Autoplugin GSM Kit-V1R

Version 7.3

Technical Description
Installation Manual

Rev. A

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Description

The **Autoplugin GSM Kit-V1R** is intended for remote control of the fuel-fired heater (parking heater, fuel operated heater, pre-heater), factory installed on **Volvo S60** (2005-2010), **V70** (2005-2007), **XC70** (2005-2007) or **XC90** (2005-2014). The kit includes 2 modules: **GSM** module and **Autoplugin RCP-V1R** module. GSM module receives commands from user's phone or smartphone and sends them to the RCP module, which controls the heater via CAN-bus.

Possibilities

- Heater remote control using SMS or via specialized application Therminal for Android (4.1 and higher) based smartphones
- Feedback about heater startup, stop and errors by SMS/ in Therminal
- Embedded remote control of the heater with the car's remote control key
- Main battery protection from discharging by inspecting voltage level and time of autonomous operation of the heater
- Plug-n-play or permanent connection

Package Content

1. GSM module
2. Autoplugin RCP-V1R module, special version (0102-1115)
3. Interconnection cable
4. Permanent connection cable
5. Plug-n-play cable
6. Technical Description and Installation Manual brochure

7. User Manual brochure

Basic Functions

1. Refer to the **User Manual** to control the heater using mobile phone or smartphone.
2. A special combination of buttons presses is used to start the heater with the remote control key. Firstly press yellow button on the key to switch on the car's perimeter lighting. Then press "Lock" button twice within 30 seconds, while lighting is on. Every "Lock" button's pressing is confirmed with direction indicators flashing.
3. To stop the heater with the remote control key, switch on and then switch off car's perimeter lighting twice. Intervals between yellow button presses should not exceed 20 seconds.
4. It is possible remotely disable startups of the heater, programmed in the CIP. Use remote control key to send stop command when the heater is idle. Starting the heater any way or turning the ignition to "on" position enables CIP timers again.
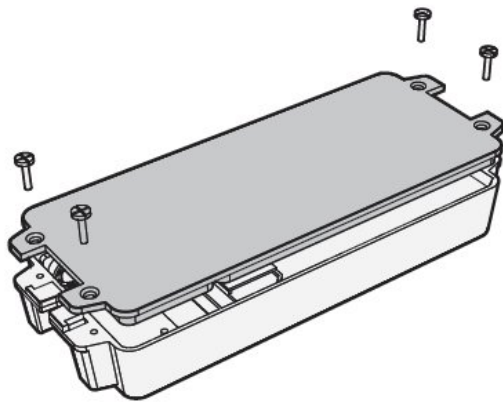
Connection

RCP module needs that 2 timers and direct start / stop function for the heater control are present in CIP. Therefore it may be necessary to load software to CIP by Volvo dealer's equipment.

GSM module is supplied without SIM card inside. The customer should buy a SIM card with subscription to the local GSM provider services. Make some operations with SIM before installation to the GSM module:

1. Insert SIM to a phone or smartphone and disable PIN code acquire
2. Send test SMS to another phone or smartphone and check that it successfully received

It is recommended to select tariffs with non-expensive SMS traffic. Combine phone account with GSM module account if possible.
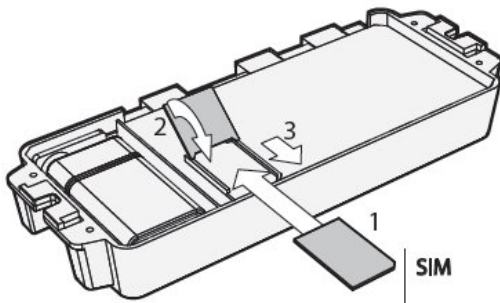
Open the case of GSM-module and install SIM card, as shown at the picture 1. Use the screwdriver from the package to remove screws. Install battery (LR6, 9V) into the GSM-module right before connecting of GSM-module.
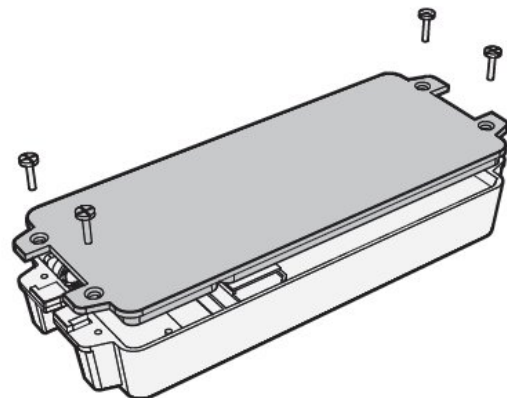
1. Unscrew the bottom
of body
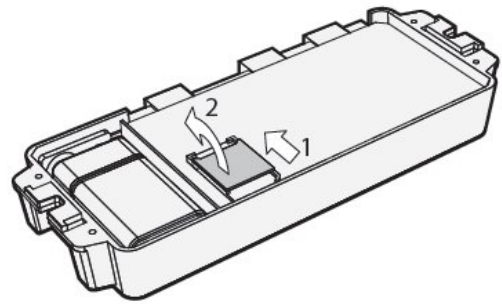
2. Slide the tray of SIM holder
to OPEN position, lift the tray

SIM

3. Insert SIM to the holder, lower the tray
and slide the tray to CLOSE position

4. Screw the bottom of body

Figure 1

Plug-n-Play Connection

This type of connection uses OBD-II service connector. It placed at the left lowest point of the dashboard. Open the case of the service connector (if applicable). Take interconnection cable and connect RCP and GSM modules together. Only highlighted at the figure 2 connectors are used. Take Plug-n-Play cable and connect it to interconnection cable. Find a place inside the dashboard for the modules. RCP and GSM modules can be joined to the packet using double-sided adhesive tape (see fig. 2). Secure packet of modules inside the dashboard with straps. If modules are placed separately, RCP module can be fixed with adhesive tape, and GSM module can be fixed with straps. Pay attention that internal antenna of GSM module (marked by dashes at the figure 2) doesn't stay close to metal parts of the dashboard. Shorten Plug-n-Play cable by straps and fix all the cables of

kit inside the dashboard. Finally connect Plug-n-Play cable to the OBD-II service connector.
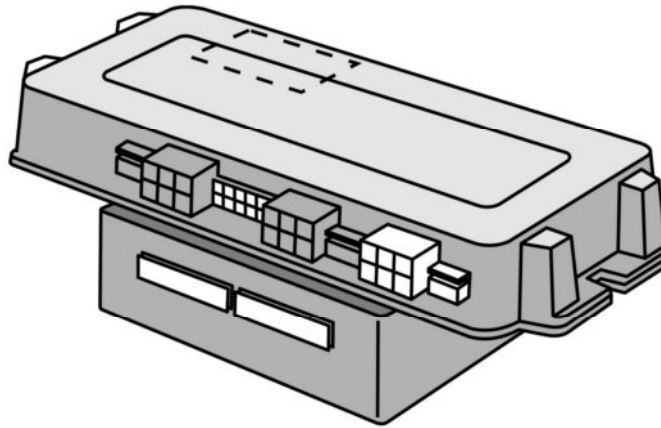
Figure 2

Permanent connection

It is recommended to install Autoplugin GSM kit permanently under the dashboard.
Take interconnection cable and connect RCP and GSM modules together. Only the connectors highlighted at the figure 2 are used. Take permanent connection cable and connect it to interconnection cable.

Table 1. Permanent connection cable's description

Permanent cable's pin number	Wire colour	Signal	Connection point
1	Black	Ground	Connects to a terminal where permanent negative potential of the battery is present (ex. to the black-white wire of the service connector, pin 4).
3	Red	Battery +	Connects to a terminal where permanent positive potential of the battery is present (ex. to the orange wire of the service connector, pin 16)
4	Yellow	CAN-L	Connects to the green wire of LOSPEED CAN-bus (ex. to the service connector's pin 11),
6	Orange	CAN-H	Connects to the white wire of LOSPEED LOSPEED CAN-bus (ex. to the service connector's pin 3).

Find a place for modules inside the dashboard. RCP and GSM modules can be joined to the packet using double-sided adhesive tape (see fig. 2). Secure packet of modules inside the dashboard with straps. If modules are placed separately, RCP module can be fixed with adhesive tape, and GSM module can be fixed with straps. Pay attention that internal antenna of GSM module (marked by dashes at figure 2) doesn't stay close to metal parts of the dashboard. Connect LED to the GSM module (instead of connector with single blue wire of permanent connection cable) and fix it at the place where it stays visible.

Shorten wires of permanent connection cable by place, as required. Temporary unplug permanent connection cable from interconnection cable. Connect free ends of permanent connection cable to the car's wiring in accordance with the table 1. Use quick splice connectors for wires connection.

Plug-in permanent connection cable to interconnection cable again. Fix cables to the car's wiring with straps.

The RCP Module's Additional Functions

By default RCP performs basic functions, such as start and stop of the heater using the remote control key. To turn on additional functions such as battery monitoring, flashing with direction indicators in the rearview mirrors, etc. enter the module into Setup mode and activate the corresponding setup item (see settings table 2).

The buttons of the left-hand stalk switch and the brakes pedal are used to enter Setup mode and to the settings change. It is necessary to stop the engine and the heater before. Turn the ignition on, press and hold the brakes pedal. Rotate the thumbwheel to turn off the display in the CIP. Then press and hold for at least 5 seconds "OK" button, while module's LED flashes once a second. Both direction indicators in the CIP confirm entering to the setup mode with 2 flashes. Release the brakes pedal and "OK" button finally.

Each setup item in the settings table is a 3-digit code. To enter a digit of a code, shortly press "RESET" button so much times, as corresponds to a digit. The LED and the direction indicators symbols in the CIP confirm each button press: the LED briefly goes off, the left direction indicator flashes one time when the first or the third digit of code is entered, the right direction indicator - when the second digit of code is entered. To complete a digit entering, press and release "OK" button. The CIP confirms it with one flash of both direction indicators simultaneously. When all three digits entered, the module checks the code for validity and confirms it with the direction indicators flashing. The both direction indicators flash twice simultaneously in case of valid code and flash twice alternately in case of invalid code.

If entered digit is not correct, press and release "OK" button until the module indicates an error. Enter the code once more in that case. Several codes can be entered without exit of setup mode.

Turn the ignition off to exit setup mode. New settings are saved in the nonvolatile memory of the module and stored there regardless of whether the module is connected or not. **Attention:** If you start the engine without exit Setup mode, new settings will not be saved in memory.

To reset the module to the factory settings, enter the code 8.1.1. Both direction indicators in the CIP should flash three times, confirming command execution. Then the module exits Setup mode and restarts.

* Factory setting
Recommended settings marked in Italics

Settings Table (2)

Settings Group	Setting	Possible Values
1. Heater Timing	**1.1.** Limitation of heater total operational time in pre-heat mode	**1.1.1** Not adjusted **1.1.2** 40 minutes **1.1.3** 50 minutes **1.1.4** 60 minutes **1.1.5** *70 minutes* **1.1.6** 80 minutes **1.1.7** 90 minutes **1.1.8** 100 minutes **1.1.9** 120 minutes
	1.2. Limitation of heater 1-cycle operational time in pre-heat mode	**1.2.1** 10 minutes **1.2.2** 15 minutes **1.2.3** 20 minutes **1.2.4** 25 minutes **1.2.5** 30 minutes **1.2.6** 40 minutes **1.2.7** 50 minutes **1.2.8** 60 minutes **1.2.9** *70 minutes*
2. Heater control with remote control key	**2.1.** "Lock" and "Yellow" button functions for the heater control	**2.1.1** *"Lock" button to the heater startup, yellow button to the heater stop **2.1.2** Yellow button to the heater startup, "Lock" button to the heater stop
	2.2. Number of sequential turning on and then turning off the perimeter lighting by "Yellow" button for heater control	**2.2.1** Heater control by "Yellow" button disabled **2.2.2** Two times **2.2.3** Three times **2.2.4** *Four times*

	2.3. Number of sequential "Lock" button presses for the heater control (with the perimeter lighting turned on)	**2.3.1** Heater control by "Lock" button disabled **2.3.2** Two presses **2.3.3** Three presses **2.3.4** *Four presses*
3. Battery Monitoring	**3.1.** Minimal battery voltage that lets the module start the heater in pre-heat mode	**3.1.1** * Not adjusted **3.1.2** 11.8V **3.1.3** 11.8V **3.1.4** 11.9V **3.1.5** *12.0V* **3.1.6** 12.1V **3.1.7** 12.2V **3.1.8** 12.3V **3.1.9** 12.4V
	3.2. Minimal battery voltage that lets the module keep operating the heater in pre-heat mode [2]	**3.2.1** * Not adjusted **3.2.2** 11.4V **3.2.3** 11.5V **3.2.4** 11.6V **3.2.5** *11.7V* **3.2.6** 11.8V **3.2.7** 11.9V **3.2.8** 12.0V
6. Indication of heater status by using car's lighting and direction indicators in rearview mirrors	**6.1.** Indication of heater startup	**6.1.1** *Off (only switching off the lighting) **6.1.2** Switch the lighting on for 1 sec **6.1.3** Switch the lighting on for 2 sec **6.1.4** Switch the lighting on for 3 sec **6.1.5** Switch the lighting on for 5 sec **6.1.6** Switch the lighting on for 7 sec **6.1.7** Switch the lighting on for 10 sec
	6.2. Indication of heater stop	**6.2.1** *Off (only switching off the lighting) **6.2.2** Switch the lighting on for 1 sec **6.2.3** Switch the lighting on for 2 sec **6.2.4** Switch the lighting on for 3 sec **6.2.5** Switch the lighting on for 5 sec **6.2.6** Switch the lighting on for 7 sec **6.2.7** Switch the lighting on for 10 sec
7. Notifications	**7.3.** Send SMS «ALARM Trunk or Hood»	**7.3.7** *When the heater has not started or shut down during operation (i.e. error occurred with the heater) **7.3.8** Do not send

	7.4. Send SMS «ALARM Doors»	**7.4.2** *When the heater has finished operation with no errors or when the engine has been run during the heater operation **7.4.8** Do not send
8. Service menu	**8.1.** Default Settings	**8.1.1** Apply default settings

* Factory setting
Recommended settings marked in italics

[1] –RCP turns off the heater if the battery voltage becomes lower than preset
[2]- Notifications are needed for Therminal operation. If user sends SMS manually, notifications may be turned off by the means of RCP settings 7.3.8 and 7.4.8, or via settings of GSM modem (see User Manual for details).

Troubleshooting

If a run-time error occurs during heater operation, RCP module informs about the error code with LED flashing. In case when Plug-n-Play cable is used for connection, additional red LED is placed inside the housing of OBD-II connector of Plug-n-Play cable and stays visible from the driver's side. The number of flashes corresponds to the error code. See table 3 for codes description and possible solutions.

Table 3

Error Code	Error Description	Possible Reasons of Error Appearance	Solutions
2	No answer from the heater followed the start command	The heater is not activated in CIP	Configure the heater by Volvo dealer's equipment
		Fuel level in the tank is close to empty ("Fuel Low" warning indicator is lighting in CIP)	Refuel the car
		The heater is blocked after 3 unsuccessful starts	Try to start the heater from CIP menu. If it not started to burn, make diagnostics of the heater.
3	Battery low	The module has determined that the battery voltage at heater startup or during heater operation is below than specified by settings 3.1 and 3.2	Charge car's battery with special charger (or start engine to charge) or cancel 3.1/3.2 module's settings

4	Time limits exceeded	Time limit for autonomous operation of the heater is achieved (with active setting 1.1)	Run the engine or cancel 1.1 setting
5	Unsuccessful start	The heater was switched off spontaneously at heater startup	Make diagnostics of the heater if the error appears again
6	Operation cycle too short	The heater was switched off spontaneously	Make diagnostics of the heater if the error appears again
8	CAN-bus error	There is a problem with connection of the module to the CAN-bus	Check for the module connection
9	Settings error	Settings have been stored incorrectly in RCP's memory	Reset the settings (8.1.1), readjust RCP

The outer bi-color (red/green) LED can be connected to the GSM-module to indicate its status in case of permanent connection. In case when Plug-n-Play cable is used for connection, green LED of GSM module, placed inside the OBD-II connector's housing of Plug-n-Play cable, illuminates the GSM module's status. See table 4 for details.

Table 4. GSM module's indication

Number of flashes in series	GSM module status	User's action required
1	No SIM access	1. Check for presence of SIM in GSM module 2. Check that SIM installed correctly 3. Install SIM into a phone and disable PIN request
2	No service	1. Check balance of GSM module 2. Check the GSM services are available: make a call to the number of GSM module and wait for "busy" signal or voice menu greeting
3	GSM module is not initialized	Refer to the User Manual
4	Ready	Not required

Glossary

CAN - Control Area Network (digital network for data transfer in vehicles)
CIP - Combined Instrument Panel
GSM – Global System for Mobile
GPRS – General packet radio service, packet oriented mobile data service
LED - Light Emission Diode
RCP - Remote Control Plug-in (electronic module for the heater remote control)
SIM – Subscriber Identification Module
SMS – Short Message Service