NEW HOLLAND

OPERATOR'S MANUAL

MOTOR GRADER

200
TIER III

Bur • Issued 11-2006
Printed in U.S.A. • Book/Form Number 75314534 NA

TO THE OWNER

MOTORGRADER NEW HOLLAND G200

ELECTRONIC ENGINE TIER3

Read this manual before you start the engine or operate the machine. If you need more information, see your dealer.

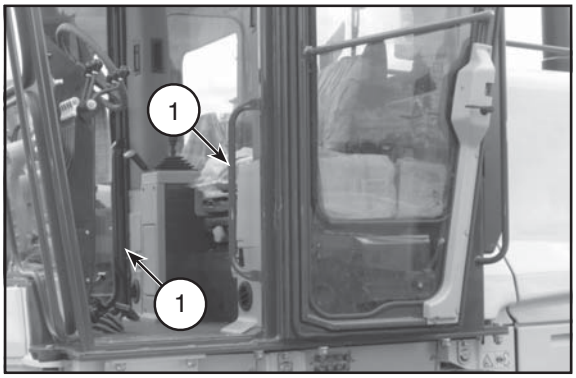
Your dealer can give you help with **NEW HOLLAND** approved service parts. Your dealer has specially trained technicians who know the best methods of repair and maintenance for your machine.

Use this manual as a guide. Your Motorgrader will remain a reliable working tool as long as it is kept in working condition and serviced properly.

SAFETY/DECALS/HAND SIGNALS

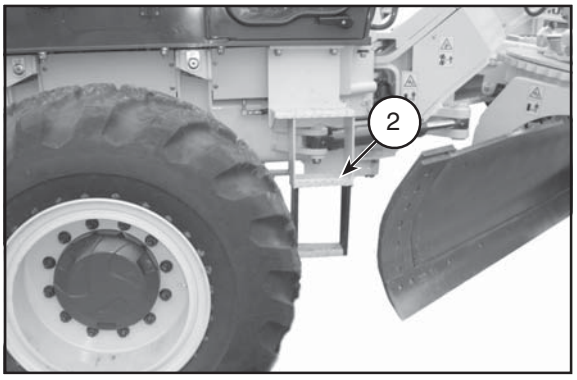
⚠ BEFORE OPERATION ⚠

- Avoid loose fitting clothing, loose or uncovered long hair, and jewelry.
- Different jobs will require different protective equipment. Items such as hard hats, protective shoes, heavy gloves, reflector type vests, respirators, ear protection, and eye protection can be required. Before you start the job, determine what protective equipment is required. Use this equipment at all times.
- Be prepared for emergencies. Always have a first aid kit and a working fire extinguisher with you and know how to use each.
- Know the hand signals used on your job. Follow the instructions of the flagman, signs, etc. See Hand Signals for more information.
- Check that all doors, guards, and covers are installed correctly or closed.
- Foreign material or grease on the steps and hand rails can cause an accident. Keep the steps and hand rails clean.
- To avoid falling, always face the machine and use the hand rails and steps when getting on or getting off. Do not rush.



1. HAND RAILS

- Remove all loose objects from the cab. Loose objects can jam controls and cause accidents.
- Before you start each day, walk around the machine and check for oil or fluid leaks. Replace all broken or missing parts and do the required lubrication and maintenance as shown in this manual. Clean all trash and debris from the machine, especially from the engine area.
- Make sure all persons are away from the machine before you start the engine.
- Before you start the engine, always fasten the seat belt.
- Before you operate at night, check that all lamps illuminate.
- Engine exhaust fumes can cause death. If you operate this machine in an enclosed area, make sure there is ventilation to replace the exhaust fumes with fresh air.
- Know the rules, laws, and safety equipment necessary for transporting this machine on a road or highway.
- If your machine has a cab make sure that all windows are clean and that the windshield wipers work correctly.



2. STEPS

SAFETY/DECALS/HAND SIGNALS

Starting

Do not run engine in closed areas without proper ventilation systems for the exhaust gases.

Never expose your head, body, feet, hands and fingers close to rotating fans or belts.

Engine

Turn radiator cap slowly to relieve system pressure, prior to removing the cap. If any coolant is needed, add only to a cold or slow running engine.

Do not refuel machine with the engine running, particularly if it is too hot, so as to prevent fire.

Never attempt to check or adjust belt tensions with the engine running.

Avoid running the engine with air intakes open without the protective guards.

If for any technical reasons, this is not possible, fit proper protections over these openings prior to servicing or operation.

Electrical System

If you have to jump start, remember cable ends must be connected as follows: (+) to (+) and (-) to (-). Avoid short-circuits. Follow carefully the instructions in this Manual. Prior to any servicing of the electrical system, ensure that the battery master switch is disconnected.

The fumes released by the battery are highly flammable. While recharging, leave batteries uncovered for better ventilation. Never check battery charge by short-circuiting the battery terminals. Do not smoke near batteries to prevent explosions.

Prior to carrying out any servicing, check for fuel or battery electrolyte leaks. Eliminate these leaks prior to proceeding with the work.

Do not charge batteries in closed areas. Check for proper ventilation to prevent possible inadvertent explosion caused by fumes buildup from the charging operation.

Hydraulic System

Fluid gushing from a hole can be invisible to the eye but have sufficient force to penetrate the skin causing serious injuries. Under these circumstances, if you have to locate leaks, use a piece of cardboard or wood.

Never use your bare hands: if the fluid penetrates your skin, see a doctor immediately. Lack of quick medical attention may lead to serious complications and skin disease.

Relieve internal system pressure prior to removing any caps, plugs, etc. (See applicable instructions).

When checking system pressures, use appropriate measuring instruments.

Implements

Keep your head, body, feet and hands away from the raised implements. Use supports provided as a safety measure, prior to proceeding to servicing and repair operations. Use proper safety elements.

If you must operate an attachment using the hydraulic machine control system, remember that this operation must be carried out only from the operator's seat position. The operator is responsible for any non-authorized persons allowed into the cab.

Ensure no other persons are within the machine's radius of operation.

Give warnings using the horn or using your own voice. Lift the attachment slowly.

Do not use the machine for transporting loose objects, unless suitable means are provided for this purpose.

When leaving the operator's cab, lower the attachment to the ground.

Prior to carrying out any servicing or repair operation with raised attachments, these must be supported on stable supports.

It is recommended that you carry a FIRST AID kit in the machine.

SAFETY/DECALS/HAND SIGNALS

HAND SIGNALS

It is recommended that you and the flagman on the job use hand signals for communications. Before you start, make sure that you both understand the signals that will be used.

START ENGINE

STOP ENGINE

COME TO ME
Move hands forward and rearward (palms in)

ALL STOP AND HOLD
Move hands forward and rearward (palms out).

INSTRUMENTS/CONTROLS

H. LOW BRAKE OIL PRESSURE

When the light is ON, this indicates insufficient oil pressure that may be caused by:

- Pump abnormalities
- Air in the brake system
- Oil leak on brake lines
- Defective pressure switch.

I. AIR FILTER RESTRICTION

When the indicator remains on constantly, the air filter element is clogged and it will be necessary to clean or replace it.

- Defective switch and/or defective panel.

J. HYDRAULIC OIL FILTER RESTRICTION

When the indicator remains on constantly, the oil filter element is clogged and it will be necessary to replace it.

K. TRANSMISSION OIL FILTER RESTRICTION

When the indicator remains on constantly, the oil filter element is clogged and it will be necessary to replace it.

L. WARNING FLASHER

This indicator flashes when the button located on the right console is pressed in.

M. RIGHT TURN SIGNAL

N. HIGH BEAM

O. LEFT TURN SIGNAL

P. SECONDARY STEERING LIGHT (OPTIONAL)

Not available.

4. DIFFERENTIAL LOCK SWITCH OPTIONAL

This switch is used to lock or unlock the differential when it is necessary. Use the differential lock switch only in straight line operation. To steer or articulate the machine the operator must turn off the differential lock switch.

IMPORTANT: *Do not turn off the differential lock system when the motorgrader is operating.*

5. GEAR AND ERROR CODE DISPLAY

This display shows the actual neutral, forward or reverse transmission gear selected.

When an error occurs the display will flash an error code indicating that a problem has been detected in the system.

When the ignition key is first turned on, the display will show three sets of double letters (TD DC ER) at the top and three 8's. The first 8 will have a diagonal line through it. This is a system light check.

If the key is left in this position without starting the engine, the display will next flash ER100 few times. This designates the revision version of the transmission's computer software.

There is also an error code ER100 but this error code only appears during recalibration.

The revision code may change. The next code will be ER101, ER102, etc.

6. STEERING WHEEL TILT LEVER

Loosen the lever and adjust the steering wheel position to obtain more comfortable operating position. Tighten lever again to assure the steering wheel does not move.

7. HOURMETER

The hourmeter indicates operating hours with the engine off and key switch in the RUN position.

INSTRUMENTS/CONTROLS

SEAT BELT

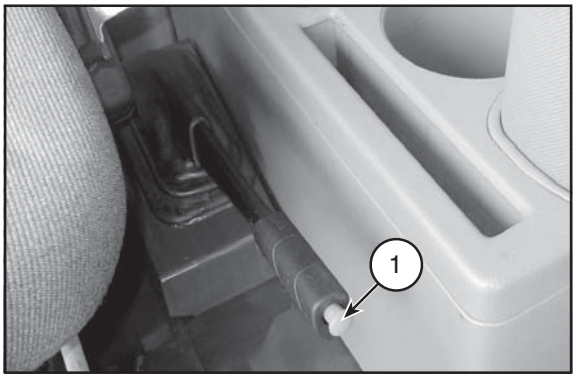
1. Pull belt from holder. Fasten the belt end into the right-hand buckle.

NOTE: *Make sure the belt end and buckle are securely fastened. Do not pull out the right-hand buckle.*

2. To release the seat belt, push the red button on the buckle.

WARNING: *Securely fasten your seat belt. Your machine is equipped with a ROPS cab, ROPS canopy or ROPS frame for your protection. The seat belt can help insure your safety if it is used and maintained. Never wear a seat belt loosely or with slack in the belt system. Never wear the belt in a twisted condition or pinched between the seat structural members.*

Parking Brake



The parking brake is hand operated. When the lever is pulled up, the ratchet teeth allow a partial or full brake application (the lever system permits other actuation positions).

To release the brake, pull the lever slowly upward, press the lock button (A) and push the lever down.

OPERATING INSTRUCTIONS

TOWING

WARNING: *Do not start suddenly at full throttle against a tow chain or cable. Take up slack carefully. Only designated towing or pulling attachments points should be used for towing or pulling operations.*

The transmission range and engine speed should be set before beginning the grading operation. Never overload the moldboard, so that the rear wheels begin to slip.

This not only alters the grade but causes unnecessary wear to rear tires.

Increasing the blade angle (putting one blade tip farther forward than the other tip) will reduce the load. The blade should be set to cast the dirt either inside or outside of the rear wheels, not under the wheels unless it is for compaction purposes.

The moldboard pitch can be changed to suit various operations. When the top of the moldboard is tilted forward the cutting edge will not slice the material, but push it. This is advantageous when pushing dirt from one location to another. Tilting the top of the moldboard to the rear will angle the cutting edge so that it will slice and create a bite into the material. This can be advantageous in heavy material because the material will roll against the moldboard, breaking it up and making it easier to move.

Using the moldboard to back drag material should be avoided if possible. This can cause heavy wear on the moldboard guides and possibly damage the side shift cylinder piston rod. If back dragging cannot be avoided, make certain material does not contact the positioning piston rod.

Worn or poorly adjusted moldboard guides will cause an unstable moldboard for fine grading.

When making heavy cuts or moving heavy loads that tend to side shift the Motorgrader, lean the front wheels toward the load to counteract side shift.

When starting a ditch, position moldboard so that one cutting edge (right or left) is directly behind and 3" (76 mm) below the front wheel, with the other end of the blade as high as possible.

Cast the material between the rear wheels. The first cut should be light enough to maintain control of the motorgrader and cut a straight ditch line. When the material accumulates under the machine, it should be cast aside before taking another cut in ditch line. Deeper ditch requires more side casting of material. If a “V” ditch is required, each side of the ditch must be cut alternately to permit the front and rear wheels to travel in the center of the ditch.

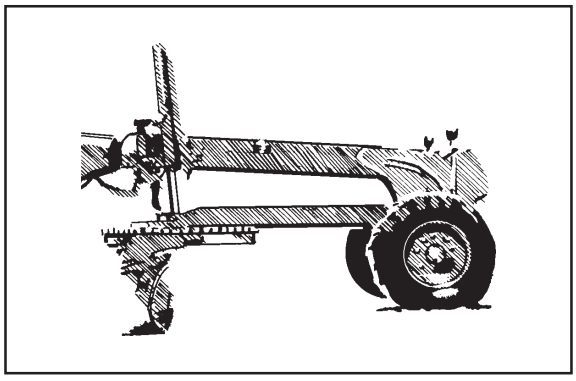
When it is necessary to cast material over the edge of a fill, side shift the moldboard to its extreme, so that the motorgrader wheels are not on edge of fill. The weight of the machine could cause the edge to give way endangering the operator. Articulation also helps in this situation.

When grading a road shoulder, it may be necessary to grade around objects, such as mailboxes abutments or utility poles. The moldboard can be side shifted around the object without changing the grade level.

BANK OR BACK SLOPING

To position the moldboard (in this case to the right side) proceed as follows:

1. Turn the circle until blade is at a right angle (90°) to the motorgrader.



BLADE POSITIONED AT RIGHT ANGLE (90°) TO MOTORGRADER

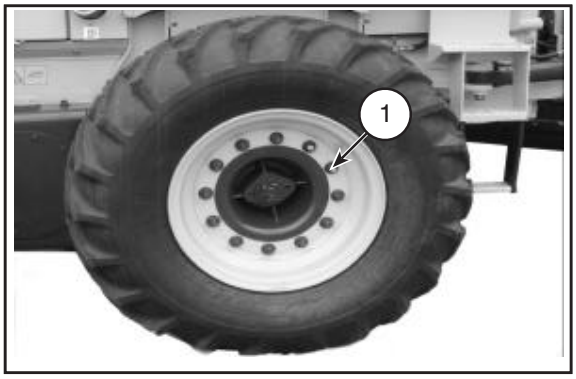
WHEELS/TIRES

WHEEL NUTS TORQUE AND TIRE PRESSURE

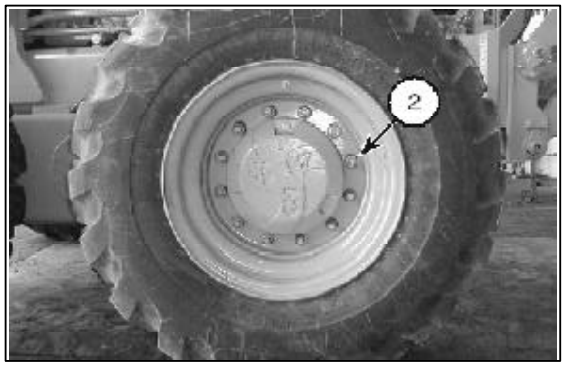
Tandem Wheel Lug Nuts

The tandem wheel lug nuts should be periodically checked for tightness.

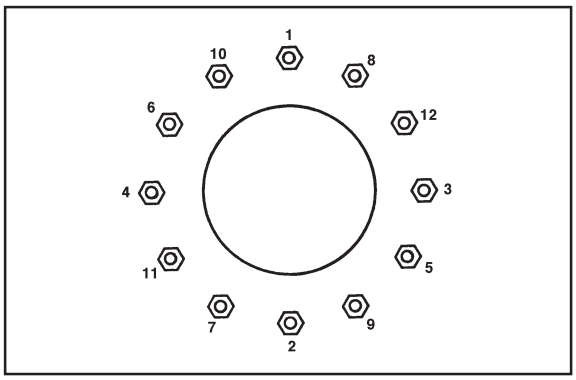
Torque the nuts to 625Nm (63,7kgf.m; 460lb.ft).



1. TANDEM WHEEL LUG NUTS



2. TANDEM WHEEL LUG NUTS (OPTIONAL)



WHEEL NUTS TIGHTENING SEQUENCE

Tire Pressure Check

WARNING: *Do not inflate the tires with flammable gases or with air from systems that use alcohol injectors. This could cause explosion and/or accidents.*

Check the pressure with a tire pressure gauge. The normal pressure is:

14.0 x 24-12 PR G2 .....2,4 bar (35 psi)
16.0 x 24-12 PR G2 .....2,1 bar (30 psi)
17.5 x 25-12 PR L2 .....3,5 bar (50 psi)
17.5 x 25-16 PR L3 .....3,5 bar (50 psi)
20.5 x 25-12 PR L2 .....2,8 bar (40 psi)
20.5 x 25-16 PR L3 .....3,5 bar (50 psi)
14.00 R24 XGLA .....3,1 bar (45 psi)

3. TIRE VALVE

Do not stand directly in front of tire while performing maintenance. Always stand to one side and extend your arm to filler valve.

Be sure tires are properly inflated to the specified pressure. Inspect for damage periodically.

Check tires only when the wheels and tires are cool to avoid under inflation. Do not use reworked wheel parts. Improper welding, heating or brazing, weakens them and can cause failure.

LUBRICATION/FILTERS/FLUIDS

FLUID LEVELS

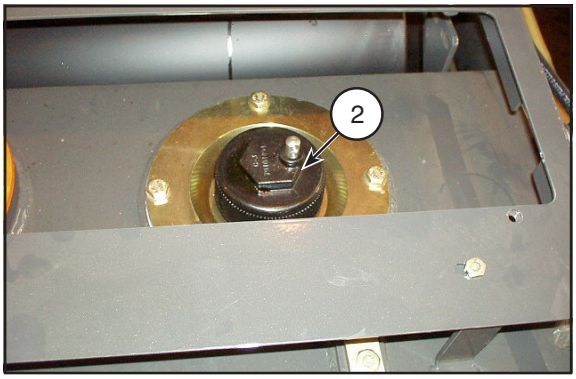
EACH 50 HOURS SERVICES

Hydraulic Tank

WARNING: *Fluid under pressure. Turn the cap slowly to relieve the pressure, before removing.*

Be sure the machine is on level ground with the engine off. Lower the moldboard to the ground. Check the oil level through sight gauge. The oil level should be at the center of the gauge. If necessary, remove the hydraulic tank filler cap and add oil.

1. OIL LEVEL GAUGE

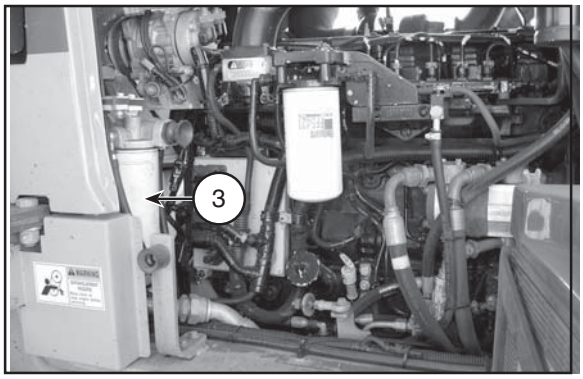


2. HYDRAULIC TANK FILLER CAP

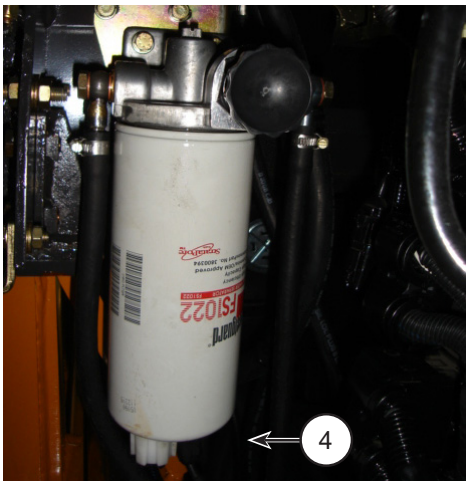
Engine Fuel Filter

Open the drain cock (4) located on the bottom of the filter to remove the accumulated water.

IMPORTANT: *The drain cock is made of plastic material. Do not over tighten when closing.*



3. WATER SEPARATOR AND FUEL FILTER



4. DRAIN BOLT

3. WATER SEPARATOR AND FUEL FILTER

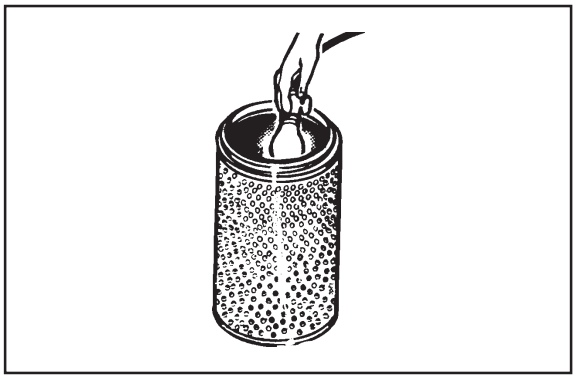
LUBRICATION/FILTERS/FLUIDS

WARNING: *Wear safety glasses with side shield or goggles when using compressed air for cleaning. This reduces the danger of accidents caused by flying particles. Limit the pressure to 30 PSI (2 bar) according to local or national requirements.*

If required clean fins inside air cleaner with a stiff fiber brush.

5. To clean element with compressed air, direct dry clean air up and down plates on clean air side of element until all dust is removed.

IMPORTANT: *The inner element of the air cleaner is extremely important. It is suggest to change it after 3 outer elements have been changed.*



6. After the filter has been cleaned and dried, it must be inspected for ruptures or holes. Place a bright light inside the element and inspect it from the outside. The light will shine through any holes or tears. If any holes are evident, install a new element.
7. Inspect inner element retaining nut (2). Change nut if it is damaged.
8. Clean inside of the air cleaner body (9) and cup (7) before reinstalling element (10). Insert element in air cleaner body and tighten wing nut (8).
9. Install cup (7) dust valve (11) at bottom and tighten clamp (5) securely. Check to see that the clamp is correctly positioned.
10. Check dust valve lips (11). The lips must be free of debris. Dirt and mud can lodge in the lips and hold them open during operation. The valve lips must be open when the engine is at low idle or is stopped. The lips must point down to function.
11. Check the air cleaner tube cap. If there is dirt, remove tube cap and blow dust from cap, remove debris if any is apparent.
12. Start engine. Observe air cleaner restriction indicator with engine running at high idle. If restriction is indicated, air cleaner inner element must be replaced. As the inner element is not cleanable, always replace it after one year of service or if a restriction is still indicated after the outer element has been cleaned.

LUBRICATION/FILTERS/FLUIDS

Hydraulic/Brake Oil Change

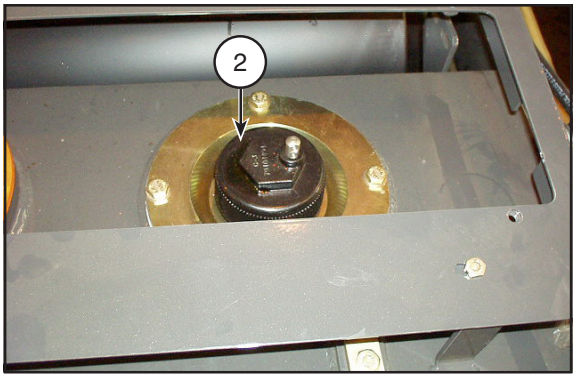
Change the hydraulic/brake oil every 2000 hours of operation or one time each year, or when ambient operating temperatures require, whichever occurs first. When changing the hydraulic oil also replace the hydraulic oil filter. Have a container available that is capable of holding 180 liters (47.5 Gal).

1. Make sure the hydraulic oil is at operating temperature.
2. Park the machine on a level surface. Lower implements to the ground and apply the parking brake.
3. Stop the engine. Put a DO NOT OPERATE tag on the steering wheel.

> **WARNING:** *Fluid under pressure. Lower implements to ground, shut off engine and move control levers several times.*
>
> *Loosen filler cap to relieve pressure, before loose fittings.*

4. Remove the drain plugs, and drain oil in a container.
5. Remove the filler cap to vent the tank as it drains. The filler element should be changed and the strainer cleaned at this time.
6. Install drain plug and fill tank with new oil.
7. Install filler cap.
8. Start the engine and operate controls so that all lines are filled.
9. Stop the engine. Check oil level. Add oil as necessary to bring to proper level.

1. HYDRAULIC OIL LEVEL GAUGE



2. HYDRAULIC OIL LEVEL FILLER

MAINTENANCE/ADJUSTMENT

Torque Specifications for ROPS Cab and ROPS

CANOPY

1. ROPS CAB AND ROPS CANOPY MOUNTING BOLTS (BOTH SIDES), TIGHTEN THE 16 BOLTS TO 772 TO 854 N.m (570 to 630 lb.ft)

NOTE: *Torque specifications are for clean, dry threads.*

Damage to the ROPS

If the machine has rolled over or the ROPS has been in some other type of accident (such as hitting an overhead object during transport), you must replace the damaged ROPS components to get as much protection as you had originally.

After an accident, check the following for damage.

A. ROPS canopy or cab.

B. Operators seat.

C. Seat belt mounting bolts and seat belt.

Before you operate the machine, replace all ROPS components that are damaged.

See the Parts Catalog or your dealer for components that are replaceable.

IMPORTANT: *DO NOT TRY TO WELD OR STRAIGHTEN THE ROPS.*

WARNING: *Improper ROPS inspection or maintenance can cause injury or death. Do the recommended ROPS inspection shown in this manual. If you must replace the ROPS, ROPS parts, or ROPS mounting hardware, use only the replacement parts shown in the* ***NEW HOLLAND*** *parts catalog for this machine.*

WARNING: *Do not modify ROPS in any manner. Unauthorized modifications such as welding, drilling, cutting or adding attachments can weaken the structure and reduce your protection. Replace ROPS if subjected to roll-over or damage. Do not attempt to repair.*

WARNING: *If you operate this machine without a ROPS and the machine rolls over, you can be injured or killed. Remove the ROPS only for service or replacement. Do not operate this machine with the ROPS removed.*

WARNING: *Adding additional weight (attachments, etc.) to the machine can cause injury or death. Do not exceed the gross weight printed on the ROPS label.*

WARNING: *Always fasten the seat belt securely before starting the Engine.*

ELECTRICAL SYSTEM

STARTING THE ENGINE USING BOOSTER BATTERIES

WARNING: *Explosive gas is produced while batteries are in use or being charged. Keep open flames and/or sparks away from the battery charging area. Charge the batteries in a well ventilated place. Park the machine on a dry firm, surface. Do not park on metal surfaces. Take care to make correct connections. Never connect a positive terminal (+) to a negative terminal (-).*

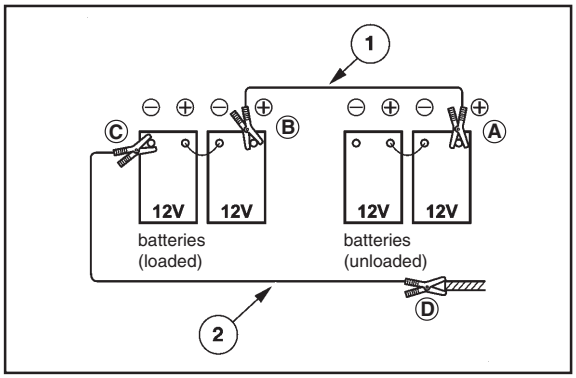
IMPORTANT: *The machine electrical system is 24 V with negative (-) ground. Use only booster batteries with same voltage.*

Connecting booster batteries

Proceed in the following order:

- Connect one terminal of the red cable (**1**) to the positive (**+**) pole of machine batteries and the other terminal of same cable to the positive (**+**) pole of booster batteries (loaded).
- Connect one terminal of the black cable (**2**) to the negative (**-**) pole of booster batteries and the other terminal of same cable to ground (machine frame).
- Start the engine.

IMPORTANT: The connection of booster batteries should not be accomplished by non-authorized personnel.



Cable connection order:

Ⓐ→Ⓑ→Ⓒ→Ⓓ

Cable disconnection order:

Ⓓ→Ⓒ→Ⓑ→Ⓐ

Disconnecting booster batteries

Proceed in the following order:

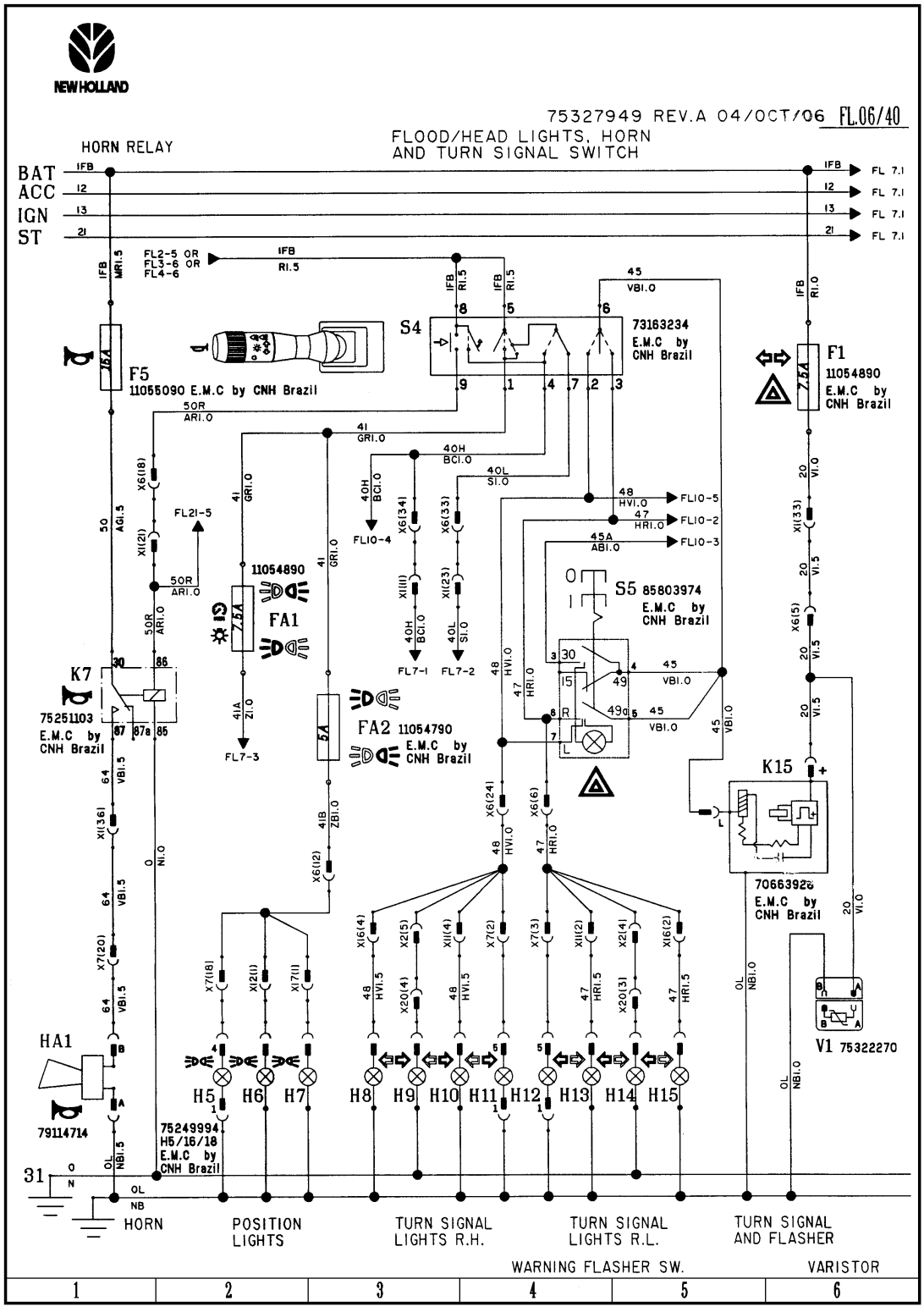
- Disconnect the black cable (**2**) terminal from ground (machine frame), then disconnect the other terminal of same cable from the negative (**-**) pole of booster batteries (loaded).
- Disconnect the red cable (**1**) terminal from the positive (**+**) pole of booster batteries, then disconnect the other terminal of same cable from the positive (**+**) pole of machine batteries (unloaded).

ELECTRICAL SYSTEM

Fault Code	Lamp Color	Cummins Description
415	Red	Oil Pressure Low - Data Valid but Below Normal Operational Range - Most Severe Level
418	—	Water in Fuel Indicator High - Data Valid but Above Normal Operational Range - Least Severe Level
428	Amber	Water in Fuel Sensor Circuit - Voltage Above Normal, or Shorted to High Source
429	Amber	Water in Fuel Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
431	Amber	Accelerator Pedal or Lever Idle Validation Circuit - Data Erratic, Intermittent, or Incorrect
432	Red	Accelerator Pedal or Lever Idle Validation Circuit - Out of Calibration
433	Amber	Intake Manifold Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect
434	Amber	Power Lost without Ignition Off - Data Erratic, Intermittent, or Incorrect
435	Amber	Oil Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect
441	Amber	Battery #1 Voltage Low - Data Valid but Below Normal Operational Range - Moderately Severe Level
442	Amber	Battery #1 Voltage High - Data Valid but Above Normal Operational Range - Moderately Severe Level
443	Amber	Accelerator Pedal or Lever Position Sensor Supply Voltage Circuit - Voltage Below Normal, or Shorted to Low Source
449	Red	Fuel Pressure High - Data Valid but Above Normal Operational Range - Moderately Severe Level
451	Amber	Injector Metering Rail #1 Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source
452	Amber	Injector Metering Rail #1 Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source
497	Amber	Multiple Unit Synchronization Switch Circuit - Data Erratic, Intermittent, or Incorrect
523	Amber	OEM Intermediate (PTO) Speed switch Validation - Data Erratic, Intermittent, or Incorrect
551	Amber	Accelerator Pedal or Lever Idle Validation Circuit - Voltage Below Normal, or Shorted to Low Source
553	Amber	Injector Metering Rail #1 Pressure High - Data Valid but Above Normal Operational Range - Moderately Severe Level
554	Amber	Fuel Pressure Sensor Error - Data Erratic, Intermittent, or Incorrect
559	Amber	Injector Metering Rail #1 Pressure Low - Data Valid but Below Normal Operational Range - Moderately Severe Level
584	Amber	Starter Relay Circuit - Voltage Above Normal, or Shorted to High Source
585	Amber	Starter Relay Circuit - Voltage Below Normal, or Shorted to Low Source
595	Amber	Turbocharger #1 Speed High - Data Valid but Above Normal Operational Range - Moderately Severe Level
596	Amber	Electrical Charging System Voltage High - Data Valid but Above Normal Operational Range - Moderately Severe Level
597	Amber	Electrical Charging System Voltage Low - Data Valid but Below Normal Operational Range - Moderately Severe Level
598	Red	Electrical Charging System Voltage Low - Data Valid but Below Normal Operational Range - Most Severe Level
649	—	Change Lubricating Oil and Filter - Condition Exists
687	Amber	Turbocharger #1 Speed Low - Data Valid but Below Normal Operational Range - Moderately Severe Level

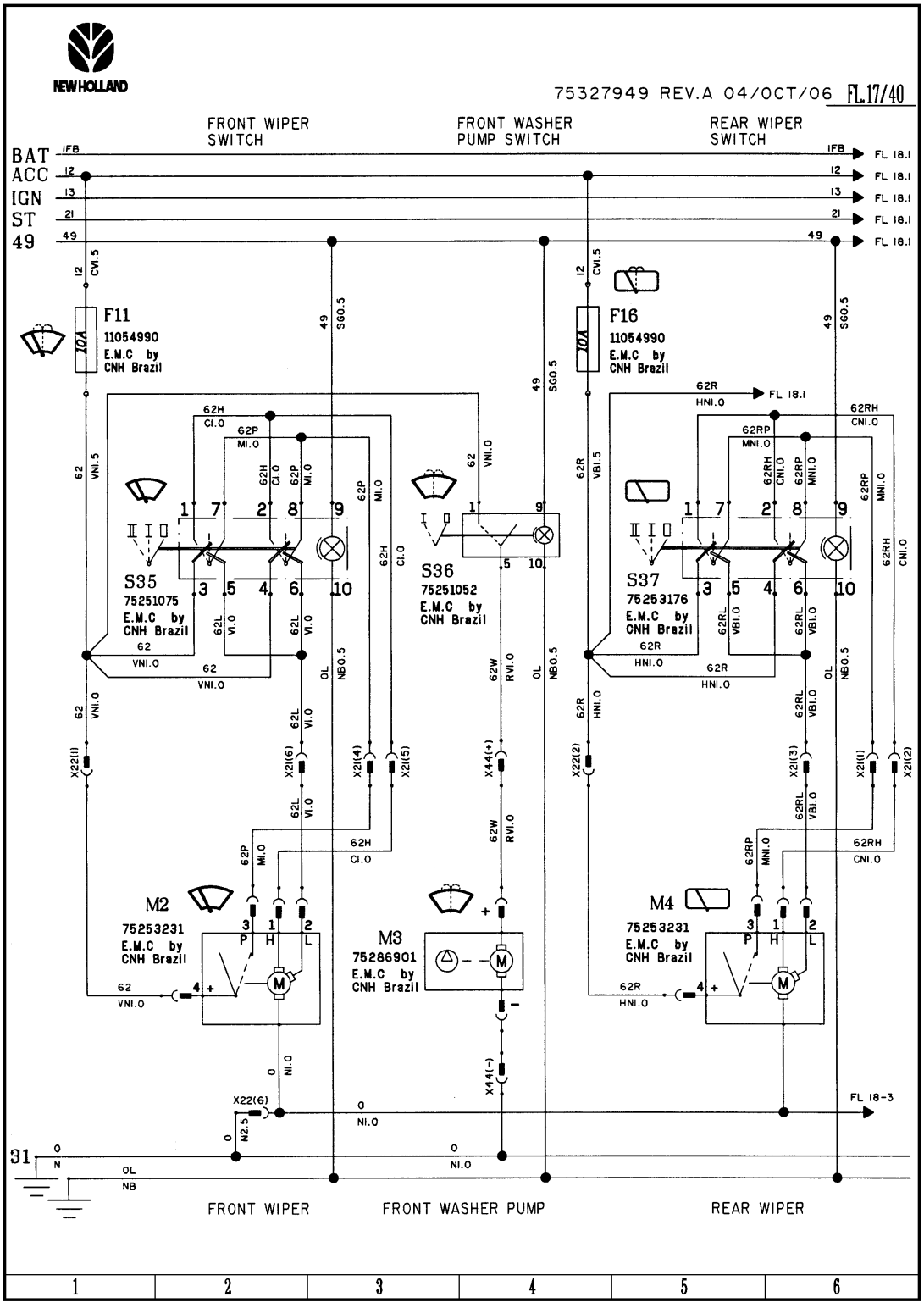
ELECTRICAL SYSTEM

DIAGRAM 3 - SHEET 6



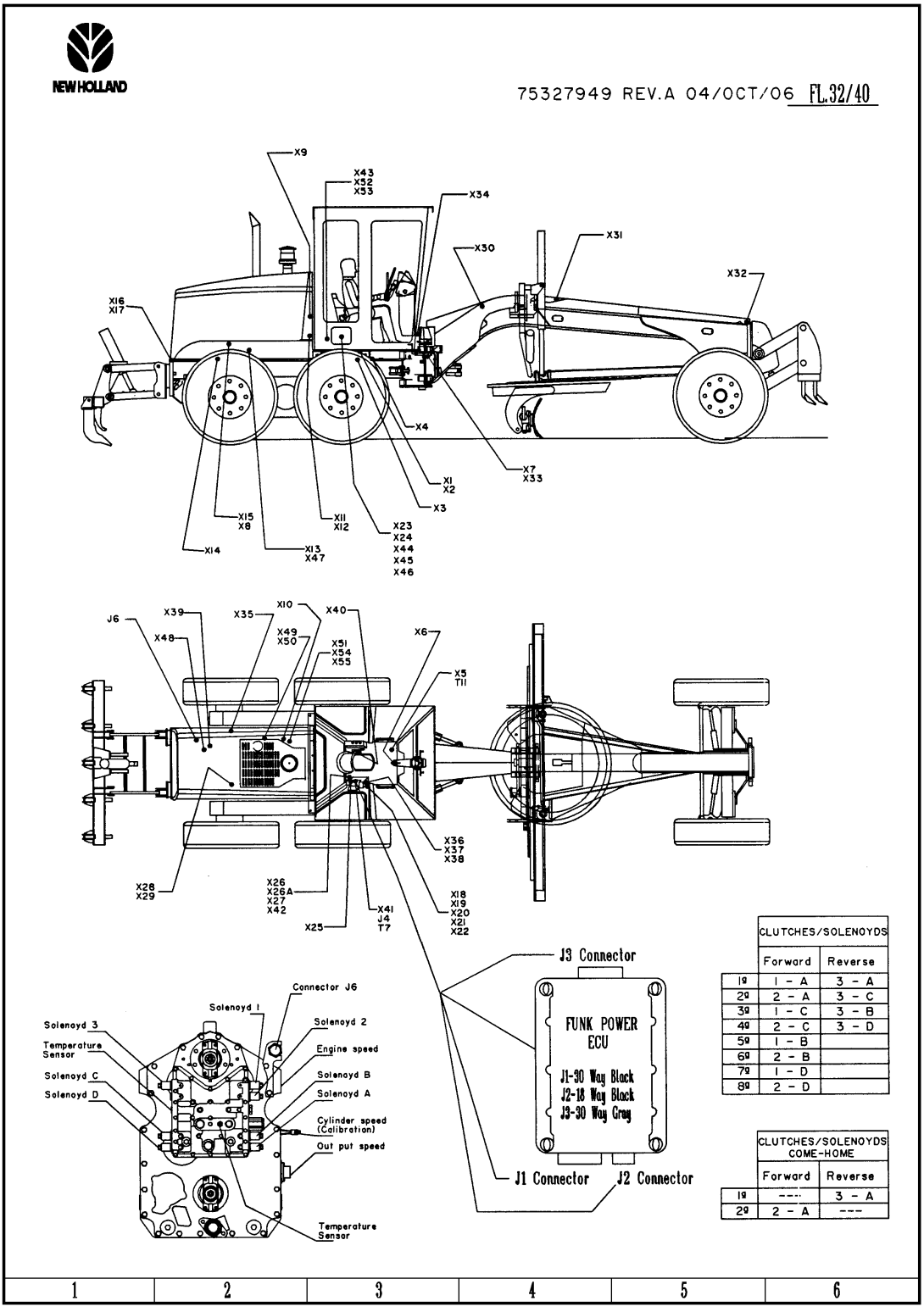
ELECTRICAL SYSTEM

DIAGRAM 13 - SHEET 17



ELECTRICAL SYSTEM

DIAGRAM 23 - SHEET 32



CLUTCHES/SOLENOYDS		
	Forward	Reverse
1º	1 - A	3 - A
2º	2 - A	3 - C
3º	1 - C	3 - B
4º	2 - C	3 - D
5º	1 - B	
6º	2 - B	
7º	1 - D	
8º	2 - D	

CLUTCHES/SOLENOYDS COME-HOME		
	Forward	Reverse
1º	----	3 - A
2º	2 - A	---