

ELECTRICAL SYSTEM

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ELECTRICAL SYSTEM

**TIGHTEN ALL HARDWARE PER SIZE TO GRADE 5 TORQUE (SEE
STANDARD TORQUE SPECIFICATIONS FOR BOLTS, SECTION 9)
UNLESS OTHERWISE SPECIFIED.**



WIRING SCHEMATIC CONTENTS

773

DOMESTIC

773 WITHOUT BOSS - WIRING SCHEMATIC
S/N 509635001-38239
(PRINTED JUNE 2001)
MC2578

773 BOSS - WIRING SCHEMATIC
S/N 509635001-38239
S/N 509616001-16306
(PRINTED JUNE 2001)
MC2582

773 WITHOUT BOSS - WIRING SCHEMATIC
S/N 509638240-40052
(PRINTED JUNE 2001)
MC2579

773 BOSS - WIRING SCHEMATIC
S/N 509638240-40052
S/N 509616307-16511
(PRINTED JUNE 2001)
MC2583

773 WITHOUT BOSS - WIRING SCHEMATIC
S/N 509640053-46093
(PRINTED JUNE 2001)
MC2580

773 BOSS - WIRING SCHEMATIC
S/N 509640053-46093
(PRINTED JUNE 2001)
MC2584

773 WITHOUT BOSS - WIRING SCHEMATIC
S/N 509646094-51304
(PRINTED JUNE 2001)
MC2581

773 BOSS - WIRING SCHEMATIC
S/N 509646094-51304
(PRINTED JUNE 2001)
MC2585

773 WITHOUT BOSS - WIRING SCHEMATIC
S/N 509651305-51526
(PRINTED JUNE 2001)
MC2598

773 BOSS - WIRING SCHEMATIC
S/N 509651305-51526
(PRINTED JUNE 2001)
MC2599

773 WITHOUT BOSS - WIRING SCHEMATIC
S/N 509651527 AND ABOVE
(PRINTED JUNE 2001)
MC2669

773 BOSS - WIRING SCHEMATIC
S/N 509651527 AND ABOVE
(PRINTED JUNE 2001)
MC2670

REFER TO SECTION 10 FOR ADVANCED HAND CONTROL OPTIONS
WIRING SCHEMATICS

WIRING SCHEMATIC CONTENTS (CONTINUED)
773

DOMESTIC

OPTIONS

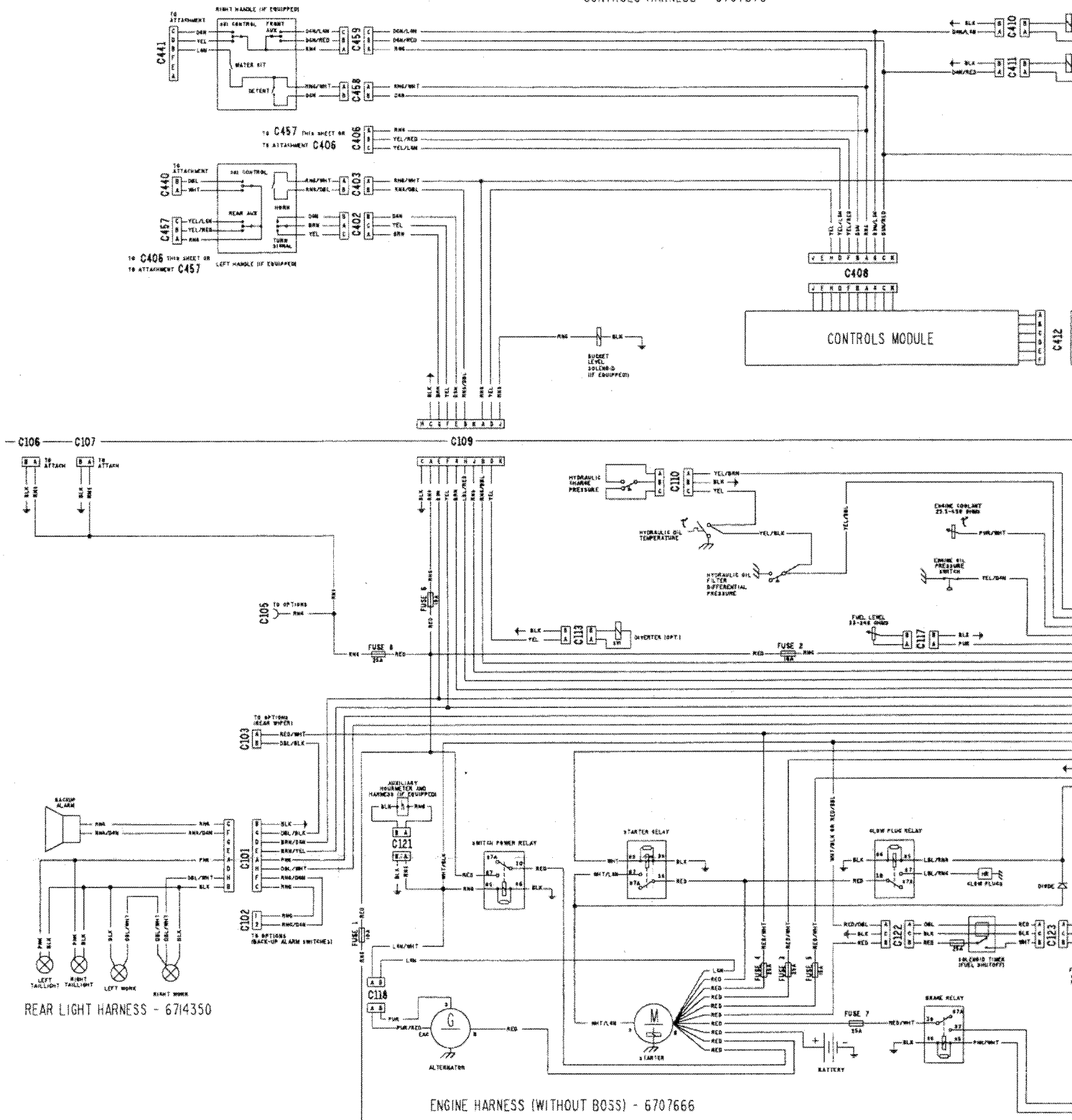
773 - WIRING SCHEMATIC
ATTACHMENT CONTROL OPTION
S/N 509635001-38679
S/N 509616001-16311
(PRINTED JUNE 2001)
MC2586

773 - WIRING SCHEMATIC
ATTACHMENT CONTROL OPTION
S/N 509638680 AND ABOVE
S/N 509616312-34999
(PRINTED JUNE 2001)
MC2587

773 - WIRING SCHEMATIC
OPTIONS
S/N 509635001 AND ABOVE
S/N 509616001-34999
(PRINTED JUNE 2001)
MC2588

773 - WIRING SCHEMATIC
OPTIONS
S/N 509635001 AND ABOVE
S/N 509616001-34999
(PRINTED JUNE 2001)
V-0112

CONTROLS HARNESS - 6707676



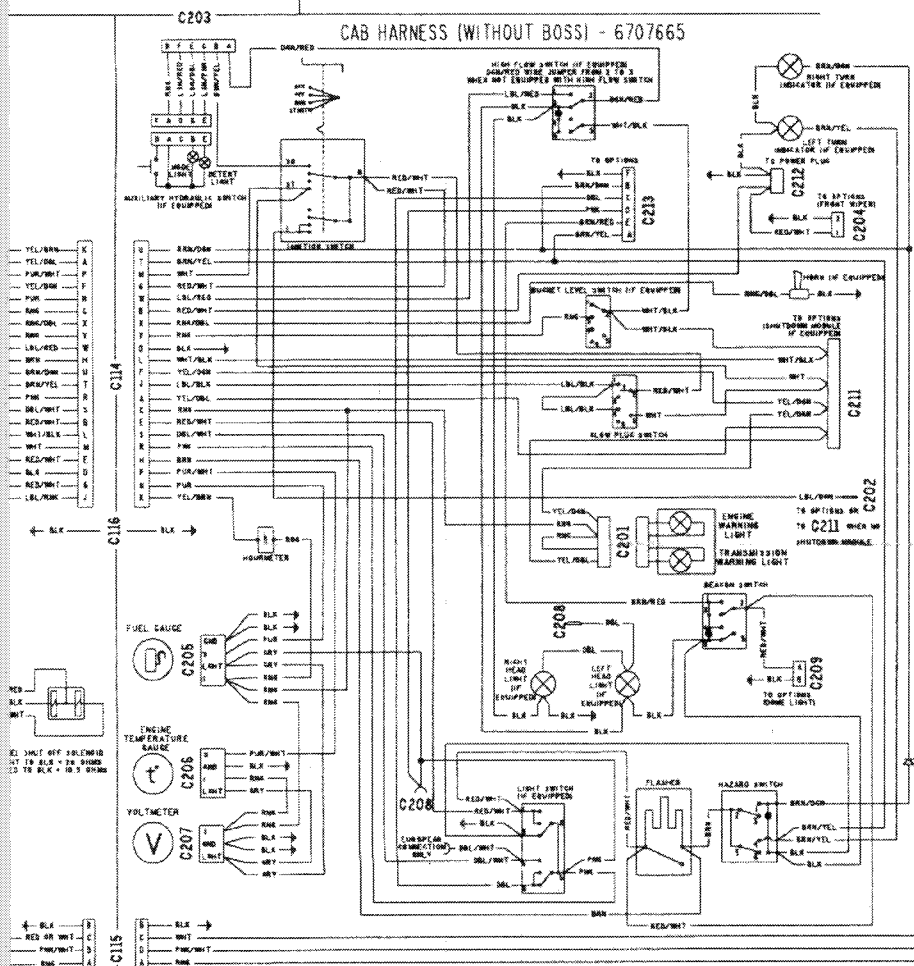
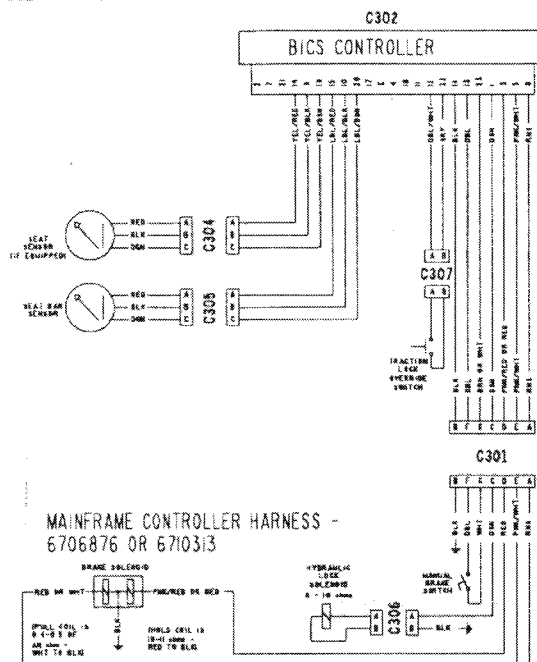
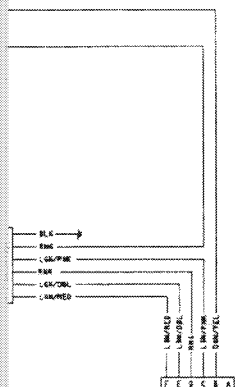
WIRES CONNECT BY
LETTER ACROSS
CONNECTORS

SOME CONNECTOR
BODIES NOT SHOWN
FOR DRAWING CLARITY

BICS CONTROLLER HARNESS - 6706828 OR 670312

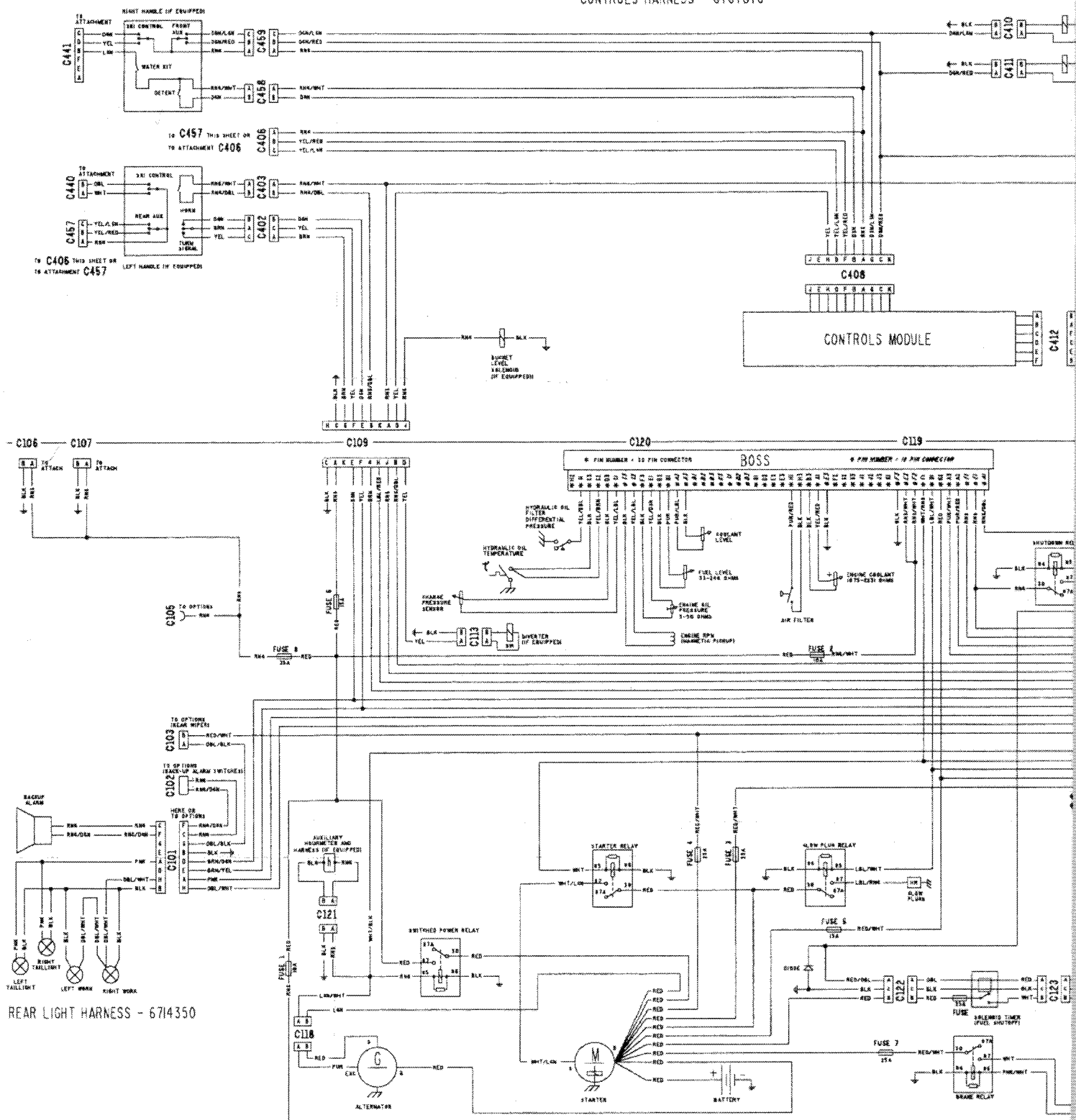
FRONT AUXILIARY
PWR SOLENOID
11 ohms

FRONT AUXILIARY
BASE SOLENOID
11 ohms

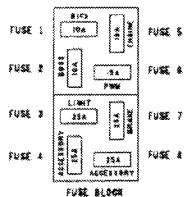


RED
ORANGE
BLACK
LIGHT BLUE
DARK BLUE
LIGHT GREEN
DARK GREEN
YELLOW
PINK
WHITE
BROWN
TAN
PURPLE
GREY

CONTROLS HARNESS - 6707676



ENGINE HARNESS (BOSS) - 6707668



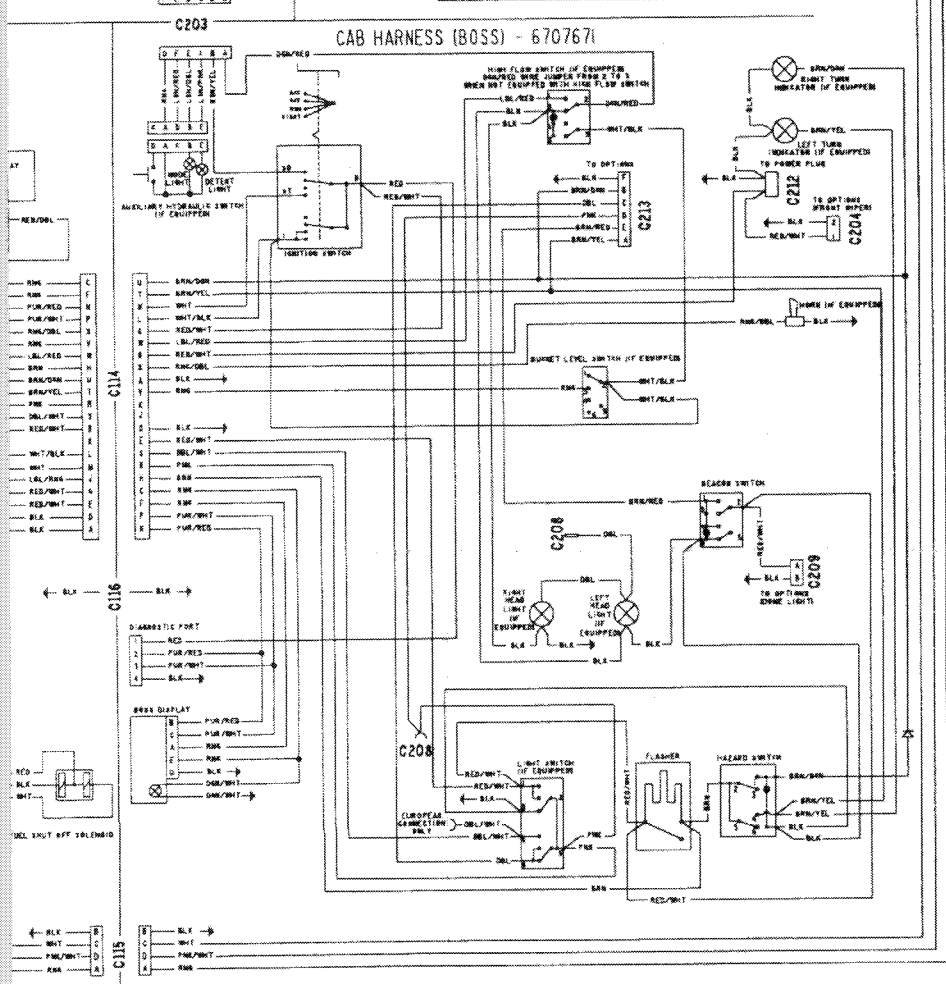
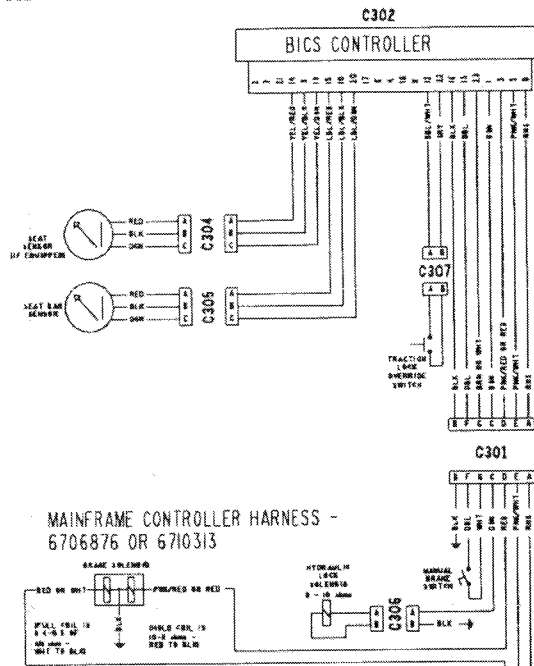
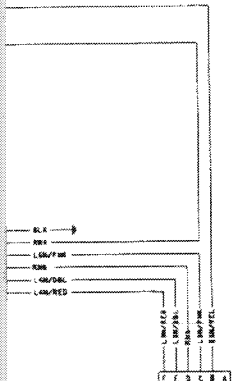
WIRES CONNECT BY
LETTER ACROSS
CONNECTORS

SON
BOO
FOR

BICS CONTROLLER HARNESS - 6706828 OR 6710312

FRONT AUXILIARY
AND REARWARD
B - 1000

FRONT AUXILIARY
SIDE WIRELESS
B - 1000



CONNECTOR
ES NOT SHOWN
DRAWING CLARITY

- RED = RED
- ORNG = ORANGE
- BLK = BLACK
- LBL = LIGHT BLUE
- DBL = DARK BLUE
- GRN = LIGHT GREEN
- DGRN = DARK GREEN
- YEL = YELLOW
- PNK = PINK
- WHI = WHITE
- BWN = BROWN
- TAN = TAN
- PUR = PURPLE
- GRY = GREY

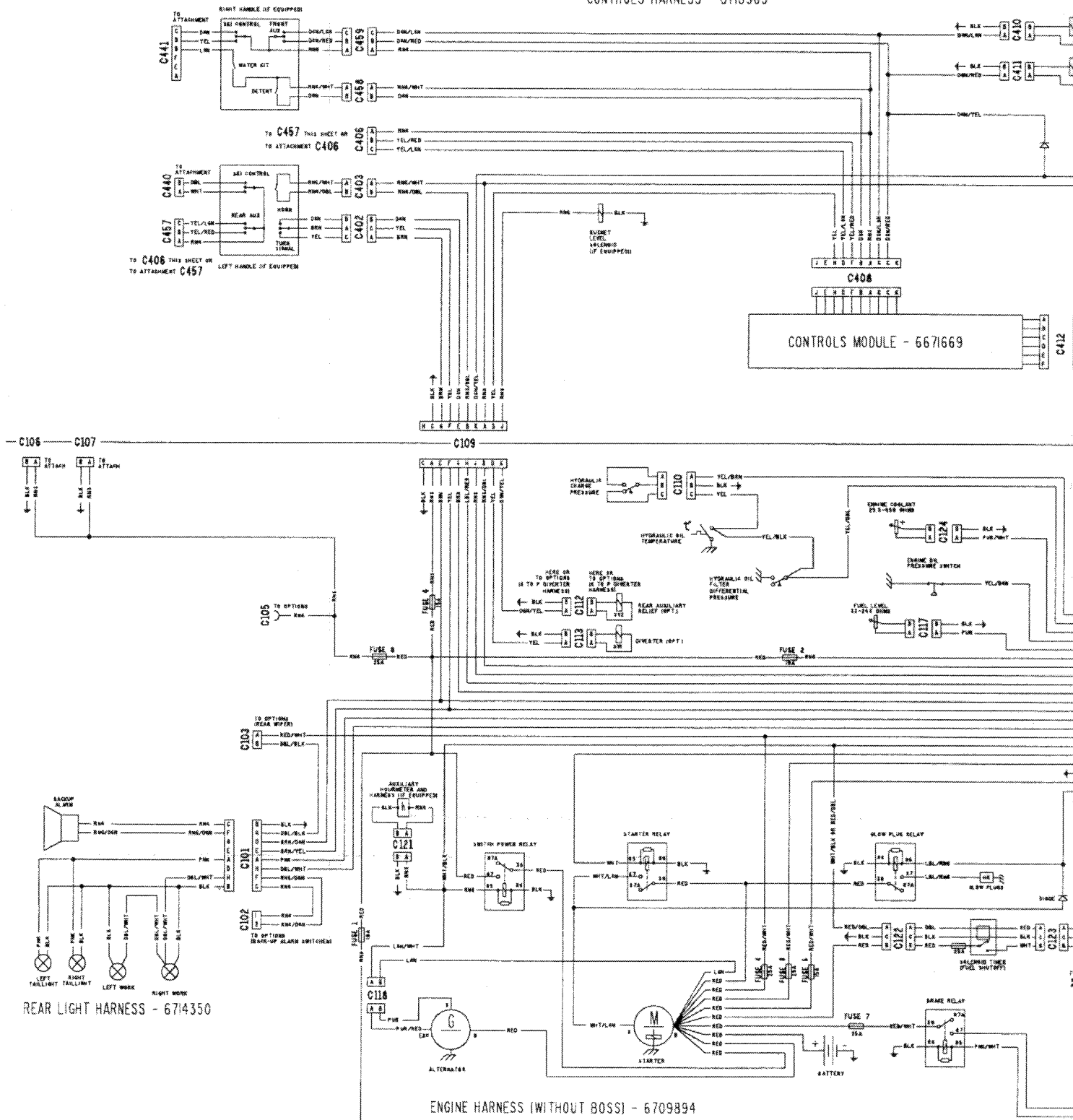
773 WITHOUT BOSS - WIRING SCHEMATIC

S/N 50963&240-40052

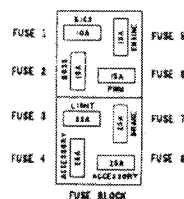
(PRINTED JUNE 2001)

WC2579

CONTROLS HARNESS - 6710365



PRINTED IN U.S.A.



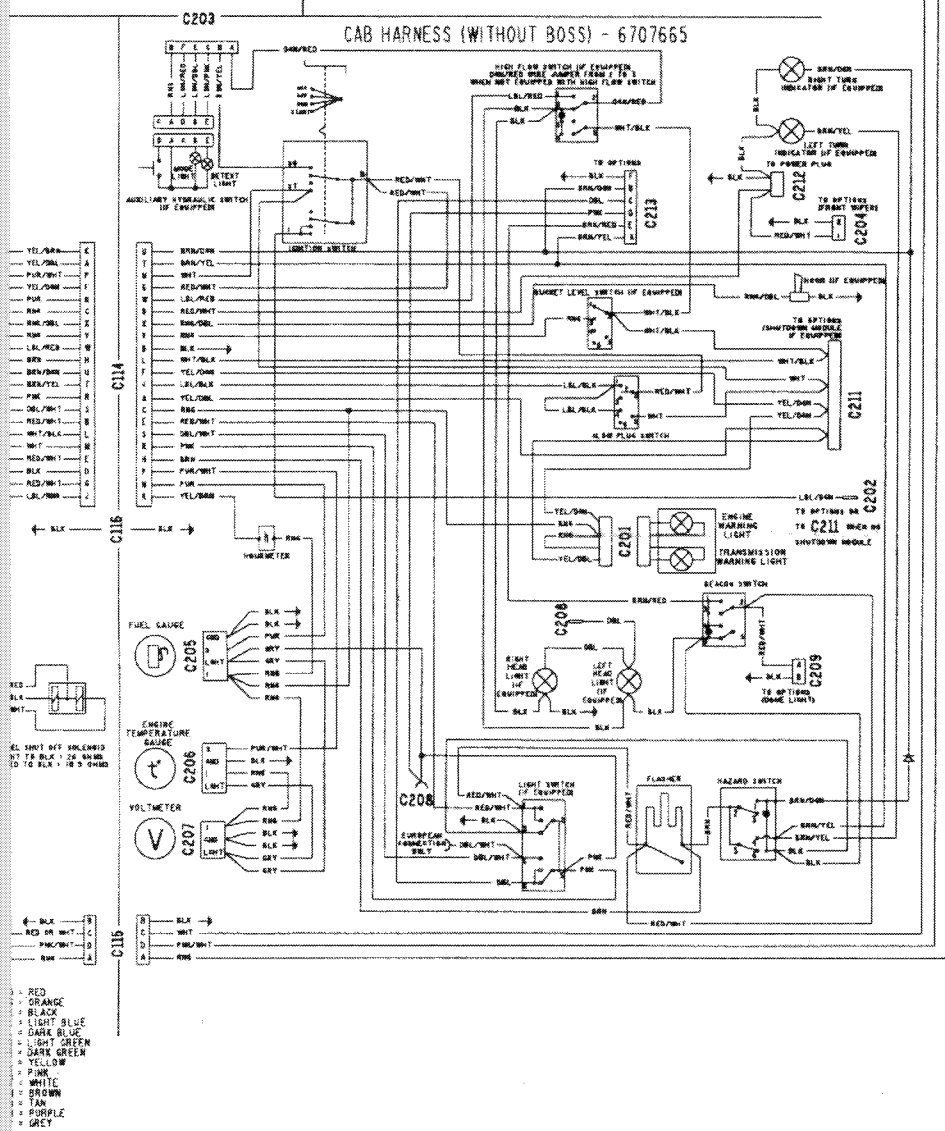
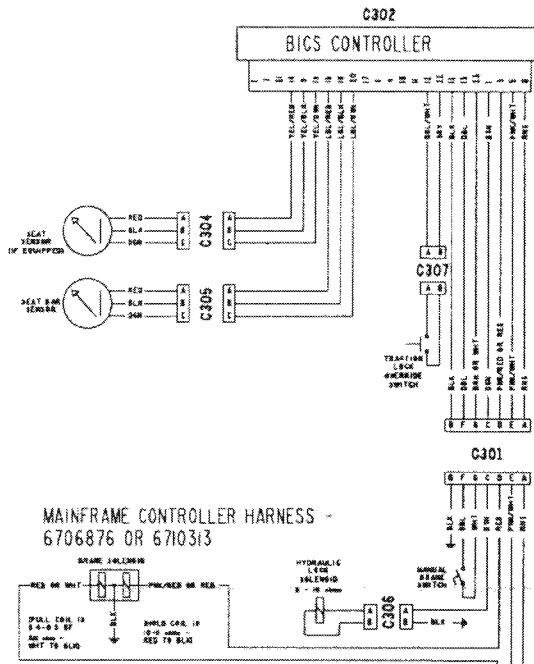
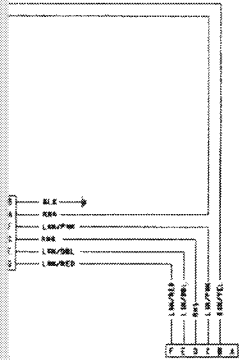
WIRES CONNECT BY LETTER ACROSS CONNECTORS

SOME CONNECTOR BODIES NOT SHOWN FOR DRAWING CLARITY

BICS CONTROLLER HARNESS - 6706828 OR 6710312

FRONT AUXILIARY
AND FUEL/TEMP
H. 1000

FRONT AUXILIARY
BASE JUNCTION
H. 1000



773 BOSS - WIRING SCHEMATIC

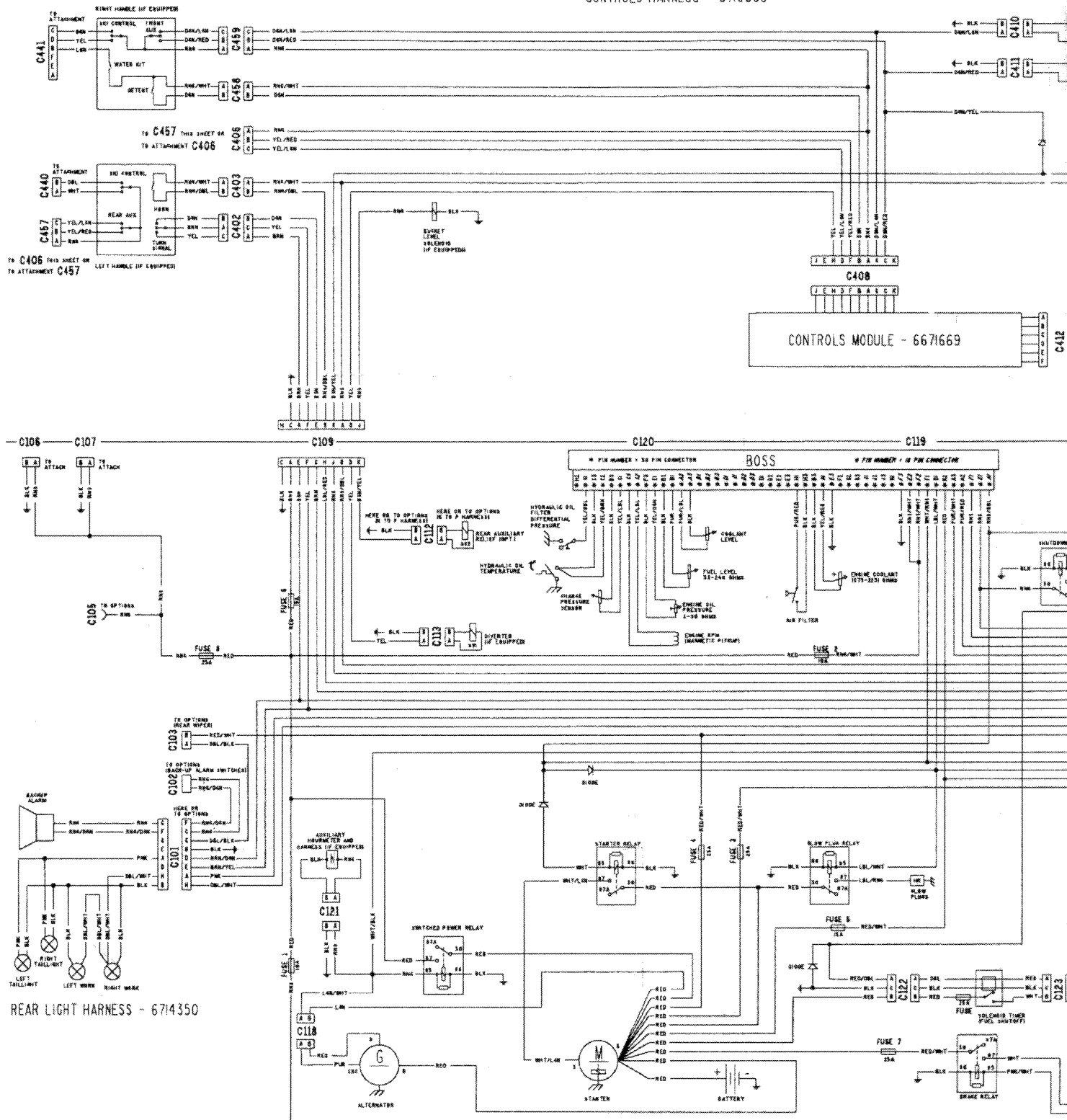
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S/N 509618307-16511

(PRINTED JUNE 2001)

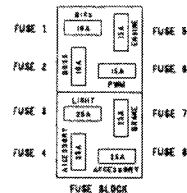
MC2583

CONTROLS HARNESS - 6710365



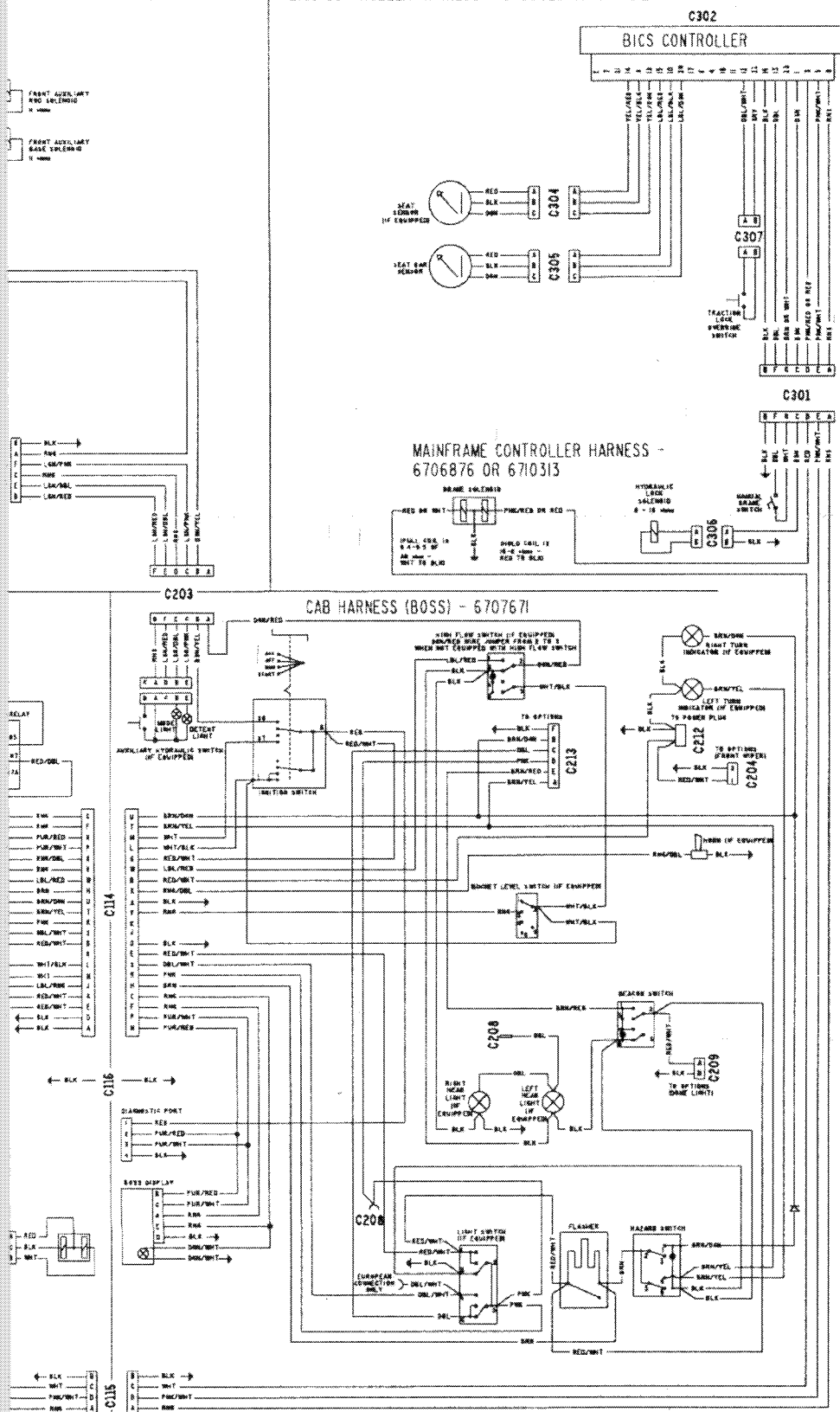
REAR LIGHT HARNESS - 6714350

ENGINE HARNESS (BOSS) - 6709891



PRINTED IN U.S.A.

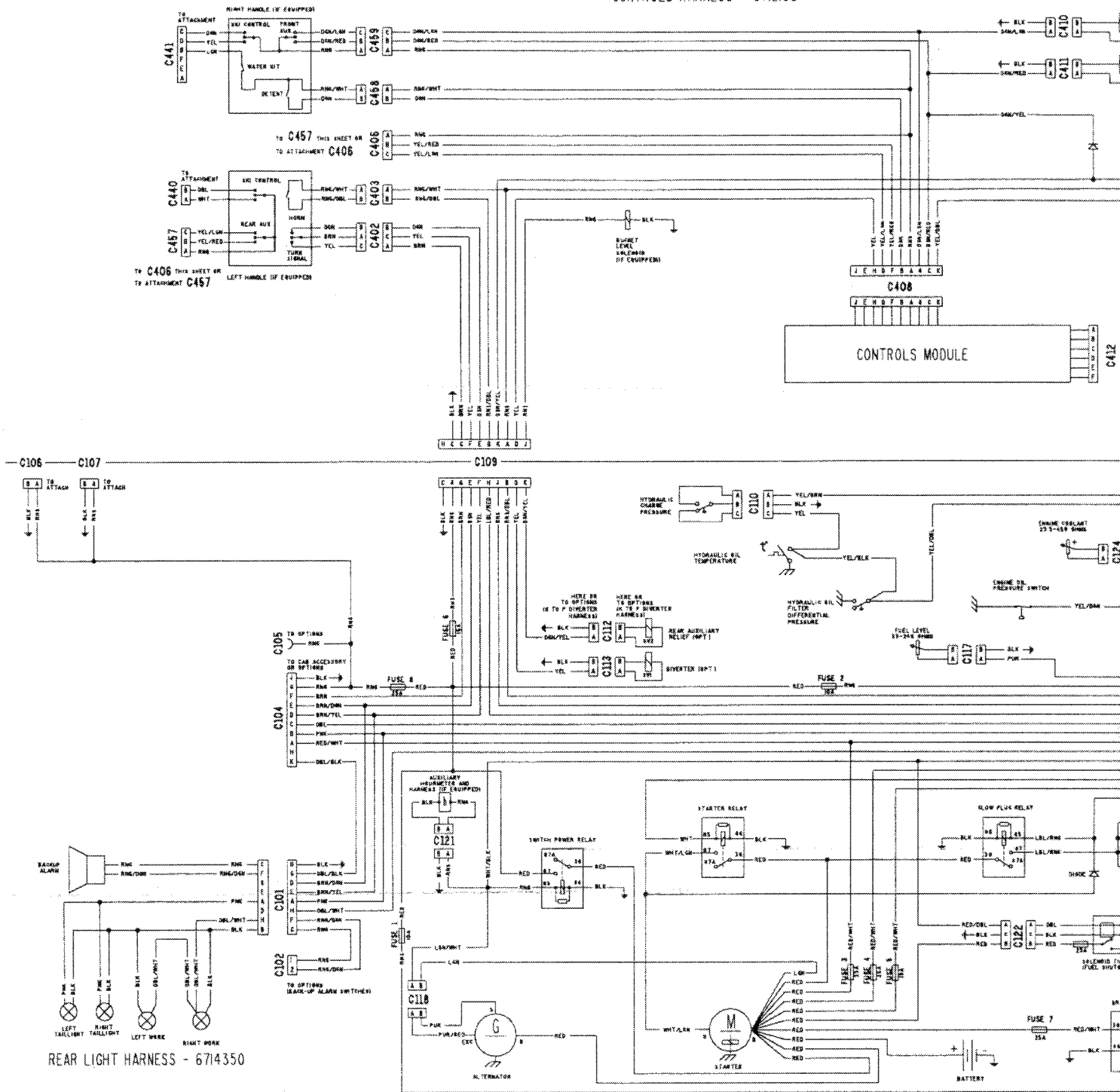
BICS CONTROLLER HARNESS - 6706828 OR 6710312



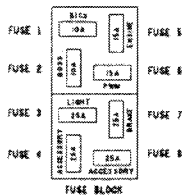
ME CONNECTOR
DOES NOT SHOWN
R DRAWING CLARITY

RED = RED
 ORG = ORANGE
 BLK = BLACK
 LBL = LIGHT BLUE
 DBL = DARK BLUE
 LGN = LIGHT GREEN
 DGN = DARK GREEN
 YEL = YELLOW
 PINK = PINK
 WHT = WHITE
 BRN = BROWN
 TAN = TAN
 PUR = PURPLE
 GRAY = GRAY

CONTROLS HARNESS - 6712136



ENGINE HARNESS (WITHOUT BOSS) - 6710486

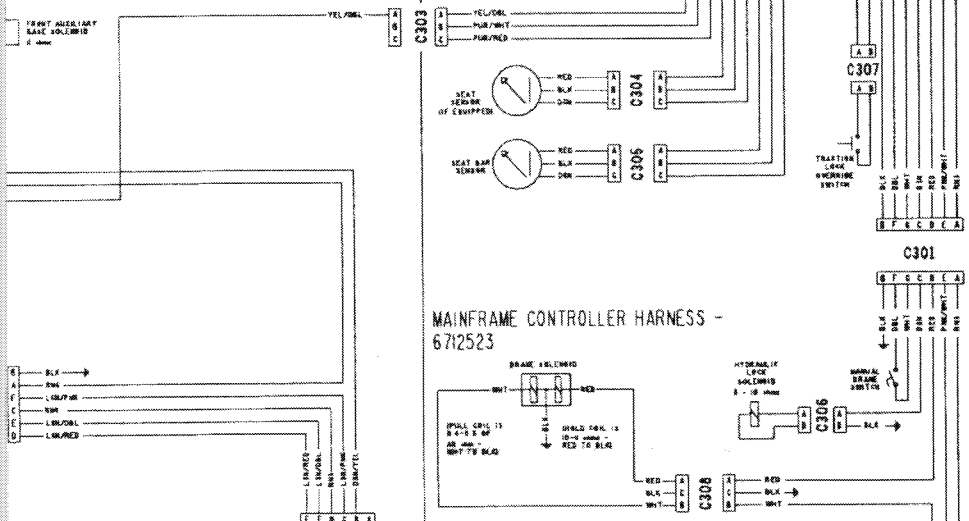


WIRES CONNECT BY
LETTER ACROSS
CONNECTORS

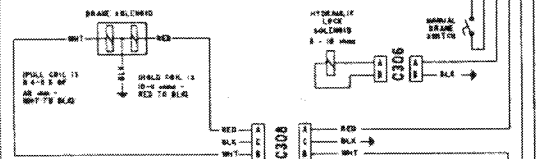
C302

FRONT ASSISTANT
NO. 34,123
d 4400K

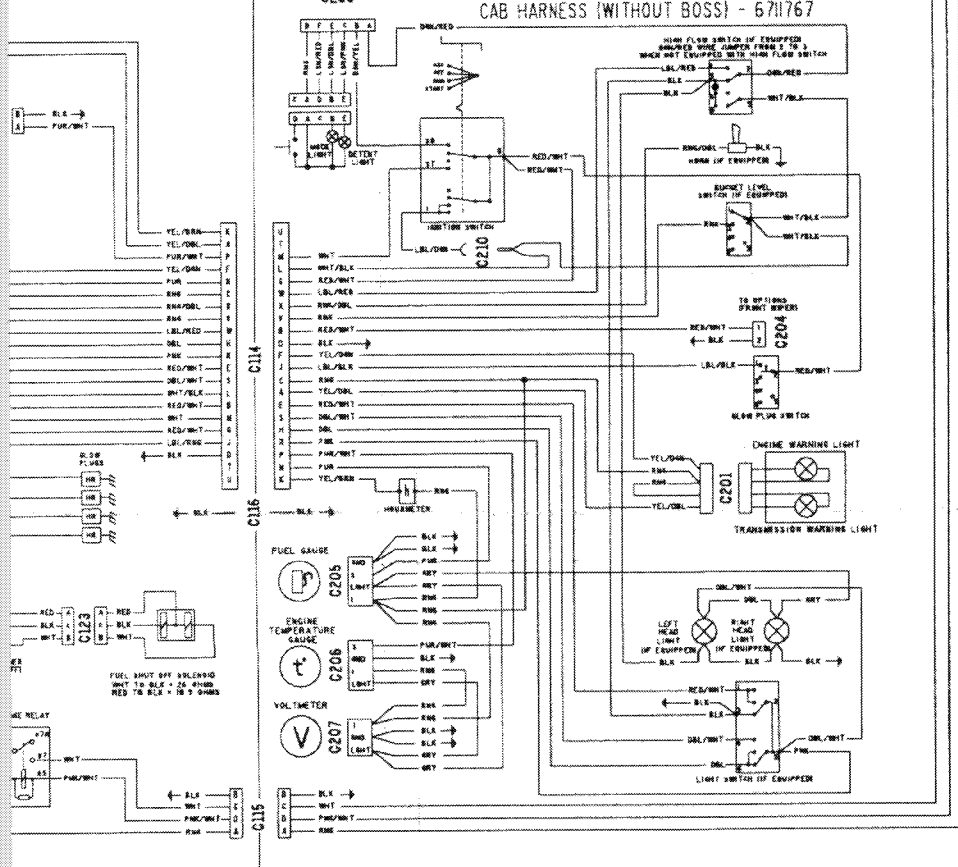
FRONT ASSISTANT
NO. 34,123
d 4400K



MAINFRAME CONTROLLER HARNESS -
6712523



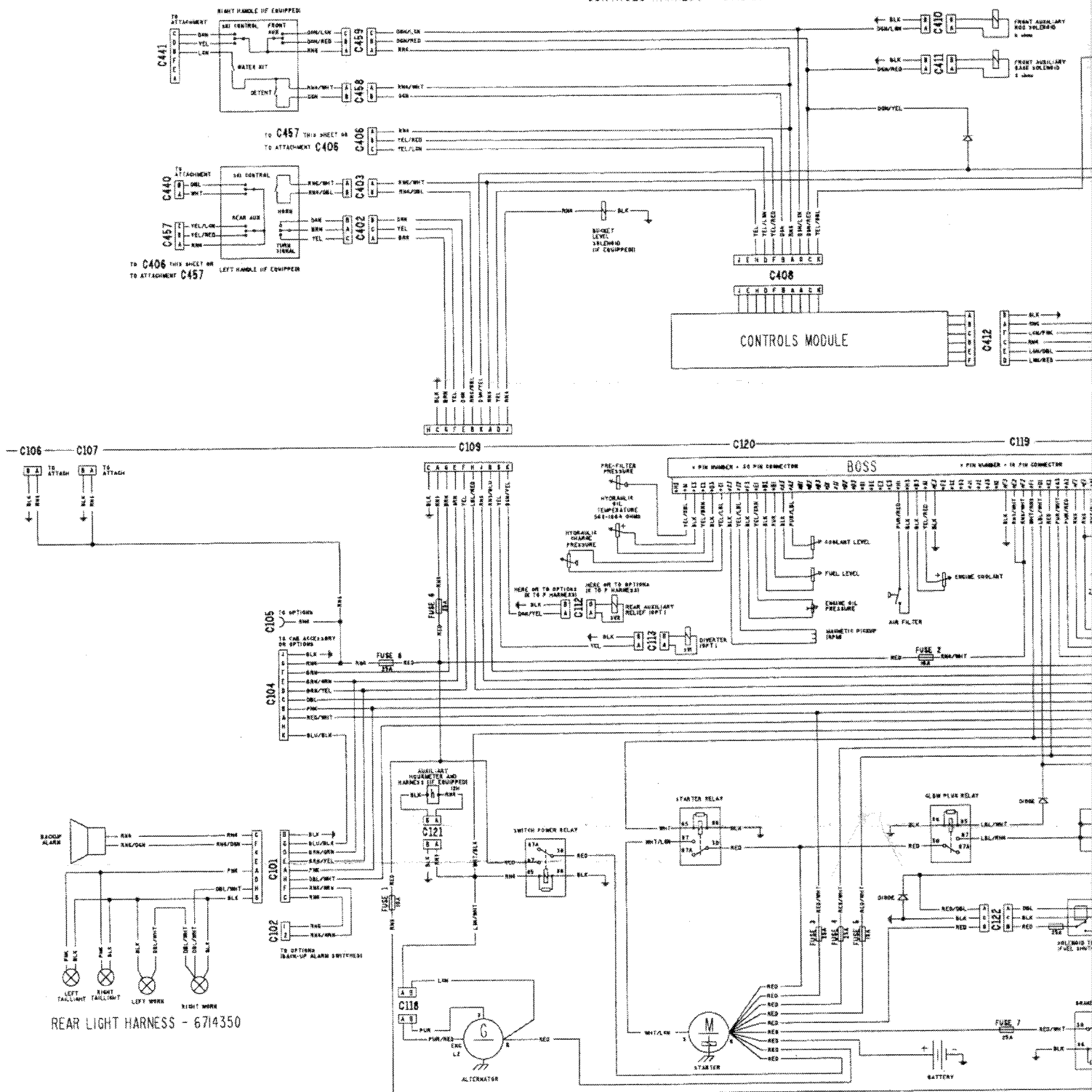
C203



RED = RED
RNG = ORANGE
BLK = BLACK
LBL = LIGHT BLUE
DBL = DARK BLUE
LGN = LIGHT GREEN
DGN = DARK GREEN
YEL = YELLOW
PNK = PINK
WHT = WHITE
BRN = BROWN
TAN = TAN
PUR = PURPLE
GRY = GREY

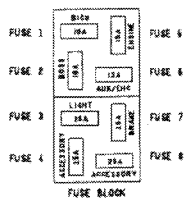
TIME CONNECTOR
DIES NOT SHOWN
FOR DRAWING CLARITY

CONTROLS HARNESS - 6712136



REAR LIGHT HARNESS - 6714350

ENGINE HARNESS (BOSS) - 6710487



WIRES CONNECT BY LETTER ACROSS CONNECTORS

SON BOB FOR

BICS CONTROLLER HARNESS - 6712134

C302

BICS CONTROLLER

MAINFRAME CONTROLLER HARNESS - 6712523

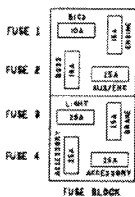
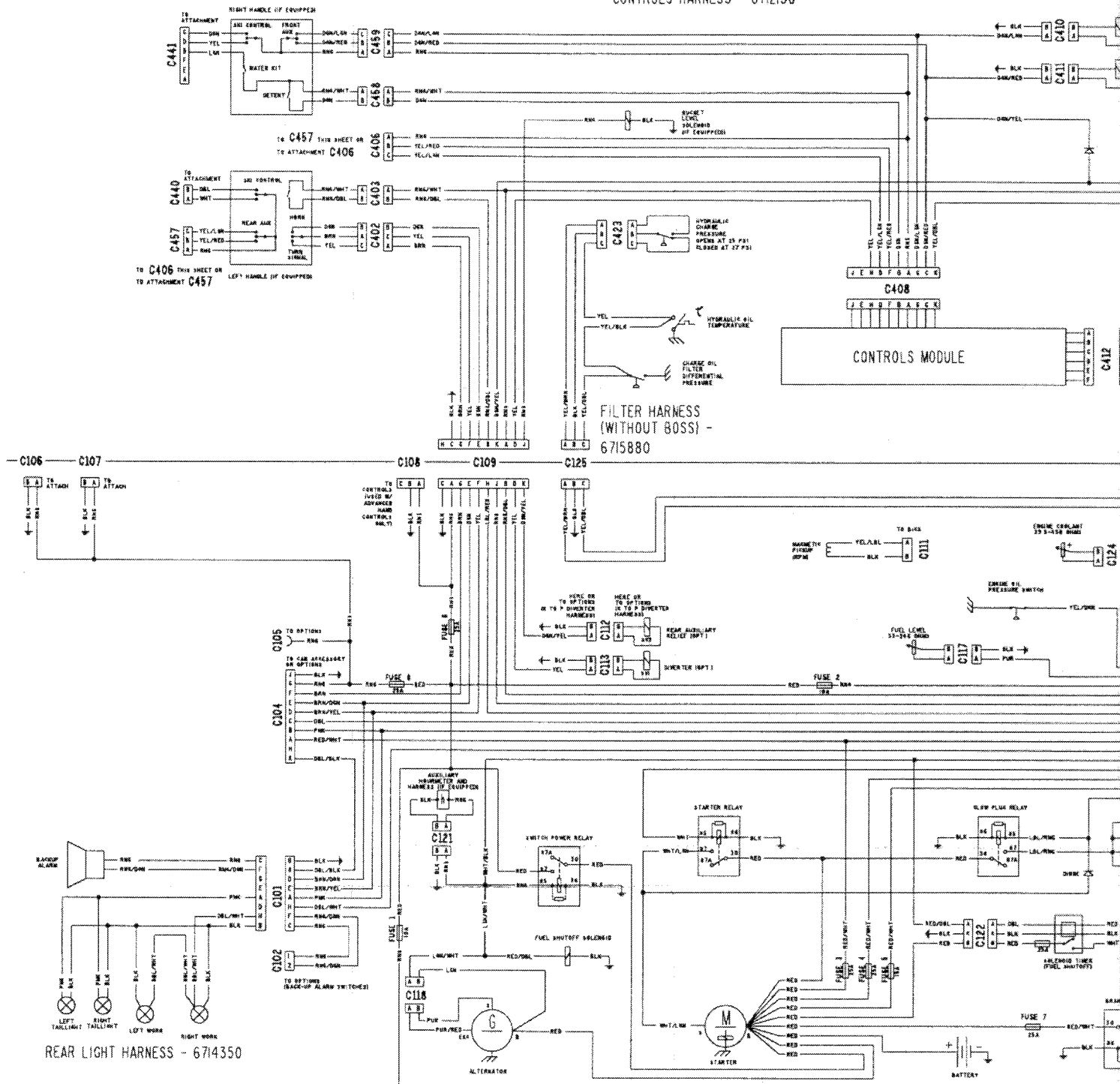
CAB HARNESS (BOSS) - 6711774

IF CONNECTOR
IES NOT SHOWN
DRAWING CLARITY

RED : RED
RNG : ORANGE
BLK : BLACK
LBL : LIGHT BLUE
DBL : DARK BLUE
LGN : LIGHT GREEN
DGN : DARK GREEN
YEL : YELLOW
PNK : PINK
WHT : WHITE
BRN : BROWN
TAN : TAN
PUR : PURPLE
GRY : GREY

MC2584 16-12-011

CONTROLS HARNESS - 6712136



C302.



MC2581 (6-12-01)

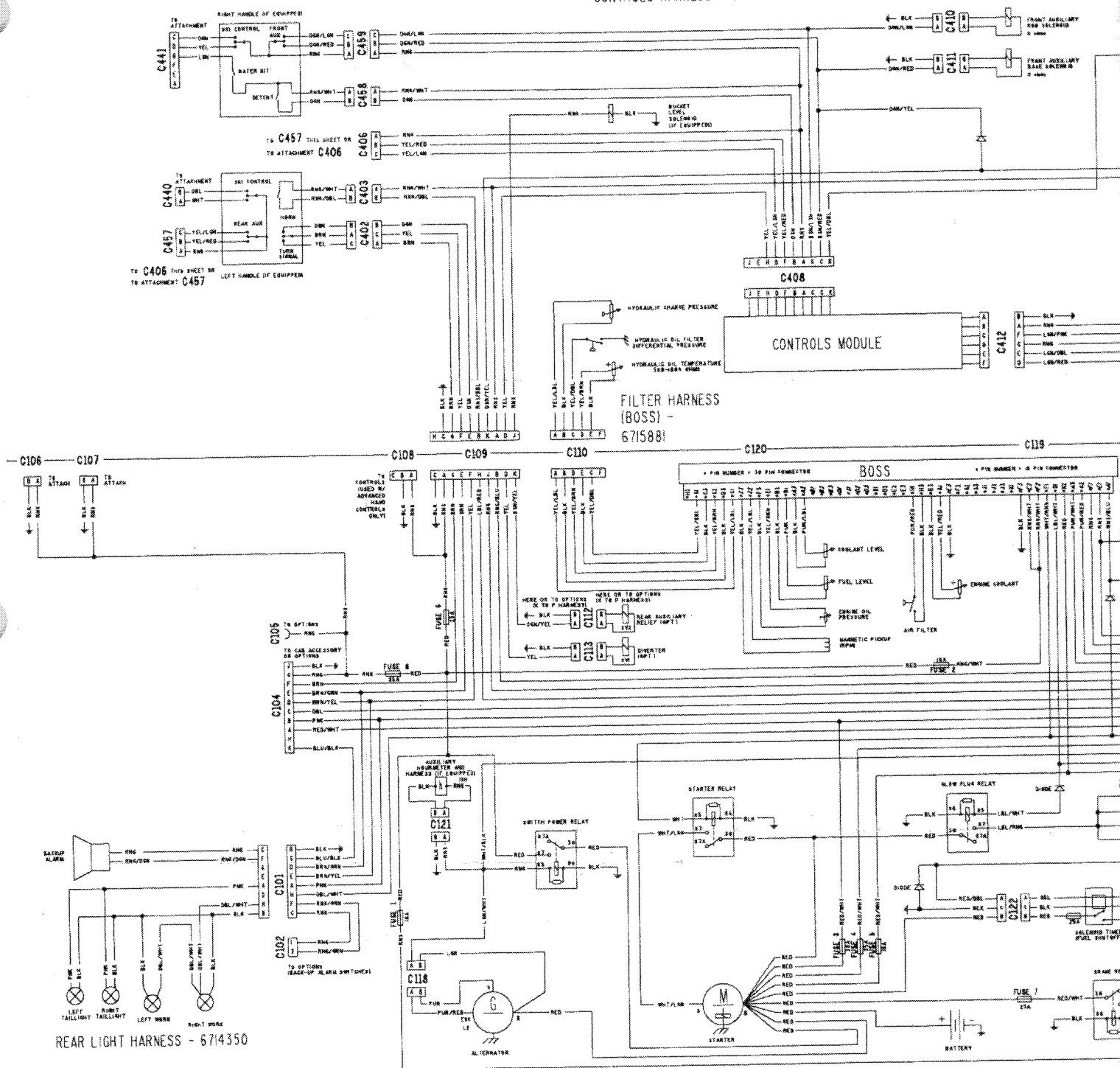
773 BOSS - WIRING SCHEMATIC

S/N 509646094-51304

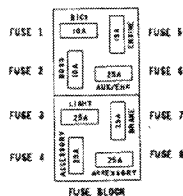
(PRINTED JUNE 2001)

MC2585

CONTROLS HARNESS - 6712136

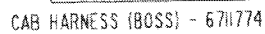


ENGINE HARNESS (BOSS) - 6715893

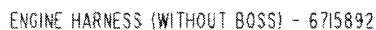


SOME BOSS FOR

C302



MC2585 (6-13-01)



BICS CONTROLLER HARNESS - 6712134

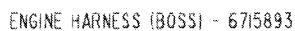
C302

BICS CONTROLLER

MAINFRAME CONTROLLER HARNESS - 6712523

CAB HARNESS (WITHOUT BOSS) - 6711767

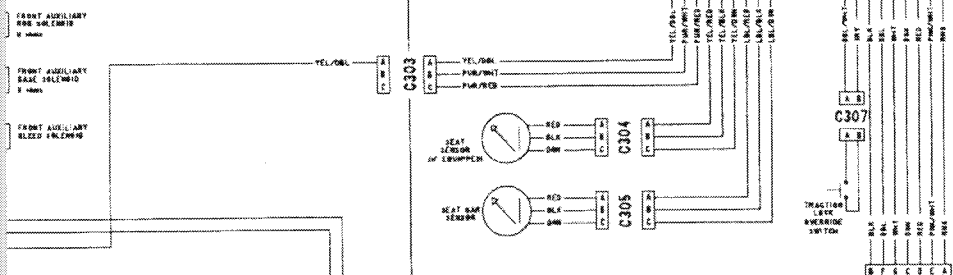
RED - RED
ORNG - ORANGE
BLK - BLACK
LBL - LIGHT BLUE
DBL - DARK BLUE
LGN - LIGHT GREEN
DGN - DARK GREEN
YEL - YELLOW
PNC - PINK
WHT - WHITE
BRN - BROWN
TAN - TAN
PUR - PURPLE
GRY - GREY



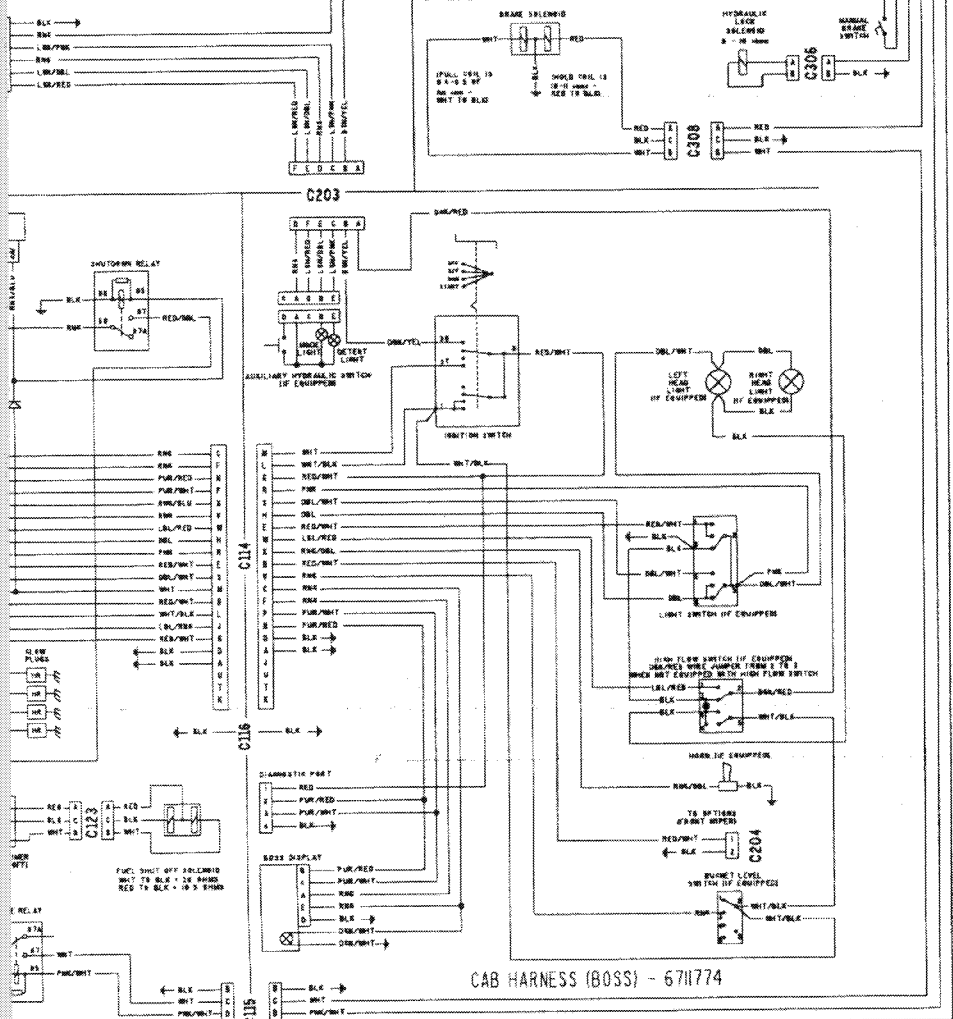
BICS CONTROLLER HARNESS - 6712134

C302

BICS CONTROLLER



MAINFRAME CONTROLLER HARNESS - 6712523

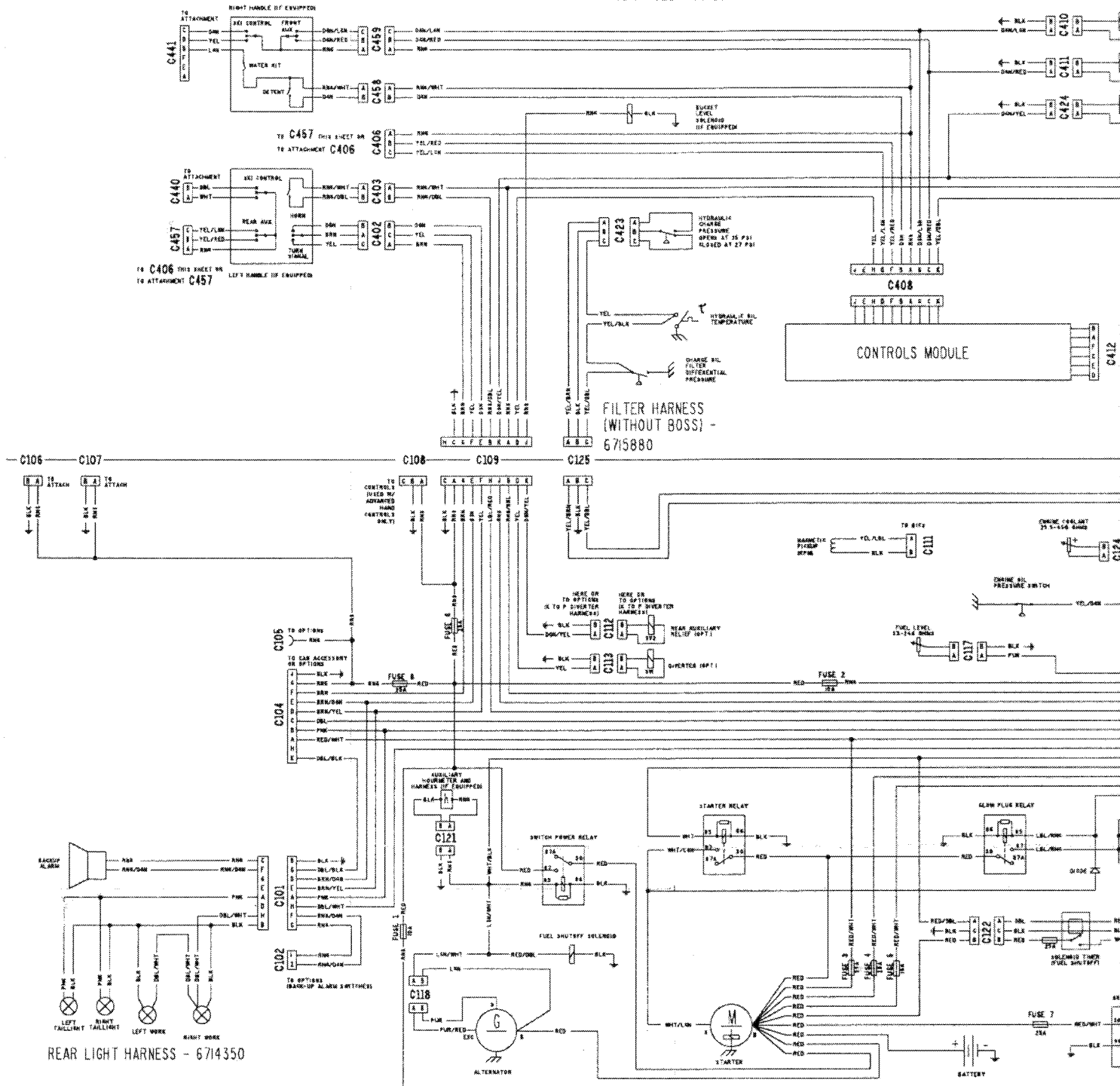


CAB HARNESS (BOSS) - 6711774

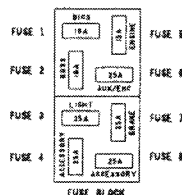
WIRE CONNECTOR
WIRING NOT SHOWN
FOR DRAWING CLARITY

- RED - RED
- ORNG - ORANGE
- BLK - BLACK
- LBL - LIGHT BLUE
- DBL - DARK BLUE
- GRN - LIGHT GREEN
- OGN - DARK GREEN
- YEL - YELLOW
- PNK - PINK
- WHT - WHITE
- BWN - BROWN
- TAN - TAN
- PUR - PURPLE
- GRY - GREY

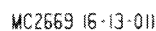
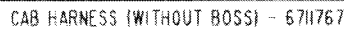
CONTROLS HARNESS - 6719149



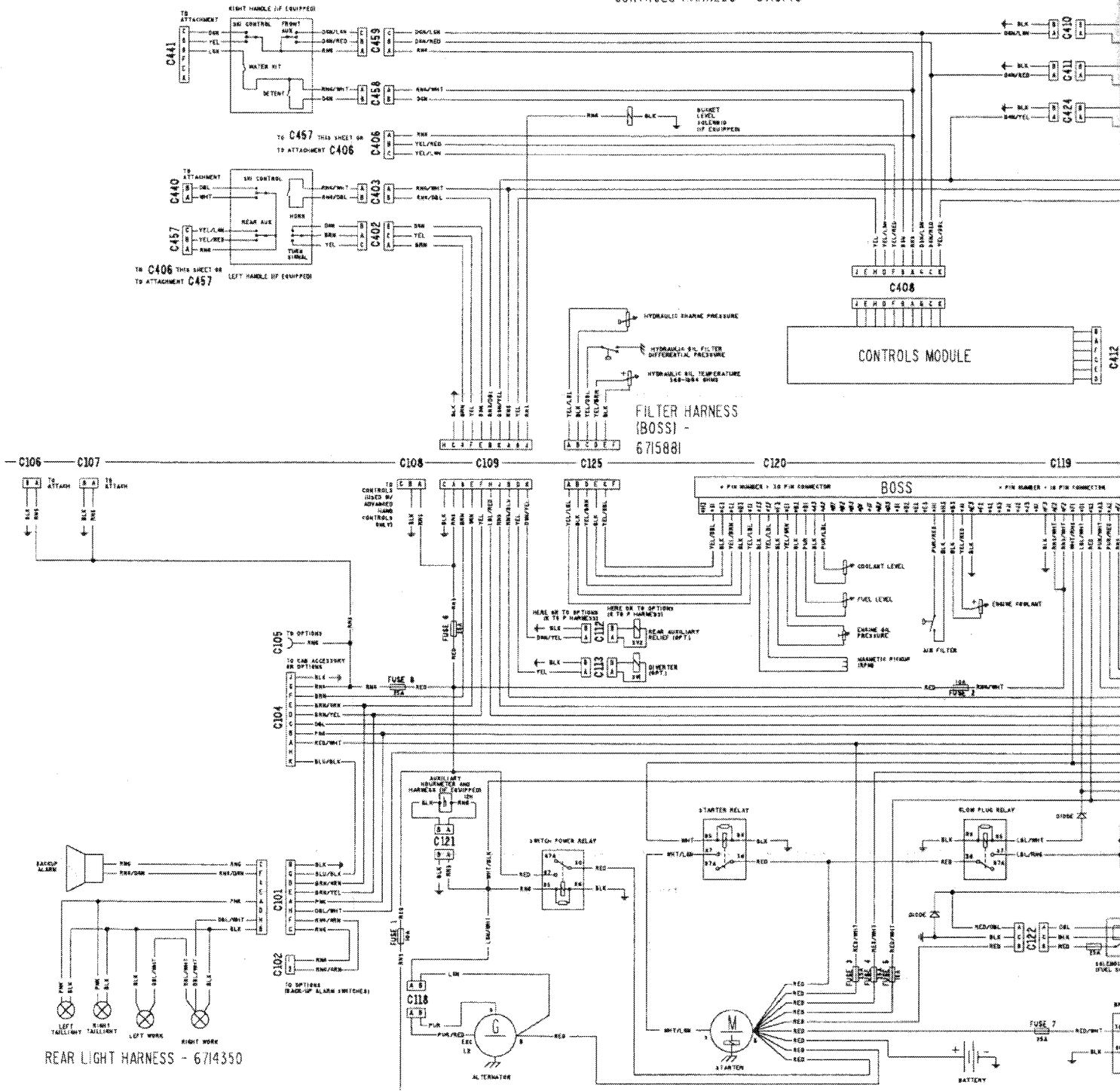
ENGINE HARNESS (WITHOUT BOSS) - 6715892



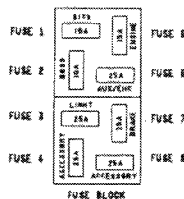
c302



CONTROLS HARNESS - 6719149



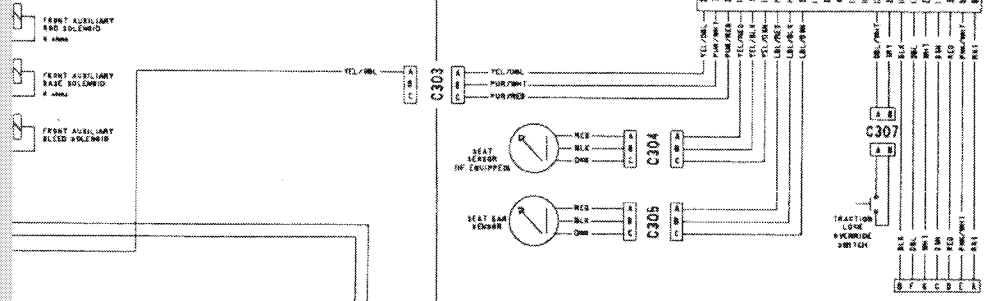
ENGINE HARNESS (BOSS) - 6715893



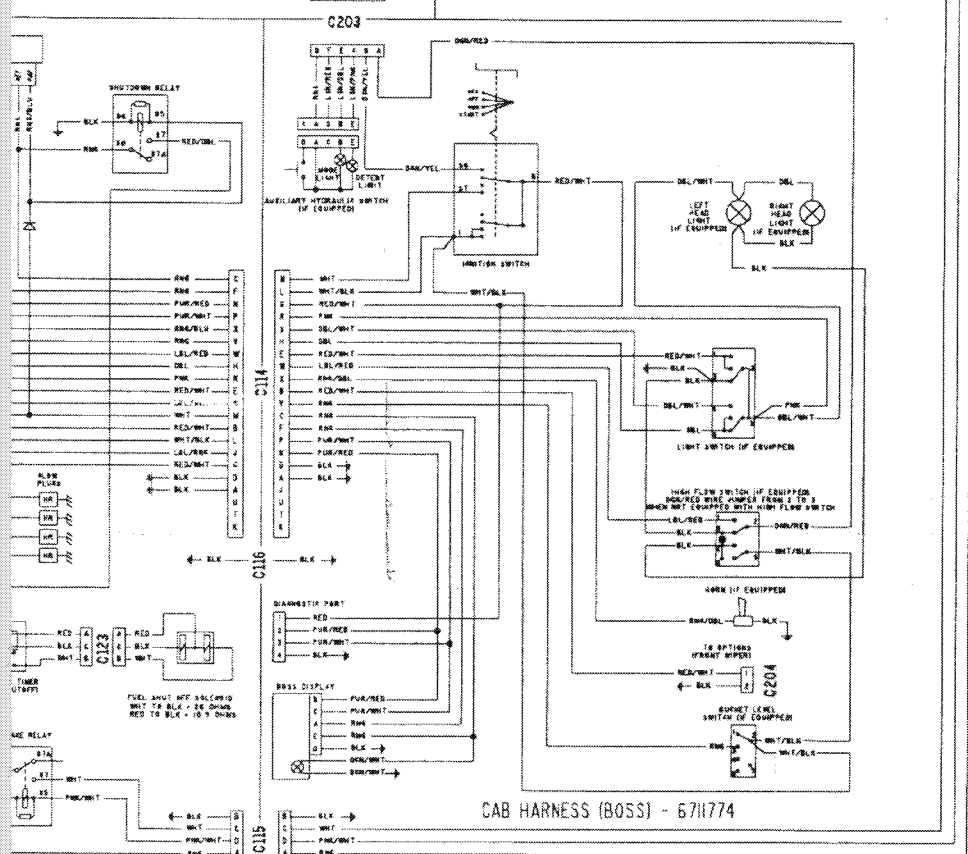
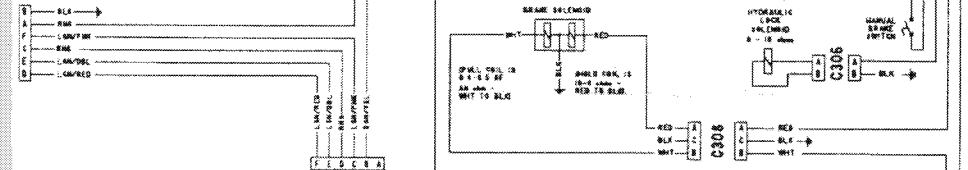
BICS CONTROLLER HARNESS - 6712134

C302

BICS CONTROLLER



MAINFRAME CONTROLLER HARNESS - 6712523

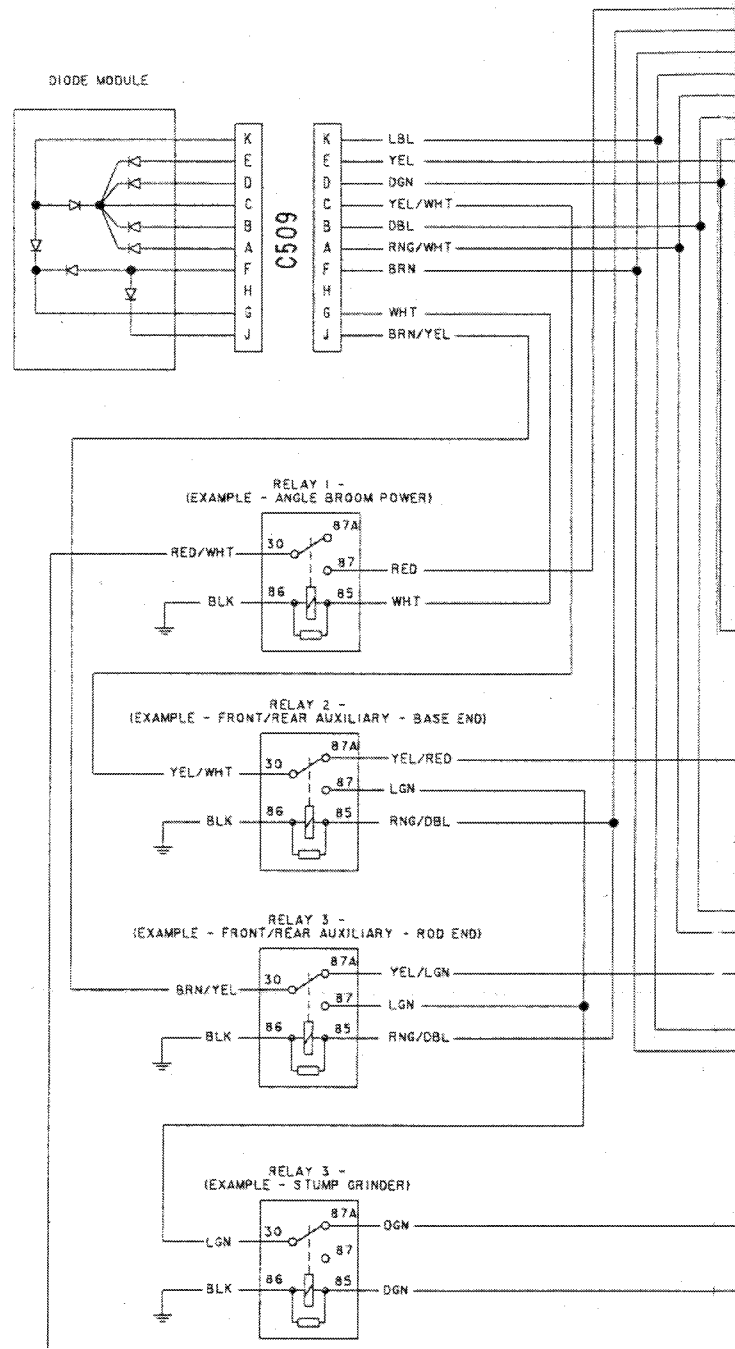


WIRE CONNECTOR DOES NOT SHOWN FOR DRAWING CLARITY

RED = RED
RNG = ORANGE
BLK = BLACK
LBL = LIGHT BLUE
DBL = DARK BLUE
LGH = LIGHT GREEN
DGM = DARK GREEN
YEL = YELLOW
PNE = PINK
WHT = WHITE
BRN = BROWN
TAN = TAN
PUR = PURPLE
GRY = GREY

773 - WIRING SCHEMATIC
 ATTACHMENT CONTROL OPTION
 S/N 509635001-38679
 S/N 509616001-16311
 (PRINTED JUNE 2001)
 MC2586

ATTACHMENT CONTROLS HARNESS - 6705901



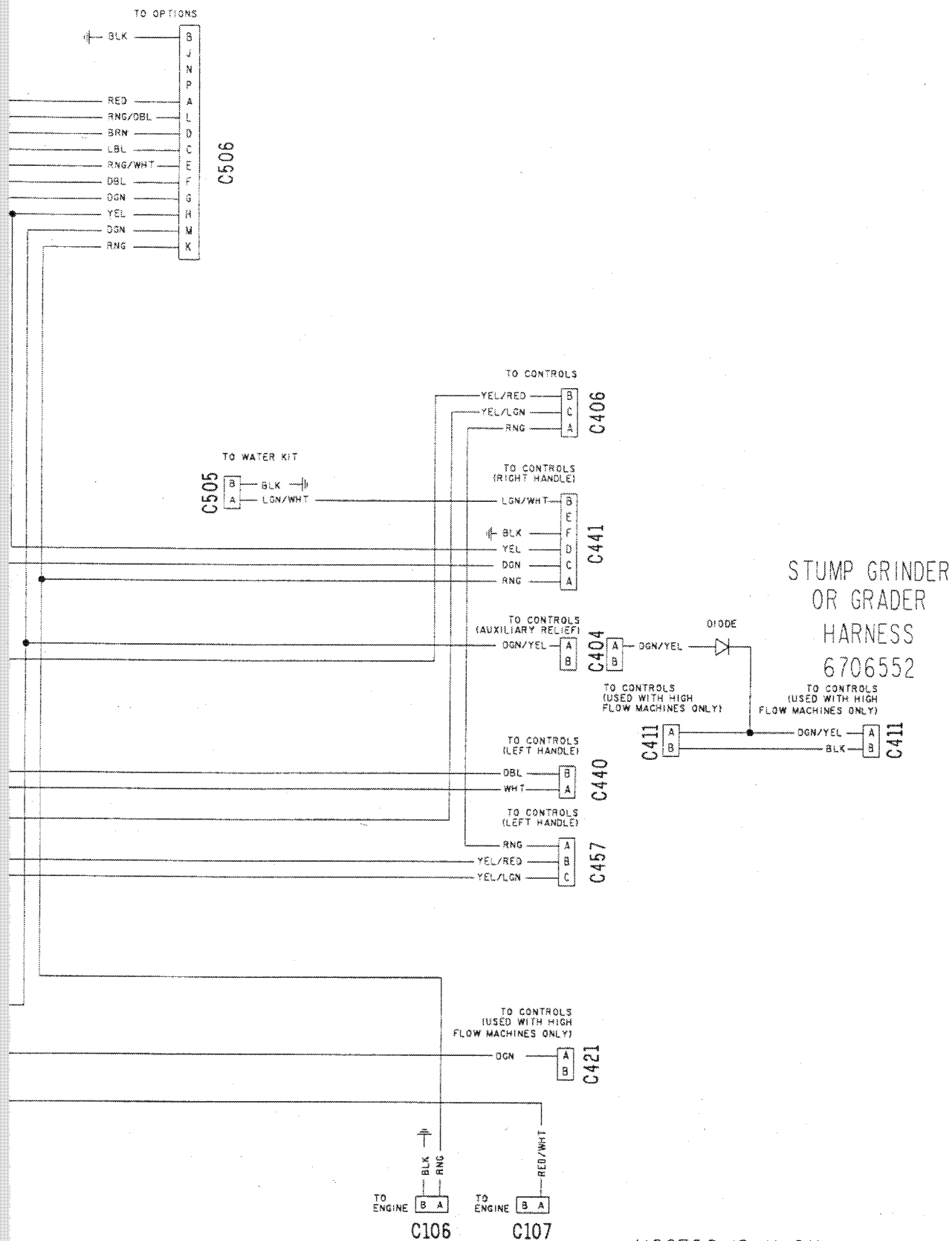
RED = RED
 ORG = ORANGE
 BLK = BLACK
 LBL = LIGHT BLUE
 DBL = DARK BLUE
 LGN = LIGHT GREEN
 DGN = DARK GREEN
 YEL = YELLOW
 PNK = PINK
 WHT = WHITE
 BRN = BROWN
 TAN = TAN
 PUR = PURPLE
 GRY = GREY

WIRES CONNECT BY
 LETTER ACROSS
 CONNECTORS



SOME CONNECTOR
 BODIES NOT SHOWN
 FOR DRAWING CLARITY

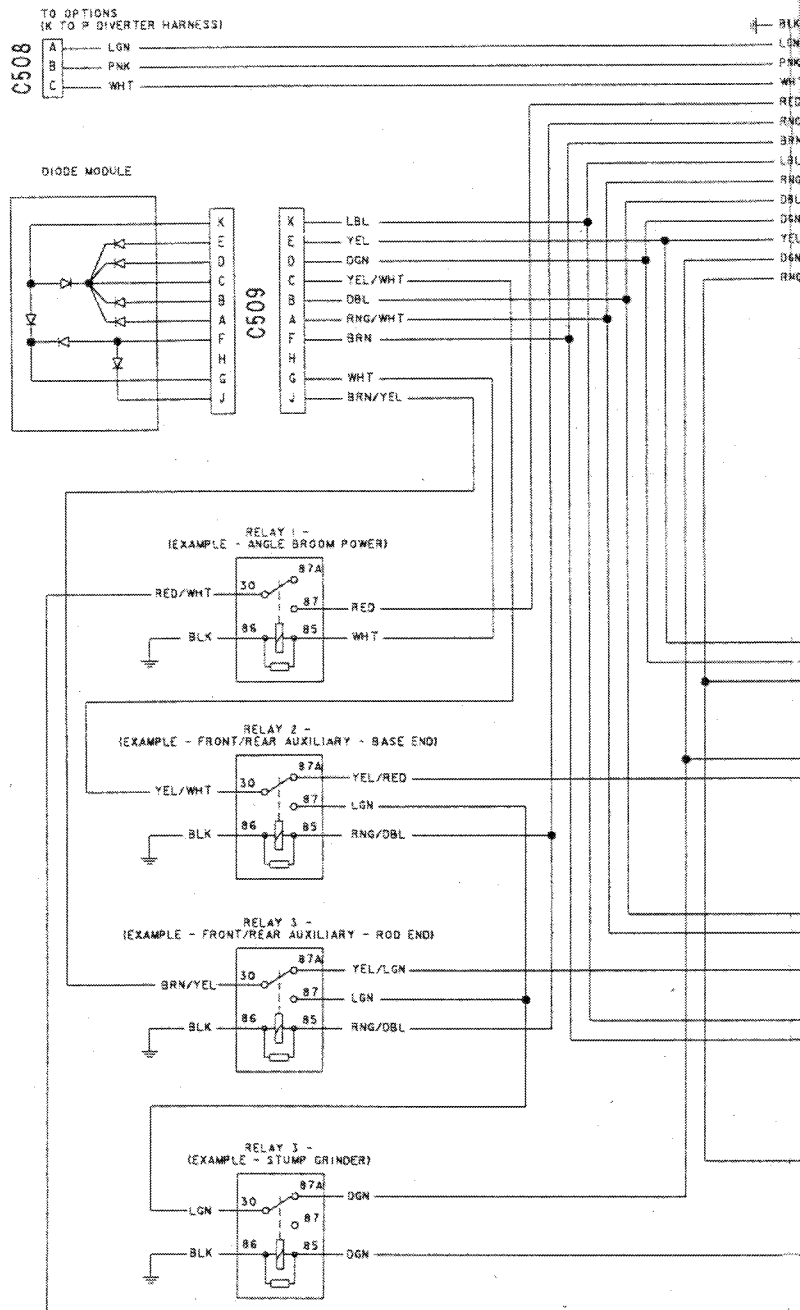
PRINTED IN U.S.A.



MC2586 (6-11-01)

773 - WIRING SCHEMATIC
ATTACHMENT CONTROL OPTION
S/N 509638680 AND ABOVE
S/N 509616312-34999
(PRINTED JUNE 2001)
MC2587

ATTACHMENT CONTROLS HARNESS - 6710300



RED = RED
RNG = ORANGE
BLK = BLACK
LBL = LIGHT BLUE
DBL = DARK BLUE
DGN = LIGHT GREEN
YEL = YELLOW
PNK = PINK
WHT = WHITE
BRN = BROWN
TAN = TAN
PUR = PURPLE
GRY = GREY

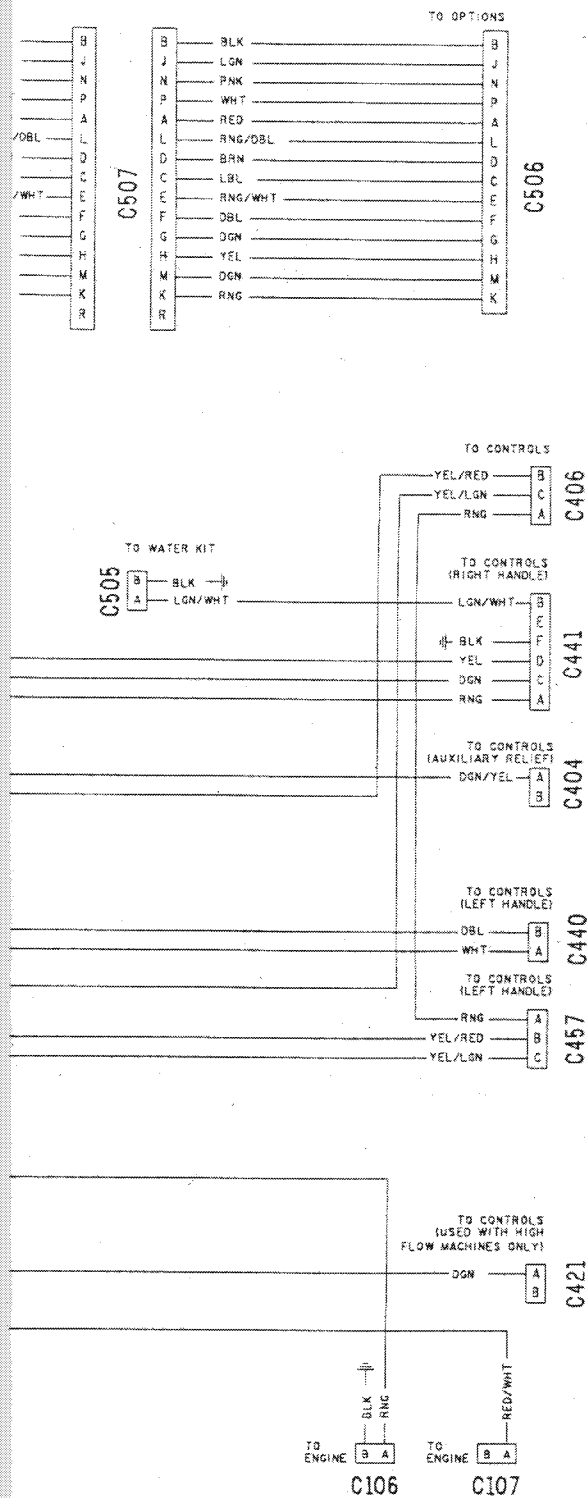
WIRES CONNECT BY
LETTER ACROSS
CONNECTORS



SOME CONNECTOR
BODIES NOT SHOWN
FOR DRAWING CLARITY

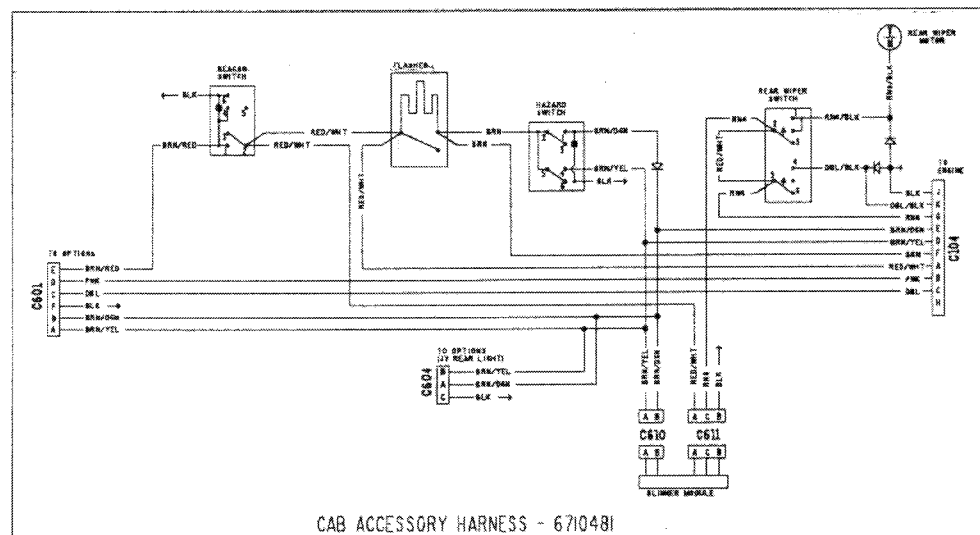
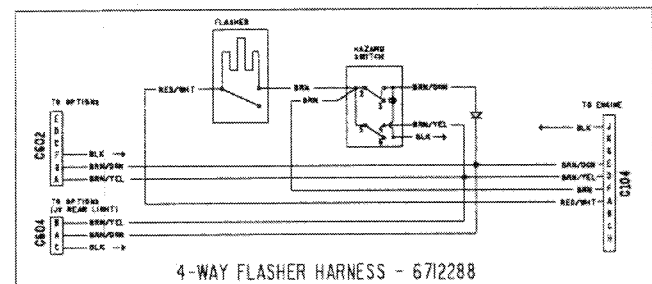
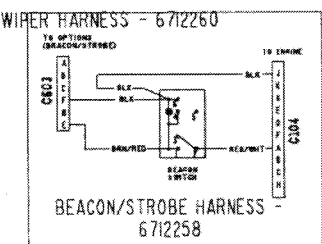
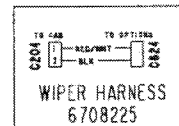
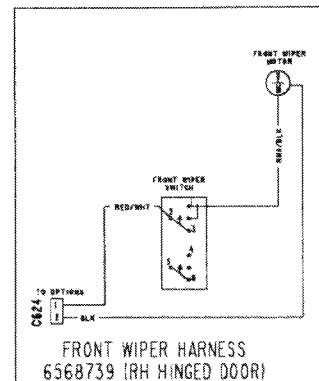
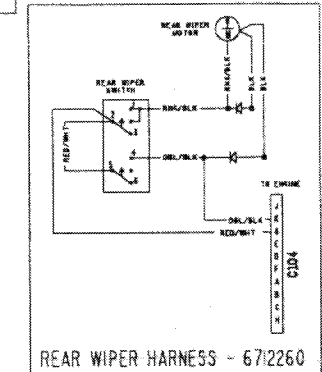
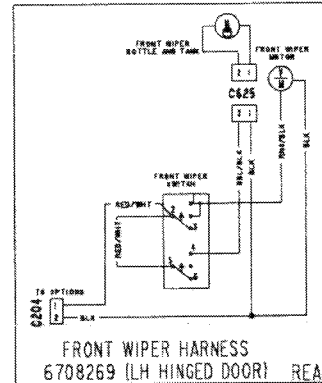
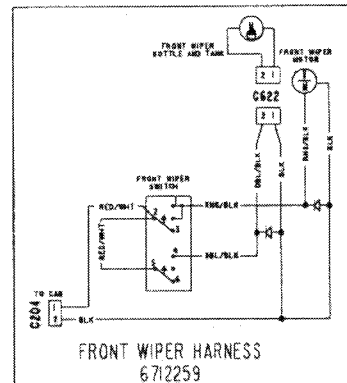
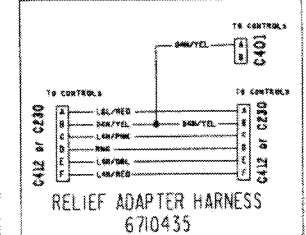
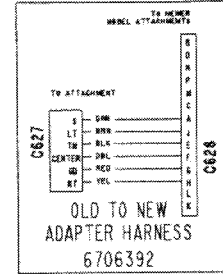
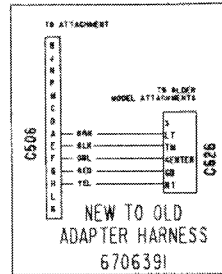
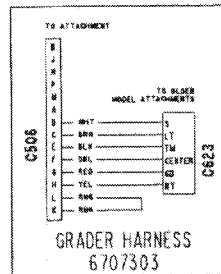
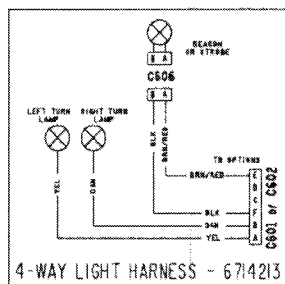
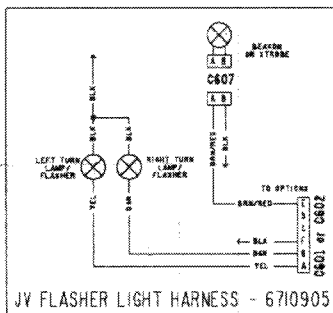
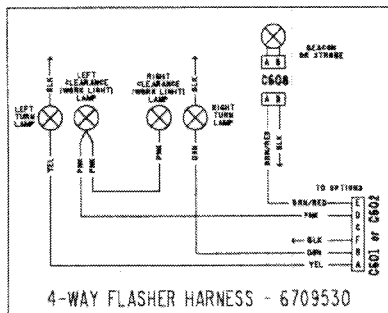
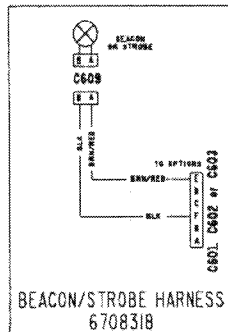
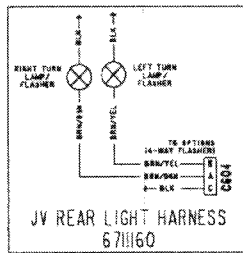
PRINTED IN U.S.A.

LIFT ARM HARNESS - 6710299

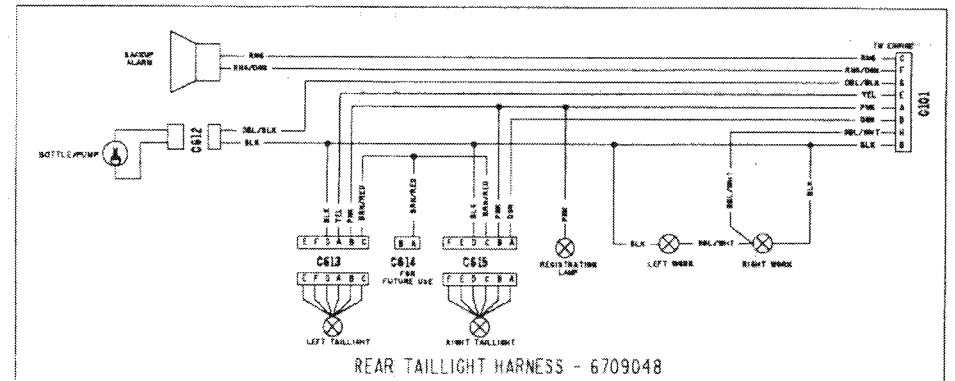
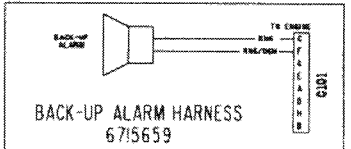
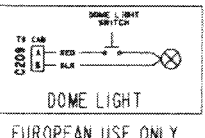
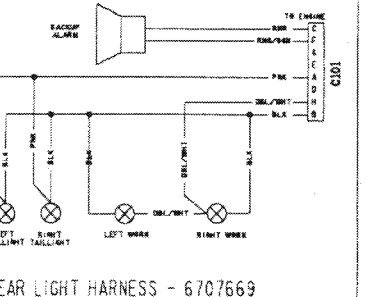
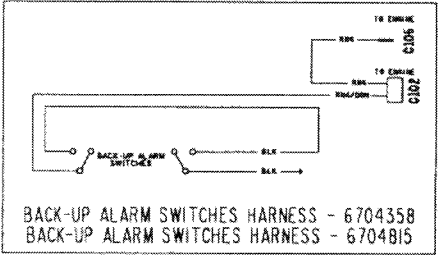
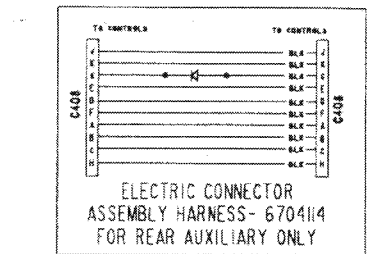
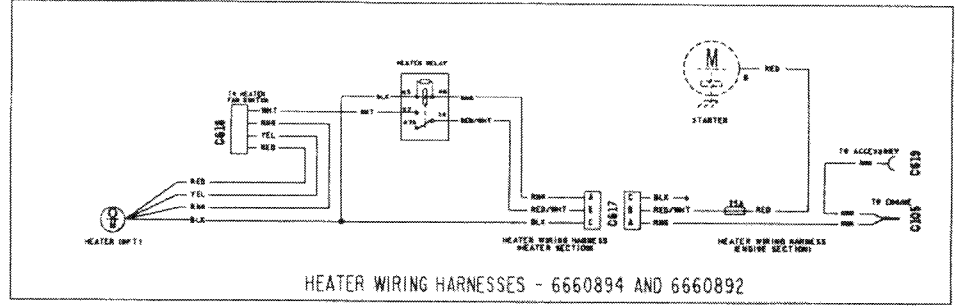
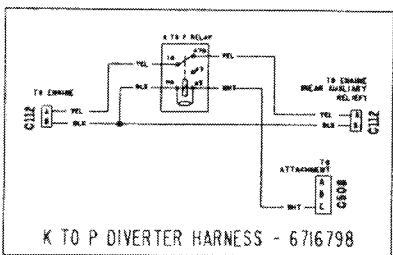
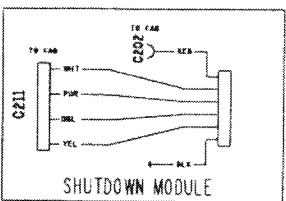
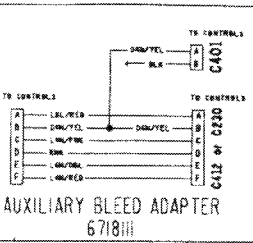


MC2587 (6-11-01)

773 - WIRING SCHEMATIC
 OPTIONS
 S/N 509635001 AND ABOVE
 S/N 509616001-34999
 (PRINTED JUNE 2001)
 MC2588



WIRES CONNECT BY
 LETTER ACROSS
 CONNECTORS



- RED - RED
- BRN - BROWN
- BLK - BLACK
- BLU - LIGHT BLUE
- DBL - DARK BLUE
- GRN - LIGHT GREEN
- DMN - DARK GREEN
- YEL - YELLOW
- PNK - PINK
- WHT - WHITE
- BRN - BROWN
- TAN - TAN
- PUR - PURPLE
- GRY - GREY

ONE CONNECTOR
DOES NOT SHOWN
FOR DRAWING CLARITY

773 - WIRING SCHEMATIC

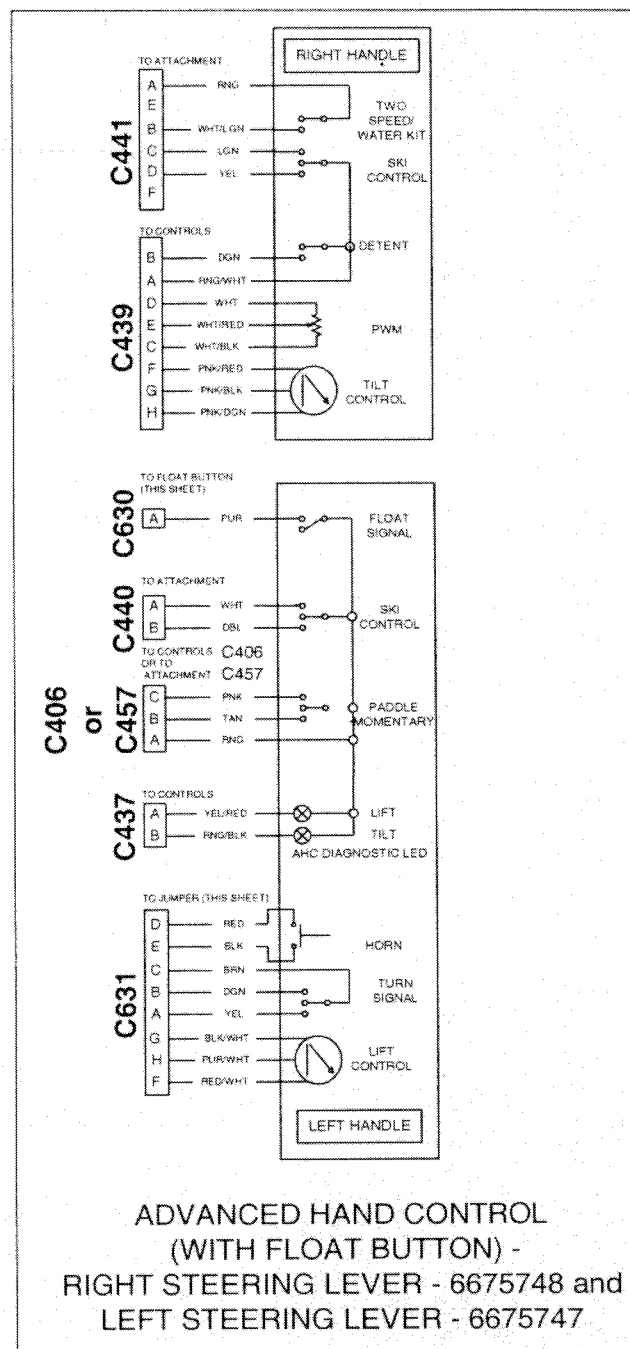
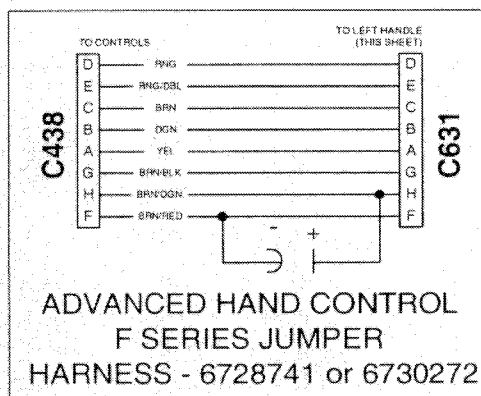
OPTIONS

S/N 509635001 AND ABOVE

S/N 509616001-34999

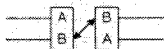
(PRINTED JUNE 2001)

V-0112



RED = RED
RNG = ORANGE
BLK = BLACK
LBL = LIGHT BLUE
DBL = DARK BLUE
LGN = LIGHT GREEN
DGN = DARK GREEN
YEL = YELLOW
PNK = PINK
WHT = WHITE
BRN = BROWN
TAN = TAN
PUR = PURPLE
GRY = GRAY

WIRES CONNECT BY LETTER
ACROSS CONNECTORS



SOME CONNECTOR
BODIES NOT SHOWN
FOR DRAWING CLARITY

BATTERY FEED 1000-1999 RED, RED/WHT, RNG
GROUND 2000-2999 BLK
MONITORING 3000-3999 LBL
HYDRAULIC 4000-4999 LGN
ATTACHMENT CONTROLS 5000-5999 YEL
LIGHTS 6000-6999 PNK
ACCESSORIES 7000-7999 WHT
ENGINE 8000-8999 TAN
COMMUNICATION 9000-9999 PUR

TROUBLESHOOTING

Chart

The following troubleshooting chart is provided for assistance in locating and correcting problems. Many of the recommended procedures must be done by authorized Bobcat Service Personnel only.



WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Handbook and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0199

PROBLEM	CAUSE
Battery will not take a charge.	1, 2, 3, 4, 5
Alternator will not charge.	1, 2, 5
Starter will not turn the engine.	2, 3, 4, 6, 7, 8, 9

KEY TO CORRECT THE CAUSE

1. Alternator belt is loose or damaged.
2. Battery connections are dirty or loose.
3. Battery is damaged.
4. The ground connection is not making a good contact.
5. The alternator is damaged.
6. The engine is locked.
7. The starter is damaged.
8. The wiring or the solenoid is damaged.
9. Check the fuses.

ELECTRICAL SYSTEM INFORMATION

Description

The loader has a 12 volt, negative ground alternator charging system. The electrical system is protected by fuses (Item 1) [A] located in the engine compartment. The fuses will protect the electrical system when there is an electrical overload. The reason for the overload must be found before starting the engine again.

IMPORTANT

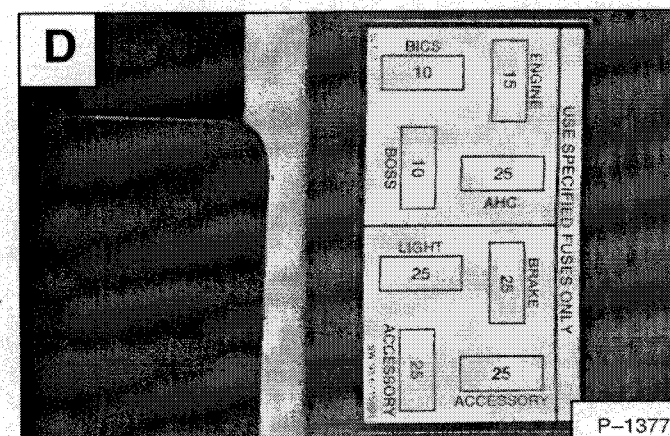
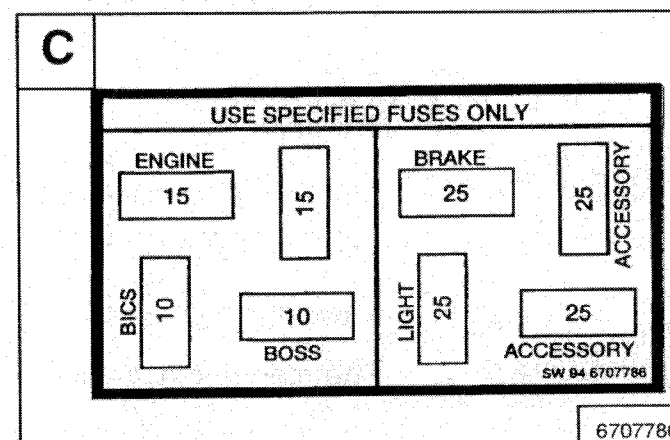
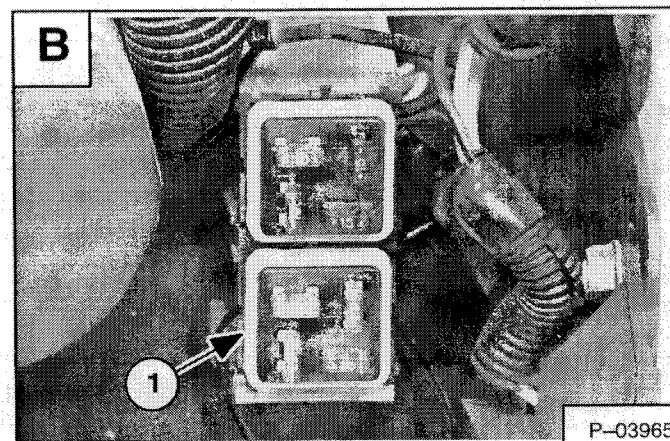
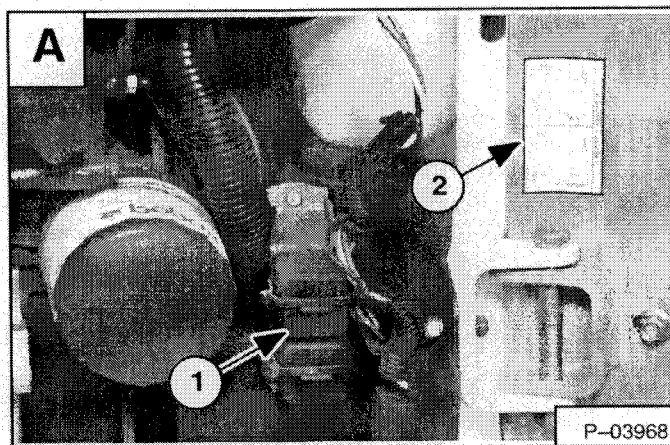
Do Not use silicone base sprays and/or sealants on harness connectors or components.

I-2123-0397

Fuse Location

The electrical system for loaders is protected by eight fuses located in the fuse block (Item 1) [B]. Remove the fuse block cover to access the fuses.

The decal (Item 2) [A] inside the rear door specifies the fuse sizes used in various loader circuits [C] & [D].



BATTERY

Removal And Installation

! WARNING

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-1296

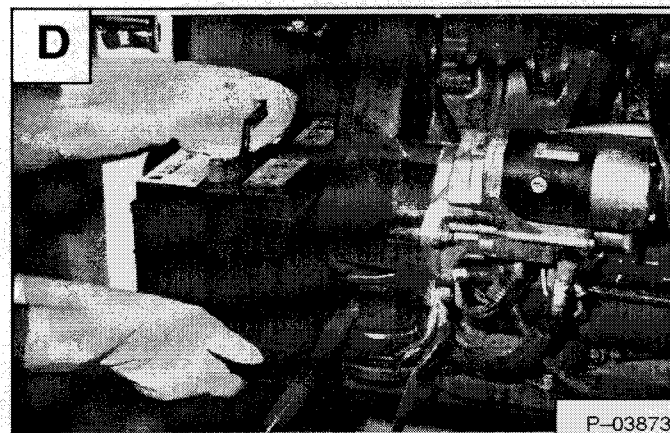
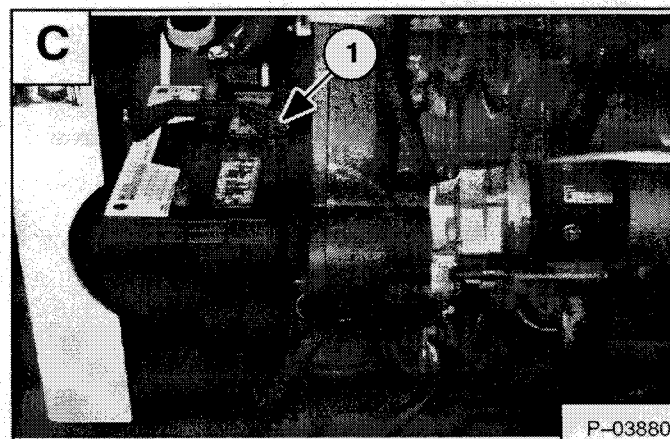
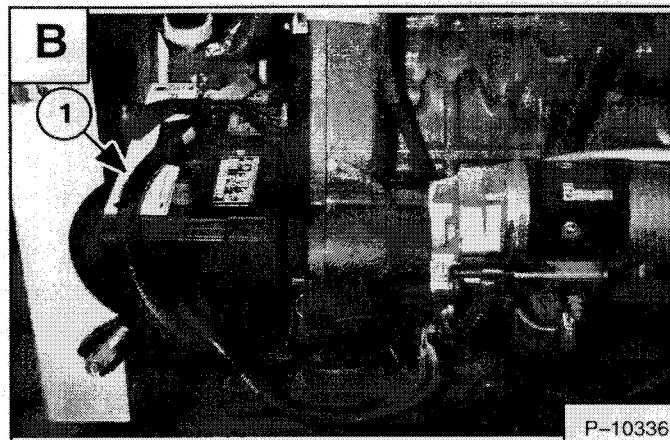
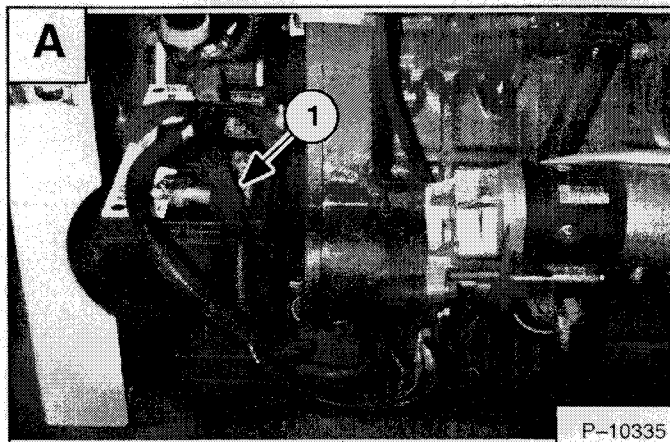
Open the rear door.

Disconnect the negative (-) battery cable (Item 1) [A] from the battery.

Disconnect the positive (+) cable (Item 1) [B] from the battery.

Remove the battery holddown clamp (Item 1) [C].

Remove the battery from the loader [D].



BATTERY (Cont'd)

Removal And Installation (Cont'd)

Installation

Always clean the terminals and cable ends when installing a new battery [A] & [B].

When installing the battery in the loader, do not touch any metal parts with the battery terminal posts.

Connect and tighten the battery cables. Connect the negative (–) cable last to prevent sparks.

Install the battery holddown clamp.

Servicing The Battery

WARNING

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

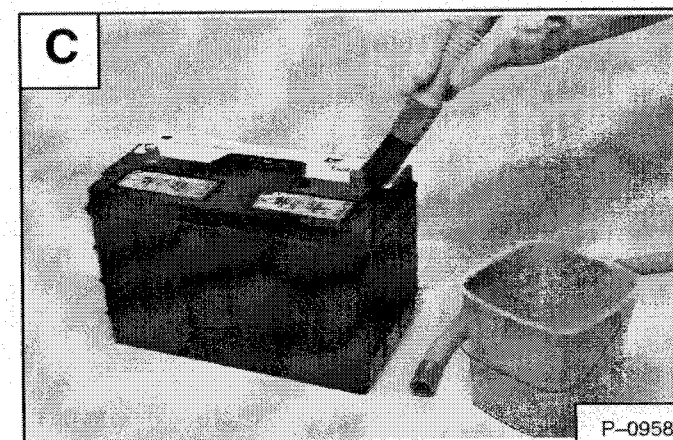
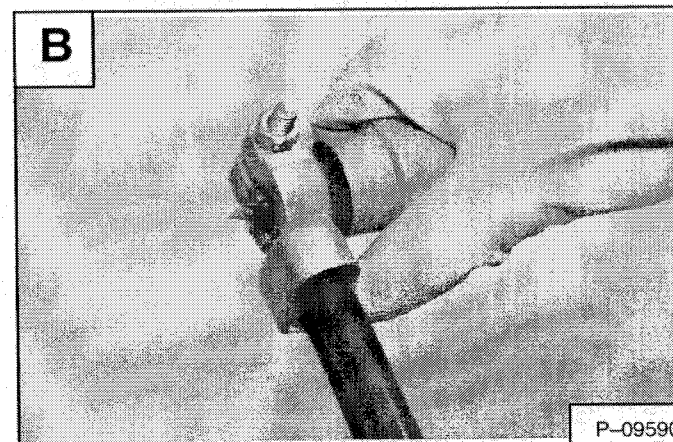
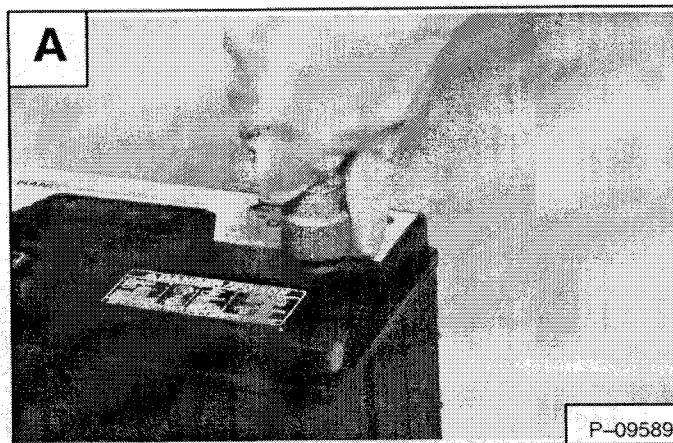
W-2065-1296

The battery cables must be clean and the connections tight. Remove acid or corrosion from the battery and cables with a sodium bicarbonate (baking soda) and water solution [C].

Clean the terminals and cable ends as shown in figure [A] and [B].

Check the electrolyte level in the battery. Add distilled water as needed.

Put battery saver P/N (6664458) or grease on the battery terminals and cable ends to prevent corrosion.



BATTERY (Cont'd)

Using A Booster Battery (Jump Starting)

! WARNING

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-1296

Keep arcs, sparks, flames and lighted tobacco away from batteries. When *jumping* from booster battery make final connection (negative) at engine frame.

Do not jump start or charge a frozen or damaged battery. Warm battery to 60°F. (16°C.) before connecting to a charger. Unplug charger before connecting or disconnecting cables to battery. Never lean over battery while boosting, testing or charging.

Battery gas can explode and cause serious injury.

W-2066-1296

If it is necessary to use a booster battery to start the engine, **BE CAREFUL!** There must be one person in the operator's seat and one person to connect and disconnect the battery cables.

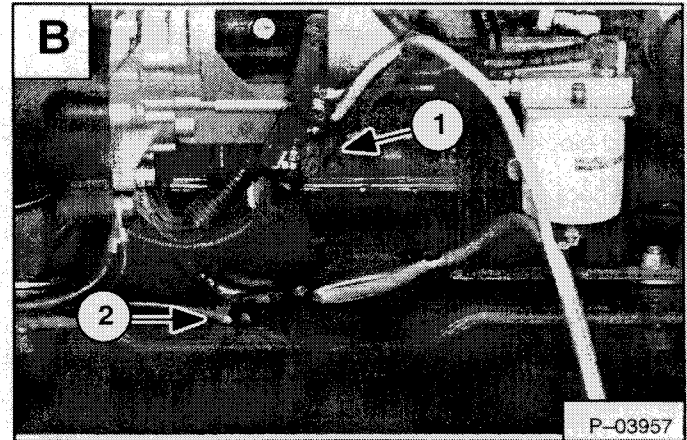
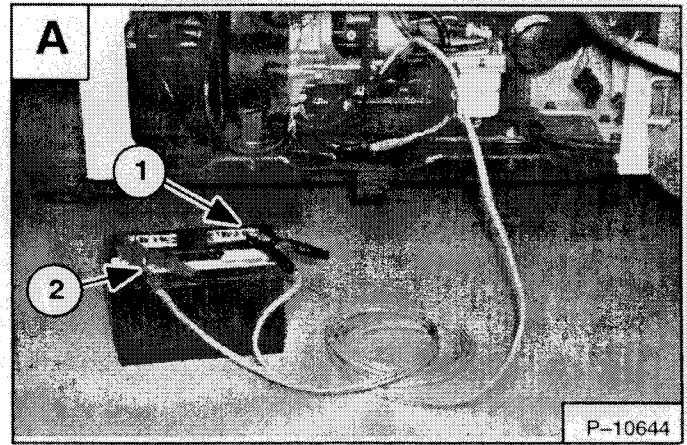
The key switch must be in the OFF position. The booster battery to be used must be 12 volt.

Connect the end of the first cable (Item 1) [A] to the positive (+) terminal of the booster battery. Connect the other end of the same cable (Item 1) [B] to the positive terminal on the loader battery.

Connect the end of the second cable (Item 2) [A] to the negative (-) terminal of the booster battery. Connect the other end of the same cable (Item 2) [B] to the engine ground cable.

Keep cables away from moving parts. Start the engine.

After the engine has started, remove the ground (-) cable (Item 2) [B] first. Remove the cable from the positive terminal on the loader battery.



IMPORTANT

Damage to the alternator can occur if:

- Engine is operated with battery cables disconnected.
- Battery cables are connected when using a fast charger or when welding on the loader (Remove both cables from the battery).
- Extra battery cables (booster cables) are connected wrong.

I-2023-1285

ALTERNATOR

Test the alternator as follows:

- Alternator Output Test
- Rectifier (Diode) Test
- Alternator Regulator Test

Alternator Output Test



WARNING

Put jackstands under the front axles and rear corners of the frame before running the engine for service. Failure to use jackstands can allow the machine to fall or move and cause injury or death.

W-2017-0286

Lift and block the loader. (See Page 1-1.)

Disconnect the negative (-) cable from the battery.

NOTE: The photo's may be different but the procedure is the same for all models.

Disconnect the red wire (Item 1) [B] from the alternator. Connect that wire to the negative (-) side of the ammeter.

Connect the positive (+) side of the ammeter to the output terminal on the alternator (Item 2) [B].

Disconnect the fuel stop solenoid connector.

Connect the negative (-) cable to the battery.

Turn on the lights and crank the engine for 30 seconds to discharge the battery.

Connect the fuel stop solenoid, start the engine and run at 2600 RPM.

The ammeter reading should be between 45-55 amps. at 2600 RPM.

If the reading is low, remove the bolts and pull the regulator cover away from the alternator.

Rectifier (Diode) Test

The alternator is removed from the loader for clarity purposes [C].

Disconnect the negative (-) cable from the battery.

Install the wires in their original location on the back of the alternator.

Connect a jumper wire (Item 1) [C] to the alternator output terminal and the regulator terminal.

Connect the battery negative (-) cable.

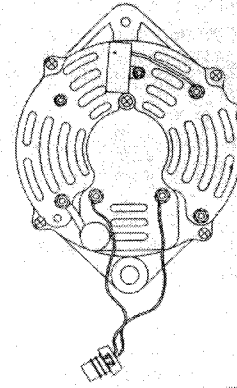
Start the engine and run at 2600 RPM.

If the reading is within 45-55 amps. at 2600 RPM replace the rectifier (diode) assembly or replace the alternator.

If the reading is low, do the Alternator Regulator Test.

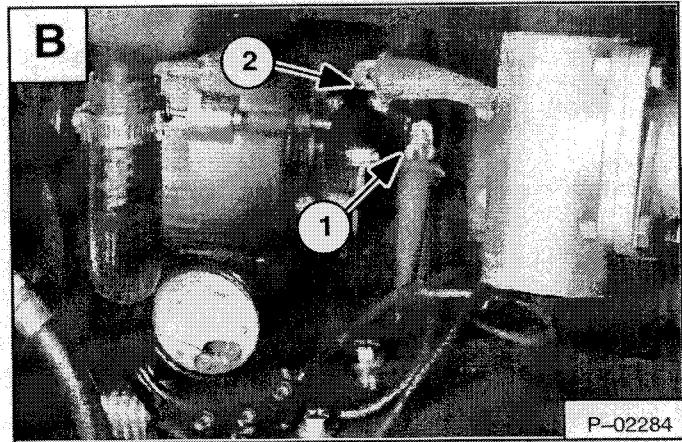
A

REAR VIEW OF ALTERNATOR



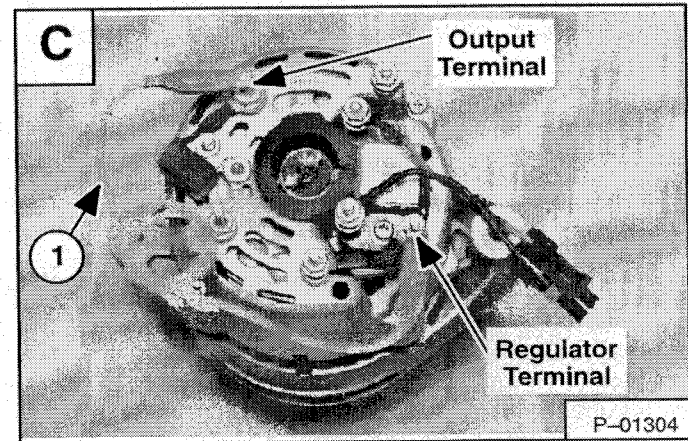
MC-01813

B



P-02284

C



P-01304

ALTERNATOR (Cont'd)

Alternator Regulator Test

! WARNING

When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

W-2050-1285

Connect the positive (+) voltmeter lead to the positive (+) battery terminal [A].

Connect the negative (-) voltmeter lead to the negative (-) battery terminal [A].

Start the engine and run at 1500-2000 RPM.

The voltmeter should read between 13.9-14.7 volts.

If the reading is low stop the engine and disconnect the battery negative (-) cable.

The alternator is removed from the loader for clarity purposes [B].

Remove the wires from the back of the alternator.

Remove the regulator cover from the back of the alternator.

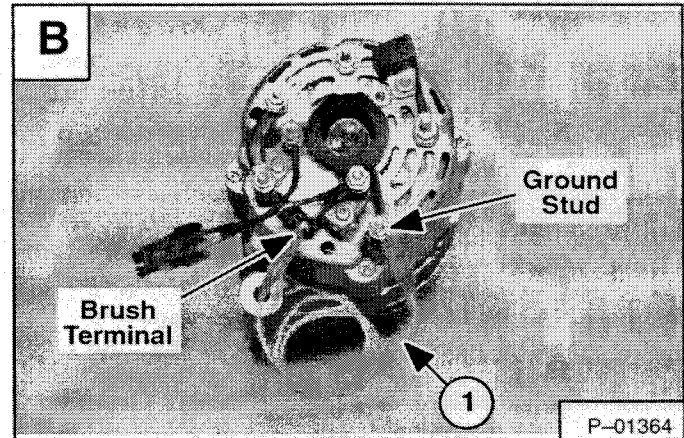
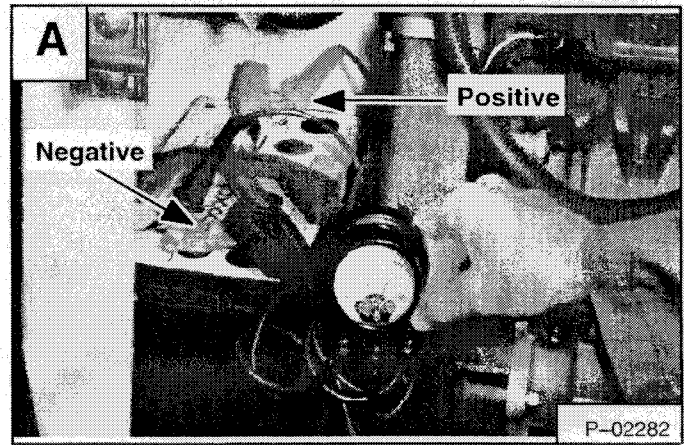
Install the wires on the back of the alternator.

Connect a jumper wire (Item 1) [B] from the brush terminal to the ground stud.

Connect the negative (-) battery cable and start the engine. Run at 1500 RPM.

If the voltmeter reading is 14.5 or above replace the regulator.

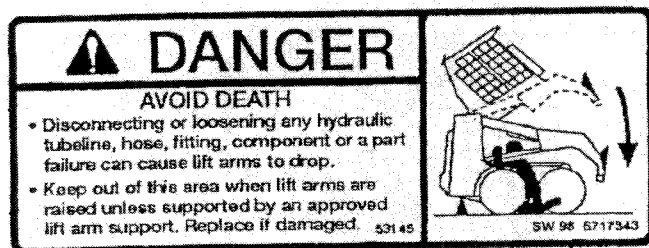
If the voltmeter reading is below 14.5, repair or replace the alternator.



ALTERNATOR (Cont'd)

Removal And Installation

Place jackstands under the rear corners of the loader.



Raise the lift arms and install an approved lift arm support device. (See Page 1-1.)



Raise the operator cab. (See Page 1-1.)

Disconnect the negative (-) cable from the battery.

Disconnect the red wire (Item 1) [A] from the alternator which comes from the battery.

Disconnect the wiring harness connector (Item 2) [A] from the alternator.

Remove the adjustment bolt (Item 3) [A] from the mounting bracket.

Remove the alternator belt from the alternator pulley.

Remove the mounting bolt (Item 4) [A] and spacer (Item 5) [A].

Adjusting The Alternator Belt

Stop the engine.

Raise the operator cab. (See Page 1-1.)

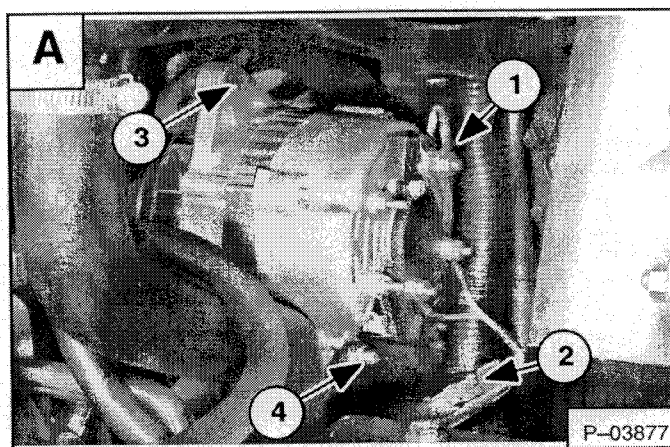
Loosen the alternator mounting bolt (Item 4) [A].

Loosen the adjustment bolt (Item 3) [A].

Move the alternator until the belt has 5/16 inch (8,0 mm) movement at the middle of the belt span with 15 lbs. (66 N) of force.

Tighten the adjustment bolt and mounting bolt.

Lower the operator cab.



IMPORTANT

Damage to the alternator can occur if:

- Engine is operated with battery cables disconnected.
- Battery cables are connected when using a fast charger or when welding on the loader (Remove both cables from the battery).
- Extra battery cables (booster cables) are connected wrong.

I-2023-1285

ALTERNATOR (Cont'd)

Disassembly And Inspection

Disassemble the alternator. (See Parts Identification Figure [A].)

Remove the regulator cover and regulator.

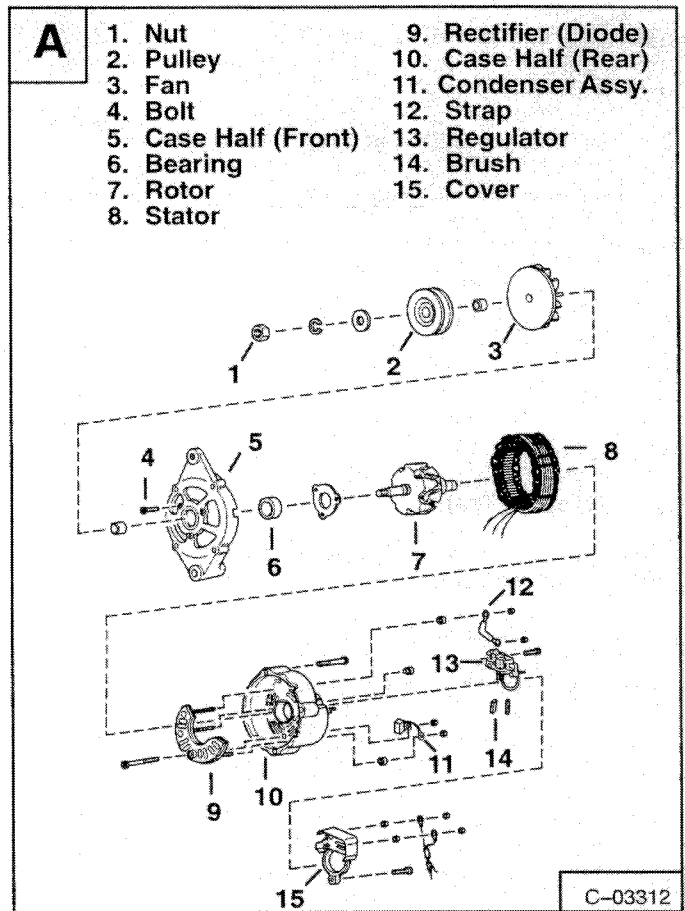
Remove the four bolts holding halves together.

Pry the halves apart (use a press if needed).

Use a soft jaw vise to hold rotor while removing pulley nut.

Remove front case half from the rotor using a plastic hammer or press.

Unsolder the stator leads from the rectifier. Remove the stator.



Stator Continuity Test

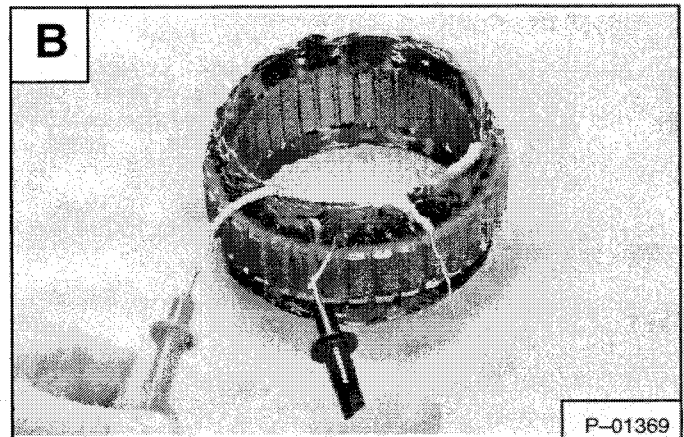
Use an ohmmeter to test the stator.

Touch the probes to two of the bare stator wires [B].

Move one of the probes to the third wire.

The readings should be the same.

If there is no continuity, replace the stator.

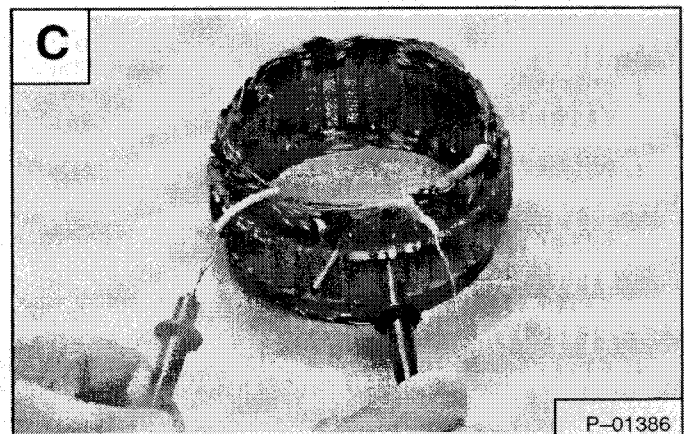


Stator Ground Test

Touch one probe to a bare stator lead and the other probe to the bare metal surface of the stator [C].

There should be no continuity.

Replace the stator if there is continuity.



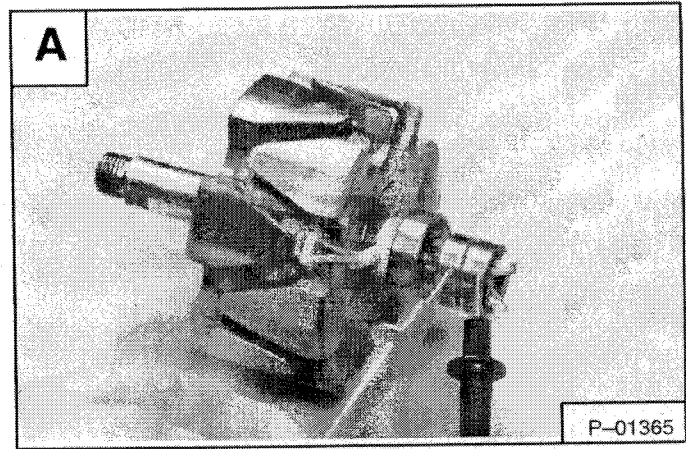
ALTERNATOR (Cont'd)

Rotor Continuity Test

Touch the probes to the slip rings [A].

The ohmmeter should read between 3.065–33.85 ohms.

If there is no continuity replace the rotor.

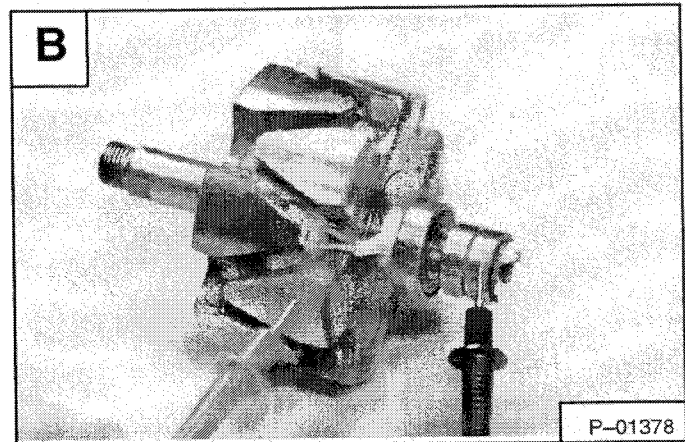


Rotor Ground Test

Touch one probe to one of the slip rings and the other probe to the rotor shaft [B].

There should be no continuity.

Replace the rotor if there is continuity.



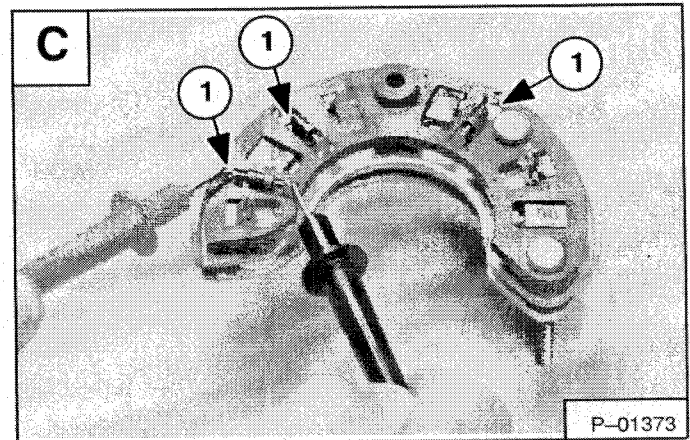
Rectifier Continuity (Diode) Test

NOTE: In the diode tests there should be continuity in one direction only. If the diode being tested shows no continuity or continuity in both directions, replace the rectifier assembly.

Touch the probes to the terminals (Item 1) [C] of each diode and read the meter.

Reverse the probes to check the diode in the other direction.

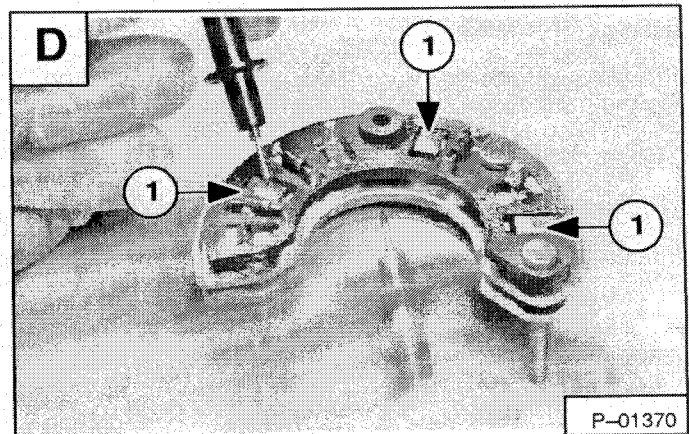
There should be continuity in one direction only.



Touch one probe to the diode (Item 1) [D] and the other probe to the connected heatsink and read the meter.

Reverse the probes to check the diode in the other direction.

There should be continuity in one direction only.



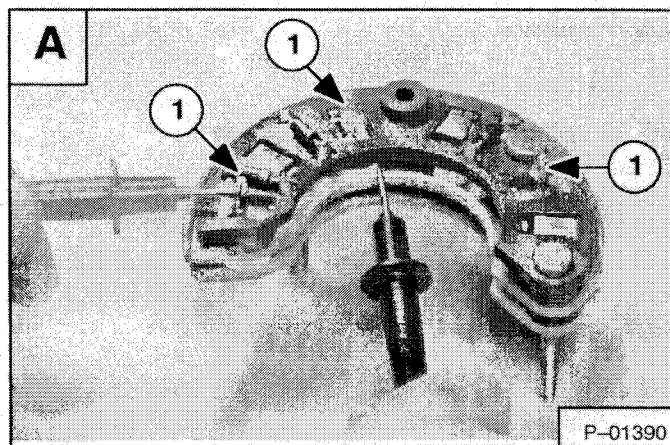
ALTERNATOR (Cont'd)

Rectifier Continuity (Diode) Test (Cont'd)

Touch one probe to the diode (Item 1) [A] and the other probe to the connected heatsink and read the meter.

Reverse the probes to check the diode in the other direction.

There should be continuity in one direction only.



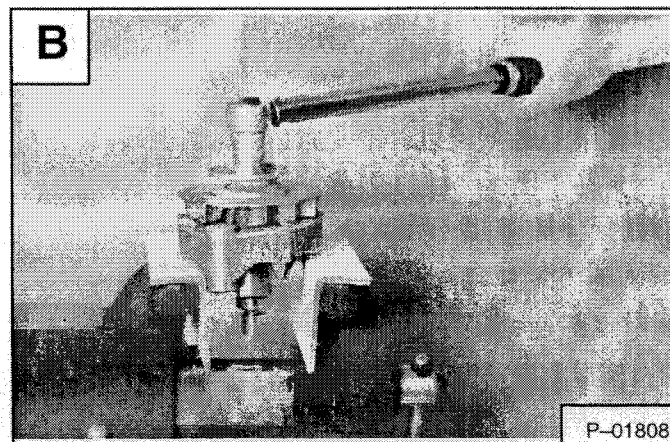
Assembly

Reverse the order of disassembly.

Do not assemble the rear case half.

Place the rotor in soft jaws when tightening the shaft nut. Tighten to 50 ft.-lbs. (68 Nm) torque [B].

Install the rear case half and the remaining parts.



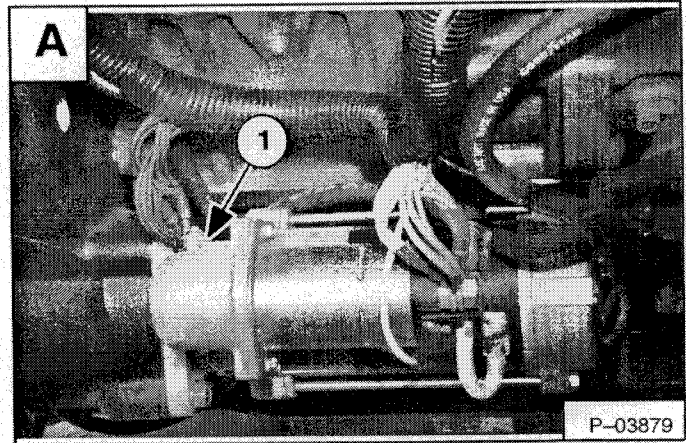
STARTER

Removal And Installation

Stop the engine and open the rear door.

Remove the negative (–) and positive (+) cables from the battery.

Remove the starter mounting bolt (Item 1) [A] and disconnect the ground wires from the starter.



Remove the lower mounting bolt (Item 1) [B]. Remove the negative (–) battery cables and frame ground cable from the starter (Item 2) [B].

Disconnect the engine harness power wires and positive (+) battery cable starter solenoid terminal (Item 3), [B].

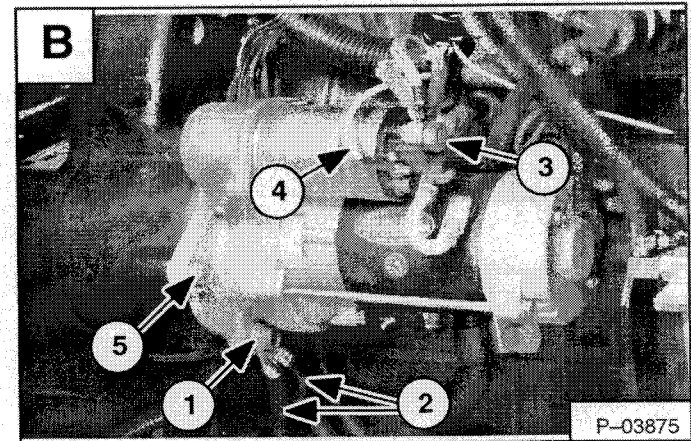
Disconnect the white wire (Item 4) [B] from the S terminal on the starter solenoid.

Remove the mounting bolt (Item 5) [B] from the starter.

Remove the starter from the engine.

Installation: Tighten the three mounting bolts to 25–28 ft.-lbs. (34–38 Nm) torque.

Reverse the removal procedure to install the starter.



STARTER (DELCO REMY)

Checking the Starter

The key switch must be in the OFF position.

The battery must be at full charge.

The cable connections on the battery must be clean and tight.

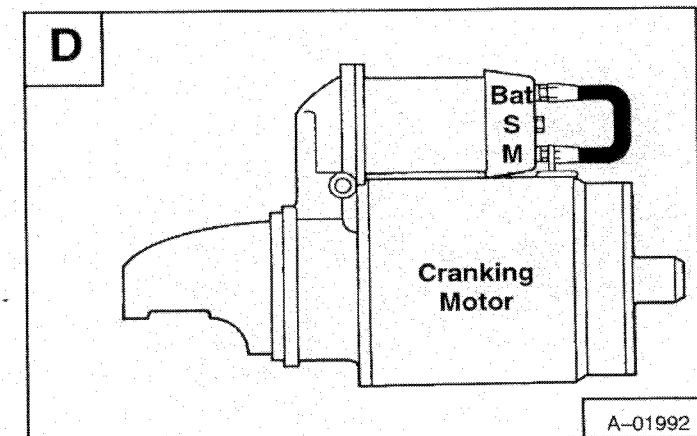
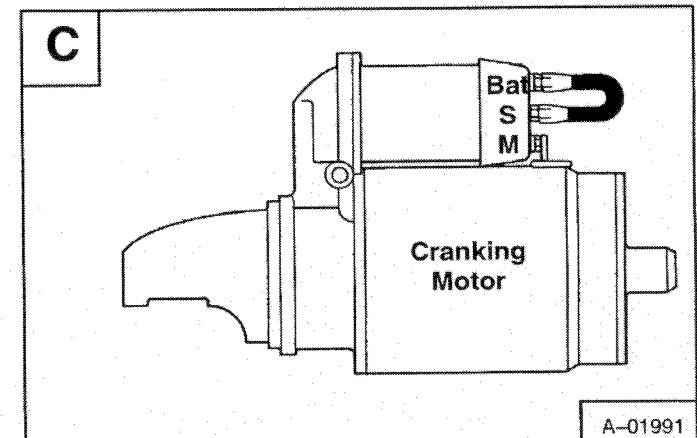
Connect a jumper wire between S terminal and BAT terminal [C].

If the starter turns but does not turn the engine, the starter drive has a defect.

Connect a jumper wire between the M terminal and the BAT terminal [D].

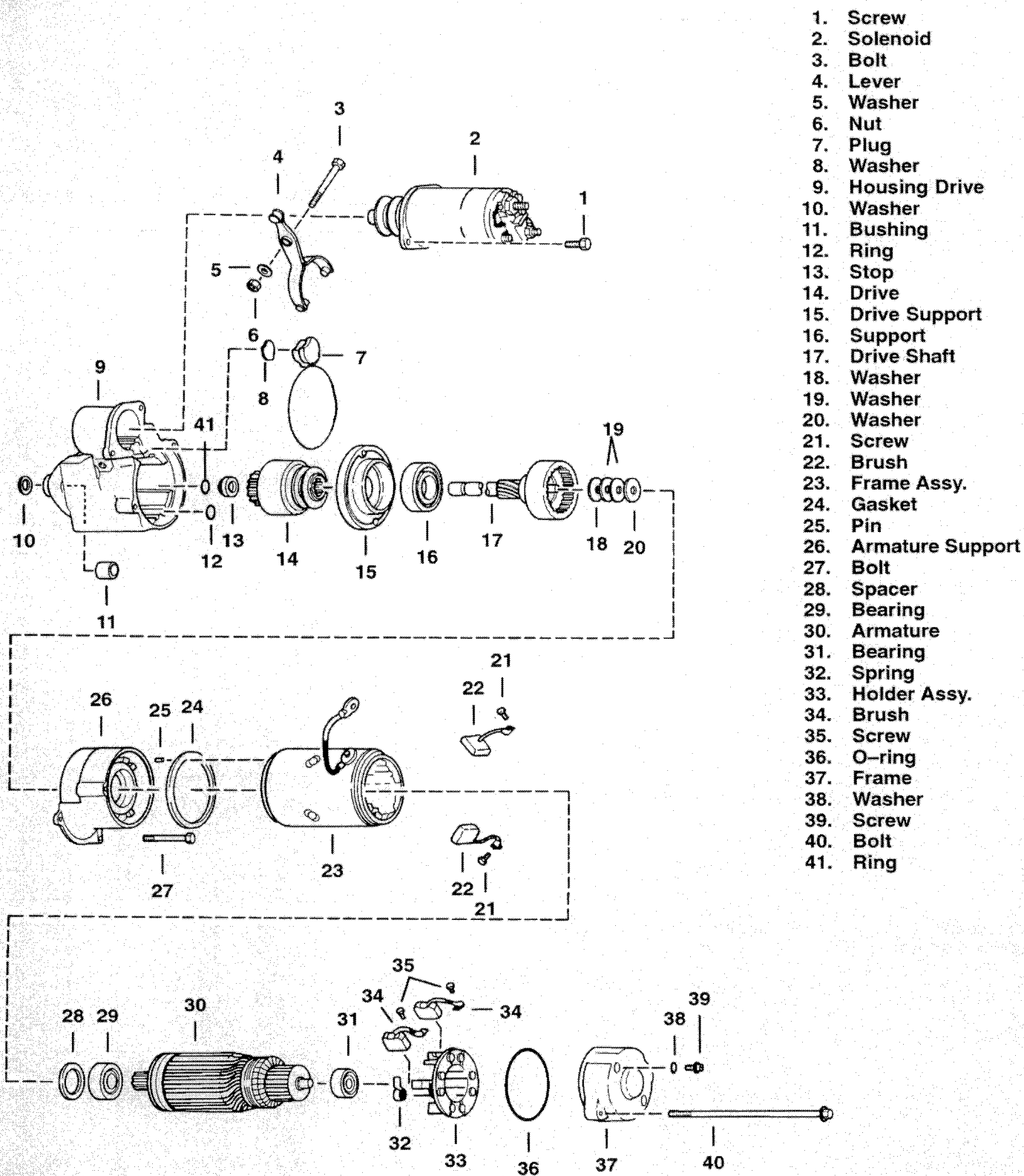
If the starter turns, the defect is in the solenoid.

If the starter does not turn, the starter is defective.



STARTER (DELCO REMY) (Cont'd)

Parts Identification

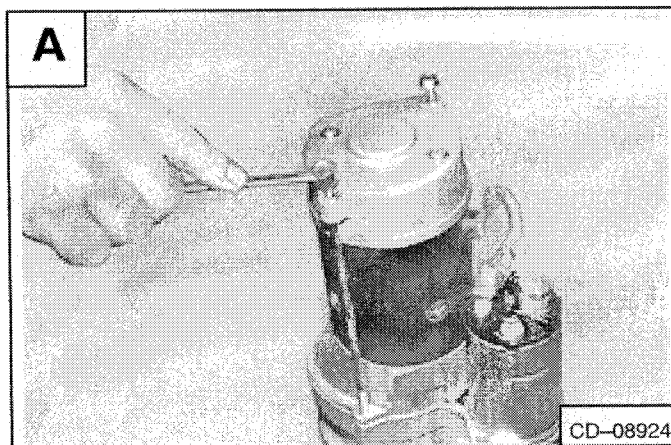


D-02119

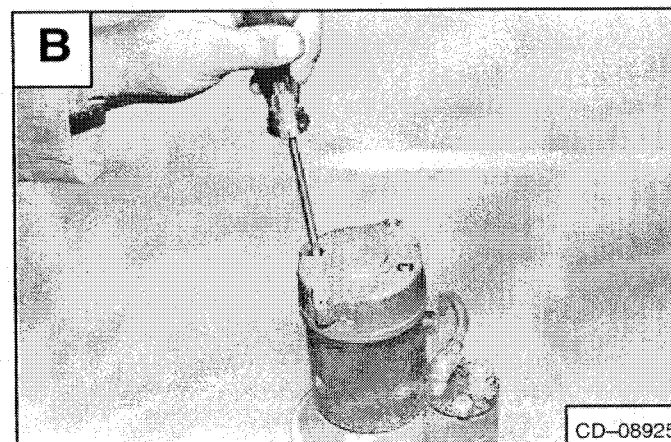
STARTER (DELCO REMY) (Cont'd)

Disassembly and Assembly

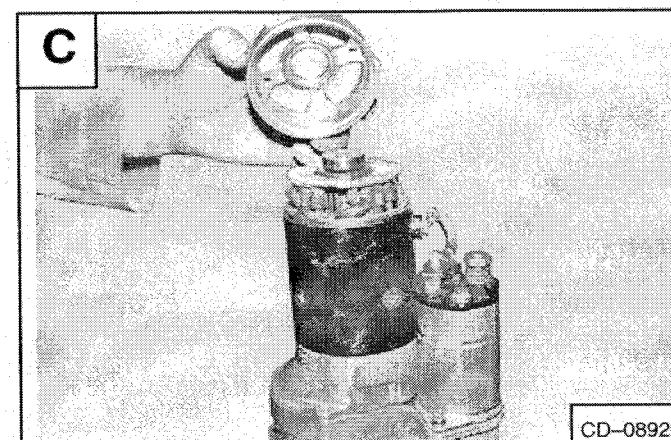
Remove the starter thru-bolts [A].



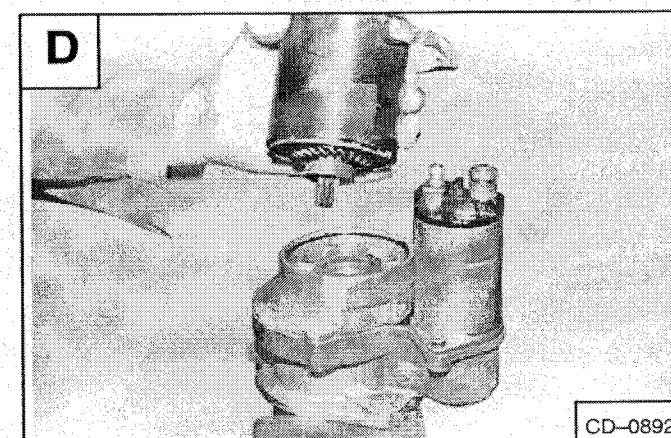
Remove the bolts for the brush holders [B].



Remove the starter end cap [C].



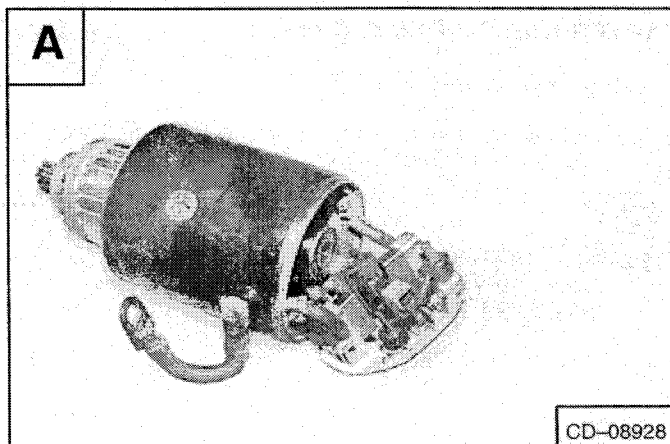
Remove the starter housing/armature assembly from the reduction gear drive [D].



STARTER (DELCO REMY) (Cont'd)

Disassembly and Assembly (Cont'd)

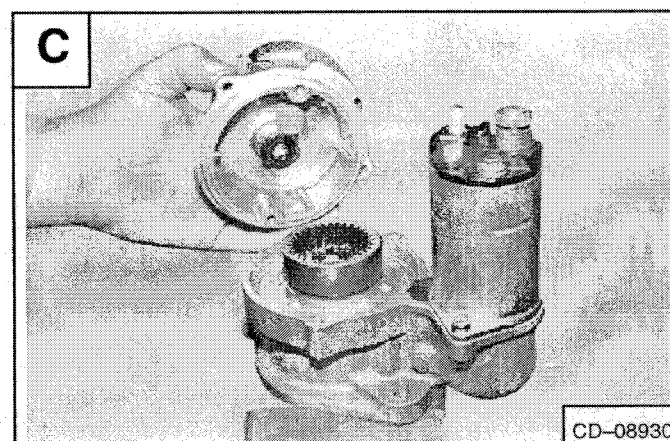
Remove the armature and brushes from the starter housing [A].



Remove the bolts from the reduction gear housing [B].



Remove the reduction gear housing [C].



STARTER (DELCO REMY) (Cont'd)

Cleaning and Inspection

Use a brush and air pressure to clean the drive, field coils, armature and starter housing.

NOTE: DO NOT use solvent to clean the drive assembly. The solvent will remove the lubricant and the drive will slip.

Check the following items:

Armature

- Broken or burned insulation
- Loose connections at commutator
- Open or grounded circuits [A] & [B]
- Worn shaft or bearings
- Rough commutator

Brush Holders

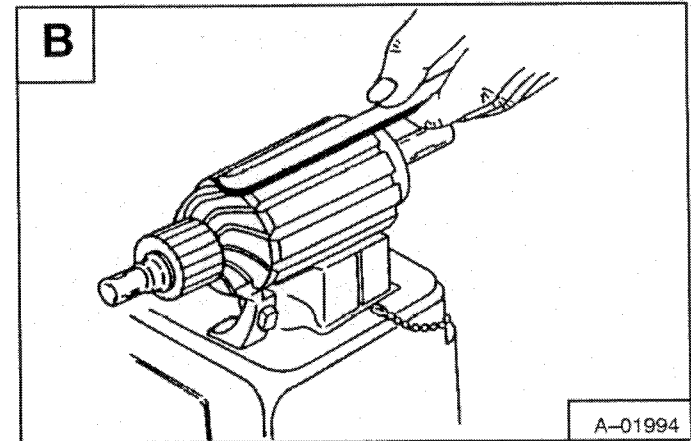
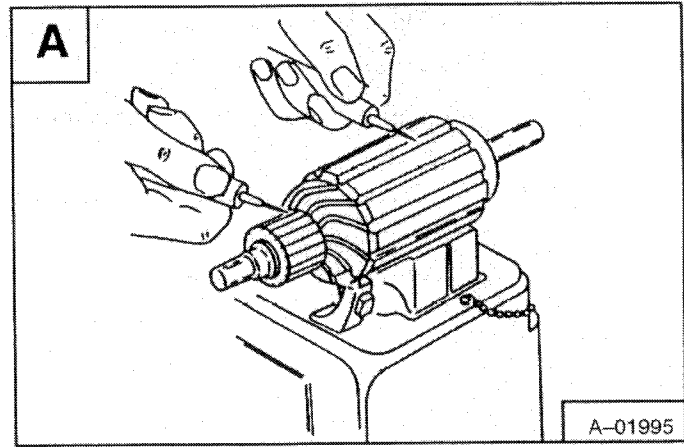
- Broken springs
- Broken insulation
- Spring tension

Field Coils

- Broken or burned insulation
- Electrical continuity
- Brush connections

Drive Gears

- Worn teeth
- Tooth engagement

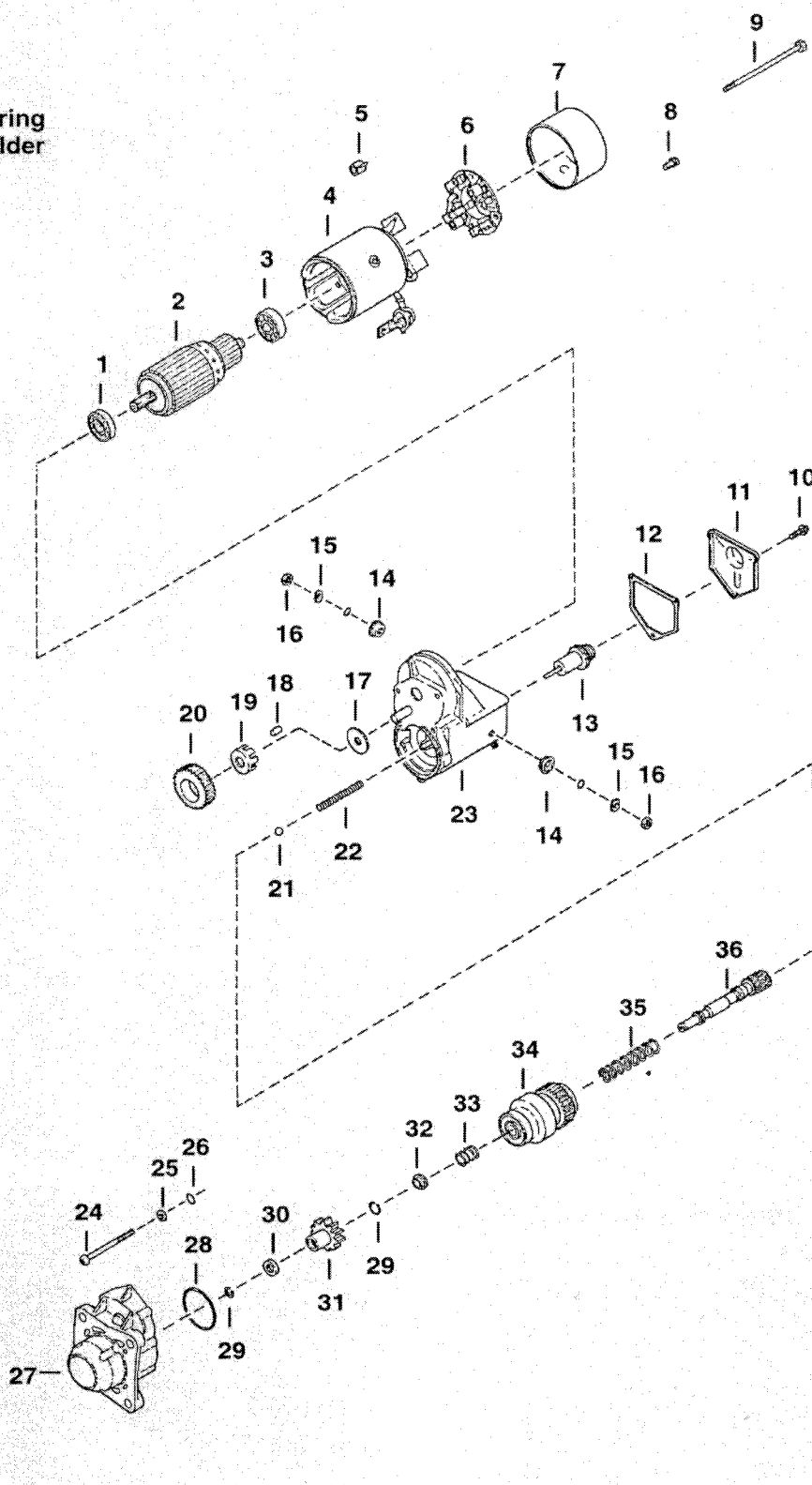


STARTER (DENSO)

Parts Identification

1. Bearing
2. Armature
3. Bearing
4. Frame
5. Brush Spring
6. Brush Holder
7. Cover
8. Bolt
9. Bolt
10. Bolt
11. Cover

12. Gasket
13. Switch
14. Nut
15. Washer
16. Nut
17. Washer
18. Roller
19. Retainer
20. Idler Gear
21. Ball
22. Spring



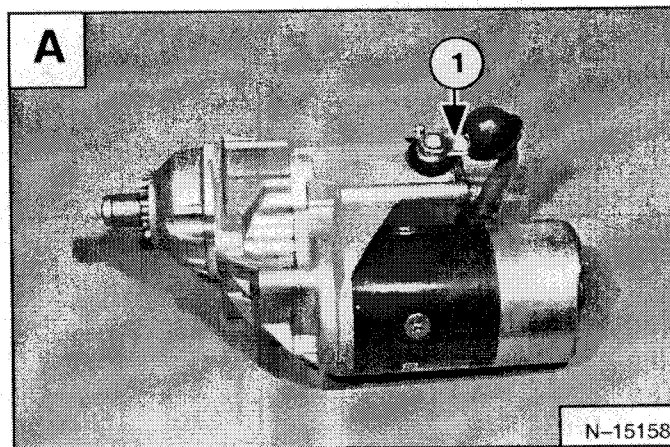
23. Housing
24. Screw
25. Washer
26. O-ring
27. Housing
28. O-ring
29. Snap Ring
30. Collar
31. Pinion Gear
32. Spring Seat
33. Spring
34. Clutch
35. Spring
36. Pinion Shaft

D-02297

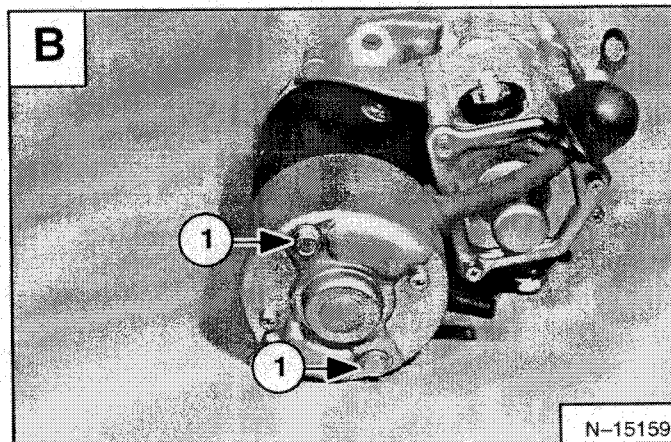
STARTER (DENSO) (Cont'd)

Disassembly

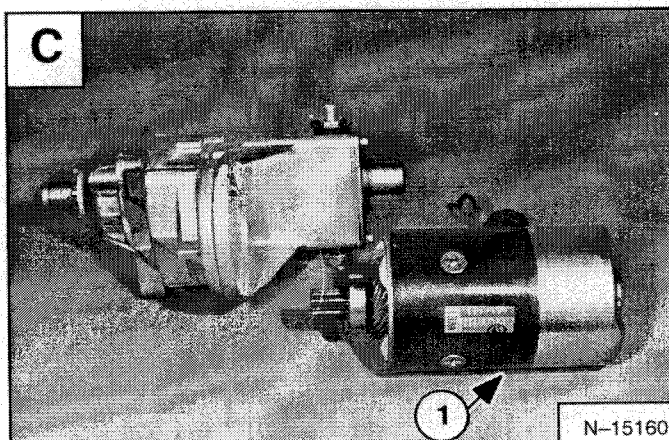
Remove the cable (Item 1) [A] from the magnetic switch.



Remove the bolts (Item 1) [B].

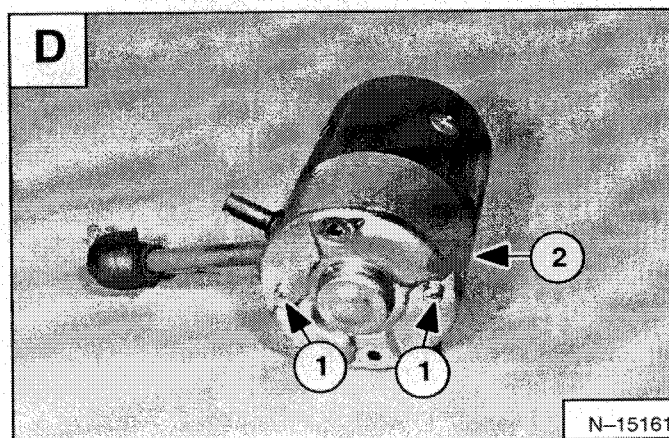


Remove the frame (Item 1) [C] from the magnetic switch.



Remove the bolts (Item 1) [D] from the brush cover (Item 2) [D].

Remove the cover (Item 2) [D].



STARTER (DENSO) (Cont'd)

Disassembly (Cont'd)

Using a needle nose pliers, pull the brush springs (Item 1) [A] back and remove the brushes (Item 2) [A].

NOTE: The brushes are non-replaceable. If the brushes are worn order a new brush holder (for the negative brushes) and yolk (for the positive brushes).

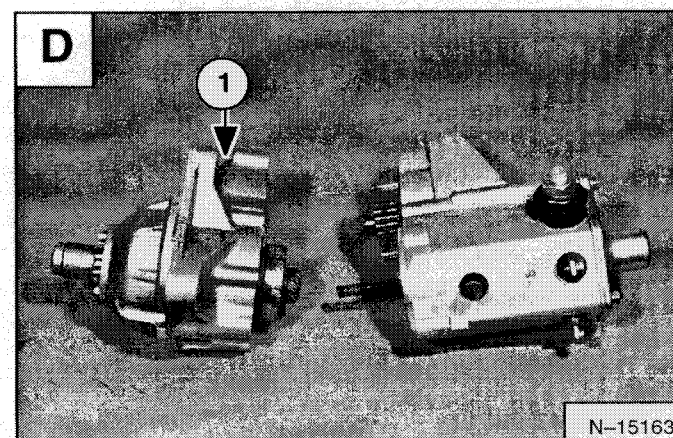
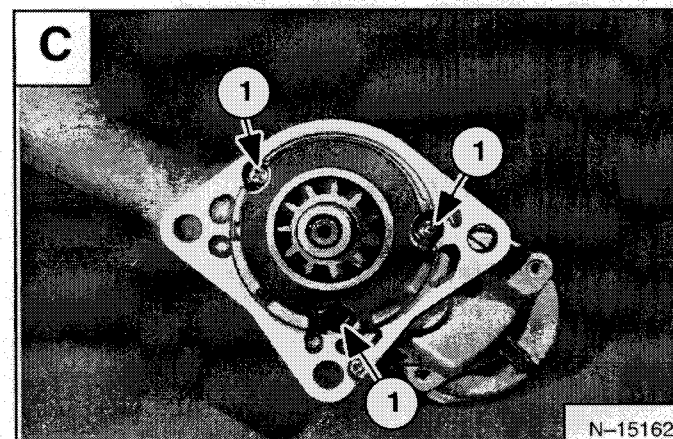
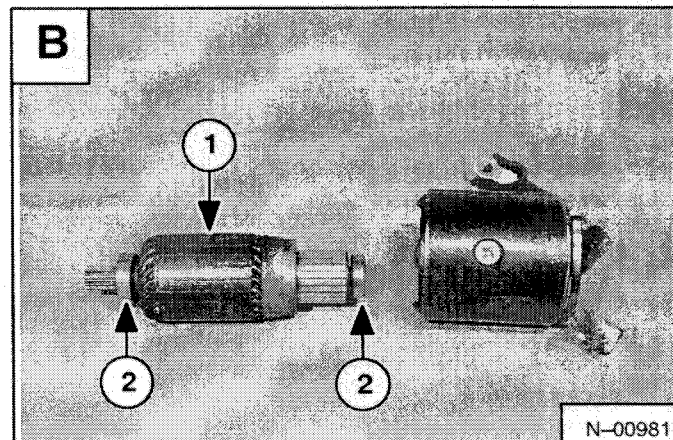
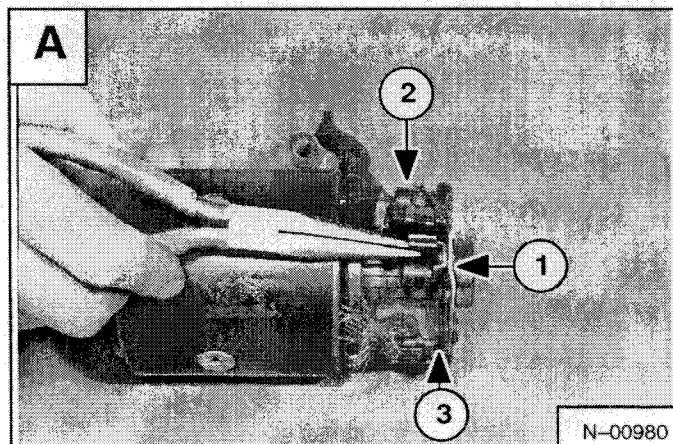
Remove the brush holder (Item 3) [A] from the end of the armature.

Remove the armature (Item 1) [B] from the frame.

Remove the bearings (Item 2) [B] from both ends of the armature.

Remove the bolts (Item 1) [C] from the starter housing.

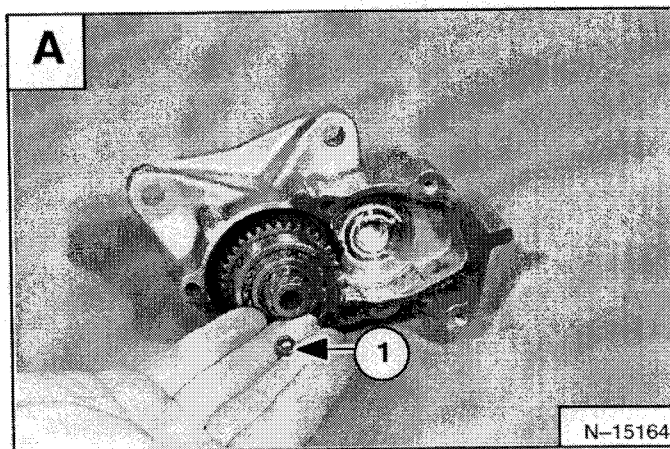
Remove the starter housing (Item 1) [D] from the magnetic switch.



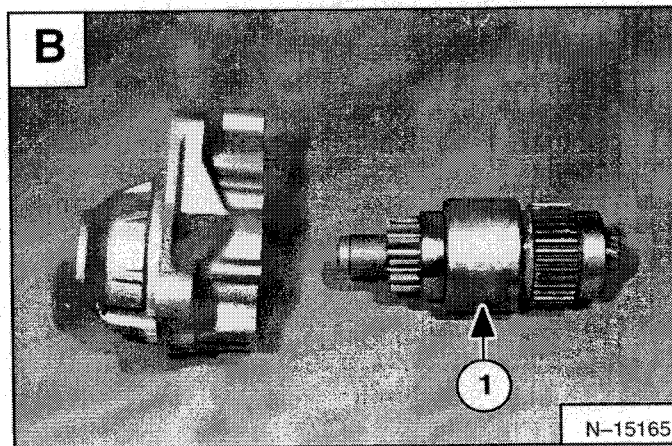
STARTER (DENSO) (Cont'd)

Disassembly (Cont'd)

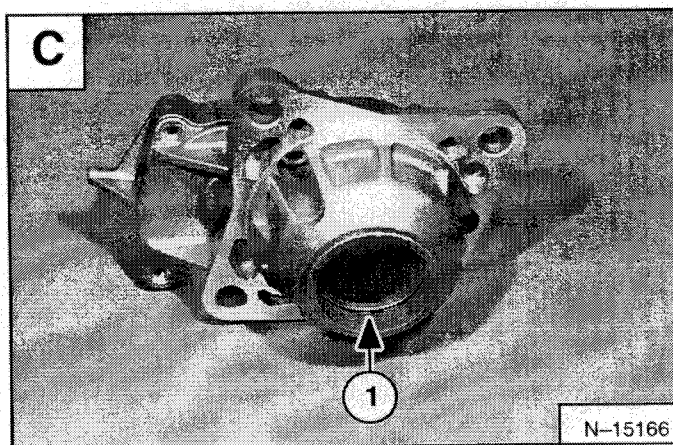
Remove the ball (Item 1) [A] from the pinion shaft.



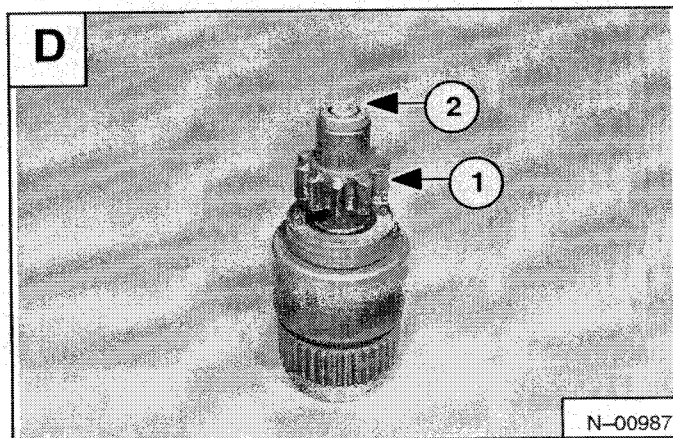
Tap the starter pinion/clutch assembly (Item 1) [B] out of the starter housing.



Remove the O-ring (Item 1) [C].



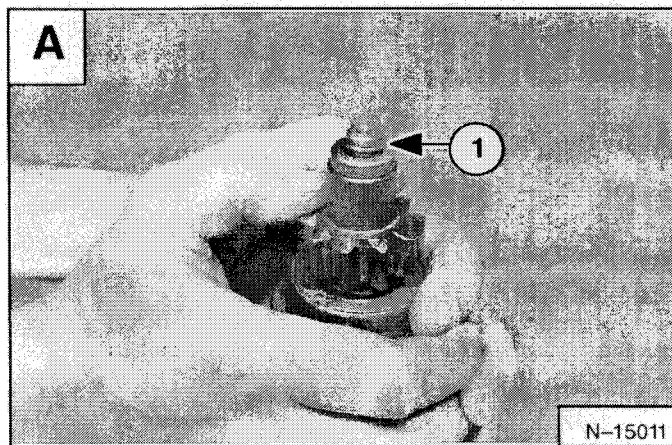
Press down on the pinion (Item 1) [D] and retainer (Item 2) [D].



STARTER (DENSO) (Cont'd)

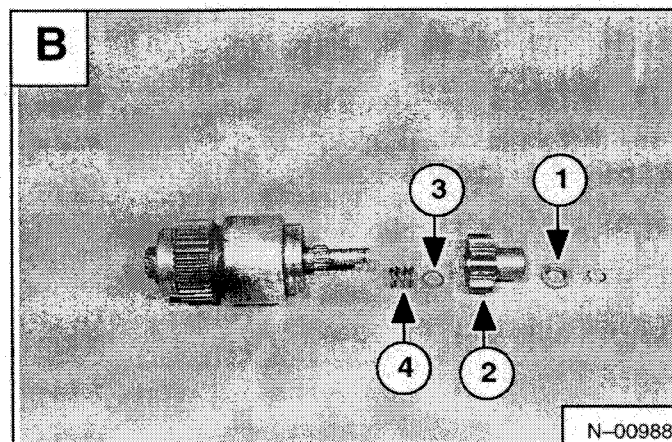
Disassembly (Cont'd)

Remove the snap ring (Item 1) [A].

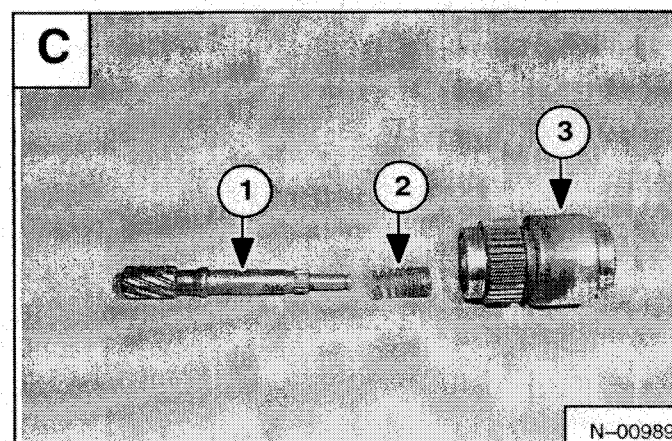


Remove the retainer (Item 1) [B] and pinion (Item 2) [B].

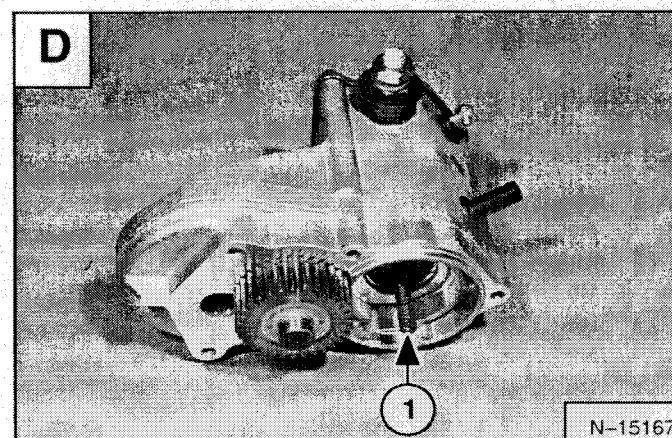
Remove the spring seat (Item 3) [B] and spring (Item 4) [B].



Remove the pinion shaft (Item 1) [C] and spring (Item 2) [C] from the over running clutch (Item 3) [C].



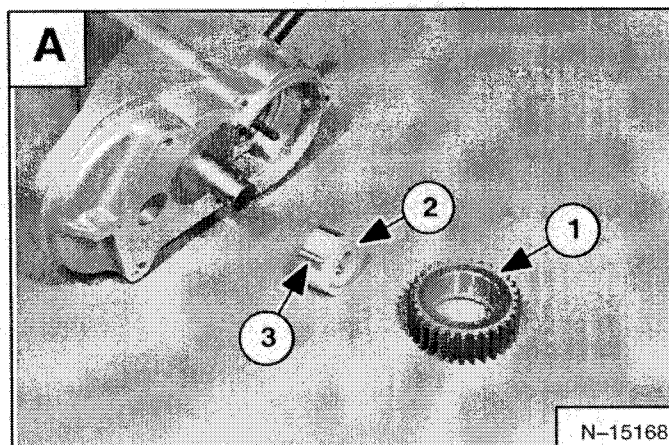
Remove the spring (Item 1) [D] from the magnetic switch housing.



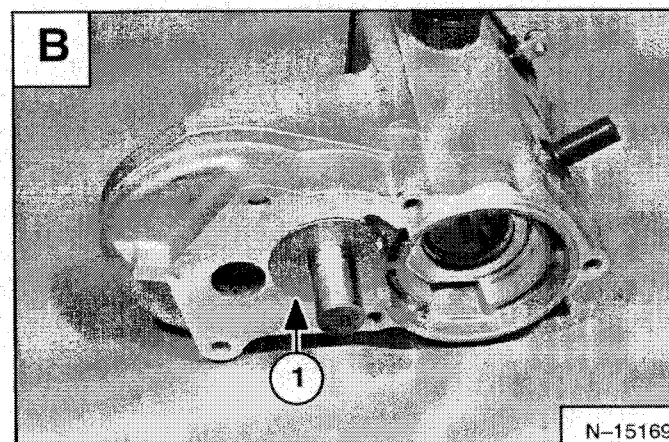
STARTER (DENSO) (Cont'd)

Disassembly (Cont'd)

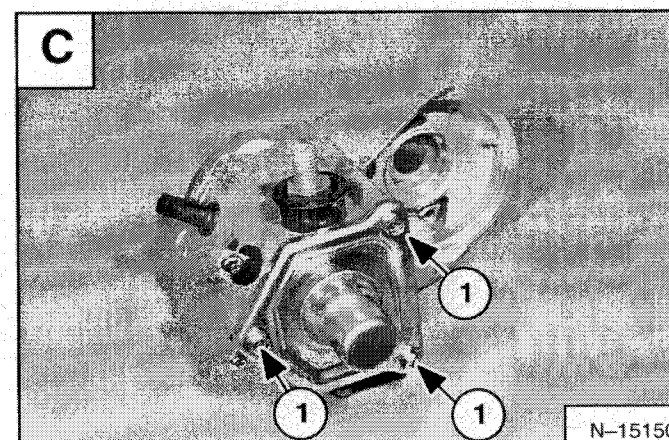
Remove the idler gear (Item 1) [A], retainer (Item 2) [A] and rollers (Item 3) [A] from the magnetic switch housing.



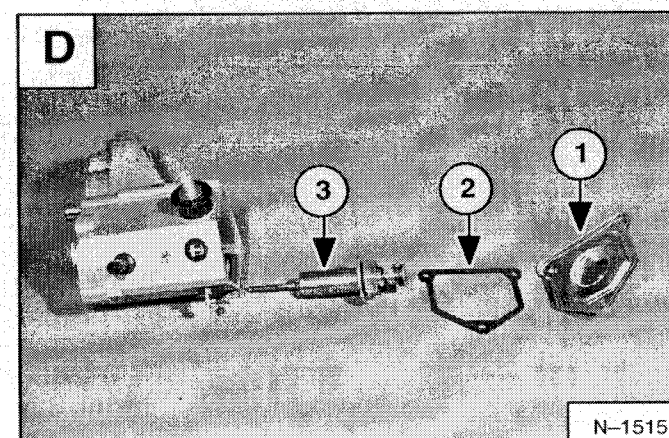
Remove the washer (Item 1) [B] from the idler gear shaft.



Remove the bolts (Item 1) [C] from the magnetic switch.



Remove the cover (Item 1) [D], gasket (Item 2) [D] and switch (Item 3) [D].



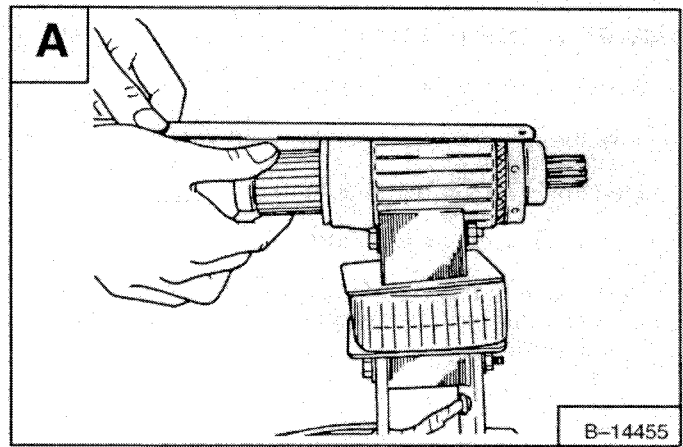
STARTER (DENSO) (Cont'd)

Inspection And Repair

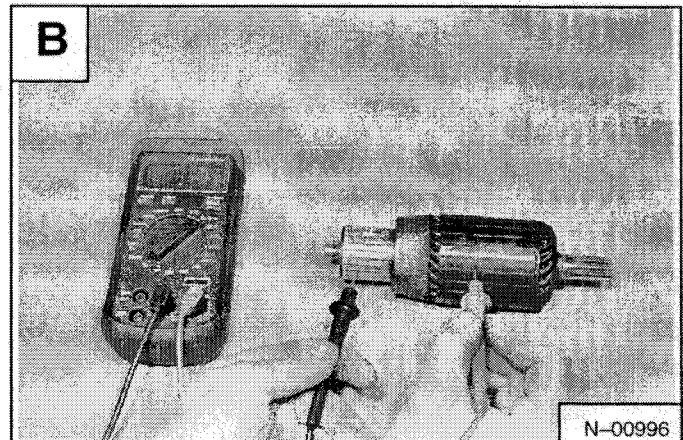
Inspect the brush cover for discoloration, indication the starter has been overheated.

Inspect the pinion teeth for wear and damage.

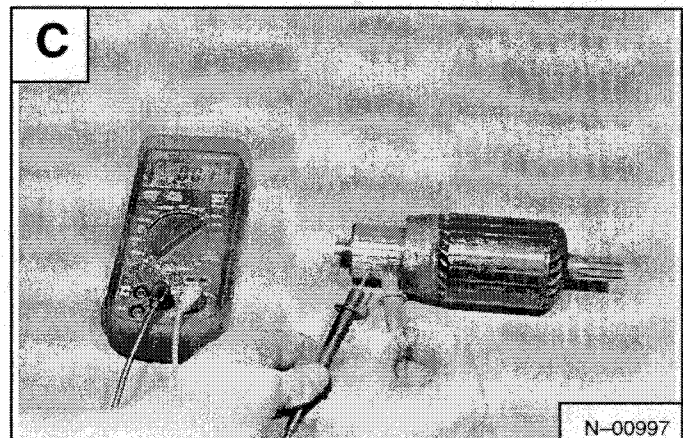
Armature Short-Circuit Test: Use a growler tester, put the armature on the growler and hold a hack saw blade against the armature core while slowly rotating the armature [A]. A short circuited armature causes the blade to vibrate and be attracted to the core. An armature which is short-circuited must be replaced.



Armature Winding Ground Test: Use a circuit tester, touch one probe to a commutator segment and the other probe to the armature core [B]. There should be no continuity. If there is continuity, the armature is grounded and must be replaced.



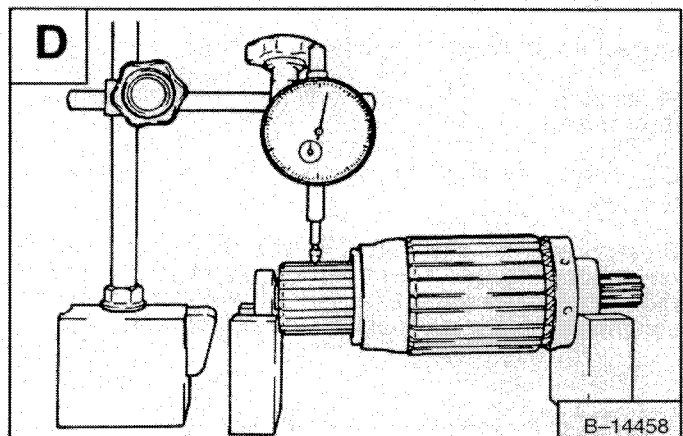
Armature Winding Continuity Test: Use a circuit tester, touch the probes to two commutator segments [C]. There should be continuity at any point. If there is no continuity, the winding is open-circuited, replace the armature.



Commutator Run-Out Test: check the commutator run-out as shown in [D].

Service Limit – 0.020 inch (0,4 mm)

If the commutator exceeds the service limit, repair as needed.



STARTER (DENSO) (Cont'd)

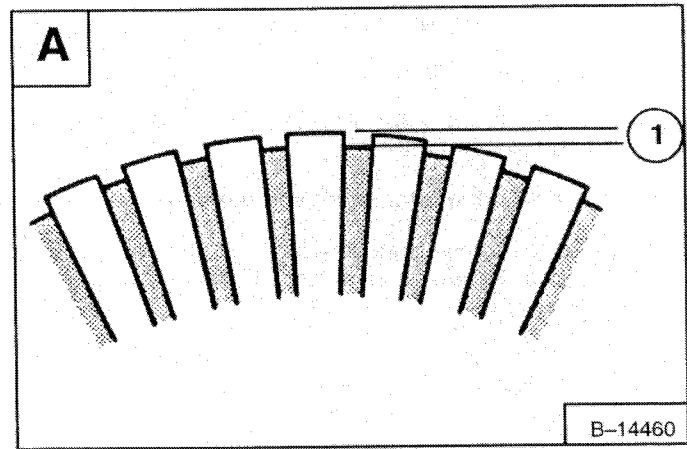
Inspection And Repair (Cont'd)

Measure the segment mica depth (Item 1) [A].

Service Limit – 0.008 inch (0,2 mm)

If it is worn, replace the armature.

Check the commutator surface for burned spots which usually indicates an open-circuit, and correct it using #400 sand paper.

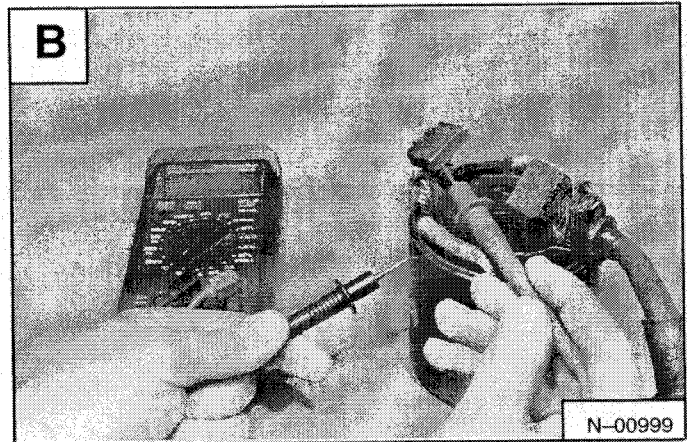


Check the field windings for wear and damage.

Check all the connections for clean and tight solder joints.

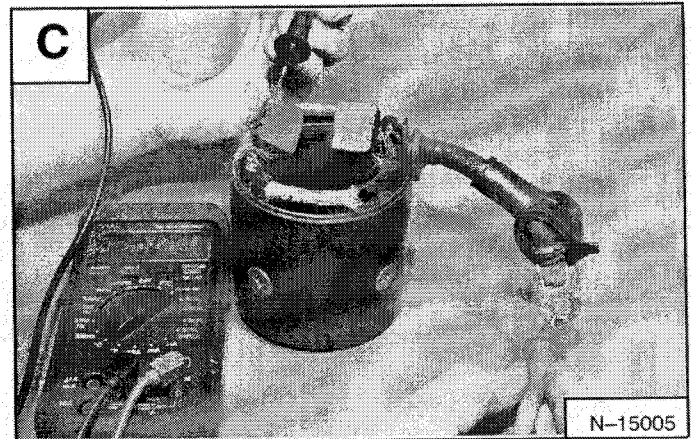
Field Winding Ground Test: Use a circuit tester, touch one probe to the field winding end of the brush and the other probe to the surface of the frame [B]. There should be no continuity. If there is continuity, the field windings are grounded.

Replace the frame.



Field Windings Continuity Test: Use a circuit tester, touch one probe to the wire and the other probe to the brush [C]. There should be continuity. If there is no continuity, the field windings are open-circuited.

Replace the frame.

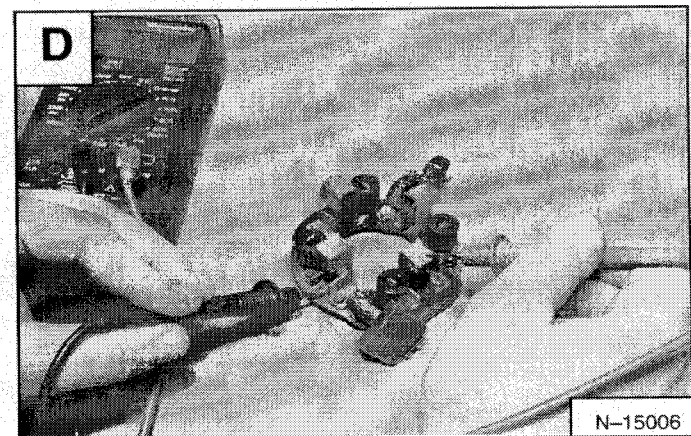


Inspect the brushes for wear and damage.

Replace the brush holder and yoke if the brushes need replacement.

Check brush spring, for damage or rust. Replace as needed.

Brush Holder Insulation Test: Use a circuit tester, touch one probe to the positive brush holder plate and the other probe to the holder plate [D]. There should be no continuity. If there is continuity, replace or repair.



STARTER (DENSO) (Cont'd)

Inspection and Repair (Cont'd)

NOTE: Assemble the over running clutch, pinion shaft, springs, and pinion for this test.

Inspect the pinion, it must rotate freely in the direction of the starter rotation and locked in the opposite rotation.

Pull the pinion out (to the engaged position) [A] and allow it to snap back to the retracted position. The pinion must fully return to the retracted position.

The following tests should be done without the armature assembly. Install the magnetic switch in the switch housing.

NOTE: Each test should be performed a short time (3 to 5 seconds) to prevent the magnetic switch winding from burning. Each test should be performed with 12 volts.

Pull-In Test: Connect the wires as shown in [B]. When connecting Terminal C and M.T. are closed, the pinion should engage.

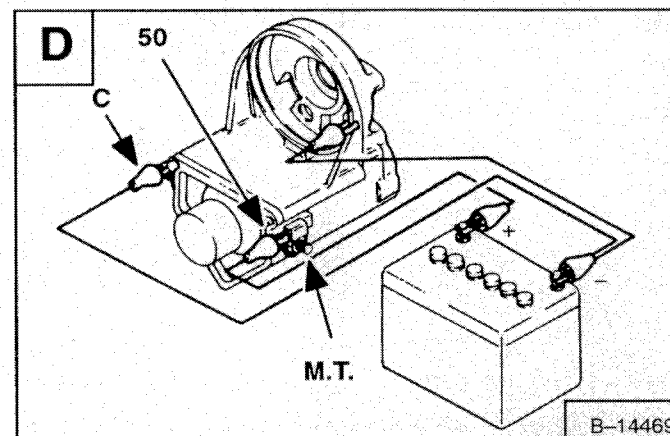
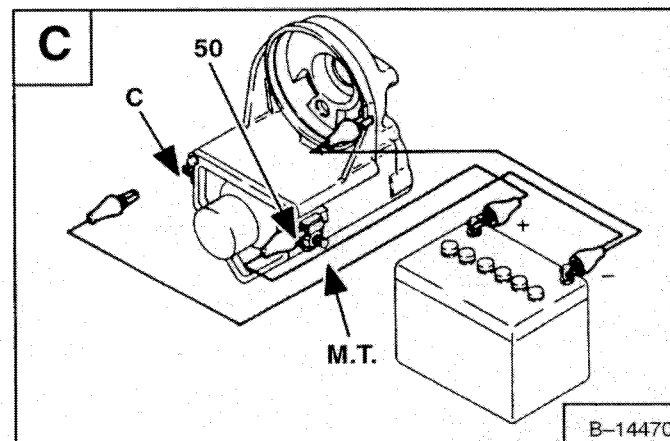
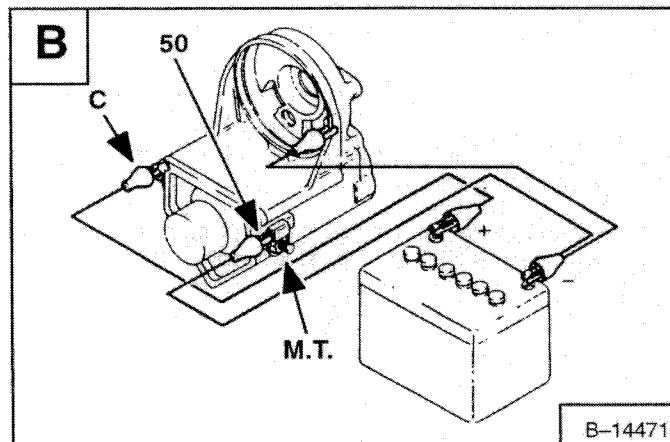
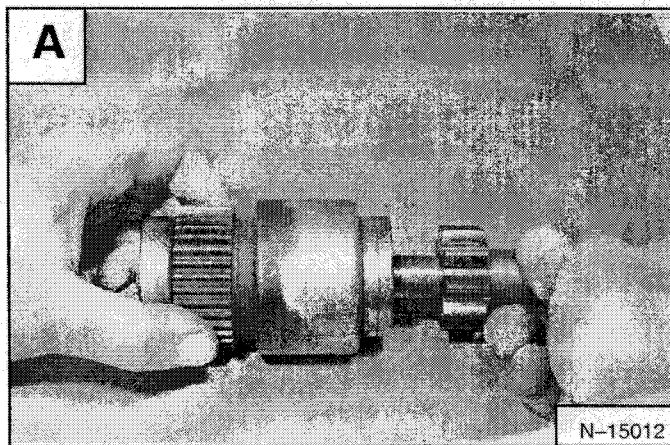
Hold-In Test: With the same conditions as in the pull-in test, open the connecting Terminal C [C]. The pinion should remain in the engaged position.

Return Test: With the same conditions as in the hold-in test, open the connecting Terminal 50 [D]. The pinion should return immediately.

M.T. . . . Main Terminal to which the main cable from the battery is connected.

C C-Terminal to which the wire from the field windings is connected.

50 50-Terminal to which the wire from the starting switch or stator relay is connected.



STARTER (DENSO) (Cont'd)

No Load Test

The following test should be done after reassembling the starter:

Clamp the starter in a vise. Using a 12 volt battery and ammeter, connect the positive wire of the battery, and the ammeter to the terminal [A]. Connect the negative wire to the starter body. Using a jumper wire, connect the 50 terminal to the main terminal.

The starter should show smooth and steady rotation immediately after the pinion is engaged, it should draw less than the specified current.

Service Limit – 220 Amp. Maximum Draw

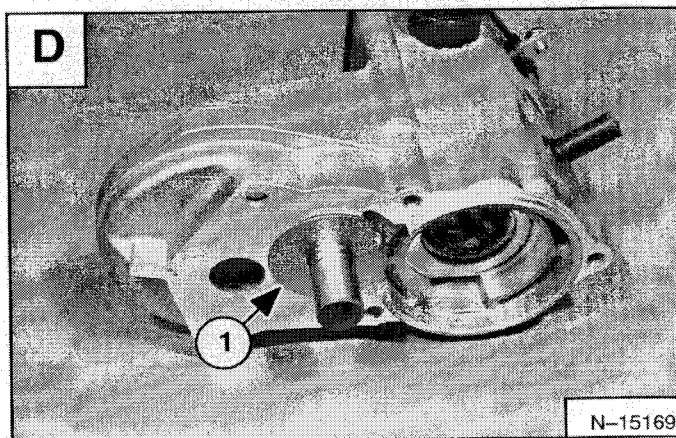
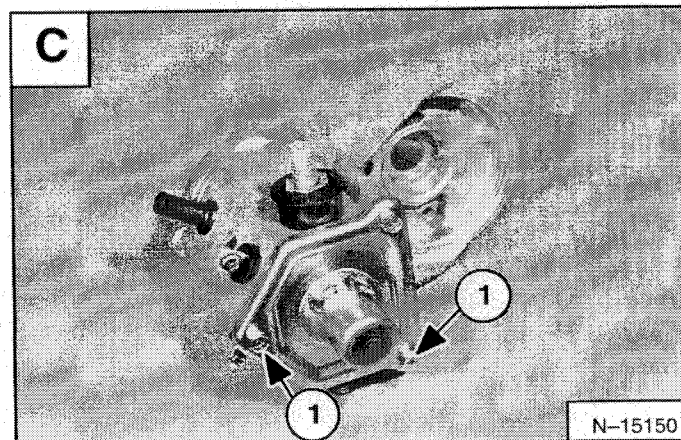
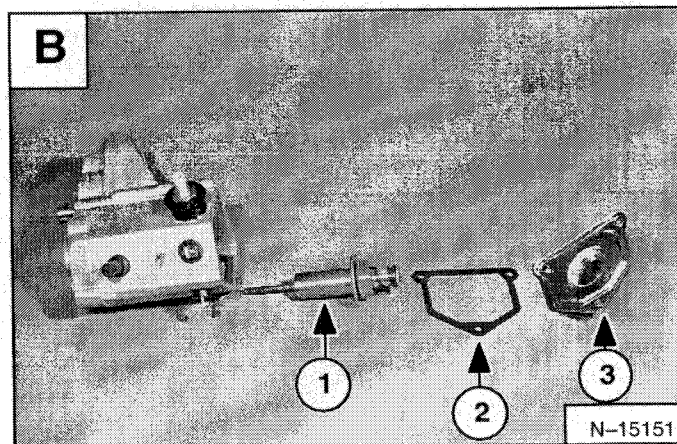
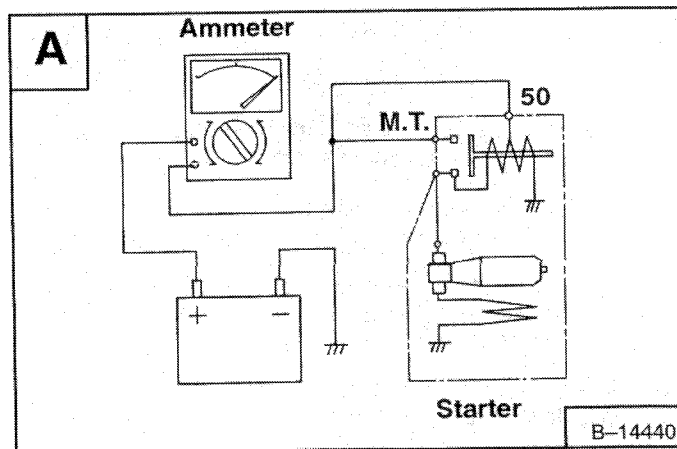
Assembly

Clean all parts and apply high temperature grease to the armature bearing, return spring, steel ball, over running clutch, and idler gear rollers.

Install the switch plunger (Item 1) [B], gasket (Item 2) [B] and cover (Item 3) [B] on the switch housing.

Install the bolts (Item 1) [C].

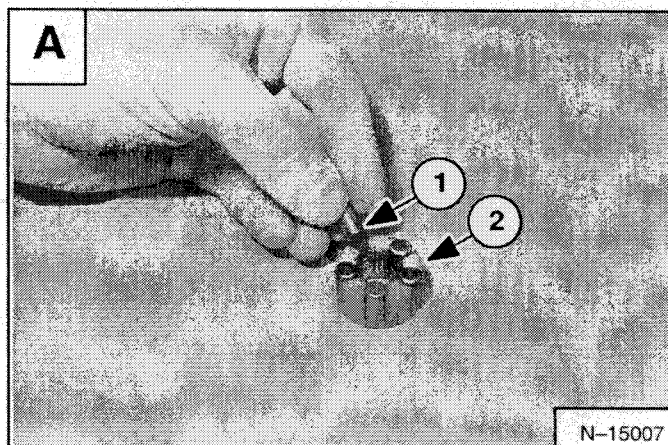
Install the washer (Item 1) [D] on the idler gear shaft.



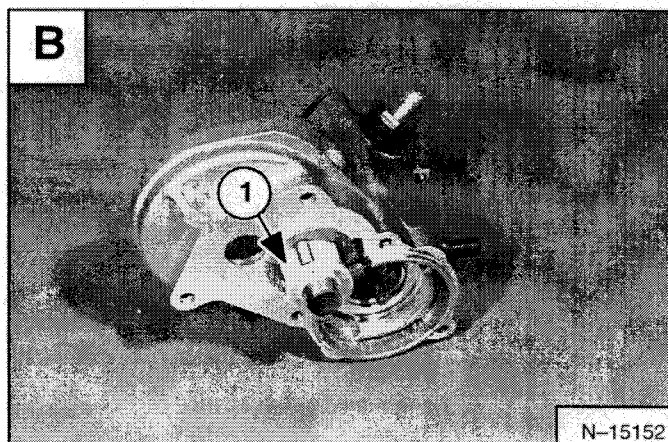
STARTER (DENSO) (Cont'd)

Assembly (Cont'd)

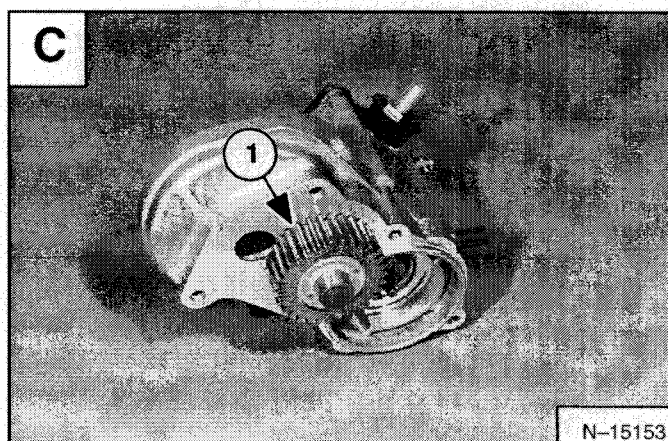
Install the rollers (Item 1) [A] in the retainer (Item 2) [A].



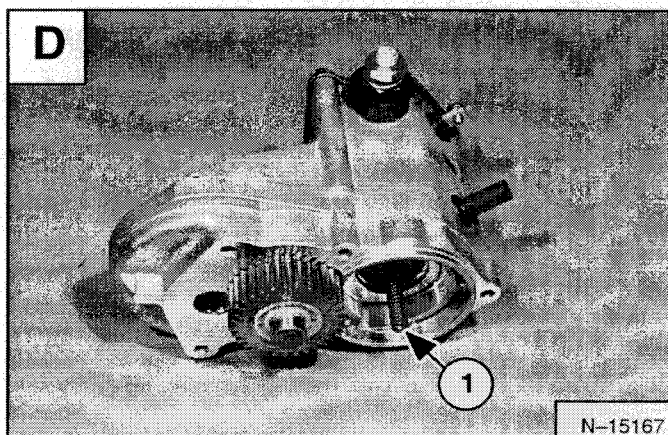
Install the roller/retainer assembly (Item 1) [B] on the idler gear shaft.



Install the idler gear (Item 1) [C] over the retainer.



Install the spring (Item 1) [D] in the magnetic switch housing.

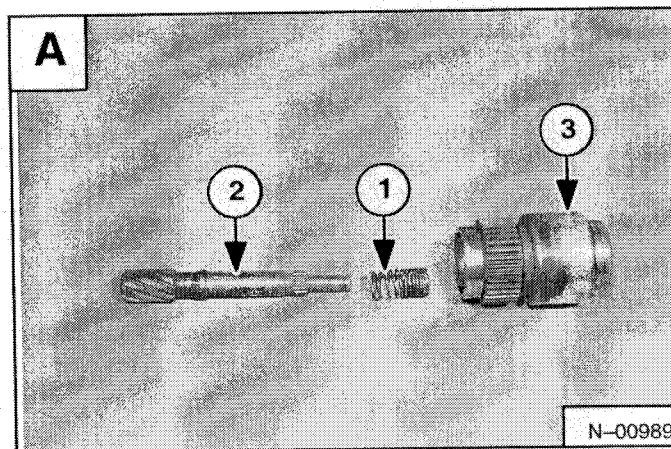


STARTER (DENSO) (Cont'd)

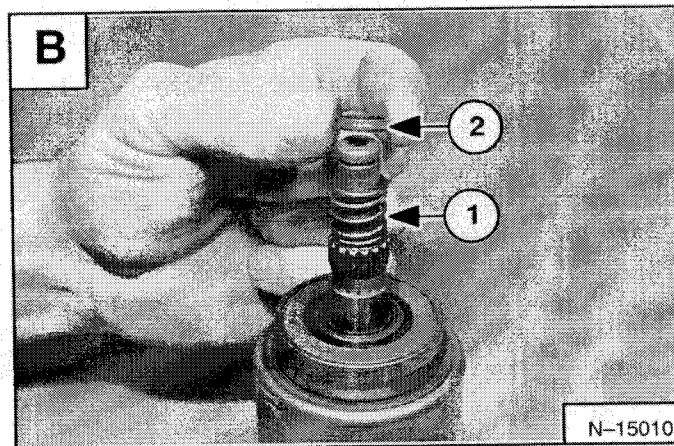
Assembly (Cont'd)

Install the spring (Item 1) [A] over the pinion shaft (Item 2) [A]. Install the pinion shaft (Item 2) [A] in the over running clutch (Item 3) [A].

Stand the clutch assembly on end.



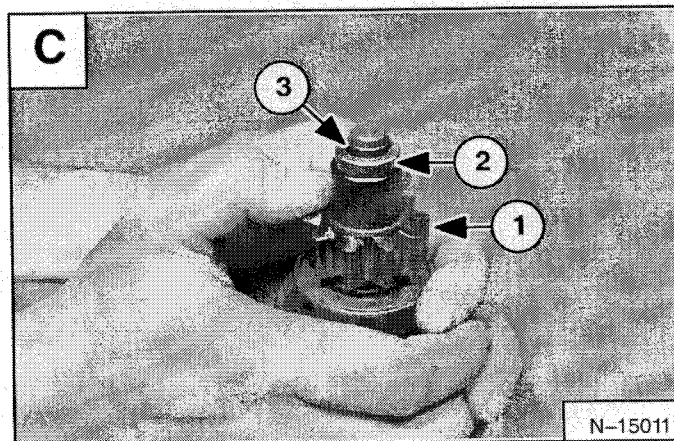
Install the spring (Item 1) [B] and spring seat (Item 2) [B] on the pinion shaft.



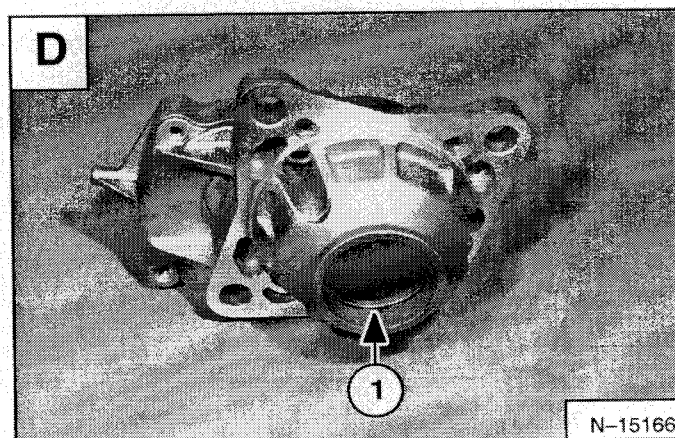
Install the pinion (Item 1) [C] and retainer (Item 2) [C] on the pinion shaft.

Press down on the pinion (Item 1) [C] and install the snap ring (Item 3) [C] on the pinion shaft.

Pull the retainer (Item 2) [C] over the snap ring (Item 3) [C].



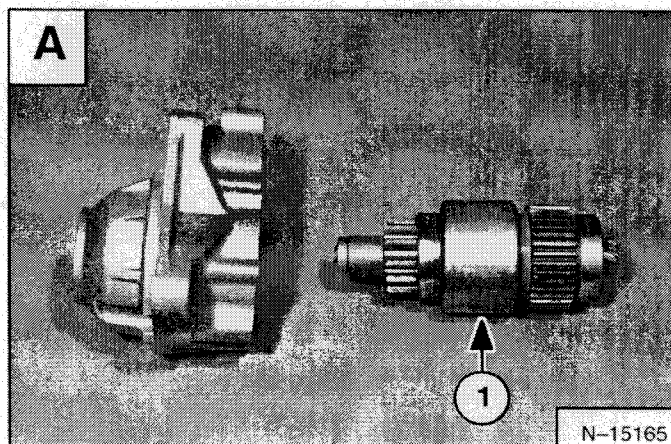
Install the O-ring (Item 1) [D] in the starter housing.



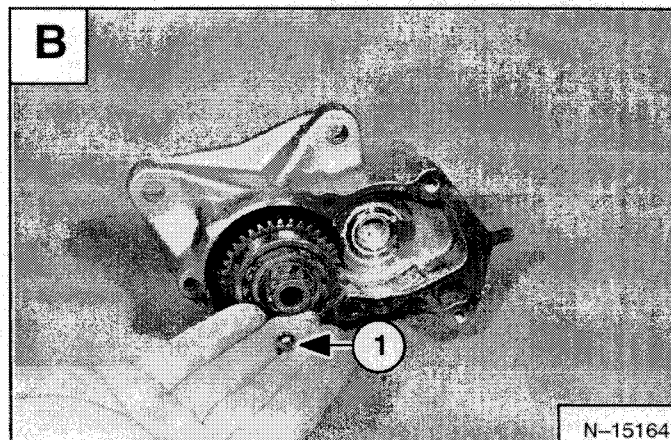
STARTER (DENSO) (Cont'd)

Assembly (Cont'd)

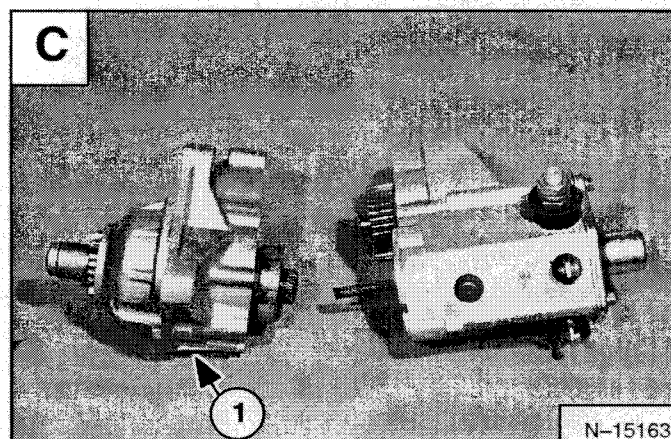
Install the pinion shaft/over running clutch assembly (Item 1) **[A]** in the starter housing.



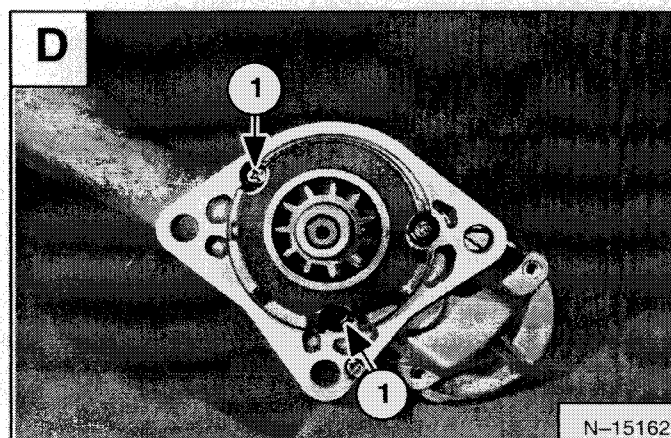
Install the ball (Item 1) **[B]** in the end of the pinion shaft.



Install the starter housing (Item 1) **[C]** on the magnetic switch housing.



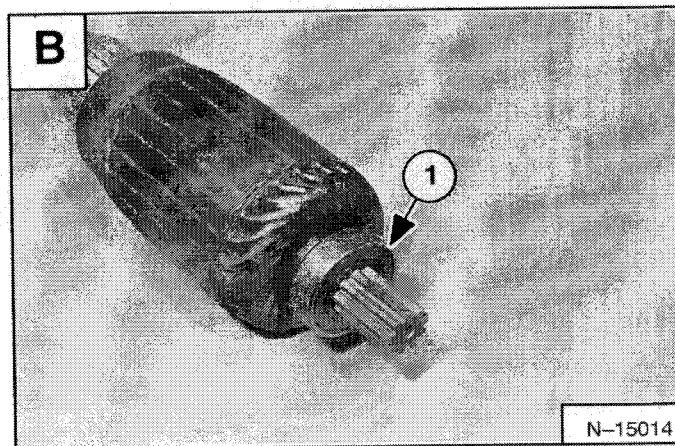
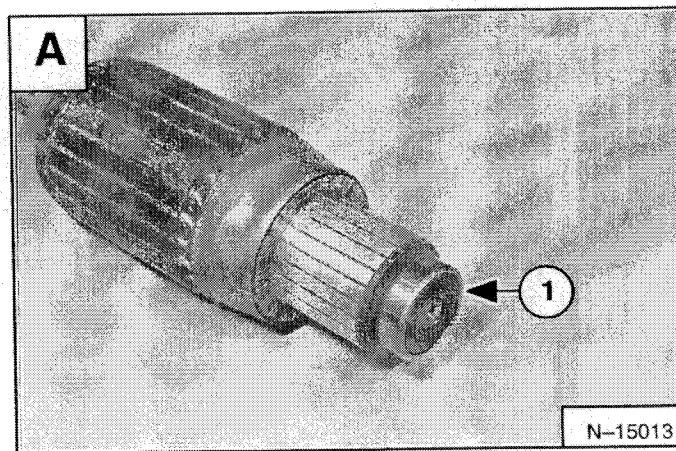
Install the bolts (Item 1) **[D]** in the starter housing. Tighten the bolts to 60–104 in.-lbs. (6,7–11,8 Nm) torque.



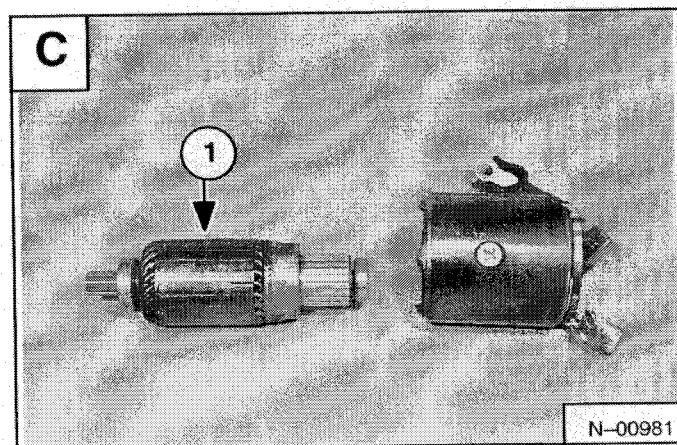
STARTER (DENSO) (Cont'd)

Assembly (Cont'd)

Install the bearings (Item 1) [A] & [B] on both ends of the armature.



Install the armature (Item 1) [C] in the frame.



STARTER (DENSO) (Cont'd)

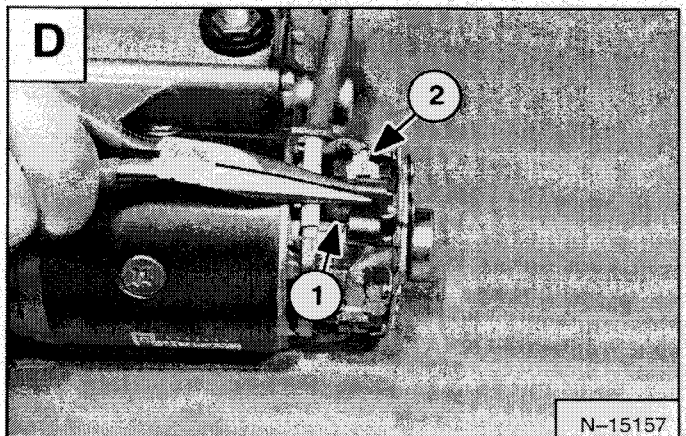
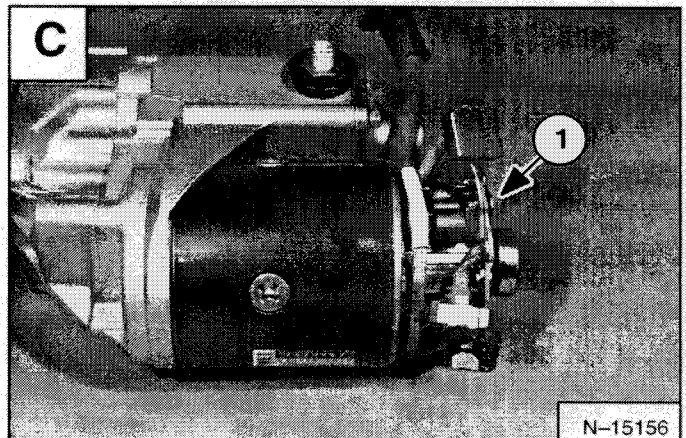
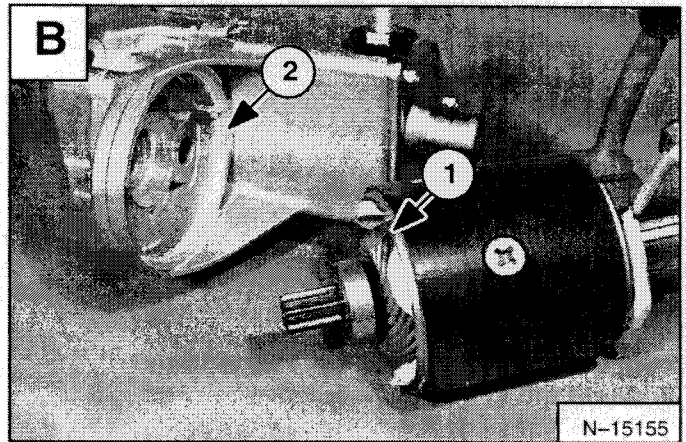
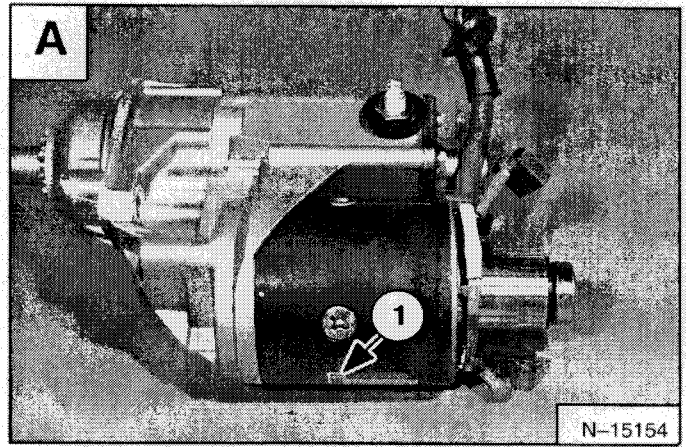
Assembly (Cont'd)

Install the frame/armature assembly (Item 1) [A] on the housing.

NOTE: Make sure the notch (Item 1) [B] in the frame matches up with the notch (Item 2) [B] in the housing.

Install the brush holder (Item 1) [C] on the end of the armature.

Using the needle nose pliers, pull the brush springs (Item 1) [D] back and install the brushes (Item 2) [D].

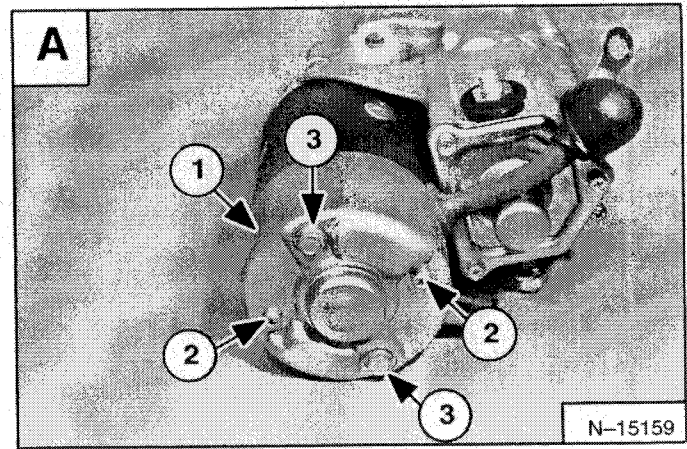


STARTER (DENSO) (Cont'd)

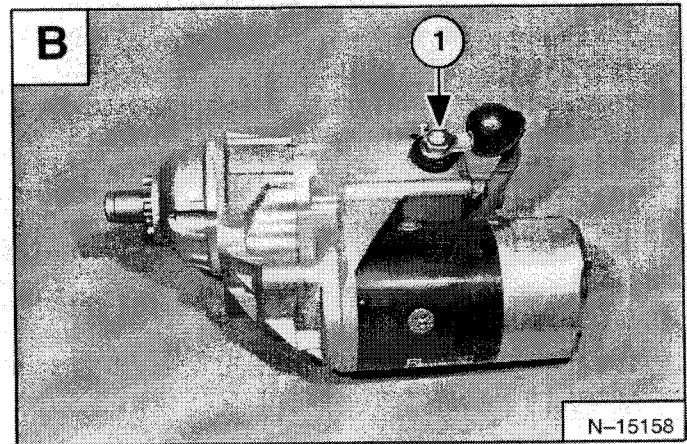
Assembly (Cont'd)

Install the brush cover (Item 1) [A] and bolts (Item 2) [A]. Tighten the bolts to 23–40 in.-lbs. (3,0–5,0 Nm) torque.

Install the thru bolts (Item 3) [A]. Tighten the bolts to 60–104 in.-lbs. (7–12 Nm) torque.



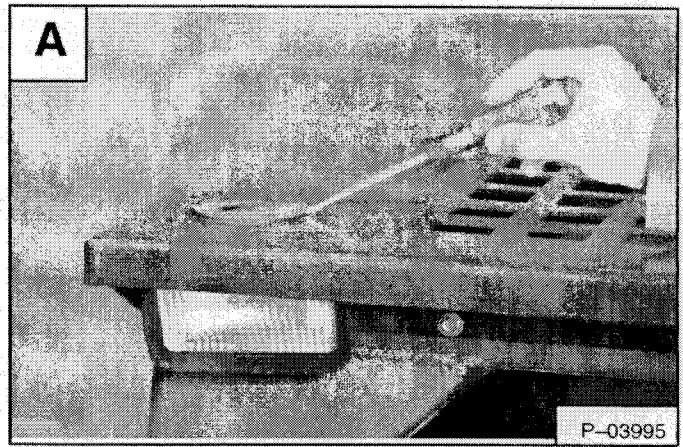
Install the cable (Item 1) [B] on the magnetic switch. Tighten the nut to 18–26 ft.-lbs. (24–35 Nm) torque.



STANDARD INSTRUMENT PANEL

Removal And Installation

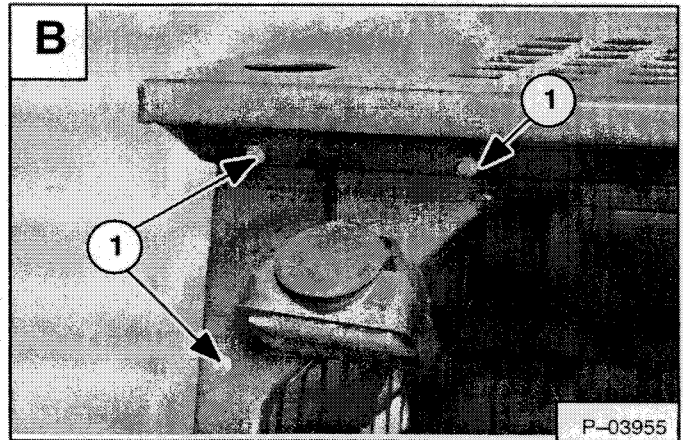
Pry the rubber light mount loose from the operator cab (both sides) [A].



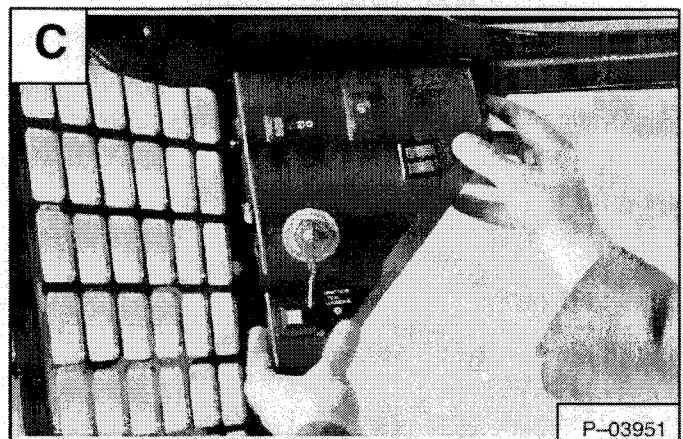
Lower the light from the operator cab and locate the three instrument panel mounting bolts (Item 1) [B] (both sides).

Remove the three mounting bolts (Item 1) [B].

Installation: Be careful to not overtighten the instrument panel mounting bolts to prevent stripping of the threaded holes in the panels.

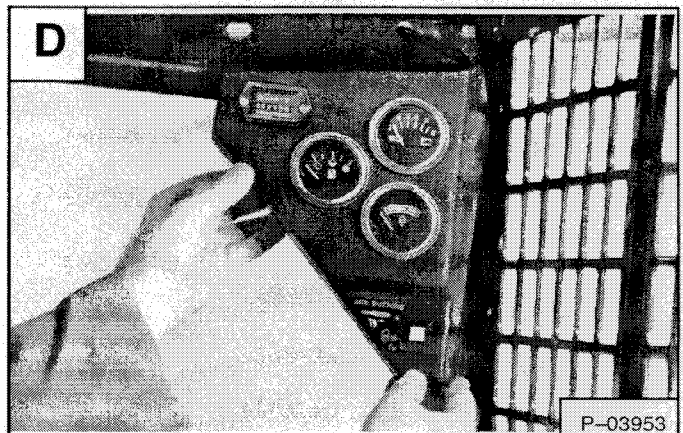


Pull the left instrument panel down and disconnect the wire harness connectors from the panel. Remove the panel [C].



Repeat steps [A] and [B]. Pull the right instrument panel down and disconnect the wire harness connectors from the panel. Remove the panel [D].

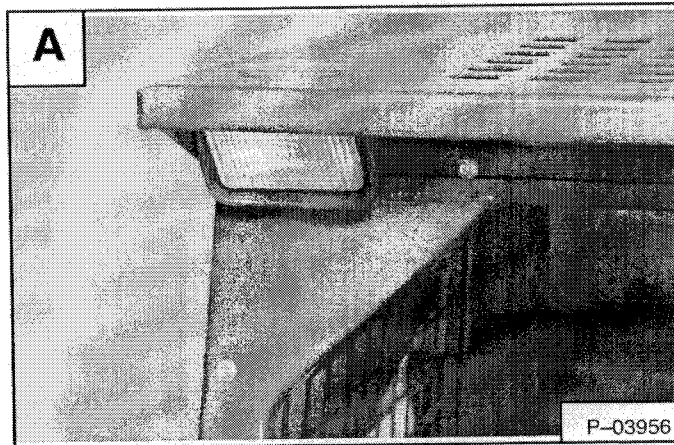
Reverse the removal procedure to install the instrument panel.



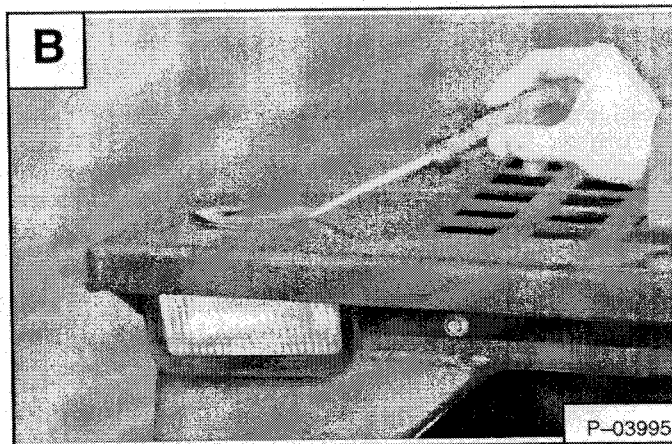
FRONT LIGHTS

Removal And Installation

The front lights are mounted in the upper corners of the operator cab [A].



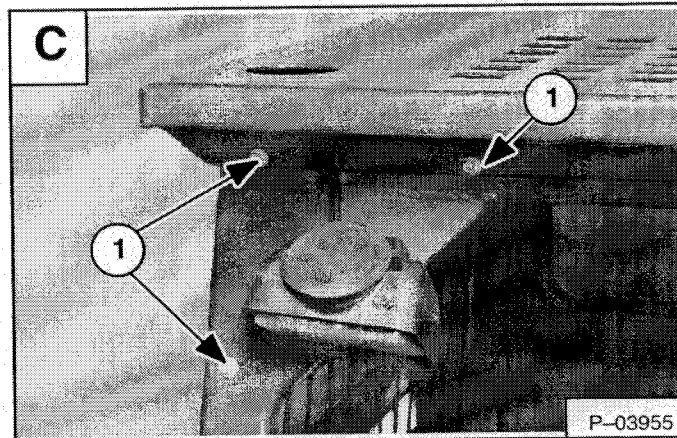
Pry the rubber light mount free from the operator cab [B].



Pull the light down and remove the three mounting bolts (Item 1) [C] from the instrument panel.

Disconnect the front light connector from the instrument panel. Remove the front light from the operator cab.

Reverse the removal procedure to install the front light.



RELAY SWITCHES

Location

The loader engine harness has relay switches located beneath the engine air cleaner [A] & [B].

There are five switches (Item 1) [A] on the BOSS® equipped loader.

The switches are for the starter, switch power, glow plug, brake and shutdown.

There are four switches (Item 1) [B] on the Standard equipped loader.

The switches are for the starter, switch power, glow plug and brake.

Remove the screw (Item 2) [A] & [B] from the mounting tab on the switch and replace if the switch malfunctions.

