

FanControl-U2

Technical manual

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1. Description of the module

Module FanControl-U2 is designed for operation in the following vehicles:

- Audi A3 (2013--), A6 (2011--), A7, A8 (2010--), Q5, Q7 (2011--), Q3, A5, Q7 (2015), TT (2015), Audi Q5 (2017--), Audi A5 Coupe (2017--), Audi A5 Sportback (2017--), Audi A4 (2015--), Audi A6 (2019--), A7 (2018--), A8 (2018--), Q8 (2018--)
- BMW 1 (F20), 3 (F30), 5 (F10), 6 (F13), 7 (F01, F02), X3 (F25), X1 (E84), 3 (E90), X5 (E70), X5 (F15), X6 (E71), 6 (E63, E64), X4 (F26), X6 (F16), X1 (F48); 7 (G11, G12); 5 (G30)
- Mini Cooper (2014--), Countryman (F60) 2017--
- Land Rover Range Rover Vogue (2013), Range Rover Vogue (2014--), Range Rover Sport (2014--), Discovery 4, Discovery Sport (2015), Evoque (2011--), Freelander 2 (2013--)
- Mercedes-Benz 463 (2013--), 447, 222, 221, 218, 216, 212, 207, 205, 204, 176, 166, 156, 211, 219, 164 (ML, GL), 251, 463, 203, 169, 639 (2003-2010), 639 (2010-2014), 906, 292 (GLE), 217, 253 (GLC), 257
- Porsche Cayenne (2011--), Macan, Panamera (2009)
- Skoda Octavia 3; Skoda Octavia 2, Superb (2009--)
- Volkswagen Touareg (2011--), Touareg (2006-2010), Amarok, Multivan T5 (2003-2009), Multivan T5 (2010--), Passat B6, Passat B7, Passat CC, Golf 5, Golf Plus, Jetta (2006--), Caddy (2004--), Touaran, Tiguan, Golf 7, Crafter, Multivan T6 (2015), Multivan T6 (2016--), VW Amarok (2017--), VW Caddy (2017--), VW Crafter (2017--), Porsche Cayenne (2018--), Porsche Panamera (2017--), VW Touareg (2018--), VW Touareg (2018--)
- Seat Altea (2004--), Leon (2006--)
- Volvo XC 60 (2008-2010), XC 60 (2011--), XC 70 (2012--), XC 90 (2005-2014)
- Infinity QX 30 2016; QX 30 2017; QX 30 2018



You can find connection manuals at www.tecel.ru/en/ or www.canbus-alarm.com.

The module allows implementing the following functions:

1. Activation of vehicle's climatic system.



Figure 1. Package

2. Activation of vehicle's factory heater.
3. Activation of heater and the climatic system for engine and interior warm-up using vehicle's factory button or factory remote control.
4. Control of Webasto Thermo Top C, Evo 5, Eberspächer D5WS heaters via digital bus.
5. Support of heat-assistance mode.

2. Connection and configuration of the module

Module pins designation is described in the Table 1 "Module connector pins designation", and connector pins enumeration – in Figure 2.

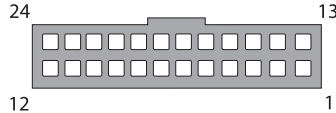


Figure 2. Connector pins enumeration. View from the harness side

Table 1. Module connector pins designation

Pin	Wire color	Type	Designation	Current mA
1	Black	Power	Ground	–
2	Yellow/black Yellow	TP-Bus	Digital bus for CheckControl	–
3	Grey/green	LIN 1	Serial data bus	–
4	Grey/blue	LIN 2	Serial data bus	–
5	Blue/yellow	Digital bus	Special bus for controlling Webasto Thermo Top C, Evo5, Eberspacher D5WS heaters Can be used for control of aftermarket heaters and, in specific cases, for factory heaters.	–
6-7	–	–	–	–
8	Orange/green		LED (+)	–
9	Blue	Input (-)	External input for module control (trigger negative control)	–
10	Green			–
11	Pink/black	Input (+)	External input for module control (status positive control)	–
12	Orange/white			–
13	Red	Power	+12 V	–
14	Yellow/red	Output (+)	There is a positive signal during FanControl operation	150 mA
15	Green/black	Output (-)	There is a negative signal during FanControl operation	150 mA
16	Brown/red	CAN 1	Vehicle CAN-H data bus	–
17	Brown	CAN 1	Vehicle CAN-L data bus	–
18	Brown/yellow	CAN 2	Vehicle CAN-H data bus	–
19	Brown	CAN 2	Vehicle CAN-L data bus	–
20	Brown/green	CAN 3	Vehicle CAN-H data bus	–
21	Brown	CAN 3	Vehicle CAN-L data bus	–
22-24	–	–	–	–

The Module shall be powered from one of vehicle's wires with +12 V unswitched voltage.

Before installation



- Carefully read this technical description
- Check whether the module is compatible with the designated vehicle and make sure that the required functions are supported by the module.

Module programming

The module is equipped with a micro-USB port which is used for connection of the module to a PC via a micro-USB cable allowing to carry out programming and adjusting various settings of the module by means of a special software which is called TECPROG (available for download at www.tecel.ru/en/ or www.canbus-alarm.com). The software allows to program the module without additional devices, quickly update the firmware, set a required vehicle model, activate the auxiliary heater mode if desired, set up the module operation time, etc. The programming can also be carried out either with a programming button – one of the vehicle's interior buttons (the information on which button is used on a particular vehicle is available at www.tecel.ru/en/ website), or with the built-in button (figure 3).













Figure 3. FanControl-U2 module

Operation mode indication

Indication is performed by means of the LED indicator. There are the following LED operation modes:


Table 2. LED indication

LED	Reason
Constantly on	Module is switched on
Off	The module is switched off
 x2	Low voltage shut-down
 x4 at startup	Heater error
Constant flashes	Group-sugroup was not set
Constant group-subgroup identification	CAN was not identified
Indication when connected via W-BUS/Eberspächer protocol:	
 x1 pause  x1	Switched off due to absence of communication or according to the standard algorithm.
 x1 pause  x2	Low voltage shut-down of the heater (registered by the heater)
 x1 pause  x3	Flame failure (only for Webasto)
 x1 pause  x4	Unknown error

Vehicle Identification

Identification is performed via TECPROG software or manually by using the built-in button.

Description of manual identification using of the built-in button:



-  CAN bus should not be connected prior to implementation of the identification procedure.
1. Power up the module. Wait for LED to star blinking.
 2. Press the built-in button 4 times. The LED will flash 4 times (or will indicate programmed group-subgroup) and will stay lit.
 3. Enter a group number by the built-in button. After a short pause (1.5 second) the LED shall indicate the entered number.
 4. If group number consists of 2 digits – enter first digit, wait for indication, then enter second digit and wait for indication
 5. Enter a subgroup number. After a short pause (1.5 second) the LED shall indicate the entered number. After a pause (about 4 seconds) the LED shall indicate the entered number (group and subgroup) as a sequence of digits.
 6. If a group and subgroup are entered correctly, press the built-in button one time, or two times, if there was an error.
 7. If the input data is correct (such model exists) the LED will blink 4 times and the unit will reboot.
 8. If the input data is wrong, the LED will light up for 15 seconds, expecting new group-subgroup. If within 15 seconds there was no data entry – module will leave programming mode.

Connection to CAN bus

Connection types

There are two types of module connection to CAN bus:

- Parallel connection. It is used to control factory heaters. CAN 1 pair is used for parallel connection in all vehicles.
- Connection by cutting into CAN-bus. It is used to control factory heaters and the climatic system.

-  In case of series connection CAN 1 pair is connected from the vehicle's side, and from the side of a climatic system, CAN 2 or CAN 3 depending on vehicle model.
-  For description of FanControl-U2 module connection in specific vehicles and operational-features with respect to different vehicles please visit www.tecel.ru/en/ website.

Module control


The module can be controlled:


- By the factory vehicle button (for information on which button is used for a particular vehicle – see www.tecel.ru/en/ or www.canbus-alarm.com website)
- By the factory remote control
- By additionally installed devices through external input (GSM module, auxiliary car alarm etc.).

Module control by the factory vehicle button

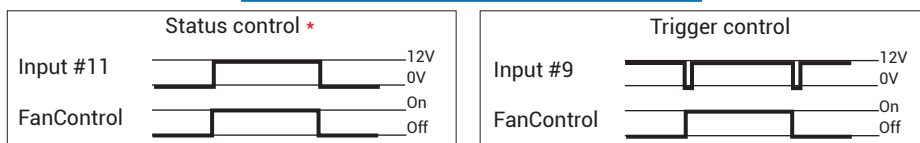
Module activation/deactivation is performed by a long (not less than 2 seconds) pressing of a certain factory button.

Module control by the vehicle factory remote control

Activation of the module is performed by triple pressing on the locking button  not less than 15 seconds after the vehicle alarm is armed.

Deactivation of the module is performed by triple pressing on the unlocking button . Pause between pressing on the button should be ~ 3 seconds.

Switch the module on/off with the external input



* To restart the module via input #11 it is necessary to switch off the "status" signal and then activate it again.

Programming sequence

1. Choose required option in table 3. Then press PB amount of times corresponding to menu code. LED will inform you about it's state.
2. Change option state. To do so press PB required amount of times, required to change the option value to the chosen one. Mind that the first value, goes after last value.

System will leave programming mode and save all changes after turning off the ignition or after 15 seconds after last button press. LED will flash 4 times if settings are saved successfully or 1 time if there is an error during save.

Table 3. System setup

Menu	Menu code	Factory default	Note
Protocol W-BUS/Eberspächer	6	1	Set automatically. Choose by hand if required. 1 – Automatic identification; 2 – Webasto; 3 – Eberspächer; 4 – Protocol control is forbidden; 5 – Factory Webasto heater alternative protocol for VAG; 6 – Factory Webasto heater for RR Evoque (2011-2013); 7 – Factory Eberspächer for RR Evoque (2011-2013)/Sport (2014-2015); 8 – Factory Eberspächer for Toyota; 9 – Factory Eberspächer for RR Sport (2016)
The vehicle battery voltage level for automatic system shut down	11	9	1 – 10,5 V; ... 9 – 11,3 V; ... 11 – 11,5 V
Heater operation time	10	3	1–10 min; 2–20 min; 3–30 min; ... 12–120 min
Supplementary (auxiliary) heater mode	12	2	If outside temperature is lower 5°C – an aftermarket heater will start automatically. If outside temperature increases to 12°C – heater will turn off. 1 – on; 2 – off
Climate sytem control algorithm	14	1	1 – standard; 2 – alternate algorithm №1*; 3 – alternate algorithm №2*; 4 – alternate algorithm №3*
Aftermarket heater temperature limiter*	15	1	1 – disabled; 2 – 71°C; 3 – 73°C; ... 9 – 85°C
Climate control setup*	20	1	1 – enabled; 2 – disabled
Climatic system settings	24	1	1 – Activation immediately after a heater is turned on 2 – Delayed activation after a heater is turned on 3 – Activation by temperature 4 – Activation after a delay or by temperature (depending on what comes first) 5 – Climatic system inactive

Menu	Menu code	Factory default	Note
Delay prior to climatic system activation	26	2	1 – 5 min; 2 – 10 min; 3 – 15 min; 4 – 20 min; 5 – 25 min; 6 – 30 min
Engine temperature to activate the climate system	28	2	1 – 30°C; 2 – 40°C; 3 – 50°C; 4 – 60°C; 5 – 70°C; 6 – 80°C;
Output №14 adjustment	30	1	1 – Heater operation (status). The output generates a constant level signal while a heater is running (If it is activated with FanControl); 2 – Control of recirculating pump. The output generates a constant level signal while the engine heater is running and also within 2 minutes after the heater is deactivated. The signal is formed if the heater is activated with FanControl. 3 – Interior ventilation running (status). The output generates a constant level while the ventilation is running (If it is activated with FanControl). 4 – The ignition imitation. The output generates a pulse signal during 5 sec. The output stops generating the signal earlier if the FanControl module detects that the ignition has been turned OFF or the heater has shutdown. 5 – Auxiliary air heaters control. The output generates a constant level signal if the engine heater is turned ON. The output stops generating the signal if the engine heater is turned OFF. The output doesn't generate any signal if the auxiliary heater mode is activated. 6 – Cooling system loop-switching valve control. The output generates a constant level signal after the engine heater is turned ON. The output stops generating the signal in 20 minutes after the engine heater has been turned off. If the engine has been started before 20 minutes expire – the signal will vanish in 5 minutes. If the engine has been shut down before 5 minutes expire – the module will continue generating the signal for 20 minutes.
Output №15 adjustment	32		
Engine heater automatic shutdown	44	2	1 – After the driver's door is opened or the brake pedal is pressed. 2 – After the ignition is turned ON.

* Used only in special cases. Check documentation to see which vehicles require these settings (www.tecel.ru/en/).

** Sensor is installed if there is no data in the CAN-bus.

Heater operation time

This option (table 3 option №10) allows to setup the module operation time (from 10 to 120 min. with 10 min. intervals). Programming is performed with the programming button (vehicle's OEM button or the built-in one).

To be able to check or change the value of this option - switch the vehicle's ignition ON, no later than in 10 seconds after turning the ignition ON press the programming button 10 times, wait until the module indicates the option status by the corresponding number of LED flashes (from 1 to 12). To change the time interval, enter a desired value by pressing the programming button the number of times required to advance from the current value to a desired one.

The default value is 3 (30 minutes). To exit the programming mode turn off the ignition or wait for 30 seconds after the last press on the programming button was made.



The value of this option is ignored if the module is controlled via the status external control input №11 (pink/black). The module remains activated until the signal is present at the input, but for no longer than 120 minutes.

Auxiliary heater mode

In this mode an aftermarket self-contained heater operates according to the algorithms of an OEM auxiliary engine heater: if the ambient temperature is below 5°C, the module will automatically switch into the auxiliary heating mode. If the ambient temperature rises above 12 °C, the heater will switch off automatically.

To activate/deactivate the auxiliary heating mode switch the vehicle's ignition ON and press the programming button 12 times (a standard button or the built-in one). The module shall indicate the option №12 "Auxiliary heater mode" status (refer to the table 3 "System setup") as follows:

- 1 LED flash – the auxiliary heater mode is ON;
- 2 LED flashes – the auxiliary heater mode OFF (the default value).

W-BUS/Eberspächer protocol selection

In most cases, the protocol is assigned automatically when you connect the system to a heater. Manual selection of the protocol is required in exceptional cases. Programming is performed only by the built-in button (see Figure 2). In order to select a protocol switch the ignition on, press the programming button 6 times. The module shall inform about the item status by series of flashes:

- 1 signal – protocol is not set (factory settings).
- 2 signals – W-BUS.
- 3 signals – Eberspächer
- 4 signals – control is disabled.

Change item status by pressing the programming button as many times as it is required. The module exits programming mode in 15 seconds after the last button-pressing. Upon successful saving of settings, the LED would flash 4 times; 1 long flash means an error.

Set heat-up temperature limit for aftermarket heater

This option is used with some vehicles in exceptional cases. You may find recommendation to use it in the corresponding manual (check www.tecel.ru/en/ or www.canbus-alarm for latest manuals).

To change this option press programming button 15 times. Module will inform about its state with series of LED flashes:

- 1 flash – off (factory default)
- 2 flashes – 71°C
- 3 flashes – 73°C
- 4 flashes – 75°C
- 5 flashes – 77°C
- 6 flashes – 79°C
- 7 flashes – 81°C
- 8 flashes – 83°C
- 9 flashes – 85°C.

3. Restoring default settings

The following steps are required to reset to default settings:

1. Power the unit off.
 2. Press the built-in button
 3. Power on. While holding the button wait until the LED starts to flash.
 4. Release the button and wait until the LED stops flashing.
- Technical data and operating conditions

Table 4. Package contents

Name	Value
Supply voltage, V	9 ... 15
Maximum current draw in operating mode, mA	200
Maximum current draw in standby mode, mA	2,5
Temperature, °C	- 40 ... + 85
Maximum relative humidity, %	95

Table 5. Package contents

Name	Number, pcs.
Central unit	1
Wire harness with connector	1
LED indicator	1
Enclosure TEC-0500	1
Technical description	1
Packaging	1

Product warranty period is 3 years from the date of purchase if installed according to the instructions. Please contact your vendor if you wish to make a warranty claim.

Seller _____ Date of purchase _____



Manufactured by TEC electronics

The product is manufactured according to Technical Specification 4372-006-78025716-10.