



EN Plug5 User Manual



Revision: 1.0v

Date: 2024-03

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1. EN Plug5 User Manual

Purpose of This Document

The purpose of this user manual is to provide information about the Plug5 devices. This user manual describes the main features of the device and how to use it.

Safety Information

The following information is provided to ensure safe operation of the device. Please read it carefully before you start using the device!

	All the associated (additional) equipment such as computers, batteries, sensors, etc. shall meet the requirements of standard EN60950-1.
	Do not disassemble the device. If the enclosure of the device is damaged, or the insulation of the wires is damaged, disconnect the power supply cables from the power supply source first.
	All wireless data transferring equipment produces interference that may affect other devices placed nearby.
	The device can be installed or dismantled only by qualified personnel!
	The device must be firmly fastened in a predefined location. The predefined location is described in the installation instructions.
	The configuration must be performed using a 2nd safety class computer (with an autonomic power supply).
	Make sure that the device is installed in a location where it will not be subjected to harsh environmental conditions for extended time periods.
	Any installation and/or handling during a lightning storm is prohibited.
	Caution! If an incorrect type of battery is used for replacement, there is a high explosion risk. Dispose of used batteries according to the environmental requirements.
	For configuration use cables that were purchased from Ruptela. Ruptela is not responsible for any harm or damage caused while using the wrong cables.
	Install the device in a restricted access location, not accessible or visible to the driver.
	This crossed-out wheeled bin symbol means that waste equipment should not be disposed of with your other household waste. The product must be taken to separate collection points at the product's end-of-life.

Notations

The following notations are used in this document to highlight important information:

Bold text

Used to indicate user interface elements or for emphasis.

Italic text

Used to indicate items that belong to a list and can be selected.

Note



Used to indicate items that belong to a list and can be selected.

Caution



Used to mark actions that require caution when handling the product.

Warning



Used to mark actions that may cause irreversible damage if performed incorrectly.

Tip



Suggestions on how to proceed.

Acronyms and Abbreviations

2G – Second Generation Cellular Technology

AC/DC – Alternating Current/Direct Current

APN – Access Point Name

CAN – Controller Area Network

DIN – Digital Input

DOUT – Digital Output

GLONASS – Global Navigation Satellite System

GNSS – Global Navigation Satellite System

GPS – Global Positioning System

GSM – Global System for Mobile Communications

OBD – On-board Diagnostics

LED – Light Emitting Diode

LTE – Long-Term Evolution

SMS – Short Message Service

SW – Single-Wire

TCP – Transmission Control Protocol

UDP – User Datagram Protocol

USB – Universal Serial Bus

References

Datasheet: <https://doc.ruptela.com/articles/project-tracking-devices/plug5-datasheet>

Quick Start Guide: <https://doc.ruptela.com/articles/project-tracking-devices/en-plug5-quick-start-guide>

Device Center: <https://doc.ruptela.com/articles/#!downloads-publication/device-center>

Advanced configuration manual: <https://doc.ruptela.com/articles/#!tracking-devices-publication/advanced-configurator-user-manual>

Firmware and configurator files: <https://doc.ruptela.com/articles/#!downloads-publication/downloads-home>

Microsoft Framework: <https://dotnet.microsoft.com/download/dotnet-framework/net48>

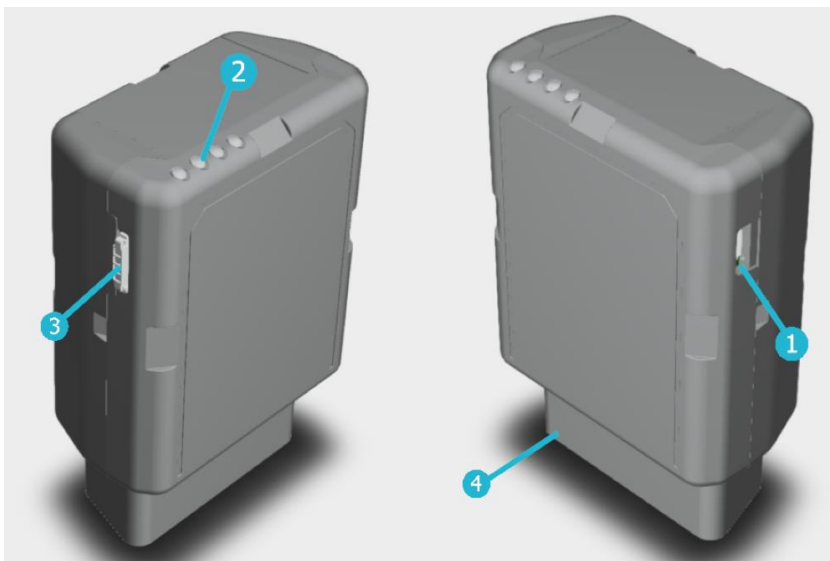
1.1 Plug5 Product Information

About

Plug5 series devices are compact Telematics units for heavy and light duty vehicles. It collects OBD, J1939 CAN BUS data, acquires its position with a GNSS signal and transfers data to a server via cellular LTE 4G CAT4/ CAT M1 network. The devices come in the following variations:

Device model	Network technology	BLE	WiFi	Region
Plug5-LTE-NA-BT	4G CAT-M1	Yes	No	North America
Plug5-LTE-EMEA-BT	4G CAT-M1	Yes	No	EMEA
Plug5-LTE-NA-BT-WiFi	4G CAT-4	Yes	Yes	North America

Device Overview



- 1 USB port
- 2 LED's
- 3 Accessory port
- 4 OBDII connector

Key Features

- Fast and simple installation
- Real-time vehicle location, history, mileage, and speed monitoring
- Light duty vehicle OBD and Proprietary CAN data reading
- Driver behavior monitoring
- Driver, vehicle, and cargo safety and security

- Wi-Fi hotspot (Plug5-LTE-NA-BT-WiFi only)
- BLE 5.1 humidity and temperature sensors

Package Contents

The device is packed in a cardboard box. The package contains only the device itself.



By default, no SIM card is provided in the package. SIM cards can be obtained from your local mobile network providers. Alternatively Contact Ruptela Sales representative for other available options.



Certification information

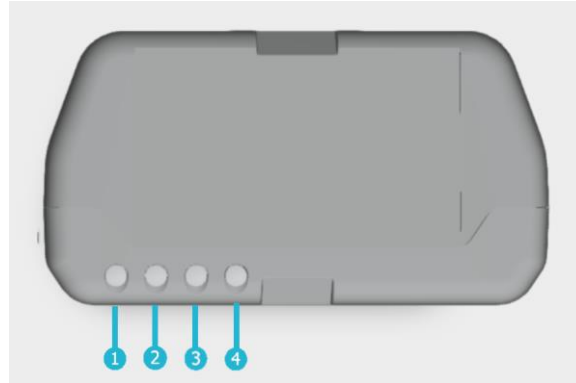
FCC	Federal Communications Commission (FCC) Interference Statement This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures: - Reorient or relocate the receiving antenna. - Increase the separation between the equipment and receiver. - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. - Consult the dealer or an experienced radio/TV technician for help. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. RF exposure warning This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.
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ISED	CAN ICES-003 (B)/NMB-003(B) Canadian Compliance Statement This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions: This device may not cause interference, and This device must accept any interference, including interference that may cause undesired operation of the device. Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: l'appareil ne doit pas produire de brouillage; l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement. IMPORTANT NOTE: Radiation Exposure Statement: This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body. Déclaration d'exposition aux radiations: Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps.
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Please visit <https://doc.ruptela.com/home/en-us/> for latest information.

1.2 Plug5 Technical Information

Indication LED Patterns



LED No	Color	Description	Pattern
1	Red	Power / Ignition status	Always ON - Custom/Virtual ignition ON and power supply is provided Blinks for 0.5 second in 1 second - Ignition OFF and power supply is provided Blinks for 0.1 second in 1 second - Working from battery, despite of the ignition status Blinks for 0.1 second in 5 seconds - Sleep mode (if sleeping when powered on from battery - indicate only sleep mode)
2	Orange	Network connectivity status	Always ON - The link with the server is open Blinks once in 4 seconds - Connected to network and internet Blinks once in 1 second - Connected to network, no internet Blinks once in 0.2 seconds - No signal
3	Green	GNSS / BLE 5.1	Always ON, short turn off once every 1 second - GNSS fix acquired / BLE 5.1 paired and connected Always ON, short turn off once every 0.4 second- GNSS fix not acquired / BLE 5.1 paired and connected Blinks once every 1 second - GNSS fix acquired / BLE 5.1 not connected Blinks once every 0.4 second - GNSS fix not acquired / BLE 5.1 not connected
4	Blue	WiFi / Autoconfiguration status	Always ON - Autoconfiguration completed Always OFF - autoconfiguration failed or if autoconfiguration was not configured Blinks for 0.01 second in 0.1 second - autoconfiguration is in progress Inverted Blinks for 0.1 second in 0.5 second - Wi-Fi hotspot is activated and autoconfiguration completed (not applicable to LTM versions) Blinks for 0.1 second in 0.5 second - Wi-Fi hotspot is activated and autoconfiguration failed / not configured (not applicable to LTM versions)

1.3 Plug5 Device Preparation

For the device to work, you first need to insert a SIM card. To do so, open the device housing and perform the actions described below.

Opening the Device

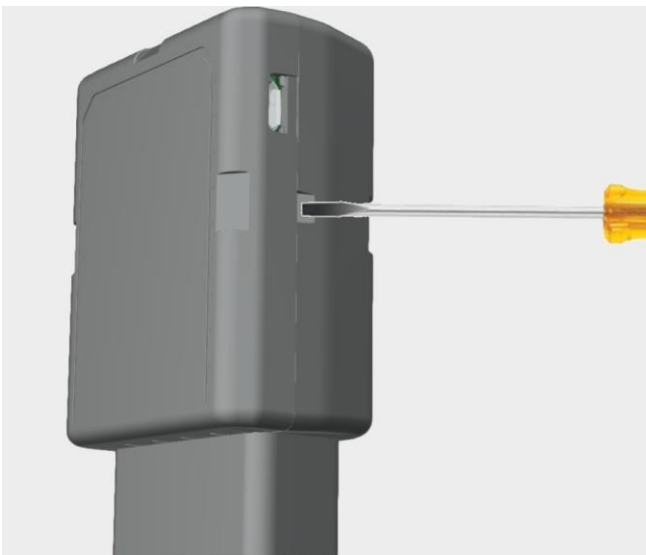
Use a flathead screwdriver to open the plastic housing. Insert the screwdriver between the top and bottom parts of the housing and lift the top part up as shown in the image below. The top of the housing should easily dismount from the holding pins.



Make sure that the device is powered off before opening it!



The use of inappropriate tools or excessive force may cause permanent damage to the device.



Avoid opening the device more times than required, as it may wear out the holding pins.

Inserting a SIM Card

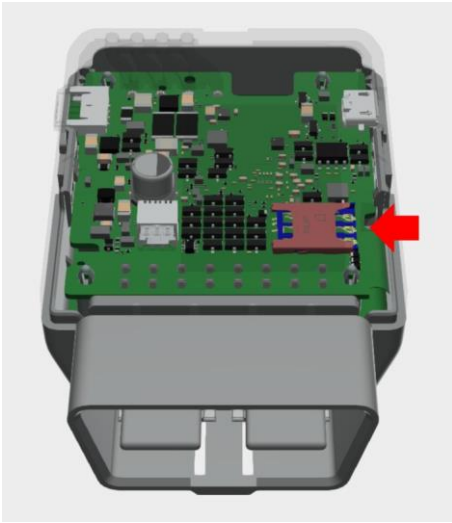
Insert your SIM card into the device as shown in the image below. The microchip must be facing down.



All SIM card security codes must be disabled, otherwise, the SIM card will not work with the device.



An industrial-grade SIM is strongly recommended if the device will be exposed to temperatures higher than 40° C.



Use a non-prepaid SIM card to ensure that the balance does not suddenly run out and cause connectivity issues.

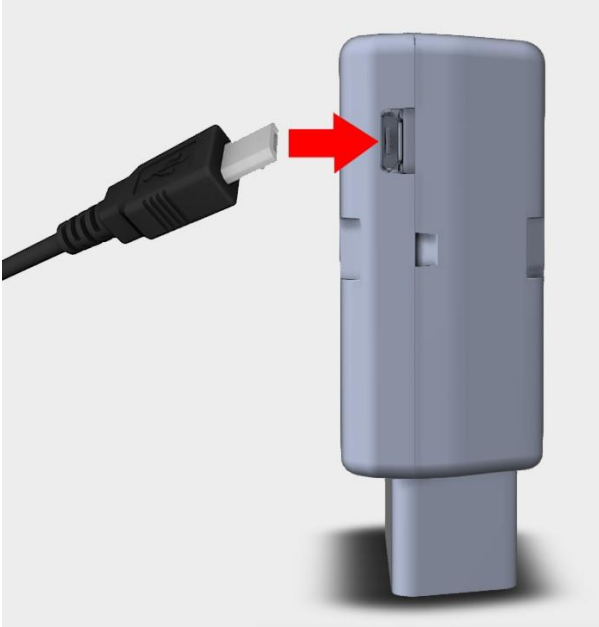
Closing the Device

To close the device, place the top of the housing on one side of the device as shown in the image below. Then simply push the other side down until you hear a clicking sound and the housing is closed.



USB Cable Connection

Connect the USB cable to the micro USB port as shown in the image below. The cable can be connected in only one way. Connect the other end to your computer.



The device can be configured when powered via USB, using an external power supply for configuration is optional.

1.4 Plug5 Device Configuration

Device Center

The Device Center application is used to configure the device. The Device Center allows you to do the following:

- Make a new configuration file
- Edit an existing configuration file
- Send a configuration file to your device
- Load an existing configuration file from your device
- Update the device firmware

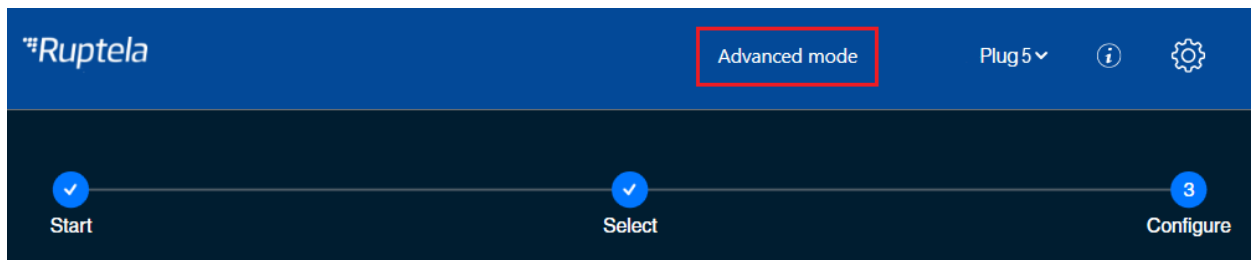
Download the Device Center from our documentation website: [Device Center](#).

Starting the Configuration



Currently **Plug5** device can be configured only via **Advanced mode** as the Device requires complex configuration functions. Which are currently not developed on Device center.

Open the Device Center and navigate to **Advanced mode** in the top bar.



A detailed description of the advanced configurator is available in [the advanced configurator user manual](#).

Configuration via SMS Commands

Alternatively, the device can be configured using SMS commands. Please refer to the following documents for an in-depth description:

- [Device configuration via SMS](#)
- [SMS commands list](#)

Updating Firmware

We recommend using the newest firmware to take advantage of our newest functionalities and improvements. Device firmware can be updated in the following ways:

- Automatically when using a configurator that is newer than the firmware
- Manually by sending a firmware file to the device via the advanced configurator
- Over-the-air using your fleet management software



The device will not send any data during firmware updates.

File Extension

Firmware file extension for Plug5 devices: **.efwe5**

Updating Firmware Automatically

If the Device Center is newer than the detected device firmware, it will suggest updating the firmware. Click **Update firmware** to update the firmware. If the firmware is not updated, you will not be able to load and save configuration files from/to the device.



To update the firmware, the tracking device must be first connected to a power supply.



This method does not require an internet connection. This allows you to update the firmware at any time or location if you have the newest Device Center.



If the Device Center is older than the firmware, you will not be able to load and save configuration files from/to the device. You will need to update the Device Center.



If you skipped the automatic firmware update suggestion and you do not want to update the firmware manually, click **Send FW** and then **Cancel**. The Advanced configurator will suggest again to update the firmware.

Updating Firmware Manually



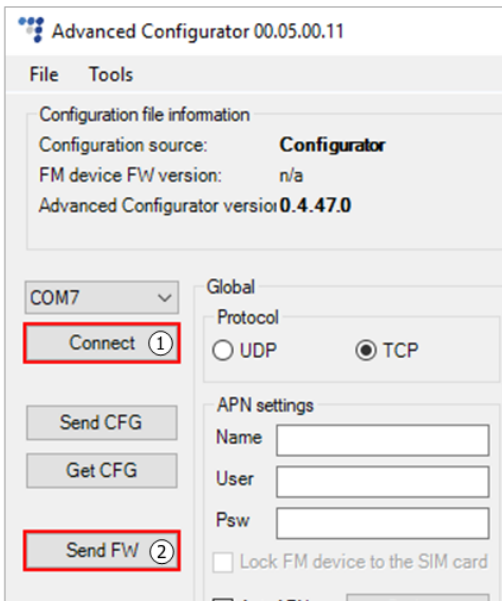
This feature requires the use of the advanced configurator.

Updating Firmware using .efw* Extension Files

To update firmware with the .efw* extension file, click **Connect** and **Send FW** in the main configurator menu. Locate your firmware file and click **Open**. The firmware update process will start.



BLE module may not work if the tracking device will be updated only with the .efw* firmware extension file.



Updating Firmware using .fwp Pack

If you do not want to manually search for an appropriate firmware file for your tracking device, you can use a general firmware pack for all devices and advanced configurator will select the file for you. To update firmware with the .fwp pack, click **Connect** and **Send FW** in the main configurator menu. Locate your firmware .fwp pack and click **Open**. The advanced configurator will upload the required device firmware file(s) and the update process will start.



To update the BLE module firmware, the tracking device must first be connected to a power supply.



If the BLE module firmware version is incompatible with device firmware version, BLE will be disabled.

Updating Firmware Over-the-air

The exact process of how to update firmware over-the-air depends on your fleet management software. The following conditions must be met for the update to be successful:

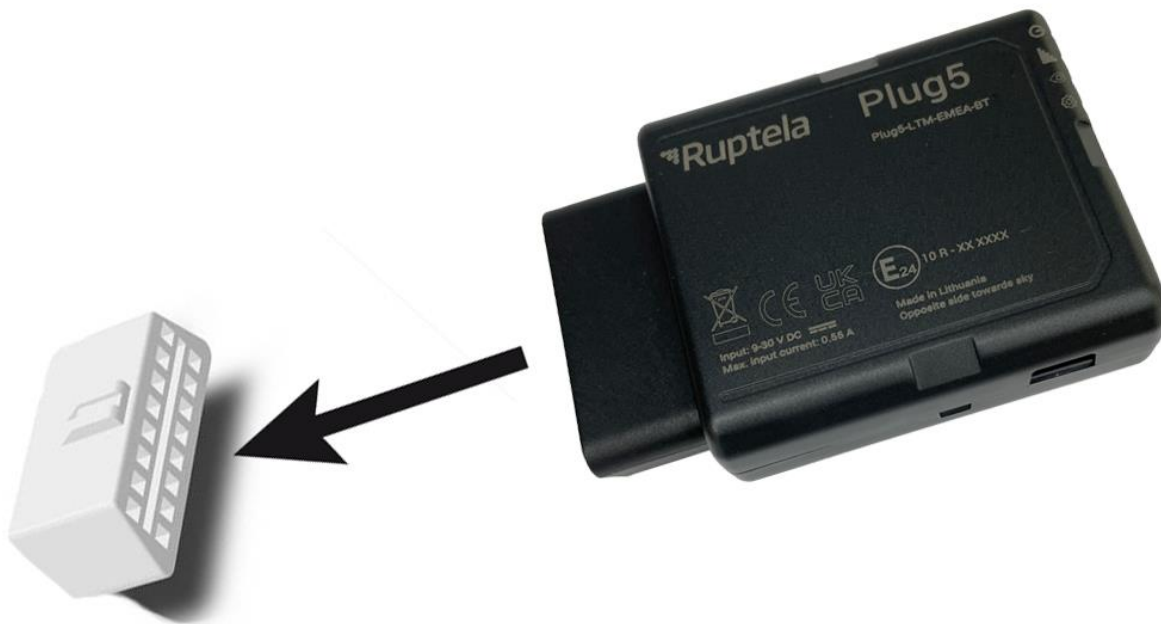
- The device must be connected to a power supply
- The device must be connected to a cellular network

1.5 Plug5 Installation in Vehicle

To install the device, you need to connect it to the OBD2 socket. Locate the OBD2 socket in your vehicle (typically located on the driver's side, underneath a panel). Insert the device into the OBD2 socket as shown in the image below.



There is only one way to plug the device in, be careful not to damage the pins.



Installation Check-up

1. Take several minutes to review the installation, and check that everything is connected properly.
2. Start the vehicle, drive outside if the vehicle was in a building, and wait for several minutes.
3. Check that the required data is received by sending an SMS command, using the installation assistant, or checking your fleet management platform.
4. Finish up the installation, make sure there are no hanging wires, and that all panels are firmly reattached.

Troubleshooting

If you did not receive the required data during the installation, you can send several SMS commands to your device to check what might be wrong.

gsminfo

Use the *gsminfo* SMS command to know if the device is connected to mobile networks and the internet.

Command syntax: *password gsminfo*

Response example: *ST:2019.06.20 23:26:33; OP 22210, **lvl 15**, LAC 20030, CID: 28289, GSM; M:I 126, R 125, SP: 0; **GPRS 0**: O 64,C 0, E 248; LK:O 575, E 1, TMO 126; RS: 04; P 0*

The relevant parameters and their values are described in the table below.

lvl	The mobile signal level. If lvl is lower than 10, the signal is weak, and it is likely that there is no connection to the network.
GPRS	The internet status. Possible values: • 0 – no internet connection • 1 – the device is connected to the internet

In the previous example, the GPRS value is 0. This would mean that the device is not connected to the internet.

getapn

If the device is connected to mobile and internet networks but does not send any data, check the APN and connection settings with the *getapn* SMS command.

Command syntax: *password getapn*

Response example: *APN: banga User: PSW: IP1: 92.62.134.38 Port1: 9021 IP2: 195.14.173.3 Port2: 9000 TCP/UDP: 0*

The parameters and their values are self-explanatory, except for **TCP/UDP**.

TCP/UDP	This parameter shows which protocol is used. Possible values: • 0 – TCP • 1 – UDP
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If the *getapn* response text is very long (for example, the APN, username, and password are 32 symbols long each, and two servers are used), it might not fit into a single message and be cropped.

coords

Use the *coords* SMS command to know if the device has an accurate GNSS fix.

Command syntax: *password coords*

Response example if there is no GNSS fix: *GPS is not available*

Response example if there is a GNSS fix: **2019-06-20 07:01**, *lat. 46.1443183, long. 11.881766, alt. 217.5, **sat. 8**, dir. 198.10, **hdop 100**, **state 3***

The relevant parameters and their values are described in the table below.

Datetime	The current date and time in GMT.
sat.	The number of visible satellites. At least 4 satellites must be visible to get an accurate GNSS signal.
hdop	The current HDOP (signal accuracy) level. If the HDOP level is above 3.5, the GNSS signal is inaccurate.
state	The current GNSS state. Possible values: 1 – GNSS module off 2 – GNSS module on, no fix 3 – GNSS module on, fix acquired 4 – GNSS module not responding 5 – GNSS module is in sleep mode 6 – GNSS module disabled

reset

When all else fails, use the *reset* SMS command to restart the device. Configuration parameters will not be lost.

Command syntax: *password reset*

Response example: *Resetting device*



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