This document will provide a quick guide to the set up and operation of the Techno HD-II CNC router equipped with the NCstudio G3 controller.

The HD-II series CNC tool changer router is powered by high precision stepper motors and controlled by a hand-held NCstudio controller.

HD-II Series

TABLE OF CONTENTS

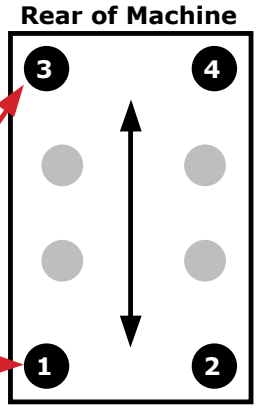
FORKLIFT GUIDE

I. UNPACKING AND MACHINE IDENTIFICATIONS

All Techno machines are shipped assembled and secured to a wooden pallet.

1.1 Unpack all items that shipped with your machine. Check the items against the packing slip to be sure nothing was left out. Notify Techno immediately if you are missing any pieces of your shipment.

Fig. 1.1



● Please note the 4 Forklift Tubes on the front and rear of the machine.

● If required, there are 4 Forklift Tubes on the sides of the machine.

II. MEASURING FORKS AND FORKLIFTING MACHINE

2.1 Forks must be centered in the front of the machine (shown in Fig 2.1).

Fig. 2.1

2.2

Fig. 2.2

Measure the distance between the forks. (shown in Fig 2.2).

SAFETY WARNING: DO NOT LIFT OR MOVE MACHINE USING GANTRY

For safety and to prevent damage to the machine and cables, Lift Machine Using Forklift Tubes ONLY

Depending on machine size — SEE QUOTE FOR MACHINE WEIGHT
NOTE: Forklift capacity must be adequate to safely lift the machine.
It is recommended to have Fork Lift Extensions to better support load.

2.3

Care must be taken not to damage the valves on the front of the machine.
Slowly move in close to the machine.

Fig. 2.3

2.4

Fig. 2.4

Forklift your machine up from the floor and remove the wooden pallet.

Safety Instructions

READ THESE INSTRUCTIONS THOROUGHLY BEFORE OPERATING MACHINE. DO NOT OPERATE MACHINE IF YOU ARE UNFAMILIAR WITH THESE SAFE OPERATING INSTRUCTIONS. DO NOT OPERATE MACHINE WITHOUT KNOWING WHERE THE EMERGENCY STOP SWITCH IS LOCATED.

WARNING: IMPROPER OR UNSAFE OPERATION OF THE MACHINE WILL RESULT IN PERSONAL INJURY AND/OR DAMAGE TO THE EQUIPMENT.

1. Keep fingers, hands, and all other objects away from machine while power is on.
2. Disconnect power to all system components when not in use, when changing accessories, and before servicing.
3. Do not loosen, remove, or adjust machine parts or cables while power is on.
4. Exercise care with machine controls and around keyboard to avoid unintentional starting.
5. Make sure voltage supplied is appropriate to specifications of components.
6. Machines must be plugged into three-pronged grounded outlets. Do not remove the grounding plug or connect into an ungrounded extension cord.
7. Keep cables and cords away from heat, oil, and sharp edges. Do not overstretch or run them under other objects or over work surfaces.
8. Use proper fixtures and clamps to secure work. Never use hands to secure work.
9. Do not attempt to exceed limits of machine.
10. Do not attempt to use machine for purposes other than what is intended.
11. Use machine only in clean, well-lit areas free from flammable liquids and excessive moisture.
12. Stay alert at all times when operating the machine.
13. Always wear safety goggles.
14. Do not wear loose-fitting clothing when operating machine. Long hair should be protected.
15. Always maintain proper balance and footing when working around the machine.
16. Maintain equipment with care. Keep cutting tools clean and sharp. Lubricate and change accessories when necessary. Cables and cords should be inspected regularly. Keep controls clean and dry.
17. Before using, check for damaged parts. An authorized service center should perform all repairs. Only identical or authorized replacement parts should be used.
18. Remove any adjusting keys and wrenches before turning machine on.
19. Do not operate the machine unattended.
20. Follow all safety instructions and processing instructions in the MSDS for the material being processed.
21. Use proper precautions with dust collection systems to prevent sparks and fire hazards.
22. Make sure to have proper fire extinguishing equipment on hand at all times.

PREVENT FIRE HAZARDS by using the proper feeds, speeds, and tooling while operating your Techno machine. For example, setting feeds and speeds too low and/or using dull tool bits creates friction at the material. The friction generates heat which can result in a fire that can be drawn through the vacuum table or dust collector without warning. Fire hazard from friction heating caused by dull tools is possible when cutting certain materials, especially composite material such as wood composites, MDF and Particleboard.

WARNING!
THE SPINDLE WILL BE DAMAGED
IF UNBALANCED EQUIPMENT IS USED.

AIR SUPPLY MUST BE FILTERED AND DRY.

COLLETING GUIDELINES

WRONG!

This picture shows an improper assembly. Notice the gap and angle of the collet in relation to the nut. The collet is not flush to the end of the collet nut. Correct this assembly before using.

RIGHT!

The picture above is how your collet nut assembly should look: the end of the collet is flush with the bottom surface of the collet nut. You will hear and feel a "SNAP" as the collet properly goes into the collet nut. Once it is assembled, then "SCREW" the nut onto the threaded spindle end.

DO NOT PUSH THE COLLET INTO THE SPINDLE AT ANY TIME!

Only the proper assembly should be screwed onto the spindle.

FOR TOOLCHANGE AND FIXED COLLET SPINDLES:

ONLY USE TOOLHOLDERS, COLLET NUTS AND TOOLS THAT ARE BALANCED TO MEET OR EXCEED THE MAX RATED SPEED OF THE SPINDLE.

TECHNO HD-II SERIES QUICK SETUP

The Techno HD-II Series router is powered by 220 Volt AC. Unless specially requested, the electronics require 3-phase power.

1.1

The Electronics are housed in the large NEMA enclosure as shown in Figure 1.1. When unpacking the machine avoid twisting the cable carrier that guides the cables to the motors.

Fig. 1.1

1.2

Open the rear of the controller using the provided key located around the emergency stop button.

You will now have access to the electronics that drive the CNC. They will be identical or like depending on the model issued. (shown in Fig. 1.2).

The terminals for the 220 volt connection are located at the bottom of the box in the front of the controller.
The input lines must be run from back to front of the controller.
(shown in Fig.1.3)

Fig. 1.2

1.3

Have a qualified electrician connect the 220V to the shown terminals. Make sure that all local electrical codes are obeyed. For single phase machine, connect power to L1 and L3 only.
Power is connected in the front.

Fig. 1.3

1.4

Unpack the hand-held controller (shown in Fig 1.4) and carefully attach this to the controller board. (shown in Fig 1.5).

Fig. 1.4

1.5

Guide the cable through the hole on the side of the enclosure and attach the hand-held controller to the DB 15 terminal.

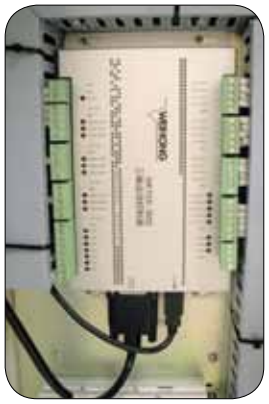


Fig. 1.5

1.6

If the machine has a vacuum hold down pump, there is a matching connector that will plug into the controller box (shown in Fig.1.6).

Fig. 1.6

1. Techno HD-II Series Installation

Fig.1.1

Carefully remove the HD-II from its wood pallet. Be sure to remove the brackets from its four feet as well as anything stowed under the HD-II during shipping.

Remove all bubble wrap, foam and strapping from the machine.

Attached the provided leveling feet to the six legs and adjust accordingly until the table is level.

1.1

Remove the controller and place it on the floor to the left of the machine.

When unpacking the controller, avoid twisting the cable carrier that guides the cables to the motors.

1.1a

Remove the three brackets used to stabilize the gantry during shipping using a M3 or M4 allen wrench. (Fig. 1.1a)

Fig.1.1a

I.2

Open the back of the controller box (shown in Fig 1.2a) with the key provided. The electronics will now be exposed and components identified in Fig 1.2b.

A- Controller Board.
B- 24Volt PSU.
C- Stepper Driver.

Fig. 1.2a

Fig. 1.2b

1.3

Take the black connector coming from the Handheld controller (fig 1.3a,) and guide it through the hole in the side of the box.

Locate the controller board (fig 1.3b) and attach the block connector as shown by the red arrow.

Fig. 1.3a

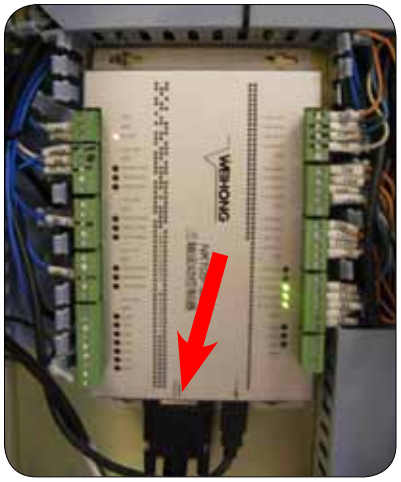


Fig. 1.3b

1.4

Have a qualified electrician attach 220 Volts to the terminal on the bottom of the box (Fig 1.4.) Unless specifically requested by the user, 3 Phase 220 Volt is needed.

If the machine has been modified for single phase operation, then L1, L3 and GND are used, and nothing is attached to L2.

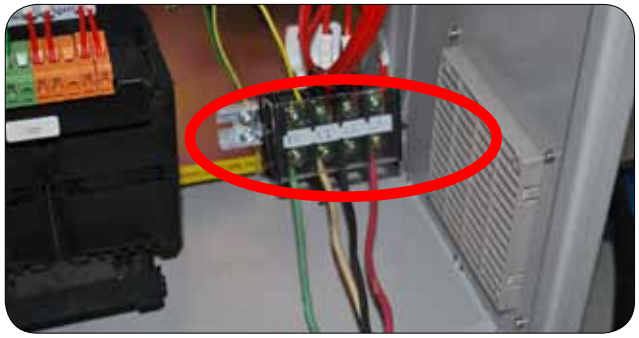


Fig. 1.4

1.5

If the machine has a vacuum table, the Vacuum Pump should be wired to 220V or 440V (depending on what is specified on the Unit,) by a qualified Electrician. (Fig 1.5a)

Fig. 1.5a

The starter box will have a round silver connector attached to a grey cable coming out of it, (Fig 1.5b).

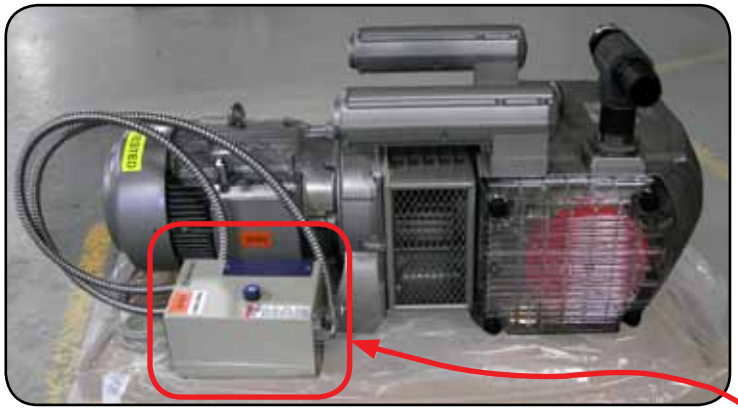
Fig. 1.5b

This connector plugs into the socket on the side of the machine, (Fig 1.5c).
This cable provides 220 volts to the starter coil to turn on the vacuum.

Fig. 1.5c

2. Vacuum Pump Installation

WARNING: Direction of Pump Rotation is critical.
Briefly start Pump and check rotation (arrow on casing).
Exchange phases if rotation is incorrect.
IF YOU RUN THE PUMP/BLOWER CONTINUOUSLY IN THE WRONG DIRECTION,
THE VANES WILL BE DAMAGED.



If a Vacuum Pump/Blower was part of your order, you will have an electrical starter box that looks like this. You should not need to wire the Vacuum Pump/Blower Motor, it has been wired and tested at the factory.

Use the T-Connector to connect the vacuum pump to the vacuum hose under the machine.

Vacuum Hose Kit

Pump/Blower Motor Starter Box & Connector

NOTE:
The cover was removed from Motor Starter.

You will need to have the electrician connect AC power (220 or 440VAC) as specified on the unit here to the Motor Starter.

3. Enabling the HD II Series

3.1 Control Panel Functions.

Figure 2.1b shows the buttons and their functions.

IMPORTANT: DOORS MUST BE CLOSED FOR POWER TO ENABLE.

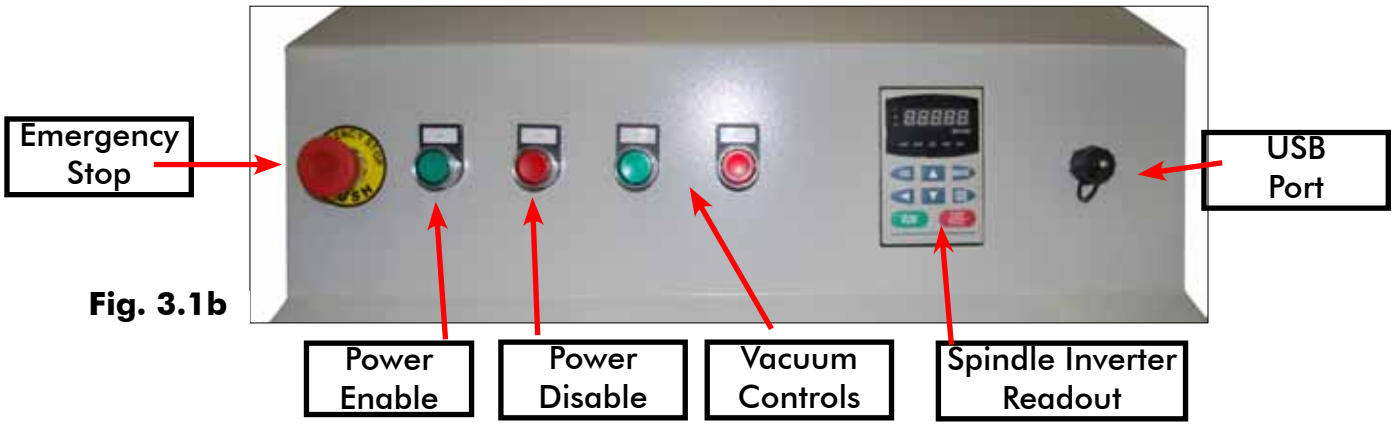


Fig. 3.1b

Once the main power switch has been engaged the controller is activated by pressing the green on switch on the front of the controller.

3.2 Powering On

Turn the machine on by turning the main power control switch to the upright position (Fig 3.2a)

Fig. 3.2a

(Note that the red POWER button will light up if the Emergency Stop is pressed during operation.)

Power is now applied to the controller box.

Press the green button to apply power to the controller and enable the motors. (Fig 3.2b)

Fig. 3.2b

4. HD-II Series Start-Up

When the machine first powers on, the display on the controller will light up and say "Starting System". (Fig. 3.1a)

Once the system has booted it will ask the user "Back to reference point?" Fig 3.2b

Fig. 3.1a

Fig. 3.2b

This is also known as 'homing' the machine. It refers to the process of the machine finding its mechanical home position.

From this point, the user has two options;
Home the machine or cancel the homing process. We recommend that you home the machine every time you start up. If you do not home the machine, certain actions will be restricted.

This will abort the sequence and the machine will stay still.

There will be no reference position and break points, offsets and all functions that rely on a reference position will be invalid.

This will cause the machine to first move the Z-axis to the top of travel, then the X and Y axis will move simultaneously, to the home /reference position. A sensor on the gantry is used to locate this position.

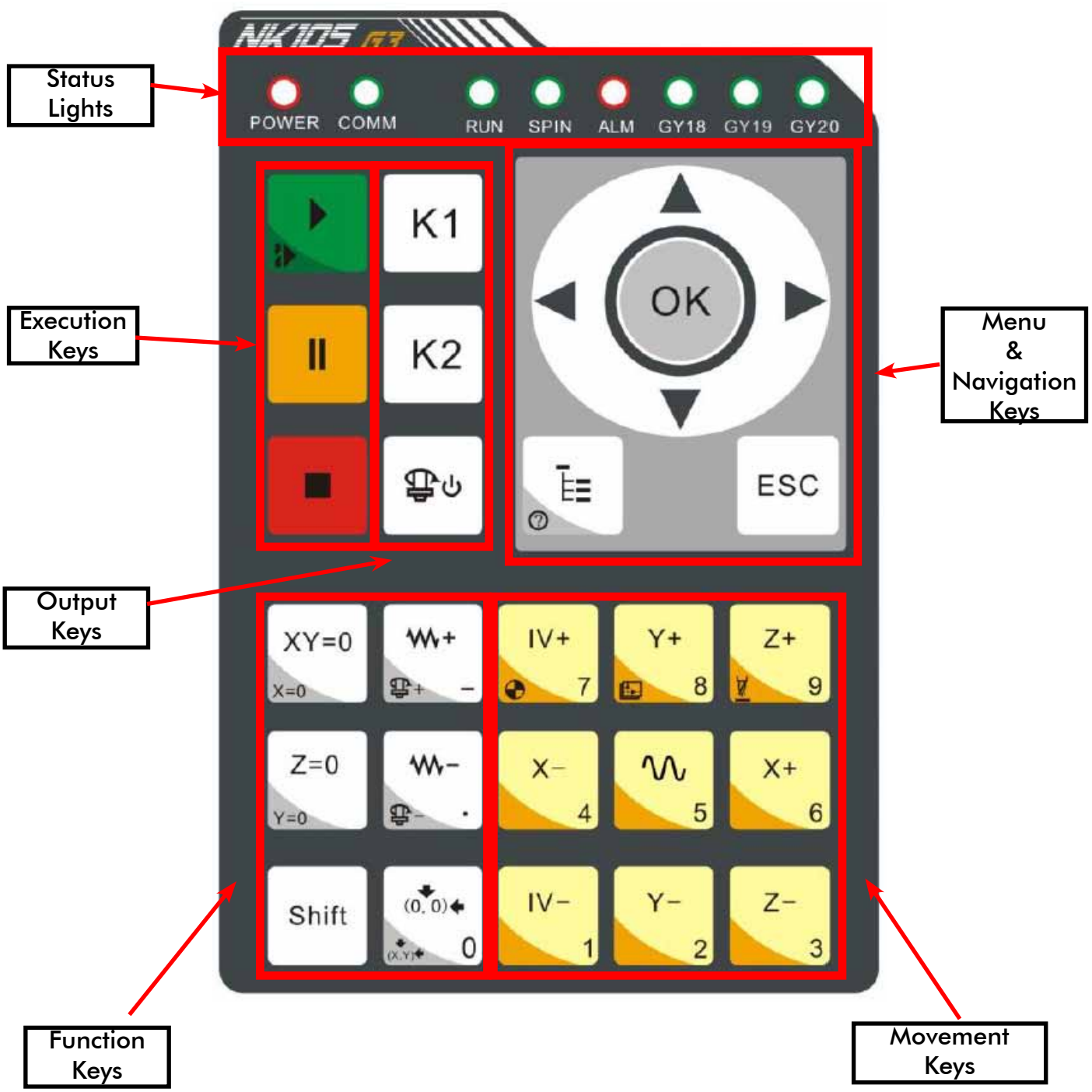
The homing procedure can be canceled at anytime by pressing ESC.

Once the machine has moved to the end of travel on each axis, it will stop and enter an IDLE state and will be ready to use.

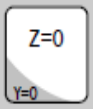
You should test all machine functions before beginning to cut. The functions are displayed in the next section.

5. NK105G3 Controller

Handheld Controller Layout
The layout of the NK105G3 handheld controller.

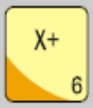


Single Keystroke Functions on the Handheld Pendant

Key icon	Key name	Function
	Spindle On / Off	Manually Turn Spindle On / Off
	Menu	Opens Controller Menu
	Escape	Escape or Back
	XY=0	Set XY Origin
	Z=0	Set Z Origin
	Shift	Shift / Secondary Function Key
	Override +	Increase Feedrate Override
	Override -	Decrease Feedrate Override
	Origin	Send to Origin
	K1	Manually Clamp / Unclamp Tool
	K2	Dust Shroud Up / Down
	OK	OK; Enter Manual Parameters Screen Change High / Low Speed and XYZ Step Increment

Movement Keys

All the movement type keys are colored yellow. They will work in both Jog and Stepping modes.

Key icon	Key name	Function
	X-	X Axis Negative Movement; Input 4
	X+	X Axis Positive Movement; Input 6
	Y+	Y Axis Positive Movement; Input 8
	Y-	Y Axis Negative Movement; Input 2
	Z+	Z Axis Positive Movement; Input 9
	Z-	Z Axis Negative Movement; Input 3
	Speed switchover	Change Between High / Low Jog Speeds; Input 5
	Positive	4th Axis Postive Movement; Input 7
	Negative	4th Axis Negative Movement; Input 1

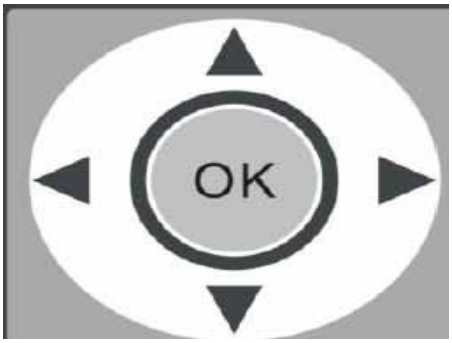
Shift Commands / Combination Keystrokes

To use the shift commands, you must press and hold the shift key and then select a second key.

Key icon	Function
Shift + ▶	Resume from Breakpoint
Shift +	Show Tips / Help Screen
Shift + XY=0 X=0	Set X Origin
Shift + Z=0 Y=0	Set Y Origin
Shift + W+	Increase Spindle Speed
Shift + W−	Decrease Spindle Speed
Shift + 0	Send to Clearance Position
Shift + IV+ 7	Send to Home Position
Shift + Y+ 8	Switch Between Absolute and Relative Coordinates
Shift + Z+ 9	Set Z Origin Using Touchpad
Shift + ⏸	Jiggle in at Pause
Shift + X+ 6	Measure Tool Length
Shift + IV− 1	Manually Clamp / Unclamp Tool

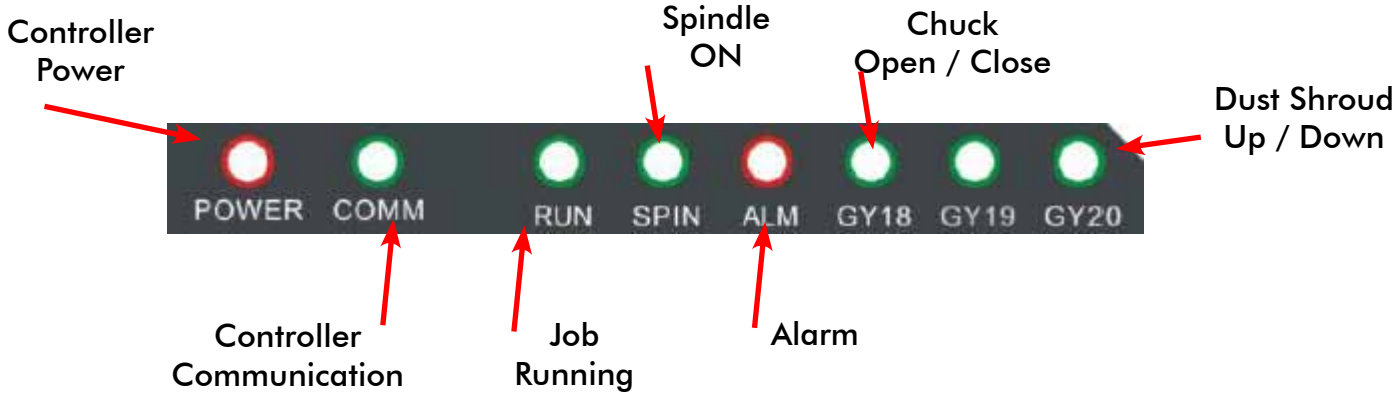
Execution Keys and Menu Navigation

Key icon	Key name	Function
	Start	Start key
	Pause	Pause during machining
	Stop	Stop machining



Use the arrows to navigate menus, move cursors and in conjunction with other keys to perform specific functions.

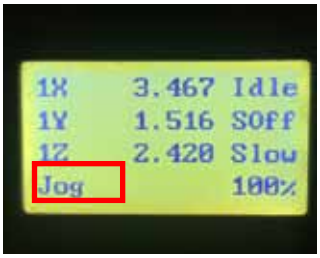
Status Lights and Indicators



6. Operating Tutorials

6.1 - Switching Movement to Step or Jog.

There are two modes that allow the user to control the movement of the machine: Jog and Step. To switch between these modes press the "Shift" button. The mode will be displayed on the bottom left of the screen.



Jog- Also known as continuous mode. When a directional arrow is pressed, the machine will move in that direction until the button is released.

Stepping- Also known as step mode. When a directional arrow is pressed, the machine will move an exact amount, as dictated by the manual parameters page. To move again, you must release the button and press it again.

6.2 - Jogging the machine and changing from High/Low Jog Speed.

To Jog the machine, hold down one of the Yellow directional keys on the keypad while in Jog mode. The keypad has X+,X-,Y+,Y-,Z+,Z- printed on the keys to indicate direction.

The machine has two speeds, High and Low.
When the machine starts it will be in the Low speed.

To toggle between low and high speed press the Jog Speed Select Button. You can only toggle speed when in Jog Mode.
The LCD will display High or Low on the right of the screen.

Press 'OK' to change high and low speeds, see section 3.3.

Select between high and low Jog speeds

6.3 - Stepping the machine.

To move the machine in increments, press down one of the Yellow directional keys on the keypad while in Stepping mode. The keypad has X+,X-,Y+,Y-,Z+,Z- printed on the keys to indicate direction.

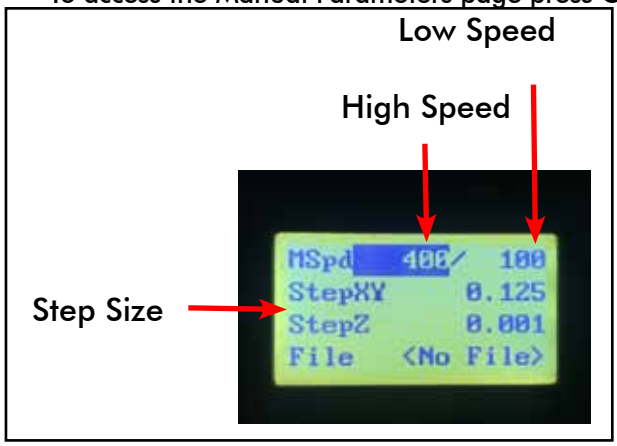
This will move the machine in predetermined increments in the axis selected.
By default, the X and Y axes will move in .005 inches and the Z axis will move in .001 inches.

Press 'OK' to change step size, see section 3.4

6.4 - Modifying the Jog Speed and Step Size

The machine can be jogged at two speeds, low and high. You can also change the increments in which the machine will move in Step mode. These speeds are set in the Manual Parameters page.

To access the Manual Parameters page press OK from the Main Screen



To move the cursor, use the Up and Down directional arrows.
Enter a new value.
Press OK to accept that value.

Set the High and Low speed to a suitable value.
Adjust the Step value as needed.

To Exit out of this screen and return to the main menu press ESC.

Warning: Adjust the step size carefully. If you set the step size to an excessive value, the machine will move by that value and could damage the machine.

When inputting a decimal increment, you must enter the value as 0.###
Zero+decimal+(your increment)

6.5 - Feedrate Override

While running a G-Code file, the user can manually override the feedrate or cutting speed of the program. The range of the override goes from 10% to 120% of the original feedrate.

The user can override the feedrate using the following keys:

Increase Feedrate

OR

Decrease Feedrate

6.6 - Adjusting the XYZ Zero position/WCS/User Origin

XYZ zero position, Working Coordinate System (WCS), and User Origin are all the same thing.

Different CAM systems and users just name the concept differently. For convenience, XYZ zero position will be used in the rest of this manual.

XYZ zero position is the location point on a drawing in a CAD/CAM package where X,Y and Z all equal zero.

Generally, XY zero is on the bottom left corner and Z zero is the top of the part. In fig 3.3a the letters are located away from the XY zero, all points representing positive integers.

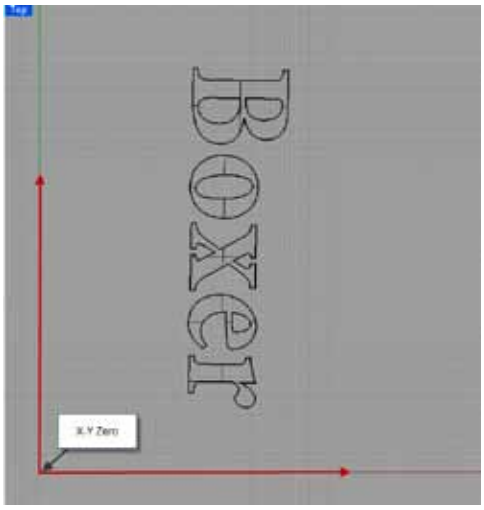


Fig. 3.3a

In Fig 3.3b the object represents the material the letters will be cut from. The machine should be jogged to the corner of the material by using the directional arrows on the keypad. Once the machine is in location press to set XY zero. The coordinates on the controller will change to 0,0.XY zero is now set.

The HD-II origin can also be set on individual axes. For example, the operator can set just X=0 or just Y=0 through the use of the "shift" key and the associated button, shown below.

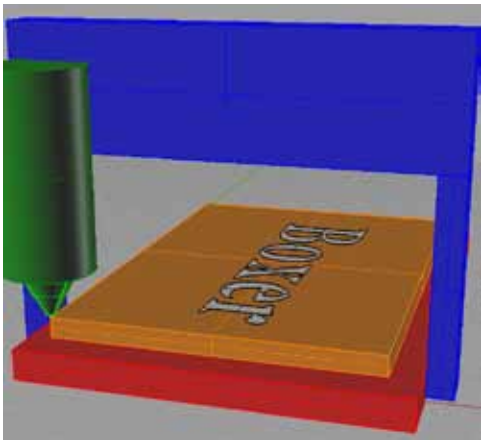
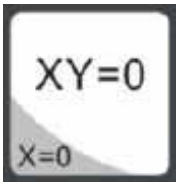


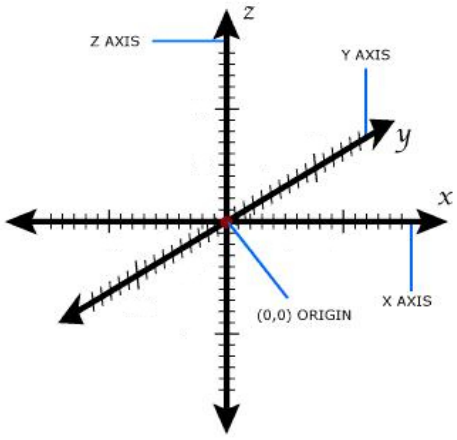
Fig.3.3b

Zero X Axis

Zero Y Axis

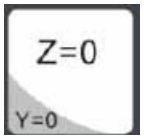


Zero both X and Y Axes



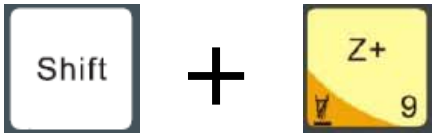
There are two methods for setting the Z-axis zero position:

1. Manual Method: Use the Z-axis directional arrows on the keypad to move the router to the top of the material. Switch to Step Mode to slowly move the machine into position. When the router bit is in position press shift/aux and the Z=0 button as shown.



Zero Z-axis

2. Tool Calibration Block: Place the touch off block on top of the material and under the cutter. Press shift/aux and 9 simultaneously. The spindle will slowly move down until it touches the touchpad. The Z axis will now be set to the top of the material.



Activate Z-Touch off procedure.

The Z coordinate will now read 'Z 0.000'

6.7 - Loading a G-code File

Press the Menu button.

Select "2.USB files" to access the flash drive.
Only a G-code file with an "nc" extension with show.

Scroll through the files with the arrows keys

Select file by pressing OK.

Then load the file by pressing 1.

Note:
Files can be copied from this USB to the controller using the "2" button
Local disk space is limited!

Once a file is copied locally, it can also be selected from the jog speed /step size screen

6.8 - Running a G-code file

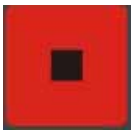
Once the XYZ origin has been set as per section 6.6 and the file has been loaded as per section 6.7 the operator is now ready to run the G-code file.

To run the G-code file simply press the start button 

Once the spindle has reached speed the machine will move into position to start the first cut.

The file can be paused while running by pressing 

To resume the file press 

To abort the file at any time press 

Note:
When the machine pauses, the spindle will stop and the Z axis will move to the Z clearance/ Safe height to allow inspection of the part.

If the machine is jogged off the part during a pause, it will lose its position and when the file is resumed it will start from the new position.

The last file can be resumed at a breakpoint by pressing.

7. Advanced Tutorials

7.1 - Alternating between Override and Programmed Feedrates

The controller can run G-code files with speed set by the user on the keypad, override speed, or with speed set in the CAM package/G-code file, programmed speeds.

To determine what speed protocol will be used, do the following:

In the main screen, press menu  to enter the menu screen .

Use the arrow key to scroll the cursor and highlight 4. oper param

Press OK to select.

Use the arrow keys to scroll the cursor and highlight 8. ignore F code

9. ignore S code

Press OK to select.

Note:
The F or S Option.
F stands for Feed rates, and S stands for Spindle RPMS.

Note:
"No" means speed in the G-code file will be obeyed.

"Yes" means speed will be overrode by the controller.

7.2 - Setting the Override Speed for a G-Code file

From the main screen, press Menu to access the Menu screen.

Use the arrow keys to move the cursor and highlight 4. oper param

Press OK to select this option and enter the Operations Parameters screen

Use the arrow keys to move between each option and press enter to select the option.

Press OK to edit the data and use the number keys to enter data.

Press OK to save data and Cancel to exit out of the screen.

Keep pressing cancel until you return to the main screen.

G00 Speed is the rapid speed, or the speed the machine moves when the cutter is above the material.

GXX Speed is the speed the machine moves when the cutter is in the material. This speed will vary with cutter size, material, cutter type, etc.

7.3 - Manually Changing Tools

The HD-II Series CNC Router is equipped with an HSD automatic Toolchanger spindle. This spindle allows the operator to save time by allowing the machine to change tools during a job, however, the operator may need to change tools manually.

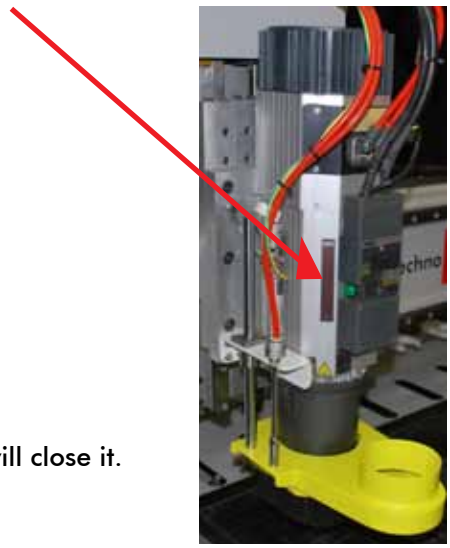
To manually change tools, the operator can either remove and insert a new tool directly into the spindle or instruct the machine to pickup a tool from the linear tool rack.

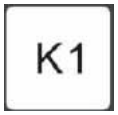
7.3.1 - Removing and Inserting tools into the Spindle

There are a few ways to open and close the chuck of the spindle, allowing the operator to quickly and easily change tools.

The easiest way to do this would be the press and release the green override button on the front of the spindle.

While one hand holds the tool currently in the spindle, press and hold the green button with the other hand. The chuck will remain open for however long the green button is pressed for.





You may also open and close the chuck using the K1 key.

When using the K1 key, you will be prompted

"Are you sure you want to clamp / unclamp the tool?".

Pressing "OK" will immediately open the chuck. Pressing K1 again will close it.

In addition, you may also press "Shift" + "1", and like pressing the green button, the chuck will open unprompted.

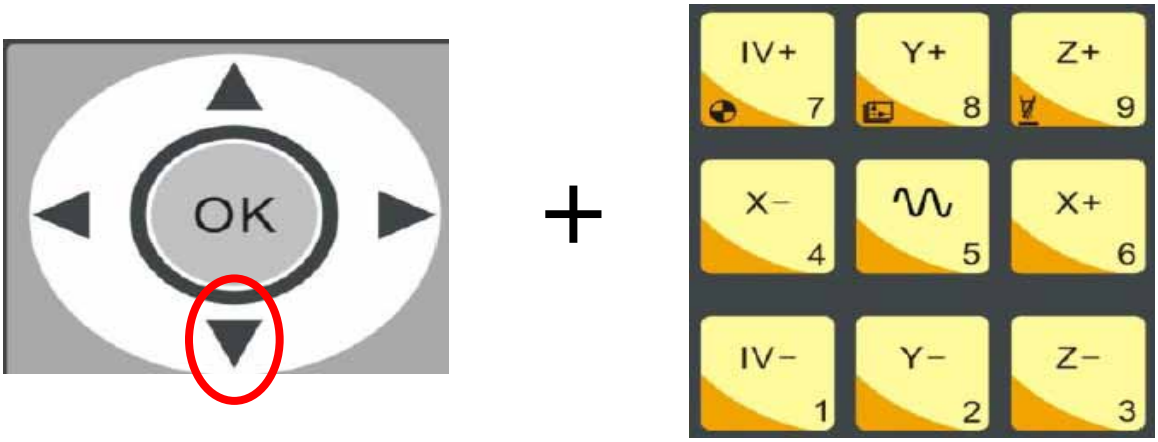
You may use any combination of these buttons to open and close the chuck.

7.3.2 - Using The Automatic Toolchanger Function

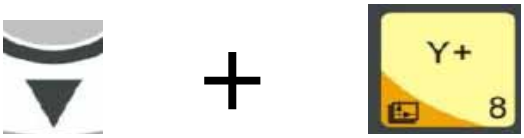
Besides manually removing and inserting a tool into the spindle of the machine, you may tell the machine to drop off and pick up new tools in the linear rack.

To perform an automatic toolchange, first ensure that the tool clip for the tool currently in the spindle is empty and that there is a tool in the position you would like to change.

Once these check have been completed, you may now change tools.



To change to a selected tool (1 - 8), Press and hold the “Down Arrow” key while simultaneously pressing the key associated with the tool you would like to change to.



For example, you have tool number 1 in the spindle and you want to change to tool number 8.

1) Check to make sure tool clip 1 is empty. Tool clip 1 is the furthest to the left of the linear rack.

2) Check to make sure tool clip 8 has a tool in it. Tool clip 8 is the furthest to the right of the linear rack.

3) Press and hold the “Down Arrow” Key

4) While holding the “Down Arrow” Key, press and release the “8” button.

5) The machine will now home, put tool number 1 away and then pick up tool number 8.

7.3.3 - Tool Change Parameters and Settings

The HD-II Series CNC Router is shipped and set up with all tool change parameters pre-set. The operator may choose to change some of these settings.

To find these settings, press "Menu" and then navigate to "4. Oper Params" and then "15. Tool Change"

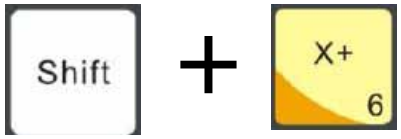
Parameter	Settings Range	Function
ATC Capacity	1 - 20 **(8)**	Number of Tools in the Toolchange Rack
CurrentToolNo.	1 - ATC Capacity	Tool Number of the Currently Loaded Tool in Spindle
Tool Offset	X / Y / Z Stroke Limits	Tool Offset in Each Axis
ToolChangeTip	Yes: Prompt **No: No Prompt**	Whether to Prompt for Tool Change During G-Code Execution
Cali Coor	Varies based on touch pad	Absolute Coordinates of Fixed Touch Pad
Cut Up Pos	Varies	Absolute Coordinates of Tool Change Upper Position
Change Speed	Varies **(400)**	Speed of Tool Change Operation in in/min
Pre-TC Pos	**X = 0** **Y = 6** **Z = 0**	Absolute Coordinates of Pre Tool Change Position
Tool Position	Varies	Absolute Coordinates of Tool Stand Locations
Calibrate Tool	Yes: Measure **No: No Measure**	Whether to Measure Tool Length After Every Tool Change
Back Pre_Pos	Yes: Return **No: No Return**	Whether to Return to Previous Position After Tool Change
Change Delay	0 - 600000 ms **(500)**	Delay time for Tool Change in milliseconds

7.4 - Setting Tool Lengths

To properly utilize the automatic toolchanger function of the HD-II Series CNC router, the operater must measure and store the lengths of all the tools that the machine will be using. This process is easy and automated, with a few options depending on the operator's needs.

Once the tool that needs to be measured is currently in the spindle (see section 4.3 for changing tools), the operator can choose the measure the tool's length.

To bring up the tool length offset menu, press and hold "Shift" and then press the "6" key.



This will bring up the "Measure Tool Length" Menu. This menu has three options;

1) **Single Measurement**

Automatically measure the length of the tool in the spindle using fixed touch pad. The controller will prompt "Successfully measured tool length" when completed.

2) **Auto Measurement** (not recommended)

Automatically changes to and measures the length of all tools using fixed touch pad.

3) **Manual Measurement** (used for irregularly shaped or oversized tools such a spoilboard cutter)

Measure tool length of the tool in the spindle based off current position. To use the feature, manually lower the tool's lowest point to the surface of the touch pad and then select "Manual Measurement". The tools length will be recorded. This is often used for tools with offset cutting surfaces (surfacing bit).

Highlight the option you would like to use and press the "OK" key. The machine will perform the selected operation.

TOOL LENGTHS MUST BE LEARNED BEFORE RUNNING A PROGRAM.
TOOL LENGTHS WILL BE SAVED AFTER SHUT-DOWN.

7.4.1 - Tool Length Measuring Settings

To change the height that the spindle retracts after a tool change,

Press "Menu", Go to "4. Oper Params", Select "17. Calib Height"

8. Maintenance Information

The Techno HD-II CNC Router will provide years of productive service if it is maintained properly. Based on a 40-hour work week, there are daily, weekly, monthly, quarterly, and yearly maintenance steps required for proper upkeep.

Daily
- Wipe down rails and clean out racks
- Blow or vacuum any chips off the machine

Weekly
- Complete all daily tasks
- Clean the machine thoroughly and remove any excess grease and grime
- Blow out any build-up in the rails or racks
- Lubrication of the XYZ axes linear bearings
- Lubrication of the Z axis ball screw

Monthly
- Complete all weekly tasks
- Clean all racks (XY) and screws (Z) with a scrub brush and degreaser
- Clean all vacuum pump filters both inline and onboard.
- Dispose of all dust in any dust collection units

Quarterly
- Complete all monthly tasks
- Grease any racks using lithium grease (XY)
- Check rack and pinions for wear
- Check bolts and screws, tighten if needed
- Check the machine for squareness and reindicate if necessary

Bi-Annually
- Complete all quarterly tasks
- Turn off power and vacuum out any debris in the controller cabinet
- Clean the filter elements inside the controller cabinet

8.1 Lubricating the X-Y Rack and Pinion

Lubrication is important with rack and pinion gearing systems. A thin film of grease should always be present on the contacting tooth flanks to minimize metal to metal contact.

Lithium grease lubrication is recommend over oil, as the oil lubrication will flow away from tooth flanks.

The grease should be applied to the rails at regular intervals, depending on the usage of the machine. Use a small brush to coat both rails on the side of the Y-axis and the single rail across the X-axis. Fig 8.1

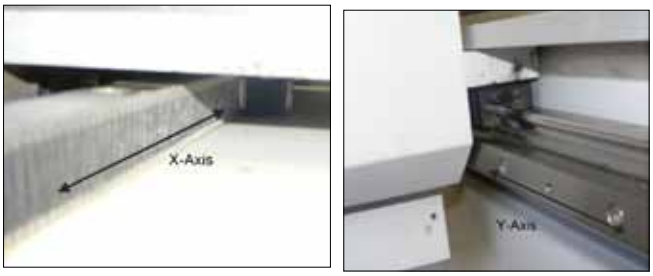


Fig 8.1

8.2 Lubricating the X-Y-Z Rails

The rail carriage bearings are sealed and protected with wipers. The rails should be lightly oiled to allow smooth operation. Avoid a build up of debris on the rails by blowing them off with air, or wiping them down with a rag. The rails do not need to be lubricated as often as the rack, once a month should be sufficient.

X-Axis Z-Axis Y-Axis Fig 8.2

8.3 Lubricating the Z Ballscrew

The Z axis uses a ballscrew and ballnut instead of a Rack and Pinion. The ballnut has a nipple for applying lubrication to the mechanism. Fig 5.3a

Lubrication Point. Fig 8.3a

Lithium grease is pumped into the lubrication point with an application gun

Fig 8.3b

8.4 Recommended Lubricants

Lithium Based Grease:
Alvania Grease No. 2(Shell)
or Equivalent.
Techno Part No.
H90Z00-8670T8
Oil:
Vactra No. 2s(mobile)
Tonner Oil or Equivalent.
Techno Part No.
H90200-LUBE002

Oil and Grease Kit:
Techno Part No.
H90Z00-LUBEKIT2

NOTE: AVOID A BUILD UP OF DEBRIS ON MOVING PARTS. CLEAN OFF ANY DEBRIS TO AVOID DAMAGING THE MACHINE.

9. Parameter and Settings

High/Low Speeds and Step Distances (from main screen, press 'OK')

MSpd:	800 / 100	
Step XY:	0.005	
Step Z:	0.005	
File:	(active file name)	Note: These numbers can vary.

All following settings can be found by pressing the 'Menu' key and are worded/abbreviated as you would see them on screen.
Note: All settings with '' on screen requires reboot to take effect.*

1. LOCAL FILES
2. USB FILES
3. OPERATIONS
    1. Back to REF Point
        1. All Home
        2. Z Home
        3. X Home
        4. Y Home
    2. Rect Machining
        1. Params Setting
            1. EngrDpth
            2. EachDpth
            3. ToolDia
            4. NoseGap
            5. Height
            6. Width
            7. X Init
            8. Y Init
            9. Mode
                1. Horiz Mill
                2. Long Mill
            10. LOAD NOW
        2. Load the Last
    3. Select Line No
        Total: ____
        StartLine: ____
        EndLine:_____
        EXECUTE NOW
    4. Machining Info
        Time
        X: _____
        Y: _____

Z: _____

5. Park MCS Site
    1. Park Mode
        1. Not Move
        2. To Park Site
        3. To WCS Origin
    2. Park Site
        1. Input Site
            Input Park Site
            X: _____
            Y: _____
            Z: _____
        2. Select Site
            Select Current Position As
            Park Pos by [OK] Key
            Return ny [ESC] Key
6. Select WCS
    1. G54 WCS
    2. G55 WCS
    3. G56 WCS
    4. G57 WCS
    5. G58 WCS
    6. G59 WCS
7. Array Process
    1. File
    2. Rows
    3. Columns
    4. RowSpace
8. Origin List
    1.
    2.
    3.
    4.
    5.
    6.
    7.
    8.
9. Nearby Process

4. Oper Param
    1. G00 Speed 800.00 in/min
    2. GXX Speed 400.00 in/min
    3. Back REF First YES
    4. Lifts on Pause* 0.25 inch
    5. Offset →

1. Public Offest
   1. X
   2. Y
   3. Z
2. Work Offset
   1. G54 Offset →
      1. X
      2. Y
      3. Z *(settings repeat through G59)*

6. Cycle Process →
   1. Cycle Process — NO
   2. Cycle Times — 1
   3. Cycle Interval — 0 ms
   4. S-Off in Intev — NO
7. G73-G83 Retract — 0.0 inch
8. Ignore F Code — NO
9. Ignore S Code — NO
10. Spindle Stop →
    1. S off at Pause* — YES
    2. S off at Stop* — YES
    3. S off at End — YES
11. Ratio on Manu* — YES
12. DXF Params →
    1. Lifting Height*
    2. Process Depth*
    3. 1st Point as 0* — NO
    4. Shape Process* — NO
    5. Bottom Process* — NO
    6. Metric Size* — NO
13. ENG Params →
    1. Lifting Height* — 0.039
    2. Tool Change Tip* — YES
    3. Cycle Times* — 1
    4. Deep Hole Mode* — 0
    5. Retract Amount* — 0.25
    6. Select Tool No* — YES
14. Plt Params →
    1. Lifting Height* — 0.039
    2. Plt Unit* — YES
    3. Tool step* — 0.001
    4. Process Depth — -0.039
15. Tool Change →
    1. ATC Capacity* — 8
    2. Current Tool No — 1

3. Tool Offset (varies by tool)
4. ToolChangeTip NO
5. Cal Coor (XY varies, Z=-1)
6. Cut Up Pos -0.039
7. Change Speed 400.000 inch/min
8. Pre-TC pos X0, Y6, Z0
9. Tool Position (varies by tool)
10. CalibrateTool NO
11. Back Pre_Pos NO
12. Change Delay 500.000 ms

16. ProcessEndTip NO
17. Cali. Height After Tool Length 0.500 inch
18. Eng Unit Yes
19. User Param
    1. user param 1 0 mm

5. MFR Param **PASSWORD: 33587550**
    1. Velocity →
        1. Decel Dist 0.394 inch
        2. Approach Speed 25.00 in/min
        3. Single Axis Acc 25.00 in/sec^2
        4. Dry Run Acc. 20 in/s^2
        5. Max Turn Acc 40.00 in/sec^2
        6. Jerk 5900.00 in/sec^3
        7. Max Speed
            1. X 1700.000 in/min
            2. Y 1700.000 in/min
            3. Z 350.000 in/min
        8. Short Seg Spd Lmt YES
        9. SPDLMT Length 0.1 inch
        10. Z Down Option 0
        11. Z Plunge Cut Spd 12.000 in/min
        12. REF Circle Radius 5.0 inch
        13. REF Circle Speed 120.00 in/min
        14. Jump Speed 0.0 in/min
        15. LookAheadDis 0.0 in
    2. Axis Output Dir →*
        X: Positive
        Y: Positive
        Z: Negative
    3. Pulse Equiv →*
        X: 0.0084375
        Y: 0.0084375
        Z: 0.0025000
    4. Machine Stroke →

1. Strk Upper Lmt →
   - X: *varies depending on machine size* *(59.25)*
   - Y: *varies depending on machine size* *(120.00)*
   - Z: 0
2. Strk Lower Lmt →
   - X: 0
   - Y: 0
   - Z: *varies depending on machine size* *(-7.240)*

5. Change Stroke →
   1. Strk Upper Lmt →
      - X: *varies depending on machine size* *(54.000)*
      - Y: *varies depending on machine size* *(107.00)*
      - Z: 0
   2. Strk Lower Lmt →
      - X: 0
      - Y: 0
      - *Z:* *varies depending on machine size* *(-100.000)*
6. Change Tool
   1. Back To REF. Before Change — YES
   2. Fixed Position — X2, Y5.5, Z0
7. Ref Point Set →
   1. RefP Speed →
      - X: 120 in/min
      - Y: 120 in/min
      - Z: 60 in/min
   2. RefPDir
      - X: Negative
      - Y: Negative
      - Z: Positive
   3. Retract Dist
      1. X Retract Dist — 0.079 inch
      2. Y Retract Dist — 0.079 inch
      3. Z Retract Dist — 0.079 inch
8. Spindle Set →
   1. Spindle Gears* — 7
   2. On/Off Delay — 5000 ms
   3. Initial Gear* — 6
   4. Max Spdl Speed* — 24000
9. Y Rotary Axis →
   1. Y as Rotary Axis* — NO
   2. Rotary Y Pulse — 0.006 deg/pulse
   3. MM as Unit — NO
   4. Rev Work Radius — 0.394 inch
   5. Rotary Takeoff — 0.291 rad/s

	6.	Rotary Y Acc	6.98 rad/s^2
	7.	Max Rotary Vel	30 r/min
10. Backlash Set			
	1.	Screw Error Compensation	NO
	2.	Compensation on	NO
	3.	Axis Backlash →*	
		X: 0.0	
		Y: 0.0	
		Z: 0.0	
11. Calib Thickness			1.860 inch *(varies)*
12. Algorithm			1
13. Arc Increment			YES
14. Arc Tolerance			0.079 inch
15. Forward Look Seg			50
16. Sign of BK REF			YES
17. Safety Height*			1.000 inch
18. Lube →			
	1.	Enable Auto Lube	NO
	2.	Time Interval	5000s
	3.	Duration	5s
19. G00 Feed 100%*			YES
20. Smoothing Time			0.0 s
21. Corner Option			0
22. Corner Tolerance			0.004 inch
23. Control Cycle			No
24. Soft Time Limit			0.500 s
25. User Param			
	1.	user param 2	Yes

6. Param Upkeep
    1. Backup Params
    2. Restore Params
    3. Factory Params
    4. Export Params
    5. Import Params
    6. Import ErrData
7. System Upkeep
    1. Language
        1. Chinese
        2. English
    2. Export Log
    3. System Update
    4. Register
    5. Help
    6. Reboot

7. Exit
8. Delete Log
9. Disk Space
10. Delete Info
11. Modify Code

8. Diagnosis
    1. System Info
        1. Software Version
        2. Card No
        3. Remaining Time
        4. Register Times
    2. Port List

1. GX01	N
2. GX02	N
3. GX03	P
4. GX04	N
5. GX05	N
6. GX06	N
7. GX07	N
8. GX08	P
9. GX09	N
10. GX10	P
11. GX11	N
12. GX12	N
13. GX13	N
14. GX14	N
15. GX15	N
16. GX16	P
17. ALAM	N
18. GY13	N
19. GY14	N
20. GY15	N
21. GY16	N
22. GY17	N
23. GY18	N
24. GY19	N
25. GY20	N

    3. Keypress Diag
    4. Import Diag
    5. Outport Diag
    6. LED Diag

BECKER

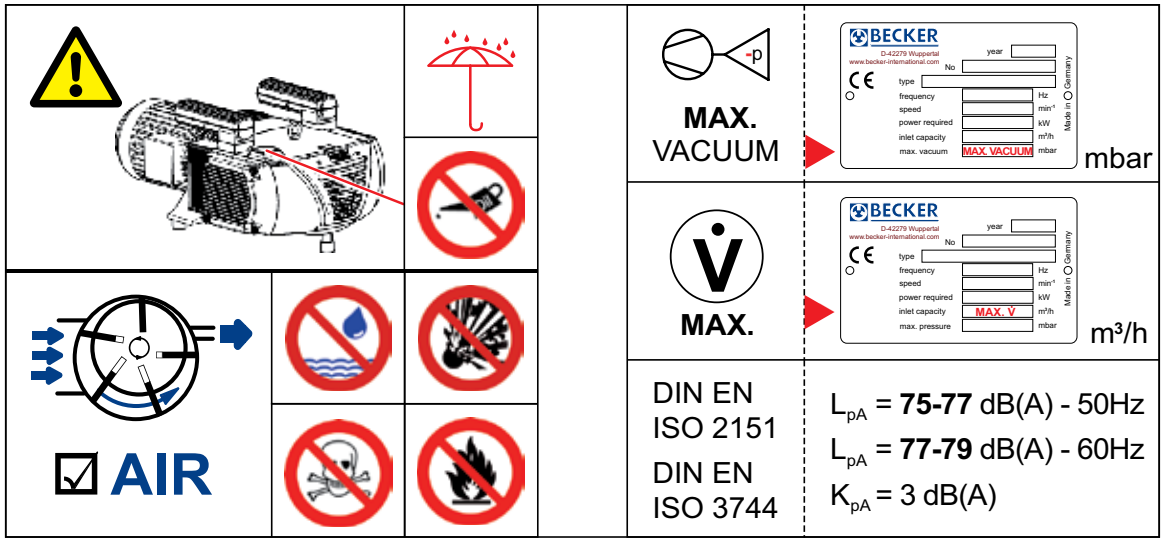
Betriebsanleitung
Operating Instructions
Instructions de service
Istruzioni d'uso
Handleiding
Instrucciones para el manejo
Manual de instruções
Naudojimosi instrukcija
Kasutusjuhend
Lietošanas instrukcija
Οδηγίες χρήσης
取扱説明書
사용설명서

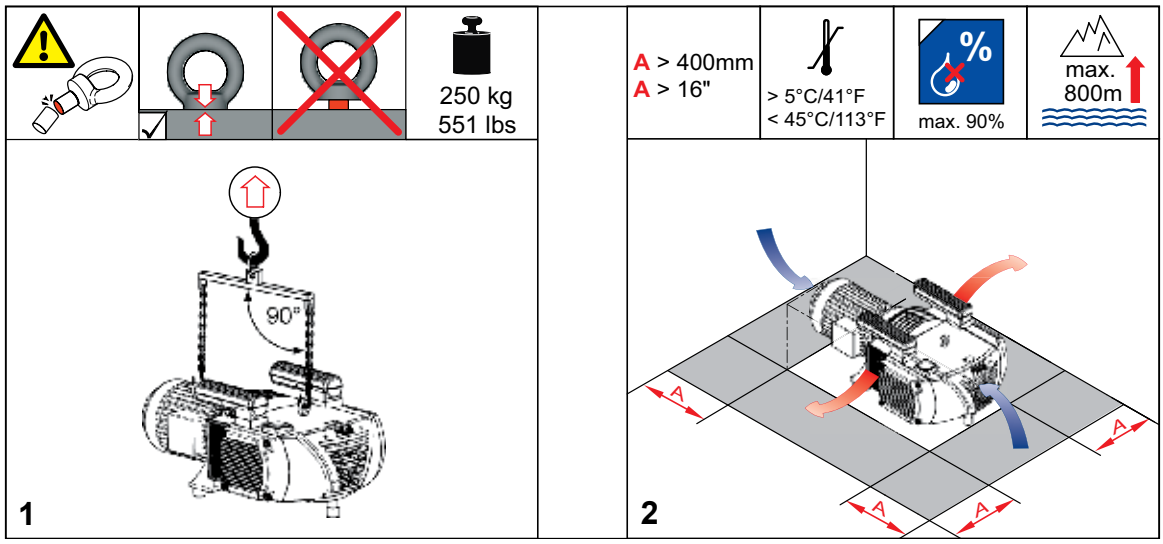
Driftsinstruks
Driftsinstruktioner
Käyttöohje
Driftsvejledning
Instrukcja obsługi
Kezelési útmutató
Návod k obsluze
Navodilo za uporabo
Návod na obsluhu
El Kitabi
Инструкция по эксплуатации
使用说明书

VTLF 2.200
VTLF 2.250

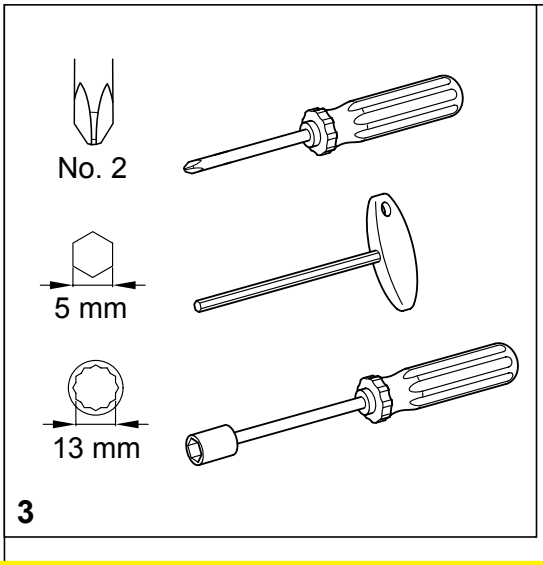
98/37 EG
2006/95 EG

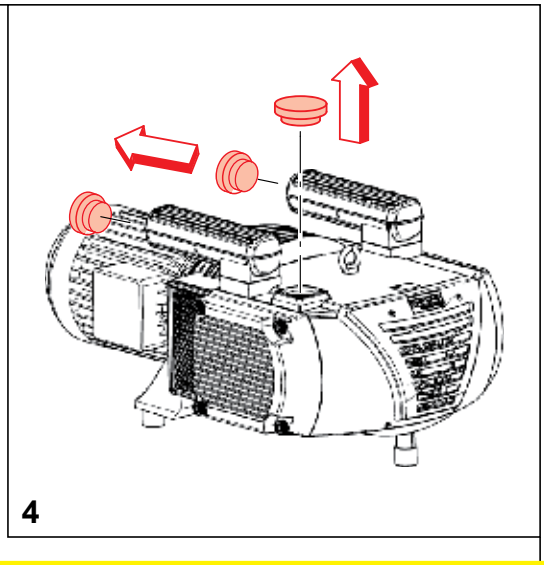
DIN EN ISO 14001:2005
DIN EN ISO 9001
001929 QM

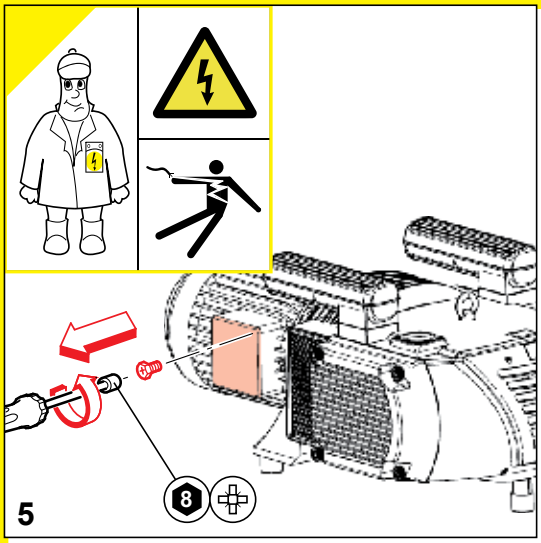


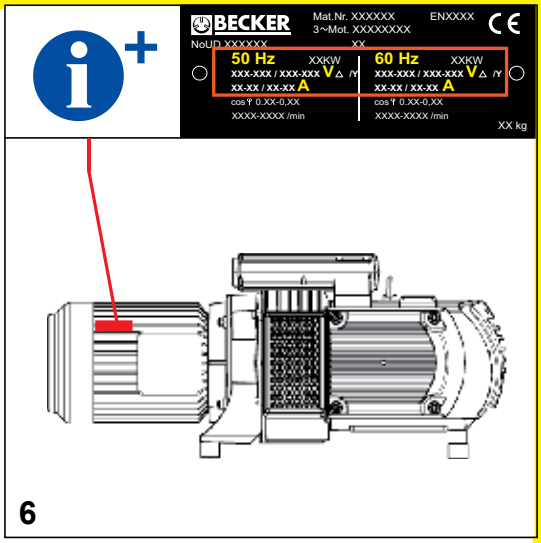


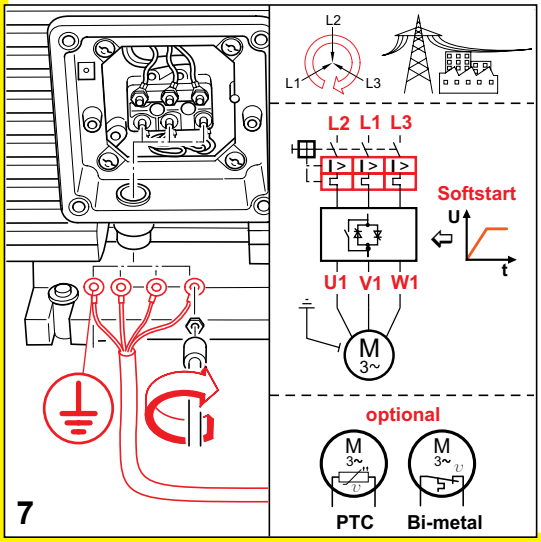
BPC 2810005220 2 04/09

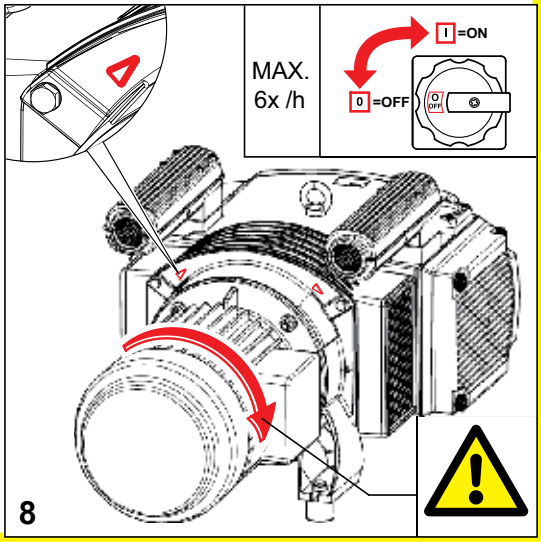

No. 2
5 mm
13 mm
3

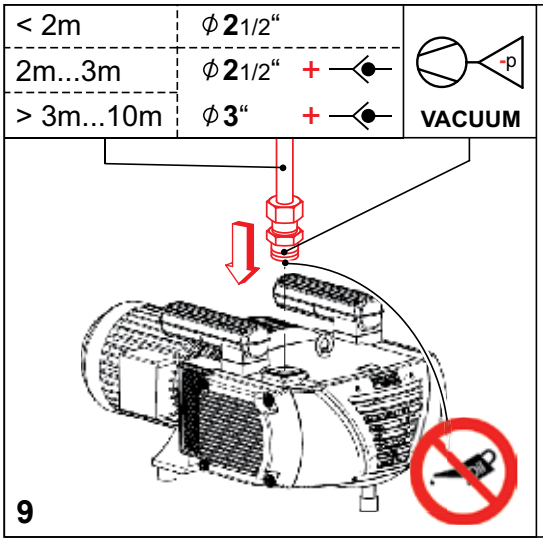

4

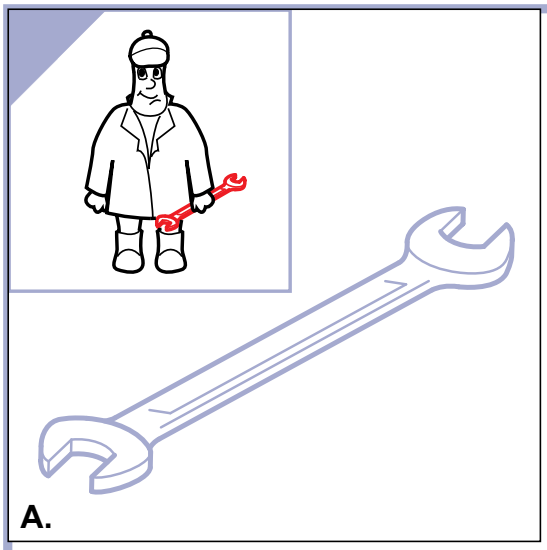

8
5

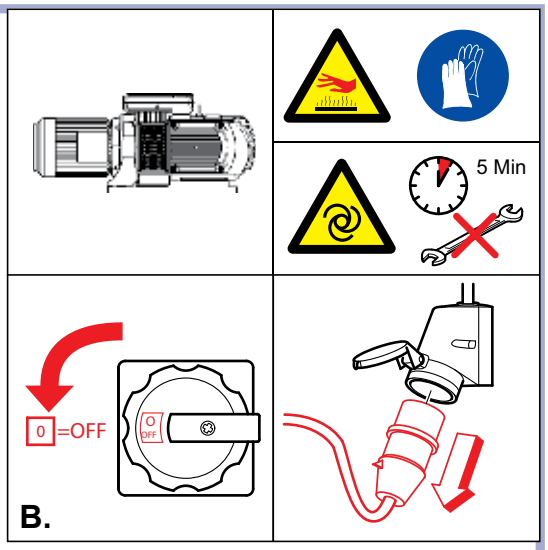

BECKER
Mat.Nr. XXXXXX
3~Mot. XXXXXXXX
ENXXXX
NoUD XXXXXX
XX
50 Hz
XXKW
60 Hz
XXKW
XX kg
6

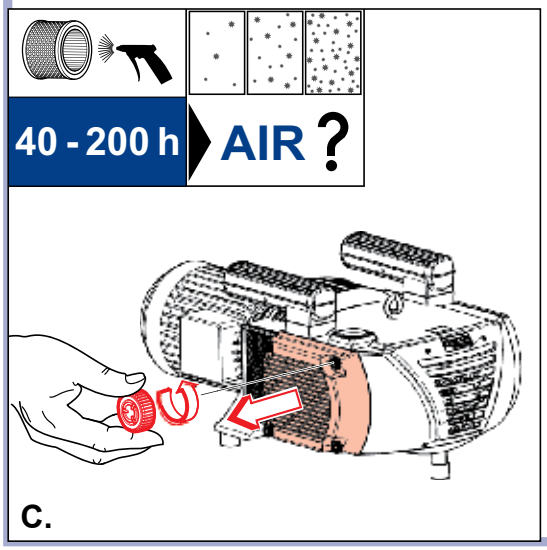

L2
L1
L3
L2 L1 L3
Softstart
U
t
U1 V1 W1
M
3~
optional
PTC
Bi-metal
7

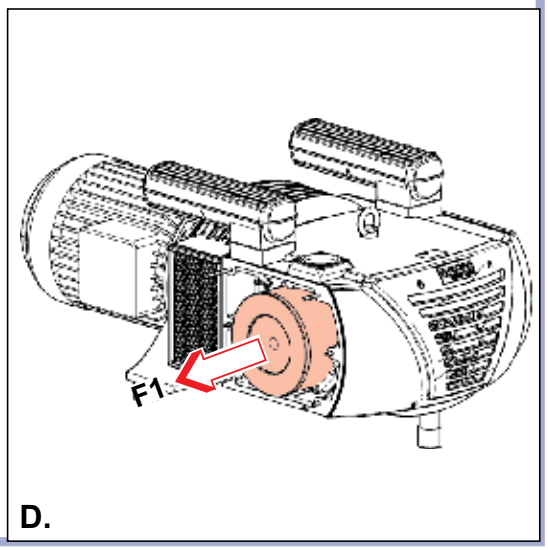

MAX.
6x /h
I =ON
0 =OFF
8

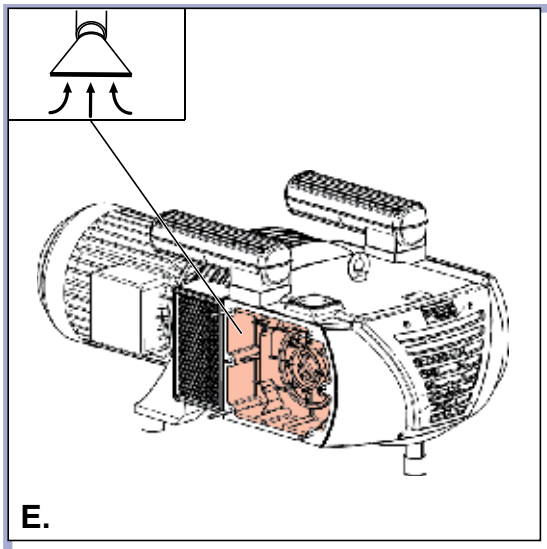

< 2m
ϕ 2 1/2“
2m...3m
ϕ 2 1/2“ +
> 3m...10m
ϕ 3“ +
-p
VACUUM
9


A.


5 Min
0 =OFF
B.

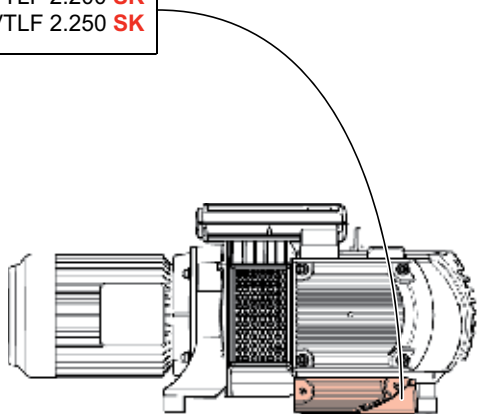

40 - 200 h
AIR ?
C.


F1
D.



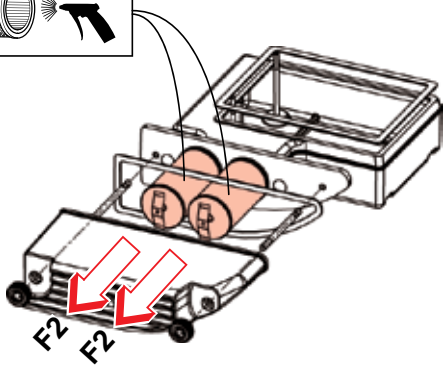
E.

VTLF 2.200 **SK**
VTLF 2.250 **SK**



F.

VTLF 2.200 **SK**
VTLF 2.250 **SK**



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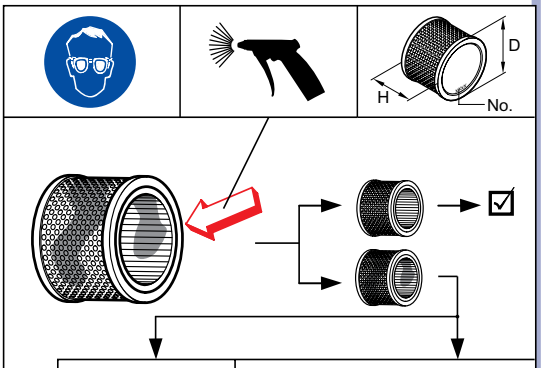
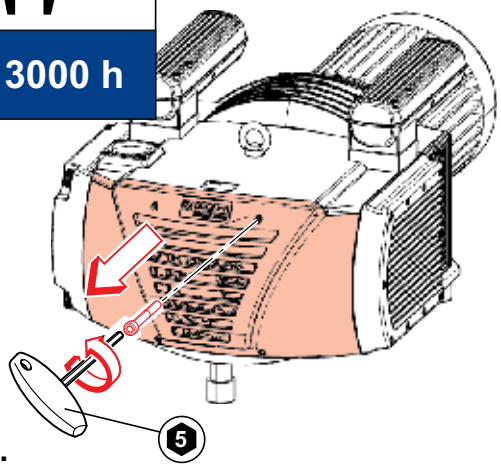


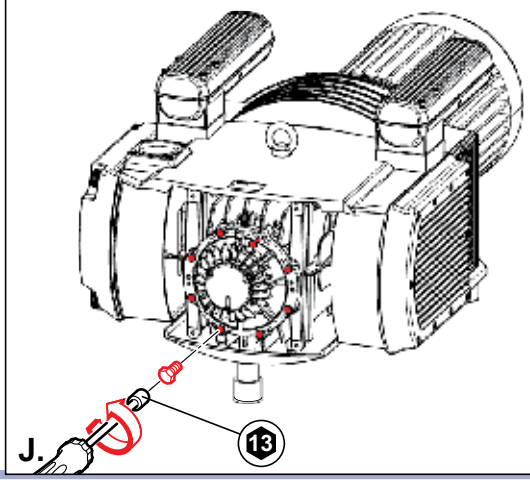
H.

F1	**F2** (VTLF - **SK**)
D: 218 mm	D: 64 mm
H: 122 mm	H: 120 mm
No.: **909512**	No.: (2x) **909510**

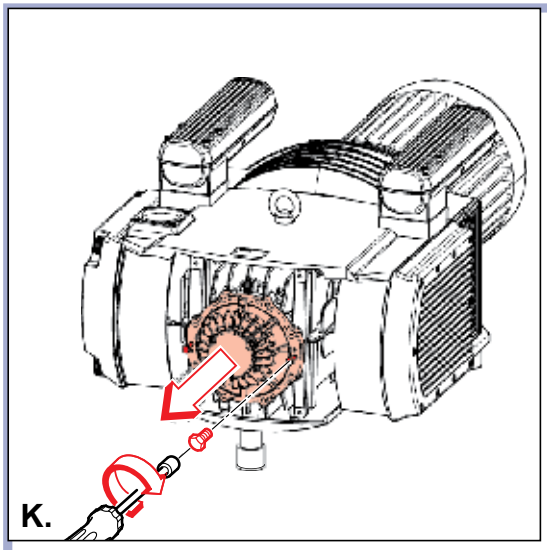
3000 h



I.



J.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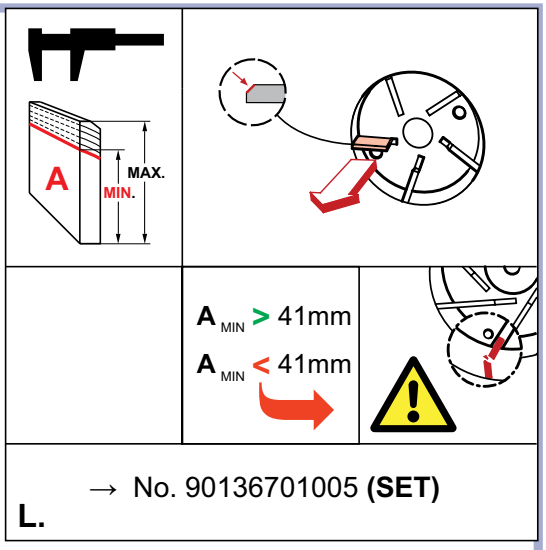
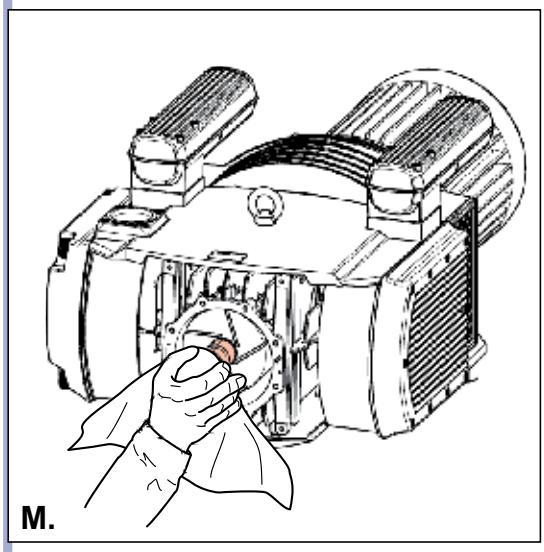


→ No. 90136701005 **(SET)**
L.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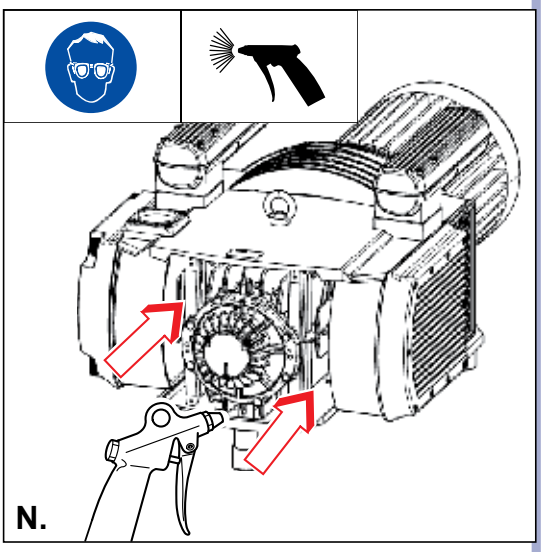
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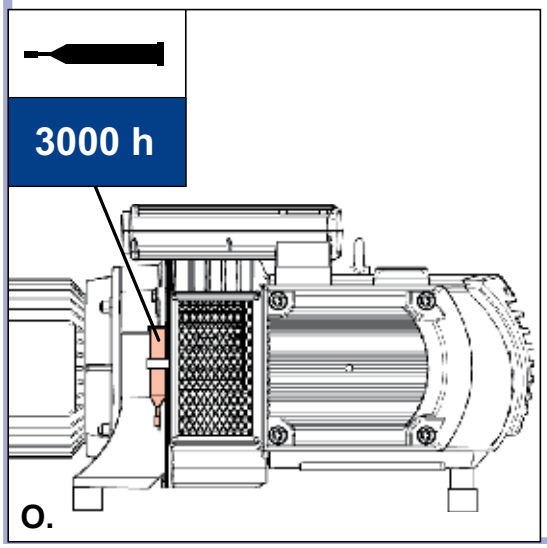
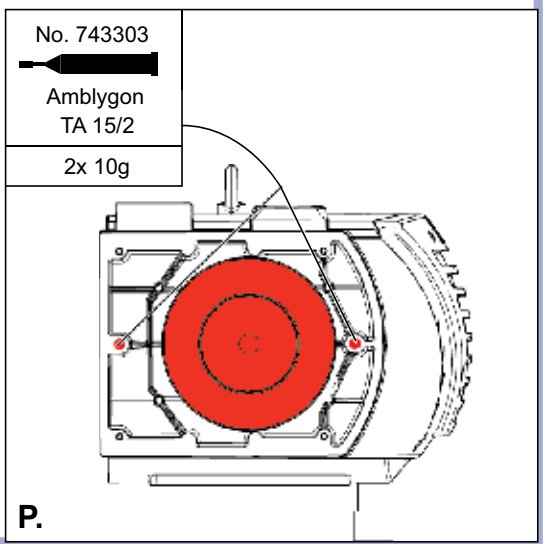


O.



P.

TLF 2.250-2.500
Internal Filter Inspection

-Tools required-

Flashlight

ATTENTION

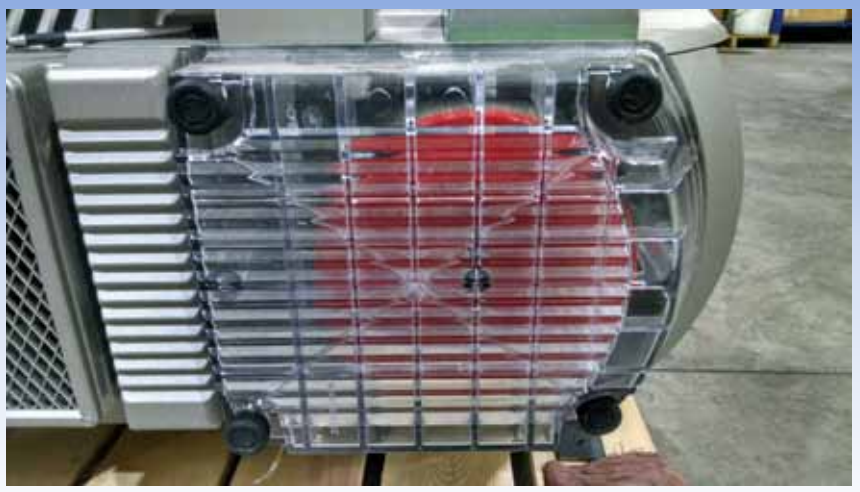
VISUAL CLUES REGARDING VTLF 2.250 FILTER MAINTENANCE SHOULD NOT ALWAYS BE THE SOLE INDICATOR OF WHETHER A FILTER IS "CLEAN".

THOUGH THE FILTER HAS TREMENDOUS SURFACE AREA, THE DEEP PLEATING OF THE FILTER MAY DISGUISE WHETHER THE FILTER IS CLOGGED.

A PERIODIC PHYSICAL INSPECTION SHOULD BE PERFORMED TO MAKE SURE THERE IS A GOOD FLOW OF AIR THROUGH THE FILTER.

A CLOGGED FILTER IS ALMOST ALWAYS THE CAUSE OF PRE-MATURE VANE WEAR OR IN SOME CASES, PUMP FAILURE

-Remove the (4) black knobs by hand-



-Remove the internal filter and look for debris-

-Check for large debris deposits. This is an indicator that the filter caught the smaller particles-

-Use a flashlight on the outside of the filter-

If light **cannot** be seen on the inside, the filter is clogged and needs replaced.

-If you **can** see light, then blow out the filter using compressed air and replace-

- This needs to be a modest amount of light.
- Light should be present through each pleat.

Greasing TLF 2.200-2.360

-Tools required-
X1 – 7433050000
(50 gram grease gun)

BECKER

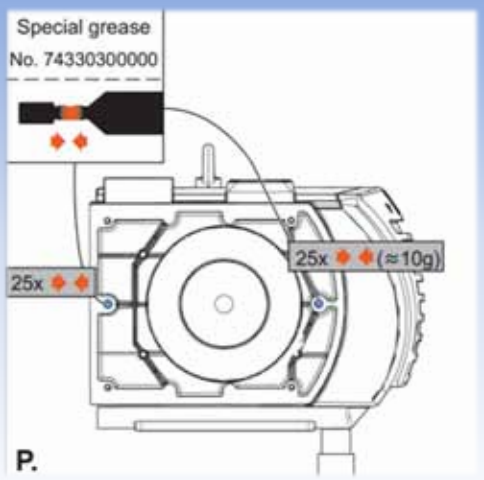
Author: Mike Ruff
Becker Pumps Corp.

Greasing instructions

The greasing instructions can be found on step "P." in the operation manual sent with each pump.

Or they can be found at www.Beckerpumps.com

Bearings are to be grease every 3000 – 4000 hours



BECKER

Author: Mike Ruff
Becker Pumps Corp.

All new units come with new grease guns.

(Found in either of the two places below)

BECKER

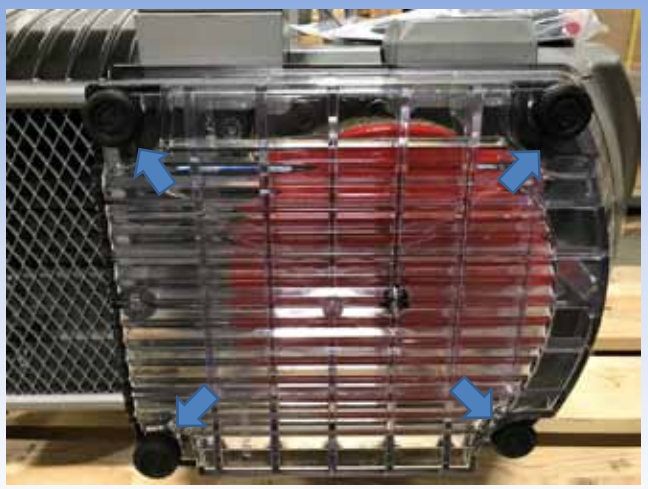
Author: Mike Ruff
Becker Pumps Corp.

GREASING PROCEDURE

BECKER

Author: Mike Ruff
Becker Pumps Corp.

Remove the filter cover by loosening the black hand knobs.



BECKER

Author: Mike Ruff
Becker Pumps Corp.

Remove the internal filter and replace if needed.

Grease fittings are found next to the filter.
(Remove the red caps.)

BECKER

Author: Mike Ruff
Becker Pumps Corp.

Remove the black cap from the grease gun

BECKER

Author: Mike Ruff
Becker Pumps Corp.

Prime all new grease guns by placing them at an angle against a hard surface.

Pump a few times until the grease is visible at the tip.

BECKER

Author: Mike Ruff
Becker Pumps Corp.

Place the grease gun against the push fitting

Pump 10x into each bearing

(New or dry bearings = 25 times per bearing)

BECKER

Author: Mike Ruff
Becker Pumps Corp.

Once the pump is ran, the grease will evenly distribute between the rollers and ball bearings.

BECKER

Author: Mike Ruff
Becker Pumps Corp.

Techno CNC Systems, LLC., Terms and Conditions For Limited Warranty and Repairs Warranty

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All Techno CNC Systems, LLC., mechanical components are warranted against manufacturer's defects in material and workmanship for a period of one (1) year from the time of shipment from Techno CNC Systems, LLC., facilities. All Techno CNC Systems, LLC., electrical components are similarly warranted for a period of one (1) year from the time of shipment from Techno CNC Systems, LLC., facilities. Techno CNC Systems, LLC.,'s sole obligation under this warranty is limited to repairing the product or, at its option, replacing the product without additional charge, provided the item is properly returned to Techno CNC Systems, LLC., for repair as described below. The provisions of this warranty shall not apply to any product that has been subjected to tampering, abuse, improper setup or operating conditions, misuse, lack of proper maintenance, or unauthorized user adjustment. Techno CNC Systems, LLC., makes no warranty that its products are fit for any use or purpose to which they may be put by the customer, whether or not such use or purpose has been disclosed to Techno CNC Systems, LLC., in specifications or drawings previously or subsequently provided, and whether or not Techno CNC Systems, LLC.,'s products are specifically designed and/or manufactured for such a purpose. NOTE: Drive motors (servo or stepper) are considered "mechanical components".

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. ALL OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHETHER EXPRESSED, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING, ARE HEREBY DISCLAIMED. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

LIMITATION OF REMEDY
In no event shall Techno CNC Systems, LLC., be liable for any incidental, consequential, or special damages of any kind or nature whatsoever. Techno CNC Systems, LLC., is in no way liable for any lost profits arising from or connected to this agreement or items sold under this agreement, whether alleged to arise from breach of contract, expressed or implied warranty, or in tort, including, without limitation, negligence, failure to warn, or strict liability.

RETURN PROCEDURE
Before returning any equipment in or out of warranty, the customer must first obtain a return authorization number and packing instructions from Techno CNC Systems, LLC.,. No claim will be allowed nor credit given for products returned without such authorization. Proper packaging and insurance for transportation is solely the customer's responsibility. After approval from Techno CNC Systems, LLC., the product should be returned with a statement of the problem and transportation prepaid. If, upon examination, warranted defects exist, the product will be repaired or replaced at no charge, and shipped prepaid back to the customer. Return shipment will be by common carrier (i.e., UPS). If rapid delivery is requested by customer, then such transport is at the customer's expense. If an out-of-warranty situation exists, the customer will be notified of the repair costs immediately. At such time, the customer must issue a purchase order to cover the cost of the repair or authorize the product to be shipped back as is, at the customer's expense. In any case, a restocking charge of 20% will be charged on all items returned to stock.

FIELD SERVICE
Repairs are ordinarily done at Techno CNC Systems, LLC.,'s Ronkonkoma, New York facility, where all necessary instrumentation is available. This instrumentation is difficult to transport, so field service is severely limited, and will only be supplied at Techno CNC Systems, LLC.,'s discretion. If field service is required and is performed at Techno CNC Systems, LLC.,'s sole discretion, all relevant expenses, including transportation, travel time, subsistence costs, and the prevailing cost per hour (eight hour minimum) are the responsibility of the customer.

UNFORESEEN CIRCUMSTANCES
Techno CNC Systems, LLC., is not liable for delay or failure to perform any obligations hereunder by reason of circumstances beyond its reasonable control. These circumstances include, but are not limited to, accidents, acts of God, strikes or labor disputes, laws, rules, or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials, and any other event beyond Techno CNC Systems, LLC.,'s control.

ENTIRE AGREEMENT/GOVERNING LAW
The terms and conditions contained herein shall constitute the entire agreement concerning the terms and conditions for the limited warranty described hereunder. No oral or other representations are in effect. This Agreement shall be governed in all respects by the laws of New York State. No legal action may be taken by any party more than one (1) year after the date of purchase.

TECHNO CNC SYSTEMS, LLC., RESERVES THE RIGHT TO CHANGE DESIGNS, SPECIFICATIONS, PRICES, AND ANY APPLICABLE DOCUMENTATION WITHOUT PRIOR NOTICE.