0171742en	002
1009	

Roller

RD 16

REPAIR MANUAL

0171742EN

Foreword

Machines covered by this manual

Machine	Item Number	Machine	Item Number
RD 16-90	0620060	RD 16-100	0620402
RD 16IRH-90	0620127	-	---

Machine documentation

- Keep a copy of the Operator's Manual with the machine at all times.
- Use the separate Parts Book supplied with the machine to order replacement parts.
- If you are missing any of these documents, please contact Wacker Neuson Corporation to order a replacement or visit www.wackerneuson.com.
- When ordering parts or requesting service information, be prepared to provide the machine model number, item number, revision number, and serial number.

Expectations for information in this manual

- This manual provides information and procedures to safely repair the above Wacker Neuson model(s). For your own safety and to reduce the risk of injury, carefully read, understand, and observe all instructions described in this manual.
- Wacker Neuson Corporation expressly reserves the right to make technical modifications, even without notice, which improve the performance or safety standards of its machines.
- The information contained in this manual is based on machines manufactured up until the time of publication. Wacker Neuson Corporation reserves the right to change any portion of this information without notice.

Copyright notice

CALIFORNIA Proposition 65 Warning:

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

Laws pertaining to spark arresters

NOTICE: State Health Safety Codes and Public Resources Codes specify that in certain locations spark arresters be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified and rated by the United States Forest Service for this purpose. In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

Trademarks All trademarks referenced in this manual are the property of their respective owners.

1 Safety Information

This manual contains DANGER, WARNING, CAUTION, *NOTICE,* and NOTE callouts which must be followed to reduce the possibility of personal injury, damage to the equipment, or improper service.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE*:** Used without the safety alert symbol, ***NOTICE indicates a situation which, if not avoided, could result in property damage.

Note: *Contains additional information important to a procedure.*

1.1 Operating Safety

Notice: State Health Safety Codes and Public Resources Codes specify that in certain locations spark arresters be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified and rated by the United States Forest Service for this purpose.

In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

WARNING

Familiarity and proper training are required for the safe operation of the machine. Machines operated improperly or by untrained personnel can be hazardous. Read the operating instructions contained in this manual and the engine manual, and familiarize yourself with the location and proper use of all controls. Inexperienced operators should receive instruction from someone familiar with the machine before being allowed to operate it.

1.1.1 DO NOT drive over curbs or other uneven objects that will result in the machine and operator being shaken.

1.1.2 DO NOT attempt to start the machine when standing alongside it. Only start the engine when seated in the driver's seat and with the forward/ reverse control in the neutral position.

1.1.3 Do not allow anyone to operate this equipment without proper training. People operating this equipment must be familiar with the risks and hazards associated with it.

1.1.4 Do not touch the engine or muffler while the engine is on or immediately after it has been turned off. These areas get hot and may cause burns.

1.1.5 Do not use accessories or attachments that are not recommended by Wacker Neuson. Damage to equipment and injury to the user may result.

1.1.6 Never leave the machine running unattended.

1.1.7 NEVER operate the machine with the fuel cap loose or missing.

1.1.8 NEVER carry passengers on the machine. Danger of crushing—keep clear of the articulated steering joint between the front and rear frames.

1.1.9 NEVER use or attempt to repair damaged safety belts or ROPS. Replace only with Wacker Neuson spare parts.

1.1.10 ALWAYS disengage and stow the locking bar for the articulated steering joint before operating the machine. The machine cannot be steered when the locking bar is engaged.

1.1.11 ALWAYS check that all controls are functioning properly immediately after start-up! DO NOT operate the machine unless all controls operate correctly.

1.1.12 ALWAYS remain aware of changing positions and the movement of other equipment and personnel on the job site.

1.1.13 ALWAYS remain seated and wear the seat belt at all times while operating the machine.

1.1.14 ALWAYS remain aware of changing surface conditions and use extra care when operating over uneven ground, on hills, or over soft or coarse material. The machine could shift or slide unexpectedly.

1.1.15 ALWAYS use caution when operating the machine near the edges of pits, trenches or platforms. Check to be sure that ground surface is stable enough to support the weight of the machine with operator and that there is no danger of the roller sliding, falling or tipping.

1.1.16 Always wear protective clothing appropriate to the job site when operating the machine.

1.1.17 Always keep hands, feet, and loose clothing away from moving parts of the machine.

1.1.18 Read, understand, and follow procedures in the Operator's Manual before attempting to operate the machine.

1.1.19 Store the machine properly when it is not being used. The machine should be stored in a clean, dry location out of the reach of children.

1.1.20 Always operate the machine with all safety devices and guards in place and in working order.

1.1.21 Make sure that all other persons are at a safe distance from the machine. Stop the machine if people step into the working area of the machine.

1.2 Operator Safety while using Internal Combustion Engines

Internal combustion engines present special hazards during operation and fueling. Read and follow the warning instructions in the engine owner's manual and the safety guidelines below. Failure to follow the warnings and safety standards could result in severe injury or death.

1.2.1 Do not smoke while operating the machine.

1.2.2 Do not smoke when refueling the engine.

1.2.3 Do not refuel a hot or running engine.

1.2.4 Do not refuel the engine near an open flame.

1.2.5 Do not spill fuel when refueling the engine.

1.2.6 Do not run the engine near open flames.

1.2.7 Do not run the machine indoors or in an enclosed area such as a deep trench unless adequate ventilation, through such items as exhaust fans or hoses, is provided. Engine exhaust contains carbon monoxide. This is a poison you cannot see or smell. Exposure to carbon monoxide can cause loss of consciousness and CAN KILL YOU IN MINUTES.

1.2.8 Refill the fuel tank in a well-ventilated area.

1.2.9 Replace the fuel tank cap after refueling.

1.2.10 ALWAYS keep the area around a hot exhaust pipe free of debris to reduce the chance of an accidental fire.

1.2.11 ALWAYS check the fuel lines and the fuel tank for leaks and cracks before starting the engine. Do not run the machine if fuel leaks are present or the fuel lines are loose.

1.3 Service Safety

WARNING

A poorly maintained machine can become a safety hazard! In order for the machine to operate safely and properly over a long period of time, periodic maintenance and occasional repairs are necessary.

1.3.1 Some service procedures require that the machine's battery be disconnected. To reduce the risk of personal injury, read and understand the service procedures before performing any service to the machine.

1.3.2 All adjustments and repairs MUST be completed before operation. Do not operate the machine with a known problem or deficiency! All repairs and adjustments should be completed by a qualified technician.

1.3.3 Do not attempt to clean or service the machine while it is running. Rotating parts can cause severe injury.

1.3.4 Do not use gasoline or other types of fuels or flammable solvents to clean parts, especially in enclosed areas. Fumes from fuels and solvents can become explosive.

1.3.5 Do not modify the machine without the express written approval of the manufacturer.

1.3.6 Do not remove the radiator cap when the engine is running or hot. The radiator fluid is hot and under pressure and may cause severe burns!

1.3.7 DO NOT stand under the machine while it is being hoisted or moved.

1.3.8 DO NOT get onto the machine while it is being hoisted or moved.

1.3.9 DO NOT use the machine as a ladder. Use safe ladders and platforms designed for this purpose.

1.3.10 DO NOT modify, weld, or drill safety frames (ROPS) fitted as original equipment. DO NOT loosen or remove bolts. DO NOT weld, drill or modify a broken safety frame.

1.3.11 DO NOT open the hydraulic lines or loosen the hydraulic connections while the engine is running! Before dismantling the hydraulic connectors or hoses, ensure that all pressure has been bled from the circuit. Hydraulic fluid under pressure can penetrate the skin, cause burns, blind, or create other personal injury hazards. Set all controls in neutral, turn engine off, and allow the fluids to cool before loosening hydraulic fittings or attaching test gauges.

1.3.12 ALWAYS check all external fasteners at regular intervals.

1.3.13 Keep the area around the muffler free of debris such as leaves, paper, cartons, etc. A hot muffler could ignite the debris and start a fire.

1.3.14 Replace worn or damaged components with spare parts designed and recommended by Wacker Neuson Corporation.

1.3.15 Disconnect the spark plug on machines equipped with gasoline engines, before servicing, to avoid accidental start-up.

1.3.16 Keep the machine clean and labels legible. Replace all missing and hard-to-read labels. Labels provide important operating instructions and warn of dangers and hazards.

1.3.17 ALWAYS do periodic maintenance as recommended in the Operator's Manual.

1.3.18 ALWAYS turn the engine off before performing maintenance or making repairs.

1.3.19 ALWAYS keep hands, feet and loose clothing away from moving parts.

1.3.20 ALWAYS make sure slings, chains, hooks, ramps, jacks, and other types of lifting devices are attached securely and have enough weight-bearing capacity to lift or hold the machine safely. Always remain aware of the location of other people in the area when lifting the machine.

1.3.21 ALWAYS make sure hose connections have been reconnected back to the correct fitting. Failure to do so may result in damage to the machine and/or injury to person on or near the machine.

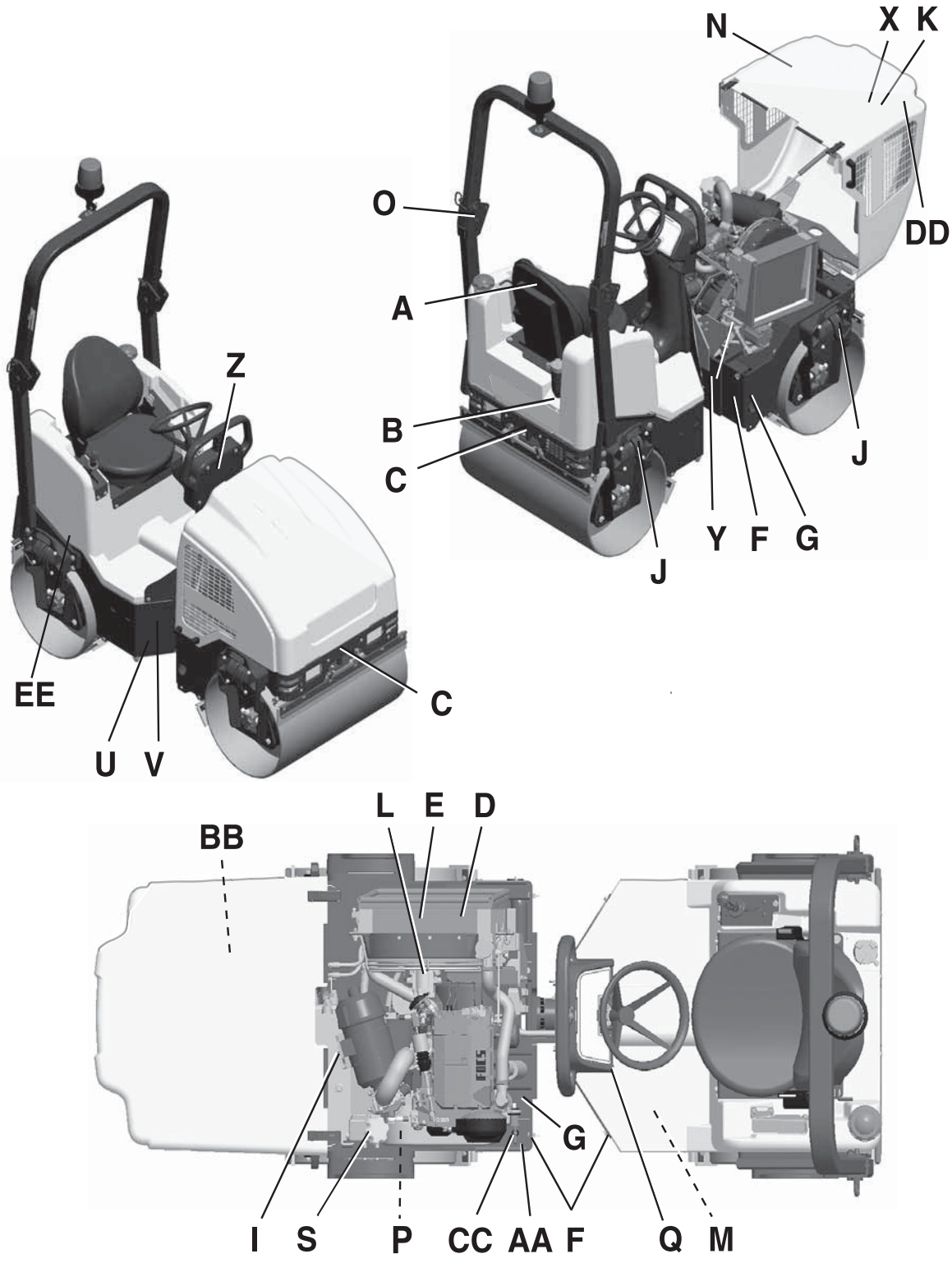
1.3.22 ALWAYS secure the articulated steering joint using the locking bar before lifting, jacking, and servicing the machine. The machine halves could swing together unexpectedly and cause a serious injury.

1.3.23 ALWAYS lock the lifting cylinders in the open position when the seat pedestal is raised.

1.3.24 Before you start the machine, ensure that all tools have been removed from the machine and that replacement parts and adjusters are firmly tightened.

1.3.25 Fluid leaks from small holes are often practically invisible. DO NOT use your bare hands to check for leaks. Check for leaks using a piece of cardboard or wood.

1.4 Label Locations



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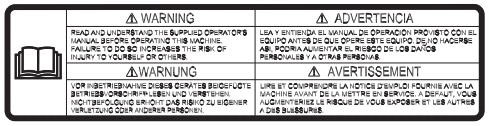
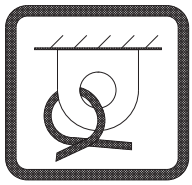
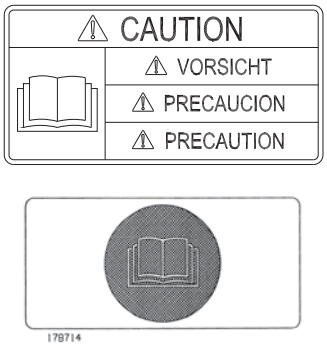
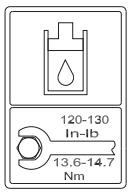
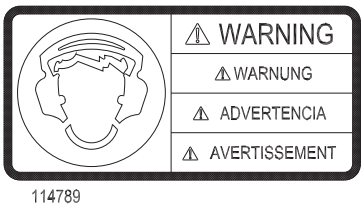
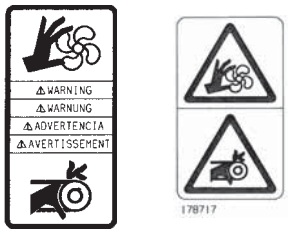
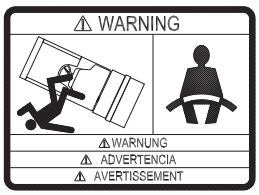
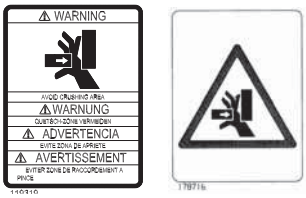
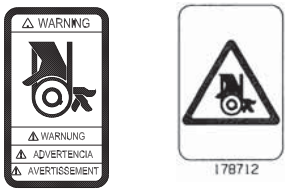
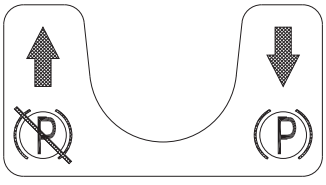
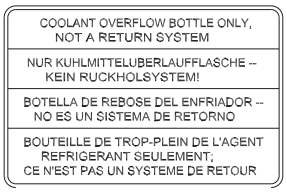
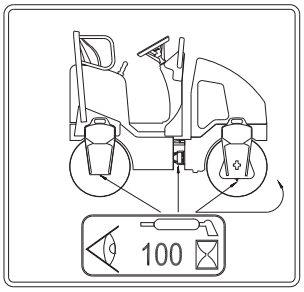
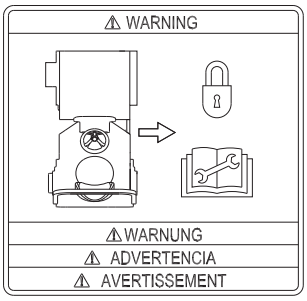
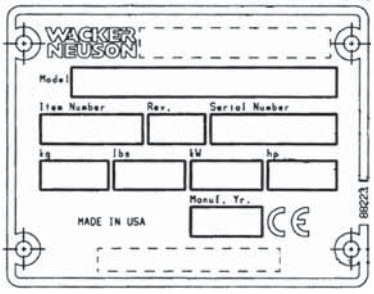
1.5 Safety and Operating Labels

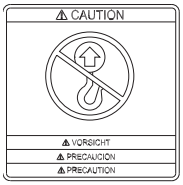
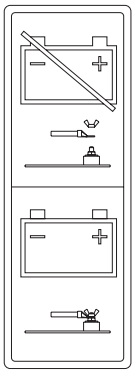
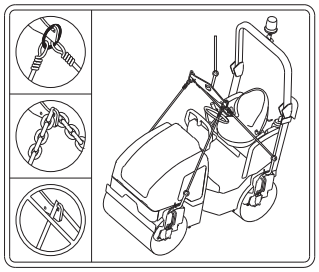
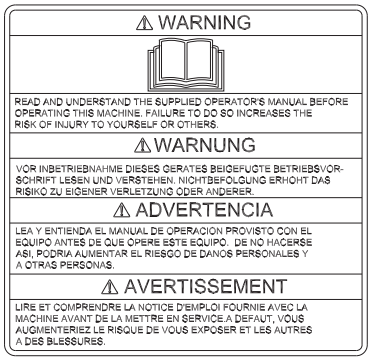
Wacker Neuson machines use international pictorial labels where needed. These labels are described below:

Ref.	Label	Meaning
A		WARNING! Read and understand the supplied Operator's Manual before operating the machine. Failure to do so increases the risk of injury to yourself or others.
B	 	DANGER! Engines emit carbon monoxide; operate only in well-ventilated area. Read the Operator's Manual. No sparks, flames, or burning objects near the machine. Shut off the engine before refueling.
C		Tie-down point.
D	 	WARNING! Pressurized contents. Do not open when hot!

Ref.	Label	Meaning
E		CAUTION! Read and understand the supplied Operator's Manual before operating this machine. Failure to do so increases the risk of injury to yourself or others.
F		WARNING! Pinch point.
G		WARNING! Hot surface!
I		Hydraulic oil reservoir fill tube. Torque nuts to 13.6-14.7 Nm (120-130 in.lbs.) maximum.
J		CAUTION Lifting point.

Ref.	Label	Meaning
K		WARNING! To prevent hearing loss, wear hearing protection when operating this machine.
L		WARNING! Pinching hazard. Rotating machinery.
M		WARNING! Disconnect battery before servicing. Read Repair Manual for instructions. Battery contains caustic acid and potentially explosive hydrogen gas.
N		WARNING! Always wear seat belt when operating roller.
O		WARNING! Avoid crushing area.
P		WARNING! Hand injury if entangled in moving belt.
Q		Parking brake is disengaged. Parking brake is engaged.

Ref.	Label	Meaning
S		Coolant overflow bottle only, not a return system.
U		Grease points: Inspect and lubricate every 100 hours of operation.
V		WARNING! Avoid crushing area. Articulated steering joint locking location. Lock the articulated steering joint before servicing the machine. Read Repair Manual.
X		Guaranteed sound power level in dB(A).
Y		A nameplate listing the model number, item number, revision number, and serial number is attached to each unit. Please record the information found on this plate so it will be available should the nameplate become lost or damaged. When ordering parts or requesting service information, you will always be asked to specify the model number, item number, revision number, and serial number of the unit.

Ref.	Label	Meaning
Z		No lift point.
AA		WARNING! Disconnect battery before servicing.
BB		Lifting of machine to be done with spreader bar only!
CC		CAUTION! Electric shock hazard at auxiliary battery positive terminal. Never touch this terminal and a metal portion of the machine simultaneously.
DD		WARNING! Read and understand the supplied Operator's Manual before operating the machine. Failure to do so increases the risk of injury to yourself or others.

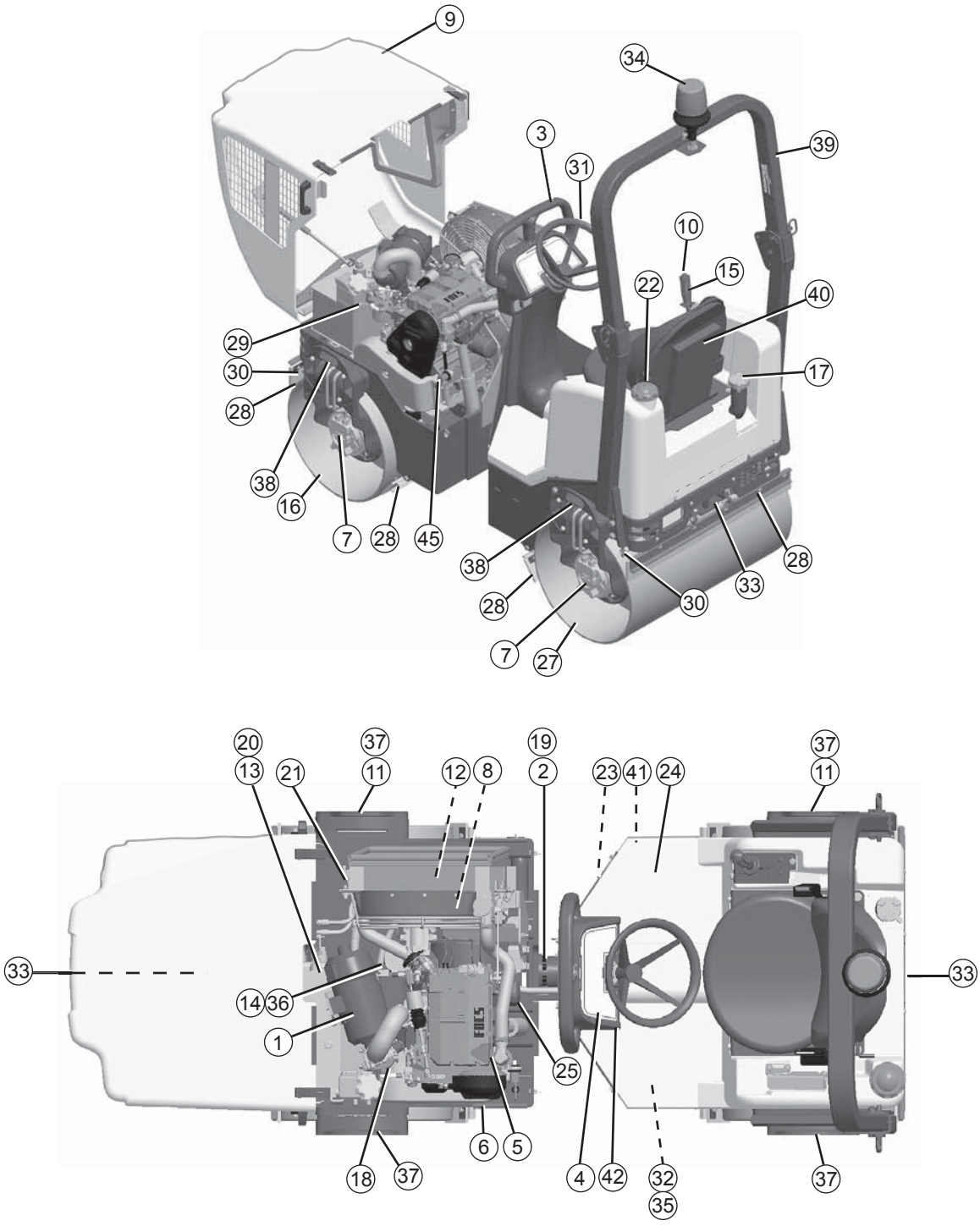
Ref.	Label	Meaning
EE		Water tank
		This machine may be covered by one or more patents.

2 Operation

2.1 Operation and Service Locations

See Graphic: wc_gr002947

Ref.	Description	Ref.	Description
1	Air cleaner	22	Water tank fill cap
2	Articulated joint	23	Lockarm
3	Hand holds	24	Operator's platform
4	Control panel	25	Engine oil filter
5	Dipstick	27	Rear drum
6	Drain hose—hydraulic tank	28	Scraper bar (4 places)
7	Drive motor (2)	29	Sightglass—hydraulic tank
8	Drive pump	30	Sprinkler tube (2)
9	Engine hood	31	Steering wheel
10	Vibration control button	32	Steering cylinder (under floor panel)
11	Exciter motor (2)	33	Tiedown (2 places)
12	Exciter/Steering pump	34	Rotating beacon
13	Hydraulic filter—return line	35	Battery (under floor panel)
14	Hydraulic strainer—suction line	36	Hydraulic suction line
15	Forward/Reverse control	37	Grease fitting—exciter (4 places)
16	Front drum	38	Lifting eye (4 places)
17	Fuel tank fill cap	39	ROPS
18	Fuel filter	40	Adjustable seat with seat belt
19	Grease fittings—articulated joint (4 places)	41	Water drain
20	Hydraulic tank fill port	42	Parking brake button
21	Hydraulic manifold block	45	Auxiliary battery positive terminal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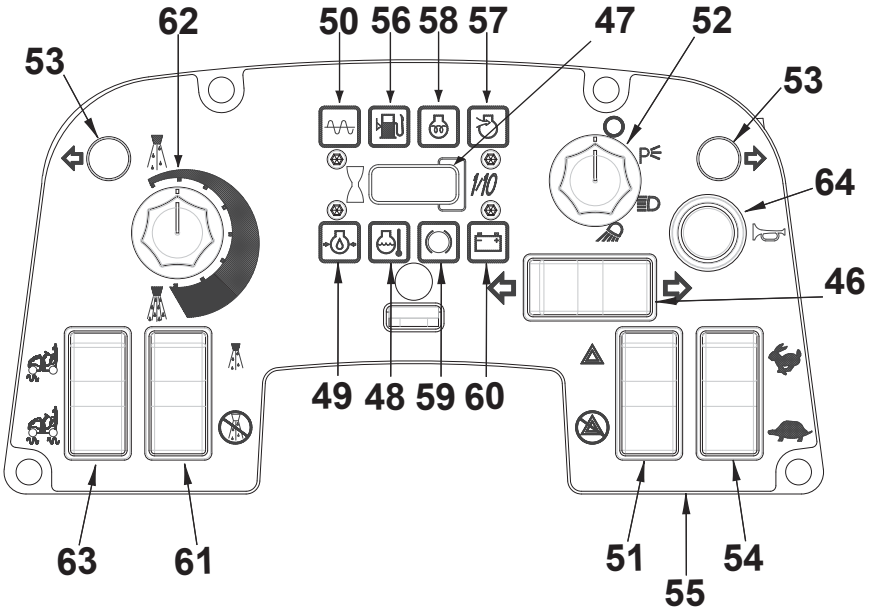
wc_gr002947

2.2 Control Panel

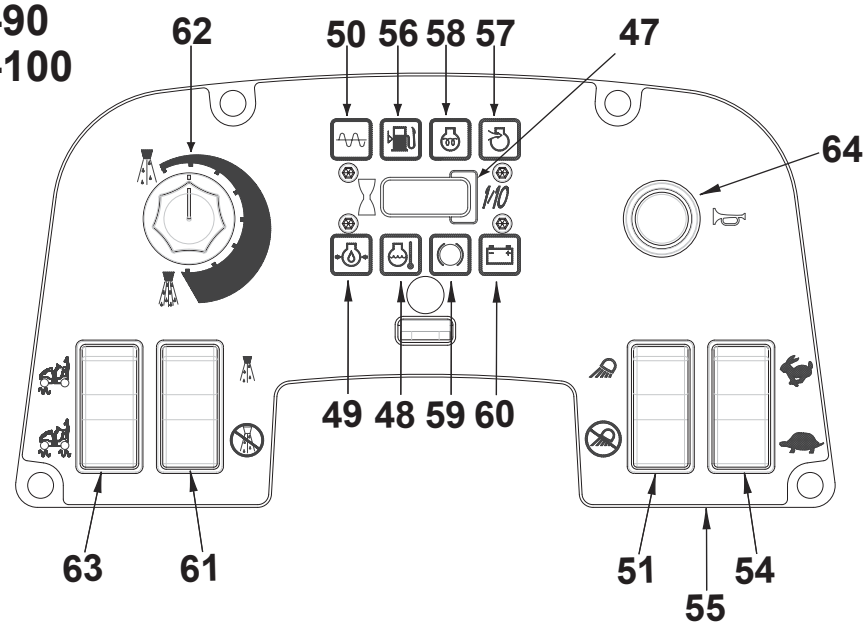
See Graphic: wc_gr004113

Ref.	Description	Ref.	Description
46	Turn signal switch—LEFT and RIGHT (RD 16IRH only)	56	Low fuel indicator
47	Hour meter	57	Air filter indicator
48	Engine coolant temperature indicator	58	Glow plug indicator
49	Low oil pressure indicator	59	Parking brake ON indicator
50	Vibration ON indicator	60	Battery indicator
51	Hazard lights switch—ON and OFF	61	Water spray switch—ON and OFF
52	Lights switch—multi-position (RD 16IRH only)	62	Water spray dial
53	Turn signal indicator (RD 16IRH only)	63	Vibration switch —BOTH DRUMS and FRONT DRUM ONLY
54	Throttle switch—HIGH and LOW	64	Horn
55	Ignition switch	-	---

RD 16 IRH



RD 16-90
RD 16-100



wc_gr004113

2.3 Application

This machine is designed as a lightweight roller to be used in the compaction of sublayers and finish layers of asphalt on roads, driveways, parking lots, and other types of asphalt-covered surfaces. Do not use this machine for any other purpose.

2.4 Before Starting

Before starting the machine check the following:

- Engine oil level
- Engine coolant level (RD 16 only)
- Hydraulic fluid level
- Condition of fuel lines
- Condition of air cleaner
- Operation of the brake system
- Fuel level
- Water level
- Condition of safety belt
- Scraper bars—clean and properly adjusted

Note: *All fluid levels should be checked with the machine on a level surface.*

Ensure that regular maintenance has been carried out.

Ensure that the driver's platform is clean.

Always use the steps and handrails when climbing on and off the machine.

WARNING

Always wear the seat belt provided when operating the roller.

2.5 Starting

See Graphic: wc_gr002952

WARNING

Exhaust gases are toxic. Do not start the engine in enclosed spaces.

2.5.1 Sit down in the operator's seat and fasten the seat belt.

2.5.2 Set the forward/reverse control **(15)** in the NEUTRAL position.

2.5.3 Press the parking brake button in **(42)** to set parking brake.

Note: *The roller will not start unless the forward/reverse control is in the NEUTRAL position.*

2.5.4 Turn the starting switch **(55)** to the ON position. The glow plug indicator **(58)** will illuminate signifying the glow plugs are on. The glow plug indicator will stay on; approximately 30 seconds at 0°C (32°F). **Do not** start the engine until the glow plug indicator light goes out.

2.5.5 Turn the starting switch **(55)** to the START position.

***NOTICE*:** Do not crank the engine starter for more than 15 seconds at one time. Longer cranking cycles could lead to starter damage.

Note: *The ignition switch has an anti-restart feature. If the engine does not start, the switch will need to be turned to the OFF position before it will allow the engine to be cranked again.*

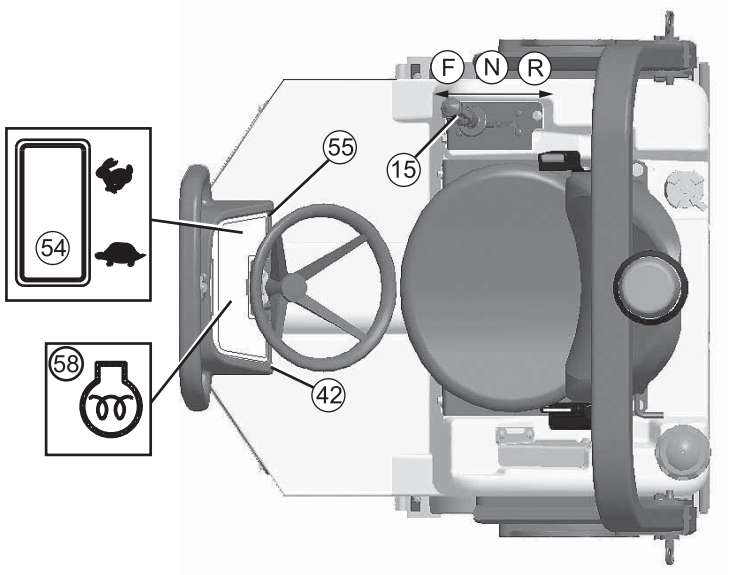
2.5.6 Allow the engine to warm up for a few minutes before operating the roller.

2.5.7 Disengage the parking brake by pulling the parking brake button out.

2.5.8 Quickly press and release the upper half of the throttle switch **(54)** to bring the engine to high throttle.

WARNING

Prolonged exposure to high noise levels can damage your hearing. Wear appropriate hearing protection while operating the roller.



wc_gr002952

2.6 Stopping/Parking

See Graphic: wc_gr002954

2.6.1 Stop the machine on a flat surface with a suitable load bearing capacity.

2.6.2 Turn the vibration off by pressing the vibration control button **(10)** on the forward/reverse lever **(15)**.

2.6.3 Press the water spray switch **(61)** to the OFF position.

2.6.4 Set the forward/reverse control **(15)** to the NEUTRAL position.

2.6.5 Return the engine throttle to idle by pressing the lower half of the throttle switch **(54)** and allow the engine to cool down.

2.6.6 Press the parking brake button **(42)** to set the parking brake. Always set the parking brake before leaving the machine.

WARNING

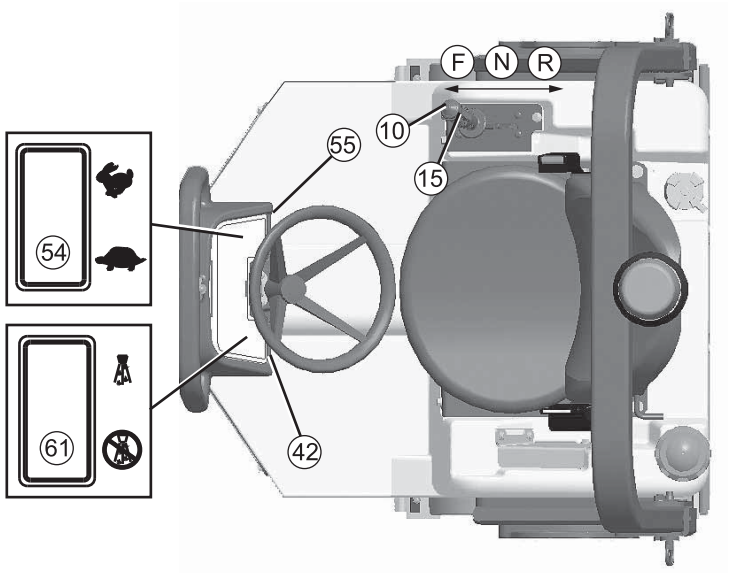
If the vehicle constitutes a hazard or obstacle to traffic when parked, it should be marked with signs, lights, and other warnings.

If the machine must be parked on a sloping surface, chock the drums with wedges to prevent any vehicle movement.

2.6.7 Stop the engine by turning the ignition switch to the OFF position **(55)**.

Note: *On the RD 16, the parking brake is automatically applied within the drive motors. The brakes are applied under the following conditions:*

- *engine is not running*
- *engine is running and the operator is not on the seat*
- *parking brake button is pushed*



wc_gr002954

2.7 Parking Brake Button

See Graphic: wc_gr002954

To hold the machine in a stopped position (parked), there is a mechanical parking brake on each drum drive motor. The mechanical parking brakes are spring-activated and hydraulically released (SAHR) type brakes. The brakes are applied when the engine is switched off or the operator leaves the seat.

When pushed in, the parking brake button **(42)** stops all travel (either forward or reverse) and applies the brake. The brakes can be released by pulling the parking brake button out.

The forward/reverse control **(15)** must be in the NEUTRAL position to allow the release of the brakes. If the forward/reverse control is not in the NEUTRAL position when the parking brake is released, the brakes will not be released.

NOTICE: Under normal operating conditions, do not use the parking brakes when the machine is moving. The parking brakes should only be used in cases of ***emergency*** when the machine is moving, e.g., following failure of the main hydraulic braking system (moving the forward/reverse control to the NEUTRAL position) or in a runaway condition traveling down a slope. Using the parking brake while the machine is moving may cause damage to the drive motors.

2.8 Battery Disconnect

This machine is equipped with a battery disconnect switch located in the engine compartment.

To disconnect and isolate the electrical system from the battery, remove the wing-nut and remove the cable from the stud.

To reconnect the battery, place the battery cable on the stud and secure with the wing-nut.

WARNING

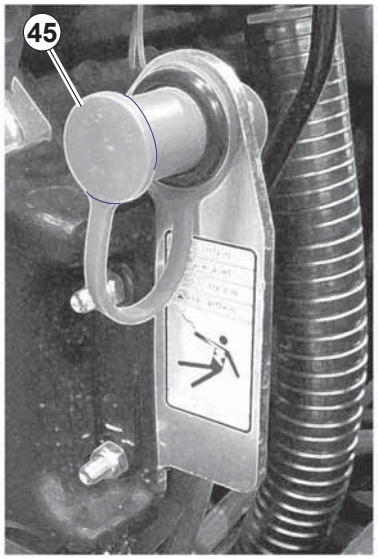
Isolate the battery before performing any maintenance operations on electrical equipment.

2.9 Auxiliary Battery Positive Terminal

This machine is equipped with an auxiliary battery positive terminal **(45)** located on top of the hydraulic tank (RD 12) or above the battery disconnect stud (RD 16).

CAUTION

CAUTION! Electric shock hazard. Never touch this terminal and a metal portion of the machine simultaneously.



wc_gr004357

Notes:

2.10 Panel Indicator Lights

See Graphic: wc_gr004117

Engine coolant temperature indicator (48)

This warning light illuminates to indicate that the engine has overheated and the engine will shut down.

***NOTICE*:** Trace the cause of overheating and rectify the situation before operating the machine.

Low oil pressure indicator (49)

This warning light illuminates when the ignition switch **(55)** is in the on position and the engine is not running; it goes out once the engine has started.

If the light illuminates when the engine is running, it indicates that the oil pressure is low and the engine will shut down.

Possible causes for the light to illuminate:

- Oil level is too low.
- Incorrect oil viscosity for the time of year.
- Fault in the oil circuit.

Do not operate the machine if the light is illuminated.

Vibration ON indicator (50)

This indicator light illuminates to indicate that the vibration is on.

Low fuel indicator (56)

This indicator light illuminates to indicate that the fuel level is low.

Air filter indicator (57)

This indicator light illuminates to indicate that the air cleaner needs to be changed.

Glow plug indicator (58)

This indicator light illuminates to indicate that the glow plugs are on.

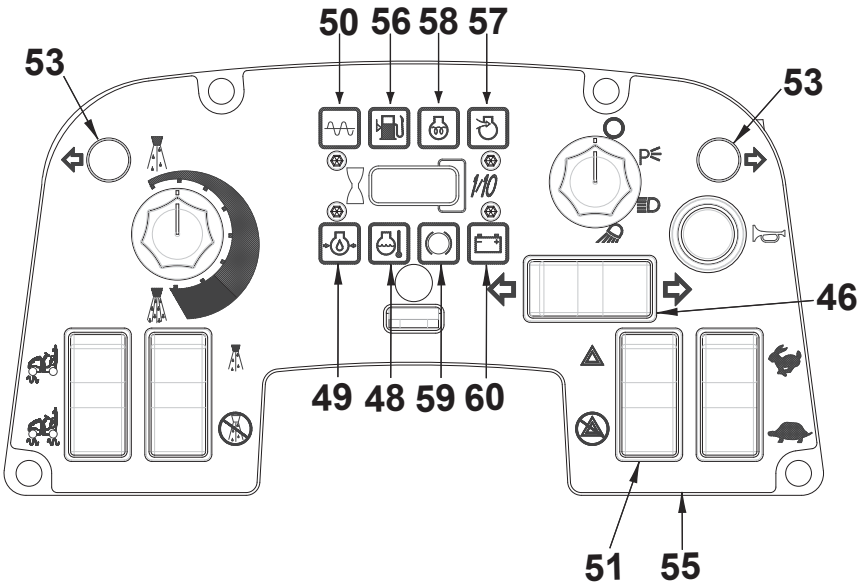
Parking brake button indicator (59)

This indicator light illuminates to indicate that the parking brake button is activated.

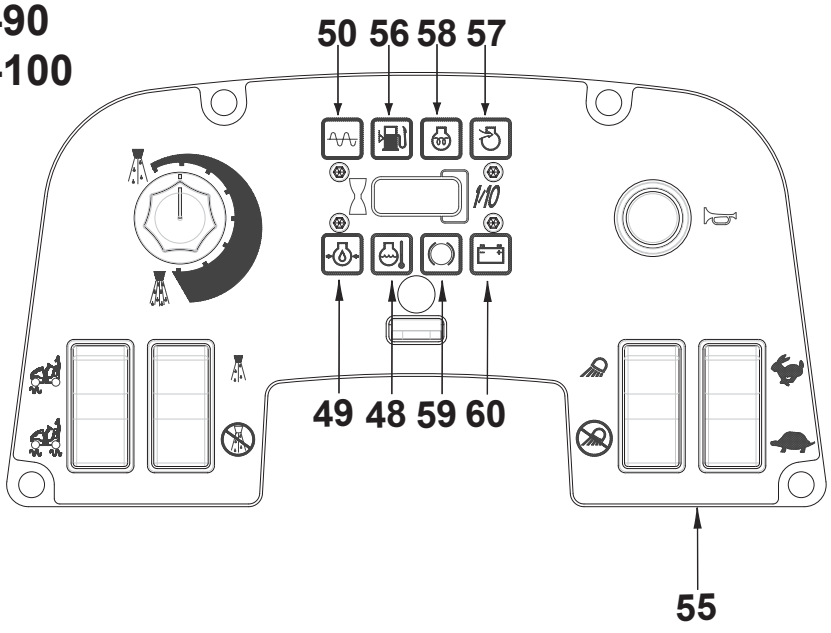
Battery indicator (60)

This indicator light illuminates when the battery is not charging.

RD 16 IRH



RD 16-90
RD 16-100



wc_gr004117

3 Engine Start System Troubleshooting

Prerequisites Before troubleshooting engine starting issues, check the battery and the cable connections to the battery. The battery must be fully charged (approximately 12V).

Sequence Complete the troubleshooting in the following sequence:

1. Check the wiring to the starter solenoid.
2. Check the 30A main fuse.
3. Check the key switch.
4. Check the crank relay.
5. Check the neutral switch.
6. Check the neutral relay.

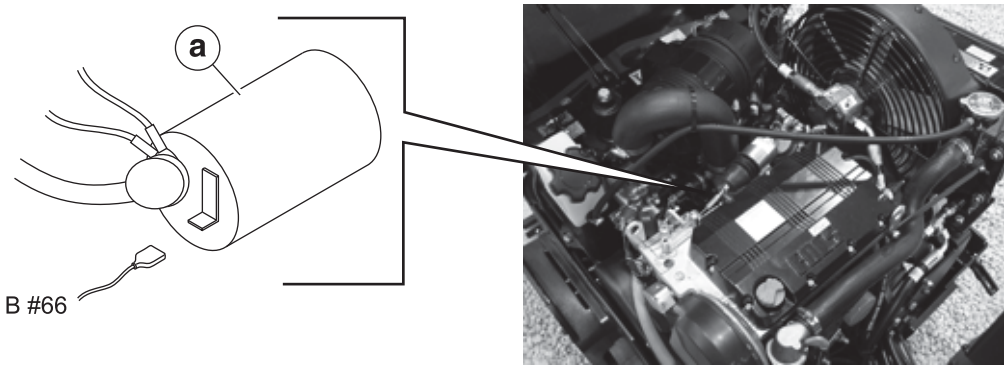
3.1 Checking the Wiring to the Starter Solenoid

Prerequisites Machine shut down

Background Black wire #66 delivers 12VDC to the starter solenoid. If this wire is broken or disconnected, the engine will not start.

Procedure Follow the procedure below to check the wiring to the starter solenoid.

1. Open the hood and locate the starter solenoid **(a)**.



wc_gr004035

2. Check the connection and condition of black wire #66.

Is the wiring OK?

Yes ____	No ____
Continue	Reconnect or repair black wire #66.

The wiring to the starter solenoid has now been checked.

3.2 Checking the 30A Main Fuse

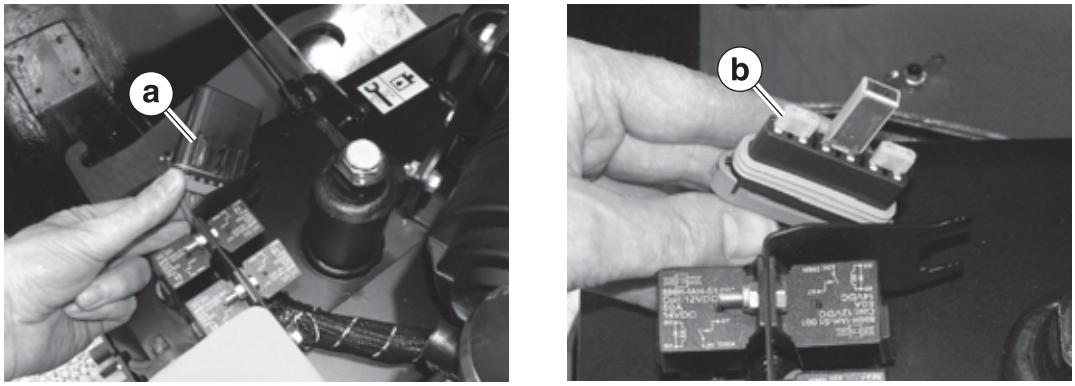
Prerequisites Machine shut down

Background There are three fuses that protect the circuitry on the RD 16:

- 30A lights
- 30A main
- 20A throttle pull

Procedure Follow the procedure below to check the 30A main fuse.

1. Open the hood and locate the fuse carrier.



wc_gr004034

2. Remove the protective cover from the fuse carrier **(a)**.
3. Check the condition of the 30A main fuse **(b)**.

Is the 30A fuse OK?

Yes ____	No ____
Continue	Replace the 30A fuse with one of same size and rating.

4. Re-install the protective cover to the fuse carrier.

The 30A fuse has now been checked.

3.3 Checking the Key Switch

Prerequisites

- Multimeter
- Fully-charged (approximately 12V) battery
- Functioning main fuse

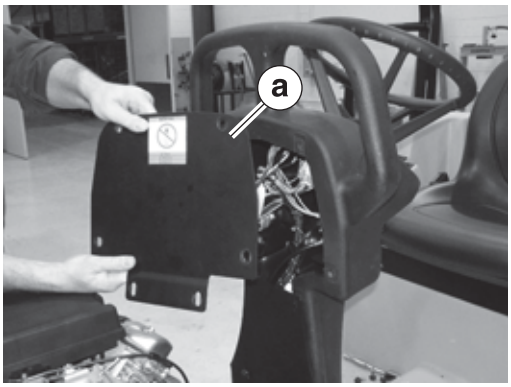
Background

The key switch is a three-position switch: ON, START, and OFF. When in the START position, the key switch directs battery voltage to the crank relay.

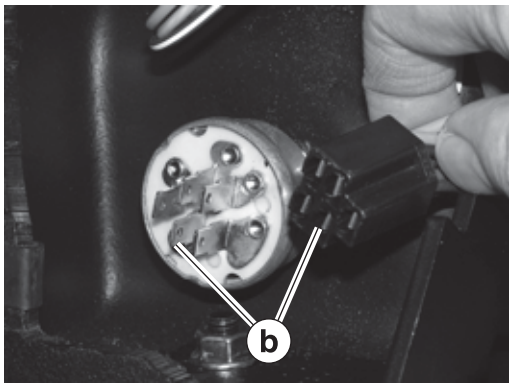
Procedure

Follow the procedure below to check the key switch.

1. Remove the screws that secure the plate **(a)** to the back of the control panel and remove the plate.



wc_gr004201



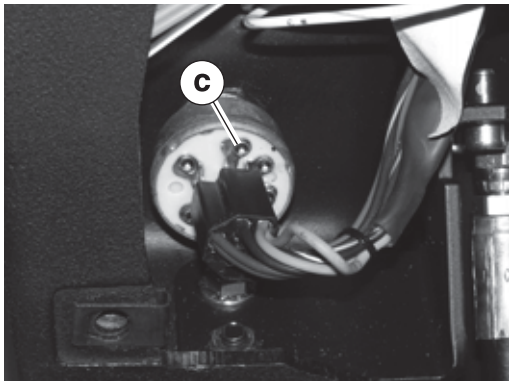
wc_gr003915

2. Using the multimeter, check the voltage between the BAT terminal **(b)** of the key switch and ground. For easier measuring, remove the plug and measure voltage at the plug.

Is battery voltage (approximately 12V) measured?

Yes ____	No ____
Continue	Check the continuity of red wire #33 between key switch and 30A main fuse. Repair red wire #33 as needed.

3. Place the key switch in the START position.



wc_gr003916

4. Check the voltage between the “S” terminal **(c)** of the key switch and ground.

Is battery voltage (approximately 12V) measured?

Yes ____	No ____
The key switch is not the problem.	The key switch has failed; replace it.

5. Re-install the plate to the back of the control console.

The key switch has now been checked.

3.4 Checking the Crank Relay

Prerequisites

- Multimeter
- Fully-charged (approximately 12V) battery
- Functioning main fuse
- Functioning key switch

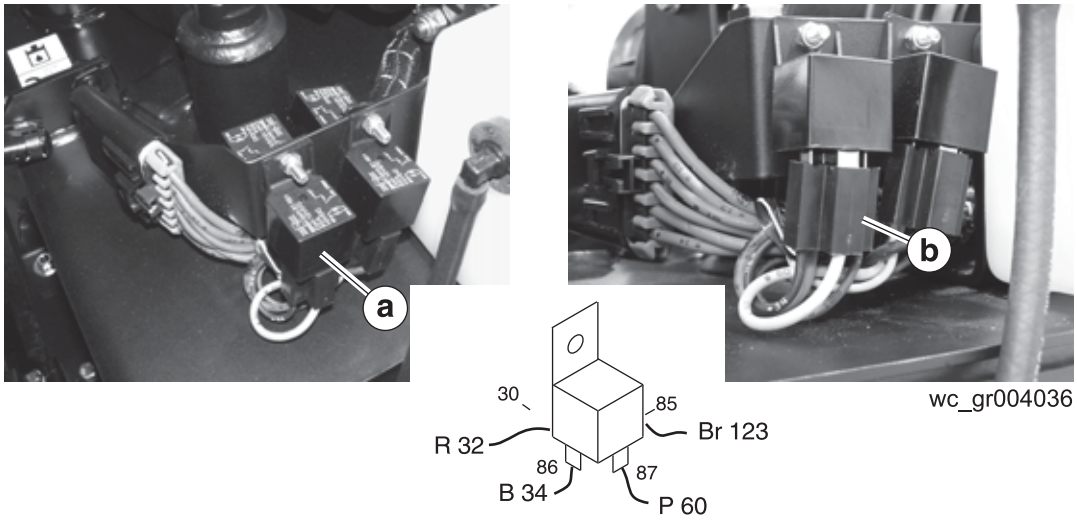
Background

The coil of the crank relay is energized when the key switch is in the START position.

Procedure

Follow the procedure below to check the crank relay.

1. Open the hood and locate the crank relay **(a)**.



2. Check the voltage between terminal 30 (red wire #32) and ground. This test may be done at plug **(b)** with it disconnected from the crank relay.

Is battery voltage (approximately 12V) measured?

Yes ____	**No ____**
Continue	Repair red wire #32.

3. With the key switch in the START position, check the voltage between terminal 86 (black wire #34) and ground. This test may be done at plug **(b)** with it disconnected from the crank relay.

Is battery voltage (approximately 12V) measured?

Yes ____	**No ____**
Continue	Repair black wire #34.

4. With the key switch in the START position, check the voltage between terminal 87 and ground (pink wire #60). For this test, plug **(b)** must be connected to the crank relay. Position the plug as shown to allow access to terminal 87.

Is battery voltage (approximately 12V) measured?

Yes ____	**No ____**
The crank relay is OK.	The crank relay has failed; replace it.

The crank relay has now been checked.

3.5 Checking the Neutral Switch

Prerequisites

- Multimeter
- Fully-charged (approximately 12V) battery
- Functioning main fuse
- Functioning key switch
- Seat platform in raised position. See section *Rear Frame Access.*

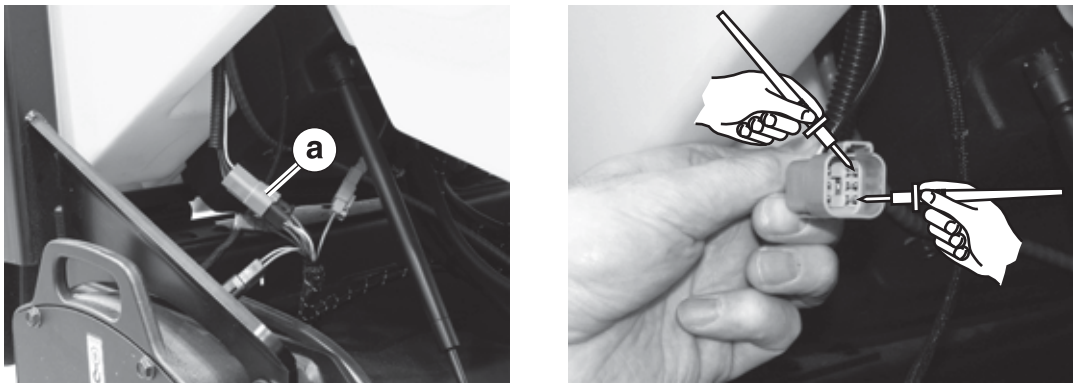
Background

The neutral switch, when closed (control lever in NEUTRAL position), allows voltage to the neutral relay.

Procedure

Follow the procedure below to check the neutral switch.

1. Locate the connector **(a)** for the neutral switch and disconnect it.



wc_gr003919

2. Place the control lever in the NEUTRAL position.
3. With the key switch in the START position, check the continuity between the pins of the connector (green and white wires).

Is there continuity?

Yes ____	No ____
Continue	The neutral switch has failed; replace it.

4. Place the control lever in the FORWARD or REVERSE position.
5. With the key switch in the START position, check the continuity between the pins of the connector (green and white wires).

Is there continuity?

Yes ____	No ____
The neutral switch has failed; replace it.	Continue

6. Repeat the test with the control lever in the REVERSE position.

Is there continuity?

Yes ____	No ____
The neutral switch has failed: replace it.	The neutral switch is OK.

7. Reconnect the wiring.
8. Lower and secure the seat platform.

The neutral switch has now been checked.

3.6 Checking the Neutral Relay

Prerequisites

- Multimeter
- Fully-charged (approximately 12V) battery
- Functioning main fuse
- Functioning crank relay
- Functioning neutral switch

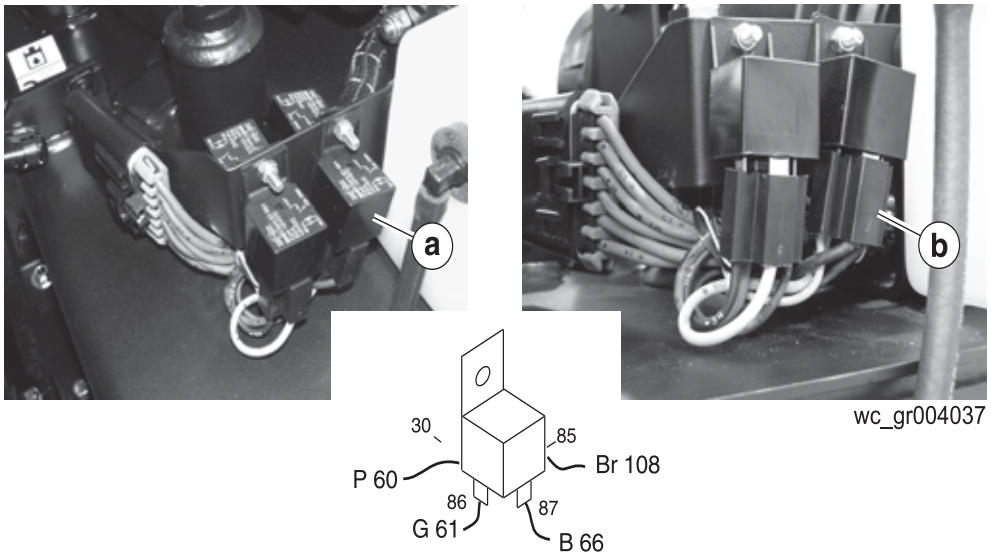
Background

The neutral relay relays battery voltage to the starter solenoid.

Procedure

Follow the procedure below to check the neutral relay.

1. Open the hood and locate the neutral relay **(a)**.



2. Place the key switch in the START position.
3. Check the voltage between terminal 30 (pink wire #60) and ground. This test may be done at plug **(b)** with it disconnected from the neutral relay.

Is battery voltage (approximately 12V) measured?

Yes ____	**No ____**
Continue	Repair pink wire #60.

This procedure continues on the next page.

Continued from the previous page.

4. Check the voltage between terminal 86 (green wire #61) and ground. This test may be done at plug **(b)** with it disconnected from the neutral relay.

Is battery voltage (approximately 12V) measured?

Yes ____	**No ____**
Continue	Repair red wire #31.

5. Check the voltage between terminal 87 (black wire #66) and ground. For this test plug **(b)** must be connected to the crank relay. Position the plug as shown to allow access to terminal 87.

Is battery voltage (approximately 12V) measured?

Yes ____	**No ____**
The neutral relay is OK.	The neutral relay has failed; replace it.

The neutral relay has now been checked.

4 Drive System

4.1 Drive System Overview

Background

The hydraulic system is powered by two pumps (exciter and drive) mounted in tandem—connected along their shafts through a solid-mounted coupling—and driven directly by the engine crankshaft through a flex coupling.

Drive pump

- The drive pump is a variable displacement, axial piston pump and includes an integral charge pump.
- Flow through the drive pump is controlled by varying its displacement through the movement of the control lever coupled to the pump's control shaft. This allows a full range of operating speeds in both forward and reverse.

Drive motors

- There are two drive motors—one mounted to each drum.
- The drive motors are plumbed in series.
- Each drive motor is equipped with Spring Activated Hydraulically Released (SAHR) brake.

System filters and strainers

- The hydraulic tank is equipped with a strainer at the fill port to trap large objects or particles which may accidentally fall into the tank while adding hydraulic fluid.
- Additional system protection is provided by a suction filter mounted in-line with the exciter pump inlet.
- The hydraulic system is protected by a return-line filter which removes dirt particles down to 10 microns and includes a flow bypass for cold weather start-up.

Troubleshooting sequence

When troubleshooting drive system problems, do so in the following sequence:

1. Check the function of the drive control cable.
2. Check the brake release solenoid valve.
3. Pressure test the drive pump and relief valve.
4. Check the drive motors.

4.2 Adjusting the Drive Control Cable

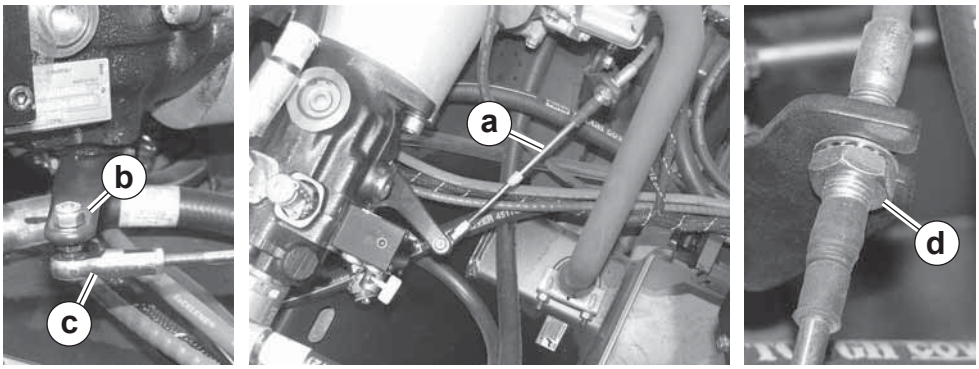
Background If the roller tends to drift in either direction when the forward/reverse control is in NEUTRAL, the drive control cable **(a)** must be adjusted.

Prerequisites

- Machine on a hard, level surface
- Engine running
- Forward/reverse control in the NEUTRAL position

Procedure Follow the procedure below to adjust the drive control cable.

1. Loosen the lock nut **(b)**.



wc_gr004121

2. Move the turnbuckle **(c)** as needed until machine movement stops.
If adjusting the turnbuckle does not achieve the desired results, a gross adjustment can be made at the nut **(d)** and then fine-tuned as described above.

The drive control cable has now been adjusted.

4.3 Checking the Brake Release Solenoid Valve

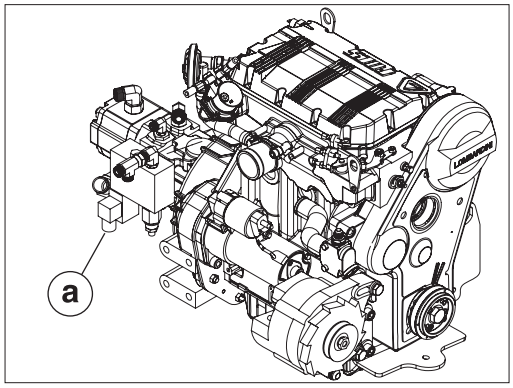
Background The brake release valve controls hydraulic pressure to the brakes. If this solenoid valve is disconnected or malfunctioning, the brakes will not release and the machine will not move.

Prerequisites

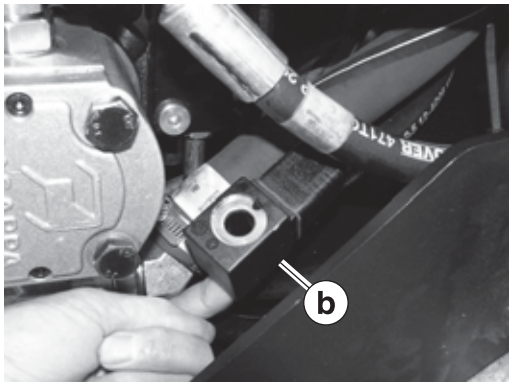
- Drums chocked
- Assistant

Procedure Follow the procedure below to check the brake release valve.

3. Open the engine compartment and locate the brake release valve **(a)**.

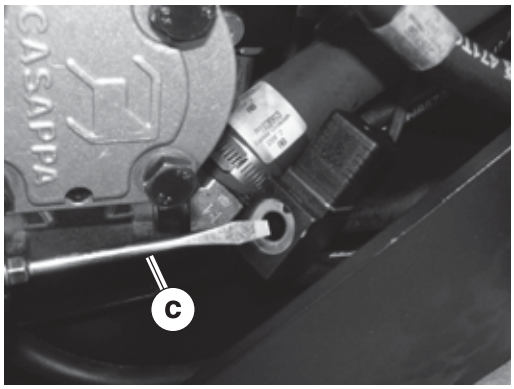


wc_gr004616



wc_gr004632

4. Remove the nut that secures the solenoid to the valve and slide the solenoid **(b)** from the valve.
5. Start the engine—the operator must remain seated in the operator's seat.
6. Place the brake switch in the OFF position.
7. Check the magnetic force created by the solenoid by having an assistant place a piece of ferrous metal such as a screwdriver **(c)** inside the solenoid.



wc_gr004633

Does the solenoid magnetically attract the screwdriver?

Yes ____	No ____
The solenoid is functioning.	Continue.

This procedure continues on the next page.

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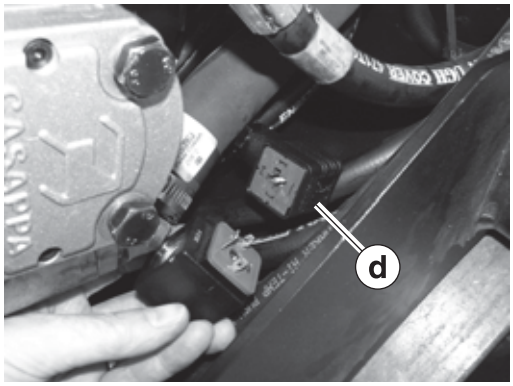
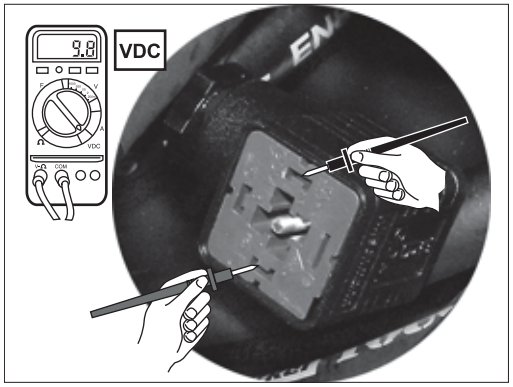
8. Remove the wiring connector **(d)** from the solenoid.



wc_gr004634



wc_gr004635

9. Check the voltage at the wiring connector (with the engine running, operator seated, and brake switch in OFF position).

Is at least 9.8V measured?

Yes ____	**No ____**
The solenoid has failed; replace it.	Check the function of the brake switch.

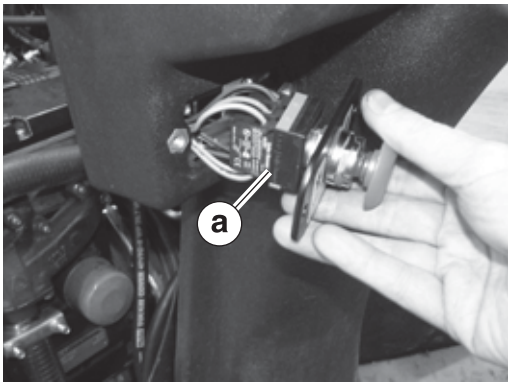
The brake release valve has now been checked.

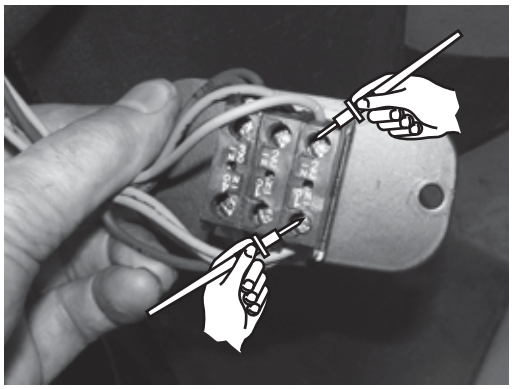
4.4 Checking the Brake Switch

Prerequisites Machine shut down

Procedure Follow the procedure below to check the brake switch.

1. Remove the screws that secure the brake switch to the console.
2. Pull the brake switch **(a)** from the console.





wc_gr004638

3. Place the brake switch in the ON position (in).
4. Check for continuity across the terminals of the brake switch. There should be continuity across terminals "–1 NC" and "–2 NC" of each module and no continuity across terminals "–3 NO" and "–4 NO".

Is there continuity as stated above?

Yes ____	No ____
Continue.	The brake switch has failed; replace it.

5. Place the brake switch in the OFF position (out).
6. Check for continuity across the terminals of the brake switch. There should be no continuity across terminals "–1 NC" and "–2 NC" of each module and continuity across terminals "–3 NO" and "–4 NO".

Is there continuity as stated above?

Yes ____	No ____
The brake switch is OK. Any problems with voltage reaching the brake solenoid are in the wiring to the solenoid.	The brake switch has failed; replace it.

The brake switch has now been checked.

4.5 Checking the Drive System Operating Pressure

Prerequisites

- Machine on a firm, level surface
- 200-bar (3000-psi) pressure gauge
- Hydraulic oil warm

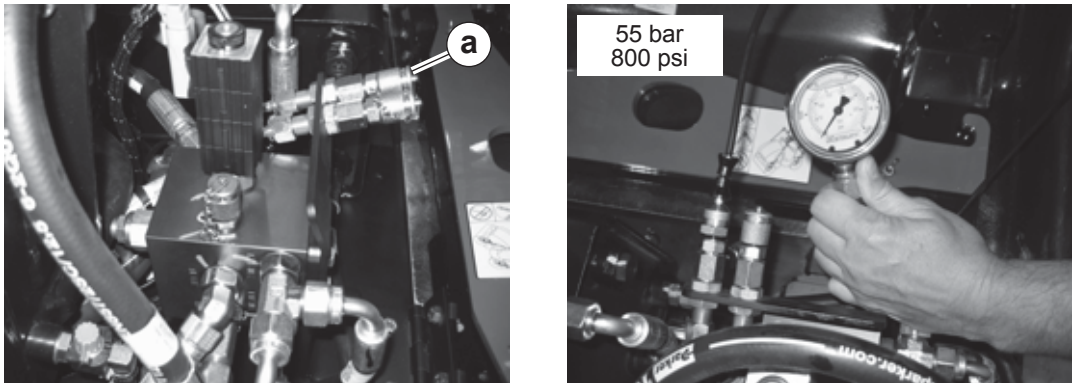
Background

Failure of the drive circuit to reach operating pressures is normally caused by a worn or damaged drive pump; however, the problem could also be the result of a badly worn motor.

Procedure

Follow the procedure below to test the drive system operating pressure.

1. Install a 200-bar (3000-psi) gauge in the forward test port **(a)**.



wc_gr004620

2. Start the engine and run the machine at full throttle.
3. Shift the control lever to the FORWARD position and record the pressure on the gauge.

The pressure should spike at approximately 97 bar (1400 psi) then settle into an operating pressure range of 55–76 bar (800–1100 psi).

Note: *Operating pressures will increase significantly when running the machine uphill, off road, or against an object.*

4. Turn off the engine.
5. Install the 3000-psi gauge in the reverse test port and repeat the procedure while operating in reverse.

Operating pressure lower than those listed indicate a failing drive motor. Higher pressures than those listed indicate a problem with the drive motors.

The drive system operating pressure has now been checked.

4.6 Checking the Drive System Relief Pressure

Prerequisites

- Machine on a firm, level surface
- 5000-psi pressure gauge

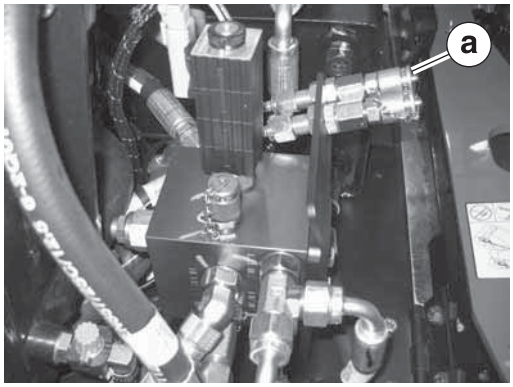
Procedure

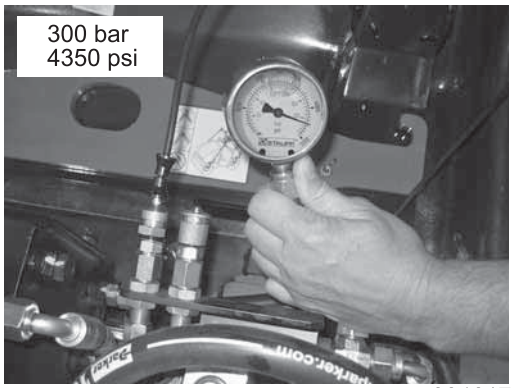
Follow the procedure below to check the drive system relief pressure.

1. Place blocks in front of and behind both drums to prevent the machine from moving, or dead head the machine against a solid concrete abutment.
2. Place the brake switch in the OFF position.

CAUTION! Crushing hazard.
▶ Use extreme caution when working near a running engine.

3. Install a 5000-psi gauge in the forward test port **(a)**.



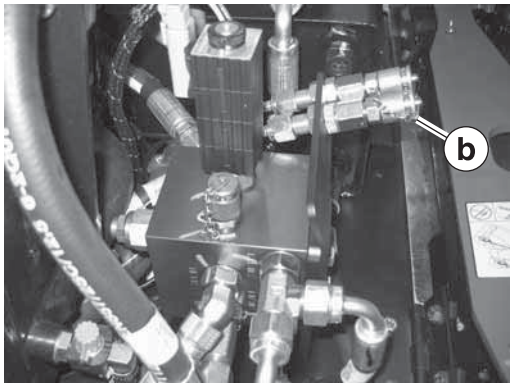


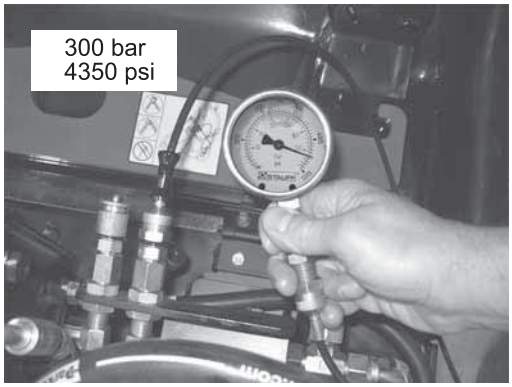
wc_gr004617

4. Start the engine and run the machine at full throttle.
5. Shift the forward/reverse control slowly into forward until pressure on the gauge tops out. This is the forward relief valve pressure.

Note: *Make sure the drums do not spin.*

6. Stop the engine.
7. Install the gauge in the reverse test port **(b)** and repeat the procedure while operating in reverse.





wc_gr004618

The drive system relief pressure has now been checked.

4.7 Checking the Drive Motors

Prerequisites

- Graduated container
- Assistant

Background

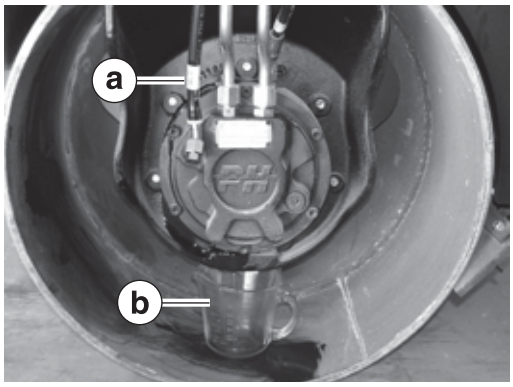
The drive motors are plumbed in series. When driving forward, hydraulic oil flows to the front drive motor first, then, on to the rear drive motor. When driving backward, hydraulic flow is just the opposite.

Procedure

Follow the procedure below to check the drive motors.

WARNING! Crushing hazard.
▶ Use extreme care when conducting this test.

1. Place blocks in front of and behind both drums to prevent the machine from moving, or dead head the machine against a solid concrete abutment.
2. Place the brake switch in the OFF position.
3. Start the engine and allow the hydraulic oil to warm up.
4. Turn off the engine.
5. Remove the case drain hose **(a)** from the front drive motor and plug the drive hose.



wc_gr004629

6. Start the engine.
7. Slowly place the forward/reverse control in the FORWARD position. Hydraulic oil will flow from the case drain port of the drive motor.
8. Have an assistant place a graduated container **(b)** underneath the drive motor to collect the hydraulic oil. Collect the hydraulic oil for one minute.
9. Turn off the engine.

This procedure continues on the next page.

Continued from the previous page.

Was more than four liters (1 gal.) of hydraulic oil collected?

Yes ____	No ____
The drive motor has failed; replace it.	Continue.

10.Reconnect the case drain hose.

Note: *If you measured less than four liters (1 gal.) but still suspect a drive motor problem, do the following: Place a 2x4 or similar piece of wood (equal to the width of the drum) in front of the drum. Attempt to drive over it. If the machine cannot drive over the piece of wood, consider replacing the drive motors.*

The drive motors have now been checked.

4.8 Manually Releasing the Parking Brakes

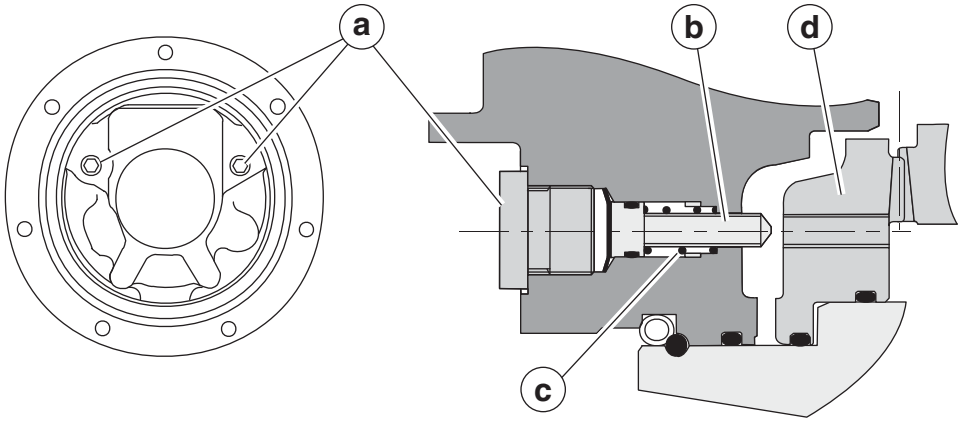
Background There are two drive motors on the roller—one on each drum. Each drive motor includes a parking brake that is spring activated and hydraulically released (SAHR).

Procedure To manually release the brakes, carry out the following procedure.

NOTICE: To avoid damaging the internal mechanism, do not use power tools to release or reactivate the brakes.

Note: *Carry out procedure on both drums.*

1. Chock each drum to prevent the machine from moving.
2. Lock the articulated steering joint.
3. Using an 8mm Allen wrench, remove the plugs **(a)** in order to access the release screws **(b)**.



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4. Using a 6mm Allen wrench, press and turn each release screw in until its threads catch in the brake plate **(d)**. Tighten each screw alternately until the spring **(c)** on each screw is fully compressed. You will feel a substantial difference in the amount of torque required to turn the screw once its spring is fully compressed.
5. Continue to tighten (turn clockwise) the two release screws to compress the brake plate springs. Alternate back-and-forth between the two screws, turning approximately 45° at a time, until the drums are no longer held by the brake plate. The brake plate should release after turning each screw approximately two (2) turns.

NOTICE: Maximum torque for the release screws is 33 Nm (24.3 ft.lbs.). Overtightening the release screws can destroy the internal mechanism.

6. Manually turn the drum to test if the brake is released.
7. Replace the plugs **(a)**, tightening them to a maximum torque of 60 ± 6 Nm (44.2 ± 4.4 ft.lbs.).

To reactivate the brakes, carry out the following procedure on both drums.

1. Remove the plugs **(a)**.

This procedure continues on the next page.

Continued from the previous page.

2. Alternating betwen the two release screws **(b)**, completely loosen them until the brake plate is disengaged.
3. Replace the plugs, tightening them to a maximum torque of 60 ± 6 Nm (44.2 ± 4.4 ft.lbs.).

Note: *Replacement drive motors come with the brakes engaged.*

5 Vibration System

5.1 Vibration System Overview

Both the vibration and steering system share the same open loop, series circuit, driven by a fixed displacement, gear-type pump (exciter pump). The system includes separate relief valves for vibration and steering, an exciter control valve exciter motor, steering valve, steering cylinder, and cooling fan.

Vibration circuit

The exciter pump pulls oil from the tank through the suction filter and sends it to the exciter manifold block. The vibration circuit is controlled by the exciter solenoid valve. This valve is electrically operated by an ON/OFF switch located on the end of the forward/reverse control lever. The vibration circuit has two modes: single-drum and dual drum. Supply oil from the exciter pump is directed to the exciter control valve. When the ON/OFF switch is in the OFF position, the exciter control valve is open, allowing oil to pass downstream to the cooling fan and to the steering valve without driving the exciter motor. When the ON/OFF switch is in the ON position, power is sent to one of two solenoid valves depending on the position of the vibration mode switch. Hydraulic oil flows to the front drum or both drums accordingly. A relief valve connected across the exciter control valve limits pressure to 290 bar (4200 psi).

Steering circuit

Steering is controlled by a steering valve and cylinder. The steering wheel is spline-mounted directly to the steering valve. The steering valve reacts to the motion of the steering wheel to direct oil to and from the steering cylinder. Oil returning from the vibration circuit is directed to the steering valve. If steering is inactive, oil passes through the steering valve and back to the return-line filter manifold. When the steering wheel is turned, the steering valve closes and directs oil to the appropriate steering line to extend or retract the cylinder. A relief valve is connected across the steering valve and is set at 45–51 bar (650–725 psi). Relief valves are also connected to each end of the steering cylinder. Each of these relief valves is also set at 45–51 bar (650–725 psi). The oil returning from the vibration and steering functions is directed back to the tank through a return-line filter. A filter bypass relief valve, set at 1.7 bar (25 psi), protects the return-line filter by routing oil past the filter if the filter is clogged.

Troubleshooting sequence

When troubleshooting:

- For systems that vibrate poorly, see section *Troubleshooting a System that Vibrates Poorly.*
- For complete vibration system failure, see sections *Checking the Vibration Solenoid Valve and Checking the Vibration Switch.*

5.2 Checking the Engine Speed and Vibration Speed

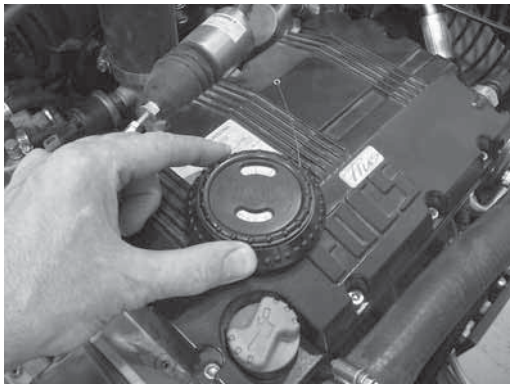
Prerequisites

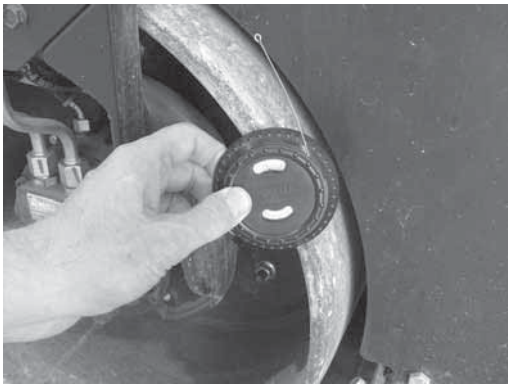
- Vibrotach
- Vibration must turn on

Procedure

Follow the procedure below to check the engine rpm and drum vpm.

1. Start the engine and place the throttle switch in the FAST position.
2. Measure the engine rpm using a vibrotach.





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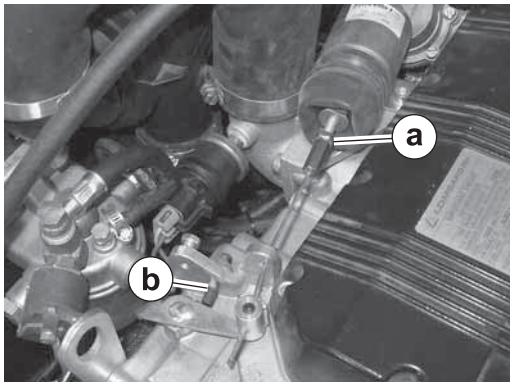
3. Measure the vpm (vibrations per minute) by placing the vibrotach on the rim of the drum while vibration is on.
4. If the vpm is not 4150–4250, adjust the throttle linkage **(a)** until it is. If vpm cannot be obtained by adjusting the linkage, adjust the stop screw **(b)**.



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The procedure to check the engine rpm and drum vpm is now complete.

5.3 Troubleshooting a System that Vibrates Poorly

Prerequisites

- 5000-psi pressure gauge
- Compactible surface such as a bed of gravel or old tires

Background

The exciter pump is designed to put out a constant flow of oil at a set engine speed. This ensures that the vibration frequency remains steady. When troubleshooting the exciter circuit, the vibration speed, operating pressure, and relief pressures must be known to help determine the cause of any problems.

Procedure

To measure vibration speed:

1. Start the machine and run it for several minutes to bring the hydraulic fluid up to normal operating temperature.
2. Drive the machine onto a compactible surface such as a bed of gravel or old tires.
3. Run the machine at full throttle. Check the engine rpm using a tachometer or vibrotach.
4. Start vibration. Hold the vibrotach (P/N 53397) against the outer rim of the drum and measure the vibration speed.

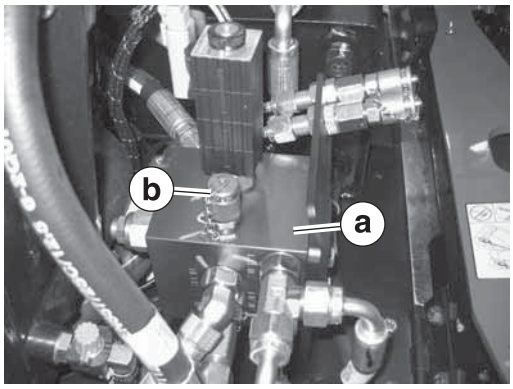
Engine rpm	Vibration Frequency vpm	Operating Pressure Single Drum Mode bar (psi)	Operating Pressure Dual Drum Mode bar (psi)
2850*	4200	103–131 (1500–1900)	138–165 (2000–2400)

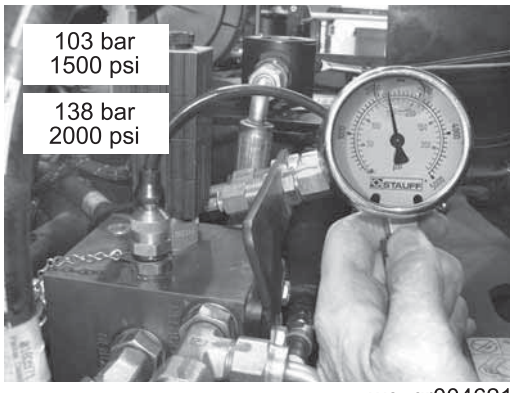
*Adjust engine rpm if necessary to obtain 4200 vpm.

5. Shut down the machine.

To check vibration system operating pressure:

1. Open the engine compartment.
2. Locate the exciter solenoid valve **(a)**.





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3. Connect a 5000-psi gauge to the test port **(b)**.

This procedure continues on the next page.

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4. Start the engine and run the machine at full throttle.
5. Turn on the vibration and measure the relief and operating pressures. The relief pressure is the pressure registered on the gauge as soon as the vibration is turned on. The system will then settle into operating pressure. Record these two pressures.
6. Shut down the machine.

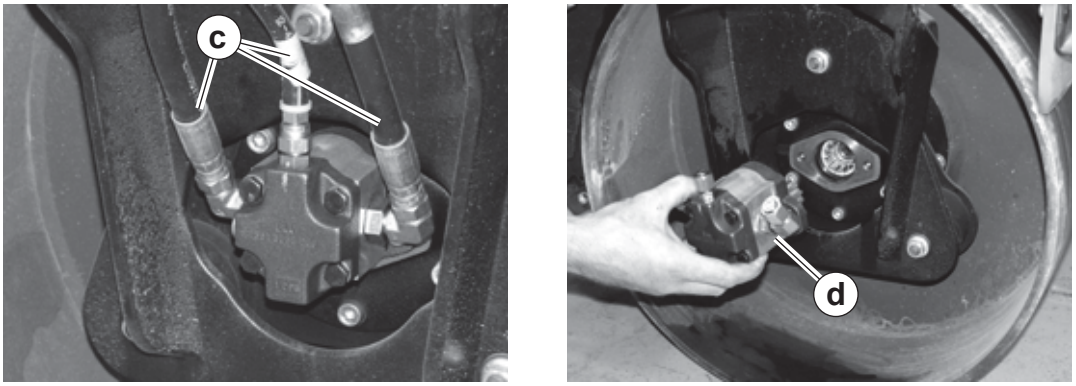
Compare the results from operating pressure, pump relief pressure, and exciter speed with the chart below.

Operating Pressure	Pump Relief Pressure	Exciter Speed	Probable Cause
N	N	N	System OK
H	N	N or L	Exciter bearings or motor binding
N or L	N	L	Exciter motor worn
L	L	L	Exciter pump damaged or worn, relief valve defective, or needs adjusting

N = Normal, L = Low, H = High

If the exciter is binding or causing high operating pressures, perform the following:

1. Disconnect the hydraulic hoses **(c)** and remove the exciter motor **(d)** from the housing.



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2. Turn the motor shaft and exciter shaft by hand and check that they both turn freely.
3. If either component does not turn freely, it has failed; replace it.

The vibration system has now been checked for poor vibration.

5.4 Checking the Vibration Solenoid Valve

Prerequisites

- Multimeter
- Assistant

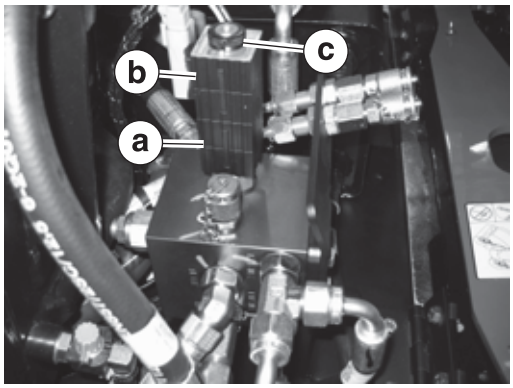
Background

There are two solenoids mounted to the vibration manifold. One controls hydraulic oil flow for dual-drum vibration and one for single-drum vibration. The lower solenoid **(a)** controls single-drum vibration. The upper solenoid **(b)** controls dual-drum vibration. To check the function of the vibration electrical system, both vibration solenoids and the vibration switch should be tested.

Procedure

Follow the procedure below to check the vibration solenoids.

1. Remove the nut **(c)** that secures each solenoid and remove the upper solenoid from the valve stem.



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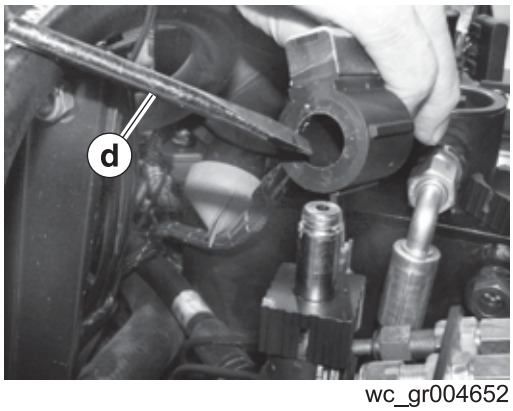
2. Have an assistant sit in the operator's seat.
3. Turn the key switch to ON. Do not start the engine.
4. Have the assistant activate the vibration using the vibration switch on the forward/reverse control lever.
5. Check the magnetic force created by the solenoid by placing a piece of ferrous metal such as a screwdriver **(d)** inside the solenoid.



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Does the solenoid magnetically attract the screwdriver?

Yes ____	No ____
The solenoid is functioning.	Continue.

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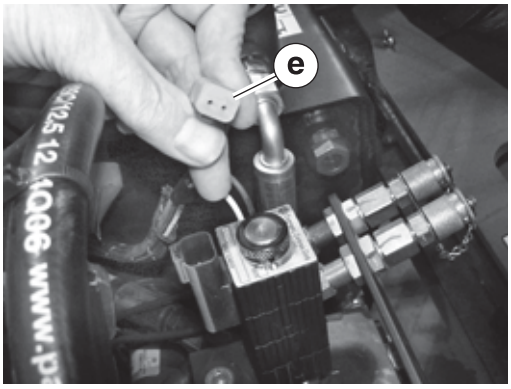
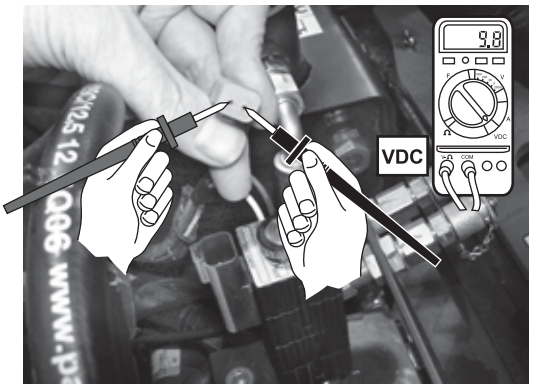
6. Remove the connector **(e)** from the solenoid.





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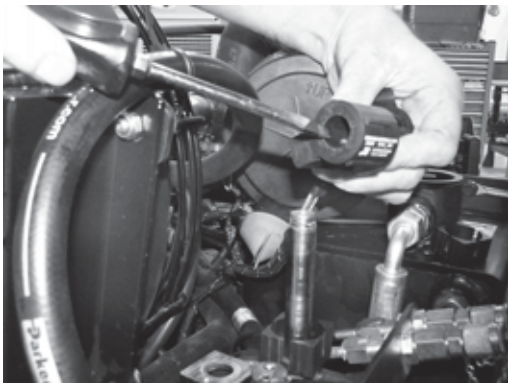
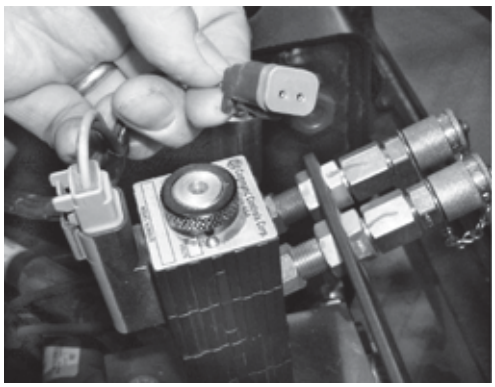
7. Check the voltage at the wiring connector.

Is at least 9.8V measured?

Yes ____	**No ____**
The coil of the solenoid has failed: replace it.	Check the function of the vibration switch.

8. Reconnect and reassemble the solenoid.
9. Check the lower solenoid in the same manner.





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The vibration solenoids have now been checked.

5.5 Checking the Vibration Switch

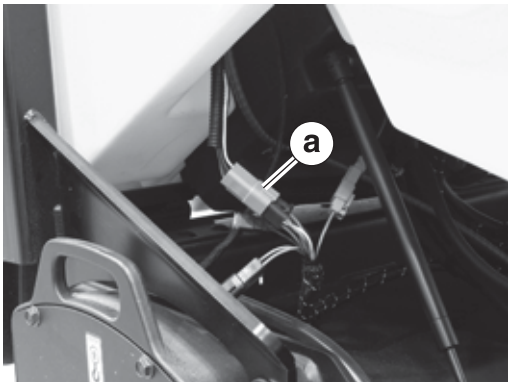
Background

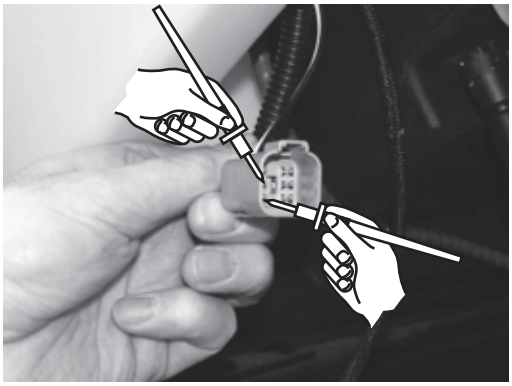
When the roller's engine is running, the solenoid of the vibration manifold receives power through the white wire via the vibration switch. To check the function of the vibration electrical system, both the vibration solenoid and the vibration switch should be tested.

Procedure

Follow the procedure below to check the vibration switch.

1. Remove the four screws that secure the seat platform. Then, raise the platform.
2. Locate the connector **(a)** for the vibration switch and disconnect it.





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3. Press the switch several times while checking for continuity between the pins of the connector (two black wires).

Does the switch open and close?

Yes ____	No ____
The vibration switch is OK.	The vibration switch has failed; replace it.

4. Reconnect the wiring.

The vibraton switch has now been checked.

6 Spray System

6.1 Troubleshooting the Spray System

Prerequisites The machine must be able to start in order to troubleshoot the spray system. If the machine does not start, see engine starting troubleshooting.

Components The electrical components of the spray system consist of:

- Pump
- Pump timer module
- Spray system switch

Sequence When troubleshooting the spray system, do so in the following sequence:

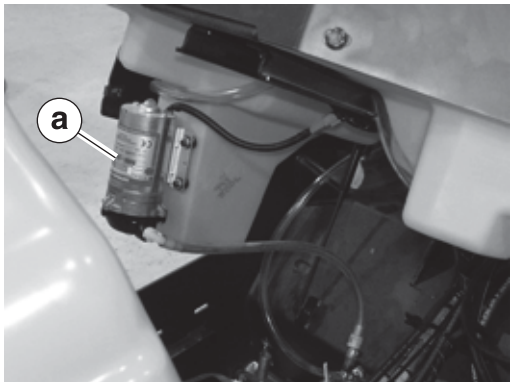
1. Check power to the pump.
2. Check the pump timer module.
3. Check the spray system switch.

6.2 Checking Power to the Spray Bar Pump

Prerequisites Seat platform in raised position. See section *Rear Frame Access*.

Procedure Follow the procedure below to check power to the spray bar pump.

1. Disconnect the wiring from the water pump **(a)**.



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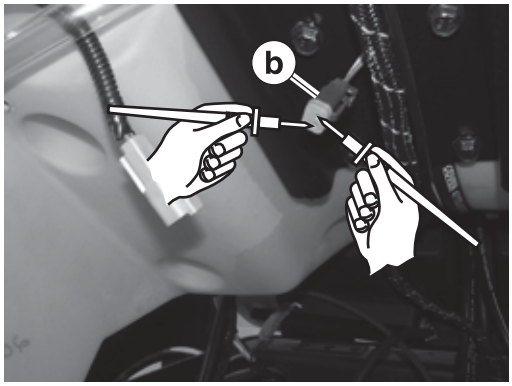

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2. Place the key switch in the ON position.
3. Place the spray system switch in the ON position.
4. Measure the voltage at the connector **(b)**.

Is more than 9.8V measured?

Yes ____	**No ____**
The pump has failed; replace it.	See section *Checking Power to Pump Timer Module*.

The procedure for checking the power to the spray bar pump is now complete.

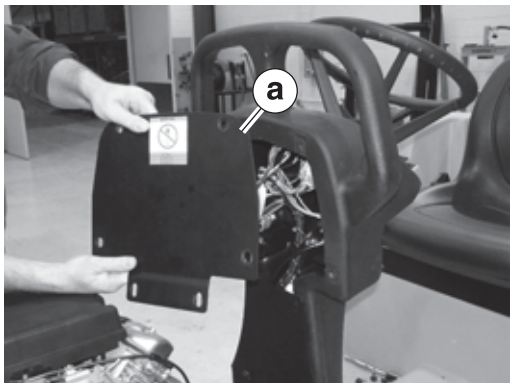
6.3 Checking the Pump Timer Module

Background The pump timer module is fed power in two locations:

- Via key switch on pink wire #01
- Via spray system switch on pink wire #18

Procedure Follow the procedure below to check power to the pump timer module.

1. Remove the control console cover **(a)**.



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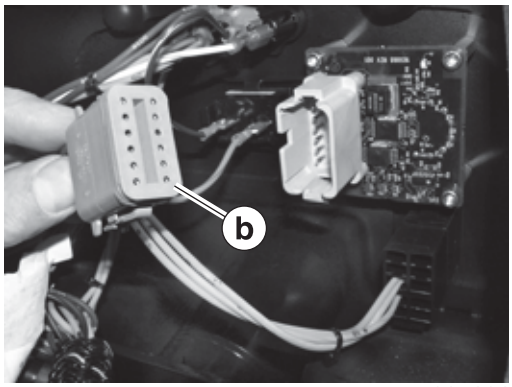

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2. Disconnect the pump timer module connector **(b)**.
3. Measure the voltage between pink wire #01 (connector pin 1) and ground.

Is more than 9.8V measured?

Yes ____	No ____
Continue	Repair or replace pink wire #1.

4. Place the key switch in the ON position.
5. Place the spray system switch in the ON position.
6. Measure the voltage between pink wire #18 (connector pin 11) and ground.

Is more than 9.8V measured?

Yes ____	No ____
The pump timer module is receiving power and should be working; continue.	Repair or replace pink wire #18.

7. Reconnect the pump timer module connector.
8. Measure the voltage between pink wire #18 (backprobe connector pin 6) and ground.

Note: *The voltage will be intermittent depending on the setting of the pump timer dial.*

Is more than 9.8V measured?

Yes ____	No ____
The pump timer module is functioning.	The pump timer module has failed; replace it.

9. Re-install the control console cover.

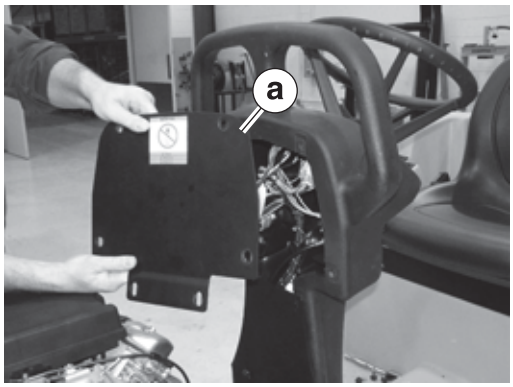
The pump timer module has now been checked.

6.4 Checking the Spray System Switch

Background The spray system switch is fed power via the key switch on pink wire #29. When in the ON position, the spray system switch allows power to the pump control timer via pink wire #18.

Procedure Follow the procedure below to check the spray system switch.

1. Remove the control console cover **(a)**.



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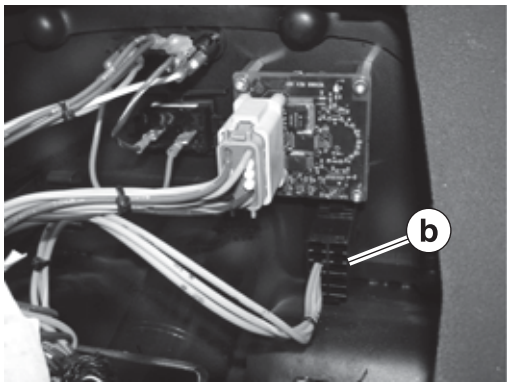

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2. Place the key switch in the ON position.
3. Measure the voltage between the incoming side of the spray system switch **(b)** (pink wire #29) and ground.

Is more than 9.8V measured?

Yes ____	**No ____**
Continue	Check the continuity of pink wire #29. Repair or replace pink wire #29.

4. Place the spray system switch in the ON position.
5. Measure the voltage between the outgoing side of the spray system switch (pink wire #18) and ground.

Is more than 9.8V measured?

Yes ____	**No ____**
The spray system switch is functioning.	The spray system switch has failed; replace it.

The spray system switch has now been checked.

7 Steering System

7.1 Checking the Steering System

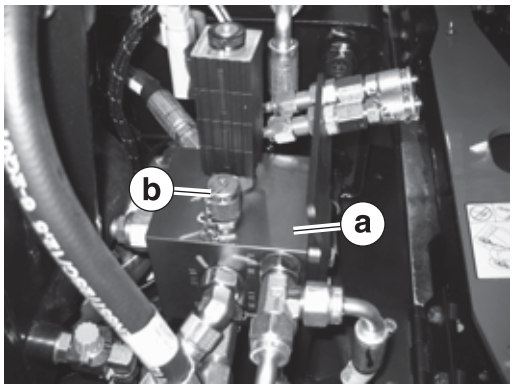
Prerequisites 200-bar (3000-psi) pressure gauge

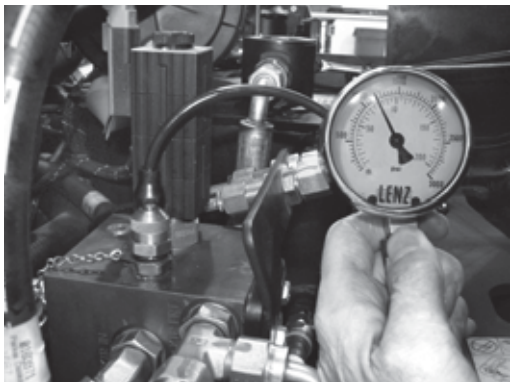
Background A badly worn exciter pump will affect both the steering and the vibration circuits because these circuits operate in series using the same supply. If hydraulic pressure to both circuits falls below operating pressures, replace the exciter pump.

Note: *In some cases the exciter pump may function well enough to operate the steering circuit but not the vibration circuit. This is due to the much lower pressure requirements of the steering circuit.*

Procedure Follow the procedure below to check the steering system.

1. Open the engine compartment.
2. Locate the exciter solenoid valve **(a)**.





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3. Connect a 200-bar (3000-psi) gauge to the test port **(b)**.
4. Start the engine.
5. Check the pressure while operating the steering.

NOTICE: Do not turn on the vibration while conducting this test. The 3000-psi gauge will be damaged.

Normal operating pressure: 55–69 bar (800–1000 psi)
Pressure while turning: 90–117 bar (1300–1700 psi)

If	Then
The pressure is near zero,	The cooling fan is bound; replace it.
The pressure is low,	Check pressure in vibration circuit. See section *Troubleshooting a System that Vibrates Poorly.* If the vibration circuit pressure is low, replace the vibration pump.
The pressure is high (over 138 bar (2000 psi)),	Check the steering cylinder for binding and replace it if necessary. If the steering cylinder is OK, replace the steering valve.

The steering system has now been checked.

8 Disassembly and Assembly

8.1 Tools Required for Disassembly/Assembly

- It is up to the mechanic to use common sense and good judgment in tool selection to reduce the risk of injury while repairing the machine.
- In cases where a special tool is required, the special tool is listed in the prerequisite section of the procedure.
- Before substituting another tool or procedure from those recommended in this manual, the mechanic must be satisfied that neither personal injury nor damage to the machine will result due to the substitution.

8.2 Information Regarding Replacement Parts

- The repair procedures contained in this manual do not include part numbers.
- For replacement parts information, refer to the Parts Book originally supplied with the machine.
- If the original Parts Book has been lost, a replacement may be ordered from Wacker Neuson Corporation.
- When ordering a replacement Parts Book, please list the model number, item number, revision level, and serial number of the machine.
- Parts Books are also available on the Wacker Neuson Corporation Web site. See www.wackerneuson.com. Enter the site as a visitor.

8.3 Information Regarding Threadlocking Compounds ( )

Background

Due to the heavy vibration inherent in this type of equipment, the repair and service procedures described in this manual specify the use of threadlocking compounds. These compounds should be used where indicated to prevent the fasteners from becoming loose.

Recommended threadlockers

Although Loctite® is referred to throughout this manual, any equivalent type of sealant such as Hernon®, Prolock, or Omnifit may be used. For a complete list of recommended sealing and locking compounds, refer to the Use of Threadlockers and Sealants chart at the end of this manual.

Applying threadlockers

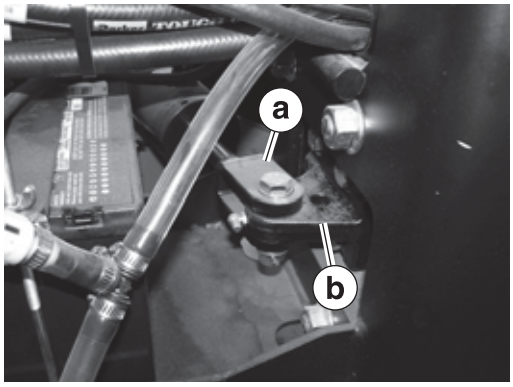
Clean the screw threads and wipe off any oil or grease before applying a thread-locking compound.

8.4 Removing the Articulating Joint

Prerequisites Crane and jacks

Procedure Follow the procedure below to remove the articulating joint.

1. Support the rear half of the machine with jacks and the front half with an appropriate crane so that the machine will not fall in on itself when the articulating joint is removed.
2. Disconnect the steering cylinder **(a)** from the pivot plate **(b)**.



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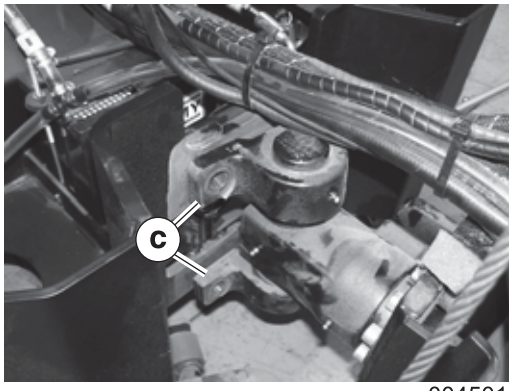

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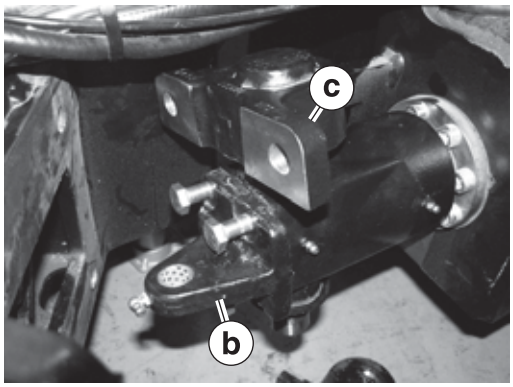
3. Remove the screws that secure each of the pillow blocks **(c)** to the frame.
4. Rotate/spread the machine halves as needed to better access the articulating joint.
5. Remove the screws that secure the pivot plate **(b)** and remove the pivot plate.



wc_gr004502

6. Remove the pillow blocks **(c)**.

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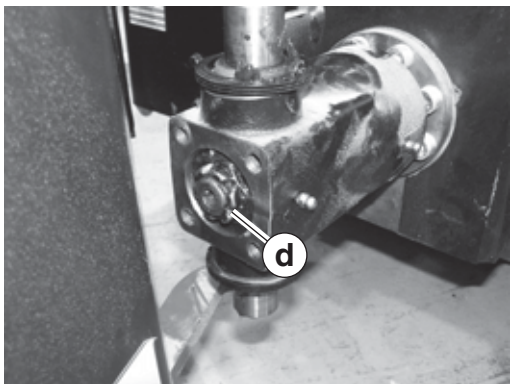
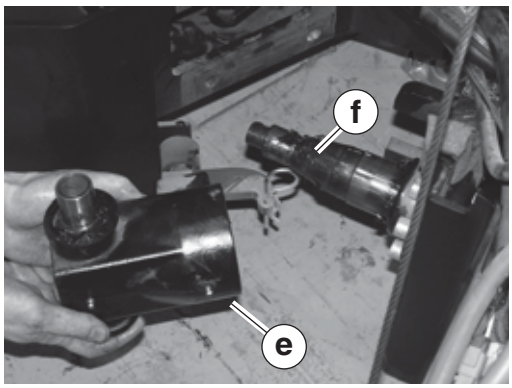
7. Remove the dowel pin and the castle nut **(d)**.



wc_gr004503



wc_gr004504

8. Pull the housing **(e)** from the shaft **(f)**.
9. Remove the screws that secure the shaft **(f)** to the front frame and remove the shaft.

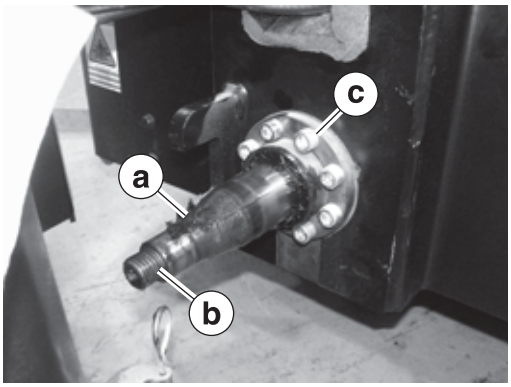
The procedure to remove the articulating joint is now complete.

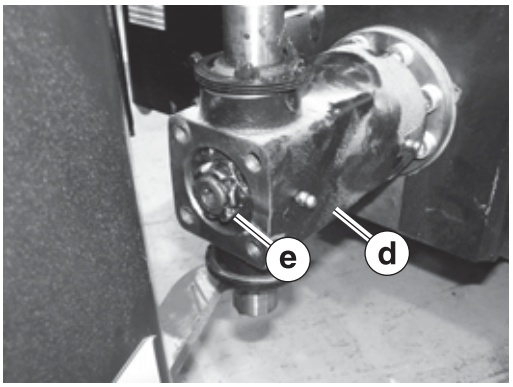
8.5 Installing the Articulating Joint

Prerequisites Crane and jacks

Procedure Follow the procedure below to remove the articulating joint.

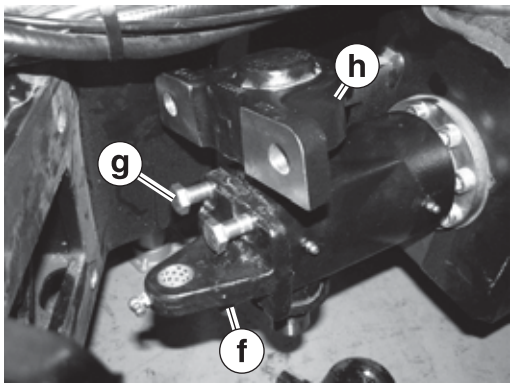
1. Support the rear half of the machine with jacks and the front half with an appropriate crane.
2. Align the shaft **(a)** so that the dowel hole **(b)** is parallel to the ground. Apply Loctite 243 to the screws **(c)** and secure the shaft to the frame.





wc_gr004505

3. Slide the housing **(d)** onto the shaft. Secure the housing with the castle nut **(e)** and the dowel pin.
4. Apply Loctite 243 to the screws **(g)** and secure the pivot plate **(f)** to the housing.



wc_gr004506

5. Add the pillow blocks **(h)** to the housing.

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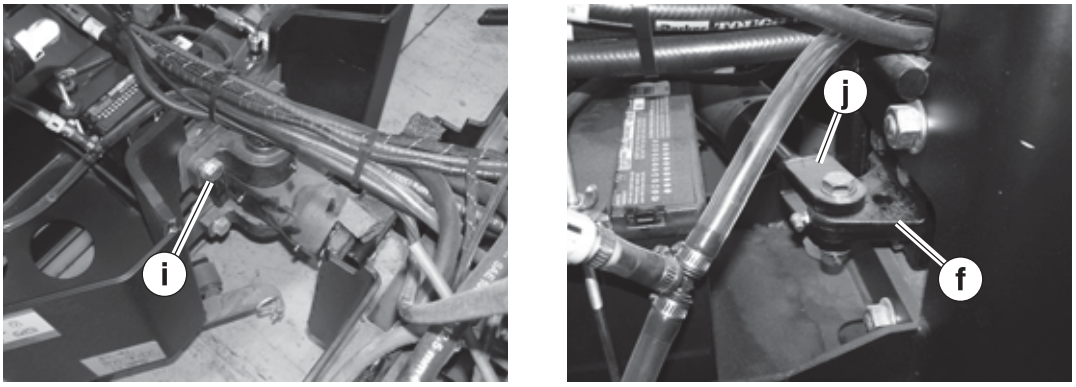
6. Apply Loctite 243 to the screws **(i)** and secure the pillow blocks to the frame.



wc_gr004507

7. Connect the steering cylinder **(j)** to the pivot plate **(f)**.

The procedure to install the articulating joint is now complete.

8.6 Removing Either Drum

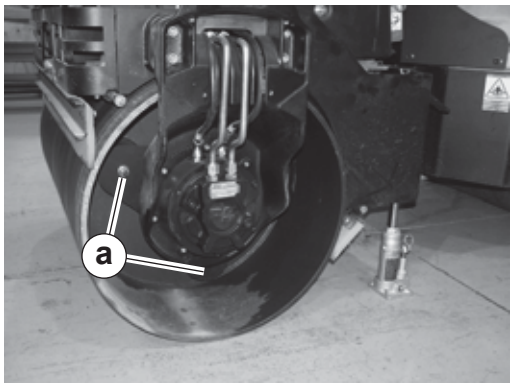
Prerequisites

- Crane and appropriate sling
- Jacks

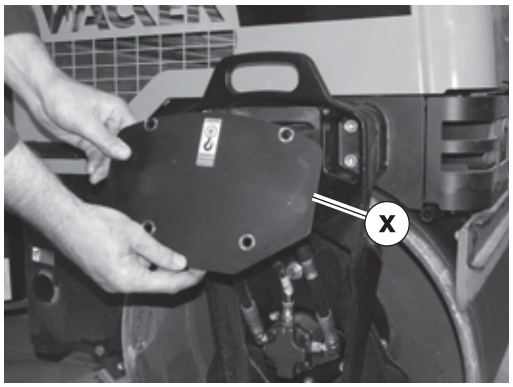
Procedure

Follow the procedure below to remove either drum.

1. Park the roller so that all three screws **(a)** that secure the drum to the drum supports are accessible.
2. Support the front half of the machine with jacks.

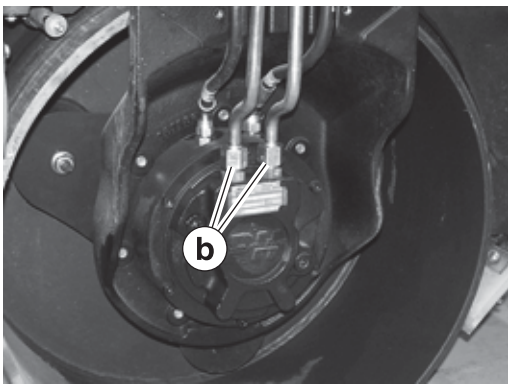


wc_gr004508

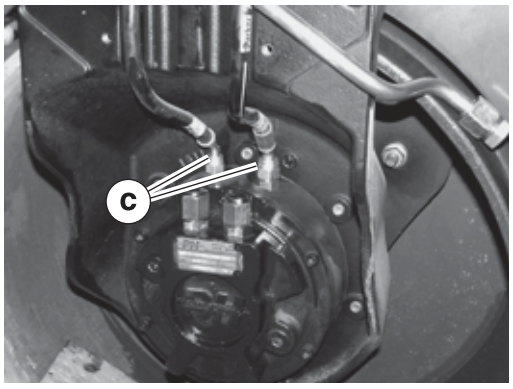


wc_gr004520

3. Remove the protective guard **(x)** from each side of the machine.
4. Disconnect and plug the hydraulic lines **(b)** from the drive motor.



wc_gr004509



wc_gr004510

5. Disconnect and plug the hydraulic hoses **(c)** from the drive motor.

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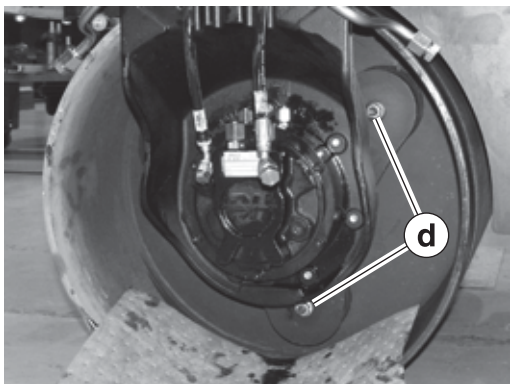
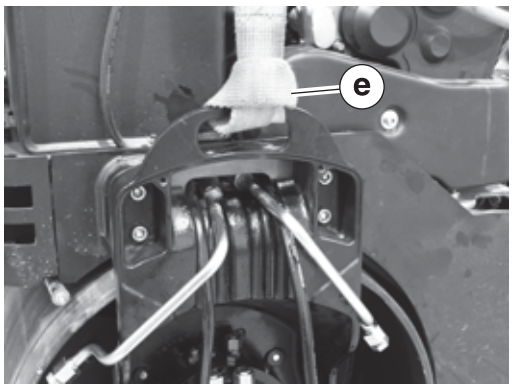
6. Remove the screws **(d)** that secure the drive plate to the drum.

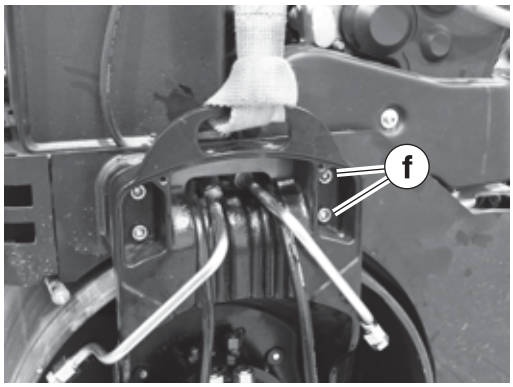


wc_gr004511

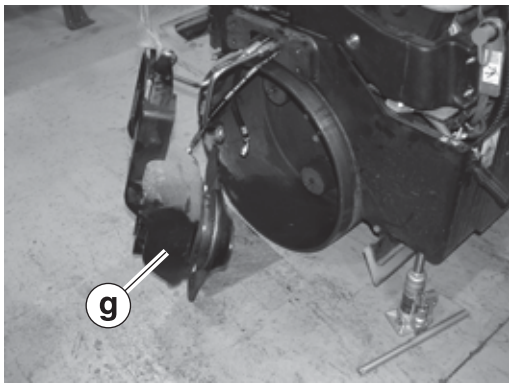


wc_gr004512

7. Secure the drum support with an appropriate sling **(e)** and crane.
8. Remove the screws **(f)** that secure the drum support to the machine.

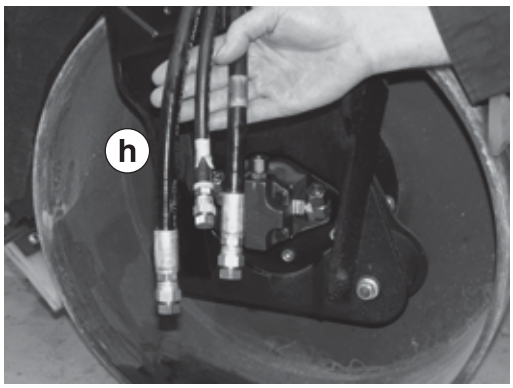


wc_gr004513

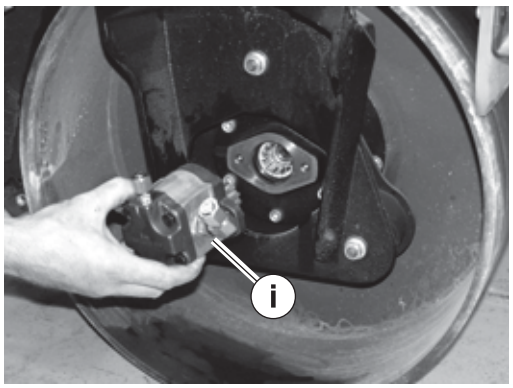


wc_gr004514

9. Lift the drum support **(g)** and drive motor from the machine.
10. Disconnect and plug the hydraulic lines **(h)** from the exciter motor. Then, remove the exciter motor **(i)**.



wc_gr004515



wc_gr004516

11. Secure the drum support with an appropriate sling and crane.

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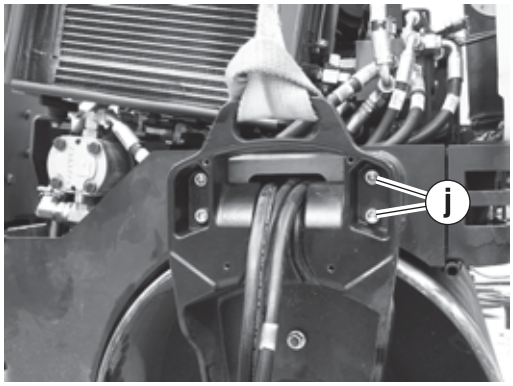
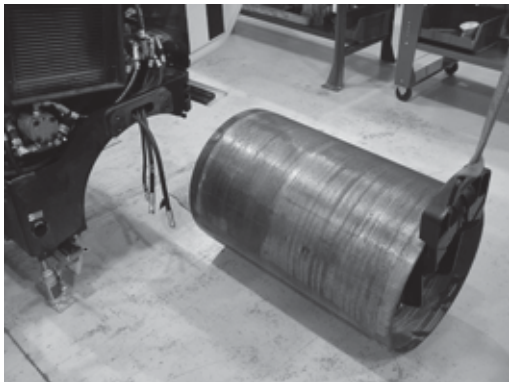
12.Remove the screws **(j)** that secure the drum support to the machine and pull the drum from the machine.



wc_gr004517



wc_gr004518

The procedure to remove either drum is now complete.

8.7 Installing Either Drum

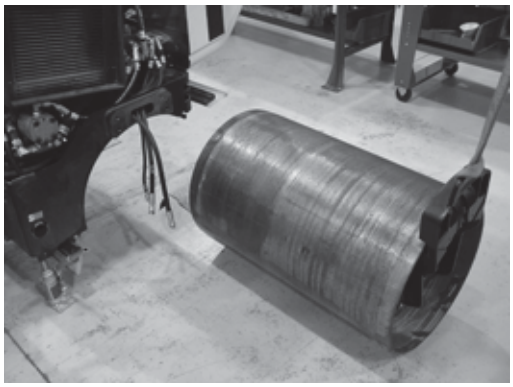
Prerequisites

- Crane and appropriate sling
- Jacks

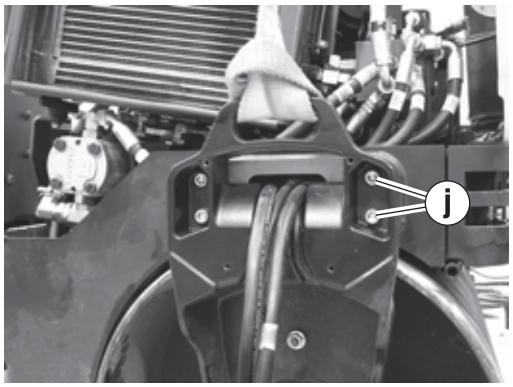
Procedure

Follow the procedure below to install either drum.

1. Position the drum underneath the frame.

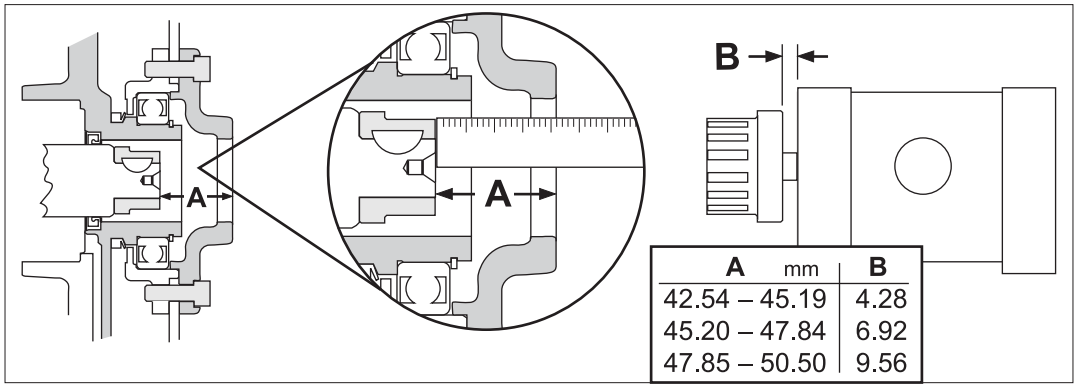


wc_gr004518



wc_gr004517

2. Apply Loctite 243 or equivalent to screws **(j)** and secure the drum support to the machine. Torque the screws to 79 Nm (58 ft.lbs.).
3. Measure the distance (A) from the end of the exciter shaft to the face of the motor mounting flange.



A mm	B
42.54 – 45.19	4.28
45.20 – 47.84	6.92
47.85 – 50.50	9.56

wc_gr005412

4. Adjust the distance (B) of coupler per the chart. Torque set screws to 4 Nm (3 ft.lbs.)

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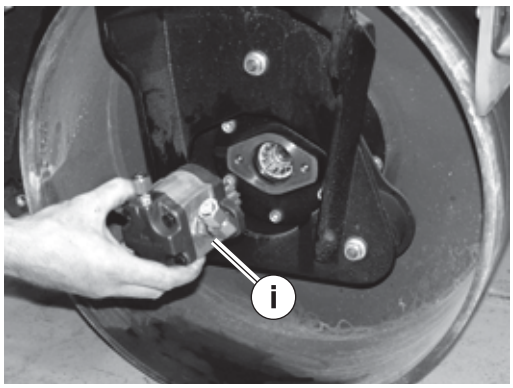
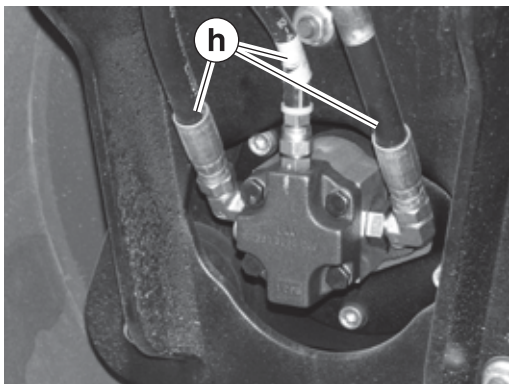
5. Install the exciter motor **(i)**. Torque the screws to 44 Nm (32 ft.lbs.).

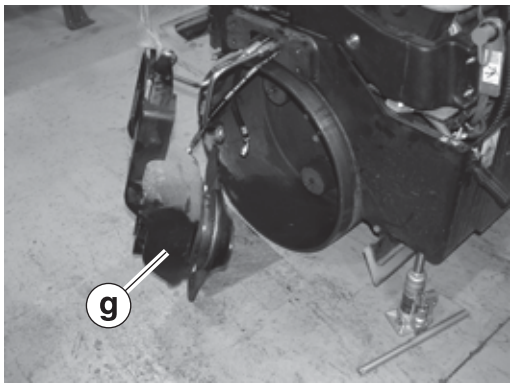


wc_gr004516

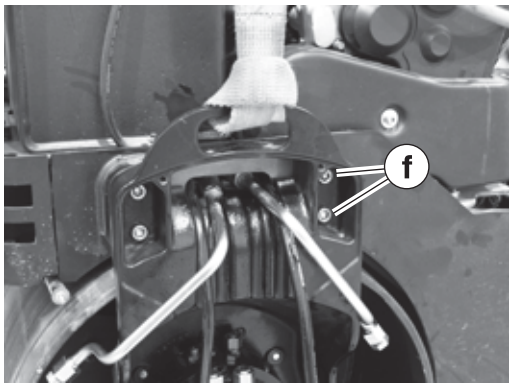


wc_gr004519

6. Reconnect the hydraulic hoses **(h)** to the exciter motor.
7. Position the drum support **(g)** and drive motor into the drum.

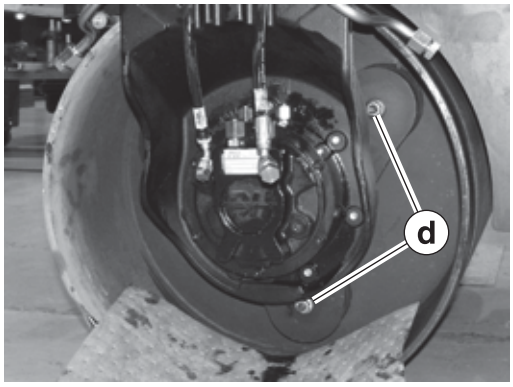


wc_gr004514

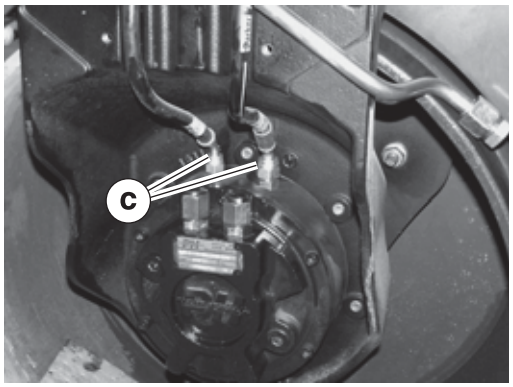


wc_gr004513

8. Apply Loctite 23 or equivalent to the screws **(f)** and secure the drum support to the machine. Torque the screws to 79 Nm (58 ft.lbs.).
9. Secure the drive plate to the drum with nuts **(d)**. Torque the screws to 76 Nm (56 ft.lbs.).



wc_gr004511



wc_gr004510

10. Reconnect the hydraulic hoses **(c)** to the drive motor.

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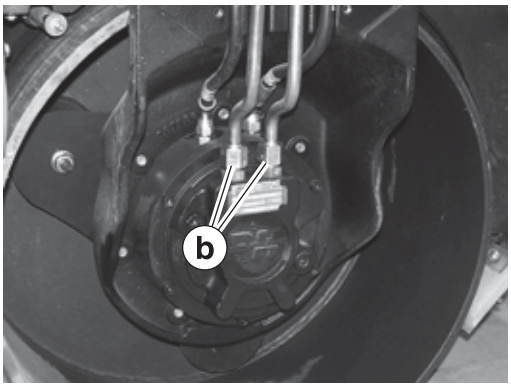
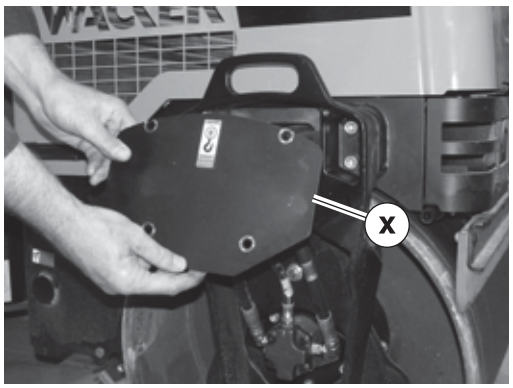
11.Reconnect the hydraulic lines **(b)** to the drive motor.



wc_gr004509



wc_gr004520

12.Re-install the guard plates **(x)**.

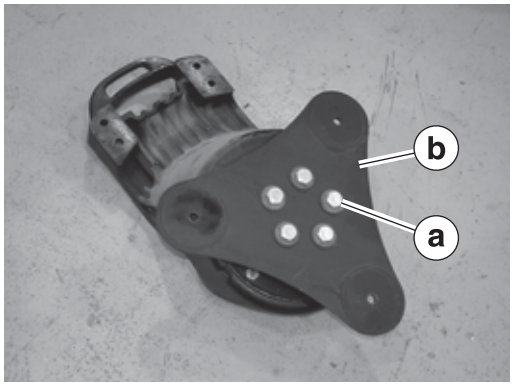
The procedure to install either drum is now complete.

8.8 Removing a Drive Motor

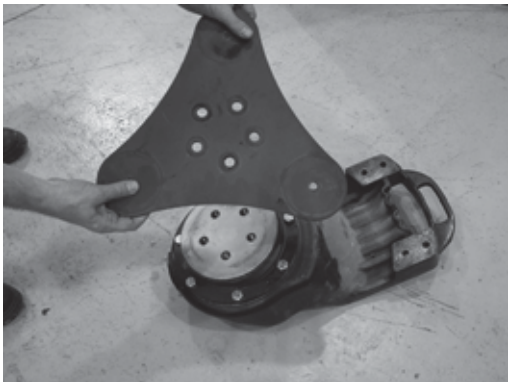
Prerequisites Front drum removed

Procedure Follow the procedure below to remove the front drive motor.

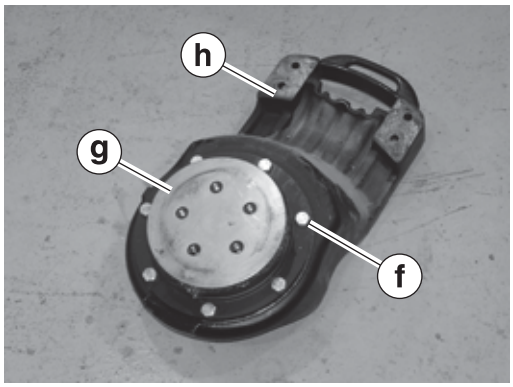
1. Remove the front drum. See section *Removing Either Drum.*
2. Remove the screws **(a)** that secure the drive plate **(b)** to the motor.



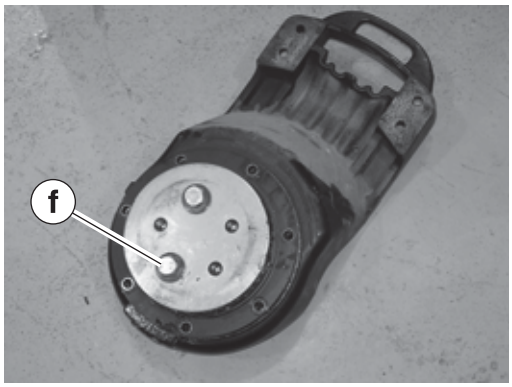
wc_gr004521


wc_gr004522

3. Remove the drive plate.
4. Remove the screws **(f)** that secure the drive motor **(g)** to the drum support **(h).**

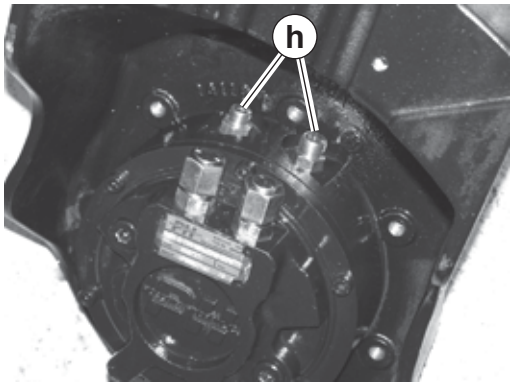


wc_gr004523

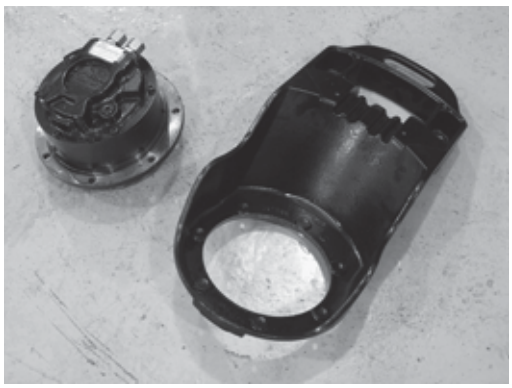


wc_gr004524

5. Re-install two of the screws to secure the dust cover.
6. Remove the two fittings **(h)** and slide the drive motor from the drum support.



wc_gr004525


wc_gr004526

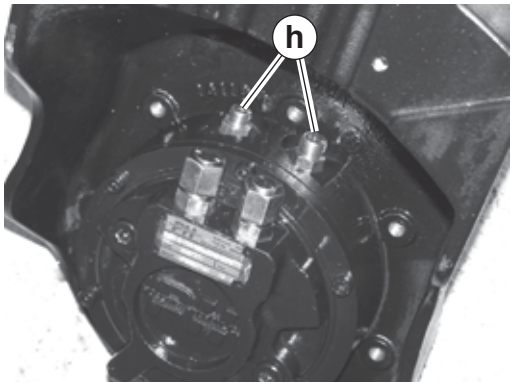
The procedure to remove the front drive motor is now complete.

8.9 Installing a Drive Motor

Prerequisites Drum removed

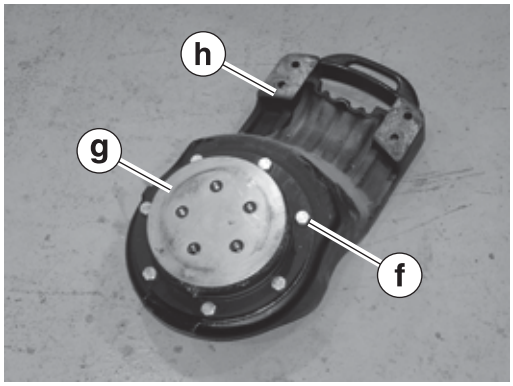
Procedure Follow the procedure below to install a drive motor.

1. Position the drive motor into the drum support.

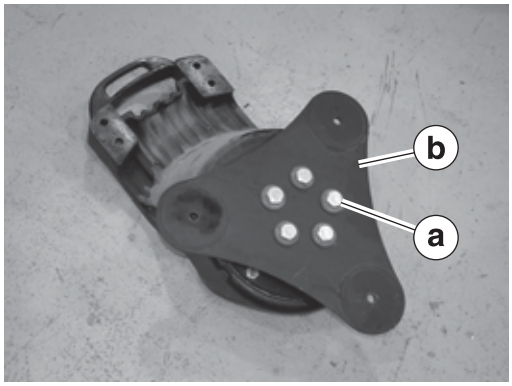


wc_gr004525

2. Install the two fittings **(h)**.
3. Apply Loctite 243 to the screws **(f)** and secure the drive motor **(g)** to the drum support **(h). Torque the screws to 76 Nm (56 ft.lbs.).**



wc_gr004523



wc_gr004521

4. Apply Loctite 243 or equivalent to the screws **(a)** and secure the drive plate **(b)** to the drive motor. Torque the screws to 76 Nm (56 ft.lbs.).
5. Re-install the drum. See section *Installing Either Drum*.

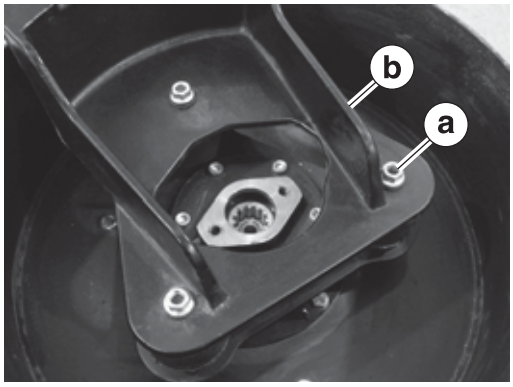
The procedure to install a drive motor is now complete.

8.10 Removing the Exciter

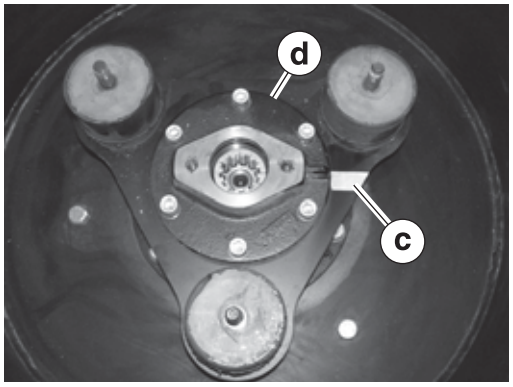
Prerequisites Drum removed

Procedure Follow the procedure below to remove the exciter.

1. Remove the screws **(a)** that secure the drum support **(b)** to the shock mounts and remove the drum support.

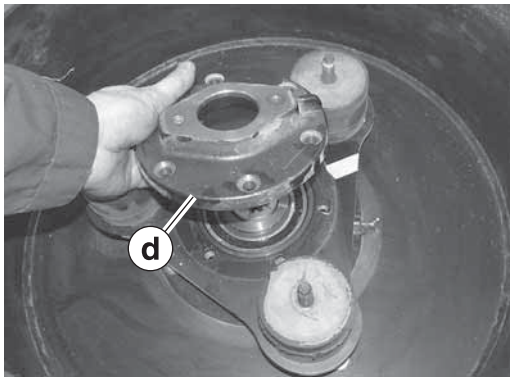


wc_gr004527

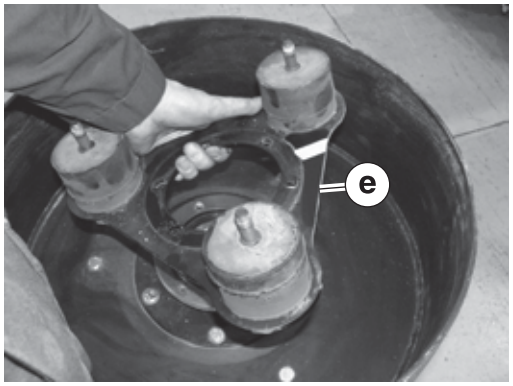


wc_gr004528

2. Mark **(c)** the position of the motor mount **(d)**.
3. Remove the motor mount **(d)**.



wc_gr004529



wc_gr004530

4. Remove the shock mount plate **(e)**.

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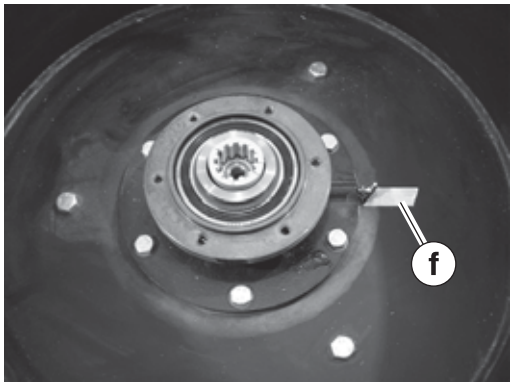
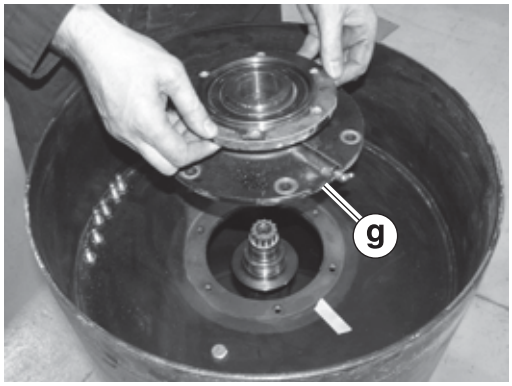
5. Mark the position **(f)** of the bearing housing.

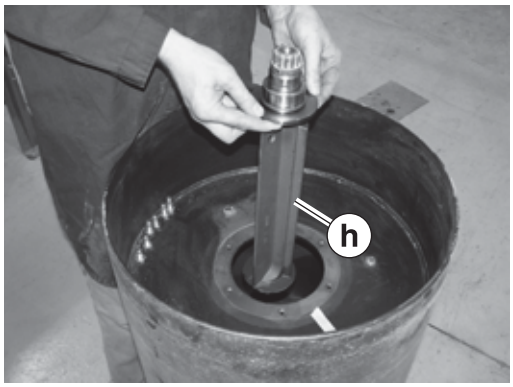


wc_gr004531



wc_gr004532

6. Remove the bearing housing **(g)**.
7. Pull the exciter **(h)** up and out of the drum.



wc_gr004533

The procedure to remove the exciter is now complete.

8.11 Installing the Exciter

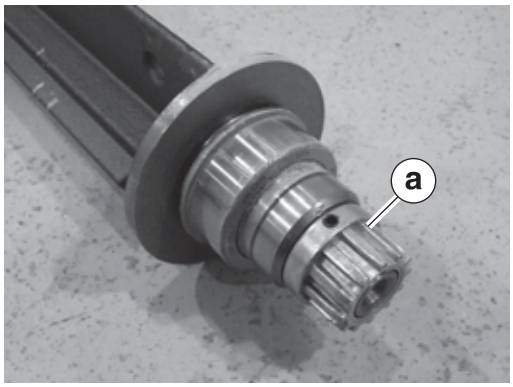
Prerequisites

- Front drum removed
- Drive-motor-side exciter bearing installed

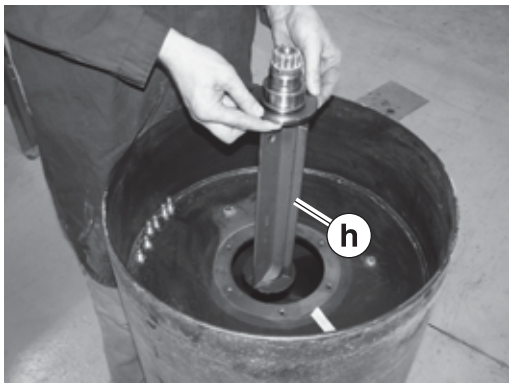
Procedure

Follow the procedure below to install the exciter.

1. Install the key and the gear **(a)** of the exciter motor coupling onto the exciter. Secure the gear to the exciter with the set screw.

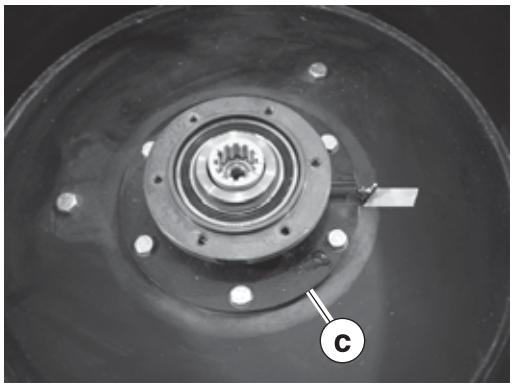


wc_gr004535



wc_gr004533

2. Slide the exciter **(h)** through the drum and into the drive-motor-side bearing race.
3. Temporarily install the exciter-side drum hub **(c)** onto the drum using three the screws.



wc_gr004536

This procedure continues on the next page.

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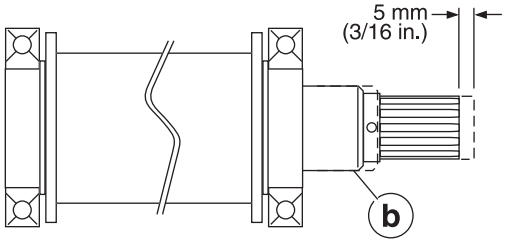
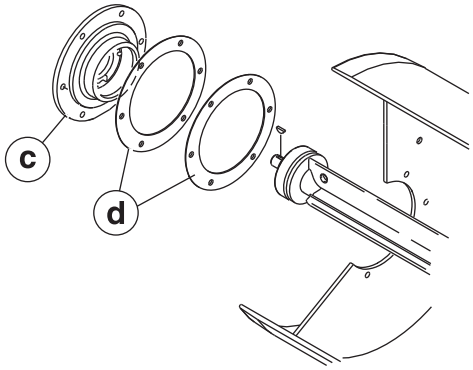
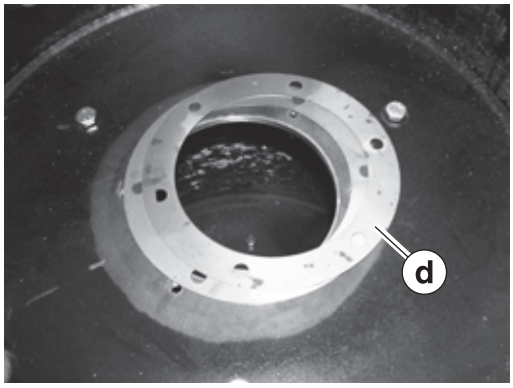
4. Check the exciter for end-play. To do so, grab the exciter **(b)** with a needle-nosed pliers and pull and push it back and forth inside the drum. There needs to be 5±1 mm (3/16±1/16 in.) of end-play for correct performance. If the correct amount of end-play is not found, remove the drum hub and install shims **(d)** as needed to obtain the correct amount of end-play. Then, using Loctite 243 on the six screws, secure the drum hub to the drum. Torque the screws to 49 Nm (36 ft.lbs.).

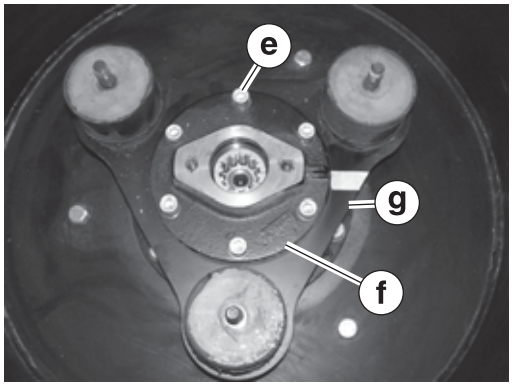




wc_gr004538



wc_gr004537



wc_gr004539

5. Using Loctite 243 on the six screws **(e)**, secure the bearing cover **(f)** and the shock mount plate **(g)** to the drum support. Torque the screws to 50 Nm (36 ft.lbs.).

The procedure to install the exciter is now complete.

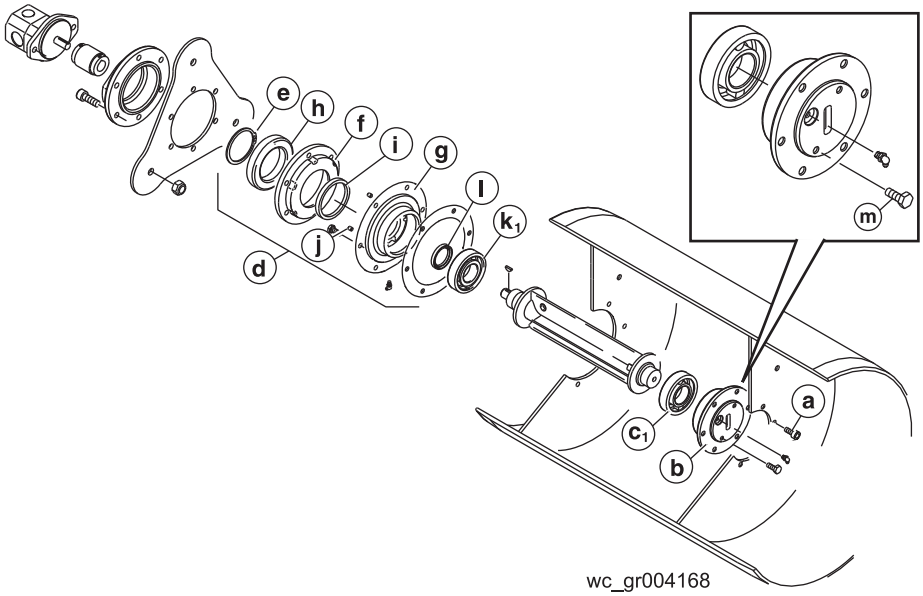
8.12 Disassembling the Exciter Bearings

Prerequisites

- Front drum removed
- Puller

Background

On the exciter side of the drum, two bearings and their flanges make up the drum hub **(d)**.

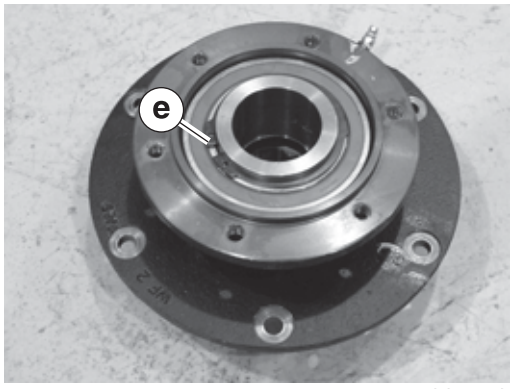


wc_gr004168

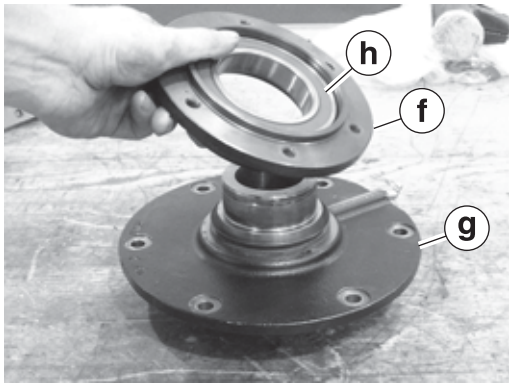
Procedure

Follow the procedure below to disassemble the exciter bearings.

1. Remove the retaining ring **(e).**



wc_gr004540



wc_gr004541

2. Use a puller to pull the smaller bearing flange **(f)** and bearing **(h)** from the shaft of the larger bearing flange **(g)**. Then, use a press to press out the bearing **(h)** from the smaller bearing flange.

This procedure continues on the next page.

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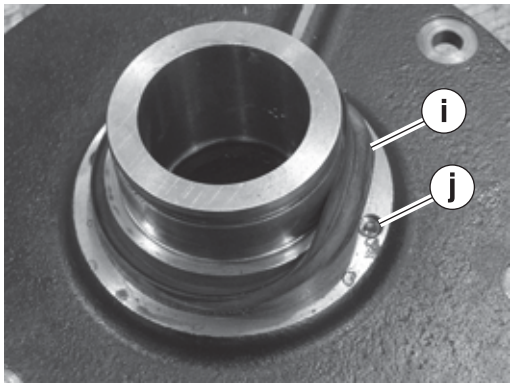
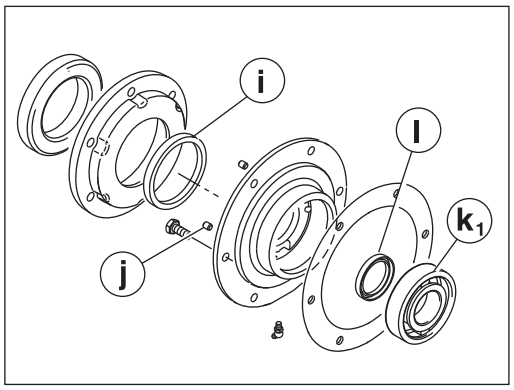
3. On the larger bearing flange, remove the outer seal **(i)** and use the two set screws **(j)** to push the outer bearing race **(k1)** from the larger bearing flange.



wc_gr004542



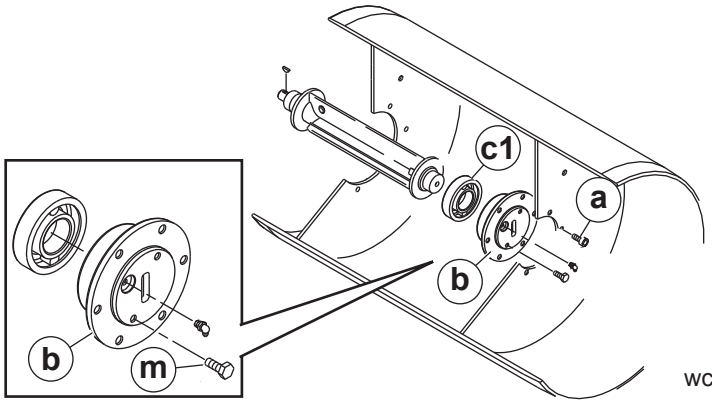
wc_gr004543

4. Remove the inner seal **(l)** if necessary.

Note: *In order to remove the drive-motor-side exciter bearing, the drive motor and the left-side drum support must be removed. See section Removing a Drive Motor.*

5. Remove the six screws **(a)** which secure the drive-motor-side bearing flange **(b)** and remove the bearing flange.

Note: *The drive-motor-side bearing flange is removed from inside the drum.*



wc_gr004171

6. Remove the two screws **(m)** from the drive-motor-side bearing flange **(b)**. In their place, insert two M8 pusher screws. Use the pusher screws to push the outer bearing race **(c1)** from the drive-motor-side bearing flange **(b)**.

This procedure continues on the next page.

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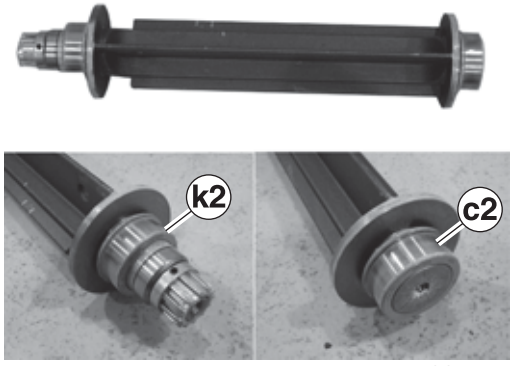
7. Use a puller to remove the inner bearing races **(c2** and **k2)** from the exciter.



wc_gr004544

The procedure to disassemble the exciter bearings is now complete.

8.13 Assembling the Exciter Bearings

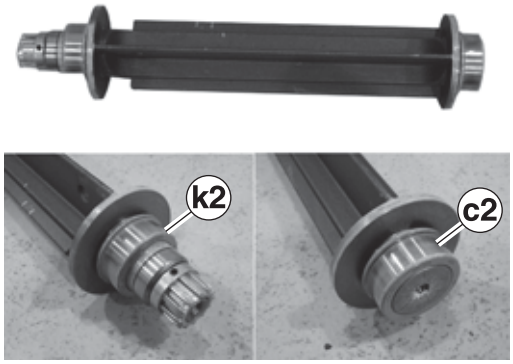
Prerequisites

- Front drum removed
- Loctite® 609 or equivalent

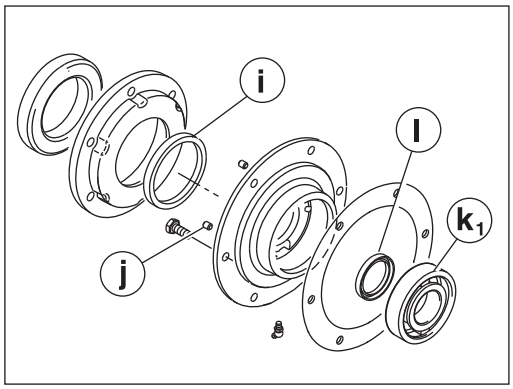
Procedure

Follow the procedure below to assemble the exciter bearings.

1. Press new inner bearing races **(c_2** and **k_2)** onto the exciter.

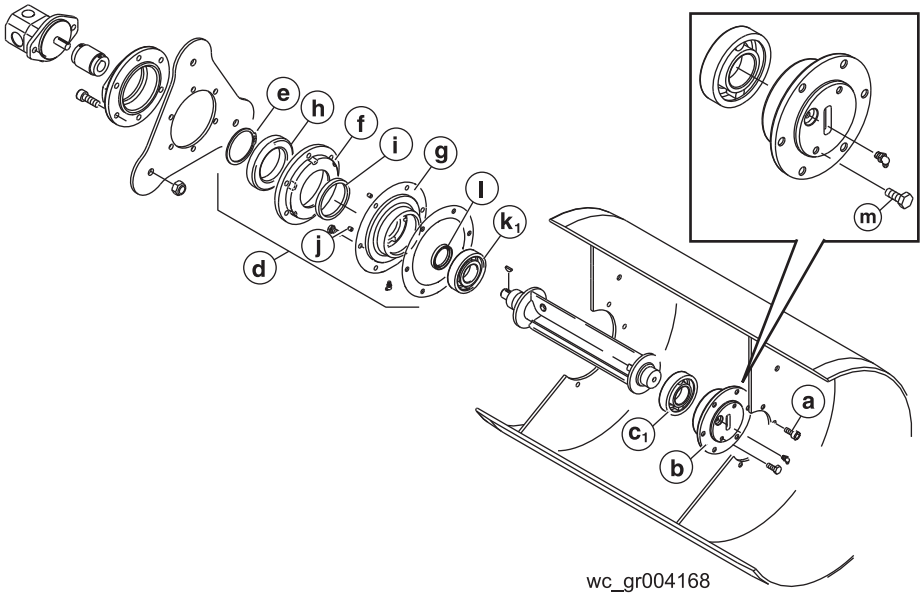


wc_gr004544



wc_gr004543

2. Apply a coat of Loctite 609 or equivalent to the outer bearing race **(c_1)**. Then, press the outer bearing race into the drive-motor-side bearing flange **(b)**.



wc_gr004168

3. Using Loctite 234 on the six screws **(a)**, secure the drive-motor-side bearing flange to the drum. Torque the screws to 49 Nm (36 ft.lbs.).

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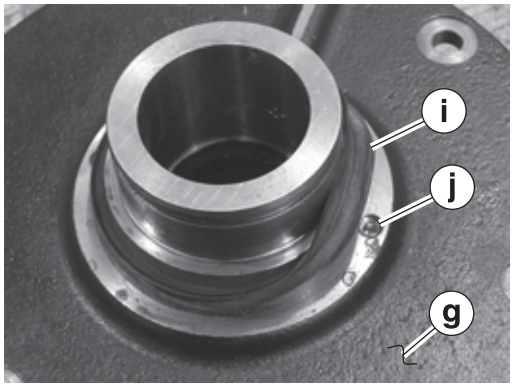
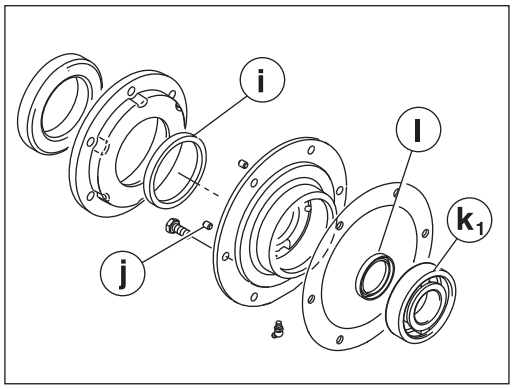
4. Be sure the set the screws **(j)** are recessed on the larger bearing flange **(g)**. Install a new inner seal **(I)**.
5. Apply a coat of Loctite 609 or equivalent to the outer bearing race **(k_1)**. Then, press the outer bearing race into the larger bearing flange.

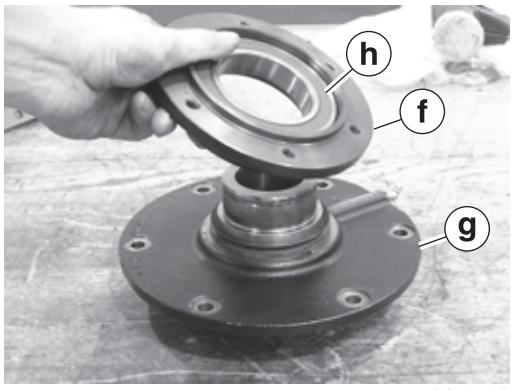


wc_gr004545

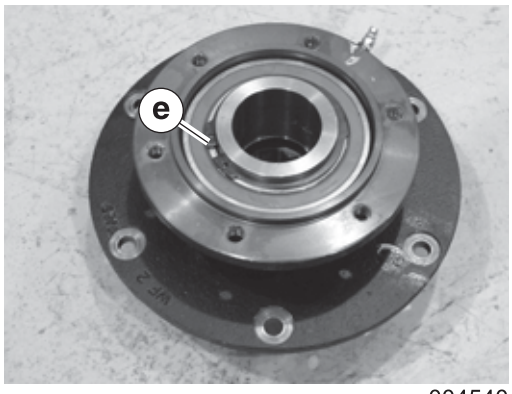


wc_gr004543

6. Install a new outer seal **(i)** on the shaft of the larger bearing flange.
7. Press the bearing **(h)** into the smaller bearing flange **(f)**.



wc_gr004541



wc_gr004540

8. Press the two bearing flanges together to create the drum hub.
9. Install the retaining ring **(e)**.
10. Lubricate the exciter bearings with wheel bearing grease Mobil XHP222 or equivalent.

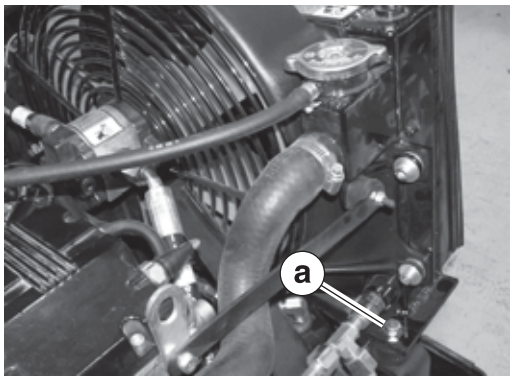
The procedure to assemble the exciter bearings is now complete.

8.14 Removing the Cooling Fan

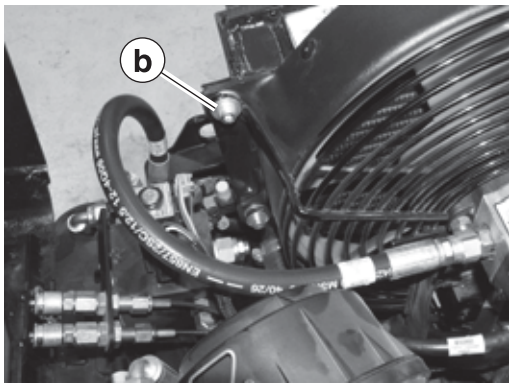
Prerequisites Engine shut down and cool

Procedure Follow the procedure below to remove the cooling fan.

1. Remove the screw **(a)** that secures the cooler to the machine. This will allow some movement of the cooler and access to other components.

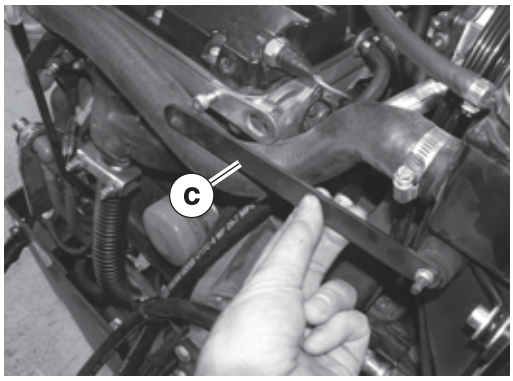


wc_gr004434

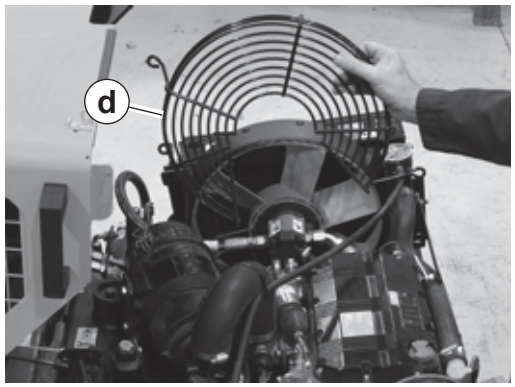


wc_gr004435

2. Remove the screws **(b)** that secure the fan guard to the cooler.
3. Remove the screw that secures the stiffener **(c)** to the engine. Allow the stiffener to remain attached to the cooler.



wc_gr004436



wc_gr004437

4. Maneuver the fan guard **(d)** out and away from the machine.

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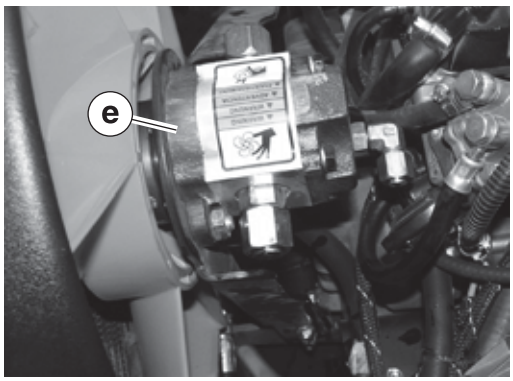
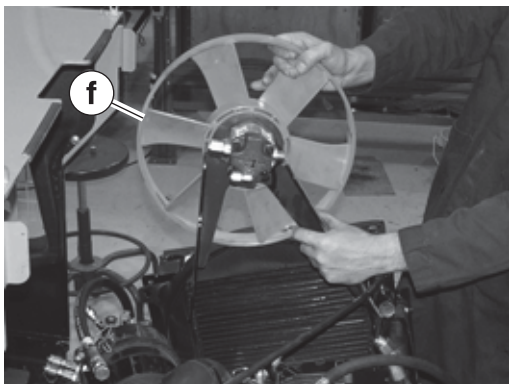
5. Remove the hoses from the fan motor **(e)**.

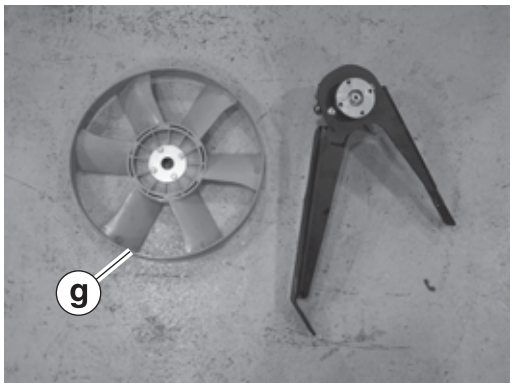


wc_gr004438

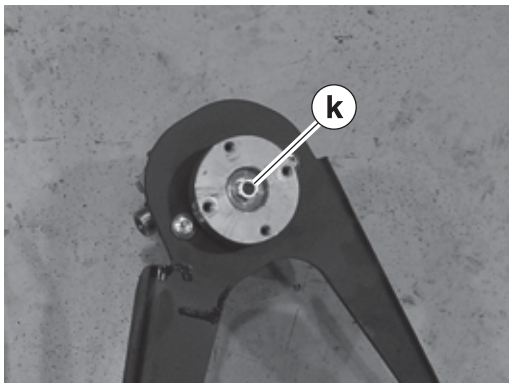


wc_gr004439

6. Remove the screws that secure the fan motor bracket and remove the fan motor bracket assembly **(f)** from the machine.
7. Remove the fan **(g)** from the fan motor.

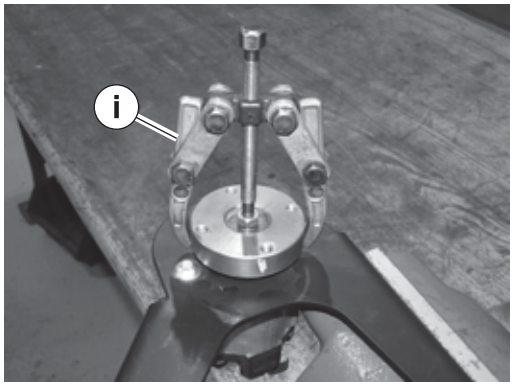


wc_gr004440

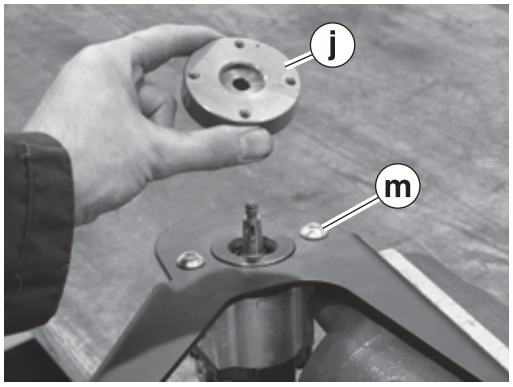


wc_gr004547

8. Loosen the screw **(k)** that secures the hub to the fan motor.
9. Loosen the hub from the fan motor using a puller **(i)**. When loose, remove the nut and remove the hub **(j)** from the machine.



wc_gr004441



wc_gr004546

10. Remove the two screws **(m)** and remove the fan motor from the fan motor bracket.

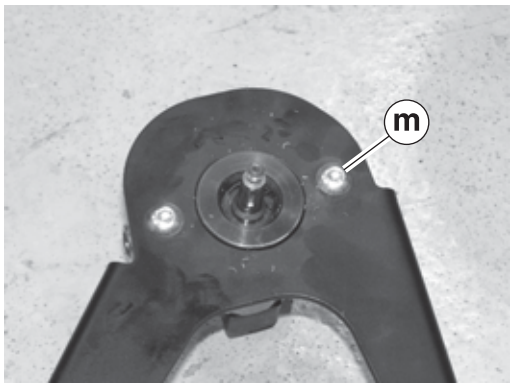
The procedure to remove the cooling fan is now complete.

8.15 Installing the Cooling Fan

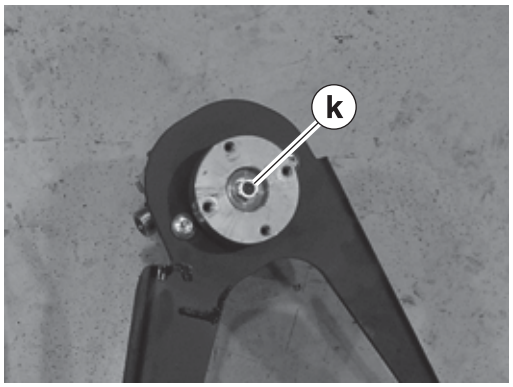
Prerequisites Engine shut down and cool

Procedure Follow the procedure below to install the cooling fan.

1. Install the fan motor to the fan motor bracket using the two screws **(m)**.

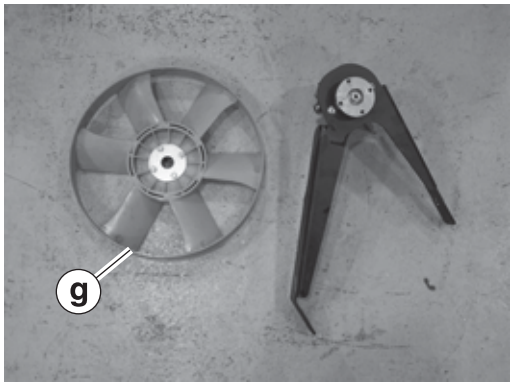


wc_gr004548

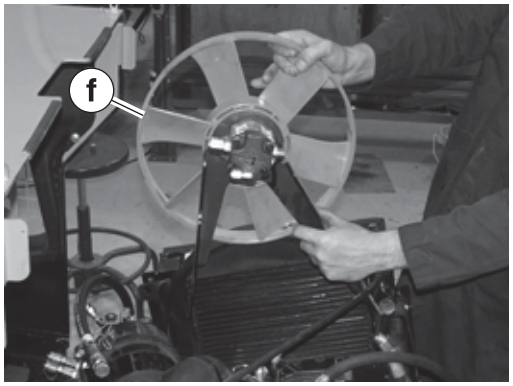


wc_gr004547

2. Install the hub to the fan motor and secure it with screw **(k)**.
3. Install the fan **(g)** to the fan motor.



wc_gr004440



wc_gr004439

4. Install the fan motor bracket assembly **(f)** to the machine.

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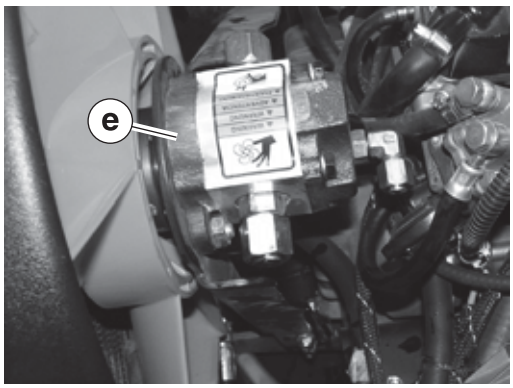
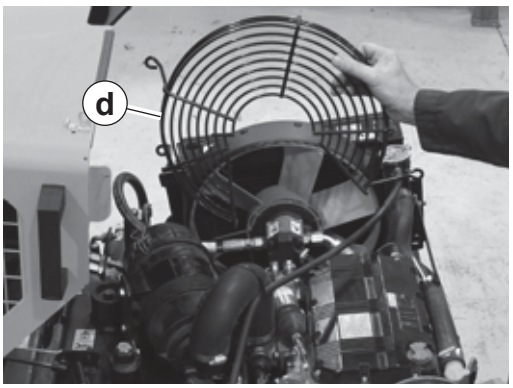
5. Install the hoses to the fan motor **(e)**.

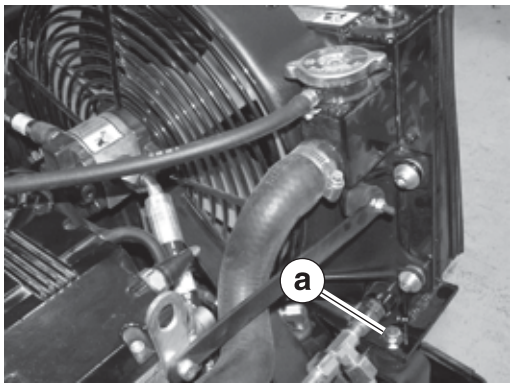


wc_gr004438

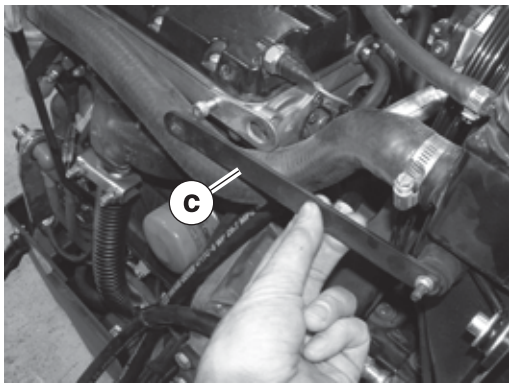


wc_gr004437

6. Install the fan guard **(d)**.
7. Install the screw **(a)** that secures the radiator/oil cooler to the machine.



wc_gr004434



wc_gr004436

8. Install the screw that secures the stiffener **(c)** to the engine.

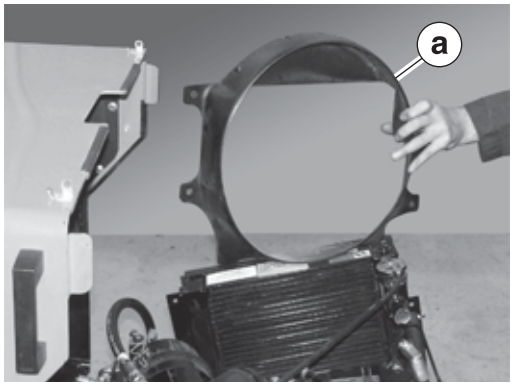
The procedure to install the cooling fan is now complete.

8.16 Removing the Radiator/Oil Cooler

Prerequisites Engine shut down and cool

Procedure Follow the procedure below to remove the radiator/oil cooler.

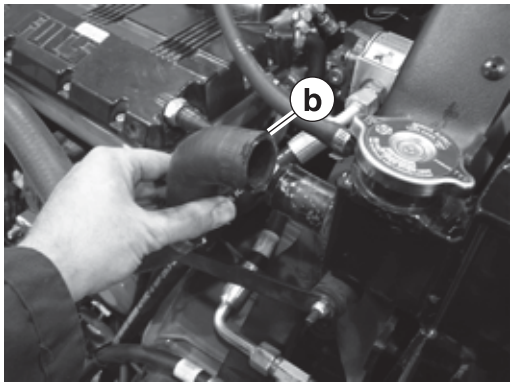
1. Remove the cooling fan. See section *Removing the Cooling Fan*.
2. Remove the shroud **(a)**.



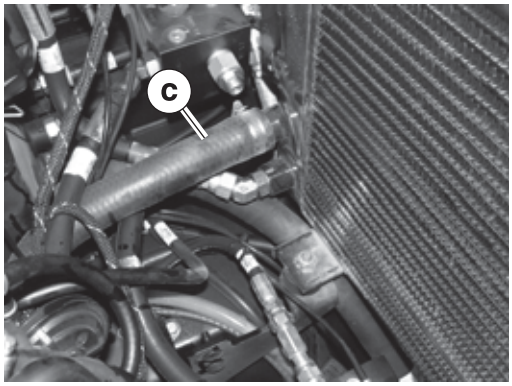
wc_gr004442


wc_gr004443

3. Drain the engine coolant from the radiator.
4. Disconnect the radiator hoses **(b** and **c)**.

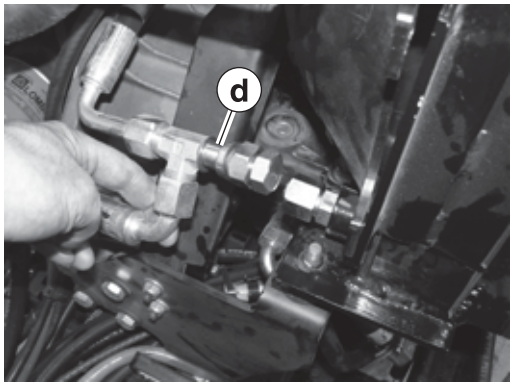


wc_gr004444

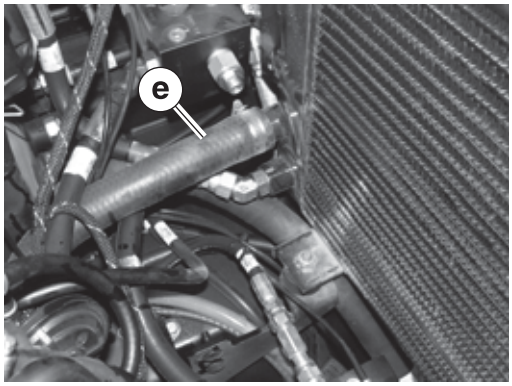


wc_gr004445

5. Disconnect the hydraulic lines from the oil cooler **(d** and **e)**.



wc_gr004446



wc_gr004447

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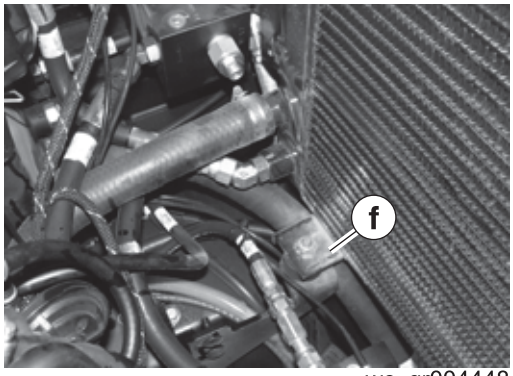
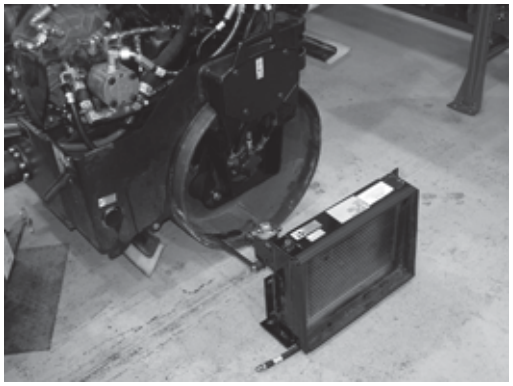
6. Remove the nut **(f)** that secures the radiator/oil cooler and pull the radiator/oil cooler from the machine.



wc_gr004448



wc_gr004449

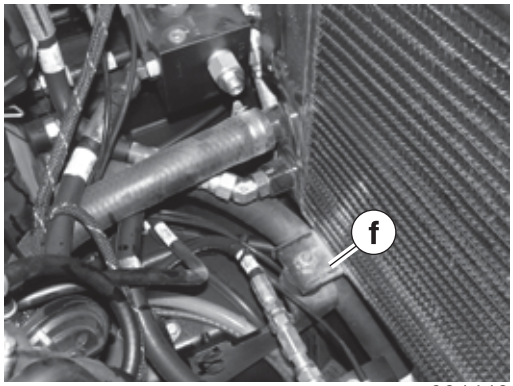
The procedure to remove the radiator/oil cooler is now complete.

8.17 Installing the Radiator/Oil Cooler

Prerequisites Engine coolant

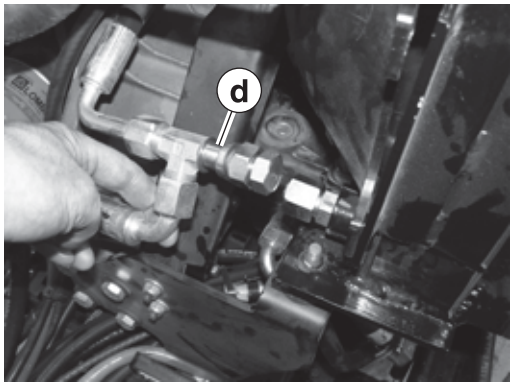
Procedure Follow the procedure below to install the radiator/oil cooler.

1. Position the radiator/oil cooler into the machine. Install but do not tighten nut **(f)**.

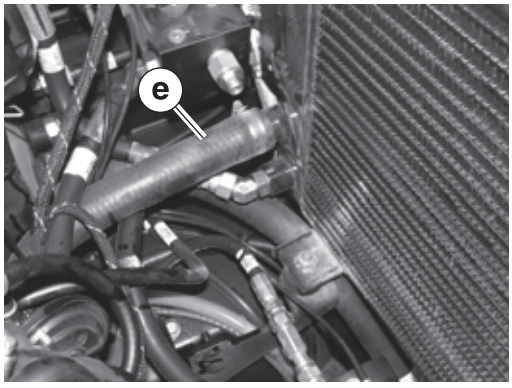


wc_gr004448

2. Connect the hydraulic lines to the oil cooler **(d** and **e)**.

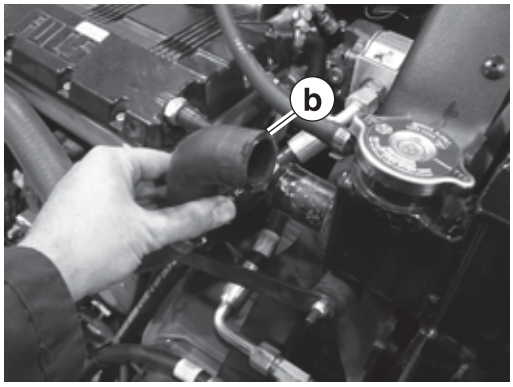


wc_gr004446

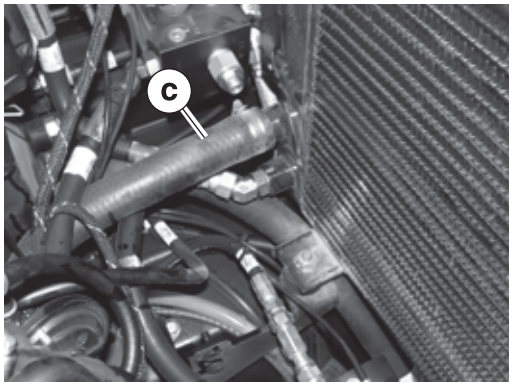


wc_gr004447

3. Connect the radiator hoses **(b** and **c)**.



wc_gr004444



wc_gr004445

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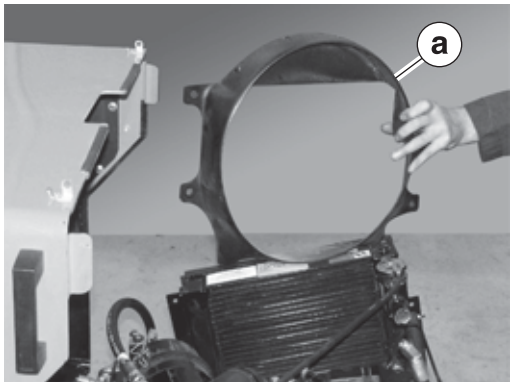
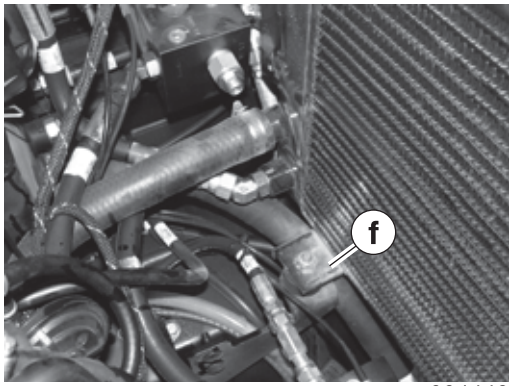
4. Install the shroud **(a)**.



wc_gr004442



wc_gr004448

5. Tighten nut **(f)**.
6. Fill the radiator with engine coolant.

The procedure to install the radiator/oil cooler is now complete.

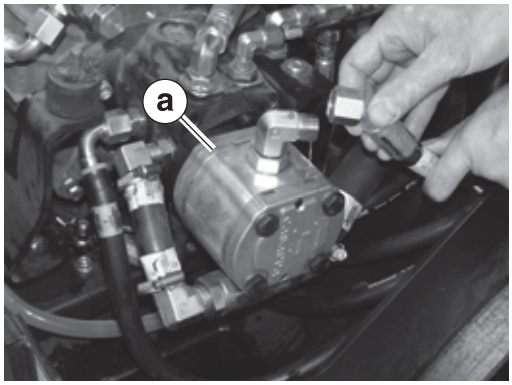
8.18 Removing the Exciter Pump

Prerequisites Cooling fan removed

Procedure Follow the procedure below to remove the exciter pump.

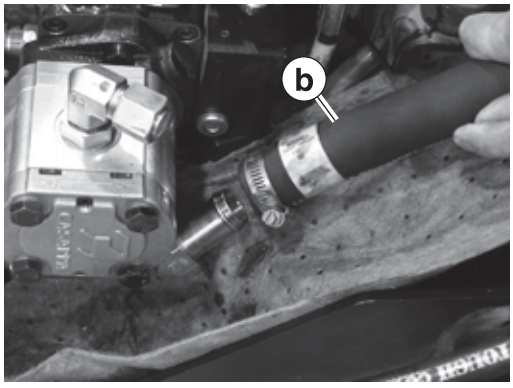
1. Remove the cooling fan. See section *Removing the Cooling Fan*.
2. Remove the radiator/oil cooler. See section *Removing the Radiator/Oil Cooler*.
3. Drain the hydraulic tank.

wc_gr004450



wc_gr004451

4. Remove the hydraulic line from the top of the exciter pump **(a)**.
5. Loosen the hose clamp and remove the suction hose **(b)** from the exciter pump—there will be oil in the suction line; be prepared to catch any that may leak out. Position the suction hose pointing upward immediately after removing it to prevent further leakage.



wc_gr004452

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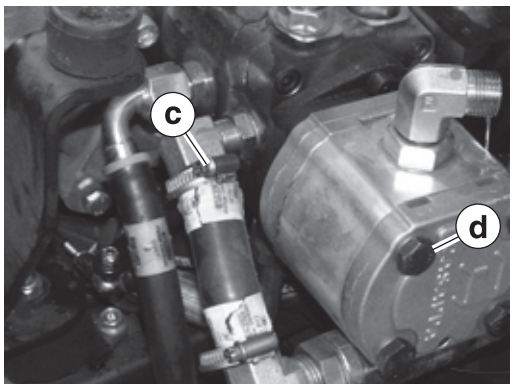
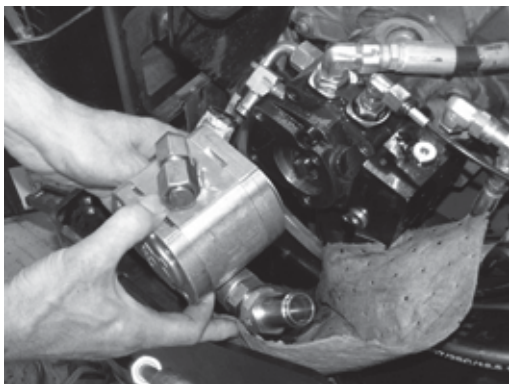
6. Loosen the hose clamp **(c)** from the drive pump.



wc_gr004453



wc_gr004454

7. Remove the four screws **(d)** that secure the exciter pump to the drive pump and pull the exciter pump from the machine.

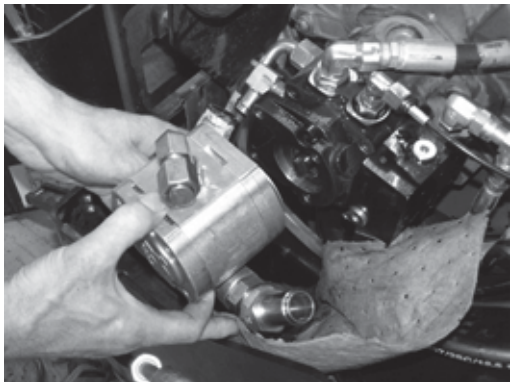
The procedure to remove the exciter pump is now complete.

8.19 Installing the Exciter Pump

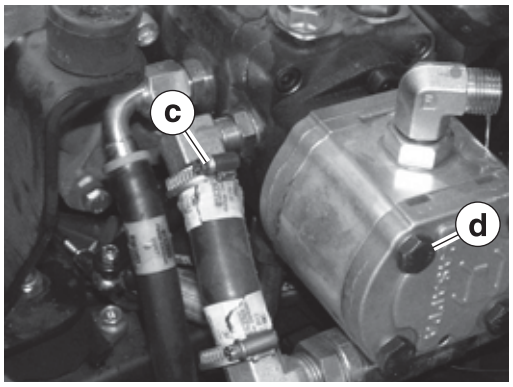
Prerequisites 10W-30 hydraulic oil (see section *Lubrication*)

Procedure Follow the procedure below to install the exciter pump.

1. Position the exciter motor into the machine. Secure it to the drive motor with screws **(d)**.

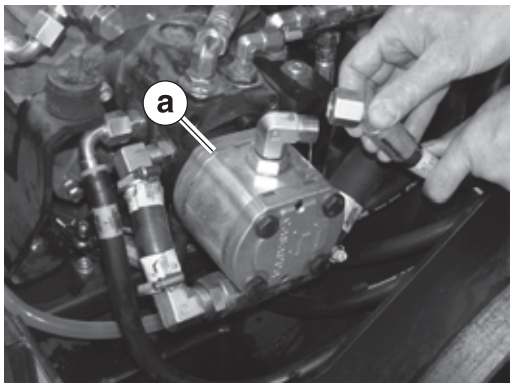


wc_gr004454

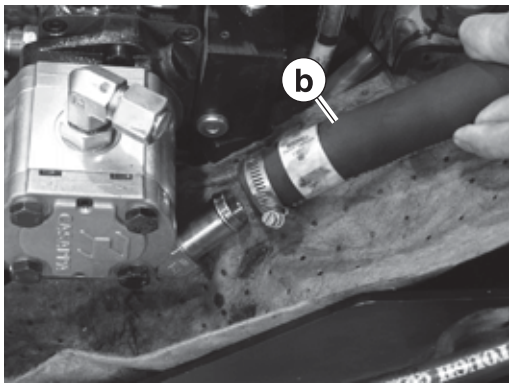


wc_gr004453

2. Connect the hose with hose clamp **(c)**.
3. Install the hydraulic line to the top of the exciter pump **(a)**.



wc_gr004451



wc_gr004452

4. Connect the suction hose **(b)** from the exciter pump.

The procedure to install the exciter pump is now complete.

8.20 Removing the Drive Pump

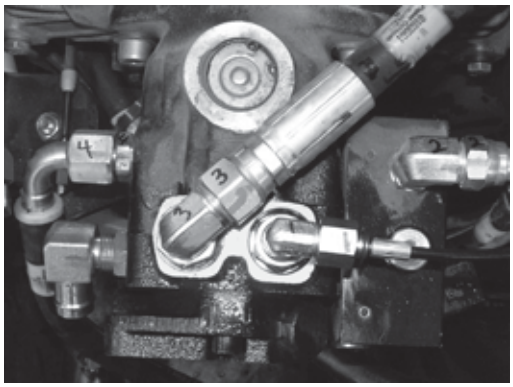
Prerequisites

- Engine shut down and cool
- Ratcheting box wrench with hex key

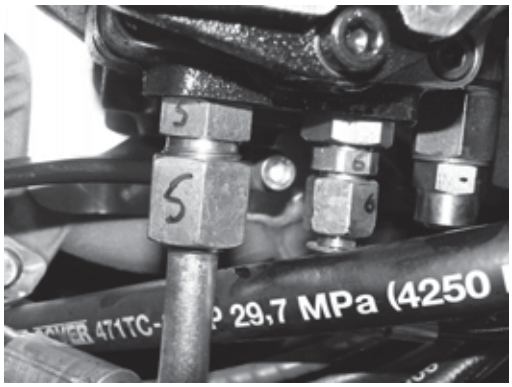
Procedure

Follow the procedure below to remove the drive pump.

1. Remove the exciter pump. See section *Removing the Exciter Pump*.
2. Label all the hydraulic lines connected to the drive pump.

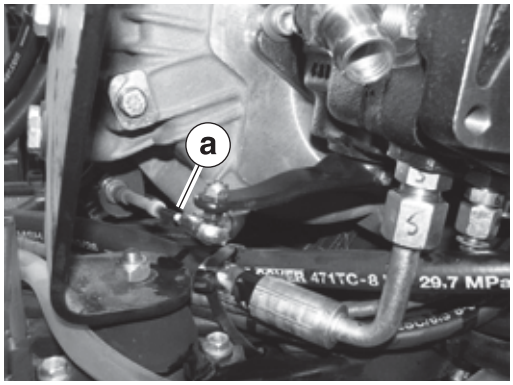


wc_gr004455

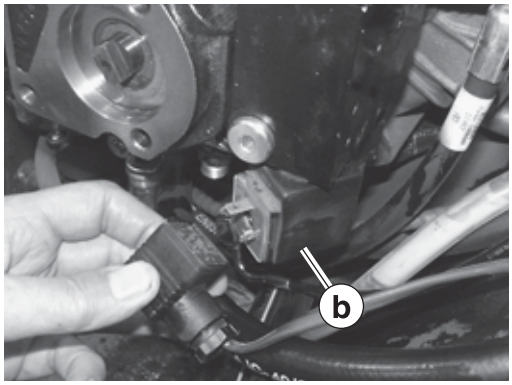


wc_gr004456

3. Remove the hydraulic lines from the drive pump.
4. Disconnect the control cable **(a)**.



wc_gr004457



wc_gr004458

5. Loosen the nut that secures the solenoid **(b)** and rotate the solenoid to gain access to the solenoid wiring connector. Then, remove the solenoid wiring connector.

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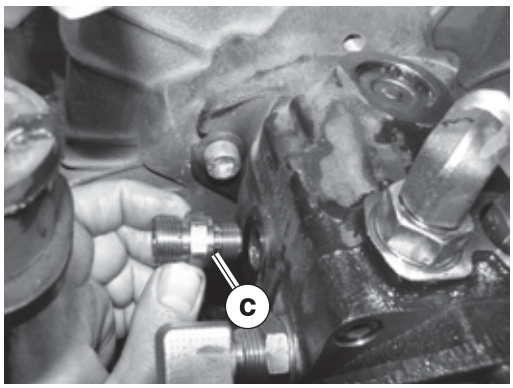
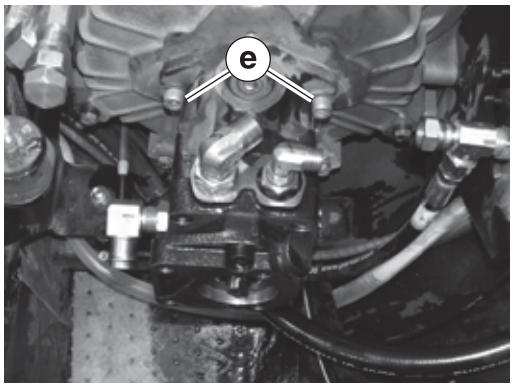
6. Remove the fitting **(c)** from the drive pump for access.

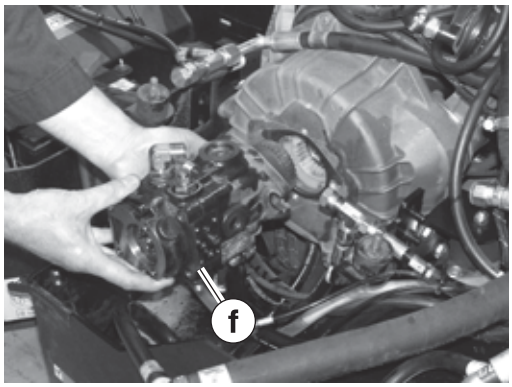


wc_gr004461

7. Remove the two screws **(e)** (with ratcheting box wrench and hex key) that secure the drive pump to the engine and remove the drive pump **(f)**.



wc_gr004460



wc_gr004459

The procedure to remove the drive pump is now complete.

8.21 Installing the Drive Pump

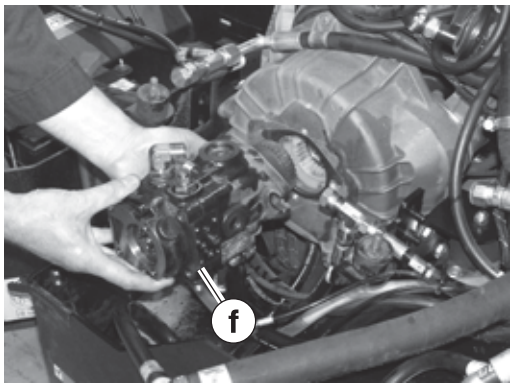
Prerequisites

- Engine shut down and cool
- Ratcheting box wrench with hex key

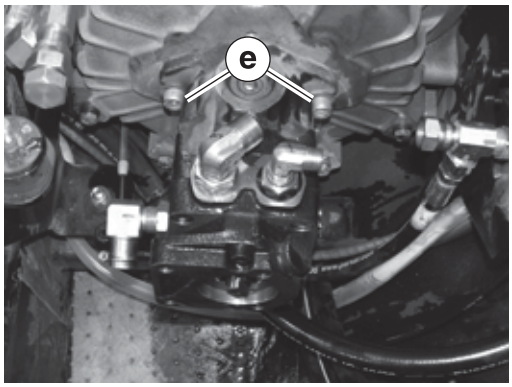
Procedure

Follow the procedure below to install the drive pump.

1. Position the drive pump **(f)** onto the engine and secure it with two screws **(e)**.

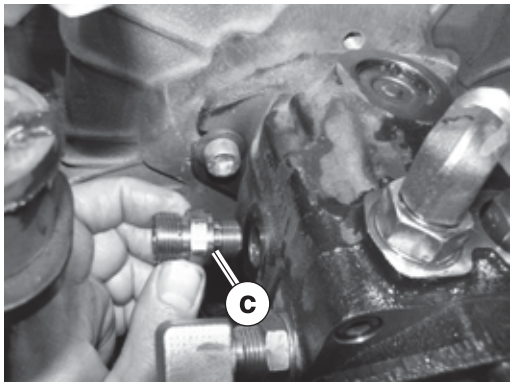


wc_gr004459

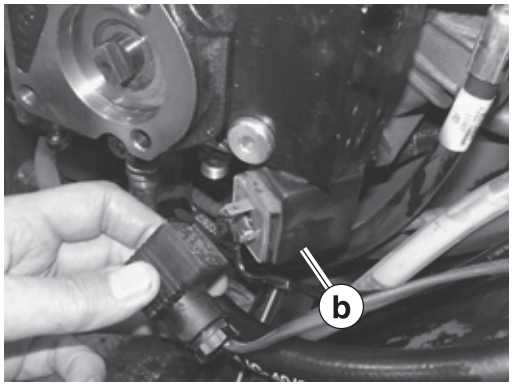


wc_gr004460

2. Install the fitting **(c)**.

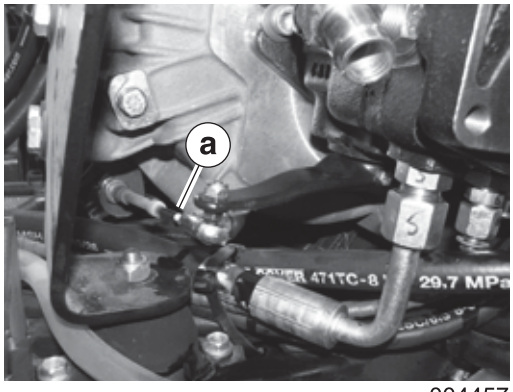


wc_gr004461



wc_gr004458

3. Install the wiring to the solenoid **(b)**.
4. Connect the control cable **(a)**.



wc_gr004457

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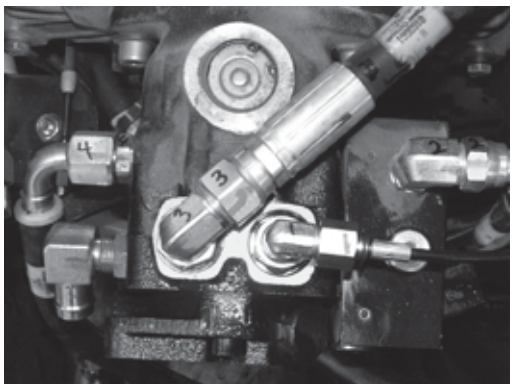
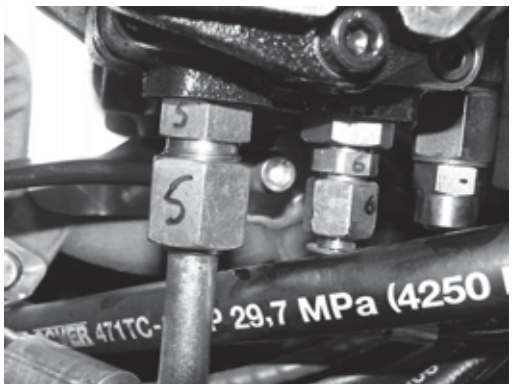
5. Connect the hydraulic lines.



wc_gr004455



wc_gr004456

The procedure to install the drive pump is now complete.

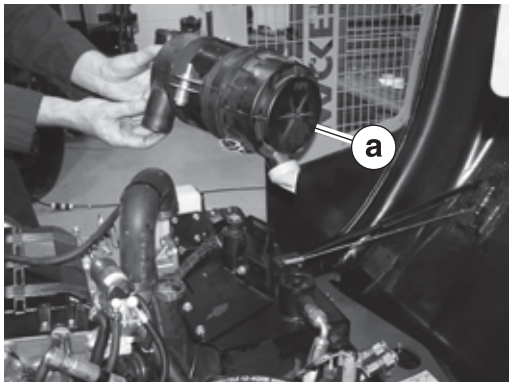
8.22 Removing the Hydraulic Oil Tank

Prerequisites Engine shut down and cool

Procedure Follow the procedure below to remove the hydraulic oil tank.

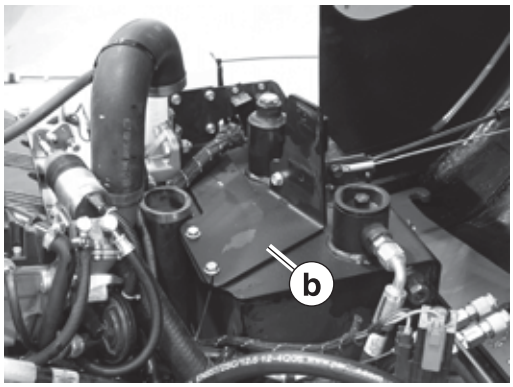
1. Drain the hydraulic oil tank.

wc_gr004450

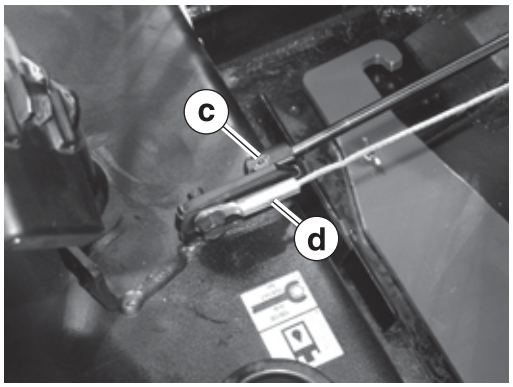


wc_gr004463

2. Remove the air filter assembly **(a)**.
3. Remove the screws that secure the support bracket **(b)** to the hydraulic oil tank.



wc_gr004464



wc_gr004465

4. Remove the piston **(c)** and the tether **(d)** from the hydraulic oil tank. Support the hood in the open position.

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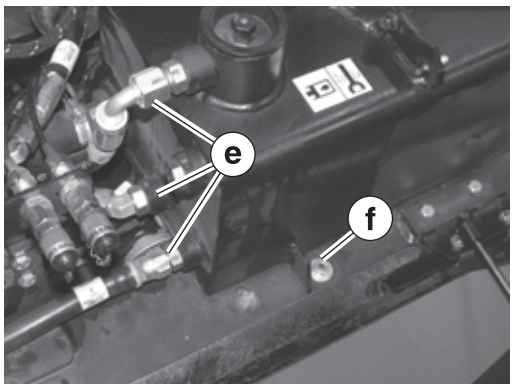
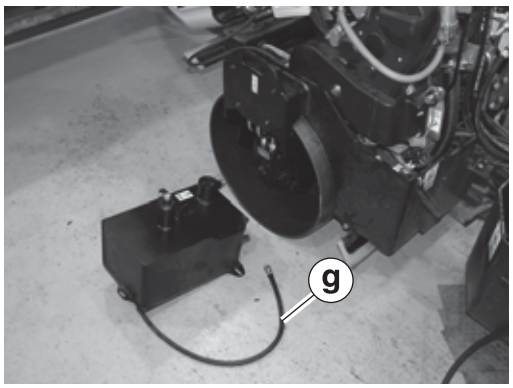
5. Disconnect the hydraulic lines **(e)** from the hydraulic oil tank.



wc_gr004466



wc_gr004467

6. Remove the screws **(f)** that secure the hydraulic oil tank to the frame and pull the hydraulic oil tank from the machine.

Note: *The hydraulic oil tank drain hose **(g)** may be disconnected before or after the hydraulic oil tank is removed.*

The procedure to remove the hydraulic oil tank is now complete.

8.23 Installing the Hydraulic Oil Tank

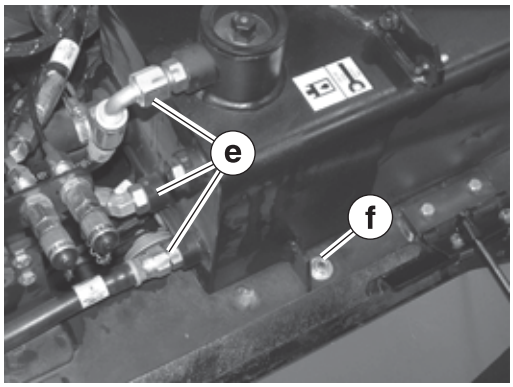
Prerequisites

- Engine shut down and cool
- 10W-30 hydraulic oil (see section *Lubrication*)

Procedure

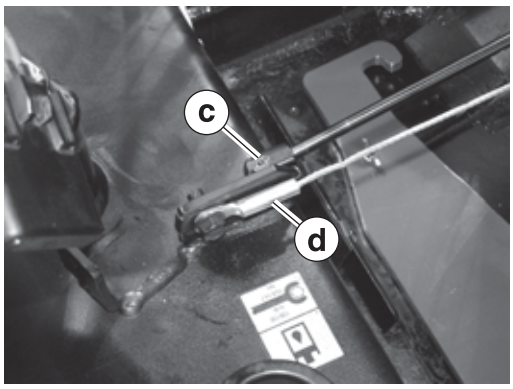
Follow the procedure below to install the hydraulic oil tank.

1. Install the hydraulic oil tank to the frame with the screws **(f)** but do not tighten the screws.

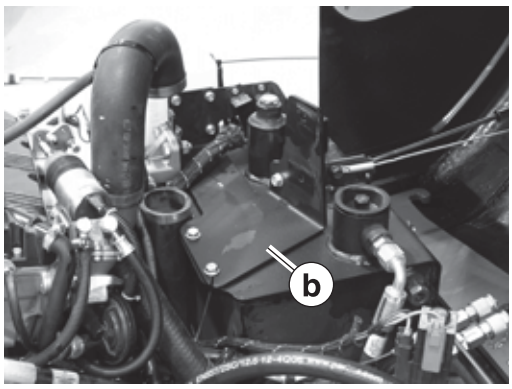


wc_gr004466

2. Connect the hydraulic lines **(e)** from the hydraulic oil tank.
3. Install the piston **(c)** and the tether **(d)** to the hydraulic oil tank.

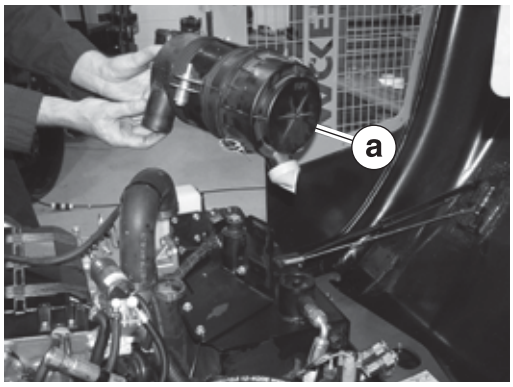


wc_gr004465



wc_gr004464

4. Install the screws that secure the support bracket **(b)** to the hydraulic oil tank.
5. Tighten screws **(f)**. Install the air filter assembly **(a)**.



wc_gr004463

The procedure to install the hydraulic oil tank is now complete.

8.24 Removing the Engine

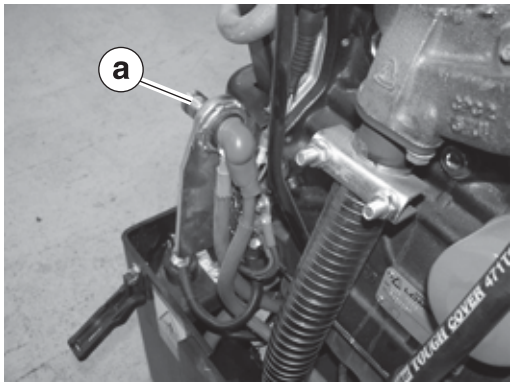
Prerequisites

- Engine shut down and cool
- Battery disconnected

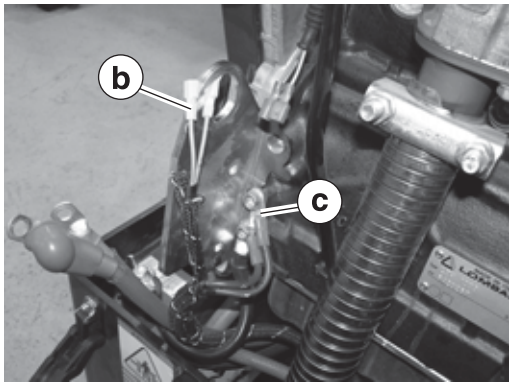
Procedure

Follow the procedure below to remove the engine.

1. Remove the radiator/oil cooler. See section *Removing the Radiator/Oil Cooler.*
2. Remove the hydraulic tank. See section *Removing the Hydraulic Oil Tank*.
3. Remove the drive pump. See section *Removing the Drive Pump*.
4. Disconnect the auxiliary battery positive terminal **(a)**.

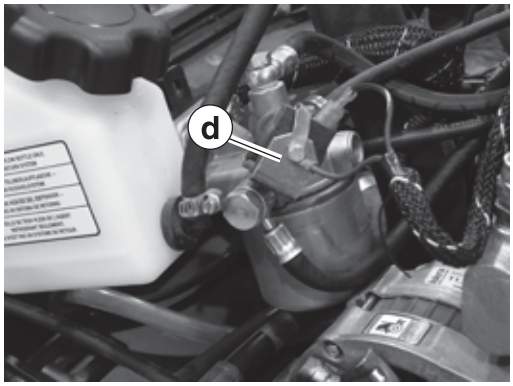


wc_gr004474

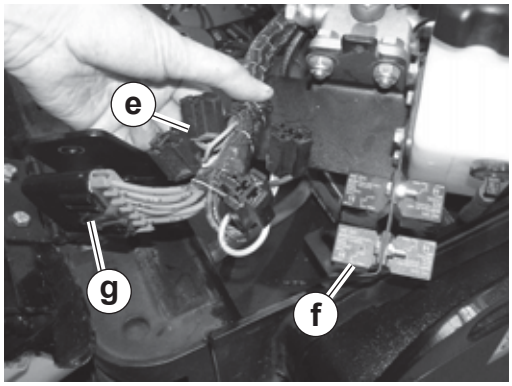


wc_gr004475

5. Disconnect the two wires **(b)** running to the engine.
6. Disconnect the ground wires **(c)** from the engine.
7. Disconnect the two wires from the fuel solenoid **(d)**.



wc_gr004476



wc_gr004477

8. Disconect the connectors **(e)** from the four relays **(f)**.
9. Disconnect the fuse holder **(g)**.

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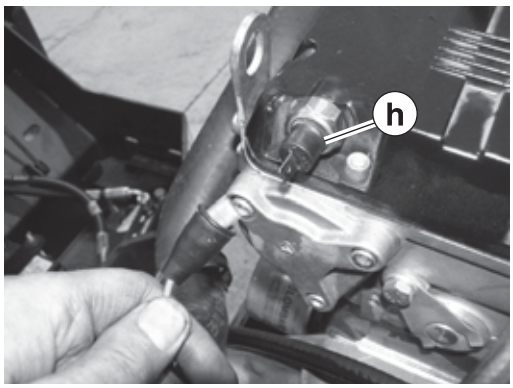
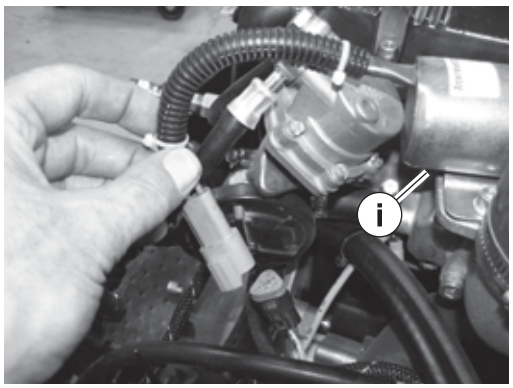
10.Disconnect the air filter indicator sensor **(h)**.



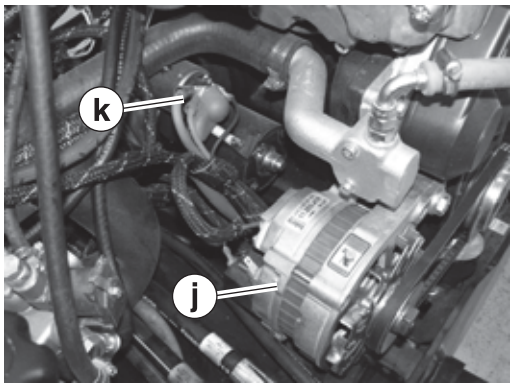
wc_gr004478



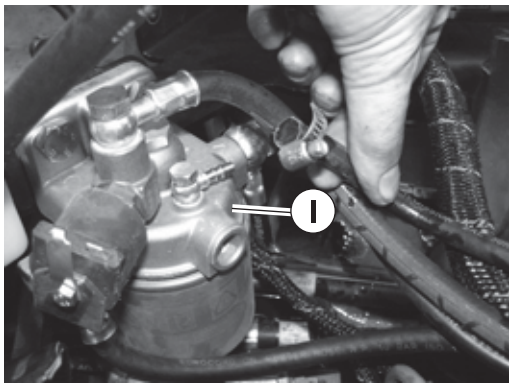
wc_gr004479

11.Disconnect the throttle solenoid **(i)**.

12.Disconnect the wiring from the alternator **(j)** and the starter solenoid **(k)**.



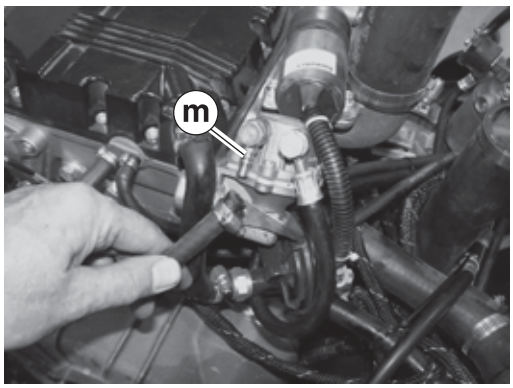
wc_gr004480



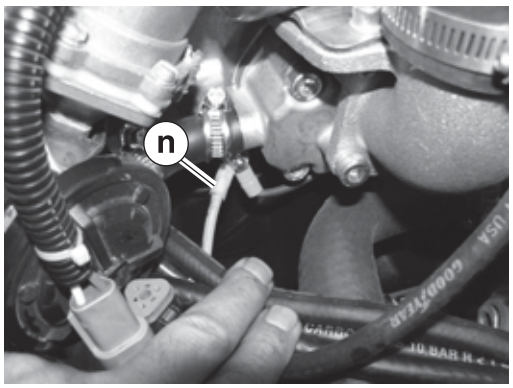
wc_gr004481

13.Disconnect the fuel hose from the filter head **(l)**.

14.Disconnect the fuel hose from the fuel rail **(m)**.



wc_gr004482



wc_gr004483

15.Disconnect the pink wire **(n)** to the glow plugs.

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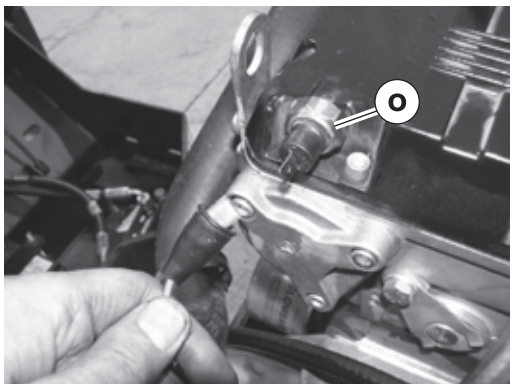
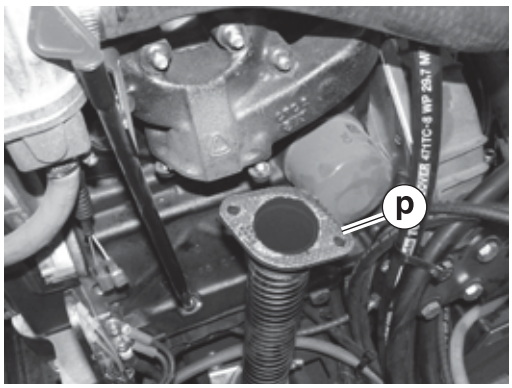
16.Disconnect the temperature sender **(o)**.



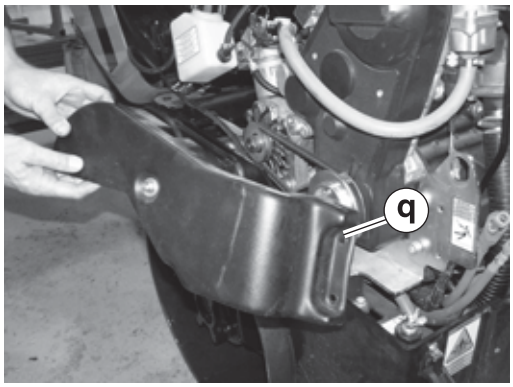
wc_gr004484



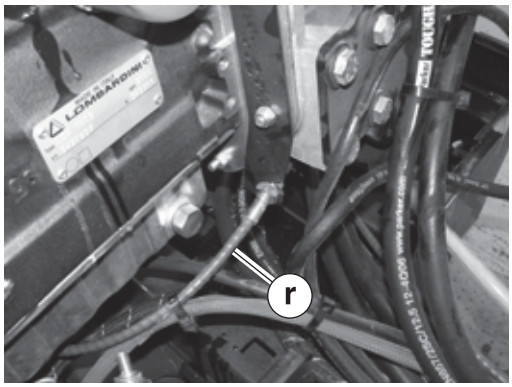
wc_gr004485

17.Disconnect the exhaust pipe **(p)**.

18.Remove the belt guard **(q)**.



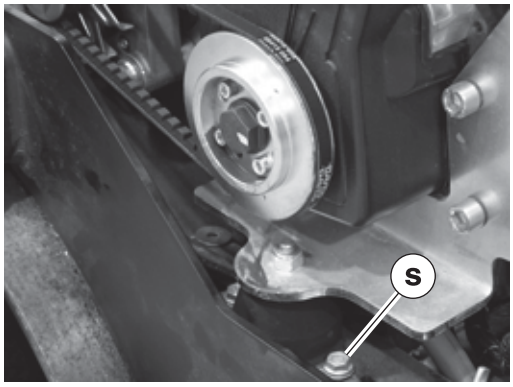
wc_gr004486



wc_gr004487

19.Disconnect the control cable **(r)** from the bracket.

20.Remove the screws **(s)** that secure the shock mounts to the frame.



wc_gr004488

wc_gr004489

21.Attach an appropriate chain or sling to the engine and pull the engine from the machine using an appropriate crane.

The procedure to remove the engine is now complete.

8.25 Installing the Engine

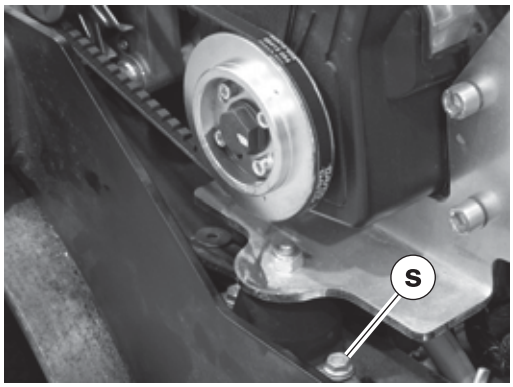
Prerequisites

- Engine shut down and cool
- Battery disconnected

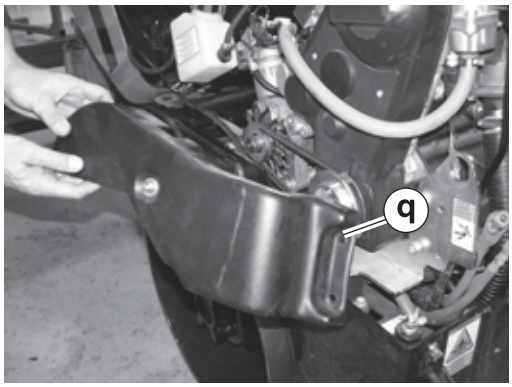
Procedure

Follow the procedure below to install the engine.

1. Position the engine into the machine and secure it using screws **(s)**.

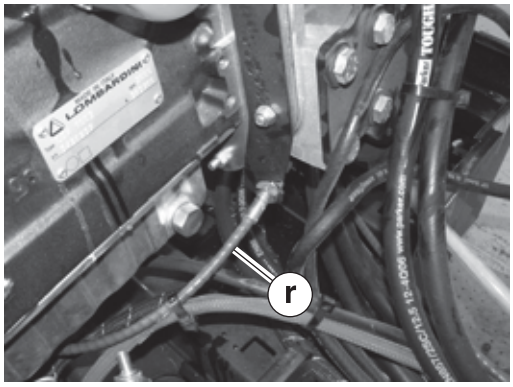


wc_gr004488

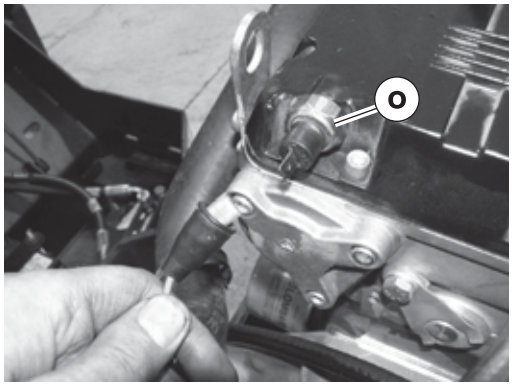


wc_gr004486

2. Install the belt guard **(q)**.
3. Reconnect the control cable **(r)** to the bracket.

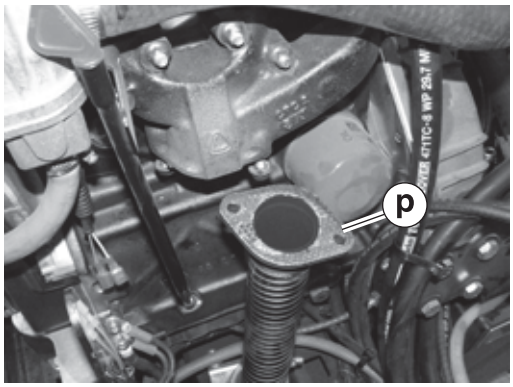


wc_gr004487



wc_gr004484

4. Reconnect the temperature sender **(o)**.
5. Reconnect the exhaust pipe **(p)**



wc_gr004485

This procedure continues on the next page.

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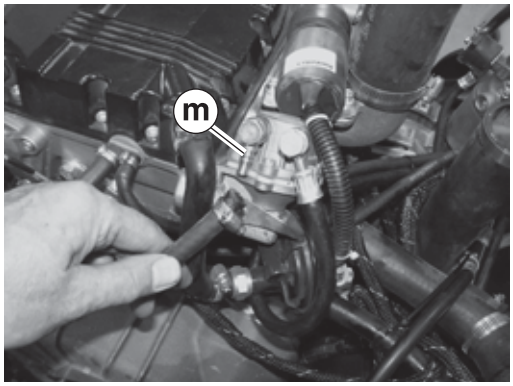
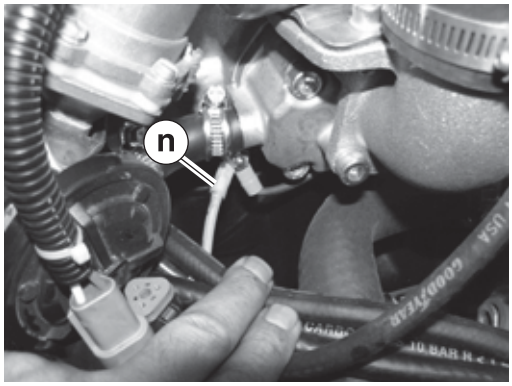
6. Reconnect the fuel hose to the fuel rail **(m)**.

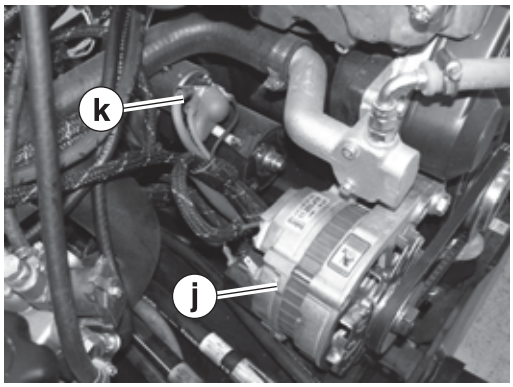


wc_gr004482

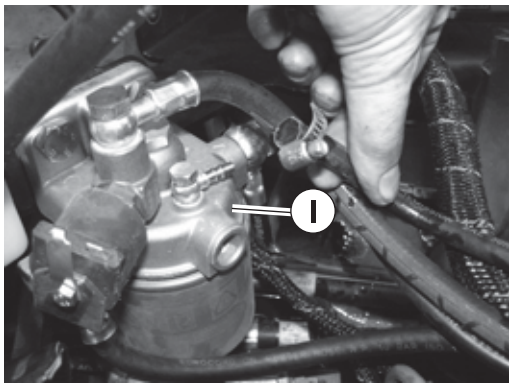


wc_gr004483

7. Reconnect the pink wire **(n)** to the glow plugs.
8. Reconnect the wiring to the alternator **(j)** and to the starter solenoid **(k)**.

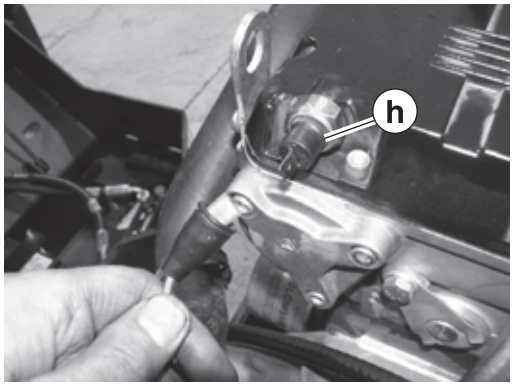


wc_gr004480

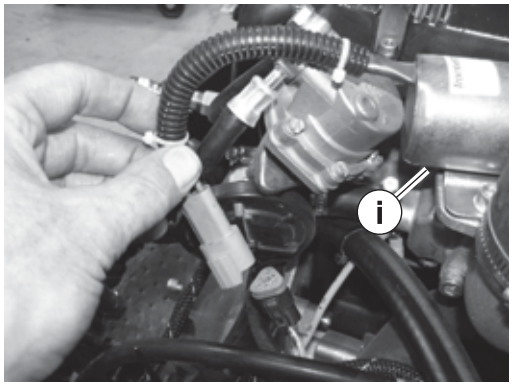


wc_gr004481

9. Reconnect the fuel hose to the filter head **(l)**.
10. Reconnect the air filter indicator sensor **(h)**.



wc_gr004478



wc_gr004479

11. Reconnect the throttle solenoid **(i)**.

This procedure continues on the next page.

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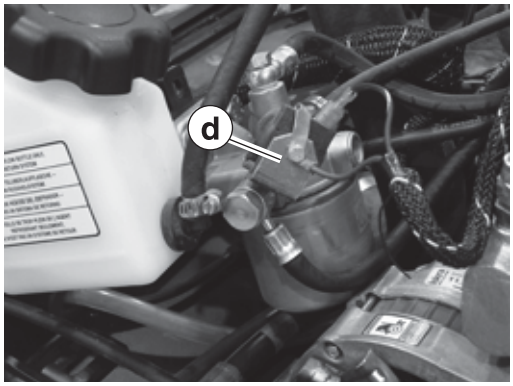
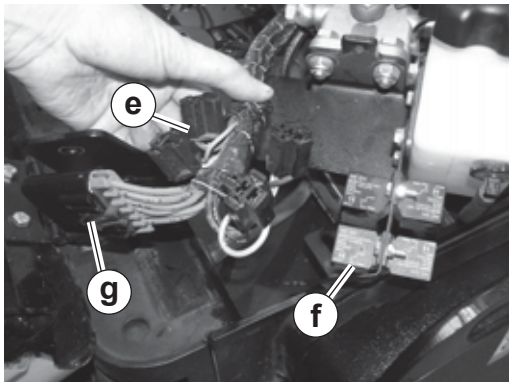
12.Reconnect the two wires to the fuel solenoid **(d)**.



wc_gr004476



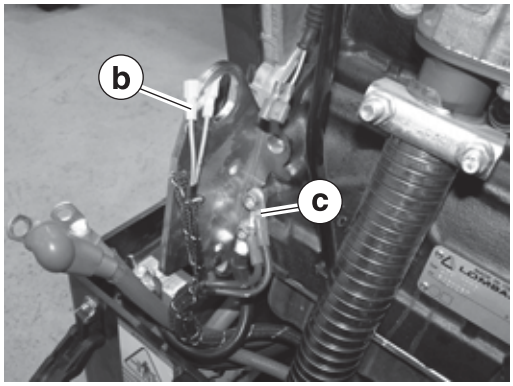
wc_gr004477

13.Reconnect the connectors **(e)** to the four relays **(f)**.

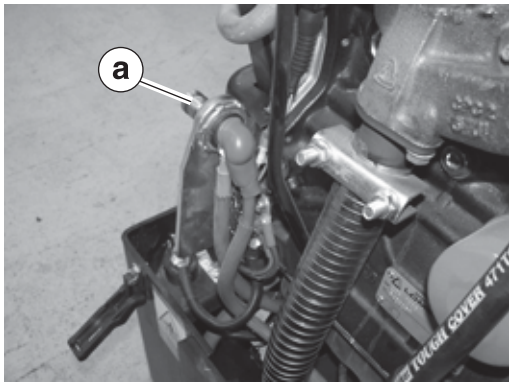
14.Reconnect the fuse holder **(g)**.

15.Reconnect the two wires **(b)** running to the engine.

16.Reconnect the ground wires **(c)** to the engine.



wc_gr004475



wc_gr004474

17.Reconnect the auxiliary battery positive terminal **(a)**.

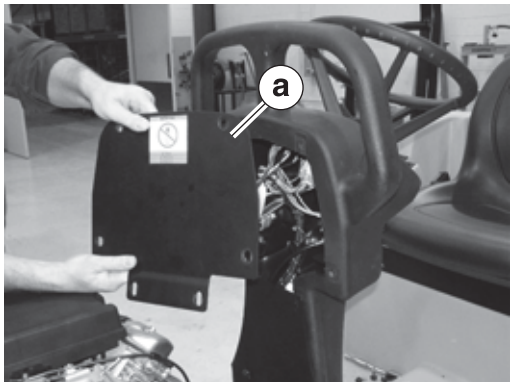
The procedure to install the engine is now complete.

8.26 Removing the Steering Valve

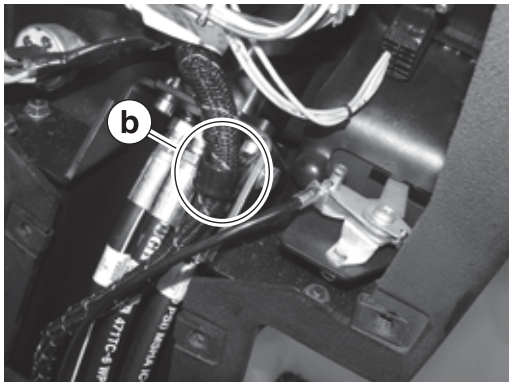
Prerequisites Machine OFF and engine cool.

Procedure Follow the procedure below to remove the steering valve.

1. Remove the front console panel **(a)**.

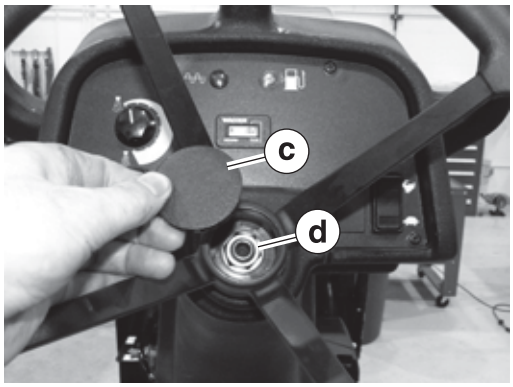


wc_gr004201



wc_gr004551

2. Remove the cable clamp **(b)**.
3. Remove the small cover **(c)** on the steering wheel.



wc_gr004554


wc_gr004555

4. Remove the nut **(d)** that secures the steering wheel and remove the steering wheel.

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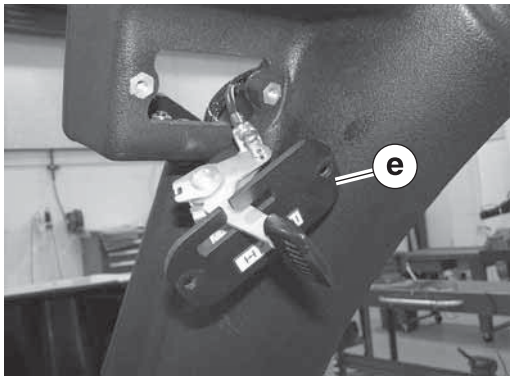
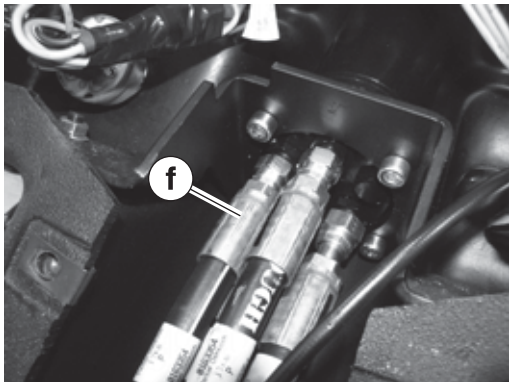
5. Remove the screws that secure the choke control **(e).** Allow the choke control to hang out of the way.

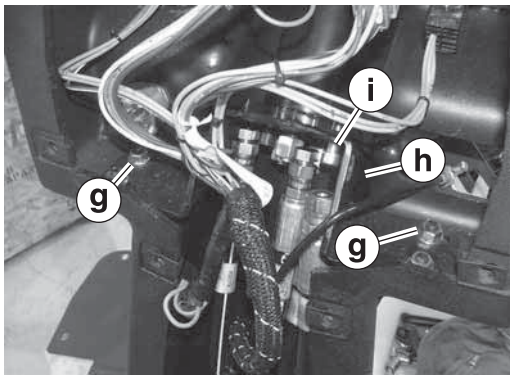


wc_gr004556

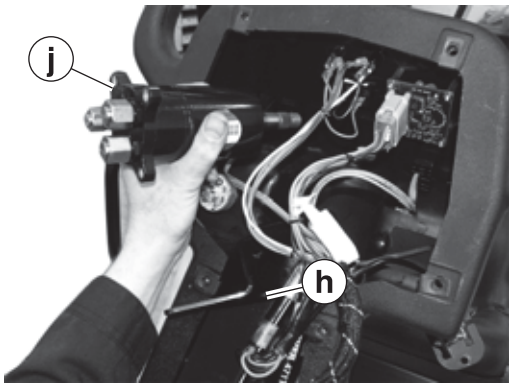


wc_gr004557

6. Label, disconnect, and plug the hydraulic lines **(f)**.
7. Remove the screws **(g)** that secure the bracket **(h)** to the console.



wc_gr004558



wc_gr004559

8. Remove the screws **(i)** that secure the steering servo. Maneuver the steering valve **(j)** out of the control console.

The procedure to remove the steering valve is now complete.

8.27 Installing the Steering Valve

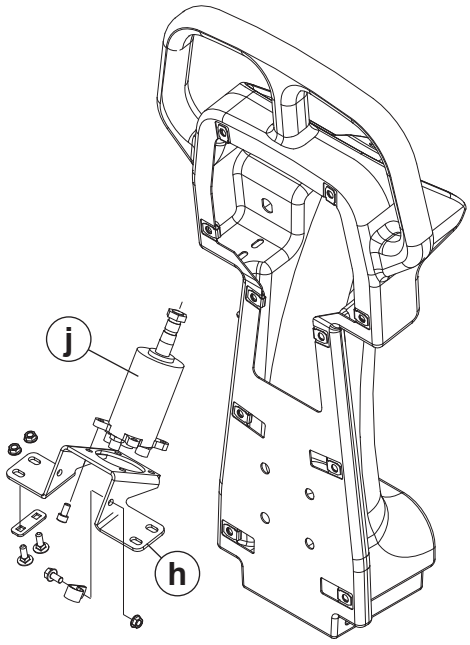
Prerequisites

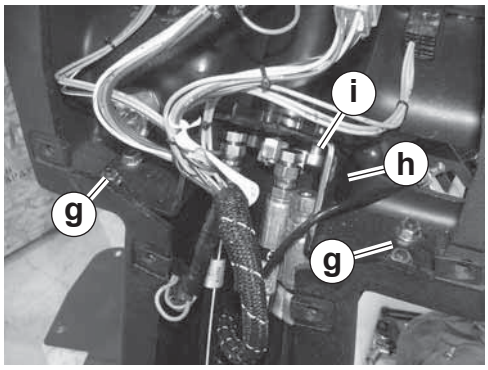
- Machine OFF and engine cool

Procedure

Follow the procedure below to install the steering valve.

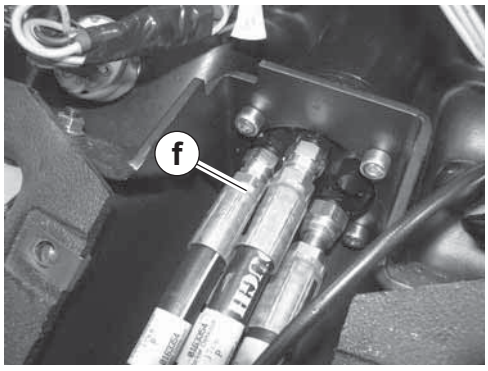
1. Position the steering valve **(j)** and bracket **(h)** into the control console. Secure the steering valve to the bracket with screws **(i)** .

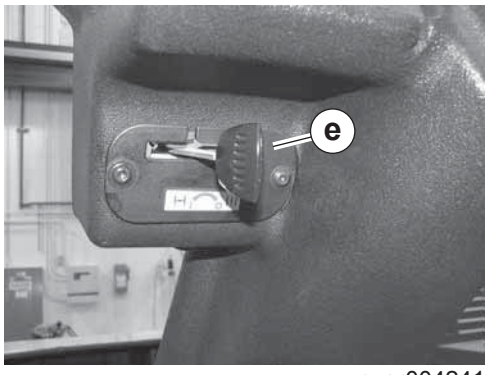




wc_gr004240

2. Secure the bracket **(h)** to the console with the screws **(g)**.
3. Connect the hydraulic lines **(f).**





wc_gr004241

4. Install the choke control **(e).**

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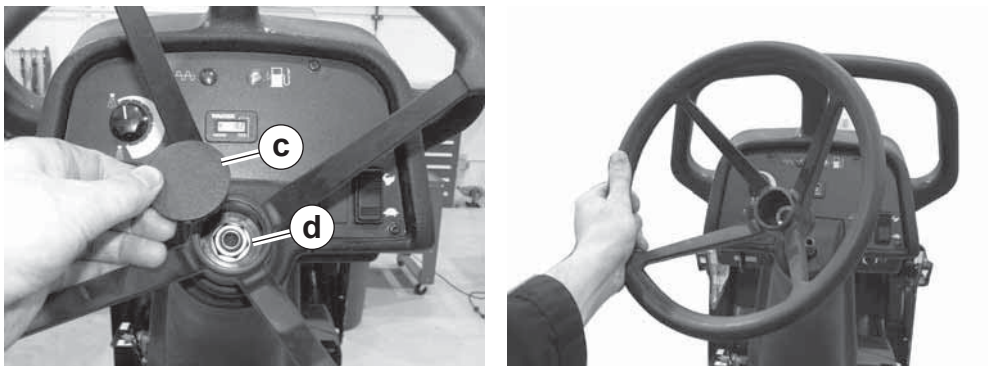
5. Install the steering wheel and secure it with the nut **(d)**.



wc_gr004202

6. Install the small cover **(c)** on the steering wheel.
7. Install the cable clamp **(b)**.

wc_gr004242

8. Install the front console panel **(a)**

The procedure to install the steering valve is now complete.

8.28 Removing the Fuel Tank

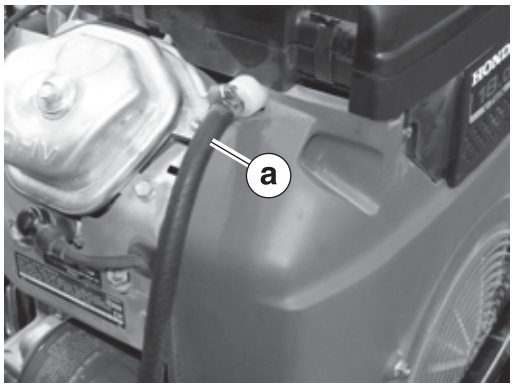
Prerequisites

- Machine shut down
- Platform in upright position. See section *Rear Frame Access*.

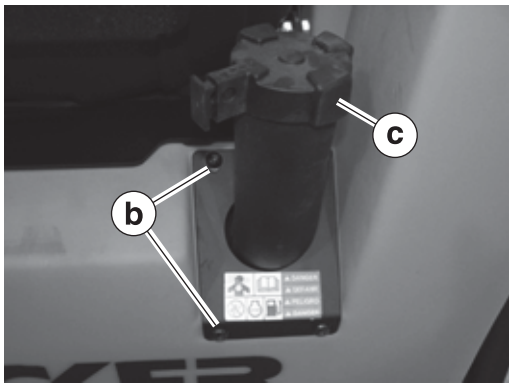
Procedure

Follow the procedure below to remove the fuel tank.

1. Drain the fuel from the fuel tank by disconnecting the fuel hose **(a)** at the engine.

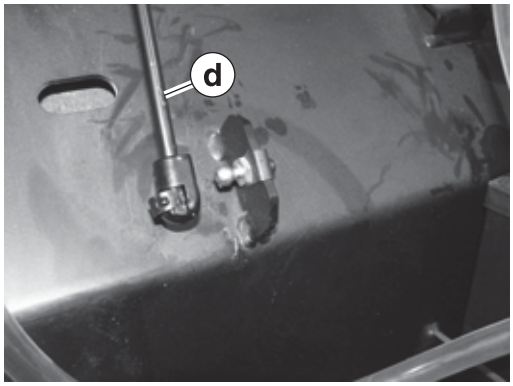


wc_gr004561

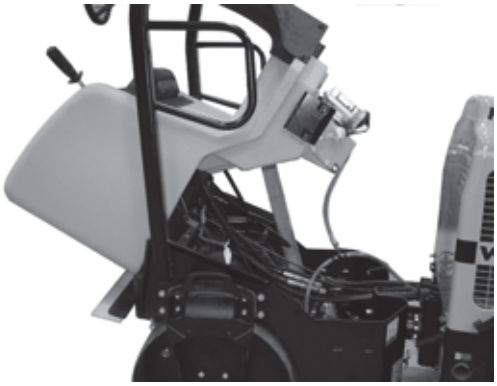


wc_gr004230

2. Remove the screws **(b)** that secure the fuel spill guard; also remove the fuel cap **(c)**.
3. Disconnect the gas struts **(d)**.



wc_gr004238



wc_gr004231

4. Support the platform in the open position—approximately 70°.

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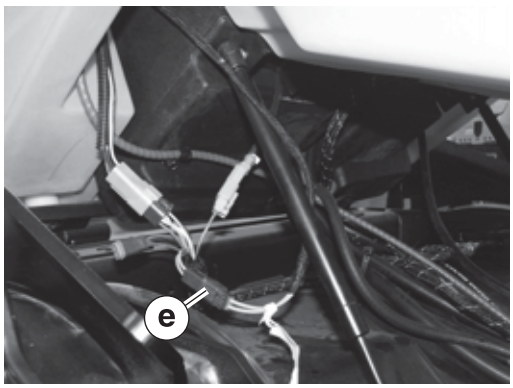
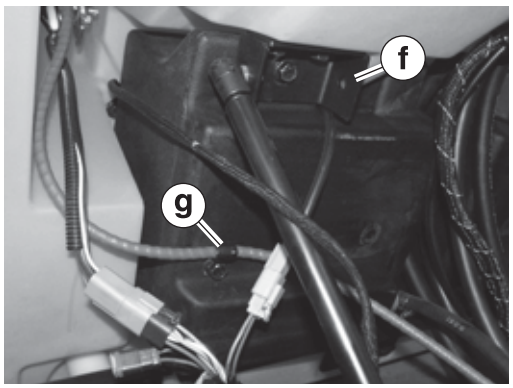
5. Disconnect the fuel sensor **(e)** from the wiring harness.

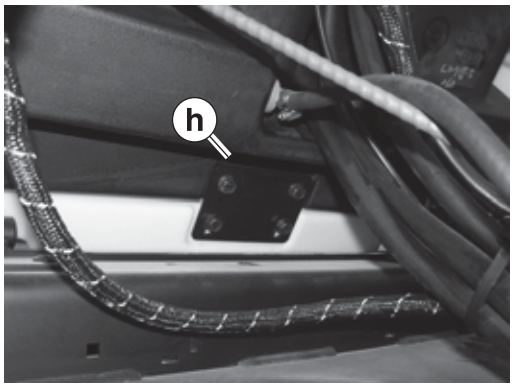


wc_gr004243



wc_gr004232

6. Remove the gas strut brackets **(f)** from the water tank and the fuel tank. Remove the cable clip **(g)**.
7. Remove the mounting plate **(h)** from the water tank and the fuel tank, and pull the fuel tank from the platform.



wc_gr004233

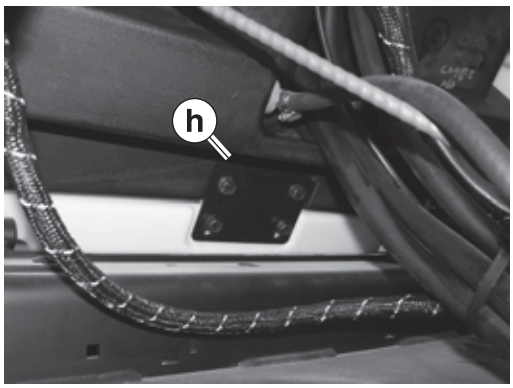
The procedure to remove the fuel tank is now complete.

8.29 Installing the Fuel Tank

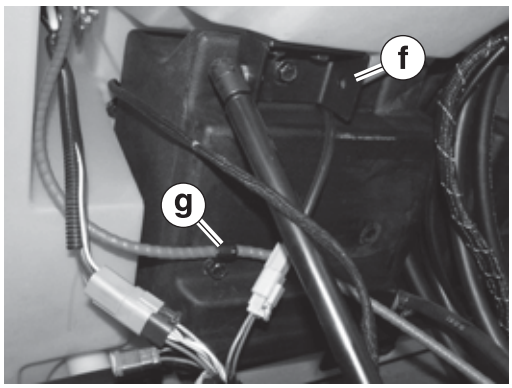
Prerequisites Platform in upright position. See section *Rear Frame Access*.

Procedure Follow the procedure below to install the fuel tank.

1. Route the fuel level sensor wiring **(i)** around the control lever side of the fuel tank. Then, position the fuel tank into the water tank and secure it with the mounting plate **(h)**. Connect the fuel level sensor to the harness.

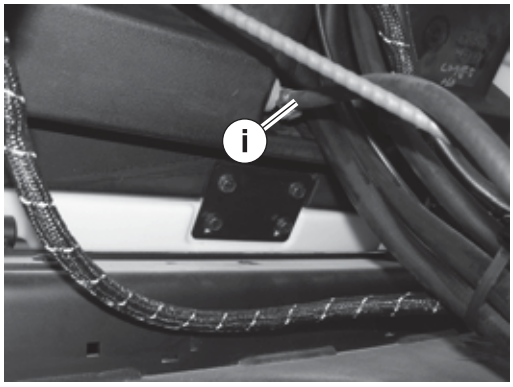


wc_gr004233

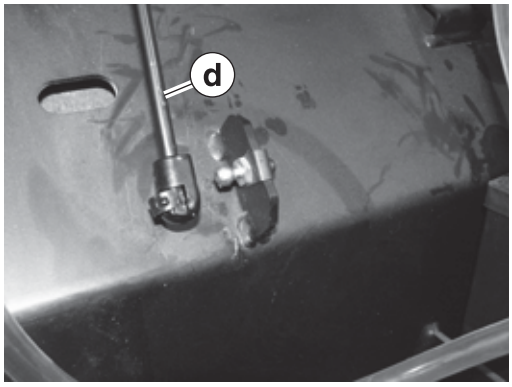


wc_gr004232

2. Install the gas strut brackets **(f)** to the water tank and the fuel tank.
3. Install the cable clip **(g)**.
4. Connect the fuel line **(i)** to the fuel tank.



wc_gr004560



wc_gr004238

5. Connect the gas struts **(d)**.

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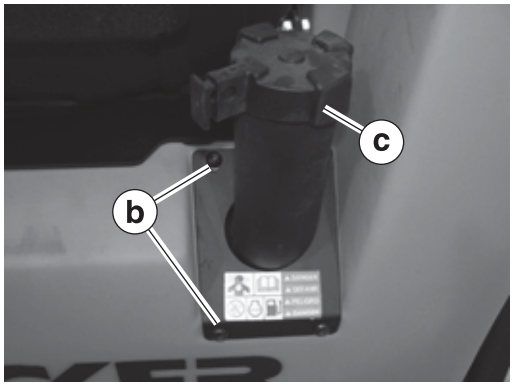
6. Install the screws **(b)** that secure the fuel spill guard. Then, re-install the fuel cap **(c)**.



wc_gr004239

The procedure to install the fuel tank is now complete.

8.30 Removing the Control Cable and Control Lever

Prerequisites

- Machine OFF and engine cool
- Seat platform in raised position

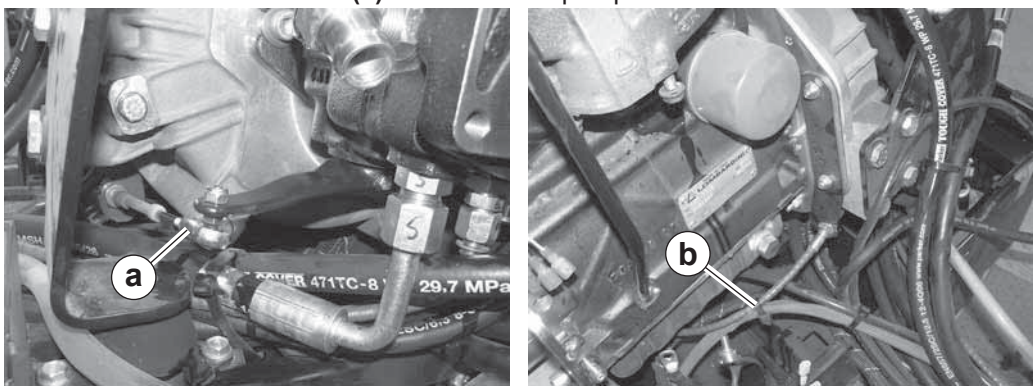
Procedure

Follow the procedure below to remove the control cable and the control lever.

CAUTION! Burn hazard. The engine exhaust pipes are extremely hot while the engine is running and for a period of time after the engine has shut down.

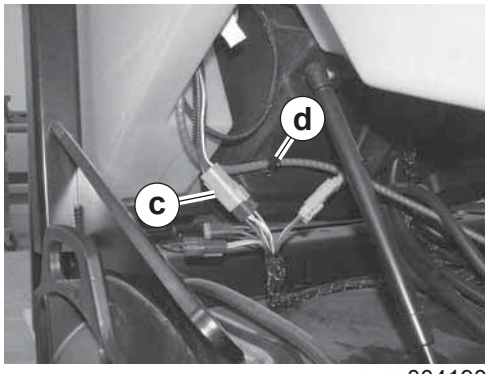
▶ Allow the exhaust pipes to cool before performing this procedure.

1. Disconnect the control cable **(a)** from the drive pump.



wc_gr005425

2. Cut the wire ties **(b)** that secure the hoses, wires, and cables. Maneuver the cable around the engine so that it is free up to the control lever.
3. Disconnect the wiring at the connector **(c)**.



wc_gr004190

4. Remove the cable clamp **(d)**.

This procedure continues on the next page.

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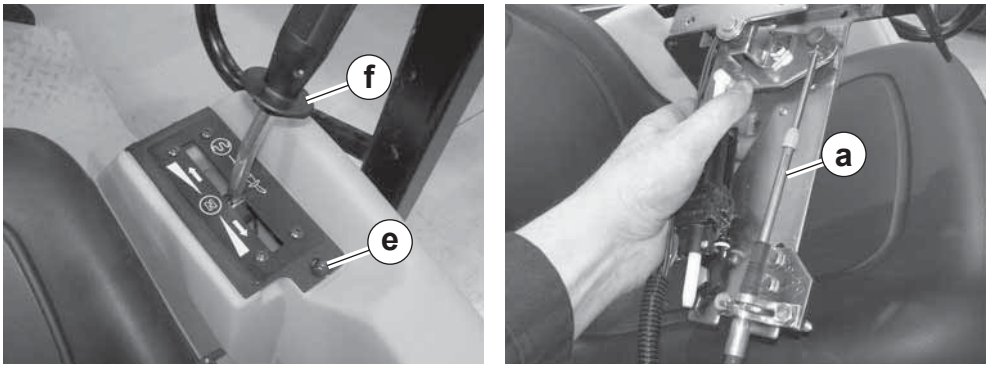
5. Remove the screws **(e)** that secure the control lever assembly **(f)** and remove the control lever assembly from the machine.



wc_gr004191

6. Disconnect the control cable **(a)** from the control lever assembly.

The procedure to remove the control cable and the control lever is now complete.

8.31 Installing the Control Cable and Control Lever

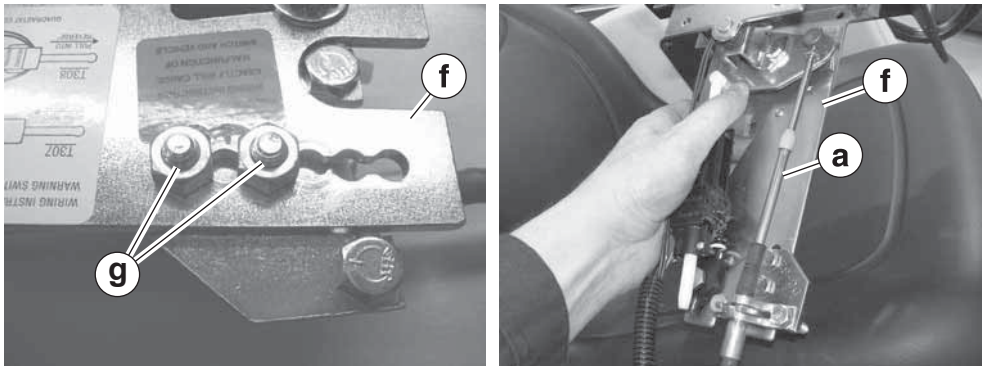
Prerequisites

- Seat platform in raised position

Procedure

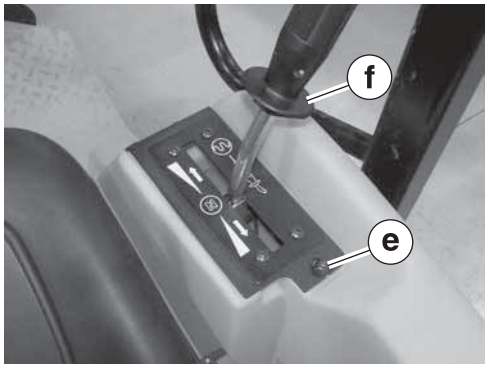
Follow the procedure below to install the control cable and the control lever.

1. Check that the clamp bracket is positioned correctly. It should be positioned with the screws **(g)** in the first and third holes of the control lever assembly **(f)**.



wc_gr005416

2. Connect the control cable **(a)** to the control lever assembly **(f)**.
3. Install control lever assembly **(f)** with the screws **(e)**.



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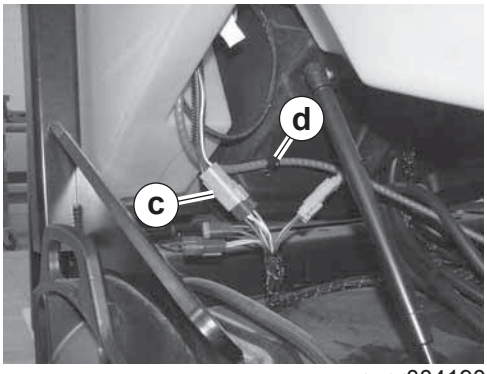

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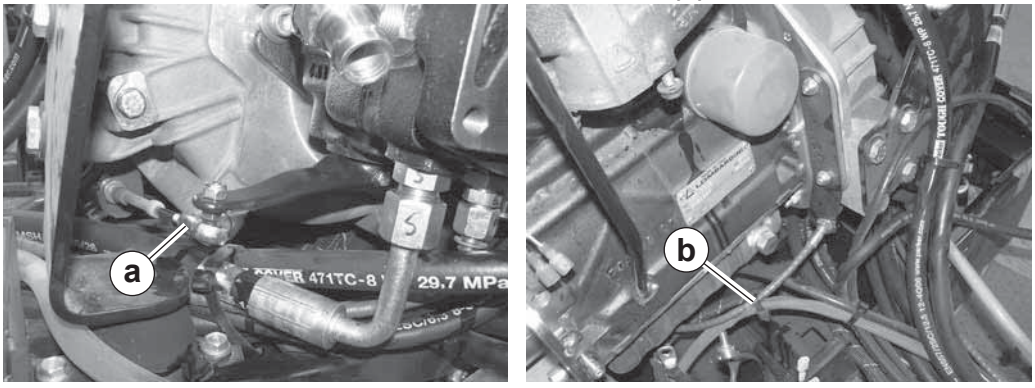
4. Install the cable clamp **(d)**.
5. Connect the wiring at the connector **(c)**.
6. Secure the hoses, wires, and cables with new wire ties **(b)**.



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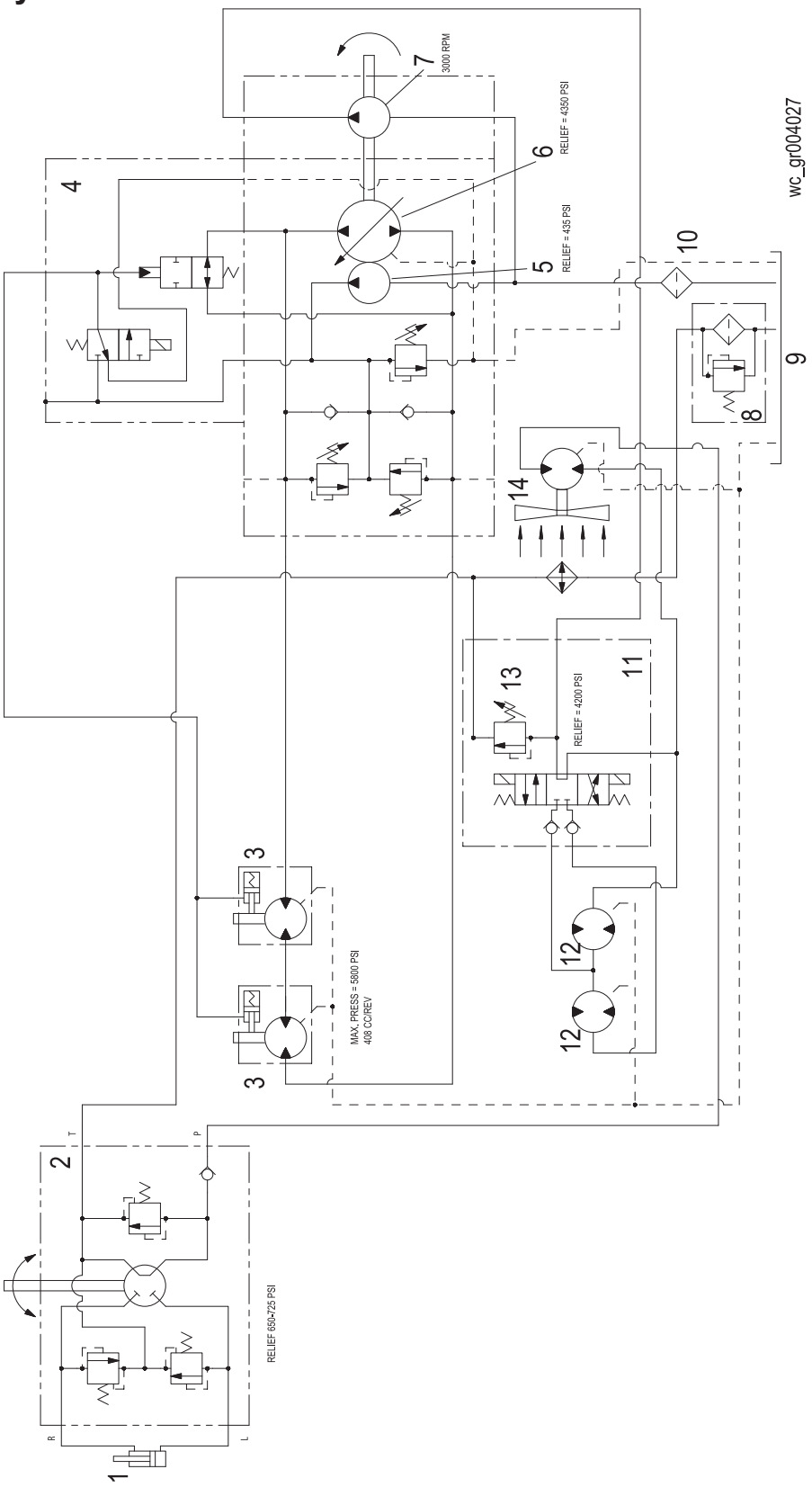
7. Maneuver the control cable **(a)** around the engine and connect it to the drive pump.

The procedure to install the control cable and the control lever is now complete.

Notes

9 Schematics

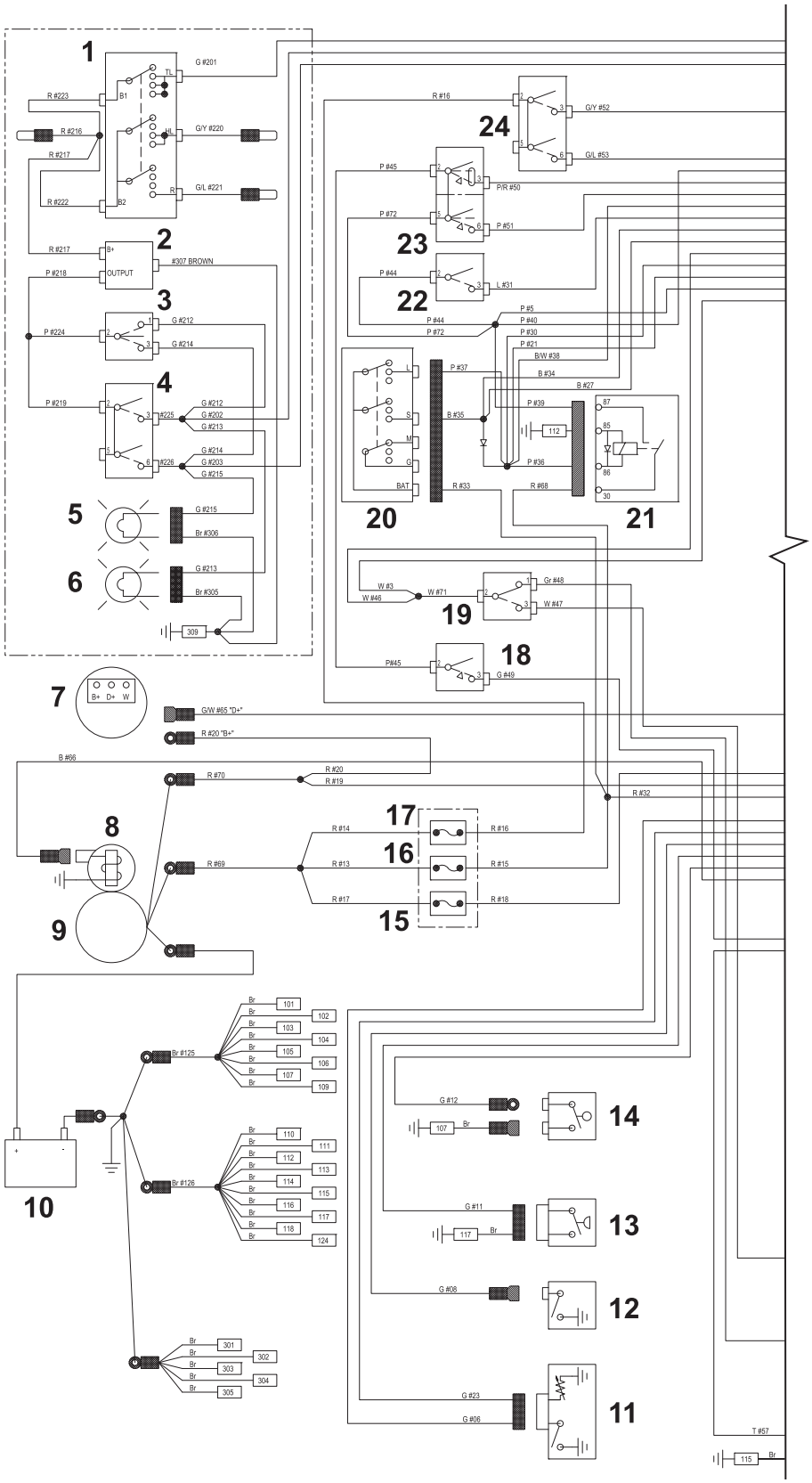
9.1 Hydraulic Schematic

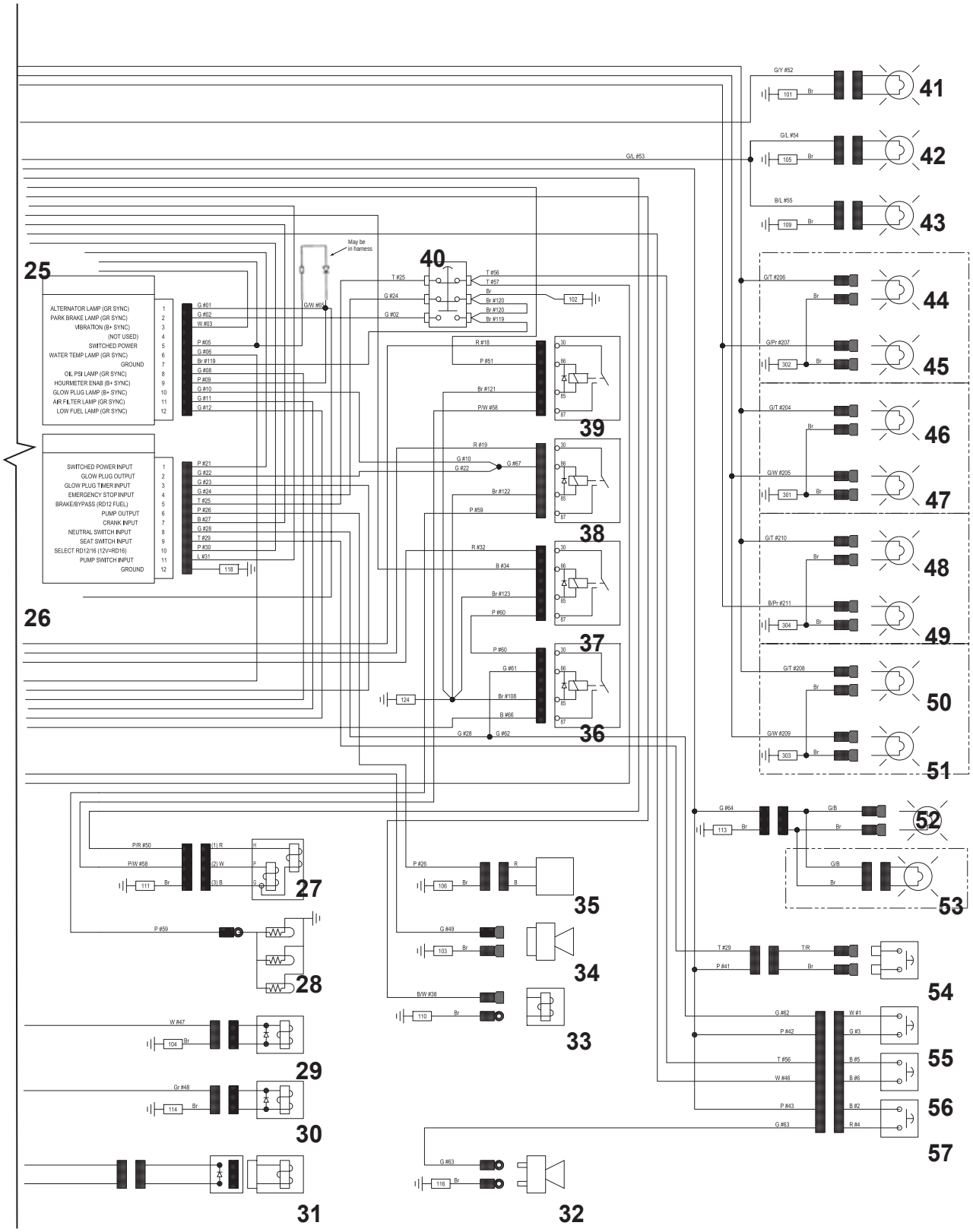


9.2 Hydraulic Schematic Components

Ref.	Description	Ref.	Description
1	Steering cylinder	8	Return filter
2	Steering unit	9	Tank
3	Drive motor	10	Suction strainer
4	Bypass	11	Vibration solenoid valve
5	Charge pump	12	Exciter motor
6	Main pump	13	Pressure relief valve
7	Exciter pump	14	Fan

9.3 Electrical Schematic—RD 16




25
ALTERNATOR LAMP (GR SYNC)
PARK BRAKE LAMP (GR SYNC)
VIBRATION (B+ SYNC)
(NOT USED)
SWITCHED POWER
WATER TEMP LAMP (GR SYNC)
GROUND
OIL PSI LAMP (GR SYNC)
HOURMETER ENAB (B+ SYNC)
GLOW PLUG LAMP (B+ SYNC)
AIR FILTER LAMP (GR SYNC)
LOW FUEL LAMP (GR SYNC)
26
SWITCHED POWER INPUT
GLOW PLUG OUTPUT
GLOW PLUG TIMER INPUT
EMERGENCY STOP INPUT
BRAKE/BYPASS (RD12 FUEL)
PUMP OUTPUT
CRANK INPUT
NEUTRAL SWITCH INPUT
SEAT SWITCH INPUT
SELECT RD12/16 (12V=RD16)
PUMP SWITCH INPUT
GROUND
May be in harness
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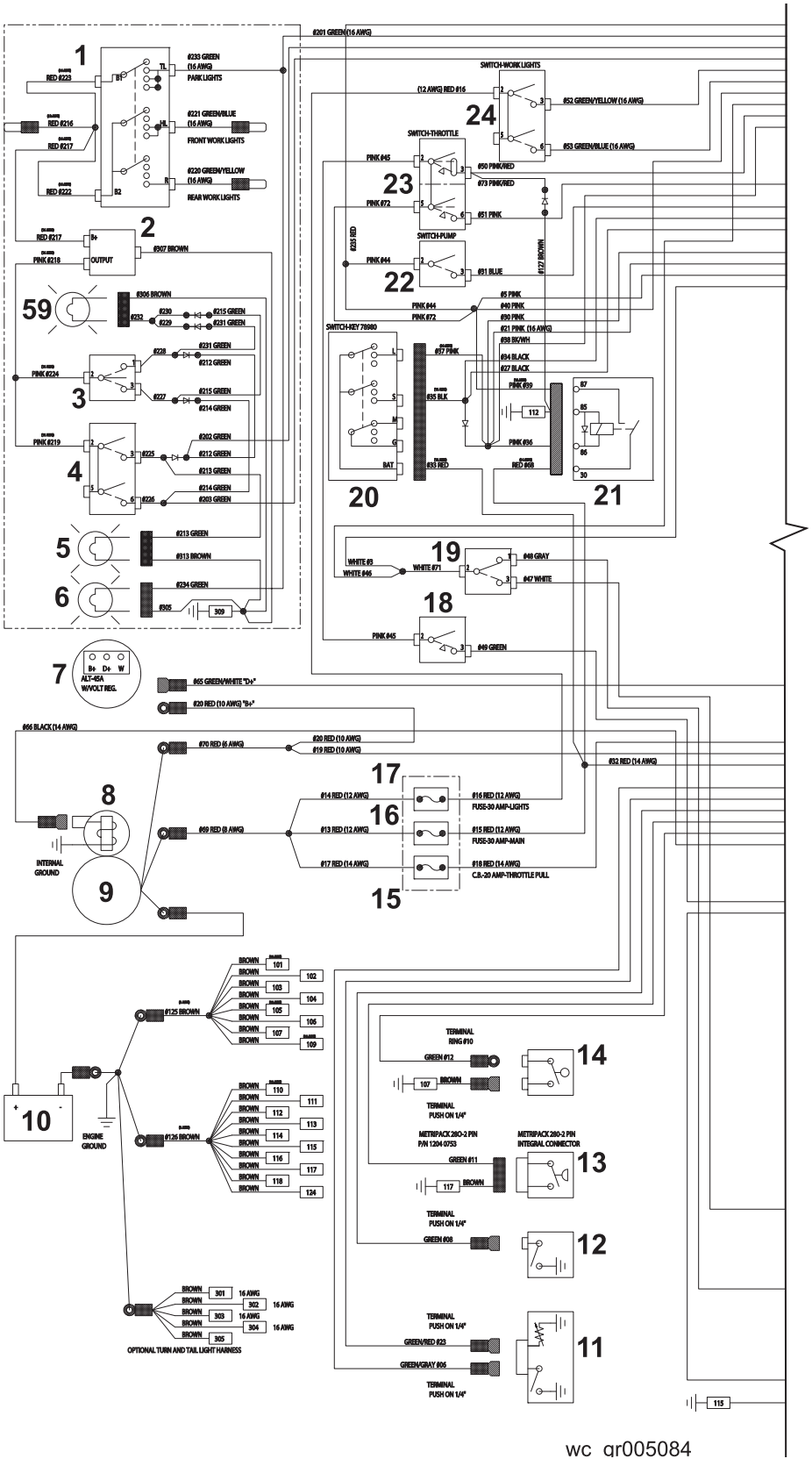
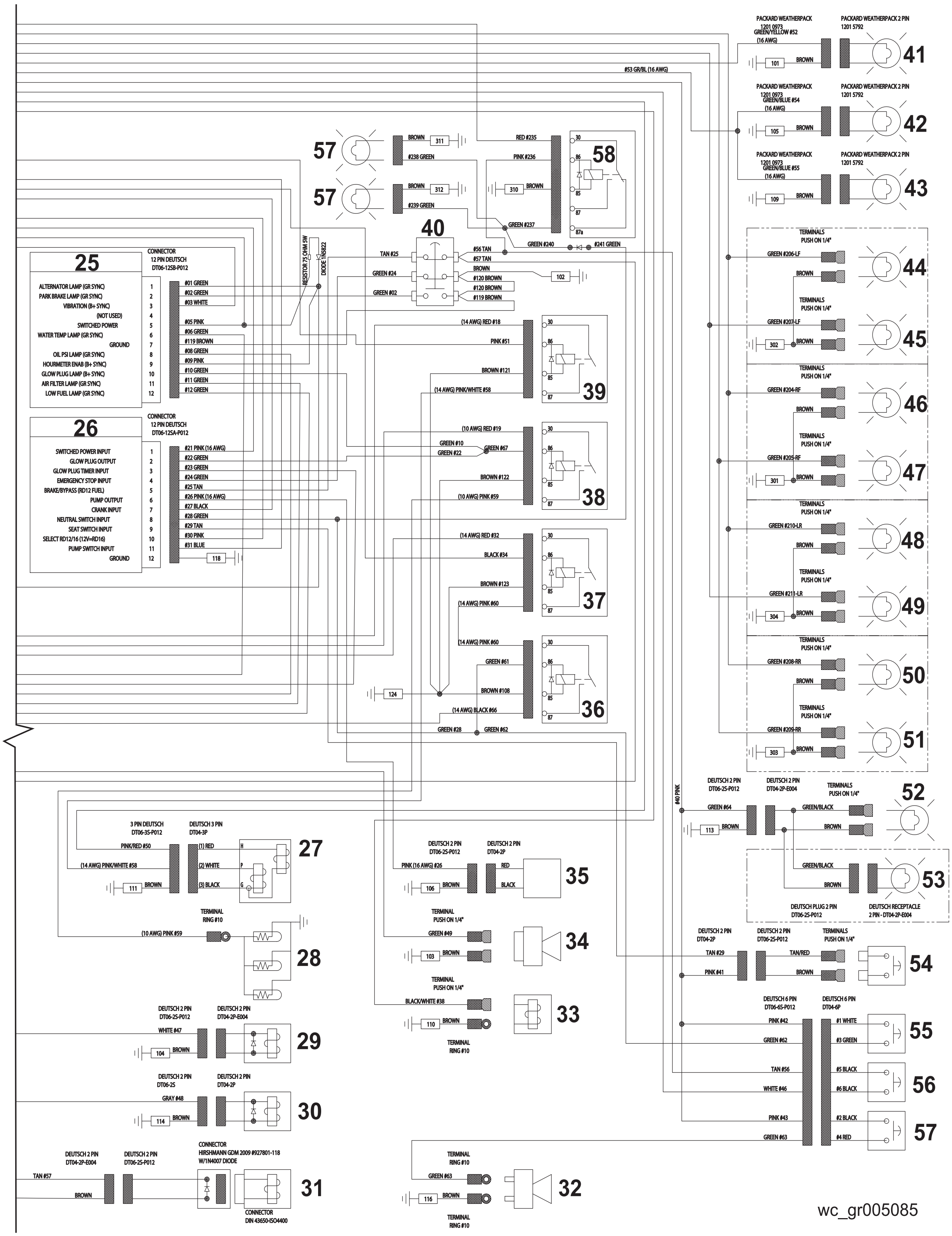
9.4 Electrical Schematic Components—RD 16

Ref.	Description	Ref.	Description
1	Light switch (optional)	29	Vibration solenoid (front only)
2	Flasher	30	Vibration solenoid (front & rear)
3	Turn signal switch	31	Brake and bypass solenoid
4	Hazard switch	32	Reverse alarm
5	Left turn signal light	33	Fuel solenoid
6	Right turn signal light	34	Horn
7	Voltage regulator	35	Spray bar pump
8	Engine crank solenoid	36	Neutral relay
9	Starter	37	Crank relay
10	Battery	38	Glowplug relay
11	Dual-function sensor	39	Throttle relay
12	Oil pressure sensor	40	Parking brake switch
13	Air filter sensor	41	Rear light (left)
14	Fuel level sensor	42	Head light (left)
15	20A fuse	43	Head light (right)
16	30A fuse (main)	44	Front parking light (left) (optional)
17	30A fuse (lights)	45	Front turn light (left) (optional)
18	Horn switch	46	Front parking light (right) (optional)
19	Vibration mode switch	47	Front turn light (right) (optional)
20	Key switch	48	Rear parking light (left) (optional)
21	Power relay	49	Rear turn light (left) (optional)
22	Pump switch	50	Rear parking light (right) (optional)
23	Throttle switch	51	Rear turn light (right) (optional)
24	Work light switch	52	Beacon
25	Display module	53	License light (optional)
26	Pump timer module	54	Seat switch
27	Throttle solenoid	55	Neutral switch
28	Glow plug engine	56	Vibration switch

Notes:

9.5 Electrical Schematic—RD 16 IRH




25
CONNECTOR
12 PIN DEUTSCH
DT06-12SB-P012
ALTERNATOR LAMP (GR SYNC)
PARK BRAKE LAMP (GR SYNC)
VIBRATION (B+ SYNC)
(NOT USED)
SWITCHED POWER
WATER TEMP LAMP (GR SYNC)
GROUND
OIL PSI LAMP (GR SYNC)
HOURMETER ENAB (B+ SYNC)
GLOW PLUG LAMP (B+ SYNC)
AIR FILTER LAMP (GR SYNC)
LOW FUEL LAMP (GR SYNC)
26
CONNECTOR
12 PIN DEUTSCH
DT06-12SA-P012
SWITCHED POWER INPUT
GLOW PLUG OUTPUT
GLOW PLUG TIMER INPUT
EMERGENCY STOP INPUT
BRAKE/BYPASS (RD12 FUEL)
PUMP OUTPUT
CRANK INPUT
NEUTRAL SWITCH INPUT
SEAT SWITCH INPUT
SELECT RD12/16 (12V=RD16)
PUMP SWITCH INPUT
GROUND
RESISTOR 75 OHM 5W
DIODE 1N5822
PACKARD WEATHERPACK
PACKARD WEATHERPACK 2 PIN
TERMINALS PUSH ON 1/4"
DEUTSCH 2 PIN
DEUTSCH 3 PIN
DEUTSCH 6 PIN
TERMINAL RING #10
CONNECTOR HIRSHMANN GDM 2009 #927801-118 W/1N4007 DIODE
CONNECTOR DIN 43650-ISO4400
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9.6 Electrical Schematic Components—RD 16 IRH

Ref.	Description	Ref.	Description
1	Light switch (optional)	31	Brake and bypass solenoid
2	Flasher	32	Reverse alarm
3	Turn signal switch	33	Fuel solenoid
4	Hazard switch	34	Horn
5	Left turn signal light	35	Spray bar pump
6	Right turn signal light	36	Neutral relay
7	Voltage regulator	37	Crank relay
8	Engine crank solenoid	38	Glowplug relay
9	Starter	39	Throttle relay
10	Battery	40	Parking brake switch
11	Dual-function sensor	41	Rear light (left)
12	Oil pressure sensor	42	Head light (left)
13	Air filter sensor	43	Head light (right)
14	Fuel level sensor	44	Front parking light (left) (optional)
15	20A fuse	45	Front turn light (left) (optional)
16	30A fuse (main)	46	Front parking light (right) (optional)
17	30A fuse (lights)	47	Front turn light (right) (optional)
18	Horn switch	48	Rear parking light (left) (optional)
19	Vibration mode switch	49	Rear turn light (left) (optional)
20	Key switch	50	Rear parking light (right) (optional)
21	Power relay	51	Rear turn light (right) (optional)
22	Pump switch	52	Beacon
23	Throttle switch	53	License light (optional)
24	Work light switch	54	Seat switch
25	Display module	55	Neutral switch
26	Pump timer module	56	Vibration switch
27	Throttle solenoid	57	Brake light
28	Glow plug engine	58	Brake light relay
29	Vibration solenoid (front only)	59	Turn signal indicator
30	Vibration solenoid (front & rear)		

10 Technical Data

10.1 Engine

Engine Power Rating

Net power rating per ISO 3046/1-IFN. Actual power output may vary due to conditions of specific use.

Item no.		RD 16 / RD 16 IRH
Engine		
Engine type		3-cylinder, 4-cycle, liquid-cooled, diesel engine
Engine make		Lombardini
Engine model		LDW 1003
Max. rated power @ rated speed	kW (hp)	16.8 (22.5) @ 2850 rpm
Displacement	cm^3 (in^3)	1028 (62.7)
Engine speed - operat-	rpm	2850
Engine speed - idle	rpm	1300
Valve clearance (cold) intake: exhaust:	mm (in.)	0.15 (0.006) 0.20 (0.008)
Battery	V	12V DC
Air cleaner	type	Dry pleated paper elements
Fuel	type	Diesel
Fuel tank capacity	L (gal)	23 (6.1)
Fuel consumption	L (gal)/hr	3.6 (0.96)
Engine oil	type L (qt)	SAE 15W40 Class CD rated 2.4 (2.5)
Coolant capacity	L (gal)	4.75 (1.25)

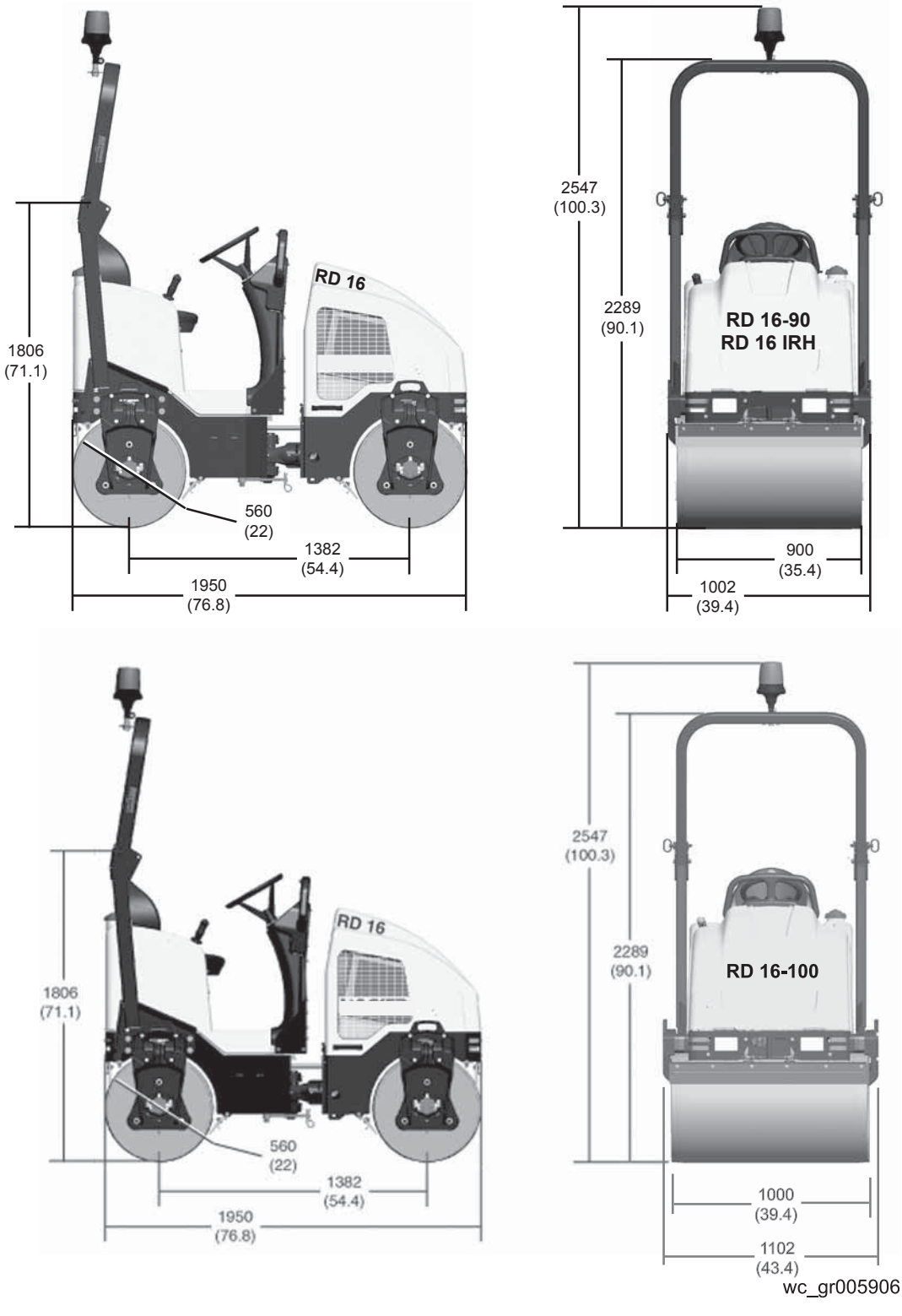
10.2 Roller

Item No.		RD 16/16 IRH
Roller		
Dry Weight	kg (lb)	1356 (2990)
Curb Clearance: Right Left	mm (in.)	 400 (15.7) 400 (15.7)
Water Tank Capacity	L (gal)	100 (26.4)
Outside Turning Radius	m (ft)	2.87 (9.4)
Forward / Reverse Speed	kph (mph)	0-9.3 (0-5.8)
Gradeability		30%
Vibration Frequency	vpm	4200

10.3 Lubrication

Item No.		RD 16 / RD 16 IRH
Lubrication		
Engine Lubrication	type L (pt)	SAE 15W40 Class SD rated 2.4 (2.5)
Hydraulic System	type L (gal)	Premium grade, anti-wear hydraulic fluid 10W30 21.6 (5.7)
Exciter	type	Mobil XHP222
Rear Drum Drive Bearing	type qty.	Mobil XHP222 2-3 shots with hand-held grease gun
Front Drum Drive Bearing	type	Sealed Bearings—No lubrication required
Articulated Joint	type qty.	Mobil XHP222 2-3 shots with hand-held grease gun

10.4 Dimensions mm (in.)



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10.5 Sound Measurements

The operating sound level, measured per the requirements of Appendix 1, Paragraph 1.7.4.f of the EC-Machine Regulations, is:

- the guaranteed sound power level (L_{WA}):

  106 dB(A)

- the sound pressure level at operator's location (L_{pA}):

  88.1 dB(A)

This sound value was determined according to ISO 3744 for the sound power level (L_{WA}).

10.6 Measurements of Operator Exposure to Vibration

The operator of this machine should expect to be exposed to vibration levels listed below when using the machine in performance of its normally intended function:

- Maximum hand/arm vibration levels are:

  2.2 m/s^2 (7.2 ft/s^2)

  These are the representative values of the weighted root mean square **(rms)** acceleration to which the hands and arms are subjected. These weighted **rms** values are measured according to ISO 5349-1.

- Whole body vibration levels do not exceed:

  0.3 m/s^2 (1 ft/s^2)

  These are the representative values of the weighted root mean square **(rms)** acceleration to which the whole body is subjected. These weighted **rms** values are measured according to ISO 2631-1.

The results are compliant to the limit and action vibration values (hand/arm and whole body) as specified in European directive 2002/44/EC.

10.7 Hydraulic Pressures

System	Operating Pressure		Relief Pressure	
	bar	psi	bar	psi
Drive**	55–76	800–1100	300	4350
Steering* —normal	41–55	600–800	45–51	650–725
—while turning	90–103	1300–1500		
Vibration —single drum	103–131	1500–1900	290	4200
—dual drum	138–165	2000–2400		

** Values for hard-packed surfaces. Values may differ depending on surface.*
*** Charge pressure: 29.3 – 30.7 bar (425–445 psi).*

Threadlockers and Sealants

Threadlocking adhesives and sealants are specified throughout this manual by a notation of “S” plus a number (S#) and should be used where indicated. Threadlocking compounds normally break down at temperatures above 175°C (350°F). If a screw or bolt is hard to remove, heat it using a small propane torch to break down the sealant. When applying sealants, follow instructions on container. The sealants listed are recommended for use on Wacker Neuson equipment.

TYPE ( ) = Europe	COLOR	USAGE	PART NO. – SIZE
Loctite 222 Hernon 420 Omnifit 1150 (50M)	Purple	Low strength, for locking threads smaller than 6 mm (1/4”). Hand tool removable. Temp. range: -54 to 149°C (-65 to 300°F)	73287 - 10 ml
Loctite 243 Hernon 423 Omnifit 1350 (100M)	Blue	Medium strength, for locking threads larger than 6 mm (1/4”). Hand tool removable. Temp. range: -54 to 149°C (-65 to 300°F)	29311 - .5 ml 17380 - 50 ml
Loctite 271/277 Hernon 427 Omnifit 1550 (220M)	Red	High strength, for all threads up to 25 mm (1”). Heat parts before disassembly. Temp. range: -54 to 149°C (-65 to 300°F)	29312 - .5 ml 26685 - 10 ml 73285 - 50 ml
Loctite 290 Hernon 431 Omnifit 1710 (230LL)	Green	Medium to high strength, for locking preassembled threads and for sealing weld porosity (wicking). Gaps up to 0.13 mm (0.005”) Temp. range: -54 to 149°C (-65 to 300°F)	28824 - .5 ml 25316 - 10 ml
Loctite 609 Hernon 822 Omnifit 1730 (230L)	Green	Medium strength retaining compound for slip or press fit of shafts, bearings, gears, pulleys, etc. Gaps up to 0.13 mm (0.005”) Temp. range: -54 to 149°C (-65 to 300°F)	29314 - .5 ml
Loctite 545 Hernon 947 Omnifit 1150 (50M)	Brown	Hydraulic sealant Temp. range: -54 to 149°C (-65 to 300°F)	79356 - 50 ml
Loctite 592 Hernon 920 Omnifit 790	White	Pipe sealant with Teflon for moderate pressures. Temp. range: -54 to 149°C (-65 to 300°F)	26695 - 6 ml 73289 - 50 ml
Loctite 515 Hernon 910 Omnifit 10	Purple	Form-in-place gasket for flexible joints. Fills gaps up to 1.3 mm (0.05”) Temp. range: -54 to 149°C (-65 to 300°F)	70735 - 50 ml

Threadlockers and Sealants

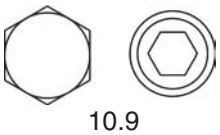
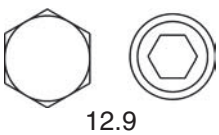
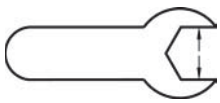
Threadlockers and Sealants (continued)

Threadlocking adhesives and sealants are specified throughout this manual by a notation of “S” plus a number (S#) and should be used where indicated. Threadlocking compounds normally break down at temperatures above 175°C (350°F). If a screw or bolt is hard to remove, heat it using a small propane torch to break down the sealant. When applying sealants, follow instructions on container. The sealants listed are recommended for use on Wacker Neuson equipment.

TYPE ( ) = Europe	COLOR	USAGE	PART NO. – SIZE
Loctite 496 Hernon 110 Omnifit Sicomet 7000	Clear	Instant adhesive for bonding rubber, metal and plastics; general purpose. For gaps up to 0.15 mm (0.006”) Read caution instructions before using. Temp. range: -54 to 82°C (-65 to 180°F)	52676 - 1oz.
Loctite Primer T Hernon Primer 10 Omnifit VC Activator	Aerosol Spray	Fast curing primer for threadlocking, retaining and sealing compounds. Must be used with stainless steel hardware. Recommended for use with gasket sealants.	2006124-6 oz.

Torque Values

Metric Fasteners (DIN)

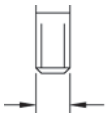
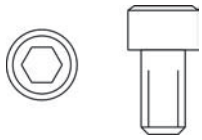
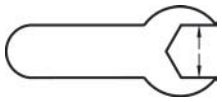
	TORQUE VALUES (Based on Bolt Size and Hardness)						**WRENCH SIZE**			
	 8.8		 10.9		 12.9					
Size	**Nm**	**ft.lb.**	**Nm**	**ft.lb.**	**Nm**	**ft.lb.**	**Metric**	**Inch**	**Metric**	**Inch**
M3	1.2	*11	1.6	*14	2.1	*19	5.5	7/32	2.5	–
M4	2.9	*26	4.1	*36	4.9	*43	7	9/32	3	–
M5	6.0	*53	8.5	6	10	7	8	5/16	4	–
M6	10	7	14	10	17	13	10	–	5	–
M8	25	18	35	26	41	30	13	1/2	6	–
M10	49	36	69	51	83	61	17	11/16	8	–
M12	86	63	120	88	145	107	19	3/4	10	–
M14	135	99	190	140	230	169	22	7/8	12	–
M16	210	155	295	217	355	262	24	15/16	14	–
M18	290	214	405	298	485	357	27	1-1/16	14	–
M20	410	302	580	427	690	508	30	1-1/4	17	–

1 ft.lb. = 1.357 Nm * = in.lb. 1 inch = 25.4 mm

Torque Values

Torque Values (continued)

Inch Fasteners (SAE)

										
Size	**Nm**	**ft.lb.**	**Nm**	**ft.lb.**	**Nm**	**ft.lb.**	**Metric**	**Inch**	**Metric**	**Inch**
No.4	0.7	*6	1.0	*14	1.4	*12	5.5	1/4	–	3/32
No.6	1.4	*12	1.9	*17	2.4	*21	8	5/16	–	7/64
No.8	2.5	*22	3.5	*31	4.7	*42	9	11/32	–	9/64
No.10	3.6	*32	5.1	*45	6.8	*60	–	3/8	–	5/32
1/4	8.1	6	12	9	16	12	–	7/16	–	3/32
5/16	18	13	26	19	33	24	13	1/2	–	1/4
3/8	31	23	45	33	58	43	–	9/16	–	5/16
7/16	50	37	71	52	94	69	16	5/8	–	3/8
1/2	77	57	109	80	142	105	19	3/4	–	3/8
9/16	111	82	156	115	214	158	–	13/16	–	–
5/8	152	112	216	159	265	195	24	15/16	–	1/2
3/4	271	200	383	282	479	353	–	1-1/8	–	5/8

1 ft.lb. = 1.357 Nm * = in.lb. 1 inch = 25.4 mm

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Wacker Neuson Limited - Room 1701–03 & 1717–20, 17/F. Tower 1, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hongkong.
Tel: (852) 3605 5360, Fax: (852) 2758 0032