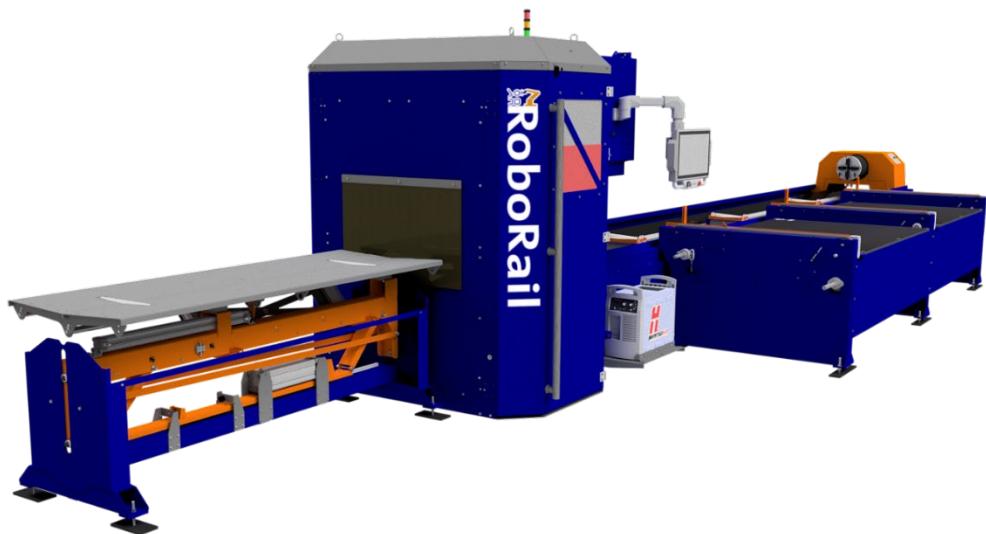


RoboRail



Original manual of the RoboRail

Version 2.2



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1 Introduction

1.1 About this manual

This manual explains to the operator how to use the RoboRail safely.

The RoboRail is a versatile machine that combines plasma and a robot to cut different profiles.

Do not let anyone operate the machine without instruction and having read and understood the complete set of manuals including:

- operator's manual
- plasma unit manual
- dust collector manual (optional)

Follow these manuals carefully to prevent personal injury or damage to the machine.

Always keep these manuals at hand and read them as many times as necessary for a complete understanding.

Keep the machine clean, maintained and in proper working condition.

It is the responsibility of the owner, the employer and the operator to take all steps to ensure optimal safety in the workshop.

For any questions or comments please contact:

Manufacturer: HGG Profiling Equipment b.v.

Address: Zuidrak 2, 1771 SW Wieringerwerf

Country: The Netherlands

Phone: +31 (0) 227 50 40 30

Website: hgg-group.com

1.2 Customer support

Spare parts and consumables are available and can be ordered from the HGG service department. Questions or information can be sent to the service department by e-mail 24 hours a day. During local office hours (Monday to Friday from 8:00 am – 17:00 pm) your questions will be handled with dedication and care.

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1.3 Disclaimer

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1.4 Document conventions

The risks in this manual are indicated like this:

	WARNING! <i>Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.</i>
	CAUTION! <i>Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury or material damage.</i>

These boxes also specify:

- *The nature and source of the risk*
- *The consequences not avoiding the hazard*
- *How to avoid the hazard*

This box gives the operator information to avoid potential problems.

	NOTICE! <i>Provides extra information to notify the user for potential problems and solutions.</i>
---	--

1.5 Definitions

Operator

Operators are instructed persons who are adequately advised to avoid the dangers this machine may create.

Instruction should include instructions in operation under normal conditions and emergency situations.

Operators are persons who start, stop, load, unload, program and clean the machine.

Mechanic

Mechanics have technical knowledge or sufficient experience to enable them to avoid the dangers which electricity, pneumatics, hydraulics and mechanics may create. Mechanics are persons who maintain and clean the machine.

Authorised person

An authorized person is authorized by the user to carry out certain activities on the machine.

2 Safety

2.1 Personal safety instructions

Check the machine as required to make sure it is in safe operating condition. When found to be in incapable of safe operation the machine must be withdrawn from service. Do not work with the machine if it is damaged or not in good working condition. Qualified personnel must repair the machine prior to its next use.

Stop the machine in such a way that another worker is unable to start the machine when you must work on or in the machine.

Only reach into the machine unless the machine is completely switched off.

The cell door cannot be opened during the cutting process. The window of the cutting cell has UV protection shield to protect your eyes. Never look directly at the torch during cutting, the bright light could damage your eyesight.

Always use the advised Personal Protection Equipment. Wear a helmet if material is being loaded using an overhead crane or a forklift.

2.2 Residual risks

The machine is designed to be safe. Despite all risk reduction measures, care must always be taken when operating the machine. Parts or machine components that are colored orange may move suddenly or unexpectedly. Some risks cannot be eliminated, the greatest potential residual risks are:

- *Wedging/crushing*
- *Burning (skin injury)*
- *Falling material*

	<p>CAUTION! WEDGING, CRUSHING HAZARD Infeed table, machine frame, cell <i>Personnel can be hit by the moving robot or material, burned by heat, affected by arc radiation, fumes, sparks, noise and laser radiation. Personnel can be drawn in or wedged. Keep the door of the cell closed during cutting. Stay behind the remote control as long as the machine is in operation. Do not approach the outfeed or infeed table. Maintenance mode is for maintenance and trouble-shooting purposes only. Do not step in or reach into the machine. Wear advised PPE.</i></p>
	<p>CAUTION! BURNING HAZARD HOT MATERIAL, COMPONENTS, PARTS OR SCRAP <i>The plasma process generates high temperatures. Material coming out of the machine can be very hot. Components of the machine can be very hot. Give material and components of the machine time to cool down before touching them. Always wear boots and fireproof gloves when handling material or removing scrap pieces.</i></p>

	CAUTION! WEDGING CRUSHING HAZARD FALLING MATERIAL, PARTS OR SCRAP <i>Sharp and hot workpieces and scrap can fall out of the front chuck on and or/from the infeed table. Use non-flammable containers for work pieces and scrap. Keep your distance and wear the recommended PPE.</i>
	WARNING HEALTH RISK, RISK OF SUFFOCATION <i>The plasma cutting process may create hazardous substances. Cutting galvanized and stainless steel creates toxic gasses and pose a health risk. Remove these gases from the work floor and release them outside. Use a dust collector and change filters regularly. Keep the cell door closed and allow time for gases to escape through the system. Do not inhale smoke. read the manual of the plasma unit for more information.</i>
	CAUTION! HEARING DAMAGE <i>The plasma cutting process generates noise emissions above 70 dB(A). Permanent hearing damage occurs with prolonged exposure. Hearing protection must be worn at all times.</i>
	WARNING! FIRE HAZARD Flammable materials in the vicinity of the machine <i>The plasma cutting process generates high temperatures and sparks. Flammable and combustible materials may catch fire. Never use the machine in a flammable or explosive environment. Remove flammable and combustible materials (oil, paint, etc.) from the vicinity of the machine and keep them at least 35 feet /10 meters away. Use a non-flammable container for work pieces and scrap.</i>
	WARNING! FIRE AND EXPLOSION HAZARD Gas cylinders and torch <i>Use gas cylinders responsibly according to national and local regulations. Keep cylinders, valves, regulators torch and consumables free from grease or oil.</i>
	WARNING! PLASMA AFFECTING MEDICAL IMPLANTS AND HEARING AIDS. <i>Magnetic fields from high currents can affect medical implants such as a pacemaker, insulin pump or hearing aid. This can lead to a life-threatening situation. Wearers of these devices should consult a doctor before going near a plasma arc.</i>

2.3 Gas and compressed air supplies

Please refer to the plasma unit manual for gas and compressed air requirements.

2.4 Personal Protection Equipment

For safety reasons operators must wear:

- Safety shoes.
- Flame proof overall / clothing.
- Flame proof gloves.
- Ear protection.
- Safety glasses.
- Helmet (when using an overhead crane or entering the cell).

2.5 Fire prevention

Make the area safe before cutting, remove all flammable material within 35 feet /10 meters Keep a Co2 type fire extinguisher nearby. Let hot metal cool down before handling it or let it touch combustible materials.



2.6 Explosion prevention

Gas cylinders contain a gas under high pressure, if damaged a cylinder can explode. Handle and use cylinders in accordance with applicable national and local regulations.

Always:

Use only cylinders that are undamaged.

Use cylinders in an upright and secured position.

Keep all gas equipment and parts in good condition, replace damaged or worn components.

Use gas equipment for only the type of gas they are designed and intended for

Never:

Lubricate gas- cylinders, -valves or -regulators with grease or oil.

Use tools to open a stuck cylinder.

2.7 Ventilation

The exhaust gases from the fume extraction and dust collection systems must be removed from the work floor according to local health and safety regulations. HGG recommends these gases be released to the exterior. When cutting stainless steel HGG **STRONGLY** advises that fumes are **ALWAYS** released outside*.

The material being cut can be a source of toxic fumes or gases that deplete oxygen. Exhaust gases pose a health risk when they are not removed from the work floor. Wait until the smoke has been extracted before opening the cell door.

To reduce the risk of exposure to fumes:

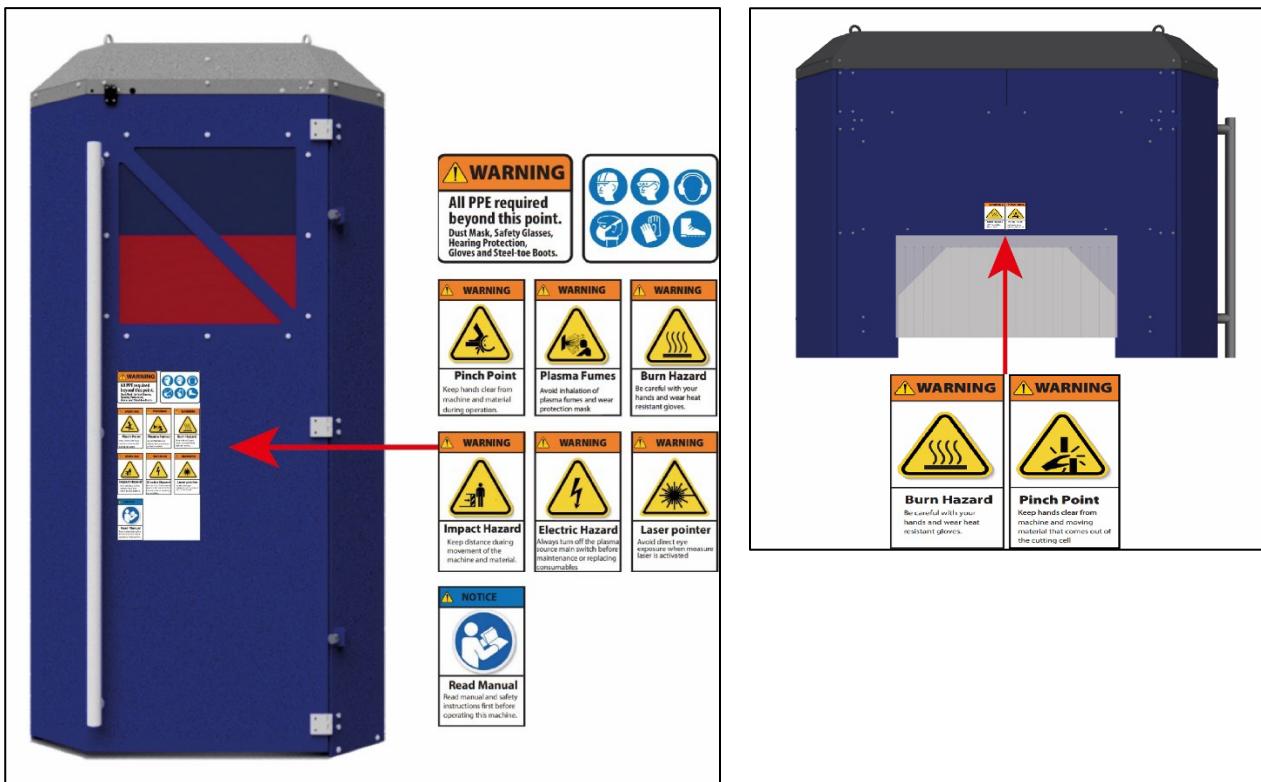
- Remove all solvents from the metal before cutting.
- Use local exhaust ventilation to remove fumes from the air.
- Do not inhale fumes, wait a while to open the door to give fumes the time to leave the cell.
- Monitor or test the air quality at the site as needed.

Consult with a local expert to implement a site plan to make sure air quality is safe.

2.8 Safety Labels

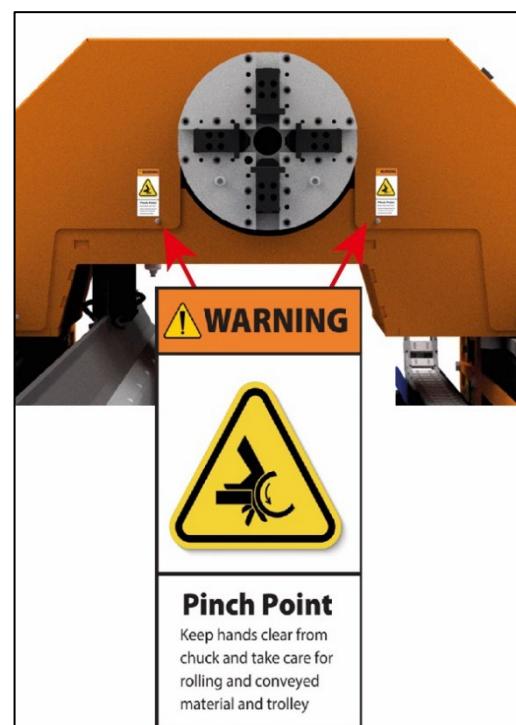
Keep the labels on the machine in good condition. Replace damaged or missing labels immediately.

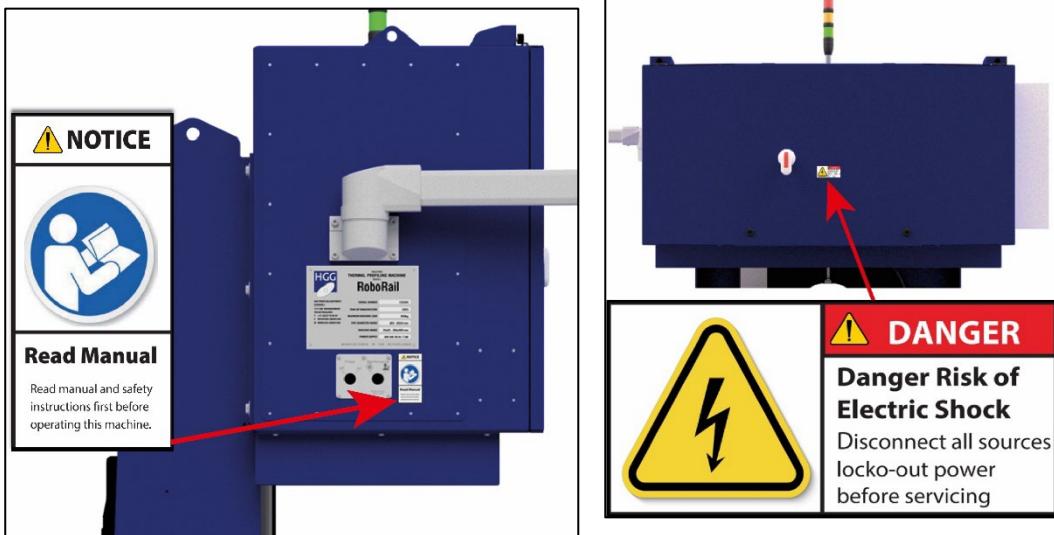
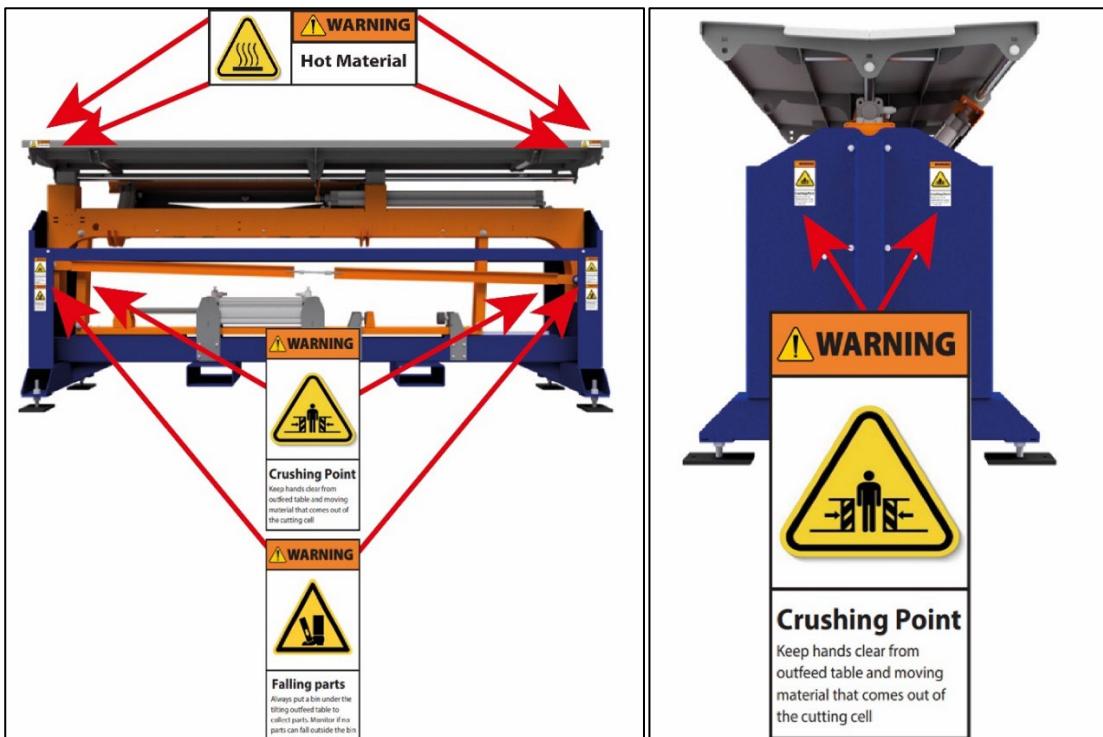
Cell

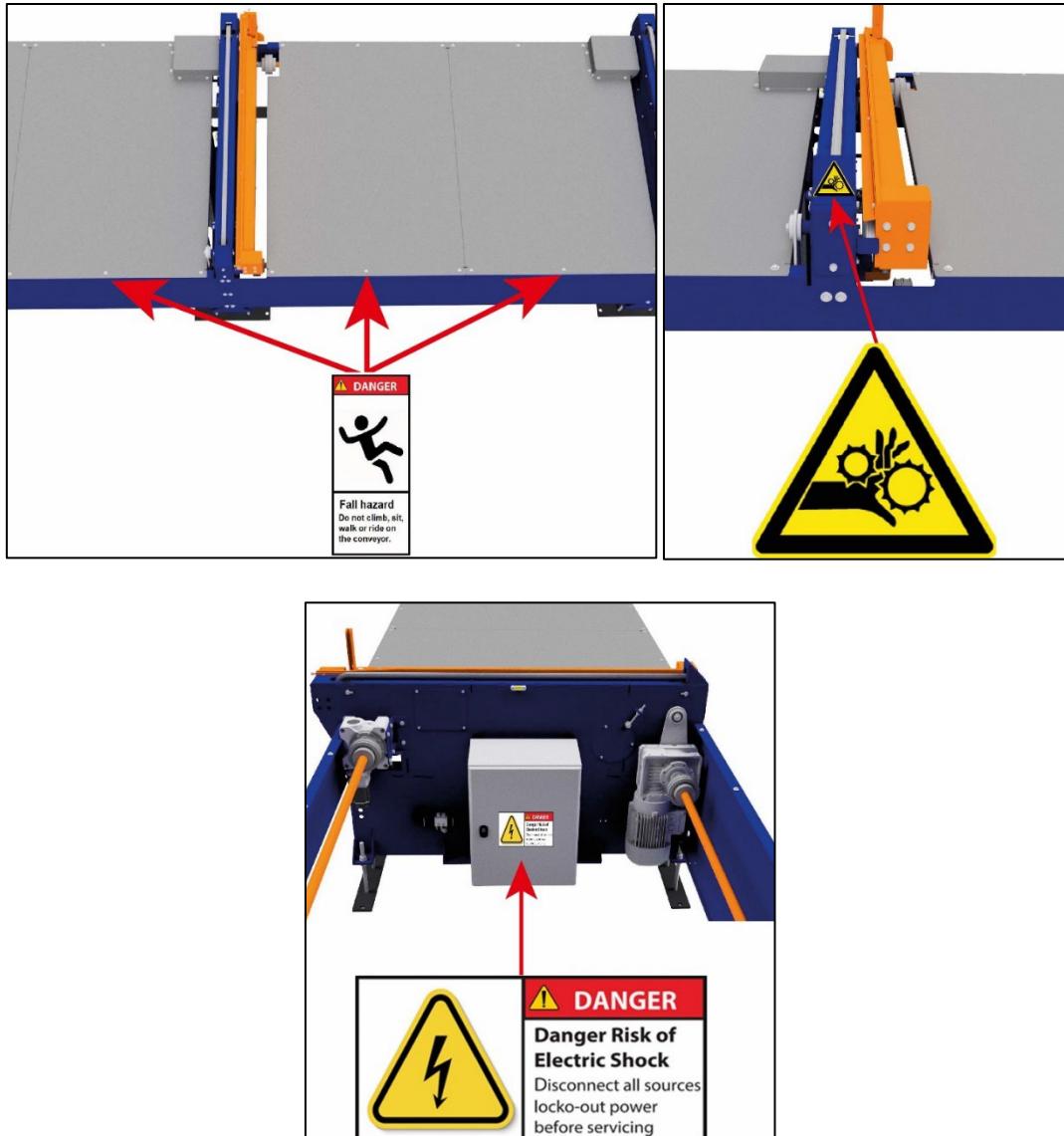


Bed and trolley





Control unit Operator side, Control unit bed side

Outfeed table


Infeed table (optional)


2.9 Software safety systems

Some operations require an intervention by the operator. To protect personnel and prevent damage to the machine the software blocks some buttons during operation.

2.10 Machine status light

An extra feature is the machine status indicator light. The operator can see immediately which action is being carried out by the machine.

Machine status			
Emergency stop			Continuous
Profiling, cutting	Flashing	Continuous	
Profiling, idle	Continuous		

2.12 Cell door lock

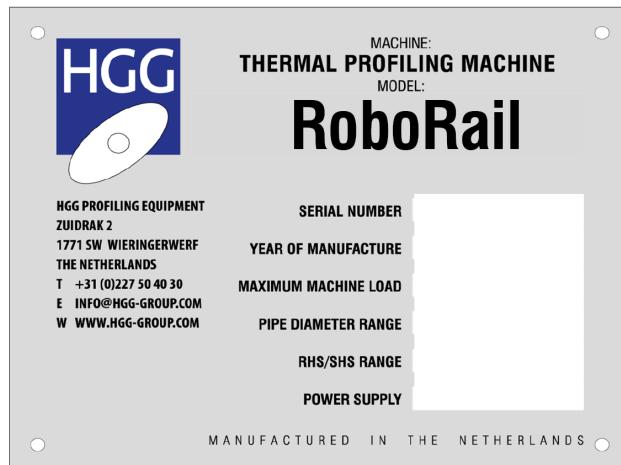
The cell protects the operator from all the dangers described. If the cell door is opened during cutting the operator could be exposed to these dangers. To prevent this from happening all activity on the machine is stopped.

The door must be locked before cutting can begin. If not, the operator will see a notification on the touch screen. If for any reason the door is opened during cutting, an emergency stop will be triggered, stopping cutting and all movement.

3 Machine overview

3.1 Intended use of the machine

RoboRail is a Thermal Profiling Machine for the cutting of metal profiles such as box sections, tubes, pipes, angles and flat bars using a plasma cutting process. The machine may only be used for industrial applications. A nameplate, like the one shown below, is located on the control unit. Do not exceed the values indicated on the nameplate and in the machine specifications. Keep the plate visible, clean and in legible condition.



3.2 Non intended use

The machine is designed to be used for objects described in Chapter 3.1.

The machine should not be used for:

- cutting hermetically sealed containers
- flammable or explosive material
- coated material or material that form noxious gasses during cutting such as galvanized material

Do not use tools other than those specified in this and the plasma unit manual in combination with the machine.

Non-intended use of the machine can:

- pose health risks or cause injury to personnel
- damage the machine or other equipment
- reduce reliability and performance of the machine.

3.3 Machine specifications

Maximum wall thickness	3/4"		20 mm	
Machine length	24 ft	40 ft.	7.315 mm	12.000 mm
Maximum weight	880 lbs	1200lbs	400 kg	550kg

3.4 Defined materials to be cut

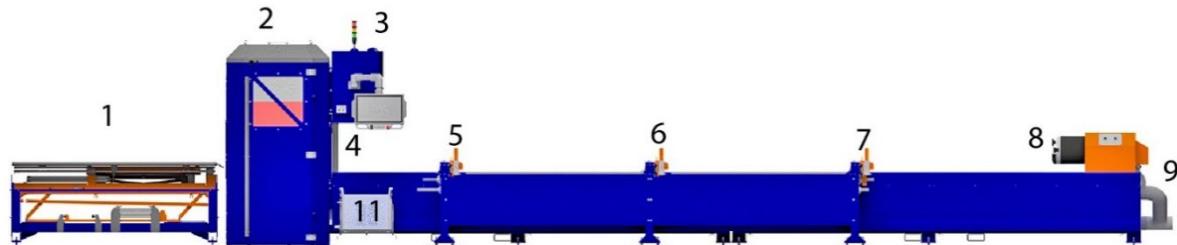
Profile	Min.	Max.	Min.	Max.
Channel	3 x 4,1 3"x 1,41"	C12 x 30" 12"x 3,7 "	UNP 50 50 x 25 mm	UNP 280 280 x 95 mm
Tube (RHS/SHS) max.ratio RHS is 1:2	1" x 1"	8" x 8"	25 x 25 mm	200 x 200 mm
Pipe (CHS)	Ø 1"	Ø 10"	Ø 25 mm	Ø 250 mm
(unequal) Angle	1"	8"	25 mm	200 mm
Flat bar min. wall thickness 10mm	2"x 8/16"	8x1"	50 x 10 mm	280 x 20 mm
Material in Mild steel only				
Rusty/dirty flat bars can cause damage to the machine and thus are not allowed.				
Max. outfeed length for pipe and tube (RHS/SHS)) is 8ft/.2.500mm				
In case outfeed length of Channels, Angles, or flats exceeds 2.500mm / 8 ft, a non-driven support conveyor is to be installed (customer supply)				

3.5 Conditions for use

The machine is suitable for use in a ventilated, wind- and rainproof environment that has:

- an ambient temperature of 0 to +45°C
- an atmospheric humidity of 90% maximum (non-condensing)
- an illumination level of 500 lux (minimum)

3.6 Machine components & controls

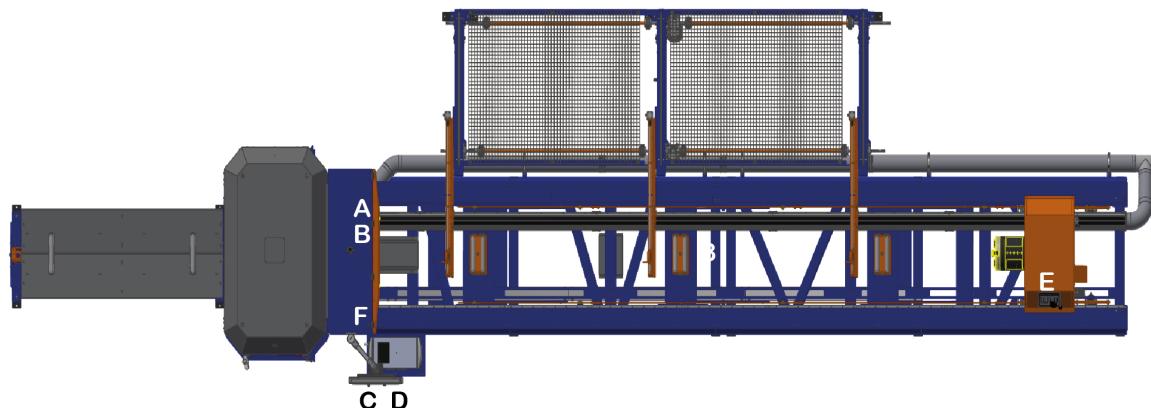


Components

- 1 Outfeed table
- 2 Cell
- 3 Control unit
- 4 Front chuck
- 5 Bogie
- 6 Bogie
- 7 Bogie
- 8 Trolley
- 9 Exhaust system
- 10 Frame
- 11 Plasma unit
- 12 Infeed loading chains (optional)

Controls

- A Main switch
- B Status light
- C Remote Control
- D Emergency stop
- E Rear Chuck Controls
- F Power/maintenance switch

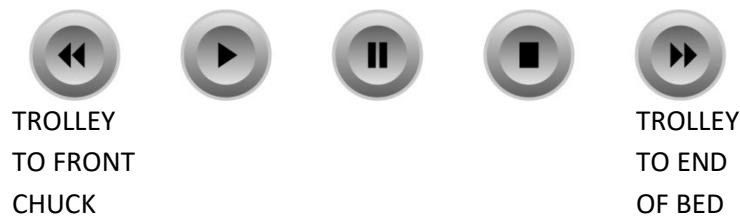


3.7 Remote control

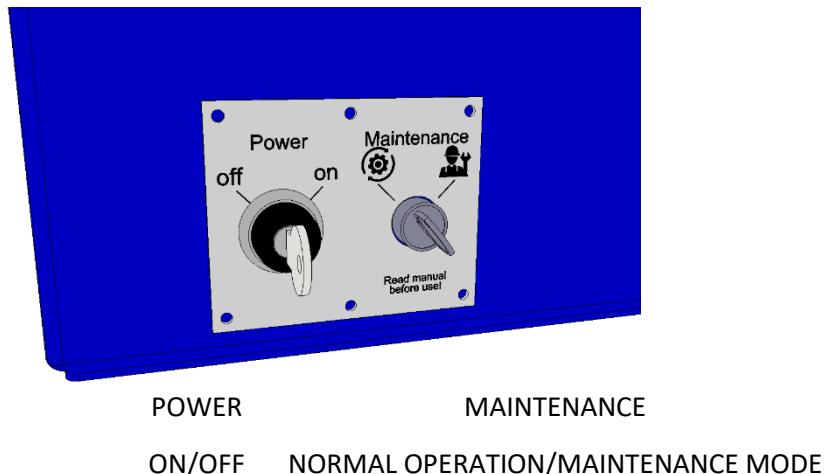


- | | | |
|------------------------|------------------------|---------------------------|
| D. USB connection | B. Touch screen | C. Short cut buttons |
| | E. 'Play' buttons | F. Emergency Stop |

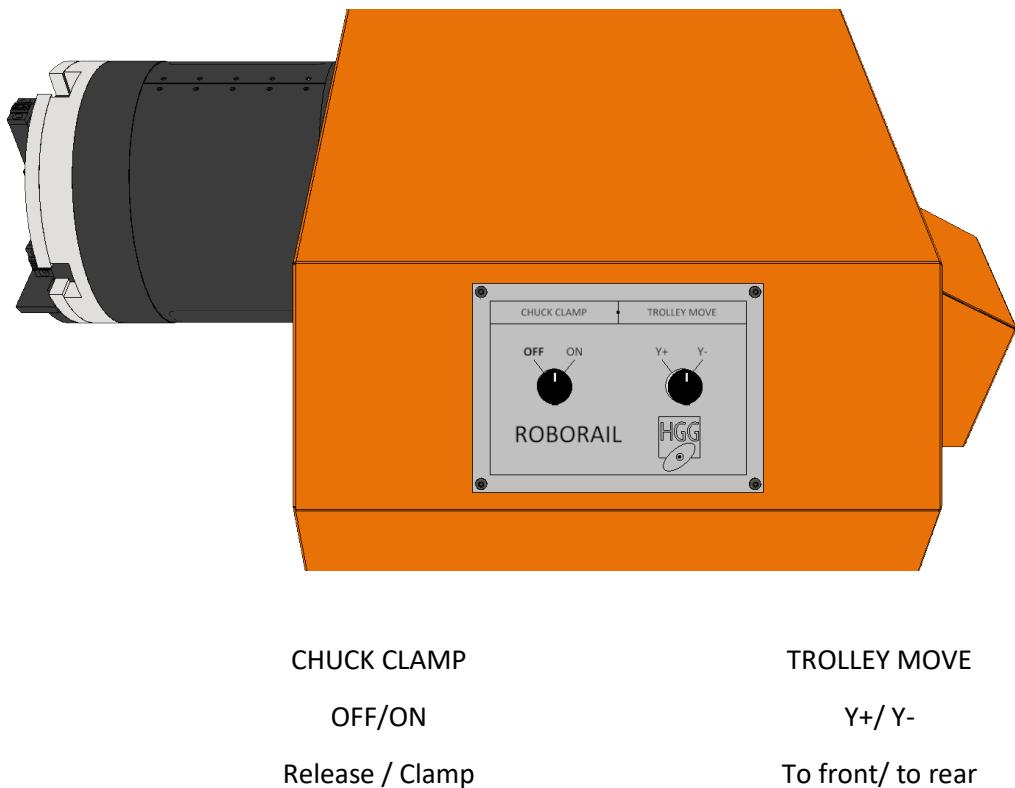
Functions of the play buttons



3.8 Power/Maintenance switches



3.9 Trolley Controls



4 Storage

4.1 Storing the machine when it will not be used for an extended period of time

If for any reason the machine needs to be moved to a new location or decommissioned and placed in storage, please contact HGG for detailed advice.

4.2 Storage environment

For long term storage the machine should be placed in a moisture and damp free environment with an ambient temperature between 5°C and 40°C. A desiccant should be used in the control unit cabinets and other electrical components (in the event of extended storage change the desiccant regularly). Ventilate the area periodically. The floor should also be damp proof or damp-proof padding should be laid before storage.

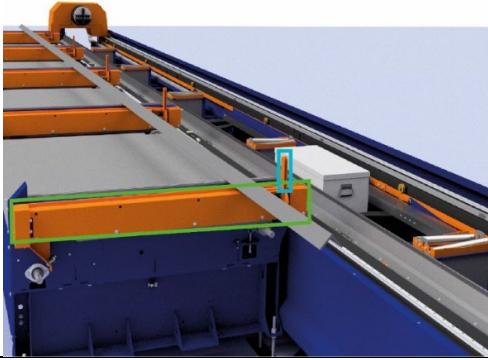
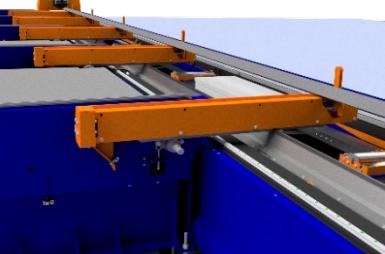
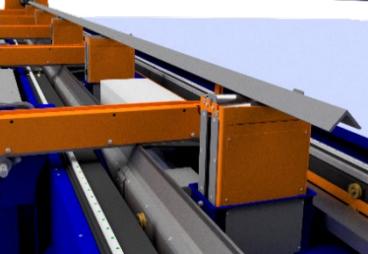
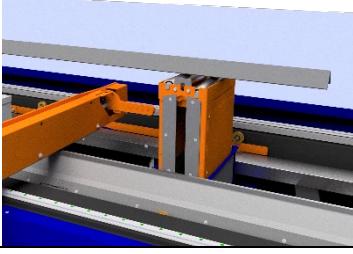
Most parts of the machine are painted or coated to prevent rusting. However, some parts are exposed to the air and should be oiled or greased regularly for protection. Alternatively, spray the parts with oil and seal with plastic coating (in the event of extended storage check the parts regularly). Treat all exposed parts, pay particular attention to the conveyor rollers, the cylinder shafts and the infeed and outfeed storage.

All hoses and cables should be shielded by protective covering to prevent damage.

5 Infeed table

The infeed table consists of sliders with arms to cut larger quantities of the same profiles in quick succession. Several profiles can be placed on the side load infeed table, which are straightened by the driven chains and arms. The sliders move one profile and place it on the bogies. Once over the bogies, the sliders lower, leaving the profile on the bogies, retracting the arms and return to their home position.

The conveyor can be controlled from the touch screen on the remote control, either in the material handling screen by selecting the conveyor or in the diagnostics screen under the conveyor tab.

	
Slider and Arm Starting position: Infeed table is homed and arms are up. Load profiles approximately 4 inches (10 cm) apart.	
	
Press Infeed on the remote control: chains with material will move toward the arm.	The sliders will bring the profiles into a straight position.
	
The sliders move the material above the bogies.	The bogies come up.
	
Arms retract and sliders return to home.	Profile ready for clamping.

6 Operation

6.1 Before starting the machine, check that:

- All persons are clear of the machine.
- No maintenance work is being performed on the machine.
- All fixed covers are in place. Some can be removed for cleaning, lubrication and maintenance.
- The machine is free of jams and other obstacles.

6.2 Starting up the machine

The operation of the machine is divided into 4 phases:



In order to use the machine for profiling the operator must go through these 4 phases from left to right. The machine starts up automatically. If an action is required, the machine will show this, with additional instructions, if needed. The button at the bottom center of the screen is always the next step. Its appearance will change accordingly to the state of the machine. The user interface will only display buttons that are allowed to be clicked in that specific state to prevent confusion.

All 4 phases are described below and the steps that need to be taken are divided into 2 types.

1. Manual (M), an action is required from the operator (Orange).
2. Automatic (A), the machine performs this action automatically (Blue).

NOTE! The images used to visualize the user interface do not show the whole functionality of the interface and are primarily used as a guideline. Always assume that the given description below describes the actions that need to be taken.

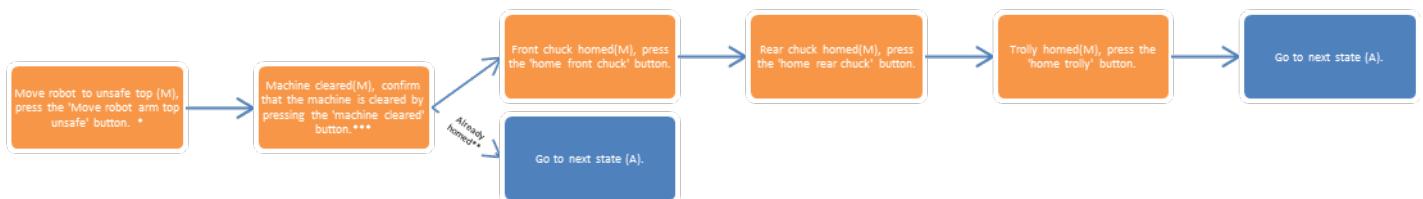
6.2.1 Powering on mode

In 'powering on mode' the machine connects to the motion controller and perform several configuration checks on both hard- and software level to assure correct operation.



6.2.2 Homing mode

In homing mode the machine is calibrated. The steps that need to be performed when the machine has had a complete power-down differ from the steps that need to be performed when the machine has been running in idle.



* Visually monitor the arm because the movement is unsafe and is not restricted in the way in which it moves to its position.

** When the machine has not had complete power-down and it has already been homed, the homing steps are skipped automatically.

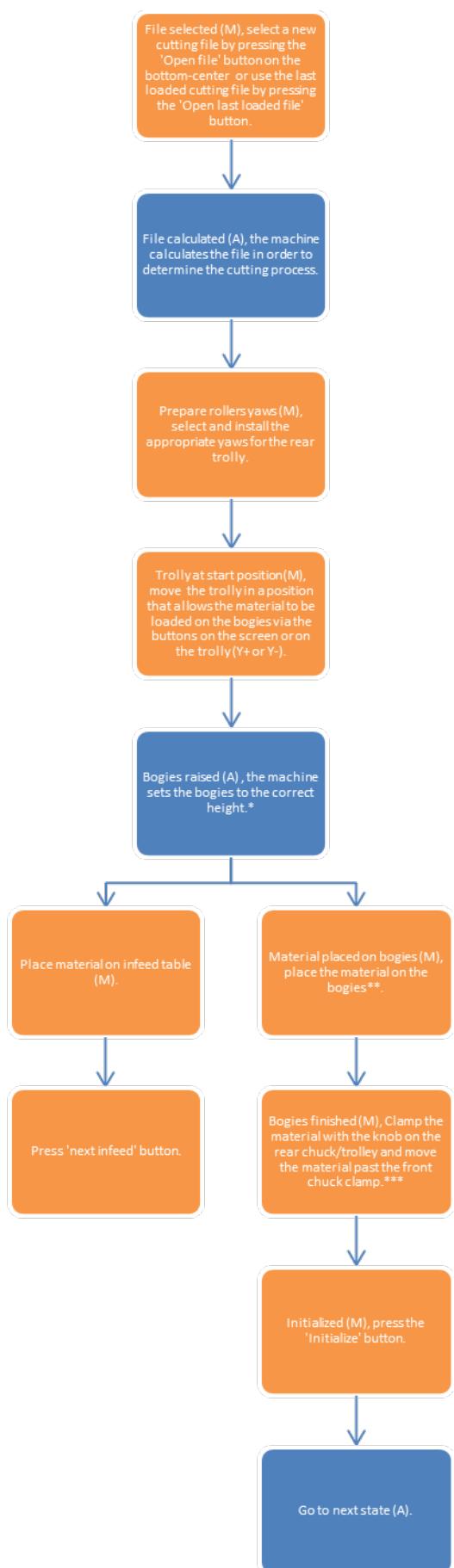
*** Use the move, rotate, open and close buttons on the right of the screen to remove previous materials.

6.2.3 Preparing mode

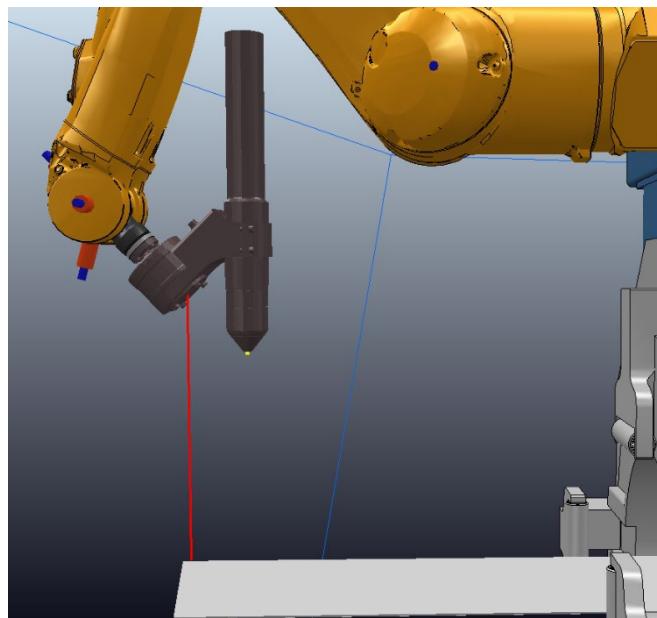


In preparing mode the machine calculates the cutting file. The machine sets the bogies to the appropriate height and the operator places the material on the bogies. The operator is also responsible for preparing the roller yaws. Another option is to eject the remnant when the operator wants to use a different material or just clear the machine from the material of the previous job. This is possible via the 'Eject remnant' button.





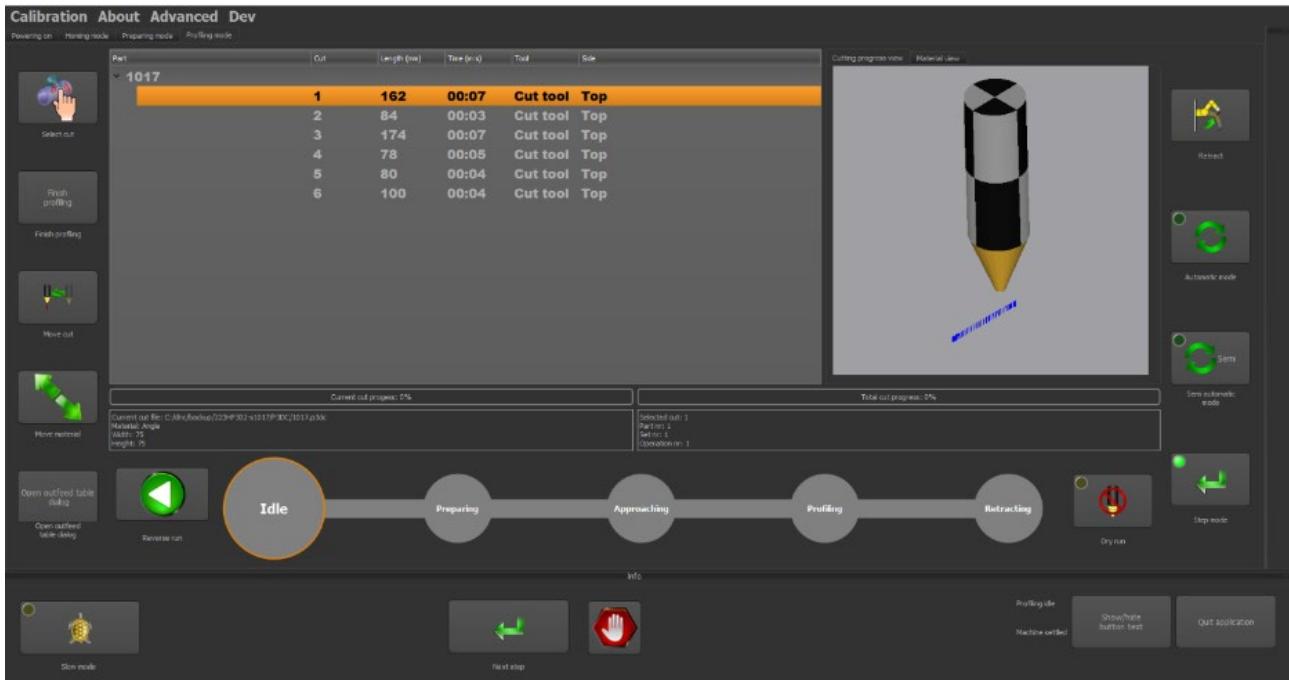
- * When a material is used which uses the same bogie height, this step is skipped to save time.
- ** Make sure the material is always placed on the front bogie.
- *** The material should be moved to a position where it meets the (imaginary) red line in the image below.



6.2.4 Profiling mode

	WARNING! CRUSHING, WEDGING, BURNING HAZARD Cell, Outfeed table <p>Heavy and hot parts can fall onto the infeed table or the floor during the final cut and injure. The outfeed table might move into the cell to catch a part and slides back again. Do not approach the table while the machine is still cutting. Provide a non-flammable container to catch the parts. Wait until parts have cooled down. These may be hot and sharp. Wear the advised PPE.</p>
	WARNING! FIRE HAZARD Debris in material to be cut <p>Wood, waste or packing material in a tube or profile can catch fire and set the machine on fire. Check each profile before loading it on the machine and remove any debris.</p>
	WARNING! FALL HAZARD Infeed table, machine frame <p>Tripping or losing one's balance on top of the infeed table or the machine frame. Use a rope or tool while loading. Do not stand on the infeed table or machine frame.</p>
	WARNING! CRUSHING, WEDGING HAZARD Infeed table, trolley, bogies, chuck <p>While loading material in the trolley personnel can get fingers or hands crushed in the trolley or front chuck between material and the jaws. Use tools to position the material. Wear the advised PPM to avoid injury.</p>

In profiling mode the machine is ready to start profiling. The operator can select between automatic and (semi) automatic profiling and step mode and is able to select different cuts.



- **Automatic mode**, automatically perform the preparing approaching, profiling and retracting steps for all cuts. Operator only clicks ‘finish profiling’ on the bottom centre of the screen after profiling is finished.
- **Semi-automatic mode**, perform the preparing, approaching, profiling and retracting steps for one cut at a time. Operator clicks ‘next cut’ after each cut and ‘finish profiling’ once all cuts are finished.
- **Step mode**, operator must press ‘next step’ after preparing, approaching, profiling and retracting.
- **Select cut**, allows the operator to select a specific cut in the lists of cuts visible in the middle of the screen.
- **Finish profiling** takes the operator back to preparing mode.
- **Move cut**, allows the operator to manually change the torch position .
- **Move material**, allows the operator to move the material forward or backward and to retract the robot arm.
- **Open outfeed table dialog**, allows the operator to tilt, raise, retract and extend the outfeed table manually.
- **Retract**, retracts the robot arm.
- **Dry run** performs profiling without cutting.

7 Converting to a different profile

Profile	Min.	Max.	Min.	Max.
Channel	3 x 4,1 3"x 1,41"	C12 x 30" 12"x 3,7 "	UNP 50 50 x 25 mm	UNP 280 280 x 95 mm
Tube (RHS/SHS) max.ratio RHS is 1:2	1" x 1"	8" x 8"	25 x 25 mm	200 x 200 mm
Pipe (CHS)	Ø 1"	Ø 10"	Ø 25 mm	Ø 250 mm
(unequal) Angle	1"	8"	25 mm	200 mm
Flat bar min. wall thickness 10mm	2"x 8/16"	8 x1"	50 x 10 mm	280 x 20 mm
Material in Mild steel only				
Rusty/dirty flat bars can cause damage to the machine and thus are not allowed.				
Max. outfeed length for pipe and tube (RHS/SHS)) is 8ft/.2.500mm				
In case outfeed length of Channels, Angles, or flats exceeds 2.500mm / 8 ft, a non-driven support conveyor is to be installed (customer supply)				

Clamp your profiles using the appropriate accessories for the front chuck and rear chuck (trolley) mounted in the correct position. Tube and box sections can be clamped from the inside or from the outside.

Operation conveyor mode check

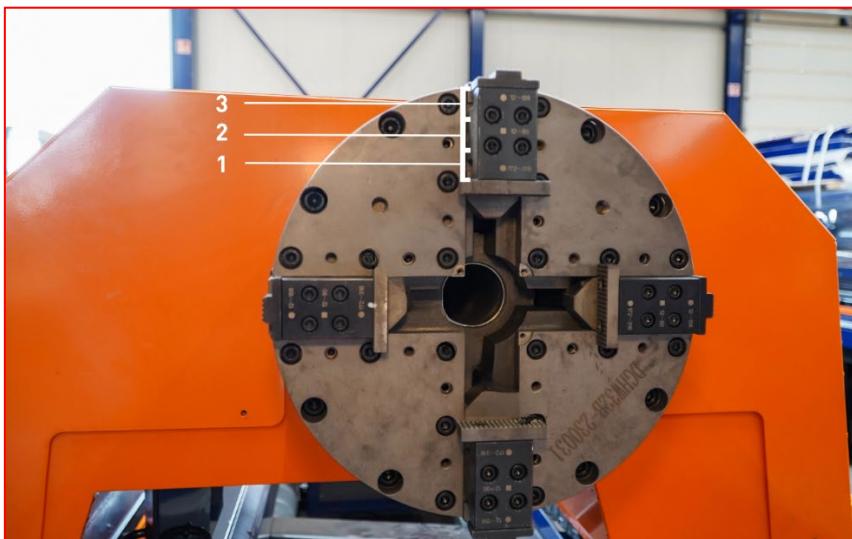
When cutting angle, channel, flatbar you must cut in conveyor mode. When preparing the machine, a check will be performed on the loaded file. If it is one of these materials, the machine checks if the conveyor mode plate is present and if the outfeed table is at its highest position.

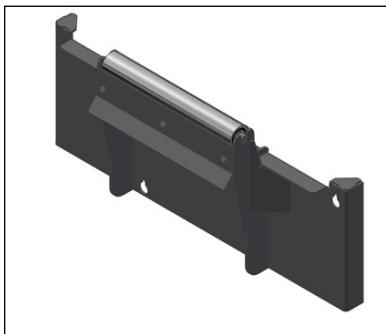
If it is not, the machine will ask to place the plate and to raise the table.

When loading a file with tube/square tube, the check will ask you to remove the plate and send the table down.

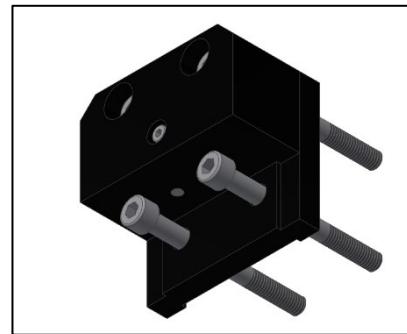
If you raise the table itself again with a tube/square tube and then go to cut a larger profile, the table will be sent down again so that you can't bump into the table with the material.

Possible Jaw Mounting Positions on the Rear Chuck or trolley:

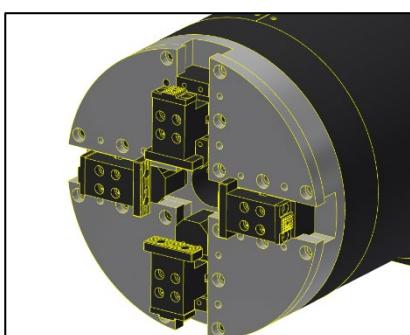


Front chuck accessories

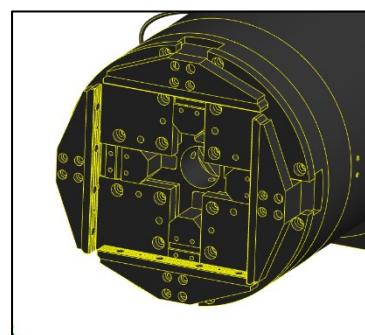
Conveyor mode plate



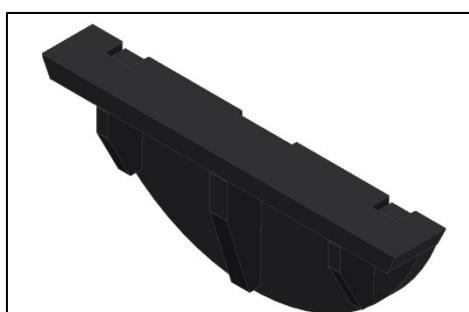
Jaw adapter

Rear chuck (trolley) accessories

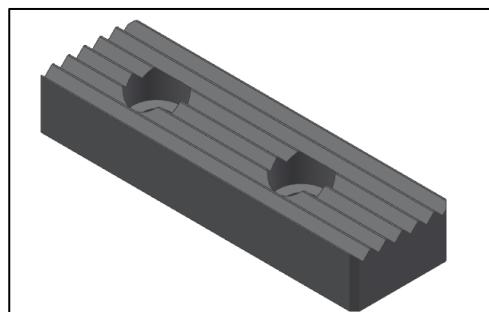
Standard jaws (A)



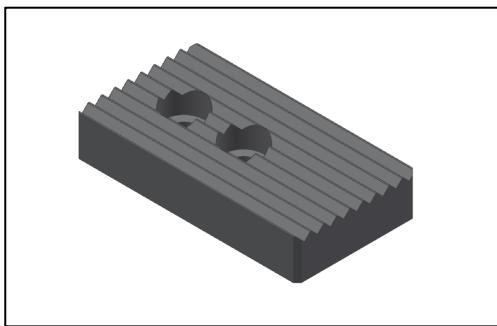
Second jaws (B)



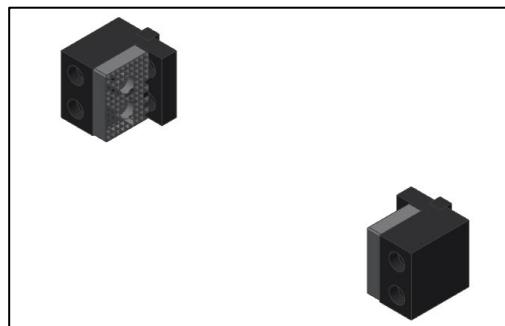
Fixed jaw



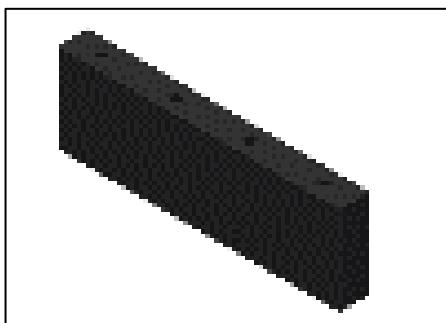
Jaw extended insert A



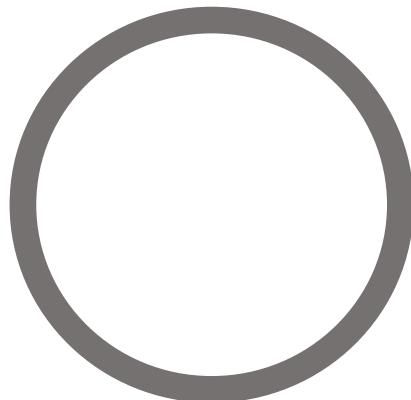
Jaw extended insert C



L-jaws



Jaw extension block



Front chuck		
Range Ø mm	Range Ø "	Jaws
25 – 140	1– 5,51	Normal jaws, position 1
102 – 232	4– 9,13	Normal jaws, position 2
200 – 250	7,87– 9,84	Normal jaws, position 3

Trolley/ rear chuck (>> serial number 1930)		
Range Ø mm	Range Ø "	Jaws
25 – 117	1– 4,60	Standard jaws (A), position 1 (<i>clamp outside</i>)
52 – 156	2,04– 6,14	Standard jaws (A), position 2 (<i>clamp outside</i>)
172 – 250	6,77– 9,84	Standard jaws (A), position 1 (<i>clamp inside</i>)
220 – 250	8,66– 9,84	Standard jaws (A), position 2 (<i>clamp inside</i>)
42 – 145	1,65– 5,70	Second jaws (B), position 1
82 – 185	3,22– 7,28	Second jaws (B), position 2
125 – 225	4,92– 8,85	Second jaws (B), position 3

Trolley/rear chuck (serial number 1930 >>)		
Range Ø mm	Range Ø "	Bekken
25– 104	1–4.09	Standard jaws (A), position 1 (<i>clamp outside</i>)
104– 195	4.09–7,67	Standard jaws (A), position 2 (<i>clamp outside</i>)
130– 222	5,11–8,74	Standard jaws (A), position 1 (<i>clamp inside</i>)
222– 250	8,74–9,84	Standard jaws (A), position 2 (<i>clamp inside</i>)
36– 114	1,41–4,48	Second jaws (B), position 1
114– 210	4,48–8,26	Second jaws (B), position 2



Front chuck		
Range mm	Range "	Jaws
25 – 140	1 – 5,51	Normal jaws, position 1
102 – 200	4 – 9,13	Normal jaws, position 2

Trolley/rear chuck (>> serial number 1930)		
Range mm	Range "	Jaws
25 – 117 mm	1 – 4,60	Standard jaws (A), position 1 (<i>clamp outside</i>)
52 – 156 mm	2,04 – 6,14	Standard jaws (A), position 2 (<i>clamp outside</i>)
172 – 200 mm	6,77 – 9,84	Standard jaws (A), position 1 (<i>clamp inside</i>)
42 – 145 mm	1,65 – 5,70	Second jaws (B), position 1
82 – 185 mm	1,65 – 5,70	Second jaws (B), position 2
125 – 225 mm	3,22 – 7,28	Second jaws (B), position 3

Trolley/rear chuck (serial number 1930 >>)		
Range mm	Range "	Jaws
25-104 mm	1 – 4,09	Standard jaws (A), position 1 (<i>clamp outside</i>)
104-195 mm	4,09 – 7,67	Standard jaws (A), position 2 (<i>clamp outside</i>)
130-200 mm	5,11 – 7,87	Standard jaws (A), position 1 (<i>clamp inside</i>)
36-114 mm	1,41 – 4,48	Second jaws (B), position 1
114-210 mm	4,48 – 8,26	Second jaws (B), position 2



<i>Conveyor mode adapter</i>		
Front chuck	Range height mm	Range height "
10 – 75	0,39 – 2,95	+ jaw adapter
56- 121	2,20 – 4,76	+ normal jaw position 1
Range width	Range width"	Jaws
- 140	-5,51	Normal jaws, position 1
102 – 232	4,01 – 9,13	Normal jaws, position 2
94 – 305	3,70 – 12	Normal jaws, position 3
Rear chuck		
Range height mm	Range height "	Jaws
- 53mm	- 2,08	Second jaw (B) position 1 + jaw extension block + fixed jaw
22 – 73mm	0,86 – 2,87	Second jaw (B) position 2 + jaw extension block + fixed jaw
Range width mm	Range width"	Jaws
50 – 117mm	1,96 – 4,60	Standard jaw (A) position 1 + jaw extended insert A
52 – 156mm	2,04 – 6,14	Standard jaw (A) position 2 + jaw extended insert A
91 – 193mm	3,58 – 7,59	L-jaws position 1 + jaw extended insert C
128 – 232mm	5,03 – 9,13	L-jaws position 2 + jaw extended insert C
168 – 270mm	6,61 – 10,62	L-jaws position 3 + jaw extended insert C
Rear chuck (serial number 1930 >)		
Range height		Jaws
- 43mm	- 1,69	Second jaw (B) position 1+ jaw extension block + fixed jaw
43 – 91mm	1,69 – 3,58	Second jaw (B) position 2 + jaw extension block + fixed jaw
59 – 98mm	2,32 – 3,85	Second jaw (B) position 1 + fixed jaw
Range width		Jaws
-104mm	- 4,09	Standard jaw (A) position 1 + jaw extended insert A
104-195mm	4,09 – 7,67	Standard jaw (A) position 2 + jaw extended insert A
88-182mm	3,46 – 7,16	L-jaws position 1
182 – 273mm	7,16 – 10,74	L-jaws position 2

Front Chuck			<i>Conveyor mode adapter</i>
Range mm	Range "	Bekken	
50 – 140	1,96 –	jaw adapter. Side jaws position 1	
102 – 232	4,01 – 9,13	jaw adapter. Side jaws position 2	
200 – 280	7,87 – 11,02	jaw adapter. Side jaws position 3	

Rear chuck (tot project 1930)		
Range mm	Range "	Jaws
50 – 117	1,96 –	Second jaw (B) top+ jaw extension block + fixed jaw (<i>vertical</i>) Standard jaw (A) side jaws position 1 + jaw extended insert A (<i>horizontal</i>)
52 – 156	2,04 – 6,14	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) Standard jaw (A) side jaws position 2 + jaw extended insert A (<i>horizontal</i>)
91 – 193	3,58 – 7,59	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) L-jaws position 1 + jaw extended insert C (<i>horizontal</i>)
128 – 232	5,03 – 9,13	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) L-jaws position 2 + jaw extended insert C (<i>horizontal</i>)
168 – 270	6,61 – 10,62	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) L-jaws position 3 + jaw extended insert C (<i>horizontal</i>)

Rear chuck (serial number 1930 >>)		
Range mm	Range "	Jaws
-104	–	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) Standard jaw (A) position 1 + jaw extended insert A (<i>horizontal</i>)
104-195	–	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) Standard jaw (A) position 2 + jaw extended insert A (<i>horizontal</i>)
88-182	–	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) L-jaws position 1 (<i>horizontal</i>)
182 – 273	–	Second jaw (B) top + jaw extension block + fixed jaw (<i>vertical</i>) L-jaws position 2 (<i>horizontal</i>)



Front chuck	<i>Conveyor mode adapter</i>	
Range mm	Range "	Jaws
- 91	- 3,58	Jaw adapter. Top jaw position 1, Side jaws position 1
68 – 99	2,67 – 3,89	Top jaw position 1, Side jaws position 1
99 – 156	3,89 – 6,14	Top jaw position 1, Side jaws position 2
130 – 164	5,11 – 6,45	Top jaw position 2, Side jaws position 2
130 – 200	5,11 – 7,87	Top jaw position 2, Side jaws position 3
Range mm	Range "	Rear chuck
- 75	-2,95	Second jaw (B) Top position 1 + jaw extension block + fixed jaw. Side jaws: Standard jaw (A) position 1 + jaw extended insert A
31 – 82	1,22 – 3,22	Second jaw (B) position 2 + jaw extension block + fixed jaw Side jaws: Standard jaw (A) position 1 + jaw extended insert A
44 – 103	1,73 – 4,05	Second jaw (B) position 2 + jaw extension block + fixed jaw Side jaws: Standard jaw (A) position 2 + jaw extended insert A
88 – 109	3,46 – 4,29	Second jaw (B) position 1 + fixed jaw Side jaws: Standard jaw (A) position 1+ jaw extended insert A
66 – 138	2,59 – 5,43	Second jaw (B) position 1 + fixed jaw Side jaws: Standard jaw (A) 2 + jaw extended insert A
116 – 138	4,56 – 5,43	Second jaw (B) position 2 + fixed jaw Side jaws: Standard jaw (A) position 2 + jaw extended insert A
116 – 166	5,43 – 6,53	Second jaw (B) position 2 + fixed jaw Side jaws: Standard jaw (A) position 3 + jaw extended insert A
146 – 172	5,74 – 6,77	Second jaw (B) position 3 + fixed jaw Side jaws: L-jaws position 2 + jaw extended insert C
146 – 198	5,74 – 7,79	Second jaw (B) position 3 + fixed jaw Side jaws: L-jaws position 3+ jaw extended insert C
149 – 200	5,86 – 7,87	Second jaw (B) position 3 + fixed jaw Side jaws: L-jaws position 3

Rear chuck	(serial number 1930>>)	
Range mm	Range "	
-60mm	- 2,36	Second jaw (B) top position 1 + jaw extension block + fixed jaw. Side jaws: Standard jaw (A) position 1 + jaw extended insert A
60-87mm	2,36 – 3,42	Second jaw (B) position 2 + jaw extension block + fixed jaw Side jaws: Standard first jaw (A) position 1 + jaw extended insert A
61-128mm	2,40 – 5,03	Second jaw (B) position 2 + jaw extension block + fixed jaw Side jaws: Standard jaw (A) position 2 + jaw extended insert A
84-89mm	3,30 – 3,50	Second jaw (B) position 1 + fixed jaw Side jaws: Standard jaw (A) position 1 + jaw extended insert A
84-146mm	3,30 – 5,74	Second jaw (B) position 1 + fixed jaw Side jaws: Standard jaw (A) position 2 + jaw extended insert A
136-146	5,35 – 5,74	Second jaw (B) position 2 + fixed jaw Side jaws: Standard jaw (A) position 2 + jaw extended insert A
84-135mm	3,30 – 5,31	Second jaw (B) position 1 + fixed jaw Side jaws: L-jaws position 1
136-200mm	5,35 – 5,87	Second jaw (B) position 2+ fixed jaw Side jaws: L-jaws position 2

8 Inspection, testing and maintenance

8.1 Introduction

Turn the power "off" when maintenance is being carried out so that nobody can get caught between moving machine parts.

	WARNING! CRUSHING, WEDGING HAZARD Infeed table, trolley, bogies, chuck If you are going to do maintenance turn off the machine so that no one is injured by moving machine parts.
	WARNING! CRUSHING, WEDGING HAZARD Never open the door or enter the cell during cutting! Maintenance mode is ONLY for maintenance, calibration and trouble-shooting purposes! Do not enter the cell during cutting, you could be hit by the moving robot, exposed to heat, UV radiation, fumes, sparks, noise and possibly, laser radiation. You could be drawn in by the conveyor rollers or wedged between the clamps.
	CAUTION! ELECTRICAL HAZARD MACHINE PARTS MAY BE LIVE Maintenance only by qualified personnel as described in this manual.
	CAUTION! BURNING HAZARD HOT MATERIAL, COMPONENTS, PARTS OR SCRAP The plasma process generates high temperatures. Components of the machine can be very hot. Give components of the machine time to cool down before touching them. Always wear boots and fireproof gloves.

8.2 Cleaning and lubrication

Make sure cleaning and lubrication is done according to the schedule supplied. It is important to clean the inside of the cell regularly, a buildup of dust and debris will reduce the life-span of some components and may compromise cutting quality.

8.3 Replacing or changing plasma torch parts

	ATTENTION! Consult the plasma unit instruction manual for information about changing plasma consumables.
---	--

- Make sure the Plasma unit power is OFF before changing consumables.
- Use the provided tools when replacing torch parts.
- Do not tighten parts excessively, they will be heated during cutting, expand and become tighter, making them difficult to remove.
- When plasma cutting with oxygen it is important to keep the consumable free from grease and oil. Always wear gloves when replacing these consumables, the oils in your skin may cause damage to the consumables or the torch!

8.4 Preventive Maintenance

Periodic maintenance is necessary to ensure the reliability and safe operation of the machine. It is very important to keep the machine in perfect condition to:

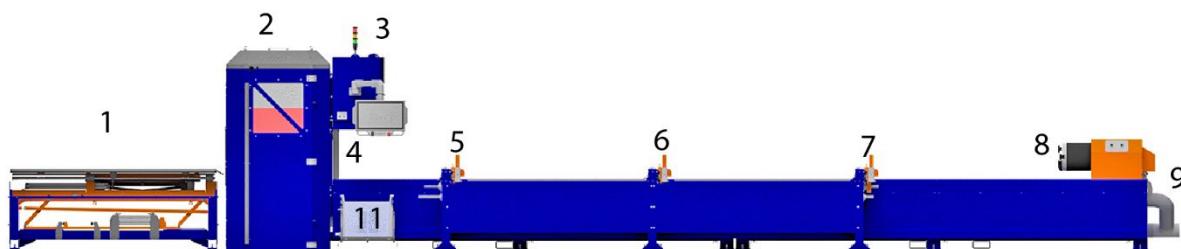
- maintain the high quality of the cutting work
- have a minimum of down time
- work safely with the machine

The machine has to be cleaned and greased according the periodic grease schedule, in the case of intensive operation according to the number of operating hours.

Plasma Unit and optional Dust collector must be maintained according to the operator's manual.

Grease/lubrification type	Nr.	HGG part nr
Unil Protect SEE NT (5 litre) protection oil	I	AO1373
Total Ceran XM100 400gr	II	AO1368
Total Alis SH 2 400gr	III	AO1367
Hydraulic oil HV-A 32 (5 litre)	IV	AO1372
ISO VG 220 gearbox oil	V	AO1374

These products are especially chosen for the maintenance. It is not recommended that these are replaced by other products. Some machine parts are sensitive to greases containing solid parts such as graphite or MoS₂. Please contact HGG if you have problems in ordering the products that are described above.



Components

- | | | |
|-----------------|----------------|-------------------------------------|
| 1 Outfeed table | 5 Bogie front | 9 Exhaust system |
| 2 Cell | 6 Bogie middle | 10 Frame |
| 3 Control unit | 7 Bogie rear | 11 Plasma unit |
| 4 Front chuck | 8 Trolley | 12 Infeed loading chains (optional) |

Maintenance every week				
Point	Description	No.	Type	Operating hours
	Visual inspection on components for damage, scrap and leaks. Replace worn parts immediately.			40
2	Visual inspection of the general condition of the robot arm.			40
2	Clean cutting cell			40
4.2	Clean the front chuck, remove dust between the housing and the rotating part at the front and between the paths in which the jaws move			40
C	Clean the screen of the remote control and the keyboard with a clean, dry cloth.			40
3	Visual inspection of the control unit cabinets for dirt and damage.			40

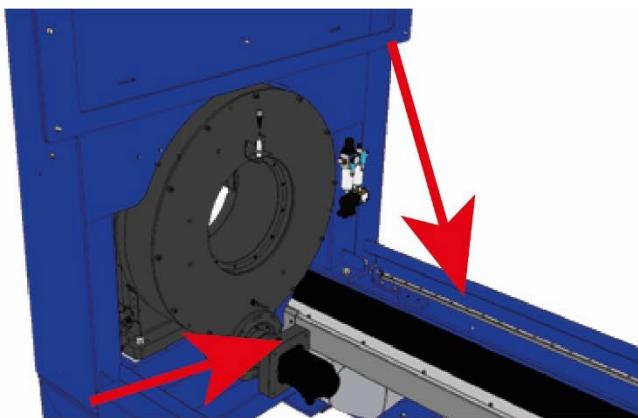
Maintenance every month				
Point	Description	No.	Type	Operating hours
10	Clean and lightly grease the toothed rack.	2	I	160
3	Remove the cooling unit filter and clean with compressed air. Replace if necessary.	1		
3	Visual inspection in the control unit and functional check of the fan.	1		
1	Degrease and clean outfeed table cylinder rods with a clean dry cloth.	4	--	160
12.1A	Visual inspection of oil reservoir on frame, empty if necessary			160
2	Clean the external surfaces of the robot arm.			160
A	Clean and lubricate the chains of the optional infeed table			

Maintenance every 2 months				
Point	Description	No.	Type	Operating hours
4.2, 8.1	Open the jaws of the chuck and the trolley completely, clean and grease		III	320
3.2, 8.1	Close the jaws of the chuck and trolley completely, clean and grease		III	320
8.2	Check energy chain, cable and hoses for damage and wear.			320
8.1	Check the position of the cables and hoses. They must move freely with no excessive bending or twisting. Check for thermal damage and other signs of wear.			320
8.1	Clean driving gear Trolley			320
8.1	Apply new grease on the gear and move the jaws back and forth			320
8.2	Pump new grease into the nipple on the motor flange		III	320
8.1	Apply new grease on the jaws on the front side		III	320

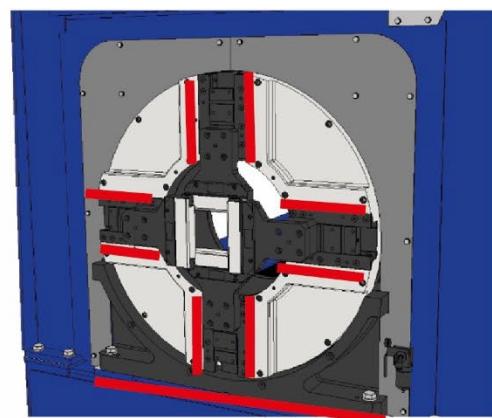
Maintenance every 6 months				
Point	Description	No.	Type	Operating hours
10/12.1	Clean the toothed rack and apply a small amount of grease to the rack and pinion.		III	1000
10	Pump a small amount of grease into the linear bearings		III	1000

Check the hoses for wear, if damaged or in a bad condition change them. It is good practice to replace all hoses after a period of 2-3 years. The rubber of the hoses will dry out with the risk of leakage!

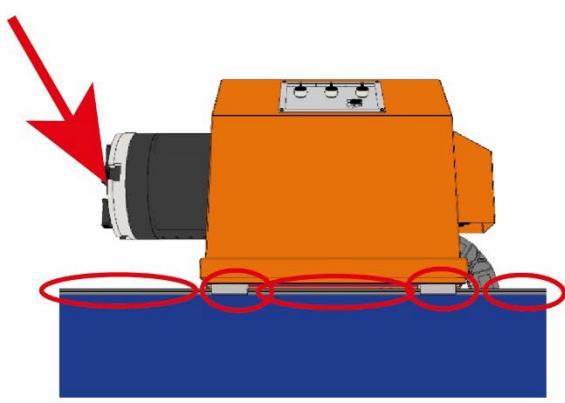
Maintenance every 5 years				
Point	Description	No.	Type	Operating hours
12.1B	Change the gearbox oil of the gearboxes of the optional infeed table.		V	1000



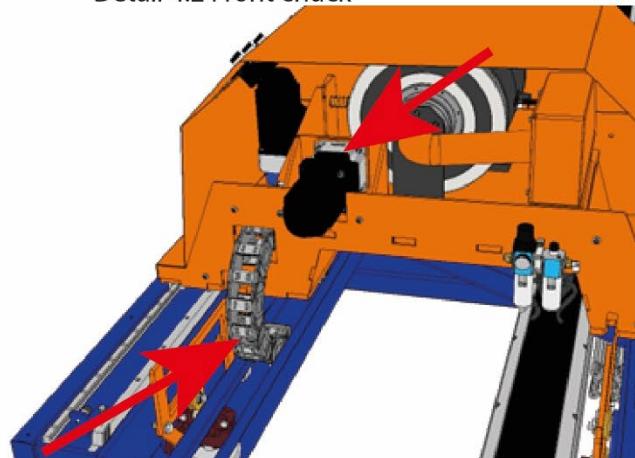
Detail 4.1 Front chuck



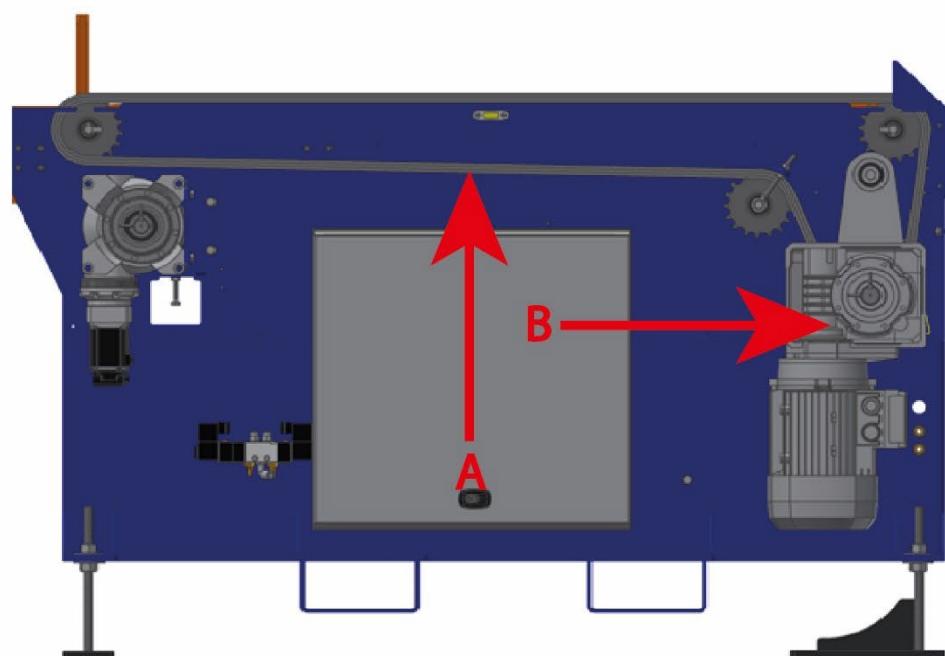
Detail 4.2 Front chuck



Detail 8.1 Trolley



Detail 8.2 Trolley



Detail 12.1 Infeed table



8.5 Plasma Unit Maintenance

Please refer to the Plasma Unit manual.

9 Calibration

Text indicators

In this document:

- Bullet points: ❖ refer to the § with the specified calibration procedure
- Bullet points: □ describe the steps to perform
- Bullet points: ➤ describe the result of the step(s)
- Bullet point: ◆ refers to an image at the bottom of the corresponding paragraph (§)
- *Text written in italics:* gives a short explanation about the calibration
- **Text written in bold:** refers to instructions on the screen of the remote control

Controls

Remote control | screen

The calibration procedures are controlled by the remote control. This is the screen (on an adjustable arm) on the control unit. The remote control contains an emergency button (●) that you must/can use in some calibration procedures to stop the RoboRail.

Do **not** use the **power on/off button** on the control panel of the robot cell (refer to § 1.2.2) to stop the RoboRail during calibration to prevent loss of settings.

Control panel | robot cell

On the side of the robot cell, underneath the control unit cabinet, there is a control panel with two key switches:

POWER		MAINTENANCE	
OFF	ON		
To de-energize the RoboRail	To energize the RoboRail	Maintenance mode off	Maintenance mode on

For calibration purposes:

- **Power** switch must be **on** (key to the right)
- **Maintenance** switch must be **on** (key to the right)

In the **Maintenance** mode the safety mechanisms of the cell door are overridden.

Control panel | trolley

On the trolley there is a control panel with two switches:

CHUCK CLAMP		TROLLEY MOVE	
OFF	ON	Y+	Y-
To open the rear chuck	To close the rear chuck	To move the trolley to the front (to the front chuck)	To move the trolley to the rear (away from the front chuck)

Responsible persons

The calibration procedures that are written in this document are exclusively reserved for mechanics.

Related documents

- RoboRail operator's manual
- 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.

Safety



Wear personal protective equipment (PPE) during the calibration procedure(s).



During calibration, 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.

Components

The images on pages 16 to 18 show an overview of the main components of the RoboRail.

Calibration types

This document describes the calibration procedure of the components that follow:

- Front chuck
- Rear chuck
- Trolley
- Robot (base and tool)
- Infeed table + sliders
- Bogies

Troubleshooting

#	Problem / symptom	Possible cause	Solution	Calibration procedure
1	Poor cutting quality	Front chuck is not level	Do a calibration of the chuck rotation (front chuck)	❖ § 3.1
		Rear chuck is not level	Do a calibration of the chuck rotation (rear chuck)	
		The front and rear chucks are not aligned	Do an alignment calibration of the chucks	❖ § 3.5
		Incorrect position of the robot	Do a tool calibration of the robot	❖ § 3.2
			Do a base calibration of the robot	❖ § 3.3
		Poor material quality	Use material that complies with the specifications and tolerances; ▪ refer to the RoboRail operator's manual	
2	Incorrect product size	Incorrect home position of the trolley	Do a calibration of the trolley	❖ § 3.4
		Incorrect position of the robot, e.g. because it has hit something	Do a tool calibration of the robot	❖ § 3.2
			Do a base calibration of the robot	❖ § 3.3
3	The bogies are too low or too high to load the material	Incorrect position of the trolley	Do a calibration of the trolley	❖ § 3.4
4	Material on the infeed table is not in the middle of the bogies	Incorrect infeed position	Do a calibration of the infeed sliders	❖ § 3.6

#	Problem / symptom	Possible cause	Solution	Calibration procedure
5	Issues when loading the material: - it is not easy to center the material on the bogies - material may fall from the bogies - infeed sliders get stuck on the material when trying to retract - any other problem to load the material	Infeed position of the material is not defined and/or not correctly configured	Do a calibration of the infeed position of the material	❖ § 3.7
6	A crash against (a part of) the RoboRail	A forklift truck or other vehicle has crashed into it	Do a calibration of the part(s) that was/were affected by the crash	Depends on the specific part(s)

Calibration procedures

To go to the calibration menu:

- Put the RoboRail in **Maintenance** mode (refer to § 1.2.2).
- Select the **Calibration** button on the remote control.

Subsequently:

- Select the desired calibration mode as explained below.

Calibration of chuck rotation

Calibration of the chuck rotation makes sure that the home position of both chucks is level. If one the chucks (or both chucks) is not level, it can have a negative effect on the cutting quality.

This calibration procedure applies to the front and rear chuck.

Necessary tool:



Spirit level

To make sure that the home position of the chucks is level, do the procedure that follows:

- Make sure that a jaw set is installed on the chucks.
- Select **Home chucks** to put the chucks at their home position.
- Make sure that jaw no. 4 is on top (◆ Image 1).
- Put a spirit level in the middle of the chucks or on top of it (front: ◆ Image 1 | rear: ◆ Image 2).

If one of the chucks (or both) is not level:

- In the **Calibration** menu: select the button **Chuck rotation calibration**.
- Select **Go to step 1** to go to the next screen.
- Select **Home chucks** to put the chucks at their home position.
- Select **Go to step 2** to go to the next screen.
- Push the **Emergency** button on the remote control to stop the motors.
- Manually turn the chuck (or both) until it is level.
- Push the **Emergency** button again to release it.
- Push **Reset and enable high power** on the remote control (bottom center of the screen).
- Select **Only press this button once the chucks are level!** to confirm the position of the chuck.
- Select **Go to step 3** to go to the next screen.
- Select **Home chucks**.
- Put again a spirit level in the middle of the chuck or on top of it.

If the chuck is level:

- Select **DONE**.
- The home position of the chuck is level.

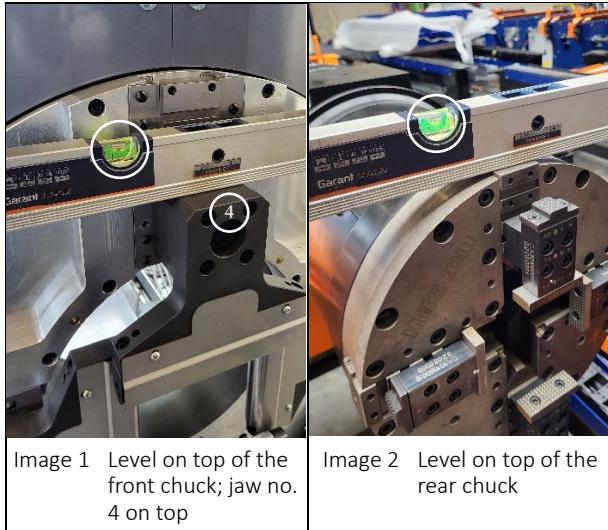
If the chuck is still not level:

- Select **Return to step 2**.
- Repeat the calibration procedure as described above.
- The home position of the chuck is level.

If you actually turned the chuck manually to put it level, you must redefine the base location of the robot.

In that case:

- Continue with § 3.3 to do a base calibration of the robot.



9.2 Alignment calibration of the chucks

Calibration of the chucks makes sure that the front and rear chucks are aligned with each other. If they are not aligned, it can have a negative effect on the cutting quality.

The RoboRail is supplied with a tube ($L = 2 \text{ m}$, $120 \times 120 \text{ mm}^$) as reference part. If this tube is not available anymore, you must take an alternative square tube – with very accurate dimensions – that you use as a reference part.*

Dimensions of the alternative tube: min. $120 \times 120 \text{ mm}$ / max. $200 \times 200 \text{ mm}^$*

- * For USA:
- dimensions of the reference tube are $L = 7 \text{ ft}$, $4 \times 8"$, thickness = $\frac{1}{8}"$
 - dimensions of an alternative tube must be min. $5 \times 5"$ / max. $8 \times 8"$

To verify if alignment of the front and rear chucks is necessary, do the procedure that follows:

- In the **Calibration** menu: select the button **Alignment calibration**.
- Select **Continue**.

If you use the reference tube supplied with the RoboRail: **

- Enter profile width: **120,00** (mm) on the screen (or use the arrow keys to do so).
- Enter profile height: **120,00** (mm) on the screen (or use the arrow keys to do so).
- Enter **Submit values**.

- ** For USA, if you did not receive the square tube but the $4 \times 8"$ tube or if you did not receive any tube:
- skip this instruction and continue with the next ("If you use an alternative square tube:")
 - enter the dimensions in mm ($1" = 25.4 \text{ mm}$)

If you use an alternative square tube:

- Accurately measure the outside dimensions of the tube (height and width).

- Enter the width and the height of the tube (in mm) on the screen (or use the arrow keys to do so). Max. value: 200 mm.
- Select **Submit values**.

Subsequently:

- Select **Open front chuck**.
- Load the tube.
- Select **Close front chuck**.
- Select **Continue**.
- Select **Approach material**. The field **Laser value** on the screen shows a certain value.
- Use the switch [Y+] on the control panel of the trolley (or the arrow button **◀** on the screen) to move the trolley fully forward.
- Keep an eye on the **Laser value** on the screen and move the trolley to the rear with switch [Y-] (or the arrow button **▶** on the screen). Make sure that the laser beam continues to hit the material.
- Select **Finish**.

If the laser value changes more than 2 (mm) you must align the chucks.

For the procedure to align the chucks:

- Contact the HGG service department.

9.3 Base calibration of the robot

Base calibration makes sure that the 0 point of the robot is actually the 0 point. It sets the correct position of the robot related to the entire system.

The RoboRail is supplied with a tube (L = 2 m, 120 x 120 mm) as reference part. If this tube is not available anymore, you must take an alternative square tube – with very accurate dimensions – that you use as a reference part.*

*Dimensions of the alternative tube: min. 120 x 120 mm / max. 200 x 200 mm**

- * For USA: - dimensions of the reference tube are L = 7 ft, 4 x 8", thickness = $\frac{1}{8}$ "
 - dimensions of an alternative tube must be min. (min. 5 x 5" / max. 8 x 8")

Before you start:

- Make sure that the conveyor mode plate is removed and that a regular chuck clamp is installed.

For the base calibration of the robot, do the procedure that follows:

- In the **Calibration** menu: select the button **Base calibration**.
- Select **Go to step 1**.

If you use the reference tube supplied with the RoboRail: **

- Select **Use default measurement tube**.

- ** For USA, if you did not receive the square tube but the 4 x 8" tube or if you did not receive any tube:
- skip this instruction and continue with the next ("If you use an alternative square tube:")
- enter the dimensions in mm (1" = 25.4 mm)

If you use an alternative square tube:

- Accurately measure the outside dimensions of the tube (height and width).
- Enter the height and the width of the tube (in mm) on the screen (or use the arrow keys to do so). Max. value: 200 mm.
- Select **Submit values**.

Subsequently:

- Select **Conveyor is removed** to confirm that the conveyor mode plate is removed and that a regular chuck clamp is installed.
 - Select **Open front chuck**.
 - On control panel of the trolley: set the switch **CHUCK CLAMP** to **OFF** to open the rear chuck.
 - Slide the reference tube or the alternative tube into the machine.
 - Select **Close front chuck**.
 - On control panel of the trolley: set the switch **CHUCK CLAMP** to **ON** to close the rear chuck.
 - Select **Move trolley forward** and/or **Move Trolley backward** to slide the tube into the robot cell.
(Alternative: use the switch [Y+] / [Y-] on the control panel of the trolley to move the trolley to the front / rear.)
 - Make sure that the tube is below the torch.
 - Select **Go to step 4**.
 - Select **Start calibrating the base**.
- The robot measures the position of the top and sides of the reference tube and defines the base location.
- The remote control shows a pop-up message to confirm that the calibration was successful.
- When the machine completed the movement: select **Done**.
 - Release the tube and remove it from the machine.
 - Select **Return to home** to exit this calibration screen.

9.4 Tool calibration of the robot

Tool calibration makes sure that the robot exactly knows the position of the torch, including the distance of the torch above the material. This calibration procedure can be important if the torch is bent due to the heat of the cutting process.

Before you start:

- Make sure that there is no material inside the cutting cell.
- Make sure that you have equipped the torch with 125 A consumables (◆ Image 3).
(Consumables of 65 A are 3 mm too short for calibration purposes.)
- Make sure that the cutting cell is closed.

In case of large cutting faults (>10 mm / $\frac{3}{8}$ "") before calibration:

- Put the robot in **Slow mode** (bottom left of the screen) so you can stop it before it hits the sensor or the robot cell.
- If this happens during the calibration process: push the **Emergency** button on the remote control to stop the robot.

For the tool calibration of the robot, do the procedure that follows:

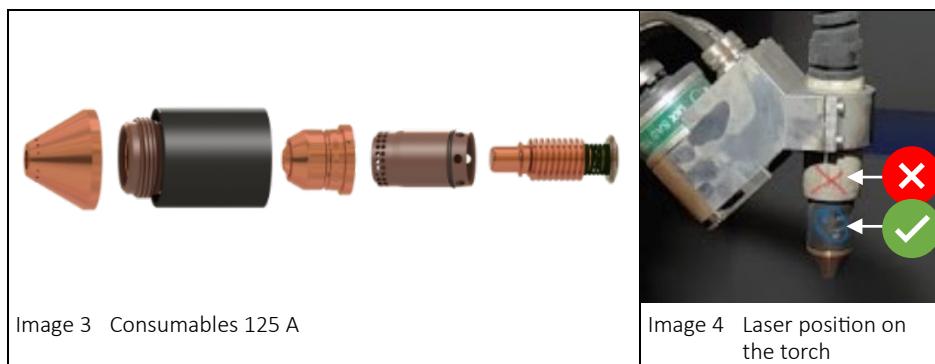
- In the **Calibration** menu: select the button **Tool calibration**.
- Inside the cutting cell: remove the cover of the tool sensor.
- Select **I have removed the sensor cover and equipped the 125amp consumables**.
- Select **Continue**.
- Select **Start tool calibration**.
- Tool calibration consists of three moving and turning cycles to set the torch position offsets correctly. This value is automatically saved.
- Make sure that the laser beam touches the black (=upper) part of the torch (◆ Image 4).
If it touches the white (=lower) part of the torch: contact the HGG service department.

When the tool calibration is completed:

- Select **Done**.
- Select **Return to home**.
- Install the cover of the tool sensor.
- The torch position is correct.

If the tool calibration of the robot did not solve the problem:

- Continue with § 3.3 to do a base calibration of the robot.



9.5 Calibration of the trolley

Calibration of the trolley sets the correct position of the trolley related to the robot. If the home position of the trolley is not correct, it can cause incorrect product sizes.

For the calibration of the position of the trolley, do the procedure that follows:

- In the **Calibration** menu: select the button **Trolley position calibration**.
- Select **Go to step 1**.
- Select **Home the trolley** to move the trolley to the rear.
- Accurately measure the distance between the rear of the trolley and the hook (◆ Image 5).
- Enter the distance (in mm) on the screen (or use the arrow keys to do so).
- Select **Submit values**.
- Select **Home trolley**.

Subsequently, to make sure that the home position of the trolley is correct:

- Accurately measure the distance between the rear of the trolley and the hook again.

If the distance = 35 mm (1 $\frac{3}{8}$ ""):

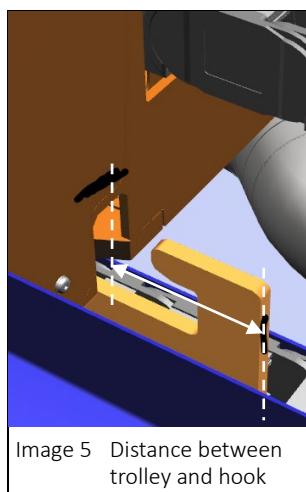
- Calibration of the trolley was successful.
- Select **Return to home**.

If the distance is \neq 35 mm (1 $\frac{3}{8}$ ""):

- Repeat the calibration procedure.

Subsequently:

- Continue with § 3.5 to align the front and rear chucks.



9.6 Calibration of the infeed | home position

Calibration of the infeed table makes sure that the home position of the infeed sliders is correct. In this position the sliders put the material in the center of the bogies.

Necessary tool:



Measuring tape

For the calibration of the position of the infeed table, do the procedure that follows:

- In the **Calibration** menu: select the button **Infeed calibration**.
- Select **Continue**.
- Select **Home infeed** to move the infeed sliders to their home position. In this position the sliders are fully retracted and they are near the end stops.
- Select **Continue**.
- Accurately measure the distance between the end of the slider and the end stop of the infeed table (this is the hook behind the slider) (◆ Image 6). It does not matter which slider you measure.
- Enter the distance (in mm) on the screen (or use the arrow keys to do so).
- Select **Submit value**.
- Select **Continue**.
- Select **Home infeed**.

Subsequently, to make sure that the home position of the sliders is correct:

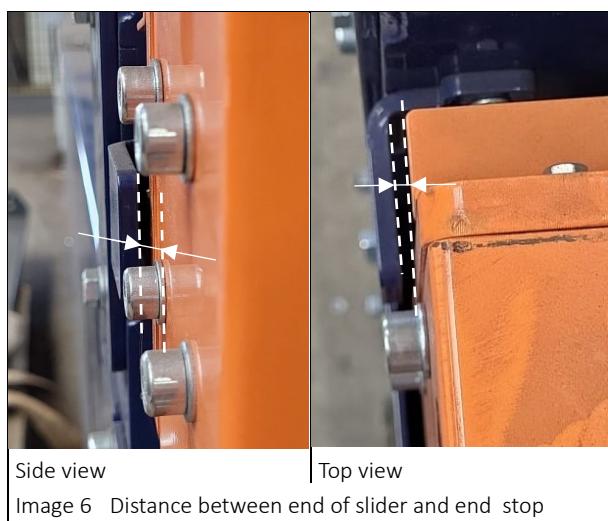
- Accurately measure the distance between the end of the slider and the end stop of the infeed table again.

If the distance = 5 mm ($\frac{1}{5}$ ""):

- Calibration of the infeed table was successful.
- Select **Return to the main screen**.

If the distance is \neq 5 mm ($\frac{1}{5}$ ""):

- Select **Go back to the previous step** and repeat the procedure.



9.7 Calibration of the infeed | material

This calibration procedure sets the correct infeed position of the material. An incorrect position can cause problems to load the material and incorrect cutting positions.

For the calibration of the infeed position of the material, do the procedure that follows:

- In the **Calibration** menu: select the button **Infeed material position calibration**.
- Select **Continue**.
- Select **Home infeed** to put the infeed at its home position.
- Select **Home trolley** to move the trolley to the rear. This is a safe position of the trolley during the calibration process.
- Select **Continue**.
- Select **Infeed forward** and/or **Infeed backward** to move the infeed just after the centerline of the bogies (◆ Image 7). In this position the infeed sliders are at 1 to max. 5 mm ($\frac{1}{25}$ to max. $\frac{1}{6}$ ") after the center of the bogies.
- Select **Submit position**.
- Select **Finish**.



Image 7 Position of the
infeed sliders

Metal profiles | shapes



Round tube/pipe



Square tube



Channel



Flat bar

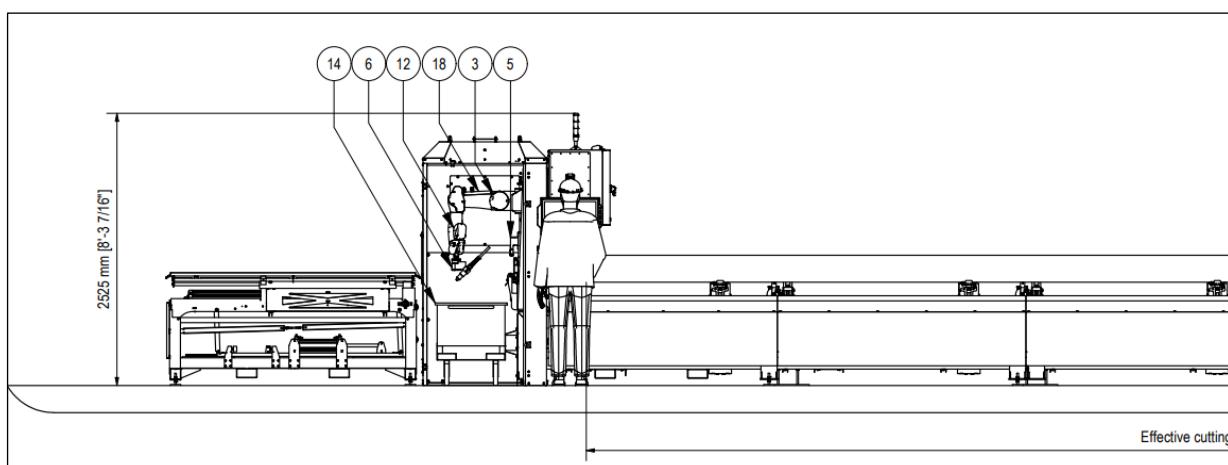


Angle

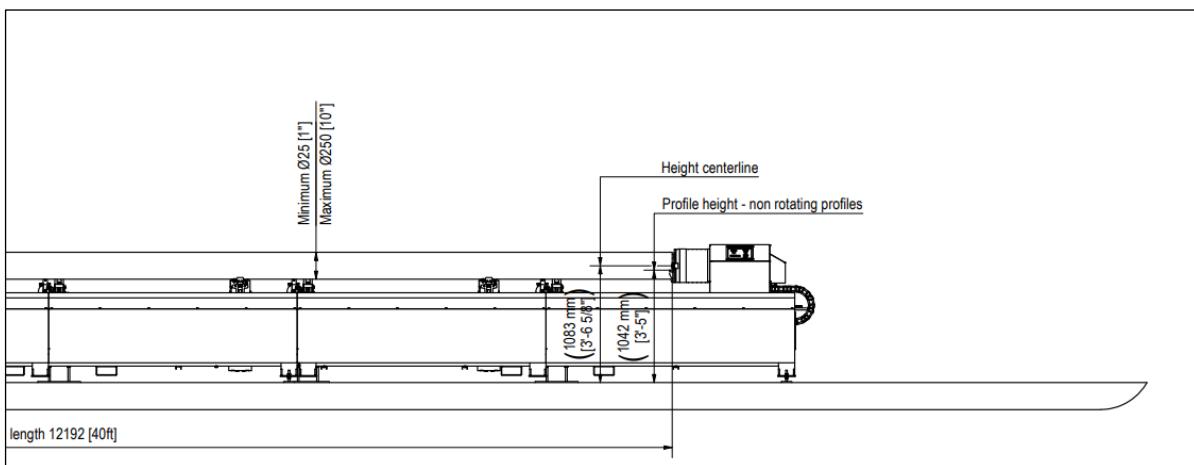
Components

Main components of the RoboRail (refer to the images below):

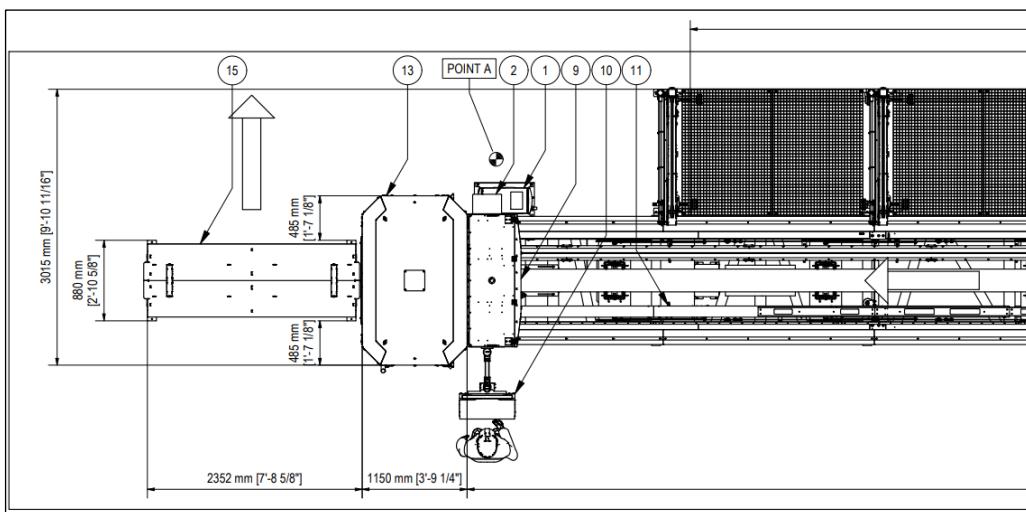
- A. Front chuck (#5)
- B. Trolley with rear chuck (#4)
- C. Infeed table (#16)
- D. Cutting cell (#13)
- E. Robot (#3)
- F. Torch
- G. Control unit (#9)
- H. Bogies (front / middle / rear)
- I. Conveyor mode plate
- J. Controls
 - Remote control (#10)
 - Power / maintenance switches
 - Trolley controls



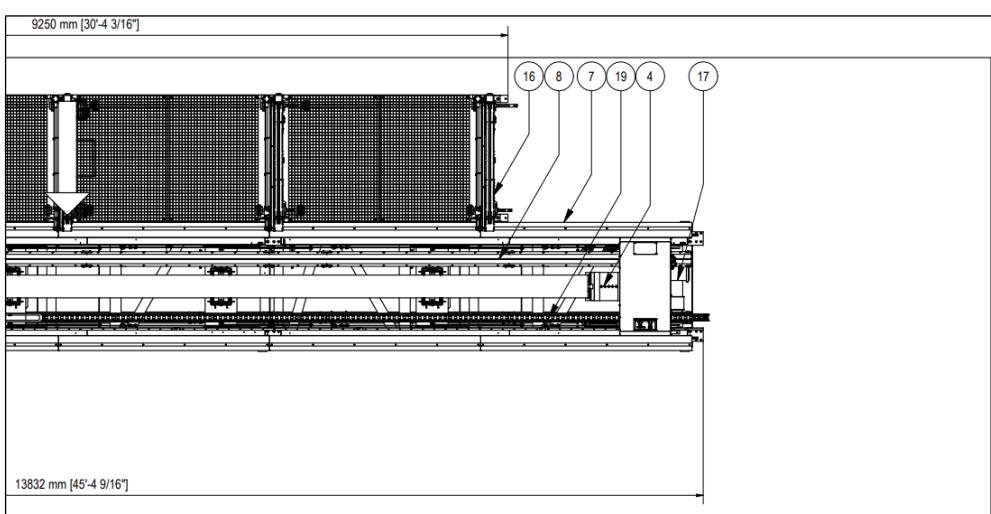
Side view | left part



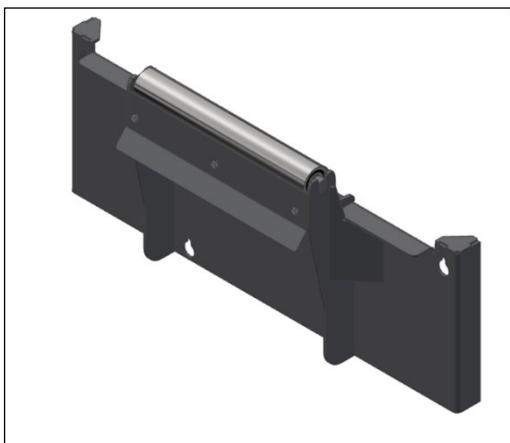
Side view | right part



Top view | left part



Top view | right part



Conveyor mode plate

10 Fault finding, troubleshooting & repair

Fault message	Fault	Possible cause or procedure for detecting the fault	Solution	Performed by
Timeout raising/lowering bogies	No feedback of bogies top or bottom	One of the reed switches of the bogies (top or bottom) has not switched,	Check the reed switches on the bogies, they should light up in an ultimate top or bottom state	Certified
Robot is in unknown position, only move to top unsafe works	The machine is not in one of the three safe positions and needs something special to continue.	Cause: emergency stop during a side to side move or not in a safe position, during a move.	<p>A retract could work if the robot is near cutting area.</p> <p>If the robot is not able to retract, a move to top unsafe could be tried, but only with slow mode enabled.</p> <p>If that doesn't work, the robot should be retrieved manually, using the pmac motor window. The axes should be jogged to approximately:</p> <p>J1:-60 J2: 45 J3:-120 J4:-180 J5: 60 J6: 0</p> <p>After this, move robot to top not safe should be pressed.</p>	Skilled

030:005:019: Could not connect to PowerMax	Serial communication to PowerMax control unit could not be started	During startup or start of a cut/marking, the machine will give this error.	Check whether plasma unit is enabled Check if the correct COM port has been selected in the settings Check the wiring between the control unit and the plasma unit	Skilled
030:005:025: Emergency stop	Emergency stop inhibits any next moves with the machine	The physical emergency button has been pressed or the emergency stop has not been reset yet.	Pull the physical emergency stop, and reset the emergency stop in software to enable the motors and pneumatics.	Unskilled
030:005:024: Shock sensor has been triggered	The torch mounted to the robot has collided, the machine will inhibit any (automatic) moves	The machine will pop-up an error.	If the collision has occurred during the cutting progress, a retract could be used to solve the issue. If the robot is in an abnormal position, the robot needs to be manually jogged	Skilled

11 Create diagnostic data collection

Whenever there is a problem on your RoboRail machine, our technical support team is always ready to help you. Our team has several diagnostic tools at their disposal. To help you successfully it is very important that the following information is as complete as possible.

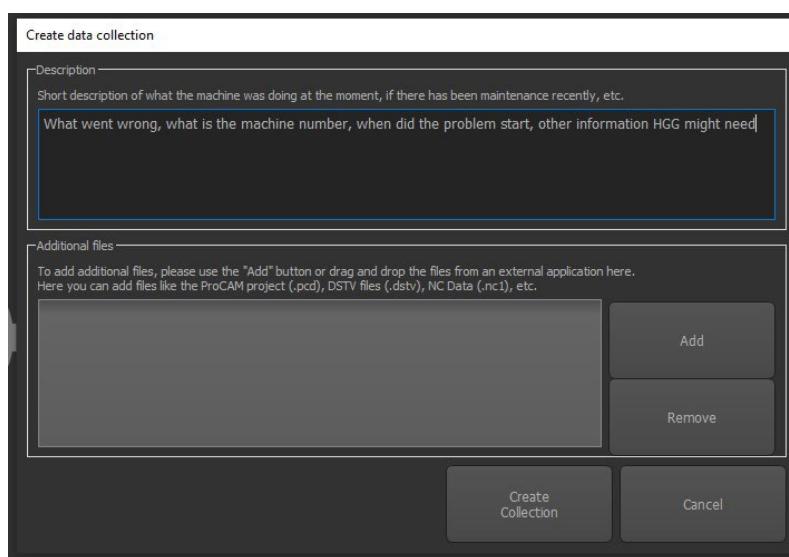
Step 1. Advanced, Generate data collection



Step 2. Create data collection following the questions in the screen:

- Machine number on the type plate,
- Description of What went wrong,
- When did the problem start,
- Other information HGG might need

Step 3. Add additional cutting files from external applications



Step 4. Create collection

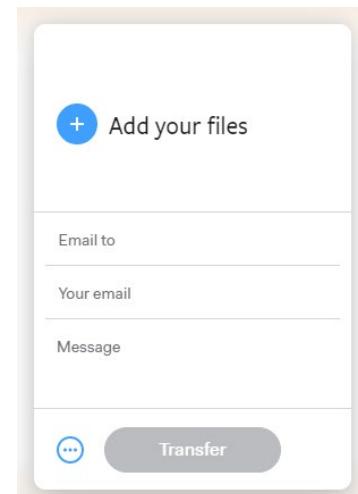
Send to HGG

You are now ready to send the information to HGG. We advise you to use an FTP server rather than email. Most email firewalls will block unrecognized file formats, also most emails have a data limit of 10 Mb or sometimes 15 Mb per email.

There are several free File Transfer Protocol servers available, HGG recommends [WeTransfer](#):

- E mail to HGG: service@hgg.nl
- Enter your own e-mail address
- Enter your machine number in the 'Message' so that it can easily be identified by HGG.

Add your files. Click on the blue cross, browse to your files.



Files:

- Most recent data collection file, e.g.: 2024_02_25-12_13_24_341_.7z
- Photos of the on-screen error messages.
- Photos of the machine.
- Photos of the part or cut that caused the problem.
- A description of what went wrong.
- Any drawings or design files of the part that caused the problem.

12 Dismantling, disabling and scrapping

The machine may no longer fit over time. The manufacturing process has changed or a different capacity is needed.

Perhaps another manufacturer would like to take over your machine. Contact HGG for a trade-in proposal.

If the machine is at the end of its life and repair or overhaul is not desired, contact HGG.

Dismantling and scrapping must be done in accordance with the instructions to prevent injury.



WARNING!

The machine must be dismantled according to instructions to avoid injury.

Batteries used in the machine or fluids must be disposed of according to local regulations.

