User Manual

PK2 Receiver X2.0 ENG

for Vesala Drill Point Locator Receiver PKR2 X2.0E
and Vesala SPL2 SmartPlug Locator X2.0

IMPORTANT: Read carefully before use.
Keep for future reference.

English

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VESALA

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1 Safety notes

To avoid possible harm, read and follow these instructions.

DANGER: Risk of electric shock, fire, or property damage

Drilling a structure may damage a dangerously live electric cable or a pressurised pipe. Before drilling a structure, make sure the structure doesn't contain dangerously live cables or pressurised pipes. If their existence cannot be excluded, the whole installation containing the structure should be de-energized and de-pressurised before drilling begins. In some cases, a decrease in locating accuracy may move the intended drill point.

ATTENTION: Risk of locating error due to electromagnetic conditions

Large metallic objects, radio transmitters or industrial equipment may degrade locating accuracy or may prevent locating completely. Before attempting to locate a drill hole, take care that there are no large metallic objects at or near the intended drill hole. Large metallic objects include radiators, sheet metal, foil, and wire mesh among other things. Shut down or move any radio transmitters that actively transmit on the same frequency at least 10 m away from the intended drill hole. This includes other drill point locators.

ATTENTION: Risk of locating error due to device misorientation

Locating drill points with misoriented devices may degrade locator performance. Instructions for properly orienting the devices are provided in section 4: Operating receivers.

2 General description

2.1 Intended use

Drill Point Locator Receiver PKR2 and SPL2 SmartPlug Locator are used to locate positions and measure distances thru non-conductive structures such as walls, floors, and ceilings before drilling or cutting. A separate transmitter unit is needed to mark the desired location. Transmitter PKT2 is included in PK2 Drill Point Locator kit with Receiver PKR2. In addition to that, PKR2 may be used with smaller transmitters SP15 SmartPlug or TX15 Plug Transmitter. SPL2 SmartPlug Locator is compatible with these small transmitters only. Drill Point Locator Receiver PKR2 and SPL2 SmartPlug Locator are intended for professional use in dry conditions.

2.2 Specifications

Operating temperature, LR03 batteries installed	-10°C…+40°C
Operating temperature, FR03 batteries installed	-20°C…+40°C
Humidity	10…90 % RH, non-condensing
Storage temperature, LR03 batteries installed	+5°C…+30°C

Storage temperature, batteries removed or FR03 batteries installed	-20°C…+40°C
Degree of protection	IEC 60529 IP40
Batteries	3 pcs 1.5V IEC LR03 or FR03
Current consumption	15…75 mA
Nominal battery voltage	4.5 V
Enclosure material	ABS
Enclosure size	176 x 78 x 29 mm
Weight, LR03 batteries included	216 g
Locating range, continuous	PKR2 and PKT2: 0…150 cm With SP15 or TX15: 0…30 cm
Extended locating range until SP15 or TX15 power saving activates	0…50 cm
Distance indication range, continuous	PKR2 and PKT2: 1…200 cm With SP15 or TX15: 0.2…30 cm
Extended distance indication range until SP15 or TX15 power saving activates	0.2…60 cm

Performance in free air, room temperature, ≥1000 mm from conductive objects	Lateral error: ±3% of actual distance between units Distance error: ± 1 cm ± 10%
Operating frequency band, maximum power transmitted	9000…13350 Hz, input 83.000…83.666 kHz, < 10 mW 433.47…434.37 MHz, input
Electromagnetic environment	ETSI EN 301 489-1: Residential, commercial and light industrial environment
Receiver category	2
International standards this product is in conformance with	EN 300 220-1 EN 300 220-2 EN 300 330 EN 301 489-1 EN 301 489-3 EN 303 454

2.3 Package contents

PK2 Drill point locator (V11740) contains the following items

- Drill Point Locator Receiver PKR2, version X2.0 (V11744)
- Drill Point Locator transmitter PKT2, version X2.0 (V11741)
- Alkaline battery LR03, 6 pcs (J01573)
- Felt pad, 4 pcs (N05925)
- Adhesive putty, Casco 2981, 60 g (S14010)
- User manuals

SPL2 SmartPlug Locator (V11762) contains the following items

- SPL2 SmartPlug Locator, version X2.0 (V11745)
- Alkaline battery LR03, 3 pcs (J01573)
- Felt pad, 4 pcs (N05925)
- User manual

Version numbers are indicated at the beginning of the serial number.

2.4 PKR2 and SPL2 parts and functions

Centre hole Mark the located point on the structure here.

Direction indicators
Red arrows show where to move the device.
Green squares indicate located position.

Display
Indicates measured distance to transmitter.
Displays firmware version letter and battery voltage at start-up.

Power LED
Green LED indicates power on. LED blinks if batteries should be replaced. Device will shut down after 10 minutes of inactivity.

Power and volume button
Long press: Toggle power on or off.
Short press: Toggle speaker volume normal or low.
Volume resets to normal at start-up.
Extended start-up press: Access menu, see chapter 3.4.

Speaker
Higher pitch indicates better alignment or shorter distance.

Batteries
Located backside under battery cover: 3 x 1.5 V LR03 or FR03

3 Commissioning

3.1 Inserting and replacing batteries

1. Clean and dry the device with a soft cloth.
2. Gently press battery cover and slide towards bottom end.
3. Remove old batteries.
4. Insert three new 1.5 V LR03 (AAA) alkaline batteries or FR03 lithium batteries. FR03 batteries should be used when ambient temperature is below -10°C. Observe that battery polarity matches markings on the battery compartment.
5. Put battery cover back on and gently close it.

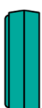
3.2 Attaching felt pads

Felt pads may be attached to the bottom of the receiver at designated spots to avoid scratches on structures and to ensure smooth movement.

3.3 Testing correct operation

Refer to Vesala Transmitter PKT2 user manual for information on how to test correct operation with Transmitter PKT2 and Receiver PKR2. To test correct operation with SmartPlug SP15 or Plug Transmitter TX15, follow this sequence:

1. When using Receiver PKR2, make sure it has the correct operation mode selected. See chapter 3.4.
2. Activate SmartPlug SP15 or Plug Transmitter TX15.
3. Power on Receiver PKR2 or SPL2 SmartPlug Locator.
4. Hold SmartPlug SP15 or Plug Transmitter TX15 directly behind Receiver PKR2 or SPL2 SmartPlug Locator at a distance of 30 cm as shown.

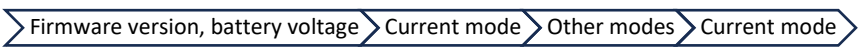


   a. Receiver should now display the distance between the devices.
5. De-activate SmartPlug SP15 or Plug Transmitter TX15 and power off Receiver PKR2 or SPL2 SmartPlug Locator.

3.4 Selecting the operation mode

PKR2 receiver is compatible with Drill Point Locator transmitter (PKT2) and plug transmitters (SmartPlug SP15 and Plug Transmitter TX15). SPL2 SmartPlug-locator is only compatible with plug transmitters. PKR2 receiver has two operation modes: Default drill point locator mode for locating the PKT2 transmitter and alternative mode for locating plug transmitters. In chosen markets, drill point locating mode in PKR2 supports inch display in addition to centimetres. To change PKR2 operation mode (or units for distance display), act as follows:

1. If the device is on, switch it off.
2. Press and hold the power button. 5s at a time, the display shows the following:



3. Release the power button during current mode or any other mode you wish to use.

- Mode change display contents:
  - Firmware version, battery voltage: E.g. E4.5 = version E, 4,5 V voltage.
  - Mode acronyms:
    - dPL (for Drill Point Locator): units in centimetres. (PKT2 transmitter)
    - PLG (for Plug): units in centimetres. (SP15 or TX15 transmitter)
    - In: Drill point locator in inches, IF supported. (PKT2 transmitter)

4 Operating receivers

4.1 Inspecting the work site for hazards

Carefully examine the structure to be drilled and surroundings for hazards before drilling.

DANGER: Risk of electric shock, fire, or property damage

Drilling a structure may damage a dangerously live electric cable or a pressurised pipe. Before drilling a structure, make sure the structure doesn't contain dangerously live cables or pressurised pipes. If their existence cannot be excluded, the whole installation containing the structure should be de-energized and de-pressurised before drilling begins. In some cases, a decrease in locating accuracy may move the intended drill point.

4.2 Objects that may decrease locating accuracy

ATTENTION: Risk of locating error due to electromagnetic conditions

Large metallic objects, radio transmitters or industrial equipment may degrade locating accuracy or may prevent locating completely. Before attempting to locate a drill hole, take care that there are no large metallic objects at or near the intended drill hole. Large metallic objects include radiators, sheet metal, foil, and wire mesh among other things. Shut down or move any radio transmitters that actively transmit on the same frequency at least 10 m away from the intended drill hole. This includes other drill point locators.

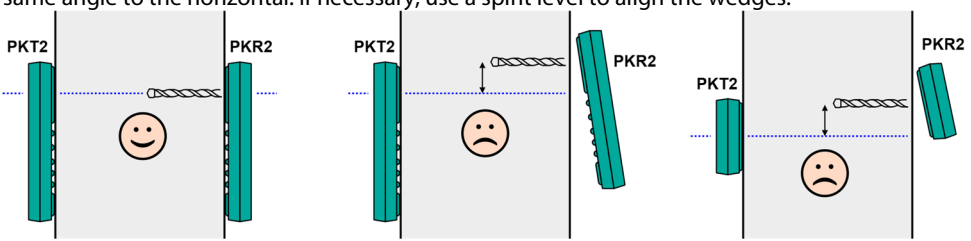
Locating accuracy will be degraded if there are large metallic objects closer to the units than the distance between the units is. Additionally, distance display may indicate longer distance than actual. To avoid locating errors when large metallic objects are present, consider another drilling location, perform offset measurement or multi-point measurement.

4.3 Locating accurately thru thick structures

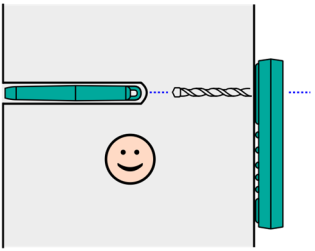
⚠ **ATTENTION**: Risk of locating error due to device misorientation

Locating drill points with misoriented devices may degrade locator performance.

Alignment errors are highlighted when locating drill points thru thick structures. When using Transmitter PKT2 with Receiver PKR2 for straight drilling, the device bottoms should face each other on parallel planes both sides of the structure. When wedge pieces are used for angled drilling, the angle of both transmitter and receiver should be the same and they should be at the same angle to the horizontal. If necessary, use a spirit level to align the wedges.



Respectively, when locating SmartPlug SP15 or Plug Transmitter TX15, the receiver should be used perpendicular to the transmitter. Notice this especially when the transmitter has been installed in an angle to the structure.

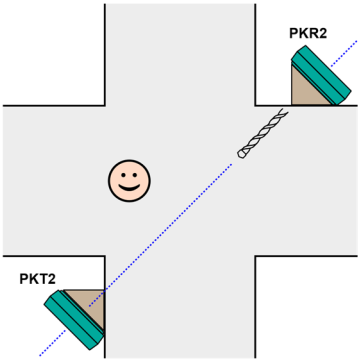


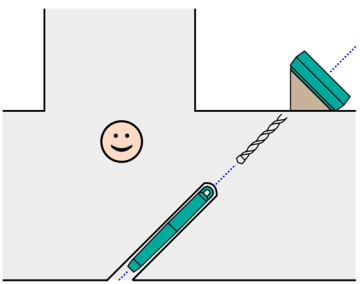
4.4 Operating the receiver

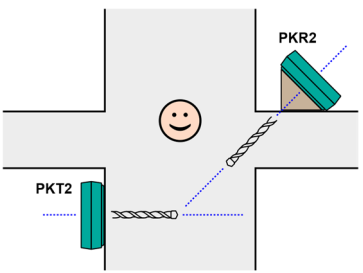
Place the receiver against the structure with the user interface towards the user. Move the receiver slowly to the direction indicated by red arrows. Two arrows pointing to a direction indicate a long distance, one stands the proximity of the measured point. The audio signal pitch increases when the receiver is moved towards the correct spot. Green squares indicate when the receiver is aligned with the transmitter. When only four green squares are displayed on the receiver, the transmitter and receiver are aligned and the distance between them can be read on the display. The spot can now be marked through the receiver's centre hole.

4.5 Measurement at an angle

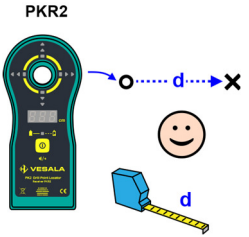
When a drill point needs to be located at an angle other than 90° to the surface of a structure, start by attaching the transmitter to the structure at the desired angle of the drill hole. Locate the transmitter while holding the receiver at an equal angle. A wedge made from a non-metallic material may be used to hold the devices at the desired angle. If the angles are not identical, the resulting hole should be drilled from both sides of the structure so that the holes meet inside the structure at different angles.



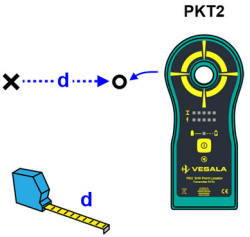




4.6 Offset measurement with PKR2 and PKT2

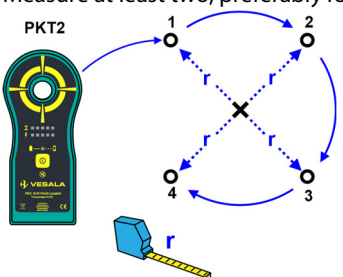


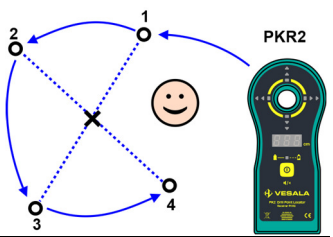
Place the transmitter on an area where no metal is present. Measure the distance and direction from the receiver to the intended drilling point. Locate the corresponding spot relative to the transmitter on the other side of the structure and use reverse measurement to define the drilling point.



4.7 Multipoint measurement with PKR2 and PKT2

Measure at least two, preferably four points at exactly same distance from the intended drilling point. Make separate measurements and markings for each reference point. The correct drilling spot is at the geometrical midpoint of the reference points.





5 Taking care of your equipment

5.1 Storing

Remove batteries before storing the device for an extended period. Batteries left in the device may leak and cause damage. Store the device, batteries and accessories inside its original packaging in a dry, warm place.

5.2 Cleaning

If the device is dirty or wet, clean and dry the outer surface of the device with a soft cloth before changing batteries. Avoid getting dirt or water inside the device. A small amount of isopropanol can be used to remove stains and disinfect the surface. Battery compartment and battery contact surfaces inside the battery compartment should only be cleaned with isopropanol and a soft, lint free cloth.

5.3 Troubleshooting

If case of trouble, follow the table below for possible remedy.

Problem	**Possible explanations**	**Remedy**
The device does not power up or unexpectedly shuts down.	One or more battery is empty.	Replace all batteries.
	One or more battery is reversed.	Orient batteries so that polarity matches markings on the battery compartment.
	Device shuts down after inactivity.	When no signal is detected, the device will shut down after 10 minutes.
Receiver gives inaccurate positioning result or indicates distance incorrectly.	There are interfering objects nearby.	Stay clear from objects or use the offset measurement method.
	Transmitter PKT2 and receiver PKR2 are not on parallel planes.	Make sure that the structure is evenly thick and place transmitter and receiver accurately on their surfaces.

Problem	Possible explanations	Remedy
Receiver gives inaccurate positioning result or indicates distance incorrectly.	Transmitter SP15 or TX15 are not perpendicular to the receiver.	Make sure the receiver is held at the same angle to the structure where the transmitter is installed.
	Wrong transmitter type or display unit is selected.	To select correct transmitter type and display units, see chapter 3.4.
Receiver does not respond to transmitter even when distance is within operating limits.	Other electric or radio equipment in close proximity interferes with the communication between the transmitter and the receiver.	Turn off, move, or otherwise eliminate the interfering equipment.
	There are large metal objects in the way.	Try to find a spot without metal or use the offset measurement method.
	Wrong transmitter type is selected.	To select correct transmitter type, see chapter 3.4.

5.4 Modifying and misuse

Do not attempt to modify the device or accessories in any way. Do not use accessories other than specified. A modified device or accessory may work in an unpredictable way or may fail to work at all.

Do not use excessive force with the device. Do not drop, throw or step on the device. If the device has been dropped, check correct operation before using it.

5.5 Warranty

Drill Point Locator Receiver PKR2 and SPL2 SmartPlug Locator have one-year warranty against material or manufacturing defects from the date of purchase. The warranty shall not cover batteries, normal wear and tear, misuse or faults resulting from modifying the product.

5.6 Disposal

Do not discard this product with household or general waste after its end-of-life. Return it for recycling according to EU Waste Electrical and Electronic Equipment directive (WEEE). For more information contact your supplier or local agent.

6 Supplier contact information

Service, spare parts, replacement user manuals and technical support:

H. Vesala Oy
Peräsimentie 1, FI-03100 Nummela, Finland
Tel. +358 44 200 2005, info@vesala.fi, www.vesala.fi

7 Declaration of conformity

Hereby, H. Vesala Oy declares that the radio equipment types Drill Point Locator Receiver PKR2 version X2.0 and SPL2 SmartPlug Locator version X2.0 are in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: vesala.fi/pk2/eudoc

Hereby, H. Vesala Oy, declares that the radio equipment types Drill Point Locator Receiver PKR2 version X2.0 and SPL2 SmartPlug Locator version X2.0 are in conformity with the relevant UK legislation: S.I. 2016/1091, S.I. 2016/1101, S.I. 2017/1206 and S.I. 2012/3032. The full text of the UK declaration of conformity is available at the following internet address: vesala.fi/pk2/ukdoc