Instruction 51-1136
11-11-11

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Installation Instructions: S&S® IST® Ignition System

For All 1999–'03 Carbureted Harley-Davidson® Twin Cam 88® Engines
Part Number 55-1221

DISCLAIMER:
S&S parts are designed for high performance, closed course, racing applications and are intended for the very experienced rider only. The installation of S&S parts may void or adversely affect your factory warranty. In addition such installation and use may violate certain federal, state, and local laws, rules and ordinances as well as other laws when used on motor vehicles used on public highways, especially in states where pollution laws may apply. Always check federal, state, and local laws before modifying your motorcycle. It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when breathed. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgment when performing installation and operating motorcycle. Good judgment begins with a clear head. Don't let alcohol, drugs or fatigue impair your judgment. Start installation when you are fresh.
- Be sure all federal, state and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be breathed. Run motorcycle in a well ventilated area where fumes can dissipate.

IMPORTANT NOTICE:

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

⚠ WARNING

Means there is the possibility of injury to yourself or others.

⚠ CAUTION

Means there is the possibility of damage to the part or motorcycle.

NOTE

Other information of particular importance has been placed in italic type.

S&S recommends you take special notice of these items.

WARRANTY:
All S&S parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of twelve (12) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&S's option if the parts are returned to us by the purchaser within the 12 month warranty period or within 10 days thereafter.
In the event warranty service is required, the original purchaser must call or write S&S immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action.
A part that is suspect of being defective must not be replaced by a Dealer without prior authorization from S&S. If it is deemed necessary for S&S to make an evaluation to determine whether the part was defective, a return authorization number must be obtained from S&S. The parts must be packaged properly so as to not cause further damage and be returned prepaid to S&S with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used and the circumstances at the time of failure. If after an evaluation has been made by S&S and the part was found to be defective, repair, replacement or refund will be granted.

ADDITIONAL WARRANTY PROVISIONS:
(1) S&S shall have no obligation in the event an S&S part is modified by any other person or organization.
(2) S&S shall have no obligation if an S&S part becomes defective in whole or in part as a result of improper installation, improper maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the S&S part.
(3) S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or for any other breach of contract or duty between S&S and a customer.
(4) S&S parts are designed exclusively for use in Harley-Davidson® and other American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

Instruction Contents:

CAUTION

Do not use a dual fire coil with the S&S ignition module.

This kit will NOT work with vehicles equipped with flat slide carbs, open primaries, and dry clutches. If you want to use IST with these configurations contact S&S, we can help set up IST.

A. Introduction

The Intelligent Spark Technology system uses a sophisticated computerized ECU module that integrates data from sensors that other ignition systems are not designed to use. The S&S system makes use of crank position sensor, cam position sensor (if present), MAP sensor, cylinder head temperature sensor, and an exclusive knock sensor that actually detects detonation or knock while the engine runs. The knock sensor allows the ECU to automatically adjust ignition timing to eliminate knock whenever it occurs. In addition, the system "remembers" the conditions that cause the engine to knock and automatically adjusts ignition timing to prevent it when those conditions reoccur. On the other hand, when conditions allow for increased ignition timing, the system will advance timing as far as possible without causing the engine to knock. In effect, the system "learns" the ignition requirements of a particular engine and writes a custom ignition map for it. This results in optimized power and fuel economy, as well as reduced emissions.

If ignition requirements change, if a lower grade of fuel is introduced, for example, the system will automatically make the necessary ignition timing changes to avoid detonation and possible engine damage. This feature is particularly important in touring applications where the rider sometimes has less control over fuel quality. If a different camshaft is installed, or if cylinder head modifications are made, the S&S Intelligent Spark Technology system changes the ignition timing for the new configuration. Even if major engine modifications are made, such as the installation of a stroker or big bore kit, the system will adjust to the ignition requirements of the engine.

Additional features:

- Simple installation – installation kits plug into stock wiring harness.
- No timing adjustments – the system adjusts timing automatically.
- Factory pre-set 6250 RPM rev limiter. Adjustable up to 7200 RPM with S&S IST Guardian Diagnostic System (p/n 55-5075).
- Single fire operation – requires two coils or dual coil package.
- High output – Automatically maximizes coil output.
- Automatic dwell adjust – will optimize current for any coil 0.5 to 3 ohms.
- Short circuit and reverse polarity protected.
- Diagnostics – scan tool or harness jumper.

NOTE: *The electronics used in the S&S® Ignition System require operation in single fire mode only. The S&S Ignition System cannot be used in dual fire mode.*

Dual Fire vs. Single Fire Ignition Systems

Two types of ignition systems have been used on Harley-Davidson® motorcycles; single or dual-fire.

Dual Fire

Dual fire ignitions fire the spark plugs in both cylinders on every stroke, each time the pistons reach the tops of the cylinders. One piston is at the top of the compression stroke, while the other piston is near the top of the exhaust stroke. Dual fire is also known as "wasted spark" because the second spark fires near the top of the exhaust stroke. Dual fire was common for many years because of its simplicity and reliability. Dual fire has a slightly rougher idle than single fire because the "wasted" spark occurred just after the top of the exhaust stroke of the rear cylinder, disrupting the incoming intake charge.

Single Fire

Single fire ignitions fire the spark plugs on every other stroke of the engine, only at the top of the compression stroke. One cylinder fires, then after one crankshaft revolution, the other cylinder fires. A single fire ignition system allows the ignition to reliably transmit more power to the coil during the compression stroke when it is needed most.

All Harley-Davidson® Twin Cam 88® motorcycles for this ignition application came from the factory with a single fire ignition. The stock coil has a small 3-connector plug. If a Twin Cam 88® motorcycle is equipped with the OEM coil, there is no need to change it. If the bike was previously customized, the ignition may have been changed. Verify coil type per below.

Ignition Coil Identification

Dual Fire Coil

In addition to the spark plug terminals, an aftermarket dual fire coil will have two wiring terminals: positive, negative.

Single Fire Coil

In addition to the spark plug terminals, an aftermarket single fire coil will have three wiring terminals: A negative terminal for the front cylinder, a common 12v + terminal, and negative terminal for the rear cylinder, this is the most common type of single fire coil.

All single fire coils are compatible with the S&S® ignition if they have a resistance of .5 to 3 ohms. Coils with higher resistance will decrease ignition output.

The S&S Ignition system will also support a variety of different ignition coil combinations as long as they are connected for single fire operation, and yield a final resistance of .5 to 3 ohms. The ignition is also compatible with dual plug heads with the correct coil configuration.

Examples of custom coil/spark plug combinations supported by the S&S ignition:

- One coil single fire for single plug heads
- One coil single fire for dual plug heads.
- Two coil single fire for single plug heads.
- Two coil single fire for dual plug heads.

Spark Plugs and Plug Wires

Spark plugs must be resistor spark plugs (suppression type) of the correct style and heat range for the application. Do not use non-resistor plugs

Spark plug wires must be suppression type. Do not use solid metal core plug wires.

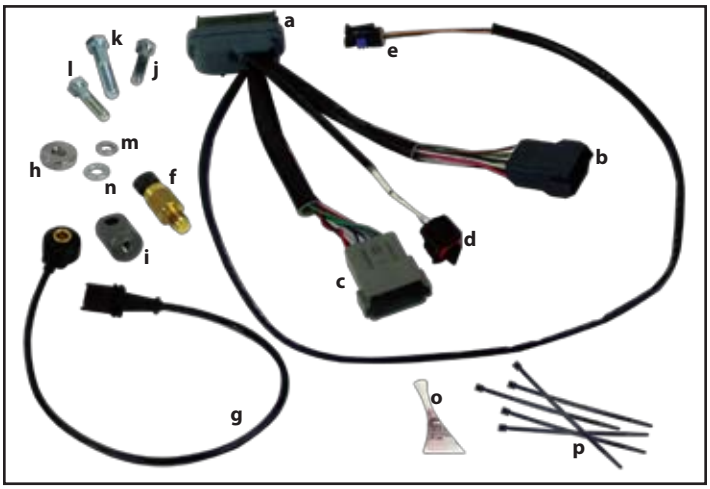
B. Parts List

The S&S Ignition Installation Kit for 1999–2003 Harley-Davidson® Twin Cam 88® (S&S #55-1012 **See Picture 1, below left**) is intended only for installation of S&S Intelligent Spark Technology (IST) Ignition Module. **See Picture 2, below right**.

S&S Ignition System Installation Kit #55-1012 contains the following items **(See Picture 1):**

- S&S #55-1017 Wiring Harness Adapter. Items (a) thru (e)
- S&S #55-1014 (H-D® #32446-99) Cylinder Head Temperature Sensor. Item (f)
- S&S #55-1015 Knock Sensor Kit. Items (g) thru (n)
- Loctite® & Wire Ties. Items (o) and (p)

All reference to Harley-Davidson® part numbers is for identification purposes only. We in no way are implying that any of S&S® Cycle's products are original equipment parts or that they are equivalent to the corresponding Harley-Davidson® part number shown



Picture 1

S&S® Intelligent Spark Technology ECU Module

Picture 2

C. Removal or Existing Ignition Module:

⚠ WARNING

Prior to installation, disconnect and remove the battery, negative cable first. This will eliminate potential sparks and inadvertent engagement of the starter while working on the motorcycle. C. Removal of Existing Ignition Module:

1. Locate the ignition module installed on your motorcycle. The ignition module can usually be found under the seat or a side cover **(See Picture 3, below left).** Refer to the Harley-Davidson® service manual for your motorcycle if you have trouble locating it.
2. Remove the module mounting hardware and unplug the module. **(See Picture 4, below right).** Each plug is disconnected by simultaneously pressing the locking tabs on the connector and pulling it away from the module. Save the mounting hardware for installation of the S&S® ignition module.

Picture 3

Picture 4

D. S&S System Installation

⚠ WARNING

Be careful not to damage the front of the tank when raising or removing it.

It is possible to install the ignition knock sensor assembly, engine temperature assembly, and wiring harness without removing the fuel tank. Loosen (do not remove) the bolt at the front of the tank, and remove the mounting bolt(s) at the rear of the tank. The rear of the tank then can be raised slightly, allowing enough room to install these components.

NOTE: *Clearances are limited at the front of the tank. Use care not to damage any painted surfaces while handling tank.*

Installing components without removing the fuel tank is a timesaving suggestion only. If there is any reservation on the part of the installing mechanic about performing this installation with the fuel tank in place, refer to the appropriate Harley-Davidson® service manual for correct procedure for removing fuel tank and related components.

1. Installation of the Cylinder Head Temperature Sensor

NOTE: *The S&S Cylinder Head Temperature Sensor for mounts in a boss found on the front head of all Harley-Davidson® Twin-Cam 88® engines. This boss is used for mounting the Engine Temperature Sensor on fuel-injected Harley-Davidson® Motorcycles. On carbureted models, the hole is plugged.*

a. Remove the plug and install the S&S Head Temperature Sensor.

b. Tighten the sensor to 10-12 ft-lbs using a deep well socket and a torque wrench. **See Picture 5, next page.**

Picture 5

2. Installation of the Knock Sensor Kit

⚠ CAUTION

Knock Sensor must be mounted to the rear cylinder for correct operation.

Mounting the Knock Sensor on the front cylinder will provide an incorrect signal.

NOTE: *There are two mounting locations possible for the knock sensor. Read description of each location, and then examine your motorcycle for which one to use. The first location has better clearance than the second location, the knock sensor will work well in either one.*

Location 1: Rear cylinder head, across from the temperature sensor on the front head. Some S&S® heads have an unused threaded hole in the rear head near the intake port. Stock Harley-Davidson® Twin Cam 88® heads and some S&S heads do not have the unused threaded hole. If the extra threaded hole is present, install the Knock Sensor there. **See Step a, below.** If the threaded hole is not present, use Location 2.

Location 2: Top motor mount at the rear cylinder head attachment point. All Twin Cam 88® heads and some early S&S heads do not have the unused, threaded hole across from the temperature sensor, and must use the top motor mount location. **See Step b, below.**

a. Knock sensor mounting at **Location 1:** Rear cylinder head
   1. Remove the plug from the rear head.
   2. Insert the 5⁄16 x 1½" coarse thread bolt (l) through the lock washer (m), knock sensor (g), and ¼" thick spacer (h).
   3. Attach this assembly to the rear head and torque to 11 ft-lb. **See Picture 6, below left.**

b. Knock sensor mounting at **Location 2:** Top motor mount location.
   1. Remove rear motor mount bolt from rear cylinder head.
   2. Test fit knock sensor mounting block to rear motor mount location using ⅜" x 2" coarse thread bolt (k) and ⅜" lock washer (n). Test fit knock sensor to mounting block (i) using bolt (j) and lock washer (m) **See Picture 7, below right.**

Picture 6

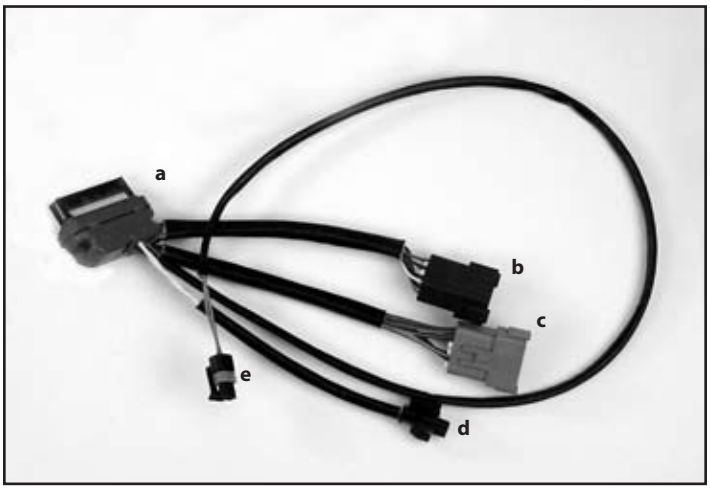
Picture 7

⚠ CAUTION

Carefully place fuel tank back into position to check Knock Sensor and mounting block clearance. Position the mounting block so that the Knock Sensor or mounting block does not contact the fuel petcock or any other part of the motorcycle. If the wiring harness or outer body of the Knock Sensor (black plastic portion) contacts the engine or any other part of the motorcycle, it could damage the Knock Sensor, or interfere with its ability to detect knock. See Picture 8, below left. Special care for rubber mounted motors must be given. View Knock Sensor while motor runs to make sure it has proper clearance.

3. After determining final position for Knock Sensor, remove mounting bolts and lockwashers, then re-install them on mounting block bolt (k), torque to 33 ft-lbs., and Loctite® 243 on knock sensor bolt (j), torque to 11 ft-lbs.

Picture 8



Picture 9

⚠ CAUTION

Hold knock sensor in position by hand only while torquing. Do NOT use pliers. Damage to knock sensor will occur.

3. Installation of the IST Ignition Module and Wiring Harness Adapter:

The Wiring Harness Adapter for Harley-Davidson® Twin Cam 88® (**See Picture 9, above right**) is a one-piece assembly consisting of the following connectors:

- (**a**) IST Ignition Module Connector: 32-Socket, Gray (Delphi®/Packard® #12129025) - Connects to the S&S® Intelligent Spark Technology Ignition Module.
- (**b & c**) Motorcycle Main Harness Connectors: (1) 12-Pin, Gray (Deutsch #DT04-12PA) & (1) 12-Pin Black (Deutsch #DT04-12PB) – Connects to the stock Harley-Davidson® wiring harness in place of the stock module.
- (**d**) Knock Sensor Connector: 2-Socket (Bosch #1928403192)
- (**e**) Head Temperature Sensor Connector: 2-Socket (Delphi®/Packard® #12162193)

NOTE: *Locking tabs on each connector listed should produce a light clicking sound when properly assembled. S&S recommends checking each connection by lightly pulling on each half of the connector to insure that the locking tabs have properly seated.*

The IST ignition module includes a hardware packet. The hardware is intended for spacing the module and the connector off of the mounting back plate. Washers are also included for the mounting screws. This hardware is only necessary on some models. The hardware packet includes the following spacers and washers:

- .200" spacers (4)
- .060" spacers (4)
- .475" OD washers (2)
- .250 ID lockwashers (2)

a. Route the wiring harness along the bike frame to ensure that the Ignition Module Connector (a) **See Picture 9, previous page** reaches the Module mounting location.

b. Connect the Ignition Module Connector (a) **See Picture 9** to the Module.

c. Install the module using the stock mounting hardware and the S&S hardware (if necessary) included with the module.

d. Plug the 12-socket black and gray plugs from the stock Harley-Davidson® wiring harness into the corresponding gray and black 12-pin Motorcycle Main Harness Connectors (**b & c**) **See Picture 9** on the S&S harness. **See Picture 10, below.**

e. The remaining portion of the harness that connects to the Head Temperature Sensor and the Knock Sensor should be routed along with the stock wiring under the gas tank.

f. Connect the Head Temperature Connector (**e**) **See Picture 9** and Knock Sensor Connector (**d**) See **Picture 9** to the corresponding sensors.

g. Use the provided wire ties to secure this portion of the harness to the motorcycle frame or a portion of the existing harness.

NOTE: *If the tank is removed or raised, temporarily replace it to insure clearance for the Engine Temperature and Knock Sensor portions of the harness. Reroute any wires that may be damaged by installing the tank.*

h. Permanently reinstall tank, reconnect battery (positive cable first) and any other portions of the motorcycle that have been removed or disconnected.

Picture 10

E. Initial Starting and Operation Procedure:

Because the S&S® Intelligent Spark Technology Ignition System is designed to learn the specific engine/motorcycle configuration it is being used for, the following initial starting and operating procedures must be followed after installing the system for the first time. These procedures need to be followed only once. After that, the motorcycle can be started and ridden as usual.

1. Initial Starting Procedure

NOTE: IMPORTANT! *On some 2001 and up models, the Vehicle Speed Signal (VSS) is sent to the ignition module in lieu of a cam position signal.*

The module must "learn" which signal is connected. It is important that the rear wheel remain motionless if the key is on the first time the module is installed.

Until the ignition has learned what type of signal is present, it could fire the plugs based on wheel movement if installed on a motorcycle with the VSS routed to the ignition module.

To insure proper learning of the type of signal used in your application:

a. Be sure to start the motorcycle in neutral and on a flat/level surface.

b. Allow the engine to run for a minimum of 10 seconds before turning the key off.

This procedure only needs to be performed once, but it should be repeated if the IST module is installed in another motorcycle.

2. Initial Operating Procedure

Initially, the S&S Intelligent Spark Technology Ignition System operates using a standard ignition-timing map that may not be optimum but is considered "safe" for most engine configurations. After 3 to 5 hours of operation, with the engine warmed up, the IST Ignition System will have adjusted the map to create one that is optimized for the particular engine configuration. **See Step 2-a.** The IST system will continually adapt to subsequent changes in riding style, fuel quality, weather conditions and elevation to further optimize the ignition map. For this reason, data recorded using a chassis dynomometer should be measured after the system has had sufficient time to learn the specific engine parameters.

a. Ride your motorcycle as you normally would during this initial learning period. The IST system will learn and adapt the ignition map to various conditions as they are encountered – so the more riding you do, the more the system will fine tune itself. Below are some suggested practices to help the system quickly create the initial optimized timing map:
   1. Allow engine to remain at normal operating temperature for at least an hour.
   2. Ride up hills and/or inclines.
   3. Ride at highway speeds for at least 20 minutes. When road conditions are safe, briefly (1-2 seconds at a time) open the throttle all the way.
   4. Ride through intersections/stretches of road where second and third gear roll-ons are required.

F. Basic Troubleshooting:

Below are some suggestions if any problems are encountered with the IST Ignition Module.

1. Problem: Engine cranks but will not start.
   Possible solutions:
   a. Check that the gas tank is full and that the fuel petcock is turned on.
   b. Check that coil wires (plug and harness) have been reinstalled properly.
   c. Check that all connections are complete on the Harley-Davidson® Twin Cam 88® Wiring Harness Adapter.
2. Problem: Key power-on switch does not seem to work.
   Possible solutions:
   a. Check for blown fuses and/or tripped circuit breakers.
   b. Check that the battery has been properly reconnected.
   c. Check that the 12-pin Black and Grey connectors are connected correctly. For example, check that the wire colors match from one side to the other. If they do not match, disconnect the connector, rotate it to the correct orientation, and reconnect.

G. Advanced Troubleshooting

The S&S® ignition system features advanced self-diagnostic capabilities. The unit detects operational faults, and stores them as codes in memory. There are two methods of retrieving trouble codes stored in memory. First, by counting Flash Codes, generated by the Check Engine light, (see note) and second, by using the S&S IST Guardian™ Diagnostic System (P/N 55-5075) connected to the data link connector of the S&S Ignition Wiring Harness. Flash codes allow the mechanic to access the trouble code information without the use of the Guardian system, but are less detailed. Steps for using both methods are outlined below.

NOTES: *If the motorcycle has a check engine light, this can be used to read stored codes. For motorcycles without an OEM check engine light, there is an LED on the face of the ignition module that functions as a check engine light, and can also be used to read stored codes.*

Trouble codes are stored in memory for as long as the fault exists, and for 50 on/off cycles of the key after a fault is corrected. The S&S IST Guardian™ Diagnostic System (P/N 55-5075) has code clearing capability, and is a way to clear trouble codes immediately after a fault has been corrected. If a fault still exists, a new trouble code will be generated.

Before purchasing the S&S IST Guardian™ Diagnostic System (P/N 55-5075) note that the software is only compatible with Windows® 2000/XP/Vista/7 32-bit systems. It will not work on 64-bit operating systems.

Also, be aware that the Guardian system is only compatible with the S&S IST ignition module. It will not work with stock Harley-Davidson® or other aftermarket modules.

1. Overview of check engine light operation.

Initial power on sequence.

The check engine light will flash in one of the three ways listed below each time the key is turned "on", and the off/run switch is set to "run"

- If no faults are detected, the IST ignition will turn the check engine light "on" for 4 seconds, then "off".
- If a fault is present at that time, the check engine light will turn "on" for four seconds, then turn "off" for four seconds, then turn "on" continuously.
- If a fault has occurred and been corrected within the past 50 key on/off cycles, the check engine light will turn "on" for four seconds, then "off" for four seconds, then "on" for eight seconds, then off.

When a current fault is detected, a code is stored in memory, and the check engine light comes on continuously.

2. Retrieving and displaying codes using the Check Engine light.

a. Turn key and off/run switch to "off"

b. Remove seat or side cover to expose the OEM datalink connector, located near the ignition module. **See Picture 11, next page.**

c. Remove rubber plug from OEM datalink connector.

d. Connect pins "1" and "2" of the datalink connector with a jumper wire. Pins have to remain jumped together during the code retrieval process.

⚠ CAUTION

See Picture 12, next page, for pin locations. Do not connect any other pins except pins 1 & 2.

e. Turn key to "on" and set off/run switch to run, but do not start engine.

f. The check engine light will flash through its initial start sequence, as described above.

g. After the initial sequence of flashes, stored trouble codes will then be sent out as a series of flashes. Trouble codes are stored as two digit numbers. The first digit of the trouble code is equal to the number of times the light flashes. There is then a 1.2 second pause, then the second digit of the trouble code is flashed, again equal to the number of times the light flashes. After three seconds, if additional codes are stored, they will flash in the same manner, until all codes have been displayed, then the sequence will repeat continuously. If only one code is stored, it will repeat continuously.

Example: After flashing the initial start sequence (as described above) there will be a pause, then flash, flash, flash, flash, (1.2 second pause) flash. (3 second pause) then the sequence repeats. This indicates code 41, meaning there is a problem with the crank position sensor.

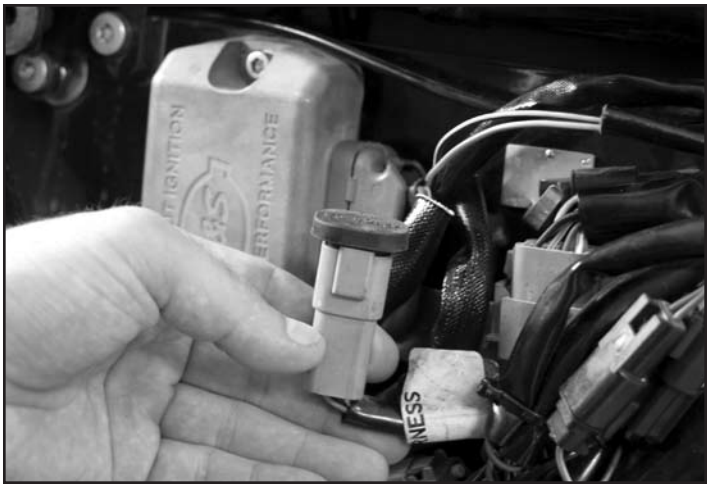
NOTE: *See chart on page 11 for definitions of fault codes supported by the S&S® ignition module.*

h. After retrieving codes, turn ignition key and run switch to "off"

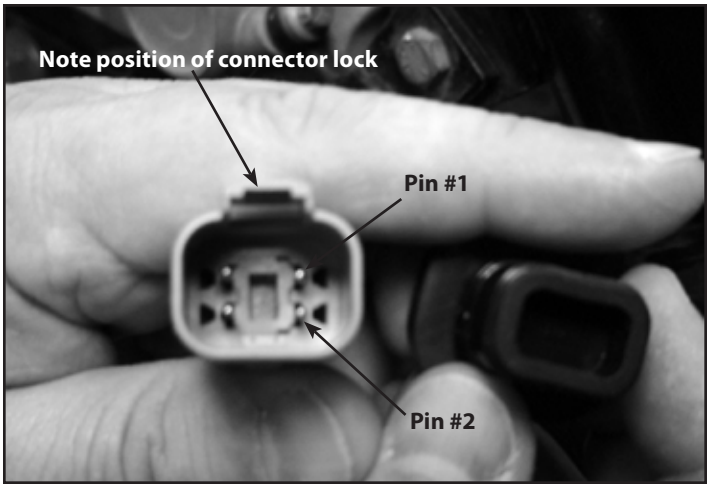
i. Remove jumper wire and replace datalink connector plug.

3. Retrieving codes using the S&S IST Guardian™ Diagnostic System (P/N 55-5075)

The Guardian system offers a more detailed decsription of the trouble codes than the Flash Code method. It also offers a way for trouble codes to be cleared immediately after a fault has been corrected rather than the 50 on/off cycles if the key that are normally required.



Picture 11



Picture 12

For more details, visit http://www.sscycle.com/software/guardian/

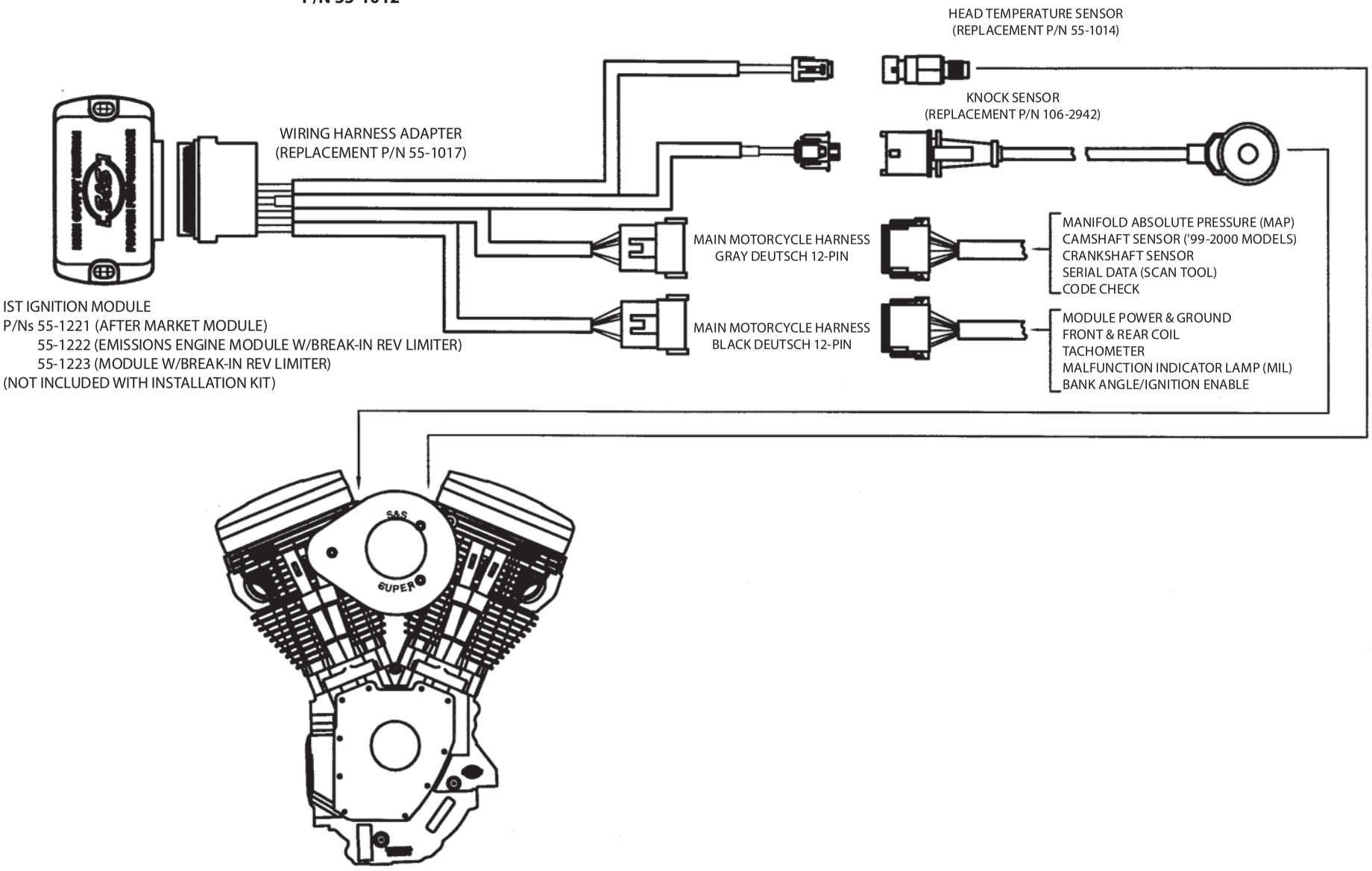
NOTES: *Before purchasing the S&S IST Guardian™ Diagnostic System (P/N 55-5075) note that the software is only compatible with Windows® 2000/XP/Vista/7 32-bit systems. It will not work on 64-bit operating systems.*

Also, be aware that the Guardian system is only compatible with the S&S IST ignition module. It will not work with stock Harley-Davidson® or other aftermarket modules.

Check Engine Lamp Code	Diagnostic Test Condition (Code Reader Only)	Fault Condition
12	P0107	MAP sensor open
12	P0108	MAP sensor high
12	P0109	MAP sensor intermittent
14	P0117	Engine Temp sensor voltage low
14	P0118	Engine Temp sensor voltage open
14	P0119	Engine Temp sensor voltage intermittent
71	P0324	Knock sensor low input
72	P0327	Knock sensor high input
41	P0335	Crank Position sensor intermittent
41	P0336	Crank Position sensor synch error
42	P0340	Cam sensor failure
16	P0562	Battery voltage low
16	P0563	Battery voltage high
54	P0603	ECM EEPROM error
24	P1351	Front ignition coil open
24	P1352	Front ignition coil high
25	P1354	Rear ignition coil open
25	P1355	Rear ignition coil high
58	P1607	Ignition Module Board temp low
58	P1608	Ignition Module Board temp high

INSTALLATION KIT FOR 1999–'03 HARLEY-DAVIDSON®
TWIN CAM 88® ENGINES

P/N 55-1012



IST IGNITION MODULE
P/Ns 55-1221 (AFTER MARKET MODULE)
55-1222 (EMISSIONS ENGINE MODULE W/BREAK-IN REV LIMITER)
55-1223 (MODULE W/BREAK-IN REV LIMITER)
(NOT INCLUDED WITH INSTALLATION KIT)

IGNITION HARNESS
P/N 55-1017
1999-2003 TWIN CAM 88®

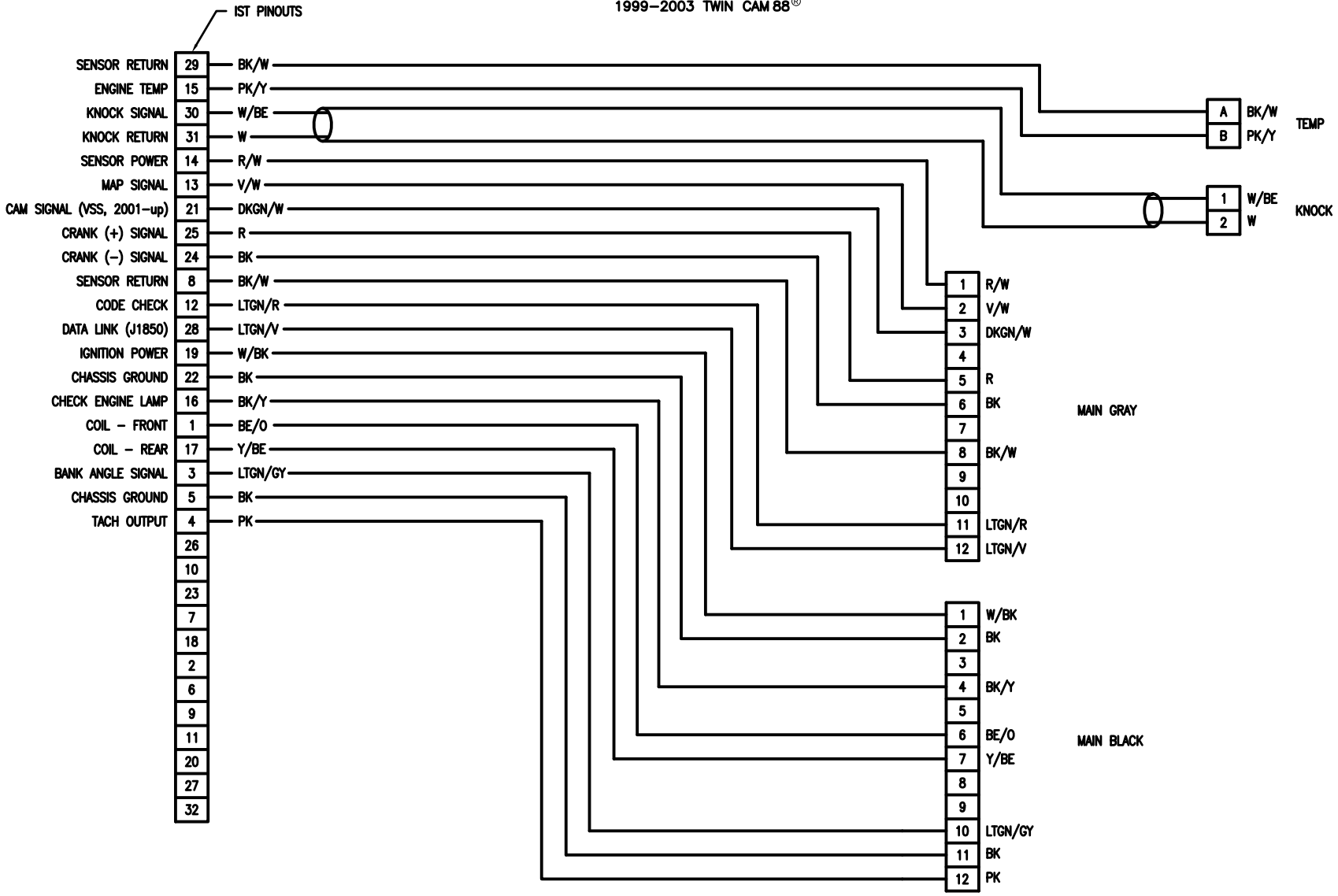


Table 1: Wire Color/Stripe Key

Wire Color → XX/ XX ← Stripe Color

BE	Blue	O	Orange
BK	Black	PK	Pink
BN	Brown	R	Red
DK	Dark	TN	Tan
GN	Green	V	Violet
GY	Gray	W	White
LT	Light	Y	Yellow

INST-51-1136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