Owner's Manual

Model SP5014TRX

Equipped with a 35HP Briggs and Stratton Engine

Machine Serial # _____
Engine Model & Spec # _____
Engine Serial # _____
Purchase Date _____
Dealer _____

Carlton
J.P.Carlton Company
Div. D.A.F. Inc.
121 John Dodd Road
Spartanburg, SC 29303
Ph. (864) 578-9335
Fax (864) 578-0210
www.stumpcutters.com

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DIESEL ENGINE EXHAUST WARNING

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproduction harm.

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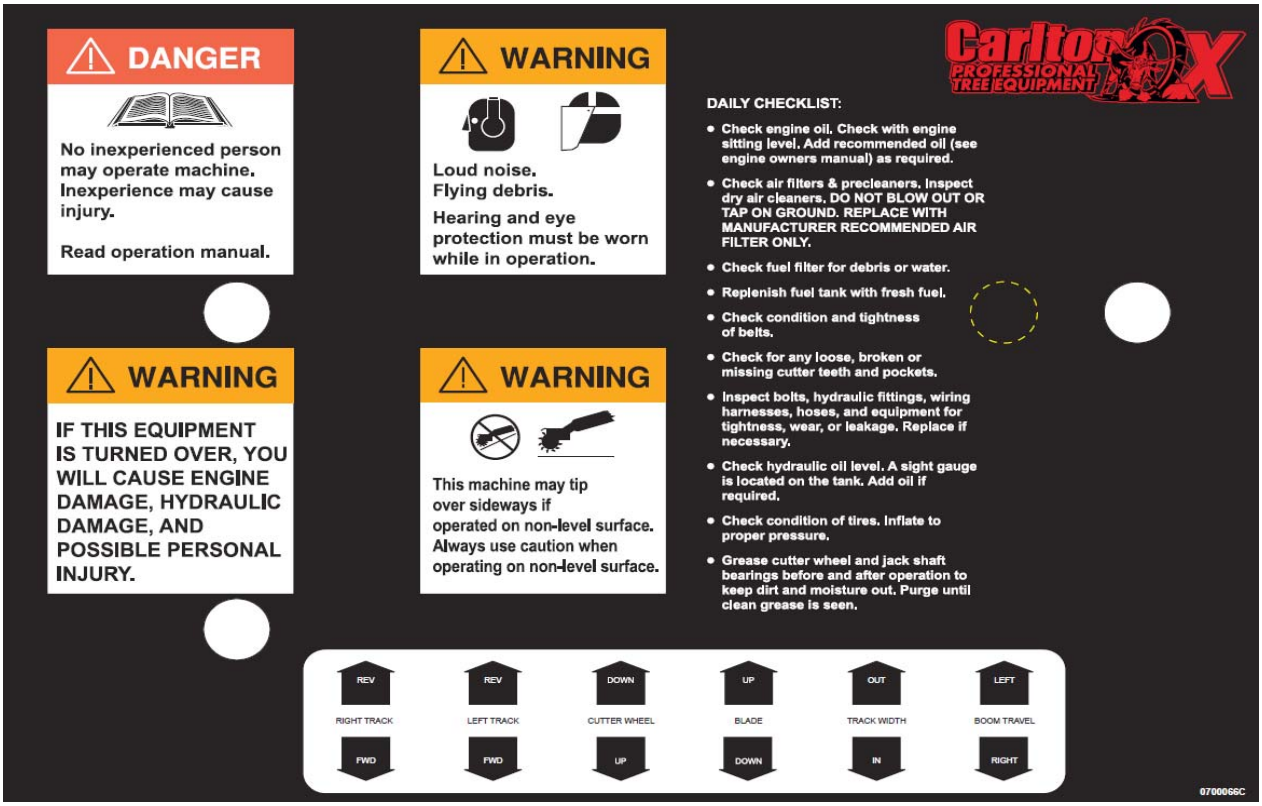
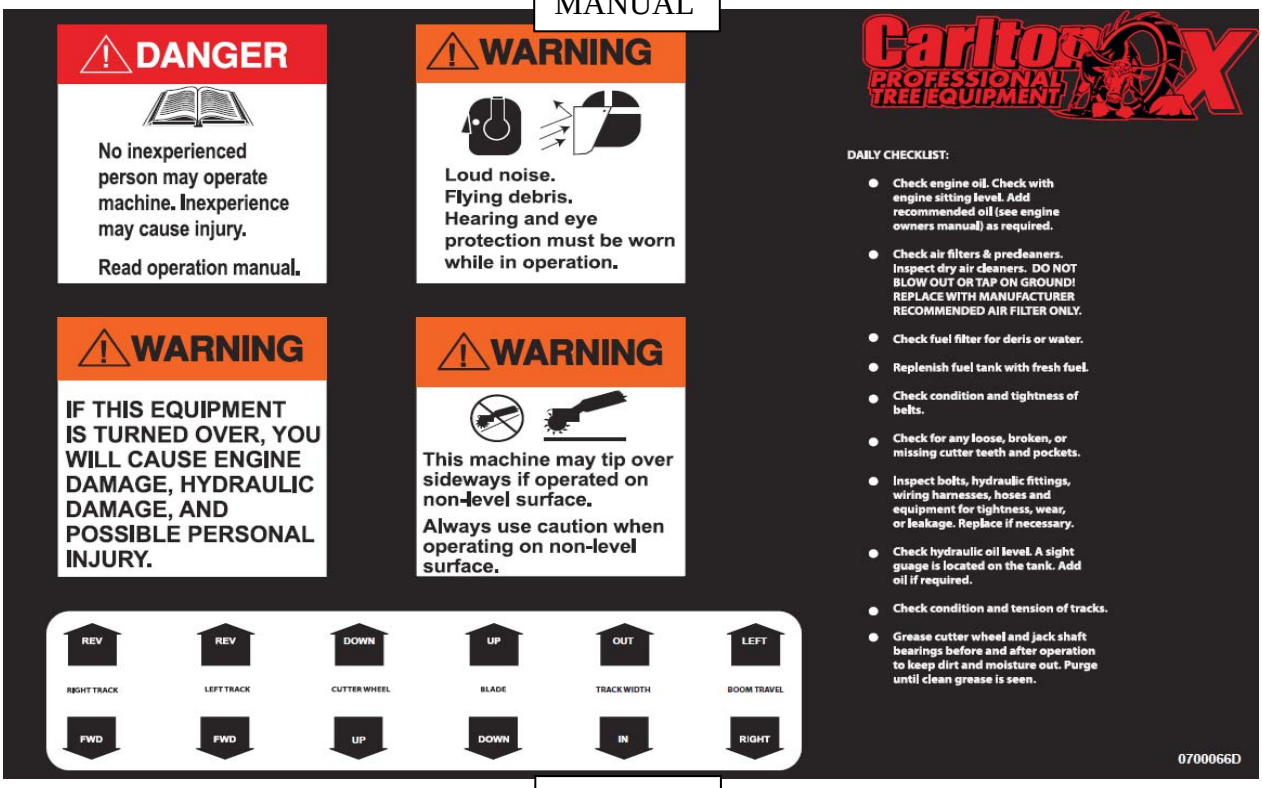


MANUAL



REMOTE

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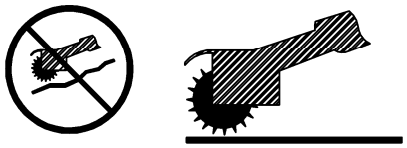
⚠ WARNING

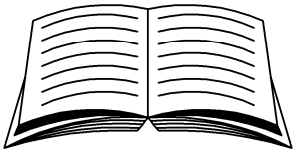
IF THIS EQUIPMENT IS TURNED OVER, YOU WILL CAUSE ENGINE DAMAGE, HYDRAULIC DAMAGE, AND POSSIBLE PERSONAL INJURY.

⚠ WARNING



This machine may tip over sideways if operated on non level surface.
Always use caution when operating on non-level surface.

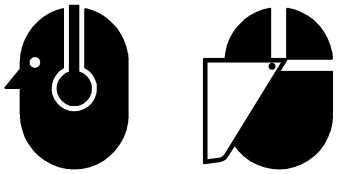
⚠ DANGER



No inexperienced person may operate machine.
Inexperience May cause injury.

Read operation manual.

⚠ WARNING



Loud noise.
Flying debris.

Hearing and eye protection must be worn while in operation.

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⚠ DANGER

DO NOT MOVE, POSITION, OR TRANSPORT THIS MACHINE WHILE THE CUTTERWHEEL IS ENGAGED.

JPC80

⚠ WARNING

KEEP AWAY FROM PRESSURIZED LEAKS

Pressurized leaks are not always visible. Check for pressurized leaks using cardboard or wood. Never use a finger, hand or other body part to check for leaks.

Injuries from pressurized leaks penetrating the skin will lead to serious health problems or death. CONSULT A PHYSICIAN IMMEDIATELY IF PENETRATION OCCURS, SURGICAL REMOVAL REQUIRED.

Release pressure from line before loosening, removing or replacing any hydraulic hoses or equipment.

0700317

⚠ WARNING

SEVERE ENGINE DAMAGE **WILL** OCCUR IF THIS ENGINE IS OPERATED AT AN ANGLE GREATER THAN 25°

PROPER ENGINE OIL LEVEL MUST BE MAINTAINED TO ACHIEVE MAXIMUM ANGLE OF OPERATION OF 25°
(SEE ENGINE OWNER'S MANUAL FOR PROPER OIL LEVEL)

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⚠ WARNING

FLAMMABLE FUEL

THIS MACHINE USES DIESEL FUEL AND HYDRAULIC OIL.

NEVER FILL TANK WHILE ENGINE IS HOT, RUNNING, OR IN A CONFINED AREA. DANGER OF FIRE OR EXPLOSION EXIST.

LEAVE ROOM IN THE TANK FOR EXPANSION FROM HEAT - NEVER FILL TANK COMPLETELY FULL.

KEEP MACHINE AWAY FROM FIRE, SPARKS, AND OTHER SOURCES OF IGNITION DURING USE AND STORAGE.

NEVER PUT MACHINE IN STORAGE WITH FUEL IN THE TANK.

ALWAYS STORE FUEL IN APPROVED (RED) CONTAINERS AND AWAY FROM SOURCES OF IGNITION.

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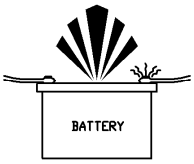
⚠ WARNING



USE CAUTION IN EXTREME COLD! FROZEN BATTERY WILL EXPLODE!

NEVER JUMP START A BATTERY IN FREEZING TEMPERATURES. INSPECT BATTERY FOR SIGNS OF FROST BEFORE STARTING IN EXTREME COLD. MOVE EQUIPMENT TO A HEATED, WELL VENTILATED AREA TO ALLOW BATTERY TO THAW BUT NOT NEAR FIRE, SPARKS, OR OTHER SOURCES OF IGNITION.

BATTERY FUMES ARE EXPLOSIVE. NEVER USE JUMPER CABLES OR RECHARGE BATTERY UNLESS IN AN OPEN OR WELL VENTILATED AREA AND AWAY FROM ALL SOURCES OF IGNITION.
BATTERY ACID CAN CAUSE SEVERE BURNS. KEEP AWAY FROM EYES, SKIN, AND CLOTHING.
ALWAYS REMOVE BATTERY BEFORE WELDING ON EQUIPMENT. FOLLOW PROCEDURES FOR WELDING AND GROUNDING BEFORE STARTING TO WELD ON THIS MACHINE OR EQUIPMENT DAMAGE AND POSSIBLY SEVERE PERSONAL INJURY WILL OCCUR.

0700314

NOTICE

SERVICING BELTS AND BEARINGS

ALWAYS TURN OFF ENGINE AND REMOVE KEY BEFORE SERVICING! ALLOW ALL PARTS TO COME TO A COMPLETE STOP AND COOL BEFORE TOUCHING!

- New belts stretch and get loose. After 2 hours of operation, check tension and tighten belts.
- Check tension and retighten every 4 hours of operation until tension stays consistent.
- See manual for instruction and proper tension.
- Thereafter, check belt tension every month until belts need replacing.

AT LEAST ONCE A MONTH:

- CHECK AND TIGHTEN BOLTS AND LOCK SETSCREWS ON ALL BEARINGS.
- CHECK AND TIGHTEN SCREWS ON ALL BELT PULLEY BUSHINGS.

REFER TO MAINTENANCE SECTION

0700311

NOTICE

Premature engine failure could occur without proper maintenance of outboard bearing. See manual for further information.

JPC

DIESEL MACHINES ONLY

NOTICE

DECALS SHOULD BE PROPERLY MAINTAINED AND REPLACED. IT IS THE DUTY OF THE OWNER OF THIS EQUIPMENT TO KEEP DECALS IN GOOD CONDITION.

REPLACEMENT DECALS MAY BE PURCHASED FROM J. P. CARLTON CO.

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STUMP GRINDER LIMITED WARRANTY

J.P. Carlton Co. Inc., hereafter referred to as the "Manufacturer", warrants each new Carlton Grinder to be free of defects in workmanship and material for a period of one year.

This warranty takes effect upon delivery to the original retail purchaser. The manufacturer, at its option, will replace or repair, at a point designated by the manufacturer, any parts which appear to have been defective in material or workmanship. The manufacturer is not responsible for consequential damages.

This warranty will not apply if the grinder is not operated in a manner recommended by the manufacturer. The following examples would void warranty:

1. The grinder has been abused.
2. The machine is involved in or damaged by an accident.
3. Repairs or attempted repairs were made without prior written authorization.
4. Including but not limited to repairs made due to normal wear.

The owner is responsible for all regular maintenance as explained in the operators' manual. Neglect in regular maintenance or failure to replace normal wear items such as teeth, pockets, lubrication oils, filters, belts, bearings, etc. may void warranty.

This warranty is expressly in lieu of any other warranties, expressed or implied, including any implied warranty or merchantability of fitness for a particular purpose and of any non-contractual liabilities including product liabilities based upon negligence or strict liability. J.P. Carlton Co. Inc. will not be liable for consequential damages resulting from breach of warranty.

IT IS NECESSARY TO RETURN THE WARRANTY VALIDATION FORM AND NOTIFY J.P. CARLTON CO. INC. IN WRITING WITHIN TEN (10) DAYS FROM DELIVERY DATE TO VALIDATE THIS WARRANTY.

NOTE: This warranty applies only to new and unused equipment or parts thereof manufactured by J.P. Carlton Co. Inc. ANY MACHINES USED FOR LEASE OR RENTAL - WARRANTY IS LIMITED TO 90 DAYS FROM FIRST DAY OF INITIAL SERVICE.

NOTICE: All power units and associated components are *NOT* warranted by J.P. Carlton Co. Inc. or their dealers. It is the customers' responsibility to return machine to the local engine distributor.

INFORMATION PHONE NUMBERS TO FIND YOUR LOCAL ENGINE & PARTS SERVICE CENTERS:
Kohler Engines..... 1-800-544-2444 (Toll Free)
Briggs & Stratton Engines..... 1-800-233-3723 (Toll Free)
Kubota ..... 1-847-955-2500 (IL-Central Time Zone)

In order to process any warranty claims, it is the owners' responsibility to report claims promptly to us or our authorized dealer from whom the equipment was purchased. It is necessary to include the following information on any and all request for warranty:

1. Dealer from whom purchased
2. Date of delivery
3. Serial number of unit
4. Model number of unit
5. Engine make and serial number
6. Length of time in use
7. Date of failure
8. Nature of failure

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EXPLANATION OF LIMITED WARRANTY

The manufacturer will not reimburse the customer or dealer labor cost incurred for installing “bolt-on” or “slip-on” items, such as pumps and motors, bearings, belts, pulleys, etc. The manufacturer will provide replacement parts at no cost to the customer for defective parts during the warranty period. Defective parts must be returned to J.P. Carlton Company. It will be the customers’ responsibility to install the replacement parts unless arrangements are made with the selling dealer.

The manufacturer will not reimburse travel cost to servicing dealer. It is the customers’ responsibility to deliver machine to dealers facility, unless other arrangements have been agreed to between the selling dealer and the customer.

The manufacturer may elect, at its discretion, to reimburse reasonable labor cost to customer or dealer for major defect repairs. Prior approval must be obtained from J.P. Carlton Company Inc.

IMPORTANT NOTICE

1. **AIR FILTER MAINTENANCE IS CRITICAL ON STUMP GRINDING MACHINES. DIRT INGESTION WILL NOT BE WARRANTED BY THE ENGINE MANUFACTURER OR J.P. CARLTON COMPANY.**

2. **OIL AND OIL FILTER MAINTENANCE AND STAYING WITHIN THE LIMITS OF THE ANGLE OF OPERATION IS ALSO CRITICAL ON STUMP GRINDING MACHINES. STARVING THE ENGINE FOR OIL WILL NOT BE WARRANTED BY THE ENGINE MANUFACTURER OR J.P. CARLTON COMPANY.**

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Warranty Validation Form

Congratulations on your purchase of a Carlton Stump Grinder. This product has been designed and manufactured to provide years of profitable service while minimizing maintenance and downtime. Please take the time now to complete this warranty validation form. This information is necessary for Carlton to instate your warranty.

Return Form To: J.P. Carlton Company, Div. D.A.F. Inc.
121 John Dodd Road
Spartanburg, SC 29303
Phone: 1-864-578-9335

Purchaser Information:

Company Name:_____ Street Address:_____
City:_____ State:_____ Zip Code:_____
Telephone:_____Contact:_____

Machine Information:

Model Number :_____ Engine Model :_____
Serial Number :_____ Serial Number :_____

Dealer Information:

Dealer Name:_____ Street Address:_____
City: _____ State:_____ Zip Code:_____
Contact Name: _____

1. _____ Customer has been instructed on operation and safety aspects of operating the equipment.
2. _____ Customer has been advised not to reach into cutter wheel area.
3. _____ Customer has been advised to stop machine and remove key before performing any type of maintenance.
4. _____ Customer has been warned not to operate the machine without the cutter wheel guard in place.
5. _____ Customer has been furnished with all parts and operators manuals.
6. _____ Customer has been instructed on equipment maintenance schedules and procedures.
7. _____ Customer has been advise that the engine or power unit that is used on this machine is warranted by the engine manufacturer and ***NOT*** **J.P. Carlton Company.** All engine warranty issues should be addressed to the local engine dealer.
8. _____ Customer understands the importance of air and oil filter maintenance, and the importance of staying within the angle of operation of the engine. If either of these is not adhered to, the engine warranty is ***VOID***.
9. _____ Customer understands to keep locking collars tight and purge bearings with grease.
10. _____ All operation and warning decals are properly displayed on equipment.
11. _____ Customer understands it is his responsibility to train all operators on operator safety.

I have inspected this equipment and find it in good working condition. To the best of my knowledge, the customer and his personnel are aware of the above procedures.

Date: _____ Signed: _____
Dealer Representative

The equipment has been thoroughly checked by the above named dealer representative, and I am satisfied with his instructions.

Date: _____ Signed: _____
Purchaser

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Congratulations on your purchase of a new Carlton® Professional Stump Grinder! Carlton® Stump Grinders have a reputation for superior performance and reliability. A machine is not profitable if it's broken-down and we do our absolute *best* to help you avoid costly downtime. Each and every machine has been *over* designed and overbuilt to ensure years and years of trouble-free operation. In this, we take pride.

The Carlton® Model SP5014TRX is designed and intended for use in unique situations where size and maneuverability are foremost. As a result, the Model SP5014TRX has its own unique operational requirements.

Read this manual carefully and TAKE RESPONSIBILITY for thoroughly familiarizing yourself with the controls and the concepts behind the operation of this machine before attempting to operate it. Slowly experiment with the controls and gradually work yourself up to the full capabilities of this machine. The Carlton® Model SP5014TRX is a durable and profitable professional stump grinder. Read this manual, the engine manual and the safety and operational decals on the machine. Use proper safety precautions. Follow the instructions and use common sense and your "OX" will perform like its namesake. If getting more work done in a day, with less trouble, is your idea of good business, then you'll *love* your new Carlton® Stump Grinder.

We welcome your suggestions on how we might better build our machines. We solicit any and all questions concerning the safe operation or proper servicing of your new stump grinder.

Please feel free to write to us with any comments.
We'll enjoy hearing from you!

The J. P. Carlton Company constantly strives to create the best professional tree equipment available in the industry. Therefore, the material in this manual is correct at the time of publication. Carlton® reserves the right to make improvements, modifications, and even discontinue features as we deem necessary to meet our goal. Carlton® also reserves the right to discontinue models without any prior notification or obligation.

Inspect your new Carlton Stump Cutter as soon as you receive it. Any damages incurred during shipment are not warranted and, therefore, are not covered repairs. You should have the truck driver verify or acknowledge any damages caused during shipment. If not, contact the truck lines as soon as possible with your complaint.

Any reference made to the right, left, front, or rear in relationship to the chipper is illustrated in the following pictures. Please refer to these any time you call your dealer or J. P. Carlton for parts or assistance.

Front

Rear

Left

Front

Right

- Direct drive hydraulic pump
- Dual hydraulic motor propulsion
- Hydraulic controls
- Safety valves permit unaffected operation uphill, downhill or level
- Heavy construction
- Counterbalancing valve
- Dual swing cylinders
- Hardened bushings in rotating cylinders
- Parking Brake
- Four Ground Engaged Track Idlers
- Large footprint provides proper weight distribution
- Spring tensioned tracks are easily adjusted
- Adjustable Timken tapered roller bearings in the pivot head with hardened shafts
- Tapered roller bearings on cutter wheel & jackshaft
- 1” thick Blanchard ground cutter wheel
- 20 carbide tipped cutter teeth
- 35” width to clear narrow fence gates
- Double wire braid hose & hydraulic lines
- Epoxy primer
- DuPont Imron® protective finish
- Key start
- High capacity battery
- Premium tires
- Heavy duty rubber and metal chip guards
- Hour meter
- Large hydraulic tank
- Hydraulic and fuel filters
- Removable chip flap
- Poly Chain® Belt to cutter wheel
- Easy engine belt adjustment
- Safety tie down loops

We Pride Ourselves
in the strength and quality of each and every machine

General:
Weight: 2215 Pounds
Length: 84 Inches
Height: 56 Inches
Width: 34 Inches
Track type: Rubber track
Track Foot Print: 7”
Track Ground Pressure: 4 PSI
Track Length: 42-1/2”
Controls:Side Mounted – Optional Remote
Fuel Capacity: 10.3 Gallons
Battery: 650 Cold Cranking Amps
Curb Clearance: 13 Inches
Cutter Wheel Diameter: 21 Inches with Teeth
Cutter Wheel Thickness:1 ¼ Inch - Blanchard Ground
Cutter Wheel RPM:1350 Nominal

Engine:
Manufacturer:Vanguard Series 540000 V-Twin Engine
Number of Cylinders: Two
Bore Type: Cast Iron Sleeve
Valves: Overhead
Bore: 3.4 Inches (85.5 mm)
Stroke: 3.4 Inches (86.5 mm)
Displacement: 60 Cubic Inches (993 cc)
Compression Ratio: 8.25:1
Maximum RPM: 3600
Horsepower: 35
Peak Torque: 52 Ft*Lbs @ 2,400 RPM
Weight: 125 Lbs (56.8 KG)
Oil Capacity w/Filter: 77.8 oz
Cooling Medium: Air
Air Cleaner: Dry Type Canister with Safety Element
Oil Filter: Spin On
Lubrication: Full Pressure w/Full Flow Filter
Electrical: 12 Volt

Hydraulic System:
Hyd Pump
Displacement: .267 cu in (4.3 cc)
Hyd Pump Drive
System: Direct Drive Coupling
Flow: 4.09 GPM
System Relief: 1850 PSI
Oil Tank Capacity: 3.6 Gallon
Oil Type: AW 46
Valve: Series Type with Fine Metering
Check Valves:Cartridge Counterbalence
Valve in Lift, Swing, and Drive Circuits
Hose:Steel Braided 16,000 PSI Burst - Exceeds SAE 100R2
Oil Filter: 10 Micron Full Flow
Lift Cylinder:3" X 12" with 1 3/8" Rod and Replaceable End with Captured Pins

Drive System:
Engine Sheave: 6/3V5.3
Jackshaft Sheave:6/3V14.0
Drive Belt: 6/3V710
Jackshaft Sprocket: 8M-40S-62 Gates PolyChain
Cutter Head Sprocket: 8M-40S-62 Gates PolyChain
Drive Belt: 8M-1200-62 Gates PolyChain
Jackshaft : 1 11/16 Inch
Cutter Head Shaft: 1 11/16 Inch
Engine Engagement: Sliding Engine Carriage
Belt and Chain Shields: Metal Bolt On

Bearings:
Jackshaft Bearings: 1 11/16 Inch Tapered Roller Bearings
Cutter Head Bearings: 1 11/16 Inch Tapered Roller Bearings
Swing Bearings: Adjustable Tapered Roller Bearings

Frame:
Tongue: 3" X 3" X 3/8" wall Mechanical Tubing
Boom: 4 1/2" X 4 1/2" X 1/4" wall Mechanical Tubing
Boom Box: 1/4" Plate
Pivot Plate: 1/2"
Supports: Gussets used Throughout

Cutter Wheel:
Wheel Diameter: 21 Inches with Teeth
Wheel Thickness:1 ¼ Inch
Wheel Speed: 1350 RPM Nominal
Number of Teeth:32 Carbide Tipped Sandvik
Wheel Type: Razor
Chip Guards: Rubber and Metal

Cutting Dimensions:
Below Ground: 14 Inches
Above Ground: 34 Inches
Width of Cut: 50 Inch Arc

Before operating the stump cutter, read this manual, the engine manual, and all the safety decals on the machine. Know all parts of the machine and their functions, especially the shut down procedures in case of emergency. No inexperienced person may operate machine. Inexperience may cause injury.

SAFETY FIRST ALWAYS!

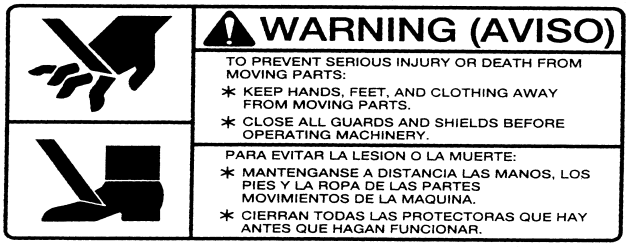
This is the **Safety-Alert Symbol**. This symbol is placed on the machine and in the manual to alert the operator to the potential for bodily injury or death. The operator should pay close attention to the instructions whenever they see this symbol.

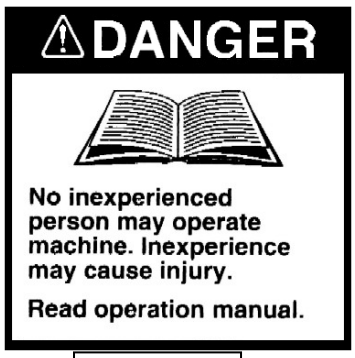
The **Safety-Alert Symbol** will be accompanied by one of the following words:
DANGER, WARNING, or CAUTION

- A **DANGER** symbol means that if the instructions are not followed the possibility of serious personal injury or death is probable.
- A **WARNING** symbol means that if the instructions are not followed there is a possibility of serious personal injury or death.
- A **CAUTION** symbol means there is an unsafe condition or practice that may cause personal injury or property damage.

PERSONAL PROTECTION:

- ❖ Wear face shield and hearing protection
- ❖ Do not wear loose-fitting clothing
- ❖ Tie back long hair
- ❖ Do not wear jewelry
- ❖ Keep clear of cutter wheel
- ❖ Keep away from moving parts
- ❖ Only operate in a well ventilated area because of carbon monoxide





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Be Safe and Practice Safe Operation using the following guidelines.

- Any individual operating this machine must first read and understand this manual, the engine manual, all component manuals, and all safety decals on machine.
- DO NOT permit children to operate machinery or to play near machinery during operation.
- Always wear face shield and hearing protection during operation. Loud noise and flying debris may cause severe injury.

⚠ DANGER

- Keep hands, feet, legs, clothing, hair and all other body parts away from cutter wheel and other moving machine parts to eliminate the possibility of injury.
- Shut down machine completely and remove key before removing debris from work area (i.e. clearing rocks, wood chips, etc.).
- DO NOT modify or change any part without written approval from J. P. Carlton Company.
- Do not ride, sit, stand, lay or climb anywhere on this machine during operation, while running, or during transport.
- Do not move, position, or transport this machine while cutter wheel is engaged.
- DO NOT operate any machinery while under the influence of alcohol or drugs (prescription, over the counter, or otherwise).

- Do not refill fuel tank while engine is hot, running, or indoors. Danger of fire or explosion exists.
- Fuel and its vapors are highly flammable and explosive. **Handle with care**. Only use approved (red) fuel containers for storage.
- Do not store fuel containers near any open flames, sparks or other sources of ignition.
- Do not store equipment with fuel in the tank.

- Battery fumes are explosive. Recharge battery in an open area away from fire, sparks, or other sources of ignition.
- Battery acid can cause severe burns. Keep away from eyes, skin, and clothing.
- Always remove battery before welding on equipment.

- Never check for hydraulic leaks using hand or finger, use cardboard or wood. Keep away from pressurized leaks. Pressurized fluid can penetrate the skin and cause injury or even death. Seek immediate medical attention if penetration occurs. Always wear eye protection.

⚠ WARNING

- **DO NOT OPERATE THE ENGINE AT AN ANGLE GREATER THAN 25° OR SEVERE ENGINE DAMAGE WILL OCCUR.** PROPER ENGINE OIL LEVEL MUST BE MAINTAINED TO ACHIEVE MAXIMUM ANGLE OF OPERATION OF 25°. (See Engine Owner's Manual for proper oil level.)
- Never allow spectators to stand and watch machine in operation without proper hearing and eye protection and standing at a safe distance. Loud noise and flying debris may cause severe injury.
- Do not operate around water, gas, power or phone lines. Check with property owner or call utilities if not sure.
- Avoid fences and clear away other objects (i.e. sticks, stones, metal, etc.).
- Be aware of the possibility of foreign objects imbedded in or buried around the stump. Do not cut crosswise of roots above ground to prevent roots being thrown.
- If unusual vibration occurs, stop engine immediately and correct problem before continuing operation.
- Keep all guards in place and properly secured during operation.
- Keep all safety devices working properly and all other machine parts in good working condition.
- Never leave the controls unattended while in operation. Be sure machine is not capable of operation when left unattended.
- Stop engine and remove key when repairing or adjusting machine or drive belts.
- Keep engine in good condition service as instructed in engine manual.
- Do not touch engine while running or hot (serious burns may result).
- Allow all machine parts to cool sufficiently before servicing or making adjustments. Hot machine parts can cause severe burns.

- Do not run the machine without a complete number of teeth in the cutter wheel tightened to the correct torque.
- Park machine on level surfaces only. Lower cutter head to the ground and use wheel chocks to prevent unattended movement.

- Do not operate stump cutter in dark, dim lit, or concealed areas.
- Keep machine clean and clear of debris to eliminate fire hazard. It is especially important to clean any oil or fuel spills to prevent the danger of fire.
- Keep cutter wheel skirt guards in good condition to help control chips during grinding.Keep safety and instructional decals clean and replace any that are damaged, difficult to read, or missing. Decals may be purchased from J. P. Carlton or an authorized dealer.

ATTENTION:
The Carlton® Model SP5014TRX Stump Grinder **CAN** be overturned on steep inclines. This can cause serious injury to operator and machine. **DO NOT OVERTURN!**

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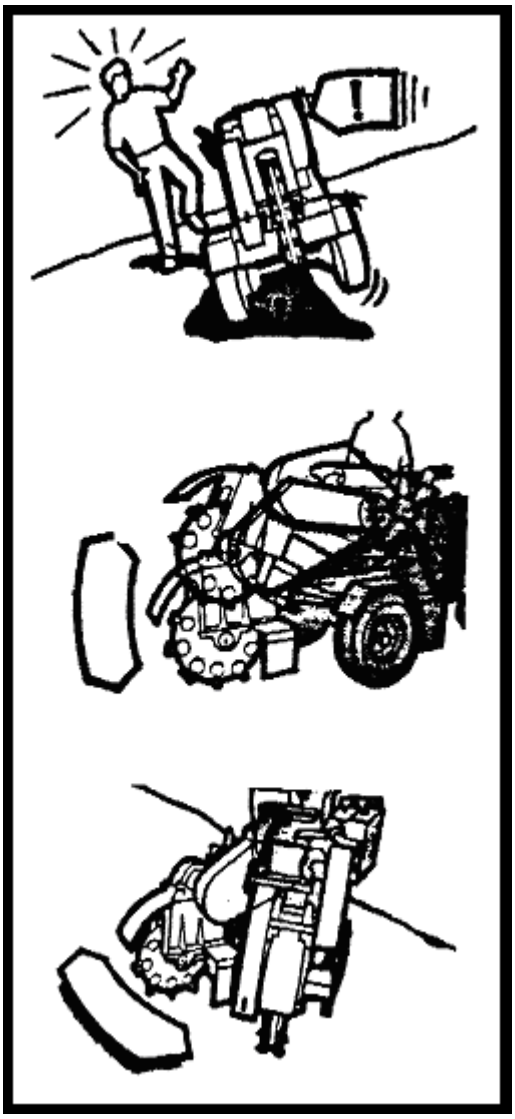
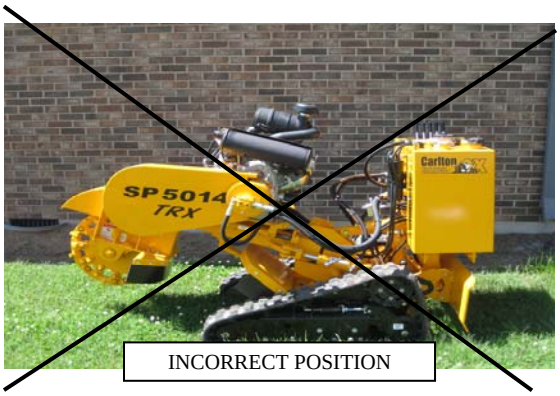


- Avoid steep side inclines when operating this machine! The narrow design width required in operating the model SP5014TRX in tight confines makes it susceptible to tipping over sideways. Overturning this machine can result in personal injury, property damage and/or seizing the engine.
  USE CAUTION.

- Positioning the **cutter wheel uphill** and as close to the ground as possible while in transit will minimize the danger of tipping over and maximize the steadiness of the Model SP5014TRX.

- When encountering a hill, the best approach is straight up or straight down. Avoid any side angles whenever possible.
  NEVER ALLOW INEXPERIENCED PERSONS TO OPERATE THIS MACHINE.

- Check engine oil at dipstick. Take reading with engine sitting level (see photos). Add recommended oil as required (see engine owners' Manual).
- Check fuel filter for debris or water.
- Replenish fuel tank with fresh fuel.
- Check condition and tightness of engine belts. (See Servicing Belts section) New belts will stretch and become loose as machine runs. Check belt tension often when belts are new.
- Check for any loose, broken or missing cutter teeth and pockets.
- Inspect bolts, hydraulic fittings, wiring harnesses, hoses and equipment for tightness, wear, or leakage. Replace if necessary.
- Inspect dry air filters. REPLACE, if necessary, WITH FACTORY AIR FILTER ONLY (see Maintenance Section for part numbers). Do not blow out or tap on ground. Follow engine manual procedure for removal and replacement. Because of the environment of a stump grinder, air filters need to be inspected and replaced more often than the engine manufacturer recommends.
- Replace inner safety filter when dirty or when the outer air filter has been changed 3 times. Do not blow out the inner safety filter or tap on ground. Do not allow dirt to get into engine when removing filters. Dirt ingestion will cause engine failure and is not warranted.
- Check hydraulic oil **daily**, with engine off and cool, and replenish as necessary. This Carlton stump grinder is equipped with a gauge that shows the level of oil and the temperature of the oil. When filling the tank with 2/3 oil, the window of the gauge will also fill with oil, as the level gets higher in the tank. Never fill the oil tank above the BLACK line at the top of the gauge. Do not run the machine with the oil level below the RED line at the bottom of the gauge.
- Grease cutter wheel and jackshaft bearings daily. Purge bearings until new grease is seen.



INCORRECT POSITION

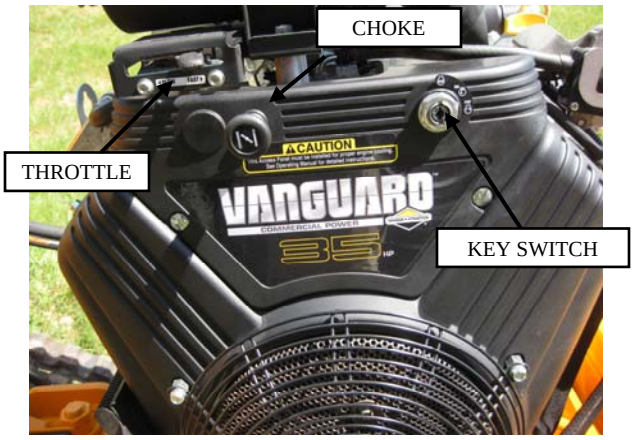

CORRECT POSITION


OIL LEVEL/TEMP GAUGE

ENGINE CONTROLS - Refer to engine manufacturers owners' manual for controls, operation, and service.

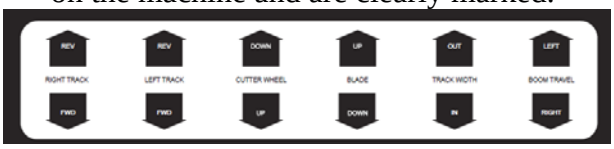
- The **Key Switch** for starting the engine is located on the Vanguard engine. There is also a choke lever and throttle lever on the engine. Read the engine manual for proper starting and operating instructions.

  DO NOT OPERATE THE ENGINE AT AN ANGLE GREATER THAN 25° OR SEVERE ENGINE DAMAGE WILL OCCUR. PROPER ENGINE OIL LEVEL MUST BE MAINTAINED TO ACHIEVE MAXIMUM ANGLE OF OPERATION OF 25°. (See Engine Owner's Manual for proper oil level.)



HYDRAULIC CONTROLS

- A series of hydraulic controls are located on the machine and are clearly marked.



STEERING TRAVEL - (lever 1 and lever 2)

RIGHT TRACK and LEFT TRACK

- Use both controls in the same direction (Fwd/Fwd or Rev/Rev) to move machine forward or reverse. The radio transmitter has a switch (BOTH TRACKS) that will move both tracks at the same time in the forward or reverse directions.
- Use controls opposite (Rev/Fwd or Fwd/Rev) of each other to turn machine either right or left. When rotating the machine, try not to leave one track stationary while rotating the other one around it as this could cause the machine to jump a track. If it is desired to spin the machine, counter-rotate the tracks.

CUTTER WHEEL (Lift) lever 3-
(Shown as CUTTER HEAD –UP/DOWN on radio transmitter.)

- This lever operates the cutter head lift function, which raises and lowers the cutter head.

BLADE - lever 4

- This lever operates the blade function, which moves the scrape blade up and down. To backfill the hole after grinding the stump, lower the scrape blade by pulling the lever back. At all other times keep the scrape in the raised position.

TRACK WIDTH - lever 5

- This lever operates the track width function, which moves the tracks in and out. To expand tracks, push valve handle forwards. To retract tracks, pull valve handle back. Tracks have a total outside width of 34” when retracted and a total outside width of 50” when expanded.

To Expand

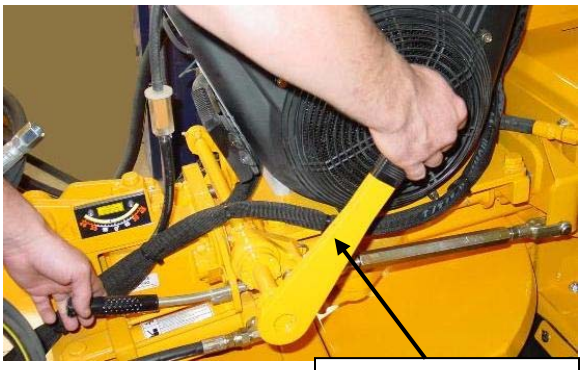
To Retract

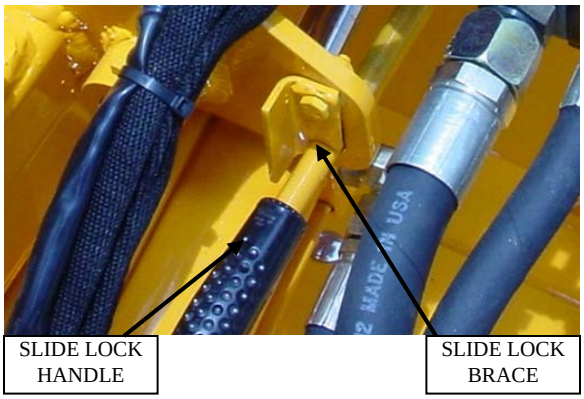
BOOM TRAVEL (Swing) - lever 6
(Shown as CUTTER HEAD –RIGHT/LEFT on radio transmitter.)

- This lever operates the cutter head swing function, which swings the boom back and forth in a left-right-left-right-left… motion.

CUTTER WHEEL ENGAGEMENT LEVER

Never start engine with cutter wheel engaged. With engine at idle, raise the engine slide lock, and slowly move the engagement lever towards the front of the machine to engage drive belts. **DO NOT ENGAGE OR DISENGAGE BELTS AT HIGH ENGINE SPEED. Injury and damage will occur.**



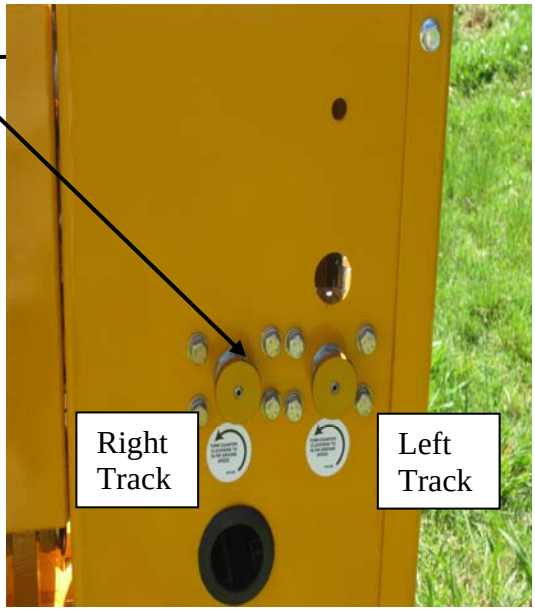


ENGINE SLIDE LOCK

Using your thumb move the engine slide lock brace and raise the engine slide lock handle. This will unlock the engine slide and allow you to engage the cutter wheel.

TRAVEL SPEED ADJUSTMENT

- Adjust travel speed for smooth operation. Turn valve counter-clockwise to decrease travel speed.



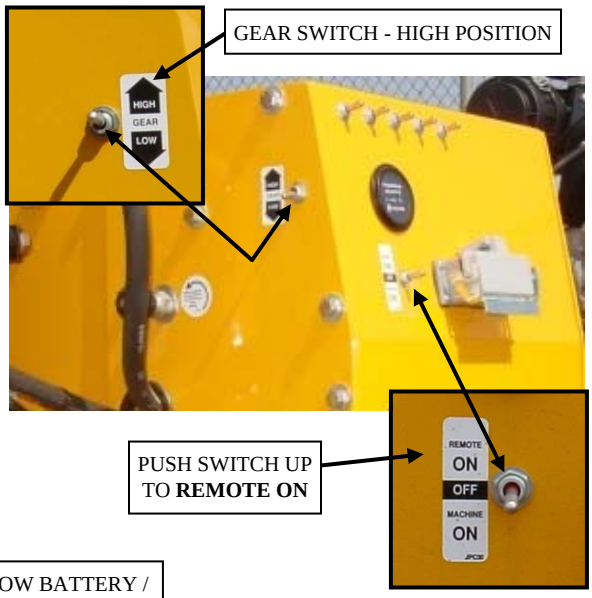
SWING SPEED ADJUSTMENT

- Adjust swing speed for smooth operation. Turn valve counter-clockwise to slow cutter head swing. Close valve by turning clockwise to allow head to move side to side at low RPM.

OPERATION – WIRELESS

- THE CUTTER WHEEL MUST BE DISENGAGED BEFORE STARTING THE MACHINE. WHEN OPERATING MANUALLY, BOOM FUNCTIONS WILL NOT OPERATE WITH HIGH/LOW GEAR TOGGLE SWITCH IN HIGH POSTION.
- To start the engine and radio control transmitter, follow these instructions.
- On the machine, turn the ignition key switch to ON (see engine picture below right), the machine switch to **Remote On,** and make sure the Gear switch is in the LOW position.
- On the transmitter, press the **E-STOP** button down.
- Toggle any switch on the transmitter.
- Twist the **E-STOP** button clockwise to release. Release the E-STOP button within 10 seconds to power up or the unit will power down. When the transmitter is operating there is a yellow light that will be flashing, the light is indicated in the picture at the right. (Read the radio control manual for more information on the meaning of different lights and colors.) If the transmitter doesn't start, check the transmitter for stuck switches, it will not start with a switch in the ON position.
- Now start the engine using the key switch. If the engine doesn't start right away and you have to restart it, make sure the light on the transmitter is still on, and restart the engine. If you lose the connection (light off), repeat the procedure from the beginning and perform each step exactly as described. Test controls for proper operation.

- The E-STOP button turns off the transmitter and the machine when it is pressed down.
- When the Flow switch is toggled up to HIGH, it only operates when the Travel function is being used. Use High/Low FLOW to switch between low and high gear. Both left/right and up/down functions will not operate with switch in HIGH flow.



NEVER WELD ON A MACHINE WITH RADIO CONTROLS WITHOUT FIRST DISCONNECTING THE RECEIVER WIRE HARNESS, OTHERWISE THE RADIO RECEIVER CAN BE DAMAGED.

PROGRAMMING – WIRELESS

- If there is a problem with the receiver or the transmitter and either has to be replaced, you will need to program the new unit to communicate with the existing unit. Or if you have more than one transmitter for this machine, it will need to be programmed to communicate with the existing receiver.
- To program the transmitter and receiver, you have to download the transmitter's unique code into the receiver. There are complete instructions along with colored illustrations in the radio control manual included in the back of this manual.
- To access the receiver, remove the front cover from the machine control box.

- Remove the cover of the remote receiver with the radio receiver attached. This will make it easier to work with the radio receiver. Remove the radio receiver panel by unlatching the plastic tabs on either side of the receiver; see the radio control manual in this manual in the back. The receiver panel will now slide out of the cap.

- Follow the instructions in the radio control manual to download the ID Code. There are specific instructions that need to be followed and corresponding illustrations. The radio control manual is included in the back of this manual.
- Push the receiver panel back up into the cap until the tabs snap back into place.

- Always replace the machine cover when maintenance or troubleshooting is complete. DO NOT RUN MACHINE WITHOUT ALL GUARDS & COVERS IN PLACE AND SECURED.

TROUBLESHOOTING

SEE THE RADIO CONTROL MANUAL FOR ANY OPERATING PROBLEMS WITH THE RADIO RECEIVER & TRANSMITTER
(Included in the back of this manual)

- First check the batteries to make sure they are providing enough power to operate the transmitter.
- There is a low battery light on the transmitter, when it starts flashing you have approximately 10 hours of operation left.
- Remove the back cover on the transmitter. Remove old batteries and replace with new batteries. The transmitter operates using 4 AA alkaline batteries.

- Next, open the cover on the machine control box. You will need to be able to see the lights on the receiver to compare to the trouble indicators on the receiver diagnostic list in the radio control manual. Check the light configuration and compare it to the Receiver Diagnostic list in the radio control manual.

- If status light on radio receiver is flashing red, a fuse is blown. To change a fuse, remove the receiver panel from the cap and change the fuse. Inspect wiring for short circuits (e.g. bare wires). If problem re-occurs, call for service. Push the receiver panel back up into the cap until the tabs snap back into place.

- Always replace the machine cover when maintenance or troubleshooting is complete. DO NOT RUN MACHINE WITHOUT ALL GUARDS & COVERS IN PLACE AND SECURED.

LOW BATTERY LIGHT

REMOVE THE BACK COVER TO ACCESS THE BATTERIES – THERE ARE 4 SCREWS HOLDING IT IN PLACE. THE BATTERY COMPARTMENT IS LABELED FOR CORRECT BATTERY ORIENTATION.

REMOVE COVER

COMPARE THE LIGHT CONFIGURATION ON THE RECEIVER TO THE DIAGNOSTIC CHART IN THE RADIO CONTROL MANUAL

REPLACE FUSE

DO NOT TOW! THE MODEL SP5014TRX IS DESIGNED TO BE TRANSPORTED TO THE JOB SITE AND WILL MOVE UNDER ITS OWN POWER ONCE ON SITE.

Transport machine in a suitable vehicle designed for a load of these dimensions and weight. A low trailer is recommended due to its decreased entry height, and will be safer all around. Always use safety tie down straps while transporting.

The model SP5014TRX can be loaded into a pick-up truck, but requires increased safety precautions against tipping. Tie-downs, a sturdy and stable loading ramp and extra caution are required.

- LOADING RAMPS MUST BE STURDY AND ATTACHED TO THE TRANSPORT VEHICLE BEFORE ATTEMPTING TO LOAD\UNLOAD THIS MACHINE.

- TRAILER MUST BE SECURELY ATTACHED TO TOW VEHICLE BEFORE LOADING OR UNLOADING THE STUMP GRINDER.

- Check trailer for security and make sure chains are properly installed.
- Check tires inflation.
- Check towing lights for proper operation
- Never transport with machine motor running.
- Towing will affect handling. Allow for extra stopping distances.
- Start and stop gradually.
- Tow at a safe reasonable speed. Obey posted speed limits.

LOADING

- **TRAILER MUST BE SECURELY ATTACHED TO TOW VEHICLE BEFORE LOADING OR UNLOADING THE STUMP GRINDER.**
- **DO NOT LOAD OR UNLOAD ON ANYTHING OTHER THAN LEVEL GROUND.**
- Start engine as recommended by the engine manufacturer's manual.
- Increase engine RPM, and raise cutter head just off the ground.
- With operator in position, push the forward travel control lever and steer machine slowly up appropriate ramp into transport vehicle. **KEEP MACHINE AS LEVEL AS POSSIBLE.**
- Continually adjust cutter head height as you go, keeping the mass as low to the ground as possible.
- Once the machine is loaded, lower the cutter head, shut down engine and secure machine tightly with sufficient tie-downs to prevent any movement in transit.

UNLOADING

- **TRAILER MUST BE SECURELY ATTACHED TO TOW VEHICLE BEFORE LOADING OR UNLOADING THE STUMP GRINDER.**
- **DO NOT LOAD OR UNLOAD ON ANYTHING OTHER THAN LEVEL GROUND.**
- Undo tie down straps and check ramps for sturdiness and positioning.
- Start engine as recommended by the engine manufacturer's manual.
- Increase engine RPM, and raise cutter head to just clear deck and/or ramp.
- Continually adjust cutter head height as you go, keeping the mass as low to the ground as possible.
- Proceed to work site using extreme caution on hills or uneven terrain.

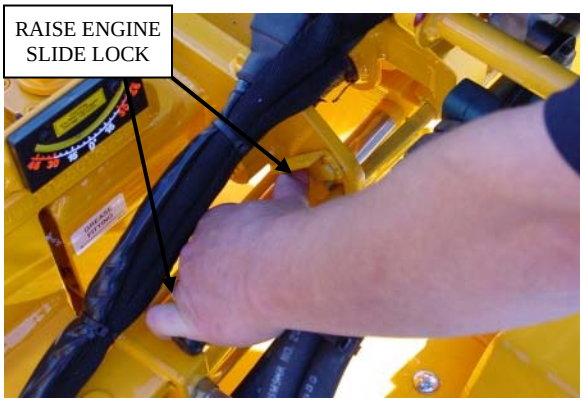
STARTING – READ ENGINE MANUFACTURERS OWNERS' MANUAL BEFORE STARTING.

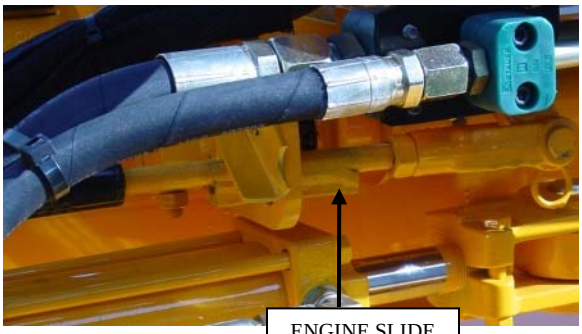
- Check all fluids before starting.
- Belts must be disengaged before starting.
- Inspect all connections, teeth, tires, etc. (see Daily Checklist).
- Start engine at half speed and allow sufficient time for oil to circulate before proceeding. (See Machine Control section for starting the machine with a remote or radio control transmitter.)
- Test controls for proper operation.
- Avoid transverse slopes. Ascend/descend hills straight up and down. A hydraulic safety valve prevents the machine from picking up speed downhill. This may also be used as a brake by decreasing engine speed.
- Hydraulic motor **will not** hold machine as a parking brake. Machine will creep.

- **DO NOT OPERATE THE ENGINE AT AN ANGLE GREATER THAN 25° OR SEVERE ENGINE DAMAGE WILL OCCUR.** PROPER ENGINE OIL LEVEL MUST BE MAINTAINED TO ACHIEVE MAXIMUM ANGLE OF OPERATION OF 25°. (See Engine Owner's Manual for proper oil level.)
- **DO NOT OPERATE AROUND WATER, GAS, POWER, OR PHONE LINES. IF IN DOUBT, CHECK BEFORE GRINDING.**
- **WEAR FACE SHIELD AND HEARING PROTECTION.**
- **KEEP CLEAR OF CUTTER WHEEL AND MOVING MACHINE PARTS.**
- **KEEP SPECTATORS AWAY.**

- Position machine at stump with cutter wheel a slight distance away from stump. **Call 811 and have all underground utilities marked before you proceed. Do not engage cutter wheel when positioning machine near stump. Hitting the stump with cutter wheel running will break the Poly Chain® belt.**

- Reduce engine RPM to idle.
- Raise cutter head clear of stump.
- Engage cutter wheel belts by raising engine slide lock and then slowly pushing engagement lever toward front of machine. When the cutter wheel is fully engaged the engine slide lock will be in a raised position.
- Increase engine RPM to full.
- Test controls for proper operation, speed, and unobstructed movement.





- Cutter head swing speed should be adjusted to a rate that will allow cutter wheel to pass through stump smoothly. If jerking, bouncing, or significant drops in engine speed occur, swing rate is to rapid and must be decreased.
- Swing speed should be determined and adjusted with the controls in the full open position.
- A counter-rotating valve is located within the hydraulic system to adjust this speed. Turning the handle counter-clockwise will open the bypass and slow swing action. Turning it clockwise will close the valve and increase swing rate.

- Lower spinning cutter wheel to stump and make a few light passes at stump to get a feel for the cutting action.
- Gradually increase cutting action and work away at stump by swinging cutter wheel left-to-right-to-left through stump in a sideways motion. Smooth, effortless cutting lengthens machine life, minimizes downtime, and is more profitable in the long run.
- Continue cutting stump by adjusting cutter wheel progressively lower until stump is cut well below ground level.

- Raise cutter wheel and swing clear of stump then extend tongue to position machine closer to stump for next series of passes. Lower cutter wheel and continue cutting.
- Continue in this manner until stump has been removed.
- Larger stumps may require repositioning machine to work at best advantages.

- Raise cutter wheel clear of stump and return to center position.
- Reduce engine speed to idle. DO NOT TURN MOTOR OFF. Engine must be allowed to cool slowly at idle for 3 – 5 minutes to avoid damage.
- With engine speed at idle; disengage drive belts by slowly pushing the engagement lever back toward the cutter wheel. The engine slide will lock automatically when belt is disengaged.
- **DO NOT DISENGAGE DRIVE BELTS AT A HIGH ENGINE SPEED.** Damage to belts and machine will occur.
- Allow cutter wheel to come to a full stop before inspecting work area.
- Turn motor off.

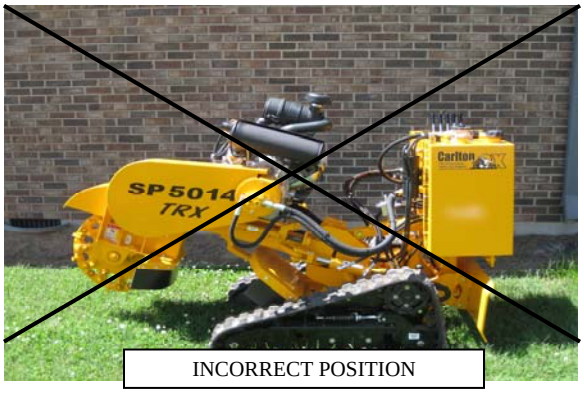
SAFETY

- **NEVER SERVICE A MACHINE WITH THE ENGINE RUNNING, SEVERE PERSONAL INJURY COULD OCCUR. TURN ENGINE OFF THEN REMOVE IGNITION KEY AND DISCONNECT POSITIVE BATTERY CABLE TO AVOID STARTING MACHINE ACCIDENTALLY.**
- **CUTTER WHEEL MUST BE DISENGAGED BEFORE TURNING ENGINE ON/OFF AND BEFORE SERVICING A MACHINE. OTHERWISE SEVERE PERSONAL INJURY COULD OCCUR AS WELL AS MACHINE DAMAGE.**
- **ALL MACHINE PARTS MUST COME TO A COMPLETE STOP AND HAVE TIME TO COOL COMPLETELY BEFORE SERVICING A MACHINE OR SEVERE INJURY COULD OCCUR, POSSIBLY SERIOUS BURNS AND/OR DISMEMBERMENT.**
- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND EQUIPMENT DAMAGE.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

- Check engine oil at dipstick **daily**; take reading with engine **sitting level (see photos)**. Add recommended oil and change oil as required. (See engine owners' manual.)

SP5014TRX Engine Filters

- 0200141 Oil Filter
- 0200142 Fuel Filter
- 0200102C Air - Main Filter
- 0200102D Air - Safety Filter

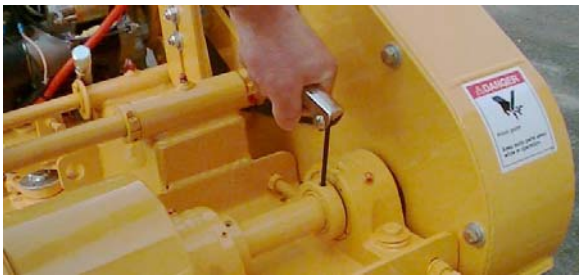


INCORRECT POSITION


CORRECT POSITION

- Check hydraulic oil level daily. This Carlton stump grinder is equipped with a gauge that shows the level of oil and the temperature of the oil. When filling the tank 2/3 with oil, the window of the gauge will also fill with oil, as the level gets higher in the tank. Never fill the oil tank above the BLACK line at the top of the gauge. Do not run the machine with the oil level below the RED line at the bottom of the gauge.
- The machine is equipped with Citgo AW46 hydraulic oil at the time of manufacture. Use the same or equivalent.

- For a new machine, change the hydraulic oil filter when the stump grinder has been operating for 10 hours. Replace with the same type of in-tank filter element supplied originally, available through Carlton or Carlton dealers. From this point on, change the filter every 200 hours of operation.
- Change hydraulic oil every 500 hours of operation or at least once a year depending on use. Flush the hydraulic tank when changing the hydraulic oil. Replace oil if it has a burnt odor or if it is contaminated. Replace oil if the stump grinder has been stored for a long period of time (all winter).
- Drain the hydraulic tank using the drain plug located on the bottom of the tank. Dispose of used oil according to state regulations.



- Check setscrews in Jackshaft Bearings and Cutter Wheel Bearings for tightness **weekly**.

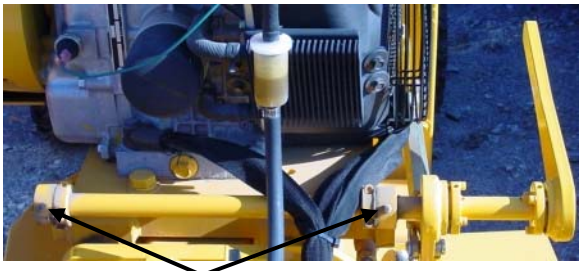
- Check cutter wheel, pockets, and teeth for wear. If any repair is needed, see "Servicing Cutter Wheel" section for further instruction.

Always clean tip of grease gun fitting and grease fitting on machine before attaching hose to prevent dirt from being forced into machine parts.

- Grease jackshaft bearings **daily**. These bearings should be purged using grease **EVERYDAY.** Purge till new grease comes out. Use Texaco® Starplex II grease. **Always clean tip of grease gun fitting and grease fitting on machine before attaching hose to prevent dirt from being forced into machine parts.**

- Grease cutter wheel bearings **Daily**. These bearings should be purged using grease **EVERYDAY.** Purge till new grease comes out. Use Texaco® Starplex II grease. **Always clean tip of grease gun fitting and grease fitting on machine before attaching hose to prevent dirt from being forced into machine parts.**

- Grease engine slide assembly every 15 – 20 hours of operation with approximately 2 to 4 shots of Texaco® Starplex II grease. (Total of 6 grease fittings.) **DO NOT OVER GREASE.**

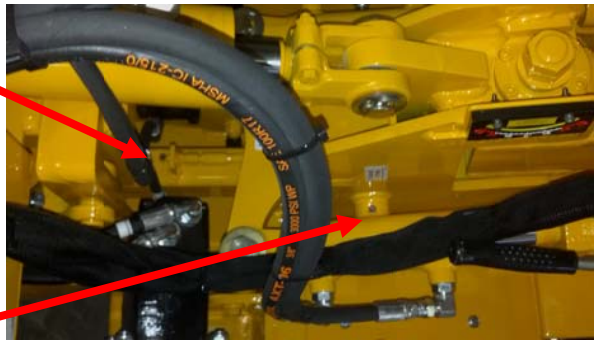


- Grease engagement lever every 15 – 20 hours of operation with approximately 2 to 4 shots of Texaco® Starplex II grease.

ENGAGEMENT LEVER GREASE FITTINGS

- Clean out Poly Chain® Guard by removing bottom portion of guard **weekly**. **Chip build up will wear Poly Chain® Belt.**

- Grease boom pivot monthly, swing cutter wheel to the right to access grease fitting. Use Texaco® Starplex II grease. **DO NOT OVER GREASE.**



- Grease bottom pivot bearings monthly. Use Texaco® Starplex II grease. You cannot over grease this area all parts are heat-treated.

- Grease track rollers **daily**. Use Texaco® Starplex II grease. You cannot over grease this area all parts are heat-treated.

- The model SP5014TRX, as well as all of our machines, is built to be a rugged performer. Your new machine is sturdy and our design goals are simplicity and reliability.
- A regularly scheduled maintenance program will pay big dividends in machine life, performance and avoided downtime.

Lubrication Schedule

- **Use Texaco® Starplex II grease.**

CARLTON MODEL SP5014TRX	Daily	15–20 Hr.	Monthly	2–3 Mon	6 Mon	Special Comments
– ENGINE SLIDE ASSEMBLY		▨				1–2 Shots
– ENGAGEMENT LEVER		▨				1–2 Shots
– BEARINGS						
– Track Rollers	▨					1–2 Shots
– Pivot Head Lift			▨			Three fittings underneath machine
– Pivot Head Swing			▨			Adjust as required.
– Cutter Wheel	▨					Purge bearings daily.
– Jackshaft	▨					Purge bearings daily.

ENGINE
REFER TO ENGINE MANUFACTURERS MANUAL FOR PROPER ENGINE SERVICING

SP5014BS

COMPLAINT	CAUSE	CORRECTION
Engine will not start. (See Engine Manufacturer Manual for further information.)	• Loose ground wire. • Loose hot wire. • Dead battery.	• Clean and tighten. • Clean and tighten. • Recharge or replace.
Hydraulic system loss of power.	• Low oil. • Valve set too low. • Missing or sheared key on pump shaft. • Bad cylinder.	• Refill with correct oil. • Adjust relief valve. • Remove pump, replace or repair keyway. • Replace cylinder packing.
Swing cylinder loss of power.	• Cutter head speed adjustment screw turned wide open.	• To slow cutter head swing at high RPM turn valve counter-clockwise. • Re-adjust for “no bounce” cutting.
Belt Squeal.	• Belt tension too loose. • Belt out of line.	• Tighten. • Align Pulleys.
Belt jumping off.	• Engaging or disengaging belt at high engine RPM. • Belt keeper too far from belt.	• Only engage or disengage belts at low engine speeds. • Adjust keeper closer to belt.
Cutter wheel vibration.	• Tooth missing. • Pocket out of balance. • Improper tooth arrangement.	• Replace missing teeth. • Always replace pockets in pairs across from each other. • Install correctly with like pairs of teeth directly across from each other.
Cutter wheel throwing teeth.	• Bad pocket. • Dirt in pocket • Worn cutter wheel	• Replace pocket. • Clean pocket and replace missing teeth. • Replace cutter wheel
Cutter wheel breaking teeth.	• Teeth set too far out of pocket.	• Use gauge to set teeth correctly.

COMPLAINT	CAUSE	CORRECTION
Cutter wheel stops turning.	• Belt not engaged. • Engine belt broke. • Poly chain® belt broke. • Sheared key in shaft. • Broke cutter wheel shaft.	• Adjust yoke assembly. • Replace belt. • Replace belt. • Replace key. • Replace shaft.
Roar in machine when cutter wheel is engaged.	• Belt guards rubbing on jackshaft or cutter wheel shaft. • Jackshaft or cutter wheel bearings going bad.	• Re-position guards off of shafts. • Replace bearings.
Traction loss of power.	• Relief valve set too low. • Hydraulic motor worn.	• Increase relief valve pressure by turning relief valve screw inward. • Replace Hydraulic motor.
Bearing will not take grease.	• Grease fitting clogged.	• Replace fitting
Cutter head swings faster one way than the other.	• Counter balance valve is out of adjustment.	• Adjust counter balance valve to equalize swing speed.

For all Radio Transmitter or Receiver problems, see the Radio Control Manual included at the back of this manual.

Replacing V-Belt

SAFETY

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- **ALL MACHINE PARTS MUST COME TO A COMPLETE STOP AND HAVE TIME TO COOL COMPLETELY BEFORE SERVICING A MACHINE OR SEVERE INJURY COULD OCCUR, POSSIBLY SERIOUS BURNS AND/OR DISMEMBERMENT.**
- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND EQUIPMENT DAMAGE.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

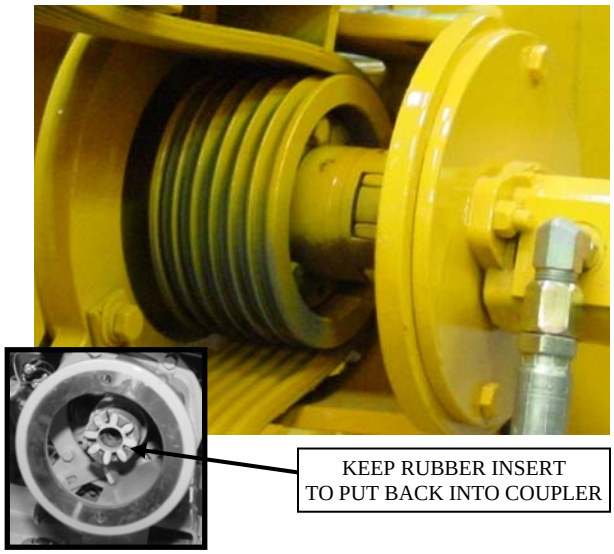
- Remove V-belt guard cover.

- Belt should be disengaged. If it isn't, push the engagement lever back toward the cutter wheel as far as it will go. Engine slide will lock automatically when the belt is disengaged. Belt will be loose when disengaged.

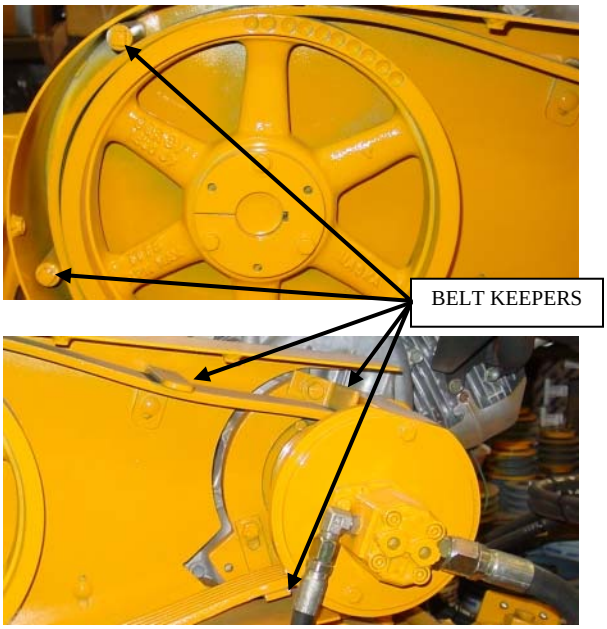
- Remove pump drive. **Only remove the bolts at 12 o'clock and 6 o'clock.** Remove the pump plate with the pump still attached, not necessary to remove and cap hoses.

Replacing V-Belt

- When you pull the pump off, the pump coupler and a rubber insert will come off with it. Take note of the insert and do not lose it.



- Loosen, don't remove, all belt-keepers to remove the engine belt. There are two belt keepers on the jackshaft sheave. The beehive has two belt keepers inside it, one on top and one on bottom. The last belt keeper is beside the beehive.

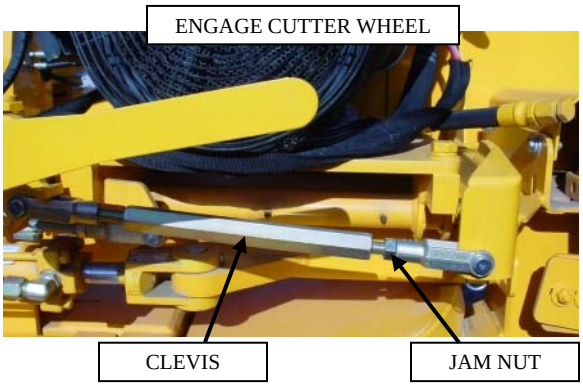


- Remove and replace the engine belt.

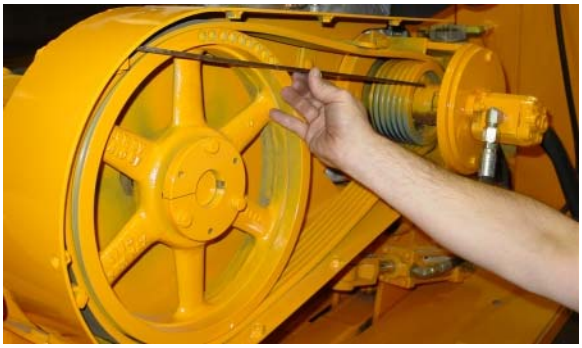
Replacing V-Belt

- After replacing belt, check it for tension.
- Engage belt using the engagement lever. Raise the engine slide lock and push the engagement lever toward the front of the machine as far as it will go. Check belt tension. **When the V-belt is tensioned properly, it will deflect 1/4" with 25 lbs. of force applied to the center of the belt between the sheaves.** New belts will stretch and become loose as machine runs. Check belt tension often when belts are new.

- Disengage the belt. **DO NOT START THE ENGINE.** If any adjustment is required, there is a linkage assembly below the engagement handle on the operator side. Loosen jam nut and adjust clevis with wrench turning up toward machine. This will make engine slide further and will tighten the belt. Make only slight adjustments at a time and recheck tension; repeat as necessary until tension is correct. Once tightness is achieved, tighten jam nut back onto clevis.



- Use this same procedure to tighten loose belts.
- DO NOT OVER TIGHTEN BELTS; OVERLY TIGHT BELTS CAN CAUSE BEARING AND ENGINE DAMAGE. Turn the clevis down with a wrench if the belt is too tight. Make only slight adjustments at a time and recheck tension; repeat as necessary until tension is correct.
- Replace belts when worn or when repeated adjustments are necessary. Belts should never get so loose that all of the adjustment capability is used.

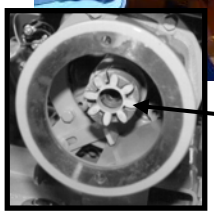


- Check to make sure the sheaves are still aligned. Place a straight edge against both sheaves to check alignment. If the sheaves were not removed or loosened, they should still be aligned.

Replacing V-Belt

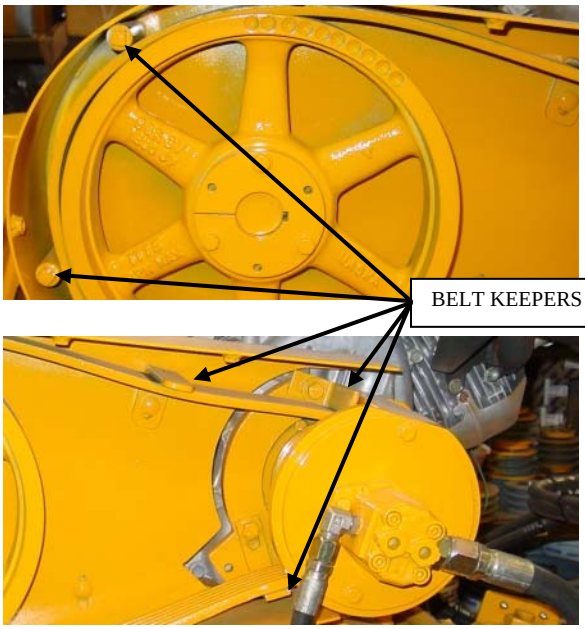
- If the belt tension was adjusted, the engine slide lock will also have to be adjusted. This locks the engine in the disengaged position so that the cutter wheel will not accidentally engage. When adjusting the engine slide lock, turn the clevis clockwise to shorten the length of the engine slide lock when the engagement linkage was lengthened. The engagement linkage would be lengthened to put more tension on the belt. Lengthen the engine slide lock if the engagement linkage was shortened.

- Replace hydraulic pump making sure the insert is in place.



REPLACE THE RUBBER INSERT WHEN REATTACHING THE PUMP

- Retighten all five belt-keepers when the belt tension has been adjusted. There are two belt keepers on the jackshaft sheave. The beehive has two belt keepers inside it, one on top and one on bottom. The last belt keeper is beside the beehive.



BELT KEEPERS

Replacing V-Belt

- Replace V-belt guard cover and tighten bolts. DO NOT RUN MACHINE WITHOUT ALL GUARDS IN PLACE AND SECURED.

GENERAL TENSIONING OF V-BELT DRIVES

Tensioning of belts on the V-belt drive is critical. A few simple rules about tensioning will satisfy most of your requirements:

1. The best tension for the V-belt drive is the lowest tension at which the belts will not slip under the highest load condition.
2. Check the tension on a new drive frequently during the first day of operation.
3. Thereafter, check the drive belt tension periodically.
4. Too much tension shortens belt and bearing life.
5. Keep belts and sheaves free from any foreign material that may cause slippage.

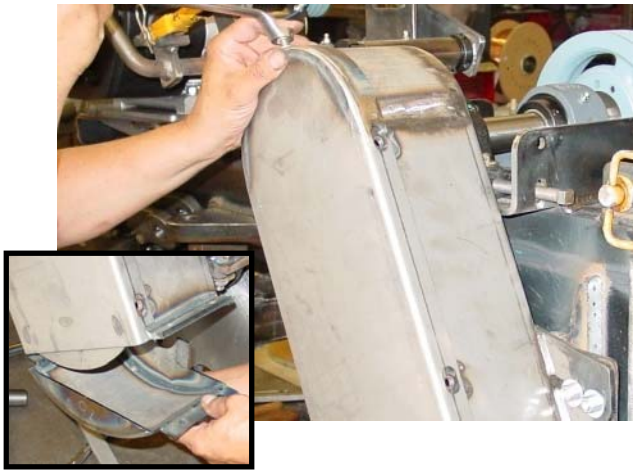
Replacing Poly Chain® Belt

SAFETY

- **NEVER SERVICE A MACHINE WITH THE ENGINE RUNNING, SEVERE PERSONAL INJURY COULD OCCUR. TURN ENGINE OFF THEN REMOVE IGNITION KEY AND DISCONNECT POSITIVE BATTERY CABLE TO AVOID STARTING MACHINE ACCIDENTALLY.**
- **CUTTER WHEEL MUST BE DISENGAGED BEFORE TURNING ENGINE ON/OFF AND BEFORE SERVICING A MACHINE. OTHERWISE SEVERE PERSONAL INJURY COULD OCCUR AS WELL AS MACHINE DAMAGE.**
- **ALL MACHINE PARTS MUST COME TO A COMPLETE STOP AND HAVE TIME TO COOL COMPLETELY BEFORE SERVICING A MACHINE OR SEVERE INJURY COULD OCCUR, POSSIBLY SERIOUS BURNS AND/OR DISMEMBERMENT.**
- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND EQUIPMENT DAMAGE.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

Special care needs to be taken with your Poly Chain® belt. Alignment, tension, and cleanliness of this belt are very important. The Poly Chain® belt needs to be checked for tension approximately every 70 to 100 hours of use. The Poly Chain® belt must be running true. If you adjust one bearing more than the other, the belt will run on an angle and will cause belt failure. A belt broken straight across is the result of a shock load. In a shock load failure, the fibers are broken and over a period of time the belt will break down from the shock load and snap in half. A broken belt with lost teeth indicates that the belt was loose. After you have installed or re-tensioned the Poly Chain® belt, you will have to re-adjust the engine V-belts for proper tension.

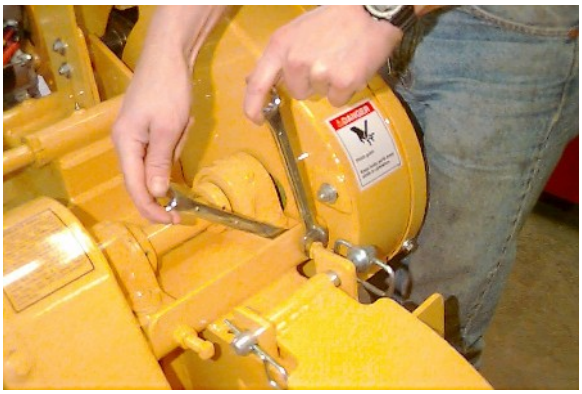
- Remove the Poly Chain® guard cover and bottom cover.



Replacing Poly Chain® Belt

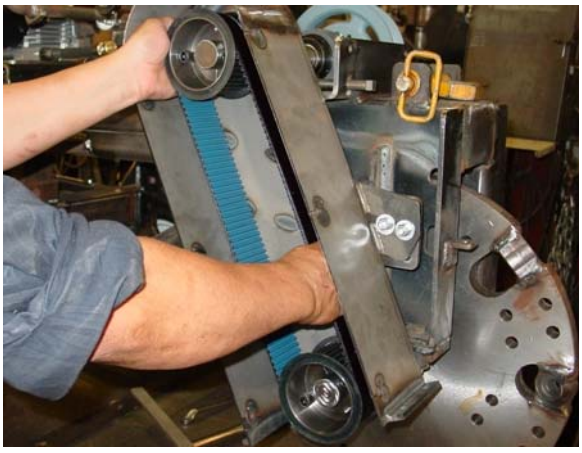
- Loosen Poly Chain® belt by moving jackshaft bearings. **MARK THE BEARINGS SO THAT YOU KNOW HOW THEY ARE POSITIONED ON THE JACKSHAFT PLATE.** Loosen bolts on bearing closest to Poly Chain® guard and remove bolts on the bearing closest to engine belt guard so that side of the jackshaft may be raised to remove Poly Chain® belt.

- Loosen the jam bolts in the back and move the bearings back.

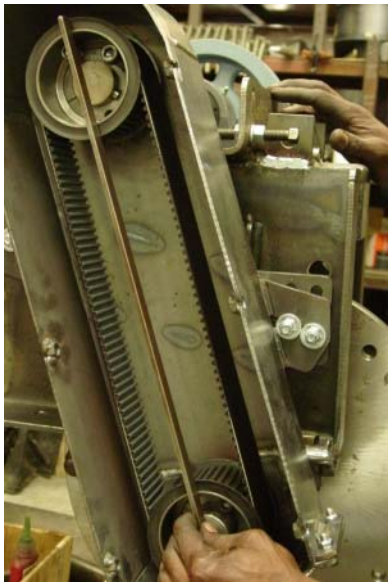


- Belt should be disengaged. If it isn't push the engagement lever back toward the cutter wheel as far as it will go. Engine slide should lock automatically when the belt is disengaged; check to make sure it does. (See Machine Controls section for engine slide lock.)

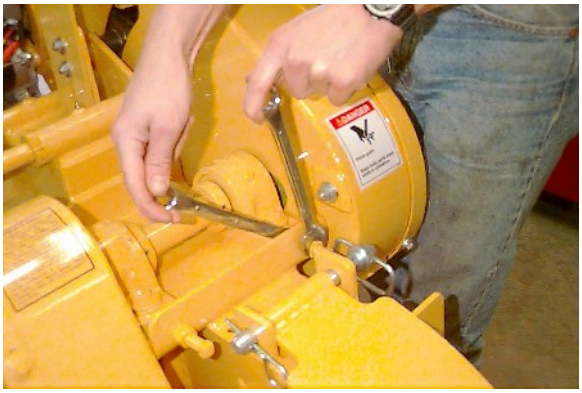
- Remove old belt and replace with new one. **Do not pry new belt over sprockets since this can break the fibers in the Poly Chain® belt.**



Replacing Poly Chain® Belt



- Check alignment of Poly Chain® sprockets using a straight edge.



- To adjust tension of the belt, slide the bearings back into the place that you had marked. Tighten the jam bolts. To tighten the belts more if needed, loosen the front jam bolts and tighten each of the back jam bolts the same number of revolutions, to keep the alignment true. After the belt is adjusted, tighten the front jam bolts back against the bearing. **After the Poly Chain® belt has been adjusted; check the V-belt tension and alignment. When the V-belt is tensioned properly, it will deflect 1/4" with 25 lbs. of force applied.**

- Replace Poly Chain® belt guard cover and bottom cover and tighten bolts.
  DO NOT RUN MACHINE WITHOUT ALL GUARDS IN PLACE AND SECURED.

Replacing Poly Chain® Belt

Tensioning Procedure for Gates Poly Chain® GT® Belts

Gates Poly Chain GT belt's high performance characteristics dictate a need for correct installation tension. The following tables provide the required minimum and maximum deflection forces based on the belt pitch, pitch length, width and center distance. Deflection values are simplified based on full rated horsepower capacity per belt width. For drives not covered by the simplified tables, or drives not using full rated horsepower capacity, refer to Page 67 in Gates Poly Chain GT Drives Manual #17595.

Step 1: Based on belt pitch and width, locate the correct table.

Step 2: Locate the RPM of your faster shaft (smaller sprocket) in the first column.

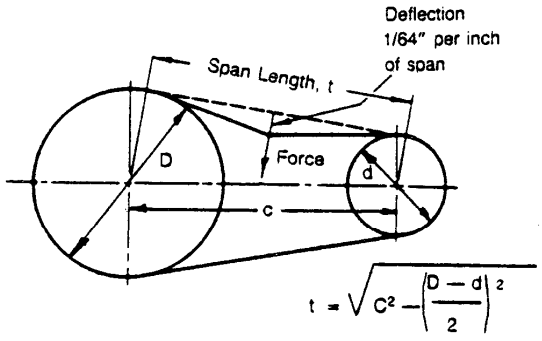
Step 3: Locate the number of grooves on your small sprocket in the second column.

Step 4: Locate the correct column for your belt length (belt lengths shown at the top of each column).

Step 5: Under the correct belt length column, locate the center distance for your drive (center of driveR shaft to center of driveN shaft in inches).

Step 6: Read down to the intersection for the recommended minimum and maximum deflection force (pounds) for your drive.

Step 7: Apply that deflection force range for the appropriate deflection (1/64" per inch of span length). See sketch.



8M-62 Minimum and Maximum Deflection Force (lbs) for 62 mm Wide Poly Chain GT Belts

RPM of Faster Shaft	Number of Grooves on Small Sprocket	Center Distance (inches) for Belt Designation																													
		8M-640, 8M-720				8M-800, 8M-896				8M-1000, 8M-1120 8M-1200				8M-1280, 8M-1440 8M-1600				8M-1792, 8M-2000				8M-2240, 8M-2400 8M-2520				8M-2840, 8M-3200 8M-3600				8M-4000, 8M-4480			
		CD <= 8		CD > 8		CD <= 9		CD > 9		CD <= 13.9		CD > 13.9		CD <= 18.5		CD > 18.5		CD <= 23.5		CD > 23.5		CD <= 35.0		CD > 35.0		CD <= 45.0		CD > 45.0		CD <= 65.5		CD > 65.5	
	Sprocket	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
5000 & Over	22 to 28	21.0	22.5	21.6	22.6	22.6	24.1	23.5	24.9	25.3	27.0	26.3	28.0	27.5	29.6	28.7	30.8	29.7	31.3	31.0	32.9	32.4	34.1	33.0	35.1	34.8	36.1	35.6	38.4	38.0	39.3	37.9	40.3
	30 to 80	22.2	23.6	22.7	23.0	24.2	26.0	24.6	25.9	26.9	29.1	27.6	29.2	29.0	31.7	30.1	32.1	31.4	32.8	32.4	34.1	34.0	36.0	34.5	36.3	36.4	37.9	37.2	39.6	39.5	40.5	39.6	41.5
Under 5000	22 to 28	21.6	23.1	22.2	23.2	23.3	24.8	24.2	25.6	26.1	27.8	27.1	28.9	28.4	30.6	29.6	31.9	30.8	32.4	32.1	34.0	33.6	35.3	34.1	36.3	36.1	37.4	36.9	39.8	39.5	40.7	39.3	41.8
to 4000	30 to 80	22.5	23.4	23.1	23.4	24.6	26.0	25.1	25.9	27.4	29.5	28.2	29.5	29.7	32.3	30.9	32.6	32.3	34.3	33.3	34.8	35.0	36.8	35.5	37.1	37.5	39.0	38.4	40.7	40.8	42.1	40.9	42.7
Under 4000	22 to 28	22.4	23.8	23.0	23.9	24.2	25.6	25.1	26.4	27.1	28.7	28.1	29.9	29.6	31.7	30.8	33.0	32.1	33.6	33.3	35.2	35.0	36.6	35.5	37.7	37.6	38.9	38.5	41.4	41.1	42.3	41.0	43.4
to 3200	30 to 80	23.0	24.0	23.7	24.0	25.2	26.3	25.7	26.5	28.2	29.9	29.1	30.1	30.6	33.0	31.9	33.3	33.4	34.9	34.4	35.6	36.1	37.7	36.7	38.1	38.8	39.9	39.8	41.9	42.2	43.3	42.4	44.0
Under 3200	22 to 28	23.3	24.9	23.9	25.0	25.2	26.8	26.1	27.6	28.2	30.0	29.3	31.2	30.9	33.3	32.1	34.5	33.5	35.3	34.8	36.9	36.5	38.4	37.1	39.5	39.3	40.8	40.2	43.4	43.0	44.4	42.9	45.6
to 2400	30 to 80	23.8	25.0	24.5	25.0	26.0	27.2	26.6	27.6	29.1	30.9	30.1	31.4	31.6	34.0	33.1	34.7	34.5	36.1	35.6	37.1	37.4	39.3	38.1	39.8	40.1	41.7	41.4	43.8	43.8	45.1	44.2	46.1
Under 2400	22 to 28	24.4	26.0	25.2	26.1	26.5	28.0	27.5	28.8	29.7	31.4	30.8	32.7	32.5	34.9	33.8	36.1	35.4	37.0	36.6	38.6	38.5	40.3	39.1	41.3	41.4	42.8	42.4	45.5	45.3	46.5	45.3	47.8
to 1800	30 to 80	24.9	26.1	25.7	26.1	27.1	28.3	27.9	28.9	30.3	32.3	31.5	32.7	33.0	35.4	34.6	36.3	36.0	37.5	37.3	38.8	39.1	41.1	40.0	41.6	42.0	43.6	43.4	45.8	45.9	47.0	46.4	48.2
Under 1800	22 to 28	25.4	27.0	26.1	27.1	27.5	29.1	28.5	29.9	30.8	32.7	32.0	34.0	33.8	36.3	35.1	37.5	36.8	38.5	38.1	40.1	40.0	41.9	40.6	43.0	43.0	44.6	44.1	47.3	47.1	48.4	47.1	49.7
to 1400	30 to 80	25.8	27.1	26.6	27.1	28.1	29.4	28.9	30.0	31.4	33.5	32.7	34.0	34.2	36.8	35.9	37.7	37.3	38.9	38.7	40.3	40.5	42.6	41.5	43.2	43.5	45.3	45.1	47.6	47.5	48.9	48.1	50.1
Under 1400	22 to 28	26.9	28.8	27.7	28.9	29.2	31.2	30.2	31.9	32.7	34.9	33.9	36.2	35.8	38.8	37.2	40.1	39.1	41.2	40.4	42.8	42.5	44.8	43.1	45.9	45.7	47.7	46.8	50.5	49.9	51.8	50.0	53.1
to 900	28 to 80	27.2	28.9	28.2	28.9	29.7	31.4	30.5	32.0	33.2	35.8	34.6	36.3	36.2	39.2	38.0	40.2	39.5	41.6	40.9	43.0	42.9	45.5	43.9	46.1	46.0	48.4	47.7	50.9	50.3	52.2	51.0	53.5
Under 900	22 to 28	28.5	30.5	29.3	30.6	30.9	33.0	32.0	33.8	34.6	36.9	35.9	38.4	37.9	41.2	39.3	42.4	41.5	43.8	42.7	45.4	45.0	47.5	45.7	48.8	48.4	50.6	49.6	53.5	52.9	54.8	53.0	56.3
to 600	30 to 80	28.8	30.6	29.8	30.7	31.4	33.2	32.3	33.9	35.1	37.9	36.5	38.4	38.2	41.5	40.1	42.5	41.8	44.1	43.3	45.5	45.3	48.2	46.4	48.8	48.7	51.2	50.5	53.9	53.2	55.3	54.0	56.7
Under 600	22 to 28	30.3	32.3	31.1	32.3	32.9	34.9	34.0	35.7	36.8	39.0	38.1	40.5	40.3	43.5	41.8	44.8	44.2	46.3	45.4	47.9	47.9	50.3	48.5	51.3	51.5	53.5	52.7	56.5	56.2	57.9	56.4	59.5
to 400	30 to 80	30.6	32.3	31.8	32.4	33.4	35.1	34.3	35.7	37.3	40.0	38.8	40.5	40.6	43.9	42.6	44.9	44.5	46.6	46.0	48.0	48.2	50.9	49.3	51.5	51.8	54.1	53.6	56.9	56.6	58.5	57.4	59.9
Under 400	22 to 28	32.7	35.2	33.6	35.3	35.6	38.1	36.7	38.9	39.8	42.7	41.2	44.1	43.7	47.6	45.2	48.8	47.9	50.6	49.1	52.2	51.8	54.9	52.5	56.0	55.7	58.5	57.0	61.7	60.8	63.2	61.0	64.9
to 200	30 to 80	33.1	35.3	34.2	35.3	36.1	38.3	37.1	39.0	40.3	43.7	41.9	44.2	43.9	47.9	46.0	48.9	48.1	50.9	49.7	52.3	52.1	55.5	53.3	56.2	56.0	59.1	58.0	62.0	61.2	63.9	62.0	65.3

Replacing Jackshaft Bearings

SAFETY

- **NEVER SERVICE A MACHINE WITH THE ENGINE RUNNING, SEVERE PERSONAL INJURY COULD OCCUR. TURN ENGINE OFF THEN REMOVE IGNITION KEY AND DISCONNECT POSITIVE BATTERY CABLE TO AVOID STARTING MACHINE ACCIDENTALLY.**
- **CUTTER WHEEL MUST BE DISENGAGED BEFORE TURNING ENGINE ON/OFF AND BEFORE SERVICING A MACHINE. OTHERWISE SEVERE PERSONAL INJURY COULD OCCUR AS WELL AS MACHINE DAMAGE.**
- **ALL MACHINE PARTS MUST COME TO A COMPLETE STOP AND HAVE TIME TO COOL COMPLETELY BEFORE SERVICING A MACHINE OR SEVERE INJURY COULD OCCUR, POSSIBLY SERIOUS BURNS AND/OR DISMEMBERMENT.**
- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND EQUIPMENT DAMAGE.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

In all Carlton® model Stump Grinders, you will find link belt bearings that are made to be purged with grease. It is necessary to purge these bearings everyday till clean grease is seen. **CAUTION should be taken not to allow grease to build up inside the belt guards.**

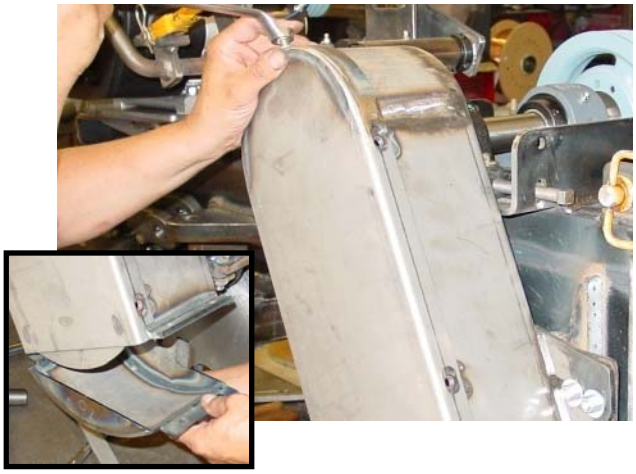
- Remove the V-belt guard cover.

- Remove engine belts and jackshaft pulley. (See Servicing Belt section to remove engine belts.) To remove the jackshaft pulley, remove the bolts from the bushing and use them to screw into the empty threaded holes to push the bushing out of the pulley. Tighten each screw just a little and go on to the next screw keep tightening a little at a time until the bushing and pulley are separated.

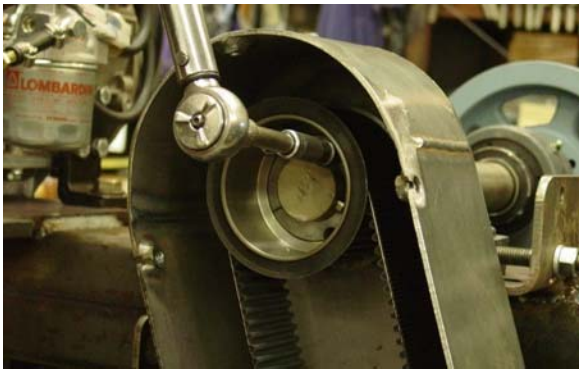
AFTER REMOVING BOLTS, SCREW BOLTS INTO THE THREADED HOLES TO PUSH THE BUSHING OUT OF THE PULLEY

Replacing Jackshaft Bearings

- Remove Poly Chain® belt guard cover and bottom cover.

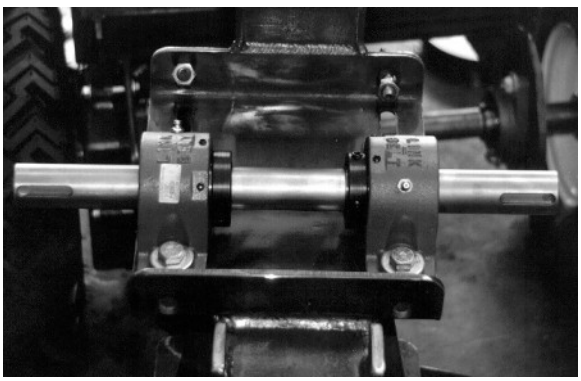


- Remove Poly Chain® sprocket by removing the bolts inside the sprocket and tapered bushing. Then screw one bolt into third hole to push sprocket off tapered bushing to remove.



- You may cut the jackshaft between the bearings and the Poly Chain® guard.

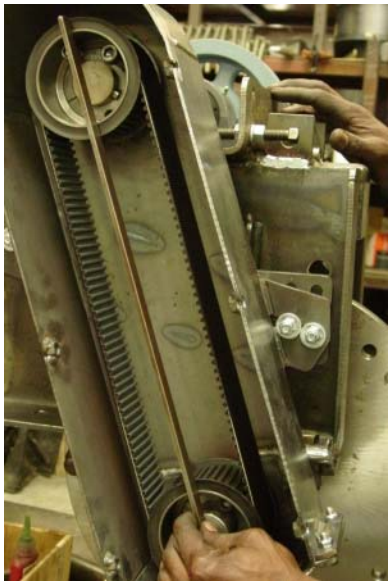
- Remove old bearings and shaft and replace with new bearings and shaft. Be sure to turn jackshaft with the longest keyway pocket toward the Poly Chain® belt side of the boom and make sure that the locking collars on the bearings are facing inward. Bolt new bearings and jackshaft back into place. Just snug bolts down, do not tighten all the way down, you will need to move them later to adjust belt tension.



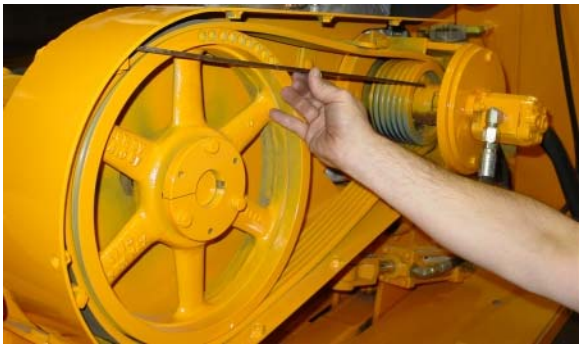
Replacing Jackshaft Bearings

NOTE: To make shaft installation easier, place shaft in a freezer for approximately one hour or overnight if possible. This will shrink the shaft and make installation into the new bearings much easier.

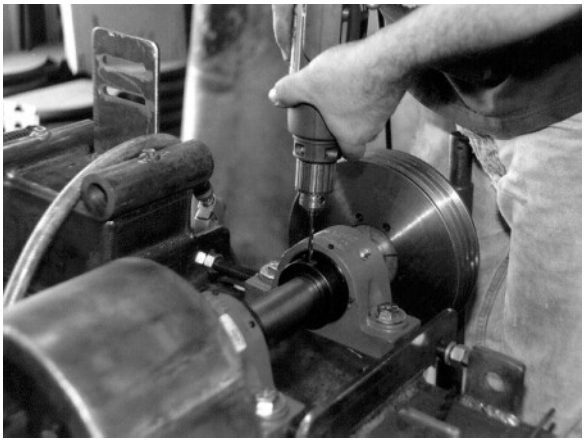
- Place Poly Chain® sprocket and tapered bushing back onto jackshaft and tighten bolts. Replace Poly Chain® belt. **Alignment is very important, use a straight edge from the jackshaft sprocket down to the cutter wheel sprocket to line up sprockets.**



- After replacing the jackshaft pulley and bushing, use a straight edge and align the jackshaft pulley with the engine pulley. Tighten the three bushing bolts down. As you tighten the bushing bolts, make sure that the pulleys stay aligned.



- There are two setscrews in each bearing. Tighten one of them down, remove one, and punch a start point in the shaft to drill a 5/16" diameter hole just deep enough for the screw to enter the shaft. Do this for all four setscrews. This will help prevent shaft from spinning inside of bearing. When replacing setscrews in bearings, use LocTite® 242 to prevent screws from loosening up.



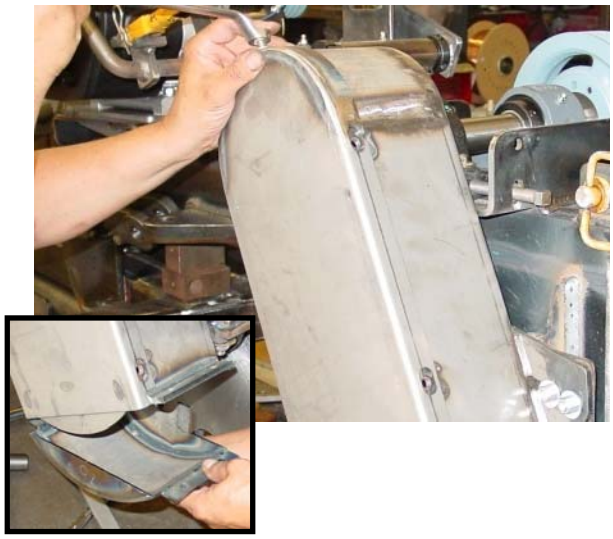
Replacing Jackshaft Bearings

NOTE: Refer to **SERVICING BELTS** section for proper installation and tensioning of all belts.

- Replace V-belt guard cover and tighten bolts.

- Replace Poly Chain® belt guard cover and end guard cover and tighten bolts.

DO NOT RUN MACHINE WITHOUT ALL GUARDS IN PLACE AND SECURED PROPERLY.



Replacing Cutter Wheel Bearings

SAFETY

- **NEVER SERVICE A MACHINE WITH THE ENGINE RUNNING, SEVERE PERSONAL INJURY COULD OCCUR. TURN ENGINE OFF THEN REMOVE IGNITION KEY AND DISCONNECT POSITIVE BATTERY CABLE TO AVOID STARTING MACHINE ACCIDENTALLY.**
- **CUTTER WHEEL MUST BE DISENGAGED BEFORE TURNING ENGINE ON/OFF AND BEFORE SERVICING A MACHINE. OTHERWISE SEVERE PERSONAL INJURY COULD OCCUR AS WELL AS MACHINE DAMAGE.**
- **ALL MACHINE PARTS MUST COME TO A COMPLETE STOP AND HAVE TIME TO COOL COMPLETELY BEFORE SERVICING A MACHINE OR SEVERE INJURY COULD OCCUR, POSSIBLY SERIOUS BURNS AND/OR DISMEMBERMENT.**
- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND EQUIPMENT DAMAGE.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

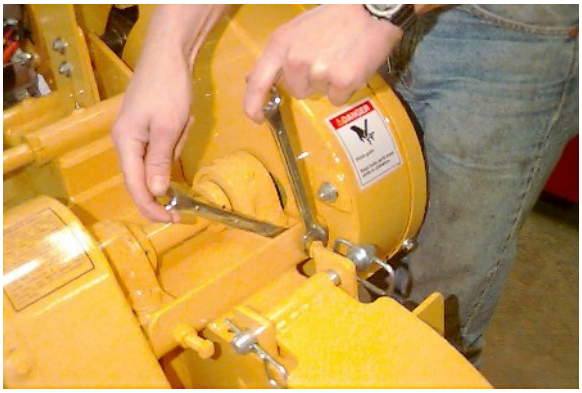
In all Carlton® model Stump Grinders, you will find link belt bearings that are made to be purged. It is necessary to purge these bearing everyday until clean grease is seen. **CAUTION should be taken not to allow grease to build up inside the belt guards.**

- Remove the Poly Chain® guard cover and bottom cover.

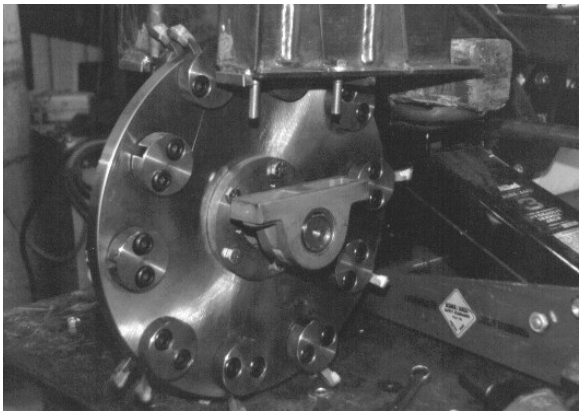
- Loosen Poly Chain® belt by moving jackshaft bearings. **MARK THEM SO THAT YOU KNOW HOW THEY ARE POSITIONED ON THE JACKSHAFT PLATE.** Loosen the four bolts that hold the jackshaft bearings down, do not remove the bolts.

Replacing Cutter Wheel Bearings

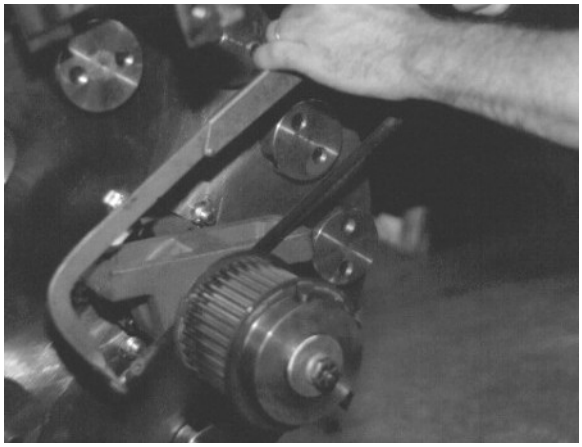
- Loosen jam bolts in the back of the jackshaft bearings and move bearings back to remove the Poly Chain® belt. You may need to unbolt V-belt guard and lift jackshaft end up to remove belt.



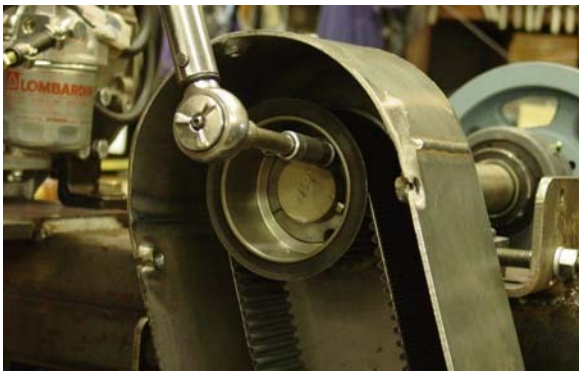
- Remove the four bolts on the cutter wheel bearings. Cutter wheel will be free from machine at this point. With the Poly Chain® belt removed, you can start the machine and raise the boom up.



- Cut the cutter wheel shaft on one side of the cutter wheel so that you can get the cutter wheel off of the shaft.

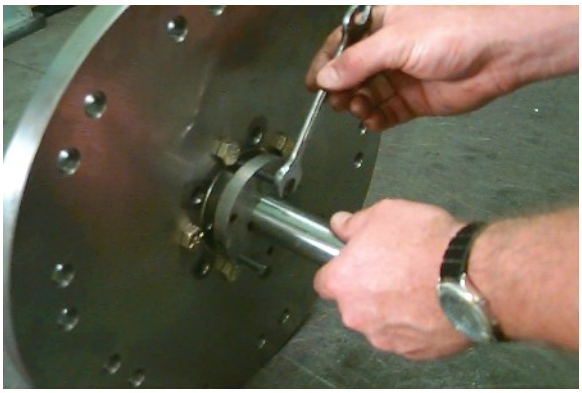


- Remove Poly Chain® sprocket by removing the bolts inside the sprocket and tapered bushing. Then screw one bolt into third hole to push sprocket off tapered bushing to remove.

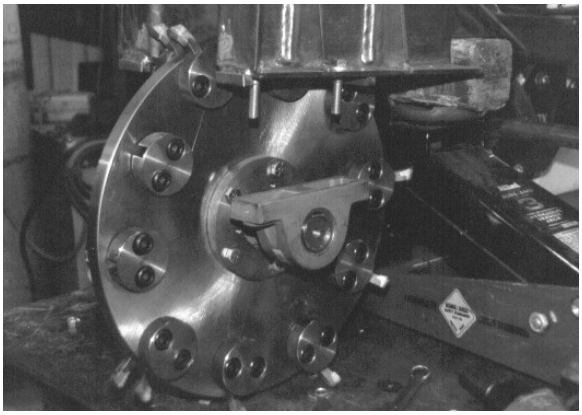


Replacing Cutter Wheel Bearings

- Take out the three bolts that hold the bushing to the cutter wheel and place them in the empty threaded holes on the bushing and tighten slowly. This will push the bushing out of the cutter wheel. Remove bushing and cutter wheel.



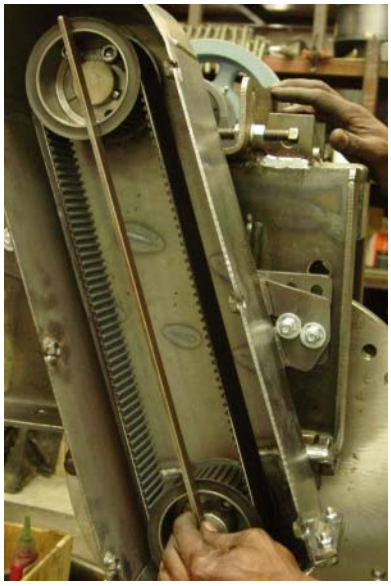
- Place cutter wheel, bushing and bearings back on new shaft. Place back up under machine and lower boom box on to bearings.



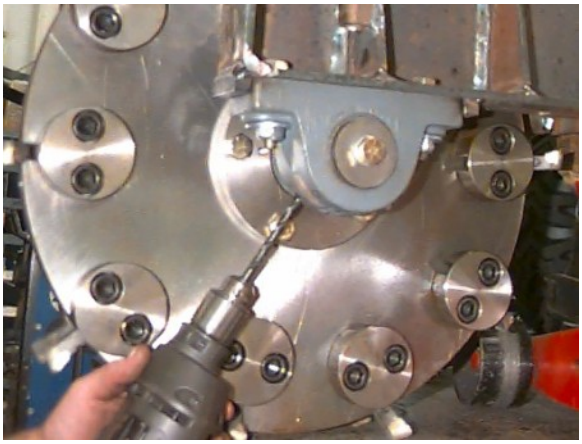
NOTE: To make shaft installation easier, place shaft in a freezer for approximately one hour or overnight if possible. This will shrink the shaft and make installation into the new bearings much easier.

- Bolt bearings and cutter wheel back to boom box and tighten bolts down.

Replacing Cutter Wheel Bearings

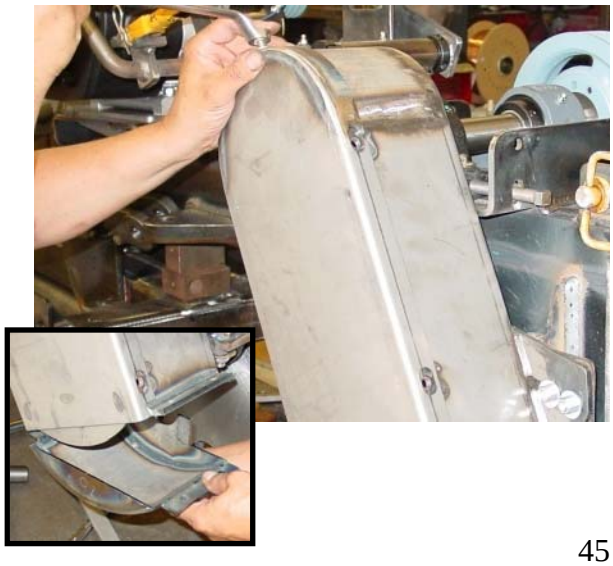


- Place Poly Chain® sprocket and tapered bushing back onto cutter wheel shaft and tighten bolts. Replace Poly Chain® belt. **Alignment is very important, use a straight edge from the jackshaft sprocket down to the cutter wheel sprocket to line up sprockets.**



- There are two setscrews in each bearing. Tighten one of them down, remove one, and punch a start point in the shaft to drill a 5/16" diameter hole just deep enough for the screw to enter the shaft. Do this for all four setscrews. This will help prevent shaft from spinning and walking inside of bearing. When putting setscrew in bearing, use LocTite® 242 to prevent screw from loosening up.

NOTE: Refer to **SERVICING BELTS** section for proper installation and tensioning of all belts.

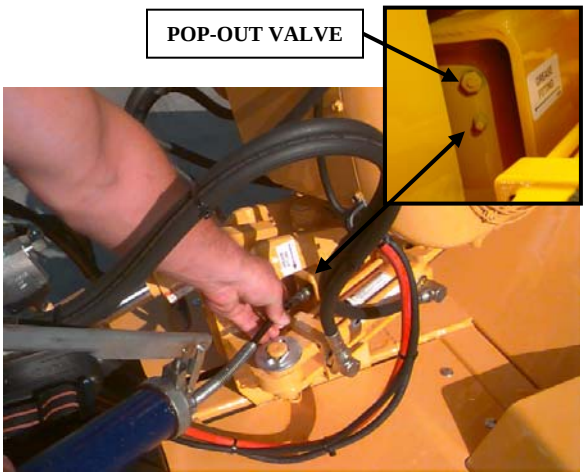


- Replace Poly Chain® guard cover and bottom guard. Tighten bolts.

DO NOT RUN MACHINE WITHOUT ALL GUARDS IN PLACE AND SECURED PROPERLY.

SAFETY

- **NEVER SERVICE A MACHINE WITH THE ENGINE RUNNING, SEVERE PERSONAL INJURY COULD OCCUR. TURN ENGINE OFF THEN REMOVE IGNITION KEY AND DISCONNECT POSITIVE BATTERY CABLE TO AVOID STARTING MACHINE ACCIDENTALLY.**
- **CUTTER WHEEL MUST BE DISENGAGED BEFORE TURNING ENGINE ON/OFF AND BEFORE SERVICING A MACHINE. OTHERWISE SEVERE PERSONAL INJURY COULD OCCUR AS WELL AS MACHINE DAMAGE.**
- **ALL MACHINE PARTS MUST COME TO A COMPLETE STOP AND HAVE TIME TO COOL COMPLETELY BEFORE SERVICING A MACHINE OR SEVERE INJURY COULD OCCUR, POSSIBLY SERIOUS BURNS AND/OR DISMEMBERMENT.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**



- Swing the cutter wheel to the right to access the boom pivot grease fitting. Grease boom pivot monthly. **Do not over grease.** There is a Pop-Out Valve above the grease fitting, if the pin pops out enough grease has been applied. Wipe off excess grease. **Excess grease will attract dirt.**

- The boom pivot is equipped with a hardened shaft and Timken® roller bearings. If the boom becomes loose, you will need to apply pressure to the bearings to tighten it. To apply more pressure to the bearings, hold the bottom nut where the cotter pin is. Remove the first nut and tighten the second nut, which will apply pressure to the roller bearings and the boom swing. You can place cutter wheel on ground and put slight pressure on cutter wheel to adjust pivot bearings.

If the main pivot bearings need replacing, you will have to remove the top pin and slide the main pivot out and install the new bearings. **See Upper Pivot Assembly for breakdown.**

- **Boom must be placed in a fixture to hold steady when you remove the pivot pin.**

SAFETY

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- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND EQUIPMENT DAMAGE.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

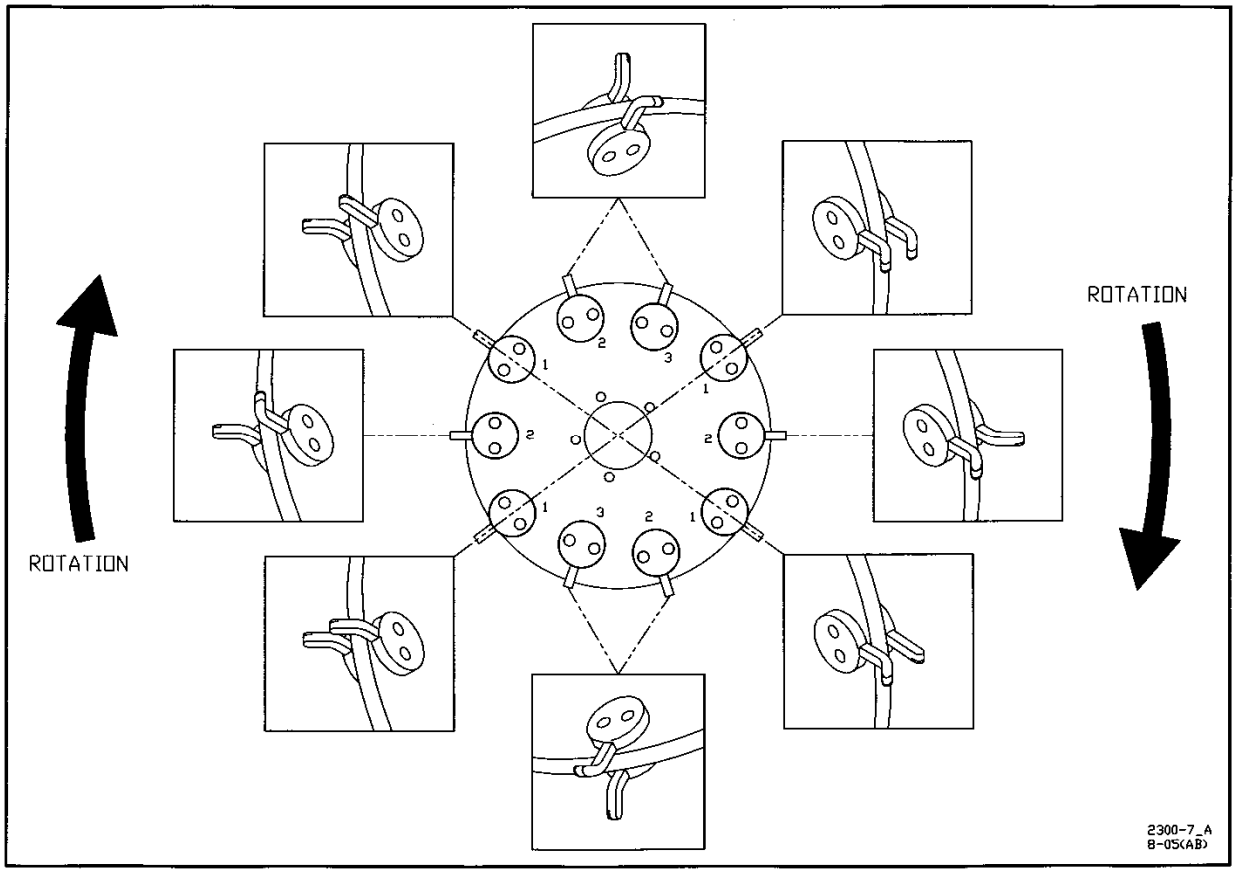
- There are twenty (20) teeth to a complete set on the model SP5014TRX. Two (2) straight teeth, nine (9) left 45° teeth and nine (9) right 45° teeth.

- A locking pin is provided to hold cutter wheel in position during tooth removal and re-installation. Locking pin will only lock on outer teeth.
  NEVER PLACE HAND ON CUTTER WHEEL TO HOLD IN PLACE WHILE CHANGING TEETH. BE SURE TO REMOVE PIN BEFORE OPERATING.

- A Tooth Setting Gauge **(P/N 0450111)** is provided with each machine for proper tooth installation. Line all teeth up with the inside edge of the groove in the gauge. Set ***ALL*** teeth to this edge with gauge against pocket, not against cutter wheel.
  See Cutter Wheel Assembly for breakdown.

TOOTH ARRANGEMENT

- Inspect pockets, teeth and bolts for damage and replace as required.
- When replacing pockets, always replace new pockets across from each other in order to prevent vibration.
- Replacement teeth must be carbide tipped and have like design as provided with the machine.
- Use anti-seize on threads to prevent bolts from "freezing up" in cutter wheel.
- When replacing complete set of teeth, be sure to duplicate original factory tooth arrangement.
- Torque bolts to 170 ft/lbs.



Opposing outside pockets carry like arrangements of teeth to cancel vibration.

- Straight teeth are mounted in ***TWO OPPOSING OUTSIDE POCKETS.*** A straight tooth must have a 45° tooth accompanying it in the same pocket set.
- The opposite pocket sets should have this same combination of straight and 45° teeth, except with positions reversed. Mounting these teeth opposite each other on the cutter wheel cancels damaging vibration.
- Two Remaining Outside Pockets must have 45° teeth overlapping centerline of wheel to make plunge cuts possible. Mount two left 45° teeth opposite two right 45° teeth.
- Inside pockets require 45° teeth mounted away from the wheel.

OPTIONAL:
Razor Cutter Wheel

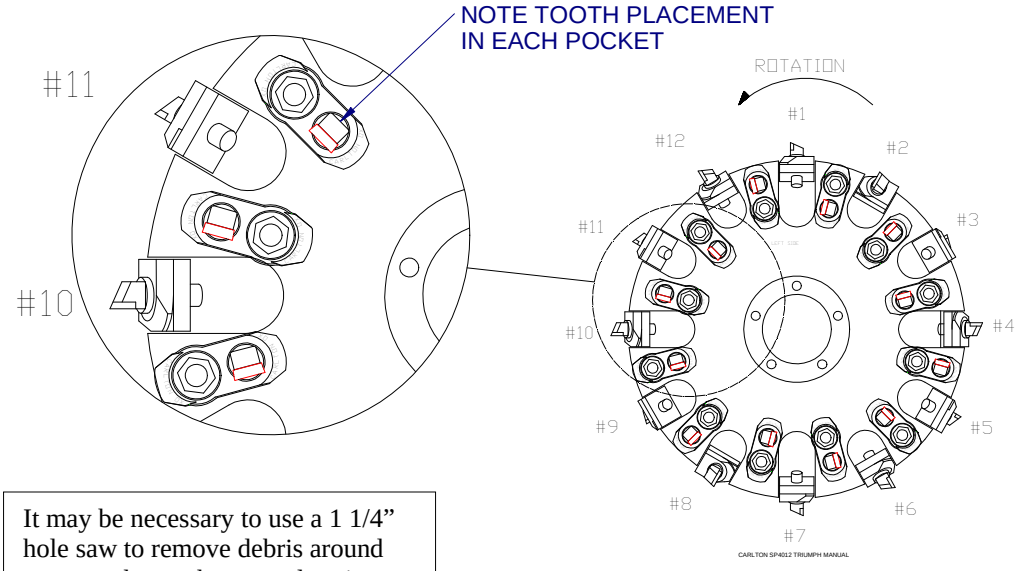
- If the machine is supplied with the optional Razor cutter wheel, there are thirty-six (36) teeth to a complete set. There are twelve (12) Short Plow Bolt Bits and twenty-four (24) Plow Bolt Bits.
- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND EQUIPMENT DAMAGE.**

- A locking pin is provided to hold cutter wheel in position during tooth removal and re-installation.
- The locking pin will only lock in the deep slots of the outer teeth. Line the slot up with the locking pin slot and insert the pin to lock position. The pin will need to be removed and reinserted as wheel is rotated to change remaining teeth. (Some early machines will only lock on an outside 20° tooth.)
- **NEVER PLACE YOUR HAND ON THE CUTTER WHEEL TO HOLD IT IN PLACE WHILE CHANGING TEETH.**
- **BE SURE TO REMOVE THE PIN BEFORE OPERATING THE STUMP CUTTER.**

- The teeth do not require a setting gauge. The only requirement is to be installed in the proper direction and tightened to the proper torque as discussed in the next section.
- **When replacing a cutter wheel tooth, replace the tooth and nut as a set and use anti-seize on the threads.**

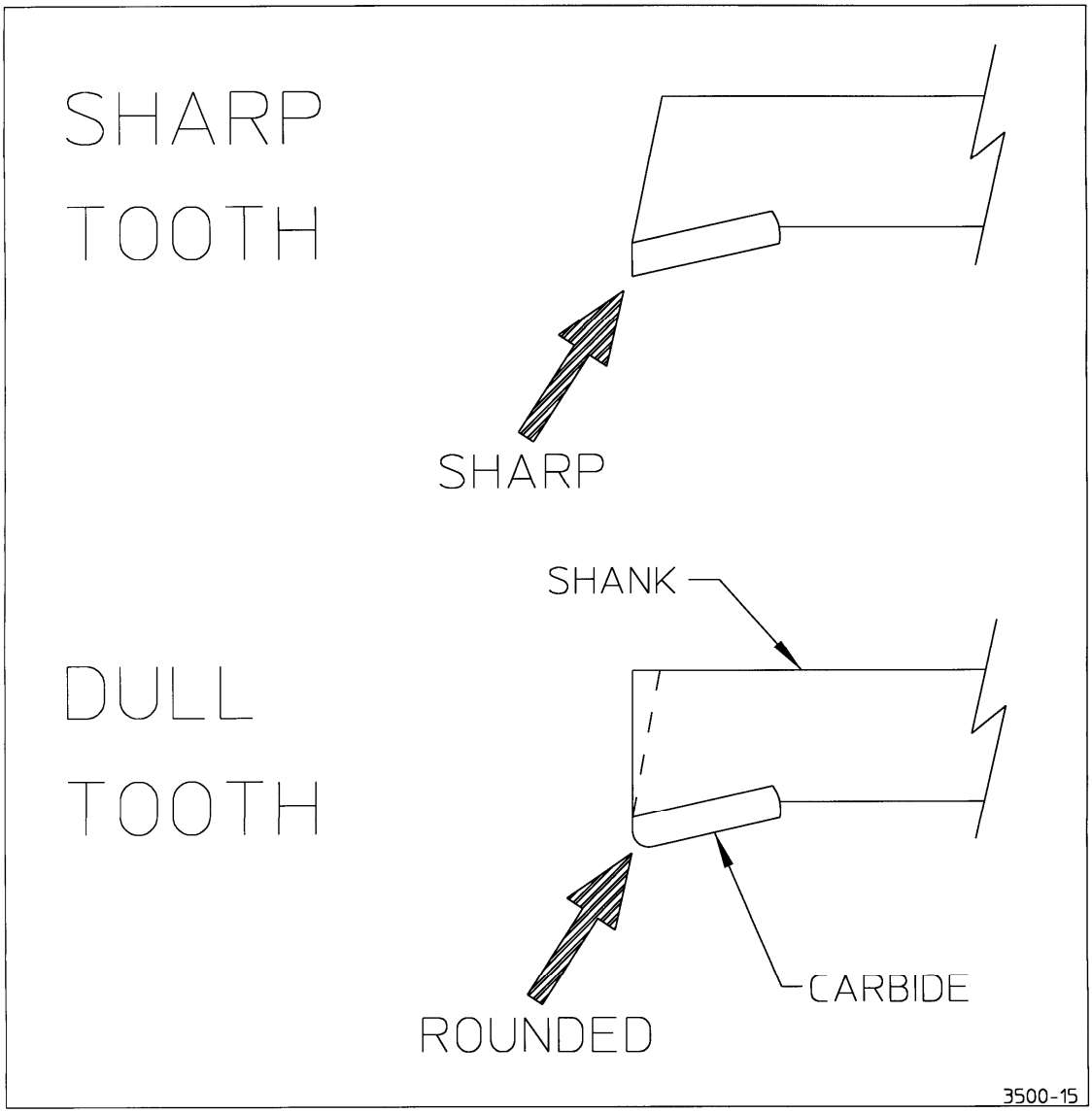
TOOTH ARRANGEMENT

- Inspect pockets, teeth and bolts for damage and replace as required.
- When replacing a cutter wheel tooth, replace the tooth and nut as a set and use anti-seize on the threads.
- When replacing teeth and pockets, also replace the teeth and pockets across from each other diagonally in order to maintain wheel balance and prevent vibration.
- All teeth and pockets are of a specific design and must be replaced with original manufacturer's replacement parts. Replacement teeth must be carbide tipped.
- When replacing complete set of teeth, be sure to duplicate original factory tooth arrangement. SEE DIAGRAM BELOW.
- The seating surfaces of the tooth and pocket are formed, but make sure the tooth is inserted with the carbide facing the direction of rotation.
- The pictured view is the engraved side of the wheel. The wheel is engraved with outside pocket numbers, outside pocket angle/direction (12 R or 12 L), and wheel rotation. (The engraved side of wheel is marked left side of wheel; this is for manufacturing purposes only. It does not refer to the left side of the machine as described in the General Information section.)
- Outside pocket teeth are Short Plow Bolt Bits. These pockets are angled and welded in place. You can switch teeth from one outside pocket to a pocket that is the opposite direction to prolong tooth life, such as switching a tooth from a 12 R with a tooth from a 12 L pocket. The cutting edge is the corner and this will turn the opposite corner out for use.
- These teeth are tightened with nuts. Torque on nuts is not to exceed 170 ft/lbs.
- All teeth on cutter wheel sides are Plow Bolt Bits. When changing these teeth you must remove both teeth in the same pocket, one on each side of the wheel. When the nuts are torqued, the pocket is jammed and the teeth can only be removed this way.
- The pocket will receive wear when cutting and can be switched from one side of the cutter wheel to the other to prolong life. Remember the teeth must be replaced in the original position on each side of the wheel.



It may be necessary to use a 1 1/4" hole saw to remove debris around nut to make tooth removal easier.

TOOTH SHARPENING



Begin by chamfering shank back past edge of carbide. You do this because if it is not back far enough the shank will hit the stump and not the carbide, thus causing a lot of vibration. Once the shank is angled far enough back, then begin sharpening carbide.

- **Cut shank with a standard rock and cut carbide with a silicone carbide or diamond rock.**
  CAUTION: GRINDING CARBIDE CAN BE A HEALTH HAZARD. Use facemask to prevent breathing in harmful material while grinding.

SAFETY

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- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**
- **RELEASE HYDRAULIC PRESSURE BEFORE PERFORMING ANY SERVICE TO HYDRAULIC LINES OR OTHER COMPONENTS.**
- **FLUID UNDER PRESSURE CAN PENETRATE THE SKIN AND CAUSE SEVERE INJURY. SEEK IMMEDIATE MEDICAL ATTENTION IF SKIN IS PENETRATED. CHECK HOSES AND FITTINGS USING A BOARD OR CARDBOARD; DO NOT USE HAND OR FINGER. ALWAYS WEAR EYE PROTECTION.**

HYDRAULIC OIL & FILTER

- Check hydraulic oil level daily. This Carlton stump grinder is equipped with a gauge that shows the level of oil and the temperature of the oil. When filling the tank 2/3 with oil, the window of the gauge will also fill with oil, as the level gets higher in the tank. Never fill the oil tank above the BLACK line at the top of the gauge. Do not run the machine with the oil level below the RED line at the bottom of the gauge.
- The machine is equipped with Citgo AW46 hydraulic oil at the time of manufacture. Use the same or equivalent. NOTE: If machine is ran in extreme climates you may need to adjust the weight of the oil for the machine to operate properly.

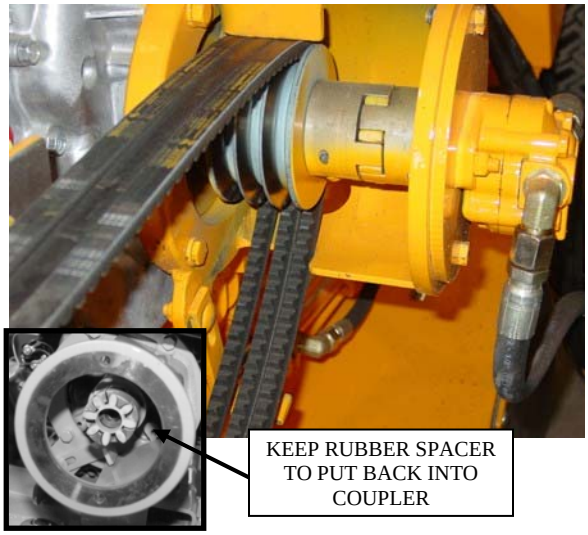
- For a new machine, change the hydraulic oil filter when the stump grinder has been operating for 10 hours. Replace with the same type of in-tank filter element supplied originally, available through Carlton or Carlton dealers. From this point on, change the filter every 200 hours of operation.
- Change hydraulic oil every 500 hours of operation or at least once a year depending on use. Flush the hydraulic tank when changing the hydraulic oil. Replace oil if it has a burnt odor or if it is contaminated. Replace oil if the stump grinder has been stored for a long period of time (all winter).
- Drain the hydraulic tank using the drain plug located on the bottom of the tank. Dispose of used oil according to state regulations.

HYDRAULIC OIL COOLER
(only on remote control machines)

- There is a hydraulic oil cooler on all remote control machines to keep the hydraulic oil from over heating. There is a temp sensor in the bottom of the oil cooler and if the oil temperature rises to 140° or higher the fan comes on to cool the oil. The fan may go on and off as the temperature of the oil changes depending on the environment and the operation of the grinder.
- Keep the fins clean. Use a garden hose and a mild detergent. Do not use a power washer as it may cause the fins to bend. Do not use an industrial strength detergent that may cause the metal to deteriorate.
- Inspect all connections and hoses for leaks and wear. Replace if necessary. Use extra care when inspecting hoses with fluid under pressure. DO NOT use your finger or hand to inspect for leaks, use a board or cardboard. Follow all safety procedures at the beginning of the Servicing Hydraulics section.

REPLACING HYDRAULIC PUMP

- Engine must be shut off.
- Disconnect hydraulic lines from pump and cap them.
- Remove bolts holding mounting plate to machine (located at 6 & 12 o'clock position)
- Remove plate/pump assembly by pulling assembly straight out. Drive coupling will separate and make removal possible. Make sure to set aside fiber spacer for later re-installation.



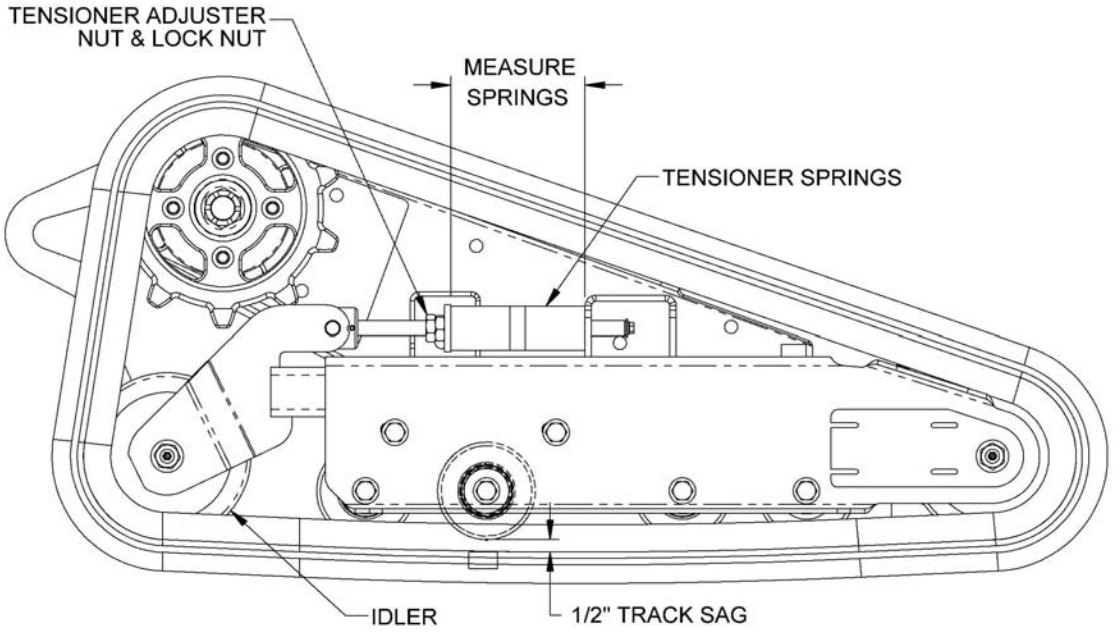
- Remove drive coupling half from pump shaft by loosening Allen screw. It may be necessary to pry apart coupling by inserting screwdriver into coupling split and relieving pressure on pump shaft. Set aside key-way for later re-installation.
- Remove pump from backing plate by removing mounting bolts.
- To install new pump, reverse this process. Making sure to replace rubber spacer in coupling.
- Recheck oil supply in reservoir.

TRACK TENSION ADJUSTMENT

Track must be tensioned enough to prevent de-tracking. Too much tension will cause increased wear on roller, sprockets and drive motor bearings. There are two methods of measuring correct tension: Measure the compression of the springs, or measure track sag.

To measure spring compression:

Loosen tension adjuster nut and lock nut completely. Measure free length of springs. Then tighten adjuster nut to compress tension spring pair to a length of 5/8" less than free length. Tighten lock nut.



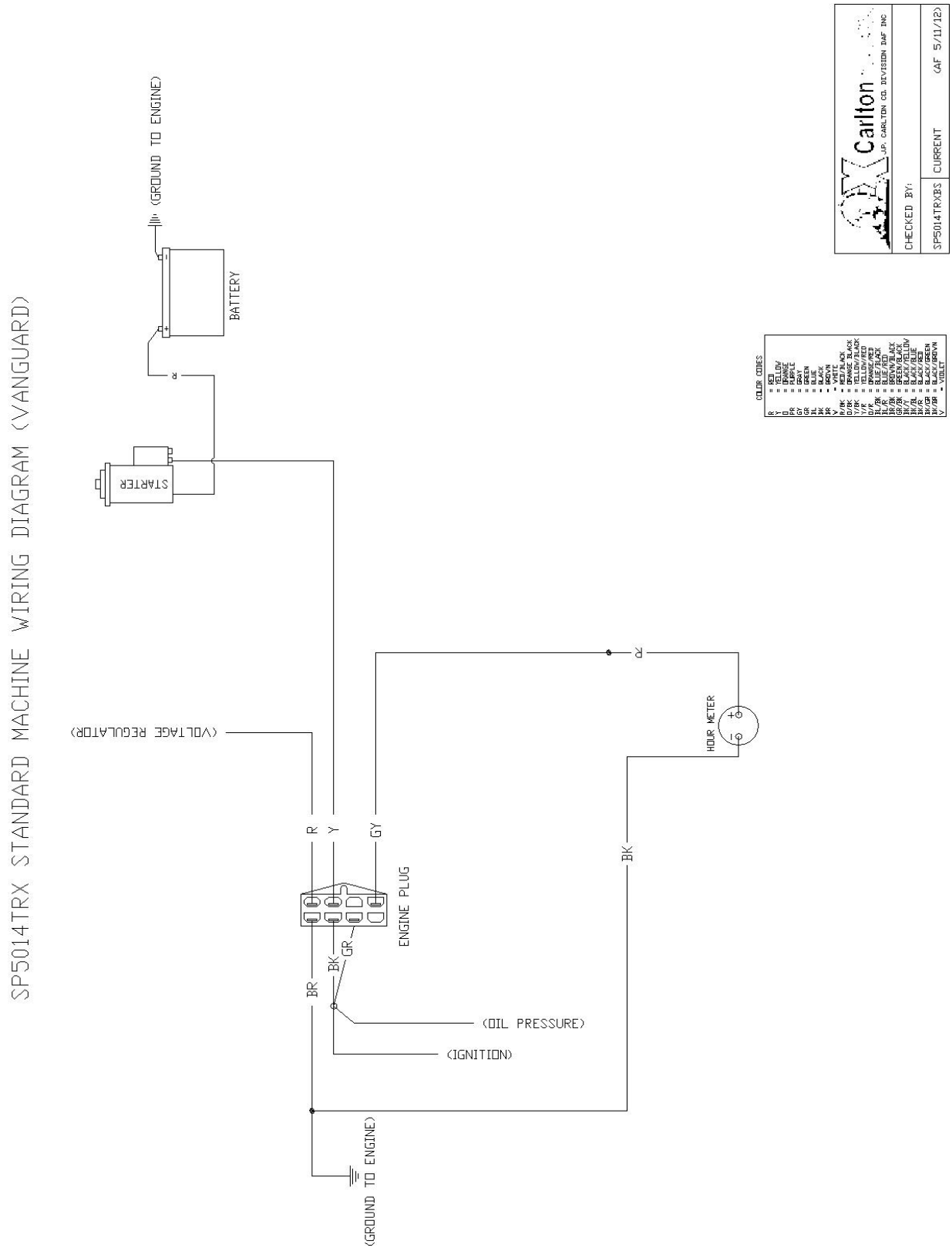
To measure track sag:

Lift the machine and raise the track off the ground. Measure the distance between either one of the central rollers and track metal core bars and adjust track tension to get 1/2" track sag.

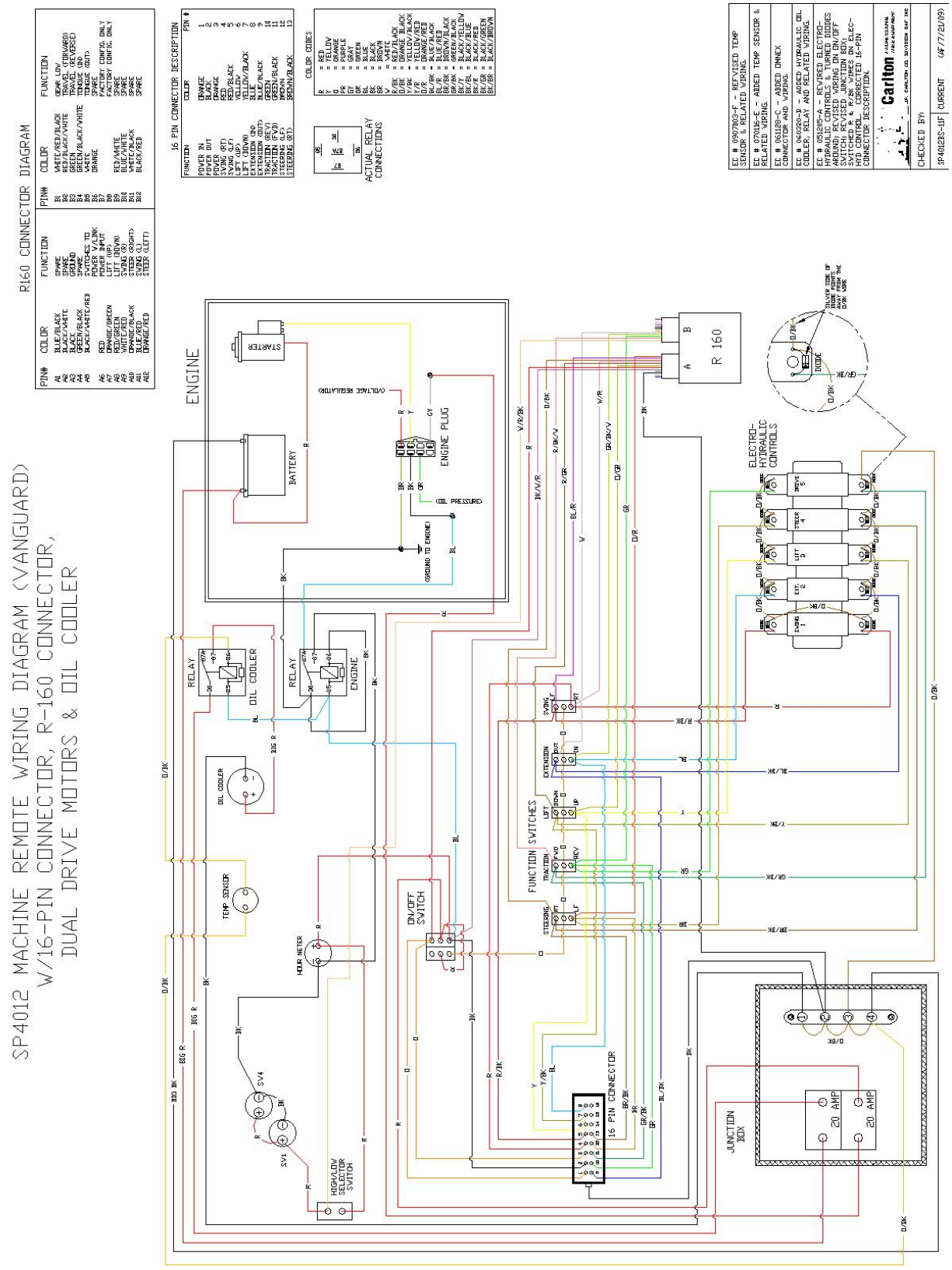
To remove/replace track:

Completely loosen tensioner nuts. Retract idler completely. Remove track from idler first, sprocket second, and front roller last. Reverse procedure to replace track. Adjust track tension per instructions and illustration.

STANDARD WIRING DIAGRAM



RADIO WIRING DIAGRAM



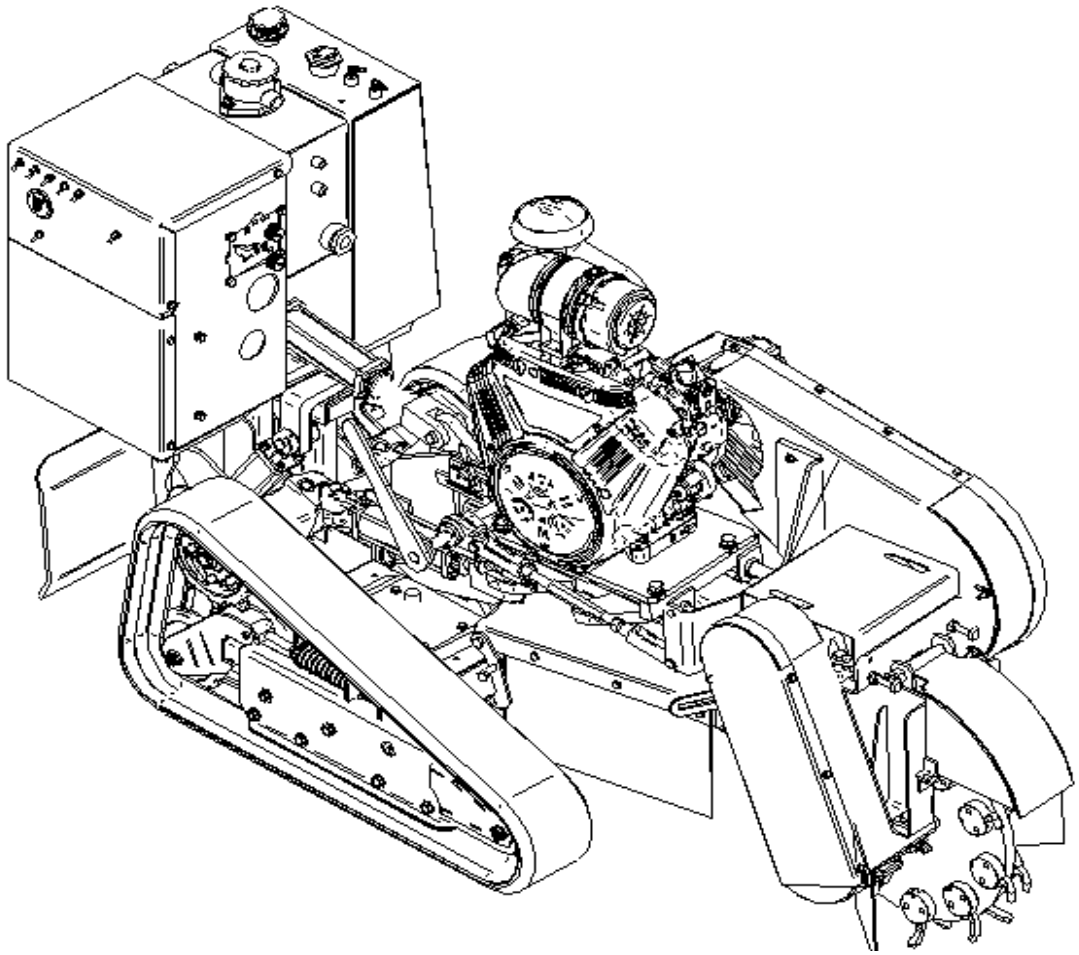
Parts Book

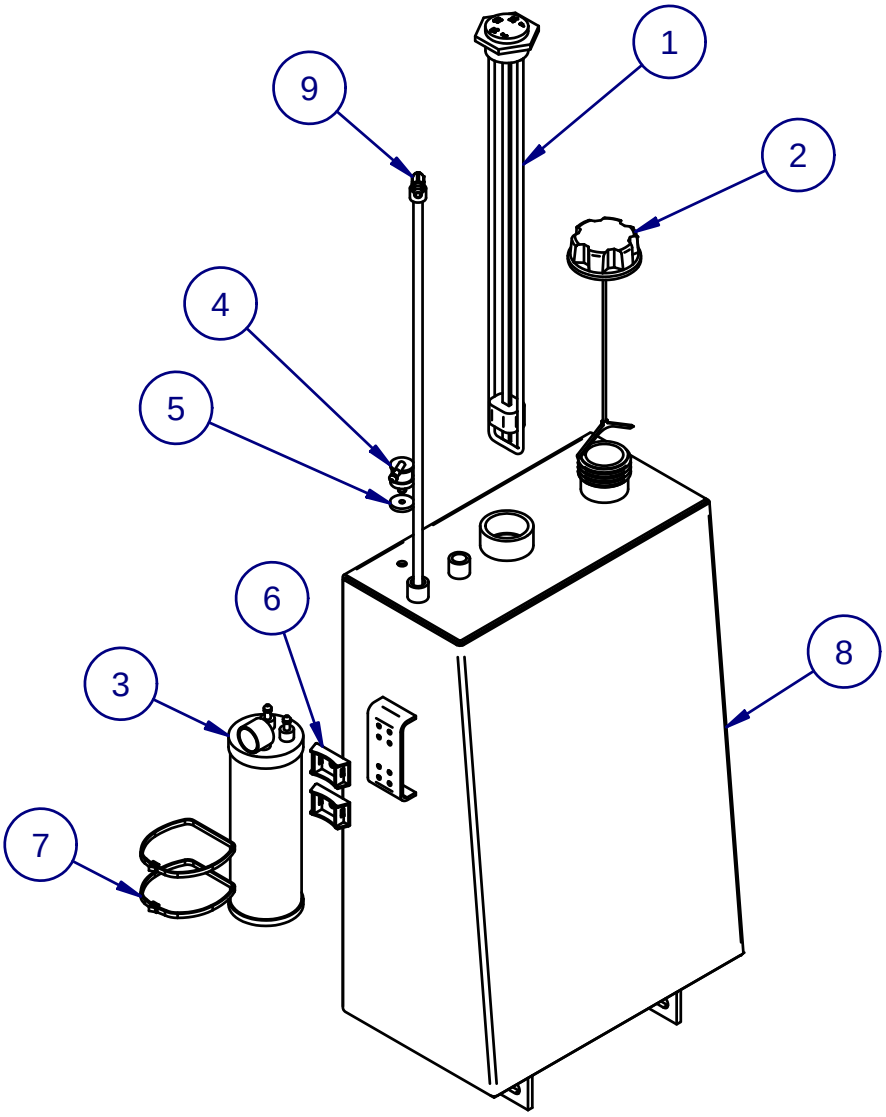
Carlton PROFESSIONAL TREE EQUIPMENT

Carlton
J.P.Carlton Company
Div. D.A.F. Inc.
121 John Dodd Road
Spartanburg, SC 29303
Ph. (864) 578-9335
Fax (864) 578-0210
www.stumpcutters.com

5014 STUMP GRINDER

35HP VANGUARD ENGINE





PART	ITEM	DESCRIPTION	QTY
1	0200210	GAUGE,SPIRAL FUEL,21"	1
2	0201001	FUEL CAP,NON-VENTED	1
3	0201002	CHARCOAL CANISTER	1
4	0201002A	VALVE,SLOSH	1
5	0201002B	GROMMET,ROLL OVER VALVE	1
6	0201002C	MOUNT,CARBON CANISTER	2
7	0350016B	Black Wire Tie - 14 1/2"	2
8	14010028	WELDMENT,FUEL TANK,GAS	1
9	14010036	WELDMENT,PICK-UP TUBE	1

FUNCTION GROUP
1 FRAME AND TANKS

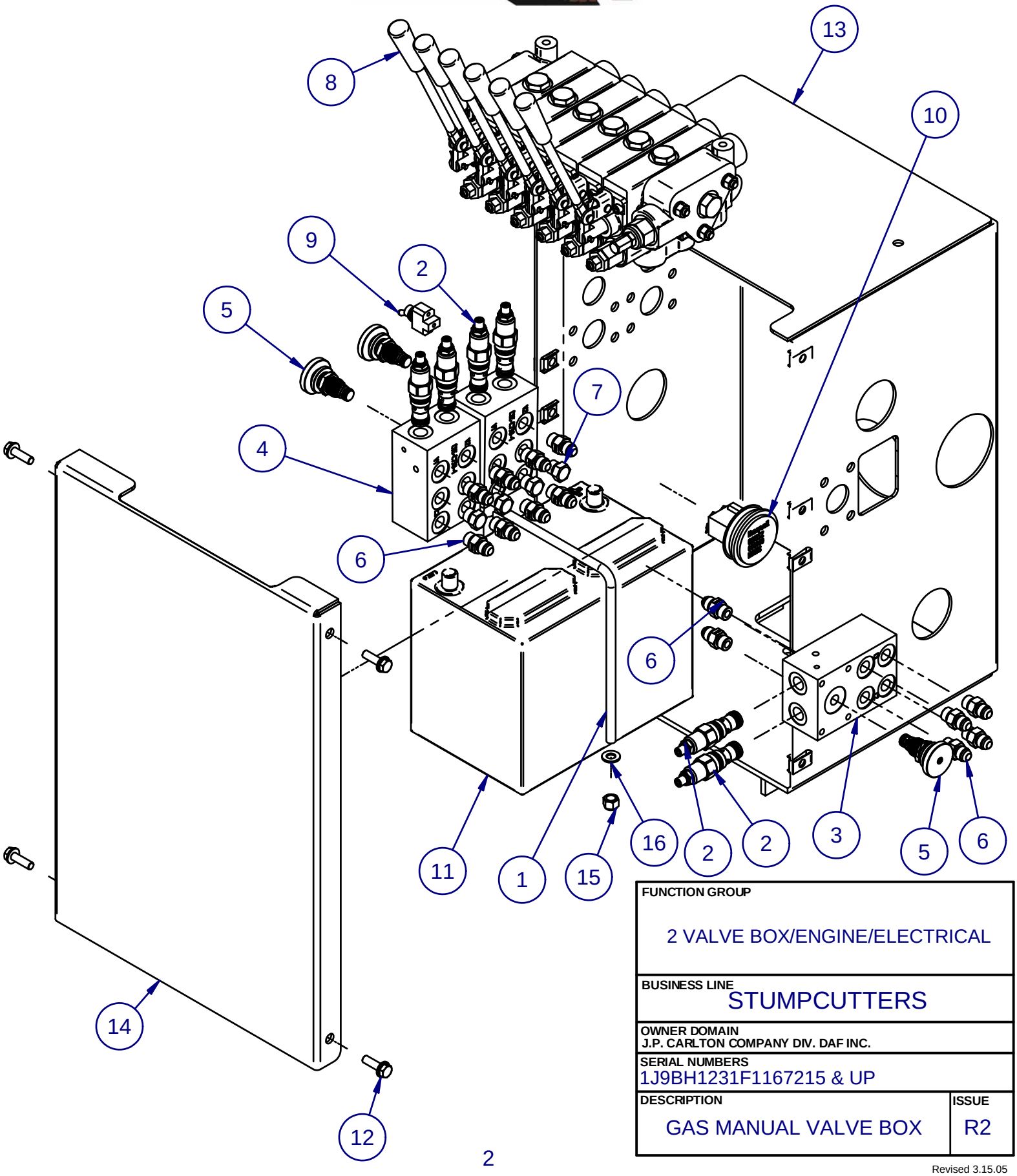
BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS
1J9BH1230C1167041

DESCRIPTION	ISSUE
ASSY,GAS FUEL TANK	R1

Revised 3.15.05



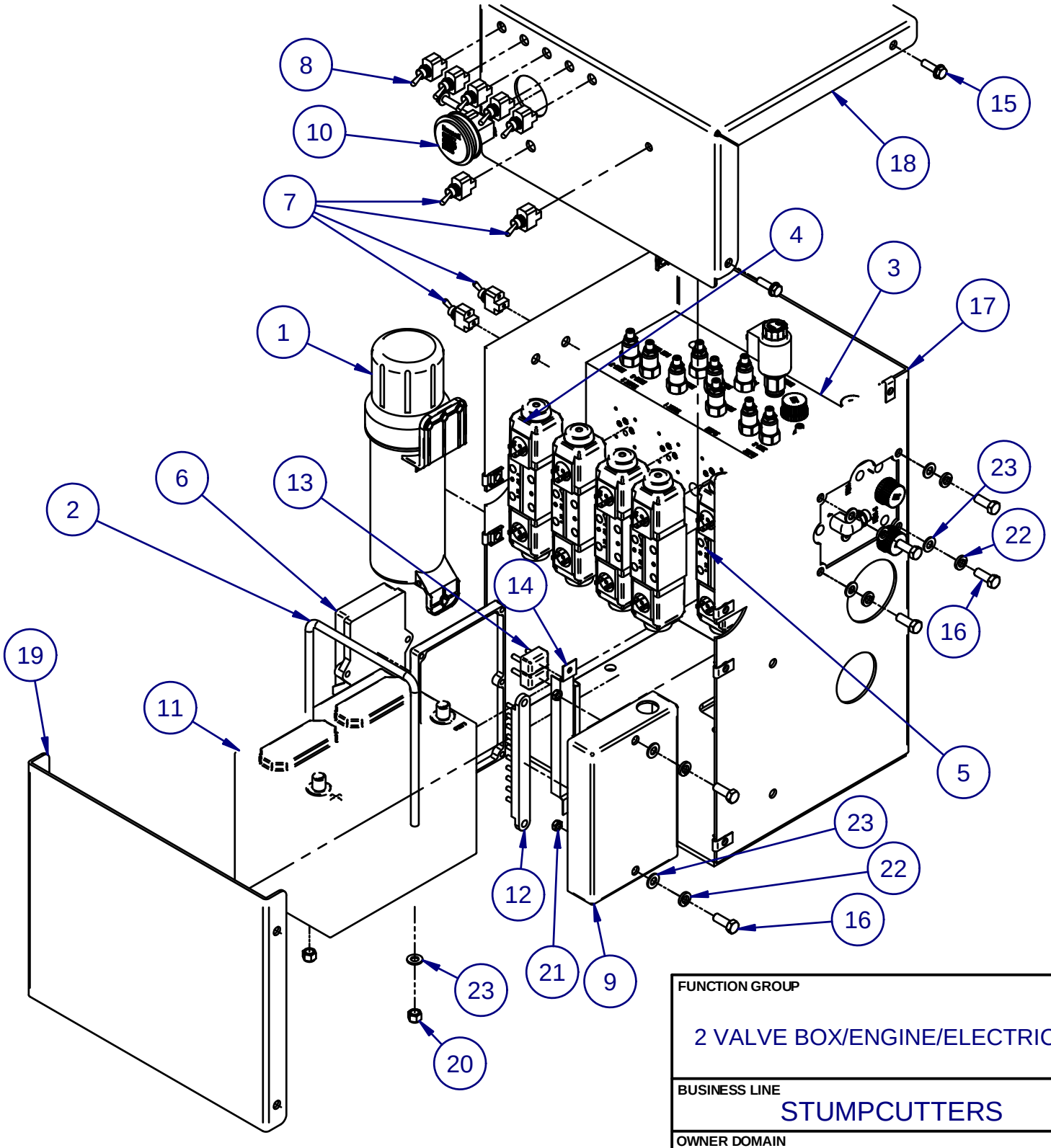
FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	1J9BH1231F1167215 & UP
DESCRIPTION	GAS MANUAL VALVE BOX
ISSUE	R2

Revised 3.15.05

PART	ITEM	TITLE	QTY
1	0150508	BATTERY BRACKET - 3/8x7x8.25	1
2	0300120A	C/B Cartridge Valve - CBCG-LKN	6
3	0300127A	25-4 Swg Mnfld Ndle Cvty C738	1
4	0300127A1	44-4 Swg Mnfld with Ndle Cvty	2
5	0300138	Vickers Needle Cartridge	3
6	03002257	3/8 JIC-3/8 ORB - 6400-6-6	14
7	0300250	3/8 ORB Plug - 6408-6	4
8	0300377	Control Valve 5014TRX Manual	1
9	0350011A	Switch-INT1-2	1
10	0350031	Hour Meter - Datcon /Hobbs	1
11	0350032A	BATTERY,12V/950 CCA	1
12	12A-0508Z1	SERRATED FLANGE HEX C/S 5/16-18 x 1 UNC GR 5	4
13	15020005	WELDMENT,EXPANADABLE VALVE BOX,MANUAL	1
14	15020021	PLATE,EXPANDABLE MANUAL VALVE BOX,FRONT	1
15	24D-06	NUT,ELASTIC STOP, 3/8-16 UNC GR8	2
16	31B-06Z1	FLAT WASHER 3/8 USS GR 8 Z&Y	2

FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	1J9BH1231F1167215 & UP
DESCRIPTION	GAS MANUAL VALVE BOX
ISSUE	R2

Revised 3.15.05



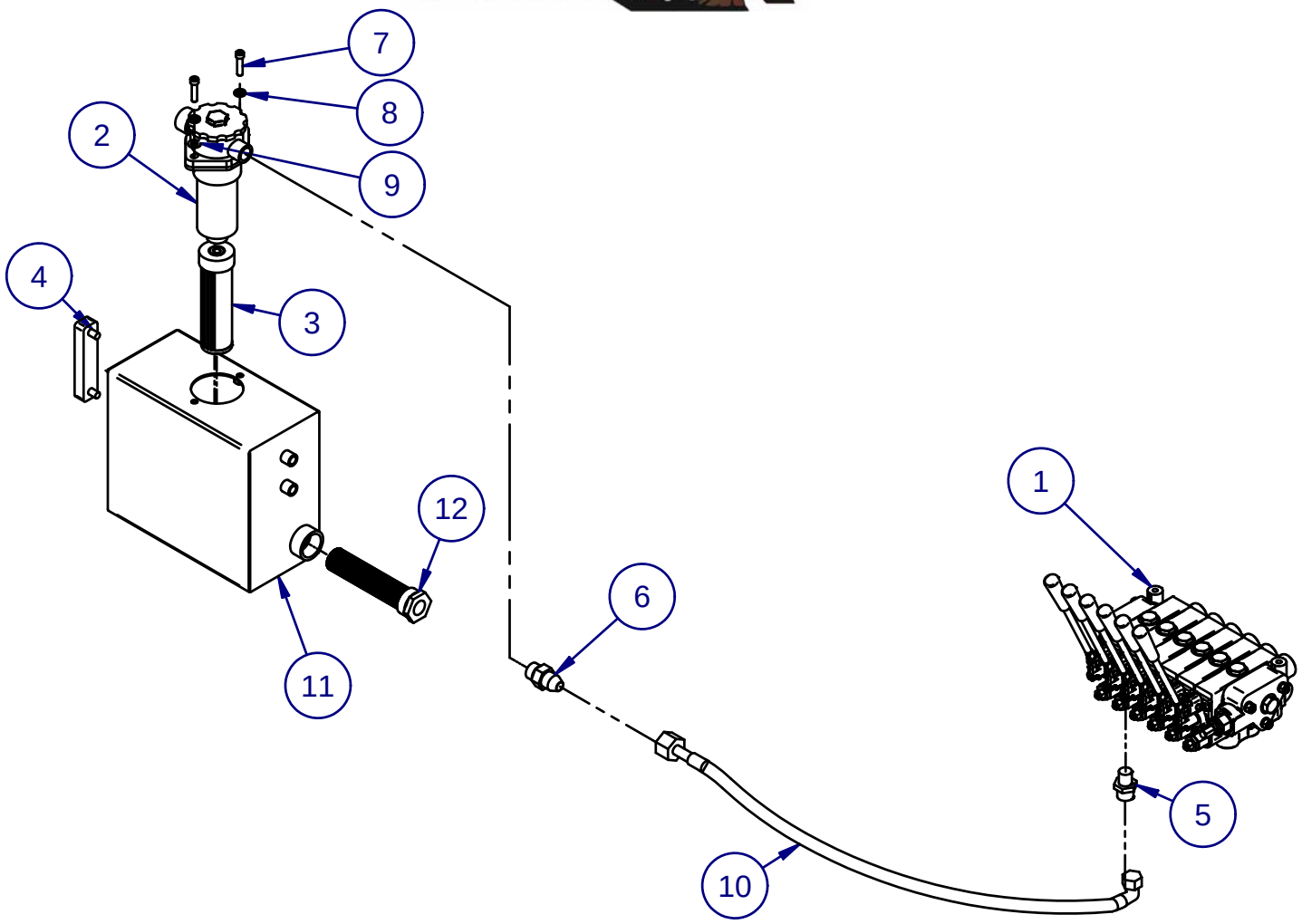
FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	GAS REMOTE VALVE BOX
ISSUE	R1

Revised 3.15.05

PART	ITEM	TITLE	QTY
1	040060	MANUAL CANISTER,MACHINE MOUNTED	1
2	0150508	BATTERY BRACKET - 3/8x7x8.25	1
3	0300121L	Manifold- SP5014TRX Sun	1
4	0300125C	SOLENOID VALVE DG4V38CVMUG761	4
5	0300125D	SOLENOID VALVE DG4V30CMUG760	1
6	0350006A	Omnex SP4012 Receiver- 2.4	1
7	03500111A	Switch-INT1-2	4
8	03500111B	Switch - Momentary INT1-7	5
9	0350029C	Junction Box 4-Wheeler 1325-DG	1
10	0350031	Hour Meter - Datcon /Hobbs	1
11	0350032A	BATTERY,12V/950 CCA	1
12	0350084	Terminal Block - 70004	1
13	0350087B	Circuit Breaker - 20 AMP 72325	2
14	0350087E	Circuit Breaker Bracket -72065	1
15	12A-0508ZI	SERRATED FLANGE HEX C/S 5/16-18 x 1 UNC GR 5	8
16	12A-0608ZI	HEX C/S 3/8-16 x 1" UNC GR 8 ZINC	10
17	15020006	WELDMENT,VALVE BOX,REMOTE	1
18	15020016	PLATE,GAS REMOTE VALVE BOX,FRT/TOP	1
19	15020019	PLATE,REMOTE VALVE BOX,BTM/FRT	1
20	24D-06	NUT,ELASTIC STOP, 3/8-16 UNC GR8	2
21	29A-04	NUT,STOVER LOCK, 1/4-20 UNC GR8	2
22	30A-06	LOCKWASHER, 3/8" USS GR8	10
23	31B-06ZI	FLAT WASHER 3/8 USS GR 8 Z&Y	12

FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	GAS REMOTE VALVE BOX
ISSUE	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300377	Control Valve 5014TRX Manual	1
2	0300135E	HYD. IN-TANK FILTER STF	1
3	0300135F	HYD. IN-TANK FILTER ELEMENT	1
4	0300266A	HYD. SITE GAUGE W/TEMP	1
5	0300236	1/2 JIC-1/2 PRB-6400-8	1
6	0300245A	1/2 JIC-3/4ORB-6400-8-12	1
7	13D-0612	SHCS 3/8X1-1/2 NC GR8	2
8	30A-06Z1	3/8 LOCK WASHER	2
9	31A-06Z1	3/8 FLAT WASHER	2
10	HSP50140	HOSE ASSEMBLY	1
11	14010020	WELDMENT,HYD. TANK	1
12	0300169	STRAINER-TANK MOUNTED LTM-15	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

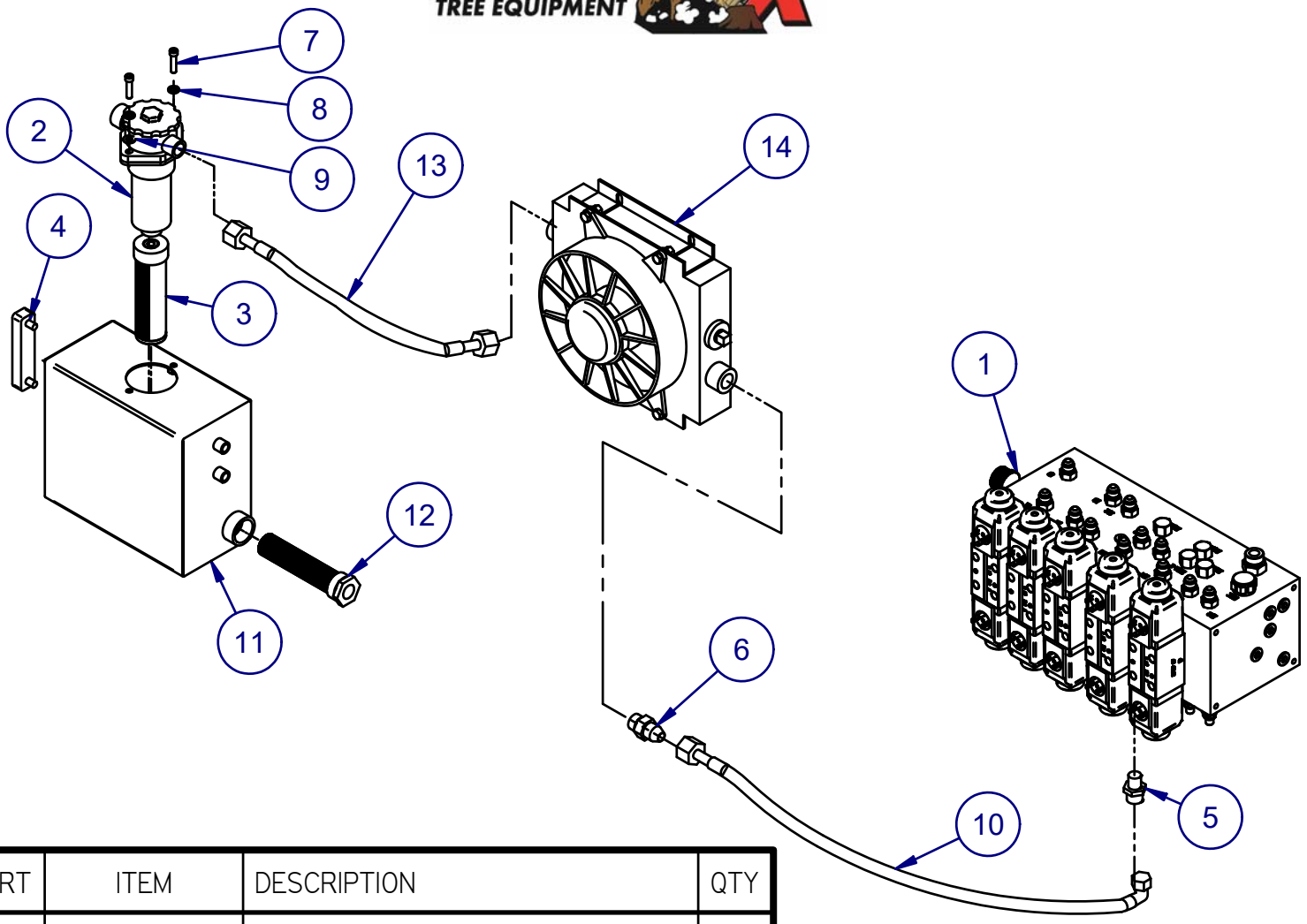
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
MANUAL VALVE HYD, RETURN ASSEMBLY

ISSUE
R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300121L	Manifold- SP5014TRX Sun	1
2	0300135E	HYD. IN-TANK FILTER STF	1
3	0300135F	HYD. IN-TANK FILTER ELEMENT	1
4	0300266A	HYD. SITE GAUGE W/TEMP	1
5	0300236	1/2 JIC-1/2 PRB-6400-8	1
6	0300245A	1/2 JIC-3/40RB-6400-8-12	1
7	13D-0612	SHCS 3/8X1-1/2 NC GR8	2
8	30A-06Z1	3/8 LOCK WASHER	2
9	31A-06Z1	3/8 FLAT WASHER	2
10	HSP5014R13	HOSE ASSEMBLY	1
11	14010020	WELDMENT,HYD. TANK	1
12	0300169	STRAINER-TANK MOUNTED LTM-15	1
13	HSP5014R16	HOSE ASSEMBLY	1
14	0300165BR1	Hydraulic Oil Cooler-	1

FUNCTION GROUP

2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE

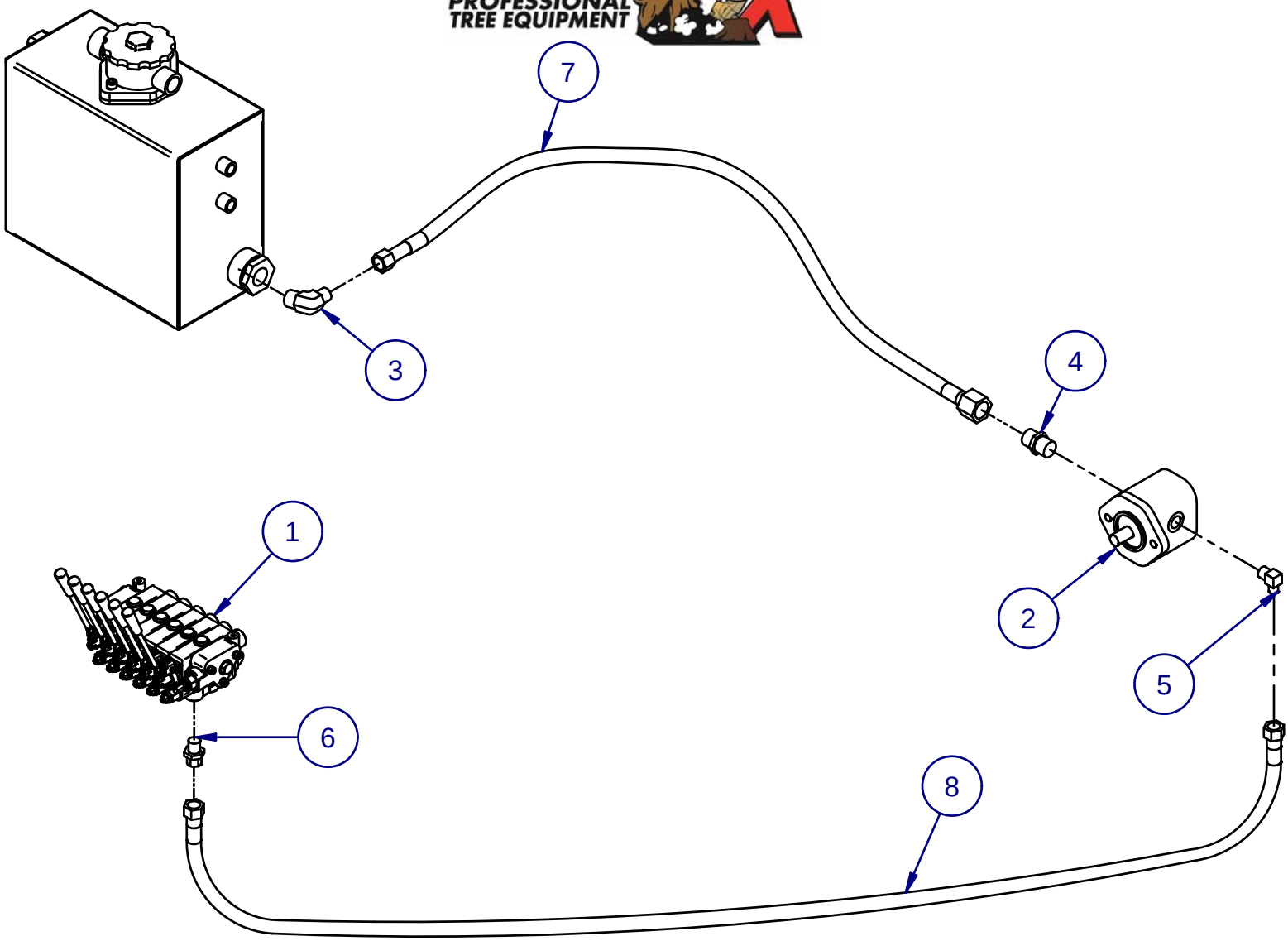
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
REMOTE VALVE HYD, RETURN ASSEMBLY	R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300377	Control Valve 5014TRX Manual	1
2	0300142G	Hyd Pump 4012- Bucher	1
3	0300354JI	3/4 NPT - 3/4 FJ45T 2503-12-12	1
4	0300212	3/4 JIC - 1/2 ORB - 6400-12-08	1
5	0300219	1/2 JIC - 1/2 ORB 90 - 6801-8	1
6	0300236	1/2 JIC-1/2 ORB- 6400-8	1
7	HSP501423	Hose Assembly	1
8	HSP501424	Hose Assembly	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

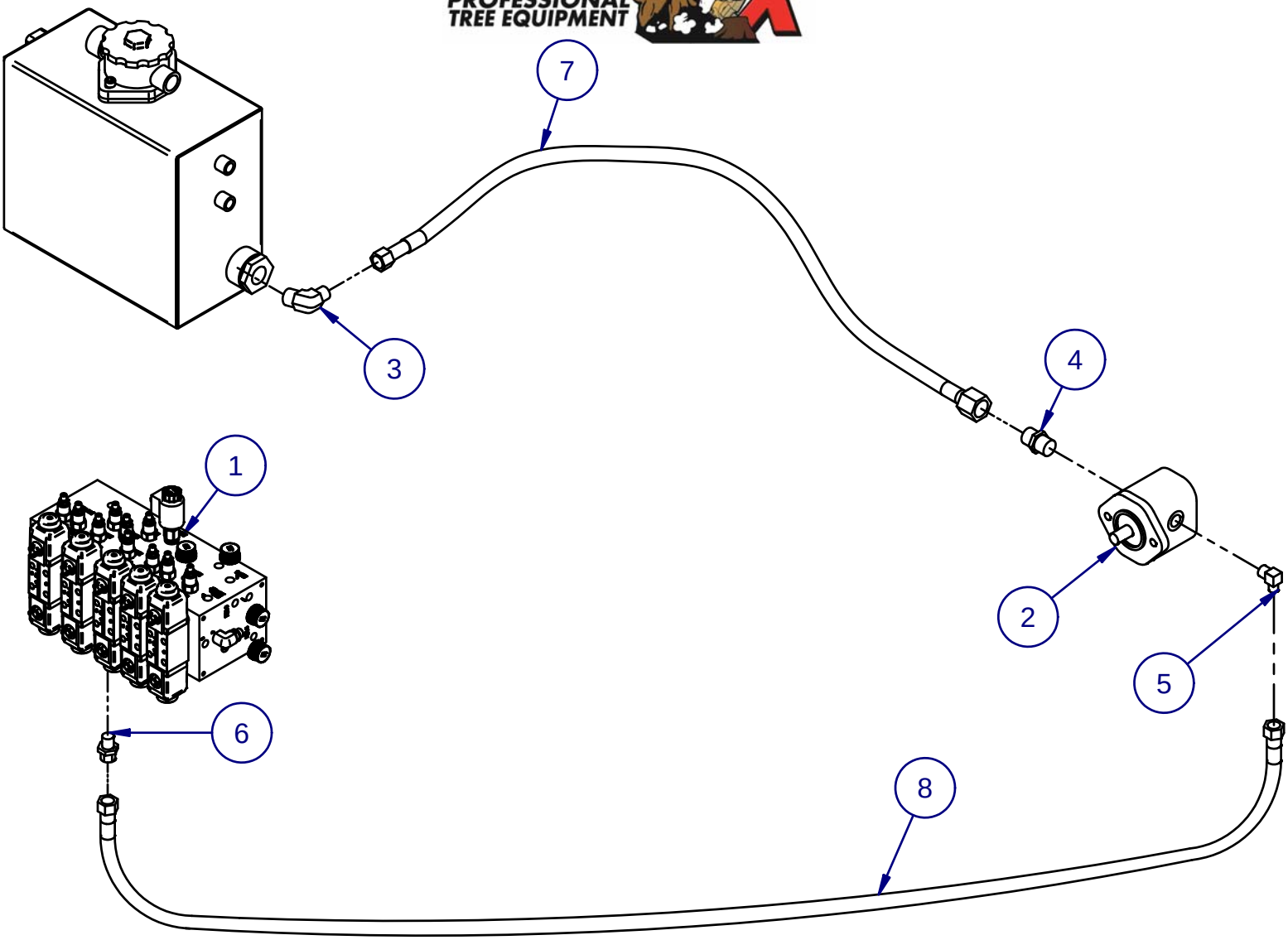
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
MANUAL VALVE GAS HYD, INLET ASSEMBLY

ISSUE
R2

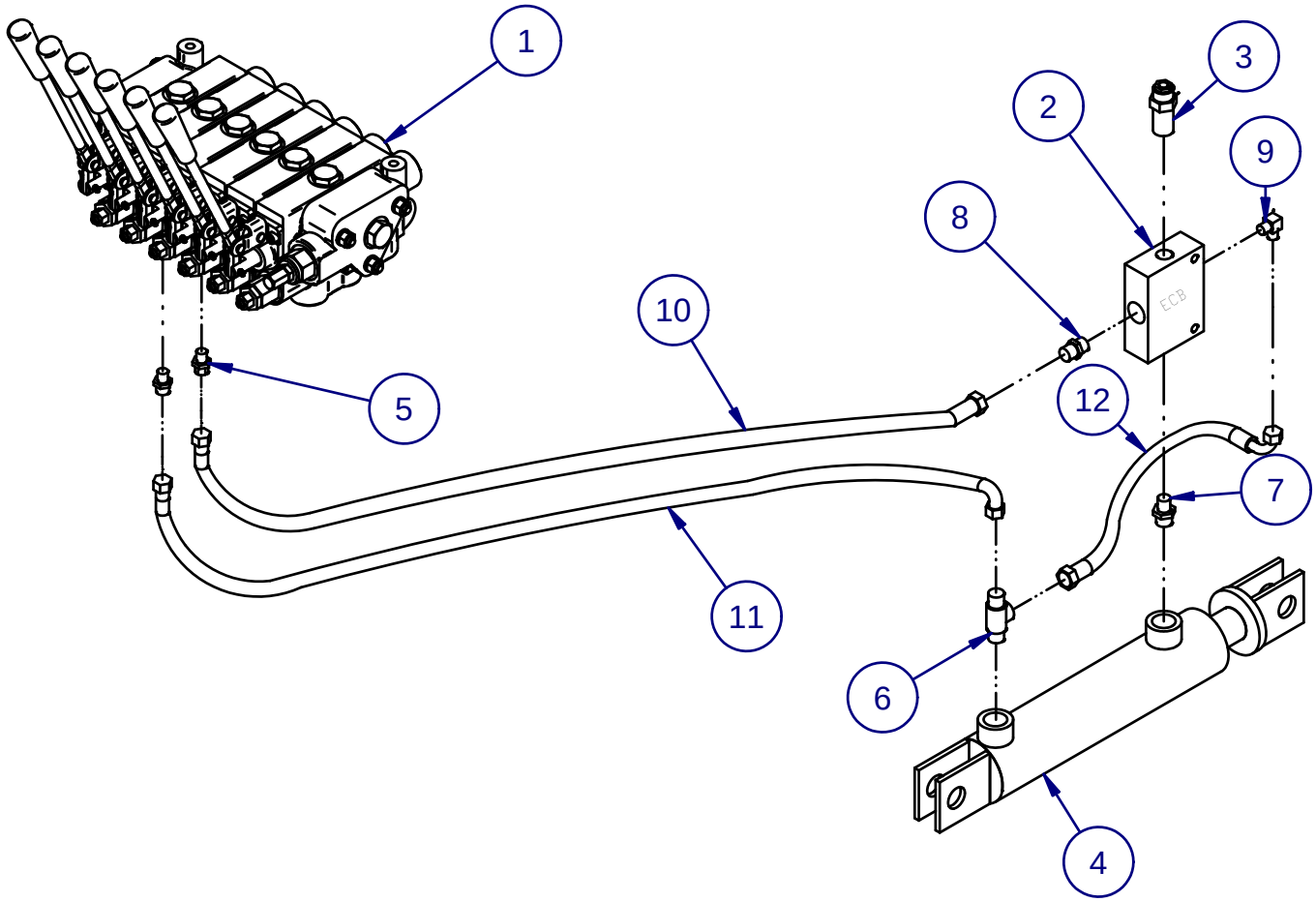
Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300121K	Manifold 4012 A308 149 C03	1
2	0300142G	Hyd Pump 4012- Bucher	1
3	0300354J1	3/4NPT - 3/4 FJ45T	1
4		3/4 JIC -1/2 ORB - 6400-12-8	1
5	0300219	1/2 JIC - 1/2 ORB 90 - 6801-8	1
6	0300236	1/2 JIC-1/2 ORB- 6400-8	1
7	HSP5014R17	Hose Assembly	1
8	HSP5014R18	Hose Assembly	1

FUNCTION GROUP	
2 VALVE BOX/ENGINE/ELECTRICAL	
BUSINESS LINE	
STUMPCUTTERS	
OWNER DOMAIN	
J.P. CARLTON COMPANY DIV. DAF INC.	
SERIAL NUMBERS	
DESCRIPTION	**ISSUE**
REMOTE VALVE GAS HYD, INLET ASSEMBLY	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300377	Control Valve 5014TRX Manual	1
2	0300122	Lift Valve Body - ECB	1
3	0300120	C/B Cartrdige Valve - CBCA-LHN	1
4	0300105Y	Hydraulic Cylinder - 3x6	1
5	0300257	3/8 JIC- 1/2 ORB - 6400-6-8	2
6	0300324	1/2FP-1/2FP-1/2MPTee 6804-8-8-8	1
7	0300251	1/2MP-3/8MP Nipple - 6401-8-6	1
8	0300210	3/8 MP - 3/8 JIC - 2404-6-6	1
9	0300213	3/8 JIC - 1/4 MP 90 - 2501-6-4	1
10	HSP501410	Hose Assembly	1
11	HSP501411	Hose Assembly	1
12	HSP501420	Hose Assembly	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

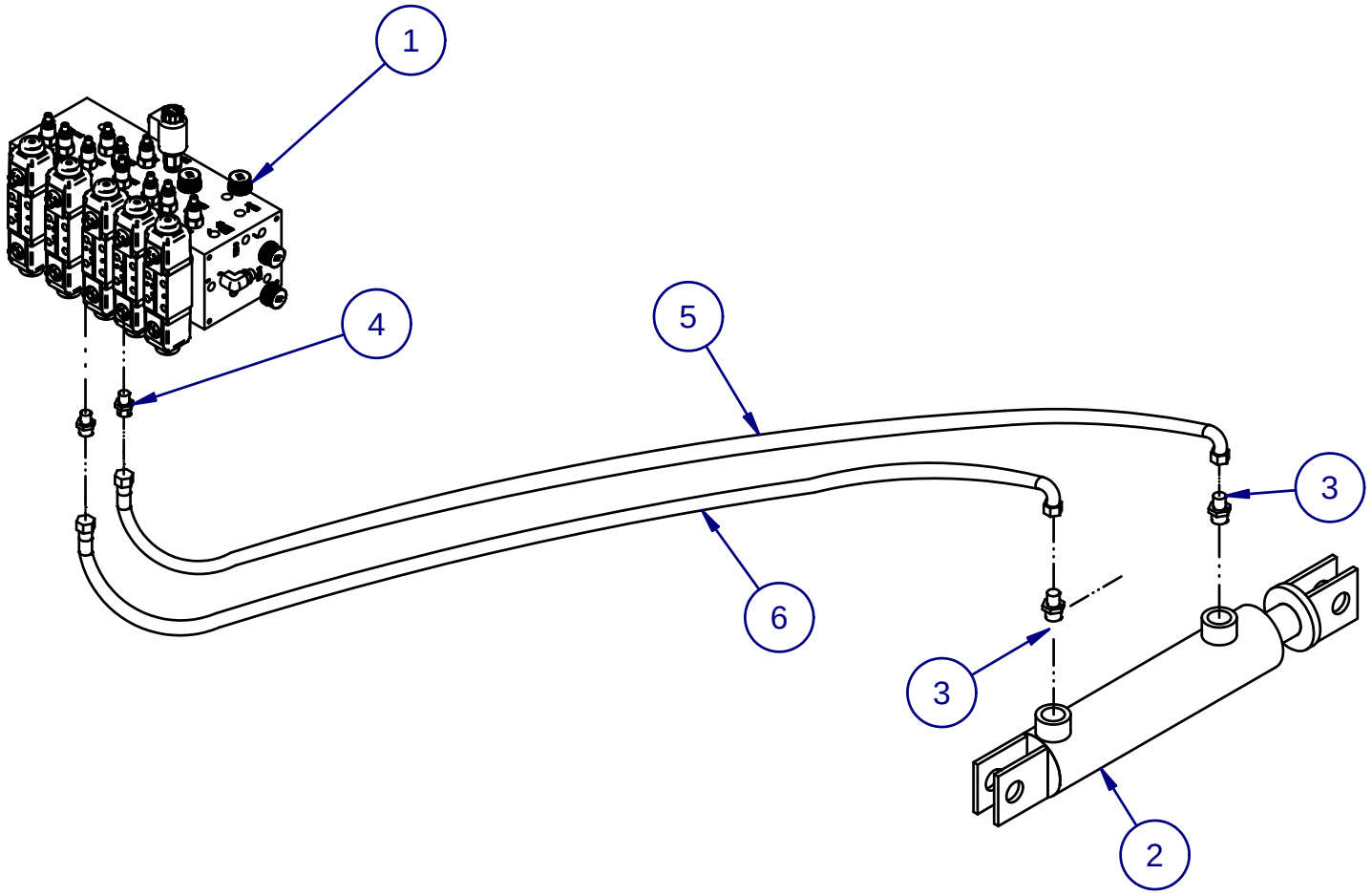
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
MANUAL VALVE LIFT HYD, ASSEMBLY

ISSUE
R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300121L	Manifold- SP5014TRX Sun	1
2	0300105Y	Hydraulic Cylinder - 3x6	1
3	0300257	3/8 JIC- 1/2 ORB - 6400-6-8	2
4	03002257	3/8 JIC-3/8 ORB - 6400-6-6	2
5	HSP501404	Hose Assembly	1
6	HSP501403	Hose Assembly	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

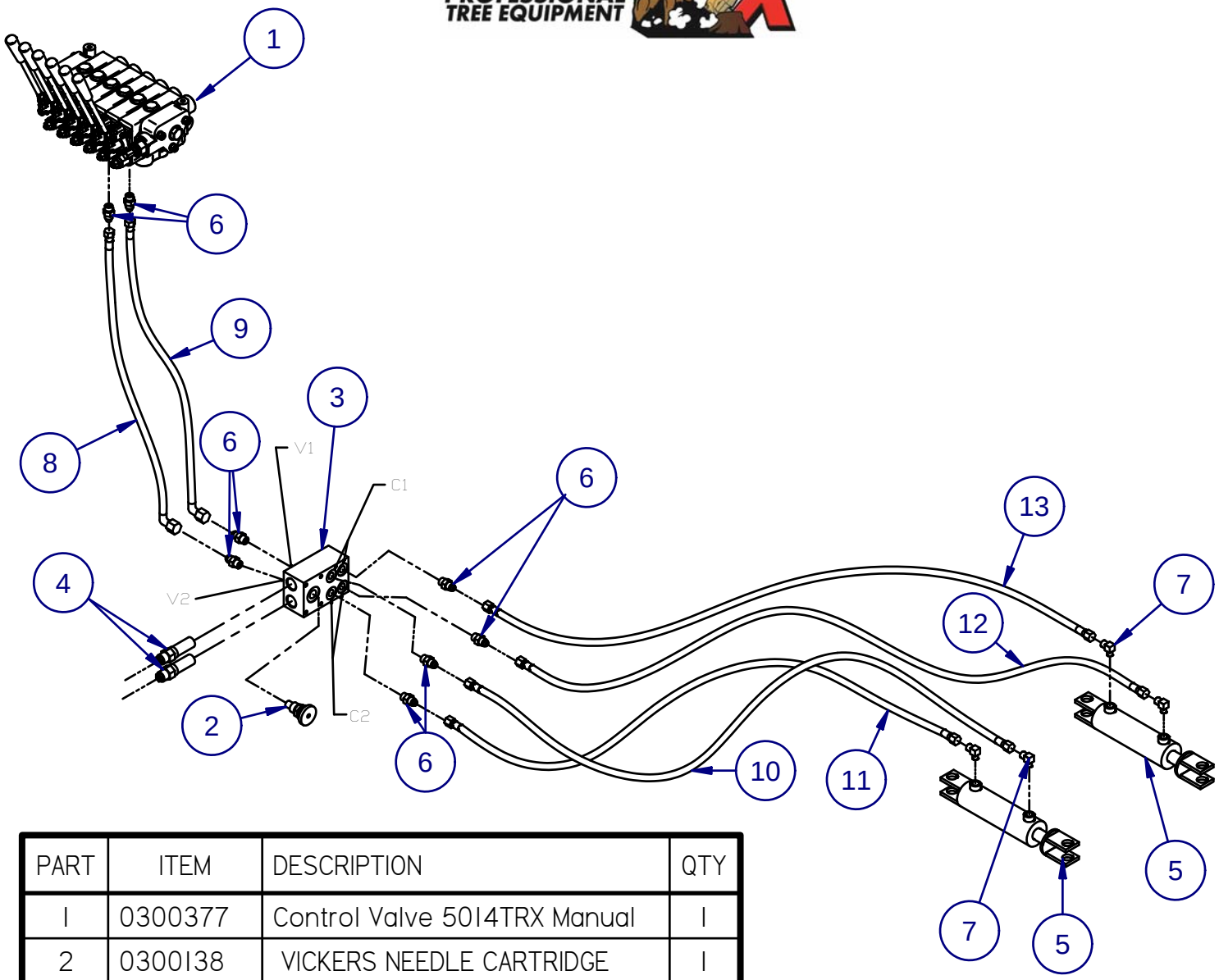
BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
REMOTE VALVE LIFT HYD, ASSEMBLY	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300377	Control Valve 5014TRX Manual	1
2	0300138	VICKERS NEEDLE CARTRIDGE	1
3	0300127A	25-4 SWG MANFLD W/ NDLE CVTY	1
4	0300120A	C/B CARTRIDGE VALVE-CBCG-LKN	2
5	0300105ZI	HYDRAULIC CYLINDER-2X4	2
6	03002257	3/8 JIC-3/8 ORB-6400-6-6	8
7	0300219	1/2 JIC-1/2 ORB 90-6801-8	4
8	HSP501415	HOSE ASSEMBLY	1
9	HSP501414	HOSE ASSEMBLY	1
10	HSP501418	HOSE ASSEMBLY	1
11	HSP501416	HOSE ASSEMBLY	1
12	HSP501417	HOSE ASSEMBLY	1
13	HSP501419	HOSE ASSEMBLY	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

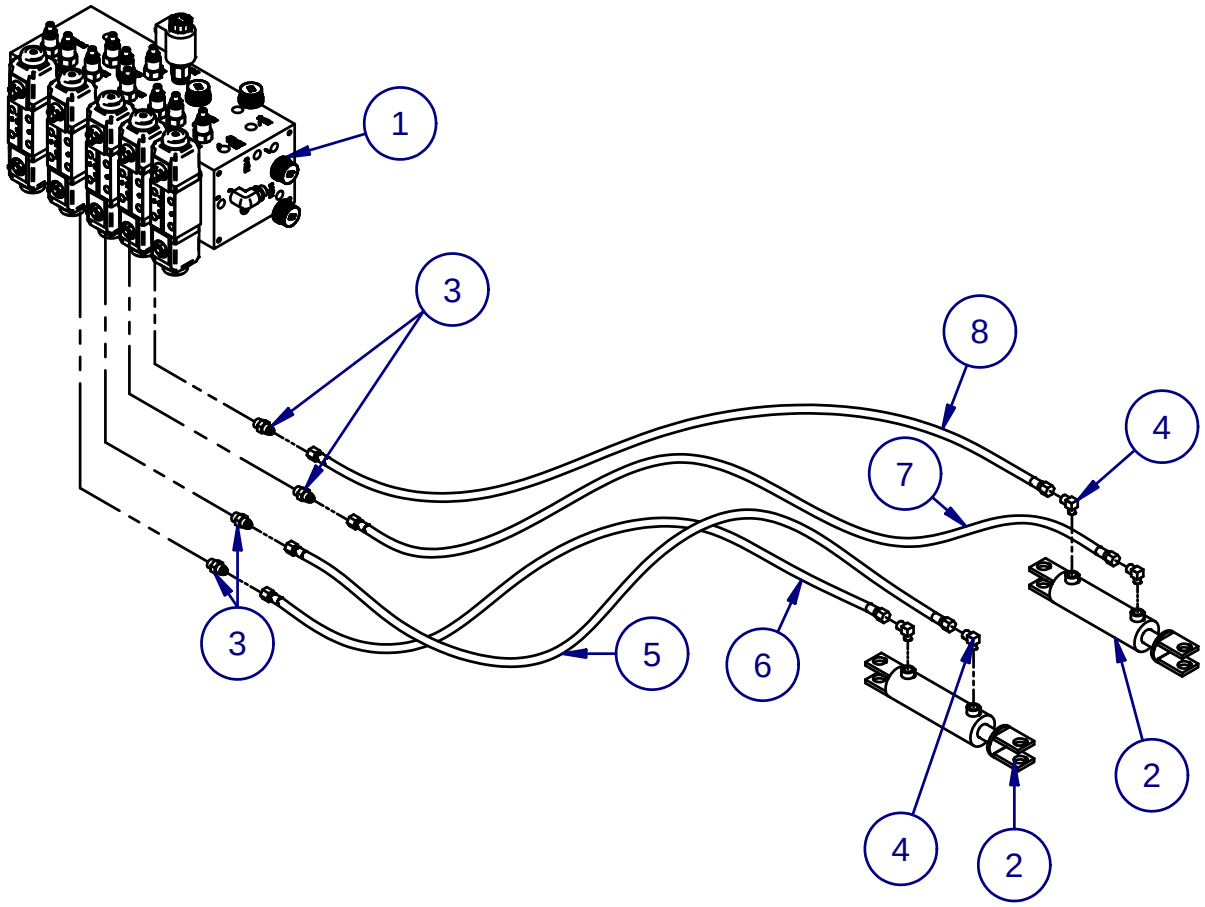
BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
MANUAL VALVE SWING HYD, ASSEMBLY	R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300121L	Manifold- SP5014TRX Sun	1
2	0300105ZI	HYDRAULIC CYLINDER-2X4	2
3	03002257	3/8 JIC-3/8 ORB - 6400-6-6	4
4	0300219	1/2 JIC-1/2 ORB 90-6801-8	4
5	HSP5014R08	HOSE ASSEMBLY	1
6	HSP5014R10	HOSE ASSEMBLY	1
7	HSP5014R09	HOSE ASSEMBLY	1
8	HSP5014R07	HOSE ASSEMBLY	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

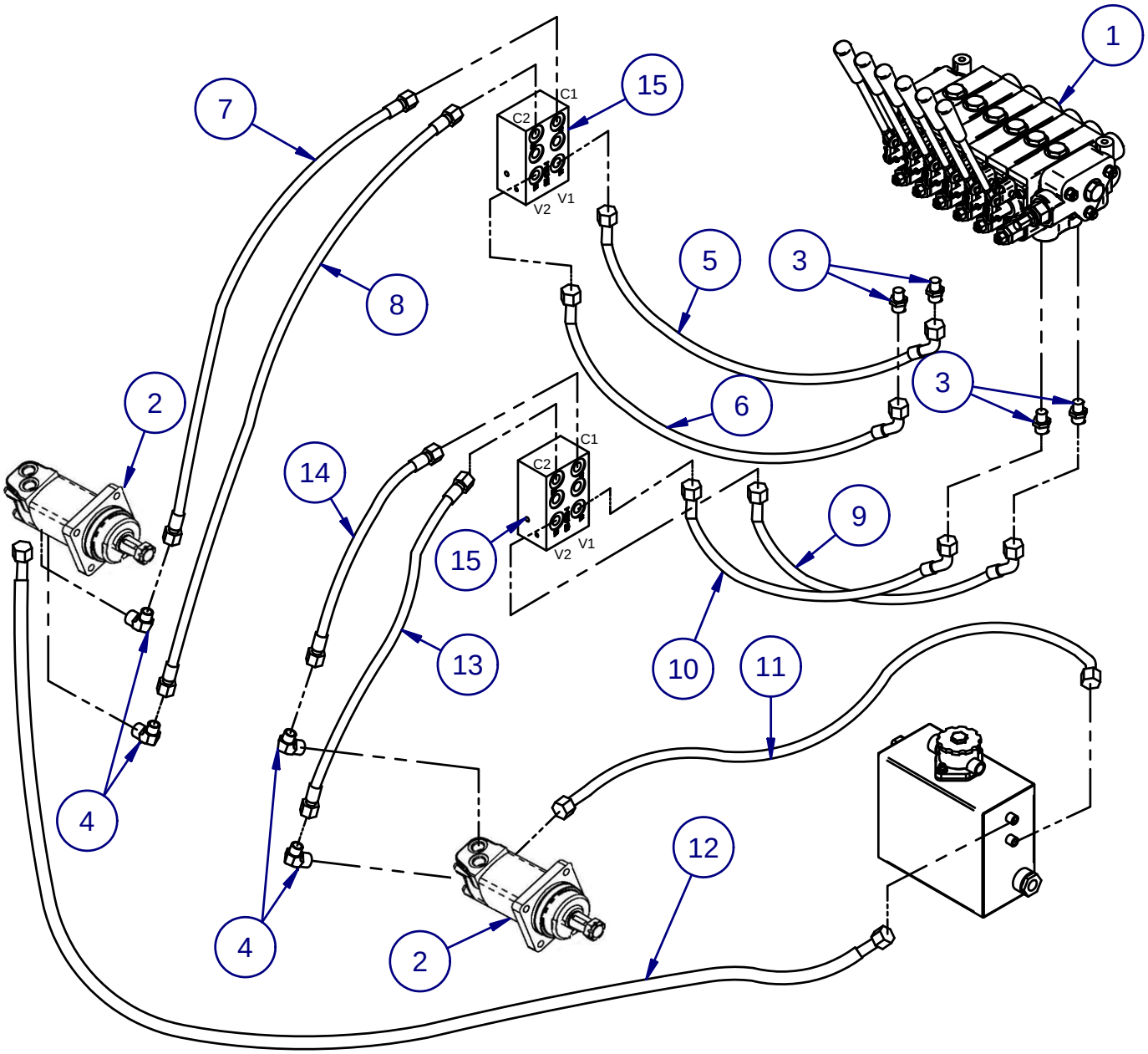
BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
REMOTE VALVE SWING HYD, ASSEMBLY	R1

Revised 3.15.05



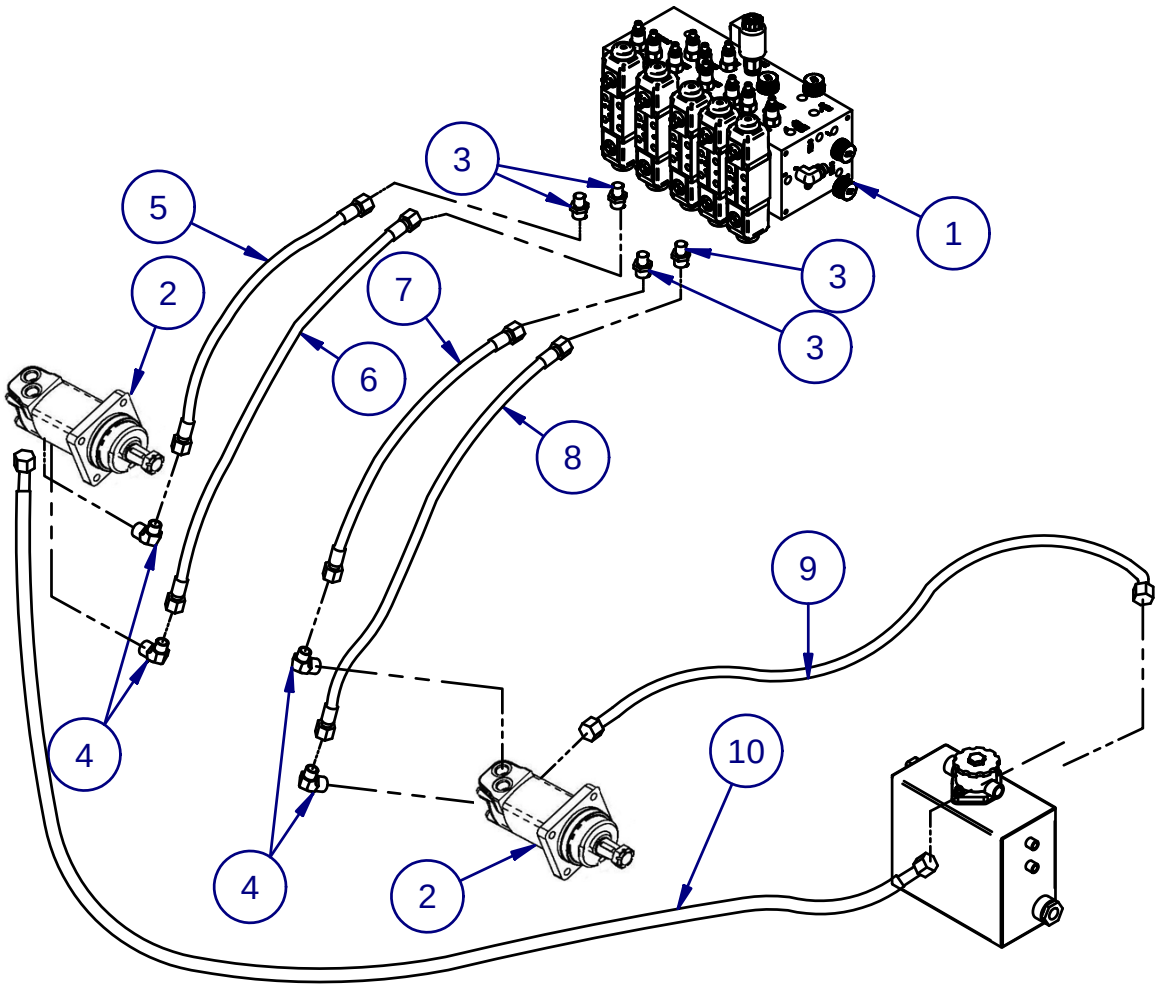
FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	MANUAL VALVE HYD, STEERING ASSEMBLY
ISSUE	R2

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0300377	Control Valve 5014TRX Manual	1
2	0400249F	Motor- Eaton	2
3	0300257	3/8 JIC- 1/2 ORB - 6400-6-8	2
4		1/2" O-Ring - 3/8" JIC 90	2
5	HSP501409	Hose Assembly	1
6	HSP501406	Hose Assembly	1
7	HSP501408	Hose Assembly	1
8	HSP501407	Hose Assembly	1
9	HSP501404	Hose Assembly	1
10	HSP501405	Hose Assembly	1
11	HSP501421	Hose Assembly	1
12	HSP501422	Hose Assembly	1
13	HSP501402	Hose Assembly	1
14	HSP501403	Hose Assembly	1
15	0300127A1	44-4 Swg Mnfld with Ndle Cvty	1

FUNCTION GROUP	
2 VALVE BOX/ENGINE/ELECTRICAL	
BUSINESS LINE	
STUMPCUTTERS	
OWNER DOMAIN **J.P. CARLTON COMPANY DIV. DAF INC.**	
SERIAL NUMBERS	
DESCRIPTION	**ISSUE**
MANUAL VALVE HYD, STEERING ASSEMBLY	R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300121L	Manifold- SP5014TRX Sun	1
2	0400249F	Motor- Eaton	2
3	0300257	3/8 JIC- 1/2 ORB - 6400-6-8	4
4		1/2" O-Ring - 3/8" JIC 90	4
5	HSP5014R14	Hose Assembly	1
6	HSP5014R15	Hose Assembly	1
7	HSP5014R11	Hose Assembly	1
8	HSP5014R12	Hose Assembly	1
9	HSP5014R02	Hose Assembly	1
10	HSP5014R01	Hose Assembly	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

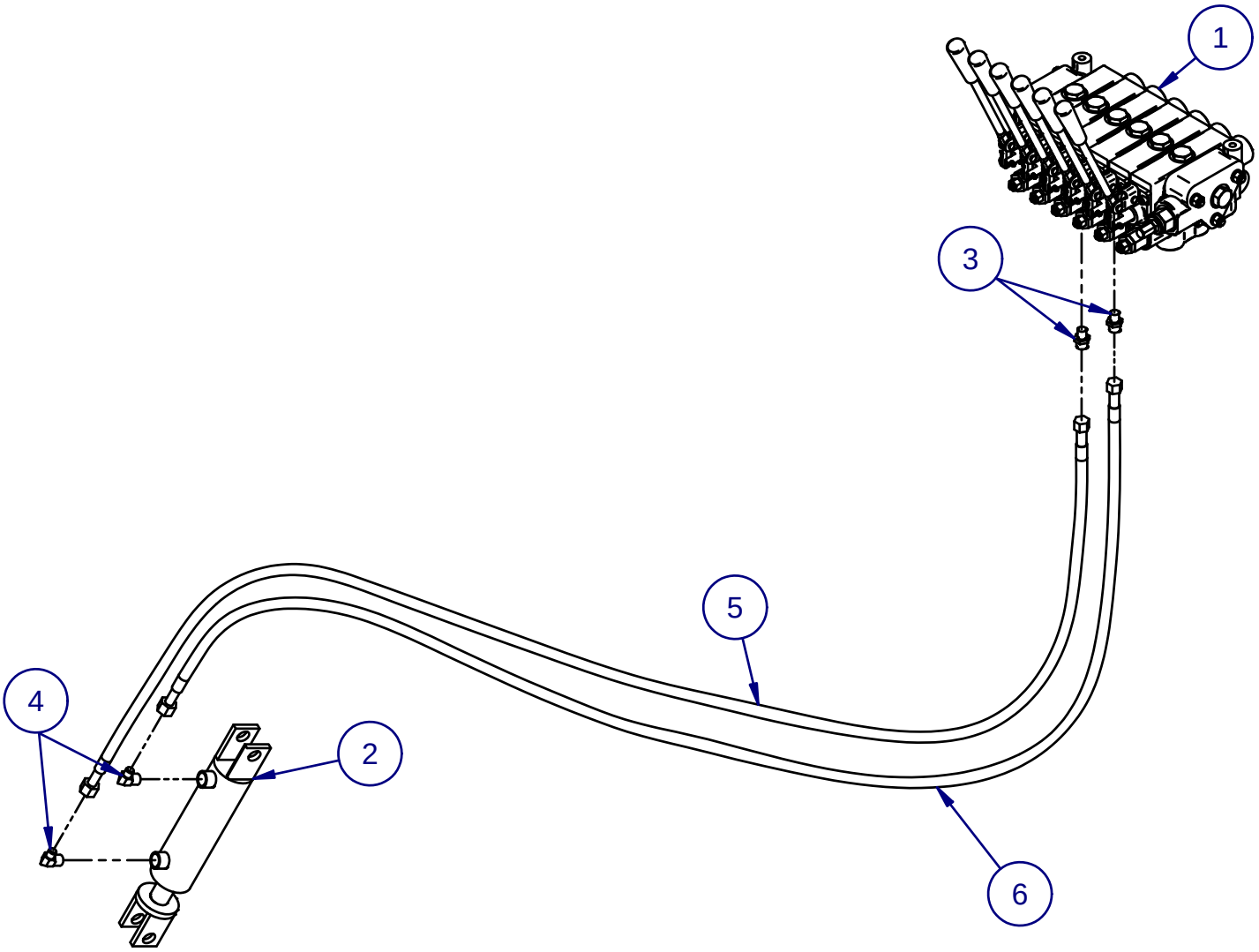
BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
REMOTE VALVE HYD, STEERING ASSEMBLY	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300377	Control Valve 5014TRX Manual	1
2	0300105A	HYDRAULIC CYLINDER	1
3	0300257	3/8 JIC- 1/2 ORB-6400-6-8	2
4		1/2" O-RING-3/8" JIC 90DEG	2
5	HSP501412	Hose Assembly	1
6	HSP501413	Hose Assembly	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

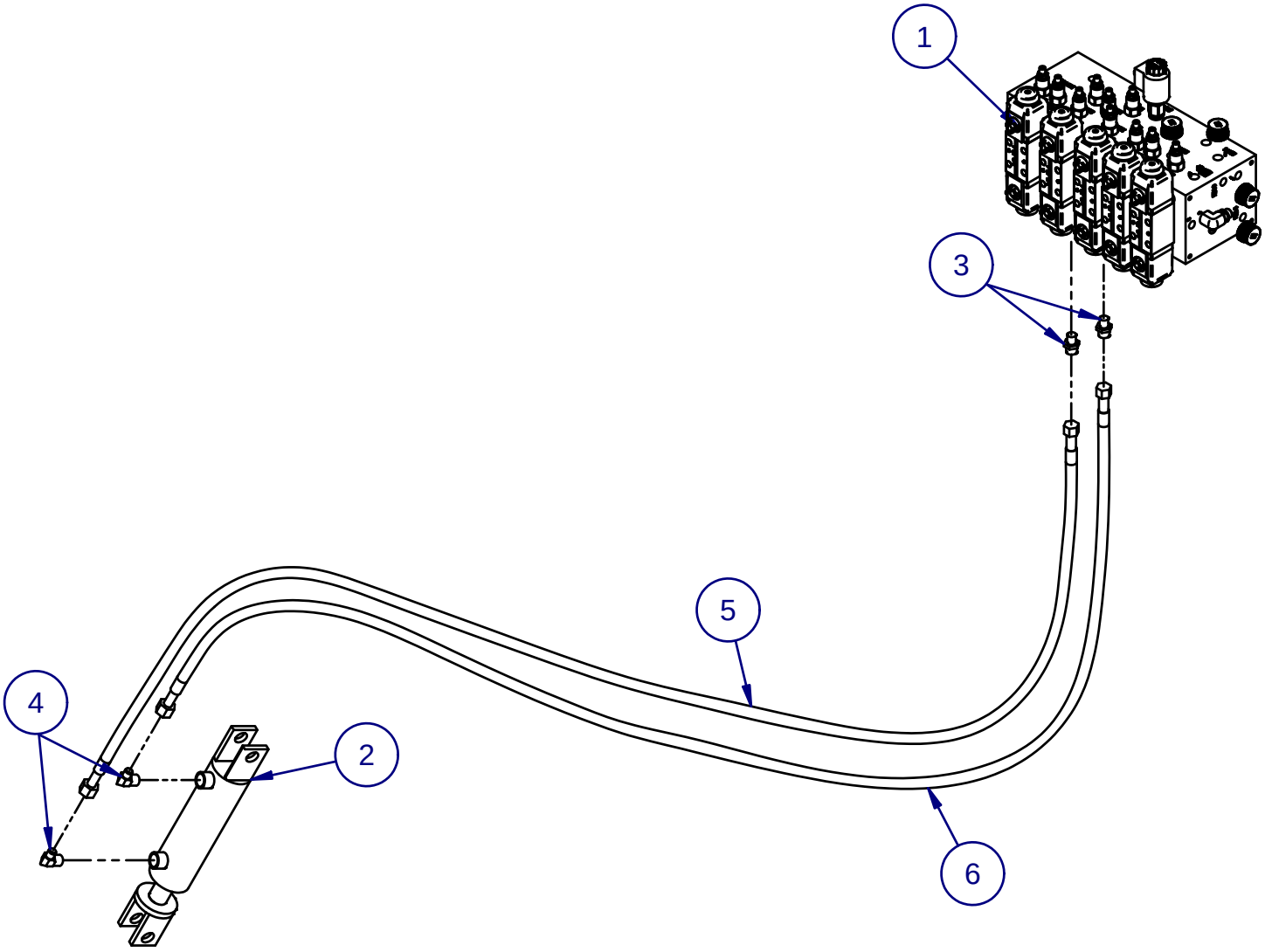
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
MANUAL VALVE BLADE HYD, ASSEMBLY

ISSUE
R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300121L	Manifold- SP5014TRX Sun	1
2	0300105A	HYDRAULIC CYLINDER	1
3	03002257	3/8 JIC-3/8 ORB - 6400-6-6	2
4		1/2" O-RING-3/8" JIC 90DEG	2
5	HSP5014R05	Hose Assembly	1
6	HSP5014R06	Hose Assembly	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
REMOTE VALVE BLADE HYD, ASSEMBLY	R1

Revised 3.15.05

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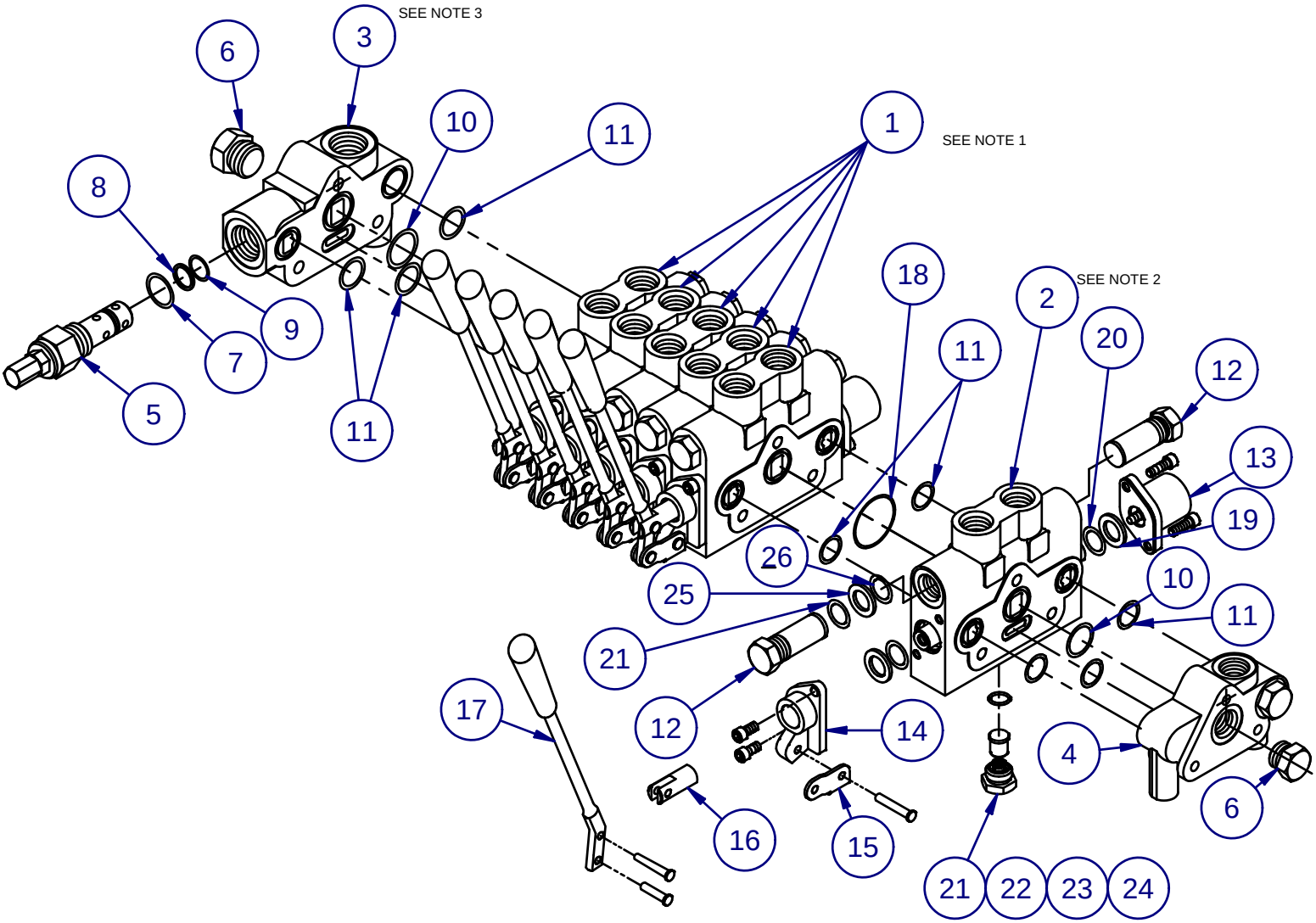


NOTES:

1. SVS WORK STATION SEAL KIT-PN 0300199ZA-INCLUDES ITEMS 11,18,20,21 AND 25.
2. SVH WORK SECTION SEAL KIT-PN 0300199ZB-INCLUDES ITEMS 10,11,20,21 AND 25.
3. SVI INLET SECTION SEAL KIT-PN 0300199ZC-INCLUDES ITEMS 10 AND 11.

FUNCTION GROUP	2 VALVE BOX\ENGINE\ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	MANUAL CONTROL VALVE ASSEMBLY
ISSUE	R2

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0300199F	Work Section - SVSIGAIAA	5
2	0300199G	Valve Section - SVHIBAIAA	1
3	0300199H	Prince Inlet Section - SVI	1
4	0300199I	Outlet Section – SVE	1
5	0300064	Relief Valve	1
6	0300261	Steel Plug, 1/2 SAE	2
7	0300072	O-Ring	1
8	0300069	Back-Up Washer	1
9	0300073	O-Ring	1
10	0300074	O-Ring	1
11	0300075	O-Ring	14
12	0300065	Relief Plug	10
13	0300199L	Valve Spool End Cap	5
14	0300060	Handle Flange	5
15	0300199M	Prince Handle Linkage	5
16	0300199N	Prince Valve Spool Extension	5
17	0300199KI	Valve Handle Kit	5
18	0300076	O-Ring	4
19	0300070	Spool Back-Up Washer	10
20	0300077	O-Ring	10
21	0300078	O-Ring	16
22	0300066	Load Check Poppet	5
23	0300067	Spring	5
24	0300068	Load Check Plug	5
25	030007I	Back-Up Washer	10
26	0300079	O-Ring	10

FUNCTION GROUP

2 VALVE BOX\ENGINE\ELECTRICAL

BUSINESS LINE

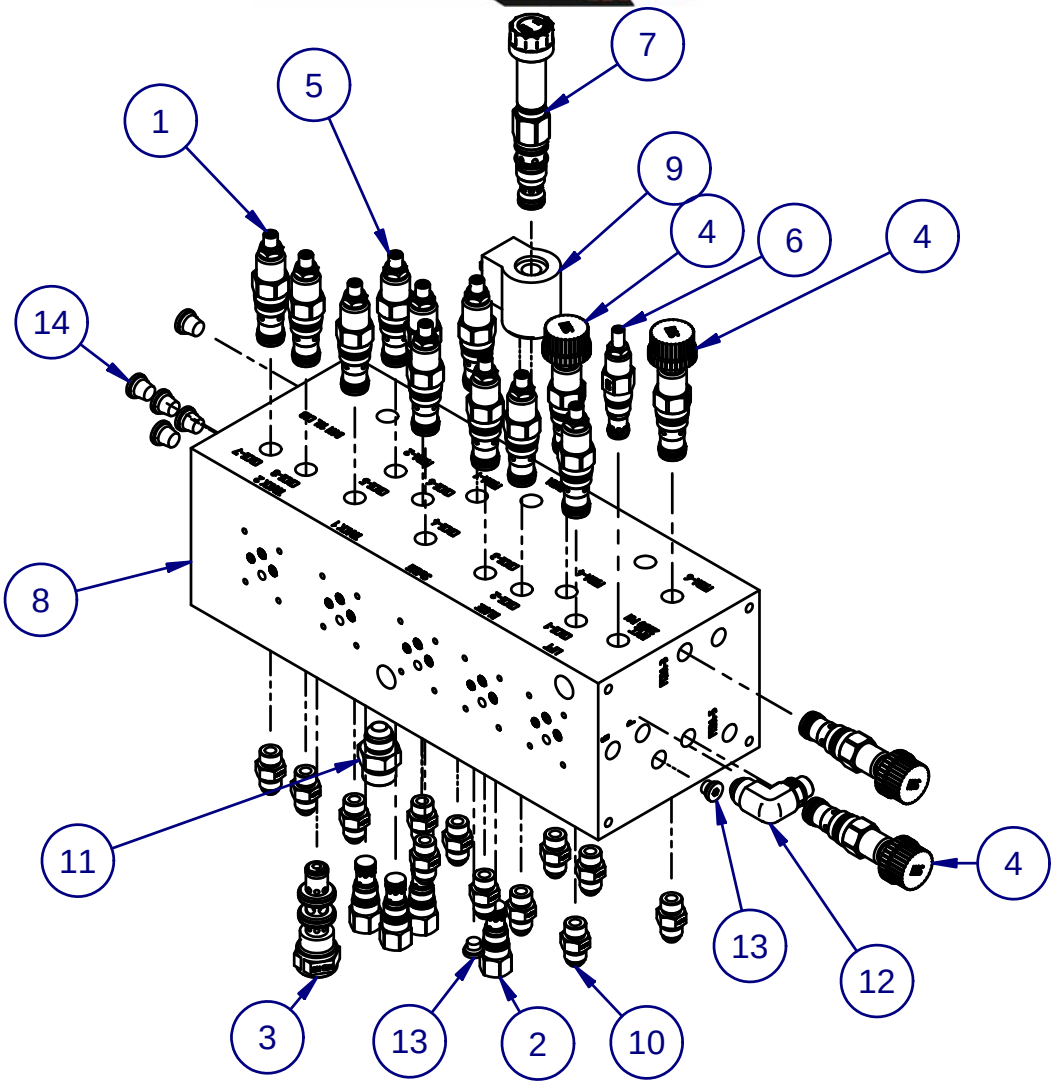
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
MANUAL CONTROL VALVE ASSEMBLY	R2

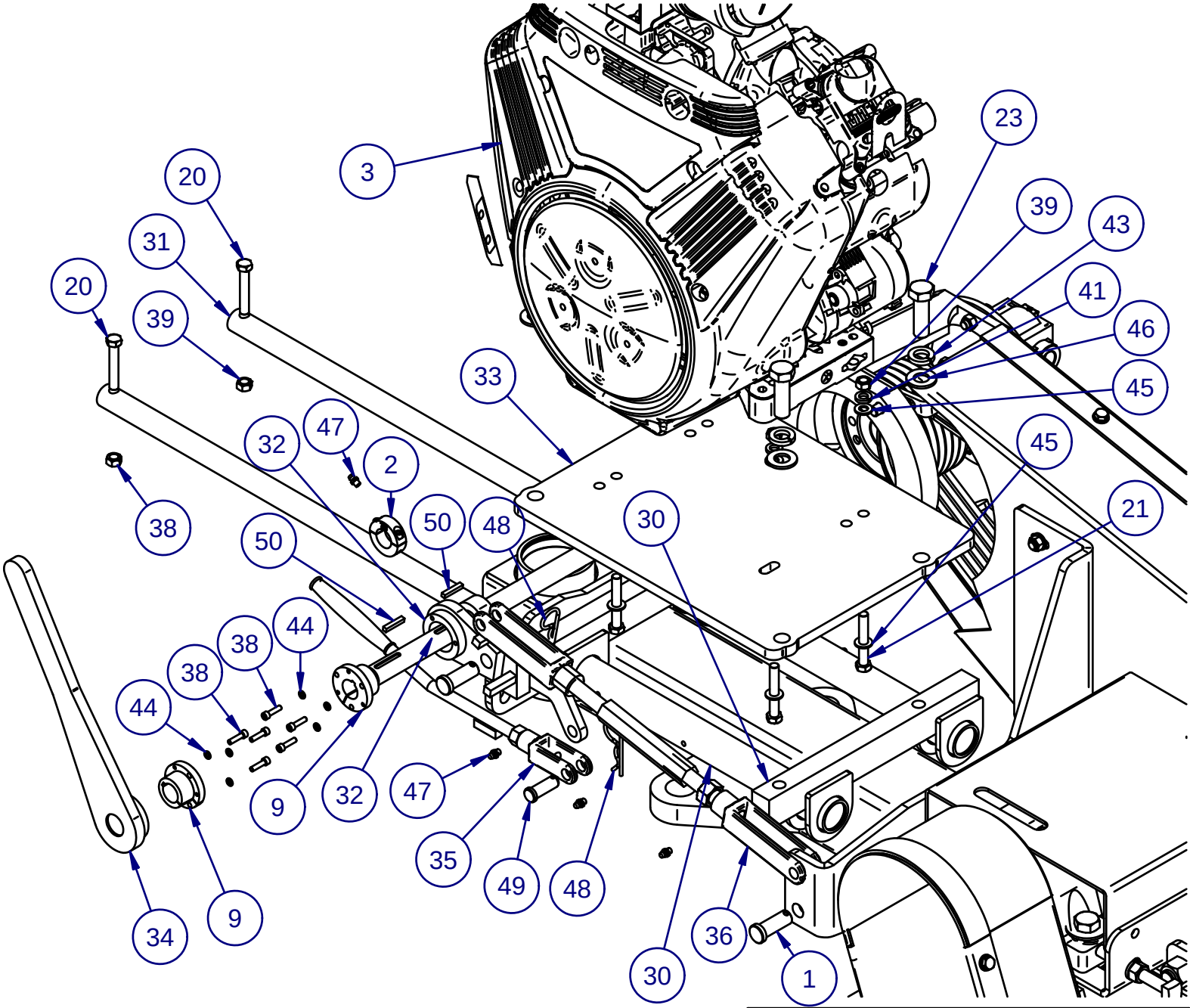
Revised 3.15.05



PART	ITEM	TITLE	QTY
1	0300120A	C/B Cartridge Valve - CBCG-LKN	8
2	030012IA3	Cartridge check valve CXBA XCN	4
3	030012IA4	FSDC-XAN Divider	1
4	030012IC	Flow Control Valve- FDBA-KAN	4
5	030012ICI	Flow Control Valve- FDBA-LAN	2
6	030012ID	PISTON RELIEF VALVE- RPCC-LAN	1
7	030012IG2	Valve 2pos 4way DMDA LAN 212	1
8	030012IM	Manifold- SP5014TRX Sun	1
9	0300128D	2500 Solenoid	1
10	03002257	3/8 JIC-3/8 ORB - 6400-6-6	12
11	0300533	1/2 JIC-5/8 ORB - 6400-8-10	1
12	0300534	1/2 JIC-3/8 ORB 90d - 6801-8-6	1
13	030055I	Plug Hes Socket ORB SAE 4	2
14	0300552	Plug Hes Socket ORB SAE 6	5

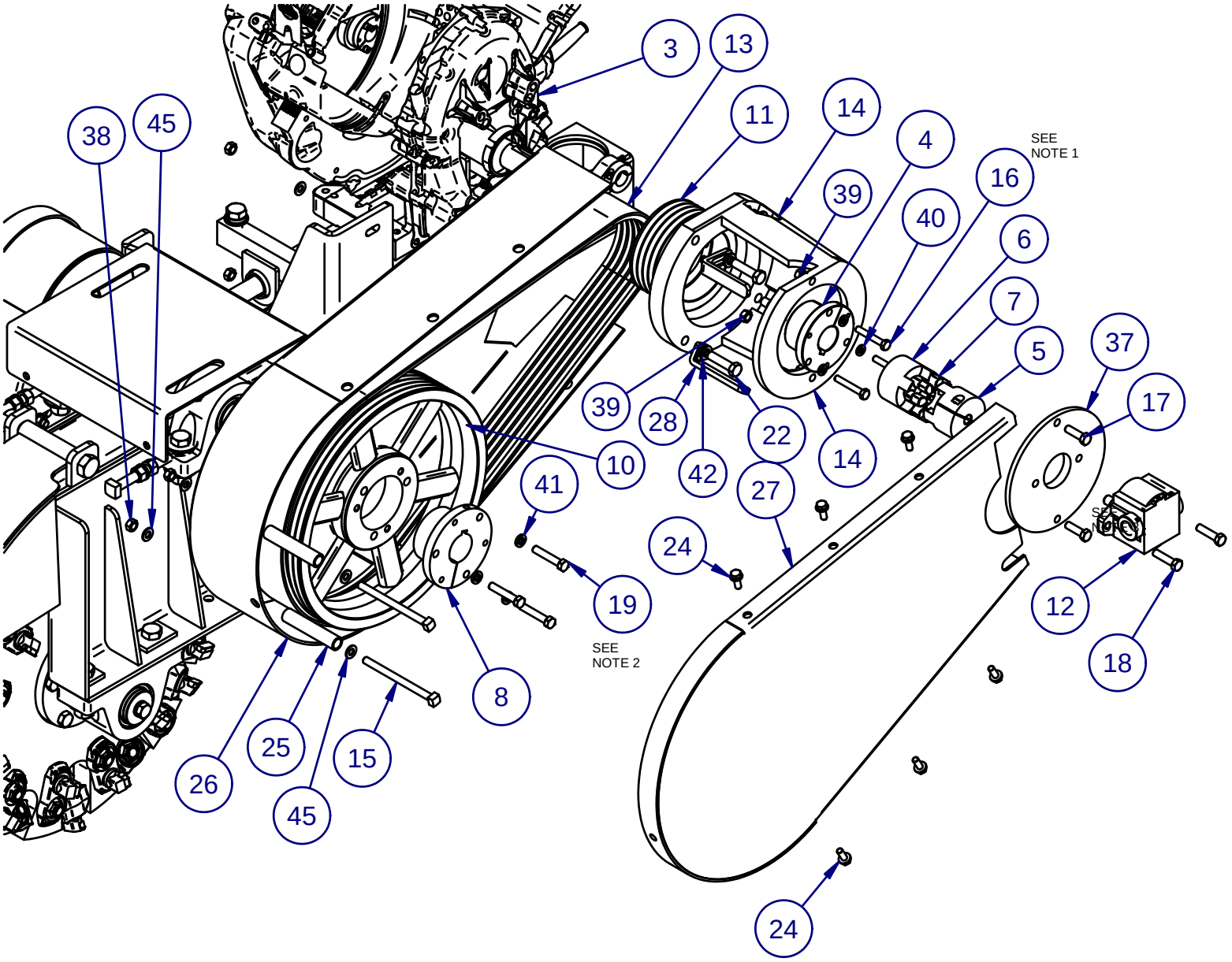
FUNCTION GROUP	
2 VALVE BOX/ENGINE/ELECTRICAL	
BUSINESS LINE	
STUMPCUTTERS	
OWNER DOMAIN	
J.P. CARLTON COMPANY DIV. DAF INC.	
SERIAL NUMBERS	
DESCRIPTION	**ISSUE**
REMOTE VALVE ASSEMBLY	R1

Revised 3.15.05



FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	35HP VANGUARD ENGINE INSTALLATION
ISSUE	R1

Revised 3.15.05



FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	35HP VANGUARD ENGINE INSTALLATION
ISSUE	R1

NOTE
1.ITEMS 12A-0516 ARE TO BE TORQUED 15FT/LBS.
2.ITEMS 12A-0616 ARE TO BE TORQUED 30FT/LBS.

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PART	ITEM	TITLE	QTY
1	0150606E	Pin - Yoke end 5/8	2
2	0150703A	SPLIT LOCK COLLAR- 7/8	2
3	0200140A	35HP BRIGGS VANGUARD ENGINE	1
4	0250120	BUSHING,QD INTERCHANGEABLE,SK 1- 7/16"	1
5	0250132	Coupling - 23/25 Pump	1
6	0250133	COUPLING - 23/25 ENGINE	1
7	0250134	SPIDER INSERT - 23/25	1
8	0250212	BUSHING,QD INERCHANGEABLE,SF 1-11/16	1
9	0250216	BUSHING JA x 7/8	2
10	0250321	SHEAVE	1
11	0250322	SHEAVE,3V5.3, 1-7/16 BUSHING	1
12	0300142G	Hyd Pump 4012- Bucher	1
13	0400142A	Belt 4012 Briggs 6/3V710	1
14	05506101	Bee Hive- Briggs/Kawaski	1
15	10D-0640	BOLT,SQ. HEAD,3/8-16 X 5" UNC GR8	2
16	12A-0516	HEX C/S 5/16-18 x 2 UNC GR 5	2
17	12A-0610Z1	HEX C/S 3/8-16 x 1-1/4" UNC GR 8 ZINC	2
18	12A-0612Z1	HEX C/S 3/8-16 x 1-1/2" UNC GR 8 ZINC	1
19	12A-0616	HEX C/S 3/8-16 x 2 UNC GR 8	3
20	12A-0618	HEX C/S 3/8-16 x 2-1/4 UNC GR 8	4
21	12A-0620Z1	HEX C/S 3/8-16 x 2-1/2 UNC GR 8 Z&Y	4
22	12A-0714Z1	HEX C/S 7/16 x 1-3/4 UNC GR8 Z&Y	4
23	12A-1016Z1	HEX C/S 5/8-11 x 2 UNC GR 8 Z & Y	4
24	12S-0506Z1	SERRATED FLANGE HEX C/S 5/16-18 x 3/4 UNC GR 5	6
25	14030043	TUBING,BELT KEEPER	2
26	14030064	WELDMENT,VANGUARD BELT GUARD,BACK	1
27	14030065	WELDMENT,VANGUARD BELT COVER,COVER	1
28	14030086	PLATE,BELT KEEPER,VANGUARD	1
29*	14030087	PLATE,BELT KEEPER,44HP TOP/VAN TOP	1
30	14040039	WELDMENT,ENGINE SLIDE	1
31	14040045	ROD,ENGINE SLIDE	2
32	14040049	WELDMENT,ENGINE ROD ADJUST. MOUNT	1
33	14040074	MOUNT,ENGINE,BRIGGS	1
34	14040083	WELDMENT,ENGAGEMENT HANDLE	1
35	14040092	ASSY,SLIDE LOCK ADJUST	1
36	14040137	ASSY,5/8 ENGAGEMENT LINKAGE,VANGUARD	1
37	14040142	PLATE,VANGUARD PUMP MOUNT	1
38	14B-1006	SHCS 10-24 x 3/4 UNC GR 8	6
39	29A-06	NUT,STOVER LOCK, 3/8-16 UNC GR8	9
40	30A-05	LOCKWASHER 5/16" USS GR8	3
41	30A-06	LOCKWASHER, 3/8" USS GR8	7
42	30A-07Z1	LOCK WASHER,7/16" USS GR8 Z&Y	1
43	30A-10Z1	LOCKWASHER 5/8" USS GR8 ZINC	4
44	30B-10	LOCK WASHER,# 10 GR 8	6
45	31B-06Z1	FLAT WASHER 3/8 USS GR 8 Z&Y	4
46	31B-10Z1	FLAT WASHER 5/8 USS NARROW GR 8 Z&Y	4
47	41E-04	GREASE FITTING 1/4-28 STRAIGHT	7
48	50L-02	SNAP PIN, 1/8 X 2-3/8	3
49	51E-08	PIN,CLEVIS,1/2"	1
50	70A-0508.5	KEY,3/16" SQ. 1-1/16" LONG	2

FUNCTION GROUP

2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE

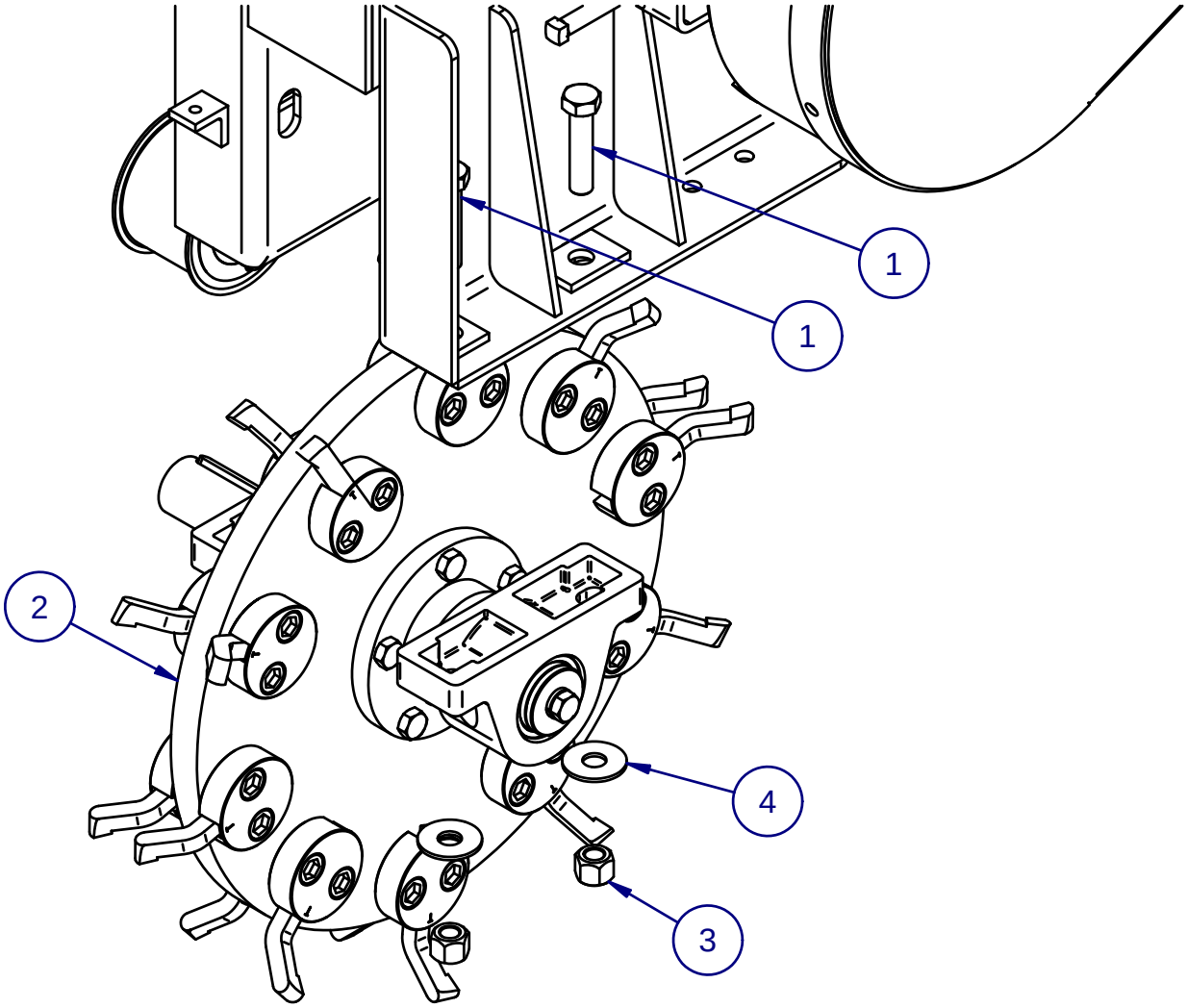
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
35HP VANGUARD ENGINE INSTALLATION	R1

Revised 3.15.05



PART	ITEM	TITLE	QTY
1	12A-1022ZI	HEX C/S 5/8-11 x 2 3/4" UNC GR 8 Z & Y	4
2	1403008I	ASSEMBLY,KUBOTA/VANGUARD STANDARD CUTTER WHEEL	1
3	29A-10	NUT,STOVER LOCK, 5/8-11 UNC GR8	4
4	31A-10ZI	FLAT WASHER 5/8 USS GR 8 NARROW Z&Y	4

FUNCTION GROUP

3 CUTTER WHEEL AND GUARDS

BUSINESS LINE

STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
INSTALL STANDARD CUTTER WHEEL	R1

Revised 3.15.05

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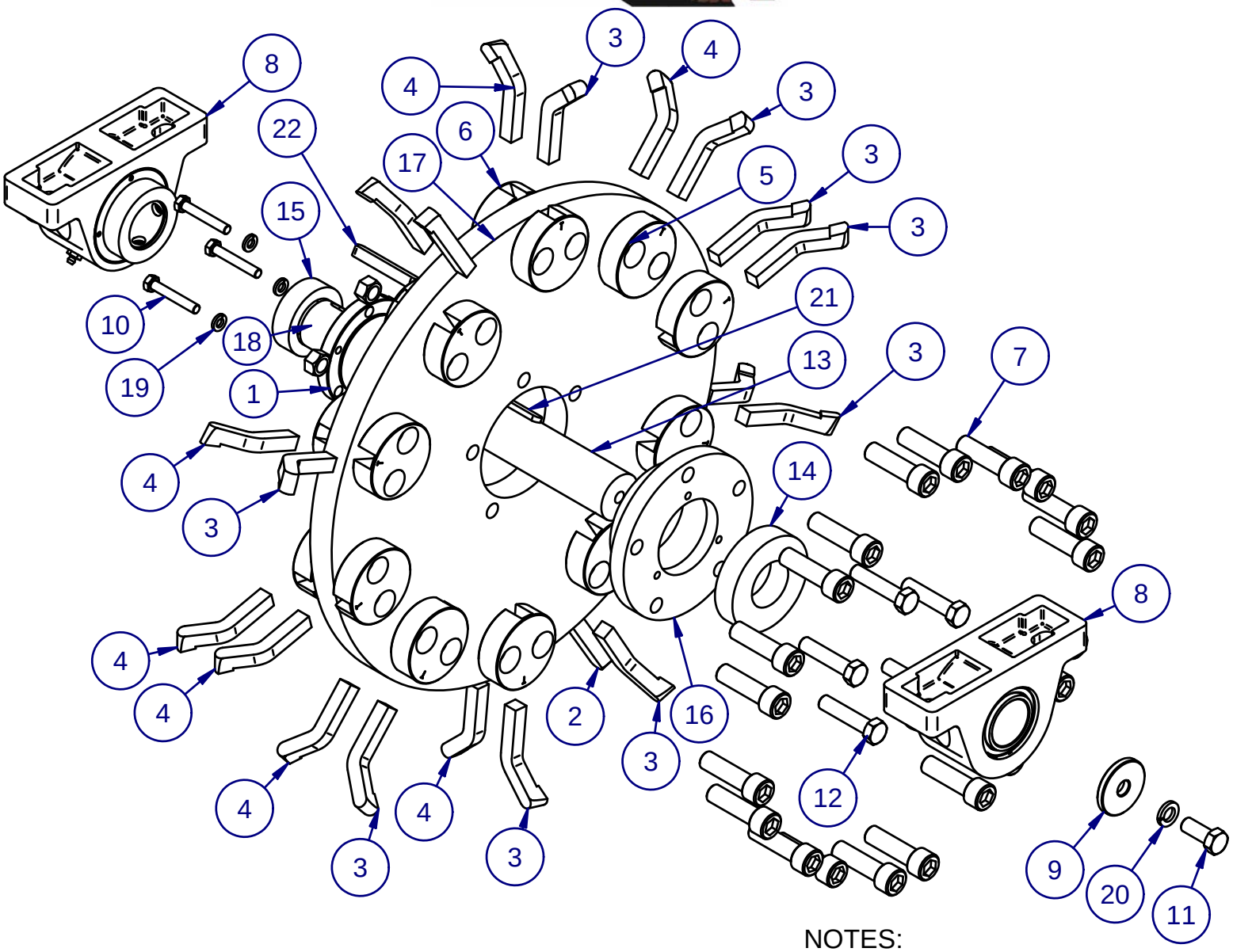

NOTES:
1. ITEM(S) 450109 TORQUE TO 150 FT/LBS
2. ITES(S) 12A-0516 TORQUE 15FT/LBS

FUNCTION GROUP	
3 CUTTER WHEEL AND GUARDS	
BUSINESS LINE	
STUMPCUTTERS	
OWNER DOMAIN J.P. CARLTON COMPANY DIV. DAF INC.	
SERIAL NUMBERS	
DESCRIPTION	**ISSUE**
STANDARD CUTTER WHEEL	R1

Revised 3.15.05

PART	ITEM	TITLE	QTY
1	0250122	BUSHING,QD INTERCHANGEABLE,SK 1-11/16"	1
2	0450101	Tooth - Straight	2
3	0450102	TOOTH,CARBIDE TIPPED,45 DEGREE RIGHT	9
4	0450103	TOOTH,CARBIDE TIPPED,45 DEGREE LEFT	9
5	0450106	Round Pocket - C/S	10
6	0450107	Round Pocket - THD	10
7	0450109	Tooth Bolt - 5/8-18 x 2 1/8"	20
8	0500113	BEARING,CUTTER WHEEL	2
9	12030024	WASHER,CUTTER WHEEL SHAFT	1
10	12A-0516	HEX C/S 5/16-18 x 2 UNC GR 5	3
11	12A-0810ZI	HEX C/S 1/2-13 x 1-1/4 UNC GR 8 ZINC	1
12	12A-0818ZI	BOLT,HEX C/S 1/2-13 x 2 1/4 UNC GR8 Z&Y	5
13	14030057	SHAFT,RAZOR CUTTER WHEEL,1-11/16	1
14	14030061	COLLAR,1-11/16 RAZR CUTTER WHEEL,LARGE	1
15	14030062	COLLAR,1-11/16 RAZOR CUTTER WHEEL	1
16	14030063	HUB,RAZOR CUTTER WHEEL	1
17	14030083	PLATE,STANDARD CUTTER WHEEL	1
18*	29A-08	NUT,STOVER LOCK, 1/2-13 UNC GR8	5
19	30A-05	LOCKWASHER 5/16" USS GR8	3
20	30A-08ZI	LOCK WASHER,1/2" USS GR8 Z&Y	1
21	70G-060615.5	KEY,3/8X3/8X1-13/16 PRATT AND WHINTYE	1
22	70G-060623	KEY,3/8X3/8X2-7/8 PRATT AND WHINTYE	1

FUNCTION GROUP

3 CUTTER WHEEL AND GUARDS

BUSINESS LINE

STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
STANDARD CUTTER WHEEL	R1

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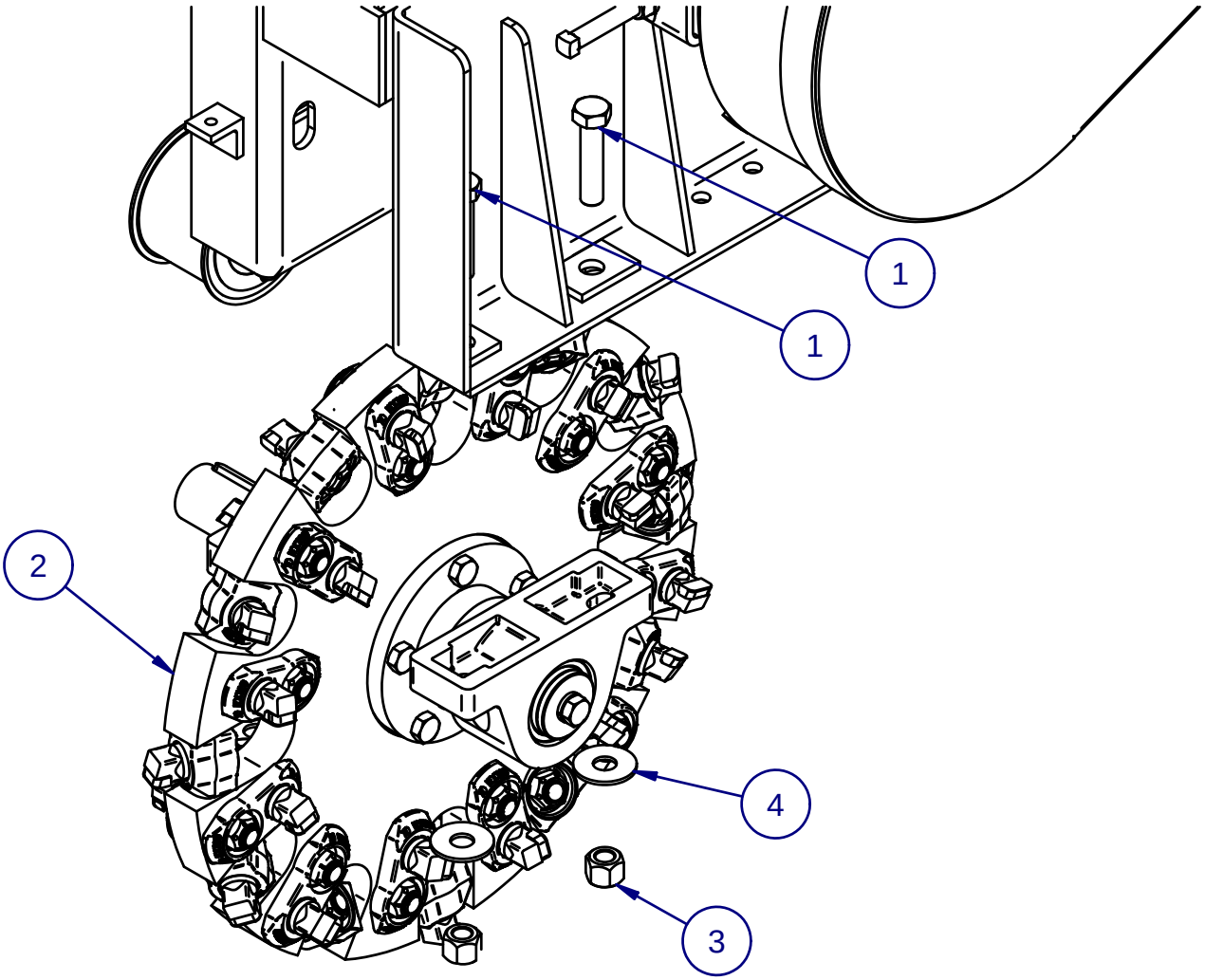

PART	ITEM	TITLE	QTY
1	12A-1022ZI	HEX C/S 5/8-11 x 2 3/4" UNC GR 8 Z & Y	4
2	14030054	ASSEMBLY,KUBOTA/VANGUARD RAZOR CUTTER WHEEL	1
3	29A-10	NUT,STOVER LOCK, 5/8-11 UNC GR8	4
4	31A-10ZI	FLAT WASHER 5/8 USS GR 8 NARROW Z&Y	4

FUNCTION GROUP
3 CUTTER WHEEL AND GUARDS

BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS
1J9BA1227A1167109

DESCRIPTION
INSTALL RAZOR CUTTER WHEEL

ISSUE
R1

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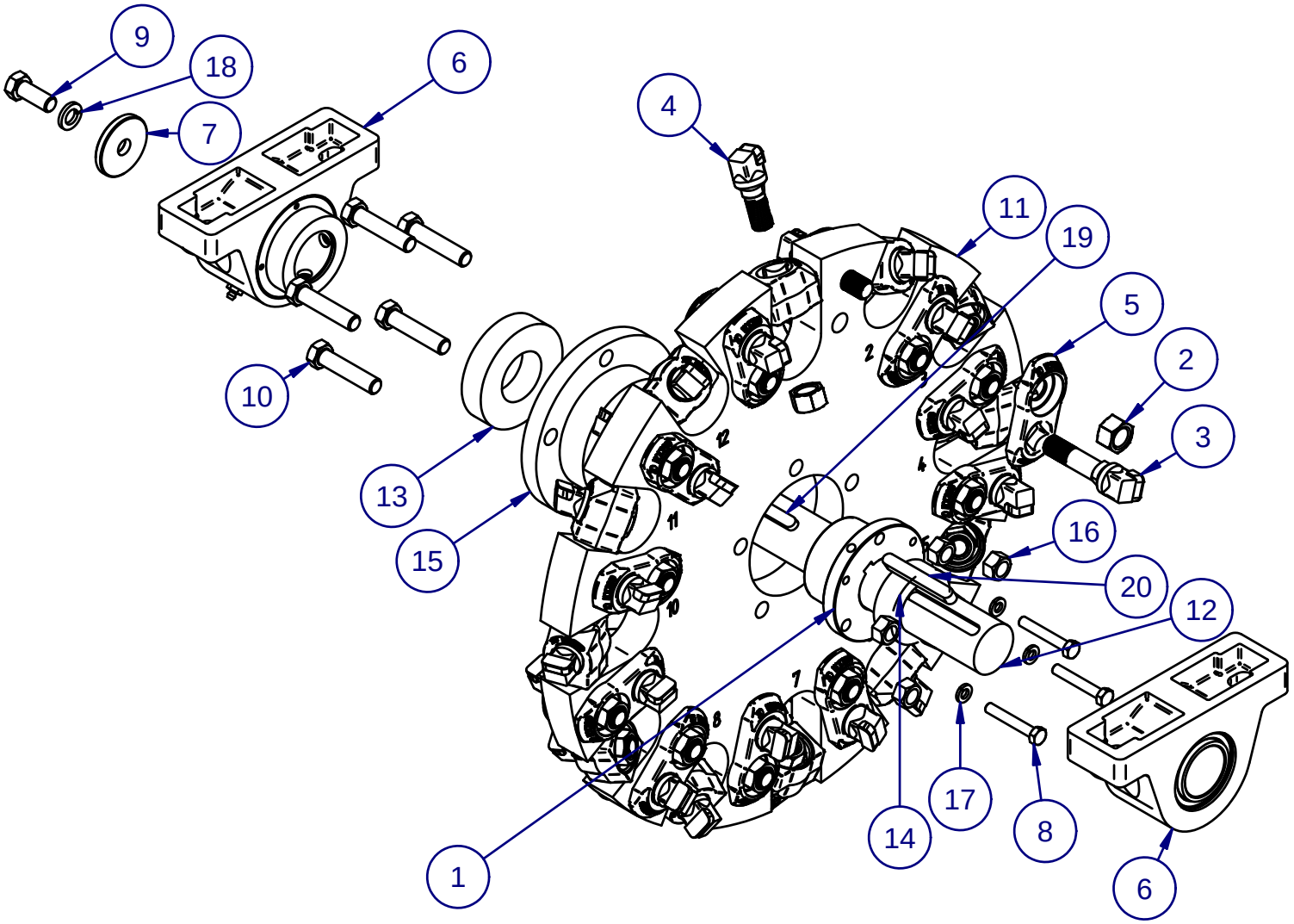


NOTES:
1. ITEM(S) 450125 TORQUE TO 270 FT/LBS

FUNCTION GROUP 3 CUTTER WHEEL AND GUARDS	
BUSINESS LINE STUMPCUTTERS	
OWNER DOMAIN J.P. CARLTON COMPANY DIV. DAF INC.	
SERIAL NUMBERS 1J9BA1227A1167109	
DESCRIPTION RAZOR CUTTER WHEEL	**ISSUE** R2

Revised 3.15.05

PART	ITEM	TITLE	QTY
1	0250122	BUSHING,QD INTERCHANGEABLE,SK 1-11/16"	1
2*	0450126A	NUT,HEX,5/8-18 UNF GR 8 Z&Y	36
3	0450130	JP Sandvik Plow Bolt Tooth	24
4	0450131	JP Sandvik Short P/B Tooth	12
5	0450132	JP Sandvik Plow Bolt Holder	24
6	0500113	BEARING,CUTTER WHEEL	2
7	12030024	WASHER,CUTTER WHEEL SHAFT	1
8	12A-0516	HEX C/S 5/16-18 x 2 UNC GR 5	3
9	12A-0810ZI	HEX C/S 1/2-13 x 1-1/4 UNC GR 8 ZINC	1
10	12A-0818ZI	BOLT,HEX C/S 1/2-13 x 2 1/4 UNC GR8 Z&Y	5
11	14030053	WELDMENT,RAZOR CUTTER WHEEL	1
12	14030057	SHAFT,RAZOR CUTTER WHEEL,1-11/16	1
13	14030061	COLLAR,1-11/16 RAZR CUTTER WHEEL,LARGE	1
14	14030062	COLLAR,1-11/16 RAZOR CUTTER WHEEL	1
15	14030063	HUB,RAZOR CUTTER WHEEL	1
16	29A-08	NUT,STOVER LOCK, 1/2-13 UNC GR8	5
17	30A-05	LOCKWASHER 5/16" USS GR8	3
18	30A-08ZI	LOCK WASHER,1/2" USS GR8 Z&Y	1
19	70G-060615.5	KEY,3/8X3/8X1-13/16 PRATT AND WHINTYE	1
20	70G-060623	KEY,3/8X3/8X2-7/8 PRATT AND WHINTYE	1

FUNCTION GROUP
3 CUTTER WHEEL AND GUARDS

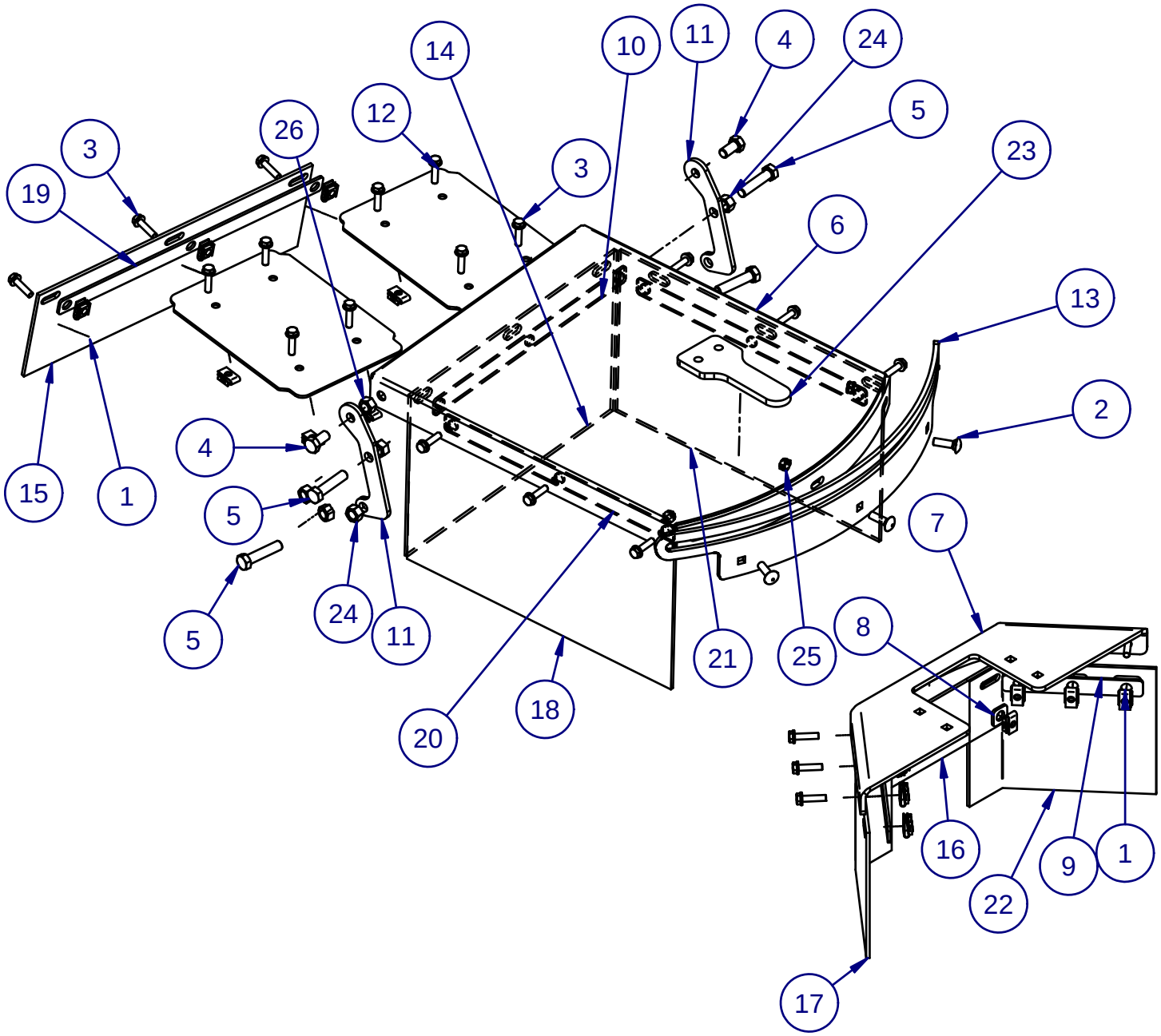
BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS
1J9BA1227A1167109

DESCRIPTION	ISSUE
RAZOR CUTTER WHEEL	R2

Revised 3.15.05



FUNCTION GROUP	3 CUTTER WHEEL AND GUARDS
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	INSTALL GUARD AND RUBBER
ISSUE	R1

Revised 3.15.05

PART	ITEM	TITLE	QTY
1	0150715	5/16 Tinnerman U Nut Retainer	28
2	10G-0610	CARRIAGE BOLT 3/8-16 x 1-1/4 UNC GR 8	3
3	12A-0510ZI	SERRATED FLANGE HEX C/S 5/16-18 x 1-1/4 UNC GR 5	28
4	12A-0808ZI	HEX C/S 1/2-13 x 1 UNC GR 8 Z&Y	2
5	12A-0818ZI	BOLT,HEX C/S 1/2-13 x 2 1/4 UNC GR8 Z&Y	4
6	15030003	WELDMENT,PAN GUARD	1
7	15030005	WELDMENT,CHIP GUARD	1
8	15030012	PLATE,PANGUARD A	2
9	15030014	MOUNT,CHIP GUARD RUBBER,SIDE	2
10	15030015	MOUNT,CHIP GUARD RUBBER,REAR	1
11	15030016	MOUNT,PAN GUARD	2
12	15030017	PLATE,SIDE GUARD	2
13	15030020	PLATE,PAN GUARD ADJUST	1
14	15030021	RUBBER,PAN GUARD,BACK	1
15	15030022	RUBBER,FRAME	1
16	15030023	RUBBER,CHIP GUARD,CENTER	1
17	15030024	RUBBER,CHIP GUARD,LH SIDE	1
18	15030025	RUBBER,PAN GUARD,LH SIDE	1
19	15030026	MOUNT,FRAME RUBBER	1
20	15030027	MOUNT,PAN GUARD RUBBER,SIDE	2
21	15030028	RUBBER,PAN GUARD,RH SIDE	1
22	15030029	RUBBER,CHIP GUARD,RH SIDE	1
23	15040016	PLATE,CHIP GUARD STOP	1
24	20A-08ZI	NUT,HEX,1/2-13 UNC Z&Y GR8	4
25	29A-06	NUT,STOVER LOCK, 3/8-16 UNC GR8	3
26	29A-08	NUT,STOVER LOCK, 1/2-13 UNC GR8	6

FUNCTION GROUP

3 CUTTER WHEEL AND GUARDS

BUSINESS LINE

STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	**ISSUE**
INSTALL GUARD AND RUBBER	R1

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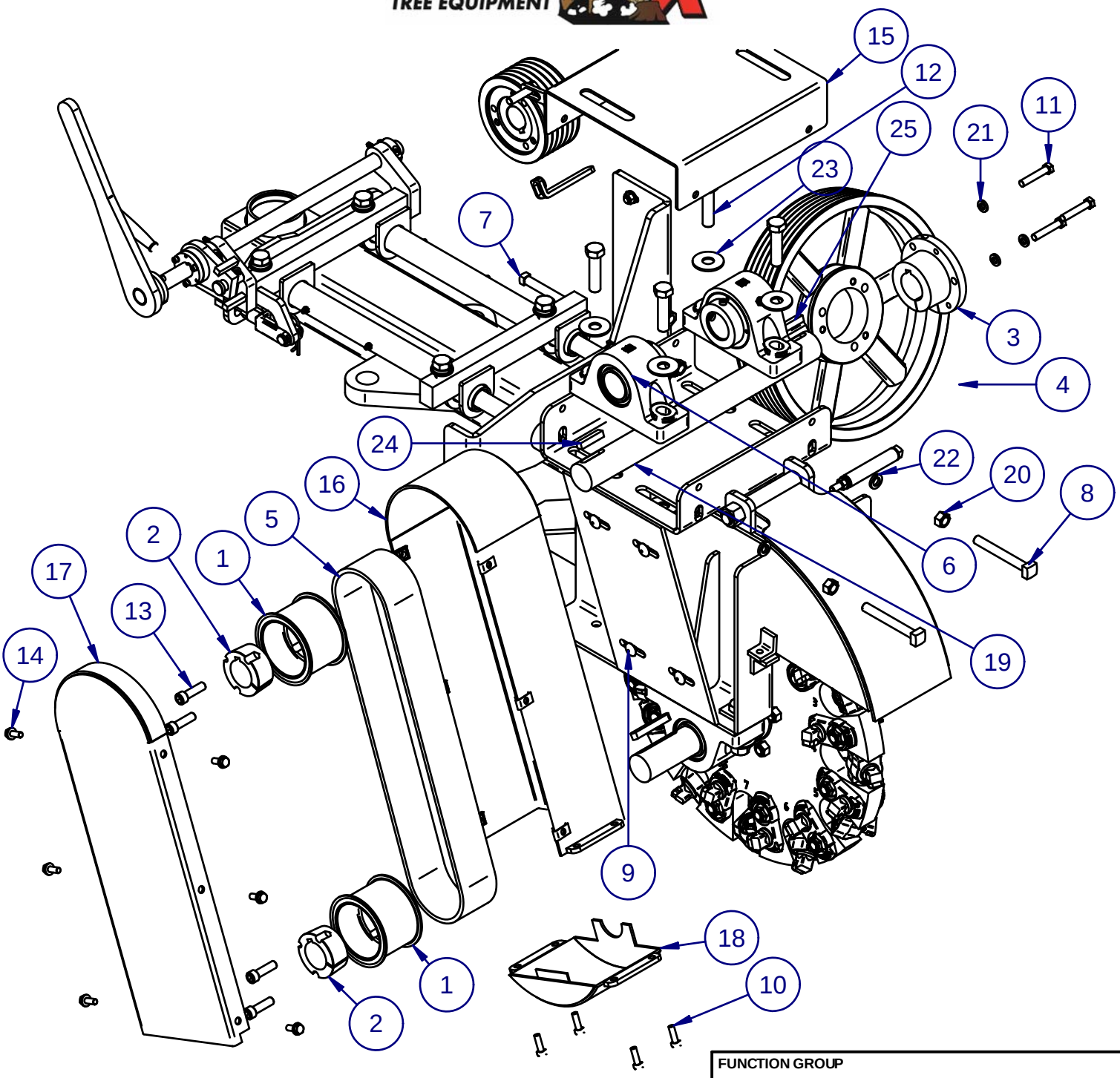

FUNCTION GROUP	4 BOOM ASSEMBLY
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	35HP VANGUARD POLY CHAIN ASSEMBLY
ISSUE	R1

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0250115A	PC Sprkt 8M-40S-62 Taper Lock	2
2	0250115F1	2012 1 11/16" Taper Lock Bshn	2
3	0250212	BUSHING,QD INERCHANGEABLE,SF 1-11/16	1
4	0250321	SHEAVE	1
5	0400112	POLYCHAIN 2300 2500 SP4012	1
6	0500113	BEARING,CUTTER WHEEL	2
7	10D-0828	BOLT,SQ. HEAD,1/2"-13 X 3-1/2" UNC GR8	1
8	10D-0832Z1	SQUARE HEAD BOLT,1/2-13 x 4 UNC GR 8	2
9	10G-0608	CARRIAGE BOLT 3/8-16 x 1 UNC GR 8	6
10	12A-0508	HEX C/S 5/16-18 x 1 UNC GR 5	4
11	12A-0616	HEX C/S 3/8-16 x 2 UNC GR 8	3
12	12A-1020Z1	HEX C/S 5/8-11 x 2-1/2 UNC GR 8 Z&Y	4
13	12D-0712	SOC HD C/S 7/16-14 X 1-1/2 UNC GR 8 BLCK	4
14	12S-0506Z1	SERRATED FLANGE HEX C/S 5/16-18 x 3/4 UNC GR 5	6
15	14020017	COVER,JACK SHAFT BEARING,BRIGGS	1
16	14040024	WELDMENT,POLY CHAIN GUARD,BACK	1
17	14040025	WELDMENT,POLY CHAIN GUARD,COVER	1
18	14040034	WELDMENT,POLY CHAIN ENDCAP	1
19	14040133	SHAFT,JACK SHAFT,1-11/16,VANGUARD	1
20	29A-08	NUT,STOVER LOCK, 1/2-13 UNC GR8	6
21	30A-06	LOCKWASHER, 3/8" USS GR8	3
22	30A-08Z1	LOCK WASHER,1/2" USS GR8 Z&Y	3
23	31A-10Z1	FLAT WASHER 5/8 USS GR 8 NARROW Z&Y	4
24	70A-0614	KEY ,3/8 SQ. 1-3/4" LONG	1
25	70A-0618	KEY,3/8 SQ. 2-1/4" LONG	1

FUNCTION GROUP

4 BOOM ASSEMBLY

BUSINESS LINE

STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION	ISSUE
35HP VANGUARD POLY CHAIN ASSEMBLY	R1

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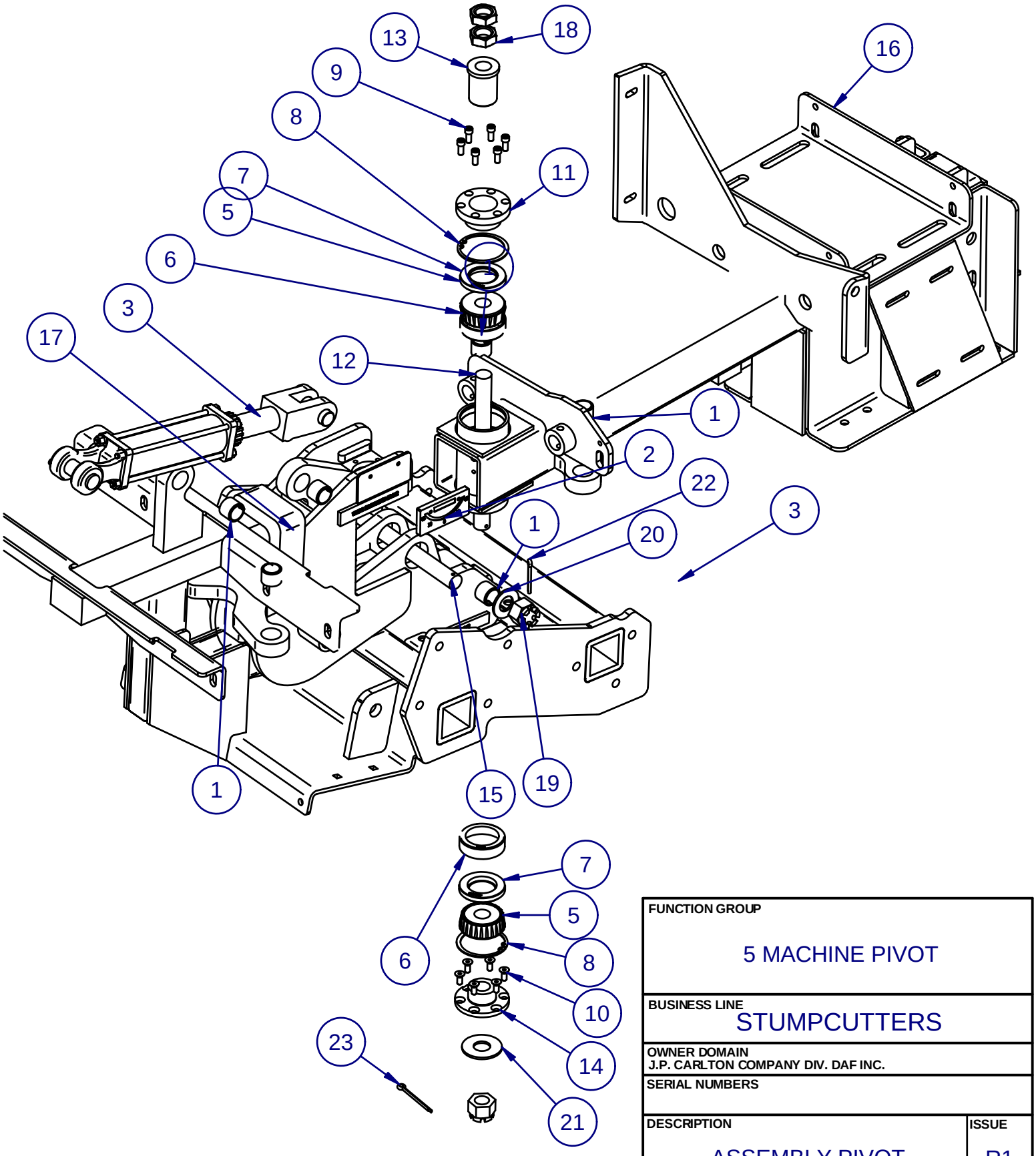


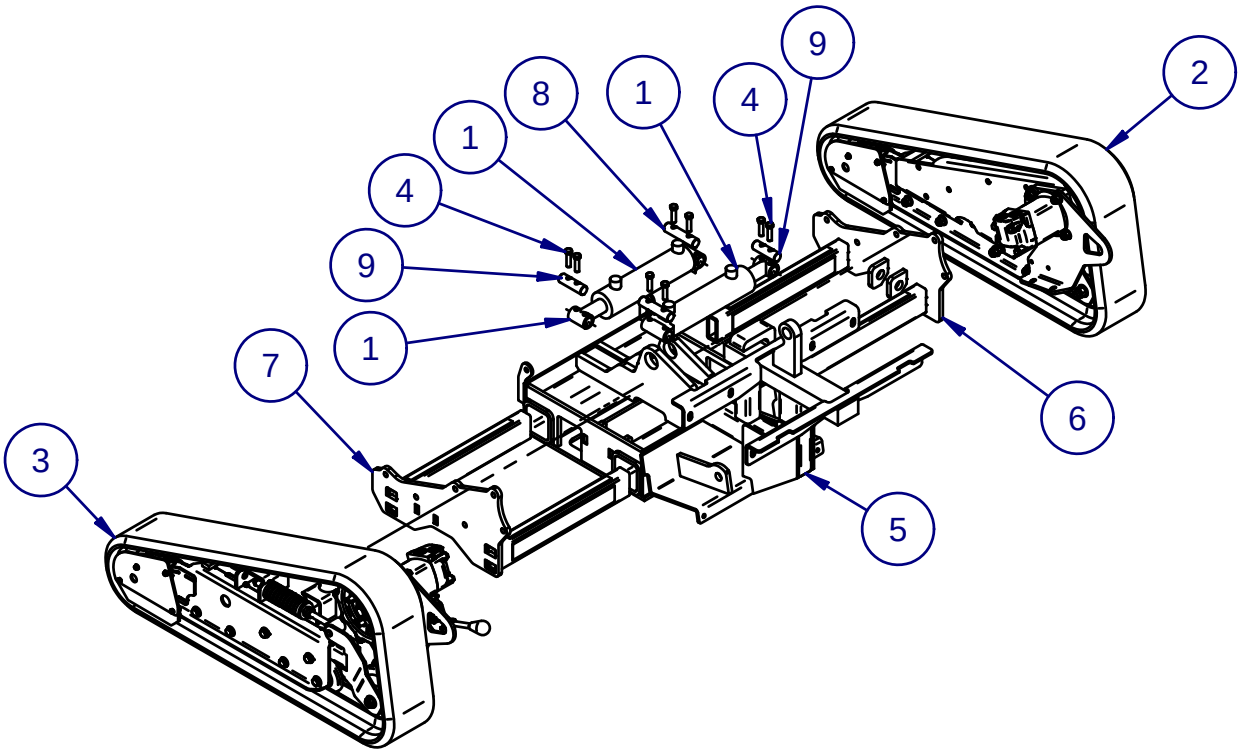
FUNCTION GROUP	5 MACHINE PIVOT
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	ASSEMBLY PIVOT
ISSUE	R1

Revised 3.15.05

PART	ITEM	TITLE	QTY
1	0150801	BUSHING,HARDENED,1"	9
2	0200293	Slope Indicator 30 Degree	1
3	0300105	Hydraulic Cylinder 2x4	2
4	0300105Y	Hydraulic Cylinder 3 x 6	1
5	0500167	Taper Bearing	2
6	0500168	Race	2
7	0500410	Seal- revised 4012	2
8	0500500	Snap ring for 2500 Pivot 2.5"	2
9	12D-0506	SOC HD C/S 5/16-18 X 3/4 UNC	6
10	12D-0506	FLAT COUNTERSUNK HD C/S 5/16-18 X 3/4 UNC	6
11	14050010	BUSHING,TOP PIVOT,HEATREATED	1
12	14050016	Swing Pivot Shaft - 1" - 23/25	1
13	14050019	Top Pivot Inner Bushing - 2500	1
14	14050024	BUSHING,PIVOT BTM	1
15	14050025	SHAFT,LIFT PIVOT	1
16	15040005	WELDMENT,BOOM,KUBOTA 33HP	1
17	15050002	WELDMENT,PIVOT	1
18	20E-16ZI	NUT,HEX, 1-14 UNC GR 8	2
19	21K-16ZI	NUT,CASTLE,1-14 UNF GR 5	3
20	34A-16	FLAT WASHER, 1" SAE GR 8	2
21	34A-20	FLAT WASHER, 1-1/16" ID 2-1/2" OD SAE GR 8	1
22	50A-0316	COTTER PIN, 3/16 X 2	2
23	50A-0324	COTTER PIN, 3/16 X 3	1

FUNCTION GROUP	5 MACHINE PIVOT
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	ASSEMBLY PIVOT
ISSUE	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	030010SZ2	CYLINDER, 5014 EXPANDABLE UNDERCARRIAGE,8"	2
2	0400249A	ASSEMBLY,UNDERCARRIAGE,RIGHT	1
3	0400249B	ASSEMBLY,UNDERCARRIAGE,LEFT	1
4	12A-0714Z1	HEX C/S 7/16 x 1-3/4 UNC GR8 Z&Y	8
5	15060003	WELDMENT,EXPANDABLE INDERCARRIAGE	1
6	15060004	WELDMENT,EXPANDABLE UNDERCARRIAGE SLIDE,LH	1
7	15060005	WELDMENT,EXPANDABLE UNDERCARRIAGE SLIDE,RH	1
8	15060025	PIN,EXPANDABLE UNDERCARRIAGE CYLINDER,LARGE	2
9	15060026	PIN,EXPANDABLE UNDERCARRIAGE CYLINDER,SMALL	2

FUNCTION GROUP
6 STEERING & UNDERCARRIAGE

BUSINESS LINE
STUMPCUTTERS

OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS
1J9BH1231F1167215

DESCRIPTION	ISSUE
EXPANDABLE UNDERCARRIAGE	R2

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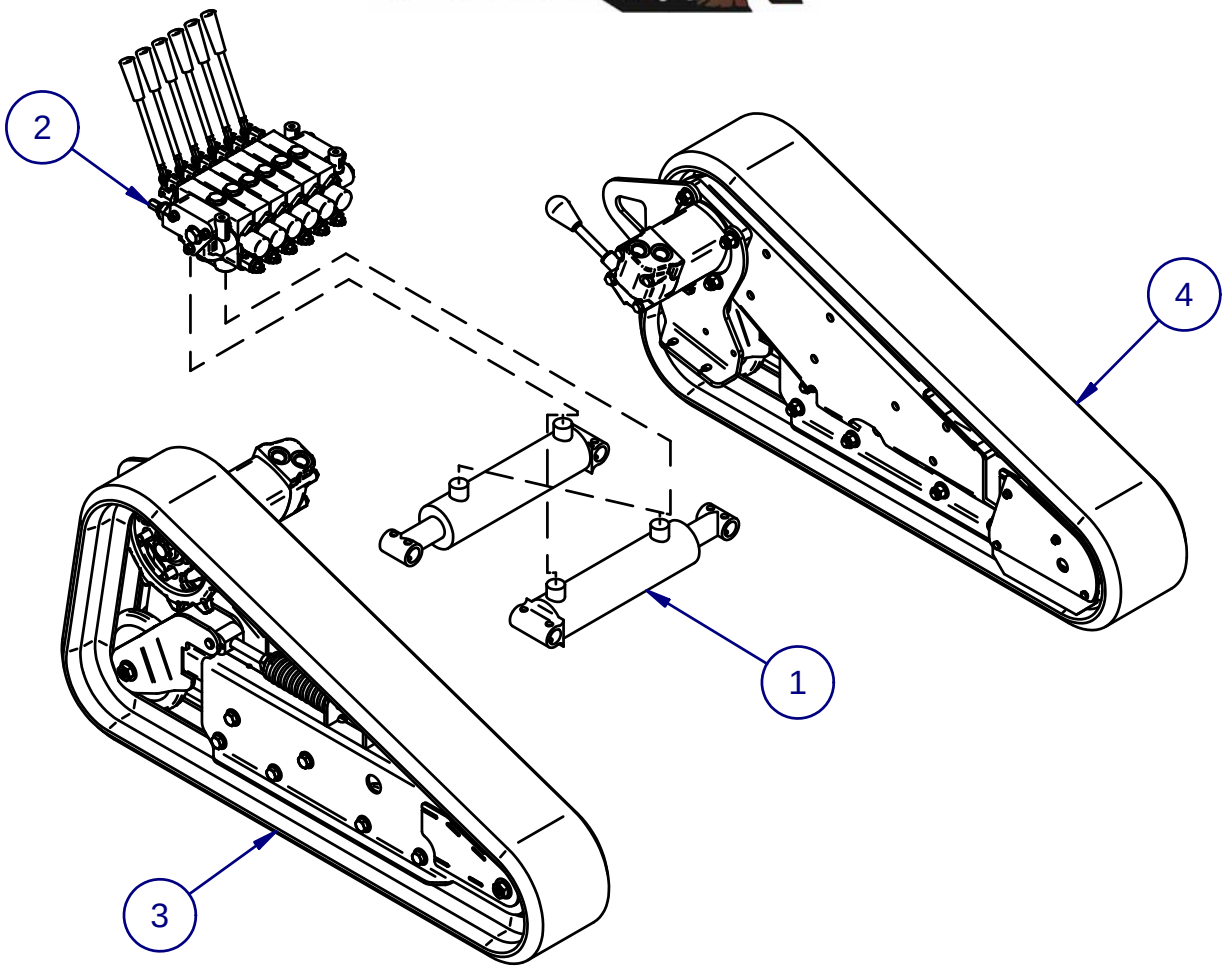
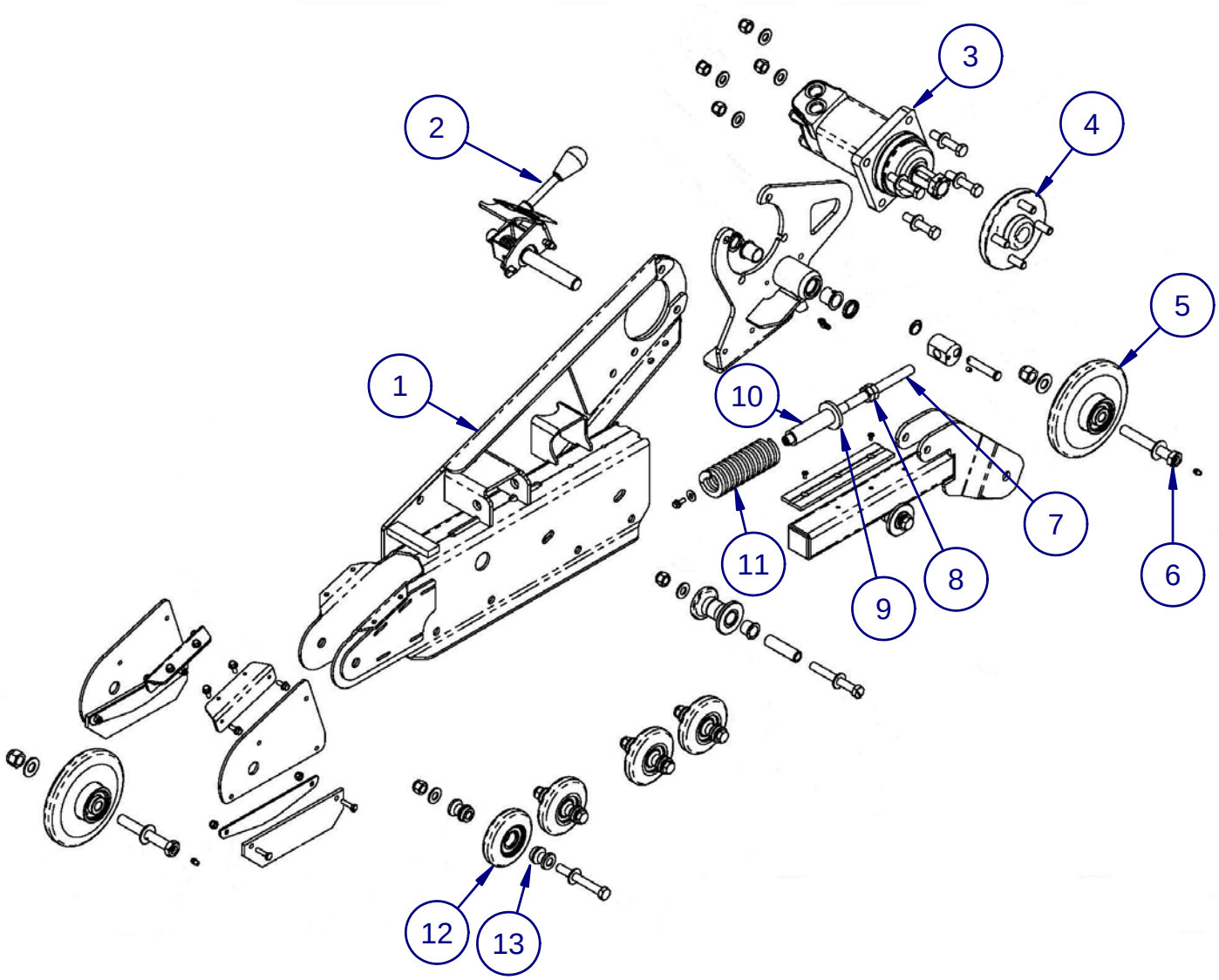


PART	ITEM	DESCRIPTION	QTY
1	030010SZ2	CYLINDER, 5014 EXPANDABLE UNDERCARRIAGE,8"	2
2	0300377	Control Valve 5014TRX Manual	1
3	0400249A	ASSEMBLY,UNDERCARRIAGE,RIGHT	1
4	0400249B	ASSEMBLY,UNDERCARRIAGE,LEFT	1

FUNCTION GROUP	6 STEERING & UNDERCARRIAGE
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	1J9BH1231F1167215
DESCRIPTION	EXPANDABLE UNDERCARRIAGE SCHEMATIC
ISSUE	R1

Revised 3.15.05

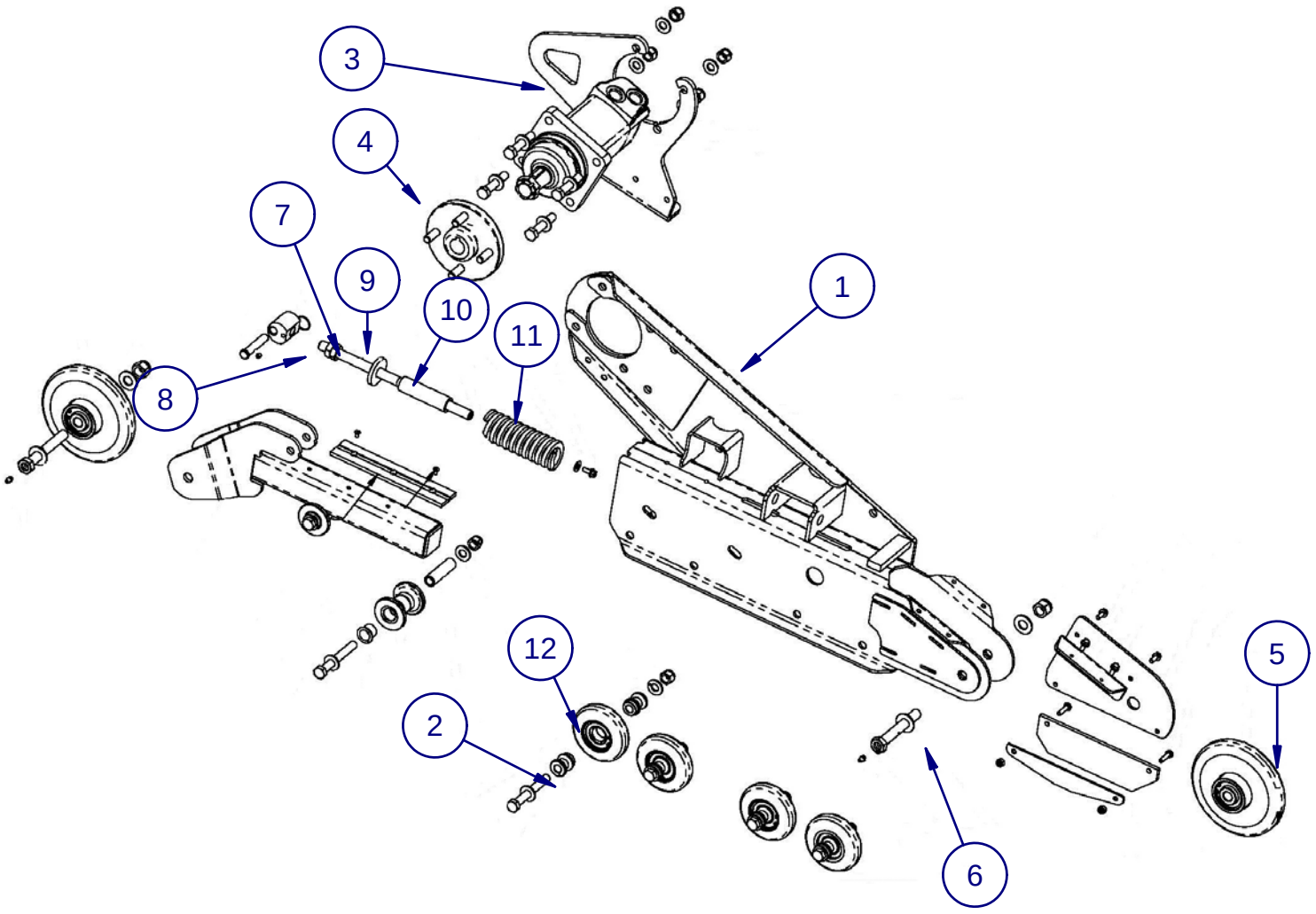


FUNCTION GROUP	6 STEERING & UNDERCARRIAGE
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	1J9BH1230C1167041
DESCRIPTION	LEFT UNDERCARRIAGE ASSEMBLY
ISSUE	R1

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0400249B	Left Carriage Assembly	1
2	0400249E	Park Brake Assembly	1
3	0400249F	Motor- Eaton	1
4	0400249K	HUB.1-1/4" TAPERED,SOLID	1
5	0400249C	Idler Assembly	2
6	0400249H	Roller Axle	2
7	0400249G	Tensioner Stud	1
8	0400249G1	Nut, Jam 5/8-11	2
9	0400249G2	Washer, Tension Spring	1
10	0400249G3	Spring Guide	1
11	0400249J	Spring	1
12	0400249D1	Roller Spacer	8
13	0400249D	Mid Roller Assembly	4

FUNCTION GROUP	6 STEERING & UNDERCARRIAGE
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	1J9BH1230C1167041
DESCRIPTION	LEFT UNDERCARRIAGE ASSEMBLY
ISSUE	R1

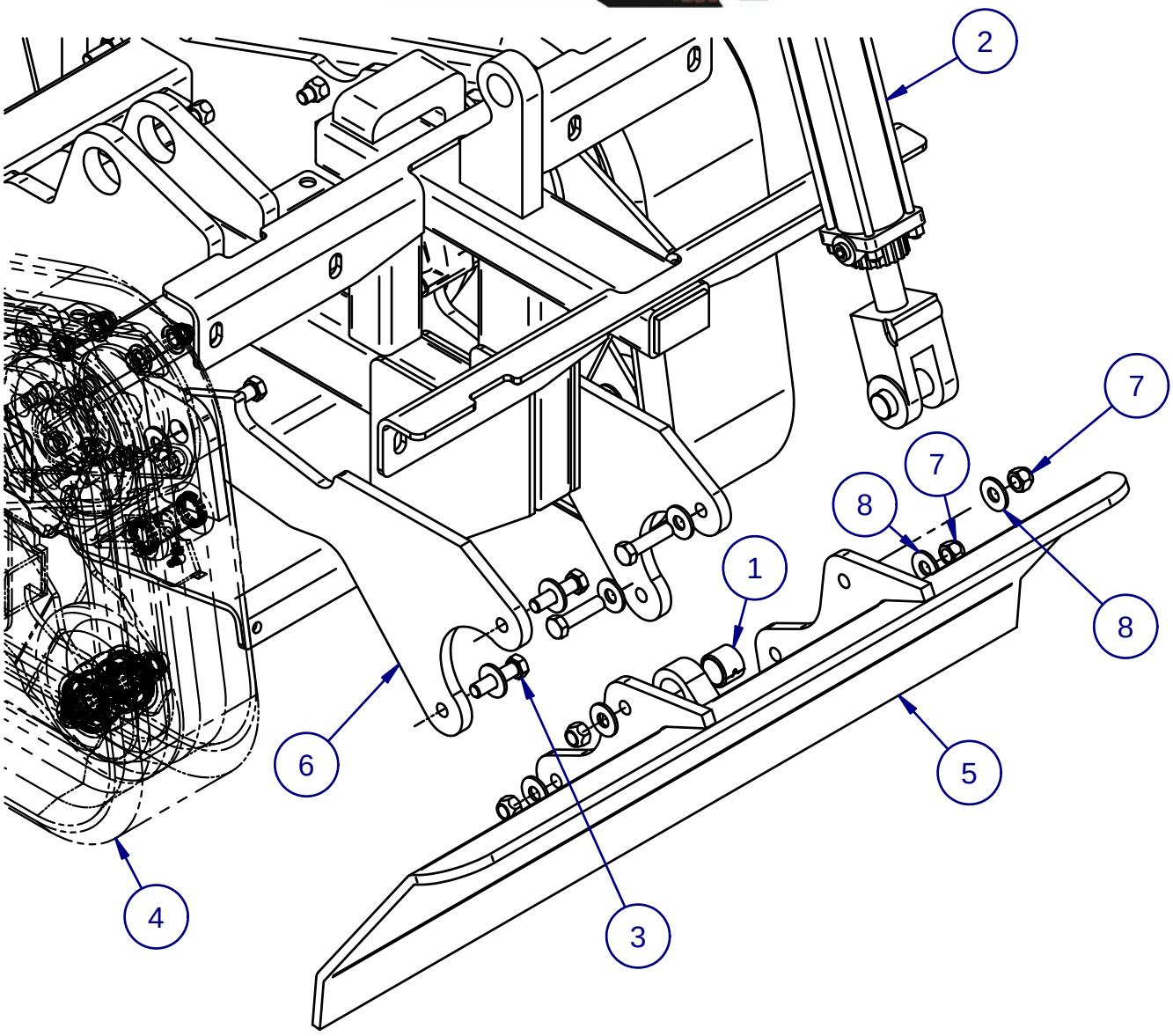


FUNCTION GROUP	6 STEERING & UNDERCARRIAGE
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	1J9BH1230C1167041
DESCRIPTION	RIGHT UNDERCARRIAGE ASSEMBLY
ISSUE	R1

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0400249A	Right Carriage Assembly	1
2	0400249D1	Roller Spacer	8
3	0400249F	Motor- Eaton	1
4	0400249K	HUB.1-1/4" TAPERED,SOLID	1
5	0400249C	Idler Assembly	2
6	0400249H	Roller Axle	2
7	0400249G	Tensioner Stud	1
8	0400249G1	Nut, Jam 5/8-11	2
9	0400249G2	Washer, Tension Spring	1
10	0400249G3	Spring Guide	1
11	0400249J	Spring	1
12	0400249D	Mid Roller Assembly	4

FUNCTION GROUP	6 STEERING & UNDERCARRIAGE
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	1J9BH1230C1167041
DESCRIPTION	RIGHT UNDERCARRIAGE ASSEMBLY
ISSUE	R1



PART	ITEM	DESCRIPTION	QTY
1	0150801	BUSHING,HARDENED,1"	2
2	0300105A	Hydraulic Cylinder 2 x 4	1
3	12A-0816Z1	BOLT,HEX C/S 1/2-13 x 2 UNC GR8	6
4	15060001	INSTALL,UNDERCARRIAGE	1
5	15070002	WELDMENT,SCRAPE BLADE	1
6	15070009	PLATE,SCRAPE BLADE/FRAME	2
7	29A-08	NUT,STOVER LOCK, 1/2-13 UNC GR8	6
8	31A-08Z1	FLAT WASHER 1/2 USS GR 8 Z&Y	12

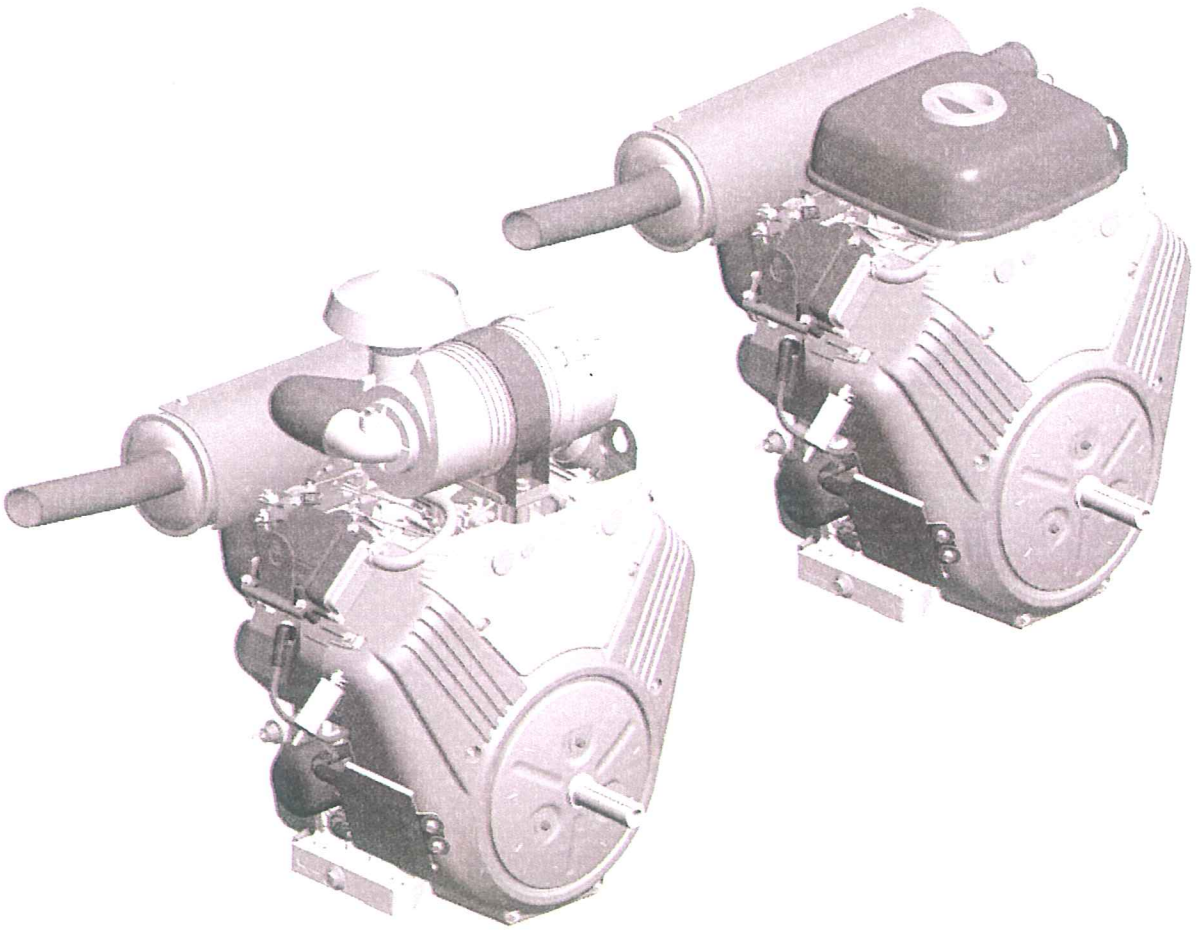
FUNCTION GROUP	7 OPTIONS
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	SCRAPE BLADE
ISSUE	R1

Revised 3.15.05

BRIGGS & STRATTON

Operator's Manual

Model 540000	Vanguard	Model 610000	Vanguard



BRIGGSandSTRATTON.com

Form No. 277112-3/07
Printed in U.S.A.

Safety References

The safety alert symbol is used to identify safety information about hazards that can result in personal injury. A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of injury. In addition, a hazard symbol may be used to represent the type of hazard.

DANGER indicates a hazard which, if not avoided, **will result in death or serious injury.**

WARNING indicates a hazard which, if not avoided, **could result in death or serious injury.**

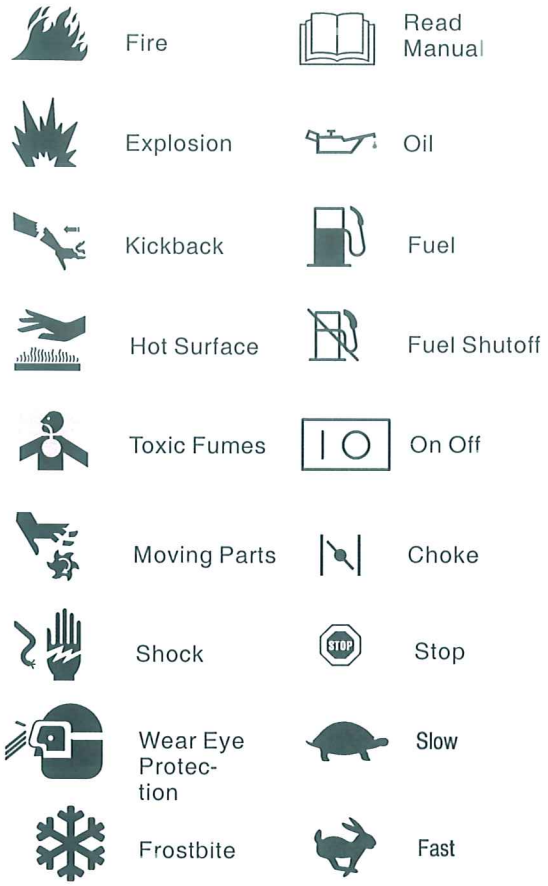
CAUTION indicates a hazard which, if not avoided, **might result in minor or moderate injury.**

CAUTION, when used **without** the alert symbol, indicates a situation that **could result in damage to the engine.**

This manual contains safety information to make you aware of the hazards and risks associated with engines, and how to avoid them. Because Briggs & Stratton does not necessarily know what equipment this engine will power, it is important that you read and understand these instructions and the instructions for the equipment this engine powers.

Table of Contents

SYMBOLS ASSOCIATED WITH THIS ENGINE:



WARNING

Briggs & Stratton does not approve or authorize the use of these engines on 3-wheel All Terrain Vehicles (ATVs), motor bikes, fun/recreational go-karts, aircraft products or vehicles intended for use in competitive events. Use of these engines in such applications could result in property damage, serious injury (including paralysis), or even death.

WARNING

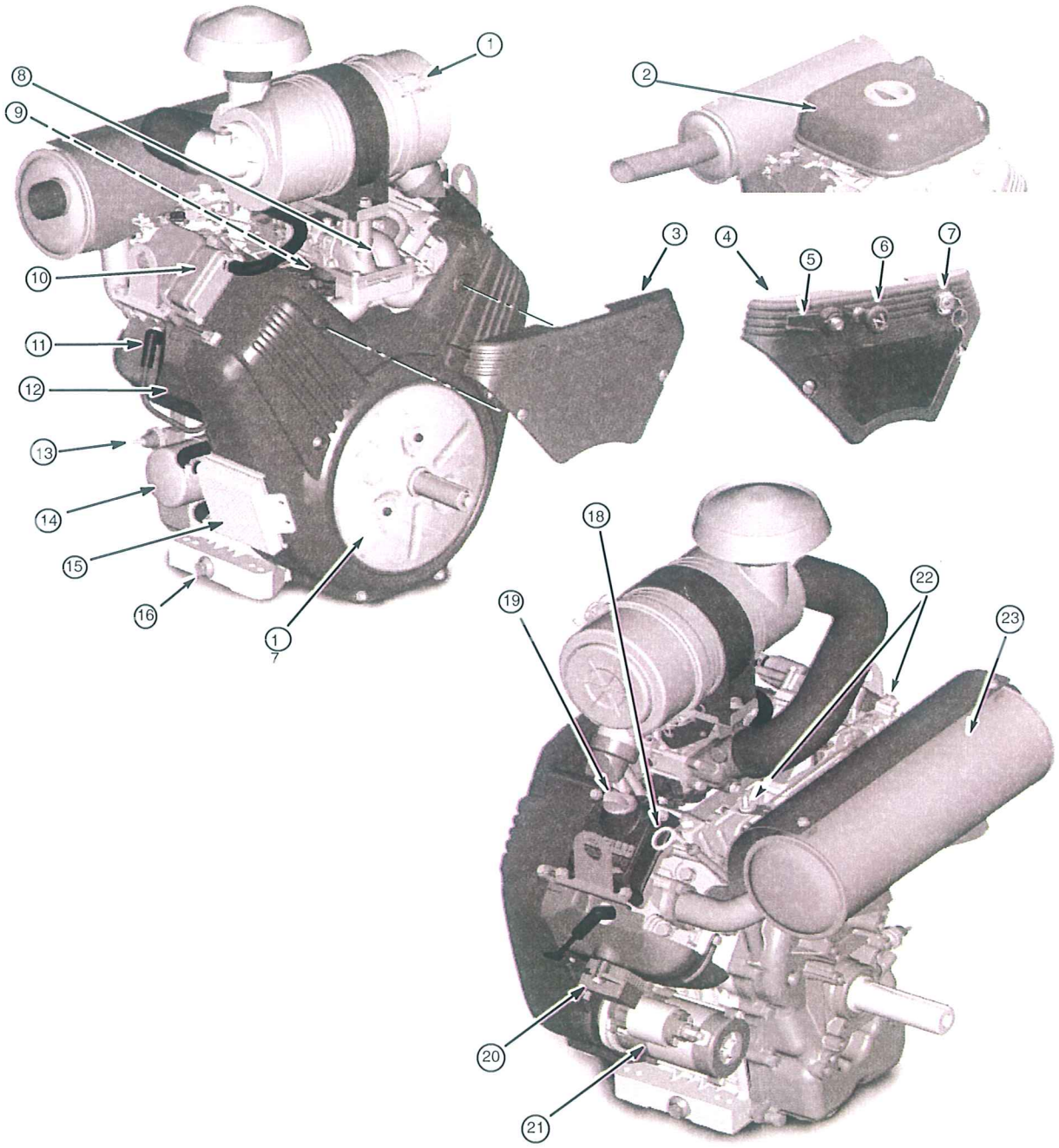
The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

CAUTION

This engine is shipped from Briggs & Stratton without oil. If you start the engine without oil, the engine will be damaged beyond repair and will not be covered under warranty.

Features

1. Air cleaner (standard)
2. Air cleaner (optional)
3. Front panel (standard)
4. Front panel with controls (optional)
5. Throttle control (optional)
6. Choke control (optional)
7. Key switch (optional)
8. Carburetor / LPG or NG fuel mixer
9. Fuel pump
10. Breather
11. Spark plug
12. Engine Model no. label
13. Oil pressure sensor
14. Oil filter
15. Oil cooler
16. Oil drain plug
17. Rotating screen
18. Oil level dipstick
19. Oil fill cap
20. Regulator or rectifier
21. Electric starter
22. Remote throttle locations
23. Muffler



Safety Information

⚠ WARNING

Gasoline and its vapors are extremely flammable and explosive.

Fire or explosion can cause severe burns or death.

WHEN ADDING FUEL

- Turn engine OFF and let engine cool at least 2 minutes before removing gas cap.
- Fill fuel tank outdoors or in well-ventilated area.
- Do not overfill fuel tank.
- Keep gasoline away from sparks, open flames, pilot lights, heat, and other ignition sources.
- Check fuel lines, tank, cap, and fittings frequently for cracks or leaks. Replace if necessary.

WHEN STARTING ENGINE

- Make sure spark plug, muffler, fuel cap and air cleaner are in place.
- Do not crank engine with spark plug removed.
- If fuel spills, wait until it evaporates before starting engine.
- If engine floods, set choke to OPEN/RUN position, place throttle in FAST and crank until engine starts.

WHEN OPERATING EQUIPMENT

- Do not choke carburetor to stop engine.

WHEN TRANSPORTING EQUIPMENT

- Transport with fuel tank EMPTY.

WHEN STORING GASOLINE OR EQUIPMENT WITH FUEL IN TANK

- Store away from furnaces, stoves, water heaters or other appliances that have pilot light or other ignition source because they can ignite gasoline vapors.

⚠ WARNING

Gaseous fuels, such as liquid petroleum gas (LPG) and natural gas (NG), are extremely flammable and can readily form explosive air-vapor mixtures at moderate temperatures.

IF YOU SMELL GAS:

- DO NOT start the engine.
- DO NOT actuate any electrical switches.
- DO NOT use the phone in the vicinity.
- Evacuate the area.
- Contact the gas supplier or fire department.

REMEMBER:

- LPG vapor is heavier than air and tends to collect in low areas. NG vapor is lighter then air and tends to collect in high areas. Both may travel to remote locations.
- Keep all flames, sparks, pilot lights and other ignition sources away from the area where the engine is operated or repaired.
- DO NOT smoke when operating or repairing the engine.
- DO NOT store gasoline or other flammable vapors or liquids in the vicinity of the engine.
- BEFORE doing any service work to the engine, shut off the gas supply.
- After initial installation or servicing, check for gas leaks. DO NOT use an open flame. Apply very soapy water or leak test solution with a brush and look for bubbles.
- Keep the equipment and the area surrounding the engine free of debris.
- Install the fuel system according to applicable fuel/gas codes.

⚠ WARNING

Starting engine creates sparking.

Sparking can ignite nearby flammable gases.

Explosion and fire could result.

- If there is natural or LP gas leakage in area, do not start engine.
- Do not use pressurized starting fluids because vapors are flammable.

⚠ WARNING

Engines give off carbon monoxide, an odorless, colorless, poison gas.

Breathing carbon monoxide can cause nausea, fainting or death.

- Start and run engine outdoors.
- Do not start or run engine in enclosed area, even if doors or windows are open.

⚠ WARNING

Rapid retraction of starter cord (kickback) will pull hand and arm toward engine faster than you can let go.

Broken bones, fractures, bruises or sprains could result.

- When starting engine, pull cord slowly until resistance is felt, then pull rapidly.
- Direct coupled equipment components such as, but not limited to, blades, impellers, pulleys, sprockets, etc., must be securely attached.

⚠ WARNING

Rotating parts can contact or entangle hands, feet, hair, clothing, or accessories.

Traumatic amputation or severe laceration can result.

- Operate equipment with guards in place.
- Keep hands and feet away from rotating parts.
- Tie up long hair and remove jewelry.
- Do not wear loose-fitting clothing, dangling drawstrings or items that could become caught.

⚠ WARNING

Running engines produce heat. Engine parts, especially muffler, become extremely hot.

Severe thermal burns can occur on contact.

Combustible debris, such as leaves, grass, brush, etc. can catch fire.

- Allow muffler, engine cylinder and fins to cool before touching.
- Remove accumulated debris from muffler area and cylinder area.
- Install and maintain in working order a spark arrester before using equipment on forest-covered, grass-covered, brush-covered unimproved land. The state of California requires this (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal land.

⚠ WARNING

Unintentional sparking can result in fire or electric shock.

Fire or explosion can cause severe burns or death.

Unintentional start-up can result in entanglement, traumatic amputation, or laceration.

Before performing maintenance or repairs:

- Disconnect spark plug wire and keep it away from spark plug.
- Disconnect battery at negative terminal (only engines with electric start).
- Use only correct tools.
- Do not strike the flywheel with a hammer or hard object because the flywheel may later shatter during operation.
- Do not tamper with governor spring, links or other parts to increase engine speed.

When testing for spark:

- Use approved spark plug tester.
- Do not check for spark with spark plug removed.

⚠ WARNING

Wear eye protection when doing repair work.

Frostbite can result from skin/eye contact with leaking LP liquid.

- Installation, adjustment and repair work should be done by a qualified technician.
- Flexible supply lines should be checked regularly to make sure they are in good condition. Replace damaged or leaking components.

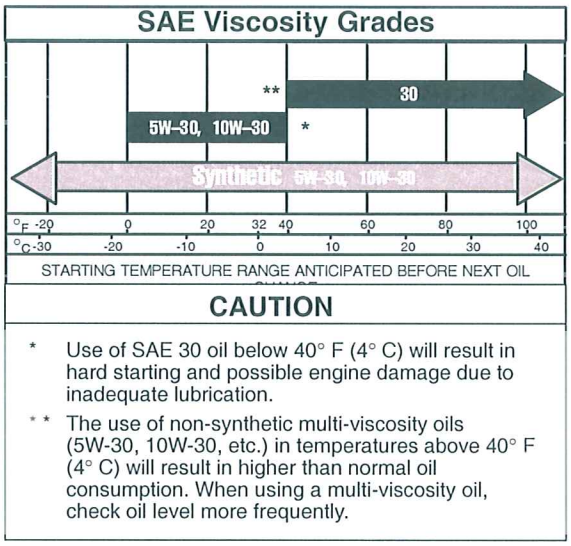
Oil

Capacity

The engine holds approximately 80 oz (2.3 liters).

Oil Recommendation

- Use a high quality detergent oil classified "For Service SG, SH, SJ, SL" or higher, such as Briggs & Stratton 30, Part Number 100005 (20 oz) or 100028 (48 oz).
- Do not use special additives.
- Do not mix gasoline with oil.
- Choose a viscosity according to the table.



CAUTION

* Use of SAE 30 oil below 40° F (4° C) will result in hard starting and possible engine damage due to inadequate lubrication.

** The use of non-synthetic multi-viscosity oils (5W-30, 10W-30, etc.) in temperatures above 40° F (4° C) will result in higher than normal oil consumption. When using a multi-viscosity oil, check oil level more frequently.

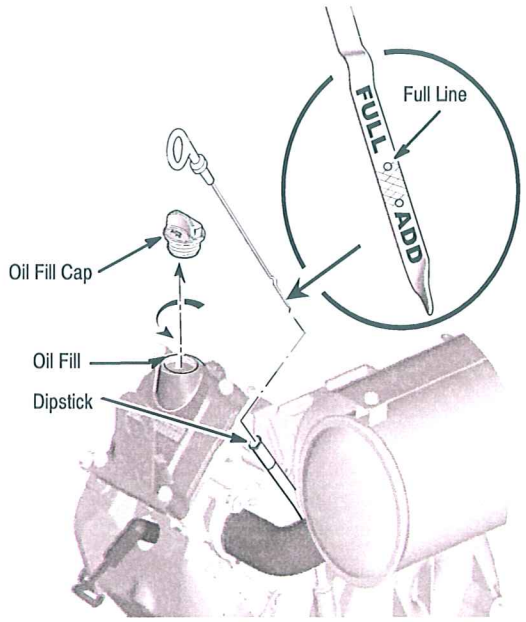
Note: Synthetic oil meeting ILSAC GF-2, API certification mark and API service symbol (shown at left) with "SJ/CF ENERGY CONSERVING" or higher, is an acceptable oil at all temperatures. **Use of synthetic oil does not alter required oil change intervals.**

Adding Oil

1. First add 67 oz (2 liters).
2. Start and run engine at idle for 30 seconds. *See Starting Instructions.*
3. Shut engine off and wait 30 seconds.
4. Then add more oil slowly to bring level to FULL mark on dipstick. DO NOT OVERFILL.

Checking Oil Level

- Check oil level before starting the engine.
- Keep oil level at FULL. Do not overfill.
- Check level daily, or after every eight (8) hours of operation.



1. Place engine level and clean around oil filler plug.
2. Remove dipstick and wipe clean with cloth.
3. Push dipstick back in and remove to check oil level. Oil level should be at FULL line on dipstick.
4. If oil is needed, add slowly.
5. Fill to FULL line on dipstick – re-check.
6. Replace dipstick firmly.

Oil Pressure

If oil pressure drops below 1–4 psi (0.1–0.2 kg/cm^2), an oil pressure switch (if engine is equipped) will either activate a warning device or stop the engine. Check oil level with dipstick.

If oil level is between ADD and FULL mark on dipstick **do not try to restart engine.** Contact an Authorized Briggs & Stratton Service Dealer. **Do not operate engine until oil pressure is corrected.**

If oil level is below ADD mark on dipstick, add oil to bring level to FULL mark. Restart engine and check oil pressure. If pressure is normal, continue to operate engine.

Note: Oil pressure gauge, if engine is equipped, is supplied by manufacturer of equipment.

Fuel

Gasoline Powered Engines

- Use clean, fresh, regular unleaded gasoline with a minimum of 85 octane. Fresh fuel prevents gum from forming in the fuel system or on essential carburetor parts. Purchase fuel in quantity that can be used within 30 days.
- For engine protection use Briggs & Stratton Gasoline Additive available from your Authorized Briggs & Stratton Dealer.
- Do not use gasoline which contains Methanol.
- Do not mix oil with gasoline.
- This engine is certified to operate on gasoline. Exhaust Emission Control System: EM (Engine Modifications).

Adding Fuel

1. Turn engine OFF and let engine cool at least 2 minutes before removing gas cap.
2. Remove cap. Fill tank to approximately 1-1/2 inches below top of neck to allow for fuel expansion. Be careful not to overfill.
3. Replace cap before starting.

CAUTION

Some fuels, called oxygenated or reformulated fuels, are fuels blended with alcohols or ethers. Excessive amounts of these blends can damage the fuel system or cause performance problems. If any undesirable operating symptoms occur, use gasoline with a lower percentage of alcohol or ether.

Liquid Propane Gas (LPG)

Natural Gas (NG) Powered Engines

- Use clean, dry fuel, free of moisture or any particulate material. Using fuels outside the following recommended values may cause performance problems.
- In engines set to run on LPG, commercial grade HD5 LPG is recommended. Recommended fuel composition is fuel with a minimum fuel energy of 2500 BTU's/ft3 with maximum propylene content of 5% and butane and heavier gas content of 2.5% and minimum propane content of 90%.
- LPG or NG engines are certified to operate on liquid propane gas or natural gas. Exhaust Emission Control System: EM (Engine Modifications).

Adding Fuel

Read the operating instructions supplied by the equipment manufacturer for information on refueling natural or LP gas engine.

⚠ WARNING

LPG/NG Engines: The equipment on which this engine is mounted is equipped with an automatic safety gas "fuel lock-off" valve. DO NOT operate the equipment if the "fuel lock-off" valve is missing or inoperative.

Cold Weather Starting

- Use correct type of oil for expected starting temperature. See *Oil*.
- Use fresh gasoline, which has higher volatility to improve starting.
- Remove external equipment and engine loads. (See equipment operating instructions.)
- Allow engine to warm up several seconds to several minutes depending on outside temperature.
- Gradually open choke.
- For maximum performance and life, operate engine with choke in OPEN and throttle in FAST.

Starting

Gasoline Powered Engines

The controls used for starting are located on the engine or on the equipment for which it powers. Read your operating manual and become familiar with the use of the controls before starting your engine.

1. Check oil level.
2. Open fuel shut-off valve (if equipped).
3. Move choke control to CHOKE or START.
4. Move throttle (if equipped) to FAST.
5. Push rocker switch (if equipped) to ON or RUN.
6. Insert key and turn to START.
7. Let engine warm up.

Note: If choke equipped, slowly adjust toward RUN position. Wait until engine runs smoothly before each choke adjustment.

Liquid Propane Gas (LPG) Natural Gas (NG) Powered Engines

1. Insert key and turn to START.
2. Let engine warm up.

CAUTION

Use short starting cycles (5 seconds, wait one minute between cycles). Follow equipment manufacturer's recommendations for charging battery.

CAUTION

The manufacturer of the equipment on which this engine is installed specifies top speed at which the engine will be operated. DO NOT EXCEED this speed.

Stopping

⚠ WARNING

- Do not stop engine by moving choke control to CHOKE. Backfire, fire or engine damage could occur.

1. Move throttle to SLOW (if equipped).
2. Turn key to OFF. Remove key and store out of reach of children.
3. Push rocker switch (if equipped) to OFF or STOP.
4. Close fuel shut-off valve (if equipped).

BRIGGS & STRATTON

Need assistance?

1-800-233-3723 (USA and Canada ONLY, Pre-recorded message.)

www.briggsandstratton.com

Maintenance

Regular maintenance will improve the performance and extend the life of the engine. See any Authorized Briggs & Stratton Dealer for service. **Use only genuine Briggs & Stratton parts. Other parts may not perform as well, may damage the engine, and may result in injury.** In addition, use of other parts may void your warranty.

Emission Control

Maintenance, replacement or repair of the emission control devices and systems may be performed by any nonroad engine repair establishment or individual. However, to obtain no charge repairs under the terms and provisions of the Briggs & Stratton warranty statement, any service or emission control part repair or replacement must be performed by a factory authorized dealer.

⚠ WARNING

Wear eye protection when doing repair work.

Frostbite can result from skin/eye contact with leaking LP liquid.

- Installation, adjustment and repair work should be done by a qualified technician.

⚠ WARNING

Unintentional sparking can result in fire or electric shock.

Fire or explosion can cause severe burns or death.

Unintentional start-up can result in entanglement, traumatic amputation, or laceration.

Before performing maintenance or repairs:

- Disconnect spark plug wire and keep it away from spark plug.
- Disconnect battery at negative terminal (only engines with electric start).
- Use only correct tools.
- Do not strike the flywheel with a hammer or hard object because the flywheel may later shatter during operation.
- Do not tamper with governor spring, links or other parts to increase engine speed.

When testing for spark:

- Use approved spark plug tester.
- Do not check for spark with spark plug removed.

Follow the instructions and schedules indicated below.

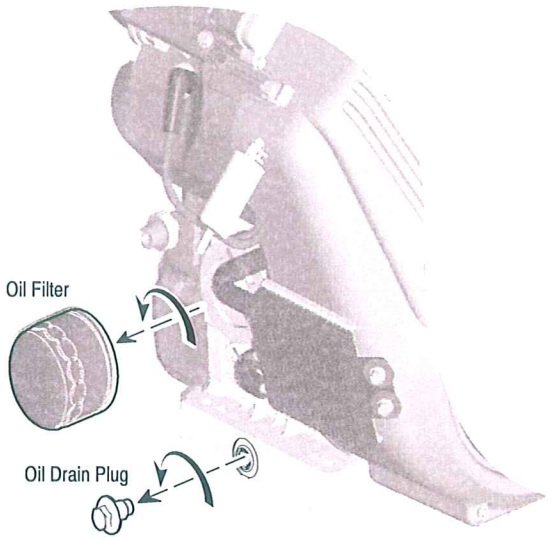
Task *Perform task at hourly or calendar interval, whichever comes first.*	Every 8 Hours or Daily	50 Hours	100 Hours	250 Hours	400 Hours	600 Hours	Yearly
Check Oil Level and for Oil Leaks							
Clean Spark Arrestor (if equipped)							
Change Oil and Oil Filter**							
Clean Air Cleaner*							
On NG / LPG Engines –Check Valve Clearance							
On Gasoline Engines –Check Valve Clearance							
Check Battery Electrolyte							
Replace Air Cleaner Cartridge*							
Change Fuel Filter							
Replace Safety Filter Cartridge							
Change Spark Plugs							

* Clean more often under dusty conditions or when airborne debris is present. Replace air cleaner, if very dirty.

** **Change oil after first 5 to 8 hours of use**, then every 100 hours. Change oil every 50 hours when operating the engine under heavy load or in high temperatures. **Check valve clearance after first 50 hours of use**, then every 250 hours on gasoline powered engines.

Changing Oil and Oil Filter

Change oil after first 5 to 8 hours of use, then every 100 hours. Change oil every 50 hours when operating the engine under heavy load or in high temperatures.



1. With engine OFF but still warm, remove oil drain plug and drain oil into appropriate receptacle. Reinstall drain plug.
2. Remove oil filter. Before installing new filter, lightly oil filter gasket with fresh, clean oil.
3. Screw filter on by hand until gasket contacts oil filter adapter. Tighten 1/2 to 3/4 turn more.
4. Place engine level and follow *Adding Oil* to add fresh oil.
5. Replace oil fill cap and dipstick.

CAUTION

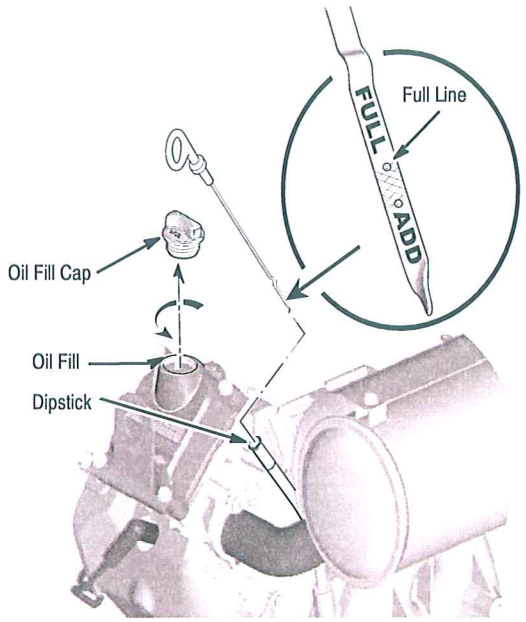
Used oil is a hazardous waste product. Dispose of used oil properly. Do not discard with household waste. Check with your local authorities, service center, or dealer for safe disposal/recycling facilities.

Adding Oil

1. First add 67 oz (2 liters).
2. Start and run engine at idle for 30 seconds. *See Starting Instructions.*
3. Shut engine off and wait 30 seconds.
4. Then add more oil slowly to bring level to FULL mark on dipstick.
5. Replace oil fill cap and dipstick.

Checking Oil Level

- Check oil level before starting the engine.
- Keep oil level at FULL. Do not overfill.
- Check level daily, or after every eight (8) hours of operation.



1. Place engine level and clean around oil filler plug.
2. Remove dipstick and wipe clean with cloth.
3. Push dipstick back in and remove to check oil level. Oil level should be at FULL line on dipstick.
4. If oil is needed, add slowly.
5. Fill to FULL line on dipstick – re-check.
6. Replace dipstick firmly.

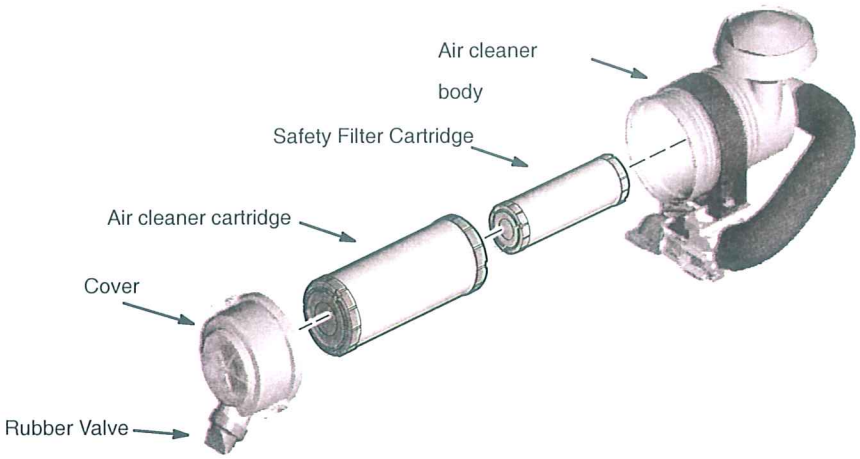
Air Cleaner

Clean cartridge every 100 hours. To clean cartridge, gently tap on end with handle of screwdriver. Replace cartridge every 400 hours. Clean and replace more often under dusty conditions.

CAUTION

Do not use pressurized air or solvents to clean foam. Pressurized air can damage foam; solvents will dissolve foam.

Cyclonic air cleaner

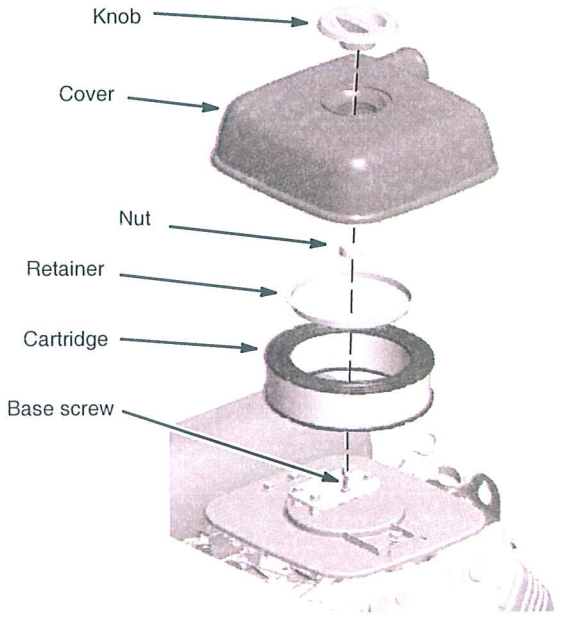


1. Unlock and remove fastening devices to remove cover and retainers, if equipped.
2. Remove cartridge from air cleaner body and inspect. Replace if very dirty or any damage occurs to cartridge.
3. Carefully clean out air cleaner cover and around base. Do not allow debris to enter engine.
4. Install clean or new cartridge in body.
5. Install retainers and cover and lock with clamps or knob.

Safety Filter Installation

Several models with the cyclonic air cleaner are also equipped with a safety filter. Replace safety filter cartridge every 600 hours, or with every other air filter cartridge replacement. To replace, pull carefully to remove from air cleaner body, ensure no debris enters engine. Install new safety cartridge first, then install air filter cartridge over safety filter.

Oval air cleaner



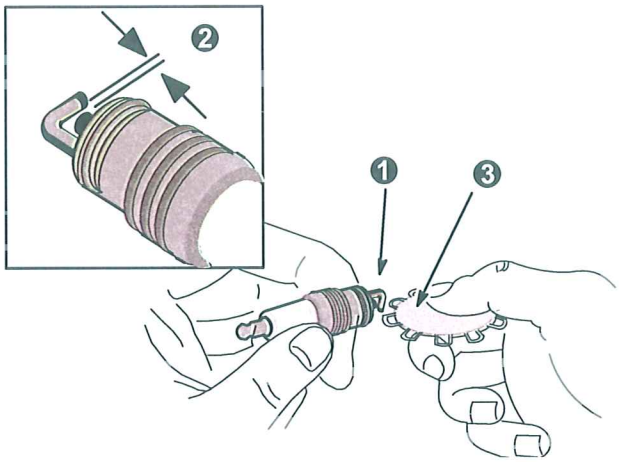
⚠ WARNING

Ensure air cleaner, retainer, and cover are properly installed before starting engine.

Spark Plug

Check the spark plug every 100 hours. Replace the spark plug if upon inspection the electrode ❶ is burned or worn. Ensure the spark plug is clean. Check the gap ❷ with a wire gauge ❸ and reset to .76 mm or 0.030 in. if necessary. Use only Briggs & Stratton Spark Tester (part number 19368) to check for spark.

Note: In some areas, local law requires using resistor spark plug to suppress ignition signals. If this engine was originally equipped with resistor spark plug, use same type for replacement.



Fuel Filter

⚠ WARNING

- Drain fuel tank or close fuel shut-off valve before replacing fuel filter. Otherwise, fuel can leak out creating a fire/explosion hazard.

When replacing fuel filter, ensure clamps are tight and fuel flows into the same direction as the arrow marked FLOW.

Valve Clearance

Check valve clearance on NG and LPG engines every 100 hours.

On gasoline engines check valve clearance every 250 hours.

Muffler/Fuel System

⚠ WARNING

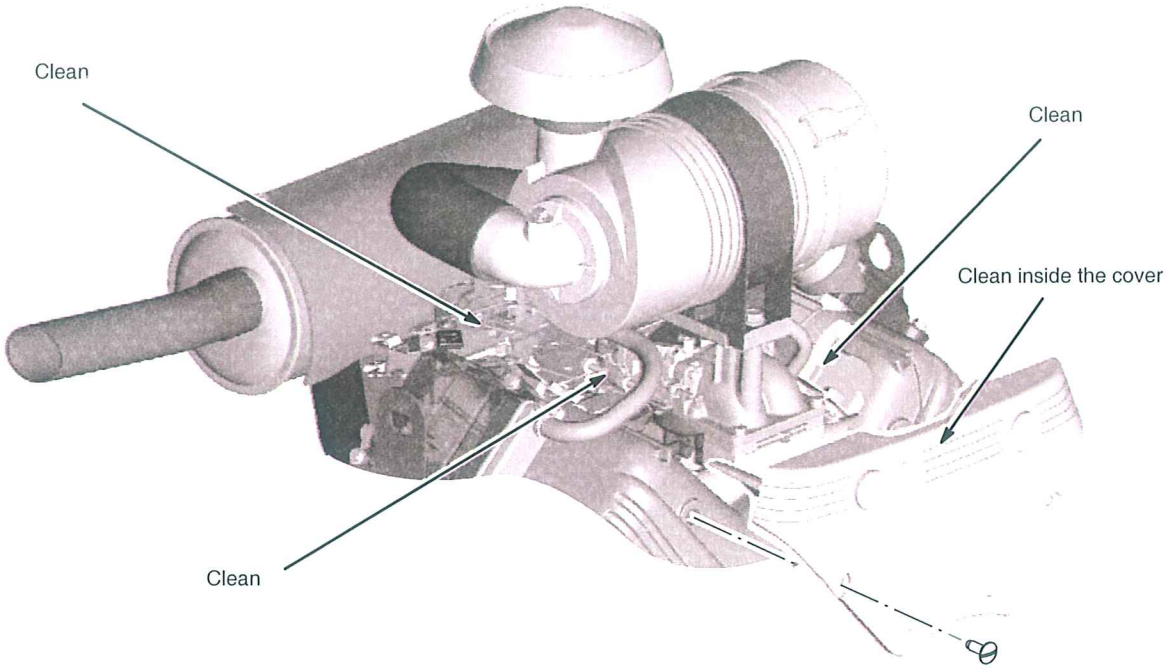
- Replacement parts for muffler and fuel system (cap, hoses, tanks, filters, etc.) must be the same and installed in the same position as original parts, otherwise fire can occur.

Cleaning Debris

Daily or before every use, clean accumulated debris from engine. Remove front panel to reveal carburetor. Clean around intake manifold, fuel pump, and carburetor. Keep linkage, spring and controls clean.

WARNING

- Engine parts should be kept clean to reduce the risk of overheating and ignition of accumulated debris.



CAUTION

Do not use water to clean engine parts. Water could contaminate fuel system. Low pressure compressed air may be used.

Storage

If engine is stored over 30 days, prepare as follows:

1. To prevent gum from forming in fuel system or on essential carburetor parts:

If fuel tank contains oxygenated or reformulated gasoline (gasoline blended with an alcohol or an ether) run engine until it stops from lack of fuel.

If fuel tank contains gasoline either run engine until it stops from lack of fuel or add a gasoline additive. If you use a gasoline additive, run the engine for several minutes to circulate the additive through the carburetor.

Then engine and fuel can be stored up to 24 months.

2. While engine is still warm, change oil.
3. Remove spark plugs and pour about 1 oz (30 ml) of engine oil into each cylinder. Replace spark plugs and crank slowly to distribute oil.
4. Clean engine of surface debris, chaff or grass.

WARNING

When storing gasoline or equipment with fuel in the tank:

- Store away from furnaces, stoves, water heaters, or other appliances that have a pilot light or other ignition source because they can ignite gasoline vapors.

When Transporting Equipment:

- Transport with fuel tank EMPTY or with fuel shut-off valve OFF.

Service

See an Authorized Briggs & Stratton Service Dealer. Each one carries a stock of Genuine Briggs & Stratton Parts and is equipped with special service tools. Trained mechanics assure expert repair service on all Briggs & Stratton engines. Only dealers advertising as "Authorized Briggs & Stratton" are required to meet Briggs & Stratton standards.

When you purchase equipment powered by a Briggs & Stratton engine, you are assured of highly skilled, reliable service at more than 30,000 Authorized Service Dealers worldwide, including more than 6,000 Master Service Technicians. Look for these signs wherever Briggs & Stratton service is offered.

You may find the nearest Authorized Service Dealer in our dealer locator map at **www.briggsandstratton.com**, or by calling 1-800-233-3723

PARTIAL LIST OF GENUINE BRIGGS & STRATTON PARTS

PART	PART NO.
Cyclonic air cleaner cartridge	841497
Safety filter cartridge	821136
Oval air cleaner cartridge	692519
Oval foam pre-cleaner	692520
Oil	100028
Oil filter	492932
Fuel filter	691035
Fuel pump	809669
Gas additive	5041
Resistor spark plug	692051
Spark plug wrench	19374
Spark tester	19368
Oil pump kit (uses standard electric drill to remove oil from engine quickly)	5056

An illustrated shop manual includes common specifications and detailed information covering adjustment, tune-up and repair of Briggs & Stratton engines. It is available for purchase from an Authorized Briggs & Stratton Service Dealer or you can order it from **www.briggsandstratton.com.**

Specifications

We recommend that you use an authorized Briggs & Stratton Service Dealer for all maintenance and service of the engine and engine parts. Use only genuine Briggs & Straton parts.

In the state of California, Model 540000 and 610000 engines are certified by the California Air Resources Board to meet emissions standards for 1000 hours. Such certification does not grant the purchaser, owner or operator of this engine any additional warranties with respect to the performance or operational life of this engine. This engine is warranted solely according to the product and emissions warranties stated elsewhere in this manual.

Model 540000

Bore ..... 3.36 in. (85.5 mm)

Stroke ..... 3.07 in. (78 mm)

Displacement ..... 54.6 cu. in. (895 cc)

Model 610000

Bore ..... 3.36 in. (85.5 mm)

Stroke ..... 3.040 in. (86.5 mm)

Displacement ..... 60.59 cu. in. (993 cc)

Tune-up Specifications

Armature air gap .. 0.005 – 0.008 in. (0.13 – 0.20 mm)

Spark plug gap ..... 0.030 in. (0.76 mm)

Valve clearance with valve springs installed and piston 1/4 in. (6 mm) past top dead center (check when engine is cold).

Intake ..... 0.004 – 0.006 in. (0.10 – 0.15 mm)

Exhaust ..... 0.004 – 0.006 in. (0.10 – 0.15 mm)

Note: Engine power will decrease 3-1/2% for each 1,000 feet (300 meters) above sea level and 1% for each 10° F (5.6° C) above 77° F (25° C). It will operate satisfactorily at an angle up to 15°. Refer to the equipment operator manual for safe allowable operating limits on slopes.

Model, Type and Code Number

To get replacement parts or technical assistance in the future write your engine Model, Type and Code number along with the date of purchase here. These numbers are located on your engine. For the location, see page with **Engine Features**.

Model

Type

Code

Date of Purchase

Technical Information

Engine Power Rating Information

The gross power rating for individual gas engine models is labeled in accordance with SAE (Society of Automotive Engineers) code J1940 (Small Engine Power & Torque Rating Procedure), and rating performance has been obtained and corrected in accordance with SAE J1995 (Revision 2002-05). Torque values are derived at 3060 RPM; horsepower values are derived at 3600 RPM. Actual gross engine power will be lower and is affected by, among other things, ambient operating conditions and engine-to-engine variability. Given both the wide array of products on which engines are placed and the variety of environmental issues applicable to operating the equipment, the gas engine will not develop the rated gross power when used in a given piece of power equipment (actual "on-site" or net power). This difference is due to a variety of factors including, but not limited to, accessories (air cleaner, exhaust, charging, cooling, carburetor, fuel pump, etc.), application limitations, ambient operating conditions (temperature, humidity, altitude), and engine-to-engine variability. Due to manufacturing and capacity limitations, Briggs & Stratton may substitute an engine of higher rated power for this Series engine.

Emission Information

Engines that are certified to meet the California Air Resources Board (CARB) Tier 2 Emission Standards must display information regarding the Emissions Durability Period and the Air Index. Briggs & Stratton makes this information available to the consumer on our emission labels. The engine emission label will indicate certification information.

The **Emissions Durability Period** describes the number of hours of actual running time for which the engine is certified to be emissions compliant, assuming proper maintenance in accordance with the Operating & Maintenance Instructions. The following categories are used:

Moderate: Engine is certified to be emission compliant for 125 hours of actual engine running time.

Intermediate: Engine is certified to be emission compliant for 250 hours of actual engine running time.

Extended: Engine is certified to be emission compliant for 500 hours of actual engine running time. For example, a typical walk-behind lawn mower is used 20 to 25 hours per year. Therefore, the **Emissions Durability Period** of an engine with an **intermediate** rating would equate to 10 to 12 years.

Certain Briggs & Stratton engines will be certified to meet the United States Environmental Protection Agency (USEPA) Phase 2 emission standards. For Phase 2 certified engines, the Emissions Compliance Period referred to on the Emissions Compliance label indicates the number of operating hours for which the engine has been shown to meet Federal emission requirements.

For engines less than 225 cc displacement.

Category C = 125 hours

Category B = 250 hours

Category A = 500 hours

For engines of 225 cc or more displacement.

Category C = 250 hours

Category B = 500 hours

Category A = 1000 hours

Warranty Information

Briggs & Stratton Corporation (B&S), the California Air Resources Board (CARB) and the United States Environmental Protection Agency (U.S. EPA) Emissions Control System Warranty Statement (Owner's Defect Warranty Rights and Obligations)

The California Air Resources Board (CARB), U.S. EPA and B&S are pleased to explain the Emissions Control System Warranty on your small off-road engine (SORE). In California, new small off-road engines model year 2006 and later must be designed, built and equipped to meet the State's stringent anti-smog standards.

Elsewhere in the United States, new non-road, spark-ignition engines certified for model year 1997 and later must meet similar standards set forth by the U.S. EPA. B&S must warrant the emissions control system on your engine for the periods of time listed below, provided there has been no abuse, neglect or improper maintenance of your small off-road engine.

Your emissions control system includes parts such as the carburetor, air cleaner, ignition system, fuel line, muffler and catalytic converter. Also included may be connectors and other emissions related assemblies.

Where a warrantable condition exists, B&S will repair your small off-road engine at no cost to you including diagnosis, parts and labor.

Briggs & Stratton Emissions Control Defects Warranty Coverage

Small off-road engines are warranted relative to emissions control parts defects for a period of two years, subject to provisions set forth below. If any covered part on your engine is defective, the part will be repaired or replaced by B&S.

Owner's Warranty Responsibilities

As the small off-road engine owner, you are responsible for the performance of the required maintenance listed in your Operating and Maintenance Instructions. B&S recommends that you retain all your receipts covering maintenance on your small off-road engine, but B&S cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the small off-road engine owner, you should however be aware that B&S may deny you warranty coverage if your small off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your small off-road engine to an Authorized B&S Service Dealer as soon as a problem exists.

The undisputed warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact a B&S Service Representative at 1-414-259-5262.

The emissions warranty is a defects warranty. Defects are judged on normal engine performance. The warranty is not related to an in-use emissions test.

Briggs & Stratton Emissions Control Defects Warranty Provisions

The following are specific provisions relative to your Emissions Control Defects Warranty Coverage. It is in addition to the B&S engine warranty for non-regulated engines found in the Operating and Maintenance Instructions.

1. Warranted Parts
   Coverage under this warranty extends only to the parts listed below (the emissions control systems parts) to the extent these parts were present on the engine purchased.
   a. Fuel Metering System
      - Cold start enrichment system
      - Carburetor and internal parts
      - Fuel pump
      - Fuel line, fuel line fittings, clamps
      - Fuel tank, cap and tether
      - Carbon canister

   b. Air Induction System
      - Air cleaner
      - Intake manifold
      - Purge and vent line

   c. Ignition System
      - Spark plug(s)
      - Magneto ignition system

   d. Catalyst System
      - Catalytic converter
      - Exhaust manifold
      - Air injection system, Pulse valve

   e. Miscellaneous Items
      - Vacuum, temperature, position, time sensitive valves and switches
      - Connectors and assemblies

2. Length of Coverage
   B&S warrants to the initial owner and each subsequent purchaser that the Warranted Parts shall be free from defects in materials and workmanship which caused the failure of the Warranted Parts for a period of two years from the date the engine is delivered to a retail purchaser.
3. No Charge
   Repair or replacement of any Warranted Part will be performed at no charge to the owner, including diagnostic labor which leads to the determination that a Warranted Part is defective, if the diagnostic work is performed at an Authorized B&S Service Dealer. For emissions warranty service contact your nearest Authorized B&S Service Dealer as listed in the "Yellow Pages" under "Engines, Gasoline," "Gasoline Engines," "Lawn Mowers," or similar category.
4. Claims and Coverage Exclusions
   Warranty claims shall be filed in accordance with the provisions of the B&S Engine Warranty Policy. Warranty coverage shall be excluded for failures of Warranted Parts which are not original B&S parts or because of abuse, neglect or improper maintenance as set forth in the B&S Engine Warranty Policy. B&S is not liable to cover failures of Warranted Parts caused by the use of add-on, non-original, or modified parts.
5. Maintenance
   Any Warranted Part which is not scheduled for replacement as required maintenance or which is scheduled only for regular inspection to the effect of "repair or replace as necessary" shall be warranted as to defects for the warranty period. Any Warranted Part which is scheduled for replacement as required maintenance shall be warranted as to defects only for the period of time up to the first scheduled replacement for that part. Any replacement part that is equivalent in performance and durability may be used in the performance of any maintenance or repairs. The owner is responsible for the performance of all required maintenance, as defined in the B&S Operating and Maintenance Instructions.
6. Consequential Coverage
   Coverage hereunder shall extend to the failure of any engine components caused by the failure of any Warranted Part still under warranty.

ABOUT YOUR ENGINE WARRANTY

Briggs & Stratton welcomes warranty repair and apologizes to you for being inconvenienced. Any Authorized Service Dealer may perform warranty repairs. Most warranty repairs are handled routinely, but sometimes requests for warranty service may not be appropriate. For example, warranty would not apply if engine damage occurred because of misuse, lack of routine maintenance, shipping, handling, warehousing or improper installation. Similarly, warranty is void if the serial number of the engine has been removed or the engine has been altered or modified.

If a customer differs with the decision of the Service Dealer, an investigation will be made to determine whether the warranty applies. Ask the Service Dealer to submit all supporting facts to his Distributor or the Factory for review. If the Distributor or the Factory decides that the claim is justified, the customer will be fully reimbursed for those items that are defective. To avoid misunderstanding which might occur between the customer and the Dealer, listed below are some of the causes of engine failure that the warranty does not cover.

Normal wear:

Engines, like all mechanical devices, need periodic parts service and replacement to perform well. Warranty will not cover repair when normal use has exhausted the life of a part or an engine.

Improper maintenance:

The life of an engine depends upon the conditions under which it operates, and the care it receives. Some applications, such as tillers, pumps and rotary mowers, are very often used in dusty or dirty conditions, which can cause what appears to be premature wear. Such wear, when caused by dirt, dust, spark plug cleaning grit, or other abrasive material that has entered the engine because of improper maintenance, is not covered by warranty.

This warranty covers engine related defective material and/or workmanship only, and not replacement or refund of the equipment to which the engine may be mounted. Nor does the warranty extend to repairs required because of:

1. PROBLEMS CAUSED BY PARTS THAT ARE NOT ORIGINAL BRIGGS & STRATTON PARTS.
2. Equipment controls or installations that prevent starting, cause unsatisfactory engine performance, or shorten engine life. (Contact equipment manufacturer.)
3. Leaking carburetors, clogged fuel pipes, sticking valves, or other damage, caused by using contaminated or stale fuel. (Use clean, fresh, lead-free gasoline and Briggs & Stratton Fuel Stabilizer, Part No. 5041.)
4. Parts which are scored or broken because an engine was operated with insufficient or contaminated lubricating oil, or an incorrect grade of lubricating oil (check oil level daily or after every 8 hours of operation. Refill when necessary and change at recommended intervals.) OIL GARD may not shut down running engine. Engine damage may occur if oil level is not properly maintained. Read Operating & Maintenance Instructions.
5. Repair or adjustment of associated parts or assemblies such as clutches, transmissions, remote controls, etc., which are not manufactured by Briggs & Stratton.
6. Damage or wear to parts caused by dirt, which entered the engine because of improper air cleaner maintenance, re-assembly, or use of a non-original air cleaner element or cartridge. (At recommended intervals, clean and re-oil the Oil-Foam element or the foam pre-cleaner, and replace the cartridge.) Read Operating & Maintenance Instructions.
7. Parts damaged by over-speeding, or overheating caused by grass, debris, or dirt, which plugs or clogs the cooling fins, or flywheel area, or damage caused by operating the engine in a confined area without sufficient ventilation. (Clean fins on the cylinder, cylinder head and flywheel at recommended intervals.) Read Operating & Maintenance Instructions.
8. Engine or equipment parts broken by excessive vibration caused by a loose engine mounting, loose cutter blades, unbalanced blades or loose or unbalanced impellers, improper attachment of equipment to engine crankshaft, over-speeding or other abuse in operation.
9. A bent or broken crankshaft, caused by striking a solid object with the cutter blade of a rotary lawn mower, or excessive v-belt tightness.
10. Routine tune-up or adjustment of the engine.
11. Engine or engine component failure, i.e., combustion chamber, valves, valve seats, valve guides, or burned starter motor windings, caused by the use of alternate fuels such as, liquified petroleum, natural gas, altered gasolines, etc.

Warranty is available only through service dealers which have been authorized by Briggs & Stratton Corporation. your nearest Authorized Service Dealer is listed in the "Yellow Pages™" of your telephone directory under "Engines, Gasoline" or "Gasoline Engines," "Lawn Mowers," or similar category.

BRIGGS & STRATTON ENGINE OWNER WARRANTY POLICY

Effective 12/06

LIMITED WARRANTY

Briggs & Stratton Corporation will repair or replace, free of charge, any part(s) of the engine that is defective in material or workmanship or both. Transportation charges on parts submitted for repair or replacement under this warranty must be borne by purchaser. This warranty is effective for and is subject to the time periods and conditions stated below. For warranty service, find the nearest Authorized Service Dealer in our dealer locator map at www.briggsandstratton.com, or by calling 1-800-233-3723, or as listed in the 'Yellow Pages™'.

THERE IS NO OTHER EXPRESS WARRANTY. IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO ONE YEAR FROM PURCHASE, OR TO THE EXTENT PERMITTED BY LAW ANY AND ALL IMPLIED WARRANTIES ARE EXCLUDED. LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES ARE EXCLUDED TO THE EXTENT EXCLUSION IS PERMITTED BY LAW. Some states or countries do not allow limitations on how long an implied warranty lasts, and some states or countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state and country to country.

WARRANTY TERMS **

Brand / Product Type	Consumer Use	Commercial Use
Vanguard™	2 years	2 years
Extended Life Series™, I/C®, Intek I/C®, Intek Pro™	2 years	1 year
Kerosene Fuel Operated Engines	1 year	90 days
All Other Briggs & Stratton Engines	2 years	90 days

** Engines used on Home Standby Generator applications are warranted under consumer use only. This warranty does not apply to engines on equipment used for prime power in place of a utility. **Engines used in competitive racing or on commercial or rental tracks are not warranted.**

The warranty period begins on the date of purchase by the first retail consumer or commercial end user, and continues for the period of time stated in the table above. "Consumer use" means personal residential household use by a retail consumer. "Commercial use" means all other uses, including use for commercial, income producing or rental purposes. Once an engine has experienced commercial use, it shall thereafter be considered as a commercial use engine for purposes of this warranty.

NO WARRANTY REGISTRATION IS NECESSARY TO OBTAIN WARRANTY ON BRIGGS & STRATTON PRODUCTS. SAVE YOUR PROOF OF PURCHASE RECEIPT. IF YOU DO NOT PROVIDE PROOF OF THE INITIAL PURCHASE DATE AT THE TIME WARRANTY SERVICE IS REQUESTED, THE MANUFACTURING DATE OF THE PRODUCT WILL BE USED TO DETERMINE THE WARRANTY PERIOD.

Briggs & Stratton Engines Are Made Under One Or More Of The Following Patents: Design D-247,177 (Other Patents Pending)

6,691,683	6,520,141	6,325,036	6,145,487	6,012,420	5,803,035	5,548,955	5,243,878	5,138,996	4,875,448	D 476,629
6,647,942	6,495,267	6,311,663	6,142,257	5,992,367	5,765,713	5,546,901	5,235,943	5,086,890	4,819,593	D 457,891
6,622,683	6,494,175	6,284,123	6,135,426	5,904,124	5,732,555	5,445,014	5,234,038	5,070,829	4,720,638	D 368,187
6,615,787	6,472,790	6,263,852	6,116,212	5,894,715	5,645,025	5,503,125	5,228,487	5,058,544	4,719,682	D 375,963
6,617,725	6,460,502	6,260,529	6,105,548	5,887,678	5,642,701	5,501,203	5,197,426	5,040,644	4,633,556	D 309,457
6,603,227	6,456,515	6,242,828	6,347,614	5,852,951	5,628352	5,497,679	5,197,425	5,009,208	4,630,498	D 372,871
6,595,897	6,382,166	6,239,709	6,082,323	5,843,345	5,619,845	5,320,795	5,197,422	4,996,956	4,522,080	D 361,771
6,595,176	6,369,532	6,237,555	6,077,063	5,823,153	5,606,948	5,301,643	5,191,864	4,977,879	4,520,288	D 356,951
6,584,964	6,356,003	6,230,678	6,064,027	5,819,513	5,606,851	5,271,363	5,188,069	4,977,877	4,512,499	D 309,457
6,557,833	6,349,688	6,213,083	6,040,767	5,813,384	5,605,130	5,269,713	5,186,142	4,971,219	4,453,507	D 308,872
6,542,074	6,347,614	6,202,616	6,014,808	5,809,958	5,497,679	5,265,700	5,150,674	4,895,119	4,430,984	D 308,871

THE POWER WITHIN™

OMNEX
TRUSTED WIRELESS

JP Carlton

SP5014 TRX
SP7015 TRX
SP8018 TRX

Installation / Configuration Manual

T151 Transmitter
R161 Receiver

March 28, 2006

DM-R161-0006A

Revision 4

Table of Contents

NOTE: *These instructions are intended only for installing and operating the remote control equipment described here. This is not a complete Operator's Manual. For complete operating instructions, please read the Operator's Manual appropriate for your particular machine.*

Safety Precautions

READ ALL INSTRUCTIONS

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Failure to follow the SAFETY PRECAUTIONS may result in radio equipment failure and serious personal injury

Installation

PROVIDE A SAFETY CUTOFF SWITCH. If maintenance is required, the radio must be disconnected from power

USE PROPER WIRING. Loose or frayed wires can cause system failure, intermittent operation, machine damage, etc.

DO NOT INSTALL IN HOT AREAS. This apparatus can be damaged by heat in excess of 158° F (70° C)

Personal Safety

MAKE SURE MACHINERY AND SURROUNDING AREA IS CLEAR BEFORE OPERATING. Do not activate the remote system unless it is safe to do so.

TURN OFF THE RECEIVER POWER BEFORE WORKING ON MACHINERY. Always disconnect the remote system before doing any maintenance to prevent accidental operation of the machine

Care

KEEP DRY. Do not clean the transmitter / receiver under high pressure. If water of other liquids get inside the transmitter battery or receiver compartment, immediately dry the unit. Remove the case and let the unit air dry

CLEAN THE UNIT AFTER OPERATION. Remove any mud, dirt, concrete, etc. from the unit to prevent clogging of buttons, switches, etc. by using a damp cloth.

Maintenance / Welding

DISCONNECT THE RADIO RECEIVER BEFORE WELDING on this machine. Failure to disconnect will result in the destruction of the radio receiver.

System Overview

The **ORIGA T151 / R161** is a portable, long range, programmable radio remote control system. Designed as a compact and easy-to-use product, this member of the **ORIGA** family puts complete control of your crane where it's needed most, with the operator. It's robust, easy to install and has complete self-diagnostics. This system can be a simple cable replacement or add intelligence to make it a total crane control package. It's a radio, a PLC and a valve driver all in one.

The **ORIGA T151 / R161** system uses Frequency Hopping Spread Spectrum (FHSS) technology. FHSS devices concentrate their full power into a very narrow signal that randomly hops from frequency to frequency within a designated band. This transmission pattern, along with CRC-16 error-checking techniques, enables signals to overcome interference that commonly affects licensed radios.

The R161 receiver is designed to be powered from a 12VDC or 24VDC system. It features 19 solid state, low-side driver input / output controls and a reliable E-Stop control.

The T151 transmitter comes with 4 to 7 switches. It uses standard, long lasting AA batteries. Each T151 transmitter uses a unique ID code to ensure that no two systems will conflict at a job site.

Features

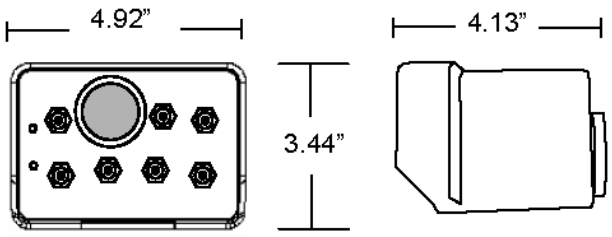
- FCC, ISC, CE approved
- License free
- 1200 foot range @ 900 MHz (900 ft. @ 2.4 GHz)
- Hand held / weatherproof / ergonomic
- Simple "wire-and-use" installation
- Resilient to impact and shock
- Available in both 900 MHz and 2.4 GHz
- Available with E-Stop for ensured operator safety
- Factory configurable for all custom applications.

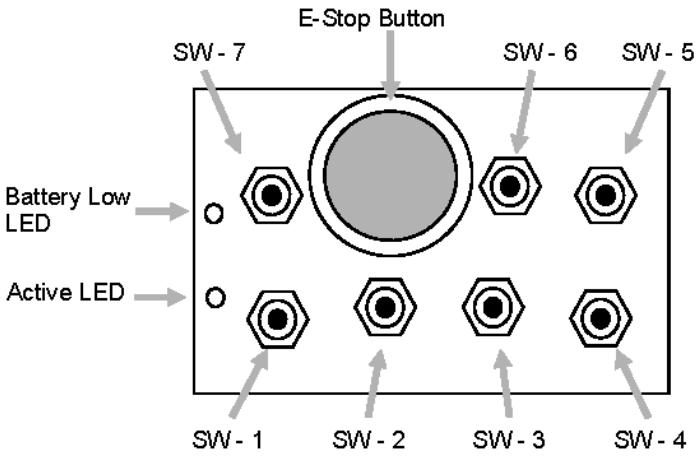
R161 Receiver

NOTE: *SP8018TRX Transmitter Shown.*

T151 Transmitter

T151 Dimensions and Controls

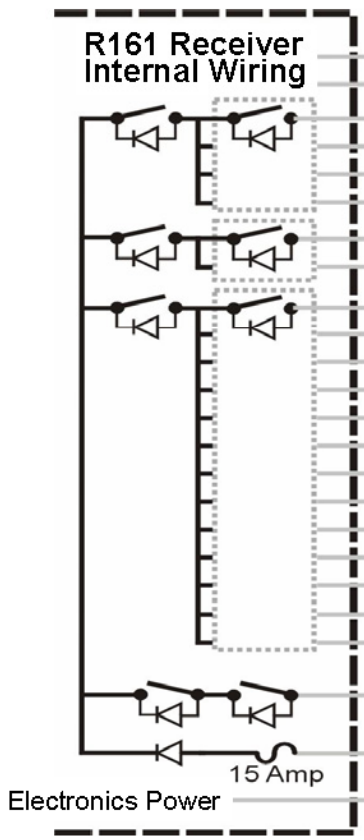




Installing the Receiver

Use the **Wiring Diagram** and the **Connector Diagram** below to connect the receiver pins directly to the appropriate contacts of the machine electronics. R161 Output Cables can be provided with every system to simplify the wiring process. The Wire Color column below only applies to the OMNEX Output Cable configuration. Tips on mounting, power connections and filtering are also provided under **Installation Considerations**.

Wiring Diagram



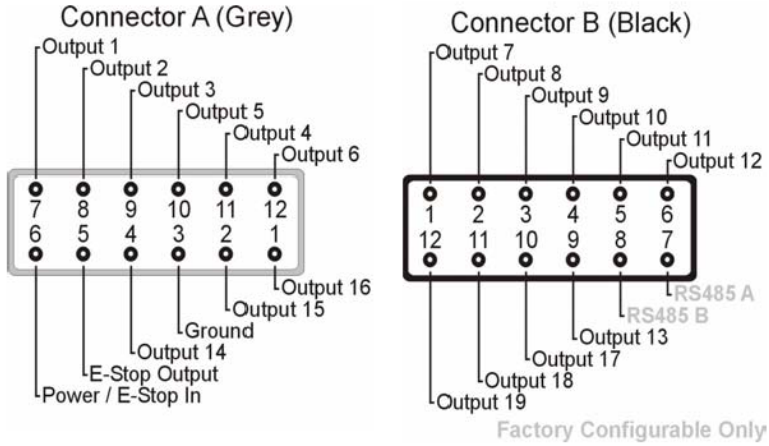
Pin-Output	Wire Colors	Functions
B7		Factory Configurable Only
B8		Factory Configurable Only
B12 - 19	Black/Red	Spare Input/Output
B11 - 18	White/Black	Spare Input/Output
B10 - 17	Blue/White	Spare Input/Output
A1 - 16	Blue/Black	Spare Input/Output
A2 - 15	Black/White	Spare Input/Output
A4 - 14	Green/Black	Spare Input/Output
B9 - 13	Red/White	Spare Input/Output
B6 - 12	Orange	R. Track Reverse
B5 - 11	White	R. Track Forward
B4 - 10	Green/Black/White	L. Track Reverse
B3 - 9	Green	L. Track Forward
B2 - 8	Red/Black/White	Gear High
B1 - 7	White/Red/Black	Flow High
A12 - 6	Orange/Red	Tracks In (7015TRX) / Blade Down (8018TRX)
A10 - 5	Orange/Black	Tracks Out (7015TRX) / Blade Up (8018TRX)
A11 - 4	Blue/Red	Cutter Head Left
A9 - 3	White/Red	Cutter Head Right
A8 - 2	Red/Green	Cutter Head Down
A7 - 1	Orange/Green	Cutter Head Up
A5	Black/White/Red	Switches to Ground with Link
A3	Black	Ground
A6	Red	Power Input (+9V to 30VDC)

Outputs: 19 solid state, high-side driver outputs, 5A max. each, total combined current 15A

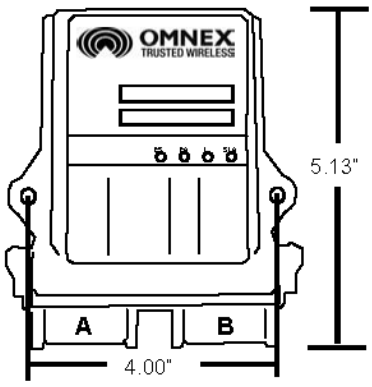
Inputs: All output pins can be factory configured as inputs.

Connector Pin Assignments

Connectors as seen from under the receiver



R161 Dimensions



Special Functions

Note: The following functions are operational while the receiver has link with the transmitter. If link is not established, all receiver outputs will be unlatched (turned OFF).

Receiver outputs controlling the following functions turn ON momentarily while the corresponding transmitter switches are toggled:

- L. Track (Forward, Reverse)
- R. Track (Forward, Reverse)
- Tracks (In, Out) *
- Blade (Down, Up) **

Receiver outputs controlling CUTTER functions (Up, Down, Right, Left) turn ON momentarily while the corresponding transmitter switches are toggled and the FLOW mode is set to LOW.

The GEAR (High) output is latched ON when the GEAR switch is toggled once. The GEAR (High) output is unlatched (turned OFF) when the GEAR switch is toggled a second time.

If the FLOW (High) transmitter switch is toggled at any point of operation, the FLOW (High) output will be ON when any L. TRACK or R. TRACK receiver outputs are ON. When the FLOW (Low) switch is toggled, the FLOW (High) output will not be ON at any point of operation.

Pressing E-Stop will turn off the transmitter and immediately turn OFF (unlatch) all outputs.

* Applies to SP7015TRX System.
** Applies to SP8018TRX System.

Installation Considerations

Mounting and Installation

The receiver can be mounted by fastening two ¼" bolts through the two mounting holes in the unit's enclosure. When mounting, ensure that the receiver is oriented so that the text is reading right.

When selecting a mounting point for the receiver, it is recommended that the location require only a minimal length of wiring to connect it to the control panel, that it will be in a visible area where it has good exposure to the operator and that it is mounted on a surface that is protected from the weather and sustains minimal vibration. It is also recommended that the receiver have the best possible line of sight with the transmitter

Power Connections and Wiring

Whenever a power connection is made to an electronic device, it is a good practice to make both the Power (+) and Ground (-) connections directly to the Battery and avoid connecting the power from the charging side of existing wiring or making use of existing "ACC" or other peripheral connection points.

Make sure that wire of sufficient gauge and insulator type is used when connecting the outputs of the receiver to the control panel. Observe any component manufacturer's instructions and recommendations for proper integration of their product. This includes the power ratings and requirements of such components as relays, valves, solenoids, etc.

Be sure to test each of the outputs with a multi-meter prior to connecting the outputs to your end devices. This will ensure that each output has been programmed to operate in the manner required by each end device.

Filtering and Noise Suppression

Whenever a solenoid or electromagnetic switch is controlled by the receiver, it is a good practice to install a Diode across its terminals to ensure that surges and spikes do not continue back into the circuit. Appropriate 36V Bi-directional Diodes kits can be ordered under the OMNEX part number "AKIT-2492-01".

Power the Transmitter

When the receiver has been installed, install batteries into the transmitter and turn it on as explained below.

1. Install Batteries

Remove the battery cover on the back of the transmitter using a slotted screwdriver and insert 4 "AA" alkaline batteries. Orientation of the batteries is embossed inside the battery housing.

T151 Battery

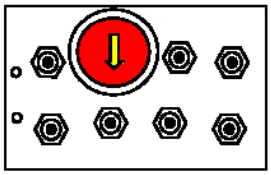
NOTE: *For operation at temperatures below –10° C to –40° C, lithium batteries are recommended. Low temperatures reduce battery performance for both alkaline and lithium types. Refer to the battery manufacturer's specifications for detailed information on low temperature performance.*

2. Turn on the Transmitter

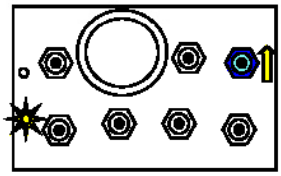
Refer to the **Light Legend** below for diagram details.

WARNING: do not install batteries backwards, charge, put in fire, or mix with other battery types. May explode or leak causing injury. **Replace all batteries at the same time as a fresh set and do not mix and match battery types.**

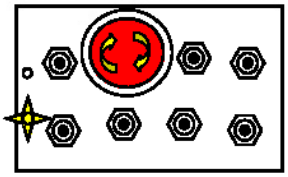
1. Press [E-Stop]



2. Press any switch



3. Twist Clockwise & Release [E-Stop]



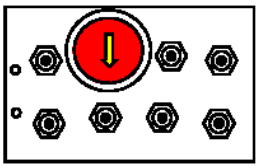
If the transmitter's (Active) light does not flash, check the battery orientation.

To turn off the transmitter, press the [E-Stop] button.

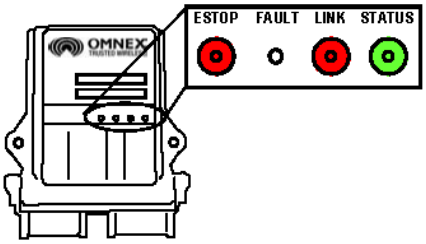
Test the Transmitter / Receiver Link

Follow these steps to ensure that there is a radio link between the transmitter and receiver.
Refer to the **Light Legend** below for diagram details

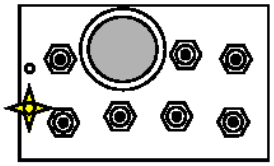
1. Press [E-Stop]

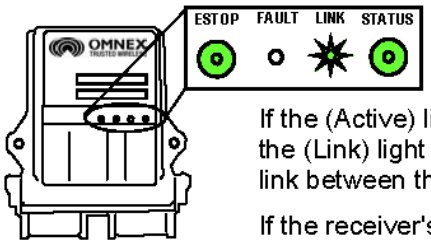


2. Power the R161



3. Power the T151





If the (Active) light on the transmitter is flashing and the (Link) light on the receiver is flashing GREEN, a link between the two exists.

If the receiver's (Link) light does not flash GREEN, follow the steps under **Download ID Code** below.

The ORIGA system is now ready for use.

Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

Download ID Code (Use in case of Link Test failure)

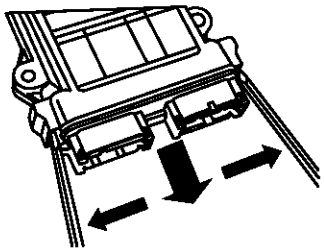
Follow these steps to download the transmitter's unique ID Code into the receiver. This will allow the receiver to establish a radio link with a specific transmitter or up to four transmitters (used individually). When downloading the first transmitters ID use step 4.1. and not 4.2.; for the remaining three transmitters use step 4.2. and not 4.1.

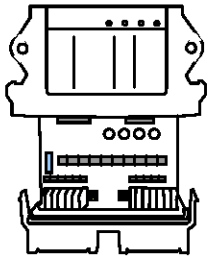
NOTE: *It is necessary to download the ID Code when replacing either the transmitter or the receiver.*

1. Opening the Receiver Case

The cap is held on by two plastic tabs at opposing sides, which can be unlatched as shown using a screwdriver. Once the cap is free, the R161 can slide open.

Use a small slotted screwdriver to press the Side Tabs inward.



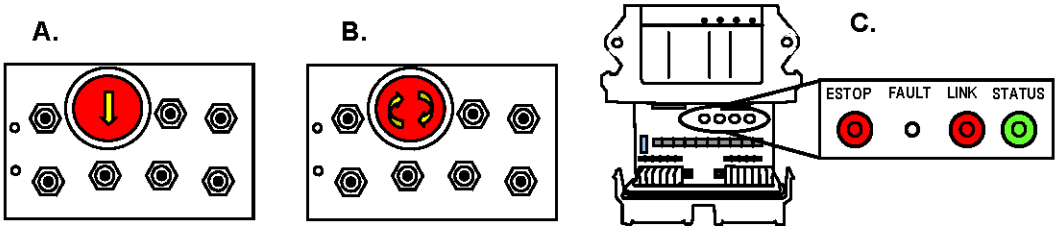


2. Prepare T151, Power R161

A. Press [E-Stop]

B. Twist clockwise & release [E-Stop]

C. Supply power to the receiver



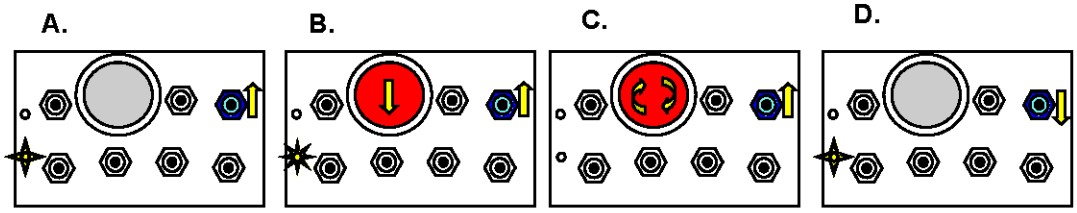
3. Power T151 into Configuration Mode

A. Hold [SW-5] switch UP

B. Press [E-Stop]

C. Twist clockwise & release [E-Stop]

D. Release [SW-5] Switch



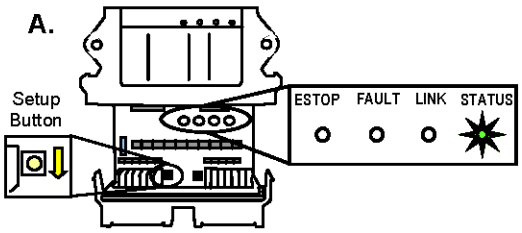
Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

Download ID Code (Con't)

4.1. Put Receiver into Setup

A. Press & hold [Setup] button until (Status) light goes from slow flash to fast flash

B. Release [Setup] button. (Status) light goes to solid GREEN, (Link) light turns off



NOTE 1: *Programming the Primary ID will clear all other ID's already programmed into the receiver.*

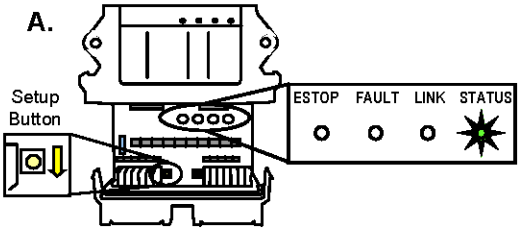
NOTE 2: *If left idle in Setup Mode for over 30 seconds, the receiver will time out. The (Link) light and (Status) light will flash RED rapidly. To return to Setup Mode, repeat step 4.*

OR

4.2. Put Receiver into Setup Mode for Secondary ID's

A. Press & hold [Setup] button until (Status) light goes from slow flash to fast flash to medium flash (approx. 10 Sec.)

B. Release [Setup] button. (Status) light goes to solid GREEN, (Link) light turns off



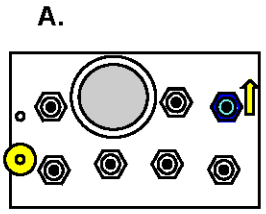
NOTE 1: *The Receiver will hold up to 4 Transmitter ID's. When the 5th Transmitter ID is downloaded, it's ID will replace the ID of the least recently used transmitter (i.e. The receiver will retain the ID's of the three transmitters that have been most recently linked).*

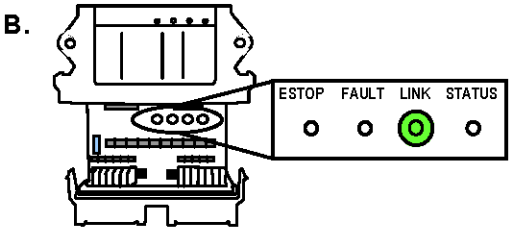
NOTE 2: *If left idle in Setup Mode for over 30 seconds, the receiver will time out. The (Link) light and (Status) light will flash RED rapidly. To return to Setup Mode, repeat step 4.*

5. Download ID Code

A. Press [SW-5] switch UP

B. (Link) light goes to GREEN. Once complete, (Link) light goes to RED as the transmitter turns off





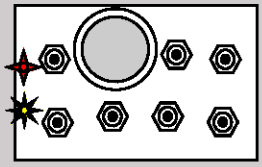
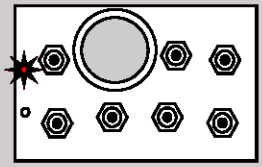
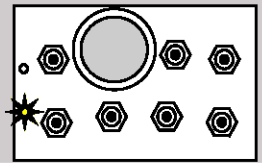
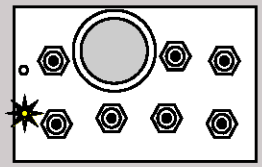
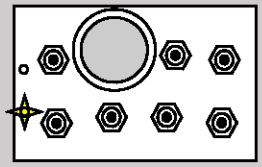
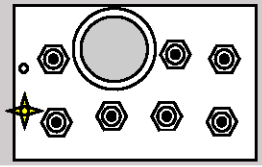
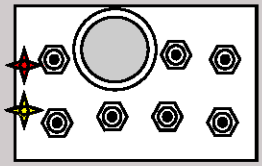
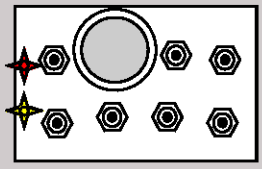
NOTE: *When replacing the receiver cover, ensure the cover snaps completely into place to create a weather proof seal around the base of the receiver.*

6. For multiple ID Downloading

A. Repeat steps 3-5, **using step 4.2. instead of 4.1.** for all remaining Transmitters. Then check the link of all Transmitters one at a time by following the instructions on page 7, Test the Transmitter/Receiver Link.

Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

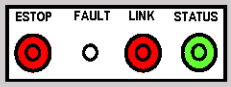
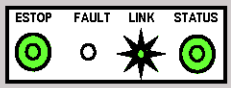
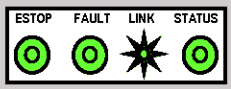
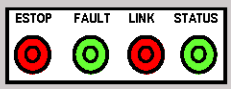
Diagnostics—T151 Transmitter

	Low battery. Unit will run approximately 10 hours after Battery light starts flashing.
	Flashing rapidly for 10 seconds indicates a transmitter failure.
	**Normal Operation** The Active light will flash several times per second, indicating that the transmitter is sending signals to the receiver. The Active light will remain on momentarily whenever a function changes
	**On Power Up** Release the E-Stop button within 10 seconds to power up the transmitter, or the unit will power down.
	**Normal Operation** The transmitter is in Download Mode.
	**On Power Up** Press and release the E-Stop button within 10 seconds to power up the transmitter, or the unit will power down.
	Stuck switch detected. Ensure that all switches are in a centered position. The transmitter will not power up when a function is ON.
	**On Power Down** Unit is still powered. Check for stuck switches, as the transmitter will not power down when a function is ON. Alternating flash means that the transmitter is in Calibration Mode.

Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

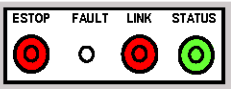
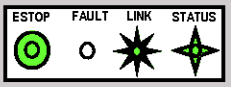
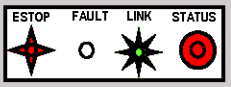
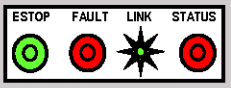
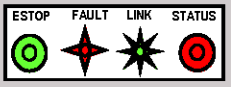
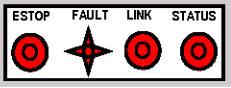
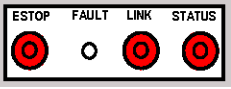
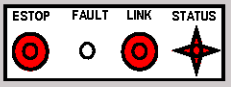
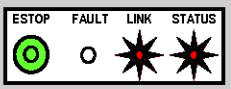
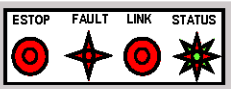
Diagnostics - R161 Receiver

Normal Operation

	Transmitter is OFF If the transmitter is off, the receiver is operating properly.
	Transmitter is ON When the transmitter is turned on, the Link light (fast flashing) and E-Stop (GREEN) indicates the receiver is operating properly
	Transmitter is in Operation When a function is activated on the transmitter, the Fault light will turn on GREEN. This indicates the receiver is operating properly
	Transmitter is OFF When a latched function is activated then the transmitter is turned off, the Fault light will stay on GREEN. If the system was intentionally designed this way, the receiver is operating properly, if not call for service.

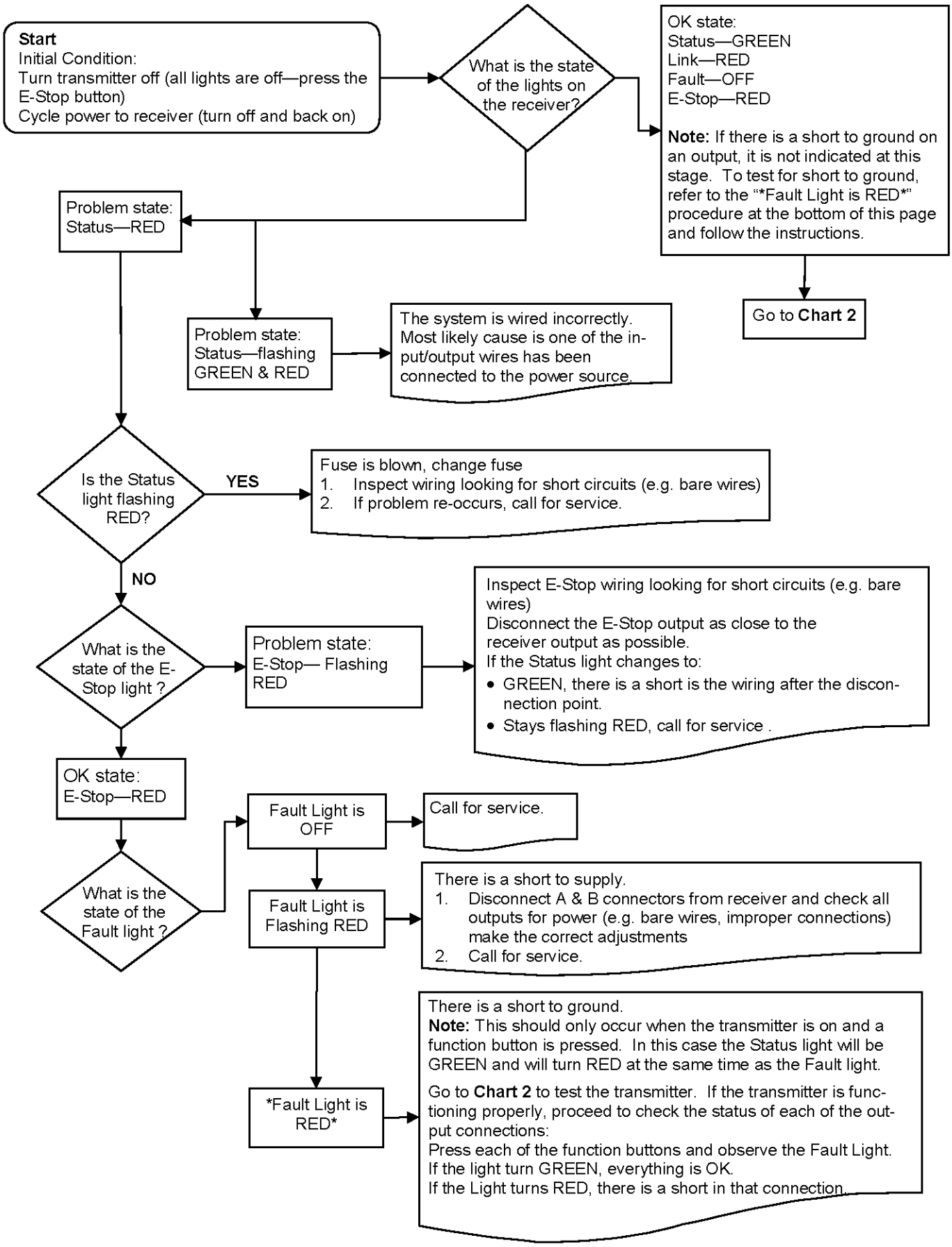
Trouble Indicators

Note: *In some cases, the indicator lights will be different depending on whether the transmitter is on or off. Please note the transmitter status in the "Description" column for each case.*

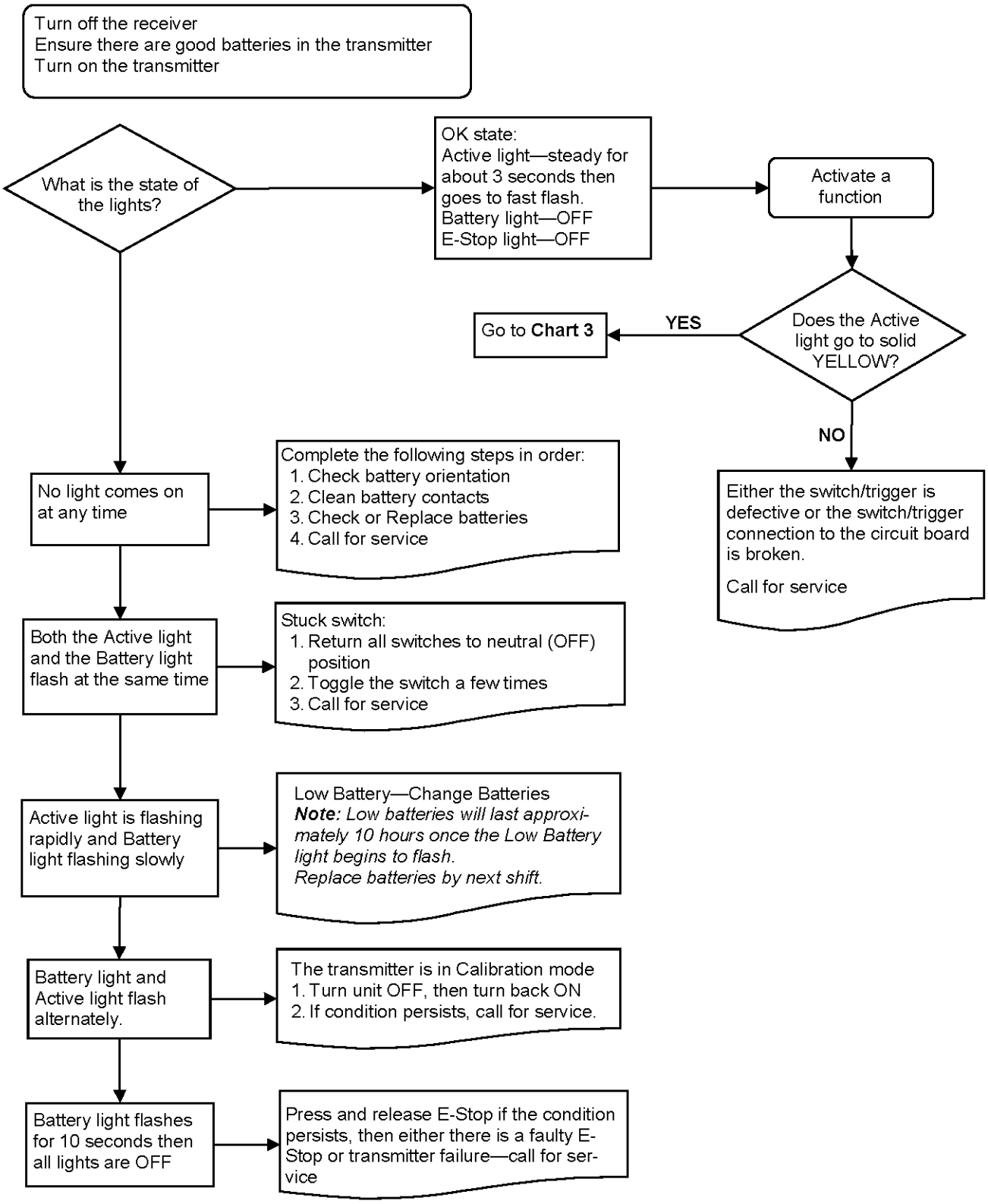
Indicator Lights	Description	Solution
	Transmitter is ON The reason is the transmitter is not communicating with the receiver.	Refer to **Trouble Shooting Chart #3** for solutions
	Transmitter is ON A low battery condition has been detected.	To detect intermittent conditions caused by poor or corroded ground or power circuits, the GREEN light will continue to flash for 30 seconds after the condition has been removed.
	Transmitter is ON An internal fault with the E-Stop has been detected.	Inspect E-Stop wiring for short circuit. Disconnect E-Stop wire as close to the receiver output as possible. If the Status light changes to: • GREEN, a short occurs after disconnection point. • Stays flashing RED, send it in for service .
	Transmitter is ON A short to ground or excessive current draw on an output. It is most likely caused by a wiring fault.	Ensure transmitter is functioning properly, check status of each output connection: Press each function button and observe Fault Light. • If GREEN, everything is OK. • If RED, there is a short in that connection.
	Transmitter is ON The E-Stop output has been connected with one of the other outputs	Follow the wire and check for connections with other wires, disconnect to see if condition clears. If not, call for service.
	Transmitter is OFF A wiring short to the battery has been detected.	Refer to **Trouble Shooting Chart #1** for solutions
	Transmitter is OFF The receiver has detected an internal fault.	Refer to **Trouble Shooting Chart #1** for solutions
	Transmitter is OFF Blown fuse detected.	Refer to **Page 8** for instructions on how to open the receiver case to access fuse. Check wiring for shorts or bare spots. If fuses continue to blow, call for service.
	Transmitter is ON A setup failure has occurred.	Either hold the Setup button for 5 seconds to return to Setup mode or cycle power to return to the normal operating mode.
	Transmitter is OFF The receiver is powered incorrectly.	Most likely cause of this condition is that an output wire or the E-Stop wire has been connected to the power supply while the power wire is disconnected from the power supply.

Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

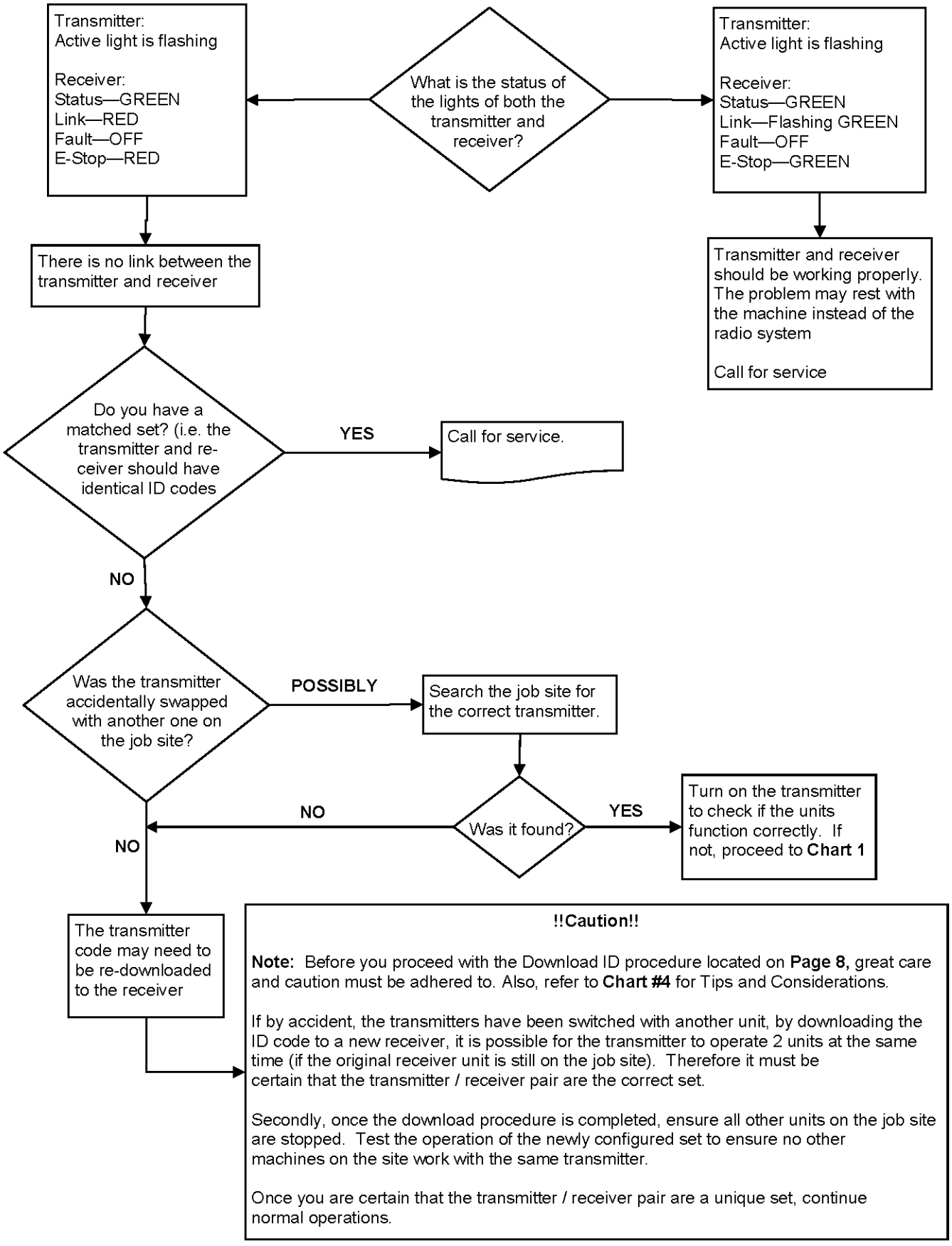
Test the Receiver—R161



Test the Transmitter—T151



Testing the Transmitter / Receiver Communication



!!Caution!!

Note: Before you proceed with the Download ID procedure located on **Page 8,** great care and caution must be adhered to. Also, refer to **Chart #4** for Tips and Considerations.

If by accident, the transmitters have been switched with another unit, by downloading the ID code to a new receiver, it is possible for the transmitter to operate 2 units at the same time (if the original receiver unit is still on the job site). Therefore it must be certain that the transmitter / receiver pair are the correct set.

Secondly, once the download procedure is completed, ensure all other units on the job site are stopped. Test the operation of the newly configured set to ensure no other machines on the site work with the same transmitter.

Once you are certain that the transmitter / receiver pair are a unique set, continue normal operations.

Considerations when Downloading the ID

Potential downloading issues

If testing of the receiver and transmitter both show the system as working (Chart 1 & 2), then the transmitter and receiver will both go into Download/Configuration mode.

Possible issues could arise during Step 4, the download phase of reprogramming. In this case there are 2 symptoms to look for:

1. The Link light on the receiver will not turn GREEN when the power switch is toggled on the transmitter to download
2. The receiver will "time out" indicating that it didn't receive a signal from the transmitter within the 30 seconds from the time the receiver was put into Setup Mode.

If all indications appear normal during the download phase, test the link by turning on the transmitter (note: the transmitter shuts off after transmitting the ID code in Step 4)

1. If the Link light on the receiver doesn't turn GREEN, the receiver didn't receive all of the information that was sent from the transmitter.

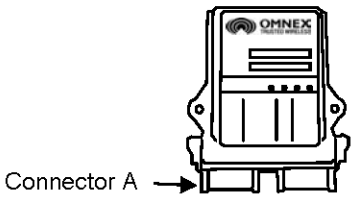
Possible Solutions

1. Try the Downloading steps again
2. If this doesn't correct the problem, send both the transmitter and receiver in for service.

Note: *you could try to determine whether the fault lies with the transmitter or receiver by completing the downloading procedure with a different transmitter. If this step works, then the fault lies with the original transmitter. If not, the fault may lie with the receiver.*

!!Caution!!

Note: Before attempting downloading with another transmitter, understand that reprogramming the receiver with another transmitter, could result in two receivers on the job site responding to the one transmitter. If the original transmitter was sent in for repair, Disconnect the receiver (disconnect connector A) to continue using the machine without remote capability and without fear of inadvertently operating the machine with the other transmitter.



Reprogramming Tips:

1. Use a pointy instrument to depress the Setup button on the receiver (i.e. a pen) as the button is relatively small
2. Follow each step as laid out in the procedure
3. Never lay the receiver circuit board down on anything metallic (there are contact points on the back which could contact the metal and damage the receiver)

Parts & Accessories

Part	Part Number	Description
Batteries	B0010	4 x AA alkaline
Output Cables	ACAB 2493-01	Generic Output Cable- see illustration
Toggle Switch	AKIT-1504-04	Honeywell 1TL1-7
E-Stop Button	AKIT-1821-02	RAFIX16, 25mm, C&K 1.30074.2810300 See illustration
Magnet Back	AKIT-2498-02	see illustration
Bipolar Diode Kit	AKIT-2492-01	36V, Bi-directional, Motorols P6KE36CA
Fuse	F0039	Bussman ATC-15
Socket Connectors	J0418	Grey, 12-pin, Deutsch DTM06-12SA
Socket Connectors	J0419	Black, 12-pin, Deutsch DTM06-12SB
	J0420	12 pos., Deutsch WM12S
Pin	J0417	Female, Size 20, Deutsch 0462-201-20141
Sealing Plug	J0421	Size 20, Deutsch 0413-204-2005
Connector Kit	AKIT-2337-01	Includes Deutsch socket connectors, wedges, pins and sealing plugs.

Output Cable

E-Stop

Magnet Back

Specifications

	R161 Receiver	T151 Transmitter
Size	5.1" x 4.7" x 1.4" (130mm x 119mm x 36mm)	3.44" x 4.9" x 4.13" (87mm x 124mm x 105mm)
Weight	0.65lbs (0.295kg)	1.8lbs (0.817kg)
Construction	High impact plastic, weatherproof	High impact, low temperature plastic, weatherproof
Input Power	+9V to 30VDC	4AA alkaline batteries
Battery Life	N/A	160 hours (continuous use)
Operating Temperature Range	-40F to 158F (-40C to 70C)	-40F to 158F (-40C to 70C)
Outputs	3A (max) each (sourcing), 10A (max) each (combined)	N/A
Antenna	Internal	Internal
Approvals	**USA**- FCC part 15.247 **Canada**- ISC RSS 2210 **Europe**- EN 440 **Australia**- C-Tick	

FCC Rules and Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.247
ISC RSS 210

Warranty

OMNEX Control Systems Inc. warrants to the original purchaser that the OMNEX products are free from defects in materials and workmanship under normal use and service for a period of ONE YEAR, parts (EXCLUDING: SWITCHES, CRYSTALS, OR PARTS SUBJECT TO UNAUTHORIZED REPAIR OR MODIFICATION) and labor from the date of delivery as evidenced by a copy of the receipt. OMNEX's entire liability and your exclusive remedy shall be, at OMNEX's option, either the (a) repair or (b) replacement of the OMNEX product which is returned within the warranty period to OMNEX freight collect by the OMNEX APPROVED carrier with a copy of the purchase receipt and with the return authorization of OMNEX. If failure has resulted from accident, abuse or misapplication, OMNEX shall have no responsibility to repair or replace the product under warranty. In no event shall OMNEX be responsible for incidental or consequential damage caused by defects in its products, whether such damage occurs or is discovered before or after replacement or repair and whether or not such damage is caused by the negligence of OMNEX Control Systems Inc.

OMNEX Control Systems Inc.

PROFESSIONAL TREE EQUIPMENT

MODEL	TYPE	ENGINE	HP	FUEL	CUTTING DEPTH	CUTTING HEIGHT	CUT SWING	Number of TEETH	WHEEL DIAMETER	WHEEL THICKNESS	TONGUE EXTENSION	WEIGHT (lbs)
900H	Walk-Behind	Honda	13	Gas	9"	21"	N/A	12	12.25"	.5"	N/A	220
SP2000	Walk-Behind	Kohler	27	Gas	24"	27"	N/A	16	19"	.5"	N/A	695
SP5014	Self-Propelled	Kohler	27	Gas	14"	34"	50" arc	20	21"	1"	N/A	1,580
		Briggs-Vanguard	35									1,650
		Kubota	33	Diesel								1,980
		Kubota	44									2,100
SP5014TRX	Track-Mounted	Briggs-Vanguard	35	Gas	14"	34"	50" arc	20	21"	1"	N/A	2,215
		Kubota	33	Diesel								2,430
			44									2,475
SP7015	Self-Propelled	Kubota Turbo	71	Diesel	15"	43"	70" arc	32	26.5"	1"	N/A	3,500
		Kohler Turbo	74									4,020
SP7015TRX	Track-Mounted	Kubota Turbo	71	Diesel	15"	43"	70" arc	32	26.5"	1"	N/A	5,100
		Kohler Turbo	74									5,380
SP8018 TRX	Track-Mounted	Kubota Turbo	99	Diesel	18"	43"	80" arc	48	31"	1-1/2"	N/A	6,340
HURRICANE	Track-Mounted	John Deere Turbo	140	Diesel	25"	72"	360°	64	36"	1-1/2"	N/A	12,500
			175									12,700
			250									12,900
3500D	Tow-Behind	Deutz Turbo	60	Diesel	15"	40"	80" arc	32	26.5"	1"	48"	2,900
7500	Tow-Behind	Kubota Turbo	74	Diesel	24"	46"	92" arc	48	31"	1-1/2"	60"	4,400
		Deutz Turbo	78									

MODEL	TYPE	ENGINE	HP	FUEL	Throat Opening	Number of Knives	WHEEL/ DRUM DIA	WHEEL THICK/DRUM WIDTH	Height	Width	Length	WEIGHT (lbs)
660	Disc	Kohler	27	Gas	6" x 6"	2	26"	1-1/2"	87"	56"	124"	1,740
1260	Disc	Briggs-Vanguard	35	Gas	12" x 6"	2	26"	1-1/2"	89"	65"	132"	2,620
		Kubtoa	33	Diesel								3,000
1290	Disc	Briggs-Vanguard	35	Gas	12" x 9"	2	30"	1-1/2"	89"	67"	132"	2,820
		Kubtoa	33	Diesel								3,482
1790	Disc	Kubtoa	84	Diesel	17" x 9"	2	30"	1-1/2"	93"	67"	186"	5,360
1712	Disc	Kubtoa	84	Diesel	17" x 12"	2	30"	1-1/2"	93"	67"	186"	5,500
1712D	Drum	Kubtoa	84	Diesel	17" x 12"	2	20-3/4"	20"	93"	67"	186"	6,920
2012	Disc	John Deere Turbo	140	Diesel	20" x 12"	4	40"	2"	100"	82"	186"	7,760
		Kubtoa	84									7,040
2015	Drum	John Deere Turbo	140	Diesel	20" x 15"	2	24"	27"	100"	82"	211"	6,820
2018	Disc	John Deere Turbo	140	Diesel	20" x 18"	6	55"	2"	108"	82"	240"	12,200
			170									12,400
			250									13,160
2518	Drum	John Deere Turbo	140	Diesel	25" x 18"	4	37"	31"	100"	82"	211"	9,360
			170									10,740