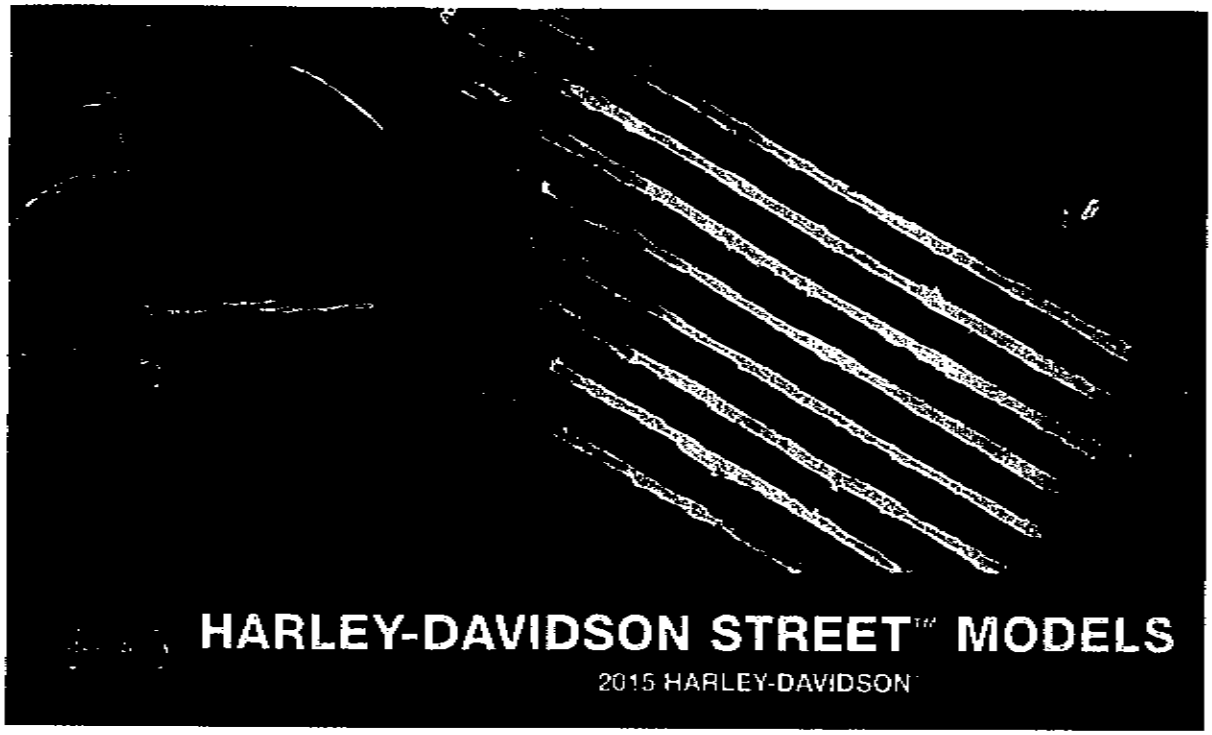
SkillsUSA
2014 Contest Projects

Motorcycle Service Technology

Click the “Print this Section” button above to automatically print the specifications for this contest. Make sure your printer is turned on before pressing the button.



The Harley-Davidson Street™ Work Station

2014 SKILLSUSA Contestants Guide

Time Limit: 2 hours 300 points

Objective:

Following the instruction contained in this work station guide and the instructions in the Harley-Davidson Service manual, the contestant will perform the following tasks in the order listed.

1. Remove the fuel tank. (Installation is performed in task #4)

    Use Manual Handout – Fuel Tank Procedures

2. Remove the battery. (Installation is performed in task #4)

    Use Manual Handout – Battery Procedures

3. Remove and replace the clutch cable. (Includes adjustment).

    Use Manual Handout – Clutch Cable Replacement Procedures

4. Adjust the four valves on the rear cylinder to specification.

    Use Manual Handout – Valve Lash adjustment Procedures

Criteria:

The contestants score will be based on completing the steps, in order and as written in the service manual. Steps performed out of sequence will result in deductions even if they lead to a successful outcome.

Deductions in the contestants score will be made for:

a. Steps performed out of sequence
b. Steps performed incorrectly
c. Safety errors made while performing steps or in work area
d. Damage to parts or equipment
e. Incorrect use of tools

2014 SKILLSUSA
Judges Scoresheet

The Harley-Davidson Street™ Work Station

Time Limit: 2 hours 300 points

Objective:

Following the instruction contained in this work station guide and the instructions in the Harley-Davidson Service manual, the contestant will perform the following tasks in the order listed.

1. Remove the fuel tank. (Installation is performed in task #4)

    Use Manual Handout – Fuel Tank Procedures

2. Remove the battery. (Do not install until #4)

    Use Manual Handout – Battery Procedures

3. Remove and replace the clutch cable. (Includes adjustment).

    Use Manual Handout – Clutch Cable Replacement Procedures

4. Adjust the four valves on the rear cylinder to specification.

    Use Manual Handout – Valve Lash adjustment Procedures

Criteria:

The contestants score will be based on completing the steps, in order and as written in the service manual. Steps performed out of sequence will result in deductions even if they lead to a successful outcome.

Deductions in the contestants score will be made for:

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b. Steps performed incorrectly
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d. Damage to parts or equipment
e. Incorrect use of tools

Start Time:_____ End Time: _____ Contestant # _____

TASK DESCRIPTION	POINTS

1. Remove Fuel Tank.

Manual sequence followed; 20 points (deduct 5 for: step out of order, performed incorrectly, safety error, damage to component or incorrect tool usage) _____

- ☐ Remove main fuse
- ☐ Remove Seat
- ☐ Lift rear of tank
- ☐ Remove belt guard
- ☐ Disconnect ground wire
- ☐ Disconnect fuel line
- ☐ Disconnect fuel pump connector
- ☐ Disconnect vent line.

Tank removed without damage to ground wire and stored 0 OR 10

2. Remove Battery

Manual sequence followed; 20 points (deduct 5 for: step out of order, performed incorrectly, safety error, damage to component or incorrect tool usage) _____

- ☐ Remove vapor valve
- ☐ Remove cover screws (top under seat)
- ☐ Remove panel screws (side)
- ☐ Remove panel (wiring can be left attached)
- ☐ Disconnect ground cable
- ☐ Disconnect positive battery cable
- ☐ Remove Battery

Battery removed without damage and stored 0 OR 20

Page 1 Point sub total _____

(70 possible)

3. Clutch Cable Replacement

Manual sequence followed; 20 points (deduct 5 for: step out of order, performed incorrectly, safety error, damage to component or incorrect tool usage) _____

- ☐ Remove speed screen (fairing)
- ☐ Disconnect lower clutch cable end at engine
- ☐ Disconnect upper clutch cable end at handlebar lever
- ☐ Remove cable from motorcycle (center cable strap remains intact)
- ☐ Install cable on motorcycle (route through center cable strap)
- ☐ Connect upper cable end to hand lever
- ☐ Connect lower cable end to engine lever
- ☐ Connect upper cable end to hand lever
- ☐ Connect lower cable end to engine lever
- ☐ Install cable strap at correct location
- ☐ Adjust clutch cable
- ☐ Install speed screen

Cable removed without damage	0 OR 10
Cable installed and routed correctly (included cable strap)	0 OR 10
Cable adjusted to specification	0 OR 10

Page 2 Point sub total _____

(50 possible)

4. Rear Cylinder Valve Lash

Questions (5 points each)

1. Valve Lash specification Intake _____Exhaust_____
2. Spark Plug Torque _____

Points _____

Manual sequence followed; 100 points (deduct 5 for: step out of order, performed incorrectly, safety error, damage to component or incorrect tool usage) _____

- ☐ Remove rear cylinder head cover (point loss for not disconnecting breather hose first)
- ☐ Remove both spark plugs (point loss for not cleaning plug cavities)
- ☐ Raise rear wheel
- ☐ Rotate engine using rear wheel to bring to TDC (point loss for rotating backwards)
- ☐ Stopped for Judges inspection
- ☐ Adjusted valves to correct specification
- ☐ Lowered rear wheel to ground
- ☐ Installed both spark plugs to correct torque
- ☐ Install rear cylinder head cover (point loss for not connecting breather hose)
- ☐ ~~Install fuel pump electrical connector~~
- ☐ Install fuel tank
- ☐ Install ground wire and route correctly
- ☐ Install fuel tank outlet line (must be locked)
- ☐ Install fuel pump fuse
- ☐ ~~Install the battery and~~ connect the battery cables (deduct points if positive is not connected first)
- ☐ Install side electrical panel
- ☐ Tighten upper cover screws (under seat)
- ☐ Install seat
- ☐ Install belt guard
- ☐ Install vapor valve (correct hose routing
- ☐ Install main fuse
- ☐ Install side covers

Page 3 Point sub total _____

(110 Possible)

Rear Cylinder Valve Lash (continued)

Engine positioned at TDC compression before loosening valves	0 OR 10
Intake Valves adjusted to specification	0 OR 10
Exhaust Valves adjusted to specification	0 OR 10
Valve cover installed correctly W/O damage	0 OR 10
Fuel Tank installed correctly W/O damage	0 OR 10
Battery installed correctly W/O damage	0 OR 10
Motorcycle final assemble complete and bike cleaned	0 OR 10

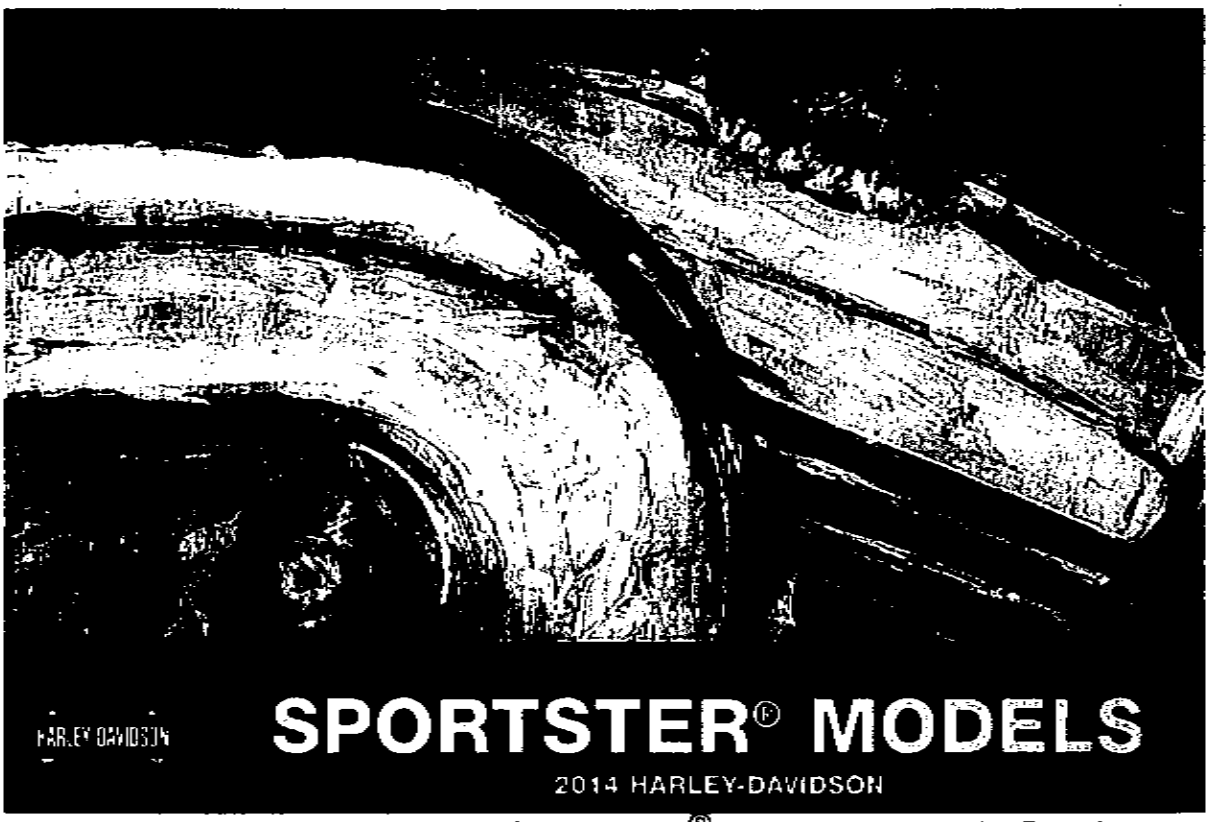
Page 4 Point sub total _____

(70 possible))

Start Time:_____ End Time: _____ Contestant # _____

Final Score: Page 1 _____
Page 2 _____
Page 3 _____
Page 4 _____

Total _____



The Harley-Davidson Sportster® Primary Work Station

2014 SKILLSUSA Contestants Guide

Criteria:

The contestants score will be based on completing the steps, in order and as written in the service manual. Steps performed out of sequence will result in deductions even if they lead to a successful outcome.

Contestant #_____

Time Limit: 30 Minutes 100 points

1. Answer the following questions. score

   a. Spark plug torque is: _____ (0) (5)

   b. Primary chain deflection is: HOT_____ COLD_____ (0) (5)

   c. Inspection cover screw torque is:_____ (0) (5)

   d. Primary chain adjuster screw locknut torque is:_____ (0) (5)

   e. Why do you think there is a different primary chain deflection specification for hot and cold engines? (Please write or print legibly)

   _____

   _____ (0) (15)

Total Points _____

1. Open the left side cover and disconnect the main fuse
2. Disconnect both spark plug wires and remove the spark plugs. (Pull the boot not the wire)
3. Remove the primary chain inspection cover and gasket
4. Lift the rear wheel with the jack so the wheel will rotate
5. Shift the transmission into 5th gear and by rotating the rear wheel in the normal direction of rotation; find the tight spot in the chain.
6. Adjust the primary chain to the correct free play.
7. Have Judge inspect free play
8. Lower rear wheel and return transmission in neutral
9. Install inspection cover
10. Install and torque spark plugs and connect secondary wires
11. Replace main fuse and close side cover

SkillsUSA

2014 Motorcycle Service Technology

Primary Chain Adjustment Score Sheet

Time Limit 1/2 hr.

100 points

Contestant #_____ Start Time:_____

Judge's Initials:_____ Stop Time:_____

Scoring Directions:

Use the scoring criteria listed below:

"0" indicates the contestant **could not or did not** correctly perform the task or answer the question.

"10,15 or 50 " indicates the contestant **did perform** the entire task or answered the question correctly.

PERFORMANCE: Grade the student's performance and record their score below.

1. Spark plug torque is: **12 ft lbs (or 144 in. lbs.)** (5) pts_____
2. Primary chain deflection is: HOT **1/4"-3/8"** COLD **3/8/"-1/2"** (5) pts _____
3. Inspection cover screw torque is: **90 in. lbs.** (5) pts_____
4. Primary chain adjuster screw locknut torque is: **20 ft. lbs** (5) pts_____
5. Why do you think there is a different primary chain deflection specification for hot and cold engines? (Please write or print legibly)

engine case expands when it warms up

_____ (15)pts _____

Contestant adjusted primary chain to within cold engine specification (50) pts _____

Contestant torqued inspection cover screws correctly (5) pts _____

Contestant torqued chain adjuster locknut correctly (5) pts _____

Contestant torqued spark plugs correctly (5) pts _____

Total Points _____

SkillsUSA

2014 Motorcycle Service Technology Contest

Workstation #8

Oral Proficiency

Judge's Score sheet

Time Limit 4 Minutes

Contestant #_____

Start Time:_____

Judge's Initials:_____

Stop Time:_____

Scoring Directions: The performance of each task should be either "0" or full points, i.e "5" or "10".

Use the following criteria listed below: **"0"** indicates the contestant ***could not or did not*** correctly perform this task.

"5" or **"10"** indicates the contestant **did perform or demonstrate** the skill correctly.

Judges read the contestant the following statement...

"Without using your name, home town or state, tell me why you should be hired for the position of technician in two (2) to four (4) minutes"

No audible pauses (umm, ahh, uhh, OK, alright, etc)	**(0,5)**	_____
Eye contact – must make eye contact during the presentation.	**(0,10)**	_____

Hand gestures and facial expressions must be used to demonstrate persuasion or exchange of information.

Hand gestures used	**(0,5)**	_____
Facial expressions used	**(0,5)**	_____
Time within 2 – 4 mins	**(0,5)**	_____

Total Possible Score 30 **Total Points** _____

SkillsUSA
2014 Motorcycle Service Technology Contest

Work station #9

Written Test

Service Manual Comprehension

(Time limit 30mins)

Sponsored by

MOTORCYCLE MECHANICS INSTITUTE

A DIVISION OF UNIVERSAL TECHNICAL INSTITUTE

SkillsUSA
2014 Motorcycle Service Technology Contest
Service Manual Comprehension

Objective: This written test allows the participant to demonstrate ability to navigate a motorcycle service manual.

Directions: Using the 2005 Harley-Davidson Softail service manual provided, select the best answer for each question, and then fill in the appropriate letter's box on the answer sheet provided.

1. How would you identify the difference between throttle & idle cables when installing them on a throttle body?

   A. Throttle cable is longer
   B. Idle cable is longer
   C. Idle cable has a spring on it
   D. Throttle cable has a spring on it

2. In what section of the service manual would you locate a V.I.N. breakdown?

   A. Section 1
   B. Section 2
   C. Section 3
   D. Section 4

3. What lubricant is required for the pivot shaft when installing the rear wheel to the swingarm on a 2005 Softail?

   A. Loctite 262 red
   B. Anti-seize
   C. Multi-purpose grease
   D. Wheel bearing grease

4. What lubricant is required when installing new brake caliper piston seals on a 2005 Softail?

   A. DOT 4 brake fluid
   B. DOT 5 brake fluid
   C. GE Versilube
   D. Dow Corning 44 Moly lube

5. What tool is required to remove oil lines from a 2005 Softail oil tank?

   A. Side cutters
   B. HD-44455
   C. HD-97087-65B
   D. No tool required

6. Other than the service manual, where is the minimum thickness of a brake rotor specified?

   A. Stamped in the face of the master cylinder
   B. Stamped in the face of the brake caliper
   C. Stamped in the face of the brake rotor
   D. Stamped in the face of the swingarm

7. What is the correct clutch lever free play on all models with cable actuated clutches?

   A. 1/8" – 1/2"
   B. 1/16" – 1/4"
   C. 1/16" – 3/8"
   D. 1/16" – 1/8"

8. What is the primary chain free play specification for a 2005 Softail at room temp/cold?

   A. 1/4" – 1/2"
   B. 5/8" – 7/8"
   C. 3/8" – 1/2"
   D. 1/2" – 5/8"

9. As the engine reaches operating temp. what happens to the primary chain free play?

   A. It increases as the engine cases expand from heat
   B. It remains the same as the engine cases expand from heat
   C. It stretches the chain
   D. It decreases as the engine cases expand from heat

10. Service intervals for the neck bearing on 2005 Softail are:

    A. Adjust every 5k miles, lubricate every 5k miles & inspect every 20k miles
    B. Adjust every 5k miles, lubricate every 10k miles & inspect every 20k miles
    C. Adjust every 10k miles, lubricate every 5k miles & inspect every 30k miles
    D. Adjust every 10k miles, lubricate every 10k miles & inspect every 30k miles

11. What is the neck bearing measurement procedure & spec for a 2005 FLSTF – FatBoy?

A. 1" – 2" & Fallaway
B. 2" – 4" & Fallaway
C. 2" – 3" & Swingaway
D. 3" – 4" & Swingaway

12. The idle cable is adjusted with the steering head in what position?

A. Wheel straight forward
B. Wheel to the left
C. Wheel to the right
D. It doesn't matter

13. When should a jiffy stand be lubed?

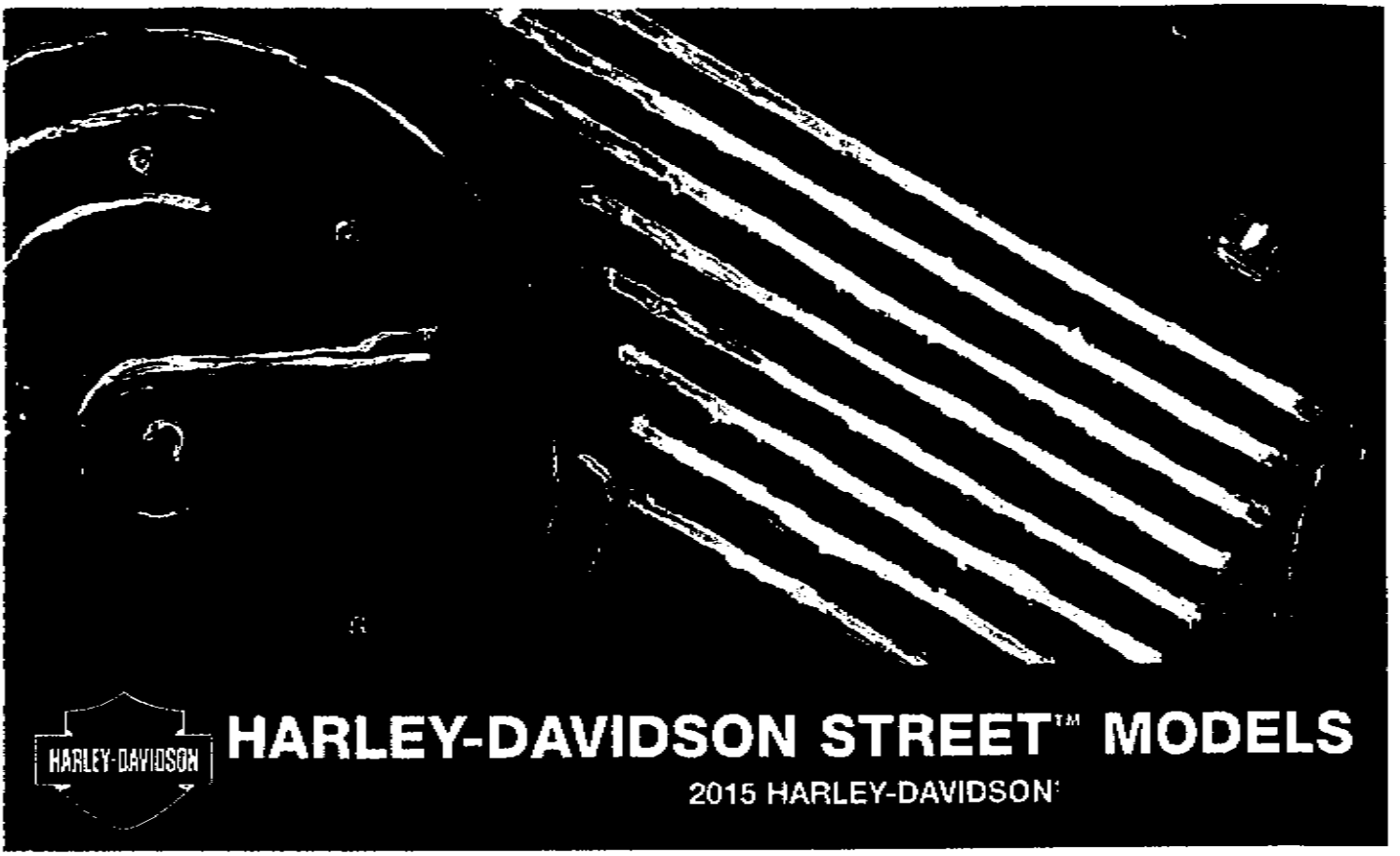
A. 5k mile service
B. 15k mile service
C. 25k mile service
D. First service

14. What is the tire pressure for a 2005 FLSTF – FatBoy front & rear for a solo rider (no passenger)?

A. 36psi front / 40psi rear
B. 38psi front / 36psi rear
C. 36psi front / 36psi rear
D. 40psi front / 36psi rear

15. When checking engine oil on a 2005 Softail the motorcycle should be at operating temp with the bike on the jiffy stand.

A. True
B. False



Battery Procedures

Some steps have be performed in advance. These steps are identified by a line through the text or the notation; THIS HAS BEEN DONE

REMOVE PRIOR TO CLUTCH AND VALVE LASH PROCEDURES, INSTALL AS PART OF VALVE LASH PROCEDURE.

TORQUE ON ALL FASTENERS WILL BE HAND TIGHT

PREPARE

1. Remove left and right side covers.
2. Remove main fuse. See 8.4 POWER DISCONNECT.
3. Remove vapor valve. See 6.10 VAPOR VALVE.
4. Remove front belt guard. See 3.21 BELT GUARDS.
5. Remove seat. See 3.36 SEAT.
6. Remove battery cover screws (2). See Figure 8-45.

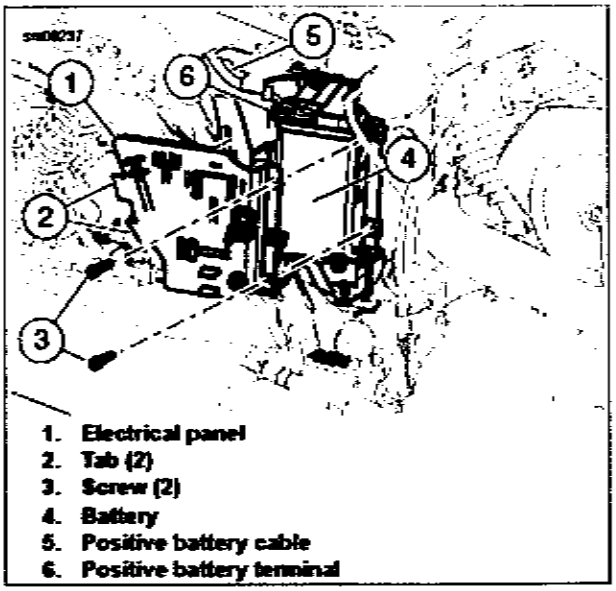
REMOVE

1. See Figure 2-32. Remove electrical panel.
   a. Remove screws (3).
   b. Remove electrical panel (1).

⚠ WARNING

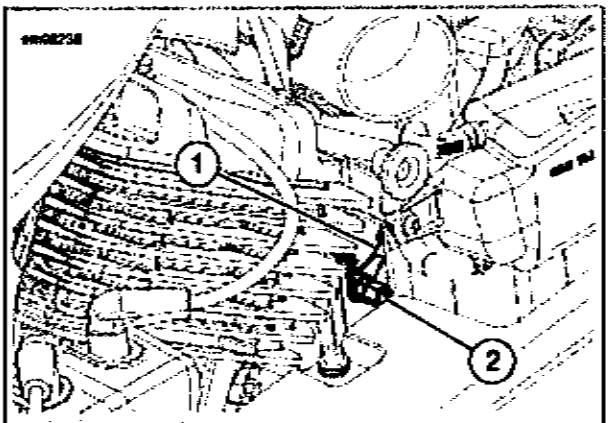
Disconnect negative (-) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00049a)

2. Remove battery.
   a. See Figure 2-33. Remove negative battery cable (1) from ground stud (2).
   b. See Figure 2-32. Remove positive battery cable (5) from positive battery terminal (6).
   c. Remove battery (4).
3. Remove negative battery cable, if necessary.



1. Electrical panel
2. Tab (2)
3. Screw (2)
4. Battery
5. Positive battery cable
6. Positive battery terminal

Figure 2-32. Battery



1. Negative battery cable
2. Ground stud

Figure 2-33. Battery Ground Cable

INSTALL PERFORMED AS PART OF VALVE LASH

FASTENER	TORQUE VALUE	
Negative battery terminal screw	[redacted]	[redacted]
Positive battery terminal screw	[redacted]	[redacted]
Battery ground stud	[redacted]	[redacted]
Electrical panel screw	[redacted]	[redacted]

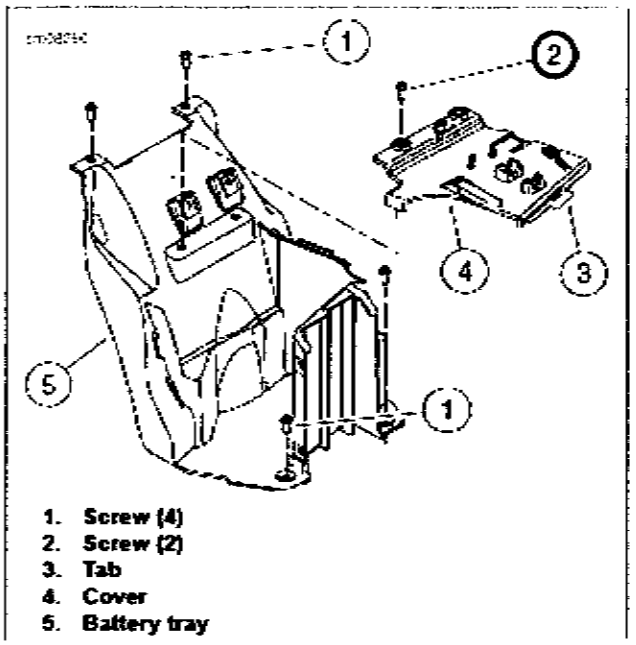
NOTICE

Connect the cables to the correct battery terminals. Failure to do so could result in damage to the motorcycle electrical system. (08215a)

1. Install negative battery cable, if removed.
   a. Connect negative battery cable to negative battery terminal. Tighten to [redacted].
2. See Figure 2-32. Install battery.
   a. Route negative battery cable through battery box.
   b. Install battery (4) in battery box.
3. See Figure 2-32. Connect battery.
   a. Connect positive battery cable (5) to positive battery terminal (6). Tighten to [redacted].
   b. See Figure 2-33. Connect negative battery cable (1) to ground stud (2). Tighten to [redacted].
4. See Figure 2-32. Install electrical panel.
   a. Install electrical panel (1).
   b. Verify electrical panel tabs (2) are inserted into slots.
   c. Install screws (3). Tighten to [redacted].

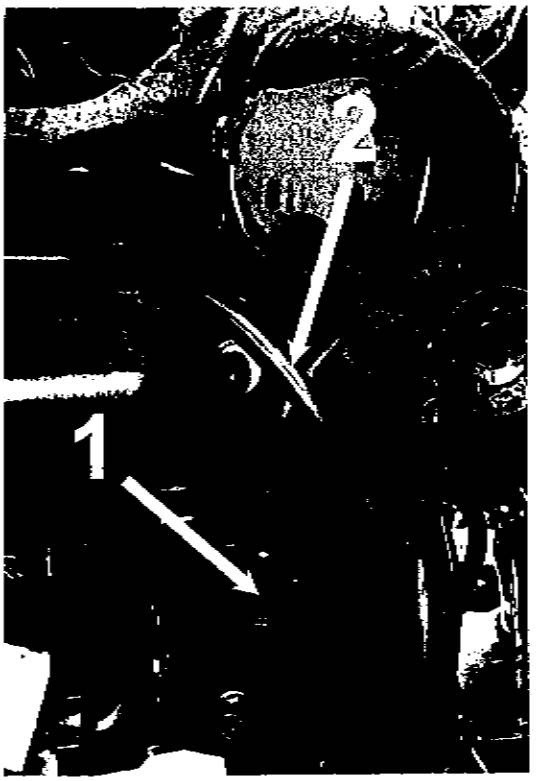
COMPLETE Performed as part of Valve Lash

1. Install battery cover screws (2). Tighten to 2.3-3.3 Nm (21-29 in-lbs).
2. Install seat. See 3.36 SEAT.
3. Install front belt guard. See 3.21 BELT GUARDS.
4. Install vapor valve. See 6.10 VAPOR VALVE.
5. Install main fuse. See 8.4 POWER DISCONNECT.
6. Install side covers. See 3.17 SIDE COVERS.



1. Screw (4)
2. Screw (2)
3. Tab
4. Cover
5. Battery tray

Figure 8-45. Battery Tray



PREPARE

1. Remove main fuse. See 8.4 POWER DISCONNECT.

REMOVE

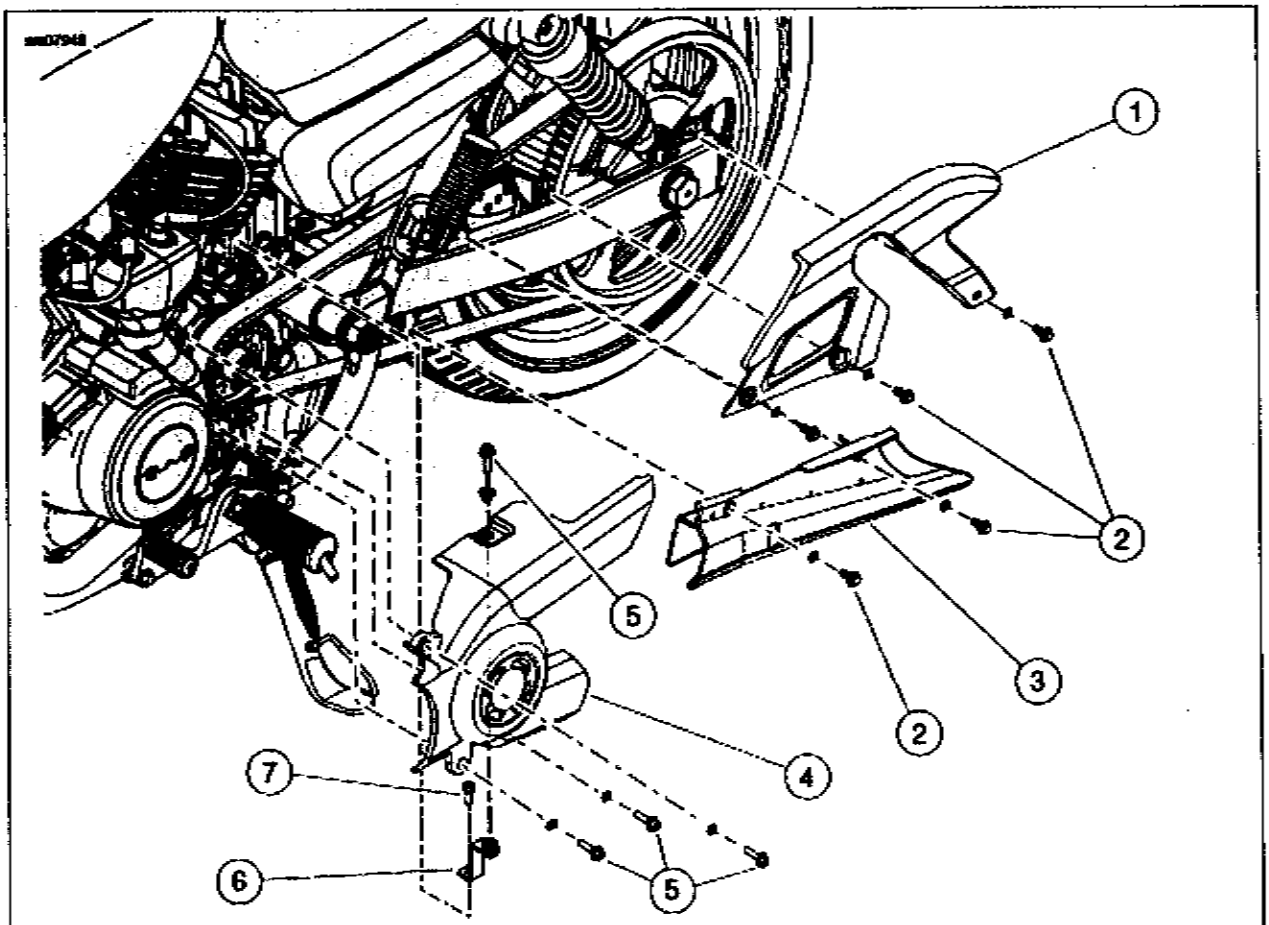
Front Belt Guard

1. See Figure 3-46. Remove front belt guard.
   a. Remove front belt guard screws (5).
   b. Remove front belt guard (4).
2. Remove screw (7) and bracket (6), if necessary.

INSTALL PERFORMED AS PART OF VALVE LASH

Front Belt Guard

1. See Figure 3-46. Install bracket, if removed.
   a. Position bracket (6).
   b. Install bracket screw (7). Tighten to [redacted] ([redacted]).
2. Install front belt guard.
   a. Position front belt guard (4).
   b. Install screws (5). Tighten to [redacted] ([redacted]).



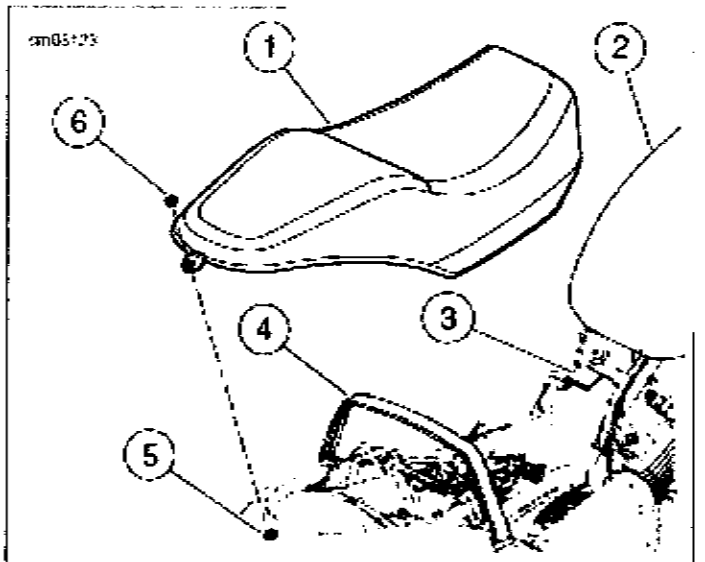
1. Upper rear belt guard
2. Rear belt guard screw (5)
3. Lower rear belt guard
4. Front belt guard
5. Front belt guard screw (4)
6. Bracket
7. Bracket screw

Figure 3-46. Belt Guards

REMOVE

Seat

1. See Figure 3-73. Remove seat.
   a. Remove seat retention screw (6).
   b. Slide seat (1) back to release from seat retention tab (3).
   c. Slide seat forward and lift above the fuel tank (2).
   d. Pull seat forward through seat strap (4).



1. Seat
2. Fuel tank
3. Seat retention tab
4. Seat strap
5. Seat retention nut
6. Seat retention screw

Figure 3-73. Seat Removal

NEGATIVE BATTERY CABLE

FASTENER	TORQUE VALUE	
Battery ground stud	[redacted]	[redacted]

Disconnect negative battery cable from ground stud when there is a possibility of injury caused by starter engagement (engine rotation).

Disconnect Negative Battery Cable

1. Remove left side cover.
2. Remove front belt guard. See 3.21 BELT GUARDS.

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00848a)

3. See Figure 8-3. Disconnect negative battery cable (1) from ground stud (2).

Connect Negative Battery Cable

1. See Figure 8-3. Connect negative battery cable (1) to ground stud (2). Tighten to [redacted] ([redacted]).
2. Install front belt guard. See 3.21 BELT GUARDS.
3. Install left side cover.

MAIN FUSE

Remove main fuse when there is a possibility of injury caused by accidental vehicle start-up or electrical equipment damage.

Remove Main Fuse

1. Remove right side cover.

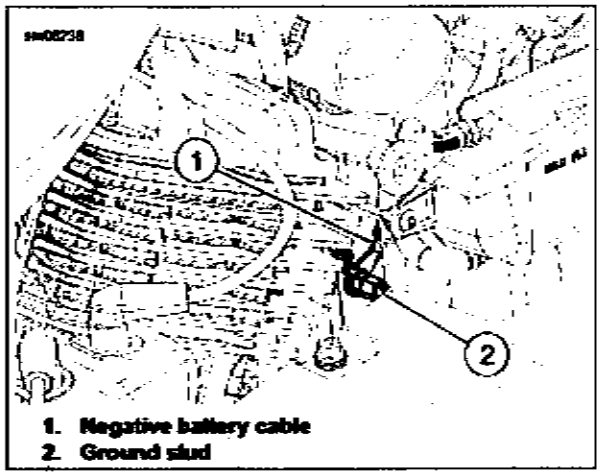
⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove main fuse before proceeding. (00251b)

2. See Figure 8-4. Remove main fuse.

Install Main Fuse

1. See Figure 8-4. Install main fuse.
2. Install right side cover.



1. Negative battery cable
2. Ground stud

Figure 8-3. Battery Ground Cable

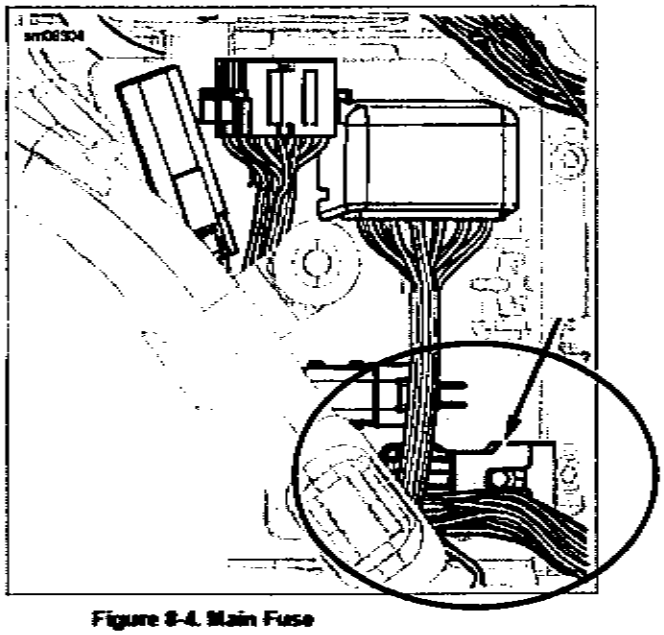
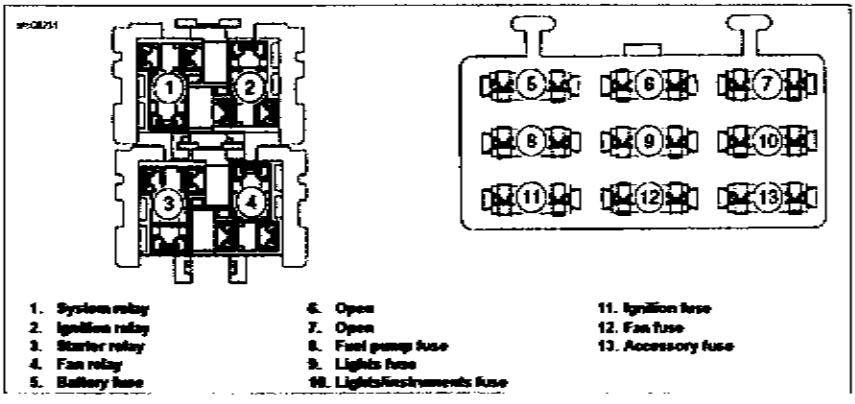


Figure 8-4. Main Fuse



1. System relay
2. Ignition relay
3. Starter relay
4. Fan relay
5. Battery fuse
6. Open
7. Open
8. Fuel pump fuse
9. Lights fuse
10. Lights/instruments fuse
11. Ignition fuse
12. Fan fuse
13. Accessory fuse

Figure 8-2. Fuses and Relays

VAPOR VALVE

PREPARE

1. Remove right side cover. !

~~2. Models with purge solenoid: Remove purge solenoid. See 6.20 PURGE SOLENOID, CALIFORNIA EMISSIONS.~~

REMOVE

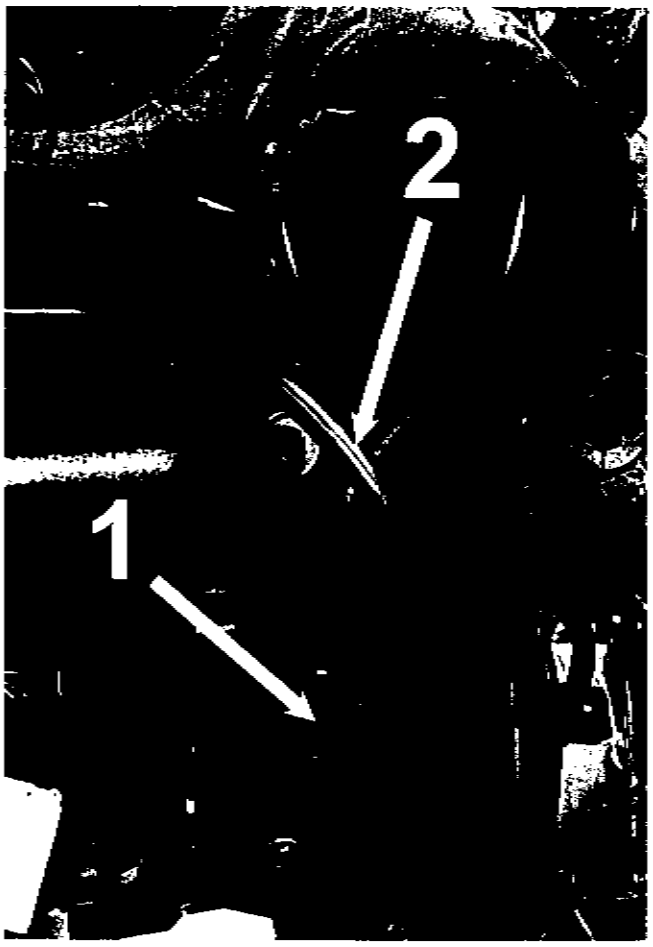
1. See Figure 6-13. Remove vapor valve.
   a. Remove vent lines (3) from vapor valve (1).
   b. Pull vapor valve from clip (2).

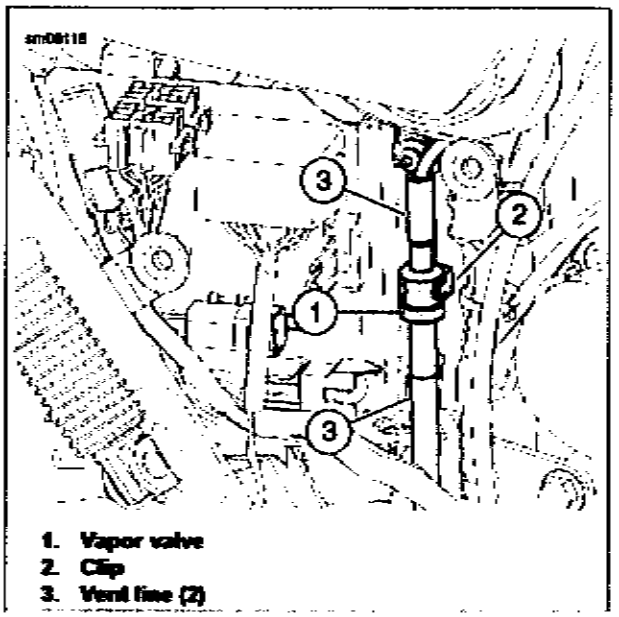
INSTALL

⚠WARNING

Excessive pressure can build in the fuel tank if vapor valve is not mounted vertically with long fitting to top. Leaks due to excessive pressure can cause a fire or explosion, which could result in death or serious injury. (M6265a)

1. See Figure 6-13. Install vapor valve.
   a. Press vapor valve (1) into clip (2).
   b. Install vent lines (3).





1. Vapor valve
2. Clip
3. Vent line (2)

Figure 6-13. Vapor Valve

COMPLETE

~~1. Models with purge solenoid: Install purge solenoid. See 6.20 PURGE SOLENOID, CALIFORNIA EMISSIONS.~~

2. Install right side cover.

2014 SKILLSUSA
CIRCUIT BUILDING WORKSTATION

4

CONTESTANT WORKSHEET

(30 minutes - 100 points)

- **Read the information and follow the procedures on the laminated instruction sheets.**
- **Record your answers on the Contestant Worksheet on the following page.**
- **Make sure your contestant number is listed on the Contestant Worksheet.**
- **Give your Contestant Worksheet to the judge when you are finished or when time runs out.**

2014 SKILLSUSA CIRCUIT BUILDING CONTESTANT WORKSHEET

Contestant Number _____ **Total Points** _____ **Judge's Initials** _____

Start Time: _____ **End Time:** _____

Note: For all questions about wire colors, spell out the color name(s), DO NOT use color codes.

1. What is the number of the 8-place connector shown in Figure 5. _____
2. Identify the color(s) of one of the wires connected to the horn switch. _____

Identify the wire colors for each of the pins in this same 8-place connector.

3. Pin 1 _____
4. Pin 2 _____
5. Pin 3 _____
6. Pin 4 _____
7. Pin 5 _____
8. Pin 6 _____
9. Pin 7 _____
10. Pin 8 _____

11. See Figure 6. What is the color(s) of the wire that leads from ground to connector 24B?

    _____

12. See Figure 6. What is the color(s) of the wire that supplies battery power to connector 24B?

    _____

13. Which fuse is in line with the wire that supplies battery power to connector 24B?

    _____

14. Indicate the wires you will need to complete the horn circuit by writing the wire colors opposite the correct position in the 8-place connector [24B]. Example: If you only need five wires to complete the horn circuit, then colors for three sockets will be blank.

Connector Location	**Wire Color**
Socket 1	
Socket 2	
Socket 3	
Socket 4	
Socket 5	
Socket 6	
Socket 7	
Socket 8	

2014 SKILLSUSA CIRCUIT BUILDING JUDGE'S SCORE SHEET

Contestant Number _____ **Total Points** _____ **Judge's Initials** _____

Start Time _____ **End Time** _____ Write points in right column (red lines).

Note: For all questions about wire colors, spell out the color name(s), DO NOT use color codes. Zero points if contestant uses wire color codes.

1. What is the number of the 8-place connector shown in Figure 5. ___**24A**_ 1 Pt. _____
2. Identify the color(s) of one of the wires connected to the horn switch.

_____**Black or Yellow with Black**_ 1 Pt. _____

Identify the wire colors for each of the pins in this same 8-place connector. 1 Pt. each.

3. Pin 1 _**Orange with White**_ _____
4. Pin 2 _**Yellow**__ _____
5. Pin 3 _**Blue**___ _____
6. Pin 4 _**White**__ _____
7. Pin 5 _**White with Violet**__ _____
8. Pin 6 _**Yellow with Black**__ _____
9. Pin 7 _**Black with Red**___ _____
10. Pin 8 _**Black**___ _____

11. See Figure 6. What is the color(s) of the wire that leads from ground to connector 24B?
____**Black**_____ 1 Pt. _____
12. What is the color(s) of the wire that supplies battery power to connector 24B? ____
____**Orange with White** ___ 2 pts. _____
13. Which fuse is in line with the wire that supplies battery power to connector 24B?
__**Accessory** or **ACCY**__ 2 pts. _____
14. Indicate the wires you will need to complete the horn circuit by writing the wire colors opposite the correct position in the 8-place connector [24B]. Example: If you only need five wires to complete the horn circuit, then colors for three sockets will be blank.

Ten (5) points if they answer both sockets 1 & 6 on the next page correctly. Socket 8 can be Black or blank, but not any other color.

Subtract 1 point for each wrong or extra answer (-5 pts. Max.) 5 pts. _____

Total possible points this page: 20 **Points Earned this page:** _____

Connector Location	Wire Color	Judge's Notes
Socket 1	**Orange with White**	**Must answer sockets 1 and 6 correctly to get 10 points.**
Socket 2		
Socket 3		
Socket 4		
Socket 5		
Socket 6	**Yellow with Black**	**Must answer sockets 1 and 6 correctly to get 10 points.**
Socket 7		
Socket 8	**Black (or blank)**	**This answer can be Black or left blank**

TASKS (observe the contestant's performance):

Building the Circuit			
Reference Number	**Judge's Notes**	**Possible Points**	**Points Earned**
Step 1	Separate Molex connector halves	3	
Step 3	Unlocks secondary lock on socket housing without damaging connector	5	
Step 4	Unlocks secondary lock on pin housing without damaging connector	5	
Step 11	Installs pins in housing. 2 points for each correct wire. **Minus 5 points** if they try using socket housing. **Minus 5 points** if they use any tools.	16 (-5) (-5)	
Step 12	Move secondary lock of pin housing to locked position	2	
Step 17	Install O/W and Y/BK wires in socket housing. Black wire optional. **Minus 2 points** for not locking secondary lock.	5 (-2)	
Step 18	Connect 2 wires to horn. Black wire can come from Horn Switch or direct from Battery. (See photos – Option 1 & 2)	2 or 3	
Step 19	Connect wires to battery in proper sequence **(pos. first)**. 3 points for correct wires, 3 points for correct sequence.	6	
Step 20	Assemble connector, sound horn	15	
	Total points this table	**60**	

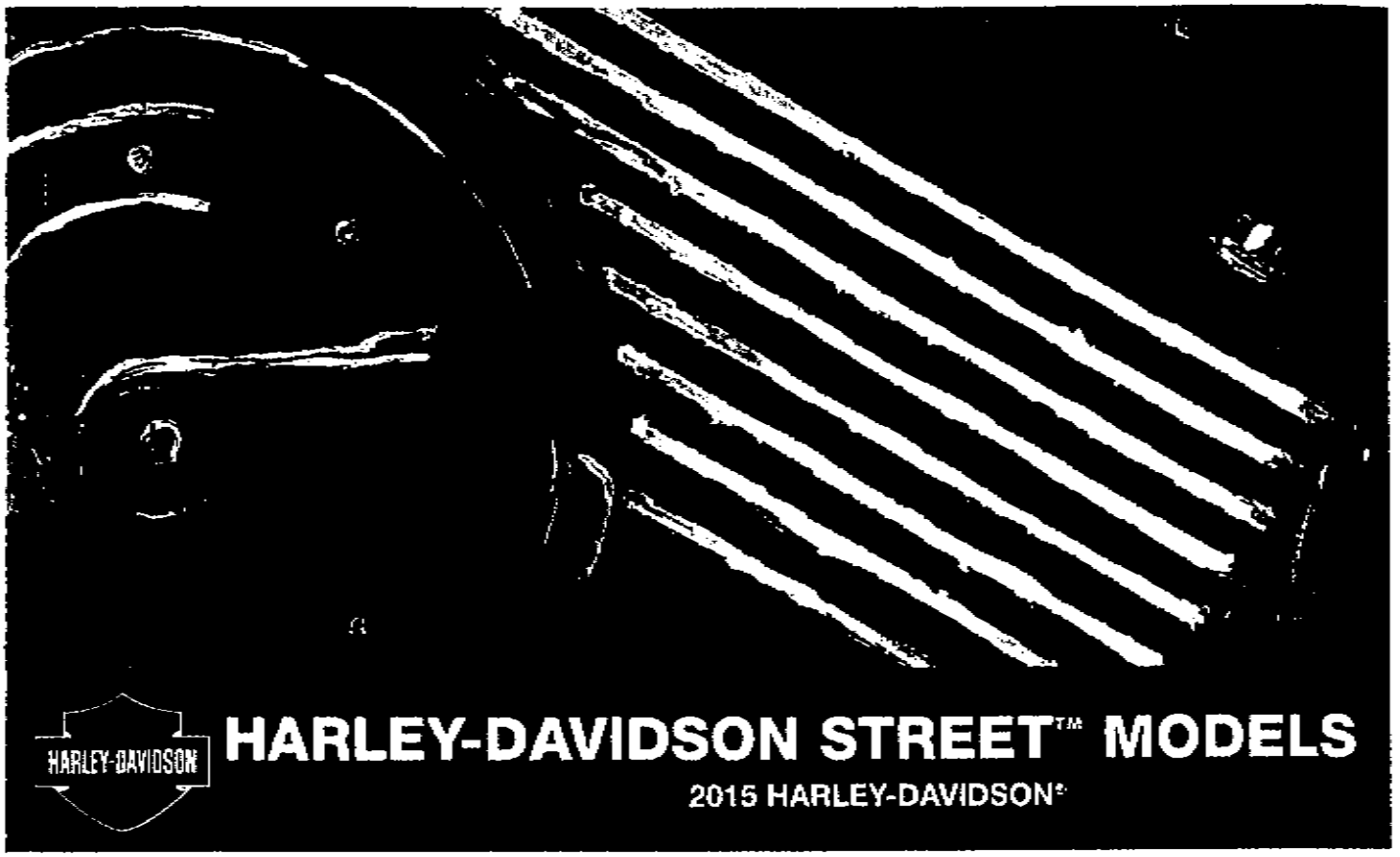
TASKS (Cont'd) (observe the contestant's performance):

Disassembling the Circuit			
Reference Number	**Judge's Notes**	**Possible Points**	**Points Earned**
	NOTE: Zero points for this table if steps/instructions are not followed.		
Step 1	Remove wires from battery in correct sequence. **(neg. first)**	**3**	
Step 3	Move secondary lock of socket housing to unlocked position.	**2**	
Step 5	Remove 3 wires from socket housing. **Minus 5 points** if they bend or break the tool.	**5 (-5)**	
Step 8	Remove all 8 wires from pin housing. **Minus 5 points** if they bend or break the tool.	**5 (-5)**	
Step 9	Restore the workstation per photograph.	**5**	
	Total points this table	**20**	
	Total points previous table (page 2)	**60**	
	Total points page 1	**20**	

Grand Total Points (100 points possible) **TOTAL** _____

Put total points on top of page 1.

Staple This Judge's Score Sheet to top of Contestant's Worksheet and turn them in.



Clutch Cable Replacement Procedures

Some steps have be performed in advance. These steps are identified by a line through the text or the notation; THIS HAS BEEN DONE

REMOVE, INSTALL AND ADJUST STEPS WILL BE PERFORMED. ONLY THE SPEED SCREEN INSTALL WILL BE PERFORMED IN THE COMPLETE STEP.

TORQUE ON ALL FASTENERS WILL BE HAND TIGHT

PREPARE

1. ~~If replacing clutch cable, remove fuel tank. See 0.9 FUEL TANK.~~
2. ~~Remove main fuse. See 8.4 POWER DISCONNECT.~~
3. Remove speed screen. See 3.25 SPEED SCREEN.

REMOVE

Clutch Cable: Lower End

1. See Figure 3-52. Remove clutch cable.
   a. Discard cable strap (6).
   b. Loosen lower jamnut (4).
   c. Remove end of clutch cable (1) from clutch lever assembly (5).
   d. Remove lower jamnut from clutch cable.
   e. Remove clutch cable, upper jamnut and clutch cable adjuster (2) from clutch cable bracket (3).

Clutch Cable: Upper End

1. See Figure 3-53. Remove clutch cable.
   a. Loosen clutch cable adjuster (2).
   b. Align slots in clutch cable adjuster, jamnut (3) and clutch hand lever assembly (4).
   c. Remove clutch cable (1) from clutch cable adjuster, jamnut and clutch hand lever assembly.
   d. Remove end of clutch cable from clutch hand lever

Pull cable through bracket at speed screen and then through cable strap (DO NOT CUT). Judge will verify removal before installation.

INSTALL

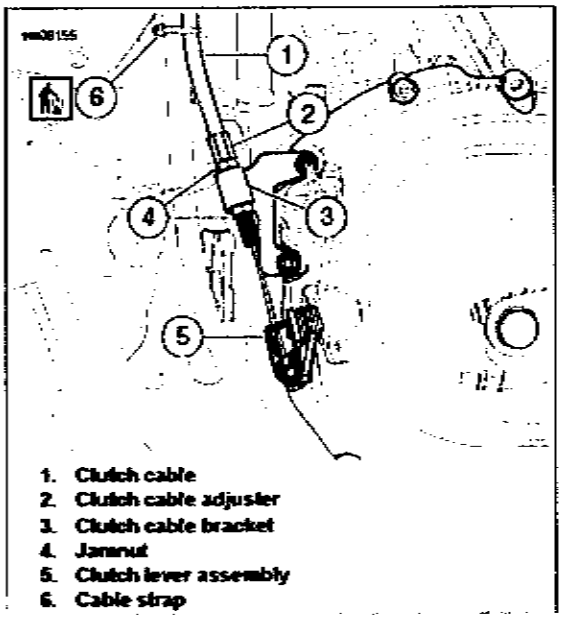
1. See Figure 3-55. Route clutch cable.
   a. Insert clutch cable (1) behind speed screen.

Clutch Cable: Upper End

1. See Figure 3-53. Install clutch cable.
   a. Install end of clutch cable (1) into clutch hand lever (5).
   b. Verify slots in clutch cable adjuster (2), jamnut (3) and clutch hand lever assembly (4) are aligned.
   c. Install clutch cable through clutch hand lever assembly, clutch cable adjuster and jamnut.

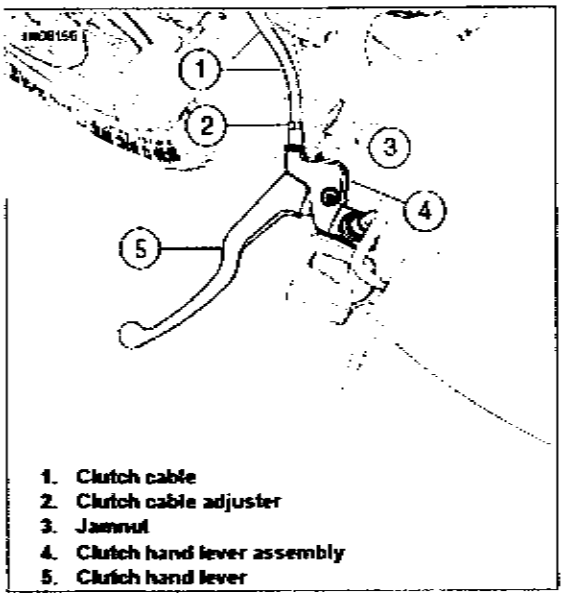
Clutch Cable: Lower End

1. See Figure 3-52. Install clutch cable.
   a. Install clutch cable (1), adjuster (2) and upper jamnut (4) through clutch cable bracket (3).
   b. Install lower jamnut on clutch cable.
   c. Install end of clutch cable into clutch lever assembly
   d. Install new cable strap (6) See Figure 3-52.
2. Adjust clutch. See 2.11 CHECK AND ADJUST CLUTCH.



1. Clutch cable
2. Clutch cable adjuster
3. Clutch cable bracket
4. Jamnut
5. Clutch lever assembly
6. Cable strap

Figure 3-52. Clutch Cable: Lower End



1. Clutch cable
2. Clutch cable adjuster
3. Jamnut
4. Clutch hand lever assembly
5. Clutch hand lever

Figure 3-53. Clutch Cable: Upper End

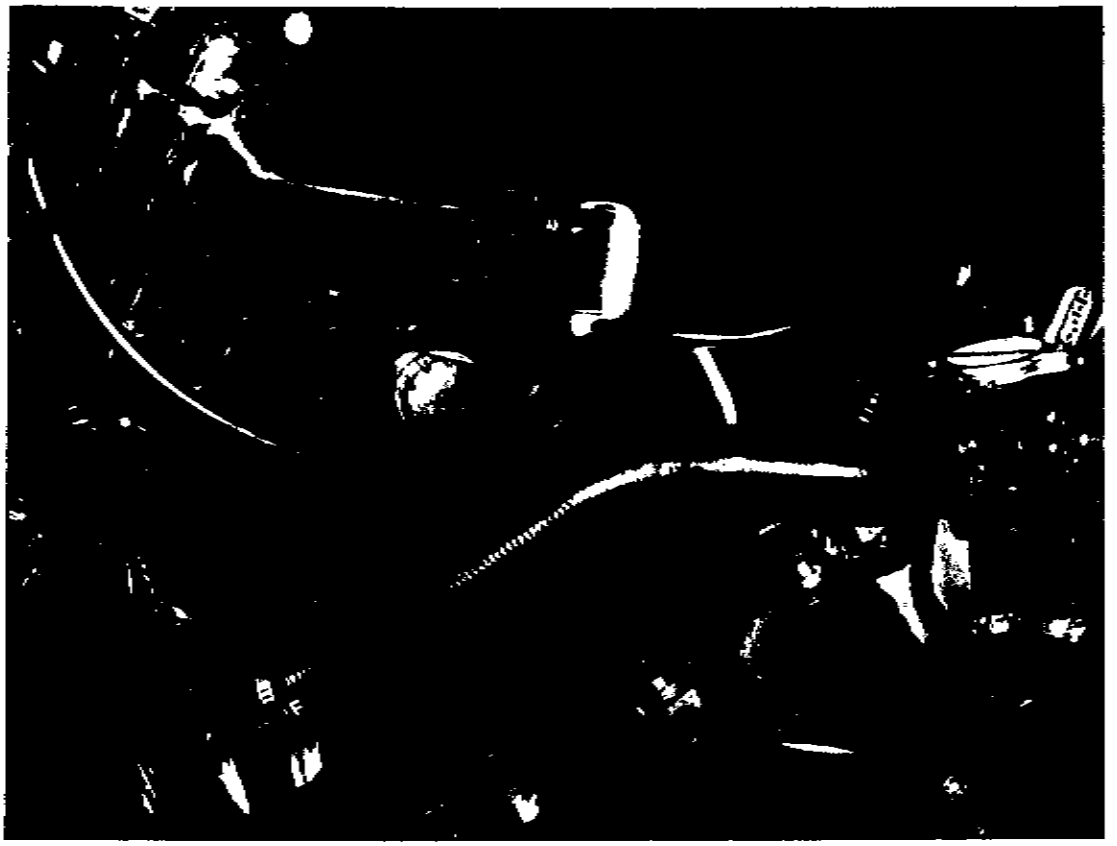


Figure 3-55. Clutch Cable Routing

CLEAN AND INSPECT

1. Inspect clutch lever and cable for wear or damage. Replace or repair as necessary.
2. Inspect clutch cable.
   a. Verify smooth operation. Replace as necessary.

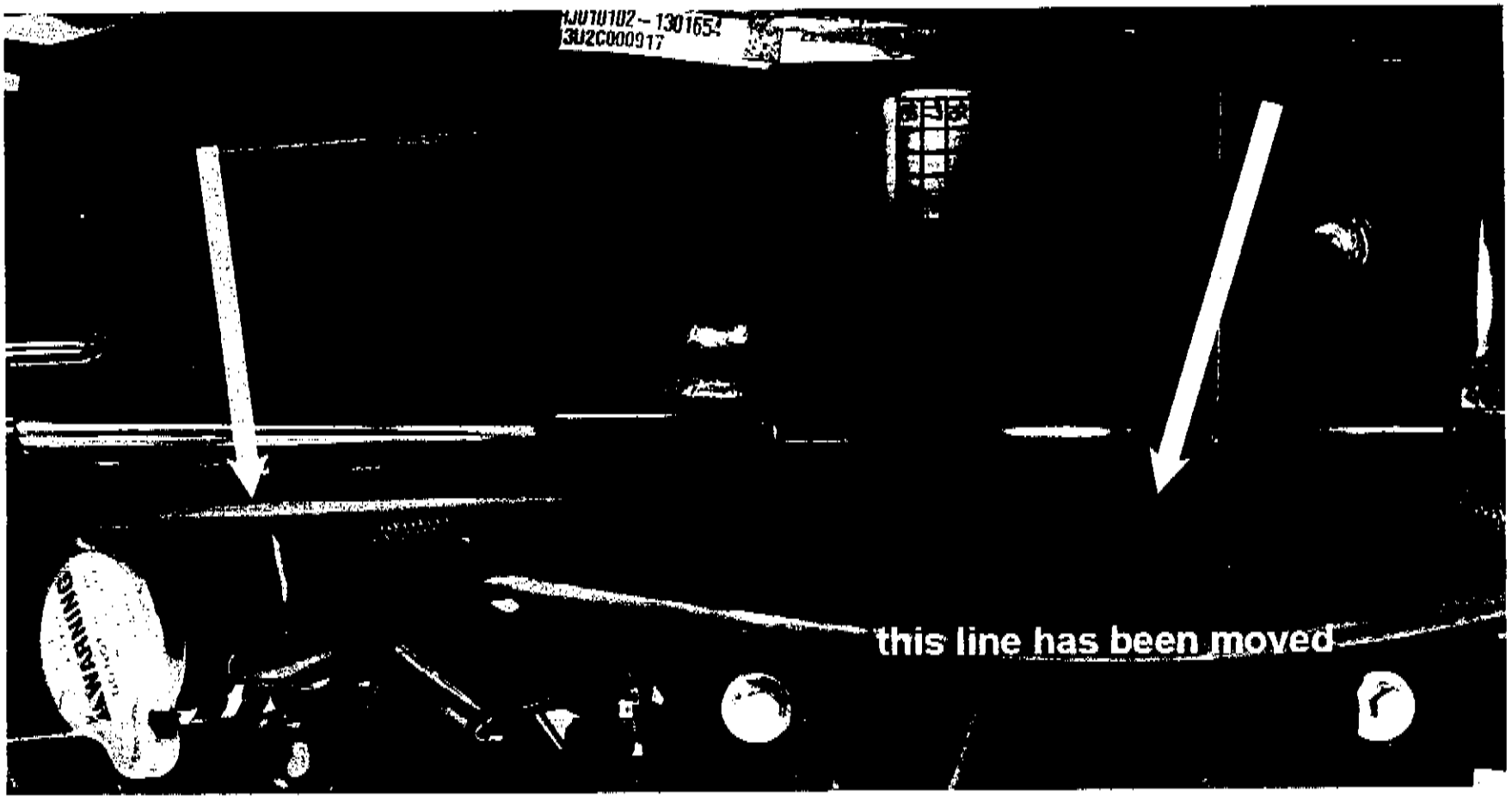
NOTICE

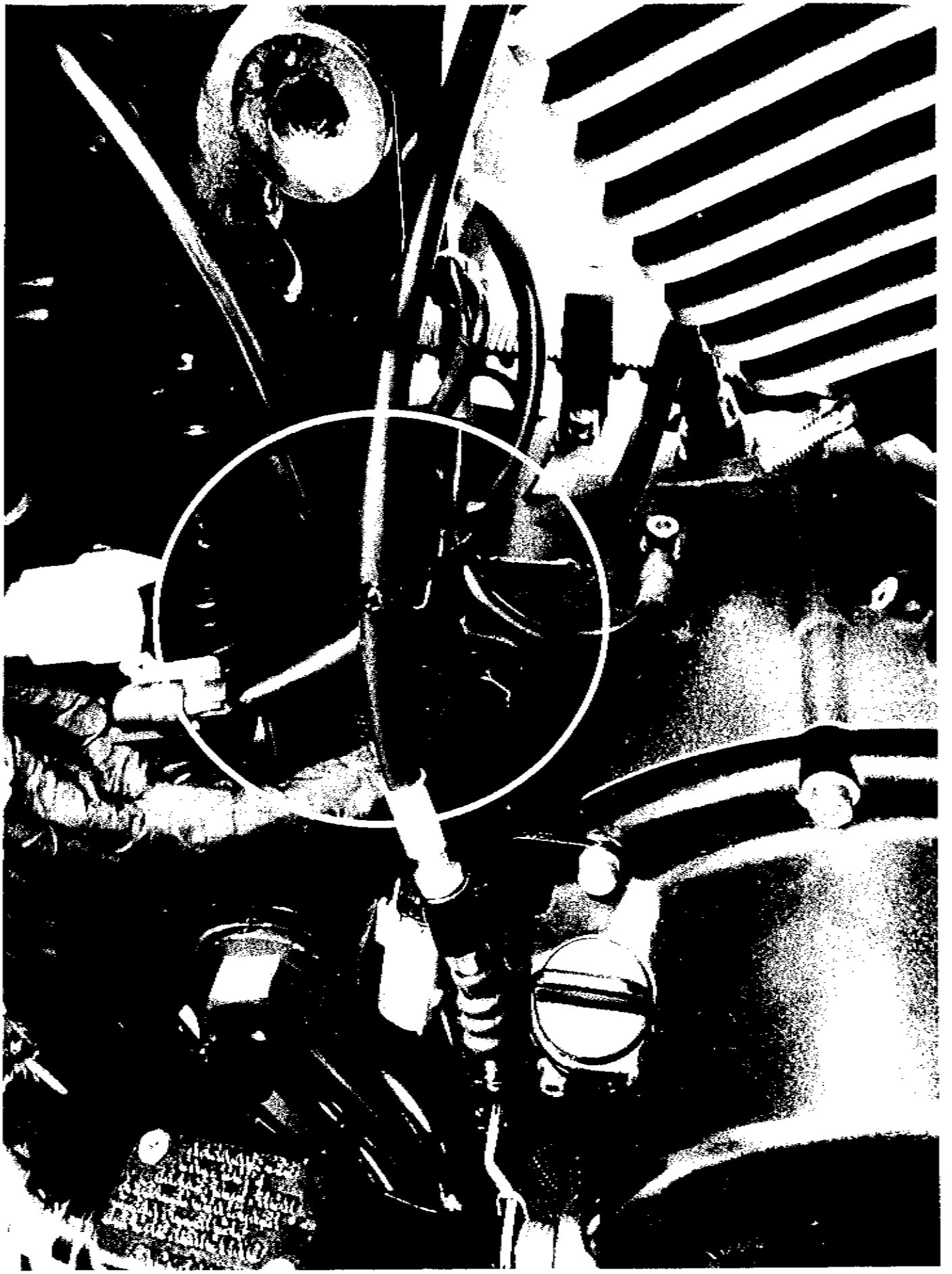
The clutch control cable must be oiled and adjusted periodically to compensate for lining wear. See MAINTENANCE SCHEDULING in this manual. Failure to oil and adjust the clutch control cable can result in equipment damage. (00203b)

~~3. Lubricate clutch hand lever and cable with HARLEY LUBE.~~

COMPLETE

1. Performed as part of Valve Lash
~~2. Install left hand grip. See 3.28 HAND GRIPS.~~
~~3. Install left handlebar switch housing. See 8.12 LEFT HANDLEBAR SWITCH HOUSING.~~
4. Install speed screen. See 3.25 SPEED SCREEN.
5. Performed as part of Valve Lash.


this line has been moved



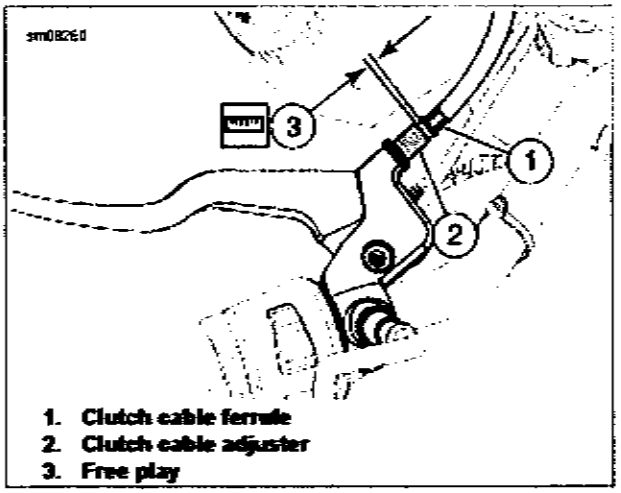
CHECK AND ADJUST

Check Free Play

1. See Figure 2-17. Measure clutch lever free play.
   a. Pull clutch cable ferrule (1) away from clutch cable adjuster (2).
   b. Measure free play (3).

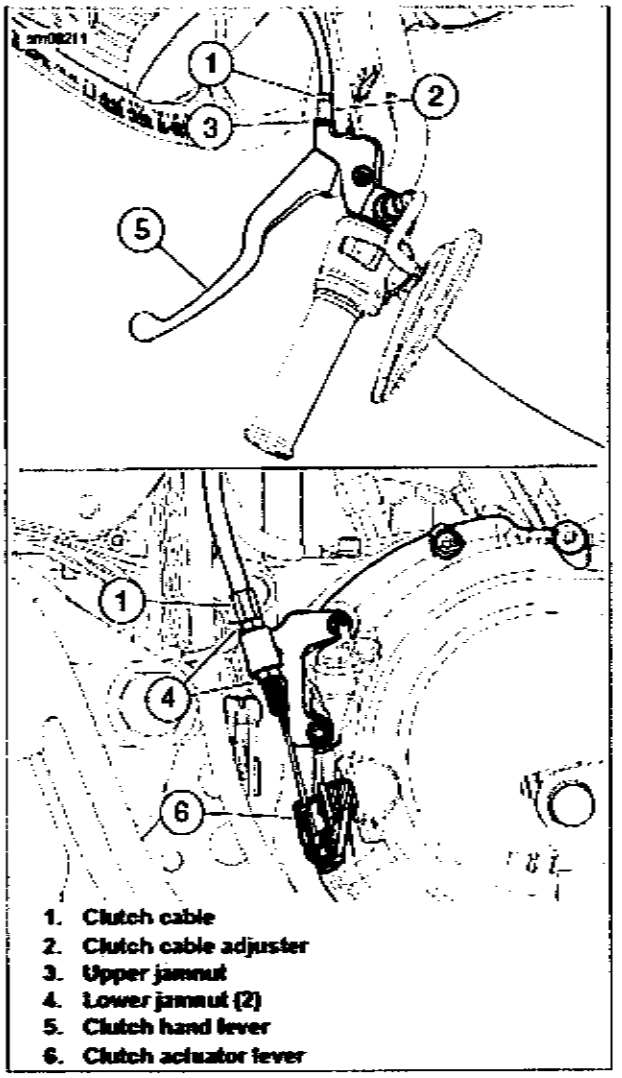
Adjust Cable

1. See Figure 2-18. Adjust clutch cable at clutch actuator lever.
   a. Verify that the clutch actuator lever (6) is fully disengaged.
   b. Loosen lower jamnuts (4).
   c. Adjust clutch cable (1) to remove slack.
   d. Tighten lower jamnuts (4).
2. See Figure 2-18. Adjust clutch cable at clutch hand control.
   a. Verify that the clutch actuator lever (6) is fully disengaged.
   b. Loosen upper jamnut (3).
   c. Turn clutch cable adjuster (2) to adjust to specification. Refer to Table 2-7.
   d. Tighten upper jamnut (3).



1. Clutch cable ferrule
2. Clutch cable adjuster
3. Free play

Figure 2-17. Clutch Lever Free Play



1. Clutch cable
2. Clutch cable adjuster
3. Upper jamnut
4. Lower jamnut (2)
5. Clutch hand lever
6. Clutch actuator lever

Figure 2-18. Clutch Cable Adjustment

Table 2-7. Clutch Lever Free Play Specifications

MEASUREMENT	mm	in
Clutch lever free play	2.0-3.0	0.079-0.118

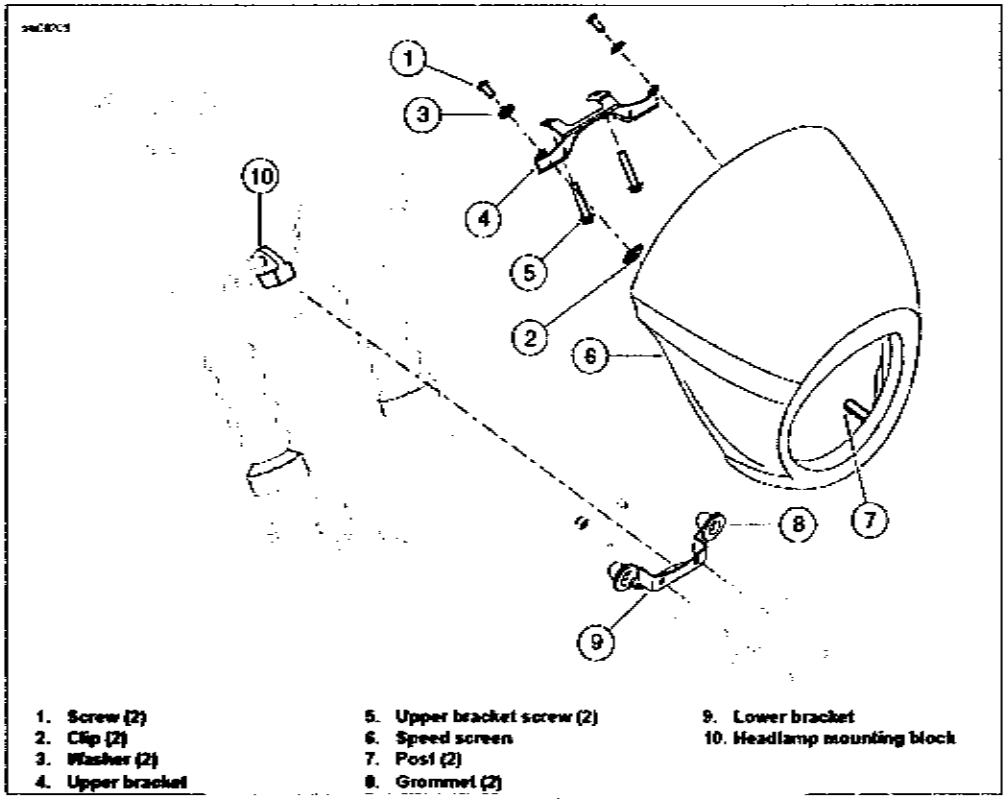
REMOVE

1. See Figure 3-60. Remove speed screen.
   a. Remove screws (1) and washers (3).
   b. Pull speed screen (6) away from upper bracket (4).
   c. Pull speed screen away from lower bracket (9) to remove posts (7) from grommets (8).
2. Remove upper bracket.
   a. Remove upper bracket screws (5).
   b. Remove upper bracket (4).
3. ~~Remove lower bracket.~~ DO NOT REMOVE
   ~~a. Remove headlamp mounting block (10). See 8.18 HEADLAMP.~~
   ~~b. Remove lower bracket (9).~~

INSTALL

FASTENER	TORQUE VALUE	
Upper speed screen bracket screw	[redacted]	[redacted]
Speed screen screw	[redacted]	[redacted]

1. ~~Figure 3-60. Install lower bracket.~~
   ~~a. Position lower bracket (9).~~
   ~~b. Install headlamp mounting block (10). See 8.18 HEADLAMP.~~
2. Install upper bracket.
   a. Position upper bracket (4).
   b. Install upper bracket screws. Tighten to [redacted].
3. Install speed screen.
   a. Align posts (7) with grommets (8).
   b. Install speed screen (6) onto lower bracket (9).
   c. Align speed screen to upper bracket (4).
   d. Install washers (3) and screws (1) to clips (2). Tighten to [redacted].



1. Screw (2)
2. Clip (2)
3. Washer (2)
4. Upper bracket
5. Upper bracket screw (2)
6. Speed screen
7. Post (2)
8. Grommet (2)
9. Lower bracket
10. Headlamp mounting block

Figure 3-60. Speed Screen

2014 SkillsUSA Crimping, Wiring, and Soldering
(100 points)

5

- **Read the task procedures on the laminated sheets and work through each task step by step.**
- **Perform tasks recording answers where needed on the answer sheet on the following page.**

Make sure contestant number is listed on the contestant sheet.

30 minutes will be given to complete this 100 point work station.

2014 SkillsUSA Crimping, Wiring and Soldering

Contestant Number _____ **Judges Initials** _____ **Start Time** _____ **End Time** _____

CONNECTOR 204A Unlock secondary lock, wire stripped 1/4"- crimp side and 1/8" - solder side (0,3)_____

72188-07BK CONNECTOR (204A)	PIN or SOCKET 1pts.	WIRE COLOR 2pts.		POINTS
Correct Crimp and Install of wire in terminal 2	PIN crimped correctly	GY/W	(0,1,2,3)	_____
Correct Crimp and Install of wire in terminal 3	PIN crimped correctly	R/GY	(0,1,2,3)	_____
Correct Crimp and Install of wire in terminal 4	PIN crimped correctly	BK/W	(0,1,2,3)	_____
• **Lock the secondary lock**			(0,3)	_____

Both connectors have all wires installed, good crimps, and wires stripped 1/8th ready for soldering

CONNECTOR 204B Unlock secondary lock, wire stripped 1/4"- crimp side and 1/8" - solder side (0,3)_____

72414-07BK CONNECTOR (204B)	PIN or SOCKET 1pts.	WIRE COLOR 2pts.		POINTS
Correct Crimp and Install of wire in terminal 2	SOCKET crimped correctly	V	(0,1,2,3)	_____
Correct Crimp and Install of wire in terminal 3	SOCKET crimped correctly	R	(0,1,2,3)	_____
Correct Crimp and Install of wire in terminal 4	SOCKET crimped correctly	BK	(0,1,2,3)	_____
• **Lock the secondary lock and connect 204A to 204B**			(0,3)	_____

Both connectors have all wires installed, good crimps, and wires stripped 1/8th ready for soldering

30 pts possible up to this point _____

SOLDER JOINTS ***4pts for each criteria***	**#1,**	**#2,**	**#3,**	**POINTS**
Thickness (top to bottom), (Less than insulation?),	____,	____,	____,	_____
Solder 'run' - solder joint length, (5/16" or Less length?),	____,	____,	____,	_____
Shine, (good shiny color?),	____,	____,	____,	_____
Width of visible solder joint, (3/16" or Less?),	____,	____,	____,	_____
Sufficient amount of solder in joint, (no strands showing?),	____,	____,	____,	_____

60 pts possible-soldering section _____

(All 3 soldered joints meeting all 5 criteria = 60pts.)

Remove all wires from both connector housings using screwdriver, plyer and Molex tool correctly. (0,2,4) _____

Cut off all six of the Molex pin/socket terminals for the next contestant. (0,2,4) _____

Present the three best solder joints to the judge and clean work station. (0,2) _____

10 pts possible-soldering section _____

(100 points possible) **TOTAL** _____

2014 SKILLS USA CRIMPING, WIRING AND SOLDERING

Contestant Number _____ **Judges Initials** _____

CONNECTOR 204A

- **Unlock the secondary lock and strip 1/4" from the crimp side and 1/8" from the solder side of the wire**

72188-07BK CONNECTOR (204A)	LIST PIN or SOCKET	LIST WIRE COLOR
Correct Crimp and Install of wire in terminal 2	_____	_____
Correct Crimp and Install of wire in terminal 3	_____	_____
Correct Crimp and Install of wire in terminal 4	_____	_____

- **Lock the secondary lock**

CONNECTOR 204B

- **Unlock the secondary lock and strip 1/4" from the crimp side and 1/8" from the solder side of the wire**

72414-07BK CONNECTOR (204B)	LIST PIN or SOCKET	LIST WIRE COLOR
Correct Crimp and Install of wire in terminal 2	_____	_____
Correct Crimp and Install of wire in terminal 3	_____	_____
Correct Crimp and Install of wire in terminal 4	_____	_____

- **Lock the secondary lock and connect 204A to 204B**
- Solder wire #2 from connector 204A to wire #2 from connector 204B, (3 to 3, 4 to 4,etc.)
- If time remains, poor solder joints can be cut away and soldered again before presenting to the judge.
- Solder joints need to be to the HDU standard.
- **Remove all wires from both connector housings using screwdriver, plyer and Molex tool correctly.**
- **Cut off all six of the Molex pin/socket terminals for the next contestant.**
- **Present the three best solder joints to the judge and clean work station.**

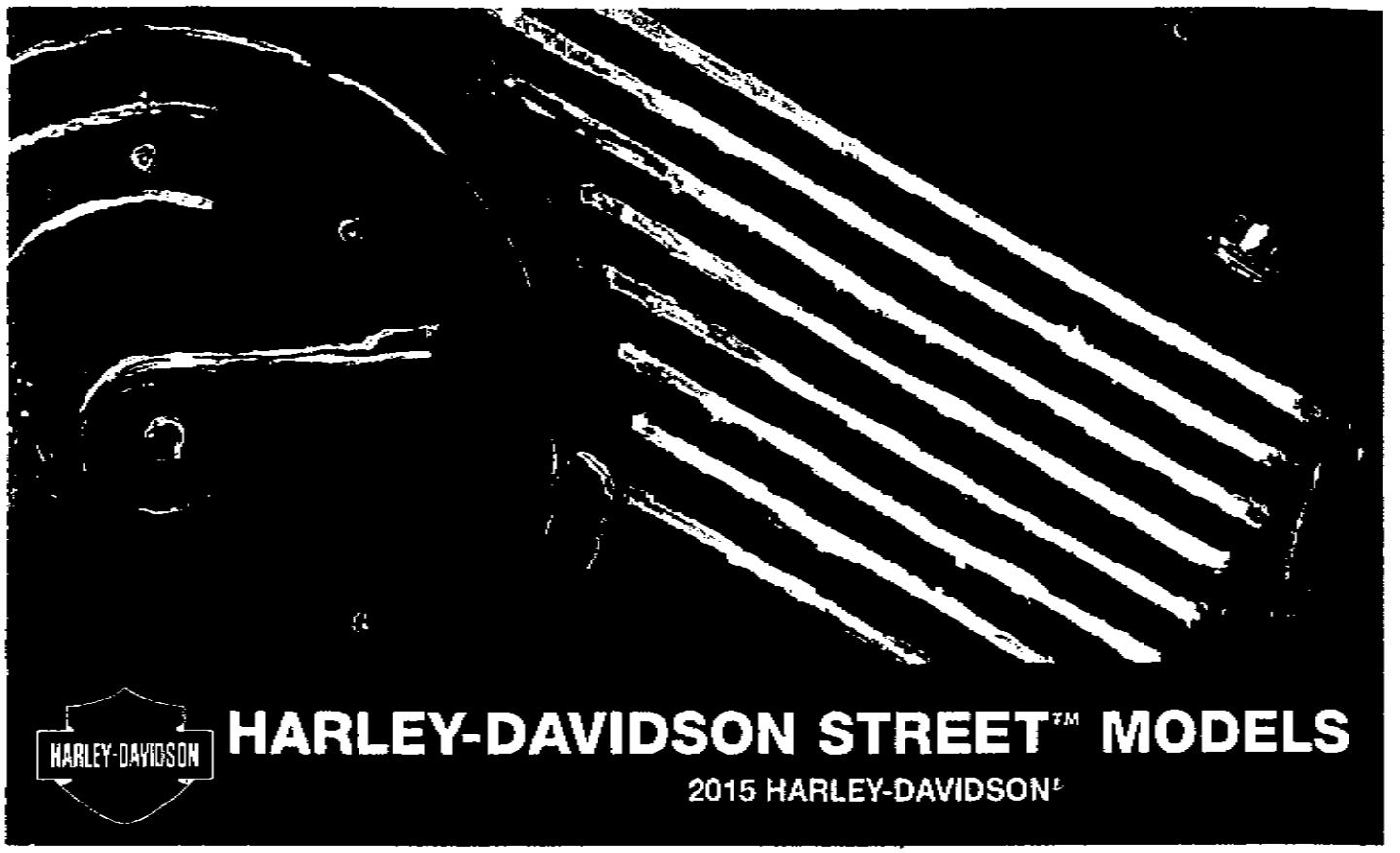
(100 points possible) **TOTAL** _____

2014 SKILLSUSA CRIMPING, WIRING AND SOLDERING
(100 points)

- **Read the task procedures on the laminated sheets and work through each task step by step.**
- **Perform tasks recording answers where needed on the answer sheet on the following page.**

Make sure contestant number is listed on the contestant sheet.

30 minutes will be given to complete this 100 point work station.



Fuel Tank Procedures

Some steps have be performed in advance. These steps are identified by a line through the text and the notation; THIS HAS BEEN DONE

REMOVE PRIOR TO CLUTCH AND VALVE LASH PROCEDURES, INSTALL AS PART OF VALVE LASH PROCEDURE.

TORQUE ON ALL FASTENERS WILL BE HAND TIGHT

PREPARE

⚠WARNING

Gasoline is extremely flammable and highly explosive. Keep gasoline away from ignition sources which could result in death or serious injury. See the Safety chapter. (00635c)

⚠WARNING

To prevent spray of fuel, purge system of high-pressure fuel before supply line is disconnected. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00275a)

~~1. Purge fuel system.~~ THIS HAS BEEN DONE

2. Remove main fuse. See 8.4 POWER DISCONNECT.

~~3. Drain fuel tank.~~ THIS HAS BEEN DONE

4. Remove seat. See 3.36 SEAT.

5. Lift rear of fuel tank. See 6.4 LIFT REAR OF FUEL TANK.

6. Remove front belt guard. See 3.21 BELT GUARD

7. See Figure 6-6. Remove fuel tank ground wire.
   a. Remove nut (2).
   b. Remove fuel tank ground wire (3) from ground stud (1) and backbone caddy (4).

8. See Figure 6-7. Remove lower fuel line.
   a. Push up on sleeve of quick disconnect fitting (1).
   b. Remove fuel line (2) from quick disconnect fitting.

9. Disconnect fuel pump connector. See 6.8 FUEL PUMP.
   a. Lift connector latch (1) See Figure 6-8.
   b. Pull connector (2) out

10. See Figure 6-4. Remove vent line (2) from fuel tank.

REMOVE

1. See Figure 6-5. Remove fuel tank.
   a. Slide fuel tank back and away from front mounts (2).
   b. Remove fuel tank.

INSTALL Performed as part of Valve Lash

1. See Figure 6-6. Install fuel tank ground wire.
   a. Position ground wire (3) in backbone caddy (4) and along frame.
   b. Install ground wire over ground stud (1).
   c. Install nut (2). Tighten to [redacted].

2. See Figure 6-5. Install fuel tank brackets (1) on front mounts (2).

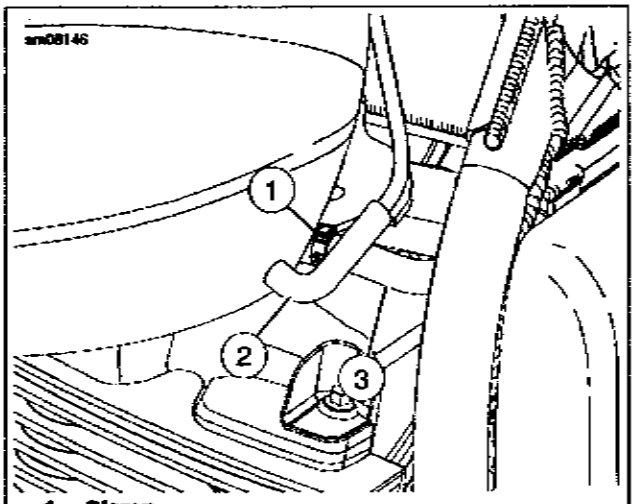
3. Connect fuel pump connector. See Figure 6-8.

INSTALL Performed as part of Valve Lash

4. See Figure 6-7. Install lower fuel line.
   a. Connect fuel line (2) to fuel rail.
   b. Engage lock (3) to secure fuel line to fuel rail.
   c. Press up on sleeve of quick disconnect fitting (1).
   d. Connect fuel line to quick disconnect fitting.
   e. Release sleeve of quick disconnect fitting to secure fuel line.

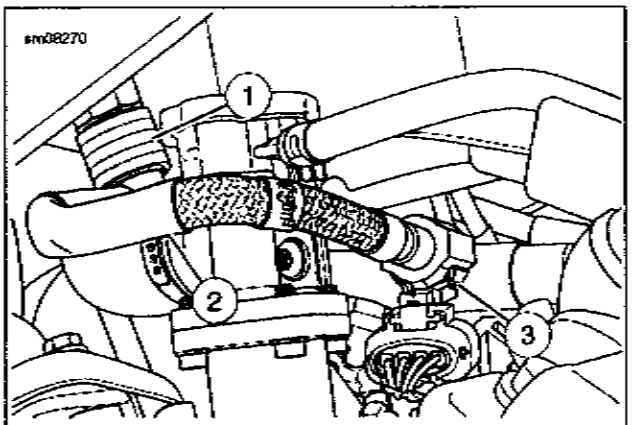
5. Install fuel pump fuse. See 8.4 POWER DISCONNECT.

6. Install vent line (2) See Figure 6-4.



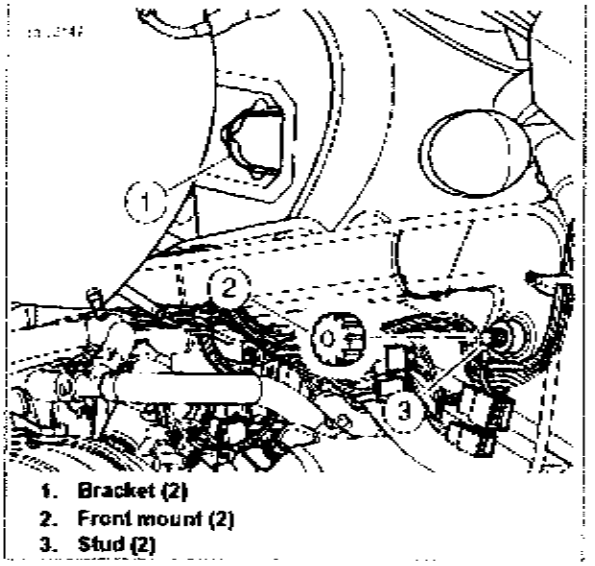
1. Clamp
2. Vent line
3. Cross-over tube

Figure 6-4. Cross-over Tube



1. Quick disconnect fitting
2. Fuel line
3. Lock

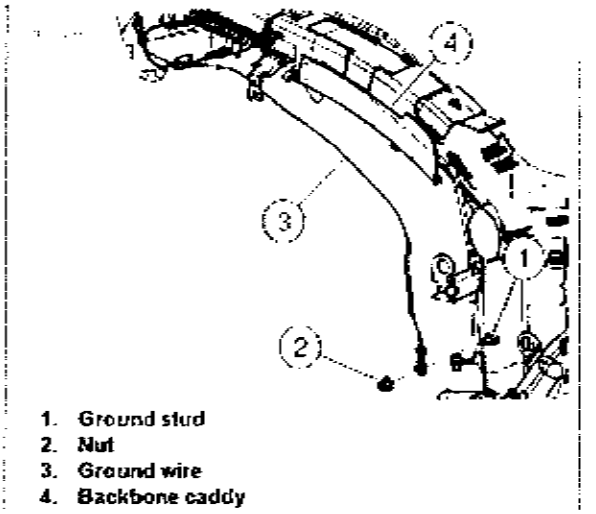
Figure 6-7. Lower Fuel Line



1. Bracket (2)
2. Front mount (2)
3. Stud (2)

Figure 6-5. Front Mount

Figure 6-8. Fuel Pump Assembly

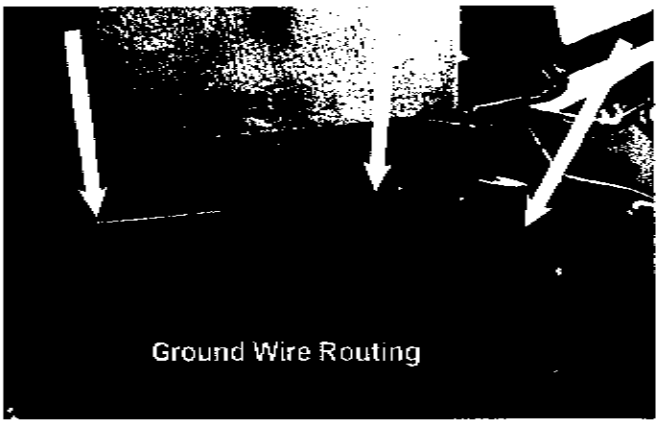


1. Ground stud
2. Nut
3. Ground wire
4. Backbone caddy

Figure 6-6. Fuel Tank Ground Wire

COMPLETE Performed as part of Valve Lash

1. Install fuel tank. See 6.4 LIFT REAR OF FUEL TANK.
2. Install seat. See 3.36 SEAT.
3. Install main fuse. See 8.4 POWER DISCONNECT.
4. Install front belt guard. See 3.21 BELT GUARDS.



PREPARE

1. Remove main fuse. See 8.4 POWER DISCONNECT.

REMOVE

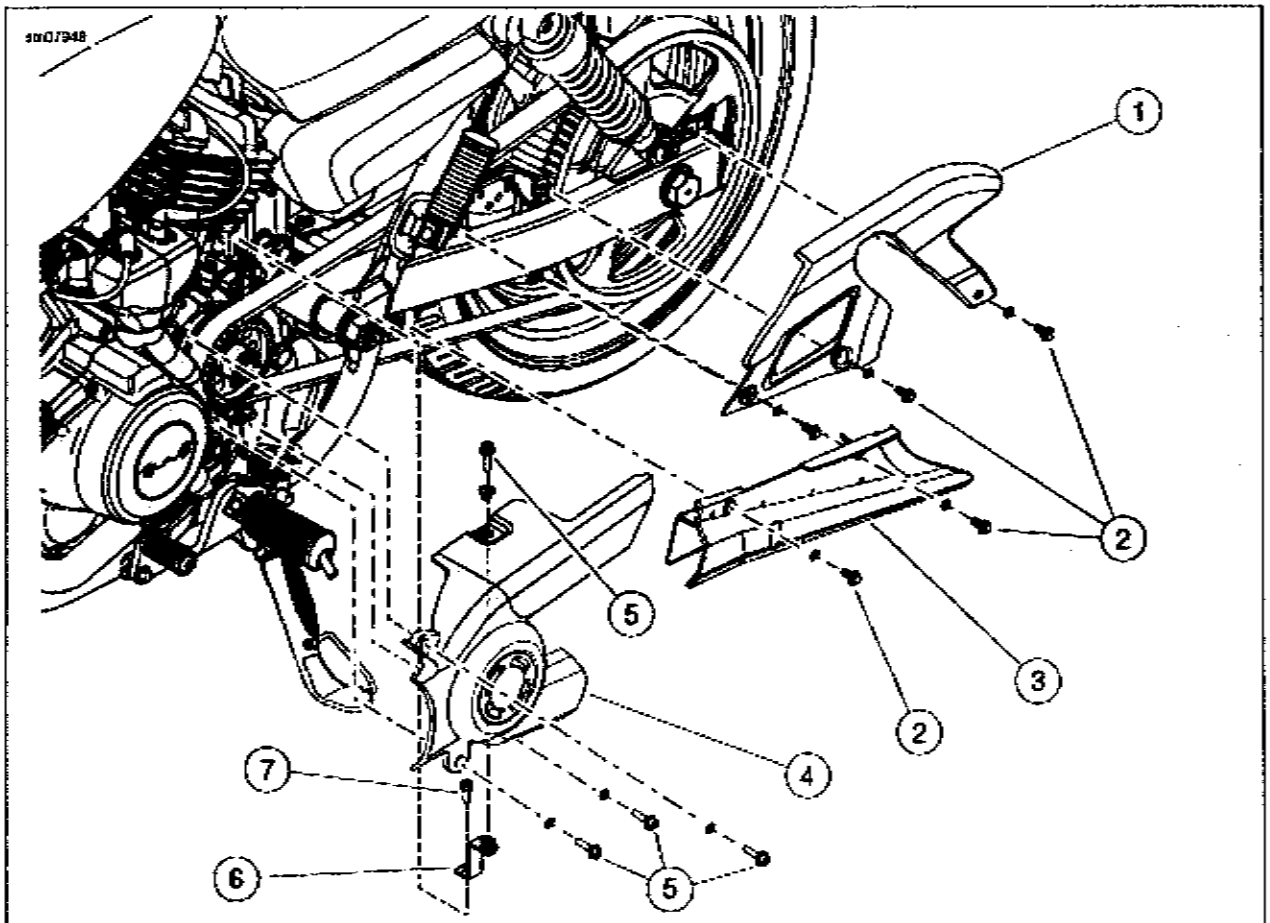
Front Belt Guard

1. See Figure 3-46. Remove front belt guard.
   a. Remove front belt guard screws (5).
   b. Remove front belt guard (4).
2. Remove screw (7) and bracket (6), if necessary.

INSTALL

Front Belt Guard

1. See Figure 3-46. Install bracket, if removed.
   a. Position bracket (6).
   b. Install bracket screw (7). Tighten to [redacted] ([redacted]).
2. Install front belt guard.
   a. Position front belt guard (4).
   b. Install screws (5). Tighten to [redacted] ([redacted]).



1. Upper rear belt guard
2. Rear belt guard screw (5)
3. Lower rear belt guard
4. Front belt guard
5. Front belt guard screw (4)
6. Bracket
7. Bracket screw

Figure 3-46. Belt Guards

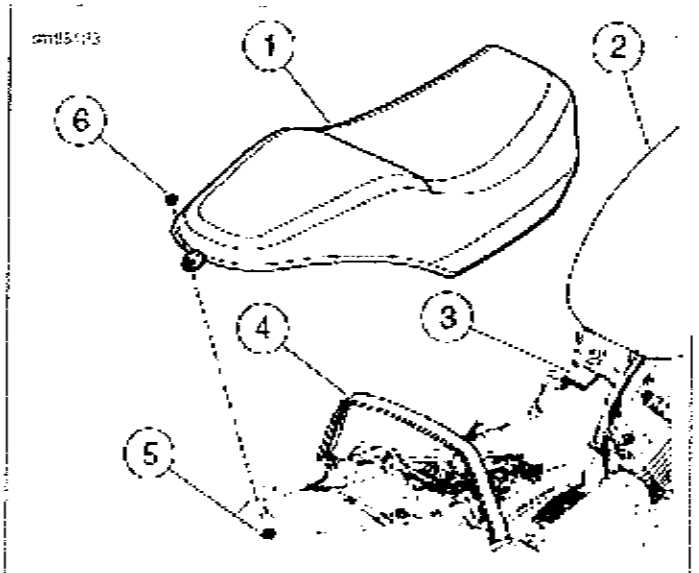
COMPLETE

1. Install main fuse. See 8.4 POWER DISCONNECT.

REMOVE

Seat

1. See Figure 3-73. Remove seat.
   a. Remove seat retention screw (6).
   b. Slide seat (1) back to release from seat retention tab (3).
   c. Slide seat forward and lift above the fuel tank (2).
   d. Pull seat forward through seat strap (4).



1. **Seat**
2. **Fuel tank**
3. **Seat retention tab**
4. **Seat strap**
5. **Seat retention nut**
6. **Seat retention screw**

Figure 3-73. Seat Removal

LIFT REAR OF FUEL TANK 6.4

PREPARE

1. Remove seat. See 3.36 SEAT.

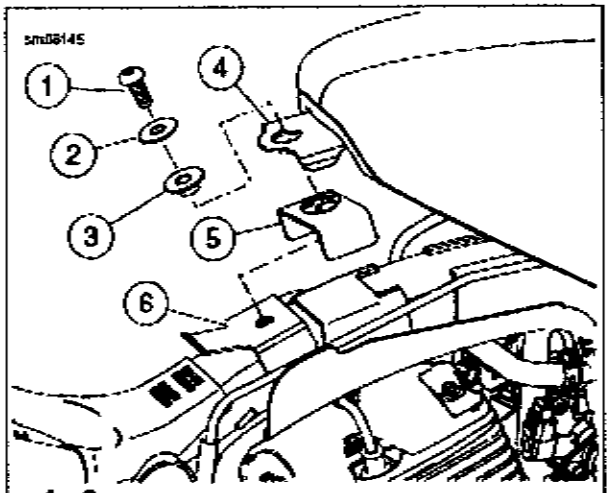
LIFT

1. See Figure 6-3. Lift rear of fuel tank.
   a. Remove screw (1), washer (2) and collar (3).
   b. Lift fuel tank bracket (4) and isolator (5). Support fuel tank as necessary.

SECURE

FASTENER	TORQUE VALUE	
Rear fuel tank screw	[redacted]	[redacted]

1. See Figure 6-3. Lower fuel tank.
   a. Insert neck of isolator (5) through hole in bracket (4).
   b. Lower fuel tank bracket (4) and isolator (5) onto tab (6).
   c. Install collar (3), washer (2) and screw (1). Tighten to [redacted] ([redacted]).



1. Screw
2. Washer
3. Collar
4. Bracket
5. Isolator
6. Tab

Figure 6-3. Rear Mount

COMPLETE

1. Install seat. See 3.36 SEAT.

MAIN FUSE

Remove main fuse when there is a possibility of injury caused by accidental vehicle start-up or electrical equipment damage.

Remove Main Fuse

1. Remove right side cover. See 3.17 SIDE COVERS.

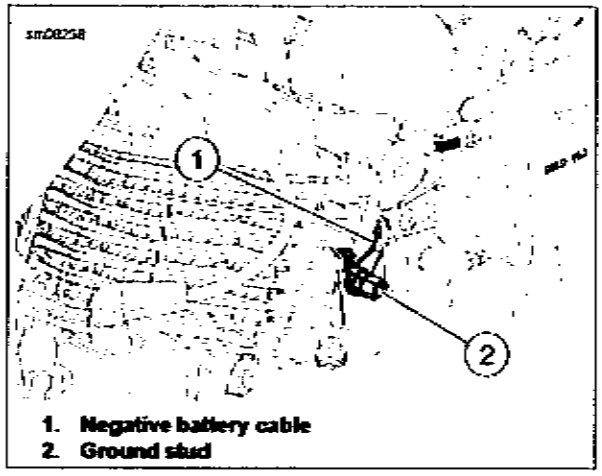
⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove main fuse before proceeding. (00251b)

2. See Figure 8-4. Remove main fuse.

Install Main Fuse

1. See Figure 8-4. Install main fuse.
2. Install right side cover. See 3.17 SIDE COVERS.



1. Negative battery cable
2. Ground stud

Figure 8-3. Battery Ground Cable

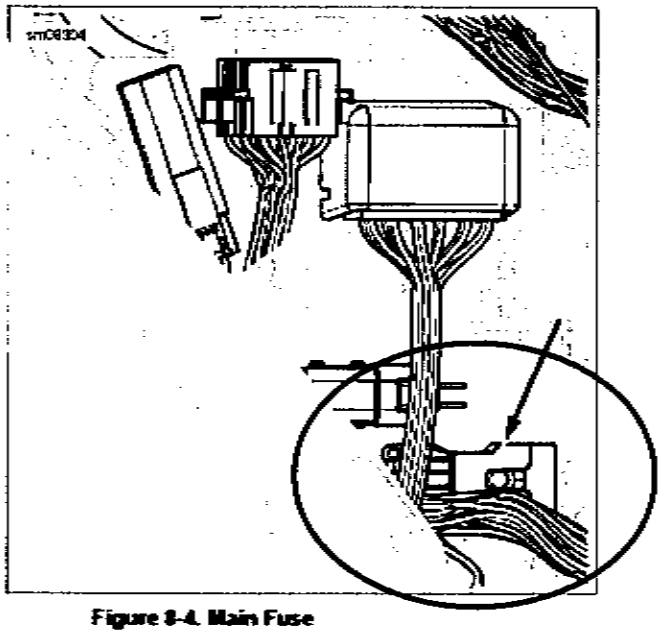
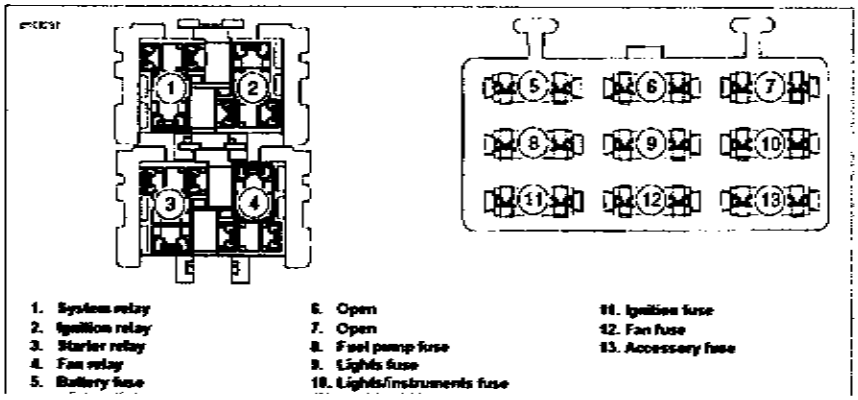


Figure 8-4. Main Fuse



1. System relay
2. Ignition relay
3. Starter relay
4. Fan relay
5. Battery fuse
6. Open
7. Open
8. Fuel pump fuse
9. Lights fuse
10. Lights/instruments fuse
11. Ignition fuse
12. Fan fuse
13. Accessory fuse

Figure 8-2. Fuses and Relays

2014 RADIO FUNCTIONALITY

Contestant Number _____ **Judges Initials** _____

3 Bars of volume is the limit for this work station.
When asked for a "path," questions assume the radio is on and can be listed as shown. IE: HOME/NAVIGATION/POI
The 6.5GT Boom! Box Radio features a touch screen. The owner's manual and USB drive are located in the Tour Pak.
LHCM=Left Hand Control Module, RHCM=Right Hand Control Module. Questions are weighted differently.

1. Turn ignition switch to Accessory. Summarize briefly in your own words what warning appears on the screen before you can see radio options? _____

2. Press the ACCEPT then the HOME face plate button, then press Tuner, then FM. (HOME/TUNER/FM). Using the left joystick tune Radio to any strong FM station and quickly press and release the Power button on the radio faceplate. What happens?_____

3. What is displayed on the radio when the (i) button is pressed on the RHCM?_____

4. Plug USB drive located in Tour Pak into Juke box (right of radio). What happens? _____

5. Press the HOME button. List the path to play a USB song. How many USB songs are there?_____, _____

6. When listening to a USB song, what happens when you quickly press the Power button? _____

7. What part of the hand controls Fast Forwards a song (not skips to the next song) from the USB Drive? Describe it's location and specific operation. _____

8. Pick one of the songs from the USB drive as your favorite and while its playing press and hold the Star button on the radio faceplate. Then when it appears on the screen – press that song with a quick press. What happens? _____Then navigate to Home/Tuner/FM and listen to the radio. Now press the Star button, what happens? _____

9. Using the joystick controls on each handlebar-tune into a strong FM radio station. Now press HOME/FAVORITES and replace an existing FM Favorite with your current FM station. Demonstrate this for the judge and describe process in detail. _____

10. List the path to adjust the bass and treble. _____

11. From this screen, briefly explain Speed Volume and describe the effect of having 4 bars compared to 1 bar. _____

12. List the path to adjust screen brightness? _____

13. Ask judge for the time and adjust clock. List the path used? _____

14. Using the joysticks on each hand control module list all the options available under Setup?_____

15. List the path and the radio software number?_____

16. Describe the difference between Global Presets and Presets. _____
_____
_____

17. List path to Prompt / Beep Volume adjustment. _____Adjust the Prompt and Beep Volume to the third bar of volume. *Have judge initial here* _____

18. From question 17 above, describe an example of when a rider would experience Prompt Volume?
_____

19. Change the language to English UK and list the path? _____

20. From questions 17-19 being complete and having the USB drive installed, plug a headset (located in the Tour Pak) into the front DIN/headset connector located on the console. Now press HOME/TUNER/FM and play any FM radio station. Press the Voice Recognition (VR) button on the LHCM and speak into the headset microphone **"Play Boston, Cool the Engines"**. *Have judge initial here when song plays*_____
NOTE: Leave USB drive installed.

21. Using the joysticks on each hand control module, change the language setting to American (US) English. Press HOME. Press the VR button and speak out the command **"A.M."** to change to an A.M. radio station.
Have judge initial here when audio changes to A.M. radio. _____

22. Press the VR button and speak out the command **"F.M."** to change to an F.M. radio station.
Have judge initial here when audio changes to F.M. radio. _____

23. List the path to turn on Intercom. _____

24. Adjust the intercom VOX (Voice Operated eXchange) level so you can comfortably talk. How many bars of VOX do you have the radio set to and what changes on the screen every time you speak into the microphone?
_____. _____

25. Go to HOME/COM/CB, turn on and tune channel to channel 15 using the left joystick. Then press the PTT (push to talk) button and say **"Breaker, Breaker 15, can I have a 10:36 and my 10:20 come back?!?"**
Write down what you hear. _____
_____

(100 points possible) TOTAL _____

2014 RADIO FUNCTIONALITY

Contestant Number _____ **Start Time** _____ **End Time** _____ **Judges Initials** _____

3 Bars of volume is the limit for this work station-watch students closely throughout each 30 min rotation. Radio to be Reset-must do in Service Mode. USB Drive and Headsets must be returned to Tour Pak Pouch. Intercom must be turned "OFF" with VOX being turned down to zero. Radio volume of Radio placed on 1 bar: CB turned placed on Channel 40 and Turned "OFF".

1. Turn ignition switch to Accessory. Summarize briefly in your own words what warning appears on the screen before you can see radio options? ***It's an HD warning to pay attention to the road and riding. FAILURE TO PAY ATTENTION WHILE RIDING COULD RESULT IN DEATH OR SERIOUS INJURY. ALWAYS CONCENTRATE ON RIDING BY KEEPING YOUR EYES AND MIND ON THE ROAD. READ YOUR OWNER'S MANUAL*** *(0,3)* ____

2. Press the ACCEPT then the HOME face plate button, then press Tuner, then FM. (HOME/TUNER/FM). Using the left joystick tune Radio to any strong FM station and quickly press and release the Power button on the radio faceplate. What happens? ***Radio Mutes*** *(0,1)* ____

3. What is displayed when the (i) button is pressed on the RHCM? ***Air Temp, Oil Pressure, EITMS Status*** *(0,1)* ____

4. Plug USB drive located in Tour Pak into Juke box (right of radio). What happens? ***Plays songs USB*** *(0,1)* ____

5. Press the HOME button. List the path to play a USB song. How many USB songs are there? ***HOME/MEDIA/ USB, 3*** *(0,3)* ____

6. When listening to a USB song, what happens when you quickly press the Power button? ***Music pauses*** *(0,1)* ____

7. What part of the hand controls Fast Forwards a song (not skips to the next song) from the USB Drive? Describe it's location and specific operation. ***LHCM Left joystick pressed and held to the right*** *(0,3)* ____

8. Pick one of the songs from the USB drive as your favorite and while its playing press and hold the Star button on the radio faceplate. Then when it appears on the screen – press that song with a quick press. What happens ***Radio Beeps*** Then navigate to Home/Tuner/FM and listen to the radio. Now press the Star button, what happens? ***Radio returns to that USB song that was selected.*** *(0,3)* ____

9. Using the joystick controls on each handlebar-tune into a strong FM radio station. Now press HOME/FAVORITES and replace an existing FM Favorite with your current FM station. Demonstrate this for the judge and describe process in detail. ***Press and hold the FM Favorite that is to be replaced until the current FM station appears on the screen. Then press it quickly and the radio will beep-acknowleging that its been saved/substituted.*** *(0,10)* ____

10. List the path to adjust the bass and treble. ***HOME/SETUP/AUDIO SETUP*** *(0,1)* ____

11. From this screen, briefly explain Speed Volume and describe the effect of having 4 bars compared to 1 bar. ***Auto Volume Control. As rider accelerates Volume of radio goes up automatically. The degree of aggressiveness is determined by how many bars are selected-4 bars is the most agreesive.*** *(0,10)* ____

12. List the path to adjust screen brightness? ***HOME/SETUP/DISPLAY/SCREEN BRIGHTNESS*** *(0,1)* ____

13. Ask judge for the time and adjust clock. List the path used? ***HOME/SETUP/DISPLAY/CLOCK*** *(0,3)* ____

14. Using the joysticks on each hand control module list all the options available under Setup. ***SPEAKER/HEADSET AUDIO SETUP, DISPLAY, GLOBAL PRESETS, FULL KEYBOARD, FEEDBACK SETTINGS, BLUETOOTH SETUP, ENGLISH, CLOCK SIERIUS XM SETUP, TRAFFIC NAVIGATION SETUP, REAR CONTROLS, SYSTEM INFO, LANGUAGE AND CLASSIC MODE.*** *(0,6)* ____

*47 points possible*_____

15. List the path and the radio software number? ***HOME/SETUP/SYSTEM INFO/SOFTWARE 1.17.4*** *(0,5)* ____

16. Describe the difference between Global Presets and Presets. ***Presets from all available media sources are made visible while listening to any and all media sources. Regular presets would offer only FM presets while listening to FM. Global Presets show Weather Band, AM, XM and FM all on one page.*** *(0,10)* ____

17. List path to Prompt / Beep Volume adjustment. ***HOME/SETUP/FEEDBACK SETTINGS*** Adjust the Prompt and Beep Volume to the third bar of volume. Have judge initial here _____ *Reset to zero at break* *(0,3)* ____

18. From question 17 above, describe an example of when a rider would experience Prompt Volume? ***When using VR (Voice Recognition), and Navigation is another example.*** *(0,2)* ____

19. Change the language to English UK and list the path? ***HOME/SETUP/LANGUAGE/ENGLISH UK*** *(0,3)* ____

20. From questions 17-19 being complete and having the USB drive installed, plug a headset (located in the Tour Pak) into the front DIN/headset connector located on the console. Now press HOME/TUNER/FM and play any FM radio station. Press the Voice Recognition (VR) button on the LHCM and speak into the headset microphone **"Play Boston, Cool the Engines"**. *Have judge initial here when song plays*___ *(0,5)* ____
NOTE: Leave USB drive installed.

21. Using the joysticks on each hand control module, change the language setting to American (US) English. Press HOME. Press the VR button and speak out the command **"A.M."** to change to an A.M. radio station. Have judge initial here when audio changes to A.M. radio. _____ *(0,2)* ____

22. Press the VR button and speak out the command **"F.M."** to change to an F.M. radio station. Have judge initial here when audio changes to F.M. radio. _____ *(0,2)* ____

23. List the path to turn on Intercom. ***HOME/COM/INTERCOM/ON*** *(0,1)* ____

24. Adjust the intercom VOX (Voice Operated eXchange) level so you can comfortably talk. How many bars of VOX do you have the radio set to and what changes on the screen every time you speak into the microphone? ***4 to 5, The INT flashes Black Letters Against a Solid White Background when VOX breaks*** *(0,10)* ____

25. Go to HOME/COM/CB, turn on and tune channel to channel 15 using the left joystick. Then press the PTT (push to talk) button and say **"Breaker, Breaker 15, can I have a 10:36 and my 10:20 come back?!?"** Write down what you hear. ***TIME OF DAY AND YOU ARE AT THE SKILLSUSA NATIONAL COMPETITION IN MOTORCYCLE TECHNOLOGY!*** *(0,10)* ____

47 points possible from previous page _____
53 points possible this page _____

(100 points possible) TOTAL _____

SkillsUSA
2014 Motorcycle Service Technology
FLHR Steering head bearing adjustment

Objective Information Sheet

150 Points
Time Limit 30 Minutes

OBJECTIVE:

Given the tools, motorcycle, and Procedural Instruction Sheet, participants will correctly adjust the steering head bearings on a 2014 Harley-Davidson FLHR model motorcycle.

SPECIFIC SKILLS:

The contestant will:

1. Follow the instructions outlined in the station test materials to correctly adjust the steering head bearings on an FLHR model with headlight and nacelle removed.
2. Use the tools and equipment properly and safely.
3. Clean and organize the work area.

The judge must completely re-set-up the station for the next participant by verifying that the steering head bearings are out of adjustment.

SkillsUSA
2014 Motorcycle Service Technology
FLHR Steering head bearing adjustment

Judge's Score sheet

Time Limit 30 Minutes

Contestant #_____

Judge's Initials:_____

Start Time:_____

Stop Time:_____

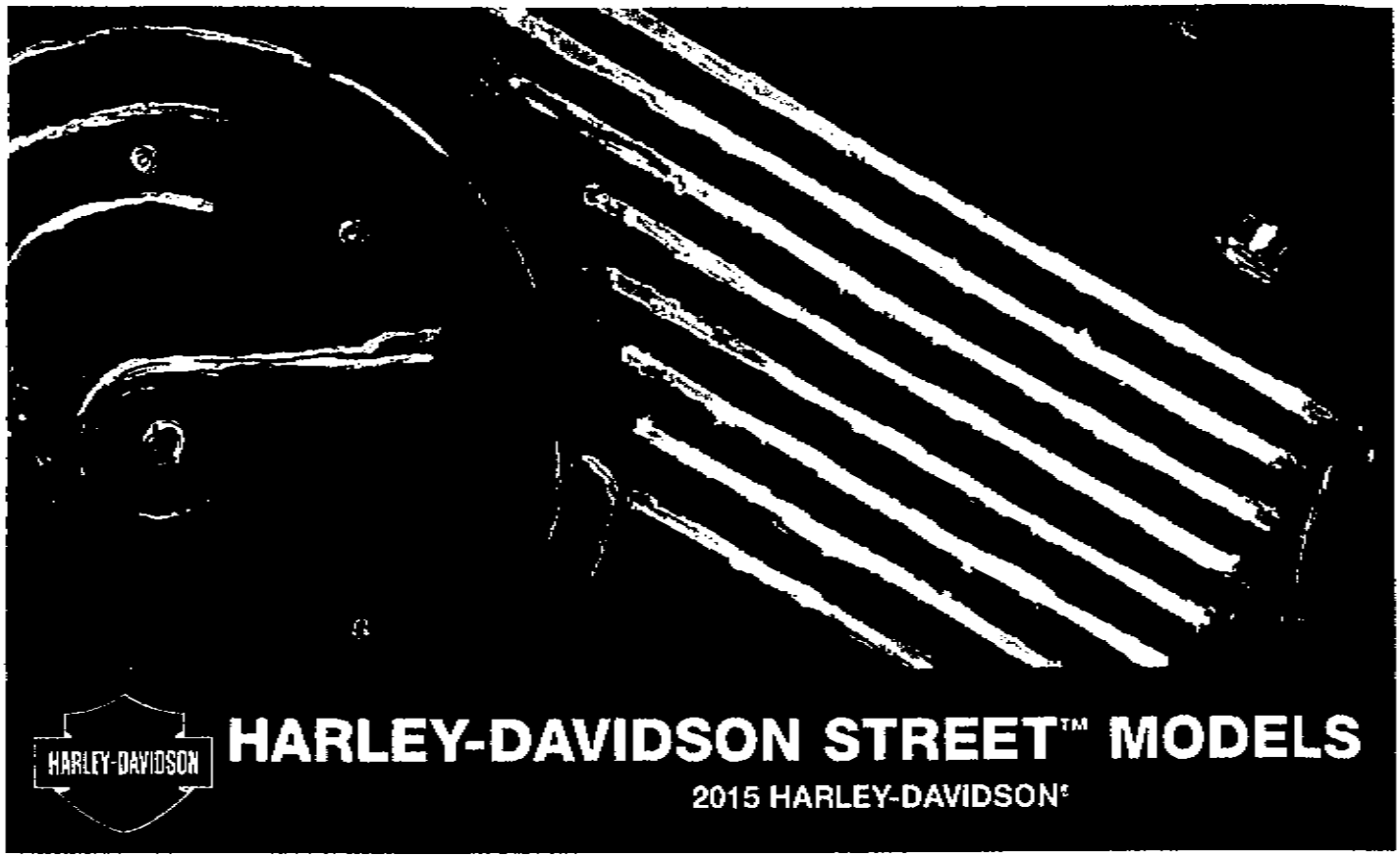
Scoring Directions: The performance of each task should be either "0" or full points, i.e "25", "50", or "75". Use the following criteria listed below: **"0"** indicates the contestant ***could not or did not*** correctly perform this task. **"25", "50",** or **"75"** indicates the contestant **did perform or demonstrate** the skill correctly.

The judge should monitor the participant's progress to ensure safe use of the equipment.

- **PERFORMANCE:** Grade the student's performance and record the score below.

1) Correctly measured the initial steering head Swing-back prior to adjustment. **(0,50)** _____
2) Correctly adjusted the steering head bearings to the required Swing-back specification of 3.4" – 4.8". **(0,75)** _____
3) Completed all task requirements for this workstation.
   a. Correctly torque all critical fasteners. I.e. Steering stem pinch screw (22 – 26 ft-lbs.) **(0,25)** _____

Total Possible Score 150 **Total Points** _____



Valve Lash Adjustment Procedures

Some steps have be performed in advance. These steps are identified by a line through the text or notation; THIS HAS BEEN DONE

ONLY THE REAR CYLINDER WILL BE USED - DO NOT REMOVE FRONT CYLINDER VALVE COVER - COVER BOLTS WILL BE REUSED-

TORQUE ON ALL FASTENERS WILL BE HAND TIGHT

PREPARE

~~1. Remove front belt guard. See 3.21 BELT GUARDS.~~

~~2. Disconnect negative battery cable. See 8.4 POWER DISCONNECT.~~

~~3. Lift rear of fuel tank. See 8.4 LIFT REAR OF FUEL TANK.~~

~~4. Remove air cleaner assembly. See 6.3 AIR CLEANER.~~

5. Remove cylinder head covers. See 4.12 CYLINDER HEAD COVERS. REAR ONLY
6. Remove spark plugs. See 2.26 CLEAN AND INSPECT SPARK PLUGS. BOTH FRONT AND REAR
7. Raise rear wheel. See 2.2 GENERAL, Secure the Motorcycle for Service.

INSPECT AND ADJUST

PART NUMBER	TOOL NAME
HD-61502	TAPPET ADJUSTING WRENCH

FASTENER	TORQUE VALUE	
Valve adjuster jamnut	[redacted]	[redacted]

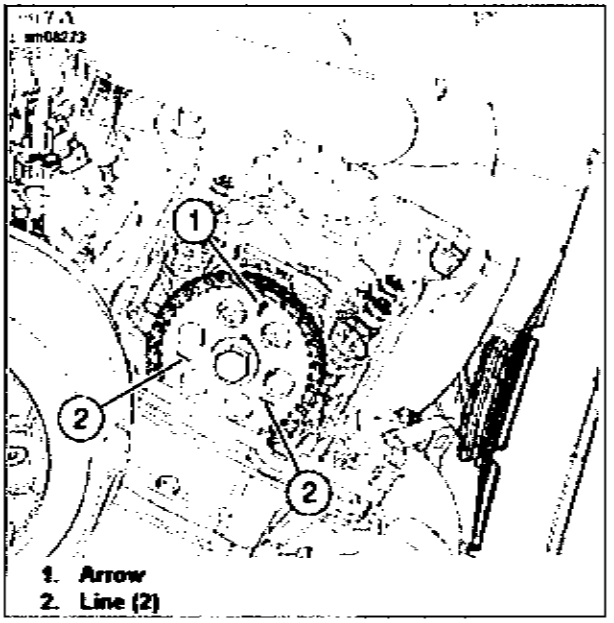
1. Rotate engine so that the measured cylinder is at TDC.
   a. Shift transmission into sixth gear.
   b. See Figure 2-30. Rotate rear wheel toward front of motorcycle until cam sprocket timing arrow (1) is perpendicular and the timing lines (2) are parallel to the cylinder head.

STOP AT THIS POINT AND HAVE THE JUDGE INSPECT BEFORE PROCEEDING.

After the Judge inspects proceed to loosen and back off all four valve adjusters before proceeding.

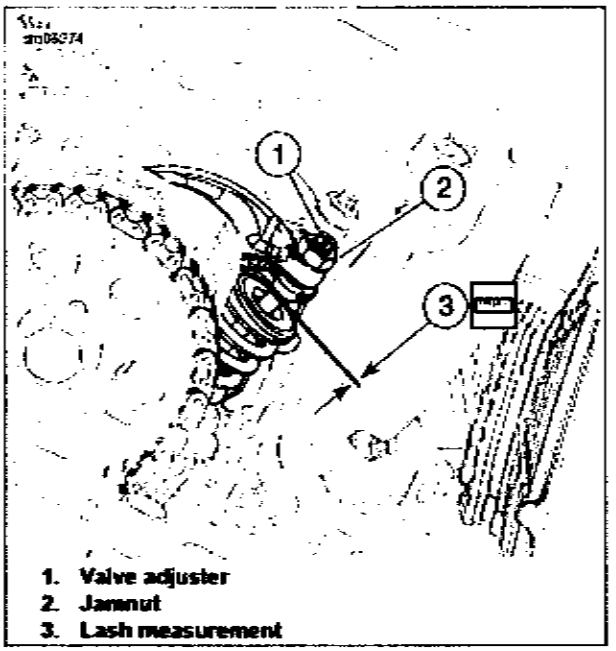
Adjust

1. See Figure 2-31. Loosen jamnut (2) using [redacted].
2. Adjust valve lash (3) to specifications. Refer to Table 2-11.
   a. Turn valve adjuster (1) clockwise to reduce valve lash. Turn valve adjuster counterclockwise to increase valve lash.
3. Holding valve adjuster in position, tighten jamnut to [redacted].



1. Arrow
2. Line (2)

Figure 2-30. Cam Timing Marks



1. Valve adjuster
2. Jamnut
3. Lash measurement

Figure 2-31. Valve Lash

Table 2-11. Valve Lash

ITEM	XG500		XG750	
Intake	0.13-0.18 mm	0.005-0.007 in	0.13-0.18 mm	0.005-0.007 in
Exhaust	0.18-0.23 mm	0.007-0.009 in	0.18-0.23 mm	0.007-0.009 in

STOP AT THIS POINT AND HAVE JUDGE INSPECT LASH SETTING BEFORE PROCEEDING!

COMPLETE

1. Shift transmission into NEUTRAL.
2. Lower rear wheel.
3. Install spark plugs. See 2.26 CLEAN AND INSPECT SPARK PLUGS.
4. Install cylinder head covers. See 4.12 CYLINDER HEAD COVERS.
5. Install air cleaner assembly. See 6.3 AIR CLEANER.
6. Install fuel tank. See 6.5 FUEL TANK.
7. Connect negative battery cable. See 8.4 POWER DISCONNECT.
8. Install front belt guard. See 3.21 BELT GUARDS.
9. Install seat. See 3.36 SEAT.

GENERAL

SERVICING A NEW MOTORCYCLE

⚠WARNING

Perform the service and maintenance operations as indicated in the regular service interval table. Lack of regular maintenance at the recommended intervals can affect the safe operation of your motorcycle, which could result in death or serious injury. (00010a)

Perform necessary set-up tasks before customer delivery. See applicable model year predelivery and set-up instructions.

The performance of new motorcycle initial service is required to keep warranty in force and to verify proper emissions systems operation. See 2.3 MAINTENANCE SCHEDULE.

Inspect motorcycle regularly for additional maintenance needs. Routinely check components between regular maintenance intervals. Always inspect motorcycle after periods of storage before riding.

Perform all of the checks in the PRE-RIDING CHECKLIST in the owner's manual following any service procedure. Operate the motorcycle to perform any final check or adjustments. If all is correct, the vehicle is ready to return to the customer.

SECURE THE MOTORCYCLE FOR SERVICE

PART NUMBER	TOOL NAME
HD-45868	FAT JACK

⚠WARNING

Be sure to check capacity rating and condition of hoists, slings, chains and cables before use. Exceeding capacity ratings or using lifting devices that are in poor condition can lead to an accident, which could result in death or serious injury. (00466c)

Always use blocking or proper stands to support motorcycle.

Set Motorcycle Upright

1. Place motorcycle upright on a level surface or suitable lift if available.
2. Verify that motorcycle is level.
3. Secure with tie-downs.

Raise Front or Rear Wheel for Service

1. Verify that motorcycle is level.
2. Use a FAT JACK (Part No. HD-45868) or similar to raise the motorcycle to service a front or rear wheel.
3. Secure with tie-downs.
4. If necessary, remove shock absorbers and raise the rear fork for service.

PREPARE

1. Remove main fuse. See 8.4 POWER DISCONNECT.

REMOVE

⚠WARNING

Disconnecting spark plug cable with engine running can result in electric shock and death or serious injury. (00464b)

1. See Figure 2-35. Remove spark plug cables from spark plugs.
2. Thoroughly clean around spark plug base.
3. Remove spark plugs.

INSTALL

FASTENER	TORQUE VALUE	
Spark plug	[redacted]	[redacted]

NOTE

The spark plug gap is within specification when there is a slight drag on the gauge.

1. Verify proper gap before installing new or cleaned spark plugs.
   a. Use a wire-type feeler gauge within specification. Refer to Table 2-13.
   b. Pass the wire gauge between the center and the outer electrodes.
   c. Adjust gap to within specification.
2. Verify spark plug threads are clean and dry.
3. Install spark plugs. Tighten to [redacted].
4. See Figure 2-35. Install spark plug cables.

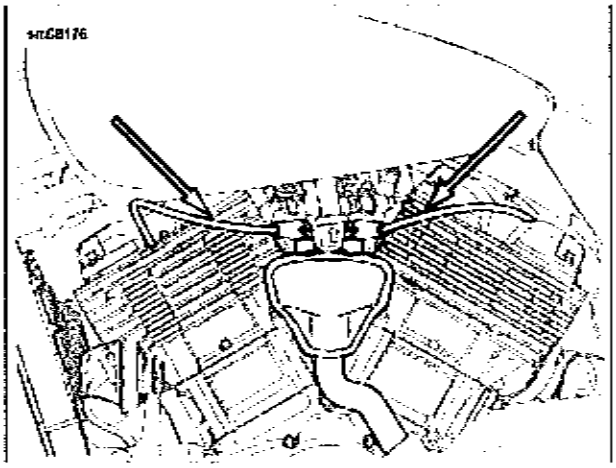


Figure 2-35. Spark Plug Cable Routing

Table 2-13. Spark Plug Gap

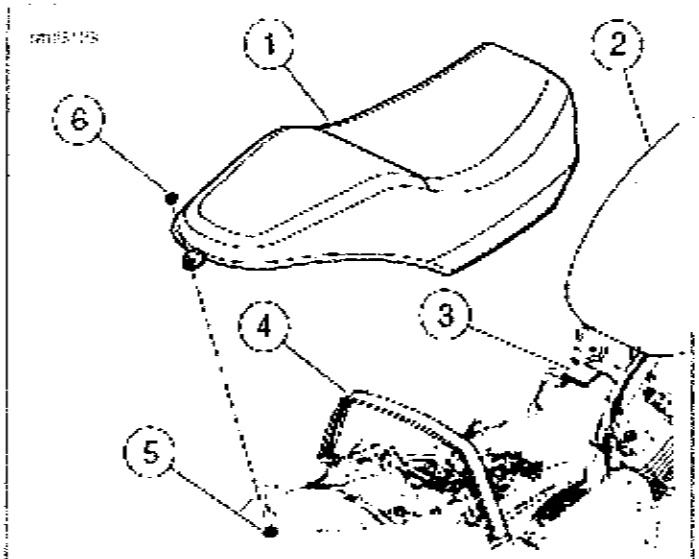
MODEL	TYPE	mm	in
XG500	RG6HCC	0.8-0.9	0.31-0.35
XG750	RG6HCC	0.8-0.9	0.31-0.35

USE COMPRESSED AIR CAN

REMOVE

Seat

1. See Figure 3-73. Remove seat.
   a. Remove seat retention screw (6).
   b. Slide seat (1) back to release from seat retention tab (3).
   c. Slide seat forward and lift above the fuel tank (2).
   d. Pull seat forward through seat strap (4).



1. **Seat**
2. **Fuel tank**
3. **Seat retention tab**
4. **Seat strap**
5. **Seat retention nut**
6. **Seat retention screw**

Figure 3-73. Seat Removal

INSPECT BATTERY

PREPARE

1. Remove left and right side covers.
2. ~~Remove main fuse. See 8.4 POWER DISCONNECT.~~
3. Remove vapor valve. See 6.10 VAPOR VALVE.
4. ~~Remove front belt guard. See 3.21 BELT GUARDS.~~
5. ~~Remove seat. See 3.36 SEAT.~~
6. Remove battery cover screws.(2). See Figure 8-45.

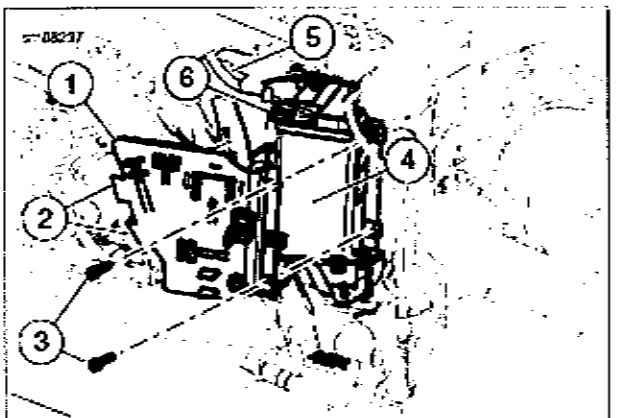
REMOVE

1. See Figure 2-32. Remove electrical panel.
   a. Remove screws (3).
   b. Remove electrical panel (1).

⚠WARNING

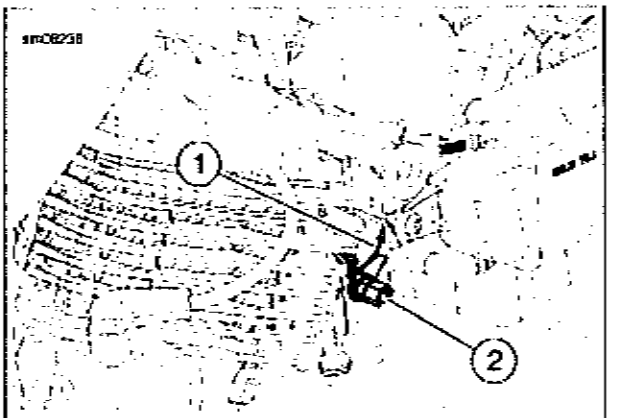
Disconnect negative (-) battery cable first. If positive (+) cable should contact ground with negative (-) cable connected, the resulting sparks can cause a battery explosion, which could result in death or serious injury. (00049a)

2. Remove battery.
   a. See Figure 2-33. Remove negative battery cable (1) from ground stud (2).
   b. See Figure 2-32. Remove positive battery cable (5) from positive battery terminal (6).
   c. Remove battery (4).
3. ~~Remove negative battery cable, if necessary.~~



1. Electrical panel
2. Tab (2)
3. Screw (2)
4. Battery
5. Positive battery cable
6. Positive battery terminal

Figure 2-32. Battery



1. Negative battery cable
2. Ground stud

Figure 2-33. Battery Ground Cable

INSTALL PERFORMED AS PART OF VALVE LASH

FASTENER	TORQUE VALUE	
Negative battery terminal screw	[redacted]	[redacted]
Positive battery terminal screw	[redacted]	[redacted]
Battery ground stud	[redacted]	[redacted]
Electrical panel screw	[redacted]	[redacted]

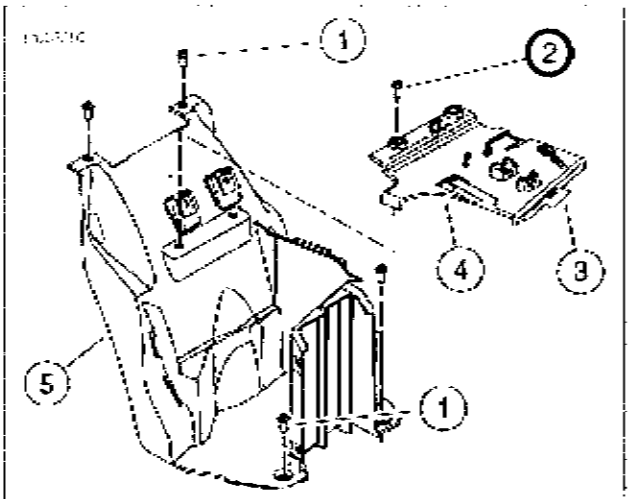
NOTICE

Connect the cables to the correct battery terminals. Failure to do so could result in damage to the motorcycle electrical system. (00215a)

1. ~~Install negative battery cable, if removed.~~
   ~~a. Connect negative battery cable to negative battery terminal. Tighten to [redacted].~~
2. See Figure 2-32. Install battery.
   a. Route negative battery cable through battery box.
   b. Install battery (4) in battery box.
3. See Figure 2-32. Connect battery.
   a. Connect positive battery cable (5) to positive battery terminal (6). Tighten to [redacted].
   b. See Figure 2-33. Connect negative battery cable (1) to ground stud (2). Tighten to [redacted].
4. See Figure 2-32. Install electrical panel.
   a. Install electrical panel (1).
   b. Verify electrical panel tabs (2) are inserted into slots.
   c. Install screws (3). Tighten to [redacted].

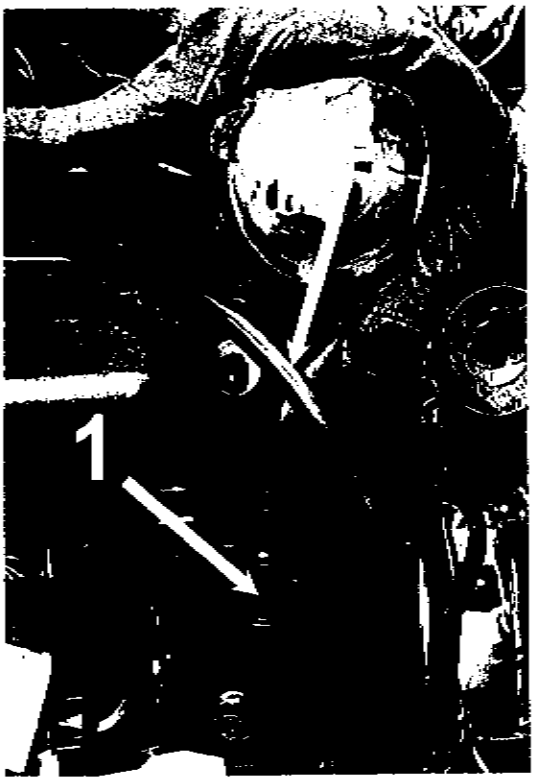
COMPLETE Performed as part of Valve Lash

1. Install battery cover screws(2). Tighten to 2.3-3.3 Nm (21-29 in-lbs).
2. Install seat. See 3.36 SEAT.
3. Install front belt guard. See 3.21 BELT GUARDS.
4. Install vapor valve. See 8.10 VAPOR VALVE.
5. Install main fuse. See 8.4 POWER DISCONNECT.
6. Install side covers. See 3.17 SIDE COVERS.



1. Screw (4)
2. Screw (2)
3. Tab
4. Cover
5. Battery tray

Figure 8-45. Battery Tray



PREPARE

1. Remove main fuse. See 8.4 POWER DISCONNECT.

REMOVE

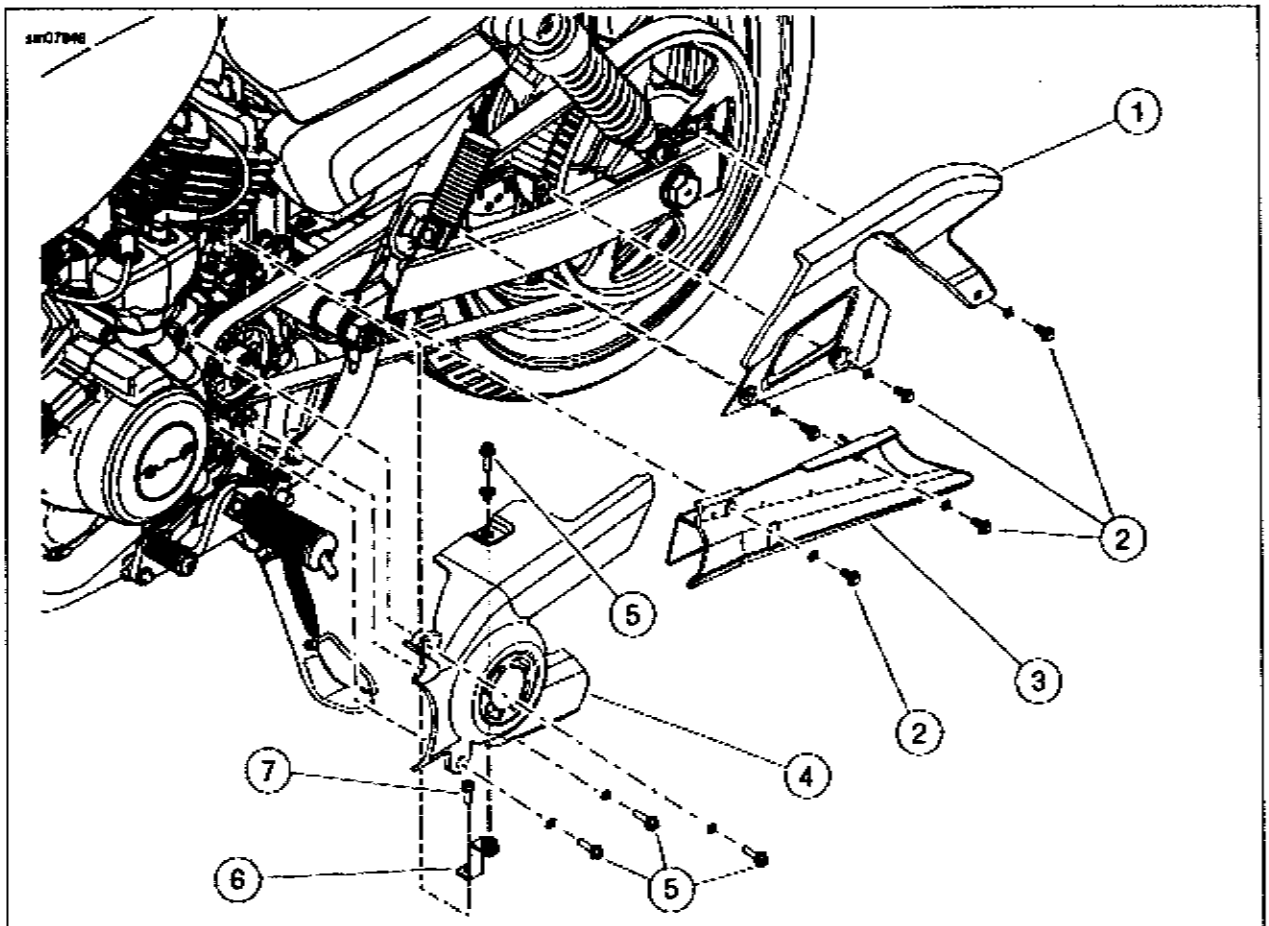
Front Belt Guard

1. See Figure 3-46. Remove front belt guard.
   a. Remove front belt guard screws (5).
   b. Remove front belt guard (4).
2. Remove screw (7) and bracket (6), if necessary.

INSTALL

Front Belt Guard

1. See Figure 3-46. Install bracket, if removed.
   a. Position bracket (6).
   b. Install bracket screw (7). Tighten to [redacted] ([redacted]).
2. Install front belt guard.
   a. Position front belt guard (4).
   b. Install screws (5). Tighten to [redacted] ([redacted]).



1. Upper rear belt guard
2. Rear belt guard screw (5)
3. Lower rear belt guard
4. Front belt guard
5. Front belt guard screw (4)
6. Bracket
7. Bracket screw

Figure 3-46. Belt Guards

COMPLETE

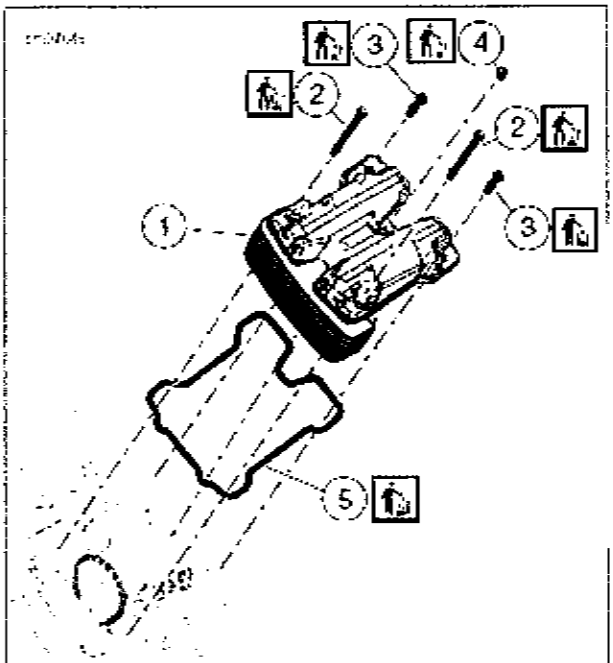
1. Install main fuse. See 8.4 POWER DISCONNECT.

PREPARE

1. Disconnect negative battery cable. See 8.4 POWER DISCONNECT.
2. Lift rear of fuel tank. See 0.4 LIFT REAR OF FUEL TANK.
3. Remove breather hoses. REAR ONLY

REMOVE REAR CYLINDER ONLY

1. See Figure 4-9. Remove cylinder head cover.
   a. Discard fasteners (2 through 4).
   b. Remove cylinder head cover (1).
   c. Discard gasket (5).



1. Cylinder head cover
2. Long bolt (2)
3. Medium bolt (2)
4. Short bolt
5. Gasket

Figure 4-9. Cylinder Head Cover

INSTALL

FASTENER	TORQUE VALUE	
Cylinder head cover bolt	10.0-12.0 Nm	89-106 in-lbs

NOTE

Verify that all mating and screw mounting surfaces are clean and dry before installation.

1. See Figure 4-9. Install cylinder head cover.
   a. Install cylinder head cover (1) and new gasket (5).
   b. Install **new** medium bolts (3).
   c. Install **new** long bolts (2).
   d. Install **new** short bolt (4).
   e. See Figure 4-9. Tighten cylinder head bolts in sequence shown to 10.0-12.0 Nm (89-106 in-lbs).

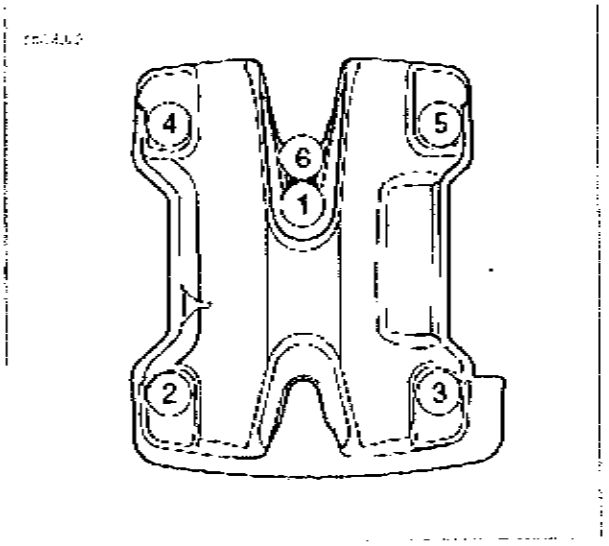


Figure 4-10. Cylinder Head Cover Tightening Sequence

NEGATIVE BATTERY CABLE

FASTENER	TORQUE VALUE	
Battery ground stud	[redacted]	[redacted]

Disconnect negative battery cable from ground stud when there is a possibility of injury caused by starter engagement (engine rotation).

Disconnect Negative Battery Cable

1. Remove left side cover.
2. Remove front belt guard. See 3.21 BELT GUARDS.

⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00848a)

3. See Figure 8-3. Disconnect negative battery cable (1) from ground stud (2).

Connect Negative Battery Cable

1. See Figure 8-3. Connect negative battery cable (1) to ground stud (2). Tighten to [redacted].
2. Install front belt guard. See 3.21 BELT GUARDS.
3. Install left side cover.

MAIN FUSE

Remove main fuse when there is a possibility of injury caused by accidental vehicle start-up or electrical equipment damage.

Remove Main Fuse

1. Remove right side cover.

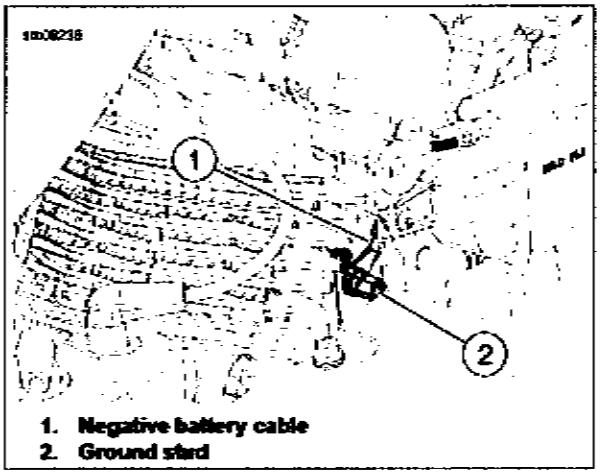
⚠WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, remove main fuse before proceeding. (00251b)

2. See Figure 8-4. Remove main fuse.

Install Main Fuse

1. See Figure 8-4. Install main fuse.
2. Install right side cover.



1. Negative battery cable
2. Ground stud

Figure 8-3. Battery Ground Cable

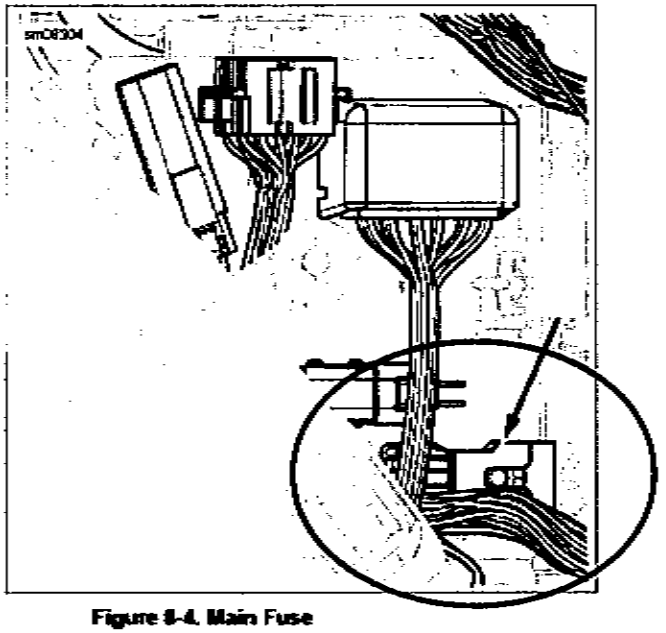
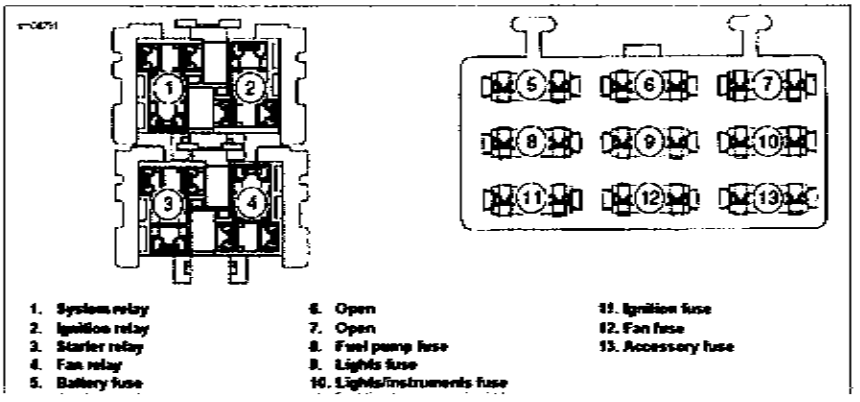


Figure 8-4. Main Fuse



1. System relay
2. Ignition relay
3. Starter relay
4. Fan relay
5. Battery fuse
6. Open
7. Open
8. Fuel pump fuse
9. Lights fuse
10. Lights/instruments fuse
11. Ignition fuse
12. Fan fuse
13. Accessory fuse

Figure 8-2. Fuses and Relays

LIFT REAR OF FUEL TANK 6.4

PREPARE

1. Remove seat. See 3.36 SEAT.

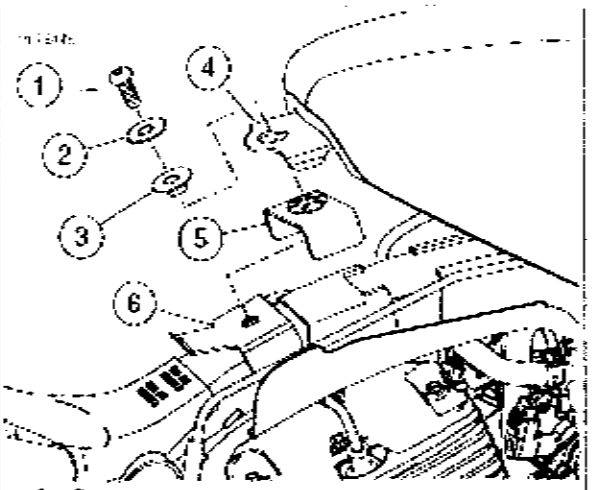
LIFT

1. See Figure 6-3. Lift rear of fuel tank.
   a. Remove screw (1), washer (2) and collar (3).
   b. Lift fuel tank bracket (4) and isolator (5). Support fuel tank as necessary.

SECURE

FASTENER	TORQUE VALUE	
Rear fuel tank screw	24.3-29.7 Nm	18-21 ft-lbs

1. See Figure 6-3. Lower fuel tank.
   a. Insert neck of isolator (5) through hole in bracket (4).
   b. Lower fuel tank bracket (4) and isolator (5) onto tab (6).
   c. Install collar (3), washer (2) and screw (1). Tighten to 24.3-29.7 Nm (18-21 ft-lbs).



1. Screw
2. Washer
3. Collar
4. Bracket
5. Isolator
6. Tab

Figure 6-3. Rear Mount

COMPLETE

1. Install seat. See 3.36 SEAT.

PREPARE

⚠WARNING

Gasoline is extremely flammable and highly explosive. Keep gasoline away from ignition sources which could result in death or serious injury. See the Safety chapter. (00635c)

⚠WARNING

To prevent spray of fuel, purge system of high-pressure fuel before supply line is disconnected. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (90275a)

1. ~~Purge fuel system.~~ THIS HAS BEEN DONE
2. Remove main fuse. See 8.4 POWER DISCONNECT.
3. ~~Drain fuel tank.~~ THIS HAS BEEN DONE
4. Remove seat. See 3.36 SEAT.
5. Lift rear of fuel tank. See 6.4 LIFT REAR OF FUEL TANK.
6. Remove front belt guard. See 3.21 BELT GUARI
7. See Figure 6-6. Remove fuel tank ground wire.
   a. Remove nut (2).
   b. Remove fuel tank ground wire (3) from ground stud (1) and backbone caddy (4).
8. See Figure 6-7. Remove lower fuel line.
   a. Push up on sleeve of quick disconnect fitting (1).
   b. Remove fuel line (2) from quick disconnect fitting.
9. Disconnect fuel pump connector. See 6.8 FUEL PUMP.
   a. Lift connector latch (1) See Figure 6-8.
   b. Pull connector (2) out
10. See Figure 6-4. Remove vent line (2) from fuel tank.

REMOVE

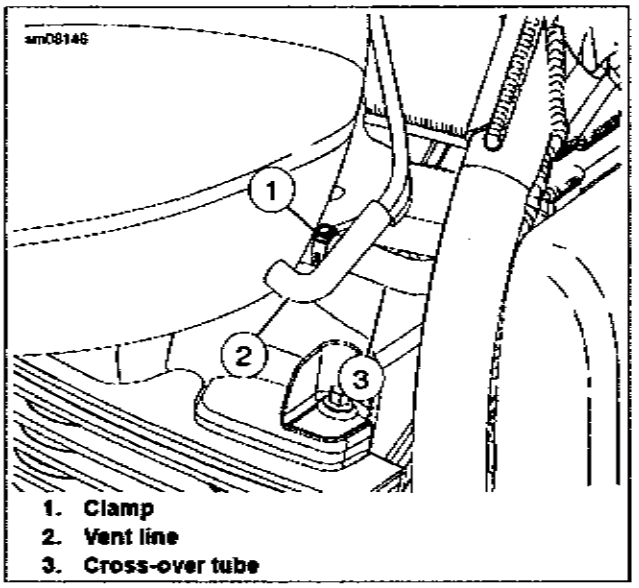
1. See Figure 6-5. Remove fuel tank.
   a. Slide fuel tank back and away from front mounts (2).
   b. Remove fuel tank.

INSTALL

1. See Figure 6-5. Install fuel tank brackets (1) on front mounts (2).
2. Connect fuel pump connector. See Figure 6-8.
3. See Figure 6-6. Install fuel tank ground wire.
   a. Position ground wire (3) in backbone caddy (4) and along frame.
   b. Install ground wire over ground stud (1).
   c. Install nut (2). Tighten to [redacted].

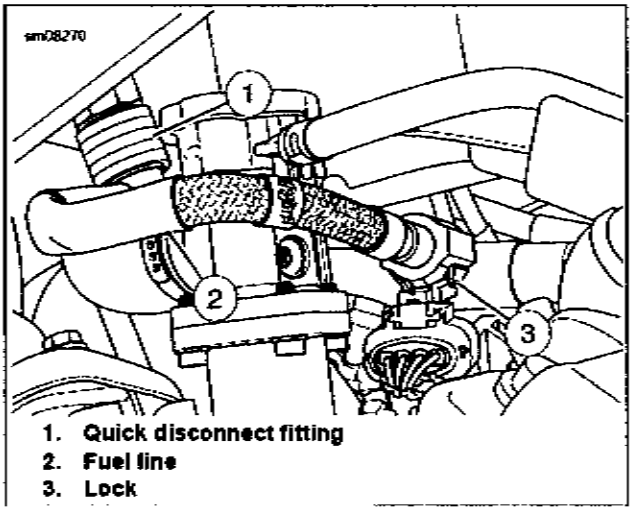
INSTALL

4. See Figure 6-7. Install lower fuel line.
   a. Connect fuel line (2) to fuel rail.
   b. Engage lock (3) to secure fuel line to fuel rail.
   c. Press up on sleeve of quick disconnect fitting (1).
   d. Connect fuel line to quick disconnect fitting.
   e. Release sleeve of quick disconnect fitting to secure fuel line.
5. Install fuel pump fuse. See 8.4 POWER DISCONNECT.
6. Install vent line (2) See Figure 6-4.



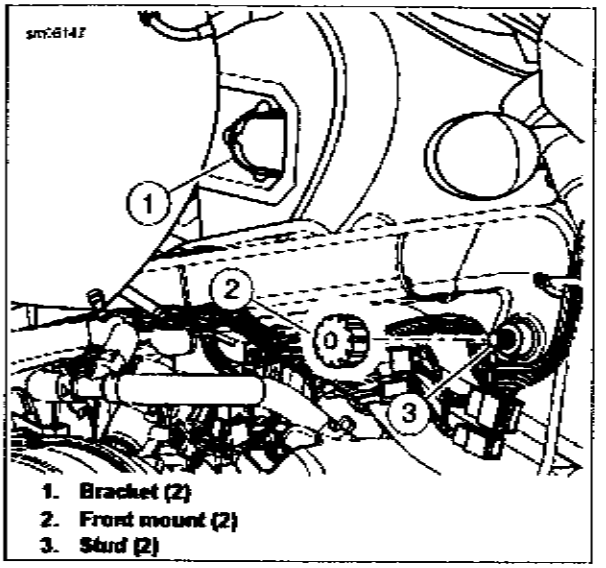
1. Clamp
2. Vent line
3. Cross-over tube

Figure 6-4. Cross-over Tube



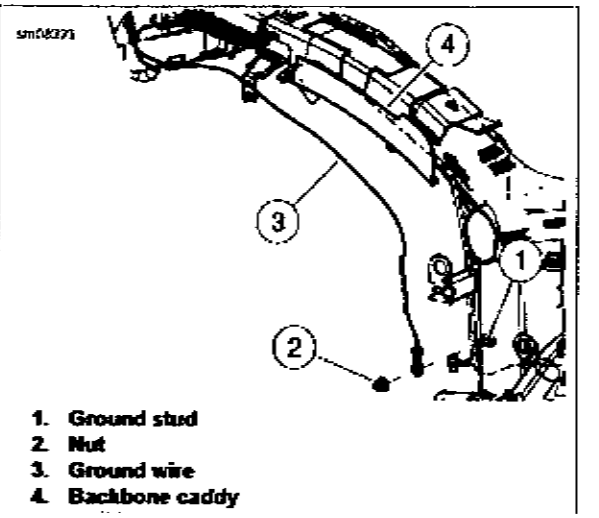
1. Quick disconnect fitting
2. Fuel line
3. Lock

Figure 6-7. Lower Fuel Line



1. Bracket (2)
2. Front mount (2)
3. Stud (2)

Figure 6-5. Front Mount



1. Ground stud
2. Nut
3. Ground wire
4. Backbone caddy

Figure 6-6. Fuel Tank Ground Wire

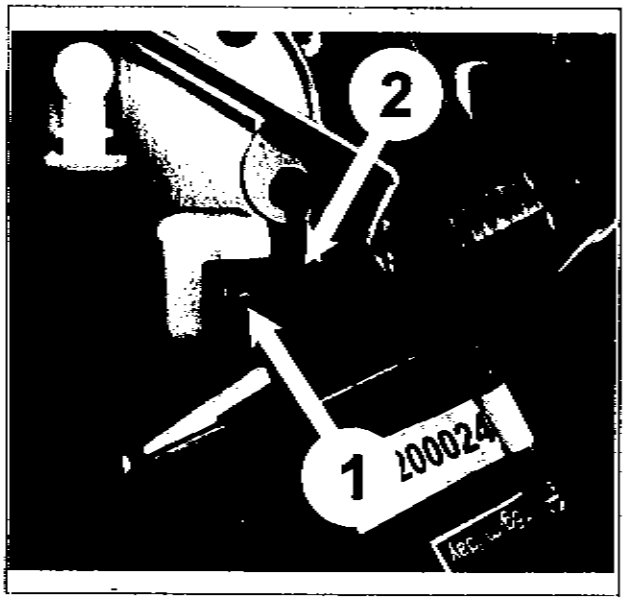


Figure 6-8. Fuel Pump Assembly

COMPLETE

1. Install fuel tank. See 6.4 LIFT REAR OF FUEL TANK.
2. Install seat. See 3.36 SEAT.
3. Install main fuse. See 8.4 POWER DISCONNECT.
4. Install front belt guard. See 3.21 BELT GUARDS.