ORMA Tracker Installation Manual
(UR-02, UR-02 rev.01, UR-03, UR-03 rev.01, MUR, UR-GLONASS)

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1 GENERAL RECOMMENDATIONS FOR MOUNTING TRACKERS

ORMA Trackers UR-02, UR-03, UR-03 rev.01, MUR, UR-GLONASS are to be mounted into any type vehicles which are equipped with in-vehicle power network of 12-24 V dc. All devices have sets of leads to be connected to the in-vehicle power network and to extra sensors located at various sites of the vehicle.

Mounting the trackers shall be performed in accordance with the rules and regulations for operating low voltage networks, subject to limitation of current characteristics of devices in accordance with their Instruction Manuals keeping up necessary precautions.

When installing the trackers, consider the possible impact of aggressive media, car fluids, moisture and mechanical damage (including causing willful damage) during operation of the vehicle, so it is recommended to install the tracker in a cab or another dry place inaccessible to the impact of the above factors, without overlapping the top tracker cover with metal parts of the vehicle (to ensure reliable reception of satellite signals).

It is more convenient to install extra sensors and to connect them to trackers in advance of the installation of the trackers themselves. Sensors are to be mounted in accordance with the protective measures and requirements for power supplying described in their Instruction Manuals.

While inserting a SIM card to a tracker (UR-03, UR-03 rev.01, MUR, UR-GLONASS), take measures to provide protection against static electricity; always shut off device power while installing the SIM card.

2 CONNECTING TRACKERS TO THE IN-VEHICLE POWER NETWORK

Places for connecting tracker power leads are selected individually for each vehicle, depending on the vehicle design and required mounting protection measures.

In order to connect a tracker in a minimum configuration, use the following vehicle wires:

vehicle ground;

power +12V or +24 V.

You are not recommended to use external batteries as a main power supply for trackers, because they cannot provide trouble-free operating trackers in conditions of cold climate. However, you can use vehicle battery leads taking into account required protection against in-vehicle network overloading, providing that there is a generator to supply power to the battery during vehicle's moving.

Always shut off the vehicle earth before mounting trackers

The vehicle earth is connected to the black wire of the tracker as described in the tracker's Manual. If the tracker is installed on the truck / lorry or a vehicle equipped with a vehicle earth switch, one of the following ways of connecting the black wire can be used:

- To the battery 'minus' before the switch – in this case the system will be under powering permanently;
- After the switch – in this case power will be switched off with switching off the earth.

Because of the earth terminal tends to oxidize in the open air, provide the reliable contact on the minus supply circuit while connecting to the earth. Remember that currents from the power systems of the vehicle must not be carried out through the contact of minus power.

The power wire +12V or +24V is connected to the red tracker wire in according with the tracker's Instruction Manual. When selecting the point to connect the tracker to the "+" of the vehicle power network, you must take measures to protect the device against possible voltage surges and short circuit failures in vehicle network. To prevent short circuit failures, please use the fuse provided.

To provide permanent monitoring the satellite communication channel, the tracker must always be under power, so the condition must be fulfilled like in case of switched off ignition this wire must still be supplied with power. So, you are NOT recommended to use connections through the ignition switch.

Maximum current rating must NOT exceed 120 mA.

As far as the tracker must be connected permanently to the vehicle power network, in cases of long time staying the vehicle battery can be discharged or its working resource decreases. To avoid fast battery discharges and to save vehicle battery resource, the tracker can be activated only with switching ignition on. For this purpose, connect the blue wire of the tracker (for all kinds of trackers) to the ignition switch in the way when the Ignition switch position causes to supply power from the battery to the tracker.

3 CONNECTING EXTERNAL DEVICES TO TRACKERS

3.1 Connecting a Fuel Level Sensor

All models of ORMA trackers excluding MUR provide connecting a fuel level sensor which requires 12 V dc or 24 V dc and operates via RS-232. Using the fuel level sensor allows receiving exact data about the amount of fuel which was consumed during vehicle moving.

The sensor is mounted into the fuel tank immediately either via existed technologic holes or special holes made under appropriate protection measures. After mounting the sensor measuring unit itself you should wire the sensor to the tracker leads and provide sensor powering. Figure 1 and Table 1 represent how to connect the fuel level sensor to the tracker.

Table 1. Color Marking of Wires for Connecting a Fuel Level Sensor

Tracker Wire	Fuel Level Sensor Terminal
Pink or Purple	RX Terminal
Grey	TX Terminal
Black	Sensor Earth
Yellow and Green (Red for UR-GLONASS) *– see Note below*	+12 V / 24 V (Power)

Note: For UR-2 and UR-02 rev.01 trackers, if the fuel level sensor requires 12 V while the tracker is powered by 24 V then the sensor must be connected to the tracker via a 24-to-12 voltage converter (please consider for diesel vehicles).

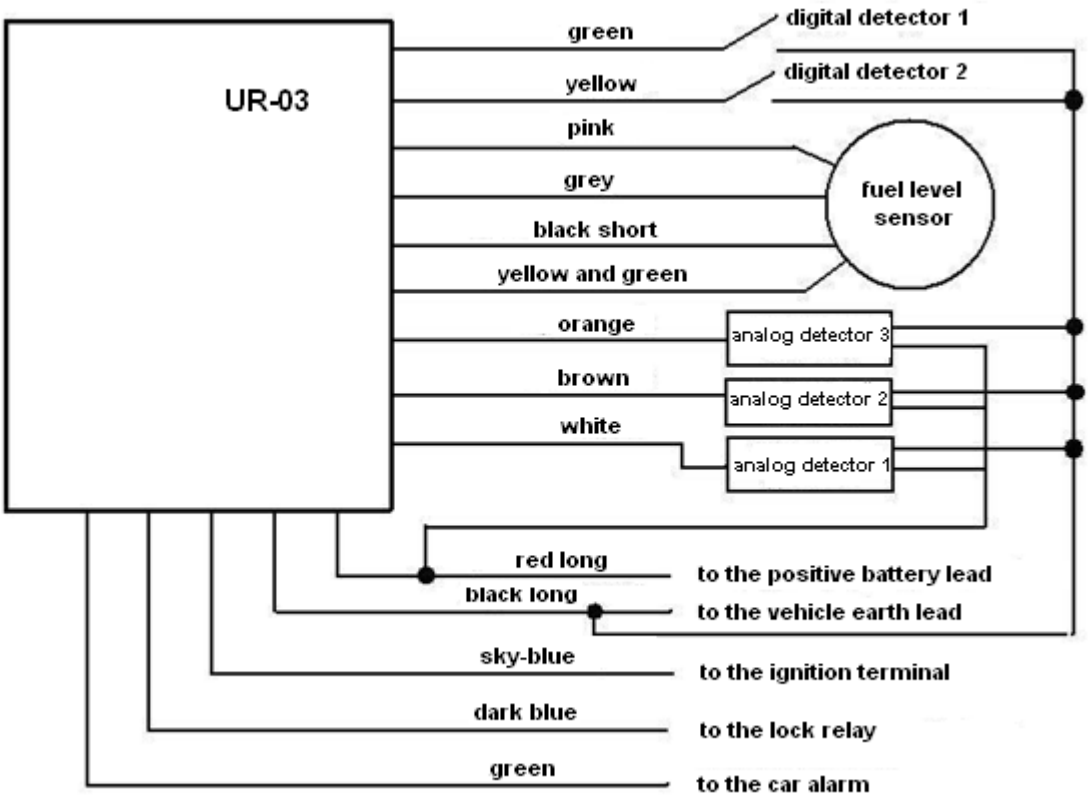

Figure 1. Connecting External Devices to Tracker Leads

3.2 Connecting Analog and Digital Detectors

All models of ORMA trackers excluding MUR provide connecting three analog detectors and two on-off detectors. External analog detectors generating 0 V to 5 V on its outputs can be connected to the tracker inputs marked as “analog detector”.

For digital detectors, if an on-off detector is in normal state then its output is closed on the earth. Otherwise, if the detector responds with an alarm, the detector’s output is open. Connecting the external detectors and mounting them should be carried out in accordance with requirements of documentation provided with the detectors.

3.3 Connecting a Car Alarm

All models of trackers except for UR-02 and UR-02 rev.01 provide connecting a car alarm. Closing the car alarm on the earth forms an alarm. So, one of the car alarm terminals must be connected to the onboard power network.

3.4 Connecting an Ignition Lockout Relay

All models of trackers except for UR-02 and UR-02 rev.01 provide connecting an ignition lockout relay. The ignition lockout relay provides stopping the vehicle engine distantly. When necessary, an operator can give a signal to switch off the engine ignition. The ignition electric circuit is usually broken via two-contact dc relay, with its coil grid being connected to a tracker output

(usually dark blue) in accordance with tracker's Instruction Manual. In case of no signal from the computer current is not carried, while on receiving a lockout signal current begins to flow through the coil and executive contacts of the relay are closed causing the ignition circuit to be open. The relay input voltage should be 12 V. The relay should control ignition operating but don't interfere operation of the ignition switch – this should be considered while relay mounting.

4 CONNECTING GPS/GLONASS AND GSM ANTENNAS

UR-02, UR-03, and MUR devices are equipped with internal GPS/GLONASS antennas, so select such tracker location that provides maximum visibility to the sky (for example, on the dashboard).

UR-02, UR-03, and MUR trackers should be mounted so that their top covers remain turned up. There must not be any current-conducting obstructions between upper surface of the tracker enclosure and the sky in a cone of degrees from vertical. A MUR tracker is equipped with an antenna of higher sensitivity, so the tracker can be hidden under the dashboard (if the dashboard is made of plastic).

Figure 2. An Example of Attaching the Tracker above the Dashboard

Figure 2 shows a way to attach an UR-02 or UR-03 tracker using the double-sided adhesive tape AVIORA. Trackers also can be mounted using two woodscrews from the back of the dashboard as shown in tracker's Manuals.

UR-02 rev.01, UR-03 rev.01, and UR-GLONASS trackers are equipped with external GPS/GLONASS antennas. So the trackers can be installed secretly at any convenient place – for example, under the dashboard as shown in Figure 3.

Figure 3. An Example of Attaching the Tracker under the Dashboard (Secured Mounting)

Installing tracking devices secretly allows avoiding possible cases of sabotage, overheating, and mechanical damages.

An UR-02 rev.01 tracking device has a built-in radio antenna, so before installing it at a secure place please check reliability of radio communications with its US-02 scanner.

4.1 Installing GPS/GLONASS and GSM Antennas

Antennas for the tracking devices having external antenna outputs are furnished with the tracking devices. As a rule, antenna's cables are quite long enough to provide a choice to install the external GPS/GLONASS or GSM antenna. Antennas without magnetic holders are attached to vehicle parts or its windshield inside the vehicle using double-sided adhesive tape provided, so that to ensure the maximum view of the sky. There must be no conductive obstructions between an active antenna surface and the sky in a cone of 30 degrees from the vertical. Each antenna has to be installed horizontally with its active surface upward, with no deviation from horizontal installing more than 20 degrees. It should be remembered that time and accuracy of locating coordinates depends on the quality of antenna installation.

A GPS antenna is intended to be installed only internally

The active surface of a GPS/GLONASS or GSM antenna is its enclosure top, not covered with a coating. The antenna is to be mounted behind the windshield inside the vehicle cabin. The windshield should be free of metallization. Unprotected antenna should not be placed outside the vehicle**.**

Figure 4. Appearance of GPS Antennas

Figure 5. Appearance of the UR-03 rev.01 Tracker with GPS Antenna and GSM Antenna

The antenna can be installed on the dashboard, or below the dashboard, or in the center of the windshield, or somewhere inside the vehicle. DO NOT install the antenna behind the rear window if the backglass is equipped with a resistive-heat defogger. External mounting the GPS antenna is prohibited.

4.2 Secure Mounting the Antenna

To preserve the appearance of the vehicle interior unchanged, GPS/GLONASS and GSM antennas are mounted secretly (flash-mounted). Secure mounting also allows avoiding cases of sabotage on the part of drivers, passengers, or third persons.

In case of secure mounting a **GSM antenna**:

- Attach the GSM-antenna to a non-conducting surface such as glass, plastic etc.;
- Provide maximum moving out of metal surfaces to increase the range of communication with the base station;
- Place the antenna far from sources of sound (radio) and vehicle loudspeakers to avoid background noise due to vehicle interference.

In case of secure mounting a **GPS/GLONASS antenna** the following must be provided:

- The antenna must be installed to maximize the view of the sky not covered by metal surfaces;
- The antenna can be installed above metal surfaces;
- The antenna can also be installed both above and below noncurrent-carrying surfaces;
- Active side of the antenna shall be turned up.

Below are the variants of installing an antenna inside a vehicle (you need maximum glass covering of the vehicle cabin not covered by metal):

- Under the seat of the driver or the passenger provided that top of the antenna is NOT covered a metal thing;
- Under the plastic front panel;
- Under the plastic panel of the rear screen.

Please remember that in case of secure mounting accuracy of estimating navigation parameters can significantly degrade, or the pre-operation time can rise, or location function can be disabled for difficult conditions (in a forest, on the streets among tower blocks, while turning suddenly on narrow streets).