JOHN DEERE
WORLDWIDE COMMERCIAL & CONSUMER EQUIPMENT DIVISION

2195

Gator™ Utility Vehicle
HPX 4X2 and 4X4 Gas and Diesel

TM2195 JANUARY 2006

TECHNICAL MANUAL



JOHN DEERE

North American Version
Litho in U.S.A.

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Manual Description

This technical manual is written for an experienced technician and contains sections that are specifically for this product. It is a part of a total product support program.

The manual is organized so that all the information on a particular system is kept together. The order of grouping is as follows:

- Table of Contents
- Specifications and Information
- Identification Numbers
- Tools and Materials
- Component Location
- Schematics and Harnesses
- Theory of Operation
- Operation and Diagnostics
- Diagnostics
- Tests and Adjustments
- Repair
- Other

NOTE: Depending on the particular section or system being covered, not all of the above groups may be used.

The bleed tabs for the pages of each section will align with the sections listed on this page. Page numbering is consecutive from the beginning of the Safety section through the last section.

We appreciate your input on this manual. If you find any errors or want to comment on the layout of the manual please contact us.

Safety
Specifications
Engine - Gas
Engine - Diesel
Electrical
Drive Train
Steering
Brakes
Miscellaneous

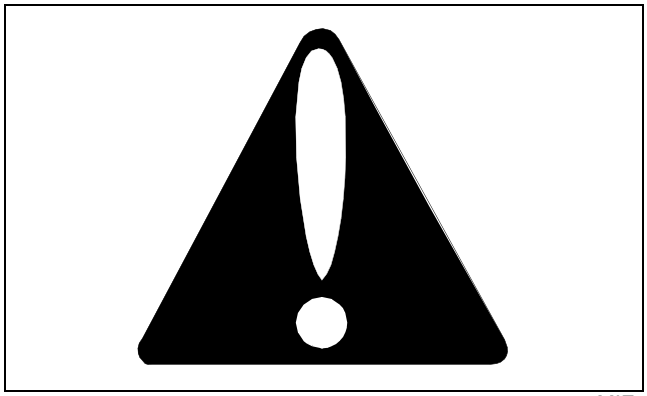
All information, illustrations and specifications in this manual are based on the latest information at the time of publication. The right is reserved to make changes at any time without notice.

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Recognize Safety Information



MIF

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

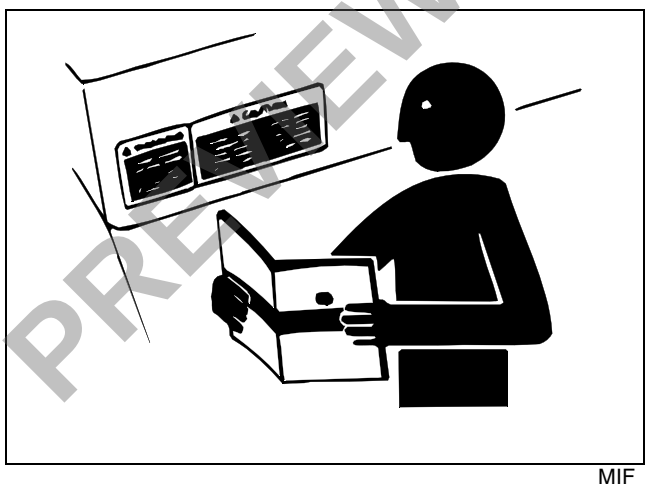
Follow recommended precautions and safe servicing practices.

Understand Signal Words

A signal word - DANGER, WARNING, or CAUTION - is used with the safety-alert symbol. DANGER identifies the most serious hazards.

DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

Replace Safety Signs

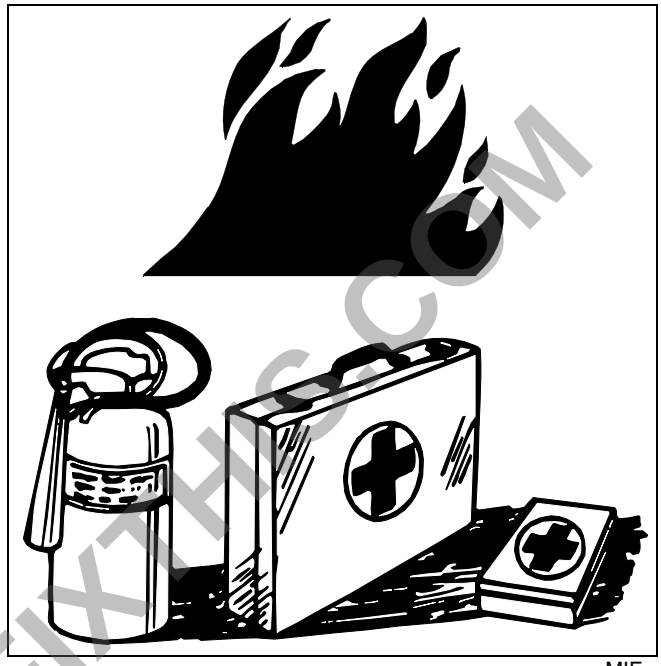


MIF

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

Handle Fluids Safely - Avoid Fires

Be Prepared For Emergencies



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- When you work around fuel, do not smoke or work near heaters or other fire hazards.
- Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.
- Make sure machine is clean of trash, grease, and debris.
- Do not store oily rags; they can ignite and burn spontaneously.
- Be prepared if a fire starts.
- Keep a first aid kit and fire extinguisher handy.
- Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.

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Specifications

General Specifications

Make	Kawasaki
Model	FD620D
Type	4-cycle gas/Liquid Cooled
Power	14.9 kW (20.0 hp)
Cylinders	2
Bore	74 mm (2.900 in.)
Stroke	68 mm (2.660 in.)
Displacement	617 cm^3 (37.7 cu-in.)
Spark Plug	NGK BPR2ES (M138938)
Spark Plug Gap	0.80 mm (0.031 in.)
Fuel Tank	20.0 L (5.25 gal)
Crankcase (with filter)	1.3 L (1.37 qt)
Engine Oil	John Deere PLUS-4® SAE 10W-40
	John Deere TURF-GARD® SAE 10W-40
Cooling system (Including recovery tank)	5.0 L (5.2 qt)

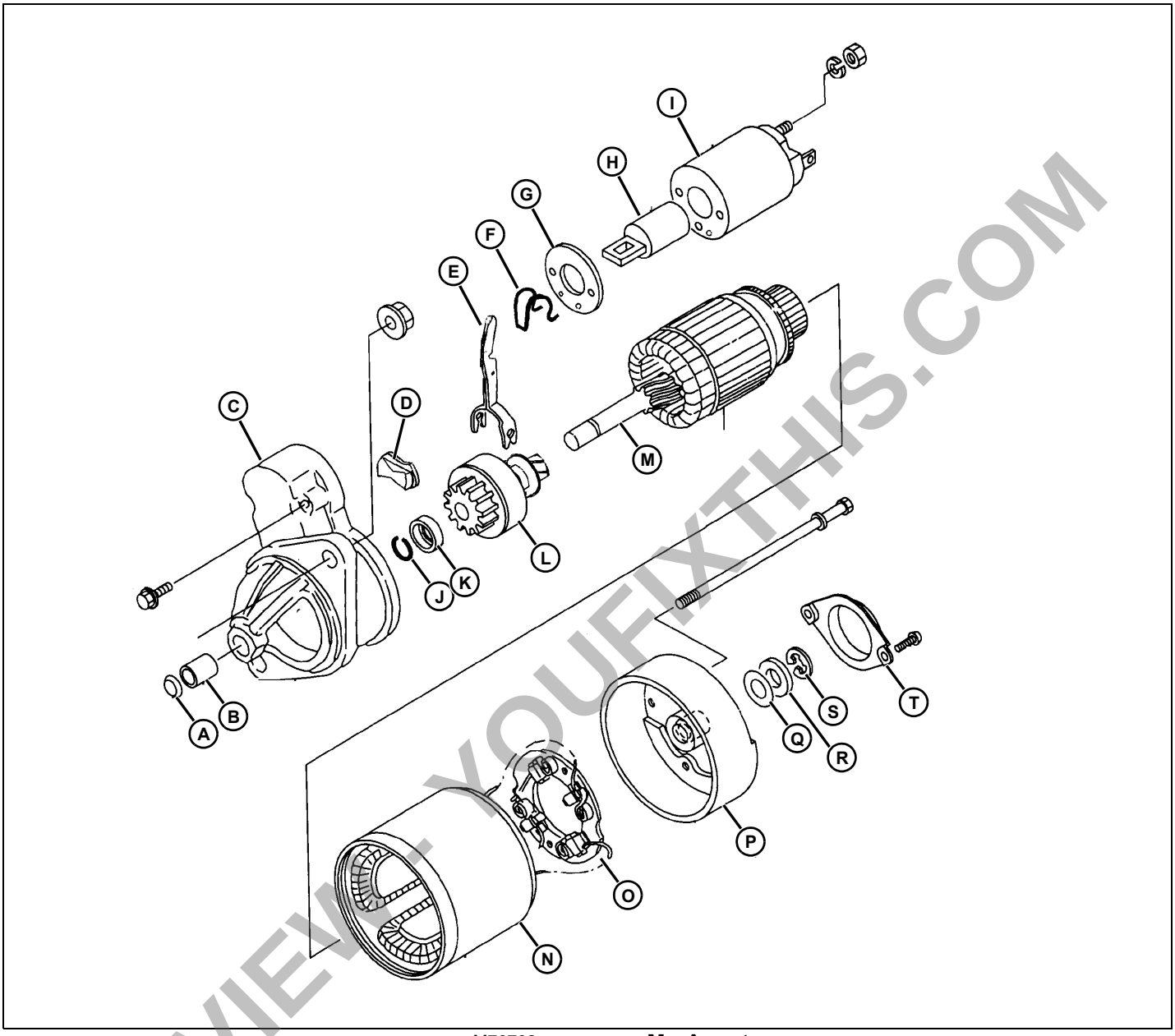
Test and Adjustment Specifications

Engine:	
Low Speed Idle (Governed)	1155 ± 75 rpm
High Speed Idle	3750 ± 25 rpm
Oil pressure sensor activates	98 kPa (14.2 psi)
Oil pressure (minimum)	276 kPa (40 psi)
Oil filter bypass valve opening pressure	78.5 - 117.5 kPa (11.4 - 17.1 psi)
Cylinder compression pressure (minimum)	1171 kPa (170 psi)
Maximum compression pressure variation between cylinders	138 kPa (20 psi)
Crankcase vacuum (minimum)	25 mm (1 in.) H2O
Intake and exhaust valve clearance (cold)	0.25 mm (0.01 in.)
Intake and exhaust valve adjustment interval	300 hrs
Valve clearance adjusting nut torque	9 N•m (79 lb-in.)
Fuel/Air System:	
Fuel Pump	
Minimum flow	105 ml (3.5 oz) in 15 seconds
Minimum pressure	10 kPa (1.5 psi)
Carburetor SLOW idle stop screw setting	50 rpm less than governed idle setting
Governed SLOW idle stop screw setting	1125 ± 75 rpm
Throttle control arm HIGH idle stop screw setting	3750 ± 75 rpm

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Starting Motor



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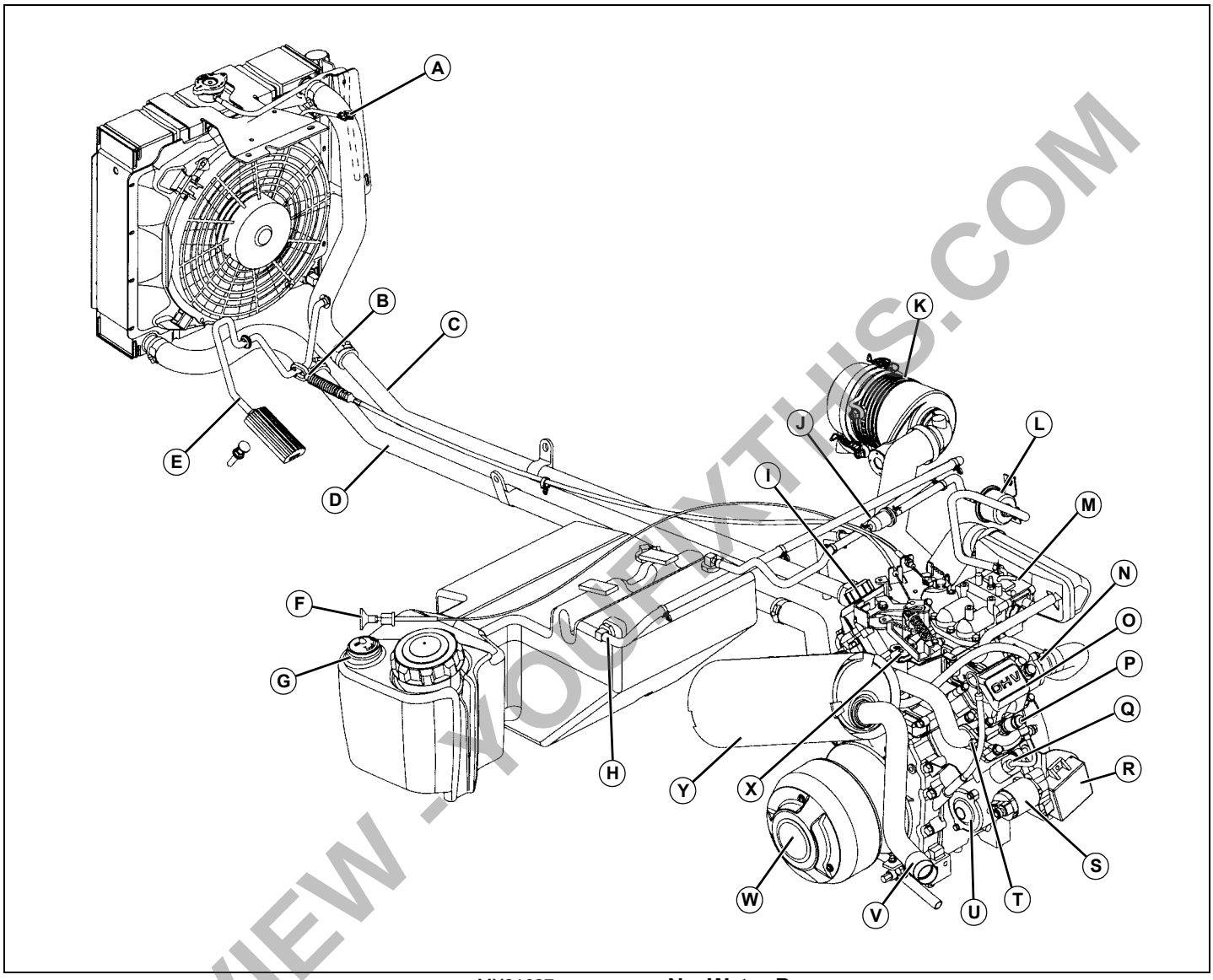
A - End Cap
B - Cover Bushing
C - End Frame
D - Dust Cap
E - Shift Fork
F - Clutch Fork Pivot
G - Shim Plate
H - Plunger
I - Solenoid
J - Retaining Ring
K - Pinion Stopper
L - Clutch
M - Armature
N - Field Coil Housing
O - Filed Brush Holder
P - Rear Cover
Q - Shim
R - Shim
S - E-Clip
T - Cap

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Component Location

Engine Component Location



MX31637

A - Thermostat Connector
B - Throttle Cable
C - Radiator Hose
D - Radiator Return Hose
E - Throttle Pedal
F - Choke Cable Control Knob
G - Fuel Gauge
H - Fuel Line
I - Oil Fill Cap
J - Fuel Filter
K - Air Filter Assembly
L - Fuel Pump
M - Carburetor
N - Water Pump
O - Valve Cover
P - Spark Plug
Q - Igniter
R - Engine Control Module
S - Starting Motor Solenoid
T - Exhaust Port
U - Starting Motor
V - Spark Arrester
W - Drive Clutch
X - Governor Assembly
Y - Muffler

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Tests and Adjustments

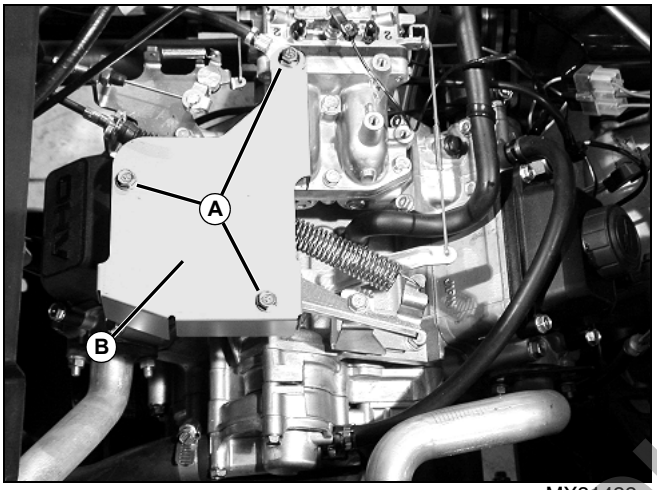
Governor: Static Adjustment

Reason:

To properly position governor arm to governor shaft for proper governor operation.

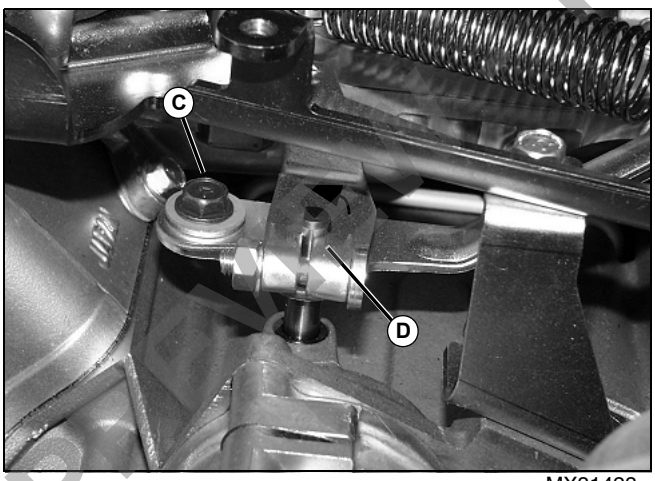
Procedure:

1. Park machine safely. (See Parking Safely in safety section) Raise cargo box.



MX31422

2. Remove three cap screws (A) and throttle control arm cover (B).



MX31423

3. Press accelerator pedal down and place a heavy weight on pedal.

IMPORTANT: Avoid damage! Cap screw has left-hand threads.

4. Loosen cap screw (C) on governor arm. Turn governor shaft and bracket (D) counterclockwise to remove any slack in governor linkage and arm.

IMPORTANT: Avoid damage! DO NOT move throttle control arm by hand, this will kink the wire cable and damage it. Use throttle pedal only.

5. Hold shaft and tighten cap screw (C).

High Idle Speed Adjustment

Reason:

To ensure engine is running at proper high idle speed.

Equipment:

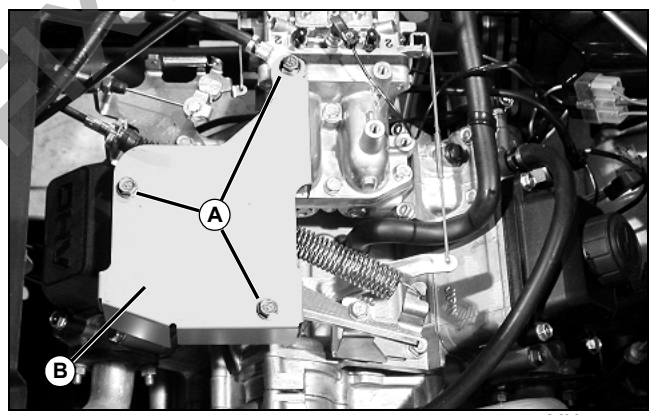
- JT05801 Induction Tachometer

-or-

- JT05719 Digital Tachometer

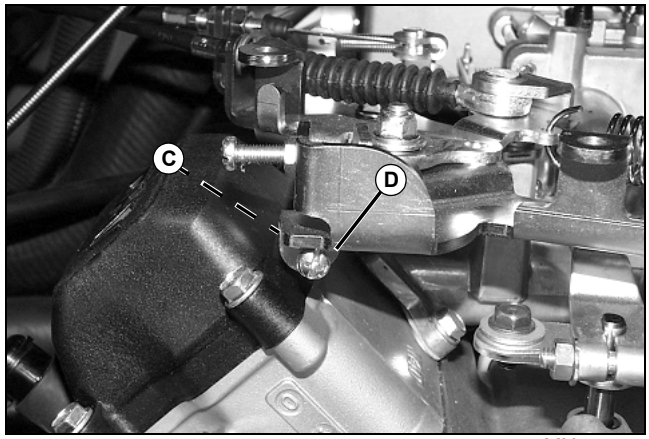
Procedure:

1. Park machine safely and raise cargo box. (See Parking Safely in safety section)



MX31422

2. Remove three cap screws (A) and throttle control arm cover (B).



MX31544

3. Start and warm up engine. Run engine at full throttle and check rpms with tachometer. Record reading.

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4. High idle speed should be 3750 ±75 rpm. If rpms are not within specification, loosen jam nut behind bracket (C) and adjust screw (D) until proper rpm is obtained and tighten jam nut.

Slow Idle Mixture and Governed Low Idle Adjustments

Reason:

To ensure correct fuel/air mixture and engine is running at proper slow idle speed

NOTE: Adjust fast idle before slow idle and mixture speed adjustment.

Equipment:

- JT05801 Induction Tachometer

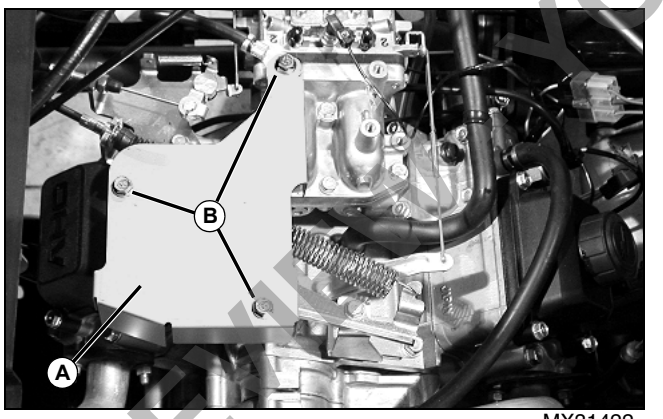
-or-

- JT05719 Digital Tachometer

Procedure:

1. Park machine safely and raise cargo box. (See "Parking Safely" on page 6 in Safety section.)

IMPORTANT: Avoid damage! Do not move the throttle control arm by hand. This will kink the wire cable and damage it. Use throttle pedal only.



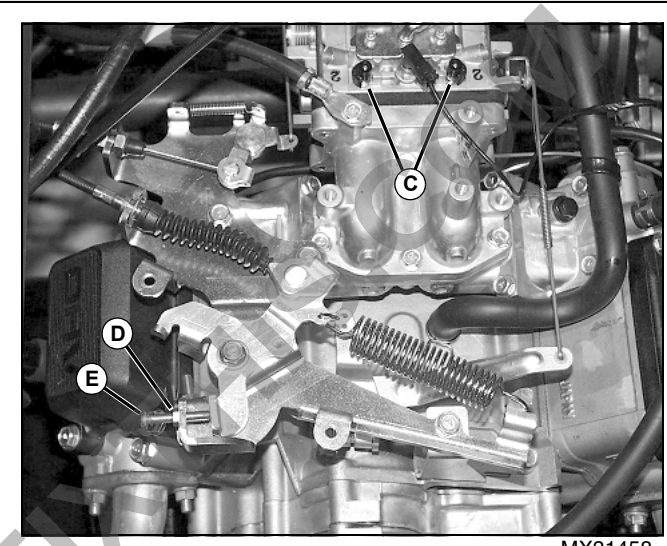
MX31422

2. Remove throttle control arm cover (A) by removing three cap screws (B).

NOTE: When throttle pedal is released, it takes approximately 30 seconds for idle speed to stabilize.

3. Run engine at fast idle until cooling fan starts. Release throttle pedal.

CAUTION: Avoid Injury! Engine components are HOT. Be extra careful not to touch the exhaust pipe or muffler while making adjustments. Wear protective eye glasses and clothing.



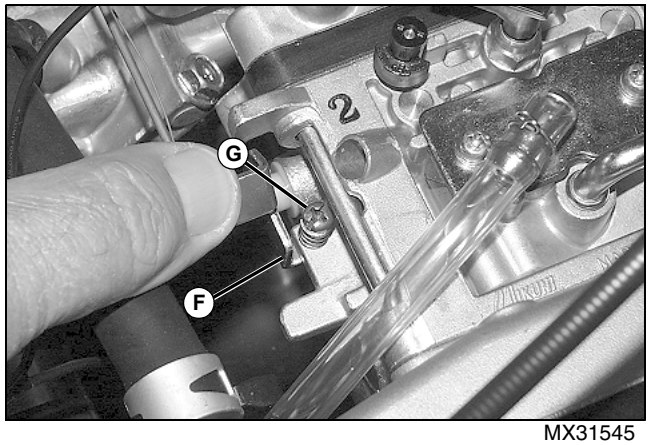
MX31458

4. Check governed idle speed with tachometer. Engine should be idling at 1155 ±75 rpm. If idle speed is not within specification, loosen jam nut (D) and adjust slow idle stop screw (E) until proper idle speed is obtained and tighten jam nut.

NOTE: Do not remove mixture screw limiter caps or force beyond stops.

5. Turn slow idle mixture screws (C), until smoothest idle is obtained.

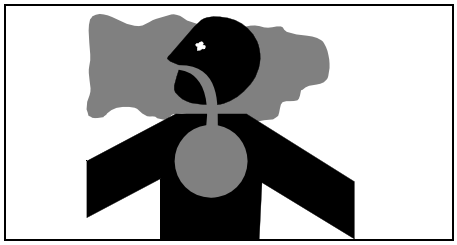
6. Repeat step 4 if necessary.



MX31545

7. Push and hold throttle so that tab (F) is against slow idle stop screw (G). While checking idle speed with tachometer, adjust screw until engine speed is 100 rpm less than governed idle speed (Step 4).

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IMPORTANT: Avoid damage! California Proposition 65 Warning: Gasoline engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Gasoline Storage

IMPORTANT: Avoid damage! Keep all dirt, scale, water or other foreign material out of gasoline.

Keep gasoline stored in a safe, protected area. Storage of gasoline in a clean, properly marked ("UNLEADED GASOLINE") POLYETHYLENE PLASTIC container WITHOUT any metal screen or filter is recommended. DO NOT use de-icers to attempt to remove water from gasoline or depend on fuel filters to remove water from gasoline. Use a water separator installed in the storage tank outlet. BE SURE to properly discard unstable or contaminated gasoline. When storing the machine or gasoline, it is recommended that you add **John Deere Gasoline Conditioner and Stabilizer (TY15977)** or an equivalent to the gasoline. BE SURE to follow directions on container and to properly discard empty container.

Diesel Fuel

CAUTION: Avoid Injury! California Proposition 65 Warning: Diesel engine exhaust and some of its elements from this product are known to the State of California to cause cancer, birth defects, or other reproductive harm.

In general, diesel fuels are blended to satisfy the low air temperature requirements of the geographical area in which they are sold.

In North America, diesel fuel is usually specified to **ASTM D975** and sold as either **Grade 1** for cold air temperatures or **Grade 2** for warm air temperatures.

If diesel fuels being supplied in your area DO NOT meet any of the above specifications, use diesel fuels with the following equivalent properties:

- **Cetane Number 40 (minimum)**

A cetane number **greater than 50 is preferred**, especially for air temperatures below -20°C (-4°F) or elevations above 1500 m (5000 ft).

- **Cold Filter Plugging Point (CFPP)**

The air temperature at which diesel fuel **begins to cloud or jell** - at least 5°C (9°F) below the expected low air temperature range.

- **Sulfur Content of 0.05% (maximum)**

Diesel fuels for highway use in the United States now require sulfur content to be **less than 0.05%.**

If diesel fuel being used has a sulfur content **greater than 0.05%, reduce the service interval for engine oil and filter by 50%.**

Consult your local diesel fuel distributor for properties of the diesel fuel available in your area.

Diesel Fuel Lubricity

Diesel fuel must have adequate lubricity to ensure proper operation and durability of fuel injection system components. Fuel lubricity should pass a **minimum of 3300 gram load level** as measured by the **BOCLE** scuffing test.

Diesel Fuel Storage

IMPORTANT: Avoid damage! DO NOT USE GALVANIZED CONTAINERS - diesel fuel stored in galvanized containers reacts with zinc coating in the container to form zinc flakes. If fuel contains water, a zinc gel will also form. The gel and flakes will quickly plug fuel filters and damage fuel injectors and fuel pumps.

It is recommended that diesel fuel be stored **ONLY** in a clean, approved **POLYETHYLENE PLASTIC** container **WITHOUT** any metal screen or filter. This will help prevent any accidental sparks from occurring. Store fuel in an area that is well ventilated to prevent possible igniting of fumes by an open flame or spark, this includes any appliance with a pilot light.

IMPORTANT: Avoid damage! Keep all dirt, scale, water or other foreign material out of fuel.

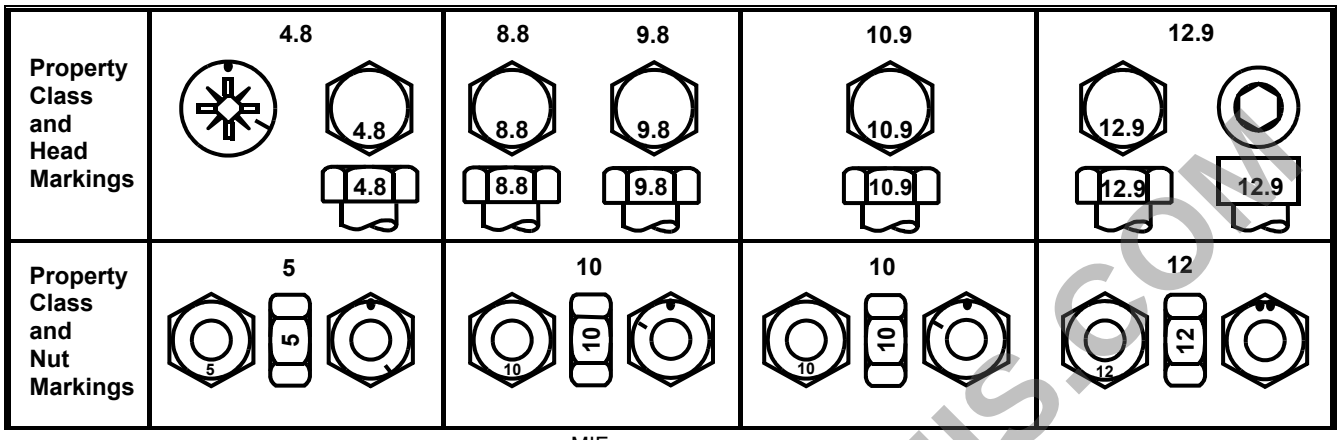
Keep fuel in a safe, protected area and in a clean, properly marked **("DIESEL FUEL")** container. **DO NOT** use de-icers to attempt to remove water from fuel. **DO NOT** depend on fuel filters to remove water from fuel. It is recommended that a water separator be installed in the storage tank outlet. **BE SURE** to properly discard unstable or contaminated diesel fuel and/or their containers when necessary.

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Specifications

Metric Fastener Torque Values



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	Class 4.8				Class 8.8 or 9.8				Class 10.9				Class 12.9			
	Lubricated a		Dry a		Lubricated a		Dry a		Lubricated a		Dry a		Lubricated a		Dry a	
SIZE	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft	N•m	lb-ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	109
M16	100	73	125	92	190	140	240	175	275	200	350	225	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

DO NOT use these hand torque values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only and include a ±10% variance factor. Check tightness of fasteners periodically. DO NOT use air powered wrenches.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same grade. Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

When bolt and nut combination fasteners are used, torque values should be applied to the NUT instead of the bolt head.

Tighten toothed or serrated-type lock nuts to the full torque value.

a *“Lubricated” means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings. “Dry” means plain or zinc plated (yellow dichromate - Specification JDS117) without any lubrication*.

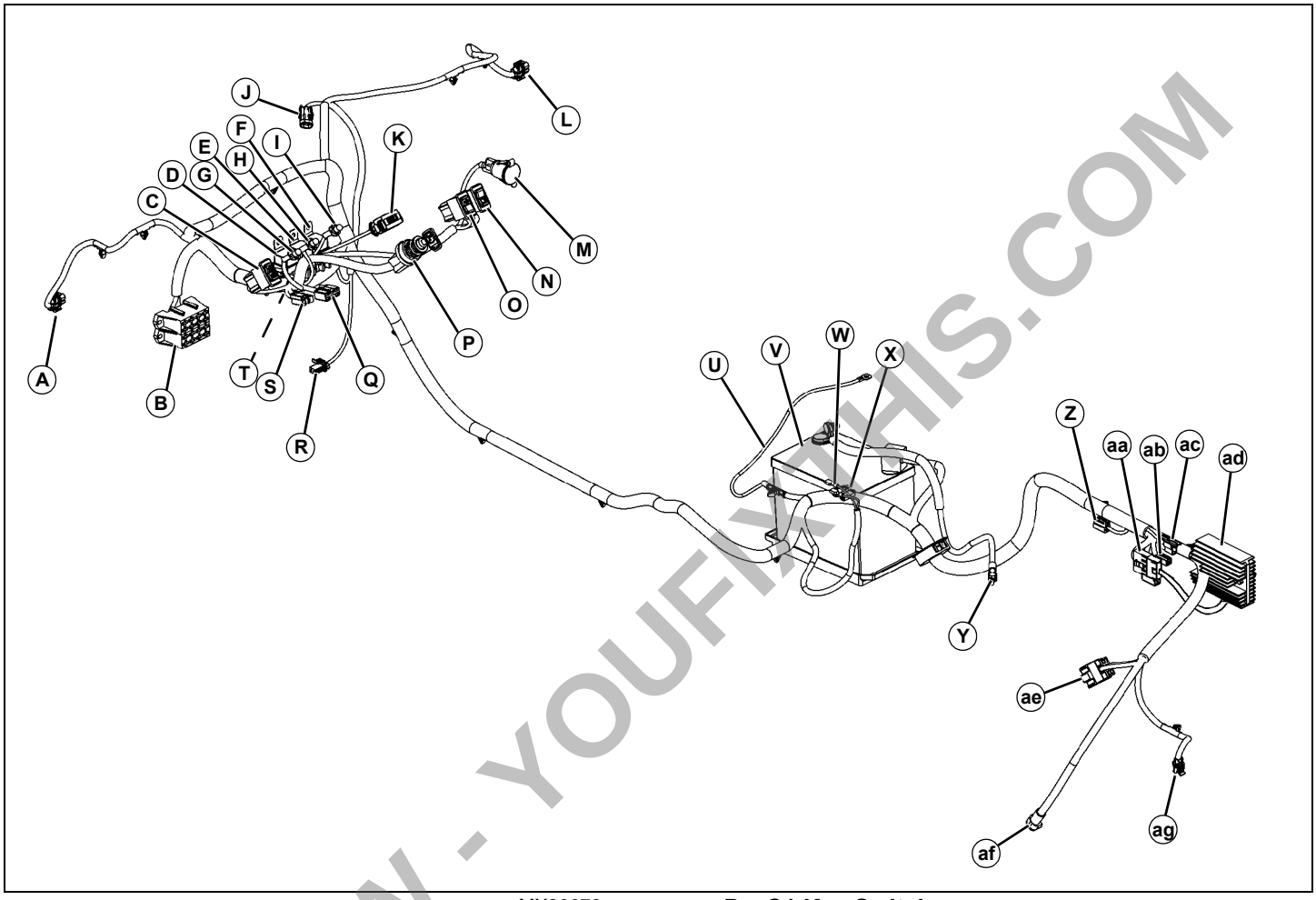
Reference: JDS - G200.

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Component Location (SN 40001-)

Electrical Components - Gas Engines



MX36672

Picture Note: Shown from left rear

A - E3 Left Headlight
B - Fuse Blocks
C - S5 Cargo Box Lift Switch (Option)
D - K1 Start Relay
E - K2 Radiator Fan Relay
F - K3 4WD Interlock Relay
G - H3 Oil Pressure Light
H - H2 Engine Temperature Light
I - H1 Park Brake Light
J - X5 Radiator Fan Connector
K - P1 Hourmeter
L - E4 Right Headlight
M - X13 12VDC Power Port
N - S4 Light Switch
O - S5 4WD Switch
P - S1 Key Switch
Q - X15 Front Light Harness Connector
R - X18 4WD Clutch
S - X14 Front Power Connector
T - V1 Diode
U - Frame Ground Wire
V - G1 Battery
W - S3 Park Brake Switch Connectors
X - X8 Accessory Connectors
Y - Engine Ground
Z - X2 Fuel Pump Connector
AA- X3 Voltage Regulator/Rectifier Connector
AB- X17 Rear Power Connector
AC- X16 Rear Lights Harness Connector
AD- N1 Voltage Regulator/Rectifier
AE- X1 and X4 Engine Wiring Harness Connectors
AF- M1 Starting Motor
AG- S2 Neutral Start Switch

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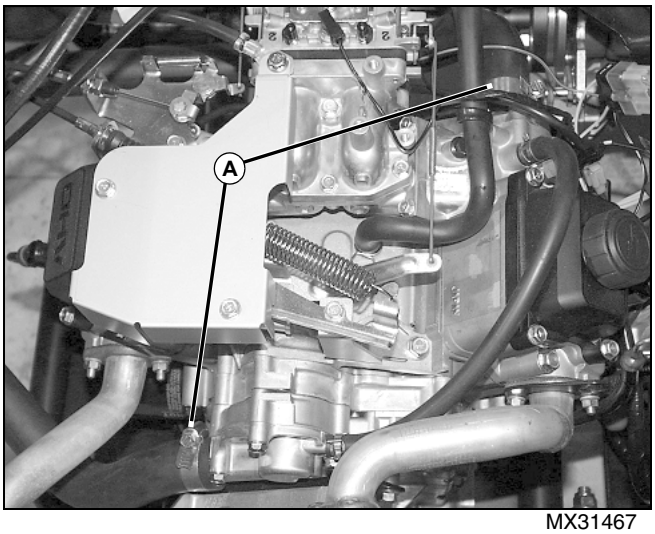
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Engine Removal and Installation

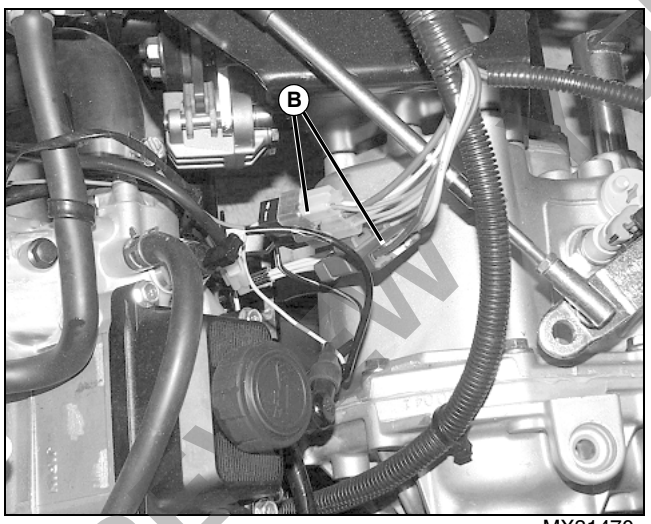
Removal:

1. Disconnect battery negative (-) cable.
2. Remove muffler and drive belt.



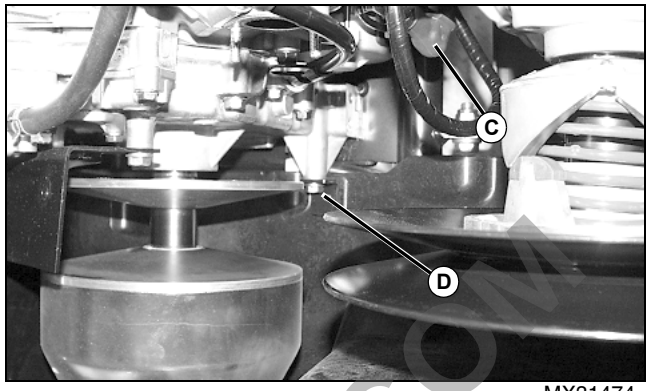
MX31467

3. Place a large drain pan under engine to catch coolant. Loosen radiator cap. Loosen coolant hose clamps (A) and disconnect hoses from engine.



MX31470

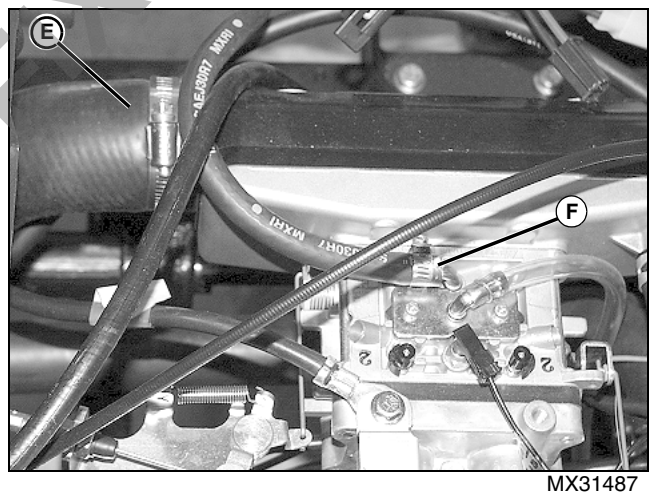
4. Disconnect engine wiring harness connectors (B).



MX31474

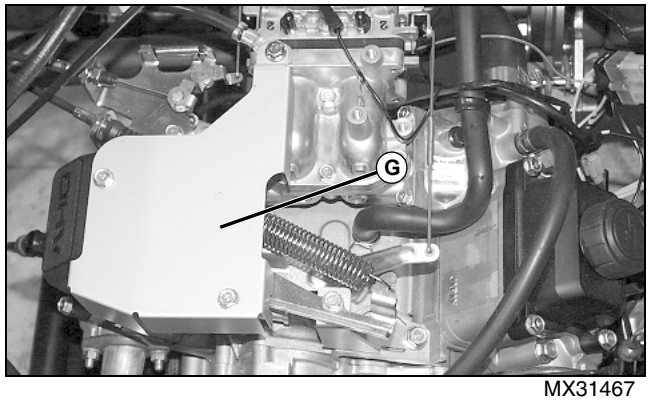
5. Disconnect battery positive (+) cable (C) from starting motor solenoid.
6. Remove cap screw (D) from clutch guard bracket.

CAUTION: Avoid Injury! Gasoline vapor is explosive. Do not expose to spark or flame. Serious personal injury can result.



MX31487

7. Remove air cleaner-to-engine hose (E) and fuel supply hose (F).

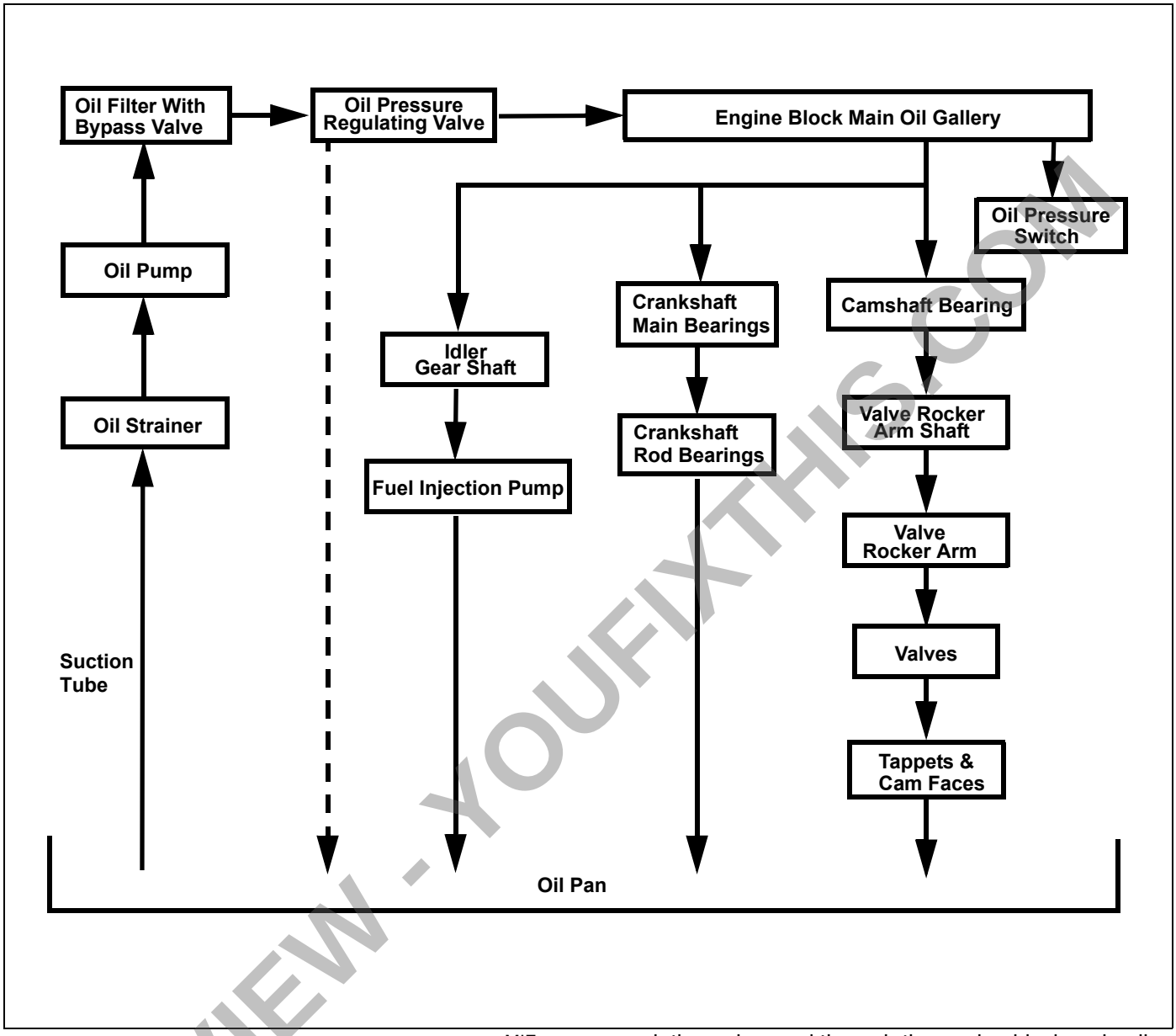


MX31467

8. Remove three cap screws and governor control cover (G).

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Lubrication System Theory of Operation



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Function:

A full pressure system lubricates engine parts with clean oil.

Theory of Operation:

The pressure lubrication system consists of a positive displacement gear-driven pump, oil strainer, full flow oil filter, oil pressure regulating valve, and an electrical oil pressure warning switch.

The oil pump is mounted on the front plate of the engine, under the engine front cover, and is driven by the crankshaft. The oil pump draws oil from the oil pan through the strainer and suction tube. The oil is then pumped through an oil passage to the oil filter, oil pressure regulating valve, and through the engine block main oil gallery.

From the main oil gallery, oil is pushed to the crankshaft main bearing journals and idler gear shaft. Drilled cross-passages in the crankshaft distribute the oil from the main bearings to the connecting rod bearing journals.

Lube oil holes in the main bearing oil grooves send oil through drilled passages to the camshaft bearings.

A drilled passage from the rear camshaft bearing through the cylinder block and cylinder head supplies lubricating oil to the rocker arm shaft. The hollow rocker shaft distributes oil to the rocker arms, tappets and valves.

If oil pressure drops below specification, a pressure switch activates the engine oil pressure light to alert the operator to shut down the engine.

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3TNE68

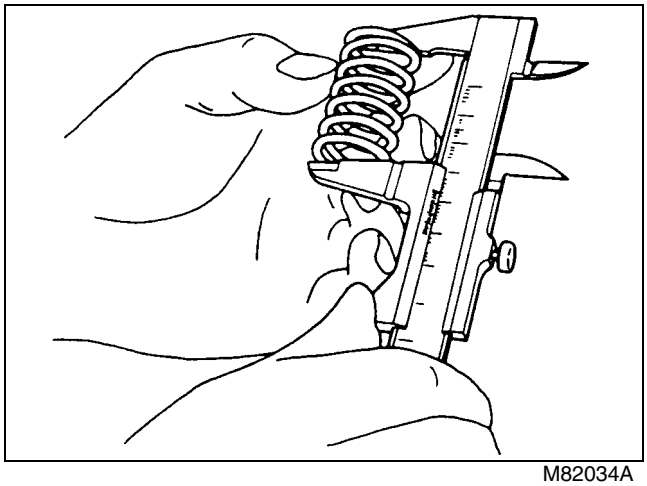
Valve Guide Height “A” . . . . . 7 mm (0.276 in.)

3TNV70

Valve Guide Height (A) . . . . 9.8 -10 mm (0.386-0.394 in.)

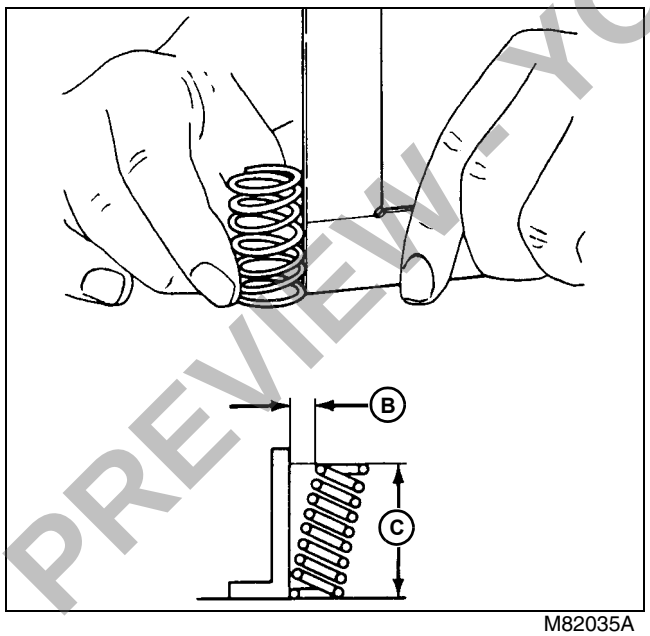
2. Ream inside diameter of valve guides using 5.50 mm Valve Guide Reamer.

Valve Springs:



M82034A

1. Measure spring free length. Replace spring if measurement exceeds specification.



M82035A

2. Measure spring inclination (B). Replace spring if measurement exceeds specification.

Spring Specifications - 3TNE68:

Spring Free Length (C). . . . . 28 mm (1.102 in.)

Maximum Inclination (B) . . . . . 0.80 mm (0.032 in.)

Spring Specifications - 3TNV70:

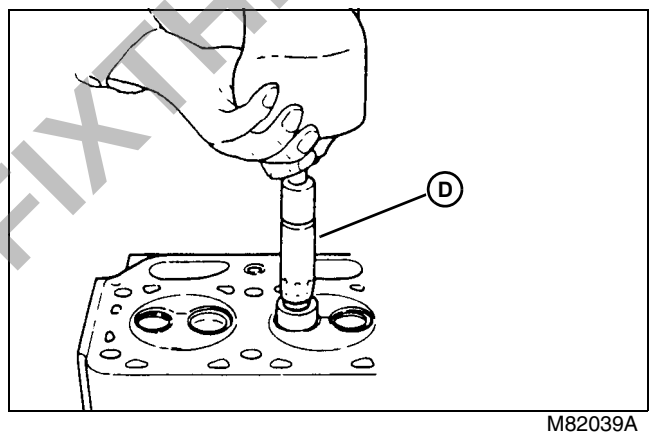
Valve Spring Free Length (C) . . . . . 37.8 mm (1.488 in.)

Maximum Spring Inclination (B) . . . . 1.3 mm (0.051 in.)

Valve Seat Grinding:

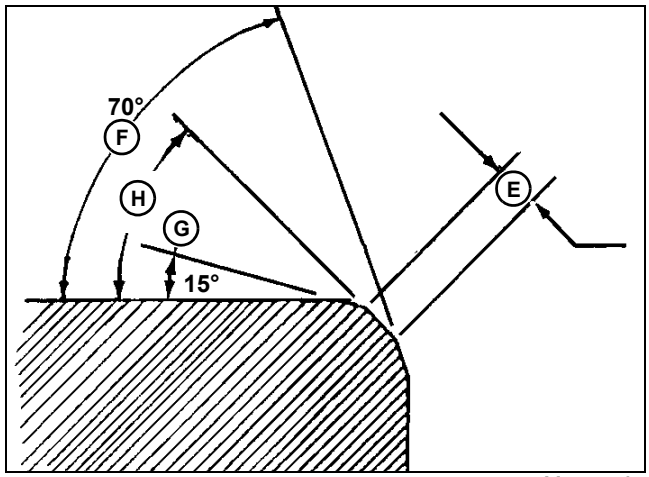
IMPORTANT: Avoid damage! Valve seats should never be cut. Cutting a valve seat can damage its sealing surface, which may result in leaks or valve/ seat failure. Valve seats should be ground and lapped.

NOTE: LIGHTLY grind valve seats only for a few seconds to avoid excessive valve seat width. If valve guide is to be replaced, always replace guide before grinding valve seat, as seat grinder pilot is centered by guide.



M82039A

1. Grind intake valve seat using a 30° seat grinder (D), and exhaust valve seat using a 45° seat grinder. Follow tool manufacturers instructions.



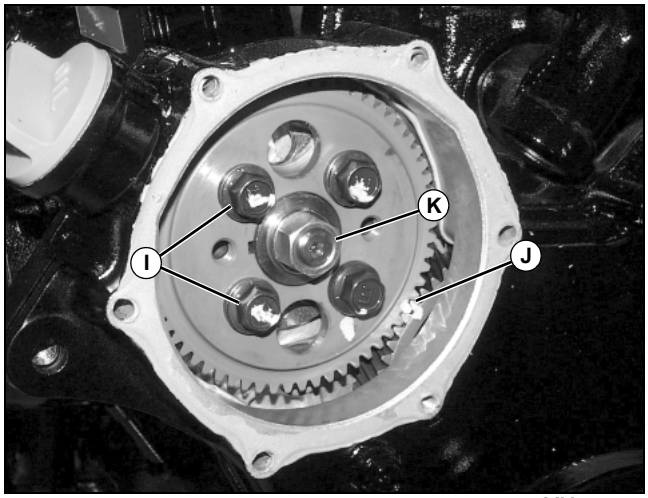
M82040A

2. Measure valve seat width (E) after grinding.

3. If seat is too wide after grinding, grind lower seat surface (F) using a 70° seat grinder until seat width is close to specifications.

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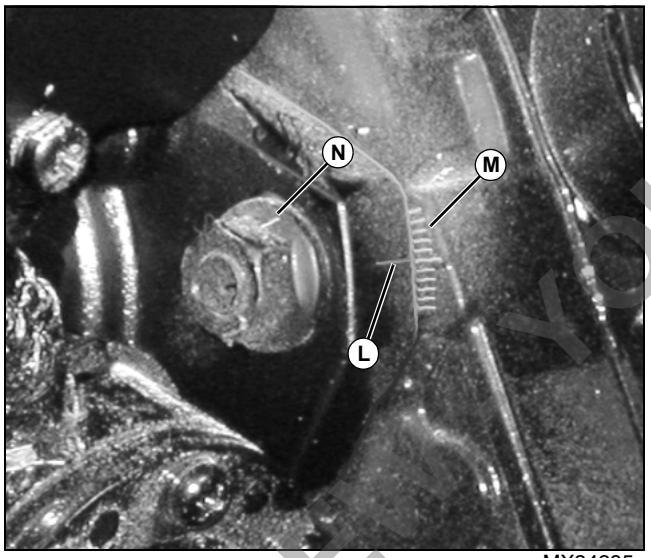
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MX34294

17.Rotate crankshaft and align timing marks (J).

18.Remove the lock nut (K) and using a puller, remove the injector pump gear.



MX34295

19.Note the location of the injector pump timing mark (L) as related to the timing gear housing timing marks (M). The replacement pump will need to be installed in the exact same location.

20.Remove the three mounting nuts (N) securing the injector pump to the crank case and remove the injector pump.

Installation:

Installation is done in the reverse order of removal.

CAUTION: Avoid injury! DO NOT attempt to adjust the ARB/EPA Certified Emissions fuel injection pump unless you are a factory trained technician with authorization to service CARB/ EPA Certified Emissions engines.

- Install and tighten injector pump, aligning the timing mark to the same mark on the timing gear housing as noted during removal.
- Install and tighten the three cap screws to specification.
- Align the timing gear marks and install injector pump gear and lock nut and tighten to specification.
- Install injector pump gear cover.
- Install the outlet hoses to the fuel transfer pump.
- Install the injector lubrication line and secure with banjo bolts.
- Install the fuel input hose and injector nozzle leakoff hose to the injector pump.
- Install fuel lines at the injection pump and the injector nozzles and tighten the connector nuts to specification. When tightening connectors, use a backup wrench to prevent delivery valves from turning.
- Install and connect the fuel shutoff solenoid.
- Install the engine. See “Engine Removal and Installation” on page 115.
- Install the air intake hose to the intake manifold.
- Turn the fuel shut-off valve on the fuel filter/water separator to the OPEN (“O”) position.
- Bleed the fuel system.

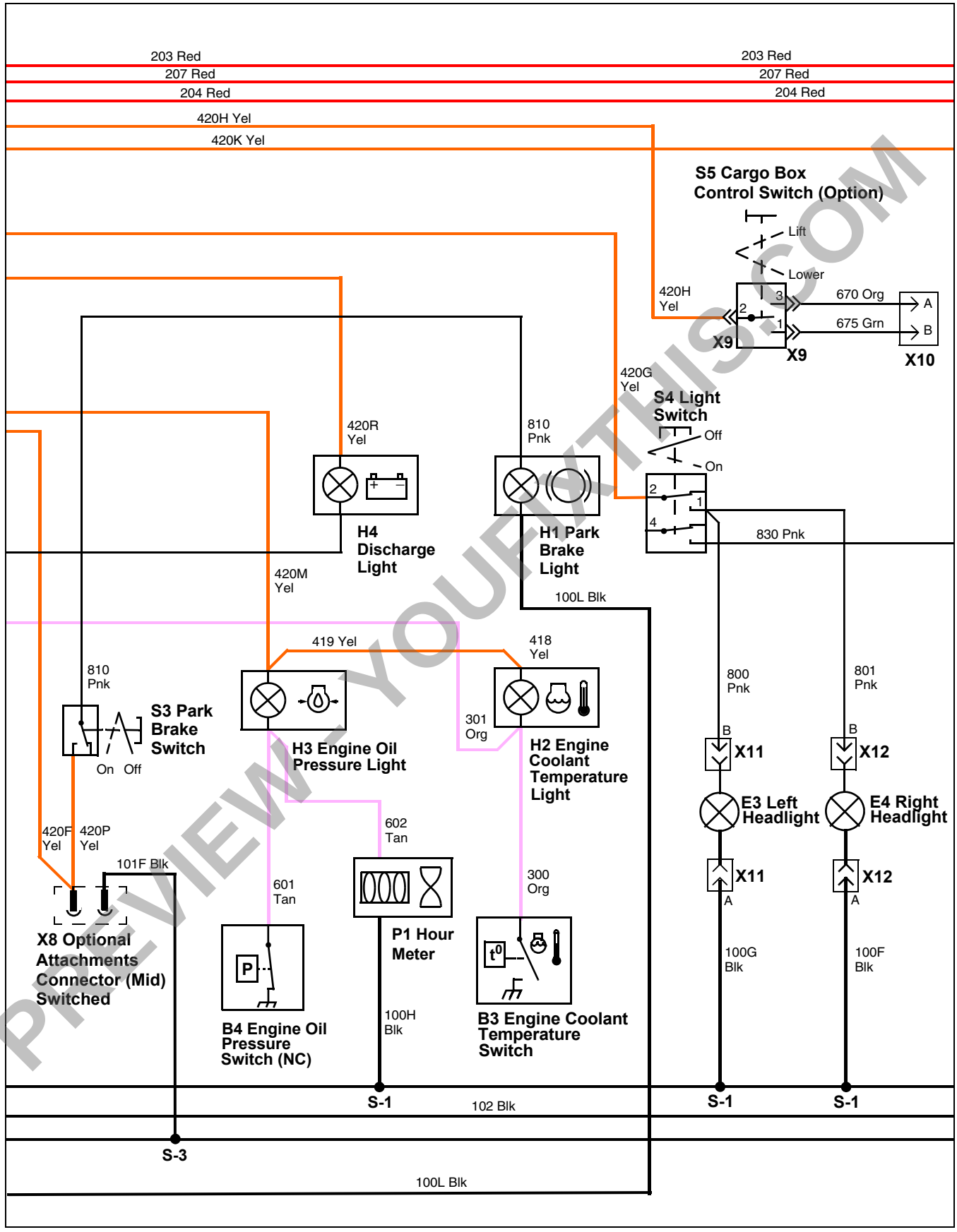
Torque Specifications:

Injector Gear Cover Cap Screws . . . . 11 N•m (97 lb-in.)
Injector Pump Drive Gear Nut
. . . . . 58 - 68 N•m (43 - 50 lb-ft)
Injector Pump Mounting Nuts
. . . . . 22.5 - 28.4 N•m (17 - 21 lb-ft)
Fuel Line-to-Injection Pump Nuts
. . . . . 29.4 - 34.4 N•m (22 - 25 lb-ft)
Fuel Line-to-Injector Nozzle Nuts
. . . . . 29.4 - 34.4 N•m (22 - 25 lb-ft)

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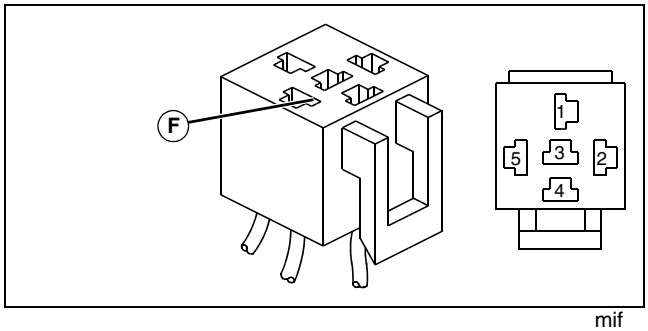
Schematic 3 of 4



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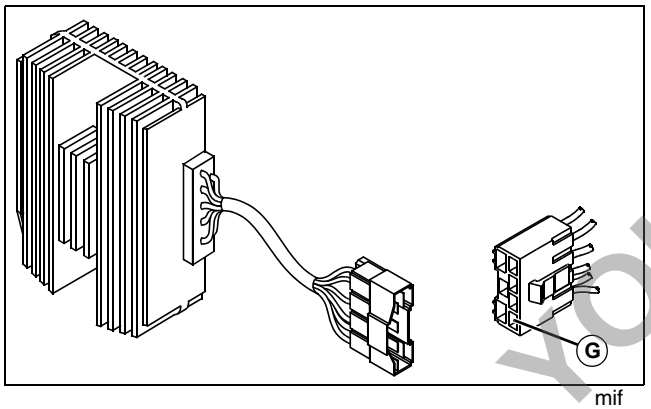


mif

(6) Remove relay. Is battery voltage present at terminal 5 (86) of K2 fan relay connector, 420E Yel wire (F)?

Yes - Install relay. Go to next step.

No - Check 420E Yel wire.

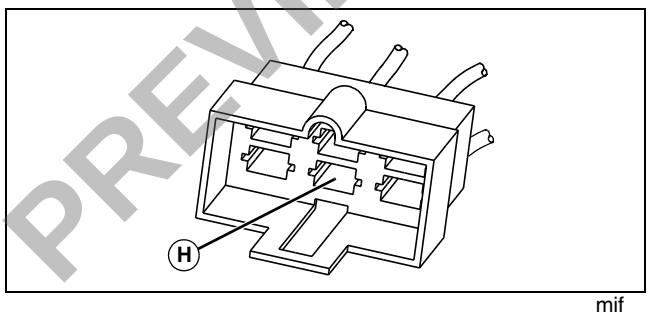


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(7) Disconnect N1 voltage regulator/rectifier. Is battery voltage present at pin D of X3 connector, 420C Yel wire (G)?

Yes - Connect regulator/rectifier. Go to next step.

No - Check 420C Yel wire.



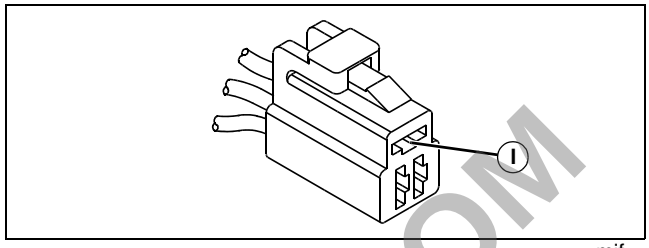
mif

(8) Disconnect engine connector. Is battery voltage present at pin E of X1 engine connector, 420B Yel wire (H)?

Yes - Connect engine wiring harness. Go to next step.

System: Switched Circuit Wiring

No - Check 420B Yel wire.



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(9) Disconnect fuel pump connector. Is battery voltage present at pin A of Y2 fuel pump connector, 420A Yel wire (I)?

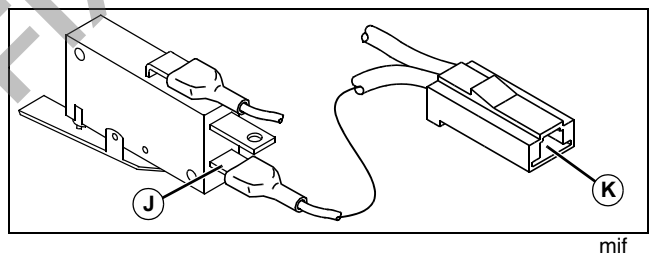
Yes - Connect fuel pump. Go to next step.

No - Check 420A Yel wire.

(10) Is park brake light illuminated?

Yes - Go to step (12).

No - Go to next step.

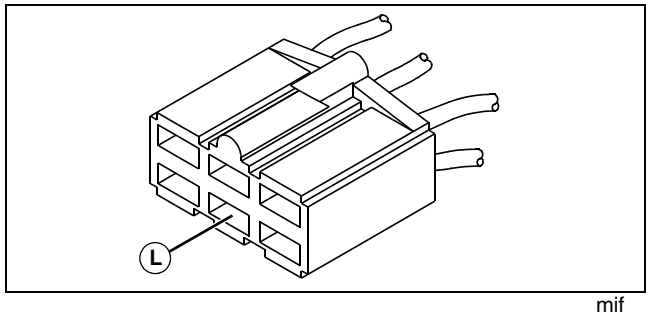


mif

(11) Is battery voltage present at S3 park brake switch, 420P Yel wire (J)?

Yes - Go to next step. Test park brake switch.

No - Check 420P and 420F Yel (K) wires.



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(12) Is battery voltage present at pin E of X15 front lights connector, 420K Yel wire (L)?

Yes - Go to next step.

No - Check 420K Yel wire.

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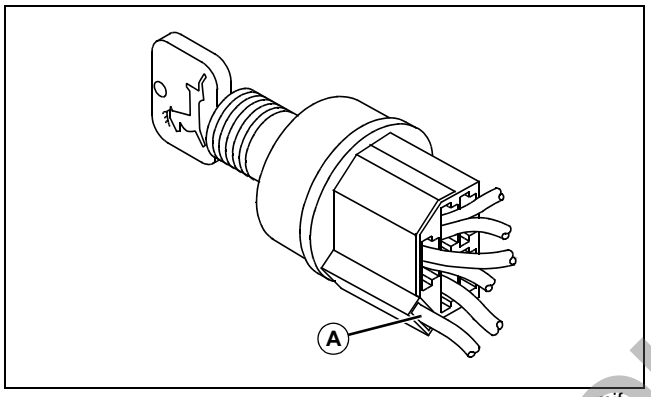
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Fuel Shutoff Circuit Diagnosis (Gas Engine - All)

Test Conditions:

- Machine parked safely. See “Parking Safely” in the Safety section.
- Cargo box raised and locked.
- Battery fully charged.
- Key switch in run position, engine off.
- Check wire connections for looseness and corrosion.

System: Fuel Shutoff Solenoid Circuit

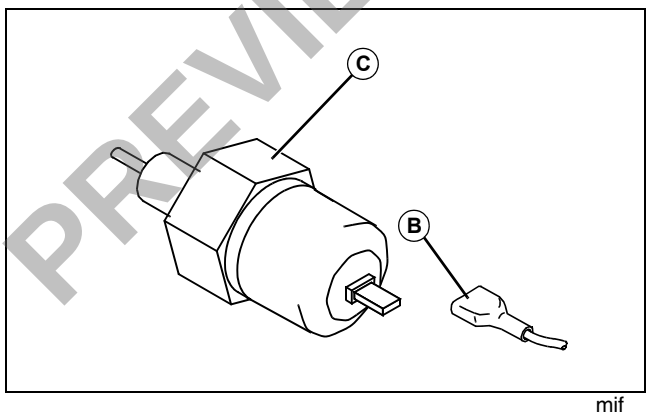


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(1) Is battery voltage present at pin A of S1 key switch (A)?

Yes - Go to next step.

No - Test key switch. See “Key Switch Test” on page 341. See “Power Circuit Diagnosis (Gas Engine) (SN -40000)” on page 246 or See “Power Circuit Operation (Gas Engine) (SN 40001 -)” on page 252.



mif

(2) Disconnect Y3 fuel shutoff solenoid from harness. Is battery voltage present at Y3 fuel shutoff solenoid, Blk wire (B)?

System: Fuel Shutoff Solenoid Circuit

Yes - Go to next step.

No - Check Blk, Yel/Wht, 420B, and 420J Yel wires and connections.

(3) Is continuity to ground present at body of Y3 fuel shutoff solenoid (C)?

Yes - Test fuel shutoff solenoid. See “Fuel Shutoff Solenoid Test (Gas Engine)” on page 350. Connect fuel shutoff solenoid.

No - Check engine ground to frame and battery.

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Park Brake Switch Test

Reason:

To make sure the brake pedal switch has continuity when plunger is released.

This switch is optional with light kits or back up alarm kit.

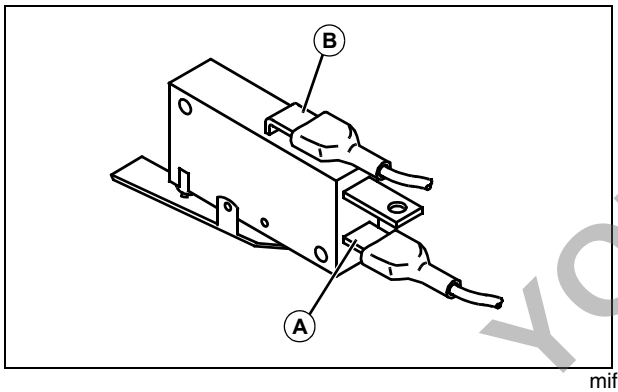
Equipment:

- Ohmmeter

Procedure:

1. Park machine safely. See “Parking Safely” in the Safety section.
2. Remove center console. See “Center Console Removal and Installation” on page 580 of Miscellaneous section.
3. Check continuity.

Results:



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- There should be continuity between terminals (A and B) when lever is released.
- There should not be continuity between terminals (A and B) when plunger is depressed.
- If continuity is not correct, replace switch.

Fuse Test

Reason:

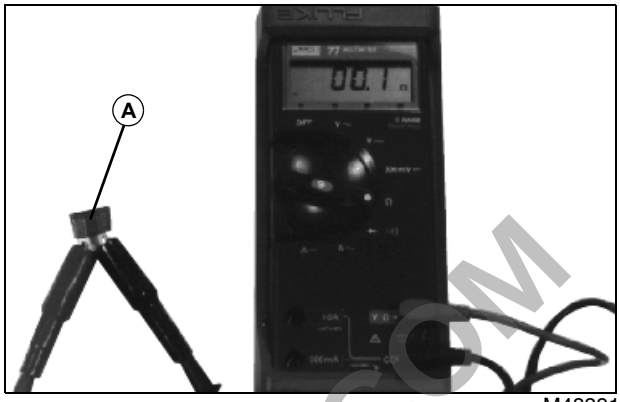
To verify that the fuse has continuity.

Equipment:

- Ohmmeter or continuity tester

Procedure:

1. Park machine safely. See “Parking Safely” in the Safety section.
2. Remove fuse from connector.



M48391

3. Check visually for broken filament (A).
4. Connect ohmmeter or continuity tester to each end of fuse.
5. Check for continuity.

Results:

- If continuity is not indicated, replace fuse.

Diode Test

Reason:

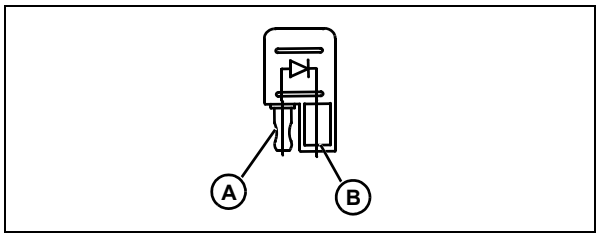
To verify that diode has proper continuity.

Equipment:

- Ohmmeter or continuity tester

Procedure:

1. Park machine safely. See “Parking Safely” in the Safety section.
2. Raise hood.
3. Remove diode from connector.



mif

4. Connect ohmmeter red (+) lead to pin (A) of diode.
5. Connect ohmmeter black (-) lead to pin (B) of diode. Check for continuity.
6. Reverse test leads. Check for continuity.

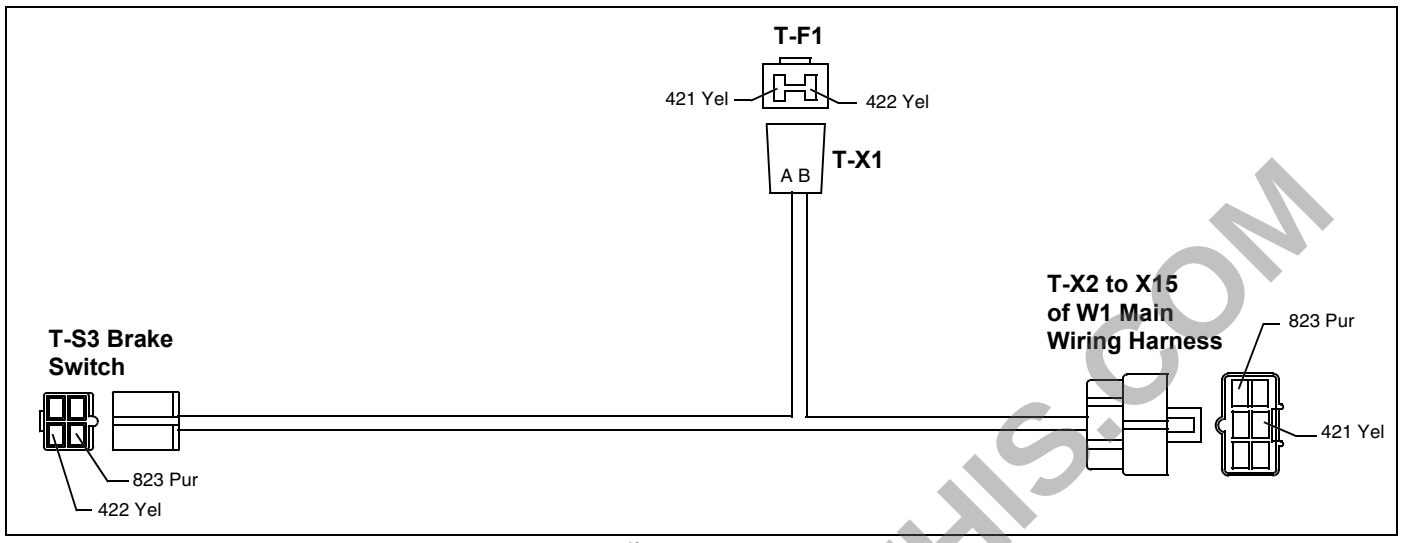
Results:

Diode must have continuity in one direction only. Replace defective diode.

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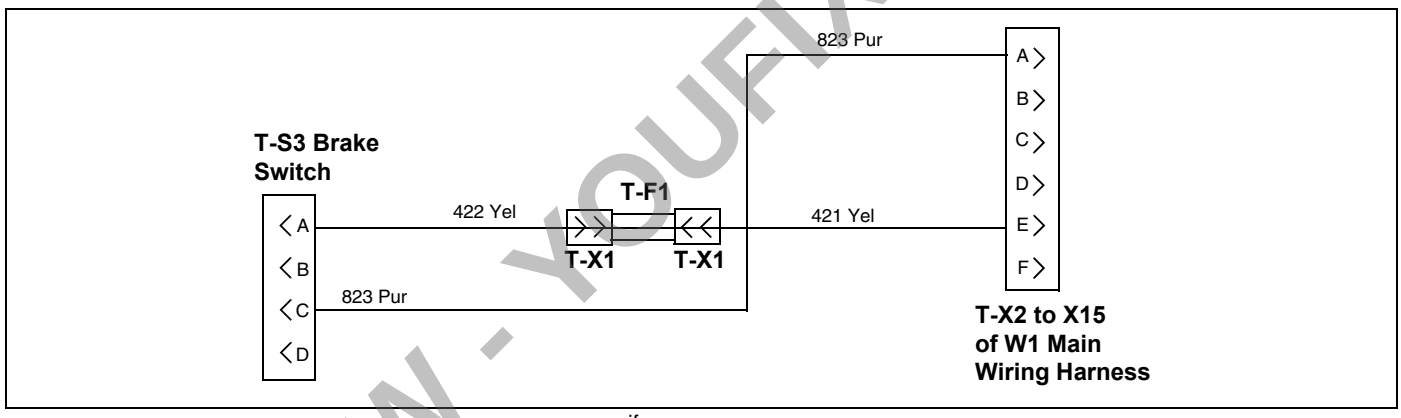
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Brake Switch Circuit Wiring Harness



mif

Brake Switch Circuit Schematic



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Brake Switch Circuit Wiring Harness Color Codes

Size/No./Color	Wire Connection Points
0.8 421 Yel	T-X2, T-X1
0.8 422 Yel	T-X1, T-S3
0.8 823 Pur	T-X2, T-S3

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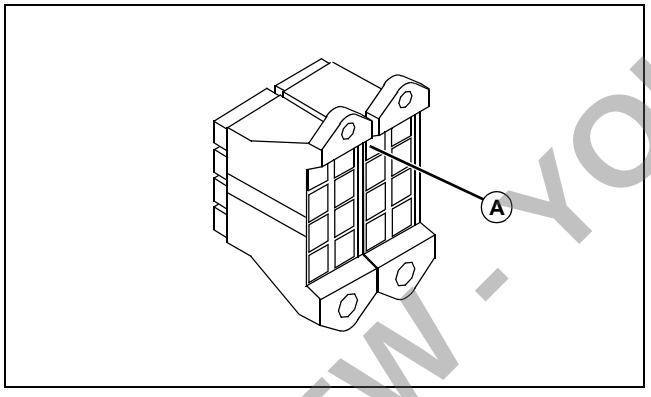
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Hazard Lights:

Test Conditions:

- Machine parked safely on a level surface.
- Park braked locked.
- Key switch in run position, engine off.
- Battery fully charged.
- Power circuits working properly. See “Power Circuit Operation (Gas Engine) (SN -40000)” on page 243, or See “Power Circuit Operation (Gas Engine) (SN 40001 -)” on page 252, or See “Power Circuit Operation (Diesel Engine) (SN -40000)” on page 261, or See “Power Circuit Operation (Diesel Engine) (SN 40001 -)” on page 270.
- Ensure that frame, harness, and engine grounds are clean and secure with good continuity.
- Check wires and connections for looseness and corrosion.
- Hazard switch in the on position.

System: Left Rear Hazard Light Circuit

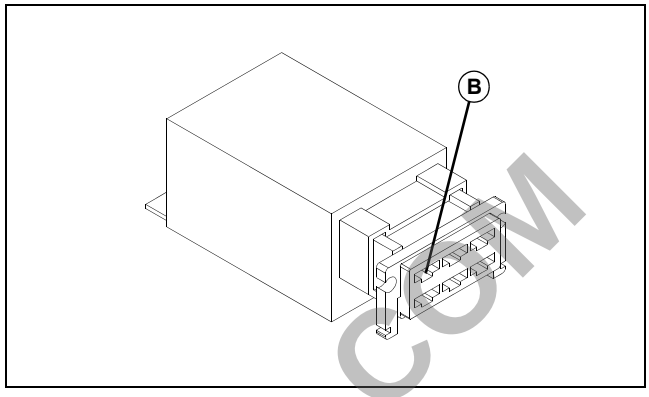


(1) Is battery voltage present at 210H Red wire of fuse block?

Yes - Go to next step.

No - Check 203A and 205H Red wires, splices, and X14 connector. If OK, test HM-F1 fuse.

System: Left Rear Hazard Light Circuit

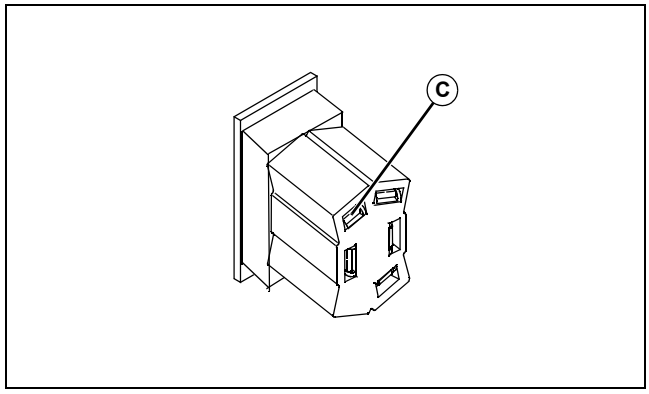


(2) Is intermittent battery voltage present at 477H Wht wire of HM-K1 flasher?

Yes - Check for flasher continuity to ground through 170H and 170J Brn wires, 100E Blk wire, splices, and X7 connector. If OK, go to next step.

No - Check 210H Red wire and connections. If OK, check for flasher continuity to ground through 170H and 170J Brn wires, 100E Blk wire, splices, and X7 connector. If OK, replace flasher.

No - Check HM-R1 resistor for 91 ohms of resistance. If not OK, replace resistor.



(3) Is intermittent battery voltage present at 494H Blu wire of HM-S4 flasher switch?

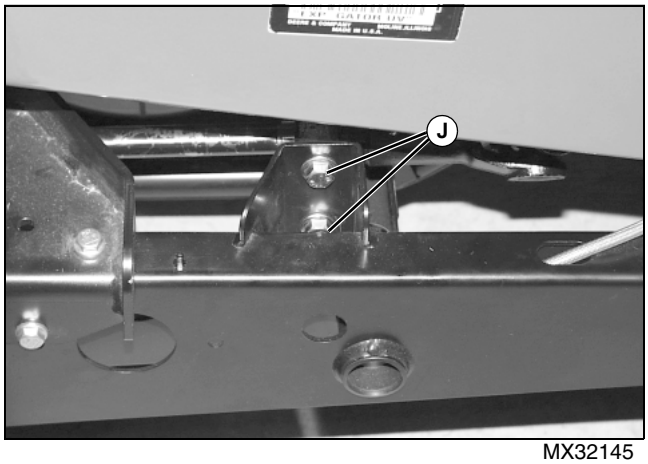
Yes - Go to next step.

No - Check 477H, 478H and 479H Wht wires and connections. If OK, replace flasher switch.

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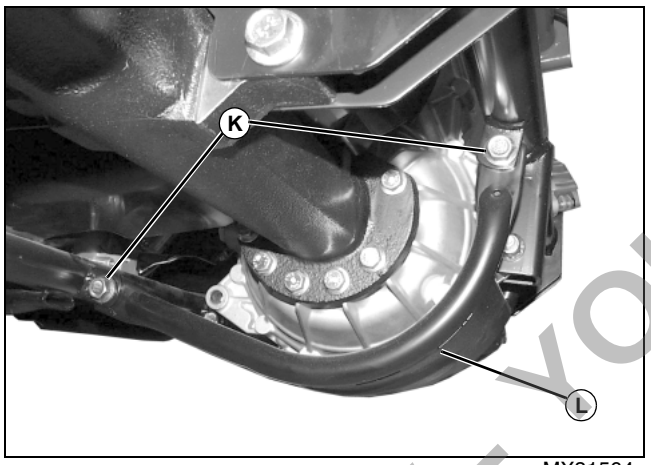
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13.Remove cotter pin and pin (I) from park brake cable.



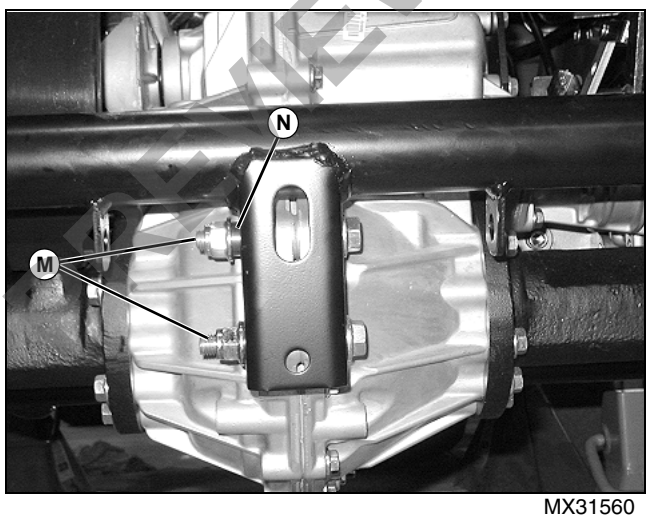
MX32145

14.If unit is equipped with MFWD remove the two bolts (J) from the MFWD drive shaft support. bearing.



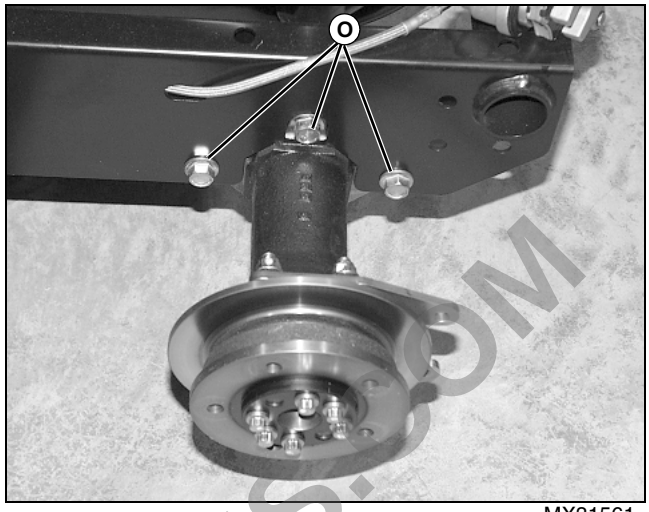
MX31564

15.Remove four cap screws and nuts (K) from skid plate (L) and remove skid plate.



MX31560

16.Remove the two rear transaxle mounting cap screws and nuts (M). Note location of spacer (N).



MX31561

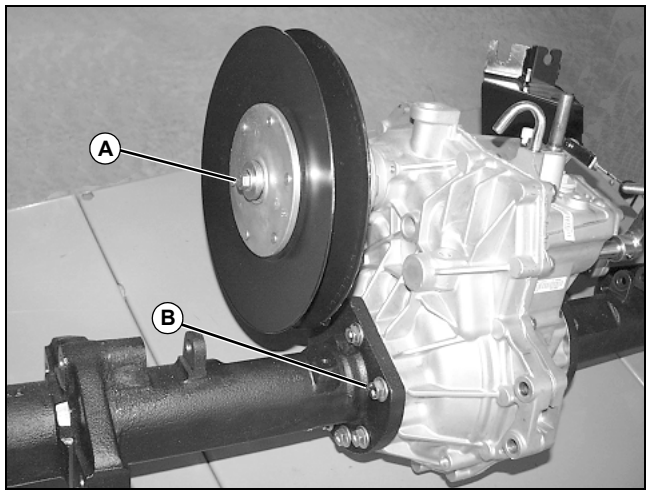
17.Support transaxle assembly with a floor jack and remove three axle mounting bolts (O) from each side.

18.Secure the lower swinging frame to the upper frame to keep it from coming down with the transaxle.

19.Start to lower transaxle until axle housing mounting holes are just below the swinging frame. Move axle to right until driven clutch clears guard, then lower transaxle completely.

Transaxle Disassembly

Disassembly:



MX31563

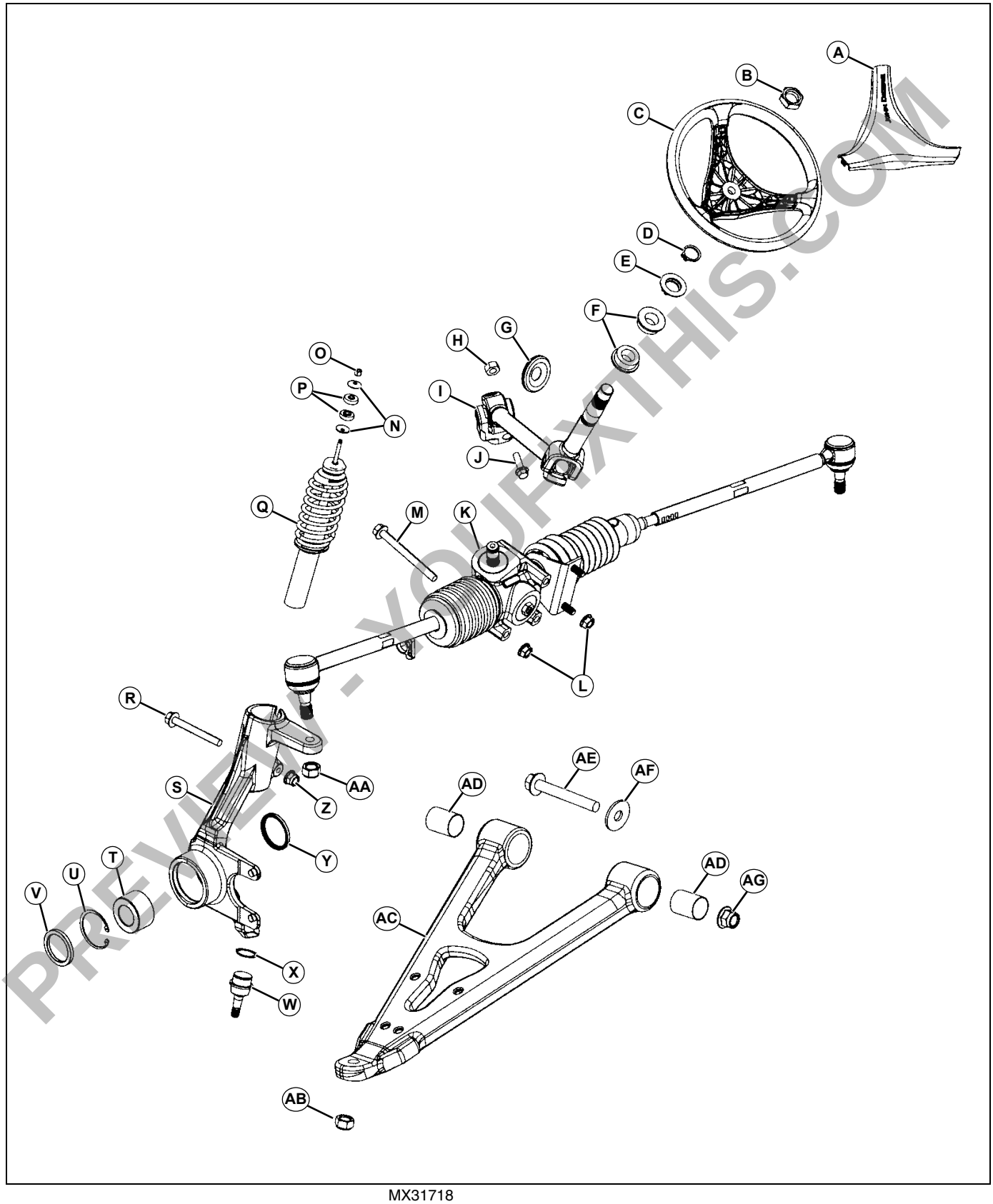
1. Remove cap screw and washer (A) and remove driven clutch. Remove cap screws (B) and remove axle housing from left side of transaxle.

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Component Location

Steering System



MX31718

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6. Remove plastic straps (I) securing brake lines to subframe. (One an each side.)

7. Disconnect brake lines from each rear brake caliper.

8. Remove rear brake line assembly, noting routing through frame and subframe (J).

Front and Rear Brake Line Installation:

- Installation is in the reverse of removal.
- Ensure that brake lines are routed correctly. Rear brake line must be routed through the rear firewall towards the front of machine first.
- Ensure that plastic straps are installed in correct locations.
- Insure that all crush washers are installed onto brake line banjo bolts.
- Bleed master cylinder if necessary. See “Bleeding Master Cylinder” on page 548.
- Bleed brake system. See “Bleeding Brakes” on page 548 for SN -40000 machines and See “Bleeding Brakes” on page 552 for SN 40001- machines.

Specifications:

Brake Line to Master Cylinder . . . . . 15 - 24 N•m (10 - 18 ft-lb)
Brake Line to Caliper . . . . . 15 - 24 N•m (10 - 18 ft-lb)
Brake Line 3-Way Valve to Firewall . . . . . 10.4 N•m (92 lb-in.)

Brake Caliper Removal and Installation

IMPORTANT: Avoid damage! Avoid contamination of the brake fluid. Thoroughly clean area around the filler cap and brake lines before removing. Do not open the brake fluid reservoir cap unless absolutely necessary.

Use extreme care when filling the reservoir. Fluid spilled on painted surfaces can cause damage.

Use only DOT3 brake fluid from a sealed container.

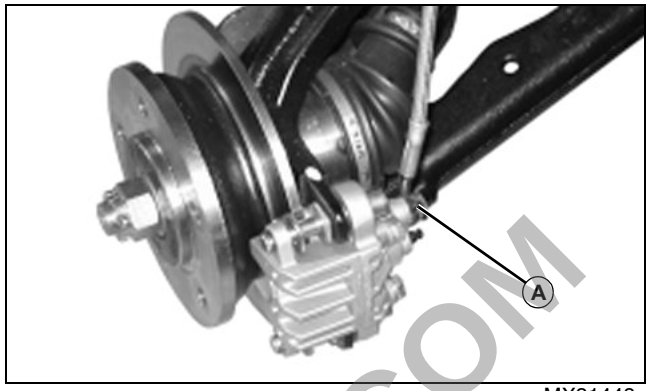
Removal:

NOTE: Front and rear calipers removal and installation is the same. Front caliper removal shown.

1. Park machine safely. See Parking Safely in the Safety Section.

2. Lock park brake.

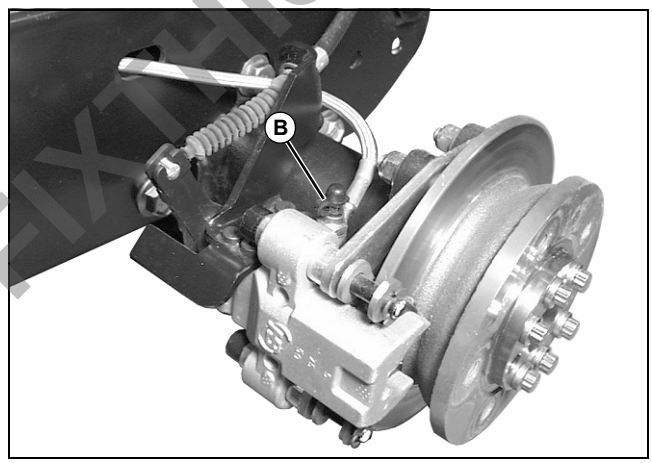
3. Remove wheels. See “Wheel Removal and Installation” on page 575 in the Miscellaneous section.



MX31448

Picture Note: Front caliper.

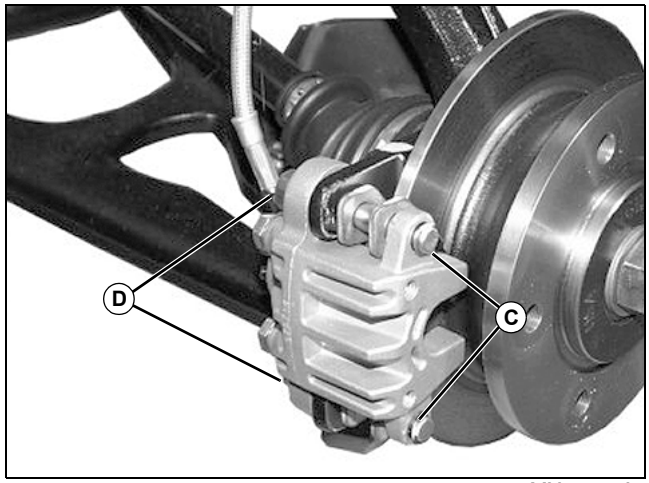
4. Remove banjo bolt (A), and crush washers securing brake line to front caliper.



MX36452

Picture Note: SN 40001- machines rear calipers shown, SN -40000 similar.

5. Remove bleed valve/brake line (B) from rear caliper.



MX31399A

Picture Note: Front calipers.

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