TRANSIENT TECHNOLOGIES

VIY5-125

Ground Penetrating Radar

User Manual

Part 1. Equipment

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All pictures in this User Manual are given for reference purpose only, and may differ from actual product appearance.

Product design and specification may be changed by manufacturer without notification.

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General information

VIY5-125. New generation of Ground Penetrating Radars.

Ground Penetrating Radar (GPR) is designed for non-destructive scanning and inspecting of different structures and underground objects.

GPR can be applied by geophysicists, building companies, can be used in different ecological investigations, utilities condition assessment (including both metallic and non-metallic, plastic, concrete, asbestos pipes). Also the equipment can be used for searching and mapping of: underground water sources leaks, oil and other dangerous liquids underground pollutions; ground water level.

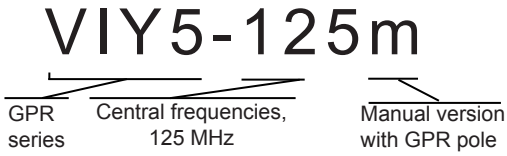
VIY5-125 Ground Penetrating Radar (GPR) has Dual Frequency antenna with central frequencies of 125 MHz.

Application of VIY5-125 GPR

- Utilities mapping and detection (pipes, cables);
- Civil engineering surveys (building basements, cellars etc.);
- Search for buried waste products, and graves;
- Mapping and location of near surface voids, karst and other cavities;
- Determination of boundaries of petroleum contamination zones etc.
- Forensic and security investigations.

Package options

Order information



VIY5-125 GPR can be ordered with three different options sets:

1. VIY5-125m Manual version
Antenna + VO-36 odometer + transportation pole

- 125 MHz antenna unit
- Odometer VO-36
- SH5-125 Replaceable bottom protector
- Transportation belt
- DC5-2 Cable (2.5m)
- Charger
- Backpack
- Laptop holder
- User manual
- User manual

✓ Laptop is not included in any GPR set and should be purchased separately

List of Equipment and Accessories

Item	View	Description
AB5-125		125 MHz frequency antenna unit with digital output, battery on board. Built-in inclinometers. Supports optional connection of GPS and measuring wheels.
Laptop holder		Laptop holder, designed for fastening the laptop to the operator's backpack.
VO-36		VO-36 is a bidirectional odometer (measuring wheel) that measures traveled distance in both directions. Odometer can be mounted to an antenna unit and should be electrically connected to the antenna by special connector. Compatible with VIY5-125 GPR
SH5-300		Protective bottom cover SH5-300, compatible with AB5-37 antenna unit.
Backpack		The backpack for GPR antenna, accessories, laptop, and Battery Box.
DC5-2 Cable		Cable (2.5 m length) to connect DATA socket on the Handcart or Battery Box to a laptop.
Charger		Charger for lead acid batteries. Included in all GPR sets.
GPS receiver		External GPS receiver. GPS kit includes: • GPS receiver • GPR cable • GPR adapter (10cm)
Synchro3 Planner		Software package for VIY5 GPR sounding process control, and also for processing and visualizing GPR data. Full software set can be downloaded for free here: http://viy.ua/download/install_VIY_SGPR.zip

Main components description

GPR consists of antenna unit connected via USB to a computer (laptop). Operator controls antenna unit through VIY5 software.
Optionally user can use with GPR antenna:

- GPS receiver

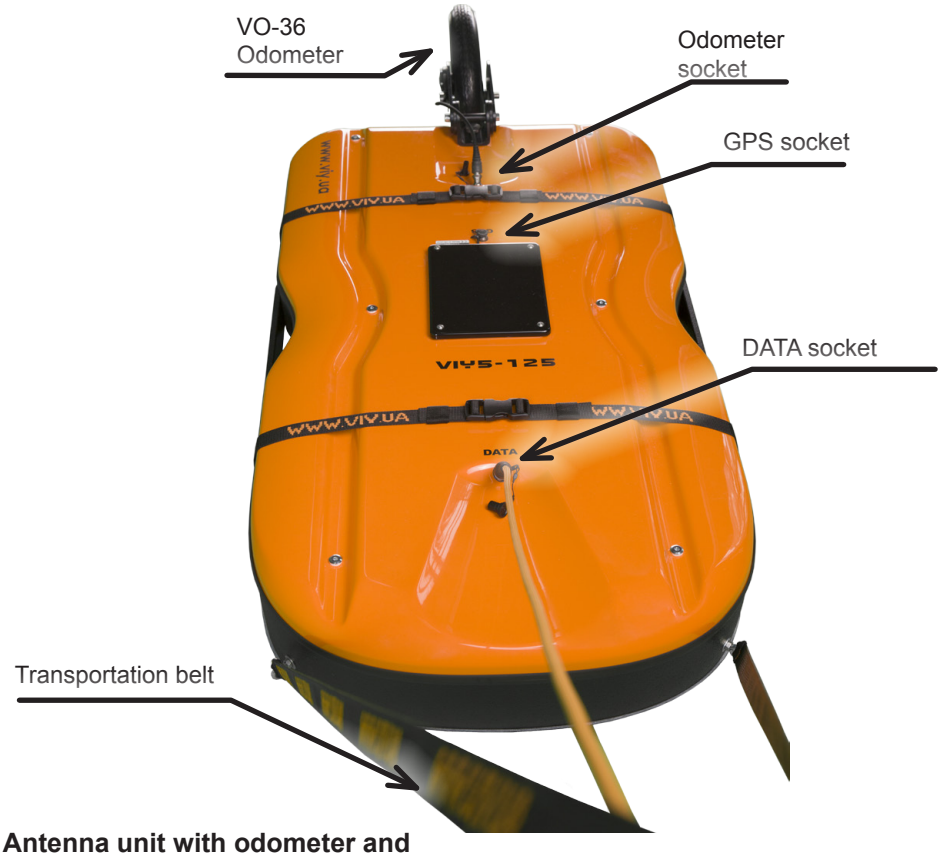
Manual version

Picture below shows general view of the manual version of VIY5-125 GPR with VO-36 odometer and a transportation belt.

Laptop can be placed on the laptop shelf that should be fastened to operator's backpack.

DC5-2 Cable should be connected to DATA socket on the antenna and to USB port of operator's laptop.

Odometer should be connected to Odometer socket on the antenna unit.
If GPS is present, it should be connected to GPS socket on the antenna unit.



Antenna unit with odometer and transportation belt

VO-36 Measuring wheel (odometer)

VO-36 is a bidirectional measuring wheel (odometer) that can be mounted on the antenna unit in manual version of this GPR. It can be mounted to the antenna unit without any extra tools.

Transportation belt

The transportation belt is a special belt that should be fixed to the antenna unit to move antenna during data acquisition process.

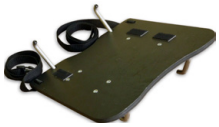
Backpack for GPR accessories and laptop shelf

The backpack is included in each GPR set. The laptop shelf is an accessory that should be used as a support for user's laptop. The shelf can be fastened to the backpack.

The backpack contains compartments for:

- GPR accessories (cables, charger, transport belt etc.)

Backpack with laptop



Laptop shelf

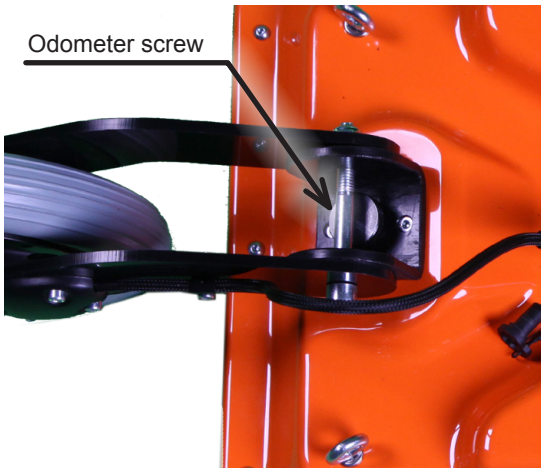
- Odometer VO-36
- User's laptop
- Laptop shelf

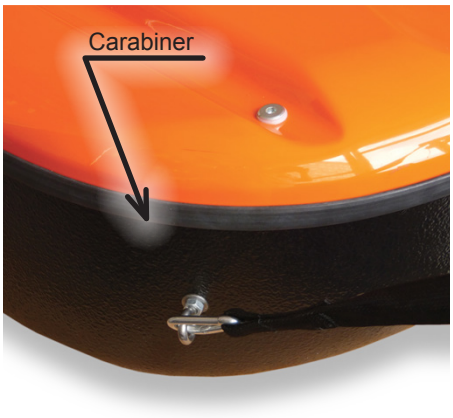
Getting Started

Manual version of VIY5-125 GPR

Mounting Transportation pole and Odometer to antenna unit.

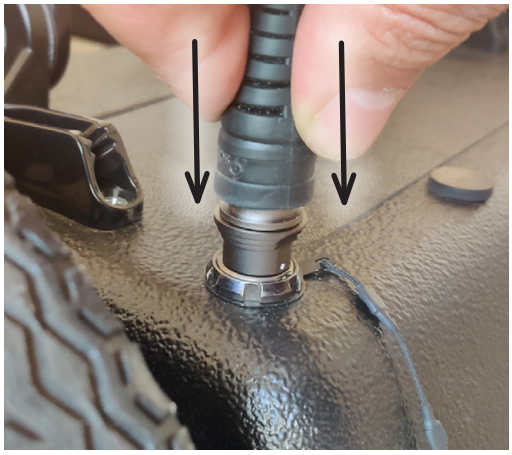
Mount odometer to the antenna unit and screw them manually. Connect the transportation belt to antenna with carabiners. Connect the cable of odometer to antenna socket.



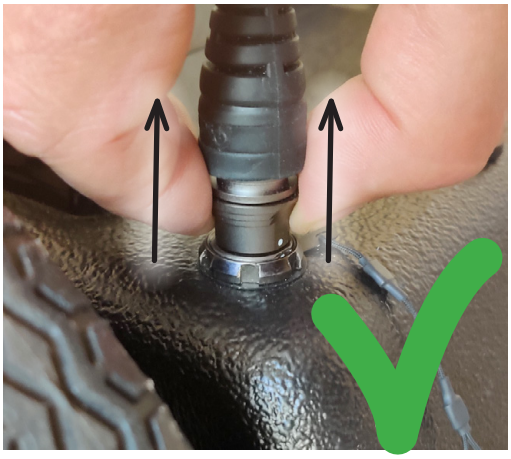


Push-pull connectors.

To connect push-pull connectors you should open cap then match together the white marks on a plug and a socket correspondingly and then insert the plug by holding its housing.



To disconnect - just pull the plug ring back and disconnect it.



- ✓ GPR power supply is turning on when DATA socket is connected to the socket
- ✓ Do not pull the cable trying disconnect the plug. It may damage the connectors!

Connecting antenna unit to a laptop

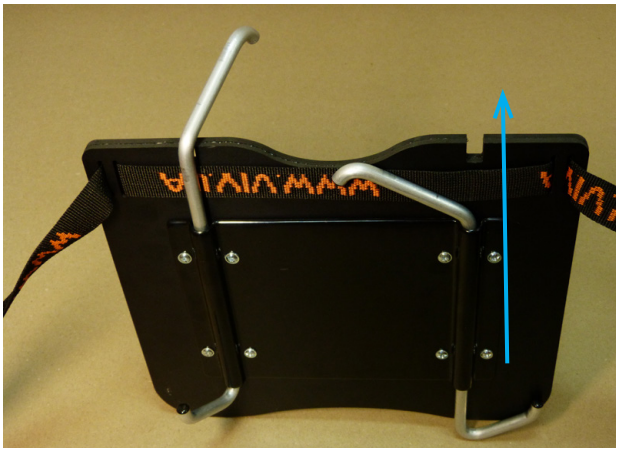
Connect DC5-2 Cable (orange cable) to DATA socket on the antenna unit and to USB port of a laptop.

Mounting the laptop shelf on the operator's backpack

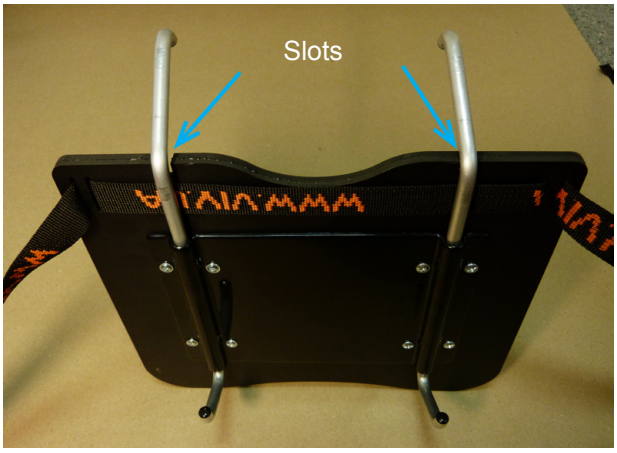
If GPR is used together with VO-22 odometer, the laptop should be mounted on the special portable shelf that should be fastened to the operator's backpack.

To mount the laptop shelf follow the next steps:

- Take the laptop folder out of the backpack.
- Stick the Velcro tape on the top of Handcart shelf and on the laptop bottom in some places (the Velcro tape is included in GPR set).
- Turn the shelf over and pull out the metallic holders (in direction shown by an arrow below).



- Turn the metallic holders 90 degree aside and put them into slots as shown on the picture below.



- Put the backpack on, adjust the backpack side stripes and fasten the backpack belt.
- Fasten operator's shelf locks to the corresponding locks on the backpack stripes

- Tuck he lower holders of the shelf behind the operator's backpack belt.

- Mount the laptop on the shelf, fastening it on the shelf with Velcro tape.

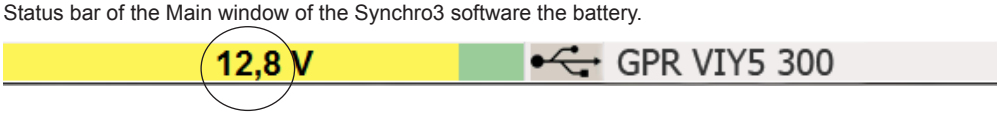
When the work is finished, fold the shelf in the back order and pack it to the backpack.

GPR parameters setting and GPR calibration

Please read ***User Manual part 2. Software*** to find instructions about setting up all the main GPR parameters, its calibration and directions of using Synchro and Planner software.

GPR battery

Each antenna unit is equipped with the sealed lead acid rechargeable battery (12 V, 7 Ah). The power supply of the antenna unit prevents the deep discharge of the battery. The battery charge level is indicated in the Status bar of the Main window of the Synchro3 software the battery.



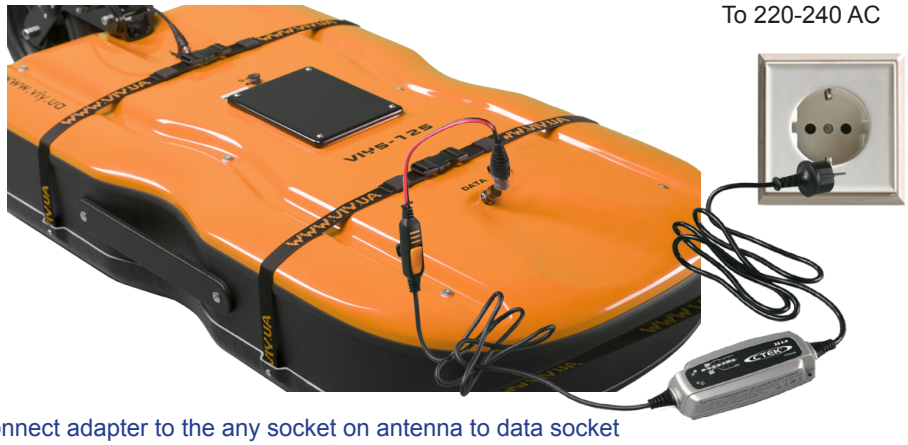
When the battery voltage is low and close to the critical value, the power supply begins beeping. When the battery voltage is below the cut-off threshold (10.8V) the power supply will turn the antenna unit off but beep sound will continue ringing twice per second. That indicates the normal state of GPR and the necessity of battery charging.
For battery charging use the charger that is included in GPR set.

Charging battery of VIY5-125 GPR

For charging the battery of VIY5-125 GPR you should connect the charger plug into DATA socket that is located on the Handcart (or into DATA socket on a Battery Box if connected), and then plug the charger to the AC power (220-240V AC, 50-60 Hz).

Charging battery with antenna installed on the Handcart.
The battery is inside the battery compartment in the Handcart:

Charging battery with antenna outside of Handcart.
The battery is in the antenna:



✓ Connect adapter to the any socket on antenna to data socket

✓ To get more information please read the charger User manual that is in the charger set.

Battery replacement

All models of GPR use the same standard sealed lead acid rechargeable battery (12 V, 7 Ah).

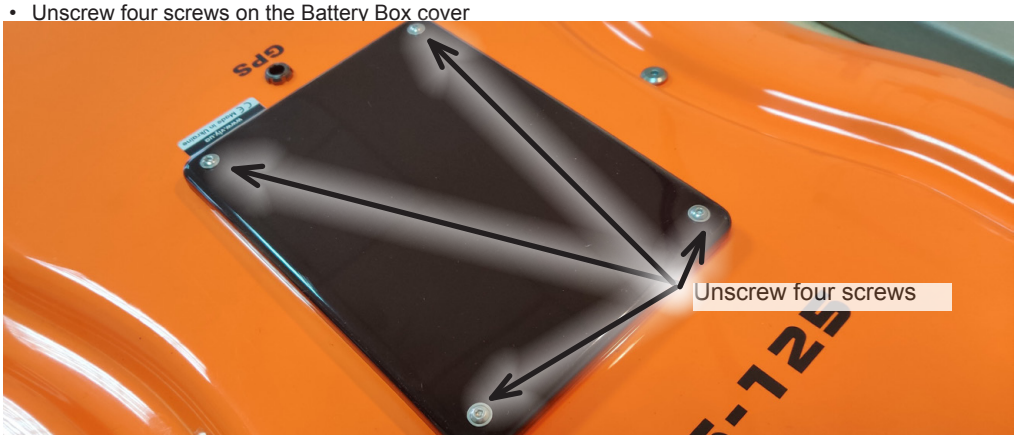
If you notice the Charger error light is on during the charging process, it means that your battery must be replaced for the new one.

✓ To get more information please read the charger User manual that is in the charger set.

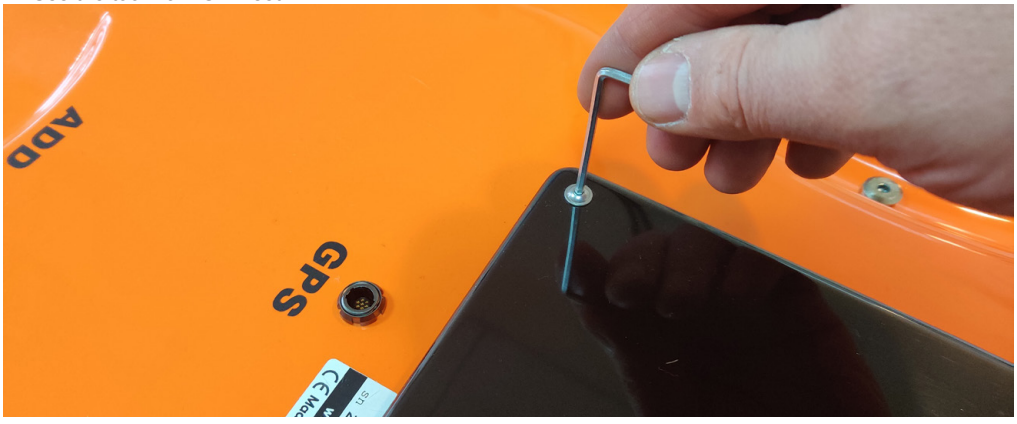
Replace battery in Antenna Unit

To replace the battery in the Antenna Unit:

- Unscrew four screws on the Battery Box cover



- Use the tool from GPR set



- Take the cover off the battery compartment.
- Take the battery out

- Replace it respecting wires polarity
  - ✓ Connecting the wires to battery, respect the polarity (red wire - battery positive pad, blue – negative pad).
- Mount the Battery Box cover back on its place, fix it with four screws.

Specifications

Model of GPR	VIY5-125
Antenna unit, MHz	125
Max sounding depth, meters (depending on soil properties)	15.0
Survey window, nsec	120, 180, 240, 300 nsec
Spatial resolution, meters, (not worse)	<0.9 m
Maximum number of samples per trace	1000
Data acquisition rate, traces per second*	up to 150
Dynamic range	not less than 135 dB
Interface	USB2
Trigger mode	single, internal, external
Analogue-to-Digital Converter range	18 bit
Three-dimensional Inclinometer	Built-in
Weight, kg	25
Dimensions, mm	1105x580x23
Operating temperature range	-20°C to 40°C
Environmental rating	IP65**
Continuous operation time	not less than 8 hours

* Data acquisition rate depends on samples per trace and trace stacking.

** Optionally can be IP67
All antennas support external GPS that can be directly connected to antenna

Limited Warranty

1. **Warranty**.

   Transient Technologies LLC warrants the enclosed hardware products to be free from defects in material and workmanship for a period of 12 (twelve months) from the date of original retail purchase.

2. **Repair Procedures, Exclusive Remedy.**

   Transient Technologies LLC will, at its option, repair or replace products not conforming to this limited warranty at no charge. This is the sole and exclusive remedy available for breach of warranty or under any other legal theory with respect to Transient Technologies LLC product. If you find a product to be defective, please contact your authorized Transient Technologies LLC representative or directly to head office of Transient Technologies LLC. When you receive authorization, return the product as directed, including proof of purchase and date, at your expense and risk. Product repairs not covered by warranty, and product updates, will be provided at a set rate.

3. **Limitations.**

   This warranty is to be avoided if the product is damaged by importer or abnormal use or by accident, if the product is altered or modified in any way, or if any attempt is made to repair the product without authorization from Transient Technologies LLC. It is solely the purchaser's responsibility to determine the suitability of these products for each particular application. Transient Technologies LLC products are in all events not suitable, and are not authorized, for use with systems potentially injurious to life or health. This warranty is not assignable.

4. **No Other Warranties.**

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