

**DAREX<sup>®</sup>**

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# **XPS-16+**

**CNC Drill Grinder and Sharpener**

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**Operating Instructions**



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# Safety Instructions

**⚠WARNING!** Read and understand all instructions. Failure to follow all instructions listed may result in electric shock, fire and/or serious injury.



## Installation/Assembly

Carefully unpack the sharpener. Check to see that no damage has occurred in shipment. Check all packing materials to be sure that all parts are present. Refer to the packing list.

**⚠DANGER!** Electrical shock can kill! Read, understand and follow ALL safety instructions.

**⚠WARNING!** Connect to properly wired (110V or 230V, as applicable) outlet, or electrical shock may occur.

**⚠CAUTION!** Do not operate the sharpener without the vacuum system running.

Grinding dust inhaled/ingested can be harmful to your health. Grinding particles will cause damage to the internal machine components.

## Work Area Safety:

- **Keep work area clean and well lit.** Cluttered or dark areas invite accidents.
- **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.** Power tools create sparks which may ignite the dust or fumes.
- **Keep children and bystanders away while operating the sharpener.** Distractions can cause you to lose control. Do not let persons not involved in the work touch the sharpener or power cord.
- **Make workshop kid proof** with padlocks, master switches or by removing starter keys.

## Electrical Safety:

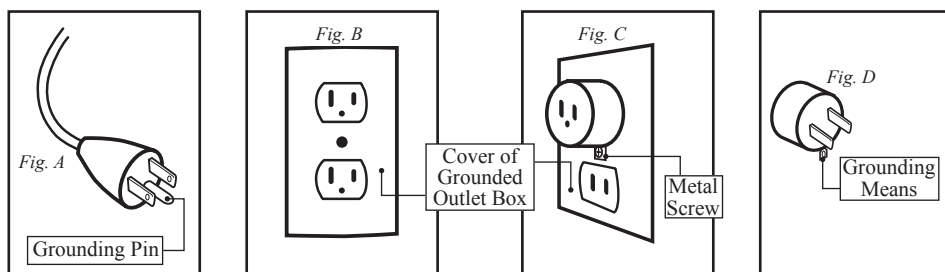
**⚠WARNING!** Do not expose power tools to rain or wet conditions.

Water entering the sharpener will increase the risk of electric shock.




- **Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools.** Unmodified plugs and matching outlets will reduce risk of electric shock.
- **Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators.** There is an increased risk of electric shock if your body is earthed or grounded.
- **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the sharpener. Keep cord away from heat, oil, sharp edges or moving parts.** Damaged or entangled cords increase the risk of electric shock.
- **Disconnect tools. Always disconnect your power tool when cleaning, inspecting, and changing attachments.** When not in use, disconnect from the power supply. Never touch internal parts of the sharpener when it is turned on or plugged in. The rotating diamond wheel can cause injury.
- **Grounding instructions. In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce risk of electric shock.** This sharpener is equipped with an electric cord having an equipment-grounding conductor and grounding plug. Do not modify the plug provided. The plug must be plugged into a matching outlet that is properly installed and grounded (110V or 230V) in accordance with all codes and ordinances. Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded. Do not use an extension cord.

- **Replace damaged or worn cord immediately.** Call Darex® Technical Support for assistance.
- **Grounded, cord-connected tools intended for use on a supply circuit having a nominal rating less than 150 volts:** This sharpener is intended for use on a circuit that has an outlet that looks like the one illustrated in Figure B, below. The tool has a grounding plug that looks like the plug illustrated in *Figure A*. A temporary adapter which looks like the adapter illustrated in *Figures C and D*, may be used (except in Canada) to connect this plug to a 2-pole receptacle as shown in *Figure B* if a properly grounded outlet is not available. The temporary adapter should be used only until a qualified electrician can install a properly grounded outlet. The green colored rigid ear lug, *Figure D*, extending from the adapter must be connected to a permanent ground such as a properly grounded outlet.



## Personal Safety:

**⚠ WARNING!** Sharpening operations can create hot sparks and metal debris, loud noises and dust!

- **Stay alert - watch what you are doing and use common sense when operating a power tool.**
- **Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.** A moment of inattention while operating power tools may result in serious personal injury.
- **Use Personal Protective Equipment (PPE). Always wear eye protection.** Protective equipment such as dust mask, non-skid safety shoes, hard hat or hearing protection used for appropriate conditions will reduce personal injuries. 
- **Prevent unintentional starting.** Ensure the switch is in the off-position before connecting to a power source.
- **Remove any adjusting key or wrench before turning the power tool on.** A wrench or a key left attached to a rotating part of the sharpener may result in personal injury.
- **Do not overreach. Keep proper footing and balance at all times.** This enables better control when using the sharpener. Nonslip footwear is recommended.
- **Dress properly. Wear closed, non-flammable protective clothing.** Do not wear loose clothing or jewelry. Keep your hair, clothing and gloves away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts.
- **Secure work. Use clamps or a vise to hold work when practical.** It's safer than using your hand and it frees both hands to operate tool.
- **Never leave tool running unattended.** Turn power off.
- **Do not touch internal parts of the sharpener when it is on.** The rotating wheel can cause injury.

## Sharpening Tool Use And Care:

**⚠ WARNING!** Use recommended accessories. Use the power tool, accessories, abrasives, and bits etc., in accordance with these instructions, taking into account the working conditions and the work to be performed. Use of the sharpener for operations different from those intended could result in a hazardous situation.

**⚠CAUTION! Keep power tools and work space clean for best performance and safety.**

- **Maintain sharpener with care.** Many accidents are caused by poorly maintained power tools. Follow instructions for lubricating and changing accessories. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the sharpener's operation. If damaged, have the sharpener repaired before use. Keep unit dry, clean and free from oil and grease.
- **Do not let sharpening debris accumulate on, in, or around the tool.** Accumulated fine metal sharpening debris can be very hot and may present a fire danger if the machine or your workspace is not properly cleaned and maintained. Accumulated sharpening debris can also degrade the life of the tool and cause premature wear on some components. If sharpening debris has accumulated, do not immediately throw it into a trash receptacle without ensuring the debris is completely cool and free of heat. Improperly disposing of the accumulated sharpening debris may present a fire risk. Do not collect the sharpening debris during sharpening. This increases the risk of heat build-up in the debris and the potential for fire.

**⚠CAUTION! When maintenance is performed on the sharpener follow the instructions.**

- **Press the emergency stop button, unplug unit from power source and use a "Lock Out/Tag Out" procedure.**
- **Do not force the sharpener or an attachment.** It will do the job better and safer at the rate for which it was designed.
- **Do not use the sharpener if the switch does not turn it on or off.** Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
- **Disconnect the plug from the power source before making any adjustments, changing attachments, or storing the sharpener.** Such preventative safety measures reduce the risk of starting the sharpener accidentally.
- **Store idle power tools out of reach of children and do not allow persons unfamiliar with the sharpener or these operating instructions to operate the power tool.** Power tools are dangerous in the hands of untrained users.
- **Keep guards in place and in working order.** A guard or other part that is damaged should be properly repaired or replaced by an authorized SERVICE CENTER unless otherwise indicated in the operating instructions.
- **Never stand on the sharpener.** Serious injury could occur if the tool is tipped or if the sharpening edge is unintentionally contacted.
- **Check damaged parts.** Before further use of the tool, a guard or other part that is damaged should be carefully inspected to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting and any other conditions that may affect its operation. A guard, defective switch, or other part that is damaged should be properly repaired or replaced by an authorized SERVICE CENTER unless otherwise indicated in these operating instructions.
- **Do not use if the grinding wheel is damaged.** Use only grinding wheels recommended by Darex®. Follow instructions provided in this operating manual for changing the wheel. The wheel must be removed in order to clean it. Do not over-tighten wheel nut. Use only flanges (or washers) furnished with the grinding wheel.

## **Service:**

- **Have your tool serviced by a qualified repair person using only identical replacement parts.** This will ensure that the safety of the power tool is maintained.

**For Technical Service and/or replacement parts, please visit our website at [www.darex.com](http://www.darex.com) or call Darex® Technical Support at 1-800-547-0222.**

Specific Safety Rules:

**⚠ WARNING!** ALWAYS use proper safety glasses. Everyday eyeglasses are NOT safety glasses. Also use face or dust mask if operation is dusty. ALWAYS wear certified safety equipment:



- ANSI Z87.1 eye protection (CAN/CSA Z94.3)
- ANSI 512.6 (53.19) hearing protection
- NIO5H/OSHA respiratory protection

**⚠ WARNING!** Use of this tool can generate and/or disperse dust, which may cause serious permanent respiratory or other injury. Always use NIOSH/OSHA approved respiratory protection appropriate for the dust exposure. Direct particles away from face and body.

**⚠ WARNING!** This product contains a chemical known to the State of California to cause cancer. Some dust created by power sanding and grinding as well as contents from the machine may contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

**⚠ WARNING!** Avoid prolonged contact with dust from power sanding, sawing, grinding, drilling, and other construction activities. Wear protective clothing and wash exposed areas with soap and water. Allowing dust to get into your mouth, eyes, or lie on the skin may promote absorption of harmful chemicals.

Safety Guidelines – Definitions

It is important for you to read and understand these Operating Instructions. The information it contains relates to protecting YOUR SAFETY and PREVENTING PROBLEMS. The symbols below are used to help you recognize this information:



**⚠ DANGER!** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**⚠ WARNING!** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

**⚠ CAUTION!** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**⚠ CAUTION!** Used without the safety alert symbol (**⚠**) indicates a potentially hazardous situation which, if not avoided, may result in property damage.

The label on your tool may include the following symbols:

|   |                                   |
|---|-----------------------------------|
| V..... volts  | A..... amperes                    |
| Hz..... hertz   | W..... watts                      |
| min ..... minutes   | ~..... alternating current        |
| —..... direct current   | n <sub>0</sub> ..... noload speed |
|  ..... Class II Construction | rpm..... revolutions or           |
|  ..... safety alert symbol   | reciprocations per minute         |

# XPS-16+ Specifications



## XPS-16+ Automatic Measurement Features

Your XPS-16+ has many features so carefully designed and engineered that you may not even be aware of their uniqueness. Once the cycle start button has been pressed, your Darex XPS-16+ begins taking measurements of the drill on the way to the grinding wheel. It locates the end of the drill, calculates diameter, locates and positions the cutting edge, determines web thickness, identifies initial contact point of drill to the wheel and then sharpens. After sharpening and before splitting the drill, the sharpener again measures and re-locates the end of the drill, ensuring an accurate split.

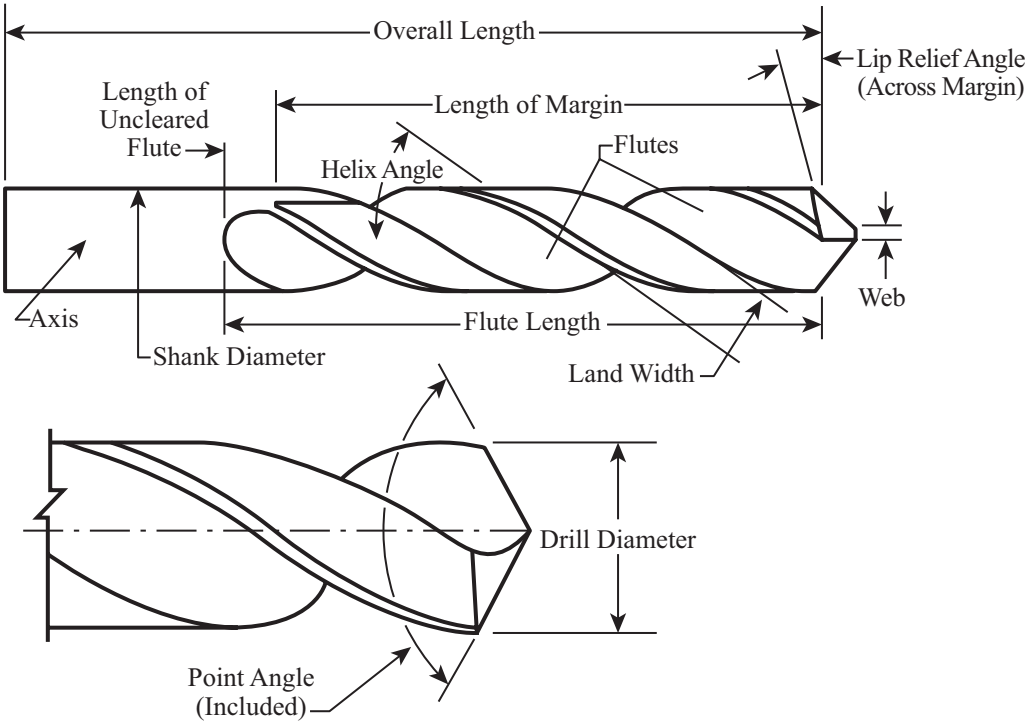
## Specifications

- **Standard Grinding Wheels:** 180 Grit CBN, 220 Grit DIA
- **Operating temperature:** Not less than 7°C (45°F) or more than 32°C (90° F)
- **Motor Specs:** BLDC motor 115/230 V RPM 3800-4500 50/60 hz
- **Power requirements:** 8 amp @ 115 V; 4 amp @ 230 V
- **Machine Dimensions:** 66cm W x 56cm D x 30.5cm H (26" W x 22" D x 12" H)
- **Machine Weight:** 52 kg (115lbs)
- **Shipping Dimension:** 78cm W x 89cm D x 45cm H (31" W x 35" D x 18" H)
- **Vacuum Dimensions:** 36cm D x 49cm H (14" D x 18" H)
- **Vacuum Weight:** 14 kg (30lbs)
- **Total Ship Weight:** 66 kg (145lbs)
- **Assembled in the USA from US and foreign parts**
- **Warranty:** 1 year defective parts and labor

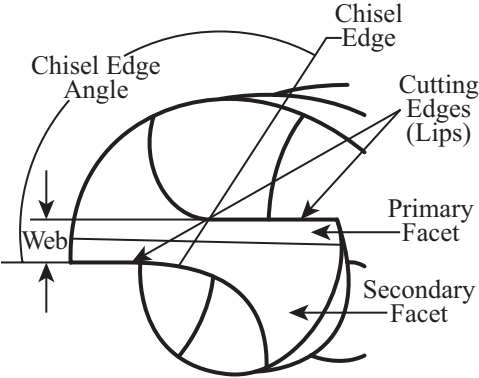


# Drill Nomenclature

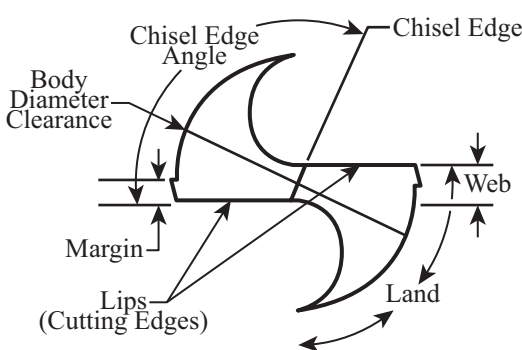
## Facet & Conic Drill Style Picture and Nomenclature



## Facet Drill

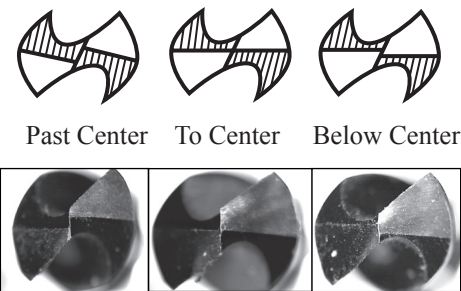


## Conic Drill

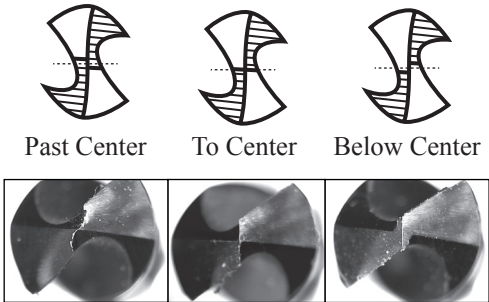


# Point Split & Relief Diagrams

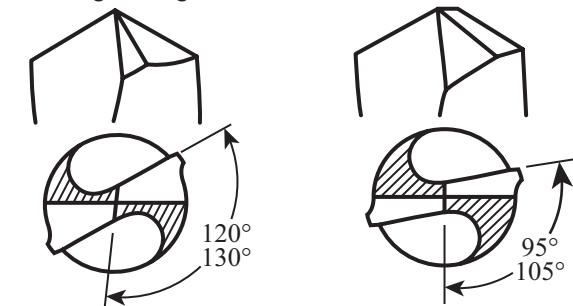
## Depth of Split Diagram



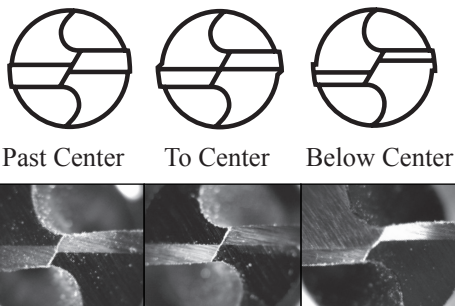
## Center of Split Diagram



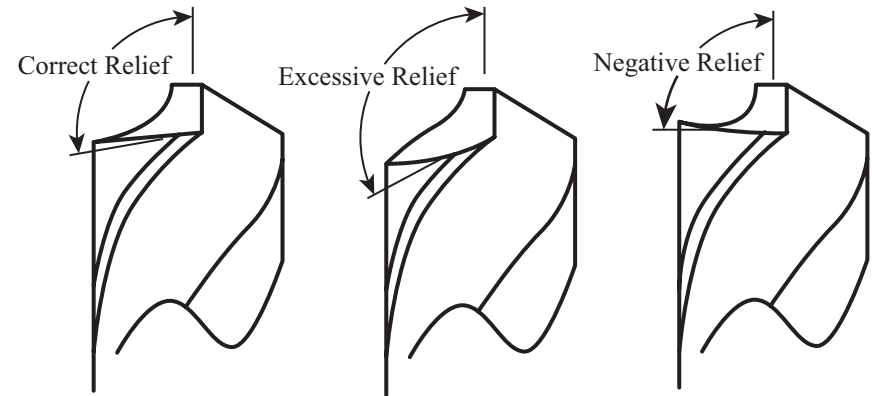
## Split Angle Diagram



## Facet



## Relief



# Machine Axis Definition



**X Axis:** A crossfeed axis which moves the grinding wheel sideways.

**C Axis:** A rotate stage which turns the drill bit about its axis.

**A Axis:** A swing stage which tilts the drill bit up and down at the rear.

**Z Axis:** An infeed axis which positions the drill bit closer to or further from the grinding wheel.

# Touch Screen Icon Reference



Cycle Start (Green)



Cycle Stop (Amber)



Continue



Return to Home



Point Angle Selection



Minimal Material Removal



Mid-range Material Removal



Maximum Material Removal



Diameter Detection  
Auto Or Manual



Tools Button To Access  
Second Page



Web Thickness  
Detection Screen



No Hone Selected



Hone primary cutting  
edge after sharpening



Primary and secondary  
cutting edge hone



Rotate drill in hone brush











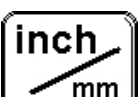
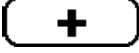
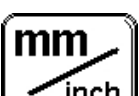
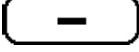
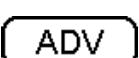

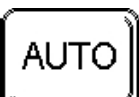
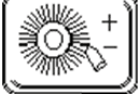
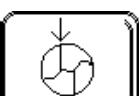




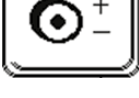








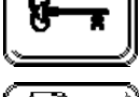

No Split or No Grind Selected



Standard Split Point



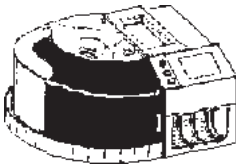
Radius Split Point

|   |  |   |  |
|---|--|---|--|
|     | Relief Selection Screen                      |     | Cursor Down  |
|    | High Speed Steel Or Cobalt Material Selector |    | Cursor Up  |
|    | Carbide Material                             |    | Page Down  |
|    | File Management                              |    | Page Up  |
|    | Sharpener (Inches) Active                    |    | Move Sharpener Axis In A Positive Direction        |
|    | Sharpener (mm) Active                        |    | Move Sharpener Axis In A Negative Direction        |
|    | Advance Selection                            |    | Hone Time Adjustment                               |
|   | Auto Mode Selector                           |    | Honing Wheel Offset Adjustment                     |
|  | Manual Align Mode Selector                   |    | Honing Brush Edge Offset Adjustment - X Axis       |
|  | Cancel Key                                   |    | Honing Brush Face Offset Adjustment - Z Axis       |
|  | Save Key                                     |   | Wheel Position Offset                              |
|  | Backspace                                    |  | Wheel Edge Offset Adjustment - X Axis              |
|  | Save   |  | Wheel Face Offset Adjustment - Z Axis              |
|  | Delete File                                  |  | Split Point Offset Adjustment                      |
|  | Open File                                    |  | Position Stage For Belt Change                     |
|   |  |  | Password Protected Area                            |
|   |  |  | Drill Stick-Out Adjustment To Adjust Facet Overlap |

# Touch Screen Details

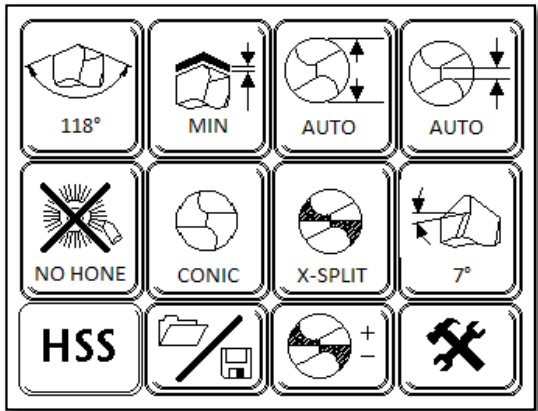
## Main Operating Screen

The screen shot this shows what will be depicted on the touch screen once power has been applied to the XPS-16+. Press the [check] in order to initialize the XPS-16+.



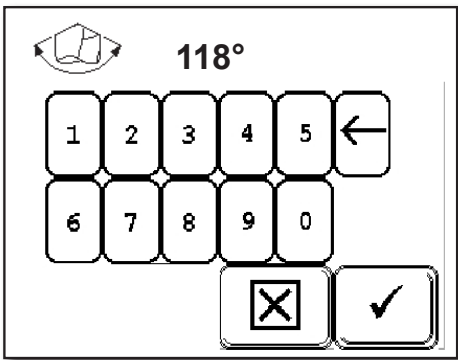
The Environmental Door has to be closed for the machine to execute initialization.

This is the Main Operating Screen. Starting left to right and top to bottom, each icon will be explained in detail.



### Point Angle Adjustment

Press the [Point Angle] icon. A keyboard will appear. Type in the point angle of the drill you wish to grind. The acceptable range is 90°-150° for conic ground drills and 115°-150° for facet ground drills.



Use the [LEFT ARROW] button to backspace.



Press the [CHECK] button to save the point angle to the main operating screen.



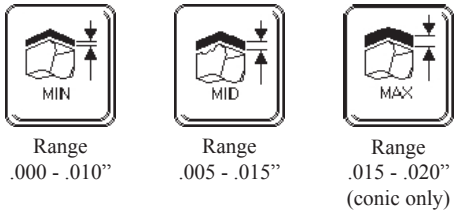
Pressing the [X] button cancels the change and takes you back to main operating screen.

**Note:** If the point angle entered is beyond the machines limits, the XPS-16+ will default to the nearest value the machine is capable of grinding.

If the desired grind angle is less than 115°, the XPS-16+ will automatically prompt the operator for additional information. The programming of the [Web Thickness] and [Advance] features will be covered in the [Web Detection] section of the User Guide.

## Material Removal Icon

Each touch will change between three options:



- Factory default is “MIN”.
- Facet drill point is limited to “MIN” & “MID”.

**Tip:** Use “MIN” when cleaning up a dull drill bit.

**Tip:** Use “MID” or “MAX” when changing point angle or repairing damaged drill bit.

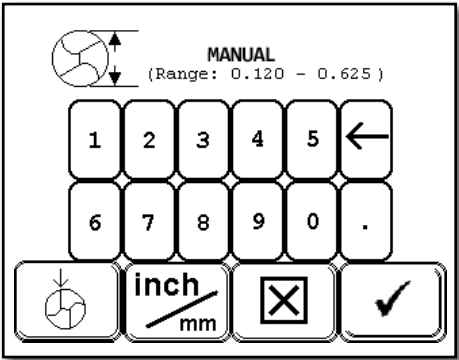


## Diameter Icon

The [AUTO] mode is the factory default setting. In this mode, ‘auto’ will appear under the **Diameter Detect** graphic. In the event the drill diameter is different than the work holding diameter, it will be necessary to enter the actual drill diameter.

**To do so:**

1. Press the Drill Diameter icon.
2. A keypad will appear.
3. Type in the drill diameter including the decimal point.
4. Press the [CHECK] icon to enter the value and return to the main menu
5. Notice the [AUTO] has now been replaced with the value just entered



**Note:** If the XPS-16+ is in the [AUTO] mode and the drill diameter is measured at less than .115”, the XPS-16+ will automatically return to the home position and prompt the operator for additional information (**Single Point Alignment** or **Manual Align**). The programming of these features will be covered in the **Web Detection** section of the User Guide.

**Tip:** The machine can be operated in either **inches** or **millimeters**. To change between them, press the **INCH/MM** icon. The value displayed on top in the **bolder** font is the current selection for all the applicable icons.





## Web Thickness

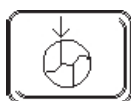
There are 3 different modes of drill bit cutting edge alignment available with the XPS-16+. In order to sharpen the different drill types and sizes, one mode may be better suited than another mode. All 3 modes are accessed via the Web Thickness/Alignment Icon on the Main Sharpening screen.

**Tip:** Remember, sharpening begins with the drill alignment and the final sharpening result depends on how accurate the cutting edge is oriented.



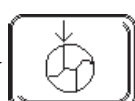
## Automatic Alignment Icon

The [AUTO] mode is the factory default setting. This enables the XPS-16+ to perform several calculations necessary to correctly align the drill prior to sharpening with the pre-programmed drill geometry. There are some instances previously mentioned in the User Guide where the machine cannot make these calculations. If these conditions occur, the XPS-16+ will interrupt the grind operation, return to the home position and prompt the operator for the necessary information. Press the [OK] icon on the touch screen to enter this feature or press the [Alignment] icon



## Manual Align Icon

This mode bypasses the Automatic Align mode and proceeds directly to sharpening the drill. In this mode, the operator is responsible for placing the drill in the chuck with 1 cutting edge vertical (12 O'clock)



- Press the [ALIGNMENT] icon. A key will appear. Press the [AUTO] icon to toggle to the [MANUAL] mode on the lower left corner of the touch screen. Press the [CHECK] to return to the main operating screen. Notice the 'auto' has been replaced with 'align' in the icon.



Vertical  
Cutting Edge

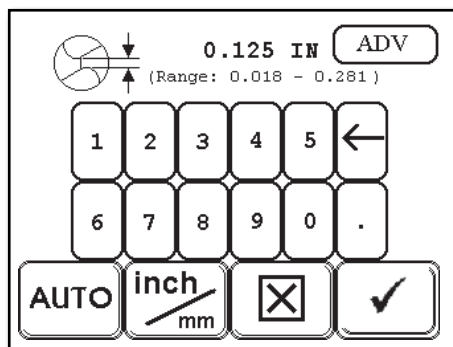
**Tip:** Because the drill alignment operation is not executed, the Manual Align mode it is faster than Auto or Single Point Alignment modes. However, because the operator is responsible for cutting edge alignment, there may be variation in results.

**Tip:** This feature is beneficial for very small drills or in the event there is an issue with the fiber optic system.

## Web Thickness (manual input)

In order to activate the Radius Split or Single Point Alignment feature, it is necessary to measure and enter the web thickness of the drill. To do so:

- Press the [ALIGNMENT] icon - a keypad will appear.
- Measure the Web thickness of the drill with calipers and enter this value on the touch screen including the decimal point. Press the [CHECK] icon to return to the main operating screen.



**Tip:** Notice the [AUTO] in the Web Detection icon has been replaced with the web thickness value just entered



When the [Advance] feature is used, the XPS-16+ is finding the cutting edge using a single point of alignment. The [Advance] feature is located in the upper right hand corner of the Alignment icon and is activated by entering any value other than zero.

There are several drill types that will require an [Advance] value to be entered by the operator. They are:

- Drills with 'hooked' cutting edges
- Drills smaller than .115" (3mm)
- Drills with a point angle of less than 115°
- Facet sharpened drills where the intersect line separating the primary and secondary facets are not parallel to the cutting edge.

**Tip:** See "Creating a Conic-Style Drill, Set-by-Step" and "Creating a Facet-Style Drill, Set-by- Step" for more detail on how to utilize the [ADV] function.

**Tip:** To align the cutting edges vertical for a standard web drill, the [ADV] is usually +15 to +22 degrees. For a thick web drill, the [ADV] is usually +2 to +8 degrees.

To confirm position, press cycle start [Green Button].

After the diameter detect routine, make sure the cutting edge of the drill is positioned at 12:00 o'clock (vertical) just prior to the drill touching the grind wheel to confirm position. Upon approaching the grinding wheel, a facet-style drill will rotate slightly counter-clockwise — this is normal. If the cutting edge orientation is not correct, press the cycle interrupt (yellow) button to halt the process. Either press the cycle interrupt button again or press the [HOME] icon on the touch screen to return the XPS-16+ to the home position.



Using the [C] axis decal on the back of the chuck as a reference, return to the Advance [ADV] feature in the [ALIGNMENT] icon and make a calculated estimate as to the direction and amount of correction.

**Tip:** If this drill is to be ground on a continued basis, it is recommended that this information be saved as a Drill file. This feature will be covered in the [FILE MANAGEMENT] portion of the User Guide.

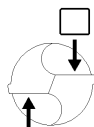
## Hone Icon

Normally only used for edge preparation on carbide drills.

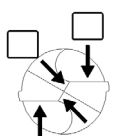
There are 3 different hone modes on the XPS-16+. Press the [HONE ICON] to toggle through the hone options including turning the hone option off. The duration the drill edge is honed and the position of the drill as it enters the hone is controlled in the [TOOLS] icon. This will be covered later in the user guide.



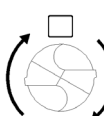
[NO HONE] is the factory default mode..



[HONE SINGLE] – Applicable for honing the drill cutting edges only.



[HONE DOUBLE] – Applicable for honing both the drill primary cutting and the secondary cutting edge that are created when the drill is split.



[HONE ROTATE] – The drill is continuously rotated during the hone process. Enter hone times in even numbers to avoid asymmetric honing.

## Hone Icon (continued)

The XPS-16+ can be used as a **HONE ONLY** machine. This is accomplished by deactivating the **[SHARPEN ICON]** and the **[SPLIT ICON]**. This feature is beneficial for new carbide drills that have not received a cutting edge treatment. Hone times vary depending on the drill size and the type of hone being used. When using the provided Silicone Carbide Hone, use 6, 12 & 18 seconds for small, medium and large drill bits respectively. If using a Diamond Hone (option), reduce those times by 50% for the different drill sizes.

***Tip:** Honing the cutting edge of a carbide drill prolongs drill life and results in better hole-size consistency between sharpening.*

***Tip:** A longer hone time produces a larger cutting edge radius. Trial and error is needed to determine the best cutting edge radius for each individual drill application. Factory default is 1 second for each mode.*

## Drill Style Icon

The XPS-16+ can sharpen 2 different drill point styles: **Conic** and **Facet**. Step by step instructions to sharpen each point style are on pages 20 and 21.



## Split Point Icon

There are 3 split options with the XPS-16+. They are:



**[NO SPLIT]** – disables the split feature if that is desired

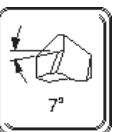


**[X SPLIT]** – This is the factory default mode with several settings predetermined by the manufacturer; including X and Z axis offset settings, the Fan Angle and the Split Angle. All of these settings can be altered by the user. These settings will be covered under the **[POINT SPLIT OFFSET]** screen in the **[TOOLS]** menu later in the User Guide.



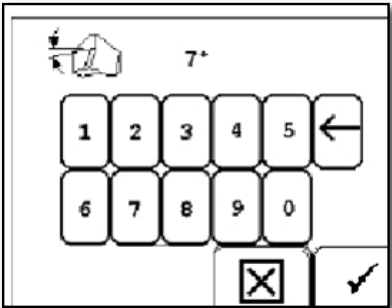
**[RADIUS SPLIT]** – This feature is only available by pressing the **[ALIGNMENT]** icon. Measure the web thickness with calipers as shown and using the keypad, enter this value including the decimal point. Press the **[CHECK]** icon to return to the Main Menu screen. Return to the **[POINT SPLIT]** icon. You will notice that the **[R SPLIT]** feature is now an option when you continue to press the **[POINT SPLIT]** icon. All geometric parameters for the Radius Split Point are controlled using the **[POINT SPLIT OFFSET]** screen in the **[TOOLS]** menu to be covered later in the User Guide.

***Tip:** If the user wishes to only split the drill and skip the sharpening function, turn off the hone and point style icons by pressing both until an “X” comes across the image.*



## Relief Adjustment

Press the **[RELIEF ADJUSTMENT]** icon to adjust relief from 5°-18° (accurate to +/- 2°). If the relief value specified is beyond the allowable range, the XPS-16+ will automatically default to its allowable range prior to sharpening. Press the **[CHECK]** icon to accept the value or the **[X]** icon to exit to the Main user interface screen.

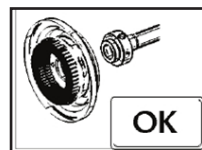




## Drill Material Icon

Pressing this icon will prompt the user to execute a grind wheel change, CBN for HSS/ Cobalt and Diamond for carbide drills. Changing to the correct icon internally adjusts some of the grind stock removal and grind speed rates.

**Tip:** Even though the XPS-16+ prompts the operator for a grind wheel change, the machine does not know if that grind wheel change has been executed. Using the incorrect grind wheel will have a negative effect on grind wheel life.



**Tip:** After a grind wheel change, it may be necessary to make an offset adjustment to the grind wheel face and/or the grind wheel edge. Those adjustments will be covered in the Wheel Position Adjustment portion of the User Guide.



## File Management Icon

Press this icon in order to save, recall or delete drill files. The XPS-16+ will store 100 custom defined drill files. In the event that more storage is necessary, the X-Loader software supplied with your XPS-16+ will allow drills files to be sent and retrieved via your computer.

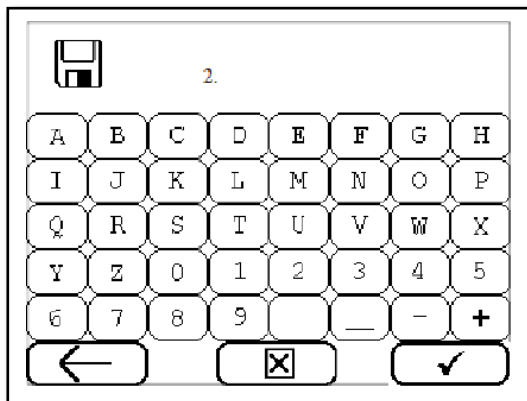
**Note:** File #1 DAREX FILE is factory created and is the default file to start with when creating new drill files.

- Press the File Management Icon – a list of the drill files existing on the XPS-16+ will appear.
- Press the [DOWN] or [UP] to move the selector arrow to an open position.

**Note:** page up or down arrows will move selector much faster.



- Press the [SAVE] icon to initiate a new program. A keyboard will appear. Using a maximum of 20 characters, name your program.
- Press the [CHECK] to return to the Main Operating Screen. Notice the file name now appears on the File Management icon.
- In the event a program is no longer necessary, use the arrow keys to move the selector to the desired program and press the [DELETE] icon. Press the [CHECK] icon to remove the program.



**Note:** In the event a program is over-written, a warning will show on the display. Pressing the [CHECK] will allow the changes to the program and pressing the [X] will not allow the changes.



**Note:** A drill file can be locked to avoid being edited or removed. In order to do so, start the drill file name with a plus [+] symbol. **Example:** +135facet

To delete or modify a locked drill file, a password is needed. Please contact your Darex Representative for customer service.

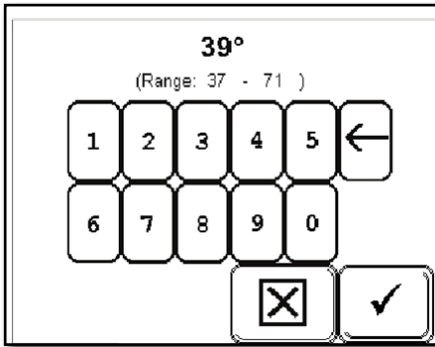
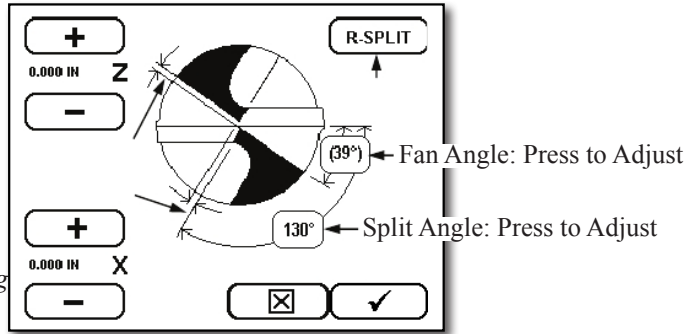
## Point Split Offset Icon

Select the point split type you wish to grind using the Point Split icon already covered in the user guide. Any split geometry you wish to alter can be adjusted using this menu. The user adjustments are:

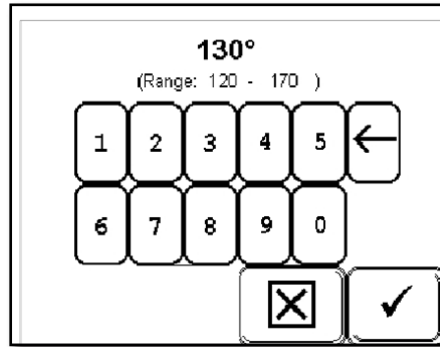
Pressing the **Z axis offsets** (plus and minus) which will control split depth.

**X axis offsets** (plus and minus) which will control the center of the split.

***Tip:** Each axis is defined by a decal applied to the Base Casting showing direction of movement. Reference these decals when making offset adjustments to either the X or Z axis. Movement increments are in 1/1000th's of an inch or .025MM if the utilized in the metric mode.*



**Fan Angle** – included angle from the cutting edge to the depth of split controlled with the Z axis.



**Split Angle** – include angle from the cutting edge to the split edge (secondary cutting edge).

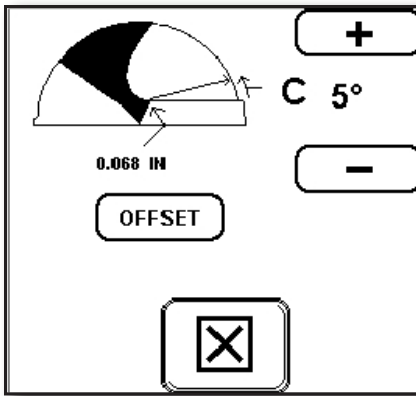
To make changes to either angle, press the touch display where either angle is displayed. A keypad will appear allowing the requested change.

***Note:** The **Fan Angle** and the **Split Angle** are interdependent to one another. When reducing the **Split Angle**, it may impact the amount of **Fan Angle**. The **XPS-16+** is able to automatically adjust the **Fan Angle** if necessary once the user has defined **Split Angle**. Notice the **Fan Angle** is always displayed as a (reference value).*



## Radius Split

In order to create a radius split, the user must first measure the web thickness and manually enter the figure into web thickness screen. Press the split icon until the R-Split option appears. When the R-Split is selected, the point split offset icon will display an R-Split option. When the R-Split is selected, the Point Split Offset page will have all the **X Split** offset adjustments plus some additional ones. In the upper right hand corner of the Point Split Offset menu will have **[R-Split]** icon. Press this icon to allow you to make adjustments to the amount of radius **[OFFSET]** and the stop angle as defined by the location of the cutting edge. A keypad will appear when the **[OFFSET]** icon is pressed allowing the operator to enter a value. Press the **[CHECK]** button to accept the value and exit back to the main Split Offset menu or press the **[X]** icon to exit without any changes made.



**Tip:** The maximum amount of the radius can be  $\frac{1}{2}$  the web thickness value you entered in the [WEB DETECTION] icon.

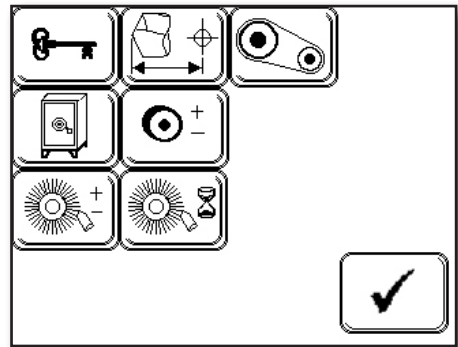
**Tip:** The **stop angle** default is preset at 5°. Anything less than 5° and the operator runs the risk of having the radius split rotate around into the cutting edge. This risk is dependent on the **stop angle** value, alignment accuracy and the web thickness value. The **stop angle** range of adjustment is from 1° to 45° in increments of 1°.

**Tip:** Radius point splitting is normally only found on carbide drills. When a drill is traditionally split [X SPLIT], the remaining geometry leaves 2 exposed 'points' of the drill where the cutting edge and split edge (secondary cutting edge X) intersect. Carbide is much too brittle to absorb this excess pressure at a point and will perform better when that energy is shared over a surface.



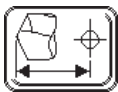
### Tools & Second Page Icon

Press the [TOOLS] icon. This will provide access to a secondary operating screen that will enable more machine options and adjustments. Much like the Main Menu screen, starting left to right and top to bottom, each icon will be explained in detail.



### Key Icon

This icon allows access to 2 different secure areas that are not accessible unless directly working with your Darex representative. Each secure area requires a unique password to enter (user locked screen password is '55').



### Facet Overlap Adjustment Icon

**This value is calibrated at the manufacturer** so that all 4 drill facets intersect in the center of the drill. Some drill manufacturers grind their geometry with an over facet (beyond center) or under facet (below center).

In order to replicate their grind, the 'facet overlap' value will have to be changed from the factory default number. In order to facet a drill past center, press the [FACET OVERLAP] icon and reduce the value shown by .010" (or .1mm). If an under facet is required, add .010" (or .1mm) to the value. Turn off the split feature and grind the drill. If the results are acceptable, save the drill file using the [FILE MANAGEMENT] icon - the new drill stickout value will be saved as well. If applicable, remember to toggle the split feature on to the correct mode prior to saving the drill file.

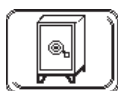




### Belt Change Icon

In the event a spindle drive belt is compromised, press the **[BELT CHANGE]** icon to move the grind motor to a position to access the motor mount bolts and change the belt. Once the grind motor reaches the access position, a warning screen **[RE-START MACHINE]** icon will pop up.

1. Power off sharpener.
2. Unplug power cord.
3. Remove access panel from rear of XPS-16+ and Perform Belt Change
4. Re Start the machine and initialize



### Safe Icon

Store up to 100 customized drill files permanently.

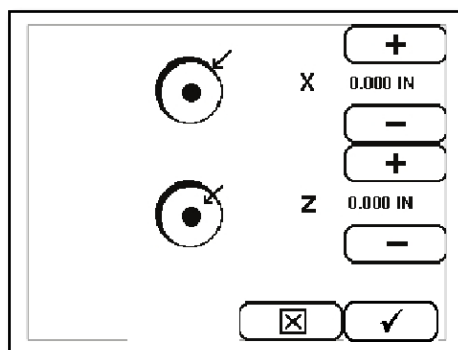
1. Press the **[SAFE]** button to save a customized drill file.
2. Within the Safe screen press the **[DISC]** button to save.
3. Within the Safe screen press the **[FILE]** button to retrieve the last 100 files saved.
4. With each Safe save, all previous files saved will be overwritten.



### Wheel Offset Icon

Press this button to make minor wheel offset adjustments. This function might be needed to compensate for new or different grit wheels.

1. Load the factory file DAREX FILE onto the main operating screen.
2. Measure the length of a 3/8" drill bit using calipers. Write down the value.
3. Sharpen that drill using the DAREX FILE.
4. Re-measure the 3/8" drill bit end-to-end. Subtract this measurement from first measurement to define amount of material being removed. Target range for material removal is .005" to .010" for the DAREX FILE.
5. Adjust X [+] or [-] buttons to optimize material removal into target range.
6. Adjust Z [+] or [-] buttons to optimize split to be on center.
7. Press the **[CHECK]** button to save and return to previous screen.



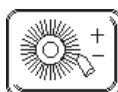
Past Center



At Center



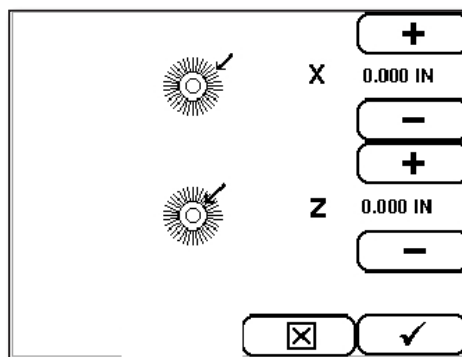
Short of Center



### Hone Offset Icon

The hone brush is consumed as it is used. This screen allows the user to adjust the position of the drill in both the X and Z axis as it enters the hone.

**Tip:** Adjustments are made in 1/1000 of an inch. Normal offsets for the Hone will require more units of adjustment in order to see change.





## Hone Time Adjustment

Once the desired Hone type is selected on the Main Menu Screen, press the [TOOLS] icon in the lower right corner of the touch display. Under the [HONE TIME] icon, the operator can input a duration value for how long the drill is to be honed. In the [HONE DOUBLE] option, there are inputs for both the primary and secondary drill edges. A keypad will appear when the user presses the touch screen. The adjustment amount is 1 to 60 seconds for all inputs. After entering a value, press the [CHECK] icon twice to return to the Main Menu screen.

**Tip:** *The longer the drill is introduced to the hone brush, the larger the hone radius will be. Trial and error is needed to determine a 'best' cutting edge preparation for the drill's application.*

**Tip:** *When using the provided Silicone Carbide Hone, use 6, 12 & 18 seconds for small, medium and large drill bits respectively. If using a Diamond Hone (option), reduce those times by 50% for the different drill sizes.*



# XPS-16+ Quick Start Guide

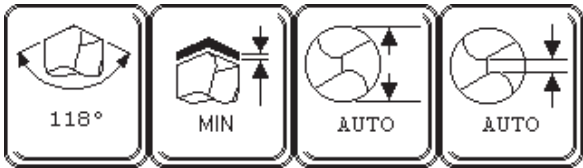
Please consult the operator’s manual for more detailed information, specifically pages 5-20. The following instructions will provide a simplified guide to using the XPS-16+.

- 1. Switch the ON/OFF switch to ON (located on the right side of the sharpener).  
*Note: If the ON/OFF switch does not latch ON, check to see if the Emergency Stop button has been applied. Twist clockwise to release.*

- 2. Press the **[OK]** that appears in the center of the touch screen. This will send A, C, X, and Z axis to their limit switches and ready the XPS-16+ for sharpening. The Environmental Door has to be closed for this to happen.



- 3. It is now time to answer some questions pertaining to the drill type that you will be grinding. It may be necessary to have the drill in hand to answer some of these questions.
- 4. Beginning with the top row of icons from the Main Operation Screen (left to right):



- a. Push the Point Angle icon and type in the angle of the drill you will be grinding. If you don’t know the angle, a protractor is useful to determine the angle. Press the ‘check’ to accept the new value and return to the main menu
  - b. The Material Take-Off icon has three selections. Pressing this icon will switch between the three (MIN, MID and MAX). Leave it at MIN unless you are changing the point angle of the drill or need to grind a significant amount of material off the end of the drill.
  - c. Leave the next two icons in the ‘AUTO’ mode. Both features are covered in detail on pages 13 and 14.
- 5. Center row of icons from the Main Operation Screen (left to right):



- a. There are three different selections under the **[HONE]** icon. Unless you are grinding a carbide drill, leave the **[HONE]** selection off (default mode). If a hone type is necessary, refer to page 14.
- b. Drill Type Icon – There are two selections here, either **[CONIC]** or **[FACET]**. Pressing this icon switches from one to the other. Select the appropriate one.
- c. Split Icon – This icon switches between **[SPLIT OFF]** and **[X SPLIT]**. Select the appropriate one. Radius Splitting is also an option with further inputs necessary under the Web Detection icon. Refer to page 13 and 14.
- d. Relief Icon – This icon will allow the operator to program in the required relief. If you do not know how much relief to grind, leave the default 7°.



6. Bottom row of icons from the Main Operation Screen (**left to right**):

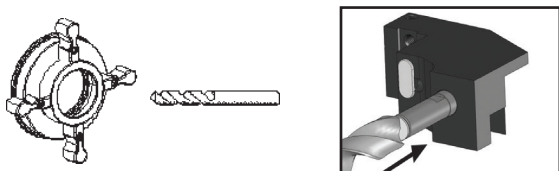


- Drill Material Icon – Pushing this icon will switch from High Speed Steel [**HSS**] to [**CARBIDE**] depending on drill material you are grinding. An icon will appear prompting the operator to change grinding wheels
- File Management Icon – This icon saves and stores drill files (programs) once the operator is satisfied with the geometry. Further instruction can be found on page 16.
- Point Split Offset Icon – In the event that any Split geometry needs to be altered after the drill is sharpened for the first time, this icon controls these adjustments. In most instances, it will not be necessary to deviate from the default settings. See page 17 for further details
- Tools Icon – this icon will take you to a secondary user menu. It will not be necessary to make any adjustments at this time. Explanation of these icons can be found on pages 18- 20 in the User Guide.



## Sharpening Cycle

- Open the Environmental Door.
- Insert the drill into the rear of the chuck with one cutting edge between 12 o'clock to 2 o'clock. Tighten the chuck knob clockwise. While doing so, be sure the tip of the drill is compressing the MTO plunger directly in front of the tip of the drill.



- Close the Environmental Door.
- Push the green Cycle Start button (under the Emergency Stop button). The Cycle Start button will illuminate for the entire sharpening cycle.

**Note:** If the Environmental Door is not closed and/or the MTO button is not compressed, a visual alarm will show on the touch screen.

- The machine will execute the following:
  - Automatically measure the diameter of the drill (the value will show under the Diameter Detect icon).
  - Automatically find one cutting edge using fiber optic technology and orient one cutting edge straight up (12 o'clock), unless it is a facet style drill.
  - Automatically touch the face of one cutting surface to determine the closest point of drill to the grind wheel.
  - Sharpen the drill to the programmed specifications.
  - Split the drill to the programmed specifications (if required).
  - Hone the drill to the programmed specifications (if required).
  - Return to the [**HONE**] position and lock the chuck. The light in the Cycle Start button will go off signaling a finished sharpening cycle. Open the Environmental Door and remove your sharpened drill.

# Creating a Conic-Style Drill, Step-by-Step

It's best to have a pattern drill, that is, one which can be used for a model without grinding on it. Mark it with tape so it doesn't get mistaken for another sample drill.

1. Decide whether or not the drill is grindable. Look for chips on the margin lines, fractures sending spall lines down the face of the drill, damage to the shank of the drill, etc.
2. If you start with the Darex file and select "Conic", turn off the split function, and press the [START] button, the result will be a drill bit that looks somewhat like the one to the right. If it is not right, regrind after selecting single point alignment and advancing the cutting edge.

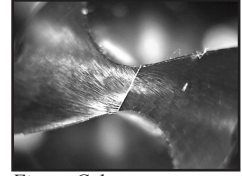
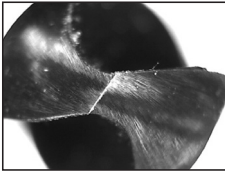


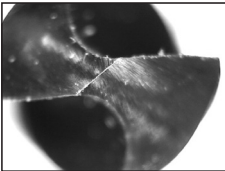
Figure C-1

## Using cutting edge advance to correct chisel angle when using Single Point Alignment

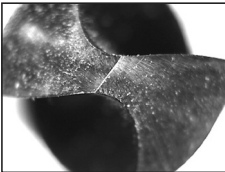
When using Single Point Alignment to enable grinding of conic drills which wouldn't have been detectable, the Chisel Angle will be incorrect. Chisel Angle should usually be  $110^\circ$  to  $130^\circ$ .



This photo shows a conic drill ground using the Darex file without a split. The chisel angle on the drill is approximately  $125^\circ$ .



This photo shows a drill ground using the Darex file and Single Point Alignment, with  $1^\circ$  entered into advance. The chisel angle on this drill is approximately  $145^\circ$ .



Making the advance  $13^\circ$  produces the result shown in this photo, which is identical to the first drill sample at  $125^\circ$ .

3. Once the advance is correct, turn on the X-split function, even if eventually going to use Radial splitting (the X split produces nice sharp boundaries that can be easily used to adjust the split relationships).
4. Look at the split angles on the pattern drill. The angle between the cutting edge and the first split line is the fan angle and is usually between  $45^\circ$  and  $65^\circ$ . If the pattern drill has coolant holes, they can be a good reference point, since the fan angle can be increased or decreased to reveal or conceal more or less of the trailing edge of the coolant hole to match the pattern drill. If the pattern drill is not coolant fed, attempt to copy the fan angle with the methods available to you. By making the fan angle a little bigger than expecting how it will end up, ( $65^\circ$  instead of  $55^\circ$ ), the process will go faster, because the sample will not have to be totally reground if the angles are wrong. The angle between the cutting lips and the secondary cutting edges is called the Split Angle, and it's usually between  $130^\circ$  and  $160^\circ$ , although some carbide and cobalt drills have a larger angle (up to  $170^\circ$ ).
5. Upon deciding what starting angles to use, enter them into the split screen. Back off the X and Z adjustments (in the "—" direction) in the Split adjustment screen about .005", Grind the sample drill with the initial split settings. It will look similar to Figure C-2.

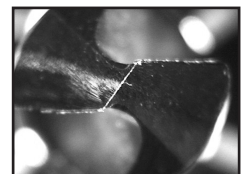
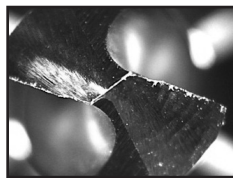


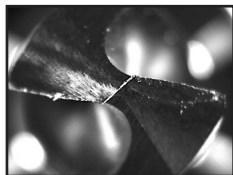
Figure C-2

6. If the angles still look good, adjust the X and Z settings to remove more material (Adjust in the “+” direction), and grind the drill again. It will look similar to *Figure C-3*.



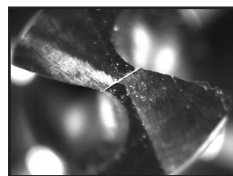
*Figure C-3*

7. Adjust X and/or Z deeper (in the + direction), and look at the drill. See *Figure C-4*. In this photo, the secondary cutting edges produced by the X adjustment are nice, but more material needs to be removed in Z, so adjust Z in the + direction in the split screen.



*Figure C-4*

8. *Figure C-5* is an example of a proper X-Style split drill.



*Figure C-5*

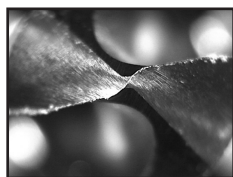
If making a drill with a RADIUS-style split, continue on as follows:

9. Change the split style to Radius and grind the drill.

10. *Figure C-6* is what the drill looks like after just changing to the Radial split. If this looks like the drill being copied, it is done. If wanting a more pronounced radius, go to the Web Thickness screen and reduce the entered web thickness by 10%. *Figure C-7* shows the results of the 10% web thickness reduction.



*Figure C-6*



*Figure C-7*

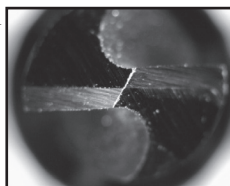
# Creating a Facet-Style Drill, Step-by-Step

It's best to have a pattern drill, that is, one which can be used for a model without grinding on it. Mark it with tape so it doesn't get mistaken for another sample drill.

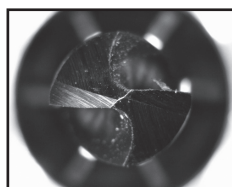
1. Decide whether or not the drill is grindable. Look for chips on the margin lines, fractures sending spall lines down the face of the drill, damage to the shank of the drill, etc.

## Adjusting Facet Shape

If you start with the Darex file and select "Facet" instead of "Conic", turn off the split function, and press the [START] button, the result will be a drill bit that looks somewhat like the one to the right. The facet lines will intersect at the centerline of the drill and the facets created will be rectangular.



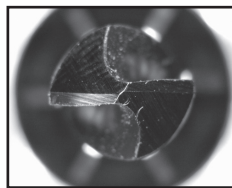
In order to compensate for a small drill size or a cutting edge that's difficult to locate, enter the web thickness and some advance to engage Single Point Alignment (SPA), which requires 1° positive or negative advance. But how much do you enter?



The picture to the left shows what happens when just entering +1° (enough to engage the advance function). Notice that the facets are no longer parallel, but are now pie-shaped.

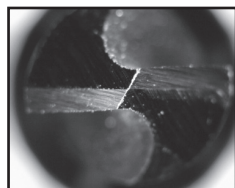
This is because the XPS-16+ is programmed to automatically detect and grind a facet drill with the proper amount of advance, and single point alignment resets that number to zero.

Therefore, the answer to the question "How much advance do I enter?" is to start at around 10° and do a test grind. The new picture below shows how the drill looks after adding 10° of advance. The changes are dramatic, but the facets are still a little bigger on the outside, next to the margin, so add in a little more advance



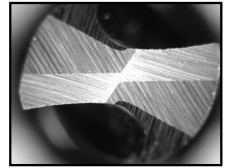
Ultimately, it turns out that 13° is just right for this particular drill. The facets are rectangular, and the drill is ready to split.

**TIP:** The higher the advance number, the smaller the outer edge of the facet will be.



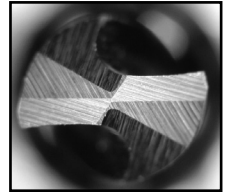
2. Once the advance is correct, turn on the X-Split Function, even if eventually using Radial splitting (the X-Split produces nice sharp boundaries that can easily use to adjust the split relationships).
3. Look at the split angles on the pattern drill. The angle between the cutting edge and the first split line is the fan angle and it is usually between 45° and 65°. If the pattern drill has coolant holes, they can be a good reference point, since the fan angle can be increased or decreased to reveal or conceal more or less of the trailing edge of the coolant hole to match the pattern drill. If the pattern drill is not coolant fed, attempt to copy the fan angle with the methods available to you. By making the fan angle a little bigger than expecting how it will end up, (65° instead of 55°), the process will go faster, because the sample will not have to be totally reground if the angles are wrong. The angle between the cutting lips and the secondary cutting edges is called the Split Angle, and is usually between 130° and 160°, although some carbide and cobalt drills have more angle (up to 170°).

4. Upon deciding what starting angles to use, enter them into the split screen here. Back off the X and Z adjustments (in the “-” direction) in the Split adjustment screen about .005” Grind the sample drill with the initial split settings. It will look similar to *Figure F-2*.



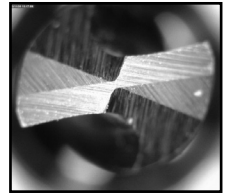
*Figure F-2*

5. If the angles still look good, adjust the X and Z settings to remove more material (Adjust in the “+” direction), and grind the drill again. It will look similar to *Figure F-3*.



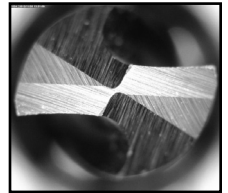
*Figure F-3*

6. Adjust X and/or Z deeper (in the + direction), and look at the drill. See *Figure F-4*. In this photo, the secondary cutting edges produced by the X adjustment are nice, but more material needs to be removed in Z, so adjust Z in the + direction in the split screen.



*Figure F-4*

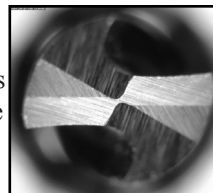
7. *Figure F-5* shows remnant chisel edge. If the goal is to produce an X-split drill, adding about 10° to the split angle to get rid of the remnants of the facet heels, creating a good looking drill.



*Figure F-5*

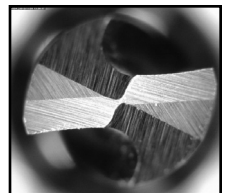
8. If creating a radially split drill, go ahead and change the split style to Radius and grind the drill.

9. *Figure F-6* is what the drill looks like after just changing to the Radial split. If this is the desired result, you’re done. If a more pronounced radius is wanted, go to the web thickness screen and reduce the entered web thickness by 10%.



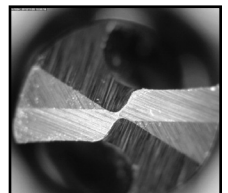
*Figure F-6*

*Figure F-7* shows the results of the 10% web thickness reduction. Note the roundness starting to form up on the cutting edges of the secondary cutting lips.



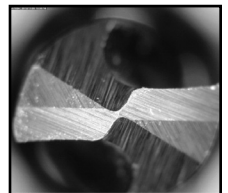
*Figure F-7*

10. *Figure F-8* shows the grind after reducing the web thickness by 20%. This is a pretty nice looking grind, if wanting a generic radial point, this one is good to go.



*Figure F-8*

11. *Figure F-9* shows too much of a reduction in web thickness. The radius is beginning to creep into the primary cutting edge, and in another 10% would obliterate about half of it.



*Figure F-9*

# Copying a Drill, Step-by-Step

These instructions are meant to be a guide for creating a copy of a drill. It is assumed that you have been able to identify and record the angles and other features of your pattern drill, through whatever means are available to you. For some, this may be a drill identification system or an old school drill microscope. Others may be limited to using a 10X loupe and guesswork. The important thing to remember is whether high-tech or no-tech, it will work if you learn enough about drills and the XPS-16+.

1. Lock in what you know, and then forget it.

- a. The first icon at the top left of the screen is used to adjust included point angle. Using either a protractor or a microscope, determine this number, enter it and save it.

***Tip:** If it's an adjustable protractor, it can be used to measure the other angles.*



- b. The second icon from the left is for adjusting material take-off (how much of the drill is ground away). **MID** Material Take Off is a good place to start; Material Take Off can be changed later if needed.
- c. Go down a row and find the Drill Point Style icon, which is the second from the left. There are only two choices here, **Conic** and **Facet**, so pick the one that looks like the drill to be copied.
- d. To the far right of this row is the Relief Angle screen. This angle is a little harder to determine, and it's important to remember that relief can only be measured at the margin of the drill.
- e. At the bottom left corner of the screen is the selector icon used to choose between the "CBN" wheel for HSS to Cobalt drills and the "Diamond" wheel for Carbide drills. Pick the one that applies. Remember, the sharpener is relying on you to install the right wheel, but doesn't know if you did. Adjust the sharpener to work with the wheel that is installed - refer to the Wheel Calibration section in this manual and follow the instructions there before proceeding.
- f. At this point, go to the File Index, name and save the file so your work is not lost.

2. Enter diameter/ or let the machine choose? If just a few drills of a particular type and diameter are to be sharpened, let the sharpener scan them for diameter automatically. There are, however, a couple of reasons to enter the diameter manually.

- There are a lot of the same sized drills to be sharpened. Under these conditions, entering the diameter saves a lot of time compared to automatic detection, because each sharpening cycle is several seconds faster if the sharpener doesn't check for diameter.
- If the drill shank is a different size than the flutes. If this is the case there is no option; the diameter must be entered. Be sure to save the file when finished.

3. Sharpen a sample drill with the split function turned off. If it is a Conic drill, look at the chisel angle. If it is a Facet drill, look at the facet shape. Adjust by using the advance feature to rotate the drill as needed.

4. Split adjustment. Start with X style even if drill has a Radial Split. When setting up the split, start with an X split. A Radial split is full of curves and it's hard to tell where all the lines are so that they can be adjusted correctly. X-style Splits are easier to analyze, since all the lines intersect sharply. As a general rule, the long split lines controlled by the "Z" axis should relate to each other with the left side line either straight across from the right or slightly higher than the right. There are exceptions to this, especially in the more exotic Carbide drills, so use the pattern as a guide. The shorter line controlled by the "X" axis are usually even with each other. Save your settings.
5. Setting Split Angles

***Tip:** Remember that the numbers used to set the Split Angle affect the settings available to build the Fan Angle. Smaller Split Angle = smaller Fan Angle available.*

***Tip:** Start with X and Z settings adjusted to the minus side and grind the drill. If the angles are incorrect, they can be changed without having to regrind the drill completely. Save settings.*

***Tip:** Set the Split Angle larger than it will probably need to be.*

***Tip:** Set the Fan Angle smaller than it will probably need to be.*
6. Setting Web thickness:

***Tip:** Use [ADVANCE] to adjust the chisel angle on Conic drills, and the Facet shape on facet drills.*

***Tip:** Use [ADVANCE] to engage single point detection.*

***Tip:** Remember that the [ADVANCE] added will also affect the Fan and Split Angles.*
7. Engage Radial Split if desired, and adjust it using web thickness, Split offset and "C" rotation. Save.
8. Set the Hone Time settings and save.



# Download Details

## Software Updates And Drill File Saving

### PC Software Installation

1. Insert the Darex XPS-16+ thumb drive that was supplied with the new machine into a disk drive.
2. Double click on the **X-Loader** zipped file.
3. Double click on the **Set-up** file.



Once installed there should be a new Icon on your computer desktop.

You are now ready to update controller software or save and retrieve drill files between a PC and the sharpener. The **X-Loader** communication software is an easy way to store drill files if needing more than the existing 100 drill file spaces. The **X-Loader** is also an easy way to re-upload the factory calibration settings should the sharpener software crash.

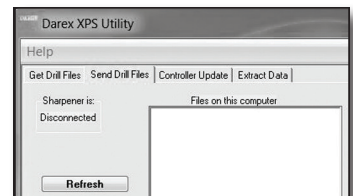
### Saving and Retrieving Drill Files

1. Open the Darex shortcut to **X-Loader** icon on your desktop.
2. Turn on the sharpener.
3. Plug the USB-to-mini-USB cable into a USB port on your PC, and into the upper mini-USB port under the cover on the bezel of the display of the sharpener.
4. With the cable installed, the X-loader will display in the upper left hand corner **Connected**.
5. Follow instructions at bottom of X-Loader screen.
6. Click the **[BROWSE]** button to create a destination folder to save the drill files to your PC.
7. Click the **[START TRANSFER]** button to save to destination folder.
8. A pop up window will say **File Saved**.



### Sending Drill Files from PC to Sharpener

1. Click the **[SEND DRILL FILES]** tab in upper left hand corner of X-Loader screen.
2. Follow instruction at bottom right of X-Loader screen.
3. Press **[BROWSE FOLDERS]** button to select the file to transfer to sharpener.
4. Then select the files within that folder.
5. The file will appear on the left screen of the X-Loader. Either "Select All" or click on the file to be moved to the screen on the right. The file will be highlighted in blue.
6. Click the **[RIGHT ARROW]** button to transfer the file from the Files on this computer screen to the Drill Files to send to the Darex Sharpener screen.
7. Then click the **[SEND]** button.



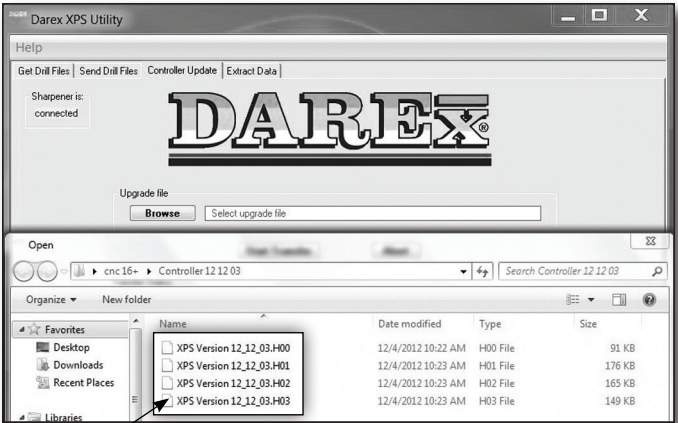
**Tip:** If a file is already on the sharpener, a pop up screen will display that the file already exists. Choose **[YES]** to over-write the file or **[NO]** to not over-write.



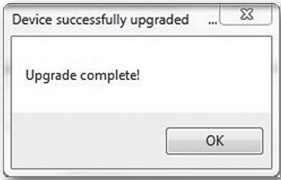
## Controller Update

The CD that was shipped with the sharpener has controller software and revision for that point in time. If there is a controller update or the controller software crashes on the sharpener, follow these instructions to re-download the controller software.

1. Turn on power for the sharpener.
2. Open **X-Loader** on PC.
3. Plug the supplied USB cable into PC and the mini-USB side of cable into upper mini-USB port on display bezel.
4. The X-Loader connectivity changes from **Disconnected** to **Connected**.
5. Click the [**CONTROLLER UPDATE**] tab at the upper left hand corner of the X-Loader screen.
6. Follow instructions on the bottom of X-Loader.
7. Click the [**FILE UPGRADE BROWSE**] button to load new controller file onto X-Loader (*Example: XPS Version 12\_12\_03.H00*). Click on any one of the four file options ending in .H00, .H01, .H02, or .H03. All of these files will load automatically.
8. Click the [**START TRANSFER**] button. Wait for operation to complete. This operation can take several minutes.



9. When complete the X-Loader pop up will display **Upgrade Complete**. The sharpener will re-initialize and is now ready to sharpen.



# Advanced Sharpening Tips

## Geometry

- Start out simple and add more features as the drill point is developed. The point and lip relief angles can be treated as absolute values. Split parameters are more relative and require some judgment and “sneaking” towards.
- To produce a small chamfer on the very outer edge of a drill, sharpen the drill at desired point angle. Then create a second program, setting the included point angle to 90°, at minimum MTO and grind 1 rotation only (watch for 1 full rotation, then press the **[PAUSE]** button twice to return to **[HOME]**).
- Secondary cutting edges which appear to be too perpendicular to the Fan Angle tend to make the best radius style splits, as the launch of the radius tends to consume most of the initial angularity.
- Another way to decide how severe the Split Angle needs to be without using a microscope (useful for on-site grinding), is to watch to see how much of the primary cutting edge is removed by the split angle and adjust to get the best match.
- If there is an unwanted straight edge remaining between the end of the split and the cutting edge, it can be rounded off by going to the R-Split screen and subtracting some of 5° of the “C” compensation.
- When splitting the point, the closer the Fan Angle is to its maximum value, the more obvious the Split corner. This means that the drill rotation is minimized to produce a given Split Angle.

## Drill Files

- Name and start saving a Drill File early on in the sharpening process
- When developing a new drill point, err on the material safe side when splitting.
- Learn to use Single Point and Manual Alignment when needed, especially for chisel edge placement. A thick web drill requires less advance ( $ADV = 4 - 8^\circ$ ) than a standard web ( $ADV = 14 - 18^\circ$ ).
- To achieve desired radius in R-Split, slowly reduce Web Thickness. In some cases it can be reduced by 65% of actual. If the web thickness is entered as too small, the drill will over-rotate the cutting edge into the wheel grinding negative Rake.
- Never turn your back on the Alignment process. Be sure the drill is going to the grind wheel in the proper orientation.

## Wheels and Hone

- Hone times vary depending on drill size. Use 3, 6 & 9 seconds for small, medium and large drills, respectively. When using SiC Hone, multiply by a factor of 2 or more.
- Use clean and sharp Grind Wheels to maximize speed of re-sharpening drills.
- A 320 DIA (diamond) Grind Wheel can be used on a limited basis to grind/split small ( $< 3/16''$ ) HSS drills to improve surface finish.

## Carbide and Facet

- On 4-Facet drills, the Split Angle needs to increase with larger point angles to avoid remnants of the secondary facet along the split edge.
- When sharpening 4-Facet drills using ADV (Single Point) alignment, a widening facet towards the OD requires a more positive ADV degree angle.
- To create more primary facet overlap on 4-Facet drills, reduce the Stickout in increments of 0.010” until the desired amount of overlap is achieved.
- When setting-up a carbide drill that has unusual features, use a comparable HSS drill and CBN grind wheel to help develop the more difficult geometries.

## Remember:

- There is no adjustment for Split Down Angle and Secondary Facet Angle.
- Use of ADVANCE is not compensated for in the Split parameters.
- Use a silver marking pen to enhance the cutting edge for drill alignment. Use a black marking pen to minimize reflections from the flute area on bright finish drills.
- When sharpening small drills ( $<3/16"$ ), start with the cutting edge close to the 2 o'clock position for better drill alignment.
- The material selector HSS vs. CARBIDE, changes some of the grind sensitivities and slows down the split rotation.
- Grind Wheel Offsets are not saved with the drill files.
- For stepped-shank drills, set the Drill Diameter to the correct value.

## General Maintenance

To extend the life of the sharpener, it is recommended a routine maintenance program be put in place. Every 200 machine hours is suggested, or more often if necessary.

### Vacuum system

Check filter on a regular basis. Inspect all hoses for cuts or tears.

**Tip:** Do not use machine if hoses are damaged.

1. Unplug vacuum from power source.
2. Using a  $1/4$  hex key wrench remove bolt and washer.
3. Wearing protective gloves, remove top  $1/2$  cover of vacuum canister, remove filter cartridge. Appropriately dispose of used filter.
4. Unthread plastic nut retaining bottom  $1/2$  of vacuum canister, remove bottom  $1/2$  of vacuum canister.
5. Clean out residual grinding dust from bottom of canister.
6. Replace with new filter cartridge.

### Lubrication Screen

After  $\pm 250$  sharpening cycles, the "LUBRICATION" screen will come up and the machine will need to go through the self-lubing process.

1. Remove drill from chuck.
2. Press the [CHECK] icon. This will begin the self-lubing cycle. Keep hands free from machine, because as it goes into the lubing process, the X, Z and A axis will begin to move simultaneously with various degrees of freedom not used during the normal drill sharpening routine. DO NOT INTERRUPT THIS PROCESS. The lube cycle will last 45 seconds.
3. Upon completion, the lubing screen will disappear and the original screen will return. Do not interrupt or stop machine once the lubing cycle has begun.



## Wheel Cleaning

**Always clean a brand new wheel before using.** Wheels are packaged in rust preventative oil and will load up if not cleaned before grinding. These wheels are maintenance free from truing and dressing but will need cleaning periodically.

1. Remove the wheel from the unit.
2. Saturate the wheel with any type of oil-less solvent, such as automotive brake cleaner.
3. Use a soft bristle brush and lightly brush the saturated wheel loosening the impacted grinding particles.
4. Re-saturate the wheel to flush out any loosened debris.
5. Dry carefully with compressed air before re-installing.
6. Make sure the grind wheel arbor and grind wheel bore are contaminant free before mounting the wheel.

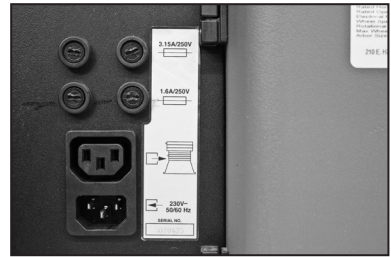
**Note:** *If after cleaning the wheel, the drills still discolor or burn, the wheel life may be exhausted and the wheel will need replaced.*

After a wheel change, verify and/or recalibrate Material Take Off (MTO):

1. Remove the wheel from the unit.
2. Use a 3/8 HSS standard twist drill, measure the length of drill before sharpening.
3. Call up the Darex #1 file and sharpen a drill.
4. After sharpening the drill, measure the drills new length. MTO should be approximately .005-.007.
5. If incorrect, adjust using Wheel Offset screen.

## Changing the Grind Motor & Vacuum Fuses

1. Unplug AC power.
2. Both sets of fuses are located on the back of the machine, on the outside the electrical box panel near the cord receptacle.
3. Fuse holder is spring loaded. Using a flat head screwdriver press in and turn counter-clockwise until fuse holder backs out enough to hold on to, turn and remove.
4. Check continuity of new fuses and their holders before replacing.
5. Replace both Vacuum fuses or both Grind motor fuses, regardless of the appearance of the second fuse.



## Cleaning Fiber Optic Lens

For good drill alignment function, keep the fiber optic lens clean. Normal service period is about every 14 days, depending on conditions, more often may be necessary.

To service, use a single drop of isopropyl alcohol on a cotton swab and lightly clean lens.

## Material Take Off (MTO)

### Sensors 1 & 2:

1. Using a soft bristle paint brush, lightly brush debris away. Occasional use of dry, clean compressed air may be required. (i.e. canned keyboard cleaner).
2. Electronics Panel Fan Filter:
  - Turn the power off and remove the fan guard and filter.
  - Clean the filter with soap and warm water and then blow dry.
  - Reinstall filter and guard.

## LCD Screen

Clean LCD screen with a soft cloth and a small amount of mild glass cleaner.

## Wheel Housing Cavity

While grinding wheel is out of the machine and before replacing wheel, vacuum out wheel housing and wipe off and around the hub area.

## External Machine Castings

Wipe down external machine castings with a mild household cleaner.

# Troubleshooting

### Machine won't turn on:

- No power at outlet
- Make sure power cord is plugged into machine and outlet
- Release E-stop button
- On/Off switch has failed
- Wiring leads are disconnected
- Fuse blown

### Failed Initialization screen test:

- Axis driver card failure
- Limit sensors are bad
- Solenoid is bad
- Machine has moved past the limit switches

### LCD screen displays garbage or grossly inaccurate information:

- Machine temperature is too cold/hot – do not operate until machine temperature reaches above 7°C (45°F) but not more than 32°C (90° F).
- Restore calibrations from locked area.

### After pressing [CYCLE START] the machine does not move into the sharpening cycle:

- Make sure drill has been loaded properly and sensor button has been depressed.
- Close door.
- Software has caused machine to hang up. Turn machine off and then on again.
- Cycle start switch needs replacement.

### Drill rotates in front of fiber optic sensor failing to locate cutting edge:

- Drill diameter is of a smaller dimension with a thick web. Try Single Point Alignment.
- Color of drill is interfering with cutting edge detection – typically gold or black drills. Use silver marking pen to color cutting lip
- False diameter was input or detected in manual mode.
- Fiberoptic Amplifier Baseline setting has changed. Contact Darex for instructions.
- Cutting edge is broken
- Cutting edge has shiny build up, such as aluminum
- Surface finish too rough
- Calibration of fiber optic sensor is incorrect and will need recalibrated
- Fiber optic lens is loose
- Fiber optic sensor needs to be replaced
- Fiber optic lens needs to be cleaned or replaced

- Sharpener is located under outside light or overhead light
  - Fiber optic lens or cable has been damaged
  - Shank is larger than body of drill and correct diameter has not been manually input
- Example: Step drill*

**Auto diameter detect will not detect correct diameter:**

- Diameter detection rod is bent or loose
- Diameter detection rod has been improperly installed.
- Incorrect diameter calibration
- Shank of drill may be larger/smaller than actually body of drill
- Drill flutes are worn or damaged
- MTO #1 button excessively worn or carbide disc has fallen off

**Auto web detection does not display correct web thickness:**

- Fiber optic sensor lens is dirty
- Fiber optic sensor is not calibrated correctly
- Fiber optic sensor is bad
- Old software installed
- 15% error margin allowed

**Cutting edge is not positioned correctly at 12:00 after edge detection:**

- Chip on cutting edge
  - Burr on cutting edge
  - The fiber optic sensor has detected the split line as cutting edge
  - Drill has a hook in the cutting edge – use the Advance Screen to compensate.
  - Changing from extreme point angles
- Example: Converting a 180° drill into a 118° point angle*
- Material build up on cutting edge
  - A value was left in the Advance Screen
  - Drill may have hooked cutting edge

**Drill incorrectly split:**

- Check offsets on the split point offset page
- Wheel calibration is off
- Check wheel edge offset on wheel offset page
- Did not align correctly
- Web thickness is wrong

**Material take off varies:**

- Check wheel face offset on wheel offset page
- Wheel calibration is off
- Spindle cartridge loose

**Drill not touching hone brush:**

- Check offsets on the Hone offset page
- Honing brush calibration is off

**Length of time drill required to grind becomes excessive:**

- Material take off too excessive
- Grinding wheel needs to be cleaned
- Grinding wheel needs to be replaced
- Grind material selection has been changed from HSS to CARBIDE

**Unable to secure drill in or release drill from chuck:**

- Solenoid not locking up
- Chuck spindle insert needs cleaned
- Drill is carbide and needs to be centered while closing the chuck
- Drill diameter too small to be clamped
- Drill has multiple diameters that are interfering with jaws
- Drill has a taper in the shank or on the body of the drill

**During initialization chuck tries to rotate unsuccessfully while making a ratcheting/ buzzing noise:**

- Solenoid has malfunctioned and chuck locking pin will not retract
- Solenoid fuse blown
- Drive pulley loose
- Belt condition

**Unexplained motion**

- Machine temperature is too cold/hot - do not operate until machine temperature reaches 7°C (45°F) but not more than 32° C (90° F)
- Software issues – restore settings from permanent memory

**Troubleshooting Vacuum:**

- Excessive grinding dust visible.
- Vacuum not operational.
- Dirty filter.
- Hoses split.
- Hoses not connected.
- Filter top box or bottom not seated properly.

**Vacuum not operational:**

- Blown fuse
- Not plugged into sharpener
- Bad control circuit on power supply
- Vacuum motor burned out

## Notes:





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