# Operating Instructions and Parts Manual

# Manual Cold Saw

## Model CS-350EU


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# 1.0 Table of Contents

# 2.0 Safety Instructions

**⚠WARNING Failure to follow these rules may result in serious personal injury:**

1. FOR YOUR OWN SAFETY, READ INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE. Learn the machine's application and limitations as well as the specific hazards.
2. Only trained and qualified personnel can operate this machine.
3. Make sure guards are in place and in proper working order before operating machinery.
4. Remove any adjusting tools. Before operating the machine, make sure any adjusting tools have been removed.
5. Keep work area clean. Cluttered areas invite injuries.
6. Overloading machine. By overloading the machine, you may cause injury from flying parts. DO NOT exceed the specified machine capacities.
7. Dressing material edges. Always chamfer and deburr all sharp edges.
8. Do not force tool. Your machine will do a better and safer job if used as intended. DO NOT use inappropriate attachments in an attempt to exceed the machines rated capacity.
9. Use the right tool for the job. DO NOT attempt to force a small tool or attachment to do the work of a large industrial tool. DO NOT use a tool for a purpose for which it was not intended.
10. Dress appropriate. DO NOT wear loose fitting clothing or jewelry as they can be caught in moving machine parts. Protective clothing and steel toe shoes are recommended when using machinery. Wear a restrictive hair covering to contain long hair.
11. Use eye and ear protection. Always wear ISO approved impact safety goggles. Wear a full-face shield if you are producing metal filings.
12. Do not overreach. Maintain proper footing and balance at all times. DO NOT reach over or across a running machine.
13. Stay alert. Watch what you are doing and use common sense. DO NOT operate any tool or machine when you are tired.
14. Check for damaged parts. Before using any tool or machine, carefully check any part that appears damaged. Check for alignment and binding of moving parts that may affect proper machine operation.
15. Observe work area conditions. DO NOT use machines or power tools in damp or wet locations. Do not expose to rain. Keep work area well lighted. DO NOT use electrically powered tools in the presence of flammable gases or liquids.
16. Blade adjustments and maintenance. Always keep blades sharp and properly adjusted for optimum performance.
17. Keep visitors a safe distance from the work area.
18. Keep children away. Children must never be allowed in the work area. DO NOT let them handle machines, tools, or extension cords.
19. Store idle equipment. When not in use, tools must be stored in a dry location to inhibit rust. Always lock up tools and keep them out of reach of children.
20. DO NOT operate machine if under the influence of alcohol or drugs. Read warning labels on prescriptions. If there is any doubt, DO NOT operate the machine.
21. Do not cut where the atmosphere might contain flammable dust, gas, or liquid vapors such as from gasoline.
22. DO NOT touch live electrical components or parts.
23. Turn off power before checking, cleaning, or replacing any parts.
24. Be sure all equipment is properly installed and grounded according to national, state, and local codes.
25. Keep all cords dry, free from grease and oil, and protected from sparks and hot metal.
26. Inspect power and control cables periodically. Replace if damaged or bare wires are exposed. Bare wiring can kill!
27. DO NOT bypass or defeat any safety interlock systems.
28. Always check that the work piece is securely clamped and that long pieces are properly supported.
29. DO NOT use a saw blade size that is outside the limits of the machine specifications.
30. Immediately release the start / run trigger button if the saw blade should get stuck in a cut. Press the red power off switch and remove the yellow lock key before raising the machine head. Then open the vise and remove the work piece. Check the blade teeth for damage. If any of the teeth are broken or missing replace the saw blade.
31. The operator should stand in front of the machine using a single hand to grip the feed handle.
32. A proper break-in period for the cold saw is recommended. Intervals of 30 minutes to be repeated two or three times, after which the cold saw may be used continuously.

# 4.0 Product Identification

## 4.1 Saw Blade Head Assembly

The section of the machine composed of the saw motor, gear case, blade and blade guard, and feed handle and trigger switch.

### 4.1.1 Feed Handle

A long-angled tube with a grip for raising and lowering the disk head and a trigger switch to start and stop the saw motor.

### 4.1.2 Gear Case

The central part of the assembly, housing the gear system. The motor mounts to the back and the output to the blade is to the left side.

### 4.1.3 Blade Guard

The Blade guard has a stationary cover which mounts to the left side of the gear case and a movable part which has linkage connect to it to cause the guard to open and expose the lower part of the blade as the feed handle is pulled downward.

### 4.1.4 Saw Blade

The saw blade is mounted onto the end of the arbor shaft and positioned to be centered within the guard assembly.


*Figure 4-1*

## 4.2 Electrical Box

The electrical box is mounted to the right of the saw blade head assembly and house the electrical control system except for the trigger switch. The function of the switches will be discussed later.

## 4.3 Machine Base

A heavy cast iron structure that supports the miter system, vise system, head assembly, and holds the coolant system.

## 4.4 Vise

A clamping system that provides the basic support and grip for the work material. A handwheel opens and closes the vise jaws.

From the operators position in front of the saw, the left side of the vise has the jaws to clamp the material. The right-side bar provides support to reduce and prevent the material from kicking out at the end of the cut.

*Figure 4-2*

## 4.5 Material Stop

The material stop to the right side of the vise may be used to set the cut length of the material. This is especially useful for multiple cuts of the same length.

## 4.6 Support Roller

The support roller to the left or infeed side of the vise will assist in holding the material on plane with the vise table as well as assist in feeding the material through the vise.

*Figure 4-3*

## 4.7 Stand

Support structure for the machine head assembly, machine base, vise system, and coolant pump system.


*Figure 4-4*

## 4.8 Coolant Pump

Located in the back of the machine stand, the self contained coolant system includes a tank, coolant pump, filter, and hoses.

*Figure 4-5*

## 4.9 Overall Dimensions

Machine Dimensions
(when assembled)

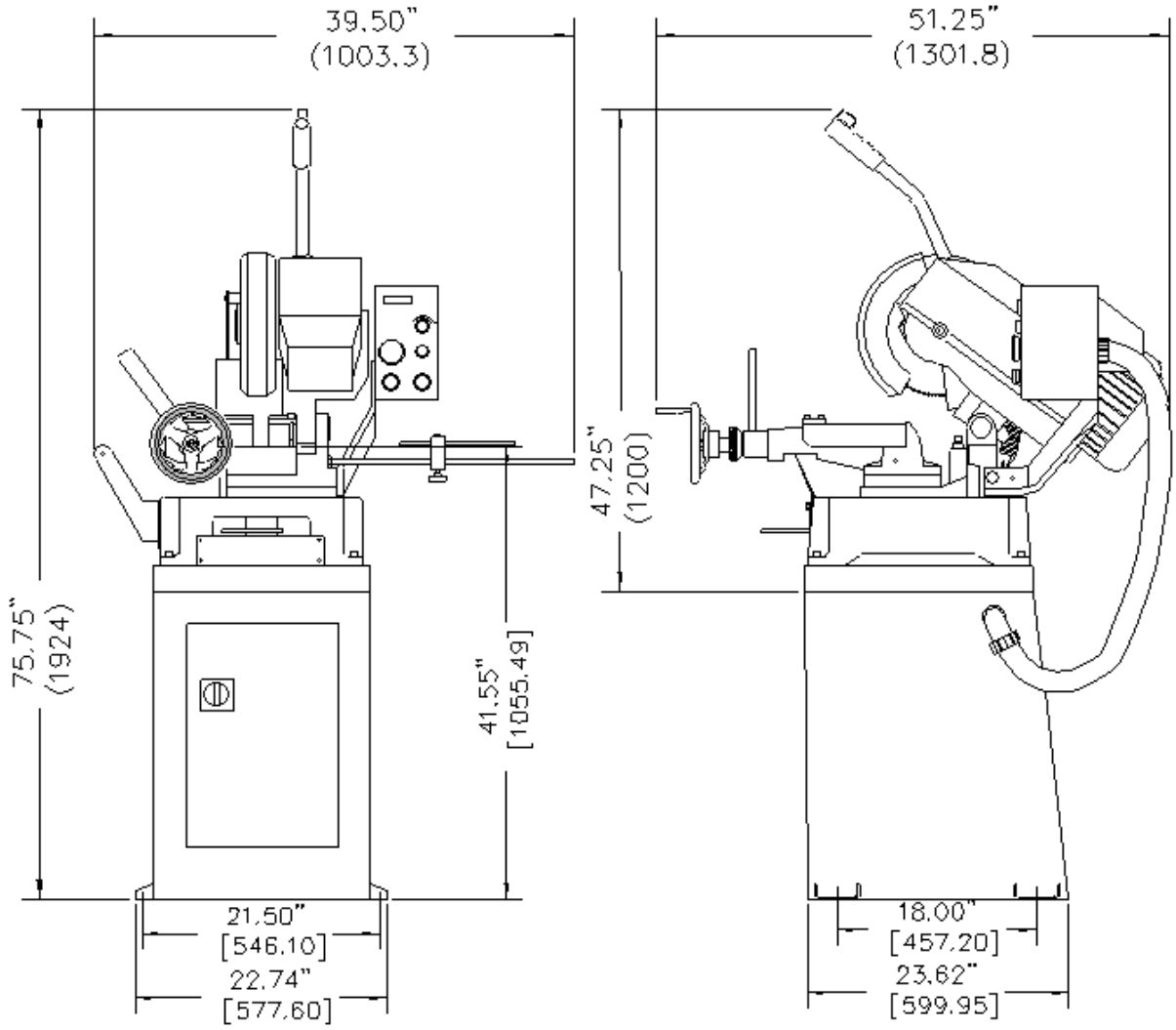



*Figure 4-6*

# 5.0 Specifications

*Table 5-1*

| | |
|---|---|
| Model number | CS-350EU |
| Stock number | BA9-1002535 |
| Motor and Electrical | |
| Main Motor | 3hp (1.86kw), 220V, 3ph, 4P, 60hz, 10A |
| Power | 220V, 1ph, 60hz |
| Coolant Pump | 1/8hp (93w), 220, 1ph, 50/60hz, 0.5A, L140 |
| General Specifications | |
| Operation | Manual |
| Head Style | Pivot |
| Blade Size (Customer Supplied, must match work material) | Ø14" (355mm) x T0.10” (2.5mm) |
| Arbor Size | 1.26" (32mm) |
| Blade Speed | Variable, 24 - 120rpm |
| Vice Style | Single Action with Cam Lock |
| Head Miter | 45° Left / 45° Right |
| Maximum Vice Opening | 4.72" (120mm) |
| Slotting Ability | No |
| Material Stop Length | 27.25” (762mm) |
| Vise Table Height from Floor | 41.55” (1055mm) |
| Coolant Tank | 1.5gal (5.7L) |
| Weights and Dimensions | |
| Net Weight with Stand | 600lbs (272kg) |
| Shipping Weight | 720lbs (327kg) |
| Overall Dimensions (LxWxH) | 51.25” x 39.5” x 75.75” (1302 x 1003 x 1924mm) |
| Base Footprint | 22.74” x 23.62” (578 x 600mm) |
| Shipping Dimensions (LxWxH) | 60" x 44" x 62" (1524 x 1118 x 1575mm) |

## 5.1 Cutting Capacities:

*Table 5-2*

| | Solid Bars | | | Tubing | | |
|---|---|---|---|---|---|---|
| Angle |  |  |  |  |  |  |
| 90° | 3.5" (90mm) | 4" x 4" (100x100mm) | 6.3" x 3.5" (160x90mm) | 4.7" (120mm) | 4" x 4" (100x100mm) | 6.3" x 3.5" (160x90mm) |
| 45° | 3" (75mm) | 3.5" x 3.5" (90x90mm) | 3.5" x 2.8" (90x70mm) | 4" (100mm) | 3.5" x 3.5" (90x90mm) | 3.5" x 2.8" (90x70mm) |

**⚠WARNING**

**Read and understand the entire contents of this manual before attempting assembly or operation. Failure to comply may cause serious injury.**

# 6.0 Setup and Assembly

## 6.1 Unpacking and Checking Contents

**⚠WARNING**

**SUFFOCATION HAZARD! Immediately discard any plastic bags and packing materials to eliminate choking and suffocation hazards to children and animals.**

**⚠WARNING**

**If any parts are missing, DO NOT place the machine into service until the missing parts are obtained and installed correctly.**

Your Baileigh machine is shipped complete in two boxes on one pallet. Separate all parts from the packing material and check each item carefully. Make certain all items are accounted for before discarding any packing material.

## 6.2 Cleanup

**⚠WARNING**

**DO NOT USE gasoline or other petroleum products to clean the machine. They have low flash points and can explode or cause fire.**

**⚠CAUTION**

**When using cleaning solvents work in a well-ventilated area. Many cleaning solvents are toxic if inhaled.**

Your machine may be shipped with a rustproof waxy coating and/or grease on the exposed unpainted metal surfaces. Fully and completely remove this protective coating using a degreaser or solvent cleaner. Moving items will need to be moved along their travel path to allow for cleaning the entire surface. For a more thorough cleaning, some parts will occasionally have to be removed. DO NOT USE acetone or brake cleaner as they may damage painted surfaces.

Follow manufacturer's label instructions when using any type of cleaning product. After cleaning, wipe unpainted metal surfaces with a light coating of quality oil or grease for protection.

**IMPORTANT:** This waxy coating is NOT a lubricant and will cause the machine to stick and lose performance as the coating continues to dry.

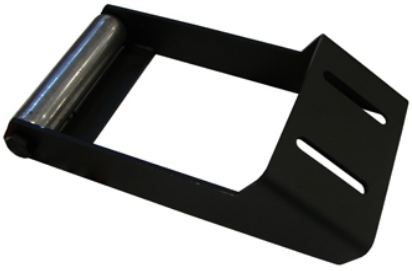
Two Person Lift. Use an assistant or lifting devise (preferred) to support the weight of the saw body. Do not lift alone.


Head and Stand Assembly

Material Stop

Hardware

Feed Handle



Support Roller

*Figure 6-1*

## 6.3 Transporting and Lifting

**NOTICE**

**Lifting and carrying operations should be carried out by skilled workers, such as a truck operator, crane operator, etc. If a crane is used to lift the machine, attach the lifting chain carefully, making sure the machine is well balanced.**

**Follow these guidelines when lifting with truck or trolley:**

- The lift truck must be able to lift at least 1.5 – 2 times the machines gross weight.
- Make sure the machine is balanced. While transporting, avoid rough or jerky motion, and maintain a safe clearance zone around the transport area.
- Use a forklift with sufficient lifting capacity and forks that are long enough to reach the complete width of the machine.
- Remove the securing bolts that attach the machine to the pallet.
- Approaching the machine from the side, lift the machine on the frame taking care that there are no cables or pipes in the area of the forks.
- Move the machine to the required position and lower gently to the floor.

- Level the machine so that all the supporting feet are taking the weight of the machine, and no rocking is taking place.

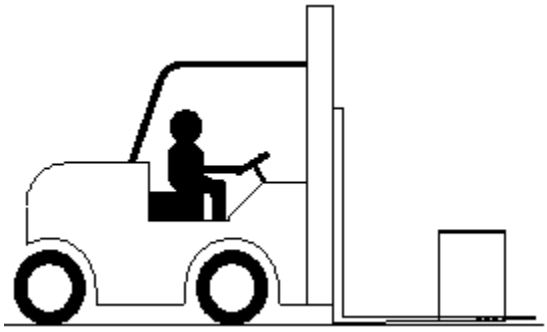


*Figure 6-2*

## 6.4 Installation

**IMPORTANT:**

Consider the following when looking for a suitable location to place the machine:

- Overall weight of the machine.
- Weight of material being processed.
- Sizes of material to be processed through the machine.
- Space needed for auxiliary stands, worktables, or other machinery.
- Clearance from walls and other obstacles.
- Maintain an adequate working area around the machine for safety.
- Have the work area well illuminated with proper lighting.
- Keep the floor free of oil and make sure it is not slippery.
- Remove scrap and waste materials regularly, and make sure the work area is free from obstructing objects.
- If long lengths of material are to be fed into the machine, make sure that they will not extend into any aisles.
- **LEVELING:** The machine should be sited on a level, concrete floor. Provisions for securing it should be in position prior to placing the machine. The accuracy of any machine depends on the precise placement of it to the mounting surface.
- **FLOOR:** This machine distributes a large amount of weight over a small area. Make certain that the floor is capable of supporting the weight of the machine, work stock, and the operator. The floor should also be a level surface. If the unit wobbles or rocks once in place, be sure to eliminate by using shims.
- **WORKING CLEARANCES:** Take into consideration the size of the material to be processed. Make sure that you allow enough space for you to operate the machine freely.
- **POWER SUPPLY PLACEMENT:** The power supply should be located close enough to the machine so that the power cord is not in an area where it would cause a tripping hazard. Be sure to observe all electrical codes if installing new circuits and/or outlets.

### 6.4.1 Anchoring the Machine

This saw can be operated as free standing if; all of the installation points are followed and the saw is solid and will not tip, rock, or move, with or without material loaded or during operation.

If it does not meet these criteria, then the saw should be anchored as follows.

- Once positioned, anchor the machine to the floor, as shown in the diagram. Use bolts and expansion plugs or sunken tie rods that connect through and are sized for the holes in the base of the stand.

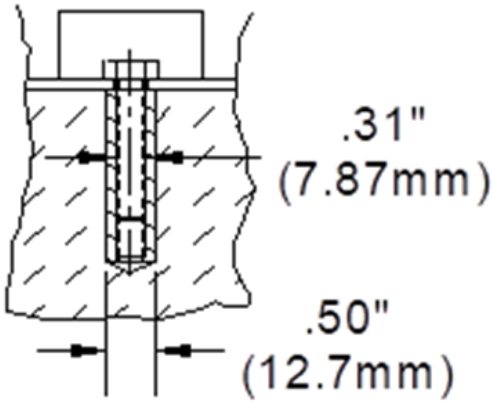



*Figure 6-4*

- This machine requires a solid floor such as concrete at a minimum of 4” (102mm) thick. 6” (153mm) minimum is preferred.

## 6.5 Assembly

**⚠WARNING**

**For your own safety, DO NOT connect the machine to the power source until the machine is completely assembled and you read and understand the entire instruction manual.**

Take out the accessories box (A) and the feed handle (B) from inside of the stand and set aside for later use.

Lift off the stand and place into the intended working location.

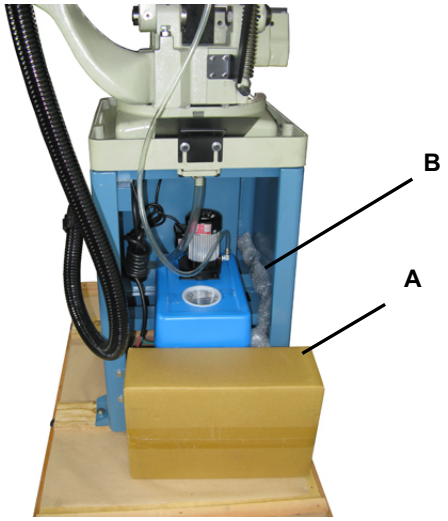



*Figure 6-5*

### 6.5.1 Prepare the Machine for Hoisting

- Using a sling (C), carefully wrap it around the collar of the moveable jaw and motor mount. Use care not to pinch wires.

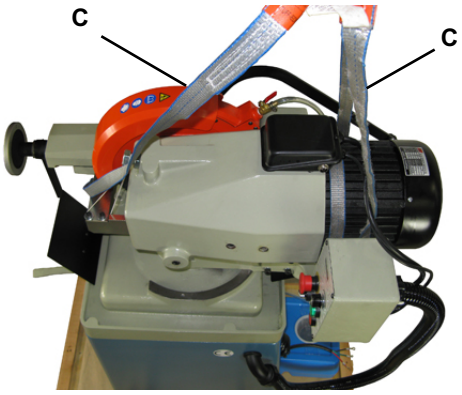



*Figure 6-6*

### 6.5.2 Remove the Oil Fill Transport Plug from Gear Transfer Case

- Use a wrench to unscrew an M20x40 hex screw from the oil fill hole (D).


*Figure 6-7*

### 6.5.3 Attach the Feed Handle to the Head Assembly

- Insert the threaded end of the feed handle (E) into the gear oil fill hole (F).
- Turn the handle clockwise (cw) until tight so that the trigger switch (G) points up.
- Tighten jam nut clockwise (cw).

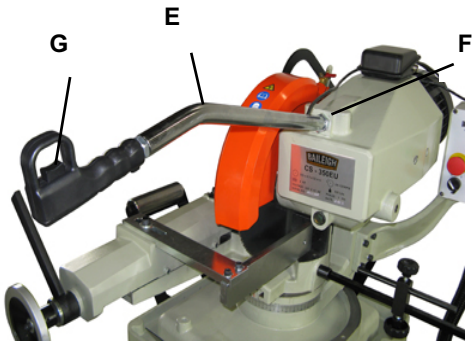



*Figure 6-8*

### 6.5.4 Connect Feed Handle Cable to Motor Box

- Route the feed handle cable over the transfer case to the electrical box on the motor.
- Plug the feed handle cable connector (H) into the open socket.
- Tighten the connector nut.


*Figure 6-9*

### 6.5.5 Attach the Support Roller to the Left Side of the Base

- Place the support roller (I) up to the machine base and align the 2 slots (J) with the screw holes in the base.
- Using (2) M10 washers and (2) M10x25 hex bolts, attach the support roller to the base.
- (DO NOT Tighten).
- Place a level across the mouth of the vise and the top of the roller. Raise or lower roller (I) until level, then secure by tightening bolts.

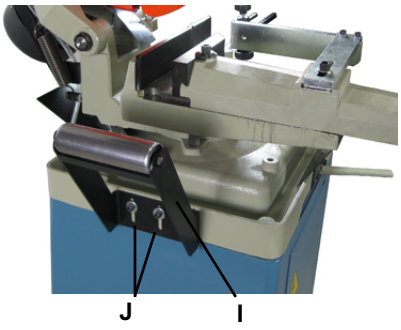



*Figure 6-10*

### 6.5.6 Attach the Bar Stop to the Vise

- Verify set screw (K) is loose enough not to interfere with the mounting hole on the side of the vise.
- Insert the collar on the long rod (L) into the side of the vise until snug making sure graduated scale can be easily read.
- Tighten the set screw (K) to secure the bar stop.

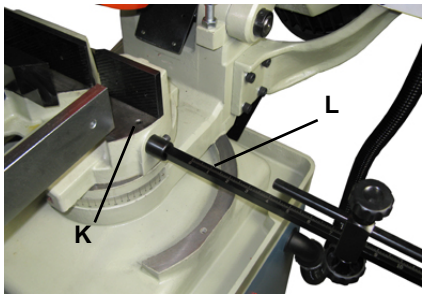



*Figure 6-11*

### 6.5.7 Verify Coolant Tank Installation

- Place the coolant pump (M) towards the rear opening of the machine stand.
- Place the coolant tank (N) onto the coolant platform (O). The trough of the tank fits over the vertical lip of the platform.
- Insert one end of the 0.50” drain hose (P) onto the hose connector (Q) on the underside of the machine base.
- Place the other end into the strainer cup (R) of the coolant tank.

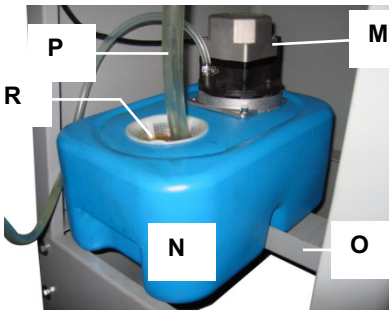



*Figure 6-12*

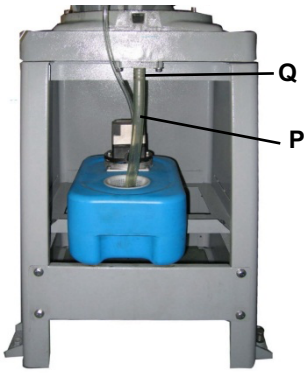



*Figure 6-13*

### 6.5.8 Install the Splash Plate

- Insert the splash plate (S) onto the front sidewall of machine base.
- Align the 2 slots (T) and attach plate with (2) M8 washers and (2) M8x20 hex screws.
- Adjust the plate to its proper position and tighten bolts.

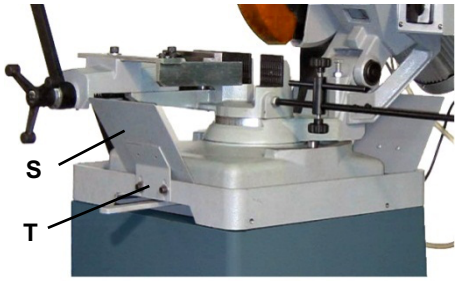



*Figure 6-14*

# 7.0 Electrical Connections

**⚠CAUTION**

**HAVE ELECTRICAL UTILITIES CONNECTED TO MACHINE BY A CERTIFIED ELECTRICIAN!**

**Check if the available power supply is the same as listed on the machine nameplate.**

**⚠WARNING**

**Make sure the grounding wire (green) is properly connected to avoid electric shock. DO NOT switch the position of the green grounding wire if any electrical plug wires are switched during hookup.**

## 7.1 Power Specifications

Your machine is wired for 220 volts, 60hz alternating current. Before connecting the machine to the power source, make sure the power source is OFF.

Before switching on the power, you must check the voltage and frequency of the power to see if they meet with the requirement, the allowed range for the voltage is ±5%, and for the frequency is ±1%.

## 7.2 Considerations

- Observe local electrical codes when connecting the machine.
- The circuit should be protected with a time delay fuse or circuit breaker with an amperage rating slightly higher than the full load current of machine.
- A separate electrical circuit should be used for your machines. Before connecting the motor to the power line, make sure the switch is in the “OFF” position and be sure that the electric current is of the same characteristics as indicated on the machine.
- All line connections should make good contact. Running on low voltage will damage the motor.

- In the event of a malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This machine is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into a matching outlet that is properly installed and grounded in accordance with all local codes and ordinances.

**⚠WARNING**

**In all cases, make certain the receptacle in question is properly grounded. If you are not sure, have a qualified electrician check the receptacle.**

- Improper connection of the equipment-grounding conductor can result in risk of electric shock. The conductor with insulation having an outer surface that is green with or without yellow stripes is the equipment-grounding conductor. If repair or replacement of the electric cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal.
- Check with qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the machine is properly grounded.
- Repair or replace damaged or worn cord immediately.

### 7.3 Power Cord Connection

1. Turn the main disconnect switch on the control panel to the OFF position.
2. Unwrap the power cord and route the cord away from the table toward the power supply.
   a. Route the power cord so that it will NOT become entangled in the saw, saw blade, or counterbalance assembly in any way.
   b. Route the cord to the power supply is a way that does NOT create a trip hazard.
3. Connect the power cord to the power supply and check that the power cord has not been damaged during installation.
4. When the saw blade is clear of any obstruction and raised to the up position, the saw turned ON to test operation.
5. Turn the saw OFF and press the E-Stop button when the saw is not in operation.

## 8.0 Adjustments

**⚠WARNING**

**Before performing the following operations, the electric power supply and the power cable must be completely disconnected.**

### 8.1 Adjusting the Mitering Lock Lever

1. The lock lever may require adjustment when the lever contacts the machine base and fails to lock the machine head at required angle. To re-adjust lever:
2. Loosen bolt (A).
3. Support the bushing (B) so that it does not drop.
4. Pivot lever (C) to unlock side (D) to allow more range of motion.
5. Re-tighten bolt (A).

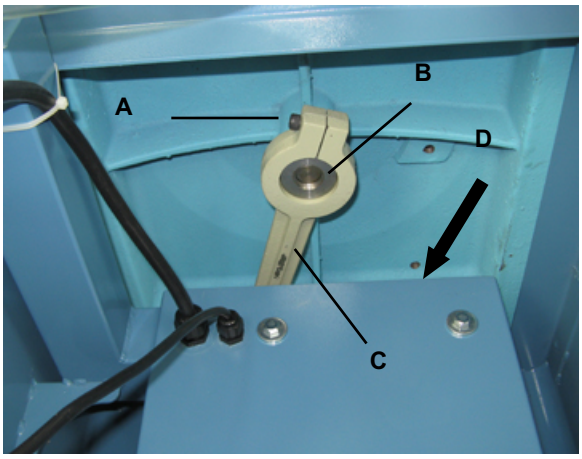



*Figure 8-1*

### 8.2 Adjustment of Saw Blade Head

If excessive axial play is found on the pivot hinge, it will be necessary to tighten the screws.

**Note:** Do not overtighten.

To adjust the saw blade head:

- Loosen the 3 set screws on each hinge nut (A).
- Tighten the nut to remove the axial play without causing the pivot to bind.
- Tighten the 3 set screws on each hinge nut (A).

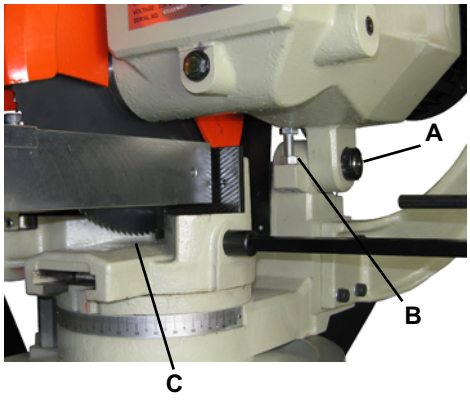



*Figure 8-2*

### 8.3 Setting Saw Blade Head Stop

To adjust the saw blade head stop:

- Loosen the jam nut (B).

- Turn the stop bolt up or down as desired to set the stop position of the blade. DO NOT allow the blade to be lowered to contact the vise (C).
- Hold the stop bolt in position and tighten the jam nut

## 8.4 Blade Tracking Adjustment

The head pivot shaft is supported by eccentric bushings. If blade tracks off center resulting in crooked cuts, adjust as follows.

1. Loosen two set screw (A) from rear of head pivot with 4mm hex wrench.

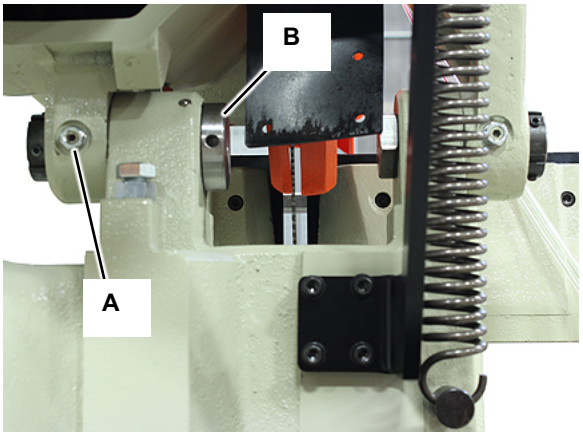



*Figure 8-3*

2. If blade tracks to right side (viewed from front of machine), rotate right socket screw (under the electrical box) clockwise with 5mm hex wrench.
3. If blade tracks to left side, rotate left socket screw counterclockwise.
4. Tighten set screws(A) and operate saw to verify correctness of adjustment.

## 8.5 Changing the Saw Blade

1. To change the saw blade:
2. Release and pivot the mobile guard (A) by removing the hex socket screw (B).
3. Place a block of wood into the vise.
4. Lower the machine head to rest the saw blade on the block of wood.
5. Using a hex wrench, remove the lock bolt (C) in a clockwise (cw) direction. (It has a left handed thread).
6. Remove the blade (D) and blade washer (E) from the spindle.
7. Remove the blade washer from the saw blade (D).
8. Place washer (E) onto the replacement blade and follow above procedure in reverse.
9. Check for proper blade rotation.

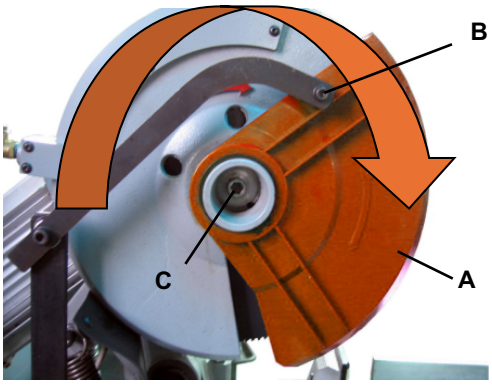



*Figure 8-4*

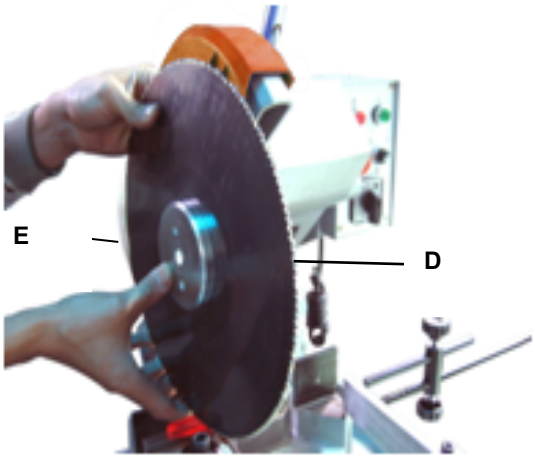



*Figure 8-5*

# 9.0 Operation

## 9.1 Miter Angle

**⚠CAUTION**

**Check that the cutting blade clears all parts of the vise assembly before cutting. The blade can strike parts of the assembly (especially during miter cuts) if not properly adjusted.**

1. Push the miter lock lever (A) to the left to release the disk head assembly.
2. Rotate the disk head assembly to the desired miter angle.
3. Use the indicator scale (B) to set the desired cut angle. (Fine tune the angle as needed to get the exact angle.

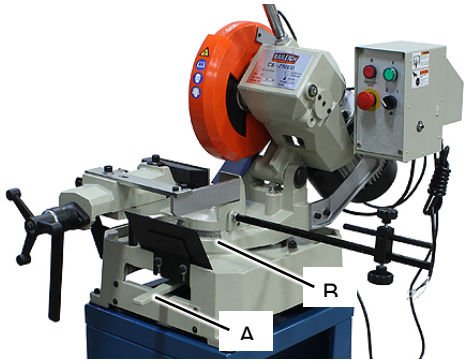



*Figure 9-1*

4. Slide the vise assembly forward or aft as needed to provide clearance for the cutting blade.
5. Adjust the vise clamping jaw (C) to allow for the blade to clear the vise without contacting the jaw.
6. Loosen the clamping bolt (D) and slide the jaw left or right as needed to clear the saw blade. The jaw should be between 0.25” and 0.5” (6 – 13mm) with out contacting the saw blade.
7. Adjust the clamping support to the right side of the blade by loosening and the mounting bolt and sliding the support within the slots (E) or when needed, changing the slots. If necessary, the clamping support may be removed.
8. Pull the miter lock lever (A) back to the right to lock in the angle. ALWAYS LOCK THE LEVER BEFORE CUTTING.

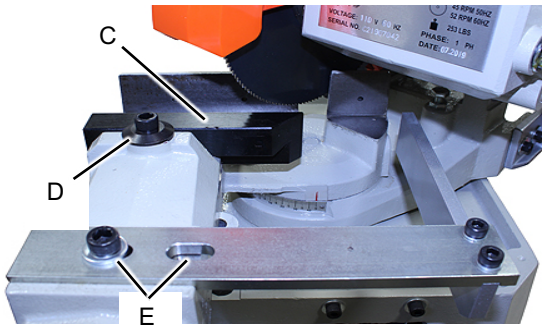



*Figure 9-2*

## 9.2 Vise Operation

1. Use the hand wheel (A) to open and close the vise jaw (B) for pieces that vary in width.
   a. Counter clockwise (ccw) to open jaws
   b. Clockwise (cw) to close jaws
2. Use the vise release lever (Z) to quickly clamp and unclamp pieces of the same width. The release lever is a 1/2 turn lever, from straight up (loosen) to straight down (clamped).
   a. Clockwise (cw) to clamp the piece
   b. Counter clockwise (ccw) to unclamp the piece

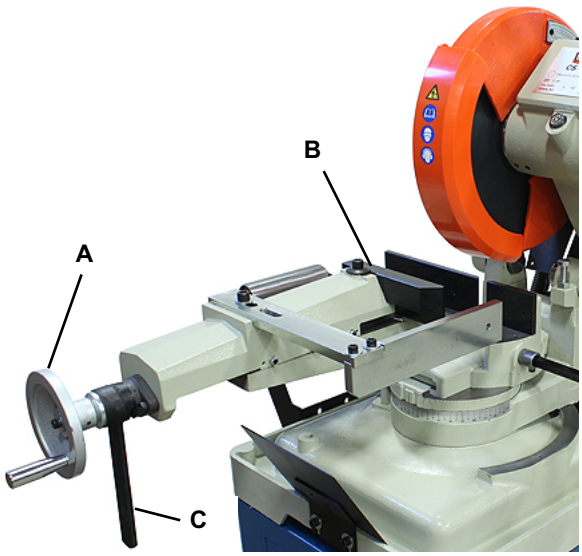



*Figure 9-3*

## 9.3 Loading the Piece Part

1. Use the vise hand-wheel to open the jaws wider than the width of the piece.
2. Measure and mark off the length of material to be cut.
3. Place the piece on the flat surface in between the vise jaws.
4. Slide the piece through the jaws so the scribed length mark lines up with the blade or disk.
5. Push the piece up against the back vise jaw.
6. Turn the hand-wheel clockwise (cw) to clamp the piece.

**If repetitive cuts are required for material of the same width:**

1. Turn the vise hand-wheel clockwise (**cw**) to approach the piece part, leaving approximately 3/16” (5mm) gap between front jaw and the piece part.
2. Then use the vise lock lever to clamp and unclamp the piece.

## 9.4 Setting Cut Length

Setting the cut length eliminates measuring duplicate pieces.

1. Measure and mark the length of material to be cut off.
2. Load the piece part.
3. Line up the cut.
4. Clamp the piece part.
5. Loosen the hex nut at the base of the bar riser (A).
6. Slide the bar riser (A) along the long rod (B) so that the tip of stop bar (C) touches the end of the piece part.

7. Tighten the hex nut at the base of the bar riser (A).

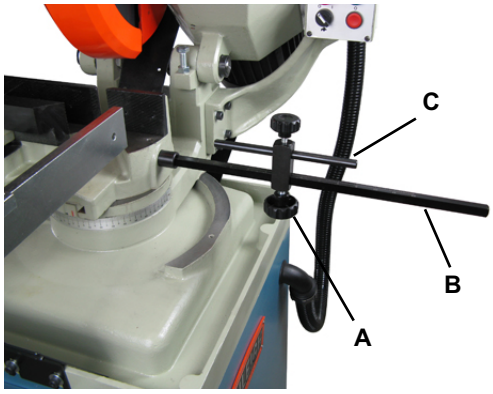



*Figure 9-4*

## 9.5 Using the Stop Bar

1. Cut off the first length from the clamped piece part.
2. Unclamp the piece part.
3. Slide the piece part forward until it reaches the tip of the stop bar (C).
4. Clamp the piece part.
5. Proceed with the cutting cycle.

## 9.6 Cutting Operation Cycle

- Set the miter cut angle.
- Open the vise jaws.
- Load and clamp the piece part.
- Adjust the bar stop for cutting length.

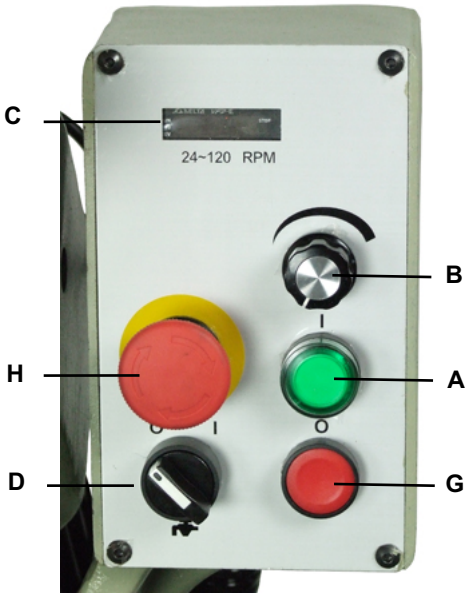



*Figure 9-5*

- Press button (A) to turn power on to the saw. (Green light will be lit).
- Set the coolant switch (B) to on.
- Grasp the feed handle (C).
- Press the trigger switch (D) to start blade motor.
- Pull down the feed handle (C) applying a steady and constant pressure.
- After cut-off, raise feed handle slowly.
- Release the trigger switch (D) to stop the blade motor.
- Use vise lever to open the jaws.
- Remove or advance the piece part forward for next cut.
- To turn off machine power press the stop button (E)
- To stop machine in an emergency situation, press the **EMERGENCY STOP** button (F).
- Before restarting machine, emergency stop button must be reset with a clockwise (cw) twist.

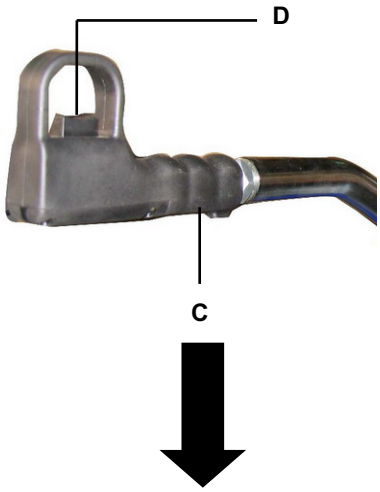



*Figure 9-6*

**NOTICE**

**Do not allow the saw to slam back up to the start position. Doing so will cause damage to the pivot block and the weight of the motor will cause damage to the gear case adaptor over time.**

## 9.7 Metal Chip Indicators

Chips are the best indicator of correct material feed force. Monitor chip information and adjust feed accordingly.

- Thin or Powdered Chips – increase feed rate or reduce saw speed.
- Burned Chips – reduce feed rate and / or saw speed.
- Curly Silvery and Warm Chips – optimum feed rate and saw speed.

The Baileigh cold saw is now ready to start work. For quality cutting and machine performance always use the correct type of blade or disk and recommended cutting speeds. To extend the life of a new blade or disk, the first two or three cuts must

be made while exerting a slight pressure on the piece part. This will double the normal cutting time.

# 10.0 Choosing a Saw Blade

**Note:** The saw blade included with this cold saw is a general-purpose blade. It is considered a starter blade and is intended to allow for the saw to make cut as soon as it is safely set up and ready for operation.

While this blade will cut many material profiles, the best cutting results will be achieved using a blade which is chosen to match the material to be cut.

To achieve a quality, economical, and efficient saw cut, the following points must be taken into consideration:

- Type of material being cut (ferrous or non-ferrous)
- Material hardness and physical dimensions
- Blade descent rate
- Rotational speed of blade
- Blade tooth profile

Choose a tooth pitch that is suitable for the workpiece. Thin-walled profiles, including tubes and pipes require close toothing. At least 3-6 teeth should be in contact with the material while cutting. Large solid or transverse sections require widely spaced toothing to allow for greater volume of chips and better tooth penetration. Soft materials such as plastics, light alloys, mild bronze, Teflon, wood, etc., require widely spaced toothing to avoid clogging.

### 10.1.1 General Characteristics

Fine Tooth Pitch – used for thin wall materials such as sheet steel, tubes and profiles.

Coarse Tooth Pitch – used for large cross-sections, and for soft materials (aluminum alloys and soft alloys in general).

### 10.1.2 Determining Proper Tooth Pitch

Proper tooth pitch depends on:

The size of the section.

The hardness of the material.

Wall thickness.

Solid sections call for blades with a coarse tooth pitch, while small cross-sections require blades with finer teeth.

When cutting walls of small cross-section 0.039” – 0.275” (1–7mm) profiles, it is important that the number of teeth actually making the cut should be at least 3 teeth. Otherwise, the effect obtained will be one of tearing rather than of chip removal, leading to a large increase in shearing stress.

When cutting thick materials or solid sections using an excessively fine-tooth pitch, the chip collects as a spiral inside the gullet, and since fine tooth pitches have small gullets, the accumulated chip will exceed the gullet capacity and press against the walls of the workpieces, resulting in poor cutting (same situation with soft materials), greater shearing stress and hence breakage of the blade.

A larger pitch should be chosen when the shape of the piece to be cut has a cross-section at any given point which exceeds the average cross-section.

*Figure 10-1*

Choice of tooth pitch T as a function of cross-section to be cut for light alloy solid pieces and profiles


| S in mm. | Pitch T | S and sp in mm. | Pitch T |
|---|---|---|---|
| 10 | 6 | 10 sp=0.5 | 3-4 |
| 30 | 8 | 30 sp=1.5 | 4-5 |
| 50 | 10 | 50 sp=2.5 | 6-7 |
| 70 | 12 | 70 sp=3.5 | 8-9 |
| 90 | 14 | 90 sp=4.5 | 8-9 |
| 130 | 18 | 130 sp=6.5 | 10 |

KEY:
s = diameter or width of the solid piece to be cut in mm.
sp = thickness of the wall to be cut in mm.
T = tooth pitch in mm.

*Figure 10-2*

### 10.1.3 Cutting and Feeding Speed

The cutting speed and the head feeding speed are limited by the amount of heat generated near to the points of the teeth. If the head feeding speed is too high, the cut will not be straight in either the vertical or the horizontal plane.

The cutting speed depends on the strength (kg/mm2) and hardness (HRC) of the material and the dimensions of the thickest section.

The feeding speed depends on the cross-section of the material. Solid or thick-walled materials (thickness>5mm) can therefore be cut at high-speed providing there is sufficient swarf removal by the blade, while thin-walled materials such as tubes or thin profiles must be cut with a low feeding speed.

### 10.1.4 Breaking in a Saw Blade

**IMPORTANT:** A new blade requires a break- in period, during which time about half the normal feeding speed should be used.

Sharp cutting edges with extremely small edge radii are required for high cutting capacity. To achieve the optimal tool life, we recommend breaking-in the

blade accordingly. The correct cutting speed is determined by the material being cut and its dimensions. It is very important that the new blade is first used with only 50% of the determined feed rate. This will avoid micro-breakages of the blade because of too large chip thicknesses. New saw blades may tend toward vibrations and vibration sounds. In this case a slight reduction of the cutting speed (feed rate if the saw is a single rpm machine) is helpful. With small workpiece dimensions approximately 300cm² of the material should be cut for breaking-in. If large work piece dimensions are to be cut, we recommend a breaking-in period of about 15 minutes. After breaking-in you may slowly increase the feed rate up to the determined value.

### 10.1.5 Coolant

The cooling fluid ensures that the blade teeth and material in the area of the cut do not overheat. The fluid must be an excellent lubricant to prevent abrasion of the teeth and welding of the chips to the teeth (seizing).

### 10.1.6 Blade Structure

For non-ferrous metals, it is common to use circular saws with a brazed hard metal HM cutting edge, consisting of a disc made of alloy tool steel (71Cr1) on which the shape of the teeth and the seats for the cutting edges are made of Widia K10. These saws have shown excellent wear resistance but low resistance to impact, which is in any case a minor problem with non-ferrous materials.

*CHEMICAL COMPOSITION:*

| *Blade body* | *C* | *Cr* | *Mn* | *Mo* | *V* | *Co* | *HRC* |
|---|---|---|---|---|---|---|---|
| ***steel type 71Cr1*** | 0,71 ÷ 0,78 | 0,20 ÷ 0,30 | 0,40 ÷ 0,70 | - ÷ - | - ÷ - | - ÷ - | 43+/-1 |

*KEY:*

C = Carbon Co = Cobalt Cr = Chromium
Mo = Molybdenum Mn = Manganese V = Vanadium
The numbers in the columns indicate the % of the element present in the steel.

*Figure 10-3*

### 10.1.7 Types of Blades

In addition to the size and pitch of the teeth, the blades also have different geometric characteristics in accordance with their particular use:

tooth cutting angle – may be negative or positive

tooth sharpening – may be BW with an alternate raked tooth or C with a roughing tooth raked on both sides and a non-raked finishing tooth

tooth pitch – the distance between the crest of one tooth and the crest of the next tooth (tooth pitch = T)

### 10.1.8 Teeth Shape

**“C” Type Sharpening (HZ)**

Coarse toothing with roughing tooth raked on both sides and non-raked finishing tooth. The roughing tooth is about 0.3 mm higher.

Coarse toothing with roughing tooth and finishing tooth. Used in saws with pitch greater than or equal to 5 mm for cutting ferrous and non-ferrous materials with solid or solid-profiled sections.

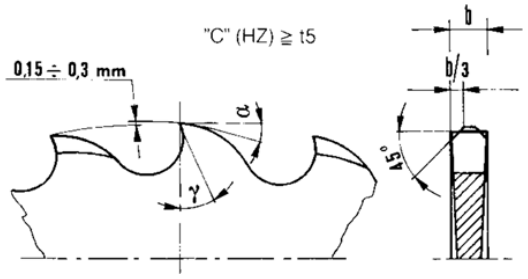



*Figure 10-4*

**“BW” Type Sharpening DIN 1838--UNI 4014**

Coarse toothing with teeth alternately raked to the right and left.

Toothing generally used on cut-off machines for cutting ferrous and alloy materials with tubular and profiled sections.

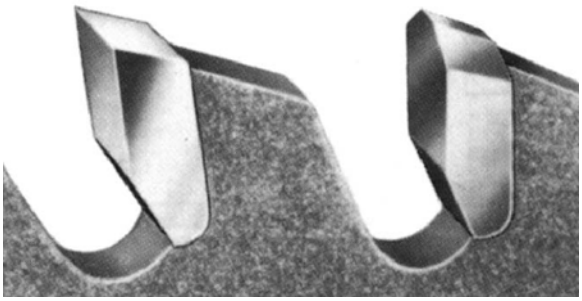
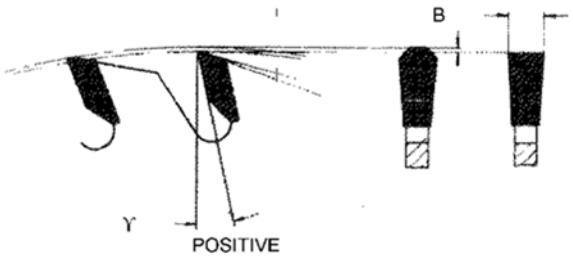


*Figure 10-5*

### 10.1.9 Positive and Negative Cutting Angles

The cutting angle may vary from positive to negative depending on the cutting speed, the profile and the type of material to be cut.

A positive angle determines better penetration of the tool and hence lower shear stress and greater ease of sliding for the swarf over the cutting edge. On the other hand, the cutting edge has lower mechanical resistance, so that as the breaking load of the material to be cut increases, the cutting angle decreases from positive until it becomes negative, thus offering a cutting edge with a larger resistant section.



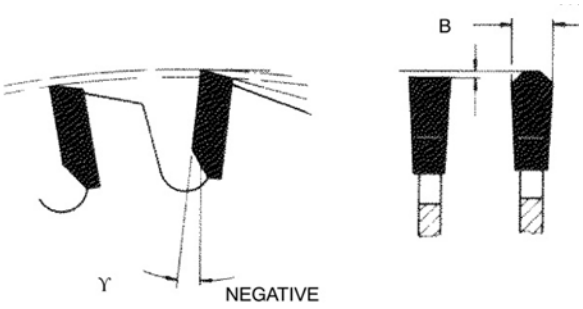



*Figure 10-6*

Short swarf material such as brass, bronze, aluminum and hard cast iron require smaller cutting angles because the swarf becomes crushed immediately and the rake angle has little effect during the cutting stage.

The cold saws use discs with positive cutting angles for cutting solid materials and with negative cutting angles for cutting hollow profiles. This is because, as a result of the high cutting speeds, even with non-ferrous materials the tool “strikes” against the wall of the profile to be cut several times, thus requiring a cutting edge with a larger resistant section.

Circular saws can also be characterized by other parameters such as the whine reduction feature, which cuts down noise at high speeds, or expansion, which compensates for the pushing of chips inside the cutting edge, thus reducing the thrust on the walls of the material to be cut.

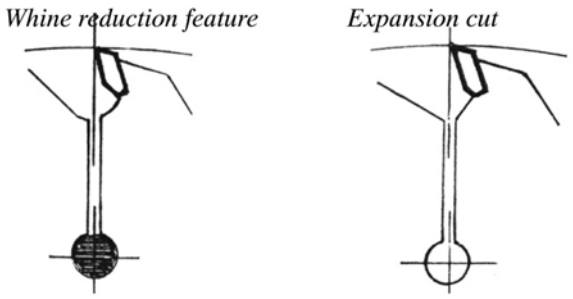



*Figure 10-7*

Use the chart on the following page to help select the saw blade suitable for your application.

Baileigh Industrial offers a wide selection of tooth styles for various cutting applications. Please phone Baileigh Industrial at (920.684.4990) to have one of our technicians assist you in selecting the proper cold saw blades for your cutting applications.