Autoplugin Therminal-V2

Version 10.2

Technical Description
Installation Manual

Rev. A

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Description

The **Autoplugin Therminal-V2** is intended for remote control of the fuel-fired heater (parking heater, fuel operated heater, pre-heater), factory installed on **Volvo S60** (2010-), **V70** (2007-), **XC70** (2007-), **S80** (2007-) or **XC60** (2008-). The kit includes two modules: climatic GSM-module **Therminal-XC/XF** and interface module **RCP Light-V2**. GSM-module receives commands from user's phone or smartphone and translates them to the RCP module, which controls the heater via CAN-bus.

Possibilities

- Heater remote control using SMS, via specialized application Therminal for Android (4.1 and higher) and iOS-based smartphones or by voice call
- 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 inspecting voltage level and time of autonomous operation of the heater
- Plug-n-play or permanent connection

Package Content

1. GSM-module Autoplugin Therminal-XC (0506-1100) или Autoplugin Therminal-XF (арт. 0506-1103)
2. Autoplugin RCP-V2 module, special version (0706-1110)
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 from a mobile phone or a smartphone.
2. A special combination of buttons presses is used to start the heater from remote control key. Firstly press "Lamp" button on the key to switch on car perimeter lighting. Then press "Lock" button twice within 30 seconds, while lighting is on. Every "Lock" button pressing is confirmed with direction indicators flashing.
3. To stop the heater from remote control key, switch on and then switch off car perimeter lighting twice. Intervals between "Lamp" button presses should not exceed 20 seconds.
4. It is possible remotely disable heater timers in the CIP. Use remote control key to send stop command when the heater is idle. Starting the heater any way or turning ignition to "on" position enables CIP timers again.

Connection

RCP module needs that 2 timers and direct start / stop function for heater control are present in the CIP. Therefore it may be necessary to load software to the CIP by the means of Volvo dealer's equipment.
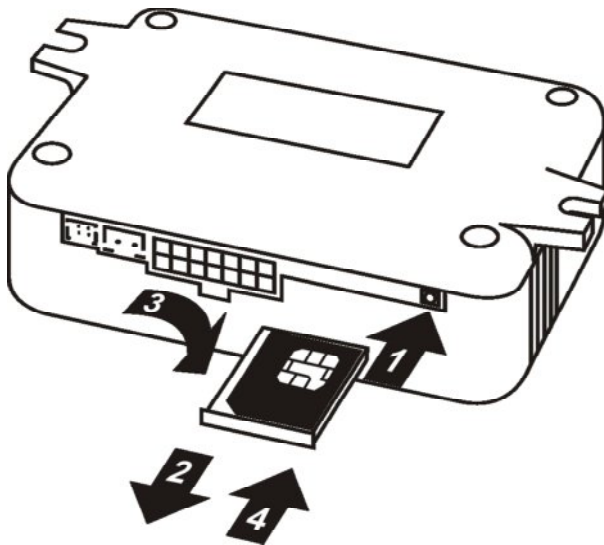
Picture 1

GSM-module is supplied without SIM card inside. The customer should buy a SIM card with subscription to local GSM provider services (SMS and GPRS are required).

It is possible you should make some preparatory 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

Choose tariff plans with non-expensive/pre-paid SMS traffic for SMS control or with pre-paid mobile data traffic for control via Internet (50-100 Mb per month is enough). Combine phone account with GSM module account if possible. Android application allows use both the mobile data and SMS, iOS application allows use only the mobile data.

Install SIM card into the GSM-module, as shown at the picture 1. The operation should be performed with unplugged power from the GSM-module. Press with a thin blunt object (philips screwdriver, pen, etc.) on the SIM-holder ejector pushbutton (1), pull for the SIM-holder and pull the holder out of the housing (2) . Then put the SIM into the holder to commit (3) and insert the holder back to the housing up to the stop (4).

We recommend firstly use Plug-n-Play connection to set up the Therminal.

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).

o Take interconnection cable with attached RCP Light module and connect it to the GSM-module by two connectors (14-pin black and 2-pin white). Take outer button and attach it to the GSM-module. Take Plug-n-Play cable and temporary connect it with interconnection cable. Then insert OBD jack into car's service socket. Turn ignition on and in 10 seconds turn it off. Wait for GSM-module boot during 30 seconds and then check that the GSM-module ready to receive commands (button's LED flashes 5 times in series).

o Launch the Quickstart procedure (see Brief User Manual for details). When the procedure will be completed make a voice call on GSM-module number and make sure the heater is started. You can detach outer button if you don't need to install it.

o Find space inside the dashboard for kit placement. Secure packet of modules inside the dashboard with straps. GSM module can be fixed with adhesive tape or can be fixed by straps. For Therminal-XC version pay attention that internal antenna of GSM-module (placed at the housing's side, opposite to SIM-holder) doesn't stay close to metal parts of the dashboard.

For Therminal-XF version connect both outer antennas' connectors to the GSM-module, according to connectors' colors. Combined GSM/GPS/GLONASS antenna has a magnetic base which can be attached to metal parts. Or can be fixed with adhesive tape. It is important to point the antenna toward the sky and don't cover it by metal parts from the sky side.

o Before final fixation of the kit connect Plug-n-Play cable to the interconnection cable one more time to be sure that cables' length is enough to make connection into OBD socket. Shorten excess length of the 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.

Permanent connection

It is recommended to install Autoplugin Therminal permanently under the dashboard.
Make all the steps listed in chapter above. Then take permanent connection cable and cconnect free ends of permanent connection cable to the car's wiring in accordance with Table 1. Use quick splice connectors for wires connection.

Table 1. Permanent connection cable 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 violet-orange wire of CAN-bus (ex. to the service connector's pin 11)
6	Orange	CAN-H	Connects to the grey-orange wire of CAN-bus (ex. to the service connector's pin 3).

Connect outer thermo sensor to the GSM module (instead of connector with single orange wire of interconnection cable) and fix it with adhesive pad at the place where temperature will be registered.
Shorten wires of permanent connection cable by place, as required. Plug permanent connection cable to the interconnection cable. Fix cables with car's harnesses by straps.

RCP Light-V2 Additional Functions

By default RCP is adjusted to perform basic functions, such as start and stop of the heater by using remote control key. To turn on the additional functions such as flashing with direction indicators in rearview mirrors or change the control combination for the key, enter the module into Setup mode and activate 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 change the settings. It is necessary to stop the engine and the heater before. Turn the ignition on by holding engine start button for at least 2 seconds, then press and hold the brakes pedal. Rotate the thumbwheel some steps to select idle display in the CIP. Then press and hold for at least 5 seconds "Read" button ("OK" button in some cars), 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 "Read/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 "Read/OK" button. The CIP confirms it with one flash of both direction indicators simultaneously. After 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 "Read/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. **Note:** 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.

* Direction indicators flashes in Setup mode only for cars with analogue instrument panel. For cars with digital instrument panel (some cars since MY 2013) use LED's indication of RCP for settings change.

Settings Table (2)

2. Heater control with remote	2.1. "Lock" and "Lamp" buttons functions for heater control	2.1.1 *"Lock" button for heater start, "Lamp" button for heater stop
		2.1.2 "Lamp" button for heater start, "Lock" button for heater stop

control key	2.2. Number of sequential "Lamp" button presses for heater control	2.2.1 Combination is disabled 2.2.2 *Four presses* 2.2.3 Six presses 2.2.4 Eight presses
	2.3. Number of sequential "Lock" button presses for heater control (during car's lighting turned on)	2.3.1 Combination is disabled 2.3.2 *Two presses* 2.3.3 Three presses 2.3.4 Four presses
6. Indication of heater status by using direction indicators in rearview mirrors	6.1. Indication of heater startup	6.1.1 *Off 6.1.2 Five flashes
	6.2. Indication of command reception from a remote control	6.2.1 *Off 6.2.2 Three flashes
	6.3. Indication of heater operation, when starting source is a remote controller	6.3.1 *Off 6.3.2 On
	6.4. Indication of heater operation, when starting source is CIP (direct or timer start)	6.4.1 *Off 6.4.2 On
	6.7. Flashing frequency for 6.3-6.4 setup items	6.7.1 One flash within 3 sec 6.7.2 One flash within 5 sec 6.7.3 * *One flash within 10 sec* 6.7.4 One flash within 15 sec
8. Service menu	8.1. Default Settings	8.1.1 Apply default settings

* Factory setting
Recommended settings marked in italics

Troubleshooting

If you have problems with heater startup try sequentially start the heater from the key, then from the button and finally – from phone. When the heater doesn't start at all, make diagnostics starting with the RCP Light. If the heater starts from the key, make diagnostics of the GSM-module.

o RCP Light diagnostics

RCP-module in the kit is responsible for command translation to and from the CAN-bus. It has the LED indicator on the side, opposite to the connector.
If a run-time error occurs during heater operation, RCP module informs about the error code with LED flashing. The number of flashes in series corresponds to the error code. See table 3 for the 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	Outer temperature is higher than +14 Celsius degrees	The heater operates only at temperatures below +15°C. It is heater manufacturer restriction
		Fuel level in the fuel tank is close to empty ("Fuel Low" warning indicator is illuminated in the CIP)	Refuel the car
		The heater was blocked after 3 unsuccessful starts	Try to start the heater from CIP menu. If it doesn't start up, make diagnostics of the heater.
5	Unsuccessful startup	The heater was switched off spontaneously at 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 module connection to the CAN-bus	Check for the module connection
9	Settings error	Settings have been stored in RCP's memory incorrectly	Reset the settings (8.1.1), readjust the module
11	Heater no connection	The heater is unplugged or out of order	Make diagnostics of the heater

o GSM-module diagnostics

If the heater doesn't start from the button, check all the kit connections. Startup from the button operates independently from GSM network status. In case when the heater starts from the button, but doesn't start via GSM (SMS, voice call or app) use GSM-module indication for diagnostics: press and hold the button until the embedded LED flashes from 5 to 10 times, then release the button. GSM-module goes to status indication mode. Status indication mode also becomes active for 2 minutes after boot or restart. See table 4 for details.

Table 4. GSM-module indication

Number of flashes in series	GSM-module status	User action required
2	Not available for GSM control	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 4. Check that GSM-module number is active: make a voice call and wait for «busy» tone[2] 5. Make sure that the GSM-module hasn't went to Shutdown mode by reason of battery discharge
3	Waiting for GSM ready	GSM-module is temporary not available. No user action required.
4	Waiting for GSM registration complete	GSM-module is temporary not available. Possible reasons: no available networks (no signal, roaming prohibited), SIM locked by the provider. Change button indication mode to check GSM signal strength level
5 or 6	Ready for command reception	No user action required

[1]*Switch off GSM-module's power supply before the operation*
[2]*Heater start will be performed. Make the second voice call to stop the heater*

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 heater remote control)
SIM – Subscriber Identification Module
SMS – Short Message Service