562800-200

Prolec 2D
Quick Start Guide

Plant Safety Solutions
Take the guesswork out of 2D Grade Control

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See glossary for key terms

Typical Operation
Excavation Mode with Tool Sensor

Main Screen

Left view

Dig view (machine arm)

- **Orange line:** "Bench" reference
- **Green area:** Flat "target" surface
- **Dotted line:** Bottom of tracks
- **0.21m:** Distance between tooth and target depth

Right View

"Tool window" (top)

- Zoomed view of tool
- Selected tool point (red dot)
- View of any target cross-grade

"Slew circle" (bottom)

- Current machine slew angle
- Active slew limits

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Typical Operation
Excavation Mode with Tool Sensor

Main Screen

Press any button to reveal up to 6 functional buttons

Main Menu

The menu shown will depend on operator/supervisor level, and whether Excavation mode or Lift mode is currently active.

Setting reference type

How to change what the “Reference now” button on the main screen does

Go to “2D Configuration” on the main menu

When you press the "Ref. type" button, it changes the function.

This affects what the “Reference now” button does on the main screen. The options include:

- "TO TARGET": When the cutting edge is at the target depth
- "TO BENCH": When the cutting edge is at bench height (survey stake or laser line)
- "TO HEADING": When the machine is aligned with a set direction
- "TO POINT": When the cutting edge touches a point on the current profile/job

The "Reference now" button image has been updated. Now, it aligns the bench height line to the cutting edge, as indicated.

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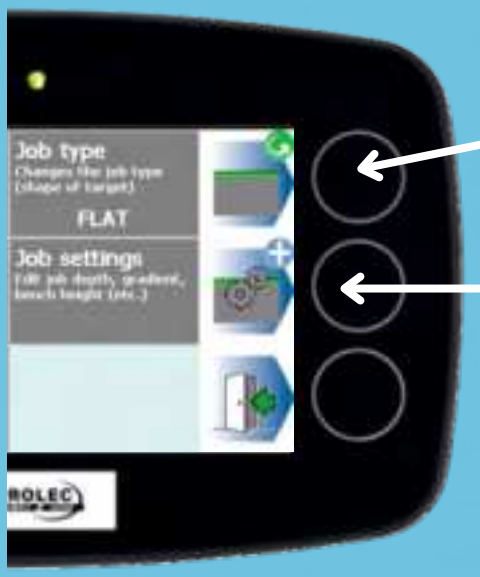
Setting up the job

In the 2D configuration menu, we can set up the job to reflect our requirements



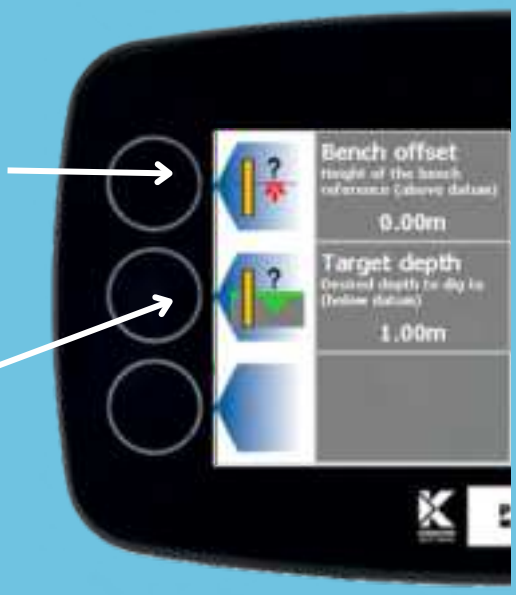
When you press "Job type," it changes the shape of the target surface (green line).

Pressing "Job settings" opens a menu where you can set bench/target heights, grades, and more.

The options in "Job settings" vary with the job type. For flat jobs, it's just bench and target settings.

"Bench offset" sets the bench/reference height relative to the site datum.
For example, here we have set "bench" to be an object or line exactly at the site datum. The operator can touch this object to reference to the bench.

"Target depth" sets how deep the target is below the datum.



Ready to dig

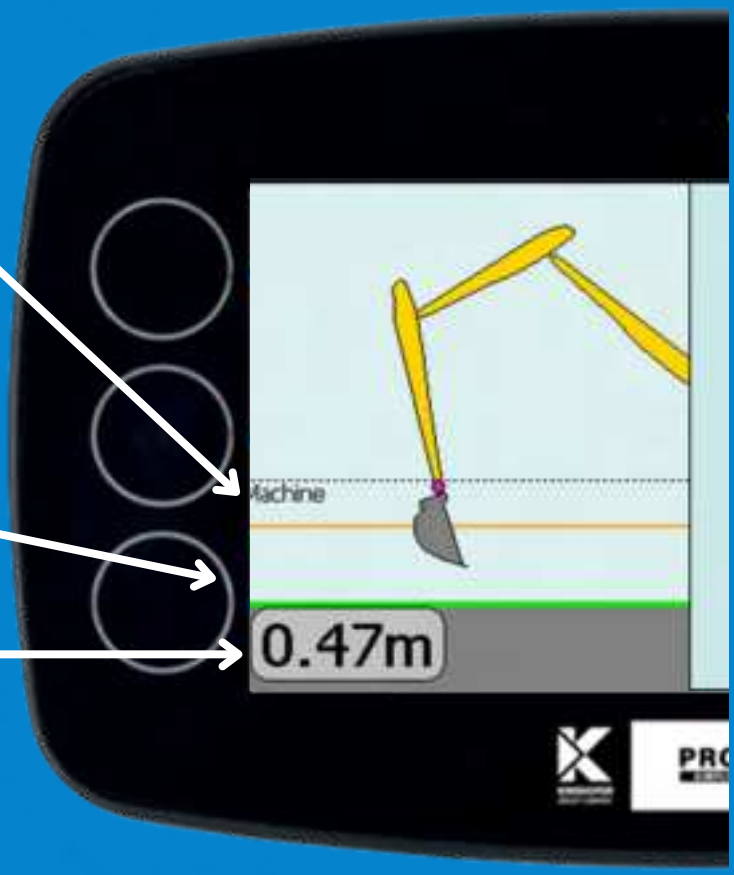
In the 2D configuration menu, set up the job to reflect requirements

Once setup is complete, return to the main screen, which shows how settings are reflected.

The bench provides a reference point as the machine moves around, here set at 0 meters.

The target depth is where to dig, set at 1 meter depth.

Tool is currently halfway into the dig, 0.47m from the target depth.

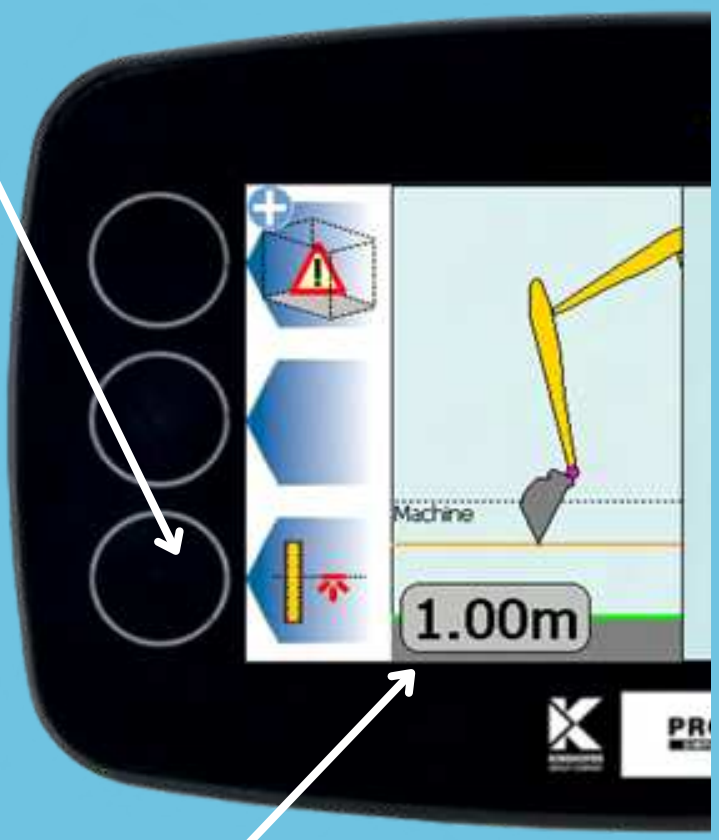


Using 2D digging

Following our current example, we've set the job type to "flat", with a 1m target depth

The reference type is set to "To bench," so when the bottom left button is pressed, the bench height on the screen aligns with the cutting edge.

When you use the bench as the starting point, think of it like placing the bucket on the ground before digging. Then, press the "Reference now" button to tell the system the correct height to use as a reference.



After referencing, the distance to between the cutting edge and the target depth is "1.00m," as expected.
(The distance between the datum and target was set to 1m.)

Using 2D digging

Now we can start digging. Dig the desired hole, using the value on screen to confirm the required depth

Digging between ground and target depth

Target depth has been reached

Target depth has been exceeded

Gradient job - Setup

A gradient job is similar to a flat job, but the ground follows a known % grade (and/or cross-grade)

Pressing the top right button will change the job type
Cycle through until "GRADIENT" is selected

We will find the reference type "TO TARGET" useful for this gradient job, so ensure that is selected (bottom left)

There are more job settings in gradient mode.

- Gradient is the % grade seen when looking forwards from the cab
- Cross-grade is the % grade seen left-to-right from the cab
- "Auto-calculate" calculates the grade for you, given a start-height, end-height, and distance

Bench offset and target depth work similarly to a flat job, however the target will be at a gradient, so the depth is applied only when referencing

Back on the main screen, the reference type has changed, and we can see the 10% target gradient

Referencing to target will align the cutting edge to a point on the slope

The target depth is set to 0m, so at this point we can see our bench and target are at the same level.

If the depth was 1m, the orange line would be 1m above where it is now.

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Gradient job - Usage

To make best use of the gradient job type, follow these steps

Extend the machine to full reach and place on the ground at start of the dig, and press "Reference now".
The tool point will be aligned as we have seen before.

Proceed to dig along the gradient using the target depth indicator as a guide

The full length of the machine has been used

Track backward so that the last-dug point is at full reach

Then re-reference to that depth, and continue digging the slope

So long as the correct heading is maintained, any size of area can be dug to a grade using this process of digging and re-referencing.

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Gradient job - Job settings

Edit the cross-grade value in job settings

The tool window will show the target cross-grade

Note that cross-grades are left-to-right from the operator's perspective, and normal grades are uphill (looking forward).

Negative values can be used if required, to dig in the alternative direction.

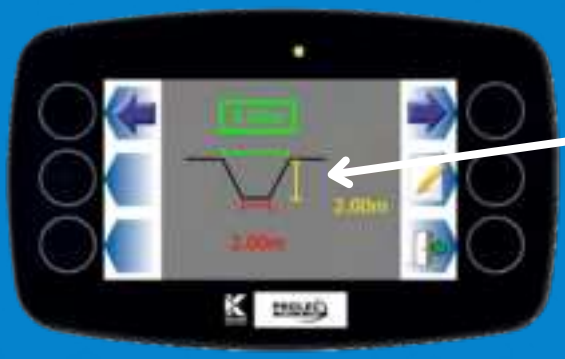
Complex shape job - Setup

Side-on perspective

Change the job type to "SHAPE (SIDE)"

The ref. type will be set to "TO POINT" as this is the only possible reference for this job type.

In job settings, we can edit the dig shape, as well as any required cross-grade



Setting the dig shape needs 3 measurements, as shown

Back at the main screen, we can see that the shape of the job has become more complex, according to the measurements we set.

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Complex shape job - Usage

Side-on perspective

Start by picking a known reference point, then position the cutting edge on it.

Press "Reference now" repeatedly until the correct part of the shape is aligned correctly with the tool on-screen.

(the current active point on the complex shape is shown in blue)

Then dig using the target distance indicator as a guide.

Digging below the surface, but above target depth

Target depth has been reached

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Complex shape job - Trench

Head-on perspective

This job type is similar to the previous one, except the viewing position is head-on rather than side-on. This can be useful for digging trenches.

Change the job type to "SHAPE (AHEAD)"

The ref. type will be set to "TO POINT" as this is the only possible reference for this job type.

Job settings are identical to the "SHAPE (SIDE)" job type

The cross-section can be seen ahead of the operator, and a depiction of the tool is shown.

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Complex shape job - Trench

Head-on perspective

The active tool point is shown in red, and can be switched between centre, left, and right. This part of the tool is aligned to the selected reference point when the "Reference now" button is pressed.

Change the active tool point in the "Tool Management" menu (from the main menu)

The tool point moves to the left edge of the tool, and this point is aligned to the reference instead of the centre point

2D Essentials

2D Essentials may be used on machines without fitting an additional tool sensor.

(contact your local dealer to activate 2D Essentials on an existing PME installation, simply with a software upgrade).

How to tell if you have 2D Essentials or 2D Standard

In 2D Essentials, the bucket on the screen shows two possible positions at the same time: one "flat-bottomed" bucket and one "crowded-out". One is active and the other is displayed as a "Ghost tool".

In 2D Standard, the real position of the bucket is shown in real time.

2D Standard

2D Essentials

Active tool **Ghost tool**

Two tool orientations

The active tool can be toggled from a button that appears on the main screen

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2D Essentials - Usage

Digging using 2D Essentials is the same process as using 2D with a tool sensor. The difference is that the tool on screen will not reflect the real angle. The two orientations, however, can be used with some operator intuition to sufficiently dig any job.

In this example, a 10% gradient is dug identical to the job we performed before using a tool sensor

Just as before, start by referencing at the start of the slope. Using the crowded-out orientation is best for this.

Once underway and at a sufficient position to allow for flat-bottom finishing, the orientation can be switched in a single tap and the operator can continue in this orientation, using the target distance as a guide as normal.

PME Limits

Limits on height and slew can be set while digging with 2D. Access these from the limits menu using the button on the main screen.

Consult the PME 100-500 Quick Start Guide for assistance.

We've set up a height limit. Height and depth limits are shown on the 2D display.

Current headroom can be seen top left

The hatched area shows the active limit

Warnings are shown when at or close to a limit

IMPORTANT: Note that motion cuts may be enforced for PME limits, but are independent of 2D guidance. PME will not stop you at a 2D target depth, it will only stop you at a PME Depth Limit.

PME Limits - continued

Slew limits, cab-protection and maximum-reach limits may also be set.

Consult the PME 100-500 Quick Start Guide for assistance.

These limits are shown in the slew circle

Slew angle limit

Arrows show safe directions of movement. Green indicates unrestricted movement, amber shows a slowdown, and red shows that motion is cut.

Depth limit

IMPORTANT: Note that motion cuts may be enforced for PME limits, but are independent of 2D guidance. PME will not stop you at a 2D target depth, it will only stop you at a PME Depth Limit.

Choosing a tool

In the main menu, press “Tool Management”.

Tools can be created/edited/deleted here, so that correct measurements are used

The active tool can be selected here

To create or edit a tool, set a name, and then enter five measurements

Locking pin to cutting edge

Hitch pin to ground

Width

Distance between pins

Hitch pin to cutting edge

Lift mode (also known as RCI)

Pressing the middle-right button switches between excavation mode and "Lift mode" (RCI), and back again.

Consult the PME 100-500 Operator Manual for assistance.

Left - Lift view panels

- Lift point height
- Lift point radius
- Headroom, if height limit active
- Load on Hook, Safe Working Load

Right - Limits info

- Movement arrow indicators (top)
- Slew circle (bottom)

Pressing any button reveals up to 6 functional buttons

Left buttons

Limits

Right buttons

Main menu

"**Lift mode" toggle** (currently on - excavation mode off)

Hide buttons (as in above image)

Warnings show when overload, and movement arrows show safe directions

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Glossary

Bench - A "reference" height or depth for determining the machine's height relative to the site. An example might be a laser beam, survey stake or a piece of ground at a known height. May be the same as the datum, or offset by a constant amount.

Datum - a known "zero point" for the site, from which other heights and depths are measured. May be the same as the bench height, or offset by a constant amount.

Dig Mode - see **Excavation mode**

Excavation mode - System mode for 2D digging to a depth, gradient, or complex shape. Also known as Dig Mode. Cannot be used at the same time as Lift Mode.

Lift mode - System mode for lifting large objects as a crane. Displays: Load on Hook, Safe Working Load, Tool Point height & radius. Cannot be used at the same time as Excavation Mode.

Limits - Height and Slew limits. Enforced using motion cuts to prevent the machine exceeding the limit.

Referencing - aligns the on-screen machine to the "bench" at different real-world points/levels.

Target - The surface that you wish to dig to. An example might be a target depth, a grade, or a complex shape.

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Let Your Journey Begin.

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