NOVA

Vulcan DVR

Engineering Drill Press™

OPERATION MANUAL



Teknatool INTERNATIONAL

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Models:
83800 – USA
83801 – Canada
83802 – NZ/Australia
83803 – Europe
83804 – UK
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GENERAL SAFETY RULES



WARNING! Failure to follow these rules may result in serious personal injury or death.

IMPORTANT: Before switching the drill press on, ALWAYS check the machine for the correct setting and speed, as well as ensuring the Chuck Key is removed.

1. **FOR YOUR OWN SAFETY, READ THE MANUAL BEFORE OPERATING THE TOOL.** Learn the machine's application and limitations, plus the specific hazards particular to it.
2. **ALWAYS USE A FULL FACE SHIELD-Strongly recommended** (must be ANSI approved) Everyday eyeglasses usually are only impact resistant and safety glasses only protect eyes. A full face shield will proteulacanct the eyes and face. Also use face or dust mask if cutting operation is dusty.
3. **WEAR PROPER APPAREL.** Do not wear loose clothing, gloves, neckties, rings, bracelets or other jewelry which may get caught in moving parts. Non slip footwear is recommended. Wear protective hair covering to contain long hair.
4. **USE EAR PROTECTORS.** Use ear muffs for extended period of operation. Use muffs rated to 103 DBA LEQ (8 hour).
5. **DON'T USE IN DANGEROUS ENVIRONMENT.** Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted. The NOVA Vulcan DVR Drill press is intended for indoor use only. Failure to do so may void the warranty.
6. **KEEP WORK AREA CLEAN.** Cluttered areas and benches invite accidents. Build-up of sawdust is a fire hazard.
7. **KEEP CHILDREN AND VISITORS AWAY.** The Nova Vulcan DVR is **not recommended** for children and infirm persons. Such personnel and onlookers should be kept a safe distance from work area.
8. **MAKE WORKSHOP CHILDPROOF** with locks, master switches, or by removing starter keys.
9. **GROUND ALL TOOLS.** If the tool is equipped with a three-prong plug, it should be plugged into a three-hole electrical receptacle. If an adapter is used to accommodate a two-prong receptacle, the adapter plug must be attached to a known ground. Never remove the third prong.
10. **MAKE SURE TOOL IS DISCONNECTED FROM POWER SUPPLY** while the motor is being mounted, connected, or reconnected.
11. **DISCONNECT TOOLS FROM WALL SOCKET** before servicing and when changing accessories such as bits, cutters and fuses etc.
12. **AVOID ACCIDENTAL STARTING.** Make sure switch is in the "Off" position before plugging in power cord.
13. **NEVER LEAVE MACHINE RUNNING UNATTENDED.** Do not leave machine unless it is turned off and has come to a complete stop.
14. **KEEP GUARDS IN PLACE** and in working order.
15. **USE CORRECT TOOLS.** Do not use a tool or attachment to do a job for which it was not designed.
16. **USE RECOMMENDED ACCESSORIES.** The use of improper accessories may cause hazards.
17. **DON'T FORCE THE TOOL.** It will do the job better and be safer at the rate for which it was designed.
18. **MAINTAIN TOOLS IN TOP CONDITION.** Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
19. **NEVER STAND ON TOOL.** Serious injury could occur if the tool is tipped or if the cutting tool is accidentally contacted.
20. **REMOVE ADJUSTING KEYS AND WRENCHES.** Form a habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.
21. **DON'T OVERREACH.** Keep proper footing and balance at all times.
22. **DIRECTION OF FEED.** Feed work into a blade or cutter against the direction of rotation of the blade or cutter only.
23. **PAY ATTENTION TO WORK.** Concentrate on your work. If you become tired or frustrated, leave it for a while and rest.
24. **SECURE WORK.** Use clamps or a vice to hold work when practical. Severe injury or death can occur if an object comes free as it can become a dangerous projectile.
25. **CHECK DAMAGED PARTS.** Before further use of the tool, any part that is damaged should be carefully checked to ensure that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, mounting, and any other conditions that may affect its operation. Any damaged part should be properly repaired or replaced.
26. **DRUGS, ALCOHOL, MEDICATION.** Do not operate machine while under the influence of drugs, alcohol, or any medication.
27. **DUST WARNING.** The dust generated by certain woods and wood products can be harmful to your health. Always operate machinery in well-ventilated areas and provide means for proper dust removal. Use wood dust collection systems whenever possible.
28. **DO NOT MODIFY OR USE DRILL PRESS FOR USES OTHER THAN FOR WHICH IT WAS DESIGNED.**

ADDITIONAL SAFETY RULES FOR DRILL PRESSES

WARNING! Failure to follow these rules may result in serious personal injury.

1. **SEEK INSTRUCTION.** If you are not thoroughly familiar with the operation of drill press, obtain advice from your supervisor, instructor, or other qualified person. Instruction from a qualified person is strongly recommended.
2. **DO NOT OPERATE DRILL PRESS** until it is completely assembled and installed. Follow instructions and recommendations.
3. **FOLLOW ELECTRICAL CODES.** Make sure wiring codes and recommended electrical connections are followed and that the machine is properly grounded.
4. **WHEN REPLACING THE FUSE** (on relevant models), completely isolate power when removing the fuse. It is imperative the plug is removed from the power supply before the fuse is removed. Replace fuse cap before reconnecting to power.
5. **DO NOT OPEN THE SWITCH AND REAR COVERS**. Components can carry dangerous voltages even when isolated from mains power.
6. **KEEP WORK AREA CLEAN.** Do not turn the drill press on before clearing the drill press of all objects (tools, scraps of wood, etc.). Keep the nearby area and floor clear of debris.
7. **CHECK SET-UP** with spindle off. Examine the set-up carefully and rotate the work piece by hand to check clearance and check speed is correctly selected before turning on spindle.
8. **DO NOT MAKE ADJUSTMENTS** when the drill press spindle is turning. Make all adjustments with power OFF.
9. **TIGHTEN ALL CLAMP HANDLES** on the drill press before operating drill press.
10. **ALWAYS CHECK CORRECT SPEED IS SELECTED BEFORE SWITCHING ON DRILL PRESS.**
11. **OPERATE AT RECOMMENDED SPEED.** Always operate the drill press at the recommended speeds. Consult the built in speed chart on the drill press for suggested speeds.
12. **DO NOT OPERATE DRILL PRESS IF DAMAGED OR FAULTY.** If any part of your drill press is missing, damaged or broken, in any way, or any electrical component fails, shut off the drill press and disconnect the drill press from the power supply. Replace missing, damaged, or failed parts before resuming operation.
13. **ADDITIONAL SAFETY INFORMATION** regarding the safe and proper operation of this product is available from the National Safety Council, 444 N. Michigan Avenue, Chicago, IL 60611 in the Accident Prevention Manual of Industrial Operations and also in the Safety Data Sheets provided by the NSC. Also refer to the American National Standards Institute ANSI 01.1 Safety Requirements for Woodworking Machines and the U.S Department of Labor OSHA 1910.213 Regulation.

INVENTORY

Use **Figure 1** and the inventory list below to inventory your drill press parts:

No	SKU	Description	Qty
1	8338055	Headstock Assembly	1
2	8338028	Column	1
3	8338025	Base	1
4		Table	1
5	8338054	Table Support Assembly	1
6	8338036	Handle Arm	1
7	8338032	Lock Handle	2
8	8338009	Down feed Handle	3
9	AK3, AK4, AK5, AK6	3mm, 4mm, 5mm and 6mm Allen keys	4
10	8338037	Handle	1
11	8338048	17mm/10mm/27mm open and close end wrench	1
12	8338049	Chuck drift	1
13	8338051	Drill Chuck	1
14	8338052	Chuck Key	1
15		MT3 Arbor	1
16	55407	Firmware Upgrade Cable	1
17		ER 32 Collet Nut	1
18		ER32 Collet	1
19		Coolant hose	1
20		Hose Connector 3/8”	1
21		ER32 Collet Spanner	1

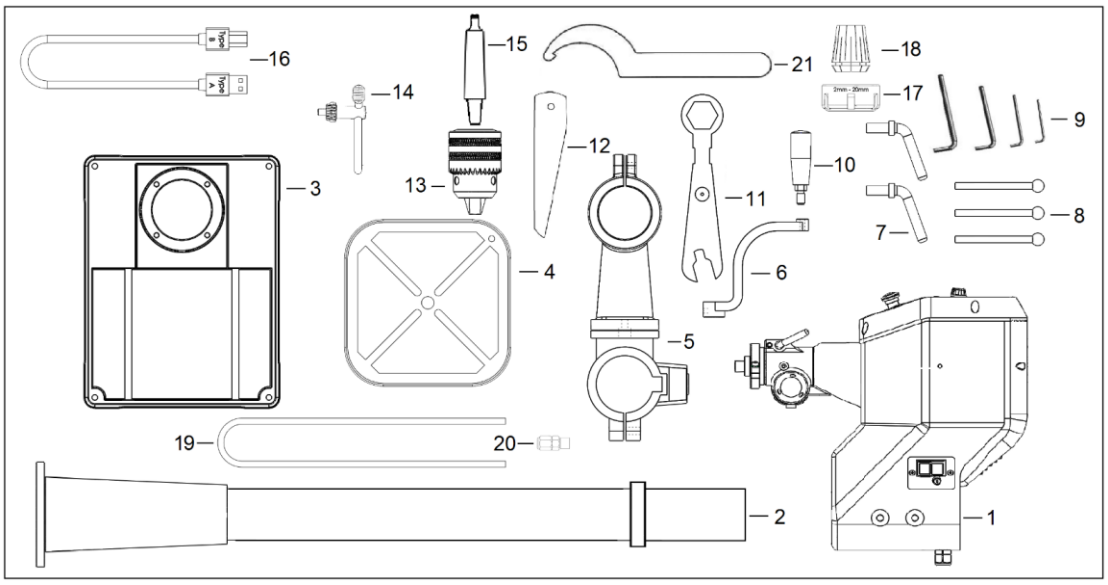


Figure 1 - Vulcan Drill press box inventory

DVR MOTOR AND CONTROLLER

Overview

The DVR Motor drive is a unique type of motor and controller where the motor and controller interact. The motor provides data to the controller on its position and load conditions. The controller uses this data to handle all the timing and power management to ensure an energy efficient and powerful motor.

The DVR integrated motor drive system contains four main parts, the DVR Motor (stator and rotor built into the headstock), the Rotor Position Sensor (RPS), the drive control board and the human-machine interface (HMI). The control board, RPS and HMI make up the electronic control system of the drive. The control board receives the commands from the user through the keypad and the HMI board, and it provides useful feedback information to the user such as the running speed and load on the motor. The information is displayed to the user via the LCD display.

DVR MOTOR Specifications and Features

- **Type of motor:** Switched Reluctance Motor
- **Rated power output:** 1250 W, 1.75 HP
- **Speed range:** 50 – 5500 rpm
- **Default Speed:** 900 rpm
- **Rotation direction:** Bidirectional (FWD & REV)
- **Power supply range:** 115 V – 240 V, 50 Hz – 60 Hz
- **Power Factor:** PF ≥ 0.95
- **Speed controller:** PI speed regulation with adaptive control coefficients
- **Three pre-set PI coefficient curves:** Soft, Normal and Hard
- Work piece inertia measurement for PI speed controller adaptive control
- Torque and speed ramp functions
- Overload protection
- Under voltage protection
- Control board over-heat protection

NOVA VULCAN Specifications and Features

- **Overall Height:** 70 5/8” (1794 mm)
- **Overall Base Width:** 17 5/8” (448 mm)
- **Overall Base Depth:** 22 3/4” (578 mm)
- **Spindle to Table Min Distance:** 4 3/4” (119 mm)
- **Spindle to Table Max Distance:** 27” (688 mm)
- **Spindle to Base:** 46 2/3” (1184 mm)
- Class F Winding Insulation. Industrial spec for long life
- **Swing:** 18”
- **Spindle Travel:** 6”
- **Number of Spindle Speeds:** Variable
- **Speed Range:** 50-3000rpm is default (option in settings to increase to 5500rpm)
- **Spindle Taper:** MT-3 & ER32
- **Table Size (Metal working)(L x W):** 13 3/5" x 13 3/5” (345mm x 345mm)
- **Table Tilt (Deg.):** -45° to +45°
- **Table Rotation (Deg.):** 360°
- **Chuck Size:** 5/8” (1-16mm)
- **Column Diameter:** 3.62” (92mm)
- **Base Size (L x W):** 22 1/4” x 17 1/2" (565mm x 445mm)

SETTING UP YOUR WORKSHOP

Workshop Requirements

Consideration	*Recommendation*
Drill Press location	Locate the NOVA Vulcan DVR Drill Press close to a power source in an area with good lighting. Leave enough clearance on all sides of the drill press, and be sure to allow for clearance when the table is swiveled. Other machines in your shop should not interfere with the operation of the drill press.
Lighting	Your shop should have adequate lighting. The work area of the drill press should be well lit; there should not be shadows cast on your work. If possible, locate near a window. A portable spotlight may be helpful.
Electrical	The NOVA Vulcan DVR Drill Press requires the appropriate power outlet nearby to power the motor. Wiring and outlets should adhere to local electrical codes. If in doubt, seek advice from an electrician. Minimize use of extension cords. See "Connecting to Power" section for extension cord and surge protector requirements.
Ventilation	Your shop should be adequately ventilated. The degree of ventilation needed will vary based on the size of the shop and the amount of work done. The use of dust collectors and filters will minimize risks to your health.

ASSEMBLING THE NOVA VULCAN DVR DRILL PRESS

WARNING! Seek help when moving the NOVA Vulcan DVR Drill Press and its heavier components to help avoid risk of injury. Read and understand the contents of this manual and recommended procedures before attempting to assemble or operate the drill press or its parts.
DO NOT CONNECT POWER ON DRILL PRESS UNTIL FULLY ASSEMBLED.

Unpacking and Preparing the Drill Press

1. Open shipping container, remove all components and set aside shipping materials. Keep all materials until drill press is assembled and ensured to be operational.
2. Arrange all components on the ground to prepare for order of assembly from bottom to top of drill press, making sure to use a protective layer to prevent the press from scratches and other damage.

Assembling the Column to the Base

3. Place the base in the desired location of the drill press, making sure to put it on a level floor. It can be secured to the floor with lag screws (not provided) through the four corner holes in the base.
   NOTE: Do not use a mobile base with this machine.
4. Align the column holes with those in the base, and thread the 4 included hex cap bolts onto the base with a 17mm wrench. Tighten firmly.

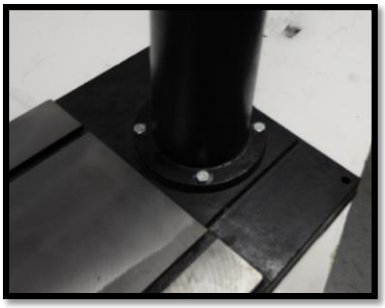


Figure 2 - The assembled column on the base

Mounting the Table Bracket and Rack

5. Insert the shaft of the worm gear through the table bracket from the inside as shown below, while mating the worm gear threads with the preinstalled gear. Make sure to insert fully so the maximum shaft is exposed for later steps.
6. Insert the rack into the table bracket as shown below, mating the rack teeth with the worm gear. Pay attention to the teeth angle with respect to the table bracket orientation. Position the bracket partway on the rack.

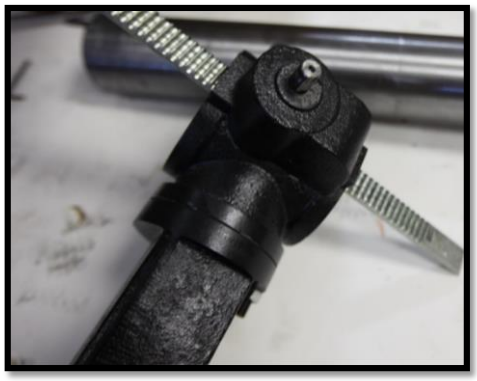


Figure 3 - Mounting the table bracket and rack 1/2

7. Slide the rack and bracket assembly down over the column and insert the bottom of the rack into the mating groove in the sleeve on the bottom of the column.
8. Slide the top collar down and over the rack, ensuring that the grooved end of the collar is on the bottom to properly guide the rack around the column (see below). Tighten set screw to secure in place.



Figure 4 - Mounting the table bracket and rack 2/2

Mounting the Headstock

Caution! Be sure to use proper lifting technique to avoid injury or damage to the drill press. Be sure to plan the method of attaching the headstock to the column before lifting. Only lift the headstock by the casting to avoid damaging more fragile components. Applying lubrication to the column will ease the installation.

9. Slide the headstock down over the column, take care to align the sides of the headstock with the sides of the base. Tighten set screws to secure in place.



Figure 5 - Mounting the headstock

Final Assembly Steps

10. Attach Table Vertical Adjustment Lever to the lifting mechanism, making sure set screw is fully tightened to flat spot on shaft.
11. Lock the table bracket handle (lock handle behind the column) and insert the table into the table bracket.
12. Loosen the table release set screw to allow proper locking against table rotation.

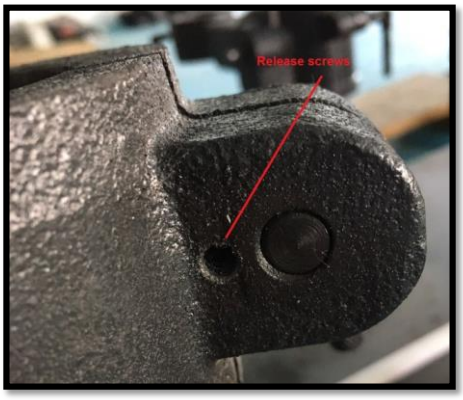


Figure 6 – Table release set screw

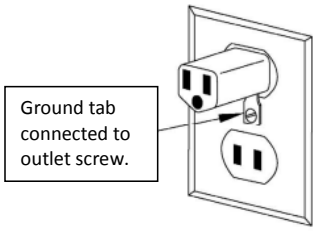
13. Install the 3 handles for raising and lowering the quill assembly.
    Note: Do Not Over Tighten.

Connecting to Power

WARNING! Improper connection of the motor can result in a risk of electrical shock.

1. The supplied power cord will have a three-prong plug with a grounding prong. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with local electrical codes.

    - **FOR 115V ONLY:** A temporary adapter can be used to plug into a two-pole outlet if a three-prong outlet is unavailable. The ground tab on the adapter must be connected to the screw on the outlet for proper grounding. This adaptor should only be used until a qualified electrician can install a properly grounded outlet.



If it is necessary to use an extension cord, the cord should be grounded and in good condition. Use an extension cord with a gauge heavy enough to avoid power loss and over-heating, and it is not recommended to use a long extension cord.

NOTE: Ground Fault Interrupters (GFI's) are generally not compatible with Variable speed motors. If you wish to use a GFI or RCD, select a unit that is confirmed for use with a Variable speed motor using capacitor charge.

IMPORTANT: A Surge Protection Device must be used, rated to at least 15 amps (for 115V countries, USA and Canada) or 10 or 15 amps (230V countries). This is to protect the DVR motors electronics from electrical spikes or surges.

USING THE NOVA VULCAN DVR DRILL PRESS



Figure 7 - Front view of headstock

Vulcan Operation Basics

NOTE: *For more a more in-depth description on the DVR Drive setup, settings, and features, please refer to section "Running the Drill Press" in this manual.*

When the NOVA Vulcan DVR Drill Press has just been powered up, the product name and logo will be displayed on the LCD, followed by warning messages.

Height Sensor Calibration

The first time the drill press is turned on, the drill press will prompt the user to calibrate the height sensor. To calibrate the sensor, follow the on-screen prompts and *make sure to carefully position the quill height at a consistent spot for each inch interval*. If the consistency of marking each inch isn't accurate enough, the calibration will have to be redone.



The default home screen will show as follows:

Default Run Speed (Fav. Speed #2D)
Depth displays current vertical position of the quill
Set Depth will display the current User Set Depth (blank when off)
Rev will be displayed at top right only when running in reverse
Load % shows the current load on the motor

Key	***Description***
ON	Start key / Reset value in select menus
OFF	Stop key / Return to main screen from menu
Menu/Cancel	Open menu / Back one level in menu / Cancel
Zero/Confirm	Set new zero location / Menu confirm

F1	Favorite Speed #1 / Scroll up in menu / Custom function
F2	Favorite Speed #2D / Scroll down in menu / Custom function **Note:** #2D is the default start up speed
F3	Favorite Speed #3 / Custom function
F4	Favorite Speed #4 / Custom function

1. **GREEN ON** – Press to start drill press at the current set speed – always check that the speed has been selected correctly. When the computer is first switched on it is set at a default speed of #2D (900 rpm by default). Remember that whenever the computer is switched off at the wall or at the incoming power supply switch, the computer will restart at the default setting. The spindle cannot restart until "ON" button is depressed.

   Ensure that the work piece is secure and the appropriate speed is selected before starting drilling. When the ON button is pressed, the screen will display the set speed and direction for 2 seconds before switching to the current running speed.

2. **RED OFF KEY**. Pressing this key will stop spindle rotation and reset the HMI (Human Machine Interface).

   The ON / OFF keys in the above panel only switch the motor on and off. The selected speed will remain until adjusted or until the computer is switched off.

3. **RPM KNOB**. Rotate the knob clockwise to increase speed and rotate the knob counter-clockwise to decrease speed. The speed can be adjusted with the drill press running or stopped.

Speed Dial Action	***Description***
Short Press	(Menu Confirm)
Turn Clockwise	Increase Speed - Coarse Adjustment / (Menu Scroll Down)
Turn Counter-Clockwise	Decrease Speed - Coarse Adjustment / (Menu Scroll Up)
Press and Hold In + Turn Clockwise	Increase Speed - Fine Adjustment
Press and Hold In + Turn Counter-Clockwise	Decrease Speed - Fine Adjustment

The speed is programmed to change with coarse and fine adjustments in increments shown in the following table:

Speed Range (rpm)	*Fine Adjustment*	*Coarse Adjustment*
Less than 200	5 rpm	20 rpm
200 – 499	5 rpm	50 rpm
500 – 999	5 rpm	100 rpm
1000 – 2999	10 rpm	200 rpm
3000 and over	20 rpm	500 rpm

4. **ZERO/CONFIRM KEY**. Pressing this key will set the current drill height as zero, and also will confirm selections in menus or on screen prompts.
5. **MENU/CANCEL KEY**. Pressing the Menu key will bring up the user interface menu where the user is able to view and modify settings on the drill press. For more information on the menu system, see the "User Interface Menu" section. Pressing this key will also return one level back in the menu.
6. **F1 to F4 KEYS**. The F1 to F4 keys can be used to set the target speed to favorite speed #1 to #4 respectively. They can also be set in the menu to perform other functions. Changes to frequently used settings can be made very easily with this feature. This can be achieved by going to the Menu > Edit F Shortcuts and select the desired function from the list.

Auto safety -- If the power is lost to the machine, when power is restored the computer will reboot but the machine will not start until the 'ON' switch is pressed. Remember to correctly select speed if different from Default speed.

WARNING! Do not push several keys together as special coded combinations of keys open diagnostic and service functions. Some of these disable control and protection functions. If an unfamiliar screen is displayed, switch off the computer and leave for one minute before rebooting.

NOTE: If the machine hasn't been used for some period (over one month) it is helpful to switch the power to the unit on 30 – 60 minutes before use.

Mounting and Using the 3MT Keyed Chuck

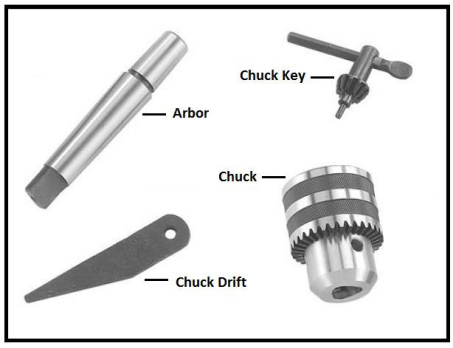


Figure 8 - Chuck components

1. Before mounting the chuck, be sure to fully clean the 3MT tapered of arbor without lubrication or debris.



Figure 9 - Seating arbor into drill chuck (left) & Seating arbor and chuck into spindle (right)

2. Slide the arbor into the spindle socket while slowly rotating the drill chuck. The Seating arbor into the drill chuck (left) shown in **Figure 9**.
3. Insert the arbor and the chuck into the spindle until it stops.
4. If the arbor and the chuck do not fully insert: while applying light upward force, rotate the chuck until it aligns and inserts fully into the spindle.
5. With the chuck jaws fully retracted, arbor and chuck upward with a hammer on a wood block or a soft hammer to fully seat the arbor and the chuck. The Seating arbor and chuck into spindle (right) shown in **Figure 8**.

Caution! DO NOT use a steel hammer on the drill chuck to seat the arbor into the spindle. You will damage the chuck and/or spindle, which may make them unusable or unsafe.

Mounting and Using the ER 32 Collet



1. Angling the collet up into the nut and pushing it past the extractor ring until the entire top portion of the collet is above the ring.

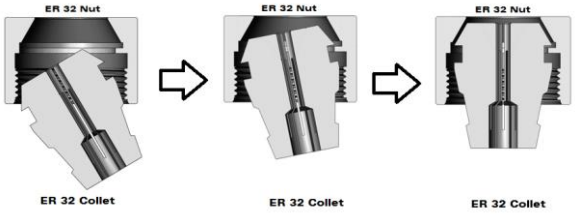
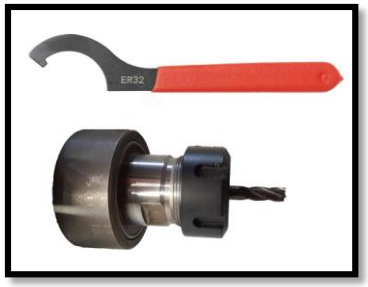


Figure 10 Seating the Collet into the Nut.

2. Push on the bottom of the collet until the collet completely enters, and lines up with, the nut. As the collet moves into proper alignment, you will hear and feel a distinct click, indicating that the top of the collet is safely secured above the extractor ring. The Seating Collet into the Nut shown in **Figure 10.**



3. The ER nut / collet assembly can now be screwed onto the spindle, loaded PreciseBits and tighten up the nut with ER spanner.



Positioning the Table

The table height and rotational position can be adjusted using the handle on the column:

1. Loosen the locking handle on the rear of the table bracket.
   NOTE: It is important to unlock this handle before adjusting the table
2. Rotate the crank handle attached to the rack to raise/lower the table to desired height.
3. Swing the table about the column to the desired position.
4. Retighten the locking handle, and ensure table is securely locked in place before drilling.

Tilting the Table

To tilt the table:

1. Loosen the bolt underneath the table using included 27mm closed end wrench.
2. Loosen set screw underneath the previous bolt using 5mm Allen key.
3. Tilt table to desired angle.
4. Retighten bolt and set screw, and ensure table is securely locked in place before drilling.

Quill Lock

For Drilling purpose

1. To lock the quill at a certain depth, pull the quill lever down to the desired level and turn the quill lock handle clockwise and tighten firmly.

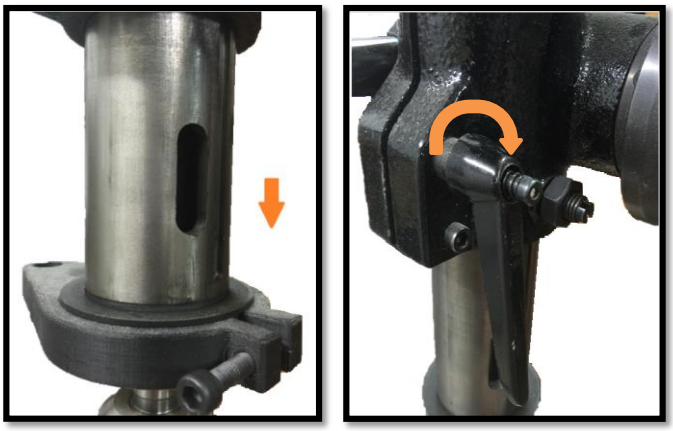


Figure 11 - Quill lock

2. If the quill lock handle is not fully tightened when it reaches its limit:
   a. Pull the handle out along the screw so it freely rotates
   b. Rotate back counter-clockwise
   c. Set handle fully back down in place on screw
   d. Tighten further until snug and quill is locked in place

For Milling purpose

1. To lock the quill at a certain depth, pull the quill lever down to the desired level.
2. Rotate back (Loosen) the griping control bolt to increase the grip force on the Quill.
3. Turn the quill lock handle clockwise and tighten firmly.

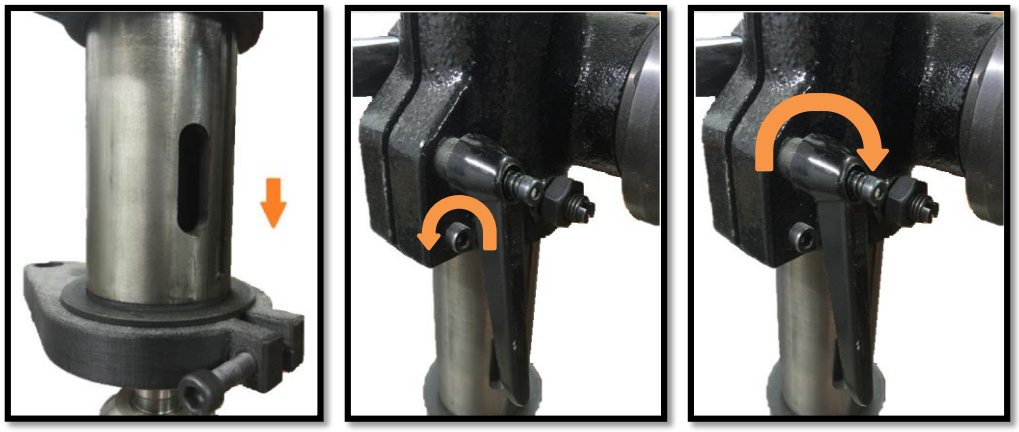


Figure 12 Quill lock

4. If the quill lock handle is not fully tightened when it reaches its limit:
    a. Pull the handle out along the screw so it freely rotates
    b. Rotate back counter-clockwise
    c. Set handle fully back down in place on screw
    d. Tighten further until snug and quill is locked in place

Using the Mechanical Depth Stop

1. Press the button on the front of the quick release nut to quickly change the height of the nut.
2. For fine adjustment of the height, the nut can be rotated along the threads.

HMI (HUMAN MACHINE INTERFACE) LAYOUT



Running the Drill press

Once in idle mode, the LCD will display the information such as the set speed, current run speed, direction and current depth, depending on the settings.
When the HMI displays that the drill press is ready to run, press the **<ON>** key to start the motor.
The **<OFF>** key can be used to stop the motor and reset the HMI into the idle mode.
To set a new zero *"Depth"* position for the drill press, press the **<Zero/Confirm>** key.
The electronic *"Set Depth"* can be accessed in the menu to set the drilling depth; press the **<Menu/Cancel>** button to access this "User Set Depth" setting in the menu and more.

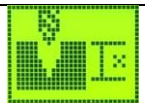
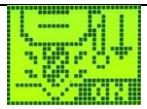
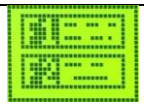
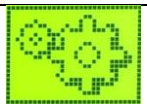
User Interface Menu

The HMI has been programmed with a user interface menu. The menu can be used to configure and view the parameters of the drill press. The user can access the HMI Menu by pressing the **<MENU>** key when the motor is idle or running.

Navigating the Menu

- To cancel or exit the menu, the user can press the **<MENU/Cancel>** key until the HMI returns to the main idle screen.
- To select an item in menu, press the **<ZERO/Confirm>** key.
- To move the cursor **UP** the operator must turn the **Speed Dial counter-clockwise** OR press the **<F1>** key.
- Similarly, to move the cursor **DOWN** the operator must turn the **Speed Dial clockwise** OR press the **<F2>** key.

Menu List

 Speed Chart	 User Set Depth	 Self-Start	 Advanced Modes
 Edit F Shortcuts	 Edit Favorite Speeds	 FWD/REV	 Configuration

Speed Chart

The NOVA Vulcan DVR Drill Press includes a built-in speed guide for drilling. The main benefit of the speed chart is the ability to input the type of drill bit, the drill bit size, and the work piece material, and the drill press will then set the speed to the recommended value.

NOTE: The speed chart is available in both metric and imperial units. This option can be changed in Configuration>Drill Settings.

To use the speed chart:

1. Go to the **Menu > Speed Chart**.
2. Select the type of drill bit.
3. Select the drill bit size.
4. Select the work piece material.
5. Confirm the new set speed.
6. The display will return to the default screen with the new speed selected.

NOTE: The speed chart is only used to give an approximate of the speed that should be used. The actual drilling speed should be selected based on the experience of the operator.

User Set Depth

The "User Set Depth" feature allows the user to quickly set the drilling depth. This is essentially an electronic depth stop that will give warning beeps when approaching the set depth and stop the motor when the depth has been reached.

Comment [S1]: The stop and reverse function was causing issues before, so it was removed, we may look to implement it later via software upgrade.

To activate the User Set Depth feature, simply select the feature in the menu and set a depth to drill. The drilling depth can be set using the **<F1>/<F2>** keys or Speed Dial. Pressing **<ON>** will reset the value to OFF. Press the **<Zero/Confirm>** button to save the depth selection and return to the main screen, or press **<Menu>** to cancel any changes. For blind holes of a certain depth, it is recommended that the drill bit "Depth" is set to Zero on the surface of the workpiece.

When the "User Set Depth" is activated, the current set depth will show on the main screen. When the feature is disabled, the value will be blank. When drilling to the set depth, the machine will start beeping at 0.5" (or 10mm in Metric mode), and the beeping will become more rapid as the drill gets closer to the set depth. The motor will finally turn off once the set depth has been reached and the machine will revert to idle.

To turn off the "User Set Depth", press the **<ON>** button followed by the **<Zero/Confirm>** button.

Self-Start

The “Self-Start” feature enables a one-handed drilling operation by automatically turning the motor on and off at pre-determined start depths. The motor will start running at 0.29”/7mm and stop once it returns to 0.24”/6mm.

For reference, the programming includes the following characteristics:

a. After this feature has been turned on, the handle must be raised to the top of the quill stroke before the first "self-start" can begin.
b. If the user is in the menu while the machine is idle, the self-start will not START, but it will STOP if the machine is running with the quill extended, the feature is activated, and the handle is raised to the stop point.
c. By default, the safety feature including warning sounds and a delay before the motor self-starts is turned OFF. This setting can be accessed through the following menu path: **Menu>Configuration>Drill Settings>Sounds/Warnings**.

Comment [S2]: Bolded

Advanced Modes

Pilot Hole

The “Pilot Hole” feature enables the user to skip the separate operation of drilling a pilot hole (in most cases) for locating a larger drill bit. Using this feature, the machine will begin drilling at a slower speed, and once the bit is seated and grabs enough material, the machine will sense this and ramp up to the set run speed. The machine determines this by sensing the load placed on the motor and responding when load threshold (this value is determined by the selected material) has been reached.

To enable the “Pilot Hole” feature, simply toggle “Slow Start” to ON, set the start speed (250 by default), and select Other/Metal/Wood. Metal will set the load threshold the highest, followed by Wood and then Other requires the smallest increase in load to ramp up.

Comment [S3]: The customers can choose from a predefined list of materials to simplify the user interface

IMPORTANT: Once the drill begins running after “Pilot Hole” is turned on, the display will first show “Pilot Initialize” at the bottom and then change to “Pilot Ready” when fully initialized. **Allow the machine to reach the pilot speed and fully initialize before drilling**. If drilling begins prematurely, the load sensing will not calculate correctly, and the drill likely will not ramp up to full speed at the appropriate time.

Tapping Mode

The tapping feature has two options for programmed cycles for tapping. Both modes require the user to manually feed the tap during tapping and should only be used when starting the drill in the Forward direction.

1. **Load Sense** – This mode will use the load sensor to determine when it has started tapping and enter a chip breaking cycle. This cycle uses the load sensor to determine when the drill needs to switch to reverse to chip break for a fixed amount of time, and then returns to forward to tap again. This repeats until the drill press senses the tapping is complete via the load **OR** if the user presses the **<ON>** button.

   NOTE: Recommended for through-hole tapping only.

2. **Chip Breaker** – This mode will use the load sensor to determine when it has started tapping and enter a chip breaking cycle. This cycle uses a fixed amount of time before switching to reverse to chip break for a fixed amount of time, and then it returns to forward to tap again. This repeats until the drill press senses the tapping is complete via the load **OR** if the user presses the **<ON>** button.

   NOTE: The tapping function is recommended for 5/16" (or M8) taps and above. The smaller sized taps may break under high torque from the motor therefore the user should take care when using the tapping mode on smaller sized taps.

Edit F Shortcuts

The **<F1>** to **<F4>** keys can be used to quickly modify a large variety of settings while the motor is idle or running. To set the alternate functions, go to **Menu > Edit F Shortcut.** There it will show the current functions for each button. Selecting one of these list items will open up the list of settings available for each F button. These custom F button functions will be stored permanently in the memory until a factory reset is performed.

Edit Favorite Speeds

The favorite speed function has traditionally been a feature in the DVR motors. The favorite speeds allow the user to quickly switch between a set of predefined or user defined speeds. The favorite speeds can be accessed by pressing the **<F1> to <F4>** keys to select Fav. Speed #1 to #4 respectively.

The predefined favorite speed values are listed below:

Key	*Favorite Speed #*	*Speed (rpm)*
<F1>	#1	250
<F2>	#2D (Default)	900
<F3>	#3	1600
<F4>	#4	3000

To modify the preset values follow the steps below:

1. the user can go to **Menu > Edit Fav Speeds**
2. Select the favorite speed to modify
3. Modify the speed using the **<F1>/<F2>** keys or Speed Dial
4. **Press <Zero/Confirm>** to save the new speed
5. **Press <Zero/Confirm>** again to confirm the value and save to memory

NOTE: When confirming the new Favorite Speed value, the new speed is automatically saved to memory. This value will be stored permanently in the memory until a factory reset.

NOTE: When setting a new Favorite Speed #2D, this changes the default speed of the machine until a factory reset.

Direction: FWD/REV

This menu item strictly toggles the drill rotation direction between Forward and Reverse. The drill must be stopped in order to change directions.

Configuration

Drill Settings

- **Max Speed** – Here the maximum speed of the drill press can be toggled between 3000 and 5500 rpm (Default: 3000rpm)
- **Units** – This toggles the units of measurement between imperial and metric.
- **Calibrate Depth** – This is where the depth sensor can be calibrated or recalibrated.
- **Braking** – This toggles the powered assisted braking on/off. The braking function provides some power to the motor after the **<OFF>** button or emergency stop has been pressed. This can be used to help stop the spindle and reduce the free spinning time. It is important that the user does not press any buttons or try to use the HMI when the motor has the braking engaged. (Default: OFF)
- **Load Sensor** – This toggles various settings of the load sensor.
    - **Jam Detect** – This setting detects if the drill bit gets jammed and shuts off the motor. (Default: ON)
    - **Spike Detect** – This detects if the load on the motor spikes abnormally and shuts off the motor. (Default: ON)
    - **Spike Threshold** – This is the load threshold which constitutes a load spike.

- **Vibration Sensor** – This changes the vibration sensor sensitivity. The vibration sensor will automatically detect vibrations in the drill press and shut off if the safety threshold has been reached (e.g. if a workpiece has been caught and is spinning around). There are 4 sensitivity settings: DISABLED / LOW / MEDIUM / HIGH. (Default: Disabled)
- **Sounds/Warnings** – This toggles various sound settings.
- **Set Depth Reached** – List of actions for the user to select from on what to do once the set depth has been reached.

Motor Parameters

The DVR motor has built in motor characterizations (speed control profiles), each with slightly different PI controller coefficients and performance characteristics:

- SOFT - For light drilling. The controller will less aggressively add power to the motor to maintain speed
- NORMAL (default) - Suitable for most work and is the default setting
- HARD - For heavy drilling. The controller will more aggressively add power to the motor to maintain speed.

NOTE: The parameters Kprop and Kint cannot be saved into the EEPROM memory because it is based on the speed profile parameter.

Parameter	***Description***	***Default Value***
Profile	Motor speed control profile	Normal
Kprop / Kint	PI speed controller coefficients	Varies
V kprop / V kint	PI voltage controller coefficients	2000 / 9000
Vd DC Bus	Motor phase DC bus voltage	360v
T Heatsink	Temperature of the controller heatsink	-
T Threshold	Temperature threshold for current reduction	60ºC
Spd Err	Difference between SET and RUN speed	-

WARNING! Extreme changes to these parameters can result in undesirable and potentially unsafe motor behavior. Call the NOVA Customer Care Center if you have any questions on what effects your changes will make.

Set Password

This setting allows the drill press to be locked upon startup, requiring a password to access or run it. If the password is forgotten, performing a factory reset will clear the password.

Upgrade FW (Firmware)

The HMI plays an important role in the control and functionality of the NOVA Vulcan DVR Drill Press as the HMI firmware version controls the features and performance of the drill press. The firmware version of the HMI can be upgraded via USB cable accessory and a PC with internet access. Be sure to check www.teknatool.com periodically for firmware upgrades for your machine, which may

allow new features or software improvements that could enhance the performance of the drill press.
Email service@Teknatool.com for firmware update software and procedure.

Version Info

The current version of the HMI and the main control board can be displayed on the LCD screen.

Factory Reset

If the user is experiencing problems with the NOVA Vulcan DVR Drill Press, then it is advised for the user to perform a factory reset.

To perform a factory reset:

1. Press **<Menu>** key.
2. Select the Configuration menu item.
3. Select the Factory Reset menu item.
4. Press <**Confirm>**.
5. Turn off the power to the NOVA Vulcan DVR Drill Press. Wait for 5 minutes for the circuitry to completely discharge.
6. Turn the power on and the LCD should display “Warning! – EEPROM Reset”.
7. Turn off the power to the Drill press again and wait 5 minutes.
8. Power up the NOVA Vulcan DVR Drill Press again, and the default parameters will be restored to the firmware memory.

MAINTAINING THE VULCAN DRILL PRESS

 **WARNING!** Always isolate from power supply (unplug) before carrying out any maintenance

Interval	*Maintenance*
After each use	Clean the work area and drill press. Vacuum shavings and dust from the headstock, table, and base.
Monthly	Wax exposed cast iron parts with a good quality paste wax. Buff out the wax thoroughly.
	Check tightness of nuts and bolts.
	Clean all tapers to ensure a secure fit.
6 Months	Lubricate the gear and the rack in the table elevation mechanism and the splines (grooves) in the spindle with a #2 tube grease.
	Lubricate the teeth of the feed shaft assembly and quill shaft with one or two drops of light-weight oil.

Problem	***Possible Cause***	***Solution***
Excessive vibration.	1. Work piece is not secure or held tightly enough. 2. Drill press incorrectly bolted to base. 3. Non-stock stand or bench is not well constructed, too light, or not level on the floor. Make sure stand is solidly constructed. Use sandbags to weigh down the stand. 4. Drill piece is blunt or damaged. 5. Incorrect speed setting.	1. Check work piece mounting.
RP State Error	The optical sensors that give the spindle position feedback ('Rotor Position' State) are obscured, damaged or have been disconnected. Dust over a long period of time may have settled on the sensors.	First, spin the spindle by hand to create a draught through the sensors. Re-try the motor. If the error remains, with the power switched off and disconnected, remove the upper-rear guard and remove any wood dust with a vacuum cleaner. Avoid getting the nozzle too close to the electronics. After this step, dust may fall into the Headstock, so suck the dust out through the vent at the front of the Headstock under the spindle. Do this sequence a few times. Try blowing if available with Vacuum or Air gun. Replace guard.
Display screen shows **PFC Corrector <Flashing>**		The computer has built in voltage condition and temperature sensors. If this message appears, check the temperature of the lower section of the headstock. If it is very hot, switch off the master switch and leave the machine to cool down for a period. If the headstock is relatively cool, the computer may have detected an under and over voltage from the mains power. Switch off and try rebooting. The DVR has a high level of protection and is intelligently checking conditions all the time.

TEKNATOOL WARRANTY

Teknatool 5 Year Limited Warranty (2 year on electrical parts)

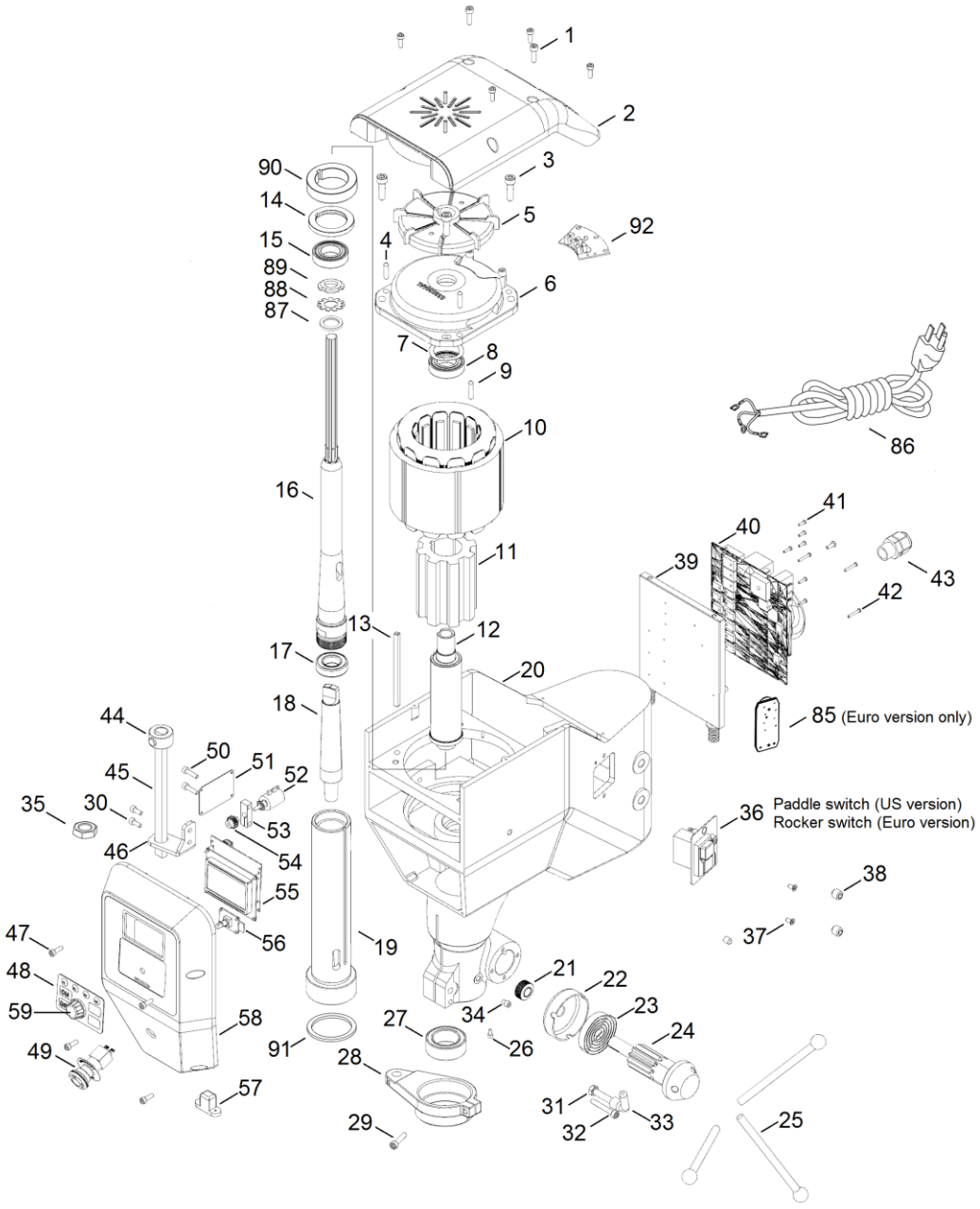
This Teknatool product is backed by a warranty from the date of purchase. Teknatool International Ltd will repair or replace, at its expense and option, this Teknatool product which in normal use has proven to be defective in workmanship or material, provided that the customer returns the product prepaid to an authorized Teknatool service center with proof of purchase of the product within TWO YEARS and provides Teknatool with reasonable opportunity to verify the alleged defect by inspection. Teknatool will pay return product by most cost effective surface transport to customer. Any special freight services above this will be at customer cost. Furthermore, Teknatool International Ltd. extends this two-year period for three additional years, excluding labor costs and electrical parts, provided the aforementioned conditions are met. All electrical parts and electronics are covered by a TWO YEAR warranty from the date of purchase.

Teknatool will not be responsible for any asserted defect, which has resulted from normal wear, misuse, abuse, power surges or excess voltage fluctuation, repair or alteration made by anyone other than an authorized service facility or representative. Under no circumstances will Teknatool International Ltd. be liable for incidental, special, indirect, and consequential damages or expenses, including loss of profits or loss of operations. This warranty is Teknatool International Ltd sole warranty. There are no other warranties, whether written or verbal, whether expressed or implied by law, trade, custom, or otherwise, whether of merchantability, fitness for purpose, or otherwise, except for remedies available to customers under the Consumer Guarantees Act or other legislation.

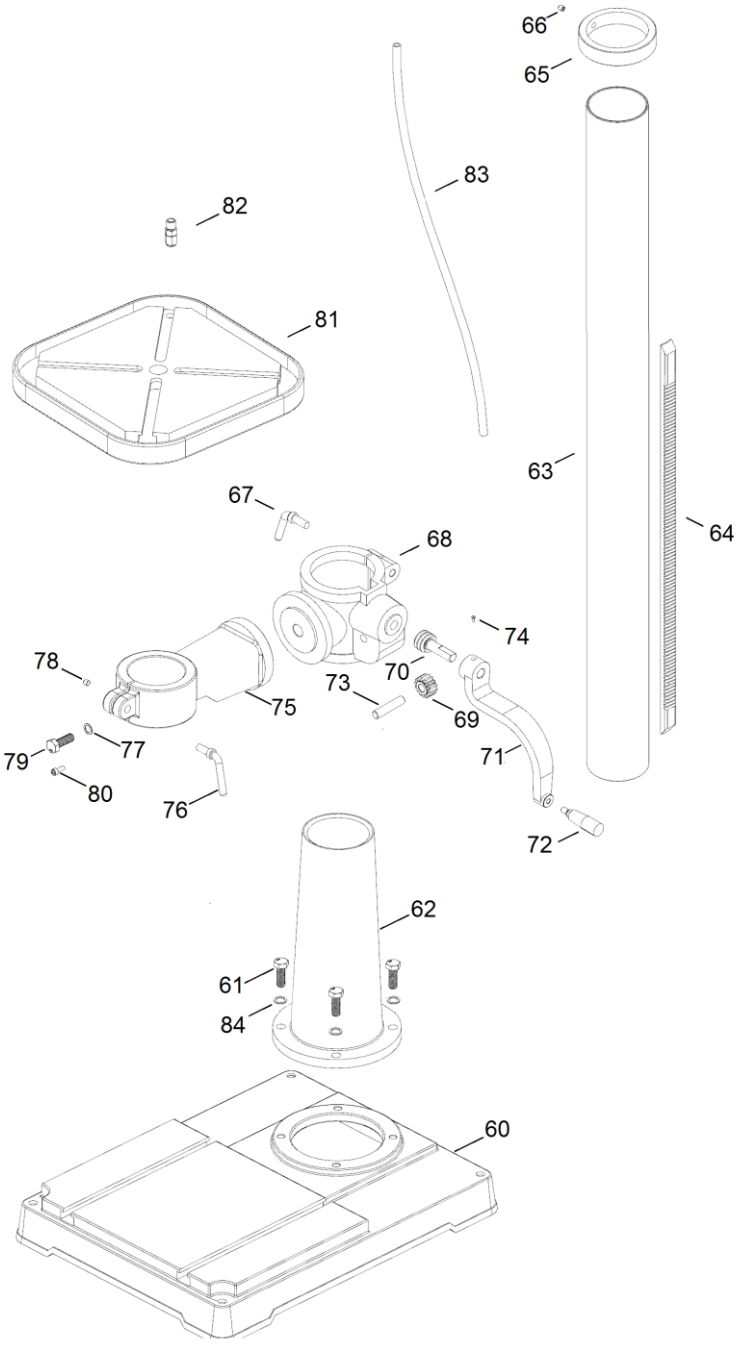
OVERSEAS CUSTOMERS: Our Teknatool Distributors and agents will issue their own warranty to cover this product. Terms may vary from those stated above; please check with your dealer. In North America warranty covers Continental USA only. For Alaska, Hawaii and other areas, warranty covers replacement of parts only and excludes transport costs.

Register your warranty faster with Teknatool online.
Visit our website on www.teknatool.com to register your warranty today!

Vulcan Drill Press Headstock Breakdown



Vulcan Drill Press Stand/Table Breakdown



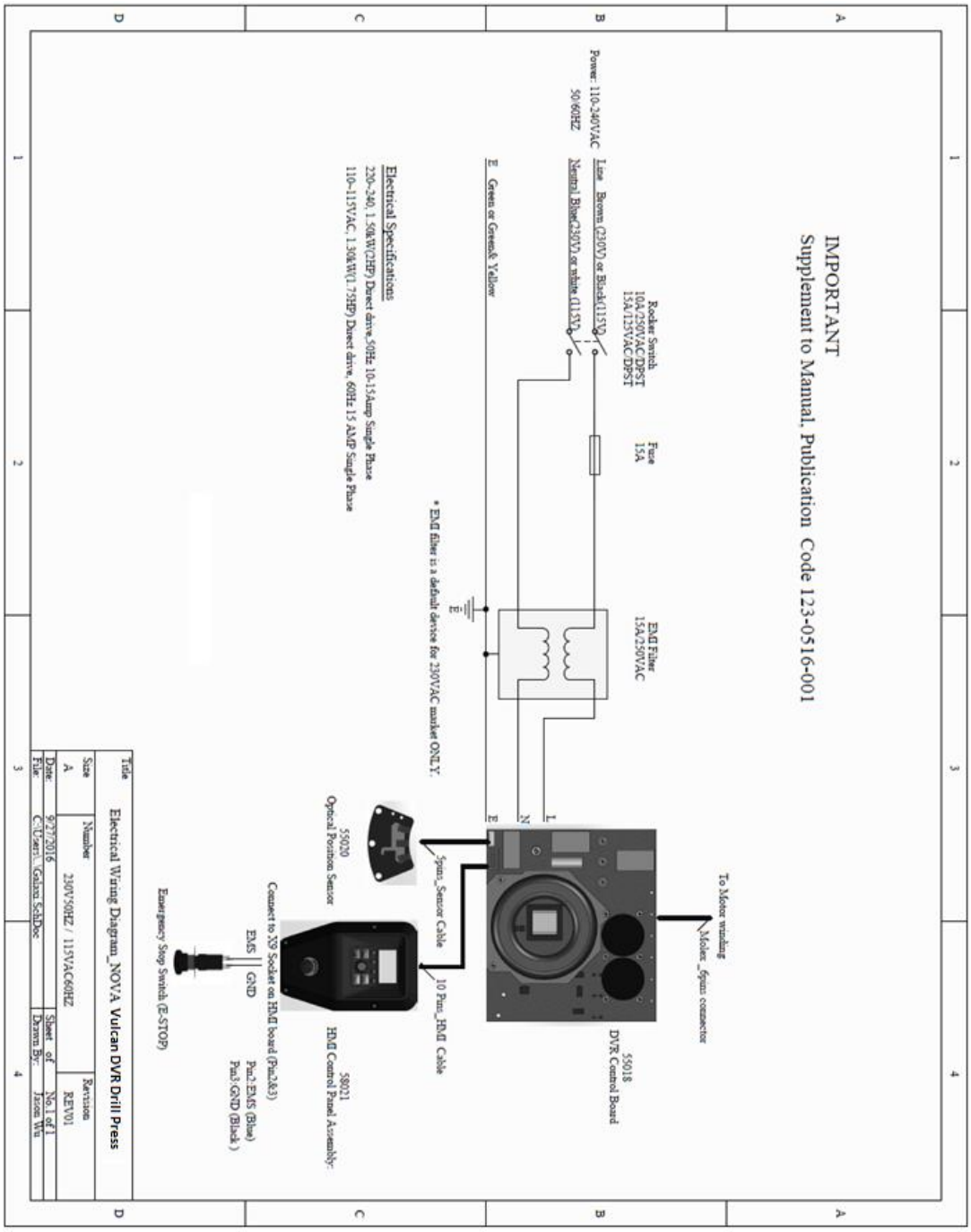
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Vulcan Drill Press Parts List

REF#	PART#	DESCRIPTION
1	C05016	M5×16 Cap Screw
2	8330355	Drill Press Top Cover
3	C08040	M8 Cap Screw
4	55431	Location pin (back motor cap)
5	52003	Fan Encoder
6	8330354	Bearing Housing
7	8338002	Wave Washer
8	6005ZZ	Ball Bearing
9	55430	Location pin (Stator)
10	55009	DVR Stator
11	55007	DVR Stack
12	8339016	DVR Motor Spindle
13	55050	DVR Motor Spindle Key
14	8339017	DVR Motor Spindle Washer
15	6005ZZ	Ball Bearing
	838110	Spindle + Quill Subassembly
16		6in MT3 & ER32 Spindle
17	6023LLB	Ball Bearing
18		MT3 Arbor
19		Engineering Drill Press Quill
20	8330353	Headstock Machined
21	8338005	Spring Nut
22	8338006	Spring Cover
23	8338007	Return Spring
24	8338008	Pinion Shaft
25	8338009	Depth Handle
26	C0408	SHCS M4×8
27		Angular contact Ball Bearing 44907
28	8339041	Mechanical Stop Mount
29	C06020	M6×20 Cap Screw
30	CM5010180	M6x10 Countersunk Screw
31	8338010	Quill Lock Bolt
32	C06030	M6×30 Cap Screw
33	8338011	Quill Lock Handle
34	8338012	Quill Pin
35	NHH14	M14 Half Hex Nut
36	8338014	Power Switch
37	CM05010	MSPC-M5×10
38	SZ1216	GSC-M12×16
39	6919011	Basic Sync
40	58018	Controller Board
41	MPB0412	MSPP-M4×12
42	MPB0325	MSPP-M3×25
43	8338019	M20 6-12mm Cable Gland
44	8338020	Quick Release Nut set
45	8339042	Mechanical Stop Rod
46	8339031	Mechanical Stop Bracket
47	C05010	M5 Cap Screw
48	8339026	Drill Press Key Pad
49	8338021	JHF16 Sub Body E-Stop

REF#	PART#	DESCRIPTION
50	C05020	SHCS M5×20
51	8338023	Pedometer Cover
52	8339021	Drill Press Depth Pot
53	8339044	Insert Block
54	8339043	Height Sensor Gear
55	598123011	LCD (Displayer)
	55400	HMI
56	8339028	Drill Press HMI Encoder
57	8338024	USB-B Type
58	8339014	Drill Press Front Facia
59	8339032	HMI Knob
60	8338025	Base
61	8338026	Hex Bolt M12-1.75×30
62	8338027	Column Base
63	8338028	Column 7-1/4 in
64	8338029	Rack
65	8338030	Rack Ring
66	SZ1010	GSC-M10×10
67	8338032	Clamp Lock handle
68	8338033	Table Bracket
69	8338034	Gear
70	8338035	Worm Gear
71	8338036	Handle Arm
72	8338037	Handle
73	8338038	Gear Shaft
74	SZ0810	GSC-M8×10
75	8338040	Table Arm Bracket
76	8338041	Table Lock handle
77	8338042	Flat Washer 3/4
78	SZ06010	GSC-M6×10
79	BNMZ20040	Hex Bolt M20×40
80	SZ1030	GSC-M10×30
81		Metal Working Table
82		Hose Connector 3/8”
83		Coolant hose
84	FW12	Flat Washer M12
85	55170	EMI filter
86	55062	USA power supply cable
	55106	EU power supply cable
	55090	AU/NZ power supply cable
	55063	South Africa power supply cable
	55112	UK power supply cable
87	FW17	Flat Washer 17mm
88	LW17	Spindle locking Washer 17mm
89	LN17	Spindle locking nut 17mm
90	8339046	Rotor Position disk
91	RW45	Rubber spacer washer 45mm
92	55020	Position Sensor

Vulcan Drill Press Wiring Diagram



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