TSM/TSSM OVERVIEW 3.1

GENERAL

See Figure 3-1. The turn signal module (TSM) has two major functions:

● Control turn signals.

● Serve as bank angle sensor.

The optional, factory-installed, security system (turn signal security module or TSSM) provides the same functionality as the TSM, but also includes security and immobilization functions.

See Section 3.2 TSM/TSSM FEATURES for complete details.

TROUBLESHOOTING

Problems fall into at least one of four categories:

● Turn signal malfunction.

● Bank angle (engine disable).

● Security lamp problem (TSSM only).

● Security system malfunction (TSSM only).

To resolve TSM/TSSM problems, four basic steps are involved. In order of occurrence, they are:

1. Retrieve DTC's using speedometer self diagnostics. See Section 3.10 SPEEDOMETER SELF DIAGNOSTICS.

2. Diagnose system problems. This involves using special tools and the diagnostic flow charts in this section.

3. Correct problems through the replacement and/or repair of the affected components.

4. After repairs are performed, the work must be validated. This involves clearing the DTC's and confirming proper vehicle operation as indicated by the behavior of the turn signals.
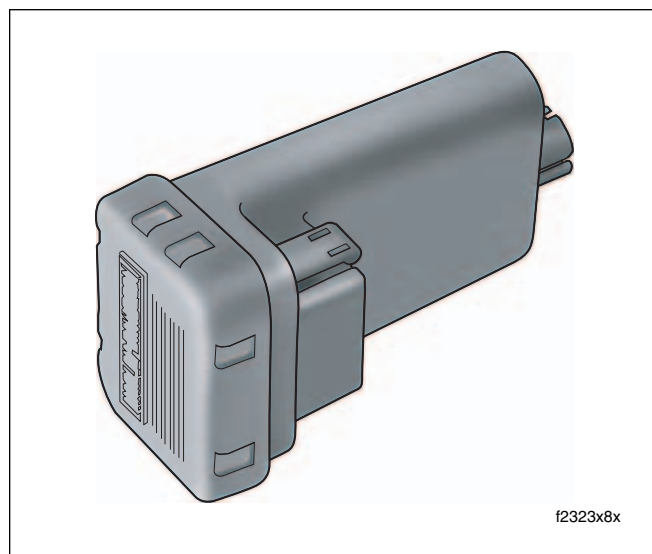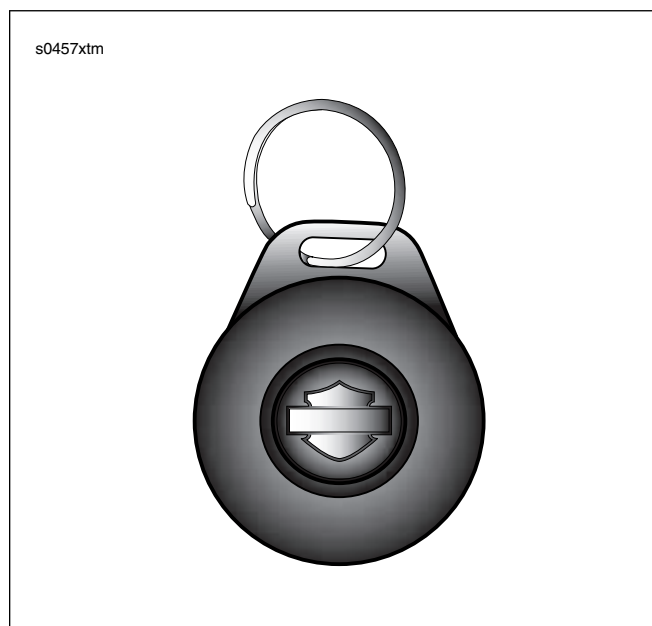

f2323x8x

Figure 3-1. TSM/TSSM

s0457xtm

Figure 3-2. Key Fob

d0735x8x

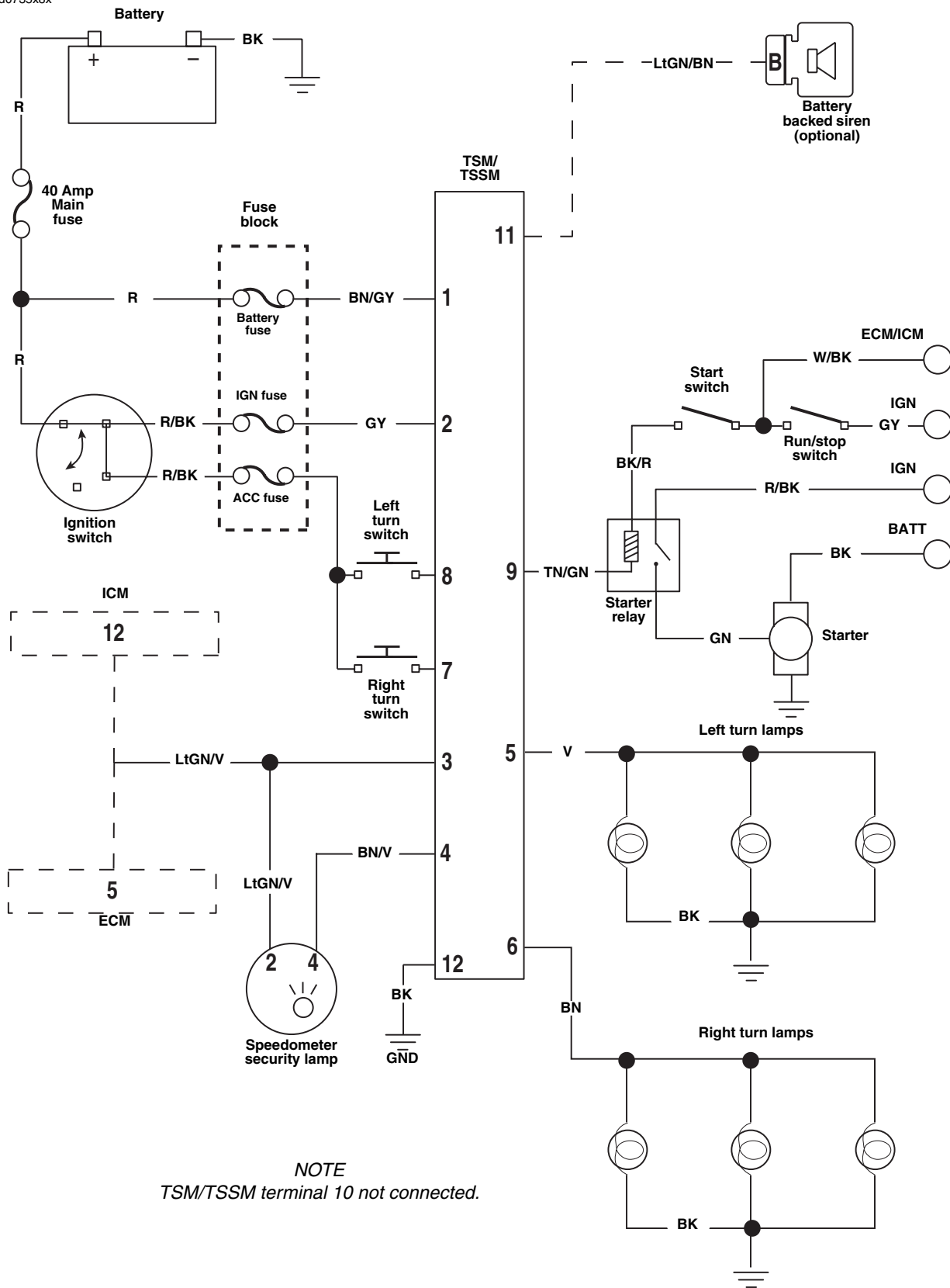**Figure 3-3. Simplified TSM/TSSM Wiring**

NOTE
TSM/TSSM terminal 10 not connected.

TSM/TSSM FEATURES 3.2

GENERAL

The Turn Signal Module (TSM) and the Turn Signal Security Module (TSSM) provide the following capabilities. Note that some hardware options and software settings are dependent upon vehicle market specifications.

TURN SIGNAL FUNCTIONS

TSM/TSSM Features

See Section 3.4 TSM/TSSM TURN SIGNAL FUNCTIONS for complete details.

● **Manual turn signal control:** Manual activation/deactivation of left and right turn signal flashing sequences.

● **Automatic turn signal cancellation:** Automatic cancellation of left and right turn signal flashing sequences based on either vehicle speed, vehicle acceleration or turn completion.

● **Emergency flashers:** Four-way left and right turn signal flashing capability.

● **Turn signal lamp diagnostics:** Self-diagnostics for short circuit and open lamp conditions on both left and right turn signal systems.

BANK ANGLE FUNCTIONS

TSM/TSSM Features

See Section 3.5 TSM/TSSM BANK ANGLE FUNCTION for complete details.

● **Emergency engine shutdown:** Monitors vehicle lean and will provide engine shutdown when lean exceeds 45° from vertical for more than one second.

● **Emergency outputs disable:** Monitors vehicle lean and will disable turn signal lamps and starter motor when lean exceeds 45° from vertical for more than one second.

SECURITY ALARM AND IMMOBILIZATION FUNCTIONS

TSSM Only Feature

The following information applies only to vehicles with the security option (TSSM). See Section 3.6 SECURITY SYSTEM (TSSM) FUNCTIONS for more information.

● **Remote arming/disarming:** See Figure 3-4. Owners may enable and disable security alarm and immobilization functions with a remote, personally carried transmitter. This transmitter is referred to as a **key fob** within this document.
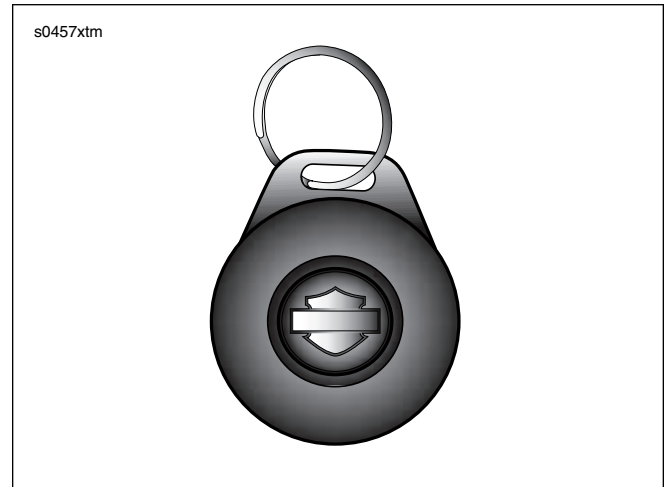
Figure 3-4. Key Fob
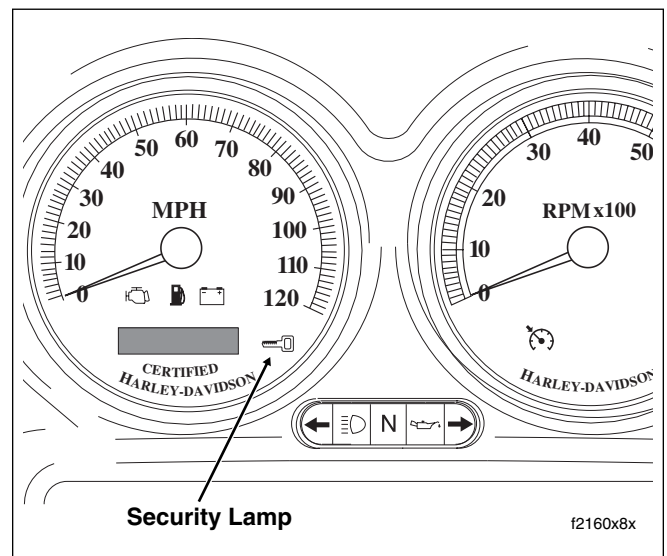
Figure 3-5. Speedometer

● **Security lamp:** See Figure 3-5. A lamp within the speedometer face tells the rider if the system is armed or disarmed.

● **Personal code disarming:** If a key fob is not available, the TSSM allows the rider to disable the security alarm and immobilization functions if the rider knows the previously entered personal code.

● **Security command confirmation:** When the system is armed or disarmed, the system provides visual feedback to the rider by flashing the turn signals and sounding the optional siren.

- **Auto-arming:** Automatically enables the security alarm and immobilization functions within 30 seconds after the ignition key is switched OFF.

NOTE

Default auto-arming behavior depends upon vehicle market. All vehicles are shipped without auto-arming. All vehicles delivered to The Netherlands market require auto-arming activation using Digital Technician. Motorcycles sold in other markets have auto-arming disabled, but it may be activated. See Section 3.3 TSM/TSSM VEHICLE DELIVERY.

- **Transport mode:** It is possible to arm the security system without enabling the motion detector for one ignition cycle. This allows the vehicle to be moved in an immobilized state.

- **Starter/ignition disable:** Should the security alarm and immobilization functions be triggered by a vehicle security condition, the starter and ignition system will be disabled.

- **Security system alarm:** See Figure 3-6. The system will alternately flash the left and right turn signals and sound an optional siren if a vehicle security condition is detected while the system is armed.
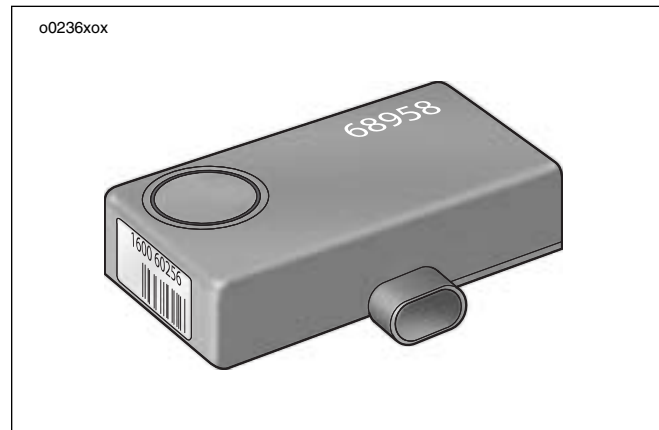

Figure 3-6. Siren

TSM/TSSM VEHICLE DELIVERY 3.3

GENERAL

WARNING

Only Touring Harley-Davidson Motorcycles are suitable for sidecar use. Consult a Harley-Davidson dealer. Use of motorcycles other than Touring models with sidecars could result in death or serious injury. (00040a)

Setting up a vehicle TSM/TSSM depends on whether the vehicle has a turn signal module (TSM) or the optional security system (TSSM) installed.

All motorcycles ship with the TSM/TSSM set for use **without** a sidecar installed. If a motorcycle is equipped with a TSM, no further configuration is required. However, if a motorcycle has an optional security system (TSSM) installed, perform the following steps as necessary.

1. Configure TSSM motorcycles by assigning **both** key fobs to the vehicle.

2. Configure TSSM motorcycles by entering a personal code picked by the owner. The personal code allows the owner to operate the system if the key fob is lost or inoperable. Record this code in the owner's manual and instruct the customer to carry a copy.

IMPORTANT NOTE

Do not forget to enter a personal code for TSSM vehicles. If a code is not assigned and both key fobs are lost or damaged while the vehicle is armed, the TSSM and ECM/ICM must be replaced.

Changes to TSM/TSSM settings are made by a series of programming operations involving the ignition key, left/right turn signal switches and key fob (security systems).

At certain steps in the programming sequence, the motorcycle may provide confirmation of settings by flashing the turn signals, turn signal indicators and/or security lamp. In addition, when programming a personal code into a TSSM system, the odometer displays the personal code to the user and dynamically updates it as the code is entered or changed.

All programming operations are listed in table format. Follow the numbered steps to configure the system. If a confirmation response is listed, wait for the confirmation before continuing to the next step. Important information pertaining to certain actions will be found in the NOTES column.

SIDECAR CONFIGURATION

WARNING

Only Touring Harley-Davidson Motorcycles are suitable for sidecar use. Consult a Harley-Davidson dealer. Use of motorcycles other than Touring models with sidecars could result in death or serious injury. (00040a)

On motorcycles equipped with a sidecar, the TSM/TSSM **must** be switched from the factory solo vehicle setting to the sidecar setting using a computer based diagnostic package called DIGITAL TECHNICIAN (Part No. HD-44750) and a BAS kit must then be installed. If the sidecar is then permanently removed, the TSM/TSSM **must** be reconfigured back to the solo setting and the BAS kit removed. To verify whether the TSM/TSSM is configured for solo or sidecar usage, refer to Table 3-1.

POWER DISRUPTION AND CONFIGURING

The TSM/TSSM will not enter configuration mode on the first attempt after battery voltage has been removed from terminal 1. This will occur after any of the following situations:

●   Battery disconnect or power drain.

●   Battery fuse or maxi-fuse removal.

●   Connecting Breakout Box to TSM/TSSM connector.

Therefore, after all battery reconnects, the configuration sequence must be modified as follows.

1. Set run switch to **OFF**, cycle ignition key **ON**-OFF-**ON**-OFF-**ON** and press left turn signal switch **twice**.

2. Repeat step listed above.

3. Continue with configuration sequence listed.

KEY FOB ASSIGNMENT

The key fob on TSSM motorcycles must be set so it will operate the alarm system on the vehicle. This assignment **must** be completed with no pauses between steps greater than 10 seconds. Turn the ignition OFF after all key fobs have been assigned. The programming mode will also exit after 60 seconds has elapsed without detecting any fob signup messages or turn signal switch activity.

Two key fobs may be assigned to the TSSM. The first successful attempt to program a fob will disable all previously assigned fobs. If a second fob is to be programmed, it must be done in the same programming sequence as the initial fob.

To assign a key fob to a motorcycle, refer to Table 3-2.

PERSONAL CODE ENTRY

First Time Code Entry: TSSM Only

IMPORTANT NOTE

Do not forget to enter a personal code for TSSM vehicles. If a code is not assigned and both key fobs are lost or damaged while the vehicle is armed, the TSSM must be replaced.

The TSSM personal code (Personal Identification Number or PIN) consists of five digits. Each digit can be any number from 1-9. The personal code **must** be used to disarm the security system in case the key fob becomes unavailable.

To set a personal code on a motorcycle with no code previously installed, refer to Table 3-3. The procedure listed uses 3-1-3-1-3 as the desired personal code.

NOTE

For better security, do not use 3-1-3-1-3 as a personal code. It is shown as an example only.

Decide what five digit code the owner would like to use. The code will be programmed using the turn signal switches and key fob. Keep a record of the code in a secure place such as your wallet or the owner's manual.

● When programming the personal code, the security lamp flashes to provide feedback when entering each digit. The odometer also displays the PIN and the change dynamically.

● The number of security lamp flashes corresponds to the number currently selected for a given digit. Therefore, the lamp may flash 1-9 times depending on the number entered. The five-digit code will change on the odometer display and the active digit will blink.

● Press the left turn switch one time to increment each digit of the code.

● Quickly press the key fob button twice to advance to the next digit of the code.

NOTE

The programming mode exits upon turning the ignition switch to OFF or if no turn signal switch/key fob button activity occurs for 60 seconds. No data is saved for partial configuration attempts if entering a PIN for the first time. If a PIN has previously been entered, the user can change any digit or group of digits.

Modifying Existing Codes: TSSM Only

If a code was previously entered, the security lamp will flash the equivalent digit, and the odometer will display the existing code with the active digit blinking. Each additional press of the left turn switch will increment the digit.

● To advance from 5 to 6, press and release the left turn switch 1 time.

● To advance from 8 to 2, press and release the left turn switch 3 times (9-1-2).

Table 3-1. Verifying Whether TSM/TSSM is Configured for Solo/Sidecar* Use

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		Verify that security lamp is not blinking (vehicle is disarmed)
2	Turn **IGN** key **ON**-OFF-**ON**-OFF-**ON**		
3	Press **left** turn switch **2 times** and release	1-4 flashes turn signals & indicators depending on vehicle configuration (See Section 3.3 TSM/TSSM VEHICLE DELIVERY regarding battery disconnects.)	1 flash-Worldwide TSM, no security 2 flashes-North American/ Domestic configurationTSSM 3 flashes-Netherlands configuration TSSM 4 flashes-European/HDI configuration TSSM
4	Press **right** turn switch **1 time** and release	1 flash turn signals & indicators	
5	Press **right** turn switch **1 time** and release	2 flashes turn signals & indicators	
6	Press **left** turn switch **1 time** and release	1-2 flashes turn signals & indicators depending on vehicle configuration	1 flash-Solo 2 flashes-Sidecar
7	Turn **IGN** key OFF		
	* Only Touring models can be configured for sidecar usage and then access to Digital Technician is required.		

Table 3-2. TSSM Key Fob Assignment

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		Verify that security lamp is not blinking (vehicle is disarmed) This assignment procedure **must** be completed with no pauses between steps greater than 10 seconds
2	Turn **IGN** key **ON**-OFF-**ON**-OFF-**ON**		
3	Press **left** turn switch **2 times** and release	1-4 flashes turn signals & indicators depending on vehicle configuration (See Section 3.3 TSM/TSSM VEHICLE DELIVERY regarding battery disconnects.)	1 flash-Worldwide TSM, no security 2 flashes-North American/ Domestic configuration TSSM 3 flashes-The Netherlands configuration TSSM 4 flashes-European/HDI configuration TSSM
4	Press **right** turn switch **1 time** and release	1 flash turn signals & indicators	
5	Press **left** turn switch **1 time** and release	2 flashes turn signals & indicators	
6	Press and hold **key fob** button until confirmation is received	2 flashes turn signals & indicators	This may take 10-25 seconds
7	If you have two key fobs, press and hold button on second **key fob** until confirmation is received	2 flashes turn signals & indicators	optional step
8	Turn **IGN** key OFF		

Table 3-3. Programming A TSSM Personal Code (Example: 3-1-3-1-3)
With No Code Previously Installed

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		Verify that security lamp is not blinking (vehicle is dis-armed) This assignment procedure **must** be completed with no pauses between steps greater than 10 seconds
2	Turn **IGN** key **ON**-OFF-**ON**-OFF-**ON**		
3	Press **left** turn switch **2 times** and release	1-4 flashes turn signals and indicators depending on vehicle configuration (See Section 3.3 TSM/TSSM VEHICLE DELIVERY regarding battery discon-nects)	1 flash-Worldwide TSM, no security 2 flashes-North American/ Domestic configuration TSSM 3 flashes-The Netherlands configuration TSSM 4 European/HDI configura-tion TSSM
4	Quickly press **key fob** button **2 times** and release	One flash turn signals and indicators Odometer displays current five-digit per-sonal code (five dashes if no code entered), first digit blinks	Vehicle is in personal code entry mode ready to enter or modify first digit
5	Press **left** turn switch **1 time** and release	Security lamp flashes 1 - 9 times if code was previously entered	A lack of confirmation flashes indicates no digit is entered
6	Press and release **left** turn switch to advance through the digits In this example, you will press and release three times	Blinking digit in odometer display incre-ments, security lamp flashes to indicate each digit selected In this example, the blinking digit dis-played is 3 and the security lamp will flash three times	You've selected 3 as a num-ber for the first digit
7	Quickly press **key fob** button **2 times** and release	Two flashes turn signals and indicators second digit in odometer display blinks	You've confirmed 3 as a num-ber for the first digit and have advanced to entering the second digit
8	Press **left** turn switch **1 time** and release	none	A lack of confirmation flashes indicates no digit is entered
9	Press and release **left** turn switch to advance through the digits In this example, you will perform this step one time	Blinking digit in odometer display incre-ments, security lamp flashes to indicate each digit selected In this example, the blinking digit dis-played is 1 and the security lamp will flash one time	You've selected 1 as a num-ber for the second digit
10	Quickly press **key fob** button **2 times** and release	Three flashes turn signals and indicators third digit in odometer display blinks	You've confirmed 1 as a num-ber for the second digit and have advanced to entering the third digit
11	Press **left** turn switch **1 time** and release	none	A lack of confirmation flashes indicates no digit is entered

Table 3-3. Programming A TSSM Personal Code (Example: 3-1-3-1-3)
With No Code Previously Installed

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
12	Press and release **left** turn switch to advance through the digits In this example, you will repeat this step three times	Blinking digit in odometer display increments, security lamp flashes to indicate each digit selected In this example, the blinking digit displayed is 3 and the security lamp will flash three times	You've selected 3 as a number for the third digit
13	Quickly press **key fob** button **2 times** and release	Four flashes turn signals and indicators fourth digit in odometer display blinks	You've confirmed 3 as a number for the third digit and have advanced to entering the fourth digit
14	Press **left** turn switch **1 time** and release	none	A lack of confirmation flashes indicates no digit is entered
15	Press and release **left** turn switch to advance through the digits In this example, you will perform this step one time	Blinking digit in odometer display increments, security lamp flashes to indicate each digit selected In this example, the blinking digit displayed is 1 and the security lamp will flash one time	You've selected 1 as a number for the fourth digit
16	Quickly press **key fob** button **2 times** and release	Five flashes turn signals and indicators fifth digit in odometer display blinks	You've confirmed 1 as a number for the fourth digit and have advanced to entering the fifth digit
17	Press **left** turn switch **1 time** and release	none	A lack of confirmation flashes indicates no digit is entered
18	Press and release **left** turn switch to advance through the digits In this example, you will repeat this step three times	Blinking digit in odometer display increments, security lamp flashes to indicate each digit selected In this example, the blinking digit displayed is 3 and the security lamp will flash three times	You've selected 3 as a number for the fifth digit
19	Quickly press **key fob** button **2 times** and release	One flash turn signals and indicators first digit in odometer display blinks	You've confirmed 3 as a number for the fifth digit and have gone back to the first digit
20	Turn **IGN** key OFF		
21	Write down code in owner's manual		
22	Arm the security system and attempt to disarm using personal code entry. Refer to Table 3-9.		

GENERAL

The TSM/TSSM's turn signal feature has several modes:

● Automatic cancellation.

● Manual cancellation.

● Four-way flashing.

● Diagnostics mode.

The turn signals cannot be activated or deactivated when the ignition key is in the ACC position. The turn signals can only be activated or deactivated with the ignition key in the IGN position.

⚠WARNING

Only Touring Harley-Davidson Motorcycles are suitable for sidecar use. Consult a Harley-Davidson dealer. Use of motorcycles other than Touring models with sidecars could result in death or serious injury. (00040a)

AUTOMATIC CANCELLATION

Press the left or right turn switch to activate automatic turn signal cancellation. There is no need to hold the turn switch in when approaching the turn. The TSM/TSSM will not cancel the signal before the turn is actually completed.

● When the directional switch is released, the system starts a 20 count. As long as the vehicle is traveling above 7 MPH (11.3 KPH) the directional will always cancel after 20 flashes if the system does not recognize any other input.

● If the vehicle speed drops to 7 MPH (11.3 KPH) or less, including stopped, the directionals will continue to flash. Counting will resume when vehicle speed reaches 8 MPH (12.9 KPH) and will automatically cancel when the count total equals 20 as stated above.

● The turn signals will cancel within two seconds upon turn completion. A sensor inside the TSM/TSSM cancels the signal after the vehicle has been returned to an upright position.

NOTE

The bank angle cancellation function has an automatic calibration feature. Ride the motorcycle for 1/4 mile (0.4 KM) at steady speeds (upright) to calibrate the system. Performance of bank angle function may not be optimal until this calibration is performed. This self-calibration is performed automatically every time the vehicle is started and ridden.

MANUAL CANCELLATION

If you want to stop the turn signals from flashing, briefly depress the turn signal switch a second time.

If you are signalling to turn in one direction and you depress the switch for the opposite turn signal, the first signal is cancelled and the opposite side begins flashing.

FOUR-WAY FLASHING

Use the following method to activate the four-way flashers.

1. With the ignition key ON and security system disarmed (models with security only), press the left and right turn signal switches at the same time.

2. Turn the ignition key OFF and arm the security system if present and desired. The four-way flashers will continue for two hours.

3. To cancel four-way flashing, disarm the security system if necessary, turn the ignition key ON and press the left and right turn signal switches at the same time.

NOTE

Auto-arming (always active on The Netherlands bikes, user selectable on other vehicles) requires that the four-way flashers be activated within 30 seconds of key OFF or after the vehicle has been disarmed.

This system allows a stranded vehicle to be left in the four-way flashing mode and secured until help is found.

If the security system is disarmed while the four-way flashers are active, the lights will flash as follows:

1. TSSM stops four-way flashing mode. Motorcycle sits for 1 second with turn signals off.

2. TSSM performs disarming confirmation (1 flash).

3. Motorcycle sits for 1 second with turn signals off.

4. Motorcycle restarts four-way flashing mode.

DIAGNOSTICS MODE

The TSM/TSSM measures the current when the turn signals are used. If there is a burned out light bulb on one side, the remaining light and the corresponding turn signal indicator flash at double the normal rate starting with the fifth flash.

Other diagnostic conditions monitored include:

● Short circuit in the turn signal wiring.

● Open circuit in the turn signal wiring.

● Stuck turn signal switch.

NOTES

● *A stuck turn signal switch will disable the automatic turn signal cancellation feature.*

● *If a stuck switch is detected, you must hold the left and right turn signal switches in for more than one second to activate the four-way flashers.*

See Section 3.8 CHECKING FOR DIAGNOSTIC TROUBLE CODES for more information.

HOME

TSM/TSSM BANK ANGLE FUNCTION 3.5

GENERAL

The turn signals, starter motor, ICM (carbureted models), ECM (EFI models), fuel pump (EFI models) and coil will be disabled in the event the vehicle tilts more than 45° from vertical for longer than one second.

⚠WARNING

Only Touring Harley-Davidson Motorcycles are suitable for sidecar use. Consult a Harley-Davidson dealer. Use of motorcycles other than Touring models with sidecars could result in death or serious injury. (00040a)

If a sidecar is installed, install Sidecar BAS Kit (Part No. 88115-03) and reconfigure the TSM/TSSM using Digital Technician.

OPERATION

The engine will shut off automatically if the vehicle tilts more than 45 degrees from vertical for longer than one second. The engine will automatically shut off even if the tilt occurs at a very slow speed. The odometer displays "tIP" when a tip over condition is detected.

To restart the motorcycle after shutdown has occurred:

1. Return the motorcycle to an upright position.

2. Cycle the ignition key OFF-**ON** before restarting the vehicle.

3-12   2006 Touring: TSM & TSSM

GENERAL

Security System Operation

The TSSM provides security and immobilization functions not found on the TSM. The TSSM will disable the starter and ignition system. Additional functions include the ability to alternately flash the left and right turn signals and sound a siren (if purchased as an option) if a theft attempt is detected.

Conditions that activate the security system when system is armed include:

- **Detecting tampering of the ignition circuit:** Turn signals flash three times, optional siren chirps once and then turns off. If the tampering continues, a second warning will activate after four seconds. Continued tampering will cause the alarm to activate for 30 seconds and then turn off. The two warnings/alarm cycle is repeated for each tampering incident.

- **Detecting vehicle movement:** Turn signals flash three times, optional siren chirps once and then turns off. If the vehicle is not returned to its original position, a second warning will activate after four seconds. If the vehicle is not returned to its original position, the alarm activates for 30 seconds then turns off. The two warnings/alarm cycle may repeat a maximum of 10 times.

- **Detecting tampering of the security lamp circuit:** Turn signals flash three times, optional siren chirps once and then turns off. If the tampering continues, a second warning will activate after four seconds. Continued tampering will cause the alarm to activate for 30 seconds and then turn off. The two warnings/alarm cycle repeats once for each tampering incident.

- **Detecting that a battery or ground disconnect has occurred while armed.** Siren, if installed, activates its self-alarm mode. Turn signals will not flash.

See Section 3.7 ARMING/DISARMING SECURITY SYSTEM (TSSM) for more information.

NOTE

Always disarm the TSSM before removing or disconnecting the battery to prevent the siren (if installed) from activating. If the TSSM is in auto-arming mode, you must disarm the system using two clicks of the key fob and disconnect the battery or remove the battery fuse before the 30 second arming period expires.

Security System Options

The following customization options are only available on the TSSM unit: alarm sensitivity, auto-arming feature and storage mode.

Default settings for the TSSM include:

- Solo vehicle configuration.

- High motion sensitivity on alarm sensitivity.

- Default auto-arming behavior depends upon vehicle market. All vehicles are shipped without atuo-arming. Vehicles delivered to The Netherlands market require auto-arming activation using Digital Technician. Motorcycles sold in other markets have auto-arming disabled, but it may be activated.

- Storage mode set to 20 days.

Differences By Market Specifications

The Netherlands TSSM set-up differs from other TSSM set-ups in the following ways:

- The Netherlands configuration always auto-arms itself within 30 seconds after the ignition key is turned OFF.

- The Netherlands version does not have the remote arming only option.

ALARM SENSITIVITY

Sensitivity

The TSSM has four sensitivity settings: extremely low, low, medium or high. The selection picked controls the sensitivity of the security system in regards to motion detection.

To set alarm sensitivity, refer to Table 3-4.

Transport Mode

It is possible to arm the security system without enabling the motion detector for one ignition cycle. This allows the vehicle to be picked up and moved in an armed state. In this mode, any attempt to hot-wire the vehicle will trigger the security system.

- To enter the transport mode, refer to Table 3-5.

- To exit from transport mode and return the system to normal operation/functions, disarm the system using either the key fob or personal code.

NOTE

Transport mode is especially useful when working on The Netherlands vehicles. If it is not used, the alarm will activate under many typical service activities.

AUTO-ARMING FUNCTION

Auto-arming causes the system to automatically arm itself (no key fob needed) within 30 seconds after the ignition key is turned OFF. During this period, the security lamp stays on solid to indicate auto-arming is starting up.

The vehicle may be moved during these 30 seconds without triggering the alarm. However, any motion after that period will trigger the security alarm. Upon expiration of the auto-arming period, the turn signals flash twice, the security lamp begins to flash and the siren (if installed) chirps twice.

The TSSM allows remote arming via the key fob at any time. However, if the system is remotely disarmed (with the key fob) but the ignition key is not turned ON within 30 seconds, the system will rearm itself when auto-arming is enabled.

The auto-arming setting depends upon vehicle market specifications.

● Domestic and HDI motorcycles have auto-arming **disabled** by default. However, the feature may be enabled if the customer desires.

● Vehicles sold in The Netherlands have auto-arming **enabled** and this setting cannot be changed.

When auto-arming is disabled, the key fob must be used to arm the security system.

To set the auto-arming function, if it is available on your vehicle, refer to Table 3-6.

STORAGE MODE

The TSSM has a special mode for long term storage. This mode prevents the security system from draining the battery after a period of days (10, 20, 60 or infinite) without any ignition key switch activity.

● If the TSSM is set to infinite, the system will not go into storage mode.

● Vehicles will enter storage mode whether the security system is armed or disarmed.

● If set to 20 days or greater, the customer must use an approved trickle charger to keep the battery from discharging.

In storage mode, all alarm functions remain active but the receiver is shut down and will not respond to the key fob. The vehicle is immobilized because the starter motor and ECM are disabled. When the storage mode is entered, the security lamp stops flashing to conserve power.

To wake up the TSSM from storage mode, the ignition key must be turned ON. This will trigger a warning/alarm if the system was previously armed. You must use the key fob or personal code to disarm the system and stop the alarm.

To set the storage mode preferences, refer to Table 3-7.

Table 3-4. TSSM Alarm Sensitivity

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		Verify that security lamp is not blinking (vehicle is disarmed)
2	Turn **IGN** key **ON**-OFF-**ON**-OFF-**ON**		
3	Press **left** turn switch **2 times** and release	2-4 flashes turn signals & indicators depending on vehicle configuration (See Section 3.3 TSM/TSSM VEHICLE DELIVERY regarding battery disconnects.)	2 flashes-North American/ Domestic configuration TSSM 3 flashes-The Netherlands configuration TSSM 4 European/HDI configuration TSSM
4	Press and hold **key fob** button until confirmation is received	1 flash turn signals & indicators	
5	Press **left** turn switch **1 time** and release	turn signals & indicators flash to indicate option selected	1 flash-extremely low 2 flashes-low sensitivity 3 flashes-medium sensitivity 4 flashes-high sensitivity
6	Press and release **left** turn switch to advance through options	turn signals & indicators flash to indicate option selected	1 flash-extremely low 2 flashes-low sensitivity 3 flashes-medium sensitivity 4 flashes-high sensitivity
7	Turn **IGN** key OFF		

Table 3-5. TSSM Transport Mode

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		Verify that security lamp is not blinking (vehicle is disarmed)
2	Turn **IGN** key **ON**		
3	Press and hold **key fob** button until confirmation is received	3 flashes turn signals & indicators	
4	Turn **IGN** key OFF		
5	Press and hold **key fob** button until confirmation is received	3 flashes turn signals & indicators	The vehicle can be moved without tripping the alarm

Table 3-6. Selecting TSSM Auto-arming Function
(Not Available on The Netherlands Vehicles)

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		Verify that security lamp is not blinking (vehicle is disarmed)
2	Turn **IGN** key **ON**-OFF-**ON**-OFF-**ON**		
3	Press **left** turn switch **2 times** and release	2-4 flashes turn signals & indicators depending on vehicle configuration (See Section 3.3 TSM/TSSM VEHICLE DELIVERY regarding battery disconnects.)	2 flashes-North American/ Domestic configuration TSSM 3 flashes-The Netherlands configuration TSSM 4 European/HDI configuration TSSM
4	Press and hold **key fob** button until confirmation is received	1 flash turn signals & indicators	
5	Press and hold **key fob** button until confirmation is received	2 flashes turn signals & indicators	
6	Press **left** turn switch **1 time** and release	turn signals & indicators flash to indicate option selected	1 flash- auto-arming disabled 2 flashes- auto-arming enabled
7	Press and release **left** turn switch to advance through options	turn signals & indicators flash to indicate option selected	
8	Turn **IGN** key OFF		

Table 3-7. TSSM Storage Mode Preferences

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		Verify that security lamp is not blinking (vehicle is disarmed)
2	Turn **IGN** key **ON**-OFF-**ON**-OFF-**ON**		
3	Press **left** turn switch **2 times** and release	2-4 flashes turn signals & indicators depending on vehicle configuration (See Section 3.3 TSM/TSSM VEHICLE DELIVERY regarding battery disconnects.)	2 flashes-North American/ Domestic configuration TSSM 3 flashes-The Netherlands configuration TSSM 4 European/HDI configuration TSSM
4	Press and hold **key fob** button until confirmation is received	1 flash turn signals & indicators	
5	Release and then hold **key fob** button until confirmation is received	2 flashes turn signals & indicators	
6	Release and then hold **key fob** button until confirmation is received	3 flashes turn signals & indicators	
7	Press **left** turn switch **1 time** and release	turn signals & indicators flash to indicate option selected	1 flash-10 days 2 flashes-20 days 3 flashes-60 days 4 flashes-Infinite
8	Press **left** turn switch to advance through options	turn signals & indicators flash to indicate option selected	1 flash-10 days 2 flashes-20 days 3 flashes-60 days 4 flashes-Infinite
9	Turn **IGN** key OFF		

ARMING/DISARMING SECURITY SYSTEM (TSSM)   3.7

GENERAL

There are two methods to arm the security system:

● Using the key fob.

● Using auto-arming. See Section 3.6 SECURITY SYS-TEM (TSSM) FUNCTIONS.

NOTE
The vehicle cannot be armed with the engine running or the ignition ON.

There are two ways to disarm the system:

● Using the key fob. This method works in all situations **except** before turning ignition key ON when TSSM storage mode is activated.

● Using the personal code.

SECURITY LAMP

Refer to Table 3-8. The security lamp within the speedometer provides feedback to the rider confirming armed or disarmed status.

Table 3-8. Security Lamp Status

LAMP	MODE
Does not flash	No security system (TSM), security system not armed or storage mode active
Flashes every second	10 minute timeout after failed personal code entry attempt or a battery reconnect has occurred while armed
Flashes every 2 seconds	Security system armed
Flashes 3 times a second	Personal code entry mode
Stays on solid with ignition key OFF	Auto-arming is starting up. You have 30 seconds before system is armed.
Stays on solid with ignition key ON	If solid for more than 4 seconds after key ON, a current DTC is present
Four-way flashers flash 6 times (TSM)	See Section 3.8 CHECKING FOR DIAGNOSTIC TROUBLE CODES

USING KEY FOB

General

The TSSM's reception range for the key fob signal depends on a specific receiver pattern.

NOTE
Environmental and geographic conditions may affect signal range.

Arming the System

1. Hold key fob horizontal at waist level.

2. Point key fob at the front of the vehicle.

3. Hold down the key fob button until the system responds with two turn signal flashes.

Disarming the System

1. Hold key fob horizontal at waist level.

2. Point key fob at the front of the vehicle.

3. Quickly press the key fob button twice. The system will respond with one turn signal flash.

NOTE
*Disarming function may require practice. The key fob button **must** be pressed twice within 1.5 seconds to send the disarm command. The action is very similar to double-clicking a computer mouse. Light quick taps work best; very hard or very slow taps are less likely to work.*

Troubleshooting

If the key fob button has been pressed numerous times while away from the vehicle, the fob may fall out of synchronization with the TSSM. If this happens, the TSSM might fail to recognize the key fob's commands.

To solve this problem, press and hold the key fob button for 10-15 seconds until the security system responds with two turn signal flashes. After confirmation, you may resume normal fob operation.

USING THE PERSONAL CODE

General

The personal code consists of five digits entered using the left and right turn signal switches. Each digit can be any number from 1-9. The personal code is intended to be used to disarm the vehicle in case the key fob becomes unavailable or inoperable.

See Section 3.3 TSM/TSSM VEHICLE DELIVERY to set a personal code.

Disarming the System

Refer to Table 3-9. If you make an error while disarming the TSSM using the personal code, the alarm will activate for 30 seconds after the last digit is entered. After a failed attempt, the security lamp will flash once every second for 10 minutes. **During this time, the vehicle will not accept any attempt to enter a personal code.**

Table 3-9. Entering A Personal Code To Disarm TSSM (Example: 3-1-3-1-3)

NO.	ACTION	WAIT FOR CONFIRMATION	NOTES
1	Set **RUN/OFF** switch to **OFF**		
2	Turn **IGN** key to **ACC**		
3	Hold **both** turn switches in until confirmation	security lamp blinks at fast rate	System is ready for personal code entry
4	Enter first digit of code (3) by pressing **left** turn switch **3 times**		
5	Press **right** turn switch **1 time**		Serves as "enter" key for first digit
6	Enter second digit of code (1) by pressing **left** turn switch **1 time**		
7	Press **right** turn switch **1 time**		Serves as "enter" key for second digit
8	Enter third digit of code (3) by pressing **left** turn switch **3 times**		
9	Press **right** turn switch **1 time**		Serves as "enter" key for third digit
10	Enter fourth digit of code (1) by pressing **left** turn switch **1 time**		
11	Press **right** turn switch **1 time**		Serves as "enter" key for fourth digit
12	Enter fifth digit of code (3) by pressing **left** turn switch **3 times**		
13	Press **right** turn switch **1 time**	security lamp stops blinking	System is disarmed. You may use the vehicle or program another key fob

TSM

If the turn signals flash six four-way flashes shortly after key ON, it indicates a DTC has been logged sometime in the last three ignition cycles.

TSSM

To diagnose system problems, start by observing the behavior of the security lamp.

NOTES

● *See Figure 3-7. "Key ON" means that the ignition key is turned to IGNITION and the engine stop switch is set to RUN (although the engine is **not** running).*

● *See Figure 3-8. When the ignition key is turned ON, the security lamp will illuminate for approximately four seconds and then turn off.*

● *If the security lamp is not illuminated at Key ON or if it fails to turn OFF after the initial four second period, the speedometer may need to be replaced. See Section 3.10 SPEEDOMETER SELF DIAGNOSTICS. If "BUS Er" is displayed on the odometer, it may take up to twenty seconds for the security lamp to illuminate.*

● *The security lamp will also light for eight seconds after the bulb check if historic DTC's are present. The security lamp will stay on if current DTC's are set. If a historic DTC is present, the security lamp will light for 50 ignition cycles or until the DTC is cleared manually.*

1. See Figure 3-9. After the lamp turns off after being illuminated for the first four second period, one of three events may occur:

   a. The lamp remains off. This indicates there are no current fault conditions or stored historic DTC's currently detected by the TSSM.

   b. The lamp stays off for only four seconds and then comes back on for an eight-second period. This indicates a historic DTC is stored, but no current DTC exists.

   c. If the lamp remains on beyond the eight-second period, a current DTC exists.

2. See CODE TYPES under Section 3.8 CHECKING FOR DIAGNOSTIC TROUBLE CODES for a complete description of DTC formats.
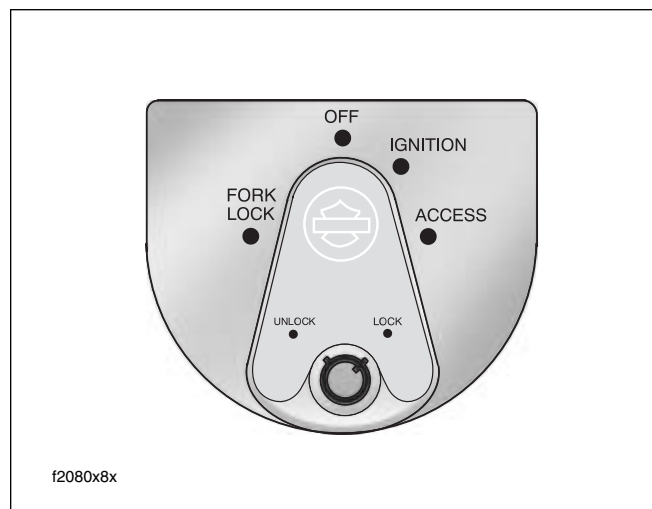
Figure 3-7. Ignition Switch (FLHX, FLHT/C/U, FLTR)
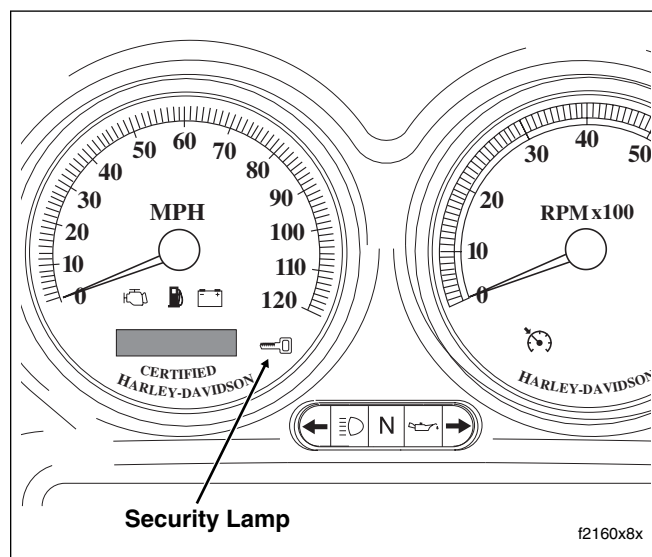
Figure 3-8. Speedometer (FLHX, FLHT/C/U)
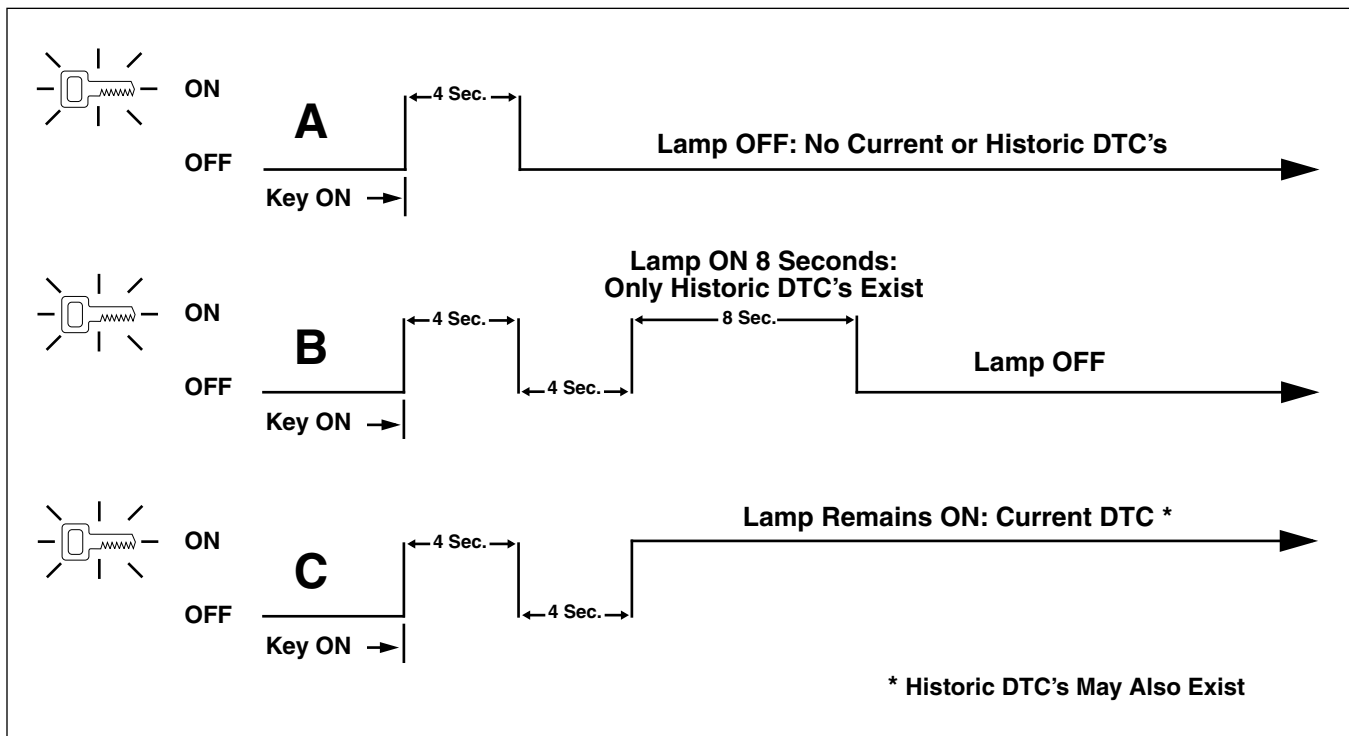
Figure 3-9. Security Lamp Operation

CODE TYPES

There are two types of DTC's: current and historic. If a DTC is stored, it can be read using either a computer based diagnostic package called DIGITAL TECHNICIAN (Part No. HD-44750) or speedometer self diagnostics. See Section 3.10 SPEEDOMETER SELF DIAGNOSTICS.

NOTES

- *To differentiate between current and historic DTC's a computer based diagnostic package called DIGITAL TECHNICIAN (Part No. HD-44750) must be employed.*

- *All DTC's reside in the memory of the ECM/ICM, TSM/TSSM, speedometer or tachometer until the DTC is cleared by use of the speedometer self diagnostics. See Section 3.10 SPEEDOMETER SELF DIAGNOSTICS.*

- *A historic DTC is also cleared after a total of 50 trips has elapsed. A trip consists of a start and run cycle. After the 50 trip retention period, the DTC is automatically erased from memory providing that no subsequent faults of the same type are detected in that period.*

Current

Current DTC's are those which are present during the current ignition cycle. See the appropriate flow charts for solutions.

Historic

If a particular problem happens to resolve itself, the active status problem is dropped and it becomes a historic DTC rather than a current DTC. For example, intermittent output shorts can become typical historic DTC's.

Historic DTC's can only be retrieved using a computer based diagnostic package called DIGITAL TECHNICIAN (Part No. HD-44750).

Historic DTC's are stored for 50 ignition cycles after any DTC was last set as current to assist in the diagnosis of intermittent faults. On the 50th cycle, the DTC will clear itself. The check engine lamp will not indicate the existence of only historic DTC's.

It is important to note that historic DTC's will exist whenever the system indicates the existence of a current fault. See MULTIPLE DIAGNOSTIC TROUBLE CODES if multiple DTC's are found.

Diagnostic charts are designed for use with current DTC's and as a result they frequently suggest part replacement. When diagnosing a historic DTC the charts can be helpful but should not lead to part replacement without verification the part is faulty.

RETRIEVING DIAGNOSTIC TROUBLE CODES

The TSM/TSSM allows two levels of diagnostics:

- The most sophisticated mode employs a computer based diagnostic package called DIGITAL TECHNICIAN (Part No. HD-44750).

- The second mode requires using the speedometer self diagnostics. Speedometer, tachometer (if equipped), TSM/TSSM and ICM/ECM DTC's can be accessed and cleared. See Section 3.10 SPEEDOMETER SELF DIAGNOSTICS.

Use of speedometer self diagnostics assumes that Digital Technician is not available.

MULTIPLE DIAGNOSTIC TROUBLE CODES

While it is possible for more than one fault to occur and set more than one DTC, there are several conditions which may result in **one** fault setting **multiple** DTC's:

Serial data DTC's (U1016, U1064, U1097, U1255, U1300 and U1301) may be accompanied by other DTC's. **Always** correct the serial data DTC's before resolving the other DTC's.

Refer to Table 3-10. This table gives most TSM/TSSM DTC's a priority ranking.

GENERAL

To locate faulty circuits or other system problems, follow the diagnostic flow charts in this section. For a systematic approach, always begin with INITIAL DIAGNOSTICS which follows. Read the general information and then work your way through the flow chart box by box.

Diagnostic Notes

If a numbered circle appears adjacent to a flow chart box, then more information is offered in the diagnostic notes. Many diagnostic notes contain supplemental information, descriptions of various diagnostic tools or references to other parts of the manual where information on the location and removal of components may be obtained.

Circuit Diagram/Wire Harness Connector Table

When working through a flow chart, refer to the illustrations, the associated circuit diagram and the wire harness connector table as necessary. The wire harness connector table for each circuit diagram identifies the connector number, description, type and general location.

In order to perform most diagnostic routines, a Breakout Box and a digital volt/ohmmeter (DVOM) are required. See Section 3.11 BREAKOUT BOX: TSM/TSSM.

To perform the circuit checks with any degree of efficiency, a familiarity with the various wire connectors is also necessary.

Job/Time Code Values

Some charts may contain warranty job/time codes. Dealership technicians filing warranty claims should use the job/time code values printed in **bold text** underneath the appropriate repair.

Reprogramming ICM/ECM

Diagnostic charts frequently suggest ECM/ICM replacement. In the event an ICM or ECM needs to be replaced, it must be reprogrammed using a computer based diagnostic package called DIGITAL TECHNICIAN (Part No. HD-44750). See your dealer. Password learn procedure must also be performed. See Section 3.24 PASSWORD LEARN.

INITIAL DIAGNOSTICS

Diagnostic Tips

● If speedometer reads "BUS Er" with the ignition key turned ON (engine stop switch at RUN with the engine off), check data bus for an open or short to ground between data link connector [91A] terminal 3 and ICM connector [10B] terminal 12 (carbureted models), ECM connector [78B] terminal 5 (EFI models), TSSM connector [30B] terminal 3, speedometer connector [39B] terminal 2 or tachometer (if equipped) connector [108B] terminal 2.

● Check for an open diagnostic test terminal between data link connector [91A] terminal 3 and TSM/TSSM connector [30B] terminal 3. With ignition key turned ON, serial data bus voltage should be typically 0.6-0.8 volts. The range of acceptable voltage is 0-7.0 volts.

● To identify intermittents, wiggle instrument and/or vehicle harness while performing steps in the Diagnostic Check charts.

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the diagnostic check flow charts. See page 3-36.

1. Connect BREAKOUT BOX (Part No. HD-42682) between wire harness connector [39B] and speedometer connector [39A] using INSTRUMENT HARNESS ADAPTERS (Part No. HD-46601). See Section 2.5 BREAKOUT BOX: SPEEDOMETER.

2. Compare TSM/TSSM system behavior to symptoms in Table 3-11.

All TSM/TSSM DTC's are listed in Table 3-10.

Other Diagnostic Trouble Codes (DTC's)

See Section 2.5 BREAKOUT BOX: SPEEDOMETER for any DTC's related to the speedometer.

See Section 4.4 INITIAL DIAGNOSTIC CHECK: ICM for any DTC's related to the ICM.

See Section 5.5 INITIAL DIAGNOSTIC CHECK: EFI for any DTC's related to the ECM.

Table 3-10. TSM/TSSM Diagnostic Trouble Codes (DTC) and Fault Conditions

PRIORITY	DTC	FAULT CONDITION	SOLUTION
1	"BUS Er"	Serial data bus shorted low/open/high	3.23 DTC U1300, U1301 or "BUS ER"
2	U1300	Serial data low	3.23 DTC U1300, U1301 or "BUS ER"
3	U1301	Serial data high	3.23 DTC U1300, U1301 or "BUS ER"
4	U1016	Loss of ICM/ECM serial data (state of health)	3.21 DTC U1016, U1255
5	U1097	Loss of Speedometer serial data (state of health)	3.22 DTC U1097, U1255
6	U1255	Missing response from other module (speedometer) at startup	3.22 DTC U1097, U1255
7	B1135	Accelerometer fault	3.19 DTC B1135
8	B1151	Sidecar BAS low	Sidecar DTC's apply only to Touring models equipped with sidecars. If these DTC's are present on non sidecar equipped motorcycles, the TSM/TSSM is not properly configured.
8	B1152	Sidecar BAS high	
8	B1153	Sidecar BAS out of range	
9	B1134	Starter output high	3.18 DTC B1134
10	B1121	Left turn output fault	3.15 TURN SIGNAL ERRORS
11	B1122	Right turn output fault	3.15 TURN SIGNAL ERRORS
12	B0563	Battery voltage high	3.16 DTC B0563
13	B1131	Alarm output low	3.17 DTC B1131, B1132
14	B1132	Alarm output high	3.17 DTC B1131, B1132
15	B1141	Ignition switch open/low	3.15 TURN SIGNAL ERRORS

Table 3-11. Symptoms That May Not Set Diagnostic Trouble Codes

SYMPTOM	SOLUTION
Fob signal to TSSM weak or fails	See 3.14 KEY FOB SIGNAL TO TSSM WEAK OR FAILS
Turn signal will not cancel or cancels erratically	See Turn Signal Error 1A in 3.15 TURN SIGNAL ERRORS
Turn signal flashes double normal rate, all bulbs good	See Turn Signal Error 3A in 3.15 TURN SIGNAL ERRORS

f2353k8b
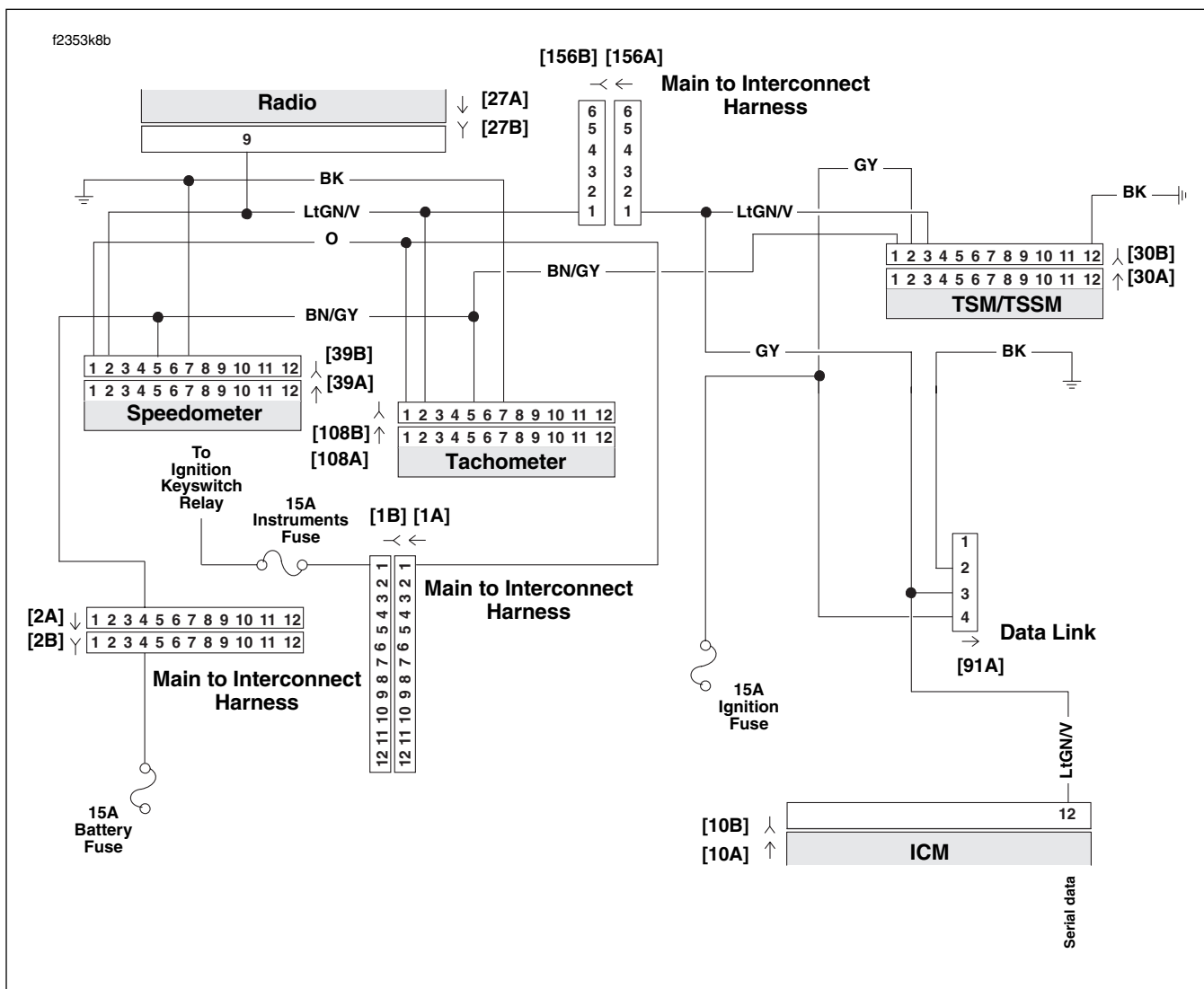
Figure 3-10. Diagnostic Check: FLHX, FLHT/C (Carbureted)

Table 3-12. Wire Harness Connectors in Figure 3-10.

NO.	DESCRIPTION	TYPE	LOCATION
[1]	Main to Interconnect Harness	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
[2]	Main to Interconnect Harness	12-Place Deutsch (Gray)	Inner Fairing - Right Fairing Support Brace
[10]	ICM	12-Place Deutsch	Under Right Side Cover
[27]	Radio	23-Place Amp	Inner Fairing - Back of Radio (Right Side)
[30]	TSM/TSSM	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	12-Place Packard	Inner Fairing (Back of Speedometer)
[91]	Data Link	4-Place Deutsch	Under Right Side Cover
[108]	Tachometer	12-Place Packard	Inner Fairing (Back of Tachometer)
[156]	Main to Interconnect Harness	6-Place Deutsch	Inner Fairing - Right Fairing Support Brace
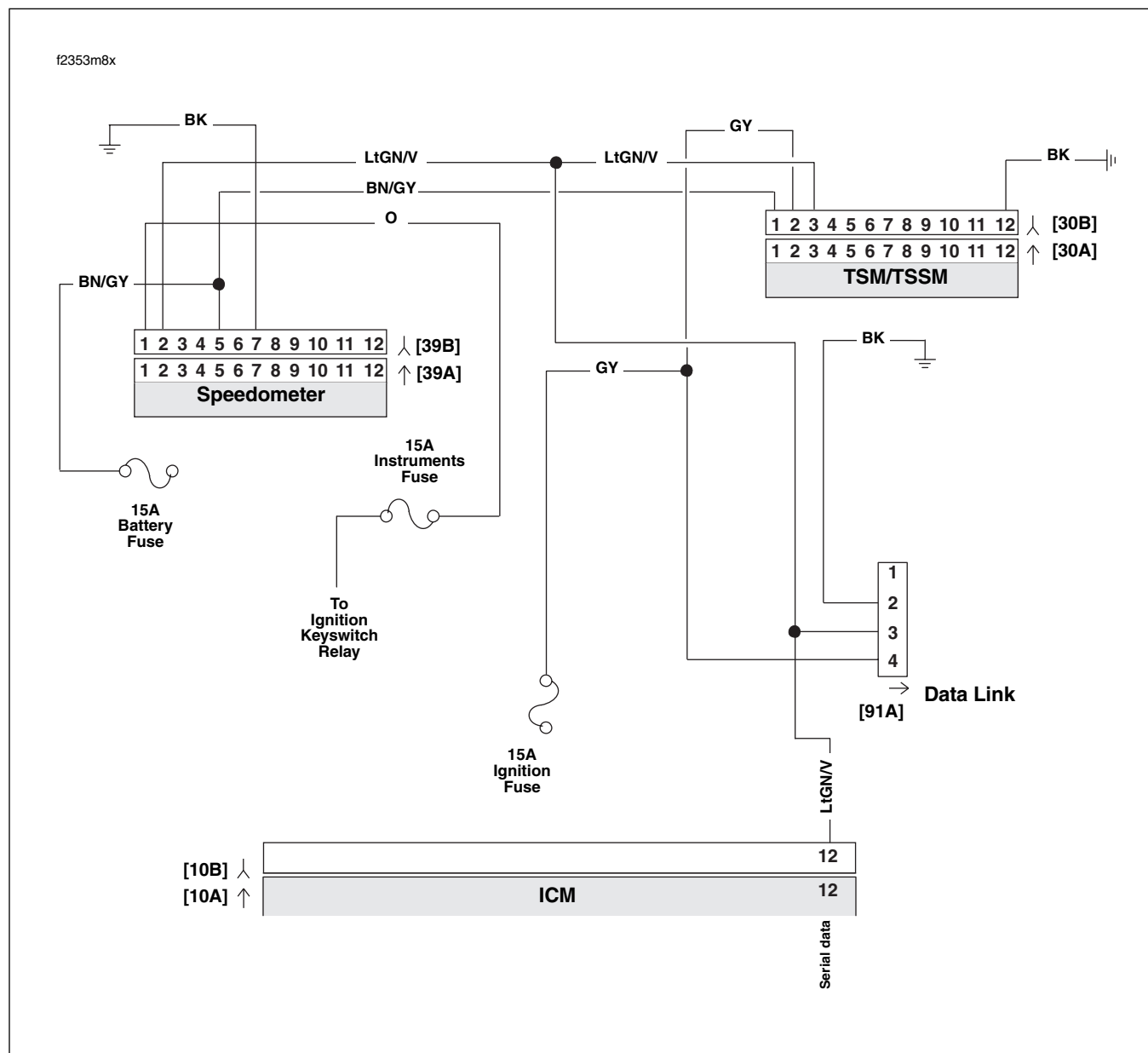
Figure 3-11. Diagnostic Check: FLHR/S (Carbureted)

Table 3-13. Wire Harness Connectors in Figure 3-11.

NO.	DESCRIPTION	TYPE	LOCATION
[10]	ICM	12-Place Deutsch	Under Right Side Cover
[30]	TSM/TSSM	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	12-Place Packard	Under Console (Back of Speedometer)
[91]	Data Link	4-Place Deutsch	Under Right Side Cover
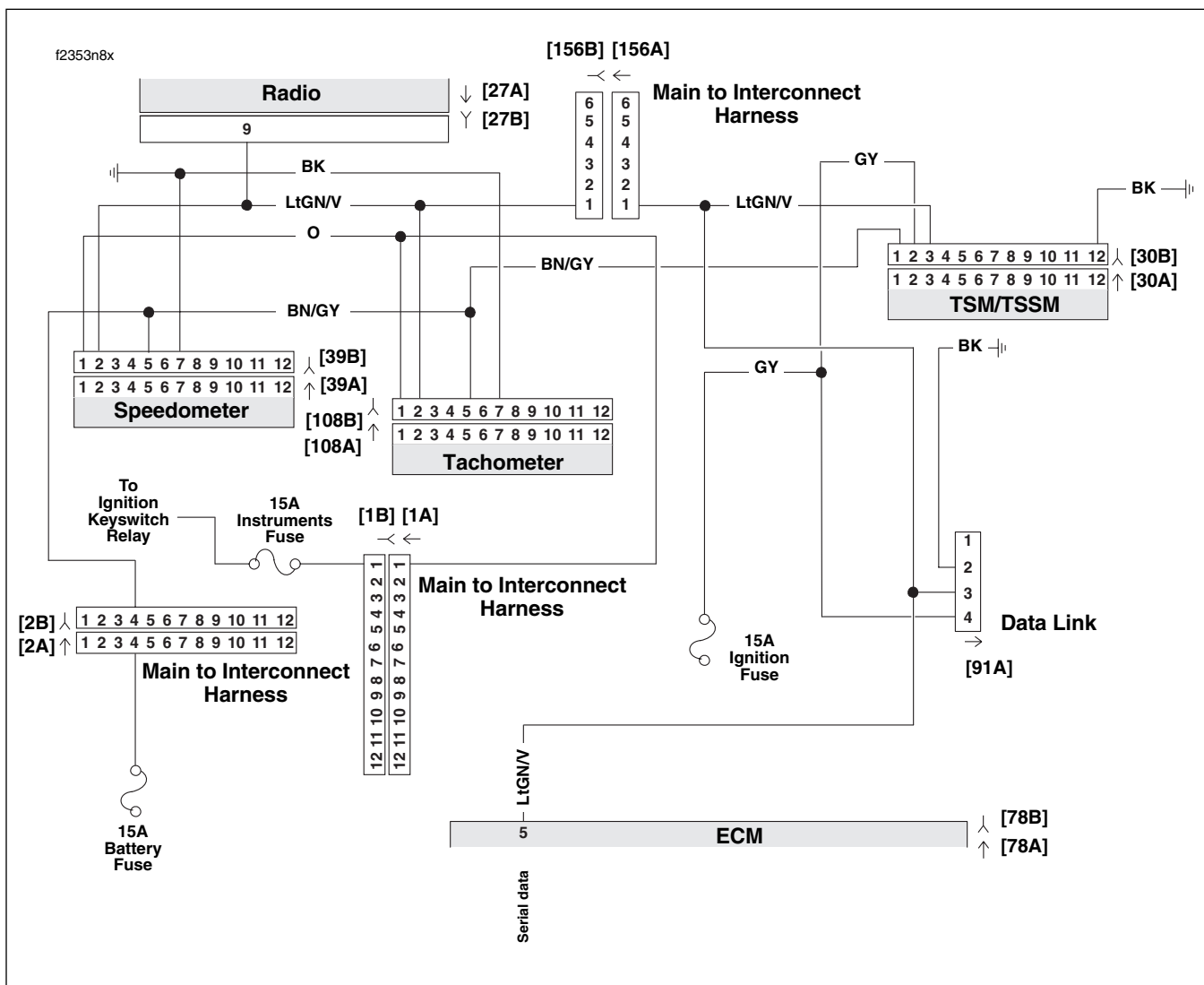
Figure 3-12. Diagnostic Check: FLHX, FLHT/C/U, FLTR (Fuel Injected)

Table 3-14. Wire Harness Connectors in Figure 3-12.

NO.	DESCRIPTION	MODEL	TYPE	LOCATION
[1]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
		FLTR	12-Place Deutsch (Black)	Inner Fairing - Below Radio (Right Side)
[2]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Gray)	Inner Fairing - Right Fairing Support Brace
		FLTR	12-Place Deutsch (Gray)	Inner Fairing - Below Radio (Right Side)
[27]	Radio	All	23-Place Amp	Inner Fairing - Back of Radio (Right Side)
[30]	TSM/TSSM	All	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Speedometer)
		FLTR	12-Place Packard	Under Bezel (Back of Speedometer)
[78]	ECM	All	36-Place Packard	Under Right Side Cover
[91]	Data Link	All	4-Place Deutsch	Under Right Side Cover
[108]	Tachometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Tachometer)
		FLTR	12-Place Packard	Under Bezel (Back of Tachometer)
[156]	Main to Interconnect Harness	FLHT/C	6-Place Deutsch	Inner Fairing - Right Fairing Support Brace
		FLTR	6-Place Deutsch	Inner Fairing - Below Radio (Right Side)
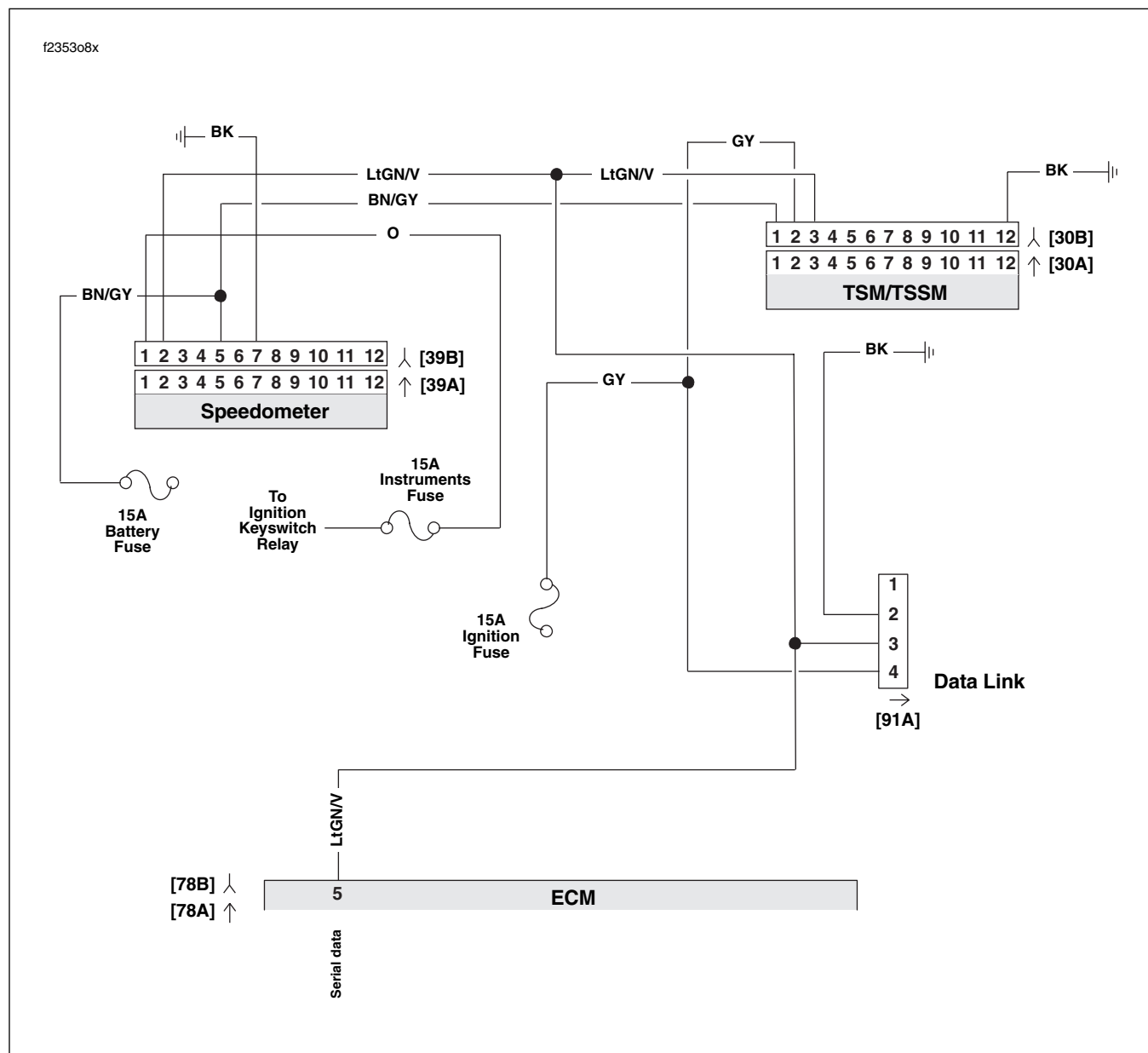
Figure 3-13. Diagnostic Check: FLHR/C/S (Fuel Injected)

Table 3-15. Wire Harness Connectors in Figure 3-13.

NO.	DESCRIPTION	TYPE	LOCATION
[30]	TSM/TSSM	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	12-Place Packard	Under Console (Back of Speedometer)
[78]	ECM	36-Place Packard	Under Right Side Cover
[91]	Data Link	4-Place Deutsch	Under Right Side Cover

Initial Diagnostic Check (Part 1 of 3)

```
                          ┌─────────────┐
                          │ Does engine │
                          │   start?    │
                          └─────────────┘
```

YES. Starts and runs.	YES. Starts, then stalls.	NO. Cranks, but will not start.	NO. Engine will not crank.
Check for DTC's.See Section 3.10 SPEEDOMETER SELF DIAG-NOSTICS. DTC's found?	For carbureted models, See Section 4.10 STARTS, THEN STALLS. For EFI models, See Section 5.12 STARTS, THEN STALLS.	For carbureted models, See Section 4.9 ENGINE CRANKS, BUT WILL NOT START. For EFI models, See Section 5.10 ENGINE CRANKS, BUT WILL NOT START.	See Section 1.2 STARTING SYSTEM DIAGNOSIS.

YES

Refer to applicable DTC priority chart. All DTC's are listed on page 3-23 in Table 3-10. DTC's are listed by priority.

NO
Unable to enter diagnostic mode.

With ignition switch OFF, press and release odometer reset switch. Does odometer display appear with display backlighting?

NO
No DTC's displayed.

2

For a list of symptoms that may not set DTC's, refer to Table 3-11.

YES

STOP

Go to Initial Diagnostic Check (Part 2 of 3).

NO

1

Check for continuity to ground at breakout box cavity 7 (black). Wiggle harness during continuity check. Continuity present?

YES

Check for battery voltage at breakout box cavity 5 (black) of speedometer while wiggling harness. Battery volt-age continuously present?

NO

Locate and repair open between terminal 7 and ground.

YES

With ignition switch OFF and speedometer connector [39] disconnected, check continuity between Breakout Box cavities 8 and 11 Is continuity present when speedometer reset switch is depressed and infinity when released?

NO

Locate and repair open between terminal 5 and battery fuse.

YES

Replace speedometer.

NO

Replace speedometer reset switch.

Initial Diagnostic Check (Part 2 of 3)

Continued from Initial Diagnostic Check (Part 1 of 3). Turn ignition switch ON, is odometer backlight present?

YES

Perform "wow" test. See Section 3.10 SPEEDOMETER SELF DIAGNOSTICS. The following features should be functional
1) backlight should illuminate
2) needle should sweep its full range of motion
3) LED's that should illuminate:
   • check engine
   • battery
   • security (all models)
4) LED's that **may** illuminate:
   • low fuel (EFI models)
   • cruise (although not cruise equipped)

Are all features functional?

NO

Replace Speedometer.

YES

Turn key to ACC. Is backlight present?

NO

1 Check for battery voltage at breakout box cavity 6. Battery voltage present?

YES

Replace speedometer.

NO

Is accessory fuse blown?

YES

Locate and repair source of fault. Replace fuse.

NO

Locate and repair open on O/W wire between terminal 6 of connector [39] and accessory fuse.

NO

1 With ignition switch turned to IGN, check for battery voltage at cavity 1 of Breakout Box. Battery voltage present?

YES

Replace speedometer.

NO

Is instrument fuse blown?

YES

Locate and repair source of fault. Replace fuse.

NO

Locate and repair open between pin 1 of connector [39] and instrument fuse.

YES

STOP

Go to Diagnostic Check (Part 3 of 3).

Diagnostic Check (Part 3 of 3)

Continued from Initial Diagnostic Check (Part 2 of 3). Is problem intermittent? ②

YES

Repeat Diagnostic Check while wiggling harnesses. Was intermittent found?

YES

Locate and repair intermittent.

NO

No trouble found.

NO Speedometer inoperative (no vehicle speed).

Remove and inspect vehicle speed sensor. Debris present?

YES

Remove debris. Reinstall vehicle speed sensor.

NO

Check for damaged wiring/loose connection between vehicle speed sensor and ICM/ECM. Is wiring damage/loose connection present?

YES

Locate and repair source of fault.

NO

Replace Speedometer.

NO Tachometer Inoperative (no engine speed).

See Test 2.4 (Part 1 of 2) under Section 2.4 SPEEDOMETER/TACHOMETER.

GENERAL

The speedometer is capable of displaying and clearing speedometer, tachometer, TSM/TSSM, and ICM/ECM DTC's (diagnostic mode).

DIAGNOSTICS

Diagnostic Tips

● For a quick check of speedometer function, a "wow" test can be performed. Press and hold odometer reset switch then turn ignition switch ON. Release reset switch. See Figure 3-14. Background lighting should illuminate, gauge needles should sweep their full range of motion, and indicator lamps [battery, security, low fuel (EFI models), check engine and cruise] should illuminate. Some lamps may illuminate even though they do not apply to the vehicle. For example, the cruise lamp may illuminate even though the motorcycle is not equipped with cruise control.

● If speedometer fails "wow" test, check for battery, ground, ignition, accessory and speedometer reset switch to speedometer. If any feature in the speedometer is non-functional, See Section 2.2 INITIAL DIAGNOSTIC CHECK: SPEEDOMETER.

Diagnostic Notes

Use of speedometer self diagnostics assumes that DIGITAL TECHNICIAN (Part No. HD-44750) is not available.

The reference numbers below correlate with the circled numbers in the Speedometer Self Diagnostics (chart)

1. To exit diagnostic mode, turn ignition switch OFF.

2. To clear DTC's for selected module, press the odometer reset switch for more than 5 seconds when DTC is displayed. This procedure will clear all DTC's for selected module.

1. **Check Engine**
2. **Low Fuel**
3. **Battery**
4. **Security**
5. **Cruise (Where Applicable)**
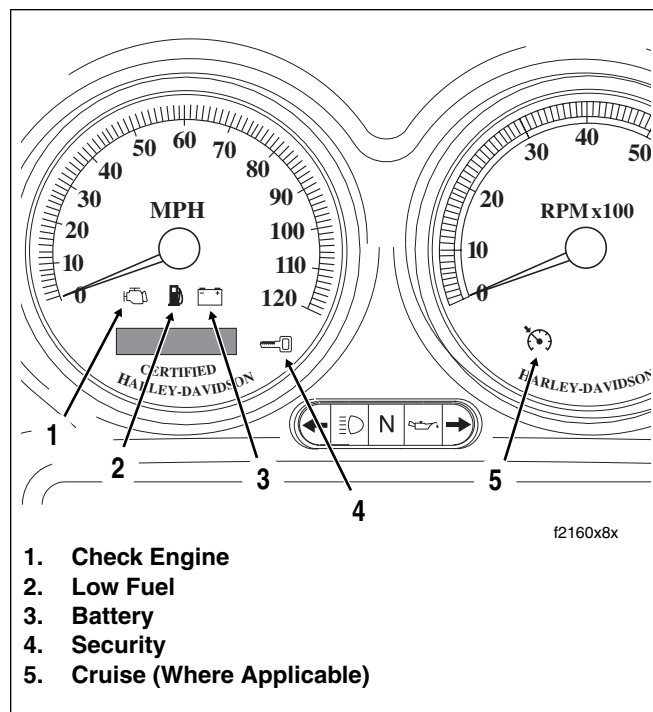
Figure 3-14. Icons
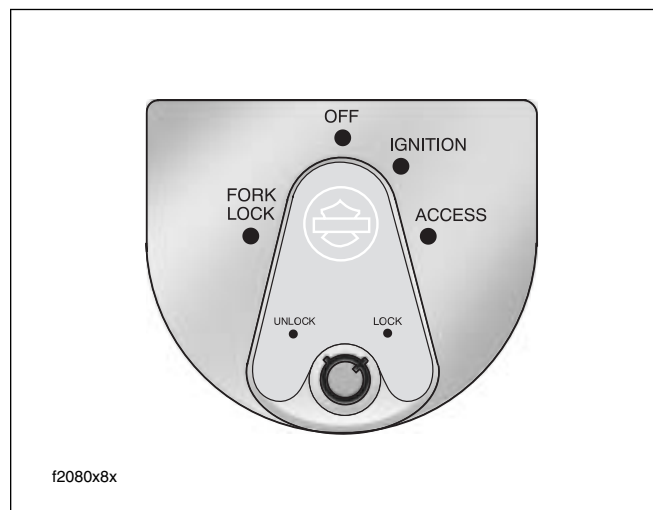
Figure 3-15. Ignition Switch (FLHX, FLHT/C/U, FLTR)

Speedometer Self Diagnostics (chart)

```
┌─────────────────────────────────┐
│ While holding odometer reset    │   ⎛ 1 ⎞
│ switch in, turn ignition switch │   ⎝   ⎠
│ to IGN. Make sure Run/Stop      │
│ switch is in RUN position.      │
└─────────────────────────────────┘
              │
┌──────────────────────────┐
│ Release reset switch.    │
│ Does "diag" appear?      │
└──────────────────────────┘
    │                    │
  ┌─────┐             ┌─────┐
  │ YES │             │ NO  │
  └─────┘             └─────┘
    │                    │
┌──────────────────┐  ┌─────────────────────────────┐
│ Press and release│  │ See Section 2.2 INITIAL     │
│ reset switch.    │  │ DIAGNOSTIC CHECK:           │
│ "PSSPT" appears. │  │ SPEEDOMETER.                │
└──────────────────┘  └─────────────────────────────┘
    │
┌──────────────┐   ┌──────────────────────────┐
│ "P" flashing.│───│ To display DTC's for the │
└──────────────┘   │ ECM/ICM, press and hold  │
    │              │ reset switch for more    │
┌──────────────────┐│ than 5 seconds.         │
│ To choose TSM/   │└──────────────────────────┘
│ TSSM, press and  │
│ release reset    │
│ switch.          │
└──────────────────┘
    │
┌──────────────┐   ┌──────────────────────────┐
│ "S" flashing.│───│ To display DTC's for     │
└──────────────┘   │ TSM/TSSM, press and hold │
    │              │ reset switch for more    │
┌──────────────────┐│ than 5 seconds.         │
│ To choose        │└──────────────────────────┘
│ speedometer,     │
│ press and release│
│ reset switch.    │
└──────────────────┘
    │
┌──────────────┐   ┌──────────────────────────┐
│ "SP" flashing│───│ To display DTC's for     │
└──────────────┘   │ speedometer, press and   │
    │              │ hold reset switch for    │
┌──────────────────┐│ more than 5 seconds.    │
│ To choose        │└──────────────────────────┘
│ tachometer, press│
│ and release reset│
│ switch.          │
└──────────────────┘
    │
┌──────────────┐   ┌──────────────────────────┐
│ "T" flashing.│───│ To display DTC's for     │
└──────────────┘   │ tachometer, press and    │
    │              │ hold reset switch for    │
┌──────────────────┐│ more than 5 seconds.    │
│ To choose        │└──────────────────────────┘
│ ECM/ICM, press   │
│ and release reset│
│ switch.          │
└──────────────────┘
    │
┌──────────────────────────┐
│ Press and release reset  │
│ switch again to continue │
│ to next module.          │
└──────────────────────────┘
```

```
┌──────────────────┐
│ Device response? │
└──────────────────┘
    │              │
  ┌─────┐        ┌─────┐
  │ YES │        │ NO  │
  └─────┘        └─────┘
    │              │
┌────────────┐  ┌──────────────────────────────┐
│ "none"     │  │ "no rsp" displayed.          │
│ displayed. │  │ See applicable code from     │
└────────────┘  │ other modules. Models not    │
    │           │ equipped with a tachometer   │
    │           │ will display "no rsp"        │
    │           │ normally.                    │
    │           │                              │
    │           │ If "no rsp" displayed on     │
    │           │ odometer on tachometer       │
    │           │ equipped vehicle, See        │
    │           │ Section 2.4 SPEEDOMETER/     │
    │           │ TACHOMETER.                  │
    │           └──────────────────────────────┘
    │
    │        ⎛ 2 ⎞  ┌──────────────┐
    │        ⎝   ⎠  │ DTC displayed│
    │               └──────────────┘
    │                     │
┌──────────────────┐  ┌──────────────────┐
│ Press and release│  │ Press and release│
│ reset switch.    │  │ reset switch.    │
│ Part number of   │  │ Are more DTC's   │
│ module will be   │  │ displayed?       │
│ displayed.       │  └──────────────────┘
└──────────────────┘    │            │
                      ┌─────┐      ┌─────┐
                      │ YES │      │ NO  │
                      └─────┘      └─────┘
                                     │
                      ┌──────────────────────────┐
                      │ "end" displayed.         │
                      │ To clear all DTC's for   │
                      │ selected module, hold    │
                      │ reset switch for more    │
                      │ than 5 seconds. If DTC's │
                      │ are not to be cleared,   │
                      │ Press and release reset  │
                      │ switch. Part number of   │
                      │ module will be displayed.│
                      └──────────────────────────┘
```

Figure 3-16. Initial Diagnostic Check

BREAKOUT BOX: TSM/TSSM   3.11

GENERAL

The BREAKOUT BOX (Part No. HD-42682) splices into the main harness. Used in conjunction with a digital volt/ohmmeter (DVOM), it allows circuit diagnosis of wiring harness and connections without having to probe with sharp objects.

INSTALLATION

1. Gain access to TSM/TSSM. See Touring Service Manual.

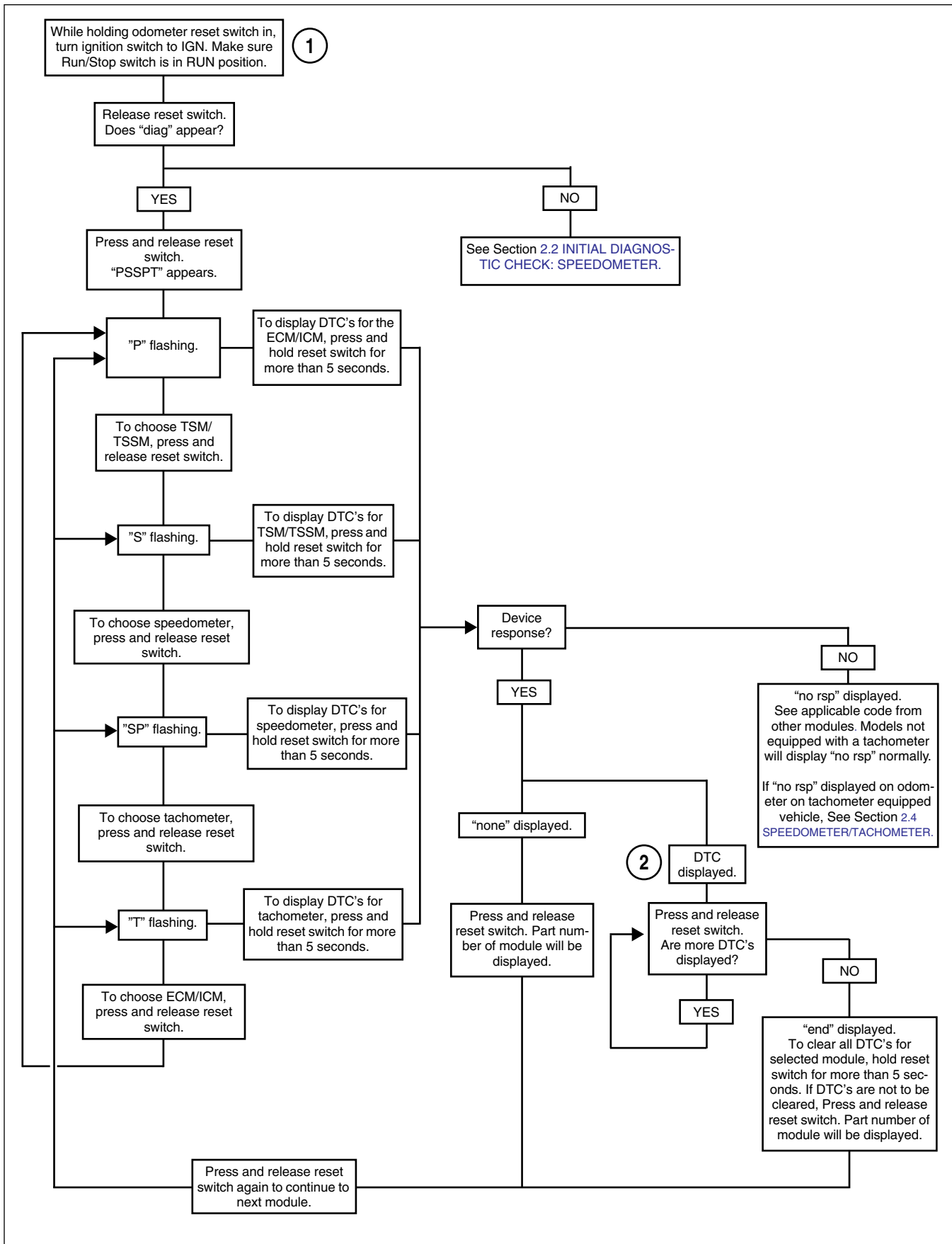2. See Figure 3-17. Depress latches on connector [30B].

3. See Figure 3-18. Attach Breakout Box to connector.

   a. Mate gray socket housing on Breakout Box with TSM/TSSM connector [30A].

   b. Mate gray pin housing on Breakout Box with wire harness connector [30B].

REMOVAL

1. See Figure 3-17. Depress latches on connector [30B].

2. Detach gray Breakout Box connector from TSM/TSSM connector [30A].

3. Detach gray Breakout Box connector from wire harness connector [30B].

4. Reinstall TSM/TSSM. See the Touring Service Manual.

5. Install parts removed for access.

NOTE

Vehicle will not start with TSM/TSSM disconnected or incorrectly mounted.

.
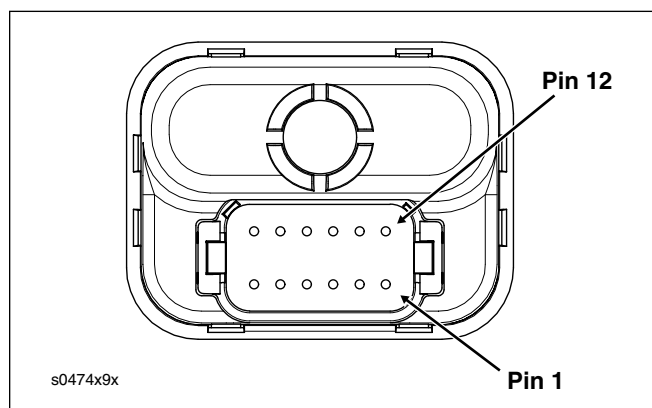
Figure 3-17. TSM/TSSM Connector

Connect Gray Side Only for Tests
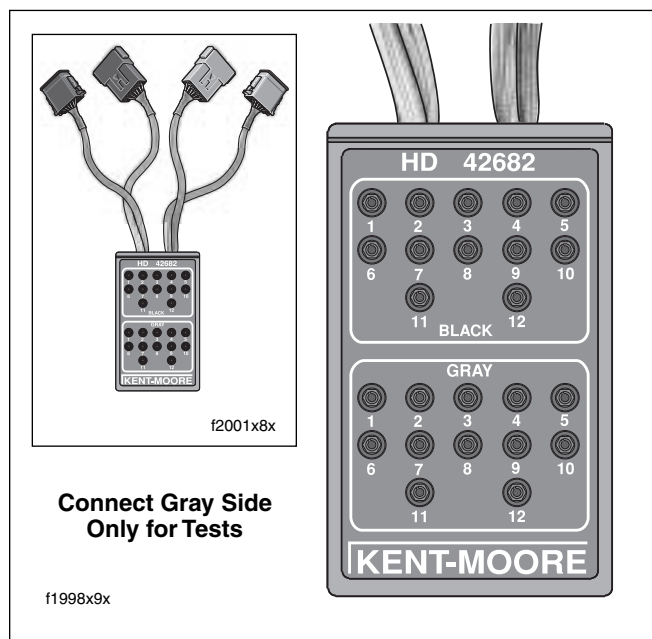
Figure 3-18. Breakout Box (Part No. HD-42682)

Table 3-16. TSM/TSSM Connector [30B]

PIN	FUNCTION	PIN	FUNCTION
1	Battery	7	Right turn switch input
2	Ignition	8	Left turn switch input
3	Serial data	9	Start relay control
4	Security lamp	10	Ignition enable signal (not used)
5	Left turn feed	11	Alarm signal
6	Right turn feed	12	Ground

GENERAL

No TSSM Power
(Security Equipped Vehicles Only)

See Figure 3-19. When the Ignition/Light Key Switch is turned to IGNITION, the security lamp should illuminate for 4 seconds. Following the initial period of illumination, the lamp should go off for 4 seconds. It may then come back on for an 8 second period, indicating an historic DTC, or remain on, indicating a current DTC.

Power and ground are supplied to the Security lamp from the speedometer circuitry. The TSSM activates an LED driver circuit in the speedometer to illuminate the security lamp. A lack of power to the TSSM will cause the security lamp to be inoperative and will also create a no start situation.

Job/Time Code Values

Dealership technicians filing warranty claims should use the job/time code values printed in **bold text** underneath the appropriate repair.

DIAGNOSTICS

Diagnostic Tips

● Check for open in BN/V wire.

● Check for blown battery fuse. See Figure 3-19.

Diagnostic Notes

The reference numbers below correlate with the circled numbers on the Test 3.12 flow charts.

1. Connect BREAKOUT BOX (Part No. HD-42682) (gray) as follows:

   a. Mate gray socket housing on Breakout Box with TSM/TSSM connector [30A].

   b. Mate gray pin housing on Breakout Box with wire harness connector [30B].

2. Connect BREAKOUT BOX (Part No. HD-42682) (black) as follows:

   a. Mate black socket housing on Breakout Box with speedometer connector [39A] (at the back of the speedometer) using INSTRUMENT HARNESS ADAPTERS (Part No.HD-46601).

   b. Mate black pin housing on Breakout Box with wire harness connector [39B] using INSTRUMENT HARNESS ADAPTERS (Part No.HD-46601).

3. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), purple pin probe and patch cord between breakout Breakout Box and ground. Align blade with slot in terminal of Breakout Box.

4. Security lamp failure requires speedometer replacement. See the Touring Service Manual.

System Fuse Block (Under Left Side Cover)

FLHR/C/S

f2210x8x

FLHX, FLHT/C/U, FLTR

f2204x8x

1.	Headlamp	7.	Radio Power
2.	Ignition	8.	Accessory
3.	Lighting	9.	Battery
4.	Instruments	10.	Brake Light Relay
5.	Brakes/Cruise	11.	P&A
6.	Radio Memory	12.	Starter Relay
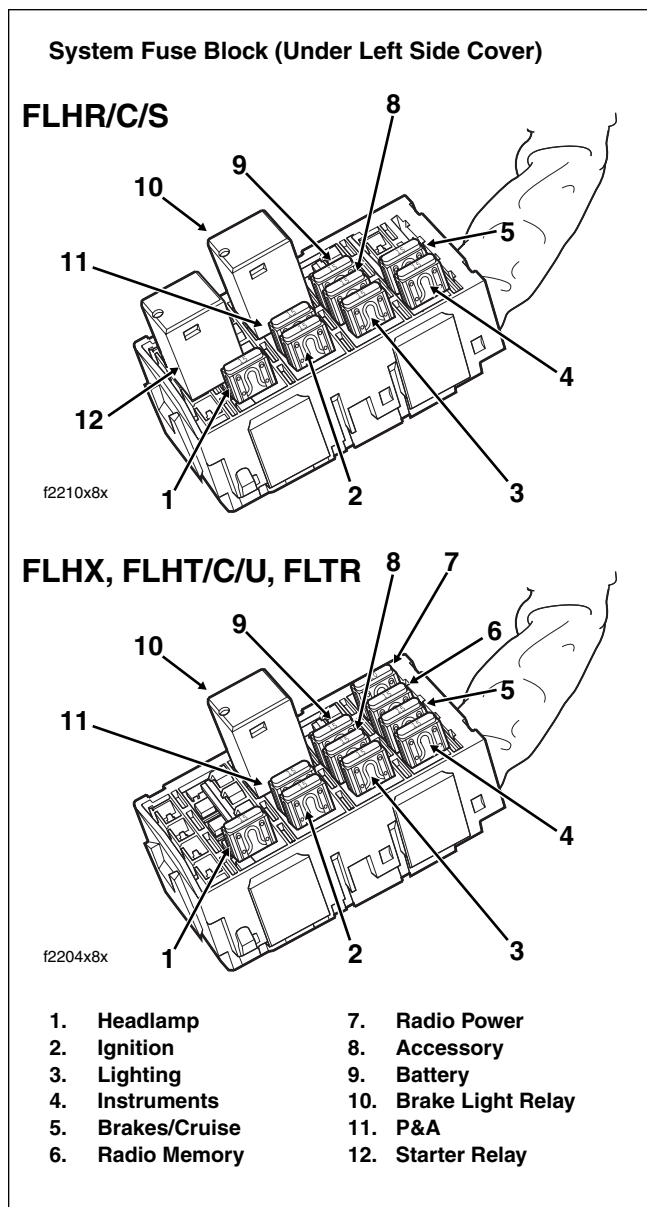
Figure 3-19. Fuse Locations
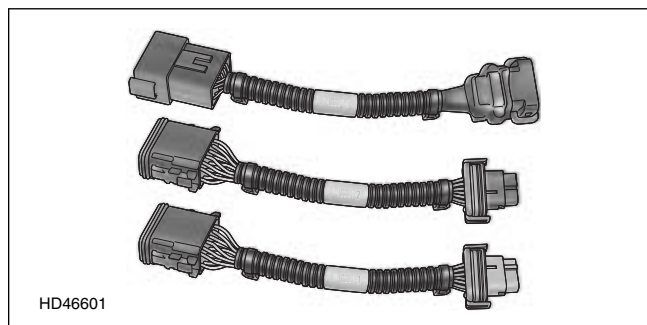
HD46601

**Figure 3-20. Instrument Harness Adapters
(Part No. HD-46601)**
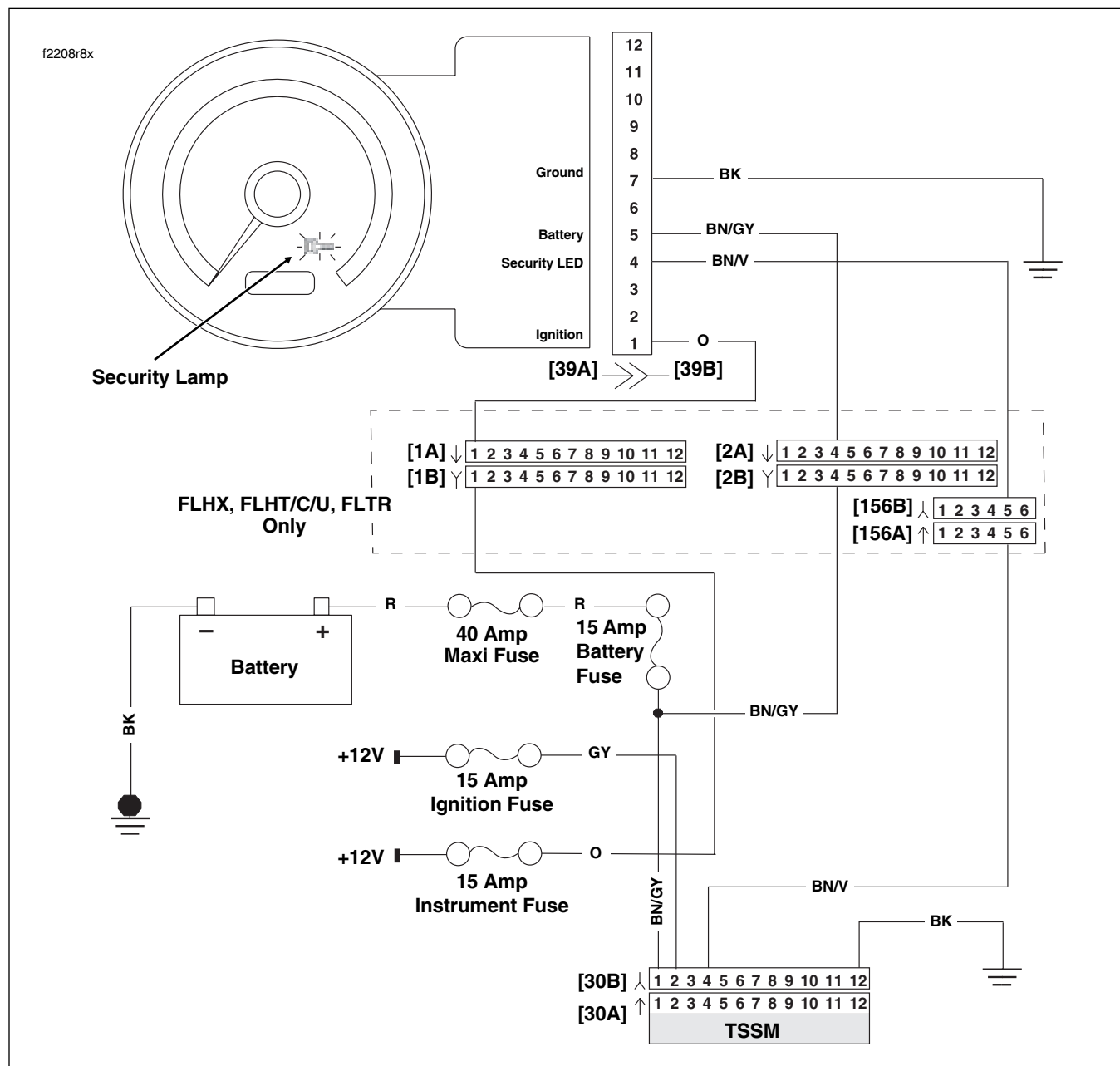
Figure 3-21. Security Lamp Circuit

Table 3-17. Wire Harness Connectors in Figure 3-21.

NO.	DESCRIPTION	MODEL	TYPE	LOCATION
[1]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
		FLTR	12-Place Deutsch (Black)	Inner Fairing - Below Radio (Right Side)
[2]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Gray)	Inner Fairing - Right Fairing Support Brace
		FLTR	12-Place Deutsch (Gray)	Inner Fairing - Below Radio (Right Side)
[30]	TSM/TSSM	All	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Speedometer)
		FLTR	12-Place Packard	Under Bezel (Back of Speedometer)
		FLHR/C/S	12-Place Packard	Under Console (Back of Speedometer)
[156]	Main to Interconnect Harness	FLHT/C	6-Place Deutsch	Inner Fairing - Right Fairing Support Brace
		FLTR	6-Place Deutsch	Inner Fairing - Below Radio (Right Side)

Test 3.12 (Part 1 of 3)
NO SECURITY LAMP AT KEY ON

Security equipped vehicles only.

Turn Ignition/Light Key Switch to IGNITION.
Set engine stop switch to RUN. Press starter
button. Turn ignition switch to OFF.
Did engine crank when starter button was pressed?

YES

NO

1
2
Check for continuity between
Breakout Box cavity 4 (black) and
cavity 4 (gray).
Is continuity present?

STOP

**Go to Test 3.12
(Part 2 of 3).**

YES

NO

Check for continuity to
ground on Breakout
Box cavity 4 (black).
Is continuity present?

Repair open on BN/V wire
between connectors [30B]
and [39B].

6735

YES

NO

Locate and repair short to
ground on BN/V wire.

6736

3
Reconnect connector [39]. Place
jumper between Breakout Box cavity 4
(gray) and battery positive terminal.
Does security lamp illuminate?

YES

NO

Replace TSSM. Learn
password and perform setup.

6737

4
Replace
speedometer.

6738

**Clear DTC's using speedometer self diagnostics.
See Section 3.10 SPEEDOMETER SELF DIAG-
NOSTICS. Confirm proper operation with no
check engine lamp.**

Test 3.12 (Part 2 of 3)

NO SECURITY LAMP AT KEY ON

Continued from Test 3.12 (Part 1 of 3).

Is connector [30] fully mated?

YES

NO

1 Place red meter lead at Breakout Box cavity 1 (gray) and black meter lead at Breakout Box cavity 12 (gray). Is battery voltage present?

Mate connector.

6739

YES

NO

Move red meter lead to Breakout Box cavity 2 (gray). Is battery voltage present?

STOP

Go to **Test 3.12 (Part 3 of 3).**

YES

NO

Replace TSSM. Learn password and perform setup.

6740

Remove left side cover. Check for voltage at ignition fuse. See Figure 3-19. Is battery voltage present on both terminals?

YES

NO

Locate and repair open on gray wire between ignition fuse and TSSM.

6741

STOP

On carbureted models go to Section 4.11 NO SPARK/ NO ICM POWER. On EFI models go to Section 5.11 NO ECM POWER.
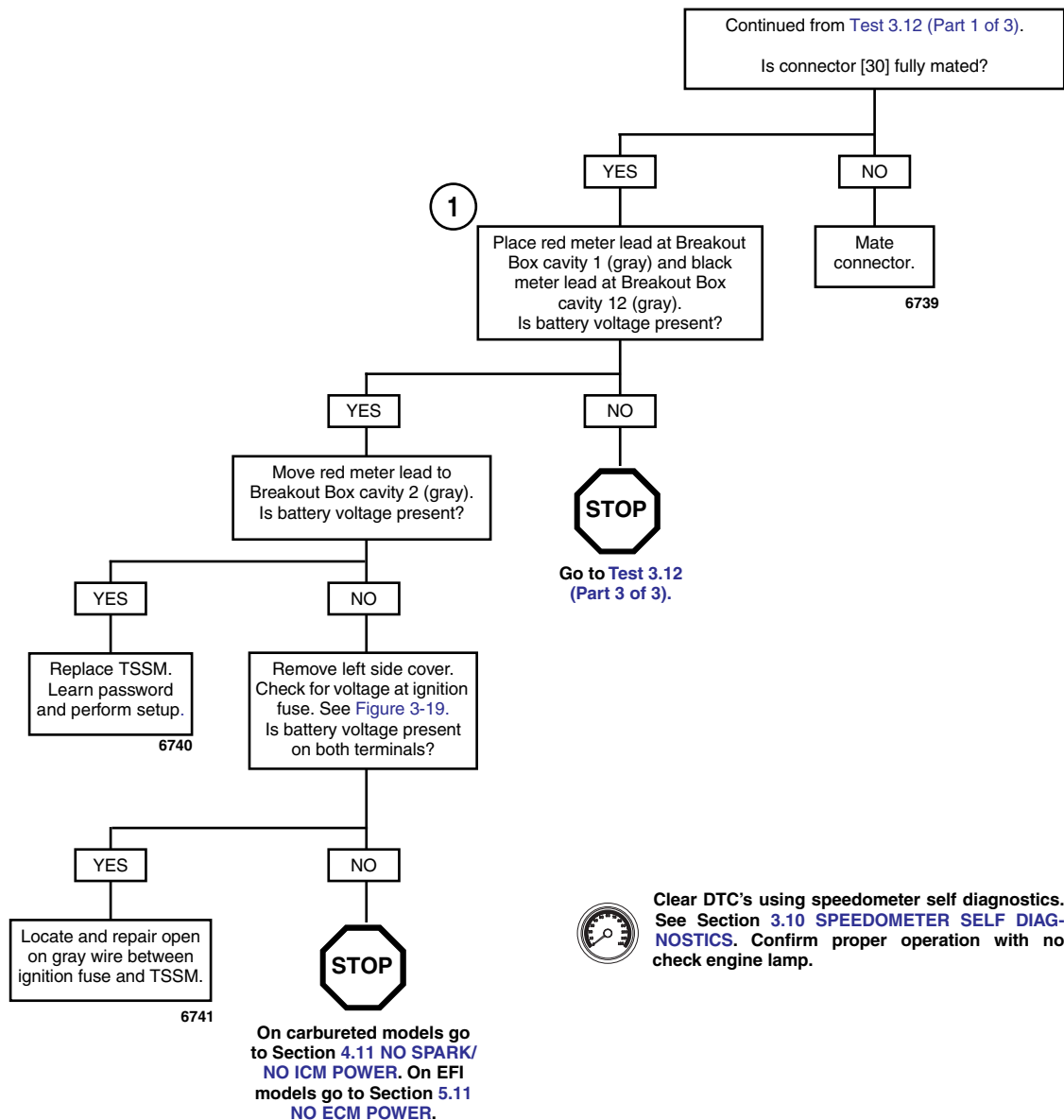
Clear DTC's using speedometer self diagnostics. See Section 3.10 SPEEDOMETER SELF DIAGNOSTICS. Confirm proper operation with no check engine lamp.

Test 3.12 (Part 3 of 3)

NO SECURITY LAMP AT KEY ON

Continued from
Test 3.12 (Part 2 of 3).

Check resistance to ground at
Breakout Box terminal 12 (gray).
Is resistance less than 1 ohm?

YES

Check for 12 volts at both terminals of
15 amp battery fuse. See Figure 3-19.
Is proper voltage present at
both terminals?

NO

Locate and
repair poor
ground.

6742

YES

Locate and repair open in BN/GY
wire between
battery fuse and TSM/TSSM.

6743

NO

One terminal.

Neither terminal.

Replace
battery fuse.

6744

Locate and repair
open between main
fuse and fuse block.

6745

**Clear DTC's using speedometer self diagnostics.
See Section 3.10 SPEEDOMETER SELF DIAG-
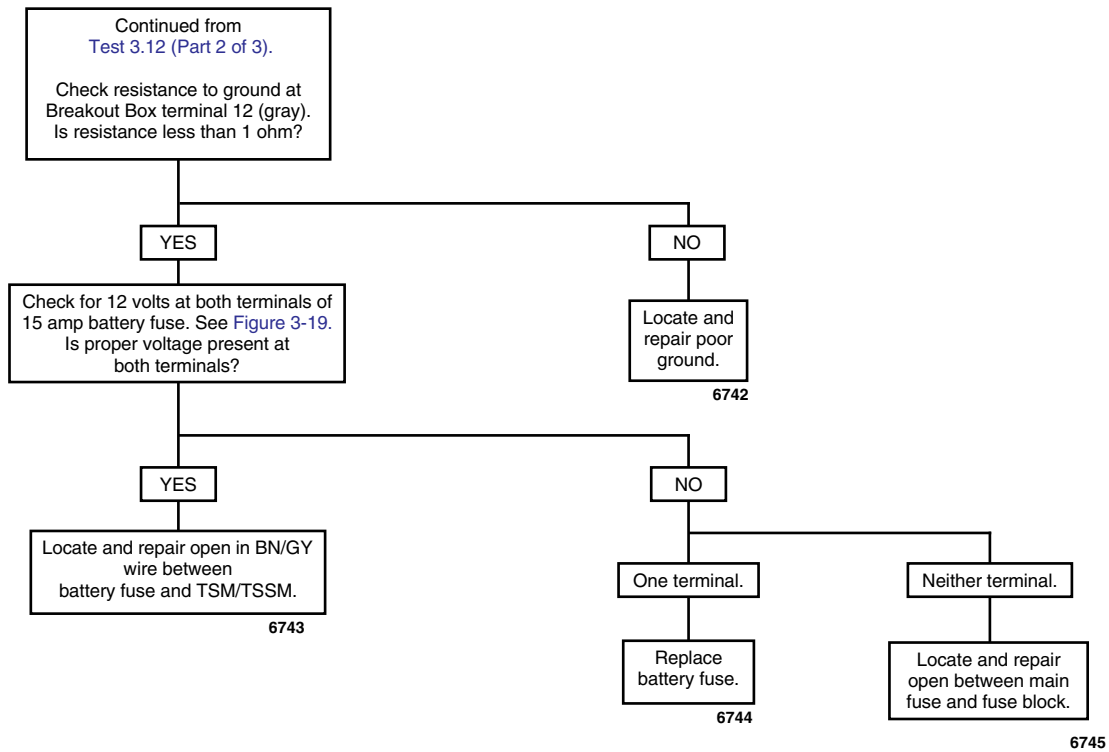NOSTICS. Confirm proper operation with no
check engine lamp.**

GENERAL

See Figure 3-22. When the Ignition/Light Key Switch is turned to IGNITION, the security lamp should illuminate for 4 seconds. Following the initial period of illumination, the lamp should go off for 4 seconds. It may then come back on for an 8 second period, indicating an historic DTC, or remain on, indicating a current DTC.

Job/Time Code Values

Dealership technicians filing warranty claims should use the job/time code values printed in **bold text** underneath the appropriate repair.

DIAGNOSTICS

Diagnostic Notes

The reference number below correlates with the circled number on the Test 3.13 flow chart.

1. Connector [39B] is on the back of the speedometer. Use HARNESS CONNECTOR TEST KIT (Part No. HD-41404A), black pin probe and patch cord.
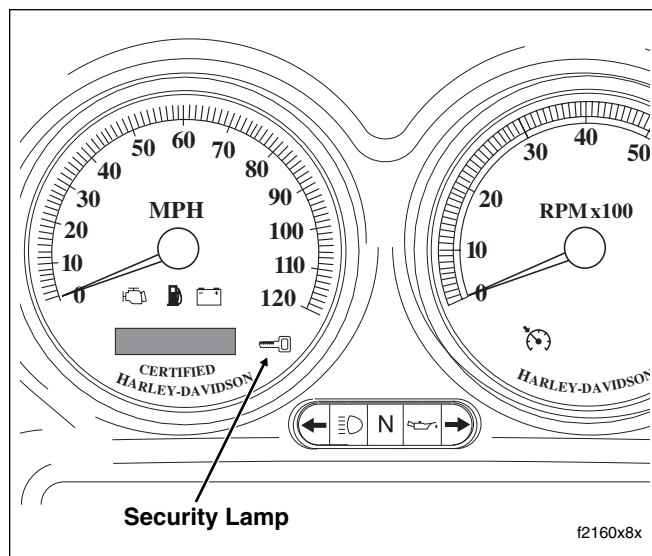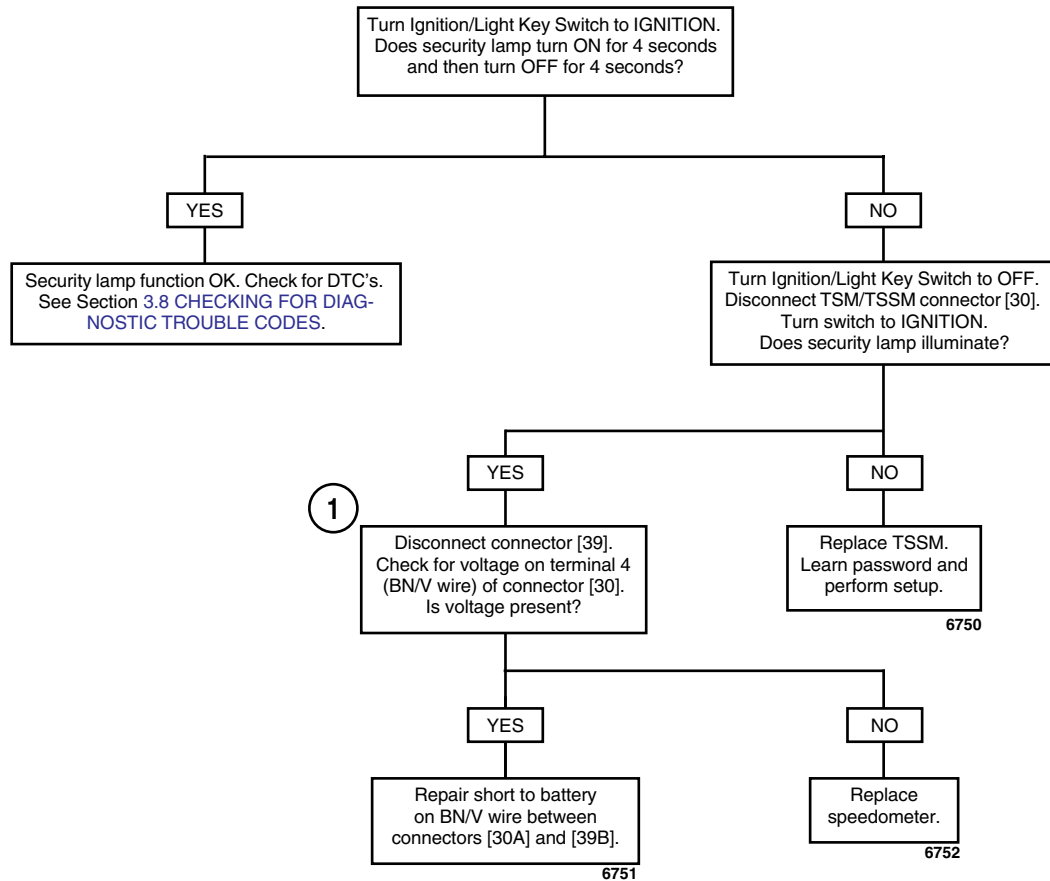

Figure 3-22. Speedometer

Figure 3-23. Security Lamp Circuit

Table 3-18. Wire Harness Connectors in Figure 3-23.

NO.	DESCRIPTION	MODEL	TYPE	LOCATION
[1]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Black)	Inner Fairing - Right Radio Support Bracket
		FLTR	12-Place Deutsch (Black)	Inner Fairing - Below Radio (Right Side)
[2]	Main to Interconnect Harness	FLHT/C	12-Place Deutsch (Gray)	Inner Fairing - Right Fairing Support Brace
		FLTR	12-Place Deutsch (Gray)	Inner Fairing - Below Radio (Right Side)
[30]	TSM/TSSM	All	12-Place Deutsch	Cavity in Crossmember at Rear of Battery Box (Under Seat)
[39]	Speedometer	FLHT/C	12-Place Packard	Inner Fairing (Back of Speedometer)
		FLTR	12-Place Packard	Under Bezel (Back of Speedometer)
		FLHR/C/S	12-Place Packard	Under Console (Back of Speedometer)
[156]	Main to Interconnect Harness	FLHT/C	6-Place Deutsch	Inner Fairing - Right Fairing Support Brace
		FLTR	6-Place Deutsch	Inner Fairing - Below Radio (Right Side)

Test 3.13

SECURITY LAMP ON CONTINUOUSLY

Turn Ignition/Light Key Switch to IGNITION.
Does security lamp turn ON for 4 seconds
and then turn OFF for 4 seconds?

YES

Security lamp function OK. Check for DTC's.
See Section 3.8 CHECKING FOR DIAG-
NOSTIC TROUBLE CODES.

NO

Turn Ignition/Light Key Switch to OFF.
Disconnect TSM/TSSM connector [30].
Turn switch to IGNITION.
Does security lamp illuminate?

YES

1

Disconnect connector [39].
Check for voltage on terminal 4
(BN/V wire) of connector [30].
Is voltage present?

NO

Replace TSSM.
Learn password and
perform setup.

6750

YES

Repair short to battery
on BN/V wire between
connectors [30A] and [39B].

6751

NO

Replace
speedometer.

6752

**Clear DTC's using speedometer self diagnostics.
See Section 3.10 SPEEDOMETER SELF DIAG-
NOSTICS. Confirm proper operation with no
check engine lamp.**

NOTES