and signal (pin C1) wire. Resistor value must be calculated and depending on the sensor's resistance (usually 1000 Ohm is a good starting point for pullup resistor).

Pressure sensor (3 wires version):



Pin C2: Input signal from pressure sensor (0-5V)
Pin A1: +5V sensors power supply (use Pin A8 for Sn2106 or older)
Pin A3: Sensors GND

NOTE: If your pressure sensor has only 2 wires (or even 1 wire) it is usually a resistance based pressure sensor. In the case of 2 wire sensor, connect one wire to the GND (pin A3), another wire to analog input (pin C2) and use pull-up resistor between +5V (pin A1) and the signal (pin C2) wire. In the case of 1 wire sensor, the ground is connected to the sensor's body thru the engine block, so you only need to connect a wire from the sensor to analog input (pin C2) and use pull-up resistor between pin A1 and C2. External pull-up resistors are usually not needed for Dash7 with Sn2113 or higher as these units have a built in 2k7 pull-up resistor from factory. If some sensors needs a "stronger" pull-up resistor, its value must be calculated and depending on the sensor's resistance (usually 1000 Ohm is a good starting point).

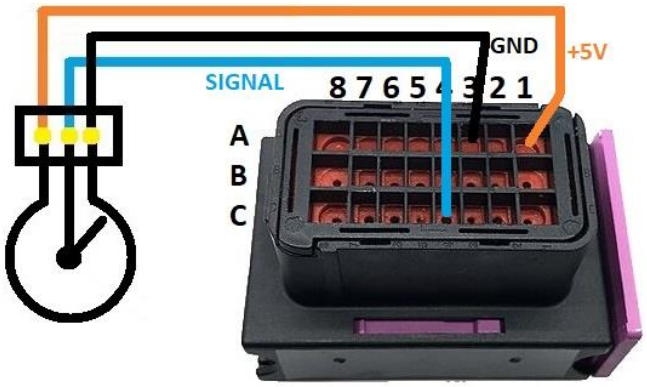
Temperature sensor (NTC):

Pin C3: Input from Temperature Sensor (NTC or PTC) 0-5V calibrable by curve
Pin A1: +5V sensors power supply
Pin A3: Sensors GND

NOTE: For Sn 2112 and below, connect 2700 Ohm pull-up resistor from pin A1 to pin C3 for most OEM sensors. Or use a value recommended by sensor's manufacturer. Not needed for Sn2113 or higher as these units have a built in 2k7 pull-up resistor from factory.

Gear position sensor, Neutral sensor or Any 0-5V sensor (Configurable input pin):

This input can be used with many types of sensors. For example: Pressure, Temperature, Position,...etc, with 0-5V output. This input can be also used for GEAR POSITION SENSOR (eg. Drum sensor) used in sequential gearboxes (since firmware V7.3.6 and GUI V3.6.5KN) or also can be used like a digital input for NEUTRAL GEAR SWITCH (since firmware V7.3.3 and GUI V3.6.2KN).



Pin C4: Configurable Input – you can use this input for any sensor connected as shown (as a voltage divider 0-5V) or like a neutral gear input channel switched to ground
Pin A1: +5V sensors power supply
Pin A3: Sensors GND

NOTE: For Sn2112: If your sensor has only 2 wires, connect 1 wire to the GND (pin A3), another wire to the input (pin C4) and use pull-up resistor between +5V (pin A1) and signal input (pin C4). Resistor value must be calculated and depending on the sensor's resistance. For OEM automotive NTC sensors it is usually 2,4 - 2,7kOhms. External pull-up is not needed for Sn2113 and higher, where internal pull-up resistor is already installed from factory.

If Configurable input pin is used like a digital input for Neutral switch, connect one side of Neutral switch to the GND and other side to the input (pin C4) and use pull-up resistor if necessary. Working principle: If Neutral gear is engaged, switch is connected to GND >>> "N" is displayed on the screen of the Dash7 (if Gear gauge is presented on actual page) and/or Neutral gear LED is turned ON. For proper function you need to go to the "Gauges" menu and set the "Neutral Gear Channel" from "NOT CONNECTED" to "DASH CONFIGURABLE INPUT" (This function is available only for firmware V7.3.3 and GUI V3.6.2KN or higher).

If Configurable input pin is used for gear position sensor, connect the sensor as on picture above and for proper function go to the "Gauges" menu and then select "Gear Channel Calibration", select strategy "All gears from drumsensor" and as a source select "DASH CONFIGURABLE INPUT". Then set voltage thresholds for all gears. (This function is available only for firmware V7.3.6 and GUI V3.6.5KN or higher).

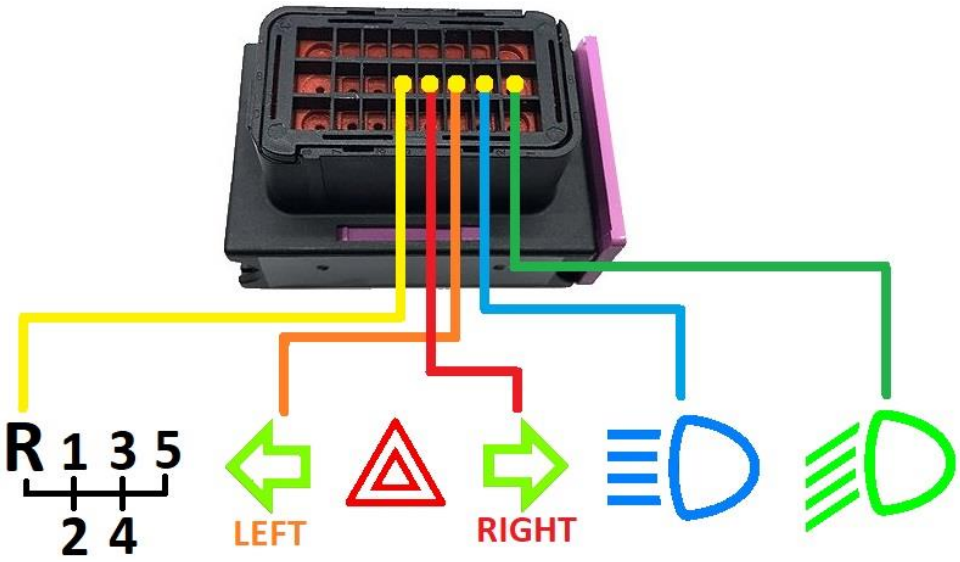
If you want to use any other device with 0-5V output as a source for this input, connect GND wire from this device to the GND pin (A3) of the Dash7 and a signal wire (0-5V max) from the device to the pin C4 of the Dash7. Make sure that the output voltage from the device will never exceed 5 Volts and the device must be turned off together with Dash7.

WARNING!

NEVER EXCEED 5 VOLTS ON 0-5V ANALOG INPUTS ! IT COULD DAMAGE YOUR DASH7 !

NOTE:
SINCE SERIAL NUMBER 2113, ALL 0-5V ANALOG INPUTS ARE PROTECTED AGAINST OVERVOLTAGE AND CAN TOLERATE VOLTAGES OVER 5 VOLTS WITHOUT DAMAGE. IN ANY CASE, WE RECOMMEND TO ALWAYS DOUBLE CHECK THE WIRING AND NEVER EXCEED 17 VOLTS ON ANY PIN OF THE DASH7 !

Digital inputs for displaying the vehicle lights status (+12V digital inputs)



Pin B1: Input 4 (Low Beam lights +12V)
Pin B2: Input 5 (High Beam lights +12V)
Pin B3: Input 6 (Turn signal light LEFT SIDE +12V)
Pin B4: Input 7 (Turn signal light RIGHT SIDE +12V)
Pin B5: Input 8 (Reversing lights +12V)

Connect wires directly from positive terminals of the bulbs to the Main unit connector.

When the lights turns ON (+12V applied to the input), indicator on the display or warning LED will also turns ON.

The hazard warning light indicator will automatically turn ON if both sides of the turn signals are flashing.

WARNING! NEVER EXCEED 17 Volts on the +12V digital inputs or it may permanently damage your Dash7.

Below 9 volts (eg. during cranking) these inputs can be unstable and switch from ON to OFF unpredictably.

Digital Inputs switched to Ground (GND digital inputs):

Pin A4: Handbrake input switched to ground
Pin A5: Oil Press Switch switched to ground
When input is connected to the ground, indicator on the screen or LED will turns ON. These inputs has internal pull-up resistors.

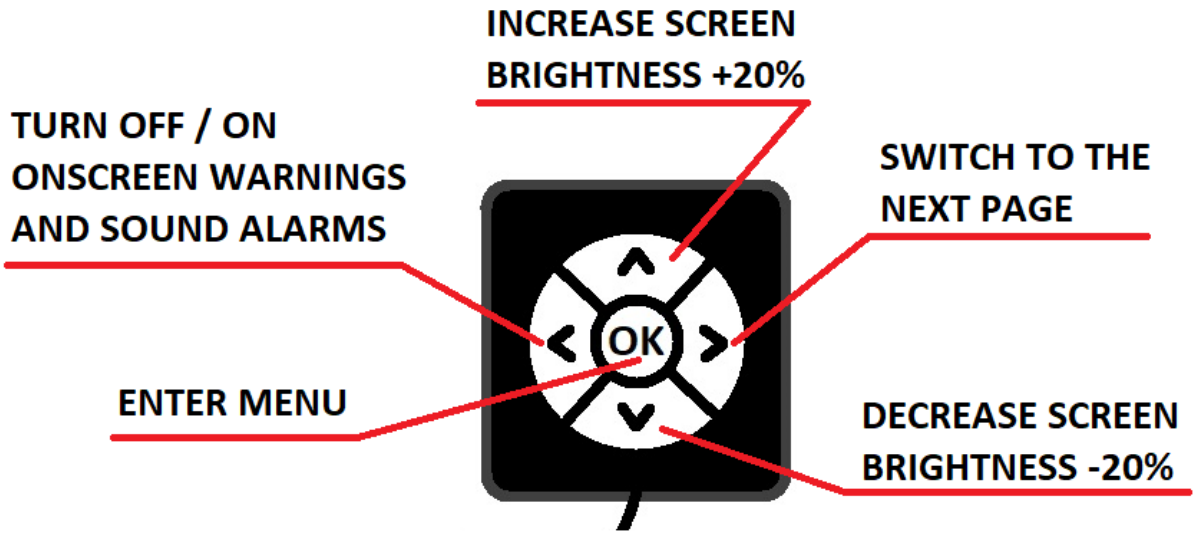
WARNING! These inputs tolerate ONLY GROUND (0 Volt) or MAX +5 Volts!!! BE CAREFUL and double check your wiring before installing connector to the Main unit. Any voltage outside these limits can damage your Dash7!

Controls

Quick Access functions

Main controls of display can be reached also while driving (racing) by QUICK ACCESS.

For reaching quick access functions you can use control buttons on remote controller.



NOTE: Please, pay full attention to driving the vehicle and use quick access functions only at the safe places on a race track !

Quick Acces functions only change parameters, but do not save their values to the memory. So, changes are valide only till the Dash7 is powered ON. After you turn the device OFF, parameters will be reset to their last saved values.

TIP: If you want to change values (eg. brightness) permanently, change them in the MENU and SAVE them.

Menu navigation

After pushing OK button, you will access the MENU. On every menu page you can navigate cursor by arrows and confirm (or change color) by OK button. Every menu page is different, so there is a HELP TEXT on every page. Help text is written in green color and give you an information about the button’s function on the actual page.

Remote control

Remote control buttons can be purchased as individual buttons, buttons on PCB, or plastic-encased buttons. The plastic case can be mounted anywhere in the interior of the car. In the lower part of this plastic case, the wires come out. For better integration into the cockpit, the user can choose the orientation of the remote control. So the case can be installed with the wires exiting at the top, bottom or sides. After mounting the box in the desired position, you can insert the “OK“ button in the correct position. In the menu "Display", you can set the Remote control orientation to 0°, 90°, 180° or 270°, depending on how you actually mounted it in the car. This function is available only for GUI V3.6.2KN or higher. Older GUIs use a fixed remote control orientation.

Graphic User Interface (GUI)

Dash7 has unique Graphic User Interface. GUI consists of Startup page with customised logo, Connection page, menu pages and 5 fully customised data pages. Data pages and Startup page can be completely customised. You can download templates or create your own design in our V3MS Web Dash Designer. You can use your own logo (picture or short video) at the Startup page . Also you can add a small logo at any data page you like.

After creating GUI in Web Dash Designer, just send it to us and after validating we will send you a file. Upload this file to the microSD card, insert the card to the SDcard adapter delivered together with your Dash7, put the adapter to the Dash7 SDcard port located on the top of the display unit (with QR code or label faced to you) and upload your new GUI to the device. Below you can find step by step instructions how to perform GUI update.

GUI Update procedure:

1. **Turn OFF the Dash7 (turn OFF ignition or another switch which cuts power supply to the Dash7)**
2. **Insert the microSD card with a new GUI file to the SD card adapter delivered with Dash7 (card must be FAT32 formatted and the GUI file must be loaded into a root directory)**
3. **Remove a dust protection cap from SD card slot located at the top of the Dash7 display unit**
4. **Gently insert SDcard adapter with microSD card to the SD card slot (with QR code or Label faced to you). A click is heard when the adapter is inserted and the adapter remains locked in the holder.**
5. **Turn ON Dash7**
6. **Update will start immediately. You will see a white screen with red letters and numbers. After few seconds screen will show message „100%“ and „Update Succesfull“**
7. **Turn OFF Dash7**
8. **Push gently down the SD card adapter and release it from the display unit**
9. **After the SDcard was removed, insert a dust protection cap back to its place and turn ON the power supply of your Dash7**
10. **Done! Enjoy your new GUI !**

NOTE: In some cases, when Dash7 was not updated for a long time, after restart a white screen could be displayed again with message „firmware upgrade“. It is normal and after few seconds your new GUI will be displayed. If not, please restart Dash7 again. After restart device should work normal and will display your new GUI.

SD Card Full-datalogger:

If Dash7 was ordered with Full-datalogger, you can save essential data from the ECU to the SD Card during driving.

Start Logging

For start logging only put your SD Card to the slot on a Main unit, then set the action when log should start in the "DATA LOG" menu and restart Dash7.

You can set start logging at:

- every startup
- only when engine is running
- only when car is moving (depending on Wheel speed 1 or 2)

Data logging

When the full-datalog function is active, you can see a small icon (Red circle with word REC or Green circle with word LOG, 

depending on GUI version) in the corner of your screen. If this icon is not visible, Dash7 is not logging to the SD card. This can happen probably because the conditions for datalog are not reached or card is not inserted (or card is damaged or incompatible or not formated right). Data logging is also indicated by a flashing LED on the Main unit (since Sn 2113, the datalog LED is located under the SD card slot and is only visible from the side view).

WARNING! SD Card must be formated FAT16 or FAT 32 (usually FAT32) . Use only SD cards with capacity up to 8GB (some microSD HC Class10 cards with SD adapter working well up to 32GB).

File name

Files are saved to the SDcard in CSV format which allows you to open these files in many log viewers (eg. MegaLogViewer) or in other software (eg.Excel, Word, Notepad, etc...). Files are named "LogXXXX.csv", where XXXX is sequence number from 0001 to 9999 for every new file. Datalogger always check the SDcard and start searching from the filename Log0001. If the file with that number does not exist, Dash7 will create it and starts logging data to that file. For better clarity and SD card longlife, we recommend not deleting the files from the card, but leaving them there until the card is not almost full. If you decide to delete files from the card or copy them to the PC, we recommend doing so with all files so that the card remains empty. This avoids mixing up files from several days or runs. The data files are compact size (about 6.7MB for 1 hour of recording), so if you have a big enough SD card, you can record on it for several weeks, months or even years (for 32GB SD card = more than 4800 hours = 200 full days). If the number of files on the SD card exceeds 9999, a "lastlog.csv" file will be created. This file will always be overwritten with the latest data every time the new log will start.

Mounting and Maintenance

Mounting

Mount the display unit in car interior in a place where you will have an unobstructed view to the screen and LEDs while driving.

The display unit is designed for mounting to the dashboard panel or holder, using 4x M5 terminals located on the back side of the unit. Dash7 with COMPOSTIE PLASTIC BODY is using long M5 screws sticking out. Dash7 with ALUMINIUM BODY is using 4 holes with M5 threat for mounting.

WARNING! When installing Dash7 with an ALUMINIUM BODY, the screws must not be screwed deeper than 10 mm into the body of the display unit. Otherwise, there is a risk of damage to the electronics in the display unit. Such damage is not covered by the warranty, so always measure the screw clearance before installation! For installation in materials with a thickness of 1-2 mm, correct screws are included in the package.

The display unit can be placed either in the instrument panel or on a separate holder (not included). When mounting in a panel, in addition to drilling the mounting holes, it is necessary to drill also holes for connectors, buzzer speaker and for the battery cover.

When mounting, make sure that there is enough space on the back for the connectors and wiring!

WARNING! Although the Dash7 main and display units are sealed, they are NOT considered as a rainproof, waterproof or water-resistant device! Using the device in wet conditions is at customer's own risk and the damage by moisture or liquids is NOT covered by factory warranty !

Mounting conditions:

- Before installation, unplug the car's battery positive or negative terminal

- If possible, mount the Dash7 on the place where it will not be exposed to a direct sunlight. Do not expose Dash7 to temperatures above 75 ° C (167 ° F)

- Never mount the Dash7 where it will be exposed to the rain or water!

- Position the cables and connectors in such a way that they cannot be damaged

- Adjust the tilt of the display for the best visibility and lock it in this position

- Place the Dash7 in the holder or panel and tighten the M5 nuts or screws on the back of the Display Unit to max 6 Nm! When installing aluminium body display unit, check the screw clearance first!

- After mounting the display unit, connect the connectors (marked PWR and CNTRL) and secure them by gently tightening the connector lock nuts

- Mount Dash7 main unit to a flat surface with 2 screws up to 6 mm in diameter (not included)

- Mount the Dash7 Main Unit on the place where it will not be exposed to direct sunlight or other heat sources (exhaust, heating, etc.). Do not expose to temperatures above 75 ° C (167 ° F)

- Pay attention to the length of the wiring from Main unit to Display Unit and to the Vems ECU

- Ideal location for the main unit is in a horizontal position, but can also be mounted vertically or "upside down"

- Crimp and connect the necessary pins into the connector of the main unit and connect all the necessary wires. Connect the sensors and inputs first and then the Dash7 power supply

- Position the cables and connectors in such a way that they cannot be damaged or exposed to heat

- Connect the connector to the main unit **after thoroughly checking** that all wires are connected correctly and correct fuse is installed on power supply!

- **DOUBLE CHECK WIRING AND CONNECTIONS!** Some inputs are NOT short-circuit or overvoltage protected. Some inputs tolerate only 5 Volts! Higher voltage can destroy your Dash7!

WARNING! IMPROPER CONNECTION MAY DAMAGE OR COMPLETELY DESTROY YOUR V3MS Dash7 !!!

- AFTER DOUBLE CHECKING you can turn ON the ignition (or other switch which turns ON the Dash7). VEMS ECU should be powered up together with Dash7 if possible.

- Immediately after the power is turned ON, you will see a Startup page with LOGO and Initialization page with flashing text “INITIALIZING”. When opening ceremony and initializing procedure of Dash7 ends correctly, data from VEMS ECU will be displayed on your Dash7 screen.

- If everything is working correctly, you can now remove the protective film from the screen, set some parameters in MENU and enjoy your Dash7!

Maintenance

Dash7 does not need during its life any special maintenance. Just keep connectors clean and protected against corrosion and keep wiring harnesses in good condition. Keep device away from high temperatures, high humidity or excessive vibrations. After a few years it could be necessary to change the real time clock battery.

Clean Dash7 body and screen only with a slightly wet towel (soft cloth or paper towel) which can’t scratch the surface.

WARNING! NEVER USE acids, solvents, thinners, gasoline, alcohol and other aggressive cleaning agents for cleaning the Dash7, otherwise you can totally damage the screen or other part of Dash7!

WARNING! ALWAYS DISCONNECT THE DASH7 MAIN UNIT AND THE DISPLAY UNIT FROM THE VEHICLE WHEN WELDING ON OR NEAR THE VEHICLE! Otherwise, it may be damaged!

For long life, if possible, set screen brightness and LEDs brightness to about 50-60% of their full capacity. At 50% brightness this parts should have a 20 000+ hours service life. Higher brightness shortens their service life.

TROUBLESHOOTING:

1. **Power is turned ON, but the screen is dark and LEDs are OFF:** Dash7 probably has no power. Check your power supply, fuses and plug again all connectors. With ignition ON, check if voltage between pins B8 and C8 on the main connector is the same as battery voltage (usually 12-14V, must not be less than 6 and more than 18V!) and if polarity is not reversed. If there is no voltage, check grounding, fuses and switches. Check if voltage between pins 1 and 6 of PWR connector is about 5V. If everything is as described, contact our tech support.
2. **Text "INITIALIZING" is flashing more than 3 seconds and message "INITIALIZATION FAILURE" is displayed**: The data connection between the main unit and the display unit is probably missing. Check continuity of the wiring between the Main Unit and the Display unit (main connector and PWR connector). Plug again all connectors and secure them on its positions. If everything is as described, but the problem persists, contact our tech support.
3. **Initialization was successful and you can see data pages, but all gauges shows numbers 888 or 0**: There is probably a missing connection between the Dash7 and the ECU or there is no data coming from the ECU. Check connection between Dash7 Main unit and VEMS ECU (RS232 connector) and check if the ECU is powered ON. Check if your ECU is not "PASSWORD PROTECTED". If yes, disable password protection (or ask your tuner), because with password protection activated the ECU do not send out any data in Triggerframe protocol.
4. **Dash7 resets, screen flickers or won't start normally:** The display unit probably has a low or unstable supply voltage. Since the serial number 2113 there is also undervoltage and overvoltage protection function. If voltage drops under 6 volts or rise over 17.8 volts, the warning message "Voltage protection" is displayed on the screen and the Dash7 turns OFF. If the voltage remains outside the safe range, the Dash7 will not turn on normally, but the screen and bottom 2 blue LEDs will remain flashing. Avoid these conditions and turn off the ignition as soon as possible. Check the quality of the power supply and battery voltage. Check if Dash7 power supply voltage during driving is not dropping under 8 volts (normally it should be over 12 or 13V). Check the wiring between main unit and display unit and secure all connectors on its positions. Check if voltage between pins 1 and 6 in the PWR connector is always about 4.8-5.2V. Check if there is not a broken wire between Main unit and the Display unit. If everything is as described, but the problem persists, contact our tech support. NOTE: during cranking if voltage drops under 6 volts, the warning message "Voltage protection" is displayed on the screen and the Dash7 resets. This is a normal condition and it is an undervoltage protection of the Dash7. To prevent this, find the reason why the voltage drops so significantly. Install a new battery, repair the starter motor or check the wiring and grounds.
5. **I can't see any OnScreen Warning (OSW) Messages even when values are out of their limits**: Probably you have turned off displaying OnScreen Warning messages. In the menu "Alarms", check that the "OnScreen Warnings ON/OFF" icon is set to "ON" (icon of the display with a green tick). If not, move your cursor to the "OSW ON/OFF icon" and press OK button to display the icon with a green tick. You should see a message "On Screen Warnings ON". Warning messages can also be turned off temporarily if on some data page the user presses the "left arrow" button on the remote control. Then a red crossed-out speaker icon will appear in the corner of the screen. To start displaying the OSW messages again, it is enough if the user presses the "left arrow" button again (a red crossed-out speaker icon will turn off).
6. **I can't hear any sound when startup or when warning messages are displayed (or the volume is low)**: Probably you have your buzzer turned off or a speaker is covered (blocked) by something. In the menu "Alarms", check that the "Alarm Buzzer ON/OFF" icon is set to "ON" (icon of the green speaker). If not, move your cursor to the "Alarm Buzzer ON/OFF icon" and press OK button to display a green speaker icon. Buzzer can also be turned off temporarily if on some data page the user presses the "left arrow" button on the remote control. Then a red crossed-out speaker icon will appear in the corner of the screen. To allow buzzer again, it is enough if the user presses the "left arrow" button again (a red crossed-out speaker icon will turn off). If the sound volume is low, check that the speaker (located on the back of the display unit) is not blocked or covered by something. To solve the problem, ensure that the sound can flow freely from the speaker. If everything is as described, but the problem persists, contact our tech support.

7. **Buttons on remote control are acting in wrong direction:** You probably have the remote control orientation set incorrectly. Go to menu “Display” and change the orientation setting of remote controller. This function is available only for GUI V3.6.2KN or higher. Older GUIs use a fixed remote control orientation. If you are using GUI V3.6.1KN or below, the remote control buttons are probably wired incorrectly. You can solve the problem by wiring them correctly according to the wiring diagram in section 2/a/ii of this installation and user manual.
8. **Cannot control the Dash7 by buttons on the remote controller:** Probably the display unit is not connected to the buttons or the buttons (or wires) are faulty. Check if the connector from remote controller (labeled CNTRL) is connected to the connector CNTRL on the back of the Display unit. Check the continuity between middle pin (pin7) of CNTRL connector on the display unit and vehicle ground (GND). Unplug CNTRL connector and check if there is a short circuit between middle pin (pin7) and other pins when you press buttons on the remote controller. If everything is as described, contact our tech support.
9. **GUI update does not start even if the microSD card is inserted in the display unit:** If microSD card is inserted correctly and after restarting the Dash7 starts normally (not on the white Update page), the microSD card is probably faulty or not properly formatted, not inserted correctly or the card does not have a valid GUI file (*.tft) or there are more than a one *.tft files on the microSD card. If the card is formatted FAT32, insert a card into the computer and check if there is a valid GUI *.tft file in the root directory. If not, format the card again (with FAT32) and then reload the tft file to the root directory of the card. Then try to upload GUI to the Dash7 again. If update does not start or “update failed” message will appear, try another SD card and repeat the whole process again. In rare cases, the SD card adapter may be faulty, but usually the problem is faulty or incorrectly inserted SD card. A correctly inserted card means that the microSD card is inserted in the adapter and the adapter is inserted into the display unit with the QR code facing the user. A click is heard when the adapter is inserted and the adapter remains locked in the holder. If everything is as described, but the problem persists, contact our tech support.
10. **GUI update failed (update failed message on the Update screen):** Probably faulty microSD card, try another card. Even if the card is working fine in PC, it can be faulty! If GUI update failed also on other SD cards, GUI file can be corrupted (very rare). Ask our tech support for a new file.
11. **Datalogger is not logging any data, LED on main unit only blink one time:** If the LED on the main unit is not flashing, it means that no data is being written to the SD card. LED blinks one time at startup during initialization, what only means that the data logger is powered up.
    Possible causes are:
    - No SD card inserted or inserted incorrectly. SD card must be inserted upside down and pushed until a click is heard and card remains locked in holder
    - SD card is write-protected. On the side of the SD card is a little switch which can lock the SD card against writing. Slide this switch to the unlocked position.
    - SD card is faulty or not formatted correctly to FAT32. Format the SD card to FAT32 or try another card.
    - Data logger is turned OFF or conditions for starting logging have not been reached. Go to menu “DATA LOG” and check if item “Start of SD card log” is set to “NEVER”. If so, change this setting according to when you want logging to start. You can set it to: “After power ON”, which start logging immediately after Dash7 is powered ON. Or you can set it to: “After engine start”, which start logging when engine RPM are higher than 0. Or you can set it to: “After Wheelspeed1 (or2) > 0“, which start logging when car speed is higher than zero. After changing these settings you must reboot the Dash7
    - No connection between the Dash7 and the ECU, or ECU is turned OFF. If no data is available from the ECU, the data logger does not log. Connect the ECU and turn it on. When data starts flowing from the ECU and logging conditions are reached, logging should start. You will see the icon LOG (or REC) in the corner of the screen and the LED on the main unit will flash fast.

    If you have followed all the steps described above and the problem persists, please contact our tech support.

12. **Alarms occurs even if the sensor for the given measurand is not used:** This can especially happen when the sensor for a particular channel is not connected (channel is not in use), because a disconnected sensor usually means that the input reading will reach its upper or lowest level (eg. -40°C or +155°C). This value is

usually outside safe thresholds and should normally trigger an alarm (because this feature is commonly used to warn the driver that a connected sensor is faulty or has been accidentally disconnected). A false alarm can also occur if ECU was disconnected and reconnected or if data from ECU are corrupted (eg. very low voltage during cranking, etc). If you want to avoid unwanted alarms from not used channel, solution is to set the thresholds for that measurand to the values which cannot be reached even with disconnected sensor. If this is not possible for some reason, you can recalibrate the input channel (change upper and lower values to any safe values, eg. 5V = 30°C and 0V = 40°C). Last way (usually not necessary) is connectiong some resistor (eg. 2.7kOhm) between the input and GND (or +5V) what set the measurand to a fix value.

13. **When I connect a laptop to the ECU and disconnect a Dash7, it stops to display data. Can I have connected both, PC and Dash7 to the ECU at the same time? :** Yes, you can have connected your laptop to the Vems ECU, and at the same time you can watch all data on the Dash7, but you must to use an adapter "Tuning cable" which is available in our shop. This adapter allows you simultaneously tune your ECU (or log data to the PC) and display all data and alarms (or also log data to the SD card) on the Dash7. Without this adapter you can have connected only one device to your ECU RS232 port at the same time (laptop or Dash7). The correct connection of the Tuning cable is: Connect the male RS232 connector of the Tuning cable (usually labeled "ECU") to the ECU's RS232 connector (make sure it is the first serial connector, as some Vems ECUs may have multiple serial connectors and the second serial connector or LCD connector will not work!). Then connect the white female RS232 connector of Tuning cable (usually labeled PC) to a computer's serial port (or via an RS232-USB adapter to a computer's USB port). Then connect a blue RS232 female connector of the Tuning cable (usually labeled DASH) to the Dash7's RS232 male connector.
14. **Tuning cable is connected, but not working as expected:** There are usually 3 possible problems with a communication via Tuning cable:
    - **Tuning cable is connected, but I can see the data only on the Dash7 and the VemsTune can't detect the ECU.** You have probably swapped the female connectors of the Tuning cable or tuning cable is not properly connected to the PC or your RS232-USB adapter is not working or wrong port selected in the VemsTune. Connect the white female RS232 connector of Tuning cable (usually labeled PC) to a computer's serial port (or via an RS232-USB adapter to a computer's USB port). Then connect a blue RS232 female connector of the Tuning cable (usually labeled DASH) to the Dash7's RS232 male connector. Open the VemsTune, click on the "ECU icon" and then click on "Detect". It should detect the USB port where the ECU is connected. If not working this way, try to swap the female connectors of the Tuning cable and try again (in very very rare cases connectors could be labeled wrong, but it is highly improbable). If problem persists, try another RS232-USB adapter (if possible) or try another Tuning cable. If you have followed all the steps correctly but still the problem persists, please contact our technical support.
    - **Tuning cable is connected, but I can see the data only in VemsTune and the Dash7 do not display data from ECU.** Probably the Tuning cable is not properly connected to the Dash7 or Tuning cable (and/or Dash7's serial cable) is faulty or Dash7 is not initialized correctly. Check the connections (blue RS232 female connector of the Tuning cable, usually labeled "DASH" must be properly connected to the Dash7's RS232 male connector) and try to restart the Dash7 and the ECU. If the problem persists, try to unconnect the Tuning cable and connect the Dash7 directly to the ECU. If Dash7 is displaying the data from ECU this way and via Tuning cable is not, probably your tuning cable is faulty. Please contact our technical support.
    - **Tuning cable is connected, but I can't see any data on the Dash7, even in the VemsTune.** With the Tuning cable connected, you can only see the data on the Dash7 when the VemsTune is connected and communicating with the ECU. If the problem occurs, probably the ECU is not powered ON or the VemsTune is not communicating with the ECU, or the ECU serial port is faulty or not properly connected to the Tuning cable or Tuning cable is faulty. First of all, check again all connections and make sure that the Tuning cable is connected as described above. If ECU is not powered ON, turn it ON, let it to connect to the VemsTune and see if this solve the problem. If problem persists, open the VemsTune, click on the "ECU icon" and then click on "Detect". It should detect the USB port where the ECU is connected and start communicating with the ECU. If ECU is not detected in VemsTune, unplug the Tuning cable and try to connect the ECU to the PC directly. If communication between

ECU and VemsTune works this way, probably your Tuning cable is faulty. If problem persists, contact our technical support.

15. **When I was burning data to the ECU via Vemstune, sometimes I got OnScreen Warning message on the Dash7 (with Tuning cable connected):** This is normal and it can't be completely eliminated. Usually it is a trigger error warning message. It happens because on a short moment when Vemstune is burning data into the Vems ECU, the data sent from the ECU to the Dash7 is corrupted. Ignore these messages during data burning.
16. **Date and Time displayed on the screen is incorrect:** The real-time clock (RTC) battery is probably not installed or dead. There is a rubber protective cover on the back of the display unit. Under this cover is the RTC battery holder. Check that the CR1220 battery is correctly installed in the holder. The battery must be fully inserted and the "+" mark must be visible on the battery. If there is no battery, install a new CR1220 battery in the holder. If there is a battery, but the wrong type or incorrectly installed, remove this battery and insert a new CR1220 battery in the correct way. If the CR1220 battery is installed correctly, but the time and date are incorrect after the Dash7 restarts, the battery is probably dead and you need to replace it with a new one. A very small screwdriver or small extraction tool is usually required to remove the old battery from the holder. With extraction tool gently push the lock that holds the battery in the holder and the battery will pop out of the holder. Then rotate the display unit until the battery falls out of the battery slot. When installing a new battery, it is sometimes necessary to first gently move the lock to its original position, then insert the new battery (positive side UP) and gently push the battery into the holder until you hear a click and the battery stays locked in place.
17. **Configurable Input of the Dash7 do not work properly like analog input for temperature or pressure:** Probably this input is now configured as a digital input for the neutral gear switch. To use the configurable input as an analog input, you must go to the "Gauges" menu and set the "Neutral Gear Channel" to "OFF". It disables neutral gear sensing and allows you to now use this configurable input as an analog input for temperature or pressure. A reboot of Dash7 may be required after changing these settings (this function is available only for firmware V7.3.3 and GUI V3.6.2KN or higher).
18. **Speed 1 or Speed 2 gauge still shows 0 kmh or mph even if car moves:** You probably don't have a wheel speed sensor connected to the wheel speed input of the Vems ECU, or the sensor is not properly calibrated or faulty or installed incorrectly. Calibration of the wheel speed sensor must be performed in the Vems ECU via Vemstune software. The Dash7 only reads wheel speed values from the ECU and therefore no configuration is required in the Dash7.
19. **Gear gauge still shows "N" or "R" even when another gear is engaged:** Probably Reverse gear input is shorted to +12V or Neutral gear input (Dash7 configurable input) is shorted to ground or his voltage is under 3 Volts. It could be a wiring problem or faulty switch. Check function of reversing lights switch on the gearbox. If faulty, change the switch, if not, check your wiring for short-circuits or bad grounds. Same with the Neutral gear switch (connected to the Dash7 Configurable input pin). Check if you are not using Configurable input pin for another purpose (pin connected to the pressure or temperature sensor, etc…). If yes, you need to go to the "Gauges" menu and set the "Neutral Gear Channel" to "OFF". It disables neutral gear sensing and allows you to use this Configurable input as an analog input for temperature or pressure. A reboot of Dash7 may be required after changing these settings (this function is available only for firmware V7.3.3 and GUI V3.6.2KN or higher). If your Neutral gear input is not connected to the harness (not in use) and the Gear gauge shows "N" (very rare case), you can try to add some pull-up resistor (eg. 2.7kOhm) between the input pin (C4) and +5V sensors supply pin (A1). This is not necessary with the Sn2113 or higher, where the pull-up resistor is already installed inside the Main unit. If you have followed all the steps described above and the problem persists, please contact our tech support.
20. **Oil/Fuel Press or Oil/Fuel Temp gauge in Dash7 is showing different values than in Vemstune:** Probably your Pressure or Temperature channels in the Dash7 are not calibrated correctly. You need to go to the "Gauges" menu and select the "Press channels calibration" or "Temp channels calibration" button. Then if you press the OK button on the remote control, you will be taken to the calibration pages, where you can set a source channel for that pressure or temperature gauge and calibrate them. As a source you need to select the ECU analog channel to which your sensor is wired. Then enter the voltage and pressure (or temperature) values depending on the sensor manufacturer's datasheet (or Vemstune data). If everything is set correctly, exit the menu and you should see the correct value on your pressure or temperature gauges.

Warranty

Factory standard limited warranty is 24 months from the date of delivery.

Warranty covers manufacturing defects and damages created during production or packaging. Warranty does not cover the damage of the device by over-current, over-heating, over-voltage, under-voltage of the device and its inputs, also does not cover any mechanical, electrical or electro-static damages made by consumer or third parties, or by natural disasters, damages caused by moisture or liquids entering the device (device and it's accessories are not waterproof or water resistant!), damages made by improper installation, extreme conditions, improper usage of the device, wear or by the car accident. Dash7 is product which requires professional installation by an experienced technician. Failure to do so may void the warranty. Warranty also does not cover damages or defects created during shipping.
Warranty is also void if the Warranty seals have been broken, if anyone has opened or modified the device or its accessories!

All warranty repairs or modifications must be performed by the manufacturer or its authorized service, otherwise the product will void the warranty.

WARNING! Product is not designed for using on public roads!

WARRANTY CARD

Stamp and signature of the workshop that installed this device

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Date of installation

Vehicle: Mark, Model, VIN, Year

Dash7 Serial number

All information in this manual is for informational purposes only, may not be considered immutable and the manufacturer reserves the right to change these informations or device specifications at any time without prior notice.

The manufacturer is not liable for any damage caused by improper use, improper connection, improper installation or modification of the device.

The information in this manual must not be considered binding and the installation must be carried out by a professionally trained person trained in working with automotive electronics and electronic devices.

This manual is valid for 2021 and 2022 Spec devices only (HW21 and HW22).

This is the 5th revision of this documentation, published 5/2023.