

STANLEY®

CS11 HYDRAULIC CHAIN SAW



SERVICE MANUAL Safety, Operation and Maintenance



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IMPORTANT

To fill out a product warranty validation form, and for information on your warranty, visit www.stanleyinfrastructure.com and select the Company tab > Warranty.

Note: The warranty validation record must be submitted to validate the warranty.

SERVICING: This manual contains safety, operation and routine maintenance instructions. STANLEY Infrastructure recommends that servicing of hydraulic tools, other than routine maintenance, must be performed by an authorized and certified dealer. Please read the following warning.

⚠ WARNING

SERIOUS INJURY OR DEATH COULD RESULT FROM THE IMPROPER REPAIR OR SERVICE OF THIS TOOL.

REPAIRS AND / OR SERVICE TO THIS TOOL MUST ONLY BE DONE BY AN AUTHORIZED AND CERTIFIED DEALER.

For the nearest certified dealer, call STANLEY Infrastructure at (503) 659-5660 and ask for a Customer Service Representative.

SAFETY PRECAUTIONS

Tool operators and maintenance personnel must always comply with the safety precautions given in this manual and on the stickers and tags attached to the tool and hose.

These precautions are given for your safety. Review them carefully before operating the tool or performing maintenance.

Supervising personnel should develop additional precautions relating to the specific work area and local safety regulations. Place the added precautions in the space provided in this manual.

The CS11 Hydraulic Chain Saw will provide safe and dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any stickers and tags attached to the tool and hose before operation. Failure to do so could result in personal injury or equipment damage.



- Operators must start in a work area without bystanders. Flying debris can cause serious injury.
- Do not operate the tool unless trained or under the supervision of an instructor. Establish a training program for all operators to ensure safe operation.
- Always wear safety equipment such as goggles, ear and head protection, and safety shoes at all times when operating the tool. Use gloves and aprons when necessary.
- Operators must be familiar with all prohibited work areas such as excessive slopes and dangerous terrain conditions.
- Do not inspect, clean or replace parts if the hydraulic power source is connected. Accidental engagement of the tool can cause serious injury.
- Always connect hoses to the tool hose couplers before energizing the hydraulic power source. Be sure all hose connections are tight and are in good condition.
- Do not operate the tool at oil temperatures above 140 °F/60 °C. High oil temperatures can cause high temperature at the tool, which can result in operator discomfort.
- Do not operate a damaged, improperly adjusted or incompletely assembled chain saw. Be sure that the chain stops moving when the trigger is released.
- Never wear loose clothing that can become entangled in the working parts of the tool.
- Keep all parts of your body away from the chain saw and maintain proper footing and balance at all times.
- Do not rely exclusively upon safety devices built into the saw. As a chain saw user, steps must be taken to keep your cutting jobs free from accidents or injury.
- With basic understanding of kickback, you can reduce or eliminate the element of surprise. Sudden surprise contributes to accidents.
- To avoid personal injury or equipment damage, all tool repair, maintenance and service must be performed by authorized and trained personnel.
- Keep a firm grip on the saw, with both hands, when operating the saw. The right hand on the rear handle and the left hand on the front handle. Use a firm grip with thumbs and fingers encircling the chain saw handles. A firm grip will help reduce kickback and maintain control of the saw. Do not let go.
- Make sure the area in which you are cutting is free of obstructions. Never allow the nose of the guide bar to contact the log, branch or any obstruction that can be accidentally hit while operating the saw.
- **WARNING:** Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California 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.

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 those dust masks that are specially designed to filter out microscopic particles.

Protect yourself and those around you. Research and understand the materials you are cutting. Follow correct safety procedures and comply with all applicable national, state or provisional health and safety regulations relating to them, including, if appropriate arranging for the safe disposal of the materials by a qualified person.

- Never start the tool while it is lying on the ground.
- Cut at rated operating speeds (GPM).

SAFETY PRECAUTIONS

- Do not overreach or cut above shoulder height.
- Follow manufacturer's sharpening and maintenance instructions for the saw chain.
- Only use bars and chains specified by STANLEY. Chains must meet the requirements of ANSI B175.1 for low kickback performance.
- Always be well rested and mentally alert before operating the chain saw.
- Do not allow other persons to be near the chain saw when starting or cutting with the chain saw. Keep bystanders and animals out of the work area.
- Do not start cut until you have a clear work area, secure footing and a planned escape path from a falling tree.
- Carry the saw with the unit de-energized and the bar and chain to the rear of your body.
- Use extreme caution when cutting small size brush and saplings. Twigs may catch the saw chain and be whipped toward the operator or pull the operator off balance.
- When cutting a limb that is under tension, be alert for spring-back so that you will not be struck when the tension on the limb is released.
- Keep the handles dry, clean and free of oil.
- Do not operate a chain saw while in a tree unless you have been specially trained to do so.
- When using tools near energized transmission lines, be sure to use only hoses labeled and certified non-conductive.
- Turn off the power unit before setting the saw down.
- Use a guide bar scabbard when transporting the saw.
- Know the location of buried or covered electrical services before starting work.
- The spiked bumper (bucking cleat) must be installed for felling operations.

ELECTRICAL HAZARDS

The following guidelines must be followed to prevent accidental contact with overhead electrical conductors and/or communication wires and cables. (ref. ANSI Z133.1-2000)

WORKING IN PROXIMITY TO ELECTRICAL HAZARDS

An inspection shall be made by a qualified arborist to determine whether an electrical hazard exists before climbing, or otherwise entering, or performing work in or on a tree.

Only qualified line-clearance arborists or qualified line-clearance arborist trainees shall be assigned to work where an electrical hazard exists. Qualified line-clearance arborist trainees shall be under the direct supervision of qualified line-clearance arborist.

A second qualified line-clearance arborists or line-clearance arborist trainees shall be within vision or voice communication during line-clearing operations aloft when line-clearance arborists or line-clearance arborist trainees must approach closer than 10 feet (3.05 meters)

to any energized electrical conductor in excess of 750 volts (primary conductor) or when:

1. Branches or limbs being removed cannot first be cut (with a pole pruner/pole saw) to sufficiently clear electrical conductors, so as to avoid contact.
2. Roping is required to remove branches or limbs from such electrical conductors. This does not apply to individuals working on behalf of, or employed by, electrical system owners/operators engaged in line-clearing operations incidental to their normal occupation.

Qualified line-clearance arborists and line-clearance arborist trainees shall maintain minimum approach distances from energized electrical conductors in accordance with Table 1.

All other arborists shall maintain a minimum approach distance from energized electrical conductors in accordance with Table 2.

Branches hanging on an energized electrical conductor shall be removed using non-conductive equipment.

Table 1 – Minimum approach distances from energized conductors for qualified line-clearance arborists and qualified line-clearance arborist trainees.

Nominal Voltage (kV phase-to-phase)	Includes 1910.269 elevation factor, sea level to 5000 ft ¹		Includes 1910.269 elevation factor, 5001 – 10,000 ft ¹		Includes 1910.269 elevation factor, 10,000 – 14,000 ft ¹	
	ft-in	m	ft-in	m	ft-in	m
0.05 to 1.0	Avoid contact		Avoid contact		Avoid contact	
1.1 to 15.0	2–04	0.71	2–08	0.81	2–10	0.86
15.1 to 36.0	2–09	0.84	3–02	0.97	3–05	1.04
36.1 to 46.0	3–00	0.92	3–05	1.04	3–09	1.14
46.1 to 72.5	3–09	1.14	4–03	1.30	4–07	1.40
72.6 to 121.0	4–06	1.37	5–02	1.58	5–07	1.70
138.0 to 145.0	5–02	1.58	5–11	1.80	6–05	1.96
161.0 to 169.0	6–00	1.83	6–10	2.08	7–05	2.26
230.0 to 242.0	7–11	2.41	9–00	2.75	9–09	2.97
345.0 to 362.0	13–02	4.02	15–00	4.58	16–03	4.96
500.0 to 550.0	19–00	5.80	21–09	6.63	23–06	7.17
765.0 to 800.0	27–04	8.34	31–03	9.53	33–10	10.32

1. Exceeds phase-to-ground; elevation factor per 29 CFR 1910.269.

ELECTRICAL HAZARDS

Table 2 – Minimum approach distances to energized conductors for persons other than qualified line-clearance arborists and qualified line-clearance arborist trainees.

Nominal Voltage kV phase-to-phase ¹	Distance	
	ft-in	m
0.0 – 1.0	10-00	3.05
1.1 – 15.0	10-00	3.05
15.1 – 36.0	10-00	3.05
36.1 – 50.0	10-00	3.05
50.1 – 72.5	10-09	3.28
72.6 – 121.0	12-04	3.76
138.0 – 145.0	13-02	4.00
161.0 – 169.0	14-00	4.24
230.0 – 242.0	16-05	4.97
345.0 – 362.0	20-05	6.17
500.0 – 550.0	26-08	8.05
785.0 – 800.0	35-00	10.55
1. Exceeds phase-to-ground.		

The tie-in position should be above the work area and located in such a way that a slip would swing the arborist away from any energized electrical conductors or other identified hazard.

While climbing, the arborist should climb on the side of the tree that is away from energized electrical conductors as required in Tables 1 and 2.

Footwear, including lineman's overshoes, having electrical-resistant soles, shall not be considered as providing any measure of safety from electrical hazards.

Rubber gloves, with or without leather or other protective covering, shall not be considered as providing any measure of safety from electrical hazards.

Ladders, platforms and aerial devices, including insulated aerial devices, shall be subject to minimum approach distances in Table 1 and 2.

Aerial devices and attached equipment (such as chippers) contacting energized electrical conductors shall be considered energized. Contact shall be avoided, except where emergency rescue procedures are being carried out. Emergency rescue should be performed in accordance with 4.3.

STORM WORK AND EMERGENCY CONDITIONS-LINE CLEARANCE

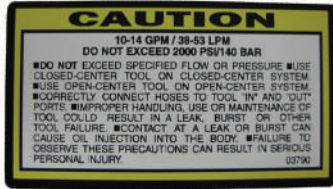
Line clearance shall not be performed during adverse

weather conditions such as thunderstorms, high winds and snow and ice storms.

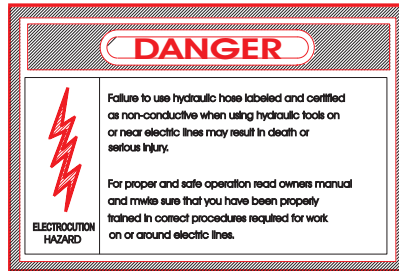
Qualified line-clearance arborists and qualified line-clearance arborists trainees performing line clearance in the aftermath of a storm or under similar conditions shall be trained in the special hazards associated with this type of work.

Line-clearance operations shall be suspended when storm work or emergency conditions develop involving energized electrical conductors. Electrical system owners/operators shall be notified immediately.

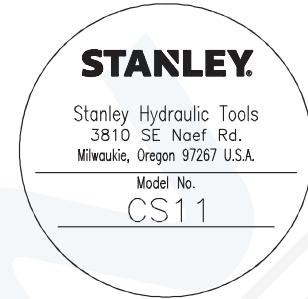
TOOL STICKERS AND TAGS



03790
GPM Decal



12412
Electrical Warning Decal



74751
Name Tag

- 04746
Auto Oiler Decal
- 13907
Kickback Warning Decal

NOTE

THE INFORMATION LISTED ON THE STICKERS SHOWN, MUST BE LEGIBLE AT ALL TIMES.

REPLACE DECALS IF THEY BECOME WORN OR DAMAGED. REPLACEMENTS ARE AVAILABLE FROM YOUR LOCAL STANLEY DISTRIBUTOR.

The safety tag (P/N 15875) at right is attached to the tool when shipped from the factory. Read and understand the safety instructions listed on this tag before removal. We suggest you retain this tag and attach it to the tool when not in use.

D A N G E R

1. FAILURE TO USE HYDRAULIC HOSE LABELED AND CERTIFIED AS NON-CONDUCTIVE WHEN USING HYDRAULIC TOOLS ON OR NEAR ELECTRICAL LINES MAY RESULT IN DEATH OR SERIOUS INJURY.
BEFORE USING HOSE LABELED AND CERTIFIED AS NON-CONDUCTIVE ON OR NEAR ELECTRIC LINES BE SURE THE HOSE IS MAINTAINED AS NON-CONDUCTIVE. THE HOSE SHOULD BE REGULARLY TESTED FOR ELECTRIC CURRENT LEAKAGE IN ACCORDANCE WITH YOUR SAFETY DEPARTMENT INSTRUCTIONS.
2. A HYDRAULIC LEAK OR BURST MAY CAUSE OIL INJECTION INTO THE BODY OR CAUSE OTHER SEVERE PERSONAL INJURY.
 - A. **DO NOT EXCEED SPECIFIED FLOW AND PRESSURE** FOR THIS TOOL. EXCESS FLOW OR PRESSURE MAY CAUSE A LEAK OR BURST.
 - B. **DO NOT EXCEED RATED WORKING PRESSURE** OF HYDRAULIC HOSE USED WITH THIS TOOL. EXCESS PRESSURE MAY CAUSE A LEAK OR BURST.
 - C. CHECK TOOL HOSE COUPLERS AND CONNECTORS DAILY FOR LEAKS. **DO NOT FEEL FOR LEAKS WITH YOUR HANDS.** CONTACT WITH A LEAK MAY RESULT IN SEVERE PERSONAL INJURY.

I M P O R T A N T

READ OPERATION MANUAL AND SAFETY INSTRUCTIONS FOR THIS TOOL BEFORE USING IT.

USE ONLY PARTS AND REPAIR PROCEDURES APPROVED BY STANLEY AND DESCRIBED IN THE OPERATION MANUAL.

TAG TO BE REMOVED ONLY BY TOOL OPERATOR.

SEE OTHER SIDE

D A N G E R

- D. DO NOT LIFT OR CARRY TOOL BY THE HOSES. DO NOT ABUSE HOSE. DO NOT USE KINKED, TORN OR DAMAGED HOSE.
3. MAKE SURE HYDRAULIC HOSES ARE PROPERLY CONNECTED TO THE TOOL BEFORE PRESSURING SYSTEM. SYSTEM PRESSURE HOSE MUST ALWAYS BE CONNECTED TO TOOL "IN" PORT. SYSTEM RETURN HOSE MUST ALWAYS BE CONNECTED TO TOOL "OUT" PORT. REVERSING CONNECTIONS MAY CAUSE REVERSE TOOL OPERATION WHICH CAN RESULT IN SEVERE PERSONAL INJURY.
4. DO NOT CONNECT OPEN-CENTER TOOLS TO CLOSED-CENTER HYDRAULIC SYSTEMS. THIS MAY RESULT IN LOSS OF OTHER HYDRAULIC FUNCTIONS POWERED BY THE SAME SYSTEM AND/OR SEVERE PERSONAL INJURY.
5. BYSTANDERS MAY BE INJURED IN YOUR WORK AREA. KEEP BYSTANDERS CLEAR OF YOUR WORK AREA.
6. WEAR HEARING, EYE, FOOT, HAND AND HEAD PROTECTION.
7. TO AVOID PERSONAL INJURY OR EQUIPMENT DAMAGE, ALL TOOL REPAIR MAINTENANCE AND SERVICE MUST ONLY BE PERFORMED BY AUTHORIZED AND PROPERLY TRAINED PERSONNEL.

I M P O R T A N T

READ OPERATION MANUAL AND SAFETY INSTRUCTIONS FOR THIS TOOL BEFORE USING IT.

USE ONLY PARTS AND REPAIR PROCEDURES APPROVED BY STANLEY AND DESCRIBED IN THE OPERATION MANUAL.

TAG TO BE REMOVED ONLY BY TOOL OPERATOR.

SEE OTHER SIDE

SAFETY TAG P/N 15875 (shown smaller than actual size)

HOSE TYPES

The rated working pressure of the hydraulic hose must be equal to or higher than the relief valve setting on the hydraulic system. There are three types of hydraulic hose that meet this requirement and are authorized for use with STANLEY hydraulic tools. They are:

Certified non-conductive — constructed of thermoplastic or synthetic rubber inner tube, synthetic fiber braid reinforcement, and weather resistant thermoplastic or synthetic rubber cover. *Hose labeled **certified non-conductive** is the only hose authorized for use near electrical conductors.*

Wire-braided (conductive) — constructed of synthetic rubber inner tube, single or double wire braid reinforcement, and weather resistant synthetic rubber cover. *This hose is **conductive** and must never be used near electrical conductors.*

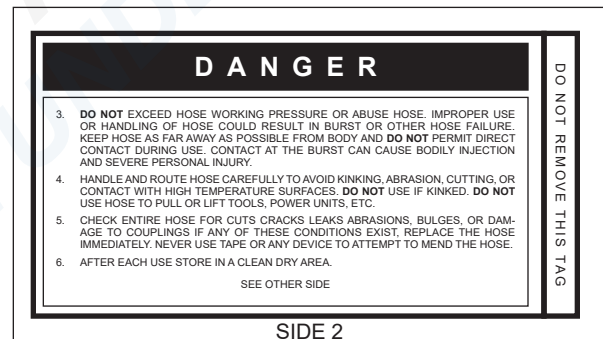
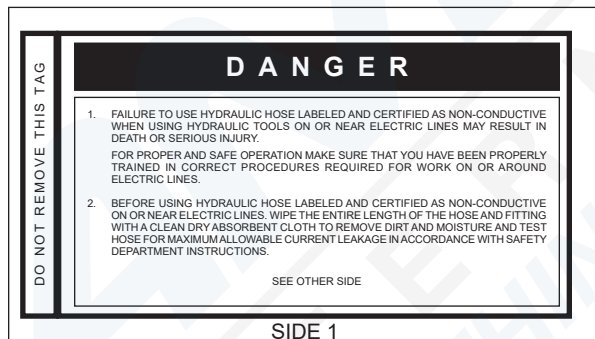
Fabric-braided (not certified or labeled non-conductive) — constructed of thermoplastic or synthetic rubber inner tube, synthetic fiber braid reinforcement, and weather resistant thermoplastic or synthetic rubber cover. *This hose is **not certified non-conductive** and must never be used near electrical conductors.*

HOSE SAFETY TAGS

To help ensure your safety, the following DANGER tags are attached to all hose purchased from STANLEY. DO NOT REMOVE THESE TAGS.

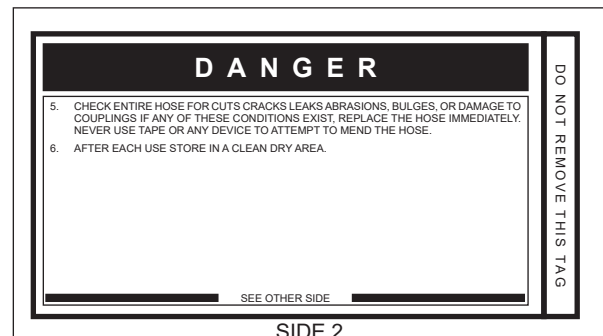
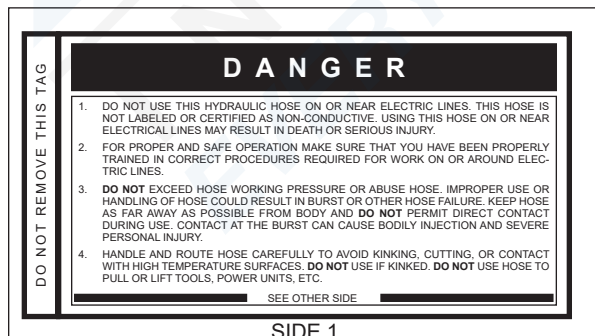
If the information on a tag is illegible because of wear or damage, replace the tag immediately. A new tag may be obtained from your STANLEY Distributor.

THE TAG SHOWN BELOW IS ATTACHED TO “CERTIFIED NON-CONDUCTIVE” HOSE



(Shown smaller than actual size)

THE TAG SHOWN BELOW IS ATTACHED TO “CONDUCTIVE” HOSE.



(Shown smaller than actual size)

HOSE RECOMMENDATIONS

Tool to Hydraulic Circuit Hose Recommendations

The chart to the right shows recommended minimum hose diameters for various hose lengths based on gallons per minute (GPM)/liters per minute (LPM). These recommendations are intended to keep return line pressure (back pressure) to a minimum acceptable level to ensure maximum tool performance.

This chart is intended to be used for hydraulic tool applications only based on STANLEY tool operating requirements and should not be used for any other applications.

All hydraulic hose must have at least a rated minimum working pressure equal to the maximum hydraulic system relief valve setting.

All hydraulic hose must meet or exceed specifications as set forth by SAE J517.

Oil Flow		Hose Lengths		Inside Diameter		USE (Press/Return)	Min. Working Pressure	
GPM	LPM	FEET	METERS	INCH	MM		PSI	BAR
Certified Non-Conductive Hose - Fiber Braid - for Utility Bucket Trucks								
4-9	15-34	up to 10	up to 3	3/8	10	Both	2250	155
Conductive Hose - Wire Braid or Fiber Braid - DO NOT USE NEAR ELECTRICAL CONDUCTORS								
4-6	15-23	up to 25	up to 7.5	3/8	10	Both	2500	175
4-6	15-23	26-100	7.5-30	1/2	13	Both	2500	175
5-10.5	19-40	up to 50	up to 15	1/2	13	Both	2500	175
5-10.5	19-40	51-100	15-30	5/8	16	Both	2500	175
5-10.5	19-40	100-300	30-90	5/8	16	Pressure	2500	175
10-13	38-49	up to 50	up to 15	3/4	19	Return	2500	175
10-13	38-49	51-100	15-30	5/8	16	Both	2500	175
10-13	38-49	100-200	30-60	3/4	19	Return	2500	175
13-16	49-60	up to 25	up to 8	1	25.4	Pressure	2500	175
13-16	49-60	26-100	8-30	5/8	16	Pressure	2500	175
				3/4	19	Return	2500	175
				3/4	19	Pressure	2500	175
				1	25.4	Return	2500	175
				5/8	16	Pressure	2500	175
				3/4	19	Return	2500	175
				3/4	19	Pressure	2500	175
				1	25.4	Return	2500	175

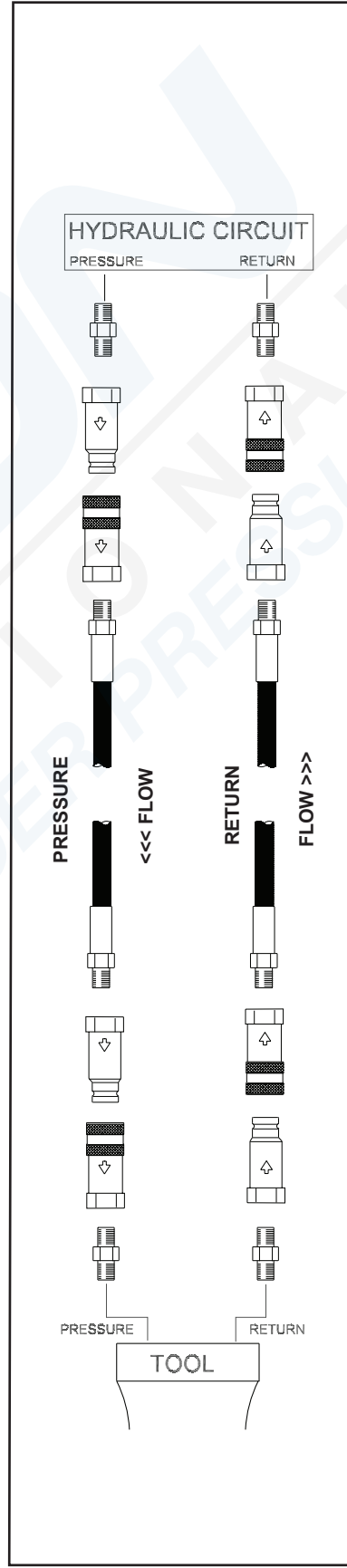


Figure 1. Typical Hose Connections






HTMA / EHTMA REQUIREMENTS

HTMA / EHTMA REQUIREMENTS

TOOL TYPE

HTMA HYDRAULIC SYSTEM REQUIREMENTS	TYPE I	TYPE II	TYPE RR	TYPE III
Flow range	4-6 GPM (15-23 LPM)	7-9 GPM (26-34 LPM)	9-10.5 GPM (34-40 LPM)	11-13 GPM (42-49 LPM)
Nominal operating pressure (At the power supply outlet)	1500 psi (103 bar)	1500 psi (103 bar)	1500 psi (103 bar)	1500 psi (103 bar)
System relief valve setting (At the power supply outlet)	2100-2250 psi (145-155 bar)	2100-2250 psi (145-155 bar)	2200-2300 psi (152-159 bar)	2100-2250 psi (145-155 bar)
Maximum back pressure (At tool end of the return hose)	250 psi (17 bar)	250 psi (17 bar)	250 psi (17 bar)	250 psi (17 bar)
Measured at a max fluid viscosity of: (At minimum operating temperature)	400 ssu* (82 centistokes)	400 ssu* (82 centistokes)	400 ssu* (82 centistokes)	400 ssu* (82 centistokes)
Temperature: Sufficient heat rejection capacity to limit maximum fluid temperature to: (At maximum expected ambient temperature)	140° F (60° C)	140° F (60° C)	140° F (60° C)	140° F (60° C)
Minimum cooling capacity at a temperature difference of between ambient and fluid temps	3 hp (2.24 kW) 40° F (22° C)	5 hp (3.73 kW) 40° F (22° C)	6 hp (5.22 kW) 40° F (22° C)	7 hp (4.47 kW) 40° F (22° C)
Note: Do not operate the tool at oil temperatures above 140° F (60° C). Operation at higher temperatures can cause operator discomfort at the tool.				
Filter minimum full-flow filtration Sized for flow of at least: (For cold temp startup and maximum dirt-holding capacity)	25 microns 30 GPM (114 LPM)	25 microns 30 GPM (114 LPM)	25 microns 30 GPM (114 LPM)	25 microns 30 GPM (114 LPM)
Hydraulic fluid, petroleum based (premium grade, anti- wear, non-conductive) Viscosity (at minimum and maximum operating temps)	100-400 ssu (20-82 centistokes)	100-400 ssu (20-82 centistokes)	100-400 ssu (20-82 centistokes)	100-400 ssu (20-82 centistokes)
Note: When choosing hydraulic fluid, the expected oil temperature extremes that will be experienced in service determine the most suitable temperature viscosity characteristics. Hydraulic fluids with a viscosity index over 140 will meet the requirements over a wide range of operating temperatures.				
*SSU = Saybolt Seconds Universal				

CLASSIFICATION

EHTMA HYDRAULIC SYSTEM REQUIREMENTS					
Flow range	3.5-4.3 GPM (13.5-16.5 LPM)	4.7-5.8 GPM (18-22 LPM)	7.1-8.7 GPM (27-33 LPM)	9.5-11.6 GPM (36-44 LPM)	11.8-14.5 GPM (45-55 LPM)
Nominal operating pressure (At the power supply outlet)	1870 psi (129 bar)	1500 psi (103 bar)	1500 psi (103 bar)	1500 psi (103 bar)	1500 psi (103 bar)
System relief valve setting (At the power supply outlet)	2495 psi (172 bar)	2000 psi (138 bar)	2000 psi (138 bar)	2000 psi (138 bar)	2000 psi (138 bar)

Note: These are general hydraulic system requirements. See tool specification page for tool specific requirements.

OPERATION

PREPARATION PROCEDURES

HYDRAULIC SYSTEM REQUIREMENTS

The hydraulic system should provide a flow of 10-14 GPM/38-53 LPM at an operating pressure of 1500-2000 psi/105-140 bar. Recommended relief valve settings are 2100-2250 psi/145-155 bar.

The system should have no more than 250 psi/17 bar backpressure measured at the tool end of the operating hoses. The system conditions for measurement are at maximum fluid viscosity of 400 ssu/82 centistokes (minimum operating temperatures).

The hydraulic system should have sufficient heat rejection capacity to limit the maximum oil temperature to 140° F/60° C at the maximum expected ambient temperature. The recommended minimum cooling capacity is 7 hp/5.22 kW at a 40 °F/22 °C difference between ambient temperature and oil temperature.

The hydraulic system should have a minimum of 25 micron filtration. It is recommended that filter elements be sized for a flow of at least 30 GPM/114 LPM for cold temperature startup and maximum dirt holding capacity.

The hydraulic fluid used should have a viscosity between 100 and 400 ssu/20 and 82 centistokes at the maximum and minimum expected operating temperatures. Petroleum based hydraulic fluids with antiwear properties and a viscosity index over 140 ssu/28 centistokes will meet the recommended requirements over a wide range of operating temperatures.

The recommended hose size is .625-inch/16 mm I.D. up to 50 ft/15 m long and .750-inch/20 mm I.D. minimum up to 100 ft/30 m long.

CHECK POWER SOURCE

1. Using a calibrated flow meter and pressure gauge, check that the hydraulic power source develops a flow of 10-14 GPM/38-53 LPM at 1500-2000 psi/105-140 bar.
2. Make certain that the hydraulic power source is equipped with a relief valve set to open at 2100-2250 psi/145-155 bar.

CONNECT HOSES

1. Wipe all hose couplers with a clean, lint-free cloth before making connections.
2. Connect the hoses from the hydraulic power source to the tool fittings. Connect return hoses first and disconnect them last to minimize trapped pressure within the tool.
3. Observe the arrow on the couplers to ensure that the flow is in the proper direction. The female coupler on the tool hose is the inlet (pressure) coupler.

4. Move the hydraulic circuit control valve to the “ON” position to operate the tool.

Note: If uncoupled hoses are left in the sun, pressure increase inside the hose may make them difficult to connect. Whenever possible, connect the free ends of the hoses together.

OPERATING PROCEDURES

The following are general wood cutting procedures and techniques. Differences in the terrain, vegetation and type of wood will make this information more or less valid for particular areas. For advice on specific woodcutting problems or techniques for your area, consult your local STANLEY representative or your county agent. They can often provide information that will make your work safer and more productive.

CUTTING TIPS

1. Check the lean of the tree. Tie a weight to a piece of string about 2 feet long. Hang the weight in your line of sight. The string is a good vertical line to help you judge the lean of the tree. The tree should fall the way it is leaning. Trees that are straight (leaning no more than 5 degrees) generally can be felled in any direction.
2. Avoid felling across another tree, log, rocks, gully or ridge. Do not fell straight uphill or downhill. Fell the tree diagonally to the hill. Consider the wind direction and velocity. Do not attempt cutting in strong winds.
3. Check the weight distribution. A tree is heavier on the side with the most limbs. It will try to fall on its heavy side. Trim a few limbs to “balance” the tree.
4. Clear the work area. You need a clean area all around the tree for good footing. Get everything out of the area where the tree will fall. Do not cut trees near structures. Because of the danger of electrocution, use extreme care when cutting trees near power lines.
5. Before starting the cut, prepare your escape path. Make sure the escape path is clear of brush and branches. The escape path should be at an angle away from the direction of fall.
6. The saw chain should cut with very little pressure applied to the handle. If you have to force the saw to cut or if the cut is not straight, cease cutting immediately to prevent further saw chain and bar damage. See the Maintenance and Adjustments section of this manual for chain replacement or adjustment procedures.
7. Underwater models require daily preventive maintenance.

OPERATION

FELLING (CUTTING DOWN A TREE) (FIGURE 2)

Observe all safety precautions. The spiked bumper (bucking cleat) must be installed for this operation.

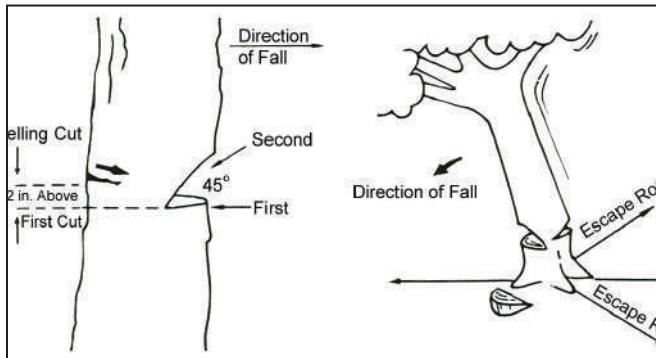


Figure 2. Felling a Tree

NOTCHING OR UNDERCUTTING

1. The notching or undercutting cut is made on the side you want the tree to fall. Place the saw so the hand guard is close to the tree trunk and the bucking cleat is dug in.
2. Start the cut horizontally. Pivot the nose of the bar in last. Cut to about one-quarter of the tree's diameter.
3. Watch out for falling limbs.
4. Make a diagonal cut down to meet the horizontal cut and remove the wood from the notch.

FELLING OR BACK CUT

5. The felling or back cut is made on the side opposite and at least 2 inches above the horizontal undercut (the felling cut is made higher as the size of the tree increases). Place the saw so the hand guard is close to the tree trunk and the bucking cleat is dug in.
6. Start the cut horizontally. Pivot the bar in until the cut is being made parallel to the notch cut. Cut until the saw is about 1 or 2 inches from the notch. Do not cut through the notch.

Note: The uncut wood between the felling and notch cuts is called the hinge. The hinge controls the fall of the tree and should be of uniform thickness.

7. As the saw nears the back cut, watch the treetop and the cut for signs of movement. Be alert as soon as the tree starts to move, turn off the saw, pull it from the tree and move away quickly on your escape route.
8. For trees larger than bar length, make two felling cuts. Cut in as far as the bar will go, move to the other side and start the second cut in the same manner as

the first while pivoting the saw to complete the felling cut.

BUCKING

Bucking is the sawing of a log or fallen tree into smaller pieces.

1. Observe all safety precautions.
2. Use both hands. Grip the saw firmly.
3. Stand uphill. A log that is cut loose may roll downhill.
4. Keep the chain out of the dirt. Dirt will dull the chain. A dull chain is unsafe.
5. Stand to the left of the saw.

CROSSCUTTING

Note: Before starting to cut through a log try to imagine what is going to happen. Look out for stresses in the log and cut through the log in such a manner that the guide bar will not get pinched.

LOGS WITH PRESSURE ON TOP (FIGURE 3)

6. Observe all safety precautions.
7. Begin with an upper cut, down from the top. Do not cut too deeply. A cut of about 1/3 of the log diameter is enough.
8. Finish with a bottom cut. They should meet.

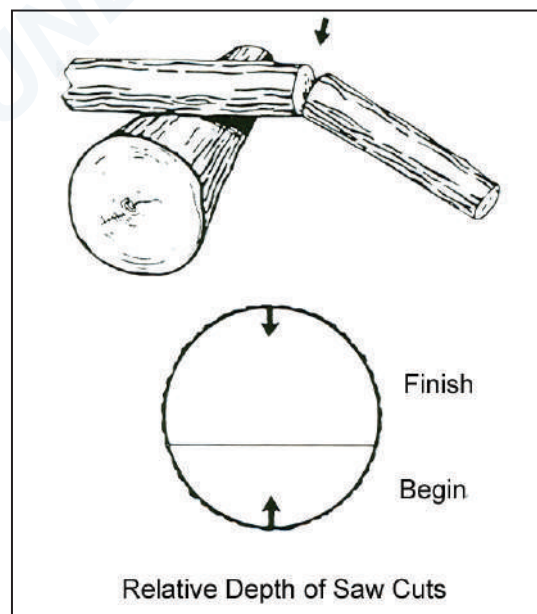


Figure 3. Crosscutting Logs with Pressure on Top

THICK LOGS LARGER THAN BAR LENGTH WITH PRESSURE ON TOP (FIGURE 4)

OPERATION

1. Observe all safety precautions.
2. Begin by cutting on the opposite side of the log.
3. Pull the saw towards you and cut from the top.
4. Cut from the bottom. Make a boring cut if the log is close to the ground.
5. Finish with a bottom cut.

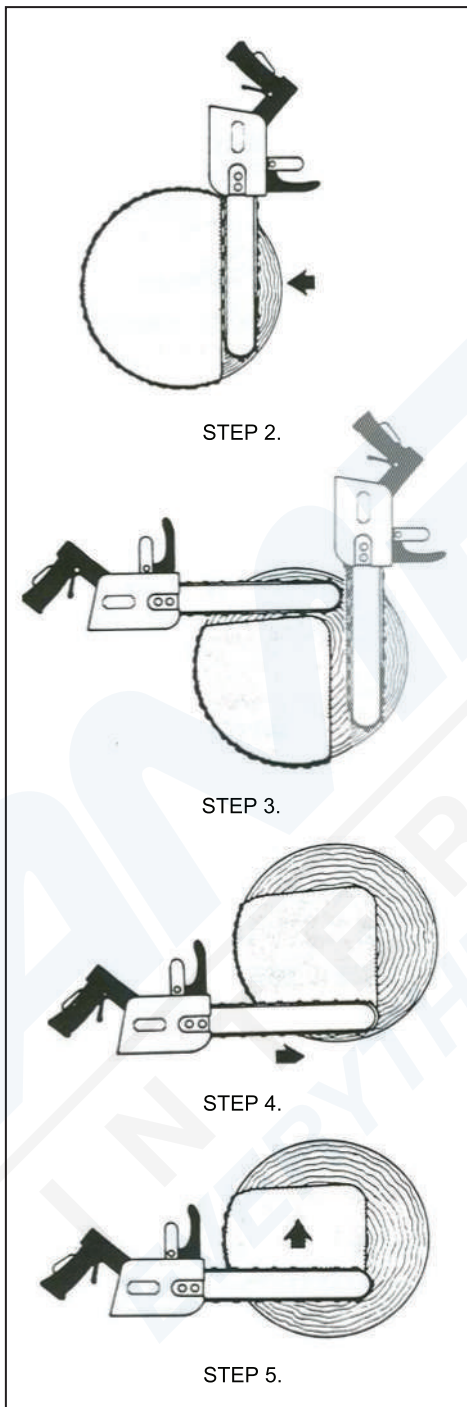


Figure 4. Crosscutting Logs Larger than Bar Length With Pressure on Top

LOGS/LIMBS WITH PRESSURE ON BOTTOM (FIGURE 5)

1. Observe all safety precautions.
2. Begin with a bottom cut. The depth of the cut should be about 1/3 of the log diameter.
3. Finish with an upper cut, down from the top. The saw cuts should meet.

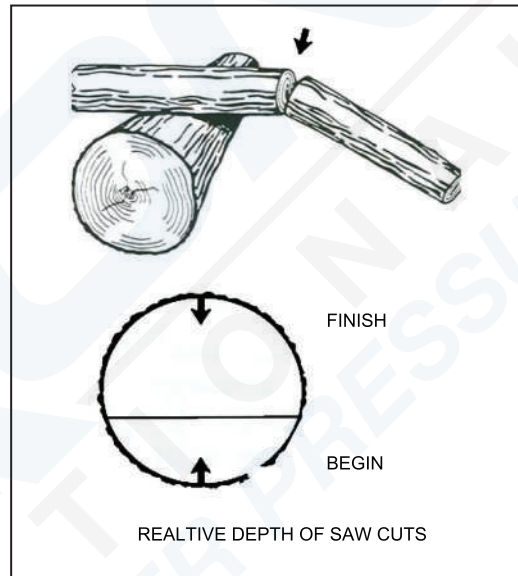


Figure 5. Crosscutting Logs/Limbs with Pressure on Bottom

THICK LOGS LARGER THAN BAR LENGTH WITH PRESSURE ON THE BOTTOM (FIGURE 6)

1. Observe all safety precautions.
2. Begin by cutting on the opposite side of the log.
3. Pull the saw towards you and cut from the top.
4. Cut from the bottom. Make a boring cut if the log is close to the ground.
5. Finish with a top cut.

PRUNING AND DEBRANCHING

1. Observe all safety precautions.
2. Use both hands. Keep a firm grip.
3. Be alert for kickback. Do not allow the tip of the bar to touch anything while the chain is in motion.
4. Do not cut overhead. Keep the saw below chest level. The chain is too close to your face in this position.

OPERATION

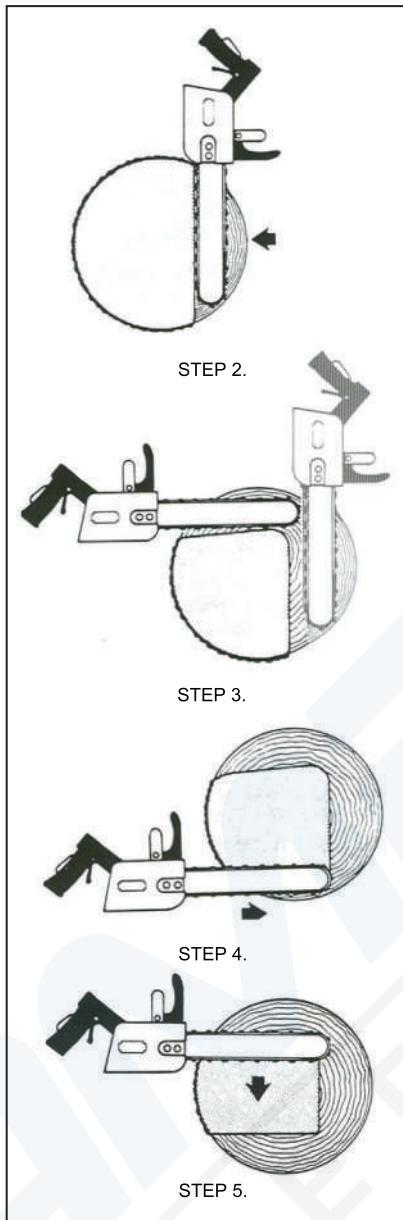


Figure 6. Crosscutting Logs Larger than Bar Length with Pressure on Bottom

COLD WEATHER OPERATION

If the saw is to be used during cold weather, preheat the hydraulic fluid at low engine speed. When using the normally recommended oils, oil should be at or above 50 °F/10 °C (400 ssu/ 82 centistokes) before use.

Damage to the hydraulic system or saw can result from use with fluid that is too viscous or thick.

Cutting frozen wood causes the cutters to wear, crack and break at the back rivet hole unless proper

precautions are taken. To extend chain life when cutting in cold weather:

5. Be sure the oiler is working.
6. Keep the chain tensioned and check often.
7. Keep the cutters properly sharpened. Touch up at least every hour. Never force a dull chain to cut.
8. Clean out the bar groove and keep the oil hole open. Turn the bar over to equalize wear on the rails.
9. Always install a new sprocket with a new chain.

UNDERWATER MODEL MAINTENANCE

After each use, the movable portions of the tool that were exposed to water should be flushed with a water displacing oil, such as WD40™. Remove water and debris as follows:

1. Spray oil through the tool and displace any remaining water.
2. Spray oil into the On/Off trigger slot area
3. Dip or spray the entire tool.
4. Cycle the tool hydraulically several times before storing away.

TOOL PROTECTION & CARE

NOTICE

In addition to the safety precautions found in this manual, observe the following for equipment protection and care.

- Make sure all couplers are wiped clean before connection.
- The hydraulic circuit control valve must be in the “OFF” position when coupling or uncoupling hydraulic tools. Failure to do so may result in damage to the quick couplers and cause overheating of the hydraulic system.
- Always store the tool in a clean, dry space, safe from damage or pilferage.
- Make sure the circuit PRESSURE hose (with male quick disconnect) is connected to the “IN” port. The circuit RETURN hose (with female quick disconnect) is connected to the opposite port. Do not reverse circuit flow. This can cause damage to internal seals.
- Always replace hoses, couplings and other parts with replacement parts recommended by STANLEY. Supply hoses must have a minimum working pressure rating of 2500 psi/172 bar.
- Do not exceed the rated flow and pressure. Rapid failure of the internal seals may result. See “SPECIFICATIONS” on page 19 for correct flow rate and pressure rating.
- Always keep critical tool markings, such as warning stickers and tags, legible.
- Tool repair should be performed by experienced personnel only.
- Make certain that the recommended relief valves are installed in the pressure side of the system.
- Do not use the tool for applications for which it was not intended.

TROUBLESHOOTING

If symptoms of poor performance develop, the following chart can be used as a guide to correct the problem. When diagnosing faults in operation of the saw, always make sure the hydraulic power source is supplying the correct hydraulic flow and pressure to the saw as listed in the table. Use a flow meter known to be accurate. Check the flow with the hydraulic fluid temperature at least 80 °F/27 °C.

PROBLEM	CAUSE	REMEDY
Cuts slow.	Insufficient fluid flow or low relief valve setting.	Adjust fluid flow to proper GPM. For optimum performance adjust relief valve to 2250 psi/155 psi.
	Chain dull.	Sharpen per instructions or replace.
	Backpressure too high.	Should not exceed 250 psi/17 bar at 14 GPM/53 LPM measured at the end of the tool operating hoses.
Bar turns color.	Insufficient oiler flow.	Use manual oiler during heavy cuts.
		Adjust oiler per service instructions.
Tool does not run.	Power unit not functioning.	Check power unit for proper flow and pressure (10 GPM/38 LPM at 1500 psi/104 bar minimum).
	Coupler or hoses blocked.	Remove obstruction.
	Mechanical failure.	Disassemble tool and inspect for damage.
Tool runs backwards.	Pressure and return reversed.	Connect for proper flow direction. Motor shaft rotates clockwise.
On/Off trigger is hard to press.	Pressure and return reversed.	Correct for proper flow direction.
	Backpressure too high.	Should not exceed 250 psi/17 bar at 14 GPM/53 LPM measured at the end of the tool operating hoses.
Oil leakage around drive sprocket.	Motor shaft seal failure.	Replace as required. Make sure that oil present is not the result of excess oiler flow.
Oil leakage between rear gear housing and valve handle assembly.	Motor face seal failure.	Replace as required.
Chain continues to move after valve is shut off.	Chain is too loose.	Tighten chain.
	Input flow too high.	Decrease flow.

SPECIFICATIONS

Capacity.....	24, 32, 36, 42 inches/61, 81, 91, 106 cm Cut Lengths
Weight	14 lbs/6.3 kg
Length.....	17 inches/43 cm
Width	9 inches/23 cm
Pressure	1500–2000 psi/105–140 bar
Flow Range	10–14 GPM/38–53 LPM
Optimum Flow	14 GPM/53 LPM
Porting	8 SAE O-ring
Connect Size and Type	1/2 inch Male Pipe Hose End
Hose Whips	Yes
Motor	Hyrevz™
Kickback Reduction Features.....	Front Hand Guard, Low Inertia Motor/Drive System

ACCESSORIES

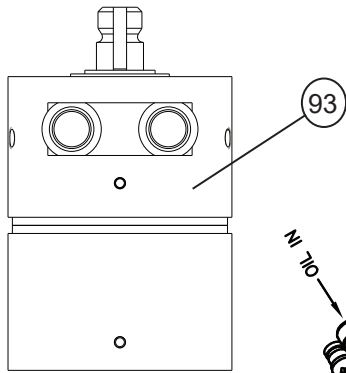
24-inch Saw Chain	72951
24-inch Cut Sprocket Nose Bar	72947
32-inch Saw Chain	72952
32-inch Cut Sprocket Nose Bar	72948
36-inch Saw Chain	72953
36-inch Cut Sprocket Nose Bar	72949
42-inch Saw Chain	72954
42-inch Cut Sprocket Nose Bar	72950
Stud Kit To Convert old CS11's To New Bar (Includes 2-Stud's, 2 Nuts, 2 Washers & Inst Sheet).....	72960

This new bar change started end of May 2012

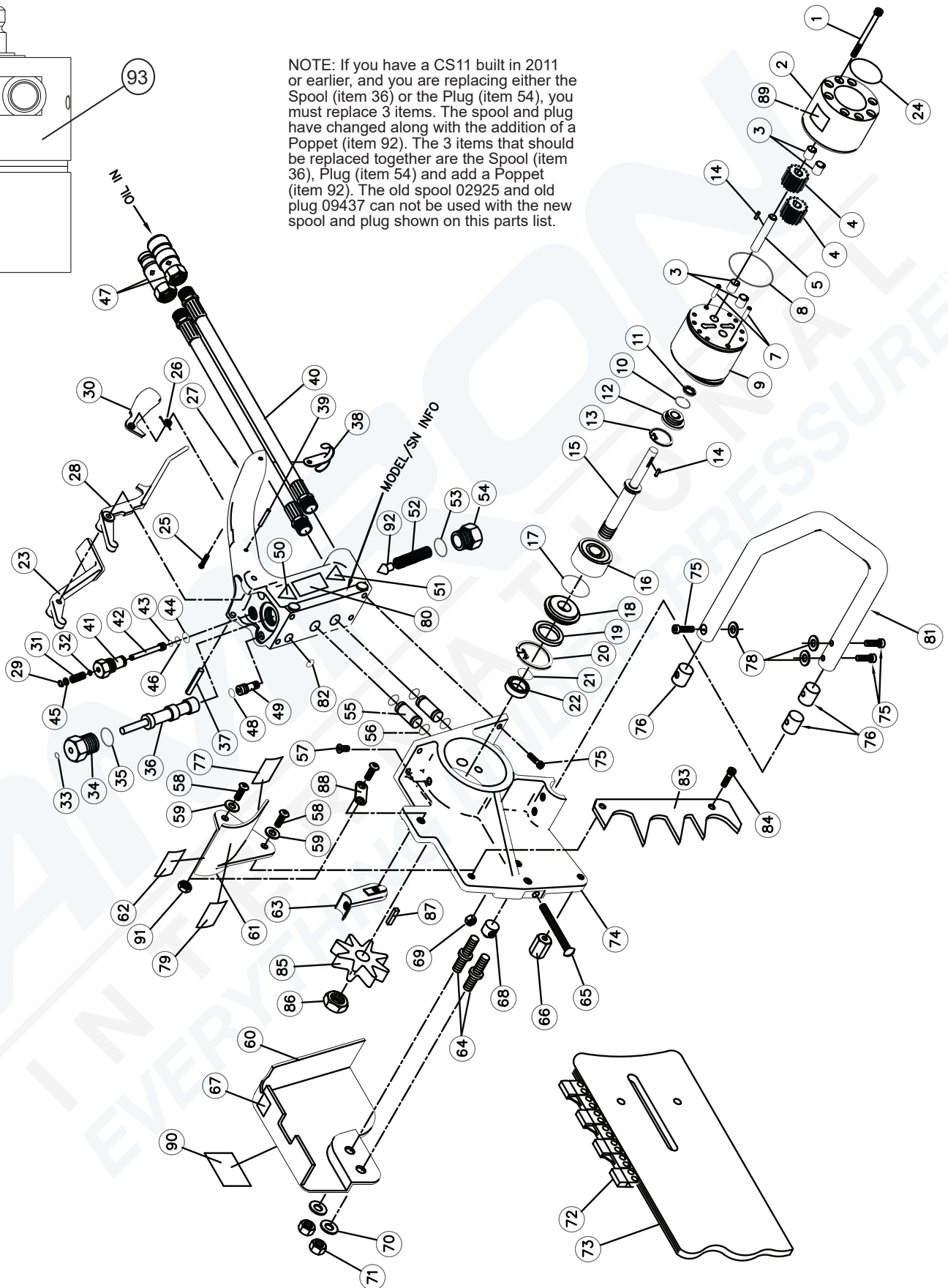
SERVICE TOOLS

Motor Seal Kit, 3 Pc (for P/N 03272 Motor).....	03327
Repair Kit	03328
O-Ring Tool Kit	04337
Bearing Installation Tool	05044
Motor Seal Kit, 2 Pc (for P/N 21444 Motor).....	10569
Repair Kit	10570
Motor Seal Kit, 2 Pc (for P/N 21443 Motor).....	10571
Repair Kit	10572

CS11 PARTS ILLUSTRATION



NOTE: If you have a CS11 built in 2011 or earlier, and you are replacing either the Spool (item 36) or the Plug (item 54), you must replace 3 items. The spool and plug have changed along with the addition of a Poppet (item 92). The 3 items that should be replaced together are the Spool (item 36), Plug (item 54) and add a Poppet (item 92). The old spool 02925 and old plug 09437 can not be used with the new spool and plug shown on this parts list.



CS11 PARTS LIST

ITEM NO.	P/N	QTY	DESCRIPTION
1	00612	8	CAPSCREW
2	31849	1	REAR GEAR HOUSING
3	06316	4	BUSHING
4	06853	2	DRIVE GEAR
5	73309	1	IDLER SHAFT
7	00713	2	DOWEL PIN
8	00178	1	O-RING *
9	21436	1	FRONT BEARING HOUSING ASSY INCLUDES ITEMS 3 AND EXPANDER PLUG
10	00171	1	O-RING *
11	00669	1	QUAD RING *
12	19884	1	SEAL GLAND
13	00170	1	RETAINER RING
14	06881	2	NEEDLE ROLLER
15	07359	1	MOTOR SHAFT
16	00148	1	BEARING •
17	02905	1	O-RING *
18	03104	1	KEEPER, SEAL & BEARING
19	03110	1	TEFLON SEAL *
20	00633	1	RETAINER RING
21	01211	1	O-RING *
22	03280	1	SPACER, SEAL RACE
23	02924	1	MANUAL OIL TRIGGER
24	74751	1	NAME TAG
25	00094	1	SCREW
26	02915	1	TORSION SPRING
27	02945	1	VALVE HANDLE ASSY
28	02941	1	TRIGGER
29	03007	1	RETAINER RING
30	02943	1	SAFETY CATCH
31	02914	1	SPRING
32	00026	1	O-RING *
33	00717	1	O-RING *
34	02931	1	VALVE CAP
35	01604	1	O-RING *
36	31138	1	VALVE SPOOL (BEFORE ORDERING THIS PART SEE NOTE PAGE 21 ILLUSTRATION)
37	03279	1	ROLL PIN
38	02911	1	HOSE CLIP
39	03278	1	ROLL PIN
40	06830	2	HOSE WHIP
41	02932	1	MANUAL OIL PLUG
42	02922	1	MANUAL OIL PLUNGER
43	05632	1	O-RING *
44	01411	1	O-RING *
45	04139	1	WASHER
46	01362	1	O-RING *
47	03974	1	COUPLER SET 1/2" NPT
48	01362	1	O-RING *
49	02921	1	AUTO OILER ADJUSTMENT PLUG
50			
51			

ITEM NO.	P/N	QTY	DESCRIPTION
52	02916	1	SPRING
53	01604	1	O-RING *
54	31137	1	PLUG (BEFORE ORDERING THIS PART SEE NOTE PAGE 21 ILLUSTRATION)
55	02912	2	OIL TUBE
56	00175	4	O-RING *
57	03006	2	CAPSCREW
58	02764	1	CAPSCREW
59	12175	2	WASHER
60	02933	1	CHAIN GUARD
61	07473	1	HAND GUARD
62			
63	20461	1	HANDLE STRUT
64	72955	2	STUD
65	02765	1	SCREW •
66	12174	1	CHAIN STOP
67	04746	1	AUTO OILER DECAL
68	03275	1	BAR ADJUSTMENT NUT •
69	17134	1	NUT •
70	72957	2	PLAIN WASHER
71	72956	2	NUT •
72	72951		SAW CHAIN, 24 INCH SAW BAR
	72952	1	SAW CHAIN, 32 INCH SAW BAR
	72953		SAW CHAIN, 36 INCH SAW BAR
	72954		SAW CHAIN, 42 INCH SAW BAR
73	72947		SAW BAR, 24 INCH SPROCKET NOSE
	72948	1	SAW BAR, 32 INCH SPROCKET NOSE
	72949		SAW BAR, 36 INCH SPROCKET NOSE
	72950		SAW BAR, 42 INCH SPROCKET NOSE
74	02947	1	CHAIN SAW ADAPTOR ASSY
75	02764	10	CAPSCREW
76	02649	3	HANDLE BAR RETAINER
77	12412	1	WARNING DECAL ELECTRICAL
78	02643	3	NEOPRENE WASHER
79	13907	1	WARNING DECAL, KICKBACK
80	03790	1	GPM DECAL
81	02936	1	HANDLE BAR
82	00018	1	O-RING *
83	02913	1	BUCKET CLEAT
84	02449	1	CAPSCREW
85	02938	1	DRIVE SPROCKET •
86	03273	1	NUT
87	03023	1	KEY •
88	12248	1	LINK PLATE
91	09277	1	HEX NUT
92	31186	1	POPPET (CONE)
93	21444	1	MOTOR ASSEMBLY CS11

SEAL KIT (CS11).....10569 •
 REPAIR KIT (Includes Seal Kit 10569).....10570
 (* Denotes Part in Seal Kit) (• Denotes Part in Repair Kit)

SERVICE

Good maintenance practice keeps the tool on the job and increase its service life.

Keep the hydraulic fluid clean at all times. Contaminated hydraulic fluid causes rapid wear and/or failure of internal parts.

Follow the procedure contained in “HYDRAULIC SYSTEM REQUIREMENTS” on page 13, to ensure peak performance from the tool.

Never disassemble the tool unless proper troubleshooting procedures have isolated the problem to an internal part. Disassemble it only to the extent necessary to replace the defective part. **KEEP CONTAMINANTS SUCH AS DIRT AND GRIT AWAY FROM INTERNAL PARTS AT ALL TIMES.**

Always determine and correct the cause of the problem prior to assembly. Further wear and tool failure can result if the original cause is not corrected.

PRIOR TO ASSEMBLY

Clean exterior of the tool.

Obtain the seal kit (part number 21443 or 21444) so all seals exposed during disassembly can be replaced.

Ensure that all seals that were exposed have been replaced with new parts.

Apply clean grease or O-ring lubrication to all parts during reassembly.

Note: For orientation of parts identified in the following procedures, see “CS11 PARTS ILLUSTRATION” on page 20.

1. Check all parts for evidence of excessive wear, scoring or obvious damage. Pay particular attention to seal and other running surfaces, looking for scratches or other signs of fluid contamination. Dirty or water contaminated fluid can cause scratches on running component surfaces.
2. Examine all exposed seals and O-rings for worn spots or damage caused by overheating or ingestion of contaminants. Although all exposed O-rings and seals must be replaced during assembly of the unit, this inspection should be performed to help identify related faulty components and the cause of an experienced or potential malfunction.
3. All components exhibiting excessive wear or deep scratches can usually be touched up using an emery cloth.
Thoroughly clean all parts before assembly.
4. Apply clean grease or O-ring lubricant to all close fitting parts and seals during assembly.

ON-OFF VALVE DISASSEMBLY AND REASSEMBLY

DISASSEMBLY

1. Drive out the 1/4-inch roll pin securing the trigger to the valve handle assembly. Depress the safety catch and remove the triggers through the bottom of the valve handle.

Note: It is not always necessary to drive the roll pins completely out of valve handle to allow removal of parts.

The safety catch can be removed at this time by driving out the 3/16-inch roll pin with a 5 mm diameter punch. It is not necessary to remove the safety catch to service the On/Off valve.

2. Remove the valve cap from the top of the handle. Remove the O-ring from valve cap bore.
3. Pull the On/Off valve out through the top of the valve handle.
4. Remove the port plug from the bottom of the valve handle. The coil spring will drop out in your hand.
5. Clean and inspect the valve and its bore in the handle carefully. The valve and bore should have a polished appearance without scoring or deep scratches. Excessive wear indicates contaminated oil in the system.

REASSEMBLY

1. Lubricate and install the O-ring in the valve cap bore.
2. Push the valve cap onto the valve stem, then thread the assembly into the top of the valve handle assembly.
3. Install the coil spring and the port plug into the bottom of the valve handle.

Note: Open and Closed Center valves are interchangeable.

4. Replace the safety catch (if removed previously). Place the torsion spring on the boss of the safety catch with the spring tab on the top of and facing the back of the catch, as shown in “CS11 PARTS ILLUSTRATION” on page 20.
5. Place the safety catch in the valve handle and align the holes using a 3/16 inch/5 mm diameter punch.
6. Install the 3/16 × 1-3/8 inch roll pin.
7. Push down on the spring tab until it snaps in place under the safety catch.
8. Depress the safety catch and slide the trigger through the bottom of the handle.
9. Line up the trigger and manual oiler trigger with the

SERVICE

pivot by inserting a 1/4 inch/6 mm diameter punch to maintain alignment while driving the roll pin into the handle. Install the 1/4 inch roll pin in the trigger pivot hole.

10. Check the safety catch/trigger mechanism for proper operation. The trigger must not activate the tool without the operator first depressing the safety catch.

MANUAL OILER DISASSEMBLY & REASSEMBLY

DISASSEMBLY

1. Perform Step 1 of the ON-OFF VALVE DISASSEMBLY procedure to remove the trigger.
2. Using a 11/16 or 3/4 inch, 3/8-drive socket, remove the manual oiler assembly from the top of the valve handle.
3. Using snap-ring pliers, remove the retaining ring, then remove the washer and coil spring. Push the plunger out of the oiler plug. Remove and discard all O-rings.

Note: The two holes in the small diameter section of the oiler plug should be open for proper oiler function.

REASSEMBLY

1. Lubricate and install the O-ring in the oiler plug bore.
2. Lubricate and install the O-ring on the plunger seat. Lubricate the plunger and push into the oiler plug from the end opposite the hex.
3. Install (in this order) the coil spring, washer, and retaining ring on that portion of the plunger protruding from the hex end.
4. Lubricate and install the two O-rings on the oiler plug. Install the manual oiler assembly in the valve handle using a 11/16-inch or 3/4-inch 3/8-drive socket.
5. Perform steps 6 through 11 of the ON-OFF VALVE REASSEMBLY procedure to install the trigger.

HYREVZ MOTOR REPAIR

REMOVAL

1. Remove the two bar clamping nuts and washers, chain guard, saw bar, and chain.
2. Remove the motor shaft jam nut (LH thread) by clamping the drive sprocket so that it cannot rotate (a chain type vise-grip works best).
3. Remove the sprocket, sprocket key and spacer.
4. Remove the four capscrews securing the chain saw adapter to the valve handle assembly, separate these assemblies.

5. Insert a hooked instrument through the oil tubes and pull them out. Take care to avoid damaging the oil tube bores in the motor and valve handle.
6. Remove the two oval head machine screws to allow the motor to be withdrawn from the chain saw adapter assembly.

DISASSEMBLY

Note: The saw can have either a two- or three-piece Hyrevz™ Motor. Identify the motor used on your saw

1. Place the motor in a vise (with soft jaws or V-blocks) around the bearing end, output shaft down.
2. On three-piece motors, scribe assembly marks across the bearing retainers and the gear housing. Make sure that the marks will be visible during reassembly.
3. Remove the eight socket head capscrews securing the bearing retainers and the gear housing.
4. Pry the rear bearing retainers or gear housing away from the mating part. Be careful to lift the retainer or housing straight off. Use the inside groove provided at the split between parts to prevent scratches on the surfaces between the parts.
5. On three-piece motors, pry the gear housing assembly away from the front bearing housing in the same manner as described in Step 4.
6. Remove the two gears, motor shaft key (or roller) and the idler shaft.
7. Remove the large face seal O-ring(s); being careful not to damage the O-ring grooves or surrounding surfaces.
8. To remove the motor shaft from the front bearing retainer or bearing housing, remove the large retaining ring securing the ball bearings. Place the retainer or housing on a flat surface with clearance for bearing removal. Push on the small end of the motor shaft until the shaft and bearing(s) slide free. Be careful not to bend the motor shaft.
9. The ball bearing(s) should be removed from the motor shaft only if they must be replaced because damage can occur during removal. To remove the bearings from the motor shaft, press on the threaded end of the motor shaft while supporting the outer race of the bearing(s). Discard the bearings.
10. Remove the retaining ring at the bottom of the ball bearing bore to service the motor shaft seal(s).
11. To remove the seal liner and associated parts on current two and three-piece motor assemblies, insert the small end of the motor shaft through the seal liner. Place a rag across the gear face of

SERVICE

the front bearing retainer and blow air through the small diameter motor shaft bearing. Use a shop air nozzle to force the seal liner onto the motor shaft for removal.

12. To remove the seal from former two-piece motor assemblies, use appropriate O-ring service tools to pry it out of its bore. Take care to avoid damaging the seal surfaces. Note seal orientation.
13. To remove the needle bearings on three-piece motors, use Collet P/N 05871, and Actuator Pin P/N 05872, along with Slide Hammer P/N 11931. These tools are available in Bearing Puller Kit P/N 05064.

To remove the bushings on two-piece motors, use Collet P/N 11930 and Actuator Pin P/N 05067, along with Slide Hammer P/N 11931.

MOTOR INSPECTION AND CLEANING

Inspect and clean all parts as follows:

CLEANING

Clean all parts with a degreasing solvent. Blow dry with compressed air and wipe clean. Use only lint free cloths.

SMALL DIAMETER BEARINGS/BUSHINGS

On three-piece motors equipped with needle bearings, check to make sure all rollers are in place and not nicked or seized. If shaft wear is present, the bearing and shaft must be replaced.

On two- or three-piece motors equipped with bushings, the inside of the bushing should be gray with some bronze showing through. If a significant amount of yellow-bronze shows, bushing replacement is required. Inspect motor shaft for corresponding wear and replace as required.

GEAR CHAMBER

The chamber bores and end faces around the bearing bores should be polished but not rough or grooved. The flat surfaces around the chamber and bolt holes should be flat and free of nicks or burrs that could cause misalignment or leaks.

GEARS

Both gears should have straight tips without nicks; square tooth ends and a smooth even polish on the teeth and end faces. Check for cracks between the drive gear keyway and gear tooth root. Discard the gear if cracks are present.

MOTOR END HOUSINGS/RETAINERS

The gear face running surface should show two interconnecting polished circles without a step and should not be rough or grooved.

The shaft seal bore should be smooth and free from

nicks or scratches.

SHAFTS

The shaft diameter at the bearing and seal locations must be smooth. Grooves, roughness or a reduced diameter indicate fluid contamination or damaged needle bearings. Grit particles may have been imbedded in the bushings grinding into the hardened shaft. If abnormal shaft wear as above occurs (in excess of normal polishing), both the shaft and associated bearings/bushings must be replaced.

REASSEMBLY

1. On current two and three-piece motors, assemble the seal liner assembly by installing the outside diameter O-ring, quad ring and (seal liner washer on three-piece motors only) as shown on the parts location diagram. Place idler shaft through the seal liner then loosely position the assembly in the seal bore of the front bearing retainer (quad ring side down). Place the seal liner washer over the shaft then carefully push the seal liner into place. Install the retaining ring. Remove the idler shaft.
2. On former two-piece motors, carefully install the shaft seal with the lips facing the gear side. Replace the back-up washer and retaining ring.
3. To install the ball bearing(s) on the motor shaft, support the ball bearing inner race and press the motor shaft through the bearing inner race.
4. To install the needle bearings in three-piece motors, use Bearing Pusher P/N 11916.

To install the bushings on two-piece motors, use Bearing Pusher P/N 11918.

5. Place the front bearing retainer/front bearing housing assembly on a smooth clean arbor press surface (protected from damage) with the large bearing bore facing up. Position the piece so that a clearance hole exists for the insertion of the motor shaft.

IMPORTANT

The graphite seal liner must not be forced, pried or pushed on directly because it can be easily damaged.

6. Apply grease to the motor shaft and keyway, then insert it through the shaft seal. Using Bearing Pusher P/N 00850, or a sleeve/socket with a diameter slightly smaller than the outside diameter of the ball bearing, press the bearing assembly into place.

SERVICE

Press only on the outer race.

Install the ball bearing retaining ring.

7. Install the key (or roller) in the keyway of the motor shaft. Use a small amount of grease to keep the key or roller in place. Slide the drive gear over the key and shaft. Install the idler shaft and gear.
8. Apply grease to the face seal O-ring groove(s) then install the O-ring(s).
9. On three-piece motors, note the scribe marks made during disassembly; then align the scribe marks and carefully slide the gear chamber and rear bearing retainer into place.

Note: Make sure dowel pins and shafts are aligned during installation.

IMPORTANT

Do not force parts together.

On two-piece motors, note the screw hole pattern on both housings. They will only assemble one way. With all parts aligned, carefully slide the gear housing assembly over the gears until it contacts the front bearing housing assembly.

IMPORTANT

Do not force parts together.

10. Turn the motor shaft manually to check for free rotation. Install the capscrews, then recheck rotation.
11. When new parts are installed, it may be necessary to “break-in” the motor. After the saw has been reassembled without the guard, bar and chain, the motor may be broken-in as follows:

⚠ WARNING

The following step can be hazardous. Failure to heed the instructions could result in serious injury.

12. Connect the saw to a hydraulic power source and check for proper operation. **READ THE FOLLOWING CAREFULLY BEFORE PROCEEDING.**
 - a. Make sure the hydraulic power source is running at the lowest GPM/LPM rate it can while still producing full pressure.
 - b. Grasp the saw firmly in a bench vise and place

the correct size wrench on the 5/8-11 nut securing the sprocket.

- c. Connect the hydraulic power source to the saw and turn the power source valve to the “ON” position.
- d. With a firm grip on the saw and wrench, SLOWLY squeeze the trigger to activate the saw.
- e. Turn the motor shaft both against and with the direction of rotation.
- f. Release the trigger and remove the wrench.
- g. Activate the saw to determine that the motor starts and runs freely.
- h. If the motor is not starting or running freely, carefully repeat this procedure until the motor performs satisfactorily.

REPLACEMENT

1. Install the oil tubes in the valve handle then push the motor into the chain saw adapter assembly.
2. Align the motor mounting holes and secure the motor using the two 5/16-18 × 3/4 inch oval head machine screws.
3. Align the oil tubes and press the chain saw adapter assembly against the valve handle assembly and secure using the four 5/16-18 × 3/4 inch capscrews. Tighten to 15 ft lb/20 Nm.
4. Install the saw chain on the saw bar then place on the mounting studs in-line with the bar adjustment nut. (Observe orientation of the chain on the bar. The cutting edge of the cutter link on the top of the bar should travel towards the bar nose).
5. Install the chain guard, two flat washers and two 3/8-16 hex nuts.
6. Perform CHAIN TENSION ADJUSTMENT procedure.

MAINTENANCE AND ADJUSTMENTS

GENERAL MAINTENANCE TIPS

There are many simple maintenance tasks which, if performed, can keep a chain saw operating at a high level of efficiency. Routine maintenance will also keep replacement costs down on the parts of the chain saw, which occasionally wear out.

BAR GROOVE WEAR

The wear pattern of the bottoms of the chain cutters, tie straps and drive lengths is a good indication of the condition of the bar.

1. If the bottoms of the drive links are worn flat, the groove is too shallow in the tailor flat section of

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the bar. The groove must be ground deeper by an authorized chain saw dealer or the bar replaced.

2. If the drive links are worn concave, the groove is shallow in the bar nose. It is possible that the armor tip of the bar nose has worn off. The groove should be rebuilt, reground or the bar replaced.

In summary, the groove width should not allow the chain to wobble from side to side when moved with fingers. Groove depth should range between 5/16 inch/8 mm to a maximum of 7/16 inch/11 mm.

BAR RAIL WEAR

A quick check can be made to determine rail wear. Put a straight edge against the bar and the cutting edge (Figure 7). Force the cutter sideways as far as it will go with the straight edge. There should be 1/16 to 1/8 inch/1.5 to 3 mm gap between the straight edge and the side of the bar. The chain should be supported squarely by the bar rails. If not, the bar is worn and the groove is sloppy. Authorized chain saw dealers have equipment to close the rails.

If the chain saw is used frequently, check the bar for flat and even rails. Rails must be flat and square with side of bar and the bar itself must be perfectly straight. If bows or bends are present in the bar, a dealer should attempt to remove them.

If the bar rails are uneven (stepped), the chain is leading off the cutter. The rails should be reground by an authorized dealer.

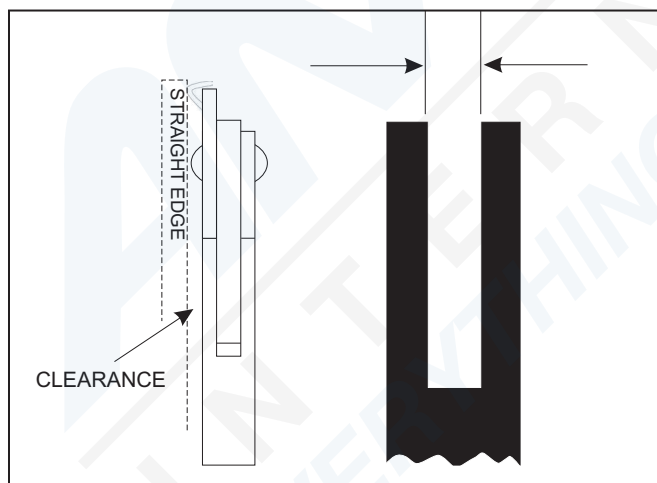


Figure 7. Rail Wear

CHAIN LUBRICATION

Soak a new chain overnight in SAE 30 oil.

Before cutting, check to make sure that oil is being thrown from the nose of the bar.

CHAIN TENSION

Correct chain tension is very important throughout the life of the chain. Check chain tension often during use (when the saw is stopped and the bar and chain are cool). The chain should move easily around the bar when pulled by hand. Watch tension and lubrication during prolonged cutting periods.

AUTOMATIC OILER ADJUSTMENT

1. Observe all safety precautions.
2. The automatic oiler adjustment plug is located in the top-forward portion of the valve handle assembly. The oil volume can be adjusted with a 3/16 inch allen wrench by turning the plug counterclockwise to increase output and turning clockwise to decrease output.

Note: Oil output will vary proportionally to load and operating pressure. It should be adequate for most operations as adjusted at the factory.

3. Initial oiler adjustment is made with the bar, chain and chain guard removed.

WARNING

The following step can be hazardous. Failure to heed the instructions could result in serious injury.

4. Connect the saw to a hydraulic power source and check for proper operation. **READ THE FOLLOWING CAREFULLY BEFORE PROCEEDING.**
 - a. Make sure the hydraulic power source is running at the lowest GPM/LPM rate it can while still producing full pressure.
 - b. Grasp the saw firmly in a bench vise and place the correct size wrench on the 5/8-11 motor shaft jam nut.
 - c. Connect the hydraulic power source to the saw and turn the circuit control valve to the "ON" position.
 - d. With a firm grip on the saw and wrench, **SLOWLY** squeeze the trigger to activate the saw.
 - e. Adjust the oiler for a flow of approximately one drop every one to two seconds.
 - f. Release the trigger and remove the wrench.

CHAIN TENSION ADJUSTMENT

1. Observe all safety precautions.
2. When the chain appears loose, lubricate it well and let it cool for a few minutes to allow for contraction

SERVICE

of the chain. Disconnect the saw from its hydraulic power source.

Note: Perform Steps 3 through 6 while holding the top end of the bar upward.

3. Loosen the two 3/8-16 bar stud nuts slightly.
4. Tighten the chain tension screw until the bottoms of the tie straps and cutters just touch the bar rails of the bottom of the bar. On sprocket nose and roller nose bars the chain must be slightly tighter.
5. Pull the chain around the bar by hand to be sure it fits the sprocket and bar properly. The chain should move easily.
6. Tighten the two 3/8-16 bar stud nuts.
7. Connect the saw to a hydraulic power source. Operate the chain at low speed (GPM) for a minute or two while pumping extra oil on the chain.
8. Stop the saw and check the tension. If it has loosened, disconnect the saw from the hydraulic power source and perform Steps 3 through 6 again to tighten the chain to the correct tension.
9. Reconnect the saw to the hydraulic power source. Operate the saw and make a few easy cuts. Check chain tension and readjust if necessary (disconnect the saw from the hydraulic power source and perform Steps 3 through 6).

Note: Never break in a new saw chain under a heavy cutting load.

10. Watch saw chain tension carefully for the first half-hour of cutting. CHAIN SHARPENING OREGON 72LG/72LP (3/8 PITCH) CHAIN

Note: Chain type stamped on drive link.

11. Observe all safety precautions.
12. Use OREGON file holder and the proper round file 7/32" for the chain to be sharpened (see tension SERVICE TOOLS). Press the file holder so it rides on both the cutter top plate and depth gauge with the guide marks in line with the bar.
13. File all of the cutters on the side of the chain opposite yourself in the direction shown.
14. Hold the file handle at 10° as you make a few firm strokes away from yourself while applying pressure against the cutting edge.
15. Move to the other side of the chain and file all of the cutters opposite to complete chain sharpening. File all of the cutters uniformly.

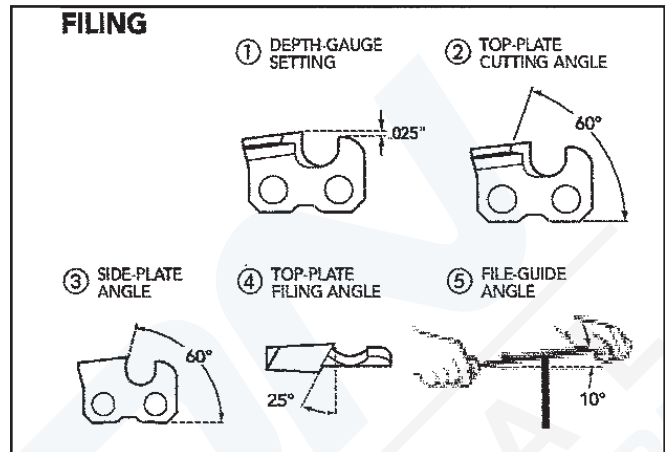


Figure 8. Chain Sharpening

WARNING

Failure to follow filing instructions can increase the level of kickback which can result in severe injury to the saw operator or bystanders. Do not exceed depth-gauge settings shown above.

SETTING THE DEPTH GAUGES

1. Observe all safety precautions.
2. Place the OREGON Gaugit, OREGON P/N 22290, on the chain after every third or fourth sharpening. If the depth gauge extends above the slot, file them level with a flat file. Depth gauge setting is .025 inch.
3. After lowering, round off the front edge to its original shape.

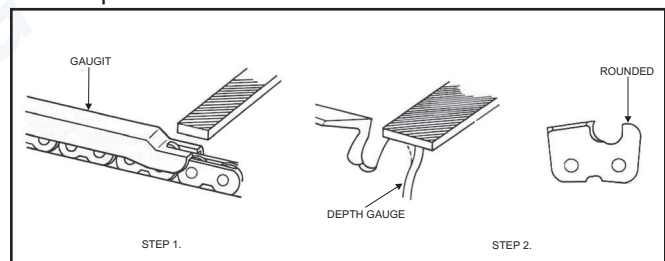


Figure 9. Setting Depth Gauge.

UNDERWATER MODEL PREVENTIVE MAINTENANCE

After each use, dip or spray the entire tool with a water displacing oil such as WD40®. Pay particular attention to the On/Off valve and trigger area of the valve handle the drive sprocket, the chain and the bar.

UNDERWATER TOOLS DEPTH GUIDELINE

UNDERWATER MODELS ONLY

⚠ CAUTION

Do not use hydraulic tools underwater that are not designated as an “underwater” model, or this will result in damage to the tool.

For underwater hydraulic tools the applications are broken down into four quadrants depending on type of tool and method of operation.

The types of tools are percussive and rotational, each with different characteristics allowing for different depth operation. With percussive tools, the nitrogen accumulator PSI must counter the increase in ambient pressure found at lower depths. Since there is a maximum PSI for percussive tools they are limited to certain depths. Rotational tools do not have accumulators and thus are capable of deeper depths.

The methods are broken into diver operated or remote operated vehicle (ROV). ROV's can reach lower depths and with an onboard hydraulic power source that is depth compensated, can operate hydraulic tools at depths of thousands of feet. ROV operation is still limited to the tool, for example a percussive tool has the same depth limitation whether ROV or diver operated.



OPERATION OVERVIEW

	PERCUSSIVE	ROTATIONAL
DIVER	Tools: Breakers, Hammer Drills and Chipping Hammers Max Depth: 500' - limitations due to accumulator PSI max (increase 40 PSI for every 100')	Tools: Grinders, Saws, Chain Saws Max Depth: 1000' - Reference hose sizing guide below
ROV	Tools: Breakers, Hammer Drills and Chipping Hammers Max Depth: 500' - limitations due to accumulator PSI max (increase 40 PSI for every 100')	Tools: Grinders, Saws, Chain Saws Max Depth: 1000' - Reference hose sizing guide below

RECOMMENDED HOSE DIAMETERS

DEPTH (FT)	8 GPM	12 GPM
100	5/8"	5/8"
300	3/4"	1"
600	1"	1"
1000	1"	1-1/4"



STANLEY®

STANLEY Infrastructure
6430 SE Lake Road
Portland, Oregon 97222 USA
(503) 659-5660 / Fax (503) 652-1780
www.stanleyinfrastructure.com