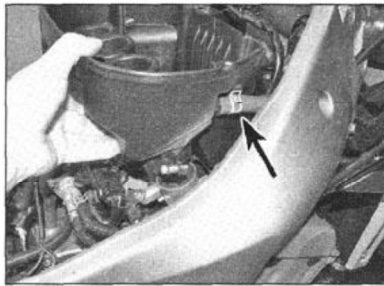
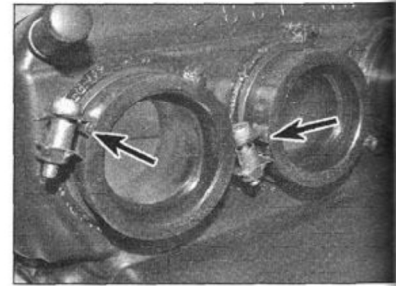


**5.3 Intake clamps (arrowed) on the underside of the housing are accessible from the rear**



**5.4 Location of the AIS hose (arrowed)**



**5.6 Clamps locate on tabs (arrowed) to ensure correct position of clamp screws**

body intakes (see illustration). A long Allen key or extension drive will be needed to reach the clamps (see Section 9).

**4** Lift the housing up off the throttle bodies, then when accessible release the clamp securing the AIS hose on the right-hand side and detach it from the housing (see illustration).

### Installation

**5** Installation is the reverse of removal.

**6** Ensure that the clamps are correctly positioned over the tabs on the housing outlets (see illustration).

**7** Lubricate the inside of the housing outlets with a squirt of WD40 or a smear of grease to aid installation on the throttle bodies. Check the condition of the various hoses and their clamps and replace them with new ones if necessary.

## 6 Fuel injection system description

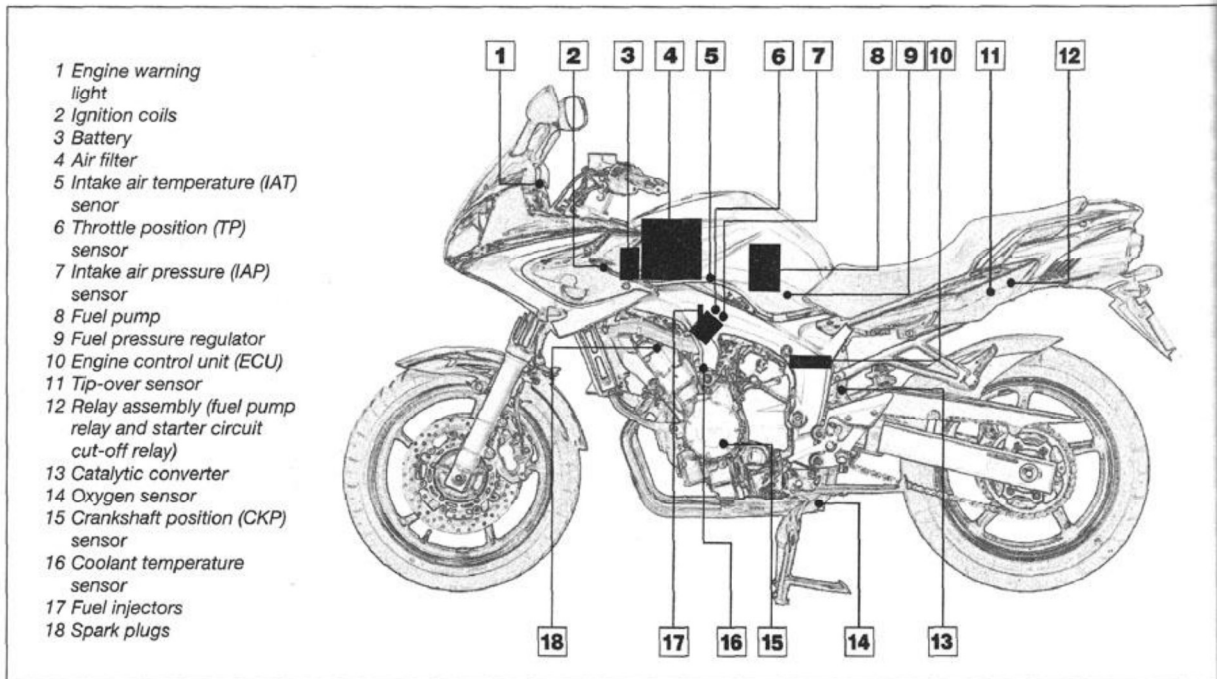
**1** The fuel injection system consists of two main component groups, the fuel circuit and the electronic control circuit (see illustration).  
**2** The fuel circuit consists of the tank, pump and filter, pressure regulator, throttle bodies and injectors. Fuel is pumped under pressure from the tank to the fuel rail, from which the individual injectors are fed. Operating pressure is maintained by the pressure regulator. The injectors spray pressurised fuel into the throttle bodies where it mixes with air and vaporises, before entering the cylinder where it is compressed and ignited.

**3** The electronic control circuit consists of the engine control unit (ECU), which operates and co-ordinates both the fuel injection and ignition systems, and the various sensors which provide the ECU with information on engine operating conditions.

**4** The ECU monitors signals from the following sensors:

- Intake air temperature sensor
- Intake air pressure sensor
- Throttle position sensor
- Crankshaft position sensor
- Coolant temperature sensor
- Oxygen sensor (2007-on models)
- Speed sensor

**5** Based on the information it receives, the ECU calculates the appropriate ignition and fuel requirements of the engine. By varying the length of the electronic pulse it sends to each



**6.1 Fuel injection and engine management system component location**

injector, the ECU controls the length of time the injectors are held open and thereby the amount of fuel that is supplied to the engine. Fuel supply varies according to the engine's needs for starting, warming-up, idling, cruising and acceleration.

**6** In the event of an abnormality in any of the sensor signals, the ECU will determine whether the engine can still be run safely. If it can, a back-up mode substitutes the sensor signal with a fixed signal, restricting performance but allowing the bike to be ridden home or to a dealer. When this occurs, the engine management warning light in the instrument cluster will come on and stay on. If the fault is serious, the fuel injection system will be shut down and the engine will not run. When this occurs, the engine management warning light will flash when the ignition switch is ON and the start button is being pressed. **Note:** The warning light should come on for 1.4 seconds after the ignition switch has been turned ON and while the starter button is being pressed. If the warning light does not come on, check

its LED circuit in the instrument cluster (see Chapter 8).

**7** After the engine has been stopped, the appropriate self-diagnostic fault code will appear on the clock LCD. If more than one fault has occurred, the lowest code numerically will be displayed. See Section 7 for fault diagnosis.

## 7 Fuel injection system fault diagnosis



**1** The system incorporates a self-diagnostic function whereby most faults, when they occur, are identified by a fault code which is displayed on the clock LCD after the engine has been stopped. The codes are stored in the ECU memory until a deletion operation is performed. In the case of a minor fault in the injection system, the engine management warning light in the instrument cluster will come on and stay on and the engine will

continue to run enabling the machine to be ridden, although performance will be significantly reduced. In the case of a major fault the warning light will flash when the ignition switch is turned ON and the start button is pressed, and it will not be possible to run the engine. Certain faults will not activate the warning light and are not subject to a fault code, but will be recorded as a diagnostic code. If the engine does not run correctly but no warning light and fault code are shown, enter diagnostic mode (see Step 3 onwards), check the code given and refer to the table.

**2** Compare the fault code displayed with those in Table 1 to identify the faulty component and the appropriate diagnostic code (where given). Next, follow the appropriate steps according to your machine and set the instrument cluster to diagnostic mode to confirm the appropriate test information. If a diagnostic code is not given for a particular fault code (i.e. 12 or 24), refer to Section 8 and check the component as described.

**Table 1 Fuel system fault codes**

Fault code	Faulty component – symptoms	Possible causes	Diagnostic code
12	Crankshaft position sensor – engine will stop and will not restart	Faulty wiring or wiring connector Damaged or improperly installed sensor or timing rotor Faulty ECU	-
13	Intake air pressure sensor – engine will run	Faulty wiring or wiring connector Damaged or faulty sensor Faulty ECU	03
14	Intake air pressure sensor hose system – engine will run	Kinked, clogged or detached hose Faulty ECU	03
15	Throttle position sensor – engine will run	Faulty wiring or wiring connector Damaged or improperly installed sensor Faulty ECU	01
16	Throttle position sensor – engine will run	Throttle position sensor stuck Faulty ECU	01
19	Sidestand switch – engine will not run	Faulty wiring or wiring connector Faulty ECU	20
21	Coolant temperature sensor – engine will run	Faulty wiring or wiring connector Damaged or improperly installed sensor Faulty ECU	06
22	Intake air temperature sensor – engine will run	Faulty wiring or wiring connector Damaged or improperly installed sensor Faulty ECU	05
24	Oxygen sensor (2007-on models) – engine will run	Faulty wiring or wiring connector Damaged or improperly installed sensor Faulty ECU	-
30	Tip-over sensor – engine will not run, fuel system turned OFF	Machine overturned Damaged or improperly installed sensor Faulty ECU	08
33	Ignition coil, Nos. 1 and 4 cylinders – engine will run dependent on how many cylinders are affected	Faulty primary wiring or wiring connector Damaged ignition coil Faulty component in ignition cut-off safety circuit Faulty ECU	30
34	Ignition coil, Nos. 2 and 3 cylinders – engine will run dependent on how many cylinders are affected	Faulty primary wiring or wiring connector Damaged ignition coil Faulty component in ignition cut-off safety circuit Faulty ECU	31

**Table 1 Fuel system fault codes (continued)**

-	Fuel injector, Nos. 1 and 4 cylinders	Faulty wiring or wiring connector	36
-	Fuel injector, Nos. 2 and 3 cylinders	Faulty wiring or wiring connector	37
-	Air induction system cut-off valve	Faulty wiring or wiring connector	48
-	Starter safety cut-off relay	Faulty wiring or wiring connector Damaged relay	50
-	Radiator cooling fan relay	Faulty wiring or wiring connector Damaged relay	51
-	Headlight relay	Faulty wiring or wiring connector Damaged relay	52
41	Tip-over sensor – engine will not run	Faulty wiring or wiring connector Damaged sensor Faulty ECU	08
42	Speed sensor/neutral switch – engine will run	Damaged speed sensor/neutral switch Faulty wiring or wiring connector Faulty ECU	07/21
43	Power supply to the fuel pump or injectors – engine will run	Faulty wiring or wiring connector Faulty ECU	09
44	Carbon monoxide (CO) density reading/writing error – engine will run	Error writing CO adjustment value to EEPROM Faulty ECU	60
46	Power supply to fuel injection system – engine will run	Faulty charging system	-
50	ECU malfunction, fault code may not be displayed – engine will not run	ECU internal memory malfunction	-
Start unable warning	Engine warning light flashes when the ignition switch is ON and the start button is pushed	Error detected – refer to fault codes 12, 19, 30, 41, 43 or 50	-
Er-1 Er-2 Er-3 Er-4	No communication or unreadable communication between ECU and instrument cluster – engine will not run	Faulty wiring or wiring connector Damaged instrument cluster Damaged ECU	-

**Diagnostic mode set-up 2004 to 2006**

**3** To set-up the diagnostic mode, first ensure that the ignition switch is OFF and that the engine stop switch is OFF, then disconnect the fuel pump wiring connector (see Section 2).

**4** Press the SELECT and RESET buttons on the instrument cluster simultaneously, then turn the ignition switch ON, keeping the SELECT and RESET buttons pressed for at least 8 seconds – all displays on the meter should disappear except for the clock and tripmeter.

**5** Select the diagnostic mode by pressing the SELECT button until DIAG appears on the clock LCD. **Note:** The CO adjustment mode will appear as an option at this stage. Confirm the selection of DIAG by pressing the SELECT and RESET buttons simultaneously for 2 seconds.

**6** Referring to Table 1 above, verify the diagnostic code that corresponds with the fault code originally displayed. Now press the SELECT or RESET button until the appropriate diagnostic code is displayed on the clock LCD. The SELECT button scrolls through the code numbers in ascending order, the RESET button scrolls through the numbers

in descending order. The corresponding operating data, as found, is displayed on the trip LCD.

**7** Refer to the diagnostic code on Table 2, and the corresponding operating data, to identify the test action required. Note that in some instances it will be necessary to turn the engine stop switch ON to verify the operating data.

**8** After each check the ignition switch must be turned OFF and the set-up procedure repeated for subsequent checks.

**9** To cancel the diagnostic mode, turn the ignition switch OFF.

**Diagnostic mode set-up 2007-on**

**10** To set-up the diagnostic mode, first ensure that the ignition switch is OFF and that the engine stop switch is ON, then disconnect the fuel pump wiring connector (see Section 2).

**11** Press the SELECT and RESET buttons on the instrument cluster simultaneously, then turn the ignition switch ON, keeping the SELECT and RESET buttons pressed for at least 8 seconds – all displays on the meter should disappear except for the clock and tripmeter.

**12** Select the diagnostic mode by pressing

the SELECT button until DIAG appears on the clock LCD. **Note:** The CO adjustment mode will appear as an option at this stage. Confirm the selection of DIAG by pressing the SELECT and RESET buttons simultaneously for 2 seconds.

**13** Turn the engine stop switch OFF.

**14** Referring to Table 1 above, verify the diagnostic code that corresponds with the fault code originally displayed. Now press the SELECT or RESET button until the appropriate diagnostic code is displayed on the clock LCD. The SELECT button scrolls through the code numbers in ascending order, the RESET button scrolls through the numbers in descending order. The corresponding operating data, as found, is displayed on the trip LCD.

**15** Select the diagnostic code on Table 2, and the corresponding operating data, to identify the test action required. Note that in some instances it will be necessary to turn the engine stop switch ON to verify the operating data.

**16** After each check the ignition switch must be turned OFF and the set-up procedure repeated for subsequent checks.

**17** To cancel the diagnostic mode, turn the ignition switch OFF.