OPERATOR'S MANUAL & PARTS LIST

RIDING MOWER MODEL 721D H^2

THE GRASSHOPPER COMPANY
Moundridge, Kansas 67107 U.S.A.
Phone (620) 345-8621
Fax (620) 345-2301

Price $7.00

Form 172214-070207
Printed in U.S.A.

INTRODUCTION

Congratulations on your selection of Grasshopper equipment. We believe you have exercised excellent judgment in the purchase of Grasshopper equipment. We are most appreciative of your patronage.

We recommend that you carefully read this entire manual before operating the unit. Time spent becoming fully acquainted with its performance features, adjustments and maintenance will add a longer and more satisfactory life to your Grasshopper.

The Grasshopper equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products it will require cleaning and upkeep. Lubricate it as specified in the manual. Observe all safety information in this manual and all safety decals on the tractor and attachments.

The illustrations and data used in this manual were current at the time of printing, but due to possible in-line production changes your machine may vary slightly in detail. The manufacturer reserves the right to make changes or add improvements to its products at any time without incurring any obligation to make such changes to products manufactured previously.

As with all lawn and grounds equipment, if handled carelessly this machine is a dangerous piece of equipment. **If used incorrectly this machine can cause severe injury.** You, the operator, are responsible when operating it. Therefore, safety is of the utmost importance.

ATTENTION:

- **Read the instructions and warnings carefully before using this machine.**
- **Read your Grasshopper warranty, enclosed with the tractor manual. To validate warranty, fill in the required information and return the warranty form within 10 days of purchase to:**

  THE GRASSHOPPER CO.
  P.O. Box 637
  Moundridge, Kansas 67107

Use only genuine Grasshopper service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation. Record the model and serial number of your mower.

MODEL:_____

SERIAL NUMBER: _____

(Serial tag is located under seat on tractor frame by throttle.)

Provide this information to your dealer to obtain correct repair parts.

CALIFORNIA

Proposition 65 Warning

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

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SPECIFICATIONS

721D H^2	
Engine	Kubota three cylinder 4 cycle liquid cooled
Model No.	D722
Horsepower (G.I.H.P.)	20.9 (15.6 kw)
Displacement	44 cu. in. (719 cc)
No-load rpm	3600
Charging System	12VDC 12.5 amp. negative ground
Starter	Electric
Electrical System	Safety interlocked
PTO	3100 r.p.m. (max.) Electric clutch
Transmission	H^2 dual path hydrostatic direct drive
Steering	Dual levers independently control speed and direction of travel. Zero turning radius (center of machine is pivot point).
Speed	
Forward (variable)	0 to 9 m.p.h. (14.5 km/h)
Reverse (variable)	0 to 6 m.p.h. (9.6 km/h)
Fuel Tank Capacity	4.3 U.S. gal. (16.3 l)
Tire Sizes	
Front Drive Wheels	
Standard	22 x 11 x 10 - 4 ply rated
Optional	22 x 10 x 10 - 4 ply rated
Tail Wheel	13 x 6.50 x 6 rib - 4 ply rated
Dimensions of Tractor	
Seat Back Height	46" (1.17 m)
Seat Cushion Height	30.5" (.78 m)
Tractor Width	50.0" (1.26 m)
Tractor Length	78" (1.98 m)
Wheel Base	49.5" (1.26 m)
Weight - Uncrated	920 lbs. (416.8 kg)
Weight - Crated	1030 lbs. (467.0 kg)
Hour Meter	Standard

SAFETY SYMBOLS

This Safety Alert Symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

Throughout this manual the term **IMPORTANT** is used to indicate that failure to observe can cause damage to equipment. The terms **CAUTION, WARNING** and **DANGER** are used in conjunction with the Safety Alert Symbol [a triangle with an exclamation mark] to indicate the degree of hazard for items of personal safety.

⚠ CAUTION

Is used for general reminders of good safety practices or to direct attention to unsafe practices.

⚠ WARNING

Denotes a specific potential hazard.

⚠ DANGER

Denotes the most serious specific potential hazard.

SAFETY DECALS

Replace Immediately If Damaged

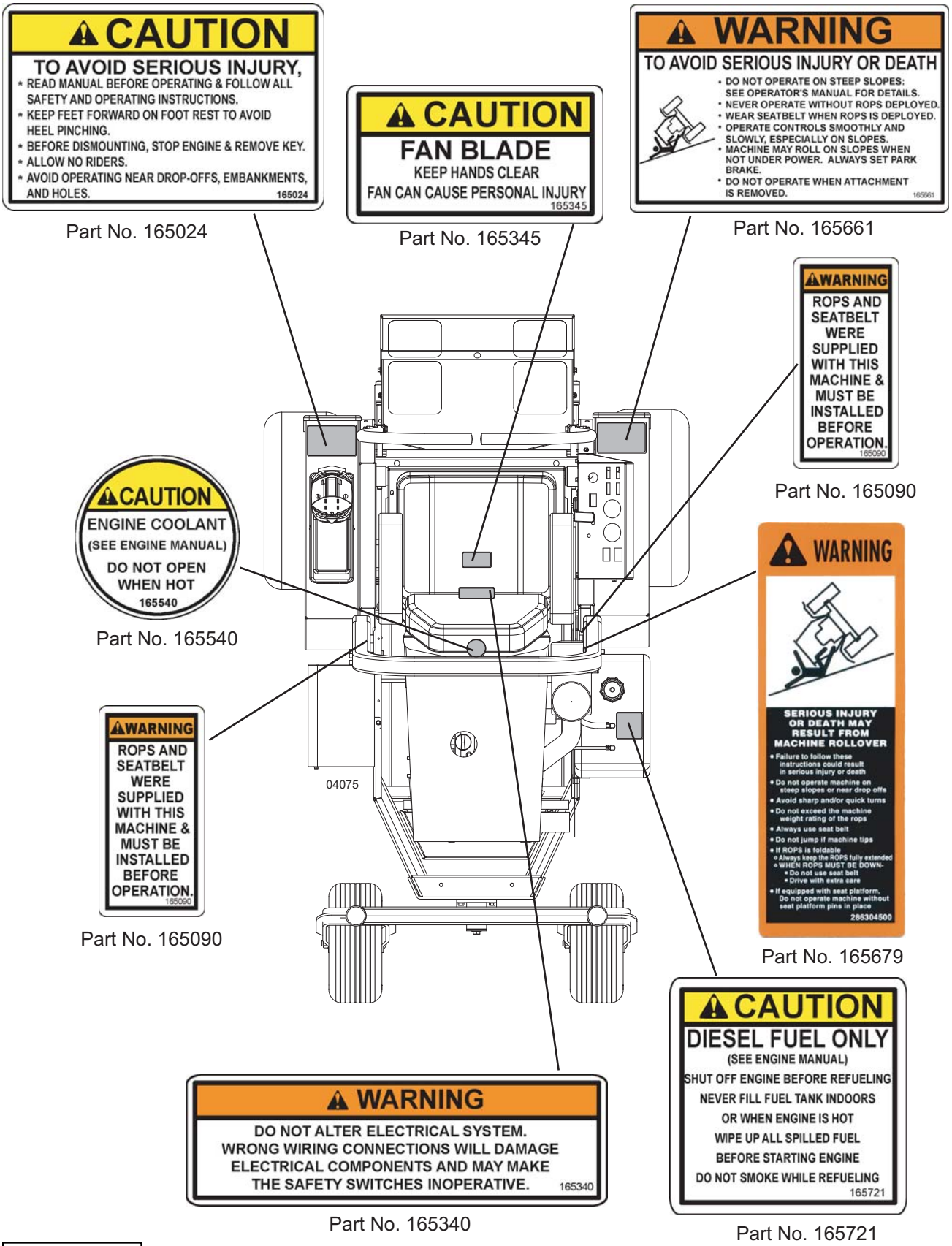


Fig. 1

WORK SAFELY - FOLLOW THESE RULES

⚠ CAUTION

The designed and tested safety of this equipment depends on it being operated within the limitations as explained in this manual. Read manual before operating.

TRAINING

- Safety instructions are important! **READ THIS MANUAL AND ALL SAFETY RULES.**
- Know your equipment's controls and how to stop tractor, engine and attachments quickly in an emergency.
- To avoid accident or injury, do not allow anyone to operate this equipment without proper instruction. Any person who operates this equipment **MUST** be instructed in and capable of the safe operation of the unit, its attachments and all controls.
- Do not allow children or unqualified individuals to operate equipment.

PREPARATION

- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough soled work shoes. Never operate tractor or implements in bare feet, sandals or sneakers.
- Ensure attachments are properly mounted, adjusted and in good operating condition.
- Make sure driveline spring-activated locking collar slides freely and is seated firmly in the tractor PTO groove.
- Check brake action before you operate. Adjust or service brakes as necessary.
- Ensure all safety switches function properly. See Operation section for details.
- Remove accumulated debris from attachment and tractor to avoid fire hazard.
- Ensure all safety shielding is in good condition and properly installed.
- Ensure either the discharge shield, restriction plate, or complete vacuum attachment is installed.
- Ensure all safety decals are installed and in good condition.
- Use correct counterweights when certain attachments are installed (see specific accessory installation instructions).
- Inspect area to be cut removing stones, branches and other debris that might be thrown causing injury or damage.
- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job.
- Low-hanging branches and similar obstacles can injure the operator or interfere with mowing operation. Before mowing, identify potential obstacles such as low-hanging branches, and trim or remove those obstacles.
- Never permit any person, other than the operator, to ride or board the tractor or implements at any time.
- Operate only in daylight or good artificial light.

FUEL HANDLING SAFETY

- In certain conditions, gasoline is extremely flammable and highly explosive. A fire or explosion from gasoline can burn you and others and can damage property.
- Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any gasoline that spills.
- Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is ¼" to ½" (6 mm to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.
- Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.
- Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.
- Always place gasoline containers on the ground away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gas-powered equip-

ment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.
- If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.
- Never use cellular phones or other portable electronic devices when handling fuel.

OPERATIONAL SAFETY

- Read "Operation" section of this manual before attempting to operate this unit.
- Do not operate without ROPS deployed.
- Fenders serve as shields. Do not operate without them.
- Keep bystanders away from equipment while it is in operation.
- Keep children and pets a safe distance away. Never direct discharge toward anyone.
- Start engine from operator's seat after disengaging tractor power takeoff and placing steering levers into the neutral swing-out position.
- Keep hands and feet away from underneath mower while engine is running. Stay clear of all moving parts on tractor and attachments.
- Protect against noise. Wear suitable hearing protection devices to protect against objectionable noise.
- Never allow anyone behind tractor or in front of implements when operating.
- Do not operate in reverse unless absolutely necessary and then only after careful observation of the entire area behind you.
- If operator must dismount to make adjustments the engine must not be running.
- If machine is equipped with a fixed ROPS, always wear seatbelt.
- If machine is equipped with a foldable ROPS,
  always wear seatbelt when ROPS is deployed.
- When foldable ROPS must be down (i.e. loading or unloading on an enclosed trailer), DO NOT use seatbelt and drive with extra care.
- Do not move steering levers from forward to reverse or reverse to forward position rapidly. The sudden change could cause loss of control and/or damage to equipment.
- Do not operate on steep slopes.
- Do not stop, start or change directions suddenly on slopes.
- Use extreme care and maintain minimum ground speed when traveling or operating on a hillside, over rough ground, or when operating close to ditches and fences.
- Reduce speed on slopes and sharp turns to minimize tipping and avoid loss of control. Be careful when changing directions on slopes.
- Stay alert for holes, rocks, roots and other hidden hazards in the terrain. Keep away from drop-offs.
- Stop mower or other attachment and tractor immediately upon striking an obstruction. Turn engine off, inspect attachment and tractor. Repair any damage before resuming operation.
- Disengage power to attachment, stop engine, remove key and wait for all movement to stop before dismounting, making adjustments, cleaning, or unclogging the machine.
- Never transport attachments with PTO running.
- Watch for traffic when operating near or crossing roadways.
- This unit is not equipped for highway use, especially when safety lighting and marking is required. It is not a recreational vehicle.
- This unit is not equipped with a drawbar. Do not pull loads.
- Take all possible precautions when leaving tractor unattended: disengage PTO, lower attachment, place controls in neutral, set parking brake, stop engine and remove key from ignition.
- Move very slowly when attachment is removed. Never carry passengers.
- Do not run engine in an enclosed area without adequate ventilation. Exhaust gases contain carbon monoxide, an odorless and deadly poison.

MAINTENANCE SAFETY

- Always perform maintenance with the machine parked on a hard level surface; with the engine stopped and the PTO disengaged; with the park brake set; and with the key removed from the ignition.
- Always remove the grounded (-) clamp from the battery when performing maintenance on the engine, clutch, or any other electrical system.
- Never work under the machine without jack stands or other equivalent safety blocks. Do NOT rely solely on mechanical or hydraulic jacks or lifts for support. Always use adequate wheel chocks on tires remaining on the ground.
- Hydraulic hoses can fail due to physical damage, kinks, age, and exposure. Check hoses regularly. Replace damaged hoses.
- Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.
- Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.
- If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension. If an exhaust pipe extension is not available, work near open doors and get outside air into the area.
- Waste products such as used oil, fuel, coolant, and batteries can harm the environment and people. Dispose of waste products properly.
- Never attempt to disconnect or alter any part of the safety interlock systems.
- Keep engine free of grass, leaves, or excess grease to reduce fire hazard and minimize engine overheating.
- Do not change engine governor settings.
- Keep tractor and attachments in good operating condition and all safety devices in place.
- Periodically tighten all bolts, nuts and screws. Check that all cotter pins are properly installed to ensure equipment is in a safe condition.
- Check brake operation frequently. Adjust and service as required.

STORING SAFELY

- Never store equipment with gasoline in the tank inside a building where fumes may reach an open flame, spark or pilot light as on a furnace, water heater, clothes dryer, or other gas appliance. Allow engine to cool before storing in an enclosure.
- If engine is to be unused for 30 days or more, add a fuel stabilizer to the fuel system. Fuel stabilizer (such as STA·BIL®) is an acceptable additive in minimizing the formation of fuel gum deposits during storage. Add stabilizer to gasoline in fuel tank or storage container. Always follow mix ratio found on stabilizer container. Run engine at least 10 minutes after adding stabilizer to allow it to reach the carburetor.
- If draining fuel tank, drain fuel into an approved container outdoors and away from open flame.
- Always provide adequate ventilation when running engine indoors. Exhaust gases contain carbon monoxide, an odorless and deadly poison.
- Remove attachments from tractor. Remove all accumulated debris from attachments and tractor.
- Sand areas where paint is chipped and repaint to prevent rust. Lubricate all locations to prevent moisture damage during storage.

GENERAL INFORMATION

The purpose of this manual is to assist the operator in maintaining and operating **GRASSHOPPER** tractors. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance.

These operating and maintenance instructions have been compiled from extensive field experience and engineering data. Some information may be general in nature due to unknown and varying conditions. However, through experience and these instructions, you should be able to develop operating procedures suitable to your particular situation.

The illustrations and data used in this manual were current at the time of printing, but due to possible in-line production changes your machine may vary slightly in detail. **GRASSHOPPER** reserves the right to redesign and change the machine as necessary without notification.

⚠ WARNING

Some illustrations in this manual show the equipment with safety shields removed to provide a better view. The mower should never be operated with any safety shielding removed.

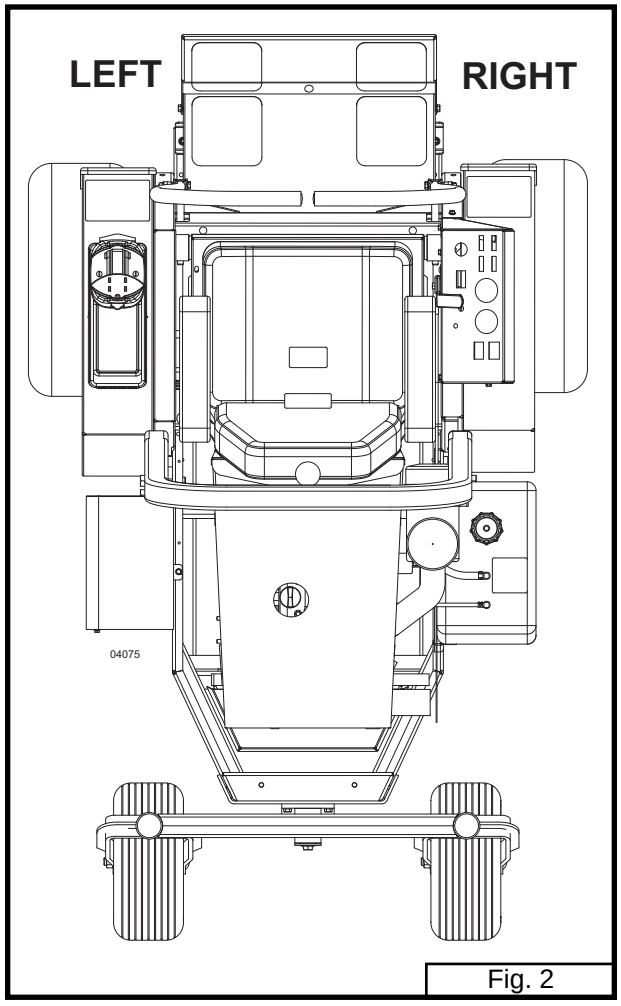


Fig. 2

Throughout this manual, references are made to right and left directions. These are determined by standing at the rear of the equipment and facing the direction of forward travel.

Mower blade rotation is clockwise as viewed from the top of mower.

MEASUREMENT CONVERSION

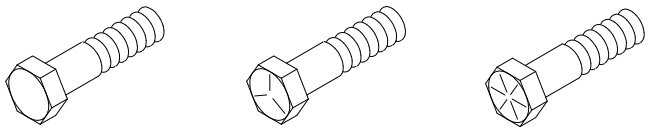
Measurements expressed in this manual are decimal values. Use the chart below if you are unsure of a measurement to obtain the fractional equivalent.

Conversion Table - Inches			
Decimal	Fraction	Decimal	Fraction
0.062	1/16	0.562	9/16
0.125	1/8	0.625	5/8
0.187	3/16	0.687	11/16
0.250	1/4	0.750	3/4
0.312	5/16	0.812	13/16
0.375	3/8	0.875	7/8
0.437	7/16	0.937	15/16
0.500	1/2	1.000	1

BOLT SIZE AND TIGHTENING RECOMMENDATIONS

The chart below lists the correct tightening torque for bolts used on Grasshopper equipment. When bolts are to be tightened or replaced refer to this chart to determine the grade of bolt and proper torque (*except when specific torque values are assigned in the manual text*).

Bolt Head Markings



SAE Grade 2 (no dashes) | SAE Grade 5 (3 radial dashes) | SAE Grade 8 (6 radial dashes)

Recommended Torque in Foot Pounds				
Bolt Diameter in Inches				
Decimal	Fraction	SAE Grade 2	SAE Grade 5	SAE Grade 8
0.250	1/4	6	11	14
0.312	5/16	13	21	25
0.375	3/8	23	38	55
0.437	7/16	37	55	80
0.500	1/2	57	85	120
0.562	9/16	82	125	180
0.625	5/8	111	175	230
0.750	3/4	200	300	440
0.875	7/8	280	450	720
1.000	1	350	680	1035

The safe operation of this machine is the responsibility of the operator. The operator should be familiar with the tractor and all attachments that will be used before starting operation. Refer to and read safety information on pages 6 through 10.

CONTROLS AND SWITCHES

Know your controls and how to stop tractor, engine and attachments quickly in an emergency.

- **Stop tractor** by moving steering levers to neutral position (*refer to section on steering lever operation, page 16-18*).
- **Stop engine** by turning key to "OFF" position.
- **Disengage** power to **attachments** by moving PTO switch to "OFF" (down) position.

Operating this unit is not difficult once you master the use of the controls. We recommend you equip the tractor with the attachment you will be using and practice in a flat open area at a medium throttle setting until you are comfortable with the controls.

⚠ WARNING

Before operating this machine be sure the operator-presence safety system works. The engine should not run without the operator in the seat if the PTO switch is on or either steering lever is in the run position.

Several safety switches are incorporated in the unit's design to prevent it from being started out of neutral or with the PTO engaged. All controls must be in the "OFF" or neutral position before the unit can be started. There is a safety switch under the operator's seat that will cause the engine to stop should the operator leave the seat with any control engaged.

PRESTART CHECK LIST

- Place tractor on level surface.
- Check crankcase oil level (refer to "Engine Manual" for proper level and type of oil used).

⚠ CAUTION

Never attempt to check oil while engine is running.

- Check radiator coolant.

⚠ CAUTION

Do not remove radiator cap while engine is hot!

- Remove and clean air intake screen on radiator.

IMPORTANT

When mowing in dusty conditions, dry grass or long grass, it may be necessary to remove and clean air intake on the radiator frequently to prevent engine overheating.

- Check for grass wrapped around PTO shaft. When mowing long grass, turn off key and check for grass wrapped around PTO shaft every 30 minutes of operation.

⚠ WARNING

Remove fuel solenoid wire to prevent accidental engine starting before attempting to remove grass from around PTO shaft.

- Check air cleaner (refer to "Engine Manual"). When mowing in dusty conditions, dry grass or long grass, it may be necessary to remove and clean air intake on the air cleaner.
- Check to be sure engine is free of dirt and debris.
- Check fuel level. Refer to "Engine Manual" for correct fuel for your requirements.

⚠ DANGER

Do not fill fuel tank while engine is running. Allow engine to cool two minutes before refueling. If fuel is spilled do not start engine; avoid creating any source of ignition until the fuel has evaporated.

- Check tire pressure (see page 19). Improper pressure will adversely affect traction, steering and level cutting height.
- Check that cooling fins on the transmission are clean.

Test Safety Interlock System Daily

Action	Left Steering Lever	Right Steering Lever	PTO Switch	Parking Brake	Proper Result
Start Circuits					
Try starting engine	Out	Out	Off	On	Engines Cranks
Try starting engine	**In**	Out	Off	On	**Engine will not crank**
Try starting engine	Out	**In**	Off	On	**Engine will not crank**
Try starting engine	Out	Out	**On**	On	**Engine will not crank**
Kill Circuits (with engine running at 1/2 throttle)					
Raise off seat	Out	Out	Off	On	Engine does not stop
Raise off seat	**In**	Out	Off	Off	**Engine Stops**
Raise off seat	Out	**In**	Off	Off	**Engine Stops**
Raise off seat	Out	Out	**On**	On	**Engine Stops**
Move left steering lever in		Out	Off	On	**Engine Stops**
Move right steering lever in	Out		Off	On	**Engine Stops**

STARTING THE ENGINE

⚠ DANGER

Never start the engine in confined rooms. Exhaust gases contain carbon monoxide, an odorless and deadly poison.

Do not allow children to approach the machine while the engine is running.

Do not operate the machine around open flames, i.e., trash fires.

Do not operate the engine when an odor of fuel is present or other explosive conditions exist.

- Position yourself on the tractor seat.
- Place both steering levers in swing-out neutral position.
- Place electric clutch switch in "OFF" (down) position.
- Set the throttle at 1/3 open.
- Insert the key into the ignition switch and turn to "ON" (black dot on switch plate).
- Check to see that the oil lamp and battery lamp are on.
- Turn the key switch counterclockwise to preheat the glow plugs in the engine. This engine is equipped with quick heat glow plugs and the standard preheating time is from 5-10 seconds. Preheating is not required once the engine is warmed up.
- Return the key to "START". When engine starts release key immediately.
- Check to see that the oil lamp and battery lamp are off. If either lamp remains lit a problem exists in that system.
- Warm the engine up at medium speed for several minutes.

IMPORTANT

If the engine does not start within 10 seconds after the starter is engaged, stop cranking the engine and wait for 30 seconds. Repeat starting sequence (including the preheating sequence). Also, if the engine will not start after refueling or after setting for a prolonged period, refer to bleeding fuel lines in the "Engine Troubleshooting" section of this manual. Never allow the starter motor to run continuously for more than 30 seconds. Be sure to warm engine up regardless of season. Loading an insufficiently warmed up engine will shorten its service life.

COLD WEATHER STARTING TIPS

Use proper viscosity oil for temperature expected (refer to "Engine Manual").

Set throttle half open.

A warm battery has better starting capacity than a cold one.

Use fresh winter grade fuel. It is better for winter starting than leftover summer grade fuel.

UNEVEN TERRAIN

⚠ WARNING

Be careful when operating machine on uneven ground.

⚠ WARNING

Do not operate on steep slopes. Operation on a steep slope could cause loss of control, machine to overturn and personal injury or death.

- Do not operate on steep slopes. This machine was not specifically designed to operate on steep slopes.
- The operator is responsible for safe operation on slopes. Only the operator can determine the stability of the machine on a given slope based on existing conditions like: machine speed and direction, slope variation, slipperiness, drop-offs, holes, obstacles, etc.
- To determine stability on a slope, start at the bottom and try to drive the machine up the slope slowly. If you cannot drive up the slope or if you feel uneasy on it, do not operate on it.
- Always start mowing at the bottom of slopes. Traveling up slopes, this machine has more traction traveling in reverse than forward. Be careful on slopes to avoid driving into a position where there is not enough traction to enable driving out or stopping.
- Tires may lose traction on slopes even though the brakes are functioning properly.
- Avoid sudden stops and deceleration when traveling forward downhill as mower may tip forwards.
- Do not mow slopes when grass is wet because slippery conditions will reduce traction and braking which in turn affects steering.
- Use caution when making turns. Slow the mower down before making sharp turns. Unit can spin very rapidly by positioning one lever too much ahead or behind the other.
- Look around you to be sure the area is clear before turning or backing up.
- Avoid starting or stopping on a slope. If tires lose traction, disengage the blades and proceed slowly straight down the slope.
- Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction.
- Pass diagonally through sharp dips and avoid sharp drops.
- Follow manufacturer's recommendation for counterweights for added stability when operating on slopes or using front or rear mounted attachments. Remove weights when not required.
- Use extra care with grass catchers or other attachments. These can change the stability of the machine. Do not use grass catcher on steep slopes.
- Do not operate without ROPS deployed.

- If machine is equipped with a fixed ROPS, always wear seatbelt.
- If machine is equipped with a foldable ROPS, always wear seatbelt when ROPS is deployed.
- Be certain that the seatbelt can be released quickly if the machine is driven or rolls into ponds or water.
- Check carefully for overhead clearances such as, branches, doorways, or electrical wires, before driving under any objects and do not contact them.

STOPPING THE ENGINE

- Set the throttle at 1/3 open. Allow engine to idle at this setting for several minutes, then move the throttle to slow idle.
- Move ignition switch to "OFF" position (upright) and remove key.

⚠ CAUTION

Always remove key from ignition switch when leaving unit unattended or when not in use.

Emergency shutdown of engine:

If the engine does not stop running with the throttle at slow idle and the starter switch in the "OFF" position, the following procedure will stop the engine.

- Unplug the wires from the fuel shut-off solenoid (item 30, page 31).
- Push the engine stop lever forward toward the radiator (refer to the Engine Manual's illustration showing the location of the engine stop lever).
- It is important that the operator be familiar with where the parts are located on the engine.

MOVING UNIT WITHOUT POWER

The hydro pumps are equipped with a dump valve (Refer to Fig. 3) that allows the unit to be moved without power by deactivating the pump. With the dump valve lever in normal operating position the fluid in the pump will make it difficult to move the unit (even with the steering levers in neutral position). The dump valve is located on the bottom toward the right front of each hydro pump. Activate the dump valve by rotating counter-clockwise with a .625 inch wrench. Rotate one revolution. When BOTH hydro pumps are deactivated the unit becomes "freewheeling" allowing it to be moved. Before the hydro pumps become operational the dump valves must be returned to their normal operating position. Do not tighten above 120 in.lbs. (10 ft.lbs.) maximum.

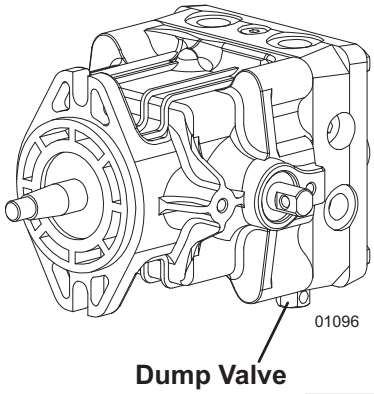


Fig. 3

STEERING LEVER OPERATION

(refer to Fig. 4, page 18)

⚠ WARNING

Do not move steering levers from forward to reverse or reverse to forward position rapidly. The sudden change could cause loss of control or damage to equipment.

The Grasshopper tractor is very unstable without an attachment. Move very slowly when attachment is removed. Never carry passengers.

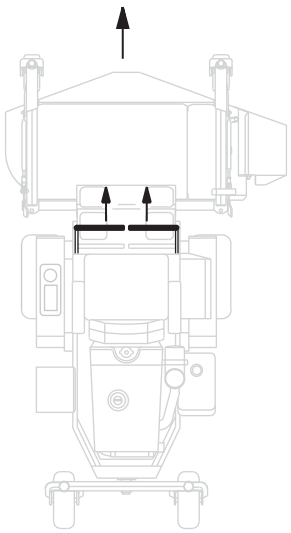
Steering levers control speed and direction of movement. Pushing the levers forward will move the tractor forward. Pulling levers to the rear will move tractor in reverse. The further forward or rearward the steering levers are moved, the faster the machine will move.

At half throttle move both steering levers from swing-out neutral inward. Move both steering levers forward. To turn right, advance left lever further forward than right lever. To turn left, advance right lever further forward than left lever. If you leave one steering lever in neutral and advance the other lever, the tractor will turn a complete circle. Move the levers to the rear and practice turning and maneuvering in reverse. Once you learn how the controls operate, practice until you become proficient and are comfortable with the unit before you begin operation with an attachment.

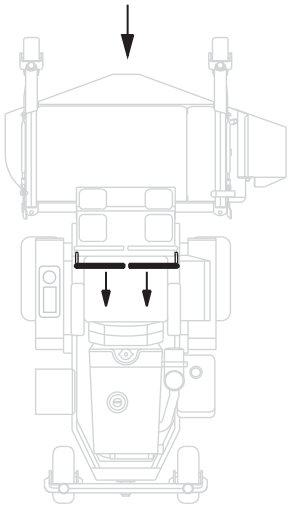
IMPORTANT

If you become confused during operation release both steering levers, they will automatically return to the centered neutral position and the tractor will stop.

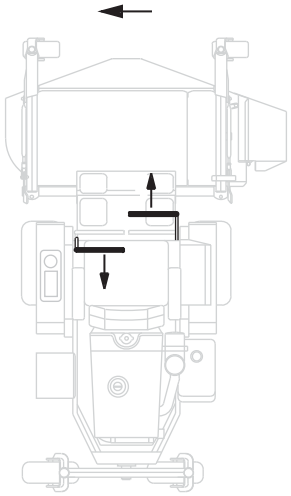
STEERING LEVER OPERATION



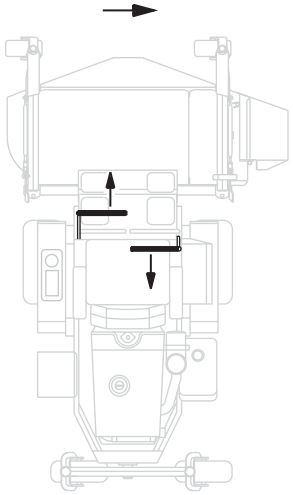
FORWARD



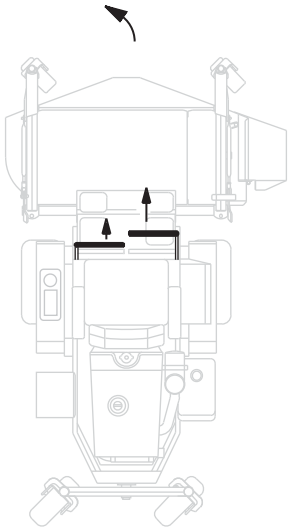
REVERSE



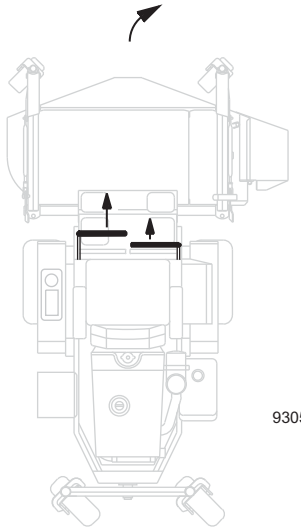
SHARP LEFT



SHARP RIGHT



GENTLE LEFT



GENTLE RIGHT

93051

Fig. 4

LUBRICATION AND MAINTENANCE

⚠ CAUTION

Always wear safety glasses and ear protection when performing any maintenance function that could cause injury to eyes or ears.

Read all safety information on pages 6 through 10.

⚠ WARNING

Lower attachment to ground, shut off tractor engine, remove key and wires to fuel solenoid before performing any maintenance.

LUBRICATION

Do not let excess grease collect on or around parts, particularly when operating in sandy areas.

The chart gives the frequency of lubrication in operating hours based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication.

Use an SAE multipurpose type grease for all locations shown. Be sure to clean fitting thoroughly before using grease gun.

For H^2 Drive System, use Grasshopper Fluid, part no. 345050 for 1 quart (.94 l) container or part no. 345055 for 1 gallon (3.76 l) container.

Lubricate Every 8 Hours of Usage	Lubricate Every 80 Hours of Usage
Rear Wheel Bearings (two fitting) Drive Shaft (one fitting)	Clutch Power Shaft (two fittings)

CAPACITIES

Fuel Tank ..... 4.3 U.S. gal. (16.3 l)
H^2 Drive System..... 2.5 U.S. qt. (2.37 l)
Drive System Fluid Change approx. ..... 2.0 U.S. qt. (1.89 l)

TIRE AIR PRESSURE

Drive Tires
- Standard 22 x 11 x 10 .....8 psi (55 kPa)
- Optional 22 x 10 x 10.....8 psi (55 kPa)
- (refer to decal on wheel for correct tire air pressure)

Rear Tires..... 12 to 15 psi (83 to 103 kPa)

H^2 DRIVE SYSTEM

Fluid Change..... 1000 hours
Filter Change..... 1000 hours

CRANKCASE OIL AND AIR FILTER

Refer to the “Engine Manual” for the time table for changing or service.

COOLING SYSTEM

Remove and clean radiator screen regularly. A dirty screen will cause the engine to overheat.

⚠ CAUTION

Do not use high pressure water or steam to clean the engine or drive compartment. Water and cleaning detergent may damage electrical components and terminals, possibly leading to component and safety circuit failure.

Use a vacuum cleaner or air blower to remove foreign material from the engine and drive compartment.

Check engine coolant when the engine is cool. If coolant is required, fill expansion tank to proper level through radiator. A solution of 50% antifreeze and 50% water must be used (freezing point about –34° F [–36° C]). Do not use 100% antifreeze or severe damage will occur.

BATTERY MAINTENANCE

Follow the procedure below for battery maintenance.

- Clean battery.
- Inspect cables for loose connection.
- Clean terminals.
- Inspect battery tray and hold-down.
- Inspect battery case for cracks or leaks.

⚠ WARNING

Batteries contain sulfuric acid. Avoid contact with skin, eyes and clothing. Batteries produce a highly explosive hydrogen gas while being charged. Always keep cigarettes, sparks, open flame and other sources of ignition away from battery. Always shield eyes and face from battery. In the event of accident, flush with water and call a physician immediately. Keep batteries and acid out of the reach of children.

CHECKING H^2 DRIVE SYSTEM FLUID LEVEL

Check fluid level in the reservoir, located under the seat, with the engine turned off. This is the fluid reservoir for both hydro pumps and wheel motors. If fluid is required, add until level is equal to the full mark on the reservoir decal (shown below). Use Grasshopper Fluid (Grasshopper part no. 345050 for 1 quart [.94 l] container).

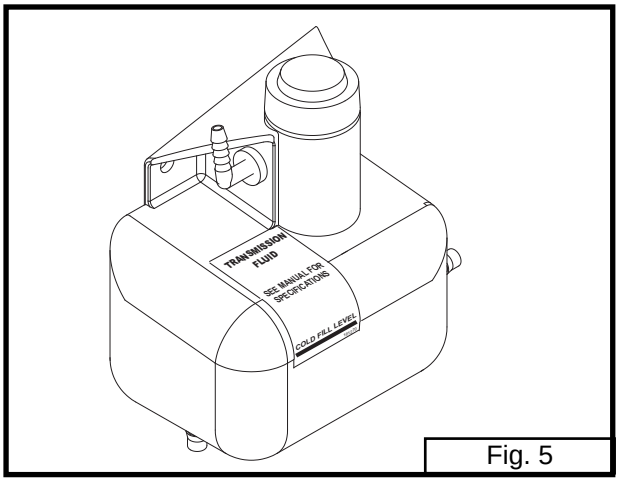


Fig. 5

CHANGING H^2 DRIVE SYSTEM FLUID AND FILTERS

Change fluid filter, mounted on the panel under the seat, every 1000 hours of use. Change fluid every 1000 hours of use. To change fluid, loosen PTO shield (item 14, page 39) and remove Trash Screen (item 57, page 29). Remove Spring Clamp (item 16, page 37) and hose (item 14, 15) from the bottom of each hydro. Use 1/4" allen wrench to also remove screw (located behind item 12 fitting, page 37) from each hydro casing. Allow oil to drain completely. Refill the reservoir with approximately 2 quarts (1.89 l) of fluid of the type and viscosity as prescribed in the previous section. Run engine and check for leaks. Stop engine and check the fluid level in the reservoir and add fluid as needed.

Note: No air bleeding is necessary since the system is self bleeding.

⚠ CAUTION

Never make adjustments with the engine running.

LOSS OF POWER IN THE H² DRIVE SYSTEM

Check the fluid level and make sure the proper amount of fluid is in the reservoir. The cooling fins and fan blades should be clean and free of foreign matter.

NO POSITIVE NEUTRAL POSITION

If drive wheels travel forward or backward when the steering lever is in swing-out position (neutral), adjustment is required.

NEUTRAL ADJUSTMENT

(Refer to illustration page 35)

1. Block up under tractor frame so both drive wheels are off the ground.
2. Make sure parking brake is released.
3. Remove linkage rod (item 6) from hydro pump control arm (item 3).
4. Place steering levers in the neutral swing-out position and start engine.
5. If either of the drive wheels turn, proceed with the following adjustment.
6. Loosen locking nut (item 13) and rotate pivot bolt (item 11) until neutral is achieved. Tighten locking nut.

NOTE: Pivot bolt roller is mounted off center and works as an eccentric when the bolt is turned.

7. Repeat procedure for drive system on the other side.
8. Reinstall linkage rod in control arm. If ball stud does not reinstall into control arm without moving the control arm, adjust length of linkage rod until it does to assure neutral adjustment will be maintained when linkage is connected.
9. Test drive machine for straight line travel with both levers full forward. If travel is not in a straight line, adjust the steering lever stop on the side that is the fastest, i.e., if machine goes to the left, adjust the right steering stop to slow down the right drive system until travel is straight ahead.

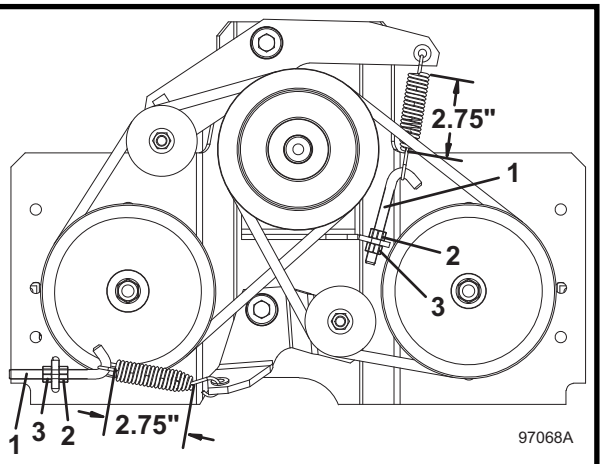
H² BELT REPLACEMENT

(Refer to illustration page 33)

1. Remove key from ignition switch.
2. Loosen the belt tension by loosening idler adjustment J-bolts (item 47) and remove belts from pulleys.
3. Remove two bolts (item 36) between flex coupling disc (item 27) and drive sheave (item 19). Remove the two spacers (item 26) between flex coupling and drive sheave.
4. Remove the two belts through the gap created by the removal of the two spacers.
5. Replace belts and reverse procedure to install belts.

NOTE: Upon reassembly, install flat washers (item 33) with rounded edges in contact with flex coupling disc. On opposite side of disc install spacers (item 26) with chamfered edges in contact with flex coupling disc.

6. To adjust the belt tension, loosen the top jam nut (item 2, Fig 6) on the J-bolt. Adjust the lower jam nut (item 3, Fig 6) so that the spring coils are extended to a length of 2.75". Tighten the top jam nut against the bracket.



1. Idler Adjustment J-Bolt
2. Top Jam Nut
3. Lower Jam Nut

Fig. 6

7. Recheck spring tension length after unit has run for ten (10) hours.

FUEL SOLENOID ADJUSTMENT

Adjust cable between fuel shut-off solenoid and engine fuel stop valve to provide full engagement of the solenoid. The solenoid should bottom out (be fully engaged) before fuel stop valve fully engages stop (approx. .0625" to .125" [1.6 to 3.2 mm] gap).

The solenoid is designed to hold the engine fuel stop valve open during operation. When the key is turned on, the solenoid energizes and opens the fuel valve. When the key is turned off, the solenoid releases and allows the fuel stop valve to close.

TESTING FUEL SOLENOID

Adjust cable as described on previous page. This model solenoid will not engage until engine is cranked. Disconnect shut-off cable from fuel shut-off lever and operate start switch. After briefly cranking the engine and with the key switch in the run position, the fuel solenoid should be engaged (pulled in). If it does not engage, check for a blown in-line fuse at the starter. If the fuse is not blown, test the solenoid as follows.

Unplug the wires leading to the fuel solenoid. Using an ohmmeter set on the X 1 OHM scale, connect meter leads to solenoid wires. Correct meter readings should be:

"Comm" wire to "Pull" wire - .25 ohms
"Comm" wire to "Hold" wire - 14 to 16 ohms

If you do not get these readings or one of the circuits reads open, the solenoid is defective and must be replaced.

ENGINE TROUBLESHOOTING

Should you experience trouble in starting the engine, use the following guide to locate possible causes.

Engine will not crank:

- Battery is discharged.
- Blown starter fuse.
- PTO switch is "ON".
- Steering levers are not out in neutral.
- Steering lever switches are out of adjustment (listen for the switch "click").
- A loose wire or connection.

Engine cranks, but will not start:

Determine if the fuel solenoid is stroking when the key switch is turned to the start position. If it is not, check for a blown fuse at the starter (item 17, page 43). If the fuse is not blown, check for voltage in the black wire at the fuel solenoid plug while the engine is cranking. If there is voltage to the solenoid while the engine is cranking, go to solenoid testing in the previous section.

If fuel shut-off solenoid is stroking but the engine will not start, it is possible the fuel line has become filled with air. The possible causes of a fuel line filled with air are:

- Running fuel tank empty before refueling.
- Plugged fuel filter.
- Loose or broken fuel line connection.

To bleed the air from the fuel lines follow the procedure outlined. Refer to "Engine Manual" for illustrations of the parts described.

- Unplug the fuel shut-off solenoid (item 30 page 31).
- Loosen air vent plugs on the fuel filter several turns. Crank the engine until bubbles do not come out any more. Tighten air vent plugs.
- Loosen air vent plug on top of the fuel injection pump. Crank the engine until bubbles do not come out anymore. Tighten air vent plug.

IMPORTANT

Cranking the engine for more than 15 seconds at a time can burn out the fuel solenoid and can lead to premature starter failure.

- Connect the fuel shut-off solenoid.
- If engine will not start after bleeding air from

the line, review trouble shooting section of Engine Manual.

Engine dies when steering levers are engaged:

- If engine starts and runs but dies when either steering lever is engaged, check the following. Make sure the parking brake is released. The steering levers cannot be engaged with the parking brake on. With the key switch "ON" and the seat switch engaged, check for ground at the two yellow wires on the seat switch. If there is ground at one wire but not the other, either the seat switch is defective or it is not being activated properly.
- If there is ground at both yellow wires on the seat switch, check for ground at the yellow wire on the parking brake switch. If there is no ground, the wire between the seat switch and the parking brake switch is broken. If there is ground at the yellow wire, check for ground at the white wire. If there is no ground at the white wire, the parking brake switch is defective and must be replaced.

NOTE: These tests must be performed with an accurate voltmeter. Do not use a test light; the amperage in this circuit is too low to properly light a test light. This circuit is the ground side of relay A.

ENGINE REMOVAL

To remove engine, disconnect: battery, fuel line, electrical wires from engine, throttle and flex coupling connected to coupling hub. Remove the four engine mount bolts to the frame and drive belts from clutch sheave. The engine can now be lifted out. Consult your local authorized engine dealer for repairs or repair parts.

WIRING CIRCUIT BOARD REMOVAL

Remove the circuit board from the console by compressing the keeper in each of the three circuit board support spacers with needle nose pliers (refer to Fig. 7). Slide the board past each keeper when it is compressed.

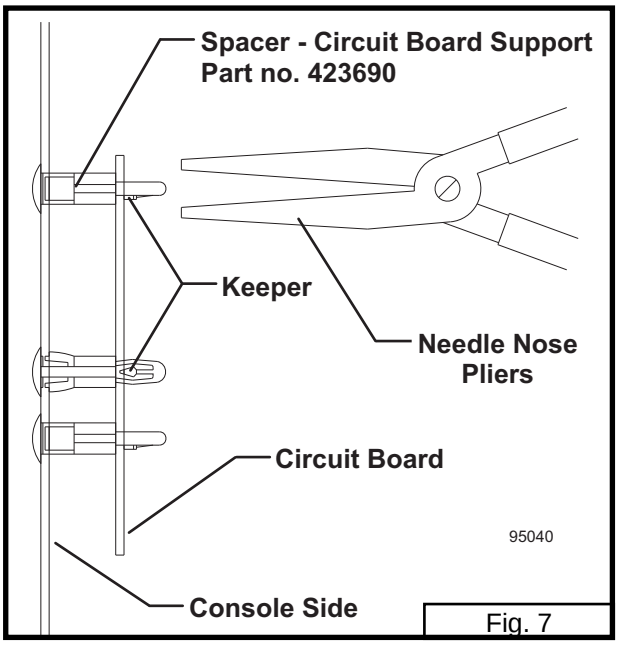


Fig. 7

PARKING BRAKE ADJUSTMENT

(Refer to Fig. 8 and illustration page 35.)
Adjust the right and left brake individually. Disconnect the right brake linkage rod (item 37). Adjust the linkage pin attached to the left brake until it takes 14 lbs. of pull at the top of the hand lever to apply the parking brake. Adjustment of brake linkage arm (item 43) may also be required. Connect the right brake linkage.

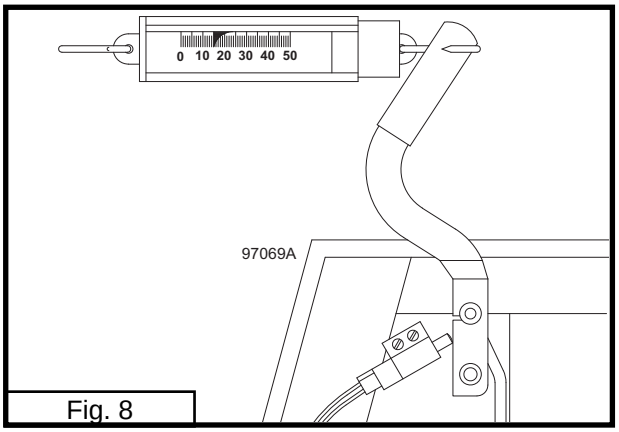


Fig. 8

Disconnect the left brake linkage rod and adjust the linkage pin attached to the right brake until it takes 14 lbs. of pull at the top of the hand lever to apply the parking brake. Connect the left brake linkage.

With both brakes connected it should take 28 lbs. of pull at the top of the hand lever to apply

the parking brake. Adjust the brake linkage arm (item 43) if necessary.

Be sure all cotter pins and jam nuts are secured.

CLUTCH REMOVAL / REPLACEMENT

1. Remove clutch shield (item 19, page 31).
2. Remove clutch bracket (item 28, page 39).
3. Loosen spring tension (item 26, page 39) on drive belt idler pulley and remove drive belts (item 29, page 39).
4. Unplug wires from clutch and remove center bolt (item 19, page 39). Slide clutch back, then remove the five hex socket head bolts (item 10, page 39) to remove clutch and stub shaft together.
5. Remove clutch from stub shaft.
6. Reverse order to install new clutch.
7. Torque stub shaft bolts to 20 ft. lbs.
8. Torque clutch bolt to 50 ft. lbs. Run clutch 15 minutes, then torque to 50 ft. lbs. again.

CLUTCH / BRAKE BURNISHING

IMPORTANT

A new clutch, or one that has not been used for three months, will require burnishing to dress drive surfaces. The clutch could fail if you do not accomplish the following procedure.

Place tractor in neutral, start engine and run at fast idle. Turn clutch switch on 30 seconds and off 30 seconds, five times at half-throttle and repeat five times at full throttle. The time interval allows the clutch surface to cool.

STEERING LEVER ADJUSTMENT

To adjust steering levers, loosen adjustable nuts that secure the levers to the lever mounts. This allows the levers to be moved forwards or backwards (refer to Fig. 9). Set levers to a comfortable position for the operator. Hold levers in an outward position and tighten adjustable nuts. The levers must line up when in neutral position and maintain one inch of clearance between ends of levers. If the levers are allowed to lean toward the center when the adjustable nuts are tightened, free play in the mounting holes may allow the levers to hit each other.

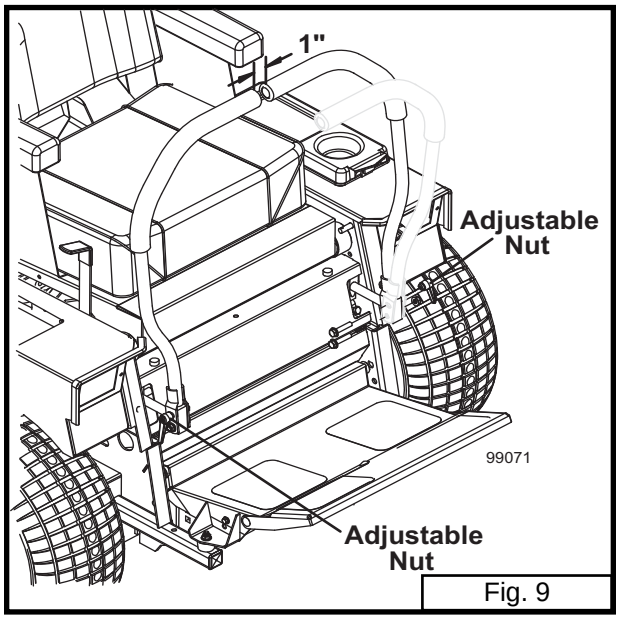


Fig. 9

FOOT REST BLOCK INSTALLATION

If installing a 33, 34 or 95 series deck on a 700 series tractor, install the foot rest blocks with the wide end of block toward the front (refer to Fig. 10).

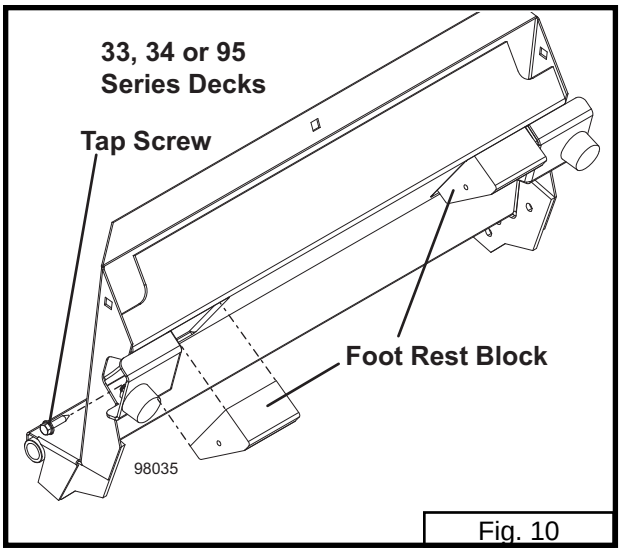


Fig. 10

If installing an SL96, SL98 series or 9772 deck on a 700 series tractor, install the foot rest blocks with the narrow end of block toward the front (refer to Fig.11).

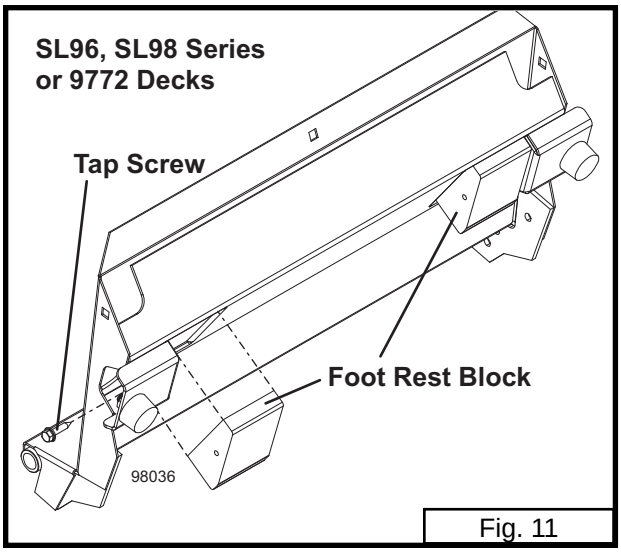


Fig. 11

TRACTION KIT INFORMATION

⚠ CAUTION

Always wear safety glasses and ear protection when performing any maintenance function that could cause injury to eyes or ears.

Read all safety information on pages 6 through 10.

ADJUSTING TRACTION SPRING TENSION

⚠ WARNING

Do not over extend springs. Over extension will cause loss of weight to rear of tractor. This could cause operator to lose control of the machine, particularly while going down hill.

Tighten adjusting bolt (item 6, page 48) until spring is extended 2 inches longer than its relaxed length. This setting applies to all deck models. Make sure deck is at its mid-height position before adjusting. Tighten locking nut (item 7, page 48) against end of spring and install wheel and fender.

REMOVING MOWER DECK FROM TRACTION KIT EQUIPPED TRACTOR

Refer to mower deck manual and reverse attaching procedure.

REAR WEIGHT REQUIREMENTS

⚠ WARNING

Additional weight may be required on the rear of the Grasshopper tractor when a traction kit is installed.

Weight kits are available from your Grasshopper dealer.
50 lb. (22.68 kg.) Weight .....Part No. 503218
Weight Mount Kit .....Part No. 503220

COUNTERWEIGHT REQUIREMENTS - 700 SERIES

COUNTERWEIGHT NOT REQUIRED ON UNITS EQUIPPED WITH COLLECTION SYSTEM

Mower Deck Model	Single Tail Wheel w/o Grasscollector		Other Than Single Tail Wheel w/o Grasscollector	
		w/ 4 Post Rated ROPS or Enclosure		w/ 4 Post Rated ROPS or Enclosure
9544 / SL9644 / 3344	0	50 lbs. (22.68 kg.)	0	50 lbs. (22.68 kg.)
9548 / SL9648 / 3348	0	50 lbs. (22.68 kg.)	0	50 lbs. (22.68 kg.)
9552 / SL9852* / 3452	0	50 lbs. (22.68 kg.)	0	50 lbs. (22.68 kg.)
9561 / SL9861* / 3461	50 lbs. (22.68 kg.)	50 lbs. (22.68 kg.)	0	50 lbs. (22.68 kg.)
9772	Not recommended		100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)
9772 w/ Elect. Height Adj.	Not recommended		100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)
9772 w/ Hyd. Deck Lift	Includes Max Trax and 50# counterweight. Requires an additional 100# for a total of 150# counterweight with 72" deck.			
AERA-vator 40"	50 lbs. (22.68 kg.)	150 lbs. (68.04 kg.)	50 lbs. (22.68 kg.)	150 lbs. (68.04 kg.)
AERA-vator 60"	100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)	100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)
Brooms: Bidirectional	100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)	100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)
Fixed Angle	50 lbs. (22.68 kg.)	150 lbs. (68.04 kg.)	50 lbs. (22.68 kg.)	150 lbs. (68.04 kg.)
Snowthrowers, 48" & 60"	100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)	100 lbs. (45.36 kg.)	150 lbs. (68.04 kg.)

* **Deck Tilt Assist Kit**: Requires an additional 50 lbs. of counterweight, unless unit is already equipped with 150 lbs. of counterweight.

This chart applies to both the standard single tail wheel and the optional dual tail wheel.

PARTS LISTS AND ILLUSTRATIONS

When ordering parts, use the description and part number as stated in this manual. Also include the serial number of the tractor or attachment the parts are to be used on.

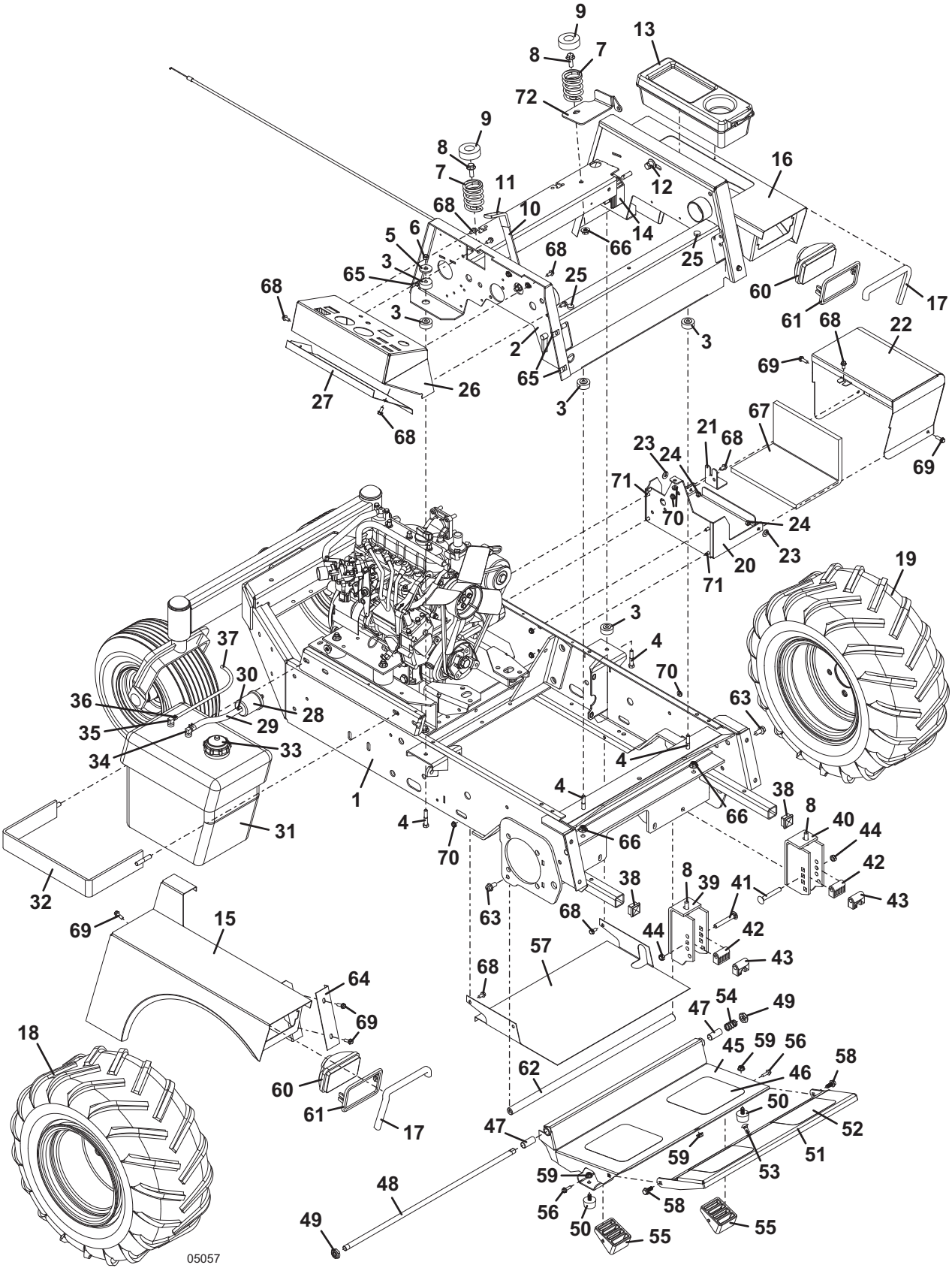
TRACTOR ASSEMBLY

Item No.	Order No.	Description
1	644368	Tractor Frame – Lower
2	643872	Tractor Frame – Upper
3	257037	Rubber Step Bushing
4	243220	Bolt .312-18 x 1.75
5	774020	Washer - .406 x 1.25
6	253450	Nut .312-18 Nylon Insert
7	283516	Seat Spring
8	253203	Whiz Bolt .375-16 x 1
9	422127	Seat Spring Cap
10	603858	Throttle Assembly
		(includes cable assembly)
	323656	Cable Assembly
	722009	Throttle Lever Stop
	722736	Throttle Stop – Heavy Duty
11	422150	Handle Grip
12	902280	Spacer
	243335	Bolt .375-16 x 1.25
	257040	Washer .375
13	422040	Tool Box
14	185530	Voltage Regulator 12V
15	693210	Fender Rt.
16	693211	Fender Lt.
17	822635	Trim – Fender Edge
18	483942	Wheel & Tire 22 x 11 x 10 Bar Tread Rt.
19	483943	Wheel & Tire 22 x 11 x 10 Bar Tread Lt.
	482483	Tire 22 x 11 x 10 Bar Tread
	483420	Wheel 10.00
	483946	Wheel & Tire 22 x 10 x 10 Turf Tread (Opt)
	482473	Tire 22 x 10 x 10 Turf Tread (Opt)
20	644163	Battery Box
21	754135	Battery Hold Down Bracket
22	644478	Battery Box Lid
23	257020	Washer .25
24	253440	Nut .25-20 Nylon Insert
25	424015	Rubber Bumper
26	693104	Console w/Decal
27	721152	Fill Panel – Console
28	101005	Fuel Prefilter
29	821713	Hose - Fuel Line .312 ID
30	280261	Hose Clamp .312
31	603812	Fuel Tank w/Draw Tube
		(includes items 34 & 35)
32	643144	Fuel Tank Mounting Bracket
33	141125	Cap w/Fuel Gauge
34	101818	Fuel Draw Tube
35	101817	Fuel Tube .187
36	280257	Hose Clamp - Spring
37	821740	Hose - Fuel Return Line
38	422065	Square Plug 1"
39	643092	Deck Mount Rt.
40	643093	Deck Mount Lt.
41	247280	Bolt .375-16 x 2.75 Carriage-Special
42	282575	Deck Mount Bushing
43	282576	Deck Mount Bushing - Floating (Opt.)
44	253460	Nut .375-16 Nylon Insert
45	604346	Foot Platform w/Tread, Bearings & Blocks
		(includes items 46, 47, 55 & 56)
46	420905	Foot Rest Tread
47	422615	Nylon Bearing
48	780673	Pivot Rod – Foot Platform
49	253470	Nut .5-13 Nylon Insert
50	424052	Rubber Bumper
51	603301	Extension – Foot Platform w/Tread
52	420904	Foot Platform Extension Tread
53	247130	Carriage Bolt .312-18 x .75
54	283312	Compression Spring
55	424100	Foot Rest Block
56	243026	Tap Screw .25 x 1
57	721388	Trash Shield
58	253192	Whiz Bolt .312-18 x .75
59	253035	Whiz Nut .312-18
60	182253	Work Lamp
61	182251	Bezel – Snap Mount
62	780900	Tension Rod
63	253200	Whiz Bolt .375-16 x .75
64	722062	Cover Panel – Right Fender
65	254431	Speed Nut .25-20
66	253043	Whiz Nut .375-16
67	427278	Pad – Battery Tray
68	253173	Whiz Bolt .25-20 x .5 Hex
69	253175	Whiz Bolt .25-20 x .75
70	253025	Whiz Nut .25-20
71	253176	Whiz Bolt .25-20 x .5 Truss
72	729230	Reinforcement – Brake Pin

Item not pictured:

605306 Decal Set - 721D H^2 Tractor

TRACTOR ASSEMBLY

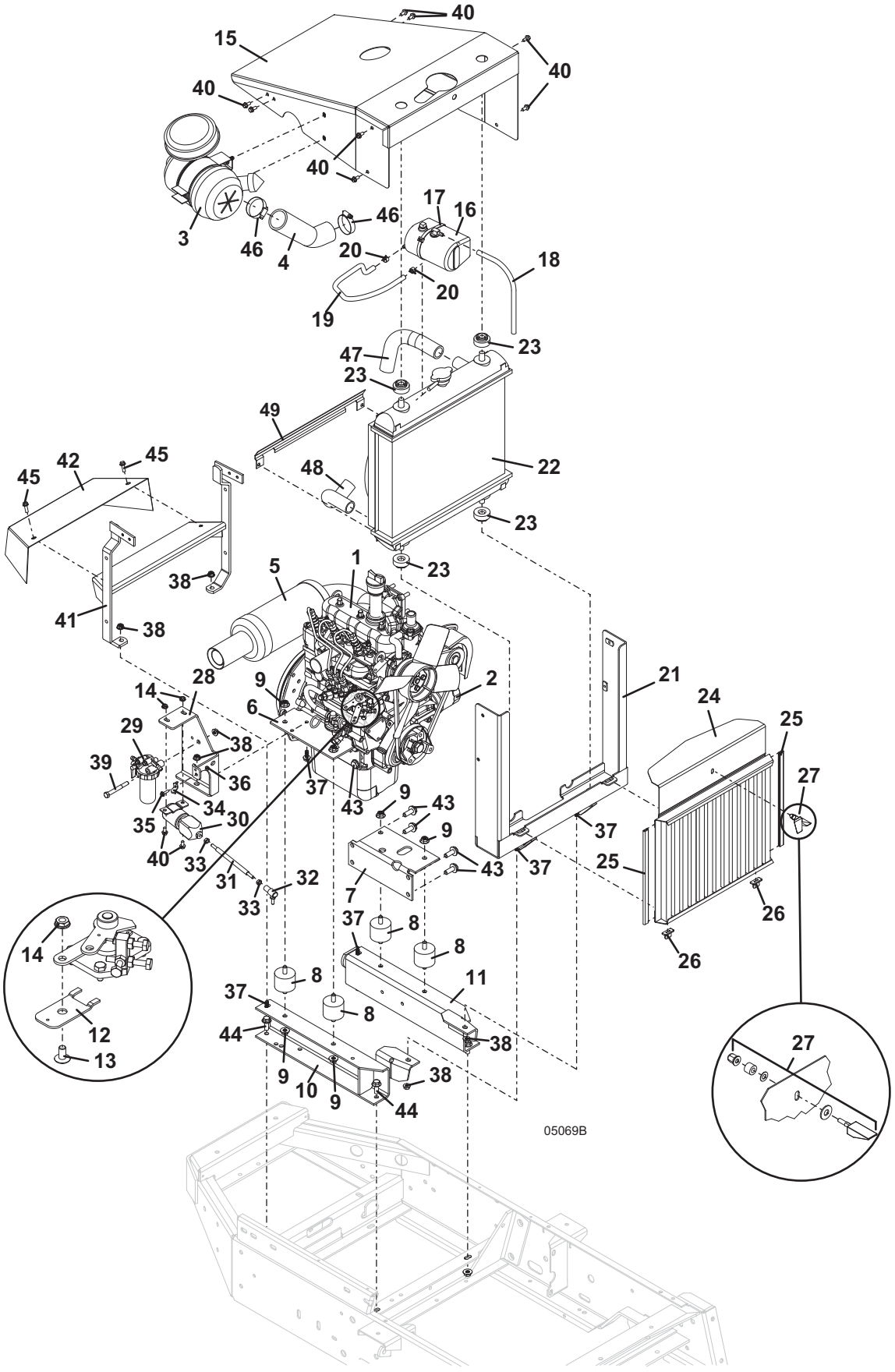


ENGINE ASSEMBLY

Item No.	Order No.	Description	Item No.	Order No.	Description
1	100176	Engine – Kubota Diesel	24	644671	Grille
2	100800*	Oil Filter (Kubota 70000-15241)	25	822636	Trim - Grille
3	100208	Air Cleaner	26	422090	Isolator
	100942	Air Filter - Primary	27	604805	Swell Latch Assembly
	100943	Air Filter - Inner	28	755121	Mount – Solenoid/Filter
4	424517	Hose – Air Intake	29	101000	Fuel Filter
5	603590	Muffler w/Gasket	30	603350	Fuel Solenoid
	101040	Muffler Gasket	31	603209	Cable Assembly
6	643292	Engine Mount – Rt.	32	265610	Ball Joint
7	643291	Engine Mount – Lt.	33	254434	Nut .25-28
8	424078	Vibration Isolator	34	180635	Clip – Conduit
9	253043	Whiz Nut .375-16	35	250258	Screw 10-24 x .75
10	643864	Mount – Engine Lower Rt.	36	253020	Whiz Nut 10-24
11	643865	Mount – Engine Lower Lt.	37	253192	Whiz Bolt .312-18 x .75
12	723063	Linkage Extension – Throttle Cable	38	253035	Whiz Nut .312-18
13	253176	Whiz Bolt .25-20 x .5	39	243240	Bolt .312-18 x 2.75
14	253025	Whiz Nut .25-20	40	253173	Whiz Bolt .25-20 x .5
15	644384	Hood Assembly	41	643866	Support – Hood Rear
16	422012	Expansion Tank	42	643766	Shield – Clutch
17	423154	Tie .25 x 15	43	271121	Flange Bolt M10 x 1.25 x 20
18	821748	Hose – Tank Overflow	44	253203	Whiz Bolt .375-16
19	821749	Hose – Radiator Overflow	45	253175	Whiz Bolt .25-20 x .75
20	280260	Hose Clamp – Spring .25	46	280303	Hose Clamp – Screw Type 2.25
21	644651	Radiator Mount	47	101054	Radiator Hose – Upper
22	101612	Radiator	48	101055	Radiator Hose – Lower
23	101080	Radiator Mount Bushing	49	721006	Fan Shield

* Kubota part number 70000-15241 replaces original equipment Kubota part number 15841-32430.

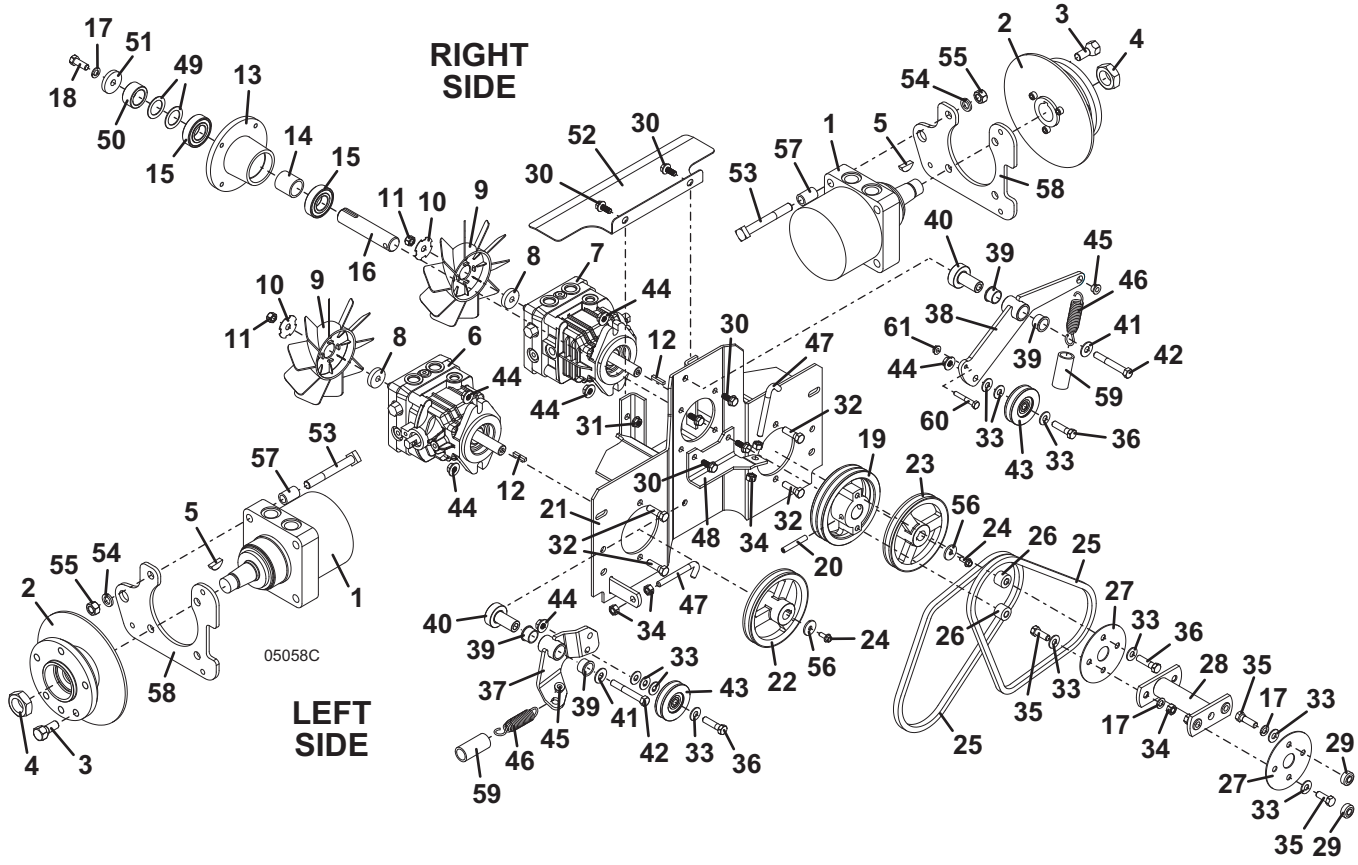
ENGINE ASSEMBLY



DRIVE ASSEMBLY

Item No.	Order No.	Description
1	603611	Wheel Motor (includes items 2, 4 and 5)
2	604442	Hub & Rotor Assembly
3	248565	Lug .5 x .875
4	254522	Jam Nut 1-20 w/Nylok
5	281860	Woodruff Key .312 x 1
6	391434	Hydro Pump Lt. w/Fan
7	391435	Hydro Pump Rt. w/Fan
8	130430	Fan Hub
9	130431	Hydro Fan
10	130432	Retainer Washer – Fan
11	253461	Nut .375-24 Nylon Insert
12	281560	Key .187 x 1 Square
13	320522	Spindle Housing
14	903650	Spacer
15	110080	Bearing – 25mm
16	882052	Drive Shaft
17	257412	Lock Washer .375
18	243331	Bolt .375-24 x 1
19	415037	Sheave
20	261061	Spiral Roll Pin .312 x 2 HD
21	644629	Pump Mount
22	415027	Sheave
23	415028	Sheave
24	270822	Flange Bolt M6 x 1 x 16
25	381537	Belt
26	902328	Spacer
27	821530	Disc – Flex Coupling
28	644118	Coupling Connector
29	902318	Spacer - Coupling
30	253192	Whiz Bolt .312-18 x .75
31	253035	Whiz Nut .312-18
32	243335	Bolt .375-16 x 1.25
33	257030	Washer .312
34	254450	Nut .375-16
35	243330	Bolt .375-16 x 1
36	243340	Bolt .375-16 x 1.5
37	824491	Idler Arm Assembly – Lower (includes items 39 & 40)
38	604450	Idler Arm Assembly – Upper (includes items 39, 40, 60 & 61)
39	121756	Oilite Bearing – Flange
40	121650	Bearing Pedestal
41	257040	Washer .375
42	243360	Bolt .375-16 x 2.75
43	604449	Idler Pulley
44	253043	Whiz Nut .375-16
45	422520	Nylon Bearing
46	283819	Extension Spring w/Swivel
47	730391	Idler Adjustment Bolt
48	725028	Spring Bracket
49	257106	Washer 1 x 18 Ga. Bushing
50	282630	Spacer .75
51	883801	Washer .25 x .406 x 1.5
52	723154	Fan Shield
53	243622	Sq. Head Bolt .5-13 x 4
54	257432	Lock Washer .5
55	254470	Nut .5-13
56	774012	Washer .281 x 1
57	902299	Spacer – Wheel Motor
58	776274	Mount – Brake & Traction Kit
59	822684	Clear Tubing
60	243038	Bolt .25-20 x 1.75
61	253025	Whiz Nut .25-20

DRIVE ASSEMBLY



DRIVE LINKAGE ASSEMBLY

Item No.	Order No.	Description	Item No.	Order No.	Description
1	391434	Hydro Pump Lt.	24	261284	Clevis Pin .312 x 1
2	391435	Hydro Pump Rt.	25	822304	Pivot Bearing
3	725338	Control Arm - Pump	26	257030	Washer .312
4	285031	Damper w/Ball Socket & Retainer	27	243335	Bolt .375-16 x 1.25
		(includes item 5)	28	253890	Lock Nut .375-16
5	265680	Ball Stud	29	644539	Brake Pivot Linkage Rod
6	780164	Steering Linkage Pump Rod	30	732616	Mount Bracket – Brake Pivot
7	265616	Ball Joint LH	31	644588	Mount – Brake Caliper
8	254444	Nut .312-24 LH Thread	32	247130	Carriage Bolt .312-18 x .75
9	265615	Ball Joint .312-24 RH Thread	33	481102	Caliper Brake Assembly – CW*
10	254441	Nut .312-24 RH Thread		603150	Brake Pad Kit
11	603726	Roller Assembly – Eccentric	34	481103	Caliper Brake Assembly – CCW*
		(includes items 12 & 13)		603150	Brake Pad Kit
12	257410	External Star Washer	35	243195	Bolt .312-18 x .75
13	254450	Nut .375-16	36	253182	Whiz Bolt .25-20 x 1.5
14	253035	Whiz Nut .312-18	37	780158	Linkage Rod – Brake
15	243035	Bolt .25-20 x 1.5	38	880926	Linkage Pin – Brake
16	253025	Whiz Nut .25-20	39	260606	Ring Cotter .047 x .312
17	754120	Neutral Return Mount – Rt.	40	644035	Brake Lever
18	754121	Neutral Return Mount – Lt.	41	422150	Handle Grip
19	729138	Neutral Return Arm Rear – Rt.	42	782851	Brake Strap
20	729139	Neutral Return Arm Rear – Lt.	43	644036	Brake Linkage Arm
21	729136	Neutral Return Arm Front – Rt.	44	265537	Clevis Yoke .312-24
22	729137	Neutral Return Arm Front – Lt.	45	253038	Whiz Nut .312-24
23	283823	Extension Spring			

*To determine CW or CCW, hold the brake assembly in hand with the ribs on brake facing toward you and the lever in the disengaged position. The direction of rotation of lever, when engaging brake, determines CW or CCW.

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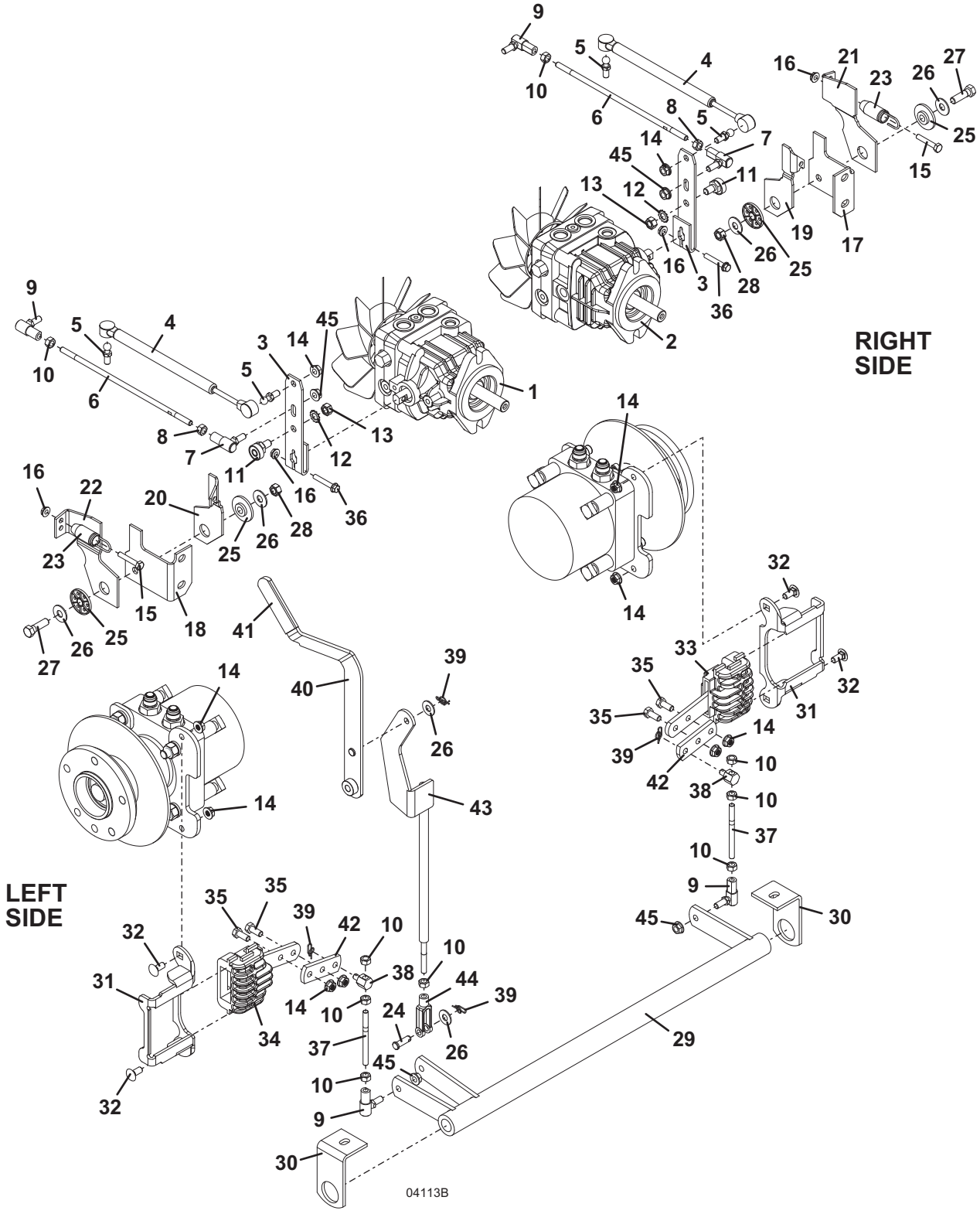
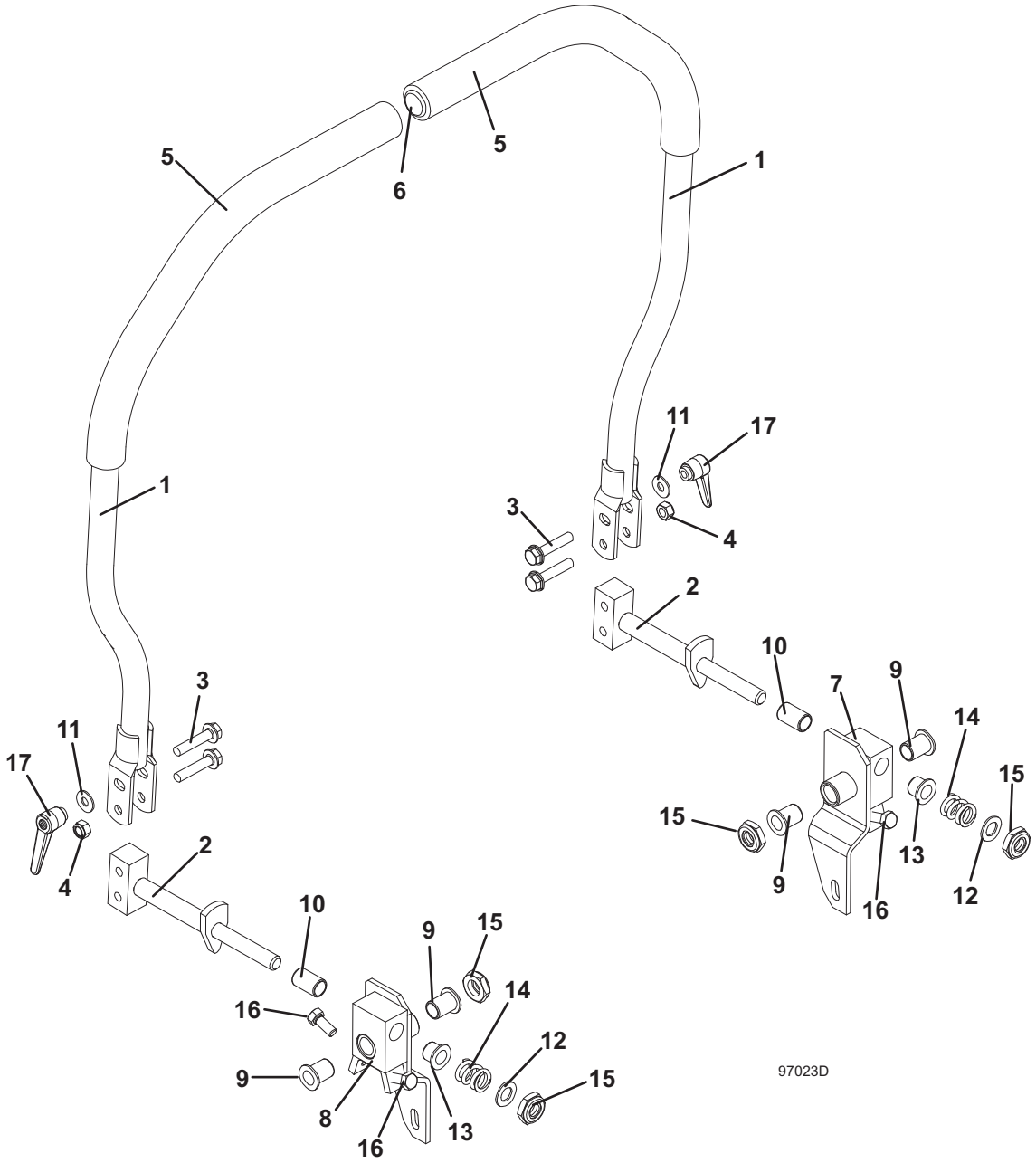
DRIVE LINKAGE ASSEMBLY

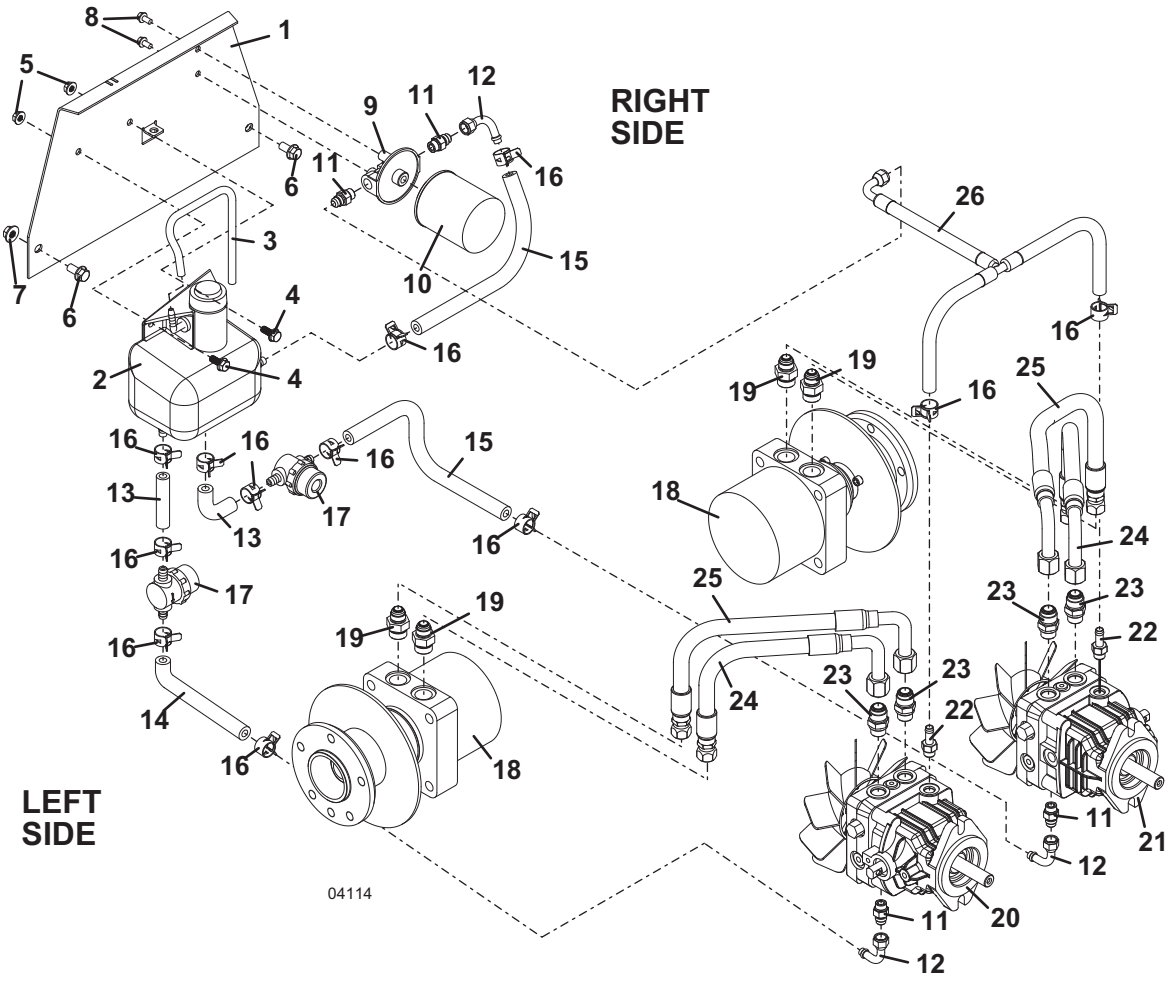


STEERING ASSEMBLY



Item No.	Order No.	Description	Item No.	Order No.	Description
1	604778	Steering Lever Assembly (includes item 5 and 6)	10	422557	Bearing
			11	257019	Washer .25 Hard
2	643926	Steering Lever Mount	12	257063	Nylon Washer
3	253195	Hex Whiz Bolt .312-18 x 1.5	13	422556	Bearing w/Flange
4	253450	Nut .312-18 Nylon Insert	14	283324	Compression Spring
5	422179	Handle Grip - Foam	15	253470	Nut .5-13 Nylon Insert
6	422095	Vinyl Cap	16	243197	Stop Bolt .312-18 x .75
7	604771	Steering Pivot Rt. w/Stop & Bearings	17	254438	Nut .375-16 Adj. Lever
8	604772	Steering Pivot Lt. w/Stop & Bearings			
9	422559	Bearing w/Flange			

RESERVOIR & HOSE ASSEMBLY



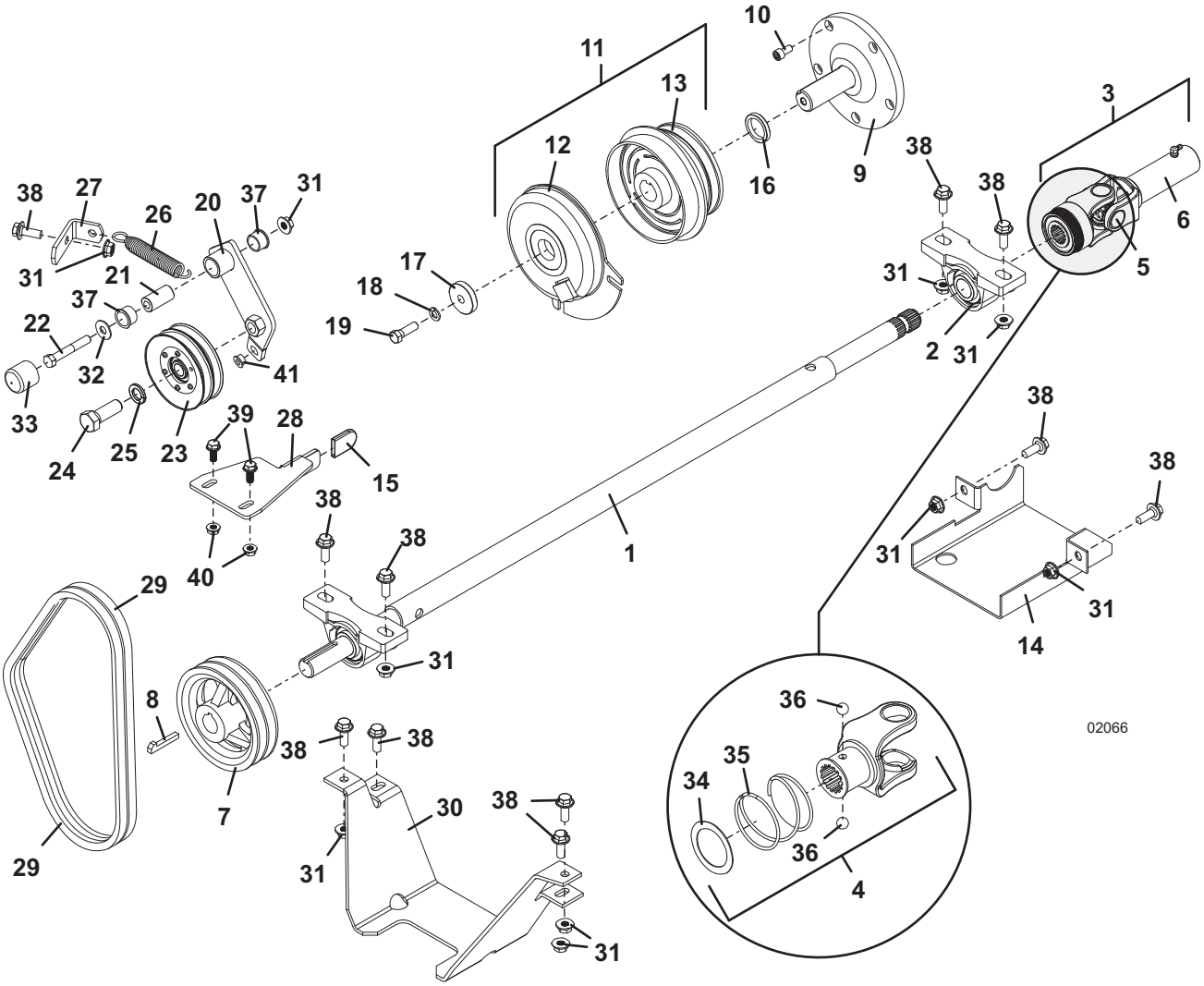
Item No.	Order No.	Description
1	723225	Plate – Filter Base
2	822332	Fluid Reservoir
	421990	Cap - Reservoir
3	821724	Clear Vent Hose
4	253192	Whiz Bolt .312-18 x .75
5	253035	Whiz Nut .312-18
6	253200	Whiz Bolt .375-16 x .75
7	253043	Whiz Nut .375-16
8	253173	Whiz Bolt .25-20 x .5
9	101024	Filter Base
10	100855	Oil Filter
11	360057	Adapter 6MJ-6MB
12	363846	Fitting #6 Beaded Stem 90°
13	821792	Hose - .375 Hydraulic 3"
14	821786	Hose - .375 Hydraulic 6.5"
15	821784	Hose - .375 Hydraulic 11.25"
16	280264	Hose Clamp – Spring .375 TOC
17	366551	Strainer – In Line .375
18	603611	Wheel Motor W/Hub
19	360063	Adapter - O-Ring 8MJ/10MB
20	391434	Hydro – H2 Lt.
21	391435	Hydro – H2 Rt.
22	363864	Fitting O-Ring Boss 6-6 MB
23	360064	Adapter - O-Ring 8MB/10MJ
24	424371	Hose Assembly .5 x 15
25	424372	Hose Assembly .5 x 17.5
26	424316	Hose Assembly .375 x 9 x 9.5 x 9.5

04114

PTO SHAFT & CLUTCH ASSEMBLY

Item No.	Order No.	Description	Item No.	Order No.	Description
1	644725	Splined Power Shaft	22	243355	Bolt .375-16 x 2.5
2	122044	Pillowblock Bearing	23	415610	Idler Pulley
3	398914	Sleeve Sect. Q.D. Drive Shaft	24	243805	Bolt .625-11 x 1.75
4	401019	Yoke Splined Quick Disconnect	25	257452	Lock Washer .625
5	121010	Cross & Bearing	26	283820	Spring Extension w/Swivel
6	401017	Yoke w/Sleeve	27	732539	Idler Spring Bracket
7	415650	Sheave	28	725118	Clutch Anti-Rotation Bracket
8	281588	Gib Key .25 x 1.5	29	381914	Drive Belt (two required)
9	824637	Clutch Stub Shaft	30	725286	Rear Sheave Guard
10	270075	Socket Hd. 8M x 1.25 x 16	31	253043	Whiz Nut .375-16 Large Flange
11	388769	Electric Clutch	32	257040	Flat Washer .375
12	388872	Field Assembly w/Brake	33	422098	Vinyl Cap
13	388862	Armature & Rotor Assembly	34	263660	External Retainer
14	729287	PTO Shaft Shield	35	283525	Compression Spring
15	422088	Clutch Bracket Cover	36	300014	Steel Ball
16	902583	Spacer 1.125 x .225	37	121756	Oilite Bearing
17	883803	Retaining Washer 11M x 1.62	38	253203	Whiz Bolt .375-16 x 1
18	257412	Lock Washer .375	39	253192	Whiz Bolt .312-18 x .75
19	243337	Bolt .375-24 x 1.25 Grade 8	40	253035	Whiz Nut .312-18
20	824499	Idler Arm (includes items 21 & 37)	41	422520	Nylon Bearing
21	881105	Bearing Pivot Shaft			

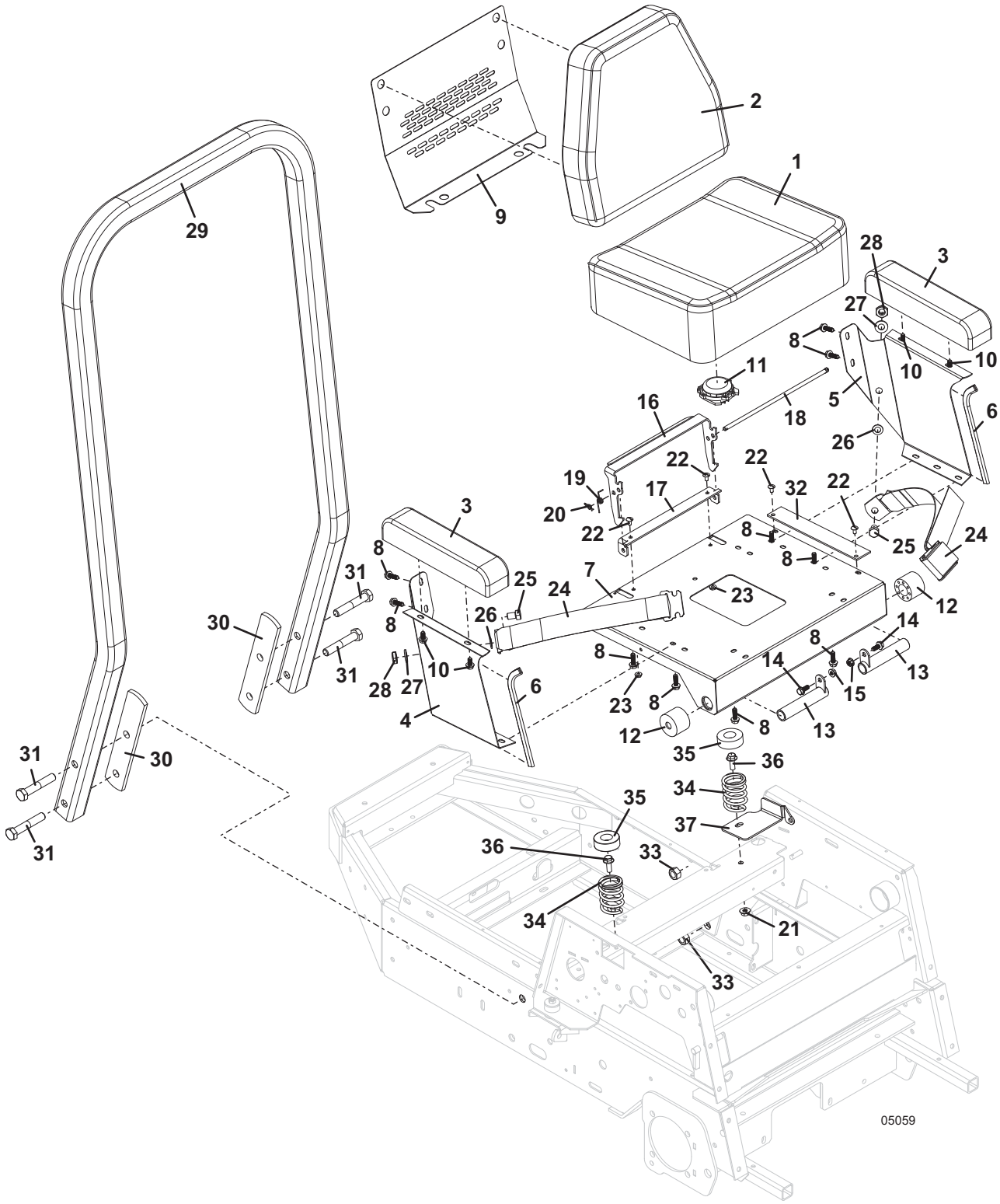
PTO SHAFT & CLUTCH ASSEMBLY



ROPS & SEAT ASSEMBLY

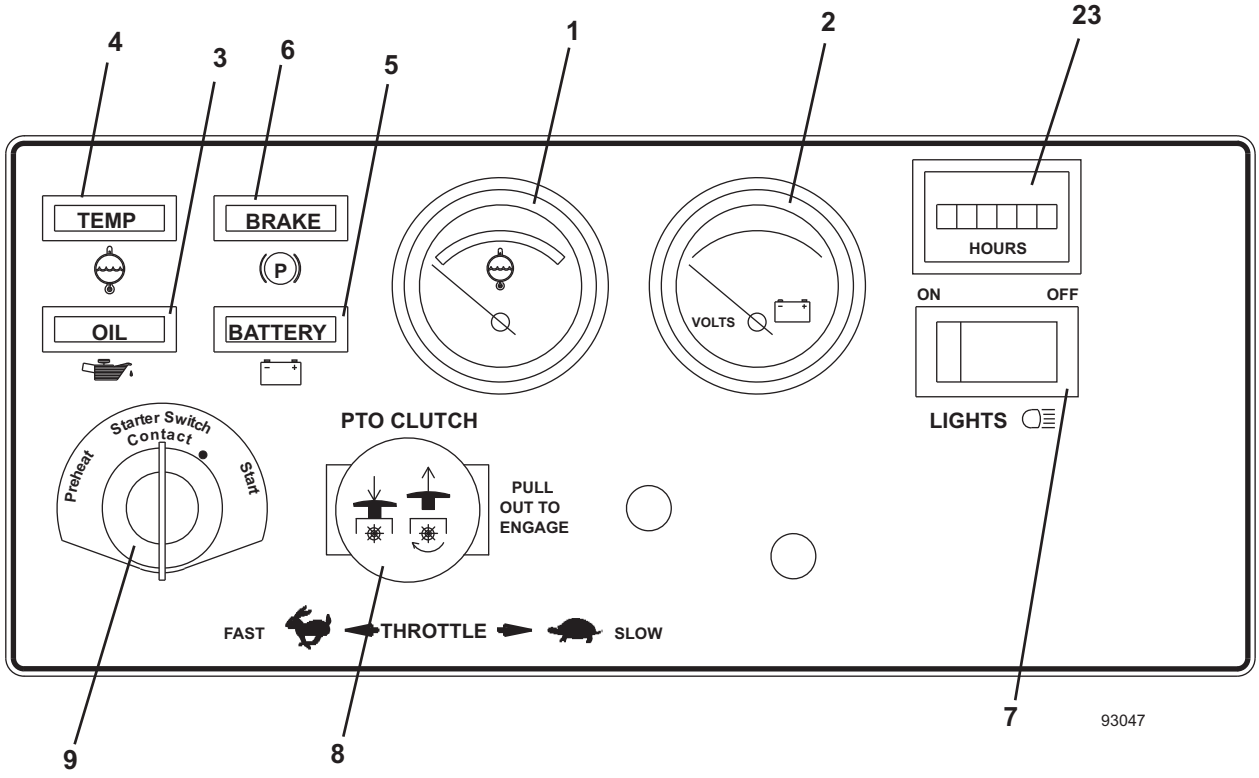
Item No.	Order No.	Description	Item No.	Order No.	Description
1	321518	Seat Cushion	20	260606	Ring Cotter .047 x .312
2	321519	Back Cushion	21	253043	Whiz Nut .375-16
3	321523	Arm Rest	22	253176	Whiz Bolt .25-20 x .5
4	723386	Side Member – Rt.	23	253025	Whiz Nut .25-20
5	723387	Side Member – Lt.	24	324200	Seat Belt – Non Retract
6	822630	Seat Edge Trim	25	243551	Bolt .5-13 x .75
7	644816	Seat Bottom	26	257063	Nylon Washer .5
8	253193	Whiz Bolt .312-18 x 1	27	257062	Washer .5 SAE
9	722388	Seat Panel	28	253470	Nut .5-13 Nylon Insert
10	253191	Whiz Bolt .312-18 x .625	29	324103	ROPS Tube
11	183871	Seat Switch - Twist	30	901645	Spacer - ROPS
12	424095	Seat Isolator	31	243840	Bolt .625-11 x 3.5
13	644618	Seat Hinge Pin	32	424176	Flap – Seat Panel
14	253192	Whiz Bolt .312-18 x .75	33	253970	Lock Nut .625-11
15	253035	Whiz Nut .312-18	34	283516	Spring – Compression
16	754240	Seat Handle – Dual Latch	35	422127	Cap – Seat Spring
17	754226	Reinforcement – Seat Handle	36	253203	Whiz Bolt .375-16 x 1
18	730230	Pivot Pin - Seat	37	729230	Reinforcement – Brake Pin
19	284408	Torsion Spring			

ROPS & SEAT ASSEMBLY

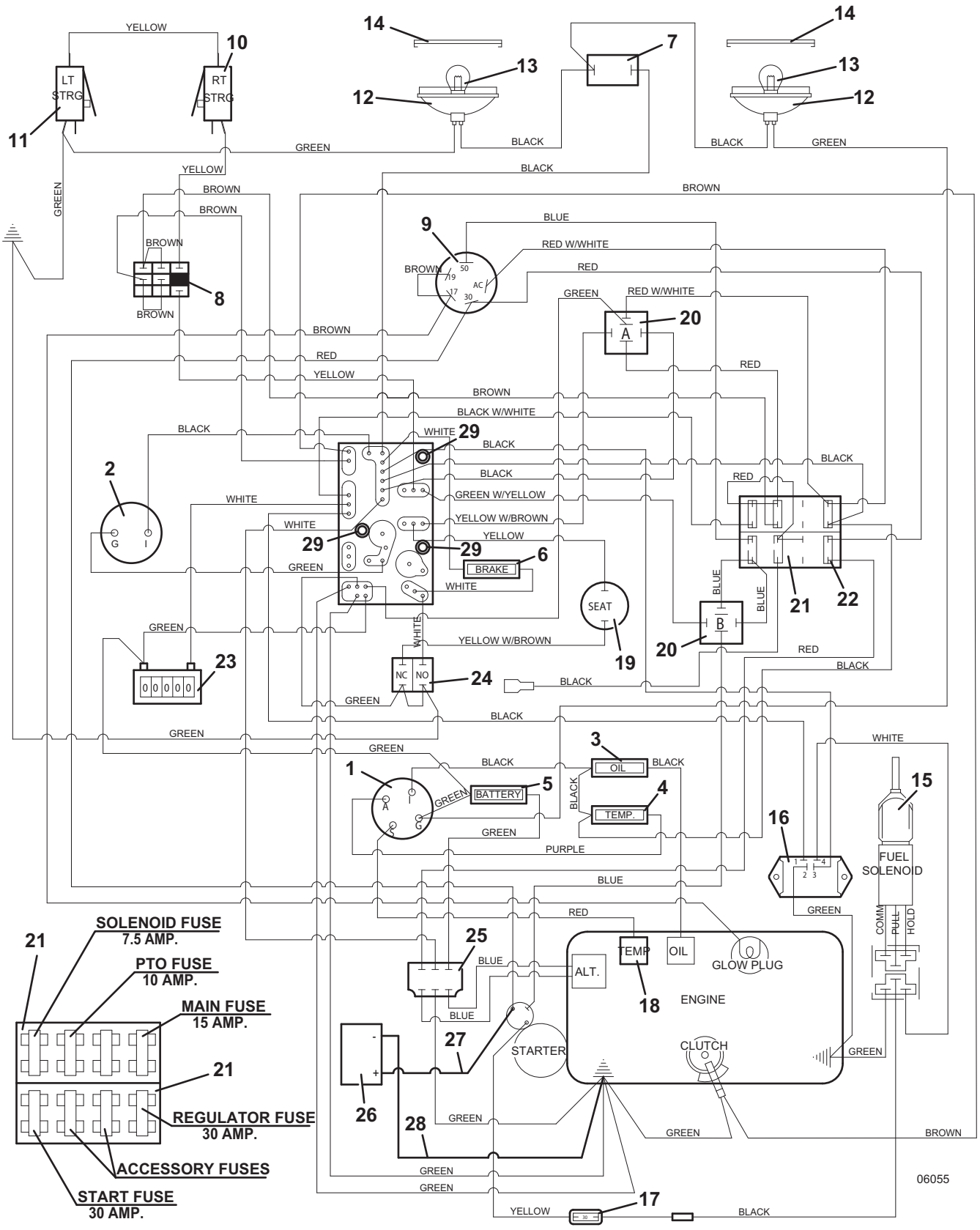


WIRING DIAGRAM

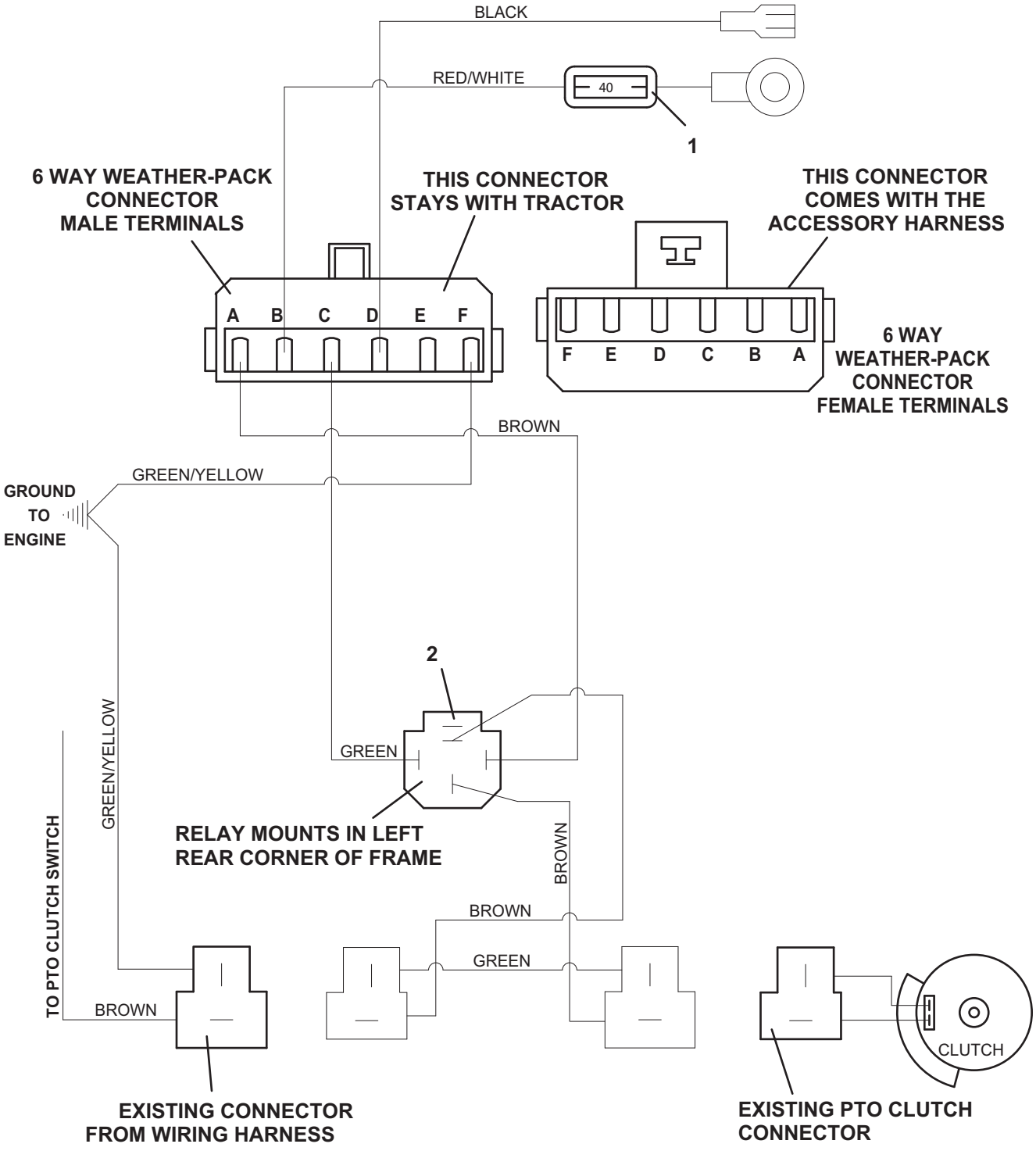
Item No.	Order No.	Description	Item No.	Order No.	Description
	604974	Wiring Assembly - 721D	18	141222	Temperature Sender
	161131	Decal - Console	19	183871	Seat Safety Switch
1	141160	Coolant Temperature Gauge	20	184272	Relay
2	141200	Voltmeter Gauge	21	181722	Fuse Block
3	182327	Oil Indicator Light		184458	1 Wire Clip
4	182328	Temperature Indicator Light		184460	2 Wire Clip
5	182325	Battery Indicator Light		184472	Double Clip
6	182326	Brake Indicator Light	22	181470	Fuse 30 Amp Auto
7	184179	Light Switch		181465	Fuse 15 Amp Auto
8	183925	Clutch Switch		181462	Fuse 10 Amp Auto
9	183827	Ignition Switch		181460	Fuse 7.5 Amp Auto
10	183860	Safety Switch - Rt. Steering	23	141551	Hour Meter
	720160	Rt. Steering Switch Mount	24	183894	Brake Switch
11	183860	Safety Switch - Lt. Steering	25	185530	Voltage Regulator
	720161	Lt. Steering Switch Mount	26	180130	Battery - 12V
12	182253	Worklight Assembly		243309	Bolt .375-16 x .375 Washer Head
		(includes item 13)		644163	Battery Box
13	182005	Light Bulb		644478	Battery Box Lid
14	182251	Bezel		754135	Battery Hold Down Bracket
15	603350	Fuel Solenoid	27	180313	Battery Cable 14"
16	184220	Module - Switch Interlock		425219	Battery Terminal Boot
17	181735	Fuse Holder	28	180276	Ground Cable 16"
	181470	Fuse 30 Amp Auto	29	423690	Spacer - PC Board Support



WIRING DIAGRAM



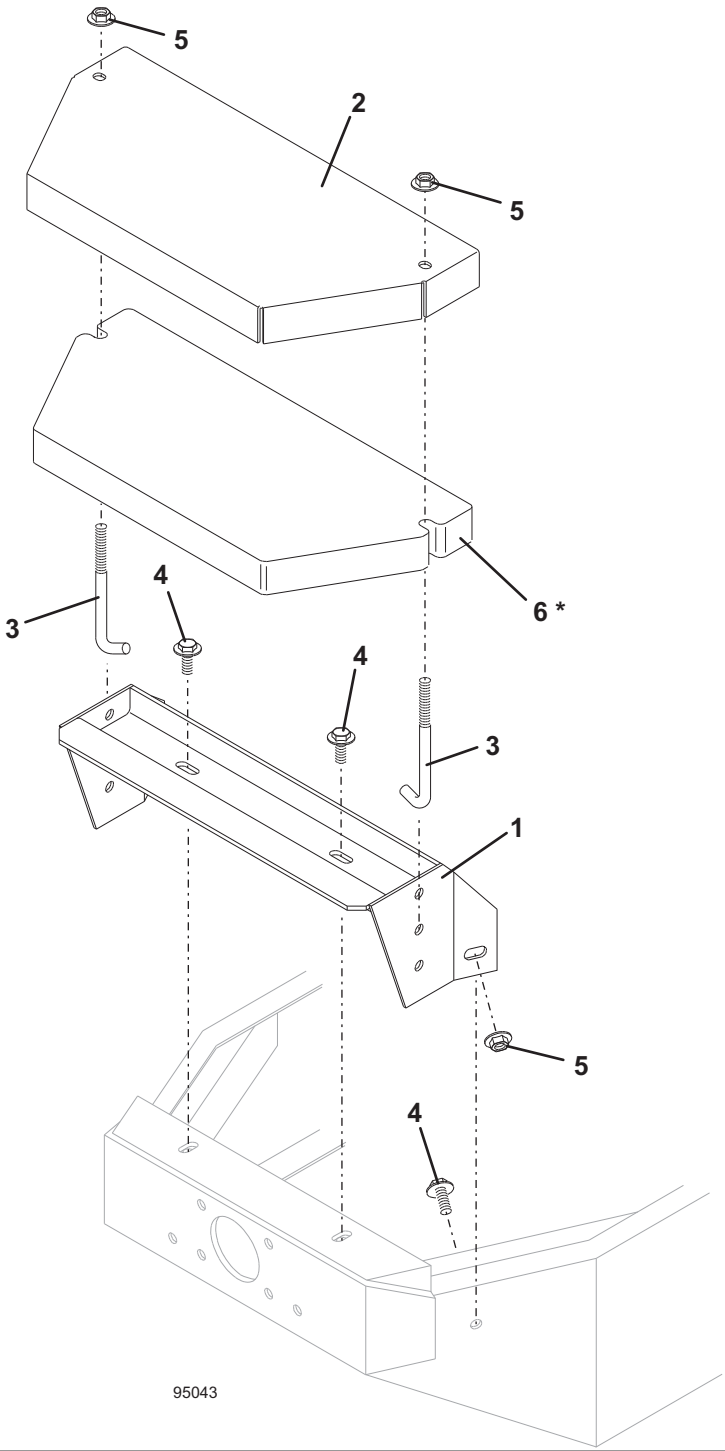
LIMITED UNIVERSAL HARNESS
(OPTIONAL ON ALL NON-HYDRAULIC LIFT MODELS)



05066

Item No.	Order No.	Description
	605957	Limited Universal Harness
1	181475	Fuse Auto - 40 Amp.
2	184271	Relay

COUNTERWEIGHT MOUNT KIT



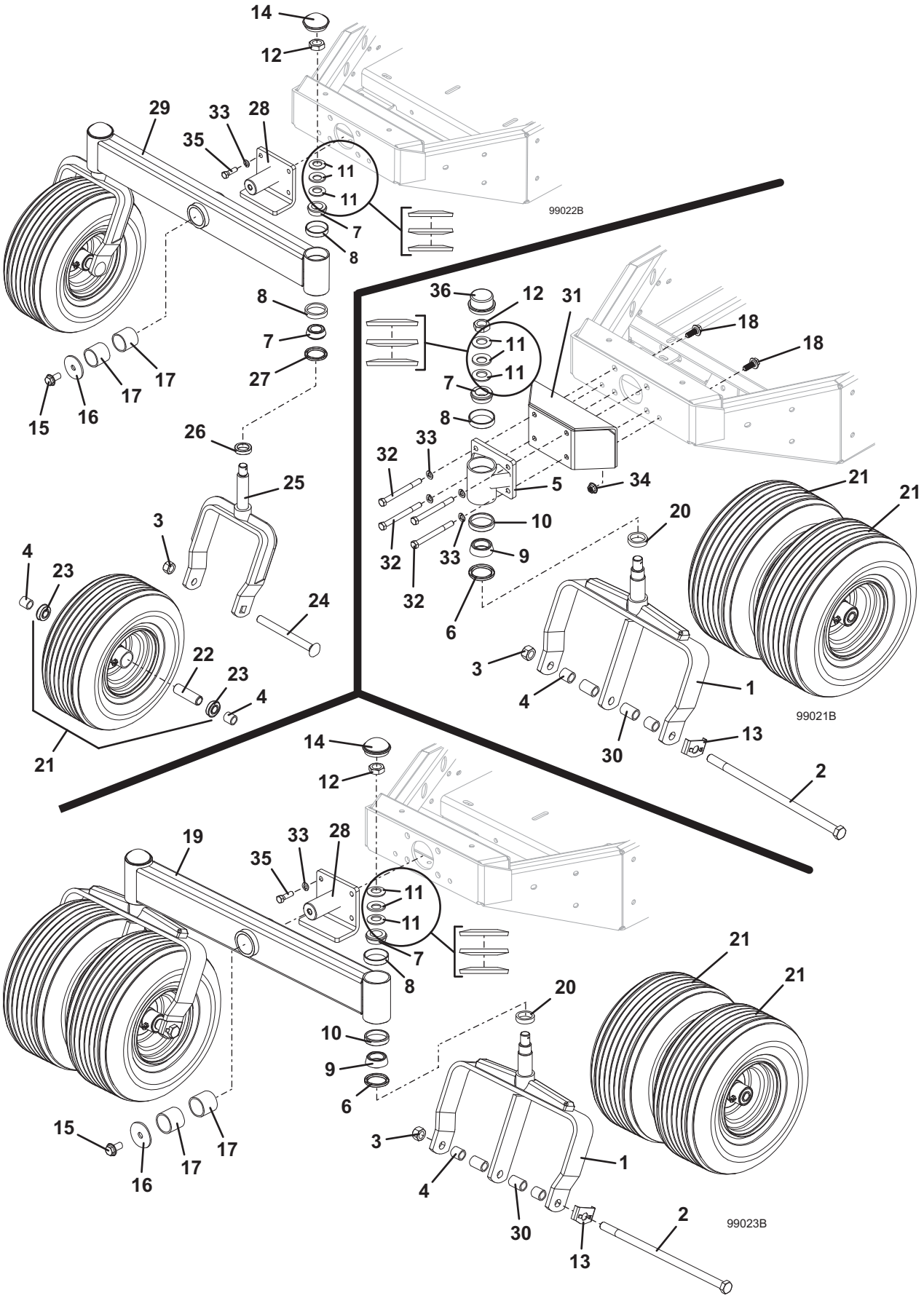
Item No.	Order No.	Description	Item No.	Order No.	Description
	503220	Counterweight Mount Kit	4	253203	Whiz Bolt .375-16 x 1
1	643915	Weight Mount	5	253043	Whiz Nut .375-16 Lg Flange
2	729691	Weight Cover	*6	503218	Counterweight - 50#
3	240151	Hook Bolt .375-16 x 6			
			*	Not Included in Kit	

95043

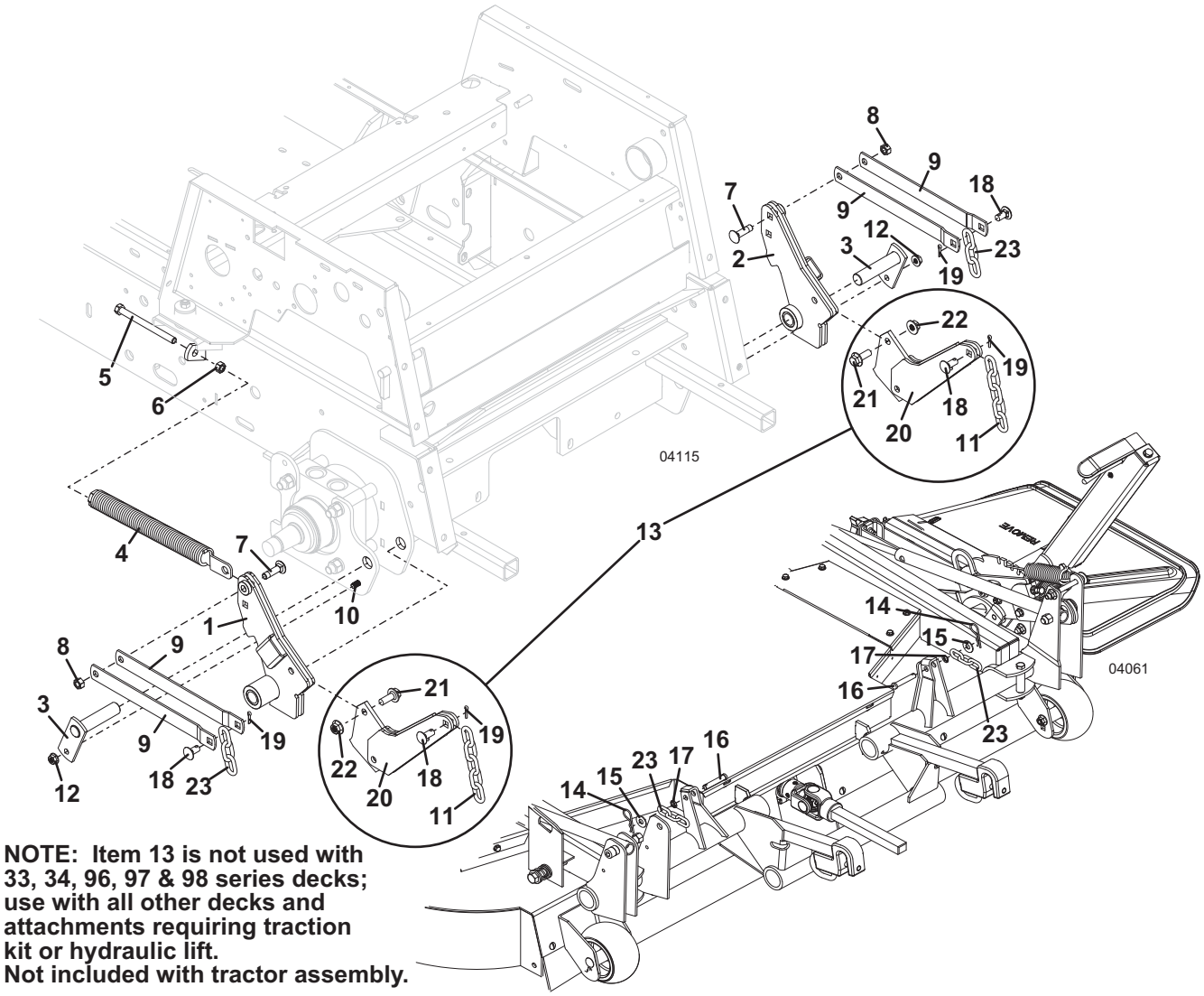
TAIL WHEEL OPTIONS

Item No.	Order No.	Description	Item No.	Order No.	Description
1	604366	Dual Fork With Nut	21	483865	Wheel & Tire Assembly 13 x 6.5 x 6
2	243922	Bolt .625-11 x 14			w/Bearing & Spacer
3	253970	Lock Nut .625-11		482355	Tire 13 x 6.5 x 6
4	902425	Axle Spacer		483306	Wheel Without Tire 6 x 4.5
5	824534	Pivot Housing - Rear Dual Fork	22	902475	Bearing Spacer
6	125855	Seal	23	120050	Wheel Bearing
7	122522	Bearing - Taper	24	247725	Bolt .625 x 7 Carriage
8	123522	Bearing Cup	25	604365	Rear Fork With Nut
9	122523	Bearing - Taper	26	282615	Spacer .375 x 1
10	123521	Bearing Cup	27	125855	Seal
11	257320	Washer - Spring	28	643631	Rear Axle Pivot
12	254505	Jam Nut .75-16 Nylon Toplock	29	824510	Axle Beam w/Bushing
13	723008	Bolt Lock	30	902427	Axle Spacer
14	481434	Dust Cap - Domed	31	643015	Pivot Mount Adapter
15	253243	Whiz Bolt .5-13 x 1	32	243385	Bolt .375-16 x 4
16	257061	Washer .5 x 2.25	33	257412	Lock Washer .375
17	833275	Oilite Bearing Reamed	34	253043	Whiz Nut .375-16
18	253202	Whiz Bolt .375-16 x 1	35	243334	Bolt .375-16 x 1.25 Grade 8
19	824508	Axle Beam w/Bushing - Dual	36	481432	Dust Cap
20	830420	Spacer .375 x 1.156			

TAIL WHEEL OPTIONS

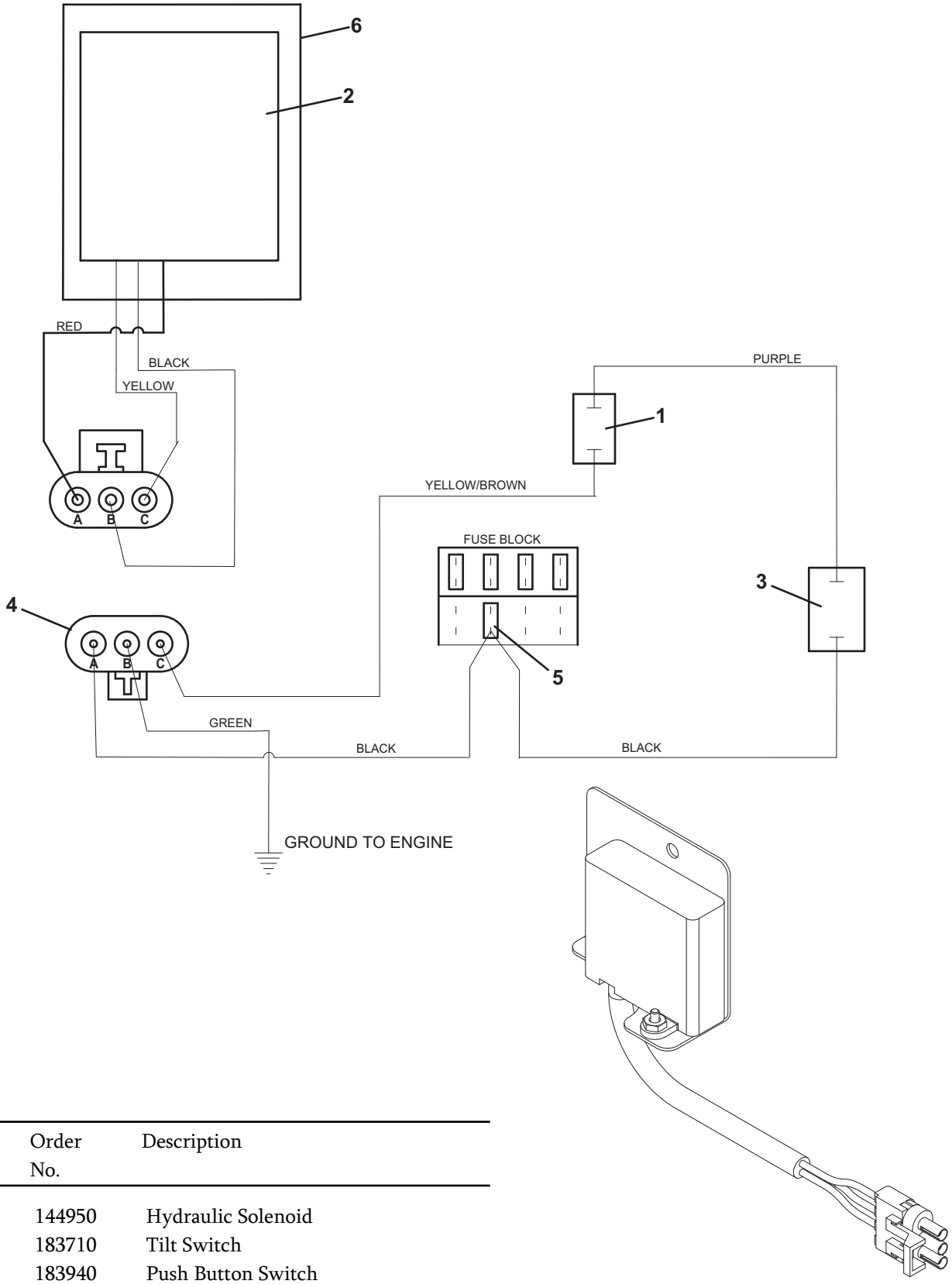


TRACTION KIT



Item No.	Order No.	Description	Item No.	Order No.	Description
1	603699	Rocker w/Bearing Rt.	12	253035	Whiz Nut .312-18
	121764	Oilite Bearing	13	604708	Rocker Arm Extension Kit (opt.)
2	603700	Rocker w/Bearing Lt.			(includes 2 each of items 11 & 18-22)
	121764	Oilite Bearing	14	260523	Hair Pin .094 x 2
3	644635	Pin	15	257040	Washer .375
4	604803	Spring Assembly - Offset	16	261362	Clevis Pin .375 x 1.75
5	243395	Bolt .375-16 x 4.5 Full Thread	17	262950	Push-on Retainer
6	254450	Nut .375-16	18	261339	Clevis Pin .375 x .875 Sq. Shank
7	247254	Carriage Bolt .375 x 1.375 Special	19	260648	Cotter Pin .125 x .5
8	253890	Lock Nut .375-16	20	644706	Extension - Rocker Arm
9	732410	Lift Strap	21	253203	Whiz Bolt .375-16 x 1
10	253192	Whiz Bolt .312-18 x .75	22	253043	Whiz Nut .375-16
11	820320	Lift Chain (5 links)	23	820317	Lift Chain (3 Links)

OPTIONAL HYDRAULIC LIFT WIRING DIAGRAM

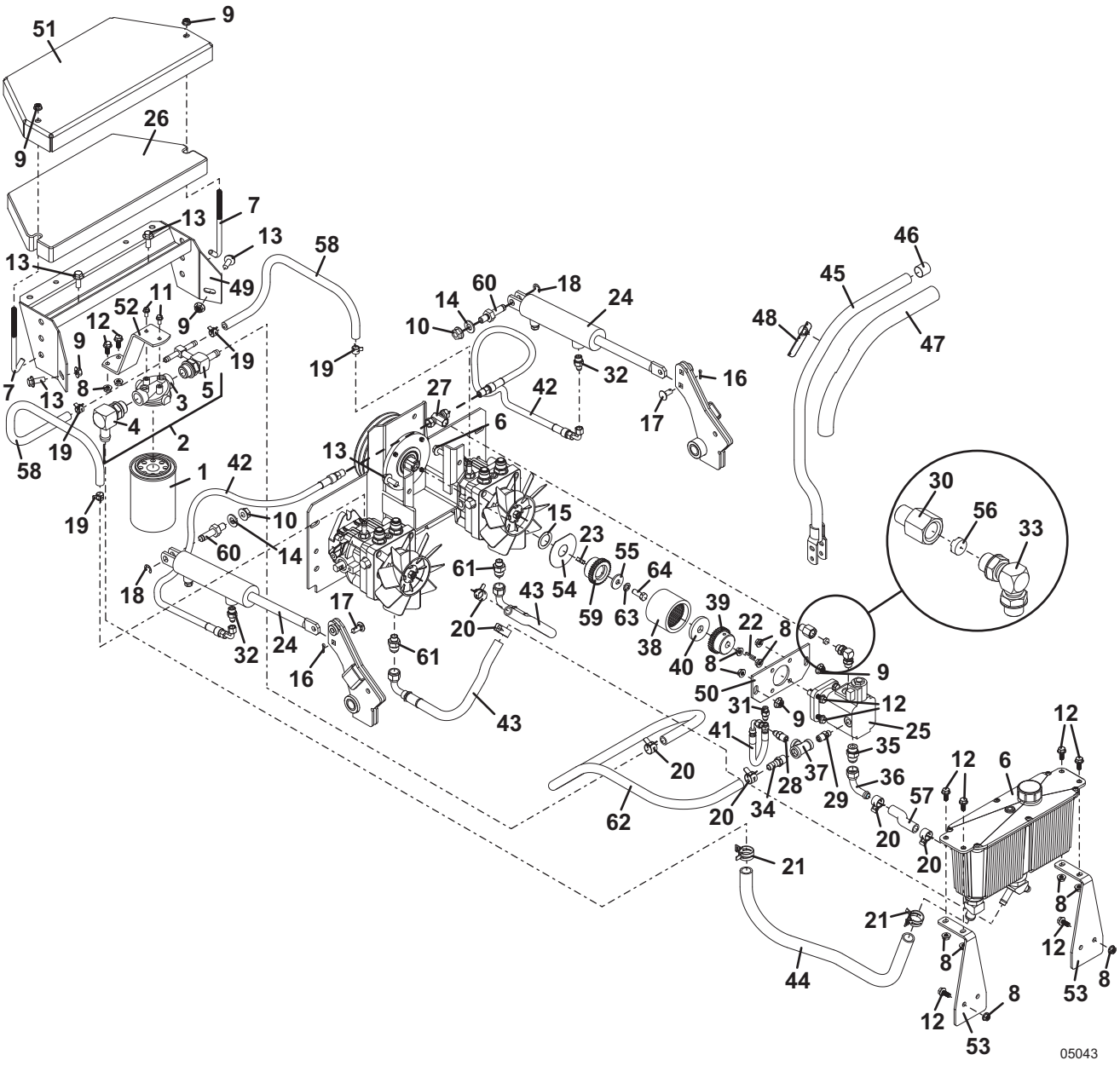


Item No.	Order No.	Description
1	144950	Hydraulic Solenoid
2	183710	Tilt Switch
3	183940	Push Button Switch
4	184973	Weather Pack Connector
5	181460	Accessory Fuse - 7.5 amp Auto
6	722747	Mount - Tilt Switch

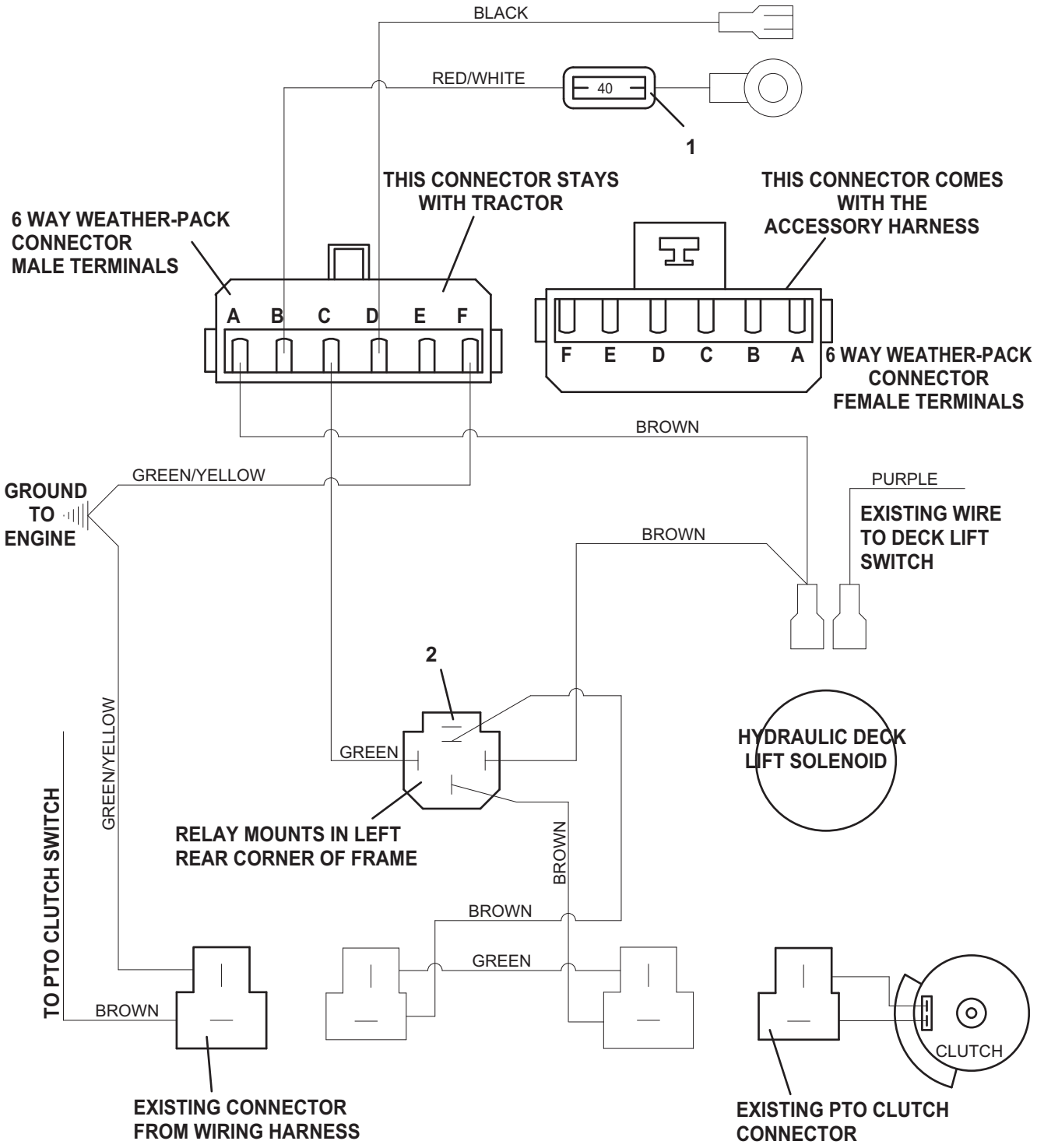
OPTIONAL HYDRAULIC LIFT ASSEMBLY

Item No.	Order No.	Description
1	100860	Oil Filter
2	101022	Filter Base Assembly (includes items 3 – 5)
3	101027	Filter Base
4	360076	Adapter w/O-Ring 12 Beaded El
5	360077	Adapter w/O-Ring 8x6x6 Bead
6	101692	Aluminum Tank Assembly
7	240151	Hook Bolt .375-16 x 6
8	253035	Whiz Nut .312-18
9	253043	Whiz Nut .375-16
10	253066	Whiz Nut .5-13
11	253173	Whiz Bolt .25-20 x .5
12	253192	Whiz Bolt .312-18 x .75
13	253203	Whiz Bolt .375-16 x 1
14	257062	Washer .5 SAE
15	257106	Washer 1 x 18 Ga. Bushing
16	260648	Cotter Pin .125 x .5
17	261339	Clevis Pin .375 x .875 Sq. Shank
18	263500	Retainer – External .5 x .042
19	280264	Hose Clamp .375 Spring TOC
20	280266	Hose Clamp .5 Spring TOC
21	280268	Hose Clamp .75 Spring
22	281540	Square Key .125 x 1
23	281580	Square Key .25 x .690
24	290021	Cylinder – Hydraulic
	290096	Cylinder Seal Kit
25	290074	Pump – Hydraulic CCW w/Solenoid
	144950	Solenoid Valve
26	323951	Counter weight
27	360005	Adapter Tee NPT/Flare
28	360012	Adapter Fitting
29	360040	Adapter M O-Ring/MPT
30	360045	Adapter m NPT/O-Ring
31	360050	Adapter M O-Ring/M Flare
32	360052	Adapter M O-Ring/M Flare
33	360055	Adapter M O-Ring 90°
34	360260	Brass Hose Insert
35	363832	Fitting STL O-Ring Boss
36	363857	Fitting 90° #8 Beaded Stem
37	366115	Reducer Tee .375 x .25 x .25
38	388560	Coupler Sleeve Nylon
39	388576	Coupler Hub .5 Bore
	259302	Set Screw - Nylon
40	424150	Stabilizer - Coupling
41	424302	Hose Assembly .25 x 13
42	424310	Hose Assembly .25 x 32.5 x 90°
43	424349	Hose Assembly .5 x 13.75 x 90°
44	821804	Hydraulic Hose .75 x 24
45	604779	Steering Lever Assembly w/Switch (includes items 46 – 48)
46	422095	Vinyl Cap
47	422179	Handle Grip
48	604799	Switch/Mount Assembly
49	643915	Mount - Weight
50	725326	Pump Mount Plate
51	729691	Weight Cover
52	732614	Oil Filter Base
53	755128	Mount – Aluminum Oil Tank
54	770045	Washer 1" ID
55	774020	Washer .406 x 1.25
56	780507	Flow Restrictor
57	821781	Hose – Hydraulic 3.5
58	821802	Hose – Hydraulic 25
59	831039	Flex Coupler – 25MM
60	887119	Pin – Cylinder Mount
61	360081	Adapter Fitting
62	821806	Hose – Hydraulic 53
63	257412	Lock Washer .375
64	243331	Bolt .375-24 x 1

OPTIONAL HYDRAULIC LIFT ASSEMBLY



STANDARD UNIVERSAL HARNESS
(ALL HYDRAULIC LIFT MODELS)



Item No.	Order No.	Description
	605959	Universal Harness
1	181475	Fuse Auto - 40 Amp.
2	184271	Relay

01-05065
Rev. 07-06