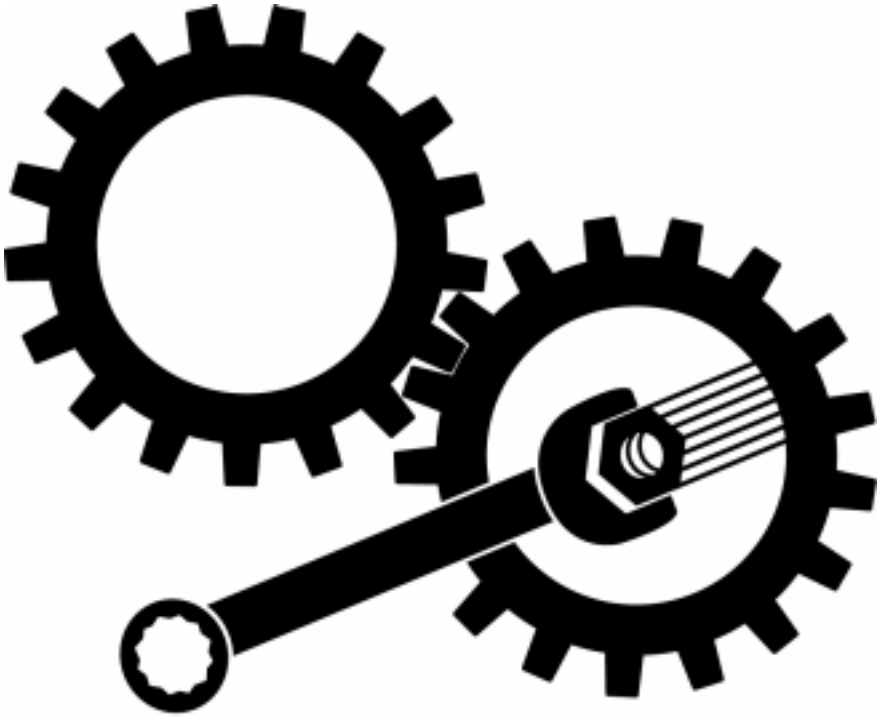
Sierra®

Service Manual

Models 936014-026, 936305-313



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SECTION 1 - INTRODUCTION

1.1 THE MANUAL

The purpose of this manual is to provide complete instructions for service, maintenance, disassembly, repair, and installation of the mechanical components for the unit.

Dealer trained service personnel should use this manual as a supplement to and reminder of the training sessions conducted by the company.

Read all information for servicing a part or system before repair work is started to avoid needless disassembly.

Operation

Before operation of the unit, carefully and completely read manuals supplied with the unit. The contents will provide you with an understanding of safety instructions and controls during normal operation and maintenance.

Safety Messages

For your safety and the safety of others always read, understand, and follow all DANGER, WARNING, and CAUTION messages found in manuals and on safety decals.

Directional Reference

All reference to left, right, front, or rear are given from the operator in the operator position and facing the direction of forward travel.

1.2 SERVICE AND REPLACEMENT PARTS

When ordering publications, replacement parts, or making service inquiries, know the Model and Serial numbers of your unit and engine.

Numbers are located on the product registration form in the unit literature package. They are printed on a serial number label, located on the frame of your unit.

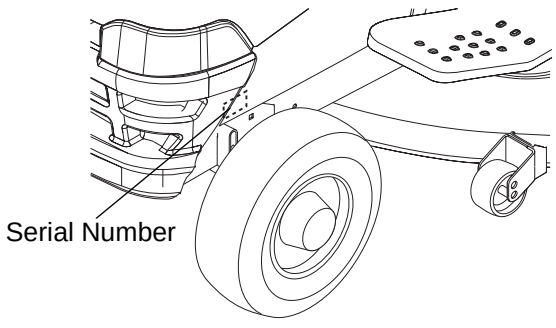


Figure 1

1.3 PRODUCT REGISTRATION

A warranty registration card must be filled out, signed, and returned at time of purchase. This card activates the warranty. Claims meeting requirements during limited warranty period will be honored.

1.4 UNAUTHORIZED REPLACEMENT PARTS

Use only Ariens replacement parts. The replacement of any part on this vehicle with anything other than a Ariens authorized replacement part may adversely affect the performance, durability, or safety of this unit and may void the warranty. Ariens disclaims liability for any claims or damages, whether warranty, property damage, personal injury, or death arising out of the use of unauthorized replacement parts.

1.5 DISCLAIMER

Ariens reserves the right to discontinue, make changes to, and add improvements upon its products at any time without public notice or obligation. The descriptions and specifications contained in this manual were in effect at printing. Equipment described within this manual may be optional. Some illustrations may not be applicable to your unit.

1.6 TECHNICAL SERVICE COMMUNICATIONS

Ariens Technical Service communicates information to the field using Service Letters, Service Bulletins, Product Notices, and Campaigns. Each communication signifies a type of information and priority. The dealer is responsible to carry out the directive provided in the communication. The types of communication are:

Service Letter - General technical information for the dealer. Technical information on how to service the product and product improvements.

Service Bulletin - Notification to update products to resolve certain issues or a notification of a policy change.

Product Notices - Notification of limited product located in a certain region. This is a limited distribution to only those who received the product involved.

Campaigns - Notification of a safety related issue. All products must be updated and are tracked by the factory until all units are corrected.

1.7 PREPARATION

Before starting any removal of parts, proper preparation is very important for efficient work. A clean work area at the start of each job will allow you to perform service repairs easily and quickly.

To reduce the incidence of misplaced tools or parts, place removed components with all attaching hardware in the disassembly order on a clean work surface. Organization is a key part of proper reassembly.

Tools, instruments, and parts needed for the job should be gathered before work is started. Interrupting a job to locate tools or parts is a needless delay.

SECTION 2 - SAFETY

2.1 SAFETY ALERTS



Look for these symbols to point out important safety precautions. They mean:

Attention!

Personal Safety Is Involved!

Become Alert!

Obey The Message!

2.2 SIGNAL WORDS

The safety alert symbol is used in decals on the unit and with proper operation procedures in this manual. They alert you to the existence and relative degree of hazards.

Understand the safety message. It contains important information about personal safety on or near the unit.

DANGER: IMMINENTLY HAZARDOUS SITUATION! If not avoided, WILL RESULT in death or serious injury.

WARNING: POTENTIALLY HAZARDOUS SITUATION! If not avoided, COULD RESULT in death or serious injury.

CAUTION: POTENTIALLY HAZARDOUS SITUATION! If not avoided, MAY RESULT in minor or moderate injury. It may also be used to alert against unsafe practices.

2.3 NOTATIONS

NOTE: General reference information for proper operation and maintenance practices.

IMPORTANT: Specific procedures or information required to prevent damage to unit or attachment.

2.4 PRACTICES AND LAWS

Practice usual and customary safe working precautions, for the benefit of yourself and others. Understand and follow all safety messages. Be alert to unsafe conditions and the possibility of minor, moderate, or serious injury or death. Learn applicable rules and laws in your area.

2.5 REQUIRED OPERATOR TRAINING

Original purchaser of this unit was instructed by the seller on safe and proper operation. If unit is to be used by someone other than original purchaser; loaned, rented or sold, ALWAYS provide the Operator's Manual and any needed safety training before operation.

2.6 SAFETY PRECAUTIONS

Safe Operation Practices for Ride-On Mowers

This cutting machine is capable of amputating hands and feet and throwing objects. Failure to observe the following safety instructions could result in serious injury or death. Your complete and unimparied attention is required at all times.

General Operation

Read, understand, and follow all instructions in this owners manual, the engine manual and on the machine before starting.

Only allow responsible adults, who are familiar with the instructions, to operate the machine.

Clear the area of objects such as rocks, toys, wire, etc., which could be picked up and thrown by the blade.

Be sure the area is clear of other people and pets before mowing. Stop machine if anyone enters the area.

Never carry passengers.

Do not mow in reverse unless absolutely necessary. Always look down and behind before and while backing.

Be aware of the mower discharge direction and do not point it at anyone. Do not operate the mower without either the entire grass catcher or the guard in place.

Slow down before turning to prevent tipping or loss of control.

Never leave a running machine unattended. Always turn off blades, set parking brake, stop engine, and remove keys to prevent unauthorized use before dismounting.

Turn off blades when not mowing.

Disengage mower clutch, stop engine, remove key and wait for moving parts to stop before leaving operators position for any reason such as removing grass catcher or unclogging chute.

Mow only in daylight or good artificial light.

Do not operate the machine while under the influence of medication, alcohol or drugs.

Watch for traffic when operating near or crossing roadways or drives.

Use extra care when loading or unloading the machine into a trailer to truck.

Use only attachments or accessories designed for your unit. See your Ariens Dealer.

Wear sturdy foorwear. Do not operate riding mower barefoot or when wearing open sandals or canvas shoes. Do not wear loose clothing that may get caught in rotating parts of unit. Wear safety glasses with side shields when operating mower.

Slope Operation

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not mow it.

Do

Mow up and down slopes, not across.

Remove obstacles such as rocks, free limbs, etc.

Watch for holes, ruts, or bumps. Uneven terrain could overturn the machine. Tall grass can hide obstacles.

Use slow speed. Choose a low gear so that you will not have to stop or shift while on the slope.

Follow the manufacturer's recommendations for wheel weights or counterweights to improve stability.

Use extra care with grass catchers or other attachments. These can change the stability of the machine. Use only approved hitch points.

Limit loads to those you can safely control.

Keep all movement on the slopes slow and gradual. Do not make sudden changes in speed or direction.

Avoid starting or stopping on a slope. If tires lose traction, disengage mower clutch and proceed slowly straight down the slope. If you must stop when going up the slope and can not safely back down: for gear drive models, depress clutch/brake pedal, disengage mower clutch, place travel speed selector in first gear (low speed) and slowly release the clutch/brake pedal.

For hydro models depress clutch/brake pedal only if necessary, disengage mower clutch, slowly release clutch brake pedal and slowly engage the forward pedal.

Do Not

Do not turn on slopes unless necessary, and then, turn slowly and gradually, downhill, if possible.

Do not mow near drop-offs, ditches, or embankments. The mower could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.

Do not mow on wet grass. Reduced traction could cause sliding.

Do not try to stabilize the machine by putting your foot on the ground.

Do not use grass catcher on steep slopes.

Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them.

Keep children out of the mowing area and under the watchful care of another responsible adult.

Be alert and turn machine off if children enter the area.

Before and when backing, look behind and down for small children.

Never carry children, even when attachments are off. They may fall off and be seriously injured or interfere with safe machine operation.

Never allow children to operate the machine.

Use extra care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

Service

Do not change engine governor setting or over speed the engine.

Replace damaged or worn out mufler immediately. Continued use could result in fire or explosion.

Use extra care in handling gasoline and other fuels. They are flammable and vapors are explosive.

- Use only an approved container.
- Never remove gas cap or add fuel with the engine running. Allow engine to cool before refueling. Do not smoke. Wipe off any spilled gasoline and allow vapors to dissipate before starting engine.
- Replace fuel tank cap and container cap securely.
- Never refuel the machine indoors.
- Never store the machine or fuel container inside where there is an open flame, such as in a water heater.

Never run a machine inside a closed area. Exhaust fumes contain carbon monoxide an odorless and deadly gas.

Keep nuts and bolts, especially blade attachment bolts, tight and keep equipment in good condition.

Never tamper with safety devices. Check their proper operation regularly.

Keep machine free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage. Allow machine to cool before storing.

Stop and inspect the equipment if you strike an object. Repair any damage before restarting.

Never make adjustments or repairs with the engine running or when engine and exhaust parts are hot from operation.

Grass catcher components are subject to wear, damage, and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check components and replace, with manufacturer’s recommended parts when necessary.

Mower blades are sharp and can cut. Wrap the blade(s) or wear gloves, and use extra caution when servicing them.

Check brake operation frequently. Adjust and service as required.

Refer to Storage Section of this owners manual if unit is to be stored for extended period.

SECTION 3 - SPECIFICATIONS

Model No. Description Name	936014 Sierra 1340G	936015 Sierra 1440G	936016 Sierra 1340H
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 41.25 (1.05) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 41.25 (1.05) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 41.25 (1.05) 52.00 (1.32) 46.00 (1.17) 480 (217)
Battery	12 Volt 290 CCA	12 Volt 290 CCA	12 Volt 290 CCA
Hour Meter	Optional (736008)	Optional (736008)	Optional (736008)
Seat	Medium	Medium	Medium
Brakes	Disc.	Disc.	Disc.
Steering	Gear	Gear	Gear
Turning Radius, in. (cm)	26 (66)	26 (66)	26 (66)
Tire Size			
Front	15x6.00-6	15x6.00-6	15x6.00-6
Rear	20x8.80-8	20x8.80-8	20x8.80-8
Diagnostic Lights	No	No	Yes
Engine	OHV 13 HP	OHV 14 HP	OHV 13 HP
Manufacture	Tecumseh	Briggs	Tecumseh
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)
Idle R.P.M.	2100	1800	2100
Governed R.P.M.	3250	3250	3250
Crank Case Capacity, oz. (L)	32 (.95)	56 (1.7)	32 (.95)
(Oil Filter)	(No)	(Yes)	(No)
Air Cleaner	Paper Element	Paper Element	Paper Element
	Foam Precleaner	Foam Precleaner	Foam Precleaner
Charging Capacity	3/5 AMP Unregulated	3/5 AMP Unregulated	3/5 AMP Unregulated
Fuel Filter	120 Micron	120 Micron	120 Micron
	2 1/2 GPA Capacity	2 1/2 GPA Capacity	2 1/2 GPA Capacity
Engine Oil	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)
	30W Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)
Spark Plug Gap	.030 Champion RN-4C	.030 Champion RC12YC	.030 Champion RN-4C
Transmission	Peerless 206-517	Peerless 206-517	Hydrogear 325-0750
	6 Speed	6 Speed	
Speed - Forward Max.	0.8 - 5.5 MPH	0.8 - 5.5 MPH	0.0 - 5.5 MPH
- Reverse Max	1.9 MPH	1.9 MPH	0.0 - 2.5 MPH
Transmission Lube	Grease	Grease	20W50 Oil
Drive Clutch	Belt Clutched	Belt Clutched	Belt Clutched
Axle Capacity	150 ft lb (110 Nm)	150 ft lb (110 Nm)	175 ft lb (129 Nm)
Allowable Added Weight	130 lb (58.9 kg)	130 lb (58.9 kg)	130 lb (58.9 kg)
Rear Axle Maximum Load	450 lb (204 kg)	450 lb (204 kg)	568 lb (257 kg)
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI	10 PSI/10 PSI	10 PSI/10 PSI
- Heavy (SnoThro)	14 PSI/10PSI	14 PSI/10 PSI	14 PSI/10 PSI
Lift System	Manual	Manual	Manual
Power Take Off - Front	Electric	Electric	Electric
Mower Pan, in. (cm)	40 (101)	40 (101)	40 (101)
Bagger 3 Bucket/1 Bag	836008/836007	836008/836007	836008/836007
Sno-Thro	836010	836010	836010
Dozer Blade	834034	834034	834034

Model No. Description Name	936017 Sierra 1440H	936018 Sierra 1540H	936019 Sierra 1640H
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 41.25 (1.05) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 480 (217)
Battery	12 Volt 290 CCA	12 Volt 290 CCA	12 Volt 290 CCA
Hour Meter	Optional (736008)	Optional (736008)	Optional (736008)
Seat	Medium-High	High	High
Brakes	Disc.	Disc.	Disc.
Steering	Gear	Gear	Gear
Turning Radius, in. (cm)	20/26 (51/66)	20/26 (51/66)	20/26 (51/66)
Tire Size			
Front	15x6.00-6	15x6.00-6	15x6.00-6
Rear	20x8.00-8	20x8.00-8	20x8.00-8
Diagnostic Lights	Yes	Yes	Yes
Engine	OHV 14 HP	OHV 15 HP	OHV 16 HP
Manufacture	Briggs	Kohler	Briggs
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)
Idle R.P.M.	1800	1800	2100
Governed R.P.M.	3250	3250	3250 Max
Crank Case Capacity, oz. (L)	56 (1.7)	64 (1.9)	56 (1.7)
(Oil Filter)	(Yes)	(Yes)	(Yes)
Air Cleaner	Paper Element	Paper Element	Paper Element
	Foam Precleaner	Foam Precleaner	Foam Precleaner
Charging Capacity	3/5 AMP Unregulated	15 AMP Regulated	16 AMP Regulated
Fuel Filter	120 Micron	120 Micron	120 Micron
	2 1/2 GPA Capacity	2 1/2 GPA Capacity	2 1/2 GPA Capacity
Engine Oil	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)
	30W Above 40^{o}F (4^{o}C)	10W Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)
Spark Plug Gap	.030 Champion RC12YC	.030 Champion RC12YC	.030 Champion RN-4C
Transmission	Hydrogear 325-0750	Hydrogear 325-0750	Hydrogear 325-0750
Speed - Forward Max.	0.0 - 5.5 MPH	0.0 - 5.5 MPH	0.0 - 5.5 MPH
- Reverse Max	0.0 - 2.5 MPH	0.0 - 2.5 MPH	0.0 - 2.5 MPH
Transmission Lube	20W50 OIl	20W50 Oil	20W50 Oil
Drive Clutch	Belt Clutched	Belt Clutched	Belt Clutched
Axle Capacity	175 ft lb (129 Nm)	175 ft lb (129 Nm)	175 ft lb (129 Nm)
Allowable Added Weight	130 lb (58.9 kg)	130 lb (58.9 kg)	130 lb (58.9 kg)
Rear Axle Maximum Load	568 lb (257 kg)	568 lb (257 kg)	568 lb (257 kg)
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI	10 PSI/10 PSI	10 PSI/10 PSI
- Heavy (SnoThro)	14 PSI/10 PSI	14 PSI/10 PSI	14 PSI/10 PSI
Lift System	Manual	Manual	Manual
Power Take Off - Front	Electric	Electric	Electric
Mower Pan, in. (cm)	40 (101)	40 (101)	40 (101)
Bagger 3 Bucket/1 Bag	836008/836007	836008/836007	836008/836007
Sno-Thro	836010	836010	836010
Dozer Blade	834034	834034	834034

Model No. Description Name	936020 Sierra 1640H	936021 Sierra 1648H	936022 Sierra 1340G
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 518 (234)	66.50 (1.68) 41.50 (1.06) 52.00 (1.32) 46.00 (1.17) 480 (217)
Battery	12 Volt 290 CCA	12 Volt 290 CCA	12 Volt 290 CCA
Hour Meter	Optional (736008)	Optional (736008)	Optional (736008)
Seat	High	High	Medium
Brakes	Disc.	Disc.	Disc.
Steering	Gear	Gear	Gear
Turning Radius, in. (cm)	20/26 (51/66)	20 (51)	26 (66)
Tire Size			
Front	15x6.00-6	15x6.00-6	15x6.00-6
Rear	20x8.00-8	20x8.00-8	20x8.00-8
Diagnostic Lights	Yes	Yes	No
Engine	OHV 16 HP	OHV 16 HP	OHV 13 HP
Manufacture	Tecumseh	Briggs	Tecumseh
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)	Unleaded 3 (11.4)	Unleaded 3 (11.4)
Idle R.P.M.	1800	1800	2100
Governed R.P.M.	3250	3400	3250 Max
Crank Case Capacity, oz. (L)	56 (1.7)	56 (1.7)	32 (.95)
(Oil Filter)	(Yes)	(Yes)	(No)
Air Cleaner	Paper Element	Paper Element	Paper Element
	Foam Precleaner	Foam Precleaner	Foam Precleaner
Charging Capacity	16 AMP Regulated	16 AMP Regulated	315 AMP Unregulated
Fuel Filter	120 Micron	120 Micron	120 Micron
	2 1/2 GPA Capacity	2 1/2 GPA Capacity	2 1/2 GPA Capacity
Engine Oil	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 30^{o}F (-1^{o}C)	5W30 Below 40^{o}F (4^{o}C)
	30W Above 40^{o}F (4^{o}C)	10W Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)
Spark Plug Gap	.030 Champion RC12YC	.030 Champion RC12YC	.030 Champion RN-4C
Transmission	Hydrogear 325-0750	Hydrogear 325-0750	Peerless 206-517
Speed - Forward Max.	0.0 - 5.5 MPH	0.0 - 5.5 MPH	0.8 - 5.5 MPH
- Reverse Max	0.0 - 2.5 MPH	0.0 - 2.5 MPH	1.9 MPH
Transmission Lube	20W50 OIl	20W50 Oil	Grease
Drive Clutch	Belt Clutched	Belt Clutched	Belt Clutched
Axle Capacity	175 ft lb (129 Nm)	175 ft lb (129 Nm)	150 ft lb (110 Nm)
Allowable Added Weight	130 lb (58.9 kg)	130 lb (58.9 kg)	130 lb (58.9 kg)
Rear Axle Maximum Load	568 lb (257 kg)	568 lb (257 kg)	450 lb (204 kg)
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI	10 PSI/10 PSI	10 PSI/10 PSI
- Heavy (SnoThro)	14 PSI/10 PSI	14 PSI/10 PSI	14 PSI/10 PSI
Lift System	Manual	Manual	Manual
Power Take Off - Front	Electric	Electric	Electric
Mower Pan, in. (cm)	40 (101)	48 (122)	40 (101)
Bagger 3 Bucket/1 Bag	836008/836007		836008/836007
Sno-Thro	836010	836010	836010
Dozer Blade	834034	834034	834034

Model No. Description Name	936023 Sierra 1540H	936024 Sierra 1548H	936025 Sierra 1640H
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 518 (234)	66.50 (1.68) 41.50 (1.06) 52.00 (1.32) 46.00 (1.17) 518 (234)
Battery	12 Volt 290 CCA	12 Volt 290 CCA	12 Volt 290 CCA
Hour Meter	Optional (736008)	Optional (736008)	Optional (736008)
Seat	High	High	High
Brakes	Disc.	Disc.	Disc.
Steering	Gear	Gear	Gear
Turning Radius, in. (cm)	26 (66)	26 (66)	26 (66)
Tire Size			
Front	15x6.00-6	15x6.00-6	15x6.00-6
Rear	20x8.50-8	20x8.00-8	20x8.00-8
Diagnostic Lights	Yes	Yes	Yes
Engine	OHV 15 HP	OHV 15 HP	OHV 13 HP
Manufacture	Briggs & Stratton	Kohler	Briggs & Stratton
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)
Idle R.P.M.	1800	1800	1800
Governed R.P.M.	3250	3250	3400
Crank Case Capacity, oz. (L)	56 (1.7)	64 (1.9)	56 (1.7)
(Oil Filter)	(Yes)	(Yes)	(Yes)
Air Cleaner	Paper Element	Paper Element	Paper Element
	Foam Precleaner	Foam Precleaner	Foam Precleaner
Charging Capacity	16 AMP Regulated	15 AMP Regulated	16 AMP Unregulated
Fuel Filter	120 Micron	120 Micron	120 Micron
	2 1/2 GPA Capacity	2 1/2 GPA Capacity	2 1/2 GPA Capacity
Engine Oil	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 30^{o}F (-1^{o}C)	5W30 Below 30^{o}F (-1^{o}C)
	10W30 Above 40^{o}F (4^{o}C)	10W30 Above 40^{o}F (4^{o}C)	30W Above 30^{o}F (-1^{o}C)
Spark Plug Gap	.030 Champion RN-46	.030 Champion RC12YC	.030 Champion RC12YC
Transmission	Hydrogear 325-0750	Hydrogear 325-0750	Hydrogear 325-0750
			6 Speed
Speed - Forward Max.	0.0 - 5.5 MPH	0.0 - 5.5 MPH	0.0 - 5.5 MPH
- Reverse Max	0.0 - 2.5 MPH	0.0 - 2.5 MPH	0.0 - 2.5 MPH
Transmission Lube	20W50 OIl	20W50 Oil	20W50 Oil
Drive Clutch	Belt Clutched	Belt Clutched	Belt Clutched
Axle Capacity	175 ft lb (129 Nm)	175 ft lb (129 Nm)	175 ft lb (129 Nm)
Allowable Added Weight	130 lb (58.9 kg)	130 lb (58.9 kg)	130 lb (58.9 kg)
Rear Axle Maximum Load	568 lb (257 kg)	568 lb (257 kg)	568 lb (257 kg)
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI	10 PSI/10 PSI	10 PSI/10 PSI
- Heavy (SnoThro)	14 PSI/10 PSI	14 PSI/10 PSI	14 PSI/10 PSI
Lift System	Manual	Manual	Manual
Power Take Off - Front	Electric	Electric	Electric
Mower Pan, in. (cm)	40 (101)	48 (122)	48 (122)
Bagger 3 Bucket/1 Bag	836008/836007		N/A
Sno-Thro	836010	836010	836010
Dozer Blade	834034	834034	834034

Model No. Description Name	936026 Sierra 1540H	936305 Sierra 1640G	936306 Sierra 1640H
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 42.50 (1.08) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 42.50 (1.08) 52.00 (1.32) 46.00 (1.17) 400 (181)	66.50 (1.68) 41.25 (1.05) 52.00 (1.32) 46.00 (1.17) 480 (217)
Battery	12 Volt 290 CCA	12 Volt 290 CCA	12 Volt 290 CCA
Hour Meter	Optional (736008)	Optional (736008)	Optional (736008)
Seat	High	Medium	Medium
Brakes	Disc.	Disc.	Disc.
Steering	Gear	Gear	Gear
Turning Radius, in. (cm)	26 (66)	26 (66)	26 (66)
Tire Size			
Front	15x6.00-6	15x6.00-6	15x6.00-6
Rear	20x8.00-8	20x8.00-8	20x8.00-8
Diagnostic Lights	Yes	No	Yes
Engine	OHV 15 HP	OHV 14 HP	OHV 14.0 HP
Manufacture	Kohler	Briggs	Briggs
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)
Idle R.P.M.	1800	1800	1800
Governed R.P.M.	3250 Max	3050 Max	2900 Max
Crank Case Capacity, oz. (L)	64 (1.9)	56 (1.7)	56 (1.7)
(Oil Filter)	(Yes)	(Yes)	(Yes)
Air Cleaner	Paper Element	Paper Element	Paper Element
	Foam Precleaner	Foam Precleaner	Foam Precleaner
Charging Capacity	15 AMP Regulated	16 AMP Regulated	3/5 AMP Unregulated
Fuel Filter	120 Micron	120 Micron	120 Micron
	2 1/2 GPA Capacity	2 1/2 GPA Capacity	2 1/2 GPA Capacity
Engine Oil	5W30 Below 30^{o}F (-1^{o}C)	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)
	10W30 Above 30^{o}F (-1^{o}C)	30W Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)
Spark Plug Gap	.030 Champion RC12YC	.030 Champion RC12YC	.030 Champion RC12YC
Transmission	Hydrogear 325-0750	Peerless 206-517	Hydrogear 312-0750
		6 Speed	
Speed - Forward Max.	0.0 - 5.5 MPH	0.7-4.8 MPH	0-5.0 MPH
- Reverse Max	0.0 - 2.5 MPH	1.6 MPH	0-2.5 MPH
Transmission Lube	20W50 Oil	Grease	20W50 Oil
Drive Clutch	Belt Clutched	Belt Clutched	Belt Clutched
Axle Capacity	175 ft lb (129 Nm)	150 ft lb (110 Nm)	175 ft lb (129 Nm)
Allowable Added Weight	130 lb (58.9 kg)	130 lb (58.9 kg)	130 lb (58.9 kg)
Rear Axle Maximum Load	568 lb (257 kg)	450 lb (204 kg)	568 lb (257 kg)
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI	10 PSI/10 PSI	10 PSI/10 PSI
- Heavy (SnoThro)	14 PSI/10 PSI	14 PSI/10 PSI	14 PSI/10 PSI
Lift System	Manual	Manual	Manual
Power Take Off - Front	Electric	Electric	Electric
Mower Pan, in. (cm)	40 (101)	49 (124) Optional 836301	30 (76.2)
Bagger 3 Bucket/1 Bag	836008/836007	836008/836007	836008/836007
Sno-Thro	836010	836010	836010
Dozer Blade	834034	834034	834034

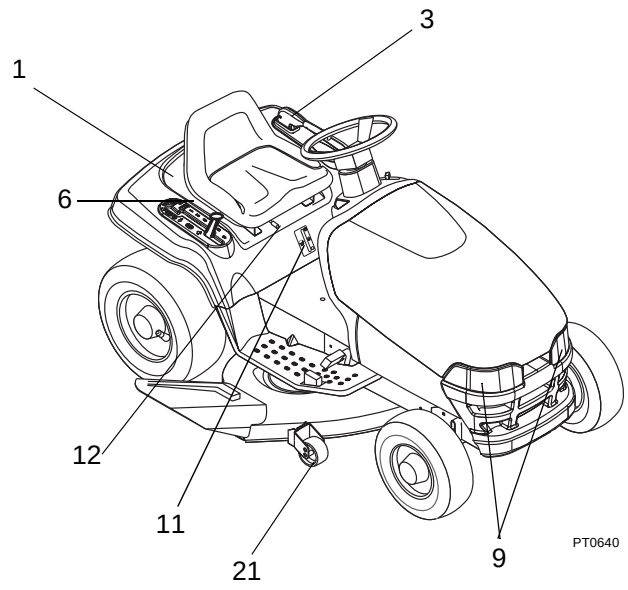
Model No. Description Name	936307 Sierra 1640H	936308 Sierra 1640G	936309 Sierra 1648H
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 41.25 (1.05) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 518 (234)
Battery	12 Volt 290 CCA	12 Volt 290 CCA	12 Volt 290 CCA
Hour Meter	Optional (736008)	Optional (736008)	Optional (736008)
Seat	High	Medium	High
Brakes	Disc.	Disc.	Disc.
Steering	Gear	Gear	Gear
Turning Radius, in. (cm)	20/26 (51/66)	20/26 (51/66)	20 (51)
Tire Size			
Front	15x6.00-6	15x6.00-6	15x6.00-6
Rear	20x8.00-8	20x8.00-8	20x8.00-8
Diagnostic Lights	Yes	Yes	Yes
Engine	1.6 HO V-Twin	14.0 HP OHV	OHV 16 HP
Manufacture	Briggs & Stratton	Briggs & Stratton	Tecumseh
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)
Idle R.P.M.	1800	1800	1800
Governed R.P.M.	3000	3250 Max	3400
Crank Case Capacity, oz. (L)	56 (1.7)	56 (1.7)	56 (1.7)
(Oil Filter)	(Yes)	(Yes)	(Yes)
Air Cleaner	Paper Element	Paper Element	Paper Element
	Foam Precleaner	Foam Precleaner	Foam Precleaner
Charging Capacity	16 AMP Regulated	3/5 AMP Unregulated	16 AMP Regulated
Fuel Filter	120 Micron	120 Micron	120 Micron
	2 1/2 GPA Capacity	2 1/2 GPA Capacity	2 1/2 GPA Capacity
Engine Oil	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)
	30w Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)
Spark Plug Gap	.030 Champion RC12YC	.030 Champion RC12YC	.030 Champion RC12YC
Transmission	Hydrogear 312-0750	Peerless 206-517	Hydrogear 325-0750
		6 Speed	
Speed - Forward Max.	0.0 - 5.0 MPH	0.8-5.5 MPH	0.0-5.5 MPH
- Reverse Max	0.0 - 2.5 MPH	1.9 MPH	0.0-2.5 MPH
Transmission Lube	20W50 Oil	Grease	20W50 Oil
Drive Clutch	Belt Clutched	Belt Clutched	Belt Clutched
Axle Capacity	175 ft lb (129 Nm)	150 ft lb (110 Nm)	175 ft lb (129 Nm)
Allowable Added Weight	130 lb (58.9 kg)	130 lb (58.9 kg)	130 lb (58.9 kg)
Rear Axle Maximum Load	568 lb (257 kg)	450 lb (204 kg)	568 lb (257 kg)
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI	10 PSI/10 PSI	10 PSI/10 PSI
- Heavy (SnoThro)	14 PSI/10 PSI	14 PSI/10 PSI	14 PSI/10 PSI
Lift System	Manual	Manual	Manual
Power Take Off - Front	Electric	Electric	Electric
Mower Pan, in. (cm)	40 (101)	40 (101)	48 (122)
Bagger 3 Bucket/1 Bag	836008/836007	836008/836007	
Sno-Thro	836010	836010	836010
Dozer Blade	834034	834034	834034

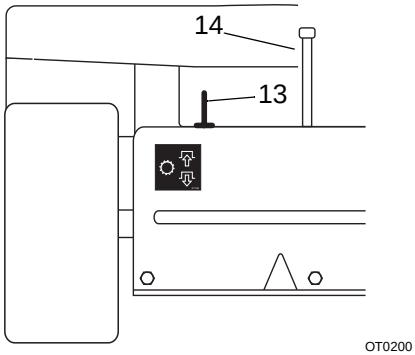
Model No. Description Name	936310 Sierra 1648H	936311 Sierra 1640H	936312 Sierra 1540G
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 41.25 (1.05) 52.00 (1.32) 46.00 (1.17) 480 (217)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 480 (217)
Battery	12 Volt 290 CCA	12 Volt 290 CCA	12 Volt 290 CCA
Hour Meter	Optional (736008)	Optional (736008)	Optional (736008)
Seat	High	High	High
Brakes	Disc.	Disc.	Disc.
Steering	Gear	Gear	Gear
Turning Radius, in. (cm)	26 (66)	26 (66)	26 (66)
Tire Size			
Front	15x6.00-6	15x6.00-6	15x6.00-6
Rear	20x8.00-8	20x8.00-8	20x8.00-8
Diagnostic Lights	Yes	Yes	No
Engine	OHV 15 HP	OHV 16.0 HP	OHV 15 HP
Manufacture	Briggs & Stratton	Briggs & Stratton	Briggs & Stratton
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)	Unleaded, 3 (11.4)
Idle R.P.M.	1800	1800	1800
Governed R.P.M.	3250	3250 Max	3050
Crank Case Capacity, oz. (L)	56 (1.7)	56 (1.7)	56 (1.7)
(Oil Filter)	(Yes)	(Yes)	(Yes)
Air Cleaner	Paper Element	Paper Element	Paper Element
	Foam Precleaner	Foam Precleaner	Foam Precleaner
Charging Capacity	16 AMP Regulated	16 AMP Regulated	16 AMP Regulated
Fuel Filter	120 Micron	120 Micron	120 Micron
	2 1/2 GPA Capacity	2 1/2 GPA Capacity	2 1/2 GPA Capacity
Engine Oil	5W30 Below 40^{o}F (4^{o}C)	5W30 Below 40^{o}F (4^{o}C)	5W40 Below 40^{o}F (4^{o}C)
	30w Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)	30W Above 40^{o}F (4^{o}C)
Spark Plug Gap	.030 Champion RN-4C	.030 Champion RC12YC	.030 Champion RN-4C
Transmission	Hydrogear 325-0750	Hydrogear 325-0750	Peerless 206-517
		6 Speed	6 Speed
Speed - Forward Max.	0.0 - 5.5 MPH	0.0-5.5 MPH	0.8-5.5 MPH
- Reverse Max	0.0 - 2.5 MPH	0.0-2.5 MPH	1.9 MPH
Transmission Lube	20W50 Oil	20W50 Oil	Grease
Drive Clutch	Belt Clutched	Belt Clutched	Belt Clutched
Axle Capacity	175 ft lb (129 Nm)	175 ft lb (129 Nm)	150 ft lb (110 Nm)
Allowable Added Weight	130 lb (58.9 kg)	130 lb (58.9 kg)	130 lb (58.9 kg)
Rear Axle Maximum Load	568 lb (257 kg)	568 lb (257 kg)	450 lb (204 kg)
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI	10 PSI/10 PSI	10 PSI/10 PSI
- Heavy (SnoThro)	14 PSI/10 PSI	14 PSI/10 PSI	14 PSI/10 PSI
Lift System	Manual	Manual	Manual
Power Take Off - Front	Electric	Electric	Electric
Mower Pan, in. (cm)	40 (101)	40 (101)	40 (101)
Bagger 3 Bucket/1 Bag	836008/836007	836008/836007	836008/836007
Sno-Thro	836010	836010	836010
Dozer Blade	834034	834034	834034

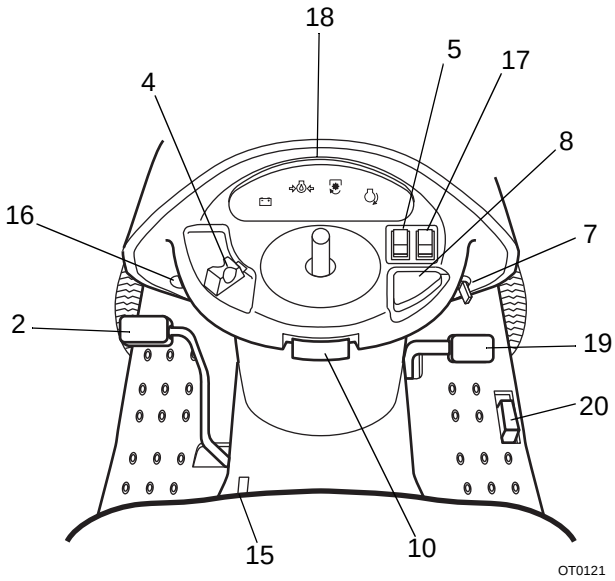
Model No. Description Name	936313 Sierra 1648H		
Length, in. (m) Height, in. (m) Width, in. (m) Wheel Base, in. (m) Actual Weight, lbs. (kg)	66.50 (1.68) 42.00 (1.07) 52.00 (1.32) 46.00 (1.17) 518 (234)		
Battery	12 Volt 290 CCA		
Hour Meter	Optional (736008)		
Seat	High		
Brakes	Disc.		
Steering	Gear		
Turning Radius, in. (cm)	26 (66)		
Tire Size			
Front	15x6.00-6		
Rear	20x8.00-8		
Diagnostic Lights	Yes		
Engine	OHV 16 HP		
Manufacture	Briggs & Stratton		
Fuel and Capacity, gal. (L)	Unleaded, 3 (11.4)		
Idle R.P.M.	1800		
Governed R.P.M.	3050		
Crank Case Capacity, oz. (L)	56 (1.7)		
(Oil Filter)	(Yes)		
Air Cleaner	Paper Element		
	Foam Precleaner		
Charging Capacity	16 AMP Regulated		
Fuel Filter	120 Micron		
	2 1/2 GPA Capacity		
Engine Oil	5W30 Below 30^{o}F (-1^{o}C)		
	30w Above 30^{o}F (-1^{o}C)		
Spark Plug Gap	.030 Champion RC12YC		
Transmission	Hydrogear 325-0750		
Speed - Forward Max.	0.0 - 5.5 MPH		
- Reverse Max	0.0 - 2.5 MPH		
Transmission Lube	20W50 Oil		
Drive Clutch	Belt Clutched		
Axle Capacity	175 ft lb (129 Nm)		
Allowable Added Weight	130 lb (58.9 kg)		
Rear Axle Maximum Load	568 lb (257 kg)		
Tire Pressure With Loads			
Front/Rear - Light & Medium	10 PSI/10 PSI		
- Heavy (SnoThro)	14 PSI/10 PSI		
Lift System	Manual		
Power Take Off - Front	Electric		
Mower Pan, in. (cm)	48 (122)		
Bagger 3 Bucket/1 Bag	N/A		
Sno-Thro	836010		
Dozer Blade	834034		

SECTION 4 - GENERAL MAINTENANCE & ADJUSTMENTS

4.1 CONTROLS AND FEATURES







1. Fuel Tank Fill
2. Clutch/Brake Pedal
3. Attachment Lift Lever
4. Throttle/Choke Lever
5. Head Light Switch
6. Travel Speed Selector (Gear only)
7. Ignition/Key Switch
8. PTO Switch
9. Headlights
10. Parking Brake control
11. Fuel Level Indicator
12. Seat Position or Adjustment
13. Transmission Disconnect Control (Hydro Only)
14. Expansion Hose with Vent (Hydro Only)
15. Mower Height Indicator
16. Choke Control (16 HP B&S Twin Only)
17. Cruise Control Switch (Hydro Only)
18. Indicator Lights (Hydro Only)
19. Forward Pedal (Hydro Only)
20. Reverse Pedal (Hydro Only)
21. Anti-Scalp Roller

Figure 2

4.2 FILLING THE FUEL TANK

WARNING: Use caution with fuel. Fuel is very flammable. Keep fuel in a clean and tight container. Keep fuel away from fire and heat. Never put fuel in the fuel tank while the engine is running or hot. Clean up any spilled fuel before starting the engine.

Add fuel to the fuel tank as needed. See your engine manual for the correct type and grade of fuel to be used.

1. Put the unit in an open and well ventilated area prior to refueling.
2. Stop the engine and set the parking brake.

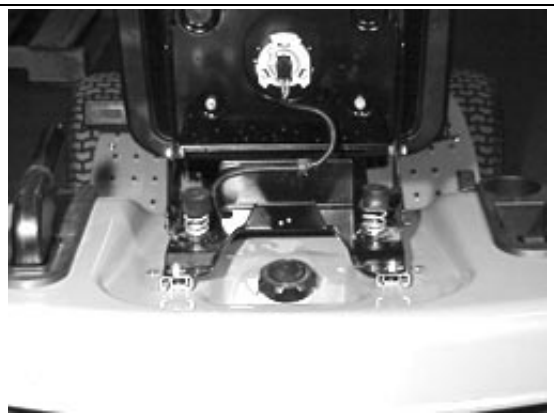


Figure 3 936-2

3. Raise the seat and clean the fuel cap and in the area around the fuel cap. Remove the cap from the fuel tank.
4. Fill the fuel tank with the proper grade of fuel recommended by the engine manufacturer. Be careful not to spill any fuel.
5. Install fuel cap on the fuel tank and tighten.
6. Clean up any spilled fuel before starting engine.

4.3 GENERAL LUBRICATION

All grease fittings should be greased at 25-hour intervals. Clean the fittings before attaching the grease gun.

Use a moly-lithium grease. Add grease until it appears at the ends of the bearing or ends of the shaft.

See Figure 3 for the locations of the grease fittings on your machine.

Every 25 hours apply motor oil to all pin connections, pivots points and areas where sliding occurs.

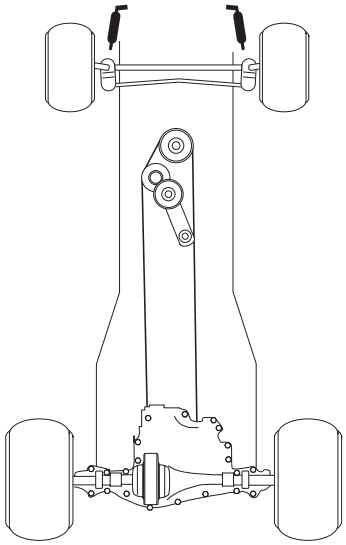


Figure 4 OT0572

4.4 CHECKING FASTENERS

Each day before operating the unit, check all nuts, bolts and other fasteners. Replace fasteners that are missing or damaged.

Tighten all nuts and bolts that are loose.

4.5 CHECKING ENGINE OIL

Check the engine oil daily prior to use. Never operate the engine with the oil below the low mark on the dipstick.

See your engine manual for oil specifications and oil filter service instructions.

To check oil level:

1. Move the unit to level location.
2. Clean around the dipstick and filter tube to prevent dirt from entering the engine.



Figure 5 936-3

3. Remove the dipstick and wipe off the oil.

4. Put the dipstick back into the engine, tighten in place, and remove again.
5. When the dipstick is removed, note the oil level and add oil accordingly. Do not over fill.

4.6 CHANGING OIL

WARNING: Engine muffler and other parts will be hot if unit has been running.

Engine oil should be changed after the first 5 hours of operation and every 25 hours there after.

1. Move the unit to a level and well ventilated area and set the parking brake.
2. If the engine is cold, let the unit run for 5 minutes.
3. When the engine is warm, stop the engine and raise the hood. Clean the area around the dipstick and drain plug.



Figure 6 936-4

4. Put an open container that will hold 1 gallon of oil under the drain plug. Remove the drain plug.
5. Allow the engine oil to drain completely. Clean and reinstall the oil drain plug.
6. Remove the oil filter. Clean the oil filter port and install a new oil filter according to the instructions on the oil filter. Fill with new oil to the "full" mark on the dipstick. Start and run the engine.
7. Stop the engine and recheck the oil level and add as necessary. Check for leakage at the drain plug and oil filter. Tighten the fittings as necessary if leakage occurs.
8. Lower the hood and latch in place, release the parking brake and return the unit to service.

4.7 CHECKING ENGINE COOLING

IMPORTANT: To prevent severe damage to the engine, proper cooling will need to be maintained.

Check the engine cooling yearly. Clean more often in dirty conditions. Remove the engine blower housing and clean the outer surface of the engine. Do not run the engine with the blower housing removed.



Figure 7 936-5

Check the air intake screen on the engine each day. Remove any grass, dirt, or debris that may have accumulated on it. The air intake screen must be kept clean.

4.8 CLEANING THE AIR CLEANER

Check the air cleaner element every day. Clean the air cleaner precleaner every 25 hours. Wash the precleaner with soap and water. Dry the precleaner, apply oil and reinstall over the paper air filter element.



Figure 8 936-6

Wipe out the air cleaner cover to remove any dirt build up in the cover. Reinstall the cover over the air cleaner prior to operating the engine. See your engine manual for instructions.

4.9 CHANGING THE AIR CLEANER ELEMENT

Replace the air cleaner element when clogged or every 100 hours. Do not attempt to clean. See your engine manual for instructions.

4.10 CHECKING THE TIRES

Before each use, make a visual check of the tires. For correct air pressure see Section 3 for specifications.

4.11 CHECKING THE TRANSMISSION FLUID (HYDRO)

The transaxle is filled and tested at the factory and should not require fluid when the unit is put into service. Inspect the transaxle for leaks or damage to the housing. If leakage is observed, do not operate until the leakage is repaired.

Check the oil level and fill to the correct level if needed.

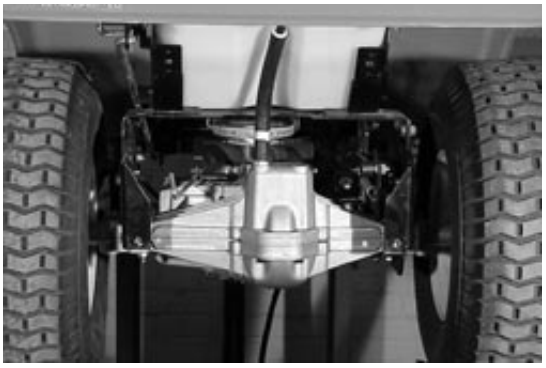


Figure 9 936-7

The oil should be between 1.25 and 1.60" from the top of the housing in the 310-0750 axle. It may be checked by removing the expansion hose. Typically, an API classification CG/CD engine oil is used with a viscosity range equivalent to 20W50.

4.12 PRIMING THE TRANSMISSION (HYDRO)

The following is suggested for the priming of new or repaired transaxles to assure proper operating performance.

1. Locate the unit on a flat level surface to limit the chance of the unit rolling while performing the following procedures.
2. Actuate the bypass (freewheel control).



Figure 10 936-8

3. Start engine and run at low idle.
4. Stroke the travel control pedal forward for five seconds and then reverse for five seconds. Do this three times in each direction.



Figure 11 936-9

5. Return the travel control to neutral.
6. Disengage the bypass and drive the unit forward and then reverse. Do this three times each way for a distance of approximately five feet.
7. Some units may require repeating the previous six steps to achieve proper operating performance.

4.13 CHECKING THE PTO CLUTCH

Measure Clutch Coil Resistance:

1. Turn engine and power take off (PTO) switch off.
2. Disconnect clutch wire connections.
3. Set meter to check ohms.
4. Connect meter leads in clutch connector.

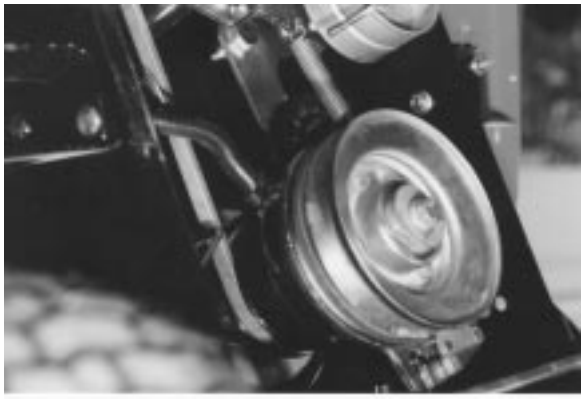


Figure 12 936-8

5. If meter reads below 6.00 ohms or above 8.00 ohms, then the clutch has failed and needs to be replaced.
6. If meter reads between 6.00 to 8.00 ohms, proceed to measure clutch current draw.

Measure Clutch Current Draw

1. Turn engine off.
2. Remove 30 amp fuse.
3. Set meter to check amps (10 amp scale).
4. Connect one meter lead to the fuse holder.
5. Connect the other meter lead to the second wire in the fuse connector.
6. Turn the ignition switch to run, sit on the seat and turn the PTO switch to on.
7. If the meter reads below 3.5 amps, the problem would be in the electrical system leading to the clutch (battery, relay, switch wiring).

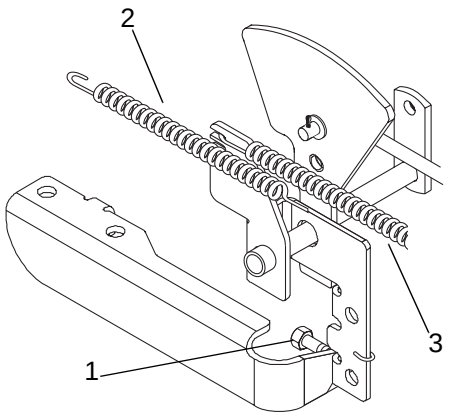
If after completing the tests:

- The resistance falls between 6.00 and 8.00 ohms.
- The amp draw is 3.50 or above.

The electric clutch is within factory specifications and is not the source of the problem.

4.14 ADJUSTMENT OF TRANSMISSION NEUTRAL (HYDRO)

1. Raise and block the rear of the unit so that the rear wheels are off the ground.
2. With the operator in the seat, start the unit and allow the transmission to warm up prior to adjustment.
3. With the parking brake released, turn the adjustment bolt clockwise until the rear wheels turn in one direction.



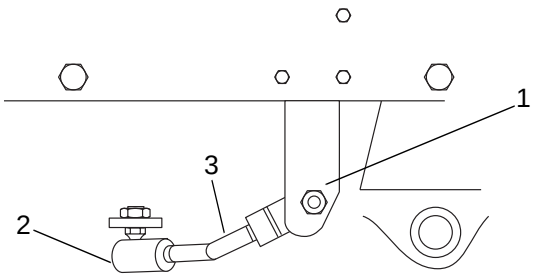
1. Neutral Adjustment Bolt
2. Spring-Forward
3. Spring-Reverse

Figure 13 OT0041

4. Turn the adjustment bolt counterclockwise until the wheels turn in the other direction.
5. Center the adjustment bolt between these two points.

4.15 ADJUSTMENT OF TRANSAXLE NEUTRAL (GEAR)

1. Raise and block the rear of the unit so that the rear wheels are of the ground.
2. Remove the left rear wheel.
3. Remove the spring loaded ball joint from the transaxle shift arm.



1. Speed Selector
2. Ball Joint (2)
3. Link

Figure 14 OT0030

4. Place the operator shift lever in neutral.
5. Move the transaxle shift arm to neutral, the OK To Start light will come on in the dash if the parking brake is set and the ignition switch is in the run position.

6. Adjust the ball joint to align with ball on the transaxle shift arm. Attach the ball joint to the ball on the shift arm.

4.16 ADJUSTMENT OF DIRECTIONAL CONTROL PEDAL

Remove the clevis pin holding the shift rod to the control pedal cross shaft. Push the forward pedal down and mark the pedal arm. Depress the rear directional control pedal and mark the pedal arm.

Place the pedal arm in the center of the forward and reverse marks and adjust the clevis to allow the clevis pin to be installed. Hold in place with the hardware removed earlier.

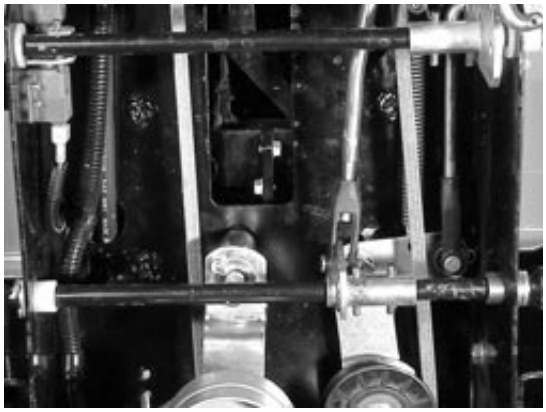


Figure 15 936-11

4.17 ADJUSTING THE BRAKE (HYDRO)

The brake was set at the factory for a specific running clearance. To check for proper setting, place a feeler gage between two of the disks (the brake will need to be released). There should be 0.015" to 0.025" clearance.

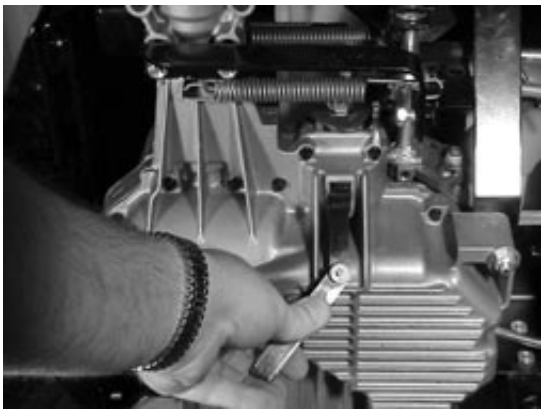
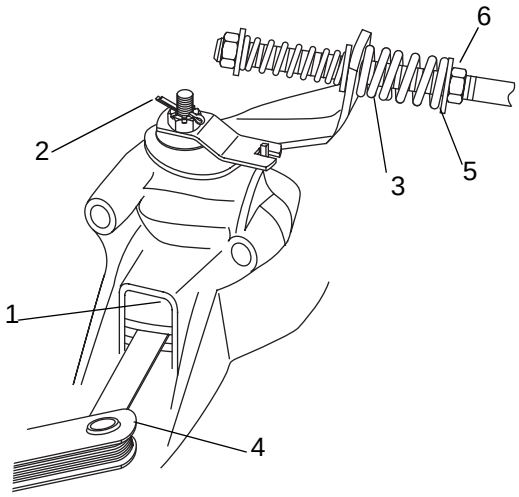


Figure 16 936-12

If the clearance is not correct, make the necessary adjustment with the brake lever tension nut.

The brake arm compression spring in the front of the brake arm should be compressed to 0.75" with the parking brake set.



1. Disc Brake
2. Castellated Nut w/Cotter Pin
3. Compression Spring- .78" OD x 1 " long
4. Feeler Gage
5. Washer
6. Nylon Lock Nut

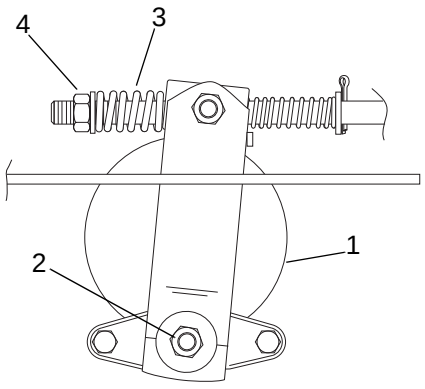
Figure 17 OT0840

4.18 ADJUSTING THE BRAKE (GEAR)

The brake was set at the factory for a specific running clearance.

Raise and support the rear of the unit with the wheels off the ground.

Tighten the brake adjustment nut and then back off the nut until the rear wheel drag is eliminated.



1. Disc Brake
2. Adjustment Nut
3. Compression Spring .78" x 1" long

Figure 18

OT0830

With the parking brake set, the rear compression spring on the brake arm should be compressed to 0.75" long.

Adjust the rear lock nut on the brake control rod until 0.75" is obtained.

4.19 ADJUSTING THE SEAT

The seat is mounted on adjustable rails and may be adjusted by moving the lever at the front center of the seat.



Figure 19

936-14

Move the lever to the center of the seat and slide seat to the desired position. Release the lever. The seat will latch into place.

4.20 MOWER DECK BELT ADJUSTMENT

The mower deck belt adjustment is controlled by a tension spring hooked to the mower deck belt idler.

If the tension spring is 4.5" or longer the belt is in good condition and will not need to be replaced. If the tension spring is 4.5" or shorter the belt is worn and will need to be replaced.

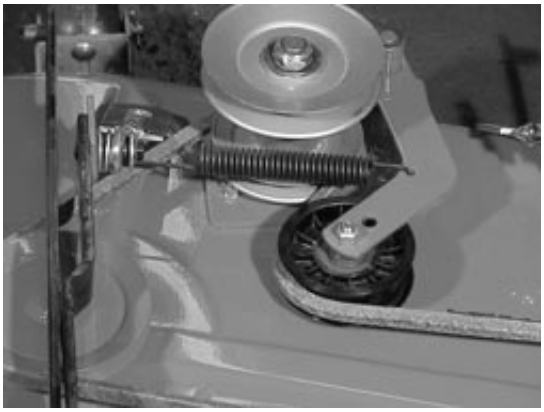


Figure 20

936-15

4.21 MOWER BELT REPLACEMENT

Disconnect the main idler spring from the unit frame and remove the PTO drive belt from the PTO clutch and the top of the mower deck jackshaft assembly.

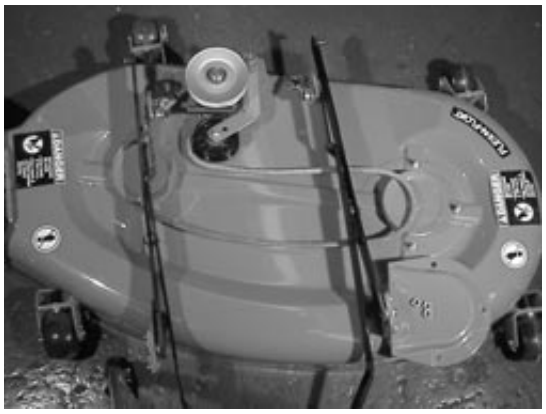


Figure 21

936-16

Remove the mower deck belt tension idler spring from the anchor post.

Remove the left hand spindle sheave cover. Remove the mower deck belt from the spindles and the jackshaft.

Replace the new belt in the reverse order.

4.22 MOWER SPINDLE LUBRICATION/ JACKSHAFT LUBRICATION

The mower deck spindles and jackshaft assemblies use sealed prelubricated bearings.

No lubrication is needed through the life of machine. Oil idler arm pivot point every 50 Hrs. Grease may be added to fill the cavity.

4.23 TRANSAXLE BELT REPLACEMENT

1. Disconnect the main idler spring from the unit frame and remove the PTO drive belt from the PTO clutch and the top of the mower deck jackshaft assembly.

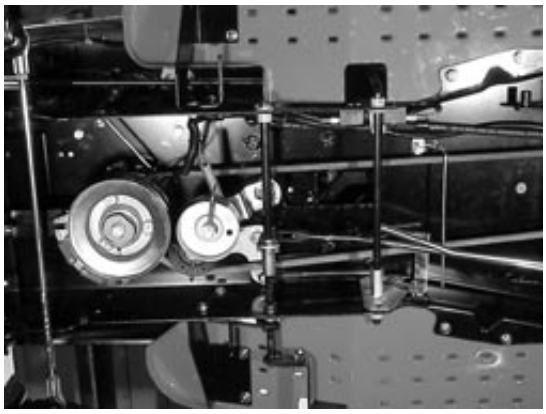
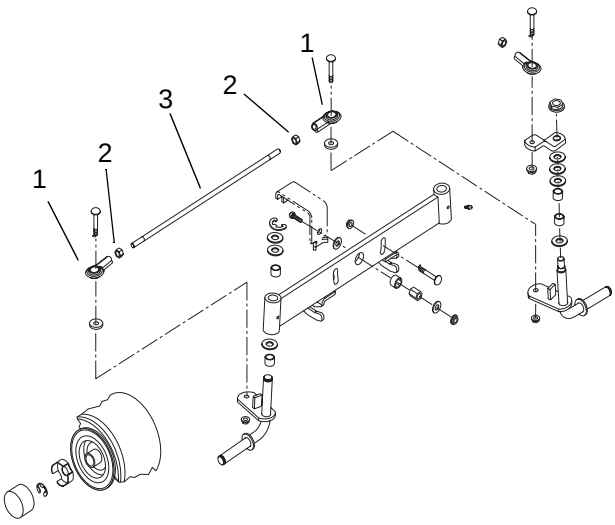


Figure 22 936-17

2. Remove the wire harness from the PTO clutch.
3. Remove the cap screw, holding the step in the center of the PTO clutch and remove the strap from the clutch.
4. Loosen the hardware securing the belt finger to the main drive belt idler.
5. Depress clutch/brake pedal and remove the main drive belt from the idler, engine and transmission pulleys.
6. Install new main drive belt in reverse order and secure belt finger hardware with 1/16" to 1/8" clearance between belt fingers and belt.



1. Tie Rod End
2. Jam Nut
3. Tie Rod

Figure 23 PT0092

4.24 STEERING

If looseness is noticed in the steering system, check hardware for tightness and wear points for excessive wear. Replace as needed.

Proper front wheel toe-in is necessary to assure proper steering and to reduce tire wear. Proper toe-in is when front of wheels are 1/16-1/8 in (.016-.032 mm) closer together than rear of wheels (measured at horizontal centerline of rim flange).

If unit wanders or excessive tire wear develops, toe-in should be checked. To correct toe-in, loosen jam nuts at tie rods ends, turn tie rod clockwise to decrease or counterclockwise to increase toe-in. Tighten jam nuts.

SECTION 5 - ENGINE

5.1 ENGINE TROUBLESHOOTING

The following trouble shooting chart is to be used to isolate engine problems and give possible causes and corrective action responses.

The trouble shooting key is generic and can be used for several types of engines. Use only those possible causes and corrective actions that apply to the unit.

TROUBLE	POSSIBLE CAUSES (Refer to Key Below)	CORRECTIVE ACTION
Black Exhaust	1, 20, 22, 25, 29, 31, 32, 33	repair or replace
Blue/White Exhaust	4, 20, 25, 31, 33, 34	repair or replace
Difficult Starting	1, 5, 7, 8, 9, 10, 20, 21, 22, 29, 31, 32, 33	repair or replace
Erratic Running	1, 7, 8, 9, 10, 20, 21, 23, 26, 29, 33, 59, 62	repair or replace
Excessive Fuel Consumption	1, 20, 22, 23, 25, 29, 31, 32, 33	repair or replace
Excessive Crankcase Pressure	25, 31, 33, 34, 45, 55	repair or replace
High Oil Pressure	4, 41	repair or replace
Knocking	22, 26, 29, 31, 33, 36, 46, 59	repair or replace
Loss of Power or System	1, 8, 10, 20, 21, 22, 23, 25, 26, 31, 32, 33	repair or replace
Low Cranking Power	2, 3, 4, 11	repair or replace
Low Oil Pressure	4, 36, 37, 39	repair or replace
Misfiring	10, 20, 25, 26, 28, 29, 32	repair or replace
Overheating	1, 19, 25	repair or replace
Poor Compression	25, 28, 29, 31, 32, 33, 34, 59	repair or replace
Starts and Stops	1, 6, 10, 62	repair or replace see electrical systems see engine service manual
Vibration	20, 23, 25, 26, 29, 33, 45, 49	repair or replace
Will Not Crank	2, 11, 45	charge battery or replace
Will Not Start	1, 10, 62	repair or replace see electrical systems see engine service manual

TROUBLESHOOTING KEY

1	Restriction in air cleaner	22	Incorrect grade of fuel	43	Faulty suction pipe
2	Bad electrical connection	23	Sticking throttle/restricted movement	44	Choked oil filter
3	Faulty starter motor	24	Exhaust pipe restriction	45	Bad solenoid switch
4	Incorrect grade of lubricating oil	25	Leaking cylinder head gasket	46	Incorrect piston height
5	Low cranking speed	26	Overheating	47	Damaged fan
6	Fuel tank empty	27	Cold running	48	Faulty engine mounting
7	Controls not in correct operation position	28	Incorrect tappet adjustment	49	Incorrectly aligned flywheel and/or flywheel housing
8	Blocked fuel feed line	29	Sticking valves	50	Faulty thermostat
9	Faulty fuel lift pump	30	Incorrect high pressure pipes	51	Restriction in water jacket
10	Choked fuel filter	31	Worn cylinder bores	52	Loose fan belt
11	Battery capacity low	32	Pitted valves and seats	53	Choked radiator
12	Air in fuel system	33	Broken, worn or sticking piston ring(s)	54	Faulty water pump
13	Faulty fuel injection pump	34	Worn valve stems and guides	55	Choked breather pipe
14	Faulty fuel injectors or incorrect type	35	Over full air cleaner	56	Damaged valve stem oil deflector (if fitted)
15	Incorrect use of cold start equipment	36	Worn or damaged bearings	57	Coolant level too low
16	Faulty cold start equipment	37	Insufficient oil in sump	58	Blocked sump strainer
17	Broken fuel injection pump drive	38	Bad/defective oil temperature switch	59	Broken valve spring
18	Incorrect fuel pump timing	39	Oil pump worn	60	Exhaust or vacuum pipe leak
19	Incorrect valve timing	40	Pressure relief valve sticking open	61	Bad or defective water temperature switch
20	Poor compression	41	Pressure relief valve sticking closed	62	Bad spark plug(s)
21	Blocked fuel tank vent	42	Broken relief valve spring		

5.2 ENGINE REMOVAL

1. Open and remove the hood from the unit.
2. Remove the negative cable from the battery.
3. Remove the attachment from the unit.
4. Remove the PTO clutch from the bottom of the engine sheave. Remove the main drive belt from the engine sheave by setting the parking brake.
5. Remove the throttle and choke control from the engine.
6. Remove the electrical wiring from the engine (charge lead, oil pressure lead, fuel solenoid lead, and magneto kill wire).
7. Remove the exhaust system from under the frame. Separate the muffler from the exhaust pipe that is bolted to the engine.
8. Remove the engine bolts and lift the engine with a hoist to remove it from the frame.



Figure 24 9336-18

5.3 ENGINE INSTALLATION

1. Check the engine base and unit frame for damage before installing the engine.
2. Place the throttle, choke control, and electrical wire out of the way prior to placing the engine onto the unit frame.
3. Once the engine is bolted onto the frame install the exhaust system and then tighten the mounting hardware.
4. Install the engine sheave and belts. Connect PTO clutch, electrical wiring, throttle and choke controls.
5. Prior to installing the attachment check for proper belt alignment and clutch function.
6. Install the negative battery cable onto the battery.
7. Reinstall the attachment onto the unit.
8. Install and close the unit hood and test operation and function of the engine.



Figure 25 936-19

SECTION 6 - HYDRO DRIVE TRAIN

6.1 HYDRO TRANSMISSION TROUBLESHOOTING

The following troubleshooting chart is to be used to isolate hydro transmission problems and give possible causes and corrective action responses.

The troubleshooting key is generic and can be used for several types of transmissions. Use only those possible causes and corrective actions that apply to the unit.

TROUBLE	POSSIBLE CAUSES (Refer to Key Below)	CORRECTIVE ACTION
Axles Will Not Turn	1, 7, 8, 12, 16, 18, 28, 32, 38, 42, 46	repair or replace
Difficult Starting	1, 6, 7, 8, 12, 16, 25, 26, 28, 38, 42, 46, 55	repair or replace
Erratic Running	1, 4, 6, 7, 8, 12, 18, 25, 26, 28, 42, 46, 55	repair or replace
Jerky When Starting	1, 4, 7, 8, 12, 18, 28, 38, 46	
Jumps Out of Gear	N/A	repair or replace
Knocking	4, 8, 12, 18, 28, 37, 42	repair or replace
Loss of Power or System	4, 12, 18, 28, 37, 42, 46	
Noisy	4, 12, 18, 26, 28, 32, 37, 42	repair or replace
Oil Leakage	4, 22, 51, 16	repair or replace
Operates Hot	4, 16, 28, 32, 35, 42	
Operates in One Direction Only	1, 8, 12, 30, 46	
Pump Failure	4, 12, 37	repair or replace
Speed Loss Under Load	1, 6, 11, 28, 37, 46, 51	repair or replace
Speed Loss Under Load	1, 4, 7, 12, 18, 28, 26	repair or replace
Will Not Drive	1, 7, 8, 18, 28, 37, 38, 46, 48	
Will Not Shift		repair or replace

TROUBLESHOOTING KEY

1	Inspect control linkage	22	Inspect hoses and lines for wear	43	Burrs on gearing
2	Inspect acceleration valves	23	Inspect implement relief valve	44	Gears improperly installed
3	Inspect charge check valves	24	Inspect charge pump	45	Forks & rod assembly incorrectly installed
4	Incorrect grade of lubricating oil	25	Bad transmission pump	46	Shifting keys broken or damaged
5	Low cranking speed	26	Overheating	47	Shifting washer in backwards
6	Controls not in correct operation position	27	Cold running	48	Shifter/Brake shaft keyways damaged
7	Belts are missing, to tight, loose or glazed	28	Bad transmission motor	49	Unit clutch not disengaging
8	Overload of vehicle	29	Check system pressure	50	Shifter stop assembled backwards
9	Replacement parts damaged	30	Shift rod grooves worn	51	Improper fit of case to cover
10	Replacement parts improperly installed	31	Reverse chain broken	52	Dowel pins not installed
11	Improperly torqued attaching screws	32	Damaged cooling fan	53	Differential bevel gears broken
12	Air in hydraulic system	33	Inspect auxiliary relief valve	54	Spring in shifter weak or broken
13	Broken shifter stop	34	Inspect cooling fan	55	Worn or stripped gear teeth
14	Inspect charge check valves	35	Inspect transmission cooling fins		
15	Inspect acceleration valves	36	Worn or damaged bearings		
16	Check oil level-gear box sump or reservoir	37	Metallic pieces or foreign objects in unit		
17	Inspect heat exchanger	38	Inspect for loosely mounted components		
18	Inspect by-pass valve	39	Steering column loose or binding		
19	Inspect charge pressure	40	Pressure relief valve sticking open		
20	Inspect inlet filter	41	Pressure relief valve sticking closed		
21	Inspect charge relief valve	42	Broken relief valve spring		

6.2 FLUIDS/GREASES

The fluids used in Hydro-gear transaxles have been carefully selected. If substitutions are made, use equivalent products.

Typically, an engine oil with a minimum rating of 55 sus at 210^{o}F (99^{o}C) and an API classification of SH/CD is recommended. A 20W-50 engine oil has been selected for use by the factory.

The grease used in the manufacture of Hydro-Gear products is a STEMS Premium grease and should be substituted with equivalent products only if it is not readily available in your area.

NOTE: This grease is not compatible with all grease types.

6.3 HYDRO TRANSMISSION REMOVAL

1. Place the unit on a flat surface and remove the negative lead from the battery and the spark plug lead from the spark plug.
2. Raise the mower pan lift arm and remove the four nuts holding the plastic insert onto the left side of the rear deck and remove the plastic insert.
3. Raise the seat and remove the wire harness from the seat switch, and remove the four carriage bolts holding the rear deck to the unit frame and remove the fuel cap from the fuel tank.
4. Lower the seat and rotate the seat deck forward and over the mower deck lift arm and off the unit frame.
5. Replace the fuel cap on the fuel tank and remove the fuel tank from the unit by releasing the fuel line from the fuel pickup tube in the tank.
6. Raise and block the unit frame on jack stands forward of the transaxle in the frame.
7. Remove the unit tail board by removing the upper two carriage bolts and the lower self tapping screws.
8. Move the tail board to the rear and up to release the transaxle dump valve link and transaxle oil expansion hose.



Figure 26

936-8

9. Remove the rear wheels by removing the hub cap, snap ring, hub cap ring, rear wheel, axle key, two flat washers and spacers.
10. Set the parking brake and remove the main drive belt from the input sheave on top of the transaxle.
11. Release the parking brake.
12. Remove the lock nut on the end of the brake rod, along with the flat washers and spring.
13. Remove the cotter pin and washer on the shift rod and remove the shift rod from the transaxle cam arm. **Do not remove or loosen the hardware on the transaxle sub-frame at this point.**
14. Release the upper and lower tension springs on the left rear of the transaxle sub-frame.
15. Support the transaxle with a floor jack from the rear of the unit.
16. Remove the two right front anchor bolts holding the transaxle subframe to the unit frame and remove the left front bolts holding the transaxle subframe to the unit frame.
17. Remove the two rear bolts on both sides of the unit frame holding the transaxle subframe to the unit frame.

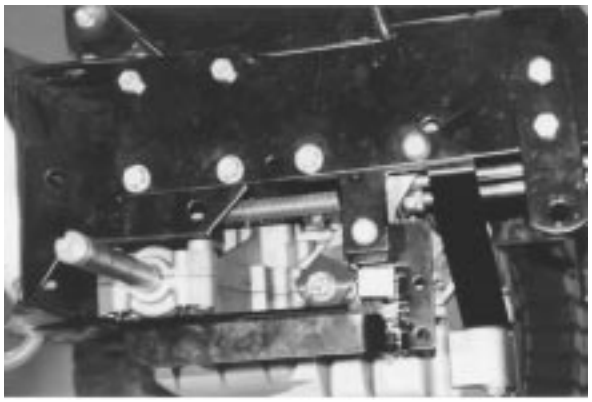


Figure 27

18. Move the transaxle assembly to the rear and out of the unit frame.
19. With the transaxle assembly removed from the unit frame, place the axle assembly on a flat work surface.

6.4 HYDRO TRANSMISSION REPAIR (MINOR)

Minor repairs may be performed, following the procedures in this section.

Cleanliness is a primary means of assuring satisfactory life of either new or repaired units. Cleaning parts by using solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign materials and chemicals.

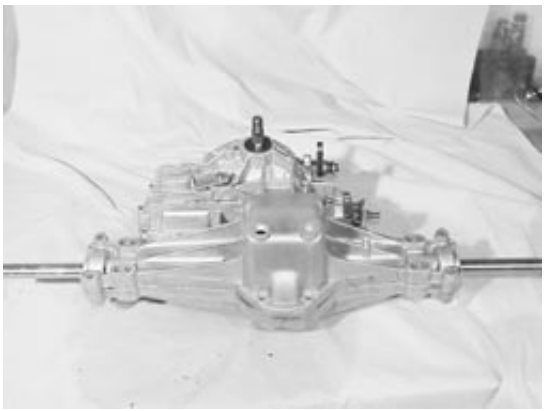


Figure 28

936-35

Protect all exposed sealing surfaces and open cavities from damage and foreign material. The outer surfaces of the transaxle should be cleaned before beginning any repairs.

Shaft Seals

Lip type seals are used on the pump input shaft, the displacement control shaft and bypass actuator shaft of the transaxle. These seals can be replaced without major disassembly of the unit. Replacement of these seals will require removal of the transaxle from the machine frame.

1. To remove the input shaft seal carefully pull the seal out of the housing bore with a "hook" type tool or a slide hammer type puller. Care must be taken to avoid damage to the housing bore or to the shaft sealing surface.



Figure 29

936-35

2. Lubricate the new seal prior to installation with a petroleum jelly.
3. Wrap the shaft spline with a thin plastic or cellophane tape to prevent damage to the new seal lip during installation.
4. Slide the seal over the shaft and press it into the housing bore. Be careful not damage the seal. The seal should seat against the retaining ring.

The displacement control shaft seal and bypass actuator shaft seal may be replaced following similar procedures.

6.5 HYDRO TRANSMISSION REPAIR (MAJOR)

1. Drain the oil by removing the breather assembly and positioning the transmission so the breather port is down to allow the oil to drain thoroughly.

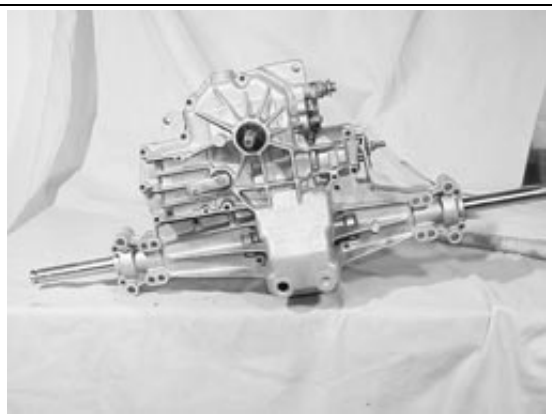
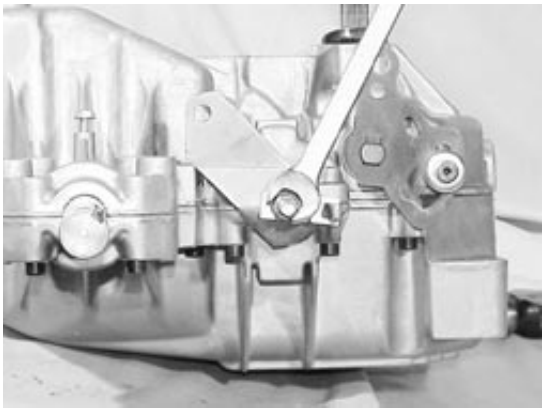


Figure 30 936-37

2. Position and secure the transmission with the upper housing down to allow access to the twenty housing assembly cap screws.
3. Using the appropriate tool, remove the twenty assembly screws.
4. Loosen the nut and the brake arm mounting bolt.



936-38

Figure 31

5. Separate the two housing halves by applying pressure with two large straight blade screw drivers. Use caution to prevent damage to the mating sealing surfaces as you separate the two halves.

NOTE: The sealant will make two halves difficult to separate.

6. All components should remain in the upper housing half (positioned down) as the bottom is lifted off.

CAUTION: The axle/differential assembly may stick as the lower housing is being lifted off of the upper housing.

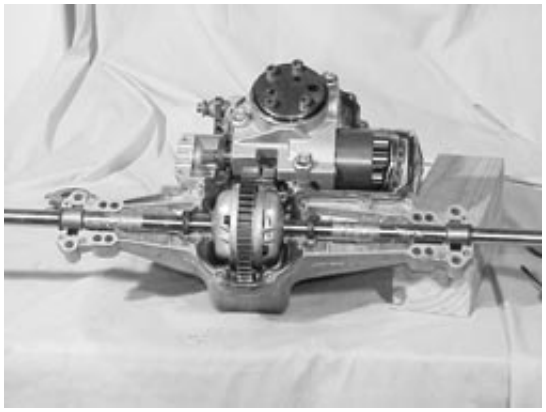


Figure 32 936-22

7. Inspect the lower housing for damage. Inspect the axle journal bearing pockets for excessive wear. Inspect the brake rotor/stator pocket for excessive wear.

NOTE: Prior to reassembly the housing mating surfaces must be thoroughly cleaned and old sealant must be removed.

8. Lift the axle/differential assembly out of the upper housing.

NOTE: It will be necessary to remove any burrs or rust from the axle ends prior to the removal of the two bronze bearings or damage to the bearings will occur.

9. Remove the two bronze journal bearings, four lip seals and flat washers from the axle ends.

NOTE: The lip seals must not be re-used during reassembly.

10. Inspect the bronze bearings for excessive wear. The bearings should be 0.7535" to 0.7561" I.D.
11. Inspect the axle ends for damage or excessive wear. The axle ends should be 0.7486" to 0.7496".



936-23

Figure 33



936-29

Figure 34

12. Inspect the differential bevel gears by rotating the axle ends.
13. Inspect the final drive gear teeth for excessive wear or damage.
14. Check the differential assembly screw for proper torque. The correct torque should be 12-14 ft. lbs. (.75-.9 Nm).
15. Inspect the journal bearings inside the differential housing for excessive wear by feeling the shafts for an unreasonable amount of play.
16. If excessive wear or damage has been found, the complete assembly must be replaced.
17. Remove the brake rotors and stators by sliding one at a time off the ends of the splined motor shaft.
18. Inspect each side of both rotors for excessive wear or damage.
19. Inspect the rotors internal splines for excessive wear or damage.
20. Inspect the stators for excessive wear and damage.
21. Replace rotors and stators as a complete kit if excessive wear or damage is found, and inspect all other mating parts.
22. Remove the oil filter. After inspecting the filter for unusual particles that it may have trapped, dispose of it properly and replace it with a new oil filter during reassembly.
23. Using a 9/16" socket (or box end) wrench, remove the three assembly bolts retaining the center section in the upper housing.

CAUTION: The pump and motor piston springs may push the center section assembly out of position while you remove these bolts.

24. Remove the center section assembly from the housing. The pump block assembly should remain in the upper housing on the input shaft, but may stick to the center section. Inspect the check valve plate bolt torque, but do not remove. Two styles of check plates have been used one has three bolts while the other has four. The one with four bolts should be torqued from 170-240 in. lbs. (10.5-14.7 Nm) while the one with three bolts should be torqued from 135-185 in. lbs. (8-11.5 Nm).

CAUTION: The aligning pins, motor shaft, bypass plate, pump block and motor block assemblies are NOT retained to the center section or the upper housing and may become separated from the assembly during removal.



936-30

Figure 35

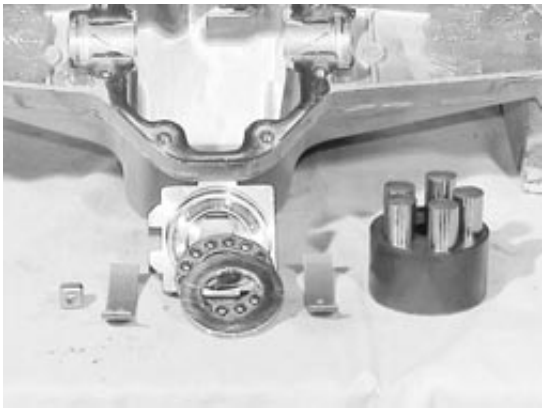
25. Remove the motor block assembly from the motor shaft and inspect for unusual wear or damage. The pistons should fit with very little side clearance in the block bores, but must slide freely.

NOTE: The correct bore diameter for the block is 0.6776" to 0.6784" and the pistons should be 0.6767" to 0.6770".

26. Remove the motor shaft, washers and bypass plate from the center section and inspect for unusual wear or damage.
27. Inspect the center section running surfaces for unusual wear or damage.
28. Remove the pump block assembly, block thrust washer and spring from the input shaft and inspect for unusual wear or damage. The pistons should fit with very little side clearance in the block bores, but must slide freely.

NOTE: The correct bore diameter for the block is 0.6295" to 0.6303" and the pistons should be 0.6288" to 0.6291".

29. Remove the two internal hex head cap screws retaining the jackshaft to the housing with a 5mm hex wrench and remove the jackshaft/pinion gear assembly from the housing.
30. Inspect the jackshaft running surface for excessive wear or damage. The jackshaft should be 0.4986" to 0.4996".
31. Inspect the pinion gear bore for excessive wear or damage. The bore should be 0.5014" to 0.5024".
32. Inspect the pinion gear teeth for excessive wear or damage.
33. If excessive wear or damage was found, the complete assembly should be replaced.



936-31

Figure 36

34. Remove the motor thrust bearing assembly, swashplate kit and cradle bearing from the housing and inspect for unusual wear or damage.
35. Remove the slot guide from the displacement control shaft.
36. Remove the bypass actuator from the housing.
37. Reposition the housing and remove the input shaft tip seal from the housing bore. A hook type tool may be used to pry the seal out. Care must be taken to avoid damage to the housing bore, shaft sealing surface or bearing. Once removed, the seal is not reusable.
38. Remove the input shaft bearing ring.
39. Remove the pump input shaft assembly from the housing.
40. Inspect the shaft and bearing for unusual wear or damage.
41. Reposition the top housing and remove the displacement control shaft and lip seal.
42. Inspect the housing for damage.

Replacement of Parts

All parts should be thoroughly cleaned in a suitable solvent. All sealant material MUST be removed from the housing halves prior to reassembly.

1. Inspect all parts for damage, nicks or unusual wear patterns. Replace all parts having unusual, excessive wear or discoloration.
2. Inspect the sealing surfaces, bearing surfaces, and shaft splines. Polish the sealing areas on the shafts if necessary. **Replace any worn or damaged parts**.

NOTE: The running surfaces of the cylinder blocks **MUST** be flat and free from scratches. If scratches or wear are found on the running surface of the cylinder block or center section, polish or replace the parts. when polishing these surfaces, up to 0.0004" may be removed. If this is not sufficient to obtain a flat surface free of scratches, the part should be replaced.

3. Clean and lightly oil parts prior to assembly of the transmission.
4. Be sure to torque all threaded parts to the recommended torque levels.
5. Replace all o-rings and shaft seals.

CAUTION: Most parts have critical high tolerance surfaces. Care must be exercised to prevent damage to these surfaces during assembly. Protect exposed surfaces, openings and parts from damage or foreign material.

6. Install the displacement control shaft.
7. Install the pump input shaft assembly and retaining ring into the housing.
8. Install the pump shaft lip seal.
9. Reposition the upper housing and install the cradle bearings.
10. Install the slot guide block onto the displacement control shaft.



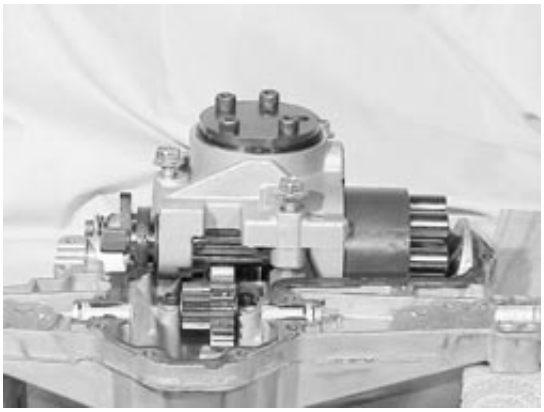
936-32

Figure 37

11. Install the swashplate assembly into the housing. The slot on the swashplate must engage the slot guide block on the displacement control shaft. Use a tool such as a screwdriver to hold the guide block in position while installing the swashplate.
12. Install the thrust washer and pump block spring onto the pump shaft.

NOTE: To simplify the installation of the pump block, wrap a rubber band snugly around the pistons. This is intended to hold the pistons in their bores as the block kit is handled during installation. Be certain to remove the rubber band.

13. With the swashplate in the neutral (0 angle), lubricate the running surfaces and install the block kit onto the pump input shaft. Make sure the splines engage properly.
14. Install the pinion gear and washers onto the jackshaft. Install the jackshaft assembly into the housing and torque the bolts from 12-170 in. lbs. (7.4-10.5 Nm).
15. Install the aligning pins and the bypass actuator into the housing.
16. Install the washers and lip seal onto the motor shaft.
17. Install the motor shaft into the center section.
18. Install the bypass plate (small end first) into the center section.
19. Lubricate the running faces and install the motor block kit onto the motor shaft.
20. Position the washers and seal and install the center section assembly onto the aligning pins and pump input shaft.



936-33

Figure 38

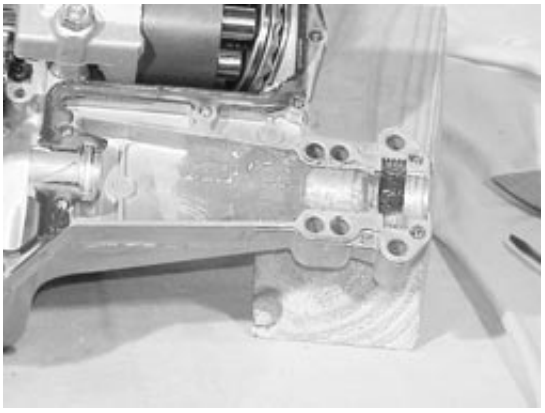
21. Insert the three assembly bolts into the center section and press center section down onto the aligning pins and pump input shaft until sealed on mounting bosses. While holding the center section in position, torque the bolts evenly from 525-700 in. lbs. (32-43 Nm).
22. Install the motor thrust bearing (with the thicker race towards the pistons) by compressing the piston springs and sliding the bearing assembly in to place.

NOTE: The tool being shown is an example of what you will need to compress the pistons and allow the bearing to be installed.

23. Fill the axle pockets of the upper housing with Rykon Premium grease (inside of bearing locations).

NOTE: This grease is not compatible with all grease types.

24. Do not overfill, and wipe off any excess grease or sealant will not cure properly.



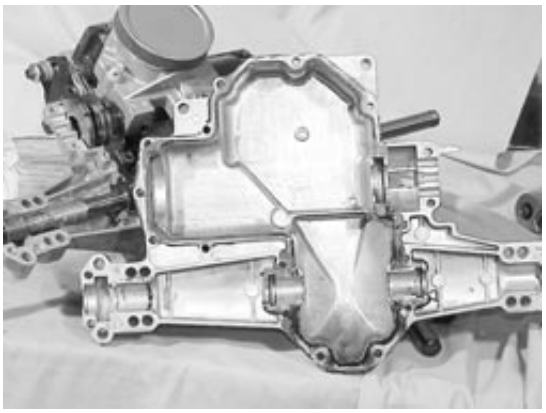
936-21

Figure 39

25. Install the washers and seals onto the differential axle assembly and align them for installation.

26. Install the differential axle assembly into the housing.
27. Install a new filter onto the center section check valve plate.
28. Install the rotors and stators. Install a stator, then a rotor (hub to inside), then a stator, then a rotor (hub to inside), then two stators.
29. Install the brake bolt (with nut) into the upper housing.
30. Apply the sealant to the lower housing.

NOTE: Sealant must be of good quality, oil and heat resistant.



936-24

Figure 40

Position the lower housing onto the upper housing and secure with assembly bolts. Torque the bolts from 135-165 in. lbs. (8-10 Nm).

NOTE: The bolts around the front of the housing are installed simultaneously at our factory. The order in which you torque them is not important.

31. After torquing all bolts, wipe off any excess sealant from the seam of the housing.
32. Reposition the transaxle assembly and check the bypass actuator and axle shafts for freedom of movement. The axle should not lock up but may be tight, while the bypass actuator must rotate freely.
33. Torque the nut on the brake bolt from 120-185 in. lbs. (7-11 Nm).
34. Install a new lip seal on the displacement control shaft and bypass actuator shaft.
35. Install the brake pins and brake arm.
36. Adjust the brake clearance as described in the brake adjustment section.
37. Install the control arm and friction pack.
38. Install the bypass actuator arm and retaining ring. Use care to avoid over extending the retaining ring.
39. Prior to adding oil to the transmission it is recommended that you test for leaks. This may be performed with a small hand pump or by using compressed air and a regulator. Do not allow more than 10 PSI to be applied or seal damage may occur. To locate a leak, apply a soap mixture around the housing seam and at all lip seals. Do not submerge unit or the brake will be damaged.

Oil Fill & Start-Up Procedures

Fill the transmission with a 20W-50 engine oil. The correct volume for fill should be 2-1/2 quarts (2.4 L).

It is recommended that the unit be purged prior to installing into the unit frame. The following is the suggested purging procedures for repaired transaxle.

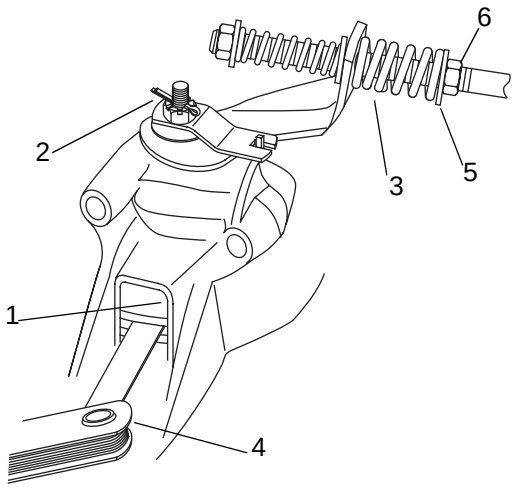
1. Spin the input shaft in a clockwise direction at 1000-1500 RPM. This may be performed in a drill press (or equivalent).
2. Engage (actuate) the bypass.
3. Stroke the control lever forward for five seconds and then reverse for five seconds. Do this three times in each direction.
4. Return the control lever to neutral.
5. Disengage the bypass.
6. Stroke the control lever forward for five seconds and then reverse for five seconds. Do this three times in each direction.

NOTE: It may be necessary to repeat these steps in the vehicle to fully purge the transmission.

7. Check the oil level after fully purging the unit of air. It should be between 1.25-1.62" (3.1-4.1 cm) from the top of the housing.
8. After installing the transmission, make sure all linkages and actuators are functioning properly.

6.6 HYDRO TRANSMISSION INSTALLATION

Before installing the transaxle assembly into the unit frame with the axle subassembly installed the following items will need to be completed.



1. Disc Brake
2. Castellated Nut w/Cotter Pin
3. Compression Spring- .78" OD x 1 " long
4. Feeler Gage
5. Washer
6. Nylon Lock Nut

Figure 41

OT0840

Make sure the brake rod has two flat washers and a heavy coil spring installed on it before inserting the transaxle into the unit frame.

1. Guide the shift rod into the shift arm and the brake rod into the brake arm as the transaxle is inserted into the frame from the rear of the unit.
2. Start the two rear 3/8" self tapping bolts into the rear of the transaxle sub frame to support the axle assembly while installing the rest of the hardware.

Do not tighten any hardware until all the support hardware is installed.

3. When all the hardware is in place, tighten to an appropriate torque.
4. Reinstall the tension spring to the shift linkage on the top and bottom of the right axle.
5. Install the two flat washers, compression spring, and lock nut on the rear of the brake rod which operates the brake arm.
6. Install the flat washer and cotter pin on the shift rod.
7. Set the parking brake and install the main drive belt on the transaxle input sheave and check the belt routing on the idler arm and engine pulley, release the parking brake.
8. Check the belt fingers and belt alignment.
9. Reinstall the rear tail board on the unit installing the dump valve rod and transaxle oil expansion hose. Reuse the hardware removed earlier, two carriage bolts and two self tapping cap screws.
10. Reinstall the fuel tank and attach the fuel line, route the seat switch wires over the fuel tank.
11. With the mower deck lift arm in the up position reinstall the rear deck onto the unit frame and over the fuel tank.
12. Route the seat switch wires through the rear deck and attach to the seat switch.
13. Install the fuel cap onto the fuel tank, attach the rear deck to the unit frame.
14. Before installing the left rear wheel install the two flat washers and spacers, install the rear wheel with key in the key way.
15. Replace the hub cap retainer and snap ring and place the hub cap over hub cap retainer.
16. Leave the right wheel off the transaxle for neutral adjustment.

Transaxle Neutral Adjustment

Make sure that the rear of the unit is suspended before the unit is started, set the parking brake and start the engine.

Make sure that the interlock system is operational before proceeding.

1. Place a weight onto the seat to activate the seat switch, and release the parking brake.
2. Turn in the cap screw on the bottom of the transaxle subframe that will pivot the top of the shift arm to the rear.
3. The axle should drive to the rear.
4. Turn the cap screw out on the axle subframe which will allow the shift arm to pivot forward and the axle should rotate forward.
5. Center the cap screw between these two points and the transaxle should be in hydraulic neutral.
6. Reinstall the right rear wheel identical to the left rear wheel.

SECTION 7 - GEAR DRIVE TRAIN

7.1 GEAR TRANSMISSION TROUBLESHOOTING

The following troubleshooting chart is to be used to isolate hydro transmission problems and give possible causes and corrective action responses.

The troubleshooting key is generic and can be used for several types of transmissions. Use only those possible causes and corrective actions that apply to the unit.

TROUBLE	POSSIBLE CAUSES (Refer to Key Below)	CORRECTIVE ACTION
Axles Will Not Turn	7, 8, 10, 13, 30, 31, 36, 38, 44, 45, 56, 53, 55	repair or replace
Difficult Starting	1, 5, 6, 38, 45	repair or replace
Erratic Running	1, 7, 8, 10, 13, 26, 30, 36, 44, 45, 46, 47, 48, 53	repair or replace
Jerky When Starting	6, 7, 8, 30, 31, 36, 38, 44, 46, 48, 53, 54, 55	
Jumps Out of Gear	1, 8, 13, 30, 36, 44, 45, 46, 54	repair or replace
Knocking	4, 8, 13, 30, 36, 37, 44, 46, 53, 55	repair or replace
Loss of Power or System	7, 8, 11	
Noisy	4, 8, 11, 36, 37, 38, 43, 55	repair or replace
Oil Leakage	26, 36, 51	repair or replace
Operates Hot	4, 8, 32, 34, 36, 43	
Operates in One Direction Only	1, 6, 36, 43, 48, 55	
Pump Failure	N/A	repair or replace
Speed Loss Under Load	1	repair or replace
Speed Loss Under Load	1, 6, 7, 8, 11, 36, 37, 44, 46, 48, 53, 55	repair or replace
Will Not Drive	1, 8, 13, 30, 36, 44, 45, 47, 50, 51, 54	
Will Not Shift	30, 44	repair or replace

TROUBLESHOOTING KEY

1	Inspect control linkage	22	Inspect hoses and lines for wear	43	Burns on gearing
2	Inspect acceleration valves	23	Inspect implement relief valve	44	Gears improperly installed
3	Inspect charge check valves	24	Inspect charge pump	45	Forks & rod assembly incorrectly installed
4	Incorrect grade of lubricating oil	25	Bad transmission pump	46	Shifting keys broken or damaged
5	Low cranking speed	26	Overheating	47	Shifting washer in backwards
6	Controls not in correct operation position	27	Cold running	48	Shifter/Brake shaft keyways damaged
7	Belts are missing, to tight, loose or glazed	28	Bad transmission motor	49	Unit clutch not disengaging
8	Overload of vehicle	29	Check system pressure	50	Shifter stop assembled backwards
9	Replacement parts damaged	30	Shift rod grooves worn	51	Improper fit of case to cover
10	Replacement parts improperly installed	31	Reverse chain broken	52	Dowel pins not installed
11	Improperly torqued attaching screws	32	Damaged cooling fan	53	Differential bevel gears broken
12	Air in hydraulic system	33	Inspect auxiliary relief valve	54	Spring in shifter weak or broken
13	Broken shifter stop	34	Inspect cooling fan	55	Worn or stripped gear teeth
14	Inspect charge check valves	35	Inspect transmission cooling fins		
15	inspect acceleration valves	36	Worn or damaged bearings		
16	Check oil level-gear box sump or reservoir	37	Metallic pieces or foreign objects in unit		
17	Inspect heat exchanger	38	Inspect for loosely mounted components		
18	Inspect by-pass valve	39	Steering column loose or binding		
19	Inspect charge pressure	40	Pressure relief valve sticking open		
20	Inspect inlet filter	41	Pressure relief valve sticking closed		
21	Inspect charge relief valve	42	Broken relief valve spring		

7.2 GEAR TRANSAXLE REMOVAL (PEERLESS)

1. Place the unit on a flat surface and remove the negative lead from the battery and remove the spark plug lead from the spark plug.
2. Raise and support the rear of the unit. Remove the rear wheel with associate hardware.
3. Remove the rear tailboard from the unit. Engage the parking brake and remove the main drive belt from the input sheave on top of the transaxle.
4. Release the parking brake and remove the brake rod from the transaxle brake arm.
5. Remove the shift link ball joint from the shift arm.
6. Support the transaxle and remove the mounting hardware and lower the transaxle out of the frame.

7.3 TRANSAXLE TEARDOWN

This unit contains an aluminum tag showing the model number.

The following steps will need to be taken prior to disassembly.

1. Clean the outside surface of the transaxle.
2. Position the shift lever in the neutral position.
3. Remove the set screw, spring and index ball.
4. Remove the neutral start switch.
5. Remove the hex head screws that hold the cover to the case.
6. Push the shift lever rod while pulling cover off of the case. The shifting lever may temporarily remain in the case. Lift off cover.
7. Remove the two brake bracket screws and remove the brake assembly.



Figure 42

8. Remove the oil from the unit prior to removing the gear shaft assemblies.
9. Remove the top bearing block on the bull gear of the differential. Remove the bull gear, bevel pinion gears with center shaft and the axles.

There are 3 shaft assemblies in this transaxle: the output shaft, the countershaft, and the shifter/brake shaft assembly. Remove these assemblies as complete as possible from the case.

As these assemblies are taken apart, lay the parts out in a systematic order. This will help to make reassembly easier and inspection of all parts possible. Clean each part as the parts are laid out.

The input shaft can also be removed and inspected or serviced. Remove the snap ring on the bevel gear and pull the shaft through the case. The square cut "O" ring must be replaced if the shaft is removed.

Tecumseh tool part No. 670251, is used for removal and installation of needle bearings for the input shaft. The needle bearing on the inboard side is installed .135-.150" below flush.

Reassembly

1. Apply grease between the bearings in the cover and install the input shaft, bevel gear and snap ring.
2. Oil both keyways and slide keys and collar on the shifter/brake shaft.

NOTE: Assemble the countershaft and the shifter/brake shaft. Match them together and place into the housing as a single unit.

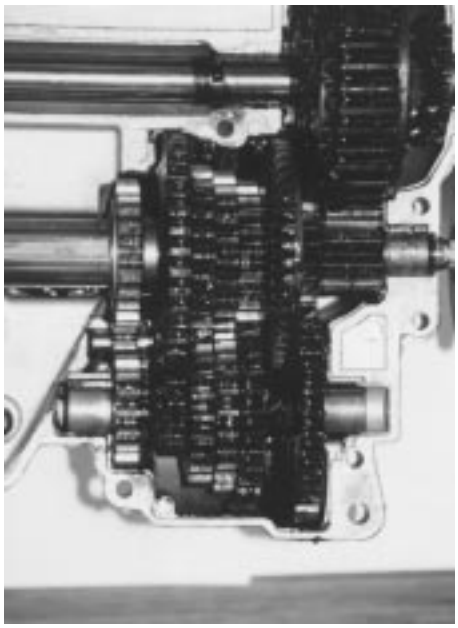


Figure 43

3. Push the shifting keys through the reverse sprocket and push the neutral collar over the end of the keys and pull the neutral collar and reverse gear up against the shoulder of the shifter/brake shaft.
4. Insert the countershaft into the smaller reverse gear. Insert a thin thrust washer next to the gear and then install the larger bevel towards the reverse gear. Place another thin thrust washer on the back side of the bevel gear.

NOTE: As all the gears are placed back into the assembly, each should be oiled prior to assembly.

5. Build the gears on the counter shaft and shifter/brake shaft alternately, meshing each gear with it's mating gear on the other shaft. The first gear on the shifter/brake would be the largest of the shifting gears. Place this gear next to the neutral collar with the flat side of the gear next to the collar.
6. Then place a shifting washer onto the shifter/brake shaft with the rounded edge towards the shifting keys. Continue this procedure until all the gears on both shafts have been added.

NOTE: It is not only important that the gears match up diameter-wise, but must match up according to thickness.

7. Add the spacer to countershaft on the other side of the reverse gear. Then place a thrust washer on each end of the counter shaft and insert the bronze bushings.
8. Place the large washer on the end of the shifter/brake shaft, the bronze bushing and the "O" ring.
9. Place the spur gear onto the splines on the other end of the shifter/brake shaft. The thin washer and bushing conclude the assembly of these 2 shafts.
10. Place the output gear on the stepped end of the output pinion. The shaft in the output pinion is permanently pressed. Place the thrust washers on each end and then the bronze bushings.

7.4 TRANSAXLE INSTALLATION

1. With the transaxle support plates mounted on the axle, place the axle assembly into the unit frame.
2. Place the brake rod into the brake arm assembly prior to mounting the axle.
3. Install all the axle mounting hardware and tighten.
4. Set the parking brake and install the main drive belt onto the axle sheave.
5. Release the parking brake and check the belt finger locations and belt routing.
6. Install the link ball joint onto the shift arm.
7. Attach the neutral switch wiring plug onto the neutral switch, check for OK to start light.
8. Attach the rear tailboard onto the rear of the unit.
9. Check for proper operation and place the unit on the ground and test the unit.

8.1 STEERING UNIT REMOVAL

1. Open and remove the hood from the unit. Remove the battery by first removing the negative battery cable and then the positive battery cable. Release the battery hold down strap and remove the battery.
2. Remove the indicator lights from the dash, remove the wiring plugs from all the switches and hour meter if installed.
3. Remove the steering wheel and steering column cone from the top of the dash assembly. Remove the knob from the throttle control, and remove the throttle control from the dash support. Remove the screws that hold the side panels to the dash support.
4. Remove the remaining screws around the base of the dash assembly from the unit frame and lift the dash assembly off the unit.
5. Remove the upper dash support and steering shaft bearing.

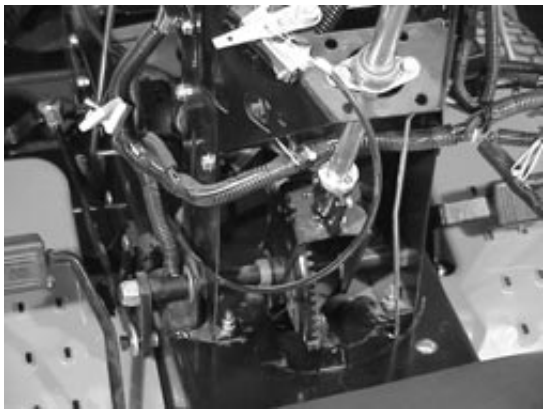


Figure 44 936-20

6. Remove the electrical components from the right side of the top dash support and remove the upper dash support from the unit.
7. Remove the steering rod arm from the left side of the unit. Remove the two snap rings from the ends of the shaft and rack assembly.
8. Remove the flange bushings from the side of the lower dash support and move the steering gear assembly to the left and rotate out of the right side of the dash support.
9. Disassemble the pinion gear support bracket and check for wear on the rack or pinion gear. Replace the parts as needed.

8.2 STEERING UNIT ASSEMBLY

1. Reassemble the steering pinion support and shim for correct back lash.

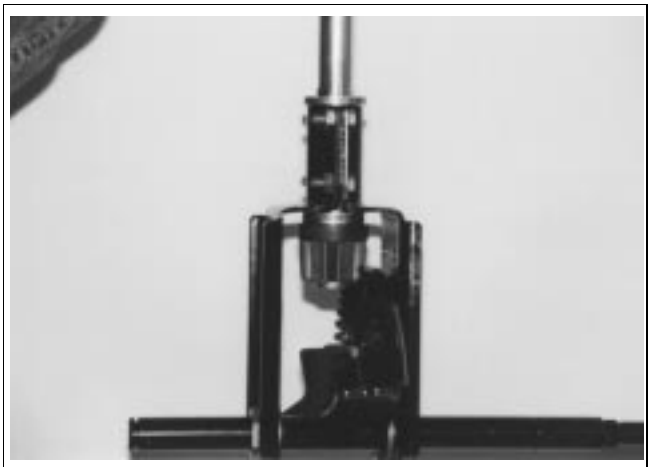


Figure 45

2. Insert the steering assembly through the lower dash support and add the flange bushings and snap rings to hold the unit in place.
3. Rotate the steering shaft up and install the upper dash support with the steering shaft bearing.
4. Reinstall the electrical components on the right side of the upper dash support. Install the dash assembly and secure to the unit frame with the screws removed earlier.
5. Secure the side panels to the dash assembly and reattach the wiring and indicating lights if used.
6. Reattach the steering wheel and the steering column cone to the top of the dash assembly.

8.3 TIE ROD ADJUSTMENT

1. With the pinion gear in the center of the rack assembly the steering rod arm should be on the end of the rack shaft in the vertically down position.
2. The front wheels should be toed in 1/8 of an inch in the front of the wheel compared to the rear of the front wheels. Adjust tie rod and ball joints to hold this dimension.
3. With the front wheels pointed straight forward attach the tie rod from the top of the left front wheel to the steering arm in the vertically down position. this will give you the maximum steering rotation right and left.

SECTION 9 - LIFT SYSTEM

9.1 LIFT SYSTEM OVER VIEW

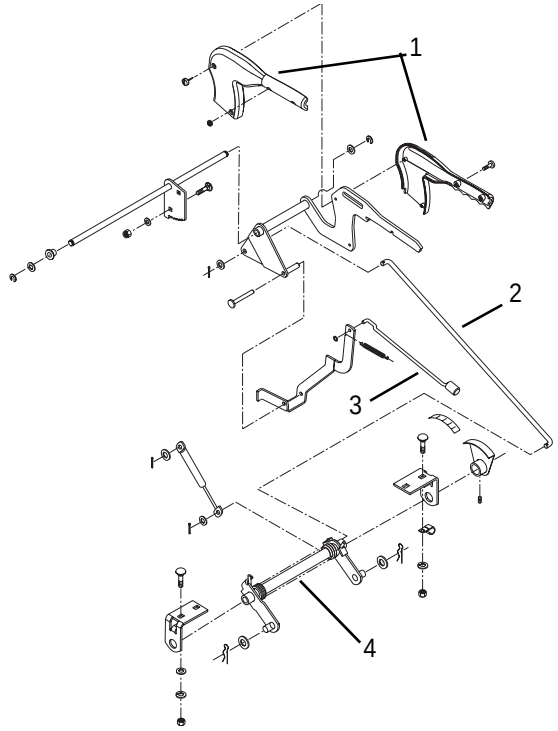
The lift system on the unit uses a spring assisted system to take the weight of the attachment away from the operator.

9.2 LIFT SYSTEM REMOVAL

1. With the mower attachment removed from the unit the lift handle should be left in the up position.
2. Remove the cotter pins on the mower lift link.
3. Remove the left center lift bracket support. Support the lift assembly and remove the left bracket. Remove the spring assembly from the unit.
4. Removal of the upper lift assembly handle on the rear deck of the unit will need to be removed.
5. Move the fuel tank forward to allow access to the mounting hardware.
6. Remove the plastic handle covering on the lift handle.
7. Release and remove the detent lever tension spring.
8. Remove the pivot pin from the lift linkage and remove detent lever from the linkage.
9. Remove the external ring from the ends of the lift lever pivot and remove the washers and bushings.
10. Remove the carriage bolts and nuts holding the pivot rod to the rear deck supports.

9.3 LIFT SYSTEM INSTALLATION

1. Insert the cross shaft and coil assembly into the support bracket still in the unit and mount the left with the hardware removed with it.
2. Insert the fuel line and wire harness into the J clamp and bend closed.
3. Insert the lift rod into the lift arm cross shaft and secure with washers and cotter pin.
4. Reassemble the upper lift assembly into the rear deck support and secure with the hardware removed earlier.
5. Install the bushings and washers onto the rod ends and secure with the external retaining rings.
6. Install the pivot pin into the lift linkage and attach the detent lever tension spring.
7. Reinstall the plastic handle covering over the metal lift handle subframe.
8. Attach the mower lift link and secure with the cotter pin.
9. Check function and operation prior to installing the mower attachment.



1. Lift Handle
2. Lift Link
3. Tension Spring
4. Spring Assembly

Figure 46

PT0111

SECTION 10 - FUEL SYSTEM

10.1 FUEL SYSTEM TROUBLESHOOTING

The following troubleshooting chart is to be used to isolate fuel system problems and give possible causes and corrective action responses. The troubleshooting key is generic and can be used for several types of engines. Use only those possible causes and corrective actions that apply to the unit.

TROUBLE	POSSIBLE CAUSES (Refer to Key Below)	CORRECTIVE ACTION
Hard Starting	1, 3, 4, 6, 11, 12, 14, 16, 17, 18	clean, repair or replace
Fuel Leak At Carburetor	5, 7, 17	repair or replace
Engine Floods	5, 15, 17	repair or replace
Will Not Idle	1, 2, 3, 6	repair or replace
Rich Idle	1, 6, 14	repair or replace
Idles With Needle Closed	14	repair or replace
Hunts Erratic Idle	2, 3, 6, 7, 12, 13, 14, 15, 18	repair or replace
Idles Fast Lean	2, 3, 7,	repair or replace
Will Not Accelerate	1, 6, 12, 14, 15, 16	repair or replace
Over Rich Acceleration	1, 15	repair or replace
Hesitates	2, 6, 11, 12, 16	repair or replace
Will Not Run at High Speed	1, 11, 12, 14, 16	repair or replace
Low Power	1, 3, 11, 14, 15, 16, 17, 18	repair or replace
Hunts at High Speed	3, 6, 7, 12, 14, 15, 16, 18	repair or replace
Runs With Needle Closed	14	repair or replace
Engine Overspeeds	2, 3, 7, 14	repair or replace

TROUBLESHOOTING KEY

1	Plugged air filter	7	Damaged or leaky "O" rings	13	Idler port restricted
2	Leaky carburetor gasket	8	Damaged diaphragm	14	Damage adjustment needle and seat
3	Throttle or choke shaft worn	9	Stuck or dirty ball check	15	Incorrect float height
4	Choke not functioning properly	10	Diaphragm upside down	16	Main nozzle restricted
5	Plug atmospheric vent	11	Plugged tank or vent	17	Dirty, stuck needle and seat
6	Air bleed restricted	12	Fuel pick-up restricted	18	Fuel inlet plugged

10.2 FUEL PUMP

The impulse style fuel pump is the most commonly used fuel pump. Impulse fuel pumps may either be mounted externally onto the carburetor fuel inlet or remotely mounted. These pumps are connected in the fuel line between the fuel supply and the carburetor or directly to the fuel inlet.

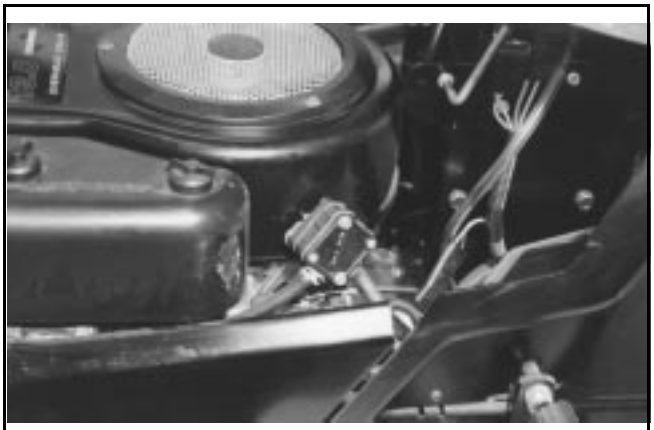


Figure 47

Impulse fuel pumps are operated by crankcase impulses created by the up and down movement of the piston. A hose called a pulse line connects the fuel pump diaphragm chamber and transmits the impulses to the pump diaphragm. The impulses actuate the diaphragm and the flap valves to lift the fuel from the fuel tank to the carburetor.

10.3 FUEL SYSTEM CONTAMINATION

Any time fuel contamination is found in the fuel system (dirt, water, algae, etc.) replace the fuel, fuel filter and flush the fuel lines. Remove the carburetor bowl and clean. Replace all items that cannot be cleaned. Reassemble the fuel system and check for proper operation.

10.4 FUEL TANK

The fuel tank is made of composite material for long life with out breaking down from the additive used in today’s blended fuels.

SECTION 11 - ELECTRICAL

11.1 TOOLS

There are some specialized tools and test equipment that are needed for electrical repair work. A brief description of these follows.

Long or needle-nose pliers - used to connect or bend wires and connectors in close quarters.

Diagonal cutters - used to cut wires or trim connections.

Wire stripper/crimping tool - available separately or as a combination tool, used to strip insulation from wires of various sizes, crimp terminals and connector on wires.

Soldering gun or soldering iron - used to solder all splices and connections to terminals, connectors, etc. A soldering gun is faster and more convenient than waiting for a soldering iron to heat.

Multimeter - analog or digital to measure voltage, amperage and ohms.

Tachometer - used to measure engine speed. Required to properly test alternator and charging circuits where output is dependent upon engine.

Heat gun - used to shrink insulated tubing in place. Used to replace electrical tape or insulated sleeving. To use place a piece of shrink tubing over a wire joint, heat with the heat gun, and it shrinks tightly around the joint to insulate it.

Supplies - electrical tape, rosin core solder (never use acid or acid core solder on electrical joints), an assortment of various size terminals, connectors, insulated or heat shrink tubing (for use on joints and connections), and an assortment of automotive type wire (in several colors).

Ariens recommends that all work be done in a professional manner. The use of the tubing to cover joints and the soldering of connections contribute to a professional looking job. In addition to a pleasing appearance. repairs made in this manner are more likely to withstand vibration. (The weakest points in an electrical system are at the joints where wires are attached. Vibration causes wires to flex at these points and eventually to break).

Replace all defective components with Ariens Factory replacement parts only. Engine parts, such as rectifiers or alternator components should be secured through the nearest engine service center.

Ariens does not recommend attempting to repair electrical components. Most do not lend themselves to repair and you would have more money invested in "time of repair" than the part would cost and the results may not be as good.

11.2 ELECTRICAL MEASUREMENTS

In many electrical circuits, there is some visible effect which indicates that the circuit is functioning properly. A switch is turned "ON" and a lamp lights. A key is turned, a starter motor runs and cranks the engine. If the lamp does not light, or the starter motor does not run, some means of measuring voltage, current flow, resistance and continuity is needed, (continuity means there is a complete electrical path through the circuit or component.)
To know exactly what conditions exist in an electrical circuit requires AC and DC Voltmeter, AC and DC Ammeter, and an Ohmmeter.

Multimeter

A single combination meter that does all of these things is available. Such a meter is called a Multimeter or Volt-Ohm-multitester (VOM). Meters of this kind are available in many forms and all change functions and ranges with switches, or by plugging test leads into different jacks. Multimeters are available in two basic types, Analog and Digital.

Analog Meters

Analog Meters have a needle that moves across a scale to give a reading. The longer the scale, the easier it is to read and more accurate the reading will be. A jeweled movement is used in this type of meter is more likely to be damaged through rough handling (except for overloaded Protected Meters) or by measuring high values that exceed the range set on the meter than a digital meter. They provide excellent service for the money as long as they are used with care.

Digital Meters

Digital Meters do not have a movement and are therefore more rugged. The reading shows up directly on a display window of some type. Since they read direct, no skill in reading the scale is required, nor is it necessary to set the range. The meter switches the ranges automatically. One has only to select the function DC Volts, AC Ampere, Ohms, etc.,) connect the test leads, and the reading is shown on the display. Because of the internal circuitry and the lack of a movement, these meters are not likely to be damaged by overloads.

In the discussions that follow, either type of meter may be used. Test procedures are the same. It is best to learn proper procedures, even though some meters may be more forgiving of mistakes. Where differences in use may occur, they will be covered in the discussion.

Voltage Measurement

A voltmeter measures the voltage difference between the test leads and the voltmeter is always connected across the circuit under test.

Current Measurement

The rules to remember when measuring current with an ammeter are; an ammeter measures the current that flows through the meter, and to measure current an ammeter must be connected into the circuit.
The latter rule means that the circuit must be opened, and the ammeter wired into it. Because this procedure is usually difficult, an ammeter is seldom used for troubleshooting.

Resistance Measurement

An ohmmeter is used to make resistance measurements and to check continuity through wires and electrical components.
The ohmmeter has a self contained battery and requires no electrical power. Using the ohmmeter on a circuit that has power applied may result in damage to the meter.

IMPORTANT: Disconnect the equipment battery when making Ohmmeter test or damage to the Ohmmeter may result.

IMPORTANT: An ohmmeter reads the resistance of whatever component is connected between the test leads. It can be used to check wires, coils, light bulbs, or any item that conducts current.

11.3 BATTERY

Set-Up:

The battery is dry charged. The dealer or customer must add electrolyte (sulfuric acid and water).

1. Remove the battery from the unit.
2. Remove all the vent caps from the battery and set the caps to one side.
3. Take the electrolyte which should be 1.265 specific gravity at 80^{o}F (27^{o}C), and fill each cell so that the electrolyte is level with the bottom of the fill ring.
4. The battery should stand for 1/2 hour. Now check electrolyte level in each cell again. If necessary add more electrolyte to bring the level up to the bottom of the ring.
5. Charge until all cells are gassing freely, and the specific gravity is constant over three successive readings taken at 30 minute intervals.
6. Immediately after charging, check level of electrolyte. If the level is low add distilled water to bring it up to the required level.
7. Replace the vent caps. It is not necessary to tighten more than finger tight.
8. Wash off the battery to remove electrolyte which may have spilled.

Maintenance:

Do an occasional visual inspection. See to it that the battery remains clean, both the case and the terminals. This visual inspection should be done once a month.

Check the level of the electrolyte. It may be necessary to add distilled water. This should be checked before each usage.

Another important check is the specific gravity. The specific gravity should be checked with the hydrometer. The reading on the gauge should be above 1.225. If the reading is allowed to fall below 1.225 specific gravity you will have an insufficient charge. If this happens charge the battery until specific gravity of 1.265 is reached over 3 successive readings. This check should be done monthly.

The state of charge can be determined approximately by the cell specific gravity or the rested open circuit voltage at room temperature and the charging time can be estimated. For example:

OCV	Specific Gravity	% of Charge	Charging Time
12.60	1.265	100%	---
12.40	1.225	75%	3 hours
12.20	1.180	50%	7 hours
12.00	1.130	25%	10 hours
11.80	1.100	0%	12 hours

If using an automatic tapering 12 volt charger, choosing a good quality 5 to 10 amps 15VDC minimum output charger and charge for 3 to 12 hours according to the battery state of charge (see table above) or until the specific gravity in each cell reaches 1.255 - 1.265 specific gravity at 80^{o}F (27^{o}C).

If using a constant current charger, charge at 1 to 2 amperes for the time given on the table above or until full specific gravity is reached.

IMPORTANT: Charging at higher rates will damage the battery and cause excessive gassing and acid spewing.

WARNING: When charging battery, remove it from the unit and make certain that you connect the positive (+) lead of the charger to the positive (+) terminal and the negative (-) lead to the negative (-) terminal. Reverse connections can cause sparks and potential unsafe conditions.

Storage:

During the off season it is important to have the battery in the same good condition or it will not deliver power when needed.

1. Make sure the battery is fully charged and the electrolyte is to the proper level.
2. Make sure the battery is clean (both the case and terminals.)
3. After cleaning the terminals, spread petroleum jelly on the terminals to prevent loss of charge and prevent corrosion.
4. Leave the cables disconnected.
5. It would be best to leave the battery in a cool, dry area during the off season. This will slow down the loss of charge during non-use periods.
6. Check your battery monthly during the off season and if the battery has a low specific gravity apply a charge to it. The battery is a perishable item and it should be stored properly to obtain a long, useful life.

Batteries not in use will self discharge and plates will sulfate permanently if not recharged. If the battery will not be used for more than three months, it should be removed and stored in a cool, dry place. Any collection of dirt, grease or electrolyte should be removed from the top of the battery. The battery must be recharged monthly or when the cell specific gravity reads less than 1.255 specific gravity before reinstalling the battery in the spring. It should always be fully recharged.

NOTE: The specific gravity should be checked in each cell and should be the same for all cells. A variation in a cell reading could be an indication of a problem. Subtract .004 from 1.265 for each 10^{o}F (12^{o}C) below 80^{o}F (27^{o}C) or add .004 to 1.265 for each 10^{o}F (12^{o}C) above 80^{o}F (27^{o}C) .

11.4 SWITCHES

Switches either open a circuit to stop current flow or close and allow current to flow through.

A normally open (N.O.) switch prevents current flow until the switch is actuated, completing the circuit and allowing current to flow through it. An example is a light switch - the lights are off until the switch is actuated and the lights go on.

A normally closed (N.C.) switch allows current to flow until the switch is actuated, breaking the circuit and stopping current flow through it. An example is an ignition switch that grounds the magneto when in the off position (completing the circuit) but opens the circuit when in the ON position allowing the engine to operate.

Switches are selected with regard to Current rating (contacts must be of sufficient size to carry the required current), Voltage rating (switches insulated for specific voltages), Case or housing (switches that are exposed to moisture and must be sealed to prevent moisture from entering), and Actuating type (push, pull, rotary, momentary contact, or micro switches).

NOTE: Check that the connections to the switches are secure and that a switch is being activated properly before performing electrical test on switches. (Safety switches on speed selector and clutch levers may be out of adjustment and not activating.)

IMPORTANT: When checking switches electrically, remove them from their respective circuit by disconnecting the wires from the switch at the connector(s) before testing or damage could result to the meter or machine components.

When an ohmmeter or multimeter set on the ohms scale, check the switch for three things: continuity between contacts of a normally open switch that closes when the switch is activated; that contacts of a normally closed switch open when the switch is activated; and that there are no shorts between contacts or between contact and ground (switch case) that should not be there.

Variation from test results described indicates a defective switch.

Normally Open Switch

To test a normally open switch (key, headlight, safety, or seat) connect the ohmmeter across the switch terminals. Meter should indicate open circuit (high resistance). Activate the switch. The ohmmeter should read up scale to zero resistance (Close Circuit). This indicates the switch is operating properly. Also check from each terminal to the switch case (if case is metal). Reading should show high resistance indicating no short to ground.

Normally Closed Switch

To test a normally closed switch connect the ohmmeter across the switch terminals. Meter should indicate a closed circuit (zero resistance). Activate the switch and

the meter should move to open circuit (high resistance). Check from each terminal to ground (switch case). Meter should show open circuit (high resistance).

Ignition Switch

NOTE: Refer to the wiring diagram of the unit involved to determine switch functions and test using the methods described.

Key Switch
(03602300)

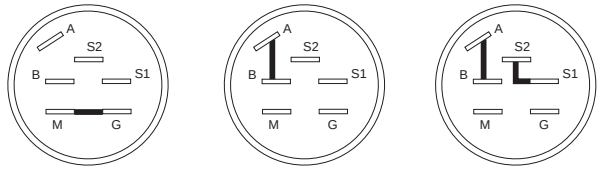


Figure 48

The ignition switch incorporates a number of functions, although not all functions are used on all equipment. The switch has three positions: OFF, RUN, and a momentary contact START position. Use an ohmmeter to check the continuity of the switch in each position.

OFF Position - Should be continuity between contacts G and M. These connections ground the engine magneto and stop the engine in the OFF position.

RUN Position - Should be continuity between contacts B and A. These connections supply power to the rest of the wiring harness. Connections G and M open to each other.

START Position - Hold switch in START position while testing. There should be continuity between contacts S1 and S2. These connections apply power to close the solenoid contacts and operate the starter motor.

In addition to the above test, place the switch in the run position and check between each contact and ground (metal case) to be sure no terminals are grounded. If the switch is operating properly, there will be no continuity between contacts other that those described.

11.5 SOLENOID AND RELAYS

Solenoid and relays are both magnetically operated devices. Both devices operate on the principle that passing a current of electricity through a coil of wire will create a magnetic field strong enough to attract a piece of iron or steel. Each device uses this principle in a slightly different manner.

Relay
(03042800)

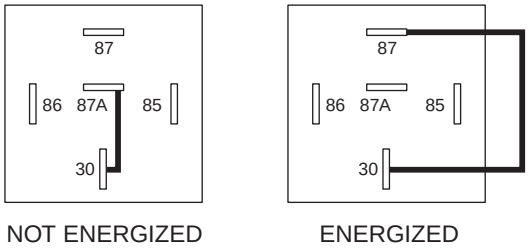


Figure 49

Relay - A basic relay consists of a coil of wire wound around a soft iron (magnetic) core. When current is passed through the coil, the core is magnetized and pulls down on a magnetic lever. The lever in turn is attached to several switch contacts which open or close other electrical circuits. In this fashion, a small current can control one or more larger electrical currents and actuate several other devices. In most cases a relay contact moves only a fraction of an inch and the magnetic pull is small.

Solenoid - A basic solenoid consists of a coil of wire wound around a hollow tube. A magnetic core slides inside the tube. When current is passed through the coil, the core is pulled into the solenoid with considerable force. With proper design, a solenoid can exert considerable force over a distance of several inches. A solenoid can therefore, pull a lever, close a heavy contact, or perform other jobs that require a straight line pull.

If a relay or solenoid fails to operate, the cause may be either electrical or mechanical.

To check electrically, connect a voltmeter across the coil of the device and activate the circuit that operates the relay or solenoid. If the meter indicates no voltage is applied, the cause is in the control circuit.

If the meter indicates proper voltage across the coil but the device does not function, remove the power, disconnect the wiring and check the continuity of the coil with an ohmmeter. The meter should indicate resistance, in the order of 3 to 5 ohms, if the coil is intact. A high resistance indicates an open coil and a defective device.

There are also a number of mechanical problems that may cause the problem.



Figure 50

The starter solenoid in the Ariens equipment is a sealed unit used to actuate the starter motor on the engines. This solenoid may have three or four connections.The two large connections carry high current to operate the starter motor. The small connections are connected to the coil and carry the control current.

To check the solenoid, disconnect the cables to the starter motor, turn the ignition switch to the start position, and listen for the solenoid to snap inside contacts closed.

If no snap is heard, check across the coils with a voltmeter. The voltage should read 12 volts with the ignition switch in the start position. If no voltage appears, the defect is in the start circuit.

If the voltage is correct, turn off the power and check continuity of the coil with an ohmmeter. If the coil is open, the solenoid is defective and must be replaced.

If the coil has the proper voltage applied, and the continuity check indicates the coil is intact, the solenoid plunger is stuck or the contacts are welded shut and the solenoid must be replaced.

If the solenoid snaps shut, but the start does not operate, check across the large contacts with an ohmmeter. If there is no continuity when the solenoid snaps shut, the contacts are defective and the solenoid must be replaced.

11.6 LIGHTING CIRCUITS

Lighting circuits are simple circuits and easiest to trouble shoot in most equipment. They consist of the lights connected in parallel, a normally open switch, a protective fuse and a source of power (battery or engine alternator).

If only one light is out, check the connector, then check the bulb for continuity (high resistance indicates a defective or burned out bulb).

If all the lights are out, check the fuse for continuity (high resistance indicates a defective or blown fuse). If the fuse is blown, check for a short in the wiring and correct before replacing the fuse.

If the fuse and lamps are good, check the circuit with an AC/DC voltmeter.

11.7 FUSES

Fuses are connected in electrical circuits to protect the circuits from damage due to overload or short circuits. Fuses are a "weak link" in the circuit. They contain a metal link designed to melt when a certain current value is exceeded thus opening or disconnecting the wiring. Once a fuse blows or melts it must be discarded and replaced with a new fuse of the same value.

Since the function of the fuse is to protect the circuit, NEVER attempt to defect the protective device by bridging or replacing with a device of a higher current rating.

Electrical testing of these devices is simple, since the device either conducts current (and is therefore functioning) or the device is open and is therefore defective. Use an ohmmeter to check for continuity. Replace defective devices only with factory replacements parts.



Figure 51

11.8 DIODES AND RECTIFIERS

Diodes are solid state, semiconductor devices. They contain no moving parts and conduct current better in one direction than the other. They are electrical "check valves" and permit current flow in one direction, but not in the other.

Diodes allow current to flow through one circuit without "backing up" into another. In engine alternator circuits a diode is used to convert current which flows back and forth (AC) in a circuit to current which flows only in one direction (DC). A device which converts alternating current to a direct current is called a **RECTIFIER**. A diode is one type of a rectifier.

To check a diode, isolate if from the circuit by disconnecting one end. With a multitester set on the lowest ohms scale setting, measure the resistance in one direction, reverse the test leads, and measure in the other direction. Readings should be high in one direction and low in the other. (If the readings are low in both directions, the diode is shorted, and if the readings are high, the diode is open.) If the readings are the same in both directions, the diode is defective and must be replaced.

IMPORTANT: Diodes are marked to indicate polarity (a band on one end, an arrow on the side, or they fit on a holder only one way.

Rectifiers

A battery is charged through the use of an alternator located in or on the engine. A charging circuit contains a rectifier because alternators produce alternating current (AC) and batteries require direct current (DC) for charging.

The rectifier may be built into the engine or it may be an external part. It may also contain a regulator to prevent overcharging the battery. (Servicing of rectifiers built into the engine should be done by an approved engine manufacturer's service center. Such a service center has access to the information and parts required to test and repair or replace engine components, including rectifiers and regulators.)

Units that contain both a rectifier and regulator are tested in a working circuit to make sure the regulator portion of the device is operating.

11.9 ELECTRIC CLUTCH

The electric clutch is used to turn on and off the attachment used on the unit by use of a switch on the dash panel. The clutch is also designed so that a brake is applied to the output shaft when the clutch is disengaged (off).

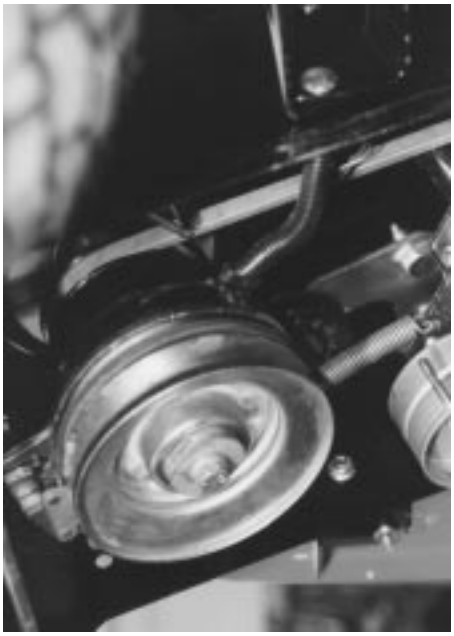


Figure 52

The field coil is mounted to a bearing support and does not rotate. The rotor is attached to the power output shaft and rotates around the field assembly. The armature is attached to the output pulley. The armature assembly is held close to the rotor by the brake assembly. The clutch is engaged by applying current to the coil connection. This results in a current flowing through the coil, magnetizing the coil pulling the armature onto the rotor with sufficient force to hold the two pieces together, effectively connecting the output and the input shafts together. Pulling armature against the rotor pulls it away from the brake, releasing the brake.

Engine Electrical Components

Engine servicing and repair should be referred to local engine manufacturers service centers that have the service information and parts available to properly service the engine. Ariens dealers should be able to test engines and engine components to pinpoint troubles and narrow them down to properly advise the engine serviceman.

11.10 ELECTRICAL

Initial check out: Make sure that all switches are in their proper position for starting: (A) PTO off. (B) transaxle in neutral position. (C) operator on the seat. (D) the parking brake pedal pushed. (E) cruise control in the off position. If no power to start the engine, start the following check list:

Step 1: Check out the battery. Use a hydrometer on all the battery cells to see if one or more is bad. Also use a voltmeter to check for proper voltage. Replace the battery if necessary and/or charge to proper level.

Step 2: Use a voltmeter to make sure you have power to terminal (B) on the back side of the ignition switch in the off position. If you don't have power to terminal (B) check the battery connections and the fuse in the red lead.

Step 3: With the ignition switch in the "run" position, check to see if power has been transferred from terminal (B) to terminal (A). Terminal (A) on the ignition switch supplies power to the back of the PTO switch on the purple lead and on to the brake switch on the brown/yellow lead out of the brake switch on the red/ violet lead to the start light and to terminal (S2) on the ignition switch and to terminal 86 on solenoid #2. Terminal (A) also supplies power to terminal 30 and terminal 86 on solenoid #1 and to the hour meter, and the voltage sensor and sensor light. When the operator is in the seat, power will transfer from terminal 30 to terminal 67 and on to the front PTO switch, and on to terminal 86 on the solenoid #2 in the yellow/red lead and on to the cruise control switch. Power is supplied to the fuel shut off solenoid from terminal 86 on solenoid #2.

Step 4: With the ignition switch in the start position, power is transferred from terminal (S2) to (S1). Terminal solenoid and goes to ground through the base of the starter solenoid.

Clutch check out: Remove the clutch lead to the wiring harness and check the clutch with a VOM for field resistance to see if the coil is good (3.0 - 3.9). If bad, the resistance will be high or not at all.

Ignition switch check out: Voltage check out in the "off" position, check for voltage at terminal B. Voltage should not be present on terminals A, S1, S2.

With the ignition switch in the "run" position, check for voltage at terminals B, A, S2. It should not be present on terminal S1.

With the ignition switch in the "start" position, check for voltage at terminals B, A, S2, S1.

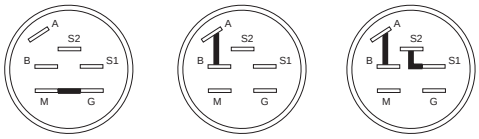
PTO switch check out: The PTO switch is a push/pull switch with straight across contacts. Power transfer should be checked with a voltmeter. The switch contacts should be checked with an Ohm meter with the wire harness plug removed. The light switch is similar to the PTO switch with only one contact.

Diode check out: Diodes are checked with an Ohm meter set on diode check, and should pass voltage in only one direction. If a diode passes voltage in both directions or not at all the diode is defective and will need to be replaced.

11.11 SWITCH CONTINUITY

The diagrams below show the various states of connection for electrical components.
The solid lines on switches show continuity.
NOTE: All switches are viewed from the rear.

Key Switch
(03602300)



OFF RUN START

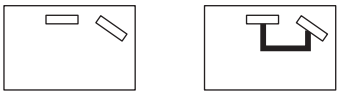
Seat Switch
(03654200)



OPERATOR OFF SEAT

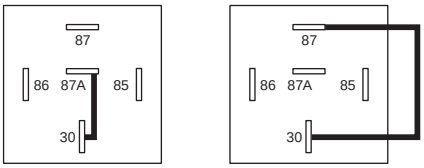
OPERATOR ON SEAT

Light Switch
(03656800)



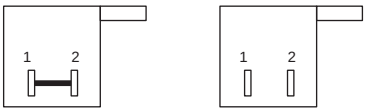
OFF ON

Relay
(03042800)



NOT ENERGIZED ENERGIZED

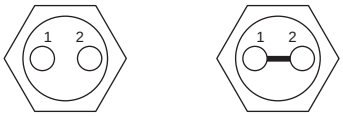
Clutch / Brake Switch
(03657100)



ENGAGED (button in)

DISENGAGED (button out)

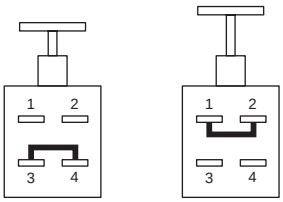
Transmission Neutral Switch
(08803700)



ENAGED (button in)

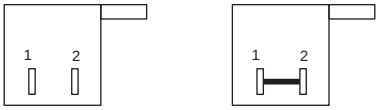
DISENGAGED (button out)

PTO Switch
(53603800)



DISENGAGED ENGAGED

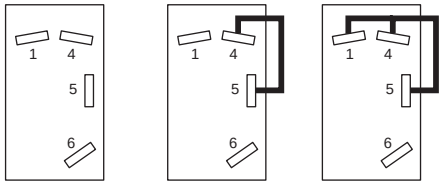
Safety Switch
(03657100)



ENGAGED (button out)

DISENGAGED (button in)

Cruise Control Switch
(03656900)



OFF CRUISE ON SET

Key Switch	Off	Run	Start
B	11:50-13:00	11.50-13.00 Vdc	11.50-13.00 Vdc
A		11.50-13.00 Vdc	11.50-13.00 Vdc
S-1			11.50-13.00 Vdc
S-2		11.50-13.00 Vdc	11.50-13.00 Vdc

Contact Resistance Is 0.1-0.3 Ohms When Correct.

Seat Switch	Off	Run	Start
Pink		11.50-13.00 Vdc	11.50-13.00 Vdc
Black	Connected To Ground		

Normally Open Contacts Manually Activated. Contact Resistance Is 0.1-0.3 Ohms When Correct.

PTO Switch	Off	Run	Start
Yellow/red (2)		11.50-13.00 Vdc	11.50-13.00 Vdc
Purple/white (2)	Connected To PTO Clutch And Light		
Purple		11.50-13.00 Vdc	11.50-13.00 Vdc
Brown/yellow		11.50-13.00 Vdc	11.50-13.00 Vdc

2 Sets Of Contacts, One Normally Open, One Normally Closed. Contact Resistance Is 0.1-0.3 Ohms When Correct

Brake Switch	Off	Run	Start
Brown/yellow		11.50-13.00 Vdc	11.50-13.00 Vdc
Red/violet (3)		11.50-13.00 Vdc	11.50-13.00 Vdc

Normally Open Contacts Manually Activated. Contact Resistance Is 0.1-0.3 Ohms When Correct.

Relay #1		Off	Run	Start
Pink 85			11.50-13.00 Vdc	11.50-13.00 Vdc
Purple	86		11.50-13.00 Vdc	11.50-13.00 Vdc
Yellow/red	87		11.50-13.00 Vdc	11.50-13.00 Vdc
87a			Not Used	Not Used
Purple (3)	30		11.50-13.00 Vdc	11.50-13.00 Vdc

Pins 85-86 Coil Resistance 87-100 Ohms. Pins 30-87 Normally Open. Pins 30-87a Normally Closed. Contact Resistance Is 0.1-0.3 When Correct.

Relay #2		Off	Run	Start
Black	85		11.50-13.00 Vdc	11.50-13.00 Vdc
Yellow/red	86	Connected To Ground		
87			Not Used	Not Used
White/black	87a	Connected To Ignition Module		
Black	30	Connected To Ground		

Pins 85-86 Coil Resistance 87-100 Ohms. Pins 30-87 Normally Open Pins 30-87a Normally Closed Contact Resistance Is O.1-0.3 Ohms When Correct.

Light Switch - Off Position	Off	Run	Start
Orange		11.50-13.00 Vdc	11.50-13.00 Vdc
Orange			

Normally Open Contacts Manually Activated. Contact Resistance Is 0.1-0.3 Ohms When Correct.

Headlight	Off	Run	Start
Orange	11.50-13.00 Volt W/switch On		
Black			

Solenoid	Off	Run	Start
Small Brown			11.50-13.00 Vdc
Small Black	Connector To Ground		
Large Red (Battery)	11.50-13.00 Vdc	11.50-13.00 Vdc	11.50-13.00 Vdc
Large Red (Starter)			11.50-13.00 Vdc

Normally Open Contacts (Big Terminals) Coil Resistance 3.0-5.0 Ohms. Contact Resistance Is 0.1-0.3 Ohms When Correct. Electrically Activated.

PTO Clutch	Off	Run	Start
Purple/white (2)			
Black	Connected To Ground		

Coil Resistance 6.0-8.0 Ohms Reference Page 10.

Cruise Switch	Off	Run	Start
Yellow/red		11.50-13.00	11.50-13.00
Black	Connector To Ground		
Green/white			
Yellow			

Normally Open Contacts, Manually Activated. Contact Resistance Is 0.1-0.3 Ohms When Correct.

Cruise Relay		Off	Run	Start
Yellow	85			
Black	86			
Yellow	87			
	87a			
Yellow	30			

Pins 85-85 Coil Resistance 87-100 Ohms. Pins 30-87 Normally Open. Pins 30-87a Normally Closed. Contact Resistance Is 0.1-0.3 Ohms When Correct.

Cruise Magnet	Off	Run	Start
Yellow			
Black	Connected To Ground		

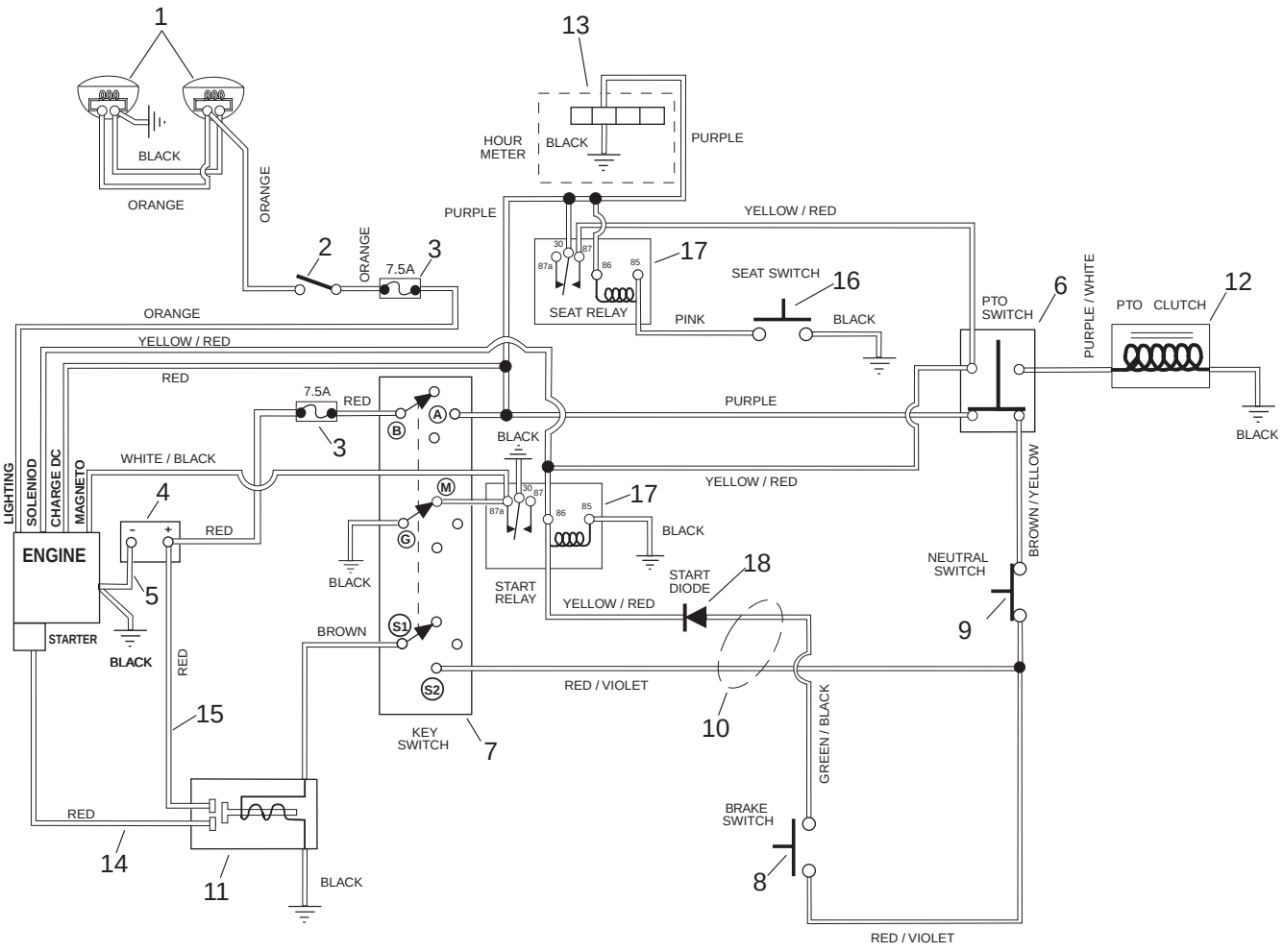
Cruise Control Resistance Is 23.3-26.8 Ohms When Correct.

Cruise Safety Switch	Off	Run	Start
Green/white			
Blue			

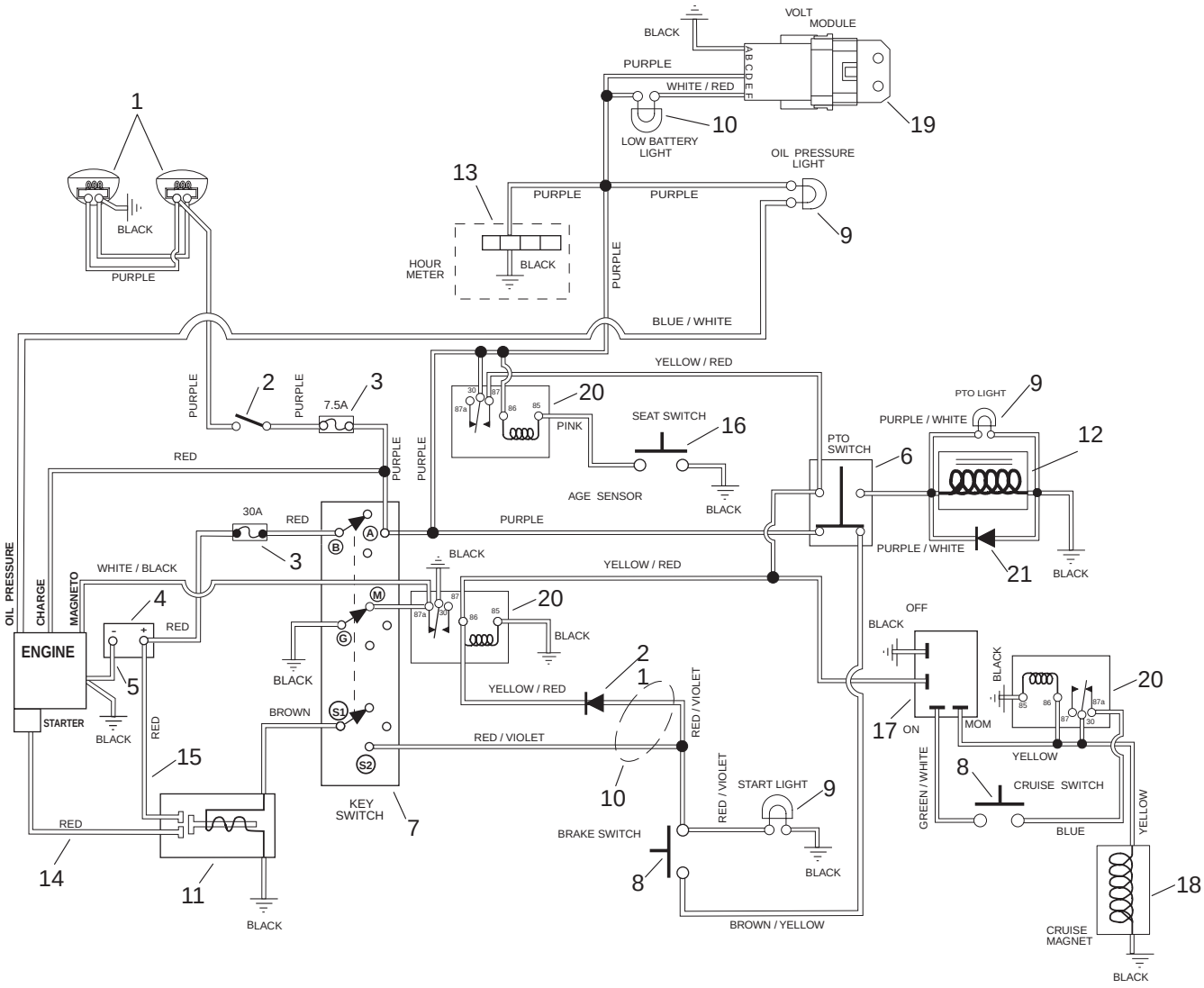
Normally Open Contacts, Manually Activated. Contact Resistance Is 0.1-0.3 Ohms When Correct.

11.12 WIRING DIAGRAMS

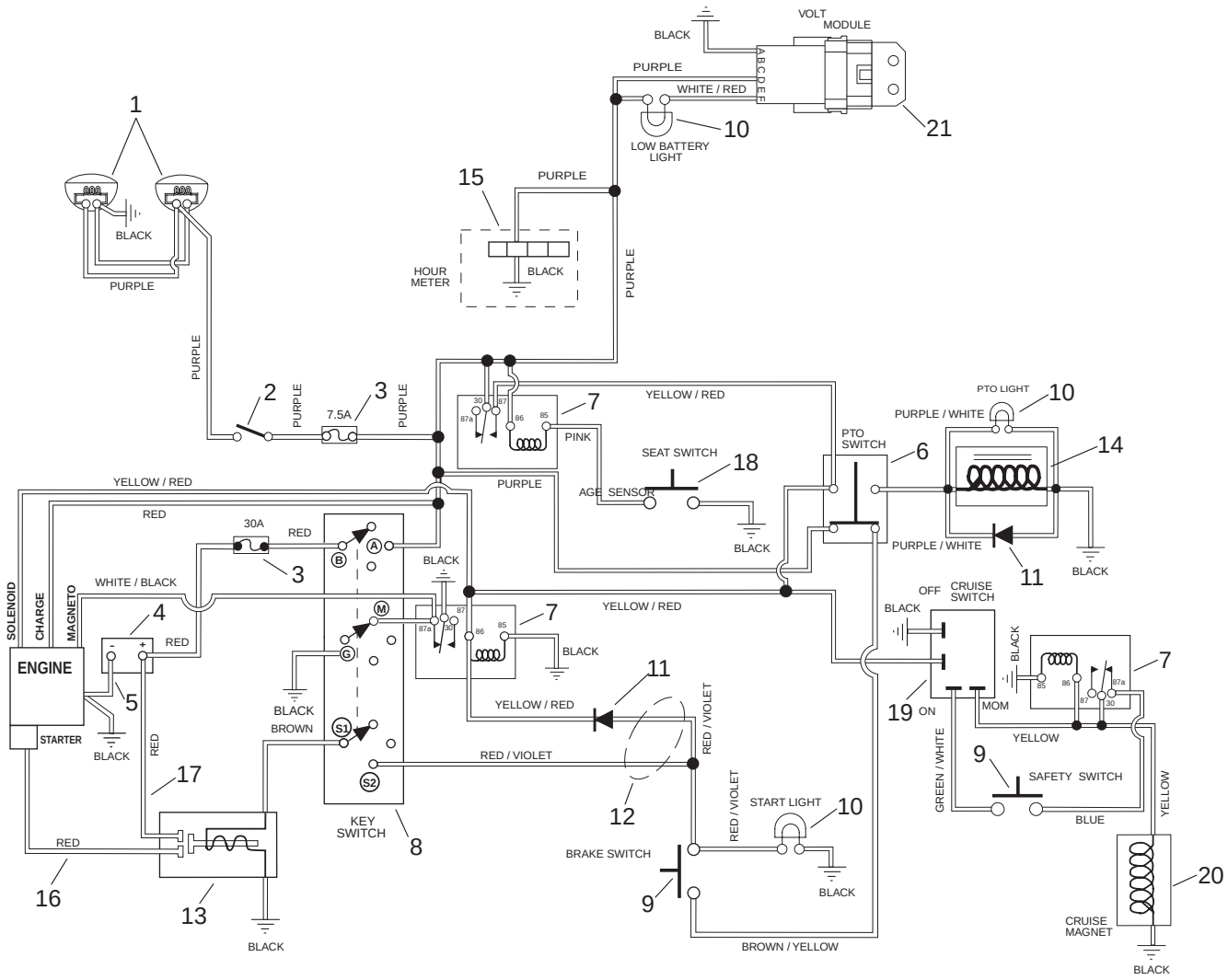
Models 936305, 308



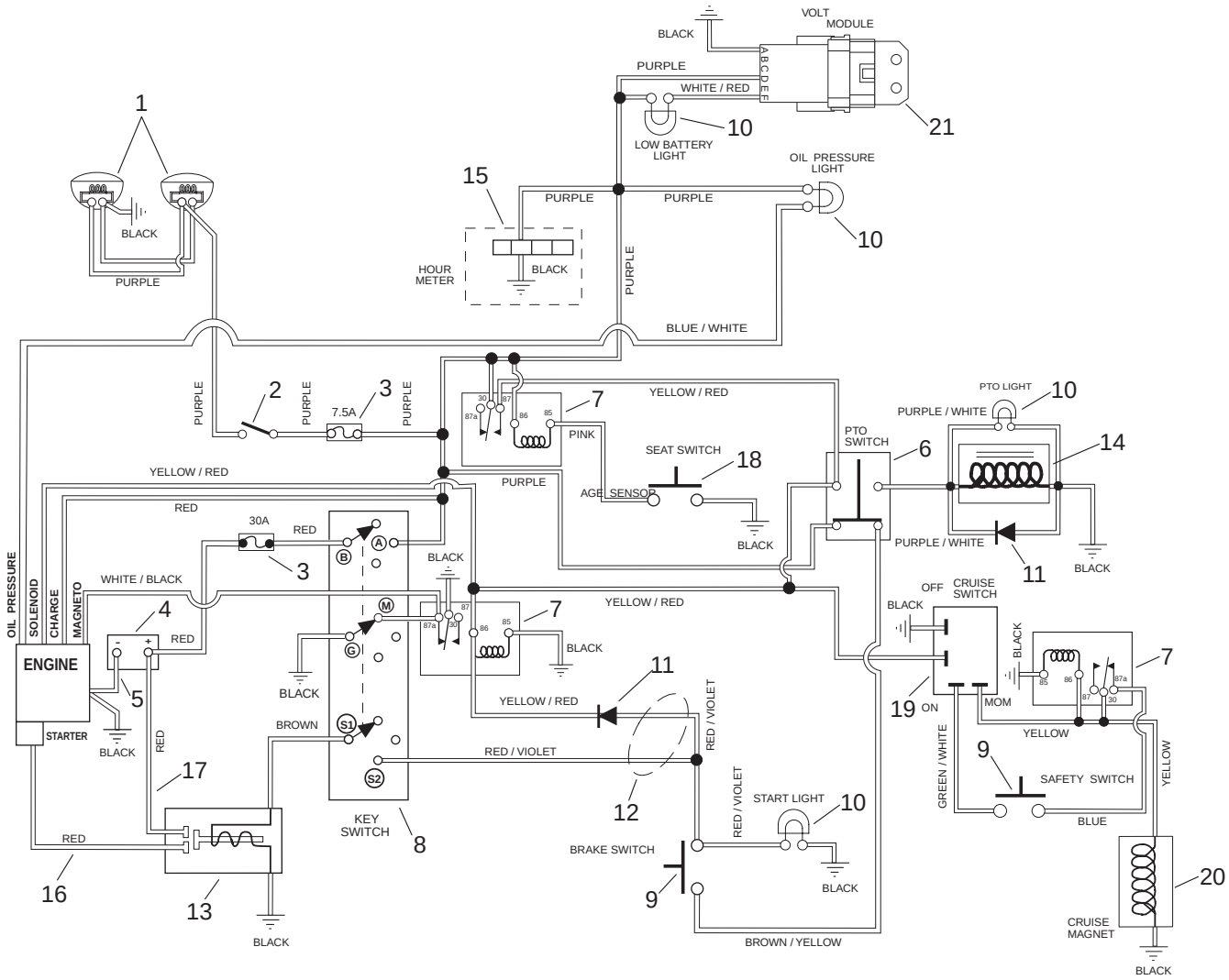
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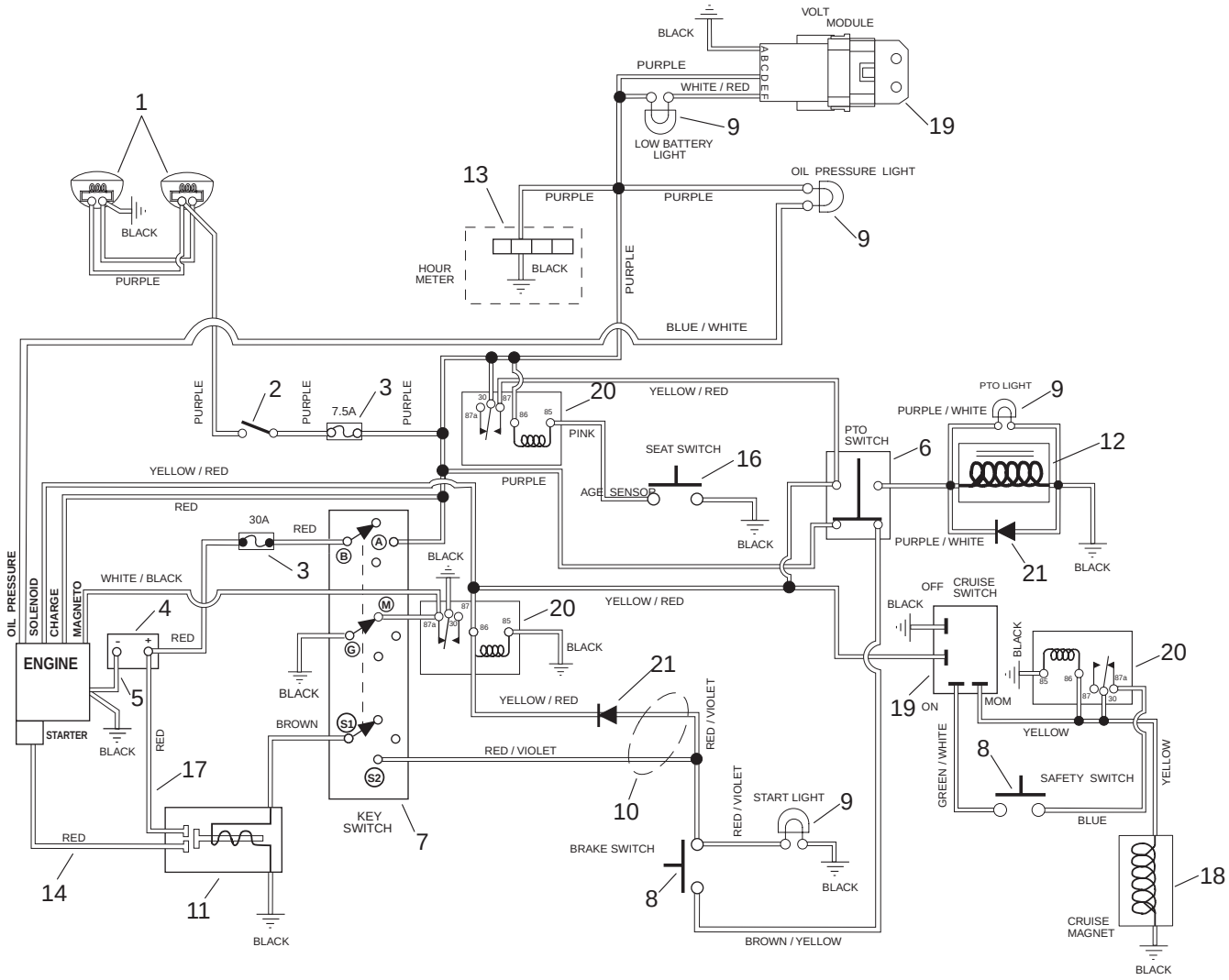
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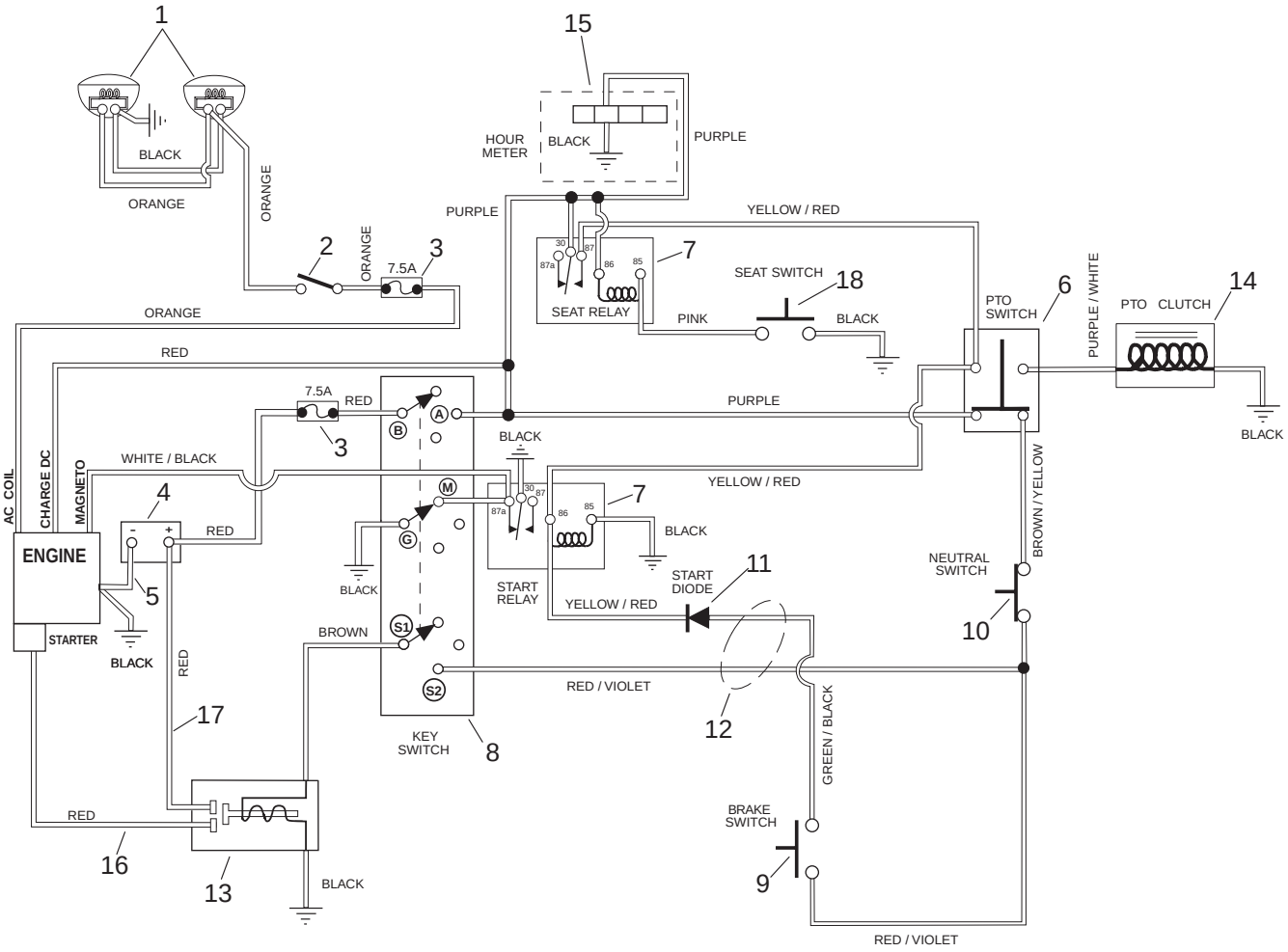
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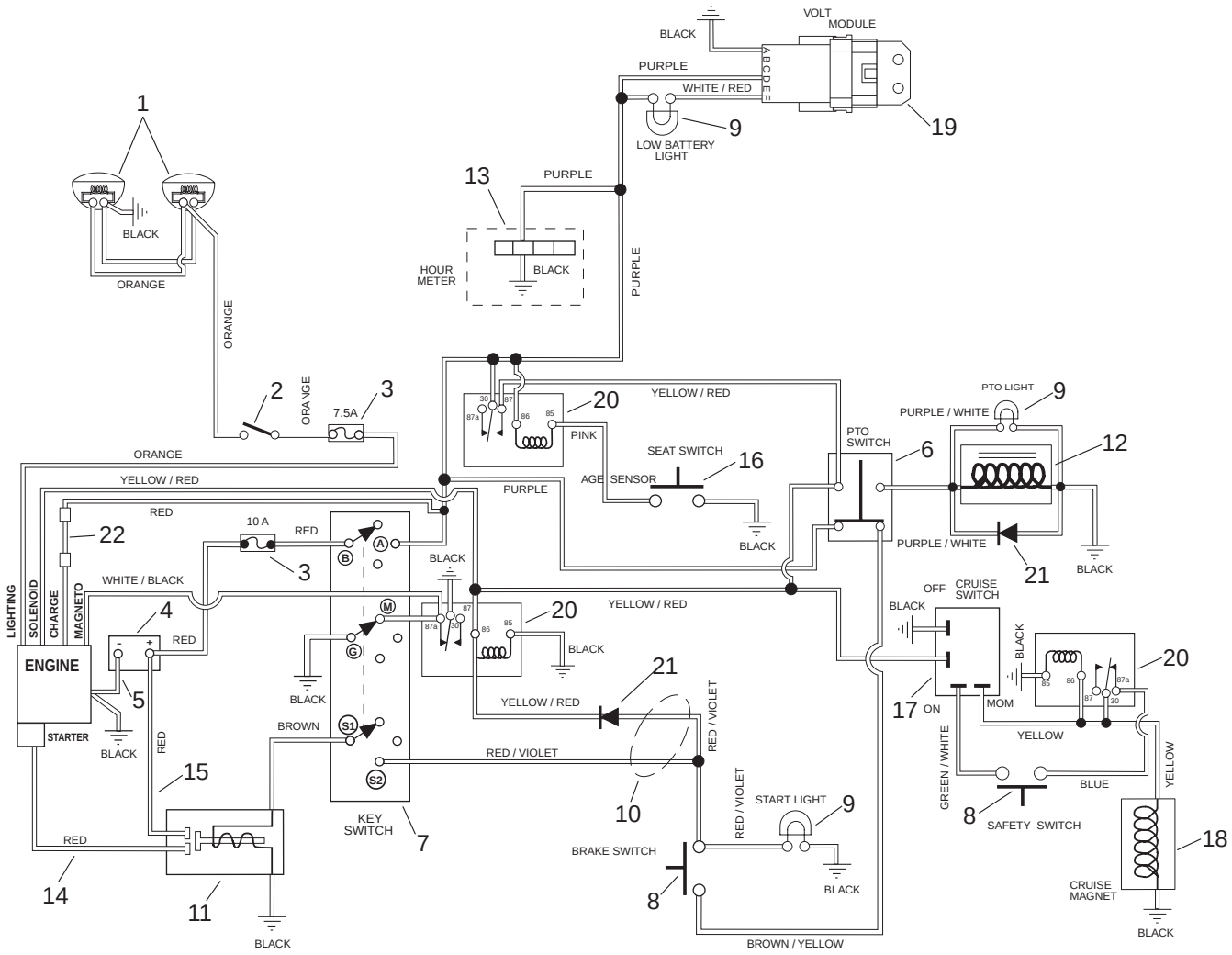
Models 936021, 307, 309



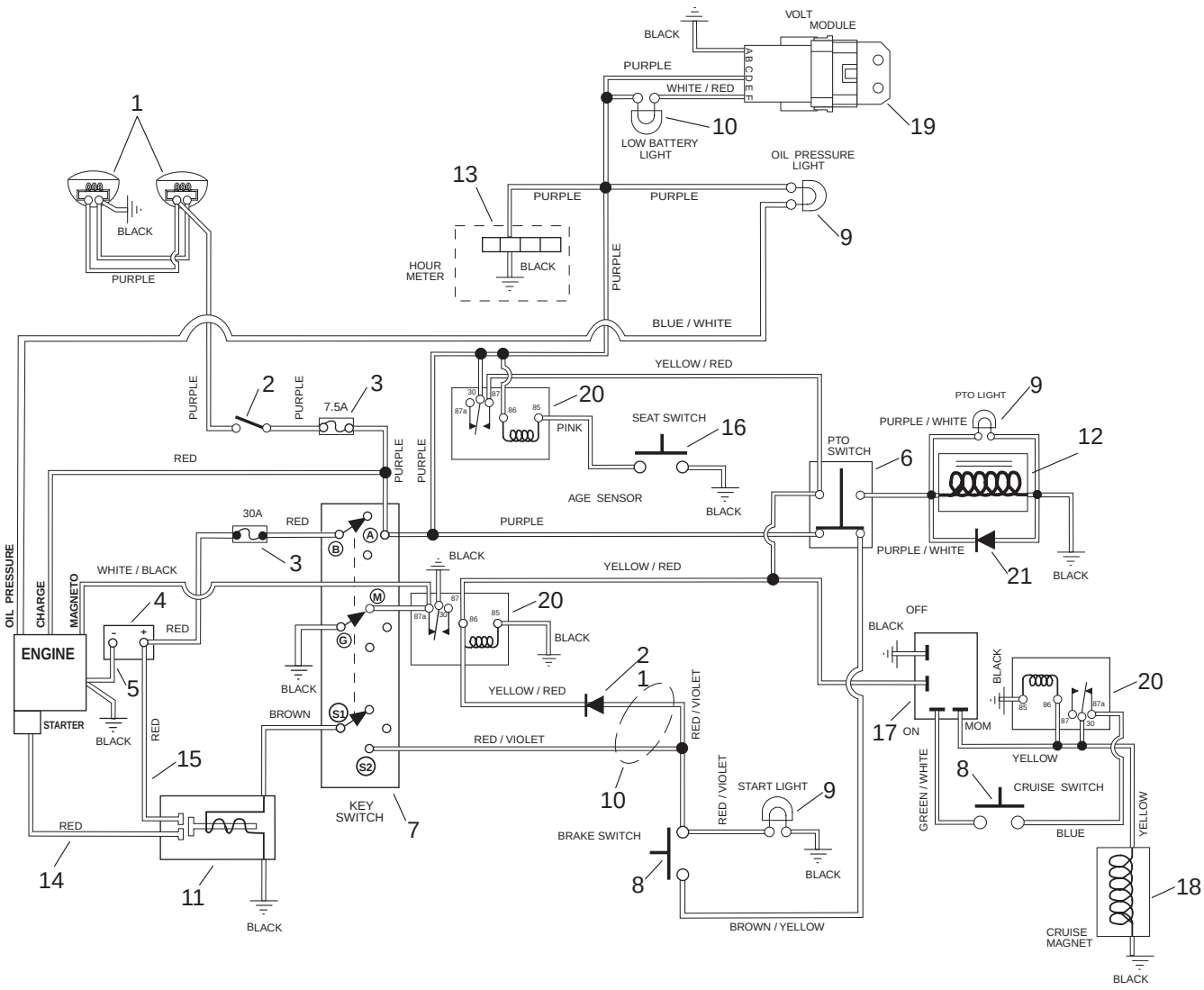
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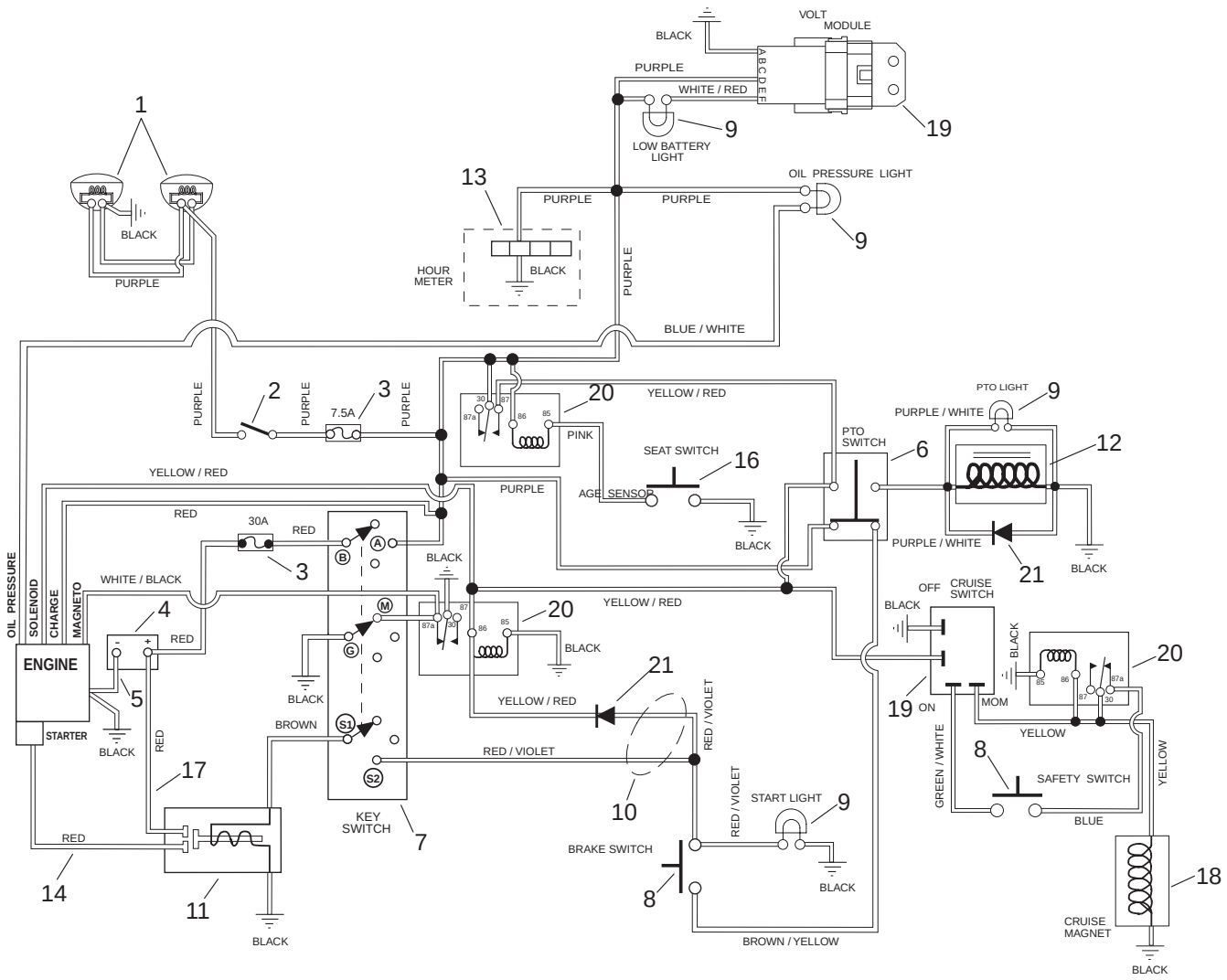
Models 936023, 310



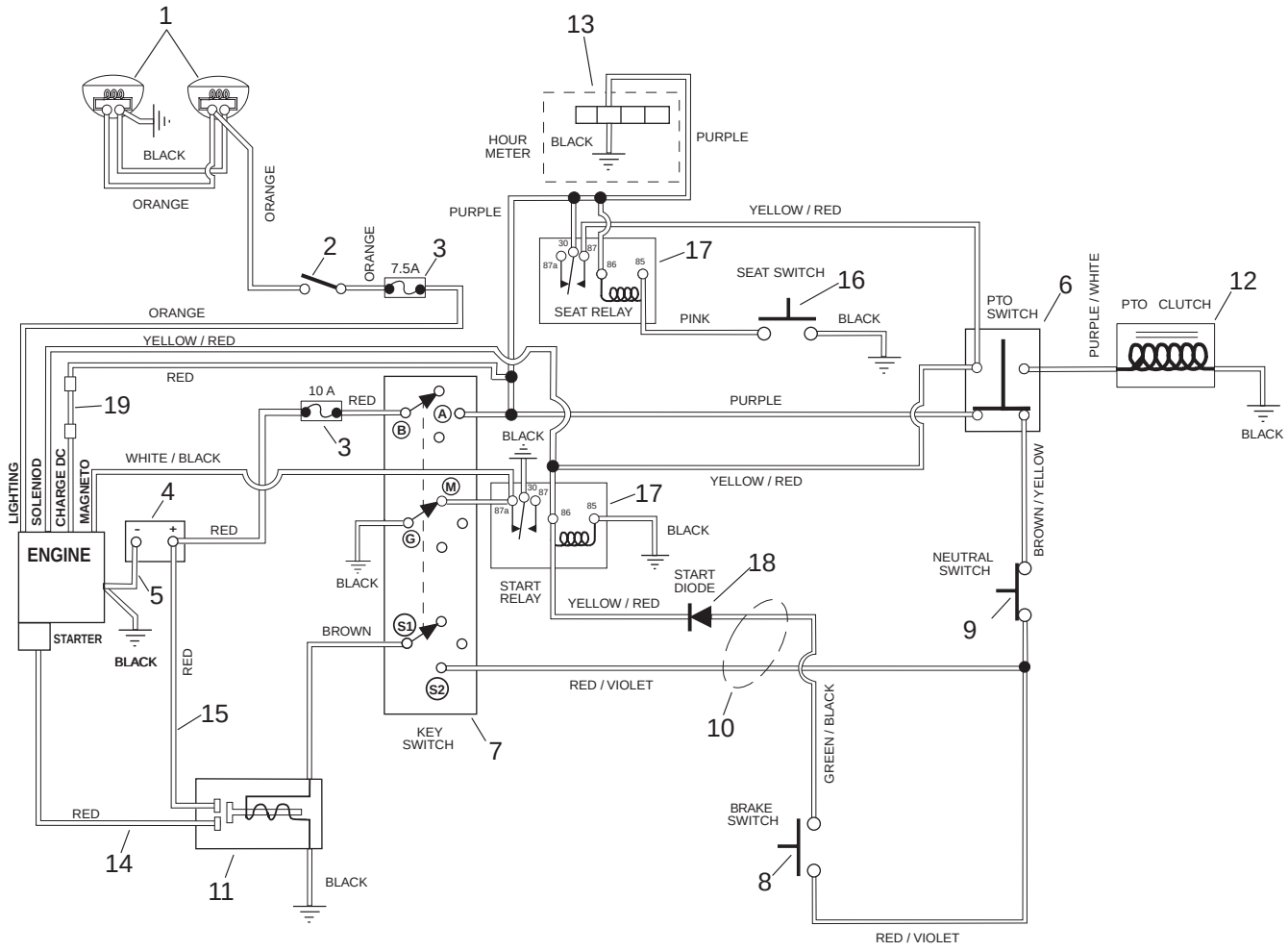
Models 936024, 026



Models 936025, 027, 311, 313



Model 936312



12.1 40" AND 48" MOWER REMOVAL

1. Remove the key from the ignition switch and the negative cable from the battery prior to removing the mower assembly.
2. Release the mower PTO belt tension by releasing the idler spring on the left side of the unit behind the front wheel. Lower the mower assembly and remove the hair pins and washers from the lift links.
3. Remove the two hair pins from the rear support control arms on the mower support linkage.
4. Slide the mower pan assembly forward to release the front hanger rod from the retainer hooks under the front axle.
5. Remove the mower deck drive belt from the PTO clutch and the top of the jackshaft assembly.
6. Raise the front of the unit to provide clearance for the mower assembly and remove the mower from under the unit.

12.2 40" AND 48" MOWER INSTALLATION

1. Raise the front of the unit and position the mower deck under the unit and hook the mower front support rod in the support hooks under the front axle.
2. Lower the front of the unit, insert the rear support control arms into the rear support brackets, and secure with hair pins removed earlier.
3. Lower the mower lift mechanism and attach the mower lift links and secure with washers and hair pins removed earlier.
4. Attach the mower drive belt to the top of the mower jackshaft assembly and route the belt inside of the belt finger on the PTO idler, and on to the PTO clutch.
5. Using a spring puller reattach the PTO idle tension spring to the unit frame behind the left front tire, check location and routing of the PTO belt before engaging the PTO clutch with engine running.
6. Reattach the battery negative cable to the battery and insert the ignition key into the ignition switch.

12.3 40" MOWER SPINDLE REMOVAL

1. With the mower deck removed from the unit the disassembly of the mower may be done.
2. Remove the left side mower spindle cover.
3. Remove the mower deck blades hardware, mower deck blades, blade trays retainer hub, spindle key and bearing slinger.
4. Remove the mower deck spindle drive belt from the spindle sheaves.
5. Remove the mower deck right side support arms to provide clearance to remove the right spindle.
6. Remove the spindle sheaves and shaft assemblies
7. Remove the mower spindle housings from the mower deck stamping.

48" Mower Spindle Removal

With the mower deck removed from the unit, the disassembly of the mower may be done.

1. Remove the right and left side mower spindle cover.
2. Remove the mower deck blades hardware, mower deck blades, blade trays retainer hub, spindle key and bearing slinger.
3. Remove the mower deck spindle drive belt form the spindle sheaves.
4. Remove the spindle sheaves from the shaft assemblies.
5. Remove the mower spindle housings from the mower deck stamping.

12.4 40" SPINDLE REPAIR

When the spindle housing has been removed from the mower deck the bearings may be removed from the housing.

1. Prior to removal of the bearings check for bearing damage and remove if necessary.
2. Attach a bearing puller to the bearing in the housing and remove the spindle bearings.
3. If the housing has been damaged replace the bearings and housings.
4. Press new bearings into the spindle housing with a press, make sure to insert the spacer tube into the housing before pressing the second bearing into place.

48" Spindle Repair

When the spindle housing has been removed from the mower deck, the spindle shaft and bearings may be removed from the housing.

1. Prior to removal of the bearing in the housing out in a press.
2. If the housing has been damaged replace the spindle shaft, bearings and housing.
3. Press new bearings into the spindle housing with a press, make sure to insert the spindle shaft into the housing before pressing the second bearing into place.

12.5 SPINDLE INSTALLATION

1. Place the spindle housings into the mower deck stamping and attach with new hardware.
2. Insert spindle shaft and sheave assemblies into the spindle housings with spacer washer under sheaves.
3. Reattach the right side mower support arms to the mower deck stamping.
4. Reattach the mower deck spindle drive belt.
5. Reinstall the bearing slinger, spindle key, retainer hub, blade trays, and mower deck blades with hardware removed earlier.
6. Check mower deck blades for clearance inside of the mower deck stamping and mounting flatness.

12.6 40" JACKSHAFT REMOVAL AND REPAIR

1. Remove the mower deck idler tension spring from the spring anchor.
2. Remove the mower deck drive belt from the jackshaft assembly.
3. Remove the hardware holding the jackshaft assembly to the mower deck stamping, remove the assembly.
4. Remove the nylock nut on the top of the spindle assembly and remove the double pulley assembly.
5. Check the bearings, and spindle shaft for wear and replace the damage parts.
6. Bearings need to be removed with a bearing puller and replaced with a bearing driver in a press.

NOTE: The bearings should have a light press fit to the bore of the pulley assembly, to tight of a press fit will preload the bearing and cause premature bearing failure.

7. Check idler arm pivot bushings for wear and movement, check the idler for run out and interferences.
8. Reassemble the double pulley assembly with the bearing spacer tube inside the assembly.
9. Place the double pulley assembly onto the spindle shaft and hold in place with a flat washer and nylock lock nut.

12.7 40" JACKSHAFT INSTALLATION

1. Place the jackshaft assembly on the mower deck stamping and attach with new hardware and torque according to the torque table.
2. Reinstall the mower spindle drive belt onto the jackshaft assembly and attach the mower deck idler tension spring to the spring anchor.
3. Rotate the mower jackshaft assembly and check routing of the belt and idler clearance to the mower deck stamping.

SECTION 13 - SNO-THRO ATTACHMENT

13.1 INSTALLATION

1. With the housing and push frame assembly positioned on a flat level surface, roll unit into position over push frame with the front of the unit over the pivot support.
2. Lift pivot support into position on the front of the unit frame and install upper mounting latch pin into the unit frame.
3. Raise the rear of the push frame and secure to the unit with the latch pin on each side of the frame.
4. With the PTO in the off position and connect the PTO drive belt from the PTO clutch to the top drive spindle on the push frame.
5. Manual lift the front of the auger/impeller housing and block it 3 to 4 inches from the floor. Insert gas cylinder onto the anchor arm and
6. Connect the lift link on the housing to the lift bell crank, install a washer and secure with a hair pin.
7. Connect the lift arm to the lift bell crank and secure with a clevis pin.
8. Secure the chute crank support to the right side of the unit frame with capscrews and lock nuts.
9. Attach the lift arm to the lift lever with clevis pin and hair pin.
10. Remove the blocking from under the snow head, attachment may now be raised or lowered with the attachment lift lever on the blower push frame.
11. Secure the discharge chute crank to the spool with a hair pin.

13.2 SHEAR BOLT REPLACEMENT

WARNING: Stop engine, lower attachment, remove key, and wait for moving parts to stop before leaving operators position and attempting to maintain or inspect auger.

Occasionally an object may enter auger/impeller housing and jam auger, breaking shear bolts which secure auger to shaft. This allows auger to turn freely on shaft preventing damage to gear drive.

IMPORTANT: Use only Ariens Shear Bolts for replacement. Use of any other type of shear bolt may result in sever damage to unit.

To replace shear bolt, slide auger outward against rollpin and align hole in shaft with hole in auger (holes in shaft for roll pins and shear bolts line up). Drive shear bolt through hole; (if shear bolt was broken this will drive remaining part from shaft and secure with nut).

13.3 MULE DRIVE BELT

1. Remove belt guard hardware and guard from housing. Release tension on flat idler and remove belt from "V" and flat idler on push frame.
2. Remove lower mounting rod and stabilizer strap from pivot support (to free mule drive belt from double idler).
3. Remove belt from drive spindle pulley and housing double pulley. Replace mule drive belt in reverse order; be sure belt seats properly in housing pulley, idlers, over lower mounting pin, around bottom groove in drive spindle pulley, and around two idlers on idler bracket- (flat idler rides against back of "V" groove and "V" groove idler against front).

Mule Drive Belt Adjustment

Mule drive belt idler spring is to extend 4 inches inside hook to inside hook. To increase tension, position pivot pin (on idler assembly at bottom rear of housing) to next lower hole in mounting bracket.

13.4 POWER TAKE OFF (PTO) BELT

Release tension on the push frame idlers and remove mule drive belt from drive spindle pulley.

Remove PTO belt fro PTO and drive spindle pulley.

Replace PTO belt in reverse order and adjust accordingly.

13.5 AUGER/IMPELLER DRIVE BELT

Remove belt guard hardware and guard from housing.

Release tension on flat idler and remove mule drive belt from "V" and flat idler on push frame, and double pulley on auger/impeller housing.

Pull spring loaded idler away from drive belt, remove belt from large lower pulley and top double pulley.

13.6 OIL AND GREASE LOCATIONS

CAUTION: DO NOT touch Sno-Thro drive parts which are hot from operation. Allow such parts to cool before servicing unit.

IMPORTANT: Wipe each fitting clean before and after lubrication.

NOTE: Use Ariens Multi-Purpose Grease (Part Number 000150) or good grade of general purpose grease at zerk fittings and oil at lubrication points.

Sno-Thro should be lubricated at beginning of season and every 25 operating hours. Refer to illustration for grease and oiling points.

13.7 SCRAPER BLADE

IMPORTANT: If scraper blade wears too far auger/impeller housing may be damaged.

Scraper blade is adjustable to compensate for wear.

To adjust scraper blade, raise and block Sno-Thro securely. With runners adjusted to their full position, loosen lock nuts retaining scraper blade, reposition it down, (Flush with runners) and tighten lock nuts.

13.8 RUNNERS

> **CAUTION:** Adjust auger/impeller housing height to provide clearance over gravel or crushed rock surfaces to avoid throwing these objects.

Runners should be adjusted as conditions require. Raising or lowering runners controls distance scraper blade is held above surface to be cleared.

When operating unit on gravel surface, lower runners so that the housing will not pick up gravel. On concrete, black-topped, or packed snow surfaces raise runners so that the scraper blade scrapes clean. To reduce tendency of housing to ride up over heavy, wet, or hardpacked snow, remove runners and install in their narrow edge down position.

To adjust runners, place unit on a flat level surface and insert a spacer under center of scraper blade that will provide desired clearance. loosen runner hardware, raise or lower runners to surface unit is resting upon, and tighten hardware.

NOTE: Uneven rear tire pressure or runner adjustment will result in uneven clearing.

13.9 DISCHARGE CHUTE CABLE

To adjust discharge chute cable, loosen clamp, rotate discharge chute in desired direction (to stop), and reposition cable. Tighten clamp and replace guard.

13.10 AUGER/IMPELLER, GEAR CASE REMOVAL

1. Remove taptite, washer, cap screw, washer, and lock washer securing belt guard to housing and remove belt guard.
2. Remove belt from pulley.
3. Remove set screws securing pulley to worm shaft and remove pulley and woodruff key.
4. Remove three nuts securing flange bearing to housing and remove bearing.
5. Remove cap screw, lock washer, washer, and flange bushing from ends of auger shaft. Remove rib neck bolts and flange whiz lock nuts securing bearing supports to housing and remove supports.
6. Pull auger/impeller and gear case from housing.
7. Remove two way lock nuts and shear bolts securing augers to auger shaft and remove augers.
8. Drive roll pins securing impeller to worm shaft and remove impeller.

13.11 GEAR CASE

1. Remove four bolts from bearing flange.
2. Remove flange and gasket.

NOTE: At this point bronze gear cannot be removed.

3. Using bearing adjustment wrench remove adjustment plug.
4. While holding input shaft in one hand and using a mallet, strike case until bearing cone pops out of the case.
5. Bronze gear can then be removed from case.
6. After bronze gear is removed, input shaft can be removed.

NOTE: It is not necessary to remove the end cap from case.

7. To remove worm gear and bearings, simply remove bolt and washer from end of shaft.
8. Check all parts for wear or damage and replace as necessary.
9. Assembly is done by inserting bronze and worm gear at same time.
10. Using adjustment wrench, tighten down on adjustment plug until input shaft is snug.
11. Replace side cover using a sealant on threads of two bottom bolts.

Gear Case Lubrication

Fill gear case with Ariens Special L-2 Gear Lubricant (Part No. 000080) until lever reaches bottom of threads in filler hole.

Check auger gear case lubricant level every 25 hours of operation.

To check, place unit in a warm location over night to allow lubricant to flow to level. Remove filler plug. Lubricant must be at least up to bottom of filler hole with unit resting on a level surface (extra lubricant will not damage gear case).



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