



Operating Instructions and Parts Manual Manual Cold Saws

Models CS-275, CS-315



model CS-315 shown

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Part No. M-414226
Revision C 12/2013
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1.0 Warranty and Service

JET, Wilton and Powermatic warrants every product they sell against manufacturers' defects. If one of our tools needs service or repair, please contact Technical Service by calling 1-800-274-6846, 8AM to 5PM CST, Monday through Friday

Warranty Period

The general warranty lasts for the time period specified in the literature included with your product or on the official JET, Wilton or Powermatic branded websites.

- JET, Wilton and Powermatic products carry a limited warranty which varies in duration based upon the product. (See chart below)
- Accessories carry a limited warranty of one year from the date of receipt.
- Consumable items are defined as expendable parts or accessories expected to become inoperable within a reasonable amount of use and are covered by a 90 day limited warranty against manufacturer's defects.

Who is Covered

This warranty covers only the initial purchaser of the product from the date of delivery.

What is Covered

This warranty covers any defects in workmanship or materials subject to the limitations stated below. This warranty does not cover failures due directly or indirectly to misuse, abuse, negligence or accidents, normal wear-and-tear, improper repair, alterations or lack of maintenance.

Warranty Limitations

Woodworking products with a Five Year Warranty that are used for commercial or industrial purposes default to a Two Year Warranty. Please contact Technical Service at 1-800-274-6846 for further clarification.

How to Get Technical Support

Please contact Technical Service by calling 1-800-274-6846. **Please note that you will be asked to provide proof of initial purchase when calling.** If a product requires further inspection, the Technical Service representative will explain and assist with any additional action needed. JET, Wilton and Powermatic have Authorized Service Centers located throughout the United States. For the name of an Authorized Service Center in your area call 1-800-274-6846 or use the Service Center Locator on the JET, Wilton or Powermatic website.

More Information

JET, Wilton and Powermatic are consistently adding new products. For complete, up-to-date product information, check with your local distributor or visit the JET, Wilton or Powermatic website.

How State Law Applies

This warranty gives you specific legal rights, subject to applicable state law.

Limitations on This Warranty

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Product Listing with Warranty Period

90 Days – Parts; Consumable items; Light-Duty Air Tools
1 Year – Motors; Machine Accessories; Heavy-Duty Air Tools; Pro-Duty Air Tools
2 Year – Metalworking Machinery; Electric Hoists, Electric Hoist Accessories
5 Year – Woodworking Machinery
Limited Lifetime – Wilton branded products; JET Parallel clamps; Manual Hoists; Manual Hoist Accessories; Shop Tools; Warehouse & Dock products; Hand Tools

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3.0 Safety warnings

1. Read and understand the entire owner's manual before attempting assembly or operation.
2. Read and understand the warnings posted on the machine and in this manual. Failure to comply with all of these warnings may cause serious injury.
3. Replace the warning labels if they become obscured or removed.
4. This cold saw is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a cold saw, do not use until proper training and knowledge have been obtained.
5. Do not use this cold saw for other than its intended use. If used for other purposes, JET disclaims any real or implied warranty and holds itself harmless from any injury that may result from that use.
6. Always wear approved safety glasses/face shields while using this cold saw. Everyday eyeglasses only have impact resistant lenses; they are not safety glasses.
7. Before operating this cold saw, remove tie, rings, watches and other jewelry, and roll sleeves up past the elbows. Remove all loose clothing and confine long hair. Non-slip footwear or anti-skid floor strips are recommended.
8. Wear ear protectors (plugs or muffs) during extended periods of operation.
9. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
 - Lead from lead based paint.
 - Crystalline silica from bricks, cement and other masonry products.
 - Arsenic and chromium from chemically treated lumber.

Your risk of exposure varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, work in a well-ventilated area and work with approved safety equipment, such as face or dust masks that are specifically designed to filter out microscopic particles.

10. Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.
11. Make certain the switch is in the **OFF** position before connecting the machine to the power supply.
12. Make certain the machine is properly grounded.
13. Make all machine adjustments or maintenance with the machine unplugged from the power source.
14. Remove adjusting keys and wrenches. Form a habit of checking to see that keys and adjusting wrenches are removed from the machine before turning it on.
15. Keep safety guards in place at all times when the machine is in use. If removed for maintenance purposes, use extreme caution and replace the guards immediately after maintenance is complete.
16. Make sure the cold saw is firmly positioned on a secure foundation.
17. Check damaged parts. Before further use of the machine, a guard or other part that is damaged should be carefully checked 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 or other part that is damaged should be properly repaired or replaced.
18. Provide for adequate space surrounding work area and non-glare, overhead lighting.
19. Keep the floor around the machine clean and free of scrap material, oil and grease.
20. Keep visitors a safe distance from the work area. **Keep children away.**
21. Make your workshop child proof with padlocks, master switches or by removing starter keys.
22. Give your work undivided attention. Looking around, carrying on a conversation and "horse-play" are careless acts that can result in serious injury.
23. Maintain a balanced stance at all times so that you do not fall or lean against the blade or other moving parts. Do not overreach or use excessive force to perform any machine operation.
24. Use the right tool at the correct speed and feed rate. Do not force a tool or attachment to do a job for which it was not designed. The right tool will do the job better and more safely.

25. Do not make a cut which exceeds the capacities of the cold saw as shown in the specifications section of this manual.
26. Use recommended accessories; improper accessories may be hazardous.
27. Maintain tools with care. Keep blades sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
28. Make sure the work piece is securely attached or clamped to the table. Never use your hand to hold the work piece.
29. Turn off the machine and disconnect from power before cleaning. Use a cloth or brush to remove chips or debris — do not use your hands.
30. Do not stand on the machine. Serious injury could occur if the machine tips over.
31. Never leave the machine running unattended. Turn the power off and do not leave the machine until it comes to a complete stop.
32. Remove loose items and unnecessary work pieces from the area before starting the machine.

Familiarize yourself with the following safety notices used in this manual:

CAUTION This means that if precautions are not heeded, it may result in minor injury and/or possible machine damage.

WARNING This means that if precautions are not heeded, it may result in serious injury or possibly even death.

- - SAVE THESE INSTRUCTIONS - -

4.0 Introduction

The JET CS-275 and CS-315 Cold Saws are designed to provide a reliable solution to the needs of machine shops and production environments that work with steel or iron. The saws are manually operated. After clamping the material in the vise, the operator presses the trigger starting the blade, and brings the operating lever downward to cut the material. The saws can perform miter cuts up to 45° to the right or left.

This manual is provided by JET covering the safe operation and maintenance procedures for the JET Cold Saw. This manual contains instructions on installation, safety precautions, general operating procedures, maintenance instructions and parts breakdown. Your machine has been designed and constructed to provide years of trouble-free operation if used in accordance with the instructions as set forth in this document.

If there are questions or comments, please contact your local supplier or JET. JET can also be reached at our web site: www.jettools.com.

Retain this manual for future reference. If the machine transfers ownership, the manual should accompany it

5.0 Cold saw features

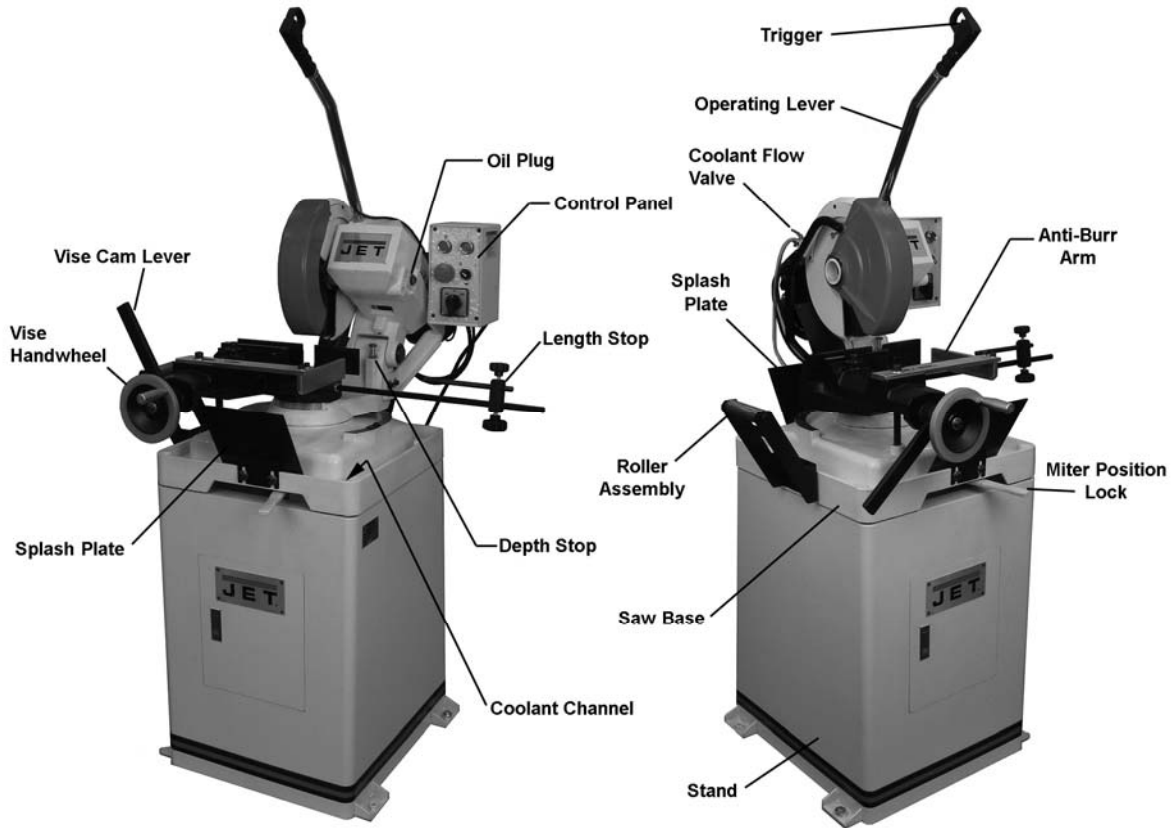


Figure 1

Miter cutting head

The *miter cutting head* is the unit that performs the cut, and is pivoted downward manually by means of the operating lever. The head is mounted to a cast iron base, and consists of a blade support unit with guard, transmission unit, and motor. The depth of cut is set by adjusting the *depth stop*. The miter cutting head swivels and locks into any position within a 135° range.

Miter position lock

The *miter position lock* secures the miter cutting head from movement. The miter is secured when the lever is moved to the right and is released when the lever is moved to the left.

Self-centering vise

The self-centering vise holds the work piece in place during cutting. The handwheel brings the vise toward the work piece, then the cam lever is

rotated for fast clamping. An anti-burr attachment is included, as well as a stop assembly for repetitive cuts of the same length.

Control panel

The panel features independent ON and OFF buttons with indicator light, a mushroom style red emergency OFF switch, coolant flow switch, and a switch for speed selection.

Flood coolant system

CAUTION The coolant pump must be submerged before operating to prevent damage to the pump.

Coolant is dispensed directly onto the saw blade from a coolant fitting on the upper blade guard. Coolant is provided through tubing from the coolant pump which rests inside the machine base. See under *Maintenance* for further information about proper coolants.

6.0 Specifications

Model numbers.....	CS-275	CS-275-1
Stock numbers.....	414226	414228
Blade diameter.....	11" (275mm)	11" (275mm)
Blade thickness.....	0.08" (2mm)	0.08" (2mm)
Arbor diameter.....	1-1/4" (32mm)	1-1/4" (32mm)
Blade speed (RPM).....	54 and 108	54
Vise type.....	adjustable jaws, cam handle	adjustable jaws, cam handle
Maximum vise opening.....	4"	4"
Miter angle range (deg.).....	90	90
Miter stops (deg.).....	45 L, 45 R	45 L, 45 R
Slotting capability.....	yes	yes
Material length stop.....	30", graduated	30", graduated
Vise platform height from floor.....	38" (96.5cm)	38" (96.5cm)
Saw motor.....	TEFC, 1-1/2HP, 3PH, 230VAC, 60Hz	TEFC, 1-1/2HP, 1PH, 115/230VAC, 60Hz (prewired 115V)
Plug provided.....	no	yes (115V)
Coolant pump.....	TEFC, 1/8HP, 1PH, 230VAC, 60Hz	TEFC, 1/8HP, 1PH, 115/230VAC, 60Hz
Coolant tank capacity.....	1.5 gal (5.7L)	1.5 gal (5.7L)
Overall dimensions (LxWxH).....	40" x 39" x 72" (1016x991x1829mm)	40" x 39" x 72" (1016x991x1829mm)
Base footprint.....	23" x 24" (584 x 610mm)	23" x 24" (584 x 610mm)
Net weight with stand.....	330 lb (150kg)	330 lb (150kg)
Shipping weight.....	360 lb (163kg)	360 lb (163kg)

Model numbers.....	CS-315	CS-315-1
Stock numbers.....	414227	414229
Blade diameter.....	12" (315mm)	12" (315mm)
Blade thickness.....	0.08" (2mm)	0.08" (2mm)
Arbor diameter.....	1-1/4" (32mm)	1-1/4" (32mm)
Blade speed (RPM).....	52 and 104	52
Vise type.....	adjustable jaws, cam handle	adjustable jaws, cam handle
Maximum vise opening.....	4.7"	4.7"
Miter angle range (deg.).....	90	90
Miter stops (deg.).....	45 L, 45 R	45 L, 45 R
Slotting capability.....	yes	yes
Material length stop.....	30", graduated	30", graduated
Vise platform height from floor.....	38" (96.5cm)	38" (96.5cm)
Saw motor.....	TEFC, 2HP, 3PH, 230VAC, 60Hz	TEFC, 2HP, 1PH, 230VAC, 60Hz
Plug provided.....	no	no
Coolant pump.....	TEFC, 1/8HP, 1PH, 230VAC, 60Hz	TEFC, 1/8HP, 1PH, 230VAC, 60Hz
Coolant tank capacity.....	1.5 gal (5.7L)	1.5 gal (5.7L)
Overall dimensions (LxWxH).....	40" x 39" x 72" (1016x991x1829mm)	40" x 39" x 72" (1016x991x1829mm)
Base footprint.....	23" x 24" (584 x 610mm)	23" x 24" (584 x 610mm)
Net weight with stand.....	390 lb (177kg)	390 lb (177kg)
Shipping weight.....	420 (190.5kg)	420 (190.5kg)

Cutting Capacities:







Model	Angle	Solid Bars			Tubing		
							
CS-275	90°	3.3"	2.5" x 2.5"	3.1" x 2.0"	3.3"	2.5" x 2.5"	3.1" x 2.0"
	45°	3.3"	2.2" x 2.2"	2.2" x 2.0"	3.3"	2.2" x 2.2"	2.2" x 2.0"
CS-315	90°	3.5"	3.2" x 3.2"	4" x 3.2"	3.5"	3.2" x 3.2"	4" x 3.2"
	45°	3.5"	2.6" x 2.6"	3.2" x 2.6"	3.5"	2.6" x 2.6"	3.2" x 2.6"

Table 1

The specifications in this manual were current at time of publication, but because of our policy of continuous improvement, JET reserves the right to change specifications at any time and without prior notice, without incurring obligations.

7.0 Unpacking

Open shipping container, and any secondary boxes. Check for shipping damage; report any damage immediately to your distributor and shipping agent. Do not discard any shipping material until the Cold Saw is assembled and running properly.

Compare the contents of your container with the following parts list to make sure all parts are intact. Missing parts, if any, should be reported to your distributor. Read the instruction manual thoroughly for assembly, maintenance and safety instructions.



7.1 Contents of shipping container

- 1 Cold Saw
- 1 Operating Lever
- 1 Work Stop Assembly
- 4 Hex Cap Screws with Nuts
- 1 Handle
- 1 Roller Assembly
- 2 Splash Plates
- 1 Coolant Tank w/ Pump (inside base)
- 1 Operating Instructions and Parts Manual (not shown)
- 1 Warranty Card (not shown)

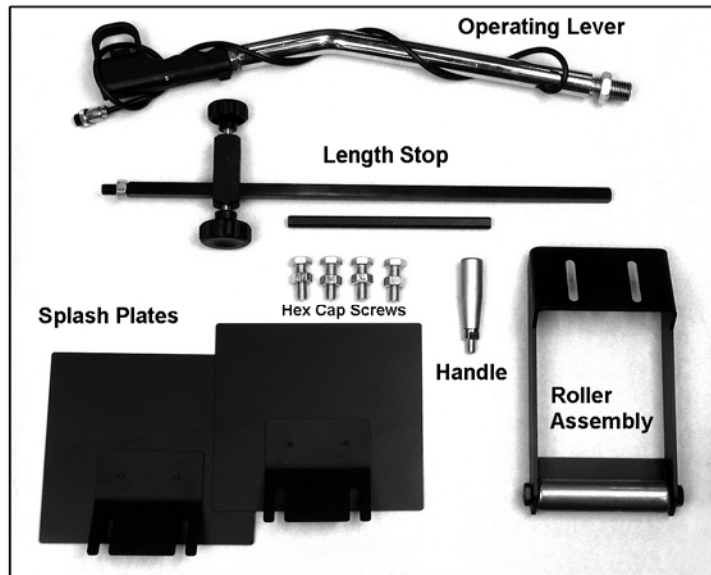


Figure 2

8.0 Installation and assembly

Tools required for assembly (not provided):

- 6mm hex key (Allen wrench)
- 12mm and 19mm open-end wrenches

Remove all packing material from around the machine. Remove screws holding the saw to the skid. Lift the machine off the skid using straps around the cast iron portions of the head (keep straps away from blade, levers, etc.).

The location should have sufficient lighting to prevent shadows around the work area. Leave enough room on all sides of the machine for movement of stock and for general maintenance work.

The base of the machine must be anchored to the floor by two lag bolts or studs properly anchored into concrete.

After positioning the machine, remove any cords that were used to secure the head in lowered position during shipping.

Exposed metal surfaces have been coated with a rust-protectant from the factory. Remove this using a soft cloth dampened with a good cleaner/degreaser. Do not use gasoline, paint thinner, acetone, or other highly flammable substances, and avoid using an abrasive pad as it may scratch metal surfaces.

8.1 Operating lever

Refer to Figure 3.

1. Remove the hex nut and screw from the hole at the front of the saw head (Figure 4). These fasteners will not be used again unless the machine needs to be transported in the future.
2. Insert the operating lever into the threaded fill hole. Rotate it a good distance into the hole, and make sure the final orientation of the handle grip is in a comfortable position for the operator, as shown in Figure 3.
3. Secure the operating lever by tightening the hex nut against the saw head.
4. Push the two-pin cable connector into the receptacle sleeve on the junction box of the motor, and tighten the knurled ring to secure.

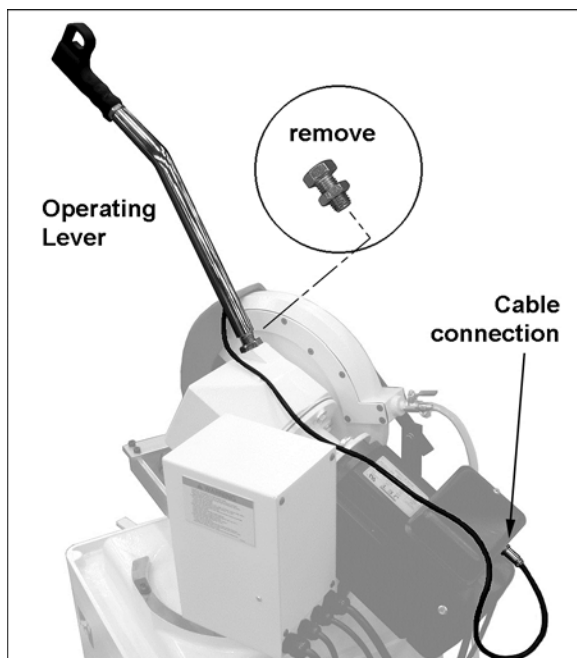


Figure 3

8.2 Handle

Refer to Figure 4.

Screw the *handle* into the handwheel and tighten with the nut, using a 12mm wrench.

8.3 Extension roller

Refer to Figure 4.

Mount the *extension roller* to the side with the existing socket head cap screws, using a 6mm hex key.

Slots make the roller assembly adjustable for height. Place a straight edge across the clamp table and the extension roller to achieve alignment.

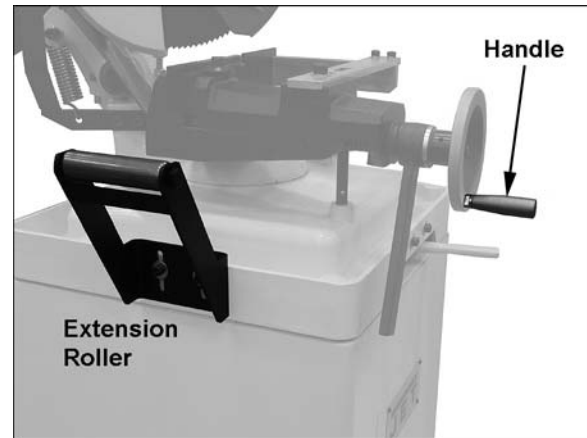


Figure 4

8.4 Coolant tank

Refer to Figure 5.

Direct the lower end of the drain hose into the basket of the coolant tank, as shown.

CAUTION Fill the tank with coolant before operating the coolant pump. Failure to do so may damage the pump.

Adjust the valve on the coolant fitting atop the blade housing, to achieve desired flow. When the coolant switch is in the ON position, flow starts when the drive motor is started. Turning off the coolant switch stops coolant flow.



Figure 5

8.5 Splash plates

Refer to Figure 6.

The plates deflect expended coolant and swarf coming off the blade, into the encircling channel of the base. The coolant drains back into the tank, while the swarf is easily cleaned from the channel.

Mount the two plates to the front and rear of the base, using the existing screws in the base and a 6mm hex key. Slots allow height adjustment.

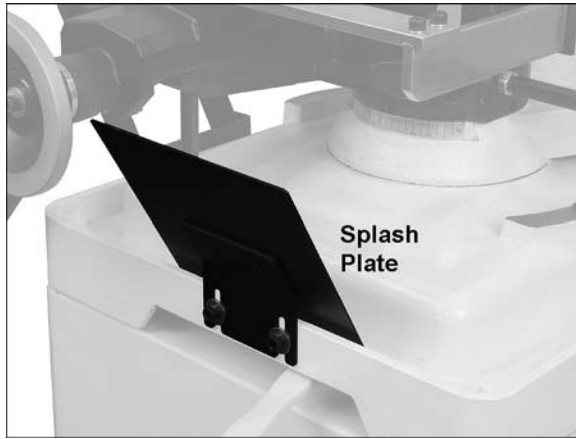


Figure 6

8.6 Length stop

Refer to Figure 7.

1. Screw the lower rod into the threaded hole in the base. Orient the rod so that the graduated scale is visible, and tighten the hex nut with a 19mm wrench to secure.
2. Calibrate the length stop: Lower the blade, and loosen the knobs on the rod holder. Then slide the upper rod into contact with the blade, and adjust the rod holder so that its left edge aligns with the zero. Re-tighten the top knob to secure the zero setting.

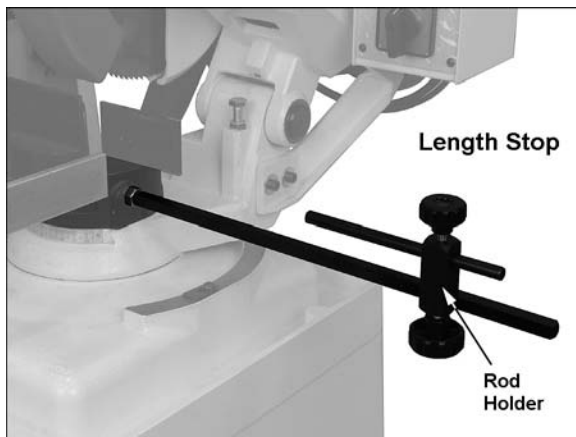


Figure 7

9.0 Electrical connections

⚠ WARNING Electrical connections must be made by a qualified electrician in compliance with all relevant codes. This machine must be properly grounded to help prevent electrical shock and possible fatal injury.

On all models, if a machine is being hard-wired to a panel, make sure a disconnect is available for the operator. During hard-wiring of the machine, make sure the fuses have been removed or the breakers have been tripped in the circuit to which the cold saw will be connected. Place a warning placard on

the fuse holder or circuit breaker to prevent it being turned on while the machine is being wired.

See table 2 for recommended circuit sizes for your particular model. **NOTE: Local codes take precedence over recommendations.**

Recommended circuit size		
CS-275	(3PH 230V)	10A
CS-275-1	(1PH, 115/230V)	20A
CS-315	(3PH 230V)	15A
CS-315-1	(1PH, 230V)	20A

Table 2

9.1 Three-phase models

The **CS-275 (3-phase)** and **CS-315 (3-phase)** are rated for 230-volt only power. They are not supplied with a plug. You may either install a proper 230V UL/CSA listed plug, or “hardwire” the machine directly to a service panel.

After wiring, make sure that the blade rotates in the proper direction. If it does not, reverse two of the 3-phase wires on the supply input.

9.2 Single-phase models

The **CS-315-1 (single phase)** is rated for 230-volt only power. It is not supplied with a plug. You may either install a proper 230V UL/CSA listed plug, or “hardwire” the machine directly to a service panel.

The **CS-275-1 (single phase)** is rated for 115/230V, prewired for 115V and supplied with a 120-volt rated plug. It may be converted to 230V. See section 9.3.

9.3 Voltage conversion (model CS-275-1 only)

To convert from 115V to 230V:

1. Remove the panel from the control box.
2. On the transformer, reconnect the L11 line from the 120V terminal to the 230V terminal (A, Figure 8).

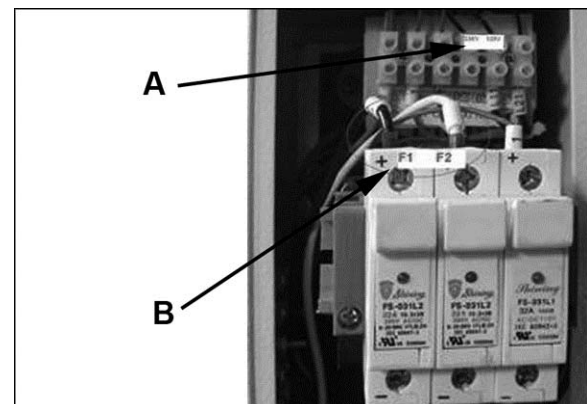


Figure 8

3. Replace the 20 amp fuses with 10 amp fuses in the first two fuse holders (B, Figure 8).

- Switch the leads in the coolant pump junction box, according to the diagram in Figure 9. (A diagram is also included on the coolant pump.)

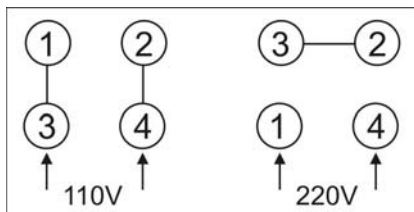


Figure 9

- The saw is now ready for 230V operation.

9.4 Grounding instructions

This machine must be grounded. 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.

Improper connection of the equipment-grounding conductor can result in a 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 a qualified electrician or service personnel if the grounding instructions are not completely understood, or if in doubt as to whether the tool is properly grounded. Repair or replace a damaged or worn cord immediately.

10.0 Adjustments

10.1 Miter adjustment

Refer to Figure 10.

The cold saw head has a rotational range of 135°. To adjust the miter position, follow the steps below:

- Move the miter position lock lever to the left to release.
- Adjust the head to the desired angle by pushing on the back of the motor to the right or left. The miter position is shown on the scale.
- Loosen the cap screw (A) atop the vise, and slide the jaw as needed to accommodate the angle of the blade. Re-tighten the cap screw securely.
- When the desired cutting angle is set, move miter position lock lever firmly to the right to secure the setting.

Two adjustable miter stops are provided for +45 and -45 degrees. Use an angle measuring device against blade and jaws, or make test cuts to verify the initial setting of these stops.

10.2 Vise

Refer to Figure 10.

The vise is self-centering and has a cam action lever for fast clamping. Use the handwheel to move the vise jaw about 1/16-inch away from the work piece, then rotate the cam lever to tighten.

The adjustable anti-burr arm keeps the off-cut end from flexing, which can cause burring. Use a 10mm hex key to loosen the arm for adjusting.

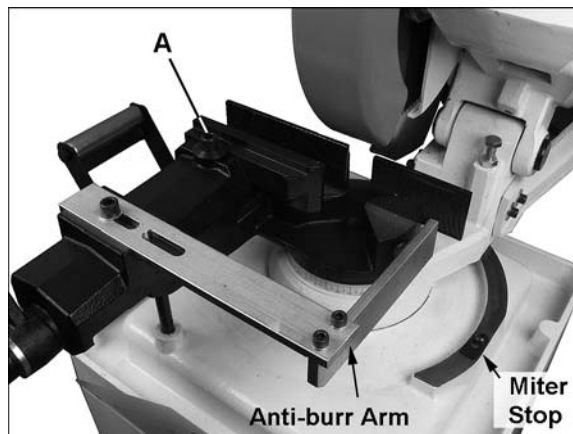


Figure 10

10.3 Stops

Refer to Figure 11.

The *front stop* limits the blade depth of cut. The *rear stop* limits return motion of the head.

To adjust depth of cut:

- Disconnect machine from power source.
- Using two 3/4" (19mm) wrenches, loosen lock nut (A) while holding screw (B) stationary.
- With the saw in the fully lowered position, turn screw (B) until the saw blade bottoms out at the desired level.
- Tighten lock nut (A).

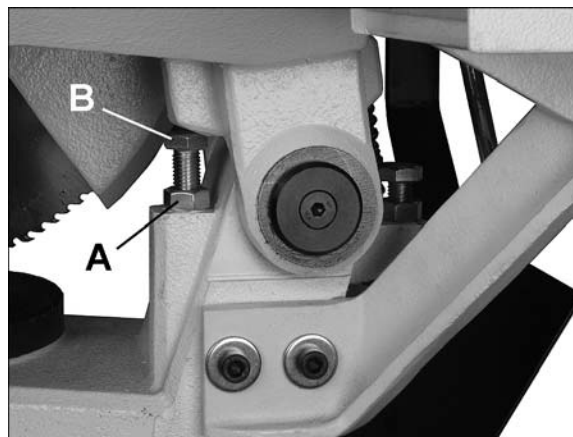


Figure 11

10.4 Blade replacement

⚠WARNING Disconnect machine from the power source before changing saw blades. Failure to comply may result in serious injury!

To change the saw blade (Figure 12):

1. Disconnect machine from power.
2. Clamp a piece of wood in the vise, and lower the blade upon it to prevent rotation.
3. Release the linkage from the blade guard at (A) with a 5mm hex key, and rotate the guard out of the way.
4. Remove the screw (B) with a 10mm hex key. *NOTE: Left-hand threads; turn clock-wise to loosen.*
5. Remove the blade (use gloves).
6. Secure a new blade by reversing the above steps. Make sure the direction of the teeth is correct.

IMPORTANT: A new blade requires a break-in period. Use half the normal feed speed for the operation; operate for a cutting surface of about 300 cm² for hard materials; about 1000 cm² for soft materials. Then resume normal speed.

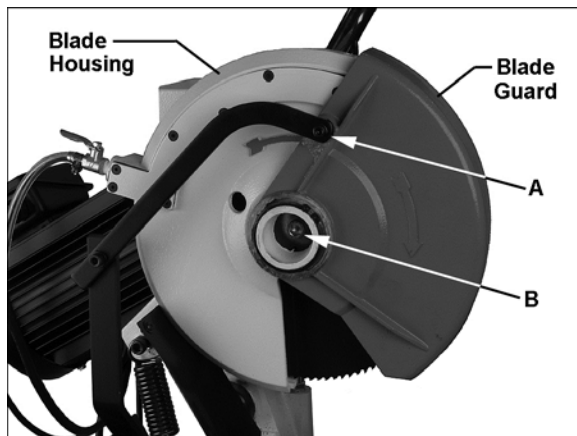


Figure 12

11.0 Controls

The Control Panel (Figure 13) has the following functions.

Power On and Off.

Pressing the *On button* activates power to the machine. The *On button* has a green indicator lamp when electrical power is active.

Pressing the red *Off button* stops blade movement.

Emergency Stop – Press to shut down all machine functions. To restart machine, rotate button clockwise to disengage E-stop.

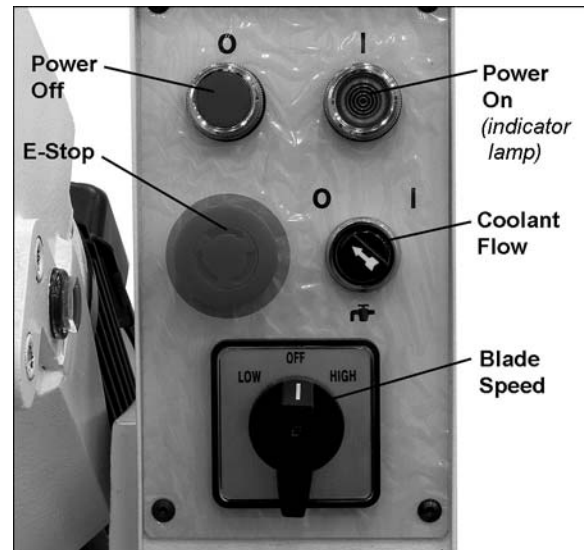


Figure 13

Coolant Flow – The green ON button must be active to start coolant flow.

Low/Off/High Switch – Selects the blade speed. For the blade to operate, the On switch must be pressed, blade speed switch must be set to Low or High (*3-phase models only*), and the trigger on the operating lever pressed.

Trigger – (shown in Figure 3). When pressed, it activates a micro-switch in the operating lever grip.

12.0 Operation

Before using the machine:

- ❑ Check that safety devices (e.g. blade guards) are in position and work perfectly and that personal safety requirements are complied with.
- ❑ Check the sharpness of the blade and verify proper coolant flow.

Operating

1. Position work piece and close the vise; rotate the cam lever at the handwheel to secure the setting of the vise. *NOTE: A long work piece must have proper support on both ends.*
2. If mitering, adjust the head accordingly and lock it in position. If making a mitered cut, verify that the blade will not contact the rear vise jaw. If it will, loosen the screw on the rear vise jaw and slide the jaw so that it clears the path of the blade, then retighten screw.
3. Turn the power on.
4. Select the blade speed.
5. Turn on coolant flow switch.
6. Start the blade by pressing the trigger on the handle grip. The trigger also activates the coolant flow.

7. Pull the operating lever to bring down the blade into the work piece. You will manually control the speed of the downstroke.
8. When the cut is complete, release the trigger and raise the head. The spring will help return the head to upward position.
9. Release the vise using the handwheel, and remove the work piece.

NOTE: When operations are complete, always return the head to upward position to relieve stress on the return spring.

13.0 Maintenance

13.1 Maintenance requirements

⚠ WARNING All maintenance and cleaning procedures must be performed with the *power switched OFF*. Failure to comply may result in serious injury!

On completion of maintenance, ensure that replaced parts and/or any tools used have been removed from the machine before starting it up.

13.2 Periodic maintenance

- ❑ Remove all swarf from the machine, preferably with a cloth.
- ❑ Remove chips from the coolant tank and change coolant regularly.
- ❑ Top off the coolant level.
- ❑ Check the wear of the blade and change if necessary (see *Blade Replacement*).
- ❑ Empty the chips out of the base.
- ❑ Clean the vise and lubricate all the joints and sliding surfaces, using good quality oil.
- ❑ Attend to daily, weekly and annual lubrication recommendations (see the *Lubrication* section).

13.3 Coolant system

Check coolant level in the tank periodically and top off if necessary. Coolant can also be added by pouring directly on the table, which will drain into the tank through the filter plate.

This coolant system can operate with either a soluble oil base coolant or water-soluble synthetic coolant. Coolant should be changed regularly. Some recommended brands are *DoAll* and *Lenox*. These coolants are available at your local industrial distributor.

Periodically remove excess chips from the coolant tank, and clean the filter on the coolant pump.

13.4 Lubrication

For long life and trouble free operation, it is essential that this machine is kept well lubricated. The vise and leadscrew should be oiled daily. Pivot joints and bearings should be greased weekly. Check the gearbox oil level weekly, full level is top of sight glass with head in full up position.

The gearbox oil should be changed out after the first 100 hours of operation, then after every 2,000 working hours. Drain the gearbox by unscrewing the plug on the side of the head (Figure 14). To refill the head, remove the operating lever and pour oil into the hole. The plug also serves as the oil level sight glass. Full level is top of sight glass with head in full up position.

Follow local regulations for proper disposal of used lubricants.

Recommended Lubricants:

Gearbox

Use Texaco Meropa® 460 or equivalent.

Grease fittings

Texaco Starplex® 2 or equivalent

Vise and Leadscrew

Regal® R & O 68

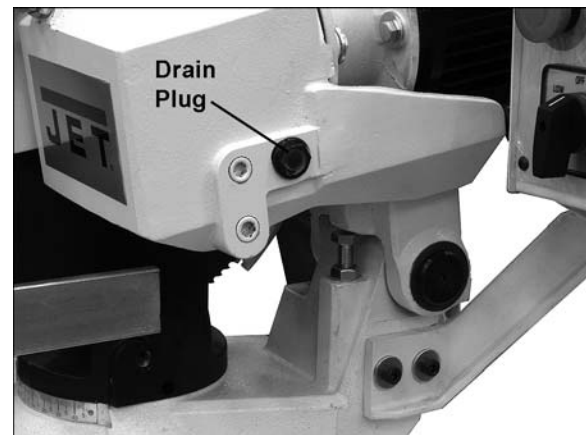


Figure 14

14.0 Blade selection

When using the cold saw, it is important to select the correct type of blade for the material to be cut. This section explains the limitations and specific applications of the different types of blades.

14.1 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).

14.2 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. This is because when cutting walls of small cross-section (1–7mm) profiles, it is important



that the number of teeth actually making the cut should not be too few, otherwise the effect obtained will be one of tearing rather than of chip removal, leading to a large increase in shearing stress. On the other hand, 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.

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.

Table 3

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

14.3 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. As we have already said, 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.

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

14.4 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 so as to prevent abrasion of the teeth and welding of the chips to the teeth (seizing).

14.5 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	0,71	0,20	0,40	-	-	-	43+/-1
71Cr1	÷	÷	÷	÷	÷	÷	
	0,78	0,30	0,70	-	-	-	

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.

Table 4

14.6 Types of blades

The blade required for the cold saw is of HM hard steel type since the machine is to be used for cutting non-ferrous materials. In addition to the size and pitch of the teeth, however, 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)

14.7 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.

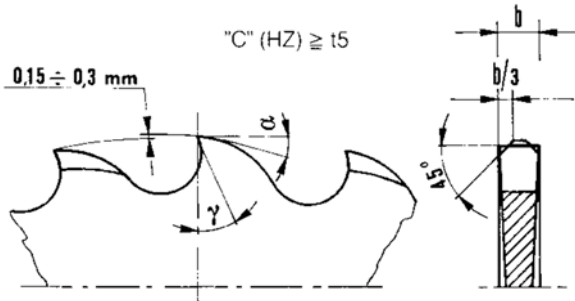


Figure 15

"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.

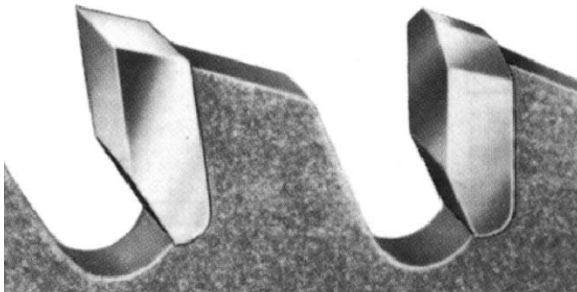


Figure 16

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.

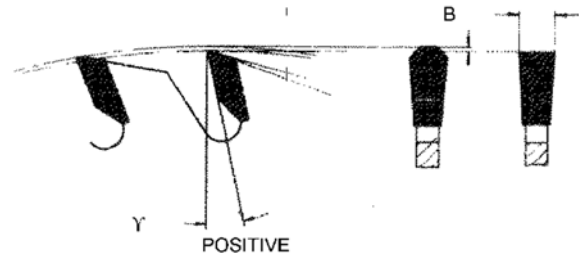


Figure 17

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.

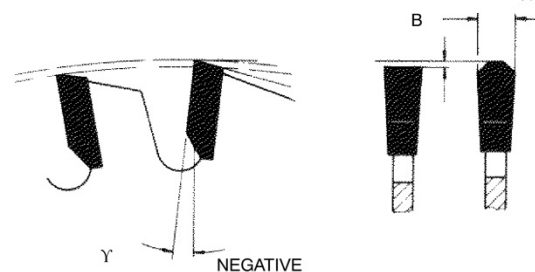


Figure 18

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.

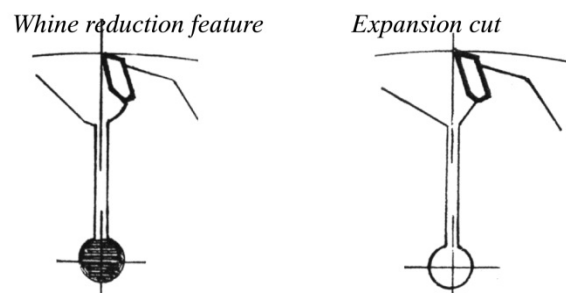


Figure 19

15.0 Troubleshooting

15.1 Blade and cutting problems

Problem	Probable Cause	Solution
Teeth breaking	Coolant flow problem	Ensure proper coolant flow; hoses unclogged; nozzles pointed correctly, etc. Make sure coolant type is suitable for the machine.
	Material too hard	Check the blade speed and the type of blade you are using. Also be aware of feed pressure.
	Blade not worn-in correctly	With a new blade it is necessary to start cutting at half feeding speed. After the wearing-in period (a cutting surface of about 300 cm ² for hard materials and about 1000 cm ² for soft materials) the blade and feed speeds can be brought up to normal values.
	Blade with excessively fine tooth pitch	The swarf wedges into the bottom of the teeth causing excessive pressure on the teeth themselves. Use a blade with coarser tooth pitch.
	New blade inserted in a partially completed cut	The surface of the cut may have undergone work hardening. When starting work again, use a lower blade speed and reduced feed pressure. A tooth from the old blade may be left in the cut: check and remove before starting work again.
	Work piece not clamped firmly in place	Any movement of the work piece during cutting can cause broken teeth: check the vise, jaws and clamping pressure.
Rapid tooth wear	Feed speed too slow	The blade runs over the material without removing it: increase feed speed.
	Blade speed too high	The teeth slide over the material without cutting it: reduce the blade speed.
	Insufficient coolant	Check the coolant level and clean coolant lines and nozzles.
	Incorrect fluid concentration	Check and use the correct concentration.
	Material defective	The materials may present altered zones either on the surface, such as oxides or sand, or in section, such as under-cooled inclusions. These zones, which are much harder than the blade, cause the teeth to break: Discard or clean these materials.
Broken blade	Blade speed too high	Reduce blade speed.
	Teeth in contact with material before starting the cut	Always check the position of the blade before starting a new job.
	Insufficient coolant	Check the coolant level and clean coolant lines and nozzles.
Cuts not straight	Feed speed too strong	Reduce feed speed.
	Blade not perpendicular to workpiece.	Contact Walter Meier technical support.

Table 5

15.2 Machine fault and operating problems

Problem	Probable Cause	Solution
Green pilot lamp not lit when ON button pressed	No incoming power	Check connections at machine and power source.
	Lamp fuse or bulb is out	Replace fuse/bulb.
Motor will not turn	Emergency Stop engaged	Rotate Emergency Stop button to disengage.
	Electrical power supply	Check: the phases; the cables; the plug; the socket. Also check that the motor connections are in place.
	Trigger switch not activating	Check that socket/plug connection from handle to motor is inserted correctly; check micro-switch in trigger.
	Transformer	Check that the voltages are present both on the input and output. Otherwise replace.
	Magnetic Contactor	Check that the phases in it are present both on the input and output, that it is not jammed, that it closes when powered and that it is not causing short circuits. Change if any of these problems are found.
	Thermal relay	Make sure it is closed, i.e. check that the phases are present in input and output, that it is not causing short circuits and responds when the reset coil is closed. If it has tripped to protect the motor, check the amperage setting, re-set, and check the motor. Change if necessary.
Motor	Check that it has not burned out, that it turns freely and that there is no moisture in the connection terminal board box. The winding can be rewound or replaced by experienced motor repair personnel.	

Table 6

16.0 Parts

Ordering replacement parts

Replacement parts are listed on the following pages. To order parts or reach our service department, call 1-800-274-6848, Monday through Friday (see our website for business hours, www.waltermeier.com). Having the Model Number and Serial Number of your machine available when you call will allow us to serve you quickly and accurately.

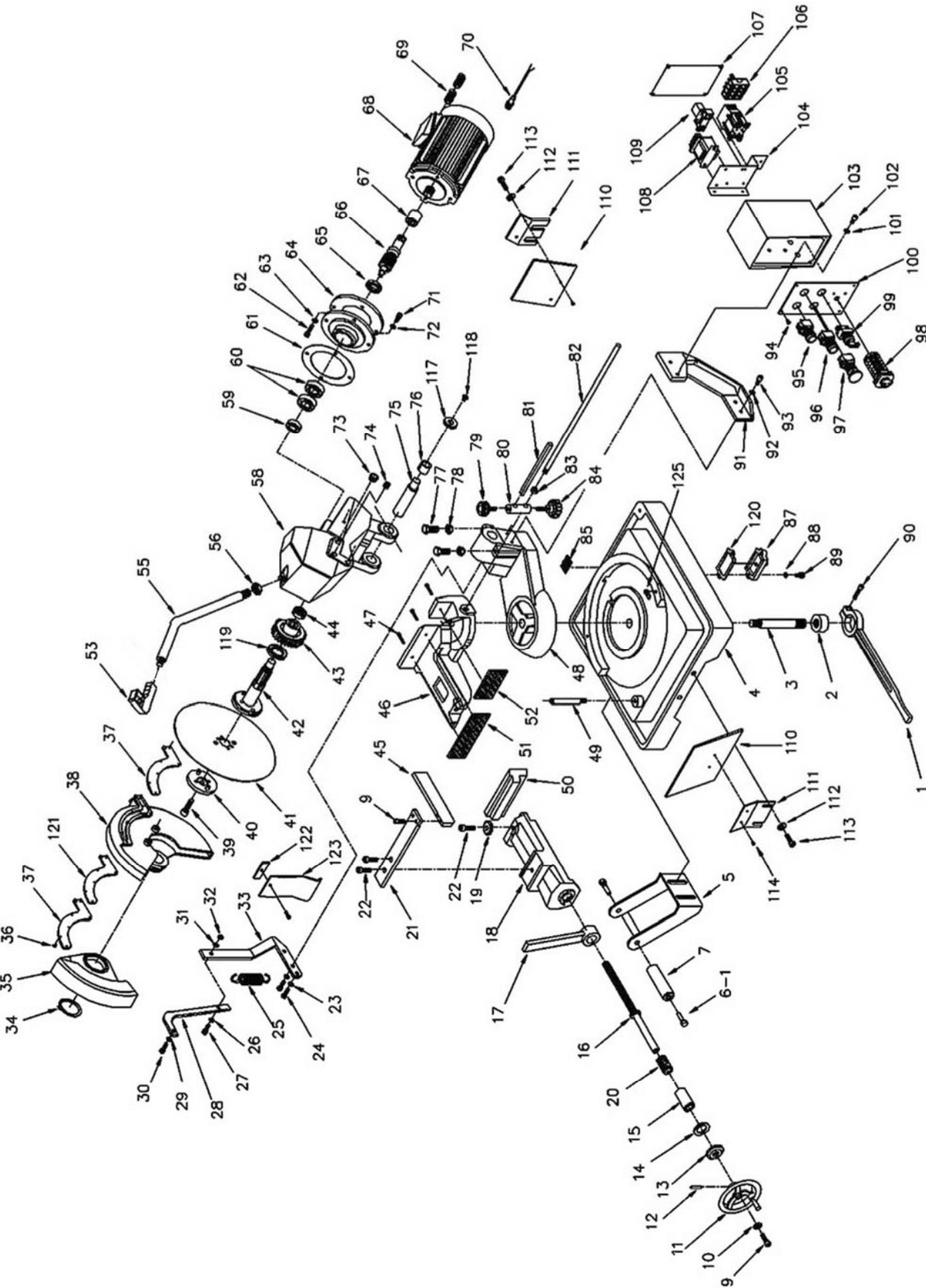
16.1.2 CS-275 Cold Saw (Machine Assembly) – Parts List

Index No.	Part No.	Description	Size	Qty
1	CS275-1	Lock Handle		1
2	CS275-2	Lock Nut		1
3	CS275-3	Shaft		1
4	CS275-4	Machine Base		1
5	CS275-5	Roller Bracket		1
6-1	TS-1492021	Hex Cap Screw	M12x30	2
7	CS275-7	Roller		1
9	TS-1504041	Socket Head Cap Screw	M8x20	3
10	TS-0680031	Flat Washer	5/16"	1
11	CS275-11	Hand Wheel		1
12	CS275-12	Pin		1
13	CS275-13	Bearing Bushing		1
14	CS275-14	Bearing		1
15	CS275-15	Bushing		1
16	CS275-16	Lead Screw		1
17	CS275-17	Lock Handle		1
18	CS275-18	Vise, Moveable		1
19	CS275-19	Washer		1
20	CS275-20	Spring		1
21	CS275-21	Plate		1
22	TS-1506021	Socket Head Cap Screw	M12x25	3
23	CS275-23	Hex Screw	M10x30	1
24	CS275-24	Spring		1
25	TS-1550061	Flat Washer	M8	1
26	TS-1504041	Socket Head Cap Screw	M8x20	1
27	CS275-27	Pin	5x12	1
28	CS275-28	Switching Plate		1
29	TS-1540061	Hex Nut	M8	1
30	TS-1550061	Flat Washer	M8	3
31	TS-1504051	Socket Head Cap Screw	M8x25	1
32	CS275-32	Switching Handle		1
33	TS-1503021	Socket Head Cap Screw	M6x10	1
34	CS275-34	Retaining Ring	S-60	1
35	CS275-35	Blade Shield		1
36	TS-2245102	Button Head Socket Screw	M5x10	14
37	CS275-37	Plate		2
38	CS275-38	Blade Cover		1
39	CS275-39	Socket Head Cap Screw (left hand thread)	M12x35LH	1
40	CS275-40	Flange		1
41	CS275-41	Saw Blade		1
42	CS275-42	Spindle		1
43	CS275-43	Worm Gear		1
44	CS275-44	Lock Nut		1
45	CS275-45	Stop		1
46	CS275-46	Vise, Stationary		1
47	TS-1502061	Socket Head Cap Screw	M5x25	3
48	CS275-48	Base Swing Arm		1
49	CS275-49	Support Rod		1
50	CS275-50	Vise Jaw Insert		1
51	CS275-51	Serrated Jaw Insert		1
52	CS275-52	Small Serrated Jaw Insert		1
53	CS275-53	Handle Grip with Trigger Switch		1
	CS275-53N	Handle Grip with Trigger Switch (s/n 1312XXXX and higher)		1
55	CS275-55	Handle		1
	CS275-55N	Handle (s/n 1312XXXX and higher)		1
56	CS275-56	Nut		1
57	TS-2310201	Hex Nut	M20	1
58	CS275-58	Machine Head		1
59	BB-6301ZZ	Ball Bearing	6301ZZ	1

Index No.	Part No.	Description	Size	Qty
60	BB-6205ZZ	Ball Bearing	6205ZZ	2
61	CS275-61	Rubber Gasket		1
62	TS-1490031	Hex Cap Screw	M8x20	4
63	TS-0680031	Flat Washer	5/16"	4
64	CS275-64	Flange		1
65	CS275-65	Oil Seal	25x45x10	1
66	CS275-66	Worm Shaft		1
67	CS275-67	Coupling		1
68	CS275-68	Motor	1.5HP, 220V, 3PH	1
	CS275-68-1	Motor	1.5HP, 115/230V, 1PH	1
69	CS275-69	Wire Terminal Clamp		4
70	CS275-70	Control Wire		1
71	TS-1490031	Hex Cap Screw	M8x20	4
72	TS-0680031	Flat Washer	5/16"	4
73	CS275-73	Oil Plug	1/2" PT	1
74	TS-0271031	Socket Set Screw	3/8"-16x3/8	2
75	CS275-75	Shaft		1
76	CS275-76	Bushing		1
77	CS275-77	Cover		1
78	TS-1504031	Socket Head Cap Screw	M8x16	2
79	CS275-79	Locking Knob	M8x20	1
80	CS275-80	Length Setting Rod Bracket		1
81	CS275-81	Upper Length Setting Rod		1
82	CS275-82	Lower Length Setting Rod		1
83	TS-1540081	Hex Nut	M12	1
84	CS275-84	Locking Knob	M8x18	1
85	CS275-85	Filter		1
86	TS-1491031	Hex Cap Screw	M10x25	1
86-1	TS-1540071	Hex Nut	M10	1
87	CS275-87	Drain Cover		1
88	TS-0680031	Flat Washer	5/16"	2
89	TS-1504051	Socket Head Cap Screw	M8x25	2
90	TS-1504071	Socket Head Cap Screw	M8x35	1
91	CS275-91	Support		1
92	TS-0680031	Flat Washer	5/16"	2
93	TS-1504041	Socket Head Cap Screw	M8x20	2
94	TS-1533032	Pan Head Machine Screw	M5x10	4
95	CS275-95	Stop Push Button		1
96	CS275-96	Start Push Button		1
97	CS275-97	Emergency Stop		1
98	CS275-98	2/4P Selection Switch	(3ph only)	1
99	CS275-99	Pump Selection Switch		1
100	CS275-100	Control Box Panel	(3ph)	1
	CS275-100-1	Control Box Panel	(1ph)	1
101	TS-0680031	Flat Washer	5/16"	2
102	TS-1490021	Hex Cap Screw	M8x16	2
103	CS275-103	Electrical Control Box		1
104	CS275-104	Control Box Bottom Plate		1
105	CS275-105	Magnetic Contactor	12D (3ph)	1
	CS275-105-1	Magnetic Contactor	18D (1ph)	1
106	CS275-106	Fuse Set	(3ph)	4
	CS275-106-1	Fuse Set	(1ph)	4
	CS275-106-2	Fuse (not shown)	10A (3ph)	3
	CS275-106-3	Fuse (not shown)	2A (3ph/1ph)	1
	CS275-106-4	Fuse (not shown)	20A (1ph)	3
107	CS275-107	Cover Plate	(3ph)	1
	CS275-107-1	Cover Plate	(1ph)	1
108	CS275-108	Transformer	(3ph)	1
	CS275-108-1	Transformer	(1ph)	1
109	CS275-109	Relay		1
110	CS275-110	Plate		1
111	CS275-111	Support Plate		1

Index No.	Part No.	Description	Size	Qty
112	TS-0680031	Flat Washer	5/16"	2
113	TS-1504031	Socket Head Cap Screw	M8x16	2
114	CS275-114	Screw	M5x6	2
119	CS275-119	Oil Seal	35x47x8	1
120	CS275-120	Rubber Gasket		1
121	CS275-121	Rubber Sheet		2
122	CS275-122	Holder Plate		1
123	CS275-123	Anti-Dust Plate		1
125	CS275-125	Stopper		2

16.2.1 CS-315 Cold Saw (Machine Assembly) – Exploded View



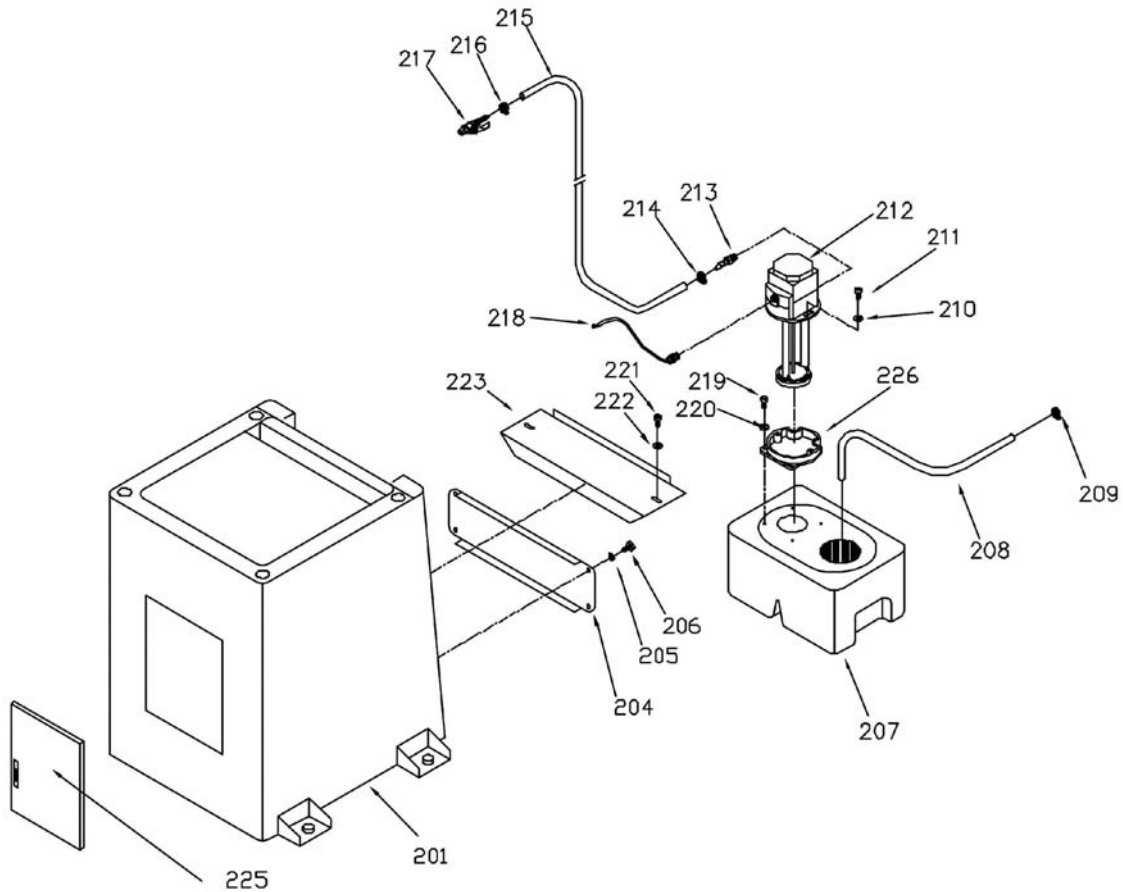
16.2.2 CS-315 Cold Saw (Machine Assembly) – Parts List

Index No.	Part No.	Description	Size	Qty
1	CS275-1	Lock Handle		1
2	CS275-2	Lock Nut		1
3	CS275-3	Shaft		1
4	CS275-4	Machine Base		1
5	CS275-5	Roller Bracket		1
6-1	TS-1492021	Hex Cap Screw	M12x30	2
7	CS275-7	Roller		1
9	TS-1504041	Socket Head Cap Screw	M8x20	3
10	TS-0680031	Flat Washer	5/16"	1
11	CS275-11	Hand Wheel		1
12	CS275-12	Pin		1
13	CS275-13	Bearing Bushing		1
14	CS275-14	Bearing		1
15	CS275-15	Bushing		1
16	CS275-16	Lead Screw		1
17	CS275-17	Lock Handle		1
18	CS275-18	Vise, Moveable		1
19	CS275-19	Washer		1
20	CS275-20	Spring		1
21	CS275-21	Plate		1
22	TS-1506021	Socket Head Cap Screw	M12x25	3
23	TS-0680031	Flat Washer	5/16"	2
24	TS-1504041	Socket Head Cap Screw	M8x20	1
25	CS315-25	Spring		1
26	TS-0680031	Flat Washer	5/16"	1
27	TS-1504041	Socket Head Cap Screw	M8x20	1
28	CS315-28	Switching Handle		1
29	TS-0680021	Flat Washer	1/4"	1
30	TS-1503031	Socket Head Cap Screw	M6x12	1
31	TS-0680031	Flat Washer	5/16"	1
32	TS-1540061	Hex Nut	M8	1
33	CS315-33	Switching Plate		1
34	CS275-34	Retaining Ring	S-60	1
35	CS315-35	Blade Shield		1
36	TS-2245102	Button Head Socket Screw	M5x10	14
37	CS275-37	Plate		2
38	CS315-38	Blade Cover		1
39	CS275-39	Socket Head Cap Screw (left hand thread)	M12x35LH	1
40	CS275-40	Flange		1
41	CS315-41	Saw Blade		1
42	CS275-42	Spindle		1
43	CS275-43	Worm Gear		1
44	CS275-44	Lock Nut		1
45	CS275-45	Stop		1
46	CS315-46	Vise, Stationary		1
47	TS-1502061	Socket Head Cap Screw	M5x25	3
48	CS315-48	Base Swing Arm		1
49	CS275-49	Support Rod		1
50	CS275-50	Vise Jaw Insert		1
51	CS275-51	Serrated Jaw Insert		1
52	CS275-52	Small Serrated Jaw Insert		1
53	CS275-53	Handle Grip with Trigger Switch		1
	CS275-53N	Handle Grip with Trigger Switch (s/n 1312XXXX and higher)		1
55	CS315-55	Handle		1
	CS315-55N	Handle (s/n 1312XXXX and higher)		1
56	TS-2310201	Hex Nut	M20	1
58	CS315-58	Machine Head		1
59	BB-6301ZZ	Ball Bearing	6301ZZ	1
60	BB-6205ZZ	Ball Bearing	6205ZZ	2

Index No.	Part No.	Description	Size	Qty
61	CS275-61	Rubber Gasket		1
62	TS-1490031	Hex Cap Screw	M8x20	4
63	TS-0680031	Flat Washer	5/16"	4
64	CS275-64	Flange		1
65	CS275-65	Oil Seal	25x45x10	1
66	CS315-66	Worm Shaft		1
67	CS275-67	Coupling		1
68	CS315-68	Motor	2HP, 220V, 3Ph	1
	CS315-68-1	Motor	2HP, 220V, 1Ph	1
69	CS275-69	Wire Terminal Clamp		4
70	CS275-70	Control Wire		1
71	TS-1490031	Hex Cap Screw	M8x20	4
72	TS-0680031	Flat Washer	5/16"	4
73	CS275-73	Oil Plug	1/2" PT	1
74	TS-0271031	Socket Set Screw	3/8"-16x3/8	2
75	CS315-75	Shaft		1
76	CS315-76	Bushing		1
77	CS315-77	Hex Cap Screw	M12x55	2
78	TS-1540081	Hex Nut	M12	2
79	CS275-79	Locking Knob	M8x20	1
80	CS275-80	Length Setting Rod Bracket		1
81	CS275-81	Upper Length Setting Rod		1
82	CS275-82	Lower Length Setting Rod		1
83	TS-1540081	Hex Nut	M12	1
84	CS275-84	Locking Knob	M8x18	1
85	CS275-85	Filter		1
87	CS275-87	Drain Cover		1
88	TS-0680031	Flat Washer	5/16"	2
89	TS-1504051	Socket Head Cap Screw	M8x25	2
90	TS-1504071	Socket Head Cap Screw	M8x35	1
91	CS275-91	Support		1
92	TS-0680031	Flat Washer	5/16"	2
93	TS-1504041	Socket Head Cap Screw	M8x20	2
94	TS-1533032	Pan Head Machine Screw	M5x10	4
95	CS275-95	Stop Push Button		1
96	CS275-96	Start Push Button		1
97	CS275-97	Emergency Stop		1
98	CS275-98	2/4P Selection Switch	(3ph only)	1
99	CS275-99	Pump Selection Switch		1
100	CS275-100	Control Box Panel	(3ph)	1
	CS275-100-1	Control Box Panel	(1ph)	1
101	TS-0680031	Flat Washer	5/16"	2
102	TS-1490021	Hex Cap Screw	M8x16	2
103	CS275-103	Electrical Control Box		1
104	CS275-104	Control Box Bottom Plate		1
105	CS275-105	Magnetic Contactor	12D (3ph)	1
	CS275-105-1	Magnetic Contactor	18D (1ph)	1
106	CS275-106	Fuse Set	(3ph)	4
	CS275-106-1	Fuse Set	(1ph)	4
	CS315-106-2	Fuse (not shown)	15A (3ph)	3
	CS275-106-3	Fuse (not shown)	2A (3ph/1ph)	1
	CS275-106-4	Fuse (not shown)	20A (1ph)	3
107	CS275-107	Cover Plate		1
	CS275-107-1	Cover Plate	(1ph)	1
108	CS275-108	Transformer		1
109	CS275-109	Relay		1
110	CS275-110	Plate		2
111	CS275-111	Support Plate		2
112	TS-0680031	Flat Washer	5/16"	4
113	TS-1504031	Socket Head Cap Screw	M8x16	4
114	CS275-114	Screw	M5x6	4
117	CS275-77	Cover		1

Index No.	Part No.	Description	Size	Qty
118	TS-1504031	Socket Head Cap Screw	M8x16	2
119	CS275-119	Oil Seal	35x47x8	1
120	CS275-120	Rubber Gasket		1
121	CS275-121	Rubber Sheet		2
122	CS275-122	Holder Plate		1
123	CS275-123	Anti-Dust Plate		1
125	CS275-125	Stopper		2

16.3.1 CS-275 and CS-315 Cold Saws (Stand Assembly) – Exploded View



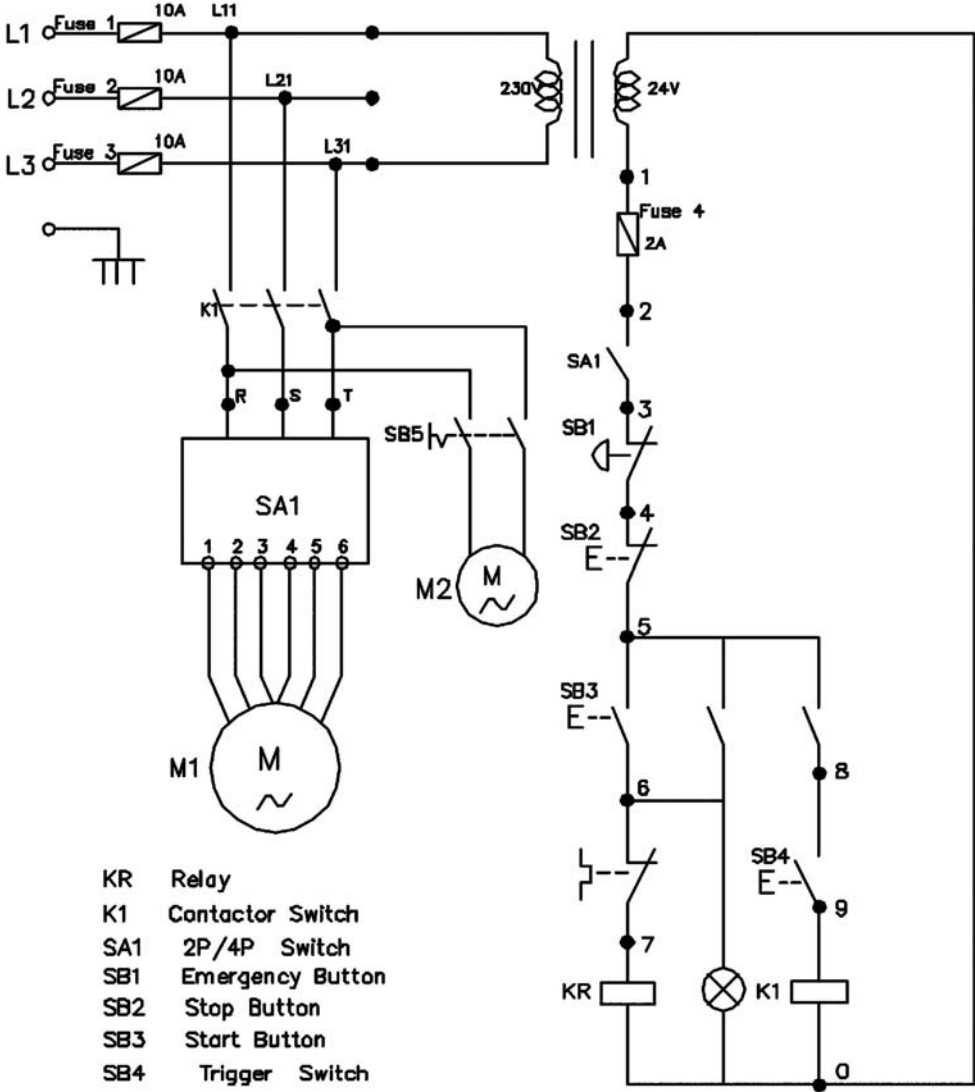
16.3.2 CS-275 and CS-315 Cold Saws (Stand Assembly) – Parts List

Index No.	Part No.	Description	Size	Qty
201	CS275-201	Stand		1
204	CS275-204	Support Plate		1
205	TS-0680031	Flat Washer	5/16"	4
206	TS-1490021	Hex Cap Screw	M8x16	4
207	CS275-207	Coolant Tank		1
208	CS275-208	Hose	1/2"	1
209	CS275-209	Hose Clamp	1"	1
210	TS-1550021	Flat Washer	M4	2
211	CS275-211	Socket Head Cap Screw	M4x18	2
212	CS275-212	Coolant Pump	230V, 1Ph	1
	CS275-212-1	Coolant Pump	115/230V, 1Ph	1
213	CS275-213	Connecting Bolt		1
214	CS275-214	Hose Clamp		1
215	CS275-215	Hose	5/16"	1
216	CS275-216	Hose Clamp	1/4"	1
217	CS275-217	Valve		1
218	CS275-218	Wire		1
219	TS-0050011	Hex Cap Screw	1/4"-20x1/2"	4
220	TS-0680021	Flat Washer	1/4"	4
221	TS-1490021	Hex Cap Screw	M8x16	2
222	TS-0680031	Flat Washer	5/16"	2
223	CS275-223	Support Plate		1
225	CS275-225	Door and Latch		1
226	CS275-226	Collar		1

17.0 Electrical connections

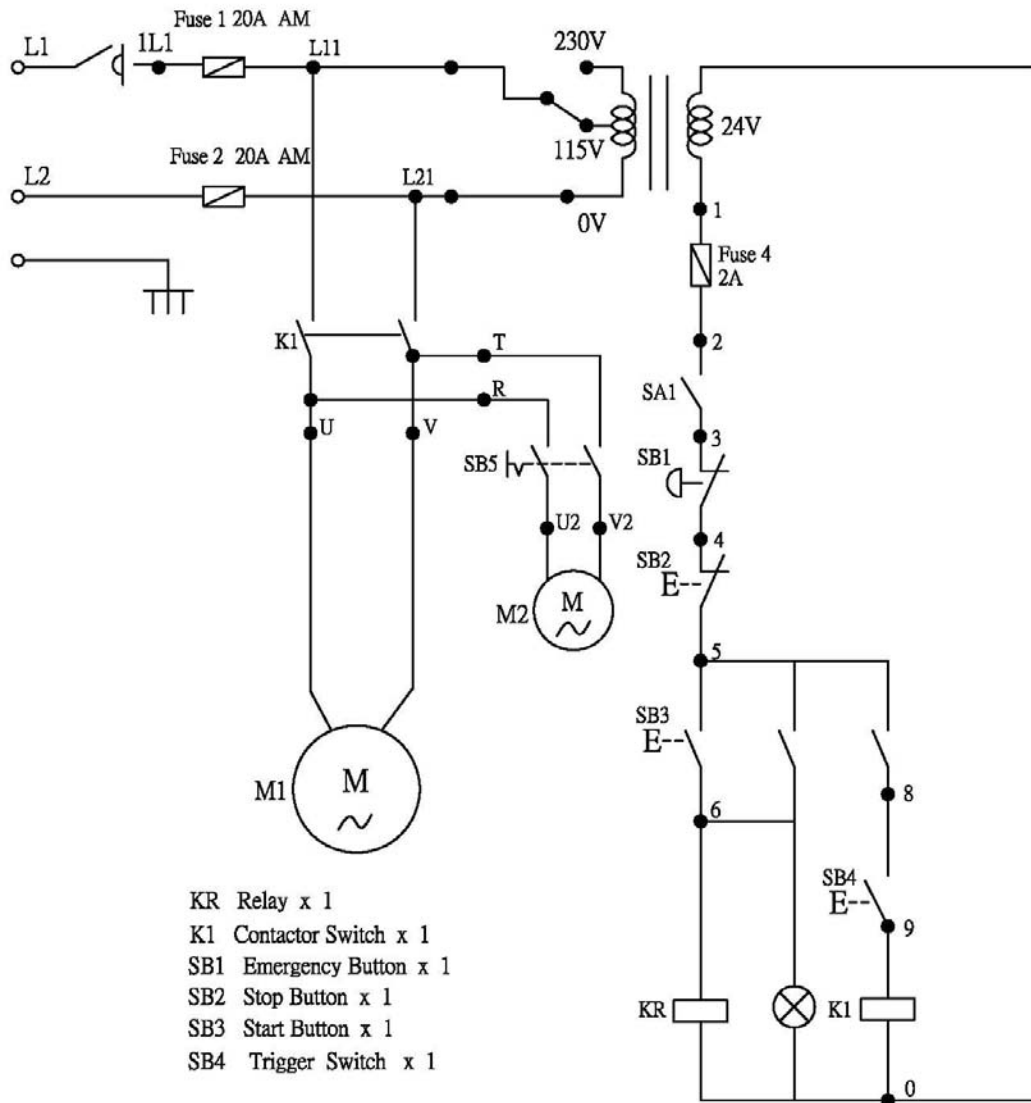
17.1 Models CS-275 and CS-315 (3 Phase)

3-Phase Only



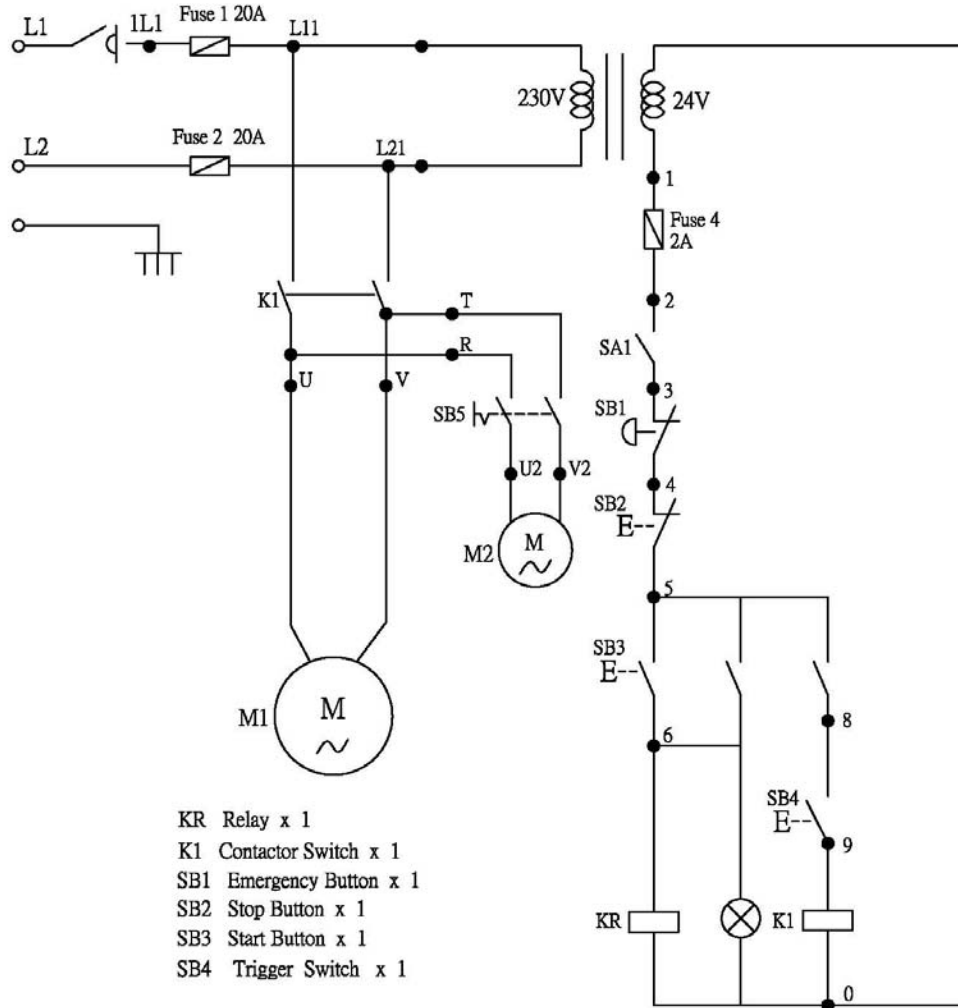
17.2 Model CS-275 (1 Phase)

Single Phase, 115/230V



17.3 Model CS-315 (1 Phase)

Single Phase, 230V



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