MODIG
MACHINE TOOL SWEDEN

HHV PRE-INSTALLATION MANUAL

HHV 2 & 3, HHV DUO

Version 1.03

NOTES

Contents

1. General

This manual contains instructions on how to prepare for the installation of the Modig HHV machines. We also take a close look on how to: unpack the container, lift/move the machine safely, floor requirements, technical requirements and more.

All the actions in the checklist, under section 2, must be fulfilled before the installation can take place. How these actions should be performed is shown in section 3 and forward.

To get a smooth and easy installation of the Modig HHV machines you must make all the actions in the checklist before the Modig crew can make the installation.

Personnel authorized to transport/lift/move the Modig HHV must familiarize themselves with all relevant information contained in this manual before proceeding. Failure to do so may result in serious damage to equipment and/or personal injury. Modig assumes no responsibility for damage or injury incurred as a result of improper use.

If any aspects of this manual are unclear, please contact Modig Machine Tool or the relevant third party parts suppliers for clarification before carrying out any procedures relating to the transport and installation of the Modig HHV.

It is very important that the all the requirements in this manual are fulfilled for optimum performance of your Modig HHV.

2. Safety

Personal safety

Machine owners, operators, maintenance and service personnel must know that the daily safety procedures are an important part of their work. Measures to prevent accidents must be one of the main purposes of the job, whatever the activity.

Get to know and respect your machine. Read and exercise the safety regulations and control procedures. Make sure that everybody who works for, with, or close to, you completely and fully understand and – more importantly – agree with the following safety regulations and the procedures at this machine.

Accidents, due to clothing and other articles becoming entangled in millers, knobs, levers or moving mechanical parts, can lead to personal injury to you or others. The following proposals will help you to prevent such accidents.

- Never wear ties, scarves, loose hanging clothing and jewelry (i.e. watches, rings and necklaces) by machines in motion.

- Use barehand gloves when they are used for handling sharp cutting tools, heavy, sharp or hot parts.
- Restrict long hair with a cap or hairnet.
- Use protective equipment and keep it in good condition.
- Use clean, approved goggles or face guard.
- Wear approved safety shoes with steel toecaps and non-slip soles to prevent harm.
- Always use ear protection.
- Never use or repair equipment if you are under the influence of alcohol, drugs or other substances or conditions that impair alertness or judgement.

Only use trained personnel, who have been instructed in safety, on the machine.

This applies for the following activities:

- Installation foundation
- Transportation
- Commissioning
- Operator
- Preventive maintenance
- Repairs

The service personnel must be specially trained in commissioning and maintenance of motor spindles.

General safety instructions

The user of the machine is responsible for supervising the correct compliance with the safety instructions associated with the machine. We recommend repeating the safety instructions for the operators at regular intervals and that this is documented in writing.

When you use the multi-operation machines, the parameters that are specified in the section machine specification, must be observed.

Failure to follow the instructions on this page can lead to serious personal injury.

Cutting tools:

Use adequate hand protection on all occasions when you handle cutting tools with sharp edges.

Training, experience and competence of the user groups

Generally, the following user groups are employed during the service life of the machine:

- Transportation specialist (shipping agent, external)
- Transportation specialist (from Modig Machine Tool)
- Operating personnel (the user's)
- Maintenance technicians, service technicians (the user's)
- Maintenance technicians, service technicians (from Modig Machine Tool)
- Commissioning technicians (from Modig Machine Tool)

The fundamental principles for the ergonomic design of the machine are based on the **Machinery Directive 2006/42/EC**. The requirements for the physical capacity in the user groups originate from these.

The individuals, as user groups, must not have any impaired physical functions (e.g. impaired sight or hearing, body size, strength).

Users of the machine must wear workwear. It must be ensured that personnel do not have long, free-flowing hair or were loose clothing or jewelry (including rings!) during work on the machine.

It is presumed that all those in the user group are familiar with the basic health and safety regulations and regulations for the prevention of accidents and they have been instructed on the use of the machine. This includes these individuals having read and understood the instructions for use and annexes, updates or changes included in these.

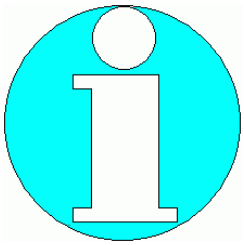
Warning instruction and signs

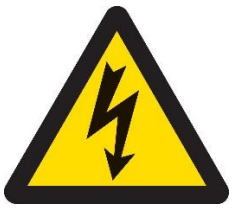
The following pictograms or warning signs and safety regulations are used in the operating instructions and on multi-operation machines.

DANGER 	Regarding direct units, faulty sensors or motors can only be replaced by personnel approved by Modig Machine Tool! When you change motors, the special safety provisions for the handling of strong magnetic components shall be observed. In the event of improper manipulation of sensor systems, serious personal injury or serious damage to the machine are to be expected!

CARE 	Pay attention to risks when performing manual tool changes at the tool station and on the work spindle! The tool most be held securely when it is loosened or be secured in another way from falling out of the tool holder. Pay attention to the risk when operating the machine in the SET-UP mode, when the work room's guard may be open. There is a risk for injury due to rotating tools and moving mechanical parts. Pay attention to the risk for injury in the following activities: • When you place tools in the loader station due to sharp cutting edges on tools, • during manual tool changes on the spindle due to sharp cutting edges on tools, • when you change the workpiece in the loader station of the machine bench because of the creation of burrs on the workpiece or shavings.

WARNING 	It is important that all internal/external personnel comply with the workplace's fire safety rules regarding equipment and evacuation routes.

	This symbol stands for: • Attention, Note, important Layout of signs: white pictogram on a blue background in a circle

	**Danger due to electric power** The sign is linked to all of the areas where electrical devices are located that involve danger. Special care should be observed at these points. Layout of signs: Black flash of lightening on a yellow background with black frame

	**Laser beam** This sign warns about dangers due to laser beams. This symbol is fastened in the work area where checks for tool fracture are performed using laser beams. The wavelength of the laser is between 400 nm and 700 nm and is split up based on the German standard VDE 0837.

	**Suspended load** This sign warns about dangers due to suspended loads. This symbol is affixed in the work area where it is necessary to warn for suspended loads.

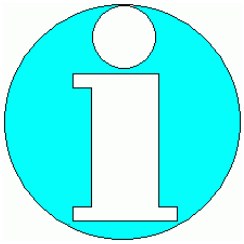
	**Obstacles/Risk for tripping** This sign warns about dangers due to obstacles or risk for tripping. This symbol is affixed in the work area where it is necessary to warn for suspended loads.

	**Fall risk** This sign warns about dangers due to fall risk. This symbol is affixed in the work area where it is necessary to warn for suspended loads.

	**Pressurized containers** This sign warns for pressurized containers. Information signs on pressurized containers for pneumatic or hydraulic systems showing that these containers are pressurized.

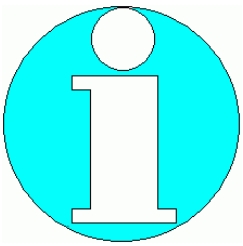
Information on machine guards

The owner of the machine must ensure that the machine and its safety equipment is in a safe condition before initial commissioning. This is also necessary during operation at suitable and regular intervals, see the service and maintenance manual.

ATTENTION 	Inform the person responsible, for example the foreman, if the condition or operation of the machine's behavior changes due to faults. When necessary, turn off the machine by switching off the main power switch. Remove damaged parts from the machine as soon as they are detected, even if no machine fault has occurred! This applies to cables and conductor in the electrical equipment!

Safety in the work area

Always keep your workplace clean. Dirty work areas with risks such as oil, garbage or water on the floor could cause someone to fall to the floor, into the machine, or on to other objects that could cause serious personal injury.

ATTENTION 	Read this and the other manuals thoroughly prior to work in the machine. In your own interest, make sure you understand all the safety instructions and observe them when you work with the machine! This applies for individuals who only work on the machine occasionally, for example, for troubleshooting, maintenance or cleaning. Always keep the user manuals handy by the machine! When you work on the machine, do not wear: • long, free-flowing hair • loose fitting clothes • jewelry, including rings! All mechanical parts that are reached on foot are provided with non-slip surface. Do not walk on other parts of the machine! To prevent damage to the telescopic guard when performing maintenance work, suitable protective measures must be taken.

Make sure your workplace is free from dangerous obstacles and be aware of protruding mechanical parts.

Place tools and similar equipment in their correct storage place immediately after use. Keep work surfaces clean, tidy and in good order.

Report unsafe working conditions to your superior manager or safety department. Objects such as: worn or broken floors, steps, railings and unstable or slippery platforms or scaffolding must be reported and repaired prior to use. Use approved tools when climbing.

3. Checklist

Action	Described in section	Note	Done, date and signature
Read this manual			
Check floor according to requirements	3		
Check electric requirements	4		
Check compressed air requirements	4		
Check environment conditions	4		
Purchase the correct coolant, grease, oil	10		
Build unloading platform	6		
Check container for outer damages	5		
Check inside of container for damaged goods, usually done by Modig distributor.	5		
Unload loose parts manually and check for any damage, usually done by Modig distributor	5		
Take off lashings according to instruction, usually done by Modig distributor	6		
Check all lifting devices	7		
Check capacity of lifting crane, forklifts and/or traverse crane involved	7		

Make a plan on how the lift/move of the HHV will be done			
Inform all staff involved with the lift/move so they understand how it will be done			
Mark the final position for the HHV with tape on the floor			
Clear the floor-area for the final position of the HHV			
If the HHV is to be rolled on its wheels for the final position: clear and measure the moving path so the HHV can get clear all the way			
Before lifting/moving into final position check that the levelling devices are positioned in the middle position so it is possible to adjust them both up and down			

4. Preparations and floor requirements

The required floor-support and horizontal correctness of the floor, is the first step in giving the HHV a chance to perform with top accuracy. Here we list the requirements for the floor that needs to be fulfilled before any installation can take place.

NOTE: The foundation is of essential importance to insure the performance, geometry, and long life of the machine!

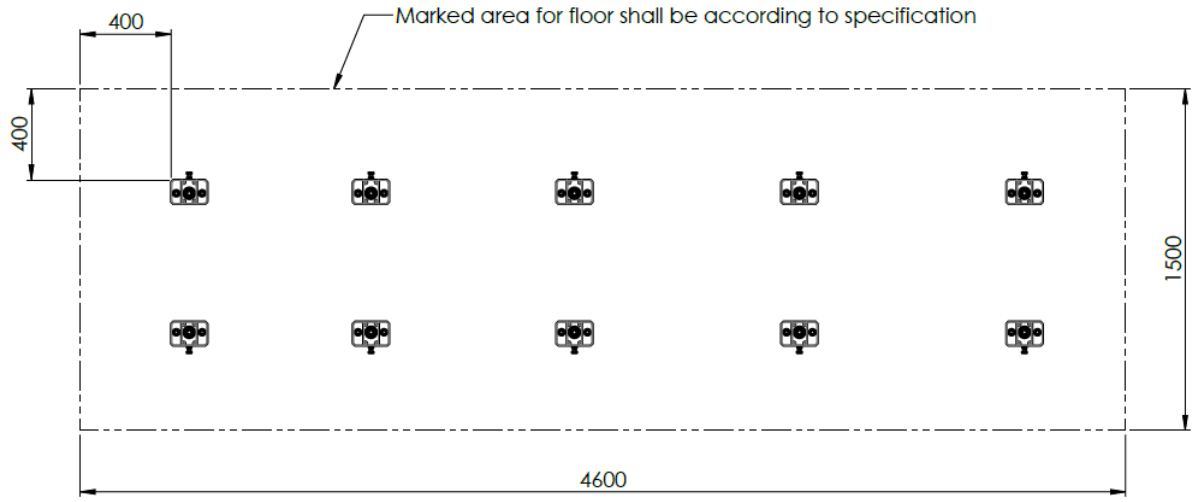
Floor space requirements

For every delivered machine there is a specific drawing attached to the documentation that show the measurements for the floorspace needed for the HHV.

Floor strength requirements

A steel reinforced foundation, with a minimum of one layer of steel reinforcement and with a total thickness of at least 152 mm (6 inches) of the best quality concrete mix is needed. The difference in floor level flatness must not exceed 0.05”/’ (4 mm) over the entire surface of the machine pad. If the level exceeds 0.05”, thicker plates, or shims, must be added to the original plate (dwg 80606) to compensate for the height difference.

EXAMPLE: Below shows required foundation area for HHV machine with long bed

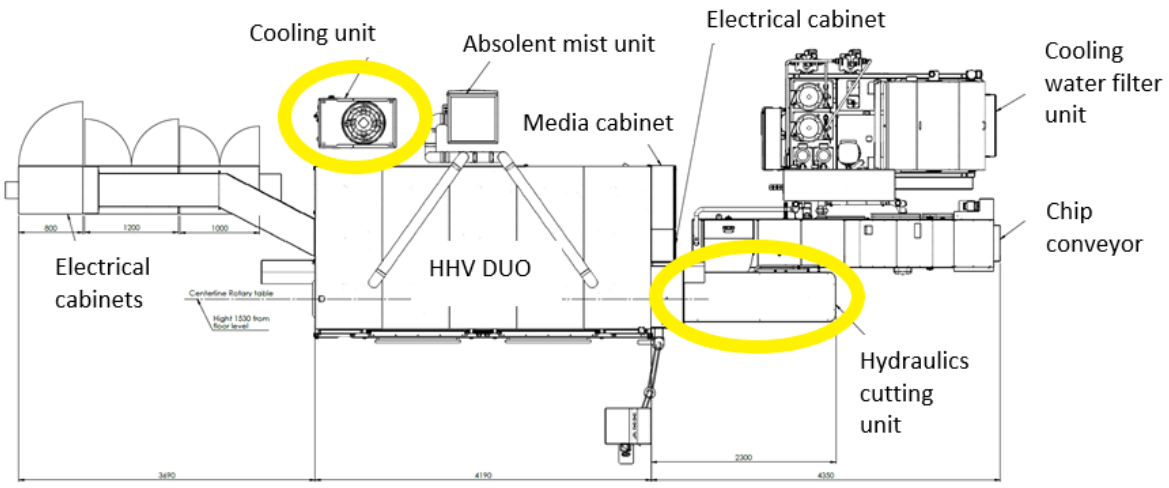


The load on each leveling device is maximum 1500kg / 3300lbs.

Depending on the length on the machine bed and additional equipment there are 6 to 10 machine leveling devices supporting the machine.

NOTE: The leveling devices (fixators) are mounted on the floor by the Modig crew and/or Modig distributor and is therefor not described in this manual.

The floor space needed differs between the HHV2 and HHV3. The HHV3 is longer than the HHV2. The HHV DUO has the same footprint as a HHV3 but has some extra equipment compared with a HHV3 (shown below). Always use the correct layout-drawing provided when planning for the floor-space needed for the installation of the machines.



View from above

The HHV DUO have two features that the other HHV:s don't have, the hydraulic cutting unit and the cooling unit. The cooling unit for the DUO is larger and therefor placed on the outside of the machine. Both marked yellow above.

NOTE: The HHV DUO is intended for use with robot and needs to be equipped with a safety fence around the machine

5. Technical requirements and working conditions

Electric requirements

The power supply and installation data is shown on the first page in the MDG-HHV Service and Maintenance manual.

The electric design and all electric components allow a variation of power supply of ± 5%.

The electric installation of the machine and electrical cabinet must be done by authorized personnel.

Compressed air requirements

Air quality shall meet or exceed ISO 8573-1 classes 1-4-1

The compressed air introduced directly onto the encoders must be cleaned by a micro filter, and must comply with the following quality classes as per ISO 8573-1(2010 edition):

Solid contaminants:	Class 1
Particle size	Number of particles per m^3
0.1 µm to 0.5 µm	≤20000
0.5 µm to 1.0 µm	≤400
1.5 µm to 1.0 µm	≤10
Max pressure dew point:	Class 4
Max pressure dew point	≤+3°C
Total oil content:	Class 1
Max oil content	0.01mg/m^3
Air working pressure requirement	6 Bar / 87 Psi
Max air pressure variation	±5%
Air consumption	1000 L/min- 35,5 CUF/min

Environment – working conditions

Optimal performance of the machine's electrical equipment requires that the ambient conditions meet the requirements laid down in SS EN 60 204 1, these are as follows:

Ambient air temperature to lie within*	41°F-104°F (5 °C 40 °C)
Maximum relative air humidity	30 % 95 %
Max. Height above sea level	3281 ft (1000 m)

*The average air temperature must not exceed 95°F (35 °C) over any 24-hr period.

6. How to unload the container

The unloading of the equipment is normally done by the Modig team/Modig distributor unless otherwise agreed.

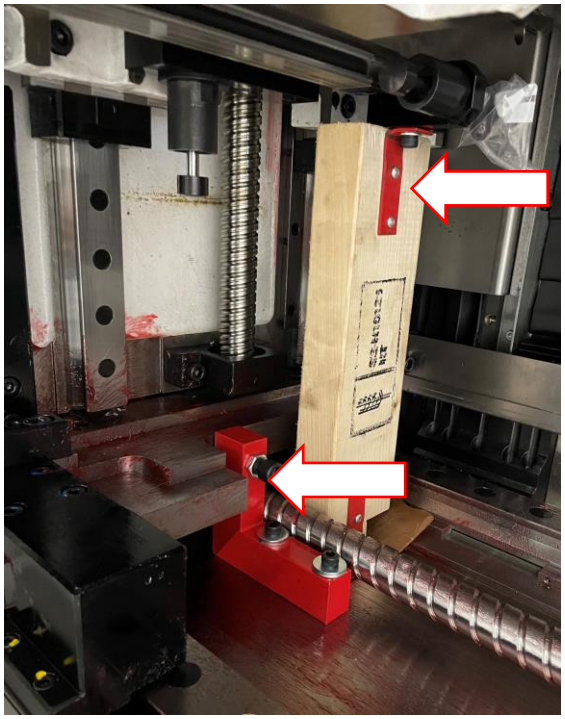
The delivered equipment shall be received only by personnel authorized to sign the shipping document and who are able to check if there are any damages to the shipment.

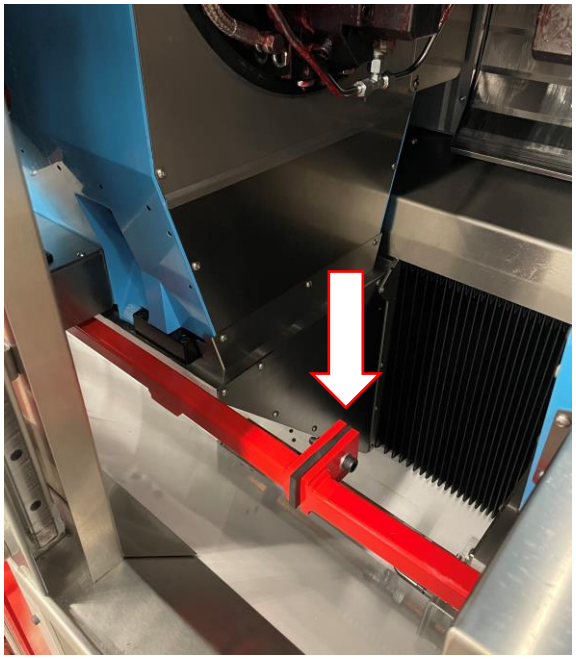
If there are any visual damages, a photo must be taken, and a note about what is discovered shall be written on the receipt for the shipping. The note shall be signed by the transporter and receiver. The company responsible for the transport must also be contacted.

If there is serious damage to the equipment, the insurance company and the party responsible for the freight need to be contacted immediately before anyone is moving anything away.

NOTE: Some parts in the HHV-machine are secured with red metal transport lock-devices, these must not be removed until the machine is standing still on its final position. The transport lock-devices will be removed by Modig staff or Modig distributor.

Some of the transport-lock-devices





Unloading the container

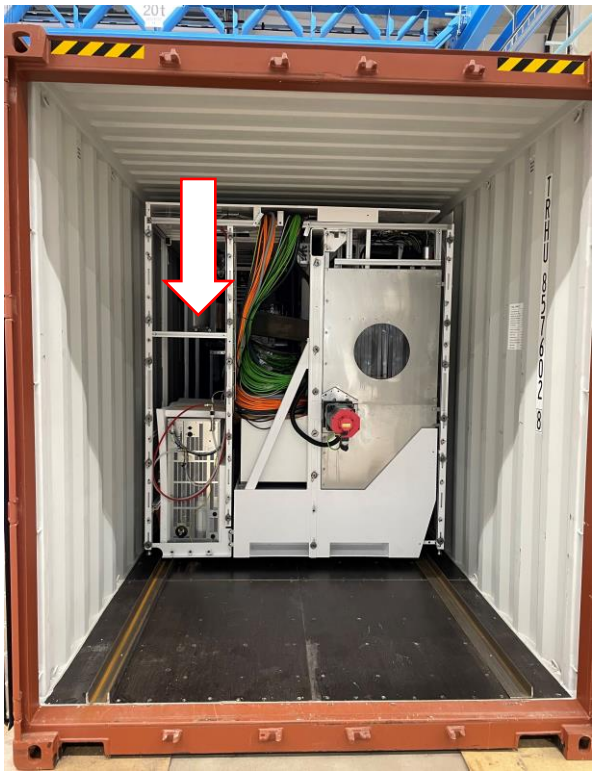
NOTE: Do not loosen the lashing straps before you have read and understood the instructions

The 40 feet container is packed at the Modig factory in a certain order. The unpacking of the HHV-container needs to be done in several steps which is explained in this section. The safety of the staff unpacking the goods must always come first. Great care needs to be taken not to damage the goods in the container during the unloading process.

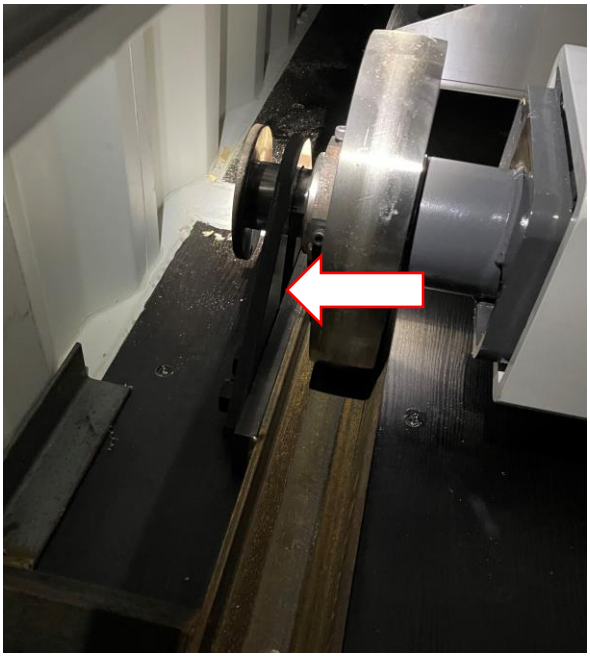
All the loose parts that are delivered with the HHV in the container is to be carefully removed and lifted out manually if possible. The HHV machine is placed in the middle of the container, and before the machine itself can be unloaded, the KNOLL-unit needs to be removed.

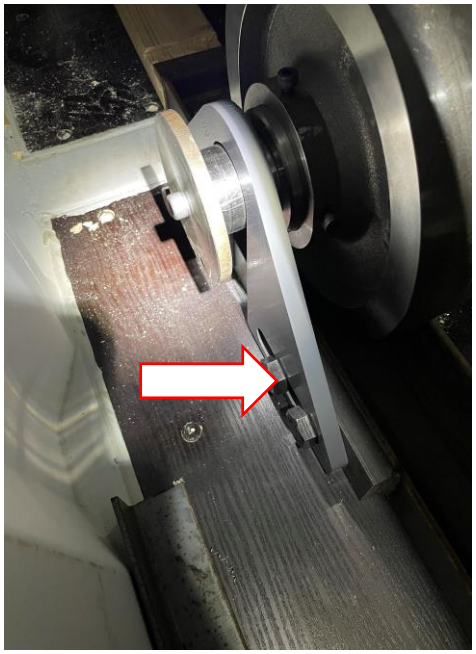
Be very careful with all the loose items when unloading. The cover-plates for the HHV should not be unwrapped to avoid damage. This unwrapping will be done by Modig crew. This also applies to all cardboard boxes and other crates, these will be opened by Modig upon installation.

The container is now opened and to the left is the KNOLL-filter unit, to the right, loose items, cover plates etc. Loosen the lashings with care and lift out the equipment. Below left, the HHV standing on its rails.

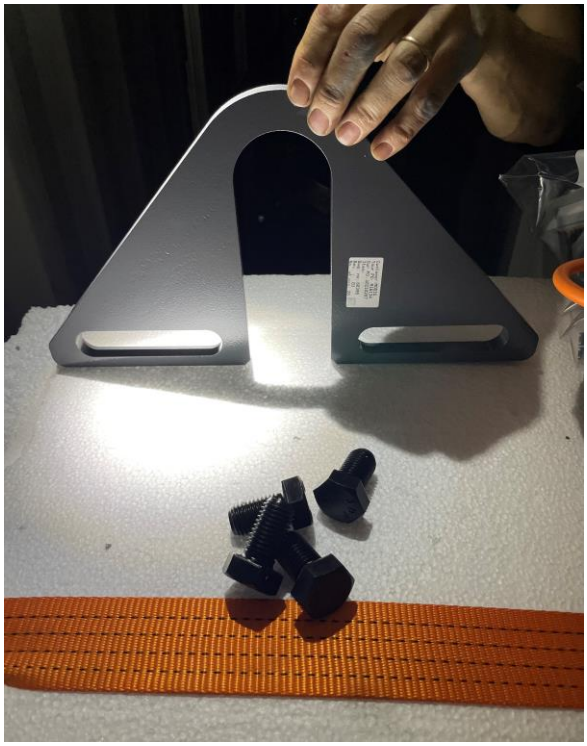


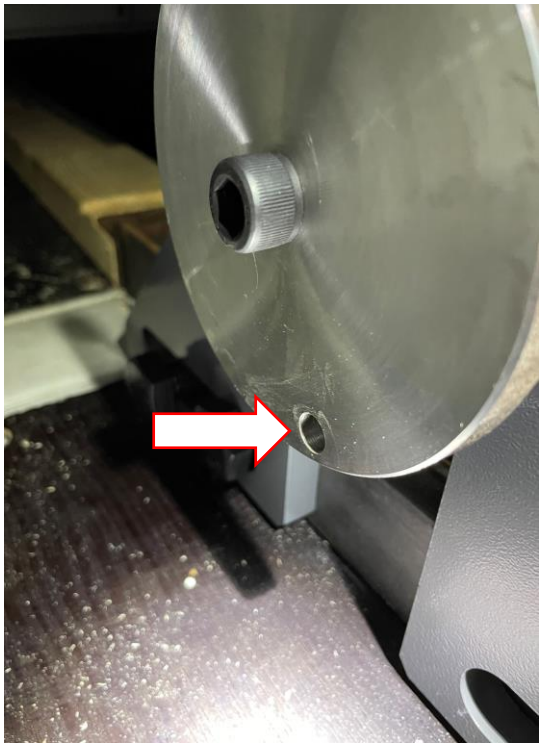
To get access to the securing-plates and the chain lashings you need to carefully climb into the machine over the SMC-cooler (see arrow left)

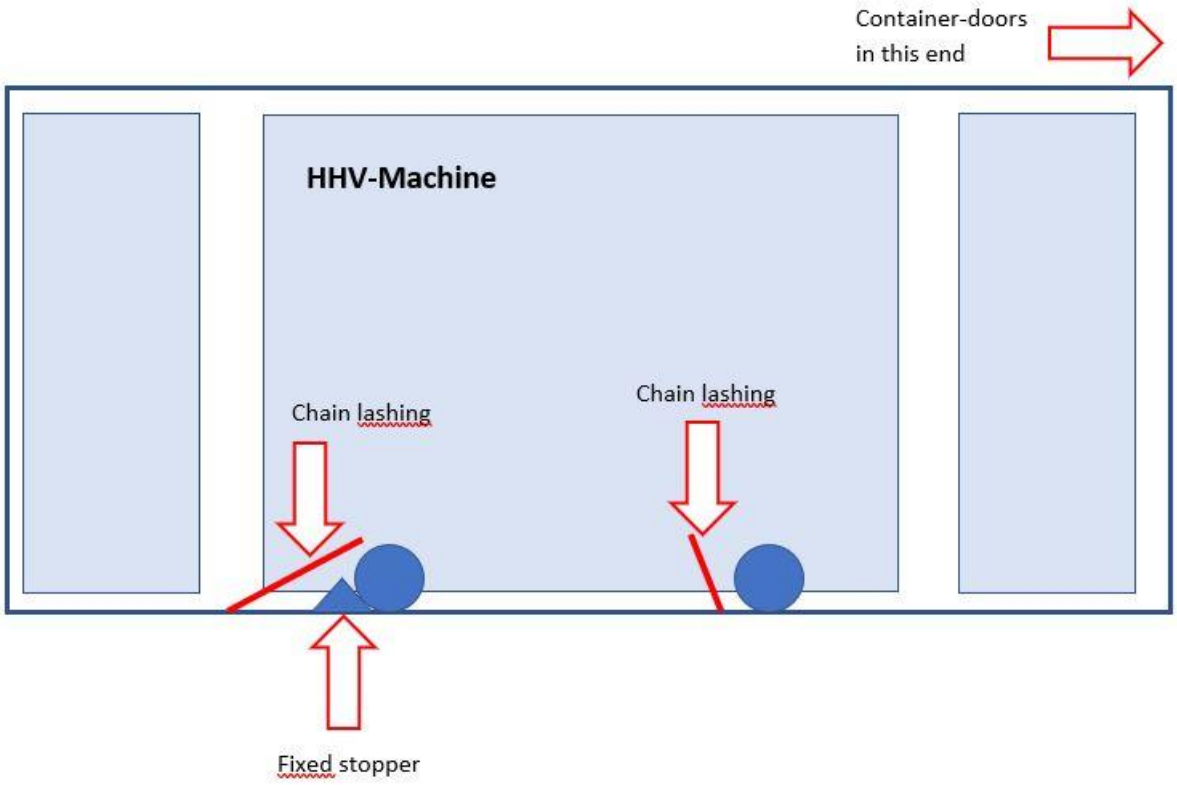




On the left side of the machine, loosen the securing-plates on front- and back-wheel and remove them. Below left, one of the securing-plates when removed. Below right, the axle is now un-locked by removing the screw. Later, when lifting the HHV, the axels needs to be pulled out a bit.







Now it is time to remove the chain-lashings (above). They are located on the left side of the HHV and in the front. After removing the chains, take them out and climb out from the machine.

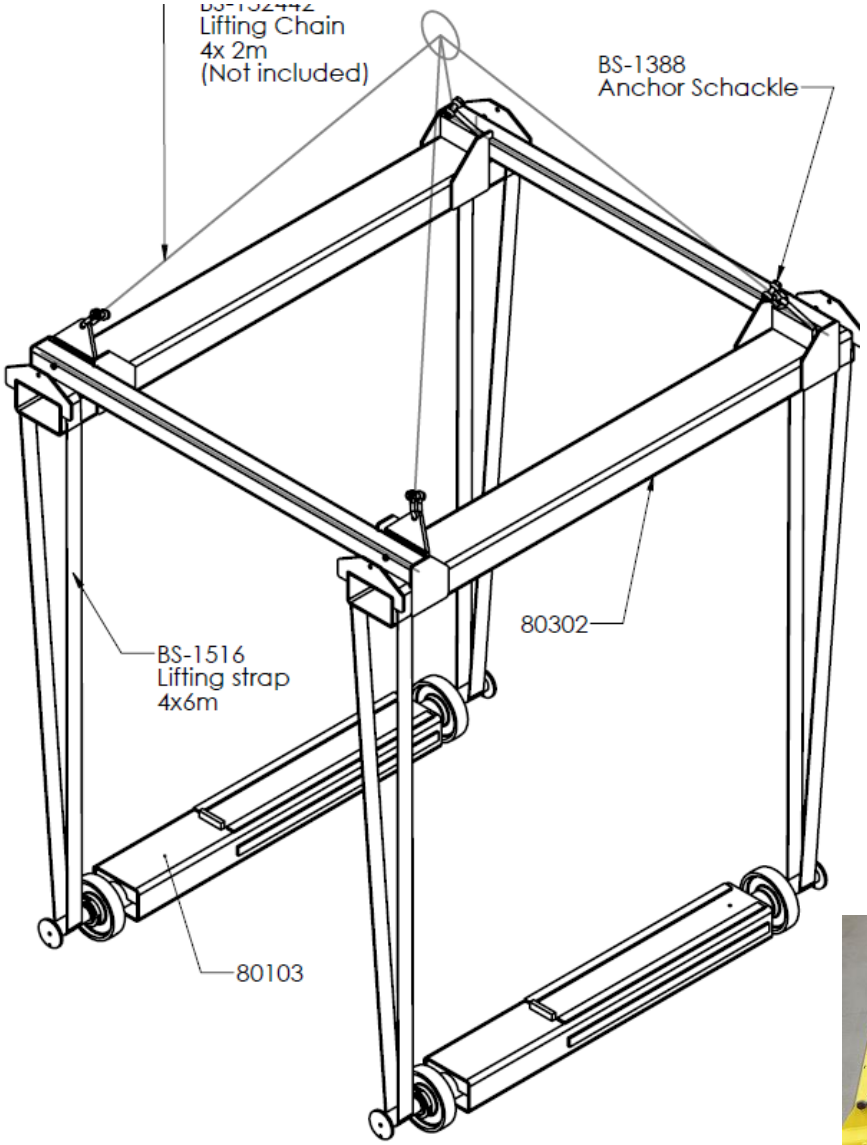
How to get the HHV out of the container

The HHV is equipped with steel-wheels and will roll out from the container if pulled. To avoid damage when pulling the unit out of the container a rigid platform needs to be built. The platform need to support the weight from the HHV-wheels, 5000 kgs/pair (11000 lbs/pair), 10.000 kgs in total weight.

The HHV wheels can be removed. The holes for the beams are also used for lifting the HHV with a forklift. The shaft at the end of the beam is used for the lifting straps.

This unloading-platform can be made in different ways. One way is to create a slope with an angel that will not make the HHV get stuck in the container roof when the first pair of wheels go down the slope. You will need a steel-plate with the same width as the container and a length of at least 4 meters (12 feet). The plate needs to be supported with steel-beams under the plate. The HHV can be pulled slowly out of the container and after going down the slope the HHV can be pulled to storing position on its own wheels.

The other method is to build a straight levelled platform and pull the HHV out just enough to get clear from the container and the lift It with a traverse crane. This is the method Modig use when loading the HHV´s into the containers.



The lifting arrangement that should be used when lifting with traverse crane. The width of the lifting beam must be at least 20 centimeters (8”) wider than the HHV

7. Lifting instructions

NOTE: The lifting device for lifting the HHV must have a capacity of at least 15 Ton / 33.000 lbs

All lifting must be done by authorized personnel

Check the capacity of the lifting crane before use. The weight of the units is explained in the documentation. Make sure the traverse crane is to be located exactly above the middle of the machine before lifting takes place.

Check that the straps are not damaged and can handle the load. Damaged lifting straps constitute a threat to safety when lifting.

Check that the attachment points for the straps are not defective. Check that all transport locking devices are assembled and tightened. Only straps supplied with the machine are to be used. The safety distance from the machine is 11 foot (3.5 meters) when lifting.

Below left, the HHV is pulled out on its wheels using a forklift. Below right, when clear from the container roof, the axles are pulled out and the HHV can be lifted with a traverse-crane.

The HHV can now be placed anywhere on its wheels if the floor strength requirements are according to specification. If the wheels are removed and the HHV is moved with a forklift, the HHV can be put on wooden joists, use at at least three joists. Below, unlash and unload the rest of the equipment.

8. Storage of the machine prior to installation

If the machine is not put into operation immediately after delivery, it is to be kept in a warm area with low air humidity. The anti-corrosive agent applied to the machine on delivery should not be removed. The area should be free from vibrations. The occurrence of dust in the machine is to be avoided. Make sure that the machine is placed on at least three wooden joists minimum 6 by 6 inches thick, placed transversal under the machine. It can also be stored on the four steel-wheels that is was equipped with when delivered if these wheels is not removed during the unloading of the HHV.

If the machine is to be stored for a longer period of time, the anti-corrosive agent is re applied once every six months.

These storage instructions are also applicable if the machine is taken out of operation.

The electrical equipment is so well protected that it can withstand transportation between -13° F (25° C) to +131° F (+ 55° C) and in the short term, i.e. not more than 24 hours, up to +158° F (+ 70° C).

9. Preparations before moving the machine into final position

On the layout drawing for the specific machine there is information about connections of electricity and compressed air and also all measurements and the machine dimensions.

The area where the HHV should be placed is to be marked with tape on the floor. The space needed is found in the drawings for each HHV-unit and varies depending on if it is a HHV2 or HHV3 and if the unit is equipped with infeeder or other options that have impact on the dimensions.

Make sure you have electricity and air reaching all the way to the connection points

The Modig crew will mount the levelling devices (fixators) on the floor and the area needs to be cleared so that this work can be done.

10. Installation and commissioning

The HHV and it´s support systems will be assembled and finally inspected by Modig or Modig distributor/assigned partner and that process is described in a separate manual, INSTALLATION MANUAL HHV

11. Requirements for oil, cooling liquid and grease

Before the HHV arrives you need to purchase the below types of coolant, oil and grease. For filling up the machine and for stock first months of use, these quantities are needed:

Lubrication point	Oil, Product Name	Lubrication interval	Amount liters / USG	Info
Hydraulic unit	MOTOREX COREX HLP 46 ISO VG 46	CHECK OIL LEVEL WEEKLY	40L / 10,5 USG HHV DUO 80L / 21 USG	5000 h or once per year
Spindle lubrication	MOTOREX SPINDLE LUBE ISO VG 68 HYPERCLEAN **SUBSTITUTE IS NOT ALLOWED**	CONTINUOUSLY REFILL	2L / 0,52 USG HHV DUO 4L/ 1 USG	2500 h / spindle
Central lubrication unit	MOTOREX GREASE 174 NLGI 00 SHELL GADUS S2 V220 00	CONTINUOUSLY REFILL	2.7L / 0,71 USG	3 month
Spindle cooling	Product name MOTOREX COOL-X	FILL AND CHECK LEVEL IN COOLER WEEKLY	5 L / 1,25 USG HHV DUO 20 L / 4,5 USG	4000 h
Metal working fluid	Motorex Swisscool 8000 (or similar spec.)	For KNOLL filter/tank-unit, volume depending on size. Mixed 6-8% into water.	100 L / 26,5 USG	Depending on production

Log over new editions

Version	Edition	Date	Edited by
1.00	First edition	2022-03-16	HW
1.01	Update info in table chapter 11	2022-08-02	HS
1.02	Added information for the HHV DUO, chapter 4	2022-08-09	HW
1.03	Added information, chapter 11	2022-08-17	HW

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