# Autoplugin Therminal F3
# Version 7.6

## Technical Description
## Installation Manual

**Rev. A**

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## Description

The **Autoplugin GSM Kit-F3** is intended for remote control of the fuel-fired heater (parking heater, fuel operated heater, pre-heater), factory installed in **Ford Kuga 2** (2012-), **Focus 3** (2011-), **Ford C-Max 2** (2011-) and **Ford Grand C-Max** (2011-). The kit includes 2 modules: **GSM** module and **RCP Can-F3** 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

- Start and stop the heater sending SMS or via specialized application Therminal from Android (4.1 and higher) based smartphone
- Feedback about heater's 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
2. RCP Can-F3 module, special version (0103-1115)
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. To start the heater using car's remote control key, press "Lock" button 3 times on the key. Time intervals between presses must not exceed 20 seconds. The unlocking of the vehicle or time interval excess restarts the counter of "Lock" button presses. Every "Lock" button's pressing is confirmed with direction indicators flashing.
*If combination of Lock button presses has no effect (no heater startup, no error appearance,) try another combination: 3 Unlock button presses, then Lock button press.*
3. By default RCP adjusted only to switch on the heater using remote control key. To switch off the heater using the key, change the setup item 3.1. As both the commands use the same combination of "Lock" presses, you should know a condition of the heater before you send a command. Therefore it is recommended to activate setup items 6.4 – 6.6 to see the heater's status by the means of direction indicators' flashing in the rearview mirrors. The possibility to stop the heater remotely may be useful in the case of cancelation of a trip, including one programmed in the CIP's menu.
4. It is possible remotely disable startups of the heater, programmed in the CIP's menu. 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.
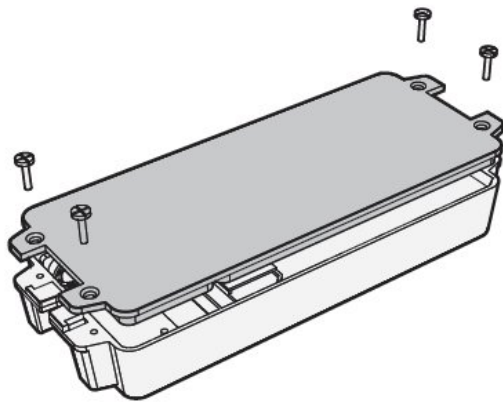
## Connection

GSM module is supplied without SIM card inside. The customer should buy a SIM card with subscription to the local GSM provider's 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.
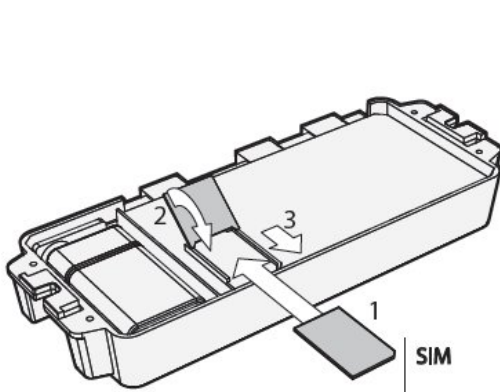
Open the case of GSM-module to install SIM card, as shown at the picture 1. Use the screwdriver from the package to remove screws.
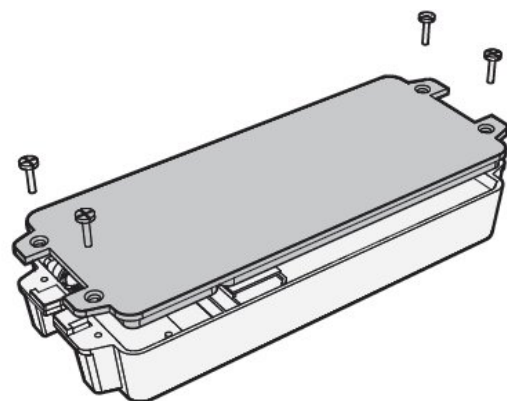
1. Unscrew the bottom
   of body
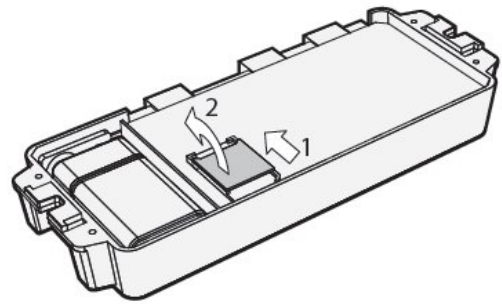
2. Slide the tray of SIM holder
   to OPEN position, lift the tray

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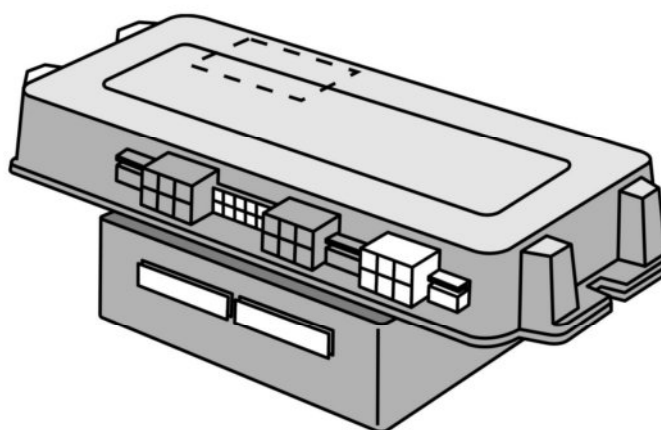
**Figure 2**

## Permanent connection

Autoplugin GSM kit can be installed under the dashboard using permanent connection to the car's wiring. Find a place inside the dashboard close the service connector.
Take interconnection cable and connect RCP and GSM modules together. Only highlighted at the figure 2 connectors 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 yellow-red 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). |

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 figire 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 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 by the straps.

## The RCP Module's Additional Functions

By default RCP is adjusted to perform only the basic functions, such as start and stop the heater using the remote control key. To turn on the 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).

A programming button and the brakes pedal are used to enter setup mode and to the settings change. You can use either additionally installed button, or front passenger's window close button on the driver's door control panel as programming button. Some car versions not allow using power window control button as programming button. Use additional button in that case.

It is necessary to stop the engine and the heater before. Turn the ignition on, press and hold the brakes pedal. Then 3 times press the programming button (press and hold additional button until LED goes off, about 1.5 seconds). Both direction indicators in the CIP confirm entering to the setup mode with 2 flashes. Release the brakes pedal finally.

Each setup item in the settings table is a 3-digit code. To enter a digit of a code, shortly press the 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 brakes pedal. 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 the case of valid code and flash twice alternately in the case of invalid code.

If entered digit is not correct, press and release brakes 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.

To clear all the errors in the heater's memory and thus unblock the heater, enter the code 9.1.1. Both direction indicators flash five times confirming errors clearing. If unblocking of the heater is impossible, the indicators flash five times alternatively. **Pay attention**: when you apply unblocking function for the first time, RCP remembers VIN code of the car. In the future unblock function will work only for this car.

* Factory setting
*Recommended settings marked in Italics*

**Settings Table (2)**

| **1.** Boost Heat Mode (Auxiliary Heating) Control[1] | **1.2.** Additional engine heating disable by coolant temperature (in Celsius degrees)[3] | **1.2.1** *Not applied<br>**1.2.2** Higher than 0 degrees<br>**1.2.3** Higher than +10 degrees<br>**1.2.4** Higher than +20 degrees<br>**1.2.5** Higher than +30 degrees<br>**1.2.6** Higher than +40 degrees<br>*1.2.7 Higher than +50 degrees*<br>**1.2.8** Higher than +60 degrees<br>**1.2.9** Higher than +65 degrees<br>**1.2.10** Higher than +70 degrees |
|---|---|---|
| **2.** Heater Timing | **2.1.** Limitation of heater's total operation time in pre-heat mode | **2.1.1** *One cycle (as the heater's manufacturer defined, 1-30 minutes)[6]<br>**2.1.2** 40 minutes<br>**2.1.3** 50 minutes<br>**2.1.4** 60 minutes<br>**2.1.5** *70 minutes*<br>**2.1.6** 80 minutes<br>**2.1.7** 90 minutes<br>**2.1.8** 100 minutes<br>**2.1.9** 120 minutes |
| | **2.2.** Limitation of | **2.2.1** 10 minutes |

| | heater's cycle operation time in pre-heat mode | **2.2.2** 15 minutes<br>**2.2.3** 20 minutes<br>**2.2.4** 25 minutes<br>**2.2.5** *30 minutes* |
|---|---|---|
| **3.** Heater remote control with remote control key | **3.1.** "Lock" button's function for the heater control | **3.1.1** *Heater start only<br>**3.1.2** Start of idle heater, stop of operated heater |
| | **3.2.** Number of sequential "Lock" button presses for the heater control | **3.2.1** Combination is disabled<br>**3.2.2** Two presses<br>**3.2.3** *Three presses*<br>**3.2.4** Four presses<br>**3.2.5** Five presses<br>**3.2.6** Six presses |
| **4.** Battery Monitoring | **4.1.** Minimal battery voltage that lets the module start the heater in pre-heat mode | **4.1.1** * Not adjusted<br>**4.1.2** 11.4V<br>**4.1.3** 11.6V<br>**4.1.4** 11.8V<br>**4.1.5** *12.0V*<br>**4.1.6** 12.1V<br>**4.1.7** 12.2V<br>**4.1.8** 12.3V<br>**4.1.9** 12.4V |
| | **4.2.** Minimal battery voltage that lets the module keep operating the heater in pre-heat mode [2] | **4.2.1** * Not adjusted<br>**4.2.2** 10.6V<br>**4.2.3** 10.8V<br>**4.2.4** 11.0V<br>**4.2.5** 11.2V<br>**4.2.6** *11.4V*<br>**4.2.7** 11.5V<br>**4.2.8** 11.6V<br>**4.2.9** 11.7 V |
| **6.** Indication of the heater's status using the car's lighting and the direction indicators in the rearview mirrors | **6.1.** Indication of command reception from a remote control[7] | **6.1.1** *Off<br>**6.1.2** Three flashes |
| | **6.2.** Indication of successful startup of the heater from a remote control | **6.2.1** *Off<br>**6.2.2** Seven flashes |
| | **6.3.** Indication of the heater's operation, when starting source is the remote control | **6.3.1** *Off<br>**6.3.2** On |

| | | |
|---|---|---|
| | **6.4.** Indication of the heater's operation, when starting source is the CIP (direct or timer start) | **6.4.1** *Off<br>**6.4.2** On |
| | **6.5.** Indication of the heater's operation, when starting source is additional button | **6.5.1** *Off<br>**6.5.2** On |
| | **6.7.** Flashing frequency for 6.3-6.5 Setup items | **6.7.1** One flash within 3 sec<br>**6.7.2** One flash within 5 sec<br>**6.7.3** * *One flash within 10 sec*<br>**6.7.4** One flash within 15 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)<br>**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<br>**7.4.8** Do not send |
| **8.** Settings reset | | **8.1.1** Apply default settings |
| **9.** Service menu | | **9.1.1** Clear all errors in heater's memory, resulting heater unblocking |

[1] – It is necessary to enable auxiliary heating in DIS for extended boost heat mode possibilities (settings 1.2, for the cars with diesel engines only): Settings > Convenience > Aux heater > On

[2] –RCP turns off the heater if the battery voltage becomes lower than preset

[3] – Setting is not tested yet

[4] – Signals appear only at the heater autonomous operation

[5] – Notifications are needed for the Therminal operation. If user sends SMS manually, notifications can 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).

[6] – By default the heater can be restarted only after the engine start, as heater's manufacturer has desired. The settings 2.1.2-2.1.5 give a possibility to restart the heater at any time. The audio unit can turn on at restart of the heater and automatically turns off in 15 minutes.

[7] – Only for the car's remote control key

# Troubleshooting

If a run-time error occurs during the heater's operation, RCP module informs about the error code with LED flashing. 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 LED's flashes 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 +15 Celsius degrees | The heater operates only at temperatures below +15°C. It is the heater manufacturer's restriction |
|  |  | Fuel level in the fuel tank is close to empty ("Fuel Low" warning indicator is illuminated in the CIP) | Refuel the vehicle |
|  |  | The heater is blocked after 5 unsuccessful starts | Try to start the heater from DIS menu. If it not started to burn, check for fuel and coolant quality (especially at extreme cold temperatures) and possible heater's exhaust system clogging by snow. Then unblock the heater in the Setup mode. |
| 3 | Battery low | The module has determined that the battery's voltage is below the specified by settings items 3.1 or 3.2 | Charge vehicle's battery with special charger (or start engine to charge) or cancel 3.1/3.2 module's settings |
| 4 | Time limits exceeded | The heater's restart is not possible without engine run. It is the heater's manufacturer restriction | Change default setting 2.1.1 to another one (2.1.2 - 2.1.9) to enable heater restart and bypass the restriction. Run the engine otherwise. |
| 5 | Unsuccessful start | The heater was switched off spontaneously at starting | 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's connection to the CAN-bus | Check for the module's connection |
| 9 | Settings error | Settings have been stored in the 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 |

The outer bi-color (red/green) LED can be connected to the GSM-module to indicate its status in the case of permanent connection.  In the 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<br>2.  Check that SIM installed correctly<br>3.  Install SIM into a phone and disable PIN request |
| 2 | No service | 1.  Check balance of GSM module<br>2.  Check the GSM services are available: make a call to the number of GSM module and wait for "busy" signal or voice menu's 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

www.autoplugin.ru