Measurement instructions

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1. Introduction

If you have problems with the cutting quality of the RoboRail machine, the technical service department of HGG may ask you to measure specific material and/or cuts. With the measurement results, together with a data collection of the machine, they can provide you targeted help to solve the problem.

This document describes the instructions to measure cuts in different shapes of metal profiles (refer to the images on page 10).

1.1 Text indicators

In this document:

- Bullet points: ▪ describe the steps to perform
- Bullet points: ➢ describe additional points of attention for use of the specific measurement tool
- Bullet points: ◆ refer to an image
- *Text written in italics:* gives an additional explanation or instruction
- **Text written in bold:** refers to instructions on the screen of the remote control

1.2 Remote control | screen

You must use the remote control to download a data collection for diagnostic purposes. This is the screen (on an adjustable arm) on the control unit.

1.3 Responsible persons

The measurement procedures that are written in this document are reserved for operators, mechanics and authorised persons.

1.4 Related documents

- RoboRail operator's manual
- FAQ RoboRail Calibration
- FAQ RoboRail FAT
- schematics, as appropriate
- parts lists
- components supplier instruction handbooks
- documents, drawings, data sheets and declarations

You can find these documents on the Internet Customer Portal.

1.5 Safety

Wear personal protective equipment (PPE) when you work with the machine.

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Make sure to remain at a safe distance from moving parts of the machine. This also applies to persons who enter the work area.

Obey the safety instructions as written in the operator's manual of the RoboRail.

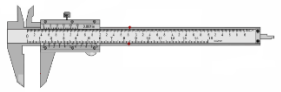
2. Tools

Depending on the size/type of the material/cut, you need one of the following measurement tools.

2.1 Caliper

A caliper is an instrument that you use to measure:
- the distance between two opposite sides of a material or cut
- the inner diameter of a material or cut
- the outer diameter of a material

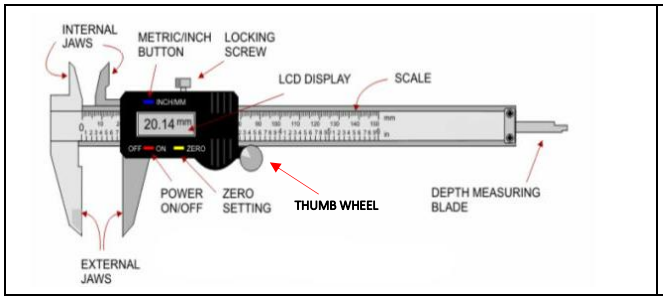
It is applicable to measure cutting sizes and material with a maximum length of 300 mm (12").

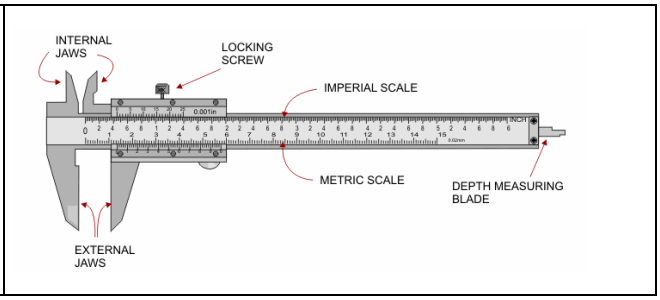
Preferred tool: **digital**		Caliper with a rated accuracy of 0,1 mm (0.004")
Alternative tool: **analog**		

Images: examples of a digital and analog caliper

How to use a caliper

➢ If you use a digital caliper, also refer to the user manual of your specific type.





➢ Make sure that you use a caliper of an appropriate length.
➢ Use the locking screw to lock the position of the jaws.
➢ Digital caliper: use the thumb wheel for fine adjustment of the jaws.

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To measure the inside of a material or cut (◆ Image 1):

- Put the internal jaws inside the material that you intend to measure. Extend the jaws to touch the material and lock them.

Image 1 Inside measurement [digital caliper | 30,06 mm]

To measure the outside of a material (◆ Image 2 |◆ Image 3):

- Put the external jaws around the material that you intend to measure. Close the jaws and lock them.

Image 2 Outside measurement [digital caliper | 35,51 mm]

Image 3 Outside measurement [digital caliper | 100,51 mm]

Subsequently:

- Read the measurement result on the display (digital caliper) or scale (analog caliper).
- Record the measurement result.

2.2 Protractor

A protractor is an instrument that you use to measure angles of the material.

Preferred tool: **digital**		Protractor with a rated accuracy of 0,1° (0.1°)
Alternative tool: **analog**		

Images: examples of a digital and analog protractor

How to use a protractor

- ➢ If you use a digital protractor, also refer to the user manual of your specific type.
- ➢ Make sure that you use a protractor of an appropriate length.

To measure the angle of a material or cut (◆ Image 4 | ◆ Image 5):

- Line up the vertex of the angle with the dot at the center of the protractor.
- Line up one side of the angle with 0° on the protractor.
- Read the protractor to see where the other side of the angle crosses the number scale.
- Record the measurement result.

Image 4 Angle measurement [digital protractor | 90,5°]

Image 5 Angle measurement [analog protractor | 86°]

2.3 Tape measure

A tape measure is a flexible ruler that you use to measure:

- the distance between two opposite sites of a material or cut
- the length of a material or cut
- the size of a material

It is applicable to measure cutting sizes and material with a length of 0,3 to 12 m (1 to 40 ft).

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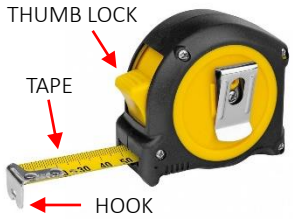
Preferred tool		Tape measure Class I according to EU Directive 2014/32/EU Class I allows a tolerance over the entire length of: 0,3 mm at 2 m | 0,4 mm at 3 m | 0,6 mm at 5 m | 0,9 mm at 8 m | 1,1 mm at 10 m *For USA:* *Make sure that you use a tape measure with the highest available accuracy for professional use, with a permitted tolerance over the entire length of max. 1/16" at 33 ft.*
	Image: example of a retractable tape measure	

How to use a tape measure

- The temperature range for use of the tape measure is **20°C ± 8°C** (54 to 82°F). Do **not** exceed this range to prevent measurement errors due to shrink or expansion of the tape.
- The hook at the end of the tape is 'floating' to provide both inside and outside measurements that are accurate.
- The thumb lock is used to keep the tape in place at the desired length and stops it from automatically retracting back into its housing
- Tape measures are available with a metric and/or an imperial scale;
  - metric markings are displayed in mm, cm and m
  - imperial markings are displayed in feet (F), inches and fractions of inches

To measure the inside of a material or cut (◆ Image 6):
- Put the hook at the inside of the material that you intend to measure.
- Extend the tape to the opposite site of the material or cut and lock it.

Image 6 Inside measurement with tape measure [29 mm]

To measure the outside of a material (◆ Image 7):
- Put the hook at the outside of the material that you intend to measure.
- Extend the tape to the opposite site of the material and lock it.

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Image 7 Outside measurement with tape measure [10,5 mm]

Subsequently:

- Read the measurement result on the tape.
- Record the measurement result.
- Unlock the tape.

3. Measurements & data collection

3.1 Measurements

The material that you measure must be free of burrs and slags to get accurate measurement results.

- If necessary, remove burrs and/or slags from the material.
- Measure the material(s) and/or cut(s) as specified by HGG. According to the size and shape of material, use one of the tools as described in this document.

➢ To measure round and rectangular tubes/pipes, make sure to take the centerline distance (◆ Image 8). This is the distance related to the exact center of the material.

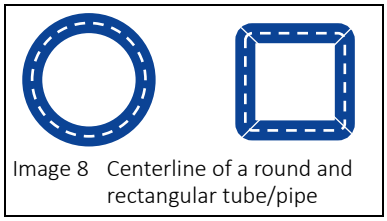

Image 8 Centerline of a round and rectangular tube/pipe

➢ To measure channels, flat bars and angles, take the longest length of the material/cut.

3.2 Diagnostic data collection

In addition to the measurement results, HGG needs a download of relevant files. These data are necessary to examine the cause of the cutting problem.

On the screen do the procedure that follows:

- In the **Advanced** menu: select **Generate data collection** (extension .7z).
- In the **Description** box: enter the following information as complete as possible:
  - the machine number; you can find this number on the type plate of the RoboRail
  - a description of what went wrong
  - when the problem started
  - any other information that may be useful to HGG to solve the problem
- In the **Additional files** box: add additional cutting files* from external applications.

  * *Cutting files such as: ProCAM project (.pcd) | DSTV files (.dstv) | NC Data (.nc1)*

  You can do this in two ways:
  - Use the **Add** button and select the files with which there is a cutting problem; or
  - Drag and drop the files from and external application.
- Select **Create Collection**.

Subsequently:

- Take/collect one or more clear pictures of:
  - error messages on the screen
  - the material or cut with which there is a cutting problem

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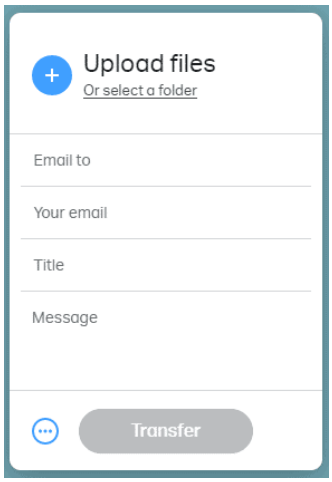
- Collect drawings and/or design files of the material with which there is a cutting problem.
- Make an even more extensive description of the cutting problem, if applicable.

Now you are ready to send the downloaded and collected files to HGG. You can do this in several ways:
- *Use an FTP server.*
- *Use a free File Transfer Protocol server. HGG recommends to use WeTransfer (https://wetransfer.com/).*



- Select + and add the collected files; or
  Select Or select a folder to add a folder with the collected files
- Enter service@hgg.nl
- Enter your own email address
- Enter your machine number
- Enter a short message or the name of your contact person at HGG
- Select **Transfer**

*Please do **not** send your files by email, because:*
- *most email firewalls will block unrecognized file formats*
- *most emails have a data limit of 10 MB or 15 MB*

- Send the collected file to the HGG technical service department in the preferred way.

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Metal profiles | shapes

Round tube/pipe | Rectangular tube | Channel | Flat bar | Angle