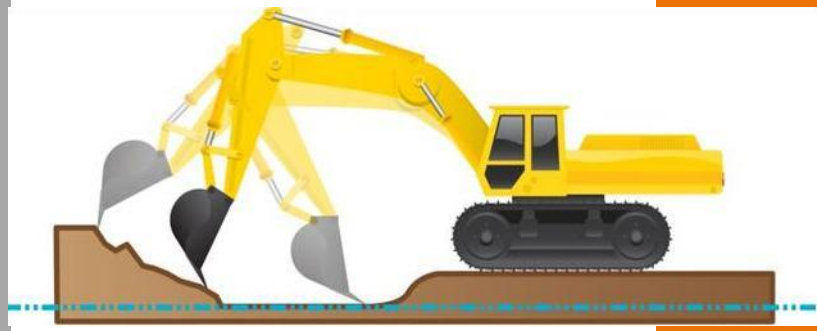
# EZDig

# User Manual

## EZDig T



## Menu

Manual Version: 2.00

Software Version: 3.5.1

Language: English

GEOMAX

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# Presentation

Use the system to dig with an excavator to a desired depth and create a leveled plane or to set a slope and create a tilted surface. Also use it to determine reach, such as for the width of a trench.

All the digging information is referenced to the left, center or right of the bucket blade (or teeth) and the depth value shown is the distance from the actual teeth position to the target depth.

Sensors measure the angle of the boom, stick, and bucket. The information is transmitted instantly to the cab display. LEDs tell you how far to dig.

A simple one-time procedure allows the EzDig system to “learn” the dimensions of your machine. That is how it constantly calculates, in real
time, where the bucket tip is in relation to the target depth.


# Excavator rotation and movement

With EzDig 1D, the operator has to dig “straight ahead” (only moving the booms/bucket in and out).

After the target depth has been set, the chassis has to stay stable. Any rotation of it may produce an error depending on the inclination.

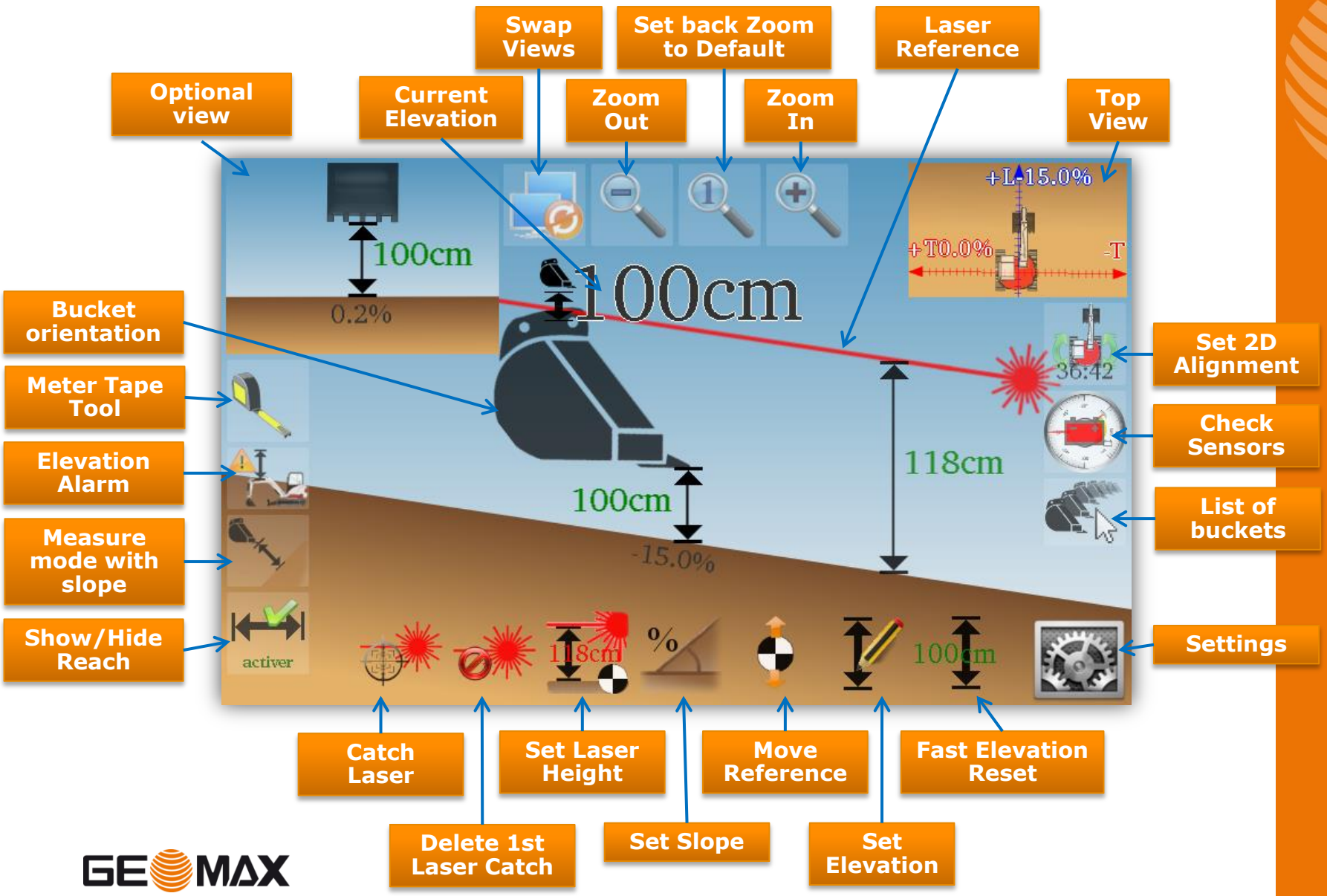
For a leveled plane, rotation of the chassis can be compensated by using a fourth sensor as a “pitch” sensor on the chassis. This will automatically correct forward and backward tilting movements of your machine as well as rotation, providing accurate depth information.

The optional 2D sensor allows to slew the cab even with a slope to dig.

The combined Tilt sensor allows to use tiltable tools.

Every time that the excavator tracks are moved, it’s necessary to zero again the reference (target) depth on a previous point or, depending on the setup, take the laser height again.

# Touchscreen overview

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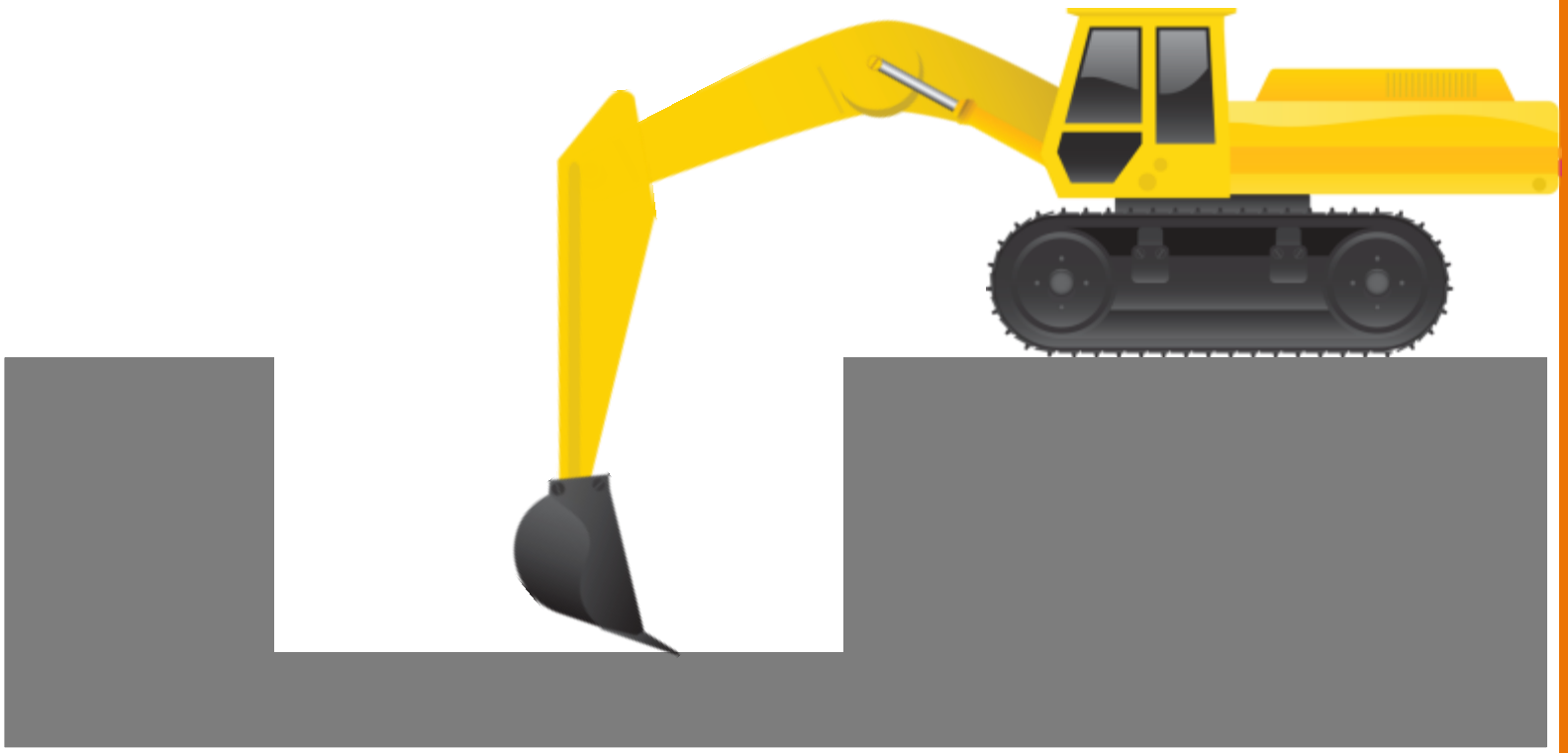
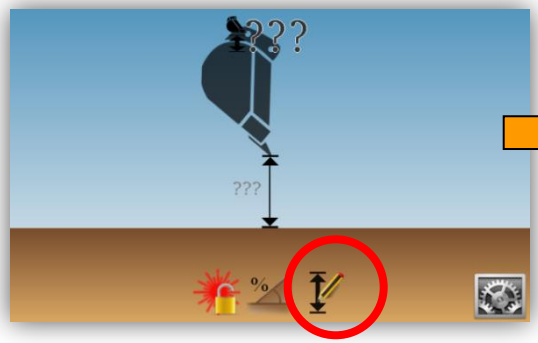
# Digging a hole - Method 1: Using the ground as reference



# Digging a hole - Method 1: Using the ground as reference



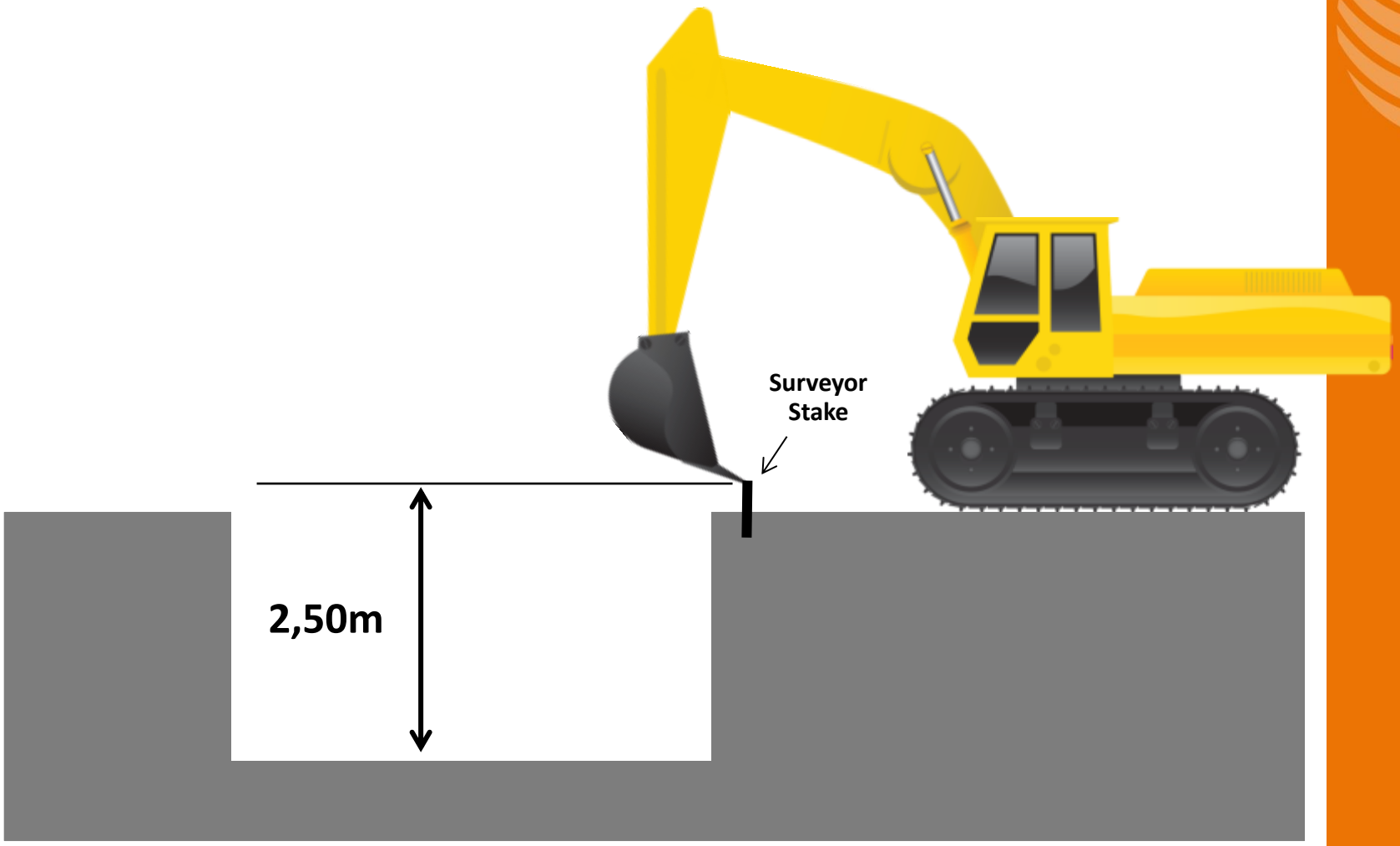

1. Place the tip of the bucket on your final elevation (ground) and Short-press one the elevation symbol:


2. Dial-in "0" and confirm with the checkmark

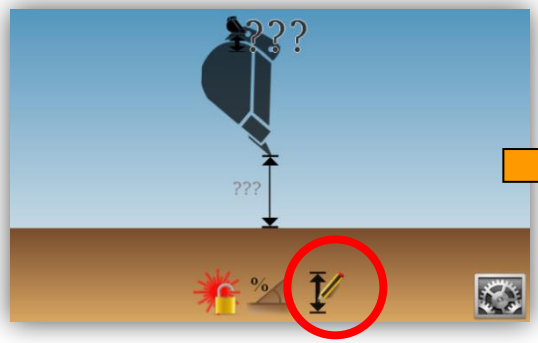

→ The screen and the LED display will indicate the actual difference of your bucket tip to the reference

NB: To redial the previous elevation, you can user button "fast elevation setting" which redial the previous elevation:

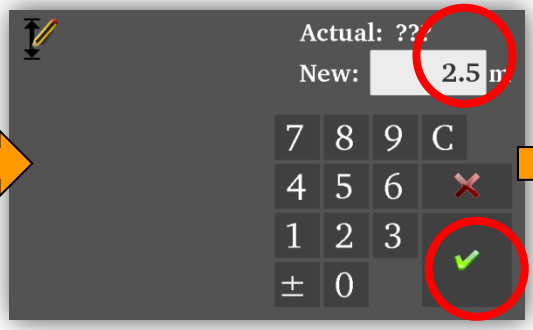
# Digging a hole - Method 2: Using surveyor stake as reference



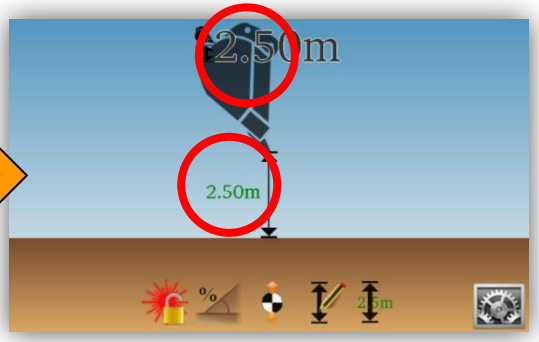
# Digging a hole - Method 2: Using surveyor stake as reference




Place the tip of the bucket on your final elevation (ground) and Short-press one the elevation symbol:



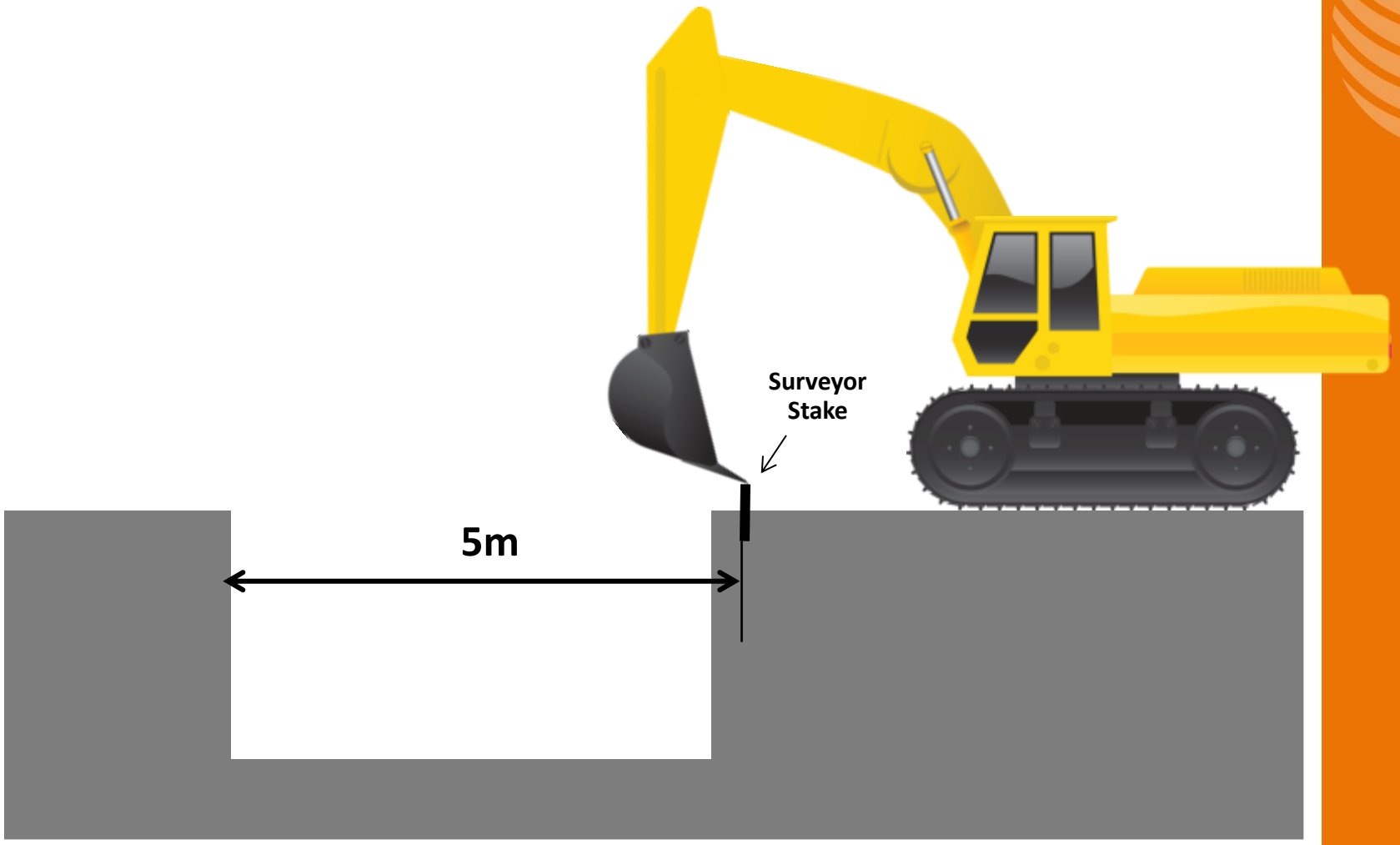

Dial-in "2.5m" and confirm with the checkmark




→ The screen and the LED display will indicate the actual difference of your bucket tip to the reference

NB: To redial the previous elevation, you can user button "fast elevation setting" which redial the previous elevation:

# Digging a 5m wide hole



# Digging a 5m wide hole

NB: Set the elevation reference following the explanations above.

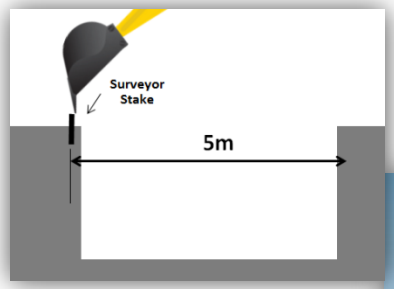
1. Click on the button "Reach Enable" at the left side of the screen: 

2. Align your cab along the axis of the hole and click on the Align button (2D only): 

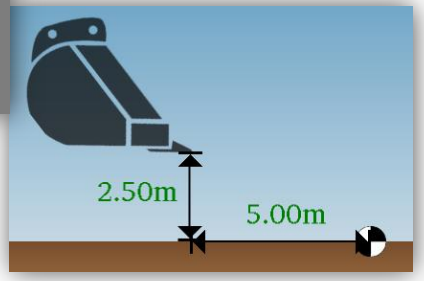

3. Leave the tip of the bucket on the surveyor stake.

4. Short-press the reach button: 

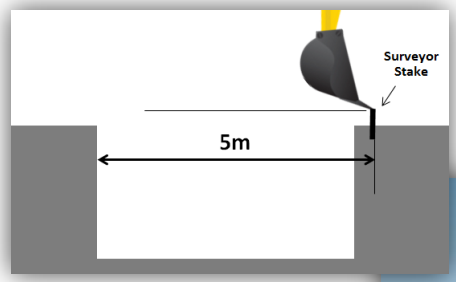
5. Possibility 1:



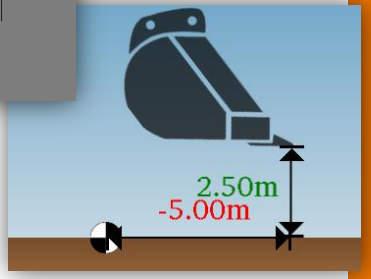

→ Dialin 5m




Possibility 2:

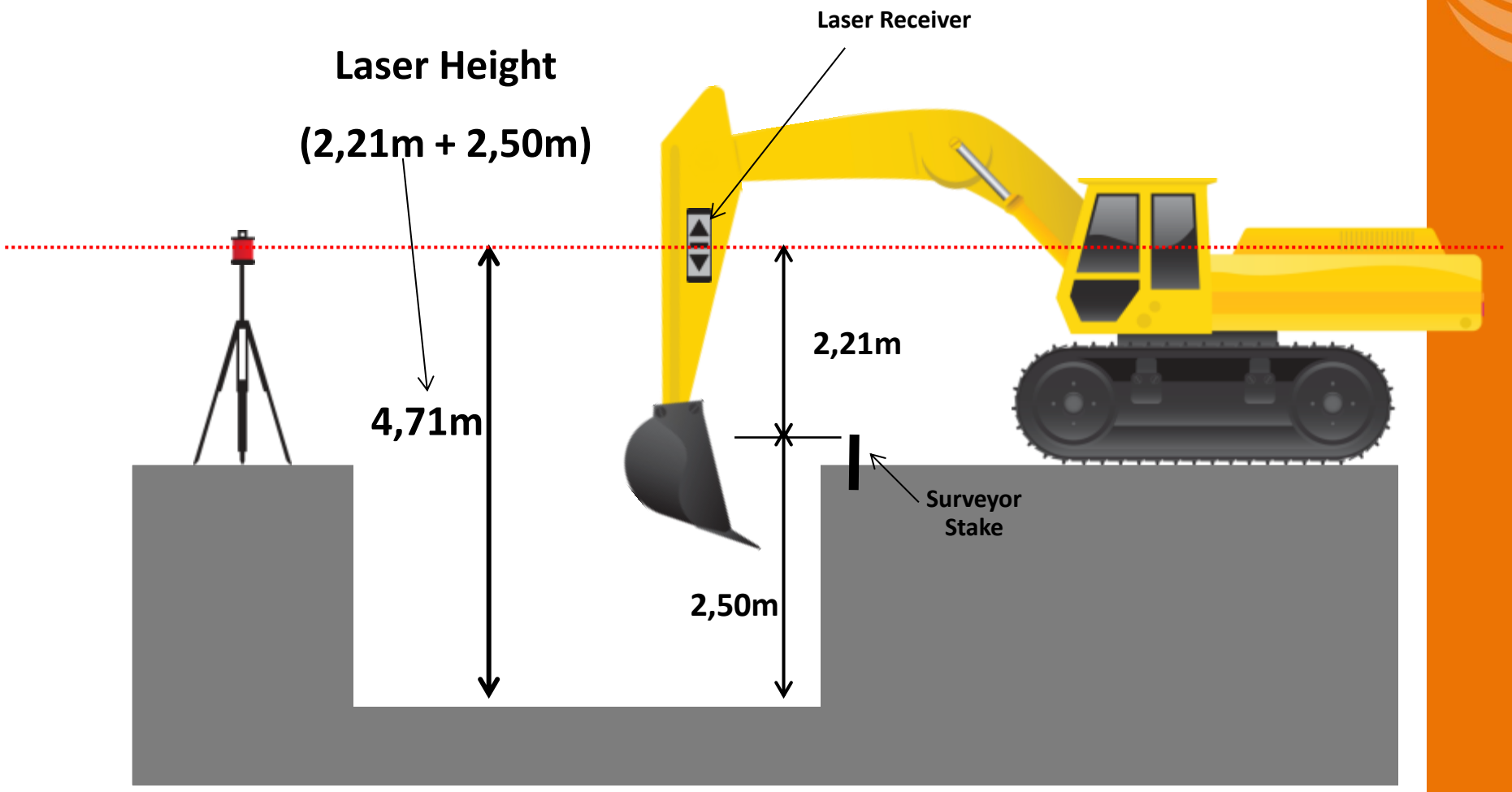



→ Dialin -5m



# Digging a hole using a rotating laser

## Method 1: Knowing the laser height

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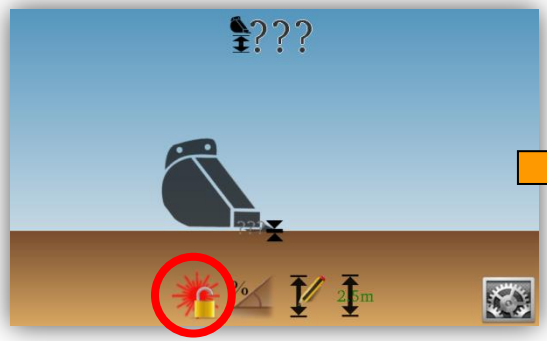
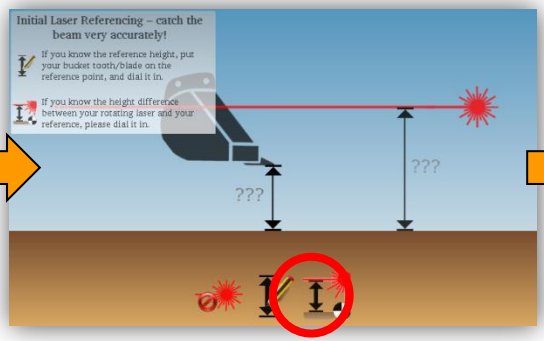
# Digging a hole using a rotating laser

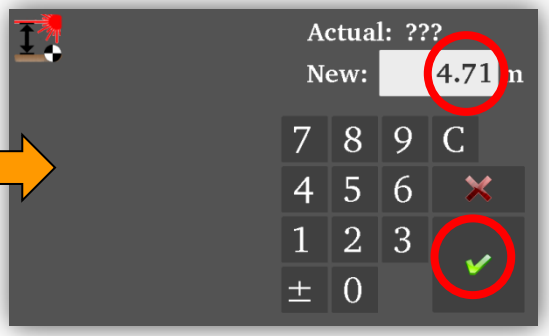
## Method 1: Knowing the laser height



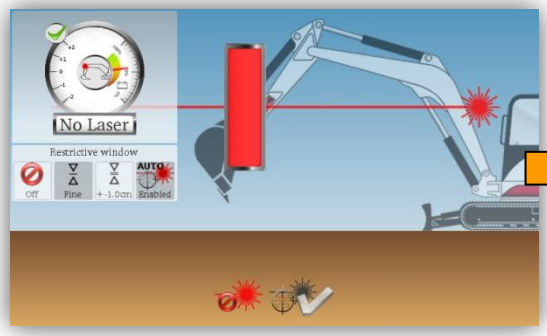

Short-press the "1st Laser Catch" Symbol



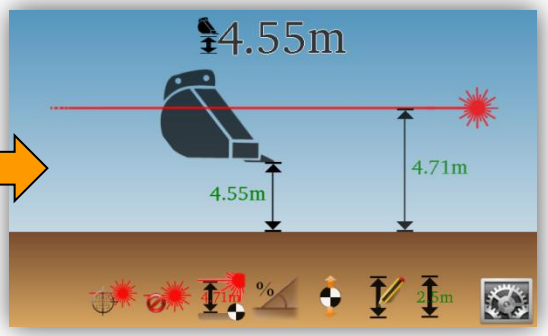

Short-press the Laser Height Symbol




Dial-in 4.71m and confirm with the checkmark




Catch the laser beam




→ The set Laser Height (4,71m) and the resulting distance to the reference will be shown on the screen.

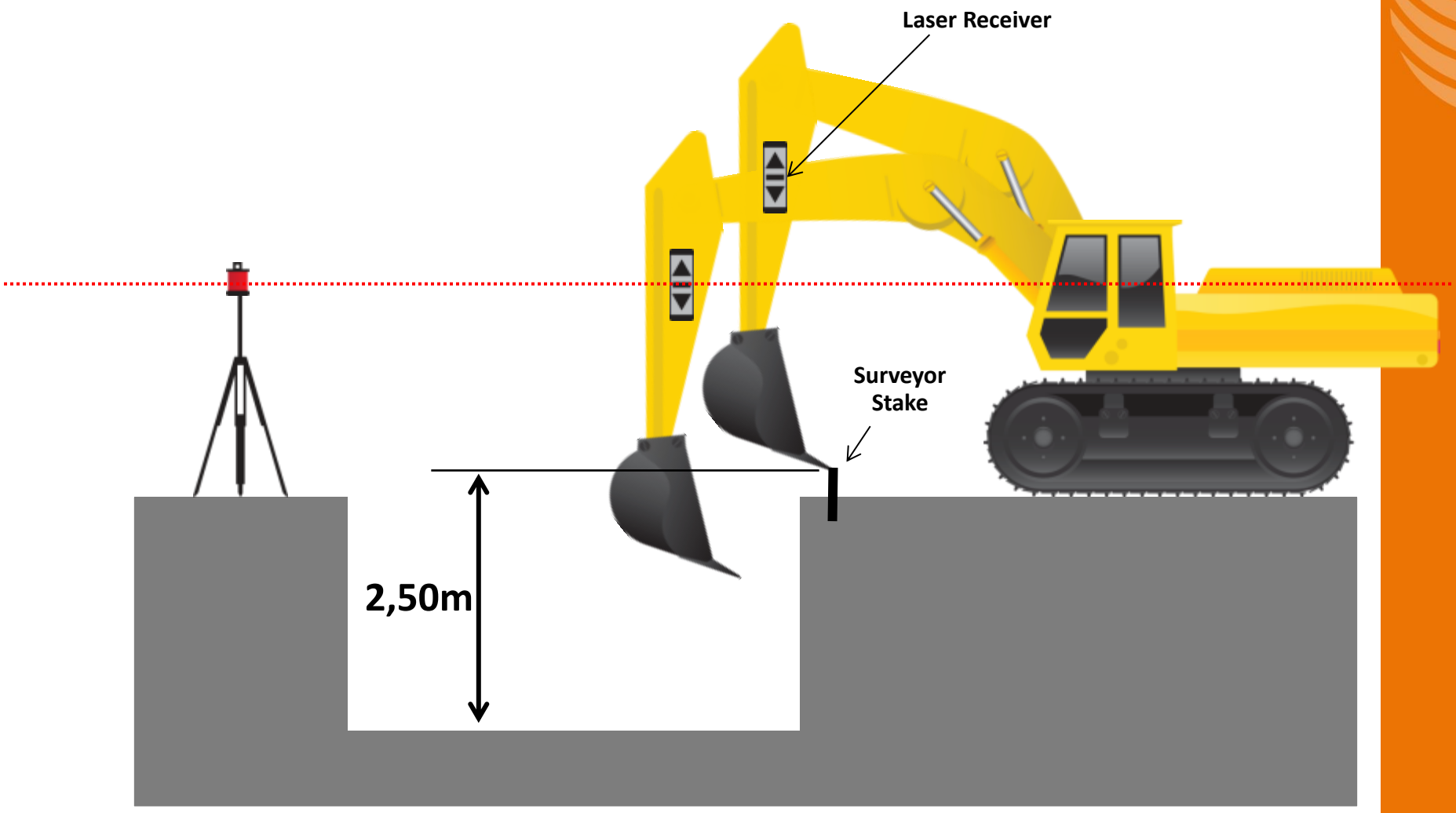
Every time you've moved the machine:

1. Short-press "Laser Catch":

2. Catch the laser beam

# Digging a hole using a rotating laser

## Method 2: Not knowing the laser height

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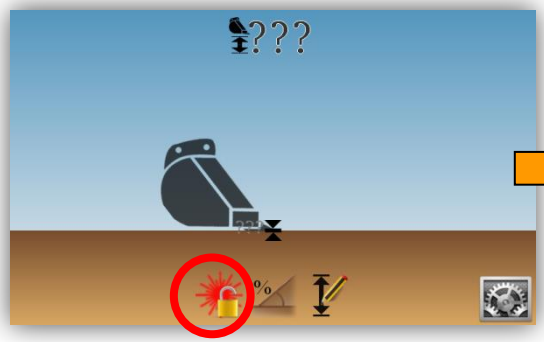
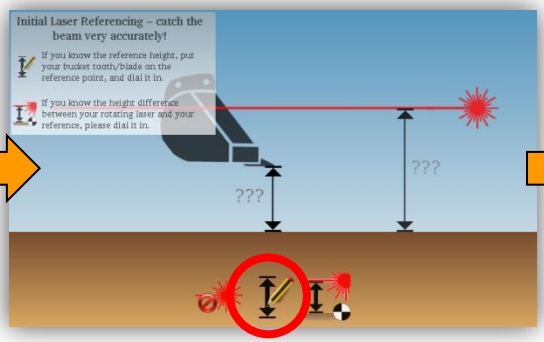
# Digging a hole using a rotating laser

## Method 2: Not knowing the laser height

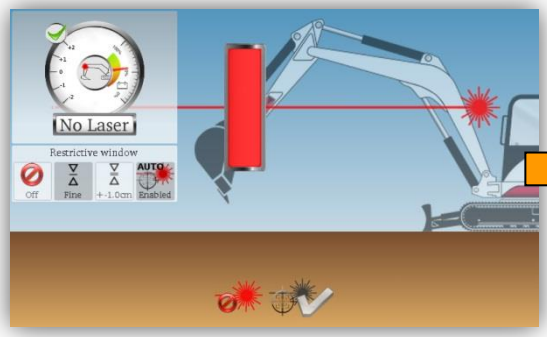



Short-press the "1st Laser Catch" Symbol

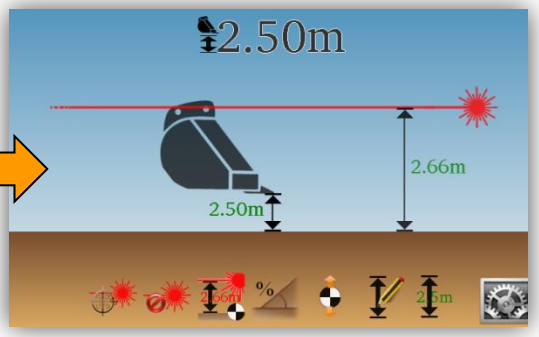



Short-press the Elevation Symbol


Leave the tip of the bucket on the surveyor stake then dial-in 2.5m and confirm with the checkmark




Catch the laser beam



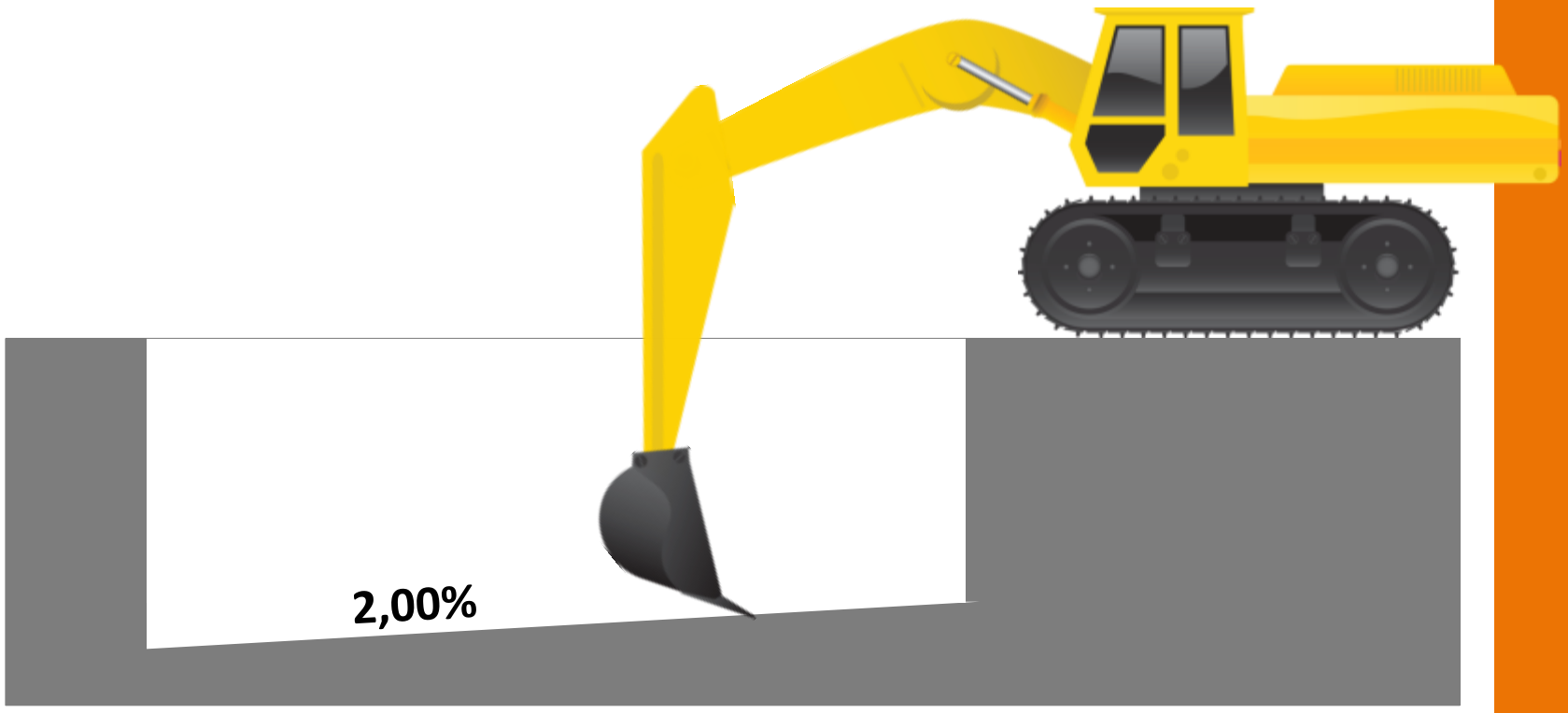

→ The set actual distance (2,50m) to the reference and the resulting Laser Height will be shown on the screen.

Every time you've moved the machine:

1. Short-press "Laser Catch": 
2. Catch the laser beam

# Digging a trench with 2% slope

## Method 1: Using the ground as reference

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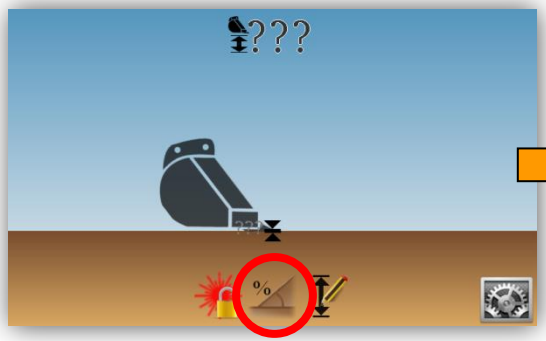
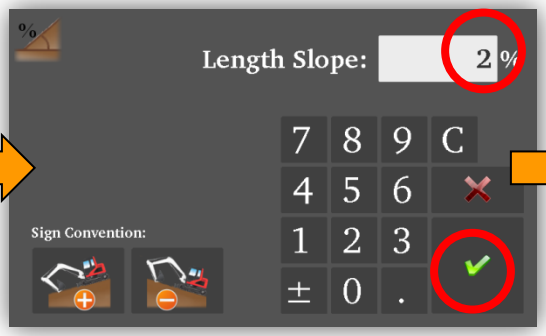
# Digging a trench with 2% slope

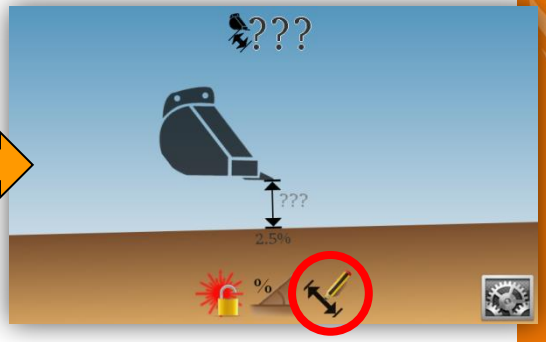
## Method 1: Using the ground as reference




Short-press the Slope Symbol




Dial-in 2.00% and confirm with the checkmark




Place the tip of the bucket on your final elevation (ground) then Short-press one the elevation symbol


Dial-in "0" and confirm with the checkmark


Same as when digging a horizontal reference, the screen and the LED display will indicate the actual difference of your bucket tip to the reference.

Note: Without 2D sensor, you have to dig straight, not leaving the slope's axis by rotating the cab. A slew of the cab out of the axis will instantly lead to a loss of accuracy!

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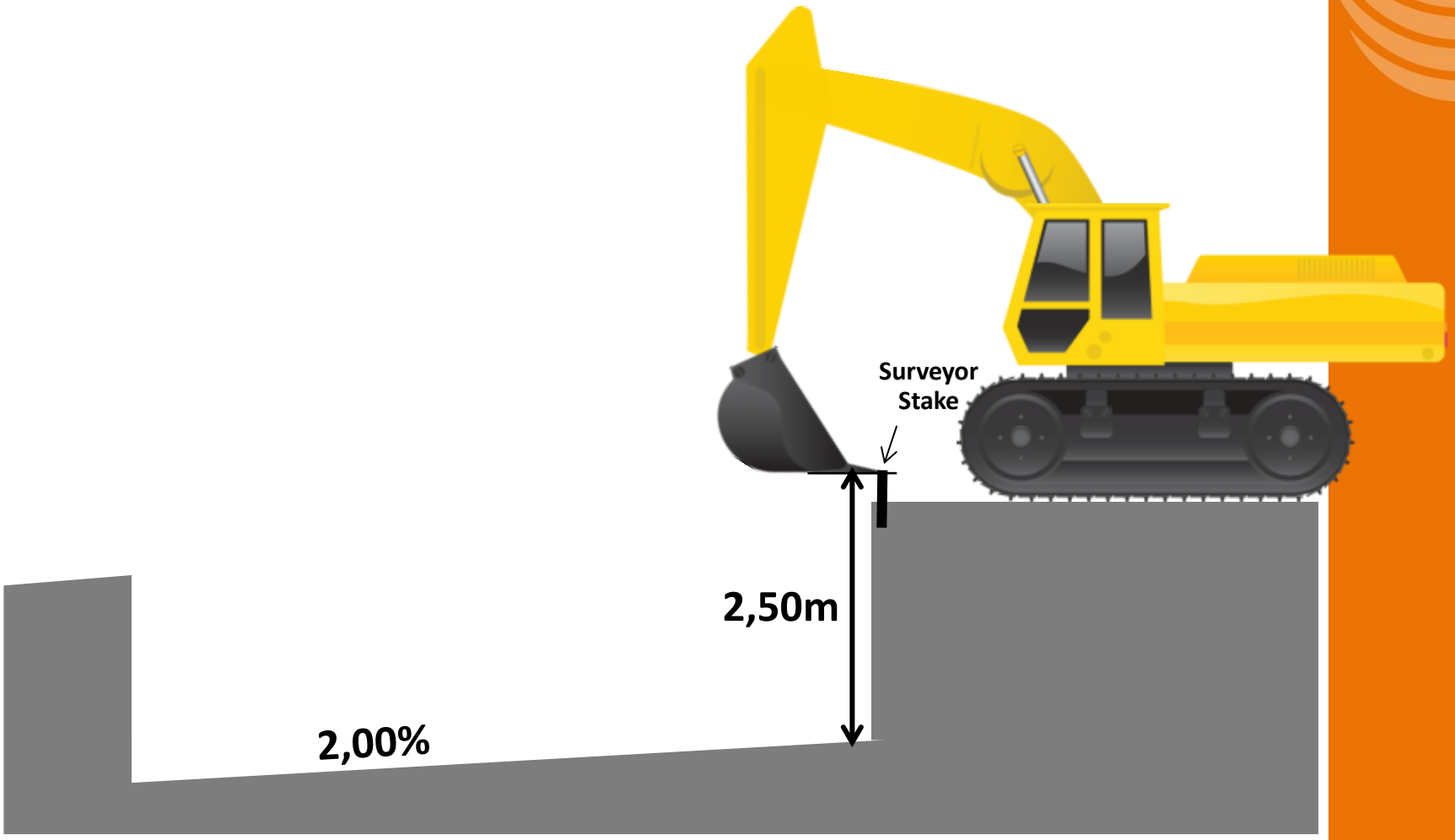
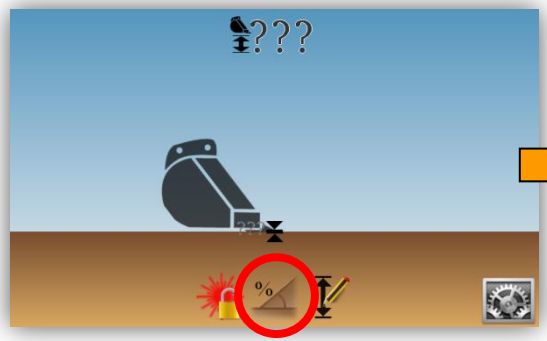
# Digging a trench with 2% slope

## Method 2: Using surveyor stake as reference

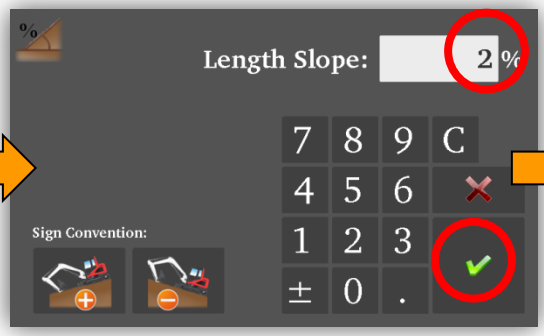


# Digging a trench with 2% slope

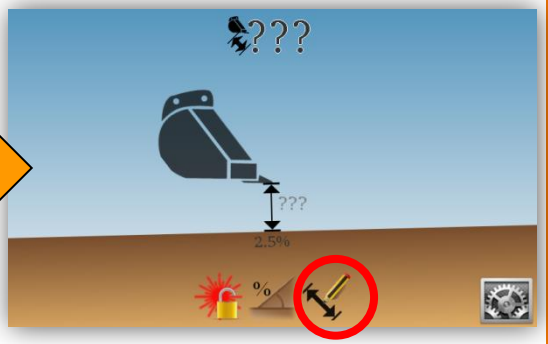
## Method 2: Using surveyor stake as reference



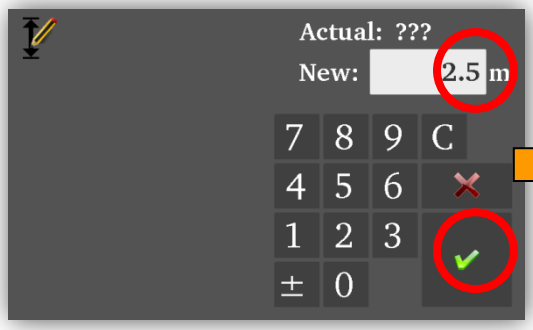

Short-press the Slope Symbol



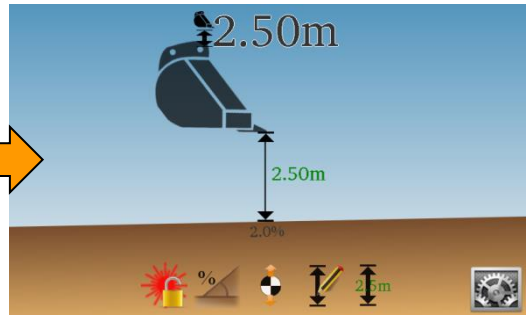

Dial-in 2.00% and confirm with the checkmark




Place the tip of the bucket on the surveyor stake <u>then</u> Short-press one the elevation symbol




Dial-in "2.5m" and confirm with the checkmark




Same as when digging a horizontal reference, the screen and the LED display will indicate the actual difference of your bucket tip to the reference.

Note: Without 2D sensor, you have to dig straight, not leaving the slope's axis by rotating the cab. A slew of the cab out of the axis will instantly lead to a loss of accuracy!

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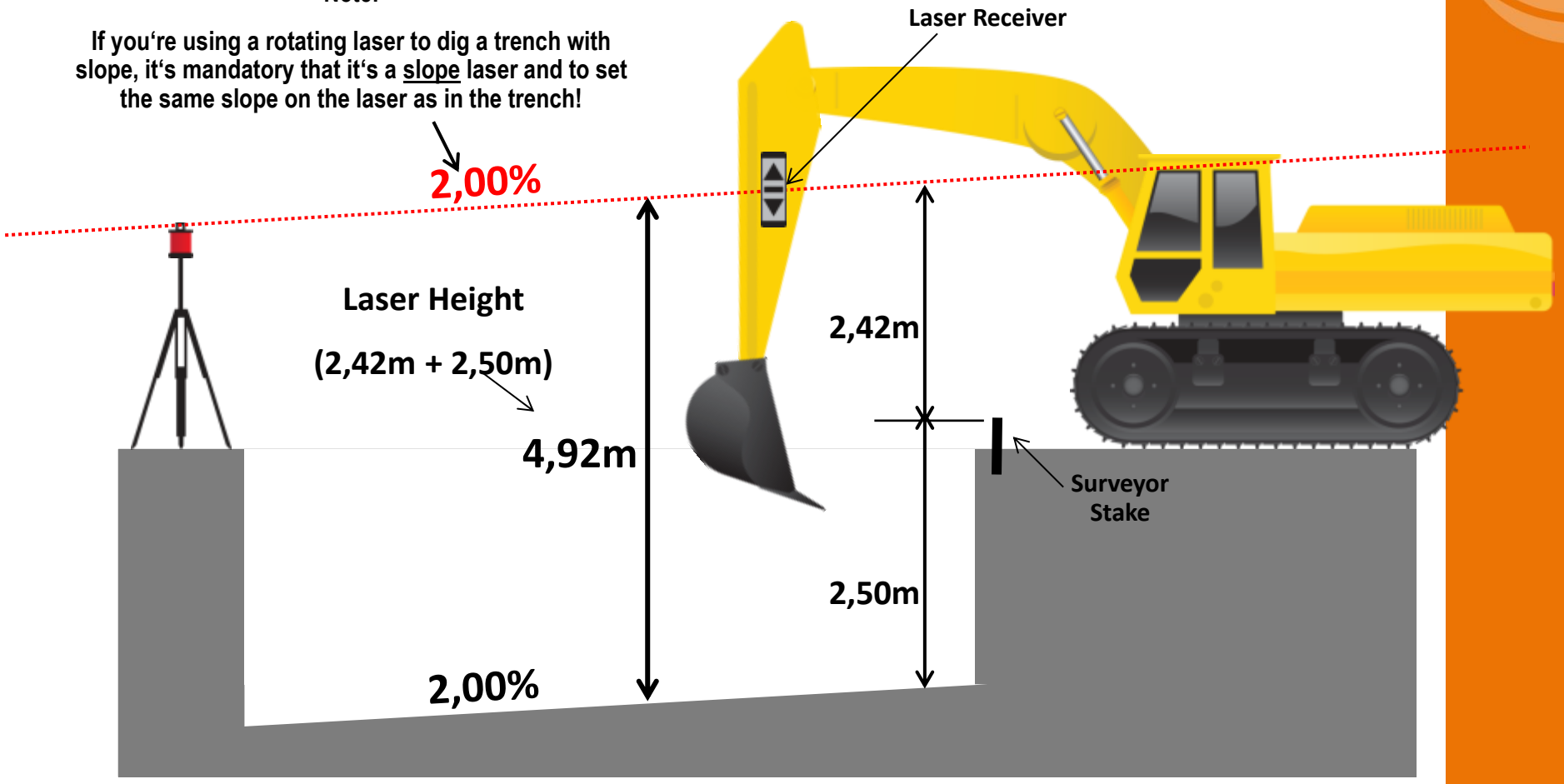
# Digging a trench with 2% slope

## using a rotating slope laser

Note:

If you‘re using a rotating laser to dig a trench with slope, it‘s mandatory that it‘s a slope laser and to set the same slope on the laser as in the trench!

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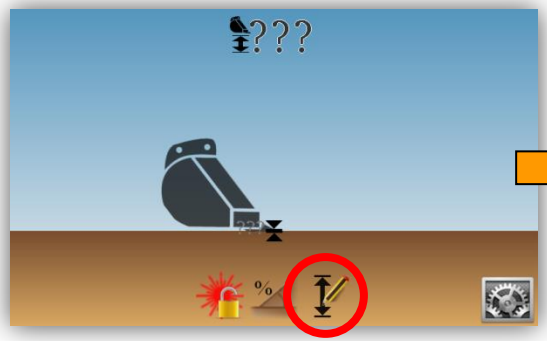
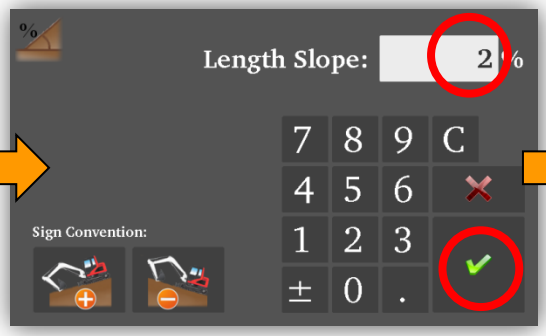
# Digging a trench with 2% slope using a rotating slope laser

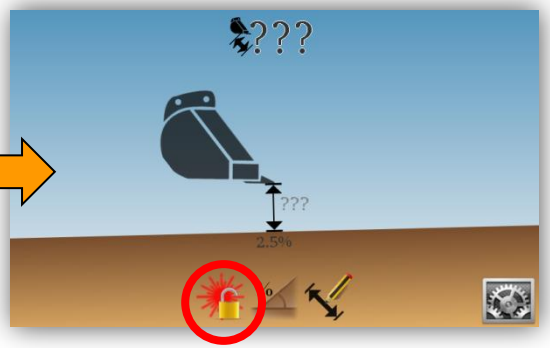
## Method 1: Knowing the laser height



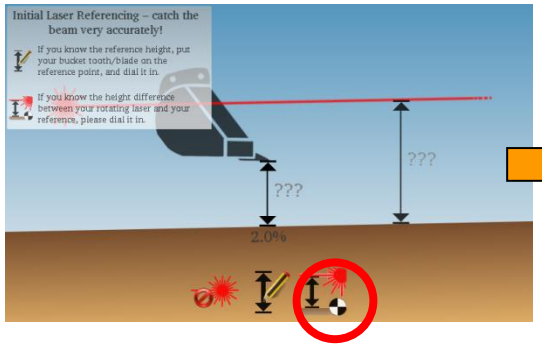

Short-press the Slope Symbol



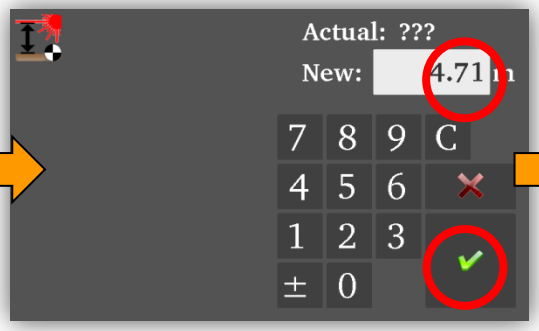

Dial-in 2.00% and confirm with the checkmark




Short-press the Laser Catch Symbol. NB: A warning will pop up to use a slope laser with the same slope set. Confirm with OK

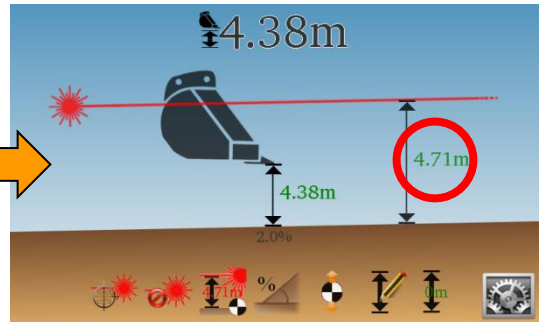



Short-press the Laser Height Symbol




Dial-in 4.71m and confirm with the checkmark.

Then catch the Laser Beam.




The set Laser Height (4,71m) and the resulting distance to the sloped reference will be shown on the screen.

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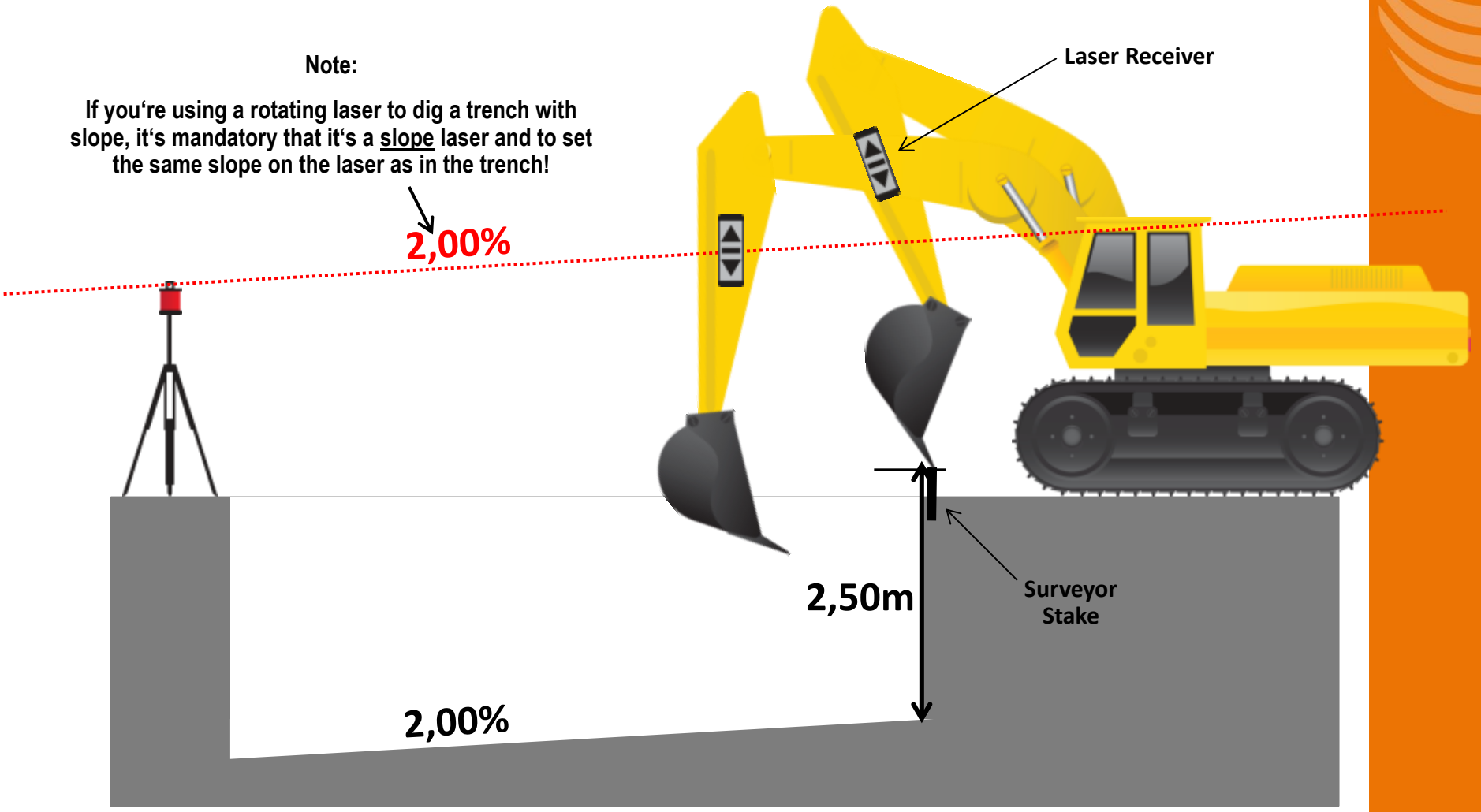
# Digging a trench with 2% slope using a rotating slope laser

## Method 2: Not knowing the laser height

Note:

If you're using a rotating laser to dig a trench with slope, it's mandatory that it's a slope laser and to set the same slope on the laser as in the trench!

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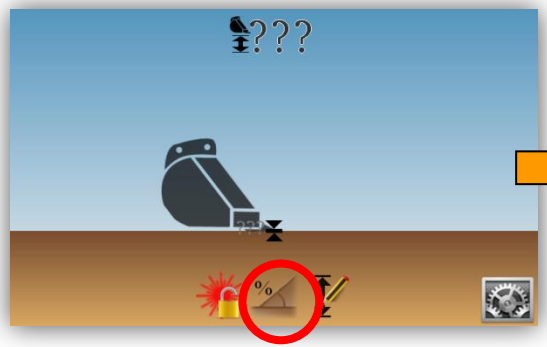
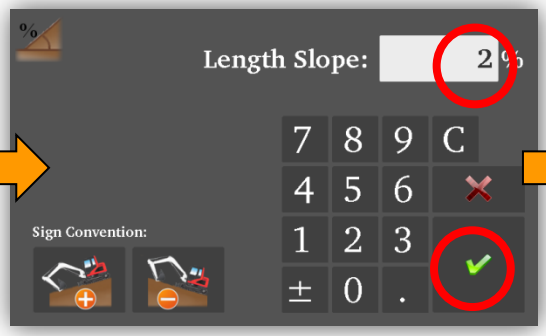
# Digging a trench with 2% slope using a rotating slope laser

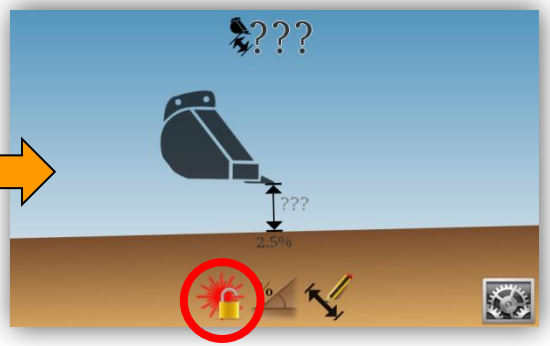
## Method 2: Not knowing the laser height



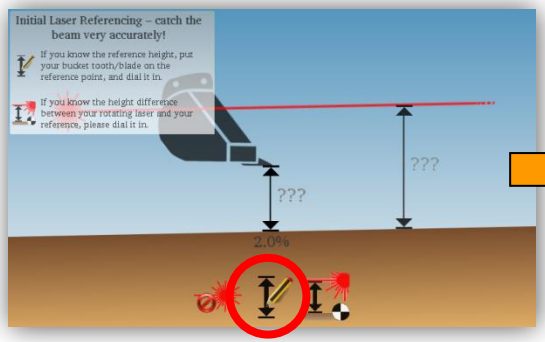

Short-press the Slope Symbol



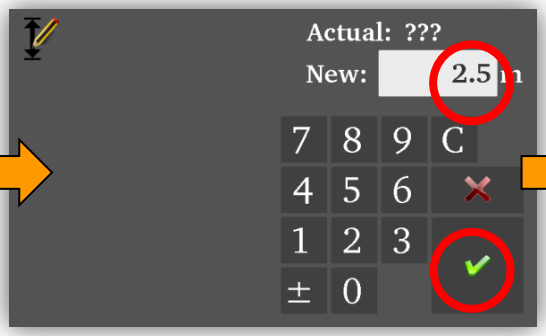

Dial-in 2.00% and confirm with the checkmark




Short-press the Laser Catch Symbol. NB: A warning will pop up to use a slope laser with the same slope set. Confirm with OK

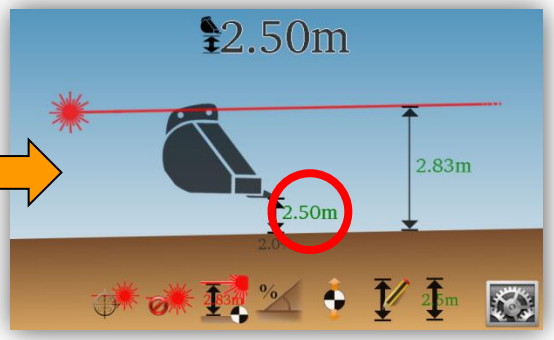



Short-press the elevation Symbol




Dial-in 2.5m and confirm with the checkmark.

Then Catch the Laser Beam.

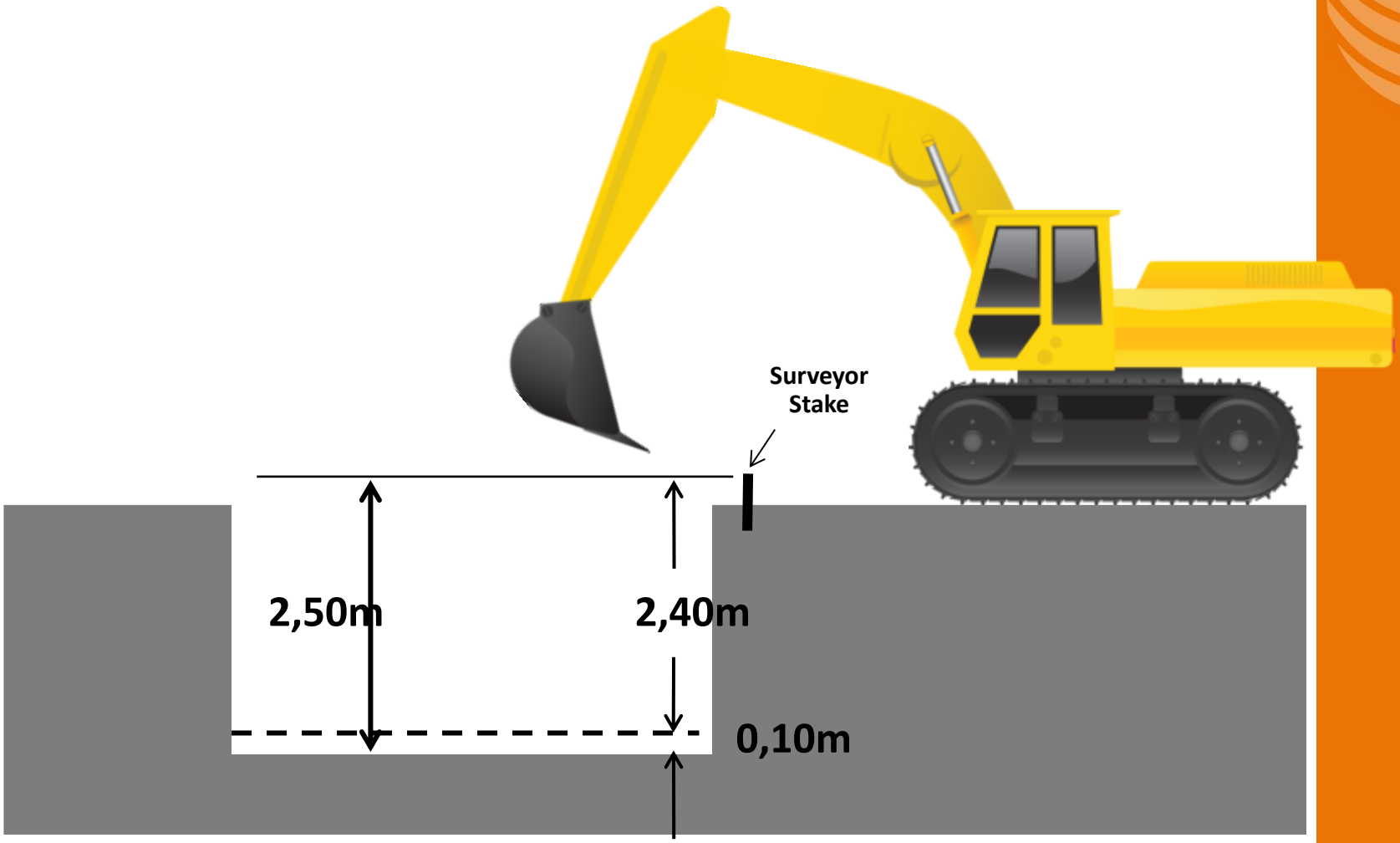



The set actual distance to the reference (2,50m) and the resulting Laser Height will be shown on the screen.

GEOMAX

# Changing the elevation

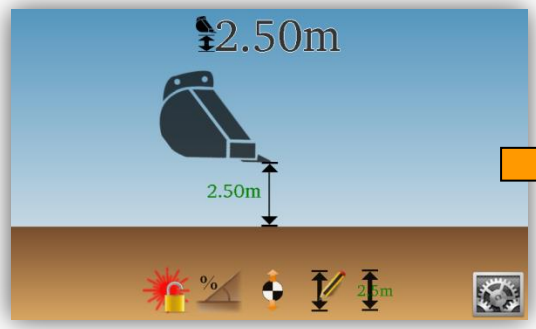
## Method 1: Working without a rotating laser



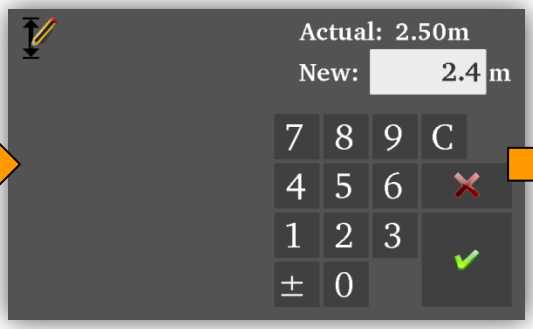

GEOMAX

# Changing the elevation

## Method 1: Working without a rotating laser
## Possibility 1: Change the elevation




Short-press the „Elevation“ Button




Dial-in a new height which is 10cm (0,1m) lower than the actual, here 2,40m, and Confirm with the checkmark.

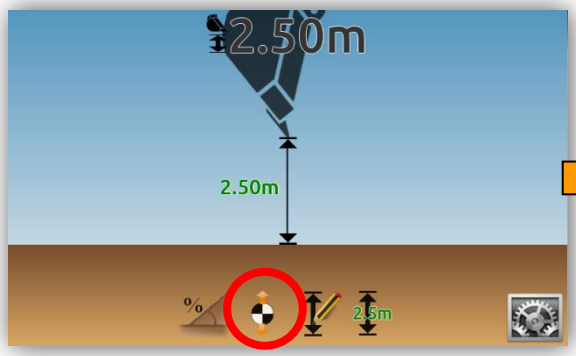

The elevation changed from 2,50m to 2,40m.

Note:

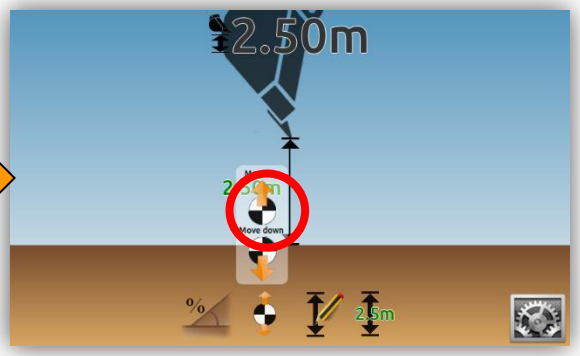
- INCREASE the Elevation to dig DEEPER
- DECREASE the Elevation to dig HIGHER

# Changing the elevation

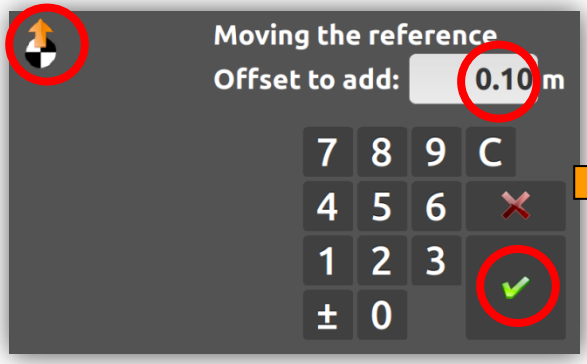
## Method 1: Working without a rotating laser
## Possibility 2: Move the reference



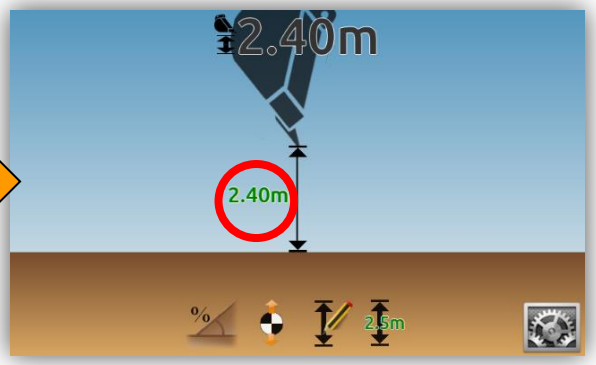

Short-press the „Reference Move“ Button




Press „Move up“



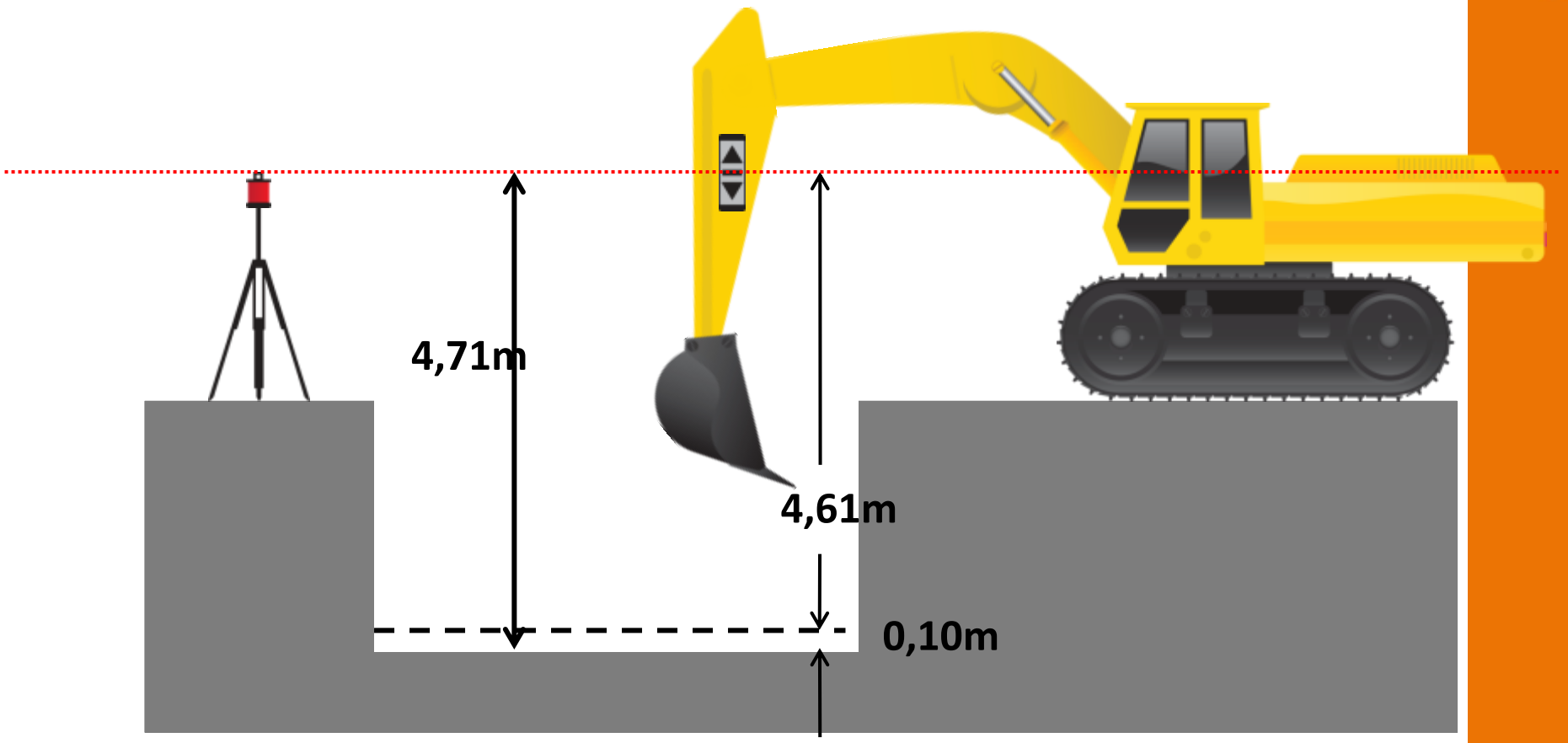

Dial-in „0,1“ and confirm with the checkmark




The elevation changed from 2,50m to 2,40m.

# Changing the elevation

## Method 2: Working with a rotating laser

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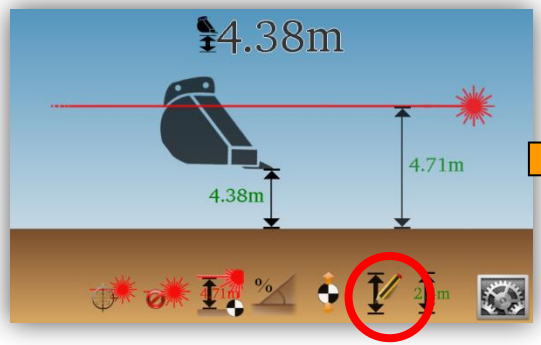
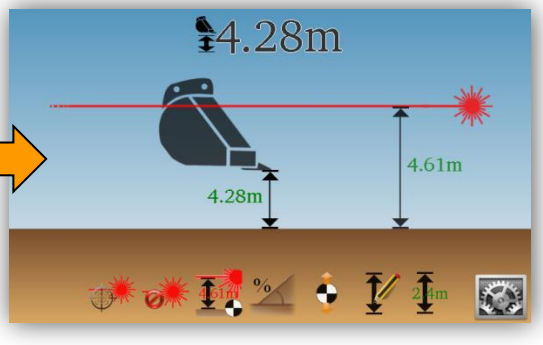
# Changing the elevation

## Method 2: Working with a rotating laser
## Possibility 1: Change the elevation




Short-press the „Elevation“ Button


Dial-in a new height which is 10cm (0,1m) lower than the actual, here 1,30m, and confirm with the checkmark



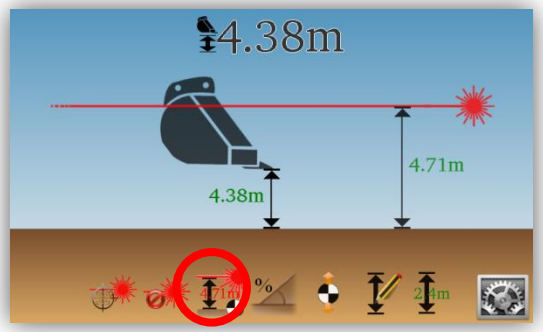

The elevation changed from 1,40m to 1,30m, and the laser height changed from 4,71m to 4,61m

Note:

- INCREASE the Elevation to dig DEEPER
- DECREASE the Elevation to dig HIGHER

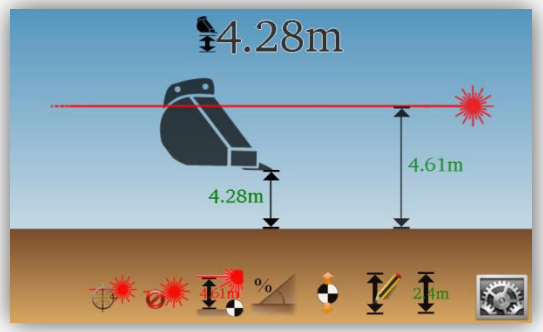
# Changing the elevation

## Method 2: Working with a rotating laser
## Possibility 2: Change the laser height




Short-press the „Laser Height" Button


Dial-in a new laser height which is 10cm (0,1m) lower than the actual, here 4,61m, and confirm with the checkmark




The elevation changed from 1,40m to 1,30m, and the laser height changed from 4,71m to 4,61m

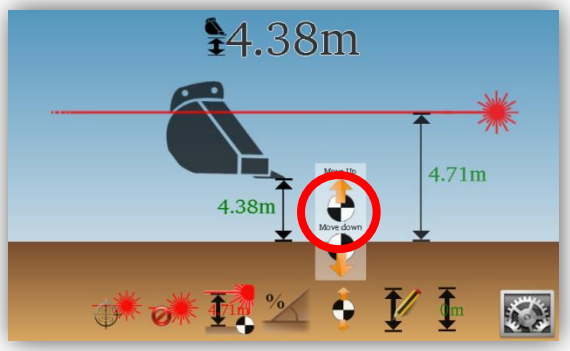
Note:

- INCREASE the Elevation to dig DEEPER
- DECREASE the Elevation to dig HIGHER

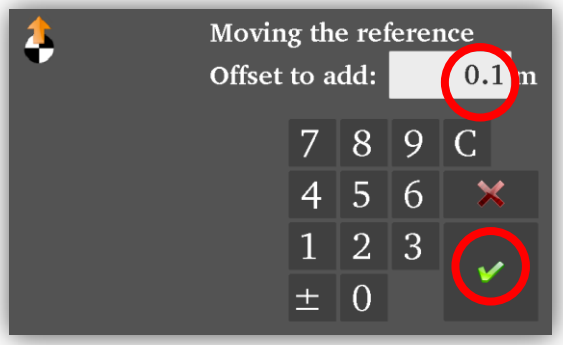
# Changing the elevation

## Method 2: Working with a rotating laser
## Possibility 3: Move the reference


Short-press the „Move Reference“ Button




Select „Move up“




Dial-in the desired offset, which is 10cm (0,1m) and Confirm with the checkmark


he elevation changed from 1,40m to 1,30m, and the laser height changed from 4,71m to 4,61m

# Safety Information: Magnets

### Use caution with the powerful magnets in EzDig mounting plates

The mounting plates used to secure the sensors to the excavator use extremely strong rare earth magnets. They must be handled with care to avoid personal injury and damage to the magnets. Fingers and other body parts can get severely pinched between two attracting magnets or other metal surface.

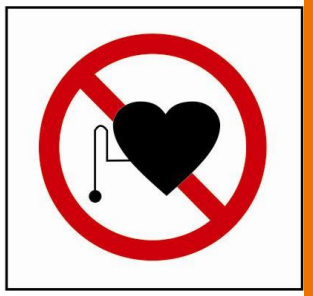
Use caution when removing the magnetic mounting plates from the carrying case. When handling them, be aware of their strong attraction to any nearby steel surface (such as the other mounting plates or metal back plates of the sensors).

### Other warnings about rare earth magnets

Never allow rare earth magnets near a person with a pacemaker or similar medical aid. The strong magnetic fields of the magnet can affect the operation of such devices.

The strong magnetic fields of rare earth magnets can also damage magnetic media such as credit cards, magnetic I.D. cards, cassette tapes, floppy disks, video tapes or other such items. They can also damage computer hard drives, televisions, VCRs, computer monitors and other CRT displays. Never place rare earth magnets near electronic appliances.

Children should not be allowed to handle rare earth magnets as they can be dangerous. Small magnets pose a choking hazard and should never be swallowed or inserted into any part of the body.



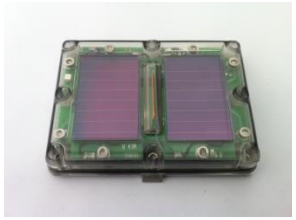
Rare earth magnets are brittle, and can peel, crack or shatter if allowed to slam together. Do not modify or machine them. Eye protection should be worn when handling these magnets, because shattering magnets can launch pieces at great speeds. They will lose their magnetic properties if heated above 80°C (175°F). Rare earth magnets should never be burned, as burning them will create toxic fumes.

GEOMAX

# Safety Information: Radio

PRECAUTIONS

The product must not be disposed with household waste.
Dispose of the product appropriately in accordance with the national regulations in force in your country.



FCC Labels on sensors & LED Display

ELECTROMAGNETIC COMPATIBILITY (EMC)

Description

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

⚠ WARNING

Electromagnetic radiation can cause disturbances in other equipment. Although the product meets the strict regulations and standards which are in force in this respect, the manufacturer cannot completely exclude the possibility that other equipment may be disturbed.

⚠ CAUTION

There is a risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example field computers, personal computers, two-way radios, nonstandard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by the manufacturer. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radios, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

⚠ CAUTION

Disturbances caused by electromagnetic radiation can result in erroneous measurements. Although the product meets the strict regulations and standards within this respect, the manufacturer cannot completely exclude the possibility product may be disturbed by very intense electromagnetic radiation, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

⚠ WARNING

If the product is operated with connecting cables attached at one of their two ends, for example, external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:

While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

GEOMAX

# Safety Information: Radio

FCC STATEMENT, APPLICABLE IN U.S.

WARNING

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 generates, uses and can radiate frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. 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 or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the 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.

Notice for Canada

This Class B digital device meets all requirements of Canadian Radio Standards Specification RSS-210.

WARNING

nges or modifications not expressly approved by the manufacturer for compliance could void the user's authority to operate the equipment.

RESPONSIBILITIES

Manufacturer of the product: The manufacturer is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Person in charge of the product: The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform the manufacturer immediately if the product and the application becomes unsafe.

WARNING

The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.

HAZARDS OF USE

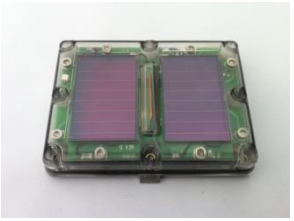
WARNING

absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.

Precautions:

All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

# Technical Information: Sensors



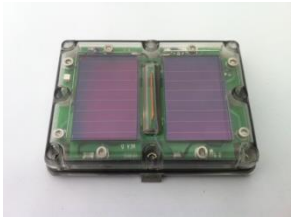
Even at miserable weather the sensors are charging. The "energy balance" is indeed negative, i.e. the sensors have consumed - when in the evening - about 5-10% more energy than was attributed by the solar cells, but this is minor. As soon as the sun is min. 1-2 hours there, the "energy balance" is already positive.

Only when the sensors are left attached on the machine over night - as they are switched on 24 hours - the situation may be more critical. Then, the energy balance is (except if 4-5 hours of sunshine) certainly negative, and after some weeks the sensors are empty.

A chock full loaded sensor holds approx. 50 hours (in total darkness - e.g. glued-down solar cells). So one sufficient jam-packed charge per week is enough.

We recommend to put the sensors outside (not attached to the plates) over each weekend. Even without any sun – just by daylight – they're getting fully charged during those 2 days.

# Technical Information: Sensors



There are various reasons why the system isn't able to detect a sensor. When you attach a sensor to a sensor plate you'll see a small green LED starting to blink on the sensor's PCB, which indicates that it's now switched ON.

If - even though attached to the sensor plate - the sensor doesn't switch ON:

-Remove the sensor from the sensor plate, wait min. 5 seconds and put it back on again.

-Check with another sensor plate.

-Put the sensor into sunlight or below a desk lamp. Try again after one hour.

If the sensor is ON (LED is blinking), but doesn't communicate with the system:

-Remove the sensor from the sensor plate. Assign the missing sensor to the system by entering the "Add Sensor" routine in the menu. Follow the instructions on the screen.

-Enter the sensor check menu through the Advanced Settings. If the angle value doesn't flicker continuously, but freezes shortly and comes back after a while, there are most likely radio disturbances:

-Try to relocate the LED display inside the cabin

-Try to relocate the cable inside the cabin if it moves along another electronic components

-Try to change the radio channel through the parameters inside the Advanced Settings menu

# Calibration Tools (Laser Pointer, adaptors & extension poles): Important notes for initial setup & calibration

During calibration the system will ask you to confirm that you're going to use the „Calibration Tools" (means, the extension poles) for setting up the laser pointer during calibration.

Be sure to unlock the laser pointer's pendulum (move front switch to the left) before using it, or the laser will not level!

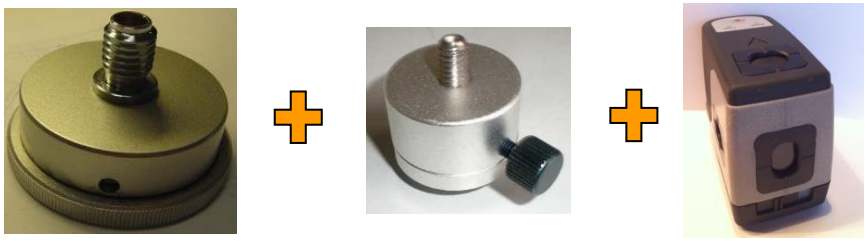
The laser beam should NOT blink while using the point laser.


## SAFETY LABELS

The One-Dot Laser used for first-time setup is a Class 2 laser, manufactured to comply with the international rules of safety IEC 60825-1, 2001. Although the power of the emission of the beam is less than 5mW in Class 2, the following cautions are recommended:

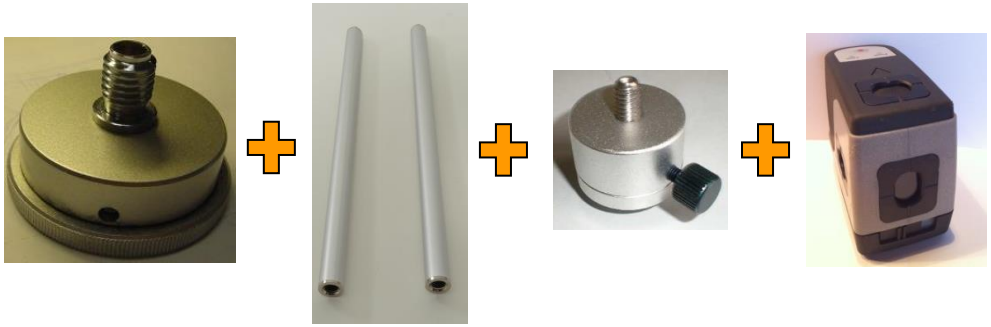
- Do not stare directly at the beam
- Do not set up the laser at eye level

For the low line „A" attach the „sandwich" 5/8" to 5/8" adaptor, 5/8" to 1/4" adaptor, point laser on any tripod.



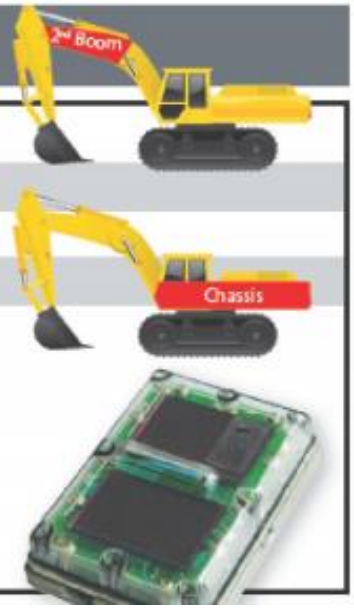
For the high line „B" put the two extension poles between the big and the small adaptor.

DO NOT change the tripod's location between line A & B.



In case you prefer to set up the laser pointer without the Calibration Tool (2 Extension Poles), you have to measure and dial-in the height difference between the low and high setup after the lower line. You may use the included magnetic L-bar for the point laser's setup.

# EZDig




## Options

- Sensor for 2nd boom
- Sensor for chassis (pitch)
- iDig laser receiver
- Kit for extra machine: 3 magnetic mounting plates for sensors, 2 suction cup mounts and cradles for cab items

Specifications subject to change without notice. 7/11

## Specifications

| |
|---|
| Accuracy: +/- 1cm (3/8") |
| Choice of depth deadband: Fine 1cm (1/2"); Medium 3cm (1"); Coarse 5cm (2") |
| Reach deadband: 3cm (1") |
| Choice of metric or feet |
| Sensors: IP68 Control unit and display: IP64 |
| Control unit power: 9-27V |
| Operating temperatures: -20° to +70° C (-4° to 158° F) |
| Sensor: 70 x 100 x 20mm; 282g (3" x 4" x 1"; 10 oz.) |

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