

Fully Automatic Bandsawing
with Conversational Set-Up,
Active Hydraulic Cutting
Force Control, True Swivel
Head for Miter Angles

MODEL 1316S - Auto

**Fully Automatic
Bandsaw with Miter Head**

Operating Manual

Built better to work stronger and last longer



Shown with Optional
Bundle Clamp System

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Wellsaw®
Made In The USA

Quality Metal Cutting Bandsaws

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Specifications

Capacity	Round Rectangular
@ 0° (90°)	13" 13"H x 16"W
@ 45°	12" 13"H x 12"W
@ 60°	7-1/2" 8-1/2"H x 7-1/2"W
Blade Size	1" x .035" x 12'6" (150")
Blade Speeds	Infinitely Variable 60-420 SFPM
Blade Guides	Carbide Guides with Rollers
Blade Tension	Double Die Spring with Indicator
Electrical Options	230/3 (See Options for Other Volt-ages)
Coolant System	Tank Capacity 8 Gallons Submersible Pump 115V/6 Amp/3 GPM
Vise Control	Quick Positioning/Air Powered
Feed Rate Control	Variable Positive Hydraulic with Sawing Force Control
Cutting Force Control	30-120 Lbs.
Jobs Storage	99
Band Wheels	15" Diameter Cast Iron
Barfeed Projection	25" Unlimited Indexes
Barfeed Accuracy	+/- .002"
Barfeed Remnant	10"
Barfeed Length	5'
Weight Capacity	3,000 Lbs.
Bed Height	35"
Floor Area	90"W x 120"L
Shipping Weight	3,100 Lbs.

1316S-Auto Components

- Square D® Programmable Machine Controller with Membrane Keypad and LCD display
- Square D® Vector Type Frequency Motor Controller
- Baldor® 5hp TEFC Blade Drive
- Baldor® 3/4hp Hydraulic Motor
- Textron/Cone Drive® Double Enveloping Gearbox
- Vickers® Hydraulic Valves
- Wellsaw Tiger-Tooth® Bi-Metal Blade
- Active Hydraulic Cutting Force Control
- Encoder Type Barfeed
- Blade Break/Stall Proximity Switch
- Working Light with Transformer
- Unitized Base Design (Saw and Barfeed) with Integral Fork Pockets
- Out of Stock Shutdown
- Self Centering Shuttle Carriage with Anti-Climbing Vises
- Discharge Table & Shute
- Spring-Loaded Carbide Guides with Rollers
- 8 Gallon Flood Coolants System with Sample/Start-Up Coolant
- Full Surround Chip Pan
- Powered Blade Brush
- 110 Volts at Controls
- Overload and Undervoltage Protection
- Precision Ground Beds and Discharge Table
- Auto Shut-Off at End of Cut
- OSHA Blade Guarding
- Low Air Pressure Safety Switch
- NFPA Electrics (with Fused Disconnect)
- Flush Hose

Key Features

Fully Automatic Bandsawing | Conversational Set-Up | Encoder Type Barfeed | Quick Set-Up and Multiple Job Programing | Automatic Kerf Compensation | Machine Diagnostics | Hydraulic Cutting Force Control System

Available Factory Options

Overhead/Bundle Clamping | Transformer for 460 Volt Operation | Chip Conveyor | Variable Vise Pressure | Laser Line Pointer | 5' and 10' Non-Powered Conveyors | Oil Injection Type Lubrication Systems | Hour Meter

Safety Instructions

⚠ WARNING



⚠ DANGER



⚠ CAUTION



1. Always wear protective eye wear when operating machinery. Eye wear shall be impact resistant, protective safety glasses with side shields which comply with ANSI Z87.1 specifications. Use of eye wear which does not comply with ANSI Z87.1 specifications could result in severe injury from breakage of eye protection.
2. Keep hands in sight and clear of all moving parts and cutting surfaces.
3. Wear proper apparel. No loose clothing or jewelry which can be caught in moving parts. Rubber soled footwear is recommended for best footing.
4. Do not overreach. Failure to maintain proper working position can cause you to fall into the machine or cause your clothing to get caught - pulling you into the machine.
5. Keep guards in place and in proper working order. Do not operate the machine with guards removed.
6. Avoid dangerous working environments. Do not use stationary machine tools in wet or damp locations. Keep work areas clean and well lit. Special electrics should be used when working on flammable materials.
7. Avoid accidental starts by being sure the start switch is "OFF" before plugging in the machine.
8. Never leave the machine running while unattended. Machine shall be shut off whenever it is not in operation.
9. Disconnect electrical power before servicing. Whenever changing accessories or general maintenance is done on the machine, electrical power to the machine must be disconnected before work is done.
10. Maintain all machine tools with care. Follow all maintenance instructions for lubricating and the changing of accessories. No attempt shall be made to modify or have makeshift repairs done to the machine. This not only voids the warranty but also renders the machine unsafe.
11. Secure work. Use clamps or a vise to hold work when practical. It is safer than using your hands and it frees both hands to operate the machine.
12. Never brush away chips while the machine is in operation.
13. Keep work area clean. Cluttered areas invite accidents.
14. Remove adjusting keys and wrenches before turning the machine back on.
15. Use the right tool. Don't force a tool or attachment to do a job it was not designed for.
16. Use only recommended accessories and follow manufacturer's instructions pertaining to them.
17. All visitors should be kept at a safe distance from the work area. Make workshop completely safe by using padlocks, master switches, or by removing starter keys.
18. Know the tool you are using - its application, limitations, and potential hazards.
19. 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 paints
 - Crystalline silica from bricks and cement and other masonry products, and
 - Arsenic and chromium from chemically treated lumber.
20. Your risk from these exposures 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 dust masks that are specifically designed to filter out microscopic particles.

General Electrical Cautions

This saw should be grounded in accordance with the National Electrical Code and local codes and ordinances. This work should be done by a qualified electrician. The saw should be grounded to protect the user from electrical shock.

Wire Sizes

Caution: for circuits which are far away from the electrical service box, the wire size must be increased in order to deliver ample voltage to the motor. To minimize power losses and to prevent motor overheating and burnout, the use of wire sizes for branch circuits or electrical extension cords according to the following table is recommended:

Conductor Length	AWG (American Wire Gauge) Number	
	240 Volt lines	120 Volt lines
0-50 feet	No. 14	No. 14
50-100 feet	No. 14	No. 12
Over 100 feet	No. 12	No. 8

Safety Instructions

⚠ WARNING



⚠ DANGER



⚠ CAUTION



Misuse of this machine can cause serious injury.

For safety, this machine must be set up, used and properly serviced.

Read, understand and follow instructions in the Parts and Maintenance manual.

DISCONNECT POWER before adjusting or servicing the saw or changing a blade.

STAY CLEAR of all moving parts. Keep hands and fingers away from the saw blade.

WHEN MOVING SAW, with hinged frame (saw head), secure the head in its down position.

WHEN CUTTING MAGNESIUM, take special precautions. Use a sharp saw blade, make only dry cuts, prevent chip accumulation, and keep fire-fighting equipment nearby.

THIS SAW SHOULD BE GROUNDED WHILE IN USE TO PROTECT THE OPERATOR FROM ELECTRICAL SHOCK.

CORD CONNECTED TOOLS. If the saw is equipped with an approved 3-conductor cord and a 3-prong grounding type plug, it should only be connected to a properly equipped and grounded receptacle. The green conductor in the cord is the grounding wire. Never connect the green wire to a live terminal.

Use only a 3-wire extension cord having a 3-pronged receptacle, a 3-pronged plug and ample amperage rating. Replace or repair a damaged or worn cord immediately.

PERMANENTLY CONNECTED TOOLS. The saw should be connected to a grounded, metal-enclosed wiring system or an equipment-grounding conductor should be run with the circuit conductors and connected to the saw's grounding terminal or lead.

To reset the manual starter after a power interruption, return the switch to OFF and press the RESET button before restarting.

KEEP GUARD IN PLACE and in working order.

REMOVE ADJUSTING KEYS AND WRENCHES. Form a habit. Check to see that all keys and wrenches are removed from the tool before turning the tool on.

KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.

AVOID DANGEROUS ENVIRONMENT. Do not use power tools in damp or wet locations. Keep your work area well lighted.

KEEP CHILDREN AWAY. All visitors should be kept a safe distance from work area.

MAKE WORKSHOP KID-PROOF with padlocks, master switches, or by removing starter keys from tools.

DON'T FORCE TOOL. It will do the job better and safer at the rate for which it is designed

USE RIGHT TOOL. Don't use a tool or attachment to do a job for which it was not designed.

WEAR PROPER APPAREL. No loose clothing or jewelry to get caught in moving parts. Rubber-soled footwear is recommended for best footing.

USE SAFETY GLASSES. Also use face or dust mask if operation is dusty.

SECURE WORK. Use clamps or a vise to hold work. Provide adequate support to prevent injury from falling work pieces.

MACHINE SET UP

- Always avoid using machine in damp or poorly lighted work areas.
- Always be sure machine is securely anchored to the floor
- Always keep machine guards in place.
- Always put start switch in "OFF" position before plugging in machine.

MACHINE USE

- Never operate with machine guards missing.
- Always wear safety glasses with side shields (See ANSI Z87.1)
- Never wear loose clothing or jewelry.
- Never overreach - you may slip into the machine.
- Never leave machine running while away from it.
- Always shut off the machine when not in use.

MACHINE SERVICING

- Always unplug machine from electrical power while servicing.
- Always follow instructions in Parts and Maintenance manual when changing accessory tools or parts.
- Never modify the machine.

Read and follow these simple rules for best results and full benefits from your machine. Used properly, WELLSAW's machinery is among the best in design and safety. However, any machine used improperly can be rendered inefficient and unsafe. It is absolutely mandatory that those who use our products be properly trained in how to use them correctly. They should read and understand the Parts and Maintenance manual as well as all labels affixed to the machine. Failure in following all of these warnings can cause serious injury.

FULL YEAR LIMITED WARRANTY

This WELLSAW is warranted against defects in material or workmanship installed or performed at the factory. Within one year from date of purchase, we will free of charge and at our option, either repair or replace any part of this WELLSAW which our examination discloses to be defective because of workmanship or a defect in the material. This warranty does not apply if this WELLSAW has been used in a manner not consistent with its' design or which has been subject to accident, alteration, abuse or misuse or which fails due to lack of care or is the result of inadequate power supply and specifically does not apply to normal wear parts. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF.

WELLSAW shall not be liable for consequential or incidental damages suffered or incurred with respect to defective materials or workmanship.

We do not authorize any person or representative to make any other warranty or to assume for us any liability in connection with the sale of our products other than those contained herein. Any agreements outside of or contradictory to the foregoing shall be void and of no effect.

All transportation costs on products or parts submitted to WELLSAW under this warranty must be paid by the user. No products or parts are to be returned without first obtaining permission.

RECEIVING AND INSTALLATION

Un-crating

Carefully remove the protective crating and skid so the saw and its parts are not marred or otherwise damaged. In the event of damage in transit, notify the carrier and file a Proof of Loss Claim immediately.

Shortages

Inspect the complete shipment carefully against the itemized packing list. Make sure that all items are present and in good condition. In the event of any shortage, notify the distributor from whom you purchased the saw and the carrier who made the final delivery.

Utility Hook-Up

The use of a qualified electrician is always recommended when connecting the saw to the main power supply. Electrical codes differ from area to area and it is the customer's responsibility to ensure that their saw complies with applicable codes. Your WELLSAW is pre-wired at the factory for a specified voltage. Always check the motor and electrical panel to ensure that they are both wired to correspond to your electrical power supply.

PARTS ORDERING

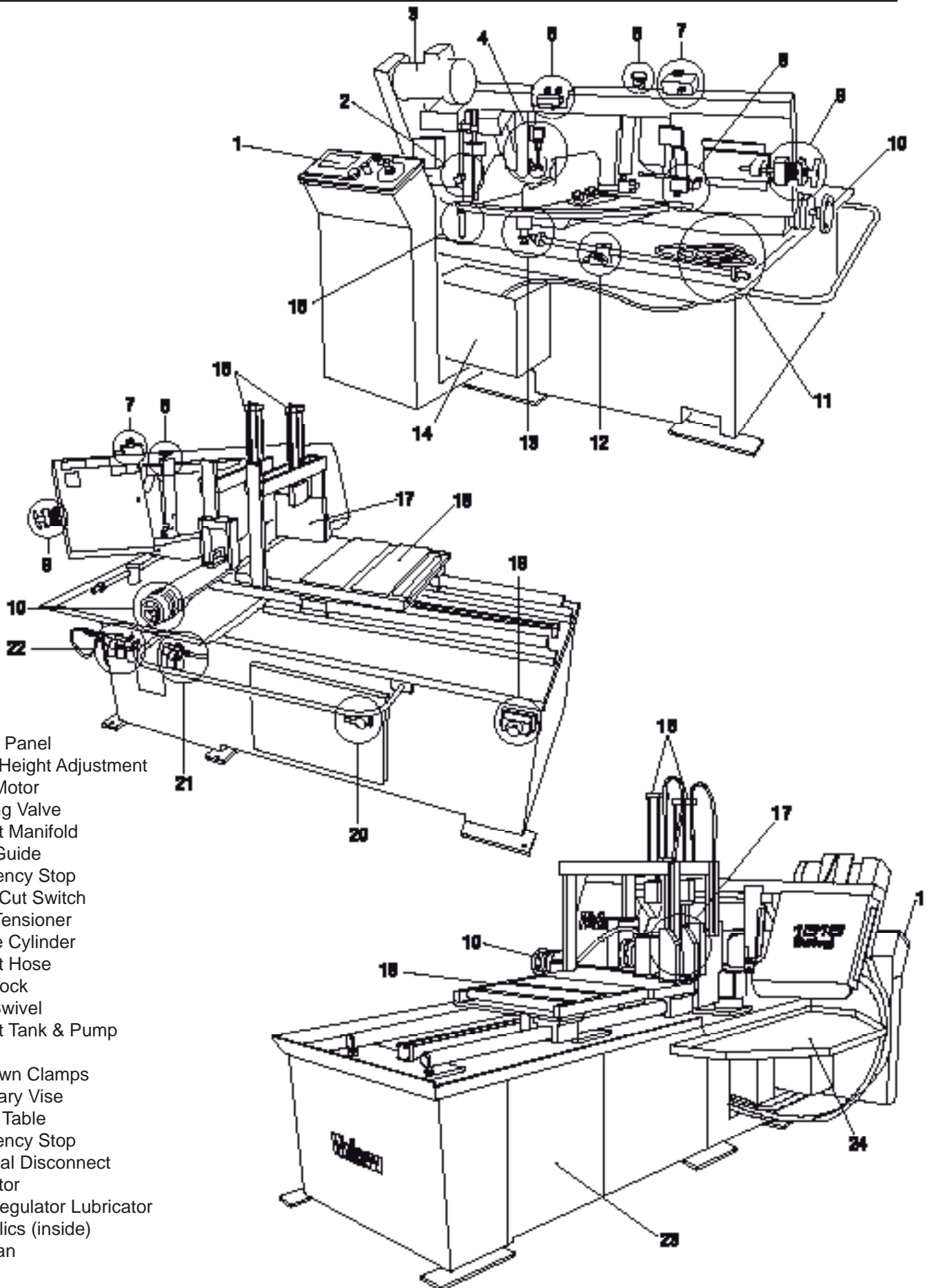
When contacting your WELLSAW Supplier of the Company for parts or service, it is essential that you have your MODEL NUMBER, SERIAL NUMBER and PURCHASE DATE available. Jot them down here for handy reference.

MODEL: _____

SERIAL NUMBER: _____

PURCHASE DATE: _____

MODEL 1316S-AUTOMATIC OVERVIEW



- 1 Control Panel
- 2 Frame Height Adjustment
- 3 Blade Motor
- 4 Metering Valve
- 5 Coolant Manifold
- 6 Blade Guide
- 7 Emergency Stop
- 8 End of Cut Switch
- 9 Blade Tensioner
- 10 Air Vise Cylinder
- 11 Coolant Hose
- 12 Table Lock
- 13 Table Swivel
- 14 Coolant Tank & Pump
- 15 Pointer
- 16 Holddown Clamps
- 17 Stationary Vise
- 18 Shuttle Table
- 19 Emergency Stop
- 20 Electrical Disconnect
- 21 Regulator
- 22 Filter Regulator Lubricator
- 23 Hydraulics (inside)
- 24 Chip Pan

MODEL 1316S-AUTOMATIC OVERVIEW

MANAGED FROM THE CONTROL PANEL

- Length of Cut
- Number of Cuts
- Blade Motor Start, Stop and Band Speed
- Saw Head Raise, Lower, or Stop
- Clamp and Unclamp both Vise Jaws
- Move Shuttle Carriage Forward or Return
- Automatic or Manual Sawing Mode
- Feed Rate Control

MANAGED BY THE OPERATOR

With stock placed on the infeed conveyor and against the blade, adjustments can be readily made to:

- Position of both Vise Jaws
- Height of Saw Head when raised
- Position of Moveable Blade Guide
- Swivel of Saw Head (if making miter cut)
- Sawing Force Control and Feed Rate Control
- Rate of Coolant Flow to each Blade Guide
- Blade Tension (when changing blade)



TROUBLE SHOOTING

NOTES ON SAWING

It is widely recognized that a proficient operator is a key to optimum bandsawing. He makes certain the machine is properly maintained and adjusted for dependable operation. He carefully sets up each cutting job to prevent damage to the machine and obtain the best performance from the equipment.

Experienced blade dealers can be very helpful in selecting the grade and proper tooth blade for each sawing job. All blades should be straight, have sharp teeth with uniform set, and be "broken in" at a reduced feed rate to obtain good cutting performance and blade life.

Every cutting situation has special characteristics requiring some experimentation to determine which blade, speed and feed rate will achieve the most satisfactory result. Cutting charts indicate a good starting point, but must be modified by direct experience if optimum performance is desired.

Here are some helpful pointers for adjusting speed and feed for cutting performance.

1. Make sure the saw is cutting a good chip from the workpiece.
2. Watch for blue chips or excessive "smoke" indicating heat in the cut which could damage the blade or work harden the material being cut.
3. Watch for excessive vibration or chatter marks on the cut-off piece indicating possible damage to the saw teeth by "hammering"
4. Check the cut-off for flatness. A dull blade or excessive feed will produce a "belly" in the cut.
5. Inspect the blade for worn, rounded or shiny cutting edges. avoid force cutting which will allow chips to "weld" to saw teeth and eventually cause the teeth to be stripped off the blade.
6. When experimenting, start with a slow speed and feed rate. Gradually increase blade speed and then feed pressure by small amounts until adverse effects are noted. You can then set the speed and feed at a reasonable level for continuous cutting. Remember that blade speed and feed pressure must be balanced to keep cutting a good chip.

CUTTING TIPS

1. Select blade and speed for material being cut. Use the coarsest tooth blade suitable for the workpiece while proving for at least two teeth cutting at all times. Use fastest suitable band speed and minimum feed source adequate to produce good cutting action. Work with work-hardening steels, maintain a steady feed; do not let teeth rub without cutting.

2. Keep the blade guides as close as possible to the workpiece.
3. If teeth wear off unusually fast, use a slower band speed.

PREMATURE DULLING OF BLADE

1. Feed rate too high or low. Check recommendation.
2. Blade speed too slow or too fast.
3. Faulty material; heavy scale, hard spots, etc.
4. Verify material analysis
5. If coolant flow is not covering saw teeth, increase coolant flow rate.
6. If saw is vibrating in cut, reduce a blade speed or increase feed rate.
7. Chipped or broken tooth may be lodged in cut.
8. "Chip welding" caused by improper feed and speed.
9. Incorrect coolant mixture.
10. Incorrect blade selection.
11. Improper break-in of new blade. New blades should be run initially with reduced feed pressure for approximately 50 to 100 square inches.
12. Saw blade teeth may be hitting blade guides. Check for proper blade size.

SAW BLADE VIBRATION

1. Incorrect blade speed for material.
2. Blade tension insufficient.
3. Back-up bearing may be worn.
4. Incorrect choice of saw tooth pitch.
5. Incorrect coolant mixture.
6. Incorrect feed setting. Increase feed.
7. Work piece not firmly clamped to vice.
8. Worn or improperly adjusted saw guides. Check and make necessary adjustments.

BLADE TEETH CHIPPING OR RIPPING OUT

1. Blade pitch too coarse. Use a fine pitch saw blade on thin work sections.
2. Improper break-in of new blade. Do not start a new blade in an old cut.
3. Work piece not held firmly enough. Clamp work securely.
4. Introduce cooling if it is not being used.
5. Faulty material; scale or hard spots.
6. Blade gullets may be loaded. Use higher viscosity lubricant or coolant.
7. Blade speed and feed may need adjustment.

PREMATURE BLADE BREAKAGE

1. Poor weld in the blade.
2. Feed rate set too high. Reduce it.
3. Excessive blade speed. Adjust it.
4. Blade guides set too tight or misaligned.
5. Blade tension set too high.
6. Blade running against flange on wheels.
Adjust wheel pitch.

BLADE SQUEAL

1. Feed rate too light for blade speed. Increase feed rate and/or reduce blade speed.

BLADE SLIPS OFF BAND WHEELS

1. Blade not tensioned correctly.
2. Wheel pitch not set properly.
3. Guides set too tight.

GULLETS OF BLADE TEETH LOADING

1. Blade pitch too fine. Review blade selection.
2. Incorrect blade speed. Consult cutting chart.
3. If not using coolant, apply it.

CHIPS WELDING TO BLADE TEETH

1. Cutting rate too high.
2. Chip brush may be out of adjustment.
3. Check coolant and application.

BLADE BECOMING SCORED

1. Saw guides may be worn. Check and replace if necessary.
2. Too much pressure on saw guides. Adjust.
3. Guides may be out of alignment.

BLADE MAKING BELLY-SHAPED CUT

1. Blade tension too light. Increase it.
2. Saw guides too far from work piece.
3. Blade pitch too fine. Use larger pitch and positive rake tooth form.
4. Feed force too heavy. Decrease it.

INACCURATE CUT-OFF

1. Is conveyor or stock stand level with saw bed?
2. Insufficient blade tension.
3. Blade guides too far apart. Always set blade guides as close to the piece as possible.
4. Blade may be dull. Check and replace if necessary.
5. Feed pressure too high. Reduce it.
6. Blade guides loose, worn or out of alignment.
7. Too many teeth-per-inch. Blade not cutting freely.
8. Chip brush not cleaning teeth properly.
9. Dirty coolant.
10. Check for loose fasteners.

ROUGH CUT / POOR FINISH

1. Excessive feed rate. See recommendations.
2. Blade too coarse. Use finer blade pitch.
3. Inadequate cutting fluid. Replace.

BLADE STALLS IN WORK

1. Insufficient blade tension.
2. Excessive feed pressure.
3. Blade tooth spacing too coarse.
4. Motor worn or defective.
5. Guides too tight against blade.

BLADE DOES NOT TRACK PROPERLY

1. Set wheel pitch so that blade runs to wheel flange but not against it.
2. Is blade tension correct?
3. Is back of blade riding against backup bearing? If not, adjust it.

AUTOMATIC STOP

When the blade has completed a cut through the material, the saw frame drops onto a limit switch actuator which shuts the motor off.

When changing a blade or doing any other maintenance or repair, ***be sure the automatic stop is engaged and disconnect the main power supply.***

It is necessary to raise the saw frame to clear the limit switch actuator before the saw can be started.

CUTTING FORCE CONTROL FEATURE

SYSTEM OVERVIEW

The Wellsaw 1316S-Auto is equipped with a Cutting Force Control System. Unlike a conventional scissor type saw the Cutting Force Control carefully maintains a constant sawing force on the blade all the way through the cut even with changing cross sections like in beams or pipes. Even at aggressive sawing rates there is no danger of overfeeding. This allows the saw to perform at rates that would not be possible otherwise without risk of damage to the blade. This feature, in combination with the five horsepower motor gives this machine the ability to cut heavier and tougher materials than a conventional saw. And it runs confidently while unattended even at high performance levels.

- Is simple to adjust
- Produces straighter cuts
- Shortens cut time
- Provides longer blade life
- Is self monitoring

BASIC PARTS OF THE SYSTEM ARE:

- A hydraulic cylinder is used to raise and lower (feed) the saw frame/head.
- A hydraulic pump is used to raise the head. This is the same pump used to move the shuttle carriage.
- An air-over-oil system provides supplemental feed pressure to the system.
- There is no counterbalance system needed for this system.

THREE CONTROLS IN THE SYSTEM

- **Feed Rate Valve** on the control panel
- **Cutting Force Valve** on the Drive End Blade Guide
- Downfeed **Pressure Control Regulator** on the side of the machine.

Always be sure that the Cutting Force roller is resting on top of the blade.

QUICK START INSTRUCTIONS

FEED RATE AND CUTTING FORCE

Locate the three controls

1. **Air Pressure Regulator** on the right side of the machine. This is the second regulator after the primary regulator
2. **Cutting Force Valve** on the Blade Guide
3. **Feed Rate Control** knob on Control Panel.

Before you begin the cut:

1. Adjust the **Air Pressure Regulator** to 10 psi. Pull the knob down to adjust. Push up to lock.
2. Adjust the **Cutting Force Valve** to the desired force.

For mildsteel use 50 lbs as a starting point. Turn the thimble at the bottom of the valve. Note the force on the scale.

3. Move the **Feed Rate Control** knob to the zero position.

To begin the saw cut:

1. Press the **Blade Start** button. Hold in until the motor runs. Note the blade speed on the display. Adjust if needed.
2. If you are starting an Auto cycle press Auto
3. Press the **Head Lower / Cycle Start** button.
4. Slowly open the **Feed Rate Control** knob.

- The saw head will lower and begin the cut.
- The **Cutting Force Valve** regulates the force of the blade on the part being cut.
- The **Feed Rate Control** knob limits the rate that the saw head falls. This can also be used to hold the saw head at the start of the saw cut during the set-up.

The Cutting Force Valve is the primary control and the Feed rate control is secondary.

CUTTING FORCE VALVE SERVICE INSTRUCTIONS

It may become necessary to open and clean the Cutting Force Valve. Indications would be:

- Irregular feed rate control
- Unusual finish on the cut part
- Unexplained damage to saw blade
- Very slow cutting rate

Disassembling the valve for inspection and cleaning

1. Lower saw frame to bottom of stroke. Turn off the Master Switch on the Control Panel. Turn off or disconnect air power to the saw.
2. Loosen the saw blade.
3. On the Cutting Force Valve find the Push Rod Assembly that fits between the Lever Arm (Part # 156266) and the valve body. Please refer to the exploded view drawing.
4. While pushing down gently on the blade move the bottom of the Push Rod Assembly off of the Lever Arm. You can then lower the Push Rod Assembly. The Spring (Part # 100136-011) will also fall out. Set these items to the side.
5. Loosen the Cap (large hex nut, Part # 156256). Take care that the Shell (Part # 156254) does not turn. Be prepared to catch a small amount of oil with a shop towel.

6. Loosen the Cap completely. The Shell with Adjusting Nut (Part # 156259) will lower. Note the Plunger sitting inside the Shell.
7. The Diaphragm may come down on top of the Shell or it may remain up against the Valve Body.
8. Remove the Diaphragm and white plastic Needle.

Inspection and Cleaning

1. The Diaphragm should be flat and have no perforations or wrinkles. If it has any defects it must be replaced.
2. Inspect the point of the Nylon needle. It must be smooth and free of debris. The point can be cleaned by twisting it into a soft cloth. If it has damage the valve will produce inconsistent force.
3. Remove the Plunger (Part # 156255). Inspect for corrosion. Polish with a scrubbing pad to remove all corrosion. Lubricate generously with a light grease.
4. Do not blow compressed air into the Valve Body. Using an aerosol can spray light penetrating oil up into the Valve Body. Allow it to drain. Again, do not blow compressed air into the Valve Body.

Assembly

1. Remove the Thimble from the Shell.
2. Place all parts within arms reach.
3. Lubricate the steel Plunger with light grease and insert into the Shell.
4. Lubricate the diaphragm liberally with hydraulic oil and place on top of the Shell (and Plunger). Take care to center the Diaphragm.
5. Stand the Needle in the center of the Diaphragm.
6. The Diaphragm is sandwiched between the Shell and the Valve Body. Before the Shell is lifted up against the Valve Body rotate the Shell so that the Force Scale is in the desired position for the operator's viewing. **DO NOT TURN THE SHELL ONCE IT IS LIFTED AGAINST THE VALVE BODY** otherwise the diaphragm may become wrinkled and the Valve will not function properly.
7. Lift the Shell up against the valve body. Hold the Shell steady to prevent turning and with your other hand install the Cap nut. Lightly tighten by hand only.
8. Install the Thimble into the Shell. Turn up all the way until it seats gently.
9. Install the Spring and Pushrod Assembly and position on top of the Lever Arm.
10. Retighten the saw blade.
11. Adjust the Cutting Force Valve "30" or all the way up.
12. Power up the machine and make a test cut. The system is self bleeding.
13. Please refer to the Test and Adjust notes for further details.

Cutting Force Control Valve Test and Adjust

Problem: The Cutting Force is too heavy (the actual cutting force is higher than the value selected on the Thimble)

Possible Cause:

1. The needle is held open on the valve seat by debris.
2. The length of the pushrod is too short.

Problem: The Cutting Force is too light or the saw head stops during the cut: (the actual cutting force is lower than the value selected on the Thimble)

1. Pushrod is too long.

Test: As a routine quick-check move the thimble on the valve up to the lightest position ("30" on the Thimble or all the way up), open the Feed Control Valve (on the Control Panel) to position 3 then press the Head Lower/Cycle Start button. The saw head should descend at a slow rate (blade motor is off). Insert a 40 thousandths (.040") feeler gauge between the top edge of the blade and the Cutting Force roller (on the little arm). This should stop the saw head. If not then adjust the push rod to lengthen it accordingly. If the head continues down after the adjustment or the weight cannot be lowered then there may be debris in the needle & seat.

Adjustment:

Tools needed:

- Bathroom scale
 - Small block of wood
 - Two ½" open end wrenches
 - .040"feeler gauge (or approximate substitute)
1. Place the block on the scale.
 2. Raise saw head enough to move the scale and block into place under the blade. The scale should be close to the stationary vise jaw.
 3. Turn the thimble in the Cutting Force valve all the way up. This represents the minimum cutting force.
 4. Open the Feed Rate control (on front panel) to position 3.
 5. (Blade motor is off) Press and hold the green HEAD LOWER /CYCLE START button. The saw head should descend slowly and the blade will come down on the wooden block.
 6. Tap on the back edge of the blade with a screwdriver to free up any tension in the guides. Note the value of the scale. It should be about 10 to 20 lbs.
 7. If the weight is too high the rod length is too short and needs adjustment. Unlock the two jam nuts and extend the pushrod. If the value is still too high after adjustment then the needle valve must be inspected for debris. See the Instructions for service on the valve.
 8. If the rod is adjusted too long the saw head will not come down at all.
 9. Remove the scale.

REVIEW OF CONTROL PANEL BUTTONS & OPERATION

MASTER START

Push green Master Start button and hold until illuminated. This enables all machine operations. All Emergency Stop buttons must be reset (out) to activate this button. Pushing the emergency stop or loss of communication to the operator screen will disable the master start.

EMERGENCY STOP

Push to stop machine operation at any time. Pull out and twist at the same time to reset. There are three emergency stops on the machine, one on the operator station, one on the top of the cutting head, and one at the end of the Barfeed. All three must be reset or out to operate the machine.

AUTO

Pushing this button puts the machine in the Automatic Mode. The adjacent red indicator light is on when the machine is in Auto Mode. Push again and the red light will turn off indicating the machine is in Manual Mode. This button is also used to cycle stop the machine after running in Auto Mode. If this button is pushed when running in Auto Mode, the red light will go out and the saw will finish the current cut cycle and then shut down. If this button is pushed while the Operator Screen is in the "QUICK JOB" or "MULTIPLE JOB" location the machine will cut the multiple length parts as programmed. All other screens will enable the single length programmed.

RESET COUNT

Pushing this button will zero the current count of cut parts. The count can also be changed on the Operator Screen.

NO TRIM CUT

This feature allows the operator to feed the part length first in Automatic Mode instead of making a trim cut first. Before running the machine in Auto Mode, push this button and the light will turn on indicating the machine will push the material forward in Auto Mode before making the first cut. This feature is very beneficial for saving time if the trim cut has already been made. Care should be taken not to bump into the blade when positioning the stock.

BARFEED RETURN

While pushing this button in manual mode the barfeed moves away from the operator or towards the back of the machine. The barfeed stops when the button is released. The red light indicates the barfeed valve is activated. The first 3 seconds after pushing, the barfeed moves slow and then shifts to high speed. The slow movement time is used for ease of positioning material under the blade for a precise cut location.

BARFEED FORWARD

Pushing this button in manual mode will cause the barfeed to move forward towards the operator or front of the machine. The light indicates the valve is activated. The first

3 seconds after pushing are slow speed and then shifts to high speed. This button is also used to home or zero the machine. When power is first applied to the machine a prompt asks the operator to "Zero Barfeed." This prompt goes away after the barfeed is moved fully forward with this button and held for 3 seconds after stopping. The barfeed can be zeroed at any time by simply holding down this button for 3 seconds while the barfeed is fully forward.

BARFEED VISE OPEN / CLOSE

Pushing this button will toggle the vise closed and then open upon the next depression. The red light is on when the vise is clamped. The machine will start in Automatic Mode in either open or closed state.

BLADE START

When pushed and held for longer than one second the blade will start. This is the only time delayed button and is designed this way to avoid any non-intentional blade starts. The Blade must be running or On to go into AUTO Mode. The red light indicates the blade is On or running.

BLADE STOP

The blade motor stops when depressed. The red light is on when the blade is off.

SAW VISE OPEN / CLOSE

Pushing this button will toggle the vise closed then open upon the next depression. The red light is on when the vise is clamped. The vise must be clamped before running in AUTO Mode. A fault will be displayed if an attempt is made to run in AUTO without this vise clamped.

HEAD RAISE

Momentarily pushing this button will cause the cutting head to raise until it touches the upper Limit Switch. This button can be used as an abort or stop cut in the auto and manual mode. The blade will also stop if it is running. The red light is on when the cutting head raise valve is on.

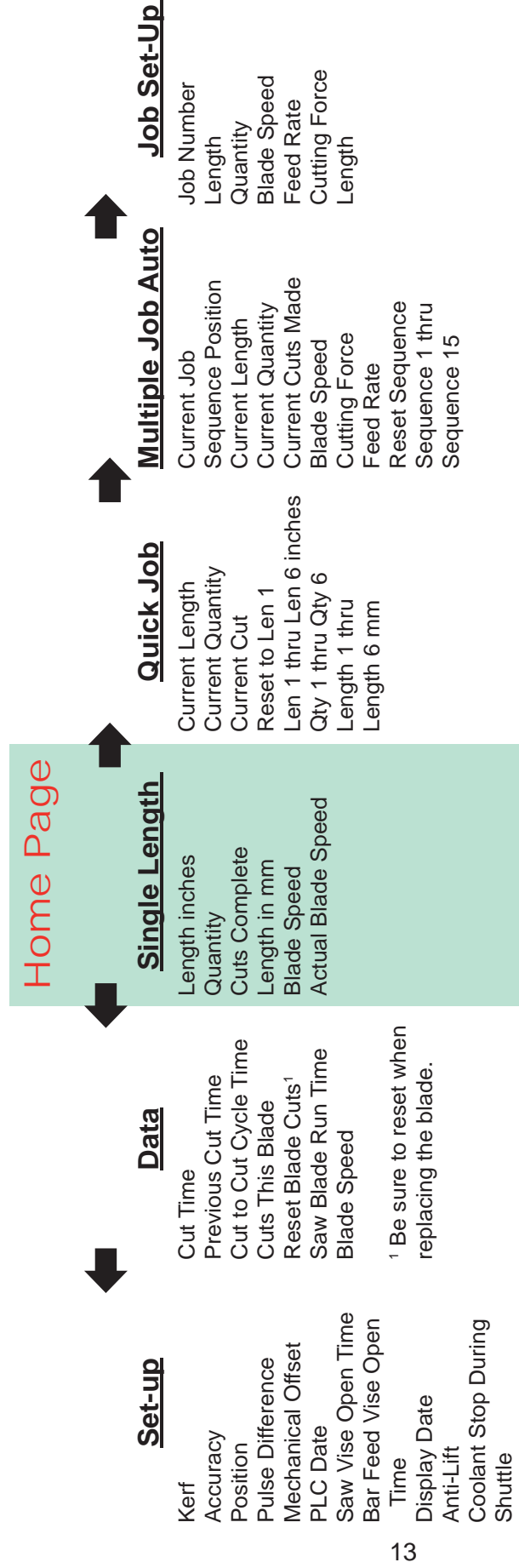
HEAD STOP

Momentarily pushing this button will stop the cutting head. The red light is on when the head is stopped.

HEAD LOWER /CYCLE START

This button will cause the cutting head to lower or feed when pushed in manual mode. The head will continue to lower after the button is released if the blade is on. The head will stop upon release if the blade is off. This button is also used to cycle start the machine in automatic mode. If the "NO TRIM CUT" feature is turn on in automatic mode the machine will feed a length of material first when this button is pushed.

Wellsaw® Model 1316S-Automatic Control Panel Navigation Menu



NAVIGATING THE MENU

There are six screens. The **SINGLE LENGTH** screen is “**Home Page**.” Active Arrows will have pilot light.

Use the **Left Arrow** to move to the screens left of the Home Page.

Use the **Right Arrow** to move to the screens right of the Home Page.

Use the ESC button to move back toward the Home Page one screen at a time.

Use the **Down Arrow** to scroll down a list.

Use the **Up Arrow** to scroll up a list.

Press MOD to change a value, then press **ENTER**. Modify a value when it shows on the top line of the screen.

Jump back to the **Home Page** from any list by pressing the ESC button

THE SIX CONTROL SCREENS

The following is a description of items that will assist in operating and manipulating data for the CNC length control. These basic tools will be used in all the pages or screens described.

1. Use the up and down arrows to move around on the current page displayed. The red light will be on next to the arrow if it is allowed to move in that direction.
2. Use the left and right arrows to move from page to page. The "ESC" key must be used to return from the direction you came, not the arrow key.
3. When changing the value of any number on any page, the desired number to must be on the top of the 2 line display. Then the "MOD" button is pushed. Enter the new value and then push the "Enter" button. The new value will then be showing.
4. If a message or alarm shows on the display and you want to clear to perform other tasks simply push the "ESC" button. If there is an active message the red alarm light will be on. To display the alarm again, push the "SHIFT" and "ENTER" key.
5. In several pages there is a RESET for sequences or quantity. To use this reset, enter a value of 1 in the data field by using the mod and enter key. The value will automatically change back to "0" after momentarily "1". The reset is then complete.
6. There are two small lights at the top left corner of the operator interface. The top red one should remain blinking continuously, indicating the communication with the control computer is OK. The machine cannot run and will automatically shut down if the light stops blinking. The lower green button indicates the current membrane button is activating when pushed.

SCREEN/PAGE Description & Operation

SINGLE LENGTH PAGE

Default page that appears when machine is first started.

- Single length indicates the length of part and continuous cuts at that length. The first line of data is LENGTH =. This can be changed at any time.
- If the LENGTH = is changed while running in automatic mode, the next length the barfeed locates will be the new value entered. The number is in inches and is programmable with accuracy of 1/1000th of an inch.
- The second piece of data is the "QUANTITY". This is the number of preset parts that will be cut before the machine stops. If a value of zero is in this field the machine will continue to run until out of stock.

- The next piece of data is the "CUTS COMPLETE". This shows how many parts have been cut. This number can be changed if desired or reset using the "RESET COUNT" on the touch key.
- Metric Length is also provided in millimeters. If this "LENGTH" mm is changed it also changes the ENGLISH inch value of the single length. The conversion works in both directions. So that both metric and ENGLISH are always available.

DATA PAGE

This page is informational, and contains the following data:

- CUT TIME : Current time in seconds required to make a cut.
- PREVIOUS CUT TIME: Time in seconds it took to complete the previous cut.
- CUT TO CUT CYCLE TIME: Length of time it takes in seconds to automatically cut a complete part.
- CUTS THIS BLADE: Number of cuts made on the machine since the last "reset" of the blade cuts was done.
- RESET BLADE CUTS: Resets the "cuts this blade" number to zero. To reset , enter a "1." The value will momentarily go to 1 and then back to zero.
- SAW BLADE RUN TIME: Total time the saw blade has run since it was new. This value cannot be changed or reset.

SETUP PAGE

Contains machine parameters that are adjustable. Most of these are factory set and will not have to be changed.

- **KERF:** Width of material the blade takes when making a cut. The machine must know this value in order to make accurate cuts. The default for a 1 inch blade is 55 or 0.055". A wide kerf blade may take more material out in a cut, so this value may have to be increased.

EXAMPLE: If a 1.000 inch part was being cut and the actual measurement was 0.997 inches, the kerf would have to be changed from 055 to 058 to get a perfect 1.000 inch part. After this change, all lengths will be accurate for this type of blade.

- **ACCURACY:** Factory default is 3 which provides positioning accuracy of better than +/- 0.002". It can be adjusted between 2 and 20. The purpose of a higher number is only for cycle time in applications of long lengths or production applications where 1 or 2 seconds per part or shuttle makes a difference. The shuttle cycle time is slightly faster due to positioning time for a higher accuracy value such as 10 or 15. A value of 10 would give a shuttle accuracy of +/-

0.006" which in most sawing applications is still very high accuracy. A value of 2 would have an accuracy of +/- 0.001" but may take slightly longer to position than a higher value. In most cases the shuttle has more than enough time to move to position because the saw is making a cut.

- **POSITION:** Barfeed's actual position in thousandths of an inch. If the saw was programmed to cut a 1.000" part, the position at the time the barfeed clamps would be approx. 1.055" with a .055 kerf. (On a single shuttle part, the barfeed always feeds the desired length plus the kerf.)
- **PULSE DIF:** Pulse difference is the actual barfeed stop error. It will always be within the ACCURACY window. Optimum is "0". This is for reference only and can be used to watch each part position. All CNC machines have an error window, most do not display this, they only indicate the position will hold within the ACCURACY window.
- **MECH OFFSET:** Mechanical offset is a single value that can be changed to compensate for a machine that is not perfectly level or aligned. The unit is 1 = 0.0001" or one ten thousandth of an inch per inch of programmed part length. The position sensor on the barfeed has a guaranteed accuracy which should keep this value zero for most applications, although if there was any error it could be compensated for with this value. An example would be if the length was programmed to 60.000" and the actual measured length was 59.994" or six thousandths short, a value of "1" could be entered. Since the value of "1" in this parameter is adding 0.0001" per inch (or one ten thousandths of an inch per inch of part length) the amount extra the barfeed would feed is $60.000" \times 0.0001" = 0.006"$. This is the amount needed to get the exact 60.000" measured part. A 30.000" part would add 0.003" per the offset. If the original measured part was long this mechanical offset would be a negative value.
- **PLC DATE:** Software revision date. 11233 is 11(November) 23 (23 rd) of 3 (2003).
- **SAW VISE OPEN TIME:** The unit is in tenths of seconds. (7 = .7 seconds) The larger the number, the more time the saw vise has to open. This is primarily used when a saw has hold down options and more time is needed to make the hold down raise higher to clear the material.
- **BARFEED VISE OPEN TIME:** The same as Saw Vise Open Time.
- **DISPLAY DATE:** The date of the display software revision MM-DD-YY.

QUICK JOB PAGE

The purpose of the quick job page is to "easily" program

multiple lengths. Up to six lengths can be programmed. The operator must be on this page when starting the machine in automatic mode for the multiple lengths to run. After starting, the operator may go to any other page desired. The first quantity of zero in a length will cause a cycle stop and a message displaying "QUICK JOB COMPLETE".

The machine can be stopped at any time in the middle of the process and then will continue where it left off after startup. To reset the program back to the first part at any time, simply change the value of "RESET" TO "1". RESET will automatically change back to "0" after reset. The "CURRENT LENGTH" will now show the first length and quantity programmed.

EXAMPLE: If 2 different lengths were desired to be cut "on the fly" the operator would enter a length value in LEN 1 and LEN2, and the corresponding quantity in QTY 1 and QTY 2.

Make sure QTY 3 has a "0" in it so the machine cycle stops after the 2 lengths programmed. LEN 1 = 26.098" QTY 1=4, LEN 2 = 3.078" QTY 2 = 16, QTY 3 = 0. This will cut 4 parts at 26.098 inches and then 16 parts at 3.078 inches and then cycle stop.

- **CURRENT LEN:** This value shows the current length the saw is cutting.
- **CURRENT QTY:** Current quantity or total number of parts the operator wants for this length.
- **CURRENT CUT:** Number of cuts made for the current length.
- **RESET TO LEN 1:** Changing this value to a "1" will reset the program and start from the top or length 1 quantity 1. The value automatically changes back to zero after reset.
- **LEN 1 Through LEN 6:** Program the lengths in order starting from length one to as many different lengths as desired. The value is in inches.
- **QTY 1 Through QTY 6:** Number of parts desired for the matching length position. If a quantity of zero is encountered, the saw will cycle stop at that position.
- **LEN 1 Through LEN 6 mm:** Metric length for each programmed length. Each length can be programmed in millimeters at these fields.

MULTIPLE JOB AUTO

The purpose of this page is to recall stored jobs and run them individually or in a sequenced order. This page must be showing on the operator display when the machine is started in automatic mode for this multiple job to run. After starting in automatic, the operator can go to any other page if desired. To view and change these jobs or lengths the operator must go to the next page which is "JOB SETUP". There are 99 different jobs to choose from and they can be sequenced in any order as programmed in SEQ 1 through

15. After the data is entered in a job the operator simply puts the first job number in SEQ 1 that is to be cut and so on for SEQ 2,3,4 etc.. When running automatic, the machine will cycle stop with the first "0" (zero) it encounters in the "SEQ".

EXAMPLE: If the operator wanted to run 3 different jobs or lengths "on the fly" a job number would be programmed into SEQ 1 through SEQ 3 and SEQ 4 would be "0". SEQ 1=87, SEQ 2=34, SEQ 3=18, SEQ 4=0, would run the three lengths and quantities programmed in those jobs, and then cycle stop.

The machine can be stopped for any reason during the middle of the cutting without affecting what is currently being cut. To Start all over again at SEQ 1, simply RESET the pointer by entering a "1" into the "RESET" field.

The top lines of data on this page always show what is currently being cut.

- **CURRENT JOB:** This is the current job that will be or is running. This value will change as the machine is changing lengths or jobs while running automatically.
- **SEQ:** This is the current sequence position.
- **CURR LENGTH:** This is the current length to be cut as programmed in the corresponding job.
- **CURR QUANTITY:** This is the current number of parts to be cut for the length shown.
- **CURR CUTS MADE:** This is the total parts cut of the current length.
- **BLADE SPEED:** This is the current blade speed programmed in the current job. It is for reference only.
- **CUTTING FORCE:** This is the current cutting force programmed into the current job. It is for reference only.
- **FEED RATE:** This is the current feed rate for the current job and length. It is for reference only.
- **RESET SEQUENCE:** Any time this is set to "1", the pointer is reset to SEQ 1.
- **SEQ 1 through 15:** Enter the job in the order desired to run starting with SEQ 1.

JOB SETUP

The purpose of job setup is to program and view the data in each job. Change the job number field and the corresponding data is displayed. The data can be changed if desired at any time. This data can also be changed while the machine is running in automatic mode if desired.

- **JOB #:** This is the current job that corresponds to the data or parameters below. Values are 1 through 99.
- **LENGTH:** Length in inches for the current job shown
- **QUANTITY:** Quantity of parts to be cut when run in auto mode.
- **BLADE SPEED:** This blade speed is in foot per minute and is for reference.

- **FEED RATE:** This is the setting on the operator control pointer for cutting head feed and is for reference only.
- **CUTTING FORCE:** This is a reference for the cutting force setting on the guide.
- **LENGTH mm:** This is the metric length of cut in millimeters. If this value is changed the inch value above automatically changes to the correct value and visa versa.

After reviewing the push button descriptions and the cutting saw controls in the main saw operation manual, a manual machine movement or part cut can be made.

A manual cut can be made by simply:

1. Clamping the part in the saw vise
2. Adjusting the cutting force if necessary
3. Closing the cutting head approach valve by rotating it clockwise to zero.
4. Starting the blade and adjusting the speed for the material to be cut.
5. Pushing the head lower push button
6. Slowly open the cutting head approach valve so the cutting head begins to lower and cut the material.

After the cut is complete, the blade will stop and the cutting head will raise.

Steps 2,4 and 6 can be omitted when the operator becomes proficient and the material is the same as previously

MANUAL OPERATION

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AUTOMATIC OPERATION

Automatic operation is simple to set up and easy to start. The following is in addition to the manual operation of the machine and describes all of the factors for successful operation. The **Quick Start Guide** also contains the basic procedures for automatic operation. Automatic mode can be started in "Single Length", "Quick Job" or "Multiple Job". The Automatic startup is the same for single and multiple length cutting.

1. The blade speed should be known before attempting to cut any material. Consult the chart in this manual or the blade supplier for this number.
2. Set both vises approximately 1/8 inch away from the material while they are in the "open" position.
3. Set the cutting head height so the head stops approximately 1/4 inch above the material.
4. Move the material under the blade manually or by clamping the barfeed vise and using the barfeed in manual mode to move the material and then clamp the saw vise. The barfeed vise can be open or closed when starting in auto. The position of the barfeed can be anywhere between 0 and the cut length to start in auto.
5. For a single length, enter the cut length desired in LENGTH =. Enter the "QUANTITY" if only a certain number of parts are to be cut. If the machine is to cut the current length until it runs out of stock, leave the QUANTITY = 0.

6. Set the cutting force and cutting head feed rate control to the desired value.
7. Set the cutting pressure low (30-40) and the feed rate low (2-4) if you do not know where to start.
8. Next, to begin cutting automatically, Start the saw blade, push the "AUTO" button (Red light should come on next to the auto button showing the machine is in auto mode) and then push the "HEAD LOWER/ CYCLE START" button. The machine will begin to make the trim cut and the barfeed will move to the cut length position and clamp the material.
9. The machine can be cycle stopped by pushing the auto button again (which puts the machine in manual mode, red light). Immediate stop can be made by pushing the "HEAD RAISE" BUTTON. The machine will also stop if it runs out of stock or the "QUANTITY" number has been cut.

ELECTRICAL MAINTENANCE NOTES

The electrical print provided with this machine shows the proper connections for all wiring. The fault/diagnostics provided on the operator screen will assist with most issues before an electrical maintenance person is called. The following information will provide the basic checks to assure proper and accurate machine operation.

There are only a few areas to verify to quickly get this machine up and running automatically. All functions should be working in manual mode before running auto.

1. The position system is working
2. The PLC should be on and running properly.
3. Lastly is the operator interface

POSITIONING SYSTEM

The run light on the processor must be on and “solid”, (not blinking). This indicates the PLC is in the “RUN” mode and is functioning properly.

The positioning system can be quickly verified in manual mode by looking at the current “position” in the setup page on the operator station. Move the barfeed manually back and forth to verify the number is changing properly. If not,

- Check that the rod and sensor are tight without movement.
- Make sure the 5VDC power supply is Working inside the electrical enclosure.
- If the barfeed already manually moves back and forth, the PLC is OK, therefore the only items left are the sensor, rod or voltage converters. These items have been tested and they rarely go bad. However, if one is bad, simply replace it as the average shop cannot repair them. The voltage converter (part # 921939) is a small black electronic device about 1” by 1/2” with four wire leads and is low cost and easy to replace. The sensor or rod can be replaced individually if desired. (part #920930).

PLC

If the position sensor is working, check all other components attached to the I/O of the PLC. Inputs to the PLC have lights with their associated inputs. Each of these can be tested for proper working order by testing the 24 VDC wire to the PLC input and/or the light. This is a simple check for a limit switch, etc. All inputs should be verified to be working if an unknown problem occurs.

Outputs can also be verified by looking at the lighted output on the PLC and by testing the voltage to the output. Blue wire is 24 VDC and red is 120 VAC.

This PLC must be ordered from Wellsaw for proper operational software.

If communication to the operator station is lost, the master start (green light) cannot be turned on. No machine movement can occur until the communication is restored.

OPERATOR INTERFACE

The operator interface is working if you can manually move something or change data. The display requires 24 VDC and the connection of a cable (part #920764) to the PLC to operate. The PLC Must be in run mode as described above for all functions to work. A red light is flashing on the operator interface if it is communicating with the PLC.

This operator interface must be ordered from Wellsaw to be assured of proper operation with this system.

In conclusion, there are few other components to check. All components are the highest quality automotive grade and will rarely fail. Components are stocked at the factory for overnight shipment if necessary.

MOTION / BLADE BREAK SENSOR

This machine is equipped with a detector that monitors the idle wheel movement. The proximity switch is monitored for motion any time the blade is running. If the motion detector does not sense motion of the machine blade and movement is stopped a fault is displayed. The LED indicator on the switch and PLC input should be flickering on and off while the blade is running for proper operation. If the blade breaks while cutting, the idle wheel stops and causes a motion fault. The same occurs if the blade stalls while cutting the material.

OUT OF STOCK SHUTDOWN

The out of stock shut down switch is located on the barfeed vise. If the vise or clamp closes too far due to lack of material, the switch will open up causing the machine to cycle stop. A fault will be displayed on the operator station.

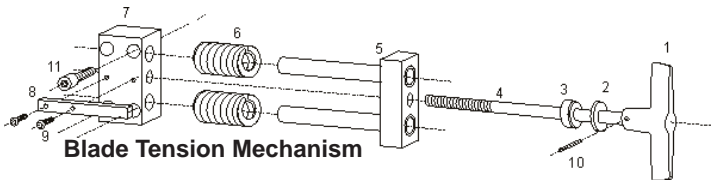
GENERAL OPERATING INFORMATION

REPLACING BLADE ON SAW

Saws with Double Spring Tensioner

Gloves must be worn for this operation.

1. Raise saw head far enough for the blade to clear the top of the vise jaws.
2. Open both Wheel doors and open blade guards
3. Push blade brush idler arm away from the belt to release the tension and remove the belt.
4. On both blade guides turn the black knurled knob counter-clockwise until it stops. This opens the carbides.
5. Turn the Blade Tensioner T handle counter-clockwise until the blade comes free from the bandwheels and remove the band.
6. Install the new band around the bandwheels and into the blade guides. Be sure that the teeth are pointing away from the flange of the wheel. The teeth should hang over the edge of the wheel. Also be sure that the teeth are pointing in the direction that the blade will travel.
7. Check to be sure that the blade is fully up into both blade guides.
8. Turn the T Handle of the tensioner until the blade becomes snug on the wheels. Pull the blade up against the wheel flange.
9. Continue to tighten the T Handle until the Pointer reaches the block. See picture.
10. Turn knobs on blade guides fully clock-wise. This closes the carbides.
11. Install blade brush belt and close the guards and wheel doors.
12. After five minutes of operation stop the saw and open the wheel doors. Inspect to be sure that the back edge of the blade is properly tracking up to the flange of the wheel. If the band is not tracking properly damage to the wheels will result.



Blade Tension Mechanism

- | | | |
|-----|------------|----------------------------|
| 1. | 101184 | T-Handle |
| 2. | 100030-007 | Flat Washer, 1/2 |
| 3. | 100410-001 | Thrust Bearing |
| 4. | 107321 | Take Up Screw |
| 5. | 155259 | Tensioner Slide Assembly |
| 6. | 101198 | Spring |
| 7. | 155262 | Tensioner Support |
| 8. | 155263 | Tensioner Slide Stop |
| 9. | 100013-009 | Cap Screw, BH, 10-32 x 1/2 |
| 10. | 100053-005 | Roll Pin, 3/16 x 1 |
| 11. | 100008-006 | Cap Screw, SH, 3/8-16 x 1 |

SUPPLEMENTAL FEED PRESSURE SYSTEM

This system provides additional sawing downforce to ensure a positive chip load when the saw head angle is high such as when cutting a large diameter solid stock. It is also helpful when sawing very tough materials. The system consists of an air-over-oil volume chamber and an air pressure regulator. Oil under pressure is applied to the top of the saw head lifting cylinder. The pressure is adjusted at the second regulator mounted on the side of the saw. **For basic operation, the pressure should be set to 5 to 10 PSI. For large or tough solid stock the pressure can be increased to a maximum of 20 PSI.**

An oil level sight gauge is provided. Check the oil level with the saw head is all the way down. The maximum level is at the top ferrule. The minimum is half way down the sight gauge.

To add oil, remove machine air pressure and remove the pipe plug at the top of the sight gauge. Open the air line at the exit port of the regulator. Fill to just below the top of the sight gauge.

WHEEL PITCH ADJUSTMENT

If the saw blade runs too low, runs off the wheels, or runs too high and rubs the wheel flange, a wheel adjustment must be made. Loosen the blade before making the following adjustments:

IDLER WHEEL

- **Blade running too low or off the wheel.**

Adjust the idler wheel block. Loosen the 2 cap screws in the block opposite the take up screw end, one-half (1/2) turn. Tighten the opposite 2 cap screws one-half (1/2) turn. Repeat if necessary.

- **Blade running too high and against the idler wheel flange.**

The blade can become distorted, its top edge rolled over and wheel flange will wear excessively. To correct this, loosen the two cap screws closest to the take up screw one-half (1/2) turn. Tighten the opposite cap screws one-half (1/2) turn. Repeat if necessary.

DRIVE WHEEL

- **Blade running too low or off the drive wheels.**

Loosen the two cap screws opposite the outside end of the wheel plate one-half (1/2) turn. Tighten the two set screws on the same end one-half (1/2) turn. Repeat if necessary.

- **Blade running too high, and against the drive wheel flange.**

Loosen the cap screws closest to the outside end of

the wheel plate and loosen the two set screws at the same time by the same amount. Repeat if necessary. Make certain all screws are tight after adjustments have been made.

BLADE GUIDE ADJUSTMENT

To properly align the saw blade for a straight and accurate cut, do the following:

Square the stationary vise jaw. Make sure it is square to the front of the vise slot. Check by placing a combination square against the front of the vise slot in the saw bed. Slide the square toward the stationary vise. Make any necessary adjustment to the vise jaw to bring it into square. Set the combination square so that one leg is along the face of the stationary vise and check to see that the blade is square to the vise jaw. If it is not square, follow the instructions for horizontal adjustment.

VERTICAL ADJUSTMENT

The back of the saw blade should just touch the carbide back up guide when the saw is running but not cutting. To adjust, loosen the 2 cap screws [A] and move the block up or down as required. (Before making this adjustment, be sure the back of the blade is properly contacting the flange on both the Drive and Idle wheels).

HORIZONTAL ADJUSTMENT

Loosen the 2 cap screws [B] securing the horizontal adjusting block (items 11 & 12 on the parts drawing). Turn the top adjusting bolt (item 5 on the parts drawing) to move the blade either in, toward the saw bed, or out, away from the saw bed.

Normally, the blade comes off the Drive Wheel with a minimum amount of adjustment needed in the Horizontal Adjusting Block. The Idle End adjusting block is more likely to require adjustment.

BLADE TILT

To ensure the blade is perpendicular to the bed of the saw, loosen the 2 cap screws [C] holding the Guide Support (28 & 29 on the parts drawing) and turn the bottom adjusting bolt (13 on the parts drawing). Set the combination square on the saw bed with the end of the rule butted against the blade above the set of the teeth. Use a 1-1/2 thousandths (.0015") shim and slide it along the top and bottom edge of the rule where it meets the saw

blade. If the shim slides between the blade and the rule at either the top or bottom, the blade guides must be adjusted.

SAFETY

Ensure that all bolts are properly tightened and that all guards are in place before using the saw.

OPERATION OF SWIVEL FEATURE FOR MITER CUTTING

The angle of the cut is adjustable from 0° (90°) to 60°. The angle is indicated by a pointer at the back of the chip pan and a large scale on the edge of the cutoff turntable. The saw head is locked into position by means of a control rod and locking block. There is a 0 stop on the back of the saw bed. **DO NOT ADJUST THIS STOP.**

To adjust the angle of the cut, loosen the angle lock handle, pull the saw head, while lining up the pointer to the desired angle shown on the scale. Then gently tighten the handle. The lock requires very little pressure to hold the head in place. **DO NOT OVER TIGHTEN.**



Stock Dimensions Tooth Pitch	0 - 1" 10/14, 8/12		1" - 3" 8/12, 6/10, 5/8		3" - 6" 5/8, 4/6, 3/4, 3 Sabre		6"+ 3/4, 2/3, 2 Sabre, 1 Tooth, 3/4" T.S.	
Material (Annealed)	Blade Speed (SFPM)	Cutting Rate (SIPM)	Blade Speed (SFPM)	Cutting Rate (SIPM)	Blade Speed (SFPM)	Cutting Rate (SIPM)	Blade Speed (SFPM)	Cutting Rate (SIPM)
<u>Carbon Steels</u>								
1008-1013	250	8 - 10	275	9 - 12	280	12 - 15	250	9 - 12
1015-1018	250	8 - 10	275	9 - 12	250	12 - 15	230	9 - 12
1048-1065	200	5 - 7	200	5 - 7	175	8 - 10	150	6 - 8
1065-1095	200	4 - 6	200	5 - 7	150	6 - 8	120	6 - 8
<u>Free Machining Steels</u>								
1108-1111	300	9 - 11	330	12 - 14	275	13 - 15	220	11 - 14
1112-1113	300	8 - 11	330	11 - 13	275	12 - 15	220	12 - 15
1115-1132	300	7 - 11	330	10 - 13	275	13 - 16	220	11 - 14
1137-1151	275	6 - 8	250	8 - 10	250	8 - 11	200	7 - 10
1212-1213	300	8 - 10	320	11 - 13	300	13 - 15	255	11 - 14
<u>Manganese Steels</u>								
1320-1330	250	5 - 7	250	5 - 8	200	8 - 11	175	7 - 10
1335-1345	250	5 - 7	225	5 - 7	200	7 - 9	175	5 - 8
<u>Nickel Chrome Steels</u>								
3115-3130	260	4 - 6	260	5 - 7	230	5 - 7	225	5 - 7
3135-3150	220	4 - 6	200	4 - 7	180	6 - 8	150	5 - 8
3310-3315	200	3 - 4	180	4 - 5	180	5 - 7	160	4 - 6
<u>Molybdenum Steels</u>								
4017-4024	300	3 - 5	270	4 - 7	250	6 - 8	220	5 - 8
4032-4042	300	3 - 5	270	4 - 7	250	6 - 8	230	5 - 8
4047-4068	250	3 - 5	220	4 - 6	200	5 - 7	180	3 - 5
<u>Chrome Moly Steels</u>								
4130-4140	280	4 - 6	250	5 - 8	250	8 - 10	220	6 - 8
4142-4150	230	3 - 5	200	4 - 6	200	5 - 7	170	4 - 6
<u>Nickel Chrome Moly Steels</u>								
4317-4320	250	3 - 5	225	4 - 6	200	5 - 7	170	4 - 6
4337-4340	230	3 - 4	200	4 - 5	200	4 - 6	170	4 - 5
8615-8627	250	4 - 5	230	6 - 7	230	6 - 8	200	6 - 7
8630-8645	250	3 - 5	230	4 - 6	230	5 - 7	180	4 - 6
8647-8660	220	2 - 4	200	3 - 5	200	4 - 6	150	3 - 5
8715-8750	250	3 - 5	220	4 - 6	220	5 - 7	180	4 - 6
9310-9317	200	1 - 3	160	2 - 3	160	2 - 4	150	2 - 3
9437-9445	250	4 - 5	230	4 - 5	230	5 - 6	180	4 - 5
9747-9763	250	2 - 4	230	3 - 5	200	4 - 6	180	3 - 5
9840-9850	240	4 - 5	220	4 - 6	200	5 - 7	180	4 - 6
<u>Nickel Moly Steels</u>								
4608-4621	250	3 - 5	220	5 - 6	220	6 - 7	200	5 - 6
4640	220	3 - 5	200	4 - 6	200	5 - 7	170	4 - 6
4812-4820	200	3 - 5	180	3 - 5	180	4 - 6	160	4 - 5
<u>Chrome Steels</u>								
5045-5046	280	4 - 6	250	5 - 7	250	8 - 10	200	7 - 8
5120-5135	280	4 - 6	250	6 - 7	240	7 - 8	180	5 - 8
5140-5160	250	3 - 5	230	4 - 6	230	5 - 7	200	4 - 6
50100-52100	180	2 - 4	160	3 - 5	150	4 - 6	100	3 - 5
<u>Chrome Vanadium Steels</u>								
6117-6210	225	4 - 5	225	5 - 7	200	6 - 8	170	5 - 7
6145-6152	225	3 - 4	200	4 - 5	200	5 - 6	150	4 - 5
<u>Die Steels</u>								
A-2	210	2 - 3	200	3 - 4	190	3 - 4	180	2 - 3
D-2, D-3	110	1 - 2	100	1 - 2	90	1 - 2	80	1 - 2
D-7	90	1	80	1	70	1	70	1
O-1, O-2	240	3 - 4	210	4 - 5	190	5 - 6	170	4 - 5
O-6	230	3 - 4	200	4 - 6	180	5 - 7	150	4 - 6

Stock Dimensions Tooth Pitch	0 - 1" 10/14, 8/12		1" - 3" 8/12, 6/10, 5/8		3" - 6" 5/8, 4/6, 3/4, 3 Sabre		6"+ 3/4, 2/3, 2 Sabre, 1 Tooth, 3/4" T.S.	
Material (Annealed)	Blade Speed (SFPM)	Cutting Rate (SIPM)	Blade Speed (SFPM)	Cutting Rate (SIPM)	Blade Speed (SFPM)	Cutting Rate (SIPM)	Blade Speed (SFPM)	Cutting Rate (SIPM)
<u>Silicon Steels</u>								
9255-9260	200	2 - 4	180	3 - 5	180	3 - 5	150	3 - 5
9261-9262	200	1 - 3	160	2 - 3	160	2 - 4	150	2 - 3
<u>High Speed Tool Steels</u>								
T-1, T-2	130	1 - 2	110	2 - 3	100	2 - 4	90	2 - 3
T-4, T-5	110	1 - 2	100	1 - 2	90	2 - 3	80	1 - 2
T-6, T-8	110	1 - 2	100	1 - 2	80	1 - 2	70	1 - 2
T-15	80	1	80	1	70	1	50	1
M-1	150	1 - 3	140	2 - 4	130	3 - 5	110	2 - 4
M-2, M3	120	1 - 2	110	2 - 3	100	3 - 4	80	2 - 3
M-4, M-10	100	1 - 2	90	1 - 2	80	1 - 3	60	1 - 2
<u>Hot Work Steels</u>								
H-12, H-13, H-21	150	2 - 4	125	3 - 5	125	2 - 4	125	2 - 4
H-22, H-24, H-25	150	1 - 3	125	1 - 3	125	1 - 3	125	1 - 3
<u>Shock Resisting Tool Steels</u>								
S-1	220	2 - 4	180	3 - 5	165	3 - 5	150	2 - 4
S-2, S-5	170	1 - 3	150	3 - 5	120	2 - 4	100	1 - 3
<u>Special Purpose Tool Steels</u>								
L-6	200	2 - 4	180	3 - 5	170	3 - 5	150	2 - 4
L-7	200	2 - 4	180	3 - 5	150	3 - 5	100	2 - 4
<u>Stainless Steels</u>								
201, 202, 302, 304	120	2 - 4	100	2 - 4	100	2 - 4	100	1 - 3
303, 303F	140	2 - 4	120	2 - 4	100	3 - 5	100	2 - 4
308, 309, 310, 330	90	1	70	1	60	2	60	1
314, 316, 317	90	1	80	1	70	2	60	1
321, 347	130	1 - 3	110	1 - 3	100	2 - 4	80	1 - 3
410, 420, 420F	150	1 - 3	130	1 - 3	120	2 - 4	100	1 - 3
416, 430F	200	3 - 5	180	4 - 6	170	5 - 7	150	4 - 6
430, 446	100	1 - 3	90	2 - 4	80	2 - 4	80	1 - 3
440 A,B,C	120	1 - 3	10	1 - 3	90	2 - 4	70	1 - 3
440F, 443	150	1 - 3	130	1 - 3	120	2 - 4	100	1 - 3
17-4PH, 17-7PH	100	2 - 3	90	2 - 4	80	3 - 4	80	2 - 3
A-7	100	1 - 2	100	1 - 2	100	2 - 3	100	2 - 3
<u>Beryllium Copper #25</u>								
BHN 100-120	350	4 - 6	300	5 - 7	275	6 - 8	225	5 - 7
BHN 220-250	250	2 - 4	225	3 - 5	200	3 - 4	175	3 - 5
BHN 310-340	200	1 - 2	160	1 - 2	140	2 - 3	100	1 - 2
<u>Nickel Base Alloys</u>								
Monel	100	1 - 2	100	1 - 2	80	1 - 2	60	1
R Monel	140	2 - 3	140	2 - 4	125	2 - 4	75	2 - 3
K Monel	100	1	80	1	60	1	60	1
KR Monel	100	1 - 3	90	1 - 3	80	1 - 3	60	1 - 2
Inconel	110	1 - 2	100	1 - 3	80	1 - 3	80	1 - 2
Inconel X	90	1	80	1	70	1	60	1
Hastelloy A	120	1 - 2	100	1 - 2	85	2 - 3	75	1 - 2
Hastelloy B	110	0 - 1	100	1 - 2	90	1 - 2	75	0 - 1
Hastelloy C	100	0 - 1	90	0 - 1	70	0 - 1	60	0 - 1
Rene 41	90	1	90	1	90	1 - 2	90	1 - 2
Udimit	100	1	90	1 - 2	90	1 - 2	90	1 - 2
Waspalloy	90	1	90	1 - 2	90	1 - 2	90	1 - 2
Titanium	100	1 - 2	100	2 - 3	100	2 - 3	100	2 - 3
<u>Titanium Alloys</u>								
TI-4AL-4MO	100	0 - 1	90	0 - 1	80	0 - 1	70	0 - 1
TI-140A2CR-2MO	100	0 - 1	90	0 - 1	80	0 - 1	60	0 - 1

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