

2015 Harley-Davidson Trike Models Service Manual Supplement 99601-15

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IMPORTANT NOTICE

Harley-Davidson motorcycles conform to all applicable U.S.A. Federal Motor Vehicle Safety Standards and U.S.A. Environmental Protection Agency regulations effective on the date of manufacture.

To maintain the safety, dependability, and emission and noise control performance, it is essential that the procedures, specifications and service instructions in this manual are followed.

Any substitution, alteration or adjustment of emission system and noise control components outside of factory specifications may be prohibited by law.

Harley-Davidson Motor Company



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READER COMMENTS

I The Harley-Davidson Service Communications Department maintains a continuous effort to improve the quality

•	eteness, accuracy, organization, usac	pility, and readability of this manual.
Please list the page, item, and	part number(s) of any errors you find	in this manual.
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ABOUT THIS MANUAL

GENERAL

This service manual supplement has been designed to be used with the current service manual and has been prepared with two purposes in mind.

- It will acquaint the user with the construction of the Harley-Davidson product and assist in the performance of basic maintenance and repair.
- It will introduce to the professional Harley-Davidson Technician the latest field-tested and factory-approved major repair methods.

We sincerely believe that this service manual supplement will make your association with Harley-Davidson products more pleasant and profitable.

NOTE

This service manual supplement provides information unique to this model motorcycle. Any information not presented in this supplement can be found in the appropriate service manual or electrical diagnostic manual. Refer to <u>Table i-1</u>.

Table i-1. Relevant Model Year Publications

PUBLICATION	PART NUMBER
Touring Models Service Manual	99483-15
Touring Models Electrical Diagnostic	99497-15
Manual	

HOW TO USE YOUR SERVICE MANUAL SUPPLEMENT

Use the TABLE OF CONTENTS (which follows this FORE-WORD) and the INDEX (at the back of this manual) to quickly locate subjects. Sections and topics in this manual are sequentially numbered for easy navigation.

NO.	CHAPTER
1	Maintenance
2	Chassis
3	Engine
4	Fuel System
5	Drive
6	Transmission
7	Electrical
Α	Appendix A Wiring
В	Appendix B Reference

For example, a cross-reference shown as **2.1 SPECIFICATIONS** refers to chapter 2 CHASSIS, heading 2.1 SPECIFICATIONS.

If the subject you seek is not in this supplement, refer to the corresponding chapter in the appropriate service manual. Check the title page located in the front of each chapter to find the subject.

For quick and easy reference, all pages contain a chapter number followed by a page number. For example, page 3-5 refers to page 5 in chapter 3. In figure legends, the number following the name of a part indicates the quantity necessary for one complete assembly.

PREPARATION FOR SERVICE

PART NUMBER	TOOL NAME
HD-48650	DIGITAL TECHNICIAN II

AWARNING

Stop the engine when refueling or servicing the fuel system. Do not smoke or allow open flame or sparks near gasoline. Gasoline is extremely flammable and highly explosive, which could result in death or serious injury. (00002a)

Good preparation is very important for efficient service work. Start each job with a clean work area. This will allow the repair to proceed as smoothly as possible. It will also reduce the incidence of misplaced tools and parts.

Clean a motorcycle that is excessively dirty before work starts. Cleaning will occasionally uncover sources of trouble. Gather any tools, instruments and any parts needed for the job before work begins. Interrupting a job to locate tools or parts is a distraction and causes needless delay.

NOTES

- To avoid unnecessary disassembly, carefully read all related service information before repair work begins.
- In figure legends, the number which follows the name of a part indicates the quantity necessary for one complete assembly.
- When servicing a vehicle equipped with the Harley-Davidson Smart Security System (H-DSSS), first disarm the system. Keep the fob close to the vehicle or use DIGITAL TECHNICIAN II (Part No. HD-48650) to disable the system. Activate the system after service is completed.

SERVICE BULLETINS

In addition to the information presented in this service manual supplement and the appropriate service manual, Harley-Davidson Motor Company will periodically issue Service Bulletins to Harley-Davidson dealers. Service bulletins cover interim engineering changes and supplementary information. Consult the service bulletins to keep your product knowledge current and complete.

WARNINGS AND CAUTIONS

Statements in this manual preceded by the following words are of special significance.

AWARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. (00119a)

ACAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. (00139a)

NOTICE

NOTICE indicates a potentially hazardous situation which, if not avoided, may result in property damage. (00140b)

NOTE

Refers to important information. It is recommended that you take special notice of these items.

Proper service and repair are important for the safe, reliable operation of all mechanical products. The service procedures recommended and described in this manual are effective methods for performing service operations.

AWARNING

Always wear proper eye protection when using hammers, arbor or hydraulic presses, gear pullers, spring compressors, slide hammers and similar tools. Flying parts could result in death or serious injury. (00496b)

Some of these service operations require the use of tools specially designed for the purpose. These special tools should be used when and as recommended. It is important to note that some warnings against the use of specific service methods, which could damage the motorcycle or render it unsafe, are stated in this manual. However, remember that these warnings are not all-inclusive. Inadequate safety precautions could result in death or serious injury.

Since Harley-Davidson could not possibly know, evaluate or advise the service trade of all possible ways in which service might be performed, or of the possible hazardous consequences of each method, we have not undertaken any such broad evaluation. Accordingly, anyone who uses a service procedure or tool which is not recommended by Harley-Davidson must first thoroughly satisfy himself that neither his nor the operator's safety will be jeopardized as a result. Failure to do so could result in death or serious injury.

USE GENUINE REPLACEMENT PARTS

AWARNING

Harley-Davidson parts and accessories are designed for Harley-Davidson motorcycles. Using non-Harley-Davidson parts or accessories can adversely affect performance, stability or handling, which could result in death or serious injury. (00001b)

To achieve satisfactory and lasting repairs, carefully follow the service manual instructions and use only genuine Harley-Davidson replacement parts. Behind the emblem bearing the words GENUINE HARLEY-DAVIDSON stand more than 100 years of design, research, manufacturing, testing and inspecting experience. This is your assurance that the parts you are using will fit right, operate properly and last longer.

PRODUCT REFERENCES

AWARNING

Read and follow warnings and directions on all products. Failure to follow warnings and directions can result in death or serious injury. (00470b)

When reference is made in this manual to a specific brand name product, tool or instrument, an equivalent product, tool or instrument may be substituted.

Special Tools

All tools mentioned in this manual with a part number beginning with "HD", "J" or "B" must be ordered through your local Harley-Davidson dealer. Special tools may only be purchased, serviced or warrantied through a Harley-Davidson dealer.

LOCTITE Sealing and THREADLOCKING Products

Some procedures in this manual call for the use of LOCTITE products. If you have any questions regarding LOCTITE product usage or retailer/wholesaler locations, contact Loctite Corp. at www.loctite.com.

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All photographs, illustrations and procedures may not necessarily depict the most current model or component, but are based on the latest production information available at the time of publication.

Since product improvement is our continual goal, Harley-Davidson reserves the right to change specifications, equipment or designs at any time without notice and without incurring obligation.

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FASTENER TORQUE VALUES

FASTENER TORQUE VALUES IN THIS CHAPTER

The table below lists torque values for all fasteners presented in this chapter.

FASTENER	TORQUI	EVALUE	NOTES
Axle adjustment screw jamnut	15-25 ft-lbs	20.3-34.0 Nm	1.11 DRIVE BELT, Setting Deflection
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	1.11 DRIVE BELT, Checking Drive Belt Deflection
Battery cable screw	60-70 in -lbs	6.8-7.9 Nm	1.11 DRIVE BELT, Setting Deflection
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	1.12 REAR WHEEL COMPENSATOR, Checking Isolator Wear
Brake caliper, front, mounting screws	28-38 ft-lbs	37.9-51.5 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper, front, pad pin	23-27 ft-lbs	31.2-36.6 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper, rear, mount bushing bolts	32-36 ft-lbs	43.4-48.8 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper, rear, mounting bracket screws	41-45 ft-lbs	55.6-61.0 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement/Apply LOCTITE MEDIUM STRENGTH THREADLOCKER AND SEALANT 243 (blue) to screws.
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm	1.6 BRAKES, Brake Fluid Replacement
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm	1.6 BRAKES, Brake Fluid Replacement
Brake caliper bleeder valve, rear	31-33 in-lbs	A 3.5-3.7 Nm A	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm	1.6 BRAKES, Brake Fluid Replacement
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm	1.6 BRAKES, Brake Fluid Replacement
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Clutch reservoir cover screws	6-8 in-lbs	0.7-0.9 Nm	1.10 HYDRAULIC CLUTCH FLUID, Fluid Inspection
Headlamp horizontal adjustment screw: FLRT	30-35 ft-lbs	40.7-47.5 Nm	1.17 HEADLAMP ALIGNMENT, Headlamp: FLRT
Headlamp nut: HDI Models	20-24 ft-lbs	27.1-32.5 Nm	1.17 HEADLAMP ALIGNMENT, FLHTCUTG HDI Dual LED Headlamps
Headlamp vertical adjustment screw: FLRT	35-45 ft-lbs	47.5-61.0 Nm	1.17 HEADLAMP ALIGNMENT, Headlamp: FLRT
Lug nuts	90-100 ft-lbs	122.0-135.6 Nm	1.11 DRIVE BELT, Setting Deflection/Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.
Parking brake adjuster jamnut	72-120 in-lbs	8.1-13.6 Nm	1.8 PARKING BRAKE, Adjustment
Parking brake adjuster jamnut	72-120 in-lbs	8.1-13.6 Nm	1.8 PARKING BRAKE, Adjustment

<u>HOME</u>

FASTENER	TORQUE VALUE		NOTES
Pinch block screws	41-45 ft-lbs	55.6-61.0 Nm	1.11 DRIVE BELT, Setting Deflection/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Transmission dipstick	25-75 in-lbs	2.8-8.5 Nm	1.5 LUBRICANTS, Checking Transmission Lubricant Level



LIFTING MOTORCYCLE WITH A JACK

JACKING POINTS

NOTICE

When lifting a motorcycle using a jack, be sure jack contacts both lower frame tubes where down tubes and lower frame tubes converge. Never lift by jacking on crossmembers, oil pan, mounting brackets, components or housings. Failure to comply can cause serious damage resulting in the need to perform major repair work. (00586d)

NOTES

- · Never use differential housing as lifting point.
- Set the parking brake and block the wheels as necessary to prevent the vehicle from rolling.
- Lift against the forgings where the down tubes and lower frame tubes join.
- Never lift using the passenger hand grab handles.

Because the balance point is toward the rear of the motorcycle, special consideration must be made when lifting with a jack for service.

See Figure 1-1. When lifting the front to remove the front tire or check steering head bearings, and so forth, engage the parking brake. Place the jack under the forward portion of the frame, approximately centered under the crankshaft, and make sure it contacts the frame tube forgings on both sides. Verify that the jack is not contacting the parking brake components.

See Figure 1-2. When lifting the rear of the motorcycle, secure the front tire in a wheel vise and secure front end to the motorcycle lift using straps. Place the jack under the rear portion of the frame, approximately centered under the clutch cover, and make sure it contacts the frame tube forgings on both sides.

Alternatively, each rear wheel can be raised by placing a jack under the left or right side of the axle.

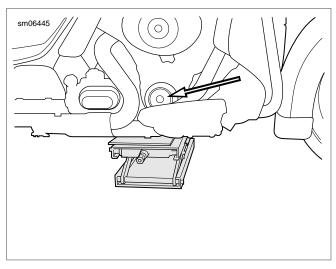


Figure 1-1. Jack Placement Under Front

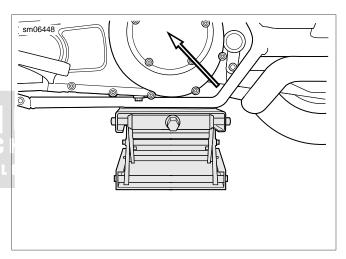


Figure 1-2. Jack Placement Under Rear

BULB REQUIREMENTS

GENERAL

Table 1-1. Bulb Chart

LAMP	DESCRIPTION (ALL LAMPS 12 VOLT)	BULBS REQUIRED	HARLEY-DAVIDSON PART NUMBER	
Headlamp	FLHTCUTG (DOM, CAN, JPN) *	LED	67700066	
	FLHTCUTG (HDI) *	LED	67700077	
	FLRT	1	68329-03	
	Auxiliary/fog lamps: FLHTCUTG (DOM, CAN) *	LED	68000020	
Tail/stop/rear turn	FLHTCUTG, FLRT (DOM, CAN)	2	68167-04	
signal lamp	FLHTCUTG (HDI, JPN) *	LED	See parts catalog	
Front turn signal	FLHTCUTG, FLRT (DOM, CAN)	2	68168-89A	
lamp	FLHTCUTG (HDI, JPN)	LED	See parts catalog	
Additional lighting	Tour-Pak side lamps * FLHTCUTG	LED	53788-06 (right side) 53789-06 (left side)	
	Fender tip lamp, front (if equipped) * FLHTCUTG	LED	See parts catalog	
	License plate lamp FLHTCUTG	2-4	52441-95	
Instruments	Speedometer *	See parts catalog		
(FLRT)	Indicator panel on fuel tank *			
Instruments	Instrument cluster *	See parts catalog		
(FLHTCUTG)	Voltmeter *	CHNICIAN° II		
	Fuel gauge * H A II	LEY-DAVIDS (
Items with *	Illuminated with LEDs. Replace assembly	upon failure.		

1.4

MAINTENANCE SCHEDULE

GENERAL

At each regular service interval, perform the required maintenance. Refer to <u>Table 1-2</u>.

Use the quick reference maintenance chart for torque values, lubricants or cross references to maintenance procedures. Refer to $\underline{\text{Table 1-3}}$.

Use the lubricants, greases and sealants table to identify maintenance supplies. Refer to <u>Table 1-4</u>.

NOTE

Grease is added to the differential during manufacturing and will last the life of the motorcycle. Never add grease to the differential. Adding grease can cause the differential to be overfilled resulting in damage to grease seals.

Table 1-2. Regular Service Intervals: 2015 Trike Models

ITEM SERVICED	PROCEDURE	1000 MI 1600 KM	5000 MI 8000 KM	10000 MI 16000 KM	15000 MI 24000 KM	20000 MI 32000 KM	25000 MI 40000 KM	30000 MI 48000 KM	35000 MI 56000 KM	40000 MI 64000 KM	45000 MI 72000 KM	50000 MI 80000 KM	NOTES
Electrical equip- ment and switches	Check operation	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	
Front tire	Check pressure, inspect tread	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	1
Front brake fluid	Inspect sight glass	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	2, 3
Clutch (hydraulic operated)	Inspect sight glass	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	2, 4
Reservoir cover screw: front brake, rear brake (FLRT) and hydraulic clutch	Check torque	Х		Х		Х		Х		X		Х	1, 5, 6
Hand control fasteners	Check switch housing screw torque	Х		X		Х		X		Х		Х	1, 5, 6
	Check clutch handlebar clamp screw torque	Х		X	TEO	×		×		Х		х	1, 5, 6
	Check front brake handlebar clamp screw torque	x		Х	HAR	L E ^X V -	DAVI	ı s ^x ı	i°	Х		Х	1, 5, 6
Steering head bearings	Disassemble, inspect, lubricate and adjust						Х					Х	5, 7
Hydraulic steering damper	Check for leaks smooth damper action, mounting fastener torque	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	8
Air cleaner	Inspect, service as required		Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	9
Engine oil and filter	Replace	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	1, 9
Engine coolant	Check freeze point, inspect for leaks	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	
	Replace coolant				Rep	olace ever	y 30,000 r	ni (48,000	km)				5
	Clean radiators	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	
Primary chaincase lubricant	Replace	Х		Х		Х		Х		Х		Х	9
Transmission lub- ricant	Replace	Х				Х				Х			9
Right front engine mount end cap screws	Check torque	Х		Х		Х		х		X		Х	1, 5, 10
Engine mount to front crankcase screws	Check torque	Х		Х		Х		Х		Х		Х	1, 5, 6
Engine stabilizer link screw torque including bracket to head screws	Check torque	Х		Х		Х		Х		Х		Х	1, 5, 10
Oil lines and brake system	Inspect for leaks, contact or abrasion	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	1, 5

Table 1-2. Regular Service Intervals: 2015 Trike Models

ITEM SERVICED	PROCEDURE	1000 MI 1600 KM	5000 MI 8000 KM	10000 MI 16000 KM	15000 MI 24000 KM	20000 MI 32000 KM	25000 MI 40000 KM	30000 MI 48000 KM	35000 MI 56000 KM	40000 MI 64000 KM	45000 MI 72000 KM	50000 MI 80000 KM	NOTES
Fuel lines and fit- tings	Inspect for leaks, contact or abrasion	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	1, 5
Rear brake fluid	Inspect sight glass	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	2, 3
Brake pads and discs	Inspect for wear	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	
Front brake and clutch master cylinder banjo bolts	Check torque	Х		Х		Х		Х		Х		Х	1, 5, 6
Front circuit mani- fold banjo bolt (12 mm)	Check torque	Х		Х		Х		Х		Х		Х	1, 5, 6
Front caliper banjo bolts	Check torque	Х		Х		Х		Х		Х		Х	1, 5, 6
Rear master cyl- inder banjo bolt	Check torque	Х		Х		х		Х		х		Х	1, 5, 6
Rear caliper banjo bolt	Check torque	Х		Х		Х		Х		Х		Х	1, 5, 6
Rear circuit mani- fold banjo bolt (10 mm)	Check torque	Х		Х		Х		Х		Х		х	1, 5, 6
Brake and clutch controls	Check, adjust and lubricate with HARLEY LUBE	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	5
Parking brake	Inspect and adjust	Х	Х	Х	X	Х	X	X	Х	Х	Х	X	5
Rear tires	Check pressure, inspect tread	X	Х	X	X	X	X	X	X	Х	Х	Х	1
Drive belt and sprockets	Inspect, adjust belt	X	Х	X	Х	X	X	X	Х	Х	Х	Х	5
Rear sprocket isolators	Inspect for wear				HAR	L E Y -	DAVI	DSON	l°	Х			5
Rear lug nuts	Check torque	Х		Х		X		Х		Х		Х	1, 5, 6, 11
Rear fork	Check pivot shaft nut torque	Х		Х		Х		Х		Х		Х	1, 5, 10
Air suspension	Check pressure, operation and leakage	Х	Х	Х	Х	х	х	Х	Х	Х	Х	Х	1, 5, 9
Exhaust system	Inspect for leaks, cracks, and loose or missing fasteners or exhaust shields	Х	X	Х	Х	Х	Х	Х	Х	Х	Х	Х	1, 9
Battery Check battery and	Battery terminal torque					Cł	neck annu	ally					1
clean connections.	Clean and lubricate terminals with ELECTRICAL CONTACT LUB- RICANT					Pe	form annu	ally					1
Spark plugs			Repl	ace every	two years	or every 3	30,000 mi	(48,000 kn	n), whiche	ver comes	first.		
Fuel door	Lubricate hinge and latch with HARLEY LUBE	Х	Х	Х	X	Х	Х	X	Х	X	Х	Х	
Front forks	Rebuild											Х	5, 12
Fuel filter element					Renl	ace every	100 000 m	i (160,000) km)				5

Table 1-2. Regular Service Intervals: 2015 Trike Models

ITEM SERVICED	PROCEDURE	1000 MI 1600 KM	5000 MI 8000 KM	10000 MI 16000 KM	15000 MI 24000 KM	20000 MI 32000 KM	25000 MI 40000 KM	30000 MI 48000 KM	35000 MI 56000 KM	40000 MI 64000 KM	45000 MI 72000 KM	50000 MI 80000 KM	NOTES
Road test	Verify component and system functions	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	13
NOTES:	1. Perform annually 2. Replace DOT 4 th 3. Brake fluid level 4. Clutch fluid level 5. Should be perforn 6. Attempt to turn th the fastener torque 7. Disassemble, ins 8. Replace or have 9. Perform maintener roads, long storage 10. Attempt to turn the fastener torque hole. Replace the facedure). Install fast 11. Always check lu 12. Disassemble, in 13. Check reverse	nydraulic fl will drop as will rise as med by an ne fastener has been spect, lubric rebuilt at 5 ance more conditions the fastener has been astener with ener. Tight ug nut torquispect, reb	uid and flus brake pass clutch we authorized using a to maintained the cate and a solo, 000 mi frequently s, short rurer using a to maintained ha new or en to specue within 5 uild forks a full full forks a full full forks a full full full full full full full fu	sh system ds wear. ars. Harley-Darace wreer I. No furth djust ever (80,000 ki in severe s, heavy s orque wree I. No furth eo or clear ification. 00-1000 n and replac	avidson de che set to the attention y 25,000 nm). riding con stop/go tranch set to er attention he the original in (805-16 e fork oil e	aler, unles he minimun n is neces ni (40,000 ditions suc ffic or poor the minim n is neces nal fastene	im torque sary. If fas km). The as extre refuel quali um torque sary. If the refuel ir wheel ir wheel ir wheel ir	me temper ty. specificat specificat fastener r and apply to	on for that es, tighten ratures, du ion for that noves, cle the approp	fastener. It to specific sty enviror t fastener. an all locki	f the faster cation. nments, m If the faste ng materia	ner does n ountainous ener does i	s or rough

Table 1-3. Quick Reference Maintenance and Torque Chart: Trike

ITEM SERVICED	SPECIFICATION	DATA		
Air cleaner	Air cleaner cover bracket screw torque	108-132 in-lbs (12.2-14.9 Nm)		
	Air cleaner cover screw torque	36-60 in-lbs (4.1-6.8 Nm)		
	Air cleaner cover screw threadlocker	LOCTITE 243 MEDIUM STRENGTH THREAD- LOCKER AND SEALANT (blue)		
Axle nut	Front HARLEY-DA	70-75 ft-lbs (94.9-101.7 Nm)		
Battery	Terminal screw torque	60-70 in-lbs (6.8-7.9 Nm)		
	Top caddy screw torque	72-96 in-lbs (8.1-10.9 Nm)		
Brake fluid level (Check	Туре	DOT 4 BRAKE FLUID		
sight glass. If fluid is low, remove reservoir cover and re-check.)	Fluid level	Front: Between upper and lower step on boss Rear: MAX mark		
and re-crieck.)	Master cylinder reservoir cover screw torque	Front: 6-8 in-lbs (0.7-0.9 Nm) Rear, FLHTCUTG: Hand-tighten Rear, FLRT: 6-8 in-lbs (0.7-0.9 Nm)		
Brakes	Minimum brake pad thickness	Front: 0.040 in (1.02 mm) Rear: 0.040 in (1.02 mm)		
	Minimum brake disc thickness	Front: 0.195 in (4.95 mm) Rear: 0.220 in (5.59 mm)		
	Maximum brake disc lateral runout (warpage)	0.008 in (0.20 mm)		
	Brake caliper banjo bolts	Front: 17-22 ft-lbs (23.1-29.8 Nm)		
		Rear: 17-22 ft-lbs (23.1-29.8 Nm)		
	Master cylinder banjo bolts	Front: 17-22 ft-lbs (23.1-29.8 Nm)		
		Rear: 27-29 ft-lbs (36.6-39.3 Nm)		
	Brake line manifold banjo bolts	Front circuit (12mm): 27-29 ft-lbs (36.6-39.3 Nm)		
		Rear circuit (10mm): 17-22 ft-lbs (23.1-29.8 Nm)		

Table 1-3. Quick Reference Maintenance and Torque Chart: Trike

ITEM SERVICED	SPECIFICATION	DATA		
Clutch fluid level	Туре	DOT 4 BRAKE FLUID		
(hydraulic operated) (Check sight glass. If the	Fluid level (with new clutch) ***	FILL level		
entire sight glass is not dark, remove reservoir cover and re-check.)	Clutch reservoir cover screw torque	6-8 in-lbs (0.7-0.9 Nm)		
Drive belt deflection	Upward force applied at midpoint of bottom belt strand	10 lbs (4.5 kg)		
	Deflection	3/8-7/16 in (9.5-11.1 mm)		
Engine coolant	Coolant type	GENUINE HARLEY-DAVIDSON EXTENDED LIFE ANTIFREEZE AND COOLANT		
	Coolant capacity	1.1 qt. (1.0 L)		
Engine oil and filter	Drain plug torque	14-21 ft-lbs (19.0-28.5 Nm)		
	Oil capacity *	4 qt. (3.8 L)		
	Filter	Hand tighten 1/2-3/4 turn after gasket contact		
Engine mount and stabil-	Engine mount, front, bolts	See the service manual.		
izers	Engine stabilizer link screws including bracket to head screws	See 2.33 ENGINE STABILIZER.		
Front fork oil	Amount	See <u>2.26 FRONT FORK</u> .		
	Туре	TYPE 'E' HYDRAULIC FORK OIL		
Hand controls	Switch housing screws	35-45 in-lbs (4.0-5.1 Nm)		
	Clutch lever bracket handlebar clamp screws	60-80 in-lbs (6.8-9.0 Nm)		
	Master cylinder reservoir handlebar clamp screws	60-80 in-lbs (6.8-9.0 Nm)		
Pivot shaft	Fasteners TEGHNIG	See <u>2.27 REAR FORK</u> .		
Primary chain lubricant	Lubricant type and capacity HARLEY-DA	FORMULA+ TRANSMISSION AND PRIMARY CHAINCASE LUBRICANT or SCREAMIN' EAGLE SYN3 FULL SYNTHETIC MOTORCYCLE LUBRICANT 20W50 Wet: 38 oz. (1124 ml) Dry: 45 oz. (1331 ml)		
	Primary chaincase drain plug torque	14-21 ft-lbs (19.0-28.5 Nm)		
Rear wheel	Lug nuts	90-100 ft-lbs (122.0-135.6 Nm)		
Spark plugs	Туре	HD-6R12		
	Gap	0.038-0.043 in (0.97-1.09 mm)		
	Torque	12-18 ft-lbs (16.3-24.4 Nm)		
Tire pressure and wear	Pressure: solo rider or with passenger	Front: 36 psi (248 kPA) Rear: 26 psi (179 kPA)		
	Wear	Replace if less than 1/32 in (0.8 mm) of tread pattern		

Table 1-3. Quick Reference Maintenance and Torque Chart: Trike

ITEM SERVICED	SPECIFICATION	DATA
Transmission lubricant	Lubricant level	Dipstick between ADD and FULL marks with motorcycle on level surface and filler plug threaded in until O-ring touches the case.
	Lubricant type and capacity **	FORMULA+ TRANSMISSION AND PRIMARY CHAIN LUBRICATION or SCREAMIN' EAGLE SYN3 FULL SYNTHETIC MOTORCYCLE LUBRICANT 20W50 32 oz (0.95 L)
	Transmission drain plug torque	14-21 ft-lbs (19.0-28.5 Nm)
	Transmission dipstick torque	25-75 in-lbs (2.8-8.5 Nm)

^{*} Capacity is approximate. When changing oil, initially add 3.0 qt (2.8 L). Run engine until warm. Check and fill as necessary.

Table 1-4. Lubricants, Greases, Sealants

ITEM	PART NUMBER	PACKAGE
3M 847 Adhesive	021200-19718 *	5 oz tube
3M General Purpose Adhesive Remover		15 oz aerosol
Anti-Seize Lubricant	98960-97	1 oz squeeze tube
CCI #20 Brake Grease	42830-05	squeeze packet (included in master cylinder rebuild kit)
DOT 4 Brake Fluid	99953-99A	12 oz bottle
Dow Corning Moly 44 Grease	94674-99	2 cc packet
Electrical Contact Lubricant	11300004	1 oz squeeze tube
Formula+ Transmission and Primary Chaincase Lubricant	99851-05	1 qt bottle
G40M Brake Grease	42820-04	squeeze packet
Genuine Harley-Davidson Extended Life Antifreeze and Coolant	99822-02	1 gal container
Genuine Harley-Davidson H-D 360 20W50 Motorcycle Oil	99816-2050/00QT	1 qt bottle
Harley-Davidson Adhesive (Griplock)	99839-95	10 g tube
Harley-Davidson High Performance Sealant - Gray	99650-02	1.9 oz squeeze tube
Harley-Davidson Leather Dressing	98261-91V	6 oz can
Harley-Davidson Seal Grease	11300005	1 oz tube
Harley Lube	94968-09	1/4 oz needle dispenser
Hylomar Gasket and Thread Sealant	99653-85	3.5 oz tube
Loctite 222 Low Strength Threadlocker and Sealant (purple)	99811-97	6 mL tube
Loctite 243 Medium Strength Threadlocker and Sealant (blue)	99642-97	6 mL tube
	11100005	50 mL bottle
Loctite 246 Medium Strength/High Temperature Threadlocker (blue)		
Loctite 262 High Strength Threadlocker and Sealant (red)	94759-99	6 mL tube
Loctite 271 High Strength Threadlocker and Sealant (red)		6 mL tube
	11100006	50 mL bottle

^{**} Capacity is approximate. When changing lubricant, initially add 28 oz (0.83 L). Check and fill as necessary.

^{***} Clutch fluid level will rise as clutch wears.

Table 1-4. Lubricants, Greases, Sealants

ITEM	PART NUMBER	PACKAGE
Loctite 411 Prism Instant Adhesive		
Loctite 420 Super Bonder Adhesive		
Loctite 565 Thread Sealant	99818-97	6 mL tube
Loctite 770 Prism Primer		
Loctite 7649 Cleaner/Primer	98968-99	1.75 oz bottle
RTV Silicone Sealer	99650-02	1.9 oz tube
Screamin' Eagle Assembly Lube	11300002	4 oz bottle
Screamin' Eagle SYN3 Full Synthetic Motorcycle Lubricant 20W50	99824-03/00QT	1 qt bottle
Special Purpose Grease	99857-97A	14 oz cartridge
Type "E" Hydraulic Fork Oil	62600026	16 oz bottle
Wheel Bearing Grease	99855-89	1 lb can
	99856-92	14 oz cartridge
* Not a Harley-Davidson part number	1	1



LUBRICANTS 1.5

ENGINE OIL LEVEL

ACAUTION

Prolonged or repeated contact with used motor oil may be harmful to skin and could cause skin cancer. Promptly wash affected areas with soap and water. (00358b)

NOTICE

Do not overfill oil. Doing so can result in oil carryover to the air cleaner leading to equipment damage and/or equipment malfunction. (00190b)

Check engine oil level at each complete fuel refill. This motor-cycle was originally equipped with GENUINE HARLEY-DAVIDSON H-D 360 MOTORCYCLE OIL 20W50. H-D 360 is the preferred oil under normal operating conditions. If operation under extreme cold or heat are expected, refer to Table 1-5 for alternative choices. See the service manual for more information.

Oil Level Cold Check

- 1. For pre-ride inspection, place motorcycle on level ground.
- See <u>Figure 1-3</u>. Remove filler plug/dipstick and wipe off the dipstick. Insert the dipstick and tighten into the fill spout.

NOTE

Oil level on a cold engine should never be above the midway point.

 See <u>Figure 1-4</u>. Remove filler plug/dipstick and check oil level. The correct oil level is midway (2) between the ADD QT and FULL HOT marks on the VEHICLE UPRIGHT gauge.

NOTE

If oil level is at or below the ADD QT mark, add only enough oil to bring the level midway (2) between the ADD QT and FULL HOT marks. Never bring the level to the FULL HOT mark on a cold engine.

Oil Level Hot Check

NOTICE

Do not allow hot oil level to fall below Add/Fill mark on dipstick. Doing so can result in equipment damage and/or equipment malfunction. (00189a)

NOTE

Perform engine oil level hot check only with engine at normal operating temperature.

1. Ride motorcycle until engine is at normal operating temperature.

- Place motorcycle on level ground. Allow engine to idle for 1-2 minutes. Turn engine off.
- See <u>Figure 1-3</u>. Remove filler plug/dipstick and wipe off the dipstick. Insert the dipstick and tighten into the fill spout.
- 4. See <u>Figure 1-4</u>. Remove filler plug/dipstick and check oil level. Oil level must register between the ADD QT and FULL HOT marks on the VEHICLE UPRIGHT gauge. If oil level is at or below the ADD QT mark, add only enough oil to bring the level to the FULL HOT mark. Do not overfill.
- 5. Start engine and carefully check for oil leaks around drain plug and oil filter.

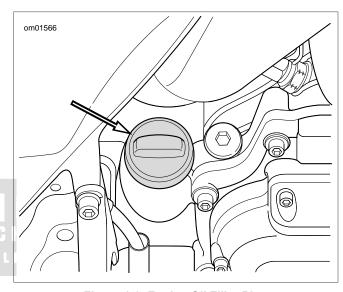


Figure 1-3. Engine Oil Filler Plug

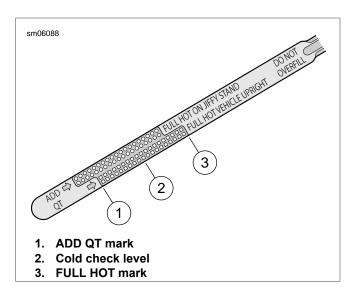


Figure 1-4. Engine Oil Dipstick (VEHICLE UPRIGHT Gauge)

Table 1-5. Recommended Engine Oils

TYPE	VISCOSITY	RATING	LOWEST AMBIENT TEMPERATURE	COLD-WEATHER STARTS BELOW 50 °F (10 °C)
Screamin' Eagle SYN 3 Full Synthetic Motorcycle Lubricant	SAE 20W50	HD 360	Above 30 °F (-1 °C)	Excellent
Genuine Harley-Davidson H-D 360 Motorcycle Oil	SAE 20W50	HD 360	Above 40 °F (4 °C)	Good
Genuine Harley-Davidson H-D 360 Motorcycle Oil	SAE 50	HD 360	Above 60 °F (16 °C)	Poor
Genuine Harley-Davidson H-D 360 Motorcycle Oil	SAE 60	HD 360	Above 80 °F (27 °C)	Poor
Genuine Harley-Davidson H-D 360 Motorcycle Oil	SAE 10W40	HD 360	Below 40 °F (4 °C)	Excellent

CHECKING TRANSMISSION LUBRICANT LEVEL

FASTENER	TORQUE	VALUE
Transmission dipstick	25-75 in-lbs	2.8-8.5 Nm

Check the transmission lubricant level with engine turned off and motorcycle on level surface.

NOTE

Allow vehicle to rest for a few moments before checking lubricant level. This will allow lubricant level to normalize.

- See <u>Figure 1-5</u>. Remove transmission lubricant dipstick. Wipe dipstick clean.
- Insert dipstick into transmission. Thread dipstick in until O-ring makes contact with case. Do not tighten.
- See <u>Figure 1-6</u>. Remove dipstick and check lubricant level on dipstick. If lubricant level is at or below the ADD (A) mark on the dipstick, add only enough lubricant to bring level to between ADD (A) mark and FULL (F) mark on dipstick.
- 4. Install dipstick. Tighten to 25-75 in-lbs (2.8-8.5 Nm).

Table 1-6. Recommended Lubricant

LUBRICANT	REFILL QUANTITY *
FORMULA+ TRANSMISSION AND PRIMARY CHAIN LUBRICANT	28 oz (0.83 L)
SCREAMIN' EAGLE SYN3 FULL SYNTHETIC MOTORCYCLE LUBRICANT 20W50	
*Approximate. Check and add as needed to be specification.	ring level within

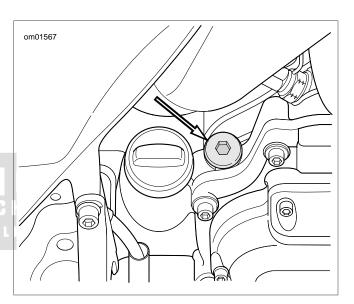


Figure 1-5. Transmission Dipstick Location

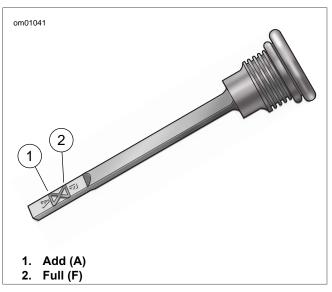


Figure 1-6. Transmission Dipstick Lubricant Level

BRAKES 1.6

HYDRAULICALLY LINKED BRAKE SYSTEM OPERATION

See <u>Figure 1-7</u>. Trike models employ a hydraulically linked brake system. This system applies both the front and rear brakes when using the rear brake pedal. The center set of

pistons in each 6-piston front caliper is actuated along with both rear calipers.

The front brake system remains independent and is applied using the front brake lever. The front brake lever actuates the remaining two sets of pistons in each front caliper to provide added stopping power while maintaining traditional motorcycle braking controls.

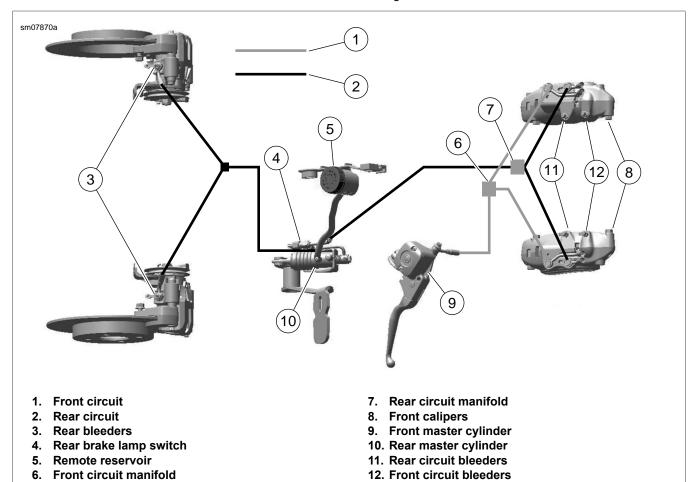


Figure 1-7. Linked Brake System

FLUID INSPECTION

NOTE

Fluid level in the reservoir will decrease with brake wear. Reservoir volume is adequate to provide fluid to the wear limits of the pads and rotors. A brake system that was properly filled when new should never need fluid added. If the level is below the full level, suspect worn brake pads and rotors or leakage.

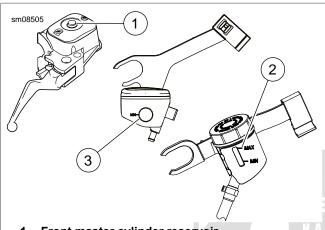
 The front brake hand lever and rear brake foot pedal must have a firm feel when applied. If not, bleed the system using only DOT 4 BRAKE FLUID. See <u>2.12 BLEEDING</u> <u>BRAKES</u>.

- 2. See Figure 1-8. Place vehicle on a flat level surface.
 - Front brake: Position motorcycle and handlebar so that master cylinder reservoir is level.
 - Rear brake: Position motorcycle so that master cylinder reservoir is level.
- 3. View the reservoir sight glass and verify fluid presence.
- Front: Sight glass must appear dark.
- Rear, FLHTCUTG: Fluid must be between the MIN and MAX lines.
- Rear, FLRT: Fluid must be above the MIN line.

NOTICE

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

- If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.
- If the fluid level is in question, remove the cover and verify fluid level. If necessary, add DOT 4 BRAKE FLUID to reservoir. Refer to <u>Table 1-7</u> and <u>Figure 1-9</u>.
- If the fluid level fails inspection, check the brake system for fluid leaks. Check that brake pads are properly installed and not worn beyond service wear limits. Perform any necessary repairs. See 1.7 BRAKE PADS AND DISCS.



- 1. Front master cylinder reservoir
- 2. Rear master cylinder reservoir: FLHTCUTG
- 3. Rear master cylinder reservoir: FLRT

Figure 1-8. Brake Fluid Sight Glass

BRAKE FLUID REPLACEMENT

PART NUMBER	TOOL NAME
SNAP-ON BB200A	BASIC VACUUM BRAKE BLEEDER

FASTENER	TORQUE	VALUE
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm

NOTES

- BASIC VACUUM BRAKE BLEEDER (Part No. Snap-on BB200A) or equivalent tool is required.
- This procedure is meant to replace fluid without introducing air. If any air enters lines during this procedure, revert to 2.12 BLEEDING BRAKES.
- Remove bleeder screw cap. Install vacuum brake bleeder to bleeder screw.
- 2. Position vehicle or handlebar so master cylinder reservoir is level.

NOTES

- Wrap a clean shop towel around the outside of the master cylinder reservoir to protect from brake fluid spills.
- · Clean master cylinder reservoir cover before removal.
- 3. Remove master cylinder reservoir cover.
- 4. Add brake fluid as necessary. Refer to Table 1-7.

AWARNING

A plugged or covered relief port can cause brake drag or lock-up, which could lead to loss of control, resulting in death or serious injury. (00288a)

5. Verify proper operation of the front master cylinder relief port by actuating the brake lever. A slight spurt of fluid will break the fluid surface in the reservoir if internal components are working properly. The spurt will not be seen in the remote reservoir on rear system.

NOTES

- Pay careful attention to fluid level in the master cylinder reservoir. Add fluid before it empties to avoid drawing air into the brake lines.
- Hold banjo bolt while opening and closing rear bleeder screw.

- Operate vacuum bleeder while maintaining fluid level in master cylinder reservoir.
 - Following the sequence in <u>Table 1-9</u>, open bleeder screw about 3/4 turn.
 - Continue until specified volume has been replaced. Refer to <u>Table 1-9</u>.
 - Tighten bleeder screw to specification. Refer to <u>Table 1-8</u>. Install bleeder screw cap.
- 7. Repeat with each caliper following the sequence in Table 1-9 until all brake lines have been serviced.
- 8. Fill reservoir to specified level. Refer to <u>Table 1-7</u> and <u>Figure 1-9</u>.

NOTE

Front master cylinder reservoir: Orient the cover with the thin edge toward the lever.

- Clean gasket and sealing surfaces of debris. Install master cylinder reservoir cover. Tighten to specification. Refer to <u>Table 1-8</u>.
- 10. Apply brakes to check proper lamp operation.



After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

11. Test ride motorcycle. Repeat the bleeding procedure if brakes feel spongy.

Table 1-7. Fluid Level

ITEM	SPECIFICATION
Front reservoir	Between upper and lower step on boss
Rear reservoir	MAX line

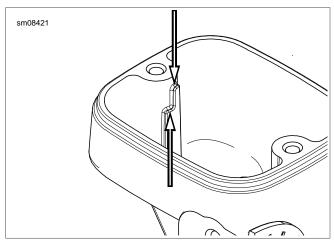


Figure 1-9. FILL Level Boss (front master cylinder)

Table 1-8. Torque Specifications

FASTENER	TORQUE VALUE
Brake caliper bleeder valve	Front: 80-100 in-lbs (9.0-11.3 Nm)
	Rear: 31-33 in-lbs (3.5-3.7 Nm)
Brake master cylinder reservoir, front, cover screws	6-8 in-lbs (0.7-0.9 Nm)
Brake master cylinder reservoir, rear, cover	FLHTCUTG: Hand-tighten FLRT: 6-8 in-lbs (0.7-0.9 Nm)

Table 1-9. Bleeding Sequence

CIRCUIT	BLEEDER LOCATION	VOLUME
Front	Front left	4 oz (118.3 cc)
	Front right	2 oz (59.1 cc)
Rear	Front left	2 oz (59.1 cc)
	Front right	4 oz (118.3 cc)
	Rear left	4 oz (118.3 cc)
	Rear right	2 oz (59.1 cc)

BRAKE LINES INSPECTION

Inspect brake lines for leaks, contact or abrasion. Refer to Table 1-10.

Table 1-10. Brake Line Inspection

LINE TYPE	INSPECTION	REMEDY
Steel lines	No marks	OK/Monitor
	Slight mark in paint or plating*	
	Copper colored-paint/plating worn off*	
	Silver colored base material-no noticeable feel of wear*	
	Silver colored base material-noticeable feel of wear*	Replace
	Brake fluid leak or other damage	

Table 1-10. Brake Line Inspection

LINE TYPE	INSPECTION	REMEDY
Flexible lines	No marks	OK/Monitor
	Slight dent in protective cover or flattening of ribs*	
	Worn through protective cover or to bottom of ribs	Replace
	Brake fluid leak or other damage	
Protective cover (steel, rubber, plastic or braided)	No marks	OK/Monitor
	Slight dent in covering*	
	Slight dent or flattening of plastic covering*	
	Worn or cut-through covering-exposed brake line material	Replace
	Brake fluid leak or other damage	



BRAKE PADS AND DISCS

INSPECTION

Check brake pads and discs:

- · At every scheduled service interval.
- Whenever components are removed for service.
- Refer to Table 1-11 for wear limits.

General Inspection

Inspect brake system for leaks and repair as necessary. Inspect brake lines and hoses for damage or wear.

Always adjust parking brake whenever brake pads are replaced.

Rear: See Figure 1-10. Rear pad wear can be visually inspected without rear wheel removal. Compare the end of tabs (2) to the surface of the outboard caliper bracket (1). If tab is flush or below the surface, disassemble and measure brake pad friction material thickness.

Front: Measure the thickness of the brake pad friction material. Check each pad.

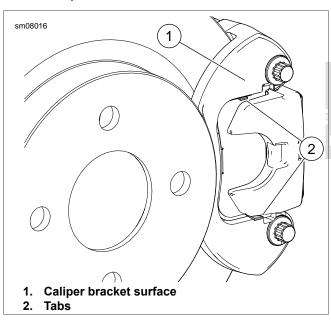


Figure 1-10. Rear Brake Pad Inspection

Brake Pads

AWARNING

Always replace brake pads in complete sets for correct and safe brake operation. Improper brake operation could result in death or serious injury. (00111a)

Replace all brake pads (inner and outer pads of both left and right side calipers) on the axle if the friction material of any single pad is worn to wear limit.

Brake Disc Thickness

Inspect brake disc surface condition. Replace disc if pitted, grooved or scored.

Inspect brake disc for excessive wear. Replace disc if worn to wear limit.

Brake Disc Lateral Runout

Inspect brake disc lateral runout and warpage. Replace disc if either is greater than specification.

Table 1-11. Brake Wear Limit Specifications

	FRONT	REAR
Friction pad thickness *	0.040 in (1.02 mm)	0.040 in (1.02 mm)
Disc thickness	0.195 in (4.95 mm)	0.220 in (5.59 mm)
Disc runout	0.008 in (0.20 mm)	0.008 in (0.20 mm)
* Friction material thickness above backing plate.		

BRAKE PAD REPLACEMENT

FASTENER	TORQUE	VALUE
Brake caliper, rear, mounting bracket screws	41-45 ft-lbs	55.6-61.0 Nm
Brake caliper, rear, mount bushing bolts	32-36 ft-lbs	43.4-48.8 Nm
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm
Brake caliper, front, mounting screws	28-38 ft-lbs	37.9-51.5 Nm
Brake caliper, front, pad pin	23-27 ft-lbs	31.2-36.6 Nm

This vehicle employs linked brakes meaning both front and rear brakes are applied when the brake pedal is operated. The front brake lever applies additional braking to the front wheel only. Service and bleeding differ from models having separate front and rear systems.

Rear Caliper Disassembly

- Remove the rear wheels. See <u>2.6 REAR WHEELS</u>.
- 2. Release parking brake. Completely loosen the parking brake adjustment. See <u>1.8 PARKING BRAKE</u>.

AWARNING

Always replace brake pads in complete sets for correct and safe brake operation. Improper brake operation could result in death or serious injury. (00111a)

3. See <u>Figure 1-11</u>. Hold bushing pins (7) by the flats and remove bushing bolts (4). Remove the caliper.

4. Remove the brake pads (1) and pad spring (5).

NOTE

Do not operate the brake pedal with the caliper removed or the piston may be forced out. This caliper contains no service parts.

Remove the cover from the rear brake master cylinder reservoir.

NOTE

Fluid level rises as the piston is pushed into the caliper. Remove fluid from reservoir if necessary.

- 6. Push the piston into the caliper until seated.
- Verify that bushing pins (7) slide smoothly in the caliper bores without rocking or sticking. Remove the bushing pins from the caliper.
- 8. Clean debris from the bushing pins and bushing bores.
- 9. Clean grooves (6) that the pads slide in.
- Inspect bushing pin O-rings (8) for damage. Replace as necessary.
- 11. If necessary, remove rear rotor:
 - a. Remove screws (2). Remove mount bracket (3).
 - b. Remove rotor.

Rear Caliper Assembly

- 1. See Figure 1-11. If removed, install rotor:
 - a. Install rotor on axle.
 - Apply a drop of LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) to the threads of each screw (2).
 - c. Install brake mount bracket (3) with screws (2). Tighten to 41-45 ft-lbs (55.6-61.0 Nm).
- 2. Lubricate bushing pin O-rings, OD of the bushing pins and bushing pin bores in the caliper using grease supplied in the brake pad kit. Do not apply grease to the threads of the bushing bolts or bushing pins.
- 3. Install a **new** pad spring (5) in the upper groove (6).
- Install new pads in grooves (6) of the caliper bracket.
 Verify that the friction material of both pads will face the disc.
- 5. Install the caliper with bushing bolts (4). Tighten to 32-36 ft-lbs (43.4-48.8 Nm).

AWARNING

After servicing brakes and before moving motorcycle, pump brakes to build brake system pressure. Insufficient pressure can adversely affect brake performance, which could result in death or serious injury. (00279a)

- 6. Operate brake pedal several times to set brake pads to proper operating position.
- Check the fluid level. Install the reservoir cover. Refer to <u>Table 1-12</u> and <u>Table 1-13</u>.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

- Install the rear wheels. See <u>2.6 REAR WHEELS</u>.
- 9. Adjust the parking brake. See <u>1.8 PARKING BRAKE</u>.
- 10. Apply brakes to check proper lamp operation.

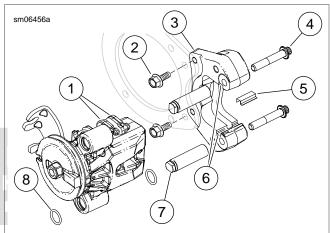
AWARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

NOTE

Avoid making hard stops for the first 100 mi (160 km) to allow the **new** pads to become conditioned to the brake discs.

11. Test ride motorcycle.



- 1. Brake pads
- 2. Screw (2)
- 3. Mount bracket
- 4. Mount bushing bolt (2)
- 5. Pad spring (install in upper groove)
- 6. Grooves
- 7. Mount bushing pin (2)
- 8. O-ring (4)

Figure 1-11. Rear Brake Caliper Assembly (left side shown)

Table 1-12. Fluid Level

ITEM	SPECIFICATION
Front reservoir	Between upper and lower step on boss
Rear reservoir	MAX line

Table 1-13. Torque Specifications

FASTENER	TORQUE VALUE	
Brake caliper bleeder valve	Front: 80-100 in-lbs (9.0-11.3 Nm)	
	Rear: 31-33 in-lbs (3.5-3.7 Nm)	
Brake master cylinder reservoir, front, cover screws	6-8 in-lbs (0.7-0.9 Nm)	
Brake master cylinder reservoir, rear, cover	FLHTCUTG: Hand-tighten FLRT: 6-8 in-lbs (0.7-0.9 Nm)	

Front Caliper Disassembly

NOTE

Protect the front fender to prevent cosmetic damage.

- 1. Remove cable straps securing the fender tip lamp wires to the left brake hoses.
- 2. See Figure 1-12. Loosen pad pin (2).
- Remove screws (5) securing the caliper. Remove the caliper.

NOTE

Do not operate the brake pedal or hand lever with the caliper removed or pistons may be forced out. This caliper contains no service parts.

4. Remove the covers from the front and rear brake master cylinder reservoirs.

NOTE

Fluid level rises as pistons are pushed into the caliper. Remove fluid from reservoir if necessary.

- Push each pad back until pistons are fully seated in caliper bores
- 6. Remove pad pin (2). Remove pads.
- 7. Inspect pad spring (4). Replace if damaged.

Front Caliper Assembly

- If replacing pad spring, seat **new** pad spring in the caliper.
 Engage the pad spring clips to the caliper.
- 2. See <u>Figure 1-12</u>. Place the **new** pads in the caliper and loosely install pad pin (2).
- Install the caliper with screws (5). Tighten to 28-38 ft-lbs (37.9-51.5 Nm).

- 4. Tighten pad pin (2) to 23-27 ft-lbs (31.2-36.6 Nm).
- Secure the fender tip lamp wires to the brake hoses with new cable straps.

NOTE

Because this vehicle has linked brakes, both the front and rear master cylinders are affected when the front calipers are serviced

- 6. Operate front and rear brakes to set the pads to the proper operating position.
- Check the brake fluid level in each master cylinder reservoir. Install the master cylinder reservoir covers. Refer to Table 1-12 and Table 1-13.

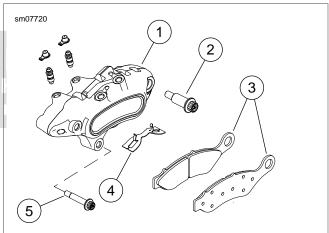
AWARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

NOTE

Avoid making hard stops for the first 100 mi (160 km) to allow the **new** pads to become conditioned to the brake discs.

8. Test ride motorcycle.



- 1. Caliper
- 2. Pad pin
- 3. Brake pads
- 4. Pad spring
- 5. Caliper mounting screw (2)

Figure 1-12. Front Brake Caliper Assembly

ADJUSTMENT

FASTENER	TORQUE VALUE	
Parking brake adjuster jamnut	72-120 in-lbs	8.1-13.6 Nm
Parking brake adjuster jamnut	72-120 in-lbs	8.1-13.6 Nm

Wheels on the Ground

- 1. Place the vehicle on a flat level surface.
- See <u>Figure 1-14</u>. Inspect the return spring for damage. Replace as necessary.
- Release parking brake. Verify the vehicle moves easily when pushed by hand.
- 4. See Figure 1-13. Pull the boot back. Loosen jamnut (2).
- Push the parking brake pedal to the first click (1). Attempt to roll the vehicle.
 - a. If some resistance is felt, go to next step.
 - If wheels turn freely, release brake and lengthen adjuster (3). Check and repeat until resistance is felt.
- 6. Push the parking brake pedal two more clicks to the **third** click. Vehicle should not move when pushed. If wheels turn, release brake and lengthen adjuster (3). Check and repeat until wheels will not turn.
- Release the parking brake pedal and verify vehicle moves freely.

NOTE

Apply a coat of grease to the adjuster threads to ease future adjustments.

- 8. Hold adjuster and tighten jamnut to 72-120 **in-lbs** (8.1-13.6 Nm).
- 9. Install the boot over the adjuster.

NOTE

Verify parking brake operates properly when parking on a slope.

Wheels off the Ground

- Place the vehicle on a flat level surface. Raise both rear wheels.
- See <u>Figure 1-14</u>. Inspect the return spring for damage. Replace as necessary.
- 3. Release parking brake. Verify both rear wheels rotate freely.
- 4. See Figure 1-13. Pull the boot back. Loosen jamnut (2).
- 5. Push the parking brake pedal to the **first** click (1). Attempt to rotate the rear wheels.
 - a. If some resistance is felt, go to next step.
 - If wheels turn freely, release brake and lengthen adjuster (3). Check and repeat until resistance is felt.

- Push the parking brake pedal two more clicks to the **third** click. Wheels should not rotate. If wheels turn, release brake and lengthen adjuster (3). Check and repeat until wheels will not turn.
- 7. Release the parking brake pedal and verify wheels rotate freely.

NOTE

Apply a coat of grease to the adjuster threads to ease future adjustments.

- 8. Hold adjuster and tighten jamnut to 72-120 **in-lbs** (8.1-13.6 Nm).
- 9. Install the boot over the adjuster.

NOTE

Verify parking brake operates properly when parking on a slope.

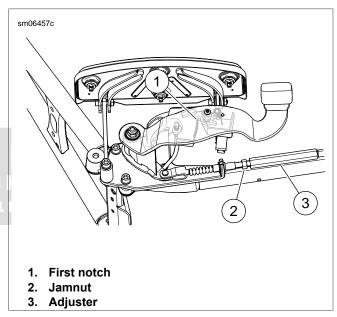


Figure 1-13. Parking Brake Adjustment

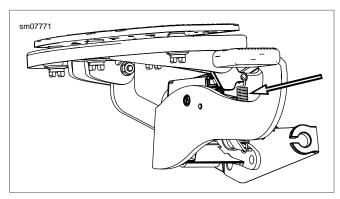


Figure 1-14. Return Spring

REAR TIRES 1.9

INSPECTION

Tire Pressure

Always maintain proper tire pressure as specified in <u>Table 2-3</u>. Do not load tires beyond GAWR specified in <u>Table 2-2</u>. Underinflated, over-inflated or overloaded tires can fail.

Check pressure when tire is cold. Refer to Table 2-3.

Tire Wear

AWARNING

Replace tire immediately with a Harley-Davidson specified tire when wear bars become visible or only 1/32 in (0.8 mm) tread depth remains. Riding with a worn tire could result in death or serious injury. (00090c)

Harley-Davidson tires are equipped with wear bars that run horizontally across the tread. When a tire is worn to the point that the wear bars are visible, or 1/32 in. (0.8 mm) tread depth remains, the tire can:

- Be more easily damaged leading to tire failure.
- · Provide reduced traction.
- Adversely affect stability and handling.
- 1. See <u>Figure 1-15</u>. Locate arrows on tire sidewalls. The arrows point to location of tread wear bars.

NOTE

See <u>Figure 1-16</u>. Tread wear bars will be at the tread surface when 1/32 in (0.8 mm) or less of tread remains. As wear may be uneven, always replace the tire before any single tread wear bar is at the tread surface.

- Also replace tire if any of the following conditions are evident:
 - Tire cords or fabric are visible through cracked sidewall
 - b. Bumps, bulges or splits.
 - c. Punctures, cuts or other damage that cannot be repaired.

Tire Replacement

AWARNING

Use only Harley-Davidson specified tires. See a Harley-Davidson dealer. Using non-specified tires can adversely affect stability, handling or braking, which could result in death or serious injury. (00024b)

Refer to Table 2-3.

Tire Balancing

NOTES

- The Trike rear wheel assemblies must be statically balanced within 0.5 oz (14 g).
- The maximum weight permitted to be added to a wheel assembly is 3.5 oz (99 g).
- Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

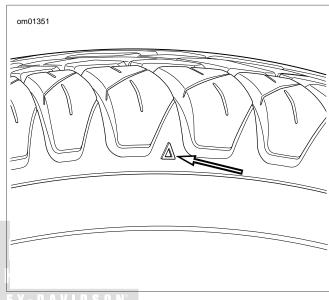


Figure 1-15. Rear Tire Tread Wear Bar Indicator

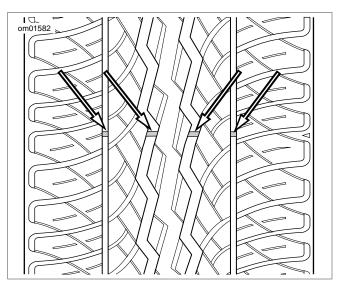


Figure 1-16. Dunlop Rear Tire Wear Bar Appearance

1.10

HYDRAULIC CLUTCH FLUID

GENERAL

The clutch is hydraulically actuated. The master cylinder creates pressure in the clutch fluid line. This pressure activates the secondary clutch actuator. The secondary clutch actuator piston extends and contacts a pushrod to disengage the clutch.

ACAUTION

Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN. (00240a)

NOTICE

D.O.T. 4 hydraulic brake fluid is used in the hydraulic clutch. Do not use other types of fluids as they are not compatible and could cause equipment damage. (00353a)

NOTICE

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

 If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.

FLUID INSPECTION

FASTENER	TORQUE VALUE	
Clutch reservoir cover screws	6-8 in-lbs	0.7-0.9 Nm

NOTES

- Fluid should never need to be added or removed from the system during normal wear. Clutch fluid volume increases with clutch wear.
- If fluid level is substantially above the FILL level, a worn clutch may be the cause.
- Check that clutch hand lever returns completely.
- 1. Place vehicle on a flat level surface.
- Position motorcycle and handlebar so that master cylinder reservoir is level.
- 3. See Figure 1-17. Verify that sight glass (3) appears dark.

NOTICE

Do not allow dirt or debris to enter the master cylinder reservoir. Dirt or debris in the reservoir can cause improper operation and equipment damage. (00205c)

- 4. If the sight glass is not dark:
 - a. Check for fluid leaks in hydraulic clutch system.
 - Remove master cylinder cover. Check fluid level in clutch reservoir.
 - c. See <u>Figure 1-18</u>. Add DOT 4 BRAKE FLUID as necessary. Do NOT exceed FILL level. Over-filling can damage seals or cause premature clutch wear.
 - d. Attach cover with screws. Tighten to 6-8 in-lbs (0.7-0.9 Nm).

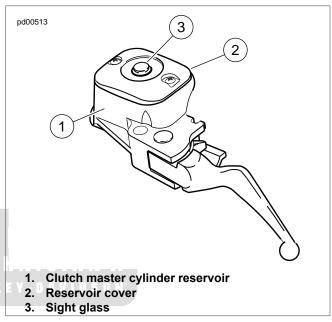


Figure 1-17. Clutch Master Cylinder Reservoir

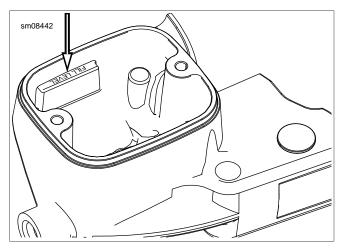


Figure 1-18. FILL LEVEL Boss (clutch master cylinder)

DRIVE BELT 1.11

CHECKING DRIVE BELT DEFLECTION

PART NUMBER	TOOL NAME
HD-35381A	BELT TENSION GAUGE

FASTENER	TORQUE VALUE	
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

NOTE

Always use BELT TENSION GAUGE (Part No. HD-35381A) to measure belt deflection. Do not rely on "feel" as this can result in belts that are under tensioned. Loose belts will fail due to "ratcheting" (jumping a tooth).

Check belt deflection:

- With transmission in neutral.
- With motorcycle at ambient temperature.
- With the rear wheels elevated or on the ground without rider or luggage.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 1. Disconnect battery negative cable.
- 2. Slide O-ring on gauge toward 0 lbs (0 kg) mark.
- 3. See <u>Figure 1-19</u>. Fit cradle against bottom of belt midway between transmission sprocket and rear sprocket.
- Push upward on knob until O-ring slides to the 10 lb (4.5 kg) mark on the tool and compare belt deflection to scale on debris deflector.
- 5. Belt must be adjusted if not within specification. Refer to Table 1-14.

Table 1-14. Belt Deflection

MODELS	IN	ММ
All models	3/8-7/16	9.5-11.1

6. Connect battery negative cable. Tighten to 60-70 **in-lbs** (6.8-7.9 Nm).

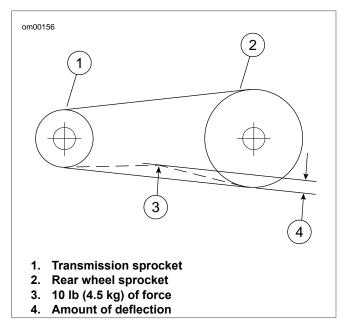


Figure 1-19. Checking Belt Deflection

SETTING DEFLECTION

FASTENER TORQUE VALUE		VALUE
Axle adjustment screw jamnut	15-25 ft-lbs	20.3-34.0 Nm
Pinch block screws	41-45 ft-lbs	55.6-61.0 Nm
Lug nuts VIDSON	90-100 ft-lbs	122.0-135.6 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

- 1. Remove rear wheels. See <u>2.6 REAR WHEELS</u>.
- See <u>Figure 1-20</u>. Loosen four pinch block bolts (1) on each side.
- 3. Loosen jamnut (2) on both adjustment screws (3).
- 4. Check axle alignment before adjusting belt tension.
 - a. Verify the axle housing is tight against the head of the adjustment screw (3). Use a scale or dial caliper to measure the distance (4) from the face of the adapter plate to the front of the axle housing on both sides.
 - Distance (4) must be within 0.062 in (1.6 mm) on each side. Turn the adjustment screws (3) until measurement is within specification.
- Reduce or increase belt deflection by turning the adjustment screw on each side in or out an equal number of turns.
- Verify that firm contact is made with heads of adjustment screws and check belt deflection. See <u>1.11 DRIVE BELT</u>, <u>Checking Drive Belt Deflection</u>.
- 7. Repeat steps until belt deflection is within specification.

- 8. Snug jamnut against rear of each adapter plate and again check axle alignment measurement (4). Tighten jamnuts to 15-25 ft-lbs (20.3-34.0 Nm).
- Remove one pinch block bolt (1) at a time and remove all residual threadlocking compound from threaded hole in pinch block. Use compressed air to blow out any debris.
- If bolt is to be reused, remove all threadlocking compound using a wire brush or wire wheel. Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
- 11. Install bolt with flat washer and tighten until snug.
- 12. Tighten all pinch block bolts in a crosswise pattern to 41-45 ft-lbs (55.6-61.0 Nm).
- 13. Verify belt deflection. Rotate the rear tires a few rotations by hand and verify the belt does not contact either the battery tray or frame. If either is the case, adjust the rear axle lateral alignment. See <u>2.28 LATERAL ALIGNMENT</u>.
- 14. Install rear wheels and tighten lug nuts in a crosswise pattern to 90-100 ft-lbs (122.0-135.6 Nm). See <u>2.6 REAR WHEELS</u>.

NOTE

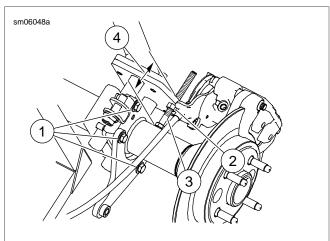
Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

15. Connect battery negative cable. Tighten to 60-70 **in-lbs** (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

16. Install seat.



- 1. Pinch block bolts (4 each side)
- 2. Jamnut
- 3. Adjustment screw
- 4. Measured distance



REAR WHEEL COMPENSATOR

CHECKING ISOLATOR WEAR

FASTENER	TORQUE VALUE	
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

1. Remove seat.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

2. Disconnect negative battery cable.

NOTE

Although this procedure can be done with the vehicle on the ground, it is easer to do with it raised on a lift.

- 3. Raise motorcycle on lift.
- 4. Engage parking brake.
- Rotate rear drive sprocket forward by hand as far as possible and hold.
- 6. See <u>Figure 1-21</u>. Draw a horizontal line from the flat of a ring gear tooth to the edge of the sprocket. Use a paint pen or felt marker for best results.
- 7. Hold the ring gear and rotate sprocket rearward by hand until sprocket stops and hold in place.
- If the line on the sprocket moves further than the flat of the next ring gear tooth, then free play is more than 4 degrees or 0.409 in (10.4 mm) and isolators must be replaced. See <u>5.5 AXLE HOUSING/DIFFERENTIAL</u> for removal and disassembly instructions.
- Connect negative battery cable. Tighten to 60-70 in-lbs (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

10. Install seat.

11. Release parking brake.

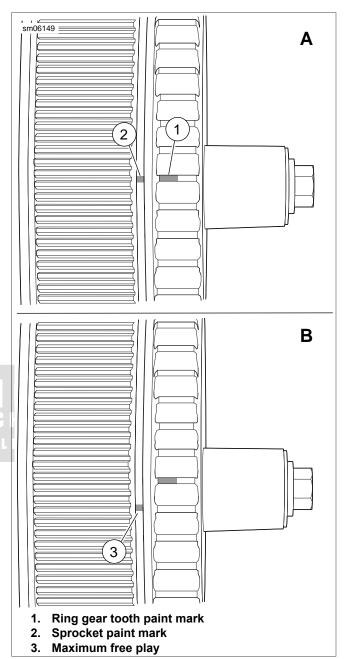


Figure 1-21. Check Isolator Wear, Reverse Equipped

REAR SUSPENSION ADJUSTMENTS

GENERAL

PART NUMBER	TOOL NAME
HD-34633	AIR SUSPENSION PUMP AND GAUGE

See <u>Figure 1-22</u>. Adjust rear air suspension pressure by adding or removing air from the air valve located behind the right side cover.

AWARNING

Do not exceed the motorcycle's Gross Vehicle Weight Rating (GVWR) or Gross Axle Weight Rating (GAWR). Exceeding these weight ratings can lead to component failure and adversely affect stability, handling and performance, which could result in death or serious injury. (00016f)

NOTES

- Use a no-loss air gauge such as AIR SUSPENSION PUMP AND GAUGE (Part No. HD-34633) to check air pressure. Check suspension pressure weekly if driven daily or before each trip if only used occasionally.
- Improper inflation of rear air suspension components also can result in a reduction of available suspension travel, reduced rider comfort and possible damage to shock absorbers.

Air pressure may be varied to suit load conditions, riding style and personal comfort. Less initial pressure does not necessarily result in a softer ride.

Refer to <u>Table 1-15</u> as a starting point in determining suitable rear air suspension pressures. Do not exceed maximum GVWR when loading vehicle. Do not pressurize system in excess of 50 psi (345 kPa).

AWARNING

Use caution when bleeding air from the suspension. Moisture combined with lubricant may leak onto the rear wheel, tire and/or brake components and adversely affect traction, which could result in death or serious injury. (00084a)

NOTICE

Do not exceed maximum air pressure for suspension. Air components fill rapidly. Therefore, use low air line pressure. Failure to do so can result in possible damage to components. (00165b)

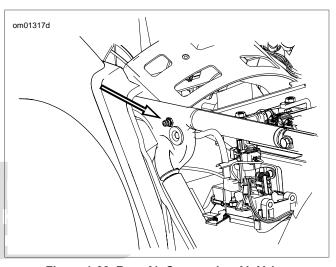


Figure 1-22. Rear Air Suspension Air Valve

Table 1-15. Rear Suspension Recommended Air Pressure

SHOCK LOAD	TOTAL WEIGHT	PRESSURE	
		PSI	kPa
Solo rider	up to 150 lb (68 kg)	5-10	34-69
	150-200 lb (68-91 kg)	10-20	69-138
	200-250 lb (91-113 kg)	20-30	138-206
	250-300 lb (113-136 kg)	30-40	206-276
	300 lb (136 kg) to maximum added weight allowed*	40-50	276-345
Solo rider with capacity luggage of 80 lb (36 kg)	up to 150 lb (68 kg)	25-30	172-206
	150-200 lb (68-91 kg)	30-40	206-276
	200-250 lb (91-113 kg)	40-50	276-345
	250 lb (113 kg) to maximum added weight allowed*	50	345
Rider plus passenger	All weights up to maximum added weight allowed*	50	345
Maximum loaded vehicle	Maximum added weight allowed*	50	345

1.14

STEERING HEAD BEARINGS

MAINTENANCE

Steering head bearings on Trike do not require a swing-back check during periodic maintenance inspections. Perform the following checks:

- 1. Raise the front wheel off the ground.
- 2. Remove the steering damper. See <u>1.15 STEERING</u> <u>DAMPER</u>.
- Move forks from stop to stop to check for smooth operation. Rough operation indicates damaged bearings. See the service manual to replace bearings.

- 4. Verify that there is no clunk:
 - a. Grasp both forks near the front axle.
 - Shake forks front to rear checking for a clunk. A clunk indicates loose fork stem. Disassemble and inspect. See the service manual.
- 5. Install steering damper. See 1.15 STEERING DAMPER.
- 6. Inspect and lubricate the bearings as specified in <u>Table 1-2</u>. See the service manual.



INSPECTION

NOTICE

When lifting a motorcycle using a jack, be sure jack contacts both lower frame tubes where down tubes and lower frame tubes converge. Never lift by jacking on crossmembers, oil pan, mounting brackets, components or housings. Failure to comply can cause serious damage resulting in the need to perform major repair work. (00586d)

- Raise motorcycle so that front wheel is off the ground. See 1.2 LIFTING MOTORCYCLE WITH A JACK.
- 2. Turn handlebars through the full range of motion at least two cycles. Observe the action of the damper for even force throughout the range of motion.

 Replace the steering damper if there is oil leakage or a lack of damping at any point in the range. See 2.32 STEERING DAMPER ASSEMBLY.

NOTE

If the vehicle is out of warranty and the steering damper needs to be repaired, return to:

Ohlins USA

703-C Old Spartanburg Road

Hendersonville, NC 28792

828-692-4525

Ohlins provides a complete rebuilding service for the steering damper used on Trike models.



FORK OIL 1.16

PROCEDURE

PART NUMBER	TOOL NAME
HD-59000B	FORK OIL LEVEL GAUGE

Fork oil change also requires rebuilding the forks. See the service manual for complete disassembly and assembly procedures. Use the following specifications in place of the ones in those procedures.

AWARNING

Incorrect amount of fork oil can adversely affect handling and lead to loss of vehicle control, which could result in death or serious injury. (00298a)

- 1. Inspect upper fork spring for damage or distortion. Replace rebound spring whenever upper fork spring is replaced.
- 2. Pour slightly more than 26 oz (771 cc) of Harley-Davidson TYPE "E" HYDRAULIC FORK OIL into fork tube.
- Set FORK OIL LEVEL GAUGE (Part No. HD-59000B) to measure 3.8 in (96 mm).
- 4. Assemble and install fork.

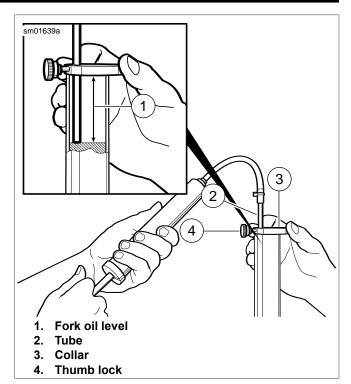


Figure 1-23. Oil Level Gauge



HEADLAMP ALIGNMENT

FLHTCUTG HDI DUAL LED HEADLAMPS

FASTENER	TORQUE VALUE	
Headlamp nut: HDI Models	20-24 ft-lbs	27.1-32.5 Nm

NOTE

Refer to the service manual for headlamp alignment on FLHTCUTG models other than HDI.

Check Alignment

- Check tire pressure.
- 2. Adjust rear shocks for the rider and intended load.
- 3. Fill fuel tank or add an equal amount of ballast.

NOTE

Choose a wall in minimum light.

- 4. See <u>Figure 1-24</u>. Park the motorcycle on a line (1) perpendicular to the wall.
- Position motorcycle so that front axle is 25 ft (7.6 m) from wall
- 6. Draw a vertical centerline (2) on the wall.

NOTE

The upper lens is low beam on LED headlamps.

- 7. With the motorcycle loaded normally, point the front wheel straight forward at wall. Measure the distance (4) from the floor to the center of the **low beam bulbs**.
- 8. Draw a horizontal line (5) at the measured distance (4).
- 9. Measure the horizontal distance from the vehicle vertical centerline to the vertical centerline of each headlamp.
- 10. See <u>Figure 1-25</u>. Mark the headlamp centerlines (1, 2) on the wall to intersect the horizontal line.

NOTE

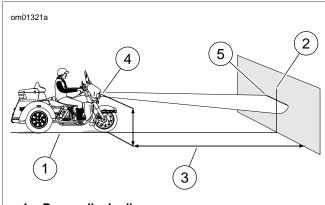
LED headlamps create a beam that is nearly flat on the top.

- 11. Verify headlamp alignment:
 - a. Set headlamps to low beam.
 - b. The headlamp is aligned when the light beam is located as shown in Figure 1-25.

Adjust Alignment

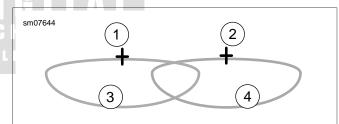
- 1. Place the vehicle facing a target wall as described above.
- Remove the turn signal lamps from the headlamp mounting brackets. See <u>7.5 FRONT LIGHTING</u>: HDI.
- Loosen the headlamp nuts only enough to allow movement of the lamp.
- 4. Turn the headlamps on **low beam**. Cover the right headlamp. Adjust the left headlamp so the top of the high intensity zone (3) is below and approximately centered under the left centerlines as shown in Figure 1-25.
- Cover the left headlamp. Adjust the right headlamp so the top of the high intensity zone (4) is below and approxim-

- ately centered under the right auxiliary/fog lamp centerlines as shown in Figure 1-25.
- Tighten headlamp nut to 20-24 ft-lbs (27.1-32.5 Nm).
- Install turn signal. See <u>7.5 FRONT LIGHTING: HDI</u>.



- 1. Perpendicular line
- 2. Vertical centerline
- 3. 25 ft (7.6 m)
- 4. Low beam bulb centerline
- 5. Horizontal line at low beam centerline

Figure 1-24. Headlamp Alignment: LED



- 1. Left headlamp centerlines
- 2. Right headlamp centerlines
- 3. Left high intensity beam area
- 4. Right high intensity beam area

Figure 1-25. Headlamp Alignment: HDI

HEADLAMP: FLRT

FASTENER	TORQUE VALUE	
Headlamp horizontal adjust- ment screw: FLRT	30-35 ft-lbs	40.7-47.5 Nm
Headlamp vertical adjustment screw: FLRT	35-45 ft-lbs	47.5-61.0 Nm

Alignment

AWARNING

The automatic-on headlamp feature provides increased visibility of the rider to other motorists. Be sure headlamp is on at all times. Poor visibility of rider to other motorists can result in death or serious injury. (00030b)

- 1. Check tire pressure.
- 2. Fill fuel tank or add an equal amount of ballast.
- Adjust rear shocks for the rider and intended load.

NOTE

Choose a wall in minimum light.

- See <u>Figure 1-26</u>. Park the motorcycle on a line (1) perpendicular to the wall.
- Position motorcycle with front axle is 25 ft (7.6 m) from wall.
- 6. Draw a vertical line (2) on the wall.

NOTE

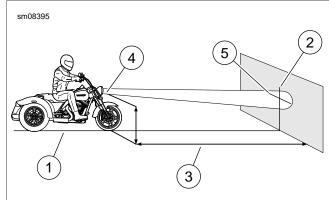
As the weight of the rider compresses the suspension, seat a person approximately the same weight as the rider.

- 7. With the motorcycle loaded normally, point the front wheel straight forward at wall. Measure the distance (4) from the floor to the center of the **high beam bulb**.
- Draw a horizontal line (5) through the vertical line on the wall 2.1 in (53.3 mm) lower than the measured bulb centerline.

NOTE

The headlamp is aligned when the light beam hot spot is located over the intersection of the lines.

9. With the high beam activated, verify headlamp alignment. Adjust as necessary.



- 1. Perpendicular line
- 2. Vertical centerline
- 3. 25 ft (7.6 m)
- 4. High beam bulb centerline
- 5. Horizontal line 2.1 in (53.3 mm) lower than bulb centerline

Figure 1-26. Headlamp Alignment: FLRT

Adjustment

- 1. Point the front wheel straight forward.
- See <u>Figure 1-27</u>. Loosen horizontal adjustment screw (2). Tilt headlamp left or right to direct light beam straight ahead.
- 3. Tighten screw (2) to 30-35 ft-lbs (40.7-47.5 Nm).
- Loosen vertical adjustment screw (1). Tilt headlamp up or down until light beam hot spot is located over the intersection of lines.
- 5. Tighten vertical adjustment screw (1) to 35-45 ft-lbs (47.5-61.0 Nm).

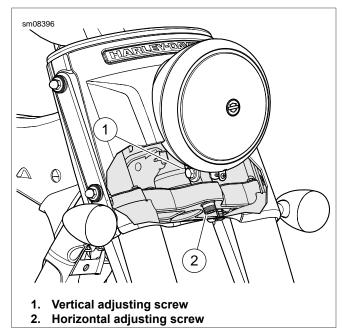


Figure 1-27. Headlamp Adjustment: FLRT

TROUBLESHOOTING

GENERAL

WARNING

The Troubleshooting section of this manual is a guide to diagnose problems. Read the appropriate sections of this manual before performing any work. Improper repair and/or maintenance could result in death or serious injury. (00528b)

Use the symptoms listed for general troubleshooting. More than one condition may be present at a time. Check all possible items to keep motorcycle in good operating condition.

NOTE

See the electrical diagnostic manual for additional information.

ENGINE

Starter Motor Does Not Operate or Does Not Turn Engine Over

- 1. Ignition switch not in IGNITION position.
- 2. Engine run switch in OFF position.
- Discharged battery, loose or corroded connections (solenoid chatters).
- 4. Starter control circuit, relay, or solenoid faulty.
- 5. Electric starter shaft pinion gear not engaging or overrunning clutch slipping.
- TSM/TSSM/HFSM Bank Angle Sensor tripped and ignition/light key switch not cycled OFF then back to IGNITION.
- 7. Security system activated.
- Motorcycle in gear and clutch not pulled in and front or rear brake applied.
- 9. Main fuse not in place.

Engine Turns Over But Does Not Start

- Fuel tank empty.
- 2. Fouled spark plugs.
- Discharged battery, loose or damaged battery terminal connections.
- 4. Engine lubricant too heavy (winter operation).

NOTE

For cold-weather starts, always disengage clutch.

- Spark plug cables in bad condition and shorting, cable connections loose or cables connected to incorrect cylinders.
- Damaged wire or loose wire connection at ignition coil, battery, or ECM connector.
- Ignition timing incorrect due to faulty ignition coil, ECM or sensors.

- 8. Bank Angle Sensor tripped and ignition switch not cycled OFF then back to IGNITION.
- Fuel filter clogged.
- 10. Sticking or damaged valve(s) or wrong length pushrod(s).
- 11. Plugged fuel injectors.

Starts Hard

- Spark plugs in bad condition or have improper gap or are partially fouled.
- 2. Spark plug cables in poor condition.
- 3. Battery nearly discharged.
- Damaged wire or loose wire connection at one of the battery terminals, ignition coil or ECM connector.
- Water or dirt in fuel system.
- 6. Intake air leak.
- 7. Fuel tank vent hose, filler cap vent or vapor valve plugged, or fuel line closed off, restricting fuel flow.
- 8. Engine lubricant too heavy (winter operation).

NOTE

For cold weather starts, always disengage clutch.

- 9. Ignition not functioning properly (possible sensor failure).
- 10. Faulty ignition coil.
- 11. Valves sticking.
- 12. Partially plugged fuel injector(s).

Starts But Runs Irregularly or Misses

- 1. Spark plugs in poor condition or partially fouled.
- 2. Spark plug cables in poor condition and shorting or leaking.
- 3. Spark plug gap too close or too wide.
- 4. Faulty ignition coil, ECM, or sensor.
- 5. Battery nearly discharged.
- 6. Damaged wire or loose connection at battery terminals, ignition coil or ECM connector.
- 7. Intermittent short circuit due to damaged wire insulation.
- Water or dirt in fuel system.
- 9. Fuel tank vent system plugged.
- 10. Air leak at intake manifold or air cleaner.
- 11. Loose or dirty ECM connector.
- 12. Faulty Sensor(s): Temperature Manifold Absolute Pressure (TMAP), Crank Position (CKP) or Oxygen (O2).
- 13. Incorrect valve timing.
- 14. Weak or damaged valve springs.
- 15. Damaged intake or exhaust valve.
- 16. Partially plugged fuel injector(s).

A Spark Plug Fouls Repeatedly

- 1. Fuel mixture too rich.
- 2. Incorrect spark plug for the kind of service.
- 3. Piston rings badly worn or damaged.
- 4. Valve guides or seals badly worn.

Pre-Ignition or Detonation (Knocks or Pings)

- 1. Fuel octane rating too low.
- Faulty spark plugs.
- 3. Incorrect spark plug for the kind of service.
- Excessive carbon deposit on piston head or in combustion chamber.
- Ignition timing advanced due to faulty sensor inputs (TMAP and/or CKP).
- Ignition timing advanced due to ECM or sensors (CKP, ET or TMAP) defective.
- 7. Intake manifold vacuum leak.

Overheating

- 1. Insufficient oil supply or oil not circulating.
- 2. Insufficient air flow over engine.
- 3. Heavy carbon deposits.
- Ignition timing retarded due to defective ECM or faulty sensor(s) (TMAP and/or CKP).
- Leaking valve(s).
- 6. Low coolant level.
- 7. Restricted radiator air flow.
- 8. Defective thermostat.
- 9. Coolant pump or fans inoperative.
- 10. Vent hose crimped.
- 11. Air in coolant.

NOTE

See the service manual COOLING chapter for additional cooling system troubleshooting.

Valve Train Noise

- Low oil pressure caused by oil feed pump not functioning properly or oil passages obstructed.
- 2. Faulty hydraulic lifter(s).
- Bent pushrod(s).
- 4. Incorrect pushrod length.
- 5. Rocker arm binding on shaft.
- 6. Valve sticking in guide.
- 7. Chain tensioning spring or shoe worn.
- 8. Cam(s), cam gear(s) or cam bushing(s) worn.
- Cam timing incorrect.

Excessive Vibration

- Wheels bent or damaged and/or tires worn or damaged.
- 2. Engine/Transmission/Rear Wheel not aligned properly.
- Primary chain badly worn or links tight as a result of insufficient lubrication or misalignment.
- 4. Engine to transmission mounting bolts loose.
- Upper engine mounting bracket loose/damaged or mounting bracket pre-loaded.
- Ignition timing advanced due to faulty sensor inputs (TMAP and/or CKP)/poorly tuned engine.
- 7. Internal engine problem.
- 8. Damaged frame.
- Stabilizer links worn or loose, or stabilizer link brackets loose or damaged.
- 10. Isolators worn or isolator bolts loose or damaged.
- 11. Rubber mounts loose or worn.
- 12. Rear fork pivot shaft fasteners loose.
- 13. Front engine mounting bolts loose.

Check Engine Light Illuminates During Operation

 Fault detected. See the electrical diagnostic manual for more information.

LUBRICATION SYSTEM

Oil Does Not Return To Oil Reservoir

- Oil reservoir empty.
- 2. Oil pump not functioning.
- Restricted oil lines or fittings.
- 4. Restricted oil filter.
- O-ring damaged or missing from oil pump/crankcase junction (also results in poor engine performance).

Engine Uses Too Much Oil Or Smokes Excessively

- Oil reservoir overfilled.
- 2. Restricted oil return line to oil reservoir.
- 3. Restricted breather operation.
- 4. Restricted oil filter.
- 5. Oil pump misaligned or in poor condition.
- 6. Piston rings badly worn or broken.
- 7. Valve guides or seals worn or damaged.
- 8. O-ring damaged or missing from oil pump/crankcase junction (also results in poor engine performance).
- Plugged crankcase scavenge port.
- 10. Oil diluted with gasoline.

Engine Leaks Oil From Cases, Pushrods, Hoses, Etc.

- 1. Loose parts.
- 2. Imperfect seal at gaskets, pushrod covers, washers, etc.
- 3. Restricted breather passages or hose to air cleaner.
- 4. Restricted oil filter.
- Oil reservoir overfilled.
- Lower rocker housing gasket installed incorrectly (upside down).
- 7. Restricted oil return line to oil reservoir.
- 8. Porosity.

Low Oil Pressure

- Oil reservoir underfilled.
- 2. Faulty low oil pressure switch.
- 3. Oil pump O-ring damaged or missing.
- 4. Bypass valve stuck in open position.
- 5. Ball missing or leaking in cam support plate.
- 6. Worn oil pump gerotor(s).
- 7. Oil diluted with gasoline.

High Oil Pressure

- 1. Oil reservoir overfilled.
- 2. Bypass valve stuck in closed position.

ELECTRICAL SYSTEM

NOTE

For diagnostic information see the electrical diagnostic manual.

Alternator Does Not Charge

- 1. Voltage regulator module not grounded.
- 2. Engine ground wire loose or damaged.
- 3. Faulty voltage regulator module.
- 4. Loose or damaged wires in charging circuit.
- 5. Faulty stator and/or rotor.

Alternator Charge Rate Is Below Normal

- Weak or damaged battery.
- Loose connections.
- 3. Faulty voltage regulator module.
- 4. Faulty stator and/or rotor.

Speedometer Operates Erratically

- Contaminated vehicle speed sensor (remove sensor and clean off metal particles).
- Loose connections.

TRANSMISSION

Shifts Hard

- Primary chaincase overfilled with lubricant.
- 2. Clutch not fully disengaging.
- 3. Transmission lubricant too heavy (winter operation).
- 4. Shifter return spring (inside transmission) bent or otherwise damaged.
- 5. Bent shifter rod.
- 6. Shifter forks (inside transmission) sprung.
- Corners worn off shifter clutch dog rings (inside transmission).

Jumps Out Of Gear

- 1. Shifter rod improperly adjusted.
- Shifter drum (inside transmission) improperly adjusted or damaged/worn.
- 3. Shifter engaging parts (inside transmission) badly worn and rounded.
- Shifter forks bent.
- 5. Damaged gears.

Clutch Slips

- Reservoir over-full.
- 2. Clutch lever not returning completely.
- 3. Damaged or binding secondary clutch actuator.
- 4. Insufficient clutch spring tension.
- Worn friction discs.

Clutch Drags Or Does Not Release

- 1. Lubricant level too high in primary chaincase.
- 2. Air in hydraulic clutch system.
- 3. Primary chain badly misaligned or too tight.
- Insufficient clutch spring tension.
- 5. Clutch discs warped.

Clutch Chatters

Friction discs or steel discs worn or warped.

HANDLING

Irregularities

- Improperly loaded motorcycle. Non-standard equipment on the front end such as heavy radio receivers, extra lighting equipment or luggage tends to cause unstable handling.
- 2. Damaged tire(s) or improper front-rear tire combination.
- 3. Irregular or peaked front tire tread wear.
- 4. Incorrect tire pressure.
- 5. Shock absorber not functioning normally.

- 6. Incorrect air suspension pressure.
- 7. Loose front wheel axle nuts or rear wheel lug nuts. Tighten to recommended torque specification.
- 8. Excessive front wheel hub bearing play.
- 9. Rear axle out of alignment with frame and front wheel.
- Steering head bearings improperly adjusted. Correct adjustment and replace pitted or worn bearings and races.
- 11. Damaged or inoperative steering damper.
- 12. Tire and wheel unbalanced.
- 13. Rims and tires out-of-round or eccentric with hub.
- 14. Rims and tires out-of-true sideways.
- 15. Rear fork pivot assembly: improperly tightened or assembled, or loose/pitted or damaged pivot bearings.
- Engine mounts and/or stabilizer links loose, worn or damaged.
- 17. Uneven rear brake operation.
- 18. Loose rear axle bearing cap bolts or bearing retainer nuts.

BRAKES

Brake Does Not Operate Normally

 Master cylinder reservoir low on fluid, system leaking or pads worn.

- 2. Brake system contains air bubbles.
- Master cylinder or caliper piston seals worn or parts damaged.
- 4. Brake pads contaminated with grease or oil.
- 5. Brake pads or disc worn.
- Brake drags: insufficient brake pedal or hand lever free play, caliper piston worn or damaged, or excessive brake fluid in reservoir.
- Brake fades due to heat buildup brake pads dragging or excessive braking.
- 8. Brake fluid leak when under pressure.

Parking Brake Does Not Hold Normally

- Parking brake requires adjustment.
- Rear brake pads or discs worn. Replace parts and adjust parking brake.

REVERSE MOTOR

Reverse Motor Does Not Operate/Cannot Enable

- 1. Vehicle not started or vehicle not in neutral.
- 2. Reverse motor circuit breaker open/tripped.





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FASTENER TORQUE VALUES

FASTENER TORQUE VALUES IN THIS CHAPTER

The table below lists torque values for all fasteners presented in this chapter.

FASTENER	TORQUE	EVALUE	NOTES
Air valve nut	12-15 in-lbs	1.4-1.7 Nm	2.25 INTERMEDIATE FRAME, Installation
Axle adapter plate screws	41-45 ft-lbs	55.6-61.0 Nm	2.28 LATERAL ALIGNMENT, Procedure/Use LOCTITE 243 MEDIUM STRENGTH THREAD- LOCKER AND SEALANT (blue)
Axle cover set screw	60-84 in-lbs	6.8-9.5 Nm	2.5 FRONT AXLE COVERS: HDI MODELS, Replacement/LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red)
Bank angle sensor bracket screws	72-108 in-lbs	8.1-12.2 Nm	2.25 INTERMEDIATE FRAME, Assembly
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	2.6 REAR WHEELS, Installation
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	2.22 BODY, Installation
Battery tray screws	72-96 in-lbs	8.1-10.9 Nm	2.25 INTERMEDIATE FRAME, Installation
Body attachment screws (inside trunk)	14-17 ft-lbs	19.0-23.1 Nm	2.22 BODY, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Body attachment screws (outside trunk)	23-28 ft-lbs	31.2-38.0 Nm	2.22 BODY, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Brake caliper, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.8 FRONT BRAKE CALIPERS, Installation
Brake caliper, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake caliper, front, mounting screws	28-38 ft-lbs	37.9-51.5 Nm	2.8 FRONT BRAKE CALIPERS, Installation/metric
Brake caliper, rear, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.10 REAR BRAKE CALIPERS, Installation
Brake caliper, rear, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake caliper, rear, mount bushing bolts	32-36 ft-lbs	43.4-48.8 Nm	2.10 REAR BRAKE CALIPERS, Installation
Brake caliper, rear, mounting bracket screws	41-45 ft-lbs	55.6-61.0 Nm	2.10 REAR BRAKE CALIPERS, Installation/Use Loctite Medium Strength Threadlocker 243 (blue)
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm	2.12 BLEEDING BRAKES, Procedure
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm	2.12 BLEEDING BRAKES, Procedure
Brake line, rear, tee locknut	59-63 in-lbs	6.7-7.1 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake line, rear, tee locknut	59-63 in-lbs	6.7-7.1 Nm	2.27 REAR FORK, Installation/Use new locknut
Brake line P-clamp screw	80-100 in-lbs	9.0-11.3 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake manifold, front circuit, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake manifold, front circuit, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake manifold, rear circuit, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake manifold, rear circuit, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake manifold mounting screw	96-120 in-lbs	10.8-13.6 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake master cylinder, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake master cylinder, front, clamp screws	60-80 in -lbs	6.8-9.0 Nm	2.7 FRONT BRAKE MASTER CYL- INDER, Assembly
Brake master cylinder, rear, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.9 REAR BRAKE MASTER CYL- INDER/PEDAL, Installation
Brake master cylinder, rear, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.11 BRAKE LINES, Rear Brake Line

FASTENER	TORQUE	EVALUE	NOTES
Brake master cylinder, rear, mounting bracket nut	30-40 ft-lbs	40.7-54.2 Nm	2.9 REAR BRAKE MASTER CYL-INDER/PEDAL, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Brake master cylinder, rear, mounting bracket screws	126-150 in-lbs	14.2-16.9 Nm	2.9 REAR BRAKE MASTER CYL-INDER/PEDAL, Installation
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm	2.12 BLEEDING BRAKES, Procedure
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm	2.12 BLEEDING BRAKES, Procedure
Brake pedal shaft locknut	15-20 ft-lbs	20.3-27.1 Nm	2.9 REAR BRAKE MASTER CYL- INDER/PEDAL, Installation
Clutch line P-clamp	40-48 in-lbs	4.5-5.4 Nm	2.15 CLUTCH FLUID LINE: FLRT, Line Replacement
Clutch line P-clamp	40-48 in-lbs	4.5-5.4 Nm	2.31 HEADLAMP NACELLE, Installation
Clutch master cylinder clamp screws	60-80 in-lbs	6.8-9.0 Nm	2.14 CLUTCH MASTER CYLINDER AND RESERVOIR, Assembly
Clutch reservoir cover screws	6-8 in-lbs	0.7-0.9 Nm	2.14 CLUTCH MASTER CYLINDER AND RESERVOIR, Assembly
Engine mount end cap screws, front	42-48 ft-lbs	56.9-65.0 Nm	2.11 BRAKE LINES, Rear Brake Line
Engine stabilizer bracket screws	30-35 ft-lbs	40.7-47.5 Nm	2.33 ENGINE STABILIZER, Stabilizer Link/Apply LOCTITE 272 HIGH STRENGTH/HIGH TEMPER-ATURE THREADLOCKER AND SEALANT (red/orange) to threads
Engine stabilizer link screws	30-35 ft-lbs	40.7-47.5 Nm	2.33 ENGINE STABILIZER, Stabilizer Link
Engine stabilizer link screws	30-35 ft-lbs	40.7-47.5 Nm	2.33 ENGINE STABILIZER, Stabilizer Link
Fairing double studs	120-180 in-lbs	13.6-20.3 Nm	2.32 STEERING DAMPER ASSEMBLY, Installation
Fender, rear, screws	108-132 in-lbs	12.2-14.9 Nm	2.23 REAR FENDERS, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Frame connection bracket screws	41-45 ft-lbs	55.6-61.0 Nm	2.25 INTERMEDIATE FRAME, Assembly
Front axle nut	70-75 ft-lbs	94.9-101.7 Nm	2.4 FRONT WHEEL, Installation
Front axle pinch screw (metric)	18-22 ft-lbs	24.4-29.8 Nm	2.4 FRONT WHEEL, Installation
Ground strap to forward stud (inside trunk)	14-17 ft-lbs	19.0-23.1 Nm	2.22 BODY, Installation
Ground strap to upper stud: FLHTCUTG	96-120 in-lbs	10.8-13.5 Nm	2.22 BODY, Assembly: FLHTCUTG
Handlebar cover screws: FLRT	10-20 in-lbs	1.1-2.3 Nm	2.31 HEADLAMP NACELLE, Installation
Headlamp mounting screw: FLRT	30-35 ft-lbs	40.7-47.5 Nm	2.31 HEADLAMP NACELLE, Installation
Headlamp nacelle acorn nuts	96-132 in-lbs	10.8-14.9 Nm	2.31 HEADLAMP NACELLE, Installation
Headlamp nacelle top cover screws	84-120 in-lbs	9.5-13.5 Nm	2.31 HEADLAMP NACELLE, Installation
Intermediate frame screws	40-45 ft-lbs	54.2-61.0 Nm	2.25 INTERMEDIATE FRAME, Installation
Left electrical caddy screw	72-96 in-lbs	8.1-10.9 Nm	2.25 INTERMEDIATE FRAME, Installation
License plate bracket screws: FLHTCUTG	18-30 in-lbs	2.0-3.4 Nm	2.17 TRUNK DOOR: FLHTCUTG, Assembly/Use LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue)
Lug nuts	90-100 ft-lbs	122.0-135.6 Nm	2.6 REAR WHEELS, Installation/Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.
Muffler bracket screws	14-18 in-lbs	19.0-24.4 Nm	2.24 REAR FRAME, Installation
Panhard rod adjustment jamnut	25-35 ft-lbs	33.9-47.5 Nm	2.30 PANHARD ROD, Adjustment

Panhard rod adjustment jamnut 25-35 ft-lbs 33.9-47.5 Nm 2.30 PANHARD ROD, Adjustment 25-60 ft-lbs 74.6-81.4 Nm 2.30 PANHARD ROD, Installation 25-60 ft-lbs 74.6-81.4 Nm 2.30 PANHARD ROD, Adjustment 25-60 ft-lbs 74.6-81.4 Nm 2.30 PANHARD ROD, Adjustment 25-60 ft-lbs 74.6-81.4 Nm 2.30 PANHARD ROD, Installation 25-60 ft-lbs 74.6-81.4 Nm 2.30 PANHARD ROD, Installation 213 PARKING BRAKE ASSEMBLY, Cascrews 213 PARKING BRAKE ASSEMBLY, Perspective productions and productions are producted assembly 25-60 ft-lbs 74.6-81.4 Nm 25-60 ft-lbs 25-60	dal
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Rear fork pivot shaft locknut 50 ft-lbs + 180 degrees additional rotation 50 ft-lbs + 180 tegrees additional rotation 67.8 Nm + 180 degrees additional rotation 2.27 REAR FORK, Installation/Always under the company of the compan	ise new
Rear frame screws 41-45 ft-lbs 55.6-61.0 Nm 2.24 REAR FRAME, Installation/ Use Logarity 262 HIGH STRENGTH THREADLOCK SEALANT (red)	
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Steering damper locknut 16-20 ft-lbs 21.7-27.1 Nm 2.32 STEERING DAMPER ASSEMBLY, I	nstallation
Steering damper side bracket acorn nuts: 120-180 in-lbs 13.6-20.3 Nm 2.32 STEERING DAMPER ASSEMBLY tion/ These also retain the auxiliary/fog/ lamp brackets.	
Steering damper side bracket to fork bracket screws: FLRT 20-25 ft-lbs 27.1-33.9 Nm 2.32 STEERING DAMPER ASSEMBLY, I	nstallation
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FASTENER	TORQUE	E VALUE	NOTES
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm	2.21 TOUR-PAK, Tour-Pak Adjustment
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm	2.21 TOUR-PAK, Installation
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm	2.21 TOUR-PAK, Installation
Trunk bulkhead cover screws	72-96 in-lbs	8.1-10.8 Nm	2.22 BODY, Assembly: FLRT
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Installation
Trunk door hinge cover screws: FLRT	25-35 in-lbs	2.8-3.9 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door hinge locknuts: FLHTCUTG	60-84 in-lbs	6.8-9.5 Nm	2.17 TRUNK DOOR: FLHTCUTG, Installation/Use new locknuts
Trunk door hinge screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Assembly/Use LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue)
Trunk door hinge to body screws: FLRT	72-96 in-lbs	8.1-11.0 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door hinge to door screws: FLRT	72-96 in-lbs	8.1-11.0 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door lanyard screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Installation
Trunk door latch: FLRT	96-120 in-lbs	10.8-13.6 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk door latch: FLRT	96-120 in-lbs	10.8-13.6 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk door latch housing screws: FLHTCUTG	48-60 in-lbs	5.4-6.8 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Latch Assembly
Trunk door latch mechanism screws: FLHTCUTG	8-10 in-lbs	0.9-1.1 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Latch Assembly
Trunk door latch pin bracket screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Installation
Trunk door latch pin jamnut: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Assembly
Trunk door latch pin jamnut: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Latch Pin
Trunk door lock housing nuts: FLHTCUTG	9-11 in-lbs	1.0-1.2 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Latch Assembly
Trunk door striker pin: FLRT	35-40 ft-lbs	47.0-54.0 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door striker pin: FLRT	35-40 ft-lbs	47.0-54.0 Nm	2.19 TRUNK DOOR: FLRT, Adjust Trunk Door
Trunk door striker screws: FLRT	72-96 in-lbs	8.1-11.0 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door tether reel screws: FLRT	72-96 in-lbs	8.1-10.8 Nm	2.22 BODY, Assembly: FLRT
Trunk door tether to door screws: FLRT	16-22 in-lbs	1.8-2.5 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk latch cover screws: FLRT	20-25 in-lbs	2.3-2.8 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk latch housing cover screw: FLHTCUTG	25-28 in-lbs	2.8-3.2 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Lockset
Trunk lock cover: FLRT	72-96 in-lbs	8.1-10.8 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk lock cover: FLRT	72-96 in-lbs	8.1-10.8 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk lock knob nut: FLRT	13-16 ft-lbs	17.6-21.7 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Upper handlebar clamp fastener, rear: all models	16-20 ft-lbs	21.7-27.1 Nm	2.16 HANDLEBAR, Adjustment: FLRT
Wheel center cap clamp screw	72-96 in-lbs	8.1-10.9 Nm	2.6 REAR WHEELS, Installation/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)

SPECIFICATIONS

GENERAL

Table 2-1. Dimensions

ITEM	FLHTCUTG		FLRT	
	IN	MM	IN	MM
Length	105.1	2670	103.1	2620
Overall Width	54.7	1390	54.9	1394
Overall Height	56.3	1430	46.7	1186
Wheelbase	65.7	1670	66.0	1675
Ground clearance	4.5	115	4.9	124
Saddle height*	27.1	688	26.9	683
*With 180 lb (81.7 kg) rider on seat.				

WARNING

Do not exceed the motorcycle's Gross Vehicle Weight Rating (GVWR) or Gross Axle Weight Rating (GAWR). Exceeding these weight ratings can lead to component failure and adversely affect stability, handling and performance, which could result in death or serious injury. (00016f)

- GVWR is the sum of the weight of the motorcycle, accessories, and the maximum weight of the rider, passenger and cargo that can be safely carried.
- GAWR is the maximum amount of weight that can be safely carried on each axle.
- The GVWR and GAWR are shown on the information label, located on the frame down tube.

The maximum additional weight allowed on the motorcycle equals the Gross Vehicle Weight Rating (GVWR) minus the

running weight. For example, a motorcycle with GVWR of 1200 lbs (544 kg) having a running weight of 800 lbs (363 kg), would allow a maximum of an additional 400 lbs (181 kg) combined weight of the rider, passenger, riding gear, cargo and installed accessories.

Table 2-2. Weights

ITEM	FLHTCUTG		FLRT	
	LB	KG	LB	KG
Running weight*	1215	551	1082	491
Maximum added weight allowed**	485	220	618	290
GVWR	1700	771	1700	771
GAWR front	500	227	500	227
GAWR rear	1200	544	1200	544

^{*} The total weight of the motorcycle as delivered with all oil/fluids and approximately 90% of fuel.

AWARNING

Use only Harley-Davidson specified tires. See a Harley-Davidson dealer. Using non-specified tires can adversely affect stability, handling or braking, which could result in death or serious injury. (00024b)

NOTE

Harley-Davidson does not perform any testing with only nitrogen in tires. Harley-Davidson neither recommends nor discourages the use of pure nitrogen to inflate tires.

Table 2-3. Specified Tires

MODEL	MOUNT	SIZE	SPECIFIED TIRE PRESSUR		RE (COLD)
				PSI	kPa
FLHTCUTG	Front	16 in.	Dunlop D402F MT90B16 72H	36	248
FLRT	Front	19 in.	Dunlop D408F 130/60B19 61H	36	248
FLHTCUTG, FLRT	Rear	15 in.	Dunlop P205/65 R15 92T	26	179

^{**} The total weight of accessories, cargo, riding gear, passenger and rider must not exceed this weight.

VEHICLE IDENTIFICATION NUMBER (VIN)

VEHICLE IDENTIFICATION NUMBER (VIN)

General

See Figure 2-2. A unique 17-digit serial or Vehicle Identification Number (VIN) is assigned to each motorcycle. For a description of each item in the VIN, refer to Table 2-4.

Location

See Figure 2-1. The full 17-digit VIN (1) is stamped on the right side of the frame near the steering head. In some destinations, a printed VIN label (2) is also attached to the front downtube.

Abbreviated VIN

An abbreviated VIN showing the vehicle model, engine type, model year, and sequential number is stamped on the left side of the crankcase between the engine cylinders.

NOTE

Always give the full 17-digit Vehicle Identification Number when ordering parts or making any inquiry about your motorcycle.

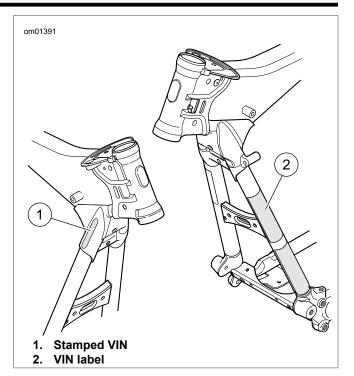


Figure 2-1. VIN Locations



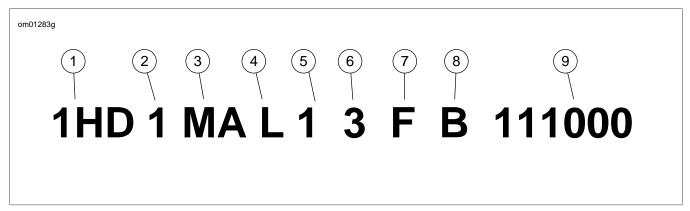


Figure 2-2. Typical Harley-Davidson VIN: 2015 Trike Models

Table 2-4. Harley-Davidson VIN Breakdown: 2015 Trike Models

POSITION	DESCRIPTION	POSSIBLE VALUES	
1	World manufacturer identifier	1HD=Originally manufactured in the United States 5HD=Originally manufactured in the United States for sale outside of the United States 932=Originally manufactured in Brazil MEG=Originally manufactured in India	
2	Motorcycle type	1=Heavyweight motorcycle (901 cm	n ³ or larger)
3	Model	MA=FLHTCUTG Tri Glide™ Ultra MC=FLRT Freewheeler™	
4	Engine type	L=Twin-Cooled [™] 1690 cm³ High Output Twin Cam 103 [™] , fuel-injected M=Air-Cooled 1690 cm³ High Output Twin Cam 103 [™] , fuel-injected	
5	Calibration/configuration, introduction	Normal Introduction 1=Domestic (DOM) 3=California (CAL) A=Canada (CAN) C=HDI E=Japan (JPN)	Mid-year or Special Introduction 2, 4=Domestic (DOM) 5, 6=California (CAL) B=Canada (CAN) D=HDI F=Japan (JPN)
6	VIN check digit	Can be 0-9 or X	
7	Model year	F=2015	
8	Assembly plant	B=York, PA U.S.A.	
9	Sequential number	Varies	

REMOVAL

- 1. Engage parking brake.
- Raise front wheel using a suitable lifting device. See 1.2 LIFTING MOTORCYCLE WITH A JACK.
- 3. Inspect wheel bearings. See the service manual.
- Remove both brake calipers. See <u>2.8 FRONT BRAKE</u> <u>CALIPERS</u>. Secure calipers to engine guard so that caliper is not suspended by brake hose.

NOTE

Do not operate brakes with the caliper removed or the caliper pistons may be forced out. Brake caliper has no serviceable parts and would result in the need to replace the caliper assembly.

- HDI: Remove axle covers. See <u>2.5 FRONT AXLE</u> COVERS: HDI MODELS.
- 6. See Figure 2-3. Remove cotter pin (6).
- 7. Insert round punch or steel rod through hole in right side of axle to hold axle stationary. Remove axle nut (7) and flat washer (5).
- 8. Loosen axle pinch screw (metric) at bottom of right side fork slider.
- 9. Using a soft mallet, gently tap end of axle towards right side of motorcycle. Catching outer spacers (2), pull axle free of fork sliders and wheel hub.
- 10. See service manual for wheel repair procedures.

INSTALLATION

FASTENER	TORQUI	E VALUE
Front axle nut	70-75 ft-lbs	94.9-101.7 Nm
Front axle pinch screw (metric)	18-22 ft-lbs	24.4-29.8 Nm

- 1. Place wheel into position with the valve stem on the right side of the motorcycle.
- 2. See Figure 2-3. Apply a light coat of ANTI-SEIZE LUB-RICANT to axle, bearing bores and bore of inner spacer (4).

NOTE

Be sure that grooves on outer spacers are on the outboard side. Outer spacers on left and right side of wheel hub are interchangeable.

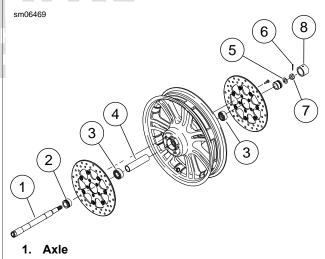
3. Slide axle through right fork slider, outer spacer, wheel hub, second outer spacer and left fork slider.

- 4. Install flat washer (5) and axle nut (7).
- Insert screwdriver or steel rod through hole in right side of axle to hold axle stationary. Tighten axle nut to 70-75 ft-lbs (94.9-101.7 Nm).
- 6. Install cotter pin (6) and bend ends. If necessary, further tighten axle nut a maximum of 15 degrees to align axle hole and nut slot.
- Push right fork slider inboard until it contacts outer spacer
 Hold in this position and tighten axle pinch screw to 18-22 ft-lbs (24.4-29.8 Nm).
- 8. Install brake calipers. See 2.8 FRONT BRAKE CALIPERS.
- HDI: Install axle covers. See <u>2.5 FRONT AXLE COVERS</u>: HDI MODELS.

AWARNING

After servicing brakes and before moving motorcycle, pump brakes to build brake system pressure. Insufficient pressure can adversely affect brake performance, which could result in death or serious injury. (00279a)

Operate front brake hand lever and foot brake pedal several times to set brake pads to proper operating position within caliper.



- 2. Outer spacer
- 3. Bearing (2)
- 4. Inner spacer
- Flat washer
- 6. Cotter pin
- 7. Nut
- 8. Axle cover (2) (HDI models)

Figure 2-3. Front Wheel (typical)

FRONT AXLE COVERS: HDI MODELS

REPLACEMENT

FASTENER	TORQUE	VALUE
Axle cover set screw	60-84 in-lbs	6.8-9.5 Nm

- See <u>Figure 2-4</u>. Loosen but do not remove set screw. Remove cover.
- 2. Remove set screw from cover.
- Liberally apply LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red) to set screw threads.
- 4. Orient cover over axle end so that set screw is on the bottom. Tighten set screw against a flat on the axle nut.
- Install cover with set screw. Tighten to 60-84 in-lbs (6.8-9.5 Nm).

6. Repeat steps for the opposite side.

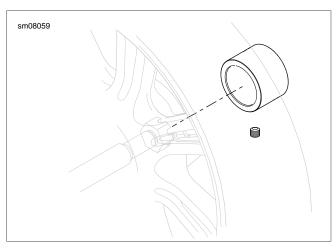


Figure 2-4. Front Axle Cover



REMOVAL

Remove seat.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

2. Disconnect battery negative cable.

NOTICE

When lifting a motorcycle using a jack, be sure jack contacts both lower frame tubes where down tubes and lower frame tubes converge. Never lift by jacking on crossmembers, oil pan, mounting brackets, components or housings. Failure to comply can cause serious damage resulting in the need to perform major repair work. (00586d)

- Position jack to lift rear of motorcycle. See <u>1.2 LIFTING MOTORCYCLE WITH A JACK</u>.
- 4. FLRT: Carefully remove center hub cap.
- 5. Before lifting motorcycle, set parking brake and loosen four lug nuts in a crosswise pattern. Raise jack.
- 6. Remove lug nuts and pull wheel from axle flange studs.
- If necessary, remove center cap.

INSTALLATION

FASTENER	TORQUE	VALUE
Wheel center cap clamp screw	72-96 in-lbs	8.1-10.9 Nm
Lug nuts	90-100 ft-lbs	122.0-135.6 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

- If removed, install center caps. Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) to center cap clamp screw. Install screw with flat washer. Tighten to 72-96 in-lbs (8.1-10.9 Nm).
- 2. Install wheel and tighten lug nuts to 90-100 ft-lbs (122.0-135.6 Nm) in a crosswise pattern.
- FLRT: Install center hub cap.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

 Connect battery negative cable. Tighten to 60-70 in-lbs (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

5. Install seat.

FRONT BRAKE MASTER CYLINDER

DISASSEMBLY

NOTE

Clean master cylinder reservoir cover before removal.

- 1. Remove master cylinder. See the service manual.
- 2. Remove cover and gasket. Turn housing upside down to remove remaining brake fluid from reservoir.

Awarning

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

- 3. Remove brake hand lever:
 - Remove retaining ring.
 - b. Remove pivot pin. Remove hand lever.
- 4. See <u>Figure 2-5</u>. Using a toothpick or small screwdriver, gently pry outer edge of seal (1) from groove (3) in piston bore.
- 5. Remove piston assembly (2) and spring.

ACAUTION

Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN. (00240a)

NOTICE

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

 If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.

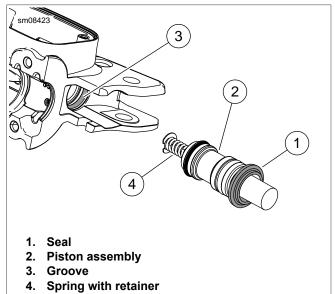


Figure 2-5. Disassemble Master Cylinder

CLEANING AND INSPECTION

AWARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

AWARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

- 1. Clean all parts with denatured alcohol. Wipe dry with a clean, lint free cloth.
- Verify that reservoir is completely free of dust, dirt or residue.
- 3. Using a clean air supply, blow out piston bore and other drilled passages. Do not use a wire or similar instrument.
- Inspect for damage. Replace master cylinder assembly if damaged.
 - a. Inspect banjo seating surface for scratches or nicks.
 - b. Inspect piston bore for scratches, nicks, scoring, pitting, corrosion or other damage.
 - Inspect seal retaining groove for damage.
- Inspect piston seals, dust seal and reservoir cover gasket for damage. Install new piston kit as necessary.

ASSEMBLY

FASTENER	TORQUE	VALUE
Brake master cylinder, front, clamp screws	60-80 in-lbs	6.8-9.0 Nm

- See <u>Figure 2-6</u>. Verify backup ring (2) is oriented as shown.
- 2. Verify primary cup (1) is installed with tapered end seated in backup ring (2).
- 3. Verify that O-ring (3) is seated in piston groove.
- 4. Install seal (4) on piston cap (5) with flat side against flange. Place on piston.
- Using lubricant in service parts kit, thoroughly coat outside diameters of primary cup, backup ring and O-ring. Coat master cylinder piston bore.
- 6. Verify retainer is in end of spring (6). Insert spring and retainer into piston bore, so that it seats against counterbore (recess) at bottom.
- 7. Install piston assembly over spring and into bore.
- 8. See <u>Figure 2-5</u>. Press down on seal until it contacts the counterbore. Larger OD of seal must be seated in groove (3).

NOTE

Install cover with thin edge toward lever.

9. Loosely install cover assembly.

AWARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

- 10. Install brake hand lever:
 - Verify that bushing is in place in lever and in good condition.
 - b. Secure with pivot pin.
 - c. Install **new** retaining ring in pivot pin groove. Verify that retaining ring is completely seated in groove.
- 11. Install the master cylinder. See the service manual. Tighten clamp screws to 60-80 **in-lbs** (6.8-9.0 Nm).
- 12. Bleed brake system. See 2.12 BLEEDING BRAKES.

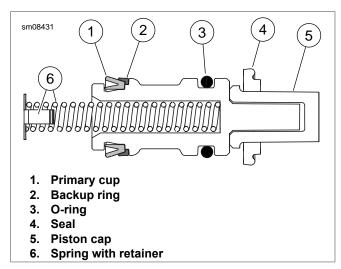


Figure 2-6. Piston Assembly Cross Section

Cover Assembly

The cover assembly contains no service parts. If necessary, assemble as shown in Figure 2-7.

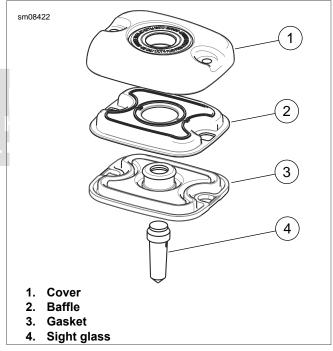


Figure 2-7. Front Reservoir Cover Assembly

FRONT BRAKE CALIPERS

REMOVAL

NOTES

- If only replacing brake pads, see <u>1.7 BRAKE PADS AND DISCS</u>.
- Wrap banjo fittings with pieces of lint-free shop towel to absorb any loss of brake fluid.
- 1. Cut cable straps securing fender tip wires to brake hose.
- 2. Remove banjo bolts. Discard sealing washers.
- See <u>Figure 2-8</u>. Remove two caliper mounting screws (5). Remove caliper.

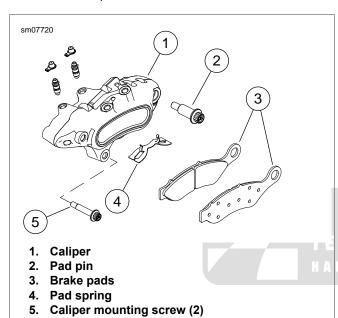


Figure 2-8. Front Brake Caliper Assembly

INSTALLATION

FASTENER	TORQUE VALUE	
Brake caliper, front, mounting screws	28-38 ft-lbs	37.9-51.5 Nm
Brake caliper, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm

- If necessary, assemble caliper with pad spring and brake pads. See 1.7 BRAKE PADS AND DISCS.
- 2. Install caliper with two screws. Tighten to 28-38 ft-lbs (37.9-51.5 Nm).
- Secure brake lines to caliper with banjo bolts and new sealing washers. Tighten to 17-22 ft-lbs (23.1-29.8 Nm).
- 4. Secure fender tip lamp wires to brake hose:
 - a. Place upper cable strap at upper crimp.
 - b. Place second cable strap at the approximate midpoint of the brake hose.

NOTE

When installing a bleeder valve, check for the presence of an O-ring used during manufacturing. To prevent improper sealing, remove and discard the O-ring. Replacement parts do not have an O-ring nor is one required.

5. Fill and bleed brake system. See <u>2.12 BLEEDING</u> <u>BRAKES</u>.

UMNIUIAN II Rley-davidson

REAR BRAKE MASTER CYLINDER/PEDAL

GENERAL

ACAUTION

Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN. (00240a)

NOTICE

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

 If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.

NOTICE

Do not allow dirt or debris to enter the master cylinder reservoir. Dirt or debris in the reservoir can cause improper operation and equipment damage. (00205c)

REMOVAL

 Remove the right side rider footboard. See the service manual.

NOTE

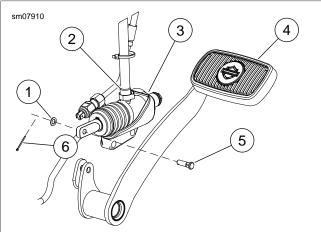
Clean master cylinder reservoir cover before removal.

- 2. Remove cover from master cylinder reservoir.
- Remove banjo bolt from master cylinder. Allow reservoir to drain. Discard sealing washers.

NOTE

Wrap banjo fittings with pieces of lint-free shop towel to absorb any loss of brake fluid.

- See <u>Figure 2-9</u>. Remove clamp securing the reservoir hose (2). See Crimp Clamps in COOLING in the service manual. Remove hose from the master cylinder.
- Remove nut (3) securing master cylinder assembly to the mounting bracket.
- Remove two screws securing the master cylinder mounting bracket to the engine mount end cap.
- Remove the mounting bracket from the brake pedal/master cylinder assembly.
- Remove the locknut securing brake pedal assembly to the pedal shaft. Pull brake pedal/master cylinder assembly from pedal shaft. Discard O-rings from each side of brake pedal shaft bore.
- 9. Remove cotter pin (6), flat washer (1) and clevis pin (5) from the brake pedal flange.



- 1. Washer
- 2. Hose from reservoir
- 3. Mounting nut (not visible)
- 4. Brake pedal assembly
- 5. Clevis pin
- 6. Cotter pin

Figure 2-9. Rear Brake Pedal/Master Cylinder Assembly

INSTALLATION

FASTENER	TORQUE VALUE	
Brake master cylinder, rear, mounting bracket screws	126-150 in-lbs	14.2-16.9 Nm
Brake master cylinder, rear, mounting bracket nut	30-40 ft-lbs	40.7-54.2 Nm
Brake pedal shaft locknut	15-20 ft-lbs	20.3-27.1 Nm
Brake master cylinder, rear, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm

- 1. See <u>Figure 2-9</u>. Install master cylinder assembly onto brake pedal flange. Install clevis pin (5) from the outboard side. Install flat washer (1) and cotter pin (6) on clevis pin.
- Apply a light coat of WHEEL BEARING GREASE to the brake pedal shaft and bore. Install new O-ring on each side of bore.
- Install brake pedal/master cylinder assembly on the pedal shaft. Install flat washer and new locknut on pedal shaft.
- Insert threaded end of master cylinder through opening in mounting bracket. Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) to threads. Start mounting nut.
- Secure mounting bracket to engine mount end cap. Tighten to 126-150 in-lbs (14.2-16.9 Nm).
- 6. Tighten mounting nut (3) to 30-40 ft-lbs (40.7-54.2 Nm).
- Tighten brake pedal shaft locknut to 15-20 ft-lbs (20.3-27.1 Nm).

- Attach brake line to master cylinder reservoir with banjo bolt (metric) and **new** sealing washers. Tighten to 27-29 ft-lbs (36.6-39.3 Nm).
- Install reservoir hose (2) with a new clamp. See Crimp Clamps in COOLING in the service manual.
- 10. Install rider footboard. See the service manual.
- 11. Bleed brake system. See 2.12 BLEEDING BRAKES.

AWARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

12. Test ride motorcycle.

DISASSEMBLY

NOTE

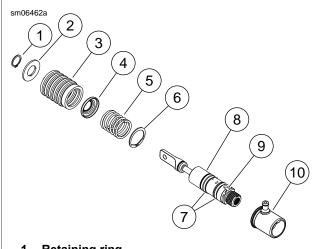
See <u>Figure 2-10</u>. Do not disassemble the cartridge assembly (8). The cartridge assembly components are not sold separately. Replace the cartridge assembly if leakage is evident.

- Thoroughly clean exterior of master cylinder assembly with denatured alcohol.
- Stand master cylinder assembly upright on a clean shop towel on the banjo sealing surface.

AWARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

- 3. See <u>Figure 2-10</u>. Push down and hold large flat washer (2). Remove retaining ring (1). Discard retaining ring.
- 4. Remove large flat washer (2), dust boot (3), spring retainer (4) and spring (5).
- 5. Push on threaded end of cartridge assembly (8) to remove. Use hand pressure only. Exercise caution to keep cartridge assembly free of dirt and grease.
- If reservoir housing (10) will be replaced, remove O-rings
 from cartridge assembly.



- 1. Retaining ring
- 2. Large washer
- 3. Dust boot
- 4. Spring retainer
- 5. Spring
- 6. Retaining ring
- 7. O-ring (2)
- 8. Cartridge assembly
- 9. Slot
- 10. Housing

Figure 2-10. Rear Master Cylinder

CLEANING AND INSPECTION

AWARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

- Clean all metal parts, except the cartridge body assembly. Dry with compressed air. Clean all rubber parts using denatured alcohol.
- Inspect housing bore for scratches. Replace housing if damage is present.
- 3. Check dust boot for damage. Replace as necessary.
- 4. Inspect threads on cartridge body. Replace master cylinder assembly if threads are damaged.
- 5. Inspect spring for distortion, cracks or broken coils. Replace as necessary.
- Clean O-ring grooves on cartridge body using a soft cotton cloth moistened with alcohol. Allow to dry. Inspect grooves for scratches.

ASSEMBLY

NOTE

O-rings (7) are included with replacement cartridge assembly.

- 1. See Figure 2-10. If O-rings (7) have been removed, lubricate **new** O-rings with DOT 4 BRAKE FLUID and install in grooves of cartridge assembly.
- Wipe bore of housing with DOT 4 BRAKE FLUID.
- Verify that large retaining ring (6) is installed on cartridge assembly.

NOTE

Use hand pressure only to assemble cartridge into housing.

- Insert cartridge assembly into housing aligning tab in housing bore with slot (9) on cartridge. Cartridge assembly is fully installed when large retaining ring (6) contacts housing.
- 5. Stand master cylinder assembly upright on a clean shop towel on the banjo sealing surface.
- 6. Install spring (5), spring retainer (4), dust boot (3), and large flat washer (2).
- 7. Push down on large flat washer and hold spring in a compressed state. Install **new** retaining ring (1) in groove of clevis.
- 8. Seat dust boot over lip on housing.
- 9. Rotate boot so that drain/air hole is at the bottom.

REAR BRAKE RESERVOIR

Removal

NOTICE

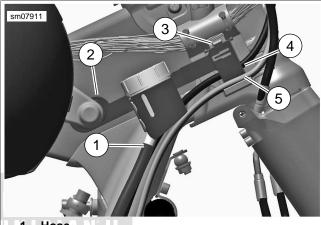
D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

- If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.
- 1. See Figure 2-11 or Figure 2-12. FLRT: Release brake line from retainer (5) on fluid reservoir.
- Reservoir only, FLHTCUTG: Release reservoir from reservoir bracket. Remove reservoir.
- FLHTCUTG: Release clutch fluid line (5) from steering head retainer.
- Release latch (3) and pull retainer away from steering head. Release brake line (4) from retainer.
- Remove reservoir/bracket assembly.
- Remove reservoir cover. Pour fluid into a suitable container.
- Remove hose (1) from reservoir. See Crimp Clamps in COOLING in the service manual.

Installation

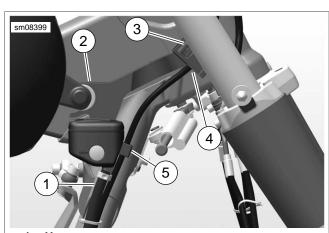
Inspect grommet for damage.

- 2. See Figure 2-11 or Figure 2-12. Slide rear wing (2) of reservoir bracket onto grommet behind fuel tank mount. Start lower portion of retainer in right steering head caddy.
- Secure brake line (4) in retainer. Rotate upper portion into place until latch (3) engages.
- 4. **FLHTCUTG:** Secure clutch fluid line (5) in retainer.
- Reservoir only, FLHTCUTG: Secure reservoir to reservoir bracket.
- 6. FLRT: Install brake line in retainer (5) on fluid reservoir.
- Install hose (1) using a **new** clamp. See Crimp Clamps in COOLING in the service manual.
- 8. Fill reservoir. Check brake system operation and bleed if necessary.



- 1. Hose
- 2. Rear wing
- 3. Latch
- **Brake line**
- Clutch fluid line

Figure 2-11. Rear Brake Fluid Reservoir: FLHTCUTG



- 1. Hose
- Rear wing 2.
- Latch
- Brake line in retainer
- Retainer on reservoir

Figure 2-12. Rear Brake Fluid Reservoir: FLRT

REAR BRAKE CALIPERS

REMOVAL

NOTE

If only replacing the brake pads, see <u>1.7 BRAKE PADS AND DISCS</u>.

- 1. Remove rear wheel. See 2.6 REAR WHEELS.
- Release parking brake. Completely loosen the parking brake adjustment. See <u>1.8 PARKING BRAKE</u>.
- Remove the parking brake cable retaining ring. Remove the cable housing from the bracket.
- Unwrap the cable from the pulley. Remove end of cable from pulley.

NOTE

Do not rotate the cable pulley after the cable is removed. Damage to the caliper could occur requiring replacement of the caliper assembly.

5. See <u>Figure 2-13</u>. If the caliper will be separated from mount bracket (3), loosen mount bushing bolts (4) before removing the caliper assembly.

NOTE

Wrap banjo fittings with pieces of lint-free shop towel to absorb any loss of brake fluid.

- Remove the banjo/bleeder bolt and two sealing washers to release the brake line. Discard the washers.
- 7. Remove two screws (2) and remove the caliper assembly.

INSTALLATION

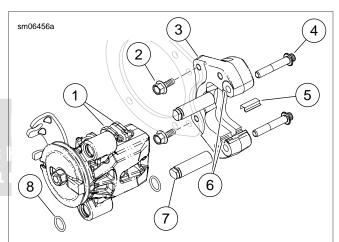
FASTENER	TORQUE VALUE	
Brake caliper, rear, mounting bracket screws	41-45 ft-lbs	55.6-61.0 Nm
Brake caliper, rear, mount bushing bolts	32-36 ft-lbs	43.4-48.8 Nm
Brake caliper, rear, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm

- See <u>Figure 2-13</u>. Install the caliper assembly with brake pads onto disc.
- Apply a drop of LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) to the threads of screws (2) and install. Tighten to 41-45 ft-lbs (55.6-61.0 Nm).

- 3. If removed, install caliper mount bushing bolts (2). Tighten to 32-36 ft-lbs (43.4-48.8 Nm).
- Install the parking brake cable end in the notch of the pulley.
- 5. Wrap the cable around the pulley and engage the cable housing in the bracket. Install the retaining ring.
- Secure the brake line with the banjo bolt and two **new** sealing washers. Tighten to 17-22 ft-lbs (23.1-29.8 Nm).
- 7. Fill and bleed the brake system. See <u>2.12 BLEEDING</u> BRAKES.
- 8. Adjust the parking brake. See 1.8 PARKING BRAKE.
- 9. Install the rear wheel. See 2.6 REAR WHEELS.

NOTE

Any time a rear wheel is removed and installed, the lug nut torque must be checked within 500-1000 mi (805-1610 km).



- 1. Brake pads
- 2. Screw (2)
- 3. Mount bracket
- 4. Mount bushing bolt (2)
- 5. Pad spring (install in upper groove)
- 6. Grooves
- 7. Mount bushing pin (2)
- 8. O-ring (4)

Figure 2-13. Rear Brake Caliper Assembly (left side shown)

BRAKE LINES 2 11

FRONT BRAKE LINES

FASTENER	TORQUE VALUE	
Brake master cylinder, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm
Brake manifold, front circuit, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm
Brake manifold mounting screw	96-120 in-lbs	10.8-13.6 Nm
Brake caliper, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm
Brake manifold, front circuit, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm
Brake manifold, rear circuit, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm

Front Master Cylinder Line Removal

1. FLHTCUTG:

- Remove outer fairing. See the service manual.
- Rotate inner fairing. See the service manual.
- See Figure 2-15. Cut cable strap to release brake line from right handlebar riser.

2. FLRT:

- Remove nacelle and headlamp. See 2.32 STEERING DAMPER ASSEMBLY.
- See Figure 2-16. Cut cable strap to release brake line from right handlebar riser.
- Turn handlebars until the master cylinder reservoir is level.

NOTE

Clean master cylinder reservoir cover before removal.

- Remove cover from master cylinder reservoir.
- 5. Remove banjo bolt from master cylinder. Allow reservoir to drain into suitable container. Discard sealing washers.

NOTE

Wrap banjo fittings with pieces of lint-free shop towel to absorb any loss of brake fluid.

- Wipe remaining fluid from the master cylinder reservoir using a clean shop cloth.
- See Figure 2-14. Remove banjo bolt (2). Discard sealing washers.
- Remove brake line.

Front Master Cylinder Line Installation

- See Figure 2-14. Position the front brake line and loosely attach to front circuit manifold with banjo bolt (2) and new sealing washers.
- See Figure 2-15 or Figure 2-16. Route line over upper fork bracket and to front master cylinder.

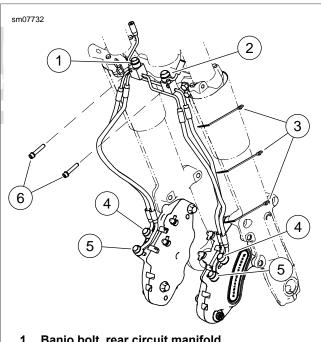
- Attach brake line to master cylinder with banjo bolt and new sealing washers. Tighten to 17-22 ft-lbs (23.1-29.8
- Tighten manifold banjo bolt (2) to 27-29 ft-lbs (36.6-39.3 Nm).

5. FLHTCUTG: See Figure 2-15.

- Secure brake line and clutch line to right handlebar riser with new cable strap (2).
- Secure brake line to clutch line with **new** cable strap (1).
- Install the inner fairing. See the service manual.
- Install outer fairing. See the service manual.

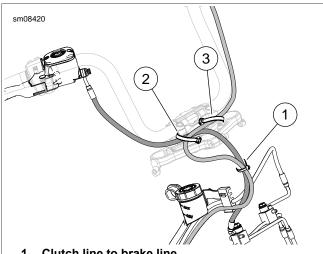
FLRT: See Figure 2-16.

- Secure brake line to right handlebar riser with new cable strap (2).
- Install nacelle and headlamp. See 2.32 STEERING **DAMPER ASSEMBLY.**
- 7. Bleed brake system. See 2.12 BLEEDING BRAKES.



- 1. Banjo bolt, rear circuit manifold
- Banjo bolt, front circuit manifold
- Cable straps
- 4. Banjo bolt, rear circuit
- 5. Banjo bolt, front circuit
- Screw, manifold

Figure 2-14. Front Brake Lines



- 1. Clutch line to brake line
- Clutch line and brake line to right riser
- Clutch line to left riser

Figure 2-15. Capture Clutch and Brake Fluid Lines: **FLTHCUTG** (Fairing removed for photo clarity)

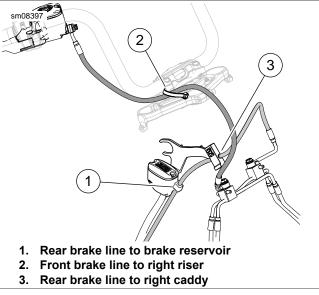


Figure 2-16. Capture Brake Fluid Lines: FLRT

Front Caliper Line Removal

NOTE

The front calipers employ two separate brake circuits. Replacement procedures are the same for each.

- 1. Remove steering damper. See 2.32 STEERING DAMPER ASSEMBLY.
- 2. See Figure 2-14. Cut cable straps (3) securing lines together.

NOTE

Wrap banjo fittings with pieces of lint-free shop towel to absorb any loss of brake fluid.

Remove circuit manifold banjo bolt (1 or 2). Discard sealing washers.

- Remove screw (6) securing circuit manifold to lower fork bracket.
- Disconnect brake lines (4 or 5) from both front brake calipers. Discard sealing washers.
- 6. Remove front brake line assembly.

Front Caliper Line Installation

- Position the front brake line assembly and loosely attach to manifold with banjo bolt and new sealing washers.
- Secure manifold with screw (6). Tighten to 96-120 in-lbs (10.8-13.6 Nm).
- Route brake lines to each front caliper. Secure with banjo bolts and new sealing washers. Tighten to 17-22 ft-lbs (23.1-29.8 Nm).
- Tighten manifold banjo bolt:
 - Front circuit manifold: 27-29 ft-lbs (36.6-39.3 Nm).
 - Rear circuit manifold: 17-22 ft-lbs (23.1-29.8 Nm).
- Secure lines together along with fender tip lamp wires using three **new** cable straps (3) on each side:
 - a. Locate cable straps approximately 2.5 in (64 mm) from each hose crimp.
 - b. Locate the third cable strap midway between hose crimps.
- Install steering damper. See 2.32 STEERING DAMPER ASSEMBLY.
- Bleed brake system. See 2.12 BLEEDING BRAKES.

REAR BRAKE LINE

PART NUMBER	TOOL NAME
SNAP-ON BB200A	BASIC VACUUM BRAKE BLEEDER

FASTENER	TORQUE VALUE	
Brake line, rear, tee locknut	59-63 in-lbs	6.7-7.1 Nm
Stop lamp switch, rear	12-15 ft-lbs	16.3-20.3 Nm
Engine mount end cap screws, front	42-48 ft-lbs	56.9-65.0 Nm
Brake master cylinder, rear, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm
Brake line P-clamp screw	80-100 in-lbs	9.0-11.3 Nm
Brake caliper, rear, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm
Brake manifold, rear circuit, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm

Removal

NOTICE

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

- If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.
- 1. Disconnect the battery.
- 2. Remove right side cover.
- 3. Remove rear wheels. See <u>2.6 REAR WHEELS</u>.
- Remove right side passenger footboard. See the service manual.
- FLHTCUTG: Remove outer fairing. See the service manual.
- 6. **FLRT:** Remove headlamp nacelle. See <u>2.31 HEADLAMP</u> NACELLE.
- 7. Cut cable straps as necessary. Record locations for assembly.

NOTE

Clean master cylinder reservoir cover before removal.

8. Remove cover from master cylinder reservoir.

NOTE

For best results, use the BASIC VACUUM BRAKE BLEEDER (Part No. Snap-on BB200A) or equivalent tool to drain the brake systems.

- 9. Drain rear brake line:
 - a. Attach vacuum brake bleeder to left rear caliper bleeder screw. Loosen screw 3/4 turn.
 - b. Operate vacuum bleeder to evacuate all fluid from line.
 - c. Repeat with right caliper.

NOTE

Wrap banjo fittings with pieces of lint-free shop towel to absorb any loss of brake fluid.

- See <u>Figure 2-17</u>. Remove banjo bolt (9) from master cylinder. Discard sealing washers.
- 11. Free rear brake line from electrical harness conduit clips (6).
- 12. Remove screw (13).
- 13. Release line from retainers (14, 15).
- 14. Remove nut (1) securing brake line tee to rear fork stud.
- 15. Free rear brake line hose from cable clips (16) on top of rear fork.
- 16. Remove reservoir hose (11) from master cylinder.
- 17. Remove banjo bolt from rear circuit manifold (3). Discard sealing washers.
- 18. Remove two clamps (5). Release line from retainer (2) on right side of steering head.
- 19. FLRT: Release line from retainer on brake fluid reservoir.
- 20. Support front of engine.
- 21. Remove right side front engine mount cap with rider footboard and master cylinder attached. Rotate and allow to lay on the surface. See the service manual.
- 22. Remove terminals from rear stop lamp switch (10).
- 23. Remove banjo bolts from rear brake calipers. Discard sealing washers.
- 24. Remove rear brake line.

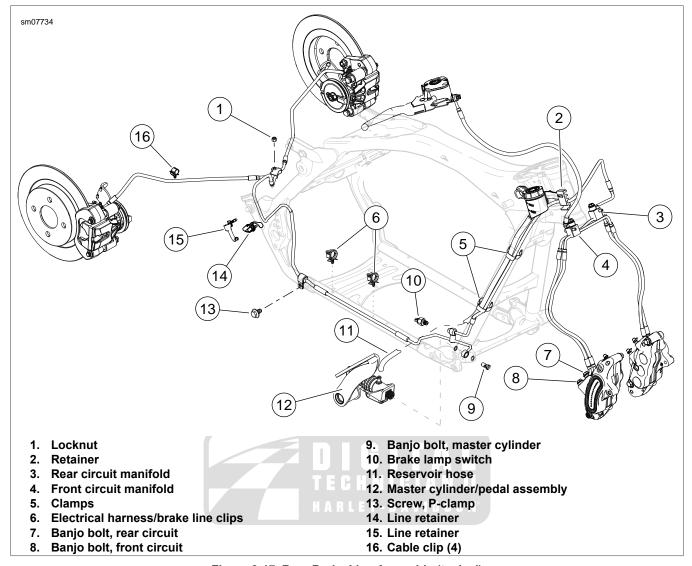


Figure 2-17. Rear Brake Line Assembly (typical)

Installation

1. Place brake line in approximate position.

NOTE

Calipers and lines have anti-rotation features. Verify they are engaged during assembly.

- Loosely secure brake line to calipers using new sealing washers.
- See <u>Figure 2-17</u>. Secure tee to rear fork with locknut (1). Tighten to 59-63 in-lbs (6.7-7.1 Nm). Capture rear brake line hose in cable clips (16) on rear fork.
- 4. Route line to manifold (3). Loosely secure with line rearward of anti-rotation pin using **new** sealing washers.
- FLRT: Capture line in retainer on brake fluid reservoir.
- Capture line in retainer (2) and clamps (5). Rotate toward the front to provide adequate clearance from the exhaust pipe.

NOTE

If installing **new** rear stop lamp switch (10), apply LOCTITE 565 THREAD SEALANT to threads and start switch into rear brake line. Tighten to 12-15 ft-lbs (16.3-20.3 Nm).

- Install right side front engine mount cap with rider footboard and master cylinder attached:
 - a. Connect terminals onto rear stop lamp switch (10).

NOTE

Confirm oil switch/sender wires are inboard of rubber engine mount.

- b. Install engine mount end cap. Tighten to 42-48 ft-lbs (56.9-65.0 Nm).
- c. Remove support under front of engine.
- 8. Secure brake line to master cylinder reservoir with banjo bolt (9) and **new** sealing washers. Tighten to 27-29 ft-lbs (36.6-39.3 Nm).
- 9. Capture rear brake line to electrical harness/brake line clips (6) and retainers (14, 15).

- 10. Secure P-clamp with screw (13). Tighten to 80-100 **in-lbs** (9.0-11.3 Nm).
- 11. **HDI:** Secure active exhaust cable to the brake line at retainer (15).
- 12. Tighten brake caliper banjo bolts to 17-22 ft-lbs (23.1-29.8 Nm).
- Tighten manifold (3) banjo bolt to 17-22 ft-lbs (23.1-29.8 Nm).
- Install reservoir hose (11) to master cylinder with a new clamp.
- 15. Install cable straps removed during removal.
- 16. Bleed brake system. See 2.12 BLEEDING BRAKES.
- 17. **FLHTCUTG:** Install outer fairing. See the service manual.

- 18. **FLRT:** Install headlamp nacelle. See <u>2.31 HEADLAMP NACELLE</u>.
- 19. Install right side cover.
- 20. Install rear wheels. See 2.6 REAR WHEELS.
- 21. Connect battery.

AWARNING

Be sure headlamp, tail and stop lamp and turn signals are operating properly before riding. Poor visibility of rider to other motorists can result in death or serious injury. (00478b)

22. Check brake lamp operation.



BLEEDING BRAKES

GENERAL

AWARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

ACAUTION

Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN. (00240a)

NOTICE

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

If DOT 4 brake fluid contacts painted surfaces, IMMEDIATELY flush area with clear water.

AWARNING

When any hydraulic brake component, line or connection is loosened or replaced on an ABS motorcycle, Digital Technician II must be used during the brake bleeding procedure to verify all air is removed from the system. Failure to properly bleed the brake system could adversely affect braking, which could result in death or serious injury. (00585c)

NOTICE

Do not allow dirt or debris to enter the master cylinder reservoir. Dirt or debris in the reservoir can cause improper operation and equipment damage. (00205c)

Verify front brake hand lever and rear brake foot pedal have a firm feel when applied. Bleed system as necessary.

PROCEDURE

PART NUMBER	TOOL NAME
SNAP-ON BB200A	BASIC VACUUM BRAKE BLEEDER

FASTENER	TORQUE VALUE	
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm

NOTE

For best results, use the BASIC VACUUM BRAKE BLEEDER (Part No. Snap-on BB200A). Refer to the instructions provided with the tool. If a vacuum brake bleeder is not available, follow the correct sequence using a manual bleeding procedure.

General Bleeding Overview

 Position vehicle or handlebar so master cylinder reservoir is level.

NOTE

Protect paint from brake fluid spills. Wrap a clean shop cloth around the outside of the master cylinder reservoir.

Remove cover from master cylinder reservoir.

AWARNING

A plugged or covered relief port can cause brake drag or lock-up, which could lead to loss of control, resulting in death or serious injury. (00288a)

 Top off the reservoir. Verify proper operation of the master cylinder relief port by actuating the brake pedal or lever. A slight spurt of fluid will break the fluid surface in the reservoir if internal components are working properly. The spurt will not be seen in the remote reservoir on rear system.

NOTE

Pay careful attention to the fluid level in the master cylinder reservoir during bleeding. Add fluid before it empties to avoid drawing air into the brake lines.

4. Proceed with the appropriate procedure.

NOTE

Always bleed all calipers in a circuit.

- Tighten bleeder screw to specification. Install bleeder screw cap.
- Fill reservoir to specified level. Refer to <u>Table 2-5</u> and <u>Figure 2-18</u>.

NOTE

Front master cylinder reservoir: Orient the cover with the thin edge toward the lever.

 Clean gasket and sealing surfaces of debris. Install master cylinder reservoir cover. Tighten to specification. Refer to <u>Table 2-6</u>.

AWARNING

After repairing the brake system, test brakes at low speed. If brakes are not operating properly, testing at high speeds can cause loss of control, which could result in death or serious injury. (00289a)

- If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.
- 8. Check operation of rear lamps.
- Test ride motorcycle. Repeat the bleeding procedure if brakes feel spongy.

Front Circuit

- 1. Beginning at the front left caliper, vacuum bleed at the upper bleeder.
- 2. Repeat with the front right caliper.
- 3. Tighten bleeders to specification. Refer to <u>Table 2-6</u>.
- 4. Verify brake operation.

Rear Circuit

NOTE

Always hold banjo bolt when loosening bleeder on rear calipers.

- Beginning at the lower bleeder of the front left caliper, vacuum bleed the caliper until no air bubbles are present. Tighten bleeder.
- 2. Continue to the lower bleeder of the front right caliper.
- 3. Continue to the rear left caliper.
- 4. Continue to the rear right caliper.

- Tighten bleeders to specification. Refer to <u>Table 2-6</u>.
- 6. Verify brake operation.

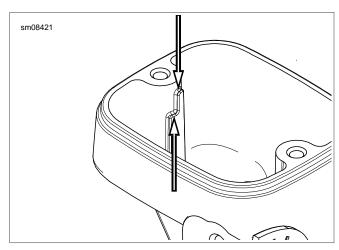


Figure 2-18. FILL Level Boss (front master cylinder)

Table 2-5. Fluid Level

ITEM	SPECIFICATION
Front reservoir	Between upper and lower step on boss
Rear reservoir	MAX line

Table 2-6. Torque Specifications

FASTENER	TORQUE VALUE
Brake caliper bleeder valve	Front: 80-100 in-lbs (9.0-11.3 Nm)
	Rear: 31-33 in-lbs (3.5-3.7 Nm)
Brake master cylinder reservoir, front, cover screws	6-8 in-lbs (0.7-0.9 Nm)
Brake master cylinder reservoir, rear, cover	FLHTCUTG: Hand-tighten FLRT: 6-8 in-lbs (0.7-0.9 Nm)

PARKING BRAKE ASSEMBLY

PEDAL ASSEMBLY

FASTENER	TORQUE VALUE	
Parking brake pawl locknut	60-96 in-lbs	6.8-10.8 Nm
Parking brake pedal locknut	15-20 ft-lbs	20.3-27.1 Nm
Parking brake pedal bracket screws	36-42 ft-lbs	48.8-56.9 Nm

- 2. See Figure 2-19. Disconnect spring (2).
- 3. Remove locknut (11), washer (12) and O-ring (13).
- 4. Pull pedal away from frame slightly while removing clevis pin securing cable end to pedal assembly.
- 5. Remove pedal assembly from shaft.
- 6. Remove remaining O-ring (14).

Removal

1. Loosen cable adjustment. See 1.8 PARKING BRAKE.

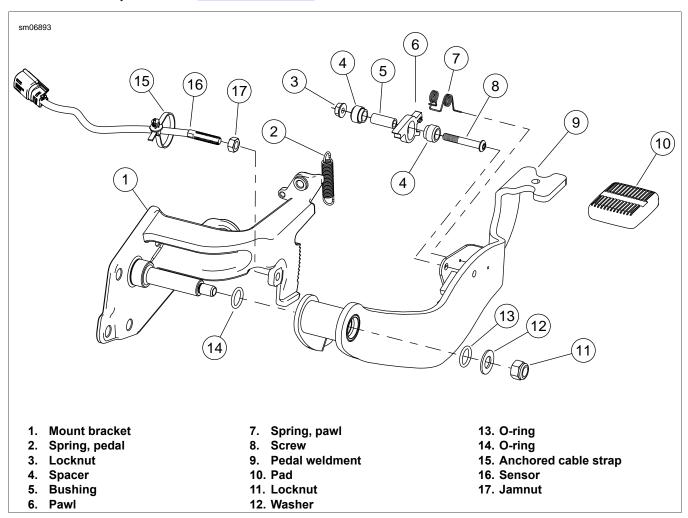


Figure 2-19. Parking Brake Pedal Assembly

Disassembly and Inspection

- 1. See <u>Figure 2-20</u>. Rotate pawl (2) clockwise to release spring (1) from notch (3).
- Squeeze legs of spring together while removing from pedal weldment.
- 3. See Figure 2-19. Remove locknut (3) and screw (8).
- 4. Remove pawl (6), spacers (4) and sleeve (5).
- 5. Pull off pedal pad (10) from pedal weldment.

6. Inspect components for wear or damage.

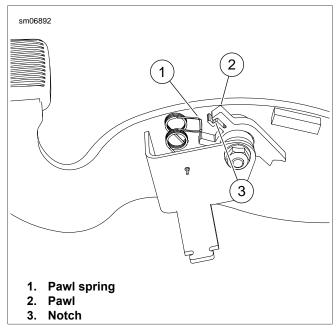


Figure 2-20. Parking Brake Pawl

Assembly

- See <u>Figure 2-19</u>. Assemble sleeve (5), pawl (6) and spacers (4). Orient as shown and install screw (8) and locknut (3). Tighten locknut to 60-96 in-lbs (6.8-10.8 Nm).
- 2. See Figure 2-20. Install pawl spring (1) oriented as shown.
- Engage spring into notch (3) of pawl and rotate pawl counterclockwise. Pawl will rotate over center and keep spring engaged.
- Install pedal pad (10). Lubricate with window cleaner to ease installation.

Installation

- See <u>Figure 2-19</u>. Install **new** O-ring (14) onto shaft.
- 2. Slide pedal assembly onto shaft and connect pedal return spring (2).
- Connect cable to pedal arm using clevis pin. Secure with retaining pin.
- 4. Install **new** O-ring (13), flat washer (12) and locknut (11). Tighten locknut to 15-20 ft-lbs (20.3-27.1 Nm).
- 5. Adjust cable. Check parking brake operation. See <u>1.8 PARKING BRAKE</u>.

Pedal Mounting Bracket

NOTE

The parking brake pedal and mounting bracket can be removed as an assembly if desired.

- Disconnect sensor connector.
- See <u>Figure 2-21</u>. Remove the left rider's footboard. See the service manual.
- 3. Loosen cable adjustment. See 1.8 PARKING BRAKE.
- 4. Remove clevis pin (3). Remove cable from pedal lever.

- 5. Remove retaining ring (4). Remove cable from bracket.
- Remove three screws (1).
- 7. Remove bracket.

NOTE

Remove all thread locking compound from screws and threaded holes

- LOCTITE 246 MEDIUM STRENGTH/HIGH TEMPER-ATURE THREADLOCKER (blue) to screws (1). Install pedal mounting bracket. Tighten to 36-42 ft-lbs (48.8-56.9 Nm).
- 9. Install cable. Secure with retaining ring (3).
- 10. Attach cable end to pedal arm. Secure with clevis pin (3) and retaining pin (2).
- 11. Install the left rider footboard. See the service manual.
- 12. Connect sensor connector.
- 13. Adjust cable. Check parking brake operation. See 1.8 PARKING BRAKE.
- 14. Verify parking brake lamp operation.

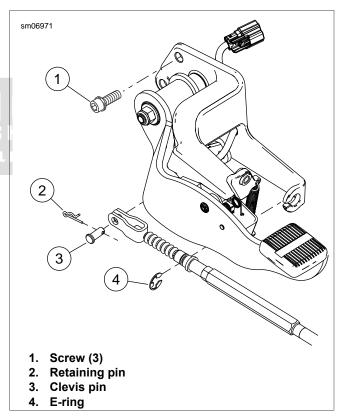


Figure 2-21. Parking Brake Assembly

PARKING BRAKE SENSOR

FASTENER	TORQUE	VALUE
Parking brake sensor jamnut	30-35 in-lbs	3.4-4.0 Nm

Adjust Sensor Gap

1. Pull pedal outward to remove free play.

- Verify gap between end of sensor and magnet in pedal weldment is 0.177-0.197 in (4.50-5.00 mm). Adjust if necessary:
 - a. Disconnect sensor connector.
 - b. Loosen jamnut. Turn sensor to adjust gap.
 - c. Tighten jamnut to 30-35 in-lbs (3.4-4.0 Nm).
 - d. Mate sensor connector.
- 3. Verify parking brake lamp operation.

Sensor Replacement

- 1. Remove left rider footboard. See the service manual.
- See <u>Figure 2-19</u>. Loosen jamnut (17).
- 3. Separate sensor connector.
- Release cable strap (15) securing sensor harness to mounting bracket. Remove sensor from mounting bracket.
- 5. Position jamnut at about half way point of sensor threads.
- Apply LOCTITE 246 MEDIUM STRENGTH/HIGH TEM-PERATURE THREADLOCKER (blue) to threads 5-11 of sensor.
- Install sensor. Adjust sensor gap.
- 8. Secure harness with cable strap (15). Mate connector.
- 9. Install rider footboard.

Magnet

- 1. See Figure 2-22. Remove magnet from pedal weldment.
- Thoroughly remove remaining adhesive. Clean mounting area with isopropyl alcohol.
- Install new magnet using a small amount of HARLEY-DAVIDSON HIGH PERFORMANCE SEALANT - GRAY. Remove all excess adhesive and verify that the magnet face is free from adhesive. Hold in place with a piece of tape for 12 hours.
- 4. Adjust sensor gap.

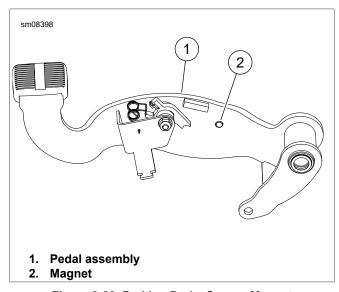


Figure 2-22. Parking Brake Sensor Magnet

CABLES

FASTENER	TORQUE VALUE	
Parking brake cable anchor bracket screws	41-45 ft-lbs	55.6-61.0 Nm

Front Cable

- 1. Remove left wheel.
- 2. Loosen parking brake cable adjustment.
- 3. See <u>Figure 2-23</u>. Remove cable retaining ring securing left rear cable (4). Pull cable from equalizer bracket and release both rear cable ends from equalizer (3).
- Remove cable retaining ring securing front cable (1).
 Remove cable from equalizer bracket.
- 5. Cut cable strap (6).
- Remove retaining pin and clevis pin from forward end of cable.
- Remove cable retaining ring securing cable to pedal mounting bracket.

NOTE

Note cable routing and anchor points during removal.

- 8. Remove cable from vehicle.
- 9. Route **new** cable in the approximate final location.
- 10. Install forward end of front cable housing in pedal mounting bracket. Secure with cable retaining ring.
- 11. Secure cable end to parking brake pedal with clevis pin $_{\rm E\,\,V}$ and retaining pin.
- 12. Install cable housing (1) in equalizer bracket. Secure with retaining ring.
- Attach ends of both rear cables in equalizer (3). Install left rear cable (4) in equalizer bracket. Secure with retaining ring.
- 14. Secure cable housing to frame with **new** cable strap (6). Install a second cable strap at lower frame junction capturing cable and fuel tank vent hose.
- Adjust cable. Check parking brake operation. See <u>1.8 PARKING BRAKE</u>.

NOTE

Any time a rear wheel is removed and installed, the lug nut torque must be checked within 500-1000 mi (805-1610 km).

- 16. Install left wheel. See 2.6 REAR WHEELS.
- 17. Verify parking brake lamp operation.

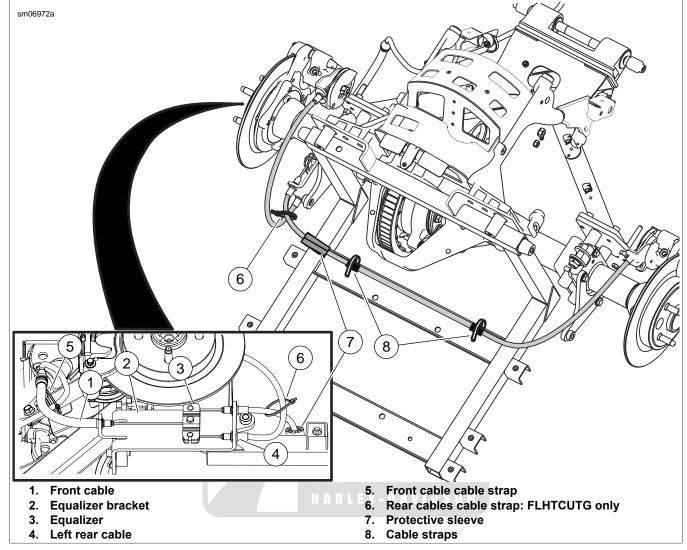


Figure 2-23. Parking Brake Equalizer and Rear Cables

Rear Cable Removal

NOTE

Replacement of either rear cable is essentially the same.

- 1. Remove both rear wheels. See <u>2.6 REAR WHEELS</u>.
- Loosen cable adjustment. See <u>1.8 PARKING BRAKE</u>.
- See <u>Figure 2-23</u>. Remove cable retaining ring. Pull cable to be replaced from equalizer bracket (2). Release anchor ball from equalizer (3).
- 4. **FLHTCUTG:** Cut cable strap (6) securing cables together.
- Remove cable housing from bracket at rear caliper. Remove cable end from actuator pulley.
- 6. Note anchor locations and remove cable from vehicle.

Rear Cable Installation

- 1. Route **new** cable in the approximate final location.
- 2. Install rear cable end in actuator pulley.

NOTE

Install washer on cable housing before installing in caliper anchor bracket.

- 3. Secure cable housing in rear caliper anchor bracket with retaining ring.
- 4. See <u>Figure 2-23</u>. Install cable end in equalizer (3). Secure cable housing in equalizer bracket. Install retaining ring.
- 5. **FLHTCUTG:** Secure cables together with **new** cable strap (6).
- Locate protective sleeve (7) on cable to absorb contact at rear frame.
- 7. **Right cable:** Secure cable to each end of the rear frame crossmember using **new** cable straps (8).

NOTE

Any time a rear wheel is removed and installed, the lug nut torque must be checked within 500-1000 mi (805-1610 km).

- 8. Install rear wheels. See <u>2.6 REAR WHEELS</u>.
- 9. Adjust cable. Check parking brake operation. See <u>1.8 PARKING BRAKE</u>.

10. Verify parking brake lamp operation.

Equalizer Bracket Removal

- 1. Remove left rear wheel.
- 2. Loosen cable adjustment. See 1.8 PARKING BRAKE.
- 3. Remove all cables from rear anchor bracket.
- 4. See <u>Figure 2-24</u>. Remove screws (2). Remove bracket (1) from rear fork.

Equalizer Bracket Installation

- 1. Apply LOCTITE MEDIUM STRENGTH THREADLOCKER AND SEALANT 243 (blue) to the threads of screws (2).
- 2. Install bracket using screws (2). Tighten screws to 41-45 ft-lbs (55.6-61.0 Nm).
- 3. Install cables. Secure with retaining rings. Adjust as necessary. See <u>1.8 PARKING BRAKE</u>.
- 4. Check parking brake operation.

NOTE

Any time a rear wheel is removed and installed, the lug nut torque must be checked within 500-1000 mi (805-1610 km).

5. Install left wheel. See 2.6 REAR WHEELS.

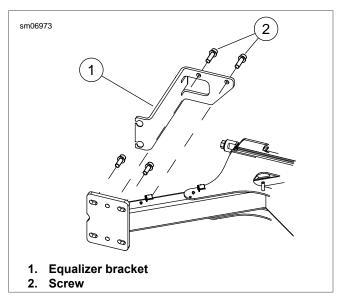


Figure 2-24. Equalizer Bracket



DISASSEMBLY

NOTE

Clean master cylinder reservoir cover before removal.

- 1. Remove the master cylinder. See the service manual.
- Remove cover and gasket. Turn housing upside down to remove remaining clutch fluid from reservoir.

WARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

- 3. Remove clutch hand lever. See the service manual.
- See <u>Figure 2-25</u>. Using a toothpick or small screwdriver, gently pry outer edge of piston boot (1) from groove (4) in piston bore.
- 5. Remove piston assembly (2) and spring (3).

ACAUTION

Direct contact of D.O.T. 4 brake fluid with eyes can cause irritation. Avoid eye contact. In case of eye contact flush with large amounts of water and get medical attention. Swallowing large amounts of D.O.T. 4 brake fluid can cause digestive discomfort. If swallowed, obtain medical attention. Use in well ventilated area. KEEP OUT OF REACH OF CHILDREN. (00240a)

NOTICE

D.O.T. 4 hydraulic brake fluid is used in the hydraulic clutch. Do not use other types of fluids as they are not compatible and could cause equipment damage. (00353a)

NOTICE

D.O.T. 4 brake fluid will damage painted and body panel surfaces it comes in contact with. Always use caution and protect surfaces from spills whenever brake work is performed. Failure to comply can result in cosmetic damage. (00239b)

 If DOT 4 brake fluid contacts painted surfaces, IMMEDI-ATELY flush area with clear water.

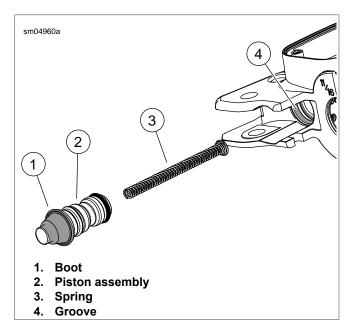


Figure 2-25. Disassemble Master Cylinder

CLEANING AND INSPECTION

AWARNING

Use denatured alcohol to clean brake system components. Do not use mineral-based solvents (such as gasoline or paint thinner), which will deteriorate rubber parts even after assembly. Deterioration of these components can cause brake failure, which could result in death or serious injury. (00291a)

WARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

- 1. Clean all parts with denatured alcohol. Wipe dry with a clean, lint free cloth.
- 2. Inspect banjo seating surface for scratches or nicks.
- Verify that reservoir is completely free of dust, dirt or residue.
- 4. Using a clean air supply, blow out piston bore and other drilled passages. Do not use a wire or similar instrument.
- Inspect for damage. Replace master cylinder assembly if damaged.
 - a. Inspect banjo seating surface for scratches or nicks.
 - b. Inspect piston bore for scratches, nicks, scoring, pitting, corrosion or other damage.
 - c. Inspect boot retaining groove for damage.

Inspect piston seals, dust boot and reservoir cover gasket for damage. Install new piston kit as necessary.

ASSEMBLY

FASTENER	TORQUE VALUE	
Clutch master cylinder clamp screws	60-80 in-lbs	6.8-9.0 Nm
Clutch reservoir cover screws	6-8 in-lbs	0.7-0.9 Nm

- 1. See <u>Figure 2-26</u>. Install boot (1) on piston until it fits into thin groove in piston.
- Using lubricant in service parts kit, thoroughly coat outside diameters of primary and secondary cups. Coat master cylinder piston bore.
- See <u>Figure 2-25</u>. With tapered end out, install spring into bore of piston assembly.
- 4. Install piston assembly into bore.

NOTES

- Do not damage piston sealing boot during installation.
- Install boot so hole faces down when master cylinder is installed.
- Compress and hold piston even with the end of the bore.
 Using a small dull-bladed screwdriver or similar tool, gently
 work sealing edges of boot until entire circumference is
 seated in cylinder bore groove.

NOTE

Install cover with thin edge toward lever.

6. Loosely install cover with gasket.

AWARNING

Wear safety glasses or goggles when removing or installing retaining rings. Retaining rings can slip from the pliers and could be propelled with enough force to cause serious eye injury. (00312a)

- 7. Install clutch hand lever. See the service manual.
- 8. Install the master cylinder. See the service manual. Tighten clamp screws to 60-80 **in-lbs** (6.8-9.0 Nm).
- 9. Bleed the system. See the service manual. Tighten reservoir cover screws to 6-8 **in-lbs** (0.7-0.9 Nm).

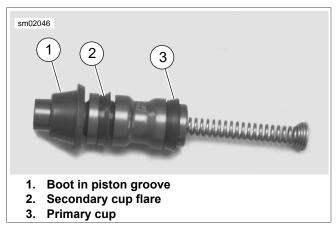


Figure 2-26. Assembled Cups and Piston

Cover Assembly

The cover assembly contains no service parts. If necessary, assemble as shown in Figure 2-27.

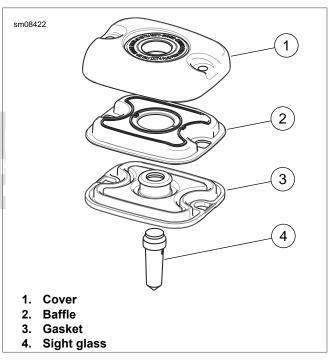


Figure 2-27. Front Reservoir Cover Assembly

CLUTCH FLUID LINE: FLRT

LINE REPLACEMENT

FASTENER	TORQUE	VALUE
Clutch line P-clamp	40-48 in-lbs	4.5-5.4 Nm

See <u>Figure 2-28</u>. Clutch fluid line replacement is similar to other models except for line routing.

NOTES

- Orient upper P-clamp with screw toward the outboard side.
- Orient lower P-clamp with screw toward the front.
- 1. Route line through two P-clamps (1), forward of left frame downtube, behind right frame downtube and above the right engine rubber mount (3).
- 2. Tighten P-clamp screws to 40-48 in-lbs (4.5-5.4 Nm).
- Secure to right frame downtube using a **new** cable strap
 through the hole in the crossmember. Secure at grommet on fluid line.
- 4. Secure to the main harness along the lower frame rail following the procedure in the service manual.

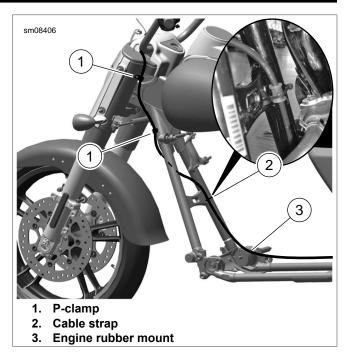


Figure 2-28. Clutch Fluid Line Routing: FLRT



HANDLEBAR 2.16

ADJUSTMENT: FLRT

FASTENER	TORQUI	E VALUE
Upper handlebar clamp fastener, rear: all models	16-20 ft-lbs	21.7-27.1 Nm

- 1. Remove trim insert from riser cover.
- 2. Loosen handlebar rear clamp screws one half turn.
- 3. See <u>Figure 2-29</u>. Place a straight edge across the wind-shield bushings.

NOTE

Measure at a right angle to the straight edge.

- 4. Measure from the straight edge to the front of the handlebar just below the upper bend.
- 5. Rotate the handlebar in the risers until the gap measures 4 in (101.6 mm).
- 6. Tighten rear clamp screws to 16-20 ft-lbs (21.7-27.1 Nm).
- 7. Install trim insert.

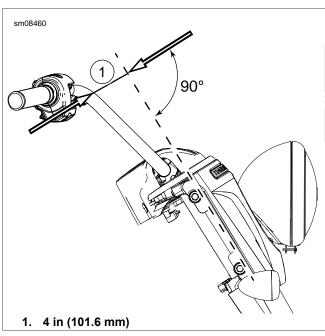
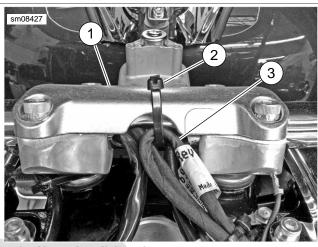


Figure 2-29. Handlebar Adjustment: FLRT

HANDLEBAR REPLACEMENT

Handlebar replacement is similar to the OE with following exceptions:

- The FLRT has internally wired handlebar similar to OE FLTR models.
- **FLRT:** See <u>Figure 2-30</u>. Secure the TGS harness to the handlebar and upper clamp with a cable strap.



- 1. Upper handlebar clamp
- 2. Cable strap
- 3. TGS harness

Figure 2-30. Secure TGS Harness

REMOVAL

- 1. See <u>Figure 2-31</u>. Remove screw (1) to release lanyard (5) from trunk door (both sides).
- 2. Remove screws (4) and remove trunk door cover.
- Disconnect license plate lamps connector (8) and trunk light connector if equipped.
- 4. Release harness from retainer clips.
- 5. Remove bottom trunk liner.
- 6. Remove locknuts with flat washers (6) from each hinge and remove door.

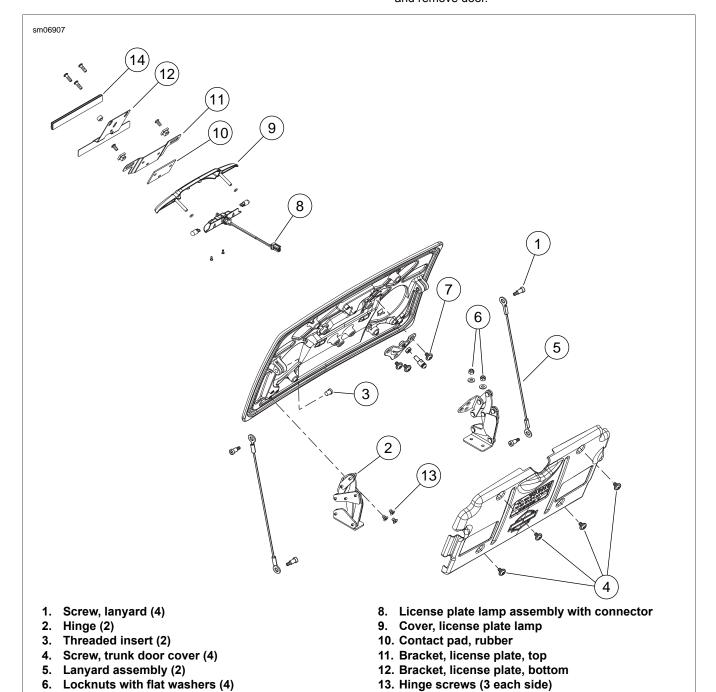


Figure 2-31. Trunk Door

14. Reflector

7. Latch bracket screw (3)

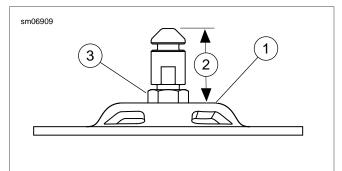
DISASSEMBLY

- See <u>Figure 2-31</u>. Remove screws (13) to release hinge (both sides).
- 2. Remove three screws (7) to release latch pin bracket.
- 3. Remove license plate lamps/bracket (9, 10, 11, 12). See 7.7 LICENSE PLATE LAMPS/BRACKET: FLHTCUTG.
- Remove screws to release license plate bracket. Gently pull upper half of bracket to release contact pad (10) from trunk door.

ASSEMBLY

FASTENER	TORQUE VALUE	
License plate bracket screws: FLHTCUTG	18-30 in-lbs	2.0-3.4 Nm
Trunk door latch pin jamnut: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm
Trunk door hinge screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm

- 1. Install license plate bracket:
 - Install three screws into upper half of license plate bracket and start into trunk door to properly locate adhesive pad.
 - Remove screws and apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
 - c. Secure upper and lower brackets with screws.
 - Tighten to 18-30 in-lbs (2.0-3.4 Nm).
- Install license plate lamps/bracket. See <u>7.7 LICENSE</u> PLATE LAMPS/BRACKET: FLHTCUTG.
- Install latch pin bracket and loosely secure with three screws approximately centered in each slot. Adjustment will be made at a later time.
- See <u>Figure 2-32</u>. If latch pin was removed, install and adjust to 1.050 in (26.67 mm) from upper surface of bracket to end of pin. Use a dial caliper to measure distance (2).
- Hold latch pin and tighten jamnut to 48-72 in-lbs (5.4-8.1 Nm).
- Apply LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue) and install screws to secure each hinge to trunk door. Tighten to 48-72 in-lbs (5.4-8.1 Nm) in a crosswise pattern.



- 1. Surface of bracket
- 2. Adjustment dimension
- 3. Jamnut

Figure 2-32. Adjust Latch Pin

INSTALLATION

FASTENER	TORQUE VALUE	
Trunk door hinge locknuts: FLHTCUTG	60-84 in-lbs	6.8-9.5 Nm
Trunk door latch pin bracket screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm
Trunk door lanyard screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm

- 1. Install the hinges over the mounting studs. If equipped with trunk light, also install the trunk light switch bracket on the left forward stud.
- Secure hinges to stud plates in body with new locknuts and flat washers. Tighten to 60-84 in-lbs (6.8-9.5 Nm).
- 3. Lubricate hinges with HARLEY® LUBE if necessary.
- 4. Install bottom trunk liner.
- 5. Connect license plate lamp connector.
- 6. Capture rear lighting harness under retainer clips.
- 7. See Figure 2-32. Adjust latch pin:
 - With latch pin bracket screws finger-tight, close and latch door to center the latch pin.
 - b. Open door and tighten screws to 48-72 in-lbs (5.4-8.1 Nm).
 - c. Close and open door to verify operation. Adjust pin bracket location or pin height if necessary.

NOTE

See <u>Figure 2-33</u>. Route rear lighting harness through gap in front left corner of trunk door cover.

- Install trunk door cover. Tighten to 30-54 in-lbs (3.4-6.1 Nm) in a crosswise pattern.
- 9. Twist lanyard 1/2 turn toward the door opening and secure to door with screw. Tighten to 48-72 **in-lbs** (5.4-8.1 Nm). Repeat step on other side.
- 10. Verify that each lanyard rotates freely at both ends.



Figure 2-33. Trunk Door Cover



TRUNK DOOR LOCKSET: FLHTCUTG

LOCKSET

PART NUMBER	TOOL NAME
HD-34736-B	VALVE SPRING COMPRESSOR

FASTENER	TORQUE VALUE	
Trunk latch housing cover screw: FLHTCUTG	25-28 in-lbs	2.8-3.2 Nm

Removal/Disassembly

- See <u>Figure 2-34</u>. Remove screws (7) and latch housing cover (6).
- Remove U-clip (5). Use a small screwdriver for best results.
- 3. Remove lockset (1) from bore.
- Inspect foam washer (2) and remove from body if necessary.
- 5. If necessary, remove lock assembly from bezel:
 - See <u>Figure 2-35</u>. Press pin out of lock bezel.
 - b. Push lock assembly from bezel.

Assembly/Installation

1. Obtain new U-clip if bent or distorted.

NOTE

The pin retaining the lock assembly in the bezel is used during manufacturing and is not necessary for repair. Installation is optional.

 See <u>Figure 2-36</u>. If the lockset is disassembled, inspect condition of the internal O-ring and replace if necessary. Apply a light film of H-D ELECTRICAL CONTACT LUB-RICANT to O-ring and install lock assembly into bezel.

NOTE

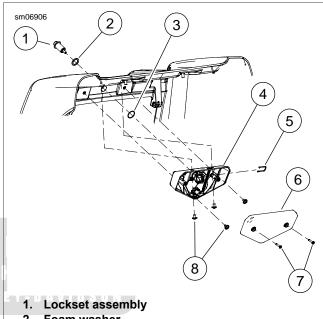
Always install the U-clip for the vehicle **LEFT** side. Bezel failure will result if installed from the right side.

- See <u>Figure 2-37</u>. Start U-clip (1) into slots of lock assembly from <u>LEFT</u> side and verify that both ends of U-clip are visible.
- 4. Retract U-clip until bore is not obstructed.
- See <u>Figure 2-34</u>. If removed, install **new** foam washer (2) on lockset (1) with the adhesive side facing body. Remove backing from foam seal and install lockset into body.
- See <u>Figure 2-38</u>. Compress the lockset into the lock mechanism to ease installation of U-clip.
 - a. Use VALVE SPRING COMPRESSOR (Part No. HD-34736-B) (1) with the large adapter (3).
 - b. Install a 5/8 in. deep well socket (2) in the adapter to press against the outer lockset bezel.
 - Turn the clamp screw only enough to install U-clip to avoid over-tightening and possible damage to the lock mechanism.

- See <u>Figure 2-34</u>. With the lockset compressed into the lock mechanism, slide U-clip (5) into installed position. When correctly installed the ends of the U-clip will protrude from opposite side of bezel.
- 8. Install latch cover with screws (7). Tighten to 25-28 **in-lbs** (2.8-3.2 Nm).

NOTE

If water spray is directed at the lock for an extended time, water may enter through the lock tumblers.



- 2. Foam washer
- 3. O-ring
- 4. Latch housing
- 5. U-clip
- 6. Latch housing cover
- 7. Screw (2)
- 8. Screw (4)

Figure 2-34. Trunk Door Lock Assembly

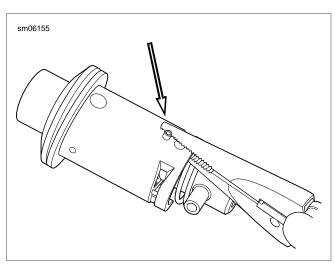


Figure 2-35. Push Pin Out

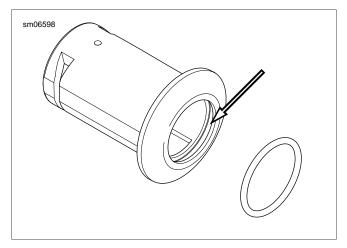
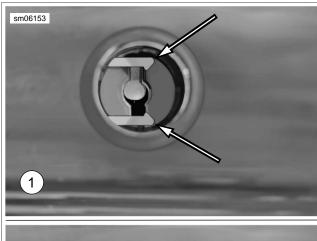
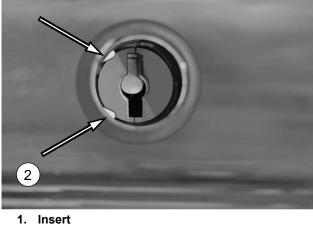


Figure 2-36. Install O-Ring





- 2. Retract
 - Figure 2-37. Install U-clip



- 1. Valve spring compressor
- 2. Socket
- 3. Large adapter

Figure 2-38. Install Trunk Lockset

LATCH ASSEMBLY

FASTENER	TORQUE VALUE	
Trunk door lock housing nuts: FLHTCUTG	9-11 in-lbs	1.0-1.2 Nm
Trunk door latch mechanism screws: FLHTCUTG	8-10 in-lbs	0.9-1.1 Nm
Trunk door latch housing screws: FLHTCUTG	48-60 in-lbs	5.4-6.8 Nm

Removal

- 1. Remove lockset. See <u>2.18 TRUNK DOOR LOCKSET:</u> <u>FLHTCUTG, Lockset</u>.
- 2. See <u>Figure 2-34</u>. Remove four screws (8) to release latch housing (4) from body.
- 3. Remove O-ring (3).

Lock Assembly Removal

- See <u>Figure 2-39</u>. Remove two screws (1) and nuts (5) to release lock assembly (2) from latch housing.
- 2. Disconnect lock arm from link (12). If necessary, remove link from latch lever (11).

Lock Assembly Installation

- 1. If removed, attach latch link (12) to latch lever (11).
- 2. Engage arm of lock assembly to link.
- 3. Install lock assembly (2) into latch housing and secure with two nuts (5) and screws (1). Tighten to 9-11 **in-lbs** (1.0-1.2 Nm).
- 4. Verify operation of latch mechanism.

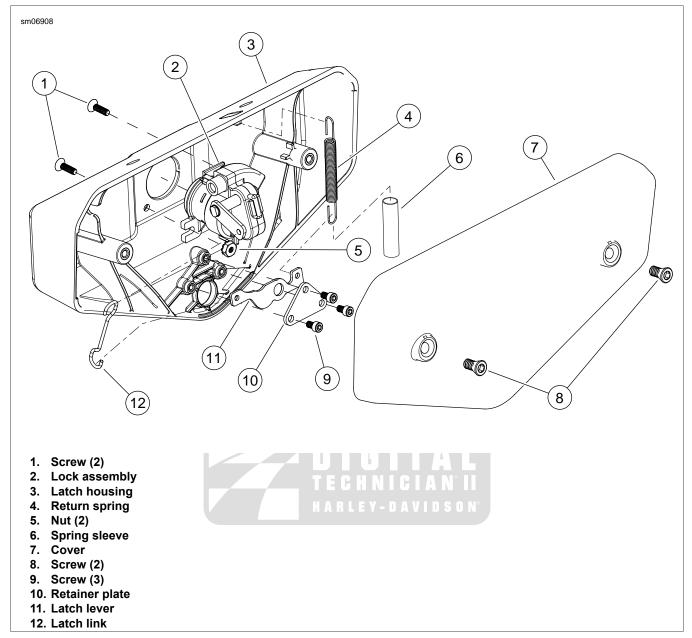


Figure 2-39. Trunk Door Latch Assembly

Latch Mechanism Replacement

- See <u>Figure 2-39</u>. Disconnect return spring (4) and sleeve (6).
- 2. Remove three screws (9).
- 3. Remove retainer plate (10) and latch lever (11) from housing. Disconnect from link (12).
- 4. Connect latch lever to link (12).

NOTE

Screws (9) must be replaced with **new**. Do not use liquid threadlocker or binding may occur.

- 5. Install latch lever (11) and retainer plate (10) and secure with three **new** screws (9). Tighten to 8-10 **in-lbs** (0.9-1.1 Nm).
- 6. Install return spring (4).

Installation

- See <u>Figure 2-34</u>. Use a small amount of grease to hold new O-ring (3) in place. Install latch housing assembly (4) and secure with four screws (8). Tighten to 48-60 in-lbs (5.4-6.8 Nm).
- Install lockset (1). See <u>2.18 TRUNK DOOR LOCKSET:</u> <u>FLHTCUTG, Lockset</u>.
- 3. Check and adjust trunk door. See <u>2.17 TRUNK DOOR:</u> <u>FLHTCUTG, Installation</u>.

LATCH PIN

FASTENER	TORQUE VALUE	
Trunk door latch pin jamnut: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm

Removal

- 1. See <u>Figure 2-40</u>. Hold latch pin with a wrench and loosen jamnut (3).
- 2. Remove latch pin and jamnut.

Installation

- 1. Install latch pin with jamnut.
- See <u>Figure 2-40</u>. Adjust the latch pin to 1.050 in (26.67 mm) from surface of latch bracket to end of pin. Use a dial caliper to measure distance (2).
- 3. Hold latch pin and tighten jamnut (3) to 48-72 **in-lbs** (5.4-8.1 Nm).

4. Check door latch operation and adjust latch pin bracket as necessary. See <u>2.17 TRUNK DOOR: FLHTCUTG</u>, <u>Installation</u>.

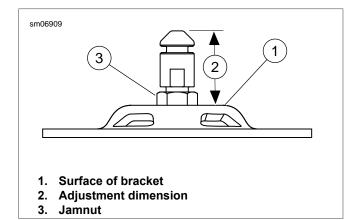


Figure 2-40. Adjust Latch Pin



TRUNK DOOR: FLRT

REPAIR

PART NUMBER	TOOL NAME
HD-25070	ROBINAIR HEAT GUN

FASTENER	TORQUE VALUE	
Trunk door hinge to door screws: FLRT	72-96 in-lbs	8.1-11.0 Nm
Trunk door tether to door screws: FLRT	16-22 in-lbs	1.8-2.5 Nm
Trunk door hinge to body screws: FLRT	72-96 in-lbs	8.1-11.0 Nm
Trunk door hinge cover screws: FLRT	25-35 in-lbs	2.8-3.9 Nm
Trunk door striker screws: FLRT	72-96 in-lbs	8.1-11.0 Nm
Trunk door striker pin: FLRT	35-40 ft-lbs	47.0-54.0 Nm

Removal

- 1. Remove screws to release lanyard from trunk door.
- See <u>Figure 2-41</u>. Remove screws (2) from hinge (1). Remove door.

Installation

- 1. See <u>Figure 2-41</u>. Install hinge (1) with screws (2). Do not tighten.
- 2. Center cast-in pins (4) on door with holes (3) in hinge.
- 3. Tighten to 72-96 in-lbs (8.1-11.0 Nm).
- 4. Install screws to secure lanyard to trunk door. Tighten to 16-22 **in-lbs** (1.8-2.5 Nm).

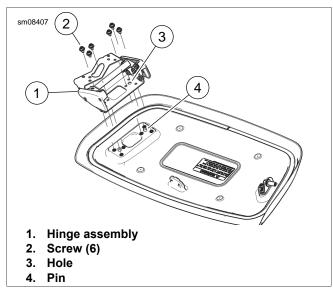


Figure 2-41. FLRT Trunk Door

Trunk Door Hinge

- 1. See Figure 2-42. Remove trunk door.
- 2. Remove screws (4). Remove hinge (3).
- 3. Remove screws (1) and covers (2) if necessary.
- Secure hinge with screws (4). Tighten to 72-96 in-lbs (8.1-11.0 Nm).
- 5. If removed, install covers (2) with screws (1). Tighten to 25-35 **in-lbs** (2.8-3.9 Nm).
- 6. Install trunk door.

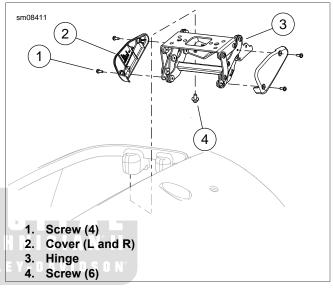


Figure 2-42. Trunk Door Hinge: FLRT

Seal Inspection

- Inspect for accumulation of dirt, grime or debris. Clean with warm soapy water, if necessary.
- Inspect for damage or excessive wear. Replace if brittle, cracked, torn or shredded.
- 3. Verify seal is adhered securely. Replace if seal is not securely adhered at any point.

Seal Replacement

NOTE

The use of ROBINAIR HEAT GUN (Part No. HD-25070) may improve seal removal.

 Remove old seal and all residual adhesive using 3M GENERAL PURPOSE ADHESIVE REMOVER or equivalent.

NOTE

Do not touch the cleaned area with fingers after cleaning.

2. Thoroughly clean the surface around the door opening using a clean cloth and isopropyl alcohol.

NOTE

Install the **new** seal with the holes toward the inside of the opening.

 See <u>Figure 2-43</u>. Beginning at the rear middle of the door, peel back a few inches of backing material and adhere the end (4) of the seal. Work only a few inches at a time.

NOTE

To prevent the possibility of water intrusion, be careful the seal flows smoothly around each corner and does not bunch or kink at the corners.

4. Continue around the opening until the seal returns to the point of beginning. Use care at the corners to prevent bunching or kinking of the seal.

NOTE

Do not cut seal long. Doing so may cause seal to bunch allowing a path of water intrusion.

- 5. Cut the seal squarely so the ends mate tightly together but do not cut long.
- After the entire seal is initially installed, go back around the entire seal and press firmly in place to be sure it is securely adhered. Visually inspect the seal contact.
- 7. Check and adjust trunk door. See <u>2.19 TRUNK DOOR:</u> <u>FLRT, Adjust Trunk Door</u>.

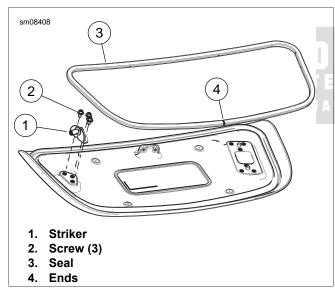


Figure 2-43. Trunk Door Seal: FLRT

Striker

 See <u>Figure 2-43</u>. Remove screws (2). Remove striker assembly.

- Install striker assembly with screws (2). Tighten to 72-96 in-lbs (8.1-11.0 Nm).
- 3. See Figure 2-44. If striker pin was removed:
 - a. Install washer on pin so cupped side will face base.
 - b. Align pin with mark on base.
 - Install flange nut. Tighten to 35-40 ft-lbs (47.0-54.0 Nm).

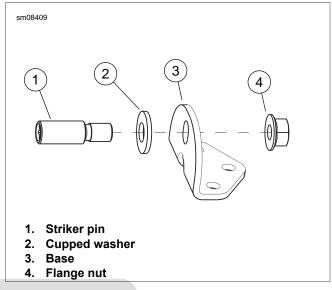


Figure 2-44. Striker Assembly: FLRT

ADJUST TRUNK DOOR

FASTENER	TORQUE VALUE	
Trunk door striker pin: FLRT	35-40 ft-lbs	47.0-54.0 Nm

- 1. Close the trunk door. Press down on the trunk door to engage latch. Pull to make sure that trunk door is secure.
- 2. Visually compare gap on left (hinge) side to the right (latch) side. Gap must be approximately the same.
- 3. Adjust striker pin:
 - a. See Figure 2-44. Loosen nut (4) only enough to allow pin (1) to move.
 - b. Adjust striker pin. Snug the nut.
 - c. Close and latch door to assess gap. Repeat until gap is approximately the same.
 - d. Tighten nut (4) to 35-40 ft-lbs (47.0-54.0 Nm).
 - e. Close and open door to verify operation.

TRUNK DOOR LOCKSET: FLRT

LOCK AND LATCH ASSEMBLY

FASTENER	TORQUE VALUE	
Trunk lock knob nut: FLRT	13-16 ft-lbs	17.6-21.7 Nm
Trunk lock cover: FLRT	72-96 in-lbs	8.1-10.8 Nm
Trunk door latch: FLRT	96-120 in-lbs	10.8-13.6 Nm
Trunk lock cover: FLRT	72-96 in-lbs	8.1-10.8 Nm
Trunk latch cover screws: FLRT	20-25 in-lbs	2.3-2.8 Nm
Trunk door latch: FLRT	96-120 in-lbs	10.8-13.6 Nm

Assembly Removal

- 1. See Figure 2-45. Remove screws (3) and latch (4).
- 2. Remove screws (2). Remove lock cover (5).
- 3. Release cable from retaining clips in trunk. Remove latch assembly.
- 4. Remove nut (1) and tabbed washer.
- 5. Remove knob (6) from bore.

Assembly Installation

- 1. Inspect seal on knob. Replace if damaged.
- 2. See Figure 2-45. Install knob (6) with larger flat on threads facing up.

NOTE

Install tabbed washer with tab toward body.

- Install tabbed washer and nut (1). Tighten to 13-16 ft-lbs (17.6-21.7 Nm).
- 4. Install lock cover (5) with screws (2). Tighten to 72-96 in-lbs (8.1-10.8 Nm).
- 5. Install latch (4) with screws (3). Tighten to 96-120 **in-lbs** (10.8-13.6 Nm).
- 6. Secure cable in three retaining clips.
- 7. Adjust latch. See 2.22 BODY.

Lock Cover

- 1. See Figure 2-46. Remove lock cover (3) from body.
- 2. Remove retaining ring (1).
- 3. Disengage cable from lock cover (3) to separate.
- 4. Assembly is the reverse of disassembly.
- Verify the cable housing is securely installed in the lock cover.
- See <u>Figure 2-45</u>. Install lock cover (5) with screws (2). Tighten to 72-96 in-lbs (8.1-10.8 Nm).

Latch Cover

NOTE

The latch and cable are serviced as an assembly only.

- Remove latch assembly from body.
- See <u>Figure 2-46</u>. Remove screws (2) securing latch cover (4) to latch.
- 3. Release cable from latch cover. Remove latch cover.
- Assembly is the reverse of disassembly. Tighten screws (2) to 20-25 in-lbs (2.3-2.8 Nm).
- See <u>Figure 2-45</u>. Install latch (4) with screws (3). Tighten to 96-120 in-lbs (10.8-13.6 Nm).

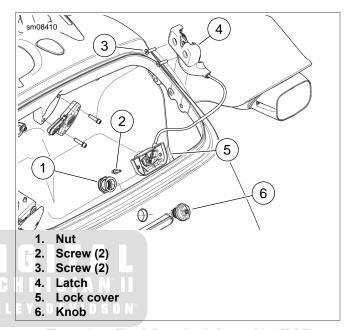


Figure 2-45. Trunk Door Lock Assembly: FLRT

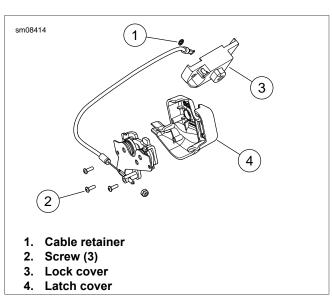


Figure 2-46. Trunk Door Lock Components: FLRT

TOUR-PAK 2.21

TOUR-PAK ADJUSTMENT

FASTENER	TORQUE VALUE	
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm

NOTE

The Tour-Pak can be secured in either the forward or rearward position.

- 1. See Figure 2-47. Separate Tour-Pak electrical connectors.
- 2. See <u>Figure 2-48</u>. Remove six flange nuts (3) to release Tour-Pak and support from body.
- Remove four flange nuts (2) to release Tour-Pak from support.
- Secure Tour-Pak in preferred position with flange nuts (2).
 Tighten to 60-72 in-lbs (6.8-8.1 Nm) in a crosswise pattern
- Attach Tour-Pak and support with six flange nuts (3).
 Tighten to 60-72 in-lbs (6.8-8.1 Nm).
- See <u>Figure 2-47</u>. Mate Tour-Pak electrical connectors. Secure to anchors.

REMOVAL

NOTE

For Tour-Pak repair, see the service manual.

- 1. Remove Tour-Pak liner.
- 2. See Figure 2-47. Separate Tour-Pak electrical connectors.
- 3. See <u>Figure 2-48</u>. Remove six flange nuts (3) to release Tour-Pak and support from body.
- 4. Remove four flange nuts (2) to release Tour-Pak from support.

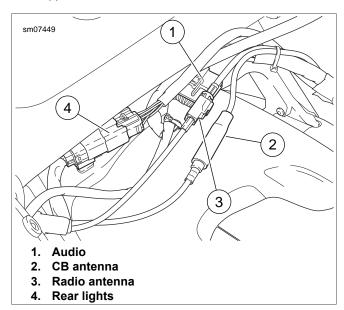


Figure 2-47. Tour-Pak Connectors

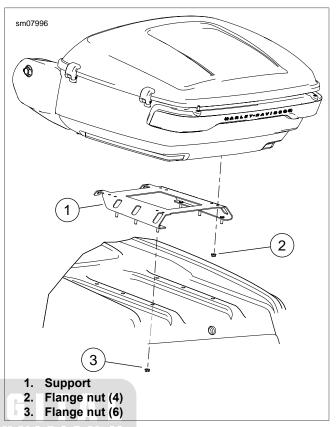


Figure 2-48. Tour-Pak Mount

INSTALLATION

FASTENER	TORQUE VALUE	
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm

- 1. See <u>Figure 2-48</u>. Attach Tour-Pak to support with four flange nuts (2). Tighten to 60-72 **in-lbs** (6.8-8.1 Nm) in a crosswise pattern.
- 2. Attach Tour-Pak and support with six flange nuts (3). Tighten to 60-72 **in-lbs** (6.8-8.1 Nm).
- See <u>Figure 2-47</u>. Mate Tour-Pak electrical connectors. Secure to anchors.
- 4. Install Tour-Pak liner.

BODY 2.22

REMOVAL

1. Remove seat.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 2. Disconnect negative battery cable.
- 3. Remove side covers.
- 4. Remove trunk liner.

NOTE

FLRT: Remove liner in the following order:

- Bottom
- · Bulkhead panel
- · Wrap-around
- See <u>Figure 2-49</u> or <u>Figure 2-50</u>. Disconnect rear lighting harness connector from main harness.
- 6. Remove four lower screws and washers (internal).

NOTE

FLHTCUTG: The left-front fastener is used as a ground stud. Remove locknut with two flat washers from front left ground stud. Remove ground strap.

- 7. Remove front fasteners and washers securing body to intermediate frame (internal).
- 8. Remove two screws and washers to release front external brackets from intermediate frame downtubes.
- 9. Place towels on the muffler ends to protect against contact with the body.

NOTE

FLRT: Due to the wrap-around design, lift the front of the body slightly and slide rearward to clear the rear frame.

10. With assistance, lift body off rear frame.

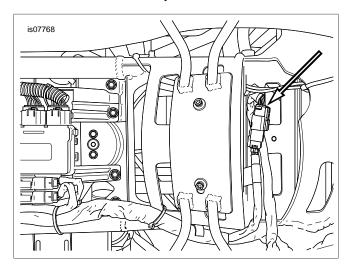


Figure 2-49. Rear Lighting Connector: FLHTCUTG

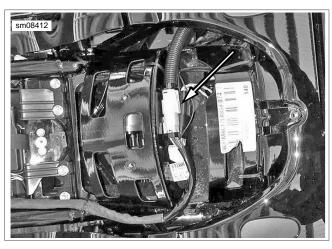


Figure 2-50. Rear Lighting Connector: FLRT

INSTALLATION

FASTENER	TORQUE VALUE	
Body attachment screws (inside trunk)	14-17 ft-lbs	19.0-23.1 Nm
Body attachment screws (outside trunk)	23-28 ft-lbs	31.2-38.0 Nm
Ground strap to forward stud (inside trunk)	14-17 ft-lbs	19.0-23.1 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

NOTES

- Clean all residual locking residue from screws.
- Start all screws before tightening any. If any screws are misaligned or difficult to start, the rear frame may not be properly aligned. To align frame, loosen four intermediateto-rear frame screws on each side and move rear frame until all body fasteners align.
- If rear frame was adjusted, clean all locking agent from screws and threaded holes, and adjust the panhard rod as outlined in 2.24 REAR FRAME.
- FLHTCUTG: Temporarily move the rear lighting harness to the left side to prevent it from becoming trapped when securing the body.
- Apply LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue) to all body fasteners. Apply to the longer end of the ground stud on Tour-Pak equipped models.

NOTE

FLRT: Due to the wrap-around design, lift the front of the body slightly and slide forward onto the rear frame.

- 3. Place towels on the muffler ends to protect against contact with the body.
- 4. With assistance, set the body in place.
- Start the front lower left screw and washer.

- 6. **FLHTCUTG:** Start longer end of ground stud with washer to fasten left-front body to intermediate frame.
- FLRT: Install two screws with washers to fasten body to intermediate frame.
- 8. Start all remaining screws and washers.
- 9. Tighten all internal screws to 14-17 ft-lbs (19.0-23.1 Nm).
- 10. Tighten two front (external) screws to 23-28 ft-lbs (31.2-38.0 Nm).
- 11. **FLHTCUTG:** Position flat washer on each side of ground strap. Install on left-front stud with **new** locknut. Tighten to 14-17 ft-lbs (19.0-23.1 Nm).
- 12. Mate rear lighting harness to main harness.
- 13. Install trunk liner.

FLRT: Install in the following order:

- a. Wrap-around
- b. Bulkhead panel
- c. Bottom
- 14. Install side covers.
- 15. Connect negative battery cable. Tighten to 60-70 **in-lbs** (6.8-7.9 Nm).

WARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

16. Install seat.

DISASSEMBLY: FLHTCUTG

- 1. Remove Tour-Pak and rack. See 2.21 TOUR-PAK.
- Remove locknut with flat washer to release ground strap from upper ground stud.
- 3. Remove rear fenders. See 2.23 REAR FENDERS.
- Remove rear lighting harness. See <u>7.8 REAR LIGHTS</u> <u>HARNESS: FLHTCUTG</u>.
- 5. Remove trunk door. See 2.17 TRUNK DOOR: FLHTCUTG.
- Remove trunk door lockset and latch assembly. See 2.18 TRUNK DOOR LOCKSET: FLHTCUTG.
- Remove trunk door seal. See <u>2.22 BODY, Trunk Door Seal: FLHTCUTG.</u>

ASSEMBLY: FLHTCUTG

FASTENER	TORQUE VALUE	
Ground strap to upper stud: FLHTCUTG	96-120 in-lbs	10.8-13.5 Nm

- 1. Install rear fenders. See 2.23 REAR FENDERS.
- Install rear lighting harness. See <u>7.8 REAR LIGHTS</u> HARNESS: FLHTCUTG.

- 3. Install rack and Tour-Pak. See 2.21 TOUR-PAK.
- Secure ground strap to upper ground stud with washer and locknut. Tighten locknut to 96-120 in-lbs (10.8-13.5 Nm).
- Install trunk door seal. See <u>2.22 BODY, Trunk Door Seal:</u> FLHTCUTG.
- 6. Install trunk door latch assembly and lockset. See 2.18 TRUNK DOOR LOCKSET: FLHTCUTG.
- 7. Install trunk door. See 2.17 TRUNK DOOR: FLHTCUTG.

DISASSEMBLY: FLRT

- 1. Remove screws securing passenger grab handles.
- 2. Remove screws securing bulkhead cover.
- 3. Remove rear fenders. See 2.23 REAR FENDERS.
- 4. Remove rear lighting harness. See <u>7.9 REAR LIGHTS</u> HARNESS: FLRT.
- Remove screws securing trunk door tether reel to bulkhead
- Remove trunk door and hinge. See <u>2.19 TRUNK DOOR:</u> <u>FLRT.</u>
- Remove trunk door lockset and latch assembly. See 2.20 TRUNK DOOR LOCKSET: FLRT.

ASSEMBLY: FLRT

FASTENER	TORQUE VALUE	
Trunk bulkhead cover screws	72-96 in-lbs	8.1-10.8 Nm
Trunk door tether reel screws: FLRT	72-96 in-lbs	8.1-10.8 Nm
Passenger grab handles: FLRT	96-120 in-lbs	10.8-13.6 Nm

- 1. Install rear fenders. See 2.23 REAR FENDERS.
- 2. Install rear lighting harness. See <u>7.9 REAR LIGHTS</u> HARNESS: FLRT.
- Install trunk bulkhead cover. Tighten to 72-96 in-lbs (8.1-10.8 Nm).
- Install trunk door latch assembly and lockset. See 2.20 TRUNK DOOR LOCKSET: FLRT.
- 5. Install trunk door. See 2.19 TRUNK DOOR: FLRT.
- Install tether reel to bulkhead. Tighten to 72-96 in-lbs (8.1-10.8 Nm).
- Install passenger grab handles. Tighten to 96-120 in-lbs (10.8-13.6 Nm).

PASSENGER GRAB HANDLES: FLRT

FASTENER	TORQUE VALUE	
Passenger grab handle screws: FLRT	96-120 in-lbs	10.8-13.6 Nm

Removal

1. Remove rear wheel. See <u>2.6 REAR WHEELS</u>.

Remove two screws securing the grab handle. Remove grab handle.

Installation

- 1. Install the grab handle with long standoff toward the front. Tighten to 96-120 **in-lbs** (10.8-13.6 Nm).
- 2. Install rear wheel. See 2.6 REAR WHEELS.

REPAIR

Threaded Inserts

NOTE

Not all threaded inserts are serviceable. Refer to the parts catalog before continuing to be sure the damaged insert can be replaced.

- See <u>Figure 2-51</u>. Remove damaged insert. Thread in a bolt or tap and use pliers to pull insert from body.
- Clean bonding area using isopropyl alcohol. Allow to dry completely.
- 3. See Figure 2-52. Install **new** insert onto a bolt.
- Thoroughly mix two-part epoxy that is recommended for use on plastic. Roll insert in adhesive to apply adhesive to insert.
- 5. See Figure 2-53. Tap insert into body until flush with surface using a plastic hammer. Remove bolt.

NOTE

Do not use solvent to clean adhesive from threads or area surrounding the insert. Weakening of the bond will result.

- 6. Carefully remove excess adhesive. If adhesive gets into threads of insert, allow to cure and remove using a tap.
- Allow adhesive to cure at least 24 hours before applying torque.

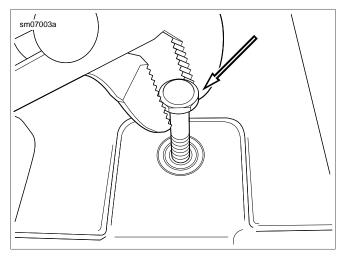


Figure 2-51. Remove Insert

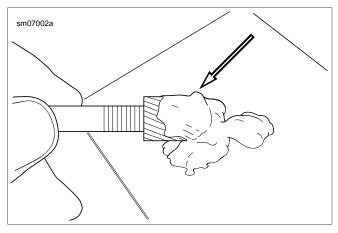


Figure 2-52. Apply Adhesive

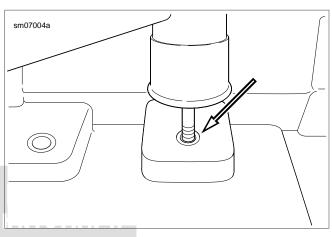


Figure 2-53. Install Insert

TRUNK DOOR SEAL: FLHTCUTG

PART NUMBER	TOOL NAME
HD-25070	ROBINAIR HEAT GUN

Inspection

- 1. Inspect for accumulation of dirt, grime or debris. Clean with warm soapy water, if necessary.
- Inspect for damage or excessive wear. Replace if brittle, cracked, torn or shredded.
- 3. Verify seal is adhered securely. Replace if seal is not securely adhered at any point.

Replacement

NOTE

The use of ROBINAIR HEAT GUN (Part No. HD-25070) may improve seal removal.

 Remove old seal and all residual adhesive using 3M GENERAL PURPOSE ADHESIVE REMOVER or equivalent.

NOTE

Do not touch the cleaned area with fingers after cleaning.

Thoroughly clean the surface around the door opening using a clean cloth and isopropyl alcohol.

NOTE

Install the **new** seal with the holes toward the inside of the opening.

3. See Figure 2-54. Beginning at the bottom middle of the opening, peel back a few inches of backing material and adhere the end (2) of the seal even with the edge of the flange as shown in Figure 2-55. Work only a few inches at a time.

NOTE

To prevent the possibility of water intrusion, be careful the seal flows smoothly around each corner and does not bunch or kink at the corners.

4. Continue around the opening until the seal returns to the point of beginning. Use care at the corners to prevent bunching or kinking of the seal.

NOTE

Do not cut seal long. Doing so may cause seal to bunch allowing a path of water intrusion.

- Cut the seal squarely so the ends mate tightly together but do not cut long. A gap of up to 0.062 in (1.6 mm) is allowed.
- 6. After the entire seal is initially installed, go back around the entire seal and press firmly in place to be sure it is securely adhered. Visually inspect the seal contact.
- 7. Check and adjust trunk door. See <u>2.17 TRUNK DOOR:</u> FLHTCUTG, Installation.

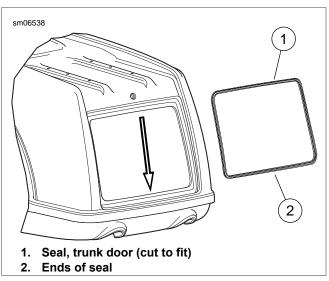


Figure 2-54. Trunk Door Seal

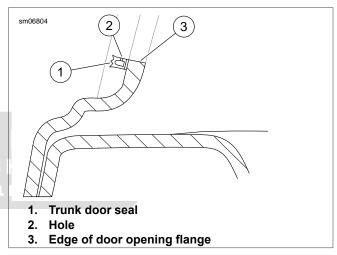


Figure 2-55. Cross Section of Gasket Placement

2.23

REAR FENDERS

REMOVAL

NOTE

Rear fender replacement does not require body removal.

- 1. Remove rear wheel. See 2.6 REAR WHEELS.
- Remove tail lamp/turn signal.
- FLHTCUTG: If necessary, remove tail lamp base (incandescent type) or bracket (LED type). See <u>7.6 TAIL</u> <u>LAMPS/REAR TURN SIGNALS</u>.
- Feed tail lamp connector through opening to inboard side of fender.
- Release rear lighting harness from anchor clips in fender well. Feed harness through holes to underside of body.

NOTE

If threaded body insert spins, hold it with a wrench from inside the trunk.

Remove six screws with flat washers to release fender from body.

Tail Lamp Bracket: FLRT

- 1. See Figure 2-57. remove screws (1).
- 2. Remove tail lamp bracket (2).

INSTALLATION

FASTENER	TORQUE	VALUE
Fender, rear, screws	108-132 in-lbs	12.2-14.9 Nm
Tail lamp bracket: FLRT	72-96 in-lbs	8.1-10.8 Nm

- 1. See <u>Figure 2-56</u> or <u>Figure 2-57</u>. Inspect adhesive rubber pads on side of body. Replace if necessary.
- Apply LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue) to threads of six screws.
- Install screws with flat washers to fasten fender to body. Tighten to 108-132 in-lbs (12.2-14.9 Nm).
- Route rear lighting harness through hole to inboard side of fender. Capture harness in anchor clips in fender well.
- Connect and install tail lamp/turn signal. See <u>7.6 TAIL LAMPS/REAR TURN SIGNALS</u>.
- 6. If installing new fender:
 - a. All except HDI: Install new reflector on side of fender. Center reflector over rear axle and 0.75 in (19.1 mm) above the bottom edge of the fender.
 - b. HDI: See <u>Figure 2-58</u>. Install new reflector on rear tip of fender.
- 7. Install rear wheel. See 2.6 REAR WHEELS.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

8. Check operation of all lamps.

Tail Lamp Bracket: FLRT

See <u>Figure 2-57</u>. Tighten screws (1) to 72-96 **in-lbs** (8.1-10.8 Nm).

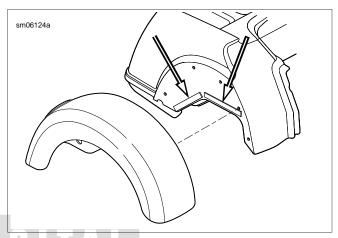


Figure 2-56. FLHTCUTG

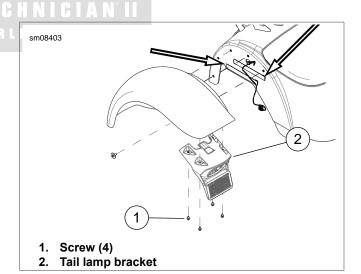


Figure 2-57. FLRT

HOME

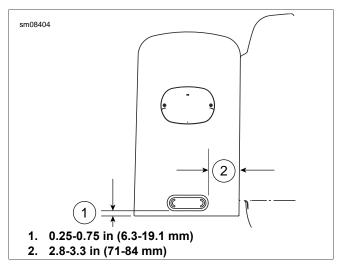


Figure 2-58. Install Rear Fender Reflector: FLHTCUTG



REAR FRAME

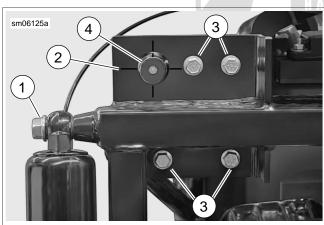
REMOVAL

- Remove body. See <u>2.22 BODY</u>.
- 2. Release both mufflers from mounting brackets.

NOTICE

When lifting a motorcycle using a jack, be sure jack contacts both lower frame tubes where down tubes and lower frame tubes converge. Never lift by jacking on crossmembers, oil pan, mounting brackets, components or housings. Failure to comply can cause serious damage resulting in the need to perform major repair work. (00586d)

- Place jack under frame, positioned to lift rear of motorcycle. See <u>1.2 LIFTING MOTORCYCLE WITH A JACK</u>. Lift rear of motorcycle until rear tires are just touching.
- Cut cable straps securing parking brake cable to rear frame.
- See <u>Figure 2-59</u>. Remove upper shock screws from both sides.
- 6. Disconnect panhard rod from right side axle pinch block. See <u>2.30 PANHARD ROD</u>.
- 7. If rear frame is to be reused, make vertical and horizontal alignment marks between intermediate frame boss (4) and rear frame (2) on each side. Remove eight screws with washers to release rear frame from intermediate frame.
- 8. Remove rear frame from intermediate frame bosses.



- 1. Upper shock screw
- 2. Rear frame
- 3. Rear frame screw
- 4. Intermediate frame boss

Figure 2-59. Rear Frame (Left Side)

DISASSEMBLY

- 1. Remove muffler brackets from rubber mounts. Remove rubber mounts from rear frame brackets.
- 2. Remove nut and flat washer to release eyelet of panhard rod and two nylon bushings from weld stud.

ASSEMBLY

- Install rubber mount into rear frame bracket.
- 2. Install muffler bracket into rubber mount.
- Repeat step on other side.

INSTALLATION

FASTENER	TORQUE VALUE	
Rear frame screws	41-45 ft-lbs	55.6-61.0 Nm
Shock absorber screws	55-60 ft-lbs	74.6-81.4 Nm
Muffler bracket screws	14-18 in-lbs	19.0-24.4 Nm

NOTE

Clean threadlocking compound from all fasteners and threaded holes prior to assembly.

- See <u>Figure 2-59</u>. Install rear frame onto intermediate frame bosses (4).
- 2. Apply LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red) and start eight screws (3) with washers. If reusing original rear frame, align marks made during removal.
- 3. If installing a **new** rear frame, side-to-side level of rear frame should be checked:
 - Set the vehicle on a flat level surface.
 - b. Set the front wheel straight forward.
 - c. Check the front wheel with an inclinometer on either front brake disc to verify it is vertical.

NOTE

Comparison of front to rear measurement is not critical. The side-to-side measurement of the front pair of tabs or rear pair is the important measurement.

- See <u>Figure 2-60</u>. Measure the distance from the level surface to the top of each body mounting tab.
- Adjust rear frame until the side-to-side measurement of either pair of tabs are within 0.125 in (3.17 mm) of each other.
- 4. Tighten screws to 41-45 ft-lbs (55.6-61.0 Nm) in a crosswise pattern.

NOTE

The length of the panhard rod must be adjusted whenever a **new** rear frame is installed. If installing the original rear frame, the rod may not require adjustment. Verify adjustment and adjust as necessary. See 2.30 PANHARD ROD, Adjustment.

- Install and adjust panhard rod. See <u>2.30 PANHARD ROD</u>, <u>Installation</u>.
- 6. Apply LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red) and install upper shock screws. Tighten screws to 55-60 ft-lbs (74.6-81.4 Nm).

<u>HOME</u>

- 7. Fasten mufflers to rubber-mounted brackets using screws with lockwashers. Tighten screws to 14-18 **in-lbs** (19.0-24.4 Nm).
- Secure parking brake cable to rear frame with **new** cable straps.
- 9. Install body. See 2.22 BODY.

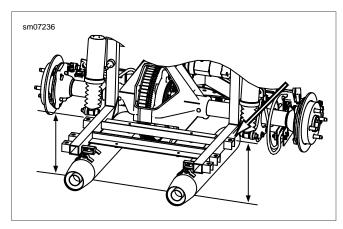


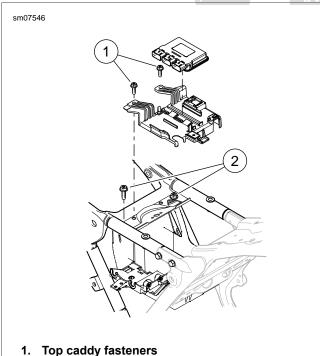
Figure 2-60. Measure Rear Frame



INTERMEDIATE FRAME

REMOVAL

- 1. Separate rear lighting harness connector from main harness. Remove connector anchor.
- 2. Remove top caddy and lay aside. Remove battery. See service manual.
- Feed harnesses and radio antenna cable into battery box.
- Cut cable straps to release harnesses from upper frame tubes.
- 5. Remove body. See 2.22 BODY.
- Remove rear frame. See 2.24 REAR FRAME.
- See Figure 2-61. Remove two screws (2) to release battery
- Disconnect BAS connector. See 7.10 BANK ANGLE SENSOR (BAS).
- 9. Remove air valve from right side of intermediate frame and cut cable straps to release air tubes. Draw air valve and tubes out through opening at rear of intermediate frame.
- 10. Cut cable straps securing reverse motor cables (if equipped) from right side intermediate frame.
- 11. See Figure 2-62. Remove screw (1) to release rear of left side caddy.
- 12. Remove three screws (2, 3) and washers from each side and remove intermediate frame.



2. Rear battery tray fasteners

Figure 2-61. Upper Caddy Fasteners

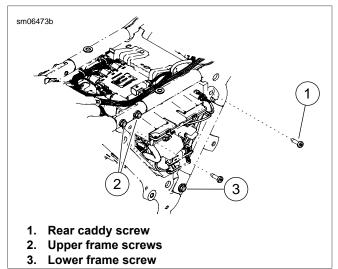


Figure 2-62. Left Side Frame

DISASSEMBLY

- Remove two screws to release frame connection bracket (both sides).
- FLHTCUTG: Remove two screws to release passenger handrail.
- Remove two screws to free BAS and bracket.
- Remove side cover grommets, if necessary (three each side).

ASSEMBLY

FASTENER	TORQUE	VALUE
Frame connection bracket screws	41-45 ft-lbs	55.6-61.0 Nm
Passenger handrail screws	60-96 in-lbs	6.8-10.9 Nm
Bank angle sensor bracket screws	72-108 in-lbs	8.1-12.2 Nm

NOTE

Orient frame connection brackets so that the threaded hole is toward the front.

- Install frame connection brackets to intermediate frame. Tighten to 41-45 ft-lbs (55.6-61.0 Nm).
- 2. FLHTCUTG: Install passenger handrail. Tighten to 60-96 in-lbs (6.8-10.9 Nm).
- 3. Install side cover grommets.
- Install BAS and bracket. Tighten to 72-108 in-lbs (8.1-12.2 Nm).

INSTALLATION

FASTENER	TORQUE VALUE	
Intermediate frame screws	40-45 ft-lbs	54.2-61.0 Nm
Left electrical caddy screw	72-96 in-lbs	8.1-10.9 Nm
Air valve nut	12-15 in-lbs	1.4-1.7 Nm
Battery tray screws	72-96 in-lbs	8.1-10.9 Nm

- Fit the intermediate frame to the main frame and start two lower screws and hardened washers. Install four remaining upper screws and hardened washers.
- 2. See <u>Figure 2-63</u>. Tighten screws in the sequence shown to 40-45 ft-lbs (54.2-61.0 Nm).
- See <u>Figure 2-62</u>. Install screw (1). Tighten to 72-96 in-lbs (8.1-10.9 Nm).
- Install new cable straps to secure reverse motor energizer lead and power cable, reverse control module harness, and HO2 sensor harnesses to intermediate frame right upper tube.

- Route air valve and tubes in through opening at rear of intermediate frame and secure air valve to frame. Tighten to 12-15 in-lbs (1.4-1.7 Nm). Install cap.
- See <u>Figure 2-64</u>. Install three **new** cable straps to secure air tubes.
- 7. See Figure 2-61. Secure battery tray with screws (2). Tighten to 72-96 in-lbs (8.1-10.9 Nm).
- 8. Route Tour-Pak lights harness and radio antenna cables back through left side of intermediate frame.
- Install new cable straps to secure harnesses to upper left and right frame tubes.
- 10. Install battery and top caddy. See the service manual.
- 11. Install rear frame. See 2.24 REAR FRAME.
- 12. Install body. See 2.22 BODY.
- Connect rear lighting harness to main harness. Push connector anchor into hole in rear of intermediate frame.

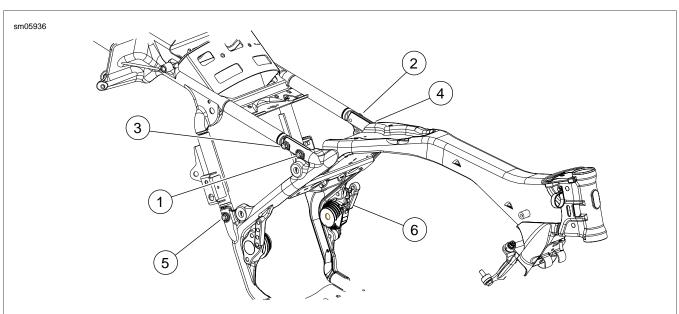


Figure 2-63. Intermediate Frame Screw Torque Sequence

HOME

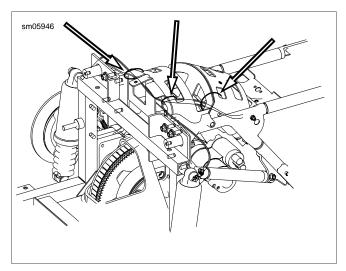


Figure 2-64. Secure Air Tubes Using Three Cable Straps



FRONT FORK 2.26

SERVICING FORKS

Front fork service is the same as two-wheeled vehicles with the following exceptions:

- Initially fill with slightly more than 26 fl oz (770 cc).
- Set oil level gauge to 3.78 in (96 mm).

Fork Removal: FLRT

 Remove headlamp nacelle. See <u>2.31 HEADLAMP</u> <u>NACELLE</u>. 2. Follow the procedure in the service manual to remove and repair forks.

Fork Installation: FLRT

- 1. Follow the procedure in the service manual to install forks.
- 2. Install headlamp nacelle. See 2.31 HEADLAMP NACELLE.



REAR FORK 2.27

REMOVAL

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)

- 1. Disconnect battery negative cable.
- Remove body. See <u>2.22 BODY</u>.
- Remove left side muffler and crossover pipe. See the service manual. Discard exhaust clamp and gasket.
- Release brake lines from four cable clips on top of rear fork
- Remove brake line manifold from rear fork stud.

NOTICE

When lifting a motorcycle using a jack, be sure jack contacts both lower frame tubes where down tubes and lower frame tubes converge. Never lift by jacking on crossmembers, oil pan, mounting brackets, components or housings. Failure to comply can cause serious damage resulting in the need to perform major repair work. (00586d)

NOTE

The center of gravity is toward the rear of the motorcycle. Verify that front wheel is secured in wheel vise and tie down straps are in place when lifting rear wheels.

Position jack under motorcycle to support rear of main frame. See <u>1.2 LIFTING MOTORCYCLE WITH A JACK</u>.

NOTE

Repeat the following steps for both sides of the rear fork.

- See <u>Figure 2-65</u>. To aid in initial alignment during assembly, use a paint pen to mark the adjustment screw (4) where it exits the front of adapter plate on both sides of motorcycle.
- 8. Loosen the jamnut. Turn the adjustment screw in as far as it will go.
- 9. Loosen four pinch block bolts (1).

NOTE

Removal of lower screws in left side fork flange will also release parking brake equalizer bracket.

- 10. Remove four screws (3).
- 11. Push adapter plates (2) toward axle housing until flange contacts pinch block.
- 12. Place a jack under rear of oil pan to support transmission.
- 13. Remove both passenger footboards and brackets.

- See <u>Figure 2-66</u>. Remove two fasteners (6) to free rear fork bracket (4).
- 15. Remove chrome plug (5) from right side rear fork bracket.

NOTES

- Use a 6-point socket for removal of the pivot shaft locknuts.
- Use an air impact wrench to remove the right-side nut. Applying heat to the right-side nut may also improve removal. If the left-side nut loosens first, remove left-side mount and use double 1/2-20 nuts to hold pivot shaft while removing right-side nut.
- Hold left side locknut (7) and use an air impact wrench to remove locknut (13) from right side of pivot shaft. Discard locknut.
- Remove cup washer (3) from right side of pivot shaft and discard.
- 18. Tap pivot shaft (11) toward left side of motorcycle.
- 19. Pull pivot shaft assembly with locknut (7), cup washer (3), rubber mount (8) and outer spacer (9) out of transmission and rear fork.
- Work rear fork free of transmission mount. Carefully lower rear fork and remove.
- 21. Remove outer spacer (9) from right side rear fork tube.
- 22. If necessary, remove rubber mount (14) from right side.
- 23. Clamp the pivot shaft assembly in a vise with soft jaws and disassemble:
 - Remove locknut (7) and discard.
 - b. Remove cup washer (3) and left mount (8).
- 24. If necessary, remove adapter plates from axle housing.

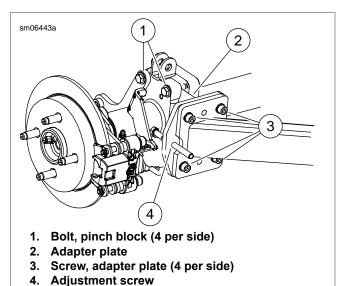


Figure 2-65. Rear Fork

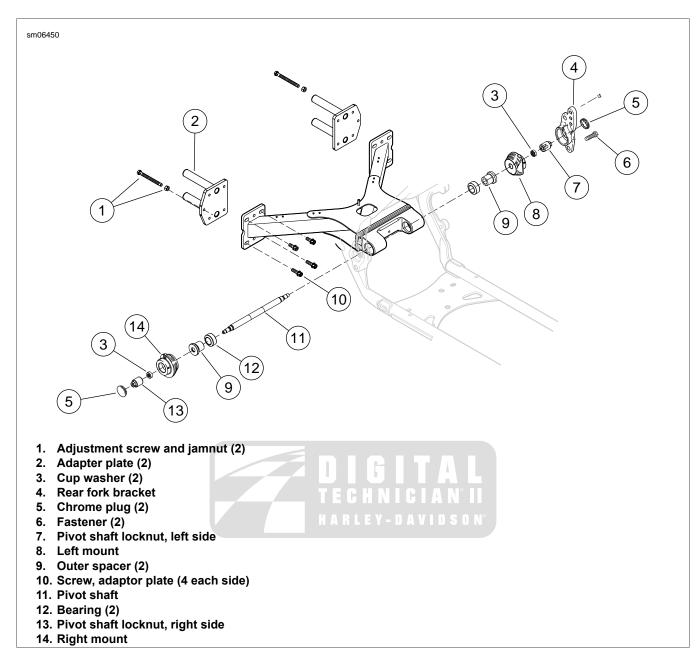


Figure 2-66. Rear Fork Components

REPAIR

PART NUMBER	TOOL NAME
HD-45327	REAR FORK BEARING INSTALLER
HD-49796	BEARING SPACER TOOL

Bearing Removal

See the service manual for bearing removal instructions.

Bearing Installation

- Bearings and spacers must be assembled before installation
 - a. Place **new** bearing flat on suitable press plate.
 - b. See <u>Figure 2-67</u>. With the collar topside, start spacer into bearing.
 - c. Press spacer until it bottoms against bearing.

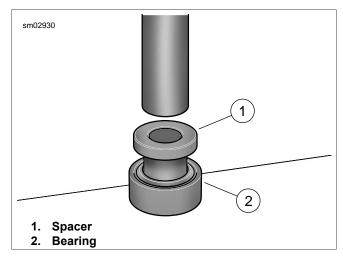


Figure 2-67. Press Spacer into Bearing

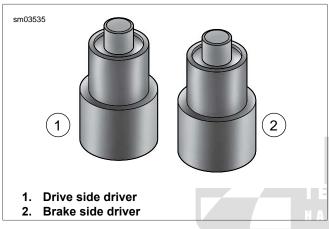


Figure 2-68. Rear Fork Bearing Installer

- 2. Coat the bearing bores in the rear fork and OD of bearings with a light coat of SPECIAL PURPOSE GREASE.
- 3. See <u>Figure 2-69</u>. Support fork squarely on press bed with the left side on top.
- 4. Insert bearing into fork assembly with spacer down.

NOTE

Note that the drivers supplied with the REAR FORK BEARING INSTALLER (Part No. HD-45327) are stamped "BRAKE SIDE" and "DRIVE SIDE". Use the "DRIVE SIDE" driver for both sides.

 Using REAR FORK BEARING INSTALLER (Part No. HD-45327) (1) stamped "Drive Side", center driver under ram and press bearing until bearing is bottomed in fork tube (2).

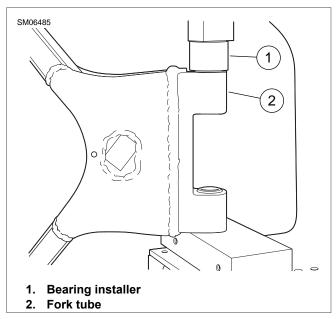


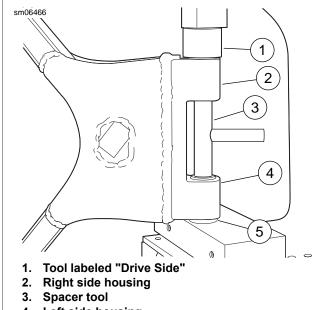
Figure 2-69. Install Left Rear Fork Bearing

6. See <u>Figure 2-70</u>. Remove tool and turn rear fork over with left side (4) resting on a socket (5) large enough to contact the outer race of the left bearing.

NOTE

If BEARING SPACER TOOL (Part No. HD-49796) is unavailable, one can be fabricated using a piece of steel at least the diameter of the flanges on inner bushings. Machine the tool to the length of 4.507 +0.002/ -0.000 in. (114.35 +0.051/ -0.000 mm).

7. Place BEARING SPACER TOOL (Part No. HD-49796) (3) centered on lower bearing and parallel to cutout between bearing bosses. Press right-side bearing using tool stamped "Drive Side" (1). Press bearing until it just contacts end of spacer tool. Shoulder on press tool will not make contact with fork tube. Bearing press depth is correct when spacer tool can be rotated by hand with a slight drag.



- 4. Left side housing
- 5. Socket

Figure 2-70. Install Right Rear Fork Bearing

INSTALLATION

FASTENER	TORQUE	VALUE
Rear fork bracket bolts	55-65 ft-lbs	74.6-88.1 Nm
Rear fork pivot shaft locknut		67.8 Nm + 180 degrees addi- tional rotation
Brake line, rear, tee locknut	59-63 in-lbs	6.7-7.1 Nm

- Clean all residual locking agent from the threads of the pivot shaft.
- See Figure 2-71. If removed, install rubber mount on innerright side of frame with the slot on the outboard side between the 12 and 1 o'clock positions. Make sure that index tab in mount cavity fully engages slot in rubber mount
- 3. See <u>Figure 2-66</u>. Place outer spacer (9) into right side rear fork tube flange facing outward.
- 4. Place belt on inboard side of rear fork and work rear fork into position on transmission mount.
- Coat pivot shaft with ANTI-SEIZE LUBRICANT. Avoid getting anti-seize on threads of pivot shaft.
- 6. Install pivot shaft (11) from left side of motorcycle, through left side fork and transmission mount. Guide end of pivot shaft through hole in right rubber mount. Use jack under oil pan to align components as necessary.
- 7. With the flange facing outward, slide outer spacer (9) onto left end of pivot shaft.
- Install left mount (8) with the flat side facing outer spacer.Rotate mount so the slot is between the 11 and 12 o'clock

- positions. Install left side fork bracket (4) fitting index tab into rubber mount slot.
- Apply two drops of LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) to fork bracket fasteners (6). Secure fork bracket. Tighten to 55-65 ft-lbs (74.6-88.1 Nm).

NOTE

Never reuse locknuts or cup washers when assembling the rear fork pivot shaft components.

- Install new cup washer (3) on left side with concave side facing the mount. Be sure that cup washer is over shoulder on shaft and start the locknut (7).
- 11. Slide **new** cup washer (3) onto right side of pivot shaft with the concave side facing the mount.
- 12. Be sure that cup washer is over shoulder on shaft and install **new** locknut (13) onto right side of pivot shaft. Hold one locknut and tighten the other locknut to 50 ft-lbs + 180 degrees additional rotation (67.8 Nm + 180 degrees additional rotation).
- 13. Verify that rear fork assembly moves freely.
- 14. Start screws to fasten adapter plates to rear fork flanges. Capture parking brake equalizer bracket on left side using longer screws in lower holes.
- 15. Tighten screws in a crosswise pattern until snug. Final torque will be applied during lateral alignment.
- 16. Adjust lateral alignment. See <u>2.28 LATERAL ALIGNMENT</u>.
- 17. Secure brake line tee to rear fork stud using a **new** locknut. Tighten locknut to 59-63 **in-lbs** (6.7-7.1 Nm).
- 18. Capture brake lines in cable clips on top of rear fork.
- Adjust drive belt deflection. See <u>1.11 DRIVE BELT</u>, Checking Drive Belt Deflection.
- Install left side muffler and cross-over pipe using a new clamp and gasket. See the service manual.
- 21. Install body. See 2.22 BODY.



Figure 2-71. Right-Side Mount

LATERAL ALIGNMENT

PROCEDURE

FASTENER	TORQUE VALUE	
Axle adapter plate screws	41-45 ft-lbs	55.6-61.0 Nm

- 1. Remove rear wheels. See 2.6 REAR WHEELS.
- Rotate differential by hand to observe belt tracking along top of drive belt.

NOTE

Verify there is adequate clearance between belt and battery box after adjustment. Belt tracking does not need to be equal distance from frame and battery box.

- 3. Check lateral alignment as follows:
 - See <u>Figure 2-72</u>. Secure magnetic base laser or hold a long straight edge against axle flange with laser beam directed forward.

NOTE

Fore/aft axle alignment must be within 0.062 in. (1.6 mm) to provide an accurate lateral alignment check. See 1.11 DRIVE BELT.

- b. See <u>Figure 2-73</u>. Remove chrome plug from fork bracket. Measure distance from end of pivot shaft nut to light beam or straight edge on both sides.
- Measurements A and B must be within 0.062 in. (1.6 mm). If adjustment is necessary, proceed to the next step.
- 4. Remove screw retaining panhard rod to right axle clevis.
- 5. Loosen eight axle-to-adapter plate screws and move axle housing left or right until alignment is within specification.
- 6. Verify that belt does not contact battery box or frame.
- 7. Install chrome plugs in rear fork brackets.

AWARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

- 8. Remove one adapter plate screw at a time and clean threads as follows:
 - Remove all residual thread locking compound from hole in adapter plate. Use compressed air to blow out any debris.
 - If reusing screw, completely remove all thread locking compound.
 - c. Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) and install screw finger-tight.
 - d. Repeat steps for all remaining adapter plate screws.

- Tighten adapter plate screws to 41-45 ft-lbs (55.6-61.0 Nm) in a crosswise pattern.
- 10. Install rear wheels. See 2.6 REAR WHEELS.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

 Adjust and connect panhard rod. See <u>2.30 PANHARD</u> <u>ROD</u>.

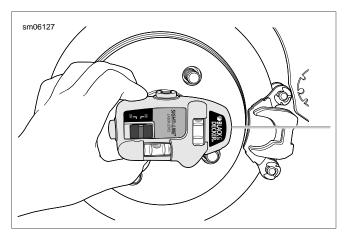


Figure 2-72. Place Laser Against Axle Flange

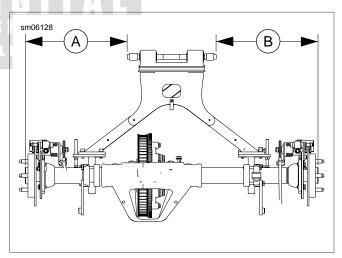


Figure 2-73. Measure Both Sides

SHOCK ABSORBERS

REMOVAL

PART NUMBER	TOOL NAME
HD-34633	AIR SUSPENSION PUMP AND GAUGE

- 1. Remove body. See 2.22 BODY.
- Place jack to support rear of motorcycle frame. See 1.2 LIFTING MOTORCYCLE WITH A JACK.
- 3. Using the no-loss AIR SUSPENSION PUMP AND GAUGE (Part No. HD-34633), add 3-5 psi (20.7-34.5 kPa) to purge lines of any oil.
- Release air from shocks and remove air tube from compression fitting.
- 5. Remove upper shock mount screw.
- Raise jack until lower shock mount screw clears rear frame and remove screw.

NOTE

Always keep shock absorber upright in a fully vertical position. Laying shock absorber down can cause oil to drain out through the compression fitting. Any loss of oil requires replacement of the shock absorber.

7. If necessary, remove three screws to release lower shock mount from pinch blocks.

INSTALLATION

FASTENER	TORQUE VALUE	
Pinch block screws	41-45 ft-lbs	55.6-61.0 Nm
Shock absorber screws	55-60 ft-lbs	74.6-81.4 Nm

AWARNING

Compressed air can pierce the skin and flying debris from compressed air could cause serious eye injury. Wear safety glasses when working with compressed air. Never use your hand to check for air leaks or to determine air flow rates. (00061a)

NOTE

See <u>Figure 2-74</u>. The left and right side lower shock mounts are not interchangeable but are not stamped for location. If both have been removed, be sure that they are installed with the boss on the outboard side.

- 1. If removed, install three screws to fasten lower shock mount to pinch blocks.
 - Using an appropriate thread chaser, completely remove all residual threadlocking compound from holes in pinch block. Use compressed air to blow out any debris.
 - b. If reusing screws, completely remove all threadlocking compound using a wire brush or wire wheel, and then apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
 - Install screws with flat washers and tighten 41-45 ftlbs (55.6-61.0 Nm).
- Completely remove threadlocking compound from threaded shock mounting holes using a thread chaser. Completely remove threadlocking compound from shock absorber mounting screws using a wire brush or wire wheel.
- Apply LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red) to screw and fasten shock absorber to lower shock mount.
- Lower jack until upper shock eye is aligned with rear frame boss.
- 5. Apply LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red) and start upper shock screw.
- 6. Tighten upper and lower screws to 55-60 ft-lbs (74.6-81.4 Nm).
- 7. Connect air tube to compression fitting. Gently tug on tube to verify that it is locked in place.
- 8. Pressurize air suspension system and check for leaks.
- 9. Install body. See 2.22 BODY.

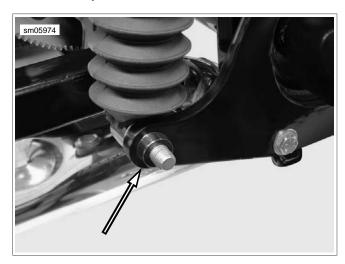


Figure 2-74. Orient With Lower Shock Mount Boss
Outboard

PANHARD ROD

REMOVAL

- 1. Remove body. See 2.22 BODY.
- 2. See Figure 2-75. Remove screw (6) and flat washer (5) from clevis (7).
- 3. Remove locknut (1) and flat washer (2) to release left ballend connector (12) and two nylon bushings (3) from stud (4) on rear frame rail.

INSTALLATION

FASTENER	TORQUI	E VALUE
Panhard rod locknut	55-60 ft-lbs	74.6-81.4 Nm
Panhard rod clevis screw	55-60 ft-lbs	74.6-81.4 Nm

NOTE

Panhard rod is directional and can cause damage if installed backwards. Take care to orient the rod correctly.

- See <u>Figure 2-75</u>. Hold panhard rod so that long bend end (11) is on the left side.
- 2. Place nylon bushing (3) on each side of left ball-end connector (12) and install on stud (4). Install flat washer (2) and **new** locknut (1). Verify nylon washers are correctly aligned and not being pinched. Tighten nut to 55-60 ft-lbs (74.6-81.4 Nm).
- 3. Secure right ball-end connector (8) in clevis (7) at top of right side pinch block with screw (6) and flat washer (5). Tighten to 55-60 ft-lbs (74.6-81.4 Nm).

NOTE

Adjust the panhard rod whenever a **new** rod, a **new** rear frame or a **new** axle/differential housing are installed, or if the rod is suspected of being misadjusted. See <u>2.30 PANHARD ROD</u>. <u>Adjustment</u>, if necessary.

4. Install body. See 2.22 BODY.

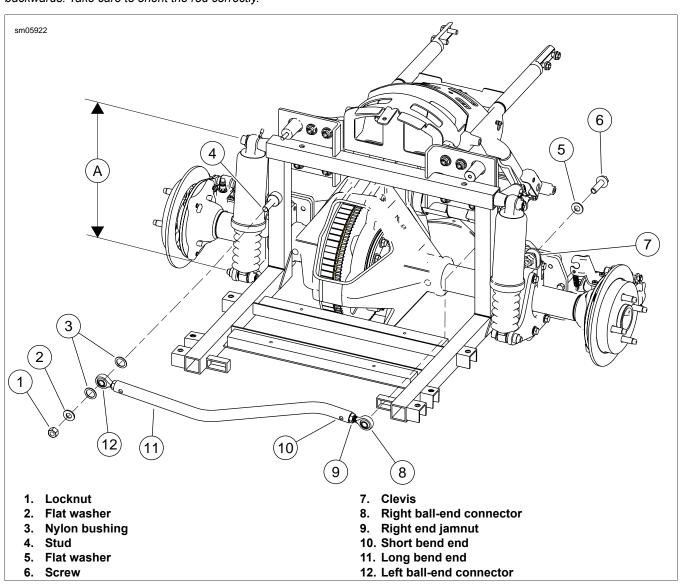


Figure 2-75. Panhard Rod

ADJUSTMENT

FASTENER	TORQUI	E VALUE
Panhard rod clevis screw	55-60 ft-lbs	74.6-81.4 Nm
Panhard rod adjustment jamnut	25-35 ft-lbs	33.9-47.5 Nm
Panhard rod adjustment jamnut	25-35 ft-lbs	33.9-47.5 Nm
Shock absorber screws	55-60 ft-lbs	74.6-81.4 Nm

NOTE

Adjust the panhard rod whenever a **new** rod, a **new** rear frame or a **new** axle/differential housing are installed, or if the rod is suspected of being misadjusted.

 Raise the vehicle using a suitable lifting device so the rear tires are just touching the lift. See <u>1.2 LIFTING MOTOR-CYCLE WITH A JACK</u>.

NOTE

Adjustment is easiest with the rear tires and wheels installed. If they have been removed, support the rear axle on each side with equally adjusted jack stands.

- See <u>Figure 2-75</u>. Disconnect the upper shock absorber screw on both sides. Move the shocks away from the upper mount and loosely install the upper screws to aid making measurement.
- 3. Adjust the jack until the distance (A) between the center of the upper shock mounting screw and lower shock eye is 11.5 in. (292.0 mm) on both sides.

- 4. With the left ball-end connector (12) attached, position the right ball-end connector (8) in clevis (7) at the top of the right side pinch block. Verify that screw (6) passes smoothly through the clevis and ball-end connector.
- 5. If adjustment is not correct, loosen jamnut (9), remove ball-end connector from clevis and adjust length until screw (6) passes through easily.
- 6. When adjustment is correct, secure ball-end connector (8) in clevis with screw (6) and flat washer (5). Tighten to 55-60 ft-lbs (74.6-81.4 Nm).

NOTE

The panhard rod could contact the reverse ring gear if not positioned properly. Be sure to hold panhard rod up and away from the differential when tightening the right adjustment jamnut.

- 7. Loosen left ball-end connector jamnut. Hold panhard rod up as far as it will easily rotate and tighten right jamnut (9) to 25-35 ft-lbs (33.9-47.5 Nm).
- 8. Allow panhard rod to rotate down slightly until right ballend connector is approximately centered in clevis. Hold panhard rod in this position and tighten left jamnut to 25-35 ft-lbs (33.9-47.5 Nm).

NOTE

Completely clean threadlocking compound from threads of rear shock screws and threaded holes.

9. Apply LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red) to upper shock screws and secure shock absorbers. Tighten screws to 55-60 ft-lbs (74.6-81.4 Nm).

HEADLAMP NACELLE

REMOVAL

- Remove windshield if equipped.
- 2. See <u>Figure 2-76</u>. Carefully pry off the fork lock trim insert (1). Remove two screws (2).
- 3. Lift the rear of the handlebar riser cover (3). Slide rearward to release catch.
- 4. Remove screws (4) securing top cover (5). Remove cover.
- Remove headlamp assembly.
 - a. Remove screw (11) securing the headlamp.
 - See <u>Figure 2-77</u>. Disconnect headlamp connector (1). Remove the headlamp assembly.
- Disconnect both turn signal lamp connectors (2, 3) on the steering head caddies.

7. Remove screw securing clutch line P-clamp to nacelle.

NOTE

Turn signal lamp/bracket assemblies are attached to the left and right rear covers (13) with double-sided tape. Separate only if needed.

- 8. See <u>Figure 2-76</u>. Remove the turn signal lamp brackets (9).
 - a. Remove acorn nuts (6) and grommets (7).
 - b. Remove lamp/bracket assemblies (9).
- 9. Remove studs (8) from one side only. Leaving at least one stud prevents the nacelle (12) from unexpectedly falling.
- 10. Remove the headlamp nacelle.

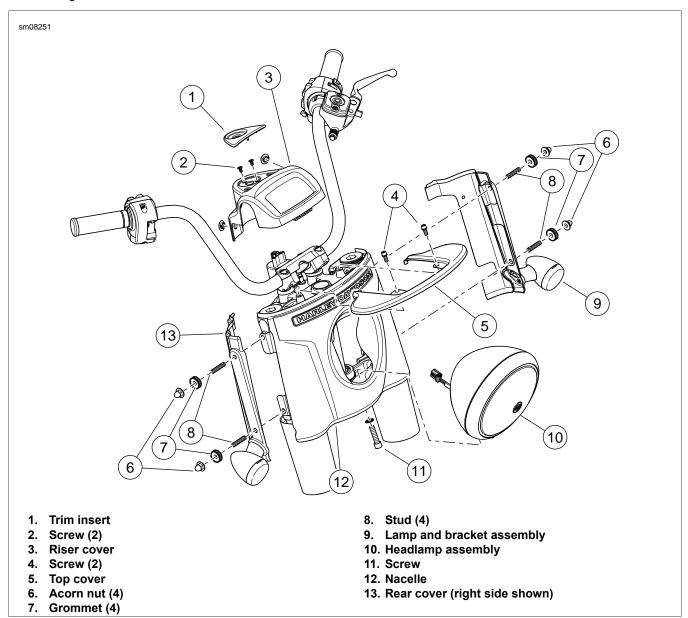


Figure 2-76. Nacelle Assembly

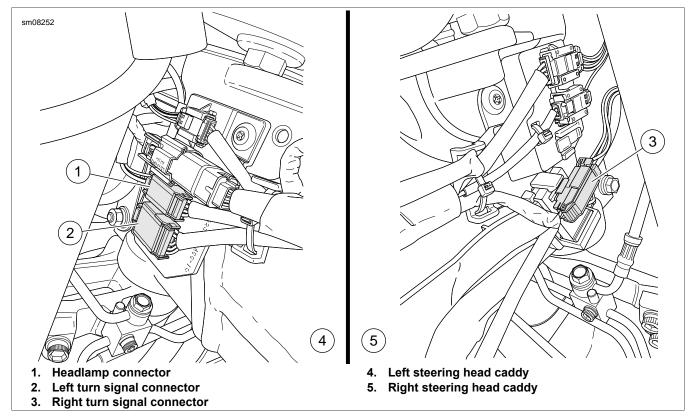


Figure 2-77. Turn Signal Connectors: FLRT

INSTALLATION

FASTENER	TORQUE	VALUE
Headlamp nacelle acorn nuts	96-132 in-lbs	10.8-14.9 Nm
Headlamp mounting screw: FLRT	30-35 ft-lbs	40.7-47.5 Nm
Headlamp nacelle top cover screws	84-120 in-lbs	9.5-13.5 Nm
Handlebar cover screws: FLRT	10-20 in-lbs	1.1-2.3 Nm
Clutch line P-clamp	40-48 in-lbs	4.5-5.4 Nm

NOTE

Installing studs to full thread depth can allow the stud to contact the fork. Only install until end of stud is visible on fork side of threaded boss.

- See <u>Figure 2-76</u>. Install headlamp nacelle housing on fork brackets.
 - a. Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) to the fork bracket end threads of stud.
 - While holding nacelle housing in place, install stud in each hole. Install only until end of stud is visible on fork side of threaded boss.

- 2. Install turn signal lamp/bracket.
 - a. Route lamp wires behind fork.
 - b. Install rear cover and lamp bracket. Secure with acorn nuts.
 - Verify that lamp wire is routed through relief in lower portion of rear cover and behind fork.
 - d. Tighten to 96-132 in-lbs (10.8-14.9 Nm).
 - e. Repeat with remaining lamp/bracket assembly.
- 3. See Figure 2-77. Mate turn signal lamp connectors (2, 3).
- 4. Mate headlamp connector (1).
- 5. See <u>Figure 2-76</u>. Install headlamp assembly. Secure with screw (11). Tighten to 30-35 ft-lbs (40.7-47.5 Nm).
- Install top cover (5) with screws (4). Tighten to 84-120 in-lbs (9.5-13.5 Nm).
- 7. Install the handlebar riser cover (3):
 - a. Engage catch on riser cover (3) into nacelle. Lower into position.
 - Install screws (2). Tighten to 10-20 in-lbs (1.1-2.3 Nm).
 - c. Install fork lock plate (1).
- 8. Secure clutch line P-clamp to nacelle. Tighten to 40-48 in-lbs (4.5-5.4 Nm).
- 9. Install windshield, if equipped.
- 10. Align headlamp. See 1.17 HEADLAMP ALIGNMENT.

STEERING DAMPER ASSEMBLY

REMOVAL

NOTE

Use a clean shop towel to protect front fender while removing damper.

- See <u>Figure 2-78</u> or <u>Figure 2-79</u>. Remove locknut (1), nylon washer (2) and steering damper from frame bracket stud.
- Remove acorn nut (8), spacer (7) and screw (6) to release steering damper eyelet from side mounting bracket (9).
- 3. If necessary, remove side mounting bracket (9).
 - a. FLHTCUTG: Remove front left lamps and bracket.
 See 7.5 FRONT LIGHTING: HDI, Lamps Bracket (HDI) or the service manual (DOM).
 - b. Remove double studs on left side. Remove bracket (9).
 - a. FLRT: See Figure 2-79. Remove two screws (12).
 - b. Remove bracket from fork bracket.
- 4. **FLRT:** See <u>Figure 2-79</u>. Remove screw (11). Release clutch line P-clamp.
- 5. Remove screw (10), frame damper mount (5) and frame bracket special nut (4).

INSTALLATION

FASTENER	TORQUE VALUE	
Fairing double studs	120-180 in-lbs	13.6-20.3 Nm
Steering damper side bracket acorn nuts: FLHTCUTG	120-180 in-lbs	13.6-20.3 Nm
Steering damper side bracket to fork bracket screws: FLRT	20-25 ft-lbs	27.1-33.9 Nm
Steering damper bracket to frame screw: FLRT	22-28 ft-lbs	29.8-38.0 Nm
Steering damper locknut	16-20 ft-lbs	21.7-27.1 Nm
Steering damper acorn nut	16-20 ft-lbs	21.7-27.1 Nm

- FLHTCUTG: See <u>Figure 2-78</u>. If removed, install side mounting bracket (9):
 - a. Secure bracket with double studs. Tighten to 120-180 in-lbs (13.6-20.3 Nm).
 - b. Secure lamps bracket with acorn nuts. Tighten to 120-180 in-lbs (13.6-20.3 Nm).
- FLRT: See <u>Figure 2-79</u>. If removed, install side mounting bracket:
 - Secure bracket with two screws.
 - b. Tighten to 20-25 ft-lbs (27.1-33.9 Nm).

- FLRT: See <u>Figure 2-79</u>. If removed, install frame damper bracket
 - Secure frame damper mount (5) and special nut (4) with screw (10).
 - b. Tighten to 22-28 ft-lbs (29.8-38.0 Nm).

NOTE

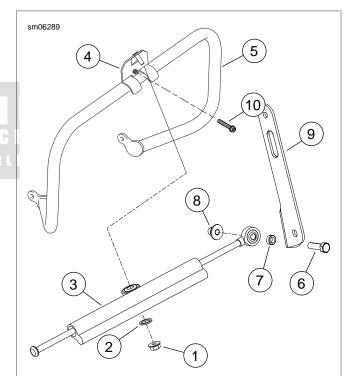
Install nylon washer (2) either above or below the steering damper.

 Install steering damper (3), nylon washer (2) and locknut (1) onto frame bracket stud. Tighten locknut to 16-20 ftlbs (21.7-27.1 Nm).

NOTE

FLHTCUTG: Install acorn nut (8) to the rear for clearance of nearby components.

Insert screw (6) through side mounting bracket (9), spacer
 and steering damper eyelet. Install acorn nut (8) and tighten to 16-20 ft-lbs (21.7-27.1 Nm).



- 1. Locknut
- 2. Nylon washer
- 3. Steering damper
- 4. Frame bracket
- 5. Engine guard (Tri Glide models)
- 6. Screw
- 7. Spacer
- 8. Acorn nut
- 9. Side mounting bracket
- 10. Screw

Figure 2-78. Steering Damper: FLHTCUTG

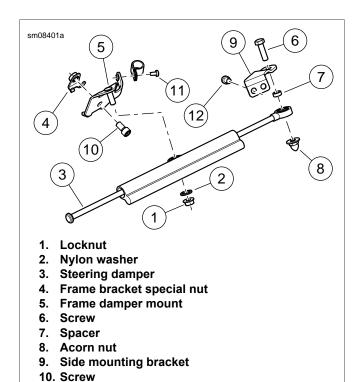


Figure 2-79. Steering Damper: FLRT

11. Screw, P-clamp 12. Screw (2)



ENGINE STABILIZER

STABILIZER LINK

FASTENER	TORQUE VALUE	
Engine stabilizer link screws	30-35 ft-lbs	40.7-47.5 Nm
Engine stabilizer bracket screws	30-35 ft-lbs	40.7-47.5 Nm
Engine stabilizer link screws	30-35 ft-lbs	40.7-47.5 Nm

Removal

- 1. See Figure 2-80. Remove screws (3) and washers (2) from each end of stabilizer link (4).
- 2. Remove link.
- Check each end of the stabilizer link for excessive wear.
 The spherical ball end may rotate freely, but should not have any lateral movement. Replace the link if lateral movement exists.

Installation

- 1. See Figure 2-80. Secure stabilizer link with screws (3) and washers (2) between link and attaching point.
- 2. Tighten to 30-35 ft-lbs (40.7-47.5 Nm).

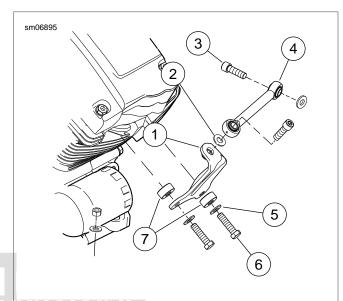
Bracket

- 1. See <u>Figure 2-80</u>. Disconnect stabilizer link from bracket (1).
- 2. Remove two screws (6) and washers (5). Remove bracket (1) and spacers (7) from cylinder head.
- 3. Apply LOCTITE 272 HIGH STRENGTH/HIGH TEMPER-ATURE THREADLOCKER AND SEALANT (red/orange) to threads of screws (6).

NOTE

Be sure to install spacers (7) as shown.

- Attach bracket to cylinder head with screws, washers and spacers. Tighten screws (6) to 30-35 ft-lbs (40.7-47.5 Nm).
- 5. Attach stabilizer link to bracket with screw (3) and washer (2). Place washer between link and attaching point.
- 6. Tighten to 30-35 ft-lbs (40.7-47.5 Nm).



- 1. Stabilizer bracket
- 2. Washer (2)
- 3. Screw (2)
- 4. Stabilizer
- 5. Washer (2)
- 6. Screw (2)
- 7. Spacer (2)

Figure 2-80. Engine Stabilizer



ENGINE

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SPECIFICATIONS: ENGINE

GENERAL SPECIFICATIONS: TWIN CAM 103™

Table 3-1. Engine: Air-Cooled High Output Twin Cam 103

ITEM	SPECIFICATION	
Number of cylinders	2	
Туре	4-cycle, 45 degree V-Type, air-cooled	
Compression ratio	9.7:1	
Bore	3.875 in	98.42 mm
Stroke	4.374 in	111.1 mm
Displacement	103.1 in ³	1690 cm ³
Lubrication system	Pressurized, dry sump with oil cooler	

Table 3-2. Engine: Twin-Cooled High Output Twin Cam

ITEM	SPECIFICATION		
Number of cylinders	2		
Туре	4-cycle, 45 degree V-Type, Twin-Cooled™		
Compression ratio		10.	0:1
Bore	3.875 in		98.42 mm
Stroke	4.374 in		111.1 mm
Displacement	103.1 in ³		1690 cm ³
Lubrication system	Pressurized, dry sump		
Cooling system	Liquid-cooled cylinder heads with lower fairing-mounted radiators, electric pump and thermostat		

Table 3-3. Oiling System

OIL PUMP	DATA
Туре	Twin gerotor, dual scavenge, crank mounted and driven, internal oil pump, dry sump
Pressure	30-38 PSI (207-262 kPa) at 2000 RPM and normal operating temperature of 230 °F (110 °C)
Filtration	5 micron media, filtered between pump and engine
Cooling: Twin Cam 103™	Thermostat controlled oil cooler (Air-cooled models only)





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FUEL SYSTEM 4.

NO UNIQUE CONTENT

Any information not presented in this supplement can be found in the service manual.





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5.6 DRIVE BELT REPLACEMENT	





FASTENER TORQUE VALUES

FASTENER TORQUE VALUES IN THIS CHAPTER

The table below lists torque values for all fasteners presented in this chapter.

FASTENER	TORQUE VALUE		NOTES
Air valve nut	12-15 in-lbs	1.4-1.7 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Installation
Axle bearing retainer locknuts	40-45 ft-lbs	54.2-61.0 Nm	5.4 AXLE, Installation/Use new locknuts
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Installation
Brake reaction plate screws	40-45 ft-lbs	54.2-61.0 Nm	5.4 AXLE, Installation
Differential assembly screws	65-70 ft-lbs	88.1-94.9 Nm	5.5 AXLE HOUSING/DIFFEREN- TIAL, Assembly/Use new screws
Differential bearing cap screws	39-44 ft-lbs	52.9-59.7 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Installation
Ring gear screws	22-26 ft-lbs	29.8-35.3 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Assembly



SPECIFICATIONS

GENERAL

Table 5-1. Sprocket Teeth

DRIVE	ITEM	NUMBER OF TEETH
Primary	Engine	34
	Clutch	46
Final	Transmission	30
	Rear wheel	70

Table 5-2. Overall Drive Ratios

GEAR	RATIO
1st Gear	10.534
2nd Gear	7.302
3rd Gear	5.423
4th Gear	4.392
5th Gear	3.741
6th Gear	3.157

NOTE

Transmission gear ratios indicate the number of mainshaft revolutions required to drive the output sprocket one revolution.



CLUTCH 5.3

NO UNIQUE CONTENT

For clutch disassembly and assembly, see Clutch: Assist and Slip in the service manual.



AXLE 5.4

REMOVAL

PART NUMBER	TOOL NAME
HD-49303	AXLE PULLER

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 1. Disconnect negative battery cable.
- 2. Remove rear wheels. See 2.6 REAR WHEELS.
- 3. Remove rear brake calipers with mounting brackets. See 2.10 REAR BRAKE CALIPERS.
- 4. See <u>Figure 5-1</u>. Remove four locknuts and T-bolts to release bearing retainer plate from axle housing.
- See <u>Figure 5-2</u>. Pull axle out of axle housing. If necessary, attach AXLE PULLER (Part No. HD-49303) to axle flange using lug nuts. Attach a slide hammer and remove axle.
- If necessary, remove four screws to free brake reaction plate.

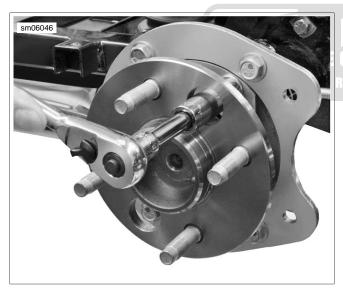


Figure 5-1. Remove Bearing Retainer From Axle Housing

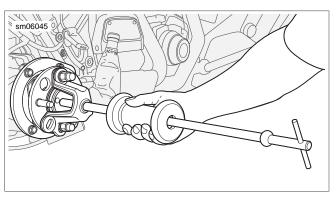


Figure 5-2. Remove Axle Using Slide Hammer

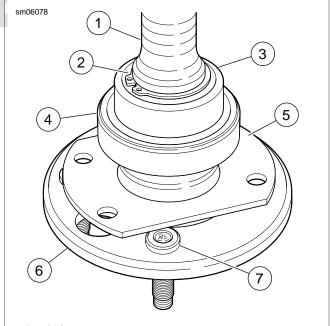
DISASSEMBLY

- 1. See <u>Figure 5-3</u>. If necessary, remove and install axle flange studs (7) using a suitable press.
- 2. Remove retaining ring (2) and discard.

NOTE

See <u>Figure 5-4</u>. A minimum 25 ton I-beam style hydraulic press is recommended for bearing removal and installation.

- 3. See Figure 5-5. Position axle so that bearing is properly supported between press plates and remove bearing and axle shaft retainer. Discard retainer and bearing.
- 4. If necessary, remove bearing retainer plate (5).



- 1. Axle
- 2. Retaining ring
- 3. Axle shaft retainer
- 4. Bearing
- 5. Bearing retainer plate
- 6. Axle flange
- 7. Axle flange stud

Figure 5-3. Axle Assembly

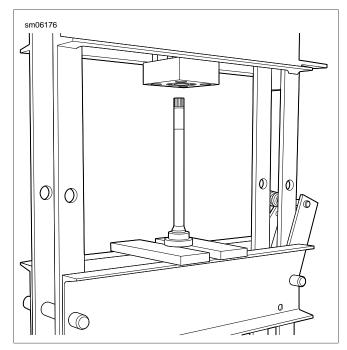


Figure 5-4. I-Beam Style Hydraulic Press

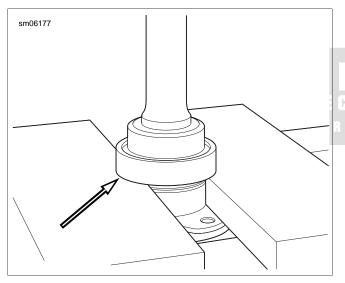


Figure 5-5. Remove Axle Bearing

ASSEMBLY

PART NUMBER	TOOL NAME
HD-34634	FORK OIL SEAL INSTALLER

- 1. Slide bearing retainer plate down axle and allow to lay on axle flange.
- 2. Slide **new** bearing onto axle until it contacts shoulder.
- See <u>Figure 5-6</u>. Slide suitable bearing support tube (1) or FORK OIL SEAL INSTALLER (Part No. HD-34634) onto axle until it contacts bearing inner race.
- Position axle with support tube (1) supported between press plates. Place press bar (2) or other suitable driver between ram and center of axle flange.

NOTE

See <u>Figure 5-6</u>. Hold bearing retainer plate (3) up during the press procedure to prevent it from being captured between bearing and axle shoulder.

- Verify that assembly is square and apply pressure with ram until bearing makes firm contact with axle shoulder.
- Remove bearing support tube and slide **new** axle shaft retainer onto axle.
- See <u>Figure 5-7</u>. Press axle shaft retainer in a similar manner until it makes firm contact with bearing. Remove assembly from press.
- Install new retaining ring in groove and verify that it is fully seated.

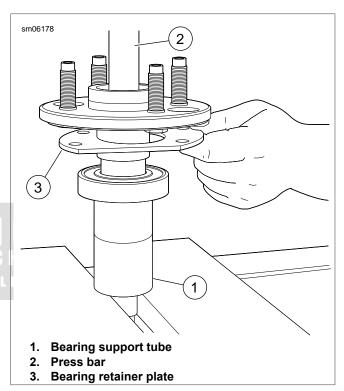


Figure 5-6. Install Axle Bearing

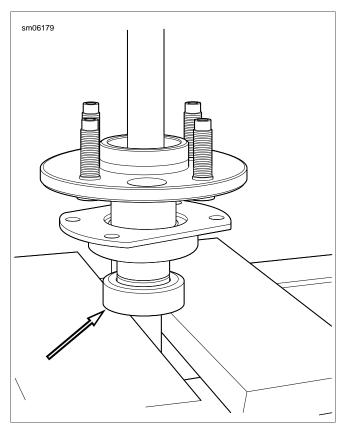


Figure 5-7. Install Bearing Retainer

INSTALLATION

FASTENER	TORQUI	E VALUE
Brake reaction plate screws	40-45 ft-lbs	54.2-61.0 Nm
Axle bearing retainer locknuts	40-45 ft-lbs	54.2-61.0 Nm

NOTE

Install the shorter axle on the left side.

- 1. If removed, install brake reaction plates with four screws each. Tighten to 40-45 ft-lbs (54.2-61.0 Nm).
- 2. Push axle into axle housing and rotate until the splines engage.
- 3. See <u>Figure 5-1</u>. Secure bearing retainer plate to axle housing using four T-bolts and **new** locknuts. Tighten to 40-45 ft-lbs (54.2-61.0 Nm) in a crosswise pattern.
- 4. Install brake rotor onto axle. Install caliper. See <u>2.10 REAR BRAKE CALIPERS</u>.
- 5. Install rear wheels. See <u>2.6 REAR WHEELS</u>.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

6. Connect battery negative cable.

AXLE HOUSING/DIFFERENTIAL

REMOVAL

1. Remove seat.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- Disconnect negative battery cable.
- 3. Remove body. See 2.22 BODY.
- 4. Remove both axles. See <u>5.4 AXLE</u>.
- If reverse motor equipped, remove reverse motor and bracket. See <u>7.13 REVERSE MOTOR AND BRACKET</u>.
- See <u>Figure 5-8</u>. Mark the adjustment screws (3) on both sides of motorcycle with a paint pen where they exit the front of adapter plates. Optionally make a note of dimension (4).
- 7. Loosen four pinch block bolts (1) on each side. Loosen jamnut (2) and back off adjustment screws. Push axle housing forward to remove all drive belt tension.

NOTE

See <u>Figure 5-9</u>. Handle bearing caps with care as they are not sold separately. Damage to bearing caps or differential housing requires replacement of the axle/differential housing assembly.

8. Remove two screws (3) to release each bearing cap (2).

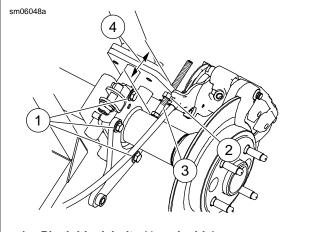
NOTE

Place masking tape at rear of rear fork to protect painted surfaces.

- Move differential/sprocket assembly forward to remove drive belt from sprocket.
- 10. Move axle housing rearward as far as it will move. Remove differential/sprocket assembly from the front. For best results, pull differential forward until it almost contacts rear fork, then rotate sideways to remove.

NOTE

If servicing differential, proceed to <u>5.5 AXLE HOUSING/DIF-FERENTIAL</u>, <u>Disassembly</u>. If replacing drive belt or axle housing, proceed with the following steps.



- 1. Pinch block bolts (4 each side)
- 2. Jamnut
- 3. Adjustment screw
- 4. Measured distance

Figure 5-8. Adjust Axle

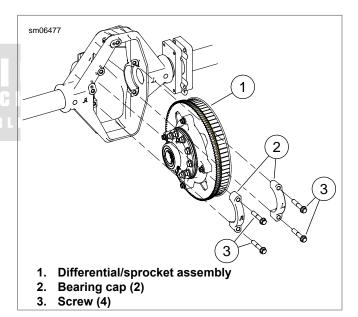


Figure 5-9. Differential and Sprocket Assembly

NOTE

If removing axle housing for belt replacement, do not detach shock absorbers. Remove upper shock bolts only.

 Remove both rear shock absorbers. See <u>2.29 SHOCK</u> ABSORBERS.

NOTE

Always keep shock absorbers in an upright position with the air line connector at the top to prevent the loss of oil. Any oil loss requires shock absorber replacement.

12. Remove rear frame. See <u>2.24 REAR FRAME</u>.

13. Pull axle housing rearward to release pinch blocks from adapter plate bosses and remove from vehicle.

DISASSEMBLY

PART NUMBER	TOOL NAME
HD-43644-3	CAMSHAFT BEARING INSTALLER
HD-49762	PULLER
HD-95635-46	ALL-PURPOSE CLAW PULLER

Bearings

NOTE

Both bearings are removed in a similar manner. The sprocket side bearing must be removed to remove the sprocket. Remove the opposite side bearing only if bearing replacement is necessary.

- See <u>Figure 5-10</u>. Sparingly apply graphite lubricant to threads of forcing screw of ALL-PURPOSE CLAW PULLER (Part No. HD-95635-46) (1). Start forcing screw into puller.
- Install suitable driver such as CAMSHAFT BEARING INSTALLER (Part No. HD-43644-3) (3) into differential bore.
- Center press plug (2) on driver and engage claws on inboard side of bearing.
- Verify that tool is square and remove bearing. Hold puller body with a wrench to prevent rotation while removing bearing.

Sprocket

- See <u>Figure 5-12</u>. Remove retaining ring (8) from groove in differential.
- 2. See Figure 5-11. Obtain three 3/8-24 UNF bolts approximately 5 in. (127 mm) long with three hardened washers.
- 3. Sparingly apply graphite lubricant to threads of forcing screw of PULLER (Part No. HD-49762) and install in puller.
- 4. See <u>Figure 5-12</u>. Attach puller to sprocket (7) using bolts and hardened washers. Thread bolts into sprocket an equal number of turns.
- Install suitable driver such as CAMSHAFT BEARING INSTALLER (Part No. HD-43644-3) into differential bore.
- Center press plug supplied with puller on driver and turn forcing screw until it makes firm contact with press plug.
- Verify that tool is square and turn forcing screw until sprocket is free.

NOTE

Sprocket bearing is not sold separately. Replace sprocket assembly if bearing replacement is necessary.

8. Remove six isolators (6) from compensator bowl (4).

Ring Gear

1. See Figure 5-12. Remove four screws (10).

Rotate ring gear (5) to align bosses with cutouts on compensator bowl (4) and separate sprocket from compensator bowl.

Differential

NOTE

See <u>Figure 5-12</u>. Due to high torque on screws (11), compensator bowl may rotate in vise if not properly clamped.

 Tighten flange of compensator bowl in soft-jawed vise so that a ring gear mounting boss is in contact with top of vise. Remove ten screws with flat washers. Remove differential (2) from compensator bowl.

NOTE

Do not separate halves of differential housing. Internal components are not sold separately.

If necessary, remove grease seal (3) on each end of differential.

NOTE

Never add grease to the differential. The grease added at the factory will last the life of the motorcycle.

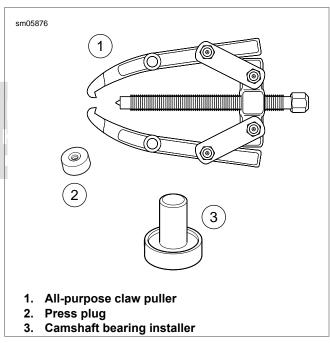


Figure 5-10. Bearing Removal Tools

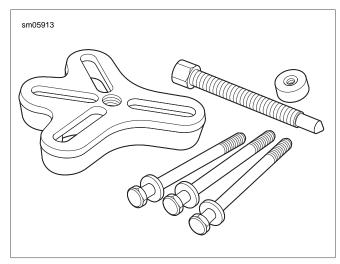
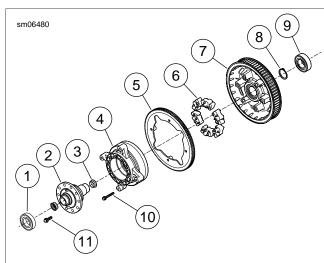


Figure 5-11. Puller Tool



- 1. Bearing, ring gear side
- 2. Differential assembly
- 3. Seal (2)
- 4. Compensator bowl
- 5. Ring gear (if equipped)
- 6. Isolators (6)
- 7. Sprocket
- 8. Retaining ring
- 9. Bearing, sprocket side
- 10. Screw (4)
- 11. Screw (10)

Figure 5-12. Differential/Sprocket Assembly

ASSEMBLY

PART NUMBER	TOOL NAME
HD-35316-12	MAIN DRIVE GEAR INSTALLER

FASTENER	TORQUE VALUE	
Differential assembly screws	65-70 ft-lbs	88.1-94.9 Nm
Ring gear screws	22-26 ft-lbs	29.8-35.3 Nm

Differential

See <u>Figure 5-12</u>. If removed, press **new** grease seals (3) into bore on each end of differential using a suitable press tool

NOTE

Due to high torque on screws (11), compensator bowl (4) may rotate in vise if not properly clamped.

- Tighten flange of compensator bowl in soft-jawed vise so that a ring gear mounting boss is in contact with top of vise.
- 3. Install differential (2) in compensator bowl. Start ten **new** screws (11) with flat washers. Tighten to 65-70 ft-lbs (88.1-94.9 Nm) in a crosswise pattern.

Ring Gear

- Clamp ring gear in soft-jawed vise and install compensator bowl onto ring gear.
- 2. Install four screws (10). Tighten to 22-26 ft-lbs (29.8-35.3 Nm) in a crosswise pattern.

Sprocket II S II N

NOTE

Replace isolators in complete sets only.

- See <u>Figure 5-12</u>. Lubricate each isolator (6) with 50/50 mix of isopropyl alcohol and water. Do not use a petroleum-based lubricant.
- Push each isolator into compensator bowl (4) so that strap engages slot in rib. Verify that each isolator bottoms in compensator bowl and that each segment is flush against side walls of rib. Leave one isolator raised slightly to be used as a guide when positioning sprocket.
- Using a 50/50 mix of isopropyl alcohol and water, lubricate sides of each isolator where contact occurs with sprocket lugs.
- 4. Align lugs on sprocket (7) with gaps between isolators and install sprocket onto compensator bowl.
- Using a suitable driver such as MAIN DRIVE GEAR INSTALLER (Part No. HD-35316-12), press on sprocket bearing inner race until sprocket bottoms on compensator howl
- 6. Install **new** retaining ring (8) in groove of differential.

Bearings

 See <u>Figure 5-12</u>. Using a suitable driver such as MAIN DRIVE GEAR INSTALLER (Part No. HD-35316-12), press

- inner race of **new** sprocket side bearing (9) until it bottoms against sprocket.
- Repeat previous step to install bearing (1) on opposite side

INSTALLATION

FASTENER	TORQUE VALUE	
Air valve nut	12-15 in-lbs	1.4-1.7 Nm
Differential bearing cap screws	39-44 ft-lbs	52.9-59.7 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

- 1. If removed, install shock absorber mounts on pinch blocks.
- Push axle housing forward until pinch blocks engage adapter plate bosses.
- 3. Install air valve:
 - Route air valve and tubes forward through opening at rear of intermediate frame.
 - Secure air valve in frame with nut (flat side inboard).
 Tighten to 12-15 in-lbs (1.4-1.7 Nm).
 - c. Install cap.
- 4. See <u>Figure 5-13</u>. Install three **new** cable straps to secure air tubes to intermediate frame.
- 5. Install rear frame. See 2.24 REAR FRAME.
- 6. Install and adjust panhard rod. See 2.30 PANHARD ROD.
- 7. Install shock absorbers. See 2.29 SHOCK ABSORBERS.
- 8. Place differential into differential housing.

NOTE

Be careful that differential does not roll out of axle housing when moving axle housing forward.

Verify that axle adjuster screws are backed off completely and move axle housing forward as far as it will go. Install drive belt on sprocket.

NOTE

Differential housing and bearing caps are stamped L(eft) and R(ight) to prevent improper assembly. Letter stamp on each cap must be right side up when installed.

- 10. See <u>Figure 5-9</u>. Install bearing caps (2). Tighten screws (3) to 39-44 ft-lbs (52.9-59.7 Nm) in a crosswise pattern.
- 11. Pull axle housing rearward and turn each adjustment screw until paint mark made during disassembly is aligned with adapter plate.
- 12. Remove protective tape from rear fork.
- Align axle and adjust belt tension. See <u>1.11 DRIVE BELT</u>. <u>Setting Deflection</u>.
- 14. Install reverse motor bracket and motor. See 7.13 REVERSE MOTOR AND BRACKET.
- 15. Install axles. See 5.4 AXLE.
- 16. Install body. See 2.22 BODY.
- 17. Connect negative battery cable. Tighten to 60-70 **in-lbs** (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

18. Install seat.

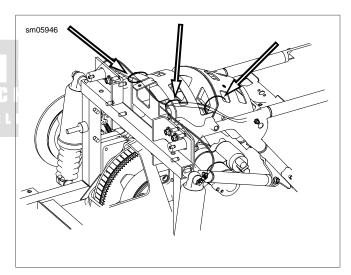


Figure 5-13. Secure Air Tubes

DRIVE BELT REPLACEMENT

REMOVAL

- Remove primary chaincase assembly. See PRIMARY CHAINCASE in the service manual.
- Remove differential to release drive belt from rear wheel sprocket. Remove axle housing. See <u>5.5 AXLE</u> <u>HOUSING/DIFFERENTIAL</u>.
- 3. Remove drive belt from transmission sprocket.
- 4. Remove rear fork pivot shaft and move rear fork back away from transmission to allow clearance for belt to pass. See <u>2.27 REAR FORK</u>.
- 5. Remove drive belt.

INSTALLATION

- Slip new drive belt between left side adapter plate and pinch blocks without over bending, twisting or kinking.
- 2. Pull drive belt forward past pivot shaft joint and work rear fork into position on transmission mount.
- 3. Install rear fork and pivot shaft. See 2.27 REAR FORK.
- 4. Install drive belt onto transmission sprocket.
- Install axle housing and differential. See <u>5.5 AXLE HOUSING/DIFFERENTIAL</u>.
- Install primary chaincase assembly. See the service manual.





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TRANSMISSION

GENERAL

Transmission servicing on Trike Models is essentially the same as the 2-wheel Touring Models except removal and installation of the rear fork. Follow the general steps outlined in the service manual but refer to 2.27 REAR FORK in this manual to remove and install the rear fork. Pay special attention to the installation and torque procedure of the pivot shaft.

SPECIFICATIONS

Table 6-1. Sprocket Teeth

DRIVE	ITEM	NUMBER OF TEETH
Primary	Engine	34
	Clutch	46
Final	Transmission	30
	Rear wheel	70

Table 6-2. Overall Drive Ratios

GEAR	RATIO
1st Gear	10.534
2nd Gear	7.302
3rd Gear	5.423
4th Gear	4.392
5th Gear	3.741
6th Gear	3.157





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FASTENER TORQUE VALUES

FASTENER TORQUE VALUES IN THIS CHAPTER

The table below lists torque values for all fasteners presented in this chapter.

FASTENER	TORQUE	VALUE	NOTES
Bank angle sensor bracket screws	72-108 in-lbs	8.1-12.2 Nm	7.10 BANK ANGLE SENSOR (BAS), Installation
Bank angle sensor screw	20-30 in-lbs	2.2-3.4 Nm	7.10 BANK ANGLE SENSOR (BAS), Installation
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.11 REVERSE CONTROL SYSTEM, Reverse Solenoid Replacement
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.11 REVERSE CONTROL SYSTEM, Circuit Breaker Replacement
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Vehicle Starter to Circuit Breaker Power Lead
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to RCM Solenoid
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, RCM Solenoid to Reverse Motor Solenoid Energizer Lead
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to Reverse Motor Solenoid Power Lead
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation
Battery tray screws	132-156 in-lbs	14.9-17.6 Nm	7.3 BATTERY TRAY, Installation
Headlamp bracket nuts, HDI	120-150 in-lbs	13.6-16.9 Nm	7.5 FRONT LIGHTING: HDI, Lamps Bracket
Headlamp cover bracket screws	22-32 in-lbs	2.5-3.6 Nm	7.5 FRONT LIGHTING: HDI, General
Headlamp cover screw	9-18 in-lbs	1.0-2.0 Nm	7.5 FRONT LIGHTING: HDI, General
Headlamp ring screw, HDI	9-14 in-lbs	1.0-1.6 Nm	7.5 FRONT LIGHTING: HDI, Headlamp Bulb Replacement: FLHTCUTG HDI
License plate lamp housing locknuts: FLHTCUTG	60-72 in-lbs	6.8-8.1 Nm	7.7 LICENSE PLATE LAMPS/BRACKET: FLHTCUTG, Installation/Use new locknuts
License plate lamp screws: FLHTCUTG	9-12 in-lbs	1.0-1.4 Nm	7.7 LICENSE PLATE LAMPS/BRACKET: FLHTCUTG, Installation
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm	7.11 REVERSE CONTROL SYSTEM, Reverse Solenoid Replacement
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to RCM Solenoid
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm	7.12 REVERSE JUMPER CABLES/WIRES, RCM Solenoid to Reverse Motor Solenoid Energizer Lead
RCM solenoid screws	32-40 in-lbs	3.6-4.5 Nm	7.11 REVERSE CONTROL SYSTEM, Reverse Solenoid Replacement
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.11 REVERSE CONTROL SYSTEM, Circuit Breaker Replacement
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Vehicle Starter to Circuit Breaker Power Lead
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to RCM Solenoid

FASTENER	TORQU	E VALUE	NOTES
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to Reverse Motor Solenoid Power Lead
Reverse circuit breaker screw	32-40 in-lbs	3.6-4.5 Nm	7.11 REVERSE CONTROL SYSTEM, Circuit Breaker Replacement
Reverse motor bracket screws	39-44 ft-lbs	52.9-59.7 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Reverse motor screws	39-44 ft-lbs	52.9-59.7 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Reverse motor screws	39-44 ft-lbs	52.9-59.7 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Reverse motor solenoid energizer lead nut	24-30 in-lbs	2.7-3.4 Nm	7.12 REVERSE JUMPER CABLES/WIRES, RCM Solenoid to Reverse Motor Solenoid Energizer Lead
Reverse motor solenoid energizer lead nut	24-30 in-lbs	2.7-3.4 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation
Reverse motor solenoid power lead nut	60-84 in-lbs	6.8-9.5 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to Reverse Motor Solenoid Power Lead
Reverse motor solenoid power lead nut	60-84 in-lbs	6.8-9.5 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation
Reverse motor solenoid screws	70 in-lbs	7.9 Nm	7.13 REVERSE MOTOR AND BRACKET, Assembly
Right caddy to battery tray screw	36-40 in-lbs	4.1-4.5 Nm	7.3 BATTERY TRAY, Installation
Solenoid to reverse motor jumper nut	45 in-lbs	5.1 Nm	7.13 REVERSE MOTOR AND BRACKET, Assembly
Starter mounting screws	25-27 ft-lbs	33.9-36.6 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Starter solenoid post nut	70-90 in-lbs	7.9-10.2 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Vehicle Starter to Circuit Breaker Power Lead
Tail lamp/turn signal base screw	36-48 in-lbs	4.1-5.4 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation/Use LOCTITE 222 LOW STRENGTH THREADLOCKER AND SEALANT (purple)
Tail lamp/turn signal bracket screw, HDI	36-48 in-lbs	4.1-5.4 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation/Use LOCTITE 222 LOW STRENGTH THREADLOCKER AND SEALANT (purple)
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.8 REAR LIGHTS HARNESS: FLHTCUTG, Installation
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.9 REAR LIGHTS HARNESS: FLRT, Installation
Transmission ground post nut	66-114 in-lbs	7.5-12.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm	7.7 LICENSE PLATE LAMPS/BRACKET: FLHTCUTG, Installation
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm	7.8 REAR LIGHTS HARNESS: FLHTCUTG, Installation

HOME

FASTENER	TORQUE VALUE		NOTES
Turn signal, front, lamp to bracket screw	12-16 ft-lbs	16.3-21.7 Nm	7.4 FRONT LIGHTING, Front Turn Signal Lamp: FLRT
Turn signal lamp, front, mounting screw, HDI	96-131 in-lbs	10.9-14.8 Nm	7.5 FRONT LIGHTING: HDI, Turn Signal Lamps



SYSTEM FUSES AND RELAYS

SYSTEM FUSES AND RELAYS

NOTE

All Trike model motorcycles use a common fuse block. Actual fuse assignment may vary based on model and options.

Fuse blocks are mounted to the electrical caddy under the left side cover. See the service manual for removal and installation of fuse blocks or the main fuse holder.

Main Fuse

- 1. Remove left side cover.
- 2. **Siren equipped models:** With security fob present, turn ignition switch ON.
- 3. See Figure 7-1. Pull main fuse from main fuse holder.
- 4. Insert main fuse into main fuse holder.
- 5. Install left side cover.

System Fuses and Relays

- 1. Remove left side cover.
- Siren equipped models: With security fob present, turn ignition switch ON.
- 3. See Figure 7-1. Remove main fuse.
- Press in tabs on the left and right sides of fuse block cover.
 Remove the cover.
- Remove system fuse or relay from fuse block. Replace fuse if the element is burned. Automotive type ATO fuses are used.
- 6. Install system fuse or relay in fuse block.
- 7. Install fuse block cover.
- 8. Install main fuse.
- 9. Install left side cover.

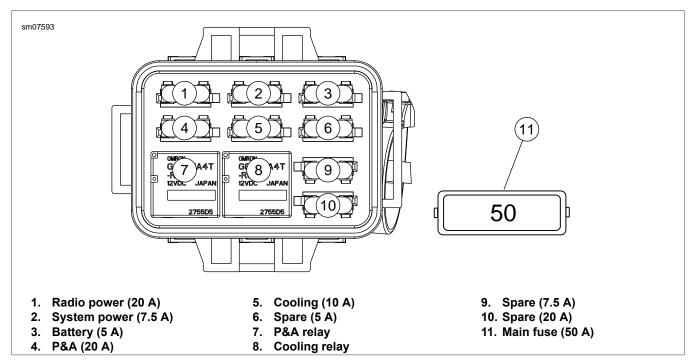


Figure 7-1. Fuses

BATTERY TRAY

REMOVAL

- Remove left and right side covers.
- 2. Remove battery. See service manual.
- 3. Remove BAS. See 7.10 BANK ANGLE SENSOR (BAS).
- Remove screws securing left side caddy.
- 5. Pull BAS harness from left side of battery tray.
- Remove screws securing ignition coil and battery holddown bracket. Remove bracket. See service manual.
- 7. Remove screw securing right side caddy.
- 8. Remove four screws securing battery tray to frame.
- If active exhaust actuator is not used, disconnect actuator connector from battery tray.
- 10. Remove four screws securing battery tray to frame.
- 11. Release caddy from dovetails while lowering battery tray into frame.
- 12. Roll front of battery tray up and out of frame.

INSTALLATION

FASTENER	TORQUE VALUE		
Right caddy to battery tray screw	36-40 in-lbs	4.1-4.5 Nm	
Battery tray screws	132-156 in-lbs	14.9-17.6 Nm	

- 1. Roll rear of battery tray down into frame.
- 2. Engage right side caddy onto dovetails while lifting battery tray up into position.

- 3. Install screw to retain caddy to battery tray. Tighten to 36-40 in-lbs (4.1-4.5 Nm).
- 4. Install four screws securing battery tray to frame. Tighten to 132-156 in-lbs (14.9-17.6 Nm).
- If active exhaust actuator is not used, connect actuator connector to battery tray.

NOTE

Route BAS harness through opening in battery tray while installing left side caddy.

- 6. Install left side caddy. See service manual.
- 7. Install BAS. See 7.10 BANK ANGLE SENSOR (BAS).
- Install ignition coil and battery hold-down bracket. See service manual.
- 9. Install battery and top caddy. See service manual.
- 10. Install left and right side covers.

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

11. Install seat.

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

12. Test all switches and lights for proper operation.

7.4

FRONT LIGHTING

REMOVAL, REPAIR AND INSTALLATION

NOTE

Service of FLHTCUTG is similar to Touring models except the steering damper bracket is secured under the left lamp bracket on Trike.

FLHTCUTG: DOM

See the service manual to service DOM models.

FLHTCUTG: JPN

JPN models do not have auxiliary/fog lamps. The lamp brackets support turn signal lamps only. See the service manual to service JPN models.

FLHTCUTG: HDI

For service of HDI models, see 7.5 FRONT LIGHTING: HDI.

FLRT Headlamp Repair

- 1. Remove headlamp. See <u>2.31 HEADLAMP NACELLE</u>.
- 2. Remove headlamp bulb. See 7.4 FRONT LIGHTING.
- See <u>Figure 7-2</u>. Remove screw (11) and nut (14). Remove mount block (10).

NOTE

Harness (9) is not serviced separately.

- 4. Secure mount block (10) with screw (11), flat washers (12), lockwasher (13) and nut (14). Hand-tighten only.
- 5. Install headlamp bulb. See <u>7.4 FRONT LIGHTING</u>.
- Install and align headlamp. See <u>2.31 HEADLAMP</u> NACELLE.

HEADLAMP BULB REPLACEMENT: FLRT

AWARNING

Handle bulb carefully and wear eye protection. Bulb contains gas under pressure, which, if not handled carefully, could cause serious eye injury. (00062b)

NOTICE

When replacement is required, use only the specified sealed beam unit or bulb, available from a Harley-Davidson dealer. An improper wattage sealed beam or bulb, can cause charging system problems. (00209a)

Replace failed bulbs. Refer to Table 1-1 for bulbs.

Bulb Removal

AWARNING

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

NOTE

Record components during disassembly to aid in correct assembly.

- Remove main fuse. See <u>7.2 SYSTEM FUSES AND</u> RELAYS, System Fuses and Relays.
- 2. See <u>Figure 7-2</u>. Remove trim ring hardware (1). Remove trim ring (2).
- 3. Remove mounting ring (3).
- 4. Disconnect headlamp connector (7) from bulb (5).
- 5. Remove boot (8) from back of headlamp lens (4).
- 6. Remove wire retaining clip (6) from headlamp base.
- 7. Remove bulb from headlamp assembly.

Bulb Installation

NOTICE

Never touch the quartz bulb. Fingerprints will etch the glass and decrease bulb life. Handle the bulb with paper or a clean, dry cloth. Failure to do so could result in bulb damage. (00210b)

NOTE

When installing a **new** bulb, make sure that connector contacts are clean for good electrical contact.

- 1. Install **new** bulb and assemble the headlamp components.
- 2. Verify slots and tabs in headlamp and trim ring are aligned.
- 3. Install boot on the headlamp lens assembly.
- Connect the headlamp connector.
- 5. Install trim ring and hardware.
- Verify that ignition switch is in OFF position. Install main fuse.

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

- 7. Check operation of all lamps.
- Align headlamp. See <u>1.17 HEADLAMP ALIGNMENT</u>, <u>Headlamp: FLRT</u>.

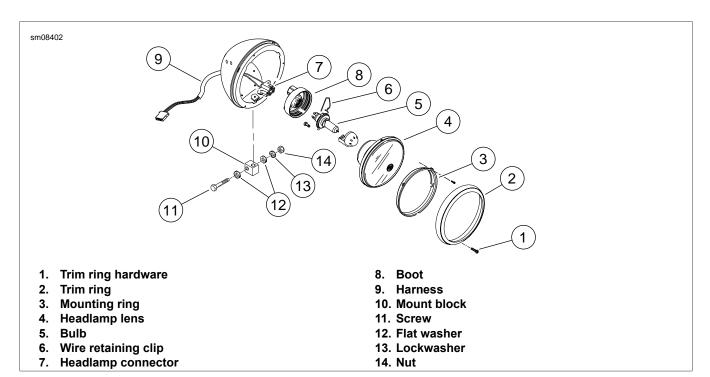


Figure 7-2. Headlamp Assembly: FLRT

FRONT TURN SIGNAL LAMP: FLRT

FASTENER	TORQUI	E VALUE
Turn signal, front, lamp to bracket screw	12-16 ft-lbs	16.3-21.7 Nm

Removal

- Remove turn signal lamp/bracket assembly. See 2.31 HEADLAMP NACELLE.
- 2. See <u>Figure 7-3</u>. Remove terminals from connector housing (6). See the service manual.
- 3. Remove screw (5) and washer (4). Remove lamp assembly from bracket.
- Remove reflector assembly if necessary. See the service manual.

Installation

- If removed, install reflector assembly and lens. See the service manual.
- 2. See <u>Figure 7-3</u>. Install lamp on mounting bracket. Tighten to 12-16 ft-lbs (16.3-21.7 Nm).
- 3. Install terminals into connector housing. Refer to <a>Table 7-1.
- Install turn signal lamp/bracket assembly. See 2.31 HEADLAMP NACELLE.

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

5. Test lamp operation.

Table 7-1. Front Turn Signal Lamp Connectors

LEFT SIDE [31L]		RIGHT SIDE [31R]	
WIRE COLOR	CHAMBER	WIRE COLOR	CHAMBER
Black	N° 1	Black	1
Violet	s n N ²	Violet	2
Blue	3	Blue	3
Empty	4		
Empty	5		
Empty	6		

HOME

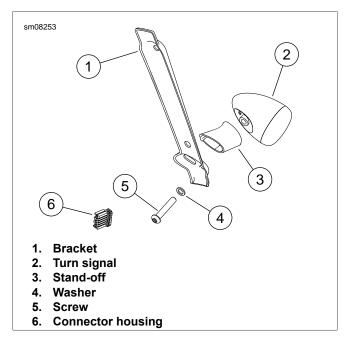


Figure 7-3. Turn Signal Lamp and Bracket



FRONT LIGHTING: HDI

GENERAL

FASTENER	TORQUE VALUE	
Headlamp cover bracket screws	22-32 in-lbs	2.5-3.6 Nm
Headlamp cover screw	9-18 in-lbs	1.0-2.0 Nm

HDI models do not have a central headlamp or auxiliary lamps. The side-mounted headlamps are used instead. A cover is installed in place of the central headlamp.

Headlamp Cover

- See <u>Figure 7-4</u>. Remove screw (1). Rotate cover (2) a few degrees counterclockwise. Pull cover straight forward to remove.
- 2. Remove screws (3). Remove mounting bracket (4).
- 3. Secure mounting bracket with screws (3). Tighten to 22-32 in-lbs (2.5-3.6 Nm).
- With the cover rotated a few degrees counterclockwise, push cover straight into place. Rotate clockwise until screw can be installed.
- Secure cover (2) with screw (1). Tighten to 9-18 in-lbs (1.0-2.0 Nm).

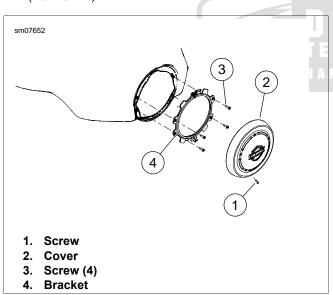


Figure 7-4. Headlamp Cover

HEADLAMP BULB REPLACEMENT: FLHTCUTG HDI

FASTENER	TORQUE	VALUE
Headlamp ring screw, HDI	9-14 in-lbs	1.0-1.6 Nm

NOTE

HDI models have LED headlamps. LED lamps contain no replacement bulbs. Replace the entire assembly if failure occurs.

Removal

- See <u>Figure 7-5</u>. Remove screw (1). Remove trim ring (2) from lamp housing.
- 2. Disconnect headlamp connector.
- 3. Remove headlamp bulb assembly and nesting ring.

Installation

- See <u>Figure 7-5</u>. Place nesting ring (4) on back of **new** bulb (3) with the index tab facing away from bulb.
- Install bulb assembly.
- 3. Mate connector to bulb.
- Engage index tab of nesting ring with slot at bottom of lamp housing.
- Engage index tabs on bulb assembly with slots in nesting ring.
- Install trim ring on lamp housing with screw centered at bottom. Tighten to 9-14 in-lbs (1.0-1.6 Nm).
- 7. Check headlamp alignment. See <u>1.17 HEADLAMP</u> ALIGNMENT, FLHTCUTG HDI Dual LED Headlamps.

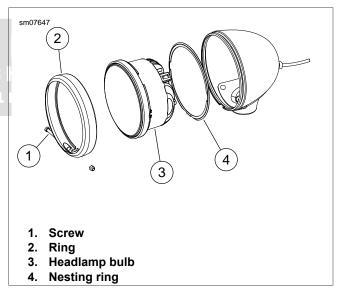


Figure 7-5. Headlamp Assembly

LAMPS BRACKET

FASTENER	TORQUE VALUE	
Headlamp bracket nuts, HDI	120-150 in-lbs	13.6-16.9 Nm

Removal

- 1. Remove two acorn nuts securing lamps bracket.
- Pull bracket away from fork and disconnect two connectors.

Installation

- 1. Mate two connectors.
- Secure lamps bracket with acorn nuts. Tighten to 120-150 in-lbs (13.6-16.9 Nm).

TURN SIGNAL LAMPS

FASTENER	TORQUE VALUE	
Turn signal lamp, front, mounting screw, HDI	96-131 in-lbs	10.9-14.8 Nm

Removal

- Remove lamps and bracket assembly. See <u>7.5 FRONT</u> LIGHTING: HDI, Lamps Bracket.
- Remove terminals 1, 2, 3 from 4-terminal connector. See JAE MX19 SEALED CONNECTORS in the service manual.
- See <u>Figure 7-6</u>. Remove screw and lockwasher securing lamp.
- 4. Pull wires through bracket as lamp is removed.

NOTE

HDI turn signal lamps contain no service parts. Failure requires replacement of the entire lamp assembly.

Installation

- 1. Pull wires through bracket as **new** lamp is put into position.
- See <u>Figure 7-6</u>. Secure lamp with screw and lockwasher. Tighten to 96-131 **in-lbs** (10.9-14.8 Nm).
- 3. Install terminals in connector. Refer to <a>Table 7-2.
- Install lamps and bracket assembly. See <u>7.5 FRONT LIGHTING: HDI, Lamps Bracket</u>.

Table 7-2. Front Turn Signal Connector, HDI [31]

WIRE COLOR	CHAMBER NUMBER
White	1
Red	2
Black (turn signal)	3
Black (headlamp)	4

HEADLAMP HOUSING

Removal

- Remove headlamp bulb. See 7.5 FRONT LIGHTING: HDI, Headlamp Bulb Replacement: FLHTCUTG HDI.
- Remove lamps and bracket assembly. See <u>7.5 FRONT LIGHTING: HDI, Lamps Bracket</u>.
- Remove terminals from 2-terminal connector and BK from terminal 4 of 4-terminal connector. See JAE MX19 SEALED CONNECTORS in the service manual.

NOTE

It is not necessary to completely remove the turn signal lamp to gain access to the headlamp retaining nut.

- 4. See <u>Figure 7-6</u>. Remove turn signal lamp. See <u>7.5 FRONT LIGHTING</u>: <u>HDI, Turn Signal Lamps</u>.
- Remove nut, lockwasher and cone washer securing headlamp housing.
- 6. Pull wires through bracket as lamp is removed.

Installation

- 1. Pull wires through bracket as **new** lamp is put into position.
- 2. See <u>Figure 7-6</u>. Secure with cone washer, lockwasher and nut. Do not tighten at this time.
- Install terminals in connectors. Refer to <u>Table 7-2</u>.
- Install lamps and bracket assembly. See <u>7.5 FRONT LIGHTING: HDI, Lamps Bracket</u>.
- 5. Install headlamp bulb. See <u>7.5 FRONT LIGHTING: HDI, Headlamp Bulb Replacement: FLHTCUTG HDI.</u>
- Adjust headlamp alignment. See <u>1.17 HEADLAMP</u> <u>ALIGNMENT</u>.

Table 7-3. Headlamp Connector, HDI [38]

WIRE COLOR	CHAMBER NUMBER	
Blue/yellow	1	
Blue/white	2	

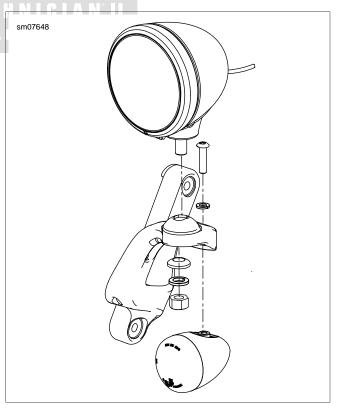


Figure 7-6. Lamps and Bracket: HDI

TAIL LAMPS/REAR TURN SIGNALS

REMOVAL

Incandescent Type

- 1. Remove two screws to release tail lamp/turn signal.
- See <u>Figure 7-7</u>. Disconnect tail lamp/turn signal connector (1).
- Disconnect rear lighting harness connector (2). Feed connector housing through opening (3) to inboard side of fender.
- 4. **FLHTCUTG:** If necessary, remove screw (4) with flat washer to release chrome base from fender bracket.
- 5. See Figure 7-8. Remove pin housing and circuit board from chrome base. Remove pin housing from circuit board.

LED Type

- See <u>Figure 7-9</u>. Remove two screws to release tail lamp/turn signal.
- Disconnect tail lamp/turn signal connector.
- If necessary, remove screw to release tail lamp bracket from fender.

NOTE

LED tail lamps contain no service parts. Failure requires replacement of the entire lamp assembly.

INSTALLATION

FASTENER	TORQUE VALUE	
Tail lamp/turn signal base screw	36-48 in-lbs	4.1-5.4 Nm
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm
Tail lamp/turn signal bracket screw, HDI	36-48 in-lbs	4.1-5.4 Nm
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm

Incandescent Type

- See <u>Figure 7-8</u>. Place pin housing over circuit board. Install assembly into base.
- 2. See Figure 7-7. FLHTCUTG: Apply LOCTITE 222 LOW STRENGTH THREADLOCKER AND SEALANT (purple) to screw (4). Secure base with flat washer and screw. Tighten to 36-48 in-lbs (4.1-5.4 Nm).
- 3. Feed connector housing through opening (3) to outboard side of fender. Install connector (2).
- 4. Connect tail lamp/turn signal connector (1).
- 5. Install tail lamp/turn signal lens with two screws. Tighten to 21-24 **in-lbs** (2.4-2.7 Nm).

NOTE

Over-tightening screws can crack the lens.

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

6. Check operation of all lamps.

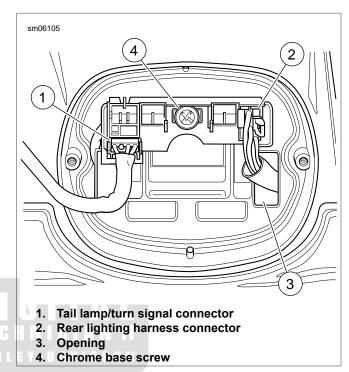


Figure 7-7. Remove Chrome Base: FLHTCUTG

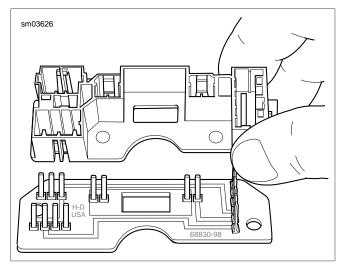


Figure 7-8. Remove Pin Housing From Circuit Board

LED Type

- 1. See Figure 7-9. If removed, install tail lamp bracket to fender. Tighten to 36-48 in-lbs (4.1-5.4 Nm).
- 2. Connect tail lamp/turn signal connector.

3. Secure tail lamp/turn signal with two screws. Tighten to 21-24 **in-lbs** (2.4-2.7 Nm).

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

4. Check operation of all lamps.

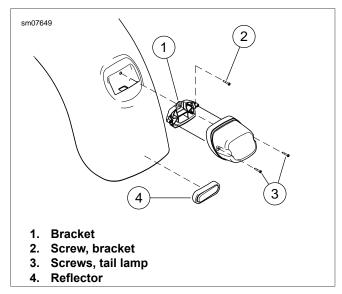


Figure 7-9. LED Tail Lamp



REMOVAL

- Remove four screws and remove trunk door inner cover.
- See <u>Figure 7-10</u>. Disconnect license plate lamp connector (1) from rear lighting harness.
- 3. Remove terminals from connector housing.

NOTE

For instructions on removing terminals, see service manual.

4. Remove two locknuts and flat washers to release license plate lamp bracket.

NOTE

License plate lamp bracket also serves as the trunk door handle.

- 5. Draw harness to outboard side of trunk door while pushing grommet (2) through hole.
- Remove screws to release lens/bulb assembly from license plate lamp bracket.

INSTALLATION

FASTENER	TORQUE VALUE	
License plate lamp screws: FLHTCUTG	9-12 in-lbs	1.0-1.4 Nm
License plate lamp housing locknuts: FLHTCUTG	60-72 in-lbs	6.8-8.1 Nm
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm

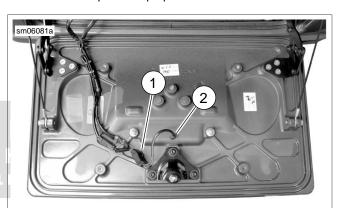
- 1. Secure lens/bulb assembly to license plate lamp bracket with screws. Tighten to 9-12 **in-lbs** (1.0-1.4 Nm).
- If replacing lens/bulb assembly, place new unit next to old unit and cut wires to proper length. Crimp new socket terminals onto wires.

- 3. See <u>Figure 7-10</u>. Feed terminals and harness with grommet to inboard side of trunk door. Seat grommet (2) in hole. Install terminals into connector housing.
- Install two new locknuts with flat washers to fasten license plate lamp bracket to trunk door. Tighten to 60-72 in-lbs (6.8-8.1 Nm).
- Connect license plate lamp connector (1) to rear lighting harness.
- 6. Install trunk door cover and tighten screws in a crosswise pattern to 30-54 **in-lbs** (3.4-6.1 Nm).

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

7. Test license plate lamp operation.



- 1. License plate lamp connector
- 2. Grommet

Figure 7-10. Inside Trunk Door

REAR LIGHTS HARNESS: FLHTCUTG

REMOVAL

- 1. Remove seat.
- See <u>Figure 7-11</u>. Disconnect rear lighting harness from main harness.
- 3. Remove rear wheels. See 2.6 REAR WHEELS.
- 4. Remove trunk door inner cover.
- 5. See <u>Figure 7-12</u>. Disconnect license plate lamp connector (3) and optional trunk light connector (4) if equipped.
- 6. Release harness from anchor clips (1).
- 7. Remove trunk liner.
- 8. Release harness from anchor clips inside trunk.
- 9. Remove grommet in front-left corner of body and feed harness through hole to underside of body.

NOTE

See <u>Figure 7-14</u>. Models equipped with LED rear lights have connectors (1, 2) located under the body. These models do not require removal of the tail/stop lamps. Separate the connectors and proceed to last step.

- 10. Disconnect harness from fenders:
 - a. Remove tail lamp/turn signal.
 - See <u>Figure 7-13</u>. Disconnect rear lighting harness connector (1). Feed harness and connector to inboard side of fender.
 - c. Release harness from three adhesive clips in fender well. Feed harness through hole to underside of body.
 - d. Repeat steps on opposite fender.
- Release harness from remaining anchor clips at underside of body.

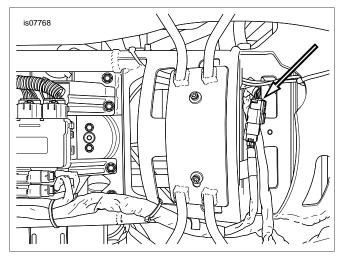
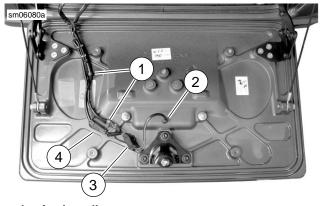


Figure 7-11. Rear Lighting Connector: FLHTCUTG



- 1. Anchor clips
- 2. Grommet
- 3. License plate lamp connector
- 4. P&A trunk light connector

Figure 7-12. Inside Trunk Door

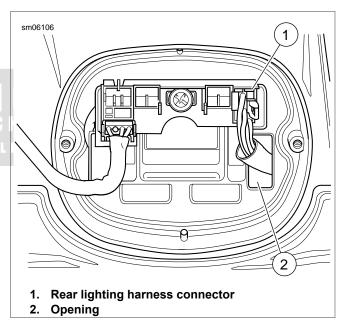


Figure 7-13. Chrome Base

INSTALLATION

FASTENER	TORQUE VALUE	
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm

NOTE

The harness is captured in a total of 25 anchor clips. There are fourteen at underside of body, three in each fender well and five inside trunk.

- 1. See Figure 7-14. Capture harness in anchor clips at underside of body:
 - a. With the 8-place connector at front of body, route harness rearward and then to left side of body through two adhesive clips (1, 2).

NOTE

HDI models equipped with LED rear lights have connectors (1, 2) located under the body.

- b. **HDI:** Route connector (2) toward the right side and capture in clips (3-5). Mate connectors (1, 2). Proceed to step 3.
- Route right tail lamp (longer branch) of harness terminating in 6-place connector to right side of body and then rearward through seven anchor clips (3-9).
- d. Route left tail lamp (shorter branch) of harness terminating in 6-place connector rearward along left side of body through five anchor clips (10-14).
- 2. Secure harness to fenders:
 - a. Route harness through holes and capture in three anchor clips in fender well.
 - See <u>Figure 7-13</u>. Feed connector to outboard side of fender and connect to tail lamp base.
 - Install tail lamp/turn signal with two screws. Tighten to 21-24 in-lbs (2.4-2.7 Nm).
 - d. Repeat steps on opposite fender.
- Feed branch of harness terminating in two 2-place Multilock connectors into trunk through hole in front-left corner of body. Install grommet into body hole.

- 4. Capture harness in five anchor clips inside trunk.
- See <u>Figure 7-12</u>. Mate license plate lamp harness connector (3) and optional trunk light connector (4) if equipped.
 Secure harness to trunk door with anchor clips (1).

NOTE

Route harness through gap in front left corner of trunk door cover.

- 6. Install trunk door cover. Tighten in a crosswise pattern to 30-54 **in-lbs** (3.4-6.1 Nm).
- 7. Install trunk liner.
- 8. Connect rear lighting harness to main harness.
- 9. Install rear wheels. See <u>2.6 REAR WHEELS</u>.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

10. Install seat.

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

11. Test rear lighting for proper operation.

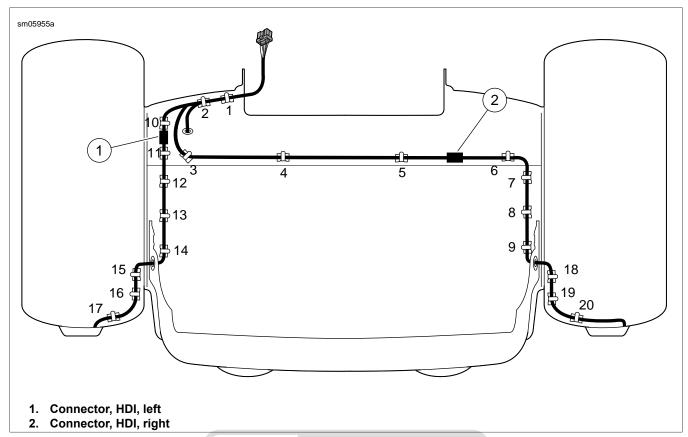


Figure 7-14. Adhesive Clip Location (As Viewed From the Top)

TECHNICIAN II HARLEY-DAVIDSON

REAR LIGHTS HARNESS: FLRT

REMOVAL

- Remove seat.
- See <u>Figure 7-15</u>. Disconnect rear lighting harness from main harness.
- 3. Remove rear wheels. See <u>2.6 REAR WHEELS</u>.
- Remove tail lamp/turn signal. See <u>7.6 TAIL LAMPS/REAR TURN SIGNALS</u>.
- 5. Feed harness to inboard side of fender.
- See <u>Figure 7-16</u>. Release harness from adhesive clips in fender well. Feed harness through hole to underside of body.
- 7. Repeat steps on opposite fender.
- Release harness from remaining anchor clips at underside of body.

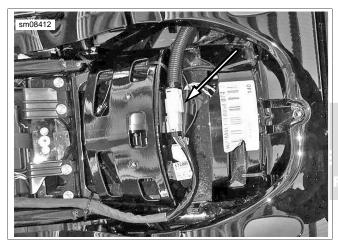


Figure 7-15. Rear Lighting Connector: FLRT

INSTALLATION

FASTENER	TORQUE	VALUE
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm

NOTES

- See <u>Figure 7-16</u>. The harness is captured in a total of 16 anchor clips. There are eight at underside of body and four in each fender well.
- The left branch of harness has violet tape at each anchor point. The right branch has brown tape. The main branch has no tape.

- See <u>Figure 7-16</u>. Beginning at anchor clip (2), capture harness in anchor clips at underside of body:
 - With the 8-place connector at front- right side of body, route longer branch of harness rearward and then to left side of body through hole leading to fender well.
 - b. Route right tail lamp (shorter branch) of harness to right side of body through hole leading to fender well.
- 2. Capture harness in clips (1-6, 11, 12).
- 3. Secure harness to fenders:
 - a. Capture in four anchor clips in fender well.
 - b. Route harness through loop in tail lamp bracket and to outboard side of fender.
 - c. Connect to tail lamp.
 - Install tail lamp/turn signal with two screws. Tighten to 21-24 in-lbs (2.4-2.7 Nm).
 - e. Repeat steps on opposite fender.
- 4. Connect rear lighting harness to main harness.
- Install rear wheels. See <u>2.6 REAR WHEELS</u>.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

Install seat.

AWARNING

Be sure that all lights and switches operate properly before operating motorcycle. Low visibility of rider can result in death or serious injury. (00316a)

7. Test rear lighting for proper operation.

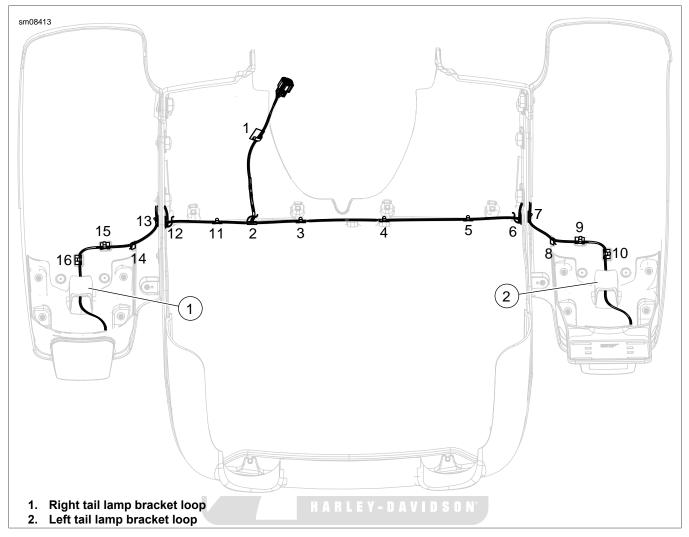


Figure 7-16. Adhesive Clip Location (As Viewed From the Bottom)

BANK ANGLE SENSOR (BAS)

REMOVAL

- 1. Remove main fuse.
- Remove seat and top caddy. See the service manual.
- See Figure 7-17. Remove screws (2) and remove sensor with bracket.
- Disconnect bank angle sensor connector.
- Remove screw (1) and sensor from bracket.

INSTALLATION

FASTENER	TORQUE VALUE	
Bank angle sensor screw	20-30 in-lbs	2.2-3.4 Nm
Bank angle sensor bracket screws	72-108 in-lbs	8.1-12.2 Nm

NOTE

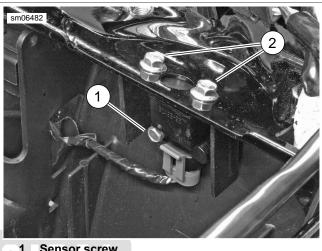
See Figure 7-17. Use ONLY the correct original equipment screws to install the BAS bracket. If longer screws are used, the BAS can send an errant "vehicle has been tipped" signal to the ECM.

- 1. Secure sensor to bracket with screw (1). Tighten to 20-30 in-lbs (2.2-3.4 Nm).
- 2. Mate sensor connector.
- Install bracket and sensor with screws (2). Tighten to 72-108 in-lbs (8.1-12.2 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

- Install top caddy and seat.
- Install main fuse. 5.



- Sensor screw
- Bracket screw (2)

Figure 7-17. Bank Angle Sensor (BAS) (battery removed for clarity)

REVERSE CONTROL SYSTEM

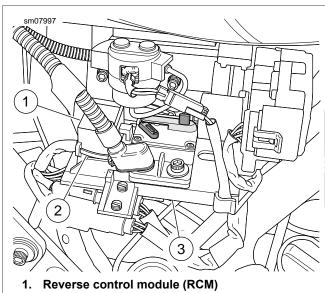
SWITCH REPLACEMENT

The reverse switch is part of a modular switch assembly and not serviced separately. See the service manual for switch module assembly replacement.

RCM REPLACEMENT

Removal

- 1. Remove main fuse.
- 2. Remove right side cover.
- See Figure 7-18. Separate connector (3) located under caddy.
- Remove cable strap (2) securing RCM (1) to electrical
- Remove RCM.



- 2. Cable strap
- RCM connector (not visible)

Figure 7-18. Reverse Control Module (RCM)

Installation

- Secure RCM on right electrical caddy with **new** cable strap.
- 2. Mate connector (3).
- 3. Install right side cover.
- 4 Install main fuse.

REVERSE SOLENOID REPLACEMENT

FASTENER	TORQUE VALUE	
RCM solenoid screws	32-40 in-lbs	3.6-4.5 Nm
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

Removal

1. Remove right side cover.

WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- Disconnect negative battery cable.
- See Figure 7-19. Disconnect 2-place connector (12). Remove boot (14).
- Remove nuts (8).
- Remove RCM jumper (4) and reverse motor solenoid energizer lead (13) from posts of solenoid.
- Remove two screws (11) to release RCM solenoid.

Installation

- See Figure 7-19. Install RCM solenoid with screws (11). Tighten to 32-40 in-lbs (3.6-4.5 Nm).
- Install reverse motor solenoid energizer lead (13) and nut (8) onto rear post of RCM solenoid.
- 3. Install RCM jumper (4) and nut (8) onto forward post.
- 4. Tighten nuts (8) to 26-40 in-lbs (2.9-4.5 Nm).
- 5. Route 2-place connector (12) through square shaped opening of boot (14) and install boot. Mate connector.
- Connect negative battery cable. Tighten to 60-70 in-lbs (6.8-7.9 Nm).

WARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

7. Install seat.

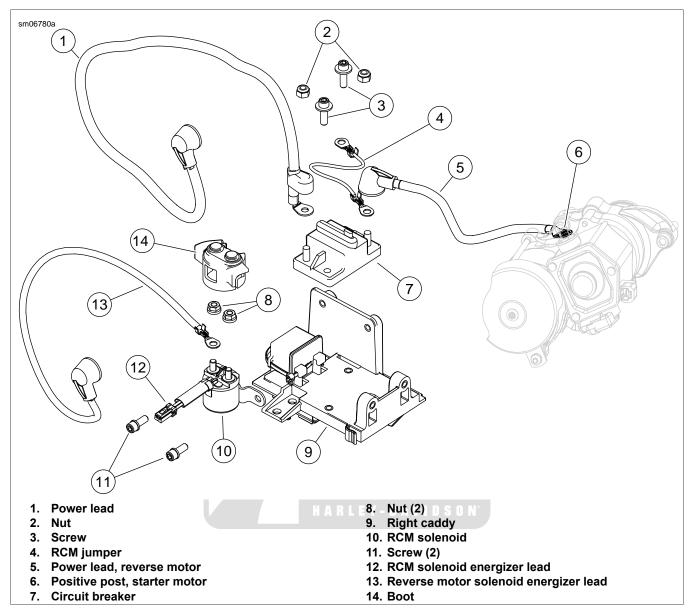


Figure 7-19. RCM Solenoid and Circuit Breaker

CIRCUIT BREAKER REPLACEMENT

FASTENER	TORQUE VALUE	
Reverse circuit breaker screw	32-40 in-lbs	3.6-4.5 Nm
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

Removal

Remove right side cover.

WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

2. Disconnect negative battery cable.

- See <u>Figure 7-19</u>. Remove nuts (2). Remove RCM jumper (4) and power lead (5) from inboard post (stamped BAT).
- Remove reverse motor power lead (1) from outboard post of circuit breaker (stamped AUX).
- Remove screws (3) to release circuit breaker (7) from caddy (9).

Installation

- See <u>Figure 7-19</u>. Install circuit breaker and secure with screws (3). Tighten screw to 32-40 in-lbs (3.6-4.5 Nm).
- Install power lead (5) and RCM jumper (4) onto inboard post of circuit breaker (stamped BAT). Install reverse motor power lead (1) onto outboard post (stamped AUX).
- Install nuts (2). Tighten to 50-60 in-lbs (5.6-6.8 Nm). Install boots
- 4. See Figure 7-20. If tripped, push reset lever (1) into circuit breaker until an audible click is heard.

5. Connect negative battery cable. Tighten to 60-70 **in-lbs** (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

- 6. Install seat.
- 7. Install side cover.

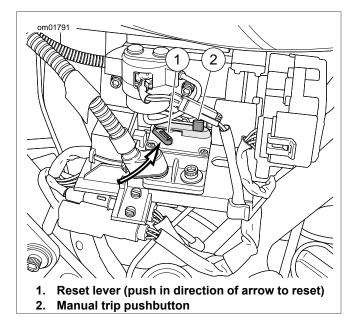


Figure 7-20. Reverse Motor Circuit Breaker



REVERSE JUMPER CABLES/WIRES

GENERAL

The reverse system uses the following jumper cables/wires:

- · Vehicle starter to circuit breaker (power circuit)
- Circuit breaker to RCM solenoid (energizer circuit)
- RCM solenoid to reverse motor solenoid (energizer circuit)
- Circuit breaker to reverse motor (power circuit)
- · Reverse motor to battery ground

VEHICLE STARTER TO CIRCUIT BREAKER POWER LEAD

FASTENER	TORQUE VALUE	
Starter solenoid post nut	70-90 in-lbs	7.9-10.2 Nm
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

Removal

1. Disconnect negative battery cable.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 2. Remove right side cover.
- 3. See Figure 7-19. Disconnect cable (5) from starter solenoid post (6).
- 4. Remove nut (2) and ring terminal from inboard post of circuit breaker. Remove cable.

Installation

- See <u>Figure 7-19</u>. Route jumper cable from circuit breaker forward under frame crossmember to starter solenoid post (6).
- Install jumper and battery positive cable ring terminals on starter solenoid post. Secure with nut. Tighten to 70-90 in-lbs (7.9-10.2 Nm). Install boot.
- Secure cable (5) and jumper (4) onto inboard post of circuit breaker with nut (2). Tighten to 50-60 in-lbs (5.6-6.8 Nm). Install boot.
- 4. Connect negative battery cable. Tighten to 60-70 **in-lbs** (6.8-7.9 Nm).

WARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

- 5. Install seat.
- 6. Install right side cover.

CIRCUIT BREAKER TO RCM SOLENOID

FASTENER	TORQUE VALUE	
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

Removal

1. Disconnect negative battery cable.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 2. Remove right side cover.
- See <u>Figure 7-19</u>. Remove boot (14) from RCM solenoid.
 Remove nut (8) and ring terminal from post of RCM solenoid.
- Remove nut (2) and ring terminal from inner post of circuit breaker. Remove jumper (4).

Installation

- 1. See <u>Figure 7-19</u>. Install ring terminals of jumper (4) and power lead (5) onto inner post of circuit breaker with nut (2). Tighten to 50-60 **in-lbs** (5.6-6.8 Nm).
- 2. Install ring terminal and nut (8) onto post of RCM solenoid. Tighten to 26-40 **in-lbs** (2.9-4.5 Nm).
- 3. Install boots.
- 4. Connect negative battery cable. Tighten to 60-70 **in-lbs** (6.8-7.9 Nm).

WARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

- Install seat.
- 6. Install right side cover.

RCM SOLENOID TO REVERSE MOTOR SOLENOID ENERGIZER LEAD

FASTENER	TORQUE VALUE	
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm
Reverse motor solenoid ener- gizer lead nut	24-30 in-lbs	2.7-3.4 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

Removal

1. Disconnect negative battery cable.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 2. Remove right rear wheel. See 2.6 REAR WHEELS.
- 3. Remove right side cover.
- 4. See Figure 7-19. Remove boot (14) from RCM solenoid.
- Remove nut (8) securing ring terminal of energizer lead (13).
- Remove boot from lower post (silver) on reverse motor solenoid. Remove nut (metric), lockwasher and ring terminal
- Cut cable straps to release jumper from upper frame tube and the reverse motor power lead. Remove energizer lead (13).

Installation

- Secure energizer lead to rear post of RCM solenoid. Tighten to 26-40 in-lbs (2.9-4.5 Nm). Install boot over RCM solenoid.
- See <u>Figure 7-22</u>. Route jumper above and behind reverse motor to solenoid.
- Install ring terminal, lockwasher and nut (metric) onto lower post (2) of reverse motor solenoid. Tighten to 24-30 in-lbs (2.7-3.4 Nm). Install boot.
- 4. Install cable straps (5) to secure cables together.
- See <u>Figure 7-21</u>. Install **new** cable strap to secure power lead and energizer jumper to upper frame tube.
- Install right rear wheel. See <u>2.6 REAR WHEELS</u>.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

 Connect negative battery cable. Tighten to 60-70 in-lbs (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

- 8. Install seat.
- 9. Install right side cover.

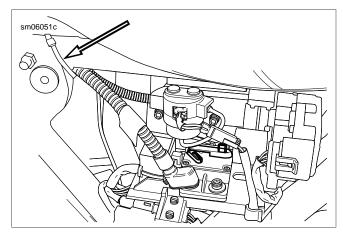


Figure 7-21. Secure Harnesses to Frame Tube

CIRCUIT BREAKER TO REVERSE MOTOR SOLENOID POWER LEAD

FASTENER	TORQUE VALUE	
Reverse motor solenoid power lead nut	60-84 in-lbs	6.8-9.5 Nm
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

Removal

1. Remove seat. Disconnect battery negative cable.

WARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 2. Remove right rear wheel. See <u>2.6 REAR WHEELS</u>.
- 3. Remove right side cover.
- 4. Remove boot, nut (metric), lockwasher and ring terminal from front post (copper) on reverse motor solenoid.
- 5. See <u>Figure 7-19</u>. Remove boot, nut (5) and ring terminal from outboard post of circuit breaker (stamped AUX).
- 6. Cut cable straps to release jumper from upper frame tube. Remove jumper (16).

Installation

- See <u>Figure 7-22</u>. Install ring terminal onto front post (1) of reverse motor solenoid. Install lockwasher and nut (metric).
- 2. Tighten nut to 60-84 **in-lbs** (6.8-9.5 Nm). Install boots.
- Route lead around rear of reverse motor and up toward the circuit breaker.
- Install ring terminal and nut onto outboard post of circuit breaker (stamped AUX). Tighten nut to 50-60 in-lbs (5.6-6.8 Nm).
- 5. Install cable straps (5) to secure cables together.

- 6. See <u>Figure 7-21</u>. Install **new** cable straps to secure power cable, energizer jumper, RCM harness and main harness to upper frame tube.
- 7. Install right rear wheel. See <u>2.6 REAR WHEELS</u>.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

8. Connect battery negative cable. Tighten screw to 60-70 in-lbs (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

- 9. Install seat.
- 10. Install right side cover.

REVERSE MOTOR TO BATTERY GROUND

FASTENER	TORQUE VALUE	
Transmission ground post nut	66-114 in-lbs	7.5-12.9 Nm
Starter mounting screws	25-27 ft-lbs	33.9-36.6 Nm
Reverse motor screws	39-44 ft-lbs	52.9-59.7 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

Removal

1. Disconnect negative battery cable.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 2. Remove right side cover.
- 3. Remove right rear wheel. See <u>2.6 REAR WHEELS</u>.
- 4. See <u>Figure 7-22</u>. Remove lower reverse motor screw with lockwasher to release ground jumper (3) ring terminal.
- 5. Remove two screws to release starter from primary chaincase. Pull starter from bore and move as necessary to access ground post at top of transmission case.

- Remove nut and ground jumper from transmission ground post
- 7. Draw ground jumper rearward to remove.

Installation

- From area of reverse motor, route new ground jumper forward over rear fork and rear brake line.
- Secure ground jumper onto transmission ground post (outboard of battery negative cable ring terminal) with nut. Tighten to 66-114 in-lbs (7.5-12.9 Nm).
- Place starter into installed position. Apply LOCTITE 243
 MEDIUM STRENGTH THREADLOCKER AND SEALANT
 (blue) and secure with two screws. Tighten to 25-27 ft-lbs
 (33.9-36.6 Nm).
- Remove all residual threadlocking compound from lower hole in reverse motor bracket using an appropriate thread chaser.
- 5. If reusing reverse motor screw:
 - a. Completely remove all threadlocking compound using a wire brush or wire wheel.
 - Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue) to threads of screw.
- See <u>Figure 7-22</u>. Secure ground jumper (3) and RCM solenoid ground lead (4) with reverse motor screw. Tighten to 39-44 ft-lbs (52.9-59.7 Nm).
- 7. Install right rear wheel. See 2.6 REAR WHEELS.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

- 8. Install right side cover.
- Connect negative battery cable. Tighten to 60-70 in-lbs (6.8-7.9 Nm).

AWARNING

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)

10. Install seat.

REVERSE MOTOR AND BRACKET

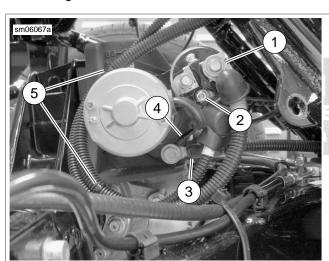
REMOVAL

Remove seat.

AWARNING

To prevent accidental vehicle start-up, which could cause death or serious injury, disconnect negative (-) battery cable before proceeding. (00048a)

- 2. Disconnect battery negative cable.
- 3. Remove right rear wheel. See 2.6 REAR WHEELS.
- 4. See <u>Figure 7-22</u>. Remove nut (metric) and lockwasher to release reverse motor power cable (1).
- 5. Remove nut (metric) and lockwasher to release reverse motor solenoid energize lead (2).
- 6. Remove two screws to release reverse motor from bracket.
- Remove three screws to release reverse motor bracket.
 Pull bracket from two dowel pins in flanges of differential housing.



- Reverse motor power cable (with red shrink tube)
- 2. Reverse motor solenoid energize lead
- 3. Battery ground jumper
- 4. RCM solenoid ground
- 5. Cable strap

Figure 7-22. Reverse Motor

DISASSEMBLY

- 1. Remove reverse motor.
- Remove nut with lockwasher to release solenoid to reverse motor jumper.
- 3. See Figure 7-23. Remove two screws with lockwashers.
- Remove solenoid, disengaging slot in drive shaft from end of lever on pinion gear.
- 5. See Figure 7-24. Remove collar (3) and spring (4).

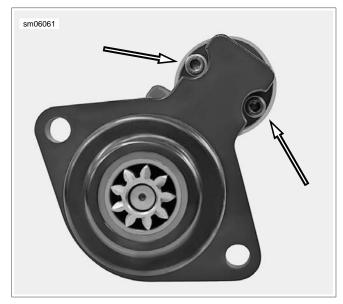


Figure 7-23. Remove Screws to Release Solenoid

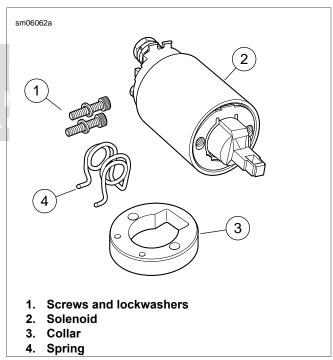


Figure 7-24. Solenoid Assembly

ASSEMBLY

FASTENER	TORQUE VALUE	
Reverse motor solenoid screws	70 in-lbs	7.9 Nm
Solenoid to reverse motor jumper nut	45 in-lbs	5.1 Nm

- See <u>Figure 7-25</u>. With spring oriented as shown, push spring into bore until it engages notch at middle of lever. Verify that ends remain proud of mounting flange.
- Apply a small amount of grease where spring and lever mate.

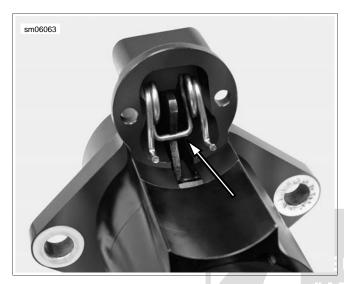


Figure 7-25. Engage Spring in Notch



Figure 7-26. Capture Lever in Slot

- 3. Engage ends of spring into chamfered holes in collar and push collar tight against mounting flange.
- Insert two screws with lockwashers through holes in mounting flange and collar.

- Pull pinion gear to the fully engaged position (out) to move lever toward collar. Move lever sideways as necessary to center between spring coils.
- See <u>Figure 7-26</u>. Hold solenoid with the lettered side up and capture end of lever in slot of plunger.
- 7. Slowly move solenoid toward installed position and secure with screws. Tighten to 70 **in-lbs** (7.9 Nm).
- Install reverse motor jumper and secure with nut and lockwasher. Tighten nut to 45 in-lbs (5.1 Nm).
- 9. Install reverse motor.

INSTALLATION

FASTENER	TORQUE VALUE	
Reverse motor bracket screws	39-44 ft-lbs	52.9-59.7 Nm
Reverse motor screws	39-44 ft-lbs	52.9-59.7 Nm
Reverse motor solenoid ener- gizer lead nut	24-30 in-lbs	2.7-3.4 Nm
Reverse motor solenoid power lead nut	60-84 in-lbs	6.8-9.5 Nm
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm

- Remove all residual threadlocking compound from all threaded holes in differential housing and reverse motor bracket.
- 2. If reusing screws, remove all threadlocking compound using a wire brush or wire wheel.

NOTE

Install new dowel pins if damaged or missing.

- Apply LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue) to threads of three screws and secure reverse motor bracket to differential housing. Tighten screws to 39-44 ft-lbs (52.9-59.7 Nm).
- See <u>Figure 7-22</u>. Install lockwasher, RCM solenoid ground (4) and battery ground jumper (3) on lower reverse motor screw.
- Apply LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue) to threads of two screws and fasten reverse motor to bracket. Tighten screws to 39-44 ft-lbs (52.9-59.7 Nm).
- Install reverse motor solenoid energize lead (2) with nut (metric) and lockwasher. Tighten to 24-30 in-lbs (2.7-3.4 Nm). Install boot.
- Install reverse motor power cable (1) with nut (metric) and lockwasher. Tighten to 60-84 in-lbs (6.8-9.5 Nm). Install boot.
- Install right rear wheel. See <u>2.6 REAR WHEELS</u>.

NOTE

Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.

9. Connect battery negative cable. Tighten screw to 60-70 in-lbs (6.8-7.9 Nm).

AWARNING

10. Install seat.

After installing seat, pull upward on seat to be sure it is locked in position. While riding, a loose seat can shift causing loss of control, which could result in death or serious injury. (00070b)



7.14

INITIAL DIAGNOSTICS

DESCRIPTION AND OPERATION

Use initial diagnostics as a starting point to efficiently troubleshoot concerns. A basic understanding of electronics and a general knowledge of the vehicle are necessary to effectively use this manual.

NOTES

- Certain diagnostic procedures require part removal. See the service manual for details.
- Certain diagnostic procedures require the use of special tools. See diagnostic tools in the electrical diagnostic manual.
- Certain diagnostic procedures require the use of tests that have precise instructions. See diagnostics and troubleshooting in the electrical diagnostic manual.

Before diagnosing a concern, perform a general functional test of the vehicle to verify the concern. This will also identify any other issues that may affect diagnostics. Use the procedures in this chapter for initial diagnostics.

NOTES

- When working through a diagnostic procedure, follow the steps in the order instructed. Never jump to a test in another procedure. All "Go to test" statements refer to a test in that procedure.
- To turn IGN ON the fob must be present while you press the engine stop switch.

Table 7-4. Diagnostic Trouble Codes (DTCs) and Fault Conditions Priority Table

DTC	PRIORITY ORDER	FAULT CONDITION	SOLUTION
B2131	201	High beam output open	7.19 HEADLAMP DIAGNOSTICS
B2132	202	High beam output shorted high	7.19 HEADLAMP DIAGNOSTICS
B2133	203	High beam output shorted low	7.19 HEADLAMP DIAGNOSTICS
B2134	204	High beam output overloaded	7.19 HEADLAMP DIAGNOSTICS
B2136	197	Low beam output open	7.19 HEADLAMP DIAGNOSTICS
B2137	198	Low beam output shorted high	7.19 HEADLAMP DIAGNOSTICS
B2138	199	Low beam output shorted low	7.19 HEADLAMP DIAGNOSTICS
B2139	200	Low beam output overloaded	7.19 HEADLAMP DIAGNOSTICS
B2226	215	BAS input open	7.20 BAS DIAGNOSTICS
B2228	218	BAS input shorted low	7.20 BAS DIAGNOSTICS
P1772	271	Reverse actuator feedback low	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS
P1775	272	Reverse actuator feedback error	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS
P1777	273	Reverse actuator low	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS
P1778	274	Reverse actuator high	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS
P1781	275	Reverse switch input error	7.21 REVERSE SWITCH SYMPTOMS AND DIAGNOSTICS

Table 7-5. Symptom Table

SYSTEM	SYMPTOM	DIAGNOSTIC PROCEDURE
Reverse Motor	Reverse motor spins but does not drive	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS
	Reverse motor stalls or spins too slowly	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS
	Reverse motor runs on	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS
	Reverse motor inoperative	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS

Table 7-5. Symptom Table

SYSTEM	SYMPTOM	DIAGNOSTIC PROCEDURE
Indicator Lamp	Parking brake lamp always on	7.17 INDICATOR LAMP DIAGNOSTICS
	Parking brake lamp inoperative	7.17 INDICATOR LAMP DIAGNOSTICS
	Reverse indicator lamp always on	7.17 INDICATOR LAMP DIAGNOSTICS
	Reverse indicator lamp inoperative	7.17 INDICATOR LAMP DIAGNOSTICS
Rear Lighting	Brake lamps inoperative	7.18 REAR LIGHTING DIAGNOSTICS
Headlamp	FLRT, high beam inoperative	7.19 HEADLAMP DIAGNOSTICS
	FLRT, low beam inoperative	7.19 HEADLAMP DIAGNOSTICS
	Dual lamp, high beam inoperative	7.19 HEADLAMP DIAGNOSTICS
	Dual lamp, low beam inoperative	7.19 HEADLAMP DIAGNOSTICS



REVERSE MOTOR SYSTEM DIAGNOSTICS

DESCRIPTION AND OPERATION

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT

The reverse motor uses battery power to move the vehicle in reverse with the engine running and the transmission in neutral.

The reverse motor is designed for light load, short duration use. Steep inclines, long distance travel in reverse or attempted operation with the brakes or parking brake applied or while the vehicle is against resistance (such as a curb) will drain the battery and may cause the reverse circuit breaker to trip.

The reverse system is an electrical system with an output drive connected directly to the vehicle drive when in operation. The system uses a:

- Reverse motor.
- · Reverse motor solenoid.
- · Reverse control solenoid.
- Reverse control module (RCM).
- 150 amp manual reset circuit breaker.
- · Reverse hand switch (LHCM).

See Figure 7-28. The reverse motor and attached reverse motor solenoid resembles a starter motor. The assembly is single direction (reverse) only and cannot be used to move the vehicle forward. Voltage to the reverse motor assembly is provided through a 150 amp manual reset circuit breaker and the RCM solenoid, in response to the output of the RCM.

Operation

The ECM will enable reverse if conditions are correct.

- · Reverse switch on LHCM is pressed.
- · Transmission is in neutral.
- · Vehicle is moving less than 2 mph (3 kph).
- Engine running at less than 1500 RPM.
- · No reverse DTCs are present.

Upon enabling reverse function, the ECM will activate the reverse telltale lamp located in the IM (FLHTCUTG) or speedometer (FLRT) and indicate reverse enable status to other modules via a CAN message.

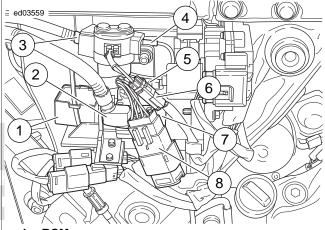
- Once the reverse enable status is acknowledged by the BCM, the BCM supplies battery voltage through the (TN/V) wire to RCM [245] terminal 3.
- 2. The RCM sends a signal to the ECM on the (TN/BE) wire.
- See Figure 7-29. When reverse is enabled, the ECM sends 5 volts to the RCM through the (TN) wire. The RCM activates the reverse control solenoid. The control solenoid activates the reverse motor solenoid causing the reverse

motor to engage and the vehicle to back up. Reverse is disabled for any of the following conditions:

- Reverse switch on LHCM is released.
- Transmission is shifted into gear.
- Engine is stopped.

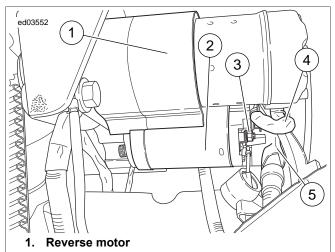
Table 7-6. Code Description

DTC	DESCRIPTION
P1772	Reverse actuator feedback low
P1775	Reverse actuator feedback error
P1777	Reverse actuator low
P1778	Reverse actuator high



- 1. RCM
- 2. 150 Amp circuit breaker [252B]
- 3. RCM solenoid [251B]
- 4. RCM solenoid [251A]
- 5. 150 Amp circuit breaker [252A]
- 6. RCM solenoid [246]
- 7. 150 Amp circuit breaker
- 8. RCM [245]

Figure 7-27. Under Right Side Cover



- 2. Reverse motor solenoid
- 3. Reverse motor solenoid terminal [248]
- 4. Reverse motor high current input terminal [249B]
- Reverse motor solenoid high current input terminal [249A]

ed03554

Figure 7-29. LHCM: Reverse Switch

Figure 7-28. Reverse Motor and Solenoid Assembly

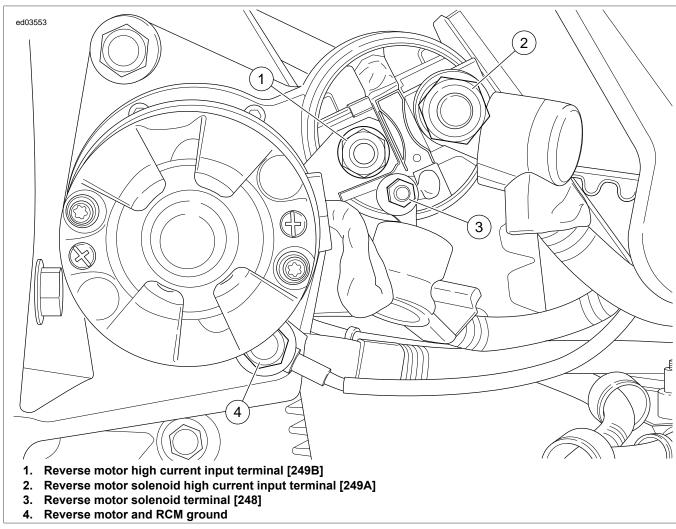


Figure 7-30. Reverse Motor and Solenoid Assembly

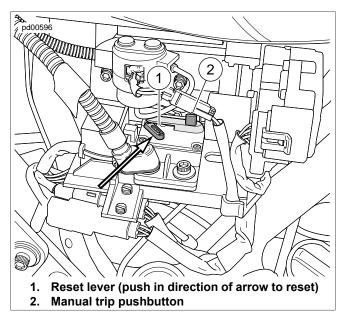


Figure 7-31. Reverse Motor Circuit Breaker

Conditions for Settings

These DTCs will set while attempting to engage reverse.

- DTC P1772 will set if ECM [78-3] terminal 4 is shorted to ground.
- DTC P1775 will set if ECM has detected an error within the reverse system.
- DTC P1777 will set if ECM [78-3] terminal 16 is shorted to ground.
- DTC P1778 will set if ECM [78-3] terminal 16 is shorted to battery voltage.

Diagnostic Tips

There is no breakout box available for testing the reverse motor system. When performing the diagnostic tests, use the HARNESS CONNECTOR TEST KIT (Part No. HD-41404) and a multimeter.

The reverse system may not work properly if battery voltage is lower than 10V. Connect battery to battery charger before performing any diagnostic tests.

Raise the rear wheels off the ground by placing jack stands under the rear axle before performing any diagnostic tests that require pushing the reverse button.

Before proceeding with diagnostic tests, make sure to do all of the following:

- Check all fuses.
- Check that battery is fully charged.
- Check that charging system is working properly.
- Trip and reset the 150 Amp circuit breaker.

NOTE

See <u>Figure 7-31</u>. The circuit breaker is manually resettable with a trip pushbutton and a reset lever.

To manually trip the circuit breaker:

- 1. Push down on the trip pushbutton.
- Reset lever will extend out.

NOTE

When the reset lever is extended as shown, the circuit breaker is open/tripped.

- To reset, press the reset lever toward the circuit breaker body until an audible click is heard and the lever is fully seated against the circuit breaker body.
- If the circuit breaker repeatedly opens under non-strenuous loading conditions, or if the reverse motor will not operate after resetting circuit breaker and checking fuses, proceed with diagnostics.

NOTES

- When the circuit breaker trips, the reverse motor pinion gear engages the ring gear. This is normal.
- There should be an audible "click" when resetting the circuit breaker. Press the reset switch until it is fully seated against the circuit breaker body.
- The reverse enable indicator may remain on while the circuit breaker is open.

It is very important that the vehicle starts and runs correctly. If the vehicle does not start and run properly, it can cause the reverse system to operate improperly.

Connector Information

For additional information about the connectors in the following diagram(s) and diagnostic procedure(s), including the color of the harness test kit terminal probes, see <u>A.1 CONNECTORS</u>.

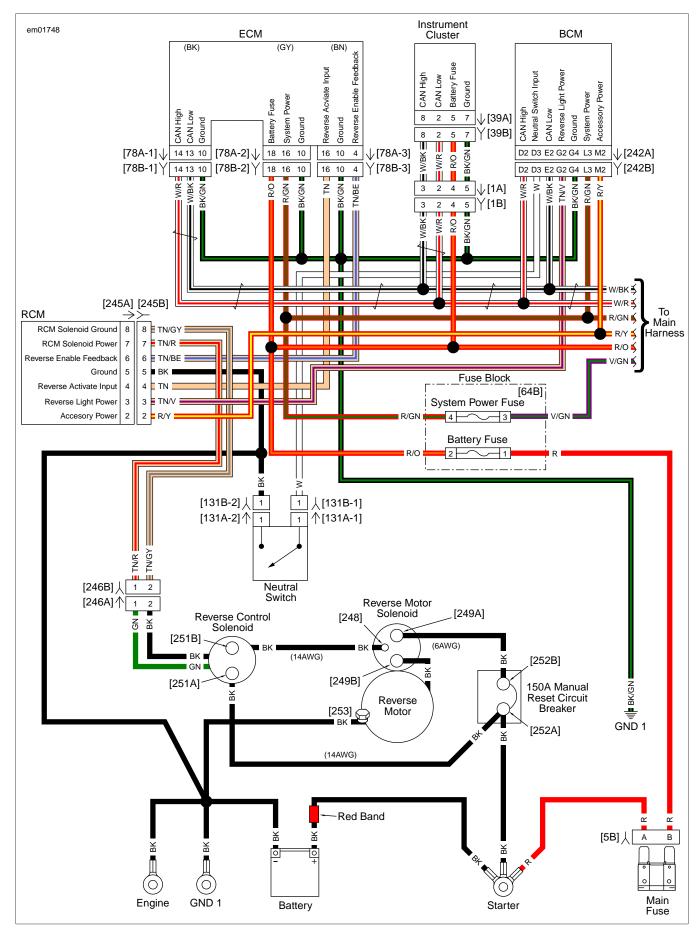


Figure 7-32. Simplified Reverse Motor System FLHTCUTG

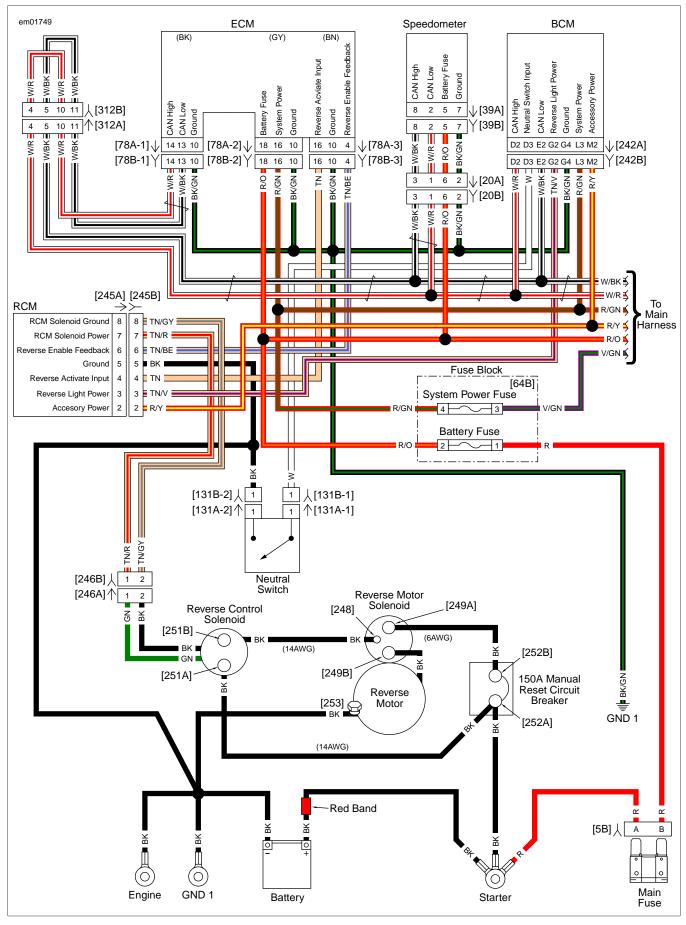


Figure 7-33. Simplified Reverse Motor System: FLRT

DTC P1772

PART NUMBER	TOOL NAME	
HD-41404	HARNESS CONNECTOR TEST KIT	
HD-50390-1	BREAKOUT BOX	
HD-50390-4	ECM CABLE	
HD-50390-4-P	ECM OVERLAY	

Table 7-7. DTC P1772 Diagnostic Faults

POSSIBLE CAUSES		
Short to ground in reverse enable feedback wire		
RCM malfunction		

1. Reverse Enable Feedback Short to Ground Test

- 1. Turn IGN OFF.
- Connect BREAKOUT BOX (Part No. HD-50390-1) and ECM CABLE (Part No. HD-50390-4) to wiring harness [78B-1], [78B-2] and [78B-3], leaving ECM [78A-1], [78A-2] and [78A-3] disconnected.
- Verify ECM OVERLAY (Part No. HD-50390-4-P) is in position on BOB.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between BOB [78-3] terminal 4 and ground.
- 5. Is continuity present?
 - a. Yes. Repair short to ground in (TN/BE) wire.
 - b. No. Go to Test 2.

2. Wiggle Test

- 1. Perform wiggle test.
- 2. Is an intermittent short present?
 - a. Yes. Repair short to ground in (TN/BE) wire. (5041)
 - b. No. Replace RCM. (6968)

DTC P1775

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM/RADIO CABLE
HD-50390-2-P	BCM/RADIO OVERLAY
HD-50390-4	ECM CABLE
HD-50390-4-P	ECM OVERLAY

Table 7-8. DTC P1775 Diagnostic Faults

POSSIBLE CAUSES	
Open in reverse enable feedback wire	
Open in backup light power	
RCM malfunction	

1. Reverse Enable Feedback Short to Voltage Test

- 1. Turn IGN OFF.
- Connect BREAKOUT BOX (Part No. HD-50390-1) and ECM CABLE (Part No. HD-50390-4) to wiring harness [78B-1], [78B-2] and [78B-3], leaving ECM [78A-1], [78A-2] and [78A-3] disconnected.
- 3. Verify ECM OVERLAY (Part No. HD-50390-4-P) is in position on BOB.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between BOB [78-3] terminal 4 and ground.
- 5. Turn IGN ON.
- 6. Is voltage present?
 - a. Yes. Repair short to voltage in (TN/BE) wire
 - b. No. Go to Test 2.

2. Reverse Enable Feedback Open Test

- 1. Turn IGN OFF.
- 2. Disconnect RCM [245].
- 3. Test continuity between BOB [78-3] terminal 4 and RCM [245B] terminal 6.
- 4. Is continuity present?
 - a. Yes. Go to Test 3.
 - b. No. Repair open in (TN/BE) wire.

3. Backup Light Power Open Test

- 1. Remove ECM BOB and connect all [78].
- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM/RADIO CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- 3. Verify BCM/RADIO OVERLAY (Part No. HD-50390-2-P) is in position on BOB.

- 4. Test continuity between BOB terminal G2 and RCM [245B] terminal 3.
- 5. Is continuity present?
 - a. Yes. Go to Test 4.
 - b. **No.** Repair open in (TN/V) wire. (5041)

4. Backup Light Power Short to Ground Test

- 1. Test continuity between BOB terminal G2 and ground.
- 2. Is continuity present?
 - a. Yes. Repair short to ground in (TN/V) wire. (5041)
 - b. No. Go to Test 5.

5. Backup Light Power Short to Voltage Test

- 1. Test voltage between BOB terminal G2 and ground.
- 2. Turn IGN ON.
- 3. Is voltage present?
 - a. Yes. Repair short to voltage in (TN/V) wire. (5041)
 - b. No. Go to Test 6.

6. Wiggle Test

- Perform wiggle test.
- 2. Is an intermittent open or short present?
 - a. Yes. Repair open/short in (TN/BE) or (TN/V) wire. (5041)
 - b. No. Replace RCM. (6968)

DTC P1777

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-4	ECM CABLE
HD-50390-4-P	ECM OVERLAY

Table 7-9. DTC P1777 Diagnostic Faults

POSSIBLE CAUSES	
Short to ground in reverse actuator input wire	
RCM malfunction	

1. Reverse Actuator Input Short to Ground Test

- 1. Turn IGN OFF.
- Connect BREAKOUT BOX (Part No. HD-50390-1) and ECM CABLE (Part No. HD-50390-4) to wiring harness [78B-1], [78B-2] and [78B-3], leaving ECM [78A-1], [78A-2] and [78A-3] disconnected.
- 3. Verify ECM OVERLAY (Part No. HD-50390-4-P) is in position on BOB.

- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between BOB [78-3] terminal 16 and ground.
- 5. Is continuity present?
 - a. Yes. Repair short to ground in (TN) wire.
 - b. No. Go to Test 2.

2. Wiggle Test

- 1. Perform wiggle test.
- 2. Is an intermittent short present?
 - a. Yes. Repair short to ground in (TN) wire. (5041)
 - b. No. Replace RCM. (6968)

DTC P1778

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-4	ECM CABLE
HD-50390-4-P	ECM OVERLAY

Table 7-10. DTC P1778 Diagnostic Faults

POSSIBLE CAUSES	
Short to voltage in reverse actuator input wire	
RCM malfunction	

1. Reverse Actuator Input Short to Voltage Test

- 1. Turn IGN OFF.
- Connect BREAKOUT BOX (Part No. HD-50390-1) and ECM CABLE (Part No. HD-50390-4) to wiring harness [78B-1], [78B-2] and [78B-3], leaving ECM [78A-1], [78A-2] and [78A-3] disconnected.
- 3. Verify ECM OVERLAY (Part No. HD-50390-4-P) is in position on BOB.
- 4. Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between BOB [78-3] 16 and ground.
- 5. Turn IGN ON.
- 6. Is voltage present?
 - a. Yes. Repair short to voltage in (TN) wire.
 - b. No. Go to Test 2.

2. Wiggle Test

- 1. Perform wiggle test.
- 2. Is an intermittent short to voltage present?
 - a. Yes. Repair short to voltage in (TN) wire. (5041)
 - b. No. Replace RCM. (6968)

REVERSE MOTOR SPINS BUT DOES NOT DRIVE

Table 7-11. Reverse Motor Spins But Does Not Drive Diagnostic Faults

POSSIBLE CAUSES	
Ring gear malfunction	
Reverse motor malfunction	
Reverse motor solenoid malfunction	

1. Ring Gear Test

- 1. Inspect ring gear for damage.
- 2. Is damage present?
 - a. Yes. Replace ring gear. (1824)
 - b. No. Go to Test 2.

2. Reverse Motor Solenoid Test

- Perform reverse motor solenoid test. See <u>7.16 REVERSE</u> MOTOR TESTING, Reverse Motor Solenoid.
- 2. Did reverse motor solenoid pass the test?
 - a. Yes. Replace reverse motor. (1825)
 - b. No. Replace reverse motor solenoid. (1832)

REVERSE MOTOR STALLS OR SPINS TOO SLOWLY

Table 7-12. Reverse Motor Stalls or Spins Too Slowly Diagnostic Faults

POSSIBLE CAUSES
Manual circuit breaker malfunction
Reverse motor malfunction
Reverse motor solenoid malfunction
Mechanical malfunction

1. Circuit Breaker Test

- 1. Inspect circuit breaker.
- 2. Reset if necessary.
- Perform voltage drop test from battery positive to reverse motor solenoid terminal [249B] with reverse motor engaged.
- 4. Is voltage drop greater than 1 volt?
 - a. Yes. Go to Test 2.
 - b. No. Go to Test 6.

2. Reverse Motor Solenoid Voltage Drop Test

 Perform voltage drop test from battery positive to reverse motor solenoid terminal [249A] with reverse motor engaged.

- 2. Is voltage drop greater than 1 volt?
 - a. Yes. Go to Test 3.
 - b. No. Replace reverse motor solenoid. (1832)

3. Reverse Motor Solenoid Circuit Test

- Perform voltage drop test from battery positive to reverse motor solenoid terminal [252B] with reverse motor engaged.
- 2. Is voltage drop greater than 1 volt?
 - a. Yes. Go to Test 4.
 - No. Repair/replace circuit breaker to reverse motor solenoid wire. (5041)

4. Circuit Breaker Voltage Drop Test

- Perform voltage drop test from battery positive to reverse motor solenoid terminal [252A] with reverse motor engaged.
- Is voltage drop greater than 1 Volt?
 - a. Yes. Go to Test 5.
 - b. No. Replace circuit breaker. (1834)

5. Vehicle Starter Test

- Perform voltage drop between battery positive and the high current power from the vehicle starter.
- 2. Is voltage drop greater than 1 Volt?
 - a. **Yes.** Repair/replace vehicle starter to battery positive wire. **(5041)**
 - No. Repair/replace vehicle starter to circuit breaker wire. (5041)

6. Ground Circuit Test

- 1. Perform voltage drop between battery negative and reverse motor mounting bolts with reverse motor engaged.
- 2. Is voltage drop greater than 1 Volt?
 - Yes. Clean/repair mounting bolts and mounting surface or ground cable from transmission case to reverse motor mounting bolt. (5041)
 - b. No. Go to Test 7.

7. Reverse Motor Current Draw On Vehicle Test

- Perform reverse motor current draw test on vehicle. See 7.16 REVERSE MOTOR TESTING.
- Are test results within range?
 - a. Yes. Go to Test 8.
 - b. No. Go to Test 9.

8. Reverse Motor Test

 Perform reverse motor solenoid test. See <u>7.16 REVERSE</u> <u>MOTOR TESTING</u>, <u>Reverse Motor Solenoid</u>.

- 2. Did reverse motor solenoid pass the test?
 - a. Yes. Replace reverse motor. (1828)
 - No. Replace reverse motor solenoid. (1832)

9. Reverse Motor Free Running Current Draw Test

- Perform reverse motor free running current draw bench test. See <u>7.16 REVERSE MOTOR TESTING</u>, <u>Testing</u> <u>Reverse Motor on Bench</u>.
- 2. Are tests results within range?
 - a. Yes. Repair source of mechanical bind. (1827)
 - b. No. Replace reverse motor. (1828)

REVERSE MOTOR RUNS ON

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT

Table 7-13. Reverse Motor Runs On Diagnostic Faults

POSSIBLE CAUSES	
Reverse motor malfunction	
Reverse motor solenoid malfunction	
Short to voltage in ground circuit	
Reverse switch malfunction	

1. Reverse Solenoid Control Circuit Test

- 1. Trip circuit breaker.
- 2. Disconnect reverse motor solenoid [248]
- 3. Reset circuit breaker.
- 4. Turn IGN ON.
- 5. Does reverse motor continue to run on?
 - a. Yes. Replace reverse motor solenoid. (1818)
 - b. No. Go to Test 2.

2. RCM Solenoid Circuit Test

- 1. Turn IGN OFF.
- 2. Disconnect [246].
- 3. Turn IGN ON.
- With the reverse drive button not pushed and using HAR-NESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between [248] and ground.
- 5. Is battery voltage present?
 - a. Yes. Go to Test 3.
 - b. No. Go to Test 4.

3. Reverse Motor Solenoid Control Circuit Test

- 1. Turn IGN OFF.
- Disconnect [251].

- 3. Turn IGN ON.
- With the reverse drive button not pushed, test voltage between [248] and ground.
- 5. Is battery voltage present?
 - a. Yes. Repair short to voltage on (BK) wire. (5041)
 - b. No. Replace RCM solenoid. (1818)

4. RCM Solenoid Control Circuit Test

- 1. Turn IGN OFF.
- 2. Disconnect [245].
- 3. Turn IGN ON.
- With the reverse drive button not pushed, test voltage between [246B] and ground.
- 5. Is battery voltage present?
 - a. Yes. Repair short to voltage on (TN/R) wire. (5041)
 - b. No. Replace RCM. (1822)

REVERSE MOTOR INOPERATIVE

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM/RADIO CABLE
HD-50390-2-P	BCM/RADIO OVERLAY
HD-50390-4	ECM CABLE
HD-50390-4-P	ECM OVERLAY

Table 7-14. Reverse Motor Inoperative Diagnostic Faults

POSSIBLE CAUSES
RCM malfunction
Reverse motor malfunction
Reverse motor solenoid malfunction
Short to voltage in ground circuit
Reverse switch malfunction

1. Reverse Switch Function Test

- Verify conditions are correct to enable reverse. See 7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS.
- 2. Start engine.
- 3. Activate reverse button on LHCM.
- 4. Does reverse indicator illuminate?
 - a. Yes. Solid "R". Go to Test 2.
 - b. Yes. Flashing "R". Go to Test 15.
 - c. No. See 7.17 INDICATOR LAMP DIAGNOSTICS.

2. RCM Circuit Test

- With reverse drive button pressed and using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between reverse motor solenoid [248] and ground.
- 2. Is voltage greater than 10.0V?
 - a. Yes. Go to Test 3.
 - b. No. Go to Test 6.

3. Reverse Motor High Current Circuit Test

- With reverse button pressed, test voltage between reverse motor solenoid [249B] and ground.
- 2. Is voltage greater than 10.0V?
 - a. Yes. Go to Test 4.
 - b. No. Go to Test 12.

4. Ground Circuit Test

- 1. Turn IGN OFF.
- Test continuity between reverse motor mounting bolt [253] and ground.
- 3. Is continuity present?
 - a. Yes. Go to Test 5.
 - No. Clean/repair mounting bolts and mounting surface. (5041)

5. Reverse Motor Solenoid Test

- 1. Perform the reverse motor solenoid test. See 7.16 REVERSE MOTOR TESTING.
- 2. Did reverse motor solenoid pass the test?
 - a. Yes. Replace reverse motor. (1828)
 - b. No. Replace reverse motor solenoid. (1832)

6. Reverse Motor Control Circuit Test

- Start engine.
- With reverse button pressed, test voltage at between reverse control solenoid [251A & B] and ground.
- 3. Is voltage greater than 10.0V at both terminals?
 - Yes. Repair open between [251B] and [248] (BK) wire. (5041)
 - b. No, only terminal [251A]. Go to Test 7.
 - c. No, neither terminal. Go to Test 11.

7. RCM Solenoid Control Circuit Test

- 1. Turn IGN OFF.
- 2. Disconnect [246].
- 3. Start engine.
- With reverse switch pressed, test voltage between [246B] terminal 1 (TN/R) wire and ground.

- 5. Is voltage greater than 10.0V?
 - a. Yes. Go to Test 8.
 - b. No. Go to Test 10.

8. RCM Solenoid Ground Circuit Test

- 1. Turn IGN OFF.
- 2. Test resistance between [246B] terminal 2 and ground.
- Is resistance less than 1 Ohm?
 - a. Yes. Replace RCM solenoid. (1832)
 - b. No. Go to Test 9.

9. RCM Ground Circuit Test

- Disconnect [245].
- 2. Test resistance between [245B] terminal 8 and [246B] terminal 2 (TN/GY).
- 3. Is resistance less than 0.5 Ohm?
 - a. Yes. Replace RCM. (1831)
 - b. No. Repair open in (TN/GY) wire. (5041)

10. RCM Solenoid Control Circuit Open Test

- Turn IGN OFF.
- 2. Disconnect RCM [245].
- 3. Test resistance between [246B] terminal 1 and [245B] terminal 7 (TN/R).
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Replace RCM.
 - b. No. Repair open in (TN/R) wire. (5041)

11. Circuit Breaker Supply Voltage Test

- 1. Test voltage between circuit breaker [252A] and ground.
- 2. Is voltage greater than 10.0V?
 - Yes. Repair open between [251A] and [252A] (BK) wire. (5041)
 - No. Repair open between [252A] and starter (BK) wire. (1830)

12. Reverse Motor Solenoid Test

- 1. Start engine.
- 2. With reverse button pressed, test voltage between reverse motor solenoid [249A] and ground.
- 3. Is voltage greater than 10.0V?
 - a. Yes. Replace reverse motor solenoid. (1832)
 - b. No. Go to Test 13.

13. Reverse Motor Circuit Solenoid Test

1. With reverse button pressed, test voltage between circuit breaker [252B] and ground.

- 2. Is voltage greater than 10.0V?
 - a. **Yes.** Repair open between [249A] and [252B] (BK) wire. **(5041)**
 - b. No. Go to Test 14.

14. Circuit Breaker Test

- With reverse button pressed, test voltage between circuit breaker [252A] and ground.
- 2. Is voltage greater than 10.0V?
 - a. Yes. Replace circuit breaker. (1834)
 - b. **No.** Repair open in (BK) wire between [252A] and starter. **(5041)**

15. Neutral Circuit Test

- 1. Verify transmission is in neutral.
- 2. Is neutral lamp functional?
 - a. Yes. Go to Test 16.
 - b. No. See neutral lamp diagnostics.

16. Accessory Circuit Open Test

- 1. Turn IGN OFF.
- 2. Disconnect RCM [245].
- 3. Turn IGN ON.
- 4. Test voltage between [245B] terminal 2 (R/Y) wire and ground.
- 5. Is voltage greater than 10.0V?
 - a. Yes. Go to Test 17.
 - b. No. Repair open in (R/Y) wire. (5043)

17. Ground Circuit Open Test

- 1. Turn IGN OFF.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test resistance between RCM [245B] terminal 5 and ground (BK) wire.
- 3. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 18.
 - b. No. Repair open in (BK) wire. (5041)

18. Backup Light Power Test

- 1. Connect [245].
- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM/RADIO CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.

- 3. Verify BCM/RADIO OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- 4. Start engine.
- With reverse button pressed, test voltage between BOB terminal G2 and ground.
- 6. Is voltage greater than 10.0V?
 - a. Yes. Go to Test 19.
 - b. No. Replace BCM.

19. Reverse Enable Feedback Test

- Turn IGN OFF.
- 2. Remove BCM BOB, and connect [242].
- Connect BREAKOUT BOX (Part No. HD-50390-1) and ECM CABLE (Part No. HD-50390-4) between wire harness [78B-1], [78B-2], [78B-3] and ECM [78A-1], [78A-2], [78A-3].
- 4. Verify ECM OVERLAY (Part No. HD-50390-4-P) is in position on BOB.
- 5. Start engine.
- 6. With reverse button pressed, test voltage between BOB [78-3] terminal 4 and [78-2] terminal 18.
- 7. Is voltage greater than 10.0V?
 - a. Yes. Go to Test 20.
 - b. No. Replace RCM.

20. Reverse Activate Test

- 1. Press reverse button two times, test voltage between BOB [78-3] terminal 16 and ground.
- 2. Is voltage between 4-6V?
 - a. Yes. Go to Test 21.
 - b. No. Replace ECM.

21. Reverse Activate Input Open Test

- 1. Turn IGN OFF.
- 2. Disconnect RCM [245].
- 3. Test resistance between BOB [78-3] terminal 16 and [245B] terminal 4.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Replace RCM.
 - b. No. Repair open in (TN) wire. (5041)

REVERSE MOTOR TESTING

TESTING REVERSE MOTOR ON MOTORCYCLE

Reverse Motor Current Draw Test

NOTE

Make sure the battery is fully charged.

See Figure 7-34. Check reverse motor current draw with an induction ammeter before disconnecting battery.

- Raise rear wheels of vehicle off the ground. See 1.2 LIFTING MOTORCYCLE WITH A JACK.
- 2. Verify the transmission is in neutral.
- 3. Clamp induction ammeter over positive battery cable next to reverse motor.
- 4. Start engine.
- 5. Activate reverse motor controls while reading ammeter.
 - Typical reverse motor current draw is approximately 90 Amperes.
 - b. If current draw exceeds 150 Amperes, the problem may be in the reverse motor or reverse motor drive. Remove reverse motor for further tests. See 7.16 REVERSE MOTOR TESTING, Testing Reverse Motor on Bench.

NOTE

Use a DC current probe if an induction ammeter is not available.

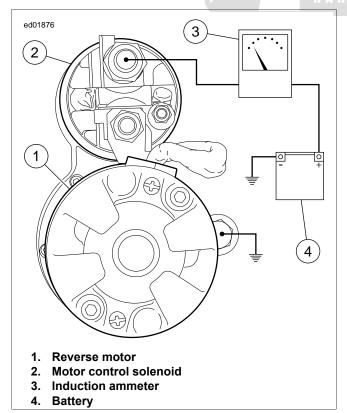


Figure 7-34. Reverse Motor Current Draw Test

TESTING REVERSE MOTOR ON BENCH

Free Running Current Draw Test

- 1. Place reverse motor in vise, using a clean shop towel to prevent scratches or other damage.
- 2. See <u>Figure 7-35</u>. Attach one heavy jumper cable (6 gauge minimum).
 - a. Connect one end to the starter mounting flange.
 - Connect the other end to the negative (-) terminal of a fully charged battery.
- 3. Connect a second heavy jumper cable (6 gauge minimum).
 - a. Connect one end to the positive (+) terminal of the battery.
 - Connect the other end to the battery terminal 4 on the reverse motor solenoid. Place an induction ammeter over cable.
- 4. Connect a smaller jumper cable (14 gauge minimum).
 - Connect one end to the positive (+) terminal of the battery.
 - b. Connect the other end to the solenoid relay terminal.
- 5. Check ammeter reading.
 - a. Ammeter should show 90 Amps maximum.
 - If reading is higher, replace the reverse motor assembly.
 - c. If starter current draw on the vehicle was over 150 Amps and this test was within specification, there may be a problem with the mechanical components of the reverse drive.

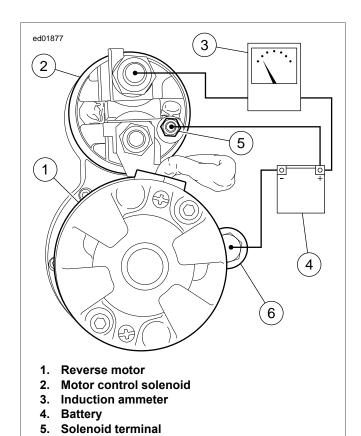


Figure 7-35. Free Running Current Draw Test

REVERSE MOTOR SOLENOID

Mounting flange bolt

Do not disassemble solenoid. Before testing, disconnect field wire from motor terminal as shown in Figure 7-36.

To prevent damage to the solenoid, perform each test for only three to five seconds.

Perform the solenoid pull-in, hold-in, and return tests together in one continuous operation. Conduct all three tests one after the other in the sequence given without interruption.

SOLENOID PULL-IN TEST

- See <u>Figure 7-36</u>. Use a 12 Volt battery and connect three separate test leads as follows:
 - a. Solenoid housing to negative battery post.
 - b. Solenoid motor terminal to negative battery post.
 - c. Solenoid relay terminal to positive battery post.
- 2. Observe reverse motor pinion.
 - a. If reverse motor pinion extends strongly, solenoid is working properly.
 - If reverse motor pinion does not extend strongly, replace the solenoid.

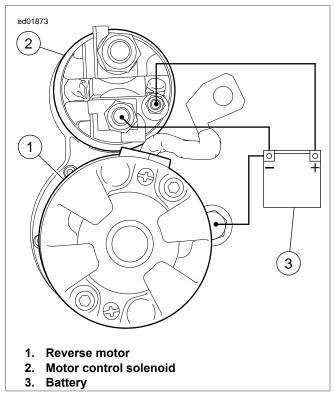


Figure 7-36. Pull-In Test

SOLENOID HOLD-IN TEST

- See Figure 7-37. With test leads still connected in the manner specified in 7.16 REVERSE MOTOR TESTING, Solenoid Pull-In Test, disconnect solenoid motor terminal/battery negative test lead at negative battery post only; reconnect loose end of this test lead to positive battery post.
- 2. Observe reverse motor pinion.
 - a. If reverse motor pinion remains extended, solenoid is working properly.
 - b. If reverse motor pinion retracts, replace the solenoid.

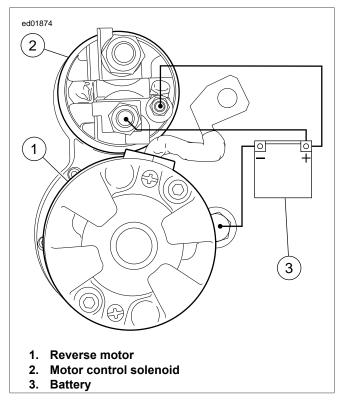


Figure 7-37. Hold-In Test

SOLENOID RETURN TEST

 See <u>Figure 7-38</u>. With test leads still connected in the manner specified at the end of <u>7.16 REVERSE MOTOR</u> <u>TESTING</u>, <u>Solenoid Hold-In Test</u>, disconnect solenoid relay terminal/positive battery post test lead at either end.

- 2. Observe reverse motor pinion.
 - If reverse motor pinion retracts, solenoid is working properly.
 - b. If reverse motor pinion does not retract, replace the solenoid.

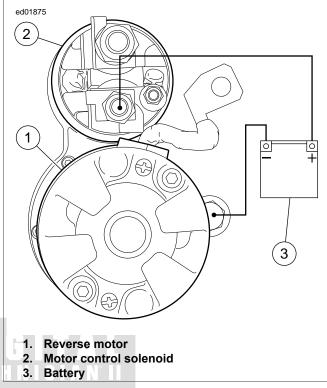


Figure 7-38. Return Test

INDICATOR LAMP DIAGNOSTICS

DESCRIPTION AND OPERATION

See <u>Figure 7-39</u>. These are several gauges with indicators in each gauge. These are integral to the gauges and are con-

trolled through messages over the CAN bus and the HD-Link communication systems.

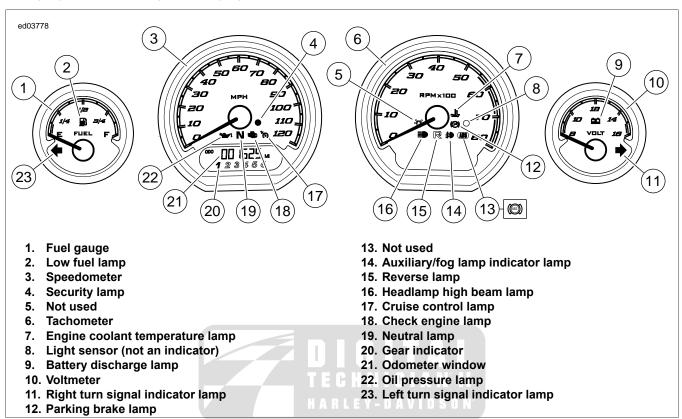
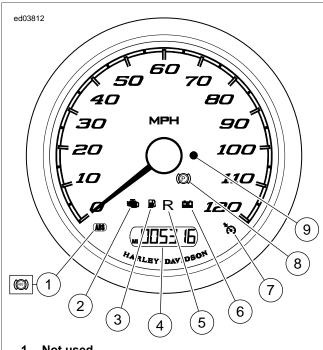


Figure 7-39. Indicator Lamps: FLHTCUTG



- 1. Not used
- 2. Check engine lamp
- 3. Low fuel lamp
- 4. Odometer window
- 5. Reverse lamp
- 6. Battery discharge lamp
- 7. Cruise control lamp
- 8. Parking brake lamp
- 9. Security lamp

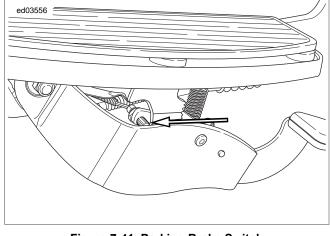


Figure 7-41. Parking Brake Switch

Diagnostic Tips

If an indicator lamp is inoperative, perform a WOW test to verify the lamp illuminates.

Connector Information

For additional information about the connectors in the following diagram(s) and diagnostic procedure(s), including the color of the harness test kit terminal probes, see A.1 CONNECTORS.



Parking Brake Lamp

The parking brake switch opens when the parking brake is engaged. This illuminates the parking brake indicator.

The parking brake indicator is controlled through the (TN/GN) wire connected to the IM (FLHTCUTG) or BCM (FLRT). When ground is removed from [39] terminal 4, the IM (FLHTCUTG) or [242] terminal D4, the BCM (FLRT) illuminates the parking brake indicator.

Table 7-15. Parking Brake Specification

SENSOR	SPECIFICATION
Gap	0.177-0.197 in (4.5-5.0 mm)

Reverse Lamp

Upon enabling reverse function, the ECM will activate the reverse telltale lamp located in the IM through a CAN message. Solid "R" indicates conditions for engaging reverse are met. Flashing "R" indicates conditions for engaging reverse are NOT met.

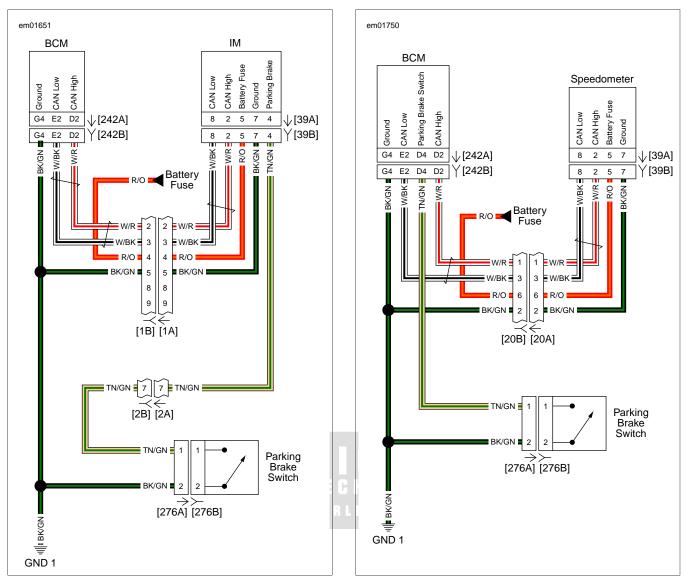


Figure 7-42. Parking Brake Switch Circuit: FLHTCUTG

Figure 7-43. Parking Brake Switch Circuit: FLRT

PARKING BRAKE LAMP ALWAYS ON

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-42682	BREAKOUT BOX
HD-46601	BREAKOUT BOX ADAPTERS
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM/RADIO CABLE
HD-50390-2-P	BCM/RADIO OVERLAY

Table 7-16. Parking Brake Lamp Always On Diagnostic Faults

POSSIBLE CAUSES	
Open in parking brake switch circuit	
Parking brake switch malfunction	
Incorrect gap between sensor and magnet	
Missing magnet	

NOTE

Before testing, verify the following:

- The magnet is present.
- The gap between sensor and magnet is within specification when parking brake is released.

1. Parking Brake Circuit Test

- 1. Release parking brake.
- 2. Does parking brake lamp turn off?
 - a. Yes. Test for intermittent. Perform wiggle test.
 - b. No. Go to Test 2.

2. Switch Test

- 1. Turn IGN OFF.
- 2. Disconnect parking brake switch [276].
- 3. Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), jumper between [276A] terminals 1 and 2.
- 4. Turn IGN ON.
- 5. Did parking brake lamp turn off?
 - a. Yes. Replace parking brake switch. (6020)
 - b. No. Go to Test 3.

3. Open BK/GN Test

- 1. Turn IGN OFF.
- 2. Remove jumper from [276A].
- Test resistance between [276A] terminal 2 and ground (BK/GN).

- 4. Is resistance greater than 0.5 Ohms?
 - Yes. Repair open between [276A] terminal 2 and ground (TN/GN). (5041)
 - b. No. FLHTCUTG Go to Test 4.
 - c. No. FLRT Go to Test 5.

4. Open TN/GN at [39] Test

- Connect BREAKOUT BOX ADAPTERS (Part No. HD-46601) to [39]. Attach connectors from BREAKOUT BOX (Part No. HD-42682) to harness adapters, leaving [39A] disconnected.
- Test resistance between BOB terminal 4 and [276A] terminal 1 (TN/GN).
- 3. Is resistance greater than 0.5 Ohms?
 - Yes. Repair open between [276A] terminal 1 and IM [39B] terminal 4 (TN/GN). (5041)
 - b. No. Replace IM.

5. Open TN/GN at [242] Test

- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM/RADIO CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- Verify BCM/RADIO OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- 3. Test resistance between BOB terminal D4 and [276A] terminal 1 (TN/GN).
- 4. Is resistance greater than 0.5 Ohms?
 - a. **Yes.** Repair open between [276A] terminal 1 and [242B] terminal D4 (TN/GN). **(5041)**
 - b. No. Go to Test 6.

6. BCM Test

- Turn IGN ON.
- 2. Does parking brake lamp illuminate?
 - a. Yes. Replace speedometer.
 - b. No. Replace BCM.

PARKING BRAKE LAMP INOPERATIVE

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT

Table 7-17. Parking Brake Lamp Inoperative Diagnostic Faults

POSSIBLE CAUSES
Parking brake switch malfunction
Short to ground in parking brake circuit

1. Parking Brake Switch Test

- 1. Turn IGN OFF.
- 2. Disconnect parking brake switch [276].

- 3. Turn IGN ON.
- 4. Did parking brake lamp turn ON?
 - a. Yes. Replace parking brake switch. (6020)
 - b. No. FLHTCUTG Go to Test 2.
 - c. No. FLRT Go to Test 3.

2. Grounded TN/GN at [39] Test

- 1. Turn IGN OFF.
- 2. Disconnect speedometer [39].
- 3. Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between [276A] terminal 1 and ground.
- 4. Is continuity present?
 - a. **Yes.** Repair short to ground between [276A] terminal 1 and ground. **(5041)**
 - b. No. Replace IM.

3. Grounded TN/GN at [242] Test

- 1. Turn IGN OFF.
- 2. Disconnect BCM [242].
- 3. Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between [276A] terminal 1 and ground.
- 4. Is continuity present?
 - a. **Yes.** Repair short to ground between [276A] terminal 1 and ground. **(5041)**
 - b. No. Replace BCM.

REVERSE INDICATOR LAMP ALWAYS ON

Table 7-18. Reverse Indicator Lamp Always On Diagnostic Faults

POSSIBLE CAUSES

Indicator malfunction

1. Reverse Indicator Function Test

- 1. Operate reverse switch.
- 2. Does reverse mode function correctly?
 - a. Yes. Replace IM. (6020)
 - b. No. See reverse DTCs.

REVERSE INDICATOR LAMP INOPERATIVE

Table 7-19. Reverse Indicator Lamp Inoperative Diagnostic Faults

POSSIBLE CAUSES

Indicator malfunction

Reverse circuit

1. Reverse Indicator Function Test

- 1. Operate reverse switch.
- 2. Does reverse mode function correctly?
 - a. Yes. Replace IM. (6020)
 - b. No. See reverse DTCs.

REAR LIGHTING DIAGNOSTICS

REAR LIGHTING

General

See Figure 7-45. The rear lighting system uses two similar tail lamp assemblies and an independent license plate lamp assembly. The tail lamps function as brake, running and turn signals.

Rear Running Lamps

The bulb type tail lamp assemblies use one dual-filament bulb each.

- One filament is for running lights and the other is for brake and turn indication.
- The running lights are powered through the lighting fuse.
- The license plate lamp is a single filament bulb and operates with the running lights.
- Tail lamps and the license plate lamp illuminate when the ignition switch is ON.

Brake Lamps and Rear Turn Signals

Brake and rear turn indicators use the same lamps in the tail lamp assemblies, but different filaments. Pressing the brake pedal or actuating the front brake lever causes the brake lamps to illuminate. Applying brakes during a turn will illuminate the opposite lamp from the indicating signal, if a signal has been selected. When indicating a right or left turn, the appropriate signal lamp flashes regardless of brakes being applied.

LED Tail Lamps

LED tail lamp assemblies are 4-wire devices. Power is supplied by the BCM.

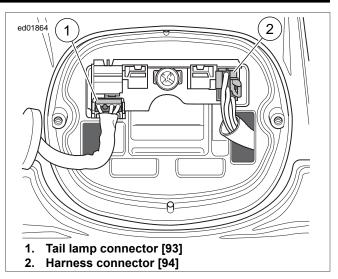


Figure 7-44. Tail Lamp Assembly (Bulb)

DIAGNOSTICS

PART NUMBER	TOOL NAME
HD-39978	DIGITAL MULTIMETER (FLUKE 78)

When performing the diagnostic tests, use a DIGITAL MULTI-METER (FLUKE 78) (Part No. HD-39978) or equivalent, for voltage and resistance measurements, and where possible, amperage.

Diagnostic Tips

- Rear turn signals work in tandem with the front turn signals. If the rear or front turn signal lamp does not illuminate when it should, check the integrity of the bulb or light for the front LED turn signals in the affected turn signal before proceeding with the diagnostics.
- If the brake lamps and license plate lamp are inoperative at the same time, check the fuse. Other accessories will also be inoperative at that time.
- Lighting ground is through the lighting harness to the vehicle frame. Make sure the ground connections are good before replacing parts and assemblies.

Connector Information

For additional information about the connectors in the following diagram(s) and diagnostic procedure(s), including the color of the harness test kit terminal probes, see <u>A.1 CONNECTORS</u>.

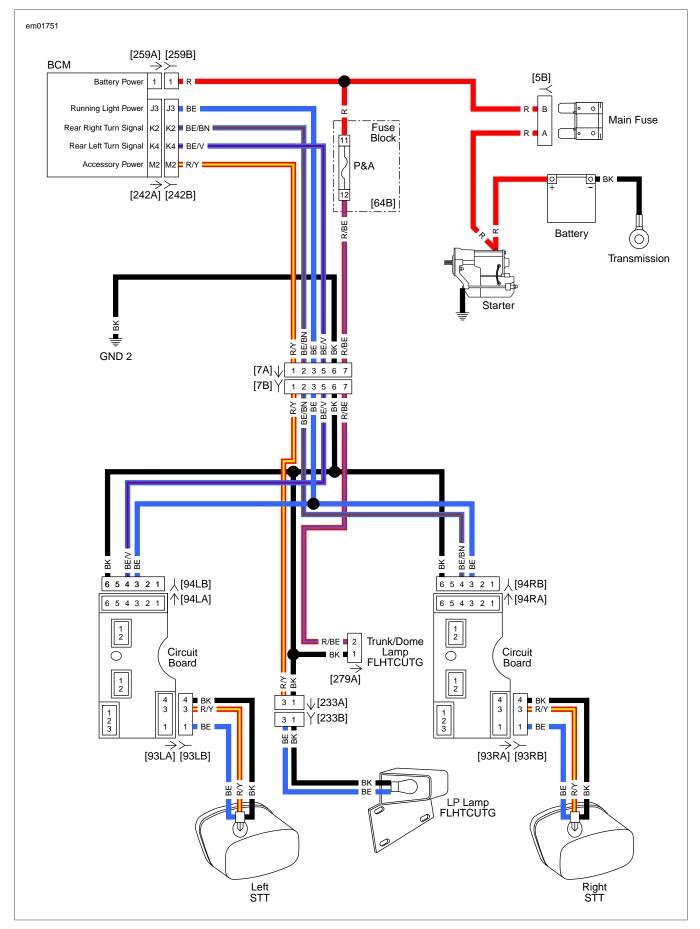


Figure 7-45. Rear Lighting System (Bulb)

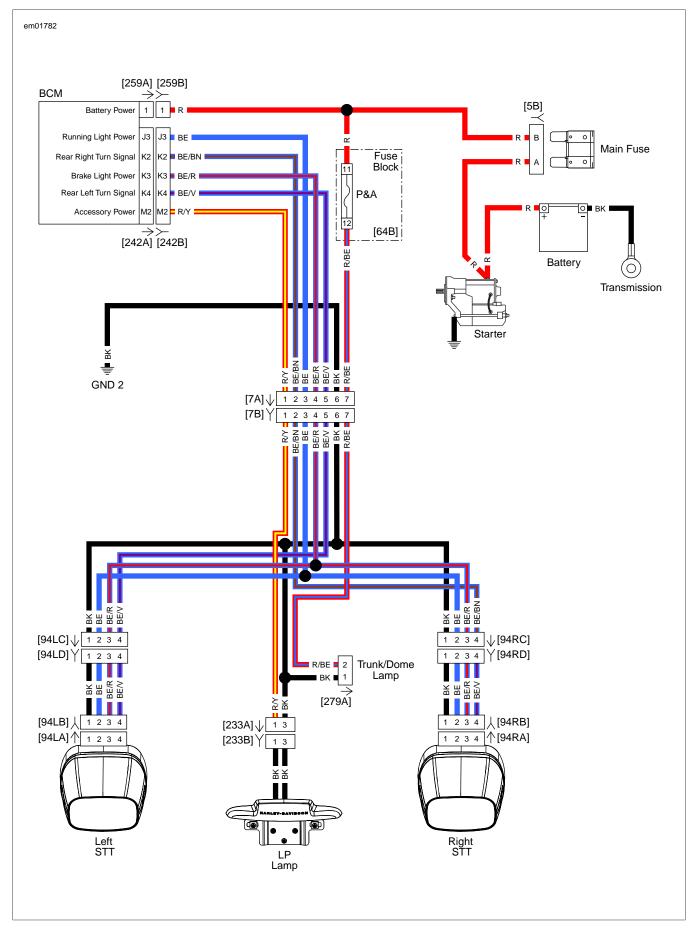


Figure 7-46. Rear Lighting System (LED)

BRAKE LAMPS INOPERATIVE

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM CABLE
HD-50390-2-P	BCM OVERLAY

Table 7-20. Stop Lamp Inoperative Diagnostic Faults

POSSIBLE CAUSES
Open power to switch circuit
Open ground circuit
Open stop lamp circuit
Stop lamp malfunction
Rear stop lamp switch malfunction
RHCM malfunction

1. Stop Lamp Switch Test

- 1. Apply front brake while observing stop lamp.
- 2. Apply rear brake while observing stop lamp.
- 3. Does stop lamp illuminate?
 - a. Yes. Stop lamp illuminates only with front brake applied. Go to Test 2.
 - b. Yes. Stop lamp illuminates only with rear brake applied. Go to Test 5.
 - c. No. One or both stop lamps fail to illuminate. <u>Go</u> to <u>Test 6.</u>

2. Brake Switch Test

- 1. Disconnect rear stop lamp switch [121-1] and [121-2].
- 2. Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), jumper [121B-1] to [121B-2].
- 3. Turn IGN ON.
- 4. Is brake lamp on?
 - a. **Yes.** Replace stop lamp switch.
 - b. No. Go to Test 3.

3. Brake Switch Ground Test

- 1. Jumper [121B-1] terminal 1 (BE/GN) wire to ground.
- 2. Is brake lamp on?
 - a. **Yes.** Repair open between [121B-2] (BK) wire and ground.
 - b. No. Go to Test 4.

4. Brake Switch Input Test

- 1. Turn IGN OFF.
- 2. Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.

- 3. Verify BCM OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Test resistance between BOB terminal F3 and [121B-1] terminal 1 (BE/GN) wire.
- 5. Is resistance less than 0.5 Ohm?
 - a. Yes. Replace BCM.
 - b. **No.** Repair open between [242B] terminal F3 and [121B-1] (BE/GN) wire.

5. RHCM Test

- 1. Turn IGN OFF.
- 2. Disconnect [22].
- 3. Connect known good RHCM to [22].
- 4. Turn IGN ON.
- 5. Apply front brake lever.
- 6. Does stop lamp illuminate?
 - a. Yes. Replace RHCM.
 - b. No. Replace BCM.

6. Bulb Test

- 1. Inspect inoperative bulb.
- Is bulb good?
 - a. Yes. Go to Test 7.
 - b. No. Lamp is an LED. Go to Test 10.
 - c. No. Replace bulb. (5197)

7. Inoperative Lamp Voltage Test

- 1. Disconnect tail lamp [93] on inoperative side.
- 2. Turn IGN ON.
- 3. Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between [93] terminal 3 and ground while activating front or rear brake controls.
- 4. Is battery voltage present?
 - a. Yes. Go to Test 8.
 - b. No. Replace circuit board on inoperative side. (5215)

8. Inoperative Lamp Ground Circuit Test

- 1. Turn IGN OFF.
- 2. Test resistance between [93A] terminal 4 (BK) and ground.
- 3. Is resistance less than 0.5 Ohms?
 - a. Yes. Repair or replace bulb socket assembly. (5215)
 - b. No. Go to Test 9.

9. Circuit Board Ground Test

- Disconnect rear fender lights [94].
- 2. Test resistance between [94B] terminal 6 and ground.

- 3. Is resistance less than 0.5 Ohms?
 - a. Yes. Replace circuit board on inoperative side. (5215)
 - b. **No.** Repair open or poor connection between [94B] terminal 6 and ground. **(5041)**

10. Inoperative LED Voltage Test

- 1. Turn IGN OFF.
- Disconnect rear fender lights [94LB] or [94RB] on inoperative side.
- 3. Turn IGN ON.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between [94LB] or [94RB] terminal 3 and ground while activating front or rear brake controls.

- 5. Is battery voltage present?
 - a. Yes. Go to Test 11.
 - b. No. Repair open in (BE/R) wire. (5041)

11. Inoperative LED Ground Test

- 1. Test voltage between [94LB] or [94RB] terminals 1 and 3 while activating front or rear brake controls.
- 2. Is battery voltage present?
 - a. Yes. Replace lamp assembly on inoperative side.
 - b. No. Repair open in (BK) wire. (5041)



HEADLAMP DIAGNOSTICS

DESCRIPTION AND OPERATION

The headlamp switch activates either the high beam or the low beam headlamps. When the ignition is turned ON, the BCM defaults to the low beam position. Pressing the upper part of the switch toggles to the high beam headlamp and the lower part of the switch toggles to the low beam headlamp.

- In the low position, the BCM supplies power to illuminate the low beam headlamp.
- Push the low position again, the BCM supplies power to the high beam headlamp to provide a flash to pass feature.
- In the high position, BCM supplies power to the high beam headlamp and sends a message to the speedometer over the CAN bus to illuminate the high beam indicator.

NOTE

See the electrical diagnostic manual for single headlamp configuration.

Table 7-21. Code Description

DTC	DESCRIPTION	
B2132	High beam output shorted high	
B2133	High beam output shorted low	
B2134	High beam output overloaded	
B2137	Low beam output shorted high	
B2138	Low beam output shorted low	=
B2139	Low beam output overloaded	

Conditions for Setting

The headlamp DTCs may require either the high or low beam headlamp be activated in order to set the DTC. Toggle back and forth between the high and low beam headlamp positions to check DTCs on both circuits.

- DTC B2131 or B2136 will set if the corresponding headlamp circuit draws less than 1.2 Amps.
- DTC B2134 or B2139 will set if the corresponding headlamp circuit draws more than 12 Amps.

Diagnostic Tips

Turn IGN to ACC.

- If low beam illuminates, this circuit is shorted to voltage.
- If the high beam illuminates, this circuit is shorted to voltage.

Connector Information

For additional information about the connectors in the following diagram(s) and diagnostic procedure(s), including the color of the harness test kit terminal probes, see <u>A.1 CONNECTORS</u>.

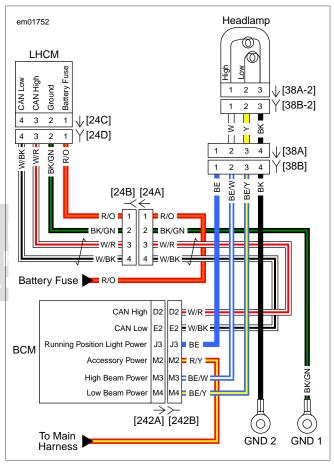


Figure 7-47. FLRT Headlamp Circuit

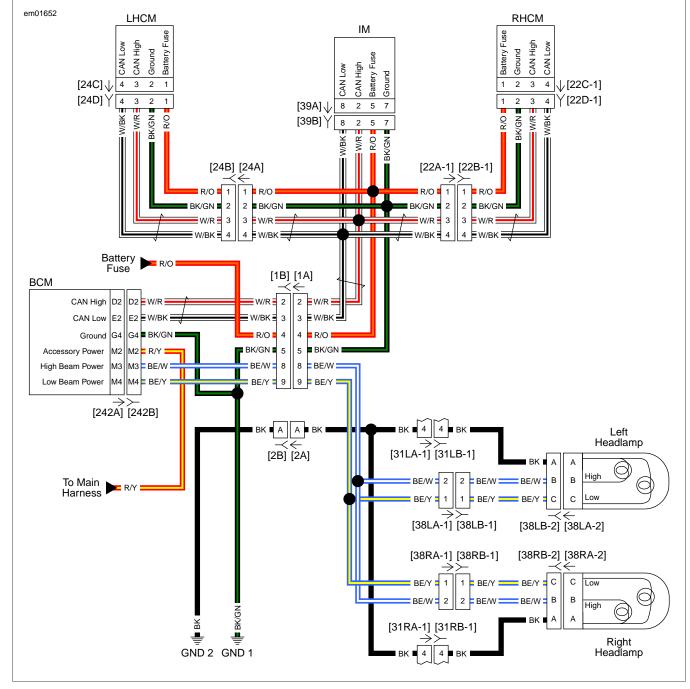


Figure 7-48. Dual Headlamp Circuit

FLRT, HIGH BEAM INOPERATIVE

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM/RADIO CABLE
HD-50390-2-P	BCM/RADIO OVERLAY

Table 7-22. High Beam Inoperative Diagnostic Faults

POSSIBLE CAUSES
Open in high beam ground circuit
Open in high beam power circuit
Headlamp malfunction

1. Headlamp Inspection Test

- 1. Visually inspect headlamp.
- 2. Is headlamp damaged?
 - a. Yes. Replace headlamp.
 - b. No. Go to Test 2.

2. Ground Circuit Open Test

- 1. Turn IGN OFF.
- 2. Disconnect headlamp [38-2].
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test resistance between [38B-2] terminal 3 and ground.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 3.
 - b. No. Repair open in (BK) ground wire.

3. Power Circuit Open Test

- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM/RADIO CABLE (Part No. HD-50390-2) between wire harness [242B] and [242A].
- Verify BCM/RADIO OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Test resistance between BOB terminal M3 and [38B-2] terminal 1 (W) wire.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 4.
 - No. Repair open in (W) or (BE/W) wire between BCM and headlamp.

4. BCM Test

- 1. Connect [38B-2].
- 2. Turn IGN ON.
- 3. Jumper BOB terminals M2 and M3.

- 4. Does high beam headlamp illuminate?
 - a. Yes. Replace BCM.
 - b. **No.** Replace headlamp.

FLRT, DTC B2132

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL

Table 7-23. DTC B2132 Diagnostic Faults

· ·
POSSIBLE CAUSES
Short to voltage in headlamp high beam circuit

1. Headlamp Test

- Turn IGN OFF.
- 2. Disconnect BCM [242].
- Using 1.5 MM TERMINAL EXTRACTOR TOOL (Part No. HD-50424), remove terminal M3 (BE/W) from [242B].
- 4. Connect [242].
- 5. Turn IGN ON.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between extracted terminal M3 and ground.
- 7. Is voltage present?
 - a. Yes. Repair short to voltage in (BE/W) or (W) wire.
 - b. No. Go to Test 2.

2. DTC Test

- 1. Install terminal M3 from [242B].
- 2. Connect [242].
- 3. Clear DTCs.
- 4. Turn IGN ON.
- 5. Observe headlamp in high and low beam positions.
- 6. Check DTCs.
- 7. Did DTC reset?
 - a. Yes. Replace BCM.
 - No. Condition is intermittent.

FLRT, DTC B2133, B2134

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM/RADIO CABLE
HD-50390-2-P	BCM/RADIO OVERLAY

Table 7-24. DTC B2133, B2134 Diagnostic Faults

POSSIBLE CAUSES	
Short to ground in high beam headlamp circuit	
Accessory lighting overloading circuit	
Headlamp malfunction	

1. High Beam Circuit Test

- 1. Turn IGN OFF.
- 2. Disconnect headlamp [38B-2].
- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM/RADIO CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- 4. Verify BCM/RADIO OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between BOB terminal M3 and ground.
- 6. Is continuity present?
 - a. Yes. Repair short to ground in (W) or (BE/W) wire.
 - b. No. Go to Test 2.

2. DTC Test

- 1. Connect [242].
- 2. Clear DTCs.
- 3. Turn IGN ON.
- 4. Check DTCs.
- 5. Did DTC reset?
 - Yes. Verify no accessory lighting is causing issue. If no issue is found, replace BCM.
 - b. No. Replace high beam headlamp.

FLRT, LOW BEAM INOPERATIVE

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM/RADIO CABLE
HD-50390-2-P	BCM/RADIO OVERLAY

Table 7-25. Low Beam Inoperative Diagnostic Faults

DOCCUPI E CALICEO
POSSIBLE CAUSES
Open in low beam ground circuit
Open in low beam power circuit
Headlamp malfunction

1. Headlamp Inspection Test

- 1. Visually inspect headlamp.
- 2. Is headlamp damaged?
 - a. Yes. Replace headlamp.
 - b. No. Go to Test 2.

2. Ground Circuit Open Test

- 1. Turn IGN OFF.
- 2. Disconnect headlamp [38-2].
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test resistance between [38B-2] terminal 3 and ground.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 3.
 - b. No. Repair open in (BK) ground wire.

3. Power Circuit Open Test

- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM/RADIO CABLE (Part No. HD-50390-2) between wire harness [242B] and [242A].
- 2. Verify BCM/RADIO OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Test resistance between BOB terminal M4 and [38B-2] terminal 2 (Y) wire.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 4.
 - b. **No.** Repair open in (Y) or (BE/Y) wire between BCM and headlamp.

4. BCM Test

- 1. Connect [38B-2].
- Turn IGN ON.
- 3. Jumper BOB terminal M2 to M4.

- 4. Does low beam headlamp illuminate?
 - a. Yes. Replace BCM.
 - No. Replace headlamp.

FLRT, DTC B2137

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL

Table 7-26. DTC B2137 Diagnostic Faults

POSSIBLE CAUSES
Short to voltage in headlamp low beam circuit

1. Headlamp Test

- 1. Turn IGN OFF.
- 2. Disconnect BCM [242].
- Using 1.5 MM TERMINAL EXTRACTOR TOOL (Part No. HD-50424), remove terminal from [242B] terminal M4 (BE/Y).
- 4. Connect BCM [242].
- 5. Turn IGN ON.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between removed terminal M4 and ground.
- 7. Is voltage present?
 - a. Yes. Repair short to voltage in (BE/Y) or (Y) wire.
 - b. No. Go to Test 2.

2. DTC Test

- 1. Install terminal M4 from [242B].
- 2. Connect [242].
- 3. Clear DTCs.
- 4. Turn IGN ON.
- 5. Observe headlamp in high and low beam positions.
- 6. Check DTCs.
- 7. Did DTC reset?
 - a. Yes. Replace BCM.
 - b. No. Condition is intermittent.

FLRT, DTC B2138, B2139

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM/RADIO CABLE
HD-50390-2-P	BCM/RADIO OVERLAY

Table 7-27. DTC B2138, B2139 Diagnostic Faults

POSSIBLE CAUSES
Short to ground in low beam headlamp circuit
Accessory lighting overloading circuit
Headlamp malfunction

1. Low Beam Circuit Test

- 1. Turn IGN OFF.
- 2. Disconnect headlamp [38B-2].
- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM/RADIO CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- 4. Verify BCM/RADIO OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between BOB terminal M4 and ground.
- 6. Is continuity present?
 - a. **Yes.** Repair short to ground in (Y) or (BE/Y) wire.
 - b. No. Go to Test 2.

2. DTC Test

- 1. Connect [242].
- 2. Clear DTCs.
- 3. Turn IGN ON.
- 4. Check DTCs.
- 5. Did DTC reset?
 - Yes. Verify no accessory lighting is causing issue. If no issue is found, replace BCM.
 - b. No. Replace low beam headlamp.

DUAL LAMP, HIGH BEAM INOPERATIVE

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM CABLE
HD-50390-2-P	BCM OVERLAY

Table 7-28. DTC B2131 Diagnostic Faults

POSSIBLE CAUSES	
Open in high beam ground circuit	
Open in high beam power circuit	
Headlamp malfunction	

1. Ground Circuit Open Test

- 1. Turn IGN OFF.
- 2. Disconnect inoperative headlamp [38-2].
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test resistance between [38B-2] terminal A and ground.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 2.
 - b. No. Repair open in (BK) ground wire.

2. Power Circuit Open Test

- Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM CABLE (Part No. HD-50390-2) between wire harness [242B] and [242A].
- 2. Verify BCM OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Test resistance between BOB terminal M3 and [38B-2] terminal B (BE/W) wire.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 3.
 - b. **No.** Repair open between [242B] terminal M3 and [38B-2] terminal B (BE/W) wire.

3. BCM Test

- 1. Connect [38B-2].
- 2. Turn IGN ON.
- 3. Jumper BOB terminals M2 to M3.
- 4. Does high beam headlamp illuminate?
 - a. Yes. Replace BCM.
 - b. No. Replace headlamp.

DUAL LAMP, DTC B2132

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL

Table 7-29. DTC B2132 Diagnostic Faults

POSSIBLE CAUSES
Short to voltage in headlamp high beam circuit

1. Headlamp Test

- 1. Turn IGN OFF.
- 2. Disconnnect BCM [242].
- 3. Using 1.5 MM TERMINAL EXTRACTOR TOOL (Part No. HD-50424), remove terminal M3 from [242B] (BE/W).
- 4. Connect [242].
- 5. Turn IGN ON.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between extracted terminal M3 and ground.
- 7. Is voltage present?
 - a. Yes. Repair short to voltage in (BE/W) wire.
 - b. No. Go to Test 2.

2. DTC Test

- Install terminal M3 from [242B].
- 2. Connect [242].
- 3. Clear DTCs.
- 4. Turn IGN ON.
- 5. Observe headlamp in high and low beam positions.
- 6. Check DTCs.
- 7. Did DTC reset?
 - Yes. Replace BCM.
 - b. **No.** Condition is intermittent. Perform wiggle test.

DUAL LAMP, DTC B2133, B2134

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM CABLE
HD-50390-2-P	BCM OVERLAY

Table 7-30. DTC B2133, B2134 Diagnostic Faults

POSSIBLE CAUSES
Short to ground in high beam headlamp circuit
Accessory lighting overloading circuit
Headlamp malfunction

1. High Beam Circuit Test

- 1. Turn IGN OFF.
- 2. Disconnect headlamp [38R-2] and [38L-2].
- 3. Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- Verify BCM OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between BOB terminal M3 and ground.
- 6. Is continuity present?
 - a. Yes. Repair short to ground in (BE/W) wire.
 - b. No. Go to Test 2.

2. DTC Test

- 1. Connect [242].
- 2. Connect [38-2].
- 3. Clear DTCs.
- 4. Turn IGN ON.
- 5. Check DTCs.
- 6. Did DTC reset?
 - Yes. Verify no accessory lighting is causing issue. If no issue is found, replace BCM.
 - b. No. Replace high beam headlamp.

DUAL LAMP, LOW BEAM INOPERATIVE

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM CABLE
HD-50390-2-P	BCM OVERLAY

Table 7-31. DTC B2136 Diagnostic Faults

POSSIBLE CAUSES	
Open in low beam ground circuit	
Open in low beam power circuit	
Headlamp malfunction	

1. Ground Circuit Open Test

- 1. Turn IGN OFF.
- 2. Disconnect inoperative headlamp [38-2].
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test resistance between [38B-2] terminal A and ground.
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 2.
 - b. No. Repair open in (BK) ground wire.

2. Power Circuit Open Test

- 1. Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM CABLE (Part No. HD-50390-2) between wire harness [242B] and [242A].
- Verify BCM OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Test resistance between BOB terminal M4 and [38B-2] terminal C (BE/Y).
- 4. Is resistance less than 0.5 Ohm?
 - a. Yes. Go to Test 3.
 - No. Repair open in (BE/Y) wire between BCM and headlamp.

3. BCM Test

- 1. Connect [38B-2].
- 2. Turn IGN ON.
- 3. Jumper BOB terminal M2 to M4.
- 4. Does low beam headlamp illuminate?
 - a. Yes. Replace BCM.
 - b. No. Replace headlamp.

DUAL LAMP, DTC B2137

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL

Table 7-32. DTC B2137 Diagnostic Faults

POSSIBLE CAUSES	
Short to voltage in headlamp low beam circuit	

1. Headlamp Test

- 1. Turn IGN OFF.
- 2. Disconnect BCM [242].
- 3. Using the 1.5 MM TERMINAL EXTRACTOR TOOL (Part No. HD-50424), remove terminal M4 from [242B] (BE/Y).
- 4. Connect BCM [242].
- 5. Turn IGN ON.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between removed terminal M4 and ground.
- 7. Is voltage present?
 - a. Yes. Repair short to voltage in (BE/Y) wire.
 - b. No. Go to Test 2.

2. DTC Test

- 1. Install terminal M4 from [242B].
- 2. Connect [242].
- 3. Clear DTCs.
- 4. Turn IGN ON.
- 5. Observe headlamp in high and low beam positions.
- 6. Check DTCs.
- 7. Did DTC reset?
 - a. Yes. Replace BCM.
 - b. No. Condition is intermittent. Perform wiggle test.

DUAL LAMP, DTC B2138, B2139

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM CABLE
HD-50390-2-P	BCM OVERLAY

Table 7-33. DTC B2138, B2139 Diagnostic Faults

· •	
POSSIBLE CAUSES	
Short to ground in low beam headlamp circuit	
Accessory lighting overloading circuit	
Headlamp malfunction	

1. Low Beam Circuit Test

- 1. Turn IGN OFF.
- 2. Disconnect headlamp [38B-2].
- 3. Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- 4. Verify BCM OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- 5. Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between BOB terminal M4 and ground.
- 6. Is continuity present?
 - a. Yes. Repair short to ground in (BE/Y) wire.
 - b. No. Go to Test 2.

2. DTC Test

- 1. Connect [242].
- 2. Clear DTCs.
- 3. Turn IGN ON.
- 4. Check DTCs.
- 5. Did DTC reset?
 - Yes. Verify no accessory lighting is causing issue. If no issue is found, replace BCM.
 - b. **No.** Replace low beam headlamp.

BAS DIAGNOSTICS

GENERAL

BAS Operation

The BCM will disable turn signal lamps and starter activation and will send a message to the ECM to shut down the ignition and the fuel pump if the vehicle is tipped over. The odometer will display "tIP" when a tip-over condition is present.

Bank Angle Sensor (BAS)

These DTCs set when a BCM is configured for Trike use and a fault is detected in the BAS.

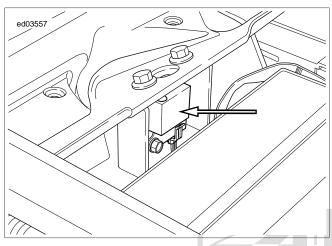


Figure 7-49. BAS [134] Behind Battery

DIAGNOSTICS

PART NUMBER	TOOL NAME
HD-48650	DIGITAL TECHNICIAN II

Diagnostic Tips

- Use DIGITAL TECHNICIAN II (Part No. HD-48650) to verify the BCM is configured for Trike.
- Verify no other circuits are tied to terminal H2 of the BCM.
- A tip-over event, short to ground, short to battery, and outof-range fault cannot be detected when the security function is in the alarm mode (lights flashing, siren sounding).

If "tiP" is displayed on the odometer after the vehicle has been returned to the upright position, then perform the procedure to reset the "tiP" condition.

Tip Over Reset

- 1. Return the vehicle to an upright position.
- 2. Cycle the IGN OFF-ON before restarting the vehicle.

If the vehicle still displays "tiP", remove the BAS. Verify proper length fasteners are mounting the BAS bracket to the frame. If fasteners are too long, the procedure to reset the BAS by cycling the ignition may not work.

Table 7-34. Trike Bank Angle Sensor (BAS) DTCs

DTC	DESCRIPTION
B2226	BAS input open
B2228	BAS input shorted low

Connector Information

For additional information about the connectors in the following diagram(s) and diagnostic procedure(s), including the color of the harness test kit terminal probes, see <u>A.1 CONNECTORS</u>.

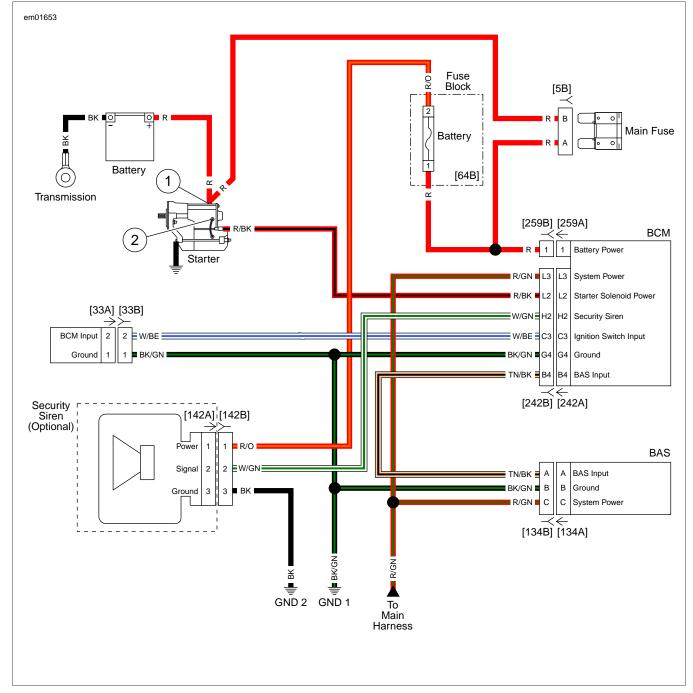


Figure 7-50. Siren Circuit

DTC B2228

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM CABLE
HD-50390-2-P	BCM OVERLAY

Table 7-35. DTC B2228 Diagnostic Faults

POSSIBLE CAUSES		
BAS malfunction		
Short to ground in BAS input circuit		

1. BAS Input Short to Ground Test

- 1. Turn IGN OFF.
- 2. Disconnect BAS [134].
- 3. Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- 4. Verify BCM OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test continuity between BOB terminal B4 and ground.
- 6. Is continuity present?
 - a. Yes. Repair short to ground in BAS input circuit (TN/BK) wire. (5041)
 - b. No. Go to Test 2.

2. Wiggle Test

- 1. Perform wiggle test.
- 2. Is an intermittent short to ground present?
 - a. Yes. Repair short to ground in (TN/BK) wire. (5041)
 - b. No. Replace BAS. (6968)

DTC B2226

PART NUMBER	TOOL NAME
HD-41404	HARNESS CONNECTOR TEST KIT
HD-50390-1	BREAKOUT BOX
HD-50390-2	BCM CABLE
HD-50390-2-P	BCM OVERLAY

Table 7-36. DTC B2226 Diagnostic Faults

POSSIBLE CAUSES	
Open in signal circuit	
Open in ground circuit	
Open in ignition circuit	
BAS malfunction	

1. System Power Test

- Turn IGN OFF.
- 2. Disconnect BAS [134].
- 3. Turn IGN ON.
- Using HARNESS CONNECTOR TEST KIT (Part No. HD-41404), test voltage between [134B] terminal C and ground.
- 5. Is battery voltage present?
 - a. Yes. Go to Test 2.
 - b. **No.** Repair open in system power circuit (R/O) wire. **(5041)**

2. BAS Ground Test

- 1. Test voltage between [134B] terminals B and C.
- 2. Is battery voltage present?
 - a. Yes. Go to Test 3.
 - b. No. Repair open in ground circuit (BK/GN) wire. (5041)

3. BAS Input Open Test

- 1. Turn IGN OFF.
- 2. Connect BREAKOUT BOX (Part No. HD-50390-1) and BCM CABLE (Part No. HD-50390-2) to wire harness [242B], leaving [242A] disconnected.
- 3. Verify BCM OVERLAY (Part No. HD-50390-2-P) is in position on BOB.
- Test resistance between BOB terminal B4 and [134B] terminal A.
- 5. Is resistance less than 0.5 Ohm?
 - a. Yes. Replace BAS. (6968)
 - b. **No.** Repair open in BAS input circuit (TN/BK) wire. **(5041)**

REVERSE SWITCH SYMPTOMS AND DIAGNOSTICS

7.21

DESCRIPTION AND OPERATION

This DTC pertains to a stuck reverse switch or an internal fault in the LHCM. If the switch is open it will not set a DTC. In most cases, there will be symptoms.

Table 7-37. Switch Symptoms

OPEN SWITCH	SYMPTOM	
Reverse	No telltale on IM	

Table 7-38. Code Description

DTC	DESCRIPTION
P1781	Reverse switch input error

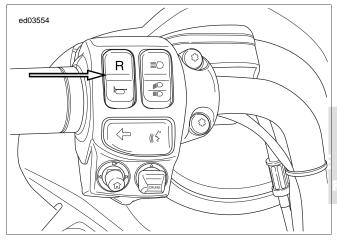


Figure 7-51. LHCM: Reverse Switch

Conditions for Settings

If the switch is held or stuck for over two minutes with the IGN ON, the stuck switch code will set.

Diagnostic Tips

Clear the DTCs and operate the vehicle to verify the DTCs are current. Stuck switch codes will take over two minutes to set.

DTC P1781

Table 7-39. DTC P1781 Diagnostic Faults

POSSIBLE CAUSES	
Damaged switch cap	

1. Switch Test

- 1. Clear DTC.
- 2. Turn IGN ON and wait three minutes.
- 3. Operate vehicle.
- 4. Check DTCs.
- 5. Did DTC reset?
 - a. Yes. Replace LHCM.
 - b. **No.** Concern is intermittent. Switch may have been pressed for an extended period of time.

LEV-DAVIDSOI

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CONNECTORS A.1

CONNECTORS

NOTE

Connectors associated with the optional reverse motor system may not be present on motorcycle being serviced.

Table A-1. Connector Locations

NO.	DESCRIPTION	TYPE	TERMINAL PROBE COLOR	LOCATION
[7]	Rear fender lights harness	8-way Molex MX150 Sealed (BK)	Gray	Top of rear fender (under seat)
[31L]	Left front turn signal	4-place JAE MX19 Sealed (BK) (HDI) 6-place Tyco 070 Multilock Unsealed (BK)	Yellow Gray	Inside left front turn signal/headlamp support Inside headlamp nacelle
[31R]	Right front turn signal	4-place JAE MX19 Sealed (BK) (HDI) 3-place Tyco 070 Multilock Unsealed (BK)	Yellow Gray	Inside right front turn signal/head- lamp support Inside headlamp nacelle
[38L-1]	Left headlamp	2-place JAE MX19 Sealed (BK) (HDI) FLHT	Yellow	Inner fairing
[38L-2]	Left headlamp	3-place Deutsch DT Sealed (GY) (HDI) FLHT	Black	Inside left headlamp housing
[38R-1]	Right headlamp	2-place JAE MX19 Sealed (BK) (HDI) FLHT	Yellow	Inner fairing
[38R-2]	Right headlamp	3-place Deutsch DT Sealed (GY) (HDI) FLHT	Black	Inside right headlamp housing
[78-3]	ECM	18-way Tyco (BN)	Breakout Box	Under seat
[134]	BAS	3-place Delphi GT 150 Sealed	Gray	Under seat behind battery
[233]	License plate lamp	3-place Tyco 070 Multilock Unsealed (W)	Gray	Under trunk door cover, left side (FLHTCUTG)
[242]	ВСМ	48-way Molex CMC Sealed (BK)	Breakout Box	Under left side cover
[245]	RCM	8-place Molex MX 150L Sealed	Gray	Under right side cover
[246]	RCM solenoid	2-place Tyco 070 Multilock Unsealed (BK)	Gray	Under right side cover
[248]	Reverse motor solenoid	Ring terminal		Bottom of reverse motor solenoid
[249]	Reverse motor solenoid/high current	Ring terminal		Front of reverse motor solenoid
[251]	RCM solenoid	Ring terminal		Under right side cover
[252]	150A circuit breaker	Ring terminal		Under right side cover
[253]	Reverse motor ground	Ring terminal		Motor mounting flange
[276]	Parking brake switch	3-place Molex MX150 Sealed (BK)	Gray	Behind voltage regulator
[279]	Trunk light	2-place Tyco 070 Multilock Unsealed (BK)	Gray	Under trunk door cover, left side (FLHTCUTG)
[312]	Trunk AUX Cap	12-place Molex MX150 Sealed	Gray	Under seat

WIRING DIAGRAM INFORMATION

Wire Color Codes

Wire traces on wiring diagrams are labeled with alpha codes. Refer to Table A-2.

For Solid Color Wires: See <u>Figure A-1</u>. The alpha code identifies wire color.

For Striped Wires: The code is written with a slash (/) between the solid color code and the stripe code. For example, a trace labeled GN/Y is a green wire with a yellow stripe.

Wiring Diagram Symbols

See <u>Figure A-1</u>. On wiring diagrams and in service/repair instructions, connectors are identified by a number in brackets []. The letter inside the brackets identifies whether the housing is a socket or pin housing.

A=Pin: The letter A and the pin symbol after a connector number identifies the pin side of the terminal connectors.

B=Socket: The letter B the socket symbol after a connector number identifies the socket side of the terminal connectors.

Other symbols found on the wiring diagrams include the following:

Diode: The diode allows current flow in one direction only in a circuit

Wire break: The wire breaks are used to show option variances or page breaks.

No Connection: Two wires crossing over each other in a wiring diagram that are shown with no splice indicating they are not connected together.

Circuit to/from: This symbol is used to identify there is a more complete circuit diagram on another page. The symbol is also identifying the direction of current flow.

Splice: Splices are where two or more wires are connected together along a wiring diagram. The location of the splice indicated in the wiring diagram is not the true location of the splice in the actual harness but to identify that the wires are spliced to that circuit.

Ground: Grounds can be classified as either clean or dirty grounds. Clean grounds are identified by a (BK/GN) wire and are normally used for sensors or modules. These grounds usually do not have electric motors, coils or anything that may cause electrical interference on the ground circuit. The dirty grounds are identified by a (BK) wire and are used for components that are not as sensitive to electrical interference.

Twisted pair: This symbol indicates the two wires are twisted together in the harness. This minimizes the circuit's electromagnetic interference from external sources. If repairs are necessary to these wires they should remain as twisted wires.

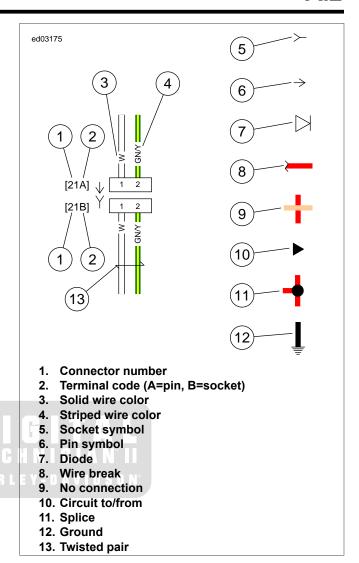


Figure A-1. Connector/Wiring Diagram Symbols

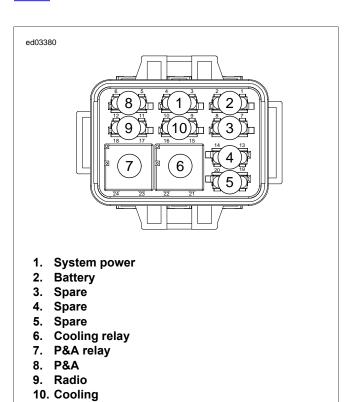


Table A-2. Wire Color Codes

ALPHA CODE	WIRE COLOR
BE	Blue
BK	Black
BN	Brown
GN	Green
GY	Gray
LBE	Light Blue
LGN	Light Green
0	Orange
PK	Pink
R	Red
TN	Tan
V	Violet
W	White
Y	Yellow

Figure A-2. Fuse Block [64B]



WIRING DIAGRAMS

Wiring Diagram List

DIAGRAM	LOCATION
Front Lighting and Hand Controls: 2015 Trike Models	Figure A-3
Fairing Harness FLHTCUTG: 2015 Trike Model	Figure A-4
Main Harness FLHTCUTG (1 of 3): 2015 Trike Model	Figure A-5
Main Harness FLHTCUTG (2 of 3): 2015 Trike Model	Figure A-6
Main Harness FLHTCUTG (3 of 3): 2015 Trike Model	Figure A-7
Main Harness FLRT (1 of 3): 2015 Trike Model	Figure A-8
Main Harness FLRT (2 of 3): 2015 Trike Model	Figure A-9
Main Harness FLRT (3 of 3): 2015 Trike Model	Figure A-10
Rear Lighting: 2015 Trike Models	Figure A-11
Radio: 2015 Trike Models	Figure A-12
Reverse FLHTCUTG: 2015 Trike Model	Figure A-13
Reverse FLRT: 2015 Trike Model	Figure A-14



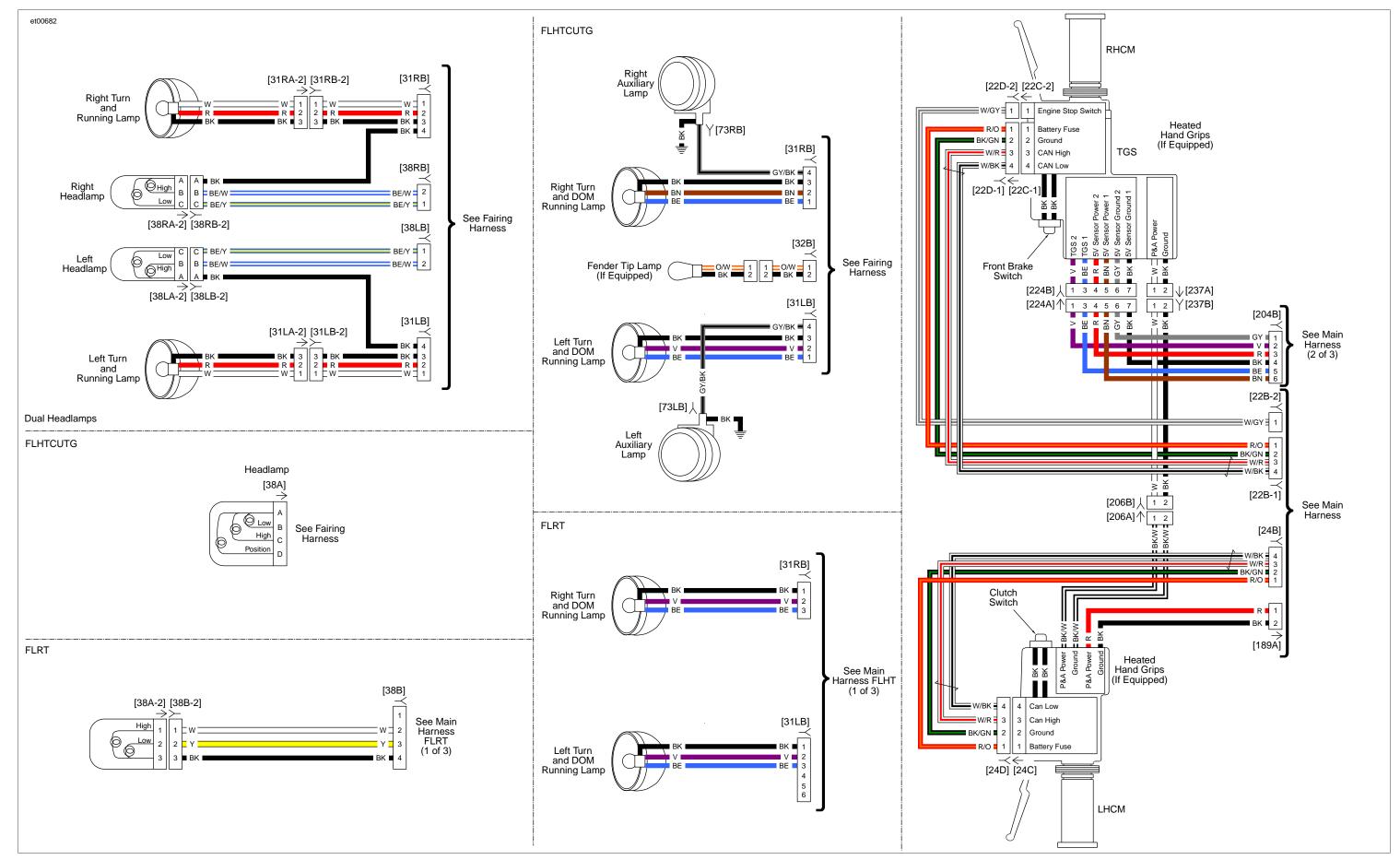


Figure A-3. Front Lighting and Hand Controls: 2015 Trike Models

Figure A-3.
Front Lighting and Hand Controls: 2015 Trike Models

Figure A-3.
Front Lighting and Hand Controls: 2015 Trike Models

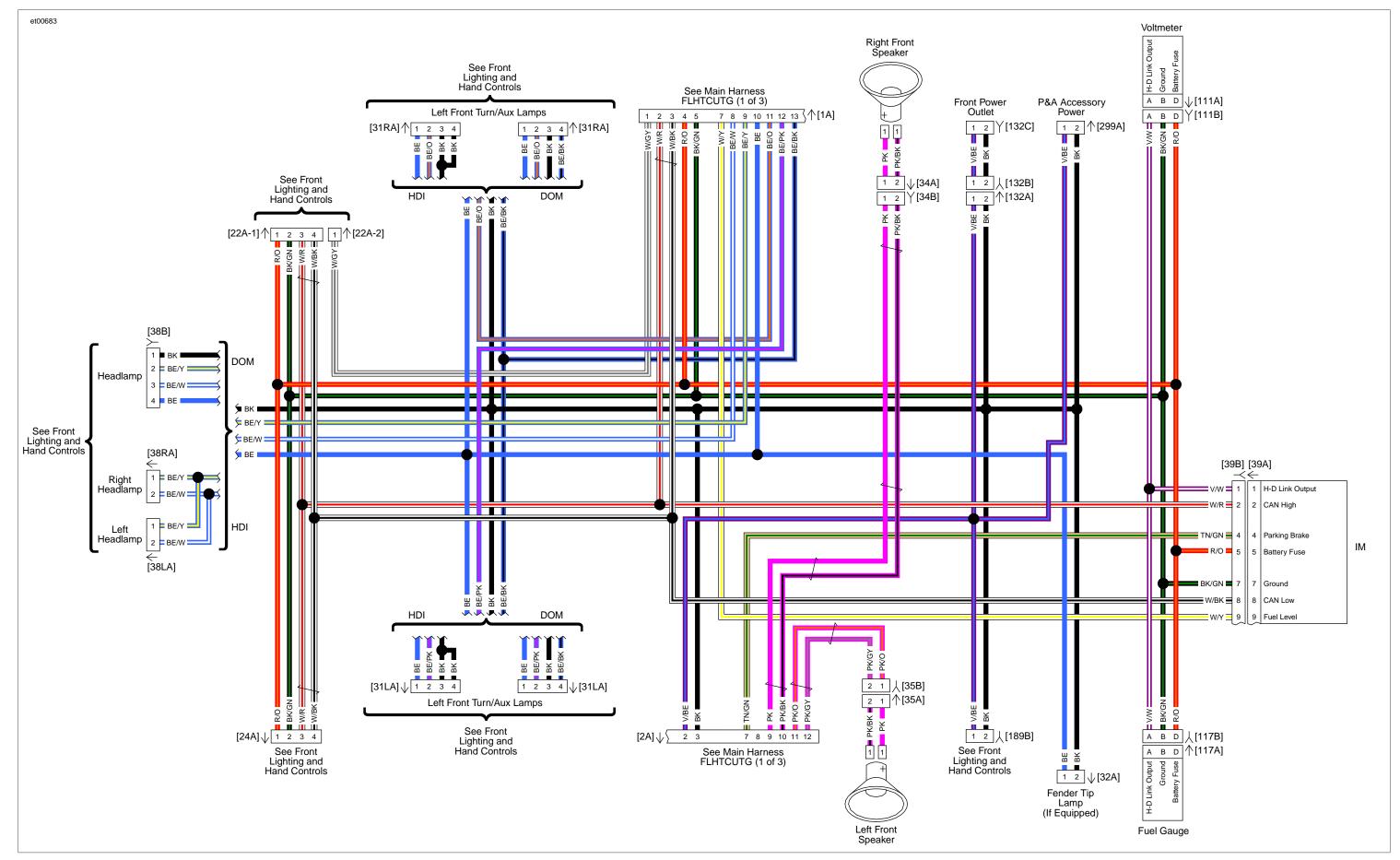


Figure A-4. Fairing Harness FLHTCUTG: 2015 Trike Model

Figure A-4.
Fairing Harness FLHTCUTG: 2015 Trike Model

Figure A-4.
Fairing Harness FLHTCUTG: 2015 Trike Model

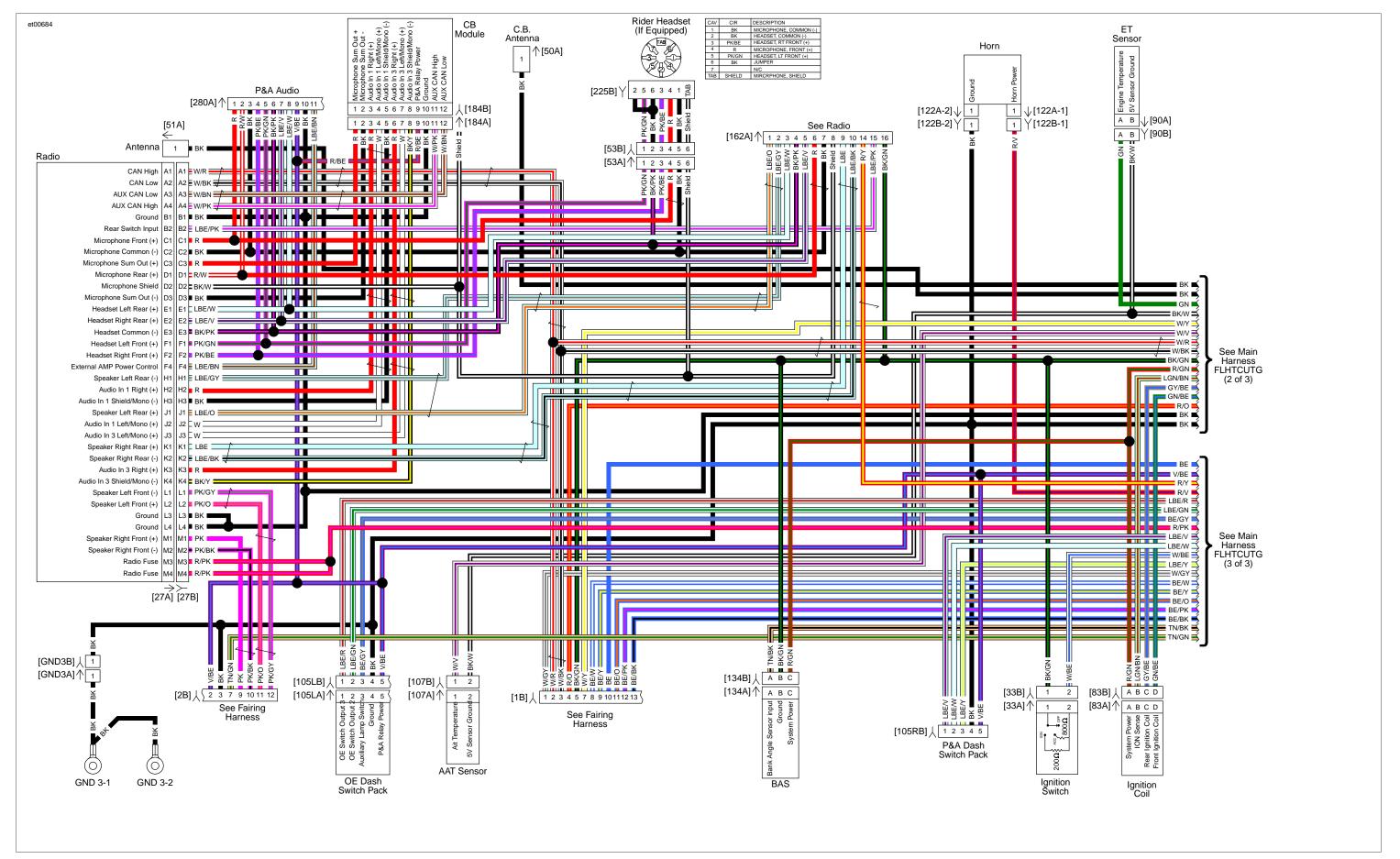


Figure A-5. Main Harness FLHTCUTG (1 of 3): 2015 Trike Model

Figure A-5.
Main Harness FLHTCUTG (1 of 3): 2015 Trike Model

Figure A-5.
Main Harness FLHTCUTG (1 of 3): 2015 Trike Model

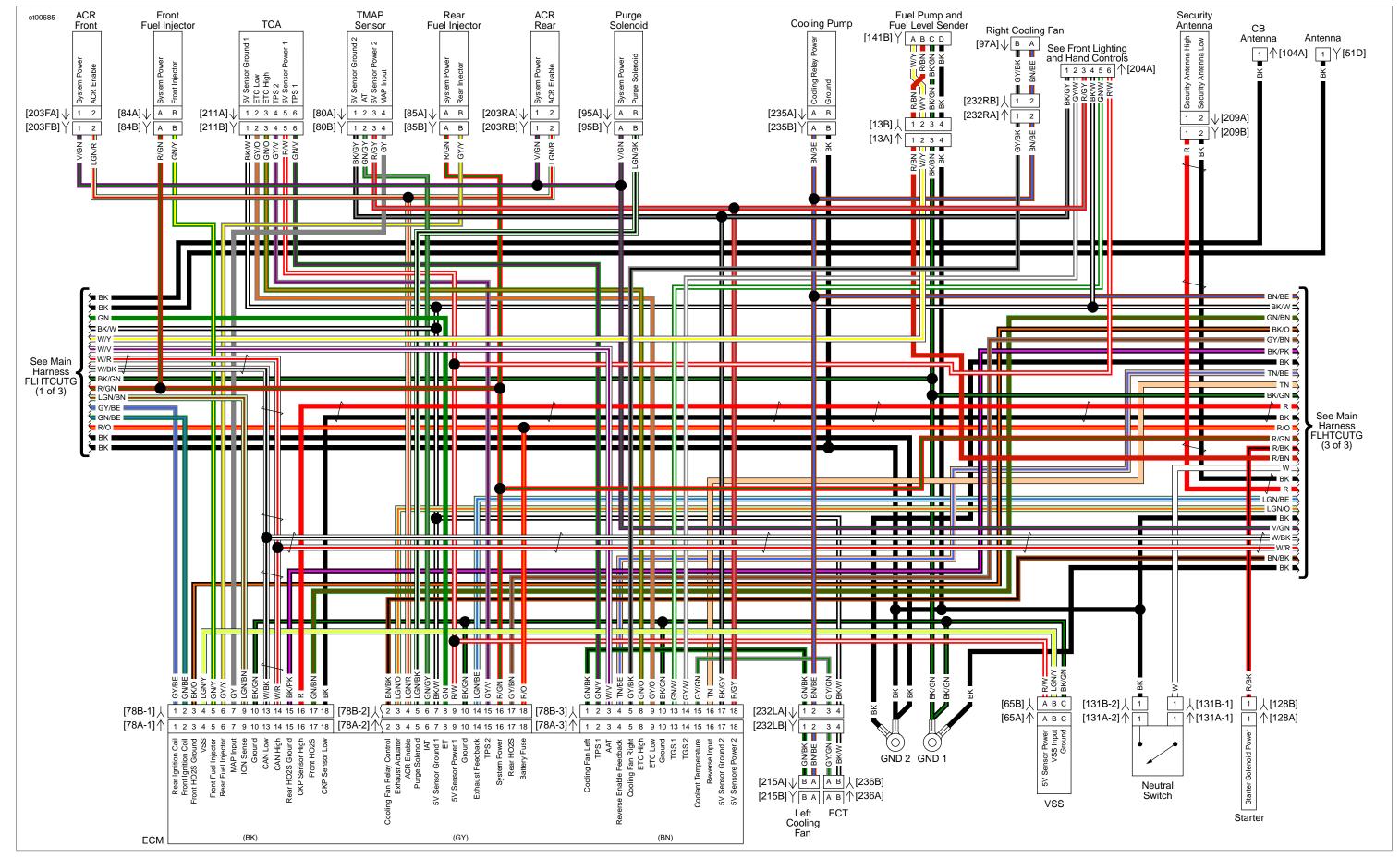


Figure A-6. Main Harness FLHTCUTG (2 of 3): 2015 Trike Model

Figure A-6.
Main Harness FLHTCUTG (2 of 3): 2015 Trike Model

Figure A-6.
Main Harness FLHTCUTG (2 of 3): 2015 Trike Model

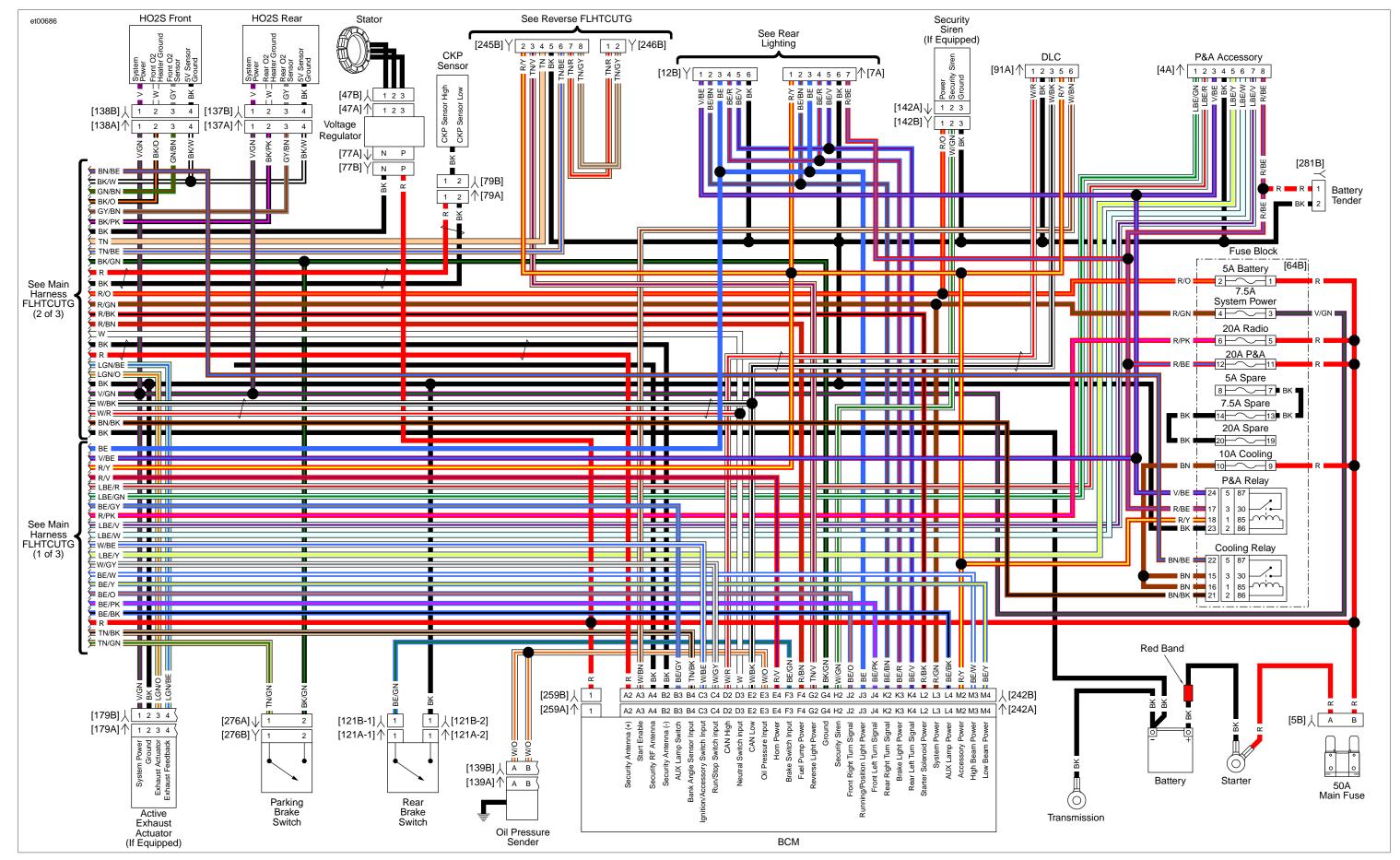


Figure A-7. Main Harness FLHTCUTG (3 of 3): 2015 Trike Model

Figure A-7.
Main Harness FLHTCUTG (3 of 3): 2015 Trike Model

Figure A-7.
Main Harness FLHTCUTG (3 of 3): 2015 Trike Model

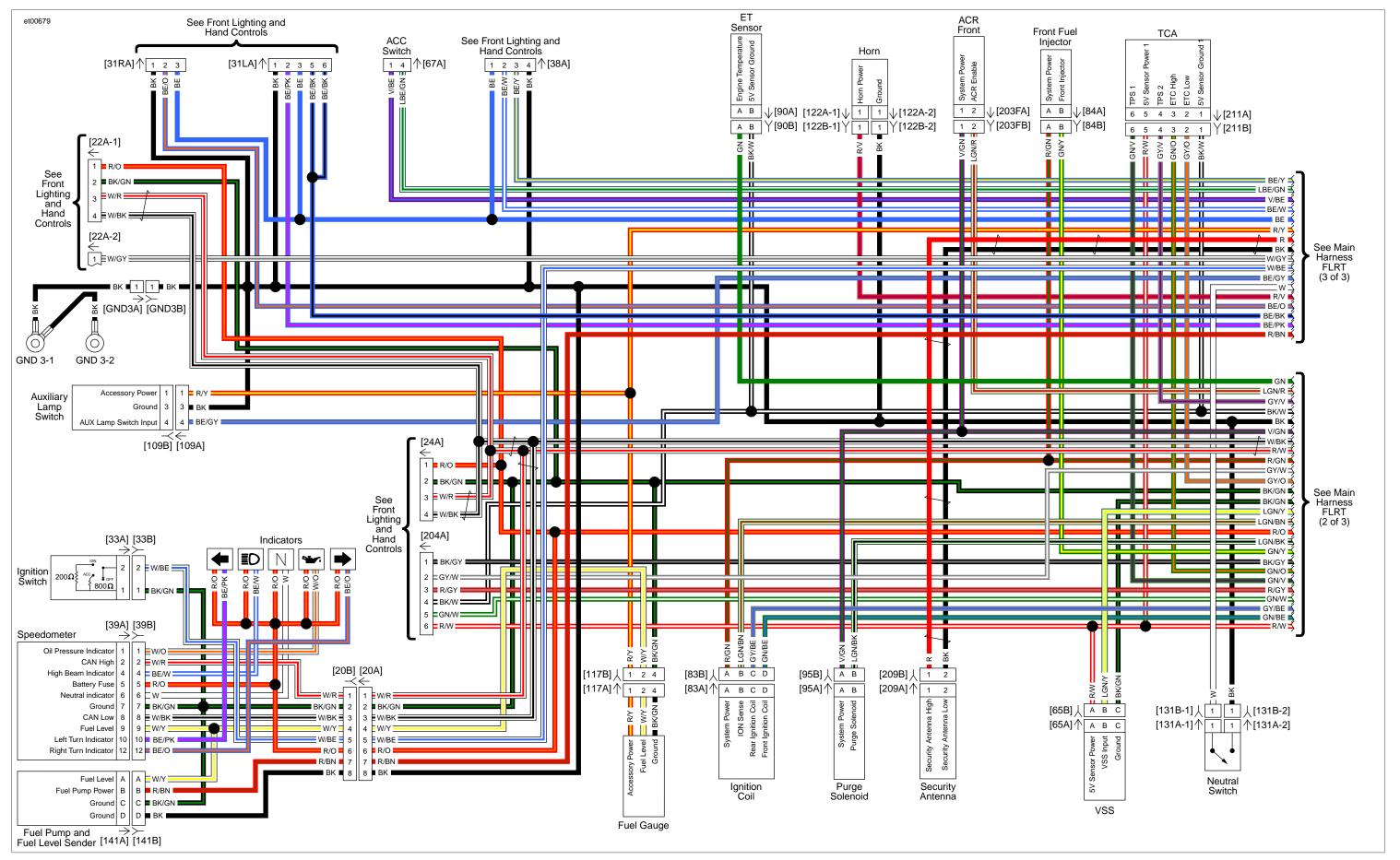


Figure A-8. Main Harness FLRT (1 of 3): 2015 Trike Model

Figure A-8.
Main Harness FLRT (1 of 3): 2015 Trike Model

Figure A-8.
Main Harness FLRT (1 of 3): 2015 Trike Model

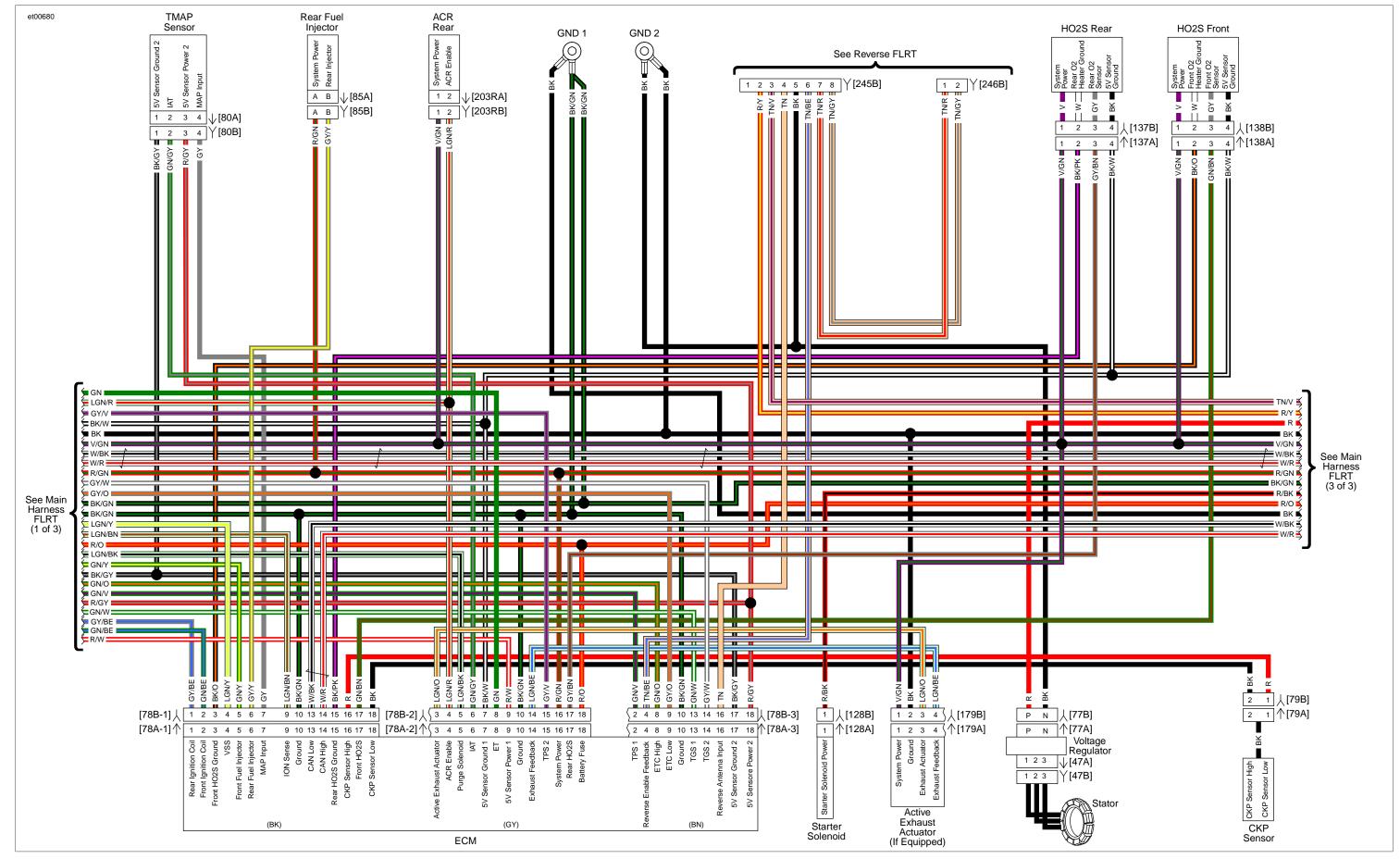


Figure A-9. Main Harness FLRT (2 of 3): 2015 Trike Model

Figure A-9.
Main Harness FLRT (2 of 3): 2015 Trike Model

Figure A-9.
Main Harness FLRT (2 of 3): 2015 Trike Model

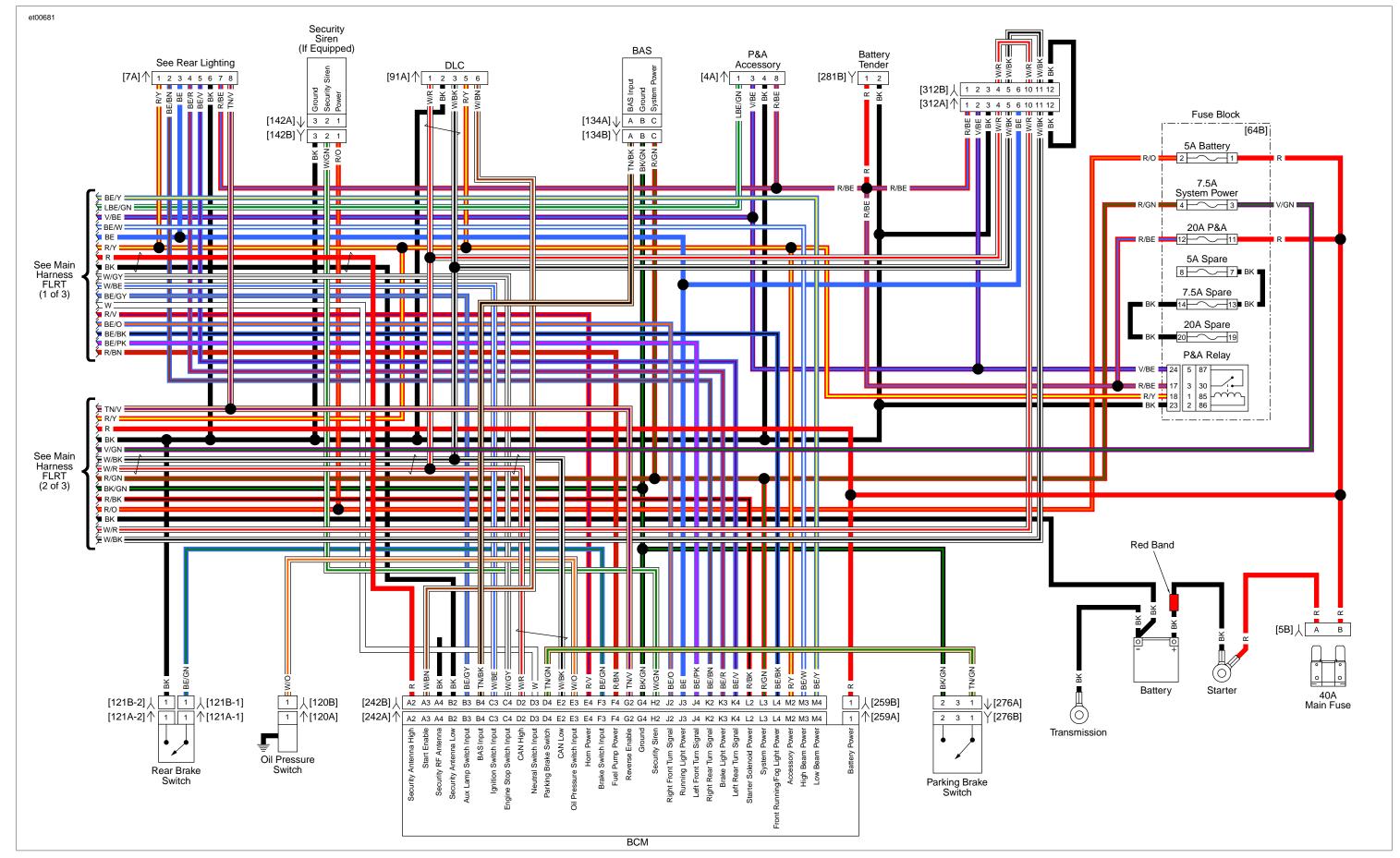


Figure A-10. Main Harness FLRT (3 of 3): 2015 Trike Model

Figure A-10.

Main Harness FLRT (3 of 3): 2015 Trike Model

Figure A-10.

Main Harness FLRT (3 of 3): 2015 Trike Model

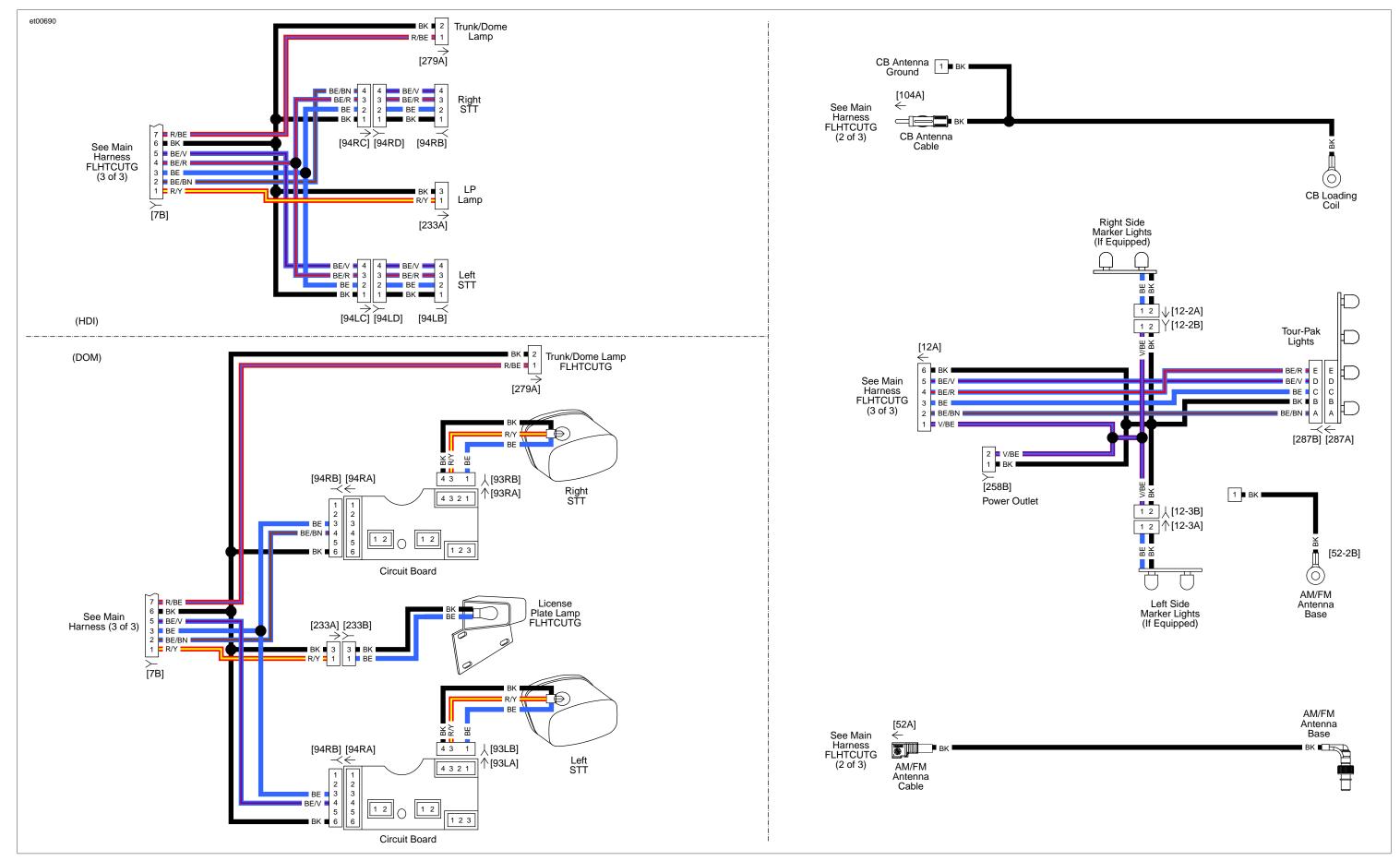


Figure A-11. Rear Lighting: 2015 Trike Models

Figure A-11.
Rear Lighting: 2015 Trike Models

Figure A-11.
Rear Lighting: 2015 Trike Models

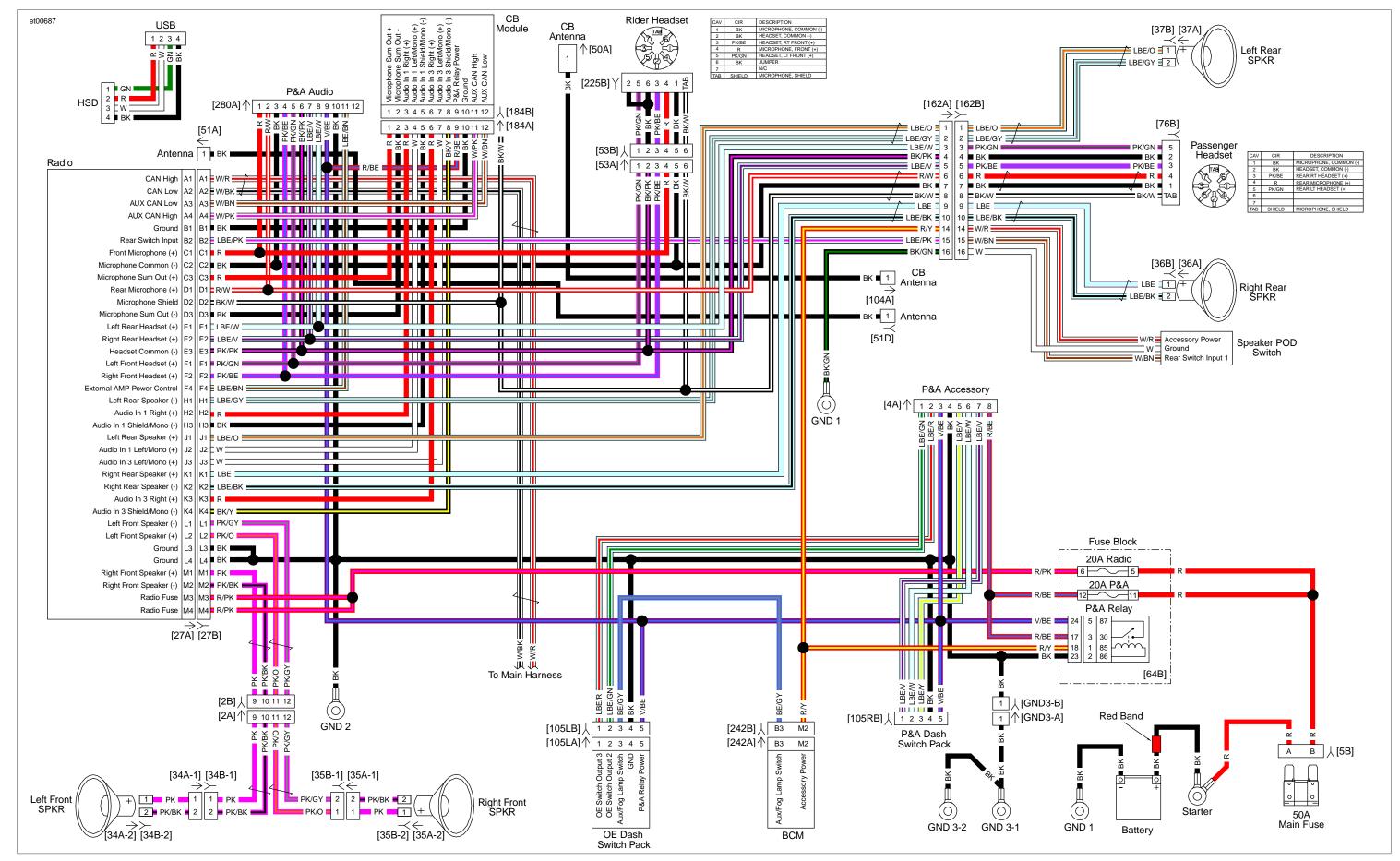


Figure A-12. Radio: 2015 Trike Models

Figure A-12.
Radio: 2015 Trike Models

Figure A-12.
Radio: 2015 Trike Models

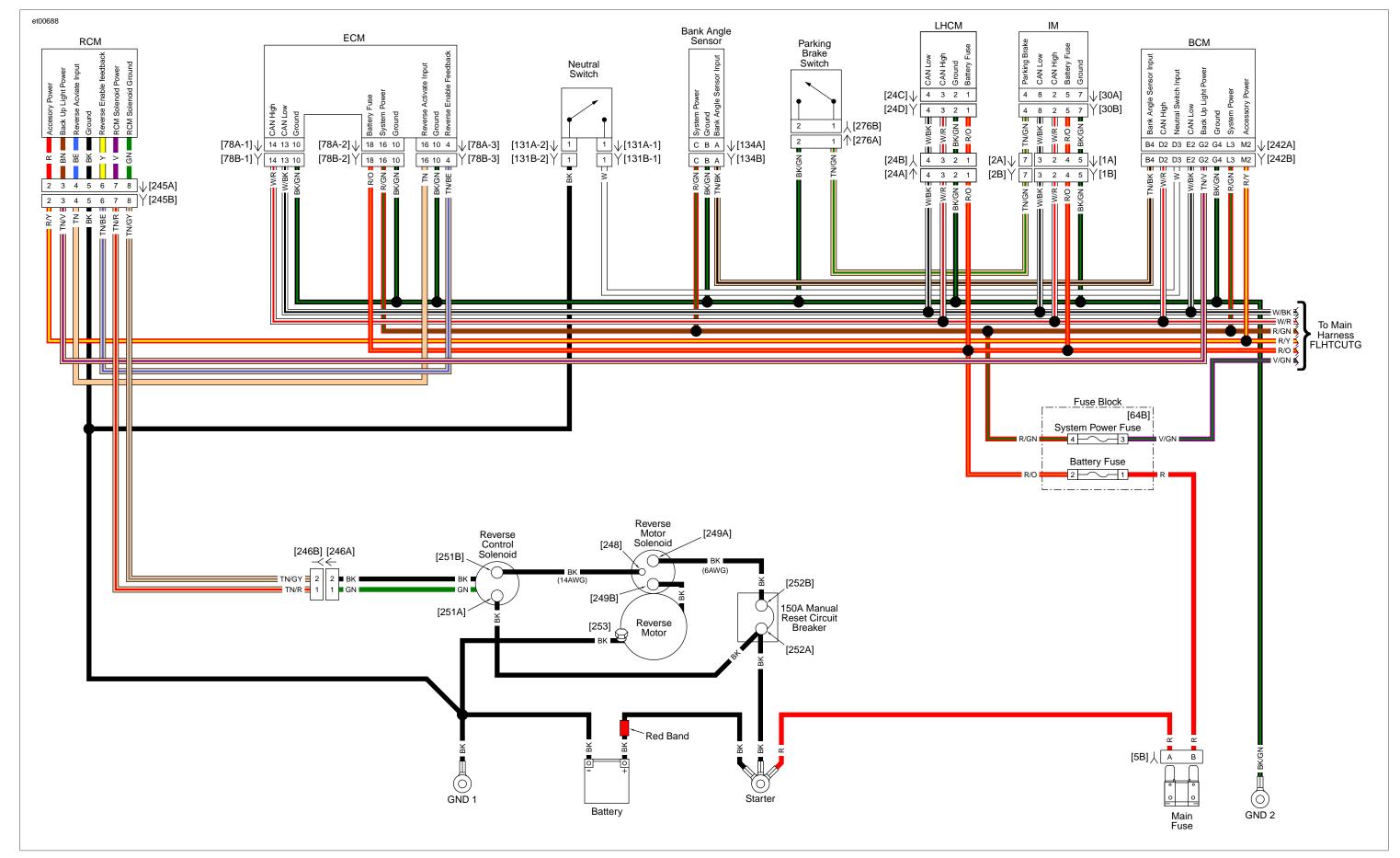


Figure A-13. Reverse FLHTCUTG: 2015 Trike Model

Figure A-13.
Reverse FLHTCUTG: 2015 Trike Model

Figure A-13.
Reverse FLHTCUTG: 2015 Trike Model

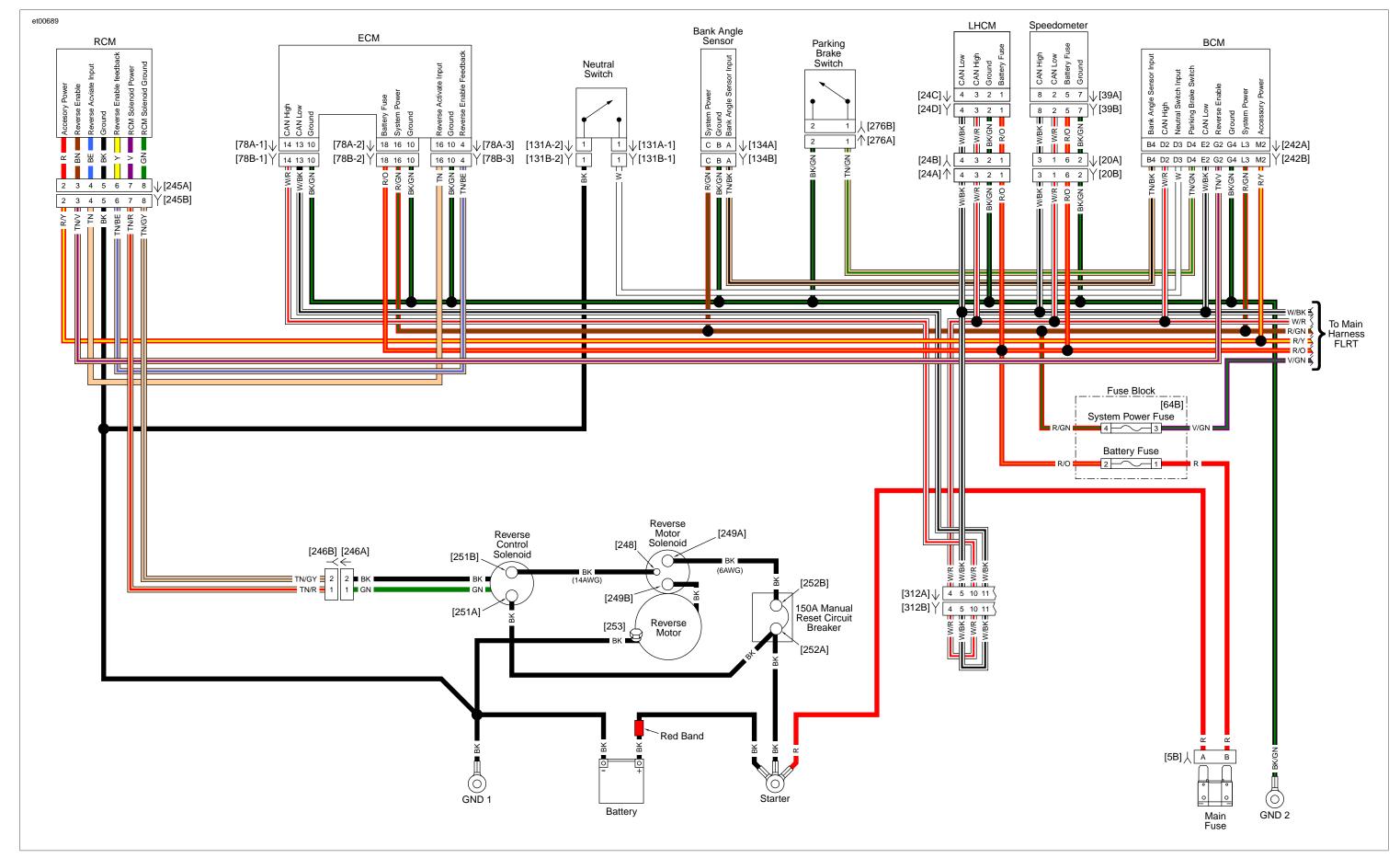


Figure A-14. Reverse FLRT: 2015 Trike Model

Figure A-14.
Reverse FLRT: 2015 Trike Model

Figure A-14.
Reverse FLRT: 2015 Trike Model

CONNECTOR END VIEWS

CONNECTOR END VIEWS

Table A-3. Rear Lighting [7A]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	R/Y	Accessory power
2	BE/BN	Right rear turn signal
3	BE	Running lights power
4	BE/R	Brake light power
5	BE/V	Left rear turn signal
6	BK	Ground
7	R/BE	P&A power
8	TN/V	Reverse enable (FLRT)

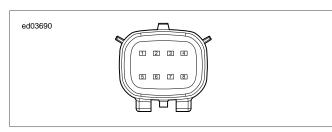


Figure A-15. Rear Lighting [7A]

Table A-4. Rear Lighting [7B]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	R/Y	Accessory power
2	BE/BN	Right rear turn signal
3	BE	Running lights power
4	BE/R	Brake light power (HDI)
5	BE/V	Left rear turn signal
6	BK	Ground
7	R/BE	P&A power
8	-	N/C

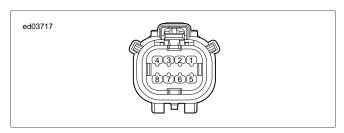


Figure A-16. Rear Lighting [7B]

Table A-5. Left Front Turn Signals (HDI) FLHT [31LA]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running lamps
2	BE/PK	Left front turn signal
3	BK	Ground
4	BK	Ground

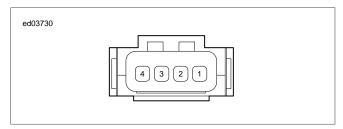


Figure A-17. Left Front Turn Signals (HDI) FLHT [31LA]

Table A-6. Front Left Turn/Auxiliary [31LA] FLRT

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BK	Ground
2	BE/PK	Left front turn signal
3	BE	Running/position light power
HN 140 I A	//° -	N/C
E V - 11 ⁵ A V I I	BE/BK	Aux lamp power
6	BE/BK	Aux lamp power

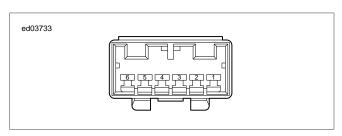


Figure A-18. Front Left Turn/Auxiliary [31LA] FLRT

Table A-7. Left/Right Front Turn Signals (HDI) [31L/RB]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	W	Running lamps
2	R	Left front turn signal
3	BK	Ground
4	BK	Ground

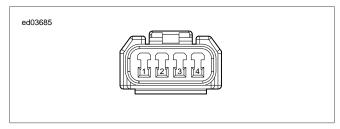


Figure A-19. Left/Right Front Turn Signals (HDI) FLHT [31L/RB]

Table A-8. Front Left Turn/Auxiliary [31LB] FLRT

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BK	Ground
2	V	Left front turn signal
3	BE	Running/position light power
4	-	N/C
5	-	N/C
6	-	N/C

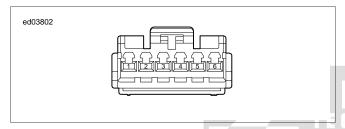


Figure A-20. Front Left Turn/Auxiliary [31LB] FLRT

Table A-9. Right Front Turn Signals (HDI) FLHT [31RA]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running lamps
2	BE/O	Right front turn signal
3	BK	Ground
4	BK	Ground

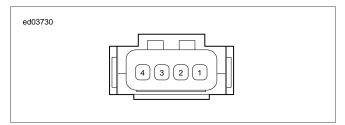


Figure A-21. Right Front Turn Signals (HDI) FLHT [31RA]

Table A-10. Front Right Turn [31RA] FLRT

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BK	Ground
2	BE/O	Right front turn signal
3	BE	Running/position light power

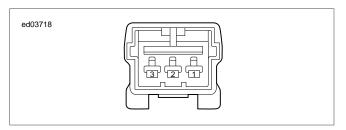


Figure A-22. Right Front Turn Signal [31RA] FLRT

Table A-11. Front Right Turn [31RB] FLRT

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BK	Ground
2	V	Right front turn signal
3	BE	Running/position light power

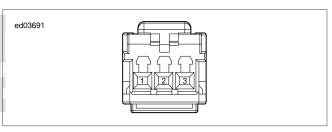


Figure A-23. Right Front Turn [31RB] FLRT

Table A-12. Left/Right Front Turn Signals (HDI) FLHT [31L/R-2]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	W	Running lamps
2	R	Left/right front turn signal
3	BK	Ground

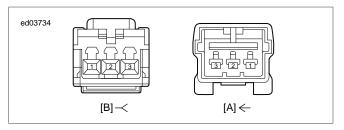


Figure A-24. Left/Right Front Turn Signals (HDI) FLHT [31L/R-2]

Table A-13. Left Front Turn Signals (DOM) FLHT [31LA]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running lamps
2	BE/PK	Left front turn signal
3	BK	Ground
4	BE/BK	Aux lamp power

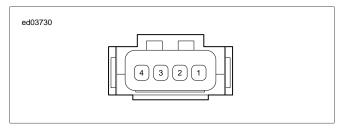


Figure A-25. Left Front Turn Signals (DOM) FLHT [31LA]

Table A-14. Left Front Turn Signals (DOM) FLHT [31LB]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running lamps
2	V	Left front turn signal
3	BK	Ground
4	GY/BK	Aux lamp power

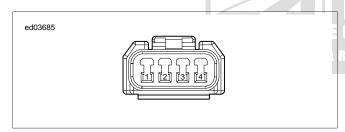


Figure A-26. Left Front Turn Signals (DOM) FLHT [31LB]

Table A-15. Right Front Turn Signals (DOM) FLHT [31RA]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running lights
2	BE/O	Right front turn signal
3	BK	Ground
4	BE/BK	Aux lamp power

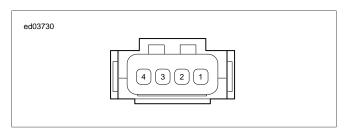


Figure A-27. Right Front Turn Signals (DOM) FLHT [31RA]

Table A-16. Right Front Turn Signals (DOM) FLHT [31RB]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running lamps
2	BN	Right front turn signal
3	BK	Ground
4	GY/BK	Aux lamp power

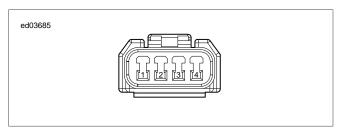


Figure A-28. Right Front Turn Signals (DOM) FLHT [31RB]

Table A-17. Left/Right Headlamp (HDI) FLHT [38L/R-1]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE/W	High beam headlamp
2	BE/Y	Low beam headlamp

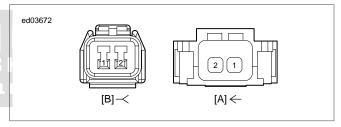


Figure A-29. Left/Right Headlamp (HDI) FLHT [38L/R-1]

Table A-18. Left/Right Headlamp (HDI) FLHT [38L/RB-2]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
Α	BK	Ground
В	BE/W	High beam headlamp
С	BE/Y	Low beam headlamp

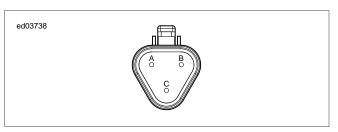


Figure A-30. Left/Right Headlamp (HDI) FLHT [38L/RB-2]

Table A-19. Headlamp [38A] FLRT

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running/position light power (HDI)
2	BE/W	High beam power
3	BE/Y	Low beam power
4	BK	Ground

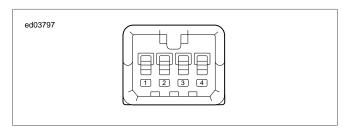


Figure A-31. Headlamp [38A] FLRT

Table A-20. Headlamp [38B] FLRT

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	BE	Running/position light power (HDI)
2	W	High beam power
3	Y	Low beam power
4	BK	Ground

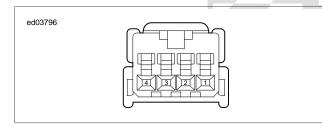


Figure A-32. Headlamp [38B] FLRT

Table A-21. Headlamp [38-2] FLRT

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	W	High beam power
2	Y	Low beam power
3	BK	Ground

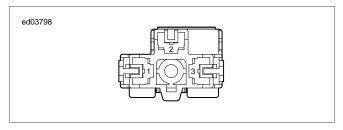


Figure A-33. Headlamp [38B-2] FLRT

Table A-22. ECM [78-3] (BN)

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	GN/BK	Cooling fan left (FLHT)
2	GN/V	TPS1
3	W/V	AAT
4	TN/BE	Reverse enable feedback
5	GY/BK	Cooling fan right (FLHT)
6	-	N/C
7	-	N/C
8	GN/O	ETC high
9	GY/O	ETC low
10	BK/GN	Ground
11	-	N/C
12	-	N/C
13	GN/W	TGS 1
14	GY/W	TGS 2
15	GY/GN	Coolant temperature (FLHT)
16	TN	Reverse activate input
17	BK/GY	5V sensor ground 2
18	R/GY	5V sensor power 2

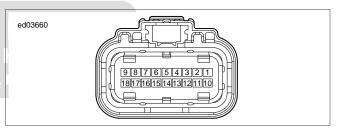


Figure A-34. ECM [78-3]

Table A-23. BAS [134]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
Α	TN/BK	BAS input
В	BK/GN	Ground
С	R/GN	System power

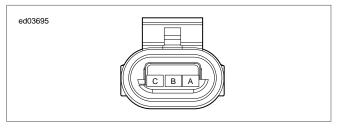


Figure A-35. BAS [134]

Table A-24. LP Lamp [233]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	R/W	Accessory power
2	-	N/C
3	BK	Ground

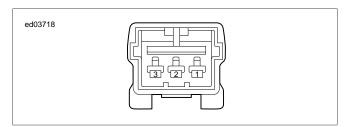


Figure A-36. LP Lamp [233]



Table A-25. BCM [242]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION				
A1	-	N/C				
A2	R	Security antenna high				
A3	W/BN	Start enable				
A4	BK	Security RF antenna				
B1	-	N/C				
B2	BK	Security antenna low				
В3	BE/GY	Aux lamp switch				
B4	-	N/C				
C1	-	N/C				
C2	-	N/C				
C3	W/BE	Ignition switch input				
C4	W/GY	Engine stop switch input				
D1	-	N/C				
D2	W/R	CAN high				
D3	W	Neutral switch input				
D4	-	N/C				
E1	-	N/C				
E2	W/BK	CAN low				
E3	W/O	Oil pressure switch input				
E4	R/V	Horn power				
F1	-	N/C				
F2	-	N/C				
F3	BE/GN	Brake switch input				
F4	R/BN	Fuel pump power				
G1	-	N/C				
G2	TN/V	Reverse enable				
G3	-	N/C				
G4	BK/GN	Ground				
H1	-	N/C				
H2	W/GN	Security siren				
H3	-	N/C				
H4	-	N/C				
J1	-	N/C				
J2	BE/O	Right front turn signal				
J3	BE	Running lights				
J4	BE/PK	Left front turn signal				
K1	-	N/C				
K2	BE/BN	Right rear turn signal				
K3	BE/R	Brake lamp power				
K4	BE/V	Left rear turn signal				
L1	-	N/C				
L2	R/BK	Starter solenoid power				
L3	R/GN	System power				

Table A-25. BCM [242]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
L4	BE/BK	Front running/fog light power
M1	-	N/C
M2	R/Y	Accessory power
М3	BE/W	High beam power
M4	BE/Y	Low beam power

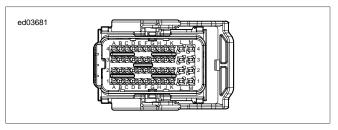


Figure A-37. BCM [242]

Table A-26. RCM [245]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION			
1	-	N/C			
2	R/Y	Accessory power			
3	TN/V	Reverse enable			
4	TN	Reverse activate input			
5 T	BK	Ground			
6	TN/BE	Reverse enable feedback			
7	TN/R	RCM solenoid power			
8	TN/GY	RCM solenoid ground			

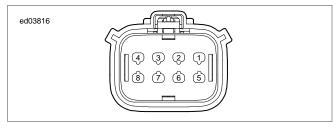


Figure A-38. RCM [245]

Table A-27. RCM Solenoid [246]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	TN/R	RCM solenoid power
2	TN/GY	RCM solenoid ground

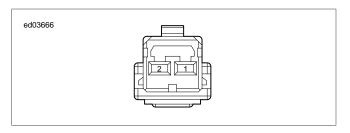


Figure A-39. RCM Solenoid [246]

Table A-28. Parking Brake Switch [276]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	TN/GN	Parking brake
2	BK/GN	Ground
3	-	N/C

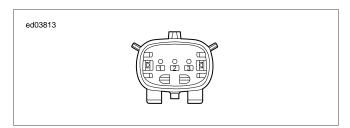


Figure A-40. Parking Brake Switch [276]

Table A-29. Trunk Light [279]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION			
1	R/BE	P&A fuse power			
2	BK	Ground			

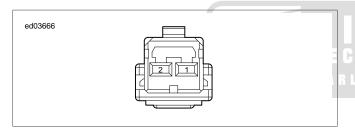


Figure A-41. Trunk Light [279]

Table A-30. Trunk AUX [312A]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	R/BE	P&A fuse
2	V/BE	P&A relay power
3	BK	Ground
4	W/R	CAN +
5	W/BK	CAN -
6	BE	Running/position light power
7	-	N/C
8	-	N/C
9	-	N/C
10	W/R	CAN +
11	W/BK	CAN -
12	BK	Tether

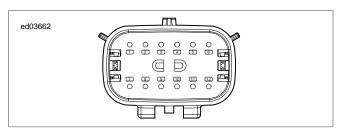


Figure A-42. Trunk AUX [312A]

Table A-31. Trunk AUX [312B]

TERMINAL	WIRE COLOR	CIRCUIT DESCRIPTION
1	-	N/C
2	-	N/C
3	-	N/C
4	W/R	CAN +
5	W/BK	CAN -
6	-	N/C
7	-	N/C
8	-	N/C
9	-	N/C
10	W/R	CAN +
11	W/BK	CAN -
12	BK	Tether

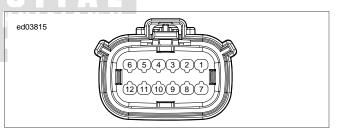
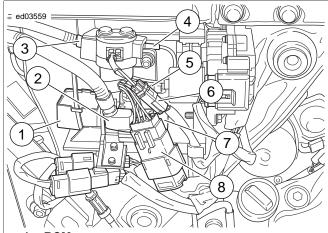


Figure A-43. Trunk AUX [312B]

COMPONENT LOCATIONS

Some components and connectors are not easily located on the motorcycle. The following figures show locations for these components and connectors. The figures are generally ordered from front to back around the motorcycle.



- 1. RCM
- 2. 150 Amp circuit breaker [252B]
- 3. RCM solenoid [251B]
- 4. RCM solenoid [251A]
- 5. 150 Amp circuit breaker [252A]
- 6. RCM solenoid [246]
- 7. 150 Amp circuit breaker
- 8. RCM [245]

1. Reverse motor
2. Reverse motor solenoid

- 3. Reverse motor solenoid terminal [248]
- 4. Reverse motor high current input terminal [249B]
- 5. Reverse motor solenoid high current input terminal [249A]

Figure A-45. Reverse Motor and Solenoid Assembly



Figure A-44. Under Right Side Cover

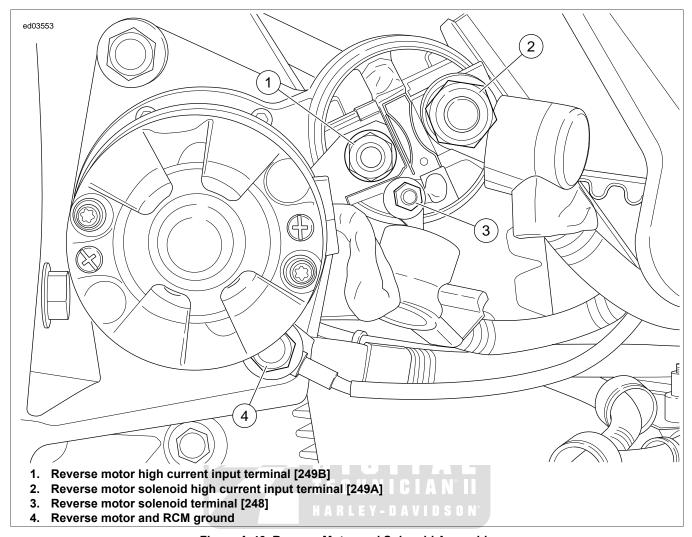


Figure A-46. Reverse Motor and Solenoid Assembly

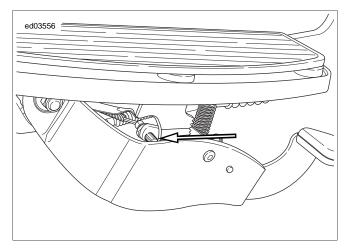


Figure A-47. Parking Brake Switch

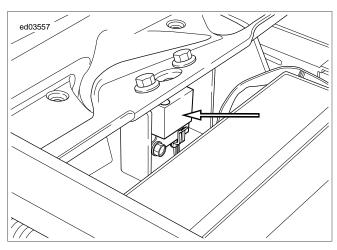


Figure A-48. BAS [134] Behind Battery



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LENGTH CONVERSION

CONVERSION TABLE

Table B-1. Metric Conversions

	MILLIMETERS to INCHES (MM x 0.03937 = IN)									INC		IILLIMETE 40 = MM)	RS		
mm	in	mm	in	mm	in	mm	in	in	mm	in	mm	in	mm	in	mm
.1	.0039	25	.9842	58	2.283	91	3.582	.001	.025	.6	15.240	1-15/16	49.21	3-5/16	84.14
.2	.0078	26	1.024	59	2.323	92	3.622	.002	.051	5/8	15.875	2	50.80	3-3/8	85.72
.3	.0118	27	1.063	60	2.362	93	3.661	.003	.076	11/16	17.462	2-1/16	52.39	3.4	86.36
.4	.0157	28	1.102	61	2.401	94	3.701	.004	.102	.7	17.780	2.1	53.34	3-7/16	87.31
.5	.0197	29	1.142	62	2.441	95	3.740	.005	.127	3/4	19.050	2-1/8	53.97	3-1/2	88.90
.6	.0236	30	1.181	63	2.480	96	3.779	.006	.152	.8	20.320	2-3/16	55.56	3-9/16	90.49
.7	.0275	31	1.220	64	2.519	97	3.819	.007	.178	13/16	20.638	2.2	55.88	3.6	91.44
.8	.0315	32	1.260	65	2.559	98	3.858	.008	.203	7/8	22.225	2-1/4	57.15	3-5/8	92.07
.9	.0354	33	1.299	66	2.598	99	3.897	.009	.229	.9	22.860	2.3	58.42	3-11/16	93.66
1	.0394	34	1.338	67	2.638	100	3.937	.010	.254	15/16	23.812	2-5/16	58.74	3.7	93.98
2	.0787	35	1.378	68	2.677	101	3.976	1/64	.397	1	25.40	2-3/8	60.32	3-3/4	95.25
3	.1181	36	1.417	69	2.716	102	4.016	.020	.508	1-1/16	26.99	2.4	60.96	3.8	96.52
4	.1575	37	1.456	70	2.756	103	4.055	.030	.762	1.1	27.94	2-7/16	61.91	3-13/16	96.84
5	.1968	38	1.496	71	2.795	104	4.094	1/32	.794	1-1/8	28.57	2-1/2	63.50	3-7/8	98.42
6	.2362	39	1.535	72	2.834	105	4.134	.040	1.016	1-3/16	30.16	2-9/16	65.09	3.9	99.06
7	.2756	40	1.575	73	2.874	106	4.173	.050	1.270	1.2	30.48	2.6	66.04	3-15/16	100.01
8	.3149	41	1.614	74	2.913	107	4.212	.060	1.524	1-1/4	31.75	2-5/8	66.67	4	101.6
9	.3543	42	1.653	75	2.953	108	4.252	1/16	1.588	1.3	33.02	2-11/16	68.26	4-1/16	102.19
10	.3937	43	1.693	76	2.992	109	4.291	.070	1.778	1-5/16	33.34	2.7	68.58	4.1	104.14
11	.4331	44	1.732	77	3.031	110	4.331	.080	2.032	1-3/8	34.92	2-3/4	69.85	4-1/8	104.77
12	.4724	45	1.772	78	3.071	111	4.370	.090	2.286	1.4	35.56	2.8	71.12	4-3/16	106.36
13	.5118	46	1.811	79	3.110	112	4.409	L E.1	2.540	1-7/16	36.51	2-13/16	71.44	4.2	106.68
14	.5512	47	1.850	80	3.149	113	4.449	1/8	3.175	1-1/2	38.10	2-7/8	73.02	4-1/4	107.95
15	.5905	48	1.890	81	3.189	114	4.488	3/16	4.762	1-9/16	39.69	2.9	73.66	4.3	109.22
16	.6299	49	1.929	82	3.228	115	4.527	.2	5.080	1.6	40.64	2-15/16	74.61	4-5/16	109.54
17	.6693	50	1.968	83	3.268	116	4.567	1/4	6.350	1-5/8	41.27	3	76.20	4-3/8	111.12
18	.7086	51	2.008	84	3.307	117	4.606	.3	7.620	1-11/16	42.86	3-1/16	77.79	4.4	111.76
19	.7480	52	2.047	85	3.346	118	4.645	5/16	7.938	1.7	43.18	3.1	78.74	4-7/16	112.71
20	.7874	53	2.086	86	3.386	119	4.685	3/8	9.525	1-3/4	44.45	3-1/8	79.37	4-1/2	114.30
21	.8268	54	2.126	87	3.425	120	4.724	.4	10.160	1.8	45.72	3-3/16	80.96	4-9/16	115.89
22	.8661	55	2.165	88	3.464	121	4.764	7/16	11.112	1-13/16	46.04	3.2	81.28	4.6	116.84
23	.9055	56	2.205	89	3.504	122	4.803	1/2	12.700	1-7/8	47.62	3-1/4	82.55	4-5/8	117.47
24	.9449	57	2.244	90	3.543	123	4.842	9/16	14.288	1.9	48.26	3.3	83.82	4-11/16	119.06

FLUID CONVERSION

UNITED STATES SYSTEM

Unless otherwise specified, all fluid volume measurements in this manual are expressed in United States (U.S.) units-ofmeasure. See below:

- 1 pint (U.S.) = 16 fluid ounces (U.S.)
- 1 quart (U.S.) = 2 pints (U.S.) = 32 fl. oz. (U.S.)
- 1 gallon (U.S.) = 4 quarts (U.S.) = 128 fl. oz. (U.S.)

METRIC SYSTEM

Fluid volume measurements in this manual include the metric system equivalents. In the metric system, 1 liter (L) = 1,000 milliliters (mL). To convert between U.S. units-of-measure and metric units-of-measure, refer to the following:

- fluid ounces (U.S.) x 29.574 = milliliters
- pints (U.S.) x 0.473 = liters
- quarts (U.S.) x 0.946 = liters
- gallons (U.S.) x 3.785 = liters
- milliliters x 0.0338 = fluid ounces (U.S.)
- liters x 2.114 = pints (U.S.)
- liters x 1.057 = quarts (U.S.)
- liters x 0.264 = gallons (U.S.)

BRITISH IMPERIAL SYSTEM

Fluid volume measurements in this manual do not include the British Imperial (Imp.) system equivalents. The following conversions exist in the British Imperial system:

- 1 pint (Imp.) = 20 fluid ounces (Imp.)
- 1 quart (Imp.) = 2 pints (Imp.)
- 1 gallon (Imp.) = 4 quarts (Imp.)

Although the same unit-of-measure terminology as the U.S. system is used in the British Imperial (Imp.) system, the actual volume of each British Imperial unit-of-measure differs from its U.S. counterpart. The U.S. fluid ounce is larger than the British Imperial fluid ounce. However, the U.S. pint, quart, and gallon are smaller than the British Imperial pint, quart, and gallon, respectively. To convert between U.S. units and British Imperial units, refer to the following:

- fluid ounces (U.S.) x 1.042 = fluid ounces (Imp.)
- pints (U.S.) x 0.833 = pints (Imp.)
- quarts (U.S.) x 0.833 = quarts (Imp.)
- gallons (U.S.) x 0.833 = gallons (Imp.)
- fluid ounces (Imp.) x 0.960 = fluid ounces (U.S.)
- pints (Imp.) x 1.201 = pints (U.S.)
- quarts (Imp.) x 1.201 = quarts (U.S.)
- gallons (Imp.) x 1.201 = gallons (U.S.)

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TORQUE CONVERSION

UNITED STATES SYSTEM

The U.S. units of torque, foot pounds and inch pounds, are used in this manual. To convert units, use the following equations:

- foot pounds (ft-lbs) X 12.00000 = inch pounds (in-lbs)
- inch pounds (in-lbs) X 0.08333 = foot pounds (ft-lbs)

METRIC SYSTEM

All metric torque specifications are written in Newton-meters (Nm). To convert metric to United States units and United States to metric, use the following equations:

- Newton meters (Nm) X 0.737563 = foot pounds (ft-lbs)
- Newton meters (Nm) X 8.85085 = inch pounds (in-lbs)
- foot pounds (ft-lbs) X 1.35582 = Newton meters (Nm)
- inch pounds (in-lbs) X 0.112985 = Newton meters (Nm)



GLOSSARY B.4

ACRONYMS AND ABBREVIATIONS

Table B-2. Acronyms and Abbreviations

ACRONYM OR ABBREVIATION		DESCRIPTION		
A		Amperes		
AAT		Ambient air temperature		
ABS		Anti-lock braking system		
AC		Alternating current		
ACC		Accessory position on ignition switch		
ACR		Automatic compression release		
AGM		Absorbed glass mat (battery)		
Ah		Ampere-hour		
AIS		Active intake solenoid		
AWG		American wire gauge		
B+		Battery voltage		
bar		Bar		
BAS		Bank angle sensor		
всм		Body control module		
вов		Breakout box		
BTDC		Before top dead center		
°C		Celsius (Centigrade)		
CA		Californía		
CAL		Calibration		
CAN		Controller area network		
СВ Тх		CB send transmission		
CB Rx		CB receive transmission		
СС		Cubic centimeters		
CCA		Cold cranking amps		
CCW		Counterclockwise		
CKP		Crankshaft position		
cm		Centimeters		
cm ³		Cubic centimeters		
CW		Clockwise		
DC		Direct current		
DLC		Data link connector		
DOM		Domestic		
DOT		Department of Transportation		
DTC		Diagnostic trouble code		
DVOM		Digital volt ohm meter		
ECM		Electronic control module		
ECT		Engine coolant temperature		
ECU		Electronic control unit		
EEPROM		Electrically erasable programmable read only memory		
EFI		Electronic fuel injection		

Table B-2. Acronyms and Abbreviations

ACRONYM OR ABBREVIATION	DESCRIPTION		
EHCU	Electro hydraulic control unit		
ET	Engine temperature		
ETC	Electronic throttle control		
EVAP	Evaporative emissions control system		
°F	Fahrenheit		
fl oz	Fluid ounce		
FPS	Fuel pressure sensor		
ft	Feet		
ft-lbs	Foot pounds		
FTP	Flash to pass		
g	Gram		
gal	Gallon		
GAWR	Gross axle weight rating		
GND	Ground (electrical)		
GPS	Global positioning system		
GVWR	Gross vehicle weight rating		
HCU	Hydraulic control unit		
HDI	Harley-Davidson International		
HD-Link	Networking system		
H-DSSS	Harley-Davidson smart security system		
HFM	Hands-free mode		
HFSM	Hands-free security module		
Hg	lercury HARLEY-DAVIDSON		
H02S	Heated oxygen sensor		
hp	Horsepower		
hr	Hour		
IAC	Idle air control		
IAT	Intake air temperature		
IC	Instrument cluster		
ID	Inside diameter		
IGN	Ignition light/key switch position		
in	inch		
in ³	Cubic inch		
INJ PW	Injector pulse width		
INTCM	Intercom		
in-lbs	Inch pounds		
JSS	Jiffy stand sensor		
kg	Kilogram		
km	Kilometer		
km/h	Kilometers per hour		
kPa	Kilopascal		
kW	Kilowatt		
L	Liter		

Table B-2. Acronyms and Abbreviations

ACRONYM OR ABBREVIATION	DESCRIPTION			
Ib	Pounds			
LCD	Liquid crystal display			
LED	Light emitting diode			
LH	Left hand			
LHCM	Left hand control module			
LP	License plate			
LT	Left			
mA	Milliampere			
MAP	Manifold absolute pressure			
max	Maximum			
mi	Mile			
min	Minimum			
mL	Milliliter			
mm	Millimeter			
mph	Miles per hour			
ms	Millisecond			
Nm	Newton-meter			
NIM	Navigation interface module			
NiMH	Nickel metal hydride			
N/A	Not applicable Programme Transfer of the Pro			
O2	Oxygen			
OD	Outside diameter			
OEM	Original equipment manufacturer			
oz	Ounce			
P&A	Parts and Accessories			
Part No.	Part number			
PIN	Personal identification number			
PND	Personal navigation device			
psi	Pounds per square inch			
PWM signal	Pulse width modulated signal			
qt	Quart			
RAD	Radio			
RCM	Reverse control module			
RDS	Radio data system			
RES	Reserve mark on fuel supply valve			
RH	Right hand			
RHCM	Right hand control module			
rpm	Revolutions per minute			
RT	Right			
S	Seconds			
SCFH				
SDARS	Satellite digital audio radio service			
SPDO				
SCFH SDARS	Cubic feet per hour at standard conditions			

Table B-2. Acronyms and Abbreviations

ACRONYM OR ABBREVIATION	DESCRIPTION
SPKR	Speaker
STT	Stop/tail/turn
TA	Traffic announcement
TCA	Throttle control actuator
TDC	Top dead center
TGS	Twist grip sensor
TPS	Throttle position sensor
TSM	Turn signal module
TSSM	Turn signal/security module
USB	Universal serial bus
V	Volt
VAC	Volts of alternating current
VDC	Volts of direct current
VIN	Vehicle identification number
VR	Voice recognition
VSS	Vehicle speed sensor
W	Watt
WA	Weather alert
WSS	Wheel speed sensor





PART NUMBER	TOOL NAME	NOTES
HD-25070	ROBINAIR HEAT GUN	2.19 TRUNK DOOR: FLRT, Repair
HD-34633	AIR SUSPENSION PUMP AND GAUGE	1.13 REAR SUSPENSION ADJUSTMENTS, General
HD-34633	AIR SUSPENSION PUMP AND GAUGE	2.29 SHOCK ABSORBERS, Removal
HD-34634	FORK OIL SEAL INSTALLER	5.4 AXLE, Assembly
HD-34736-B	VALVE SPRING COMPRESSOR	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Lockset
HD-35316-12	MAIN DRIVE GEAR INSTALLER	5.5 AXLE HOUSING/DIFFERENTIAL, Assembly
HD-35381A	BELT TENSION GAUGE	1.11 DRIVE BELT, Checking Drive Belt Deflection
HD-39978	DIGITAL MULTIMETER (FLUKE 78)	7.18 REAR LIGHTING DIAGNOSTICS, Diagnostics
HD-41404	HARNESS CONNECTOR TEST KIT	7.15 REVERSE MOTOR SYSTEM DIA- GNOSTICS, Description and Operation
HD-41404	HARNESS CONNECTOR TEST KIT	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1772
HD-41404	HARNESS CONNECTOR TEST KIT	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1775
HD-41404	HARNESS CONNECTOR TEST KIT	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1777
HD-41404	HARNESS CONNECTOR TEST KIT	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1778
HD-41404	HARNESS CONNECTOR TEST KIT	7.17 INDICATOR LAMP DIAGNOSTICS, Parking Brake Lamp Always On
HD-41404	HARNESS CONNECTOR TEST KIT	7.17 INDICATOR LAMP DIAGNOSTICS, Parking Brake Lamp Inoperative
HD-41404	HARNESS CONNECTOR TEST KIT	7.18 REAR LIGHTING DIAGNOSTICS, Brake Lamps Inoperative
HD-41404	HARNESS CONNECTOR TEST KIT	7.18 REAR LIGHTING DIAGNOSTICS, Brake Lamps Inoperative
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2132
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2133, B2134
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2137
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2138, B2139
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2132
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2133, B2134
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2137
HD-41404	HARNESS CONNECTOR TEST KIT	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2138, B2139
HD-41404	HARNESS CONNECTOR TEST KIT	7.20 BAS DIAGNOSTICS, DTC B2228
HD-42682	BREAKOUT BOX	7.17 INDICATOR LAMP DIAGNOSTICS, Parking Brake Lamp Always On
HD-43644-3	CAMSHAFT BEARING INSTALLER	5.5 AXLE HOUSING/DIFFERENTIAL, Disassembly
HD-43644-3	CAMSHAFT BEARING INSTALLER	5.5 AXLE HOUSING/DIFFERENTIAL, Disassembly
HD-45327	REAR FORK BEARING INSTALLER	2.27 REAR FORK, Repair
HD-46601	BREAKOUT BOX ADAPTERS	7.17 INDICATOR LAMP DIAGNOSTICS, Parking Brake Lamp Always On
HD-48650	DIGITAL TECHNICIAN II	7.20 BAS DIAGNOSTICS, Diagnostics
HD-49303	AXLE PULLER	5.4 AXLE, Removal

PART NUMBER	TOOL NAME	NOTES
HD-49762	PULLER	5.5 AXLE HOUSING/DIFFERENTIAL, Disassembly
HD-49796	BEARING SPACER TOOL	2.27 REAR FORK, Repair
HD-50390-1	BREAKOUT BOX	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1772
HD-50390-1	BREAKOUT BOX	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1775
HD-50390-1	BREAKOUT BOX	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1775
HD-50390-1	BREAKOUT BOX	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1777
HD-50390-1	BREAKOUT BOX	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1778
HD-50390-1	BREAKOUT BOX	7.15 REVERSE MOTOR SYSTEM DIA- GNOSTICS, Reverse Motor Inoperative
HD-50390-1	BREAKOUT BOX	7.15 REVERSE MOTOR SYSTEM DIA- GNOSTICS, Reverse Motor Inoperative
HD-50390-1	BREAKOUT BOX	7.17 INDICATOR LAMP DIAGNOSTICS, Parking Brake Lamp Always On
HD-50390-1	BREAKOUT BOX	7.18 REAR LIGHTING DIAGNOSTICS, Brake Lamps Inoperative
HD-50390-1	BREAKOUT BOX	7.19 HEADLAMP DIAGNOSTICS, FLRT, High Beam Inoperative
HD-50390-1	BREAKOUT BOX TEGHT	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2133, B2134
HD-50390-1	BREAKOUT BOX H A R L E Y	7.19 HEADLAMP DIAGNOSTICS, FLRT, Low Beam Inoperative
HD-50390-1	BREAKOUT BOX	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2138, B2139
HD-50390-1	BREAKOUT BOX	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, High Beam Inoperative
HD-50390-1	BREAKOUT BOX	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2133, B2134
HD-50390-1	BREAKOUT BOX	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, Low Beam Inoperative
HD-50390-1	BREAKOUT BOX	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2138, B2139
HD-50390-1	BREAKOUT BOX	7.20 BAS DIAGNOSTICS, DTC B2228
HD-50390-1	BREAKOUT BOX	7.20 BAS DIAGNOSTICS, DTC B2226
HD-50390-2	BCM/RADIO CABLE	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1775
HD-50390-2	BCM/RADIO CABLE	7.15 REVERSE MOTOR SYSTEM DIA- GNOSTICS, Reverse Motor Inoperative
HD-50390-2	BCM/RADIO CABLE	7.17 INDICATOR LAMP DIAGNOSTICS, Parking Brake Lamp Always On
HD-50390-2	BCM CABLE	7.18 REAR LIGHTING DIAGNOSTICS, Brake Lamps Inoperative
HD-50390-2	BCM/RADIO CABLE	7.19 HEADLAMP DIAGNOSTICS, FLRT, High Beam Inoperative

PART NUMBER	TOOL NAME	NOTES	
HD-50390-2	BCM/RADIO CABLE	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2133, B2134	
HD-50390-2	BCM/RADIO CABLE	7.19 HEADLAMP DIAGNOSTICS, FLRT, Low Beam Inoperative	
HD-50390-2	BCM/RADIO CABLE	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2138, B2139	
HD-50390-2	BCM CABLE	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, High Beam Inoperative	
HD-50390-2	BCM CABLE	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2133, B2134	
HD-50390-2	BCM CABLE	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, Low Beam Inoperative	
HD-50390-2	BCM CABLE	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2138, B2139	
HD-50390-2	BCM CABLE	7.20 BAS DIAGNOSTICS, DTC B2228	
HD-50390-2	BCM CABLE	7.20 BAS DIAGNOSTICS, DTC B2226	
HD-50390-2-P	BCM/RADIO OVERLAY	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1775	
HD-50390-2-P	BCM/RADIO OVERLAY	7.15 REVERSE MOTOR SYSTEM DIA- GNOSTICS, Reverse Motor Inoperative	
HD-50390-2-P	BCM/RADIO OVERLAY	7.17 INDICATOR LAMP DIAGNOSTICS, Parking Brake Lamp Always On	
HD-50390-2-P	BCM OVERLAY T E G III	7.18 REAR LIGHTING DIAGNOSTICS, Brake Lamps Inoperative	
HD-50390-2-P	BCM/RADIO OVERLAY H A R L E V	7.19 HEADLAMP DIAGNOSTICS, FLRT, High Beam Inoperative	
HD-50390-2-P	BCM/RADIO OVERLAY	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2133, B2134	
HD-50390-2-P	BCM/RADIO OVERLAY	7.19 HEADLAMP DIAGNOSTICS, FLRT, Low Beam Inoperative	
HD-50390-2-P	BCM/RADIO OVERLAY	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2138, B2139	
HD-50390-2-P	BCM OVERLAY	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, High Beam Inoperative	
HD-50390-2-P	BCM OVERLAY	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2133, B2134	
HD-50390-2-P	BCM OVERLAY	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, Low Beam Inoperative	
HD-50390-2-P	BCM OVERLAY	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2138, B2139	
HD-50390-2-P	BCM OVERLAY	7.20 BAS DIAGNOSTICS, DTC B2228	
HD-50390-2-P	BCM OVERLAY	7.20 BAS DIAGNOSTICS, DTC B2226	
HD-50390-4	ECM CABLE	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1772	
HD-50390-4	ECM CABLE	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1775	
HD-50390-4	ECM CABLE	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1777	

PART NUMBER	TOOL NAME	NOTES
HD-50390-4	ECM CABLE	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1778
HD-50390-4	ECM CABLE	7.15 REVERSE MOTOR SYSTEM DIA- GNOSTICS, Reverse Motor Inoperative
HD-50390-4-P	ECM OVERLAY	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1772
HD-50390-4-P	ECM OVERLAY	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1775
HD-50390-4-P	ECM OVERLAY	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1777
HD-50390-4-P	ECM OVERLAY	7.15 REVERSE MOTOR SYSTEM DIAGNOSTICS, DTC P1778
HD-50390-4-P	ECM OVERLAY	7.15 REVERSE MOTOR SYSTEM DIA- GNOSTICS, Reverse Motor Inoperative
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2132
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL	7.19 HEADLAMP DIAGNOSTICS, FLRT, DTC B2137
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2132
HD-50424	1.5 MM TERMINAL EXTRACTOR TOOL	7.19 HEADLAMP DIAGNOSTICS, Dual Lamp, DTC B2137
HD-59000B	FORK OIL LEVEL GAUGE	1.16 FORK OIL, Procedure
HD-95635-46	ALL-PURPOSE CLAW PULLER	5.5 AXLE HOUSING/DIFFERENTIAL, Disassembly
SNAP-ON BB200A	BASIC VACUUM BRAKE BLEEDER	1.6 BRAKES, Brake Fluid Replacement
SNAP-ON BB200A	BASIC VACUUM BRAKE BLEEDER	2.11 BRAKE LINES, Rear Brake Line

FASTENER	TORQUE	E VALUE	NOTES
Air valve nut	12-15 in-lbs	1.4-1.7 Nm	2.25 INTERMEDIATE FRAME, Installation
Air valve nut	12-15 in-lbs	1.4-1.7 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Installation
Axle adapter plate screws	41-45 ft-lbs	55.6-61.0 Nm	2.28 LATERAL ALIGNMENT, Procedure/Use LOCTITE 243 MEDIUM STRENGTH THREAD- LOCKER AND SEALANT (blue)
Axle adjustment screw jamnut	15-25 ft-lbs	20.3-34.0 Nm	1.11 DRIVE BELT, Setting Deflection
Axle bearing retainer locknuts	40-45 ft-lbs	54.2-61.0 Nm	5.4 AXLE, Installation/Use new locknuts
Axle cover set screw	60-84 in-lbs	6.8-9.5 Nm	2.5 FRONT AXLE COVERS: HDI MODELS, Replacement/LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red)
Bank angle sensor bracket screws	72-108 in-lbs	8.1-12.2 Nm	2.25 INTERMEDIATE FRAME, Assembly
Bank angle sensor bracket screws	72-108 in-lbs	8.1-12.2 Nm	7.10 BANK ANGLE SENSOR (BAS), Installation
Bank angle sensor screw	20-30 in-lbs	2.2-3.4 Nm	7.10 BANK ANGLE SENSOR (BAS), Installation
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	1.11 DRIVE BELT, Checking Drive Belt Deflection
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	1.11 DRIVE BELT, Setting Deflection
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	1.12 REAR WHEEL COMPENSATOR, Checking Isolator Wear
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	2.6 REAR WHEELS, Installation
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	2.22 BODY, Installation
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Installation
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.11 REVERSE CONTROL SYSTEM, Reverse Solenoid Replacement
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.11 REVERSE CONTROL SYSTEM, Circuit Breaker Replacement
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Vehicle Starter to Circuit Breaker Power Lead
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to RCM Solenoid
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, RCM Solenoid to Reverse Motor Solenoid Energizer Lead
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to Reverse Motor Solenoid Power Lead
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground
Battery cable screw	60-70 in-lbs	6.8-7.9 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation
Battery tray screws	72-96 in-lbs	8.1-10.9 Nm	2.25 INTERMEDIATE FRAME, Installation
Battery tray screws	132-156 in-lbs	14.9-17.6 Nm	7.3 BATTERY TRAY, Installation
Body attachment screws (inside trunk)	14-17 ft-lbs	19.0-23.1 Nm	2.22 BODY, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Body attachment screws (outside trunk)	23-28 ft-lbs	31.2-38.0 Nm	2.22 BODY, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Brake caliper, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.8 FRONT BRAKE CALIPERS, Installation
Brake caliper, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake caliper, front, mounting screws	28-38 ft-lbs	37.9-51.5 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement

FASTENER	TORQUE	VALUE	NOTES
Brake caliper, front, mounting screws	28-38 ft-lbs	37.9-51.5 Nm	2.8 FRONT BRAKE CALIPERS, Installation/metric
Brake caliper, front, pad pin	23-27 ft-lbs	31.2-36.6 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper, rear, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.10 REAR BRAKE CALIPERS, Installation
Brake caliper, rear, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake caliper, rear, mount bushing bolts	32-36 ft-lbs	43.4-48.8 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper, rear, mount bushing bolts	32-36 ft-lbs	43.4-48.8 Nm	2.10 REAR BRAKE CALIPERS, Installation
Brake caliper, rear, mounting bracket screws	41-45 ft-lbs	55.6-61.0 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement/Apply LOCTITE MEDIUM STRENGTH THREADLOCKER AND SEALANT 243 (blue) to screws.
Brake caliper, rear, mounting bracket screws	41-45 ft-lbs	55.6-61.0 Nm	2.10 REAR BRAKE CALIPERS, Installation/Use Loctite Medium Strength Threadlocker 243 (blue)
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm	1.6 BRAKES, Brake Fluid Replacement
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper bleeder valve, front	80-100 in-lbs	9.0-11.3 Nm	2.12 BLEEDING BRAKES, Procedure
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm	1.6 BRAKES, Brake Fluid Replacement
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake caliper bleeder valve, rear	31-33 in-lbs	3.5-3.7 Nm	2.12 BLEEDING BRAKES, Procedure
Brake line, rear, tee locknut	59-63 in-lbs	A 6.7-7.1 Nm A	2.11 BRAKE LINES, Rear Brake Line
Brake line, rear, tee locknut	59-63 in-lbs	6.7-7.1 Nm	2.27 REAR FORK, Installation/Use new locknut
Brake line P-clamp screw	80-100 in-lbs	9.0-11.3 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake manifold, front circuit, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake manifold, front circuit, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake manifold, rear circuit, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake manifold, rear circuit, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake manifold mounting screw	96-120 in-lbs	10.8-13.6 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake master cylinder, front, banjo bolt	17-22 ft-lbs	23.1-29.8 Nm	2.11 BRAKE LINES, Front Brake Lines
Brake master cylinder, front, clamp screws	60-80 in-lbs	6.8-9.0 Nm	2.7 FRONT BRAKE MASTER CYL- INDER, Assembly
Brake master cylinder, rear, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.9 REAR BRAKE MASTER CYL- INDER/PEDAL, Installation
Brake master cylinder, rear, banjo bolt	27-29 ft-lbs	36.6-39.3 Nm	2.11 BRAKE LINES, Rear Brake Line
Brake master cylinder, rear, mounting bracket nut	30-40 ft-lbs	40.7-54.2 Nm	2.9 REAR BRAKE MASTER CYL-INDER/PEDAL, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Brake master cylinder, rear, mounting bracket screws	126-150 in-lbs	14.2-16.9 Nm	2.9 REAR BRAKE MASTER CYL- INDER/PEDAL, Installation
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm	1.6 BRAKES, Brake Fluid Replacement

FASTENER	TORQUE	E VALUE	NOTES
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake master cylinder cover screws, FLRT, rear reservoir	6-8 in-lbs	0.7-0.9 Nm	2.12 BLEEDING BRAKES, Procedure
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm	1.6 BRAKES, Brake Fluid Replacement
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm	1.7 BRAKE PADS AND DISCS, Brake Pad Replacement
Brake master cylinder reservoir cover screws, front reservoir	6-8 in-lbs	0.7-0.9 Nm	2.12 BLEEDING BRAKES, Procedure
Brake pedal shaft locknut	15-20 ft-lbs	20.3-27.1 Nm	2.9 REAR BRAKE MASTER CYL-INDER/PEDAL, Installation
Brake reaction plate screws	40-45 ft-lbs	54.2-61.0 Nm	5.4 AXLE, Installation
Clutch line P-clamp	40-48 in-lbs	4.5-5.4 Nm	2.15 CLUTCH FLUID LINE: FLRT, Line Replacement
Clutch line P-clamp	40-48 in-lbs	4.5-5.4 Nm	2.31 HEADLAMP NACELLE, Installation
Clutch master cylinder clamp screws	60-80 in -lbs	6.8-9.0 Nm	2.14 CLUTCH MASTER CYLINDER AND RESERVOIR, Assembly
Clutch reservoir cover screws	6-8 in-lbs	0.7-0.9 Nm	1.10 HYDRAULIC CLUTCH FLUID, Fluid Inspection
Clutch reservoir cover screws	6-8 in-lbs	0.7-0.9 Nm	2.14 CLUTCH MASTER CYLINDER AND RESERVOIR, Assembly
Differential assembly screws	65-70 ft-lbs	88.1-94.9 Nm	5.5 AXLE HOUSING/DIFFEREN- TIAL, Assembly/Use new screws
Differential bearing cap screws	39-44 ft-lbs	52.9-59.7 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Installation
Engine mount end cap screws, front	42-48 ft-lbs	56.9-65.0 Nm	2.11 BRAKE LINES, Rear Brake Line
Engine stabilizer bracket screws	30-35 ft-lbs	40.7-47.5 Nm	2.33 ENGINE STABILIZER, Stabilizer Link/Apply LOCTITE 272 HIGH STRENGTH/HIGH TEMPER-ATURE THREADLOCKER AND SEALANT (red/orange) to threads
Engine stabilizer link screws	30-35 ft-lbs	40.7-47.5 Nm	2.33 ENGINE STABILIZER, Stabilizer Link
Engine stabilizer link screws	30-35 ft-lbs	40.7-47.5 Nm	2.33 ENGINE STABILIZER, Stabilizer Link
Fairing double studs	120-180 in-lbs	13.6-20.3 Nm	2.32 STEERING DAMPER ASSEMBLY, Installation
Fender, rear, screws	108-132 in-lbs	12.2-14.9 Nm	2.23 REAR FENDERS, Installation/Apply LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue).
Frame connection bracket screws	41-45 ft-lbs	55.6-61.0 Nm	2.25 INTERMEDIATE FRAME, Assembly
Front axle nut	70-75 ft-lbs	94.9-101.7 Nm	2.4 FRONT WHEEL, Installation
Front axle pinch screw (metric)	18-22 ft-lbs	24.4-29.8 Nm	2.4 FRONT WHEEL, Installation
Ground strap to forward stud (inside trunk)	14-17 ft-lbs	19.0-23.1 Nm	2.22 BODY, Installation
Ground strap to upper stud: FLHTCUTG	96-120 in-lbs	10.8-13.5 Nm	2.22 BODY, Assembly: FLHTCUTG
Handlebar cover screws: FLRT	10-20 in-lbs	1.1-2.3 Nm	2.31 HEADLAMP NACELLE, Installation
Headlamp bracket nuts, HDI	120-150 in-lbs	13.6-16.9 Nm	7.5 FRONT LIGHTING: HDI, Lamps Bracket
Headlamp cover bracket screws	22-32 in-lbs	2.5-3.6 Nm	7.5 FRONT LIGHTING: HDI, General
Headlamp cover screw	9-18 in-lbs	1.0-2.0 Nm	7.5 FRONT LIGHTING: HDI, General

FASTENER	TORQUI	E VALUE	NOTES
Headlamp horizontal adjustment screw: FLRT	30-35 ft-lbs	40.7-47.5 Nm	1.17 HEADLAMP ALIGNMENT, Headlamp: FLRT
Headlamp mounting screw: FLRT	30-35 ft-lbs	40.7-47.5 Nm	2.31 HEADLAMP NACELLE, Installation
Headlamp nacelle acorn nuts	96-132 in-lbs	10.8-14.9 Nm	2.31 HEADLAMP NACELLE, Installation
Headlamp nacelle top cover screws	84-120 in-lbs	9.5-13.5 Nm	2.31 HEADLAMP NACELLE, Installation
Headlamp nut: HDI Models	20-24 ft-lbs	27.1-32.5 Nm	1.17 HEADLAMP ALIGNMENT, FLHTCUTG HDI Dual LED Headlamps
Headlamp ring screw, HDI	9-14 in-lbs	1.0-1.6 Nm	7.5 FRONT LIGHTING: HDI, Headlamp Bulb Replacement: FLHTCUTG HDI
Headlamp vertical adjustment screw: FLRT	35-45 ft-lbs	47.5-61.0 Nm	1.17 HEADLAMP ALIGNMENT, Headlamp: FLRT
Intermediate frame screws	40-45 ft-lbs	54.2-61.0 Nm	2.25 INTERMEDIATE FRAME, Installation
Left electrical caddy screw	72-96 in-lbs	8.1-10.9 Nm	2.25 INTERMEDIATE FRAME, Installation
License plate bracket screws: FLHTCUTG	18-30 in-lbs	2.0-3.4 Nm	2.17 TRUNK DOOR: FLHTCUTG, Assembly/Use LOCTITE 243 MEDIUM STRENGTH THREAD- LOCKER AND SEALANT (blue)
License plate lamp housing locknuts: FLHTCUTG	60-72 in-lbs	6.8-8.1 Nm	7.7 LICENSE PLATE LAMPS/BRACKET: FLHTCUTG, Installation/Use new locknuts
License plate lamp screws: FLHTCUTG	9-12 in-lbs	1.0-1.4 Nm	7.7 LICENSE PLATE LAMPS/BRACKET: FLHTCUTG, Installation
Lug nuts	90-100 ft-lbs	122.0-135.6 Nm	1.11 DRIVE BELT, Setting Deflection/Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.
Lug nuts	90-100 ft-lbs	122.0-135.6 Nm	2.6 REAR WHEELS, Installation/Always check lug nut torque within 500-1000 mi (805-1610 km) after wheel installation.
Muffler bracket screws	14-18 in-lbs	19.0-24.4 Nm	2.24 REAR FRAME, Installation
Panhard rod adjustment jamnut	25-35 ft-lbs	33.9-47.5 Nm	2.30 PANHARD ROD, Adjustment
Panhard rod adjustment jamnut	25-35 ft-lbs	33.9-47.5 Nm	2.30 PANHARD ROD, Adjustment
Panhard rod clevis screw	55-60 ft-lbs	74.6-81.4 Nm	2.30 PANHARD ROD, Installation
Panhard rod clevis screw	55-60 ft-lbs	74.6-81.4 Nm	2.30 PANHARD ROD, Adjustment
Panhard rod locknut	55-60 ft-lbs	74.6-81.4 Nm	2.30 PANHARD ROD, Installation
Parking brake adjuster jamnut	72-120 in-lbs	8.1-13.6 Nm	1.8 PARKING BRAKE, Adjustment
Parking brake adjuster jamnut	72-120 in-lbs	8.1-13.6 Nm	1.8 PARKING BRAKE, Adjustment
Parking brake cable anchor bracket screws	41-45 ft-lbs	55.6-61.0 Nm	2.13 PARKING BRAKE ASSEMBLY, Cables
Parking brake pawl locknut	60-96 in-lbs	6.8-10.8 Nm	2.13 PARKING BRAKE ASSEMBLY, Pedal Assembly
Parking brake pedal bracket screws	36-42 ft-lbs	48.8-56.9 Nm	2.13 PARKING BRAKE ASSEMBLY, Pedal Assembly
Parking brake pedal locknut	15-20 ft-lbs	20.3-27.1 Nm	2.13 PARKING BRAKE ASSEMBLY, Pedal Assembly
Parking brake sensor jamnut	30-35 in-lbs	3.4-4.0 Nm	2.13 PARKING BRAKE ASSEMBLY, Parking Brake Sensor
Passenger grab handles: FLRT	96-120 in-lbs	10.8-13.6 Nm	2.22 BODY, Assembly: FLRT
Passenger grab handle screws: FLRT	96-120 in-lbs	10.8-13.6 Nm	2.22 BODY, Passenger Grab Handles: FLRT

FASTENER	TORQUE	EVALUE	NOTES
Passenger handrail screws	60-96 in-lbs	6.8-10.9 Nm	2.25 INTERMEDIATE FRAME, Assembly
Pinch block screws	41-45 ft-lbs	55.6-61.0 Nm	1.11 DRIVE BELT, Setting Deflection/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Pinch block screws	41-45 ft-lbs	55.6-61.0 Nm	2.29 SHOCK ABSORBERS, Installation/Use LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue)
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm	7.11 REVERSE CONTROL SYSTEM, Reverse Solenoid Replacement
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to RCM Solenoid
RCM solenoid post nuts	26-40 in-lbs	2.9-4.5 Nm	7.12 REVERSE JUMPER CABLES/WIRES, RCM Solenoid to Reverse Motor Solenoid Energizer Lead
RCM solenoid screws	32-40 in-lbs	3.6-4.5 Nm	7.11 REVERSE CONTROL SYSTEM, Reverse Solenoid Replacement
Rear fork bracket bolts	55-65 ft-lbs	74.6-88.1 Nm	2.27 REAR FORK, Installation/Apply two drops of LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue) to threads
Rear fork pivot shaft locknut	50 ft-lbs + 180 degrees addi- tional rotation	67.8 Nm + 180 degrees addi- tional rotation	2.27 REAR FORK, Installation/Always use new locknuts and cup washers
Rear frame screws	41-45 ft-lbs	55.6-61.0 Nm	2.24 REAR FRAME, Installation/ Use LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red)
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.11 REVERSE CONTROL SYSTEM, Circuit Breaker Replacement
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Vehicle Starter to Circuit Breaker Power Lead
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to RCM Solenoid
Reverse circuit breaker nuts	50-60 in-lbs	5.6-6.8 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to Reverse Motor Solenoid Power Lead
Reverse circuit breaker screw	32-40 in-lbs	3.6-4.5 Nm	7.11 REVERSE CONTROL SYSTEM, Circuit Breaker Replacement
Reverse motor bracket screws	39-44 ft-lbs	52.9-59.7 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Reverse motor screws	39-44 ft-lbs	52.9-59.7 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Reverse motor screws	39-44 ft-lbs	52.9-59.7 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Reverse motor solenoid energizer lead nut	24-30 in-lbs	2.7-3.4 Nm	7.12 REVERSE JUMPER CABLES/WIRES, RCM Solenoid to Reverse Motor Solenoid Energizer Lead

FASTENER	TORQUE	E VALUE	NOTES
Reverse motor solenoid energizer lead	24-30 in-lbs	2.7-3.4 Nm	7.13 REVERSE MOTOR AND BRACKET, Installa-
nut			tion
Reverse motor solenoid power lead nut	60-84 in-lbs	6.8-9.5 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Circuit Breaker to Reverse Motor Solenoid Power Lead
Reverse motor solenoid power lead nut	60-84 in-lbs	6.8-9.5 Nm	7.13 REVERSE MOTOR AND BRACKET, Installation
Reverse motor solenoid screws	70 in-lbs	7.9 Nm	7.13 REVERSE MOTOR AND BRACKET, Assembly
Right caddy to battery tray screw	36-40 in-lbs	4.1-4.5 Nm	7.3 BATTERY TRAY, Installation
Ring gear screws	22-26 ft-lbs	29.8-35.3 Nm	5.5 AXLE HOUSING/DIFFERENTIAL, Assembly
Shock absorber screws	55-60 ft-lbs	74.6-81.4 Nm	2.24 REAR FRAME, Installation/Use LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red)
Shock absorber screws	55-60 ft-lbs	74.6-81.4 Nm	2.29 SHOCK ABSORBERS, Installation/Use LOCTITE 262 HIGH STRENGTH THREAD- LOCKER AND SEALANT (red)
Shock absorber screws	55-60 ft-lbs	74.6-81.4 Nm	2.30 PANHARD ROD, Adjustment/Use LOCTITE 262 HIGH STRENGTH THREADLOCKER AND SEALANT (red)
Solenoid to reverse motor jumper nut	45 in-lbs	5.1 Nm	7.13 REVERSE MOTOR AND BRACKET, Assembly
Starter mounting screws	25-27 ft-lbs	33.9-36.6 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)
Starter solenoid post nut	70-90 in-lbs	7.9-10.2 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Vehicle Starter to Circuit Breaker Power Lead
Steering damper acorn nut	16-20 ft-lbs	21.7-27.1 Nm	2.32 STEERING DAMPER ASSEMBLY, Installation
Steering damper bracket to frame screw: FLRT	22-28 ft-lbs	29.8-38.0 Nm	2.32 STEERING DAMPER ASSEMBLY, Installation
Steering damper locknut	16-20 ft-lbs	21.7-27.1 Nm	2.32 STEERING DAMPER ASSEMBLY, Installation
Steering damper side bracket acorn nuts: FLHTCUTG	120-180 in-lbs	13.6-20.3 Nm	2.32 STEERING DAMPER ASSEMBLY, Installation/ These also retain the auxiliary/fog/HDI head-lamp brackets.
Steering damper side bracket to fork bracket screws: FLRT	20-25 ft-lbs	27.1-33.9 Nm	2.32 STEERING DAMPER ASSEMBLY, Installation
Stop lamp switch, rear	12-15 ft-lbs	16.3-20.3 Nm	2.11 BRAKE LINES, Rear Brake Line/Use LOCTITE 565 THREAD SEALANT
Tail lamp/turn signal base screw	36-48 in-lbs	4.1-5.4 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation/Use LOCTITE 222 LOW STRENGTH THREADLOCKER AND SEALANT (purple)
Tail lamp/turn signal bracket screw, HDI	36-48 in-lbs	4.1-5.4 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation/Use LOCTITE 222 LOW STRENGTH THREADLOCKER AND SEALANT (purple)
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.6 TAIL LAMPS/REAR TURN SIGNALS, Installation

FASTENER	TORQUE	VALUE	NOTES
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.8 REAR LIGHTS HARNESS: FLHTCUTG, Installation
Tail lamp/turn signal screws	21-24 in-lbs	2.4-2.7 Nm	7.9 REAR LIGHTS HARNESS: FLRT, Installation
Tail lamp bracket: FLRT	72-96 in -lbs	8.1-10.8 Nm	2.23 REAR FENDERS, Installation
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm	2.21 TOUR-PAK, Tour-Pak Adjustment
Tour-Pak mounting nuts	60-72 in -lbs	6.8-8.1 Nm	2.21 TOUR-PAK, Tour-Pak Adjustment
Tour-Pak mounting nuts	60-72 in -lbs	6.8-8.1 Nm	2.21 TOUR-PAK, Installation
Tour-Pak mounting nuts	60-72 in-lbs	6.8-8.1 Nm	2.21 TOUR-PAK, Installation
Transmission dipstick	25-75 in-lbs	2.8-8.5 Nm	1.5 LUBRICANTS, Checking Transmission Lubricant Level
Transmission ground post nut	66-114 in-lbs	7.5-12.9 Nm	7.12 REVERSE JUMPER CABLES/WIRES, Reverse Motor to Battery Ground
Trunk bulkhead cover screws	72-96 in-lbs	8.1-10.8 Nm	2.22 BODY, Assembly: FLRT
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Installation
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm	7.7 LICENSE PLATE LAMPS/BRACKET: FLHTCUTG, Installation
Trunk door cover screws: FLHTCUTG	30-54 in-lbs	3.4-6.1 Nm	7.8 REAR LIGHTS HARNESS: FLHTCUTG, Installation
Trunk door hinge cover screws: FLRT	25-35 in-lbs	2.8-3.9 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door hinge locknuts: FLHTCUTG	60-84 in-lbs	6.8-9.5 Nm	2.17 TRUNK DOOR: FLHTCUTG, Installation/Use new locknuts
Trunk door hinge screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Assembly/Use LOCTITE 243 MEDIUM STRENGTH THREAD-LOCKER AND SEALANT (blue)
Trunk door hinge to body screws: FLRT	72-96 in -lbs	8.1-11.0 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door hinge to door screws: FLRT	72-96 in -lbs	8.1-11.0 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door lanyard screws: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.17 TRUNK DOOR: FLHTCUTG, Installation
Trunk door latch: FLRT	96-120 in-lbs	10.8-13.6 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk door latch: FLRT	96-120 in-lbs	10.8-13.6 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk door latch housing screws: FLHTCUTG	48-60 in-lbs	5.4-6.8 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Latch Assembly
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Trunk door latch pin jamnut: FLHTCUTG	48-72 in-lbs	5.4-8.1 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Latch Pin
Trunk door lock housing nuts: FLHTCUTG	9-11 in-lbs	1.0-1.2 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Latch Assembly
Trunk door striker pin: FLRT	35-40 ft-lbs	47.0-54.0 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk door striker pin: FLRT	35-40 ft-lbs	47.0-54.0 Nm	2.19 TRUNK DOOR: FLRT, Adjust Trunk Door
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FASTENER	TORQUI	E VALUE	NOTES
Trunk door tether reel screws: FLRT	72-96 in-lbs	8.1-10.8 Nm	2.22 BODY, Assembly: FLRT
Trunk door tether to door screws: FLRT	16-22 in-lbs	1.8-2.5 Nm	2.19 TRUNK DOOR: FLRT, Repair
Trunk latch cover screws: FLRT	20-25 in-lbs	2.3-2.8 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk latch housing cover screw: FLHTCUTG	25-28 in-lbs	2.8-3.2 Nm	2.18 TRUNK DOOR LOCKSET: FLHTCUTG, Lockset
Trunk lock cover: FLRT	72-96 in-lbs	8.1-10.8 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk lock cover: FLRT	72-96 in-lbs	8.1-10.8 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Trunk lock knob nut: FLRT	13-16 ft-lbs	17.6-21.7 Nm	2.20 TRUNK DOOR LOCKSET: FLRT, Lock and Latch Assembly
Turn signal, front, lamp to bracket screw	12-16 ft-lbs	16.3-21.7 Nm	7.4 FRONT LIGHTING, Front Turn Signal Lamp: FLRT
Turn signal lamp, front, mounting screw, HDI	96-131 in-lbs	10.9-14.8 Nm	7.5 FRONT LIGHTING: HDI, Turn Signal Lamps
Upper handlebar clamp fastener, rear: all models	16-20 ft-lbs	21.7-27.1 Nm	2.16 HANDLEBAR, Adjustment: FLRT
Wheel center cap clamp screw	72-96 in-lbs	8.1-10.9 Nm	2.6 REAR WHEELS, Installation/Use LOCTITE 243 MEDIUM STRENGTH THREADLOCKER AND SEALANT (blue)

TECHNICIAN°II
HARLEY-DAVIDSON°

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