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The Xtreme Choice of Professional Landscapers and Municipalities

LCT450

Tow-Behind Debris Collector



Units shown with options.



**2019 Edition
PRODUCT MANUAL**
Owner's Manual
Safety Manual
Pre-Operating Manual
Operating Manual
Maintenance Manual
Service Manual
Parts Catalog



PERFORMANCE

QUALITY

VALUE

SERVICE



xtremevac.com

 **CAUTION**

**DO NOT ATTEMPT to OPERATE
or REPAIR the DEBRIS COLLECTOR
WITHOUT FIRST READING and
UNDERSTANDING this MANUAL.**

IF YOU HAVE ANY QUESTIONS CONCERNING
the INSTALLATION or OPERATION of the UNIT,
PLEASE CALL your Trusted **XTREME VAC** Dealer
LISTED BELOW for ASSISTANCE BEFORE
ATTEMPTING to REPAIR or OPERATE the UNIT.

**IMPROPER USE OF ANY MACHINE
CAN RESULT IN SERIOUS INJURY!**

**STUDY and FOLLOW ALL SAFETY
PRECAUTIONS BEFORE OPERATING
or REPAIRING UNIT**

This Manual is an integral part of the debris collector
and should be kept with the unit when it is sold.

Sold and Serviced by:



The Xtreme Choice of
Professional Landscapers
and Municipalities

103019 CT

Registration

Please take the time to register you leaf collector and your engine for warranty purposes.

You may go to our website: www.xtremevac.com to register your unit or use the warranty sheet below and mail to:

Attn: Xtreme Vac Registration
Xtreme Vac
5118 Glen Alden Drive
Richmond, VA 23231

You may also fax the form to: (804) 226-6914.

For engine registration, please use the forms provided in your engine owner's manual.

XTREME VAC LEAF COLLECTOR / XSWEEP WARRANTY REGISTRATION

(Register your leaf vacuum or XSWEEP to start your warranty)

Register online at www.xtremevac.com/register.asp

Purchaser's Name _____

Department _____

MAILING Address _____

City _____ State/Province _____ Postal Code _____

Leaf Collector Serial Number -

Leaf Collector VIN Number 1 Z 9 P R 1 6 8

Date Delivered (mm/dd/yyyy) ____/____/____

Leaf Collector/Sweeper Model Number (please check one)

XV6527 XV8027/31 Xtreme Sweep XV6000 SCL65TM Other: _____

Engine Manufacturer: John Deere Kawasaki Cummins Kubota Other: _____

Engine Serial Number:

(example PE4045T123456, John Deere engines must have 13 characters)

Contact Name _____

Telephone (_____) _____ - _____

THANK YOU FOR PURCHASING AN Xtreme Vac!

Note: This form may be **faxed** to (804) 226-6914

The leaf collector owner's and safety manual was received. I understand that it is the responsibility of each user and mechanic to carefully read and understand the safety and operating sections of the owner's manual.

Purchaser's Signature

Date

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⚠ WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

PLEASE RECORD THE FOLLOWING INFORMATION BEFORE
PLACING THE UNIT INTO SERVICE:

Model Number: _____ Unit Serial No.: _____

Purchase Date: _____ Engine Serial No.: _____

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SAFETY PRECAUTIONS

WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.



DANGER

DO NOT RIDE, SIT OR STAND ON UNIT.

**RIDING ON UNIT
COULD RESULT IN BODILY
HARM OR FATAL INJURY
USE EXTREME CAUTION WHEN
UNIT IS IN USE, OR IN MOTION.**

If the decal above is missing or damaged call your dealer immediately. Never operate a unit with damaged or missing safety decals.

 DANGER

DO NOT RIDE, SIT OR STAND ON UNIT

 DANGER

DO NOT MODIFY THE UNIT FOR RIDERS IN ANY WAY. SERIOUS INJURY OR DEATH MAY OCCUR

Xtreme Vac's leaf collectors are NEVER to be used to accommodate riders. If your unit has been modified to accommodate riders, remove these modifications immediately as this can result in serious injury or death.

SAFETY PRECAUTIONS





WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

1.1 Safety Symbol Definitions:

This manual provides the owners/operator with procedures for safe operation, maintenance and repair of your leaf collector. As with any machine, there are hazards associated with their operation. For this reason safety is emphasized throughout this manual. To highlight specific safety information the following safety definitions are provided to assist the reader.

The purpose of safety symbols are to attract your attention to possible dangers. The safety symbols, and their explanations, deserve your careful attention and understanding. The safety warnings do not by themselves eliminate any danger. The instructions or warnings they give are not substitutes for proper accident prevention measures.

SYMBOL	MEANING
	SAFETY ALERT SYMBOL: Indicates danger, warning or caution. Attention is required in order to avoid serious personal injury. May be used in conjunction with other symbols or pictographs.
	Disregarding this safety warning WILL result in serious equipment damage, injury or possible death.
	Disregarding this safety warning CAN result in serious equipment damage, injury or possible death.
	Disregarding this safety warning MAY result in minor or moderate injury or property damage.

SAFETY PRECAUTIONS

WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

1.2 Do's and Do Not's:

This section contains some general safety precautions to do and not to do. This is not an all inclusive list and it is the responsibility of the operator to have proper training and use common sense in work situations.

WARNING

DO NOT:

1. **DO NOT** operate, maintain or repair this unit without having fully read and understood ALL the aspects of this manual.
2. **DO NOT** ride, sit or stand on unit at anytime.
3. **DO NOT** modify the leaf vacuum for any reasons to allow for riders.
4. **DO NOT** operate the unit in a state of disrepair.
5. **DO NOT** operate the unit with ANY guards or safety devices broken, missing, or inoperable.
6. **DO NOT** operate the unit without wearing proper safety equipment.
7. **DO NOT** operate this unit while under the influence of any alcohol or medication.
8. **DO NOT** operate this unit if you have a record of mental instability or dizziness which could result in injury to yourself or others.
9. **DO NOT** operate this unit if you are under 18 years of age.
10. **DO NOT** operate this unit without fully inspecting the unit for any damage or leakage.
11. **DO NOT** operate if the unit has any excessive vibration.
12. **DO NOT** operate unit with the inspection door limit switch damaged or missing.
13. **DO NOT** operate unit unless it is properly connected to a leaf collection box.
14. **DO NOT** operate unit unless it is properly attached to the tow vehicle.
15. **DO NOT** tow unit without using all the safety chains.
16. **DO NOT** tow unit with a damaged tongue.
17. **DO NOT** fill fuel tank with engine running. Allow engine to cool for 5 minutes before refueling.
18. **DO NOT** operate unit if fuel is spilled or with fuel cap off.
19. **DO NOT** smoke or weld near the unit.
20. **DO NOT** run engine in an enclosed area.
21. **DO NOT** place hands or feet near moving or rotating parts.
22. **DO NOT** operate engine with an accumulation of grass, leaves or

SAFETY PRECAUTIONS

WARNING

DO NOT, continued;

other debris on the engine.

23. DO NOT run engine with air cleaner removed.

24. DO NOT leave leaf machine unattended while in operation.

25. DO NOT park machine on steep grade or slope.

26. DO NOT vacuum a leaf pile without looking for foreign objects such as metal, glass, plastic or large pieces of wood.

WARNING

Do's:

1. **DO** completely read and understand the owner's manual before operating, maintaining or repairing the leaf collector.
2. **DO** follow engine and PTO manufacturer operating and maintenance instructions.
3. **DO** check fuel lines and fittings frequently for cracks or leaks. Replace if necessary.
4. **DO** completely inspect the unit before leaving the service garage.
5. **DO** check the tow tongue each day for cracks.
6. **DO** inspect and be attentive to what is being vacuumed.
7. **DO** check the impeller, liners and blower housing for cracks or holes daily.
8. **DO** wear proper safety equipment as described in this manual.
9. **DO** watch for pedestrians, animals and other foreign material when vacuuming leaves.
10. **DO** replace any worn or missing safety stickers immediately.

WARNING

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and birth defects or other reproductive harm. Wash Hands after handling

WARNING

Engine Exhaust, some its constituents and certain vehicle components contain or emit chemicals known to the state of California to cause cancer and birth defects or other reproductive harm.

SAFETY PRECAUTIONS

1.3 Training:

WARNING

Improper use of the Xtreme Vac leaf collector CAN result in severe personal injury or death. All personnel using this leaf vacuum must be trained and qualified with all the operations, maintenance, repair and safety procedures defined in this manual.

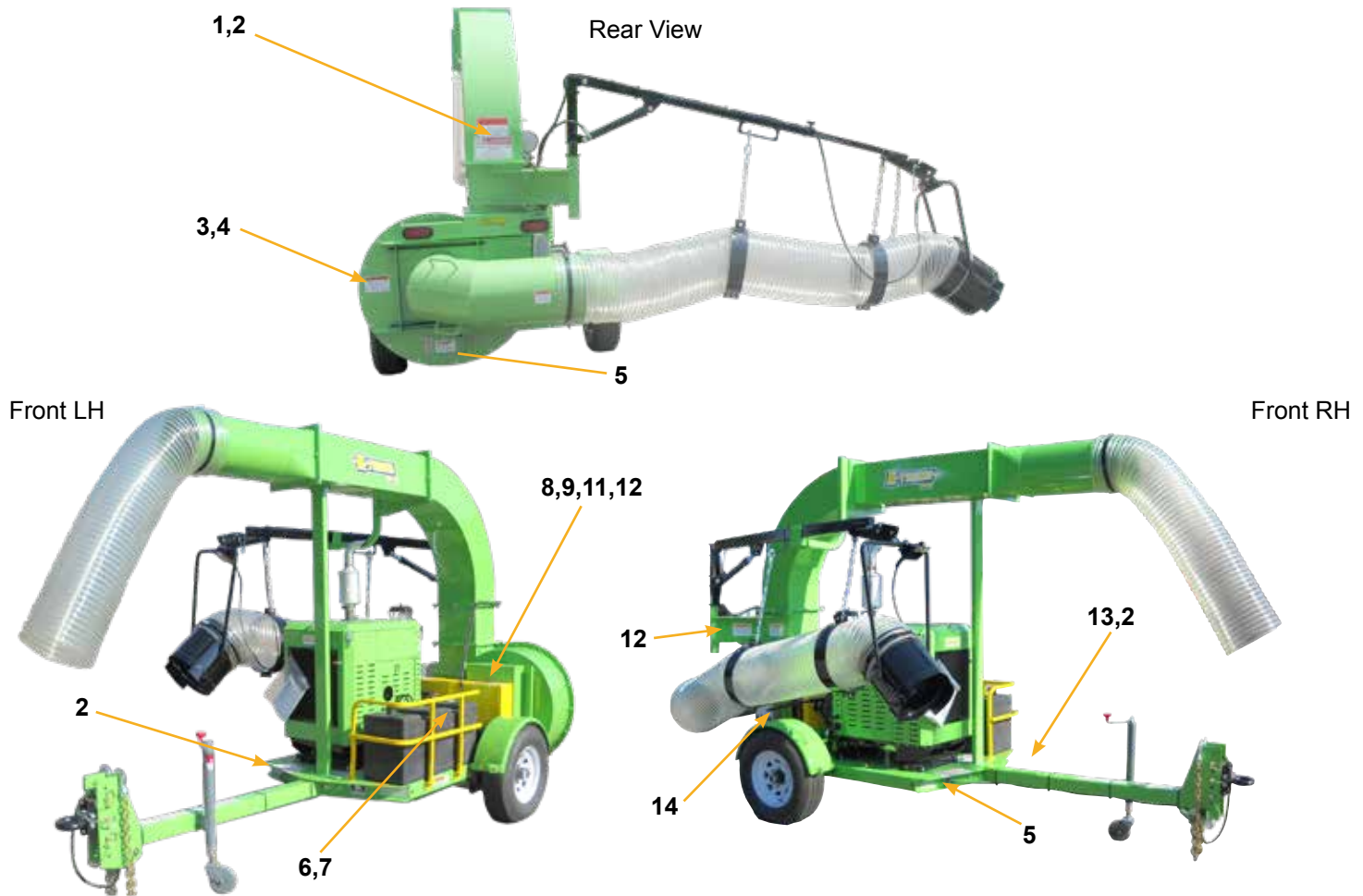
The warnings and procedures regarding safety in this manual are to be used as a guideline only. It is impossible to cover all the events that could happen in the vacuuming process. For this reason, it is vital that the owner accept the responsibility to implement a training program that will provide every operator or mechanic the basic skills and knowledge to make good judgement in all situations.

This training program must include the entire scope of hazards, precautions and government regulations encountered in the vacuuming process. The program should stress the need for regularly scheduled preventive maintenance and detailed equipment safety checks.

It is strongly recommended that all training programs be documented to ensure all operators and mechanics receive initial training on not just the operation but the safety features of the leaf collector.

SAFETY PRECAUTIONS

1.4 Decal Listing:



Decals shown on next page

ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION
Rear View Picture			Front RH Picture		
1	200181	Head, Eye and Ear Protection Required	12	200192	Caution - Do not operate unit without reading the manual
2	200179	Do Not Ride, Sit or Stand on Unt	13	200180	Danger - Inspect Tongue for damage
3	200189	Check Impeller	2	200179	Do Not Ride, sit or stand on unit.
4	65.1801	Do Not Operate Unit without Hose Attached	14	200104	Warning - check lug nuts
5	200182	Do Not Open Cover While in operation			
Front LH Picture					
6	200177	Flammable			
7	200055	Diesel Fuel only			
2	200179	Do Not Ride, Sit or stand on unit			
8	200106	Caution Pinch Point			
9	200109	Do Not Over Lubricate			
10	200178	Danger Explosion Hazard			
11	200183	Danger - Rotating Parts			
5	200182	Do Not Open Cover While in operation			

SAFETY PRECAUTIONS

1.4 Safety Decals - Decal Layout for X-treme Vac

1 200181 Head, Eye and Ear Protection Required



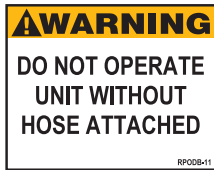
2 200179 Do Not Ride, Sit or Stand on Unit



3 200189 Check Impeller



4 65.1801 Do Not Operate Unit without Hose Attached



5 200182 Do Not Open Cover While in operation



6 200177 Flammable



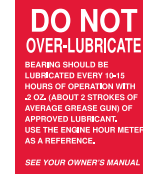
7 200055 Diesel Fuel only



8 200106 Caution Pinch Point



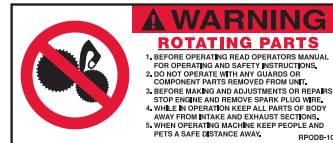
9 200109 Do Not Over Lubricate



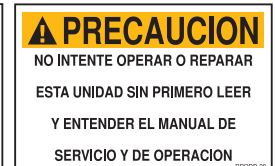
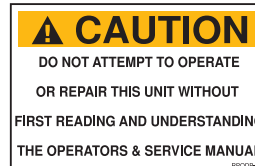
10 200178 Danger Explosion Hazard



11 200183 Danger - Rotating Parts



12 200192 Caution - Do not operate unit without reading the manual



13 200180 Danger - Inspect Tongue for damage



14 200104 Warning - check lug nuts



2.0 PRE-OPERATING SECTION

WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

2.0 PRE-OPERATING SECTION

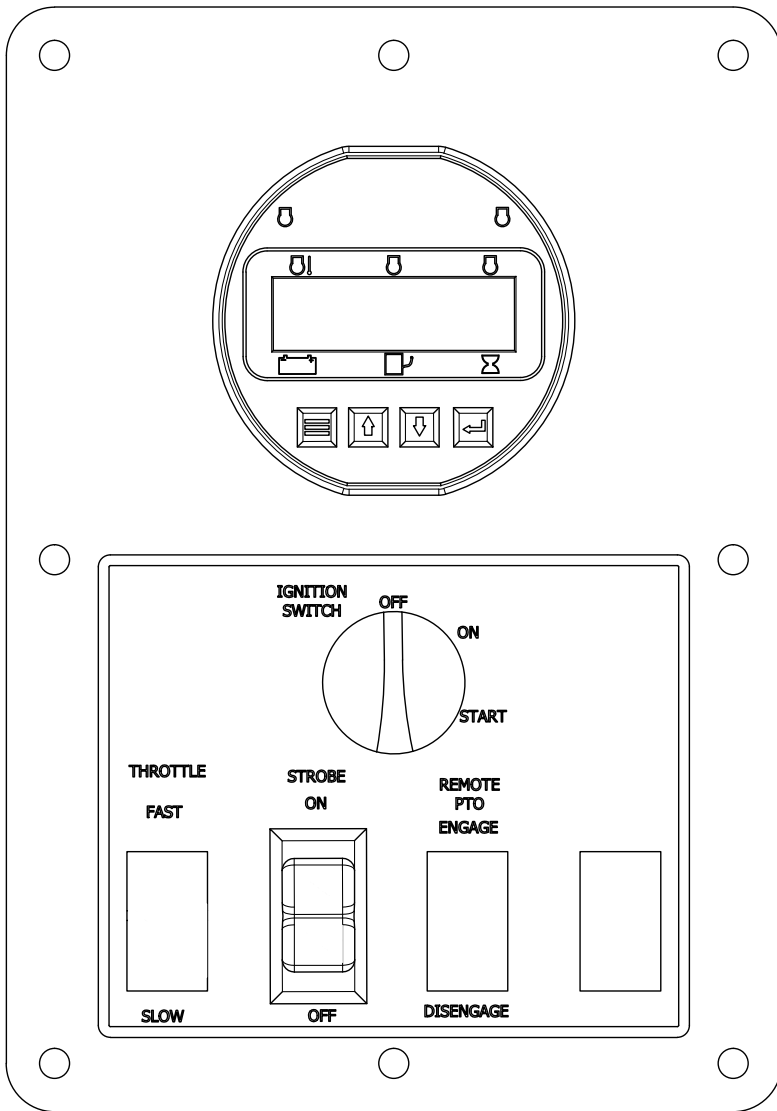
**2.0
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Section**

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Pre-Operating Section

2.1 Instrument and Controls:



Ignition Switch:

Used to power the accessories and start the unit.
ACCESSORIES - first position
STARTER ENGAGE - second position (springs return to first position)

Strobe Toggle

This switch toggles the strobe light on the Blower Housing (6.3 & 8.2)

CONTROL MODULE

To enter Menu system

Hold Menu button and press Enter ◀ button

Menu Navigation

Press Menu to scroll menu options
Press Up ▲ arrow to enter Menu option
Press Down ▼ arrow to return

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

⚠ CAUTION

Always make sure the PTO is disengaged before starting unit.

Pre-Operating Section

2.1 Instruments and Controls, cont.:

Main Menus

- >**Active Engine Fault Codes**
View/Scroll Active Codes

- >**Stored Engine Fault Codes**
View/Scroll Stored Fault Codes

- >**Engine Parameters**
View ECU Engine Information
(%Load, Torque, Oil Temp, ect)

- >**Engine Identification**
Engine Model # View
Engine Serial # View

- >**Module Information**
Control Unit Part# View
Control Unit Software Version View

- >**Controller Set**
Input Configuration
Throttle Configuration
Module Configuration
CAN Configuration
MOD bus Configuration

Configuration Menus (Controller Set)

- >**Input Configuration**
Analog 1 Funtion
Digital 1 Function

- >**CAN Configuration (Throttle)**
Throttle type Selection
TSC Minimim Speed
TSC Maximum Speed
TSC Ramp Rate
Throttle Curve Selection

- >**Module Configuration**
Display Units (English, Metric)
Hourmeter Source (Engine ECU, Internal)
Battery Source (J1939, Internal)
Battery Volt Trim

- >**CAN bus Configuration**
Source Adress (Default=44) Others Available
TSC1 Address (Default=3) Others Available
Engine Address (Default=0) Others Available
Oil / Fuel Transmit

- >**MOD bus Configuration**
Baud Rate
Parity
Stop Bits
Slave Address
Enable Gauges
Tachometer Range
Engine Oil Tempertature Range
Transmission Oil Temperature Range

To access the controller setup menus (Configuration Menus), a password is required

Pre-Operating Section

2.2 Safe Operations:

WARNING

ALL personnel using, maintaining or servicing this unit must be trained in all safety procedures outlined in this manual. Improper or careless use of this equipment CAN result in personal injury or death.

Operations shall be restricted to:

1. Properly trained, qualified and experienced operators and/or qualified and experienced maintenance and test personnel.
2. Trainees under the direct supervision of qualified and experience personnel.
3. Qualified and experienced maintenance and service personnel.

Operators who qualify to operate this equipment under the above restrictions shall also comply with the following physical requirements:

1. Have good vision and the ability to read and understand this manual as well as all safety and operational decals on the equipment.
2. Be capable of hearing, with or without a hearing aid, at a level needed to safely operate this equipment.
3. A record of mental stability with no history of epileptic seizures, dizziness, or any other disability that may result in injury to himself or others.

If any of these requirements are not satisfied at any time, the person failing to meet these requirements **MUST NOT OPERATE THIS EQUIPMENT.**

Pre-Operating Section

2.2 Safe Operations, continued:

Additional Requirements:

1. Each operator must demonstrate competence to understand all safety decals, operator's manuals, safety codes, applicable government regulations, and all other information applicable to the safe and proper operation of the leaf vacuum.
2. Each operator must demonstrate the ability to recognize an emergency situation that may arise during vacuuming operations and the knowledge and procedures to implement corrective action.
3. Each operator must demonstrate or provide evidence of qualification and experience prior to operating the leaf vacuum.
4. Each operator must be able to recognize existing or potential problems regarding the mechanical integrity of the leaf vacuum and report any maintenance requirements to the supervisor in charge.
5. Each operator must wear the proper personal clothing and safety gear. (Refer to SAFETY PRECAUTIONS Section 5.4)
6. Operators must not be physically or mentally fatigued.
7. Operators must not be under the direct or indirect influence of alcohol and/or drugs. This includes prescription drugs that could cause drowsiness, dizziness, or any other condition that would impair their ability to operate or use this equipment in a safe manner.

Pre-Operating Section

2.3 Preparation For Operation

CAUTION

Before your leaf vacuum is put into operation it is very important to read and follow the procedures outlined in the engine owner's manual. (EOM).

For specific information regarding the following checks please refer to the "Maintenance" section of this manual and the engine owner's manual.

WARNING

DISENGAGE the clutch and remove the negative battery cable before performing the following checks.

WARNING

NEVER place any part of the body under or behind guards or any other area in which you cannot see.

IMPORTANT CHECKS:

NOTE: The following checks contained in the next three sections should be performed prior to leaving the storage area.

1. Check engine fuel, coolant and oil levels. (see EOM)
2. Check engine air filter
3. Check all bolts and nuts to ensure they are tight.
4. Check all controls for free and proper operation.
5. Check main drive belt (if equipped) for proper adjustment.
6. Inspect the fan blades to ensure that they are not bent , deformed, fatigued or cracked. Replace fan if any damage is present.
7. Inspect the intake hose flange to make sure it is connected correctly to the blower housing.
8. Inspect the leaf vacuum frame and structure for any bent, broken, cracked, missing or loose parts.
9. Check all guards to ensure they are undamaged, in place and properly secured.
10. All decals must be in place and legible prior to operating the leaf vacuum. See the decal section for decal replacement.

Pre-Operating Section

2.4 Pre-Transport Checks

WARNING

Failure to properly hitch the leaf vacuum to the tow vehicle, verify the road worthiness of the leaf vacuum and the tow vehicle and verify all equipment is properly stowed, may cause serious injury or death to yourself or others.

TOW VEHICLE MUST have proper towing capacity for the leaf vacuum being towed. Check the tow vehicles operating manual for rated capacity.

Do not tow the leaf vacuum unless all important checks listed below are completed.

IMPORTANT CHECKS

1. Hitch is properly secured to tow vehicle and hose boom secured. Frame must be level or the tongue slightly lower than the rear of the leaf vacuum while towing to ensure proper weight distribution. The hitch may have to be adjusted when towing with vehicles of varying tow hitch height.
2. Safety chains installed correctly.
3. Chains routed under trailer tongue in an “X” pattern between tow vehicle and trailer.
4. Slack in chain should be adjusted to permit turning but should not be dragging on the ground.
5. Connect trailer wiring to the tow vehicle and ensure that all trailer lighting is operating properly.
6. Ensure that the safety breakaway switch is functioning properly and attached securely to the tow vehicle. Allow enough slack to ensure that vehicle turns will not activate the safety breakaway switch. **NOTE:** Follow manufacturers procedure to ensure tow vehicles brake control box is properly adjusted.

Pre-Operating Section

2.4 Pre-Transport Checks, continued:

7. Check the general condition of the tires, tire pressure and ensure that all lugnuts are securely fastened.
8. Visual examination of the leaf vacuum frame, suspension and structure to determine if all components are correctly positioned and secured for travel.
9. Check the intake hose boom to verify that it is securely fastened to the leaf vacuum and can not swing free. (if equipped).
10. Verify there are no loose tools or materials on the trailer, inside the intake and exhaust hoses, or inside the engine sheet metal.
11. Check all cones, wheel-chocks, signs or other support tools and materials to ensure proper stowage.

Pre-Operating Section

2.5 Personal Protective Equipment and Clothing

WARNING

Always wear proper safety equipment as outlined below, not wearing such equipment **CAN** result in serious personal injury or possible death.

IMPORTANT CHECKS:

Anyone operating the leaf vacuum equipment **MUST** wear appropriate protective equipment and clothing to protect them from injury during operations.

PROTECTIVE EQUIPMENT:

1. **Head Protection:** Hard hats without under-chin strapping.
2. **Eye Protection:** Wraparound goggle type eye protection held in place with an elastic band around the head or a hard hat mounted face shield, which provides full protection of the face.
3. Eye protection must meet ANSI Z87.1 standards.
4. **Hearing Protection:** plug type or “muff type” ear protection should be worn at all times while operating the unit.
5. **Breathing Protection:** Paper filter type dust masks should be worn to protect from dirt and dust particles during the vacuuming process.
6. **Reflective Vests:** Highly visible vests should be worn so motorists can see the operator in all weather and lighting conditions.
7. **Work Gloves:** Gloves should be worn to protect the hands and wrists from debris.
8. **Steel Toed Boots:** should be worn to protect the feet.

DANGER

Work clothes **MUST** be close fitting, but not restrictive of movement, without any loose parts that could be entangled in any parts of the leaf vacuum. This includes items such as jewelry, chains and backpacks.

Pre-Operating Section

2.6 Work Site Preparation

WARNING

Never place any part of the body under or behind guards or any other visually obscured area.

Making sure the leaves are clear of possible dangerous material is critical to safe vacuuming. Vacuuming up metal, glass, rocks or other dangerous material CAN cause serious damage to the equipment or personal injury.

The following guidelines must be followed to insure safety.

1. An inspection of the leaves to be vacuumed must be done prior to the vacuuming process. We realize that it is impossible to completely inspect every inch of leaves being vacuumed, but it is imperative that all leaves be inspected for obvious dangerous material before vacuuming.
2. The operator should never be in the line of traffic, the operator should work on the shoulder whenever possible.
3. The operators should place cones or other barriers to provide adequate warnings to vehicles and pedestrians that vacuuming is in progress.
4. Strobe lights on the leaf vacuum and on the tow vehicle should be on at all times for high visibility.
5. Confirm that all operators are wearing proper clothes and personal protective equipment.
6. Restrict all personnel, except the operator from the area near the leaf vacuum. **DO NOT** allow pedestrians, children or animals near the work area.
7. Make sure that the exhaust hose (if equipped) fits properly into the box container so that all debris is blown into the box container.

OPERATING SECTION

WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

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OPERATING SECTION

3.1 Starting Engine

CAUTION

Always make sure the PTO is disengaged before starting unit. (See figure 3b)

CAUTION

DO NOT start the engine in an enclosed building. Proper ventilation is required before starting the engine.

WARNING

Thoroughly read and understand the safety and pre-operating sections of this manual before starting the engine.

Throttle Control

The Module Uses J1939 throttle aka Torque Speed Control (TSC1)

PRIOR TO STARTING ENGINE, select the proper throttle control mode and parameters required for application

Throttle is set through the Throttle Configuration Menu in the Control module

Under CAN Configuration, you will find Throttle Type Selection / TSC Min Speed / TSC Max Speed / TSC Ramp Rate / Throttle Curve Selection

Manual Throttle Options

1) Vernier Throttle

Standard Up and Down Throttle between the set Minimum and Maximum selections. The Ramp rate is the rate of acceleration in RPMs per second.

2) 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 pressed. When the Up button is released, the engine goes back to idle speed.

OPERATING SECTION

3.1 Starting Engine, continued;

Review the Engine Operating Manual supplied with your leaf vacuum for specific start-up, maintenance and operating instructions. It is especially important to review break-in service procedures for brand new units.

Starting Procedure:

1. Perform all the pre-starting, pre-operating checks outlined in the EOM and in this manual.
2. Make sure the PTO is disengaged as shown in **figure 3a**
3. **IMPORTANT:** Do not operate the starter for more than 30 seconds at a time. To do so may overheat the starter. If the engine does not start the first time, wait at least 2 minutes before trying again. If the engine fails to start after 4 attempts, see the trouble shooting section of the EOM and this manual.
4. Turn the ignition switch all the way to the right, when the engine starts release the ignition switch. It should spring back to the ON position.
5. **IMPORTANT:** If the ignition switch is released before the engine starts, wait until the starter and the engine stop turning before trying again. This will prevent possible damage to the starter and/or flywheel.
6. Check all gauges for normal engine operation. If operation is not normal, stop the engine and determine the cause.
7. **IMPORTANT:** To assure proper lubrication, operate the engine at or below 1200 rpm with no load for 1 -2 minutes. Extend this period 2 - 4 minutes when operating at temperatures below freezing.

figure 3a



PTO shown disengaged

OPERATING SECTION

3.2 Engine Controller-Installation

WARNING

Engine must undergo a **60 deg warmup** before clutch switch is live (active/useable)

Must Engage AND Disengage **UNDER 1300rpms**, anything over 1300 will not engage or disengage

ECU Throttle Settings

Controls, Inc. panels use J1939 throttle, also called TSC throttle (torque/speed control). This is different from the older analog and digital throttle options provided in engine ECU's. Two throttle settings need to be implemented in the engine ECU.

- 1) TSC throttle needs to be enabled in the engine ECU settings
- 2) TSC address needs to be matched to control panel throttle setting

Most engine ECU today have TSC enabled as a default setting but for situation where it is not, the engine ECU needs to be updated with this setting enabled. The control panel has a number of TSC addresses that can be selected to match the engine ECU setting.

CAN bus Wires

With J1939 engines, all of the communications between the engine ECU and the control panel occurs over the two CAN bus wires. This includes the engine information (like oil pressure, engine speed, alarm codes and alarm lamps) going from the engine ECU to the control panel and throttle commands going from the control panel to the engine ECU. If there is a break in the CAN bus wires, communications stop and the control panel displays a CAN bus error message. Also, in spark ignition engines, CAN bus wires should be located away from the spark plug wires, distributor cap and ignition coil to avoid EMI from these high voltage components.

Proper Diode Installation

The proper installation of diodes protects the control panel and other electrical components (such as the engine ECU) from transient voltage spikes generated whenever any relay (coil) in the system is de-energized. See diode protection for more details. 1939 engine harnesses provided by the engine manufacturer or Controls, Inc. follow proper diode protection specifications.

Relay Outputs

Many of our products provide for relay outputs that can be used to drive other components and devices. These outputs are rated for a maximum current draw of 5 to 10 amps. For components or devices that draw more than this (such as a starter or glow plug circuit), it is necessary to install a slave relay that is diode protected into the circuit. Controls, Inc. can provide any necessary slave relays.

OPERATING SECTION

3.2 Engine Controller-Installation Cont.

Panel Throttle Settings

A number of panel settings are available in different Controls, Inc. panels. It is important to check the throttle settings during installation. Basic settings for minimum speed, maximum speed and ramp rate should be reviewed for a manual start situation. For an auto start situation, other settings for warm up speed, operating speed and cool down speed should be reviewed.

Interlock Settings

Interlock settings provide the ability to turn relay outputs on and off based on conditions like engine speed or engine run. They are typically used for clutch engage/disengage or to turn on/off other devices when required during equipment operation. These settings need to be reviewed during installation

Stored engine ECU codes can be viewed in the Stored Codes menu. The panel displays are codes currently stored on the engine ECU.

Alarm Log

All alarms and shutdowns are added to the control panel alarm log. The alarm log maintains the last 32 alarms and faults. Each event is logged with the engine hour reading at the time of occurrence. This provides a history of alarms and shutdowns for mechanical engines that is valuable for service and troubleshooting.

OPERATING SECTION

3.3 Engine Controller-Operating

The engine communicate with panels over the CAN bus, two wires that run between the engine ECU and the control panel. All sensors are monitored by the engine ECU. The control panel gets all engine information from the engine ECU. Typically, the engine ECU handles all engine alarms, derates and shutdowns. Alarm lamps and codes are communicated to the control panel from the engine ECU from which the panel illuminates the appropriate lamp and displays the corresponding code.

Display

Six full time parameters are displayed:

- 1) Engine Temperature
- 2) Engine Speed
- 3) Oil Pressure
- 4) Battery Voltage
- 5) Fuel Rate or Fuel Level (requires fuel level sender)
- 6) Engine Hours

For alarms, the display provides the appropriate lamp, the corresponding code and a descriptive message for the operator. See alarms for additional information.

Menu Access

A number of product settings are accessed via the menu system. To access the menu system, hold down the MENU button and simultaneously press the ENTER button.

To exit the menu system, it is the same process. Hold down the MENU button and simultaneously press the ENTER button.

Available Menus:

Emissions Parameters (iT4)	View emissions information & Regen Options (Auto, Inhibit, Request)
Active Fault Codes	View active fault codes
Stored Fault Codes	View stored fault codes
Operation Event Log	View last 32 start and stop events (hour stamped)
Alarm Event Log	View last 32 alarm events (hour stamped)
Engine Parameters	View other engine ECU parameters (i.e. % load, % torque, boost pressure)
Engine Identification	View engine model and serial number
Module Information	Control panel part number and software version
Controller Setup	Configure settings for throttle, inputs, outputs and other available options

Panel settings are made in the controller setup menu. A password is required to change settings. Contact your OEM, engine dealer, distributor or Controls, Inc. for this information.

OPERATING SECTION

3.3 Engine Controller-Operating Cont.

Menu Navigation

- 1) Press MENU button to scroll available menus
- 2) Press UP button to enter into a menu
- 3) Press DOWN button to exit a menu

Change a Menu Setting (Controller Setup menu)

- 1) A password is required to change a setting
- 2) Press ENTER button (A bracket appears around the setting)
- 3) Press the UP and DOWN buttons to view available selections
- 4) Press ENTER button to make selection, (brackets disappear)
- 5) Exit menus (hold down MENU button and simultaneously press the ENTER button)
- 6) RECYCLE POWER TO THE PANEL (Turn panel power off and then back on)

WARNING

Engine must undergo a **60 deg warmup** before clutch switch is live (active/useable)

Must Engage AND Disengage **UNDER 1300rpms**, anything over 1300 will not engage or disengage

OPERATING SECTION

3.4 Engine Controller-Alarms & Codes

With J1939 engines, the engine ECU manages all alarms, derates and shutdowns. The control panel serves as a fault code reader providing lamp illuminations, alarm codes and alarm messages. Below is an example of an engine ECU shutdown for low oil pressure.



Alarm Indications

- 1) No engine shutdown with alarms
- 2) Yellow lamp illumination
- 3) Parameter blinks on display

J1939 Codes

The list of J1939 codes is extensive. A list of common codes is available on the following pages or by visiting <http://www.controlsinc.com/support/J1939SPNFMICODES.pdf>

Control Panel Alarms & Shutdowns

Alarms and shutdowns can also be provided by the control panel. These are in addition to engine ECU shutdowns. Panel controlled alarms and shutdowns are available for the following:

- 1) Low Oil Pressure (Alarm & Shutdown)
- 2) High Engine Temperature (Alarm & Shutdown)
- 3) Overspeed (Shutdown Only)
- 4) Fuel Level (Alarm & Shutdown)
- 5) Battery Voltage (Alarm Only)

OPERATING SECTION

3.4 Engine Controller-Alarms & Codes Cont.

Active Engine ECU Codes

Active engine ECU codes can be viewed in the Active Codes menu. Frequently, the engine ECU broadcast several codes when there is an engine issue. The active engine menu provides a list of all currently active codes.

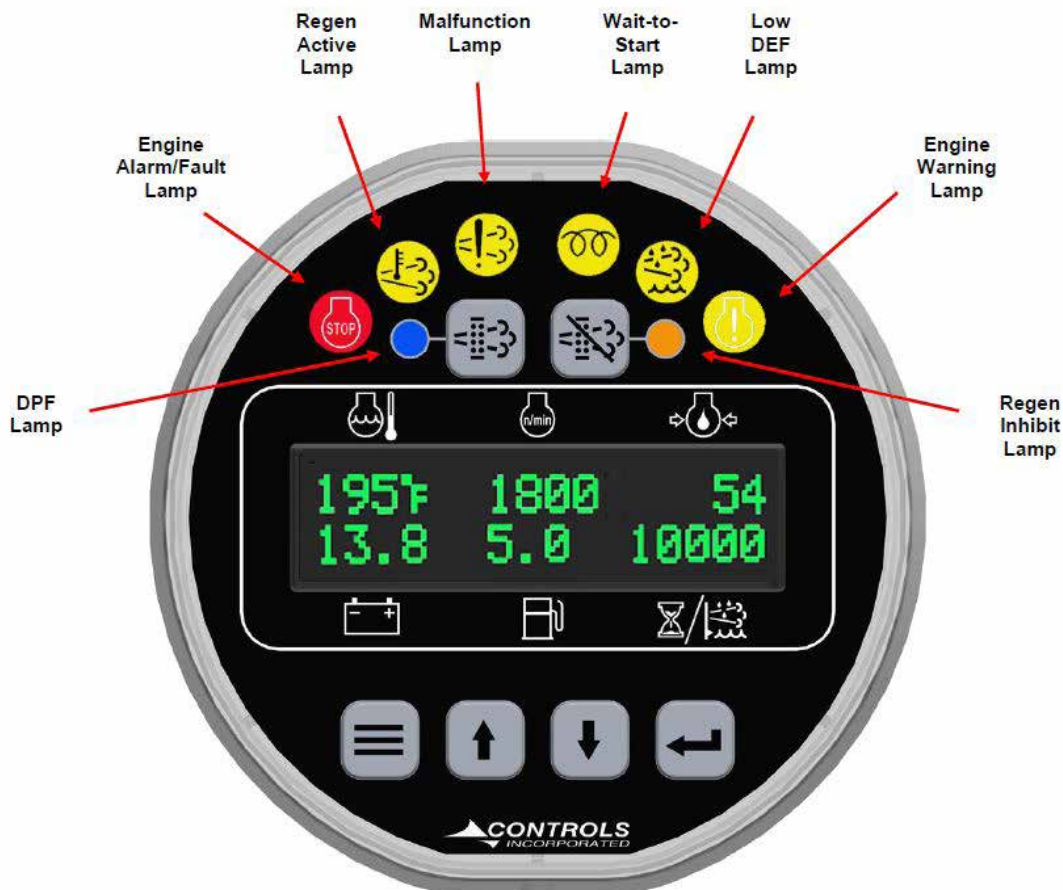
Stored Engine ECU Codes

Stored engine ECU codes can be viewed in the Stored Codes menu. The panel displays are codes currently stored on the engine ECU.

Alarm Log

All alarms and shutdowns are added to the control panel alarm log. The alarm log maintains the last 32 alarms and faults. Each event is logged with the engine hour reading at the time of occurrence. This provides a history of alarms and shutdowns for mechanical engines that is valuable for service and troubleshooting.

Indicator Lamps



OPERATING SECTION

SPN	FMI	TEXT TRANSLATION
28	3	% Accelerator Position #3 (Throttle 2) Voltage Above Normal or Shorted to High Source H
28	4	Percent Accelerator Position #3 (Throttle 2) Voltage Below Normal or Shorted to Low Source
29	3	Percent Accelerator Position #2 (Throttle 1) Voltage Above Normal or Shorted to High Source
29	4	Percent Accelerator Position #2 (Throttle 1) Voltage Below Normal or Shorted to Low Source
91	3	Accelerator Pedal Position (Multi-State Throttle) Voltage Above Normal, or Shorted to High Source
91	4	Accelerator Pedal Position (Multi-State Throttle) Voltage Below Normal or Shorted to Low Source
91	9	Accelerator Pedal Position A valid throttle message is not being received or is late
91	14	Accelerator Pedal Position Throttle signal voltage is or has been out of range
94	1	Fuel Delivery Pressure Pressure Very low
94	3	Fuel Delivery Pressure Fuel Rail Pressure Voltage out of range high
94	4	Fuel Delivery Pressure Fuel Rail Pressure Voltage out of range low
94	10	Fuel Delivery Pressure Pressure dropping too fast
94	13	Fuel Delivery Pressure Out of calibration
94	16	Fuel Delivery Pressure High fuel pressure
94	17	Fuel Delivery Pressure No rail fuel pressure
94	18	Fuel Delivery Pressure Low fuel pressure
97	0	Water In Fuel Indicator Water In Fuel Detected
97	3	Water In Fuel Indicator Water In Fuel Voltage out of range high
97	4	Water In Fuel Indicator Water In Fuel Voltage out of range low
97	16	Water In Fuel Indicator Water In Fuel Detected
97	31	Water In Fuel Indicator Water In Fuel Detected
100	1	Engine Oil Pressure Low oil pressure
100	3	Engine Oil Pressure Voltage Above Normal or Shorted to High Source
100	4	Engine Oil Pressure Voltage Below Normal or Shorted to Low Source
100	16	Engine Oil Pressure Oil pressure reading incorrect
100	18	Engine Oil Pressure Low oil pressure
105	0	Intake Manifold 1 Temperature High manifold air temperature
105	3	Intake Manifold 1 Temperature Voltage Above Normal or Shorted to High Source
105	4	Intake Manifold 1 Temperature Voltage Below Normal or Shorted to Low Source
105	16	Intake Manifold 1 Temperature High manifold air temperature
107	0	Air Filter Differential Pressure Plugged air filter condition detected
107	31	Air Filter Differential Pressure Plugged air filter condition detected
110	0	Engine Coolant Temperature High coolant temperature
110	3	Engine Coolant Temperature Voltage Above Normal or Shorted to High Source
110	4	Engine Coolant Temperature Voltage Below Normal or Shorted to Low Source
110	15	Engine Coolant Temperature High coolant temperature
110	16	Engine Coolant Temperature High coolant temperature
111	1	Coolant Level Low coolant level
158	2	Keyswitch Intermittent
158	17	Keyswitch Circuit problem
174	0	Fuel Temperature High fuel temperature
174	3	Fuel Temperature Voltage Above Normal or Shorted to High Source
174	4	Fuel Temperature Voltage Below Normal or Shorted to Low Source
174	15	Fuel Temperature High fuel temperature
174	16	Fuel Temperature High fuel temperature
174	31	Fuel Temperature Voltage out of range
189	31	Rated Engine Speed Speed Derate Condition Exists due to fault
190	0	Engine Speed Engine overspeed
190	2	Engine Speed Data Erratic, Intermittent or Incorrect
190	3	Engine Speed Voltage Above Normal or Shorted to High Source
190	4	Engine Speed Voltage Below Normal or Shorted to Low Source
190	5	Engine Speed Circuit is open
190	16	Engine Speed Engine overspeed

OPERATING SECTION

611	3	Injector Wiring Shorted to battery
611	4	Injector Wiring Shorted to ground
620	3	Sensor Supply Voltage 1 (+5V DC) Voltage Above Normal or Shorted to High Source
620	4	Sensor Supply Voltage 1 (+5V DC) Voltage Below Normal or Shorted to Low Source
627	1	Power Supply Low voltage to injectors
627	4	Power Supply Power interruption
629	13	Reprogram Controller ECU problem
629	19	ECU to Pump Communications Error ECU not receiving messages from Pump
632	2	Fuel Shutoff Valve Fuel Shutoff Error Detected
632	5	Fuel Shutoff Valve Fuel Shutoff Non-Functional
632	11	Fuel Shutoff Valve Fuel Shutoff Solenoid circuit is open or shorted
636	2	Engine Position Sensor Timing signal error
636	8	Engine Position Sensor Timing signal error
636	10	Engine Position Sensor Timing signal error
637	2	Timing (Crank) Sensor Timing signal error
637	7	Timing (Crank) Sensor Timing signal error
637	8	Timing (Crank) Sensor Timing signal error
637	10	Timing (Crank) Sensor Timing signal error
639	13	CAN Bus The CAN bus failure
651	5	Injector Cylinder #1 The current to the injector is less than expected
651	6	Injector Cylinder #1 The current to the injector increases too rapidly
651	7	Injector Cylinder #1 The injector fuel flow is lower than expected
652	5	Injector Cylinder #2 The current to the injector is less than expected
652	6	Injector Cylinder #2 The current to the injector increases too rapidly
652	7	Injector Cylinder #2 The injector fuel flow is lower than expected
653	5	Injector Cylinder #3 The current to the injector is less than expected
653	6	Injector Cylinder #3 The current to the injector increases too rapidly
653	7	Injector Cylinder #3 The injector fuel flow is lower than expected
654	5	Injector Cylinder #4 The current to the injector is less than expected
654	6	Injector Cylinder #4 The current to the injector increases too rapidly
654	7	Injector Cylinder #4 The injector fuel flow is lower than expected
655	5	Injector Cylinder #5 The current to the injector is less than expected
655	6	Injector Cylinder #5 The current to the injector increases too rapidly
655	7	Injector Cylinder #5 The injector fuel flow is lower than expected
656	5	Injector Cylinder #6 The current to the injector is less than expected
656	6	Injector Cylinder #6 The current to the injector increases too rapidly
656	7	Injector Cylinder #6 The injector fuel flow is lower than expected
729	3	Inlet Air Heater Driver #1 Inlet air heater stuck on
729	5	Inlet Air Heater Driver #1 Inlet air heater will not turn on
833	2	Rack Position Sensor Error
833	3	Rack Position Sensor Rack Position Voltage above normal
833	4	Rack Position Sensor Rack Position Voltage below normal
834	2	Rack Actuator Rack Error
834	3	Rack Actuator Rack Actuator Circuit voltage above normal
834	5	Rack Actuator Rack Actuator Circuit open
834	6	Rack Actuator Rack Actuator Circuit grounded
834	7	Rack Actuator Rack Position Error
970	2	Auxiliary Engine Shutdown Switch External Engine Shutdown Switch intermittent
970	11	External Engine Protection Shutdown External Engine Protection Shutdown active
970	31	Auxiliary Engine Shutdown Switch External Engine Protection Shutdown active
971	31	Engine Derate Switch External Derate input has been activated
1041	2	Start Signal Indicator Start Signal Missing
1041	3	Start Signal Indicator Start Signal Always Active

OPERATING SECTION

1076	0	Fuel Injection Pump Fuel Control Valve Error
1076	1	Fuel Injection Pump Fuel Control Valve Error
1076	2	Fuel Injection Pump Fuel Control Valve Error
1076	3	Fuel Injection Pump Fuel Control Valve Error
1076	5	Fuel Injection Pump Fuel Control Valve Error
1076	6	Fuel Injection Pump Fuel Control Valve Error
1076	7	Fuel Injection Pump Fuel Control Valve Error
1076	10	Fuel Injection Pump Fuel Control Valve Error
1076	13	Fuel Injection Pump Fuel Control Valve Error
1077	7	Fuel Injection Pump Controller
1077	11	Fuel Injection Pump Controller
1077	12	Fuel Injection Pump Controller
1077	19	Fuel Injection Pump Controller
1077	31	Fuel Injection Pump Controller Power derated
1078	7	Fuel Injection Pump Speed/Position Sensor Error
1078	11	Fuel Injection Pump Speed/Position Sensor Error
1078	31	Fuel Injection Pump Speed/Position Sensor VP44 Unable to Achieve Desired Timing
1079	3	Sensor Supply Voltage 1 (+5V DC) Voltage Above Normal or Shorted to High Source
1079	4	Sensor Supply Voltage 1 (+5V DC) Voltage Below Normal or Shorted to Low Source
1080	3	Sensor Supply Voltage 2 (+5V DC) Voltage Above Normal or Shorted to High Source
1080	4	Sensor Supply Voltage 2 (+5V DC) Voltage Below Normal or Shorted to Low Source
1109	31	Engine Protection System Approaching Shutdown Approaching Shutdown
1110	31	Engine Protection System Engine has been shutdown
1347	5	Fuel Pump Assembly #1 The circuit is open, shorted to ground, or overloaded
1347	7	Fuel Pump Assembly #1 Rail pressure control mismatch
1347	10	Fuel Pump Assembly #1 Low fuel flow
1348	5	Fuel Pump Assembly #2 The circuit is open, shorted to ground, or overloaded
1348	10	Fuel Pump Assembly #2 Low fuel flow
1485	2	ECU Main Relay Pump power relay fault
1569	31	Engine Protection Torque Derate Fuel derate limit condition exists
2000	6	Fuel Injection Pump Fuel Control Valve Error
2000	13	Security Violation The proper controller has not been installed

OPERATING SECTION

3.5 Engine Controller- Digital Inputs

Digital Inputs

Digital inputs can be used for engine shutdowns using normally open or normally closed (to ground) switches. Switches for parameters such as low coolant level can be incorporated into the control panel. Shutdown indications include red lamp illumination and a display message (i.e. Low Coolant Level Shutdown).

CONTROL PANEL DIGITAL INPUTS

The panel has two digital inputs available to monitor other components, senders or signals. The analog input is preset to fuel level and cannot be configured. The digital inputs can be used for a number of purposes including alarms and shut downs.

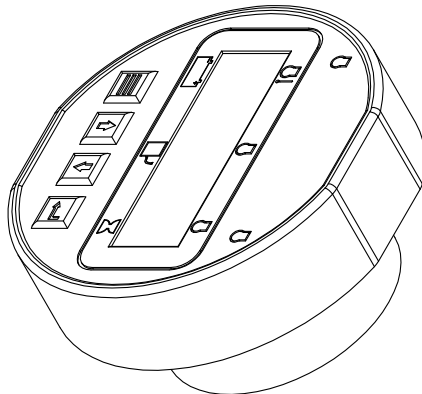
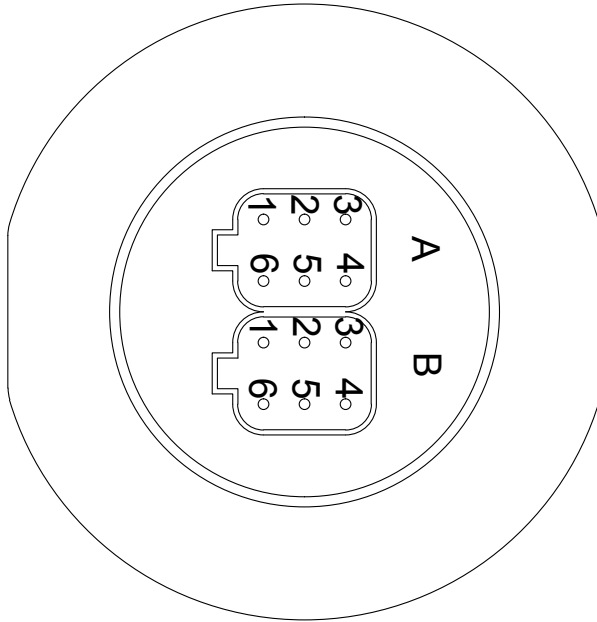
Input	Heading	Default	Options	Connector	Pin
Digital 1	Normally	Open	Open / Closed	A	4
	Function	None			
	Message	None			
	Check	Off	Off / Always / Run		
Digital 3	Normally	Open	Open / Closed	B	6
	Function	None			
	Message	None			
	Check	Off	Off / Always / Run		
Digital 4	Normally	Open	Open / Closed	B	3
	Function	None			
	Message	None			
	Check	Off	Off / Always / Run		
Digital 5	Normally	Open	Open / Closed	B	4
	Function	None			
	Message	None			
	Check	Off	Off / Always / Run		
Digital 6	Normally	Open	Open / Closed	B	5
	Function	Throttle Down			
	Message	None			
	Check	Always	Off / Always / Run		
Digital 7	Normally	Open	Open / Closed	B	2
	Function	Throttle Up			
	Message	None			
	Check	Always	Off / Always / Run		

OPERATING SECTION

3.6 Engine Controller- Pin Out

PIN #	COLOR	FUNCTION
1A	Yellow	Battery +
2A	Yellow	CAN High
3A	Green	CAN Low
4A	-	Digital Input 1
5A	Pink	Fuel Level
6A	Black	Battery -

PIN #	COLOR	FUNCTION
1B	-	Clutch Output
2B	Yellow w/Blue Stripe	Throttle Up
3B	-	Digital Input 4
4B	-	Digital Input 5
5B	Blue w/Yellow Stripe	Throttle Down
6B	Black	Digital Input 6



OPERATING SECTION

3.7 Engaging the PTO

figure 3b



PTO shown disengaged

⚠ WARNING

Thoroughly read and understand the safety and pre-operating sections of this manual before starting the engine.

⚠ WARNING

Make sure the intake hose is properly attached and make sure the front of the hose is clear of any objects which could be inadvertently vacuumed during the PTO engagement process.

Review the Engine Operating Manual supplied with your leaf vacuum for specific start-up, maintenance and operating instructions. It is especially important to review break-in service procedures for brand new units.

figure 3c



PTO shown fully engaged

Engaging the PTO (refer to figures 3b, 3c and 3d):

1. Perform all the pre-starting, pre-operating checks outlined in the EOM and in this manual.
2. Start the engine as previously discussed in this manual and in the EOM.
3. Once the engine has been allowed to thoroughly warm up (engine temperature gauge should read at least 180 degrees) pull the throttle control until the engine reaches 1000 rpm.

OPERATING SECTION

3.7 Engaging the PTO, continued;

figure 3b



PTO shown disengaged

4. Grasp the PTO handle (fig. 3b) and slowly raise the handle. **NOTE:** Some units have a PTO assist cylinder which engages the PTO at a specific speed in order to properly engage the PTO. Because of this the PTO handle only needs to be raised slightly, then the assist cylinder will take over and engage the PTO automatically. (fig. 3c)

5. **IMPORTANT:** If the unit experiences any heavy vibrations or makes any unusual noises, shut the engine down and after following the necessary safety guidelines, have a qualified technician investigate the cause. **DO NOT** operate a unit that is in a state of disrepair.

6. If the unit is running smoothly and does not display any excessive vibration, the unit is ready to vacuum leaves. **NOTE:** Please see the next section before vacuuming leaves.

figure 3c



PTO shown fully engaged

Disengaging the PTO (refer to figures 3b and 3d):

1. Decrease the rpm to 1000 rpm.
2. Grasp the PTO handle and slowly disengage the PTO.
3. When the PTO is fully disengaged, the engine can be shut down.

OPERATING SECTION

3.8 Vacuuming Leaves

WARNING

Thoroughly read and understand the safety, pre-operating and operating sections of this manual before vacuuming. Wear the proper safety equipment as outlined in this manual.

WARNING

Make sure the exhaust hose is connected to the box container properly before vacuuming leaves. Visually inspect the leaves before vacuuming for any material that could be harmful to the leaf vacuum or people. This includes bottles, wood, steel, glass, stone or other hard or breakable objects.

Vacuuming Leaves:

1. Start the engine and engage the PTO using the procedures stated earlier in this manual.
2. Set the engine throttle to around 1400 rpm.
3. NOTE: Always vacuum leaves using the lowest rpm as possible. This saves fuel and decreases the amount of dust escaping the box container.
4. Lower the intake hose to a few inches above the leaf pile. Hold the intake nozzle at a 45 degree angle to allow proper air flow. This should allow the leaves to be vacuumed. DO NOT bury the intake nozzle into the leaf pile, this will cut off the air flow and will make vacuuming much more difficult and increase the chance of clogging.
5. If the leaves are not vacuuming, increase the rpm to 1400 and try vacuuming at this setting.
6. NOTE: Wet leaves will need higher rpm's to vacuum whereas dry leaves will only need minimal rpm's.
7. Continue moving the nozzle in a sweeping motion above the leaves while vacuuming.

Maintenance Section

WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

4.0 MAINTENANCE SECTION

4.0 MAINTENANCE SECTION

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4.0 MAINTENANCE SECTION

Maintenance Section

4.1 Maintenance Overview:

CAUTION

Only properly trained personnel should perform maintenance or repair on this equipment. Consult Xtreme Vac before performing any maintenance procedures that is not specifically covered in this manual. Improper maintenance or repair may void any and all warranties on this equipment.

WARNING

Improper maintenance or repair CAN result in equipment damage and/or personal injuries.

DANGER

BEFORE CONTINUING, please read and understand the Safety, Pre-operating and Operating sections of this manual before doing any procedures in this section.

A properly maintained leaf vacuum will dramatically extend the life of the unit and will create a safer work place as well. For the general safety and welfare of all personnel it is important to create a scheduled maintenance program that covers all the elements in this manual as well as the engine, PTO and axle owner's manuals provided with this unit.

Use the chart on the following page as a guide for your scheduled maintenance program. If there are any questions concerning any of these procedures please call your Xtreme Vac dealer.

Maintenance Section

4.2 Maintenance and Lubrication Chart

This chart is only a reference, always consult the Owners Manual of the Engine, PTO, etc for actual recommendations

(Use Hour Meter as a Guide)

MAINTENANCE	INTERVAL					
	Daily	First 8 Hours	Every 25 Hours	Every 50 Hours	Every 100 Hours	Every 200 Hours
Check and add engine oil, coolant and fuel*	●					
Check for loose nuts or bolts	●					
Check for fuel, oil and coolant leakage	●					
Check or clean air intake screen*	●					
Lubricate Impeller Shaft Flange Bearings	●					
Check Lug Nuts and Tire Pressure / Condition	●					
Check Trailer Safety Chains and Hitch	●					
Check Tow Bar for Damage or Wear	●					
Clean air cleaner foam element*	●					
Clean air cleaner paper element*	●					
Plug in battery charger (every night)	●					
Change engine oil*		●			●	
Clean and Check Battery and Connections			●			
Check Power Band Tension / Condition			●			
Check Electric Brakes			●			
Check Impeller for Damage, Cracks or Wear			●			
Lubricate Throttle and Choke Cables				●		
Check Blower Housing Interior for Cracks or Wear				●		
Inspect Intake Hose for Damage				●		
Clean and regap spark plug*					●	
Replace oil filter*					●	
Replace air cleaner paper element*					●	
Inspect radiator and hoses*(k)					●	
Check fan belt conditions and tension*(k)					●	
Inspect all Duct Work for Cracks, Holes or Wear					●	
Grease / Inspect Wheel Bearings for Corrosion					●	
Change coolant*(k)						●
Check Fuel Tank for Corrosion / Cracks						●

* = see the engine owner's manual for complete details

k = have an authorized John Deere engine dealer perform those services

Maintenance Section

4.3 Lubrication:

⚠ CAUTION

Remove the negative battery terminal before attempting any lubrication procedures.

⚠ WARNING

Thoroughly read and understand the safety and pre-operating sections of this manual before performing any lubrication procedures.

Figure 4.3A



Grease Points

NOTE: DO NOT mix different types of grease. The old grease MUST BE purged before a different type of grease is used. Mixing grease WILL cause premature failure to the bearings.



The following are general lubrication procedures for our standard units. Any special or custom built units may have other lubrication procedures not directly mentioned in this manual. Please consult Xtreme Vac before any lubricating procedures not specifically mentioned in this manual.

Proper lubrication of your unit correlates directly to how long your unit will last. A properly maintained unit will last much longer than a unit that is not maintained properly.

NOTE: Always lubricate bearings at the end of each work day. This will displace any moisture in the bearings. Also lubricate thoroughly before extended shutdown or storage.

Lubrication Points:

1. **Drive Bearings (figure 4.3a):** These bearings are critical components of the belt-driven units. These bearings should be greased every 10 hours with approximately two strokes from the average hand pump grease gun. The type of grease used in these bearings are also critical to the performance of the bearings. A multi-purpose, heavy-load, high-temperature, moisture resistant #2 grease is required for the drive bearings. Xtreme Vac recommends Mantek Elite Supreme #1 WG Extreme Duty multi-purpose grease. Other premium quality grease that matches the above requirements may be used but after years of testing Xtreme Vac recommends the Premalube grease.

Maintenance Section

4.3 Lubrication, continued;

Lubrication Points, continued:

2. **Trailer Wheel Bearings (figure 4.3b):** Most of Xtreme Vac's units are equipped with "EZ-Lube" grease fittings. This allows the operator to grease the bearings without removing the hubs. The "EZ-Lube" feature consists of axle spindles that have been specially drilled and fitted with a grease zerk in their ends (fig. 4.3c). When grease is pumped into the zerk, it is channelled to the inner bearing and then flows back to the outer bearing and eventually back out the grease cap hole. The trailer wheel bearings should be checked and greased after the first 30 days of service then at the beginning of every season.

Figure 4.3b



Grease fitting is behind rubber plug

Grease specifications:

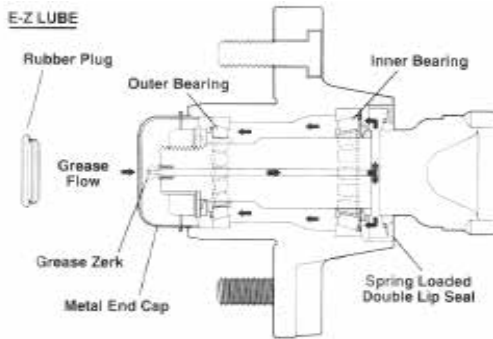
Thickener Point.....	Lithium Complex
Dropping Point.....	230 degr. C minimum
Consistency.....	NLGI No.2
Additives.....	EP, Corrosion & Oxidation Inhibitors
Base Oil.....	Solvent refined Petroleum Oil
Base Oil Viscosity.....	@40 deg. C 150cSt Min.
Viscosity Index.....	80 Minimum
Pour Point.....	-10 deg. Minimum

Approved Sources:

Mobil Oil.....	Mobilgrease HP
Exxon/Standard.....	Ronex MP
Kendall Refining.....	Kendall L-427
Ashland Oil Co.....	Valvoline Val-plex EP Grease.
Penzoil.....	Premium Wheel Bearing Grease 707L

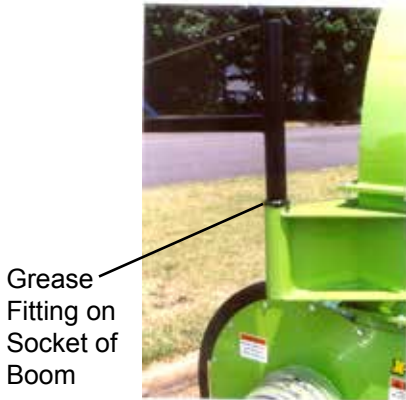
For any questions concerning wheel lubrication please consult the axle owner's manual supplied with your leaf collector or contact Xtreme Vac.

Figure 4.3c



Maintenance Section

Figure 4.3d



4.3 Lubrication, continued;

Lubrication Points, continued:

3. **Boom Socket (figure 4.3d):** The socket should be greased once a week to keep the boom mast moving smoothly. Grease the boom socket once every week with a multi-purpose moisture resistant #2 grease.
4. **Hinge and Friction Points:** Leaf vacuum operation and longevity can be improved by keeping hinges and friction points lubricated. Xtreme Vac recommends that lubrication be performed weekly. Use SAE30 weight oil on hinges and a premium grade, high temperature lithium based EP#2 grease on friction points.

⚠ WARNING

Never go under the dump body unless the body is empty and the body prop(s) is in the proper position.

⚠ CAUTION

The body prop is designed and intended to support an **EMPTY** truck body in the raised position. Unload the body before using the body prop(s).

Maintenance Section

4.4 Preventive Maintenance

⚠ CAUTION

Remove the lead spark plug wires before attempting any maintenance procedures.

⚠ WARNING

Thoroughly read and understand the safety and pre-operating sections of this manual before performing any maintenance procedures.

The following are general preventative maintenance procedures for our standard units. Any special or custom built units may have other preventative maintenance procedures not directly mentioned in this manual. Please consult Xtreme Vac before doing any preventative maintenance procedures not specifically mentioned in this manual.

Proper preventative maintenance of your unit, just like lubrication, correlates directly to how long your unit will last. A properly maintained unit will last much longer than a unit that is not maintained properly.

Preventative Maintenance:

1. **Engine Oil:** Change the oil and oil filter according to schedules provided in your engine's owner's manual (EOM). The engine oil level should be checked every day. The level should be checked after the engine has been stopped for a period of time. This will allow the oil to drain back into the oil pan, allowing a better indication of the true oil level. If the level is low, see the engine's owner's manual for the correct type of oil.
2. **Engine Coolant:** Check the coolant level before starting the unit each day. The coolant level should not be less than one inch below the top of the radiator.

⚠ CAUTION

NEVER check the engine coolant when the engine is hot. Allow the engine to cool at least one hour before checking the coolant. Check the engine owner's manual for instructions. **ALWAYS** wear eye and hand protection when working with the radiator.

Maintenance Section

4.4 Preventive Maintenance, continued;

Preventative Maintenance, continued:

3. **Engine Radiator:** The engine radiator on a leaf vacuum becomes clogged with dust and debris frequently because of the nature of the job. If the radiator is not cleaned properly it WILL cause improper cooling and WILL eventually cause serious damage to your engine. The debris accumulating on the radiator can be lessened by lowering the RPM on the engine to a level just enough to vacuum the leaves. The higher the RPM the more dust that is put into the air. Also, it may be necessary to put mesh or tarps on the top of the leaf box container to reduce the debris and dust. If this is done, make sure there is enough air ventilation on the box so the box is not blown apart. Proper belt condition and coolant mix-ratio, as well as coolant conditioners, are all critical to proper engine cooling. See the engine's owner's manual for specifics on coolant mixture ratios and conditioners. The radiator should be inspected and cleaned with compressed air everyday at the very least.

DANGER

NEVER attempt to clean or inspect the radiator with the engine running or while the engine is HOT. Allow the engine to cool at least one hour before maintaining the radiator. Check the engine owner's manual for instructions. ALWAYS wear eye and hand protection when working with the radiator.

4. **Engine Air Cleaner:** Due to the large amounts of dust generated in collection leaves, it is critical to your engine's life that the pre-cleaner and air filter be maintained properly. The pre-cleaner (if equipped) should be cleaned at least daily of any debris that has accumulated. If conditions warrant it should be cleaned more. The air filter should be checked daily and should be replaced at the first sign of it being dirty. See the engine's owner's manual for details. It is a good idea to clean out the air filter housing once a week to clean any dust debris that may have accumulated.
5. **Tires and Wheels:** Tires and wheel lug nuts should be checked on a daily basis. Tires should be checked for excessive wear and proper air pressure. Check the side wall of the tire for proper inflation pressure. Torque all 1/2" diameter lug nuts from 90 to 120 foot pounds. Torque all 5/8" diameter lug nuts from 175 to 225 foot pounds. Consult the axle manufacturer's owner's manual for more detailed information.

Maintenance Section

4.4 Preventive Maintenance, continued;

Preventative Maintenance, continued:

6. **Trailer Brakes (if equipped):** Most of the newer Xtreme Vac leaf vacuums have electric brakes on the axle(s). It is critical that these brakes work properly. The trailer's brakes should be checked daily, before leaving the equipment yard, for proper operation. The trailer brakes are designed to work in synchronization with your tow vehicles brakes. Never use your tow vehicle or trailer brakes alone to stop the combined load. The synchronization between the tow vehicle and the leaf vacuum is accomplished through the brake controller and needs to be set correctly. Please read the brake controllers manual and the axle owner's manual for these procedures.

WARNING

DO NOT tow the leaf vacuum with damaged or non-operating brakes. Check the brakes daily for proper operation.

The brakes should be adjusted after the first 200 miles of operation when the brake shoes and drums have "seated" and at 3,000 mile intervals, or as use and performance requires. The adjustment procedures are beyond the scope of this manual, please see the axle owners/service manual for specific instructions.

The trailer brakes should be inspected and serviced at yearly intervals or more often as use and performance requires. Magnets and shoes must be changed when they become worn or scored thereby preventing adequate vehicle braking. Again, see the axle owner's/service manual for specific procedures.

7. **FUEL TANK:** Fill the fuel tank at the beginning of the work shift leaving a gap of at the top of the tank for expansion of fuel. A full fuel tank will reduce the possibility of condensation forming in the tank and moisture entering the fuel lines. Check the fuel lines daily for cracks, holes or tightness.

Maintenance Section

4.4 Preventive Maintenance, continued;

Preventative Maintenance, continued:

CAUTION

ALWAYS wear eye and hand protection when working with the battery.

8. **BATTERY:** Xtreme Vac's units are supplied with "maintenance free" batteries so there is no need to check fluid levels but the battery terminals should be checked daily for corrosion. Remove any corrosion with a wire brush and coat the terminals with light grease or petroleum jelly to reduce the possibility of corrosion. Also check the battery cable for wear all cable connections and battery tie downs to be certain that they are not loose.
9. **DRIVE BELT (if equipped):** The main drive belt should be checked daily for cracks and for proper tension. If the belt shows any sign of

CAUTION






Remove the lead spark plug wires before removing the belt guard.

cracking it should be replaced immediately. The proper tension of the belt should be approximately 1/2" deflection when applying a 8 pound pull.

10. **FASTENERS:** Fasteners should be checked weekly for the first 30 days and monthly thereafter. They must be in place at all times and properly torqued. For general torque values see the torque chart at the end of this section.

Maintenance Section

4.5 Torque Values

<u>INCH BOLT AND CAP SCREW TORQUE VALUES</u>					<u>METRIC BOLT AND CAP SCREW TORQUE VALUES</u>						
TYPE	SAE GRADE					CLASS					
	5		8			8.8 or 9.8		10.9		12.9	
HEAD MARK					HEAD MARK						
SIZE(D)	LB-FT		LB-FT		SIZE(D)	LB-FT		LB-FT		LB-FT	
	Lub*	Dry*	Lub*	Dry*		Lub*	Dry*	Lub*	Dry*	Lub*	Dry*
1/4"	7	9	10	12.5	M6	6.5	8.5	9.5	12	11.5	14.5
5/16"	15	18	21	26	M8	16	20	24	30	28	35
3/8"	26	33	36	46	M10	32	40	47	60	55	70
7/16"	41	52	58	75	M12	55	70	80	105	95	120
1/2"	63	80	90	115	M14	88	110	130	165	150	190
9/16"	90	115	130	160	M16	140	175	200	255	240	300
5/8"	125	160	175	225	M18	195	250	275	350	325	410
3/4"	225	280	310	400	M20	275	350	400	500	460	580
7/8"	360	450	500	650	M22	375	475	540	675	625	800
1"	540	675	750	975	M24	475	600	675	850	800	1000
1-1/8"	675	850	1075	1350	M27	700	875	1000	1250	1150	1500
1-1/4"	950	1200	1500	1950	M30	950	1200	1350	1700	1600	2000
1-3/8"	1250	1550	2000	2550	M33	1300	1650	1850	2350	2150	2750
1-1/2"	1650	2100	2650	3350	M36	1650	2100	2350	3000	2750	3500

***Lub** means coated with a lubricant such as engine oil, or fasteners with phosphate or oil coatings. "Dry" means plain or zinc plated without any lubrication.

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening. Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not the bolt head.

Maintenance Section

4.6 Quick Reference Maintenance Chart

CAUTION

Only properly trained personnel should perform maintenance or repair on this equipment. Consult ODB before performing any maintenance procedures that is not specifically covered in this manual. Improper maintenance or repair may void any and all warranties on this equipment.

NOTE: THIS CHART IS FOR REFERENCE ONLY, CONSULT THE ENGINE'S OWNERS MANUAL FOR SPECIFIC DETAILS. FOR JOHN DEERE 3029 ENGINES ONLY.

ITEM	DISCRIPTION
Fuel Requirement	Diesel fuel specified to EN 590 or ASTM D975
Fuel Capacity	20 Gal
Low / High Idle Speed	900 rpm / 2,400 rpm
Engine Oil: Grade Viscosity Capacity	API service classification; CG-4, CF-4 SAE15W-40 / SAE10W-40, or SAE 5W-30 (see EOM manual for details) 9 US qt
Coolant: Type Mixture Freezing Point Amount	Permanent type of antifreeze; green in color (see EOM manual) Water 50%; Antifreeze 50%; (1:1) -35 degrees C (-31 degrees F) 2.5 US gallons
Hydraulic Tank Type Amount	High Viscosity, Premium Hydraulic Fluid; Shell Tellus #68 recommended. (ISO 68 viscosity grade) 8 US gallons

WARNING

Improper maintenance or repair CAN result in equipment damage and/or personal injuries.

DANGER

BEFORE CONTINUING, please read and understand the Safety, Preoperating and Operating sections of this manual before doing any procdedures in this section.

Service Section

WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

5.0 SERVICE SECTION

5.0 SERVICE SECTION

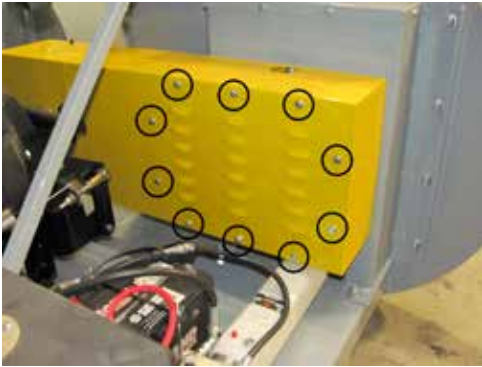
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5.0 SERVICE SECTION

Service Section

5.1 Replacing the Drive Belt

figure 5.2a



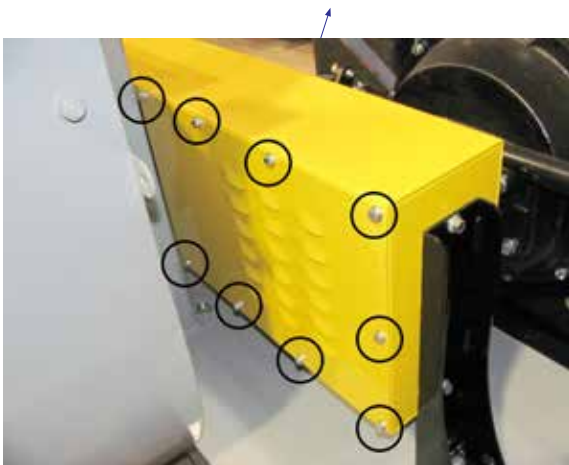
⚠ WARNING

Thoroughly read and understand the safety and pre-operating sections of this manual before working on the unit.

⚠ WARNING

Make sure the negative battery cable is disconnected before opening the blower housing.

figure 5.2b

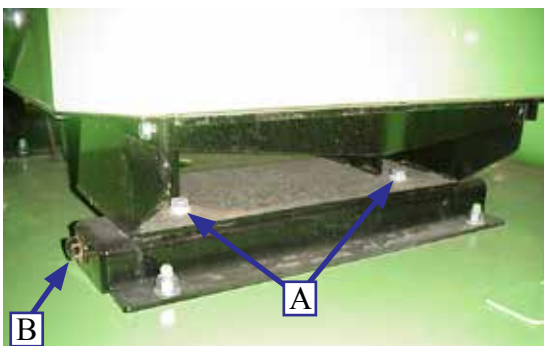


Belt Adjustment / Removal Procedure :

Belt adjustment / Removal is made easy by the using the engine adjustment brackets and bolts. Be careful when working around the engine and muffler area, as it may be hot. On a new unit, the belt should be adjusted after the first 30 hours of use and every 100 hours thereafter.

1. Remove the belt guard covers by removing the bolts holding on the covers (FIG. 5.2A & B).
2. Loosen the engine base bolts (Item A on FIG 5.2C), there are 2 on each mount.
3. Then drive the adjuster bolt (Item B on FIG. 5.2C) counter-clockwise to move the engine toward the impeller shaft. This will loosen the belt.

figure 5.2c



Service Section

5.1 Replacing the Drive Belt (if equipped), continued;

figure 5.2d



⚠ WARNING

Thoroughly read and understand the safety and pre-operating sections of this manual before working on the unit.

⚠ WARNING

Make sure the negative battery cable is disconnected before opening the blower housing.

Review the safety section of this manual before attempting these procedures.

Belt Adjustment / Installation Procedure :

1. To tighten or install the belt, make sure the two pulleys are lined up. Use a straight edge to make sure (FIG 5.2D). If the pulleys are not lined up loosen one of the pulleys and move the pulley in or out until the two pulleys line up.
2. Tighten the belt by turning the adjuster bolt clockwise until the belt is tight. The correct tension is when the belt deflects 1/2" - 3/4" using an 8 pound pull. **DO NOT OVERTIGHTEN.**
3. Re-install the belt guard cover exactly as you removed it.

Service Section

5.2 Impeller Removal / Installation

⚠ CAUTION

Make sure the engine is OFF and the negative battery cable is disconnected before attempting any service procedures.

REMOVAL

1. The blower housing face must be removed to gain access to the impeller. Use an overhead crane or forklift to support the face while removing.
2. Once the face has been removed, remove the shaft protector (Fig. 1 or 2).
3. Saturate the shaft and bushing using a penetrating lubricant to help loosen the bushing. Clean any grease or debris from the bushing and shaft.
4. Remove the 3 bolts attaching the bushing to the impeller.(Fig. 3) Being careful not to break the bolts. If a set screw is on the lip of the bushing, loosen it using an allen wrench.(Fig. 4)
5. Using two of the bolts that were just removed screw those bolts into the threaded holes on the bushing. Drive the two bolts into the bushing.(Fig. 5) This will separate the bushing from the impeller. Alternate from one bolt to the other driving only about a 1/4" at a time to keep the bushing coming out straight. It is imperative to keep the bushing straight to remove it.

IMPORTANT: Be sure to drive the bushing out evenly or it will get in a bind making removal much harder.

6. If the bushing does not come off using the two bolts, drill and tap several additional 3/8-16 holes around the bushing. Using Grade 8, 3/8-16 - 2 inch bolts, alternately drive the bolts 1/4" at a time to remove the bushing. **KEEP THE BUSHING STRAIGHT** while removing.

IMPORTANT: If additional holes were drilled in the bushing, it can not be reused. It must be replaced.

7. Once the bushing has been removed use an overhead crane or other suitable device to help lift the impeller out of the blower housing.
8. At this point it would be a good idea to inspect the blower housing liners and blower housing for any damage or wear. Any damage or wear to the liners should be fixed by replacing the liners immediately.

Fig. 1

Fig. 2

Belt Drive



Fig. 3



Fig. 4



Fig. 5



Service Section

5.2 Impeller Removal / Installation, cont.;

⚠ CAUTION

Make sure the engine is OFF and the negative battery cable has been disconnected before attempting any service procedures.

INSTALLATION

1. Clean the shaft of any debris and remove any rust using a 120 grit emory cloth.
2. Using an overhead crane or other suitable lifting device lift the impeller on to the shaft. Turn the impeller to align the keyways of the shaft with the keyway in the impeller.
3. Insert key into the keyway. A light sanding of the keyway may be needed, as well as a few light blows with a rubber mallet.
4. Tap the bushing onto the shaft aligning the keyways.
5. **BELT DRIVE UNITS:** Align the bushing and key to be flush with the end of the shaft (Fig 1).
6. Put the 3 bolts into the non-threaded holes and drive them into the impeller holes evenly. Alternate between the three bolts as you drive the bolts in. Torque to 40 to 50 lbs/ft. There should be a gap of 3/8" to 1/2" between the bushing and the impeller.

IMPORTANT: Slowly spin the impeller by hand making sure that the back of the impeller is not hitting any of the bolt heads located at the back of the blower housing.

8. If the bushing has a set screw on it, tighten the screw snug with an allen wrench (Fig. 3). This will help keep the key in place.
9. Install the shaft protector on to the shaft (Fig. 4).

Fig. 1



Fig. 2



Fig. 3



Fig. 4

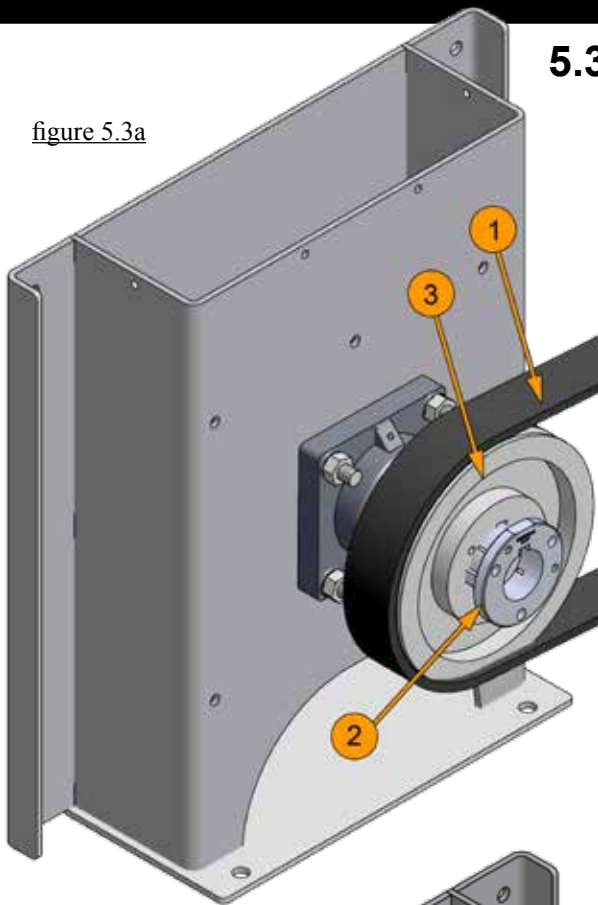
Belt
Drive



Service Section

5.3 Impeller Bearings Removal / Installation

figure 5.3a



⚠ WARNING

Thoroughly read and understand the safety and pre-operating sections of this manual before working on the unit.

⚠ WARNING

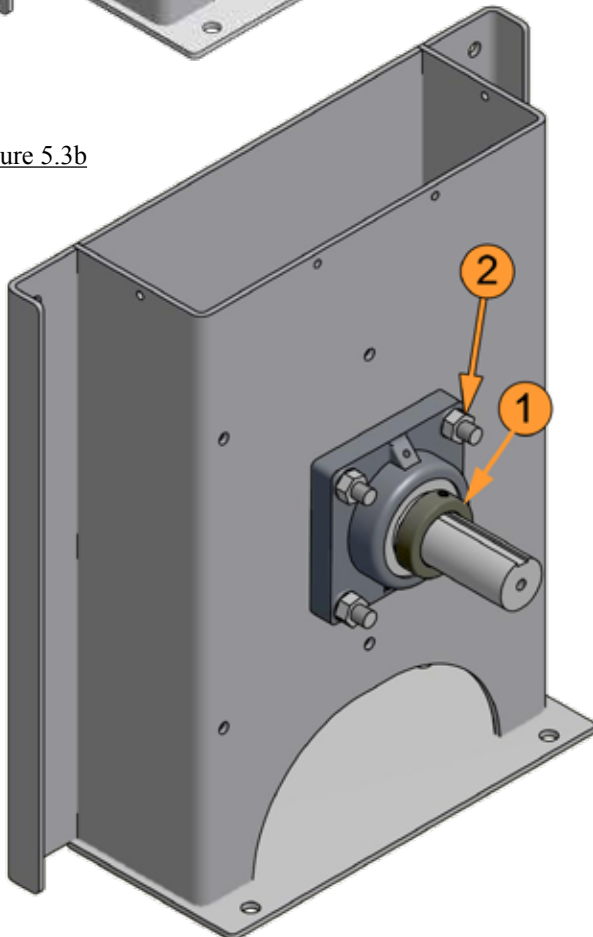
Make sure the negative battery cable is disconnected before opening the blower housing.

Review the safety section of this manual before attempting these procedures.

Removing Drive Bearings (refer to 5.3a thru 5.3d):

1. Remove the impeller and drive belt as described in this manual.
2. If the bearings have not "seized" onto the shaft then removal is straightforward.
3. Loosen the pulley (item# 2, fig. 5.3a) by removing the bushing bolts (item# 3, fig. 5.3a).
4. Remove the bearing collar (Item# 3, fig. 5.3b), if equipped, at the rear of the front bearing (the bearing closest to the blower housing).
5. On the rear bearing (closest to the engine) loosen the set screw on the bearing lock collar (Item# 1, fig. 5.3b)
6. Pull the shaft out toward the blower housing. The bearing plate, front bearing and pulley should come out in one unit.
7. If the shaft doesn't pull out easily, lubricate the shaft generously where the shaft goes through the bearings. If the shaft still doesn't come out, the final solution is to cut the shaft in half.
8. Once the shaft is out, remove the front bearing from the shaft by using steps 5 and 6.

figure 5.3b



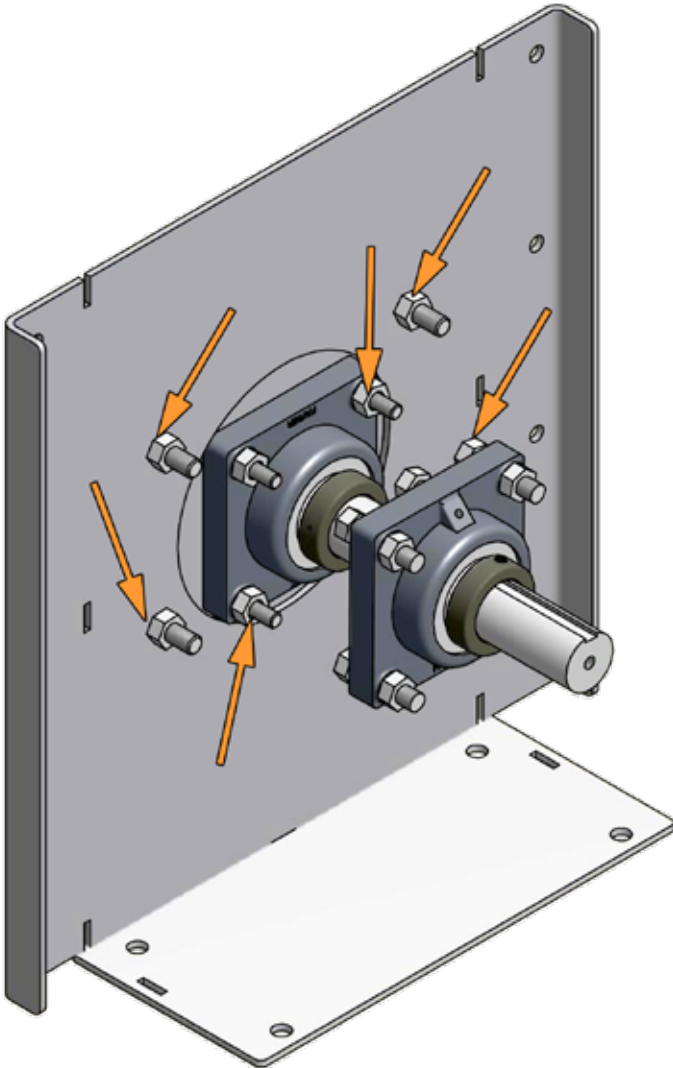
Service Section

5.3 Impeller Bearings Removal / Installation, continued

Review the safety section of this manual before attempting these procedures.

figure 5.3c

Shown with part of pedestal cut away



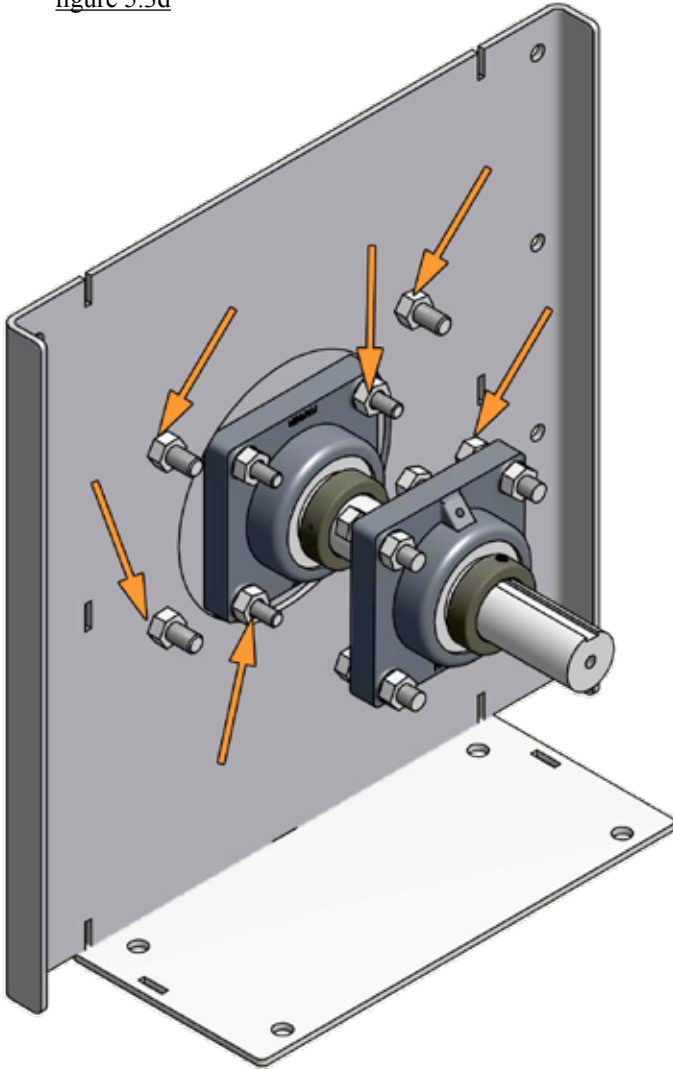
Installing the Drive Bearings:

1. Make sure the shaft is clean and remove any burrs.
2. Bolt up the rear bearing (closest to the engine) to the frame.
3. Bolt the front bearing to the bearing plate
4. Bolt the bearing plate (fig. 5.3c) up to the blower housing and bearing frame.
5. Slide the shaft through the front bearing, making sure the front locking collar is slid on to the shaft.
6. Once the shaft is through the front bearing, install the pulley onto the shaft, but don't tighten it until the bearings have been installed and your sure the two pulleys are lined up correctly.
7. Slide the shaft through the rear bearing (closest to the engine). Make sure the front locking collar is put on before the bearing.
8. Once the shaft is in place, lock down the bearings:
9. Starting with the rear bearing (closest to the blower housing) install the rear collar on the blower housing side (figure 5.3b).
10. Push the set collar up to the bearing.
11. Tighten the set screw.
12. Install the front locking collar sliding the locking collar up to the bearing and the turn the collar clockwise until it slips over the inner ring extension and engages the eccentric. Turn by hand until the parts are locked together.

Service Section

5.3 Impeller Bearings Removal / Installation, continued

figure 5.3d



13. Place a punch or drift in the blind hole in the collar and strike it sharply to the lock the collar and ring tightly together
14. Tighten the set screws with an Allen wrench until the set screw stops.
15. Do steps 10-14 for the other bearing also.
16. Line up the pulleys and tighten the busing.
17. Re-install the belt guards and impeller as described earlier.

Service Section

5.4 Engine Wiring Harness Diagram

Engine Wiring Harness Diagram

June 2005 and after

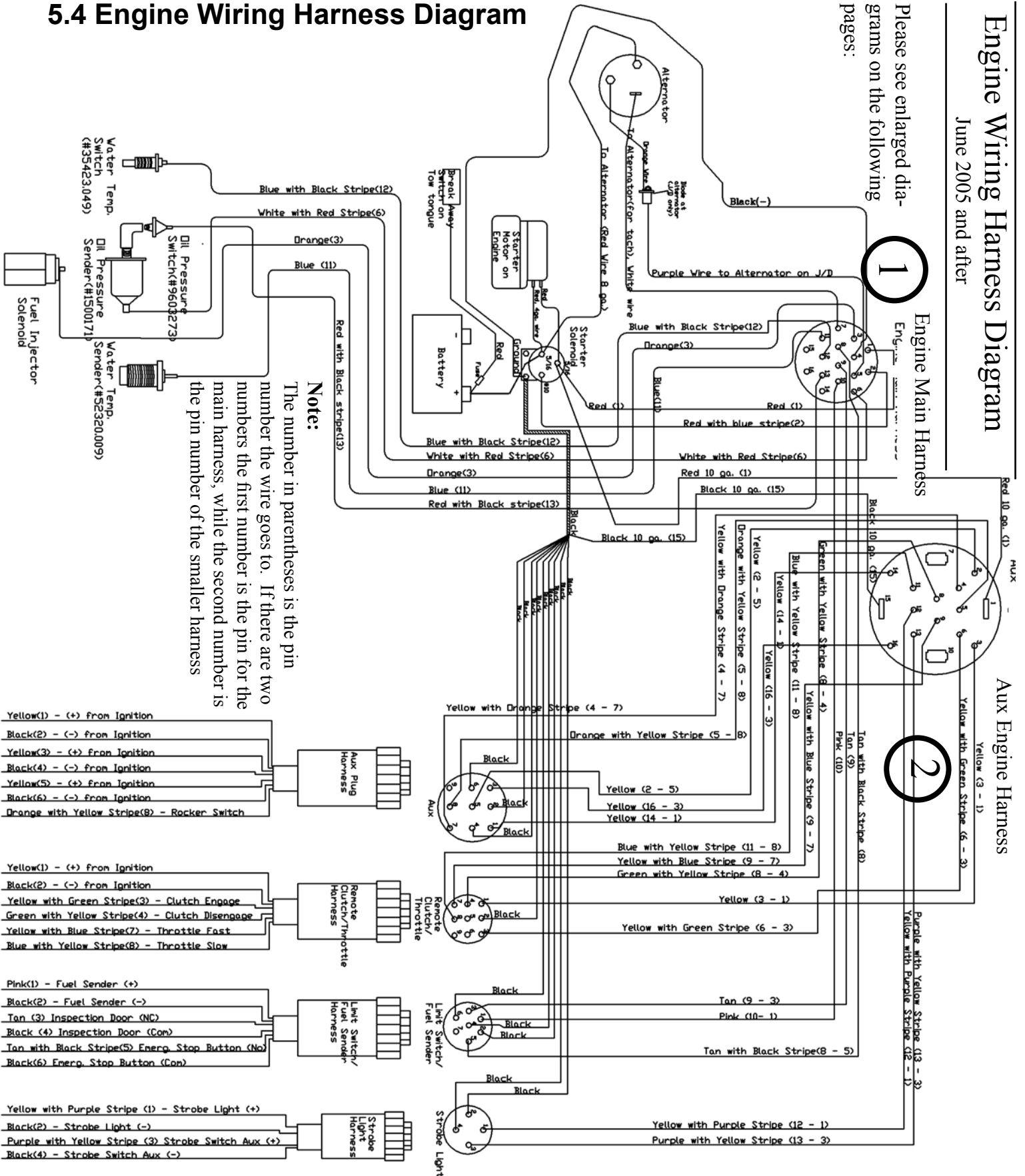
Please see enlarged diagrams on the following pages:

1

Engine Main Harness

2

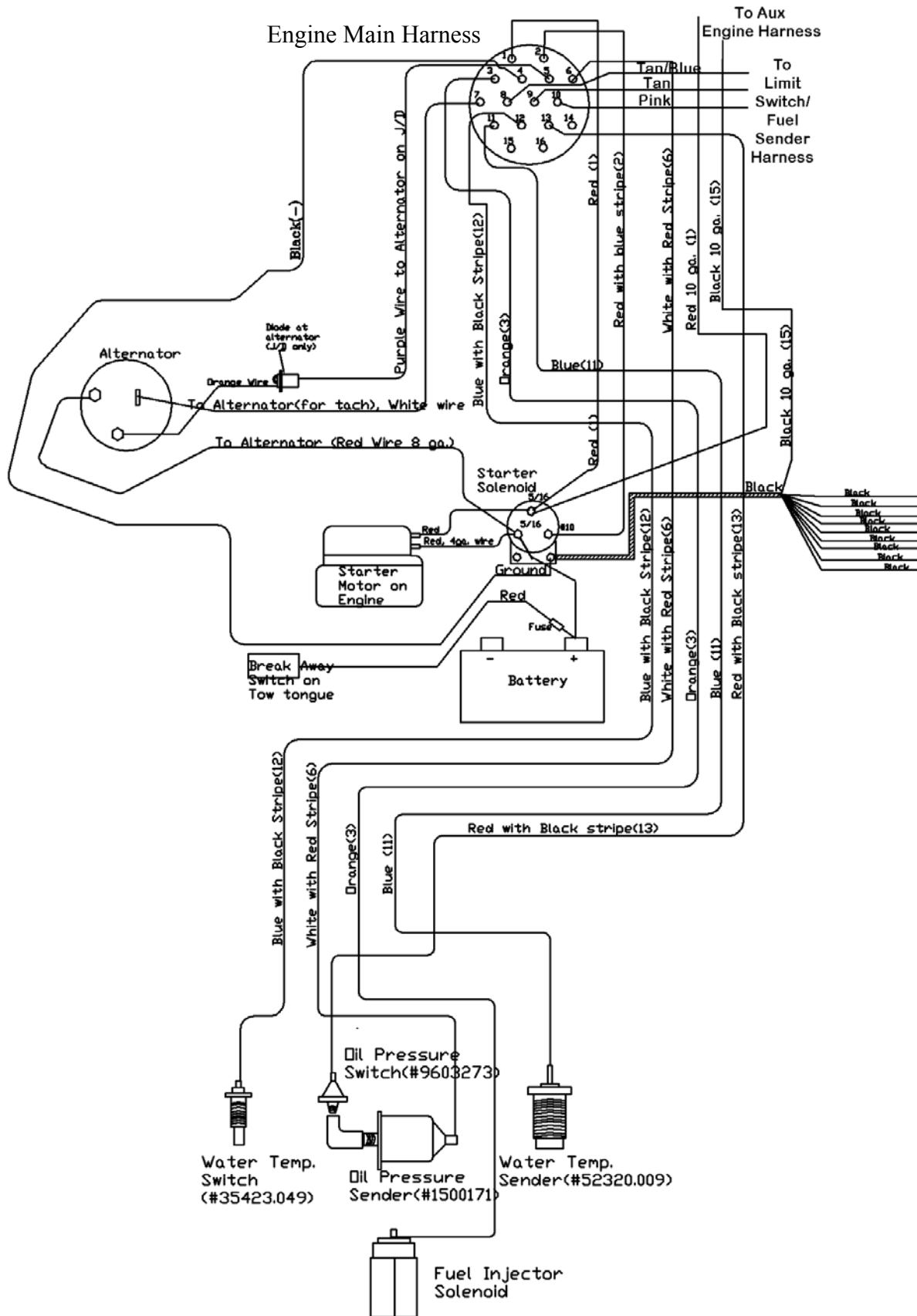
Aux Engine Harness



Note:
The number in parentheses is the pin number the wire goes to. If there are two numbers the first number is the pin for the main harness, while the second number is the pin number of the smaller harness

Service Section

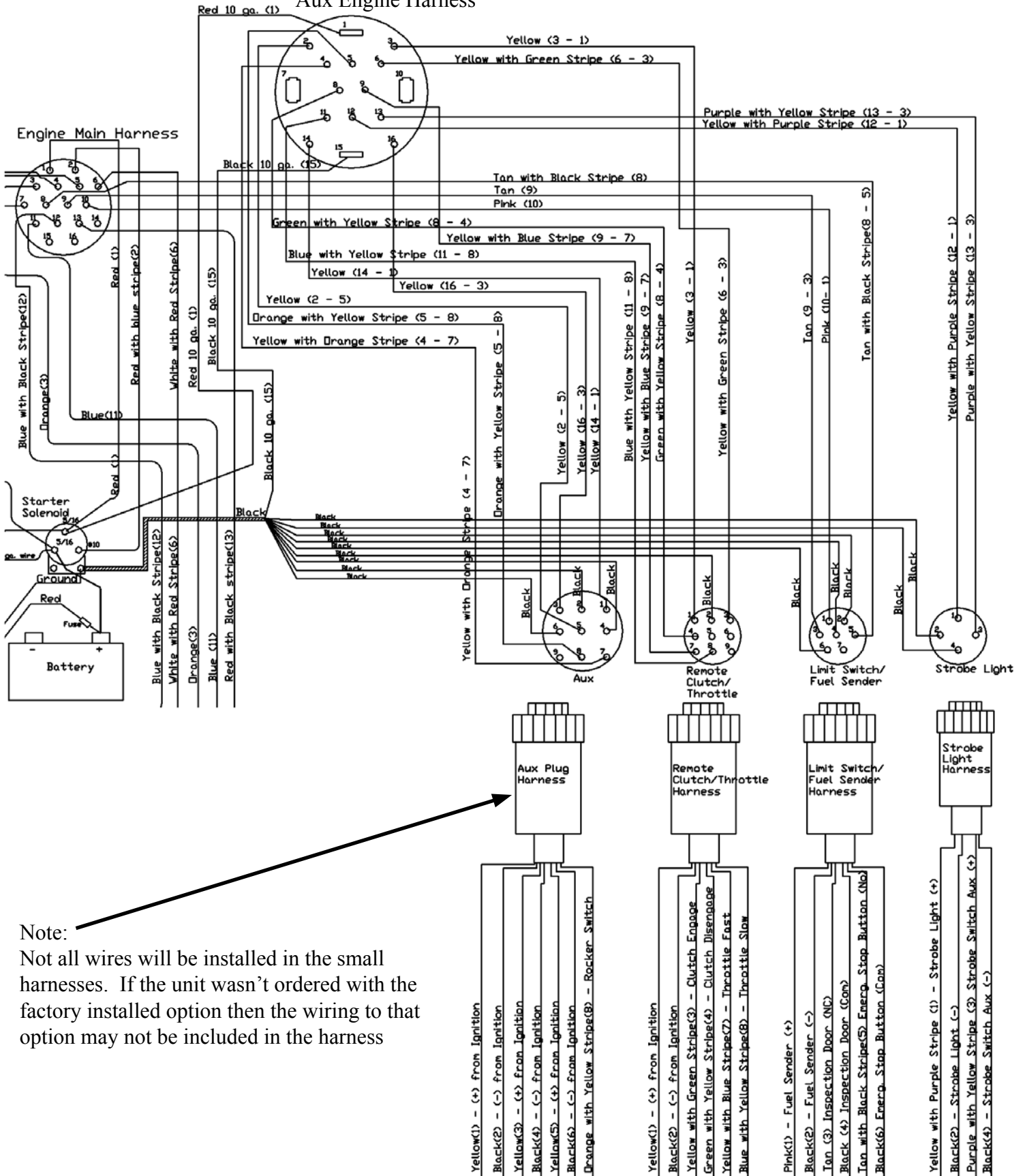
5.5 Engine Main Harness - Enlarged



Service Section

5.6 Auxillary Engine Harness - Enlarged

Aux Engine Harness



Note: Not all wires will be installed in the small harnesses. If the unit wasn't ordered with the factory installed option then the wiring to that option may not be included in the harness

Service Section

5.7 Engine Wiring Harness Descriptions

ENGINE MAIN HARNESS		
PIN #	COLOR	DESCRIPTION
1	Red	"+" from Solenoid (battery)
2	Red w/ Blue Stripe	Starter Solenoid
3	Orange	Fuel Shutoff Solenoid
4	Black	"-" from Solenoid (battery)
5	Purple	Alternator Energize "+"
6	White w/ Red Stripe	Oil Sender
7	White	Tach Signal from Alternator
8	Tan w/ Black Stripe	Emergency Stop Button (650 only) goes to Limit Switch plug pin #5
9	Tan	Inspection Door on Blower Housing, goes to Limit Switch plug pin #3
10	Pink	Fuel Sender, goes to Limit Switch Plug pin #5
11	Blue	Water Temperature Sender on Engine Block
12	Blue w/ Black Stripe	Water Temperature Switch on Engine Block
13	Red w/ Black Stripe	Oil Pressure Switch on Engine Block
AUXILLARY ENGINE HARNESS		
1	Red 10 Gauge	"+" from Solenoid (Battery)
2	Yellow	Aux "+" from Ignition; goes to Aux Plug Harness pin #5
3	Yellow	Aux "+" from Ignition; goes to Remote Clutch Harness pin #5
4		
5		
6	Yellow w/ Green Stripe	Clutch Engage; goes to Remote Clutch Harness pin #3
7	[empty]	
8	Green w/ Yellow Stripe	Clutch Disengage; goes to Remote Clutch Harness pin #4
9	Yellow w/ Blue Stripe	Throttle Fast; goes to Remote Clutch Harness pin #7
10	[empty]	
11	Blue w/ Yellow Stripe	Throttle Slow; goes to Remote Clutch Harness pin #8
12	Yellow w/ Purple Stripe	Strobe Light "+"; goes to Strobe Light Harness pin #1
13	Purple w/ Yellow Stripe	Strobe Light Aux; goes to Strobe Light Harness pin #3
14	Yellow	Aux "+" from Ignition; goes to Aux Plug Harness pin #1
15	Black 10 gauge	"-" from Solenoid (Battery)
16	Yellow	Aux "+" from Ignition; goes to Aux Plug Harness pin #3
STROBE LIGHT HARNESS		
	Yellow w/ Purple Stripe	Fuel Sender "+"; came from Engine Main Harness pin #10
	Black	Strobe Light "-"; came from ground to solenoid
	Purple w/ Yellow Stripe	Strobe Switch Aux "+"; came from Aux Engine Harness pin #13
	Black	Strobe Switch Aux "-"; came from ground on Solenoid

Service Section

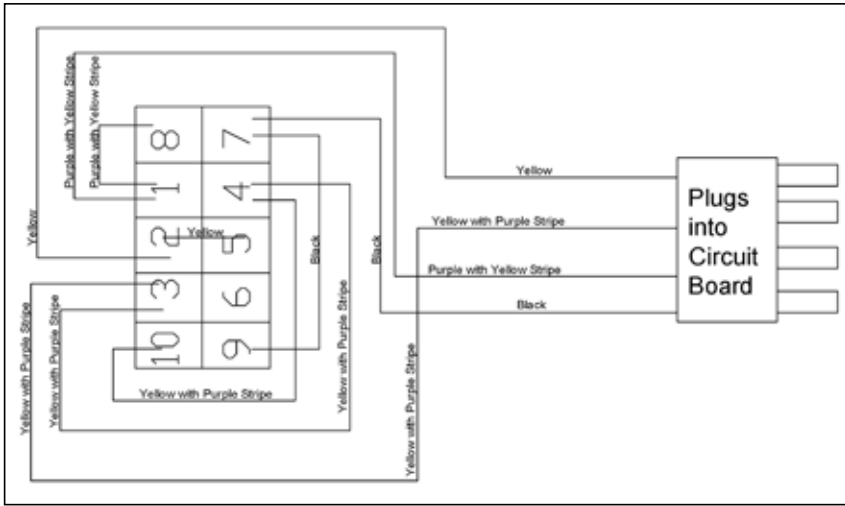
5.7 Engine Wiring Harness Descriptions, continued

FUEL & LIMIT SWITCH HARNESS		
	Pink	Fuel Sender "+"; came from Engine Main Harness pin #10
	Black	Fuel Sender "-"; came from ground to solenoid
	Tan	Inspection Door "+"; came from Engine Main Harness pin #9
	Black	Inspection Door "-"; came from ground to solenoid
	Tan w/ Black Stripe	Emergency Stop Button "NO"; came from Engine Main Harness #8
	Black	Emergency Stop Button "COM"; came from ground on Solenoid
	[empty]	
REMOTE THROTTLE AND CLUTCH HARNESS		
1	Yellow	"+" from Ignition; came from Aux Engine Harness pin# 3
2	Black	"-" from Ignition; came from ground on Solenoid
3	Yellow w/ Green Stripe	Clutch Engage; came from Aux Engine Harness pin# 6
4	Green w/ Yellow Stripe	Clutch Disengage; came from Aux Engine Harness pin# 4
5	[empty]	
6	[empty]	
7	Yellow w/ Blue Stripe	Throttle Fast; came from Aux Engine Harness pin# 9
8	Blue w/ Yellow Stripe	Throttle Slow; came from Aux Engine Harness pin# 11
9	[empty]	
AUX PLUG IN HARNESS		
1	Yellow	"+" from Ignition; came from Aux Engine Harness pin# 14
2	Black	"-" from Ignition; came from ground on Solenoid
3	Yellow	"+" from Ignition; came from Aux Engine Harness pin# 16
4	Black	"-" from Ignition; came from ground on Solenoid
5	Yellow	"+" from ignition; came form Aux Engine Harness pin# 2
6	Black	"-" from ignition; came from ground on solenoid
7	[empty]	
8	Orange w/ Yellow Stripe	Rocker Switch; came from Aux Engine Harness pin# 5
9	Yellow w/ Orange Stripe	Rocker Switch; came from Aux Engine Harness

Service Section

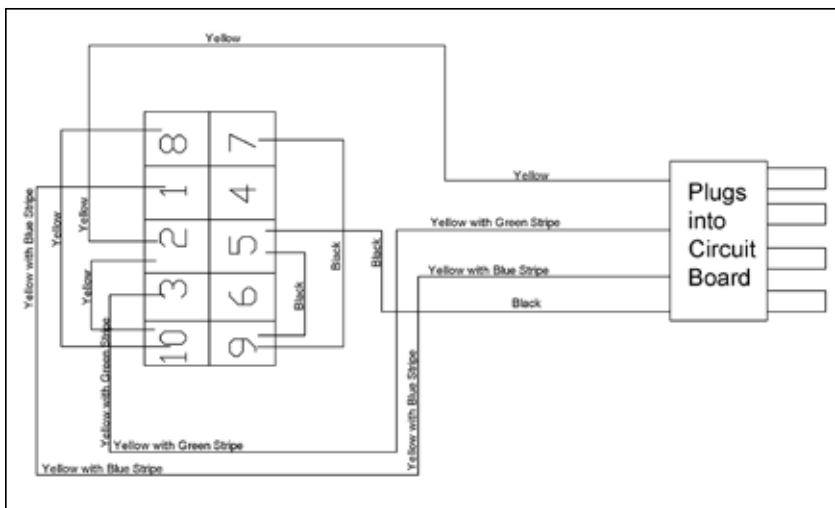
5.8 Engine Rocker Switch Wiring Diagrams

Strobe Light Rocker Switch



Pin#	Color	Description
1	Purple w/ Yellow Stripe	“+” Aux from Switch
2	Yellow	“+” from Circuit Board
3	Yellow w/ Purple Stripe	“+” from Strobe Light
4	Yellow w/ Purple Stripe	Looped from #3
5	Yellow	Looped from #2
6		
7	Black	“-” from Circuit Board
8	Purple w/ Yellow Stripe	Looped from #1
9	Black	Looped from #7
10	Yellow w/ Purple Stripe	Looped from #4

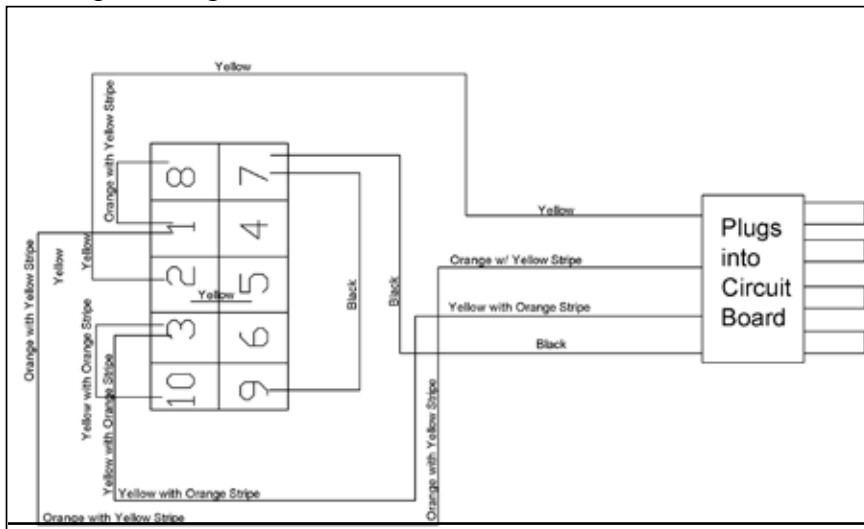
Remote Throttle and Remote Clutch Rocker Switch



Pin#	Color	Description
1	Yellow w/ Blue Stripe	Throttle Fast / Clutch Engage
2	Yellow	“+” from Circuit Board
3	Yellow w/ Green Stripe	Throttle Slow / Clutch Disengage
4		
5	Black	“-” from Circuit Board
6		
7	Black	Looped from #9
8	Yellow	Looped from #10
9	Black	Looped from #5
10	Yellow	Looped from #2

This plug is used for the Remote Throttle and the Remote Clutch Rocker Switches.

Caterpillar Engine Heater Rocker Switch

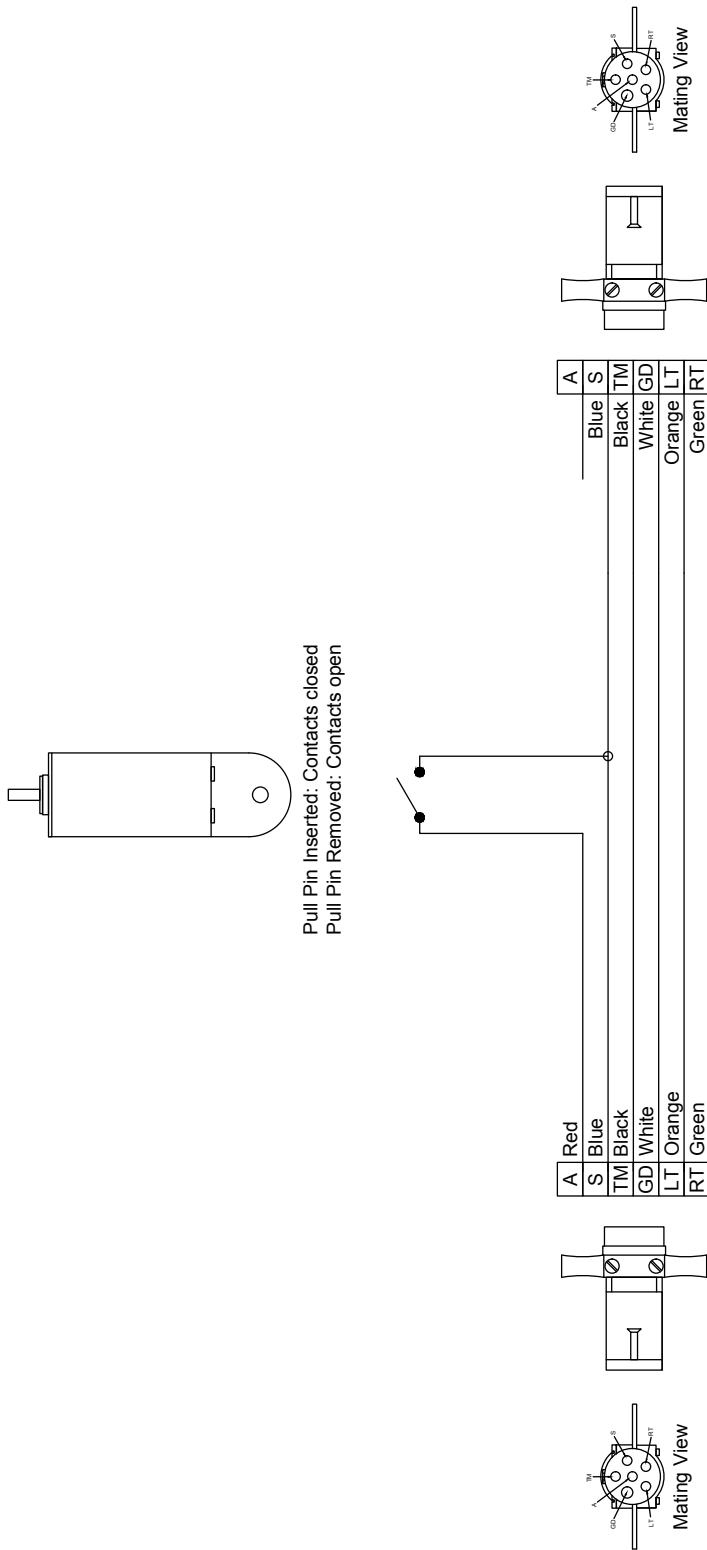


Pin#	Color	Description
1	Orange w/ Yellow Stripe	“+” Aux from Switch
2	Yellow	“+” from Circuit Board
3	Yellow w/ Orange Stripe	“+” to Engine Heater
4	Yellow w/ Orange Stripe	Looped from #2
5	Yellow	Looped from #2
6	Yellow	Looped from #2
7	Black	“-” from Circuit Board
8	Black	Looped from #1
9	Orange w/ Yellow Stripe	Looped from #7
10	Black	Looped from #3

Yellow w/ Orange Stripe

Service Section

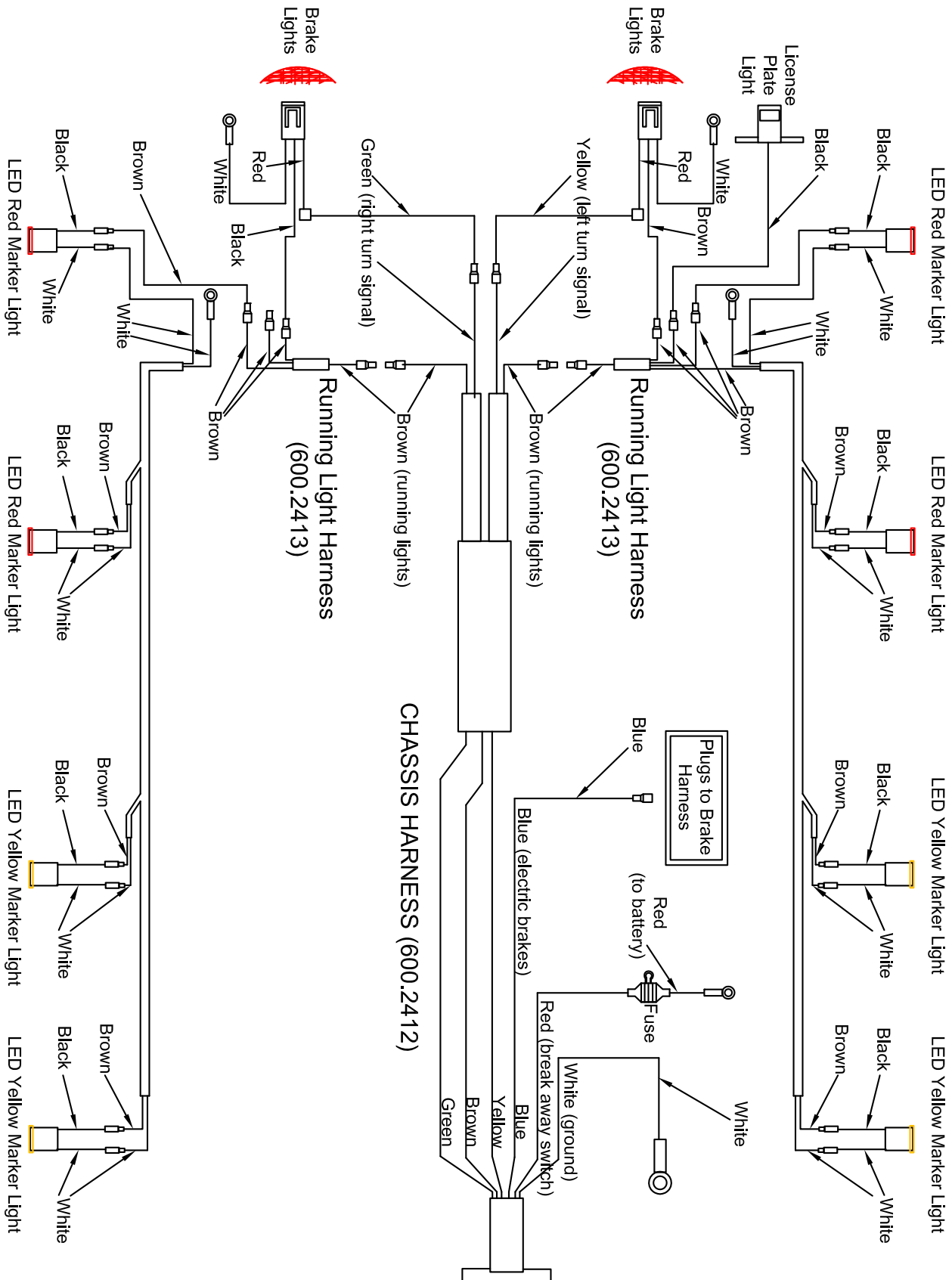
5.9 Trailer Plug Diagram



Service Section

5.10 Trailer Wiring Diagram

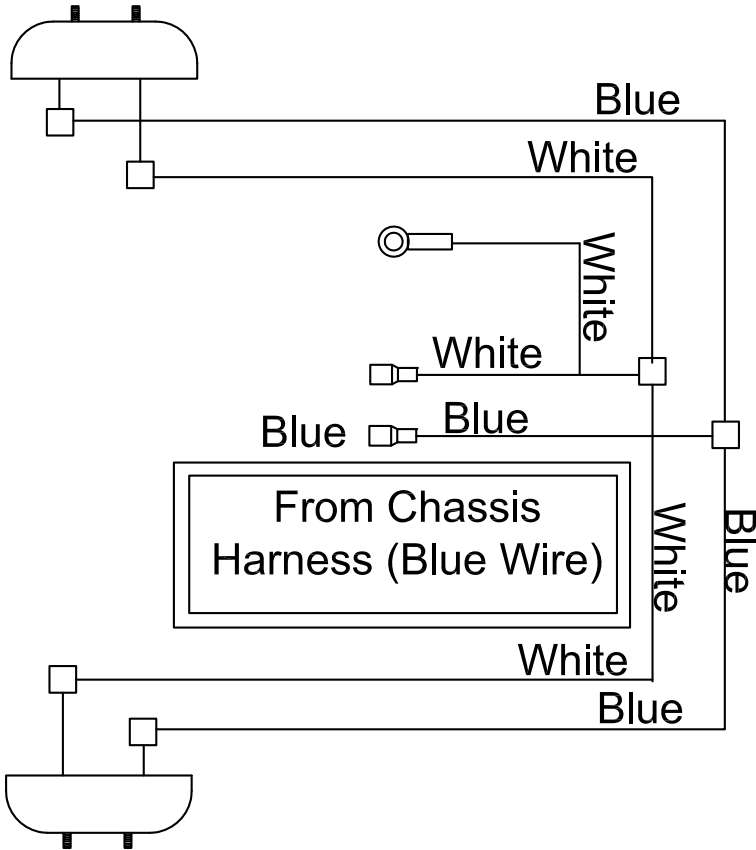
TRAILER WIRING HARNESS



Service Section

5.11 Brake Wiring Harness

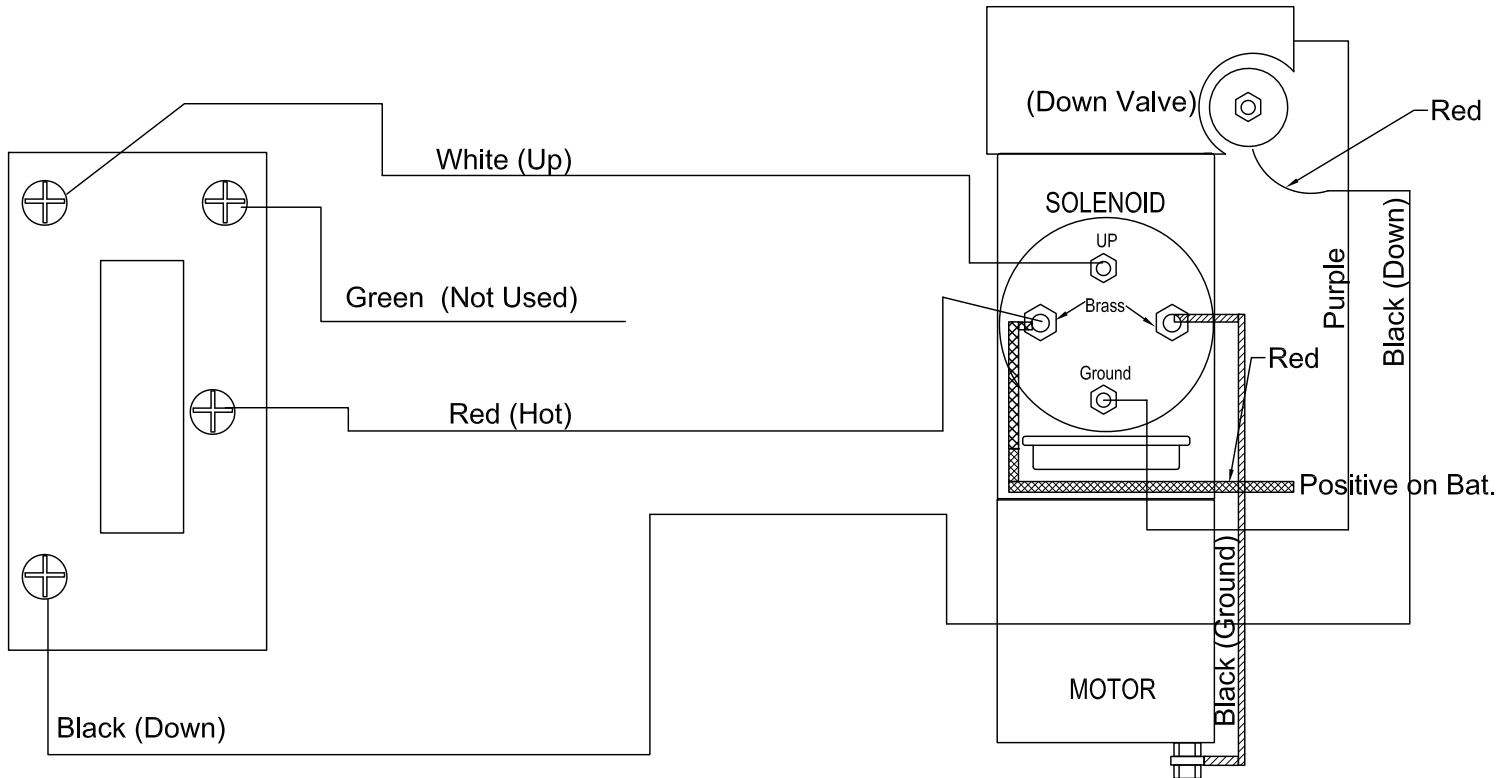
BRAKE HARNESS (600.613)



Service Section

5.12 Boom Wiring Diagram

Yellow SPX 2012 and after



COLOR	FUNCTION
Black	Down
White	Up
Purple	Ground on Solenoid
Red (4 gauge cable)	Positive to Battery
Black (4 gauge cable)	Ground from Solenoid to Hydraulic Motor

PARTS BREAKDOWNS SECTION

 **WARNING**

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.

PARTS BREAKDOWN SECTION

6.0 ENGINE GROUP

7.0 CLUTCH GROUP

8.0 BLOWER HOUSING GROUP

9.0 TRAILER GROUP

10.0 HOSE BOOM GROUP

**PARTS
BREAKDOWNS**



6.0 ENGINE GROUP

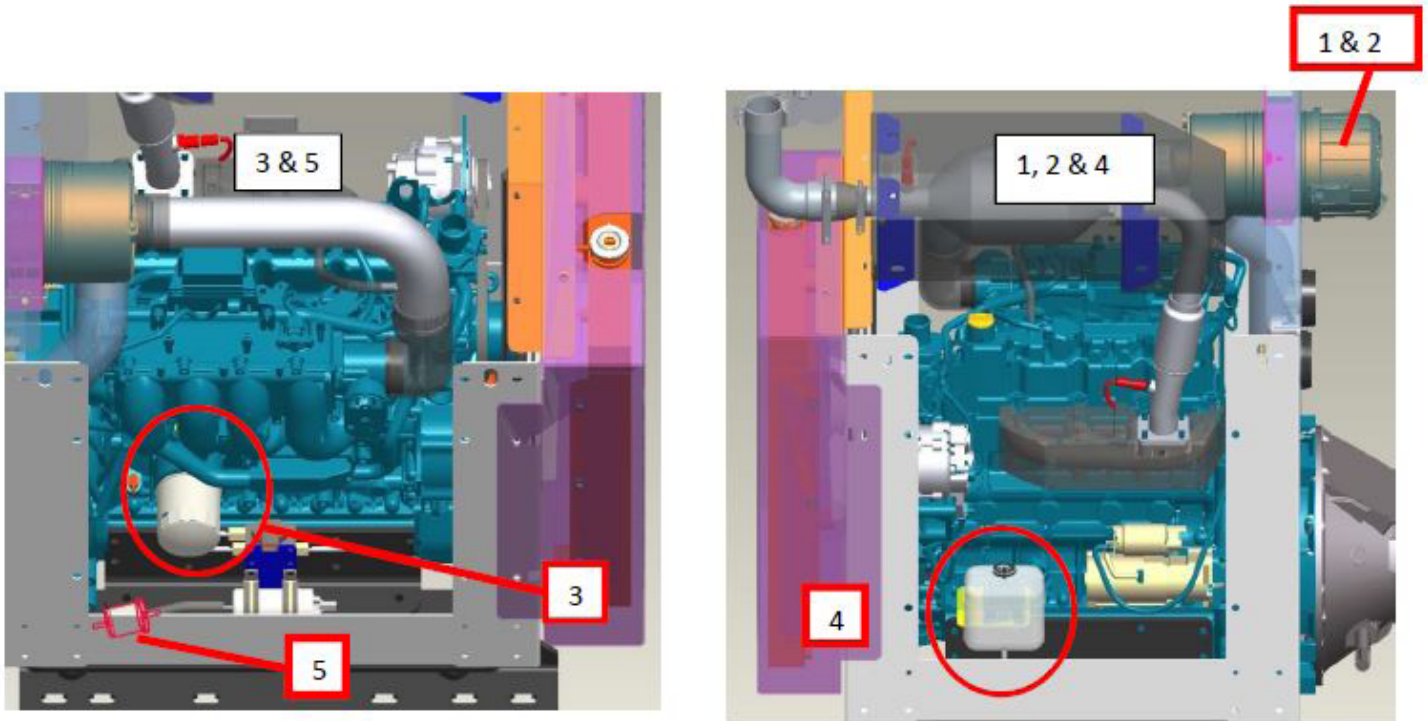
PARTS BREAKDOWN SECTION

6.0 ENGINE GROUP

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6.12 Battery Group.....	86

Parts Breakdowns

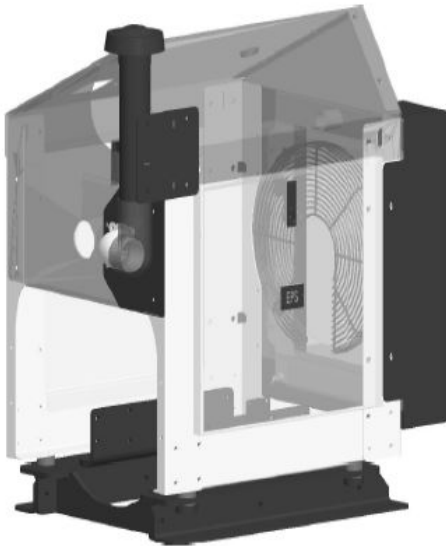
6.1 Kubota Common Service



	Description	Service Interval	Task Required	Notes
1	Air Filter	Yearly/As Needed	Replace Filter	Use Approved Filter P/N: CH07-14074
2	Safety Element	Yearly/As Needed	Replace Filter	Use Approved Filter P/N: ST07-14270
3	Oil Filter	*Every 400 Hours*	Change Oil & Filter 3.22 US Gal Capacity	Use SL or Better Oil Filter P/N: EG505-32111
4	Radiator Overflow Reservoir	Daily	Check Fluid Level	50/50 Anti-Freeze/Water Ratio Fill to Line on Reservoir
5	Fuel Filter	Every 100 Hours Yearly	Check Filter Replace Filter	Use Approved Filter P/N: 12581-43012
6	***Spark Plugs***	Every 100 Hours Every 2000 Hours	Clean/Adjust Spark Plugs Change Spark Plugs	Use Approved Spark Plugs P/N: IFR6F8DN

Parts Breakdowns

6.2 Kubota Sheet Metal Group



8149X-ODB
SCALE: 0.070

BILL OF MATERIALS

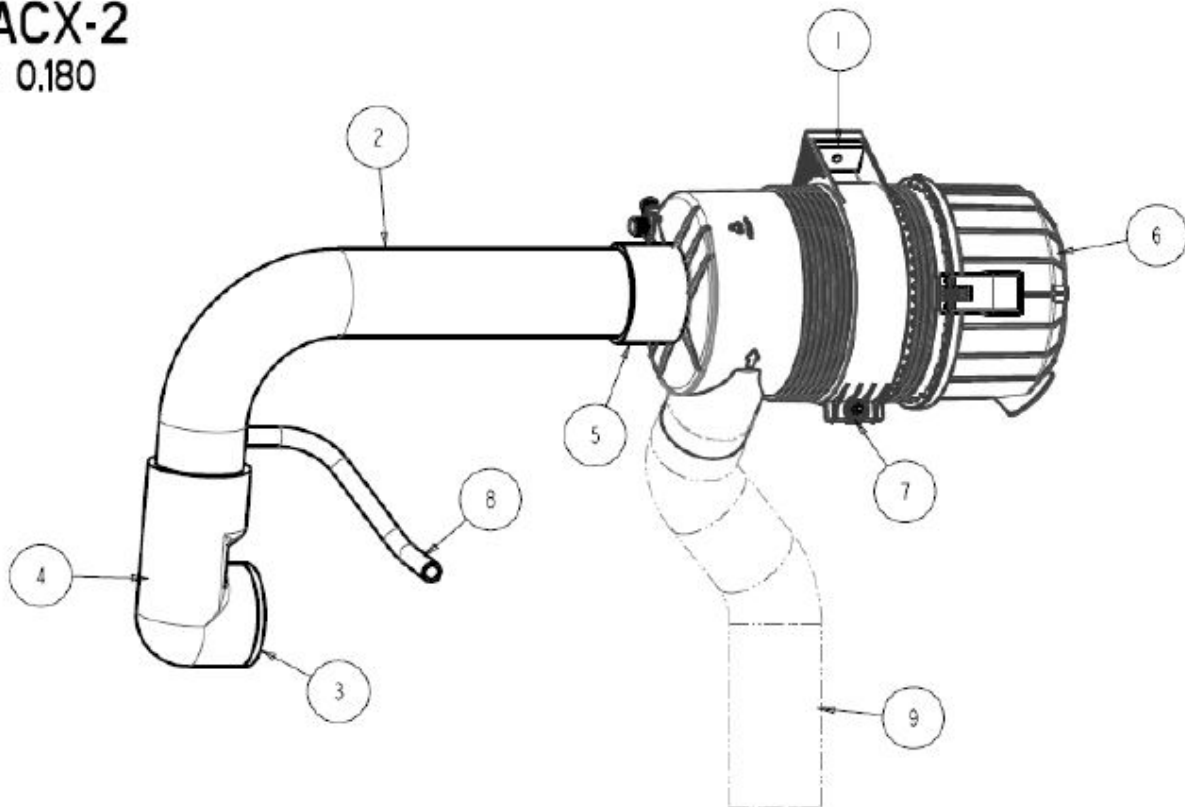
ITEM	FILE NAME	DESCRIPTION	MANUF.	MANUF. NO.	QTY
1	1737	FAN GUARD, 19"	EPS	EPS1737	1
2	6642	ISOLATOR CUP	EPS	EPS6642	4
3	8083	WG3800-G RADIATOR	EPS	EPS9999	1
4	8150	WG38C SUB-FRAME	EPS	EPS8150	1
5	8151	WG38C ENG MNT	EPS	EPS8151	2
6	8152	WG38C SHROUD	EPS	EPS8152	1
7	8153	WG38C BOTTOM RAIL R	EPS	EPS8153	1
8	8154	WG38C BOTTOM RAIL L	EPS	EPS8154	1
9	8155	WG38C POST FRONT R	EPS	EPS8155	1
10	8156	WG38C POST FRONT L	EPS	EPS8156	1
11	8157	WG38C POST REAR R	EPS	EPS8157	1
12	8158	WG38C POST REAR L	EPS	EPS8158	1
13	8159	WG38C REAR PANEL	EPS	EPS8159	1
14	8161	WG38C FUEL BKT	EPS	EPS8161	1
15	8168	WG38C CONTROL PANEL PLATE	EPS	EPS8168	1
16	8170	WG38C RAD HOSE UPPER	EPS	EPS8170	1
17	8171	WG38C RAD HOSE LOWER	EPS	EPS8171	1
18	8183	WG38C SGL TRIG LATCH DOOR	EPS	EPS8183	2
19	9020	WG38-STC TOP	EPS	EPS9020	1
20	9021	WG38-STC REAR PANEL	EPS	EPS9021	1
21	9022	WG38-STC FRONT PANEL	EPS	EPS9022	1
22	9291	ODB LEFT MOUNT	EPS	EPS9291	1
23	9292	ODB RIGHT MOUNT	EPS	EPS9292	1
24	9293	WG3800 ODB GUARD	EPS	EPS9293	1
25	9588	WG3800 INTAKE PIPE	EPS	EPS9588	1
26	90CB30	COBRA ELBOW, 3.00 X 3.00	PUROSIL	90CB30	1
27	9200W	ODB C PANEL WELDMNT	EPS	EPS9200W	1
28	9296W	ODB INTAKE FLANGE	EPS	EPS9296W	1
29	9600K72	GROMMET	McMASTER-CARR	9600K72	1
30	DON27	INLET HOOD	DONALDSON	H001379	1
31	EBE03	LATCH, TRIGGER	EBERHARD	536-XK BLK	2
32	EPS_LOGO_PLATE	EPS LOGO PLATE	EPS	54356-0836	1
33	GAT01	RAD CAP 13 PSI SAE SMALL	GATES	31527	1
34	MCM19	RUBBER GROMMET	McMASTER-CARR	9307K23	6
35	MCM80	SHOULDER, SCREW .375 X .50 LG	McMASTER-CARR	90298A619	6
36	TEC03	ISOLATOR	TECH PRODUCTS	60024	4
37	TOUGH_STUFF_LOGO_PLATE	TOUGH STUFF LOGO PLATE	EPS	54357-0836	1

Parts Breakdowns

6.3 Kubota Air Cleaner Group

BILL OF MATERIALS					
ITEM	QTY	FILE NAME	DESCRIPTION	MANUF.	MANUF. NO.
1	2	2425	NUT BLOCK, AIR CLEANER BAND	EPS	EPS2425
2	1	9026	WG38-STC AC PIPE	EPS	EPS9026
3	1	30R275S	EPDM INSERT, 2.75-3.00 SHORT	PURASIL	30R275S
4	1	90CB30	COBRA ELBOW, 3.00 X 3.00	PURASIL	90CB30
5	1	RC-300	RUBBER COUPLING	EPS	3.00" ID
6	1	VI4147-20_00	AIR CLEANER	VIRGIS	VI4147-20_00
7	1	VI5322_01	FROT MOUNTING BAND	VIRGIS	CF0T-15322
8	1	V38-BREATHER-HOSE-2	BREATHER HOSE	HOSEMASTER	1/2" ID X 11" LONG
9	1	WG38-INTAKE-HOSE	3" INTAKE HOSE	McMASTER-CARR	5488K61 x 1.5 FT

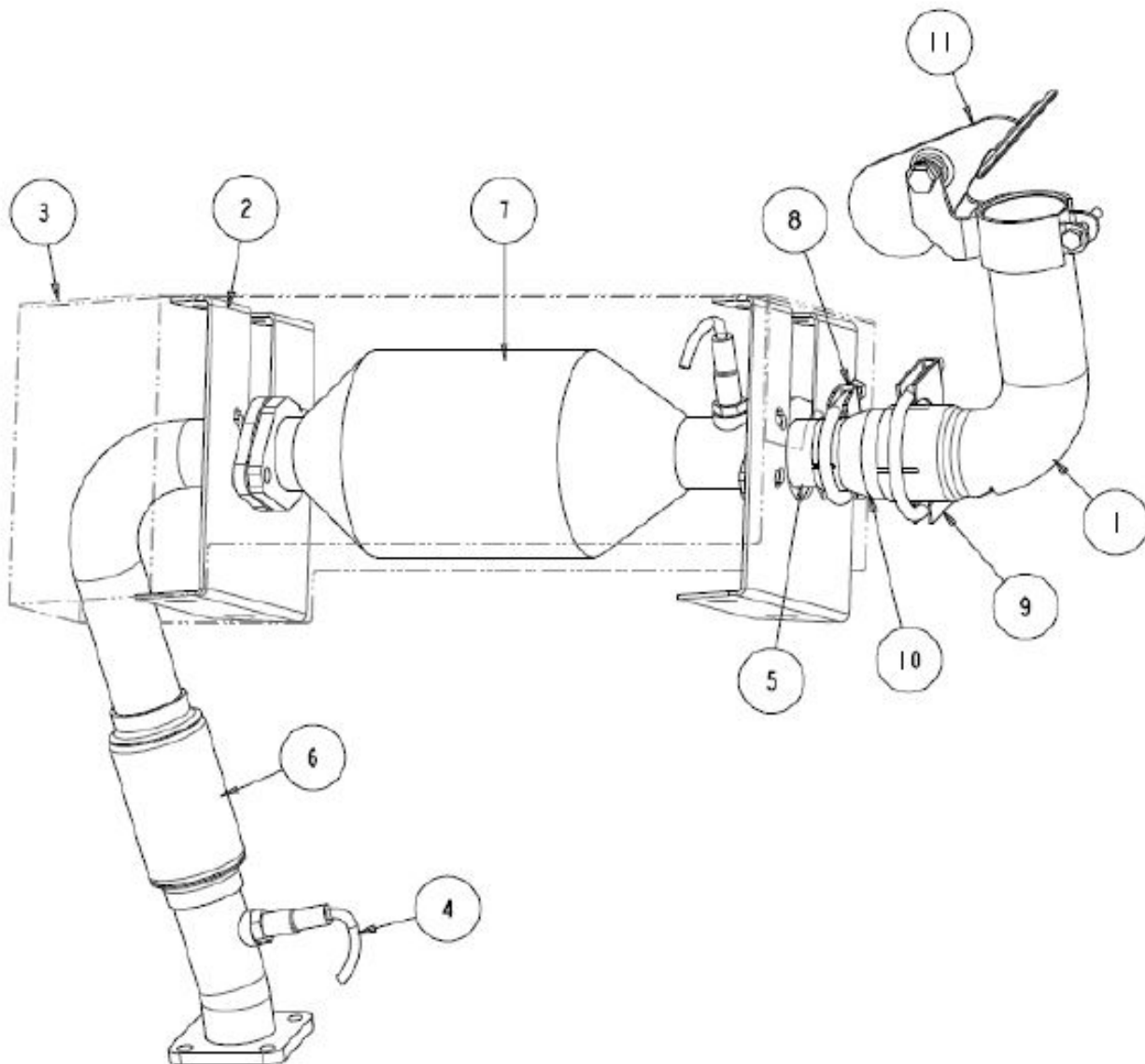
WG38-ACX-2
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Parts Breakdowns

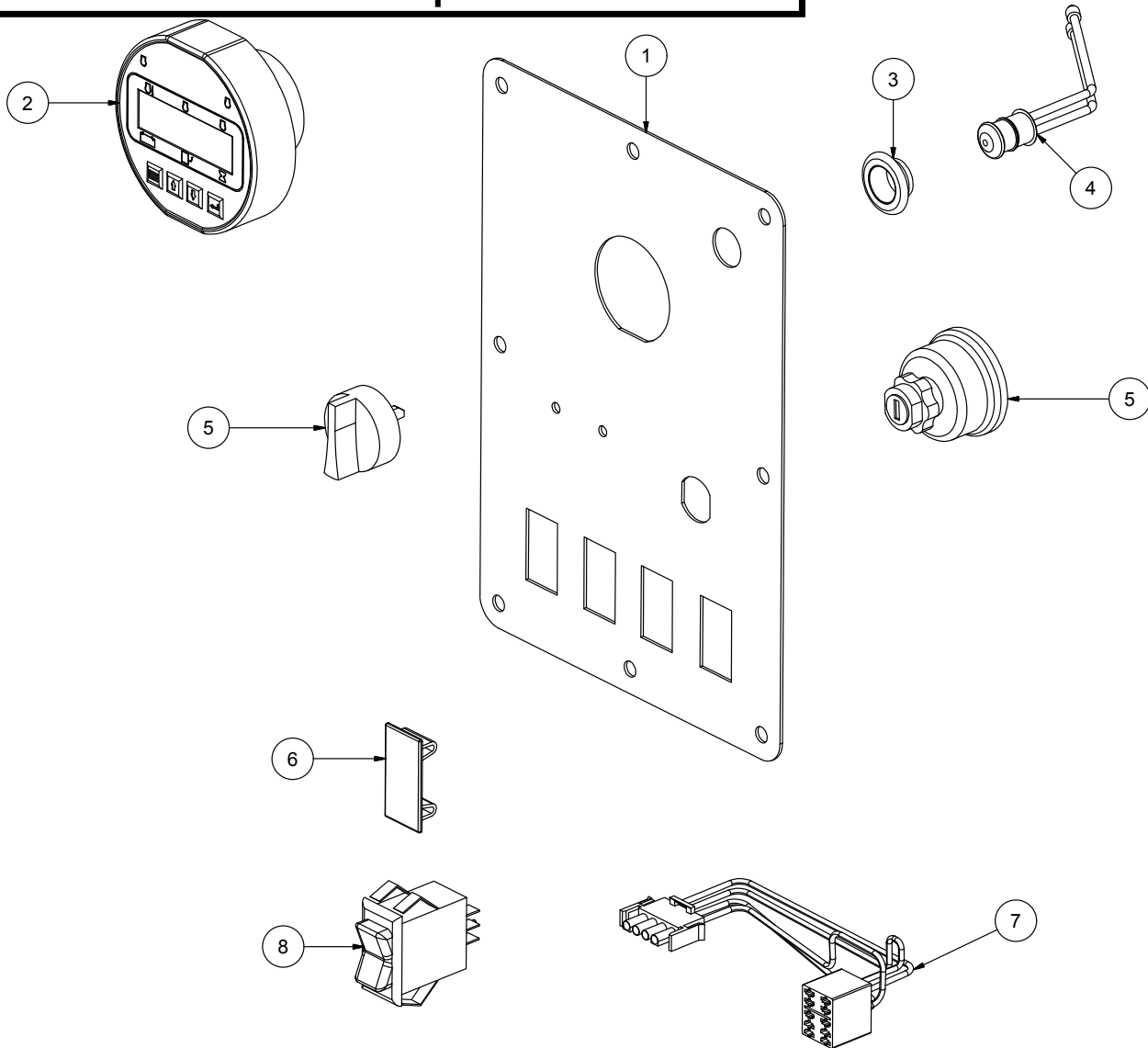
6.4 Kubota Exhaust Component Group

BILL OF MATERIALS					
ITEM	QTY	FILE NAME	DESCRIPTION	MANUF.	MANUF. NO.
1	1	3904	CHIPPER TAILPIPE FOR INLINE SA	EPS	EPS3904
2	2	9023	WG38-STC CAT YOKE	EPS	EPS9023
3	1	9024	WG38-STC CAT COVER	EPS	EPS9024
4	2	02SENSOR	O2 SENSOR	KUBOTA	EG523-12101
5	1	8564W	WG38C STRAIGHT TAILPIPE	EPS	EPS8564W
6	1	9010W	WG38-STC HEADER WELDMENT	EPS	EPS9010W
7	1	EG504-12121	WG3800 CATALYST	KUBOTA	EG504-12121
8	1	HEA01	MUFFLER CLAMP, 2.00	HEARTTHROB	MC5200
9	1	NAP11	MUFFLER CLAMP, 3.00	NAPA	733-5794
10	1	RSA20200-1	SPARK ARRESTOR	ACTIVE EXHAUST	RSA20200
11	1	TIS04	RAIN CAP 2.5 INCH	TISCO	WC6



Parts Breakdowns

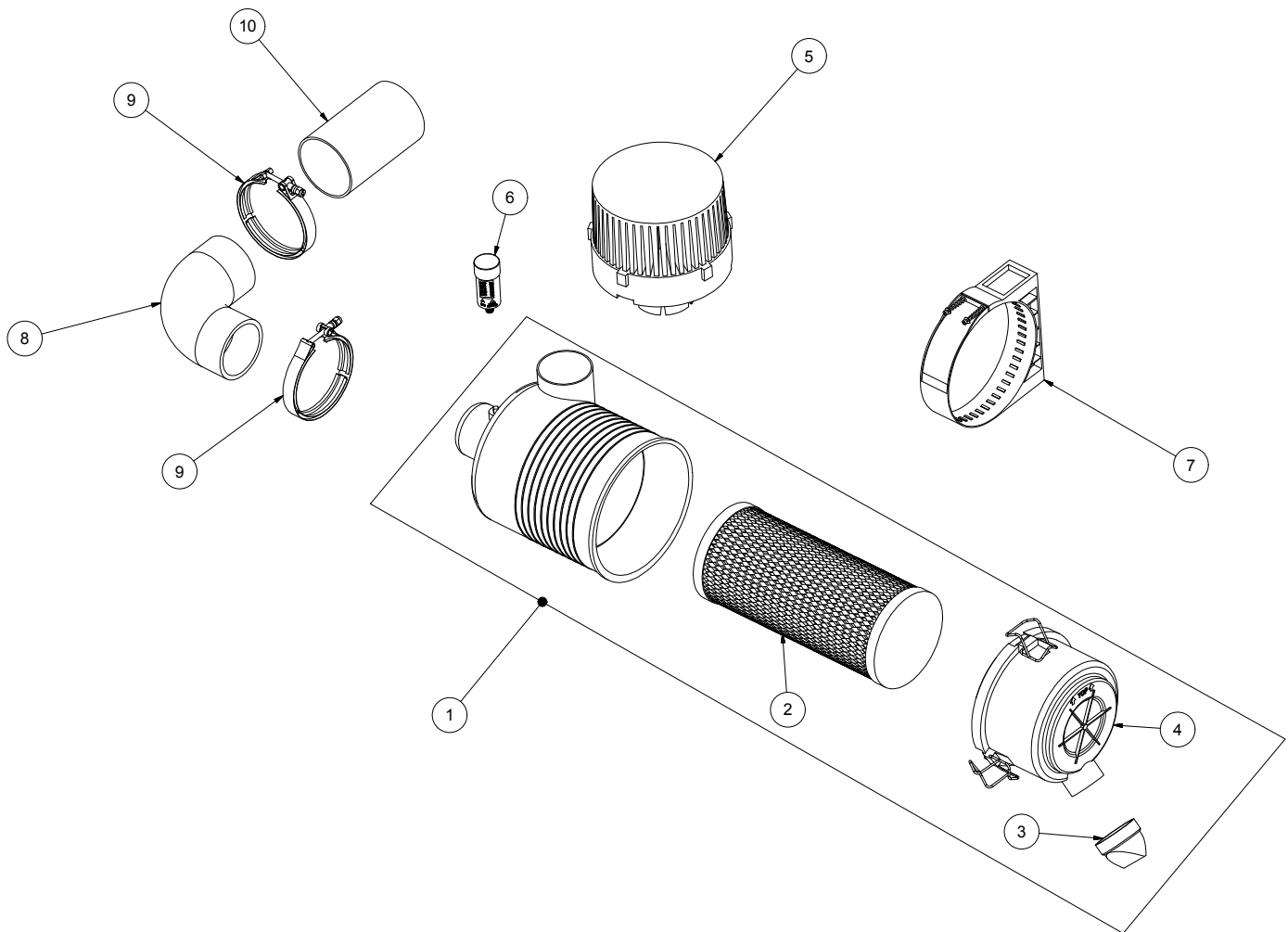
6.5 Instrument Panel Group



ITEM#	PART NO.	DESCRIPTION
1	40454104	ECU Mounting Plate
2	MVP303 MVP137	Display, Diesel Display, Gas
3	STD2201G	Grommet
4	STD2201	Red Marker Light
5	9506023	Ignition and Key
6	40450028	Hole Plug
7	30291201 700407 STD2214C	Switch Jumper, Strobe Light Key Switch Harness Strobe Switch Harness
8	40450021B1	Rocker Switch
NS	30291200B	Engine Harness (display to Factory JD Harness)

Parts Breakdowns

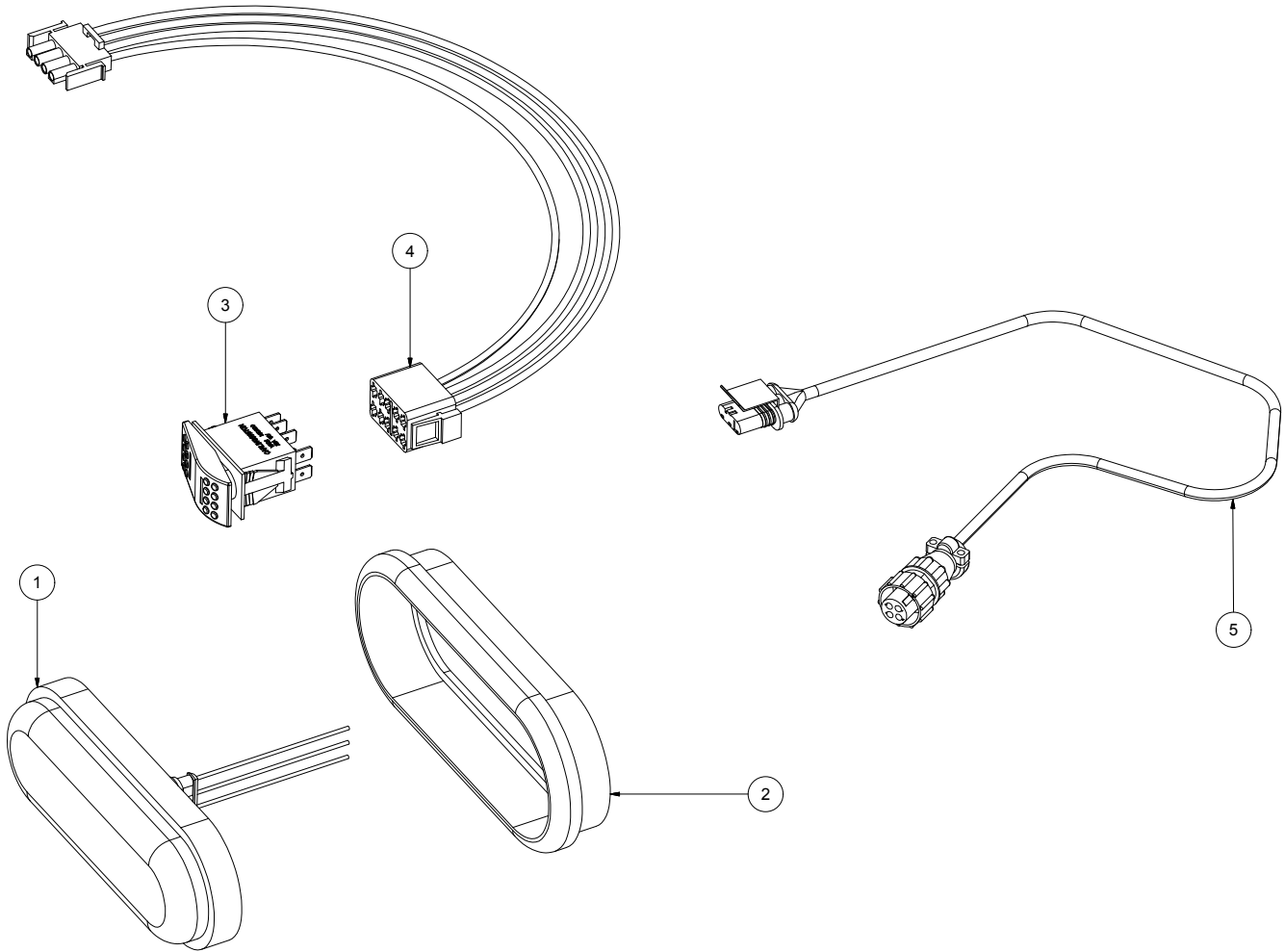
6.6 Air Cleaner Group



ITEM #	PART NUMBER	DESCRIPTION
1	OD-G082527	Air Cleaner Assembly w/filter (2 - 4)
2	UU-P828889	Filter Element
3	UU-P158914	Vacuator Valve
4	UU-P534048	Cover, does not include vacuator valve
5	UU-21.1330001	Pre-Cleaner, Turbo III
6	OD-X002102	Air Restriction Indicator
7	OD-P777732	Mounting Clamp
8	OD-P105532	90 Degree Rubber Elbow
9	OD-HS.52	Clamp
10	call	Straight Aluminum Pipe

Parts Breakdowns

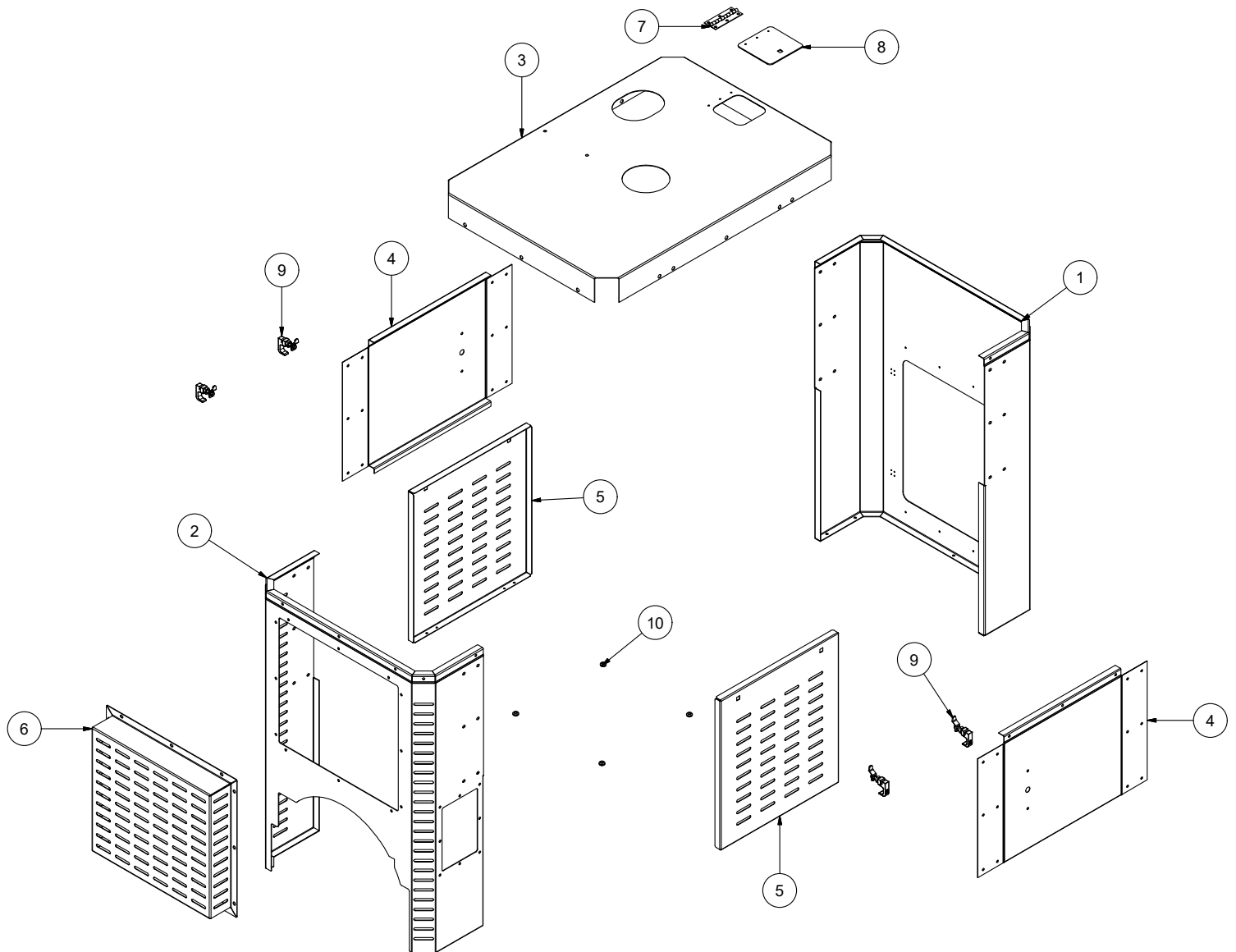
6.7 Strobe Light Parts Group



ITEM #	PART NUMBER	DESCRIPTION
1	STD2213	LED Strobe Light
2	STD2214G	Grommet
3	40450021B1	Rocker Switch
4	40450024B	Switch Wiring Harness
5	STD2214	Wiring Harness, rocker switch to light.
6	STD2534	Strobe Light Bracket , 600 Only

Parts Breakdowns

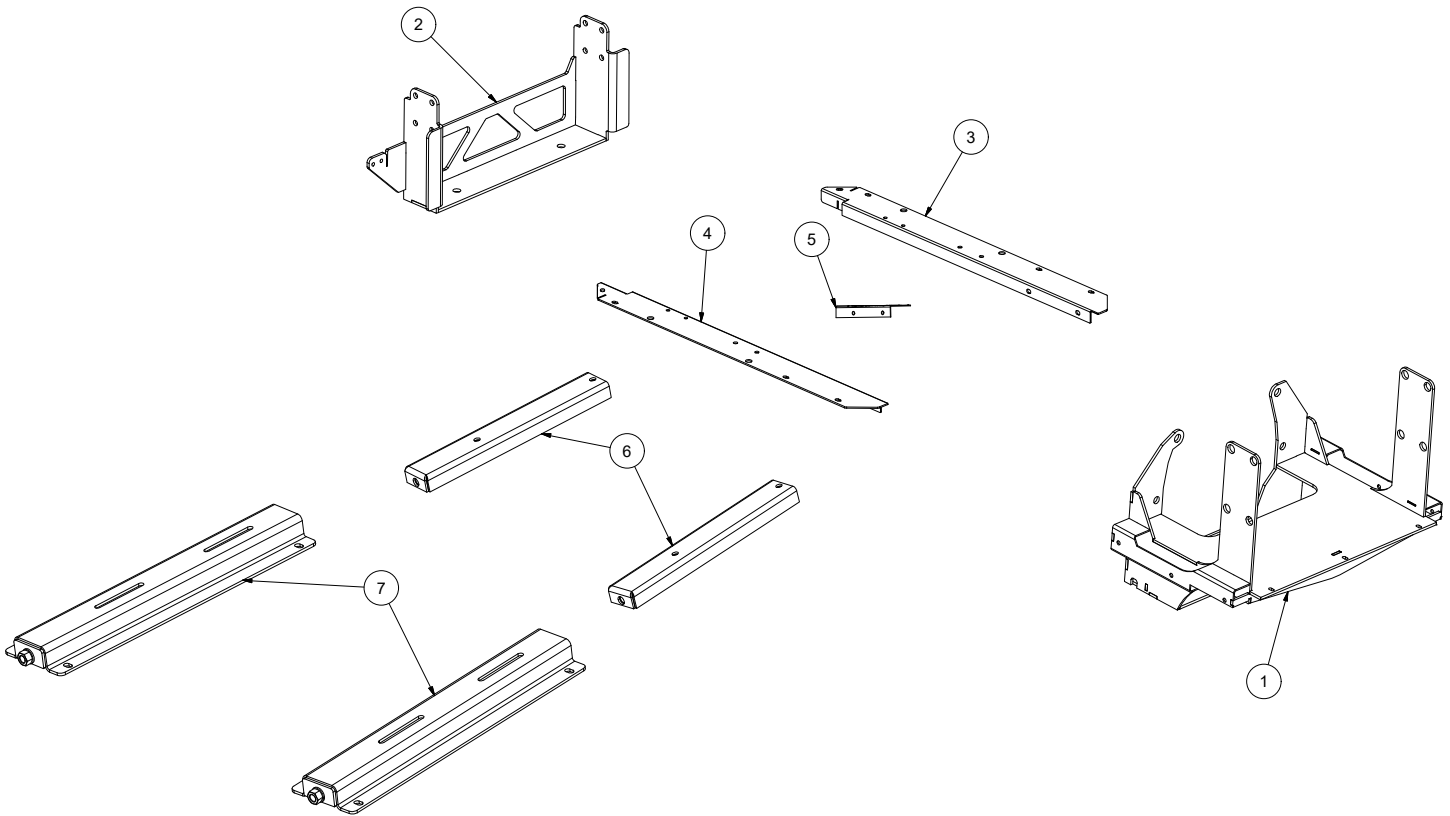
6.8 Sheet Metal Group - 4045 John Deere



ITEM#	PART NO.	DESCRIPTION
1	40454001	Sheet Metal Front
2	40454002	Sheet Metal Rear
3	40454004	Sheet Metal Doors
4	40454003	Sheet Metal Upper Doors
5	40454005	Sheet Metal Hood
6	30292108	Rear Access Panel
7	40452102C	Radiator Door Hinge
8	40452102B	Radiator Fill Door
9	LCT60624A	Lift And Turn Latch
10	285626012	Door Grommet

Parts Breakdowns

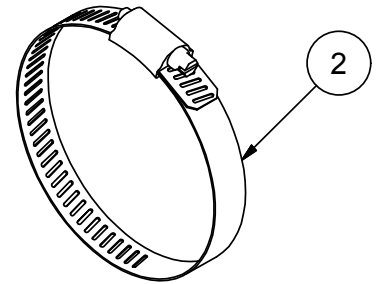
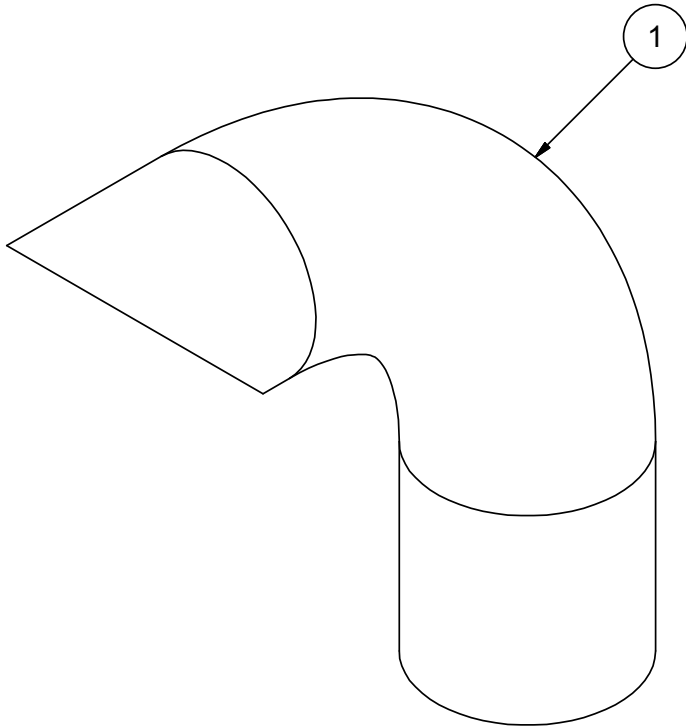
6.9 Engine Mount Group



ITEM#	PART NO.	DESCRIPTION
1	40452151A	Front Motor Mount
2	40452152	Rear Motor Mount
3	40454006	RH Side Rail
4	40454007	LH Side Rail
5	765XZ	Deutsch Conn. Side Rail Bracket
6	255XZ	Adjustable Motor Mount Channel
7	202XZ	Adjustable Motor Mount

Parts Breakdowns

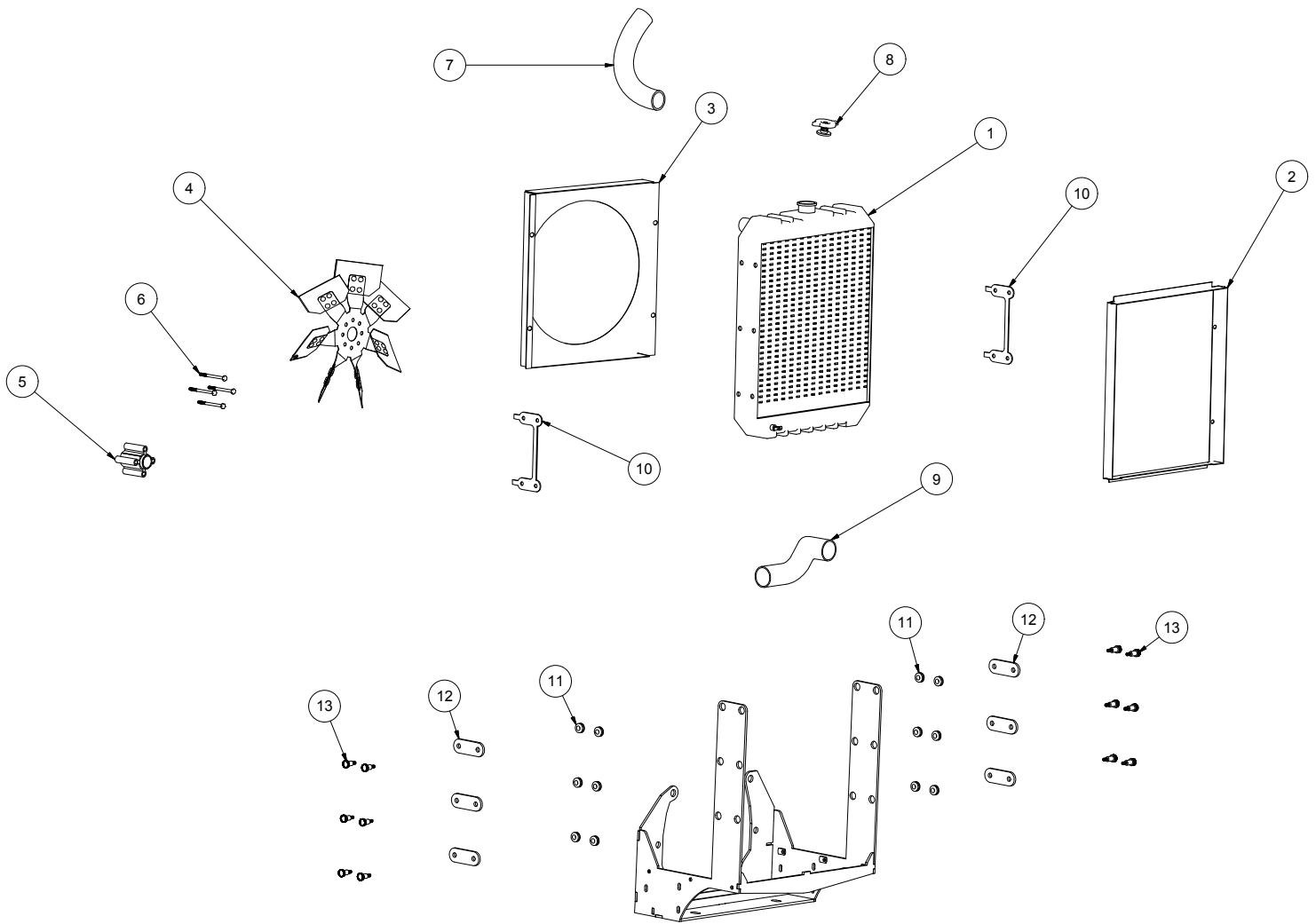
6.10 Muffler Group



ITEM#	PART NO.	DESCRIPTION
1	P206302ODX	Elbow
2	OD-HS.52	Clamp

Parts Breakdowns

6.11 Radiator Group

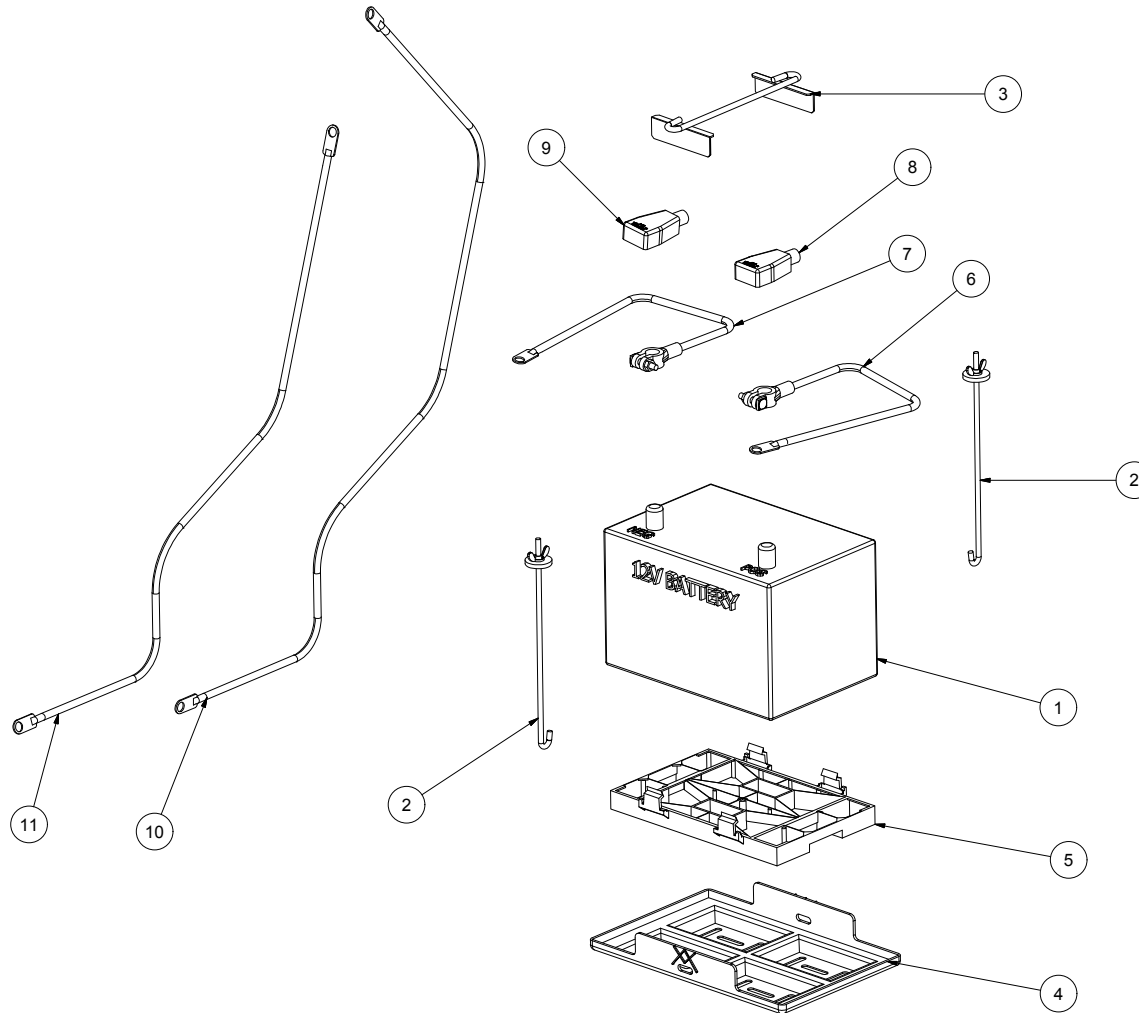


ITEM#	PART NO.	DESCRIPTION
1	40459501A2	Radiator
2	40452190B	Front Fan Shroud
3	40452190A	Rear Fan Shroud
4	AT35158A	Radiator Fan
5	R128443	Fan Spacer
6	G8M8X090	Spacer Bolts, 4 required
7	8411ODX	Upper Radiator Hose

ITEM#	PART NO.	DESCRIPTION
8	10300	Radiator Cap
9	40459681	Lower Radiator Hose
10	40452151G	Radiator Shim
11	256126012	Radiator Grommet
12	40452151F	Radiator Bolt Bracket
13	ZSB500750	Shoulder Bolt

Parts Breakdowns

6.12 Battery Group



ITEM#	PART NO.	DESCRIPTION
1	STD2200	Battery, Not Shippable
2	BHB10J	J-Hook
3	BHCB	Battery Hold Down Bar
4	BTS1	Battery Tray
5	N/A	N/A
6	LCT60084B	Battery Cable Starter
7	LCT6015B	Ground Cable
8	BTCR	Terminal Cover Red
9	BTC	Terminal Cover Black
10	60084R	Red Cable to Pump
11	LCT60024SS	Ground Cable



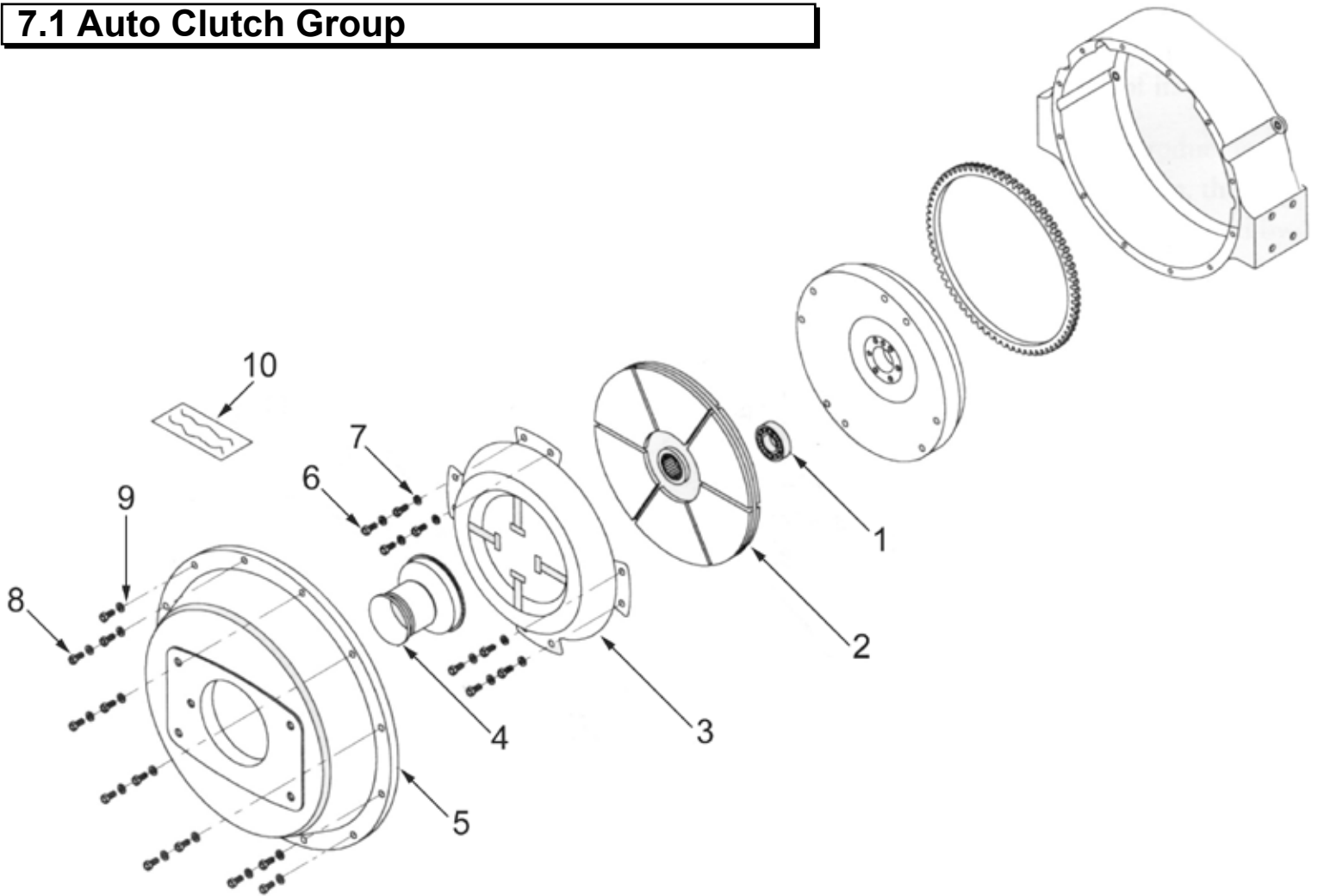
7.0 CLUTCH GROUP

7.0 CLUTCH GROUP

7.1 Auto Clutch Group.....	88
7.2 Auto PTO Group.....	89
7.3 Auto PTO Linkage	90
7.4 Clutch Assist Group	91

Parts Breakdowns

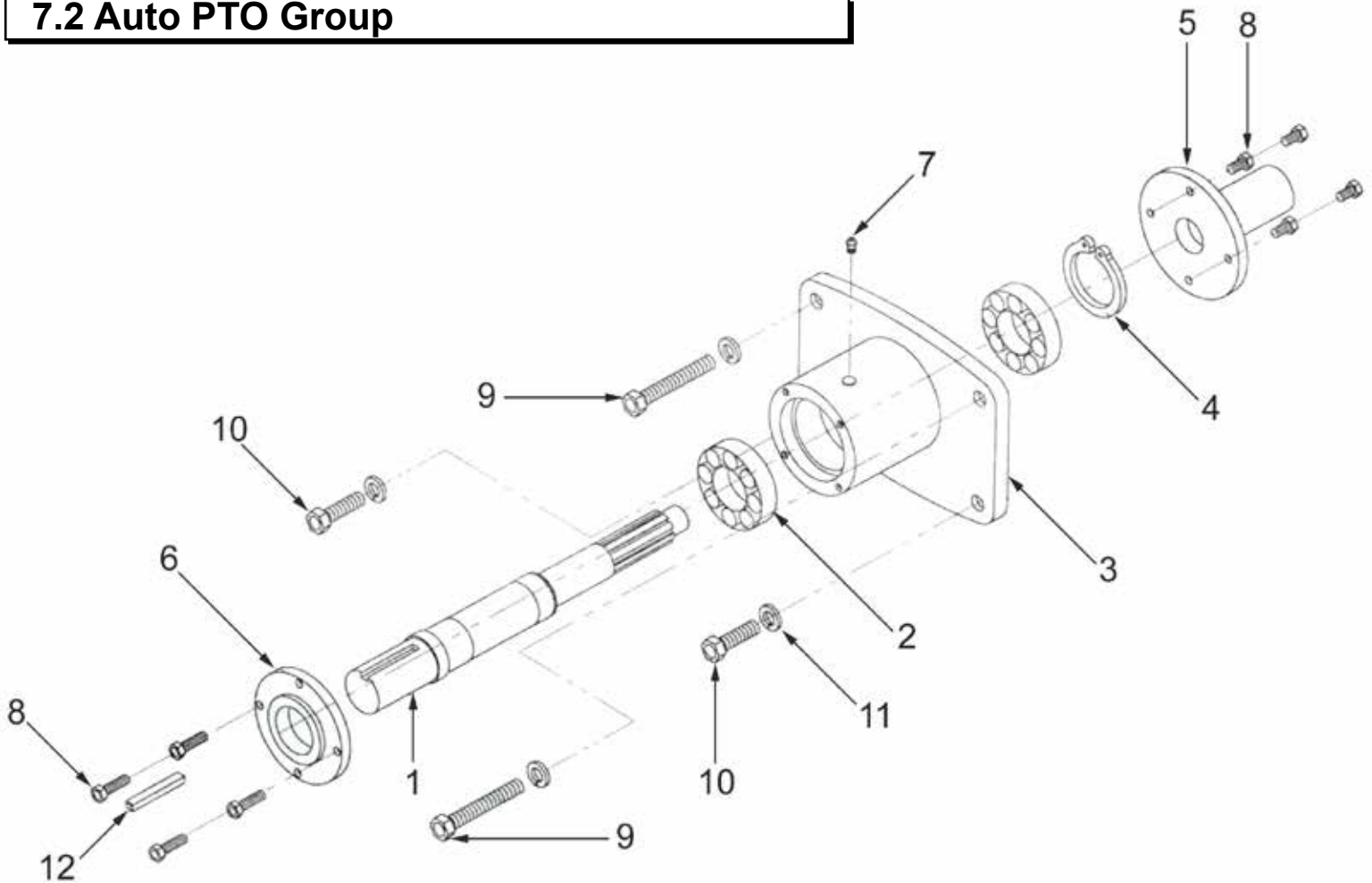
7.1 Auto Clutch Group



ITEM #	PART NUMBER	DESCRIPTION
*	OD-48080050.8OF	*Complete PTO and Clutch Assembly 03/08 -
1	OD-41500217	Pilot Bearing, JD
2	OD-41500237	Clutch Disk
3	OD-LC1919	Pressure Plate, 03/08 -
4	OD-41500250	Throw out Bearing, 03/08 -
5	OD-41500172	Clutch Cover
6	OD-45000054	Bolt, 3/18-16 x 1"
7	OD-45000063	Lock Washer, 3/8"
8	OD-45000226	Bolt, M10-1.50 x 35MM
9	OD-45000046	Lock Washer, M10
10	OD-41500216	Decal, Diesel Clutch

Parts Breakdowns

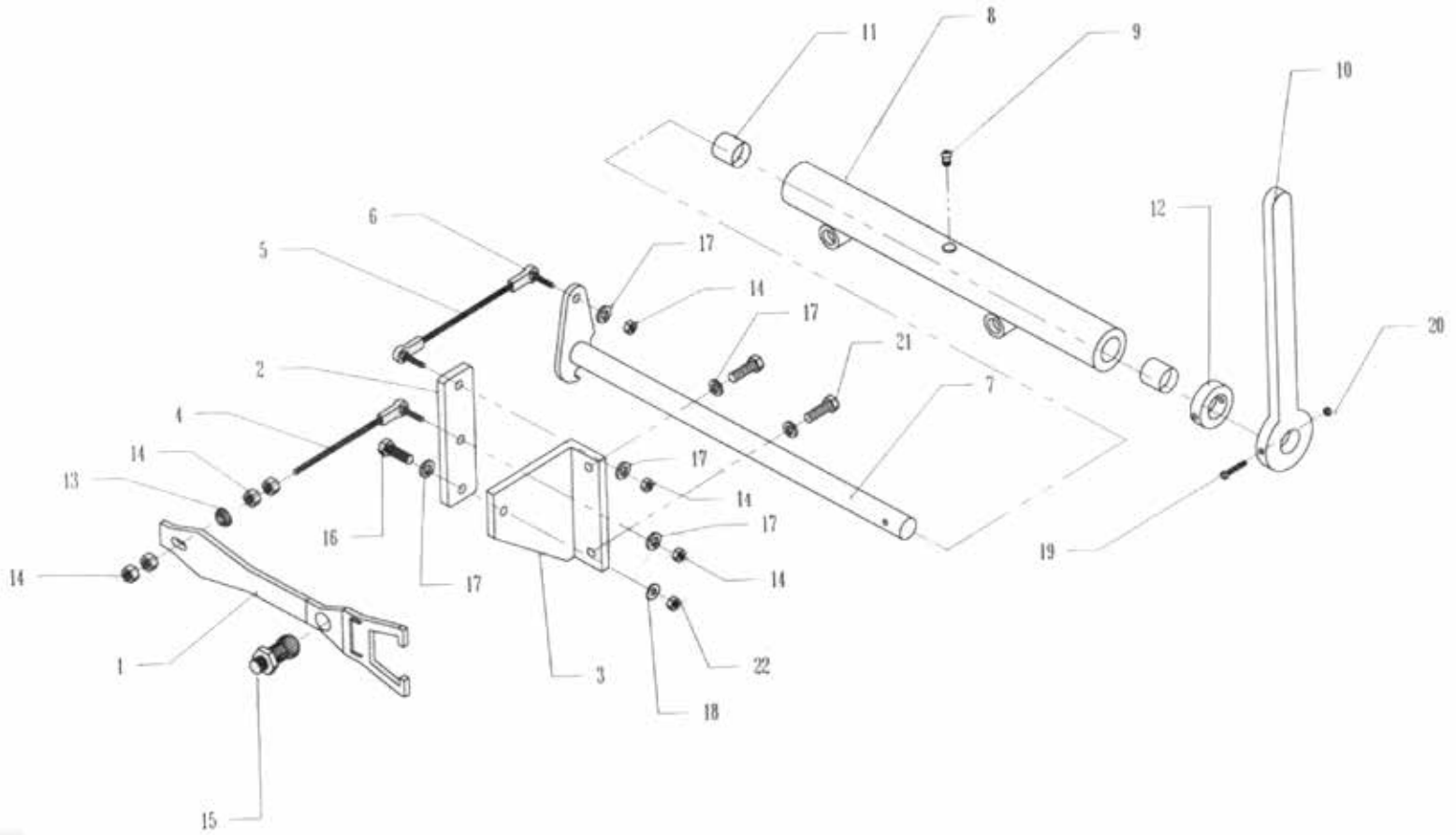
7.2 Auto PTO Group



ITEM #	PART NUMBER	DESCRIPTION
1	OD-41500138	PTO Shaft
2	OD-41500125	PTO Bearing
3	OD-41500055	PTO Housing
4	OD-41500056	Snap Ring, 1-11/16"
5	OD-41500000	PTO Collar
6	OD-41500123	Bearing Retaining Cover
7	OD-41500058	Grease Zerk
8	OD-45000029	Bolt, 5/16-18 x 3/4"
9	OD-45000105	Bolt, 9/16-12 x 3"
10	OD-45000104	Bolt, 9/16-12 x 1-1/2"
11	OD-45000103	Lock Washer
12	OD-LCT650.601K	Key, Stepdown - direct drive units only
12	OD-LCT650.601F	Key, Belt drive units only

Parts Breakdowns

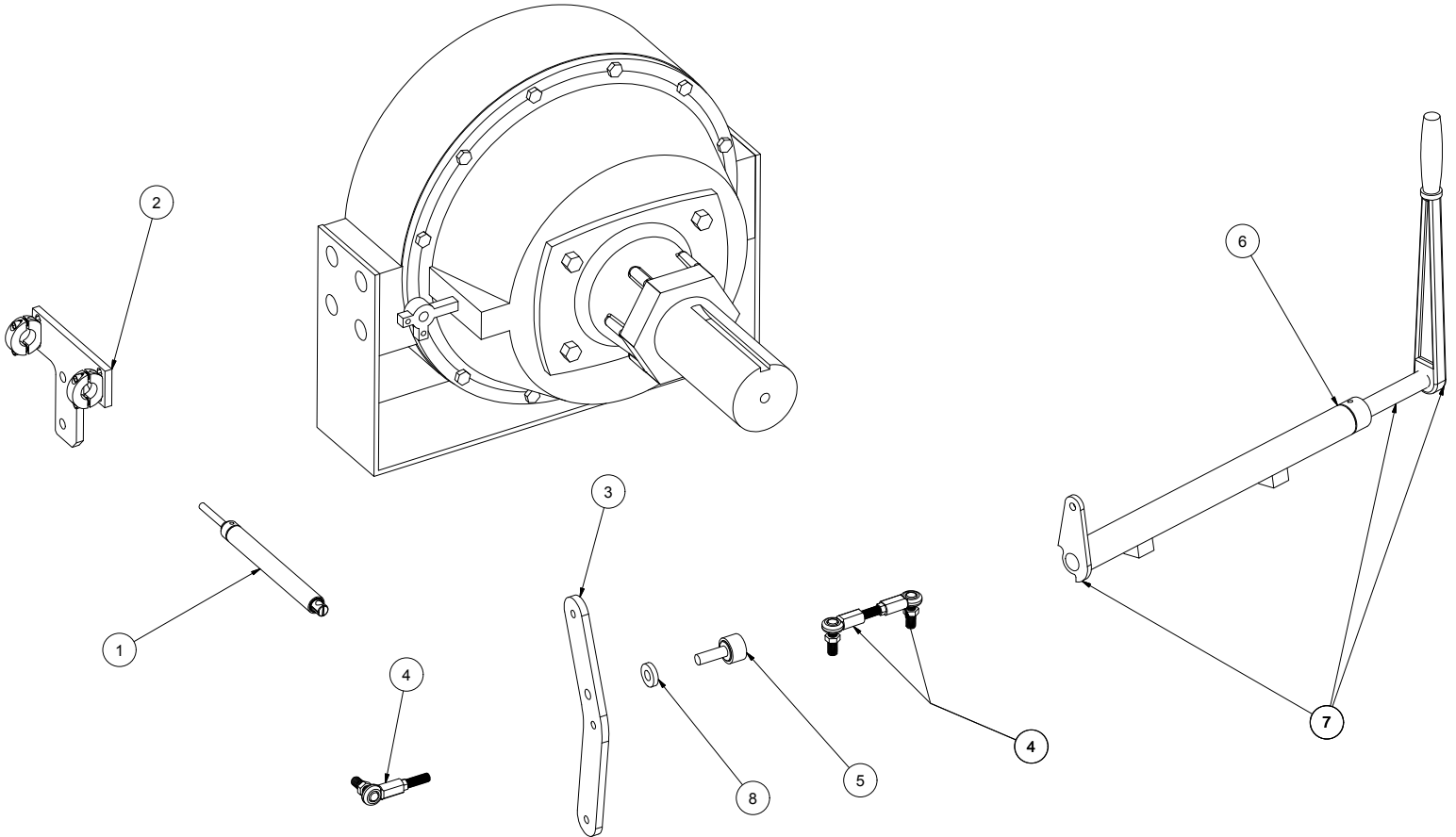
7.3 Auto PTO Linkage



ITEM#	PART NO.	DESCRIPTION	ITEM#	PART NO.	DESCRIPTION
1	41500063	Fork	13	41500030	Rocker Ball
2	41500089	Linkage Bracket	14	45000050	Nut, 3/8-16
3	41500166	Linkage Bracket	15	41500001	Pivot Ball
4	41500065	Linkage Rod	16	15000177	Bolt, 3/8-16 x 1-3/4"
5	41500066	Linkage Rod	17	45000063	Lock Washer, 3/8"
6	41500019	Linkage Rod End	18	45000064	Flat Washer, 3/8"
7	41500041A.HD	Shaft, Lever	19	45000012	Bolt, 1/4 - 28
8	41500002	Shaft Housing	20	45000015	Locknut, 1/4-28
9	41500043	Grease Zerk	21	45000055	Bolt, 3/8-16 x 1-1/4"
10	41500044	Clutch Handle	22	45000051	Locknut, 3/8-16
11	41500045	Shaft Bushing	23	41500002	Assembly, PTO Lever
12	41500046	Shaft Collar			

Parts Breakdowns

7.4 Clutch Assist Group



ITEM #	PART NUMBER	DESCRIPTION
1	400050.A	Clutch Cylinder
2	400053C	Cylinder Support Bracket, JD
3	B3.3.3165	Clutch Bracket Arm
4	41500019	Linkage, Rod end
	41500019A	Linkage, Threaded insert
5	400050C1	Bearing
6	41500102	Pivot Shaft tube, Auto HD
7	4150041AHD	Pivot Shaft



8.0 BLOWER HOUSING GROUP

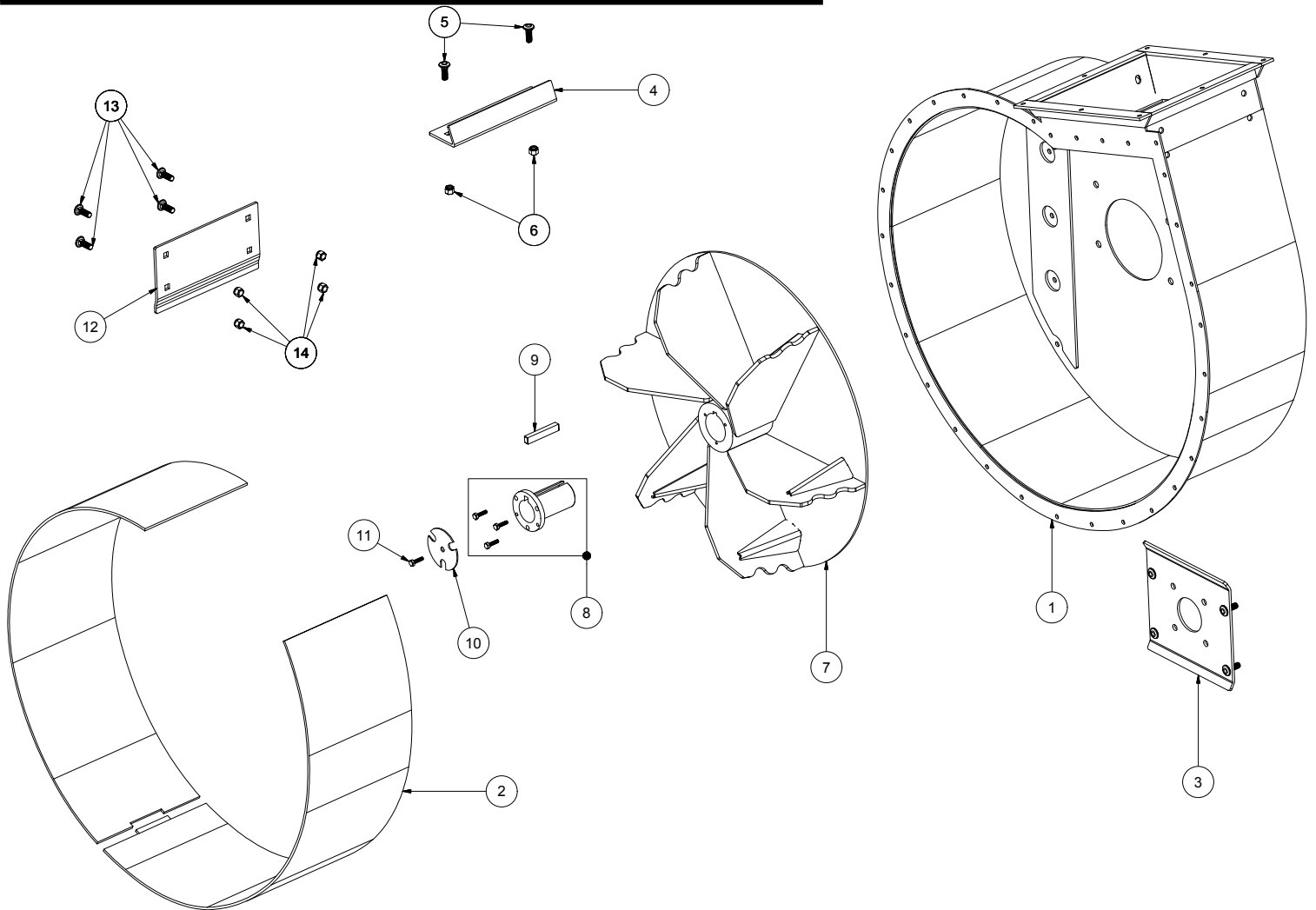
8.0 BLOWER HOUSING GROUP

8.1 Blower Housing Group	93
8.2 Blower Housing Face Group	94
8.3 Belt Drive Group	95
8.4 Exhaust Duct Group	96

BLOWER HOUSING GROUP

Parts Breakdowns

8.1 Blower Housing Group

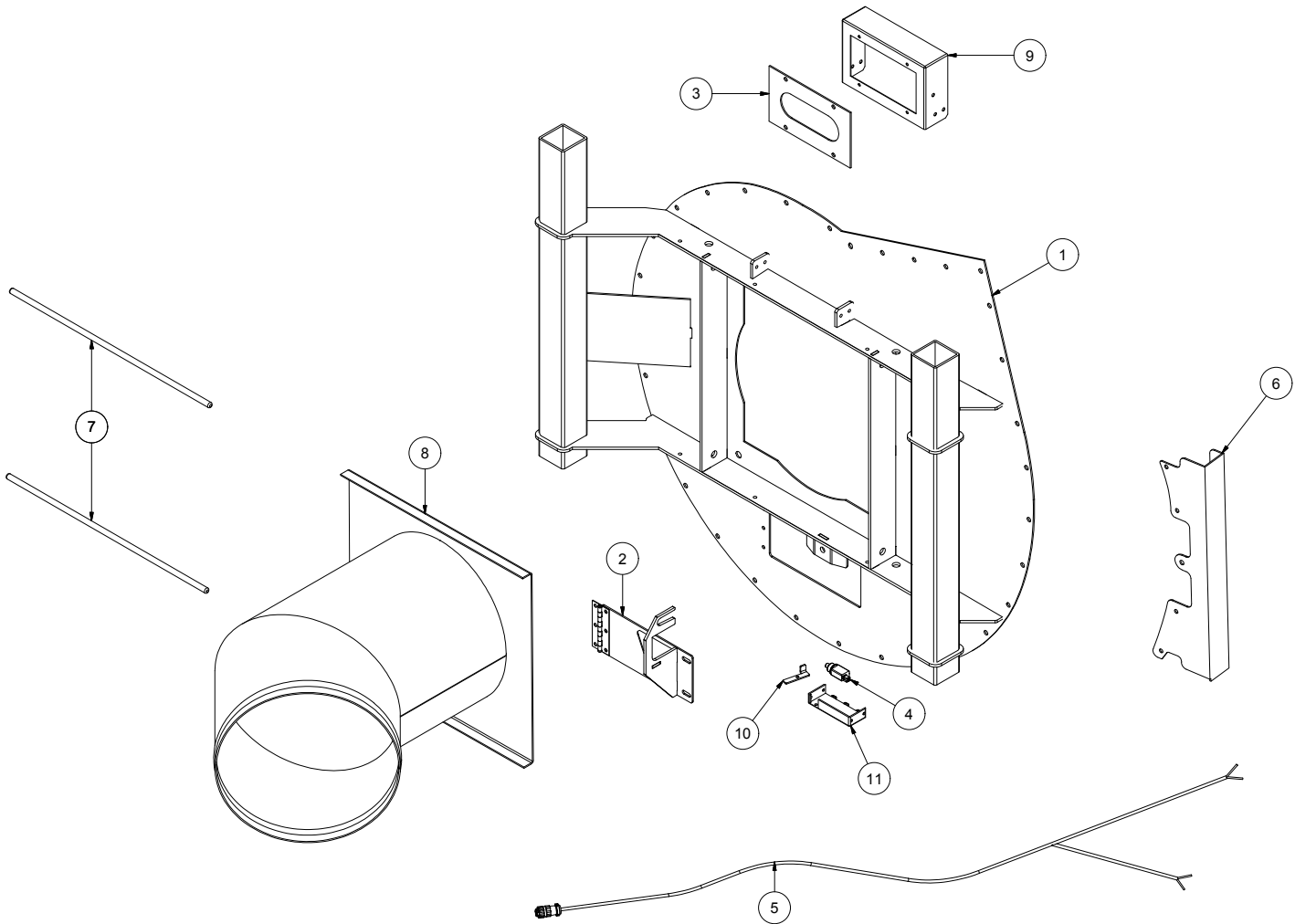


ITEM#	PART NO.	DESCRIPTION
1	8003017	Blower Housing Back
2	LCT620602	Liner Set
3	LCT600603	Bearing Plate
4	LCT620602A	Bolt-In Liner
5	LCT620603	Bolt
6	LCT620603N	Nut
7	283XZ	Impeller
8	LCT650601	Impeller Bushing
9	LCT650601F	Bushing Key

ITEM#	PART NO.	DESCRIPTION
10	LCT600615	Shaft Protector
11	5CZ500750	Shaft Bolt
12	LCT620604	Straight Liner
13	LCT620603	Bolt
14	LCT620603N	Nut

Parts Breakdowns

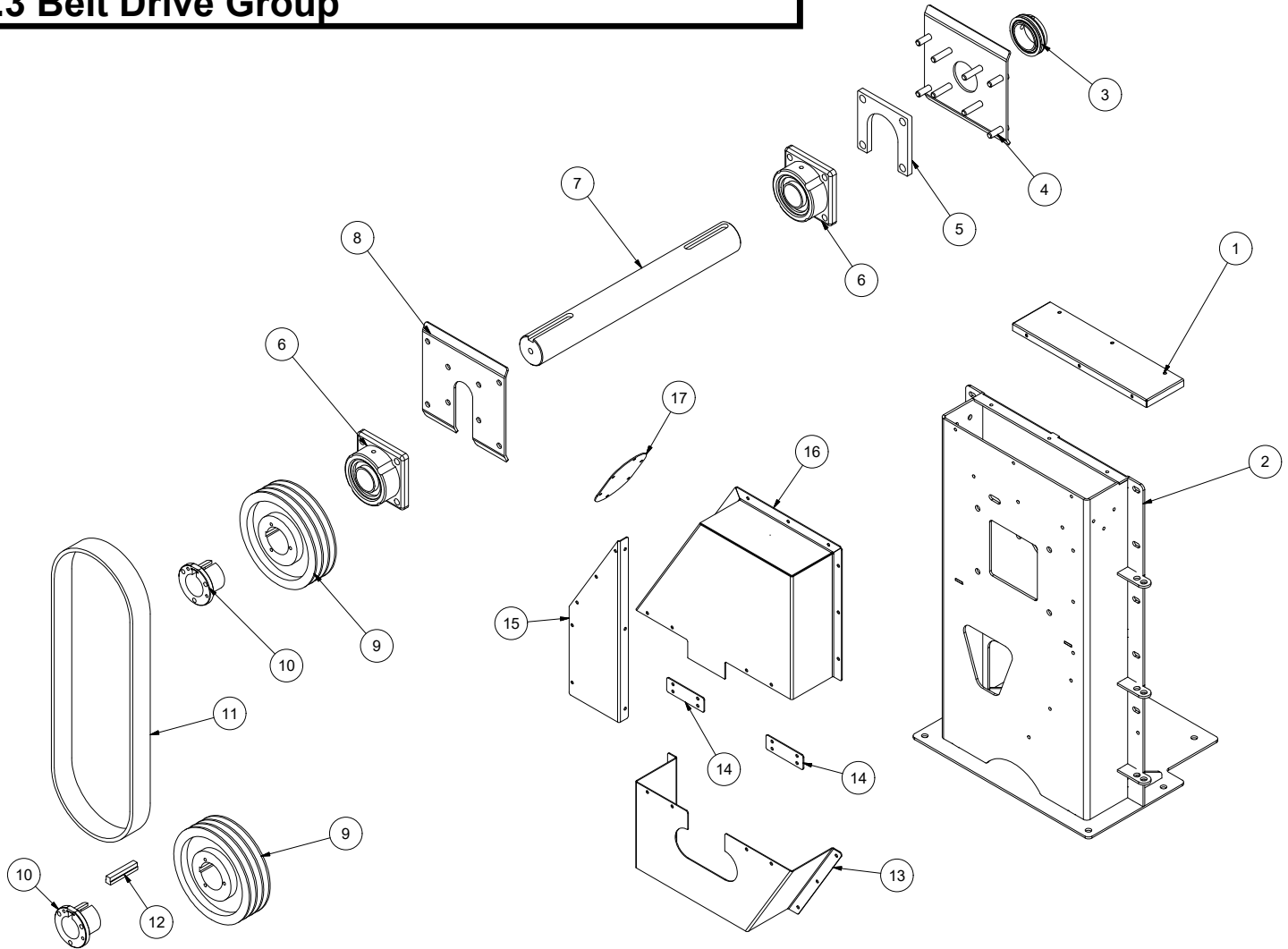
8.2 Blower Housing Face Group



ITEM #	PART NUMBER	DESCRIPTION
1	6503018	Blower Housing Face
2	SCL621602	Inspection Door
3	LCT650102	Tail Light Cover Plate
4	641051	Limit Switch
5	712XZ	Limit switch power cord
6	6503019	Hose Guard
7	LCT6006351	Retaining Rod
8	LCT650624	Intake Elbow
9	6502214	Strobe Light Box
10	STD4001	Limit Switch Actuator
11	STD4000A STD4000	Limit Switch Box Assembly Limit Switch Box

Parts Breakdowns

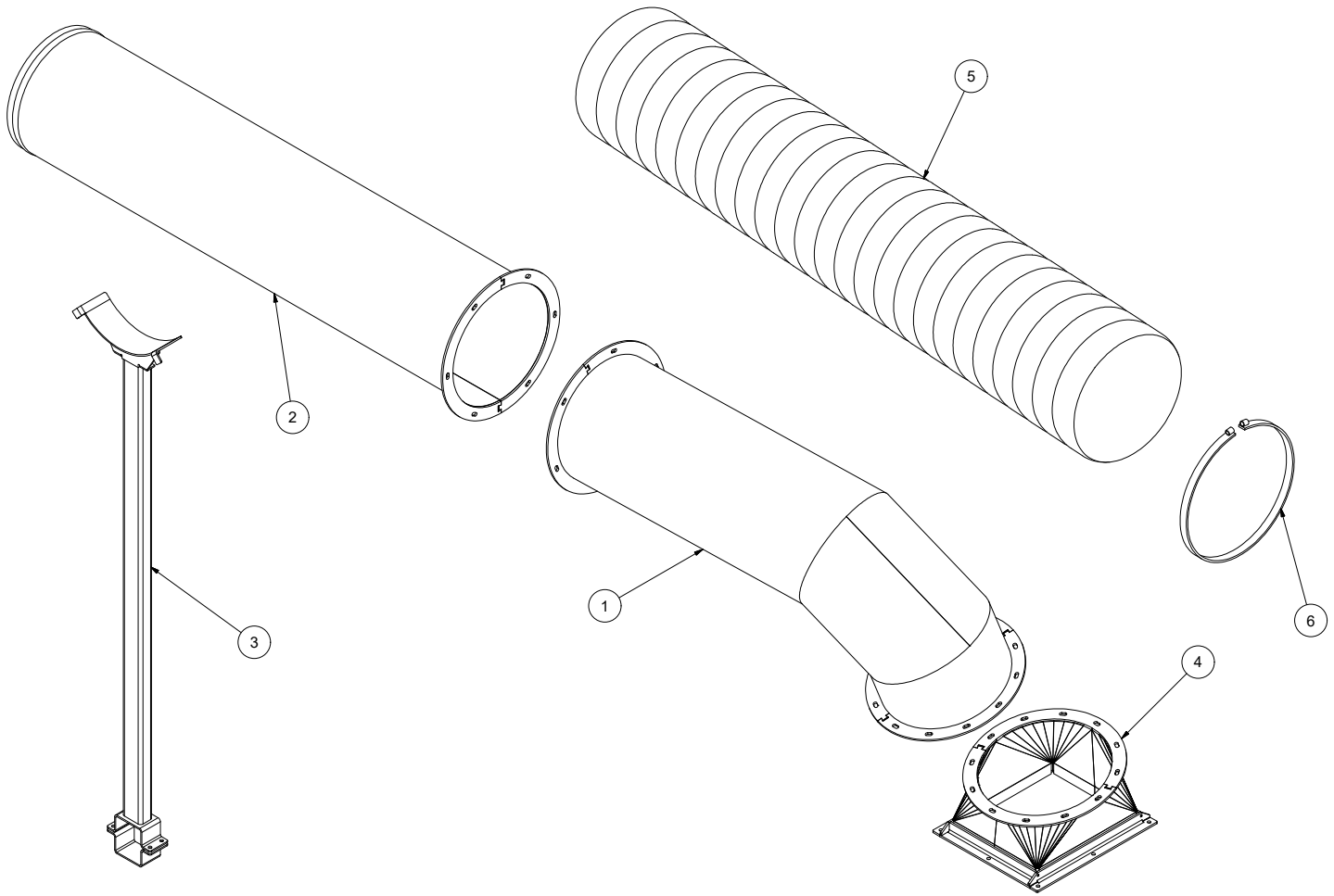
8.3 Belt Drive Group



ITEM #	PART NUMBER	DESCRIPTION	ITEM #	PART NUMBER	DESCRIPTION
1	274XZ	Pedestal Top Guard	15	259XZ	Belt Guard Back Plate
2	200XZ	Pedestal	16	257XZ	Belt Guard Top
3	LCT650602C	Bearing Seal Collar	17	281XZ	Belt Guard Inspection
4	LCT600603	Inner Bearing Plate			
5	LCT650602D	Bearing Plate Spacer			
6	LCT650602A	4 Bolt Bearing			
7	5501405	Shaft			
8	272XZ	Outer Bearing Plate			
9	4501402	Pulley			
10	LCT650604A1	Bushing			
11	580XZ	Power Band Belt			
12	LCT650601K	Step Down Key (PTO)			
13	258XZ	Belt Guard Bottom			
14	260XZ	Belt Guard Nut			

Parts Breakdowns

8.4 Exhaust Duct Group



ITEM#	PART NO.	DESCRIPTION
1	LCT650610	Exhaust Elbow
2	LCT650609	Straight Exhaust Duct
3	639XZ	Exhaust Duct Support Stand
4	LCT650611	Duct Square To Round
5	LCT616616	Hose Band
6	LCMDH1648	Medium Duty Hose



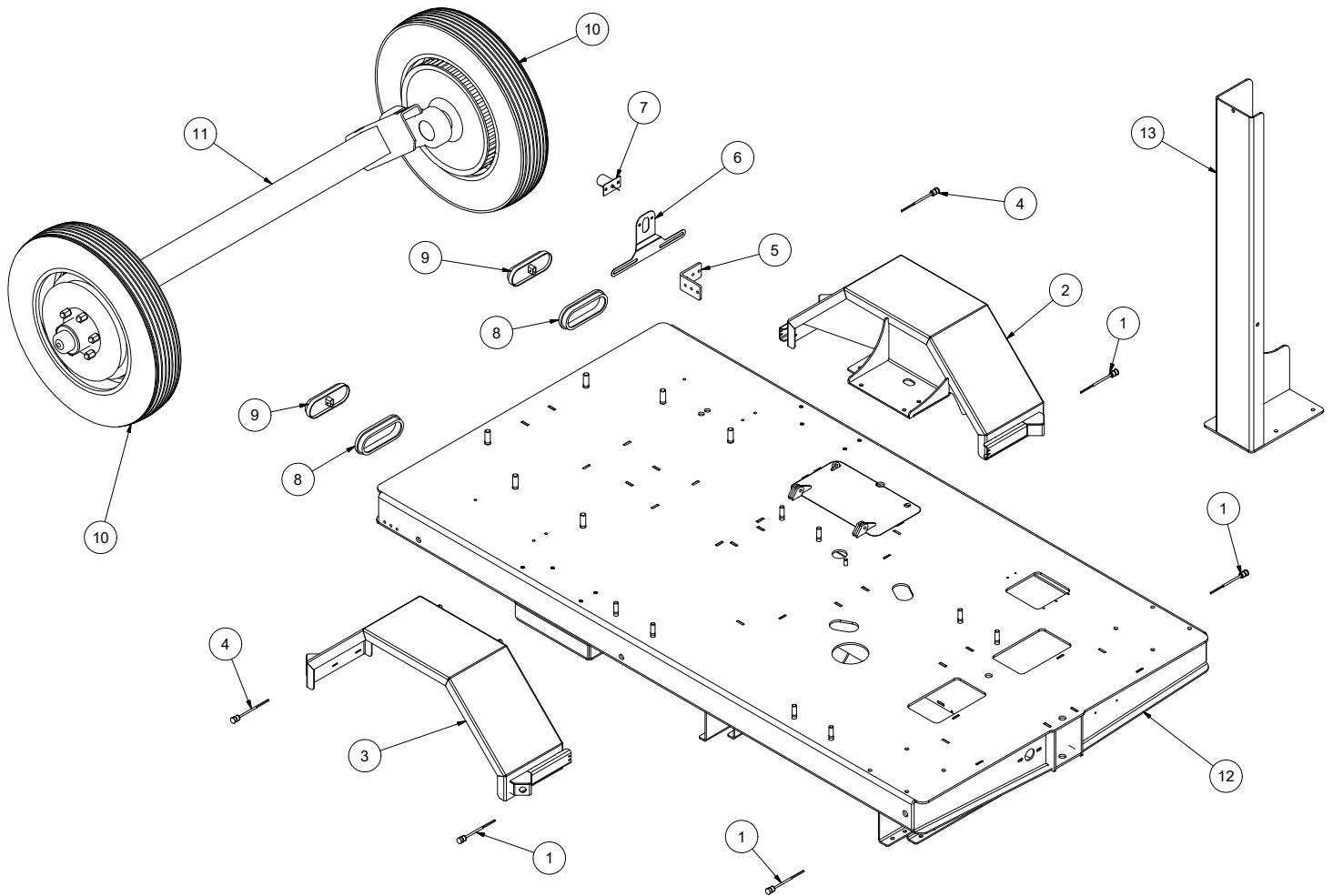
9.0 TRAILER GROUP

9.0 TRAILER GROUP

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Parts Breakdowns

9.1 Trailer Bed / Axle Group

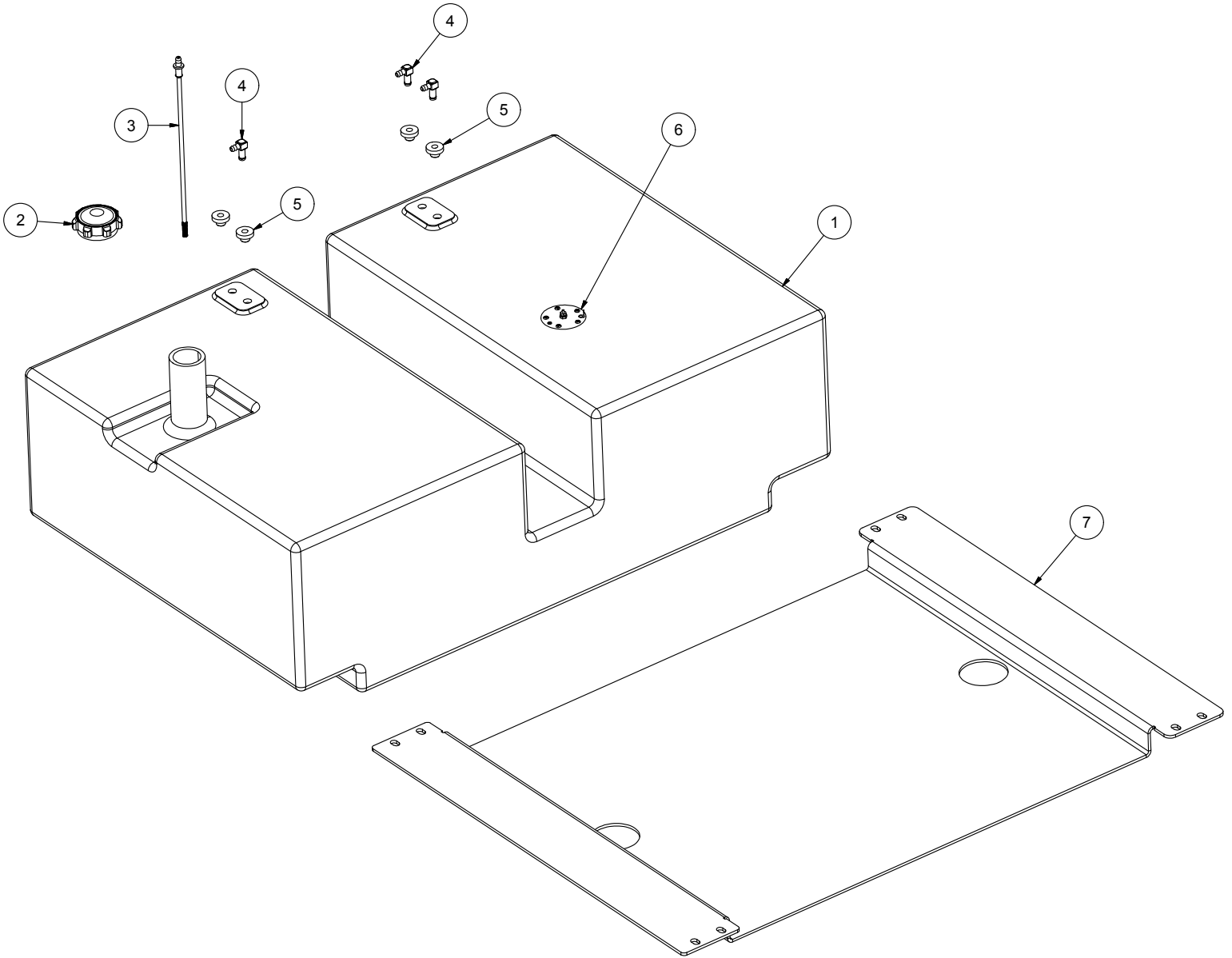


ITEM#	PART NO.	DESCRIPTION
1	STD2202	Marker Light Amber
2	468XZ	LH Fender
3	469XZ	RH Fender
4	STD2201	Marker Light Red
5	LCT600011	License Plate Bracket LCT Units
6	LCT600010	License Plate Bracket
7	LCT60615B	License Plate Light
8	STD2414G	Tail Light Grommet
9	STD2414	Led Tail Light
10	LCT622619	Tire Assembly

ITEM#	PART NO.	DESCRIPTION
11	LCT622614TE	Axle
12	636XZ	Trailer Bed
13	637XZ	Hose Standoff

Parts Breakdowns

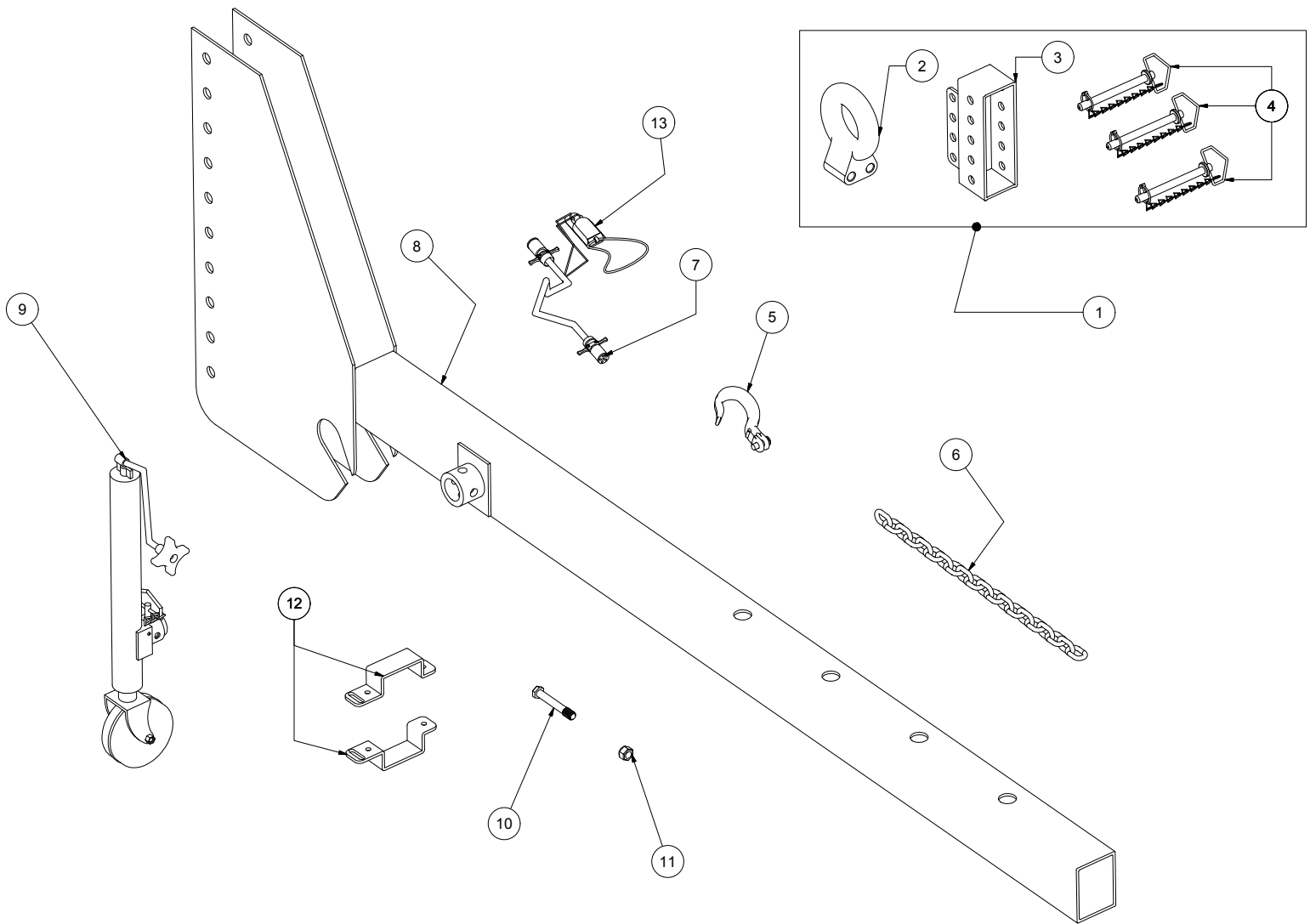
9.2 Fuel Tank Group



ITEM#	PART NO.	DESCRIPTION
1	6002520B	Fuel Tank
2	STD8101	Fuel Cap
3	I-09-010-12SCAL	Fuel Sender
4	MET633901	Fuel Fitting (NOT for pickup)
5	MET633901M	Fuel Fitting Grommet
6	6002527	Fuel Fitting, Pickup Tube and Screen
7	6502514	Support Bracket
NS	6002531B	Fuel Line Cover
	6002532B	Fuel Line Cover with Slot
	6502513	Rubber Fuel Tank Shim

Parts Breakdowns

9.3 Tongue Group



ITEM #	PART NO.	DESCRIPTION	ITEM #	PART NO.	DESCRIPTION
1	LCT622623A	Pintle Eye Assembly	9	LCT622624	Parking Jack
	consists of		12	LCT622635A	Hose Lock Brkt,600
2	LCT622623	Pintle Eye Ring	13	SCL822826A	Breakaway Switch, included in #7
3	LCT622623A2	Bracket w/ U-Channel			
4	200012	Pintle Eye Pins			
5	2000091	Safety Hook, 3/8"			
6	LCT600201	Safety Chain			
7	SCL822826A	Power Cord,#13 incl.			
8	LCT622633	Tow Bar, LCT650			



10.0 HOSE BOOM GROUP

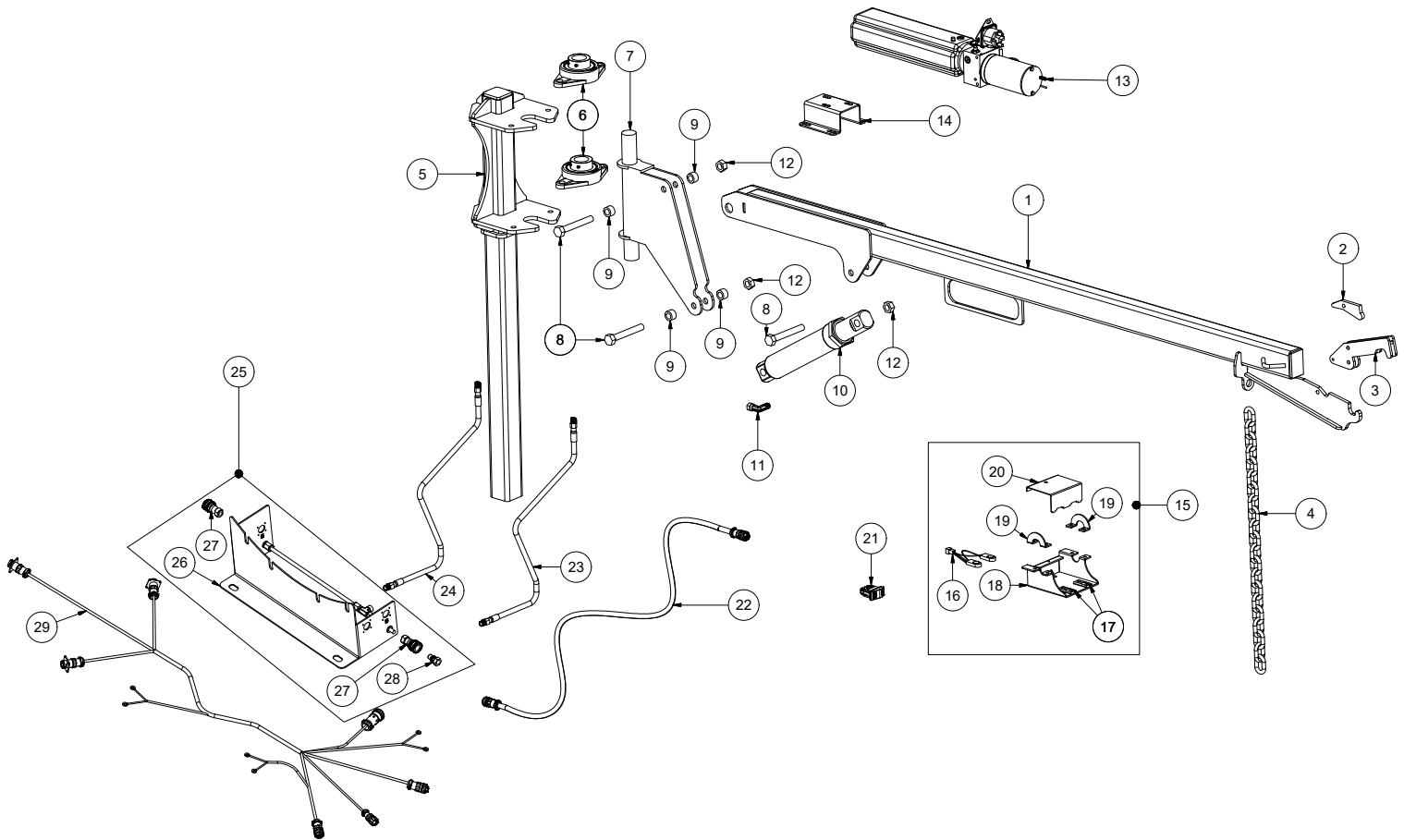
10.0 HOSE BOOM GROUP

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HOSE BOOM GROUP

Parts Breakdowns

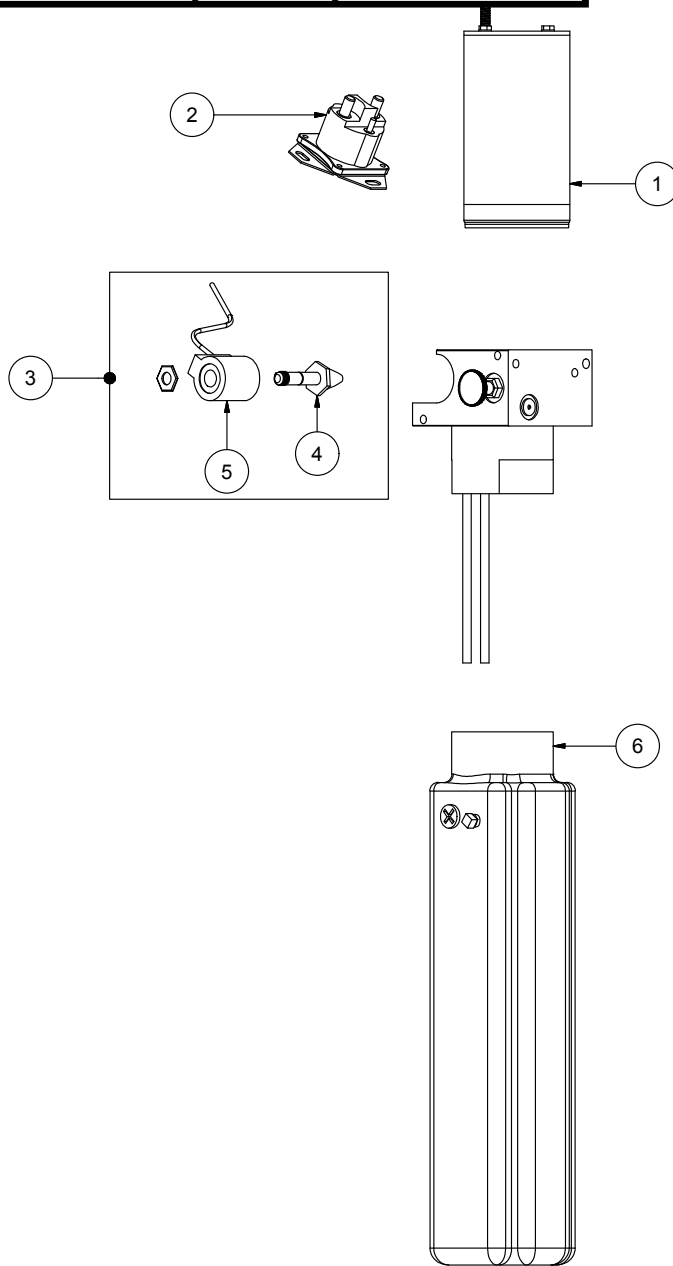
10.1 Intake Hose Boom Group



ITEM#	PART NO.	DESCRIPTION	ITEM#	PART NO.	DESCRIPTION
1	LCT6506202B	Boom Arm	15	STD.2320	Up/Down Switch Assembly
2	6502317	Nozzle Latch Lever	16	STD2321C	Push Buttons
3	6502316	Nozzle Latch Hook	17	STD2322	SS Button Hold Down
4	LCT60642	Chain	18	STD2320B	Push Button Box
5	6502311B	Boom Mast	19	LCT616615D	Hold Down Bracket
6	LCT616801	Boom Bearings	20	STD2320D	Cover Plate
7	6502311	Boom Swivel	21	4045.0021A1	Rocker Switch(optional)
8	5CZ.625.4.0	Bolt, 5/8" x 4" Long	22	650.2322B	Up/Down Switch Harness
9	RMB531	Brass Bushing	23	HOSE1021	Boom Hydraulic Hose
10	MPCS15012	Boom Cylinder	24	Call	Foot Assembly
11	HYF1014	90 Degree Fitting	25	650.132	Foot
12	ZESNC.625	Nut	26	OD-S105.2	Female Quick Disconnect
13	MPM3219S	Hydraulic Pump	27	OD-S105.2	Female Quick Disconnect
14	200022	Pump Spacer	28	650.135C	Harness

Parts Breakdowns

10.2 Hydraulic Boom Pump Group



ITEM #	PART NUMBER	DESCRIPTION
	MPM3219S	Complete Pump Assembly (all above)
1	MP-08004	Electric Motor, 12V
2	MP-17744	Solenoid Switch, heavy duty
3	MP-19283D	Coil, Cartridge Assembly
4	MP-07193D	Cartridge
5	MP-10861D	Coil, 2 way - 2 position
6	MP-06232	Plastic Reservoir, 3.5" x 15.7"

SAFETY PRECAUTIONS

WARNING

Read and understand this entire manual before operating, maintaining or repairing the leaf vacuum.



**DO NOT RIDE, SIT OR STAND
ON UNIT.**

**RIDING ON UNIT
COULD RESULT IN BODILY
HARM OR FATAL INJURY
USE EXTREME CAUTION WHEN
UNIT IS IN USE, OR IN MOTION.**

If the decal above is missing or damaged call Xtreme Vac immediately and we will send you a replacement free of charge. Never operate a unit with damaged or missing safety decals.

 **DANGER**

DO NOT RIDE, SIT OR STAND ON UNIT

 **DANGER**

**DO NOT MODIFY THE UNIT FOR RIDERS IN ANY
WAY. SERIOUS INJURY OR DEATH MAY OCCUR**

Xtreme Vac's leaf collectors are NEVER to be used to accommodate riders. If your unit has been modified to accommodate riders, remove these modifications immediately as this can result in serious injury or death.



CAUTION

**DO NOT ATTEMPT TO OPERATE
OR REPAIR
THE LEAF COLLECTOR WITHOUT FIRST
READING AND UNDERSTANDING THIS
MANUAL**

IF YOU HAVE ANY QUESTIONS CONCERNING THE
INSTALLATION OR OPERATION OF THIS UNIT, PLEASE CALL
XTREME VAC FOR ASSISTANCE BEFORE ATTEMPTING TO
REPAIR OR OPERATE THE UNIT.

**IMPROPER USE OF ANY MACHINE CAN
RESULT IN INJURY!**

**STUDY AND FOLLOW ALL SAFETY
PRECAUTIONS BEFORE OPERATING OR
REPAIRING UNIT**

THIS MANUAL IS AN INTEGRAL PART OF THE LEAF COLLECTOR AND SHOULD
BE KEPT WITH THE UNIT WHEN IT IS SOLD.