Owner's Manual

Model SP7015 *TRX*

Machine Serial #	_____
Engine Model #	_____
Engine Specification #	_____
Engine Serial #	_____
Purchase Date	_____
Dealer	_____

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

BLANK SHEET

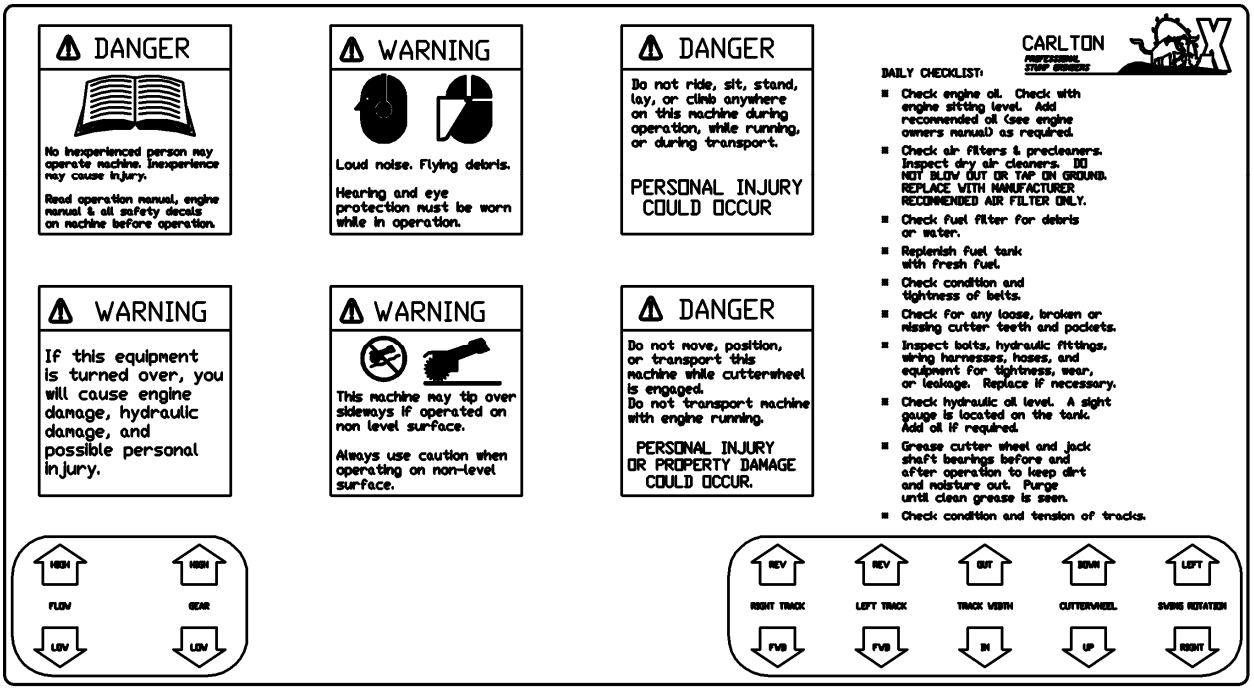
DIESEL ENGINE EXHAUST WARNING

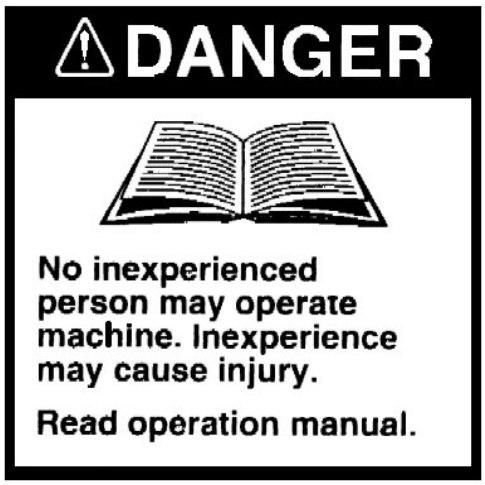
CALIFORNIA

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.

BLANK SHEET


DANGER
No inexperienced person may operate machine. Inexperience may cause injury.
Read operation manual, engine manual & all safety decals on machine before operation.
WARNING
Loud noise. Flying debris.
Hearing and eye protection must be worn while in operation.
DANGER
Do not ride, sit, stand, lay, or climb anywhere on this machine during operation, while running, or during transport.
PERSONAL INJURY COULD OCCUR
CARLTON
DAILY CHECKLIST:
Check engine oil. Check with engine sitting level. Add recommended oil (see engine owners manual) as required.
Check air filters & precleaners. Inspect dry air cleaners. DO NOT BLOW OUT OR TAP ON GROUND. REPLACE WITH MANUFACTURER RECOMMENDED AIR FILTER ONLY.
Check fuel filter for debris or water.
Replenish fuel tank with fresh fuel.
Check condition and tightness of belts.
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.
Check hydraulic oil level. A sight gauge is located on the tank. Add oil if required.
Grease cutter wheel and jack shaft bearings before and after operation to keep dirt and moisture out. Purge until clean grease is seen.
Check condition and tension of tracks.
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
Do not move, position, or transport this machine while cutterwheel is engaged.
Do not transport machine with engine running.
PERSONAL INJURY OR PROPERTY DAMAGE COULD OCCUR.
HIGH
FLOW
LOW
HIGH
GEAR
LOW
REV
RIGHT TRACK
FWD
REV
LEFT TRACK
FWD
OUT
TRACK WIDTH
IN
DOWN
CUTTERWHEEL
UP
LEFT
SWING ROTATION
RIGHT


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.


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


WARNING
IF THIS EQUIPMENT IS TURNED OVER, YOU WILL CAUSE ENGINE DAMAGE, HYDRAULIC DAMAGE, AND POSSIBLE PERSONAL INJURY.
JPC38

BLANK SHEET

⚠ DANGER

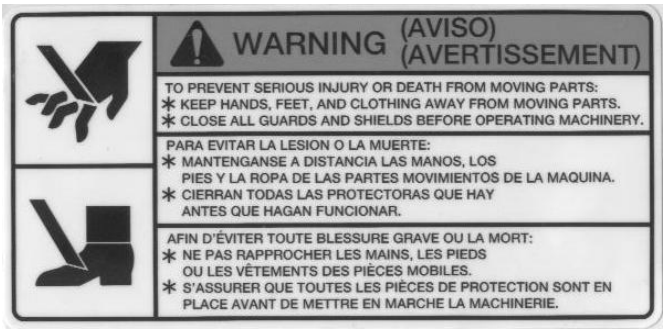
Do not move, position, or transport this machine while cutterwheel is engaged.
Do not transport machine with engine running.

PERSONAL INJURY
OR PROPERTY DAMAGE
COULD OCCUR.

⚠ DANGER

Do not ride, sit, stand, lay, or climb anywhere on this machine during operation, while running, or during transport.

PERSONAL INJURY
COULD OCCUR



BLANK SHEET

⚠ 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

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.

0700316

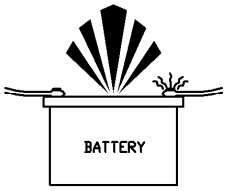
⚠ WARNING

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)

0700075A

⚠ 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

BLANK SHEET

⚠ CAUTION

DO NOT OVER-TENSION TRACKS!!

TOO MUCH TRACK TENSION CAN CAUSE TRACK DAMAGE, BEARING DAMAGE, AND/OR FRAME DAMAGE.

THE CORRECT SAG DISTANCE BETWEEN THE TRACK AND THE ROLLER IS 1", MEASURED AT THE CENTER ROLLER. SEE PICTURED ILLUSTRAION IN OWNERS' MANUAL MACHINE MAINTENANCE SECTION FOR TRACK TENSIONING.

JPC070001_A

NOTICE

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

JPC

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.

0700309

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

BLANK SHEET

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:

Honda ..... 1-770-497-6400 (GA-Eastern Time Zone)
Kohler Engines..... 1-800-544-2444 (Toll Free)
Briggs & Stratton Engines..... 1-800-233-3723 (Toll Free)
Lombardini ..... 1-770-623-3554 (GA-Eastern Time Zone)
Deutz Engines..... 1-800-241-9886 (Toll Free)
John Deere Engines ..... 1-800-533-6446 (Toll Free)
Caterpillar ..... 1-877-636-7658 (Toll Free)
Kubota ..... 1-847-955-2500 (IL-Central Time Zone)
Kawasaki Engines..... 1-616-949-6500 (MI-Eastern Time Zone)
Wisconsin Engines ..... 1-800-932-2858 (Toll Free)
Onan Engine..... 1-800-888-6626 (Toll Free)

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

BLANK SHEET

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.**

3. **FAILURE TO MAINTAIN OUTBOARD BEARING CAN CAUSE ENGINE FAILURE.**

BLANK SHEET

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

BLANK SHEET

BLANK SHEET

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 SP7015 *TRX* machine is designed for use in unique situations where size and maneuverability are foremost. As a result, the Model SP7015 *TRX* 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 SP7015 *TRX* is a durable and profitable professional stump grinder. Read this manual. Use proper safety precautions. Follow the instructions provided 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 equipment available in the stump cutting 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 Grinder as soon as you receive it. Any damages incurred during shipment are not warranted and therefore 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 right, left, front or rear in relationship to the stump cutter is illustrated in the following picture. Please refer to these any time you call your dealer or J. P. Carlton Company for parts or assistance.

Front

Left

Rear

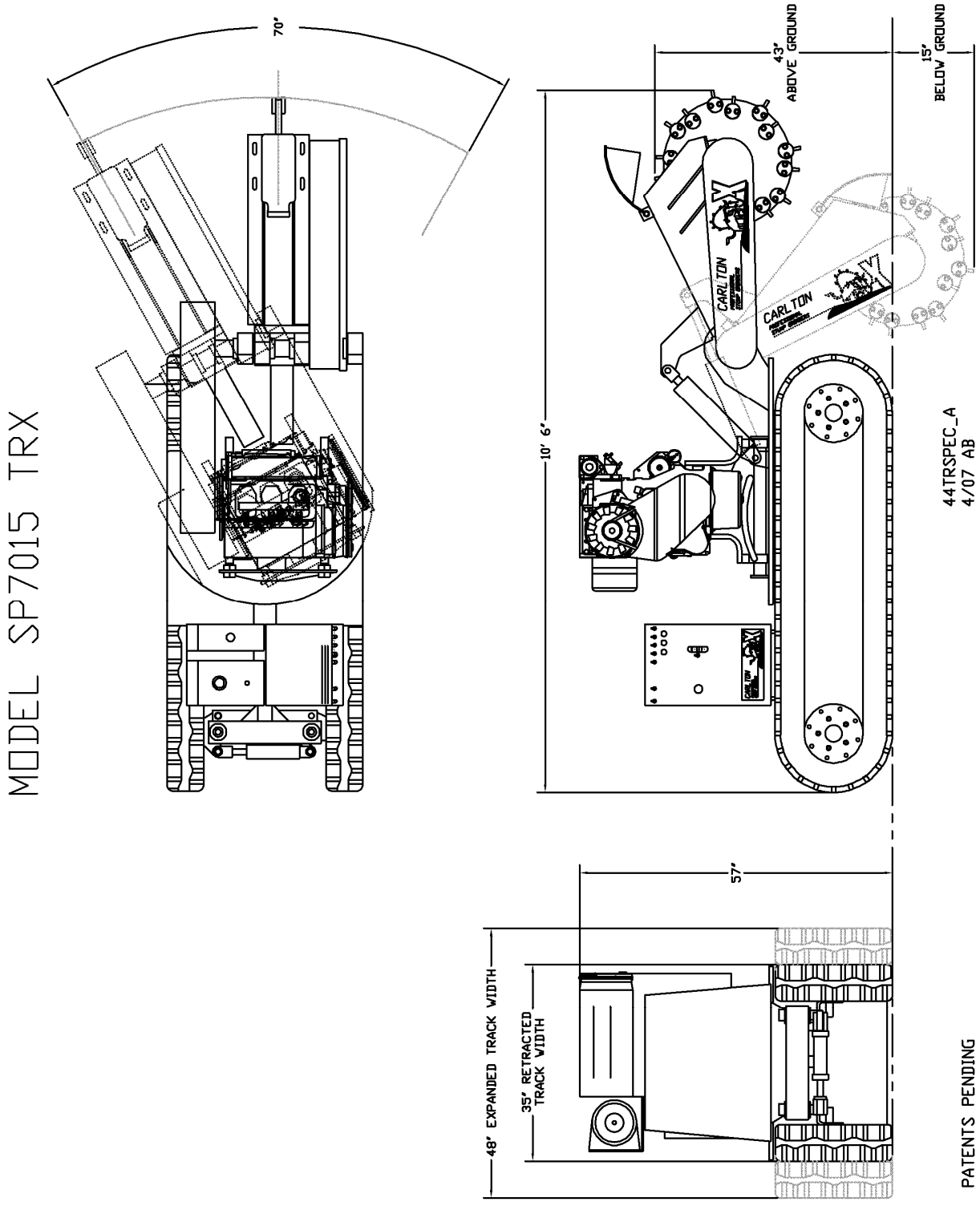
Front

Right

- Diesel Power
- Direct drive hydraulic pump
- Hydraulic motor propulsion
- Hydraulic controls
- Wireless remote control box (Optional Tether Backup Available)
- Large hydraulic tank
- Hydraulic and fuel filters
- Safety valves permit unaffected operation uphill, downhill or level
- Heavy construction
- Counterbalancing valve
- Dual swing cylinders
- Hour meter
- Hardened bushings in rotating cylinders
- Hydraulic Steering
- Tapered roller bearings on cutter wheel & jackshaft
- 1” thick Blanchard ground cutter wheel
- 32 carbide tipped cutter teeth
- Poly Chain® to cutter wheel
- Easy engine belt adjustment
- 35” width to clear narrow fence gates
- Tracks hydraulically expand from 35” to 48”
- Double wire braid hose & hydraulic lines
- Safety tie down loops
- Epoxy primer
- Dupont Imron® protective finish
- Key start
- High capacity battery
- Heavy-duty rubber and metal chip guards

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

Engine	Kubota 71HP Turbo Diesel Kohler 74HP Turbo Diesel
Weight	Kubota- 5,380 lbs, Kohler- 5,820 lbs
Length	10’ 6”
Height	57”
Machine Width Track Width Retracted	35”
Track Width Extended	48”
Track Dimension	9 1/2” x 75” Long
Controls	Wireless Remote Optional Tether Backup Available
Cutting Depth Below Ground	15”
Cutting Height Above Ground	43”
Cutter head Swing	70” arc
Number of Teeth on Cutter Wheel	32
Cutter Wheel Diameter w/Teeth	26 1/2”
Cutter Wheel Thickness	1” Blanchard Ground
Engine Belt Size	4 Band 4B105
Cutter Wheel Belt Size	14M-2100-68
Cutter Wheel Bearing Size	2”
Jack Shaft Bearing	1 11/16”
Boom Bearing Size	2 15/16”
Swing Bearing	20” Kaydon Table Bearing Rated at 102,000 ft. lbs.
Engine Stub Shaft Bearing	1 3/4”
Fuel Tank Capacity	9.6 Gallons
Hydraulic Tank Capacity	9.6 Gallons


MODEL SP7015 TRX
70'
43' ABOVE GROUND
15' BELOW GROUND
10' 6'
CARLTON
CARLTON
44TRSPEC_A
4/07 AB
57"
48" EXPANDED TRACK WIDTH
35" RETRACTED TRACK WIDTH
PATENTS PENDING

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!

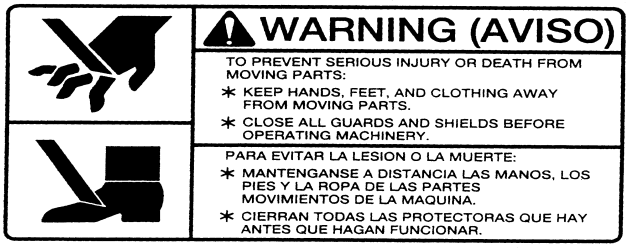
This is the **Safety-Alert Symbol**. This symbol is placed on the machine and in the manual to alert the operator to the potential for bodily injury or death. The operator should pay close attention to the instructions whenever they see this symbol.

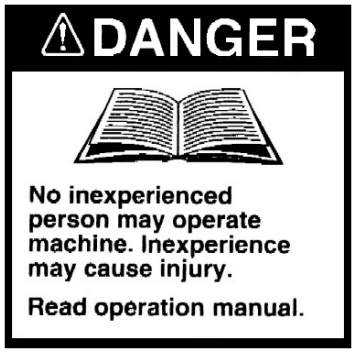
The **Safety-Alert Symbol** will be accompanied by one of the following words:
DANGER, WARNING, or CAUTION

- 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





P/N 0700008

P/N 0700010

P/N 0700027

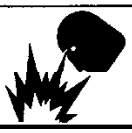
Be Safe and Practice Safe Operation using the following guidelines.

- 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).

⚠ WARNING



- 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.

⚠ WARNING

- 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.

- **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.)

⚠ WARNING

- 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.

⚠ WARNING

- 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.

⚠ WARNING

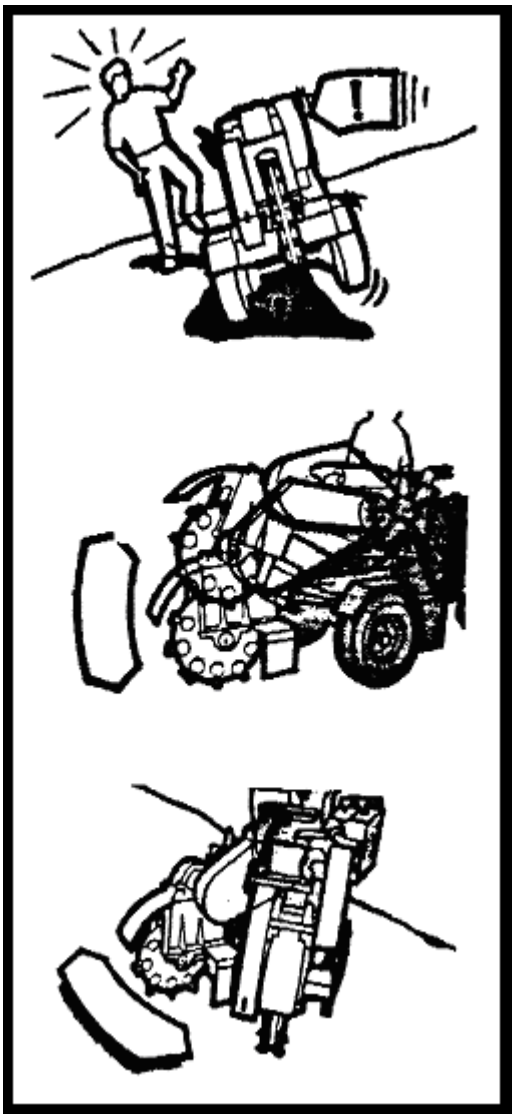
- Do not run the machine without a complete number of teeth in the cutter wheel tightened to the correct torque.
- Park machine on level surfaces only. Lower cutter head to the ground.
- Do not operate stump cutter in dark, dim lit, or concealed areas.
- Keep machine clean and clear of debris to eliminate fire hazard.

⚠ CAUTION

- 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.

ATTENTION:
The Carlton® Model SP7015 *TRX* Stump Grinder **CAN** be overturned on steep inclines. This can cause serious injury to operator and machine. **DO NOT OVERTURN!**

P/N 0700024



- Avoid steep side inclines when operating this machine! The narrow design width required in operating the model SP7015 *TRX* 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 SP7015 *TRX*.

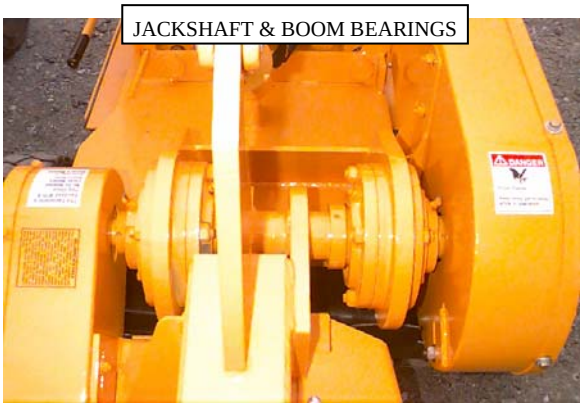
- When encountering a hill, the best approach is straight up or straight down. Avoid any side angles whenever possible.
  NEVER ALLOW INEXPERIENCED PERSONS TO OPERATE THIS MACHINE.

DAILY CHECKS SHOULD BE PERFORMED BEFORE STARTING THE ENGINE FOR THE DAY. **DO NOT** INSERT KEY INTO ENGINE UNTIL ALL CHECKS HAVE BEEN COMPLETED.

- Check engine oil at dipstick. **Engine must be level.** Boom in raised position will not affect the engine position; machine must be on level ground. 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 drive 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 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 level. A sight glass is located on the tank. Add oil if required. Do not fill tank full, the oil will expand and spill out in hot climates.
- Grease jackshaft and boom bearings daily, apply only 2 to 4 shots of grease. Do not over grease.
- Cutter wheel shaft bearings must be purged with grease daily. Purge until clean grease is seen.
- Check the condition of the tracks and adjust tension if necessary (see Maintenance section).

ENGINE SITTING LEVEL

JACKSHAFT & BOOM BEARINGS



CUTTER WHEEL BEARING

TRACK TENSION

STARTING THE MACHINE…KUBOTA

- THE CUTTER WHEEL MUST BE DISENGAGED BEFORE STARTING THE MACHINE.
- Turn toggle switch to **PARK** on the **PARK/RUN** toggle switch.
- Turn key to start engine.
- Turn toggle switch to **RUN** on the **PARK/RUN** toggle switch.
- The machine is now ready for operation.

KUBOTA

STARTING THE MACHINE…KOHLER

- Turn the key to the right and stop.
- Wait for the engine to cycle. (about 3 seconds)
- After the engine cycles, turn the key to the right to start the engine.

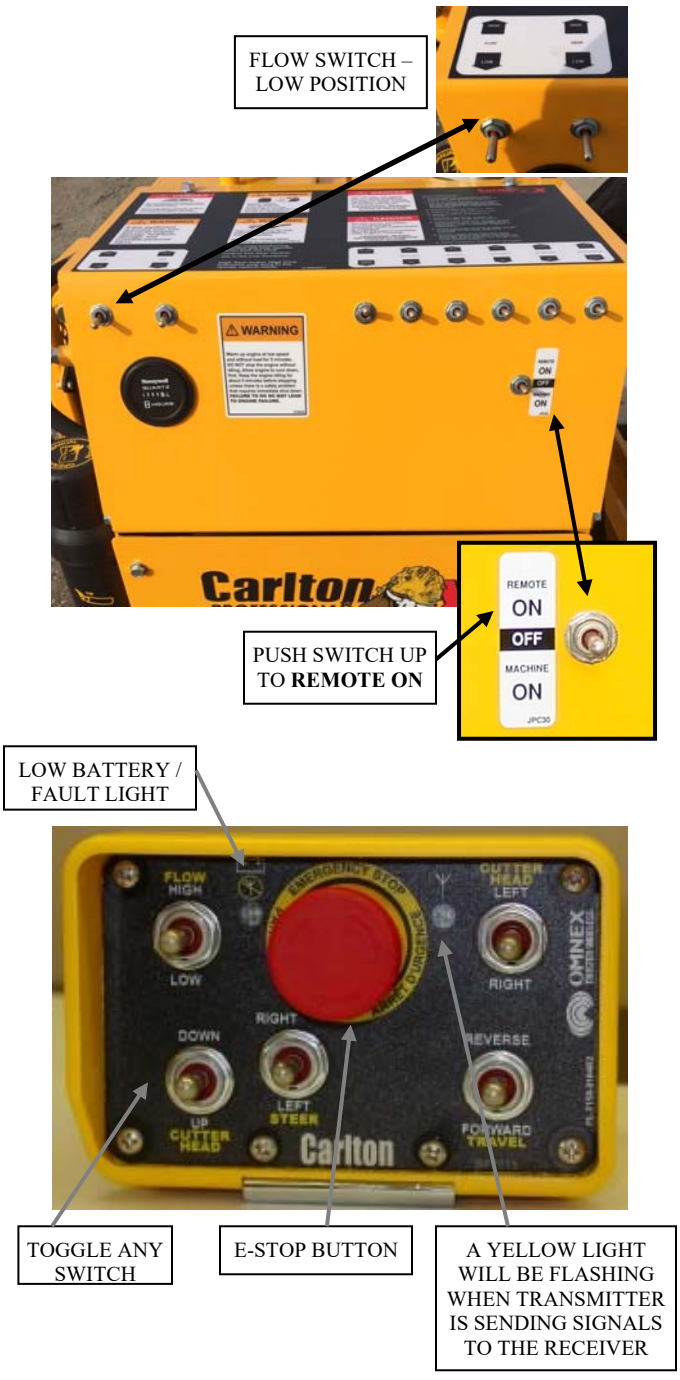
***** FOLLOW DIRECTIONS ON THE FOLLOWING PAGE IF YOUR MACHINE IS EQUIPPED WITH A WIRELESS REMOTE. *****

KOHLER

OPERATION – WIRELESS

- THE CUTTER WHEEL MUST BE DISENGAGED BEFORE STARTING THE MACHINE.
- To start the engine and radio control transmitter, follow these instructions.
- Turn the ignition key switch to ON, the machine switch to **Remote On,** and make sure the flow switch is in the LOW position and in AWD if equipped. Flip the toggle switch to **PARK** if equipped with a Kubota **(**see previous page).
- 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 (See previous page). If the engine doesn't start right away and you have to restart it, turn the key switch OFF and back ON. 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.

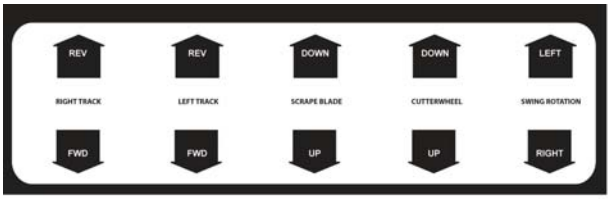
- The E-STOP button turns off the transmitter and the machine when it is pressed down.
- When the Flow switch is toggled up to HIGH, it only operates when the Travel function is being used.



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

HYDRAULIC CONTROLS

- A series of hydraulic controls are located on the machine and radio transmitter, which are clearly marked for use. There are four operating and positioning functions on the machine and remote transmitter, the machine detail is shown below. To operate push the toggle switch in the direction of the command you want to perform.



- 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.

TRACK WIDTH

- Use the Track Width control to **extend** the track width for more stability in positioning and during grinding or to **retract** the track width for maneuvering the machine through tight places. If equipped with scape blade, the scrape blade must be switched to off position. Use the scrape blade switch on control panel to adjust track width.

LIFT (Cutter Wheel)
(Shown as CUTTER HEAD –UP/DOWN on radio transmitter.)
This switch will move the cutter head up and down. The cutter head must be raised for ground travel to the stump and must be lowered in the rest mode or to be transported. The cutter head must be raised to start cutting at the top of the stump and lowered gradually to remove the stump completely below the ground.

HYDRAULIC SCRAPE BLADE
(Optional)
(Shown as BLADE –UP/DOWN on radiotransmitter.)

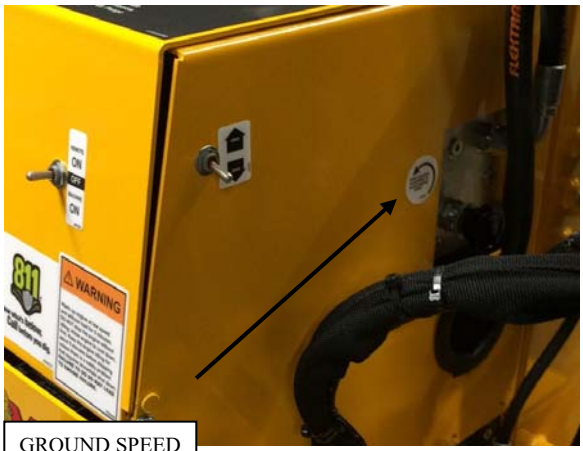
- This switch will move the scrape blade up and down.

SWING
(Shown as CUTTER HEAD –RIGHT/LEFT on radio transmitter.)

- The swing switch will rotate the cutter head to the left and right to cut across the stump.

GROUND SPEED ADJUSTMENT VALVE

- Located on the rear side of the control box, this valve controls ground (travel) speed. Adjust ground speed for fast and slow operation. Turn the valve clockwise to increase speed and counter-clockwise to go slower.



GROUND SPEED ADJUSTMENT

FLOW CONTROL

- Flow control affects how fast the machine travels. High flow is for moving the machine from one place to another very quickly. Low flow is used for more climbing power or for precision when positioning the cutter wheel close to the stump. For further control of the ground speed in low flow use the ground speed control knob. **The machine must be in low flow before operating the cutter wheel. Must be in low flow for wireless remote to function correctly.**

LIFT SPEED ADJUSTMENT VALVE

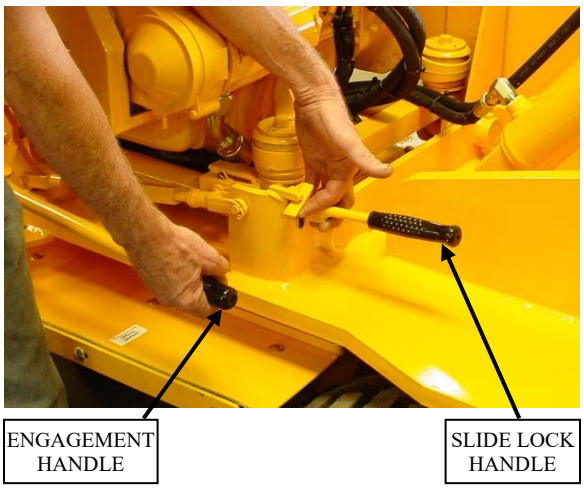
- Located on the front of the machine, the lift speed adjustment controls the down speed of the cutter wheel to prevent the cutter head from dropping to fast. Turn the control knob counter-clockwise to slow cutter head down speed or turn the control knob clockwise to increase down speed.

SWING SPEED ADJUSTMENT VALVE

- Located on the front of the machine, this valve controls the swing speed of the cutter head. Adjust swing speed for smooth operation. Turn the valve control knob counter-clockwise to slow the swing speed at high engine speeds. Close the valve by turning clockwise to allow the cutter wheel to move side to side at low engine speed.

CUTTER WHEEL ENGAGEMENT

- Reduce engine speed to idle and raise cutter wheel clear of stump. Engage cutter wheel drive belt by lifting up the slide lock and slowly pulling engagement handle back.
- **DO NOT ENGAGE OR DISENGAGE BELT AT HIGH ENGINE SPEED; PERSONAL INJURY AND MACHINE DAMAGE MAY OCCUR.**
- **ALWAYS DISENGAGE BEFORE TURNING MACHINE ON/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.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

OPTIONAL RADIO CONTROL

INSTALLING A RADIO TRANSMITTER

NOTE: IF EQUIPPED WITH WIRELESS REMOTE, MACHINE MUST BE SWITCHED TO LOW FLOW FOR PROPER WIRELESS REMOTE OPERATION-IF AWD, MACHINE MUST BE SWITCHED TO AWD AND BE IN LOW FLOW FOR PROPER WIRELESS REMOTE OPERATION

- To install a radio (wireless) transmitter, remove the lower cover on the control box. There are 2 bolts on each side.
- Remove the receiver cover. Drill holes in this cover for attaching the radio control receiver; make sure the hole locations match the bolt locations on the radio receiver.
- Bolt the radio receiver to the cover and then replace the cover on the remote receiver inside the control box.
- Use the wiring and connector diagrams, in the radio control manual included at the back of this manual, to wire directly to the appropriate contacts of the machine electronics. Contact your Carlton dealer if you need assistance not the radio control manufacturer.
- The radio transmitter and receiver will be programmed at the factory when purchased as a set.

THE RADIO CONTROL RECEIVER, SHOWN AT THE RIGHT, MUST BE INSTALLED IN THE CONTROL BOX

REMOVE THE CONTROL BOX BOTTOM COVER

REMOVE THE COVER ON THE REMOTE RECEIVER AND DRILL HOLES TO ATTACH THE RADIO RECEIVER

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 at 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

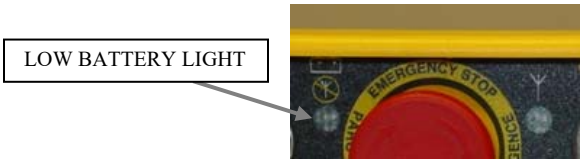
SEE THE RADIO CONTROL MANUAL FOR ANY OPERATING PROBLEMS WITH THE RADIO RECEIVER & TRANSMITTER
(Included in the back of this manual)

- 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.

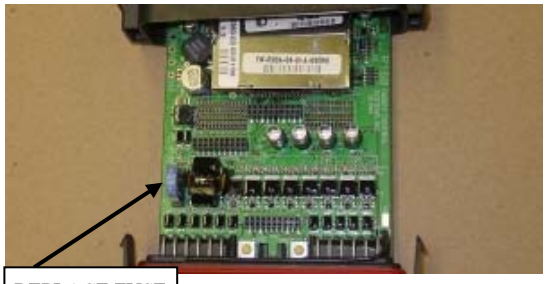
- If status light on radio receiver is flashing red, a fuse is blown. To change a fuse, remove the receiver panel from the cap and change the fuse. Inspect wiring for short circuits (e.g. bare wires). If problem re-occurs, call for service. Push the receiver panel back up into the cap until the tabs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



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.

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



DO NOT TOW! THE MODEL SP7015 TRX 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.

- **THE TRAILER MUST BE SECURELY ATTACHED TO THE TOW VEHICLE BEFORE LOADING OR UNLOADING THE STUMP GRINDER.**
- **LOADING RAMPS MUST BE STURDY AND SECURELY ATTACHED TO THE TRAILER BEFORE ATTEMPTING TO LOAD OR UNLOAD THE MACHINE.**

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

- **THE TRAILER MUST BE SECURELY ATTACHED TO THE TOW VEHICLE BEFORE LOADING OR UNLOADING THE STUMP GRINDER.**
- **DO NOT LOAD OR UNLOAD ON ANYTHING OTHER THAN LEVEL GROUND.**

LOADING

- Start engine as recommended by the engine manufacturers manual.
- Increase engine RPM, raise cutter head just off the ground.
- Position the machine behind the trailer and close to the loading ramps. Push the forward track controls on the remote control and watch closely to make sure both tracks stay on the ramps while loading. KEEP THE MACHINE AS LEVEL AS POSSIBLE.
- Continually adjust the cutter head height as you go up the ramps, keeping the mass as low to the ground as possible.
- When the machine is loaded, lower the cutter head and shut down the engine.
- Secure the machine tightly with sufficient tie downs to prevent any movement in transit.

UNLOADING

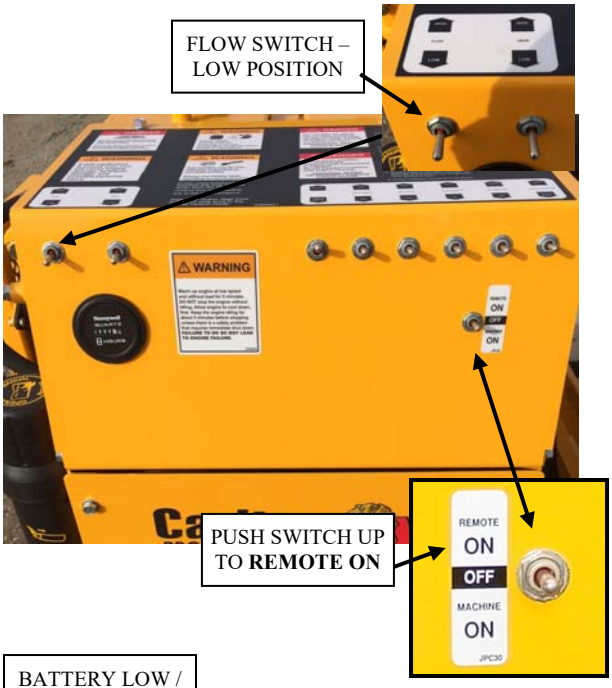
- With trailer still securely attached to tow vehicle, remove tie down straps and make sure ramps are securely attached to trailer and positioned correctly to unload the machine.
- Start engine, increase RPM, and raise cutter head to just clear the deck and ramp.
- Continually adjust the cutter head up and down to keep the mass as low to the ground as possible.
- Raise cutter head and proceed to the work site using extreme caution on hills and uneven terrain. Use the gear and flow controls in high position to get to the job site faster and use the gear and flow controls in low to make climbing easier. See the Machine Controls section for more information.

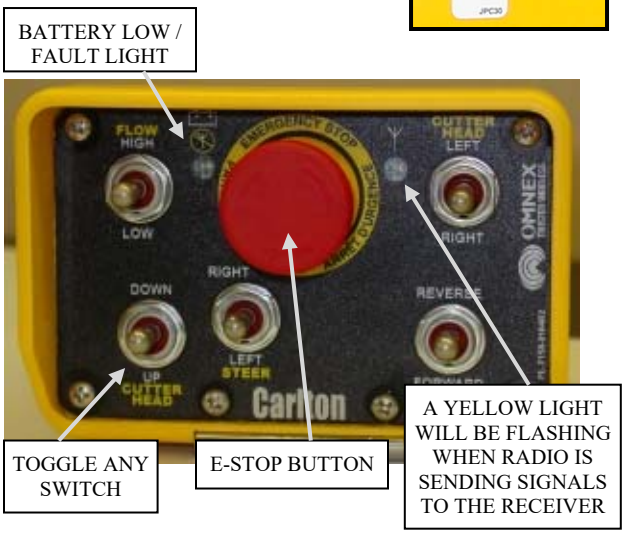
STARTING - READ THIS MANUAL, ALL MACHINE DECALS, AND THE ENGINE MANUAL BEFORE STARTING.

- Check all fluids before starting.
- Drive belts (cutter wheel) must be disengaged before starting.
- Inspect all connections, teeth, tracks, etc. (See Daily Checklist).
- Avoid transversing slopes. Ascend/descend hills straight up & down.

- **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 FACESHIELD AND HEARING PROTECTION.**
- **KEEP CLEAR OF CUTTING WHEEL AND MOVING MACHINE PARTS.**
- **KEEP SPECTATORS AWAY.**

- **THE CUTTER WHEEL MUST BE DISENGAGED BEFORE STARTING THE MACHINE.**
- The SP7015 *TRX* stump grinder is a radio control machine. To start the engine and radio control transmitter, follow these instructions.
- Turn the ignition key switch to ON, the machine switch to **Remote On,** and make sure the flow switch is in the LOW position and in AWD if equipped. Flip the toggle switch to **PARK** if equipped with a Kubota **(**see **MACHINE CONTROLS** section).
- 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.





- Start engine. (Follow directions in the **MACHINE CONTROLS** section depending on the engine your machine is equipped with). If the engine doesn't start right away and you have to restart it, turn the key switch OFF and back ON. Make sure the light on the transmitter is still on, and restart the engine by turning the key. If you lose the connection (light off), repeat the procedure from the beginning and perform each step exactly as described.
- Start engine at half speed and allow sufficient time for oil to circulate before proceeding. Test controls for proper operation.

KUBOTA

KOHLER

- Position machine at stump with cutter wheel a slight distance away from stump. **Do not engage cutter wheel when positioning machine near stump. Hitting the stump with the cutter wheel running will break the Poly Chain® belt.**

- Reduce engine speed to idle.
- Put machine flow control in low. Cutter head positioning functions only operate in low flow. (See Machine Controls section.)
- Raise cutter head clear of stump.
- Engage cutter head drive belts by lifting the engine slide lock and raising the engagement handle to slide the engine forward and engage the cutter wheel. **DO NOT ENGAGE OR DISENGAGE BELT AT HIGH ENGINE SPEED; PERSONAL INJURY AND MACHINE DAMAGE MAY OCCUR.**
- Increase engine speed 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 too 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 clockwise will open the bypass and slow swing action. Turning it counter-clockwise will 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 cutting wheel progressively lower until stump is cut well below ground level.

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

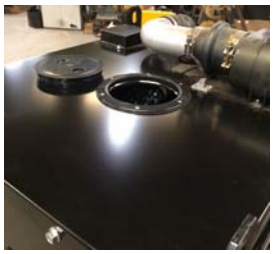
- Raise cutter wheel clear of stump and return to center position.
- Reduce engine speed to idle. DO NOT TURN OFF MOTOR. Engine must be allowed to cool slowly at idle for 3-5 minutes to avoid damage.
- With engine at idle; disengage drive belts by slowly releasing engagement handle.
- **DO NOT ENGAGE OR DISENGAGE BELT AT HIGH ENGINE SPEED; PERSONAL INJURY AND MACHINE DAMAGE MAY OCCUR.**
- Turn off motor. Allow cutter wheel to come to a full stop before inspecting work area.

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.**

- Check engine oil at dipstick with the engine sitting level. Add recommended oil and changes oil as required per the engine owner's manual.

KUBOTA



KOHLER

- Check hydraulic oil tank. A sight glass is provided on the tank for easy viewing. If fluid is visible in the sight glass, oil level is good. Keep tank filled to the proper level, approximately 7/8 full, leaving space at the top for expansion as oil gets warm.
- This machine is equipped with Citgo AW 32 hydraulic oil at the time of manufacture. Refill with the same or equivalent oil.

- Clean Poly Chain® belt guard **weekly** by removing the bottom guard. **Chip build-up will wear the Poly Chain® belt.**

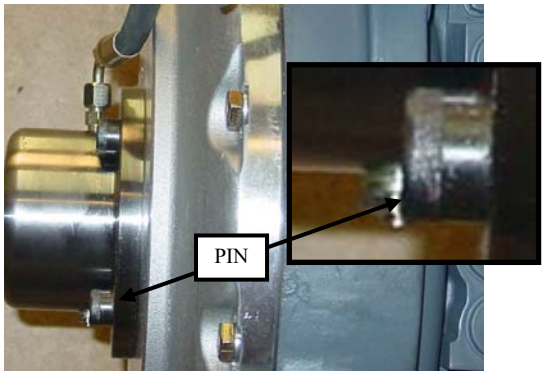
- Check cutter wheel, pockets, and teeth for wear **daily**. If any repair is needed, see Servicing Cutter Wheel section for further instruction.

- Check setscrews in cutter wheel bearing collars for tightness weekly.

- Check setscrews in jackshaft bearing collars and in boom bearing collars for tightness weekly.

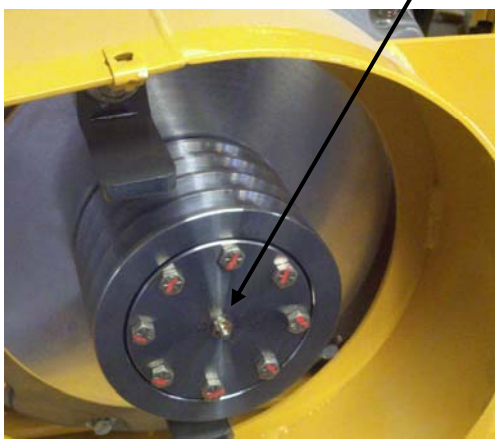
Always clean tip of grease gun fitting and grease fitting on machine before attaching hose to prevent dirt from being forced into machine parts.

- Grease the bearing supported stub shaft every 1000 hours of operation using Texaco® Starplex II grease. The grease fitting is easily accessible behind the V-belt guard. Apply grease using a hand held grease gun until the pin extends from the pressure relief valve (located 180°from grease fitting on the bearing). Wipe off excess grease. **Excess grease will attract dirt.**

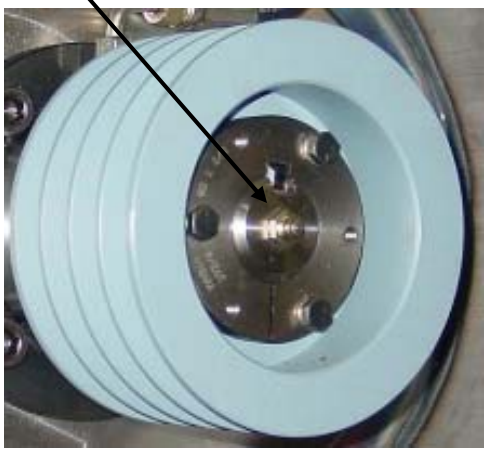


- A grease fitting is on the end of the stub shaft to grease the spline coupling. Apply 2 to 3 shots of grease approximately every 1000 hours of operation. Wipe off excess grease. **Excess grease will attract dirt. DO NOT over grease, over greasing could cause a hydraulic type lift on seals**.

GREASE APPROXIMATELY EVERY 1000 HOURS OF OPERATION

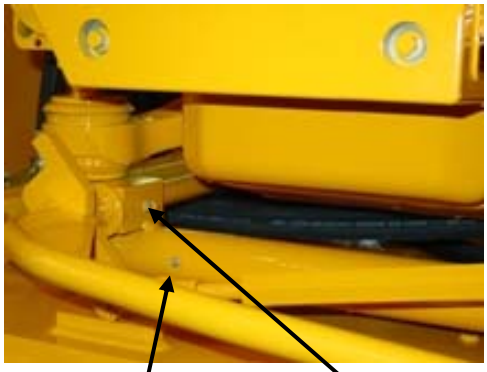


Kubota and Kohler



Deutz

- Grease engine slide and engagement handle **weekly**. Use Texaco® Starplex II grease.



ENGINE SLIDE (6) AND ENGAGEMENT (2) GREASE FITTINGS

TRACK TENSIONING

- The tracks are tensioned by adding grease to the tensioning cylinder. This is accomplished by using a standard hand operated grease gun. Each track has a grease fitting located beneath a cover cap on the side of the track. Remove the cap to access the tensioning grease fitting. Install grease into the tensioning fitting using a standard hand operated grease gun. It should only take a few pumps of grease to tension the tracks.

- The model SP7015 *TRX*, 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 PROFESSIONAL TREE EQUIPMENT - MODEL SP7015 TRX	DAILY	WEEKLY	2-3 Mon.	6 Mon.	Special Comments
- ENGINE SLIDE		▨			1-2 shots
- ENGAGEMENT LINKAGE		▨			1-2 shots
- TRACK TENSIONING CYLINDER					Give a few pumps using a standard hand held grease gun when track gets loose. DO NOT OVER GREASE!
- TRACK FINAL DRIVE					Change after initial 200 hours. Change every 1000 hours or year whichever comes first after that. Only use SAE 30 CD OIL (SYNTHETIC)
- BEARINGS					
- Pivot Table Bearing		▨			Every 100 hours of operation or at least every 6 months when not in use
- Boom Bearings	▨				2-4 shots
- Jack Shaft Bearings	▨				2-4 shots
- Cutter Wheel Bearings	▨				Purge bearings daily
- Bearing Supported Stub Shaft				▨	Every 1000 hrs of operation apply grease until the pin on the opposite side of the stub shaft extends
- Stub Shaft End for Coupling-Deutz				▨	Grease approximately every 1000 hrs. of operation 2 - 3 shots of grease
- Stub Shaft End for Bearing Support-Kubota				▨	Grease approximately every 1000 hrs. of operation 2 - 3 shots of grease
ENGINE REFER TO ENGINE MANUFACTURERS MANUAL FOR PROPER ENGINE SERVICING					

44TR-8_F (6/15) KJL

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.	• Screw in speed adjustment screw to close bypass. 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.
Cutter wheel stops turning.	• Belt not engaged. • Engine belt broke. • Poly chain® belt broke. • Sheared key in shaft. • Broken cutter wheel shaft.	• Adjust yoke assembly. • Replace belt. • Replace belt. • Replace key. • Replace shaft.

COMPLAINT	CAUSE	CORRECTION
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 away from 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.
Track too loose.	• Tensioning cylinder too low on grease. DO NOT OVER GREASE TRACKS WILL BOW	• See Maintenance Section on Tensioning Tracks.

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

Replacing Engine 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.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

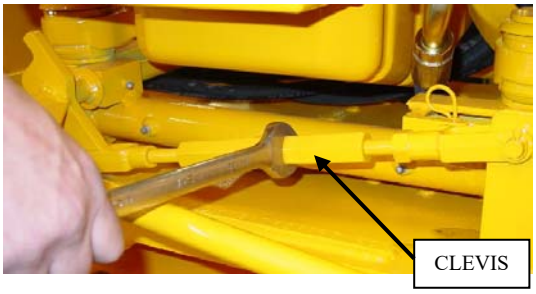
- Remove engine belt guard cover, by removing the nine bolts that hold it on.

- When replacing the engine belt, there are two belt keepers around the engine pulley and one behind the jackshaft pulley that need to be loosened. Once these are loosened the belt can be removed and replaced.

Replacing Engine Belt

- Slide the engine back toward the cutter wheel with the engagement handle as far as it will go, then remove the belt and put on the new belt.

- After replacing the belt, check it for tension. Slide the engine forward to engage the belt. **The belt should deflect 3/8" with 25 lbs. of force centered between the pulleys.** New belts will stretch and become loose as machine runs. Check belt tension often when belts are new.
- 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. When proper tension is achieved, tighten jam nut back onto clevis.
- Use this same procedure to tighten loose belts.
- DO NOT OVER TIGHTEN BELT; OVERLY TIGHT BELTS WILL CAUSE BEARING AND ENGINE DAMAGE. Turn the clevis down with a wrench if the belt is too tight.
- Replace belts when worn or when repeated adjustments are necessary. Belts should never get so loose that all of the adjustment capability is used.



- 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.

Replacing Engine Belt

- Replace and tighten the belt keepers.

- Replace the v-belt guard cover and tighten bolts.
- NEVER RUN MACHINE WITHOUT ALL GUARDS IN PLACE AND SECURED.

GENERAL TENSIONING OF V-BELT DRIVES

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 belt will not slip under the highest load condition.
2. Check the tension on a new belt frequently during the first day of operation.
3. Thereafter, check the 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.
6. If a V-belt slips, tighten it.

Replacing Poly Chain® Belt

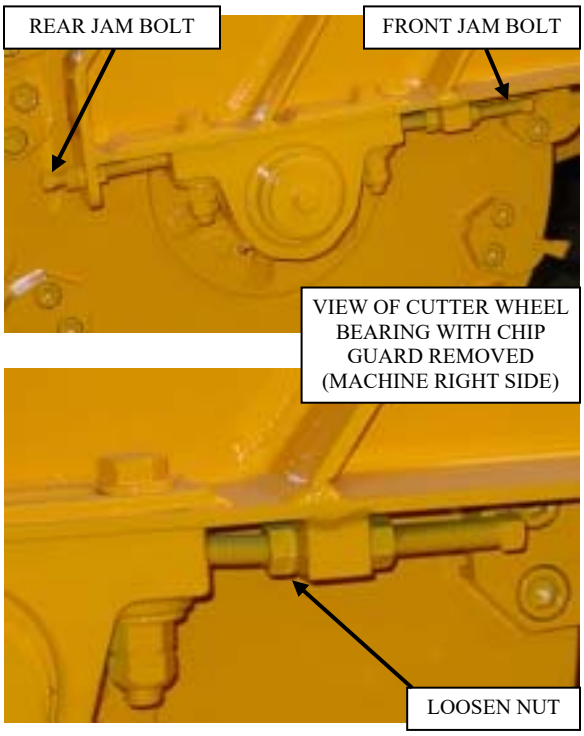
SAFETY

- **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 SET OF TEETH PROPERLY INSTALLED. EXCESSIVE MACHINE VIBRATION WILL OCCUR CAUSING PREMATURE BEARING FAILURE AND OTHER EQUIPMENT DAMAGE.**
- **PLACE THE CUTTER WHEEL ON THE GROUND WHEN PERFORMING SERVICE ON A MACHINE.**

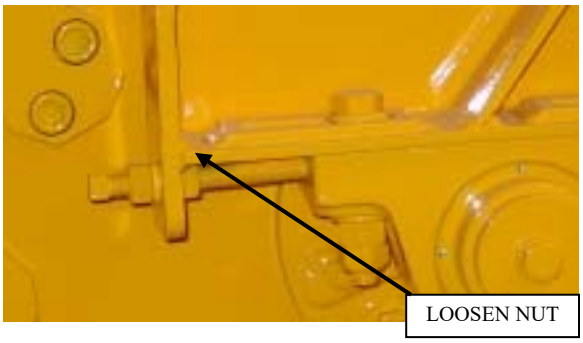
Special care needs to be taken with your Poly Chain® belt. **Alignment**, **tension**, and **cleanliness** of this belt are very important. The Poly Chain® belt needs to be checked for tension approximately every 70 to 100 hours of use. The Poly Chain® belt must be running true. If you adjust one bearing more than the other, the belt will run on an angle, which 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. When replacing the Poly Chain® belt, do not try to pry belt on over pulley this can break the fibers. After you have installed or re-tensioned the Poly Chain® belt, you will have to re-adjust the engine belt for proper tension.

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

Replacing Poly Chain® Belt



- Loosen the front jam bolts on the underside of the boom box and move the cutter wheel toward the engine as far as possible. This will loosen the Poly Chain® belt. You will need to loosen the same jam bolt on both bearings.
- **NOTE: Keep a count of how many turns you make on the jam bolts when you loosen them, making the same number of turns on both jam bolts. This makes adjusting the Poly Chain® belt easier when you are finished changing it. Tighten the jam bolts the same number of turns as you loosened them to keep the belt running true. Use a straight edge to check pulley alignment when adjustments have been made.**
- **Once the belt has been replaced, reverse the procedure to re-assemble the boom. Use the jam bolts on the cutter wheel bearings to adjust proper tension on the belt making sure to tighten or loosen them equally, keeping the sprockets aligned. See chart that follows for tensioning specifications.**



- If belt tension needs adjusting, tighten belt tension by loosening the jam bolts at the back of the machine. **Adjust both bearings the same amount or belt will run at an angle and cause breakage.** Loosen jam bolts on both sides the same amount and readjust the nuts on opposite side to lock position. Loosen cutter wheel bearing bolts and pull cutter wheel toward back of machine to tighten belt, retighten bolts. Reposition front jam bolts against cutter wheel bearing and tighten.

- Replace the Poly Chain® belt guard cover and the bottom cover.
- NEVER RUN MACHINE WITHOUT BELT GUARDS AND COVERS IN PLACE AND BOLTS TIGHTENED.

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.

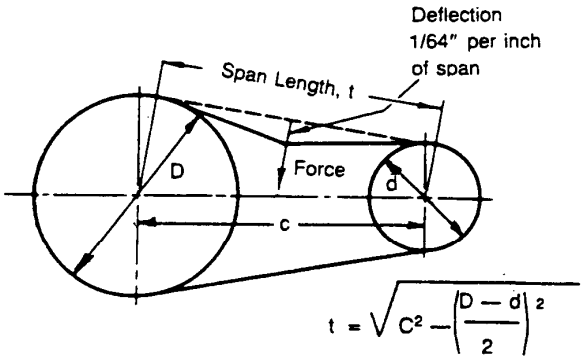
Step 3: Locate the number of grooves on your small sprocket in the second column.

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.



14M-68 Minimum and Maximum Deflection Force (lbs) for 68 mm Wide Poly Chain GT Belts

RPM of Faster Shaft	Number of Grooves on Small Sprocket	Center Distance (inches) for Belt Designation																									
		14M-994, 14M-1120				14M-1190, 14M-1260 14M-1400				14M-1568, 14M-1750				14M-1960, 14M-2100 14M-2240				14M-2380, 14M-2520 14M-2660, 14M-2800				14M-3136, 14M-3304 14M-3500				14M-3920, 14M-4410			
		CD <= 11.4		CD > 11.4		CD <= 13.7		CD > 13.7		CD <= 15.1		CD > 15.1		CD <= 22.2		CD > 22.2		CD <= 27.6		CD > 27.6		CD <= 40.0		CD > 40.0		CD <= 56.9		CD > 56.9	
		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.
3200 & Over	28 to 30	43.8	46.7	45.5	46.8	48.1	50.6	49.2	52.0	52.1	53.3	54.5	57.1	57.7	59.3	59.9	63.2	61.7	64.4	64.2	68.0	66.9	70.4	69.6	73.3	73.1	76.6	74.2	78.5
	32 to 43	46.1	49.4	47.4	48.7	50.3	54.8	51.7	55.0	54.9	57.5	56.9	60.4	60.8	65.0	62.5	66.8	64.6	68.3	67.0	71.9	70.4	74.7	72.6	77.3	76.3	80.8	77.4	82.6
Under 3200	28 to 30	44.1	47.2	46.0	47.2	48.7	51.5	49.9	52.9	53.0	54.3	55.4	58.2	59.0	60.7	61.2	64.6	63.2	66.0	65.8	69.7	68.8	72.3	71.5	75.3	75.3	78.9	76.4	80.8
to 2400	32 to 56	46.2	49.0	47.3	48.0	51.0	55.7	52.3	55.4	56.7	60.8	57.9	61.7	62.9	67.6	64.0	68.5	66.9	72.3	68.9	74.0	73.0	77.7	75.0	79.8	79.1	84.3	80.1	85.7
Under 2400	28 to 30	45.1	48.3	47.1	48.3	50.0	52.8	51.2	54.2	54.6	55.7	57.0	59.8	60.9	62.5	63.0	66.5	65.3	68.0	67.9	71.8	71.3	74.6	73.9	77.6	78.0	81.4	79.1	83.3
to 1800	32 to 75	46.8	49.2	48.2	48.8	51.7	55.5	53.2	55.4	58.2	62.3	59.1	61.9	64.9	69.6	65.5	69.6	68.4	74.3	70.7	75.6	75.7	81.1	77.2	81.8	82.0	87.5	82.7	87.9
Under 1800	28 to 30	46.2	49.5	48.2	49.6	51.2	54.2	52.5	55.6	56.0	57.2	58.5	61.4	62.5	64.4	64.7	68.3	67.1	69.9	69.7	73.8	73.3	76.8	76.0	79.8	80.2	83.9	81.3	85.8
to 1400	32 to 80	47.7	50.1	49.2	49.9	52.6	56.3	54.3	56.4	59.0	62.3	60.2	62.7	66.0	69.9	66.8	70.2	70.9	75.1	72.3	76.2	77.4	82.1	79.0	82.7	83.9	88.9	84.7	89.1
Under 1400	28 to 30	47.8	51.3	49.9	51.4	53.0	56.3	54.3	57.7	58.0	59.4	60.5	63.7	64.8	67.0	67.0	70.9	69.6	72.7	72.2	76.6	76.1	79.9	78.8	82.9	83.2	87.2	84.3	89.1
to 1000	32 to 80	49.1	51.8	50.8	51.6	54.2	58.1	56.0	58.2	60.6	63.9	62.0	64.7	67.7	71.4	68.9	72.3	72.8	76.9	74.5	78.6	79.8	84.1	81.5	85.2	86.4	91.2	87.5	91.9
Under 1000	28 to 30	49.1	52.6	51.4	52.7	54.5	57.7	55.9	59.1	59.8	60.9	62.3	65.3	66.8	68.7	69.0	72.7	71.8	74.6	74.4	78.5	78.5	82.0	81.2	85.0	85.8	89.5	86.9	91.4
to 800	32 to 80	50.5	53.0	52.2	52.9	55.6	59.4	57.5	59.6	62.1	65.3	63.7	66.2	69.4	72.8	70.8	74.0	74.6	78.6	76.5	80.4	81.9	85.9	83.7	87.2	88.7	93.1	89.9	94.1
Under 800	28 to 30	50.6	54.3	52.9	54.4	56.2	59.6	57.6	61.0	61.7	62.9	64.2	67.4	68.9	71.1	71.1	75.0	74.1	77.1	76.7	81.1	81.0	84.8	83.7	87.8	88.5	92.5	89.6	94.4
to 600	32 to 80	52.0	54.7	53.7	54.5	57.2	61.3	59.2	61.4	63.9	67.2	65.6	68.2	71.3	75.0	72.9	76.3	76.7	80.9	78.7	82.8	84.3	88.4	86.2	89.9	91.3	95.8	92.6	96.9
Under 600	28 to 30	52.8	56.8	55.2	56.8	58.5	62.4	60.0	63.7	64.3	65.8	66.9	70.4	71.8	74.4	74.1	78.4	77.3	80.7	79.9	84.7	84.5	88.7	87.2	91.7	92.3	96.8	93.4	98.7
to 400	32 to 80	54.1	57.1	56.0	57.0	59.5	63.9	61.6	64.1	66.4	70.0	68.2	71.1	74.1	78.3	75.8	79.6	79.8	84.4	81.9	86.4	87.7	92.1	89.7	93.8	95.0	99.9	96.4	101
Under 400	28 to 30	56.3	61.0	58.8	61.1	62.4	67.1	63.9	68.4	68.6	70.9	71.3	75.5	76.7	80.2	79.0	84.1	82.5	86.8	85.2	91.0	90.3	95.5	93.0	98.5	98.5	104	99.6	106
to 200	32 to 80	57.6	61.3	59.6	61.2	63.4	68.6	65.6	68.8	70.7	75.1	72.6	76.3	78.9	84.0	80.6	85.3	84.9	90.6	87.1	92.6	93.4	98.8	95.4	101	101	107	103	108
Under 200	28 to 30	63.0	68.4	65.8	68.5	69.9	75.3	71.5	76.7	77.0	79.9	79.8	84.6	86.0	90.3	88.3	94.2	92.6	97.5	95.3	102	101	107	104	110	110	117	112	119
to 60	32 to 80	64.5	68.7	66.7	68.6	70.9	76.9	73.4	77.1	79.0	84.2	81.1	85.3	88.1	94.0	90.0	95.4	94.9	101	97.3	103	104	111	106	112	113	120	114	121

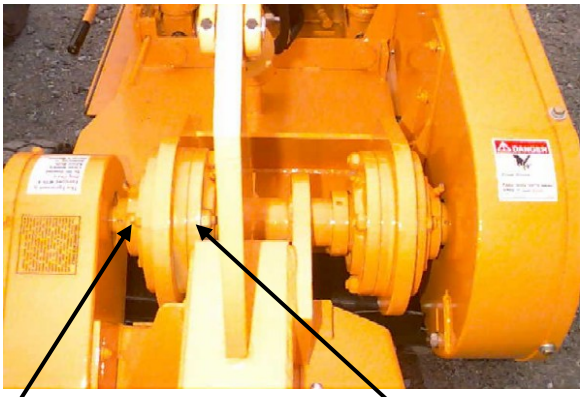
SAFETY

- **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.**

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

JACKSHAFT BEARINGS

- There are four (4) bearings on the jackshaft; two (2) mounted on the inside of the supports and two (2) mounted on the outside of the supports. These bearings should be greased daily to keep dirt and moisture out. These bearings should not be purged, only use 2 to 4 shots of grease.
  PROPER MAINTENANCE IS CRITICAL TO ENSURE LONG BEARING LIFE.

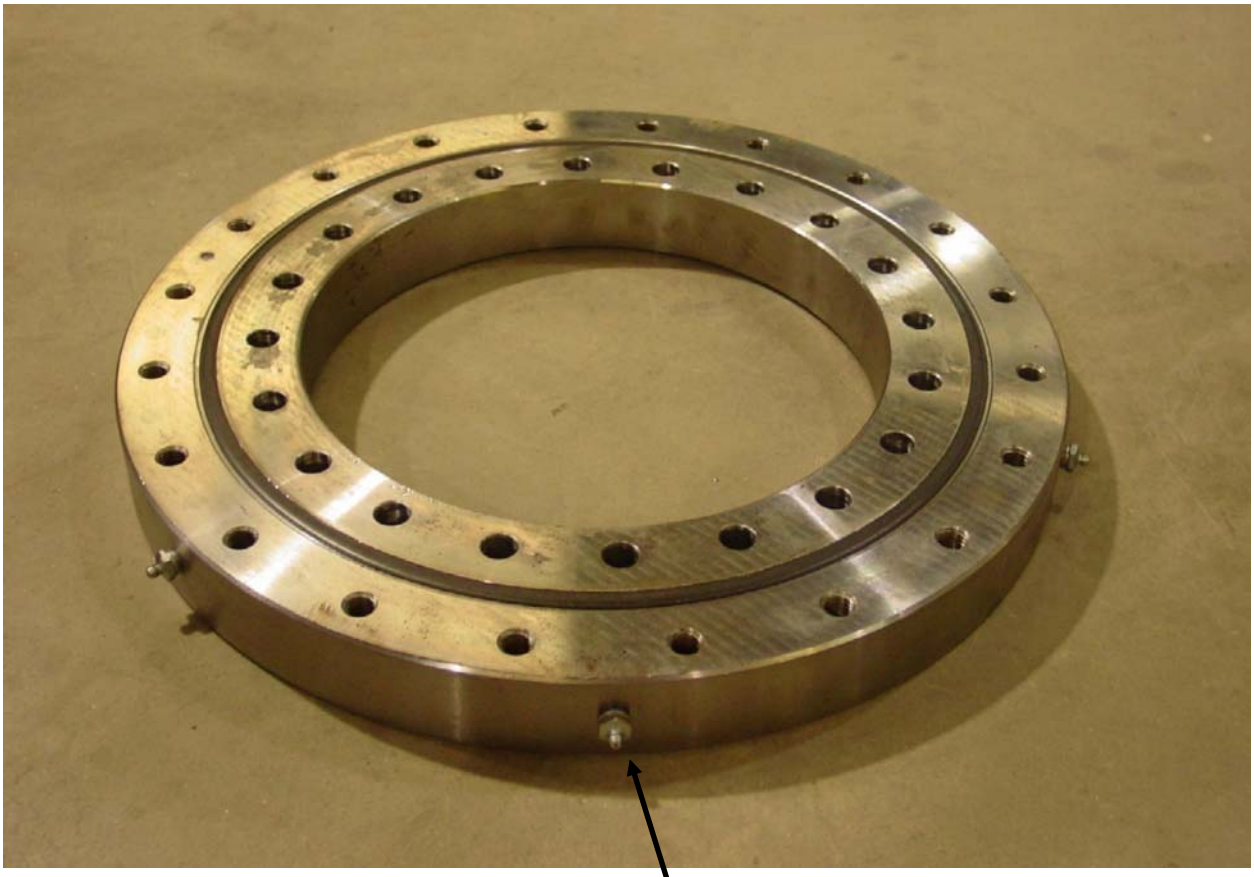


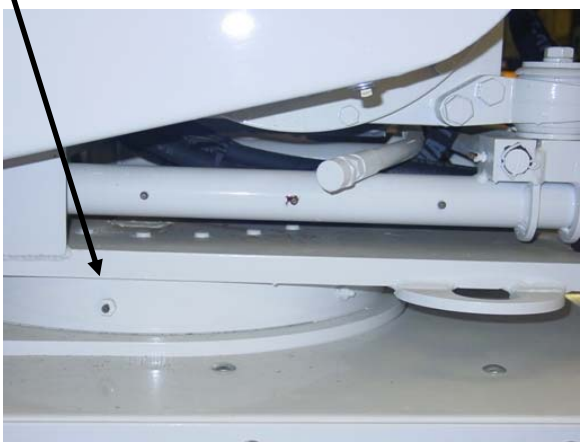
CUTTER WHEEL BEARINGS

- There are two (2) bearings on the cutter wheel shaft. These bearings should be purged using grease **EVERYDAY**. Purge until new grease is seen to keep dirt and moisture out.
  PROPER MAINTENANCE IS CRITICAL TO ENSURE LONG BEARING LIFE.

***** Your machine is lubed with Texaco® Starplex II grease when it is delivered from the factory. Starplex II is lithium complex soap grease, which contains a specially formulated additive package to provide excellent rust protection, resistance to water washout and extreme pressure properties. It is recommended as multipurpose, high performance grease for severe duty industrial applications involving high temperatures, water contamination and shock loading. Operating temperature range is from 450 F to -15 F. *****

SERVICING PIVOT TABLE BEARING





While turntable bearings require almost no attention, what little they are given will pay big dividends in long life, high performance, and trouble free service. Lubricate the bearing every 100 operating hours for relatively slow rotating applications. Idle equipment should not be neglected. Grease dries out and "breathing" due to temperature changes can cause condensation within the bearing. Whether used or not, the bearing should have grease introduced every 6 months. It is always a good idea to rotate the bearing a few turns to coat all surfaces with fresh grease.

Also when greasing bearing, inspect seals, making certain that they are in proper position in grooves and intact. Check tightness of mounting bolts and retighten if needed. Be alert to changes in rotation, unusual sounds, and vibrations.

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.**

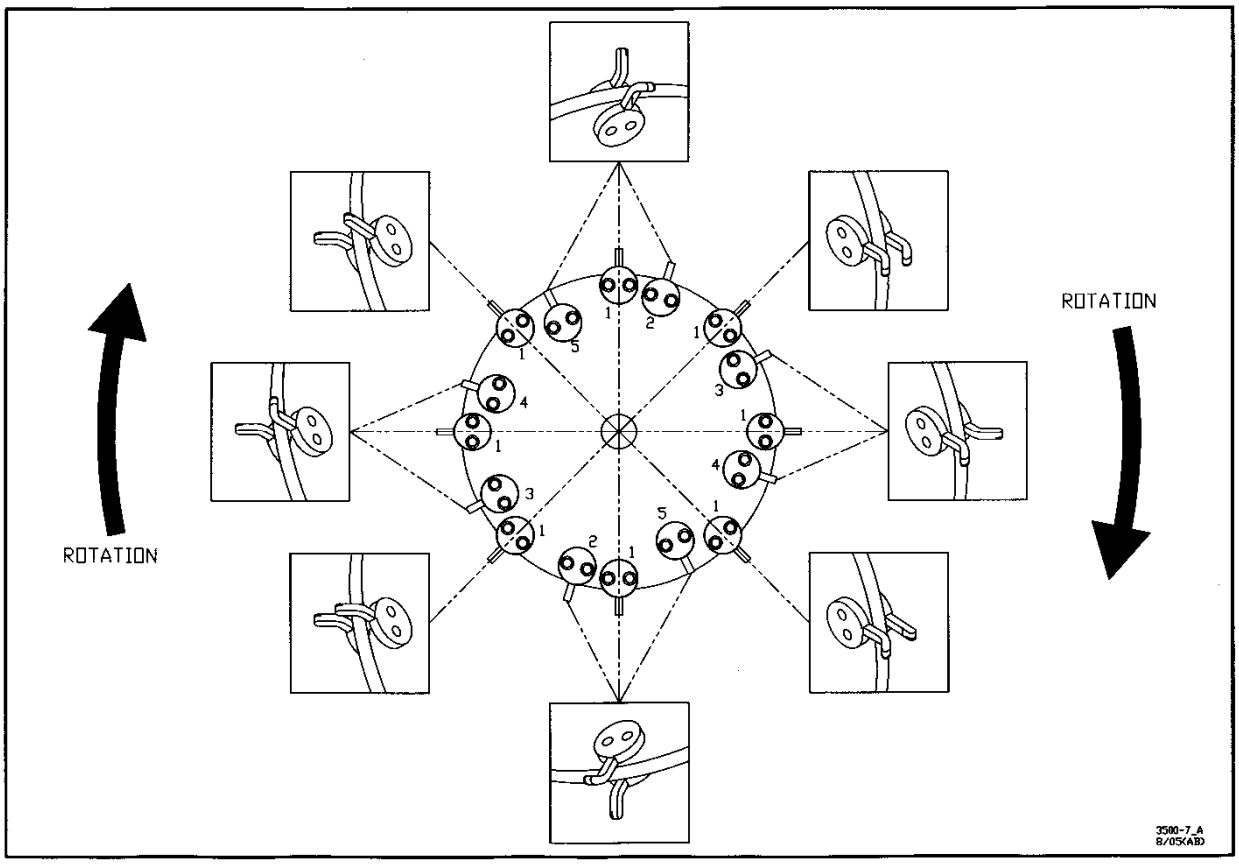
- There are thirty-two (32) teeth to a complete set on the model SP7015. Two (2) straight teeth, fifteen (15) left 45° teeth and fifteen (15) right 45° teeth.

- 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 YOUR HAND ON THE 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. All teeth are set 1 ¼" out of the pocket to the edge of the carbide.

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 same design as provided with the machine.
- Use anti-seize on threads to prevent bolts from "freezing up" in cutter wheel pockets.
- 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 cutting 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.
- The second pocket in each group gradually goes back into the cutter wheel for half a rotation and then repeats.

OPTIONAL:
Razor Cutter Wheel

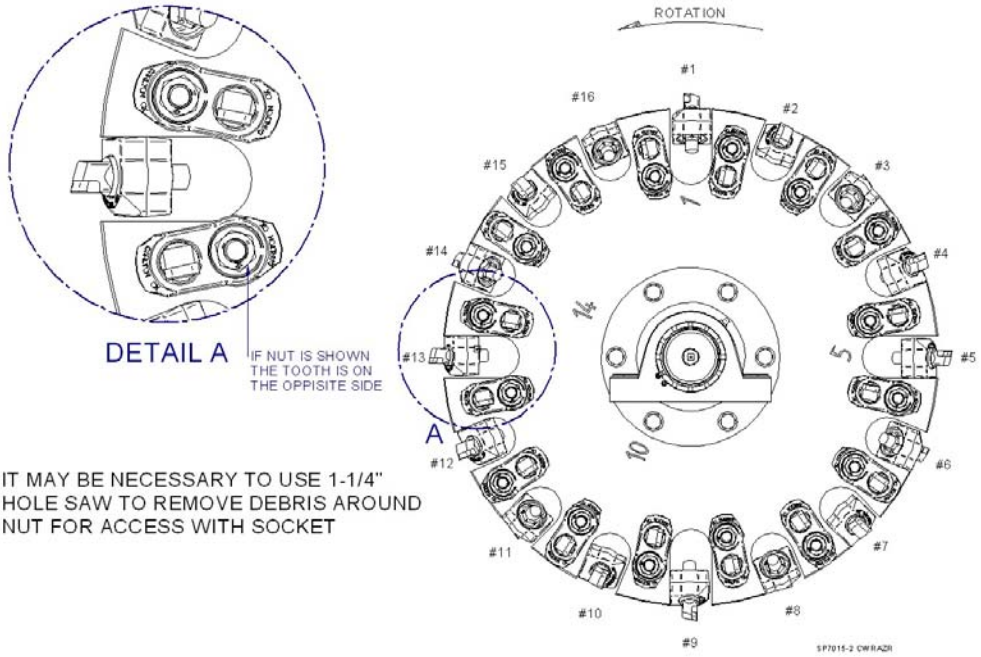
- If the machine is supplied with the optional Razor cutter wheel, there are forty-eight (48) teeth to a complete set. There are sixteen (16) Short Plow Bolt Bits and thirty-two (32) Plow Bolt Bits.
- **DO NOT OPERATE A MACHINE WITHOUT A COMPLETE NUMBER OF TEETH IN THE CUTTER WHEEL PROPERLY INSTALLED. 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.
- **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.**

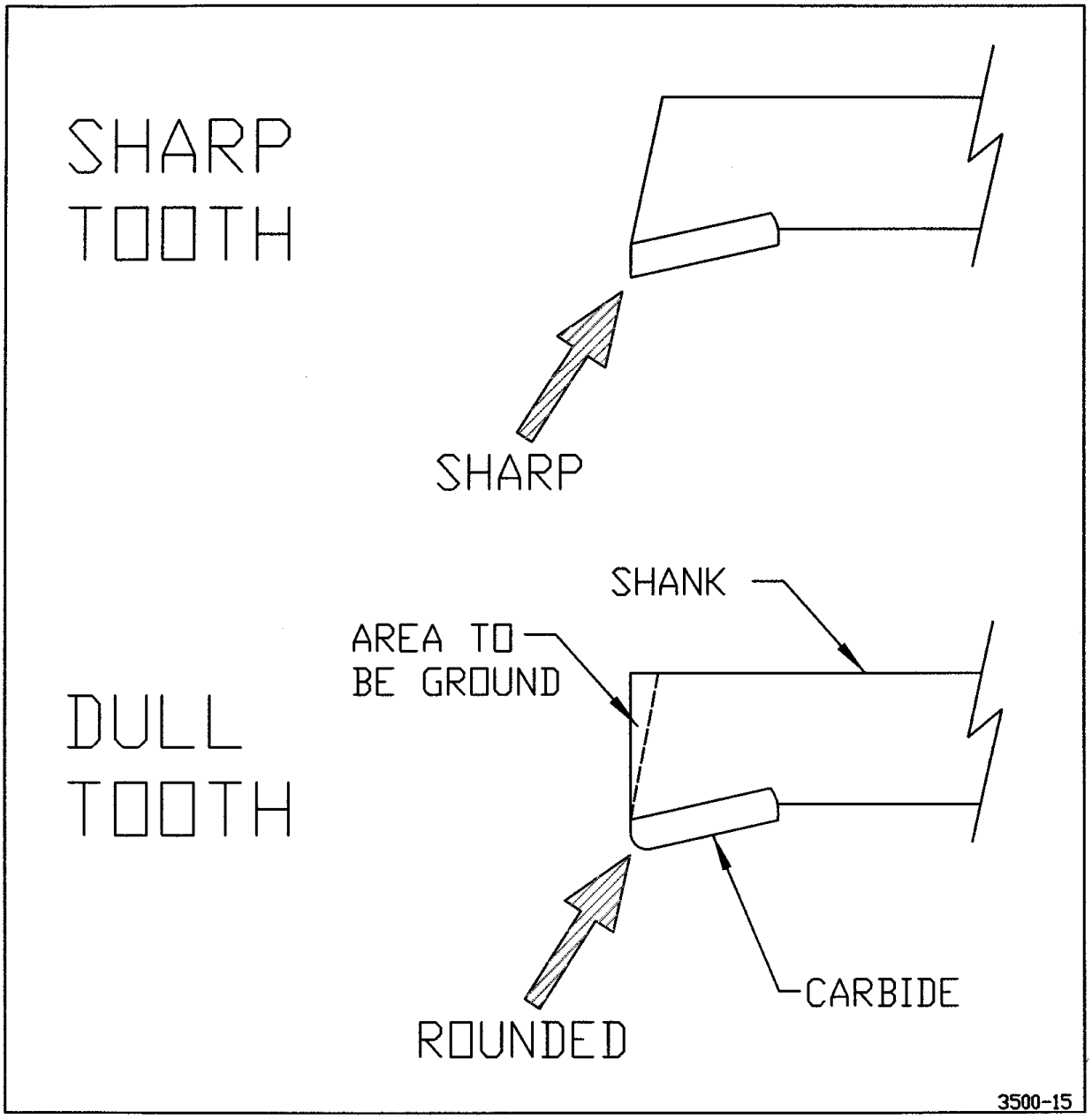
- The teeth do not require a setting gauge. The only requirement is to be installed in the proper direction and tightened to the proper torque as discussed in the next section.
- **When replacing a cutter wheel tooth, replace the tooth and nut as a set and use anti-seize on the threads.**

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 (16 R or 16 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 (04501311). 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 16 R with a tooth from a 16 L pocket. The cutting edge is the corner and this will turn the opposite corner out for use.
- These teeth are tightened with a nut (0450126A). Torque on nuts is not to exceed 170 ft/lbs.
- All teeth on cutter wheel sides are Plow Bolt Bits (0450130). 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.
- These teeth are tightened with a nut (0450126A). Torque on locking jam nuts is not to exceed 170 ft/lbs.
- 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.



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

- **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.**
- **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 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 AW32 hydraulic oil at time of manufacture; use the same or equivalent.
- Drain and replace hydraulic oil at least once a year, more often if oil is very dark or smells burnt. Discard used oil 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.
- Remove key & disconnect battery cable.
- Make sure that hydraulic oil is cool and that pressure is relieved from the lines.
- Disconnect hydraulic lines from pump and cap them, mark which line goes where to reconnect correctly.
- Remove bolts holding pump to engine.
- Replace pump and tighten bolts.
- Uncap and reconnect hydraulic lines paying attention to how they were marked.
- Recheck oil supply in reservoir, replenish if necessary.

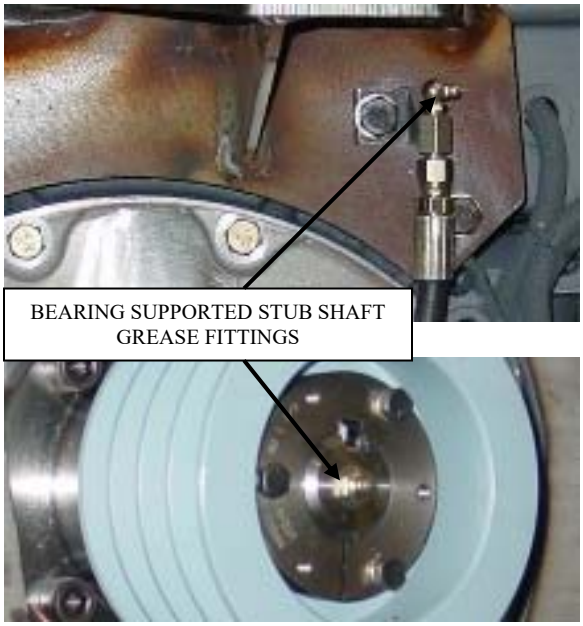
HYDRAULIC HOSES & FITTINGS

- Inspect hydraulic hoses and fittings daily for leaks, tightness, wear, or damage. Repair or replace as needed.
- FLUID UNDER PRESSURE CAN PENETRATE THE SKIN AND CAUSE SEVERE INJURY. CHECK HOSES AND FITTINGS USING A BOARD OR CARDBOARD; DO NOT USE HAND OR FINGER. SEEK IMMEDIATE MEDICAL ATTENTION IF SKIN IS PENETRATED. ALWAYS WEAR EYE PROTECTION.

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.**

- The most service you should have to do for the **bearing supported stub shaft** is to grease it properly. The bearing grease fitting is easily accessible behind the V-belt guard. Another grease fitting is on the end of the stub shaft to grease the splines in the coupling. Follow the instructions in the Machine Maintenance section for frequency and application of grease. Also see the Lubrication Chart.

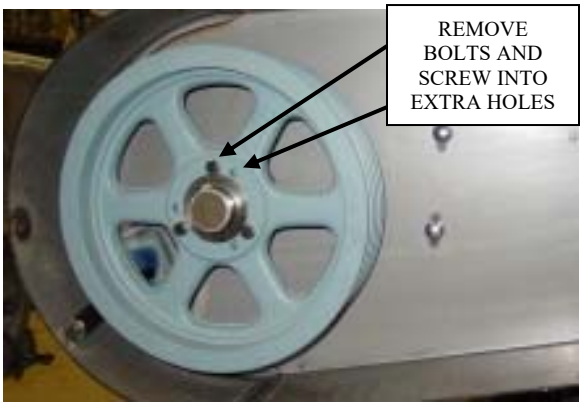


BEARING SUPPORTED STUB SHAFT GREASE FITTINGS

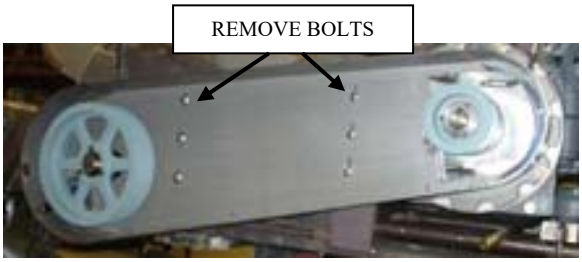
- If the bearing supported stub shaft should fail for any reason, these are the procedures for replacement. First remove the V-belt following the instructions in the Servicing Belt Section of the manual. Remove the engine belt keepers instead of just loosening the bolts and lay aside to put on new stub shaft plate assembly.

REMOVE V-BELT GUARD COVER AND FOLLOW INSTRUCTIONS FOR REMOVING V-BELT.

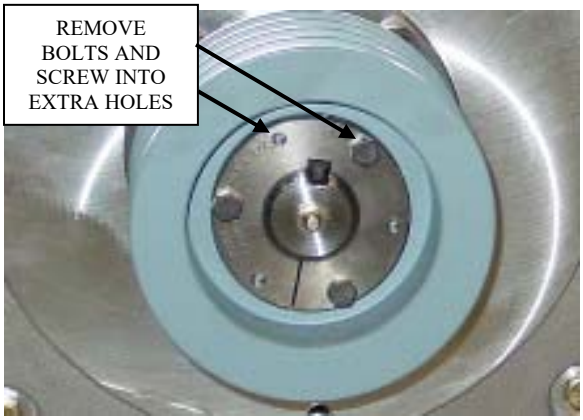
- Next you will need to remove the jackshaft sheave. Remove the bolts in the jackshaft sheave and screw them back into the empty threaded holes to push the sheave off the bushing and remove the bushing and sheave. Make sure to keep all machine parts and hardware together to make reassembly easier.



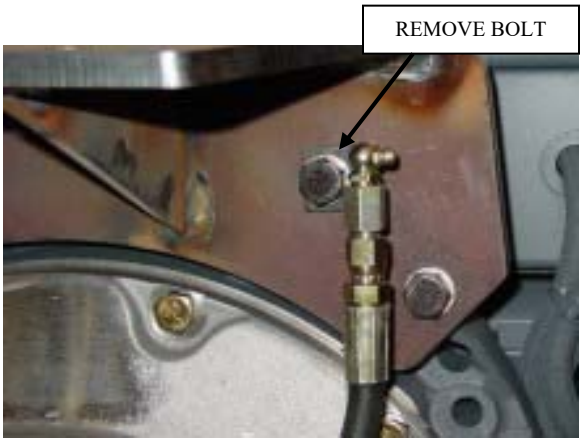
- Remove the bolts holding the belt guard onto the machine and remove the belt guard.



- Then remove the engine sheave. Remove the bolts in the engine sheave bushing and screw them into the extra threaded holes to push the bushing out of the sheave and remove the bushing and sheave.

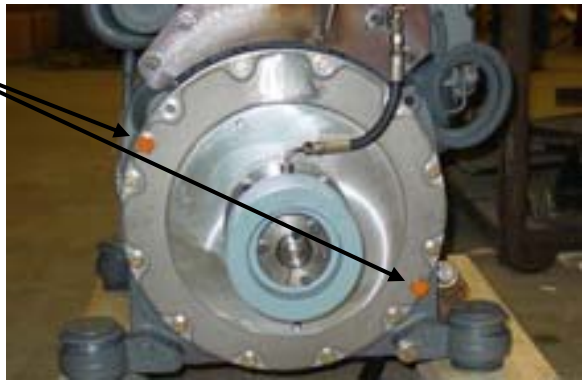


- Remove the bolt holding the extended grease fitting to the air filter bracket and remove the extension from the stub shaft.



- You can now remove the bearing supported stub shaft plate. Remove the bolts holding the shaft plate to the engine. There are eleven 10MM bolts to remove. Pull the plate straight off.

- There are two threaded holes that can be used to push the shaft plate off the engine mount. Insert two of the bolts that were removed from the stub shaft plate and slowly screw them in until the plate breaks loose. Leaving a couple of bolts screwed in slightly may help to keep the assembly from dropping when separated from the engine.



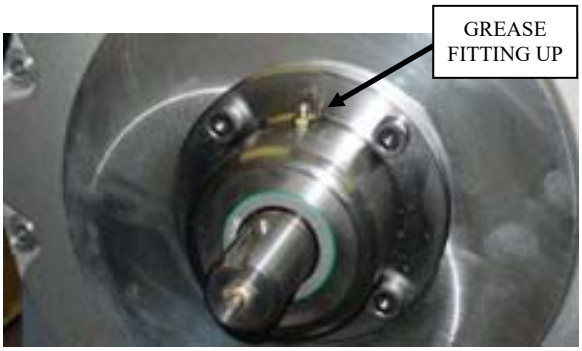
- Remove the coupling plate. There are eight 10MM bolts holding this plate to the flywheel. These bolts had LocTite® blue applied before installation.

- When parts have been removed, clean the engine flywheel with a cleaning solvent and check for burrs around the holes and on the surface of the flywheel. Use a very fine sand paper to remove any burrs.

- Replace any parts found defective or worn. Put stub shaft coupling plate onto the flywheel. The plate is attached using eight 10MM-1.5 x 20MM bolts with a lock washer. Put LocTite® 242 (blue) on the end of the bolt and lightly tighten all bolts. When all bolts have been inserted and lightly tightened, torque all bolts to 35 ft. lbs.

- Put anti-seize (coupling lubricant) on the inside of the coupling. Line up external splines with the coupling ID and slide the stub shaft plate into place.

- Make sure the grease fitting is on the top of the assembly. Replace the 10MM-1.5 x 30MM bolts and torque to 35 ft. lbs. There are eleven bolts holding the plate to the engine.



- Remove the grease fitting and replace with the grease fitting extension supplied with the machine.

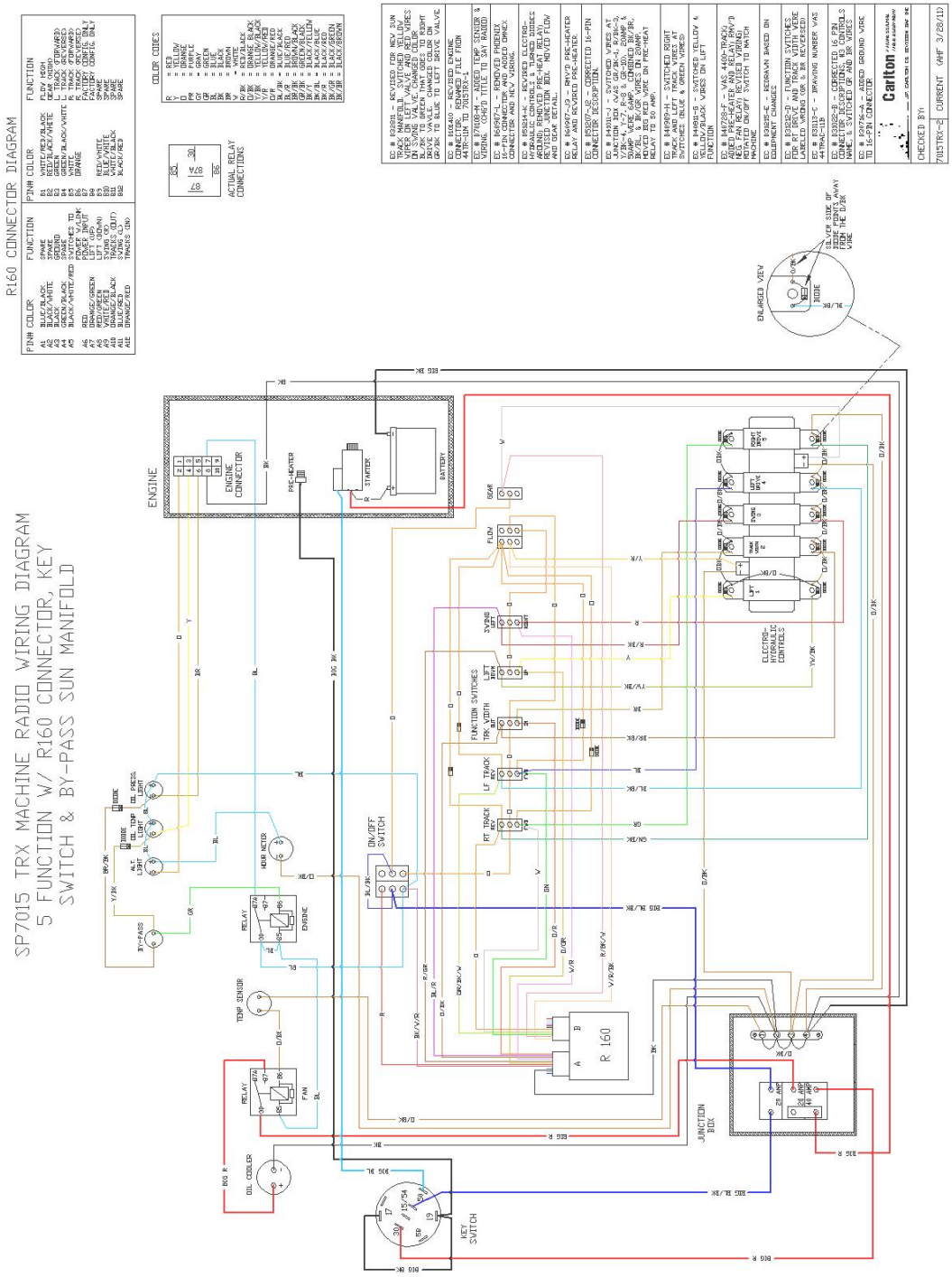
- Bolt grease fitting to the air filter bracket.
- Before starting the engine, apply grease to the grease fitting until the pin on the opposite side of the stub shaft pops out. This must be done daily to protect the bearing in the stub shaft assembly.

- Start replacing parts in the opposite order in which they were removed. Replace the V-belt guard and then replace the engine and jackshaft sheaves. Torque the bolts in the sheaves to 30 ft. lbs. It will be easier to bolt the belt keepers onto the stub shaft plate before you put the engine sheave on.

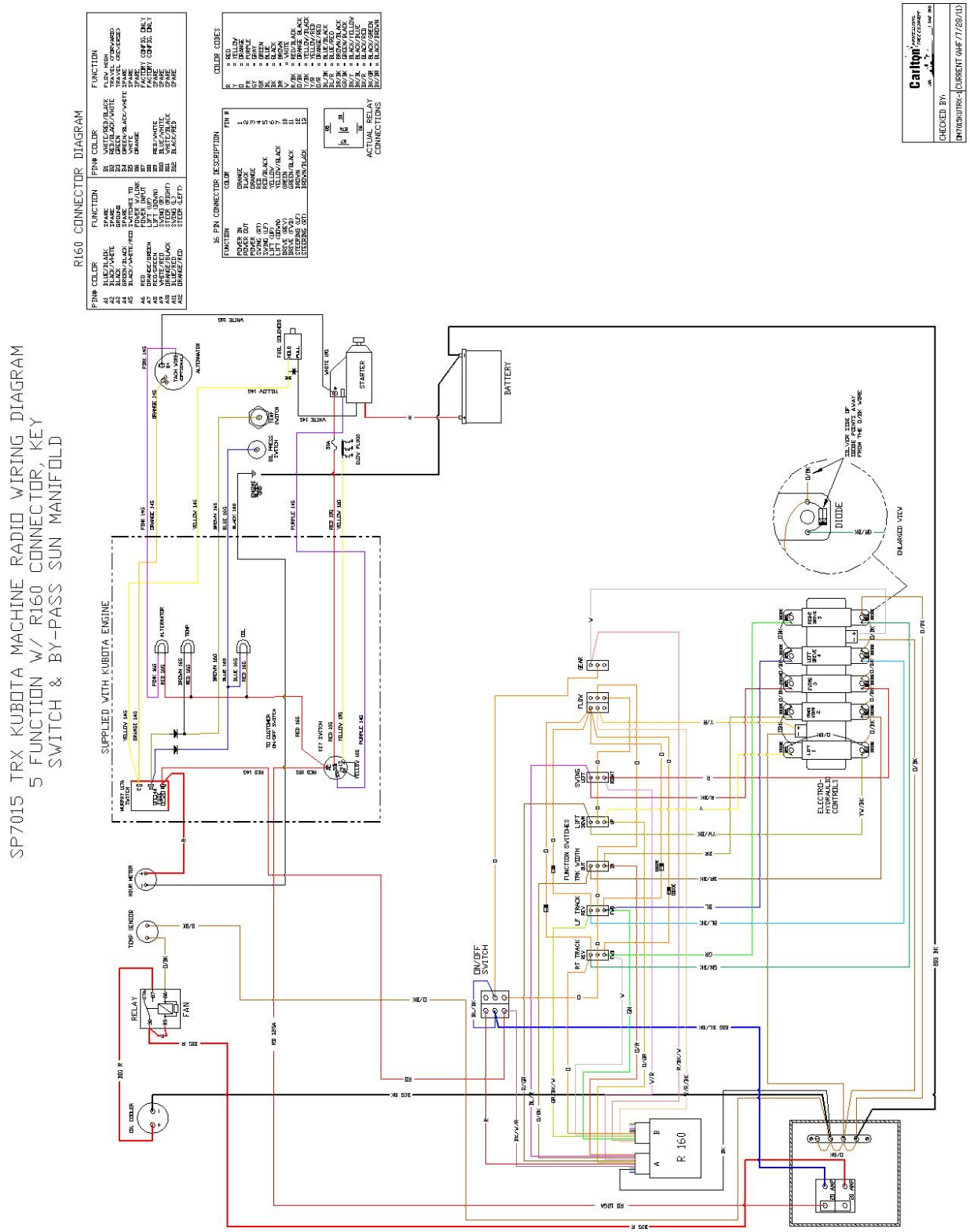
- Replace the V-belt and align the sheaves as instructed in the Servicing Belt Section of this manual. Adjust sheaves as necessary to get the proper belt alignment. Check belt tension and set as described in Servicing Belt section. Belt alignment and tension are very important for long bearing life. **Always replace belt guard cover before running the machine.**

- Grease stub shaft bearing through the end of the shaft. Apply 2 to 3 shots of grease approximately every 1000 hours of operation. Wipe off excess grease. **Excess grease will attract dirt. DO NOT over grease, over greasing could cause a hydraulic type lift on seals**.

RADIO CONTROL MACHINE DIAGRAM



SEE RADIO CONTROL MANUAL,
INCLUDED IN THIS MANUAL,
FOR MORE INFORMATION.


SP7015 TRX KUBOTA MACHINE RADIO WIRING DIAGRAM
5 FUNCTION W/ R160 CONNECTOR, KEY
SWITCH & BY-PASS SUN MANIFOLD
R160 CONNECTOR DIAGRAM
16 PIN CONNECTOR DESCRIPTION
COLOR CODES
ACTUAL RELAY CONNECTIONS
SUPPLIED WITH KUBOTA ENGINE
BATTERY
STARTER
FUEL SOLENOID
ALTERNATOR
TEMP SWITCH
OIL PRESS SWITCH
GLOW PLUGS
DIODE
ENLARGED VIEW
KEY SWITCH
ELECTRO-HYDRAULIC CONTROLS
FUNCTION SWITCHES
GEAR
FLOW
SWING
LIFT
TRK WIDTH
LF TRACK
RT TRACK
ON/OFF SWITCH
HOUR METER
TEMP SENSOR
RELAY
FAN
OIL COOLER
R 160
CHECKED BY:
DM7015KUTRX-1
CURRENT (4HF/7/28/11)

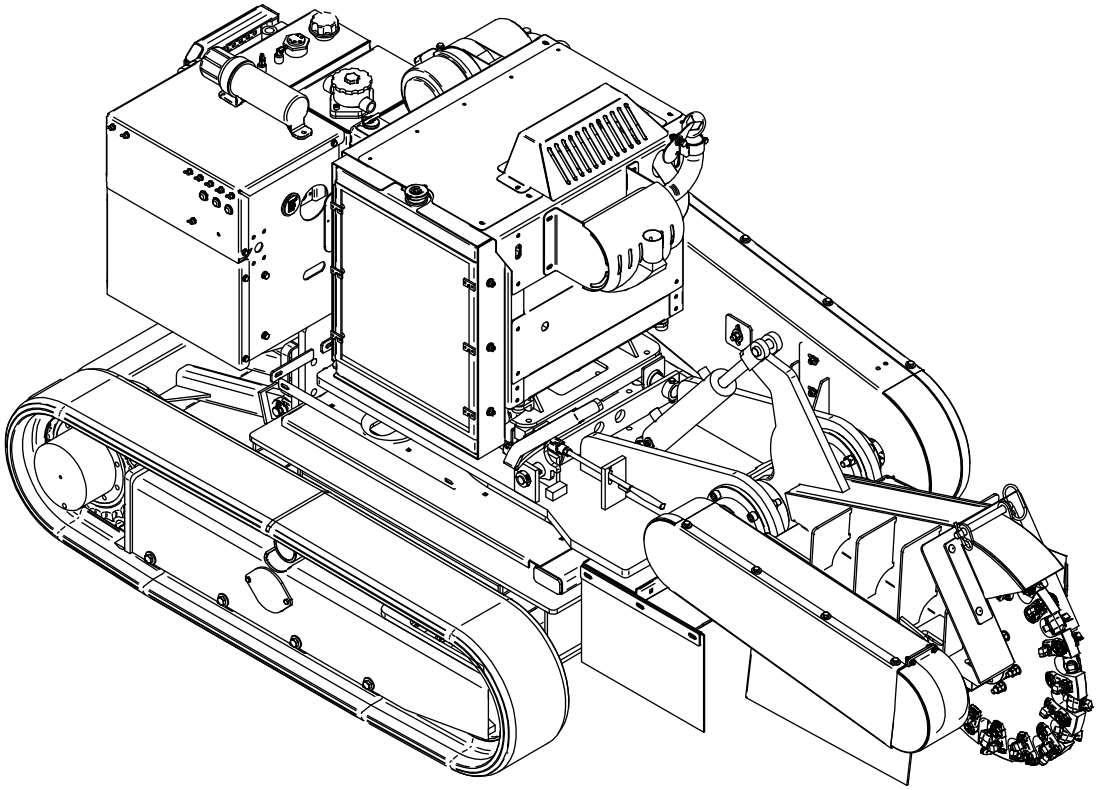
Parts Book

Carlton
PROFESSIONAL TREE EQUIPMENT

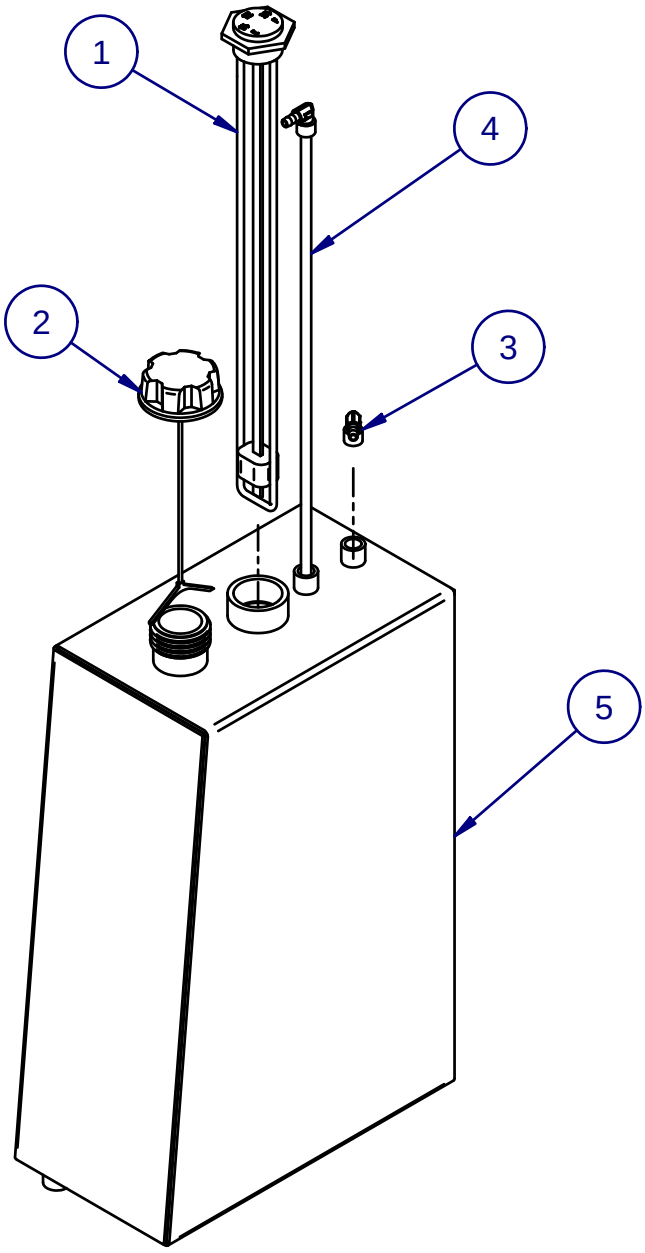
Carlton
J.P.Carlton Company
Div. D.A.F. Inc.
121 John Dodd Road
Spartanburg, SC 29303
Ph. (864) 578-9335
Fax (864) 578-0210
www.stumpcutters.com

7015*TRX* STUMP GRINDER

71 HP KUBOTA DIESEL ENGINE
74 HP KOHLER DIESEL ENGINE



BLANK SHEET



PART	ITEM	DESCRIPTION	QTY
1	0200210	GAUGE,SPIRAL FUEL,21"	1
2	0201001A	Vented Cap- Yellow DIESEL	1
3	0300253	3/8MP-5/16BARB - 4290-5-6	1
4	14010036	WELDMENT,PICK-UP TUBE	1
5	17010005	WELDMENT,FUEL TANK,DIESEL	1

FUNCTION GROUP
1 FRAME AND TANKS

BUSINESS LINE
STUMPCUTTERS

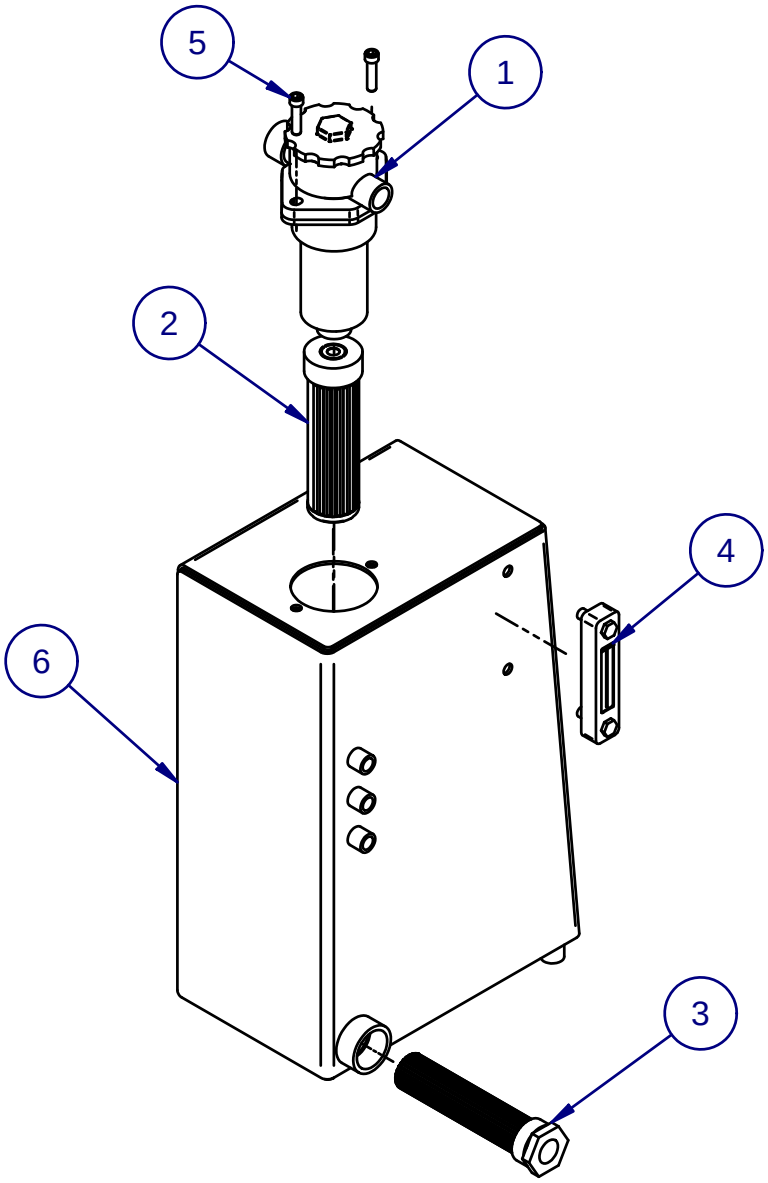
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
ASSY,DIESEL FUEL TANK

ISSUE
R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300135E	HYDRAULIC IN TANK FILTER STF	1
2	0300135F	HYDRAILIC IN TANK FILTER ELEMENT	1
3	0300169	STRAINER- TANK MOUNTED LTM-15	1
4	0300266A	HYDRAULIC SITE GAUGE W/TEMP	1
5	12D-0612	SHCS 3/8 X 1-1/2 NC GR 8	2
6	17010004	WELDMENT,HYDRAULIC TANK	1

FUNCTION GROUP
1 FRAME AND TANKS

BUSINESS LINE
STUMPCUTTERS

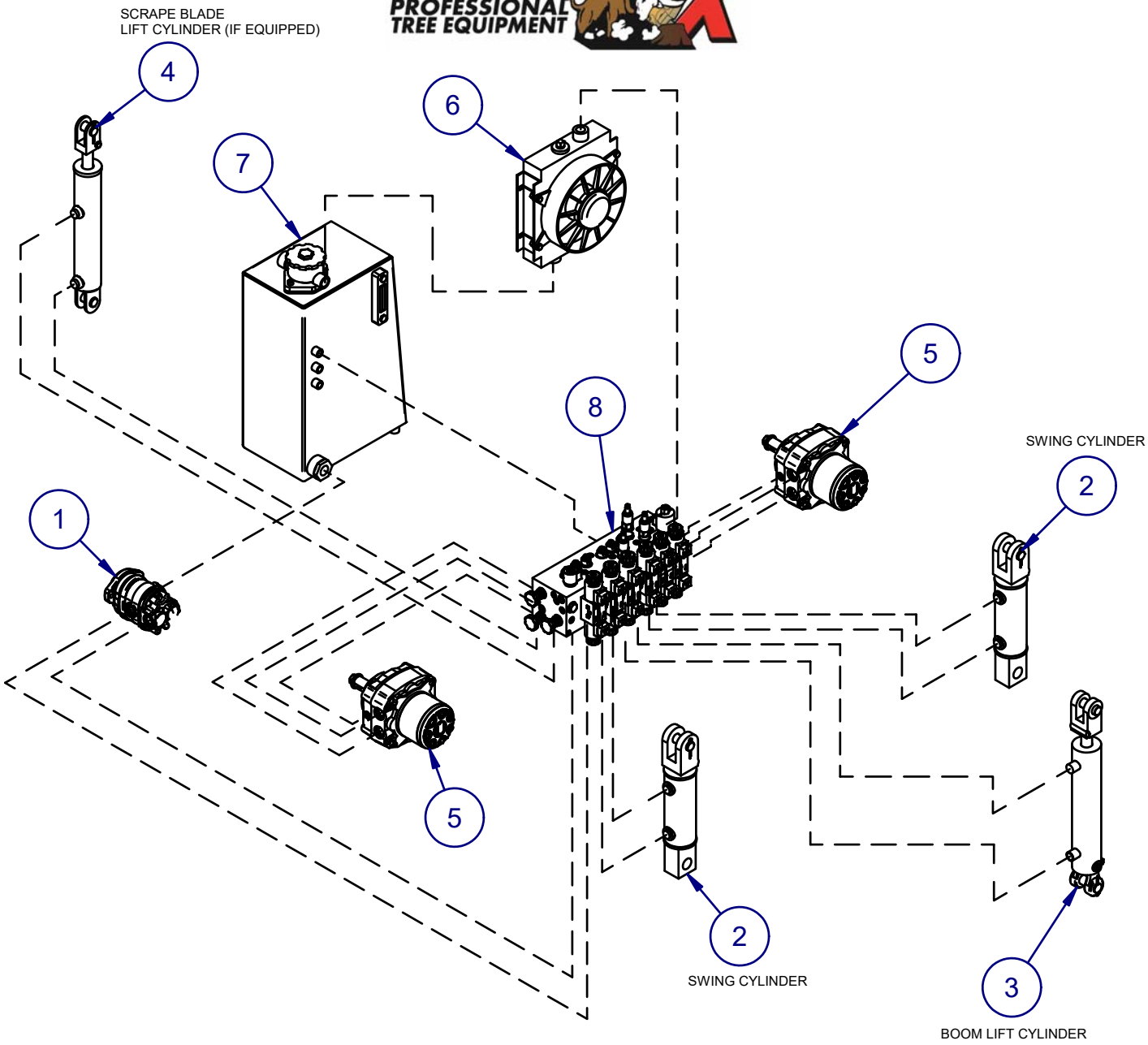
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
ASSY,HYDRAULIC TANK

ISSUE
R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0300142F	Double Pump, 7015 TRX	1
2	0300105C	LIFT CYLINDER	2
3	0300105F	Hydraulic Cylinder - 3x12	1
4	0300106A	CYLINDER-9" CHIPPER LIFT	1
5	0300118E	HYDRAULIC BRAKE MOTOR,7015	2
6	0300165BR1	HYDRAULIC OIL COOLER- 7015- MA	1
7	17010002	ASSY,HYDRAULIC TANK	1
8	HF0300134	HYDRAFORCE SP7015TRX	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

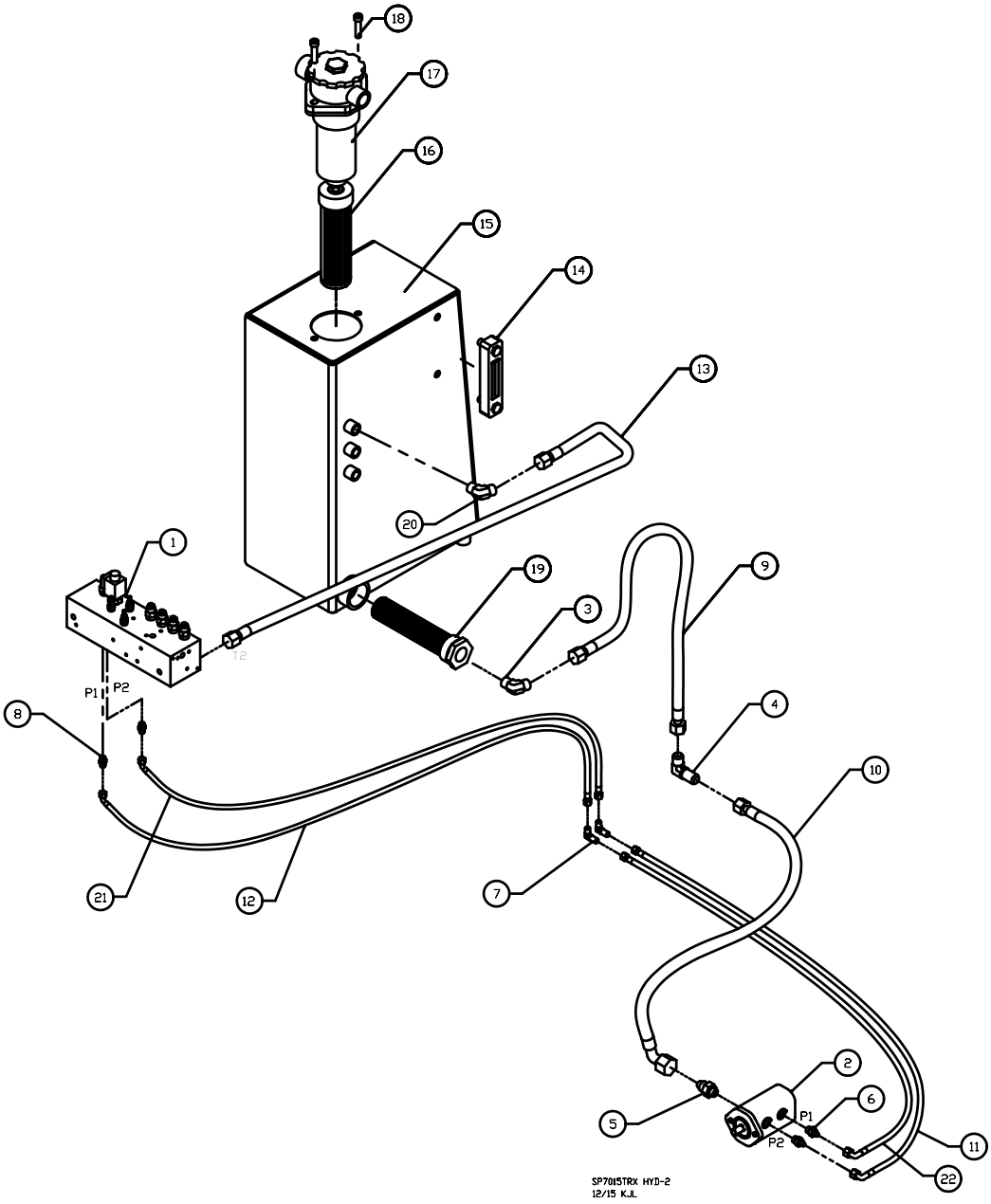
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
HYDRAULIC SCHEMATIC TRX

ISSUE
R3

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	**ISSUE**
HYDRAULIC INLET ASSEMBLY	R2

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	HF0300134	MANIFOLD	1
2	0300142F	DOUBLE PUMP	1
3		16 MP - 16 JIC 90°	1
4		BULK HEAD - 16 JIC-16 JIC	1
5		16 JIC - 10 O-RING	1
6		8 JIC - 10 O-RING 90°	2
7	03002561	BULK HEAD - 8 JIC-8 JIC	2
8	0300236	8 O-RING - 8 JIC	2
9	HSP7015-24	HOSE ASSEMBLY	1
10	HSP7015-K25	HOSE ASSEMBLY	1
11	HSP7015-11	HOSE ASSEMBLY	1
12	HSP7015-K20	HOSE ASSEMBLY	1
13	HSP7015-9	HOSE ASSEMBLY	1
14	0300266A	HYDRAULIC SITE GAUGE W/TEMP	1
15	17010004	WELDMENT,HYDRAULIC TANK	1
16	0300135F	REPLACEMENT HYDRAULIC IN-TANK FILTER ELEMENT	1
17	0300135E	HYDRAULIC IN-TANK FILTER	1
18	12D-0612	SHCS 3/8"X1-1/2" UNC GRADE 8	2
19	300169	STRAINER-TANK MOUNTED	1
20		6 JIC - 6MP 90°	1
21	HSP7015-K21	HOSE ASSEMBLY	1
22	HSP7015-10	HOSE ASSEMBLY	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

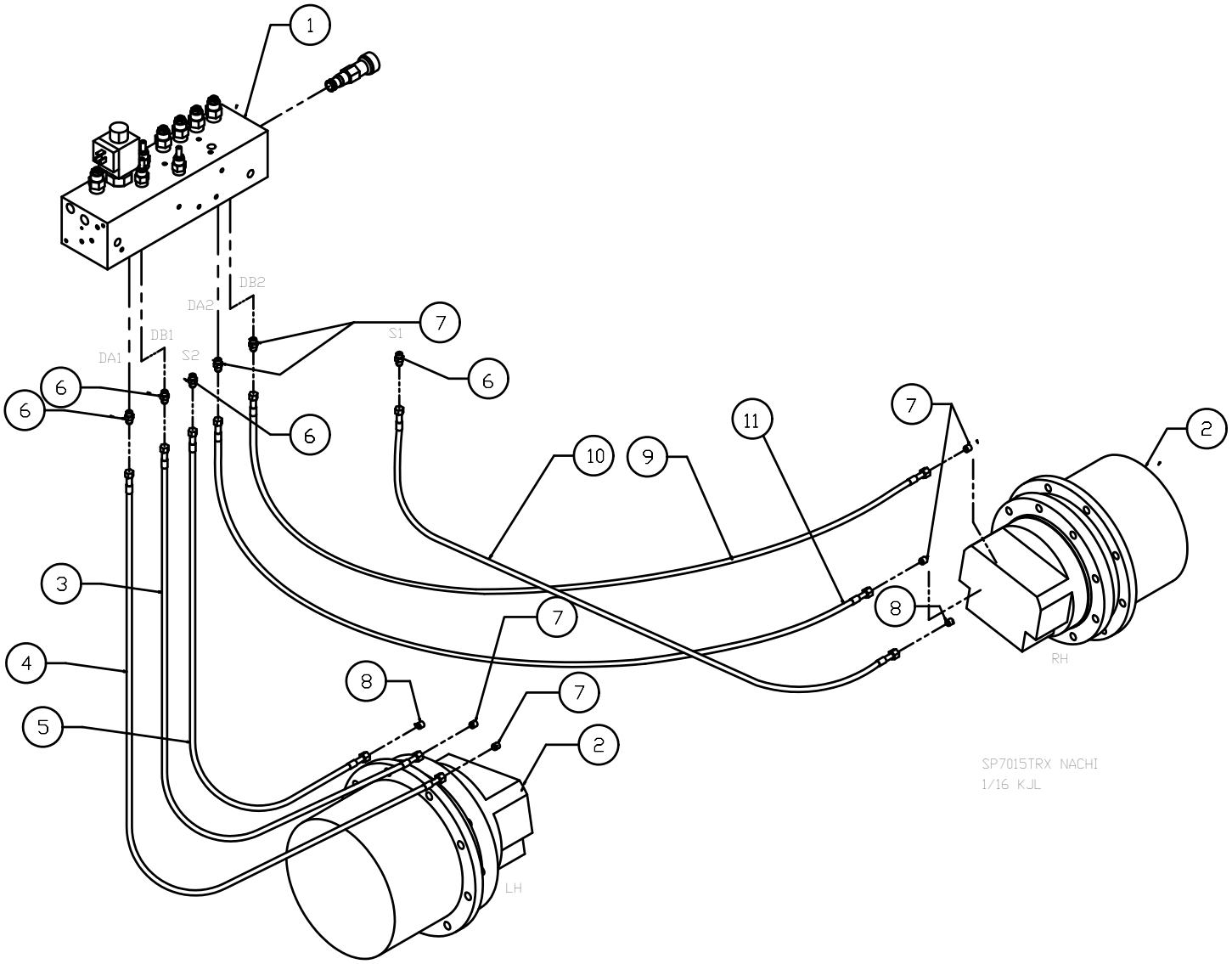
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
HYDRAULIC INLET ASSEMBLY	R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	HF0300134	MANIFOLD	1
2	0300118E	HYDRAULIC TRACTION MOTOR	2
3	HSP7015-26	HOSE ASSEMBLY	1
4	HSP7015-3	HOSE ASSEMBLY	1
5	HSP7015-14	HOSE ASSEMBLY	2
6		6 O-RING - 6 JIC	4
7		10 O-RING - 6 JIC STRAIGHT	6
8		4 O-RING - 6 JIC	2
9	HSP7015-5	HOSE ASSEMBLY	2
10	HSP7015-15	HOSE ASSEMBLY	1
11	HSP7015-4	HOSE ASSEMBLY	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

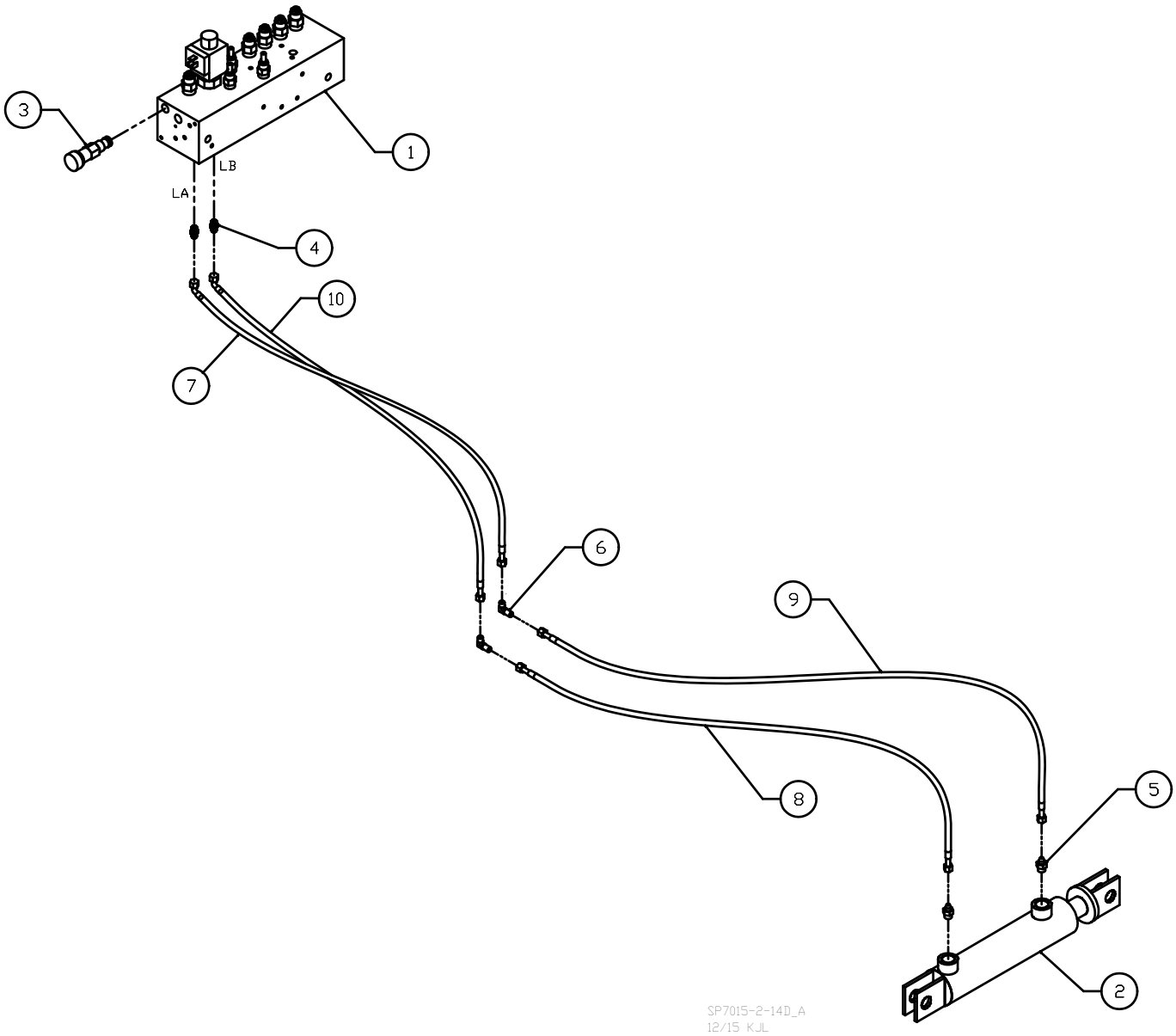
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
TRACK DRIVE ASSEMBLY

ISSUE
R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	HF0300134	MANIFOLD	1
2	0300105F	HYDRAULIC CYLINDER - 3" X 12"	1
3		RELIEF VALVE - LIFT SPEED ADJUDTMENT	1
4		6 O-RING - 6 JIC	2
5		8 O-RING - 6 JIC	2
6	0300256	BULK HEAD - 6 JIC - 6 JIC	2
7	HSP7015-17	HOSE ASSEMBLY	1
8	HSP7015-23	HOSE ASSEMBLY	1
9	HSP7015-22	HOSE ASSEMBLY	1
10	HSP7015-16	HOSE ASSEMBLY	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

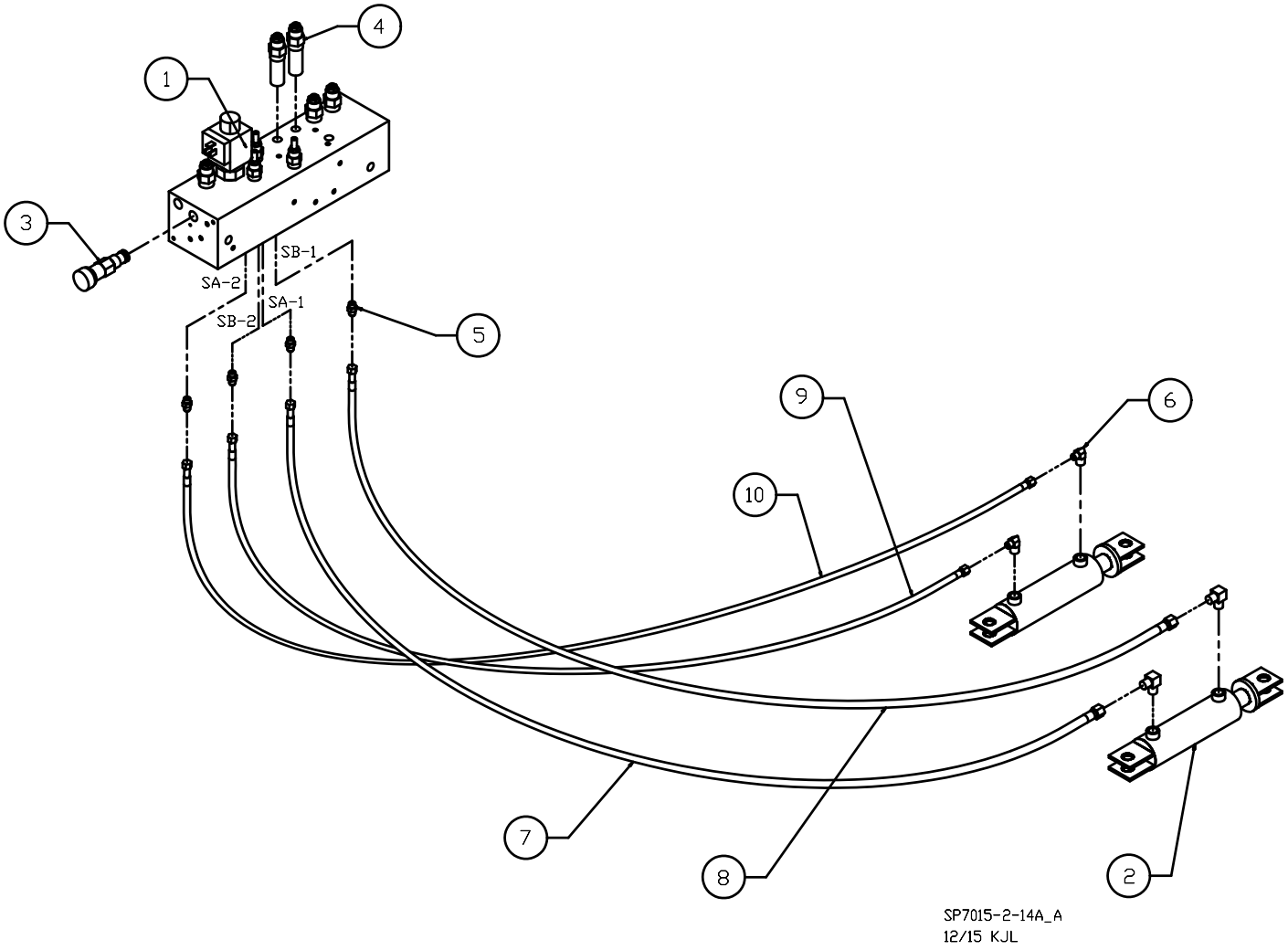
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
HYDRAULIC LIFT ASSEMBLY

ISSUE
R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	HF0300134	MANIFOLD	1
2	0300105C	HYDRAULIC CYLINDER - 3" X 4"	2
3		RELIEF VALVE - SWING SPEED ADJUDTMENT	1
4	0300120A	CARTRIDGE VALVE - LKN	2
5		6 O-RING - 6 JIC	4
6	0300215	8 MP - 6 JIC 90°	4
7	HSP7015-7	HOSE ASSEMBLY	1
8	HSP7015-27	HOSE ASSEMBLY	1
9	HSP7015-8	HOSE ASSEMBLY	1
10	HSP7015-6	HOSE ASSEMBLY	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

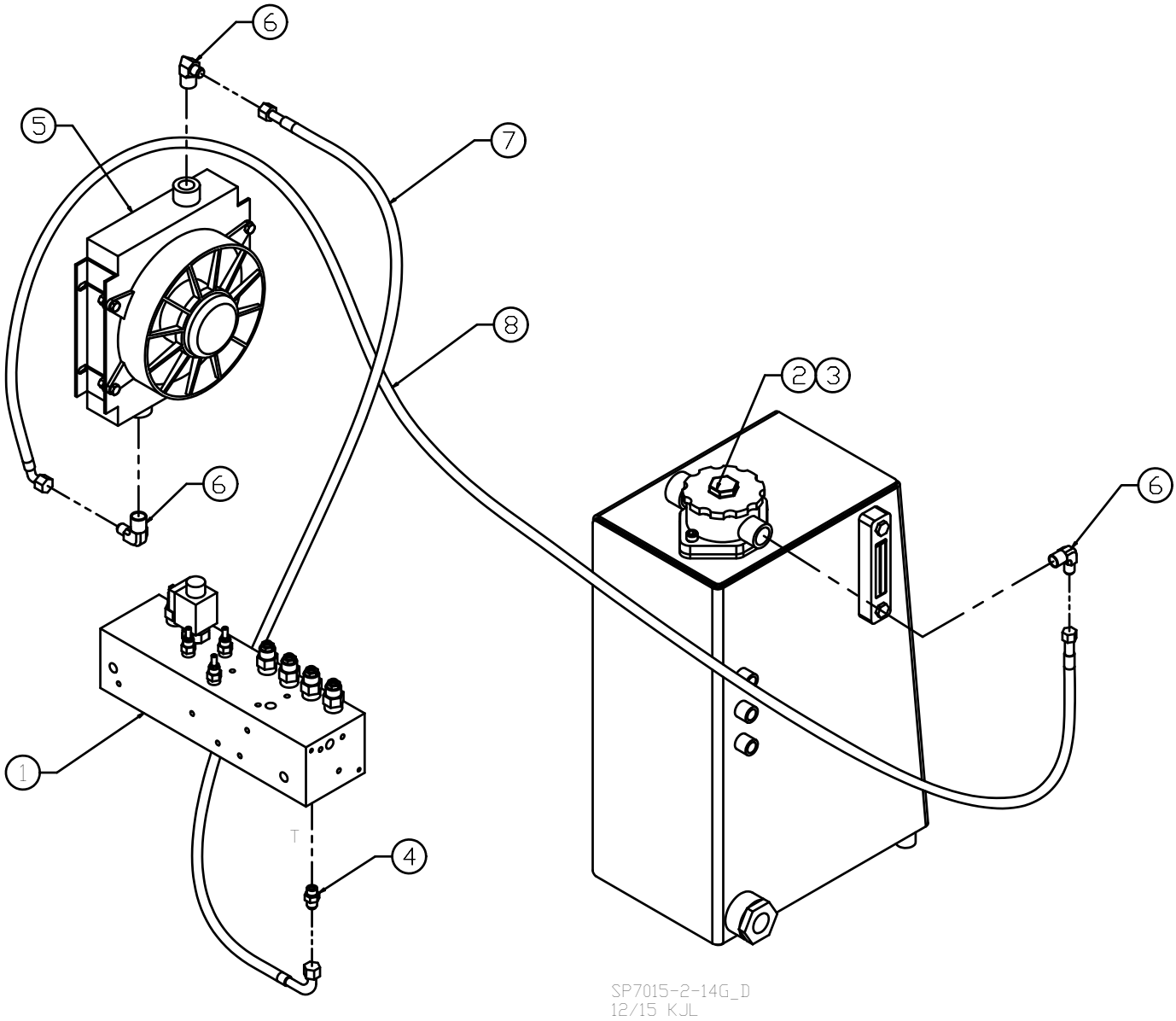
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
HYDRAULIC SWING ASSEMBLY	R2

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	HF0300134	MANIFOLD	1
2	0300135E	HYDRAULIC FILTER HEAD	1
3	0300135F	HYDRAULIC FILTER	1
4		10 O-RING - 10 JIC	1
5	0300165BR1	OIL COOLER	1
6		12 O-RING - 10 JIC 90°	3
7	HSP7015-18	HOSE ASSEMBLY	1
8	HSP7015-19	HOSE ASSEMBLY	1

FUNCTION GROUP
2 VALVE BOX/ENGINE/ELECTRICAL

BUSINESS LINE
STUMPCUTTERS

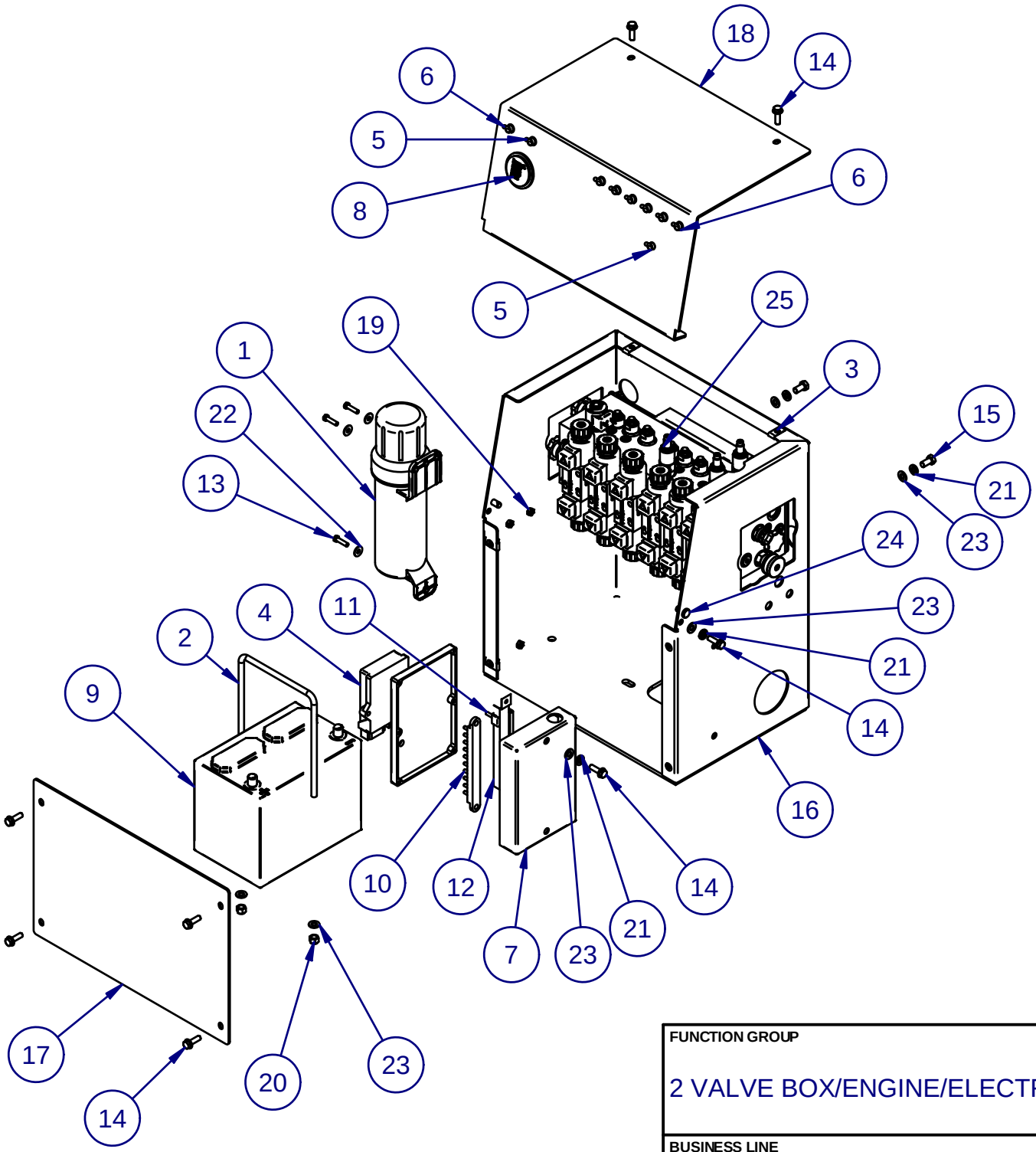
OWNER DOMAIN
J.P. CARLTON COMPANY DIV. DAF INC.

SERIAL NUMBERS

DESCRIPTION
HYDRAULIC RETURN ASSEMBLY

ISSUE
R3

Revised 3.15.05



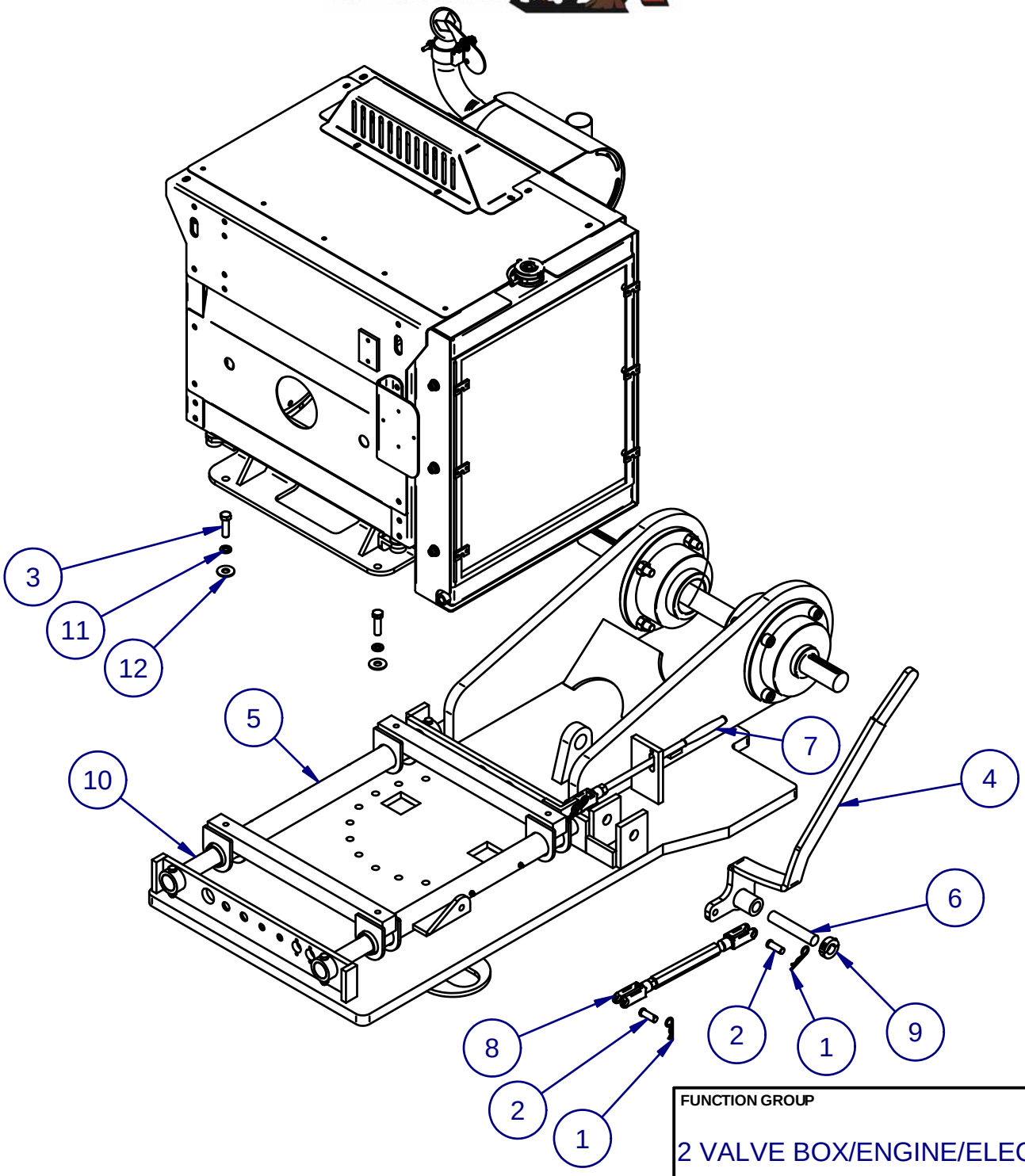
FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	VALVE BOX WITH REMOTE/TRX
ISSUE	R2

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	040060	MANUAL CANISTER,MACHINE MOUNTED	1
2	0150508	BATTERY BRACKET - 3/8x7x8.25	1
3	0150715	5/16 Tinnerman U Nut Retainer	6
4	0350006A	Omnex SP4012 Receiver- 2.4	1
5	03500111A	Switch-INT1-2	2
6	03500111B	Switch - Momentary INT1-7	7
7	0350029C	Junction Box 4-Wheeler 1325-DG	1
8	0350031	Hour Meter - Datcon /Hobbs	1
9	0350032A	BATTERY,12V/950 CCA	1
10	0350084	Terminal Block - 70004	1
11	0350087B	Circuit Breaker - 20 AMP 72325	1
12	0350087E	Circuit Breaker Bracket -72065	1
13	12A-0408	HEX C/S 1/4-20 x 1 UNC GR 8	3
14	12A-0508ZI	SERRATED FLANGE HEX C/S 5/16-18 x 1 UNC GR 5	9
15	12A-0606ZI	HEX C/S 3/8-16 x 3/4" UNC GR 8 ZINC	4
16	17020131	WELDMENT,VALVE BOX,TRX,ANGLED LID	1
17	17020133	PLATE,COVER,BOTTOM,TRX,ANGLED LID	1
18	17020134	PLATE,LID,TRX,ANGLED	1
19	20A-04ZI	NUT,HEX, 1/4-20 UNC GR 5 ZINC	3
20	24D-06	NUT,ELASTIC STOP, 3/8-16 UNC GR8	3
21	30A-06	LOCKWASHER, 3/8" USS GR8	7
22	31A-04	FLAT WASHER, 1/4 USS GRD NARROW 5	3
23	31B-06ZI	FLAT WASHER 3/8 USS GR 8 Z&Y	9
24	51E-0606	PIN,CLEVIS,3/8"x3/4"	2
25	HF0300134	HYDRAFORCE SP7015TRX MANIFOLD	1

FUNCTION GROUP	
2 VALVE BOX/ENGINE/ELECTRICAL	
BUSINESS LINE	
STUMPCUTTERS	
OWNER DOMAIN	
J.P. CARLTON COMPANY DIV. DAF INC.	
SERIAL NUMBERS	
DESCRIPTION	**ISSUE**
VALVE BOX WITH REMOTE/TRX	R2

Revised 3.15.05



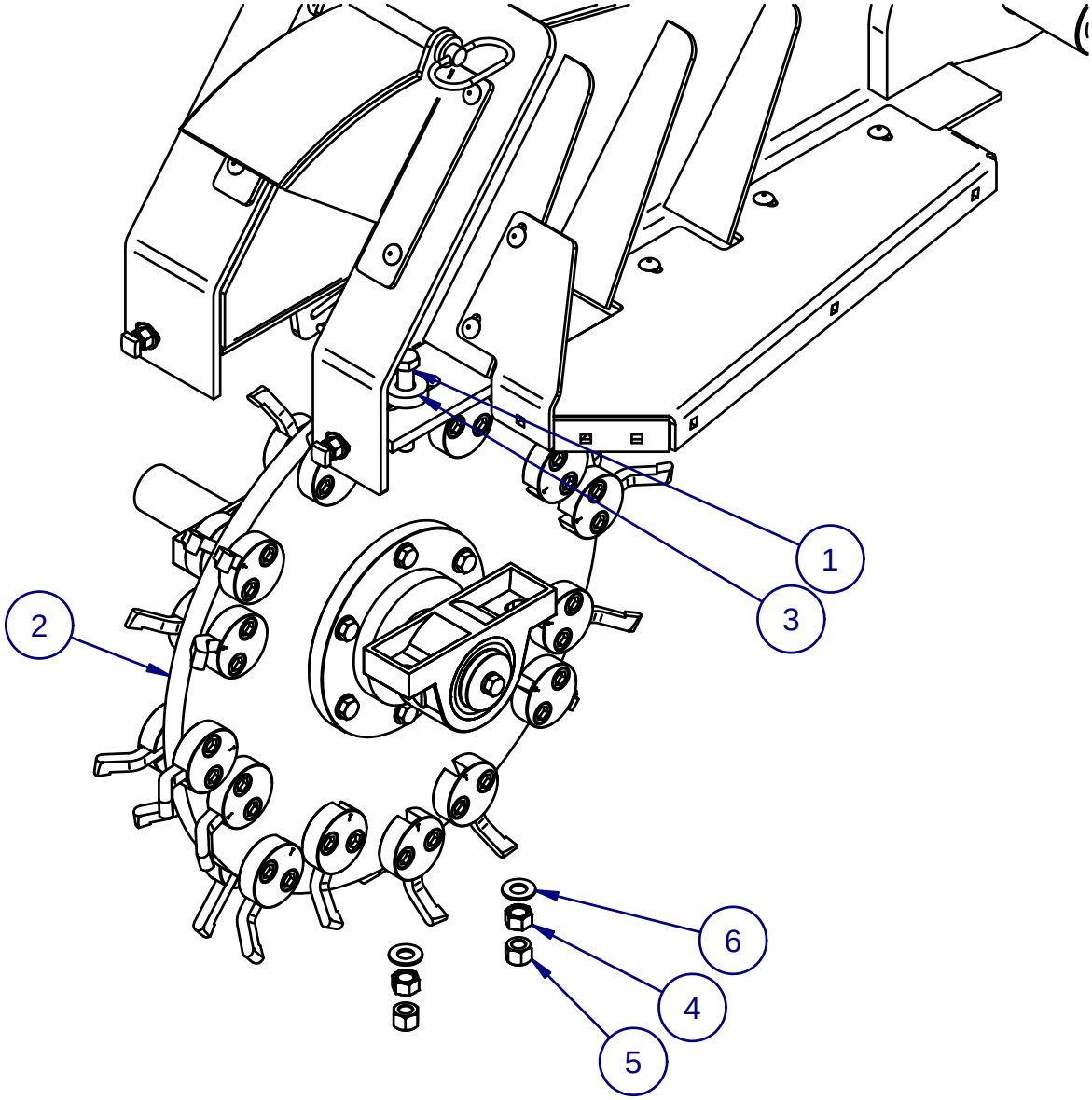
FUNCTION GROUP	2 VALVE BOX/ENGINE/ELECTRICAL
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	ENGINE INSTALLATION
ISSUE	R1

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0150504	HAIRPIN COTTER (HITCHPIN) 1/8	3
2	0150603	PIN,CLEVIS,1/2	3
3	12A-0814	HEX C/S 1/2-13 x 1-3/4 UNC GR 8	4
4	17020008	WELDMENT,KUBOTA ENGINE SLIDE ENGAGEMENT	1
5	17020009	WELDMENT,MOTOR SLIDE,KUBOTA	1
6	17020060	ROUND BAR,ENGAGEMENT HANDLE	1
7	17020077	ASSY,ENGINE SLIDE LOCK	1
8	17020080	ASSY,LINKAGE,ENGAGEMENT HANDLE	1
9	17050002	WELDMENT,TURN TABLE,KUBOTA	1
10	17520010	ROUND BAR,ENGINE SLIDE	2
11	30A-08Z1	LOCK WASHER,1/2" USS GR8 Z&Y	4
12	34B-08	FLAT WASHER 1/2" SAE-W GR8	4

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

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	12A-1032ZI	HEX C/S 5/8-11 x 4 UNC GR 8 Z & Y	4
2	17030001	ASSY,STANDARD CUTTER WHEEL	1
3	17030089	PLATE,WASHER,CW BEARINGS	4
4	20A-10ZI	NUT,HEX,5/8-11 UNC GR 8 Z&Y	4
5	29A-10	NUT,STOVER LOCK, 5/8-11 UNC GR8	4
6	34A-10ZI	FLAT WASHER 5/8 SAE GR8 ZINC	4

FUNCTION GROUP

3 CUTTER WHEEL AND GUARDS

BUSINESS LINE

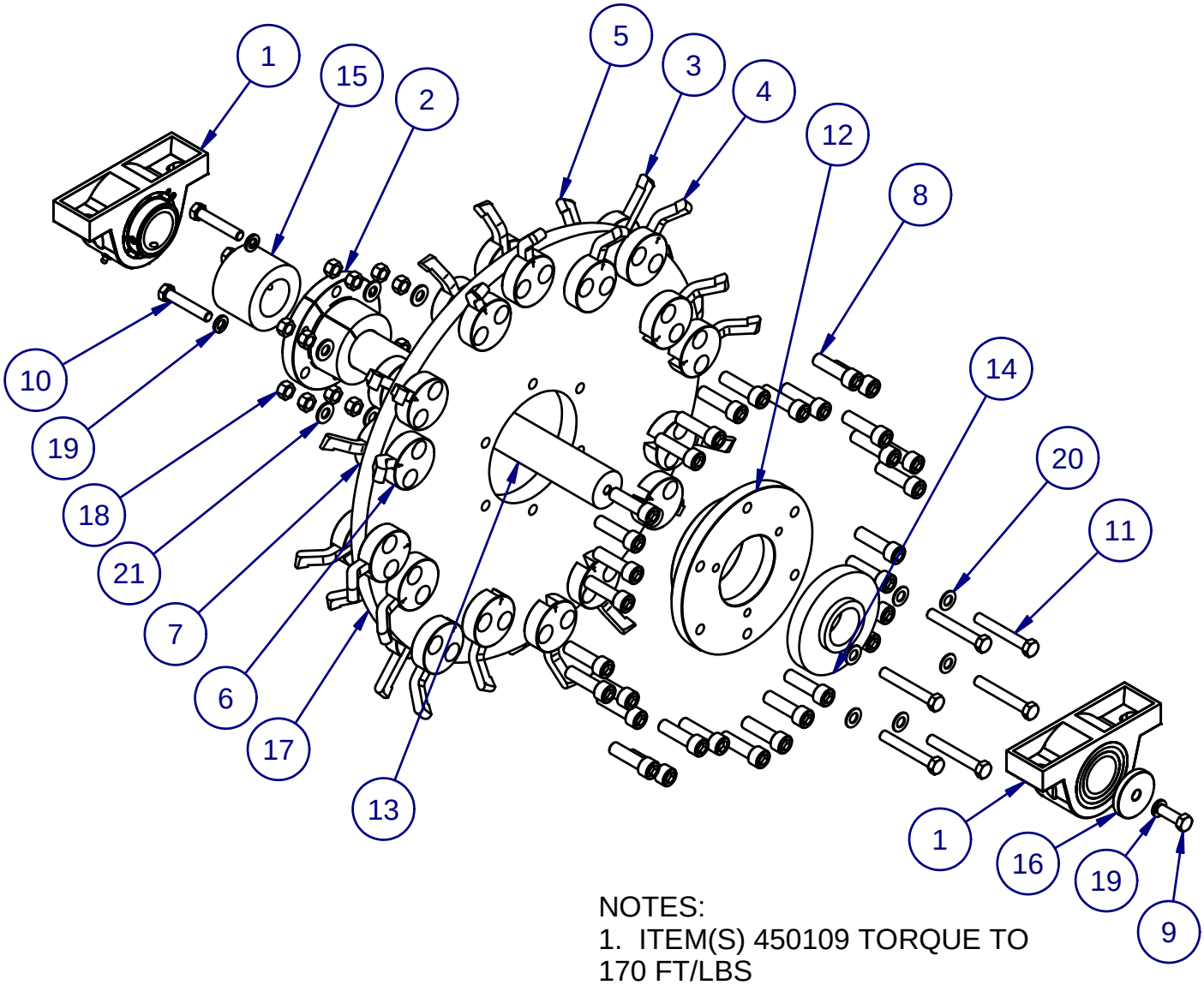
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
INSTALL STANDARD CUTTER WHEEL	R2

Revised 3.15.05



NOTES:
1. ITEM(S) 450109 TORQUE TO 170 FT/LBS
2. ITES(S) 12A-0822ZI 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	DESCRIPTION	QTY
1	0500114	Bearing - 2"	2
2	0250183C	BUSHING,QD INTERCHANGEABLE,E 2"	1
3	0450101	Tooth - Straight	2
4	0450102	TOOTH,CARBIDE TIPPED,45 DEGREE RIGHT	16
5	0450103	TOOTH,CARBIDE TIPPED,45 DEGREE LEFT	14
6	0450106	Round Pocket - C/S	16
7	0450107	Round Pocket - THD	16
8	0450109	Tooth Bolt - 5/8-18 x 2 1/8"	32
9	12A-0812Z1	HEX C/S 1/2-13 x 1-1/2 UNC GR 8 Z&Y	1
10	12A-0822Z1	HEX C/S 1/2-13 x 2 3/4 UNC GR 5	3
11	12A-0828Z1	HEX C/S 1/2-13 x 3 1/2 UNC GR 8	6
12	17030020	HUB,"E" BUSHING CUTTER WHEEL	1
13	17030021	SHAFT,RAZOR WHEEL	1
14	17030022	COLLER,RAZOR WHEEL,LARGE	1
15	17030023	COLLAR,RAZOR WHEEL,SMALL	1
16	17030024	ENDCAP,CUTTER WHEEL SHAFT	1
17	17030026	PLATE, CUTTER WHEEL, 7015	1
18	29A-08	NUT,STOVER LOCK, 1/2-13 UNC GR8	12
19	30A-08Z1	LOCK WASHER,1/2" USS GR8 Z&Y	4
20	31B-08Z1	FLAT WASHER 1/2 USS WIDE GR 8 Z&Y	6
21	34A-08	FLAT WASHER, NARROW 1/2 SAE GR8	6

FUNCTION GROUP
3 CUTTER WHEEL AND GUARDS

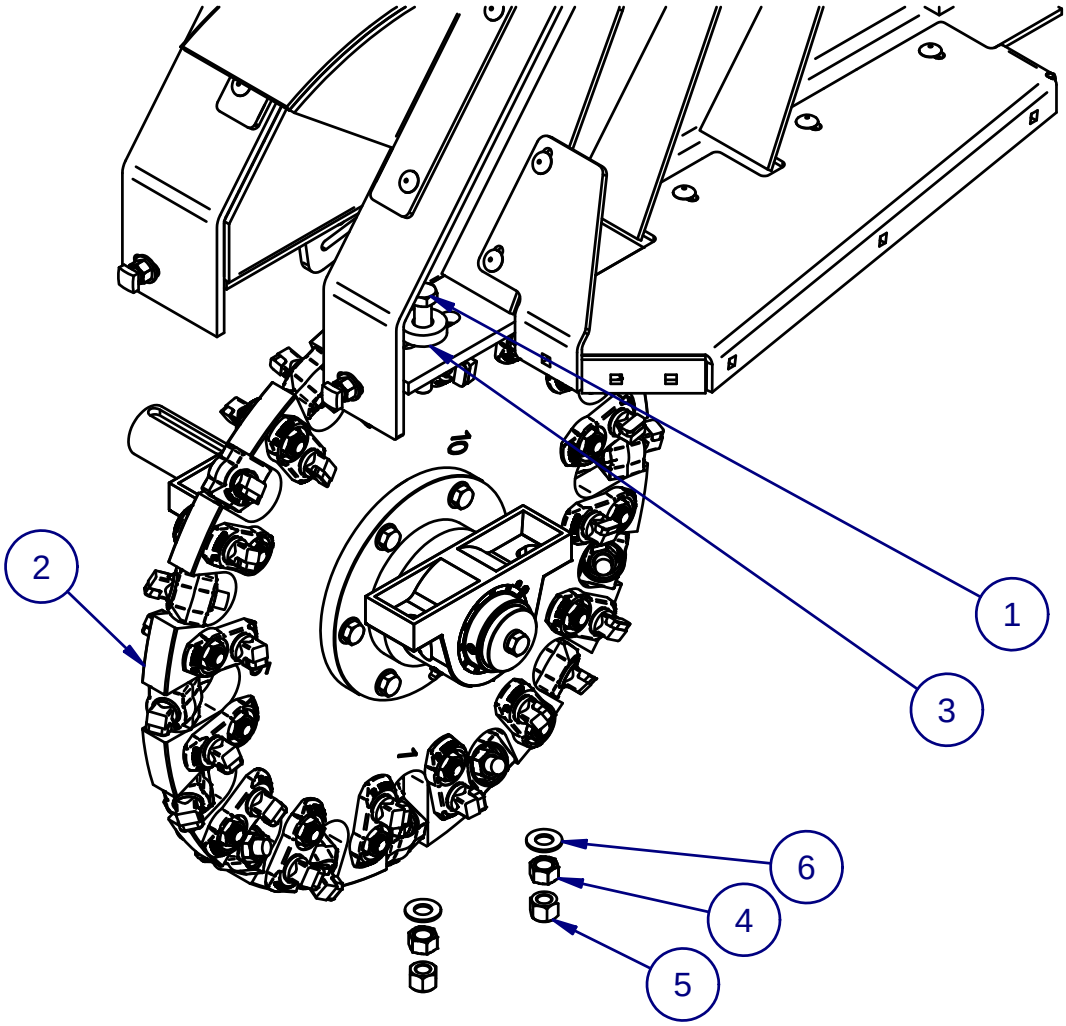
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
STANDARD CUTTER WHEEL	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	12A-1032ZI	HEX C/S 5/8-11 x 4 UNC GR 8 Z & Y	4
2	17030003	ASSY,RAZOR WHEEL,26.5 DIA	1
3	17030089	PLATE,WASHER,CW BEARINGS	4
4	20A-10ZI	NUT,HEX,5/8-11 UNC GR 8 Z&Y	4
5	29A-10	NUT,STOVER LOCK, 5/8-11 UNC GR8	4
6	34A-10ZI	FLAT WASHER 5/8 SAE GR8 ZINC	4

FUNCTION GROUP
3 CUTTER WHEEL AND GUARDS

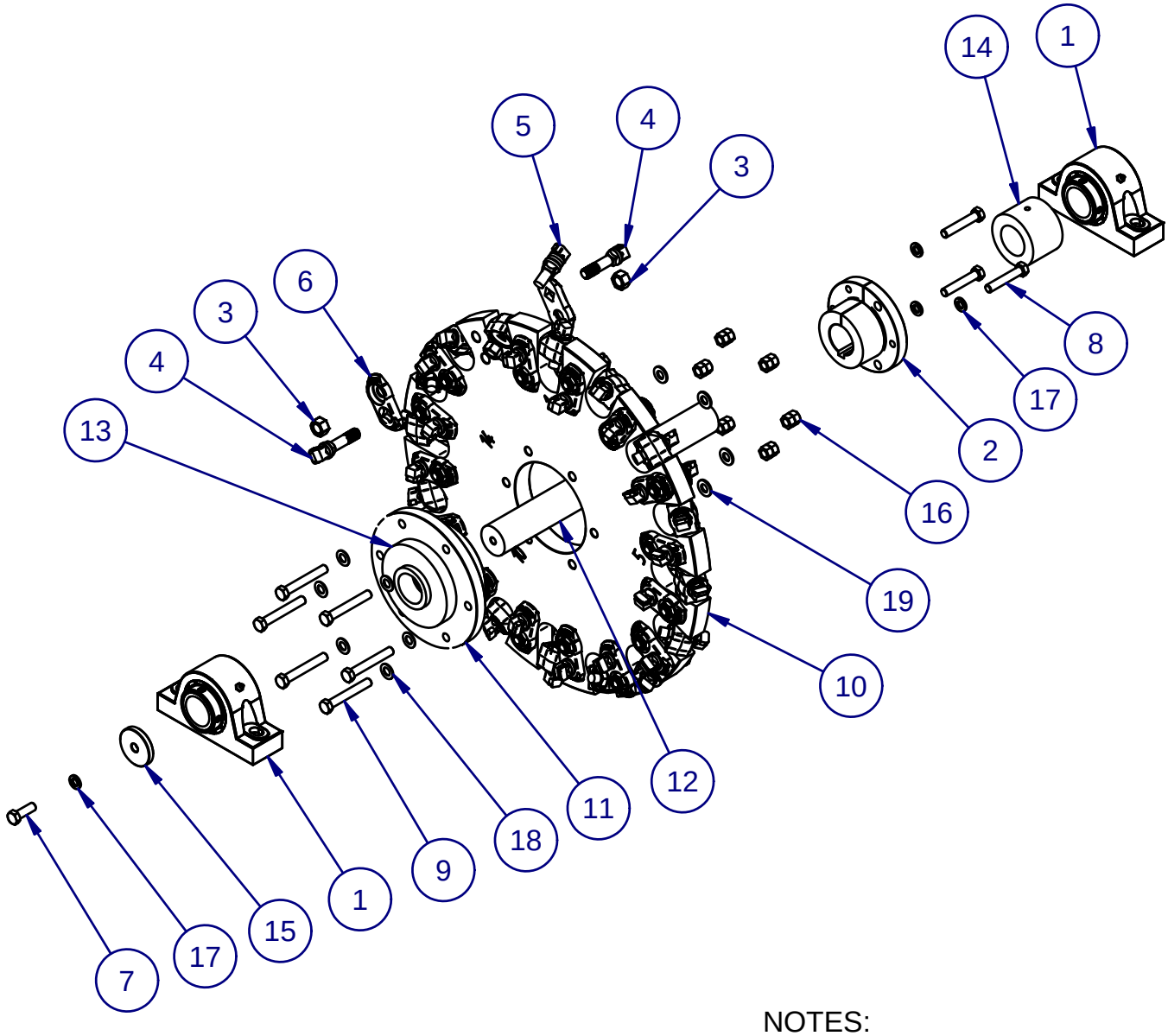
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
INSTALL RAZOR CUTTER WHEEL	R1

Revised 3.15.05



NOTES:
1. ITEM(S) 450126A TORQUE TO 155 FT/LBS

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

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0500114	Bearing - 2"	2
2	0250183C	BUSHING,QD INTERCHANGEABLE,E 2"	1
3	0450126A	NUT,HEX,5/8-18 UNF GR 8 Z&Y	48
4	0450130	JP Sandvik Plow Bolt Tooth	32
5	04501311	JP Sandvik- Short w Long Head	16
6	0450132	JP Sandvik Plow Bolt Holder	32
7	12A-0812ZI	HEX C/S 1/2-13 x 1-1/2 UNC GR 8 Z&Y	1
8	12A-0822ZI	HEX C/S 1/2-13 x 2 3/4 UNC GR 5	3
9	12A-0828ZI	HEX C/S 1/2-13 x 3 1/2 UNC GR 8	6
10	17030004	WELDMENT,RAZOR WHEEL	1
11	17030020	HUB,"E" BUSHING CUTTER WHEEL	1
12	17030021	SHAFT,RAZOR WHEEL	1
13	17030022	COLLER,RAZOR WHEEL,LARGE	1
14	17030023	COLLAR,RAZOR WHEEL,SMALL	1
15	17030024	ENDCAP,CUTTER WHEEL SHAFT	1
16	29A-08	NUT,STOVER LOCK, 1/2-13 UNC GR8	12
17	30A-08ZI	LOCK WASHER,1/2" USS GR8 Z&Y	4
18	31B-08ZI	FLAT WASHER 1/2 USS WIDE GR 8 Z&Y	6
19	34A-08	FLAT WASHER, NARROW 1/2 SAE GR8	6

FUNCTION GROUP

3 CUTTER WHEEL AND GUARDS

BUSINESS LINE

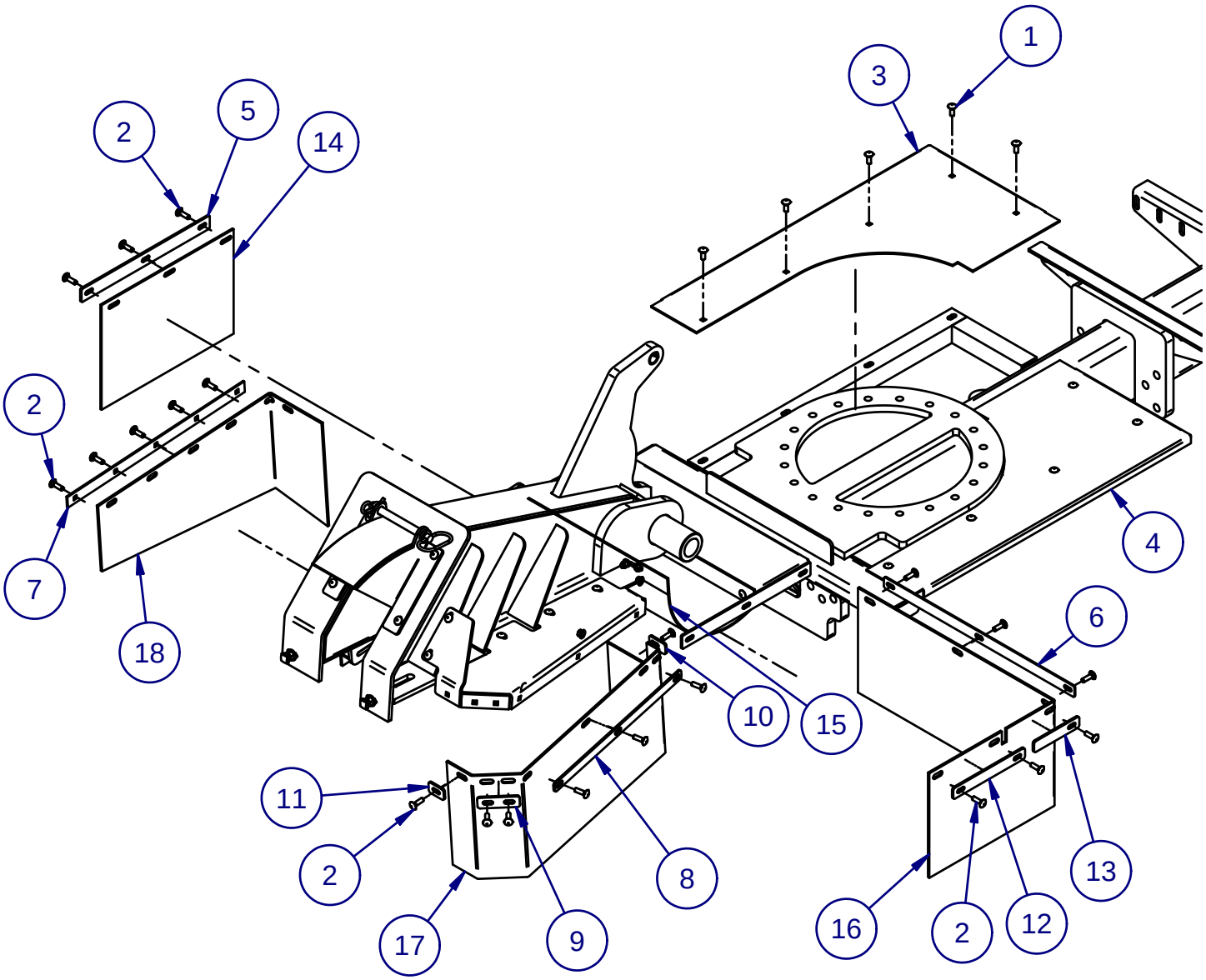
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
RAZOR CUTTER WHEEL	R1

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	**ISSUE**
CHIP GUARD ASSEMBLY/TRX	R1

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	10G-0608	CARRIAGE BOLT 3/8-16 x 1 UNC GR 8	10
2	10G-0610	CARRIAGE BOLT 3/8-16 x 1-1/4 UNC GR 8	28
3	17030063	PLATE,CHIP DECK,LH,TRX	1
4	17030064	PLATE,CHIP DECK,RH,TRX	1
5	17030069	PLATE,MOUNT,SIDE,CHIP GUARD,BOOM/TURNTABLE	1
6	17030070	PLATE,MOUNT,CHIP GUARD,TURNTABLE	1
7	17030074	PLATE,MOUNT,RUBBER GUARD,BOOM	1
8	17040084	PLATE,BOOM CHIP GUARD RUBBER MNT,SIDE	1
9	17040085	PLATE,BOOM CHIP GUARD RUBBER MNT,BACK	1
10	17040086	PLATE,BOOM CHIP GUARD RUBBER MNT,SMALL	1
11	17040089	PLATE,MOUNT,BOOM CHIP GUARD	1
12	17040090	PLATE,MOUNT,BOOM,CHIP GUARD,SIDE	1
13	17040091	PLATE,MOUNT,BOOM,CHIP GUARD,BACK	1
14	4404313_A	BOOM LEFT FRONT CHIP GUARD	1
15	4404317	SKIRT,RUBBER,SP7015 TRX,BOOM,BACK	1
16	4404318	SKIRT,RUBBER,SP7015 TRX,TURNTABLE	1
17	4404319	SKIRT,RUBBER,SP7015 TRX,BOOM,RIGHT SIDE	1
18	4404320	SKIRT,RUBBER,SP7015,POLY CHAIN SIDE	1

FUNCTION GROUP
3 CUTTER WHEEL AND GUARDS

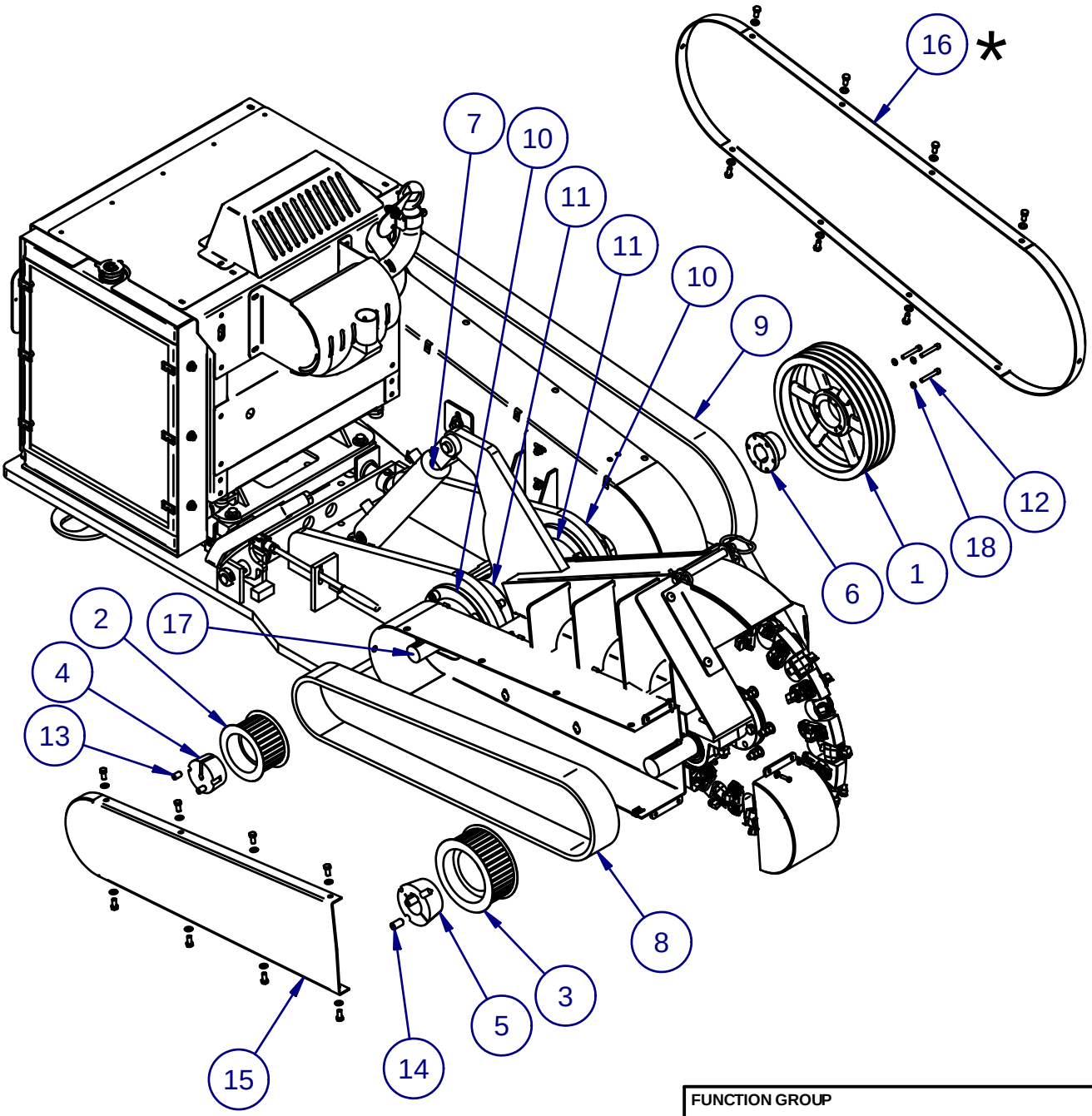
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
CHIP GUARD ASSEMBLY/TRX	R1

Revised 3.15.05



FUNCTION GROUP	4 BOOM ASSEMBLY
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	POLY CHAIN/V-BELT ASSEMBLY
ISSUE	R1

Revised 3.15.05

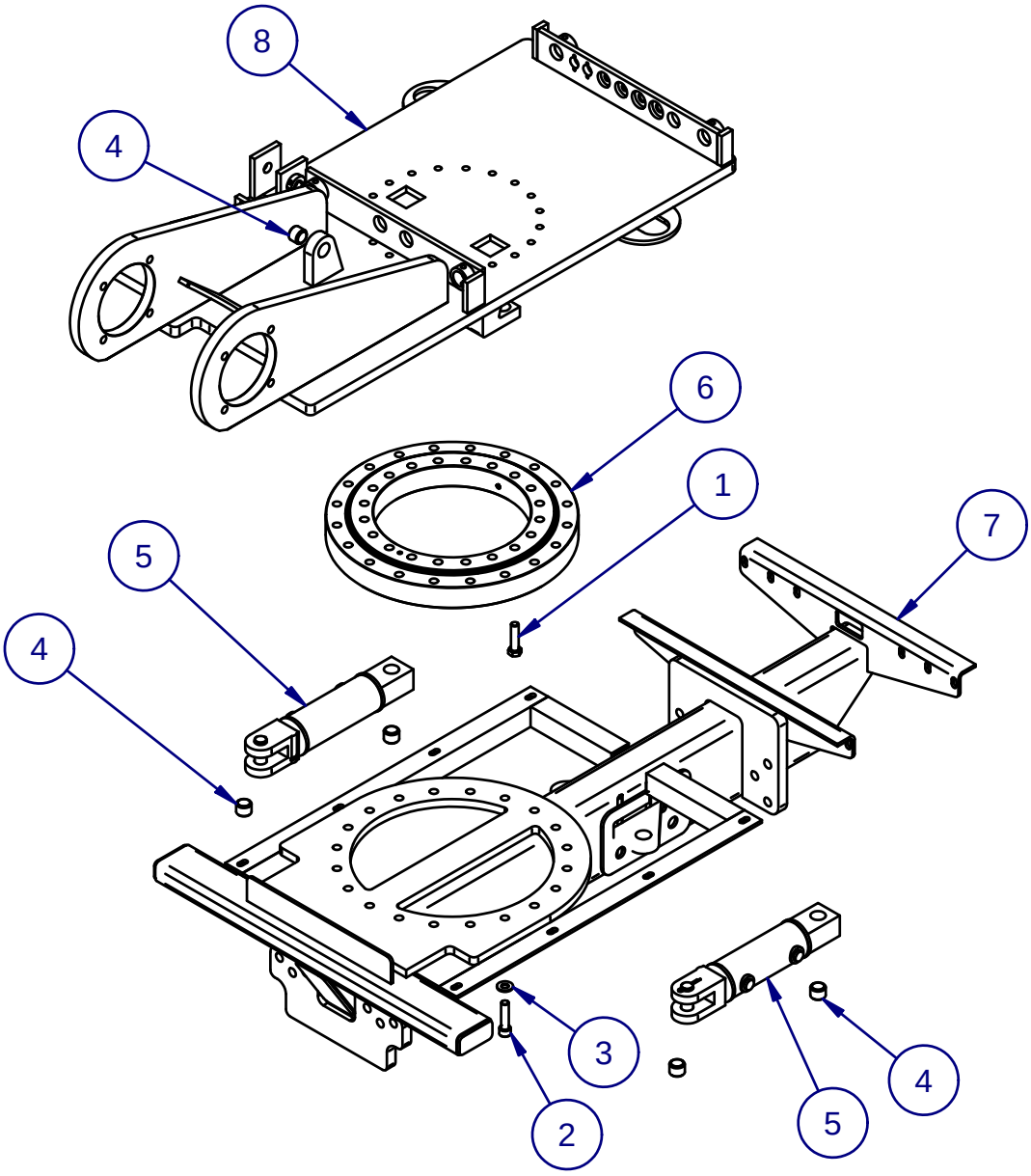
PART	ITEM	DESCRIPTION	QTY
1	0250104	SHEAVE,JACKSHAFT,7015	1
2	0250115B	PC Sprkt 14MX-29S-68Taper Lock	1
3	0250115C	SPROCKET,POLY CHAIN,CUTTER WHEEL	1
4	0250115G	BUSHING,SPROCKET,JACK SHAFT	1
5	0250115M	BUSHING,TAPER LOCK,2"	1
6	0250122	BUSHING,QD INTERCHANGEABLE,SK 1-11/16"	1
7	0300105F	Hydraulic Cylinder - 3x12	1
8	0400123	POLYCHAIN BELT	1
9	0400131	V-BELT,4B105	1
10	0500144	BEARING,JACKSHAFT,1 11/16"	2
11	0500145	BEARING,BOOM,2 15/16"	2
12	12D-0532	SOC HD C/S 5/16-18 X 2 UNC ,GRADE 5	3
13	16E-0814	Hexagon Socket Set Screw, Cup Point, 1/2 - 13 x 0.875	2
14	16E-1020	Hexagon Socket Set Screw, Cup Point, 5/8 - 11 x 1.25	2
15	17030007	ASSY,POLY CHAIN GUARD,KUBOTA	1
*16	17030041	ASSEMBLY,MOTOR GUARD,KUBOTA	1
17	17040022	SHAFT,JACK SHAFT 1-11/16	1
18	30A-05	LOCKWASHER 5/16" USS GR8	3

NOTE:
IF MACHINE IS EQUIPPED WITH A KOHLER ENGINE;

- ITEM #16 WILL BE - 17030042

FUNCTION GROUP	4 BOOM ASSEMBLY
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	POLY CHAIN/V-BELT ASSEMBLY
ISSUE	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0150125	HEX C/S 5/8-11 x 2 1/2 UNC GR 8	20
2	0150156	5/8-11 X 2 1/2 SHCS	18
3	0150305	FLAT WASHER 5/8 SAE GR8 ZINC	18
4	0150801	BUSHING,HARDENED SPRING	5
5	0300105C	LIFT CYLINDER	2
6	0500125	Turntable Bearing - 3500-4 7015	1
7	17010020	WELDMENT,FRAME,TRX,W/ BLADE	1
8	17050002	WELDMENT,TURN TABLE,KUBOTA	1

FUNCTION GROUP
5 TURNTABLE

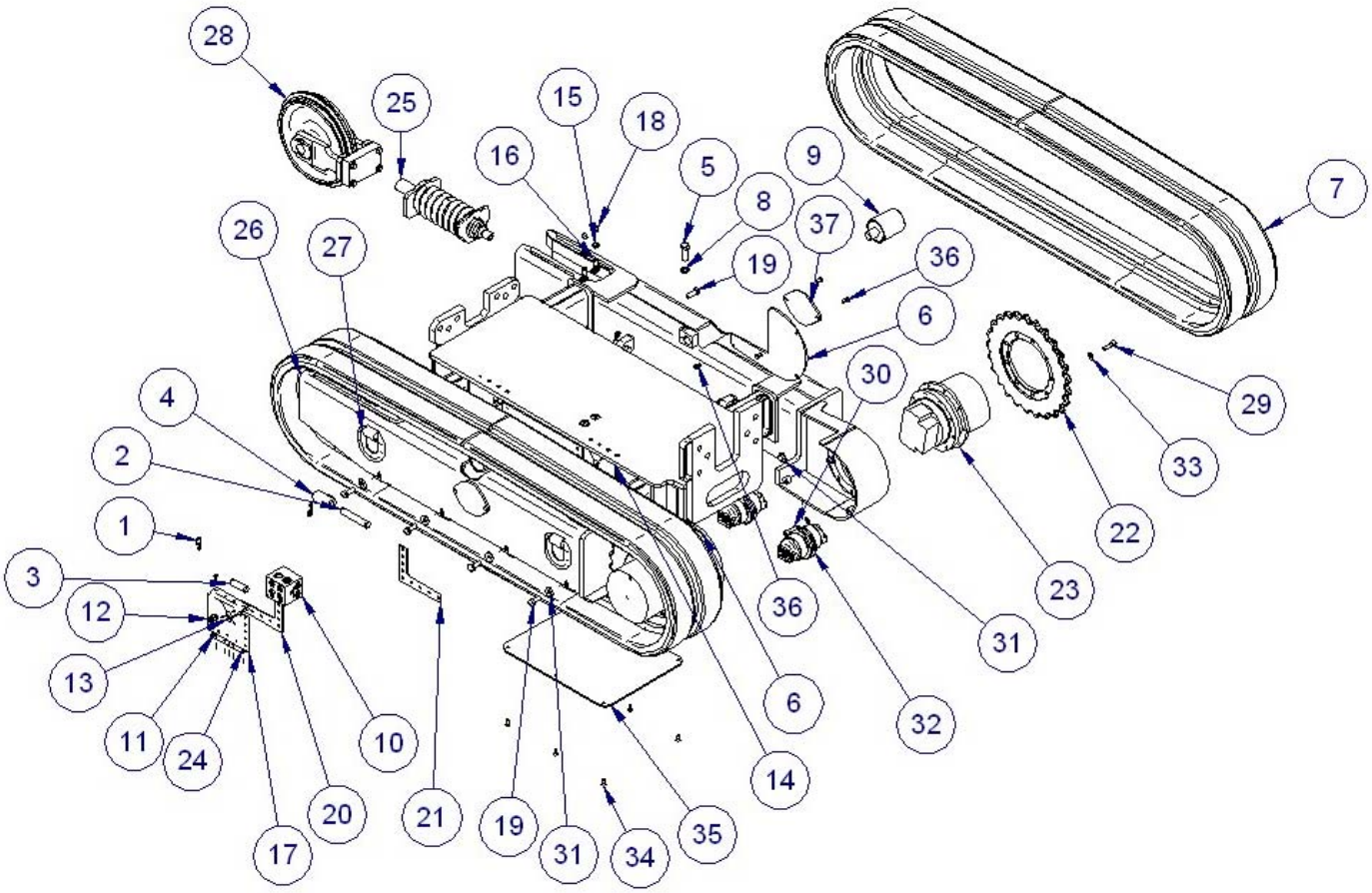
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
TURNTABLE ASSEMBLY/TRX	R1

Revised 3.15.05



FUNCTION GROUP	6 UNDERCARRIAGE
BUSINESS LINE	STUMPCUTTERS
OWNER DOMAIN	J.P. CARLTON COMPANY DIV. DAF INC.
SERIAL NUMBERS	
DESCRIPTION	TRACK ASSEMBLY
ISSUE	R1

Revised 3.15.05

PART	ITEM	DESCRIPTION	QTY
1	0400244B1	PIN,CLEVIS-PINS	8
2	0400244B2	PIN,CYLINDER-CYL. ENDS	4
3	0400244B3	PIN,CYLINDER-ROD ENDS	4
4	0400244B	CYLINDER,HYDRAULIC	4
5		BOLT,M16_50	2
6		PLATE,COVER (FINAL DRIVE)	2
7	0400244A	TRACK GROUP 42 LINKS W 230 WIDTH	2
8		WASHER (16) (C. ROLLER)	2
9	0400244C	ROLLER,CARRIER (B01)	2
10		VALVE,PROPORTIONING	1
11		SCREW BUTTON HD (1/4"-20UNC) (SHIELDS)	52
12		FITTING,VSLVE-37DEG JIC	1
13		BOLT,HEX HD (1/4"-20 UNC X 3.25)	2
14		SHIELD,RUBBER	2
15		NUT,FITTING-BULKHEAD	2
16		FITTING-BULKHEAD 45DEG-37DEG JIC	2
17		DIRT SHIELD	2
18		CAR PLUG FOR 9/16" FITTING	2
19		BOLT,M14 35	16
20		PLATE,ASSY BACKING L SHAPED	2
21		PLATE,ASSY BACKING L SHAPED	2
22	0400244D	SPROCKET,(801) I=25	2
23	400241	FINAL DRIVE,PHV3B-35B-P-8480A	2
24		PLATE,ASSEMBLY BACKING	4
25	0400244E	SPRING ASSEMBLY,COMPLETE (B01)	2
26		CARBODY & SIDEFRAME AY & MTG PLATES	1
27		LIFTING RING	4
28		IDLER ASSEMBLY COMPLETE (B01)	2
29		BOLT,SCKT HD CAP (M12X1.75X35) (SPROCKET)	4
30		BOLT,SCKT HD CAP (M12X1.75X40) (FINAL DRIVE)	4
31		WASHER (15) (T. ROLLER)	16
32	0400244G	ROLLER ASSEMBLY-TRACK	8
33		WASHER (13) (FINAL DRIVE; SPROCKET)	8
34		SCREW SCHCS. (M8X1.25X20) (COVER ACCESS)	6
35		PLATE,COVER-ACCESS (CARBODY)	1
36		BOLT,HEX HD (M8X16) (COVER ADJUSTMENT,FINAL DRIVE	10
37		PLATE,COVER- (ADJUSTMENT)	2

FUNCTION GROUP

6 UNDERCARRIAGE

BUSINESS LINE

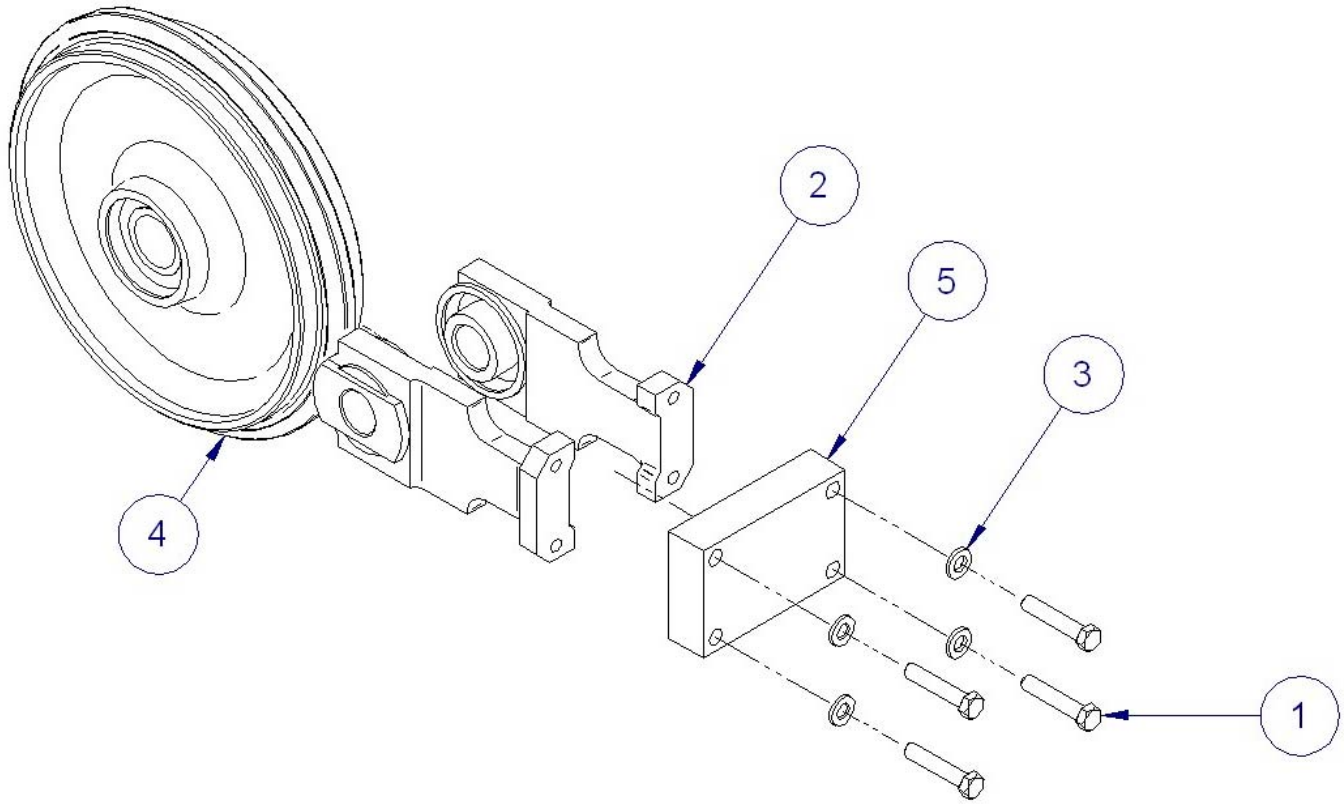
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	**ISSUE**
TRACK ASSEMBLY	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1		BOLT,M12X60	4
2	0400244F2	BRACKET,LARGE IDLER	1
3		WASHER, M12	4
4	0400244F1	IDLER,LARGE	1
5	0400244F3	BRACKET,CENTER,LARGE IDLER	1

FUNCTION GROUP
6 UNDERCARRIAGE

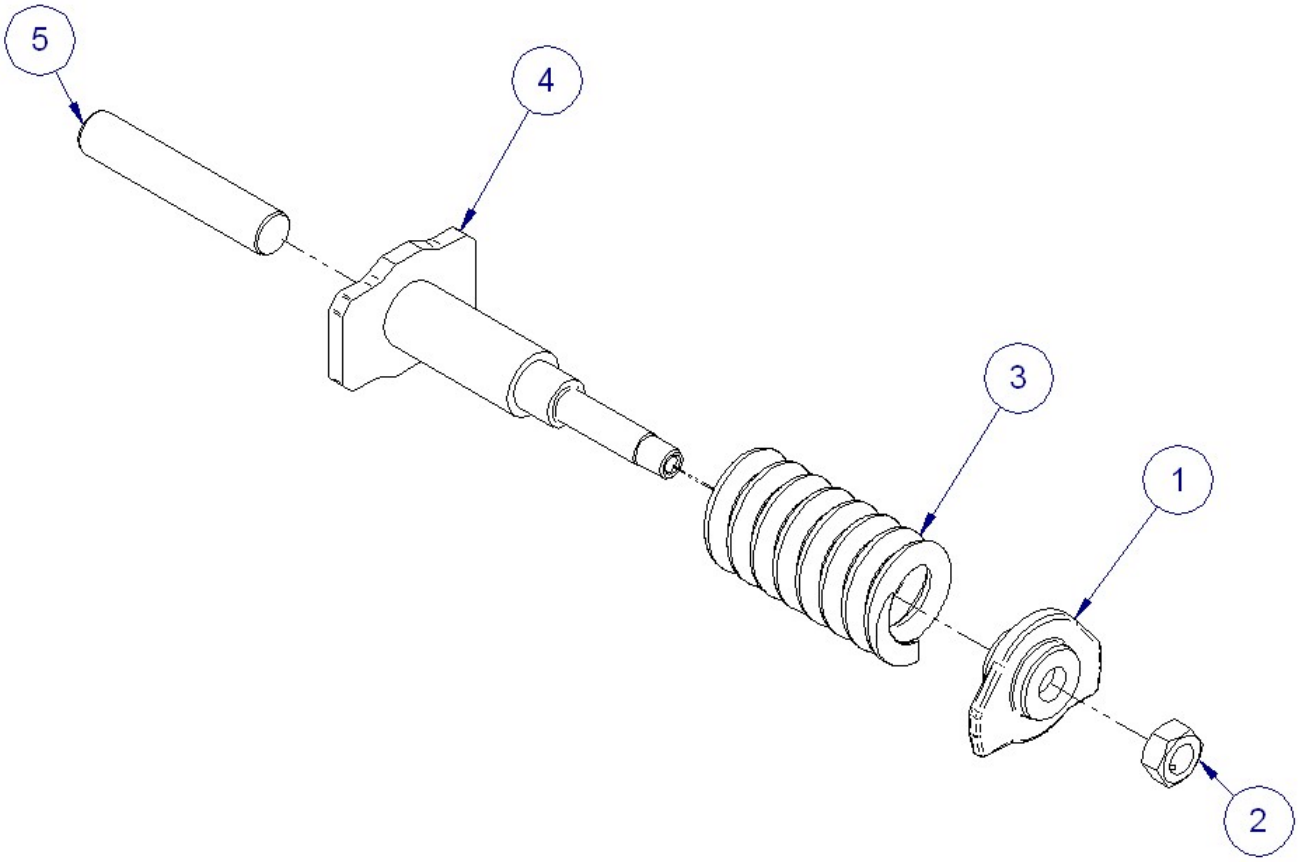
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
TRACK/IDLER ASSEMBLY	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	0400244E1	BRACKET,SPRING	1
2		NUT	1
3	0400244E2	SPRING	1
4	0400244E3	WELDMENT,SPRING BRACKET	1
5	0400244E4	ROD,SPRING	1

FUNCTION GROUP
6 UNDERCARRIAGE

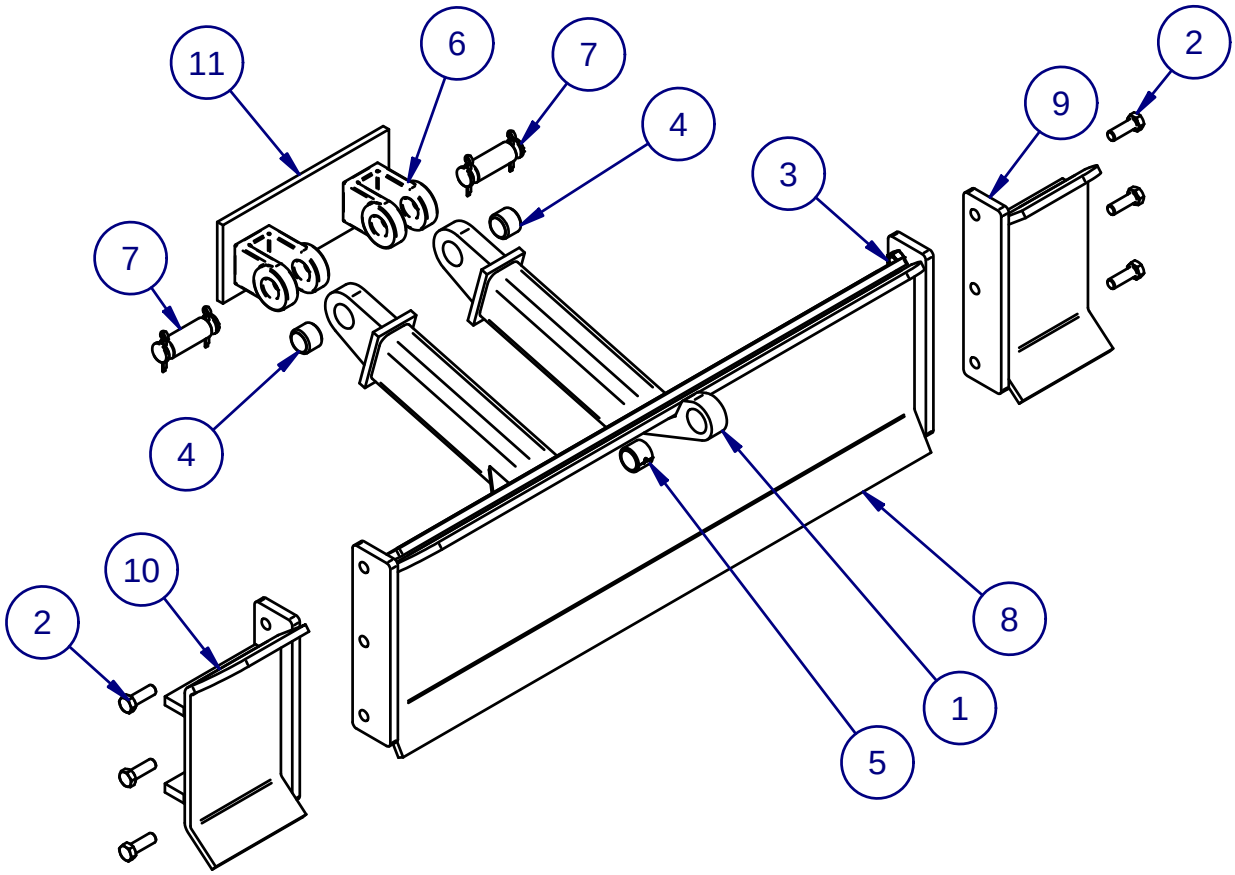
BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
SPRING ADJUSTMENT ASSEMBLY	R1

Revised 3.15.05



PART	ITEM	DESCRIPTION	QTY
1	17070024	PLATE,LIFT EAR,SCRAPE BLADE,SHORT	1
2	0150106A	HEX C/S 1/2-13 x 1-1/2 UNC GR 8	6
3	0150205	NUT,HEX,1/2-13 UNC GR8	6
4	0150801	BUSHING,HARDENED SPRING	2
5	0150801	BUSHING,HARDENED,1"	1
6	0300105F1	CLEVIS END	2
7	0300110M	ASSY,PIN,SCRAPE BLADE,7015,TRX	2
8	17070002	WELDMENT,SCRAPE BLADE,TRX	1
9	17070003	WELDMENT,BLADE EXTENSION,LH	1
10	17070004	WELDMENT,BLADE EXTENSION,RH	1
11	17070028	FLATBAR,SCRAPE BLADE MOUNT/FRAME	1

FUNCTION GROUP
7 OPTIONS

BUSINESS LINE
STUMPCUTTERS

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

SERIAL NUMBERS

DESCRIPTION	ISSUE
SCRAPE BLADE / TRX	R1

Revised 3.15.05

BLANK SHEET

OMNEX
TRUSTED WIRELESS

JP Carlton
SP8018TRX
SP7015TRX

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

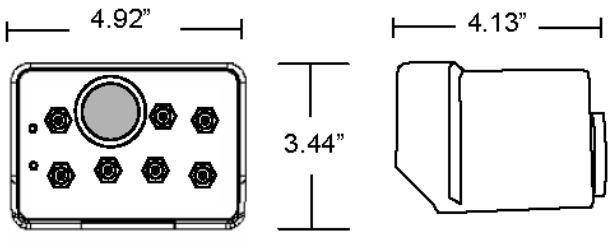
- FCC, ISC, CE approved
- License free
- 1200 foot range @ 900 MHz (900 ft. @ 2.4 GHz)
- Hand held / weatherproof / ergonomic
- Simple "wire-and-use" installation
- Resilient to impact and shock
- Available in both 900 MHz and 2.4 GHz
- Available with E-Stop for ensured operator safety
- Factory configurable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

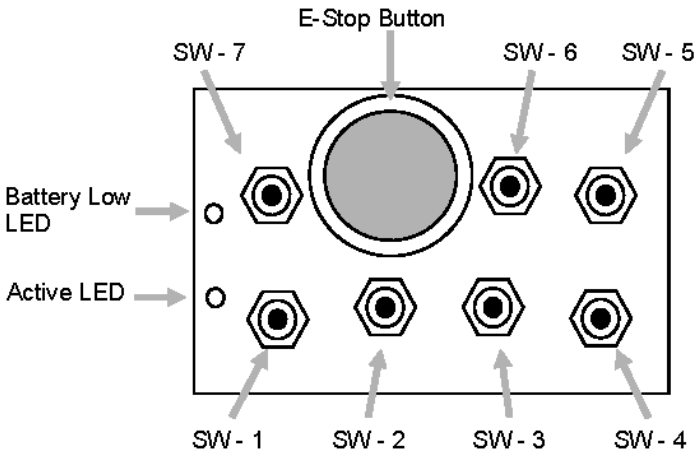
R161 Receiver

NOTE: *SP8018TRX Transmitter Shown.*

T151 Transmitter

T151 Dimensions and Controls

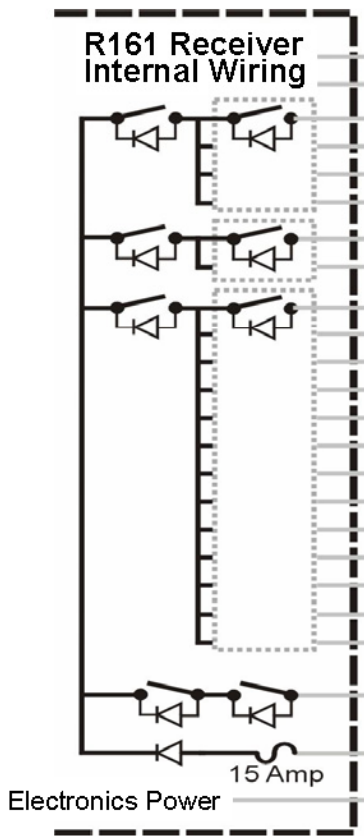




Installing the Receiver

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



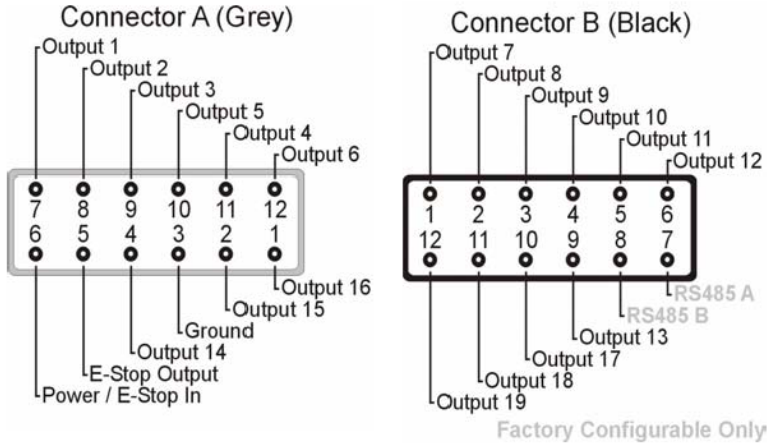
Pin-Output	Wire Colors	Functions
B7		Factory Configurable Only
B8		Factory Configurable Only
B12 - 19	Black/Red	Spare Input/Output
B11 - 18	White/Black	Spare Input/Output
B10 - 17	Blue/White	Spare Input/Output
A1 - 16	Blue/Black	Spare Input/Output
A2 - 15	Black/White	Spare Input/Output
A4 - 14	Green/Black	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

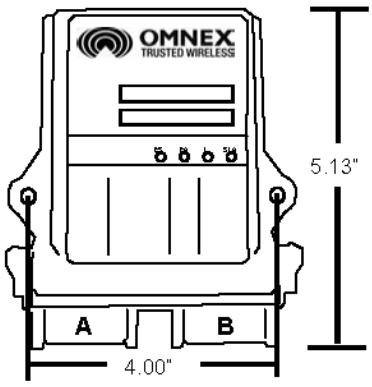
Inputs: All output pins can be factory configured as inputs.

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

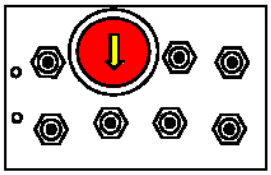
NOTE: *For operation at temperatures below –10° C to –40° C, lithium batteries are recommended. Low temperatures reduce battery performance for both alkaline and lithium types. Refer to the battery manufacturer's specifications for detailed information on low temperature performance.*

2. Turn on the Transmitter

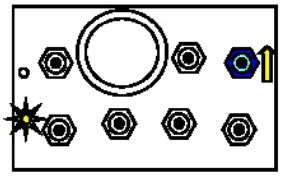
Refer to the **Light Legend** below for diagram details.

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.**

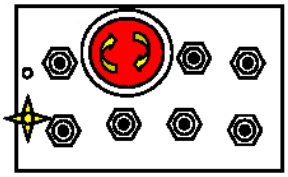
1. Press [E-Stop]



2. Press any switch



3. Twist Clockwise & Release [E-Stop]



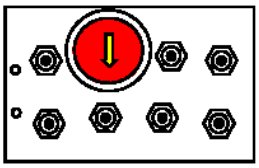
If the transmitter's (Active) light does not flash, check the battery orientation.

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

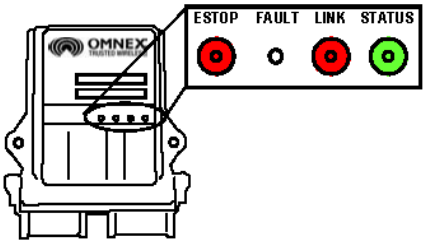
Test the Transmitter / Receiver Link

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

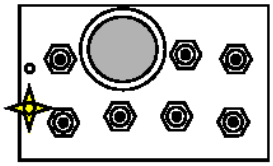
1. Press [E-Stop]

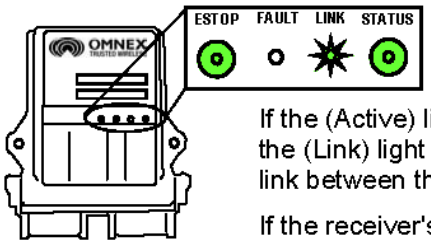


2. Power the R161



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)

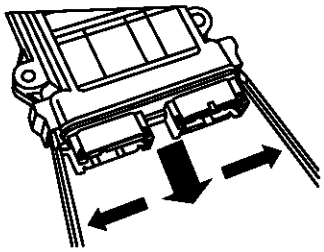
Follow these steps to download the transmitter's unique ID Code into the receiver. This will allow the receiver to establish a radio link with a specific transmitter or up to four transmitters (used individually). When downloading the first transmitters ID use step 4.1. and not 4.2.; for the remaining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

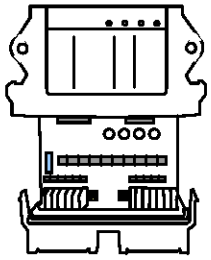
NOTE: *It is necessary to download the ID Code when replacing either the transmitter or the receiver.*

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.



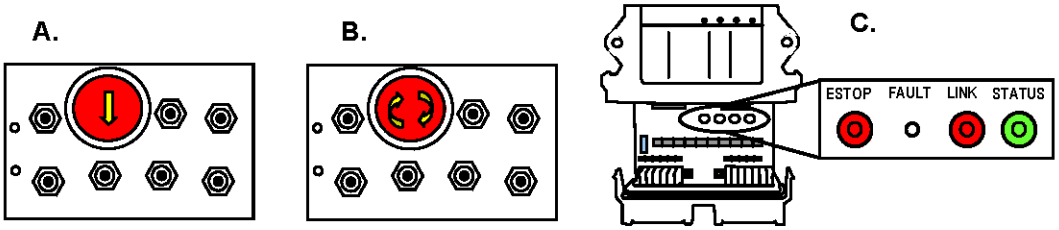


2. Prepare T151, Power R161

A. Press [E-Stop]

B. Twist clockwise & release [E-Stop]

C. Supply power to the receiver



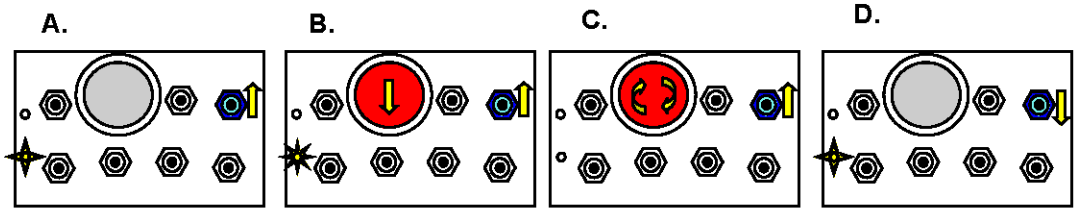
3. Power T151 into Configuration Mode

A. Hold [SW-5] switch UP

B. Press [E-Stop]

C. Twist clockwise & release [E-Stop]

D. Release [SW-5] Switch



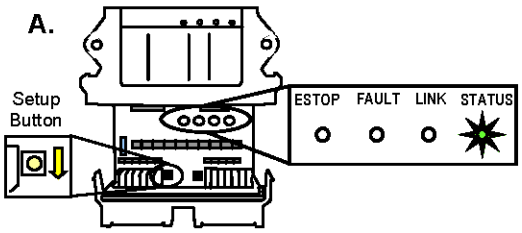
Light Legend	Solid	Slow Flash	Fast Flash	Red Light	Green Light	Yellow Light	Alternating Red & Green Light

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.*

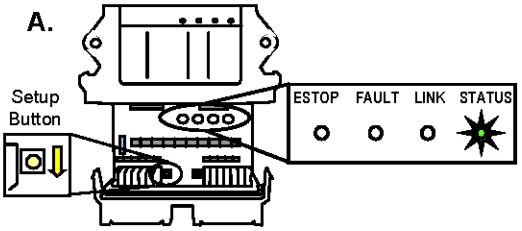
NOTE 2: *If left idle in Setup Mode for over 30 seconds, the receiver will time out. The (Link) light and (Status) light will flash RED rapidly. To return to Setup Mode, repeat step 4.*

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



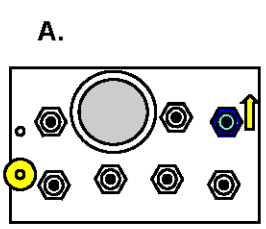
NOTE 1: *The Receiver will hold up to 4 Transmitter ID's. When the 5th Transmitter ID is downloaded, it's ID will replace the ID of the least recently used transmitter (i.e. The receiver will retain the ID's of the three transmitters that have been most recently linked).*

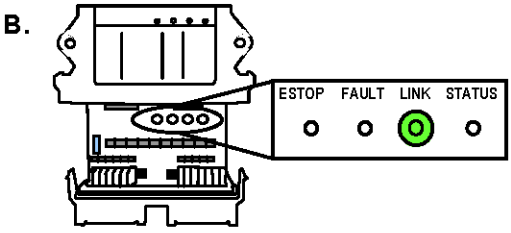
NOTE 2: *If left idle in Setup Mode for over 30 seconds, the receiver will time out. The (Link) light and (Status) light will flash RED rapidly. To return to Setup Mode, repeat step 4.*

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





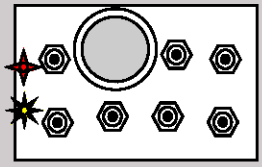
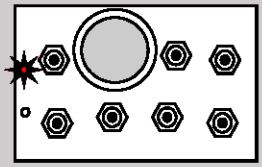
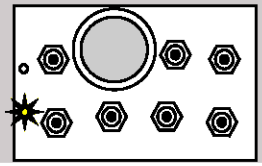
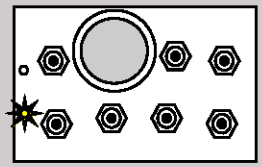
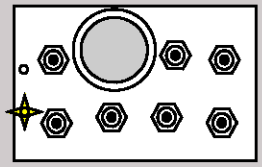
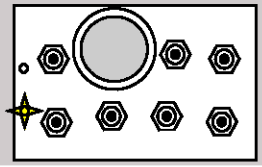
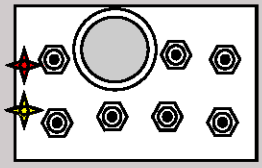
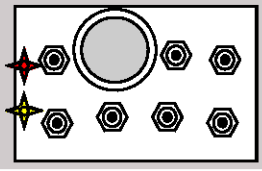
NOTE: *When replacing the receiver cover, ensure the cover snaps completely into place to create a weather proof seal around the base of the receiver.*

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

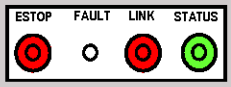
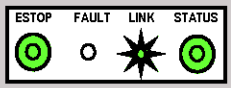
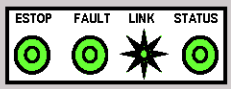
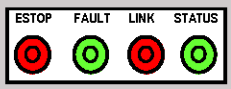
Diagnostics—T151 Transmitter

	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

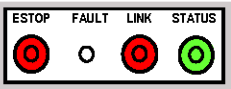
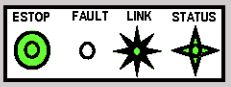
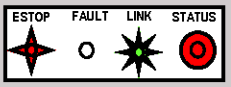
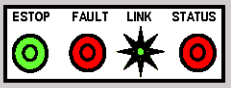
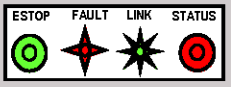
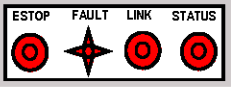
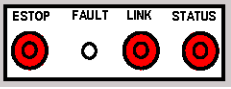
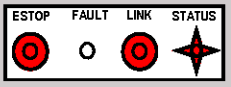
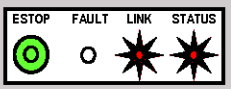
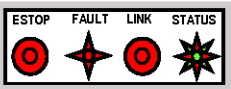
Diagnostics - R161 Receiver

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.

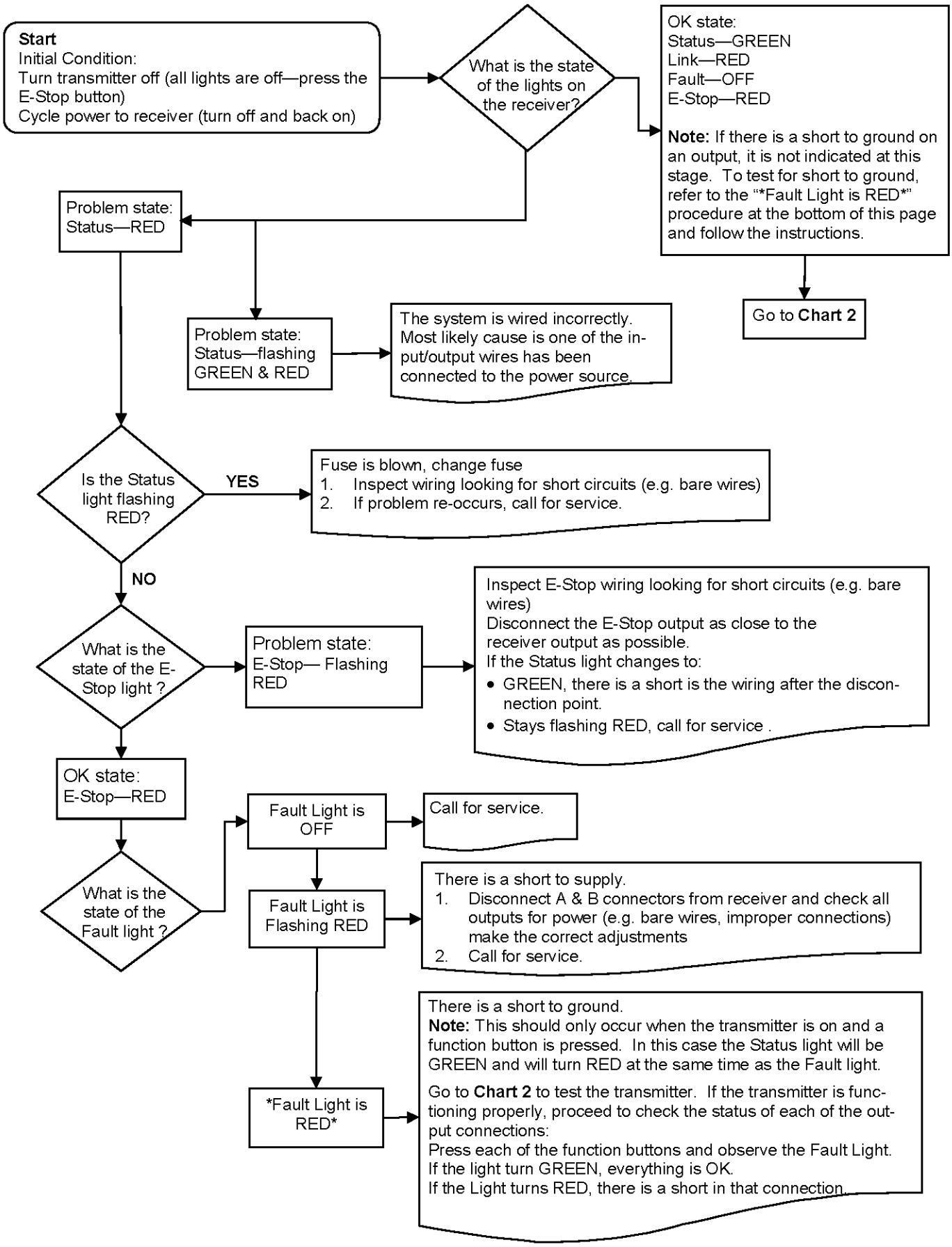
Trouble Indicators

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.*

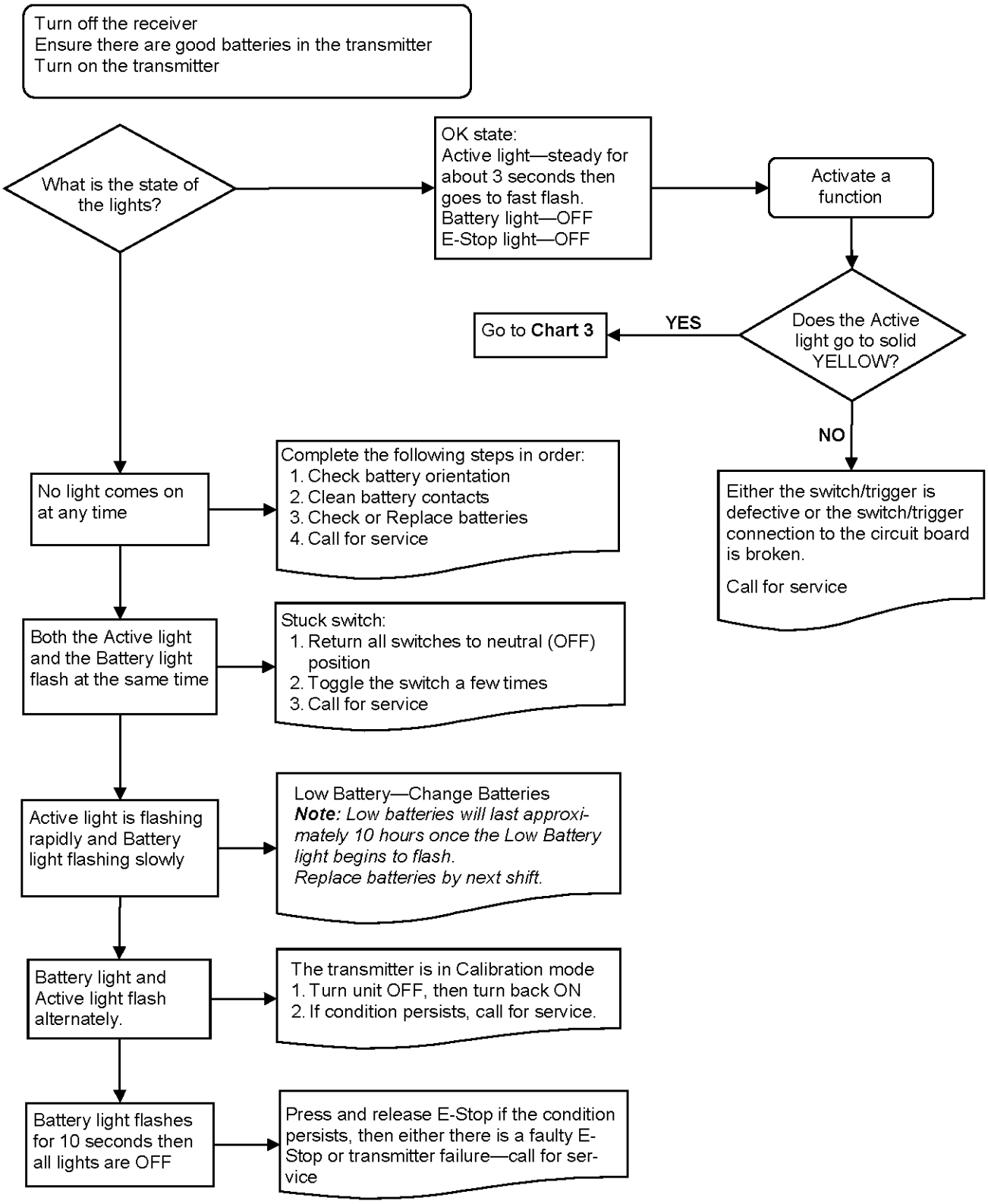
Indicator Lights	Description	Solution
	Transmitter is ON The reason is the transmitter is not communicating with the receiver.	Refer to **Trouble Shooting Chart #3** for solutions
	Transmitter is ON A low battery condition has been detected.	To detect intermittent conditions caused by poor or corroded 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

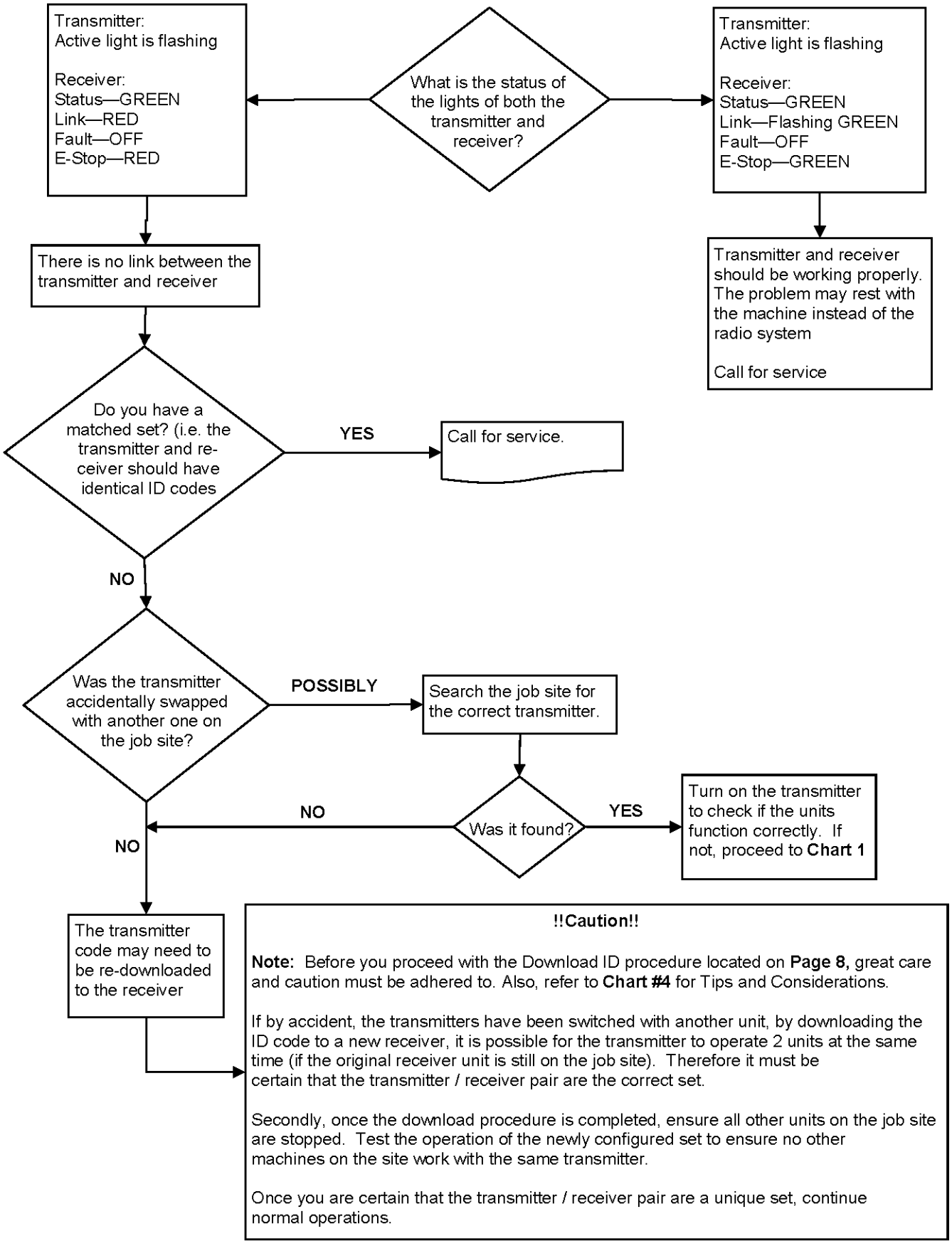
Test the Receiver—R161



Test the Transmitter—T151



Testing the Transmitter / Receiver Communication



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.

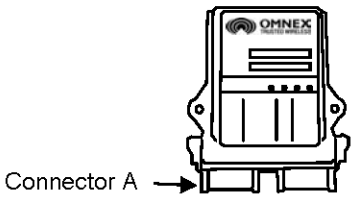
Possible Solutions

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

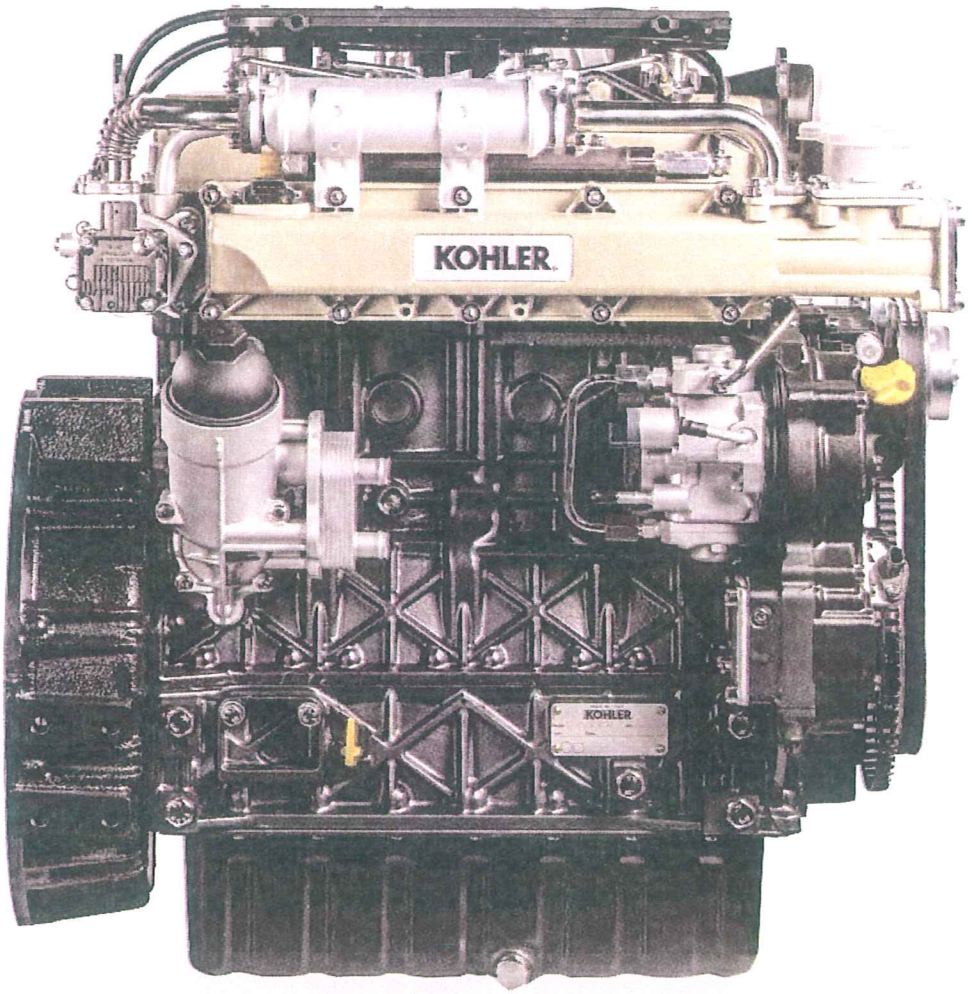
OMNEX Control Systems Inc. warrants to the original purchaser that the OMNEX products are free from defects in materials and workmanship under normal use and service for a period of ONE YEAR, parts (EXCLUDING: SWITCHES, CRYSTALS, OR PARTS SUBJECT TO UNAUTHORIZED REPAIR OR MODIFICATION) and labor from 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.

KDI 1903TCR - KDI 2504TCR

OWNER MANUAL

KOHLER® Diesel KDI



KOHLER®

KOHLER

REGISTRATION OF MODIFICATIONS TO THE DOCUMENT

Any modifications to this document must be registered by the drafting body, by completing the following table.

Drafting body	Code document	Model N°	Edition	Revision	Date issue	Date Review	Written by	Endorsed
DICOM/ATLO	ED0053029490	51269	3°	2	12/2013	04/2014		

The online manuals are provided with hyperlinks which direct you to each individual chapter. By clicking on;
- The analytic index titles you can go directly to the selected subject.
- The blue underlined words you can go directly to a paragraph, a table or a picture.
- The chapter titles (headings) you come back automatically to the chapter initial page.
- The paragraph titles the best script size for reading is displayed.
- There are multimedia videos recognizable by the icon "play" ▶ (only on manual in digital verision).
- Clicking next to the bottom page number you come back to the analytic index.

EN

INDEX

EN

KOHLER

EN

W

1.1 Manual's purpose

- This manual contains the instructions needed to carry out proper use and maintenance of the engine, therefore it must always be available, for future reference when required.
- This manual is an integral part of the engine, in the event of transfer or sale, it must be attached to it.
- Safety pictograms can be found on the engine and it is the operator's responsibility to keep them in a perfectly visible place and replace them when they are no longer legible.
- Information, description and pictures in this manual reflect the state of the art at the time of the marketing of engine.
- However, development on the engines is continuous. Therefore, the information within this manual is subject to change without notice and without obligation.
- KOHLER reserves the right to make, at any time, changes in the engines for technical or commercial reasons.
- These changes do not require KOHLER to intervene on the marketed production up to that time and not to consider this manual as inappropriate.
- Any additional section that KOHLER will deem necessary to supply some time after the main text shall be kept together with the manual and considered as an integral part of it.
- The information contained within this manual is the sole property of KOHLER. As such, no reproduction or replication in whole or part is allowed without the express written permission of KOHLER.

1.2 Glossary and Definitions

The paragraphs, tables and figure are divided into chapter with their progressive numbers.
Ex: **Par. 2.3** - chapter 2 paragraph 3.
Tab. 3.4 - chapter 3 table 4.
Fig. 5.5 - chapter 5 figure 5.

The references of the objects described in the text and in figure and number are indicated by letters, which are always and only related to the paragraph you are reading unless there are specific references to other figures or paragraphs.

The figure are based on model 2504 TCR, where necessary the version 1903 TCR is illustrated.

NOTE: All data, measurements and relevant symbols are shown in the glossary section.

1.3 Emission-Related Installation Instructions

Failing to follow the instructions in the applications guidebook when installing a certified engine in a piece of nonroad equipment violates federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.
OEM must apply a separate label with the following statement: "ULTRA LOW SULFUR FUEL ONLY" near the fuel inlet.
Ensure you are installing an engine appropriately certified for your application. Constant speed engines may only be installed on constant speed equipment for constant speed operation.
If you install the engine in a way that makes the engine's emission control information label hard to read during normal engine maintenance, you must place a duplicate label on the equipment, as described in 40 CFR 1068.105.

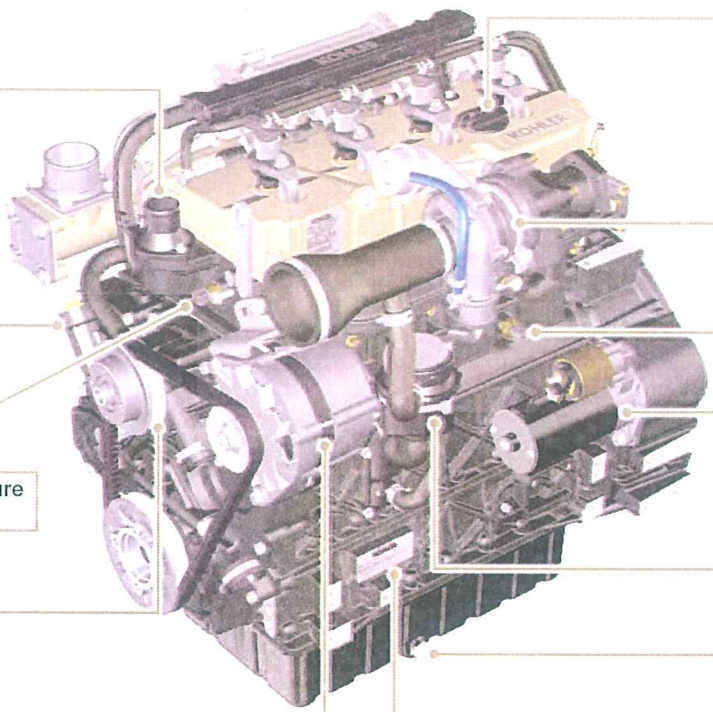
1.4 Service request

- Authorized service centers can be found in the service handbook (received with the product purchased).
- The complete and updated list of authorized Kohler Co. service centers can be found on our web site: http://www.kohlerengines.com/wheretobuy/landing.htm.
- If you have any questions regarding your warranty rights and responsibilities or the location of the nearest **Kohler Co.** authorized service location, you should contact **Kohler Co.** at 1-800-544-2444 or access our website at www.KohlerEngines.com (USA and North American).

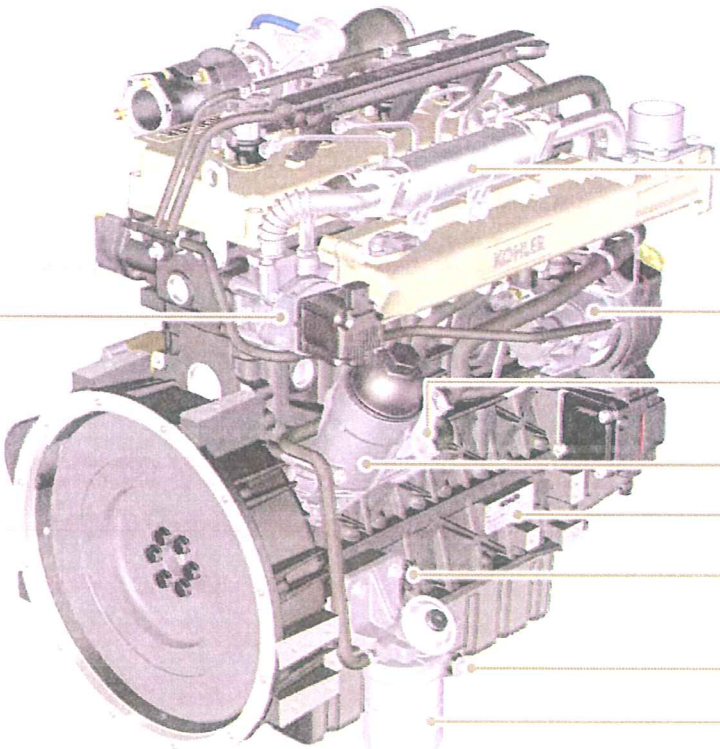
EN

1.5 Engine component identification

SIDE VIEW A



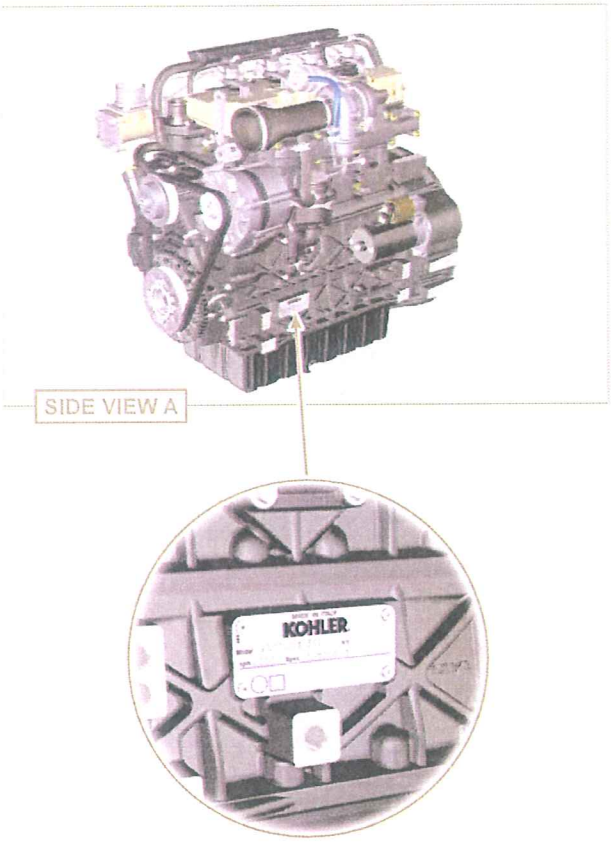
SIDE VIEW B

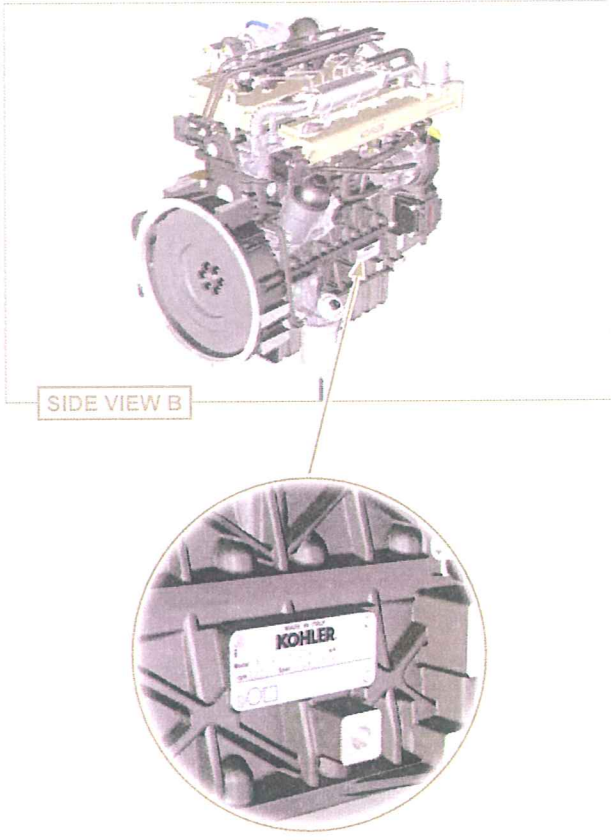


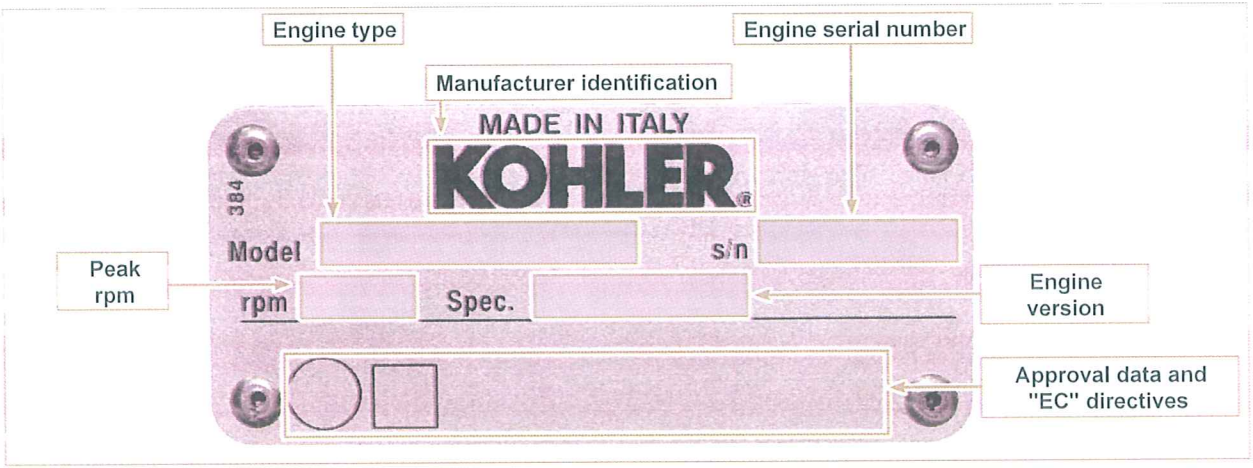
EN

1.6 Manufacturer and motor identification data

The nameplate motor identification is find side A or side B.

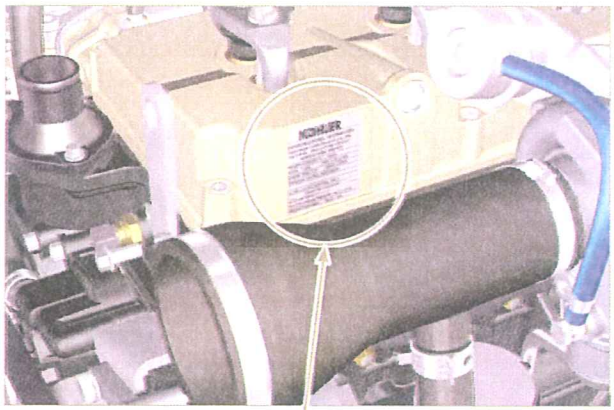


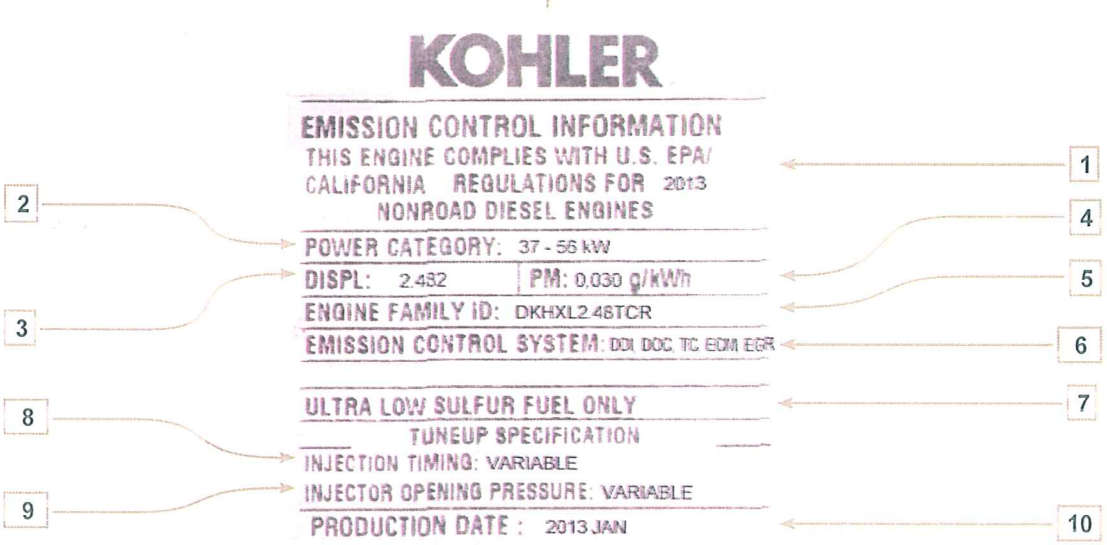




EN

1.7 Label for EPA rules





POS.	DESCRIPTION
1	Model year in compliance with the rules
2	Power category (kW)
3	Engine displacement (L)
4	Particulate emission limit (g/kWh)
5	Engine family ID
6	Emission Control System = ECS
7	Fuel with low sulphur content
8	Injection timing (*BTDC)
9	Injector opening pressure (bar)
10	Production date (example: 2013.JAN)

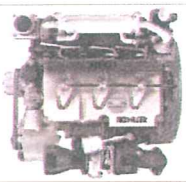
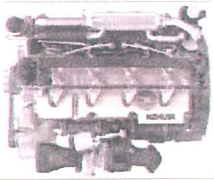
EN

2.1 General description of the engine

- 4-stroke, in-line cylinders Diesel engine;
- Liquid-cooling system;
- 4 valves per cylinder with hydraulic tappets;
- Turbocharger with Waste-gate valve;
- Direct injection.

2.2 Engine specifications

Tab. 2.1

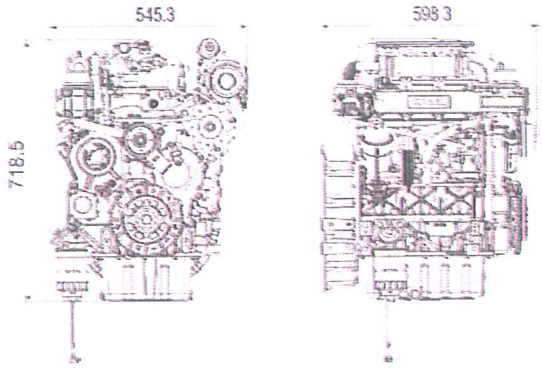



TECHNICAL DATA		UNIT OF MEASURE	KDI 1903 TCR	KDI 2504 TCR
ENGINE TYPE				
CYLINDERS		n.	3	4
BORE		mm	88	
STROKE		mm	102	
DISPLACEMENT		cm³	1861	2482
MAX INCLINATION DURING OPERATION (even in combined)		degree	30° max. 30 minutes	
		degree	35° max 1 minute	
OIL CAPACITY (MAX level.) including oil filter	standard version	lt.	8.9	11.5
DRY WEIGHT		Kg	233	267

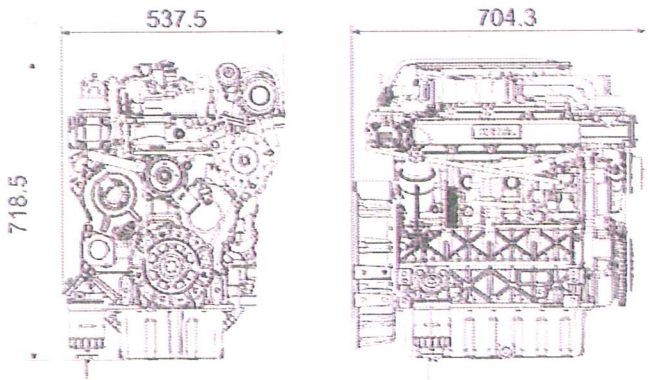
513 588

2.3 Engine dimensions (mm)

KDI 1903 TCR



KDI 2504 TCR



EN

2.4 Oil

Important

- The engine may be damaged if operated with improper oil level.
- Do not exceed the MAX level because a sudden increase in engine rpm could be caused by its combustion.
- Use only the recommended oil to ensure adequate protection, efficiency and service life of the engine.
- The use of lubricants other than recommended may shorten the engine life.
- Viscosity must be appropriate to the ambient temperature to which the engine is to be exposed (**Par. 2.4.1**).

Danger

- Prolonged skin contact with the exhausted engine oil can cause cancer of the skin.
- If contact with oil cannot be avoided, thoroughly wash your hands with soap and water as soon as possible.
- For the exhausted oil disposal, refer to Par. 6.6 DISPOSAL and SCRAPPING.

2.4.1 SAE oil classification

- In the SAE classification, oils are identified according to viscosity without considering any other qualitative characteristic.
- The code is made up of two numbers. The first number refers to the viscosity when cold, for use during winter ("**W**"= winter), while the second number is for viscosity at high temperatures.

Tab. 2.2

RECOMMENDED OIL			
VISCOSITY	SAE	5W-40 (≥ -25°C) 0W-30 (< -25°C)	LOW S.A.P.S.
WITH SPECIFICATIONS	API	CJ4	
	ACEA	E6 - E9	

N. B.: Low S.A.P.S. technology (fuel with low Sulphate, Phosphorous, Sulphur content) keeps catalyst in working conditions. The presence of sulfate, phosphorus and sulfur ashes causes with time the catalyst clogging and its consequent inefficiency.

CLASSIFICATION	DESCRIPTION ACEA SPECIFICATION
E6	Long drain LOW S.A.P.S.
E9	Long drain MID S.A.P.S.

2.5 Fuel

Important

- Use the same type of diesel fuel as used in cars (EN 590 for E.U. - ASTM D975 regulation - S 15 for U.S). Use of other types of fuel could damage the engine. Do not use dirty diesel fuel or mixtures of diesel fuel and water since this will cause serious engine faults.

Warning

- Clean fuel prevents the fuel injectors from clogging. Immediately clean up any spillage during refuelling.
- Never store diesel fuel in galvanized containers (i.e. coated with zinc). Diesel fuel and the galvanized coating react chemically to each other, producing flaking that quickly clogs filters or causes fuel pump and/or injector failure.

2.5.1 Fuel for low temperatures

- When operating the engine in ambient temperatures lower than 0 degrees C, use suitable low temperature fuel normally available from fuel distributors and corresponding to the specifications of Tab. 2.3 pag. 12.
- These fuels reduce the formation of paraffin in diesel at low temperatures.
- When paraffin forms in the diesel, the fuel filter becomes blocked interrupting the flow of fuel.

EN

2.5.2 *Biodiesel fuel*

- Fuels containing 10% methyl ester or B10. are suitable for use in this engine provided that they meet the specifications listed in the **Tab. 2.3**.
- **DO NOT USE** vegetable oil as a biofuel for this engine.
- Any failures resulting from the use of fuels other than recommended will not be warranted.

Tab. 2.3

FUEL COMPATIBILITY								
	Compatible		Certification emission		Warranty coverage		Engine waste	
	yes	no	yes	no	yes	no	yes	no
EN 590, DIN 51628 - Military NATO fuel F-54 (S=10 ppm)								
No 1 Diesel (US) - ASTM D 975 - Grade 1-D S 15 (S=15 ppm)								
No 1 Diesel (US) - ASTM D 975 - Grade 1-D S 500 (S=500 ppm)					(1)			(1)
No 2 Diesel (US) - ASTM D 975 - Grade 2-D S 15								
No 2 Diesel (US) - ASTM D 975 - Grade 2-D S 1500					(1)			(1)
ARCTIC (EN 590/ASTM D 975)	(2)							
High sulfur fuel < 5000 ppm (<0.5%)					(1)			(1)
High sulfur fuel > 5000 ppm (<0.5%)					(3)			(3)
High sulfur fuel > 10000 ppm (>1%)								
Civil Jet Fuels Jet A/A1								
Civil Jet Fuels Jet B								
Bio Fuels (EN14214)	(4)		(4)		(4)			(4)

(1) Except for catalyst clogged and EGR.

(2) Without adding oil.

(3) Except for catalyst clogged and EGR. Shorter oil change intervals.

(4) Max. 10% in fuel.

2.5.3 *Emission-Related Installation Instructions*

Failing to follow the instructions in the applications guidebook when installing a certified engine in a piece of nonroad equipment violates federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.
OEM must apply a separate label with the following statement: "ULTRA LOW SULFUR FUEL ONLY" near the fuel inlet.
Ensure you are installing an engine appropriately certified for your application. Constant speed engines may only be installed on constant speed equipment for constant speed operation.
If you install the engine in a way that makes the engine's emission control information label hard to read during normal engine maintenance, you must place a duplicate label on the equipment, as described in 40 CFR 1068.105.

EN

2.6 Coolant recommendation

Tab. 2.4

TECHNICAL SPECIFICATIONS
50% ETHYLENEGLYCOL e 50% DECALCIFIED WATER
50% PROPYLENE GLYCOL e 50% DECALCIFIED WATER

2.7 Battery recommendation

Battery not supplied by Kohler

RECOMMENDED BATTERIES	
AMBIENT TEMPERATURE	BATTERY TYPE
from 0°C to -15°C	90 Ah/20 h - 450 A/DIN 90 Ah/20 h - 885 A/EN 90 Ah/20 h - 855 CCA/SAE
from -15°C to -25°C	110 Ah/20 h - 500 A/DIN 110 Ah/20 h - 980 A/EN 110 Ah/20 h - 950 CCA/SAE

EN

3.1 Safety information

- The intended use of the engine is in conformity with the machine on which it is mounted.
- Any use of the machine other than that described cannot be considered as complying with its intended purpose as specified by KOHLER .
- KOHLER declines all responsibility for any change to the engine not described in this manual made by unauthorized KOHLER personnel.
- A proper use of the engine, a strict observance of the rules listed below and the rigorous application of all these precautions will avoid the risk of accidents or injuries.
- Those who carry out the use and maintenance on the engine must wear the safety equipment and the accident-prevention guards.
- KOHLER declines all direct and indirect liability for failure to comply with the standards of conduct contained in this manual.
- KOHLER cannot consider every reasonably unforeseeable misuse that may cause a potential danger.

3.2 General remarks

3.2.1 Note for OEM

- When installing the KDI engines, always bear in mind that any variation to the functional systems may result in serious failures to the engine.
- Any improvement must be verified at KOHLER testing laboratories before application of the engine.
- In case the approval to a modification is not granted, KOHLER shall not be deemed responsible for any consequential failures or damages to the engine.
- The engine may only be assembled on a machine by personnel specifically trained by KOHLER and who work in compliance with the existing documentation.
- The engine has been built to the specifications of a machine manufacturer, and it is his responsibility to ensure that all necessary action is taken to meet the essential and legally prescribed health and safety requirements. Any use of the machine other than that described cannot be considered as complying with its intended purpose as specified by KOHLER, which therefore declines all responsibility for accidents caused by such operations.

3.2.2 Note for end user

- The following indications are dedicated to the user of the machine in order to reduce or eliminate risks concerning engine operation and the relative routine maintenance work.
- The user must read these instructions carefully. Failure to do this could lead to serious danger for his personal safety and health and that of any persons who may be in the vicinity of the machine.
- On starting, make sure that the engine is as horizontal as possible, unless the machine specifications differ.
- Make sure that the machine is stable to prevent the risk of overturning.
- The engine must not operate in places containing inflammable materials, in explosive atmospheres, where there is dust that can easily catch fire unless specific, adequate and clearly indicated precautions have been taken and have been certified for the machine.
- To prevent fire hazards, always keep the machine at least one meter from buildings or from other machinery.
- Children and animals must be kept at a due distance from operating machines in order to prevent hazards deriving from their operation.
- Fuel and oil are inflammable. The tank must only be filled when the engine is off. Before starting, dry any spilt fuel.
- Make sure that no soundproofing panels and the ground or floor on which the machine is standing have not soaked up any fuel.
- Fuel vapour is highly toxic. Only refuel outdoors or in a well ventilated place.
- Do not smoke or use open flames when refuelling.
- During operation, the surface of the engine can become dangerously hot. Avoid touching the exhaust system in particular.
- Before proceeding with any operation on the engine, stop it and allow it to cool.
- Always open the radiator plug or expansion chamber with the utmost caution, wearing protective garments and goggles.
- The coolant fluid is under pressure. Never carry out any inspections until the engine has cooled.
- If there is an electric fan, do not approach the engine when it is still hot as the fan could also start operating when the engine is at a standstill.

Important

- This operation should be carried out with vacuum pump.
- The oil must be drained whilst the engine is hot. Particular care is required to prevent burns. Do not allow the oil to come into contact with the skin because of the health hazards involved.
- During operations that involve access to moving parts of the engine and/or removal of rotating guards, disconnect and insulate the negative wire (-) of the battery to prevent accidental short-circuits and to stop the starter motor from being energized.
- Check belt tension only when the engine is off.

EN

- Fully tighten the tank cap each time after refuelling. Do not fill the tank right to the top but leave an adequate space for the fuel to expand.
- To start the engine follow the specific instructions provided in the engine and/or machine operating manual. Do not use auxiliary starting devices not originally installed on the machine (e.g. Startpilot).
- Before starting, remove any tools that were used to service the engine and/or machine. Make sure that all guards have been refitted.
- Do not mix fuel with elements such as oil or kerosene. Failure to comply with this prohibition will cause the non-operation of the catalyst and non-observance of the emissions declared by **KOHLER**.
- Pay attention to the temperature of the oil filter when the filter itself is replaced.
- Only check, top up and change the coolant fluid when the engine is off and reached the ambient temperature. Coolant fluid is polluting, it must therefore be disposed of in the correct way.
- Do not use air and water jets at high pressures on cables, connectors and injectors.

Important

- Only use the eyebolts **A** installed by **KOHLER** to move the engine (**Fig. 3.1**).
- The angle between each lifting chain and the eyebolts shall not exceed 15° inwards.
- The correct tightening of the lifting screws is 25Nm.
- Do not interpose spacers or washers between the eyebolts and engine head.
- Provided that the above requirements are met, if the lifting eyebolts are subject to permanent deformation (inwards), all subsequent lifting operations must be performed in order to prevent them from bending in the opposite direction.

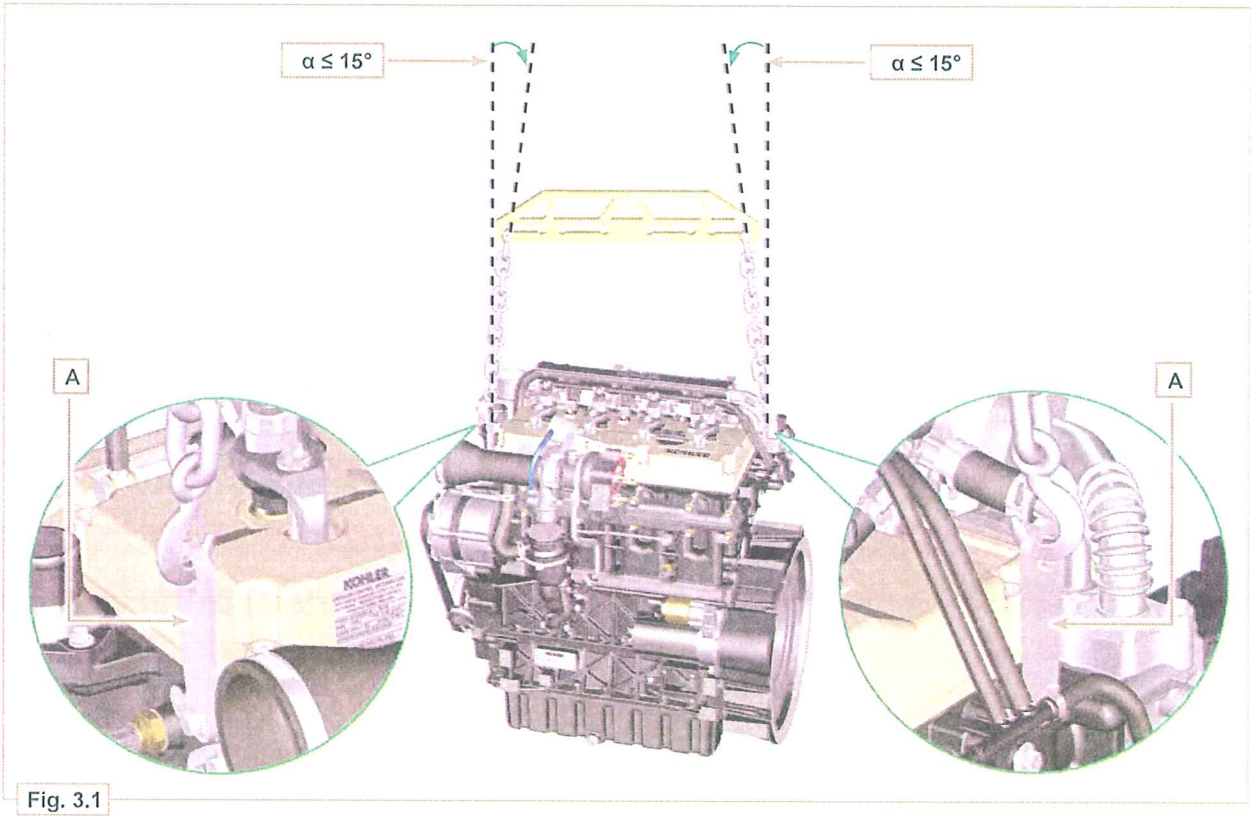


Fig. 3.1

EN

3.3 Safety signal description

- To ensure safe operation please read the following statements and understand their meaning.
- Also refer to your equipment manufacturer's manual for other important safety information.
- This manual contains safety precautions which are explained below.
- Please read them carefully.

3.3.1 Adhesive safety plates

The following is a list of the adhesive safety plates that may be found on the engine, which indicate potential points of danger to the operator (Par. 3.6).

Read the Operation and Maintenance handbook before performing any operation on the engine.

Hot Parts.
Danger of burns.

Presence of rotating parts.
Danger of jamming or cutting.

Presence of explosive fuel.
Danger of fire or explosion.

Presence of steam and pressurized coolant.
Danger of burns.

Lifting point.

Electrical shock.
Danger of severe scalding or death.

High pressure fluid.
Danger of fluid penetration.

Lethal Exhaust Gases.
Danger of poisoning or death.

3.3.2 Safety guards

Hereunder is a list of safety guards that must be worn prior to carrying out any type of operation and to avoid potential harm to the operator.

Use protective gloves before carrying out the operation.

Use protective glasses before carrying out the operation.

Use sound absorbing protections before carrying out the operation.

3.3.3 Warnings

Hereunder is a list of safety warnings that may be found in the manual, which advise you to pay attention when carrying out particular procedures that may be potentially dangerous to the operator or things.

Danger

- This indicates situations of grave danger which, if ignored, may seriously threaten the health and safety of individuals.

Important

- This indicates particularly important technical information that should not be ignored.

Warning

- This indicates that failure to comply with it can cause minor damage or injury.

EN

3.4 Information and safety signals

ACCIDENTAL START

Accidental Starts can cause severe injury or death.

Before working on the engine or equipment, disconnect the battery negative (-) wire.

HOT PARTS

Hot Parts can cause severe burns.

Engine components can get extremely hot from operation.
Do not touch engine while operating or just after stopping.
Never operate the engine with heat shields or guards removed.

ROTATING PARTS

Rotating Parts can cause severe injury.

Stay away while engine is in operation. Keep hands, feet, hair, and clothing away from all moving parts to prevent injury.
Never operate the engine with covers, shrouds, or guards removed.

LETHAL EXHAUST GASES

Carbon Monoxide can cause severe nausea, fainting or death.

Avoid inhaling exhaust fumes and never run the engine in a closed building or confined area.
Carbon monoxide is toxic, odorless, colorless, and can cause death if inhaled.

ELECTRICAL SHOCK

Electrical Shock can cause injury.

Do not touch wires while engine is running.

HIGH PRESSURE FLUID RISK OF PUNCTURE

High Pressure Fluids can puncture skin and cause severe injury or death.

Do not work on fuel system without proper training or safety equipment.
Fluid puncture injuries are highly toxic and hazardous.
If an injury occurs, seek immediate medical attention.

EXPLOSIVE FUEL

Explosive fuel can cause fires and severe burns.

Fuel is flammable and its vapours can ignite.
Store fuel only in approved containers, in well ventilated, unoccupied buildings.
Do not fill the fuel tank while the engine is hot or running, since spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition.
Do not start the engine near spilled fuel.
Never use fuel as a cleaning agent.

EXPLOSIVE GAS

Explosive Gas can cause fires and severe acid burns.

Charge battery only in a well ventilated area.
Keep sparks, open flames, and other sources of ignition away from the battery at all times.
Batteries produce explosive hydrogen gas while being charged.
Keep batteries out of the reach of children.
Remove all jewelry when servicing batteries. Before disconnecting the negative (-) ground cable, make sure all switches are OFF.
If ON, a spark will occur at the ground cable terminal which could cause an explosion.

CALIFORNIA WARNING - DECLARATION 65

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

3.5 Safety and environmental impact

Every organisation has a duty to implement procedures to identify, assess and monitor the influence of its own activities (products, services, etc.) on the environment.
Procedures for identifying the extent of the impact on the environment must consider the following factors:

- Liquid waste.
- Waste management.
- Soil contamination.
- Atmospheric emission.
- Use of raw materials and natural resources.
- Regulations and directives regarding environmental impact.

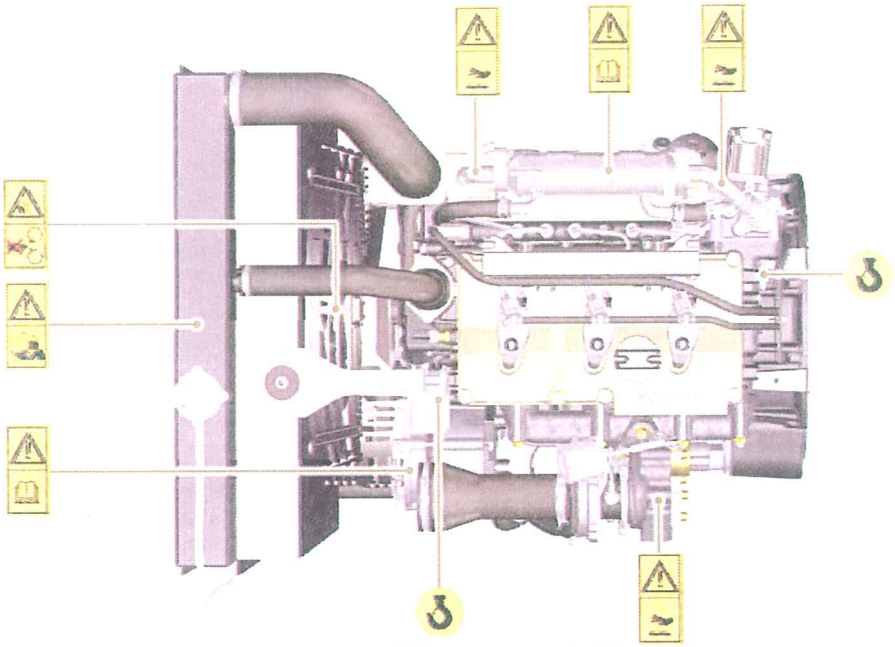
In order to minimise the impact on the environment, **KOHLER** now provides a number of indications to be followed by all persons handling the engine, for any reason, during its expected lifetime.

- All packaging components must be disposed of in accordance with the laws of the country in which disposal is taking place.
- Keep the fuel and engine control systems and the exhaust pipes in efficient working order to limit environmental and noise pollution.
- When discontinuing use of the engine, select all components according to their chemical characteristics and dispose of them separately.

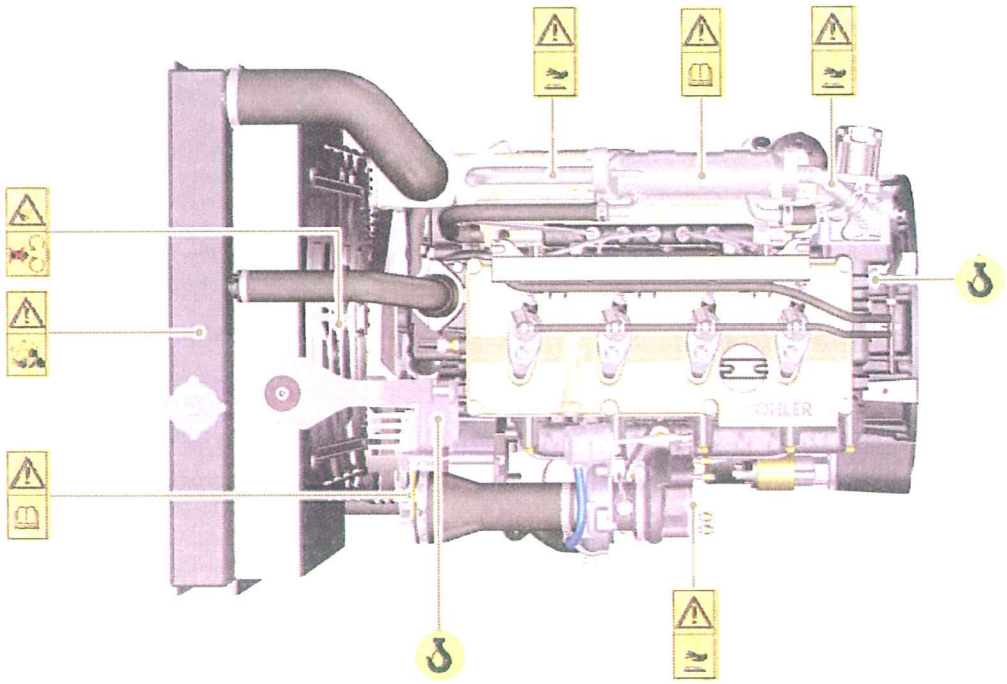
EN

3.6 Location of safety labels on engine

KDI 1903 TCR



KDI 2504 TCR



EN

4.1 Pre-start check

- Read carefully the following pages and carry out the operations described below in accordance with the instructions specified.

Important

- Non compliance with the operations described in the following pages involves the risk of damages to the engine and vehicle on which it is installed as well as personal and/or property damage.
- Increase the frequency of maintenance operations in heavy working conditions (engine starts but stops, very dusty and hot environments, etc...).

4.2 Running-in period

NOTE: For the first 50 hours of engine operation, it is advisable not to exceed 75% of the maximum power supplied.

4.3 Starting and turning off

4.3.1 Starting

1 - Check the level of the engine oil, fuel and coolant and fill if necessary (Par. 4.5 and Par. 4.6).

2 - Put the ignition key in the ignition switch (if supplied).

3 - Tun the key to **ON** position.

4 - Turn the key beyond the **ON** position and release it when the engine starts (the key will return into ON position automatically).

Important

- Do not actuate the starter for more than 15 seconds at a time. If the engine does not start, wait for one minute before repeating attempt.
- If engine does not start after two attempts see Tab. 7.1 and Tab. 7.2, to locate the cause.

4.3.2 After starting

Warning

- Make sure that all the warning lights on the control panel are off when the engine is running.

1 - Run at minimum speed for a few minutes according to table (except constant speed engine).

AMBIENT TEMPERATURE	TIME
≤ -20°C	2 minutes
from -20° C to -10°C	1 minutes
from -10° C to -5° C	30 seconds
from -5° C to 5° C	20 seconds
≥ 5° C	15 seconds

EN

4.3.3 Turning off

1 - Do not turn off the engine when it is running at the maximum rotation speed (except constant speed engine).

2 - Before turning it off, keep it idle at minimum speed for about 1 minute.

3 - Turn the key to OFF position.

4.4 Refuelling

Danger

- Fill the engine off.
- The only approved fuels are those listed in Tab. 2.3 pag. 12.
- In those countries where diesel has a high sulphur content, its is advisable to lubricate the engine with a high alkaline oil or alternatively to replace the lubricating oil recommended by KOHLER more frequently.
- To avoid explosions or fire outbreaks, do not smoke or use open flames during the operations.
- Fuel vapours are highly toxic.Only carry out the operations outdoors or in a well ventilated place.
- Keep your face well away from the fuel fill to prevent harmful vapours from being inhaled.
- Dispose of fuel in the correct way and do not litter as it is highly polluting.
- When refuelling, it is advisable to use a funnel to prevent fuel from spilling out.The fuel should also be filtered to prevent dust or dirt from entering the tank.

Do not overfill the fuel tank. Leave room for the fuel to expand.

NOTE: At the first fuelling or if the tank was empty bleeding the fuel system (Par. 6.4 point 8).

4.5 Oil filling

Important

- For safety precautions see Par. 3.1.

1 - Loosen the oil filler cap A or the oil filler cap C if the cap A is not accessible.

2 - Add the type and amount of oil recommended (Tab. 2.1 and Tab. 2.2).

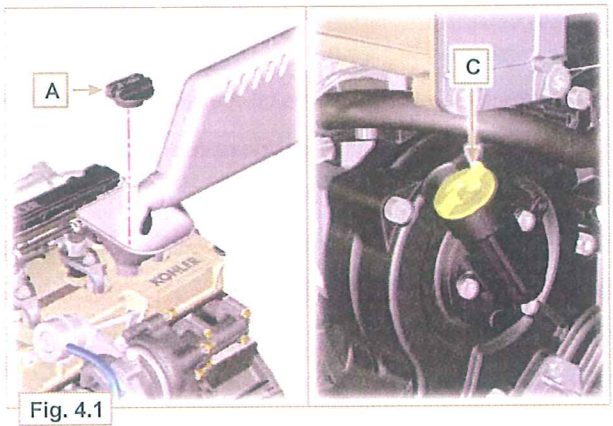


Fig. 4.1

3 - Before checking oil engine needs to be level.

4 - Remove the oil dipstick B and check that the level is up to but does not exceed the MAX.

5 - If level is not at the MAX. level, add additional oil.

6 - Re-tighten the cap A or C.

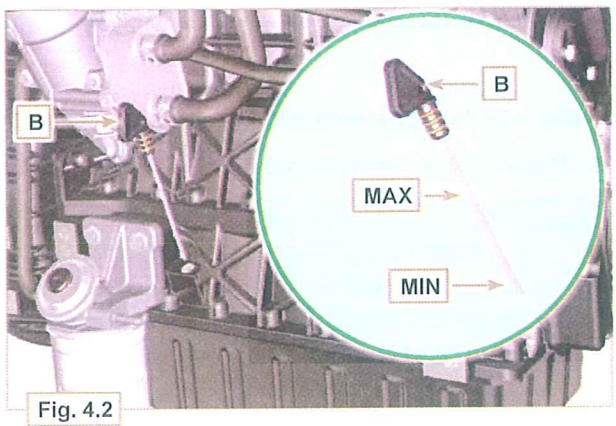


Fig. 4.2

EN

4.6 Coolant filling

Warning

- An anti-freeze protection liquid (ANTIFREEZE) - mixed with decalcified water - must be used.
- The freezing point of the refrigerant mixture depends on the amount concentration in water.
- As well as lowering the freezing point, the antifreeze also raises the boiling point.
- A 50% mixture is recommended to ensure a general level at protection prevents the formation of rust, galvanic currents and calcium deposits.

NOTE: Before proceeding with any operation on the engine, stop it and allow it to cool.

Warning

- Presence of steam pressurized coolant danger of burns.

1 - Loosen the cap A and fill the radiator with coolant composed of:
50% ANTIFREEZE and 50% decalcified water.

2 - Top liquid up until the pipes inside the radiator are covered by about 5 mm.
Do not overfill the radiator, but leave room for the coolant to expand.

3 - For engines equipped with expansion tank, pour in fluid until reaching the max level mark.

4 - Re-tighten the cap A.

5 - Bleeding the cooling circuit as indicated in the Par. 5.8.

6 - After a few hours of operator, stop the engine and allow the liquid to cool returns to a ambient temperature and check the coolant level again.

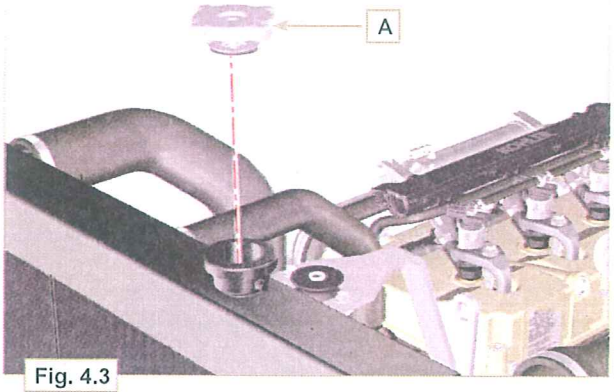


Fig. 4.3

EN

5.1 Useful information about maintenance

- This chapter shows all operations described in the **Tab. 5.1** and **Tab. 5.2** if you have the skills appropriate may be directly carried out by the user.
- Periodic inspection and maintenance operations must be carried out as indicated in this manual and are the responsability of the user.
- Failure to comply with these service and maintenance intervals increases the risk of technical damage to the engine. Any non compliance makes the warranty become null and void.
- In order to prevent personal and property damage read carefully the instructions listed below before proceeding with any operation of the engine.

Warning

- Inspections must be made when the engine is off and cold.
- Place engine on level surface to ensure accurate measurement of oil level.
- Before starting, to avoid spillages of oil make sure that:
  - the oil dipstick is inserted correctly;
  - also check that:
    oil drain plug and
    oil filler cap are tightened firmly.

5.2 Periodic maintenance

The intervals of preventive maintenance in **Tab. 5.1** and **Tab. 5.2** refer to the engine operating under normal operating conditions with fuel and oil meeting the recommended specifications.

Tab. 5.1

CLEANING AND CHECKING							
OPERATION DESCRIPTION	PERIOD (HOURS)						PAR.
	10	250	500	1000	1500	5000	
Engine oil level	■						5.3
Coolant level / Check of the radiator heat-exchanger surface (2)	■						5.8 5.6
External cartridge dry-type air filter (2)		■					5.5
Radiator heat-exchange surface and Intercooler (2)		■					5.6
Alternator belt tension (5)		■					5.9
Rubber hose (intake air / coolant)			■				5.7
Fuel hose			■				--

Tab. 5.2

REPLACEMENT								
OPERATION DESCRIPTION		PERIOD (HOURS)						PAR.
		10	250	500	1000	1500	5000	
Engine oil (1)				■				6.1
Oil filter cartridge (1)				■				6.2 6.3
Fuel filter cartridge (1)				■				6.4
Alternator Poly-V belt	Alternator V belt (3) (6)			■				--
	Not heavy environmental condition (6)						■	--
	Heavy environmental condition (6)					■		
Coolant (6)					■			--
Intake manifold hose (air filter - intake manifold) (6)					■			--
Coolant hoses (6)					■			--
Dry air cleaner external cartridge (2) (6)		After 6 checks with cleaning The replacement must be carried out by authorized KOHLER workshops						6.5
Fuel line hose		The replacement must be carried out by authorized KOHLER workshops						

(1) - In case of low use: 12 months.
(2) - The period of time that must elapse before checking the filter element depends on the environment in which the engine operates.
The air filter must be cleaned and replaced more frequently under very dusty conditions.
(3) - In case of low use: 36 months.
(4) - In case of low use: 24 months.
(5) - Not Poly-V type.
(6) - The replacement must be carried out by authorized KOHLER workshops.

EN

5.3 Oil level check

1 - Remove the oil dipstick B and check that the level is up to MAX.

2 - Pour in recommended oil until reaching the MAX level mark.

3 - Reinstall the oil dipstick B completely.

4 - Re-tighten the cap A and/or C (Fig. 5.2).

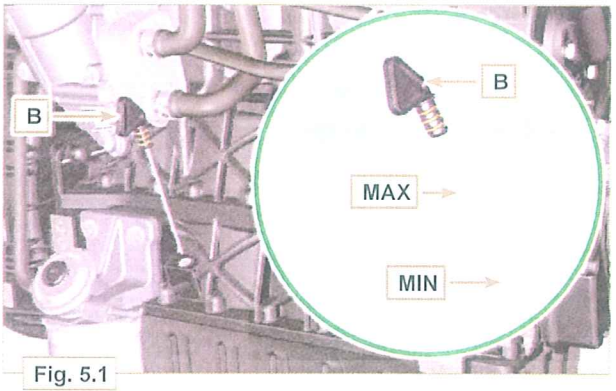


Fig. 5.1

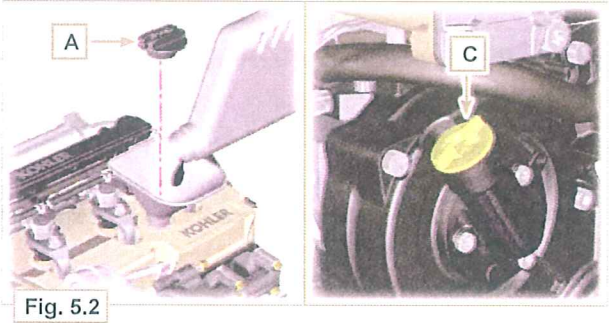


Fig. 5.2

5.4 Oil dipstick on cylinder head

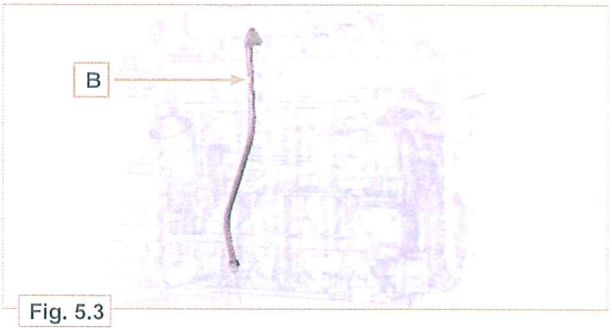


Fig. 5.3

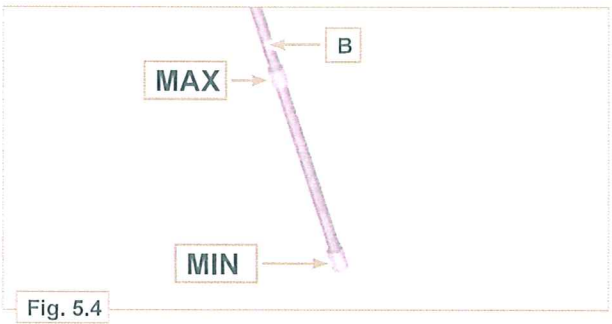


Fig. 5.4

5.5 Air filter check

NOTE: Components not necessarily supplied by KOHLER.

1 - Release the two clasps F of the cover A.

2 - Remove the cartridges B and G.

3 - Remove the cap C.

4 - Clean the inside components A, C and D with a damp cloth.

5 - **Do not use compressed air**, repeatedly tap the front side E on a flat surface.

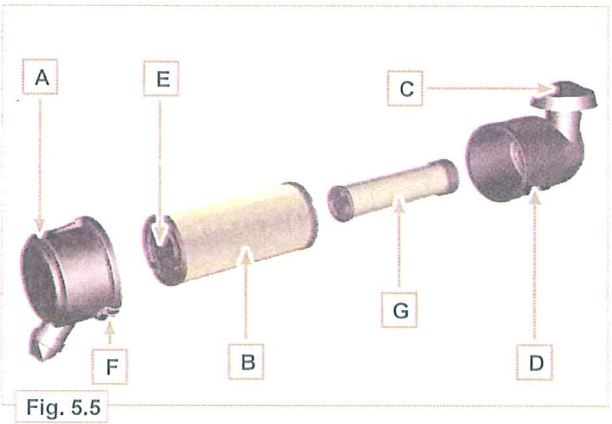


Fig. 5.5

Important

- When the cartridge G is dirty, **do not clean it** but **replace** cartridges B and G.

6 - Reinstall:
- cartridges G and B.
- the cap C.
- the cover A checking the right tightness of clasps F.

EN

Danger

For safety precautions see Cap. 3.

5.6 Check of the radiator heat-exchanger surface

NOTE: Component not necessarily supplied by KOHLER.

Important

- Wear safety goggles when using compressed air.
- The radiator heat-exchange surface must be cleaned on both sides.

1 - Check the radiator heat-exchange surface D.

2 - Clean the surface with a brush soaked in special detergent if it is clogged.

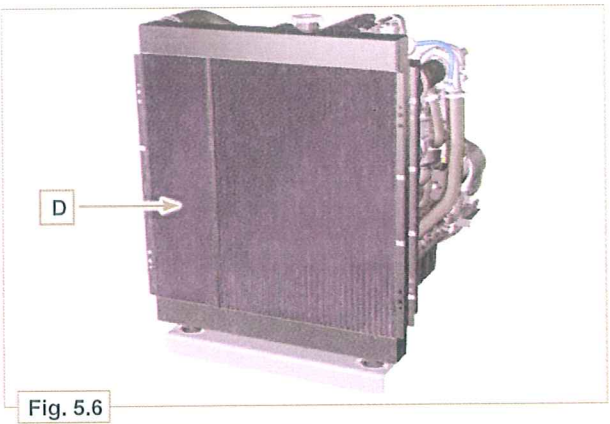


Fig. 5.6

5.7 Rubber hoses check

The check is carried out by exerting a slight deflection or bending along the pipe and near the hose clamps.

Components must be replaced if they have clear signs of cracks, tears, cuts, leaks and do not retain a certain degree of elasticity.

Important

- If hoses are damaged contact an authorized KOHLER workshop.

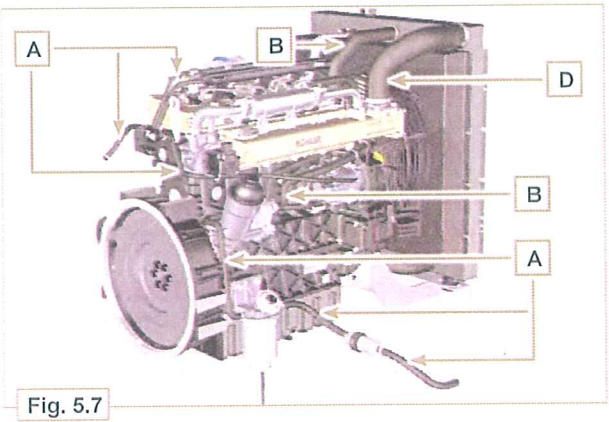


Fig. 5.7

1 - Check that the:

- Fuel system hoses A are intact.
- Cooling circuit hoses B.
- Vent system pipes C.
- Air system ducts D.
- Oil return circuit hose E.

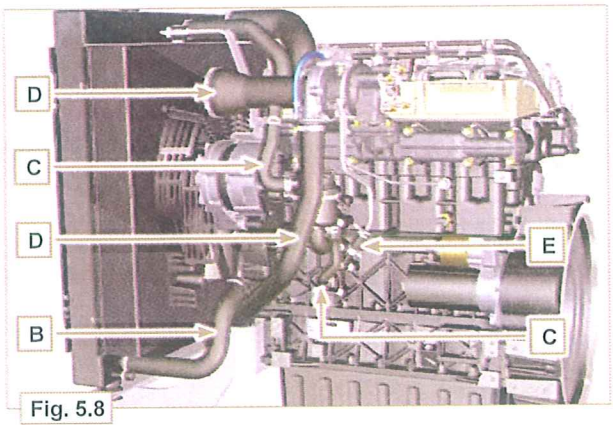


Fig. 5.8

EN

5.8 Check coolant level

NOTE: Before proceeding with any operation on the engine, stop it and allow it to cool.

Warning

- Presence of steam pressurized coolant danger of burns.

NOTE: Component not necessarily supplied by KOHLER.

1 - Start the engine without the radiator cap A.

2 - Top liquid up until the pipes inside the radiator are covered by about 5 mm.

3 - Top up if necessary.

4 - Do not overfill the radiator, but leave room for the coolant to expand.

5 - Reinstall radiator cap A.

6 - For engines equipped with expansion tank (B), check that the fluid is until reaching the max level mark.

NOTE: For coolant filling see Par. 4.6.

Warning

- Before starting make sure that the radiator cap and cap, if present, are installed correctly to avoid spillage of liquid or vapour at high temperatures.

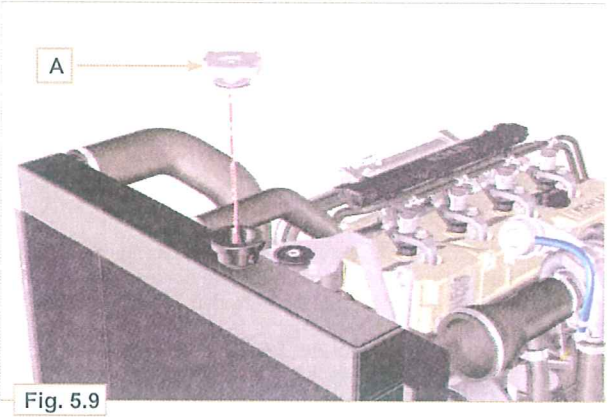


Fig. 5.9

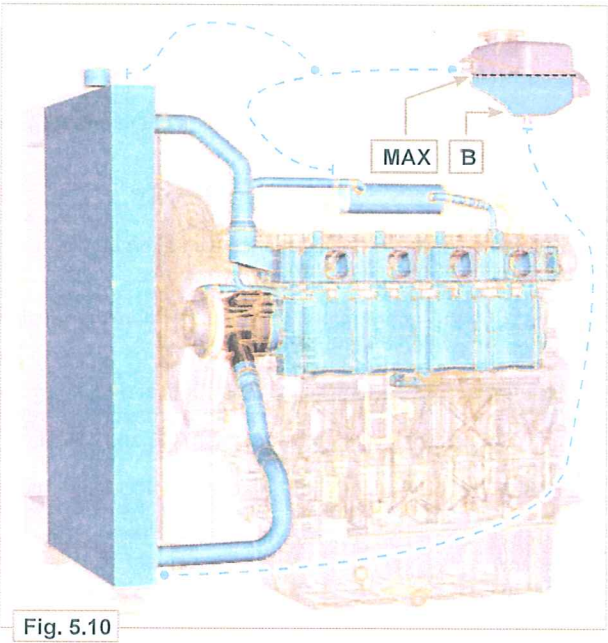


Fig. 5.10

EN

5.9 Check and setting alternator standard belt tension

5.9.1 Check

1 - Check the belt A condition, if worn out or deteriorated, **replace it.**

2 - Check by the appropriate tool that at point p the tension value is between **80** and **85 Hz.**

Using the tool F (DENSO BTG-2 or a similar one) shown in the picture, it is possible to check the corresponding value in Newtons, which should be between **350** and **450 N.**

Should the correct tool not be available, the belt tension can be checked by applying a force in the direction of arrow G of approx' 10kg on the point p. When correctly tensioned the belt must show a movement of less than 10 mm.
If not adjus it.

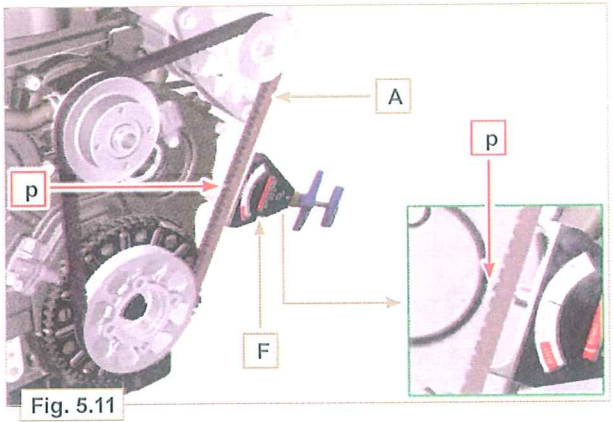


Fig. 5.11

5.9.2 Adjustment

1 - Loosen the fastening bolts B and C.

2 - Pull the alternator outwards (in direction of the arrow D), to tension the belt.

3 - Tension the belt tightening the bolts B and C.

4 - Tighten bolts B and C in sequence with a torque wrench E (tightening torque of **40 Nm**).

5 - Check by the appropriate tool that at point p the tension value is between **80** and **85 Hz.**

Using the tool F (DENSO BTG-2 or a similar one) shown in the picture, it is possible to check the corresponding value in Newtons, which should be between **350** and **450 N.**

Should the correct tool not be available, the belt tension can be checked by applying a force in the direction of arrow G of approx' 10kg on the point p. When correctly tensioned the belt must show a movement of less than 10mm.

Let the engine run for some minutes, then let it cool down at ambient temperature and repeat the operations **2**, **3**, **4** and **5** in case the belt tension results out of the above mentioned values.

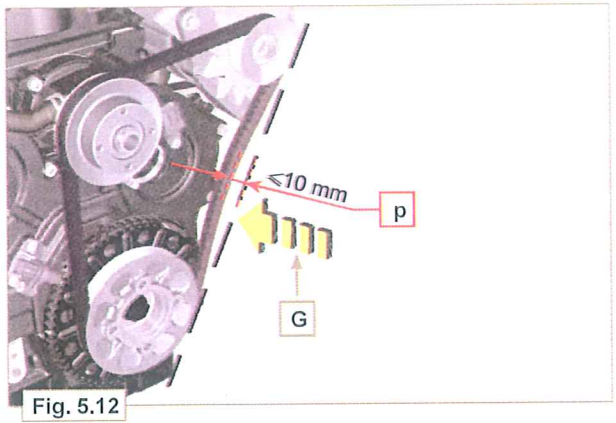


Fig. 5.12

NOTE: Contact KOHLER authorised workshops for replacement.

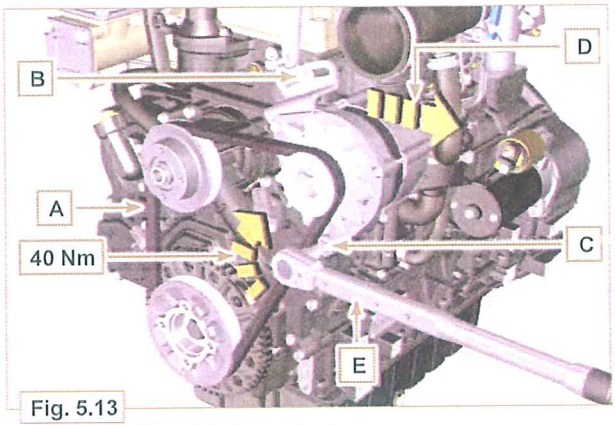


Fig. 5.13

5.10 Check Poly-V alternator belt

NOTE: The poly-v belt is not adjustable.

1 - Check the belt A condition, if worn out or deteriorated, **replace it.**

NOTE: Make sure that the ribs of the belt A are inserted correctly into the grooves of the pulleys B (as shown in D1 and D2).

2 - Start the engine and run it for some minutes, then turn off it, and let it cool down at ambient temperature.
Check by the appropriate tool that at point p the tension value is between **149** and **196 Hz.**

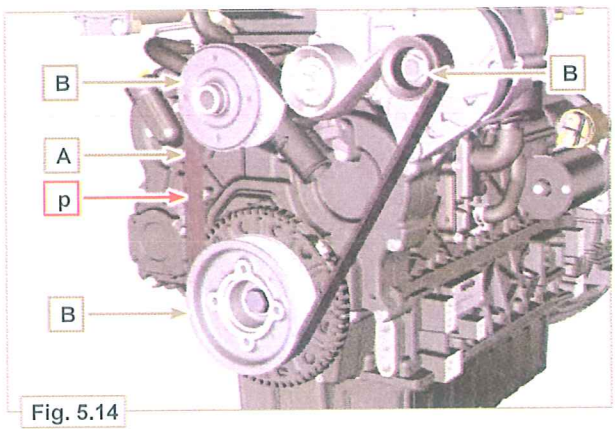


Fig. 5.14

EN

NOTE: If the poly-v belt tension results out of the above mentioned values contact **KOHLER** authorised workshops for replacement.

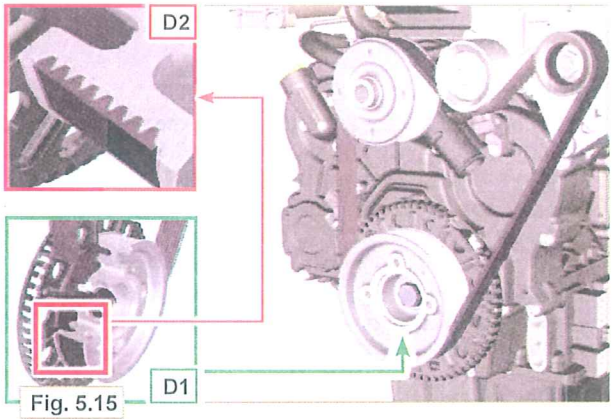


Fig. 5.15

5.11 Control water filter cartridge fuel

NOTE: When turn on lights on control water filter cartridge fuel see Par. 6.4.

1 - Gently loosen the wing screw A without removing it.

2 - Drain the water if present.

3 - Re-tighten the wing screw A as soon as the fuel begins to flow.

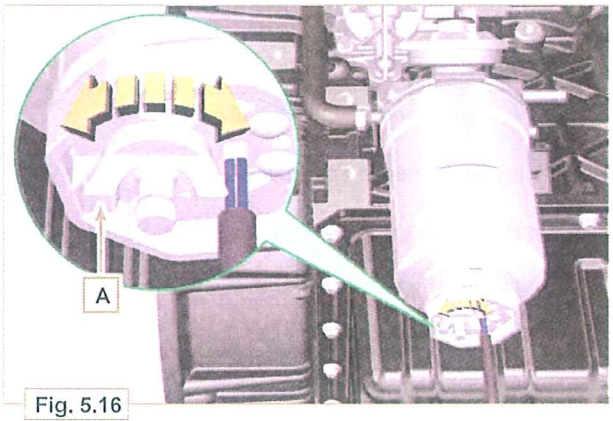


Fig. 5.16

EN

5.12 Product preservation

Important

- If the engines are not to be used for 6 months, they must be protected by carrying out the operations described in Engine storage (up to 6 months) **(Par. 5.13)**.
- If the engine is still not in use after the first 6 months, it is necessary to carry out a further operation to extend the protection period (more than 6 months) **(Par. 5.14)**.
- If the engine is not to be used for an extended period, the protective treatment procedure must be repeated within 24 months of the previous one.

5.13 Engine storage up to 6 months

Before storing the engine check that:

- The environments are not humid or exposed to bad weather. Cover the engine with a proper protective sheet against dampness and atmospheric contaminants.
- The place is not near electric panel.
- Avoid storing the engine in direct contact with the ground.

5.14 Engine storage over 6 months

Follow the steps described in Par. 5.13.

1 - Engine oil replacement (Par. 6.1).

2 - Refuel with fuel additives for long storage.
The following additives are recommended:
DEFA Fluid Plus (Pakelo Lubricants),
Diesel Treatment (Green Star),
Top Diesel (Bardhal),
STP® Diesel Fuel Injector Treatment.

3 - With expansion tank:
make sure that the coolant is up to the **maximum** level.

4 - Without expansion tank:
Top liquid up until the pipes inside the radiator are covered by about 5 mm.
Do not overfill the radiator, but leave room for the fuel to expand.

5 - Start the engine and keep it idle at minimum speed for 2 minutes.

6 - Bring the engine to 3/4 of the **maximum** speed for 5÷10 minutes.

7 - Turn off the engine.

8 - Completely empty the fuel tank.

9 - Spray SAE 10W-40 on the exhaust and intake manifolds.

10 - Seal the exhaust and intake ducts to prevent foreign bodies from entering.

11 - When cleaning the engine, if using a pressure washer or steam cleaning device, avoid directing the nozzle on electrical components, cable connections and sealed rings (oil seals etc).
If cleaning engine with a pressure washer or steam cleaner, it is important to maintain a minimum distance of at least 200mm between the surface to be washed and the nozzle - avoiding absolutely electrical components such as alternators, starter motors and engine control units (ECU).

12 - Treat non-painted parts with protective products.

13 - Loosen the alternator belt Par. 5.9.

If the engine protection is performed according to the suggestions indicated no corrosion damage should occur.

5.15 Engine starting after storage

1 - Remove the protective sheet.

2 - Use a cloth soaked in degreasing product to remove the protective treatment from the external parts.

3 - Inject lubricating oil (no more than 2 cm^3) into the intake ducts.

4 - Adjust the alternator belt tension (Par. 5.9).

5 - Refill the tank with fresh fuel.

6 - Make sure that the oil and the coolant are up to the **maximum level.**

7 - Start the engine and keep it idle at minimum speed for a two about minutes.

8 - Bring the engine to 75% of **maximum** rated speed for 5 to 10 minutes.

9 - Stop the engine while the oil is still hot (Par. 6.1), discharge the protective oil in a suitable container.

Warning

- Over time, lubricants and filters lose their properties, so it is important consider whether they need replacing, also based on the criteria described in Tab. 5.2.

10 - Replace the filters (air, oil, fuel) with original spare parts.

11 - Pour new oil (Par. 4.5) up to the **maximum** level.

12 - Empty the cooling circuit completely and pour in the new coolant up to the **maximum** level (Par. 4.6).

EN

Danger

Disconnect the negative wire (-) from the battery to avoid accidental engine starting.

6.1 Engine oil replacement

Important

- Place engine on level surface to ensure accurate measurement of oil level.

NOTE: Perform this operation with warm engine, to get a better fluidity of the oil and get a full discharge of oil and impurities contained in it.

1 - Loosen the oil filler cap A (Fig. 6.1).

2 - Remove the oil dipstick B.

3 - Remove the oil drain p'ug D and the gasket E (the oil drain plug is on both sides of the oil sump).

4 - Drain oil in an appropriate container.
(For the exhausted oil disposal, refer to Par. 6.6 DISPOSAL and SCRAPPING).

5 - Replace gasket E.

6 - Tighten the drain oil plug D (tightening torque at 50 Nm).

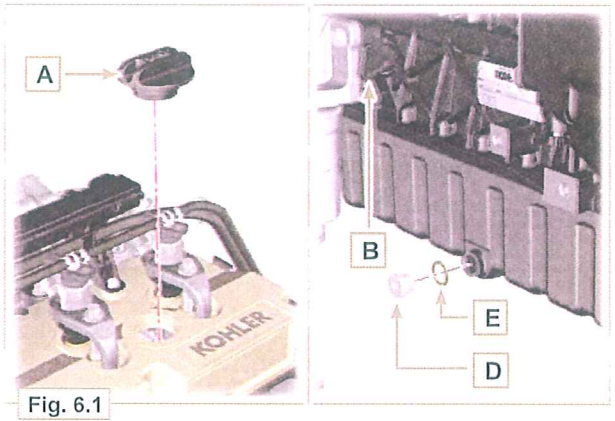


Fig. 6.1

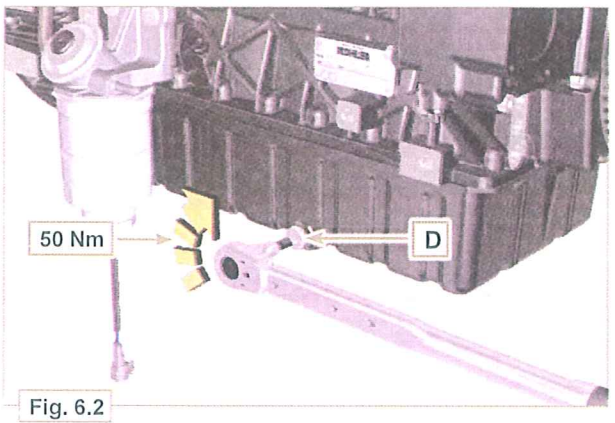


Fig. 6.2

7 - Add the type and amount of oil recommended (Tab. 2.1 and Tab. 2.2).

8 - If the plug A is not accessible, use the oil filler cap C.

Important

- Do not exceed the MAX level on the dipstick.

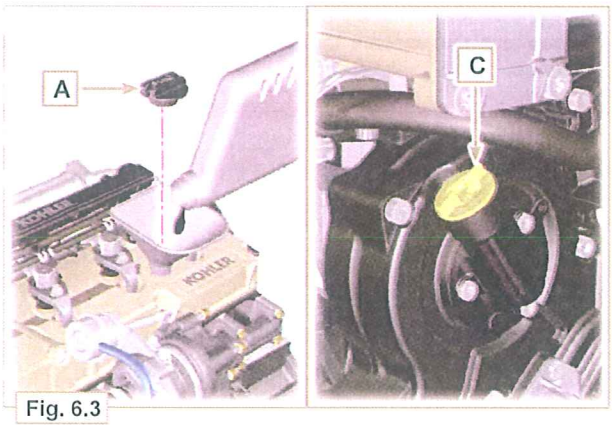


Fig. 6.3

EN

9 - Fit and remove the oil dipstick B to check the level. Pour in fluid until reaching the MAX level mark.

10 - Upon completion, reinstall the oil dipstick B completely.

11 - Tighten the cap A or C.

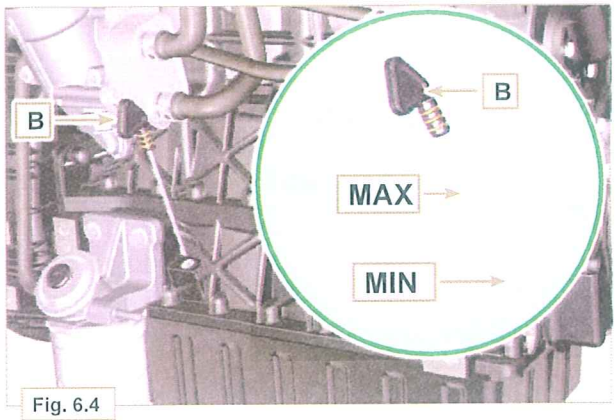


Fig. 6.4

Warning

Oil filter cartridge replacement (Par. 6.2) and fuel filter replacement (Par. 6.4)

In case of low use replace it 12 months.
For disposal of oil filter cartridge and fuel filter refer to Par. 6.6 DISPOSAL and SCRAPPING.

6.2 Oil filter cartridge replacement

1 - Loosen the cap A.

2 - Remove the cap A as well as the oil cartridge B from the oil filter support.

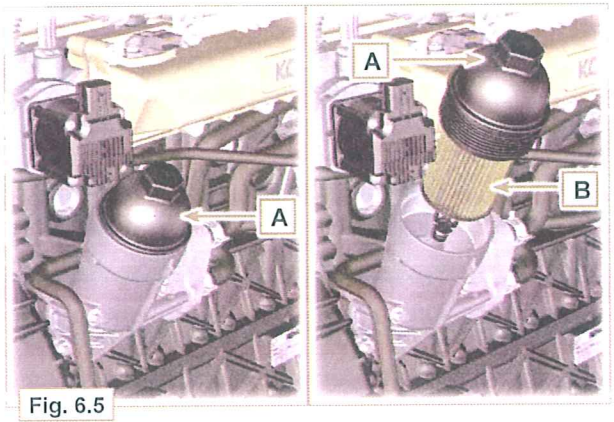


Fig. 6.5

3 - Remove and replace the oil cartridge B with a new one. Remove and replace the gaskets C, D and E with new ones.

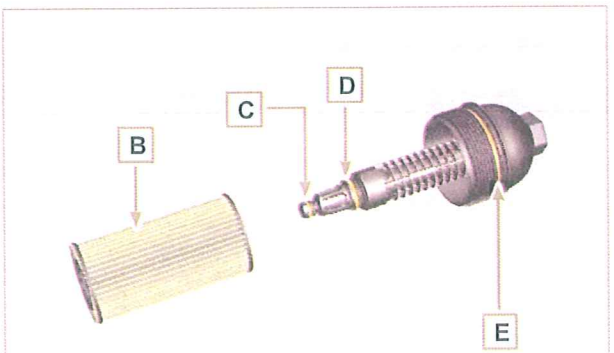


Fig. 6.6

EN

4 - Fit and tighten the cover A on the oil filter support F, tightening it with a torque wrench G (tightening torque of 25 Nm).

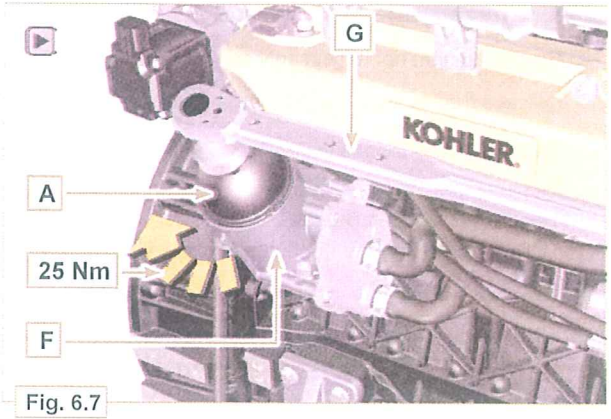


Fig. 6.7

NOTE: Click on the icon ( ) to play the procedure.

6.3 Remote oil filter cartridge replacement (optional)

1 - Unscrew and remove the cartridge A using the appropriate wrench.

2 - Lubricate the gasket and screw on the new cartridge A using the appropriate wrench.

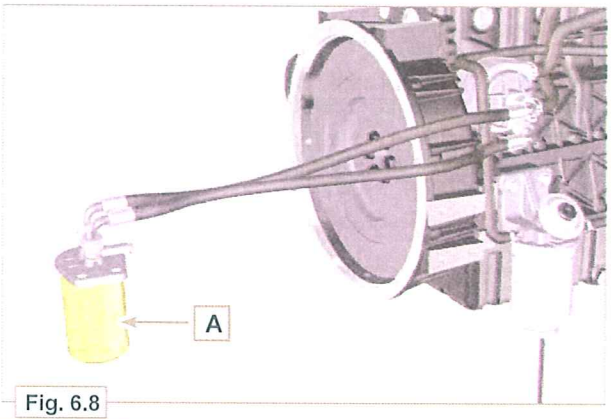


Fig. 6.8

6.4 Fuel filter cartridge replacement

1 - Disconnect the cable A of the water presence sensor C.

2 - Remove the water presence sensor C from its cartridge B.

3 - Loosen the cartridge B using the appropriate wrench F (Fig. 6.10).

4 - Lubricate the gasket D of the new cartridge B.

Important

• Do not fill the new cartridge B with fuel.

5 - Tighten the new empty cartridge B (Fig. 6.10) on the diesel fuel filter support E using the special wrench F (tightening torque of 17 Nm).

6 - Tighten the water presence sensor C on the new cartridge B (tightening torque of 5 Nm).

7 - Reconnect the cable A of the water presence sensor C.

NOTE: Bleeding.

8 - Push repeatedly the button G in order to fill the circuit.

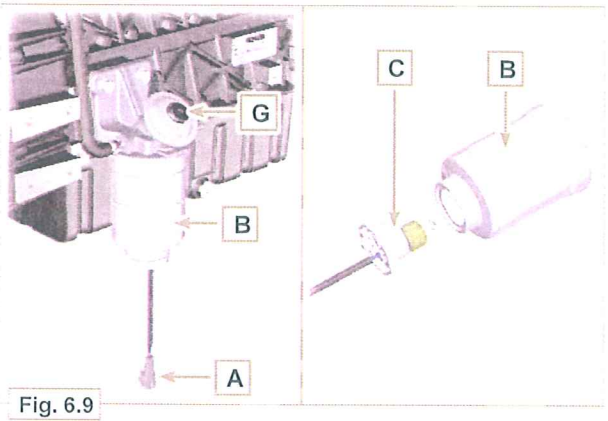


Fig. 6.9

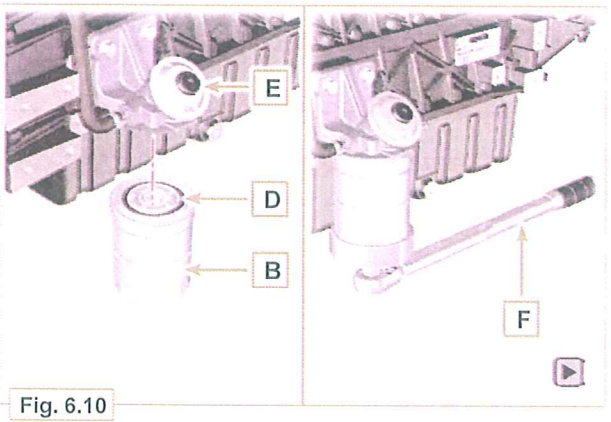


Fig. 6.10

NOTE: Click on the icon ( ) to play the procedure.

EN

6.5 Air filter cartridge replacement

NOTE: Component not necessarily supplied by KOHLER.

1 - Release the two fastenings F of the cover A.

2 - Remove the cartridges B and G.

3 - Reinstall:
- the new cartridges B and G.
- the cover A checking the right tightness of fastenings F.

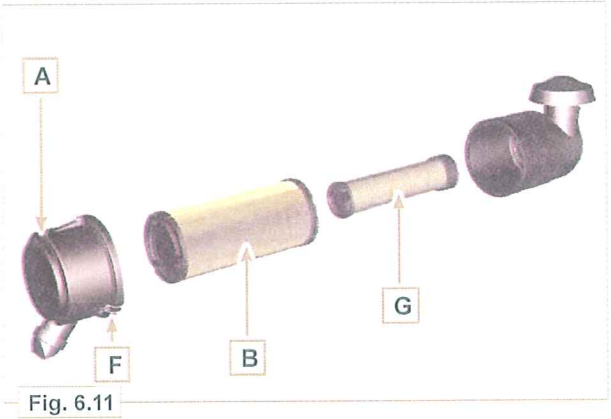


Fig. 6.11

6.6 Disposal and scrapping

- In case of scrapping, the engine shall be disposed of in appropriate locations, in conformity with the law in force.
- Before scrapping, it is necessary to separate the rubber or plastic parts from the rest of the components.
- The parts only composed of plastic material, aluminium and steel can be recycled if collected by the appropriate centers.
- Waste oil must properly be recycled and disposed of in the correct way to safeguard the environment. According to the laws in force, it is classified as hazardous waste, therefore it must be collected by the appropriate centers.

EN

7.1 Useful information about failures

- This chapter contains information about the problems that may appear during engine operation with its causes and trouble shooting **Tab. 7.2**.
- In some cases, you shall turn off the engine immediately to avoid further damage **Tab. 7.1**.

Tab. 7.1

	THE ENGINE MUST BE IMMEDIATELY TURNED OFF WHEN
1	Warning RED light turn on
2	The oil pressure indicator light turns on while running
3	The engine rpms suddenly increase and decrease
4	A sudden and/or unusual noise is heard
5	Colour the exhaust fumes suddenly darkens

Tab. 7.2

TROUBLES	POSSIBLE CAUSE	SOLUTION	PAR.
Warning YELLOW light turn on	Engine ECU has detect a malfunctions	Contact **KOHLER** authorised workshops	--
The engine does not start	Sulphated battery terminals corroded	Clean the battery terminals	--
	Battery voltage too low	Recharge the battery or replace it	--
	Low fuel level	Refuel	4.4
	Frozen fuel	Contact **KOHLER** authorised workshops	--
	Clogged fuel filter	Replace with a new filter	6.4
	Air suction in fuel system	Contact **KOHLER** authorised workshops	--
	Clogged air filter	Replace with a new filter	6.5
	Clogged pipes	Contact **KOHLER** authorised workshops	--
	Open fuse	Replace with a new fuse; if the problem persists, contact **KOHLER** authorised workshops	--
	Intake or exhaust system clogged	Contact **KOHLER** authorised workshops	--
Engine starts but stops	Inefficient electrical connections	Clean the electrical contacts; if the problem persists, contact **KOHLER** authorised workshops	--
	Sulphated battery terminals	Clean the battery terminals	--
	Clogged fuel filter	Replace with a new filter and clean the tank	--
	Clogged fuel pipes	Contact **KOHLER** authorised workshops	--
RPM instability at idle speed	Clogged fuel pipes	Contact **KOHLER** authorised workshops	--
Low idle speed	Clogged fuel pipes	Contact **KOHLER** authorised workshops	--
	Poor quality fuel	Clean the tank and refuel with quality fuel	2.5
Blue smoke	High oil sump level	Replace the engine oil; if the problem persists, contact **KOHLER** authorised workshops	--
	Clogged air filter	Replace with a new filter	6.5
Excessive fuel consumption	Clogged air filter	Replace with a new filter	6.5
	High oil sump level	Replace the engine oil; if the problem persists, contact **KOHLER** authorised workshops	--
Engine lost its initial performance	Clogged air filter	Replace with a new filter	6.4
	Clogged fuel pipes	Contact **KOHLER** authorised workshops	--
	Cheap fuel	Clean the tank and refuel with quality fuel	--
	High oil sump level	Replace the engine oil; if the problem persists, contact **KOHLER** authorised workshops	--
Slow acceleration	Clogged fuel filter	Replace the fuel filter	6.4
Engine jerking	Clogged fuel pipes	Contact **KOHLER** authorised workshops	--
Engine overheats	Insufficient coolant level	Fill up to the level	4.6
	High oil sump level	Replace the engine oil; if the problem persists, contact **KOHLER** authorised workshops	--
	Clogged radiator	Clean the radiator; if the problem persists, contact **KOHLER** authorised workshops	--

- In the event that the solutions proposed in **Tab. 7.2** do not eliminate the trouble, contact a **KOHLER** authorized workshop.

EN

WARRANTY INTERNATIONAL

3 YEAR LIMITED WARRANTY - KOHLER DIESEL ENGINES

Kohler Co. warrants to the original retail consumer that each new Diesel engine will be free from manufacturing defects in materials or workmanship in normal service for the applicable coverage period set forth below beginning on the date of purchase; provided the engine is operated and maintained in accordance with Kohler Co.'s instructions and manuals. If no hour meter is installed as original equipment then 4 hours of use per day and 5 days per week will be used to calculate hours used.

ENGINE SERIES	WARRANTY PERIOD	OPERATING HOURS	WARRANTY COVERAGE
Diesel (Non-KDI)	3 Years	0 – 2.000	100% Parts & Labor
KDI	3 Years	0 – 2.000	100% Parts & Labor
		2.001 – 6.000	Major Components Only *

* Major component defects are failures related to a crankcase casting, cylinder head casting, crankshaft, crankshaft pulley, camshaft, connecting rod, flywheel, and oil pump.

Kohler Co.'s obligation under this warranty is expressly limited, at its option, to an appropriate adjustment, repair or replacement of such part or parts as found to be defective following an inspection by Kohler Co. or an authorized service facility designated by Kohler Co.

EXCLUSIONS

The following items are not covered by this warranty.

- Damage caused by: (i) an accident or casualty; (ii) unreasonable use or neglect; (iii) normal wear; (iv) premature wear from improper maintenance; (v) improper storage; (vi) old or contaminated fuel left within the fuel system, which includes but is not limited to tanks, fuel lines, or fuel injection components.
- Failures caused by: (i) faulty repairs made by any party other than Kohler Co. or an authorized service facility designated by Kohler Co.; (ii) use of non-Kohler replacement service parts; or (iii) an act beyond the control of Kohler Co., which includes but is not limited to theft, vandalism, fire, lightning, earthquake, windstorm, hail, volcanic eruption, flood or tornado.
- Transportation charges in connection with the repair or replacement of defective parts.
- Engine accessories such as fuel tanks, clutches, transmissions, power drive assemblies, and batteries, unless supplied or installed by Kohler Co.
- Rental of equipment during performance of warranty repairs.
- Fuel, lubricating oil, air filters, oil filters, or coolant/antifreeze

IMPLIED OR STATUTORY WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. KOHLER CO. MAKES NO OTHER EXPRESS WARRANTY, NOR IS ANYONE AUTHORIZED TO MAKE ANY ON KOHLER CO.'S BEHALF. KOHLER CO. AND/OR THE SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND.

Some states or countries do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country (www.KohlerEngines.com), or state to state within U.S.A.

TO OBTAIN WARRANTY SERVICE

Original retail purchaser must bring the engine to an authorized service facility designated by Kohler Co. found by visiting www.KohlerEngines.com or telephone 1-800-544-2444 (U.S.A. and Canada).

ENGINE DIVISION, Kohler Co., Kohler Wisconsin

EN

WARRANTY NORMS EPA

KOHLER CO.

CALIFORNIA AND FEDERAL EMISSION CONTROL WARRANTY STATEMENT YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board, U.S. Environmental Protection Agency ("EPA") and Kohler Co. are pleased to explain the emission control system warranty on your MY2014-2016 engine. In California ("the State") and US EPA regulated applications, new heavy-duty off-road engines must be designed, built and equipped to meet the State's and U.S EPA's stringent anti-smog standards. Kohler Co. must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, Kohler Co. will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE

The MY2014-2016 heavy-duty off-road engines are warranted for the periods listed below. If any emission-related part on your engine is defective, the part will be repaired or replaced by Kohler Co.

MY2014-2016 KD, KDW AND ALL TPEM ENGINES	
ENGINE POWER	DURATION
kW < 19 (hp < 25)	3 years or 2,000 hours
kW ≥ 19 (hp ≥ 25)	5 years or 3,000 hours

MY2014-2016 KDI ENGINES	
ENGINE POWER	DURATION
kW < 19 (hp < 25)	3 years or 6,000 hours
kW ≥ 19 (hp ≥ 25)	5 years or 6,000 hours

OWNER'S WARRANTY RESPONSIBILITIES

(a) As the off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Kohler Co. recommends that you retain all receipts covering maintenance on your off-road engine, but Kohler Co. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
(b) As the off-road engine owner, you should however be aware that Kohler Co. may deny you warranty coverage if your off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
(c) Your engine is designed to operate on diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements.
(d) You are responsible for initiating the warranty process. The ARB suggests that you present your off-road engine to a Kohler Co. dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact Kohler Co., by visiting www.KohlerEngines.com or telephone 1-800-544-2444 (U.S.A. and Canada).

EN

COVERAGE

Kohler Co. will repair or replace emission control system parts, components and sub-assemblies found to be defective with respect to materials or workmanship at no cost to you including engine exhaust system related diagnosis, labor and parts. The choice and responsibility of the decision to repair or replace an emission control system defect will be solely that of Kohler Co. Emission control system parts/ components covered by the Federal and California Emission Control Systems Limited Warranty are listed below.

- Fuel injector(s)
- Injection pump(s)
- Exhaust manifold
- Intake manifold
- Exhaust gas recirculation (EGR) tube
- Crankcase ventilation valve
- Electronic control unit (ECU) if equipped
- Sensors associated with ECU operation
- Emission control information labels
- Turbocharger (if equipped)
- Fuel limiting device

Parts/components that are scheduled to be replaced as part of the required maintenance schedule will be covered under the warranty provisions for a period of time up to the first scheduled replacement point for the subject parts/ components. Subsequent damage to other engine components as a direct result of a warrantable failure an exhaust emission part/ component will be covered under the warranty provisions described herein.

As the heavy-duty off-road engine owner, you should however be aware that Kohler may deny you warranty coverage if your heavy-duty off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications. Only due to the above reasons, the manufacturer may deny the warranty coverage.

EN

UM KDI 1903TCR_2504TCR_ cod. ED0063029490 - 3ª ed_rev. 02

A

Alternator	A component that transforms mechanical energy into AC electrical energy.
Authorised workshop	Kohler authorised service centre

B

Bore	Internal diameter of the cylinder in combustion engines.

C

Catalyst	A device in charge of filtering exhausted gas.
Combustion	Chemical reaction of a mixture composed of fuel and fuel (air) inside a combustion chamber.
Common Rail	A high-pressure "Common Duct" that produces a constant supply of fuel directly to the injectors.

E

EC	"European Community".
ECS	Emission Control System
ECU	Electronic Control Unit; an electronic device in charge of electronically detecting and controlling other electronic control devices.
EGR	Exhaust Gas Recirculation, in internal combustion engines; a system that enables recirculation of combusted gas by means of taking it in once again, which enables it to break down a part of the pollutants present in the exhaust gas.
EGR Cooler	Recirculated exhaust gas cooling; a system that is able to cool recirculated gas (EGR) from the exhaust. This enables the temperature to remain constant inside the intake manifold, thus improving combustion inside the cylinders and breaking down pollutants further.
Electronic injector	An electronically activated component able to inject jets of atomised fuel inside the cylinders.
EPA	Environmental Protection Agency. The United States' authority that safeguards the environment; its duty is to govern and control polluting emissions.

F

Fig.	Figure.
Functional units	Component, or group of main components, able to carry out specific functions on the engine.

G

Galvanised	Material that has undergone surface protection treatment.

H

Heavy conditions:	Type of extreme condition referred to the work environment in which the engine is used (very dusty - dirty area, or in a contaminated environment due to various types of gas).
Heater	A device that heats the intake air by means of an electrical resistor.

I

Installation torque	A term indicated for installation of threaded components and which is determined by means of a unit of measurement Nm.

K

KDI	"Kohler Direct Injection"

M

Maintenance - periodic	A group of maintenance actions that have the sole objective to control and replace elements on their expiry, without modifying or improving the functions carried out by the system, neither increasing the value nor improving performance.
Max.	Maximum.
Min.	Minutes.
Min.	Minimum.
Model	Model, engine identification plate, which indicates the engine's model.

O

Oil Cooler	Small radiator used to cool the oil.

P

Par.	Paragraph.
Poly-V	Poly-V, the name associated with a service belt, which derives from the profile of its section that is constructed with joined Vs.

R

Ref.:	Reference.

S

s/n	Serial number (engine identification name plate) indicating the engine identification series/chassis number.
Sulphated	Chemical reaction between sulphur dioxide and water or hydroxide.
Spec.	Specification, (engine identification name plate) indicating the engine version.

T

Torque	Force applied to an object that rotates on an idler shaft.
Tab.	Table.
T-MAP	T-MAP (sensor), measures the temperature and absolute pressure inside the intake collector.
TCR	"Turbo Common Rail".
Thermostatic valve	A valve that adjusts the flow of coolant liquid; it is able to operate by means of temperature variation.

Turbocharger

Device that compresses air intake by sending it to the intake manifold by means of a turbine.

U

Used oil

Oil altered by operation or time, which is no longer compliant for correct lubrication of the components.

SYMBOLS AND UNITS OF MEASUREMENT

SYMBOL	UNIT OF MEASUREMENT	DESCRIPTION	EXAMPLE
α	degree	Rotation/inclination angle	1°
cm^2	square centimetre	Area	1 cm^2
Ø	millimetre	Circumference	Ø 1 mm
Nm	newton-metre	Torque	1 Nm
mm	millimetre	Dimension	1 mm
µm	1/1000 of a millimetre (micron)		1 µm
h	hour	Quantity	1 h
g/kWh	grammes per kilowatt per hour		1 g/kWh
kg/h	kilogramme per hour		1 kg/h
Lt./min.	litres per minute		1 Lt./min.
Lt./h	litres per hour		1 Lt./h
ppm	parts per million		1 ppm
N	newton	Force	1 N
A	Ampere	Intensity of electrical current	1 A
Lt.	litre	Liquids	1 Lt.
gr.	gramme	Weight	1 gr.
kg	kilogramme		1 kg
W	Watt	Power	1 W
kW	kiloWatt		1 kW
pa	pascal	Pressure	1 pa
KPa	Kilopascal		1 KPa
bar	barometric pressure		1 bar
mbar (1/1000 bar)	barometric pressure		1 mbar
R	Resistance	Resistance to electrical current (referred to a component)	1 Ω
Ω	ohm	Resistance of electrical current	1 Ω
Rpm	revs per minute	Rotation of an axis	1 Rpm
Ra	average roughness expressed in microns	Roughness	Ra = 1
°C	degree centigrade	Temperature	1°C
V	Volt	Electrical voltage	1 V
⬢	millimetre	Hex-head capscrew	⬢ 1 mm
cm^3	cubic centimetre	Volume	1 cm^3
Lt.	litre		1 Lt.

EN

Translated from the original manual in Italian language.

Data reported in this issue can be modified at any time by KOHLER.

FORM NO.	ED0053029490		
ISSUED	09/2013		
REVISED	02	DATE	04/2014

KOHLER.

EUROPE
Lombardini Srl
Via Cav. del lavoro
A. Lombardini n° 2
42124 Reggio Emilia, ITALY
T. +39-(0)522-389-1
F. +39-(0)522-389-503

USA & CANADA
Kohler Co.
444 Highland Drive,
Kohler - Wisconsin (53044), US
T. +1 920 457 4441
F. +1 920 459 1570

FRANCE
Lombardini France S.a.s.
47 Alléè de Riottier,
69400 Limas, FRANCE
T. +33-(0)474-626500
F. +33-(0)474-623945

DEUTSCHLAND
Lombardini Motoren GmbH
Silostr. 41,
65929 FRANKFURT
Hessen, DEUTSCHLAND
T. +49-(0)69-9508160
F. +49-(0)69-5073410

UK
Lombardini U.K. Ltd
1, Rochester Barn - Eynsham Road
OX2 9NH
Oxford, UK
T. +44-(0)1865-863858
F. +44-(0)1865-861754

ESPAÑA
Lombardini ESPAÑA, S.L.
P.I. Cova Solera 1-9
08191 - Rubí (Barcelona)
ESPAÑA
T. +34-(0)9358-62111
F. +34-(0)9369-71613

ROAPAC
Lombardini Singapore
26 Keong Saik Road (3rd floor)
Asia Pacific Represent.Offices
089154- Singapore
T. +65-(0)622-50556
F. +65-(0)622-50551

CONTROLS INCORPORATED

Product Manual

Part Number: MVP-102
Revision: 1.0

P.O. Box 368 • Sharon Center, OH 44274
Phone 330.239.4345 • Fax 330.239.2845 • www.controlsinc.com

TABLE OF CONTENTS

Prior to starting the engine, select the proper throttle control mode and parameters required for application.

CAN Bus Configuration

This module communicates to the engine ECU via the J1939 CAN Bus network. This is a three wire connection to the engine ECU. Engine information and alarm codes are broadcast over the CAN bus from the engine ECU to the controller display. And, the controller communicates throttle commands to the engine ECU over the CAN bus.

To assure proper communications between the engine ECU and the controller, the correct **SOURCE ADDRESS** and **TSC1 ADDRESS** need to be selected in the controller for the particular engine make and model. These settings are available in the **CAN CONFIGURATION MENU**.

Throttle Settings

The following **bolded** settings are required for manual (and automatic) operation in the Throttle Configuration menu.

CAN Configuration	Throttle Type Selection
	TSC Minimum Speed
	TSC Maximum Speed
	TSC Ramp Rate
	Throttle Curve Selection

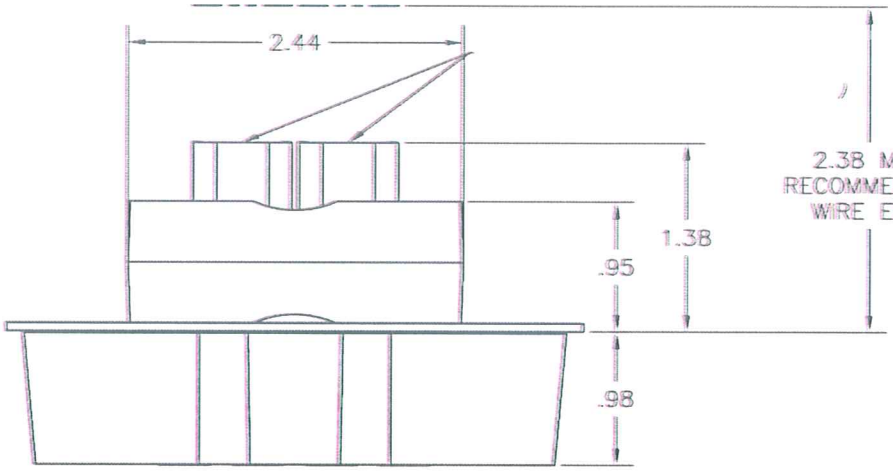
Manual Throttle Options

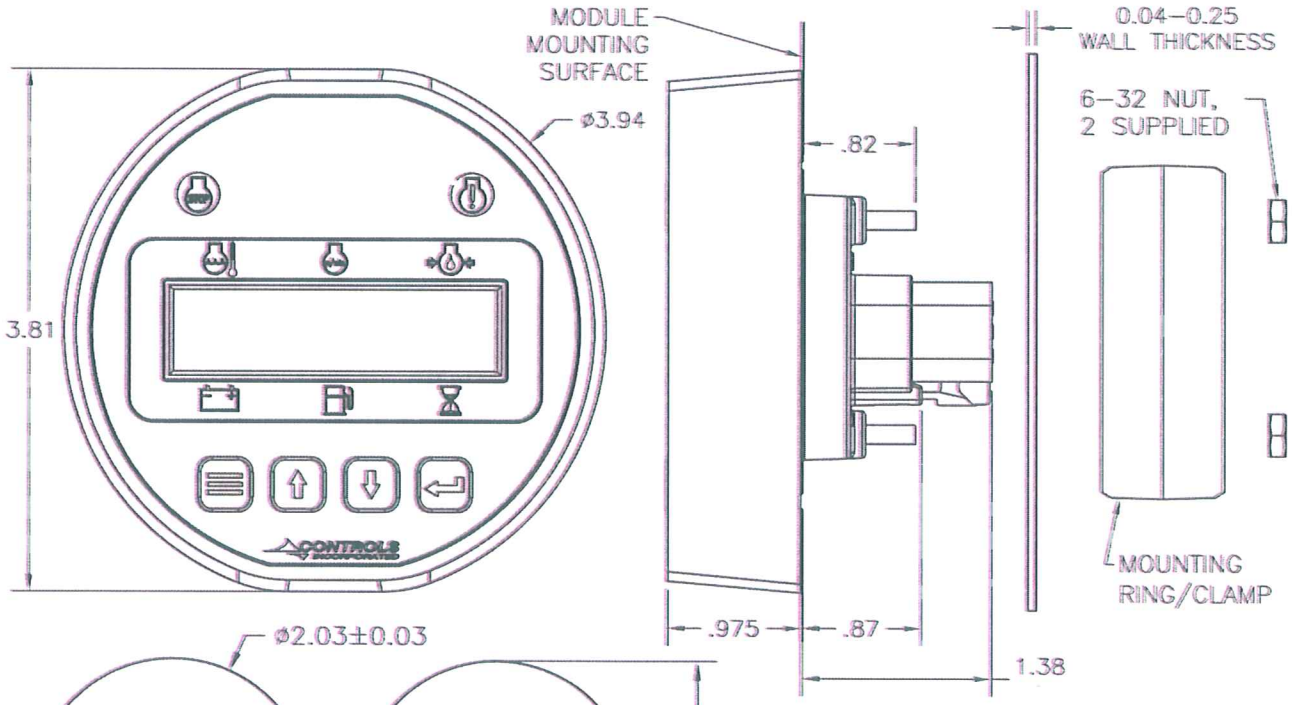
1) **Vernier Throttle**
   Vernier throttle is standard up and down throttle between the minimum and maximum selections. The ramp rate is the rate of acceleration in rpm's per second. The control panel uses J1939 throttle, also called "torque speed control" or TSC1.

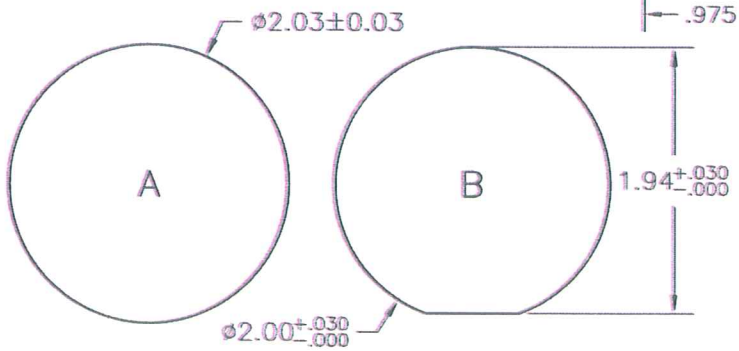
2) **Multistate Throttle**
   Multistate throttle provides for one, two, three or four specific operating speeds. Pressing the up and down buttons adjusts engine speed between the selected multistate speed selections.

3) **High/Low**
   Engine accelerates to the Max speed setting with the UP button is pressed. When the UP button is released, the engine goes back to idle speed.

INSTALLATION INFORMATION







MOUNTING HOLE REQUIREMENTS (A OR B)

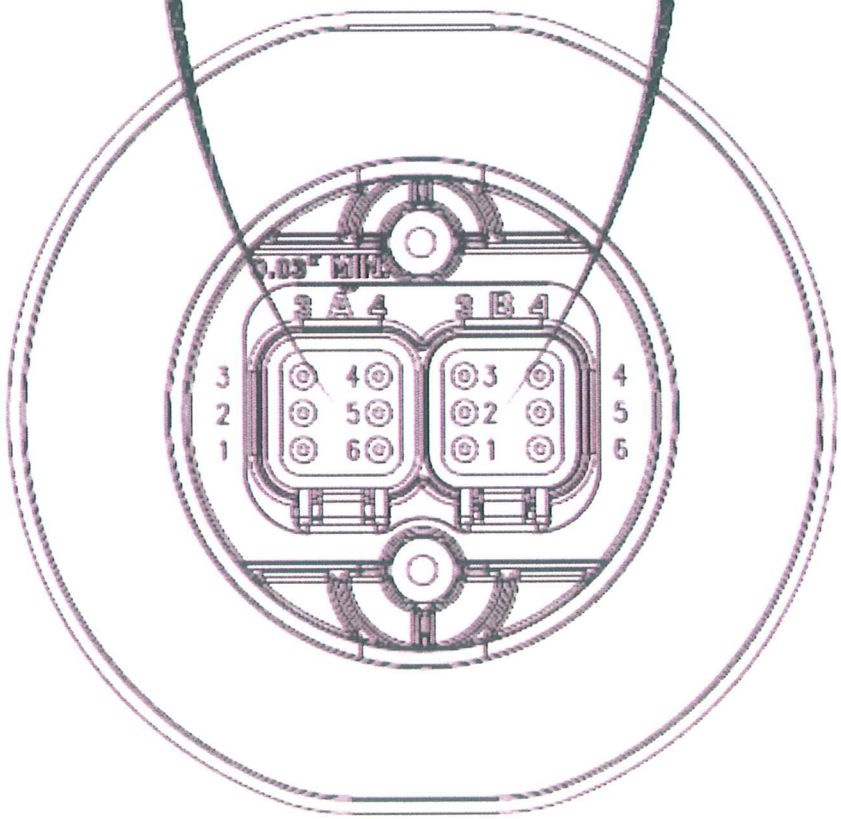
CONNECTOR INFORMATION

CONNECTOR A

FUNCTION	PIN
BATTERY +	1
CAN H	2
CAN L	3
DIGITAL INPUT 1	4
FUEL LEVEL	5
GROUND	6

CONNECTOR B

FUNCTION	PIN
BATTERY +	1
DIGITAL 1	2
RS-485 +	3
RS-485 -	4
DIGITAL 2	5
GROUND	6



ENGINE ALARMS, CODES AND MESSAGES

Engine ECU Alarm/De-Rate/Shut Downs

It is important to understand panel operation with respect to engine safety protections, alarms, and fault codes. The panel operates with J1939 engines. These engines have an ECU (engine control unit) which is essentially a computer that runs the engine. When engine parameters are out of normal operating ranges, the ECU takes specific actions which can include the following:

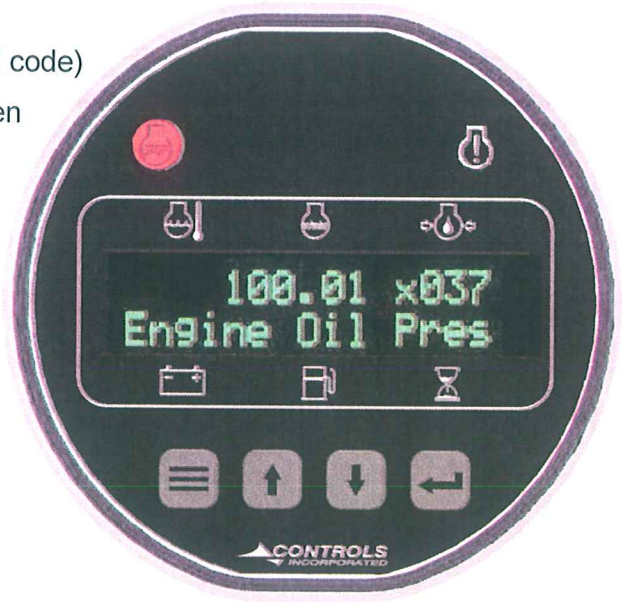
1) Broadcast a trouble code
2) Broadcast a red or yellow lamp
3) De-rate the engine
4) Shut down the engine
5) Turn on alarm horn

It is the engine ECU that de-rates or shuts down the engine when it is not operating within normal parameters. This includes more common shut downs like high engine temperature and low oil pressure but can encompass a large range of parameters depending on the ECU.

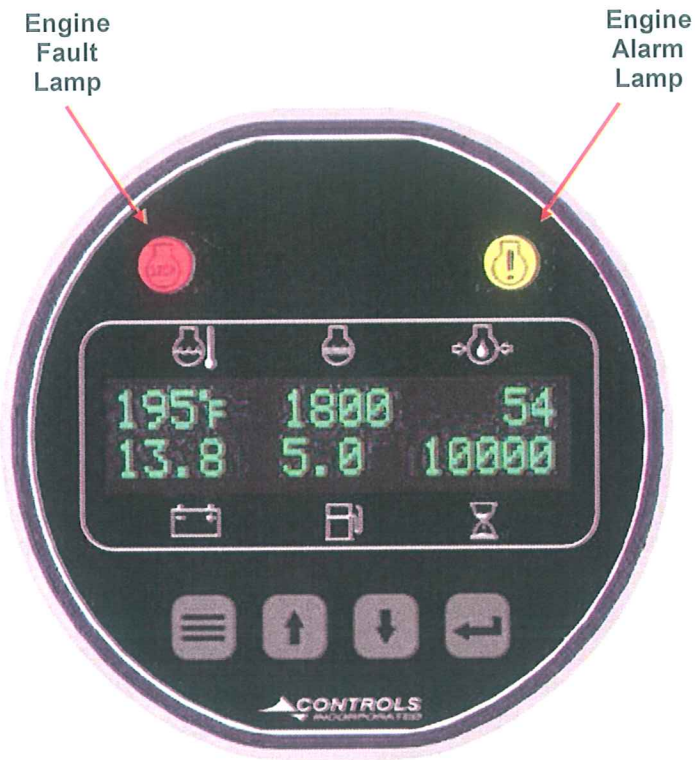
Alarm Annunciation and Code Reader

This panel is configured to operate with standard J1939 engines where engine de-rate and shutdowns are managed by the engine ECU. The panel communicates with the engine ECU and serves as a trouble code reader. When the engine ECU broadcasts a trouble code (called an SPN.FMI code) the panel does the following:

1) Illuminate the appropriate LED indicator lamp
    a. Yellow Lamp = Alarm
    b. Red Lamp = Engine Shut Down
2) Displays the trouble code (standard SPN.FMI code)
3) Displays a code description on the LCD screen
4) Displays the occurrence count of the code



Indicator Lamps



Active and Stored Engine ECU Codes

The panel also provides the ability to check the engine ECU for all ACTIVE and STORED engine ECU codes. These codes can be viewed via the Active Codes and Stored Codes menus.

CONTROL PANEL ANALOG AND DIGITAL INPUTS

The panel has one analog input and up to one digital input available to monitor other components, senders or signals. These inputs can be used for a number of purposes including alarms and shut downs.

Input	Heading	Default	Options	Connector	Pin
Analog 1	Function			A	5
Digital 1	Normally	Open	Open / Closed	A	4
	Function	None			
	Message	None			
	Check	Off	Off / Always / Run		

1) Analog 1 Function Options

1) Fuel Level S-W – Fuel amount, in percentage, can be measured and displayed using a standard Stewart Warner scale sender of 240 ohms – 33 ohms. 240 = Empty and 33 = Full. Sender ground must be common with battery negative.
2) Fuel Level VDO – Fuel amount, in percentage can be measured and displayed using a VDO scale sender of 10 ohms – 180 ohms. 10 = Empty and 180 = Full. Sender ground must be common with battery negative.
3) Oil Pressure PSI – Oil pressure, in PSI, can be measured and displayed using a standard Stewart Warner scale sender of 240 ohms – 33 ohms. 240 = 0 PSI and 33 = 100 PSI. Sender ground must be common with battery negative.
4) Oil Pressure bar – Oil pressure, in bar, can be measured and displayed standard Stewart Warner scale sender of 240 ohms – 33 ohms. 240 = 0 bar and 33 = 7 bar. Sender ground must be common with battery negative.
5) Oil Pressure VDO PSI – Oil pressure, in PSI, can be measured and displayed using a standard Stewart Warner scale sender of 10 ohms – 180 ohms. 10 = 0 PSI and 180 = 150 PSI. Sender ground must be common with battery negative.
6) Oil Pressure bar – Oil pressure, in bar, can be measured and displayed using a standard Stewart Warner scale sender of 10 ohms – 180 ohms. 240 = 0 bar and 33 = 10 bar. Sender ground must be common with battery negative.
7) Switch – This setting allows for a switch to be connected rather than an analog sender. Set Analog 1 Message to assign a label to the switch device.
8) None – Set to None when no functionality is required.

2) Digital Input Function Activation

1) Off / Always / Run – Describes when the parameter will be monitored for alarm conditions. Run refers to when the engine is running. Off disables the alarm conditions. Always enables the alarm constantly regardless of engine state.
2) Alarm Delay – The time period, after Sender Check Bypass, that the parameter must be on the alarm condition before the alarm becomes latched.

3) Digital B Port Options

1) B1 – Used to attach an external switch for throttle control. Default is Throttle Up
2) B2 – Used to attach an external switch for throttle control. Default is Throttle Down

3) MENU SYSTEM

To Enter Menu System

Hold MENU button and press ENTER button.

Menu Navigation

Press MENU button to scroll menu options.

Press UP arrow button to enter menu.

Press DOWN arrow button to reverse.

Exit Menu System

Hold MENU button and press ENTER button.

To Change a Setting

Press ENTER button to bring up brackets [ ].

Press UP arrow button and DOWN arrow button to change setting.

Press ENTER button to make selection, brackets disappear.

Recycle key to the OFF position after changing a setting.

Main Menus

Main Menus	Sub Menus		
Active Engine Fault Codes	View/Scroll Active Fault Codes		Viewing Menus
Stored Engine Fault Codes	View/Scroll Stored Fault Codes		
Engine Parameters	View ECU Engine Information (% Load, Torque, Oil Temp, etc.)		
Engine Identification	Engine Model # View		
	Engine Serial # View		
Module Information	Control Unit Part# View		
	Control Unit Software Version View		
Controller Setup (PASSWORD PROTECTED)	Input Configuration	(1)	Configuration Menus
	Throttle Configuration	(2)	
	Module Configuration	(3)	
	CAN Configuration	(4)	
	MOD bus Configuration	(5)	

To access the controller setup menus, a password is required.

Configuration Menus

(1)	**Input Configuration**	Analog 1 Function
		Digital 1 Function
(2)	**CAN Configuration**	Throttle Type Selection
		TSC Minimum Speed
		TSC Maximum Speed
		TSC Ramp Rate
		Throttle Curve Selection
(3)	**Module Configuration**	Display Units (English, Metric)
		Hourmeter Source (Engine ECU, Internal)
		Battery Source (J1939, Internal)
		Battery Volt Trim
(4)	**CAN bus Configuration**	Source Address (Default = 44) Others available
		TSC1 Address (Default = 3) Others available
		Engine Address (Default = 0) Others available
		Oil/Fuel Transmit
(5)	**MOD bus Configuration**	Baud Rate
		Parity
		Stop Bits
		Slave Address
		Enable Gauges
		Tachometer Range
		Engine Oil Temperature Range
		Transmission Oil Temperature Range

BLANK SHEET

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