

LCT650

Belt Driven Leaf Collector



**Owner's Manual
Safety Manual
Pre-Operating Manual
Operating Manual
Maintenance Manual
Service Manual
Parts Catalog**

2018 DIESEL Edition

ODB Company
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823
www.leafcollector.com



MUNICIPAL PRODUCTS
SINCE 1910

LCT650

816210

 **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
ODB 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 LEAF COLLECTOR AND SHOULD
BE KEPT WITH THE UNIT WHEN IT IS SOLD.

ODB COMPANY
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823



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 ODB 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

ODB'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.

Municipal Products
Since 1910



Municipal Products
Since 1910

ODB COMPANY
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823
www.odbco.com or
www.leafcollector.com

THANK YOU

Thank you and Congratulations on the purchase of your ODB Leaf Collector. Your ODB leaf collector has been carefully designed and manufactured to give you a maximum amount of dependability and years of trouble-free operation. Take comfort in the fact the ODB has been manufacturing municipal products since 1910 and takes pride in our product's quality and our customer service.

Please take the time to thoroughly read this manual, as well as the engine manual, in its entirety before operating, maintaining, servicing or repairing your leaf collector. Please thoroughly review and follow all the safety procedures located in this manual.

Whenever you need replacement parts, service information or any question regarding your **ODB** product please feel free to contact us at **800-446-9823** or **www.odbco.com**.

Please record the following information for future reference:

Model No.	_____
Serial No.	_____
VIN No.	_____
Engine Serial No.	_____
Date of Purchase:	_____

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

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1.0 GENERAL SAFETY

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DANGER

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**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 ODB 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

ODB'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.

SAFETY PRECAUTIONS

WARNING

Do Not, continued;

21. **DO NOT** place hands or feet near moving or rotating parts.
22. **DO NOT** operate engine with an accumulation of grass, leaves or 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.

SAFETY PRECAUTIONS

1.3 Training:

WARNING

Improper use of the ODB 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 Safety Decals



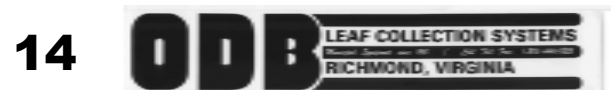
**Decals
shown at end
of section
1.4**



ITEM NO.	PART NUMBER	DESCRIPTION
1.	200182	Danger--Do Not Open Cover While in Operation
2.	200179	Danger--Do Not Ride, Sit or Stand on Unit
3.	200181	Danger--Head, Eye and Ear Protection Required
4.	200221	LCT650 Leaf Collector sticker
5.	200109	Do Not Over-Lubricate bearings
6.	200055	Use Diesel Only
7.	200177	Danger--Flammable
8.	200059	Do Not Engage PTO over 1,000 RPM
9.	200183	Danger--Rotating Parts
10.	200178	Danger--Explosion Hazard
11.	200189	Danger--Check Impeller and Liners Daily for Wear
12.	200180	Danger--Inspect Tow Bar for Damage
13.	200104	Warning--Check Lug nuts
14.	200061	ODB leaf collection systems sticker
15.	200120	Throttle decal
16.	200112	Safety Shut off-Ignition decal

SAFETY PRECAUTIONS

1.4 Safety Decals - Decal Layout for LCT60C/600/650/6000



SAFETY PRECAUTIONS

1.5 VIN and Serial Number Locations

figure 1.5a



⚠ WARNING

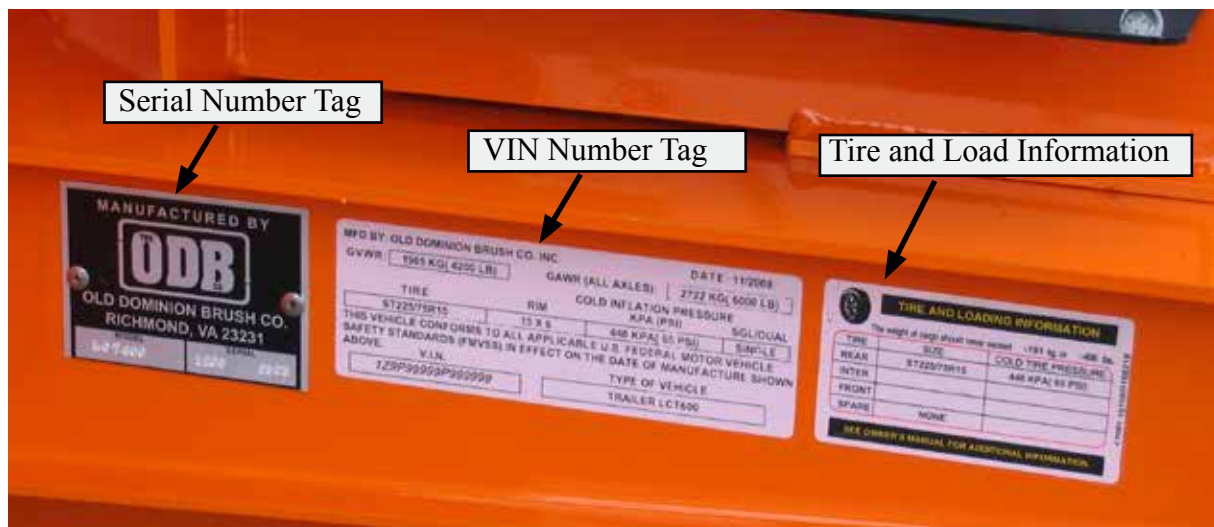
Thoroughly read and understand the safety and pre-operating sections of this manual before starting the engine.

⚠ WARNING

Make sure each operator knows and understands the load ratings of the towed vehicle and that he/she is qualified to tow the vehicle.

The serial number tag and Vehicle Identification Number (VIN) sticker is located in front of the unit to the right of the the tongue. (See figure 1.5a).

The VIN sticker gives the user critical information regarding the trailer specifications such as Gross Vehicle Weight Rating (GVWR) which is the maximum allowable total weight of the fully loaded trailer, including liquids, cargo and the tongue weight of any towed vehicle, the GAWR or Gross Axle Weight Rating which is the maximum allowable weight the axles are designed to carry. The tire inflation pressure is also on the sticker.



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

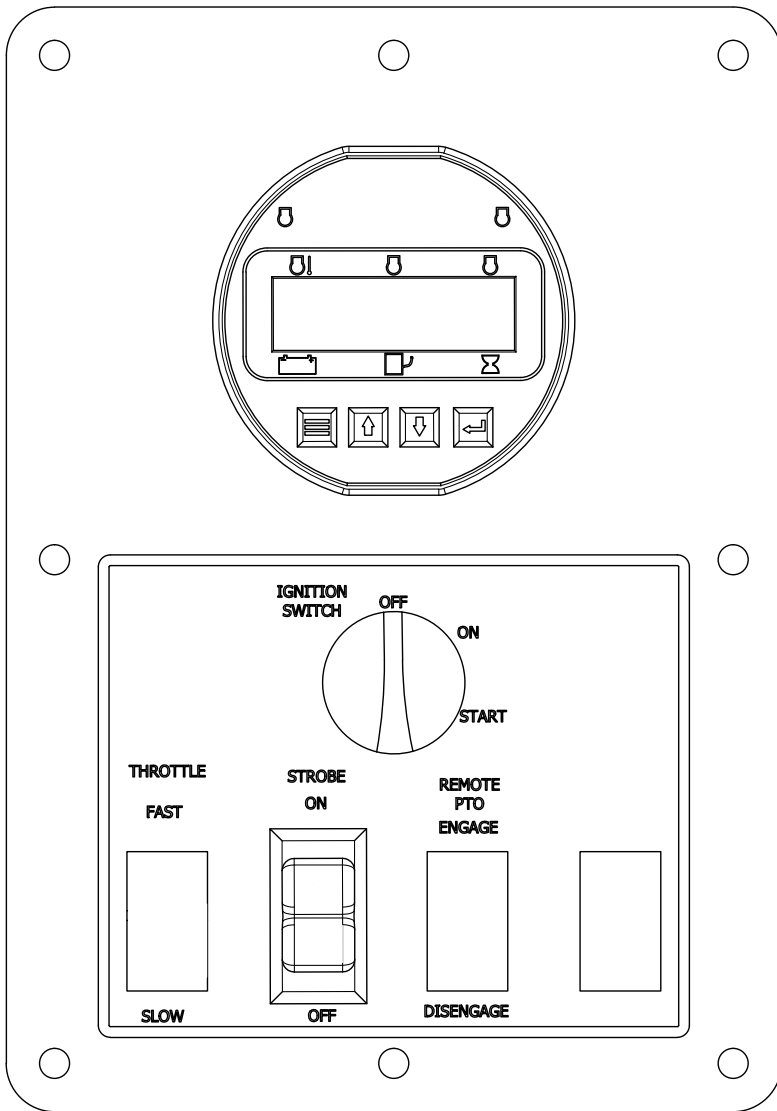
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Pre-Operating Section

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 Instrument 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.

3.0 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 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

3.1 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

3.2 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

3.2 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

3.3 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

3.3 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.

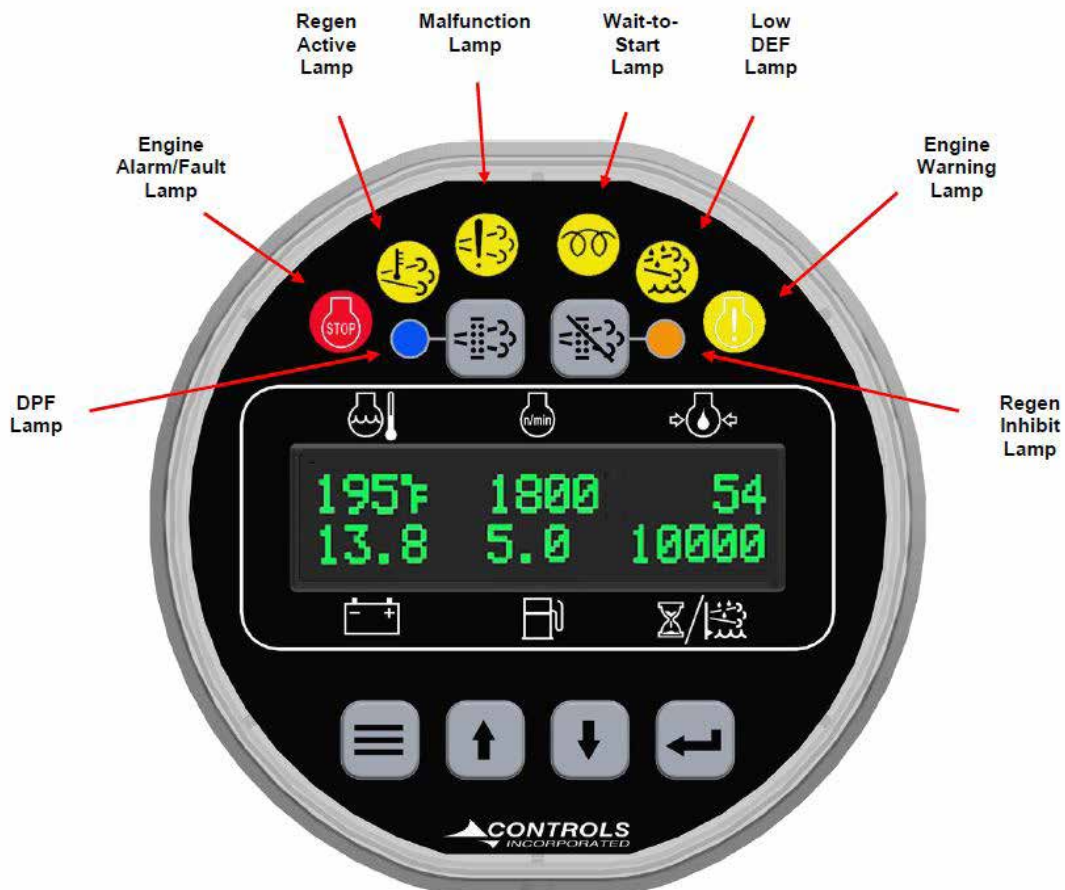
Stored Engine ECU Codes

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

3.4 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.

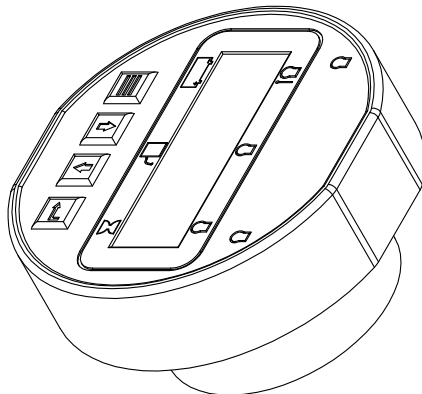
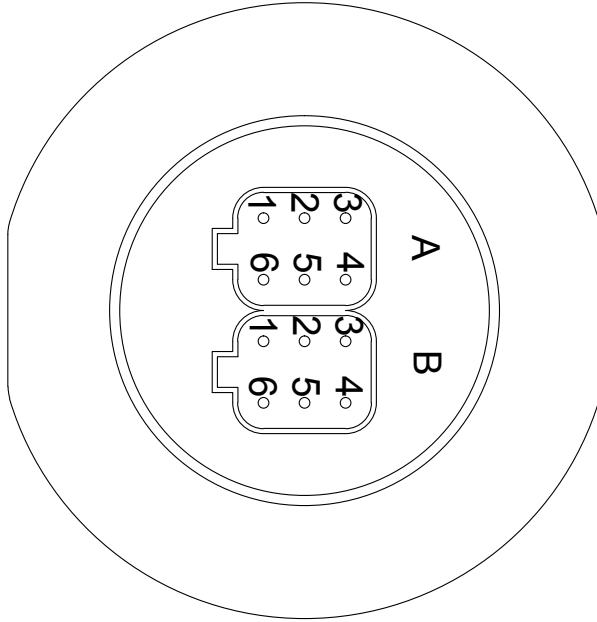
Input	Heading	Default	Options	Connector	Pin
Digital 1	Normally	Open	Open / Closed	A	4
	Function	None			
	Message	None			
	Check	Off	Off / Always / Run		
Digital 3	Normally	Open	Open / Closed	B	6
	Function	None			
	Message	None			
	Check	Off	Off / Always / Run		
Digital 4	Normally	Open	Open / Closed	B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

3.5 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

3.6 Engaging the PTO

figure 3b



PTO shown disengaged

PTO handle

⚠ 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.

figure 3c



safety assist cylinder

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.

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.
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

figure 3d



PTO shown fully engaged

Operating Section

3.6 Engaging the PTO, continued;

figure 3d



PTO shown fully engaged

figure 3b



PTO shown disengaged

PTO handle

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.

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

3.7 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.

4.0 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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Maintenance Section

4.1 Maintenance Overview:

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.

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 ODB.

Maintenance Section

4.2 Maintenance and Lubrication

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

(Use Hour Meter as a Guide)

ITEM	DAILY/ 10 HOURS	40 HOURS / WEEKLY	80 HOURS / 2 WEEKS
Check Engine Oil Level	X		
Check coolant level	X		
Check Fuel Filter	X		
Lubricate Main Shaft Bearings	X		
Lubricate PTO Bearings	X		
Check Air Filter	X		
Check / Clean Pre-Filter	X		
Check Lug Nuts and Tire Pressure	X		
Inspect Radiator and Radiator Screen	X		
Check Engine as described in Engine's Owner Manual	X		
Inspect Blower Housing Exterior	X		
Check Trailer Lights and Turn Signals	X		
Check Power Band	X		
Inspect Impeller Thoroughly for Damage	X		
Check All Nuts and Bolts for Tightness	X		
Check Tow Bar for Damage / Wear	X		
Check Bolt Hole where Tongue Connects to Trailer	X		
Clean and Inspect Battery and Connections		X	
Inspect Intake and Exhaust Hoses for Wear		X	
Inspect All Ducts for Damage		X	
Remove Blower Face and Inspect Liners for Wear		X	
Check PTO / Clutch Adjustment		X	
Grease / Inspect Wheel Bearings for Corrosion or Wear			X
Inspect all Hydraulic and Fuel Lines for Leaks or Wear			X

Maintenance Section

4.3 Lubrication:

⚠ CAUTION

Remove the negative battery terminal before attempting any lubrication procedures.

Figure 4.3A



⚠ WARNING

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

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 the factory or your dealer before any lubricating procedures not specifically mentioned in this manual.

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.

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. We recommend L 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 we recommends the Mantek grease.



Maintenance Section

4.3 Lubrcation, continued;

- 2. Trailer Wheel Bearings (figure 4.3b):** Most of the 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

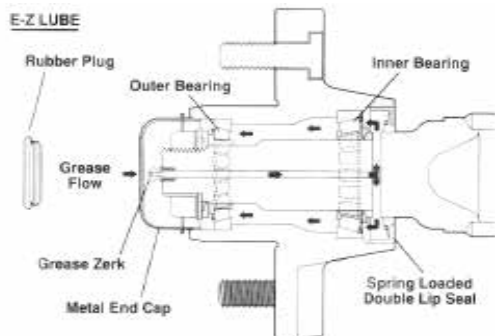
Approved Sources:

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 the manufacturer or dealer.

- 3. Boom Swivel Bearings (figure 4.3d):** Grease the boom bearings once every week with a multi-purpose moisture resistant #2 grease.

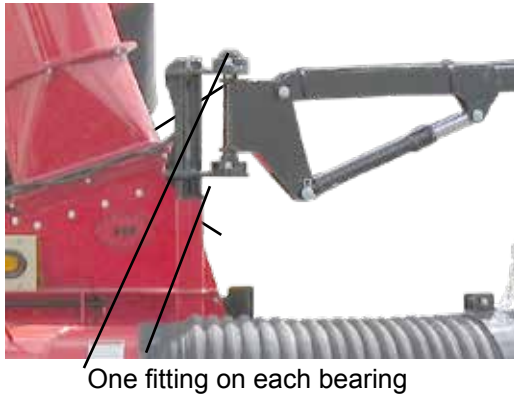
Figure 4.3c



Maintenance Section

4.3 Lubrication, continued;

Figure 4.3d



Lubrication Points, continued:

- 4. PTO Bearing & PTO Shaft Fitting (figure 4.3e):** The PTO bearings should be greased after every 50 hours of operation with a high grade, high temperature lithium base #2 lubricant having an operating temperature of 200 degrees F. Three to five pumps with a hand operated grease gun is sufficient. **NOTE:** Units manufactured after 2000 may not have a PTO bearing grease fitting. These bearings are sealed and do not require greasing. The PTO crossover shaft and linkage should be lubricated with high temperature lithium base #2 lubricant after 200 hours of operation.
- 5. Hinge and Friction Points:** Leaf vacuum operation and longevity can be improved by keeping hinges and friction points lubricated. It is recommended 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.
- 6. Hitch and Tongue (figure 4.3f):** The hitch and hitch ring should be checked and lubricated daily to minimize wear. Apply grease and/or SAE30 weight oil wherever applicable.

Figure 4.3e

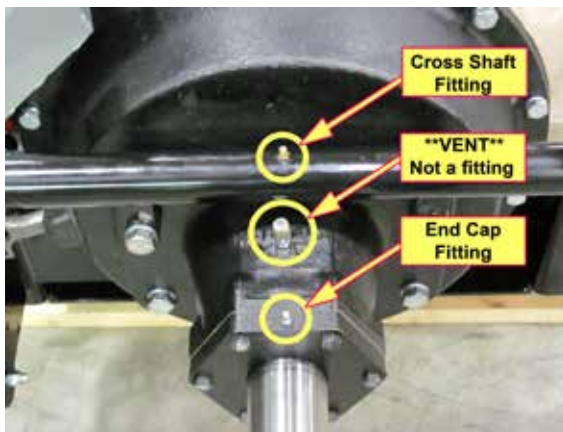
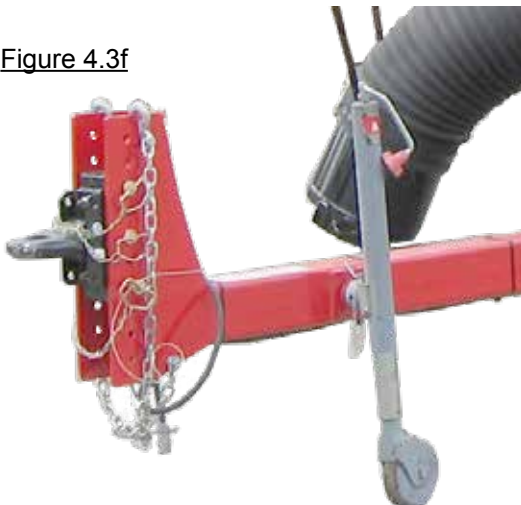


Figure 4.3f



Maintenance Section

4.4 Preventative Maintenance

CAUTION

Remove the negative battery terminal 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 the manufacturer 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 Preventative 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 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 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. DO NOT attempt to clean the air filter, replace the dirty air filter. 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 manual for more detailed information.

Maintenance Section

4.4 Preventative Maintenance, continued;

Preventative Maintenance, continued:

- 6. Trailer Brakes (if equipped):** 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 Preventative Maintenance, continued;

Preventative Maintenance, continued:

CAUTION

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

8. **BATTERY:** The 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

CAUTION






Remove the negative battery cable before opening the belt guard.

daily for cracks and for proper tension. If the belt shows any sign of 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.
11. **INSTRUMENT PANEL AND CIRCUIT BOARD:** The instrument panel and circuit board should be cleaned with compressed air daily. Also the circuit board connectors should be wiped clean and have nonconductive grease applied weekly to help maintain solid connections.
12. **BOOM HYDRAULIC PUMP:** Check the fluid level daily. If fluid needs to be added, automatic transmission fluid (ATF) is recommended. Clean debris and oil off the solenoid and pump daily. A build up of debris can cause premature failure to the pump. Check and tighten all hydraulic fittings making sure there are no leaks.

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.

 **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
ODB 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 LEAF COLLECTOR AND SHOULD
BE KEPT WITH THE UNIT WHEN IT IS SOLD.

ODB COMPANY
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823





5.0 SERVICE SECTION

**Service and Troubleshooting
Wiring Diagrams**

ODB COMPANY
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SERVICE AND TROUBLESHOOTING

5.0 SERVICE SECTION

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Service Section

5.1 Engine Electrical Troubleshooting Guide

ENGINE RUNS ONLY WHEN OVERRIDE BUTTON IS DEPRESSED

Make sure the PTO is disengaged.

1. Take a look at the limit switch located at the inspection door of the blower housing. Check to be sure that the inspection door closes completely and that the door presses in the limit switch. The limit switch is extremely sensitive and only needs to open 1/64" to shut the engine off.
2. If the inspection door closes properly and presses in the limit switch properly, then disconnect the two wires from the back of the limit switch.
3. Start the engine using the normal procedure then release the shut off button. If the engine continues to run then the problem lies in the limit switch or the limit switch wiring. If the engine still cuts off then the limit switch is not the cause, go to Testing the shut off switch.

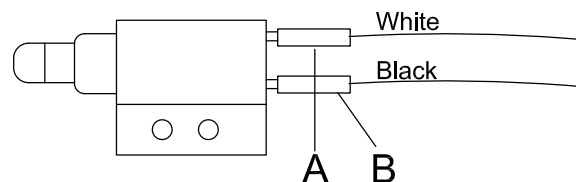
TO TEST THE LIMIT SWITCH:

4. With an ohm meter check the resistance of the terminals A & B (Fig. 1) while the button is not depressed. There should be no resistance or continuity. With the button depressed there should be full continuity or infinite resistance, if not the switch is bad and should be replaced.

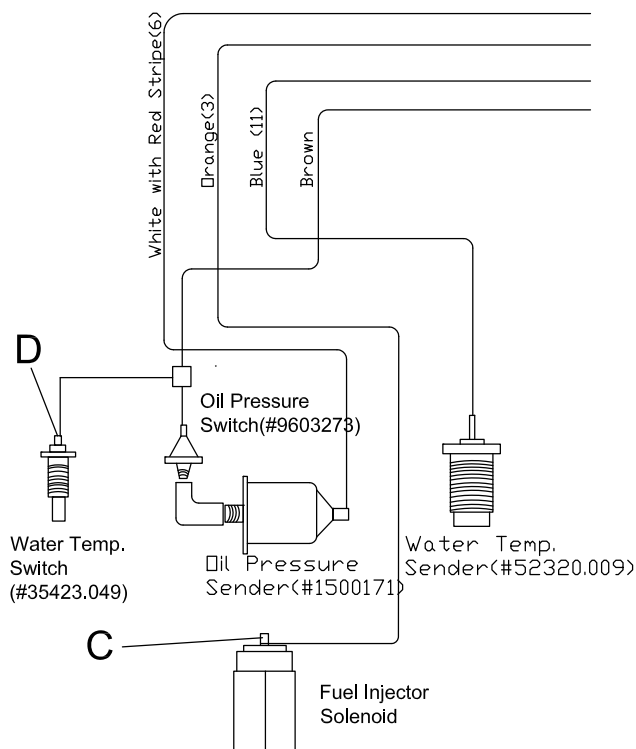
TESTING THE SHUT OFF (MURPHY) SWITCH:

5. Turn the ignition switch to the first position.
6. Put a test light to terminal B (Fig. 3) to test for current. If there is no current at B, power is not getting to the shut off switch. Then the problem is not the shut off switch.
7. If there is current at terminal B, put a test light on the fuse at location Z (Fig. 3). If there is no current there the fuse is blown. Replace fuse.
8. If there is current at B and Z, push the override button (letter X, Fig. 3) in on the shut off switch. While the button is depressed place the test light on terminal C (Fig. 3). If there is current at terminal C then the shut off switch is functioning properly and the problem lies elsewhere. If there is no current at terminal C then the shut off switch is defective and needs to be replaced.
9. Next locate the fuel solenoid valve located on the fuel injector pump (Letter C, Fig. 2). It has an orange wire running to it. Pull the ignition switch to the first position. Put a test light on the terminal of the fuel solenoid where the wire is attached. Test light should light up showing current, if not shut off switch is bad. Replace.
10. If engine still cuts off after shut off button is released then test the water temperature switch (located on the engine block, Letter D, fig. 2) by removing the brown wire attached to the temperature switch. Start the engine using the normal procedure then release the shut off button. If the engine continues to run then the water temperature switch is defective. Replace the switch. If the engine shuts off, do the same test on the oil pressure switch. If the engine continues to shut off after this test call ODB for additional service procedures.

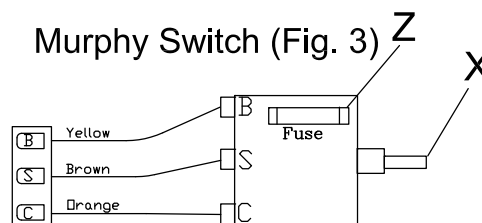
Limit Switch (Fig. 1)



Typical Wiring (Fig. 2)



Murphy Switch (Fig. 3)



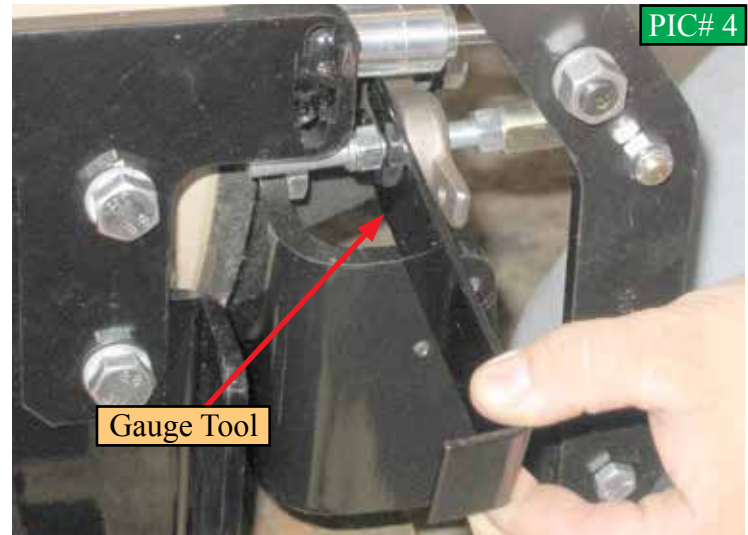
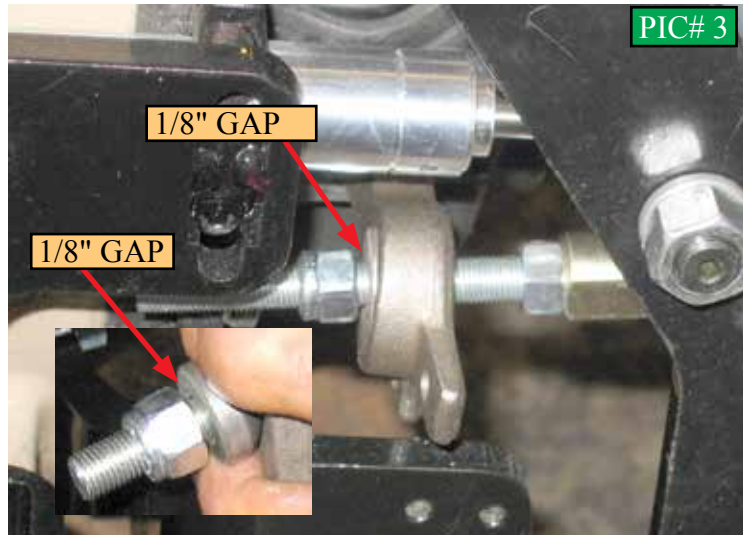
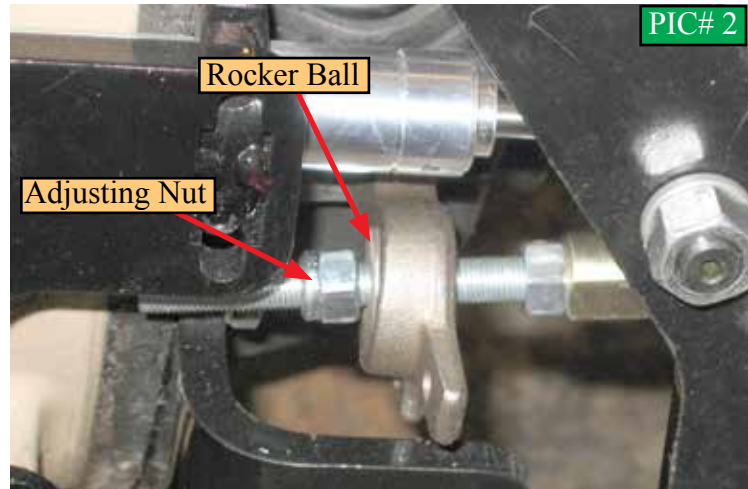
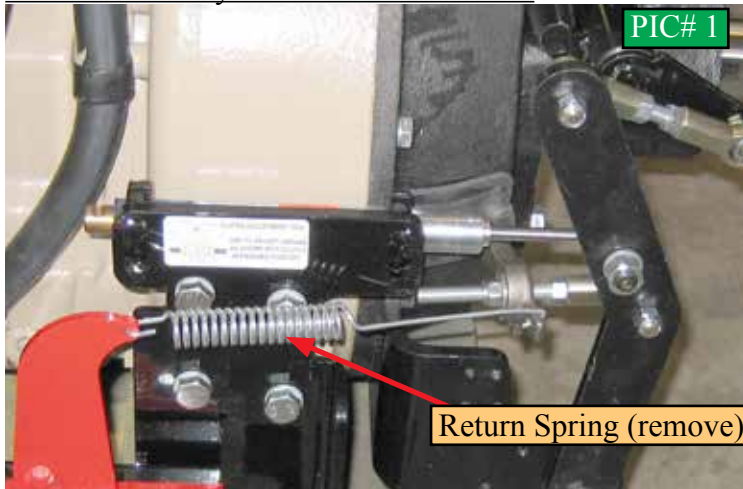
Service Section

5.2 Auto Mfg. Clutch Adjustment - 2008 and after

CAUTION

Rotating Shafts, pulleys, and moving belts can cause severe injury or can be fatal. The engine and driven unit **MUST** be completely stopped before any adjustments or work is attempted to the engine, driven unit, or the PTO clutch itself.

The clutch linkage should be checked after the first 15 hours of operation and every 40 hours there after. An improperly adjusted clutch can result in premature wear to the clutch disc, flywheel and the throwout bearing and will void the warranty on the clutch and PTO.

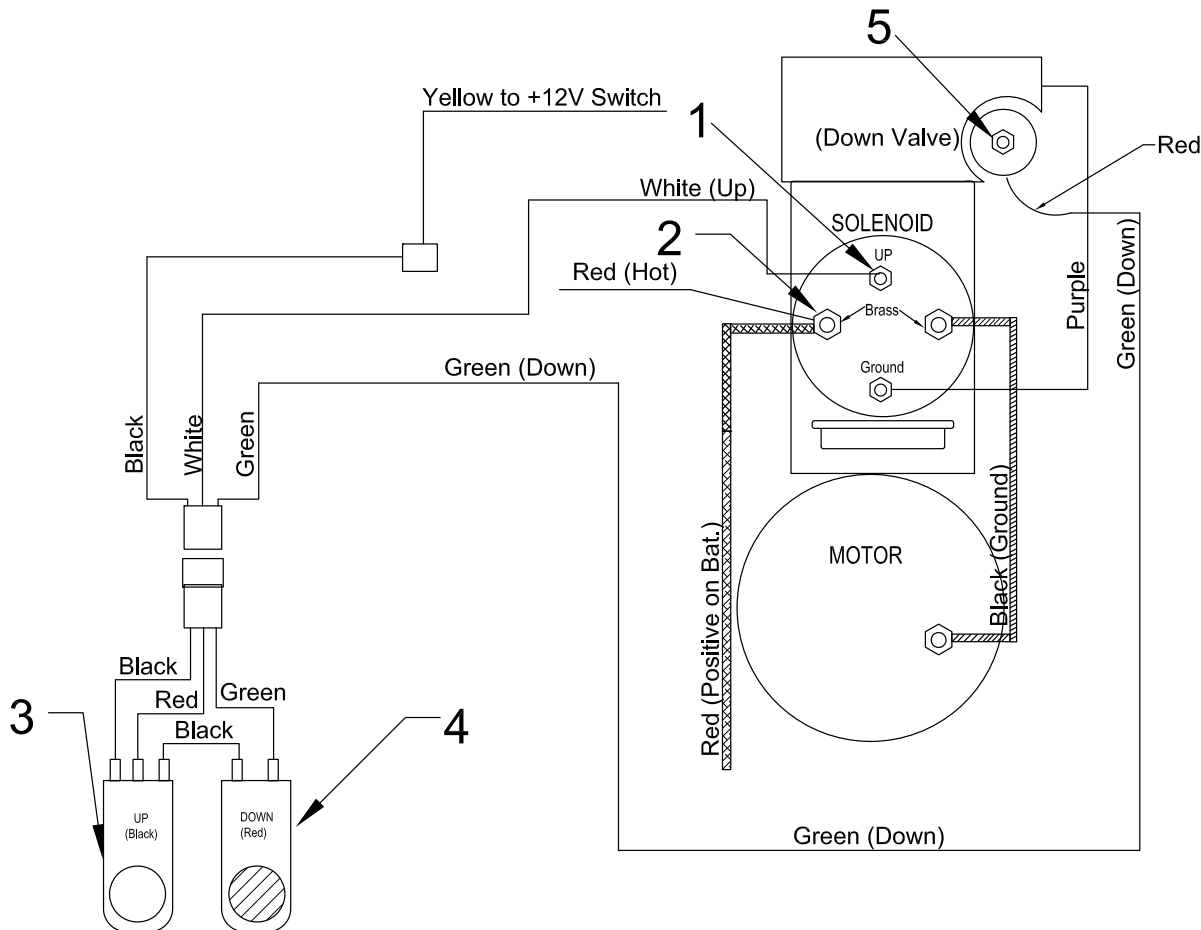


ADJUSTMENT OF THE CLUTCH LINKAGE

1. Make sure the engine is OFF and remove the negative battery cable to ensure the unit can not accidentally be started.
2. Remove the spring from the throwout arm. (See PIC# 1) An accurate measure of the arm tension **CAN NOT** be made with the spring attached.
3. With the clutch in the engaged position (the PTO is engaged when the PTO handle is pointing straight up on the LCT600 and LCT6000 and pointing out to the side (3 o'clock) on the LCT60C, LCT650 and SCL800TM) adjust the nut (See PIC# 2) against the "rocker ball" until a 1/8" gap between the nut and rocker ball is visible (See PIC# 3).
4. If available, use the special 1/8" gauge tool to slip between the nut and rocker ball. With the proper adjustment the gauge should slide between the nut and rocker ball with a slight amount of pressure. (See PIC# 4)
5. Move the adjustment nut to create the 1/8" gap.
6. Re-install the return spring.
7. Place the handle in the disengaged position. Check to make sure that the PTO output shaft turns freely.

Service Section

5.3 Hydraulic Boom Troubleshooting Guide



BOOM WILL NOT GO UP

1. Check the fluid level in the reservoir.
2. Using a test light make sure there is current at the outside solenoid post (item#2), this has a 4 gauge Red battery cable attached. If no current is found check the battery condition and battery connections.
3. If there is current at this post, depress the "up" button (item# 3), while pressing the "up" button check for current at the middle post (item# 1), it has a White wire attached. If there is current at the post (item# 1) the solenoid may be defective. Run a jumper wire connecting #1 and #2. This will test the motor, bypassing the solenoid. If the boom raises, the motor is okay (motor part# MP-08004) but the solenoid is bad and needs to be replaced. Solenoid part number is MP-17744.
4. If there is NO current at the post (item# 1) check the wiring between the switch and the solenoid. If the wiring checks out okay, the switch is bad and needs to be replaced.

BOOM WILL NOT GO DOWN

1. Using a test light make sure there is current at the outside solenoid post (item#2), this has a 4 gauge Red battery cable attached. If no current is found check the battery condition and battery connections.
2. Press and hold the "down" button (item# 4), take a test light and probe through the insulation and test for current on the red wire at the valve (item #5).
3. If there is current, the valve is bad and need to be replaced. Valve part number is MP-19283.D. If there is NO current, check the wiring between the switch and valve, especially any connections. If the wiring checks out okay, the switch is bad and needs to be replaced.

Service Section

5.4 Impeller Installation and Removal

REMOVAL



CAUTION: Before removing the blower housing face remove the negative battery cable to ensure unit can not be started.

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

Direct
Drive



Fig. 2

Belt
Drive



Fig. 3



Fig. 4



Fig. 5



Service Section

5.4 Impeller Installation and Removal, continued

INSTALLATION

CAUTION: Before removing the blower housing face remove the negative battery cable to ensure unit can not be started.

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).

DIRECT DRIVE UNITS: The bushing and key should protrude from the shaft about 1/2 inch (Fig. 2).

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.

7. 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.
8. Install the shaft protector on to the shaft (Fig. 4 or 5).

Fig. 1



Fig. 2



Fig. 3



Fig. 4

Direct
Drive

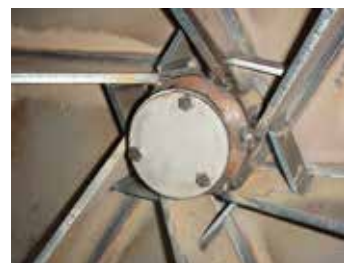


Fig. 5

Belt
Drive



Service Section

5.5 Belt Adjustment and Replacement Guide

⚠ CAUTION

Remove the negative battery terminal before attempting any maintenance procedures.

Belt Removal

1. Make sure the leaf vacuum is not running and remove the battery cable from the negative battery terminal to ensure that the unit cannot be accidentally started.
2. Open the sheet metal doors to gain access to the belt and pulleys.
3. Loosen the four motor mount bolts (Items A and B, figures #1 & 3) located above the motor mount adjustment brackets. There are 2 in the front mount and 2 in the rear mount.
4. To create slack in the belt, the motor assembly needs to be raised upward by either using a bottle jack or an overhead crane.
5. Secure the motor assembly so that it can not fall.
6. Remove the belt.

Belt Replacement

1. Place the belt around the two pulleys, aligning the grooves of the belt with the grooves of the pulley and carefully lower the motor assembly.
2. **IMPORTANT:** Use a straight edge to make sure the pulleys are aligned (figure #3).
3. If the pulleys are not aligned use either of the adjustable motor mount nuts to compensate for the mis-alignments.
4. Using the adjustable motor mount nuts at the rear of the unit (Items A&B, figure #3) turn one of the nuts clockwise to start moving the motor assembly. Move the motor assembly approximately two inches then do the same to the other side. Continue alternating between the two sides until the belt is aligned.
5. Check the tightness at the center of the belt between the two pulleys. The belt should depress approximately 1/2".
6. Tighten down the 2 bolts closest to the blower housing (Item A, figure #1). Loosen the adjustable motor mount nuts (Items A & B, figure #3) by turning counter-clockwise a couple of turns until the front 2 motor mount bolts (Item A & B, figure #1) are completely straight. The motor assembly should not move, if it does move then the bolts (Item A) were not tight enough and the belt would need to be readjusted using the steps above. Once the bolts (Figure #1) are straight tighten them down.
7. Re-attach the battery cable to the negative battery post.
8. Close the sheet metal doors and secure it with the latches.
9. Start the engine and increase the throttle to 750 RPM's.
10. Engage the clutch, listening for any squealing from the belt. If the belt squeals use the above directions to tighten the belt a little more.
11. After approximately 8 hours of use the new belt should be checked for proper tightness in case the belt stretched.

Figure #1

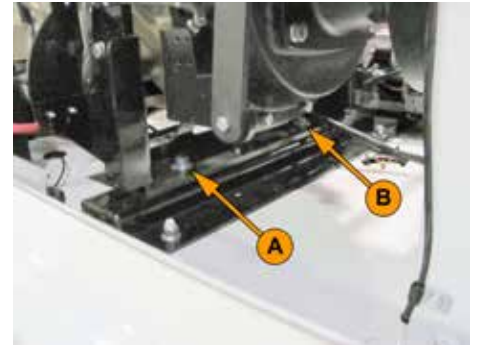
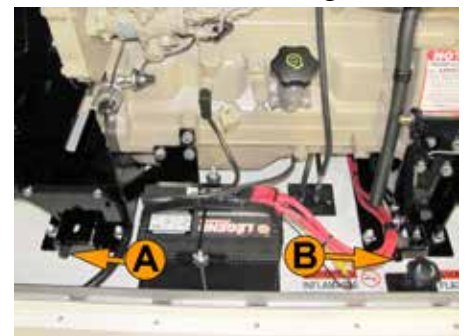


Figure #2



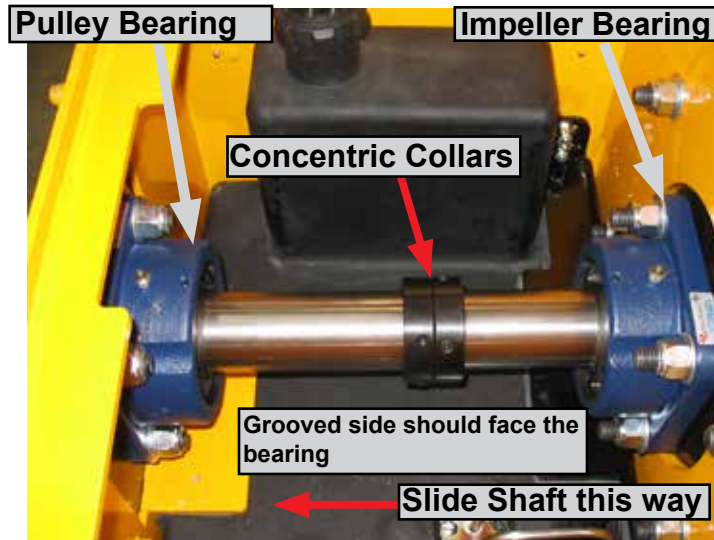
Figure #3



Service Section

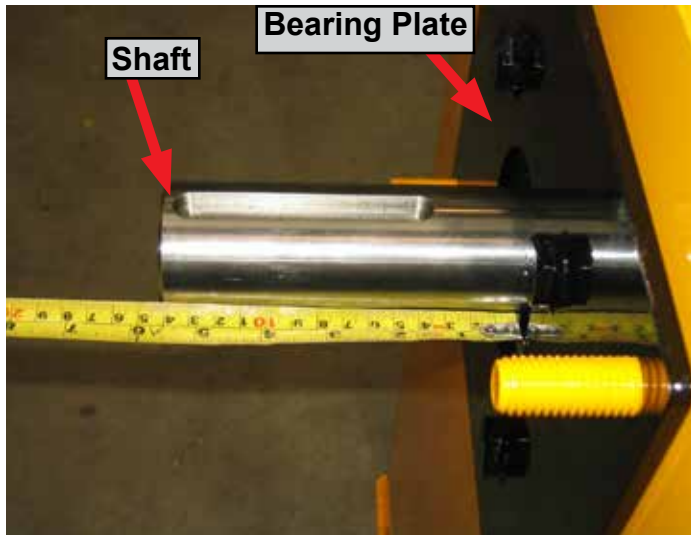
5.6 Flange Bearing Installation and Removal

FIGURE #1



1. Place the bearings on to the black bearing plates inside the pedestal. Hand tighten the bolts onto the nuts at this point.
2. Slide the shaft through the back of the impeller bearing and half way to the pulley bearing. The shaft should fit tight. Clean the shaft and remove any burrs if necessary. Also lightly polishing it with a fine emery may ease installation.
3. Before going through the pulley bearing, place both concentric collars (black collars) onto the shaft (figure #1). Make sure the grooved side is facing the bearing.
4. Continue sliding the shaft through the pulley bearing until the shaft protrudes out from the pulley side 5-5/8". (Figure #2)
5. Now slide the concentric collar toward the respective bearing making sure the grooved side is toward the bearing.
6. Turn the concentric collar clockwise until it slips over the inner ring extension and engages the eccentric. Turn by hand until the parts are locket together.
7. Place a punch or drift in the blind hole in the collar and strike it sharply to lock the collar and ring tightly together (figure #3)
8. Tighten the set screws with an Allen wrench until the set screw stops turning and the Allen wrench starts to spring. (Figure #4)
9. Completely tighten all four of the nuts to secure each bearing.

FIGURE #2



Continued... →

FIGURE #3



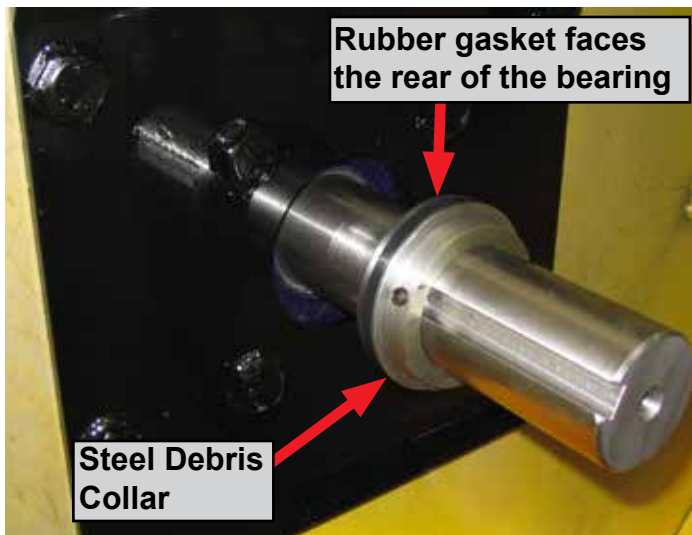
FIGURE #4



Service Section

5.6 Impeller Installation and Removal

FIGURE #5



1. Now move to the blower housing where the shaft comes out from the bearing. Put the steel debris collar (chrome color with a rubber seal on one side) onto the shaft with the rubber gasket side facing the rear of the bearing (away from the impeller). See Figure #5.
2. Push the steel collar seal up to the bearing and make sure the groove in the collar goes inside the groove in the bearing. (Figure #6) This creates the sealed fit to keep debris out of the bearing.

NOTE:

3. If the collar is too large for the hole in the bearing plate, a "new style" bearing plate will need to be ordered that has a larger diameter hole. Units manufactured before April 2002 will most likely need to be converted to the new bearing plate (part number LCT600.603 {all but LCT6000} and LCT630.104A for the LCT6000. This plate is for the blower housing or impeller side only. The pulley side bearing does not use the steel debris collar.
4. Completely tighten the two Allen head screws. See figure #6.

NOTE:

Each bearing comes with a steel debris collar but it will be used only on the bearing on the impeller side. You may discard the other collar if you're replacing the pulley bearing.

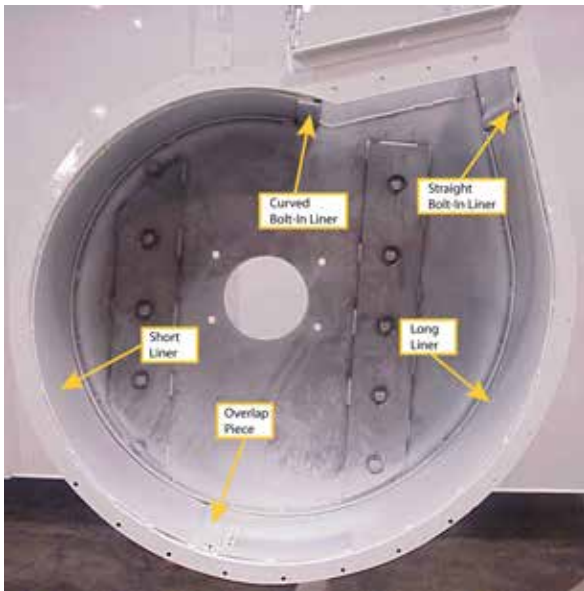
FIGURE #6



Service Section

5.7 Replacing the Blower Housing Liners

figure 5.5a



⚠ 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. To gain access to the interior of the blower housing please see the previous sections.

Removing and installing the Liners (refer to 5.5a and 5.5b):

⚠ WARNING

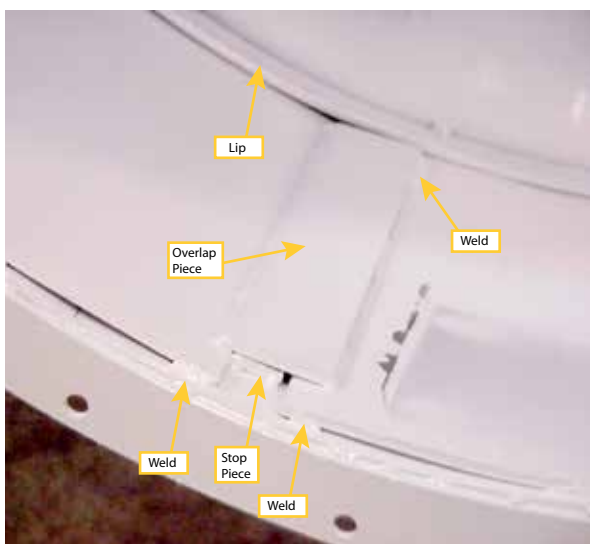
Keep all fuel and fuel fumes away from the unit when grinding or welding. Work only in a well ventiated area.

1. Unbolt the the blower housing face as described previously in this manual.
2. Remove the curved and straight bolt-in liners by removing the appropriate bolts.
3. With a grinder cut out the remaining welds to free the liners. DO NOT remove the "stop piece" at the bottom of the housing.

TO INSTALL:

1. Place the short liner into lip at the rear of the housing and line up the bottom of the liner with the "stop" at the bottom of the housing. The short liner has the overlap piece on it and should be installed as shown in the pictures at the left.
2. Tack weld the liner in place every 8 to 10 inches to help keep the liner in place.

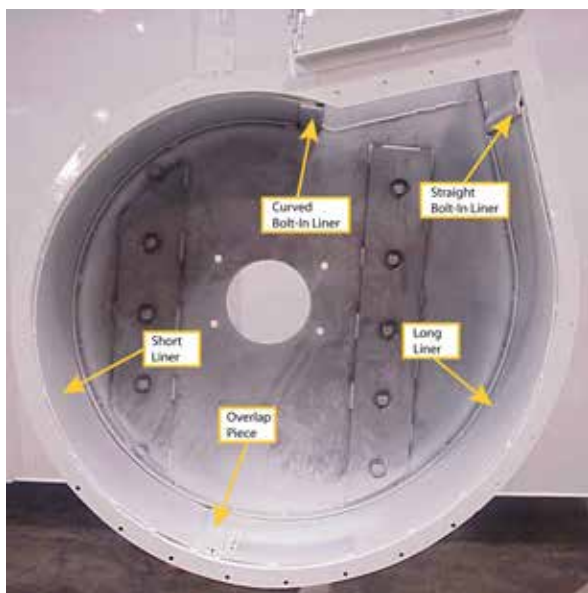
figure 5.5b



Service Section

5.7 Replacing the Blower Housing Liners; continued,

figure 5.5a



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. To gain access to the interior of the blower housing please see the previous sections.

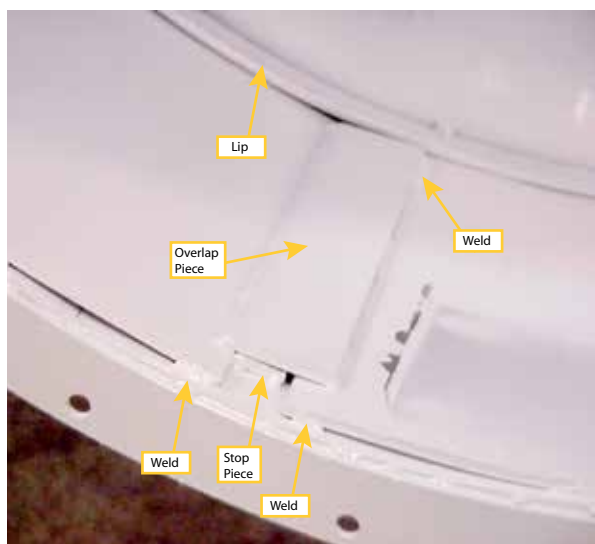
Installing the Liners (refer to 5.5a and 5.5b), continued;

WARNING

Keep all fuel and fuel fumes away from the unit when grinding or welding. Work only in a well ventiated area.

3. Install the long liner the same way as the short liner except the long liner should slip under the overlap piece. Make sure the liner slips under the rear lip and the overlap piece.
4. Tack weld the long liner to the overlap piece and tack weld around the liner as you did on the short liner.
5. Install the two bolt-in liners just as they were removed.

figure 5.5b





5.10 WIRING DIAGRAMS

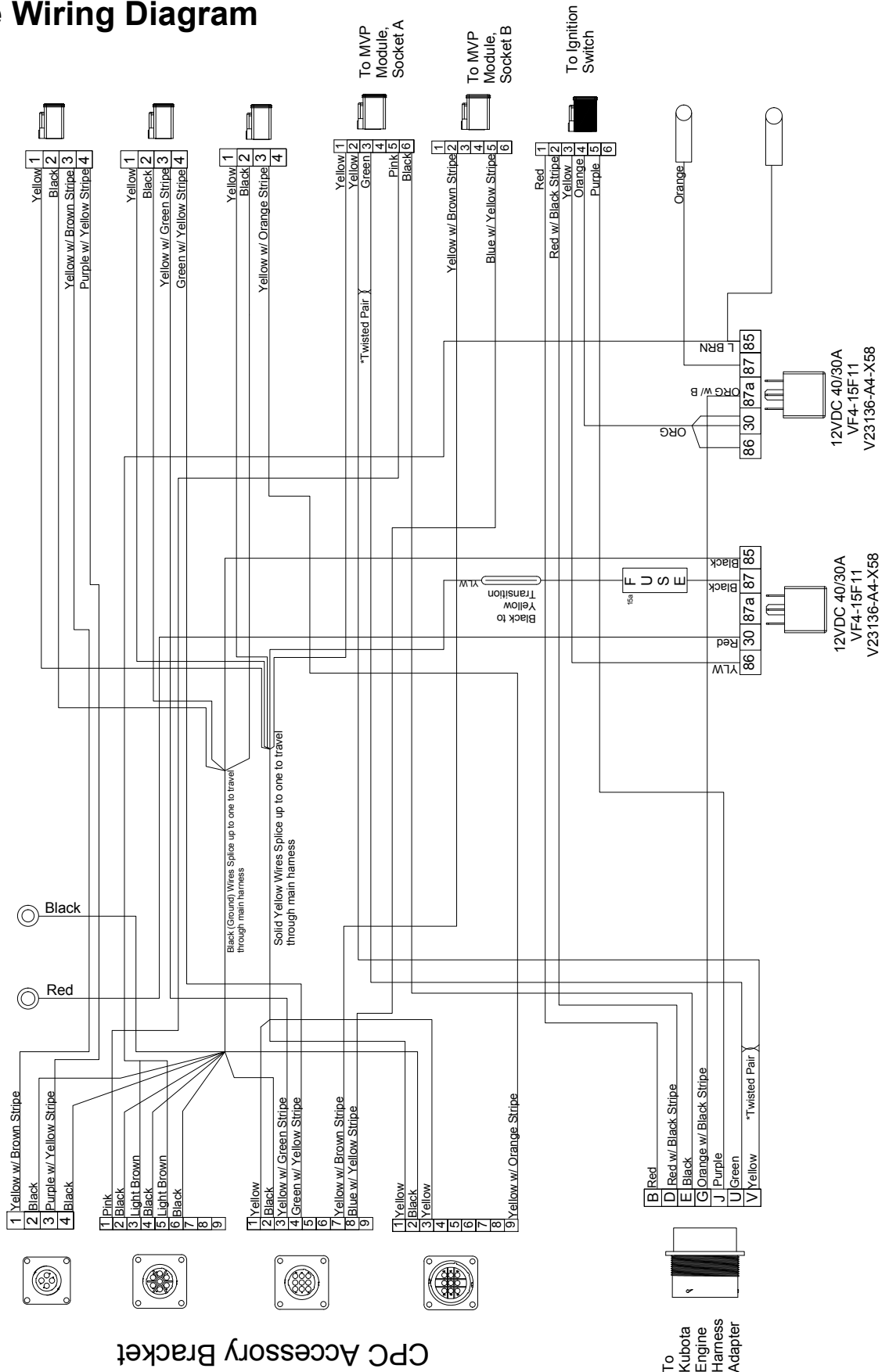
5.10 WIRING DIAGRAMS

5.10.1 Engine Wiring Diagram	67
5.10.2 Engine Main Harness - Adapter	68
5.10.3 Engine Rocker Switch Wiring Diagrams	69
5.10.4 Trailer Plug Wiring Diagram	70
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Service Section

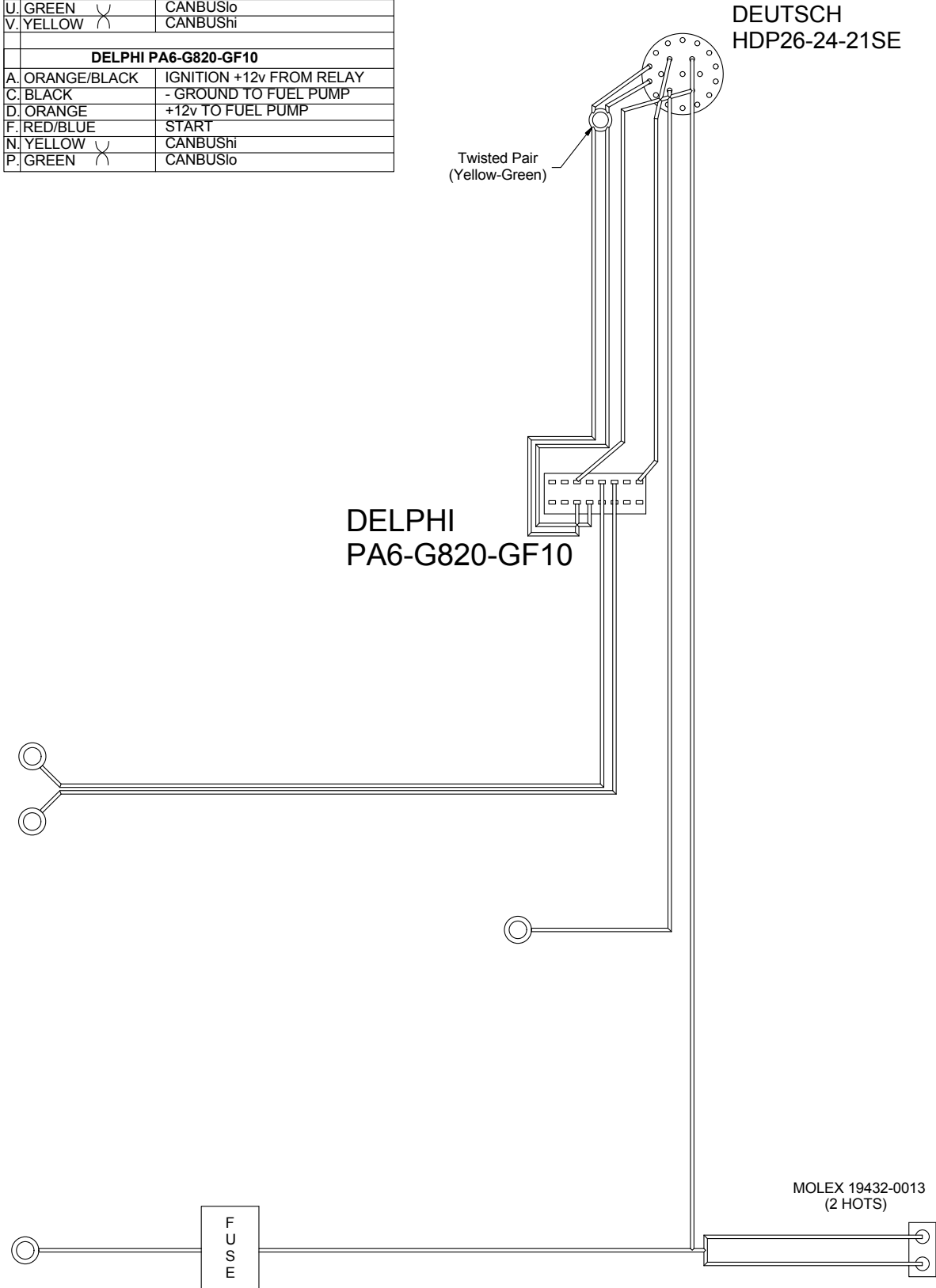
5.10.1 Engine Wiring Diagram



Service Section

5.10.2 Engine Main Harness - Adapter

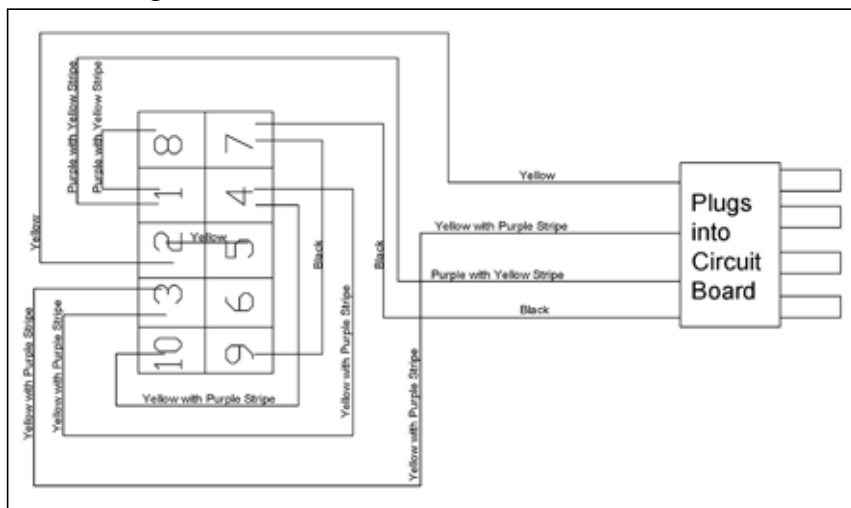
DEUTSCH HDP26-24-21SE	
B. RED	+12v FROM STARTER TERMINAL
D. RED/BLUE	START
E. BLACK	GROUND
G. ORANGE/BLACK	IGNITION FROM LIMIT RELAY
U. GREEN	CANBUS _{lo}
V. YELLOW	CANBUS _{hi}
DELPHI PA6-G820-GF10	
A. ORANGE/BLACK	IGNITION +12v FROM RELAY
C. BLACK	- GROUND TO FUEL PUMP
D. ORANGE	+12v TO FUEL PUMP
F. RED/BLUE	START
N. YELLOW	CANBUS _{hi}
P. GREEN	CANBUS _{lo}



Service Section

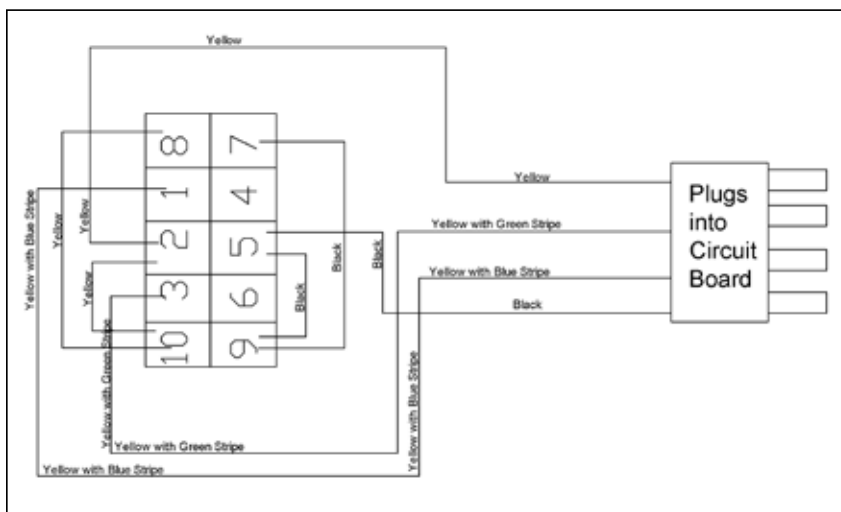
5.10.3 Engine Rocker Switch Wiring Diagrams

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

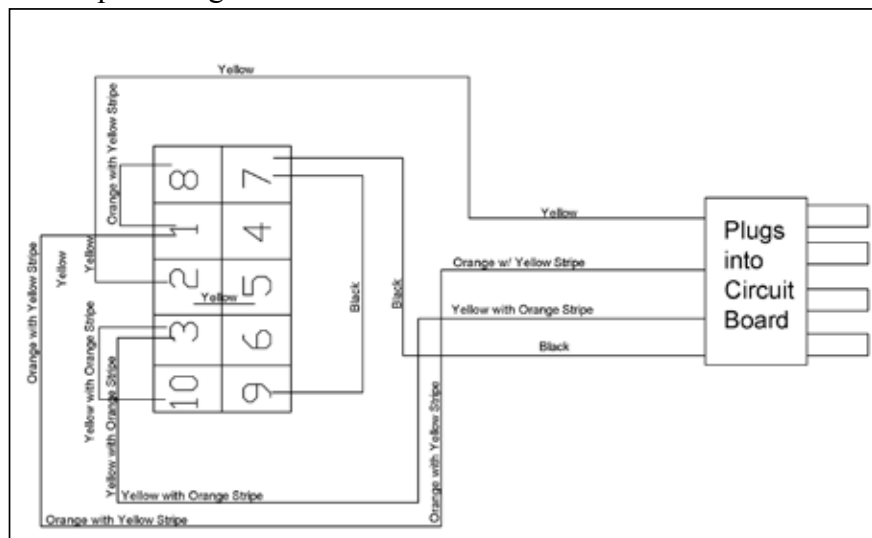
Remote Throttle and Remote Clutch Rocker Switch



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.

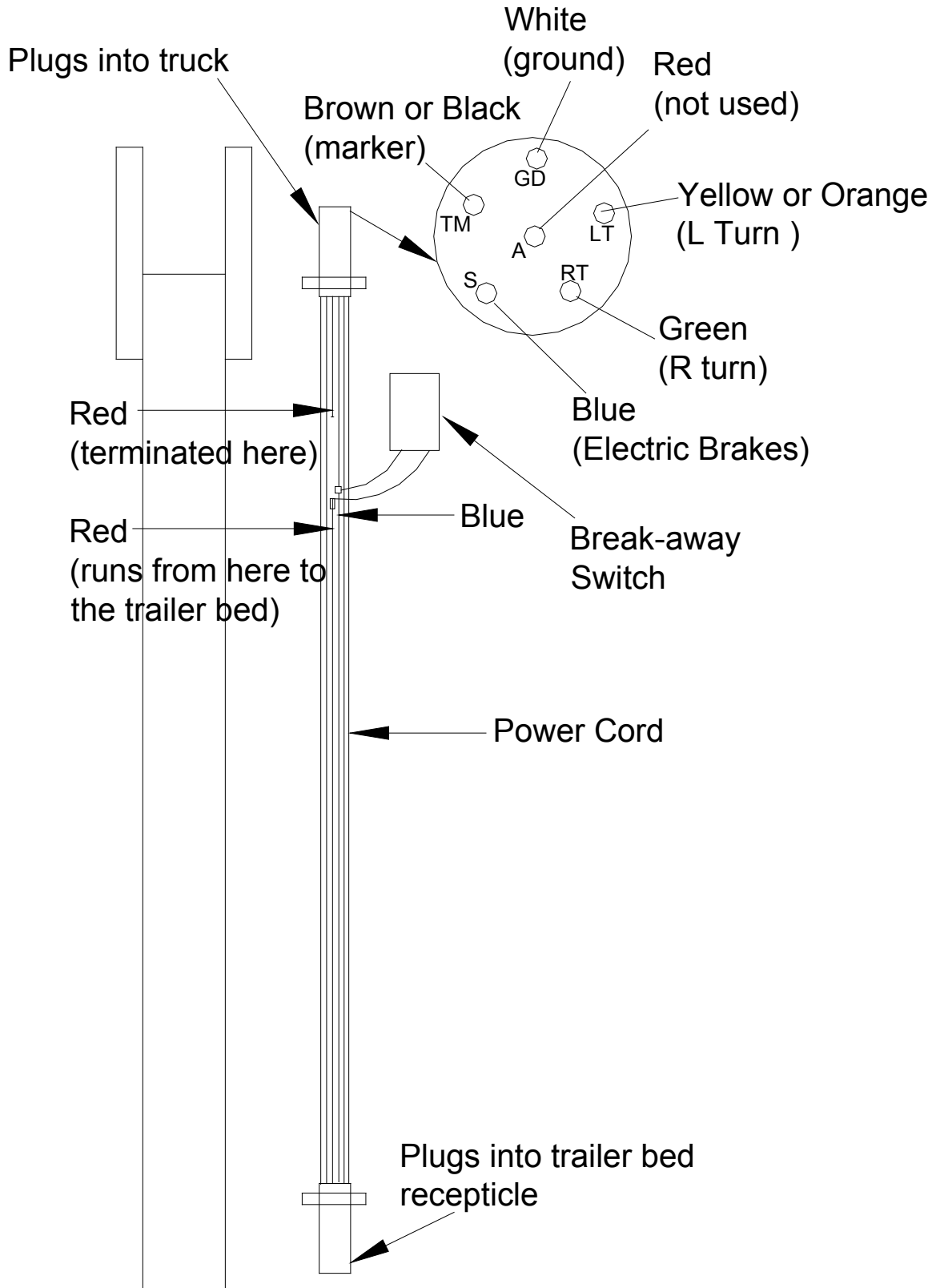
Caterpillar Engine Heater Rocker Switch



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

Service Section

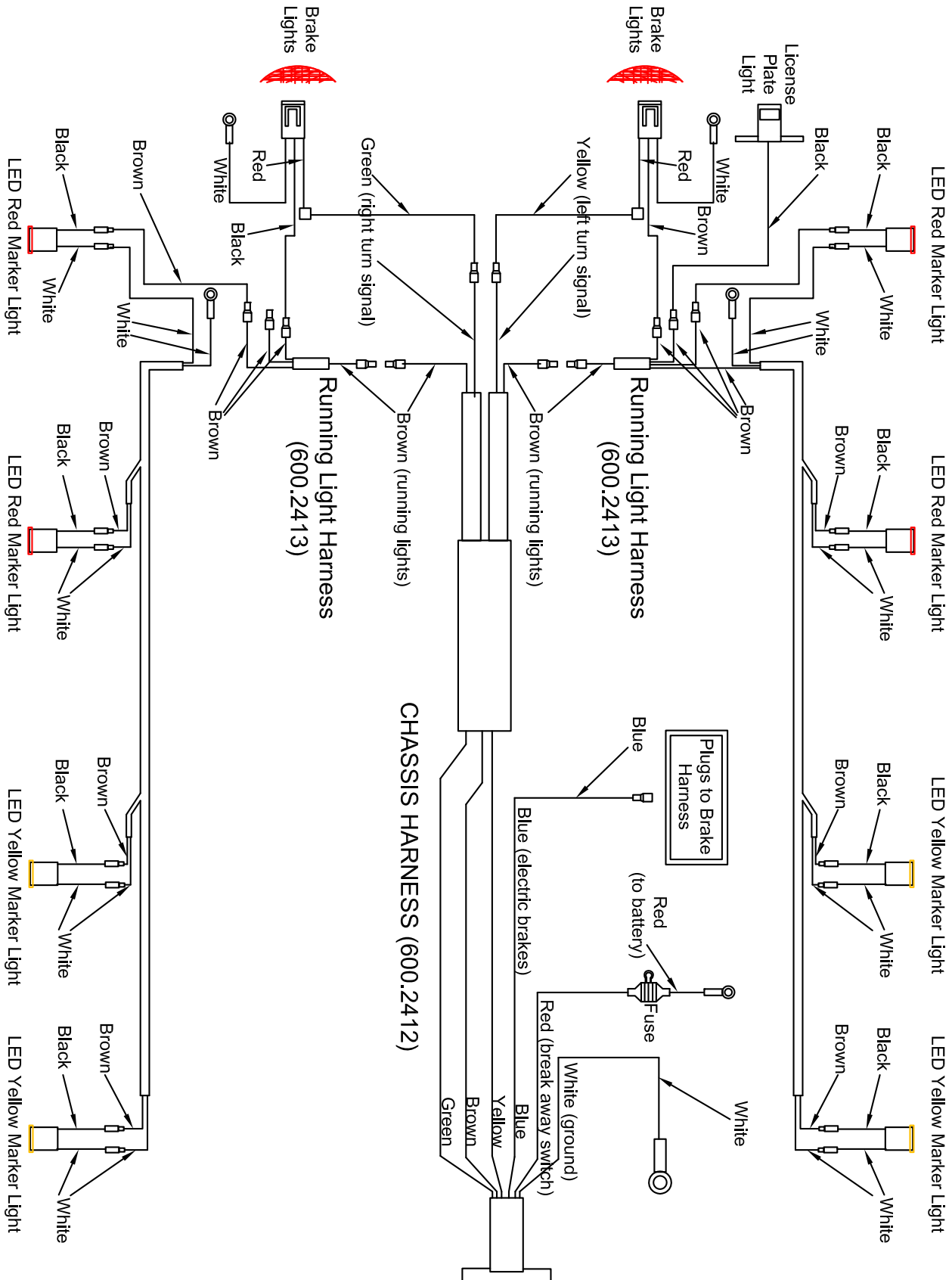
5.10.4 Trailer Plug Wiring Diagram



Service Section

5.10.5 Engine Wiring Harness Descriptions

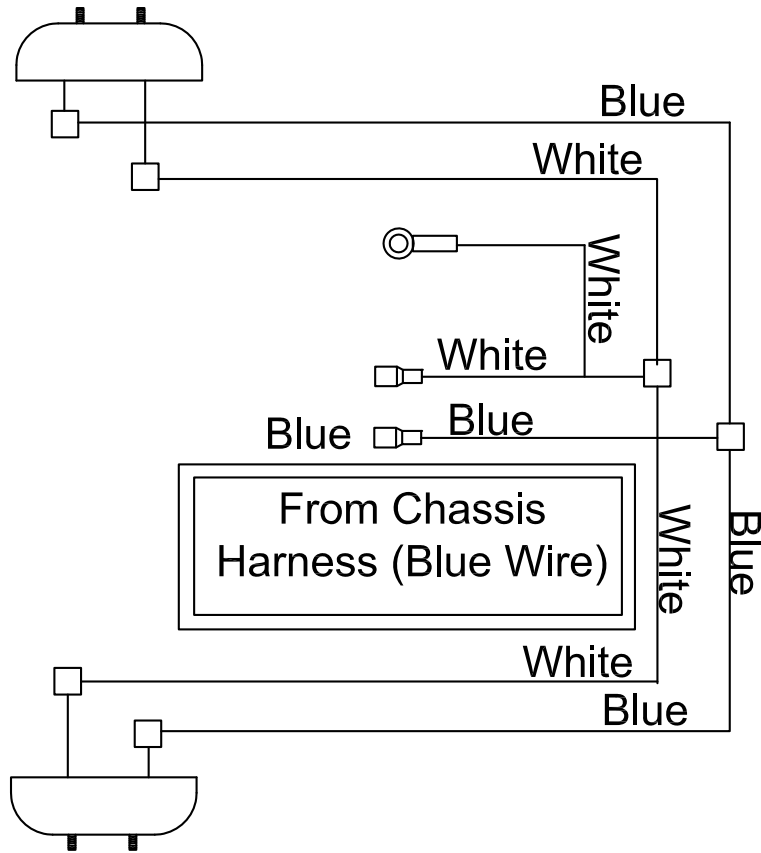
TRAILER WIRING HARNESS



Service Section

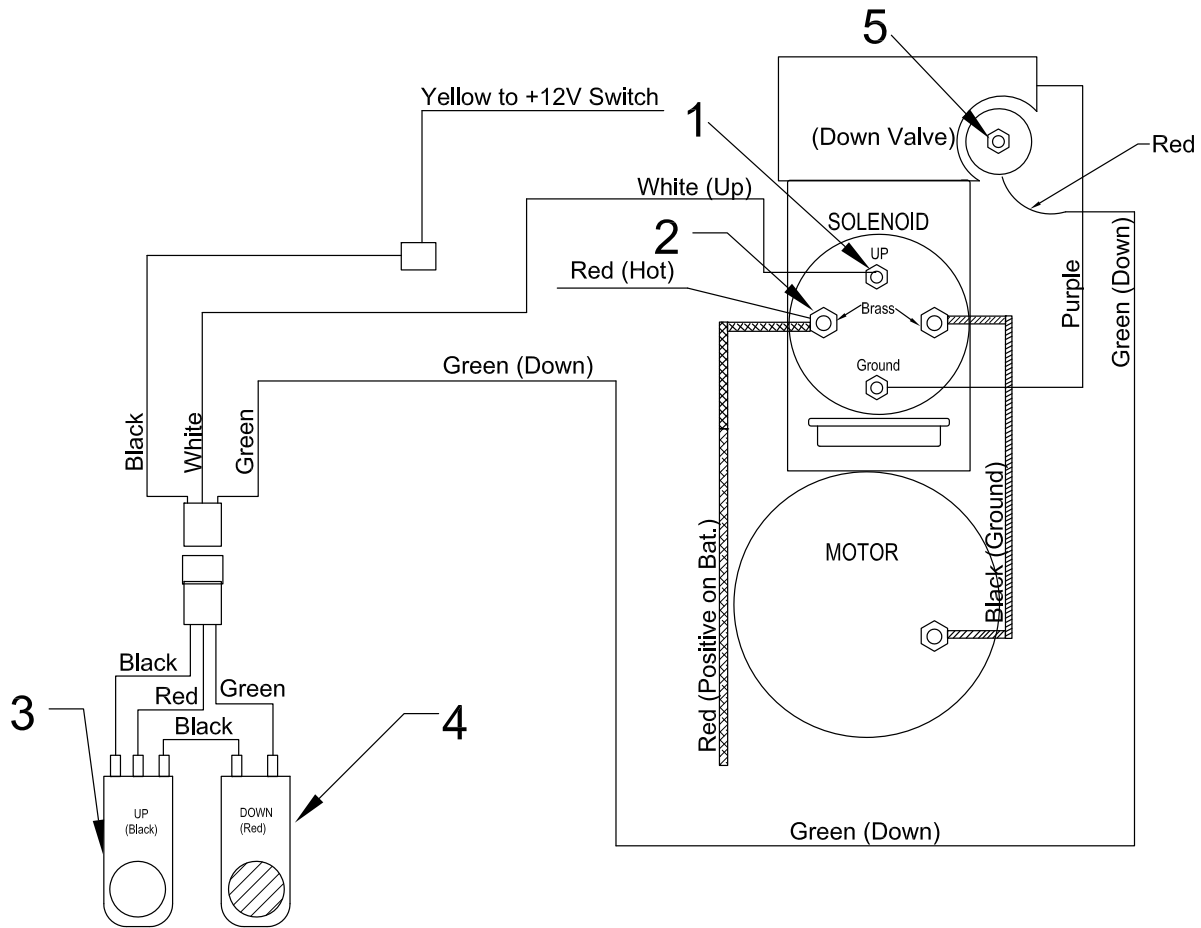
5.10.6 Brake Wiring Harness

BRAKE HARNESS (600.613)



Service Section

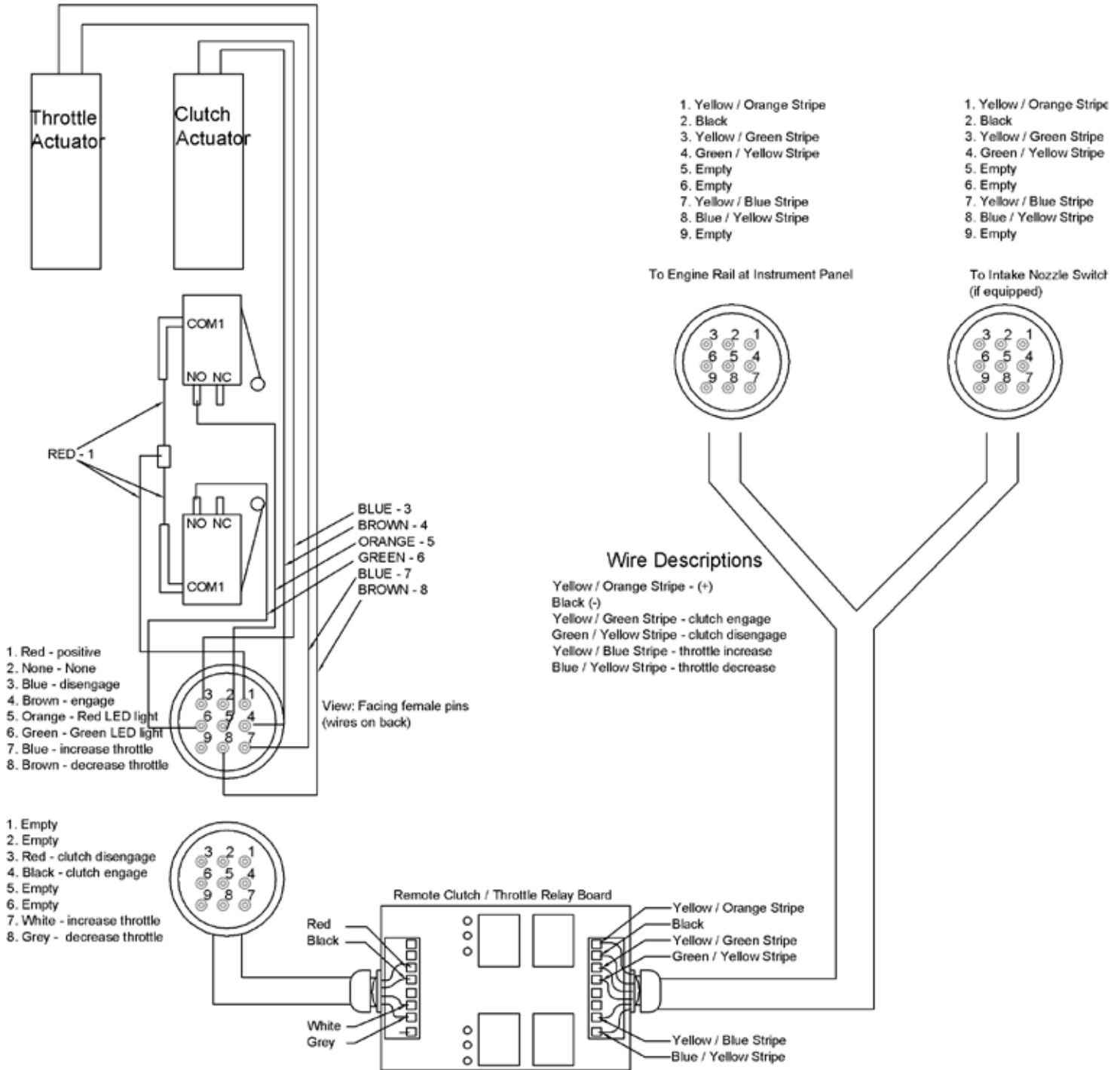
5.10.7 Boom Wiring Diagram



COLOR	FUNCTION
Green	Down
White	Up
Purple	Ground on Solenoid
Red (4 gauge cable)	Positive to Battery
Black (4 gauge cable)	Ground from Solenoid to Hydraulic Motor
Black (from up down switch)	changes to Yellow - Positive for Boom Rocker Switch on instrument panel (if equipped)

Service Section

5.10.8 Remote Throttle / Clutch Wiring Harness





PARTS BREAKDOWNS SECTION

**Engine Group
Clutch Group
Blower Housing Group
Trailer Group
Hose Boom Group**

PARTS BREAKDOWN SECTION

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6-0

6.0 ENGINE GROUP

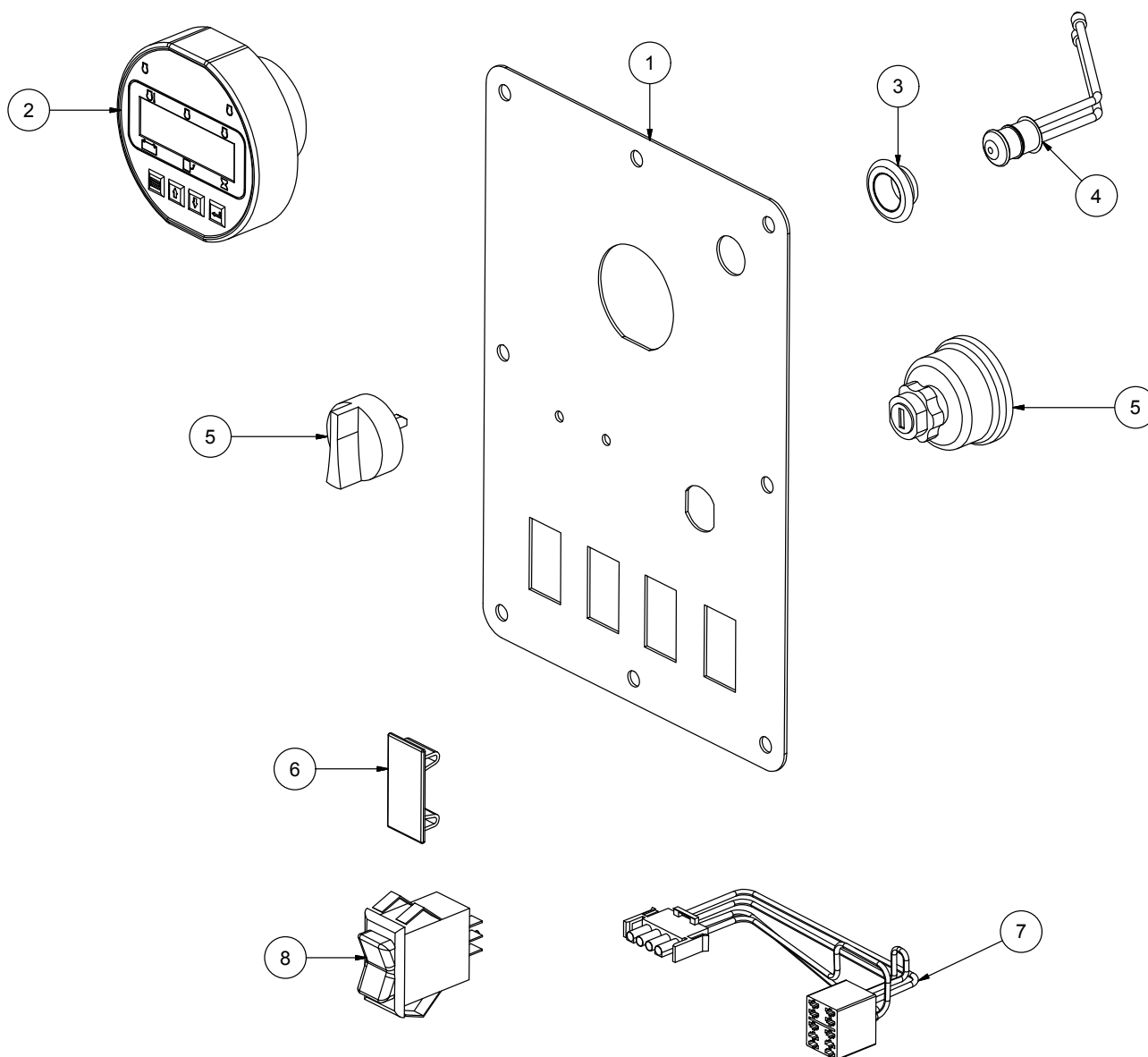
6.0 ENGINE GROUP

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6.4 Sheet Metal Group	80
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6.10 Remote Clutch and Remote Throttle Assembly.....	86
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ENGINE GROUP

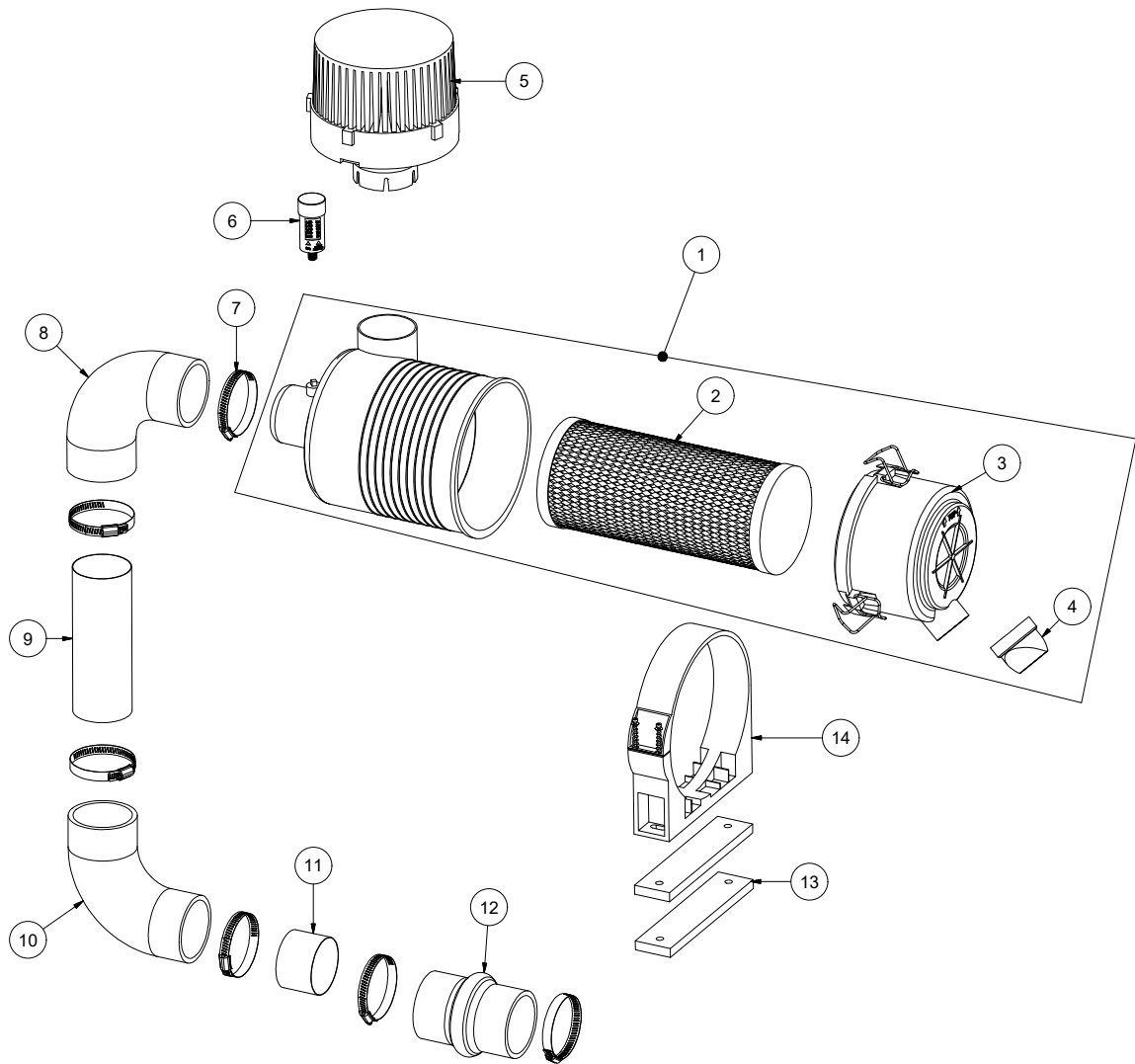
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6.1 Instrument Panel Group



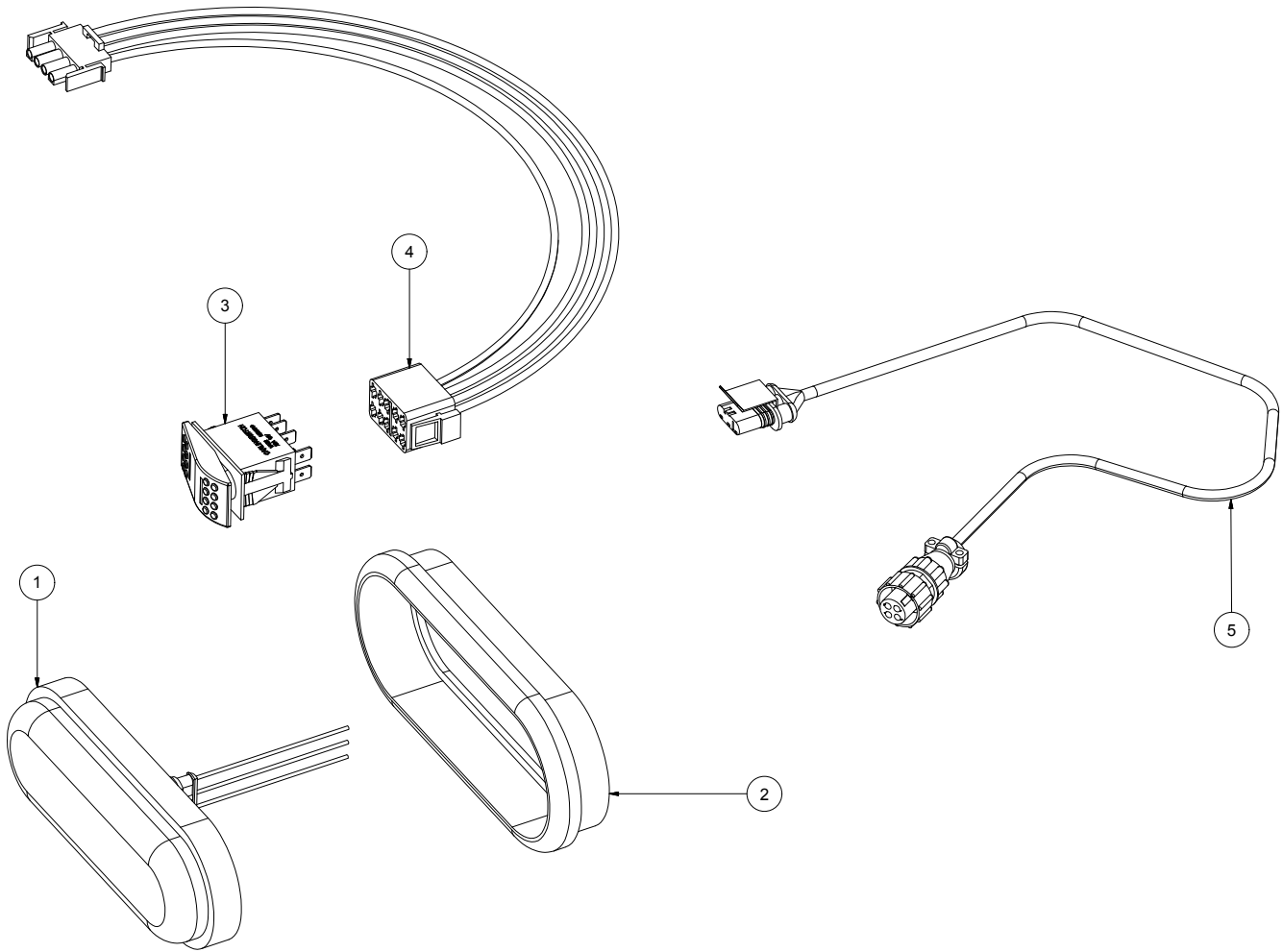
ITEM#	PART NO.	DESCRIPTION
1	4045.2112H	Plate
2	MVP.308	Display, Diesel
3	STD.2201G	Grommet
4	STD.2201	Red Marker Light
5	95060.23	Ignition and Key
6	4045.0028	Hole Plug
7	3029.1201 70.0407 STD.2003	Switch Jumper, Strobe Light Key Switch Harness Strobe Switch Harness
8	4045.0021B	Rocker Switch
NS	KUB.4048	Engine Harness

6.2 Air Cleaner Group



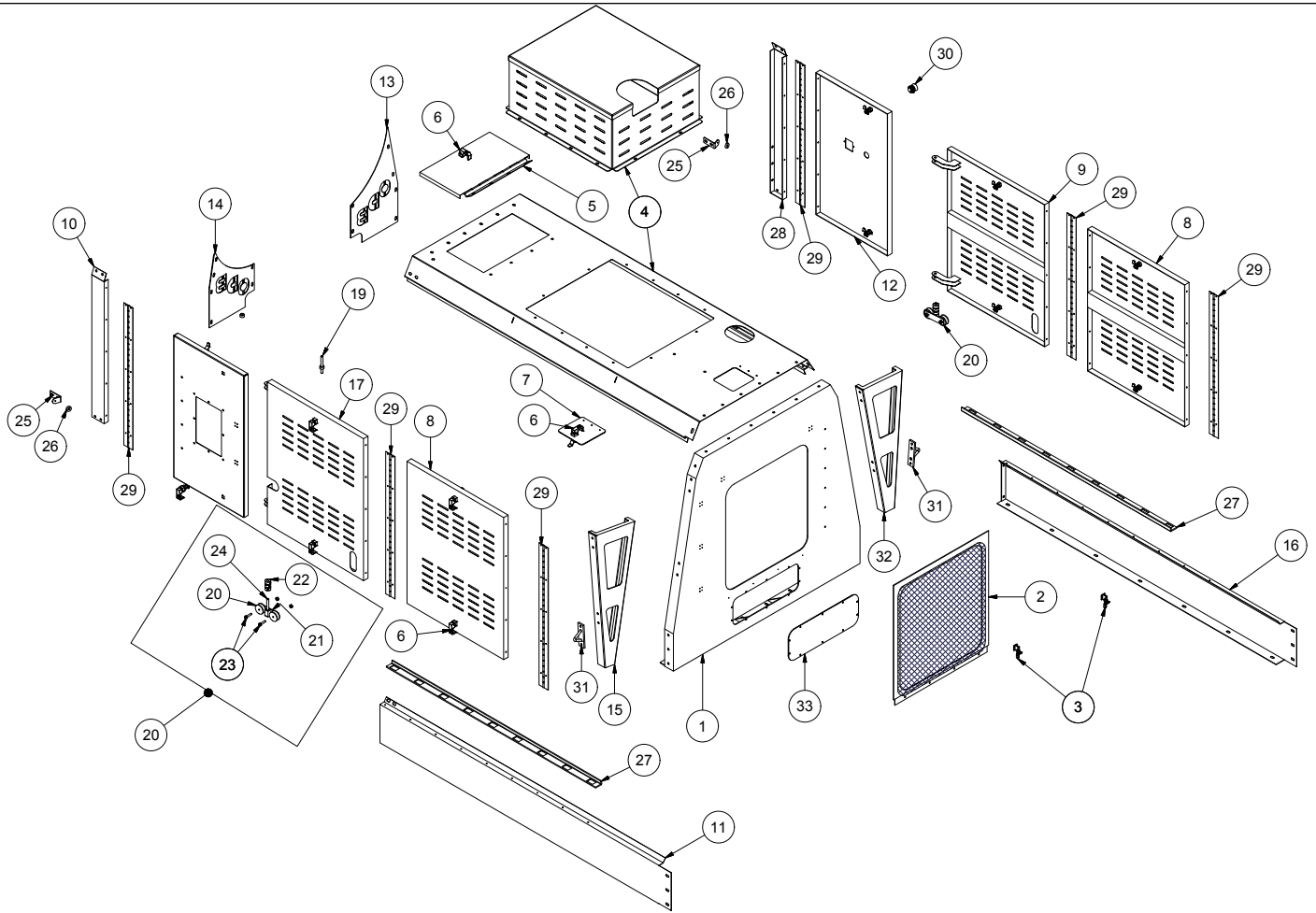
ITEM#	PART NO.	DESCRIPTION
1	OD-G082527	Air Cleaner Assembly w/ Filter
2	UUP828889	Filter
3	UU-P534048	Cover (Does NOT incl Vacuator Valve)
4	UU-P158914	Vacuator Valve
5	UU-21.1330001	Pre Cleaner, Turbo III
6	OD-X002102	Air Restriction Indicator
7	OG-HS.52	Clamp
8	P123462	Elbow, 3x3.5
9	N/A	Aluminum Pipe
10	P105532	Elbow, 3in 90 Deg
11	N/A	Aluminum Pipe
12	P105608	Straight Coupling, 3in
13	KUB.4028	1/2in Spacer (x2)
14	OD-P777732	Mounting Clamp

6.3 Strobe Light Parts Group



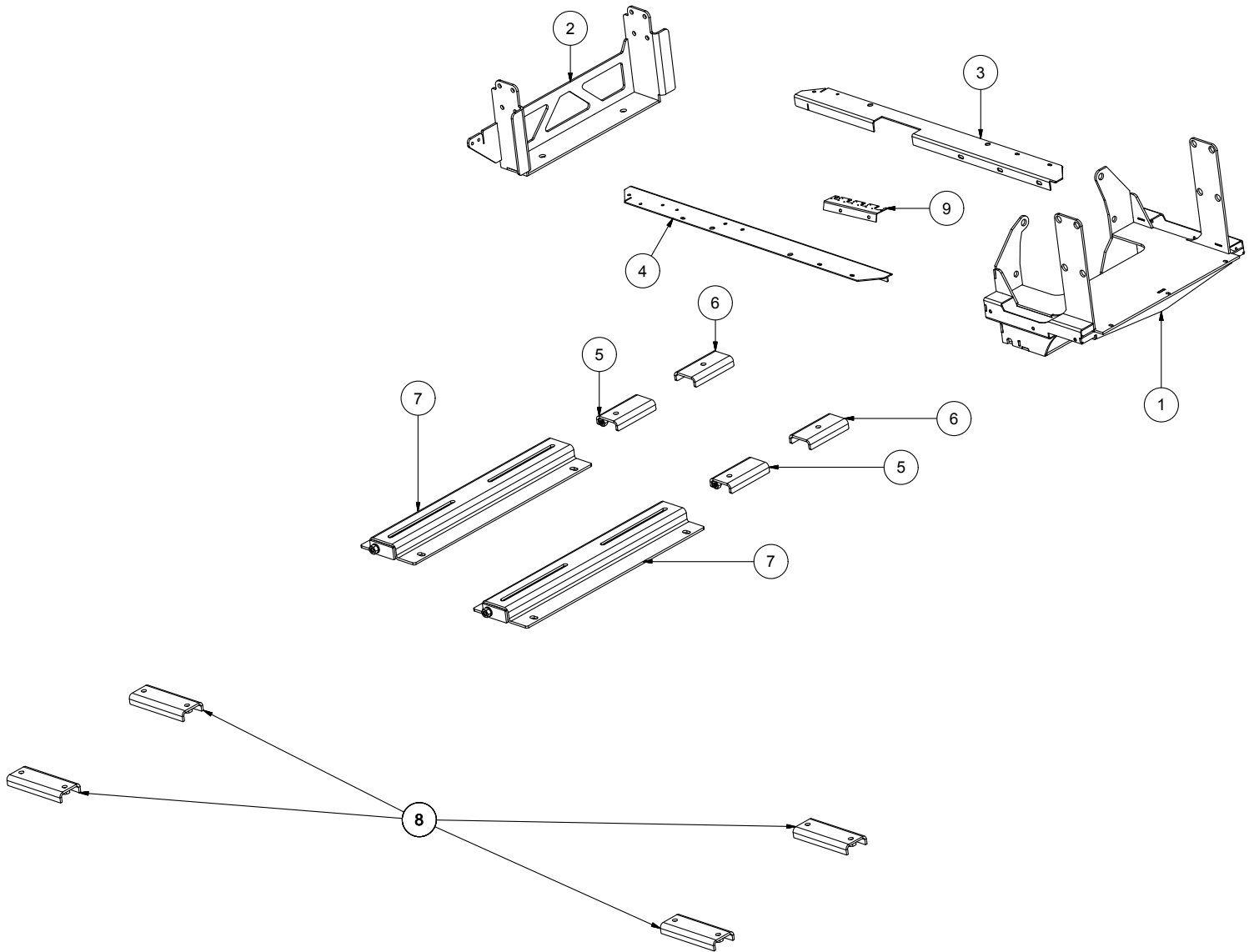
ITEM #	PART NUMBER	DESCRIPTION
1	STD.2213	LED Strobe Light
2	60700	Grommet
3	4045.0021B1	Rocker Switch
4	4045.0024B	Switch Wiring Harness
5	STD.2214	Wiring Harness, rocker switch to light.
6	STD.2534	Strobe Light Bracket , 600 Only

6.4 Sheet Metal Group



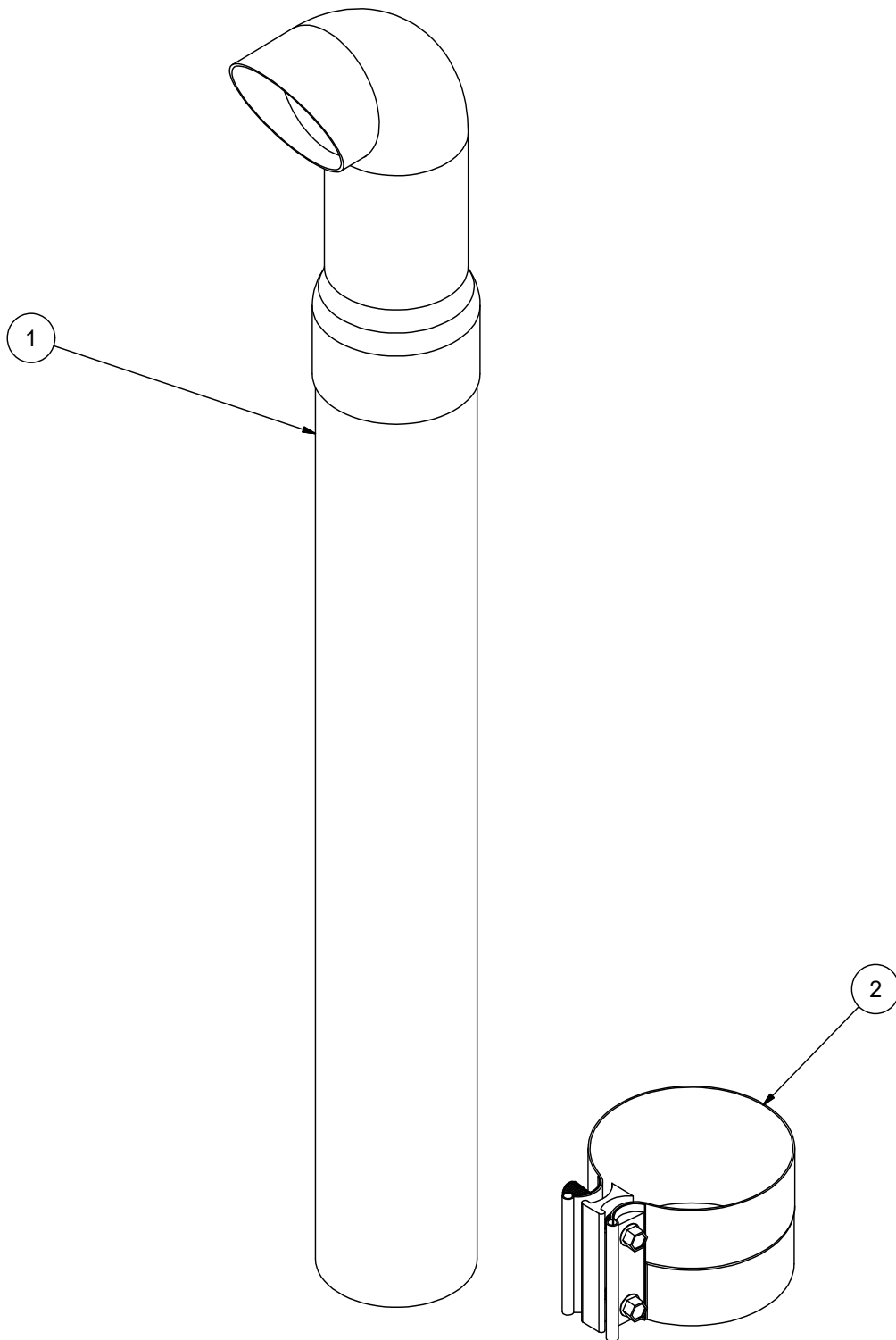
ITEM#	PART NO.	DESCRIPTION	ITEM#	PART NO.	DESCRIPTION
1	650.2101	Nose Cone	17	650.2113	Door Center, RH
2	4045.0018	Radiator Screen	18	650.2115C	Door Rear, inst. panel
3	LCT650.114	Rad. Screen Latch	19	650.2125	Door Top Guide, Pin
4	650.3100 650.3101	Top Panel/Hood JD Canister Cover, Bolt On JD	20	650.2123AS	Guide Roller Assembly
5	LCT650.667A	Bearing Access Door		.. 650.2123	.. Roller Wheel
6	LCT60.624A	Lift and Turn Latch	21	.. 650.2124	.. Roller Carriage
7	4045.2102A 4045.2102C	Radiator Access Door Rad. Access Door Hinge	22	.. 650.2126	.. Set Collar (also on #19)
8	650.2111	Door Front, RH	23	.. 650.2127	.. Bolt
9	650.2114	Door Center, LH	24	.. 650.2125	.. Carriage Pin
10	650.2109	End Plate, RH	25	650.2130	Door Stop
11	650.2105	Lower Side Panel, RH	26	650.2131	Door Stop Rubbe
12	650.2116	Door Rear, LH Stop Switch	27	650.2122	Door Guide Rail Bottom
13	LCT650.134	Back Plate, LH	28	650.2108	End Plate, RH
14	LCT650.135	Back Plate, RH	29	650.2128	Hinge
15	LCT650.108B	Nose Cone Handle, RH	30	800T	Emergency Stop Button
16	650.2105	Lower Side Panel, LH	31	LCT650.125	Chain Bracket
			32	LCT650.108A	Nose Cone Handle, LH
			33	650.2140	Nose Cone Cover Plate

6.5 Engine Mount Group



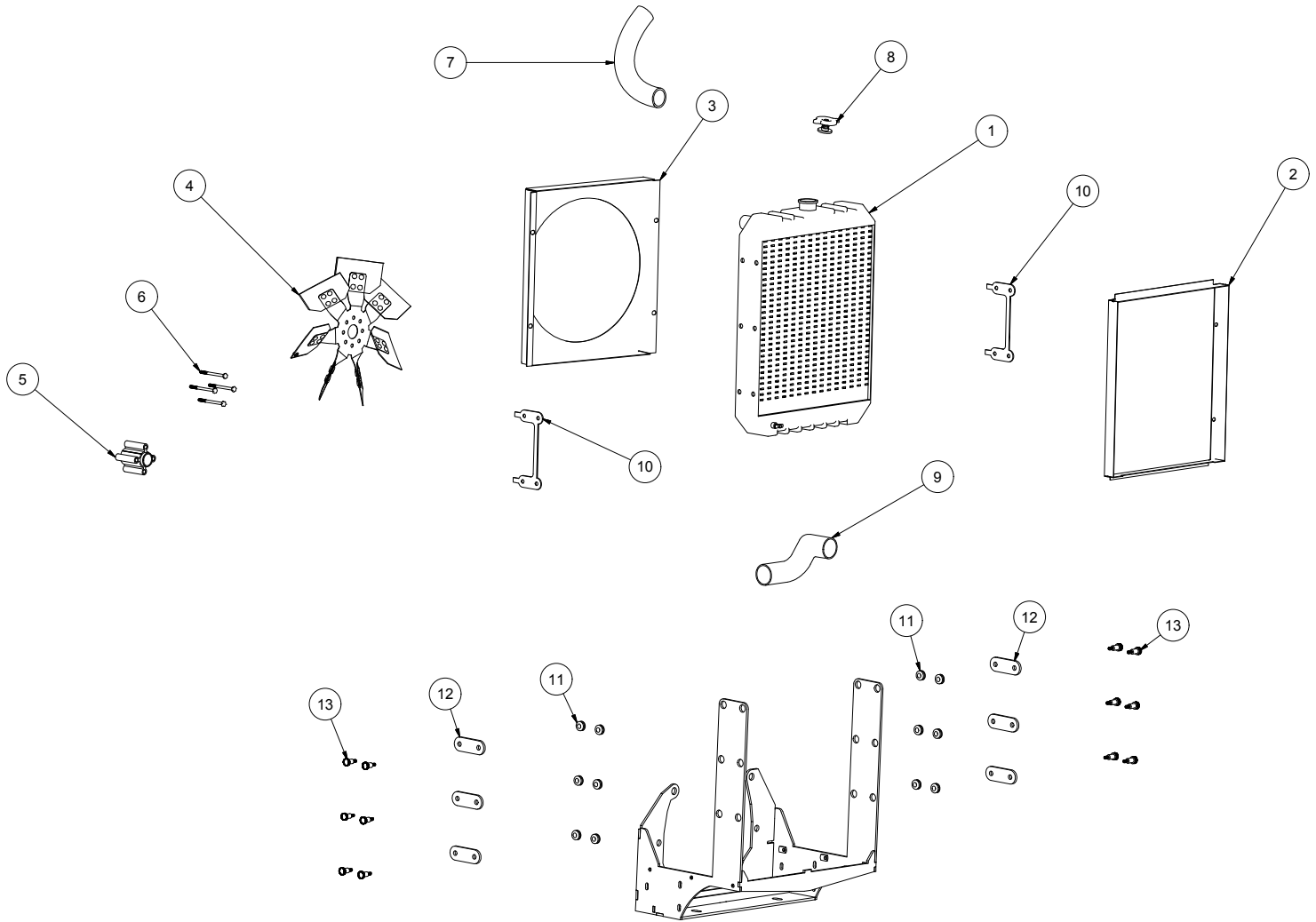
ITEM #	PART NUMBER	DESCRIPTION
1	4045.2151A	Engine Mount, Front
2	4045.2152	Engine Mount, Rear
3	4045.2154B	Side Rail, LH, except LCT650
4	4045.2153	Side Rail, RH
5	LCT604.603.1	Engine Adjuster Nut
6	LCT604.603.1A	Engine Adjuster Bracket
7	LCT604.603.2	Adjustable Motor Mount
8	LCT604.603.B	Engine Base Adjuster
9	STD.6304B	Wiring Harness Bracket

6.6 Muffler (Exhaust) Assembly



ITEM #	PART NUMBER	DESCRIPTION
1.	4045.4105	Muffler
2.	J000200	Clamp, muffler

6.7 Radiator Assembly Group

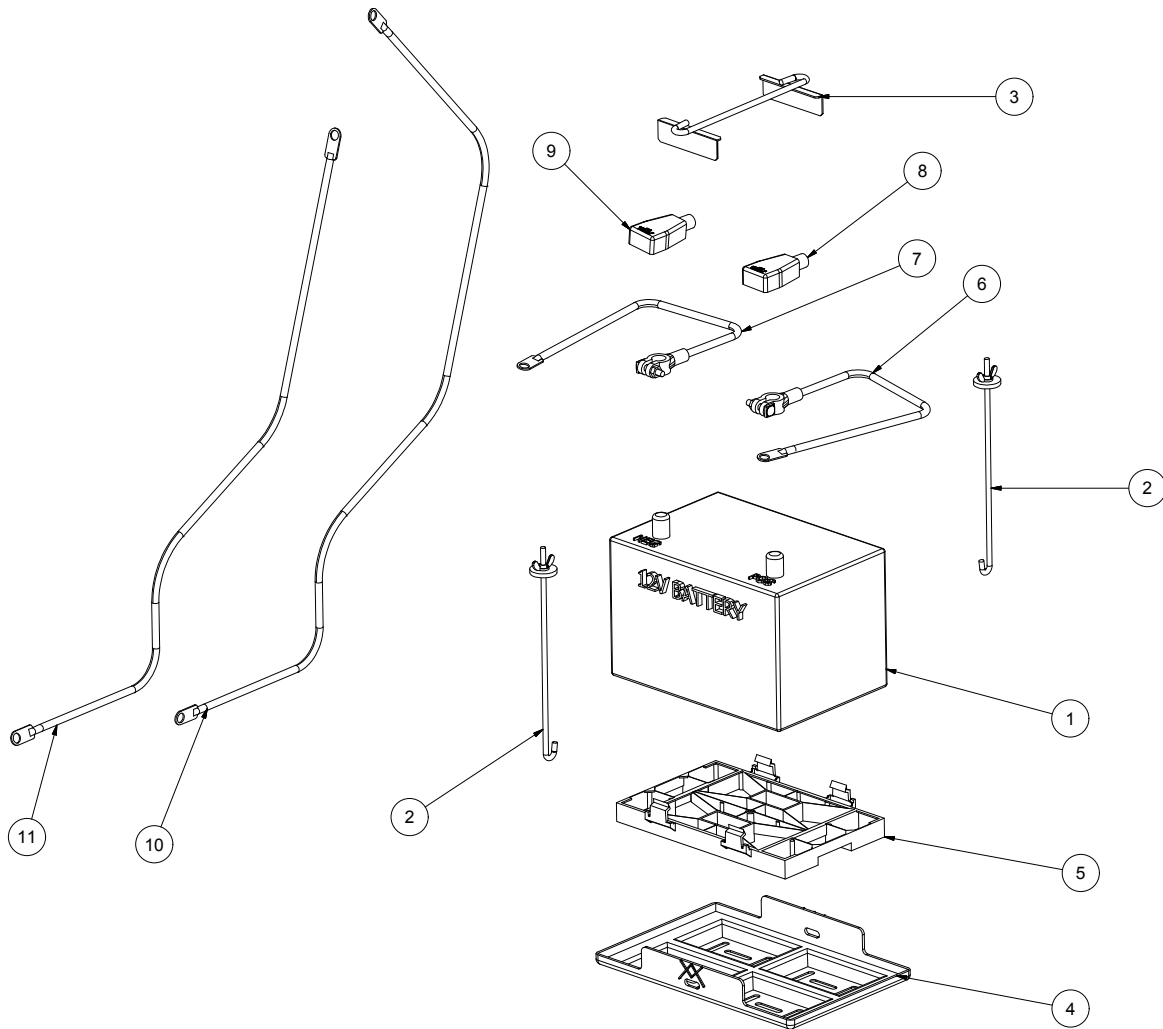


ITEM#	PART NO.	DESCRIPTION
1	4045.9503	Radiator
2	4045.2190B	Front Fan Shroud
3	4045.2190A	Rear Fan Shroud
4	AT35158.A	Radiator Fan
5	R128443	Fan Spacer
6	G8M8X090	Spacer Bolts, 4 required
7	JDTH.1	Upper Radiator Hose

ITEM#	PART NO.	DESCRIPTION
8	10300	Radiator Cap
9	4045.9681	Lower Radiator Hose
10	4045.2151G	Radiator Shim
11	2561.26012	Radiator Grommet
12	4045.2151F	Radiator Bolt Bracket
13	ZSB.500.750	Shoulder Bolt

6.8 Battery Group

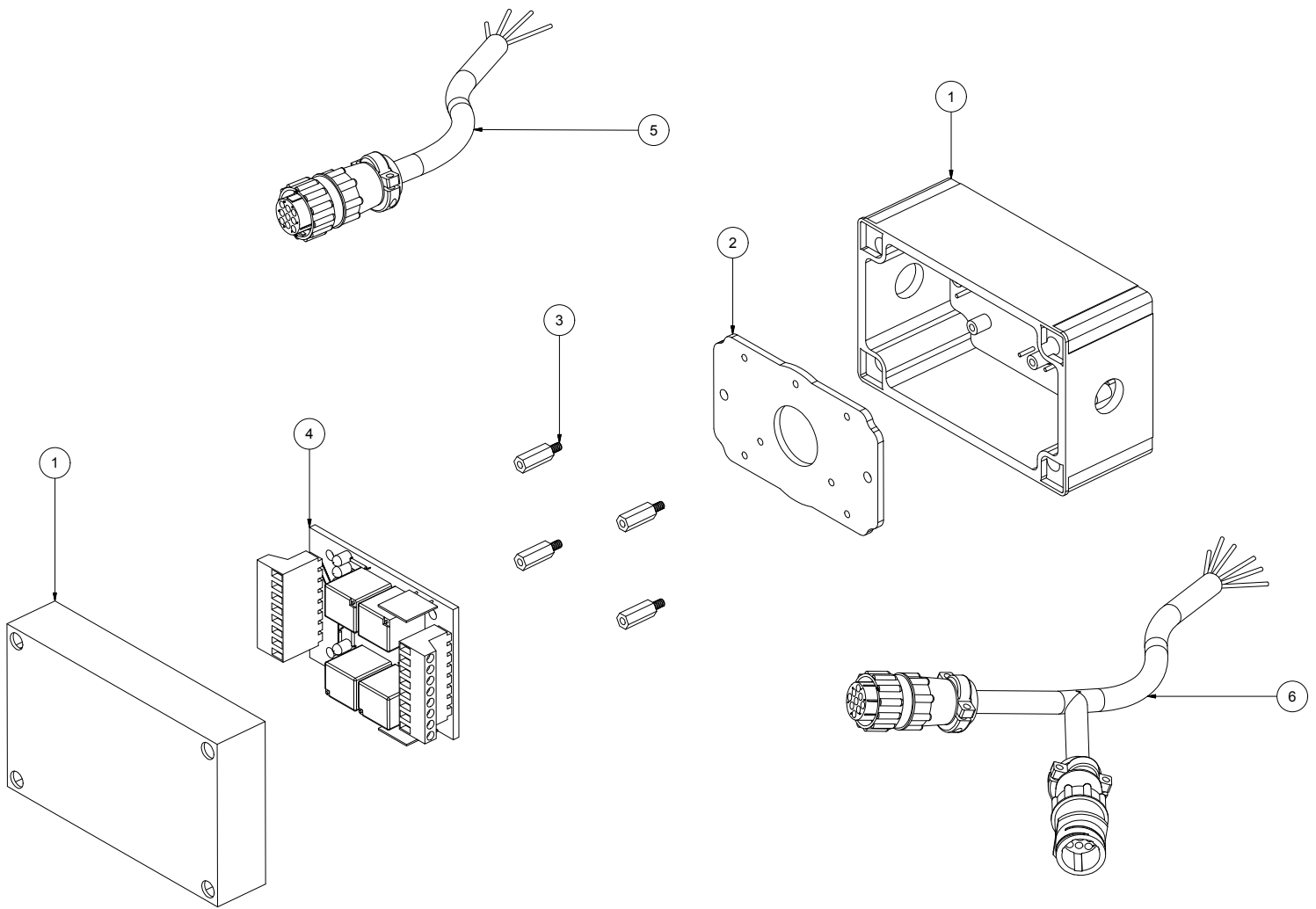
Standard units 2001 and after



ITEM #	PART #	DESCRIPTION
1.	STD.2200	Battery, not shippable
2.	BHB10J	J-Hook
3.	BHCB	Battery Hold Down Bar
4.	BTS1	Battery Tray, all but SCL's
5.	N/A	N/A
6.	SCL.42B	Positive Battery Cable, Battery to Solenoid - LCT60C/650- 42" long
	LCT600.84B	Positive Battery Cable, Battery to Solenoid - LCT600/6000 - 84" long
7.	LCT60.15B	Negative Battery Cable, all - 15" long
8.	BTC.R	Terminal Cover, Red, all
9.	BTC	Terminal Cover, Black, all
10.	JD4045.12SS MET.60SS LCT60C.153SS	Red Cable to Hydraulic Boom Pump, SCL/600/6000 - 72" long Red Cable to Hydraulic Boom Pump, LCT650, 60" long Red Cable to Hydraulic Boom Pump, LCT60C, 153" long
11.	LCT600.24SS	Ground (Black) Cable to Chassis, 600/6000/60C - 24"

6.9 Remote Clutch / Throttle Circuit Board Assembly

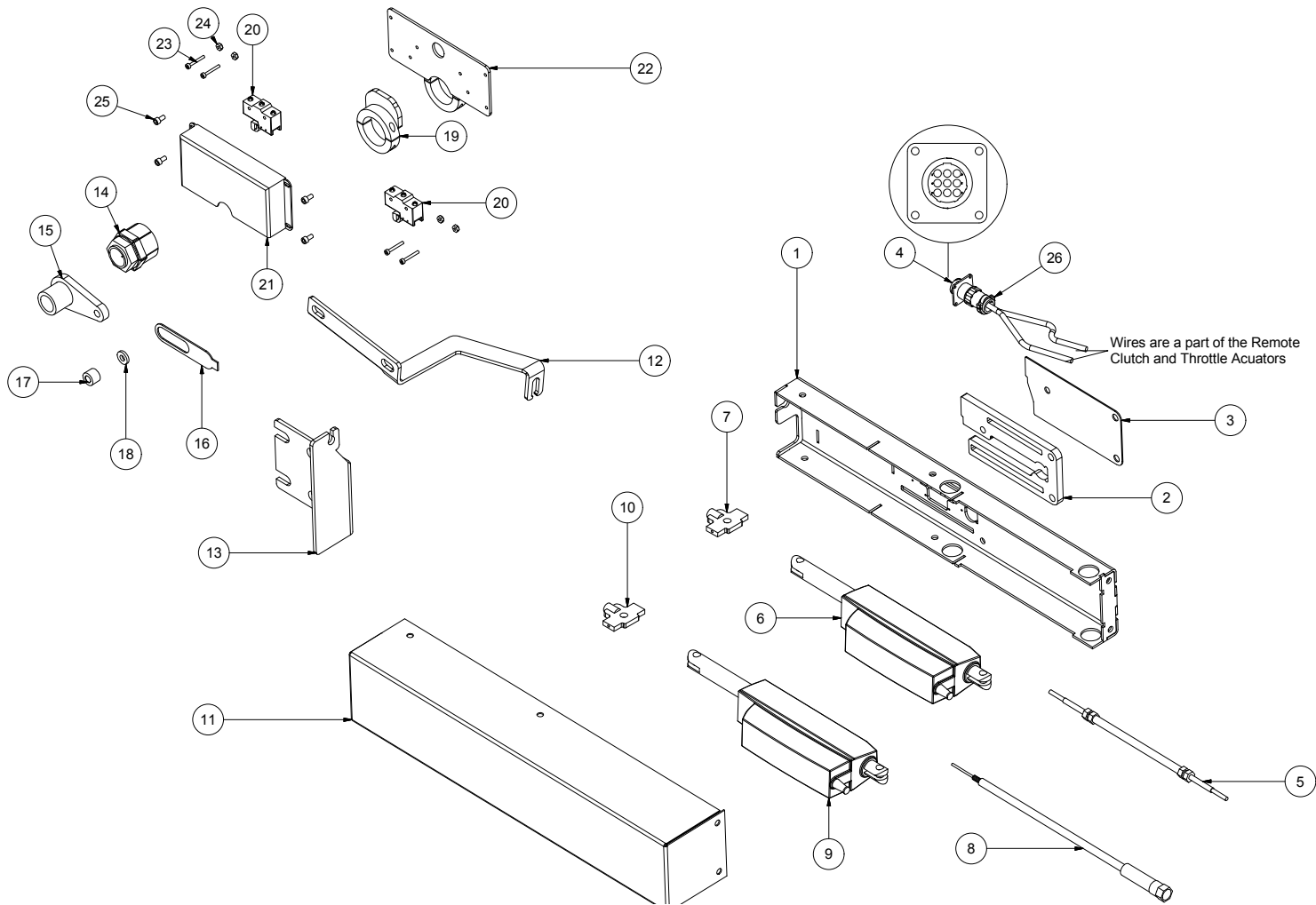
October 2005 and after with remote throttle / clutch option



ITEM #	PART NUMBER	DESCRIPTION
*	STD.3000	Entire Assembly
1	only available as an assembly	Box and Cover
2	only available as an assembly	Backing Plate
3	only available as an assembly	Spacer, rquires 4
4	only available as an assembly	Circuit Board
5	only available as an assembly	Actuator Wiring Harness
6	only available as an assembly	Instrument Panel and Nozzle Wiring Harness

6.10 Remote Clutch and Remote Throttle Assembly

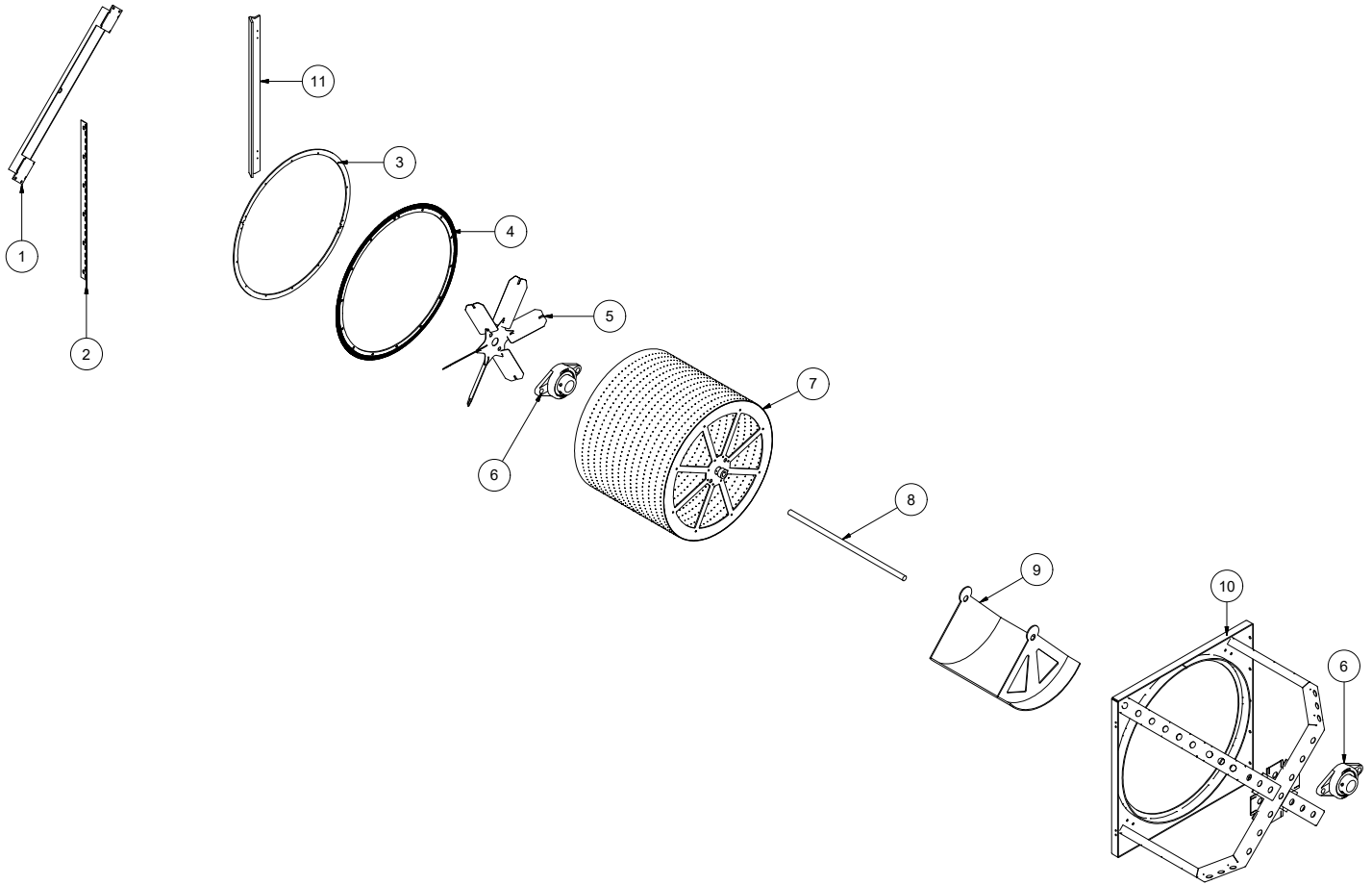
after March 2002- ver. 2



ITEM #	PART NO.	DESCRIPTION
	STD.6550B	Entire Assembly
1	STD.6551A	Mounting Base
2	STD.6551A.01	Thick Spacer
3	STD.6551A.02	Thin Spacer
4	STD.2919	CPC Plug, 9 Pin
5	STD.6554 STD.6554B	Clutch Cable - Direct Drive Clutch Cable - Belt Drive
6	STD.6556	Clutch Actuator (top)
7	STD.6559	Cable Adaptor - clutch
8	STD.6553 STD.6553B	Throttle Cable - direct drive Throttle Cable - belt drive
9	STD.6557	Throttle Acuator (bottom)
10	STD.6558	Cable Adaptor-throttle
11	STD.6552A	Cover

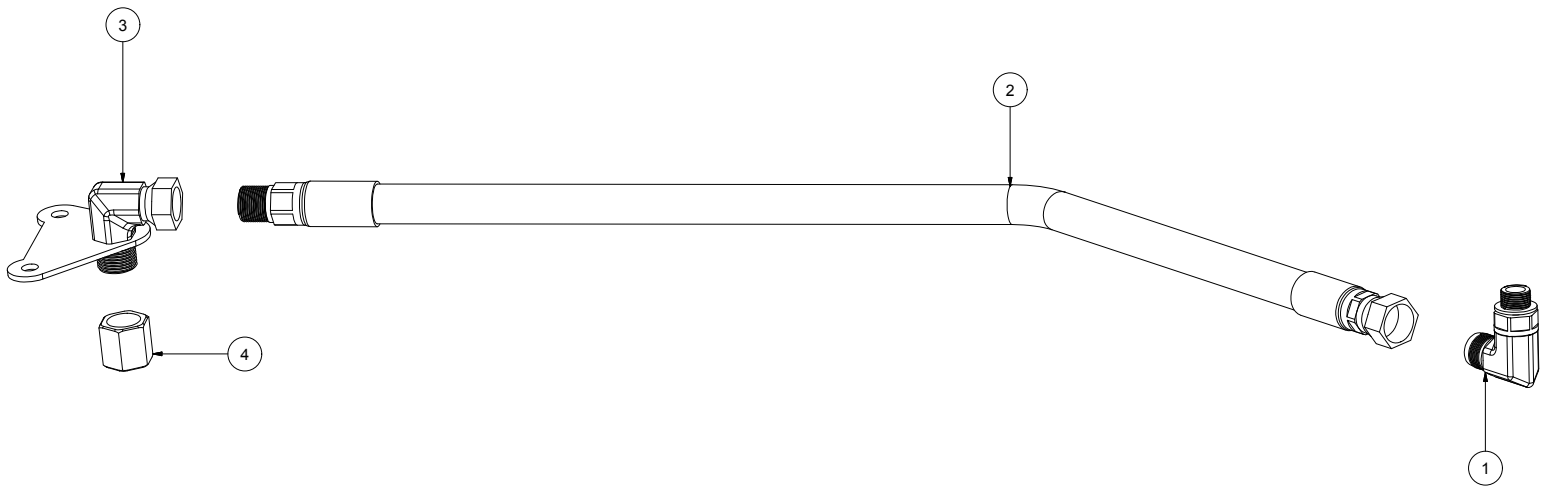
ITEM #	PART NO.	DESCRIPTION
12	4045.6565	Throttle Cable Bracket
13	4045.6564	Clutch Cable Bracket
14	STD.6563	Torque Coupling
15	STD.6562	Coupling Sleeve
16	STD.6560	PTO Cable Adaptor
17	STD.6561	Roller Bearing
18	STD.6568	Spacer Washer
19	STD.6569	Collar Cam (3x only)
20	800.433	Limit Switch (3x only)
21	STD.6571	Cover
22	STD.6570	Limit Switch Bracket
23	BSB632X.1.00	Bolt 1in
24	NS632ESN	Nut
25	BSB1032X.375	Bolt Bolt .375in
26	STD.2916	CPC Housing

6.11 Chaffe Eliminator Assembly, hinged



ITEM #	PART NO.	DESCRIPTION
*	RAS.200	Chaffe Assembly
1	RAS.207	Shaft Bracket
2	RAS.206	Hinge
3	RAS.110	Brush Holder
4	RAS.109	Strip Brush
5	RAS.201	Fan
6	RAS.204	Flange Bearing
7	RAS.203	Barrell
8	RAS.105	Shaft
9	RAS.205	Air Deflector
10	RAS.202	Support Frame
11	RAS.114 RAS.208	Angle Frame, LCT650 only Angle Frame, 3029 Only

6.12 Remote Oil Drain Kit, LCT650



ITEM #	PART NUMBER	DESCRIPTION
*	4045.146	Entire Assembly (Item 1 - 5)
1.	4045.146A	90 Degree Fitting (to oil pan)
2.	4045.146B	Drain Hose
3.	4045.146C	Bracket and Fitting
4.	4045.146F	Drain Plug



7-0

7.0 CLUTCH GROUP

7.0 CLUTCH GROUP

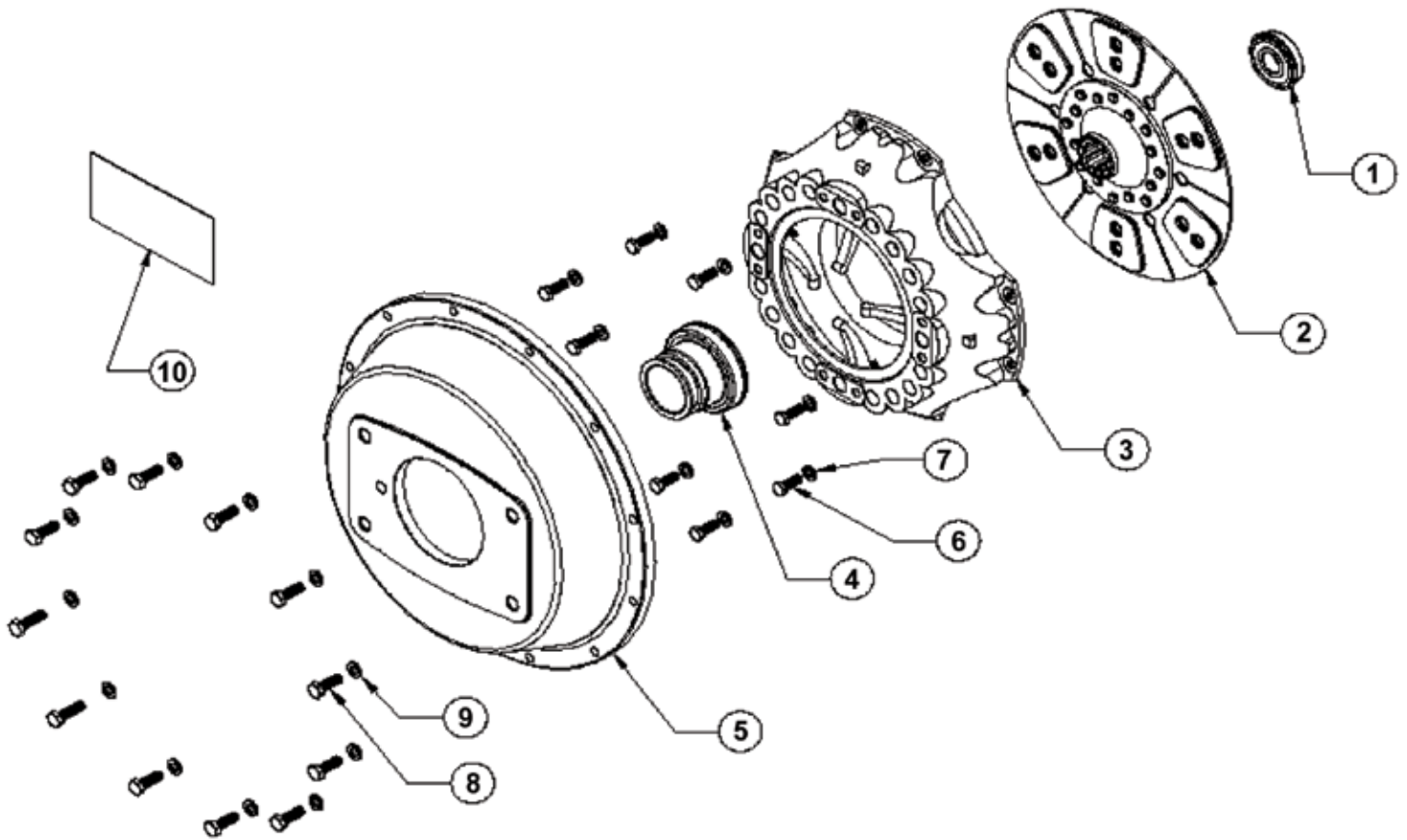
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CLUTCH GROUP

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7.1 AutoHD PTO Clutch Group

February 2006 - Present

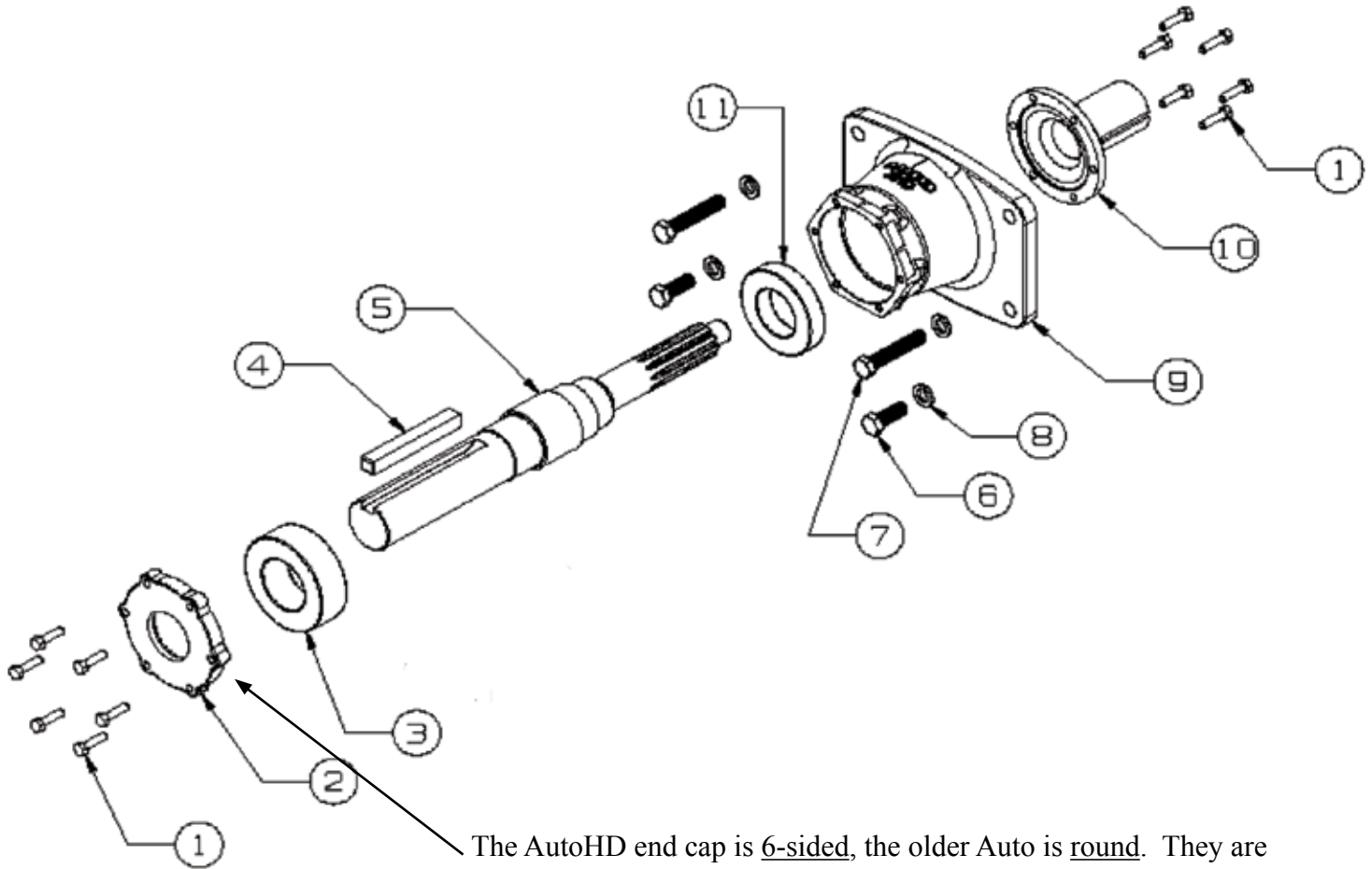


ITEM #	PART NUMBER	DESCRIPTION
*	OD-48080050.8OF	*Complete PTO and Clutch Assembly 03/08 -
1	OD-41500217	Pilot Bearing, JD
2	OD-41500237	Clutch Disk
3	OD-LC1919	Pressure Plate, 03/08 -
4	OD-41500248	Throw out Bearing, 03/08 -
5	OD-41500172	Clutch Cover
6	OD-45000054	Bolt, 3/18-16 x 1"
7	OD-45000063	Lock Washer, 3/8"
8	OD-45000226	Bolt, M10-1.50 x 35MM
9	OD-45000046	Lock Washer, M10
10	OD-41500216	Decal, Diesel Clutch

Note: *48080050 and 48080050.8OF includes the everything on this page, the AutoHD PTO page and the AutoHD linkage page. This is the complete PTO/Clutch assembly. It does not include the clutch assist assembly.

7.2 AutoHD PTO Assembly Group

February 2006 - Present

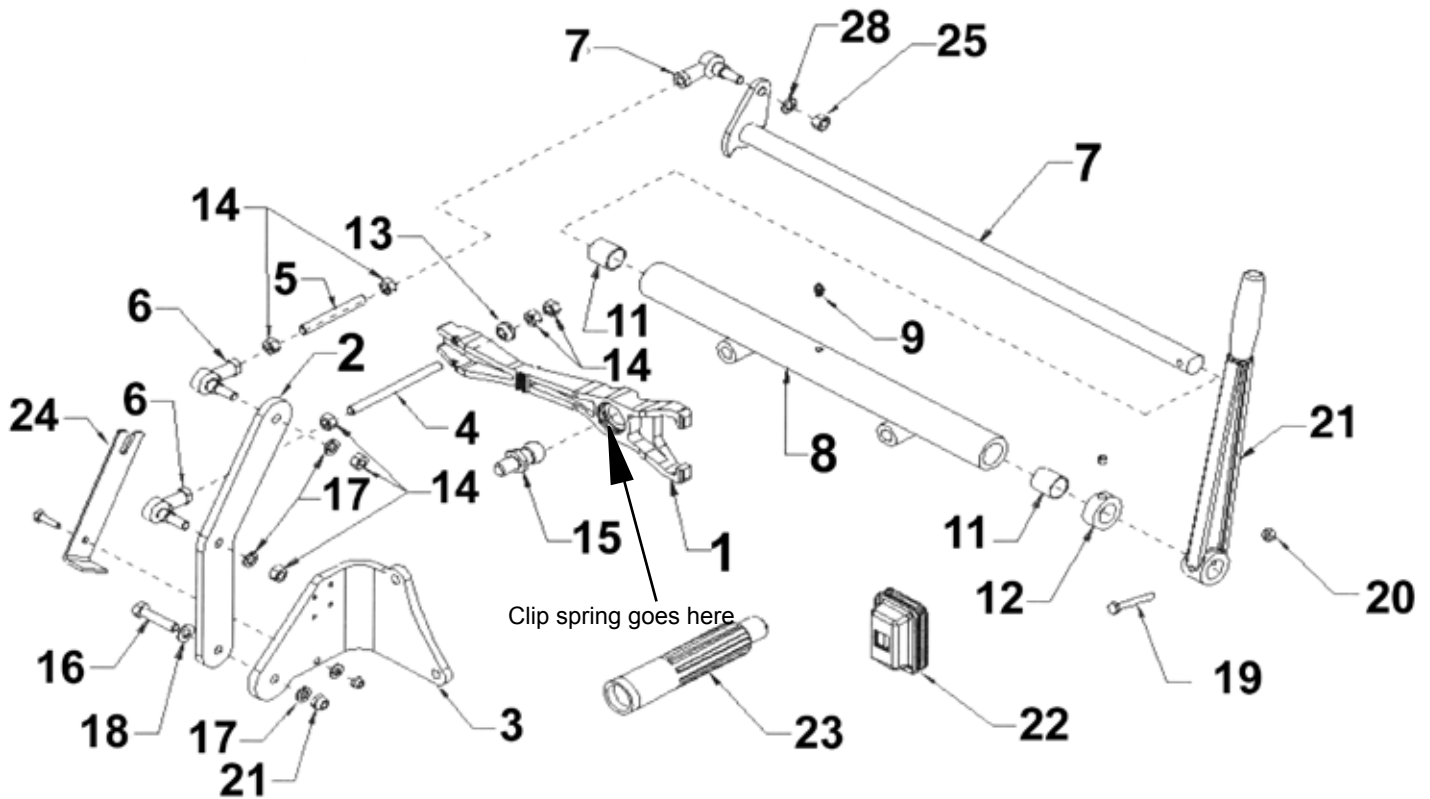


The AutoHD end cap is 6-sided, the older Auto is round. They are not interchangeable! Some units in the time period above used the standard Auto PTO. Please verify.

ITEM #	PART NUMBER	DESCRIPTION
*	OD-41500252	Complete PTO Assembly (items 1 -11,13)
**	OD-48080050.8OF	**Complete PTO & Clutch Assembly
1	OD-45000212	Bolt, 5/16-18 x 1-1/4" HD model
2	OD-41500205M	Bearing Retainer Cover
3	OD-41500206	PTO Bearing, Rear
4	OD-LCT650.601K OD-LCT650.601F	Key, Stepdown--direct drive units only Key, belt drive units only
5	OD-41500203	PTO shaft
6	OD-45000105	Bolt, 9/16-12 x 1- 3/4"
7	OD-45000177	Bolt, 9/16-12 x 3"
8	OD-45000103	Lock Washer, 9/16"
9	OD-41500204	PTO Housing
10	OD-41500242	PTO Collar, 03/08 - present
11	OD-41500207	PTO Bearing, Front

7.3 AutoHD PTO Linkage Group

February 2006 - Present

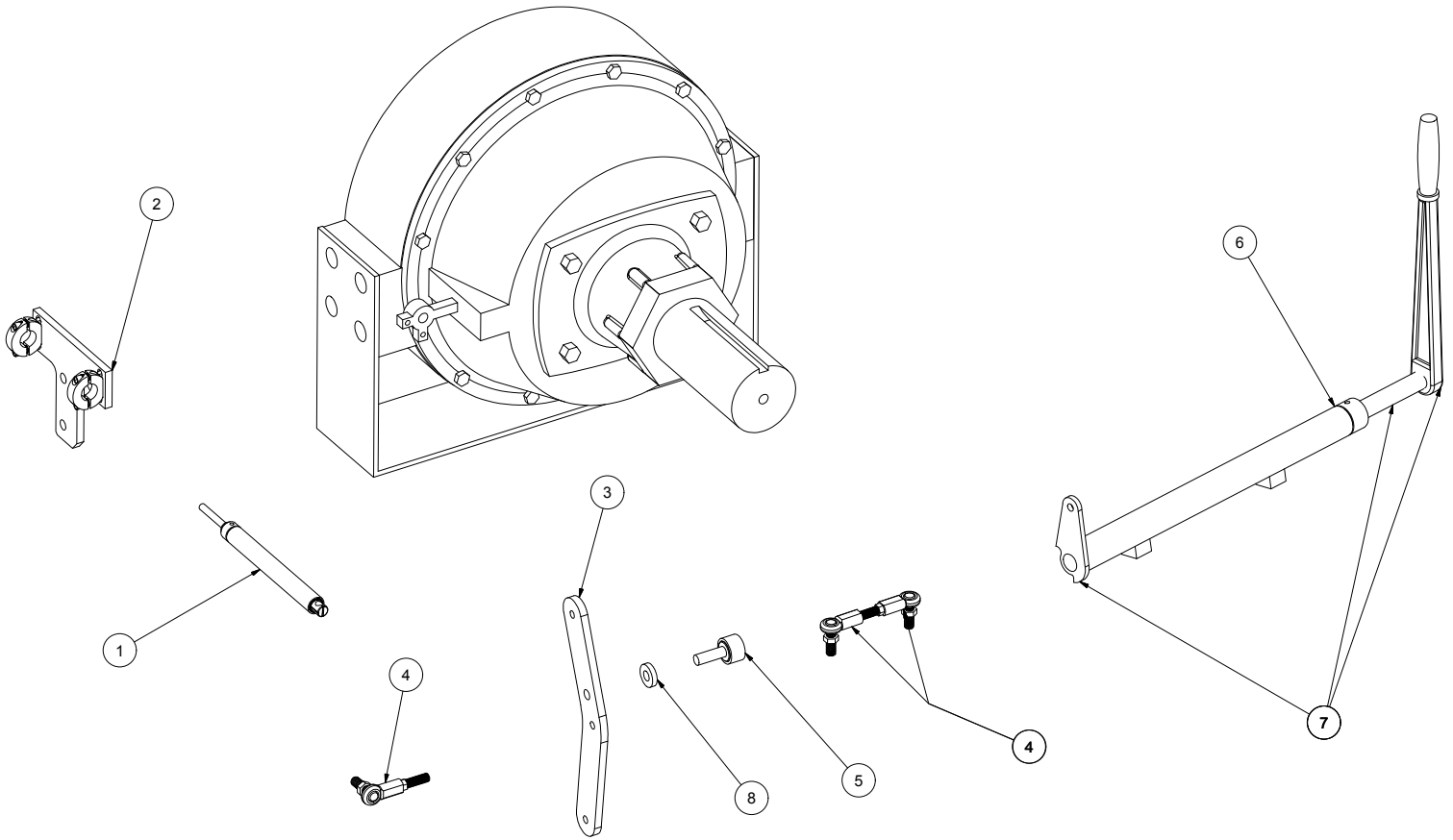


ITEM #	PART NO.	DESCRIPTION
1	41500251	Fork, 03/08-
NS	41500174	Clip Spring in Fork
NS	41500999	Return Spring
2	41500095	Linkage Bracket
3	41500241	Linkage Bracket
4	41500065	Linkage Rod
5	41500066	Linkage Rod
6	41500019	Linkage Rod End
7	see below	Shaft, Lever
8	41500102	Shaft Housing, AutoHD
9	41500043	Grease Zerk
10	NLA	NLA

ITEM #	PART NO.	DESCRIPTION
11	41500045	Shaft Bushing
12	41500046	Shaft Collar
13	41500030	Rocker Ball
14	45000050	Nut, 3/8 - 16
15	41500072	Pivot Ball 03/08-
16	45000177	Bolt, 3/8 - 16 x 1 3/4"
17	45000063	Lock Washer, 3/8"
18	45000064	Flat Washer, 3/8"
19	45000012	Bolt, 1/4 - 28 x 2"
20	45000015	Locknut, 1/4 - 28
21	41500044	Handle
22	41500175	Boot
23	41500164	Alignment Tool
24	41500103	Alignment Tool

7.4 Clutch Assist Group

Auto PTO- John Deere 4045D/T (11/00 -); Caterpillar 2005 and after



ITEM #	PART NUMBER	DESCRIPTION
1	400050.A	Clutch Cylinder
2	400054.C	Cylinder Support Bracket, JD
3	41500095	Clutch Bracket Arm, Auto HD
4	41500019	Linkage, Rod end
	41500019A	Linkage, Threaded insert
5	400050.C1	Bearing
6	41500102	Pivot Shaft Tube, Auto HD
7	41500041A.HD	Pivot Shaft,
8	400050.C2	Spacer

7.5 Kraft Fluid Drive Group (Optional)

Fluid Drive Coupler (Optional)

TRANSFLUID

trasmissioni industriali



1000B Northbrook Parkway

Suwanee, GA 30024

Ph: 770-963-6288

Fax: 770-963-9678

E-mail: transfluid@kraftpower.com

Massachusetts - New Jersey - New York - North
Carolina - Ohio - Pennsylvania

INSTALLATION AND MAINTENANCE MANUAL

THIS MANUAL CONTAINS INSTRUCTIONS FOR
INSTALLATION, START UP, FUNCTIONING, AND
MAINTENANCE KFBD POWER TAKE OFFS.

WE SUGGEST THAT ANY PERSON WHO IS
RESPONSIBLE FOR USE AND/OR MAINTENANCE
SHOULD BE PROVIDED WITH THIS MANUAL. THE
RESPECT OF RULES, CONTAINED IN THIS MANUAL IS
MANDATORY FOR WARRENTY VALIDITY.

WE REQUIRE THAT, FOR SPARE PARTS ORDERS, IT
IS IMPORTANT TO PROVIDE, BESIDES PART NUMBER
AND QUANTITY: MODEL, SPECIFICATION No AND
SERIAL No WHICH ARE STAMPED ON NAME PLATE.

Type :

Spec. nr. :



Serial nr. :

13KFBD

drive with us

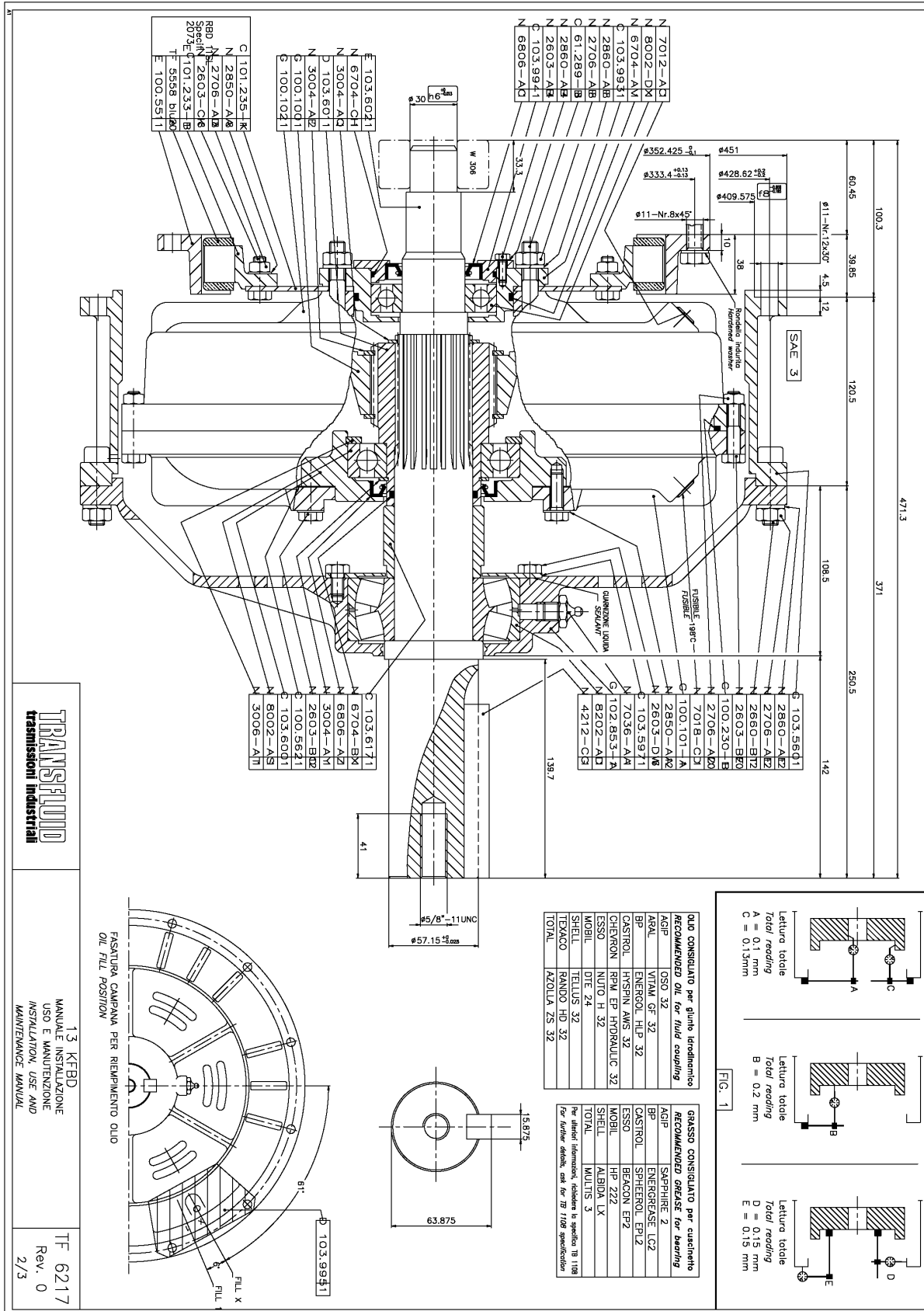
7.6 Kraft Fluid Drive Installation (Optional)

Fluid Drive Coupler (Optional)

 <p>trasmissioni industriali</p>	 <p>13 KFBD MANUALE INSTALLAZIONE, USO E MANUTENZIONE INSTALLATION, USE AND MAINTENANCE MANUAL</p>	<p>TF 6217 Rev.0 1/3</p>				
<p>Questo manuale contiene le istruzioni per l'installazione, l'avviamento, l'uso e la manutenzione del giunto idrodinamico tipo KFBD. CONSIGLIAMO CHE I RESPONSABILI DELL'USO E DELLA MANUTENZIONE DEL KFBD, VENGANO DOTATI DEL PRESENTE MANUALE. IL NON RISPETTO DELLE REGOLE CITATE IN QUESTO MANUALE, PROVOCA IL DECADERE DELLA GARANZIA.</p> <p>Ricordiamo che, per ordinare le parti di ricambio, e' importante specificare, oltre al numero di dettaglio e quantita' richiesta, anche: TIPO - N° di SPECIFICA - N° di SERIE del KFBD, che si trovano stampigliati sulla targhetta di identificazione a bordo macchina.</p> <p><i>This manual contains instructions for installation, start up, working, and maintenance of KFBD fluid coupling.</i> WE SUGGEST THAT ANY PERSON WHO IS RESPONSIBLE FOR USE AND/OR MAINTENANCE, SHOULD BE PROVIDED WITH THIS MANUAL. THE RESPECT OF RULES, CONTAINED IN THIS MANUAL, IS MANDATORY FOR WARRANTY VALIDITY.</p> <p><i>We recall that, for spare parts order, it is important to provide, besides detail number and quantity, even: TYPE - SPECIFICATION Nr. - SERIAL Nr. of KFBD that are stamped on identification metal plate.</i></p>						
<table border="1"> <thead> <tr> <th data-bbox="284 590 824 617">DESCRIZIONE</th> <th data-bbox="824 590 1367 617">DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td data-bbox="284 617 824 772"> Il KFBD e' un giunto idrodinamico la cui parte esterna, motrice, e' collegata al volano di un motore endotermico mediante un giunto elastico ed il cui albero di uscita e' supportato da un cuscinetto orientabile a rulli, lubrificato ad olio, alloggiati in una campana di supporto flangiata al coprivolano del motore. Un secondo cuscinetto, alloggiato nel volano, sostiene l'albero di uscita dal lato motore. Il KFBD e' adatto per applicazioni con puleggia od i linea. </td> <td data-bbox="824 617 1367 772"> KFBD is a fluid coupling having the outer driving impeller connected to the internal combustion engine flywheel through an elastic coupling. The output shaft is supported by a spherical roller bearing, oil lubricated, fitted in a cover flanged to the engine flywheel housing. Another bearing, fitted into the flywheel, supports the output shaft at the engine side. The KFBD is suitable for pulley or in line applications. </td> </tr> </tbody> </table>			DESCRIZIONE	DESCRIPTION	Il KFBD e' un giunto idrodinamico la cui parte esterna, motrice, e' collegata al volano di un motore endotermico mediante un giunto elastico ed il cui albero di uscita e' supportato da un cuscinetto orientabile a rulli, lubrificato ad olio, alloggiati in una campana di supporto flangiata al coprivolano del motore. Un secondo cuscinetto, alloggiato nel volano, sostiene l'albero di uscita dal lato motore. Il KFBD e' adatto per applicazioni con puleggia od i linea.	KFBD is a fluid coupling having the outer driving impeller connected to the internal combustion engine flywheel through an elastic coupling. The output shaft is supported by a spherical roller bearing, oil lubricated, fitted in a cover flanged to the engine flywheel housing. Another bearing, fitted into the flywheel, supports the output shaft at the engine side. The KFBD is suitable for pulley or in line applications.
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<p>Prima di iniziare il montaggio del KFBD sul motore, e' bene verificare che il volano rientri nelle tolleranze SAE. Questo e' importante soprattutto per il buon funzionamento del giunto elastico. (Vedere foglio 2/3 Fig.1)</p> <p><i>Before KFBD be mounted onto the engine, it is recommended to check that flywheel be within SAE tolerances. This is very important for elastic coupling good working. (see sheet 2/3 Fig.1)</i></p>						
<table border="1"> <thead> <tr> <th data-bbox="284 955 824 982">INSTALLAZIONE (vedere foglio 2/3)</th> <th data-bbox="824 955 1367 982">INSTALLATION (see sheet 2/3)</th> </tr> </thead> <tbody> <tr> <td data-bbox="284 982 824 1822"> <ol style="list-style-type: none"> Montare l'anello di trascinamento del giunto elastico sul volano del motore. Montare il cuscinetto pilota, ingrassato a vita, sull'albero del KFBD. Montare la flangia SAE 3 sul coprivolano. Posizionare il gruppo completo, osservando con cura l'allineamento dell'albero nel cuscinetto pilota e dei blocchetti del giunto elastico con l'anello di trascinamento montato sul volano. La campana esterna deve essere orientata in modo da avere l'apertura per il riempimento dell'olio a circa 60° dalla verticale, in senso orario guardando il volano del motore. Così montato, si avra' l'apertura di drenaggio dell'olio in basso. Infine fissare il gruppo con le apposite viti sulla flangia esterna. Riempimento olio giunto (vedere tabella olii consigliati). Togliere il coperchio che protegge il tappo di carico. Ruotare il giunto sino a portare il tappo in corrispondenza del segno di riferimento X sulla verticale (X-1-2-3-4 dipende dall'applicazione). Togliere il tappo e riempire fino allo sbocco dal foro (13KFBD X=5,2 lt.), quindi chiudere utilizzando del sigillante sul filetto. La coppia di serraggio e' 30 Nm per tappo 3/8". Rimontare il coperchio di protezione. Riempimento grasso (vedere tabella grassi consigliati). Mediante l'apposito ingrassatore,, riempire la camera di lavoro del cuscinetto fino a far fuoriuscire il grasso attorno all'albero Dare alcuni colpi, con un martello non metallico, sull'estremita' dell'albero onde eliminare ogni eventuale tensione sui cuscinetti dovuta alla resistenza offerta dal cuscinetto pilota, quando esso viene montato forzato nella sede del volano. 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#6217-1 06/04/01	TRANSFLUID S.r.l. via V.Monti 19-20016 Pero (MI) Italy tel.0039-02-339316.1 - fax.0039-02-33910699 - www.transfluid.it - e-mail:info@transfluid.it					

7.7 Kraft Fluid Drive Breakdown (Optional)

Fluid Drive Coupler (Optional)



TRANSFLUID
Transmission Industrial

13 KEFD
MANUALE INSTALLAZIONE
USO E MANUTENZIONE
INSTALLATION USE AND
MAINTENANCE MANUAL

TF 6217
Rev. 0
2/3

7.8 Kraft Fluid Drive Common Parts (Optional)

Fluid Drive Coupler (Optional)



ITEM #	PART NUMBER	DESCRIPTION
1	UU-TFP7018CC	390 Degree Fuse Plug, 5/8"
2	UU-TFP2292	Seal Kit
3	UU-8202AD	Roller Bearing
4	UU-TFP103602X	Shaft
5	UU-8002DX	Bearing, small
6	UU-8002AS	Ball Bearing
7	UU-KPC2.01.5	Fluid, 1-1/2 gallon



8-0

8.0 BLOWER HOUSING GROUP

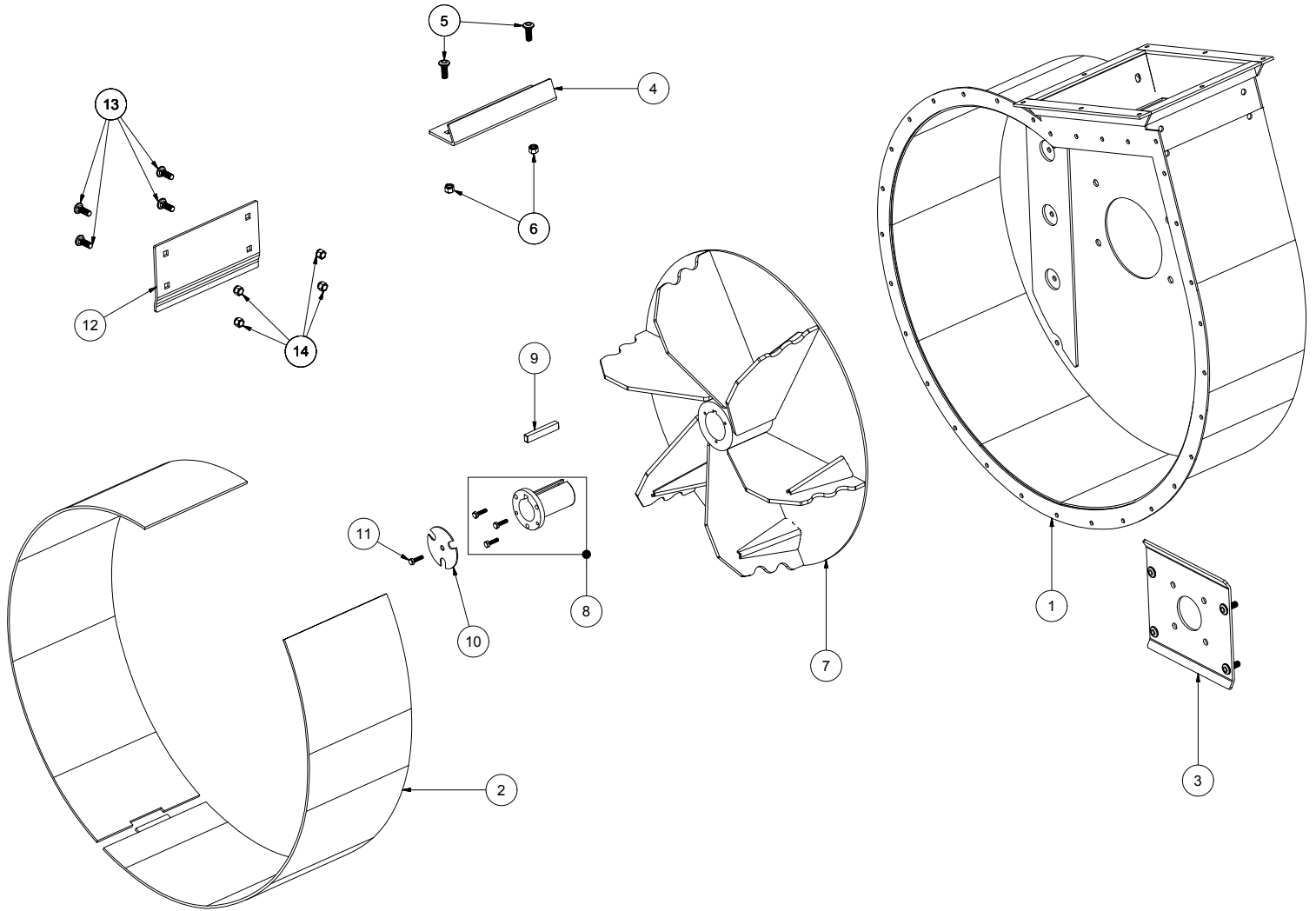
8.0 BLOWER HOUSING GROUP

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8.3 Pedestal Group.....	101
8.4 Exhaust Duct Assembly	102

BLOWER HOUSING GROUP

ODB COMPANY
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823

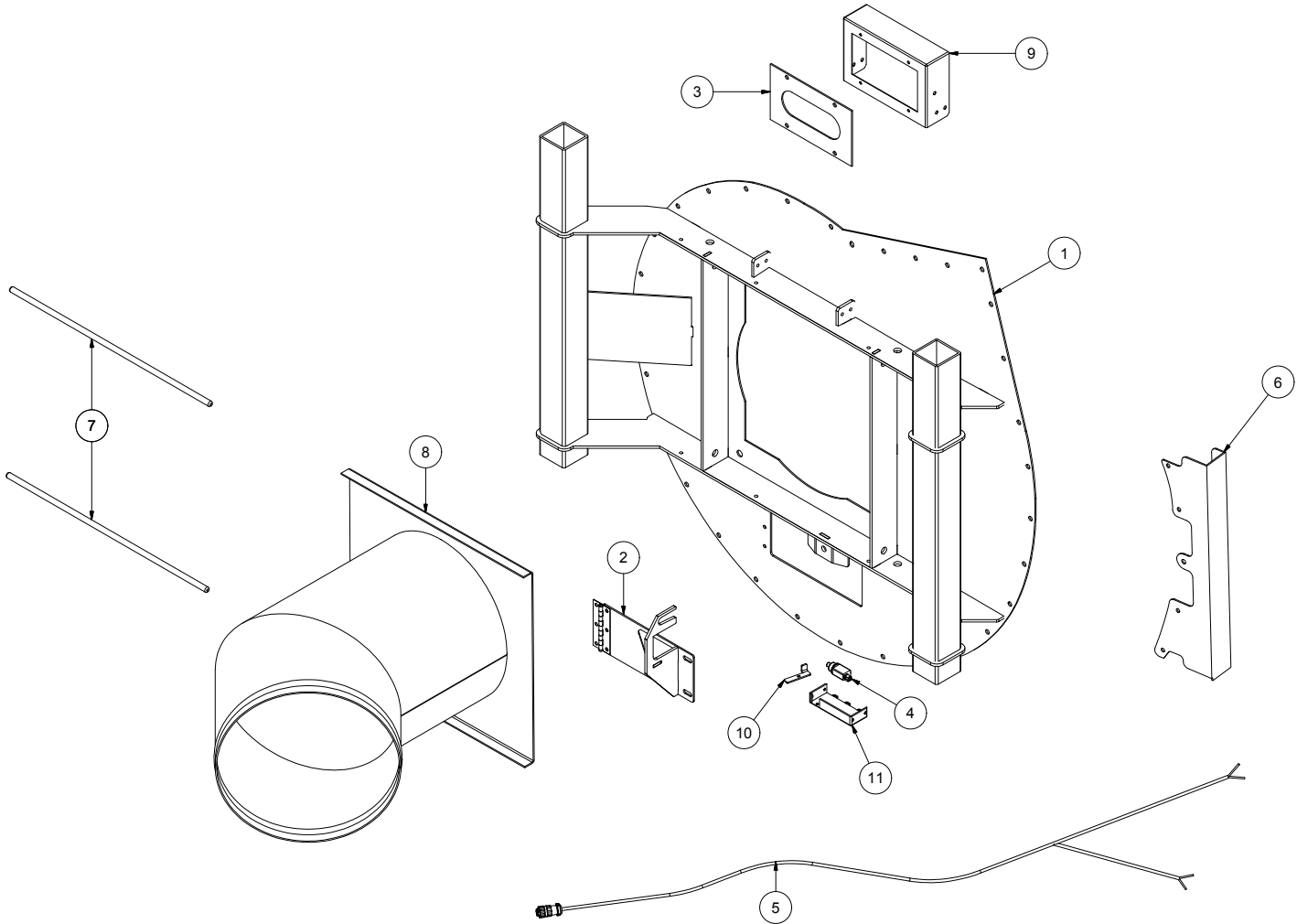
8.1 Blower Housing Group



ITEM#	PART NO.	DESCRIPTION	ITEM#	PART NO.	DESCRIPTION
1	800.3017	Blower Housing Back	10	LCT600.615	Shaft Protector
2	LCT620.602	Liner Set	11	5CZ.500.750	Shaft Bolt
3	LCT600.603	Bearing Plate	12	LCT620.604	Straight Liner
4	LCT620.602A	Bolt-In Liner	13	LCT620.603	Bolt
5	LCT620.603	Bolt	14	LCT620.603N	Nut
6	LCT620.603N	Nut			
7	600.3028	Impeller			
8	LCT650.601	Impeller Bushing			
9	LCT650.601F	Bushing Key			

8.2 Blower Housing Face Group

September 2002 and after

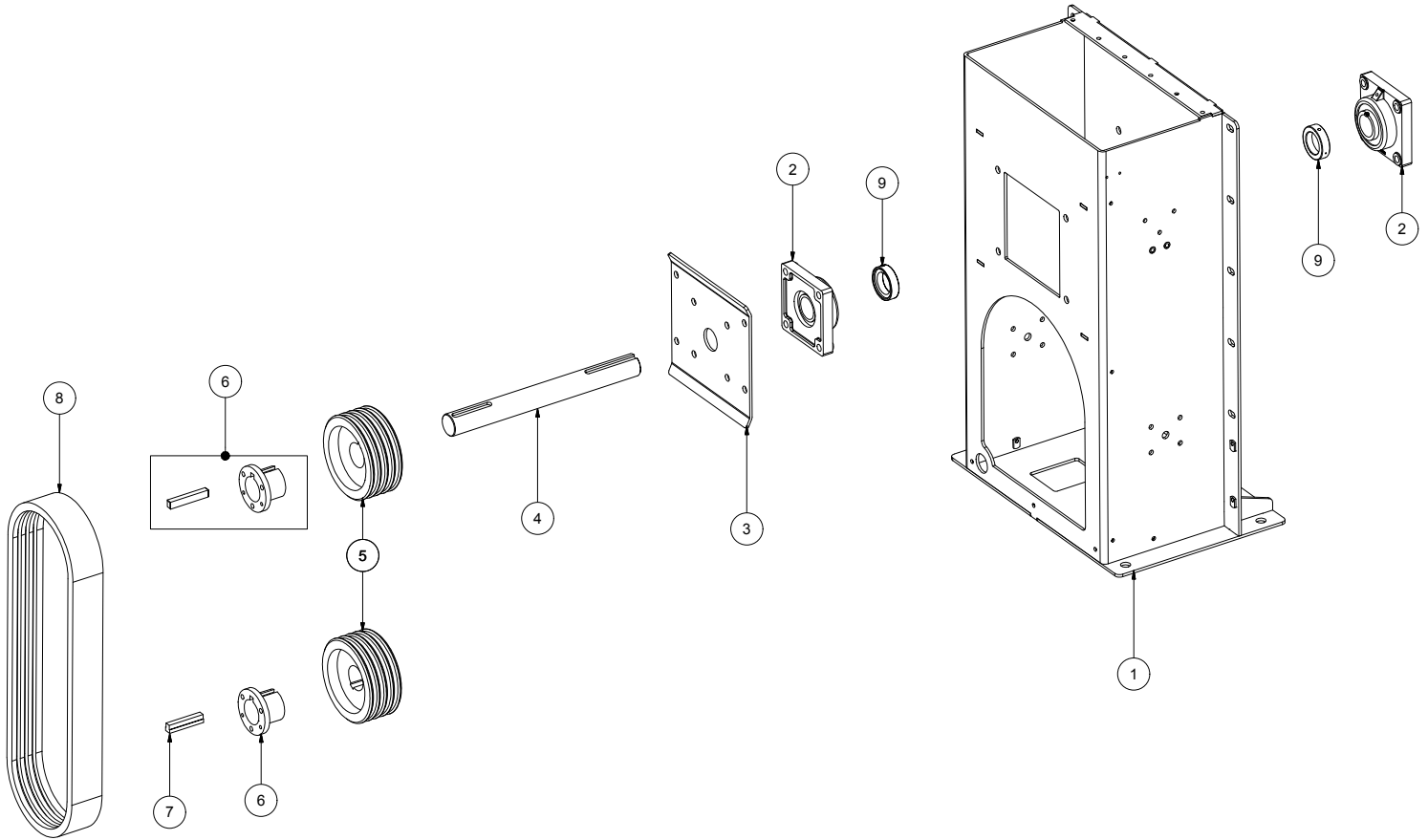


ITEM #	PART NUMBER	DESCRIPTION
1	650.3018	Blower Housing Face
2	SCL621.602	Inspection Door
3	LCT650.102	Tail Light Cover Plate
4	6410.51	Limit Switch
5		Limit switch power cord
6	6503019	Hose Guard
7	LCT600.635.1	Retaining Rod
8	LCT650.624	Intake Elbow
9	LCT650.102C	Strobe Light Box
10	STD.4001	Limit Switch Actuator
11	STD.4000.A STD.4000	Limit Switch Box Assembly Limit Switch Box

*tabs were welded to the face to accept the new strobe light box (part# LCT650.102C)

**The dates are estimated.

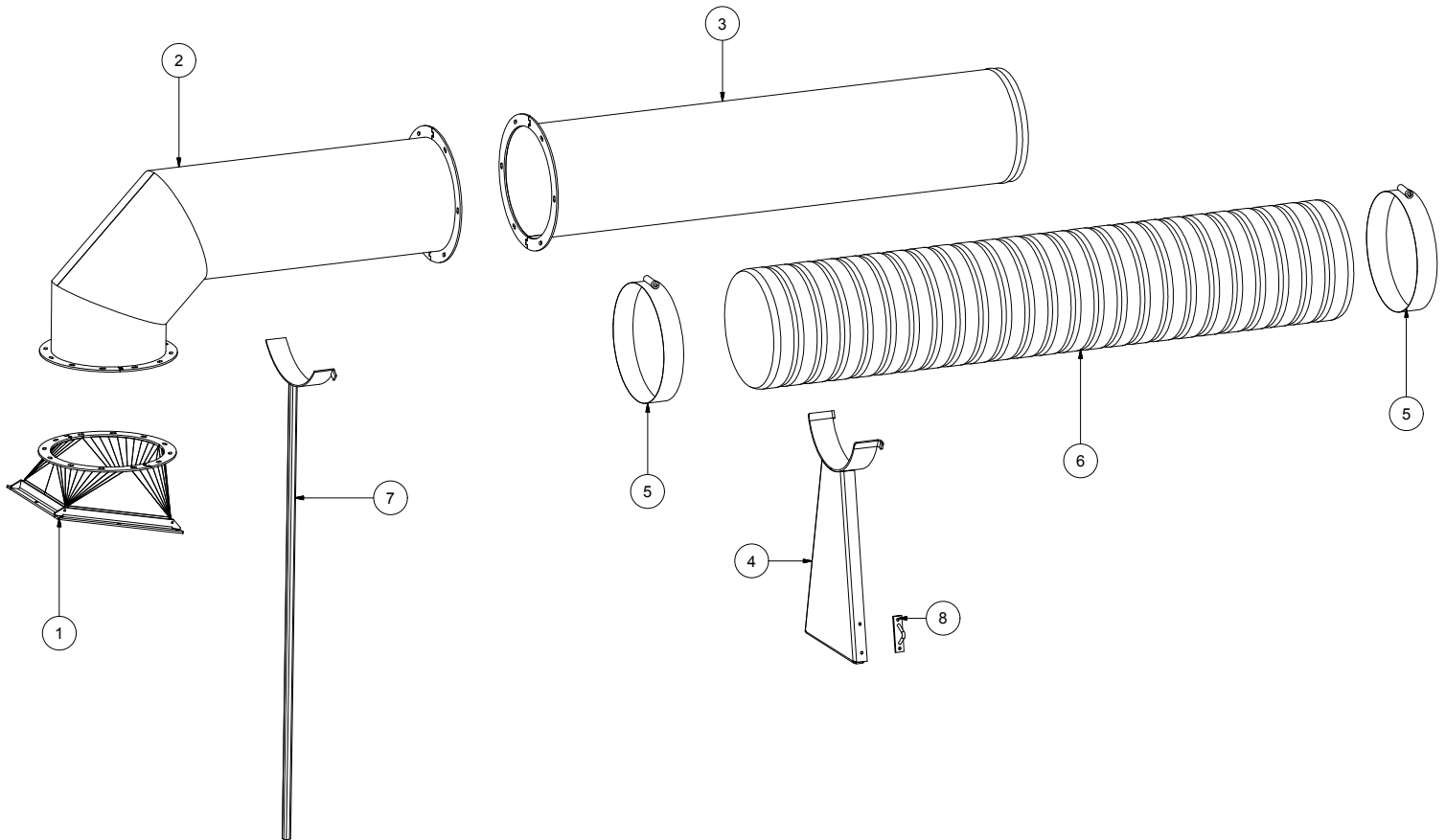
8.3 Pedestal Group



ITEM #	PART NUMBER	DESCRIPTION
1	LCT609.602B	Pedestal
2	LCT650.602.A	Flange Bearing
3	LCT600.611	Bearing Plate
4	LCT650.504	Shaft
5	LCT650.603.11A	Pulley
6	LCT650.604A	Bushing
7	LCT650.601K	Step Down Key
8	SCL850.606	Power Band
9	LCT650.602.C	Bearing Collar
NS	650.2211	Belt Guard (2 Piece)

8.4 Exhaust Duct Assembly

LCT650 after February 2001



ITEM #	PART NUMBER	DESCRIPTION
1	LCT650.611	Square to Round Duct (Transition)
2	LCT650.610	Exhaust Elbow 90 Degree Duct
3	LCT60.703C	Straight Duct
4	LCT616.603A	Exhaust Duct Support
5	LCT616.616	Hose Band - Bolt Style
6	LC-MDH.16.48	Exhaust Hose - 16"D x 48" Long
7	LCT60.629	Exhaust Hose Support (optional)
8	LCT650.125	Bracket, Exhaust Duct Support



9-0

9.0 TRAILER GROUP

9.0 TRAILER GROUP

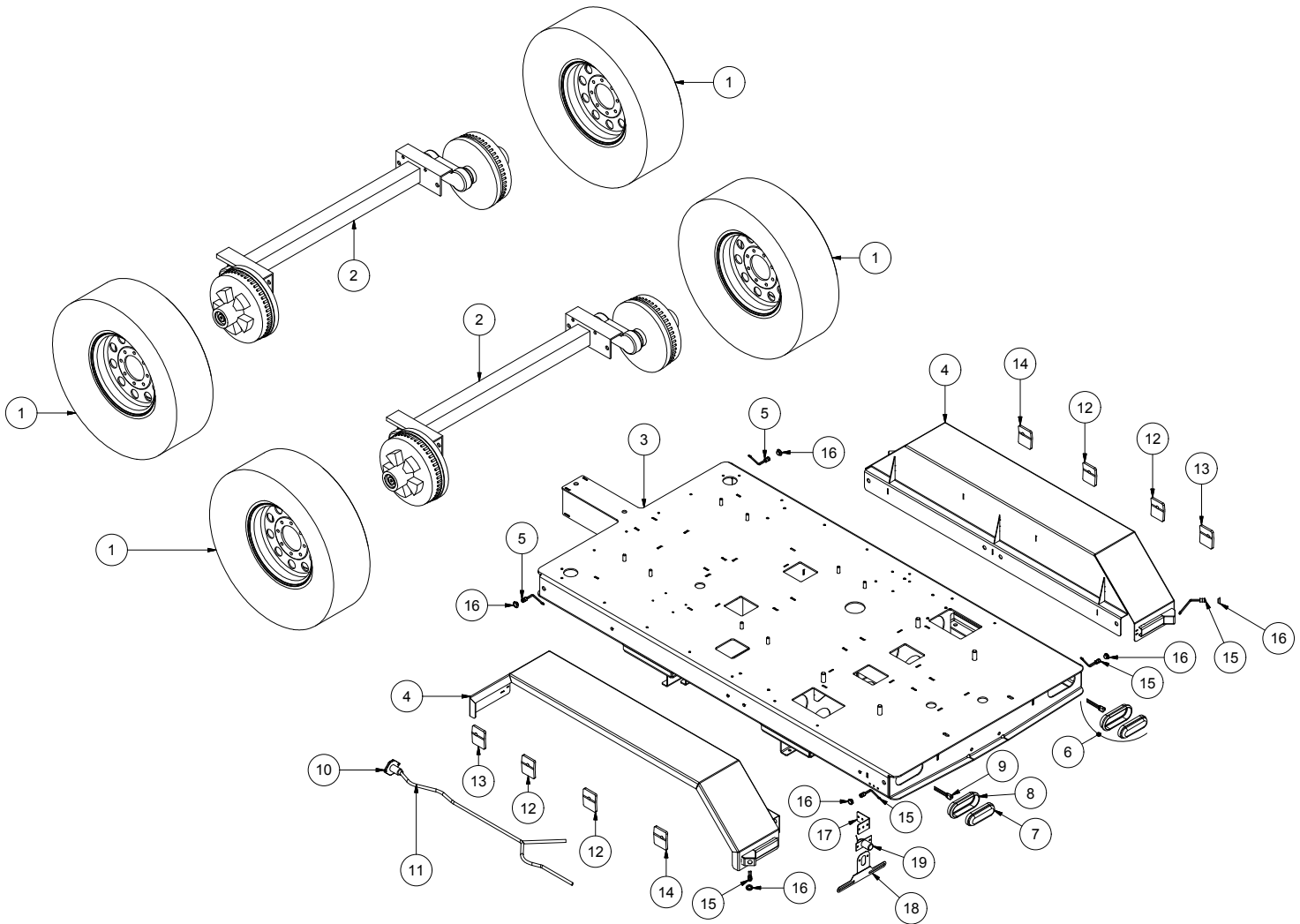
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9.6 Brake Assembly	109

TRAILER GROUP

ODB COMPANY
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823

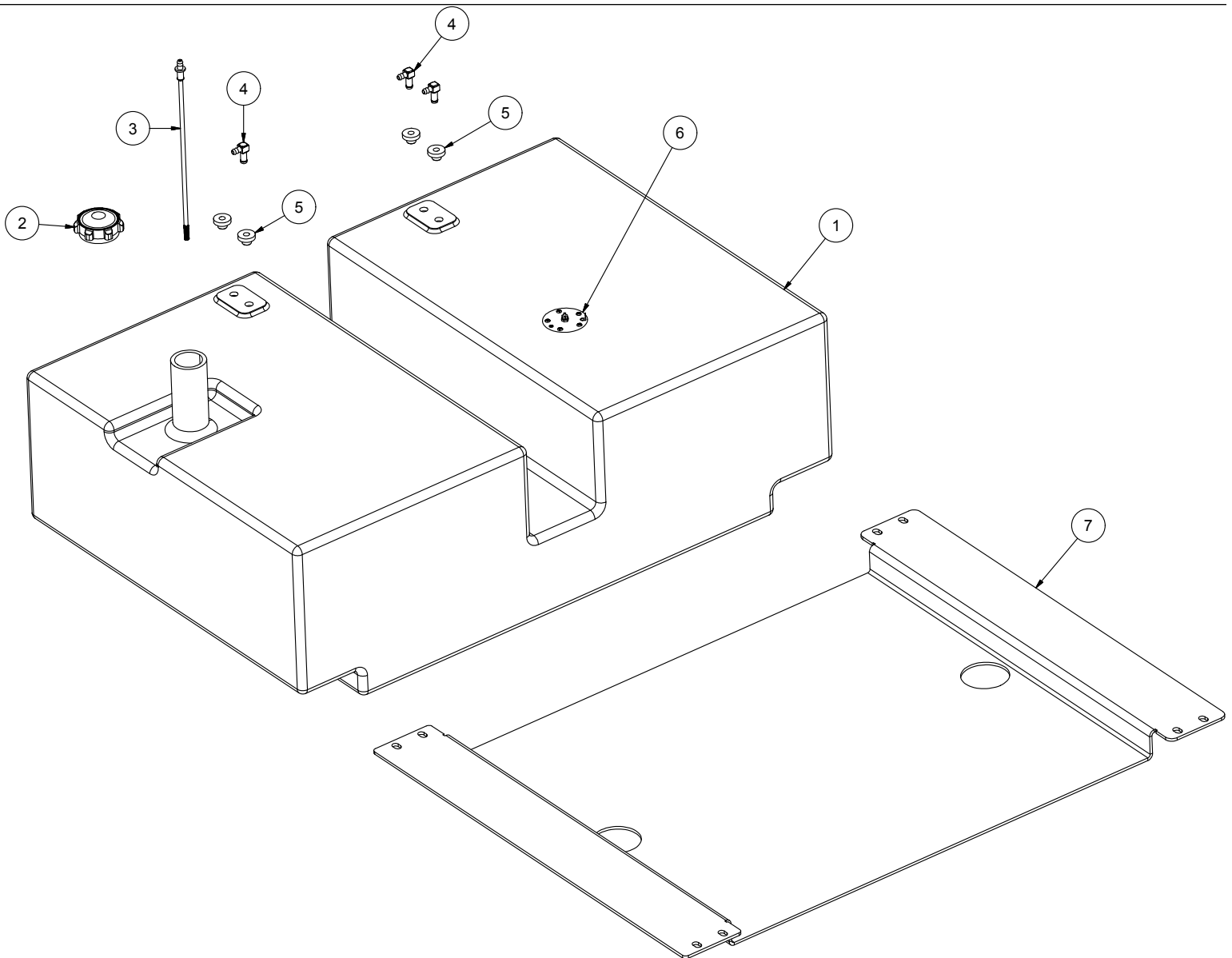
9.1 Trailer Bed Group

February 2008 and after



ITEM#	PART NO.	DESCRIPTION	ITEM#	PART NO.	DESCRIPTION
1	LCT622.619.08	Tire and Rim Assembly	10	UU1235	Trailer Plug Socket, 6 wire
	..LCT622.619T.08	.. Tire only	11	650.141	Trailer Wiring Harness
	..LCT622.619R.08	.. Rim only	12	650.2435	Fender Stiffener, Center
2	LCT652.601JDA	Axle Assembly 4.5K	13	650.2436	Fender Stiffener, LH
3	38066	Trailer Bed	14	650.2437	Fender Stiffener, RH
4	LCT650.630B	Fender, Right or Left	15	STD.2201	Marker Light, Red
5	STD.2202	Marker Light, LED Yellow	16	STD.2201G	Grommet, Marker Light
6	STD.2414	Tail Light Assembly	17	600.2437	License Plate Mount Bracket
7	... OD60250R	... LED Light Only	18	LCT600.010	License Plate Bracket
8	... OD60700	... Grommet	19	LCT60.615B	License Plate Light
9	... OD94706	... Plug Harness Only			

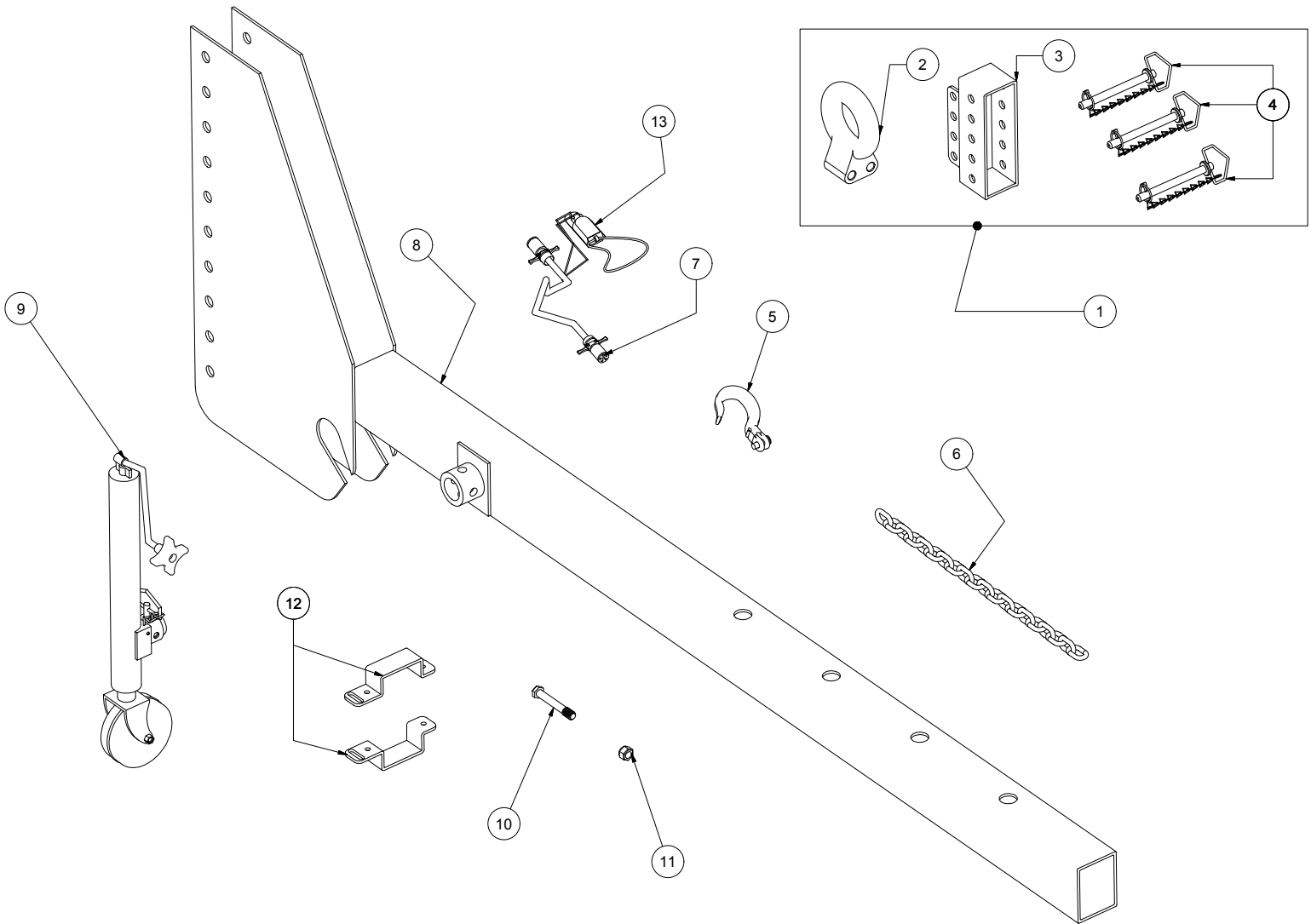
9.2 Fuel Tank Group



ITEM#	PART NO.	DESCRIPTION
1	600.2520B	Fuel Tank
2	STD.8101	Fuel Cap
3	I-09-010-12SCAL	Fuel Sender
4	MET633.901	Fuel Fitting (NOT for pickup)
5	MET633.901M	Fuel Fitting Grommet
6	600.2527	Fuel Fitting, Pickup Tube and Screen
7	650.2514	Support Bracket

9.3 Tongue Group

LCT60C, LCT600, LCT650 and LCT6000

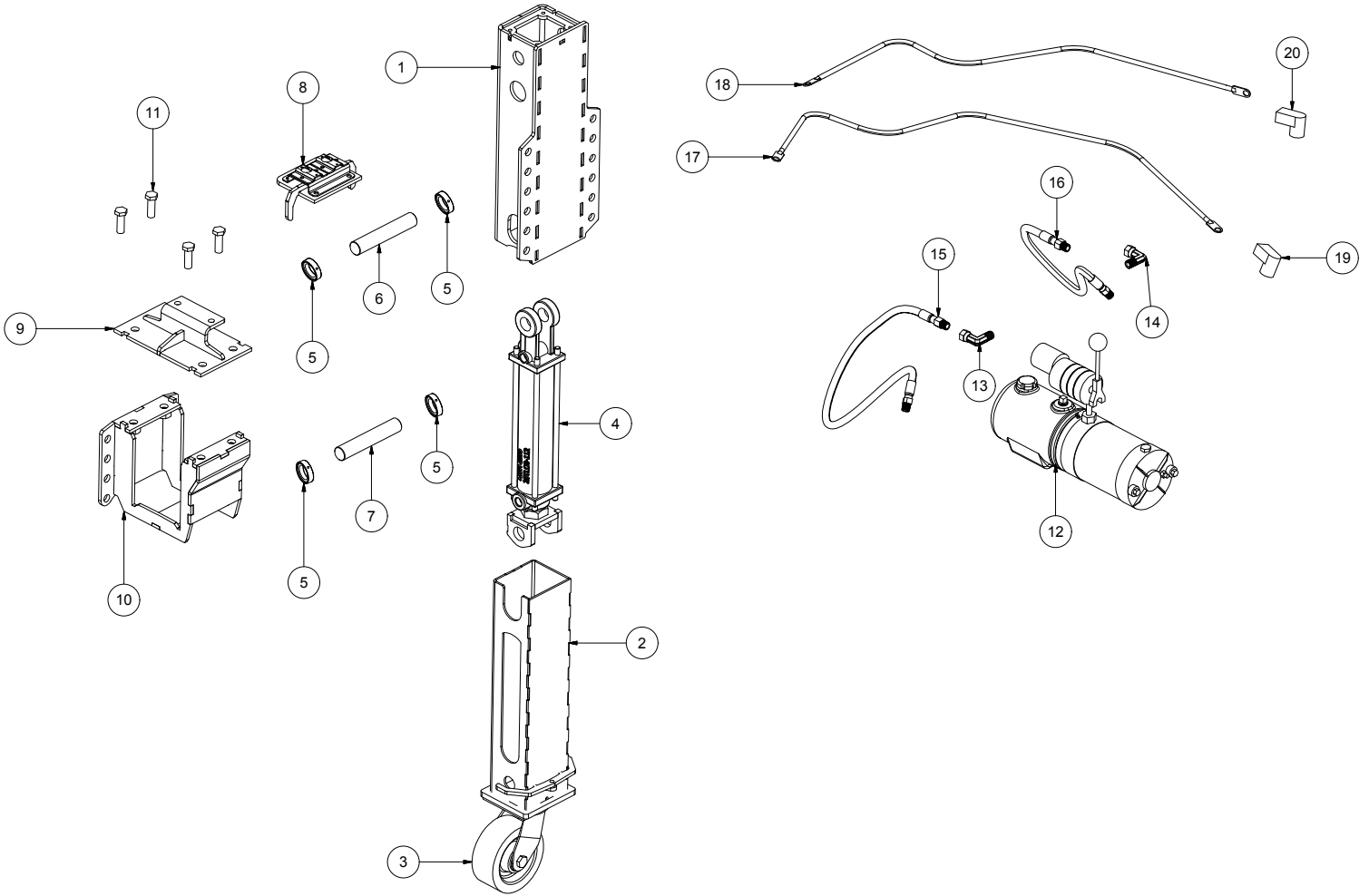


ITEM #	PART NO.	DESCRIPTION
1	LCT622.623D	Pintle Eye Assembly
	consists of	
2	LCT622.623	Pintle Eye Ring
3	LCT622.623B	Bracket w/ U-Channel
4	200012	Pintle Eye Pins
5	200009.1	Safety Hook, 3/8"
6	LCT600.201	Safety Chain
7	LCT622.626	Power Cord,#13 incl.

ITEM #	PART NO.	DESCRIPTION
8	LCT622.633	Tow Bar, LCT60C/650
	LCT622.634	Tow Bar, LCT600
	LCT622.636	Tow Bar, LCT6000
9	LCT622.624	Parking Jack
12	LCT622.635A	Hose Lock Brkt,600
	LCT622.625	Hose Lock Brkt,6000
13	SCL822.826A	Breakaway Switch, included in #7

9.4 Hydraulic Parking Jack - OPTIONAL

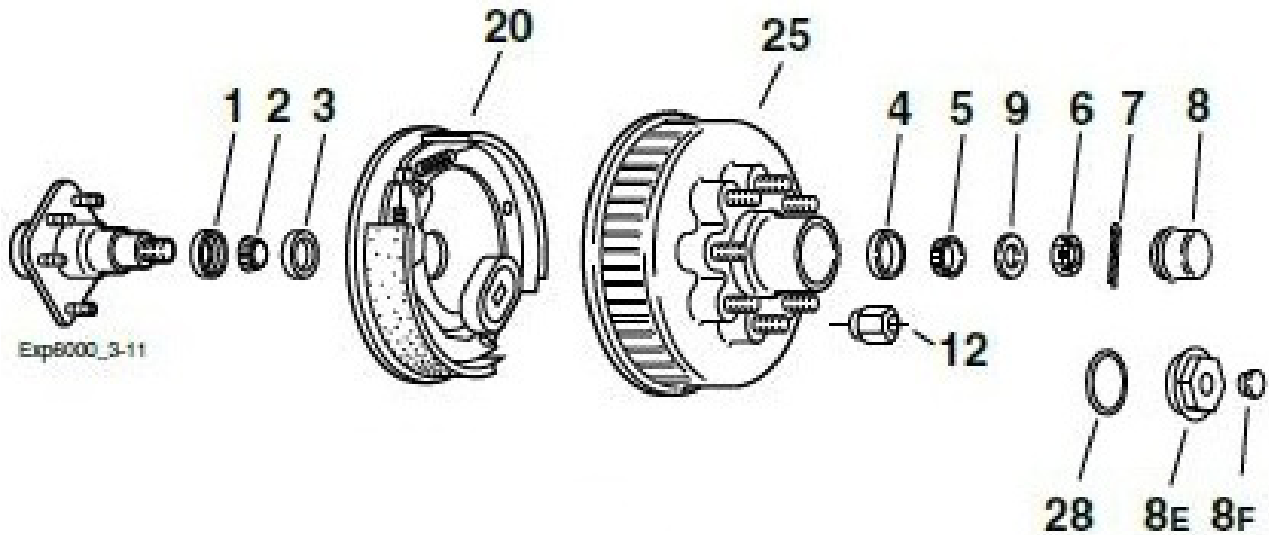
LCT60C/ 600 / 6000 / 650 - optional - Nov. 2006 and after



ITEM#	PART NO.	DESCRIPTION	ITEM#	PART NO.	DESCRIPTION
*	LCT622.624H1	Hyd. Parking Jack Assembly incl. all below except#1-10	11	5CZ.500.1.5	Clamp Bolts
*	LCT622.624H2	Hyd. Parking Jack Assembly complete (includes 1-19)	12	MPM310	Hydraulic Pump
1	STD.9001	Outer Tube	13	80.1552	Fitting, 90 degree
2	STD.9002	Inner Tube	14	80.1552	Fitting, 90 degree
3	STD.9003	Caster Assembly	15	STD.9009 STD.9009B	Hydraulic Hose, Top Hydraulic Hose, Top 2/3X
4	STD.9014	Cylinder	16	STD.9010 STD.9010B	Hydraulic Hose, Bottom Hydraulic Hose, Bttm 2/3x
5	STD.9006	Lock Collars	17	STD.9012	Battery Cable, Red
6	STD.9004	Top Pin	18	STD.9013	Battery Cable, Black
7	STD.9005	Bottom Pin	19	65.1306	Stud Cover, Red
8		Outer Tube Top	20	65.1307	Stud Cover, Black
9	STD.9008*	Clamp Top	Notes: *#8,9 not used on 2/3 axis units * #11-13,16-19 not used on 2/3 axis units * will work on older units(use LCT622.624H2)		
10	STD.9007 6000.9007	Clamp Bottom, 600/800/650 Clamp Bottom, 6000			

9.5 Axle Hub Assembly

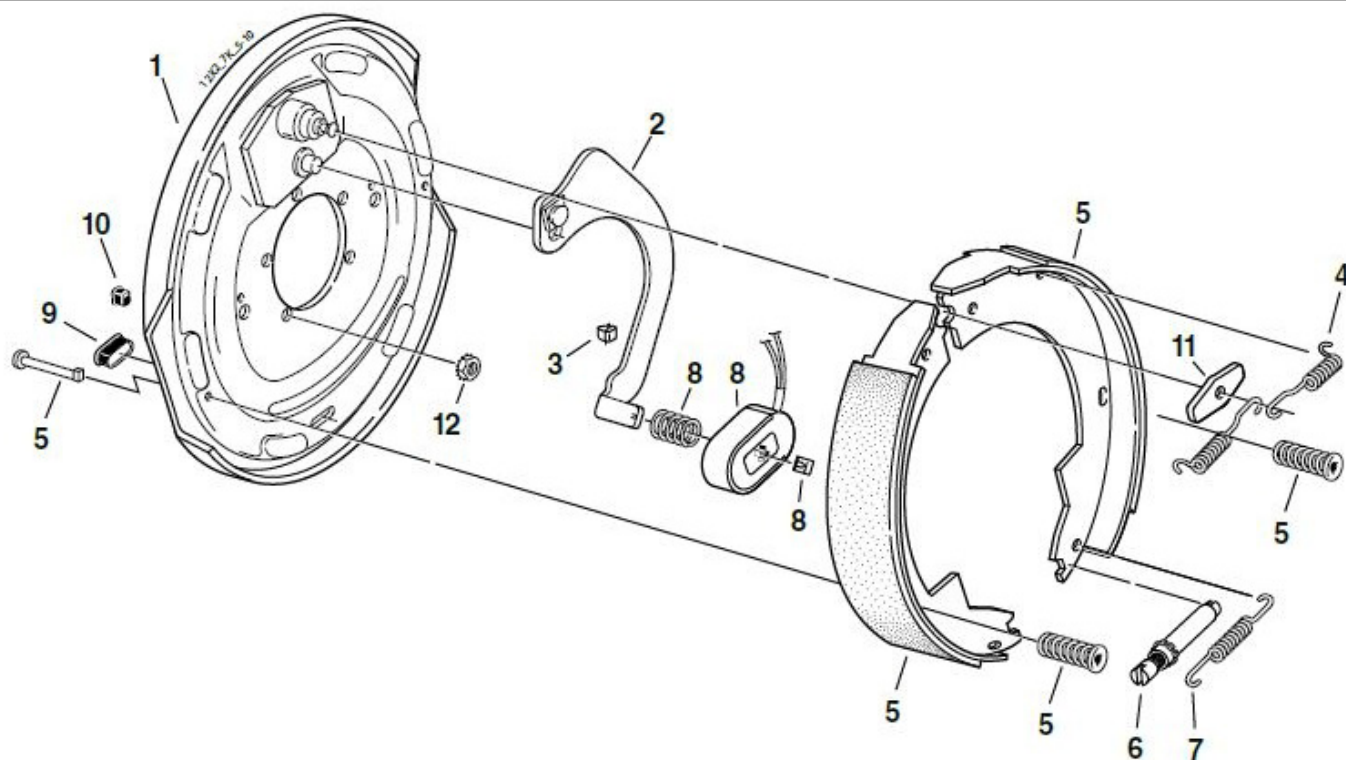
LCT60C/600/650/6000



ITEM #	PART NUMBER	DESCRIPTION
1	010-036-00	Grease Seal
2	031-030-02	Inner Bearing Cone
3	031-030-01	Inner Bearing Cup
4	031-017-01	Outer Bearing Cup
5	031-017-02	Outer Cone
6	006-176-00	Spindle Nut
7	019-002-00	Cotter Pin
8	021-039-00	Cap
8E	021-042-01	Cap
8F	085-001-00	Rubber Plug
9	005-023-00	Spindle Washer
12	006.080.00	Lug Nut, 1/2-20
20	K23-180-00 K23-181-00	7K Electric Brake Assembly, LH 7K Electric Brake Assembly, RH
25	008-219-04 008-219-13 008-219-18	Grease Hub and Drum 1/2" Stud 9/16" Stud 5/8" Stud
28	010-045-00	O Ring

9.6 Brake Assembly

LCT60C/600/650/6000



ITEM #	PART NUMBER	DESCRIPTION
0	K23-180-00 K23-181-00	LH Complete Brake Assembly RH Complete Brake Assembly
1	036-089-10	Backing Plate Assembly
2	047-107-05 047-108-05	Actuator Lever Arm Assembly, LH Actuator Lever Arm Assembly, RH
3	027.005.00	Wire Clip
4	046.009.00	Retractor Spring
5	K71-127-00	Shoe and Lining Kit
6	043.004.00	Adjuster Assembly
7	046-018-00	Adjusting Screw Spring
8	K71-125-00 042-143-00 027-009-00 046-080-00	Magnet Kit containing: (1) Magnet (Black Wire) (1) Magnet Clip (1) Magnet Spring
9	046.007.00	Plug
10	046.016.00	Wire Grommet
11	005-067-00	Anchor Post Washer
12	006-193-00	Nut Washer Assembly

• #12 Not Included with complete brake assembly. Item Sold Separately.



10-0

10.0 HOSE BOOM GROUP

10.0 HOSE BOOM GROUP

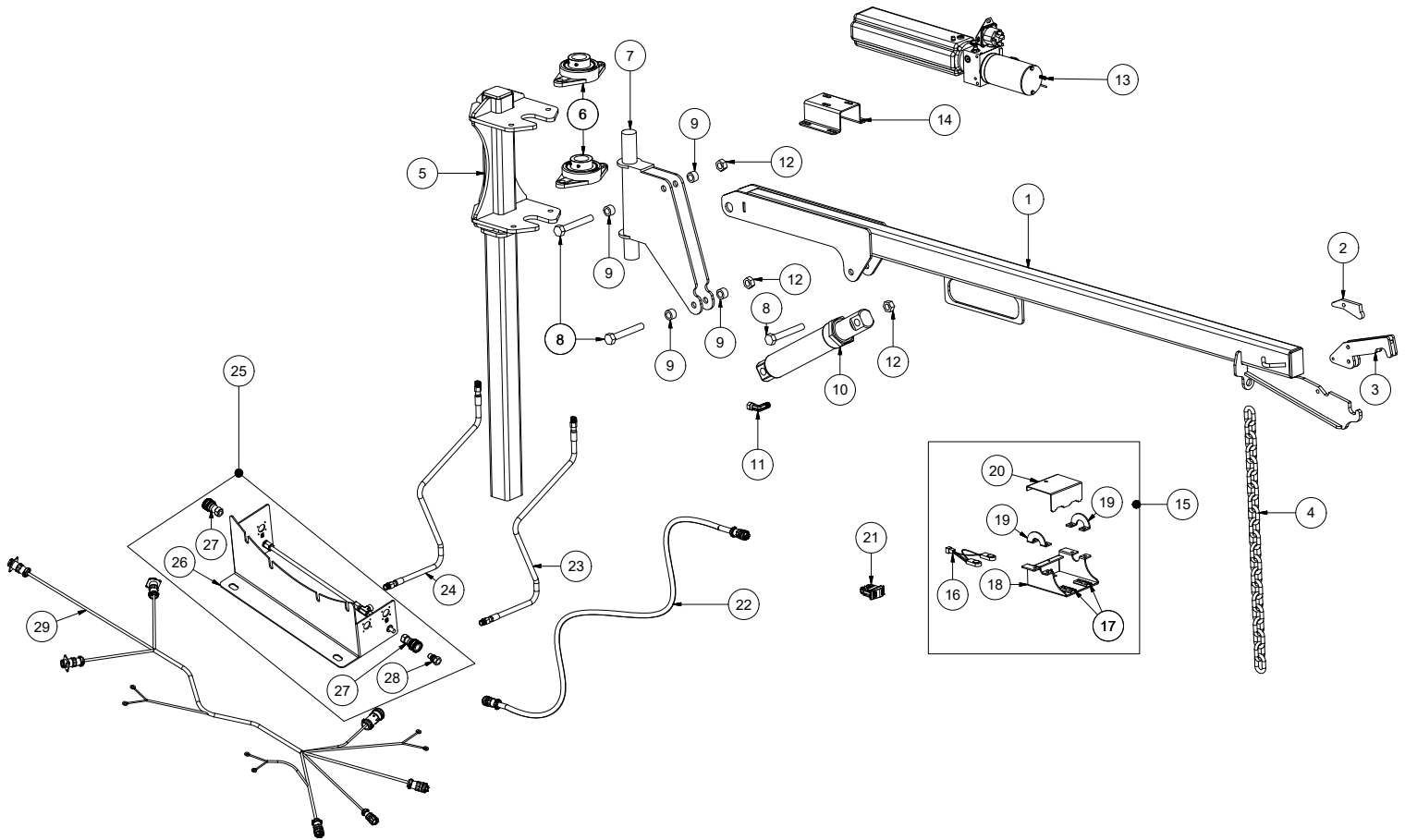
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HOSE BOOM GROUP

ODB COMPANY
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823

10.1 Boom Group

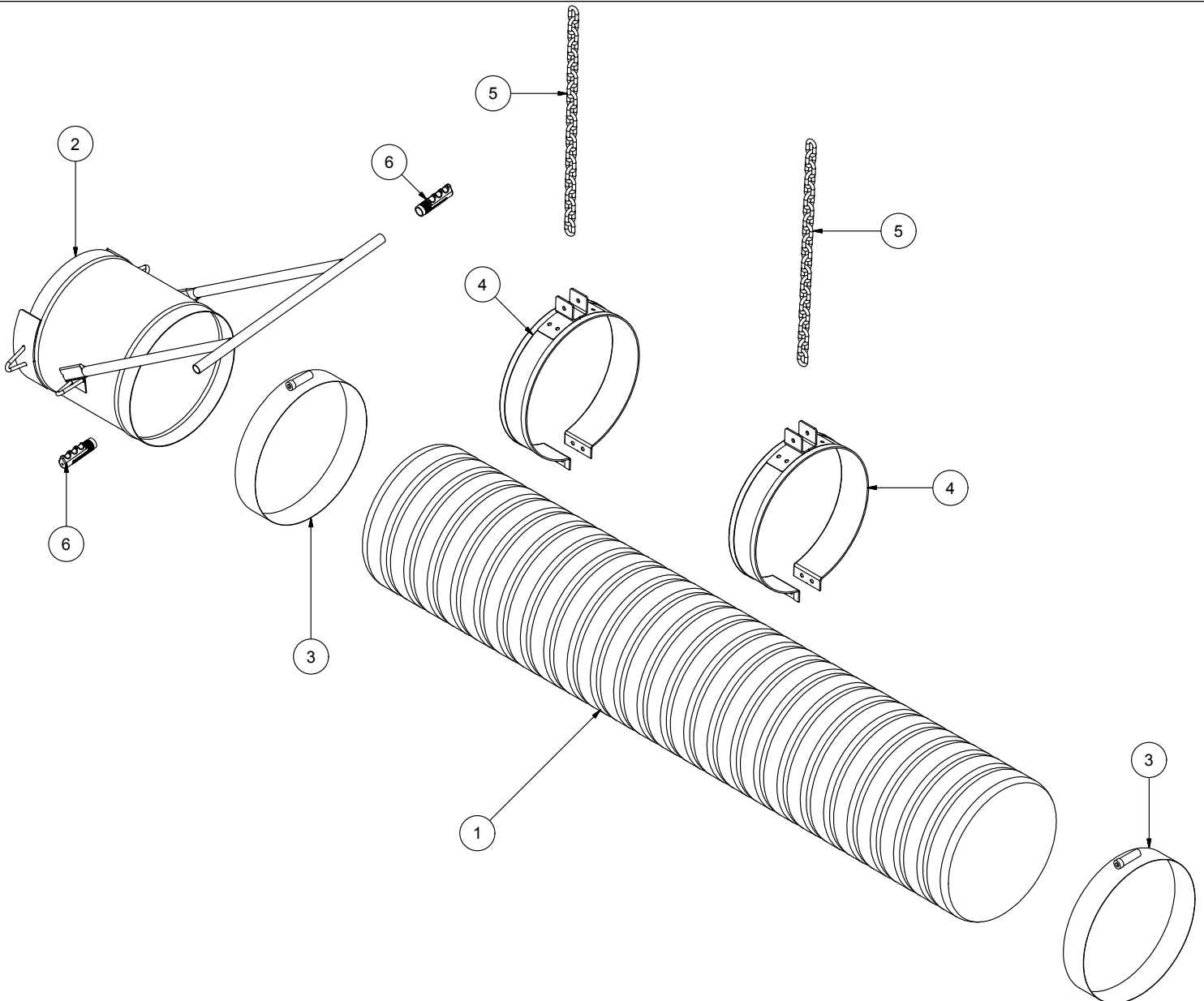
May 2012 - present



ITEM#	PART NO.	DESCRIPTION
1	LCT650.620.2B	Boom Arm
2	650.2317	Nozzle Latch Lever
3	650.2316	Nozzle Latch Hook
4	LCT60.642	Chain
5	650.2311B	Boom Mast
6	LCT616.801	Boom Bearings
7	650.2311	Boom Swivel
8	5CZ.625.4.0	Bolt, 5/8" x 4" Long
9	RMB531	Brass Bushing
10	MP-CS.150.12	Boom Cylinder
11	OD-9405.4.4	90 Degree Fitting
12	ZESNC.625	Nut
13	MP-M3219.S	Hydraulic Pump
14	LCT650.104	Pump Bracket

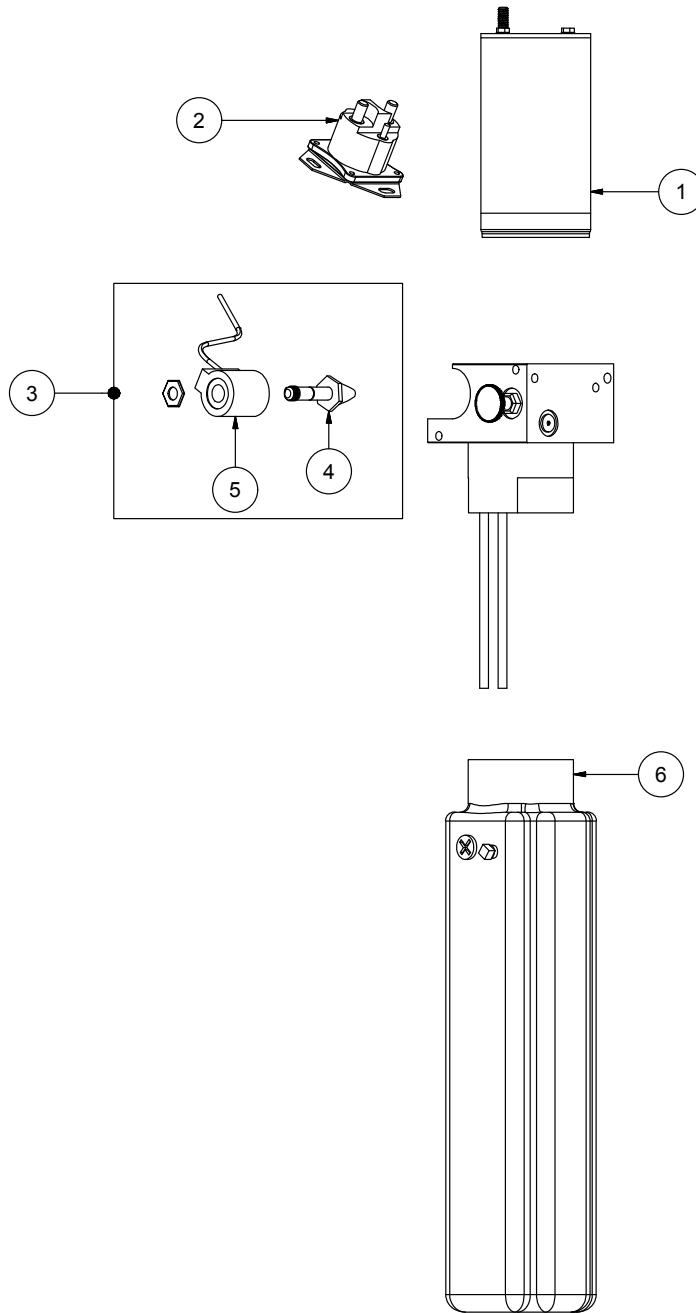
ITEM#	PART NO.	DESCRIPTION
15	STD.2320	Up/Down Switch Assembly
16	STD.2321C	Push Buttons
17	STD.2322	SS Button Hold Down
18	STD.2320B	Push Button Box
19	LCT.616.615D	Hold Down Bracket
20	STD.2320E	Cover Plate
21	4045.0021A1	Rocker Switch(optional)
22	650.2322	Up/Down Switch Harness
23	LCT617.608	Hydraulic Hose, 64"
24	Call	Foot Assembly
25	650.132	Foot
26	OD-S105.2	Female Quick Disconnect
27	OD-S105.2	Female Quick Disconnect
28	650.135C	Harness

10.2 Intake Hose Group



ITEM #	PART NUMBER	DESCRIPTION
1	LC-MDH.16.120 LC-SDH.16.120.UC LC-MDH.16.100	Intake Hose, except SCL Intake Hose, Urethane (multi-axis) Intake Hose, SCL800
2	LCT616.601	Intake Nozzle
3	LCT616.616	Hose Clamp, Bolt Style
4	LCT616.603U LCT616.603U.B	Hose Clamp, 3/8" thick hoses Hose Clamp, urethane hoses
5	LCT60.642	Support Chain
6	SCL670.5	Grip

10.3 M3219 Hydraulic Boom Pump



ITEM #	PART NUMBER	DESCRIPTION
	MP-M3219.S	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-07193.D	Cartridge
5	MP-10861.D	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 ODB 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

ODB'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.

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 **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
ODB 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 LEAF COLLECTOR AND SHOULD
BE KEPT WITH THE UNIT WHEN IT IS SOLD.

ODB COMPANY
5118 Glen Alden Drive
Richmond, VA 23231
800-446-9823

