

OPERATORS' GUIDE

REL-CS16 HYDRAULIC CHAINSAW



For cutting and trimming of limbs and branches from the ground or an aerial bucket.



RELIABLE EQUIPMENT & SERVICE CO., INC.
92 Steamwhistle Drive • Ivyland, PA 18974 • USA
Phone: 215-357-3500 • Fax: 215-357-9193

MODEL: REL-CS16

MAX. PRESSURE: 2,000 PSI

SERIAL NO.: _____

YEAR: _____



WARNING



All information found in this guide must be read and understood before use or testing of this tool. Failure to read and understand these warnings and safe handling instructions could result in severe personal injury and or death.

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CS Manual 05-16

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This symbol indicates items of extreme importance. Safety of user and others may be in jeopardy if these instructions are not read and understood.

DESCRIPTION

The **REL-CS16** hydraulic chainsaw is intended for safe pruning, trimming and felling of trees from the ground or aerial bucket. The powerful hydraulic drive motor provides continuous cutting from any Open-Center or Closed-Center hydraulic system with an operating pressure between 1,000 to 2,000 psi at 4-8 gpm.

Features include a 16 inch bar (standard), anti-kick chain, adjustable automatic chain oiler, safety trigger to prevent accidental chain movement, covered sprocket guard, and a quick set spool which can be turned 180 degrees for closed-center or open-center operations.

UPON RECEIPT OF THIS TOOL, COMPLETE THE REGISTRATION BELOW.

SERIAL NUMBER _____

DATE OF PURCHASE _____

DEALER NAME _____



WARNING

BEFORE USING THIS CHAINSAW, READ THE WARNINGS and the recommended practices described in this manual. Failure by the operator to read and fully understand these warnings will leave this person unqualified to use and operate this tool. Property damage, severe personal injury, and/or death could result by not following these warnings.

These warnings will appear in appropriate locations when they are pertinent to the particular subject being shown. Read each one carefully and follow them strictly.



Eye Protection

WARNING

Always wear eye protection to avoid injury from flying debris or hydraulic oil leaks. Failure to do so can result in serious personal injury.



Dust Mask

WARNING

Some timbers may produce irritants. Failure to observe this warning may result in serious health issues and/or breathing difficulty.



Hard Hat

WARNING

Always wear a hard hat to avoid injury from debris. Failure to do so can result in serious personal injury.



Foot Protection

WARNING

Always wear foot protection. Failure to do so can result in serious personal injury.



Hearing Protection

WARNING

Always wear hearing protection, to avoid hearing loss due to long term exposure to high noise levels.



Operation/Safety methods may vary in accordance with the working guidelines established by each utility or contractor.

WARNING

For your own safety, ensure that you fully comply with all safe operation guidelines required by your employer.



WARNING

Safety

DO NOT attempt to make any changes to any of the component parts or accessories when connected to the power source.

DO NOT adjust, inspect, or clean tool while the tool is connected to the power source. The tool could accidentally start up and cause serious injury.

DO NOT lock the trigger in the On Position. In an emergency, it is impossible to shut down the tool. Serious damage or injury could occur during the time required to stop the tool.

DO NOT alter or remove the safety latch attached to the trigger. This latch is designed to prevent accidental movement of the trigger, which could cause the chain to start up and cause severe personal injury or property damage.

DO wear protective gloves when handling or adjusting the saw chain. The saw can and will cause damage to the hands without gloves either running or stopped. Failure to follow these warnings can result in serious injury and/or death.



WARNING

Jamming / Pull-In

Jamming or pinching will occur when the wood being cut closes in on the top of the chain or guide. This action results in pushback or a kickback, usually very fast with strong force toward the operator. Be careful and be aware of what causes this set of circumstances, so the operator can do everything possible to avoid them.

WARNING

Tip Contact / Kickback

Accidentally touching an object with the tip of the chainsaw can cause a rapid movement of the assembly up and back towards the operator, with possible injury to the operator or damage to the surrounding objects.

WARNING

Worn or Damaged Saw Chain

DO NOT operate this tool with a worn or damaged saw chain. Worn, damaged, or dull saw chain will increase the likelihood of kickback or pushback.



WARNING

Burn Hazard

Saw body, blade, bar as well as other components will be hot during and after use. Use care when handling this tool. Hot surfaces may cause serious burns. Failure to observe this warning may result in serious personal injury.



WARNING

Electrical Shock Hazard

Use only certified nonconductive hoses and fittings. Always wear and use the necessary clothing, equipment and safety practices to protect against electrical shock. Failure to follow these rules can result in serious personal injury.



WARNING

Oil Injection Injury

Hydraulic oil or fluid under the skin is a serious injury. Oil under pressure can penetrate the skin and may cause dismemberment or loss of life. Seek medical assistance immediately if such an injury should occur.

Always wear safety gloves and eye protection when operating or handling.

DO NOT use fingers or hands to attempt to locate a leak.

DO NOT Handle Hoses or Couplers while the hydraulic system is pressurized.

NEVER open or service the system before completely depressurizing.



WARNING

General Safety

Ensure that all fellow employees and bystanders are clear and protected from possible injury caused by this tool or the operations being performed. Persons in close proximity could be injured and property damaged if the tool were to malfunction. This tool should always be used within the limits and purposes stated by the product manufacturer. Abuse or usage over and above the manufacturers' intended purposes could cause damage to the tool and severe injury to the operator.



WARNING

Burn Hazard

Do Not connect or disconnect tool, hoses or fittings while power source is running or while hydraulic fluid is hot. Hot hydraulic fluid may cause serious burns. **Chain & Bar may also cause burns.** Failure to observe this warning could result in serious injury.



CAUTION

Safe Operation & Care

USE THIS TOOL FOR CUTTING WOOD ONLY, Any other use can result in injury or property damage.

INSPECT TOOL BEFORE USE. Replace any worn, damaged or missing parts. A damaged or improperly assembled tool may malfunction, injuring operator and/or nearby personnel.

INSPECT HYDRAULIC HOSES AND COUPLINGS before each use. Repair or replace if any cracking, leakage, wear or damage is found. Worn or damaged hoses may fail resulting in personal injury or property damage.

CLEAR WORK AREA of all bystanders and unnecessary personnel before operating this tool. Falling debris could cause serious injury or death.

Failure to observe this warning could result in serious injury.



CAUTION

Safe Handling

HYDRAULIC FLUID MAY CAUSE SKIN IRRITATION.

Handle hydraulic tools and hoses with care to prevent hydraulic fluid from making contact with skin.

IN THE EVENT OF ACCIDENTAL SKIN CONTACT with hydraulic fluid, immediately wash the area thoroughly.

Failure to observe this warning could result in serious injury.



CAUTION

Vibration Hazard

Apply just enough pressure to make the cut. Applying excess pressure to the tool may cause operator discomfort or temporary numbness.

Failure to observe this warning could result in serious injury.

TOOL SPECIFICATIONS

Overall Length 32 in. (81.28 cm)
Width..... 10 in. (19.05 cm)
Weight..... 9.75 lbs. (4.22 kg)
Pitch..... .375 in. (8.26 mm)
Chain Gauge050 in. (1.47 mm)
Chain Bar Length..... 16 in. (40.64 cm)
Flow Range 4-8 gpm (15-30 lpm)
Operating Pressure 1,000 - 2,000 psi (69-140 bar)



WARNING

These specifications must be strictly adhered to for this tool to function properly. Any deviation can cause severe injury or death. Use only factory specified parts when repairing and/or replacing. Severe damage to the tool can occur with non-specified parts.



WARNING

Always use chains rated for 4,200 FPM (1,280 MPM) or higher. Always use chains that meet applicable safety code specifications. Failure to heed these warnings could result in severe bodily injury.

HYDRAULIC FLUIDS

All hydraulic fluids that meet these listed specifications or the listed HTMA specifications may be used for this tool.

S. U. S. _____

@ 100° F (38° C) 140 TO 225

@ 210° F (99° C) 40 minimum

FLASH POINT 340° F min. (170° C min.)

POUR POINT -30° F min. (-34° C min.)



WARNING

HOSES AND FITTINGS

There exists the potential for shock in using anything other than certified nonconductive hoses and hydraulic oil with dielectric properties, when using system components near energized electrical lines. Failure to recognize these conditions could cause electrocution.

Hoses and fittings used with this tool must comply with S.A.E. J1273 which covers recommended practice for selection, installation, and maintenance of hose and hose assemblies. The **correct hoses and fittings are available from your supplier.**

WARNING: Failure to comply with these warnings could result in severe bodily injury.

UNIT/HOSE CONNECTIONS



WARNING

ALWAYS SHUT OFF pump/power source before connecting or disconnecting system components. **ALWAYS DEPRESSURIZE** hydraulic system before disconnecting this unit or any of the systems components.

ALWAYS TIGHTEN couplings completely. Loose or improperly tightened couplings will not allow fluid to pass through the hose creating a blockage in the supply or return line.



CAUTION

HOSE INSTALLATION

Care must be taken to assure the correct connection of the hoses to the pressure “P” and return “T” ports. If the hoses are incorrectly connected, the tool will run in reverse. This will damage the tool and create dangerous conditions for the operator.

Always inspect hoses and connectors before using this tool each time before using. Replace or repair if any leakage is evident. Leakage is a sign of deterioration in component parts. Worn or leaking parts must be repaired or replaced, or injury and severe damage could result.

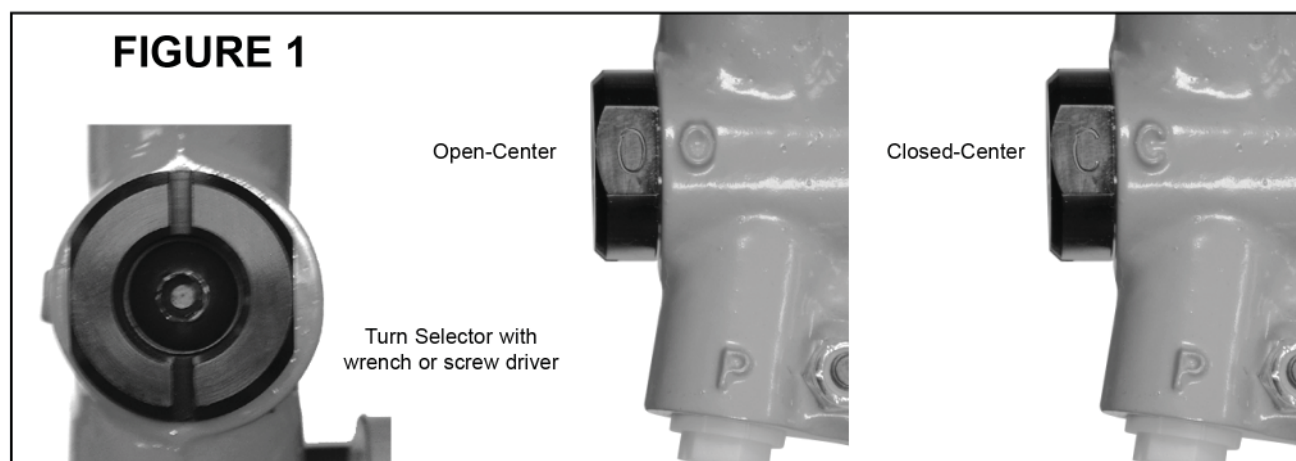
PRE-OPERATION OF SAW

WARNING! DO NOT connect hoses or fittings to this chainsaw before completing all the following instructions.

Before attempting to run or use the saw, check all connections, including hoses, couplings, chain tension, cleanliness, and ensure that safety trigger is moving freely.

Wear all safety items required and make sure that the working area is clear of obstructions and non essential personnel. Set the saw to Open or Closed-Center, according to which system the power supply pump provides. It is important to know which type of power system is supplying the saw so that the chainsaw can be properly set. All these items are crucial to the safe operating procedure of the chainsaw.

Setting Spool Selector for Open Center/Closed Center System



Make sure hoses are disconnected from the chainsaw and inspect the following items:

Inspect the saw chain. The chain tension should be set per Fig. 3. If the tension is too tight, the saw guide bar will wear excessively. If the tension is too loose, the chain could jump the track. Follow the settings as described in Fig. 3.

Set the automatic oiler as described in Fig. 2. If set properly, a fine mist should show at the tip of the chain. Too much fluid will drain the reservoir of oil. Follow the instructions on page 12. Check the fluid level regularly for fluid loss.

Inspect the chain for damage. The saw will not function properly with a worn or damaged chain. Look for bending, wear, or any damage to the chain assembly.

Damaged chain assemblies could cause pinching or kickback, resulting in serious injury to the operator.

CAUTION

New saw chains require a break-in period. The chain tension will need to be adjusted frequently as described on page 13.

OPERATION

Hold the chainsaw control handle in one hand and the forward handle in the other hand. After positioning the saw in the cutting area, engage the trigger actuator, allowing the trigger to be depressed. Depress the trigger slowly and allow the chain to start rotating. When at full speed, feed the saw into the material. Twisting or jamming the saw while cutting can cause problems such as kickback, jamming, pulling, or stalling within the cut. This can cause failure and damage to the saw. This can also seriously injure the operator. (See Safety Instructions) Allow the chain blade to do the work while applying a pressure against the cut. When the cut is completed, release the trigger and the saw will stop rotating.

OPERATIONAL SAFETY

- There are a number of safety items that need to be addressed when using the tool. Seek out the supervisor for basic instruction in handling the tool. Some basic problems are easily overcome by knowing the rules of operation.
- Kickback was described earlier in this manual (see page 4). Read again.
- Kickback occurs when the tip of the blade touches the wood. Faithfully avoid touching the wood at either the tip or the top side of the blade. Touching the tip will kick the saw up and back toward the operator at lightning speed.
- Touching the wood with the top side will pull the saw out of the operator's hands. Both situations can cause serious injury and/or damage to the operator, nearby persons, and surrounding equipment.
- Always be aware of the material being cut. Such things as nails and other hard objects can cause kickback and damage to the chain blade. This will cause a serious malfunction.
- Always run the chain at full speed when cutting.
- Always stand to the side of the cutting path of the chain.
- Never be off balance or overreach while cutting.
- Always wear and use proper safety equipment.
(i.e. hand & eye protection)
- Always be alert to shifting or falling tree limbs.



Binding and pinching of the chainblade will occur and cause difficulty in handling.

- To store the chainsaw between operations, find a clear, flat space and lay the saw on the space. Another option is to hang the chainsaw in an out of the way space.
- If the chainsaw is out of use for a period of time, shut off the hydraulic power source to prevent unnecessary heat and wear on the chainsaw and hoses.

MAINTENANCE

The service schedule should be followed as closely as possible. The life, reliability, and safety of the tool is dependent on maintenance and will help the tool to remain productive for a much longer period.

DAILY MAINTENANCE

CLEAN: All surfaces including handle, trigger, trigger actuator, fittings, hoses, motor and housing.

INSPECT: Saw chain for wear and damage. Worn or damaged parts can cause kickback during operation. Improperly sharpened chain components can cause a malfunction. Inspect saw frequently while in use (**NOT RUNNING**). Inspect for damage and tension. Inspect for cracked hoses and leaking fittings.

CHECK: Fluid level of the power source reservoir frequently. The automatic oiler uses hydraulic fluid for the bar and chain, this will cause the fluid level to drop.

All the above items must be replaced with new parts if signs of wear are evident.

ADJUST: Saw chain and automatic oiler. Too much or too little tension will wear the chain. Insufficient oil will wear the saw chain and the chain guide, and cause heat to build up at the tip where most of the wear occurs. The automatic oiler should allow oil to show at the tip as a fine mist when the saw is running at full speed.

FLUID CONTAMINATION: Cover the ends of fittings with a rubber dust cap when disconnected. This will help keep the fluid from contamination.

MONTHLY MAINTENANCE: Inspect per Appendix A, SAE Standard J1273, 5/86 for hose or fitting damage such as wear, cracks or leakage, replace the necessary parts.

NOTE: Keep decals clean and legible. Replace decals when necessary. Part #RL29400

Date	Parts or Service Required

SERVICE

Automatic Chain Oiler:

The automatic chain oiler is designed to continuously lubricate the chain and the guide bar while the chainsaw is running. This lubrication is an important factor in minimizing wear and tear on components as is commonly found in chainsaws. By utilizing the fluid from the supply circuit and sending the fluid through a metering valve, the fluid is then directed to the chain and guide in the quantity required. By adjusting the metering screw, fluid can be applied at a greater or lesser volume, depending on the usage of the chainsaw.

IMPORTANT: Check the operation of the automatic oiler frequently.

Adjusting the Automatic Oiler: Fig. 2

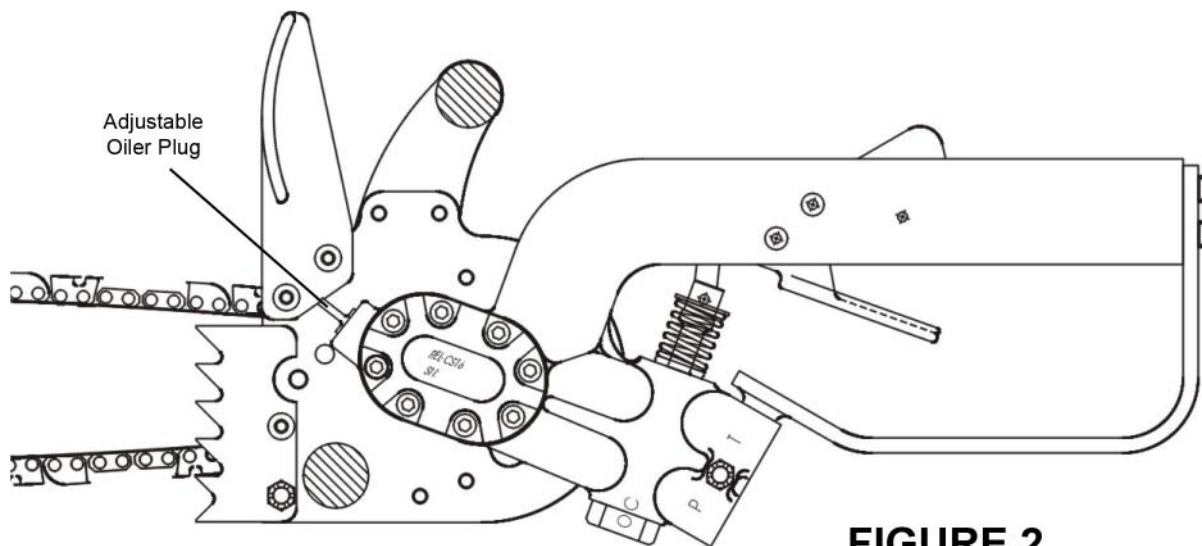


WARNING: Disconnect the hydraulic source! Severe injury can occur if the power is on and the saw starts running accidentally!

Use Adjustable oiler plug with Key style grip for simple flow adjustment. Shown in Figure 2.

Turn the screw counterclockwise to increase the oil flow. To decrease the flow, turn the screw clockwise. Make adjustments by turning no more than $\frac{1}{2}$ turn. Run the saw at full speed and watch the end of the saw. If a fine mist appears at the end while running, then it is adjusted properly. If there is no visible mist, make another adjustment counterclockwise.

If adjusting an older unit and change in flow occurs while running, clean the oil outlet hole under the end of the chain bar. It may have become clogged with debris.



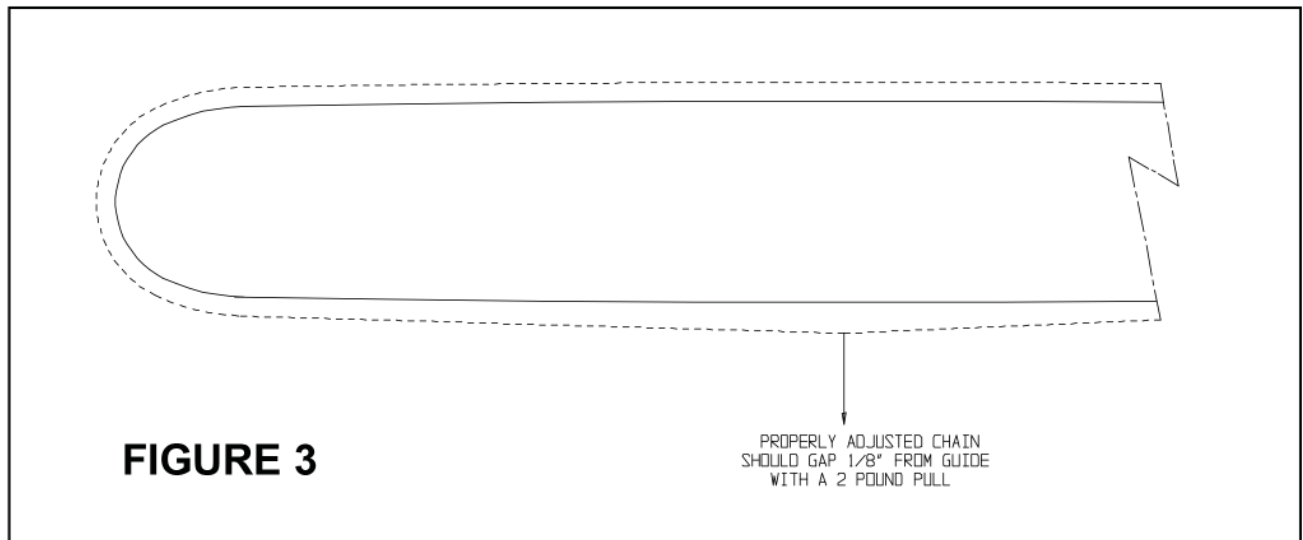
Saw Chain Tension:

Tension checking and adjusting must be done frequently before start and during cutting operations. The chain must be set to the proper tension in order for the saw to function properly. If the chain is too loose, the chain can jump the track of the guide bar, probably causing damage to the bar and associated components. If the chain is adjusted too tight, heat and wear will ruin the guide bar.

Setting Tension:

Disconnect Hoses or shut off the hydraulic supply system before making adjustments.

The adjusting screw is in the motor, head, and drive unit. Check tension by pulling the chain at the bottom side (Fig. 8) away from the guide with a two-pound (approx.) pull. If the chain pulls away more than 1/8", the chain is too loose. Less than 1/8" is too tight. Loosen the two mounting screws that hold the chain bar to the frame. Turn the adjusting screw counterclockwise to loosen tension, clockwise to increase tension. Retighten mounting screws and recheck tension. Tightening mounting screws may alter the setting. If necessary, repeat the process until the chain has 1/8" space between the chain and guide.



TROUBLE SHOOTING

Determine the source (i.e. tool or hydraulic system) of the problem before trouble shooting.

Will not run

Improper power source.....	Verify power source meets specifications
Low hydraulic fluid	Check fluid level
Incorrect viscosity	Use recommended fluid
Tool damaged	Disassemble and replace damaged parts
Hoses incorrectly connected	Switch hoses
Dirt in tool	Disassemble, clean and repair

Tool runs hot

Low fluid level	Fill pump reservoir to correct level
Fluid viscosity incorrect	Use recommended fluid
Fluid dirty	Drain tank, flush, and replace fluid
Power supply not functioning correctly	Reset to operator manual specs

Tool runs slow

Power supply not functioning correctly	Reset to operator manual specs.
Fluid not warmed to correct temp	Allow tool a warm-up period
Fluid viscosity too high	See recommended viscosity
Air in hydraulic system	Check hoses for breaks, leaks, or loose connections
Dirt or contaminants in tool	Disassemble and clean
Hydraulic fluid level low	Fill to level. Check for leaks

Tool is erratic

Hydraulic fluid not warm	Allow oil to warm up
Dirt or contaminants in tool	Clean and reassemble
Air in system	Check hoses for breaks, leaks, or loose connections

Tool leaks hydraulic fluid

Guide bar oil port clogged	Clean oil slot under motor assy under guide bar
Worn or damaged seals	Disassemble and replace worn or damaged seals
Component screws loose	Tighten all fasteners

Trigger operation is difficult / sticks when released

Tool valve spool sticky	Clean up spool so that spool slides freely
Check for misalignment	Align trigger linkage

Tool lacks power

Chain adjusted too tight	Adjust chain as shown in "Adjusting Tension"
Control valve leaking	Worn part or seal rings

Tool does not cut

Saw is dull or damaged.....	Resharpen or replace
Chain adjusted too tight	Adjust chain as shown in "Adjusting Tension"
Chain installed backward.....	Remove chain and install properly
Worn Guide Bar	Replace with new part

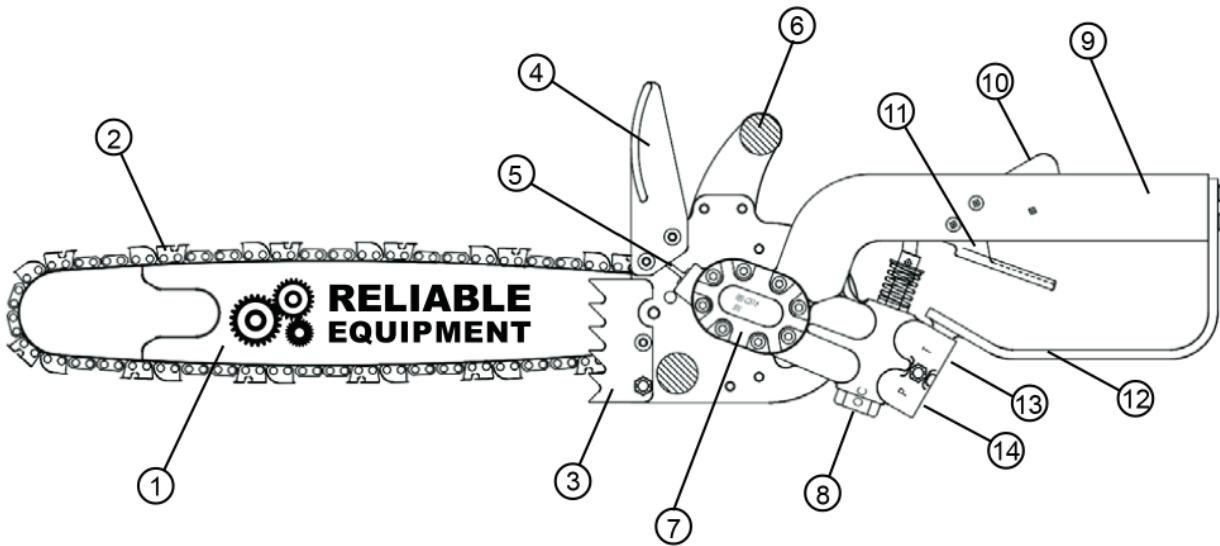
Tool runs backwards

Hoses misconnected	Reverse the hoses
--------------------------	-------------------

Chain does not rotate properly

Chain adjusted too tight	Adjust chain as shown in "Adjusting Tension"
Hydraulic pressure trapped in tool	Release hydraulic pressure by bleeding tool
Damaged guide bar	Inspect guide bar groove & Replace if needed

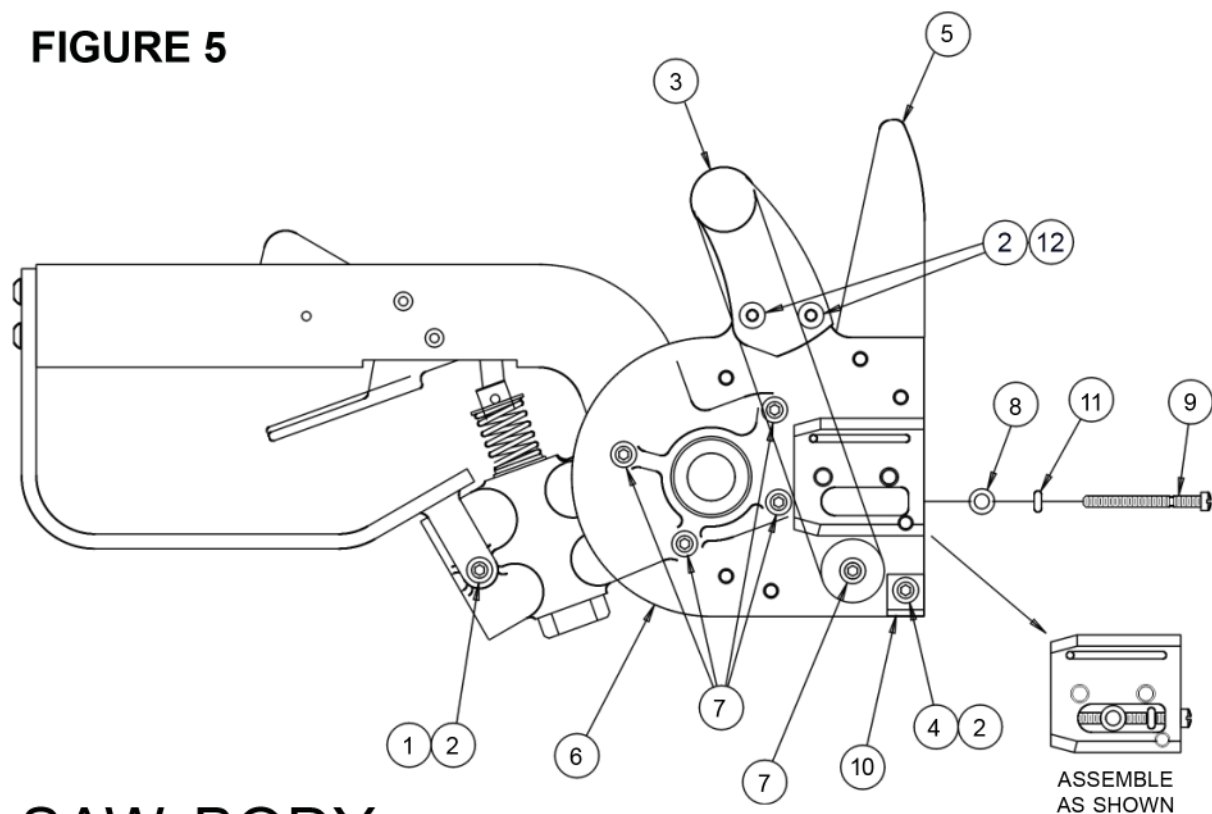
FIGURE 4



MAJOR COMPONENTS PARTS LIST

KEY	DESCRIPTION
1	16" Bar (standard)
2	Chain .058 in. gauge / .325 in. Pitch
3	Spike Rack
4	Safety Shroud
5	Automatic Oiler Adjustment
6	Front Handle
7	Hydraulic Motor & Serial Number
8	Hydraulic Circuit Selector Open-Center/Closed-Center
9	Control Handle
10	Safety Trigger Actuator
11	Trigger
12	Lower Hand Guard
13	Tank Port
14	Pressure Port
15	Label Set (4 pcs) Part # RL29400

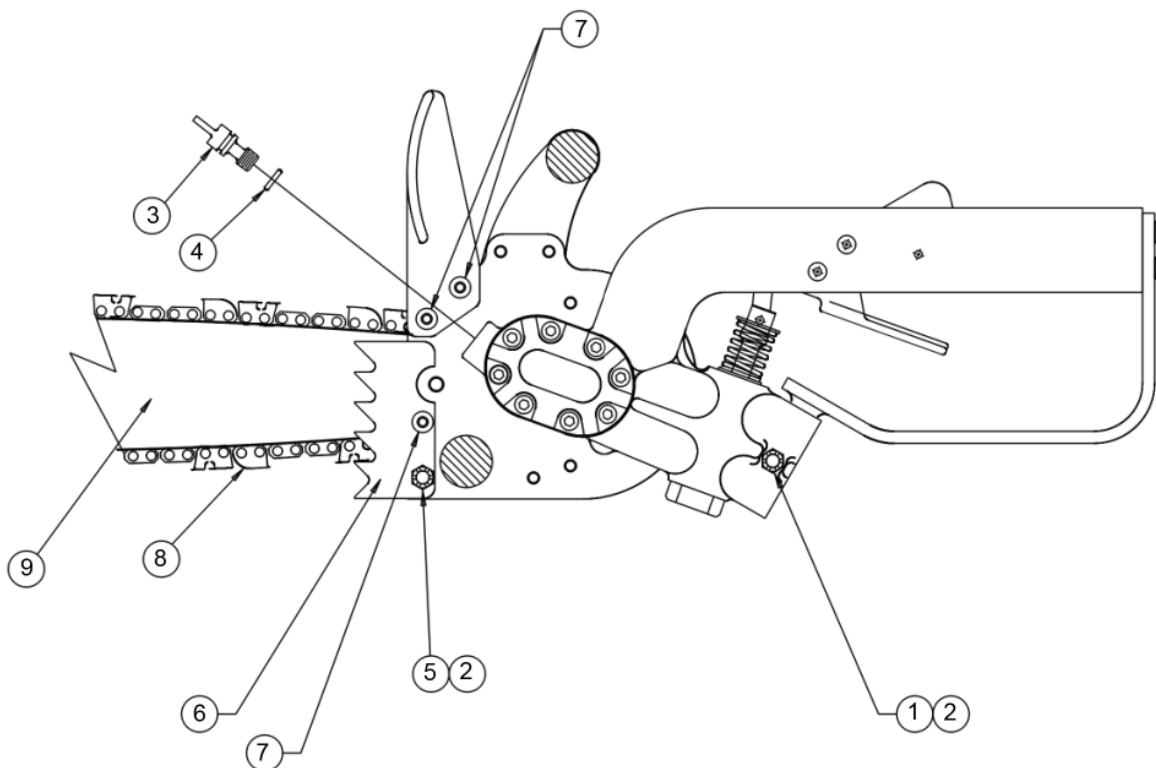
FIGURE 5



SAW BODY (CHAIN SIDE)

Item	Qty.	Part No.	Description
1	1	R29040	SCREW, BUTTON HEAD
2	4	R29041	NUT, NYLON LOCKING
3	1	R29038	FRONT HANDLE
4	3	R29061	SCREW
5	1	R29037	SHROUD
6	1	R29025	MOUNTING PLATE
7	5	R29043	SCREW
8	1	13419	ADJUSTMENT DOG
9	1	13455	ADJUSTING SCREW WITH KEEPER
10	1	R29023	CHAIN CATCHER
11	1	13485	O-RING, ADJ SCREW KEEPER
12	2	R29088	SCREW

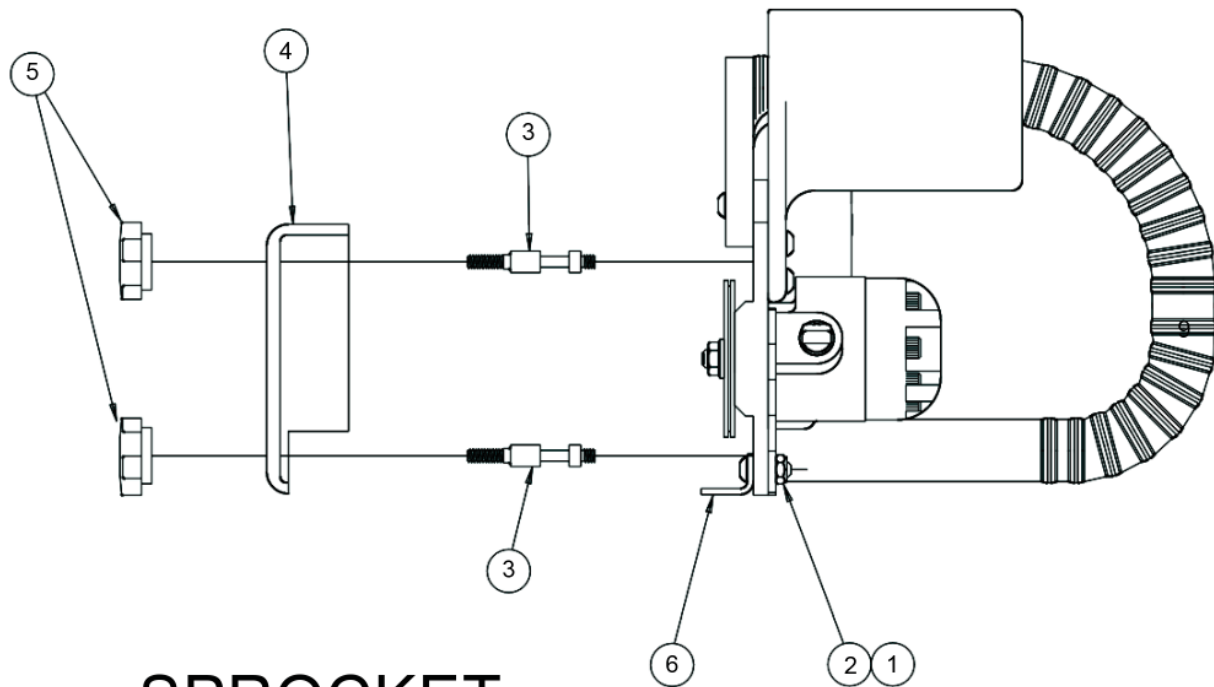
FIGURE 6



**SAW BODY
(MOTOR SIDE)**

Item	Qty.	Part No.	Description
1	1	R29040	SCREW, BUTTON HEAD
2	2	R29041	NUT, NYLON LOCKING
3	1	R29033	OILER PLUG
4	1	13413	O RING
5	4	R29061	SCREW
6	1	R29024	SPIKE RACK
7	2	R29043	SCREW
8	1	R29201	16" CHAIN
9	1	R29200	16" BAR

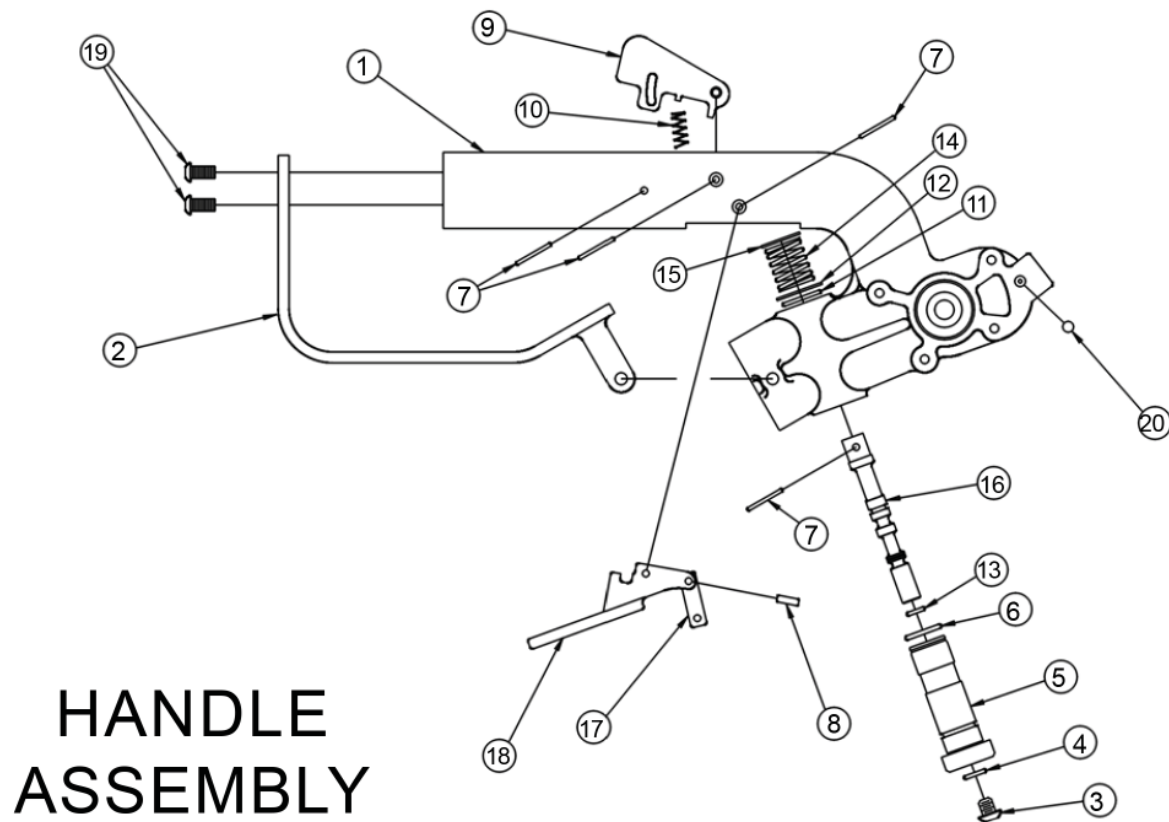
FIGURE 7



SPROCKET COVER ASSEMBLY

Item	Qty.	Part No.	Description
1	1	R29041	NUT, NYLON LOCKING
2	1	R29061	SCREW
3	2	R29065	STAND OFF
4	1	R29020	COVER
5	2	R29071	PLASTIC KNOB
6	1	R29023	CHAIN CATCHER

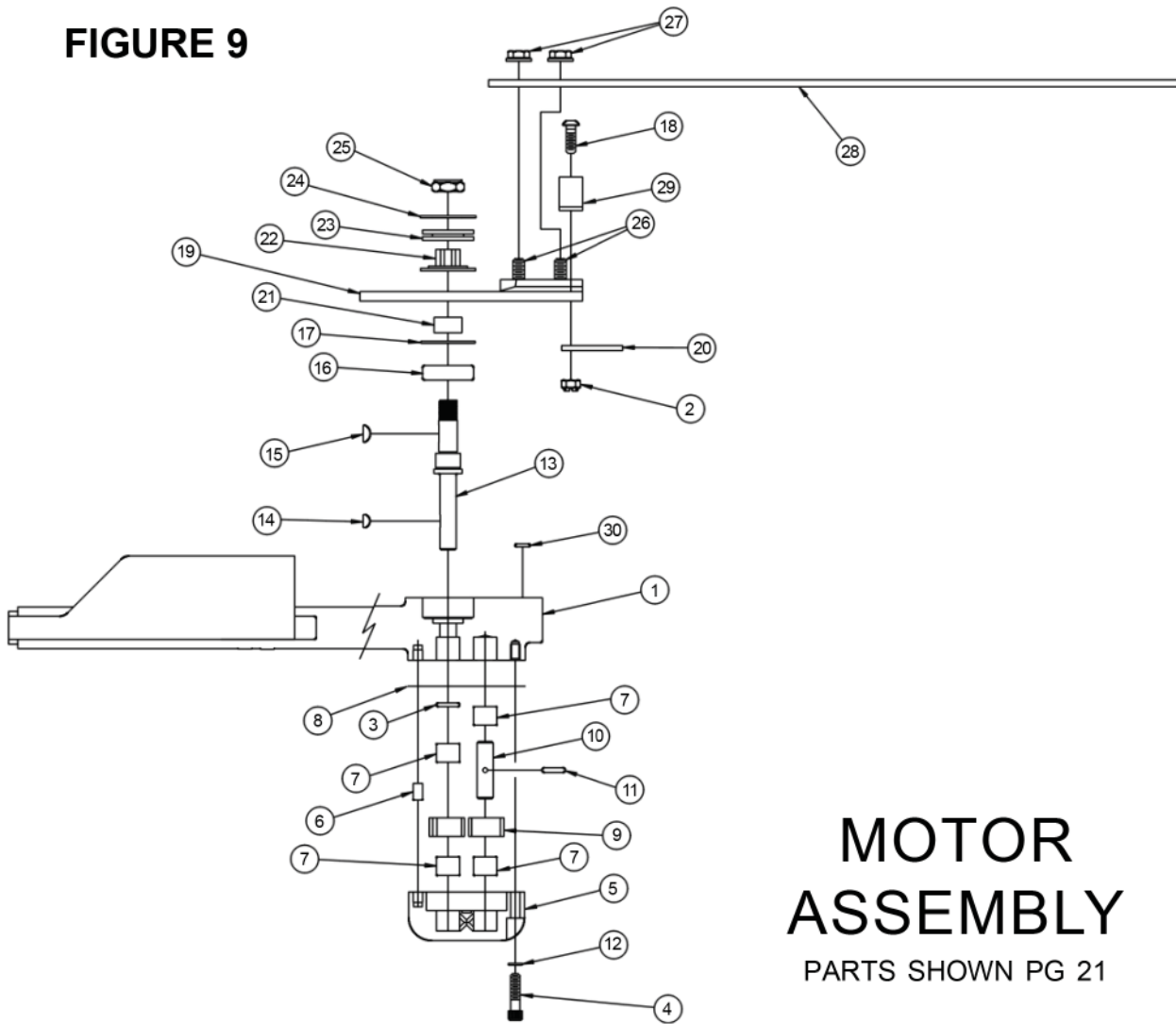
FIGURE 8



HANDLE ASSEMBLY

Item	Qty.	Part No.	Description
1	1	R29032	SAW HANDLE
2	1	R29036	LOWER HANDLE
3	1	R29042	SCREW, BUTTON HEAD CAP
4	1	13439	O-RING
5	1	R29035	SLEEVE, SPOOL
6	1	R29044	O RING
7	4	R29045	SS SPRING PIN
8	1	R29046	SS SPRING PIN
9	1	R29029	SAFETY
10	1	R29047	SPRING, SAFETY
11	1	R29048	O RING
12	1	R29049	RETAINING RING
13	1	R29050	O RING
14	1	R29051	SPRING, TRIGGER
15	1	R29052	SS FLAT WASHER
16	1	R29034	SPOOL
17	1	R29030	LINK
18	1	R29031	TRIGGER
19	2	R29043	SCREW
20	1	R29063	O-RING, OILER X-OVER

FIGURE 9



MOTOR ASSEMBLY

PARTS SHOWN PG 21

NOTE: Keep decals clean & legible.

Replace decals when necessary.

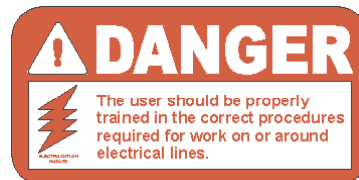
Label Set: Part # RL29400

15.1 - 30.3 l/min (4 - 8 gpm)
138 Bar (2000 psi)



BEFORE USING THIS CHAINSAW
READ THE SAFETY WARNINGS
and recommended practices described
in the manual. Failure by the operator to
read and fully understand the warnings
will leave this person unqualified to use
and operate the tool.

Failure to observe all warnings and instructions could result
in property damage, severe personal injury, and/or death.



Item	Qty.	Part No.	Description
1	1		COMPLETE HANDLE ASSEMBLY
2	1	R29041	NUT, NYLON LOCKING
3	1	13439	O-RING
4	8	13128	SCREW, SHCS
5	1	13106	MOTOR CAP
6	1	13131	DOWEL
7	4	12736	NEEDLE BEARINGS
8	1	13436	PLASTIC GASKET
9	2	12875	11 TOOTH GEAR
10	1	12771	IDLER SHAFT
11	1	12795	DRIVE PIN
12	1	13129	LOCKWASHER
13	1	29026	DRIVE SHAFT
14	1	12798	# 403 WOODRUFF KEY
15	1	13429	# 304 WOODRUFF KEY
16	1	13411	ROLLER BEARING
17	1	13434	RET. RING
18	1	R29061	SCREW, BHSC
19	1	R29025	MOUNTING PLATE
20	1	R29024	SPIKE RACK
21	1	R29027	KEYED SPACER
22	1	R29064	SPROCKET ADAPTER
23	1	R29066	RIM SPROCKET
24	1	13433	FLAT WASHER
25	1	13409	NUT, NYLON LOCKING
26	2	R29070	THREADED STUD
27	2	R29069	HEX FLANGE NUT,
28	1	R29200	16" BAR
29	1	R29023	CHAIN CATCHER
30	1	R29063	O-RING, OILER X-OVER



READ BEFORE DISASSEMBLY



WARNING

Before any disassembly, disconnect hoses from the Chainsaw! Any residual pressure within the unit can and will spray at high velocity, injuring the person doing the disassembly. Hot or pressurized hydraulic fluid will cause serious injury to the body! Accidental movement of the chain can cause serious injury, dismemberment of a hand, finger or any other part of the body.

Complete disassembly is not recommended. Return the unit to an authorized dealer for total disassembly and/or repair.

All maintenance or disassembly should take place on a flat, clean work surface covered with towels or wipers so as to have a clean space for the disassembled parts.

Inspect each part during disassembly for wear, scratches, and cuts. Discard the worn or damaged parts and replace with new parts.

O-rings are sensitive to sharp edges. Inspect closely for cuts or damage. A small cut will cause a leak. When assembling or disassembling O-rings, use hydraulic fluid as a lubricant to help disassembly or installation.



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